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SeqStudio™ Flex Series Genetic Analyzer with Instrument Software v1.1.1 USER GUIDE

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When used for purposes other than Human Identification the instruments cited are for Research Use Only. Not for use in diagnostic procedures.





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Revision	Date	Description
С	24 July 2023	Updated with the following changes for software version 1.1.1.
		 Added information that library objects that are included in plate files must be identical in Plate Manager v2.1.1 software and in the instrument software.
		Added information about the enhancements that have been made to the auto-spectral calibration algorithm.
		Added "Edit a dye set" on page 289.
		Removed the section called "Functions that are not available when the SAE module is enabled" because all functions listed in the previous version are now available.
		The names of three new size standard definitions for HID secondary analysis were added.
		The text of the footer that appears in reports was added.
В	21 April 2023	HID applications for the SeqStudio™ Flex Series Genetic Analyzer with Instrument Software v1.1 and SeqStudio™ Plate Manager software (v2.1 or later) were added.
		Instructions were revised to recommend weekly instrument maintenance for HID applications.
		Thermo Fisher Connect was updated to Thermo Fisher™ Connect Platform.
		 Instructions to view injection group details and/or well attributes were added (see "(Optional) View injection group details and/or well attributes" on page 93).
		• Instructions were revised to recommend at least two cloud administrators for each instrument (see "Administrator set up for the Thermo Fisher™ Connect Platform" on page 212 and "Thermo Fisher™ Connect Platform (cloud) administrator functions" on page 233).
		 Pass/fail criteria and results for the fragment/HID install checks were updated (see "View fragment/HID analysis install run results" on page 351).
		Instructions to set up Demo mode when SAE is enabled were added (see "Enable and set up Demo mode (SAE enabled)" on page 466).
		Laser specifications were updated (see "Operating specifications" on page 541).
		 Safety standards were updated to include IEC 60825-1: 2014+A11:2021 (see "Safety standards" on page 563).
А	26 January 2022	New document for SeqStudio™ Flex Series Genetic Analyzer with Instrument Software v1.0.

The information in this guide is subject to change without notice.

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Contents

CHAPTER 1 Product information	16
Product description	16
Precautions for use	17
Instrument components	18
Instrument interior components	21
Power and communication connections	22
Theory of operation	23
Preparing the instrument	. 23
Preparing samples	. 23
During a run	. 24
Results	. 24
Materials for routine operation	24
Instrument consumables handling, usage limits, and expiration	25
Configuring the instrument to prevent the use of consumables beyond	
expiration and usage limits	
Important notice regarding use of consumables that exceed supported limits	
Buffer storage, usage, and limits	
Polymer storage, usage, and limits	
Conditioning reagent storage, usage, and limits	
Capillary array storage and usage	
Hi-Di [™] Formamide storage and usage	
About the SeqStudio [™] Flex Series Instrument Software v1.1.1	
Profile and sign in options	
Parts of the software	
Companion software	
Secondary analysis software	
Network connection options	. 52
Network and password security requirements	53
Network configuration and security	53
Password security	53

CHAPTER 2 Get started	54
Sign in	54
Profile and sign in options	56
Create a local profile (one time only)	56
Sign in	58
Switch user or sign out	60
Sign in (if another user is signed in)	61
Workflow: Create a plate, start and monitor a run, then view results	63
Prepare the instrument	65
Review upcoming maintenance	65
Check consumables status	67
Check instrument status	68
Preheat the instrument oven and the detection cell	68
Check for leaks and spills	
Check buffer fill levels	71
Replenish consumables	72
Ensure proper installation of CBC septa	
Control the LED light, speaker volume, and screen brightness	73
CHAPTER 3 Prepare the samples	74
Sample preparation guidelines	74
Plate and strip-tube layout	76
Prepare and assemble sample plates	77
Prepare sample plates	
Prepare the plate assembly	78
CHAPTER 4 Create a plate file on the instrument	84
Create, copy, or import a plate file	84
Options for creating plate files	84
Create a plate file	85
Copy a plate file	86
Import a plate file	87
Enter plate properties	89
Enter injection properties	
(Optional) View injection group details and/or well attributes	
Specify replicate injections	
Enter sample names, sample types, and custom fields	95

CHAPTER 5	(Optional) Create a plate file in the Plate Manager software	. 97
Avail	able Plate Manager software platforms	. 97
Get s	started with the Plate Manager software (desktop)	. 98
	About the software (desktop)	98
	Access the Plate Manager software (desktop)	102
	Parts of the Plate Manager software (desktop) home screen	103
	Connect the Plate Manager software (desktop) to an instrument	105
Get :	started with the Plate Manager software (cloud)	. 107
	About the SeqStudio [™] Plate Manager software (Thermo Fisher [™] Connect Platform)	107
	Access the Plate Manager software (cloud)	
	Parts of Plate Manager software (cloud) home screen	
	Connect Plate Manager software (cloud) to an instrument	
Set u	ıp a plate file	116
	Create or open a plate file (PSM file)	
	Enter plate properties	117
	Enter sample and injection information	118
	Save a plate file (desktop)	120
Keyb	ooard shortcuts and examples	122
Set u	up cloud analysis in the Plate Manager software (cloud)	125
Print	the plate layout	. 126
	d a plate file to the Inbox on the instrument	
	tional functions in the Plate Manager software	
, 10.0.	Load or download an example plate file	
	Specify replicate injections (Add run module function)	
	Use the list view in the Plate tab	
	Define custom fields	
	Save a plate file in CSV format	130
	Export or download a plate file in PSM format	. 130
	Manage the software	. 132
CHAPTER 6	Start and monitor a run	136
Load	I and unload a plate	136
	Load a plate into the instrument	136
	Unload a plate from the instrument	139
Link	a plate file and start a run	. 140
Unlir	nk a plate file	. 144
Proc	esses that the instrument performs during a run	144
	run check messages and plate alerts during a run	
	Pre-run checks when a plate run starts or a re-injection or a cancelled	
	injection is added to the Run queue	
	Pre-run checks before each injection or when a paused run is resumed	146

Run plates with the automated barcode workflow	. 147
Create the plate files before the barcoded plates are loaded into the drawer	. 147
Pre-run checks and plate alerts in an automated barcode run	149
View alert and notification details	149
Auto-spectral calibration during an injection	. 150
Auto-spectral calibration overview	. 150
Auto-spectral calibration requirements	
View auto-spectral calibration results	. 152
View real-time results in the home screen	. 153
Pause the instrument in the home screen	157
Use the Run queue to monitor a run on the instrument	160
Parts of the Run Queue screen	. 160
View real-time results in the Run Queue screen	
Change the injection list order	
Cancel or add injections or specify re-injections in the Run Queue screen	
Pause the instrument in the Run Queue screen	. 166
CHAPTER 7 View results on the instrument	169
Options for viewing results on the instrument	. 169
View results for a completed run (Run history)	. 170
Export results from the instrument – Results and data files, logs, and reports	. 171
Sample QC and quality alerts	172
Use the electropherogram screen	
Sequence analysis results	
Parts of the sequencing electropherogram screen	
Sequencing results and well details	
Understanding Quality Values (QVs)	
Fragment/HID analysis results	179
Parts of the fragment/HID analysis electropherogram screen	. 179
Fragment/HID analysis results and well details	180
CHAPTER 8 (Optional) Use the Remote Monitoring software	182
Monitor a run from the Remote Monitoring software	. 182
Open the Remote Monitoring software from the Plate Manager software (cloud) .	182
Open the Remote Monitoring software from the InstrumentConnect software	184
Parts of the Remote Monitoring software home screen	185
Plate file requirements for viewing analyzed and cloud results	. 187
View instrument notifications in your Thermo Fisher™ Connect Platform account.	
Set up email notifications from the instrument	
View real-time results in the Remote Monitoring software	
Sequencing results	
Fragment/HID analysis results	. 192

Cancel injections or specify re-injections in the Remote Monitoring software Pause the instrument from the Remote Monitoring screen, resume from the	. 192
instrument home screen	. 193
Monitor a run from a mobile device	. 193
Register the instrument with the InstrumentConnect app	
Monitor a run from a mobile device	. 194
View results in the Remote Monitoring software	. 199
View results for a completed run in the Remote Monitoring software (Run History tab)	
Export a results report from the Remote Monitoring software	. 202
Download results from the Remote Monitoring software	. 202
Viewing spectral calibration or install run results in the Remote Monitoring software	. 203
Use cloud analysis in the Remote Monitoring software	. 203
Automated cloud analysis with secondary analysis software	. 203
Workflow: cloud analysis	
Set up cloud analysis for a completed run in the Remote Monitoring software	
Access cloud analysis results from the Remote Monitoring software	. 208
CHAPTER 9 Use the instrument with the Thermo Fisher™	
Connect Platform	211
Overview of the Thermo Fisher™ Connect Platform features	. 212
Administrator set up for the Thermo Fisher™ Connect Platform	. 212
User setup for the Thermo Fisher™ Connect Platform	. 214
Local profile and cloud profile: when to use, user name, and user initials	. 215
Sign in to apps.thermofisher.com and access the InstrumentConnect software	. 217
(One time) Link your Thermofisher.com account to the instrument	. 218
Connect the instrument to your Thermofisher.com account	
Link a local profile to your Thermofisher.com account (one time)	
Sign in to the instrument with a cloud profile	
Re-link the instrument to your cloud profile	
Disconnect the instrument from your Thermofisher.com account	
Disconnect using the InstrumentConnect software	
Disconnect using the instrument software	
Change your cloud profile PIN	
Set up email notifications from the instrument	
Tasks for the cloud administrator of an instrument	
Enable or disable Thermo Fisher™ Connect Platform access on the instrument (administrator only)	
Thermo Fisher™ Connect Platform (cloud) administrator functions	
Manage the users and administrators of your instrument	
Change the instrument name in the InstrumentConnect software (cloud	. 20-
administrator only)	. 235

For more information on using the Thermo Fisher™ Connect Platform	235
Use Alexa [™] voice commands	236
Enable (register) the voice command function	. 236
Disable the voice command function	. 236
Use voice commands	. 237
Basic voice commands	238
Interactive voice command—start run	
Microphone icon () indicators for voice commands	. 240
CHAPTER 10 Use the instrument with the SAE Administrator Console	. 242
Overview of the Security, Auditing, and E-signature (SAE) v2.1 module components .	243
Configuring the SAE module and setting permissions	244
Enable SAE mode on the instrument and specify the SAE server (administrator only) .	. 245
Disable SAE mode on the instrument (administrator only)	. 247
Sign in to the instrument with SAE enabled	248
Audit reason requirements	. 249
E-signature requirements for starting a spectral, install, or regular run	. 249
Sign an object before a regular run is started	
Sign an object when a regular run is started	
Signing during an automated barcode run	
Displaying signatures	
Use the instrument when the SAE server is offline	
SAE error messages and actions	
O/ LE O// O/ INCOSAGO DE AND ADMONDE	200
CHAPTER 11 Manage library resources on the instrument	257
Overview of libraries	257
General library procedures	. 259
Create a new entry from a factory-provided or locked entry	. 259
Lock or unlock a library entry	
Copy a library entry	
Edit a library entry	
Import a library entry	
Export a library entry	
Filter library lists Delete a library entry	
Plate files library	
Plate file definition	
Create a plate file	
Define custom fields	
Export or delete a plate file	
Import a plate setup from a CSV or PSM file	. 267
Plate file Properties tab	. 268

Plate file Plate tab	269
Plate file Edit Injection Properties screen	270
Plate file Edit Well Properties screen (sample name entry)	273
Run modules library	274
Run module overview	274
Run modules provided	274
Create a new run module	275
Run module settings	276
Size standards library	278
Size standard overview	
Size standard definition files provided	
Create a new size standard	
Modify a factory-provided normalization size standard	
Size standard normalization feature	
File Name Conventions library	
File name convention overview	
Create a new file name convention	
File name convention settings	
Injection protocols library	
Injection protocols library	
Create a new injection protocol	
Injection protocol settings	
Dye sets library	
Dye set overview	
Create a new dye set	
Create a custom dye set	
Edit a dye set	
Dye set settings	
Analysis settings library	
Analysis settings overview	
Create a new analysis settings	
Analysis settings—Sequencing	294
Analysis settings—Fragment/HID analysis	297
Results Groups library	304
Results group overview	304
Create a new results group	304
CHAPTER 12 Run calibrations and install checks	306
Run a spatial calibration	306
Spatial calibration overview	
When to perform a spatial calibration	
Perform a spatial calibration	
Evaluate the spatial calibration results	
·	

	Example spatial profiles	010
	Export spatial calibration results or report	311
	Run a spectral calibration	312
	Overview of spectral calibration	312
	When to perform a spectral calibration	313
	System dye sets versus custom dye sets	314
	Using BigDye [™] Direct Cycle Sequencing Kit chemistry	314
	Estimated spectral calibration run times	315
	Prepare for custom dye set spectral calibration	316
	Prepare for spectral calibration	316
	Perform a spectral calibration	
	View spectral calibration results	
	Example spectral calibration data	
	Export spectral calibration logs or report	
	View and export the spectral calibration history	331
	Perform an install run	333
	Overview of install run	
	When to perform an install run	
	Estimated install run times	
	Prepare for the install run	
	Perform an install run	
	View sequencing install run results	
		0.54
	View fragment/HID analysis install run results	
	View fragment/HID analysis install run results	
	·	357
•	View, export, or delete an install run history	357 360
•	View, export, or delete an install run history	357 360
•	View, export, or delete an install run history CHAPTER 13 Maintain the instrument Maintenance schedule	357 360 360
	View, export, or delete an install run history CHAPTER 13 Maintain the instrument Maintenance schedule Review upcoming maintenance	357 360 360 361 362
•	View, export, or delete an install run history CHAPTER 13 Maintain the instrument Maintenance schedule Review upcoming maintenance Daily instrument maintenance tasks	357 360 360 361 362 363
	View, export, or delete an install run history CHAPTER 13 Maintain the instrument Maintenance schedule Review upcoming maintenance Daily instrument maintenance tasks Monthly instrument maintenance tasks	357 360 361 362 363
•	View, export, or delete an install run history CHAPTER 13 Maintain the instrument Maintenance schedule Review upcoming maintenance Daily instrument maintenance tasks Monthly instrument maintenance tasks Annual planned maintenance tasks	357 360 361 362 363 364
•	View, export, or delete an install run history CHAPTER 13 Maintain the instrument Maintenance schedule Review upcoming maintenance Daily instrument maintenance tasks Monthly instrument maintenance tasks Annual planned maintenance tasks As-needed instrument maintenance tasks	357 360 361 362 363 364 364
•	View, export, or delete an install run history CHAPTER 13 Maintain the instrument Maintenance schedule Review upcoming maintenance Daily instrument maintenance tasks Monthly instrument maintenance tasks Annual planned maintenance tasks As-needed instrument maintenance tasks Maintenance wizard overview	357 360 360 361 363 364 364 366
•	View, export, or delete an install run history CHAPTER 13 Maintain the instrument Maintenance schedule Review upcoming maintenance Daily instrument maintenance tasks Monthly instrument maintenance tasks Annual planned maintenance tasks As-needed instrument maintenance tasks Maintenance wizard overview Clean the instrument Export consumables log files	357 360 361 362 364 364 364 366
•	View, export, or delete an install run history CHAPTER 13 Maintain the instrument Maintenance schedule Review upcoming maintenance Daily instrument maintenance tasks Monthly instrument maintenance tasks Annual planned maintenance tasks As-needed instrument maintenance tasks Maintenance wizard overview Clean the instrument	357 360 360 361 363 364 364 366 368
•	View, export, or delete an install run history CHAPTER 13 Maintain the instrument Maintenance schedule Review upcoming maintenance Daily instrument maintenance tasks Monthly instrument maintenance tasks Annual planned maintenance tasks As-needed instrument maintenance tasks Maintenance wizard overview Clean the instrument Export consumables log files Install buffers (wizard)	357 360 360 361 363 364 364 366 368 369
•	View, export, or delete an install run history CHAPTER 13 Maintain the instrument Maintenance schedule Review upcoming maintenance Daily instrument maintenance tasks Monthly instrument maintenance tasks Annual planned maintenance tasks As-needed instrument maintenance tasks Maintenance wizard overview Clean the instrument Export consumables log files Install buffers (wizard) Install the anode buffer container (ABC) Install the cathode buffer container (CBC)	357 360 360 361 362 364 364 366 368 369 369
•	View, export, or delete an install run history CHAPTER 13 Maintain the instrument Maintenance schedule Review upcoming maintenance Daily instrument maintenance tasks Monthly instrument maintenance tasks Annual planned maintenance tasks As-needed instrument maintenance tasks Maintenance wizard overview Clean the instrument Export consumables log files Install buffers (wizard) Install the anode buffer container (ABC) Install the cathode buffer container (CBC) Replenish, change, flush, and store polymer (wizards)	357 360 360 361 363 364 364 366 368 369 372
•	CHAPTER 13 Maintain the instrument Maintenance schedule Review upcoming maintenance Daily instrument maintenance tasks Monthly instrument maintenance tasks Annual planned maintenance tasks As-needed instrument maintenance tasks Maintenance wizard overview Clean the instrument Export consumables log files Install buffers (wizard) Install the anode buffer container (ABC) Install the cathode buffer container (CBC) Replenish, change, flush, and store polymer (wizards) Precautions for use	357 360 360 361 363 364 364 368 369 375 375
•	View, export, or delete an install run history CHAPTER 13 Maintain the instrument Maintenance schedule Review upcoming maintenance Daily instrument maintenance tasks Monthly instrument maintenance tasks Annual planned maintenance tasks As-needed instrument maintenance tasks Maintenance wizard overview Clean the instrument Export consumables log files Install buffers (wizard) Install the anode buffer container (ABC) Install the cathode buffer container (CBC) Replenish, change, flush, and store polymer (wizards)	357 360 360 361 362 364 364 364 366 368 369 375 375

Change and store a capillary array (wizards)	377
Parts of the capillary array	
Install or change the capillary array (wizards)	380
Store a capillary array	381
Maintain the pump (wizards)	382
Parts of the polymer delivery pump	
Avoiding damage to the pump assembly	
Remove bubbles from the polymer pump (wizard)	
Wash the pump chamber and channels (wizard)	
Flush the water trap (pump trap)	
Shut down, move, and reactivate the instrument	387
Shutdown the instrument (wizard)	
Move and level the instrument	
Reactivate the instrument (wizard)	
Maintenance wizard procedures	
Change Capillary Array maintenance wizard	
Change Polymer Type (with change array option) maintenance wizard	
Fill Array with Polymer maintenance wizard	
Remove bubbles maintenance wizard	
Spatial Calibration maintenance wizard	
Replenish Buffers maintenance wizard	
Wash Pump and Channels maintenance wizard	
Replenish Polymer maintenance wizard	
Shut Down Instrument maintenance wizard	
Reactivate Instrument maintenance wizard	434
CHAPTER 14 Manage the software (instrument)	446
Connect the instrument to a computer or network (hardware connections)	
Wired and wireless network options	
Wired and wireless network connections on the instrument	
Antivirus recommendations for direct connection of the computer to the instrument	
Connect the instrument directly to a computer	
Connect the software to a network drive (software settings)	
Determine the IP address for a computer on a network	
Create folders and enable network folder sharing	
Connect the instrument to a network drive (software)	
Manage sign-in profiles	
Local profile roles (standard and administrator) and functions	
Change the role of a local profile (administrator only)	
Edit your own local profile	454
Delete a local profile or a cloud profile from an instrument (administrator only)	
Create a local profile (one time only)	
Change your own local profile PIN	458

	Manage settings	458
	Display instrument hardware and software information	459
	Configure consumables usage and warnings (administrator only)	460
	Set up email notifications from the instrument	461
	Enable SAE mode on the instrument and specify the SAE server	400
	(administrator only)	
	Enable and set up Demo mode (SAE disabled)	
	Enable and set up Demo mode (SAE enabled)	
	Enable/disable the internal barcode reader (administrator only)	
	Set the power save duration (administrator only)	469
	Enable or disable Thermo Fisher™ Connect Platform access on the instrument (administrator only)	469
	Manage instrument settings	
	Change the instrument name (administrator only)	471
	Manage date and time settings (administrator only)	
	Update the software (administrator only)	
	Manage the network configuration (administrator only)	
	Select a language (local administrator or SAE administrator only)	475
	Configure, check status, and cancel background exports and backups	475
	Set the default save location for results	477
	Manage storage space	477
	Automatic file cleanup (autopurge)	
	Export results from the instrument - Results and data files, logs, and reports	478
	Delete a run history	478
	Back up user data (instrument settings, library items, and results) (administrator only)	479
	(administrator only)	
-	(administrator only)	480
	(administrator only) APPENDIX A Troubleshooting Troubleshooting workflow	480
	(administrator only) APPENDIX A Troubleshooting Troubleshooting workflow Troubleshooting resources	480 481
	(administrator only) APPENDIX A Troubleshooting Troubleshooting workflow Troubleshooting resources Use Smart Help to request assistance from Technical Support or Service	480 481 483
	(administrator only) APPENDIX A Troubleshooting Troubleshooting workflow Troubleshooting resources	480 481 483
	(administrator only) APPENDIX A Troubleshooting Troubleshooting workflow Troubleshooting resources Use Smart Help to request assistance from Technical Support or Service	480 483 483
-	(administrator only) APPENDIX A Troubleshooting Troubleshooting workflow Troubleshooting resources Use Smart Help to request assistance from Technical Support or Service Start a remote support session Inspect the data—Troubleshooting procedures Review the analyzed data	480 483 483 484 485
-	(administrator only) APPENDIX A Troubleshooting Troubleshooting workflow Troubleshooting resources Use Smart Help to request assistance from Technical Support or Service Start a remote support session Inspect the data—Troubleshooting procedures Review the analyzed data View the raw data and the EPT plot	480 481 483 484 485 485
	(administrator only) APPENDIX A Troubleshooting Troubleshooting workflow Troubleshooting resources Use Smart Help to request assistance from Technical Support or Service Start a remote support session Inspect the data—Troubleshooting procedures Review the analyzed data View the raw data and the EPT plot Check size standard quality (fragment/HID analysis)	480 481 483 484 485 485
	(administrator only) APPENDIX A Troubleshooting Troubleshooting workflow Troubleshooting resources Use Smart Help to request assistance from Technical Support or Service Start a remote support session Inspect the data—Troubleshooting procedures Review the analyzed data View the raw data and the EPT plot	480 483 483 485 485 485
	(administrator only) APPENDIX A Troubleshooting Troubleshooting workflow Troubleshooting resources Use Smart Help to request assistance from Technical Support or Service Start a remote support session Inspect the data—Troubleshooting procedures Review the analyzed data View the raw data and the EPT plot Check size standard quality (fragment/HID analysis) Check size standard quality (fragment/HID analysis) in the Remote	480 483 483 484 485 485 485
	APPENDIX A Troubleshooting Troubleshooting workflow Troubleshooting resources Use Smart Help to request assistance from Technical Support or Service Start a remote support session Inspect the data—Troubleshooting procedures Review the analyzed data View the raw data and the EPT plot Check size standard quality (fragment/HID analysis) Check size standard quality (fragment/HID analysis) in the Remote Monitoring software	480 483 483 485 485 485 485
	APPENDIX A Troubleshooting Troubleshooting workflow Troubleshooting resources Use Smart Help to request assistance from Technical Support or Service Start a remote support session Inspect the data—Troubleshooting procedures Review the analyzed data View the raw data and the EPT plot Check size standard quality (fragment/HID analysis) Check size standard quality (fragment/HID analysis) in the Remote Monitoring software Inspect the instrument —Troubleshooting procedures	480 483 483 485 485 486 486 489
	APPENDIX A Troubleshooting Troubleshooting workflow Troubleshooting resources Use Smart Help to request assistance from Technical Support or Service Start a remote support session Inspect the data—Troubleshooting procedures Review the analyzed data View the raw data and the EPT plot Check size standard quality (fragment/HID analysis) Check size standard quality (fragment/HID analysis) in the Remote Monitoring software Inspect the instrument—Troubleshooting procedures View the instrument sensor details and EPT plot	480 483 483 485 485 485 485 485 486 487 489
	APPENDIX A Troubleshooting Troubleshooting workflow Troubleshooting resources Use Smart Help to request assistance from Technical Support or Service Start a remote support session Inspect the data—Troubleshooting procedures Review the analyzed data View the raw data and the EPT plot Check size standard quality (fragment/HID analysis) Check size standard quality (fragment/HID analysis) in the Remote Monitoring software Inspect the instrument —Troubleshooting procedures View the instrument sensor details and EPT plot Check the pump for bubbles or debris	480 481 483 485 485 485 486 486 489
	APPENDIX A Troubleshooting Troubleshooting workflow Troubleshooting resources Use Smart Help to request assistance from Technical Support or Service Start a remote support session Inspect the data—Troubleshooting procedures Review the analyzed data View the raw data and the EPT plot Check size standard quality (fragment/HID analysis) Check size standard quality (fragment/HID analysis) in the Remote Monitoring software Inspect the instrument —Troubleshooting procedures View the instrument sensor details and EPT plot Check the pump for bubbles or debris Additional troubleshooting procedures	480 483 483 485 485 486 487 489 492 492

Run self tests to check the touchscreen, speakers, microphone, and	404
proximity sensor Power off or power on the instrument	
Instrument interior components	
QC error and alert troubleshooting	
QC errors—Sequencing and fragment analysis	
QC errors—Sequencing	
QC errors—Fragment/HID analysis	
QC errors—Spectral calibration (manual)	501
QC errors—Sequencing or fragment/HID analysis install run	502
Cloud analysis troubleshooting	503
Consumables troubleshooting	503
Home screen and general instrument software troubleshooting	504
Install run troubleshooting	506
Instrument troubleshooting	507
Library troubleshooting	508
Maintenance wizard troubleshooting	509
Plate troubleshooting	509
Plate file troubleshooting	509
Plate Manager software troubleshooting	510
Remote Monitoring software troubleshooting	513
RFID troubleshooting	
Run troubleshooting	
-	
Plate alert troubleshooting (automated barcode workflow)	517
Run history troubleshooting	519
Run queue troubleshooting	519
SAE troubleshooting	519
Sample and data troubleshooting	520
Sequencing and fragment/HID applications	521
Sequencing applications	525
Fragment analysis applications	527
Settings screen troubleshooting	527
Sign in troubleshooting	528
Software troubleshooting	529
Spatial calibration troubleshooting	530
Spectral calibration troubleshooting	531
Thermo Fisher™ Connect Platform troubleshooting	532
Voice command troubleshooting	533

	APPENDIX B Run modules and dye sets	. 534
	Run modules, read lengths, size ranges, and run times	534
	Dye sets	
	APPENDIX C Instrument specifications	. 539
	7.1. 2.1.2.3. Companient operations in the second s	000
	Instrument dimensions and clearance	
	Operating specifications	
	Environmental requirements	
	Electrical requirements	
	Wired and wireless network options and requirements	
	Network and firewall requirements	
	Power and communication connections	545
	APPENDIX D Catalog numbers	547
	Plates bases retainers and septa	547
	Instrument consumables	548
	Sequencing analysis reagents and consumables	548
	Fragment/HID analysis reagents	549
•	APPENDIX E Radio Frequency Identification (RFID) technology	
	RFID precautions for use	
	Locations of RFID read/write units	
	RFID function	
	RFID specifications	
	RFID troubleshooting	553
	APPENDIX F Safety	554
	Symbols on this instrument	554
	Standard safety symbols	555
	Location of safety labels	
	Control and connection symbols	
	Conformity symbols	
	Safety information for instruments not manufactured by Thermo Fisher Scientific	
	Instrument safety	
	General	
	Electrical safety	
	Cleaning and decontamination	
	Instrument component and accessory disposal	
	•	

	Safety and electromagnetic compatibility (EMC) standards	562
	Safety standards	
	EMC standards	563
	Environmental design standards	564
	Radio compliance standards	564
	Chemical safety	565
	Biological hazard safety	566
APPE	ENDIX G Documentation and support	567
- AFFL	• •	
- AFFL	Related documentation	567
- AFFL	Related documentation	
- AFFL		567



Product information

Product description	16
Theory of operation	23
Materials for routine operation	24
Instrument consumables handling, usage limits, and expiration	25
About the SeqStudio [™] Flex Series Instrument Software v1.1.1	29
Network connection options	52
Network and password security requirements	53

IMPORTANT! Before using this product, read and understand the information in the "Safety" appendix in this document.

Product description

The SeqStudio™ 8 Flex Genetic Analyzer and the SeqStudio™ 24 Flex Genetic Analyzer are fluorescence-based DNA analysis instruments using capillary electrophoresis technology with 8 or 24 capillaries.

The product (8-capillary model Cat. No. A50369, 24-capillary model Cat. No. A50370) includes the following components:

- Instrument
- 8-capillary or 24-capillary array and POP™ polymer
- Reagents and consumables for your application and for system qualification
- Integrated software for instrument control, data collection, quality control, basecalling, and sizecalling of samples



IMPORTANT! The protection provided by the equipment may be impaired if the instrument is operated outside the environment and use specifications, the user provides inadequate maintenance, or the equipment is used in a manner not specified by the manufacturer (Thermo Fisher Scientific).

IMPORTANT! Observe current good clinical and laboratory practices when using this instrument.

Precautions for use



WARNING! Radio frequency identification (RFID) could possibly disrupt the operation of patient-worn and/or implanted active medical devices. To minimize such effects, do not come within 10 cm of this instrument if you have a patient-worn and/or implanted active medical device.

Instrument components



Figure 1 Parts of the instrument

- 1 Pump compartment
- ② Microphones
- ③ On/Off
- 4 Proximity sensor
- 5 Speakers
- 6 Drawer compartment

- 7 USB ports
- 8 Touchscreen
- 9 Blue LED
- (1) Capillary array, detection cell, detection cell heater, and oven compartment

Part	Function		
Pump compartment (see Figu	re 2 on page 21 for a detailed figure of the pump compartment)		
Anode buffer container (ABC)	Contains 1X running buffer to support all electrophoresis applications on the instrument. Has a built-in overflow chamber to maintain constant fluid height.		
Polymer delivery pump (PDP)	Pumps polymer into the array and allows for automated maintenance procedures. Includes the displacement pump chamber, polymer chambers, piston water seal, capillary array port, check valve fitting, water trap waste container, buffer valve, anode electrode, buffer gasket, and holds the anode buffer container.		
Polymer pouch or conditioning	Polymer pouch—Supplies polymer to the polymer delivery pump.		
reagent pouch	 Conditioning reagent pouch—Used for washing the polymer pump and capillary array during polymer type changes, and during instrument shut down. Has adequate volume for a one-time use. 		
Cathode buffer container (CBC)	Contains 1X running buffer to support all electrophoresis applications on the instrument.		
Drawer compartment			
Plate holders	Contains positions for up to four plates that correspond to positions A, B, C, and D on the home screen of the software. The drawer can be opened when the instrument is running to add and remove sample plates. The order in which plates are run can be controlled by the user or can be automated using the bar code workflow.		
Internal barcode reader (not shown)	Scans the barcodes on plates to support an automated workflow.		
Capillary array and detection array compartment)	cell compartment (see Figure 2 on page 21 for a detailed figure of the capillary		
Capillary array	Enables the separation of the fluorescent-labeled DNA fragments by electrophoresis. It is a consumable that is available with 8 or 24 capillaries.		
Oven/oven door	Maintains uniform capillary array temperature.		
Detection cell	Allows detection of the fluorescent-labeled DNA fragments.		
Detection cell heater	Maintains uniform detection cell temperature.		
Other components			
Touchscreen	Allows interaction with the instrument using tap and swipe actions.		
Blue LED	Indicates proper operation of the instrument. Flashes amber if there is a problem with operation.		
Speakers, microphone, and proximity sensor	For use with voice commands and instructional videos. For information, see "Use Alexa™ voice commands" on page 236.		

Chapter 1 Product information Product description

(continued)

Part	Function	
Radio frequency identification (RFID) tags (not shown in figure)	RFID tags on the following primary instrument consumable labels are detected by read/write units in the instrument interior:	
For more information, see Appendix E, "Radio Frequency Identification (RFID) technology".	 Capillary array Anode buffer container (ABC) Cathode buffer container (CBC) POP™ polymer The instrument reads and tracks the following information: Lot numbers Serial numbers Dates (expiration) Capacity (usage) RFID tags are read and written in response to a user action (for example, running a wizard or starting a run). All dashboard values are updated when RFID tags are read and written. The days on instrument is also updated automatically every 6 minutes. 	

Instrument interior components

Figure 2 and Figure 3 are provided below for reference in this section. See also page 382 and "Parts of the capillary array" on page 378.

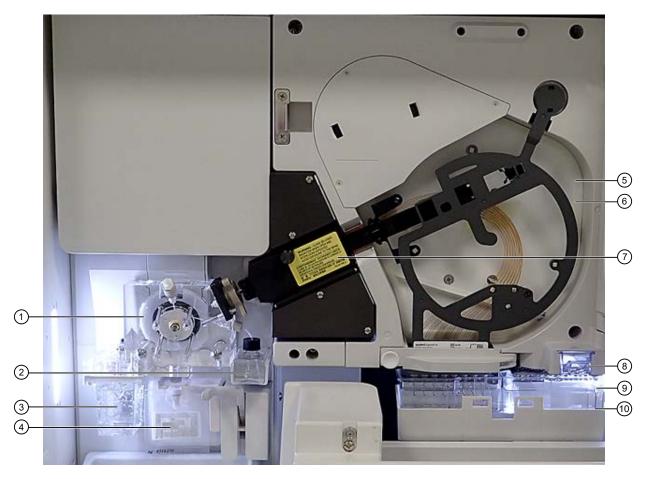


Figure 2 Instrument interior (includes the pump compartment and capillary array compartment)

- 1 Polymer delivery pump (PDP)
- 2 Water trap waste container
- 3 Anode buffer container (ABC)
- 4 Polymer or conditioning pouch
- (5) Oven compartment (the oven door is open and not shown)
- 6 Capillary array
- (7) Detection cell heater (with the door closed)
- (8) Oven condensation reservoir
- (9) Cathode buffer container (CBC)
- (10) CBC autosampler



Figure 3 Detection cell heater with the door open and a capillary array installed. The detection cell in the capillary array is shown in the red box.

Power and communication connections

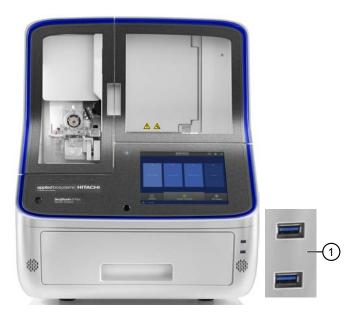


Figure 4 Instrument front panel connections

① USB ports used for transferring data

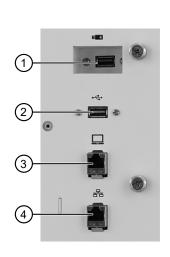




Figure 5 Instrument rear panel connections

- (1) Recessed USB port (for use with the wireless network adapter; adapter not shown)
- 2 USB port (for optional USB barcode scanner connection)
- ③ Direct connection port ____ (to allow computer connection without a network)
- ④ Wired network port 器
- (5) Circuit breaker (rear power switch; use the power switch on the front panel for normal operation)
- 6 Power receptacle

Theory of operation

Preparing the instrument

The following runs are required to prepare the instrument for routine operation. After initial preparation these runs are not required unless a new capillary array is installed or a new dye set/polymer combination will be used.

- **Spatial calibration**—Associates the signal from each capillary to a specific position on the CCD camera. For more information, see "Run a spatial calibration" on page 306.
- **Spectral calibration**—Generates a matrix for each capillary that compensates for dye overlap and is used to convert the 20–color data into 4-, 5-, or 6-dye data. For more information, see "Run a spectral calibration" on page 312.
- **Install run**—Ensures that the instrument meets specifications for the application types being run. For more information, see "Perform an install run" on page 333.

Preparing samples

When DNA samples are prepared for sequencing and fragment/HID analysis on the instrument, fluorescent dyes are attached to the DNA.

During a run

During a run, the instrument:

- Prepares the capillaries by pumping fresh polymer under high pressure from the polymer delivery pump to the waste position in the cathode buffer container (CBC).
- Electrokinetically injects the sample into the capillaries by briefly applying a low voltage.
- Washes the capillary tips in the rinse position of the CBC, then returns the capillary to the buffer position of the CBC.
- Ramps the voltage up to a constant level.

A high electric field is created between the ground end of the anode buffer container (ABC) and the negative voltage applied to the load header of the capillary array. This field pulls the negatively charged DNA through the separation polymer. The smaller fragments migrate faster than the larger fragments and reach the detector first.

To ensure optimal separation and maintain denaturation of the DNA, the capillaries are thermally controlled in the oven and in the detection cell. The oven has a Peltier heat unit and fan-circulated air.

In the detection cell, the dyes attached to DNA are excited by a narrow beam of laser light. The laser light is directed into the plane of the capillaries from both the bottom and top. A small amount of laser light is absorbed by the dyes and emitted as longer wavelength light in all directions.

- Captures the fluorescent light on the instrument optics while blocking the laser light. The light
 passes through a transmission grating, which spreads the light out. The light is imaged onto a
 cooled CCD array. For each capillary, 20 zones on the CCD are collected to provide 20-color data
 for each capillary.
- Converts the 20-color data into multi-dye data for the entire run. For sequencing applications,
 4 different dyes are used to determine the 4 bases A, G, C and T. For fragment/HID analysis applications, up to 6 dyes can be used to determine fragment sizes in a single run.

Results

The software generates an electropherogram (intensity plot) for each dye based on the migration of DNA fragments over the run and generates primary analysis results:

- For sequencing applications, the electropherogram is adjusted to compensate for slight mobility differences due to the dyes, then basecalling is performed and quality values are assigned. Results are generated in AB1 file format.
- For fragment/HID analysis, the software uses the internal size standard to assign a fragment size to each peak and a sizing quality value to the sample. Results are generated in FSA file format.

Materials for routine operation

Materials for limited operation are provided when the instrument is installed. These materials are listed in "Instrument consumables handling, usage limits, and expiration" on page 25. For more information on ordering the materials for routine operation, you can do either of the following:

- See Appendix D, "Catalog numbers"
- · Contact your local representative

Instrument consumables handling, usage limits, and expiration

IMPORTANT! Before handling chemicals, read and understand all applicable Safety Data Sheets (SDSs) and use appropriate personal protective equipment (gloves, gowns, eye protection, etc). To obtain SDSs, see Appendix G, "Documentation and support".

IMPORTANT! Do not leave the instrument for more than 20 minutes without a pouch (polymer or conditioning reagent), buffers, array, and an array port plug installed. The capillary array and pump can dry out if these consumables are not installed.

IMPORTANT! Use only the parts listed in Appendix D, "Catalog numbers".

Containers and pouches are ready-to-use. Labels are embedded with a radio frequency identification (RFID) tag that the instrument uses to track usage and expiration date.

Configuring the instrument to prevent the use of consumables beyond expiration and usage limits

By default, the instrument is configured to allow the use of consumables beyond expiration and usage limits.

For information on changing the configuration, see "Configure consumables usage and warnings (administrator only)" on page 460.

Important notice regarding use of consumables that exceed supported limits

BEFORE DISMISSING THE WARNING THAT THE CONSUMABLES HAVE REACHED SUPPORTED LIMITS AND CONTINUING WITH OPERATION OF THE INSTRUMENT, PLEASE READ AND UNDERSTAND THE FOLLOWING IMPORTANT NOTICE AND INFORMATION:

Thermo Fisher Scientific does not recommend the use of consumables that exceed supported limits. The recommended limits are designed to promote the production of high-quality data and minimize instrument downtime. Reagent and consumable lifetime minimum performance are based on testing and studies that use reagents and consumables that have not exceeded supported limits.

The use of consumables beyond the supported limits may impact data quality or cause damage to the instrument or capillary array. The cost of repairing such damage is *NOT* covered by any Thermo Fisher Scientific product warranty or service plan. Customer use of expired consumables is at customer's own risk and without recourse to Thermo Fisher Scientific. For example, product warranties do not apply to defects resulting from or repairs required due to misuse, neglect, or accident including, without limitation, operation outside of the environmental or use specifications or not in conformance with Thermo Fisher Scientific instructions for the instrument system, software, or accessories.

Please see your specific service contract or limited product warranty for exact language regarding coverage and ask your Thermo Fisher Scientific representative if you have further questions.

Buffer storage, usage, and limits

Cat. No.	Description	Storage ^[1]
4393927	Anode Buffer Container 3500/Flex Series (ABC), 4 pack	2-8°C ^[2]
	Contains 1X running buffer	
4408256	Cathode Buffer Container 3500/Flex Series (CBC), 4 pack	2-8°C ^[2]
	Contains 1X running buffer	

 $[\]ensuremath{^{[1]}}$ See the expiration date on the label. Do not use expired product.

^[2] Buffers have been qualified to ship at ambient conditions. For a description of the qualification, go to http://find.thermofisher.com/ce/ambientbuffers/email?CID=fl-we18868.

Instrument	On-instrument supported limits Lower of:	Guidelines
8-capillary	14 days, 240 injections, or expiration date	The buffer has been verified for use for up to 14 days on
24-capillary	14 days, 100 injections, or expiration date	the instrument.

For the details on messages that are displayed, see "Check consumables status" on page 67.

Polymer storage, usage, and limits

Cat. No.	Description	Storage ^[1]
4393715	POP-4™ (384) Performance Optimized Polymer	2–8°C
4393710	POP-4™ (960) Performance Optimized Polymer	IMPORTANT! Do not freeze polymer.
4393717	POP-6™ (384) Performance Optimized Polymer	
4393712	POP-6™ (960) Performance Optimized Polymer	
4393708	POP-7™ (384) Performance Optimized Polymer	
4393714	POP-7™ (960) Performance Optimized Polymer	

^[1] See the expiration date on the label. Do not use expired product.

Pouch size	Instrument	On-instrument supported limits Lower of:	Guidelines
384 samples	8-capillary	14 days, 60 injections, or expiration date	The polymer has been verified for use for up to 14 days on the instrument at the following temperature ranges: • 15–25°C—POP-4™ and POP-7™
	24-capillary	14 days, 20 injections, or expiration date	 15–30°C—POP-6™ At higher temperatures, the limit is 7 days on the instrument.



(continued)

Pouch size	Instrument	On-instrument supported limits Lower of:	Guidelines
960 samples	8-capillary	14 days, 120 injections, or expiration date	The polymer has been verified for use for up to 14 days on the instrument at the following temperature ranges: • 15–25°C—POP-4™ and POP-7™
	24-capillary	14 days, 50 injections, or expiration date	 15–30°C—POP-6™ At higher temperatures, the limit is 7 days on the instrument.

Note: A polymer pouch includes a small reserve volume that is used for the **Remove bubbles** maintenance wizard, which consumes ~350 μ L of polymer. The reserve volume is sufficient to run the wizard ~4 times (including the remove bubbles step during other maintenance wizards). If you manually run the **Remove bubbles** maintenance wizard >4 times, the volume of polymer that is available for samples may be depleted.

For the details on messages that are displayed, see "Check consumables status" on page 67.

Conditioning reagent storage, usage, and limits

Cat. No.	Description	Storage ^[1]
4393718	Conditioning Reagent Kit 3500/Flex Series 1 ur	2–8°C
	(single-use)	After removing from storage, use the pouch within 24 hours.

^[1] See the expiration date on the label. Do not use expired product.

On-instrument supported limits	Guidelines
Single use or expiration date	See the expiration date on the label. See "Important notice regarding use of consumables that exceed supported limits" on page 25.

Capillary array storage and usage



WARNING! SHARP The electrodes on the load-end of the capillary array have small, blunt ends that can lead to piercing injury.

Cat No.	Description	Storage
A49104	Capillary array 36-cm SeqStudio™ 8 Flex	15–30°C
A49106	Capillary array 50-cm SeqStudio™ 8 Flex	
A49105	Capillary array 36-cm SeqStudio™ 24 Flex	
A49107	Capillary array 50-cm SeqStudio™ 24 Flex	

On-instrument supported limits	Guidelines
160 injections when used with Thermo Fisher Scientific reagents, or expiration	Capillary arrays have been verified for 160 injections when used with Thermo Fisher Scientific reagents.
date	If you remove a capillary array from the instrument for future use, see "Store a capillary array" on page 381.

Hi-Di™ Formamide storage and usage

Formamide is an injection solvent that is used to prepare samples. It is not a consumable that is installed on the instrument as are the other consumables listed in this section. It does not include an RFID tag on the label.

Cat. No.	Description	Storage ^[1]
4401457	5 mL	–25°C to −15°C
4440753	4 × 5 mL	If frequent sampling is required, dispense and freeze small aliquots of Hi-Di™ Formamide. To preserve quality, minimize freeze-thaw cycles and exposure to air and room temperature.
4311320	25 mL	Use of Hi-Di™ Formamide after 8 freeze/thaw cycles has not been validated.

 $^{^{[1]}}$ See the expiration date on the label. Do not use expired product.

About the SeqStudio™ Flex Series Instrument Software v1.1.1

The SeqStudio™ Flex Series Instrument Software v1.1.1 is the on-instrument, integrated touchscreen software that runs the SeqStudio™ Flex Series Genetic Analyzer.

The software includes the following features:

- Complete workflow, from plate file setup to review of primary analysis results
- Intuitive display of sample quality, run notifications, and consumables status
- 4-plate capacity, with interactive plate loading during runs
- Ability to prioritize the order of injections and plates
- Automated barcode workflow with the internal barcode reader and optional user-supplied external USB barcode reader
- Enhanced results accuracy with spectral autocalibration during every run
- Libraries to allow reuse of plate files, injection protocols, and other elements that are required to run plates
- On-instrument learning aids and assistance:
 - On-instrument tutorial videos with additional videos available on www.thermofisher.com
 - Demonstration mode that allows use of most features (see "Enable and set up Demo mode (SAE disabled)" on page 464 or "Enable and set up Demo mode (SAE enabled)" on page 466)
 - Step-by-step wizards for instrument maintenance procedures
 - Smart help and remote session features to request and obtain assistance from Technical Support (requires connection to Thermo Fisher™ Connect Platform)
- Optional connection to Thermo Fisher™ Connect Platform to access additional features:
 - Voice commands

Note: This feature is not supported for HID applications.

- Remote plate file creation
- Data storage on the cloud
- Remote run monitoring from the cloud or a mobile device
- Automated cloud analysis with Thermo Fisher Scientific sequencing and fragment analysis cloud apps

Note: This feature is not supported for HID applications.

- Optional use with the Security, Audit, and E-Signature (SAE) module for controlled user access
- Application programming interface (API) to allow automation of instrument and software functions

Profile and sign in options

The profile you use to sign in depends on your instrument configuration.

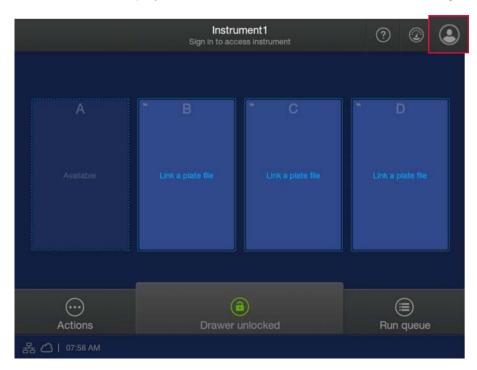
- Use a *local profile* for a standalone instrument. Most procedures in this user guide describe using the instrument when you are signed in with a local profile.
- Use a Thermo Fisher™ Connect Platform account (cloud profile) for an instrument that is connected to Thermo Fisher™ Connect Platform. For procedures that describe using the instrument when you are signed in with a cloud profile, see Chapter 9, "Use the instrument with the Thermo Fisher™ Connect Platform".
- Use an SAE account for an instrument that is configured for security, audit, and e-signature functions. For procedures that describe using the instrument when you are signed in with an SAE account, see Chapter 10, "Use the instrument with the SAE Administrator Console".

Create a local profile (one time only)

A profile that you create on the instrument is referred to as a *local profile*.

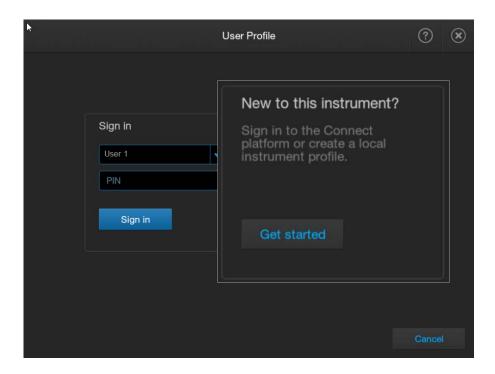
Note: If you will use the instrument with the Thermo Fisher™ Connect Platform, skip this step and connect the instrument to your Connect Platform account. See Chapter 9, "Use the instrument with the Thermo Fisher™ Connect Platform".

In the home screen, tap (Profile).
 If user initials are displayed instead of (Profile), see "Switch user or sign out" on page 34.

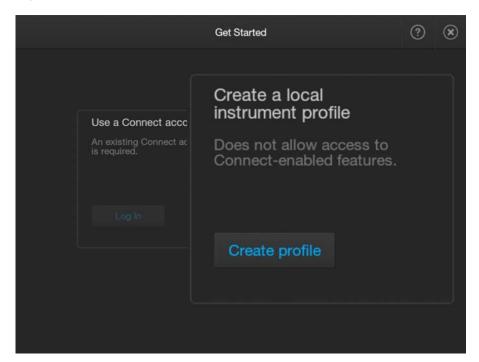


2. In the User Profile screen, tap Get Started.

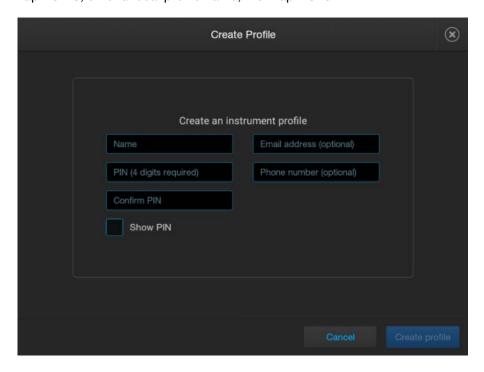
Note: If **SAE Sign in** is displayed instead of **Sign in**, see "Sign in to the instrument with SAE enabled" on page 248.



3. Tap Create profile.



4. Tap Name, enter a local profile name, then tap Done.



- 5. Tap PIN (4 digits required), enter a four-digit numerical PIN, then tap Enter.
- 6. Tap **Confirm PIN**, reenter the PIN, then tap **Enter**.
- 7. Tap Create profile.

The home screen is displayed with your user initials (for example, (xx)) in place of (a) (Profile).

For more information on profiles, see "Local profile and cloud profile: when to use, user name, and user initials" on page 215.

Sign in

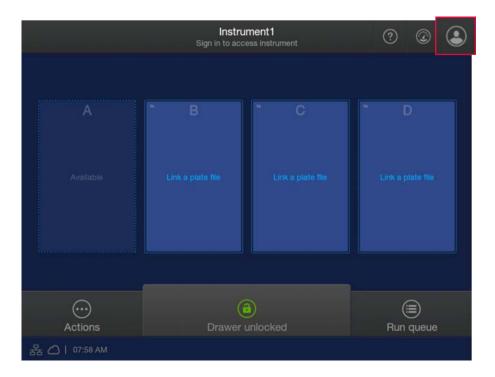
A profile is required to sign in to the instrument.

Note: If you do not have a profile, see one of the following sections:

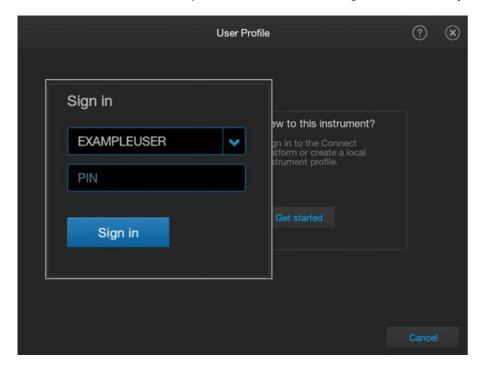
- If you are not using the instrument with Thermo Fisher™ Connect Platform, see "Create a local profile (one time only)" on page 30.
- If you are using the instrument with Thermo Fisher™ Connect Platform, see "(One time) Link your Thermofisher.com account to the instrument" on page 218.

If the **SAE Sign in** screen is displayed instead of the **Sign in** screen, see "Sign in to the instrument with SAE enabled" on page 248.

In the home screen, tap (Profile).
 If user initials are displayed instead of (Profile), see "Sign in (if another user is signed in)" on page 35.



2. In the User Profile screen, tap the down arrow under Sign in, then select your profile.



3. Tap the PIN field, enter your PIN, then tap Sign in.

The home screen is displayed with your user initials (for example, (xx)) in place of (a) (Profile).

For more information on profiles, see "Local profile and cloud profile: when to use, user name, and user initials" on page 215.

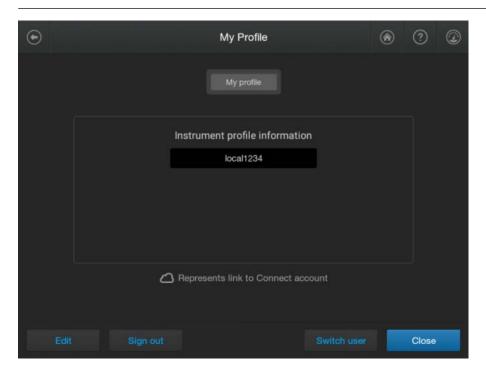
Switch user or sign out

- 1. Tap the profile icon for the signed-in user (for example, (xx)) (indicates no user is signed in).
- 2. In the My Profile screen, tap either of the following buttons:
 - **Switch user**—Tap to sign in without signing the current user out.

Note: This option is not available if SAE mode is enabled. For more information, see Chapter 10, "Use the instrument with the SAE Administrator Console".

Sign out—Tap to sign out.

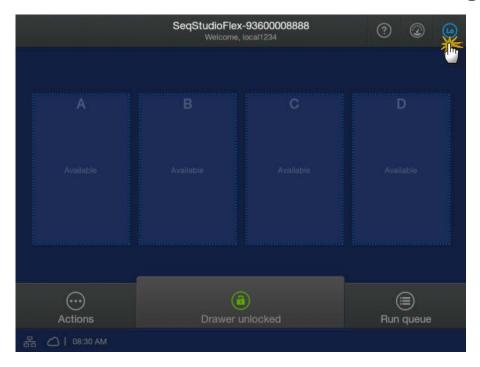
Note: If SAE mode is enabled on the instrument, your system administrator may have set the **Automatic screen locking** feature to automatically sign out after a specified time. For information on the screen locking function, see *SAE Administrator Console v2.0 or later User Guide for PCR systems* (Pub. No. MAN0017468).



- 3. Follow the appropriate steps:
 - If you selected **Switch user**, select the profile to sign in with, then enter your PIN. The home screen is displayed with your user initials.
 - For more information, see "Local profile and cloud profile: when to use, user name, and user initials" on page 215.
 - If you selected **Sign out**, tap **Yes** to confirm. The home screen is displayed with **()** (**Profile)** and no user is signed in.

Sign in (if another user is signed in)

1. In the home screen, tap the profile icon for the signed-in user (for example, (x_0)).

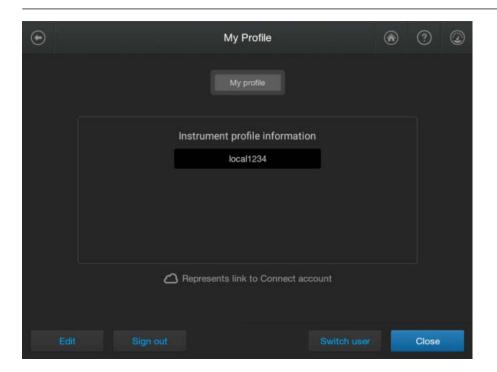


- 2. In the My Profile screen, tap either of the following buttons:
 - Switch user—Tap to sign in without signing the current user out.

Note: This option is not available if SAE mode is enabled. For more information, see Chapter 10, "Use the instrument with the SAE Administrator Console".

Sign out—Tap to sign out.

Note: If SAE mode is enabled on the instrument, your system administrator may have set the **Automatic screen locking** feature to automatically sign out after a specified time. For information on the screen locking function, see *SAE Administrator Console v2.0 or later User Guide for PCR systems* (Pub. No. MAN0017468).



3. Tap your profile, then enter your PIN.

The home screen is displayed with your user initials.

For more information, see "Local profile and cloud profile: when to use, user name, and user initials" on page 215.

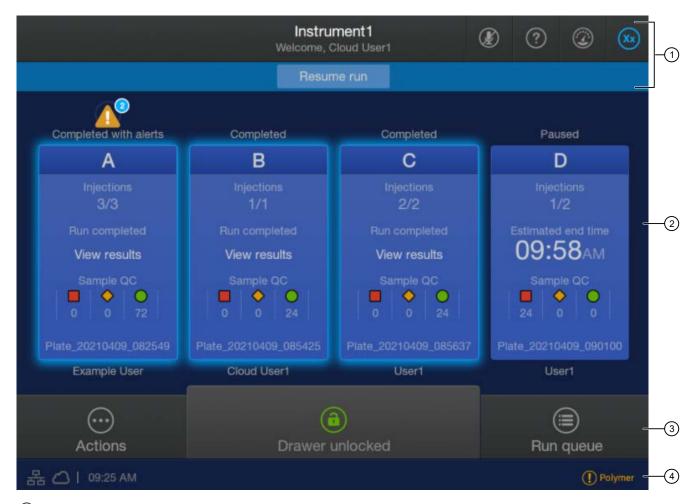
Parts of the software

The home screen is the main screen of the software where you select, run, and monitor plate runs. For more information, see "Parts of the home screen" on page 37.

From the home screen, you access the following screens:

- Link Plate File screen where you select the plate file that contains the settings that are used to run and analyze a plate. When you link a plate file, you can modify settings, if needed, and start the plate run. For more information, see "Parts of the Link Plate File screen" on page 42.
- Run Queue screen where you view and change the order of the injection list. For more information, see "Parts of the Run Queue screen" on page 45.
- Actions screen where you access most functions in the software other than running plates
 and using the run queue. The Actions screen includes options for instrument settings, libraries,
 maintenance and support, and viewing results for completed plates. For more information, see
 "Actions screen" on page 49.
- **Dashboard** screens where you view information about instrument status, consumables status, and upcoming maintenance. For more information, see "Dashboard screens—Instrument Status, Consumables Status, and Upcoming Maintenance" on page 50.

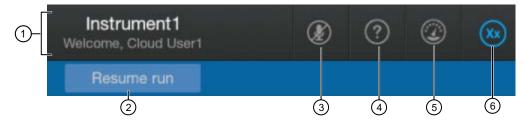
Parts of the home screen



- 1) Icon bar—See "Icon bar" on page 38.
- 2 Plate positions—See "Plate positions in the home screen" on page 39.
- (3) Actions, drawer status, and Run queue—See "Actions, drawer status, and Run queue in the home screen" on page 41.
- 4 Instrument conditions—See "Instrument conditions in the home screen" on page 41.

Many screens in the software include a **(home)** icon at the top right that allows you to return to the home screen.

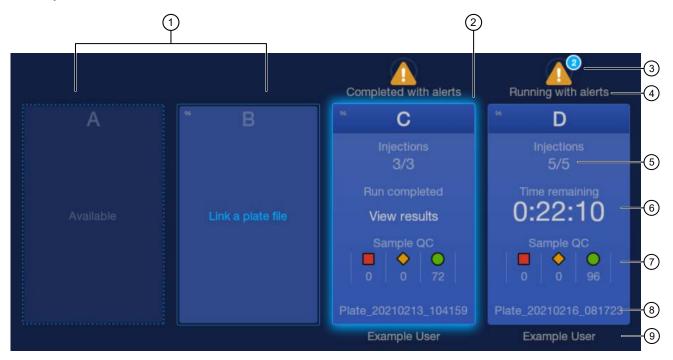
Icon bar



- 1 Instrument name and signed-in user name.
- Pause indicator and Resume run button—Resume run is displayed after you click Pause instrument or if the instrument is paused because of an error condition. When the instrument is completely paused, the indicator changes to the Resume run button. See "Pause the instrument in the home screen" on page 157.
- ③ P—Microphone for voice commands. Displayed only when a user is signed in with a cloud profile. When enabled, can be used to issue voice commands for linking a plate, starting a run, and other functions. See "Use Alexa™ voice commands" on page 236.
- 4 ? Help—Provides information on using the instrument.
- (5) Dashboard—Displays screens for instrument status, consumables status, and upcoming maintenance. See "Prepare the instrument" on page 65.
- (6) (Xx) initials of the signed-in user (3) (Profile) icon is displayed if no user is signed in). In the example above, "Xx" is displayed for user name "Xxxxxxx". For more information, see "Local profile and cloud profile: when to use, user name, and user initials" on page 215.

Note: For information on Thermo Fisher™ Connect Platform features, see Chapter 9, "Use the instrument with the Thermo Fisher™ Connect Platform".

Plate positions in the home screen



- 1 Plate position and status
- 2 Glowing border on a completed plate position.
- (3) Plate alerts
- 4 Run status
- (5) Plate injections

- 6 Time remaining or Estimated end time
- (7) Sample QC (or Spectral QC or Install QC) for the plate
- (8) Plate name
- 9 User name

Screen element	Description		
Plate position and status	See "Plate position status and plate run status" on page 40.		
Glowing border	Indicates that the plate run status is Completed.		
Plate alerts	Displays alert information about injection order changes, re-injections, insufficient polymer, and other conditions. The number of alerts is indicated above the symbol.		
	 Displays alert information during an automated barcode workflow run that pause the instrument and prevent the run from continuing. 		
	For more information on plate alerts, see the following sections:		
	"Pre-run check messages and plate alerts during a run" on page 146		
	"Plate alert troubleshooting" on page 515		
	"Plate alert troubleshooting (automated barcode workflow)" on page 517		
Run status	See "Plate position status and plate run status" on page 40.		
Plate injections	The number of the currently running or completed injection and the total number of injections for the plate.		

Screen element	Description	
Time remaining	Time remaining until all injections for the plate are completed. Changes to Estimated end time if the injection order for the injection or the plate is moved to a later position in the run queue. See "Use the Run queue to monitor a run on the instrument" on page 160.	
Sample QC (or Spectral QC or Install QC) for the plate	See "Sample QC and quality alerts" on page 172.	
Plate name	Plate name.	
User name	Name of the user who was signed in when the run was started.	

Plate position status and plate run status

Status	Description		
Plate position sta	Plate position status		
Occupied	The corresponding position in the instrument drawer contains a plate. These positions are abeled as Link plate file in the instrument home screen.		
Available	The corresponding position in the instrument drawer is empty.		
Plate run status			
In queue	An injection is waiting to start. The injection will start based on the order of the injection list displayed in the Run Queue screen.		
Running	Data collection for the injection is in process.		
Analyzing	Data collection for the injection is complete, analysis is in process.		
Exporting	Result files are being sent to the Save location in the plate file.		
Completed	Analysis and export is complete, results are available.		
Aborting/aborted	An injection with status of Running was cancelled.		
Cancelled	An injection with status of In queue was cancelled.		
Paused	The instrument was paused and the "pause immediately" option was selected.		
	The pause and cancel commands can be issued in the SeqStudio™ Flex Remote Monitoring software or on the instrument.		
	Runs must be resumed on the instrument.		

Actions, drawer status, and Run queue in the home screen



- ① **Actions**—Displays a screen that allows access to most functions of the instrument: Creating plate files, libraries, maintenance functions, run history, system and instrument settings, and other functions. All options on the **Actions** screen are described in the following sections of this guide.
- 2 Drawer status—(a) (Drawer locked), (a) (Drawer unlocked), Drawer open. The drawer is locked when the instrument is injecting samples from a plate. You can open the drawer whenever the status is (a) (Drawer unlocked).
- 3 Run queue—Displays the injection list where you can view or change the injection order, add re-injections, cancel injections, and access results for completed injections. See "Use the Run queue to monitor a run on the instrument" on page 160.

Instrument conditions in the home screen



Status icons	Description		
몲	The instrument is connected to a wired network.		
<u></u>	The instrument is connected to a wireless network.		
	The instrument is connected to a network drive.		
	A USB drive is present in a USB port on the instrument. IMPORTANT! Perform a virus scan on a USB drive before inserting it into a port on the instrument. Note: It can take up to 15 seconds for the instrument to recognize a USB drive after the drive is inserted in a USB port. exFAT-formatted USB drives are recommended.		
0	The Thermo Fisher™ Connect Platform option is enabled in the software. This icon is displayed even if the current user is not connected to their Thermofisher.com account. For more information, see Chapter 9, "Use the instrument with the Thermo Fisher™ Connect Platform".		
	The instrument doors are open.		

Status icons	Description		
(or individual consumable name)	 The flags are displayed only if consumables expired/exceeded limits and/or pre-expiry warnings are enabled. For more information, see "Configure consumables usage and warnings (administrator only)" on page 460. 		
	If more than one consumable has an issue, (Consumables is displayed.		
	If one consumable is affected, the consumable name is displayed in the alert, for example, Polymer.		
	Tap the icon to display the Consumables Status screen. For more information, see "Check consumables status" on page 67.		
(!) Maintenance	The maintenance flag is displayed if any maintenance tasks are past due. Tap the icon to display the Upcoming Maintenance screen. For more information, see "Review upcoming maintenance" on page 65.		
! The SAE server is offline	The SAE server offline flag is displayed when the instrument has lost connection with the SAE server. You can tap the icon to display the SAE Server Offline screen to view more information, such as the server IP, port, when the server was last online, and the time remaining for the offline sign in.		
We recommend that you resolve the connection issue before the time remaini sign in expires. After the time expires, you cannot sign in to the system unless is restored. For more information, see "Use the instrument when the SAE serv page 255.			
Exporting	The exporting flag is displayed when results files are being sent to the save locations that are specified in the plate file for a completed plate. Tap the icon to display the Background Export Status screen. For more information, see "Configure, check status, and cancel background exports and backups" on page 475.		

Parts of the Link Plate File screen

The Link Plate File screen allows you to select a plate file to associate with a physical plate.



Option	Description
Note: Plate files are listed alphabetically by name. Tap Last modified to see the newest plates added to the Inbox.	Open a plate file that you created in the Plate Manager software and sent to the instrument. See Chapter 5, "(Optional) Create a plate file in the Plate Manager software". For more information, see "About the Inbox on the instrument" on page 43.
△Thermo Fisher™ Connect	Open a plate file that you created in the Plate Manager software (cloud). This option is displayed only if access to the Thermo Fisher™ Connect Platform is enabled. See: • "Get started with the Plate Manager software (cloud)" on page 107 • "Enable or disable Thermo Fisher™ Connect Platform access on the instrument (administrator only)" on page 232
□ USB drive	Open a plate file in PSM or CSV format.
IMPORTANT! Perform a virus scan on a USB drive before inserting it into a port on the instrument. Note: It can take up to 15 seconds for the instrument to recognize a USB drive after the drive is inserted in a USB port. exFAT-formatted USB drives are recommended.	Note: To navigate up in the folder structure, tap ⊕ (Back). For more information, see "PSM and CSV plate files for import into the instrument" on page 87.
■ Network drive	Open a plate file in PSM or CSV format. • "Connect the instrument to a network drive (software)" on page 452 • "PSM and CSV plate files for import into the instrument" on page 87 Note: To navigate up in the folder structure, tap (Back).
■My Instrument	Open an existing plate file from the Plate files library on the instrument.
Create new plate file	Create a new plate file. See Chapter 4, "Create a plate file on the instrument".

About the Inbox on the instrument

The **Inbox** feature on the instrument allows you to send plate files from the Plate Manager software to an instrument. Plate files that are sent to the **Inbox** on an instrument are also saved in the **Plate files** library.

When you link a plate file, you can navigate to the **Inbox** to select the plate file (which lists only plate files that have been sent to the instrument). This feature makes it easier and more convenient to locate a plate file, instead of navigating to the **My instrument** location (which lists all plate files in the library).

Plate files are removed from the **Inbox** after they are run. Plate files remain in the library after they are run.

The **Inbox** contains plate files from all users (it does not contain only the plate files that you send to the instrument).

The **Inbox** accepts only the following plate files:

- Plate files with unique names that do not already exist on the instrument.
- Plate files with the same polymer and capillary array configuration as the instrument.
- Plate files with library objects that are identical in Plate Manager software and the instrument software.

Unique plate file names

A plate file can be sent to the **Inbox** one time only. The instrument accepts only plate files with unique names. If you send a plate file with a name that already exists in the **Inbox** and in the **Plate files** library on the instrument, a **Failed to send** status is listed for a plate file in the Plate Manager software.

If you want to change a plate file after you send it to an instrument, you can do any of the following:

- Change the plate file name in the Plate Manager software, then send again.
- Delete the plate file from the **Plate files** library on the instrument to remove it from the **Inbox** on the instrument, then send again.

Matching configuration

The **Inbox** accepts only plate files that match the configuration of the instrument. For example, if a 50-cm capillary array is installed on the instrument with POP-7™ Polymer, the **Inbox** does not accept a plate file that specifies a 50-cm capillary array with POP-6™ Polymer. If you send a plate file with a configuration that does not match the configuration of the instrument to which you send the plate file, the following occurs:

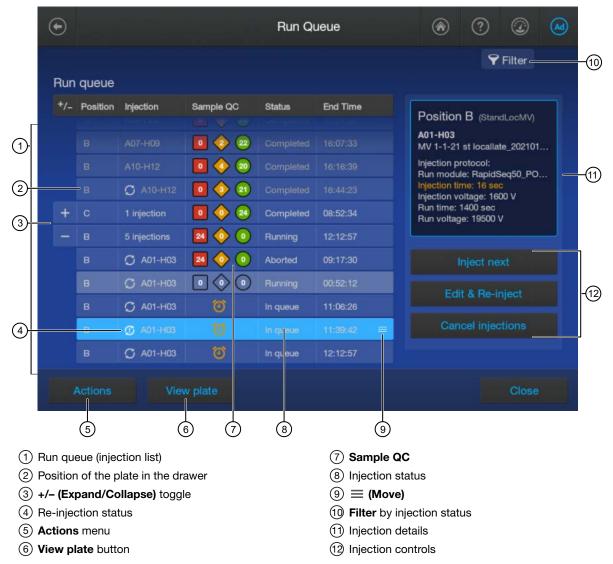
- In the Plate Manager software, a Sent status is displayed in the Recent plate files list.
- The plate file is not added to the **Inbox** on the instrument.
- The plate file is added to the **Plate files** library.

Consistency of library objects between software systems

The **Inbox** accepts only plate files with library objects that are identical in Plate Manager v2.1.1 software and the instrument software. The instrument does not accept a plate file from Plate Manager v2.1.1 software if there are differences between any of the associated library objects.



Parts of the Run Queue screen



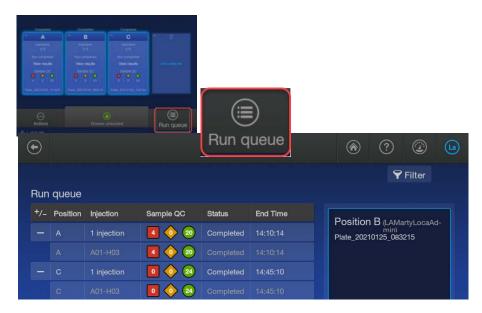
Screen element	Description	
Run queue (injection list) and +/- (Expand/Collapse) toggle	Swipe up to display more rows in the list. Tap + (plus) to expand the list to show a injections for the plate positions. Tap - (minus) to collapse all injections under the position.	
Re-injection status symbol	 CRe-injection CRe-injection with different injection parameters (Run module, Injection time, Injection voltage, Run time, Run voltage) 	
Actions menu	Displays the Pause instrument or Resume run button.	

Screen element	Description		
View plate button	Active only when a single injection or plate with one injection is selected.		
	Displays the electropherogram or plate view for the selected injection.		
	 If you select a running or completed injection, the raw or analyzed plot is displayed. 		
	If you select a plate with one injection, the plate view is displayed.		
Sample QC	Lists the number of samples for each status: ■ Error, ◆ Caution, ● Good. Statuses are listed per plate and per injection. For more information, see "Sample QC and quality alerts" on page 172.		
	(Clock) icon is displayed if the plate has been in the drawer for more than 24 hours. The software does not prevent you from running samples that have been on the instrument for more than 24 hours.		
	Note: Samples that are prepared in Hi-Di™ Formamide are stable for 16–24 hours. Data quality may be reduced if samples exceed 24 hours on the instrument. Samples that are prepared in aqueous solution have lower stability than samples that are prepared in Hi-Di™ Formamide.		
Injection status	In queue—Injection will start based on the order of the injection list.		
	Running—Data collection is in process.		
	Analyzing – Data collection is complete, analysis is in process.		
	 Exporting—Result files are being sent to the Save location that is specified in the plate file. 		
	Completed—Analysis and export is complete, results are available.		
	Aborting/aborted—An injection with status of Running was cancelled.		
	Cancelled—An injection with status of In queue was cancelled.		
	Paused—The instrument was paused (Actions ▶ Pause instrument).		
≡(Move)	Press-drag to move an injection in the list and change the injection order.		
Filter	Filter by injection status (not plate run status): All runs, Completed runs, Running and In queue, Canceled runs.		
Injection details	Details for the selected injection. Injection parameters that have been edited for a re-injection are displayed in orange.		

Screen element	Description		
Injection controls Note: Buttons are inactive if more than 1 injection is selected or if the action is not applicable for the injection.	• Inject next—Moves the injection to the next position in the list to be injected. For information, see "Change the injection list order" on page 163.		
	• Edit & Re-inject—Tap to add re-injections to the run. If needed, change the run settings. For information, see "Cancel or add injections or specify re-injections in the Run Queue screen" on page 165. The button is inactive if a spectral calibration or install run injection is selected or if more than one injection is selected.		
	 Cancel injection—Stops the current injection or an in-queue injection. The injection status after cancellation depends on when in the run the injection was cancelled. See Injection status above. For information, see "Cancel or add injections or specify re-injections in the Run Queue screen" on page 165. 		
	 Add to Queue—Active if you select a cancelled injection. Changes the status to In queue. The button is inactive if a spectral calibration or install run injection is selected. 		

Run queue features

The **Run queue** is accessible from the home screen.



You can perform the following tasks in the **Run Queue** screen.

Task	Action	
View the injection list	In the home screen, tap Run queue.	
Change the order of plates and injections	In the Run queue screen, press-drag \equiv (Move) to move a plate or injection up of down in the list.	
Select a plate or injections to run next	This button is active in the Run queue screen during a run only. Tap a plate or injection, then tap Inject next .	

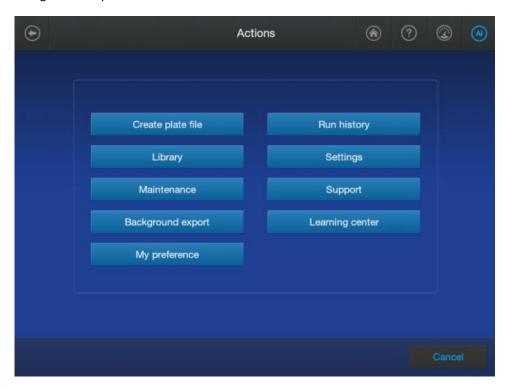


Task	Action		
Re-inject samples	In the Run queue screen, tap an individual injection, then tap Edit & Re-inject. To inject with the same settings, tap Done. To inject with different settings, change settings, then tap Done.		
	Note: If you select a spectral calibration or install run injection, the Edit & Reinject button is inactive. Re-injections are not permitted for these run types.		
Display results for a	Tap a plate row to display the plate view.		
plate or injection	Tap an injection row, then tap View plate to display the electropherogram view with analyzed data displayed by default.		
Cancel injections	Tap an injection, then tap Cancel injections . The status after cancelling depend on when the cancel was done during the run.		
	If you tap when the status is Running, the status changes to Aborted.		
	If you tap when the status is In queue, the status changes to Cancelled.		
Pause the instrument	Tap Actions ▶ Pause instrument during a run only.		
Resume a run (displayed only when the instrument is paused)	Tap Resume run at the top of the Run queue screen. You can also resume a run from the home screen and the Instrument status screen.		



Actions screen

The **Actions** screen provides access to most functions in the software other than running plates and using the run queue.



Dashboard screens—Instrument Status, Consumables Status, and Upcoming Maintenance

The **Dashboard** screens provide access to consumables status, instrument status, and upcoming maintenance tasks. For more information, see "Prepare the instrument" on page 65.



Companion software

The instrument can be used with the following software:

- Plate Manager software (desktop)—An application for creating plate files and sending them to the Inbox on the instrument.
- Plate Manager software (cloud)—An application with the same features as the desktop option, plus the additional features of setting up automatic cloud analysis and accessing SeqStudio™ Flex Remote Monitoring software. This application requires connection to Thermo Fisher™ Connect Platform.
- SeqStudio™ Flex Remote Monitoring software—An application that allows you to monitor instrument runs from a remote computer or from a mobile device. This application requires connection to Thermo Fisher™ Connect Platform.
- Security, Auditing, and E-signature software—Optional module that controls user access, grants
 permission to specific functions and actions, provides an audit trail, and supports electronic
 signature.

Secondary analysis software

Secondary analysis software is available for desktop computers and on the Thermo Fisher™ Connect Platform.

Note: Cloud analysis is not supported for HID applications.

Visit apps.thermofisher.com for the latest available secondary analysis applications.

For information on using these applications to perform automated analysis, see "Automated cloud analysis with secondary analysis software" on page 203.

Secondary analysis applications on the Connect Platform

Application type	Software	Description
Sequencing	Quality Check (QC) module	 Automatically checks sequence trace quality. Provides a results summary that is based on quality parameter settings. Auto-flags lower-quality traces for further inspection.
	Variant Analysis (VA) module	 Finds variants in samples that are sequenced on Applied Biosystems™ genetic analyzers. Reports variants at genomic coordinates. Allows export of variant calls in standard Variant Call Format.
	Next-generation Confirmation (NGC) module	 Confirms next-generation sequencing (NGS) variants using capillary electrophoresis (CE) technology. Allows visualization of the variants that are detected by both NGS and CE platforms. Allows export of confirmed variants in standard Variant Call Format.
Fragment analysis	Peak Scanner™ Software	Performs peak sizing.
	Microsatellite Analysis Software	Performs peak sizing and genotyping on microsatellite samples.

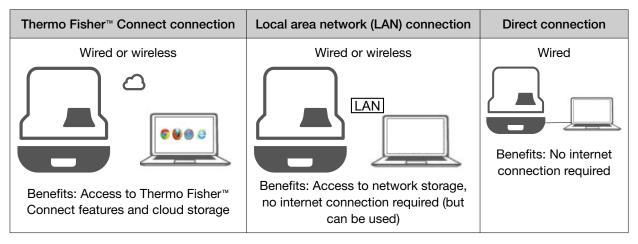
Desktop secondary analysis software

IMPORTANT! Older versions of the desktop secondary analysis software cannot analyze data files generated by the SeqStudio™ Genetic Analyzer. Contact Support for information on obtaining the latest versions of software.

Analysis	Software	Minimum version required
Sequencing	Sequencing Analysis Software	7.1
	SeqScape™ Software	4.1
	Variant Reporter™ Software	3.1
	Minor Variant Finder Software	1.2
	MicrobeBridge Software	1.2
Fragment analysis	GeneMapper™ Software	6.1
HID analysis	GeneMapper™ <i>ID-X</i> Software	1.7

Network connection options

The instrument can be connected to a network or computer in the following configurations.



For more information, see:

- "Connect the instrument to a computer or network (hardware connections)" on page 446
- "Connect the software to a network drive (software settings)" on page 450

Network and password security requirements

Network configuration and security

The network configuration and security settings of your laboratory or facility (such as firewalls, antivirus software, network passwords) are the sole responsibility of your facility administrator, IT, and security personnel. This product does not provide any network or security configuration files, utilities, or instructions.

If external or network drives are connected to the software, it is the responsibility of your IT personnel to ensure that such drives are configured and secured correctly to prevent data corruption or loss. It is the responsibility of your facility administrator, IT, and security personnel to prevent the use of any unsecured ports (such as USB, Ethernet) and ensure that the system security is maintained.

Password security

Thermo Fisher Scientific strongly recommends that you maintain unique passwords for all accounts in use on this product. All passwords should be reset upon first sign in to the product. Change passwords according to your organization's password policy.

It is the sole responsibility of your IT personnel to develop and enforce secure use of passwords.



Get started

Sign in	54
Profile and sign in options	56
Workflow: Create a plate, start and monitor a run, then view results	63
Prepare the instrument	65

Sign in

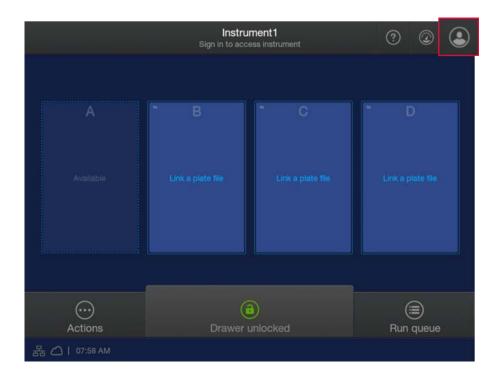
A profile is required to sign in to the instrument.

Note: If you do not have a profile, see one of the following sections:

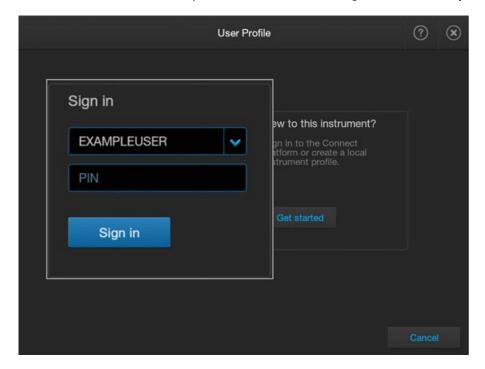
- If you are not using the instrument with Thermo Fisher™ Connect Platform, see "Create a local profile (one time only)" on page 30.
- If you are using the instrument with Thermo Fisher™ Connect Platform, see "(One time) Link your Thermofisher.com account to the instrument" on page 218.

If the **SAE Sign in** screen is displayed instead of the **Sign in** screen, see "Sign in to the instrument with SAE enabled" on page 248.

In the home screen, tap (Profile).
 If user initials are displayed instead of (Profile), see "Sign in (if another user is signed in)" on page 35.



2. In the User Profile screen, tap the down arrow under Sign in, then select your profile.



3. Tap the PIN field, enter your PIN, then tap Sign in.

The home screen is displayed with your user initials (for example, (xx)) in place of (a) (Profile).

For more information on profiles, see "Local profile and cloud profile: when to use, user name, and user initials" on page 215.

Profile and sign in options

The profile you use to sign in depends on your instrument configuration.

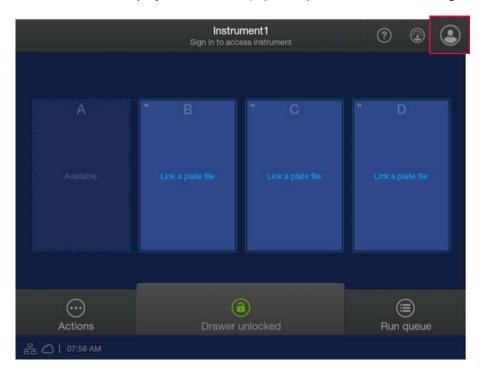
- Use a *local profile* for a standalone instrument. Most procedures in this user guide describe using the instrument when you are signed in with a local profile.
- Use a Thermo Fisher™ Connect Platform account (cloud profile) for an instrument that is connected
 to Thermo Fisher™ Connect Platform. For procedures that describe using the instrument when you
 are signed in with a cloud profile, see Chapter 9, "Use the instrument with the Thermo Fisher™
 Connect Platform".
- Use an SAE account for an instrument that is configured for security, audit, and e-signature functions. For procedures that describe using the instrument when you are signed in with an SAE account, see Chapter 10, "Use the instrument with the SAE Administrator Console".

Create a local profile (one time only)

A profile that you create on the instrument is referred to as a local profile.

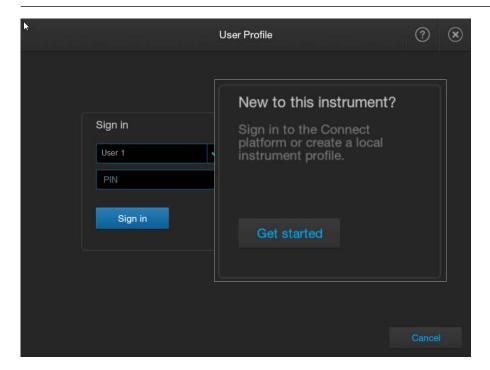
Note: If you will use the instrument with the Thermo Fisher™ Connect Platform, skip this step and connect the instrument to your Connect Platform account. See Chapter 9, "Use the instrument with the Thermo Fisher™ Connect Platform".

In the home screen, tap (Profile).
 If user initials are displayed instead of (Profile), see "Switch user or sign out" on page 34.

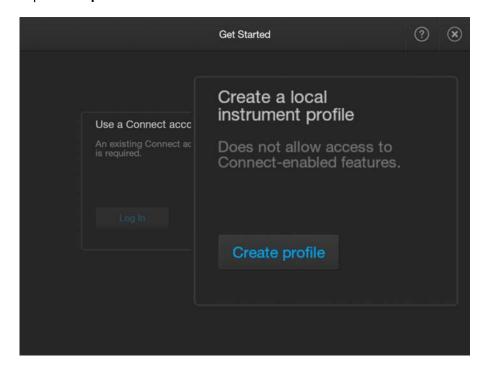


2. In the User Profile screen, tap Get Started.

Note: If **SAE Sign in** is displayed instead of **Sign in**, see "Sign in to the instrument with SAE enabled" on page 248.



3. Tap Create profile.



Chapter 2 Get started Profile and sign in options

4. Tap Name, enter a local profile name, then tap Done.



- 5. Tap PIN (4 digits required), enter a four-digit numerical PIN, then tap Enter.
- 6. Tap Confirm PIN, reenter the PIN, then tap Enter.
- 7. Tap Create profile.

The home screen is displayed with your user initials (for example, (xx)) in place of (a) (Profile).

For more information on profiles, see "Local profile and cloud profile: when to use, user name, and user initials" on page 215.

Sign in

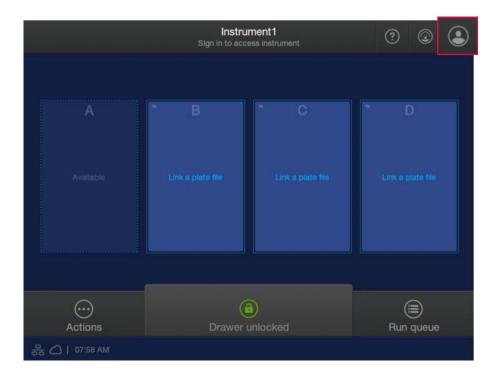
A profile is required to sign in to the instrument.

Note: If you do not have a profile, see one of the following sections:

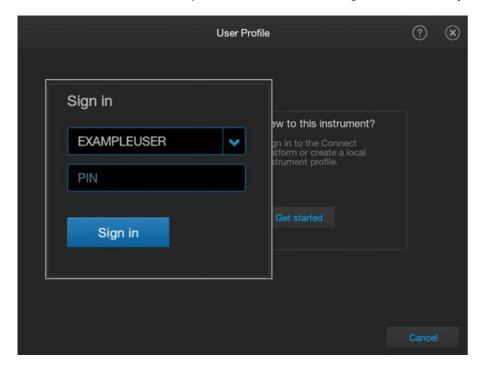
- If you are not using the instrument with Thermo Fisher™ Connect Platform, see "Create a local profile (one time only)" on page 30.
- If you are using the instrument with Thermo Fisher™ Connect Platform, see "(One time) Link your Thermofisher.com account to the instrument" on page 218.

If the **SAE Sign in** screen is displayed instead of the **Sign in** screen, see "Sign in to the instrument with SAE enabled" on page 248.

In the home screen, tap (Profile).
 If user initials are displayed instead of (Profile), see "Sign in (if another user is signed in)" on page 35.



2. In the User Profile screen, tap the down arrow under Sign in, then select your profile.



3. Tap the PIN field, enter your PIN, then tap Sign in.

The home screen is displayed with your user initials (for example, (xx)) in place of (a) (Profile).

For more information on profiles, see "Local profile and cloud profile: when to use, user name, and user initials" on page 215.

Chapter 2 Get started Profile and sign in options

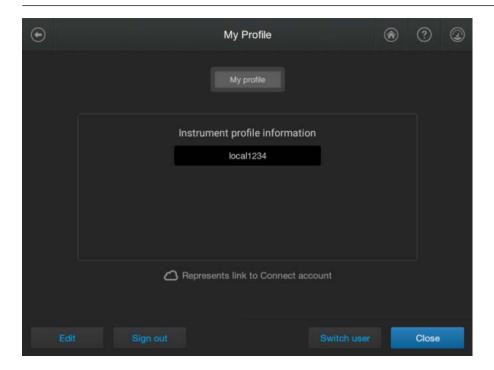
Switch user or sign out

- 1. Tap the profile icon for the signed-in user (for example, (x)) (a) indicates no user is signed in).
- 2. In the My Profile screen, tap either of the following buttons:
 - **Switch user**—Tap to sign in without signing the current user out.

Note: This option is not available if SAE mode is enabled. For more information, see Chapter 10, "Use the instrument with the SAE Administrator Console".

Sign out—Tap to sign out.

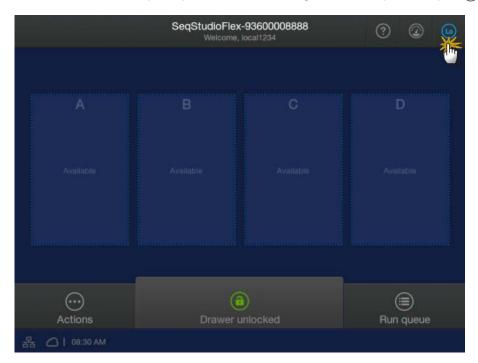
Note: If SAE mode is enabled on the instrument, your system administrator may have set the **Automatic screen locking** feature to automatically sign out after a specified time. For information on the screen locking function, see *SAE Administrator Console v2.0 or later User Guide for PCR systems* (Pub. No. MAN0017468).



- 3. Follow the appropriate steps:
 - If you selected **Switch user**, select the profile to sign in with, then enter your PIN. The home screen is displayed with your user initials.
 - For more information, see "Local profile and cloud profile: when to use, user name, and user initials" on page 215.
 - If you selected **Sign out**, tap **Yes** to confirm. The home screen is displayed with **(Profile)** and no user is signed in.

Sign in (if another user is signed in)

1. In the home screen, tap the profile icon for the signed-in user (for example, (xx)).

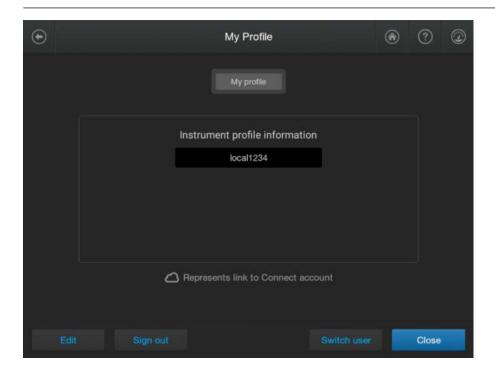


- 2. In the My Profile screen, tap either of the following buttons:
 - **Switch user**—Tap to sign in without signing the current user out.

Note: This option is not available if SAE mode is enabled. For more information, see Chapter 10, "Use the instrument with the SAE Administrator Console".

• Sign out—Tap to sign out.

Note: If SAE mode is enabled on the instrument, your system administrator may have set the **Automatic screen locking** feature to automatically sign out after a specified time. For information on the screen locking function, see *SAE Administrator Console v2.0 or later User Guide for PCR systems* (Pub. No. MAN0017468).



3. Tap your profile, then enter your PIN.

The home screen is displayed with your user initials.

For more information, see "Local profile and cloud profile: when to use, user name, and user initials" on page 215.



Workflow: Create a plate, start and monitor a run, then view results

Use the instrument

reate

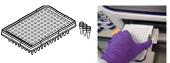
Create a plate file in the SeqStudio $^{\scriptscriptstyle{\text{TM}}}$ Plate Manager software and print the plate layout.



Prepare

Prepare the instrument, prepare the samples and the plate, then load the plate into the instrument.





.¥ Z

Link a plate file located in the **Inbox**, on the instrument, on a network or USB drive, or on the Thermo Fisher™ Connect Platform.





Start

Set injection properties, then start the run.



Use the instrument

Monitor the run in the home screen by viewing the information for a plate position, or by tapping a plate position to view the plate layout and run progress.

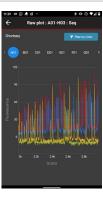




Monitor the run in the SeqStudio™ Flex Remote Monitoring software by opening the InstrumentConnect software, then selecting an instrument.



Monitor the run from a mobile device by launching the InstrumentConnect app, selecting an instrument, then tapping a plate position.



Use the instrument

View and analyze results in any of the following locations:

- In the home screen, tap the plate position.
- In the Run Queue screen, tap an injection.
- In the home screen, select ⊙ Actions ▶ Run history.
- In the Remote Monitoring software, tap the plate position.



Prepare the instrument

Review upcoming maintenance

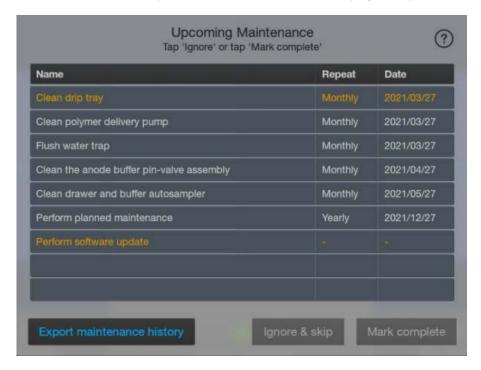
Review the upcoming maintenance task list daily, perform the scheduled tasks, then mark the tasks as complete. In addition to the upcoming maintenance list, the home screen displays an alert when a task is due to be performed. For information on maintenance tasks, see Chapter 13, "Maintain the instrument".

Note: For HID applications, monthly maintenance tasks should be completed weekly to ensure minimal loss of resolution.



Chapter 2 Get started Prepare the instrument

1. Display the upcoming maintenance tasks by tapping ② (Dashboard) at the top right of the home screen. If the Upcoming Maintenance screen is not displayed, tap ≼ or ▶.



Tasks are displayed. Note the following:

- Overdue tasks are displayed in orange.
- The software update reminder is displayed only if a software update is available on the Thermo Fisher™ Connect Platform or on a USB drive. For more information, see "Update the software (administrator only)" on page 471.
- The yearly planned maintenance task can be updated by Service only.
- 2. Tap any of the following buttons as needed.

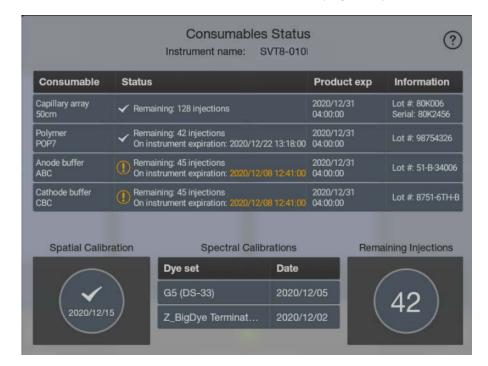
Note: Buttons are active only if you sign in to the software.

- (Toggle button) Ignore & skip or Smart help —When Perform planned maintenance is selected, the Ignore & skip button changes to the Smart help button.
 - **Ignore & skip**—To acknowledge a task without marking it as complete.
 - Smart help—To access the Smart Help screen to contact Service for yearly planned maintenance. For more information, see "Use Smart Help to request assistance from Technical Support or Service" on page 483.
- Mark complete To mark a task as complete. Marking as complete updates the due date listed on the screen.
- Export maintenance history—To generate a CSV file
 (InstrumentName_Maintenance_History_Log_Date_Timestamp.csv) that lists all skipped and completed events.

Check consumables status

Note: The home screen displays an alert if any consumables need replacement.

1. Display the consumables status screen by tapping ② (Dashboard) at the top right of the home screen. If the consumables status screen is not displayed, tap < or ➤.



The screen displays expiration dates and lot numbers (determined from the RFID tags on the consumable containers).

The **Remaining injections** number corresponds to the consumable with the fewest remaining injections.

Consumables information is displayed in orange if any of the following conditions are met.

- One or more consumables has expired or exceeded the on-instrument usage limit (the maximum number of days that the consumable can be installed on the instrument)
- The consumable is within the following days of product expiration:
 - Capillary array—1 day
 - Polymer—14 days
 - Buffer-7 days
- The percentage of maximum number of injections remaining for a consumable is ≤10%
- The polymer and/or the buffer is within 1 day of the on-instrument usage limit

If the software is configured to prevent running if a consumable has expired or exceeded the usage limit, you must replace the consumable before you can start a run.

2. Check the consumables for the number of injections, samples, or days remaining for a consumable.

Chapter 2 Get started Prepare the instrument

For more information, see the following sections:

- "Configure consumables usage and warnings (administrator only)" on page 460 for information on consumables warnings and preventing runs with consumables that exceed limits.
- "Install buffers (wizard)" on page 369
- "Replenish, change, flush, and store polymer (wizards)" on page 375
- "Change and store a capillary array (wizards)" on page 377

Check instrument status

Note: The home screen displays an alert if any temperature is out of range.

Display the instrument status screen by tapping ② (Dashboard) at the top right of the home screen. If the instrument status screen is not displayed, tap < or >.



The screen displays controls and status for the instrument.

The drawer temperature is displayed only if the temperature is ≥37°C for more than 5 minutes.

Preheat the instrument oven and the detection cell

Preheat the instrument oven and the detection cell while you prepare for a run. The detection cell temperature is set by the software. If the oven is not at the set temperature when you start a run, the first injection cannot begin until the oven reaches the set temperature. This wait time affects the time at which the run finishes.

The preheat function automatically turns off after the time specified for the power save duration (see "Set the power save duration (administrator only)" on page 469).

We recommend that you preheat the oven for at least 30 minutes before you start a run if the instrument is cold.

As temperatures stabilize, they may fluctuate slightly when they reach the set-point.

1. Display the instrument status by tapping ② (Dashboard) at the top right of the home screen (if the Instrument Status screen is not displayed, tap ≼ or ▶).





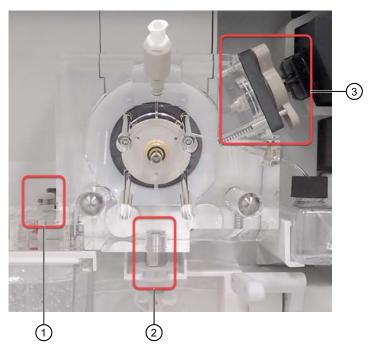
2. Tap Preheat oven.

Check for leaks and spills

- 1. Open the front doors.
- 2. Inspect the instrument interior.
- 3. Wipe any spills.

Chapter 2 Get started Prepare the instrument

4. Check for leaks around the buffer-pin valve, check valve, and array port lock.



- 1 Buffer-pin valve
- 2 CV (check valve) fitting
- 3 Array port lock
- 5. Remove dried residue and ensure that the array port lock is securely tightened.

Check buffer fill levels

- 1. Open the front doors.
- 2. (Optional) Turn on the interior light: tap ② (Dashboard), tap <, then tap On for the LED light.
- 3. Check the buffer fill levels. Verify that the buffer level is at the top of the fill line. The meniscus must align with the fill line. Ensure that the septa on the CBC are properly seated.

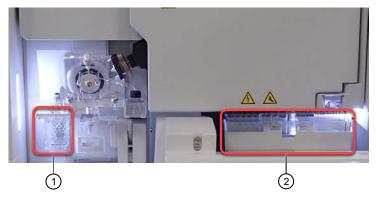


Figure 6 Location of ABC and CBC

- 1 ABC
- ② CBC

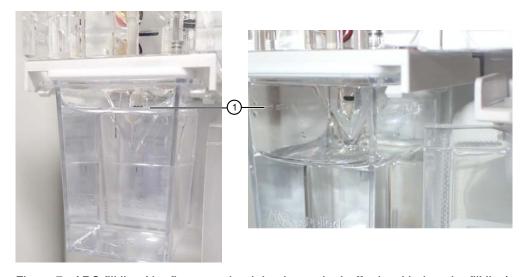


Figure 7 ABC fill line (the figure on the right shows the buffer level below the fill line)

1) ABC fill line



Figure 8 CBC fill line

1 CBC fill line

IMPORTANT! Replace the buffer if the level is below the fill line.

Replenish consumables

If a consumable is expired or if the buffer fill level is below the fill line, replenish the consumables as described in the following topics:

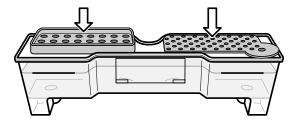
"Replenish polymer or change polymer type (wizard)" on page 375

IMPORTANT! Wear gloves while handling polymer, the capillary array, septa, ABC, or CBC.

- "Install the anode buffer container (ABC)" on page 369
- "Install the cathode buffer container (CBC)" on page 372
- "Change and store a capillary array (wizards)" on page 377

Ensure proper installation of CBC septa

When you install the CBC buffer septa, press firmly to seat the septa.



IMPORTANT! Look at the CBC from the side and ensure that there is no gap between the container and the lip of the septum.

For information about installing the septa, see "Install the cathode buffer container (CBC)" on page 372.

Control the LED light, speaker volume, and screen brightness

1. Display the instrument status by tapping ② (Dashboard) at the top right of the screen (if the instrument status is not displayed, tap < or ➤).



2. As needed, adjust the settings for LED light, Volume, and Screen brightness.



Prepare the samples

Sample preparation guidelines	74
Plate and strip-tube layout	76
Prepare and assemble sample plates	77

Sample preparation guidelines

Item	Guidelines
Plates and tubes	 Use MicroAmp™ Optical Reaction Plates or MicroAmp™ Reaction Tubes with a base and retainer set. Use a base and retainer with the same catalog number.
	Use the appropriate septa for the plates and tubes.
The state of the s	• For more information, see "Plates bases retainers and septa" on page 547.
Fragment/HID	Prepare the fragment/HID analysis reactions as recommended by the kit instructions.
analysis sample preparation	• Use a 10–20 μL sample volume for 96-well plates or 8-strip tubes. Use a 5–20 μL sample volume for 384-well plates.
	• Samples prepared with Hi-Di™ Formamide are stable for 16–24 hours on the instrument. Samples that are prepared in aqueous solution have lower stability than samples that are prepared in Hi-Di™ Formamide.
	Note: Data quality may be reduced if samples exceed 16–24 hours on the instrument. The software displays an alert if a sample will exceed 24 hours on the instrument by the end of the run.
	 Ensure that Hi-Di™ Formamide is fresh.
	 Hi-Di™ Formamide should not undergo more than 8 freeze-thaw cycles.
	 Use the same day after thawing.
	 See "Hi-Di™ Formamide storage and usage" on page 28.
	• For more information, see DNA Fragment Analysis by Capillary Electrophoresis User Guide (Pub. No. 4474504).

(continued)

Item	Guidelines
Sequence analysis sample preparation	 Prepare sequencing reactions according to kit instructions, and purify the extension products with ethanol precipitation, spin columns, or the BigDye XTerminator™ Purification Kit.
1 1840 1860 1860 1600 1600 1600 160 7 7 7 5 5 5 00/4 60 107 107 5 5	 If ethanol precipitation or spin columns are used, dry the samples in a vacuum centrifuge without heat or at low heat for 10–15 minutes or until dry.
	Note: Do not over dry the samples.
	 Resuspend in 10–20 μL of Hi-Di™ Formamide.
	 Use a 65 μL or 130 μL sample volume for samples that are prepared with the BigDye XTerminator™ Purification Kit. See BigDye XTerminator™ Purification Kit User Guide (Pub. No. 4374408).
	IMPORTANT! Use the appropriate run modules for samples prepared with the BigDye XTerminator™ Purification Kit. See "Run modules, read lengths, size ranges, and run times" on page 534.
	• Use a 10–20 µL sample volume for samples that are prepared with Hi-Di™ Formamide.
	• Samples prepared with Hi-Di™ Formamide are stable for 24 hours on the instrument.
	Note: Data quality may be reduced if samples exceed 24 hours on the instrument. The software displays an alert if a sample will exceed 24 hours on the instrument by the end of the run.
	 Ensure that Hi-Di™ Formamide is fresh.
	 Hi-Di™ Formamide should not undergo more than two freeze-thaw cycles (one to aliquot and one for use).
	Use the same day after thawing.
	 Do not resuspend samples in water, which can decrease sample stability and create signal variability upon electo-kinetic injection.
	 For more information, see DNA Sequencing by Capillary Electrophoresis Chemistry Guide Second Edition (Pub. No. 4305080).

Plate and strip-tube layout

You can print a plate layout in the Plate Manager software. See "Print the plate layout" on page 126.

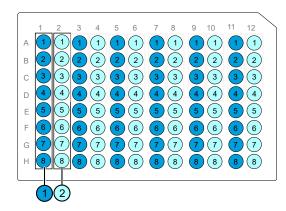


Figure 9 96-well plate and strip-tube capillary-toplate mapping (8 capillary)

- Injection 1, 3, 5, 7, 9, 11 (wells A–H)
- Injection 2, 4, 6, 8, 10, 12 (wells A–H)

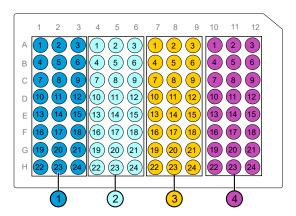


Figure 10 96-well plate and strip-tube capillary-to-plate mapping (24 capillary)

- Injection 1 (wells A1–H3)
- Injection 2 (wells A4–H6)
- Injection 3 (wells A7–H9)
- Injection 4 (wells A10–H12)

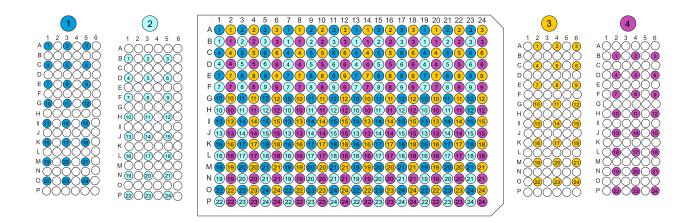


Figure 11 384-well plate capillary-to-plate mapping (24 capillary only)

- Injection 1 (wells A1, A3, A5; wells C1, C3, C5; wells E1, E3, E5; wells G1, G3, G5; wells I1, I3, I5; wells K1, K3, K5; wells M1, M3, M5; wells O1, O3, O5)
- Injection 2 (wells B1, B3, B5; wells D1, D3, D5; wells F1, F3, F5; wells H1, H3, H5; wells J1, J3, J5; wells L1, L3, L5; wells N1, N3, N5; wells P1, P3, P5)
- Injection 3 (wells A2, A4, A6; wells C2, C4, C6; wells E2, E4, E6; wells G2, G4, G6; wells I2, I4, I6; wells K2, K4, K6; wells M2, M4, M6; wells O2, O4, O6)
- Injection 4 (wells B2, B4, B6; wells D2, D4, D6; wells F2, F4, F6; wells H2, H4, H6; wells J2, J4, J6; wells L2, L4, L6; wells N2, N4, N6; wells P2, P4, P6)

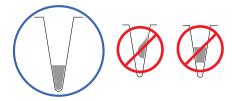
Prepare and assemble sample plates

IMPORTANT! Do not use warped or damaged plates.

Prepare sample plates

- If you use plates with barcodes, check the barcode label before proceeding.
 If the barcode label is dirty, wipe it clean. If the barcode label is not attached firmly to the plate, do not use the plate.
- 2. Pipet samples into the plate wells.
- 3. Briefly centrifuge the plate.
- 4. Verify that each sample is positioned correctly at the bottom of its well.

IMPORTANT! If the contents of any well contain bubbles or are not located at the bottom of the well, repeat step 3 and step 4.



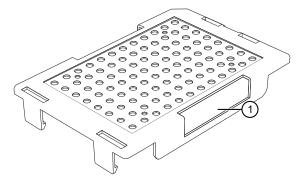
5. Store the plate on ice and protected from light until you are ready to load the plate in the instrument.

Prepare the plate assembly

Prepare the plate assembly on a clean, level surface. Wear gloves when handling septa. Do not heat plates that are sealed with septa.

Plate retainer required for the SeqStudio™ Flex Series Genetic Analyzer

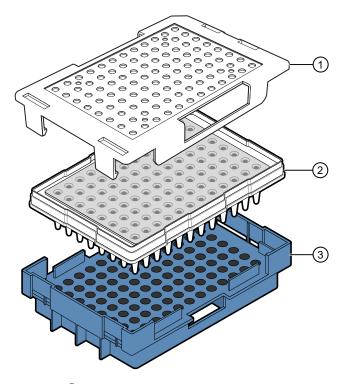
For the SeqStudio™ Flex Series Genetic Analyzer, use the SeqStudio™ Flex series plate retainers only, which have one opening to allow barcode reading. For catalog numbers, see "Plates bases retainers and septa" on page 547. Using the older style plate retainers with two openings on the side can cover the plate barcode and cause a barcode error in the home screen.



① SeqStudio™ Flex series plate retainer that allows barcode reading

96-well plate assembly, standard or fast

IMPORTANT! Use the correct 96-well standard or fast plate retainer and plate base with the same catalog number. Using the wrong plate base may affect performance. For plate assembly specifications and catalog numbers, see Appendix D, "Catalog numbers".



- 1) Plate retainer with one opening on side to allow barcode reading
- 2 Plate with septum
- (3) Plate base

Note: Reuse of the septum is not recommended.

- 1. Align the holes in the septum with the wells of the plate, then press down firmly on the septa until the septum lies flat on the plate.
- 2. If the contents of any well contain bubbles or are not located at the bottom of the well, briefly centrifuge the plate, remove the plate from the centrifuge, then verify that each sample is positioned correctly in the bottom of its well.
- 3. Place the plate into the plate base.
- 4. Snap the plate retainer (cover) onto the plate base.

IMPORTANT! Ensure that the plate retainer is firmly snapped in place on top of the plate (see "Prepare the plate assembly" on page 78). If the retainer is not snapped in place, the plate assembly can become jammed in the drawer.

5. Verify that the holes of the plate retainer and the septum are aligned. If the holes are not aligned, take the assembly apart, then re-assemble.

IMPORTANT! The array tips will be damaged if the plate retainer and septum holes are not aligned.

8-tube strip assembly, standard or fast

IMPORTANT! Use the correct 8-tube standard or fast strips plate retainer and plate base with the same catalog number. Using the wrong plate base may affect performance. See Appendix D, "Catalog numbers" for plate assembly specifications and catalog numbers.

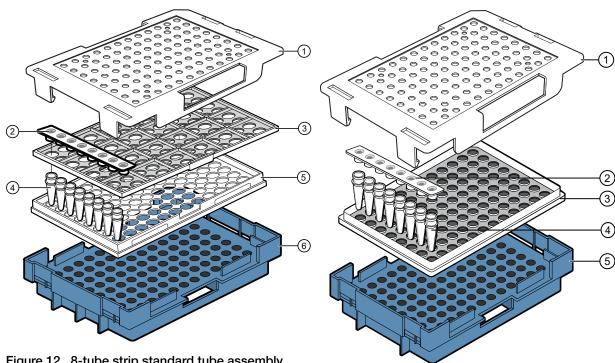


Figure 12 8-tube strip standard tube assembly

- (1) Plate retainer with one opening on side to allow barcode reading
- 2 Septum strip
- (3) Retainer
- 4) 8-tube strip standard tubes
- 5 96-well tray
- 6 Plate base

Figure 13 8-tube strip fast tube assembly

- 1 Plate retainer with one opening on side to allow barcode reading
- (2) Septum strip
- 3 96-well tray
- 4) 8-tube strip fast tubes
- (5) Plate base

Note: Reuse of the septa strips is not recommended.

- 1. If the reagents of any tube contain bubbles or are not located at the bottom of the well, briefly centrifuge the plate, remove the plate from the centrifuge, then verify that each sample is positioned correctly in the bottom of its well.
- 2. Place the tubes in the 96-well tray.

Ensure that the orientation of the 8-strip tubes matches the plate layout of the plate file and the well numbers of the 96-well tray. If the orientation is incorrect, the samples on the plate will not match the sample information in the plate file. Data will be identified with incorrect well IDs and sample information.

- 3. For 8-strip standard tubes, place the retainer on the tubes.
- 4. Align the holes in the septum strip with the retainer (8-strip standard tube) or the tubes (8-strip fast tube), then firmly press down.

IMPORTANT! The array tips will be damaged if the plate retainer and septum strip holes are not aligned.

- 5. Place the tray-tube-retainer assembly into the plate base.
- **6.** Snap the plate retainer (cover) onto the plate base.

IMPORTANT! Ensure that the plate retainer is firmly snapped in place on top of the plate (see "Prepare the plate assembly" on page 78). If the retainer is not snapped in place, the plate assembly can become jammed in the drawer.

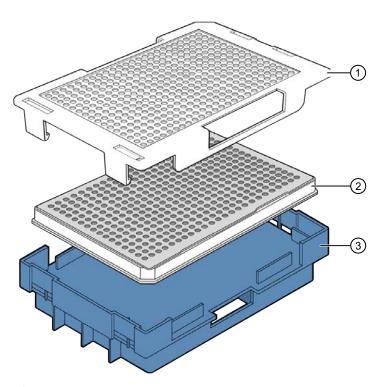
7. Verify that the holes of the plate retainer and the septum strip are aligned. If the holes are not aligned, take the assembly apart, then re-assemble.

384-well plate assembly

IMPORTANT! Use the correct 384-well plate retainer and plate base with the same catalog number. Using the wrong plate base may affect performance. See Appendix D, "Catalog numbers" for plate assembly specifications and catalog numbers.

- 1. If the reagents of any well contain bubbles or are not located at the bottom of the well, briefly centrifuge the plate, remove the plate from the centrifuge, then verify that each sample is positioned correctly in the bottom of its well.
- 2. Place the plate into the plate base.
- 3. Place the septum on the plate and press down to seat.

Note: Reuse of the septum is not recommended.



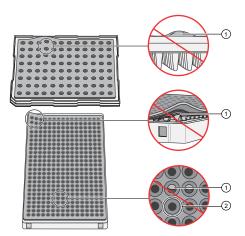
- 1) Plate retainer with one opening on side to allow barcode reading
- 2 Plate with septum
- (3) Plate base
- 4. Snap the plate retainer (cover) onto the plate base.

IMPORTANT! Ensure that the plate retainer is firmly snapped in place on top of the plate (see "Prepare the plate assembly" on page 78). If the retainer is not snapped in place, the plate assembly can become jammed in the drawer.

5. Verify that the holes of the plate retainer and the septum are aligned. If the holes are not aligned, take the assembly apart, then re-assemble.

Check the alignment and seating of the septum

Check the alignment of the septum with the wells and ensure that the retainer is firmly snapped in place.



- Septum and well are not aligned
- ② Septum and well are properly aligned



Create a plate file on the instrument

Create, copy, or import a plate file	84
Enter plate properties	89
Enter injection properties	90
Specify replicate injections	94
Enter sample names, sample types, and custom fields	95

Create, copy, or import a plate file

Ensure that each plate file has a unique name. Do not enter any personal information, such as the name of a person, date of birth, address, or social security number in any fields when you create a plate file.

Note: The instrument does not provide an option to print the plate layout. If you require a printed plate layout for reference when adding samples to a plate, create the plate file in the Plate Manager software. For more information, see Chapter 5, "(Optional) Create a plate file in the Plate Manager software" and "Print the plate layout" on page 126.

Options for creating plate files

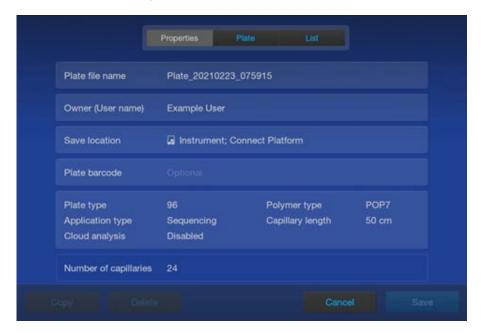
You can create a plate file on the instrument, but it may be more convenient to create a plate file in the Plate Manager software. The Plate Manager software offers these advantages:

- Easier entry of sample names and other attributes
- Shortcut keys are available
- Ability to copy and paste entries
- · Ability to print the plate layout

For information on using Plate Manager, see Chapter 5, "(Optional) Create a plate file in the Plate Manager software".

Create a plate file

1. In the home screen, tap ⊙ Actions ➤ Create plate file.

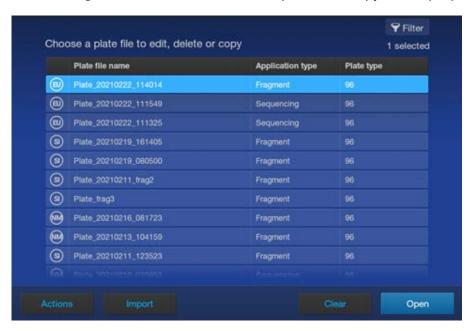


Note: This function is the same function you access from the **Create a new plate file** option on the **Link Plate** screen and the **Copy** function in the **Plate files** library.

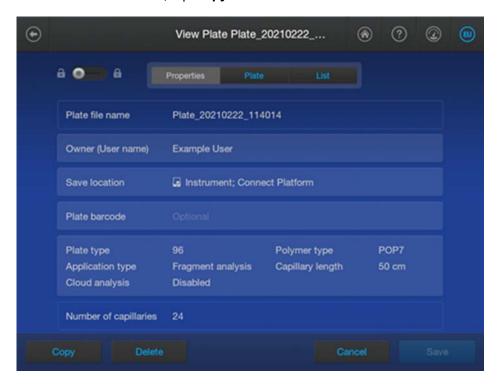
2. Proceed to "Enter plate properties" on page 89.

Copy a plate file

- 1. In the home screen, tap ⊕ Actions ➤ Library ➤ Plate files.
- 2. In the Manage Plate Files screen, select the plate file to copy, then tap Open.



3. In the View Plate screen, tap Copy.



- 4. Enter a name for the plate file.
- 5. Proceed to "Enter plate properties" on page 89.

Import a plate file

PSM and CSV plate files for import into the instrument

The Plate Manager software can create plate files in PSM or CSV format.

Note: The instrument also creates a PSM file when you save a plate file.

PSM format

PSM files are in an encrypted format that can be created and opened only by the instrument software or the Plate Manager software.

- A PSM file contains the following information:
 - Plate properties
 - Injection settings, file name conventions, results group, sample name and all remaining information that is needed to collect and analyze data

When you open a PSM file on the instrument, the settings from the PSM file are automatically created if they are not already present in the libraries on the instrument.

CSV format

CSV files are in a comma-delimited format that can be created in the Plate Manager software or another application such as Excel™ or Notepad. CSV files can be opened by the instrument software, the Plate Manager software, or other applications.

- A CSV file contains the following information:
 - Plate properties
 - Only the names of settings that are needed to collect and analyze data.

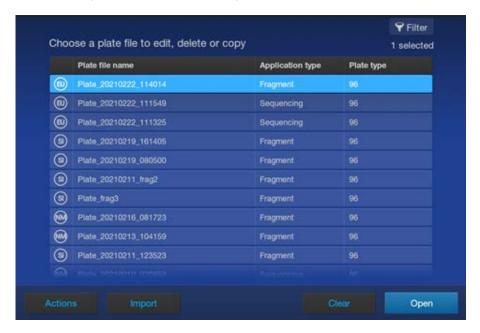
For information on creating a plate file in CSV format in the Plate Manager software, see "Save a plate file in CSV format" on page 130 and "Load or download an example plate file" on page 128.

When you open a CSV file on the instrument, the following occurs:

- If any of the settings that are named in the CSV file are not already present in the libraries on the instrument, an error message is displayed and the CSV file is not imported.
- If all settings that are named in the CSV file are already present in the libraries on the instrument, the CSV file is imported and the settings from existing items are used.

Import a plate file

- 1. In the home screen, tap ⊕ Actions ➤ Library ➤ Plate files.
- 2. In the Manage Plate Files screen, tap Import.



3. Navigate to the location where the plate file has been saved (network drive, Thermo Fisher™ Connect Platform, or USB drive), then select the plate file.

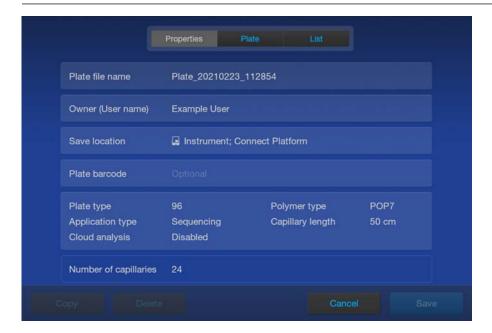
IMPORTANT! Perform a virus scan on a USB drive before inserting it into a port on the instrument.

- 4. When the plate file is imported into the library, select it, then tap **Open**.
- 5. Proceed to "Enter plate properties" on page 89.

Enter plate properties

After you create, copy, or import a plate file, the Create Plate or View Plate screen is displayed.

Note: The figure shown below is for creating a plate file. The fields and information are the same if you copy or import a plate file. However, you cannot change the plate file name for an imported plate file. To change the name of an imported plate file, make a copy of the plate file. See "Copy a plate file" on page 86.



1. *(Optional)* Tap a section of the screen, then change the default setting for **Plate file name**, **Owner**, **Save location** (for results), **Plate barcode**, **Plate type**, or **Application type**.

For information on the settings, see "Plate files library" on page 262.

2. (Optional) Select additional locations for the results in the Save location field.

The plate file and the results are always saved to the instrument.

In addition, you can save the results to a network drive, a USB drive, or the Thermo Fisher™ Connect Platform. The save location for results can be changed when the plate file is linked before a run.

To set a default save location for results, see "Set the default save location for results" on page 477.

Note: If you open a previously saved plate file and the **Save location** field displays strikethrough text, it means that the instrument is no longer connected to the originally specified save location. You cannot run the plate file until the instrument is connected to the save location again. Alternatively, make a copy of the plate file without the disconnected save location. To make a copy, select \odot **Actions > Library > Plate files**, select the plate file, then tap **Open > Copy**.

- 3. Tap the **Plate** tab at the top of the screen.
- 4. Proceed to "Enter injection properties" on page 90.

Enter injection properties

After you tap the **Plate** tab in the create or view screen, the plate view is displayed with the first injection group selected.

Note: *Injection group* refers to each set of 8 or 24 wells on the plate, based on instrument configuration.



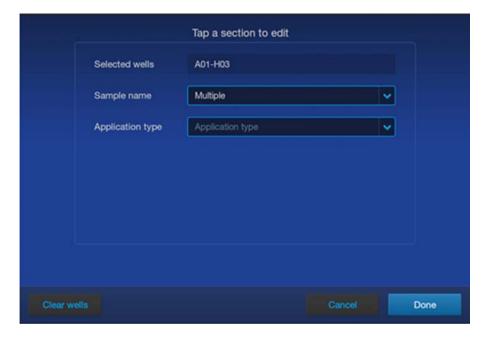
- 1. Select additional injection groups as needed.
 - Tap a well to select a single injection group.
 - Press-drag to select multiple injection groups or the entire plate.
 - Tap (Select/deselect) at the top left of the plate to select or deselect all wells on the plate.

Note: All settings in the remaining steps will be assigned to all selected injection groups. If different injection groups require different settings, repeat these steps for each injection group.

2. Tap the injection pane to display the **Edit Injection Properties** screen.



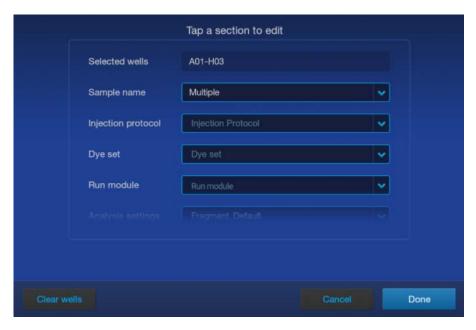
If you are creating a mixed plate, the first **Edit Injection Properties** screen is displayed.



3. Tap the **Application type** field, select the application for the wells, then tap **Done**.



4. In the next Edit Injection Properties screen, specify the settings for the injection.



Specify settings by doing either of the following:

- In the **Injection protocol** field, select a protocol. An injection protocol contains the elements listed below. When you select an injection protocol, these elements are automatically selected. However, you can tap any of the fields below the Injection protocol field to select a different element for the plate file as described below. Swipe up to display the rest of the screen.
- Select individual elements in the following fields. Selecting an individual element overrides an injection protocol selection and clears the Injection protocol field.
 - Dye set
 - Run module
 - **Analysis settings**
 - Size standard (fragment/HID analysis only)

Note: If you use the BigDye™ Direct Cycle Sequencing Kit, select **Z_BigDye Direct** for the dye set. For more information, see "Using BigDye™ Direct Cycle Sequencing Kit chemistry" on page 314.

For information on creating injection protocols and other run settings, see Chapter 11, "Manage library resources on the instrument".

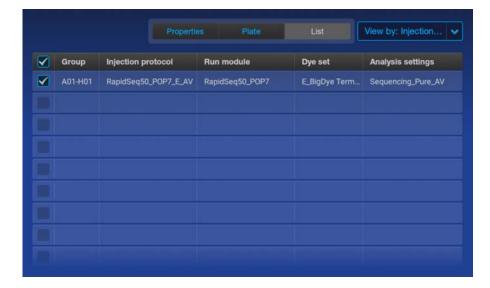
- 5. (Optional) Select a file name convention or a results group.
 - A file name convention determines the naming of results files.
 The default sequencing file name convention appends WellID_SampleName_Timestamp to the file name. The default fragment file name convention appends
 WellID_SampleName_SampleType_Timestamp to the file name.
 - A results group determines the organization of results files.
 The default results group organizes and groups files by start run time. On the instrument, results are not grouped into subfolders specified by the results group, but you can view results by results group name.
- 6. (Optional) Specify replicate injections. See "Specify replicate injections" on page 94.
- 7. *(Optional)* View well attributes or details for the injection group. See "(Optional) View injection group details and/or well attributes" on page 93.
- 8. Tap the **Sample name** field, then proceed to "Enter sample names, sample types, and custom fields" on page 95.

(Optional) View injection group details and/or well attributes

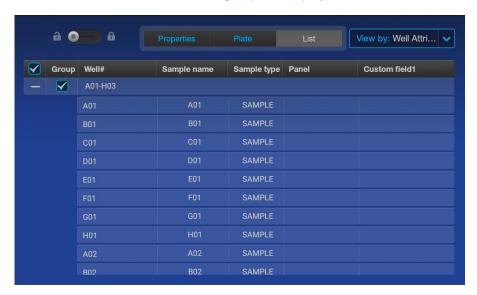
Note: *Injection group* refers to each set of 8 or 24 wells on the plate, based on instrument configuration.

- 1. In the Create Plate or View Plate screen, tap the List tab.
- 2. Select a checkbox next to the group of interest.
- 3. Tap the View by: Injection Group dropdown list, then tap Injection Group.

 The injection protocol, run module, dye set, analysis settings, and (fragment/HID analysis only) size standard for the selected group are displayed.



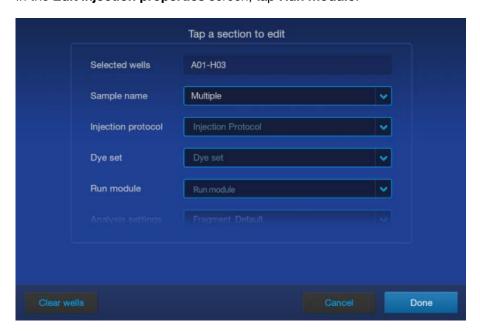
4. Tap the **View by** dropdown list, then tap **Well Attributes**. The well attributes for the selected group are displayed.



5. Tap (-) (Back) to return to the previous screen.

Specify replicate injections

1. In the Edit injection properties screen, tap Run module.



2. Select up to 6 different run modules.

Samples will be re-injected using each run module.

To re-inject using the same run module or using modified run module settings, see "Cancel or add injections or specify re-injections in the Run Queue screen" on page 165.

Enter sample names, sample types, and custom fields

After you tap the **Sample name** field in the **Edit Injection Properties** screen, the **Edit Well Properties** screen is displayed.



Figure 14 Edit Well Properties screen

Note: If you want to use the default settings for sample names (well ID), Sample type (sample), or amplicon or specimen (blank) and do not need to add special fields, you can skip this step.

- 1. In the Edit Well Properties screen, tap an attribute in the left column, for example, Sample name.
- 2. Tap the checkbox next to one or more wells, or tap the checkbox next to Select all to batch edit.
- 3. Tap the entry field for the attribute (for example, Sample Name), enter the setting, then tap Enter.
- 4. Repeat for all entry fields for the attribute.
- 5. Repeat for each attribute in the left column, and enter or select the appropriate setting:
 - (Sequencing only, not shown in Figure 14) Amplicon and Specimen—Optional text that can be used by secondary analysis software.
 - (Fragment/HID analysis only) Panel—Optional text that can be used by secondary analysis software.
 - (Fragment/HID analysis only) Sample type—Sample, Positive Control, Negative Control, or Allelic Ladder.
 - **Custom fields 1–10**—Text fields to include additional sample attributes or identifiers that can be used in file name conventions or by secondary analysis applications.
- 6. Tap **Done** to close the **Edit Well Properties** screen, then tap **Done** again to close the **Edit Injection Properties** screen.

Chapter 4 Create a plate file on the instrument Enter sample names, sample types, and custom fields

- 7. Tap **Save**.
- 8. (Optional) Lock the plate file. See "Lock or unlock a library entry" on page 259.
- 9. Proceed to Chapter 6, "Start and monitor a run".



(Optional) Create a plate file in the Plate Manager software

Available Plate Manager software platforms	. 97
Get started with the Plate Manager software (desktop)	. 98
Get started with the Plate Manager software (cloud)	107
Set up a plate file	116
Keyboard shortcuts and examples	122
Set up cloud analysis in the Plate Manager software (cloud)	125
Print the plate layout	126
Send a plate file to the Inbox on the instrument	127
Additional functions in the Plate Manager software	128

Ensure that each plate file has a unique name. Do not enter any personal information, such as the name of a person, date of birth, address, or social security number in any fields when you create a plate file.

Available Plate Manager software platforms

The SeqStudio™ Plate Manager software (2.1 or later) is an optional software platform used to create plate files in PSM format or CSV format. For a definition of formats and suggestions for when to use each format, see "PSM and CSV plate files for import into the instrument" on page 87.

Two Plate Manager software platforms are available. You can use either platform with the instrument.

Platform	Description
SeqStudio™ Plate Manager software (desktop)	Use this platform to create plate files and send them to the Inbox on an instrument.
SeqStudio™ Plate Manager software (cloud)	 Use this platform to: Create plate files and send them to the Inbox on an instrument. Set up automatic cloud analysis. Access the SeqStudio™ Flex Remote Monitoring software. IMPORTANT! The Plate Manager software (cloud) requires connection to the Thermo Fisher™ Connect Platform. You must have a Thermofisher.com account; see Chapter 9, "Use the instrument with the Thermo Fisher™ Connect Platform".

In this document, the Plate Manager software is referred to in the following ways:

- If a section is specific to a platform, the software is identified as Plate Manager software (desktop) or Plate Manager software (cloud).
- If a section applies to both platforms, the software is identified as Plate Manager software.

Note: The Plate Manager software does not include SAE functionality. Auditing for a plate file begins when it is linked or when it is imported into the **Plate files** library in the instrument software.

Get started with the Plate Manager software (desktop)

About the software (desktop)

The software (desktop) is used to create plate files in PSM format or CSV format. For a definition of formats and suggestions for when to use each format, see "PSM and CSV plate files for import into the instrument" on page 87.

The Plate Manager software (desktop) provides the same basic functions as the Plate Manager software (Thermo Fisher™ Connect Platform), but does not have access to the SeqStudio™ Flex Remote Monitoring software or automated cloud analysis.

Plate files can be run on the SeqStudio™ Flex Series Genetic Analyzer or the SeqStudio™ Genetic Analyzer.

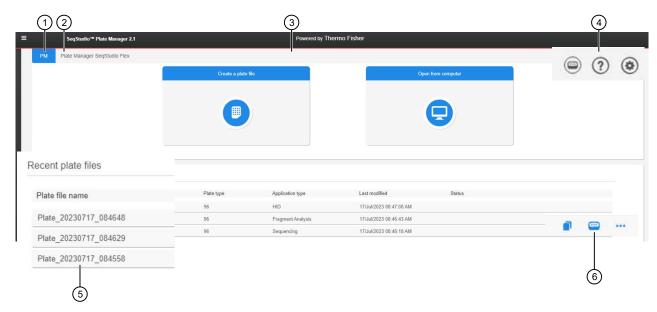
IMPORTANT! The Plate Manager software (desktop) does not include SAE functionality. If SAE mode is enabled for the instrument, auditing for a plate file begins when it is linked or when it is imported into the **Plate files** library.

For more information

This guide provides information on using the SeqStudio™ Plate Manager 2.1 software with the SeqStudio™ Flex Series Genetic Analyzer.

For information on using the SeqStudio[™] Plate Manager 2.1 software with the SeqStudio[™] Genetic Analyzer, see SeqStudio[™] Genetic Analyzer Instrument and Software User Guide (Pub. No. MAN0018646 for v1.2 software or Pub. No. MAN0016138 for v1.1 software).

Parts of the Plate Manager software (desktop) home screen



- 1 PM icon
- (2) Instrument type
- 3 Create or open a plate file
- 4) Switch instrument, help, and settings
- 5 Recent plate files list
- 6 Copy, send to instrument, and actions

Screen element	Description
PMicon	Click in any screen to display the home screen.
Instrument type	The instrument type determines the type of plate file you set up (SeqStudio Flex or SeqStudio). Click (Switch instrument) to switch between SeqStudio Flex and SeqStudio.
Create or open a plate file Create a plate file Copon from computer	 Allows you to do the following: Create a new plate file. Open a plate file (PSM file) that you created in the Plate Manager software or on the instrument. Open a plate file (CSV file) that you downloaded from the Plate Manager software or created in a spreadsheet or text editor application.
(Switch instrument)	Switches the instrument type between SeqStudio ™ Flex and SeqStudio ™. The type of plate file you set up is determined by the instrument type that is selected.



(continued)

Screen element	Description
?	Opens the software help system.
(Help)	
*	Displays the selections for the default Save location for plate files, connecting the Plate Manager software to an instrument, and accessing libraries.
(Settings)	
Recent plate files list	Lists the 10 most recently created or edited plate files and their status. The status indicates if a plate file was sent to an instrument. New plate files are added to the top of the list. The oldest plate file is automatically removed when a new plate file is added.
	If a Failed to send status is shown, place the cursor over the status to display the reason for the failure.
	Failed to send
	936000786 : Failed to send (Duplicate plate name)
	Makes a copy of the selected plate file with _Copy appended to the plate name.
(Copy & edit, in Recent plate files list)	
	Allows you to select one or more instruments, then sends the selected plate file to the Inbox on the instrument(s).
(Send to instrument, in Recent plate files list)	
• • •	Contains the following commands:
(Actions in Decembrate	• Export (plate file)
(Actions, in Recent plate files list)	Remove from Recent Files
- ,	Delete permanently Consol cond to instrument
	Cancel send to instrument

PSM and CSV plate files for import into the instrument

The Plate Manager software can create plate files in PSM or CSV format.

Note: The instrument also creates a PSM file when you save a plate file.

PSM format

PSM files are in an encrypted format that can be created and opened only by the instrument software or the Plate Manager software.

- A PSM file contains the following information:
 - Plate properties
 - Injection settings, file name conventions, results group, sample name and all remaining information that is needed to collect and analyze data

When you open a PSM file on the instrument, the settings from the PSM file are automatically created if they are not already present in the libraries on the instrument.

CSV format

CSV files are in a comma-delimited format that can be created in the Plate Manager software or another application such as Excel™ or Notepad. CSV files can be opened by the instrument software, the Plate Manager software, or other applications.

- A CSV file contains the following information:
 - Plate properties
 - Only the names of settings that are needed to collect and analyze data.

For information on creating a plate file in CSV format in the Plate Manager software, see "Save a plate file in CSV format" on page 130 and "Load or download an example plate file" on page 128.

When you open a CSV file on the instrument, the following occurs:

- If any of the settings that are named in the CSV file are not already present in the libraries on the instrument, an error message is displayed and the CSV file is not imported.
- If all settings that are named in the CSV file are already present in the libraries on the instrument, the CSV file is imported and the settings from existing items are used.

Network and password security requirements

Network configuration and security

The network configuration and security settings of your laboratory or facility (such as firewalls, antivirus software, network passwords) are the sole responsibility of your facility administrator, IT, and security personnel. This product does not provide any network or security configuration files, utilities, or instructions.

If external or network drives are connected to the software, it is the responsibility of your IT personnel to ensure that such drives are configured and secured correctly to prevent data corruption or loss. It is the responsibility of your facility administrator, IT, and security personnel to prevent the use of any unsecured ports (such as USB, Ethernet) and ensure that the system security is maintained.



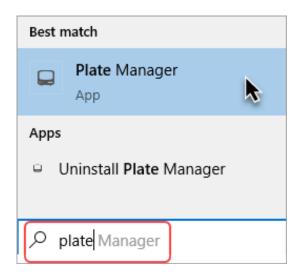
Password security

Thermo Fisher Scientific strongly recommends that you maintain unique passwords for all accounts in use on this product. All passwords should be reset upon first sign in to the product. Change passwords according to your organization's password policy.

It is the sole responsibility of your IT personnel to develop and enforce secure use of passwords.

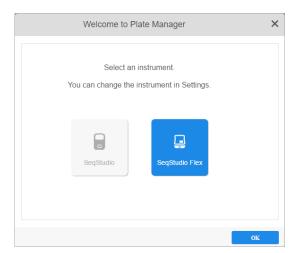
Access the Plate Manager software (desktop)

1. In the Windows[™] desktop, click , type **Plate Manager**, then select **Plate Manager** from the start menu.

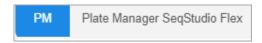


2. (First use only) In the Select an instrument screen, select SeqStudio Flex.

The instrument type determines the plate type that is created. You can change the instrument type at any time in the home screen by clicking (Switch instrument) at the top right of the screen.



The selected instrument type is displayed at the top left of the Plate Manager software home screen.

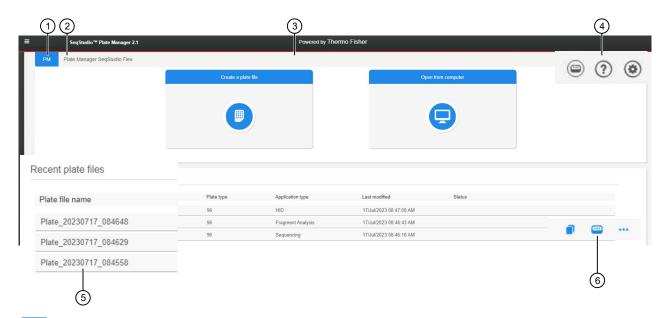


Note: You can also use the Plate Manager software with a SeqStudio[™] instrument. To change the default instrument type, click **(Switch instrument)** at the top right of the screen, then select **SeqStudio**.



For information, see *SeqStudio™ Genetic Analyzer Instrument and Software User Guide* (Pub. No. MAN0018646 for v1.2 software or MAN0016138 for v1.1 software).

Parts of the Plate Manager software (desktop) home screen



- 1 PM icon
- 2 Instrument type
- 3 Create or open a plate file
- 4 Switch instrument, help, and settings
- (5) Recent plate files list
- 6 Copy, send to instrument, and actions

Screen element	Description
PMicon	Click in any screen to display the home screen.
Instrument type	The instrument type determines the type of plate file you set up (SeqStudio Flex or SeqStudio).
	Click (Switch instrument) to switch between SeqStudio Flex and SeqStudio.



(continued)

Screen element	Description
Create or open a plate file Create a plate file Country of the computer Country of the computer	 Allows you to do the following: Create a new plate file. Open a plate file (PSM file) that you created in the Plate Manager software or on the instrument. Open a plate file (CSV file) that you downloaded from the Plate Manager software or created in a spreadsheet or text editor application.
(Switch instrument)	Switches the instrument type between SeqStudio ™ Flex and SeqStudio ™. The type of plate file you set up is determined by the instrument type that is selected.
(Help)	Opens the software help system.
(Settings)	Displays the selections for the default Save location for plate files, connecting the Plate Manager software to an instrument, and accessing libraries.
Recent plate files list	Lists the 10 most recently created or edited plate files and their status. The status indicates if a plate file was sent to an instrument. New plate files are added to the top of the list. The oldest plate file is automatically removed when a new plate file is added. If a Failed to send status is shown, place the cursor over the status to display the reason for the failure.
	Failed to send
	936000786 : Failed to send (Duplicate plate name)
(Copy & edit, in Recent plate files list)	Makes a copy of the selected plate file with _Copy appended to the plate name.
(Send to instrument, in Recent plate files list)	Allows you to select one or more instruments, then sends the selected plate file to the Inbox on the instrument(s).

(continued)

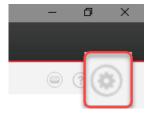
Screen element	Description
(Actions, in Recent plate files list)	Contains the following commands: • Export (plate file) • Remove from Recent Files • Delete permanently • Cancel send to instrument

Connect the Plate Manager software (desktop) to an instrument

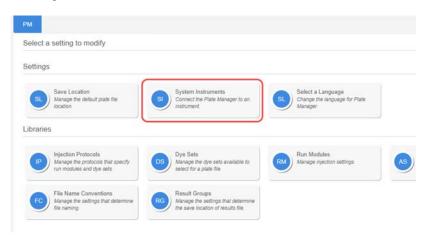
When the Plate Manager software is connected to an instrument, you can send a plate file to the **Inbox** on the instrument.

To use this feature, the following is required:

- The instrument and the computer must be connected to a network or directly connected to each other. For information, see "Connect the instrument to a computer or network (hardware connections)" on page 446.
- You need the IP address of the instrument to connect to the Plate Manager software. See "Display instrument hardware and software information" on page 459.
- 1. At the top right of the Plate Manager software home screen, click (Settings).



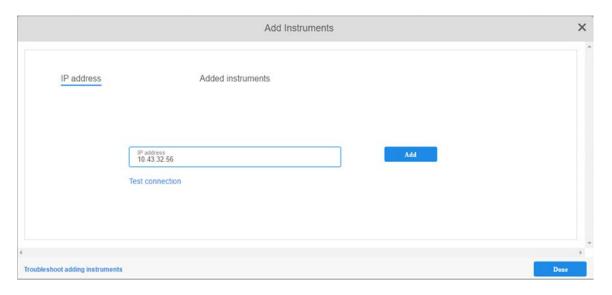
2. Click System Instruments.



3. Enter the IP address of the instrument in the IP address field, then click Test connection.

Note: To determine if the instrument is already connected, click Added instruments.

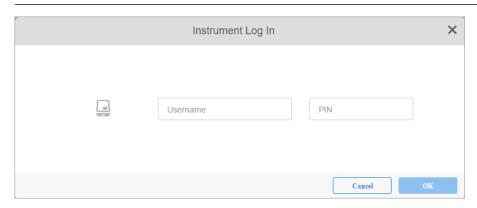




If the connection is not valid, check the address that you entered.

4. Click Add, enter information in the Username and PIN for the instrument fields, then click OK.

Note: You can enter a local or a cloud profile. For information on cloud and local profiles, see Chapter 9, "Use the instrument with the Thermo Fisher™ Connect Platform".



Note: To delete an instrument, click **Added instruments**, select an instrument, then click $\hat{\mathbf{m}}$ (**Delete**).

Get started with the Plate Manager software (cloud)

About the SeqStudio™ Plate Manager software (Thermo Fisher™ Connect Platform)

The SeqStudio™ Plate Manager software is used to create plate files in PSM format or CSV format. For a definition of formats and suggestions for when to use each format, see "PSM and CSV plate files for import into the instrument" on page 87.

Plate files can be run on the SeqStudio™ Flex Series Genetic Analyzer or the SeqStudio™ Genetic Analyzer.

IMPORTANT! The Plate Manager software (cloud) does not include SAE functionality. If SAE mode is enabled for the instrument, auditing for a plate file begins when it is linked or when it is imported into the **Plate files** library.

SeqStudio™ Flex and SeqStudio™ instruments

If a SeqStudio[™] Flex Series Genetic Analyzer or a SeqStudio[™] Genetic Analyzer is linked to your Thermofisher.com account, the Plate Manager software provides the following features:

- · Create plate files on the cloud
- Access the Remote Monitoring software to monitor instrument runs remotely from a computer or a smart device

SeqStudio™ Flex instruments

For the SeqStudio™ Flex Series Genetic Analyzer, the Plate Manager software provides these additional features:

- Send plate files from the Plate Manager software to the Inbox on the instrument
- · Set up automated cloud analysis

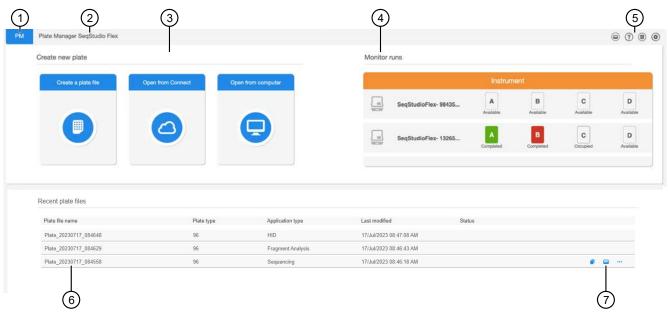
For more information

This guide provides information on using the SeqStudio™ Plate Manager software with the SeqStudio™ Flex Series Genetic Analyzer.

For information on using the SeqStudio[™] Plate Manager software with the SeqStudio[™] Genetic Analyzer, see SeqStudio[™] Genetic Analyzer Instrument and Software User Guide (Pub. No. MAN0018646 for v1.2 software or Pub. No. MAN0016138 for v1.1 software).

5

Parts of Plate Manager software (cloud) home screen



- 1 PM icon
- (2) Instrument type
- 3 Create or open a plate file
- 4 Monitor runs

- (5) Switch instrument, release notes, settings, and help
- (6) Recent plate files list
- 7 Copy, send to instrument, and actions

Screen element	Description
PM icon	Click in any screen to display the home screen.
Instrument type	The instrument type determines the type of plate file you set up (SeqStudio Flex or SeqStudio).
	Click (Switch instrument) to switch between SeqStudio Flex and SeqStudio.
Create or open a plate file Create new pate Control pate 10 Control pat	 Allows you to do the following: Create a new plate file. Open a plate file (PSM file) that you created in the Plate Manager software or on the instrument. Open a plate file (CSV file) that you downloaded from the Plate Manager software or created in a spreadsheet or text editor application.

(continued)

Screen element	Description
Instrument Instrument1 A B C D Completed Completed Completed Completed Completed Completed Completed Completed Completed Completed Completed Completed Completed Completed Completed Completed Completed Completed Completed C	Lists the instruments that are linked to your Thermofisher.com account or your local profile. SeqStudio™ Flex Series Genetic Analyzer and SeqStudio™ Genetic Analyzer instrument types can be listed.
	For more information, see:
	"Connect Plate Manager software (cloud) to an instrument" on page 116
	"Plate position status and plate run status" on page 40
	You can click an instrument to display the SeqStudio™ Flex Remote Monitoring main screen. For more information, see Chapter 6, "Start and monitor a run".
	Change instrument type between SeqStudio ™ Flex and SeqStudio ™.
(Switch instrument)	The type of plate file you set up is determined by the instrument type that is selected.
	Displays release notes for the software.
(Release notes)	
*	Displays the selections for the default Save location for plate files and accessing libraries.
(Settings)	
?	Opens the software help system.
(Help)	
Recent plate files list	Lists the 10 most recently created or edited plate files and their status. The status indicates if a plate file was sent to an instrument. New plate files are added to the top of the list. The oldest plate file is automatically removed when a new plate file is added.
	If a Failed to send status is shown, place the cursor over the status to display the reason for the failure.
	Failed to send
	936000786 : Failed to send
	(Duplicate plate name)
	Makes a copy of the selected plate file with _Copy appended to the plate name.
(Copy & edit, in Recent plate files list)	



(continued)

Screen element	Description		
	Allows you to select one or more instruments, then sends the selected plate file to the Inbox on the instrument(s).		
(Send to instrument, in Recent plate files list)			
• • •	Includes the following commands:		
	Export (plate file)		
(Actions, in Recent plate files list)	Remove from Recent Files		
	Delete Permanently		
	Cancel Send to Instrument		

Plate position status and plate run status

Status	Description		
Plate position sta	Plate position status		
Occupied	The corresponding position in the instrument drawer contains a plate. These positions are labeled as Link plate file in the instrument home screen.		
Available	The corresponding position in the instrument drawer is empty.		
Plate run status			
In queue	An injection is waiting to start. The injection will start based on the order of the injection list displayed in the Run Queue screen.		
Running	Data collection for the injection is in process.		
Analyzing	Data collection for the injection is complete, analysis is in process.		
Exporting	Result files are being sent to the Save location in the plate file.		
Completed	Analysis and export is complete, results are available.		
Aborting/aborted	An injection with status of Running was cancelled.		
Cancelled	An injection with status of In queue was cancelled.		
Paused	The instrument was paused and the "pause immediately" option was selected.		
	The pause and cancel commands can be issued in the SeqStudio™ Flex Remote Monitoring software or on the instrument.		
	Runs must be resumed on the instrument.		

Secondary analysis cloud applications on the Thermo Fisher™ Connect Platform

The secondary analysis cloud applications listed below are available for cloud analysis.

Note: Cloud analysis is not supported for HID applications.

Visit apps.thermofisher.com for the latest available secondary analysis applications.

Secondary analysis applications on the Connect Platform

Analysis	Арр	Description
Sequencing	Quality Check (QC) module	Automatically checks sequence trace quality.
	∧ [∞]	 Provides a results summary that is based on quality parameter settings.
		Auto-flags lower-quality traces for further inspection.
	Variant Analysis (VA) module	 Finds variants in samples that are sequenced on Applied Biosystems[™] genetic analyzers.
	₽	Reports variants at genomic coordinates.
		Allows export of variant calls in standard Variant Call Format.
	Next-generation Confirmation (NGC) module	Confirms next-generation sequencing (NGS) variants using capillary electrophoresis (CE) technology.
	NGC <u>a</u> N	Allows visualization of the variants that are detected by both NGS and CE platforms.
		Allows export of confirmed variants in standard Variant Call Format.
Fragment	Peak Scanner™ Software	Performs peak sizing.
analysis	∕ o [®]	
	Microsatellite Analysis Software	Performs peak sizing and genotyping on microsatellite samples.
	MSA	

PSM and CSV plate files for import into the instrument

The Plate Manager software can create plate files in PSM or CSV format.

Note: The instrument also creates a PSM file when you save a plate file.

PSM format

PSM files are in an encrypted format that can be created and opened only by the instrument software or the Plate Manager software.

- A PSM file contains the following information:
 - Plate properties
 - Injection settings, file name conventions, results group, sample name and all remaining information that is needed to collect and analyze data

When you open a PSM file on the instrument, the settings from the PSM file are automatically created if they are not already present in the libraries on the instrument.

CSV format

CSV files are in a comma-delimited format that can be created in the Plate Manager software or another application such as Excel™ or Notepad. CSV files can be opened by the instrument software, the Plate Manager software, or other applications.

- A CSV file contains the following information:
 - Plate properties
 - Only the names of settings that are needed to collect and analyze data.

For information on creating a plate file in CSV format in the Plate Manager software, see "Save a plate file in CSV format" on page 130 and "Load or download an example plate file" on page 128.

When you open a CSV file on the instrument, the following occurs:

- If any of the settings that are named in the CSV file are not already present in the libraries on the instrument, an error message is displayed and the CSV file is not imported.
- If all settings that are named in the CSV file are already present in the libraries on the instrument, the CSV file is imported and the settings from existing items are used.

Network and password security requirements

Network configuration and security

The network configuration and security settings of your laboratory or facility (such as firewalls, antivirus software, network passwords) are the sole responsibility of your facility administrator, IT, and security personnel. This product does not provide any network or security configuration files, utilities, or instructions.

If external or network drives are connected to the software, it is the responsibility of your IT personnel to ensure that such drives are configured and secured correctly to prevent data corruption or loss. It is the responsibility of your facility administrator, IT, and security personnel to prevent the use of any unsecured ports (such as USB, Ethernet) and ensure that the system security is maintained.

Password security

Thermo Fisher Scientific strongly recommends that you maintain unique passwords for all accounts in use on this product. All passwords should be reset upon first sign in to the product. Change passwords according to your organization's password policy.

It is the sole responsibility of your IT personnel to develop and enforce secure use of passwords.

Access the Plate Manager software (cloud)

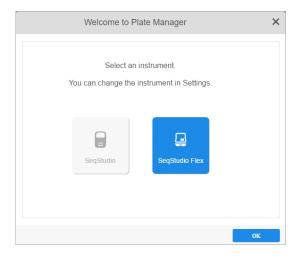
Note: In this chapter, the Plate Manager software on Thermo Fisher™ Connect Platform is referred to as *Plate Manager software (cloud)*.

- 1. Sign in to apps.thermofisher.com.
- In the My apps list, select Plate Manager.
 If Plate Manager is not listed under My apps, scroll down in the All Apps list.

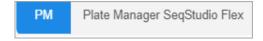


3. (First use only) In the Select an instrument screen, select SeqStudio Flex.

The instrument type determines the plate type that is created. You can change the instrument type at any time in the home screen by clicking (Switch instrument) at the top right of the screen.



The selected instrument type is displayed at the top left of the Plate Manager home screen.



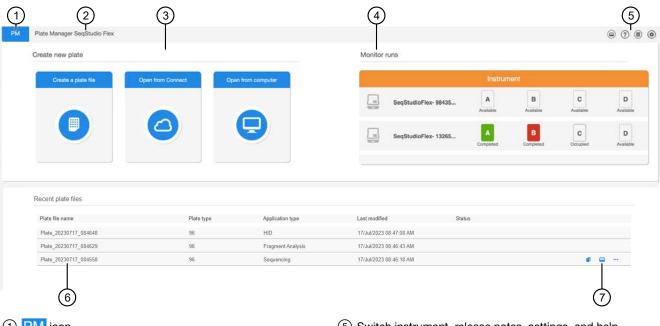


Note: You can also use the Plate Manager software with a SeqStudio™ instrument. To change the default instrument type, click (a) (Switch instrument) at the top right of the screen, then select SeqStudio.



For information, see SeqStudio™ Genetic Analyzer Instrument and Software User Guide (Pub. No. MAN0018646 for v1.2 software or Pub. No. MAN0016138 for v1.1 software).

Parts of Plate Manager software (cloud) home screen



- 1 PM icon
- 2 Instrument type
- (3) Create or open a plate file
- (4) Monitor runs

- (5) Switch instrument, release notes, settings, and help
- (6) Recent plate files list
- (7) Copy, send to instrument, and actions

Screen element	Description
PM icon	Click in any screen to display the home screen.
Instrument type	The instrument type determines the type of plate file you set up (SeqStudio Flex or SeqStudio).
	Click ((Switch instrument) to switch between SeqStudio Flex and SeqStudio.

(continued)

Screen element	Description
Create or open a plate file	Allows you to do the following: Create a new plate file.
Code, path for Control Code between Code Code Code Code Code Code Code Code	 Open a plate file (PSM file) that you created in the Plate Manager software or on the instrument. Open a plate file (CSV file) that you downloaded from the Plate Manager software or avoided in a carrendeless of the plate of th
Instrument A B C D Companied Companied Companied Companied Companied Companied Companied Companied Companied Companied Companied Compani	created in a spreadsheet or text editor application. Lists the instruments that are linked to your Thermofisher.com account or your local profile. SeqStudio™ Flex Series Genetic Analyzer and SeqStudio™ Genetic Analyzer instrument types can be listed. For more information, see: • "Connect Plate Manager software (cloud) to an instrument" on page 116 • "Plate position status and plate run status" on page 40
	You can click an instrument to display the SeqStudio™ Flex Remote Monitoring main screen. For more information, see Chapter 6, "Start and monitor a run".
	Change instrument type between SeqStudio™ Flex and SeqStudio™.
(Switch instrument)	The type of plate file you set up is determined by the instrument type that is selected.
	Displays release notes for the software.
(Release notes) (Settings)	Displays the selections for the default Save location for plate files and accessing libraries.
(Help)	Opens the software help system.
Recent plate files list	Lists the 10 most recently created or edited plate files and their status. The status indicates if a plate file was sent to an instrument. New plate files are added to the top of the list. The oldest plate file is automatically removed when a new plate file is added.
	If a Failed to send status is shown, place the cursor over the status to display the reason for the failure.
	Failed to send
	936000786 : Failed to send (Duplicate plate name)

(continued)

Screen element	Description		
	Makes a copy of the selected plate file with _Copy appended to the plate name.		
(Copy & edit, in Recent plate files list)			
	Allows you to select one or more instruments, then sends the selected plate file to the Inbox on the instrument(s).		
(Send to instrument, in Recent plate files list)			
• • •	Includes the following commands: • Export (plate file)		
(Actions, in Recent plate files list)	 Remove from Recent Files Delete Permanently Cancel Send to Instrument 		

Connect Plate Manager software (cloud) to an instrument

When the **Plate Manager** software (cloud) is connected to an instrument, you can perform the following tasks.

- Create plate files on the cloud
- Access the Remote Monitoring software to monitor instrument runs remotely from a computer or a smart device

The **Plate Manager** software (cloud) lists the instruments that are linked to your Thermofisher.com account. If no instruments are listed, perform the following steps.

- 1. Ensure that Thermo Fisher™ Connect Platform is enabled on the instrument. See "Enable or disable Thermo Fisher™ Connect Platform access on the instrument (administrator only)" on page 232.
- 2. Link the instrument to your Thermofisher.com account. For information, see:
 - "(One time) Link your Thermofisher.com account to the instrument" on page 218
 - "Link a local profile to your Thermofisher.com account (one time)" on page 223

Set up a plate file

As an alternative to creating a plate file in the SeqStudio™ Plate Manager software, you can create plate files in CSV format. For information, see the following sections:

- "Load or download an example plate file" on page 128
- "Save a plate file in CSV format" on page 130

Create or open a plate file (PSM file)

- 1. Click PM at the top left of any screen to display the home screen.
- 2. In the home screen, create or open a plate file:
 - Click Create a plate file to create a new plate file.
 - (Cloud only) Click Open from Connect to open a plate file that was saved to the Thermo Fisher™ Connect Platform.
 - Click Open from computer to open a plate file in PSM or CSV format. If an error message is displayed when you open a CSV file, see "PSM and CSV plate files for import into the instrument" on page 87.

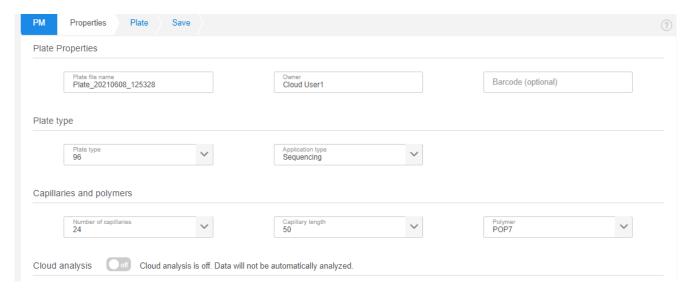
Note: If the Set up a plate dialog box is displayed when you click Create a plate file, the instrument type is set to SeqStudio. Click (Switch instrument) at the top right of the screen, then select SeqStudio Flex.



1 If the **Set up a plate** dialog box is displayed, the instrument type is not set to **SeqStudio Flex**.

Enter plate properties

1. (Optional) In the Properties tab, edit the entries in the Plate file name, Barcode, or Owner fields.



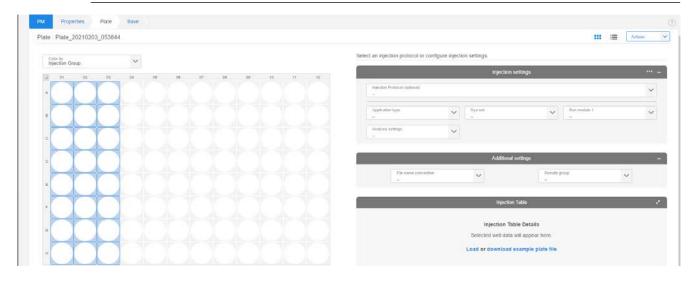
- 2. In the Application type list, select a type: Sequencing, Fragment analysis, HID, or Mixed (sequencing and fragment analysis).
 - A mixed plate allows you to run sequencing and fragment analysis samples on the same plate.
- 3. In the **Number of capillaries**, **Capillary length**, and **Polymer** fields, specify the settings for the configuration that the plate file will be used with.
- 4. Click Next.

Enter sample and injection information

This procedure describes using the plate view in the **Plate** tab. Alternatively, you can click **≔ (List)** to enter information in table format. You can use keyboard shortcuts for text fields in both views (for example, **Sample name**). You cannot use keyboard shortcuts for selection fields (for example, **Injection protocol**). For information, see "Use the list view in the Plate tab" on page 129 and "Keyboard shortcuts and examples" on page 122.

1. In the **Plate** tab, select one or more injection groups: Click a well to select one injection group; control+click or click-drag to select multiple injection groups; or click (Select/deselect) to select all injection groups.

Note: *Injection group* refers to each set of 8 or 24 wells on the plate, based on instrument configuration.



Note: All settings in the remaining steps will be assigned to all selected injection groups. If different injection groups require different settings, repeat these steps for each injection group.

- Specify the settings for the run using either of the following options.For information on creating your own protocols and settings, see "Manage libraries" on page 133.
 - In the Injection protocol field, select a protocol.
 An injection protocol contains the individual elements listed below. When you select an injection protocol, these elements specified in the injection protocol are automatically selected.

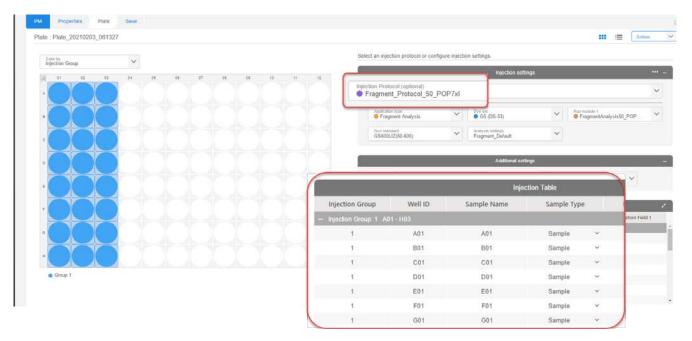
- Select individual elements in the following fields. Selecting an individual element overrides an injection protocol selection and clears the **Injection protocol** field.
 - Application type
 - Dye set
 - Run module

Note: Run module 1 is used for the first injection you specify. To specify replicate injections, see "Specify replicate injections (Add run module function)" on page 129. For more information on run modules and dye sets, see *SeqStudio™ Flex Series Genetic Analyzer with Instrument Software v1.1 Help*.

- Analysis settings
- Size standard (fragment/HID analysis only)

Note: If you use the BigDye[™] Direct Cycle Sequencing Kit , select **Z_BigDye Direct** for the dye set. For more information, see "Using BigDye[™] Direct Cycle Sequencing Kit chemistry" on page 314.

The **Injection Table** is displayed for the selected injection.



3. (Optional) Under Additional settings, assign a File name convention and Results group to each injection as needed.



- A file name convention determines the naming of results files.
 The default sequencing file name convention appends WellID_SampleName_Timestamp to the file name. The default fragment/HID file name convention appends WellID_SampleName_SampleType_Timestamp to the file name.
- A results group determines the organization of results files.
 The default results group organizes and groups files by start run time. On the instrument, results are not grouped into subfolders specified by the results group, but you can view results by results group name.

For information on creating new file name conventions and results groups, see "Manage libraries" on page 133.

4. Edit the following entries in the **Injection Table** as needed.

Click **(Expand)** to display more settings.

Note: You can use copy and paste or click-drag functions to fill the fields in the **Injection Table**. For information, see "Keyboard shortcuts and examples" on page 122.

- (Optional) Edit the entry in the Sample name field for each well (the default sample name is well ID).
- (Optional) Define custom fields (see "Define custom fields" on page 130).
- (Fragment/HID analysis only) Select the Sample type for each well: Allelic ladder, Negative control, Positive control, or Sample.
- (Sequencing only) Enter the Amplicon and Specimen type for each well.
- 5. Click Next.

Save a plate file (desktop)

Two options are available when you save a plate file:

- Save the plate file to the specified location.
- Save the plate file to the specified location AND send it to the **Inbox** on one or more instruments. For more information, see "About the Inbox on the instrument" on page 43.

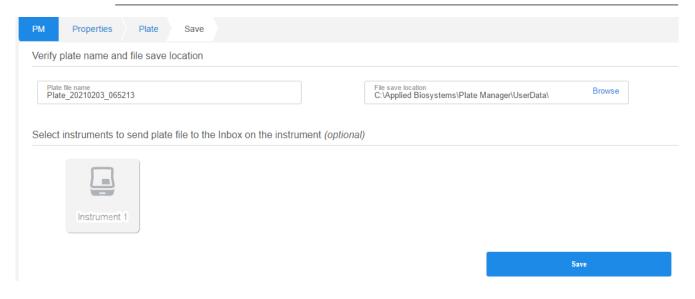
- 1. In the **Save** tab, perform these optional tasks as needed.
 - Change the settings for **Plate file name** and **File save location**. This location specifies the default location for plate files only.

If you do not send the plate file directly to the instrument, save it to a network drive or a USB drive so that you can open it on an instrument.

IMPORTANT! Perform a virus scan on a USB drive before inserting it into a port on the computer.

Select an instrument if you want to send the plate file to the Inbox on the instrument.

Note: If an instrument is not shown, see "Connect the Plate Manager software (desktop) to an instrument" on page 105.



Note: To set the default **File save location**, click **(Settings)** in the Plate Manager home screen, then click **Save Location**.

2. Click Save.

The plate file (PSM file) is saved in the specified location. If you selected an instrument, the plate file is also sent to the **Inbox** and to the plate files library on the instrument.

The home screen is displayed when the plate file is sent or saved.

Keyboard shortcuts and examples

You can use the following shortcuts in the Plate Manager software. You can use some of the shortcuts in the plate view. You can use all of the shortcuts in the list view.

Shortcuts

Windows™	macOS™	Action
Ctrl+A	Cmd+A	Select all
Ctrl+C	Cmd+C	 List view (:≡)—Copy text from cells in the injection table or copy from a spreadsheet or a text editor into cells. See the example at the end of this table. Plate view (:::)—Copy an injection group on the plate or copy cells in the injection table.
Ctrl+V	Cmd+V	Paste • List view (:≡)—Paste copied text from a spreadsheet or a text editor into the injection table. • Plate view (:≡)—Paste a copied injection group to another position on the plate.
Ctrl+X	Cmd+X	Cut
Ctrl+Z	Cmd+Z	Undo
Ctrl+Y	Cmd+Shift+Z	Redo
Delete	Delete	 List view (:≡)—Move to the cell above, below, to the right, or to the left of the current cell in the injection table. Plate view (:::)—Delete an injection group from the plate.
Arrow keys Top and bottom arrow keys are active only in 384-well plates.	Arrow keys Top and bottom arrow keys are active only in 384-well plates.	 List view (:≡)—Move to different cells. Plate view (:::)—Move to the next injection group.
Shift+Arrow keys	Shift+Arrow keys	Select contiguous cells above, below, to the right, or to the left of the current cell
Tab	Tab	Move to cell to the right in the injection table
Shift+Tab	Shift+Tab	Move to cell to the left in the injection table
Double-click a cell or select a cell, then press Enter	Double-click a cell or select a cell, then press Enter	Allow text entry in the cell
Enter or Escape	Enter or Escape	Accept a cell entry and move to next cell

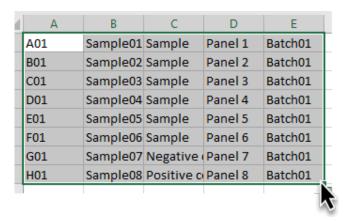
(continued)

Windows™	macOS™	Action
Backspace	Backspace Delete a cell entry before pressing Enter or Escape	
F1	F1	Open the help system.
		Note: If you use a smaller keyboard that displays multiple items on the keys, you may have to press-hold FN (function key) when you press F1 .

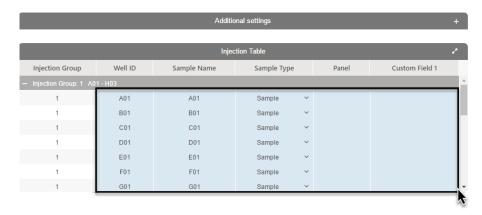
Example: Copy from a spreadsheet and paste into the Plate Manager software

You can create a sample list in a spreadsheet program, such as Excel™, copy it, then paste it into the injection table.

In the spreadsheet program, select the cells to copy, then press Ctrl+C.



In the Plate Manager software, select the destination cells in the injection table, then press Ctrl+V.

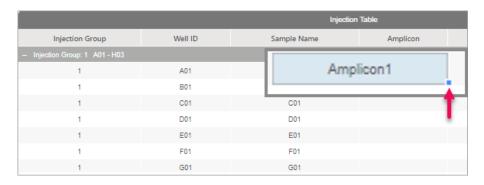


Example: Click-drag entries from a cell to other cells in the Plate Manager software

In the Plate Manager injection table, double-click a field, then enter the information.

Place the cursor over the square bottom-right corner of the cell, until the cursor changes to a crosshair. Click-drag down to the desired cell.





	Injection Table		
Injection Group	Well ID	Sample Name	Amplicon
- Injection Group: 1 A01 - H03			
1	A01	A01	Amplicon1
1	B01	B01	
1	C01	C01	
1	D01	D01	
1	E01	E01	
1	F01	F01	
1	G01	G01	

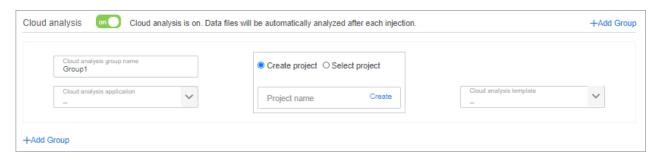
		Injection	Table
Injection Group	Well ID	Sample Name	Amplicon
- Injection Group: 1 A01 - H03			
1	A01	A01	Amplicon1
1	B01	B01	Amplicon1
1	C01	C01	Amplicon1
1	D01	D01	Amplicon1
1	E01	E01	Amplicon1
1	F01	F01	Amplicon1
1	G01	G01	Amplicon1

Set up cloud analysis in the Plate Manager software (cloud)

You can create a plate file that specifies automatic secondary analysis in a Thermo Fisher™ Connect Platform application. See "Secondary analysis software" on page 51.

Before you set up cloud analysis, note the following:

- Set up an analysis template in the secondary analysis software if you are using VA, NGC, or MSA software for cloud analysis. Analysis templates are optional for QC and PS software.
- In the plate file, you must enable and set up cloud analysis on the **Properties** tab, and specify cloud analysis groups on the **Plate** tab.
- In the cloud analysis settings in the plate file, you can select an existing project or create a new project for results in the secondary analysis software.
- 1. In Plate Manager software (cloud), create a plate file. See "Create or open a plate file (PSM file)" on page 117.
- 2. In the **Properties** tab, enable the **Cloud analysis** option.



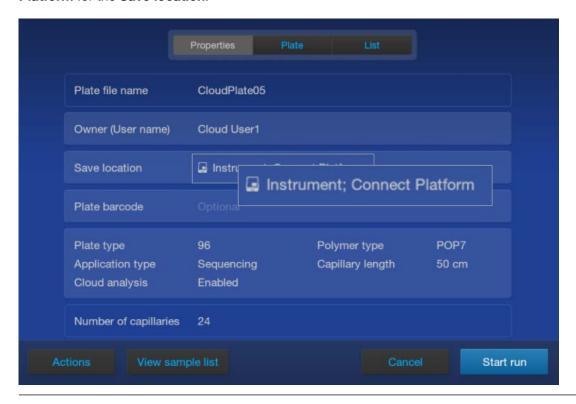
- In the Cloud analysis application list, select the application.
 The options displayed in the list depend on the Application type selected for the plate (above the cloud analysis settings).
- 4. Select the name of a project in the secondary analysis software or create a new project. Cloud analysis results are added to the specified project.



- 5. For VA, NGC, or MSA cloud applications, select the name of a template that you created in the secondary analysis software. Analysis templates are optional for QC and PS software.
- 6. *(Optional)* Click **Add Group** to add additional cloud analysis groups. These groups allow you to process data with different templates or different applications.

IMPORTANT! When you link the plate file in the home screen on the instrument, edit the plate file to add **Connect Platform** to the **Save location**.

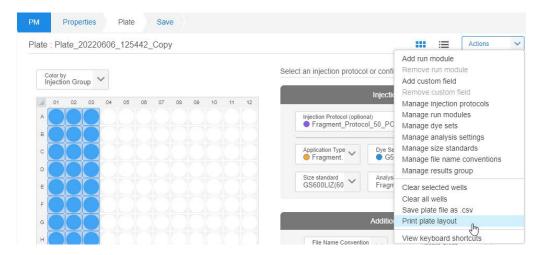
If you link a plate file that has cloud analysis enabled, but does not specify **Connect Platform** for the **Save location**, a warning message is displayed. You cannot start the run until you specify **Connect Platform** for the **Save location**.



Print the plate layout

- 1. Click PM to display the home screen of the Plate Manager software.
- 2. Open a plate file.
 - Click Open from Connect, navigate to the appropriate file, then click Import.
 - (Cloud only) Click Open from Connect, navigate to the appropriate file, then click Import.
 - Click **Open from computer**, navigate to the appropriate file, then click **Open**.
 - Click a plate file in the Recent plate files list.
- 3. Click the Plate tab.

4. Click Actions ▶ Print plate layout.



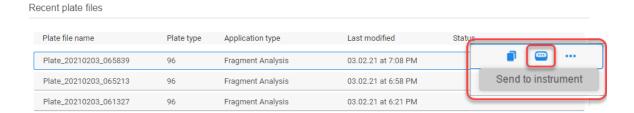
A PDF file of the plate layout is downloaded.

Send a plate file to the Inbox on the instrument

If you do not send a plate file to an instrument when you save the plate file, you can send it from the **Recent plate files list** in the Plate Manager software.

For information on the plate files that are accepted by **Inbox**, see "About the Inbox on the instrument" on page 43.

- 1. Click PM to display the home screen of the Plate Manager software.
- 2. At the far right of the **Recent plate files** list, place the cursor on a plate file in the **Recent plate files** list.



3. Click (Send to instrument).

Note: To cancel the **Send to instrument** command, click **··· (Actions) ▶ Cancel send to instrument**.

If a failed message is displayed, place the cursor over the message to display the reason. For suggestions to address the issue, see "About the Inbox on the instrument" on page 43.



Failed to send 936000786 : Failed to send (Duplicate plate name)

Additional functions in the Plate Manager software

Load or download an example plate file

You can load an example plate file to use as a starting point for creating a new plate file.

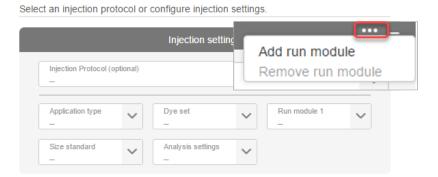
You can download an example plate file if you are going to create a plate file in CSV format.

- 1. Click PM to display the home screen of the Plate Manager software.
- 2. Click Create a plate file.
- 3. In the **Properties** tab, specify the number of wells, the application, and so on. These settings determine the contents of the example plate file.
- 4. Click the Plate tab.
- 5. In the **Injection Table** section, click an option.
 - Load—Displays a default plate file in the Plate tab. You can use the default settings as a
 starting point to create a plate file. (You cannot update the settings for the default plate that is
 loaded when you click Load.)
 - **Download**—Saves a CSV file with default settings.



Specify replicate injections (Add run module function)

1. In the **Plate** tab, click ··· (Actions) at the top right of the **Injection settings** table, then select Add run module.



2. Select one or more injection groups, then select a run module for the replicate injection.

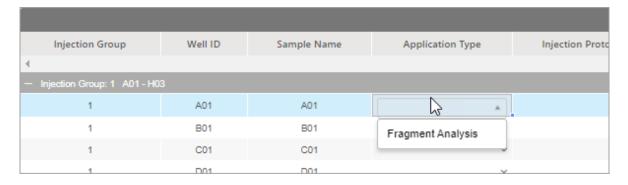
You can add up to 5 different run modules (for a total of 6 injections). Run module 1 is used for the first injection you specify. Additional run module fields are added for replicate injections.

To remove replicate injections, click ··· (Actions) at the top right of the Injection settings table, then select Remove run module. The last added injection/run module is deleted.

Use the list view in the Plate tab

The list view displays a larger view of the Injection table.

- 1. At the top-right of the **Plate** tab, click \equiv (List).
- 2. Double-click the first cell in the **Application Type** column, then select the application type.



If you are creating a mixed plate, sequencing and fragment analysis options are available. For other plates, only the option that you selected in the **Properties** tab is available.

- **3.** For remaining selection fields, double-click the first cell to display the list of options, then select an option.
- 4. For entry fields, double-click a field to type an entry or use shortcuts to copy and paste, click-drag to fill down, and so on.

For information, see "Keyboard shortcuts and examples" on page 122.

Define custom fields

Custom fields are text fields in which you can include additional sample attributes or identifiers. Custom fields can be used in file name conventions or by some secondary analysis applications.

- In the Plate tab, select Actions ➤ Add custom field.
 You can add up to 10 custom fields.
- 2. Enter information in the custom field in the table at the right of the plate.

To remove a custom field, select **Actions** > **Remove custom field**. The last added custom field is deleted.

Save a plate file in CSV format

You can download an example plate file to use as a template for creating a plate file in CSV format.

For information on plate file formats, see "PSM and CSV plate files for import into the instrument" on page 87.

- 1. Click PM to display the home screen of the Plate Manager software.
- 2. Click Create a plate file.
- 3. Click the Plate tab.
- 4. Select Actions > Save plate file as .csv.
- 5. Edit the CSV file in a spreadsheet or text editor application.
- 6. (Optional) Open the CSV file in the Plate Manager software by selecting **Open from computer** in the home screen.

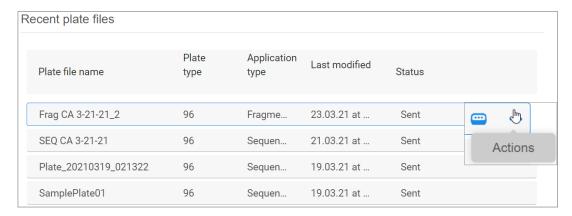
Export or download a plate file in PSM format

This command performs the same function as the **Export** command in the **Recent files list** in the home screen.

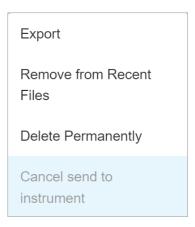
For information on plate file formats, see "PSM and CSV plate files for import into the instrument" on page 87.

- (Plate Manager software (cloud) only) To download a PSM file when you are creating the plate file:
 - a. Click the Save tab in the Plate Manager software.
 - b. Click the **Download** tab in the Plate Manager software.

- To export a PSM file from a saved plate file:
 - a. Click PM to display the home screen of the Plate Manager software.
 - b. At the far right of the **Recent plate files** list in the home screen, place the cursor over the ··· icon until the **Actions** menu is displayed.



c. Right-click, then select **Export**.



Note: If you remove a plate file from the list, the PSM file is still accessible in DataConnect tab of the InstrumentConnect software. If you delete a plate file from the list, it cannot be retrieved unless it has been sent to the instrument.





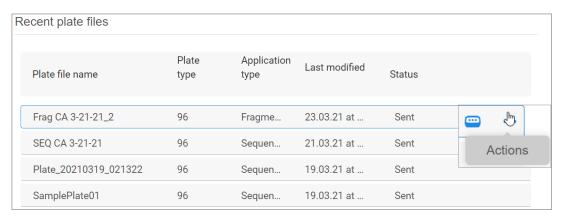
Manage the software

Manage plate files in the Plate Manager software

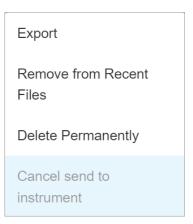
The Plate Manager software does not include a **Plate files** library as the instrument does. To manage plate files, edit the **Recent plate files** list in the Plate Manager software home screen.

The list contains the 10 most recently created or edited plate files and their status. New plate files are added to the top of the list. The oldest plate file is automatically removed when a new plate file is added.

- 1. Click pm to display the home screen of the Plate Manager software.
- 2. At the far right of the **Recent plate files** list, place the cursor over the ··· icon until the **Actions** menu is displayed.



3. Right-click, then select a command as needed.



Note: (*Plate Manager software (desktop)*) If you remove a plate file from the list, the PSM file is still accessible on your computer. If you delete a plate file from the list, it cannot be retrieved in the Plate Manager software. If the plate file was sent to the instrument, it is accessible on the instrument.

Note: (Plate Manager software (cloud)) If you remove a plate file from the list, the PSM file is still accessible in **DataConnect** tab of the InstrumentConnect software. If you delete a plate file from the list, it cannot be retrieved in **DataConnect** tab or the Plate Manager software. If the plate file was sent to the instrument, it is accessible on the instrument.



Manage libraries

Overview of libraries

The following libraries are available in the software.

These libraries are also available on the instrument. For information on how the instrument imports library entries from plate files that are created in the Plate Manager software, see "PSM and CSV plate files for import into the instrument" on page 87.

For information on the settings in library items, see Chapter 11, "Manage library resources on the instrument".

Library	Description
Plate Files	Not present in the Plate Manager software. See "Manage plate files in the Plate Manager software" on page 132.
Injection Protocols	An injection protocol contains a run module, dye set, size standard (fragment/HID analysis only), and analysis settings.
	An injection protocol is an optional item in a plate file. You can alternatively select the individual items that are contained in an injection protocol.
Run Modules	A run module contains the parameters that control the instrument during data collection.
Dye Sets	A dye set defines the number, dye color, and migration order of the dye peaks in the sample.
Size Standards (fragment/HID analysis only)	A size standard defines the sizes of known fragments. It is used to generate a standard curve. The standard curve is used to determine the sizing of unknown samples.
Analysis Settings	Analysis settings define basecalling (sequencing) and sizing (fragment/HID analysis) parameters.
File Name	A file name convention specifies the naming convention for sample data files.
Conventions	If you do not specify a file name convention for a plate, the following default file name conventions are used:
	Sequencing—Well_Sample_TimeStamp
	Fragment/HID analysis—Well_Sample_SampleType_TimeStamp
Results Groups	A results group defines the folder name where sample data files are stored.
	If you do not specify a results group, the default results group is used: StartRuntime.



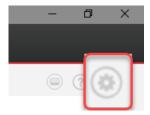
Manage libraries

For information on the settings in library items, see Chapter 11, "Manage library resources on the instrument".

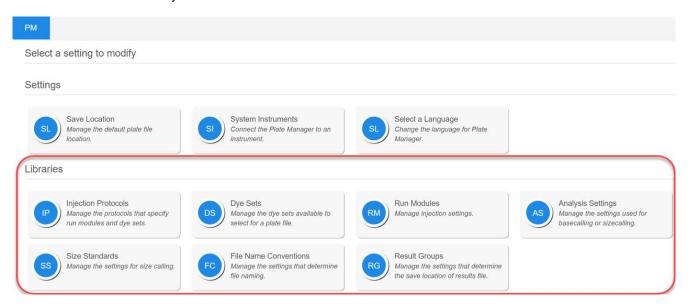
Note: Library items cannot be locked in the Plate Manager software. To lock a plate file, open the plate file in the Plate files library, then edit it and lock it.

Note: This procedure describes accessing libraries through the settings screen. You can also access libraries from the **Plate** tab by selecting items from the **Actions** menu at the top right of the screen.

- 1. Click PM to display the home screen of the Plate Manager software.
- 2. At the top right of the home screen, click (*) (Settings).

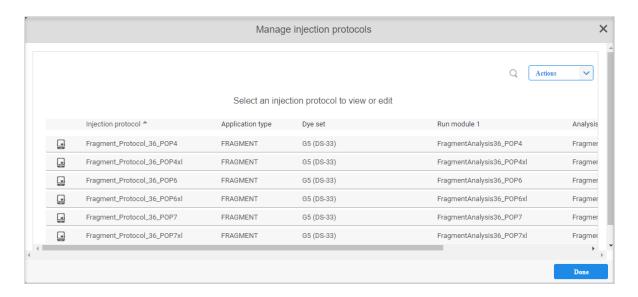


3. Click the library of interest.



Note: The System Instruments option is displayed in the desktop software only.

This example shows the injection protocols library.



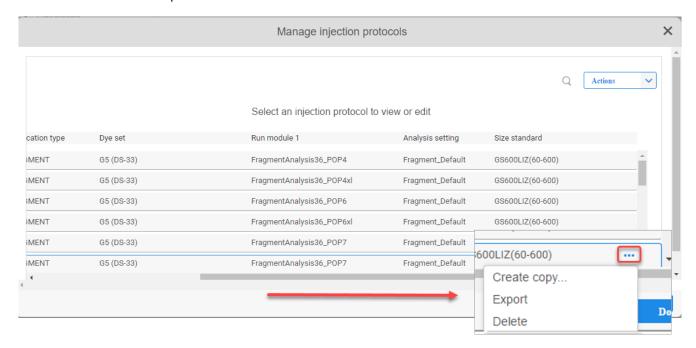
Items listed with (Instrument) are factory provided and cannot be modified.

- 4. Perform any of the following actions as needed.
 - Select Actions > Import or Actions > Create new.

Note: Some libraries provide only the **Import** option.

If you are importing or creating a plate file, see "PSM and CSV plate files for import into the instrument" on page 87.

 Scroll to the far right of the library screen, click ···, then select Create copy, Export, or Delete options.





Start and monitor a run

Load and unload a plate	136
Link a plate file and start a run	140
Unlink a plate file	144
Processes that the instrument performs during a run	144
Pre-run check messages and plate alerts during a run	146
Run plates with the automated barcode workflow	147
View alert and notification details	149
Auto-spectral calibration during an injection	150
View real-time results in the home screen	153
Pause the instrument in the home screen	157
Use the Run queue to monitor a run on the instrument	160

Load and unload a plate

Load a plate into the instrument

You can load a plate into the instrument at any time, except when the instrument is injecting samples from a plate. The drawer is locked during sample injection.

Plates are run in sequential order (A, B, C, D) unless you change the injection order in **Run queue**.

Note: In the automated barcode workflow, plates are run in the order in which they are loaded into the drawer. For information, see "Run plates with the automated barcode workflow" on page 147.

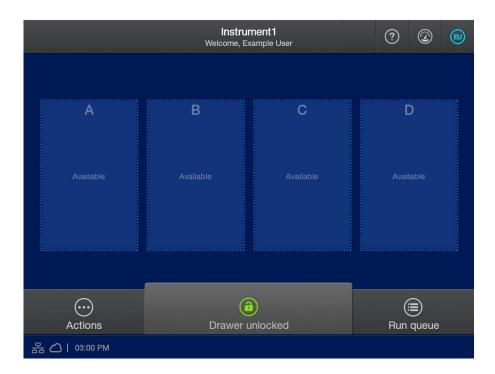
Note: Ensure that you use the correct plate retainer for the instrument. See "Plates bases retainers and septa" on page 547.

IMPORTANT! Ensure that the plate retainer is firmly snapped in place on top of the plate (see "Prepare the plate assembly" on page 78). If the retainer is not snapped in place, the plate assembly can become jammed in the drawer.

1. Ensure that the **Drawer unlocked** status is displayed in the home screen.

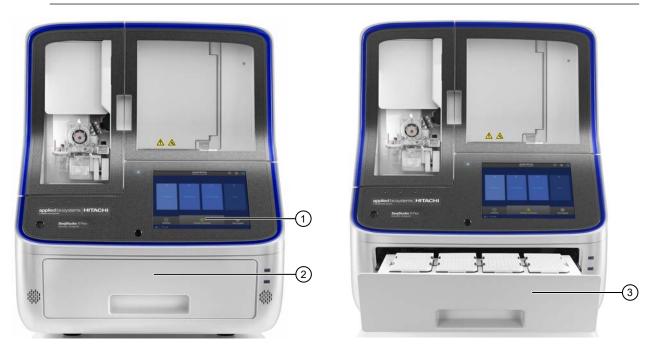
Positions in the drawer that are empty are marked as Available.

Positions in the drawer that contain a plate display a plate image or are marked as **Link a plate file**. In the following figure, all positions are empty and available.



2. Pull the drawer open.

IMPORTANT! Do not open and close the drawer rapidly. Doing so can cause vibration and disruption of the samples in the plates. Results may be adversely affected.

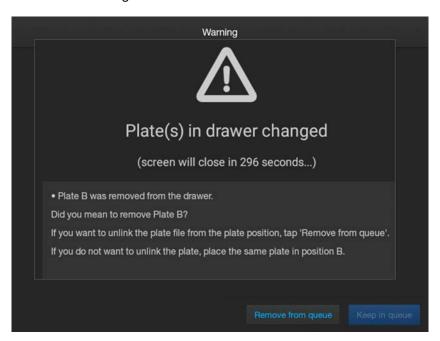


- 1 Drawer unlocked status
- (2) Drawer closed
- 3 Drawer open

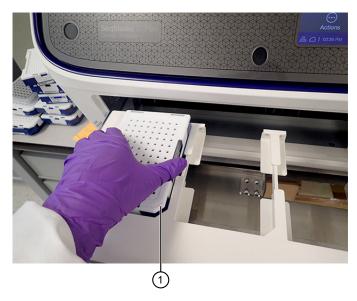
IMPORTANT! To avoid injury, do not place your hands into any empty spaces in the drawer.

3. If no empty positions are available, remove a plate from the drawer.

If you remove a plate from the drawer, a warning message is displayed asking if you intentionally removed the plate (see the following figure). Tap **Remove from queue**. The position status in the home screen changes to **Available**.



4. Place the new plate into an empty position. Align the notched corner of the plate with the notched corner of the plate holder.



1) Notched corner of plate and plate holder in instrument

The position status in the home screen changes to Link plate file.

5. Push the drawer closed.

IMPORTANT! To avoid injury, keep your hands away from any empty spaces in the drawer when you push the drawer closed.

Proceed to "Link a plate file and start a run" on page 140.

Unload a plate from the instrument

1. Ensure that the **Drawer unlocked** status is displayed in the home screen.



2. Pull the drawer open.

IMPORTANT! Do not open and close the drawer rapidly. Doing so can cause vibration and disruption of the samples in the plates. Results may be adversely affected.

3. Remove a plate.

IMPORTANT! To avoid injury, do not place your hands into any empty spaces in the drawer.

A message is displayed asking if you intentionally removed the plate. Tap **Remove from queue**. The status of the plate position changes to **Available**.



4. Push the drawer closed.

IMPORTANT! To avoid injury, keep your hands away from any empty spaces in the drawer when you push the drawer closed.

Link a plate file and start a run

IMPORTANT! Before linking a plate, check consumables status (see "Check consumables status" on page 67). Ensure that the remaining number of injections and consumables volumes are sufficient for the plates you are preparing to run.

Note: If you are signed in to the instrument with a cloud profile, voice commands can be used to link a plate file and start a run. See Chapter 9, "Use the instrument with the Thermo Fisher™ Connect Platform" and "Use Alexa™ voice commands" on page 236.

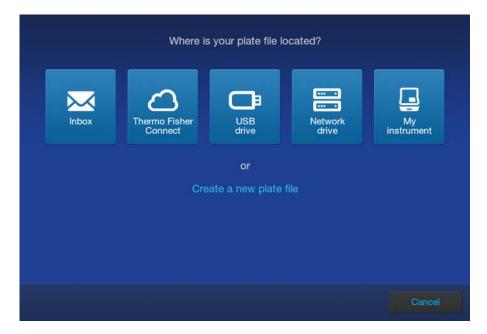
Before you select a plate file, load the associated plate into the instrument. See "Load a plate into the instrument" on page 136.

Note: After a plate is linked, you cannot display the plate properties tab. To view plate properties for linked or running plates, open the plate file in the **Plates** file library. See "Plate files library" on page 262.

1. In the home screen, tap **Link a plate file** in the plate position for the loaded plate.



2. In the Link Plate File screen, tap an option.



Option	Description
Note: Plate files are listed alphabetically by name. Tap Last modified to see the newest plates added to the Inbox.	Open a plate file that you created in the Plate Manager software and sent to the instrument. See Chapter 5, "(Optional) Create a plate file in the Plate Manager software". For more information, see "About the Inbox on the instrument" on page 43.
△Thermo Fisher™ Connect	Open a plate file that you created in the Plate Manager software (cloud). This option is displayed only if access to the Thermo Fisher™ Connect Platform is enabled. See: • "Get started with the Plate Manager software (cloud)" on page 107 • "Enable or disable Thermo Fisher™ Connect Platform access on the instrument (administrator only)" on page 232
□ USB drive IMPORTANT! Perform a virus scan on a USB drive before inserting it into a port on the instrument. Note: It can take up to 15 seconds for the instrument to recognize a USB drive after the drive is inserted in a USB port. exFAT-formatted USB drives are recommended.	Open a plate file in PSM or CSV format. Note: To navigate up in the folder structure, tap ⊕ (Back). For more information, see "PSM and CSV plate files for import into the instrument" on page 87.
■ Network drive	Open a plate file in PSM or CSV format. • "Connect the instrument to a network drive (software)" on page 452 • "PSM and CSV plate files for import into the instrument" on page 87 Note: To navigate up in the folder structure, tap (Back).
☐ My Instrument Create new plate file	Open an existing plate file from the Plate files library on the instrument. Create a new plate file. See Chapter 4, "Create a plate file on the instrument".

IMPORTANT! The Plate Manager software does not include SAE functionality. Auditing for a plate file begins when it is linked or when it is imported into the **Plate files** library.

3. (Optional) Tap \(\bigvere \) (Filter), type a keyword, then tap Filter.

A keyword can be any string of text that is part of a plate file name. For example, if you use the default plate file naming which includes the date on which the plate was created, you could type **20210302** to display plates that were created on March 2, 2021.

Note: This action does not filter by date, it filters by using part of the plate file name.

Plates that match the keyword are displayed when you tap **Filter**.

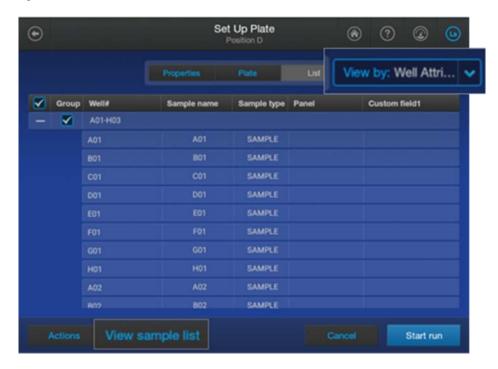
Note: If you select the **Inbox** or **My Instrument** option, only plate files with properties that match the polymer and capillary array configuration of the instrument are available for selection.

- 4. Select a plate file.
 - If an Import failed message is displayed, see "Plate file troubleshooting" on page 509.
- 5. Tap the **Plate** and **List** tabs to verify that settings are correct.

IMPORTANT! If you select a plate file that has cloud analysis enabled, ensure that **Connect** is specified for the **Save location** in the **Properties** tab. If it does not specify **Connect Platform**, a warning message is displayed. You cannot start the run until you specify **Connect Platform** for the **Save location**.

If you change the injection properties for a plate file that specifies cloud analysis, cloud analysis is automatically disabled.

Note: To quickly view the sample names, tap **View sample list** or tap the **List** tab, then tap **View by • Well Attributes**.



If changes are needed, see Chapter 4, "Create a plate file on the instrument".

If you selected an incorrect plate file, tap Actions > Change plate file.

- 6. Tap Start run.
- 7. Proceed to "Use the Run queue to monitor a run on the instrument" on page 160 or "Monitor a run from the Remote Monitoring software" on page 182.

Unlink a plate file

If a plate position is linked to a plate file, the plate position displays information about the plate and the run. If a plate position is not linked to a plate file, the plate position status displays **Link a plate file**. For more information, see "Parts of the home screen" on page 37.

There are two ways to unlink a plate file from a plate position when a run is complete.

- Remove the plate from the drawer. See "Unload a plate from the instrument" on page 139.
- In the home screen, tap the position to unlink. The **Run Details** screen is displayed. Tap **Actions Unlink plate file**.

Note: If you want to change the linked plate file before you start a run, tap Actions > Unlink plate file in any of the Set Up Plate screens.

Processes that the instrument performs during a run

After you tap Start run, the instrument performs the following processes.

- Performs pre-run checks.
 - If any pre-run checks do not pass, the software displays a message screen or a (Plate alert). For more information, see "Pre-run check messages and plate alerts during a run" on page 146 and "View alert and notification details" on page 149.

Note: The instrument conditions messages that are displayed in the bottom right of the home screen are not triggered by pre-run checks. For more information, see "Instrument conditions in the home screen" on page 41.



- If pre-run checks pass, the run starts.
- Changes the run status in the home screen and the **Run Queue** screen:
 - If no other plate is running, changes the status to **Running** and displays the time remaining until the run is complete.
 - If another plate is running, changes the status to In queue and displays the estimated end time
 until the run is complete. The estimated end time changes to Time remaining when the plate
 run starts.



- 1 Plate run status is set to running if no other plates are in the run queue
- 2 Time remaining for a running plate
- 3 Plate run status is set to In queue if other plates are in the run queue
- 4 Estimated end time for a plate that is in the run queue but has not started
- (5) Plate alerts and number of alerts

For more information on plate run statuses, see "Plate position status and plate run status" on page 40.

- Displays the **End time** in the **Run Queue** screen for each injection.
- Performs an auto-spectral calibration. For information, see "Auto-spectral calibration during an injection" on page 150.
- Changes the status to Analyzing when data collection is complete and results are being analyzed.
 Analysis can take up to 3 minutes. The next injection can start while the results for an injection are being analyzed.
- Changes the status to Exporting if a save location other than the instrument is specified.
- Updates the Sample QC in the home screen and the Run Queue screen after each injection is analyzed.

Pre-run check messages and plate alerts during a run

Pre-run checks are performed at the following times during a run:

- When a plate run starts
- When a re-injection is added to the Run queue
- · Before each injection
- When a paused run is resumed
- When a cancelled injection is added back to the Run queue

A partial list of pre-run checks is shown below.

- Checks for valid spatial and spectral calibrations.
- Checks for a passing install run.
- Checks consumables expiration, volume, and number of remaining injections.
- Determines if adequate storage space is available for results.
- Determines if the plate has been installed in the drawer for more than 24 hours.
- Checks that the save locations specified in the plate file are available and writable.
- If you run using the automated barcode workflow, performs additional checks. See "Run plates with the automated barcode workflow" on page 147.

Pre-run checks when a plate run starts or a re-injection or a cancelled injection is added to the Run queue

Pre-run checks are performed when a plate run starts or when a re-injection or a cancelled injection is added to the Run queue. If these pre-run checks do not pass, a message screen is displayed. Two message types are possible:

- Pre-run check failure message—The error condition must be corrected before the run can start. Here are examples of pre-run check failure messages:
 - No spatial calibration available for capillary array.
 - Plate type of the installed plate does not match the plate file.
- Pre-run check warning message—For information only, tap **OK** to start the run.
 Here are examples of pre-run check warning messages:
 - Injections on plate will exceed or have exceeded 24 hours on instrument.
 - Network drive save location is not writable.

Pre-run checks before each injection or when a paused run is resumed

Pre-run checks are also performed before each injection or when a paused run is resumed. If these pre-run checks do not pass, a (Plate alert) symbol is displayed at the top of a plate position.

To display the reason for the alert, tap the \bigwedge (**Plate alert**) symbol. The **Notifications** screen is displayed. For more information, see the following sections:

- "View alert and notification details" on page 149
- "Plate alert troubleshooting" on page 515

Run plates with the automated barcode workflow

The automated barcode workflow includes the following steps and instrument actions:

- You create plate files, then load the plates into the instrument.
- The instrument automatically links the plate files to the loaded plates by matching the barcodes.
- The instrument performs pre-run checks (see "Pre-run check messages and plate alerts during a run" on page 146).
- The instrument performs additional automated barcode workflow pre-run checks to ensure that sufficient polymer volume is available to run all plates and that required e-signatures are present.

The barcode reader function must be enabled for this workflow. See "Enable/disable the internal barcode reader (administrator only)" on page 468.

Note: If you create the plate files after you load the plates in the instrument, the plate files are not automatically linked to plates and additional pre-run checks for the automated barcode workflow are not performed.

Create the plate files before the barcoded plates are loaded into the drawer

IMPORTANT! Before setting up plates for the automated barcode workflow, check consumables status (see "Check consumables status" on page 67). Ensure that the remaining number of injections and consumables volumes are sufficient for the plates you are preparing to run. Ensure that no consumables will exceed the expiration date during the run.

1. Create the plate files:

a. In the home screen, tap . Actions > Create plate file.

For additional options to create a plate file, see Chapter 4, "Create a plate file on the instrument".

Alternatively, you can create the plate file in the Plate Manager software. See Chapter 5, "(Optional) Create a plate file in the Plate Manager software".

b. In the **Properties** tab, tap the **Plate barcode** section, enter the plate barcode by typing or using an external USB barcode reader, then tap **Enter**.

If you are creating a new plate, proceed to "Create a plate file" on page 263.



- c. When the plate file is set up, tap Save.
- 2. Load the plates into the instrument in the order in which you want them to run. See Load a plate into the instrument.

Sensors in the plate positions recognize the order in which plates are loaded into the instrument. In the automated barcode workflow, plates are run in the order in which they are loaded into the instrument.

For example, if you load the first plate in position D, this plate will run before the plates in other positions. (In the regular workflow, plates are run in sequential order: A, B, C, D.)

Note: If you want to manually link the plate files to the plates, do so before you close the instrument drawer.

3. Close the drawer.

When you close the drawer, the instrument performs the following actions:

- Scans the plate barcode for the first plate that is loaded into the drawer.
- If it finds a plate file with a matching plate barcode, adds the plate to the Run queue.
- If it does not find a plate file with a matching plate barcode, displays a Link plate file error or
 Barcode error.

For more information on plate alerts, see "Plate alert troubleshooting (automated barcode workflow)" on page 517.

- Repeats the scan step and the add to run queue step for all installed plates.
- Starts the run for the first installed plate.

- Performs pre-run checks as described in "Processes that the instrument performs during a run" on page 144.
- Scans the barcode for the next plate loaded into the instrument, performs pre-run checks, then adds the plate to the **Run queue**. Repeats this step for remaining plates.

IMPORTANT! If you open the drawer to add or remove plates, be very careful to remove only plates that have already been run. If you load a different plate in the position of a plate that has not yet been run, a **Link plate** error is generated, the instrument pauses, and all injections for the original plate are cancelled.

After you load the correct original plate in the position, go to the **Run Queue** screen, select the cancelled injections, then tap **Add to queue**.

Pre-run checks and plate alerts in an automated barcode run

In an automated barcode run, pre-run checks are performed when a plate file is linked to a plate position. If pre-run checks do not pass, a (Pre-run checks failed) symbol is displayed at the top of a plate position.

To display the reason for the alert, tap the \triangle symbol. A message screen that identifies the failed check is displayed.

For more information, see "Plate alert troubleshooting (automated barcode workflow)" on page 517.

View alert and notification details

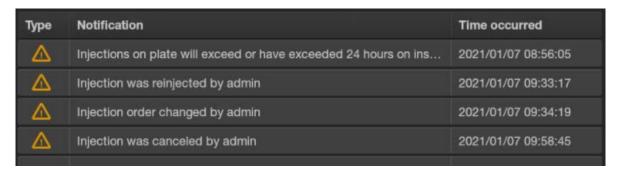
1. If a plate alert symbol (\triangle) is displayed for a plate position, tap \triangle . The number of notifications is listed with the alert symbol.

Notifications are saved for each user. After you view the notifications, the number of alerts is no longer displayed. If a different user signs in, the number of alerts is displayed until the user views the notifications.



1 Tap an alert to display the **Notifications** screen. The number above the symbol indicates the number of notifications for the plate.

Examples of plate alerts are displayed below.



2. Tap **OK** to return to the home screen.

Auto-spectral calibration during an injection

Auto-spectral calibration overview

During data collection, the instrument detects the signal of fluorescent dyes that are attached to DNA amplicons. Although each dye emits its maximum fluorescence at a different wavelength, there is some overlap in the emission spectra between the dyes. A spectral calibration creates a reference deconvolution matrix (also referred to as a dye matrix) that corrects for the overlapping fluorescence emission spectra of the dyes. A deconvolution matrix is created for each capillary in a capillary array. A dye matrix is created when you run the manual spectral calibration function. The dye matrix is then optimized and updated by the auto-spectral calibration function, which is performed automatically for each capillary during each injection.

For later runs, one of the following occurs:

- The run uses its own auto-spectral dye matrix.
- The run borrows from the previous auto-spectral dye matrix or from the manual calibration if no auto-spectral dye matrix has been made.

In the auto-spectral calibration process, the instrument uses spectral data from the samples to optimize and update the dye matrix from the manual calibration, which generates an auto-spectral dye matrix. This feature optimally reduces pull-up (false secondary peaks under a true peak) that can be caused by changes in the spectral characteristics from the original manual calibration dye matrix. The instrument performs an auto-spectral calibration for factory-provided and custom dyes.

The auto-spectral calibration process is iterative. For all capillaries in each injection, the instrument evaluates the spectral characteristics of the current sample.

- If the spectral characteristics of the current sample meet the requirements for the auto-spectral calibration algorithm—The instrument optimizes, updates, saves, and applies the auto-spectral calibration to the current sample data.
- If the spectral characteristics do not meet the requirements for the algorithm—The instrument applies the auto-spectral calibration from a previous injection to the current sample data. If an auto-spectral calibration is not available for the capillary position, the instrument applies the manual spectral calibration to the current sample data.

The auto-spectral setting is enabled by default. However, you can change this setting when you create a custom dye set with the auto-spectral setting disabled, if needed. When you perform a run with a custom dye set that does not use the auto-spectral function, the instrument applies the manual spectral calibration to the sample data. If you run samples that use manual calibration, it is important to perform a manual spectral calibration to provide a valid manual calibration for samples if any of the following actions are performed or observations are made.

- The capillary array is changed.
- The instrument is moved.
- The optical system is adjusted by Service.
- A decrease in spectral separation (pull-up/pull-down in peaks) in the raw or analyzed data is observed.

Auto-spectral calibration requirements

For successful auto-spectral calibration, each dye used in the sample must contain at least one peak that does not overlap with peaks that are labeled with a different dye.

In applications such as microsatellite instability, high peak density and overlap across dyes and a low number of scans in the region of usable data prevents successful auto-spectral calibration.

In other applications with high peak density, such as human identification, cell line authentication, or sequencing, auto-spectral calibration is typically successful because of minimal overlap across dyes.

In samples where auto-spectral calibration cannot be performed and no saved auto-spectral calibration is available for the capillary position, the instrument applies the most recent manual spectral calibration to samples. Over time, you may observe pull-up peaks for samples that cannot use auto-spectral calibration. To address this issue, create a custom dye set, then turn the auto-spectral calibration function off. Compared to when the auto-spectral function is turned on, when the auto-spectral calibration function is turned off, the system requires manual calibrations more frequently.

View auto-spectral calibration results

The software reports the status of auto-spectral calibration in the well details screen for each sample.

- **1.** Tap (Information) in either of the following locations:
 - Wells tab
 - Electropherogram screen



2. Swipe up to display Spectral calibration status.



The software reports one of the following statuses.

- Optimized successfully for this run on Date_Timestamp—The spectral calibration was optimized during auto-spectral calibration using spectral data from the sample and the optimized auto-spectral dye matrix was applied to the sample and saved for future use.
- Calibration from sample with timestamp Date_Timestamp—Although the software was not
 able to optimize the calibration with information from the current sample, it used the most recently
 saved optimized auto-spectral dye matrix for the capillary, and applied it to the sample. The most
 recently saved optimized auto-spectral dye matrix is more current than the dye matrix from a
 manual spectral calibration.
- Calibration from manual calibration performed on Date_Timestamp—The software was not
 able to optimize the calibration with spectral data from the current sample and did not find a saved
 auto-spectral dye matrix for the capillary position. The dye matrix from the most recent manual
 spectral calibration was applied to the sample.

Note: If the calibration status for all samples in a run is reported as "Calibration from manual ...", and you observe pull up-peaks, perform a manual spectral calibration, then repeat the run.

IMPORTANT! Spectral calibration status is reported for informational and tracking purposes only. This calibration status does not reflect the quality of the sample or affect the results. However, use of the manual spectral calibration instead of the auto-spectral calibration can increase the likelihood of pull-up peaks.

View real-time results in the home screen

For more information on reviewing results, see:

- "View real-time results in the Run Queue screen" on page 162
- "View results for a completed run (Run history)" on page 170

- 1. If a plate alert symbol (1) is displayed for a plate position, see "View alert and notification details" on page 149.
- 2. In the home screen, tap a running plate position.



The plate view is displayed.



- 1) Completed injection
- 2 Running injection
- (3) In queue injection
- (4) Tap to display the plate legend

3. (Optional) Tap the Injections tab.



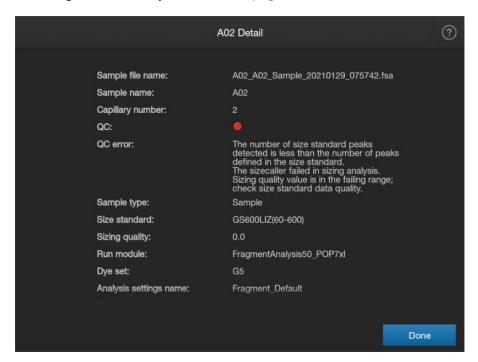
- 4. Tap an injection to display the electropherogram screen. For information see, "Use the electropherogram screen" on page 173.
- 5. Tap **Done** in the electropherogram screen, then tap the **Wells** tab. If needed, swipe up to view all wells.

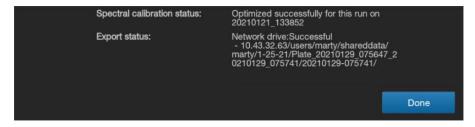


6. Tap **(i)** (Information) to display the details for the well. If needed, swipe up to view all wells.

For more information, see:

- "Sample QC and quality alerts" on page 172
- "Sequence analysis results" on page 175
- "Fragment/HID analysis results" on page 179





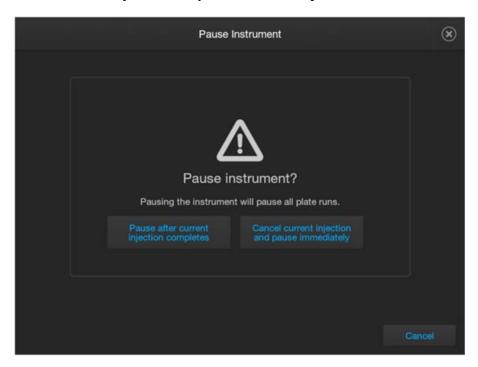
Pause the instrument in the home screen

Note: You can also pause the run in the run queue (see "Pause the instrument in the Run Queue screen" on page 166), in instrument status (see "Check instrument status" on page 68), and in the Remote Monitoring software (see "Pause the instrument from the Remote Monitoring screen, resume from the instrument home screen" on page 193).

1. In the Plate tab or Injections tab, tap Actions > Pause instrument.

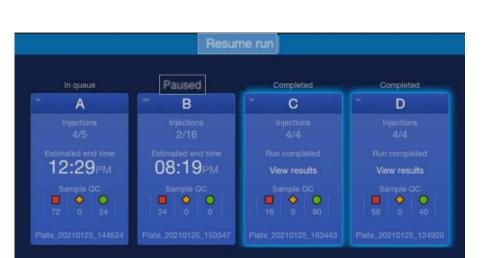


2. In the Pause Instrument screen, tap a pause option: Pause after current injection completes or Cancel current injection and pause immediately.



If you select the pause immediately option, the status of the injection changes to **Aborted** and the wells for the injection are marked X (canceled/aborted) in the plate view. If the pause occurs late in the injection cycle, sufficient data may have been collected for analysis. If sample quality is high, it is possible to see • or • **Sample QC** instead of \blacksquare for an aborted injection.

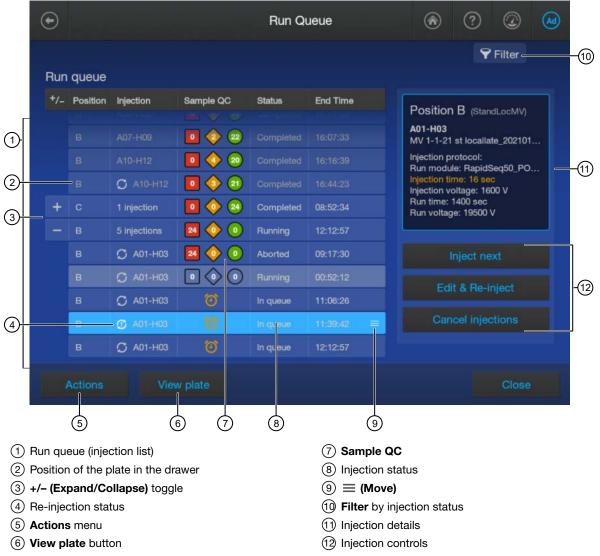
- 3. Tap **Done** to display the home screen.
 - The **Resume run** button is displayed at the top of the screen.
 - The plate status is set to Paused.



4. Tap **Resume run** when needed.

Use the Run queue to monitor a run on the instrument

Parts of the Run Queue screen



Screen element	Description	
Run queue (injection list) and +/- (Expand/Collapse) toggle	Swipe up to display more rows in the list. Tap + (plus) to expand the list to show all injections for the plate positions. Tap - (minus) to collapse all injections under the plate position.	
Re-injection status symbol	 Re-injection Re-injection with different injection parameters (Run module, Injection time, Injection voltage, Run time, Run voltage) 	
Actions menu	Displays the Pause instrument or Resume run button.	

(continued)

Screen element	Description	
View plate button	Active only when a single injection or plate with one injection is selected.	
	Displays the electropherogram or plate view for the selected injection.	
	 If you select a running or completed injection, the raw or analyzed plot is displayed. 	
	If you select a plate with one injection, the plate view is displayed.	
Sample QC	Lists the number of samples for each status: ■ Error, ◆ Caution, ● Good. Statuses are listed per plate and per injection. For more information, see "Sample QC and quality alerts" on page 172.	
	(Clock) icon is displayed if the plate has been in the drawer for more than 24 hours. The software does not prevent you from running samples that have been on the instrument for more than 24 hours.	
	Note: Samples that are prepared in Hi-Di™ Formamide are stable for 16–24 hours. Data quality may be reduced if samples exceed 24 hours on the instrument. Samples that are prepared in aqueous solution have lower stability than samples that are prepared in Hi-Di™ Formamide.	
Injection status	In queue—Injection will start based on the order of the injection list.	
	Running—Data collection is in process.	
	Analyzing—Data collection is complete, analysis is in process.	
	 Exporting—Result files are being sent to the Save location that is specified in the plate file. 	
	Completed — Analysis and export is complete, results are available.	
	Aborting/aborted—An injection with status of Running was cancelled.	
	Cancelled—An injection with status of In queue was cancelled.	
	Paused—The instrument was paused (Actions ➤ Pause instrument).	
≡(Move)	Press-drag to move an injection in the list and change the injection order.	
Filter	Filter by injection status (not plate run status): All runs, Completed runs, Running and In queue, Canceled runs.	
Injection details	Details for the selected injection. Injection parameters that have been edited for a re-injection are displayed in orange.	

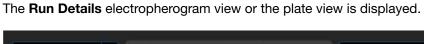
(continued)

Screen element	Description		
Injection controls Note: Buttons are inactive if more than 1 injection is selected or if the action	 Inject next—Moves the injection to the next position in the list to be injected. For information, see "Change the injection list order" on page 163. Edit & Re-inject—Tap to add re-injections to the run. If needed, change the run settings. For information, see "Cancel or add injections or specify re-injections in 		
is not applicable for the injection.	the Run Queue screen" on page 165. The button is inactive if a spectral calibration or install run injection is selected or if more than one injection is selected.		
	 Cancel injection — Stops the current injection or an in-queue injection. The injection status after cancellation depends on when in the run the injection was cancelled. See Injection status above. For information, see "Cancel or add injections or specify re-injections in the Run Queue screen" on page 165. 		
	 Add to Queue—Active if you select a cancelled injection. Changes the status to In queue. The button is inactive if a spectral calibration or install run injection is selected. 		

View real-time results in the Run Queue screen

For more information on reviewing results, see:

- "View real-time results in the home screen" on page 153
- "View results for a completed run (Run history)" on page 170
- "Use the electropherogram screen" on page 173
- Chapter 7, "View results on the instrument"
- 1. In the home screen, tap
 Run queue.
- 2. In the **Run Queue** screen, select an injection or a completed plate with one injection only, then tap **View Plate**.
 - If you select a running or completed injection, the raw or analyzed plot is displayed.
 - If you select a completed plate with one injection, the plate view is displayed. (The **Plate view** button is inactive if you select a plate with more than one injection. Select a single injection to view more information.)





Change the injection list order

- 1. In the home screen, tap (
 Run queue.
- 2. Use either of the following options to change the order.
 - Press-drag

 (Move) to move an injection or a plate position in the list and change the injection order.

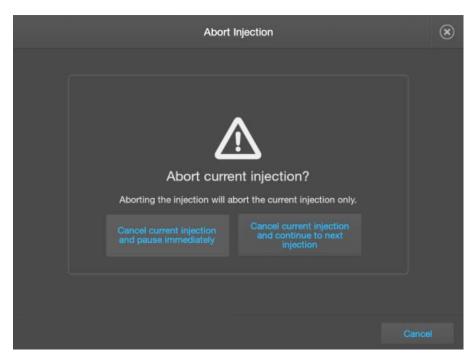
Select a plate or one or more injections, then tap Inject next.
 The plate or injections is moved up to the next position in the list to be injected. An example of using Inject next for an injection is shown below.



Position A has 2 injections, one already completed (1) and one in queue (3). Position B has 16 injections total. One of those injections was selected to be injected next (2) thereby moving ahead of the second injection for Position A (note the end times). The other 15 injections for Position B are still In queue (4).

Cancel or add injections or specify re-injections in the Run Queue screen

- 1. In the home screen, tap
 Run queue.
- 2. In the **Run Queue** screen, do any of the following: select a plate or an injection, then specify the action:
 - To cancel injections—Select a plate or one or more injections, then tap Cancel injections. Select an option: cancel the injection immediately and then pause the instrument, or cancel the current injection and start the next injection.



• **To specify re-injections**—Select an injection, then tap **Edit & Re-inject**. Change the settings if needed, then tap **Done**.

IMPORTANT! The **Edit & Re-inject** button is inactive if you select more than one injection, a spectral calibration, or an install run injection.

The re-injection is added to the list with \bigcirc (Re-inject) or \bigcirc (Re-inject with changes) icon. Updated run settings for the re-injection are displayed in orange.



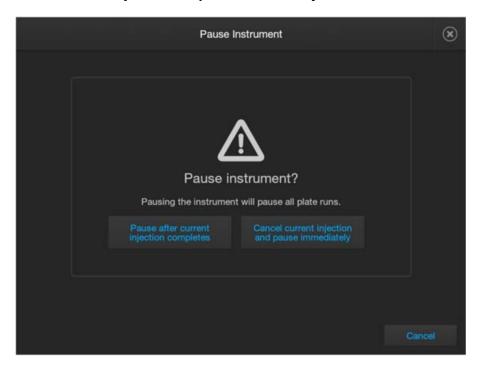
• To add a cancelled injection back into the queue—Select a plate or one or more injections, then tap Add to queue. This button is displayed only if one or more injections have been cancelled, and is active only when a cancelled injection is selected.

Pause the instrument in the Run Queue screen

Note: You can also pause the run from the home screen (see "Pause the instrument in the home screen" on page 157), in instrument status (see "Check instrument status" on page 68), and in the Remote Monitoring software (see "Pause the instrument from the Remote Monitoring screen, resume from the instrument home screen" on page 193).

- 1. In the home screen, tap (=) Run queue.
- 2. In the Run Queue screen, select a plate or an injection, then tap Actions > Pause instrument.

3. In the Pause Instrument screen, tap a pause option: Pause after current injection completes or Cancel current injection and pause immediately.



If you select the pause immediately option, the status of the injection changes to **Aborted** and the wells for the injection are marked X (canceled/aborted) in the plate view. If the pause occurs late in the injection cycle, sufficient data may have been collected for analysis. If sample quality is high, it is possible to see • or • **Sample QC** instead of \blacksquare for an aborted injection.

When the run is paused:

- The **Resume run** button is displayed at the top of the screen.
- The plate run status is set to Paused.
- The current injection status changes to **Aborted**.
- Injections that have not started are listed as Paused.



4. Tap **Resume run** when needed.



View results on the instrument

Options for viewing results on the instrument	169
View results for a completed run (Run history)	170
Export results from the instrument—Results and data files, logs, and reports	171
Sample QC and quality alerts	172
Use the electropherogram screen	173
Sequence analysis results	175
Fragment/HID analysis results	179

Options for viewing results on the instrument

You can access results from three places in the instrument software:

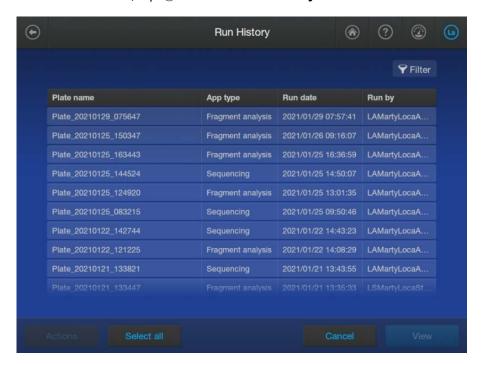
- Home screen—See "View real-time results in the home screen" on page 153
- Run Queue screen See "View real-time results in the Run Queue screen" on page 162
- Run history—See "View results for a completed run (Run history)" on page 170

You can also view results in the Remote Monitoring software. See Chapter 8, "(Optional) Use the Remote Monitoring software".

View results for a completed run (Run history)

Note: For information on viewing completed results for a spectral calibration or an install run, see "View and export the spectral calibration history" on page 331 or "View, export, or delete an install run history" on page 357.

1. In the home screen, tap ⊕ Actions ▶ Run history.



2. Tap a plate, then tap View.

The results for the plate are displayed.



- 3. Do any of the following as needed.
 - Tap a well, then tap **View** to view the raw, EPT, or analyzed electropherogram for a well.
 - Tap (Information) to display the details for the well.
 - Tap \(\bigcap \) (Filter), then enter a keyword such as the well number to filter the results (by Well ID and Sample name attributes) that are listed.
 - Tap the **Result group** tab to list the wells by results group.
 - Tap a well, then tap Actions, then select an option to export the results or the run log.

For more information, see:

- "Sample QC and quality alerts" on page 172
- "Sequence analysis results" on page 175
- "Fragment/HID analysis results" on page 179
- · "Results Groups library" on page 304

Export results from the instrument—Results and data files, logs, and reports

- 1. In the home screen, tap ⊕ ▶ Actions ▶ Run history.
- 2. Select one or more plates from the Run History table.
- 3. Tap Actions.
- 4. Tap the item to export:
 - Run results folder—Contains:
 - Fragment/HID analysis-FSA (data) and CSV (sizing) file for each sample
 - Sequencing AB1 file for each sample
 - PSM (plate) file
 - (Sequencing only) ZIP file that contains FASTA, PHD.1, and QUAL files for each sample

Results folder name format: PlateName StartRunDate timestamp

• Logs (ZIP)—Contains the run results, auto-spectral calibration information, injection logs, PSM plate file, CID raw data files, EPT information, and post-processing files.

```
Log file name format: PlateName_date_UniqueID.zip, for example: Plate_20201021_121952.pdf
```

• Report (PDF)—Contains the results of the plate run.

Report file name format: InstrumentName_PlateName_StartRunDate_timestamp.pdf, for example: Instrument1 Plate 20201021 121952.pdf

5. Select an export location, then tap **Next**.

IMPORTANT! Perform a virus scan on a USB drive before inserting it into a port on the instrument.

Note: It can take up to 15 seconds for the instrument to recognize a USB drive after the drive is inserted in a USB port. exFAT-formatted USB drives are recommended.

A message is displayed when the file is exporting. If you are exporting many files, see "Configure, check status, and cancel background exports and backups" on page 475.

Sample QC and quality alerts

The color-coded **Sample QC** results are listed below. These results are shown in several locations: home screen, **Run Queue** screen, plate view, electropherogram screen, and well details.

Table 1 Sample QC results that are displayed in the software

Color code	Description	
(green, good)	All QC thresholds passed.	
(yellow, caution)	At least 1 caution quality alert was triggered.	
(red, error)	At least 1 error quality alert was triggered.	

Note: For results with (yellow, caution) or (red, error) sample QC, view the analyzed data and the raw data.

The QC thresholds and quality alerts that are used to determine **Sample QC** results are listed below.

Some quality alerts are not shown in the software. They are used only to determine the Sample QC.

For more information, see "QC errors—Fragment/HID analysis" on page 499 and "QC errors—Sequencing" on page 499.

Table 2 QC thresholds and quality alerts that are used to determine Sample QC (these tests and alerts are not shown in the software)

QC tests	Quality alert	
Offscale data	(yellow, caution)—Offscale signal is detected.	
Sequencing QC tests		
Trace score	(green, good)—≥30	
	(yellow, caution)—≥15 and <30	
	(red, error)—<15	

Table 2 QC thresholds and quality alerts that are used to determine Sample QC (these tests and alerts are not shown in the software) (continued)

QC tests	Quality alert		
Fragment/HID analysis QC tests			
SQ (size quality)	• (green, good) — ≤0.75		
	(yellow, caution) — 0.25–0.74		
	●(red, error)—<0.25		
	How Size Quality is determined		
	The Size Quality algorithm evaluates the similarity between the fragment pattern for the size standard dye specified in the size standard definition and the actual distribution of size standard peaks in the sample, then calculates an interim SQ (a value between 0 and 1).		
	For more information, see the following sections:		
	"QC error and alert troubleshooting" on page 498		
	"Sample and data troubleshooting" on page 520		
Broad peak in size standard peaks	(yellow, caution)—Broad peaks are detected in the size standard.		
Number of size standard peaks	(red, error)—Fewer than the expected number of standard peaks are detected.		
Manual spectral calibration C	QC test		
Borrowed capillary	(yellow, caution)—Spectral data was borrowed for the capillary.		
	For information, see "Spectral calibration sharing between capillaries" on page 325.		
Install run QC test			
CRL value (sequencing)	(red, error)—CRL value is below the internally specified limit.		
Alleles within bins (fragment/HID analysis)	(red, error)—At least one allele is not within an internally specified bin.		

Use the electropherogram screen

This section describes using the electropherogram screen on the instrument.

For more information on accessing the electropherogram screen and the parts of the screen, see:

- "View real-time results in the Run Queue screen" on page 162
- "View real-time results in the home screen" on page 153
- "View results for a completed run (Run history)" on page 170
- "Parts of the sequencing electropherogram screen" on page 175
- "Sequence analysis results" on page 175

Chapter 7 View results on the instrument Use the electropherogram screen

- "Parts of the fragment/HID analysis electropherogram screen" on page 179
- "Fragment/HID analysis results" on page 179
- 1. Press-drag the thumbnail pane to the region of interest.

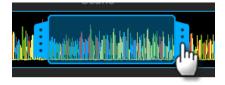




- 1) Thumbnail pane is at start of trace by default
- 2 Press-drag to move the thumbnail pane to the region of interest
 - 2. Adjust the display as needed.
 - Press-drag one finger to pan to the left or right.
 - Zoom in and out by pinching and expanding with two fingers.
 - Tap on the left border of the trace, tap a dye to deselect.
 - Tap on the right border of the trace, then tap Q Zoom In, Q Zoom Out, or Fit to screen to adjust the display.
 - Press-drag the center of the pane in thumbnail view to scroll left or right.



Press-drag the right or left handle of the pane to zoom horizontally.



Sequence analysis results

Parts of the sequencing electropherogram screen



- (1) Quality Value bars. For more information, see "Understanding Quality Values (QVs)" on page 178.
 - Pure basecall with QV ≥20
 - Pure basecall with QV 15–19
 - Pure basecall with QV <15
 - Mixed basecall
- ② Basecalls—The background of a mixed basecall is flagged in red. You can set the secondary peak threshold, as a percentage of the primary peak, for consideration as a mixed basecall by the basecalling algorithm. Reaching this threshold is a necessary but not sufficient condition for arriving at a mixed base determination. See "Analysis settings—Sequencing" on page 294.
- 3 Trace color hide/show—Tap to open, then tap a color to hide or show.
- (4) Analyzed trace.
- (5) Thumbnail trace—Drag the center of the pane in the thumbnail trace to display another trace area in the top pane. Drag the right or left handle of the pane to zoom horizontally.
- 6 Sample name and result summary. See "Sequencing results and well details" on page 176.
- (7) Trace tab—Tap to view the raw, EPT, or analyzed trace for the well. If the raw trace is blank, press-drag the thumbnail pane over the region of data to view.
- (8) Zoom tools—Tap to open.
- (9) Well details—Tap to display well details. See "Sequencing results and well details" on page 176.

Sequencing results and well details

If needed, swipe up to see all information.

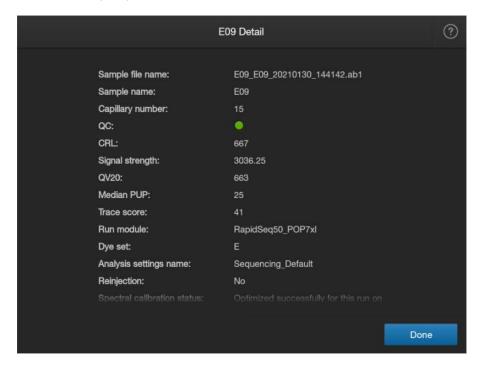




Table 3 Results

Result	Description	
QC (Sample QC)	—All QC tests passed.	
	One was a striggered.	
	—At least 1 error quality alert was triggered.	
	For more information see "Sample QC and quality alerts" on page 172.	

Table 3 Results (continued)

Result	Description	
QC error	Lists the causes of the QC issue.	
	A QC error message is shown for results with (yellow, caution) or (red, error) sample QC. For more information see, "QC errors—Sequencing" on page 499.	
CRL (Contiguous Read Length)	The longest uninterrupted segment of basecalls with an average Quality Value (QV) ≥20. In addition to evaluating the QV of a basecall, the software considers the QV of adjacent basecalls within a 21-bp moving window to determine a contiguous read length based on quality values: the software starts from the 5' end and calculates the average QV across a moving window size of 21, sliding 1 bp at a time, to the 3' end. The resulting longest contiguous segment is determined as the CRL.	
	For more information, see "Understanding Quality Values (QVs)" on page 178.	

Table 4 Well details

Result	Description	
Sample file name, Sample name, Capillary number, Run module, Dye set, Analysis settings name, Re-injections	Sample identification information, settings used to collect the data, and re-injection status.	
Signal strength	The average relative fluorescence unit (RFU) for all dyes across the electropherogram in the raw data.	
Trace score	The average basecall Quality Value (QV) of basecalls in the clear range sequence of a trace.	
	The <i>clear range</i> is the region of the sequence that remains after excluding the low-quality or error-prone sequence at the 5' and 3' ends. The clear range is determined by the settings in the analysis method. See "Analysis settings—Sequencing" on page 294.	
Median PUP (pull-up peak)	A measure of noise or pull-up that is determined by taking the mean of the ratios of signal strength calculated for each basecalled peak: primary peak/secondary peak under the primary peak.	
	A higher value indicates less baseline or secondary noise. A lower value indicates an elevated baseline or secondary noise.	
	Example 1: Main called base signal strength is 1,000 RFU and the largest secondary peak beneath it is 10 RFU; PUP=100	
	Example 2: Main called base signal strength is 1,000 RFU and the largest secondary peak beneath it is 100 RFU; PUP=10	
Spectral calibration status	For information, see "Auto-spectral calibration during an injection" on page 150.	
Export status	Indicates whether the results were saved to a location in addition to the instrument, either during data collection or by exporting the Run history.	

Understanding Quality Values (QVs)

Quality value ranges

The color of a QV bar indicates the QV of a basecall. The height of the QV bar indicates the relative value of a QV. A taller bar equates with a higher, better QV.

- Pure basecall with QV ≥20
- Pure basecall with QV 15–19
- Pure basecall with QV <15
- Mixed basecall

Pure basecall versus mixed basecall QVs

- Pure basecalls and mixed basecalls have the same probability of error for the associated basecall (Quality Value (QV) = -10Log 10 (Pe), where Pe is Probability of Error.
- High-quality pure basecalls typically have QVs of 20 or higher.
- The distribution of quality values for mixed basecalls differs dramatically from that of pure basecalls.
- Mixed basecalls have a maximum QV of 20.
- · Review all mixed basecalls.

Quality values (QV) and probability of error (Pe)

QV	Pe	QV	Pe
1	79.0%	30	0.10%
5	32.0%	35	0.032%
10	10.0%	40	0.010%
15	3.2%	45	0.0032%
20	1.0%	50	0.0010%
25	0.32%	60	0.00010%

Fragment/HID analysis results

Parts of the fragment/HID analysis electropherogram screen



- 1 Basepair or scan display selection.
- 2 Trace color hide/show Tap to open, then tap a color to hide or show.
- (3) Analyzed trace. By default, the low-base pair size region is selected and the size standard trace is visible.
- (4) Size standard curve (red line).
- (5) Thumbnail trace—Drag the center of the pane in the thumbnail trace to display another trace area in the top pane. Drag the right or left handle of the pane to zoom horizontally.
- (6) Sample name and results. See "Fragment/HID analysis results and well details" on page 180.
- (7) Trace tab—Tap to view the raw, EPT, or analyzed trace for the well. If the trace is blank, press-drag the thumbnail pane over the region of data to view.
- (8) Zoom tools—Tap to open.
- 9 Well details—Tap to display well details. See "Fragment/HID analysis results and well details" on page 180.

Fragment/HID analysis results and well details

If needed, swipe up to see all information.

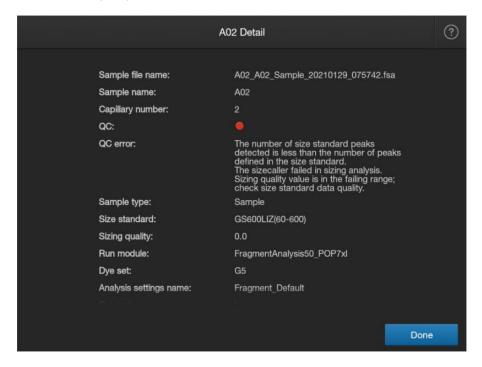




Table 5 Results

Setting	Description	
QC (Sample QC)	One of the state of the st	
	One was a striggered.	
	—At least 1 error quality alert was triggered.	
	For more information see "Sample QC and quality alerts" on page 172.	
QC error	Lists the causes of the QC issue.	
	A QC error message is shown for results with (yellow, caution) or (red, error) sample QC. For more information see, "QC errors—Fragment/HID analysis" on page 499.	
Sizing quality (SQ)	For more information see "Sample QC and quality alerts" on page 172.	

Table 6 Well details

Setting	Description
Sample file name, Sample name, Capillary number, Size standard, Run module, Dye set, Analysis settings name, Re-injection	Sample identification, settings used to collect the data, and re-injection status.
Spectral calibration status	For information, see "Auto-spectral calibration during an injection" on page 150.
Export status	Indicates whether the results were saved to a location in addition to the instrument, either during data collection or by exporting the Run history.



(Optional) Use the Remote Monitoring software

Monitor a run from the Remote Monitoring software	182
Monitor a run from a mobile device	193
View results in the Remote Monitoring software	199
Use cloud analysis in the Remote Monitoring software	203

Use the SeqStudio™ Flex Remote Monitoring software to monitor runs, view results, and perform cloud analysis.

There are three ways to access the Remote Monitoring software:

- "Open the Remote Monitoring software from the Plate Manager software (cloud)" on page 182
- "Open the Remote Monitoring software from the InstrumentConnect software" on page 184
- "Monitor a run from a mobile device" on page 193

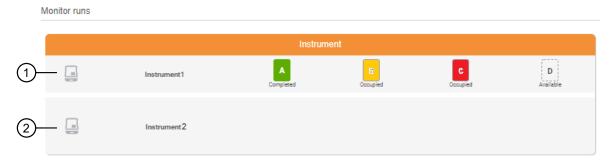
Monitor a run from the Remote Monitoring software

To use the Remote Monitoring software, you must be signed in to Thermofisher.com with a cloud profile, and your cloud profile must be linked to the instrument. For more information, see Chapter 9, "Use the instrument with the Thermo Fisher™ Connect Platform".

Open the Remote Monitoring software from the Plate Manager software (cloud)

1. Open the Plate Manager software (cloud). See "Access the Plate Manager software (cloud)" on page 113.

The **Monitor runs** pane lists the SeqStudio™ Flex and SeqStudio™ instruments that are linked to your Thermofisher.com account.



- SeqStudio[™] Flex instrument with 4 plate positions
- ② SeqStudio™ instrument with 1 plate position

Plate positions are color-coded to reflect **Sample QC**. See "Sample QC and quality alerts" on page 172.

2. (If you are using a SeqStudio™ Flex instrument) Click an instrument in the **Monitor runs** pane in the Plate Manager software home screen.

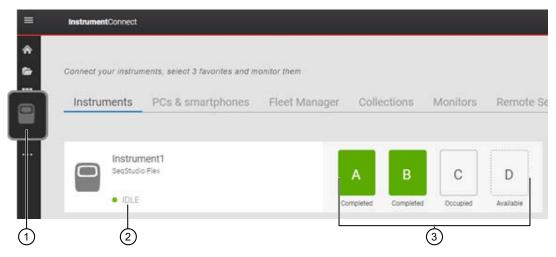
The Remote Monitoring software home screen is displayed. See "Parts of the Remote Monitoring software home screen" on page 185.

Note: (If you are using a SeqStudio™ instrument) See SeqStudio™ Genetic Analyzer Instrument and Software User Guide (Pub. No. MAN0018646 for v1.2 software or Pub. No. MAN0016138 for v1.1 software).

Open the Remote Monitoring software from the InstrumentConnect software

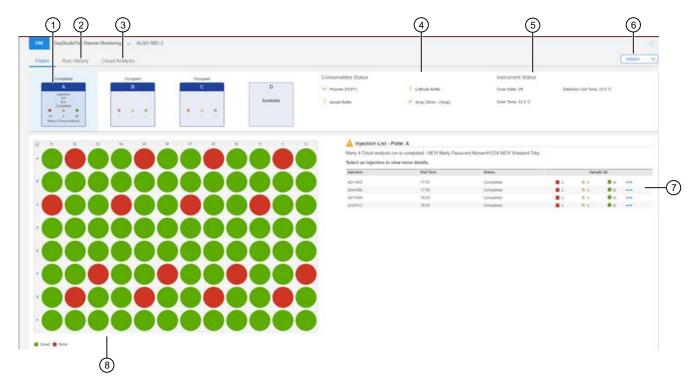
The InstrumentConnect main screen lists all instruments that are linked to your Thermofisher.com account.

- 1. Sign in to apps.thermofisher.com. See "Sign in to apps.thermofisher.com and access the InstrumentConnect software" on page 217.
- 2. In the left pane, click (InstrumentConnect).



- 1 InstrumentConnect
- ② Instrument status. Possible statuses are: Idle, Running, or UNKNOWN (the instrument has been idle for ≥24 hours).
- 3 Plate positions
 - Plate positions are color-coded to reflect **Sample QC**. See "Sample QC and quality alerts" on page 172.
 - A (Warning) icon indicates that at least one well on the plate has a (Caution Sample QC status.
- 3. If no instruments are listed, perform the following steps. For information, see Chapter 9, "Use the instrument with the Thermo Fisher™ Connect Platform".
 - a. Ensure that Thermo Fisher™ Connect Platform is enabled on the instrument.
 - b. Link the instrument to your Thermofisher.com account.
- 4. Click a SeqStudio™ Flex instrument in the InstrumentConnect screen. The Remote Monitoring main screen is displayed. See "Parts of the Remote Monitoring software home screen" on page 185.

Parts of the Remote Monitoring software home screen



- 1 Plate positions for the selected instrument
- (2) Run History tab
- (3) Cloud Analysis tab
- 4 Consumables Status pane

- (5) Instrument status pane
- 6 Actions menu
- (7) Injection list pane
- 8 Plate layout with colors to indicate Sample QC

Screen element	Description
Plate positions for the selected instrument	Shows the plate positions and plate run status for the selected instrument. Each plate image displays the number of samples per plate for each Sample QC status — ■ Error, ◆ Caution, ● Good. For more information, see: • "Sample QC and quality alerts" on page 172 • "Plate position status and plate run status in the Remote Monitoring software home screen" on page 186
Run History tab	Lists the results that have been saved to Thermo Fisher™ Connect Platform. See "View results for a completed run in the Remote Monitoring software (Run History tab)" on page 199.
Cloud Analysis tab	Lists the projects that have been generated by cloud analysis. See: • "Set up cloud analysis for a completed run in the Remote Monitoring software" on page 206 • "Access cloud analysis results from the Remote Monitoring software" on page 208



(continued)

Screen element	Description
Consumables Status	Click the Consumables Status pane to display details of each consumable.
pane	For information on orange color-coding, see "Check consumables status" on page 67.
Statement bear of the bay (LT Seatment by DET).	Note: The consumables status pane is blank when the instrument status is UNKNOWN.
Instrument Status pane	Displays temperatures and information about the oven and the detection cell.
Instrument Status Carbos Buller Own Status Of Deviction Cell Temp 23.5 °C Anny (Storn - 24.cag) Own Temp 53.5 °C	Displays instrument status: IDLE, RUNNING, or UNKNOWN (the instrument has been idle for ≥24 hours).
Actions menu	Provides commands: Pause instrument, Export result report.
Injection List pane	Lists the injections for the plate and shows re-injection status— Re-injection, re-injection with different injection parameters (Run module, Injection time, Injection voltage, Run time, Run voltage).
ACHINE O PAR Annua Parente Canada Pa	For each injection, lists the number of samples for each status — ■ Error, ◆ Caution, ■ Good. For more information, see "Sample QC and quality alerts" on page 172.
Plate layout with colors to indicate Sample QC	Color-coded Sample QC results for the selected plate. See "Sample QC and quality alerts" on page 172.
	Click a well to display the electropherogram screen for the plate.

Plate position status and plate run status in the Remote Monitoring software home screen

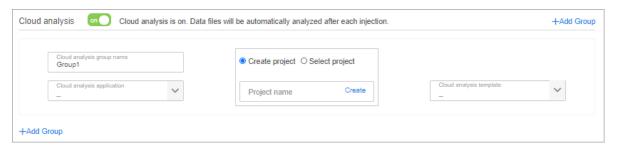


Status	Description	
Plate position status		
Occupied	A plate is present in the corresponding position in the instrument drawer. These positions are labeled as Link plate file in the instrument home screen.	
Available	The corresponding position in the instrument drawer is empty.	
A named plate is shown	The plate in the corresponding position in the instrument drawer is linked to a plate file. Possible statuses are listed below.	
Plate run status		
In queue	An injection is waiting to start. The injection will start based on the order of the injection list.	
Running	Data collection for the injection is in process.	
Analyzing	Data collection for the injection is complete, analysis is in process.	
Completed	Analysis and export is complete, results are available.	
Aborting/aborted	An injection with status of Running was cancelled.	
Cancelled	An injection with status of In queue was cancelled.	
Paused	The instrument was paused or an injection was cancelled and the pause immediately option was selected.	
	The pause and cancel commands can be issued in the SeqStudio™ Flex Remote Monitoring software or on the instrument.	
	Runs must be resumed on the instrument.	

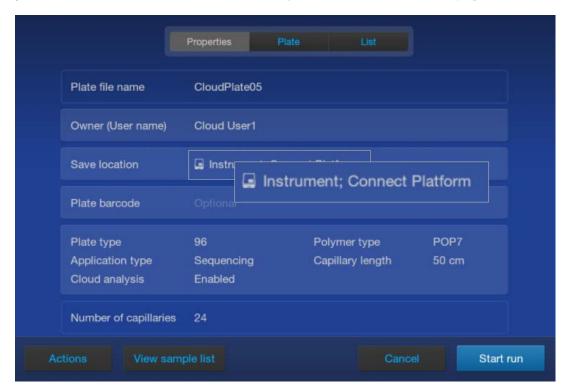
Plate file requirements for viewing analyzed and cloud results

To view the analyzed data, a results report, or cloud analysis results in the Remote Monitoring software, you must do the following:

• Create a plate file in the Plate Manager software (cloud) and enable cloud analysis. For information, see "Set up cloud analysis in the Plate Manager software (cloud)" on page 125.



• Link the plate file on the instrument and set the **Save location** field to **Connect Platform** before you start the run. For information, see "Link a plate file and start a run" on page 140.



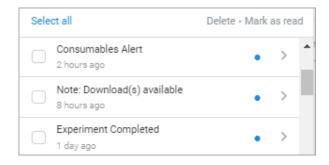
If the **Save location** field in the plate file is not set to **Connect Platform**, you can still monitor the run. However, the **Export results report** function is not available, and the **Analyzed**, **Run history**, **Cloud analysis** tabs do not display information for the plate.

View instrument notifications in your Thermo Fisher™ Connect Platform account

In any screen in the Thermo Fisher™ Connect Platform, click
 If the icon is gray and does not display a number, no notifications are available, or all notifications have been marked as "read".



Information about run completion, consumables, downloaded ZIP files that are available, and other instrument notifications is displayed. (A run is referred to as an **experiment** in notifications.)



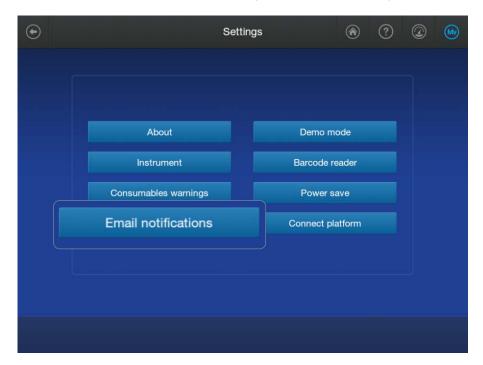
2. Click a notification, then click Mark as read or Delete as needed.

Set up email notifications from the instrument

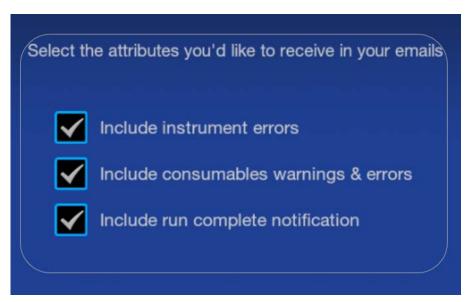
When an instrument is linked to your cloud profile, email notifications from the instrument are automatically sent to the email address that is associated with your Thermofisher.com account.

Note: Plate alerts are not instrument errors. Therefore, plate alert information is not emailed to you. For more information, see "View alert and notification details" on page 149.

- 1. Sign in to the instrument with your cloud profile and PIN.
- 2. In the home screen of the instrument, tap \odot Actions > Settings > Email notifications.



3. In the **Email Notifications** screen, select or deselect the options for which you want to receive email notifications, then tap **Done**.



View real-time results in the Remote Monitoring software

1. In the **Plates** tab, click a running plate position.

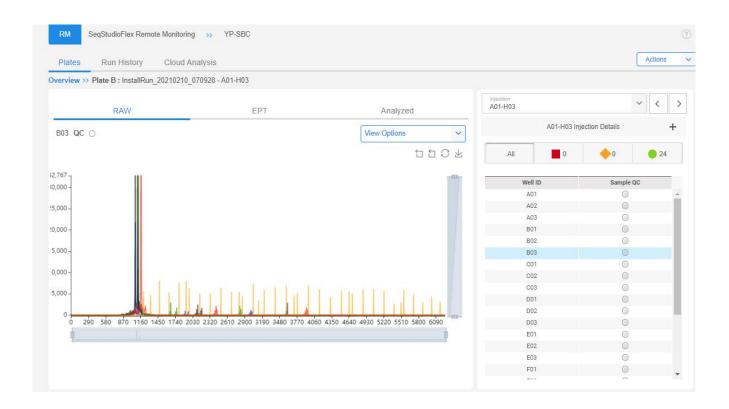


2. Click a well to display the electropherogram view.

The raw data is displayed by default. The **Analyzed** tab is blank if analysis is not complete, or if the results are not saved to Thermo Fisher™ Connect Platform.

Note: On the instrument, the Analyzed tab is displayed by default.

Note: You can use the mouse scroll wheel to zoom on the trace.



Note: A gray symbol in the **Sample QC** field indicates that the data files are being exported from the instrument to the Remote Monitoring software.

3. Alternatively, you can select an injection in the **Injection List**, click ··· (Actions), then click **View** details.

Results are displayed in the sample list at the right of the screen. For more information, see "Sample QC and quality alerts" on page 172.



Sequencing results

Result	Description
QC (Sample QC)	 —All QC tests passed. —At least 1 warning quality alert was triggered. —At least 1 failing quality alert was triggered. For more information see "Sample QC and quality alerts" on page 172.
CRL (Contiguous Read Length)	The longest uninterrupted segment of basecalls with an average Quality Value (QV) ≥20. In addition to evaluating the QV of a basecall, the software considers the QV of adjacent basecalls within a 21-bp moving window to determine a contiguous read length based on quality values: the software starts from the 5' end and calculates the average QV across a moving window size of 21, sliding 1 bp at a time, to the 3' end. The resulting longest contiguous segment is determined as the CRL.

Fragment/HID analysis results

Setting	Description	
QC (Sample QC)	 —All QC tests passed. —At least 1 warning quality alert was triggered. 	
	—At least 1 failing quality alert was triggered.	
	For more information see "Sample QC and quality alerts" on page 172.	
Sizing quality (SQ)	For more information see "Sample QC and quality alerts" on page 172.	

Cancel injections or specify re-injections in the Remote Monitoring software

IMPORTANT! You can cancel an injection in the Remote Monitoring software, but you cannot resume the run. You can resume the run from the instrument only.

IMPORTANT! To cancel injections, re-inject, or pause the instrument, you must be signed in to the instrument and to the Thermo Fisher™ Connect Platform with the same cloud profile.

If another user is signed in to the instrument when you select any of these commands, a message is displayed in the Remote Monitoring software indicating that the request was not sent to the instrument.

- 1. In the **Plates** tab, select an injection in the **Injection List** pane.
- 2. In the Sample QC field, click ··· (Actions).

Note: If more than one injection is selected, nothing is displayed when you click ... (Actions).

3. Select the Re-inject or Cancel injection options.

The changes that you make in the Remote Monitoring software are shown in the **Run Queue** screen on the instrument.

Pause the instrument from the Remote Monitoring screen, resume from the instrument home screen

Note: You can also pause the run in the run queue (see "Pause the instrument in the Run Queue screen" on page 166), in instrument status (see "Check instrument status" on page 68), and the home screen (see "Pause the instrument in the home screen" on page 157).

- 1. In the instrument home screen, tap Actions > Pause instrument.
- 2. In the **Pause Instrument** screen, tap an option to pause after the run is complete or to pause immediately.

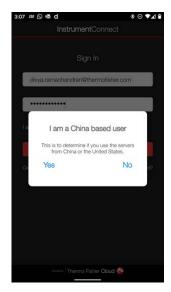
If you select the pause immediately option, the status of the injection changes to **Aborted** and the wells for the injection are marked X (canceled/aborted) in the plate view. If the pause occurs late in the injection cycle, sufficient data may have been collected for analysis. If sample quality is high, it is possible to see • or • **Sample QC** instead of \blacksquare for an aborted injection.

To resume the instrument run, tap **Resume** in the instrument home screen. The next injection in the **Run queue** is started.

Monitor a run from a mobile device

Register the instrument with the InstrumentConnect app

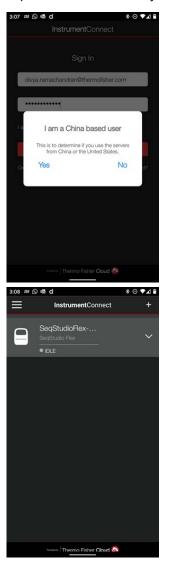
- 1. On your mobile device, download the InstrumentConnect app from the Apple Store or from Google™ Play.
- 2. On your mobile device, launch the InstrumentConnect app, then sign in with your Thermofisher.com user name and password.
- 3. Tap **Yes** or **No** to select your region.



- **4.** If the **SeqStudio Flex** instrument is not already listed, register the instrument to link your Thermofisher.com account to the instrument:
 - a. Follow the directions to relink your account, and select **Mobile devices**. See "Re-link the instrument to your cloud profile" on page 226.
 - b. Tap \equiv (Menu), then tap Register Instrument.
 - c. Tap QR code.
 - d. With your mobile device, scan the QR code displayed in the instrument touchscreen.

Monitor a run from a mobile device

- 1. On your mobile device, launch the InstrumentConnect app, then sign in.
- 2. Tap **Yes** or **No** to select your region, then tap the instrument to monitor.

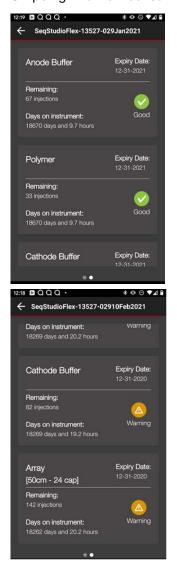


3. Tap the instrument, tap a plate position, then swipe right to display the injection list for the instrument.





4. Swipe right to view consumables status.



Swipe left to return to the injection list.

5. Tap > to display the plate positions.

The plate run statuses are shown. Completed plates are color-coded for overall sample quality. For information, see "Sample QC and quality alerts" on page 172.





6. Tap a plate position to display the injection list, then tap > to display the well list.



- 7. Tap a well, then tap **View Raw Plot** to display the electropherogram.
 - Swipe left to view the entire trace.
 - Pinch-zoom to expand the trace.

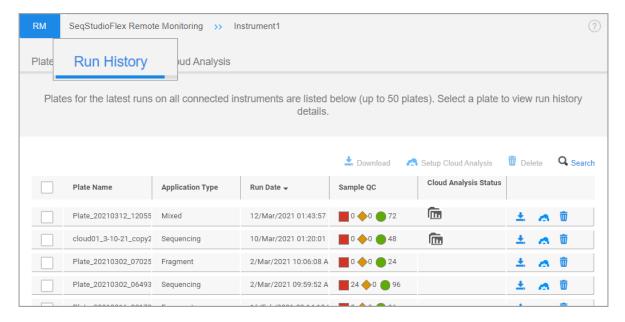
View results in the Remote Monitoring software

View results for a completed run in the Remote Monitoring software (Run History tab)

Plates are listed in the **Run history** tab only if the **Save location** in the plate file specifies **Connect Platform**.

The list contains up to 50 of the most recently completed plate runs across all connected instruments. New plate runs are added to the top of the list. If the list contains 50 plates and a new plate is added, the oldest plate is automatically removed.

1. In the Remote Monitoring software home screen, click the **Run History** tab.





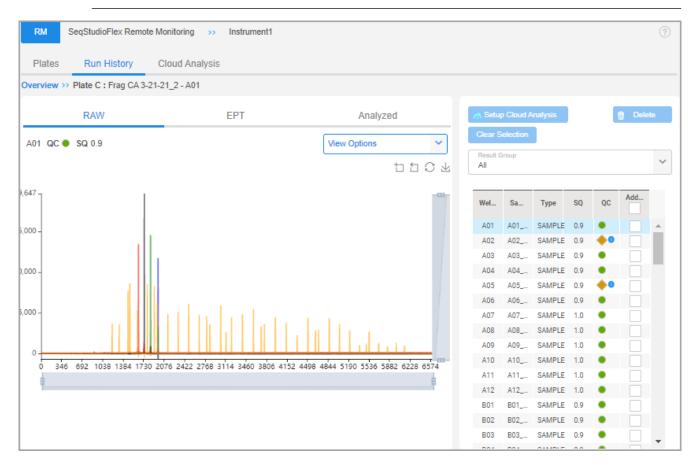
2. Do any of the following as needed.

Task	Action
Download results	See "Download results from the Remote Monitoring software" on page 202.
Set up cloud analysis	See "Use cloud analysis in the Remote Monitoring software" on page 203.
Delete projects from the list	Select one or more rows, then click (Delete) . The plates are no longer listed in the Run History tab, but are accessible on the instrument.
Search for a plate	The plate list displays up to 50 plates. If a plate is not displayed in the list and has not been deleted from the plate list, you can click Q (Search) then enter text from any field to filter the list. For example, if you type Fragment, only plates with an Application Type of Fragment are listed. You can also enter a date or text that is within a plate file name. To unfilter the list, delete the text in the search field.

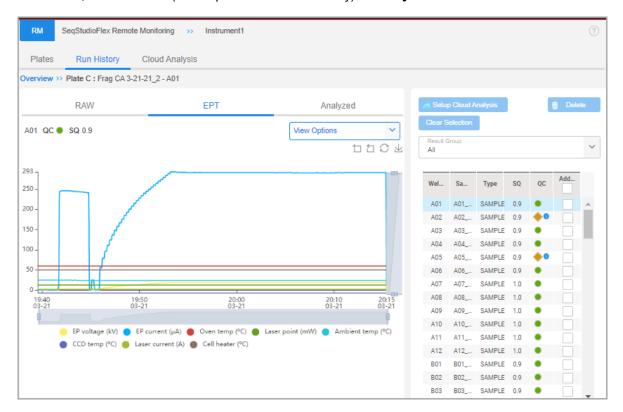
3. Click a plate to display the electropherogram view.

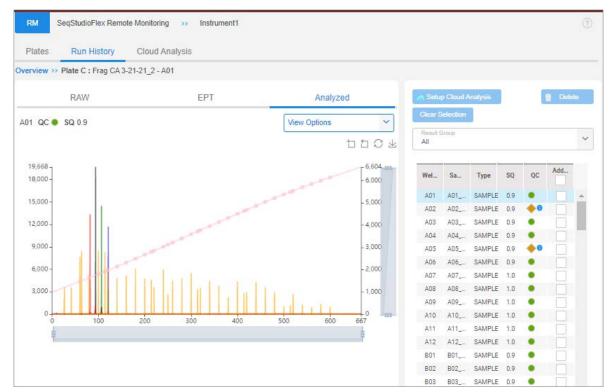
The raw data is displayed by default.

Note: You can use the mouse scroll wheel to zoom on the trace.



4. As needed, click the EPT (electrophoresis and telemetry) or Analyzed tabs.





For more information, see:

- "Sample QC and quality alerts" on page 172
- "Sequencing results" on page 192
- "Fragment/HID analysis results" on page 192

Export a results report from the Remote Monitoring software

This option generates the same report that you can generate on the instrument (by selecting a plate in the **Run History** screen, then selecting **Actions** • **Export report**).

- 1. In the Plates tab, click a completed plate.
- 2. At the top-right of the **Plates** tab, select **Actions Export result report**.

Note: If the **Export result report** option is inactive, the results were not saved to the Thermo Fisher™ Connect Platform, or the results files are not yet uploaded to the Connect Platform.

The report contains the results of the run.

Report file name format: InstrumentName_PlateName_date_UniqueID.pdf, for example: Instrument1_Plate_20201021_121952.pdf

Download results from the Remote Monitoring software

This option downloads the same files and report that you can generate on the instrument (by selecting a plate in the **Run History** screen, then selecting **Actions** • **Export run results**).

- 1. Click the Run History tab.
- 2. Select one or more plates.
- 3. Click **!** (Download).

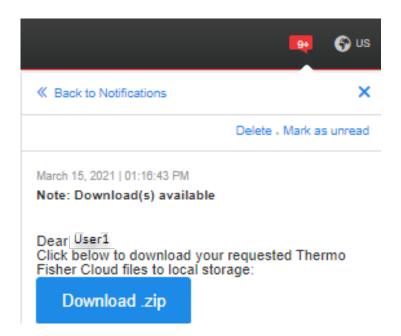
The files for the selected plate are compressed and an email with a link to the files is sent to the email address associated with your Thermofisher.com account.

Download file name: tfcdownload.zip

Contains a folder PlateName Date Timestamp that contains:

- Results report: InstrumentName PlateName Date Timestamp.pdf
- Folder: Date_Timestamp that contains:
 - Fragment analysis-FSA (data) and CSV (sizing) file for each sample
 - Sequencing-AB1 (data) file for each sample
 - Plate file (PSM file)
 - Run EPT.CSV
 - ZIP file that contains FASTA, PHD.1, and QUAL files for each sample

In addition to the email, a notification is displayed in the Thermo Fisher™ Connect Platform. You can access the ZIP file from the notification. See "View instrument notifications in your Thermo Fisher™ Connect Platform account" on page 188.



Viewing spectral calibration or install run results in the Remote Monitoring software

When viewing results for spectral calibration or install runs in the Remote Monitoring software, only raw data is displayed.

Spectral calibration or install run plates are not added to the **Run History** tab or the **Cloud Analysis** tab

For information on viewing spectral calibration or install run results on the instrument, see Chapter 12, "Run calibrations and install checks".

Use cloud analysis in the Remote Monitoring software

Automated cloud analysis with secondary analysis software

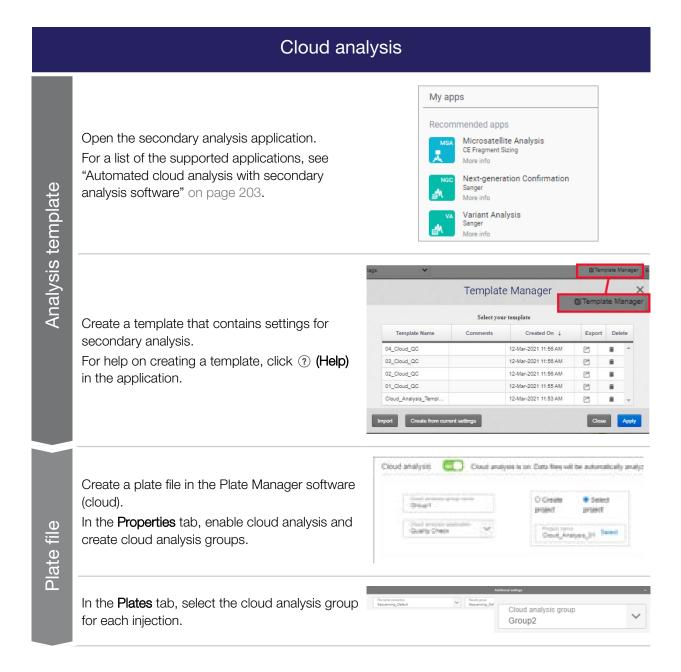
The automated cloud analysis feature allows the instrument to send data to the Thermo Fisher™ Connect Platform for secondary analysis. You can specify one or more Connect Platform cloud applications for the analysis.

Cloud analysis can be set up before or after a plate is run.

- Before a plate is run—Create a plate file in the Plate Manager software (cloud) and enable cloud analysis. See "Set up cloud analysis in the Plate Manager software (cloud)" on page 125 and "Plate file requirements for viewing analyzed and cloud results" on page 187.
- After a plate is run—Select a plate in the SeqStudio™ Flex Remote Monitoring software, then specify cloud analysis. See "Set up cloud analysis for a completed run in the Remote Monitoring software" on page 206.

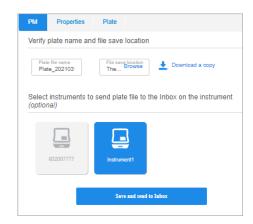
To use the cloud analysis feature, access to the Thermo Fisher™ Connect Platform must be enabled on the instrument. See Chapter 9, "Use the instrument with the Thermo Fisher™ Connect Platform".

Workflow: cloud analysis



Cloud analysis

In the **Save** tab, save the plate file and optionally send it to the **Inbox** on the instrument.



3 L

Start the run.



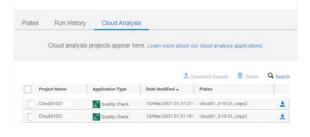
onitor

In the Plate Manager software (cloud), click the running plate position to open the Remote Monitoring software.



sults

In the Remote Monitoring software, click the **Cloud Analysis** tab to display the list of projects that have been generated by cloud analysis.

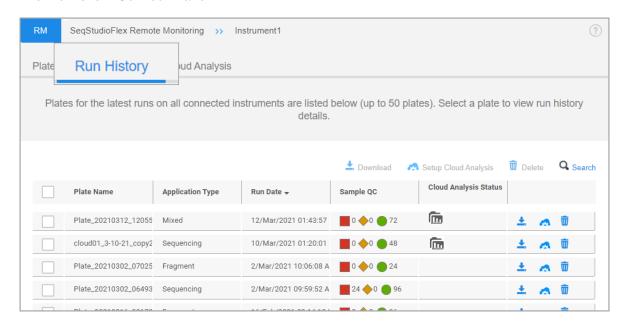






Set up cloud analysis for a completed run in the Remote Monitoring software

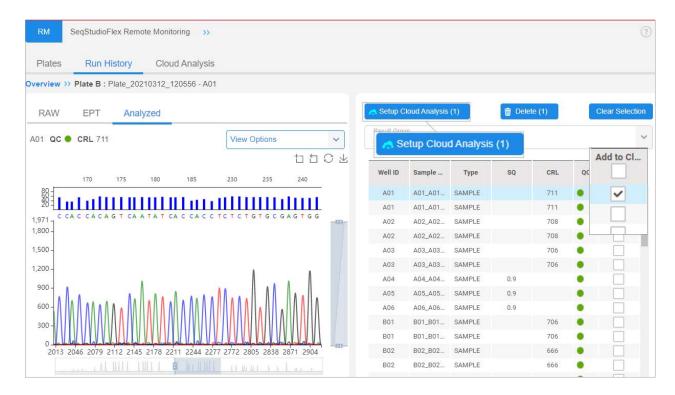
In the Remote Monitoring software, click the Run History tab.
 If a plate is not listed in the Run History tab, it indicates that the results were not saved to the Thermo Fisher™ Connect Platform.



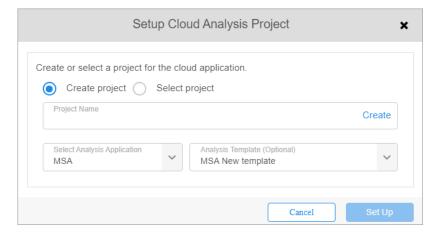
Note: The Cloud Analysis Status field indicates the status of the *plate file*. The field displays (data folder) if cloud analysis is enabled in the plate file.

The Cloud Analysis Status field does not reflect the status of the cloud analysis.

To view results before you set up cloud analysis, click a plate.By default, the RAW tab is displayed. The Analyzed tab is shown below.



- 3. As needed, view the raw, EPT, and analyzed data for samples.
- 4. For samples that you want to process with cloud analysis, select the **Add to Cloud** checkbox.
- 5. When the samples of interest are selected, click **Setup Cloud Analysis**.



- **6.** Select the name of a project in the secondary analysis software or create a new project. Cloud analysis results are added to the specified project.
- 7. Select the name of a template with analysis settings that you created in the secondary analysis software.
- 8. Click Set Up.

When you click **Set Up**, the secondary analysis project name is added to the **Cloud Analysis** tab and analysis begins.

Access cloud analysis results from the Remote Monitoring software

A project is added to the project list in the Cloud Analysis tab at the following times:

- When a plate run is complete (all injections are complete)
- If a plate is run more than one time (including re-injections)
- When cloud analysis is specified in the Run History tab
- If a plate specifies injections for sequencing and fragment analysis: When all injections for an application type are completed

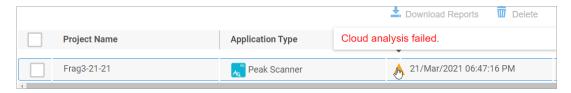
If a project is not listed in the **Cloud Analysis** tab, see "Remote Monitoring software troubleshooting" on page 513.

- 1. Click the Cloud Analysis tab.
 - If the cloud analysis settings in the plate file specify a new project, the project is created and added to the list in the **Cloud Analysis** tab, and results are generated in the secondary analysis application.
 - If the cloud analysis settings in the plate file specify an existing project, the project is added
 to the list in the Cloud Analysis tab, and all files in the project are analyzed with the cloud
 analysis settings in the plate file.

Note: If the plate file specifies the Quality Check (QC) module or the Peak Scanner™ Software, and no cloud analysis template is specified, the data is not reanalyzed. The results are obtained from the data file.

Note: The project list contains only projects that are associated with plates that you run. Up to 50 of your most recent projects are listed. New projects are added to the top of the list. If the list contains 50 projects and a new project is added, the oldest project is automatically removed.

2. If (Warning) is displayed for a project, place the cursor over the symbol to display the reason.



3. Do any of the following as needed.

Task	Action
Display the results of the cloud analysis	Double-click a row. The results for the project are displayed in the secondary analysis application.
	IMPORTANT! If the project has not finished analyzing, do not make any changes in the project.
	For information on viewing results, click ② (Help) in the application.
Download reports for the cloud analysis	Select one to five rows, then click (Download Reports) to download ZIP files. Repeat if you have more than five project reports to download. See the table below for the files that are downloaded for each application.
Delete projects from the list	Select one or more rows, then click i (Delete).
Search for a project or a plate	The project list displays up to 50 projects. If a project is not displayed in the list and has not been deleted from the project list, you can click Q (Search), then enter text from the project or plate name to filter the list. For example, if you enter <i>Fragment</i> , only plates with the fragment application type are listed. You can also enter a date or text that is within a project or plate file name. To unfilter the list, delete the text in the search field.

The files that are downloaded depend on the application.

Application type	Software	Description
Sequencing	Quality Check (QC) module	 Each ZIP file contains a QC PDF file and a Plate report PDF file. Downloaded file format name: PlateName_QC_PLATE_Report_Date_Timestamp.zip. Report format names: PlateName_QC_Report_Date_Timestamp.pdf and PlateName_PLATE_Report_Date_Timestamp.pdf
	Variant Analysis (VA) module	 All variants list (VCF file) Project summary report (PDF file)
	Next-generation Confirmation (NGC) module	 Confirmed variants list (CSV file) Project summary report (PDF file)
Fragment analysis	Peak Scanner™ Software	Project summary report (PDF file)



(continued)

Application type	Software	Description
Fragment analysis	Microsatellite Analysis Software	 Genotype table for all samples (CSV file) Summary report for all samples without plots (PDF file)



Use the instrument with the Thermo Fisher™ Connect Platform

Overview of the Thermo Fisher [™] Connect Platform features	212
Administrator set up for the Thermo Fisher [™] Connect Platform	212
User setup for the Thermo Fisher [™] Connect Platform	214
Local profile and cloud profile: when to use, user name, and user initials	215
Sign in to apps.thermofisher.com and access the InstrumentConnect software	217
(One time) Link your Thermofisher.com account to the instrument	218
Connect the instrument to your Thermofisher.com account	221
Link a local profile to your Thermofisher.com account (one time)	223
Sign in to the instrument with a cloud profile	225
Re-link the instrument to your cloud profile	226
Disconnect the instrument from your Thermofisher.com account	227
Change your cloud profile PIN	228
Set up email notifications from the instrument	230
Tasks for the cloud administrator of an instrument	232
For more information on using the Thermo Fisher [™] Connect Platform	235
Use Alexa™ voice commands	236

Overview of the Thermo Fisher™ Connect Platform features

The following features are available when the Thermo Fisher™ Connect Platform is enabled on an instrument, and your Thermofisher.com account is linked to the instrument.

Feature	For information, see
Plate Manager software (cloud)	"Get started with the Plate Manager software (cloud)" on page 107
Voice commands on the instrument	"Use Alexa™ voice commands" on page 236
Smart Help Note: You can use this feature when you are logged in with a local or a remote profile.	"Use Smart Help to request assistance from Technical Support or Service" on page 483
Automated cloud analysis	"Use cloud analysis in the Remote Monitoring software" on page 203
Monitor instruments remotely from a computer or a smart device	"Monitor a run from the Remote Monitoring software" on page 182
	"Monitor a run from a mobile device" on page 194
Sign in to any instrument with the same profile	_

Administrator set up for the Thermo Fisher™ Connect Platform

IMPORTANT! This procedure is for users with a local profile or cloud profile when SAE mode is disabled. When SAE mode is enabled, see "Connect the instrument to your Thermofisher.com account" on page 221.

Before the instrument can be used with the Thermo Fisher™ Connect Platform by any user, a local administrator must do the following:

- Sign in with a local administrator profile, then enable Connect Platform access on the instrument.
- Link the local administrator profile to the administrator's Thermofisher.com account. Linking overwrites a local profile user name with a cloud profile user name.

IMPORTANT! The first user to link the instrument to a Thermofisher.com account is automatically assigned the role of cloud administrator for the instrument. Ensure that an administrator is the first user to link. If another user is the first to link, that user must grant administrator privileges to an administrator.

1. Perform the following steps on the instrument.

Note: We recommend at least two cloud administrators for each instrument.

a. Create a personal local administrator profile for linking. See "Create a local profile (one time only)" on page 30 and "Change the role of a local profile (administrator only)" on page 454.

Note: Do not use the default Admin profile for linking. Linking a local profile to a ThermoFisher.com account overwrites the profile user name. If you use the default Admin profile for linking, the default **Admin** profile will no longer be available in the **Select instrument profile** screen when you sign in.

- b. Sign in to the instrument with your personal local administrator profile (username and PIN). See "Sign in" on page 32.
- c. Enable Connect Platform access on the instrument. See "Enable or disable Thermo Fisher™ Connect Platform access on the instrument (administrator only)" on page 232.
- d. Edit your personal local administrator profile to link to the Connect Platform and obtain a link code for the instrument. See "Re-link the instrument to your cloud profile" on page 226.
- 2. Perform the following steps on the Connect Platform.
 - a. Access the Connect Platform. See "Sign in to apps.thermofisher.com and access the InstrumentConnect software" on page 217.
 - b. In the InstrumentConnect software, click **Link instrument**, then enter the link code you obtained for the instrument in substep 1d.
 - **c.** If this is the first time you are linking, enter a PIN that you will use when you sign in to the instrument.
- 3. Perform the following steps on the instrument.
 - a. Note that your user initials are updated in the home screen.
 - **b.** Tap your user initials to display your cloud user name.

The next time that you sign in to the instrument, use your cloud profile. See "Sign in to apps.thermofisher.com and access the InstrumentConnect software" on page 217.

You will use your local profile to sign in only if the Connect Platform is not available. See "Local profile and cloud profile: when to use, user name, and user initials" on page 215.

See also:

- "Tasks for the cloud administrator of an instrument" on page 232
- "Re-link the instrument to your cloud profile" on page 226
- "Disconnect using the InstrumentConnect software" on page 227
- "Change your cloud profile PIN" on page 228
- "Set up email notifications from the instrument" on page 189

User setup for the Thermo Fisher™ Connect Platform

IMPORTANT! This procedure is for users with a local profile or cloud profile when SAE mode is disabled. When SAE mode is enabled, see "Connect the instrument to your Thermofisher.com account" on page 221.

Before a user can access the Thermo Fisher™ Connect Platform functions, the user must do one of the following:

- Link the instrument directly to the user's Thermofisher.com account (recommended).
- Link the user's local profile to the user's Thermofisher.com account. Linking overwrites a local profile user name with a cloud profile user name.
- 1. Perform the following steps on the instrument.
 - a. If you do not have a local profile, obtain a link code for the instrument. See "(One time) Link your Thermofisher.com account to the instrument" on page 218.
 - b. If you have a local profile, obtain a link code for the instrument. See "Link a local profile to your Thermofisher.com account (one time)" on page 223.
- 2. Perform the following steps on the Connect Platform.
 - a. Access the Connect Platform. See "Sign in to apps.thermofisher.com and access the InstrumentConnect software" on page 217.
 - b. In the InstrumentConnect software, click **Link instrument**, then enter the link code you obtained for the instrument in step 1.
 - c. If this is the first time you are linking, enter a PIN that you will use when you sign in to the instrument.
- 3. Perform the following steps on the instrument.
 - a. Note that your user initials are updated in the home screen.
 - **b.** Tap your user initials to display your cloud user name.

The next time that you sign in to the instrument, use your cloud profile. See "Sign in to the instrument with a cloud profile" on page 225.

You will use your local profile to sign in only if the Connect Platform is not available. See "Local profile and cloud profile: when to use, user name, and user initials" on page 215.

See also:

- "Re-link the instrument to your cloud profile" on page 226
- "Disconnect the instrument from your Thermofisher.com account" on page 227
- "Change your cloud profile PIN" on page 228
- "Set up email notifications from the instrument" on page 189

Local profile and cloud profile: when to use, user name, and user initials

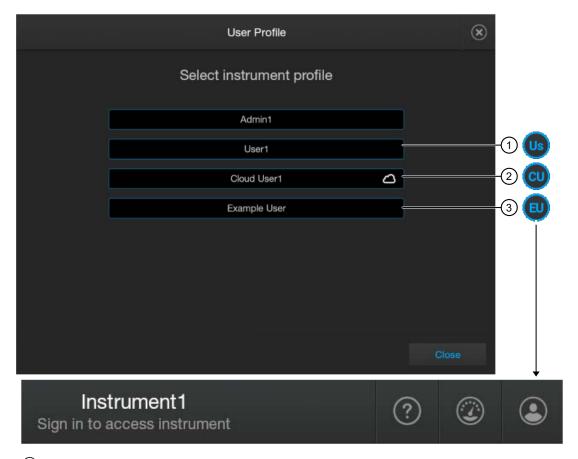
When to use

Use your local profile or your cloud profile under the following conditions.

- Sign in to the instrument with your local profile—Before the instrument is linked to your ThermoFisher.com account, or if access to the Thermo Fisher™ Connect Platform has been disabled or is interrupted (the △ cloud icon is not displayed on the home screen).
- Sign in to the instrument with your cloud profile—After the instrument is linked to your Thermo Fisher Scientific account and the Connect Platform function is enabled on the instrument and active (the △ cloud icon is displayed on the home screen).

User name and initials

The following figure shows the user name and initial format for local and cloud profiles.

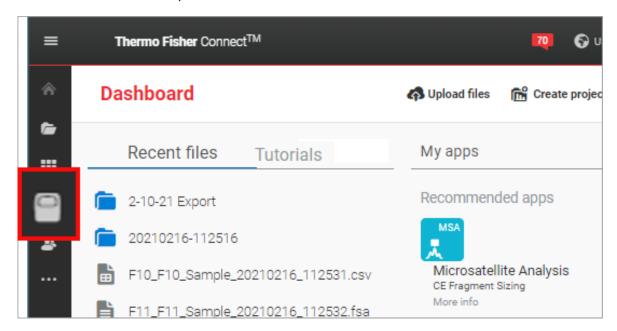


- 1 Local profile
- (2) Cloud profile
- 3 Originally cloud profile, but now local profile because it is not linked to an instrument

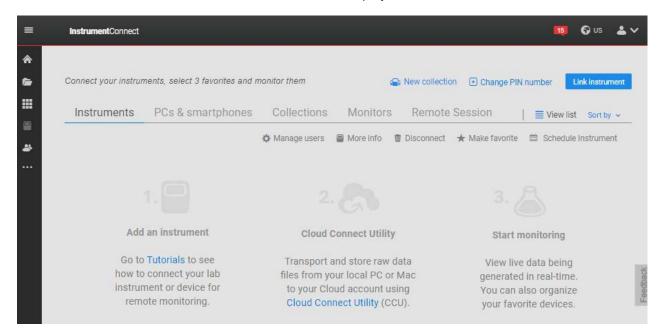
Type of user profile	Description
Local	 A local profile with user name and PIN is created manually by a user. The user name cannot contain spaces. Example: User1. The user initials displayed in the home screen are the first letter (uppercase) and second letter (lowercase) of the user name. Example: Us. For more information, see "Create a local profile (one time only)" on page 30.
Cloud	 A cloud profile is created automatically when you link an instrument or your local profile to your Thermofisher.com account. The user name is created automatically by the software using the FirstName and LastName from your Thermofisher.com account, and includes △ in the Select instrument profile screen. Example: Cloud User1 △. Note: The cloud user name is not the user name you use to sign in to Thermofisher.com. You create the PIN manually on the Connect Platform when you link. If you linked a local profile to your Thermofisher.com account (instead of linking the instrument directly to your Thermofisher.com account), the cloud profile user name includes the local profile user name in parentheses. Example: Cloud User1 (User1) △ (not shown in the example figure above). Note: The cloud user name is not the user name you use to sign in to Thermofisher.com. The user initials displayed in the home screen are the first letters of the first and last names of the user name (uppercase). Example: CU Profile is listed with △ in the Select instrument profile screen. For more information, see: "(One time) Link your Thermofisher.com account to the instrument" on page 218 "Link a local profile to your Thermofisher.com account (one time)" on page 223
Local converted from cloud	 Occurs when a cloud administrator removes a user from an instrument or disconnects the instrument from the InstrumentConnect software. For more information, see "Thermo Fisher™ Connect Platform (cloud) administrator functions" on page 233. If you linked a local profile to your Thermofisher.com account, the original local profile user name is available. Example: If your Cloud User1 (User1) account is unlinked, your User 1 local profile is available when you sign in. If you linked the instrument directly to your Thermofisher.com account, the local profile uses the same user name and initials as your cloud account, but does not include in the Select instrument profile screen. Example: If your Example User account is unlinked, your Example User local profile is available when you sign in.

Sign in to apps.thermofisher.com and access the InstrumentConnect software

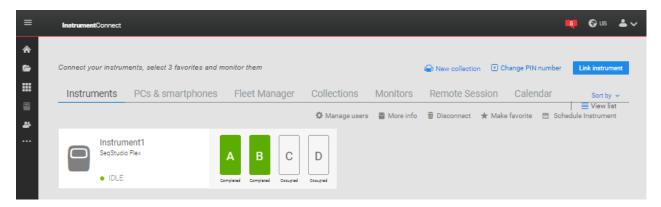
- 1. Go to apps.thermofisher.com.
- In the sign in screen, sign in or create an account.
 The Thermo Fisher™ Connect Platform Dashboard is displayed with the (InstrumentConnect) icon in the left pane.



3. Click (InstrumentConnect) to display the InstrumentConnect screen. If no instruments are linked, the screen below is displayed.



If an instrument is linked, the screen below is displayed. In this example, 2 plates have been run on the instrument, and all results passed all quality checks (plates are green).



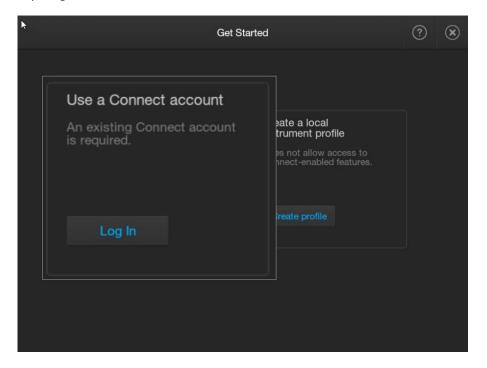
(One time) Link your Thermofisher.com account to the instrument

Follow this procedure if you do not have a local profile on the instrument. If you have a local profile, see "Link a local profile to your Thermofisher.com account (one time)" on page 223.

Note: This is typically a one-time procedure. However, you may need to re-link if an administrator removes you from an instrument in the InstrumentConnect software or disconnects the instrument from the InstrumentConnect software.

- - If another user is signed in to the instrument, tap ((Profile), then tap Sign out.
- 2. In the **User Profile** screen, tap **Get started**.

3. Tap Log In.



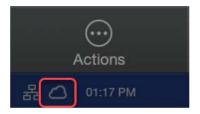
4. Tap a connection option.

Note: This function links the instrument to your Thermofisher.com account, not to a specific mobile device or PC.

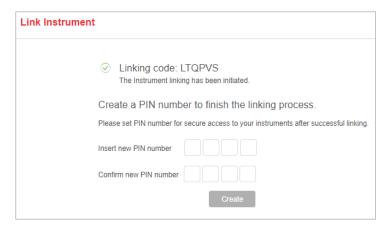
Option	Action
Mobile devices With this option, the instrument generates a QR (Quick Response) code, and you use your smart	Note: Before selecting this option, install and sign in to the InstrumentConnect software on your mobile device. See "Monitor a run from a mobile device" on page 193.
device to read the QR code.	a. Tap Mobile devices to display a QR code.
	b. Hold the camera on your mobile device over the QR code that is displayed on the touchscreen.
	c. If this is the first time you are linking, you are prompted to create a PIN. You can use this PIN with your cloud profile to access any instrument that is listed in the InstrumentConnect software.
	You can alternatively enter a link code in InstrumentConnect.
□PC With this option, the instrument generates a link code, and you enter the link code into the InstrumentConnect screen.	 a. Tap PC to display a link code. b. On a computer, access the Thermo Fisher™ Connect Platform. c. Access the InstrumentConnect software. d. Click Link instrument. e. Enter the link code.



Note: If a time-out error is displayed after you tap a connection option, check the home screen on the instrument to ensure that \triangle (cloud) is displayed. If it is not displayed, contact the instrument administrator.

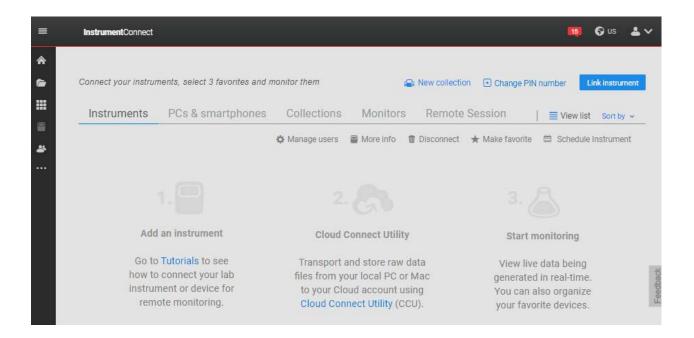


5. If this is the first time you connect, you are prompted to create a PIN. You can use this PIN with your cloud profile to access any instrument that is listed in the InstrumentConnect screen.



If this is the first time you link, your cloud profile is created. For more information, see "Local profile and cloud profile: when to use, user name, and user initials" on page 215.

The InstrumentConnect screen is displayed when the instrument is linked.



Connect the instrument to your Thermofisher.com account

Connect the instrument to your Thermofisher.com account on the Thermo Fisher™ Connect Platform.

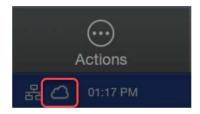
- 1. Sign in to the instrument (see "Sign in to the instrument with SAE enabled" on page 248).
- 2. In the home screen, tap your profile icon (for example, (EU) for **Example User**).
- 3. Tap Edit, then enter your SAE account password.
- 4. In the Edit My Profile screen, tap Connect profile.
- 5. Tap a connection option.

Note: This function connects the instrument to your Thermofisher.com account, not to a specific mobile device or PC.

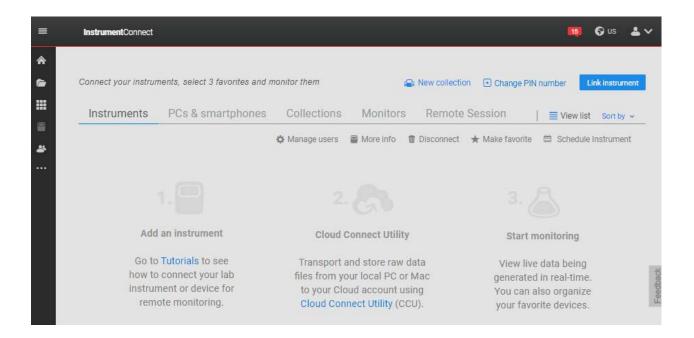


Option	Action
Mobile devices With this option, the instrument generates a QR (Quick Response) code, and you use your smart	Note: Before selecting this option, install and sign in to the InstrumentConnect software on your mobile device. See "Monitor a run from a mobile device" on page 193.
device to read the QR code.	a. Tap Mobile devices to display a QR code.
	 b. Hold the camera on your mobile device over the QR code that is displayed on the touchscreen.
	c. If this is the first time you are linking, you are prompted to create a PIN. You can use this PIN with your Thermofisher.com account to access any instrument that is listed in the InstrumentConnect software.
	You can alternatively enter a link code in InstrumentConnect.
☐PC With this option, the instrument generates a link code, and you enter the link code into the InstrumentConnect screen.	 a. Tap PC to display a link code. b. On a computer, access the Thermo Fisher™ Connect Platform. c. Access the InstrumentConnect software. d. Click Link instrument. e. Enter the link code.

Note: If a time-out error is displayed after you tap a connection option, check the home screen on the instrument to ensure that \triangle (cloud) is displayed. If it is not displayed, contact the instrument administrator.



The InstrumentConnect screen is displayed when the instrument is linked.



Link a local profile to your Thermofisher.com account (one time)

Follow this procedure if you have a local profile on the instrument. If you do not have a local profile, see "(One time) Link your Thermofisher.com account to the instrument" on page 218.

Note: The procedure below is typically a one-time procedure. However, you may need to re-link if an administrator removes you from an instrument in the InstrumentConnect software or disconnects the instrument from the InstrumentConnect software.

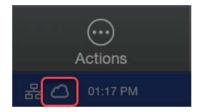
- 1. Sign in to the instrument (see "Sign in" on page 32).
- 2. In the home screen, tap your profile icon (for example (EU), for Example User).
- 3. Tap **Edit**, then enter your PIN.
- 4. In the Edit My Profile screen, tap Connect profile.
- 5. Tap a connection option.

Note: This function links the instrument to your Thermofisher.com account, not to a specific mobile device or PC.

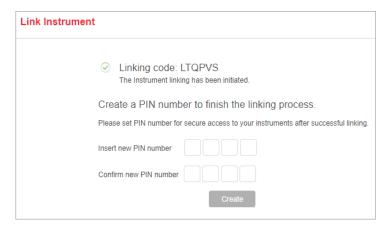


Option	Action
Mobile devices With this option, the instrument generates a QR (Quick Response code, and you use your smart	Note: Before selecting this option, install and sign in to the InstrumentConnect software on your mobile device. See "Monitor a run from a mobile device" on page 193.
device to read the QR code.	a. Tap Mobile devices to display a QR code.
	 b. Hold the camera on your mobile device over the QR code that is displayed on the touchscreen.
	c. If this is the first time you are linking, you are prompted to create a PIN. You can use this PIN with your cloud profile to access any instrument that is listed in the InstrumentConnect software.
	You can alternatively enter a link code in InstrumentConnect.
With this option, the instrument generates a link code, and you enter the link code into the InstrumentConnect screen.	 a. Tap PC to display a link code. b. On a computer, access the Thermo Fisher™ Connect Platform. c. Access the InstrumentConnect software. d. Click Link instrument. e. Enter the link code.

Note: If a time-out error is displayed after you tap a connection option, check the home screen on the instrument to ensure that \triangle (cloud) is displayed. If it is not displayed, contact the instrument administrator.

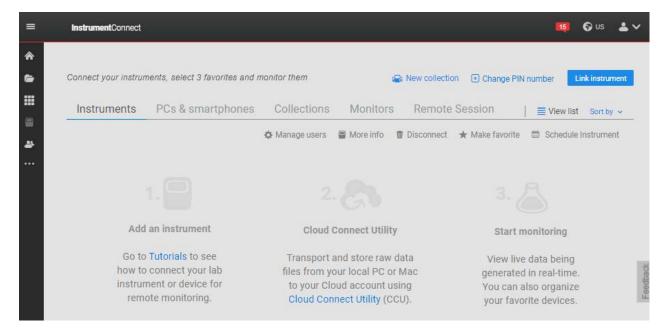


6. If this is the first time you connect, you are prompted to create a PIN. You can use this PIN with your cloud profile to access any instrument that is listed in the InstrumentConnect software.



If this is the first time you link, your cloud profile is created. For more information, see "Local profile and cloud profile: when to use, user name, and user initials" on page 215.

The InstrumentConnect screen is displayed when the instrument is linked.

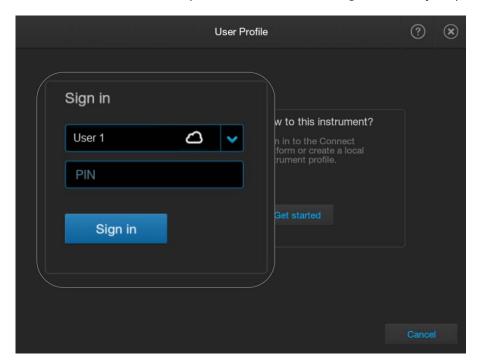


Sign in to the instrument with a cloud profile

If you do not have a cloud profile, see:

- "Sign in to apps.thermofisher.com and access the InstrumentConnect software" on page 217
- "(One time) Link your Thermofisher.com account to the instrument" on page 218
- "Link a local profile to your Thermofisher.com account (one time)" on page 223

- 1. In the home screen, tap (Profile). If user initials are displayed instead of ⓐ, see "Switch user or sign out" on page 34.
- 2. In the User Profile screen, tap the down arrow under Sign in, select your profile, then tap Sign in.



Note: If your cloud profile does not display △ (cloud), it means that your cloud profile was unlinked from the instrument. A cloud administrator has removed you or disconnected the instrument in InstrumentConnect, or you disconnected yourself. See "Re-link the instrument to your cloud profile" on page 226.

The home screen is displayed.

Re-link the instrument to your cloud profile

If your cloud profile does not display riangle (cloud) in the **User Profile** screen, it means that your cloud profile was unlinked from the instrument. Edit your local profile to re-link to the instrument.

Note: The first user who links the instrument to their cloud profile is automatically assigned the cloud administrator role for the instrument (even if the user's local profile does not have the administrator role).

- 1. Go to www.thermofisher.com, then sign in to with your Thermofisher.com account.
- 2. In the instrument home screen, tap (Profile).
- 3. Select your profile from the **Sign in list**, then enter your **PIN**.

Note: Your profile name is listed as FirstName LastName (LocalProfleName).

- 4. Tap your initials, tap **Edit**, then enter your **PIN**.
- 5. Tap Connect profile.
- 6. In the Connect to the Connect Platform screen, tap a connection option.

Note: This function links the instrument to your Thermofisher.com account, not to a specific mobile device or PC.

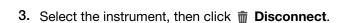
Option	Action
Mobile devices With this option, the instrument generates a QR (Quick Response) code, and you use your smart	Note: Before selecting this option, install and sign in to the InstrumentConnect software on your mobile device. See "Monitor a run from a mobile device" on page 193.
device to read the QR code.	a. Tap Mobile devices to display a QR code.
	b. Hold the camera on your mobile device over the QR code that is displayed on the touchscreen.
	c. If this is the first time you are linking, you are prompted to create a PIN. You can use this PIN with your cloud profile to access any instrument that is listed in the InstrumentConnect software.
	You can alternatively enter a link code in InstrumentConnect.
□PC With this option, the instrument generates a link code, and you enter the link code into the InstrumentConnect screen.	 a. Tap PC to display a link code. b. On a computer, access the Thermo Fisher™ Connect Platform. c. Access the InstrumentConnect software. d. Click Link instrument. e. Enter the link code.

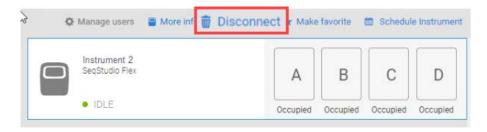
Disconnect the instrument from your Thermofisher.com account

Note: If you disconnect the instrument from your Thermofisher.com account, the Alexa™ voice command functions are disabled. For more information, see "Use Alexa™ voice commands" on page 236.

Disconnect using the InstrumentConnect software

- 1. Access the InstrumentConnect software (see "Sign in to apps.thermofisher.com and access the InstrumentConnect software" on page 217).
- 2. In the left pane, click (InstrumentConnect).





4. Tap Confirm.

Disconnect using the instrument software

- In the home screen, tap (Profile).
 The My Profile screen is displayed.
- Tap Edit, then enter your password.The Edit My Profile screen is displayed.
- Tap Disconnect profile.
 The Disconnect from the Connect Platform screen is displayed.
- Tap Yes to confirm, then tap Close.
 The instrument is disconnected from your Thermofisher.com account.

Note: If you are the only Thermo Fisher™ Connect Platform administrator for the instrument, you will receive an error message. You must disconnect directly from the Connect Platform.

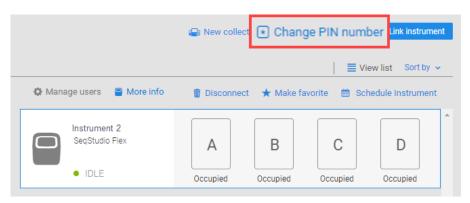
Change your cloud profile PIN

A cloud profile PIN is associated with your profile, not with an instrument.

When you update your PIN from any location, it is automatically updated in other locations. For example, if you update your cloud profile PIN using the InstrumentConnect screen as described below, it updates the PIN you use to sign in to any instrument. If you update your cloud profile PIN on an

instrument, it updates the PIN that you use when you link to an instrument in the InstrumentConnect screen.

- 1. Access InstrumentConnect (see "Sign in to apps.thermofisher.com and access the InstrumentConnect software" on page 217).
- 2. Click (instrument) to display the InstrumentConnect screen.
- 3. Click Change PIN number, then enter a new PIN.

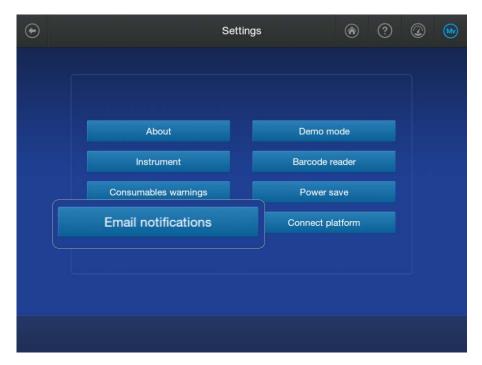


Set up email notifications from the instrument

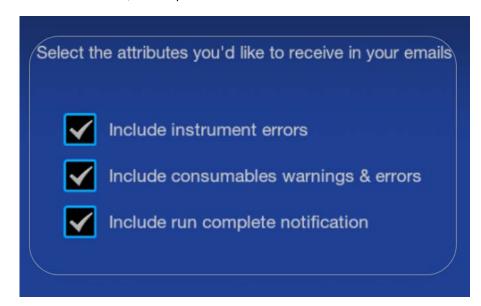
When an instrument is linked to your cloud profile, email notifications from the instrument are automatically sent to the email address that is associated with your Thermofisher.com account.

Note: Plate alerts are not instrument errors. Therefore, plate alert information is not emailed to you. For more information, see "View alert and notification details" on page 149.

- 1. Sign in to the instrument with your cloud profile and PIN.
- 2. In the home screen of the instrument, tap \odot Actions > Settings > Email notifications.



3. In the **Email Notifications** screen, select or deselect the options for which you want to receive email notifications, then tap **Done**.



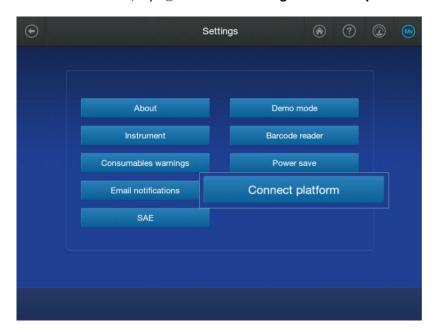
Tasks for the cloud administrator of an instrument

Enable or disable Thermo Fisher™ Connect Platform access on the instrument (administrator only)

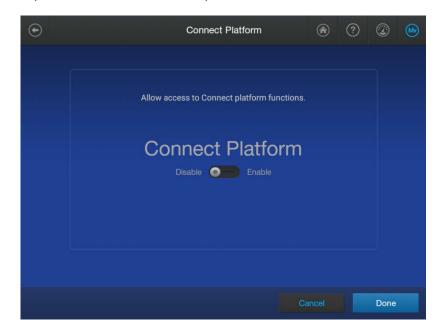
You can change this setting if the permission has been granted to you in the SAE Administrator Console.

Note: The Connect Platform button is inactive if you are not an administrator.

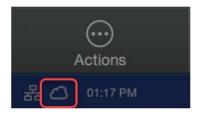
1. In the home screen, tap ⊙ Actions ➤ Settings ➤ Connect platform.



2. Tap Enable or Disable, then tap Done.



The home screen is displayed with a cloud icon in the lower left corner if Connect Platform access is enabled on the instrument.



For more information, see Chapter 9, "Use the instrument with the Thermo Fisher™ Connect Platform".

Thermo Fisher™ Connect Platform (cloud) administrator functions

Note: The first user who links the instrument to their cloud profile is automatically assigned the cloud administrator role for the instrument (even if the user's local profile does not have the administrator role).

At least one cloud administrator is required for each instrument. We recommend at least two cloud administrators for each instrument.

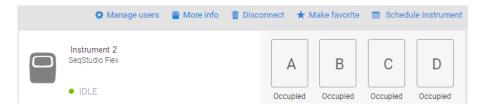
A cloud administrator can perform the following tasks in the InstrumentConnect software:

- Access the Manage users function in InstrumentConnect to see a list of all cloud profiles that are linked to the instrument.
- Assign the cloud administrator role to one or more users.
- · Remove a user from an instrument.
- Disconnect the instrument from the InstrumentConnect software.
- Change the instrument name.

Manage the users and administrators of your instrument

Any user with a cloud administrator role can manage cloud users for an instrument or disconnect an instrument from **InstrumentConnect**.

- 1. Sign in to apps.thermofisher.com.
- 2. Click to access the InstrumentConnect software.
- 3. Select the instrument.



Note: The **Manage users** and other administrator functions are not displayed until you select an instrument. The functions are inactive if your cloud profile does not have the administrator role.

4. To perform administrator tasks:

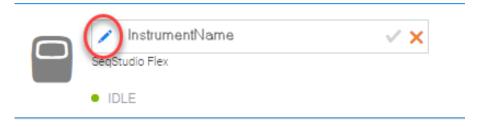
Task	Action
Assign the Admin role to an additional user	Click Manage users, select the Admin checkbox for the user that you want to change to administrator, then click Close.
Remove a user	Click Manage users, click mext to a user name, then click Confirm.
Disconnect the instrument	Click Disconnect , then click Confirm . Disconnecting unlinks <i>all</i> cloud profiles and removes the instrument from InstrumentConnect. It also disables the voice command function for all cloud profiles. For more information, see "Use Alexa™ voice commands" on page 236. Users must relink to the instrument. See "Re-link the instrument to your cloud profile" on page 226.
	Note: The first user who links the instrument to their cloud profile is automatically assigned the cloud administrator role for the instrument (even if the user's local profile does not have the administrator role). Note: To disconnect selected users, use the Remove option.

Change the instrument name in the InstrumentConnect software (cloud administrator only)

The instrument name can be changed in the InstrumentConnect software by a cloud administrator.

Note: The instrument name can also be changed on the instrument by a local administrator or an SAE administrator. See "Change the instrument name (administrator only)" on page 471.

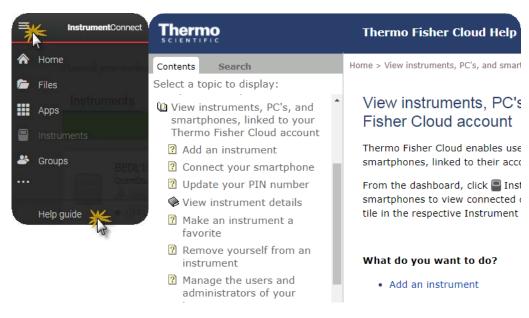
- 1. Sign in to apps.thermofisher.com.
- 2. Click to access the InstrumentConnect software.
- 3. Select the instrument, then click / (edit).



4. Change the instrument name, then click

For more information on using the Thermo Fisher™ Connect Platform

In the top left of any Thermo Fisher™ Connect Platform screen, click ≡, then select **Help guide**.



Use Alexa™ voice commands

Note: This feature is not supported for HID applications.

Voice commands use Amazon™ Alexa™ for Business.

IMPORTANT! To use Alexa™ voice commands, you must connect the instrument to your Thermofisher.com account. If the instrument is disconnected from Thermofisher.com account, the voice command function is disabled.

Enable (register) the voice command function

This procedure is required the first time each user signs in to an instrument with a cloud profile. If access to the Thermo Fisher™ Connect Platform is disabled for the instrument after the voice command function is enabled, the voice command function is unregistered (disabled) for all users.

Before you perform this procedure, ensure that the instrument time is set to **Automatic**. See "Manage date and time settings (administrator only)" on page 471.

Note: In this section, an icon is referred to as *disabled* if it displays a forward slash. The gray disabled microphone is shown below.



- Sign in to the instrument with a cloud profile.
 The home screen displays the gray disabled icon *\mathbb{\epsilon}\$.
- Tap the gray disabled icon to start registration.
 During registration, the icon changes to the amber disabled icon . Registration can take up to 3–5 minutes.

The blue active icon ① is displayed when the instrument is registered and ready to accept voice commands, and a person is detected by the proximity sensor.

Disable the voice command function

The voice command function can be disabled for individual users or for the instrument.

• To disable the voice command function for an individual user, tap the microphone icon to mute the microphone. The muted microphone icon is shown below.



To disable the voice command function for the instrument, disable access to the Thermo Fisher™
Connect Platform. See "Enable or disable Thermo Fisher™ Connect Platform access on the
instrument (administrator only)" on page 232.

Use voice commands

- 1. Sign in with a cloud profile.
- 2. Ensure that the blue microphone icon (1) is displayed at the top of the screen.



If the icon is displays a forward slash as shown below, the microphone is muted. Alexa cannot accept commands when the microphone is muted. Tap the icon to unmute the microphone.



If the icon is gray as shown below, step in front of the proximity sensor on the front of the instrument.

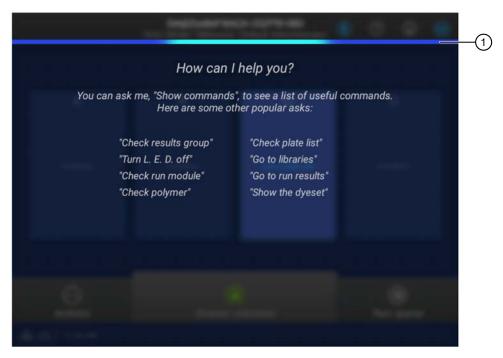




- 1 Microphone
- 2 Proximity sensor
- 3 Speakers
- 3. Say "Alexa".

A blue bar is displayed on the touchscreen when Alexa can accept a command (see the following figure).





- (1) Blue bar at the top of the touchscreen indicates that Alexa can accept a command
- Say "Open flex instrument".
 Alexa responds with "How may I help".
- 5. Use voice commands as needed. See "Basic voice commands" on page 238 and "Interactive voice command—start run" on page 239.

For help with voice commands, see "Voice command troubleshooting" on page 533.

Basic voice commands

Note: If the blue bar is not displayed on the touchscreen, say *Alexa*. Wait until the blue bar is displayed, then say *Open flex instrument*. When Alexa responds with *How may I help*, say a command.

Note: To exit out of voice command mode at any time, say Alexa, stop.

Commands	Result
Instrument status commands	
Check consumables, Check buffer, Check polymer, Check array	The Consumables status screen is displayed.
Library commands	
Go to plates (or the library name of interest), show me plates	The first screen of the library is displayed.
Run history commands	
Go to Run history, show me run history	The Run History screen is displayed.

Interactive voice command-start run

The start run command prompts you through linking a plate file and start the run

Note: To exit out of voice command mode at any time, say Alexa, stop.

Step	User command	Instrument action and Alexa reply
1	Alexa	How can I help you? You can ask me, "Show commands", to see a list of useful commands. Here are some other popular asks: "Check results group" "Check plate list" "Turn L. E. D. off" "Go to libraries" "Check run module" "Go to run results" "Check polymer" "Show the dyeset" 1 Blue bar at the top of the touchscreen indicates that Alexa can accept a command How may I help you?
2	Open flex instrument	The home screen is displayed.
3	Start run	Which plate do you want to link?
4	A (or the position of interest). You can also say <i>Drawer A</i> , <i>Position A</i> , or <i>Plate A</i> .	The Link Plate File screen is displayed. From which plate source do you want to select the plate?
5	Inbox (or Cloud (Thermo Fisher™ Connect Platform), USB, network drive, or .Instrument).	The Select Plate File screen is displayed. Select plate file. You can say page up or page down.



(continued)

Step	User command	Instrument action and Alexa reply
6	Say the file number of the plate file to link, then say Start run.	Run is being initiated now.
	In the example below, you could say 4 to select Plate_115, then say Start run.	Pre-run checks are performed, then the run starts.
	Type Plate file name 1	
	You can also use the following voice commands to navigate through the list before specifying the file number:	
	Page up, Page down, Scroll up, Scroll down, Go back.	
	Note: If you do not want to start the run, you can do any of the following: Say the file number of the plate file to link, then say No.	
	 After the plate file is linked but before the run starts, say Cancel run, Cancel plate, or Unlink. Say Alexa, stop. 	

Microphone icon ① indicators for voice commands

Microphone icon states	Status of voice commands	
	The microphone is ready to accept commands. Tap the icon to mute the microphone.	
(Blue)	The icon turns gray ♠ if the proximity sensor does not detect a person or if access to the Thermo Fisher™ Connect Platform is interrupted. The icon turns blue again ♠ when a person is detected or access to the Connect Platform is restored.	
	The microphone is muted and cannot accept voice commands. Tap the icon to unmute the microphone.	
(Blue with strikethrough symbol)	The icon turns gray	
(Gray with strikethrough symbol)	Access to the Thermo Fisher™ Connect Platform is interrupted or this is the first time you have signed in with your cloud profile. See "Enable (register) the voice command function" on page 236.	

(continued)

Microphone icon states	Status of voice commands
	Displayed briefly after the microphone is unmuted. The icon turns blue ① when the microphone is ready to accept commands.
(Gray) (Amber)	
(Gray) (Amber) with strikethrough symbol	Displayed the first time you sign in with your cloud profile. See "Enable (register) the voice command function" on page 236.



Use the instrument with the SAE Administrator Console

Overview of the Security, Auditing, and E-signature (SAE) v2.1 module components	243
Configuring the SAE module and setting permissions	244
Enable SAE mode on the instrument and specify the SAE server (administrator only)	245
Disable SAE mode on the instrument (administrator only)	247
Sign in to the instrument with SAE enabled	248
Audit reason requirements	249
E-signature requirements for starting a spectral, install, or regular run	249
Sign an object before a regular run is started	250
Sign an object when a regular run is started	251
Signing during an automated barcode run	253
Displaying signatures	254
Use the instrument when the SAE server is offline	255
SAE error messages and actions	255



Overview of the Security, Auditing, and E-signature (SAE) v2.1 module components

The Security, Auditing, and E-signature (SAE) v2.1 module includes three components:

- SAE Administrator Console—Tool that is used by an SAE administrator to configure the SAE module.
- SAE server (server)—Repository that stores SAE settings, user accounts, audit records, and
 e-signature records. By default, the SAE server is installed on the same computer as the SAE
 Administrator Console.
- **SAE screens** (client)—Screens that are displayed in an application (sign in, audit, and e-signature) and that require user input. The instrument software runs on the client.

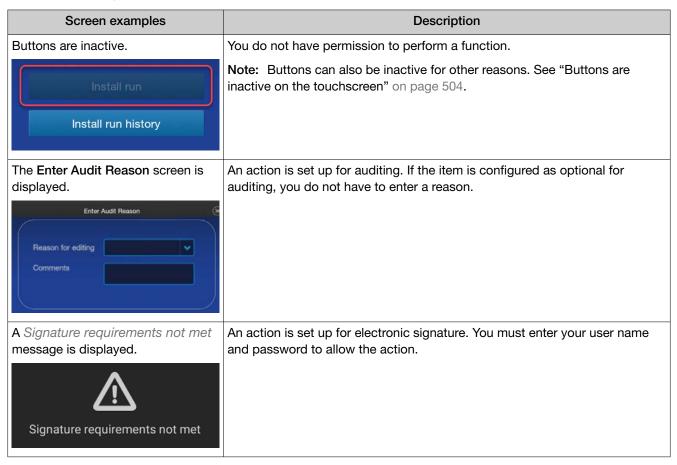
The Security, Auditing, and E-signature (SAE) v2.1 module provides the following SAE functionality on the instrument:

- System security—Controls password policies, user sign in, and access to functions.
- Auditing—Tracks changes and actions performed by users.
- **E-signature** —Allows users to provide an electronic signature (user name and password) when performing certain functions.

Depending on the way that your SAE administrator configures these features, you may observe the following:

- Some of the features and functions described in other chapters of this guide may not be accessible to vou.
- Buttons may be inactive, indicating that you do not have permission to perform a function.

 You may see audit and e-signature screens when you use the software (examples are shown below).



Configuring the SAE module and setting permissions

For information on configuration and permissions, see SAE Administrator Console v2.1 User Guide for Capillary Electrophoresis Products (Pub. No. MAN0025849).

Enable SAE mode on the instrument and specify the SAE server (administrator only)

Before you enable SAE mode, install the SAE Administrator Console on a computer with a static IP address.

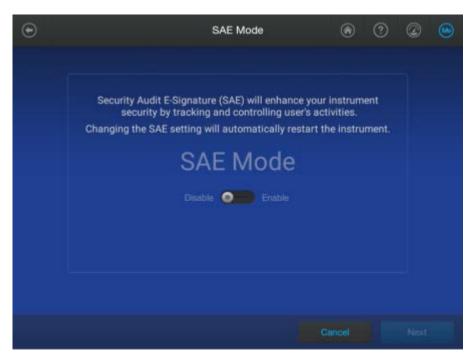
After you enable SAE mode, the instrument automatically restarts.

This procedure requires a local administrator profile and an SAE administrator account. For information on creating SAE accounts, see *SAE Administrator Console v2.1 User Guide for Capillary Electrophoresis Products* (Pub. No. MAN0025849).

- 1. Sign in to the instrument with a local administrator profile.
- 2. Ensure that there are no runs in progress and that no plate positions are linked.
- 3. Tap ⊙ Actions ➤ Settings ➤ SAE.

Note: The **SAE** button is not displayed in the **Settings** screen unless the function has been enabled by Service.

4. In the **SAE Mode** screen, press-drag the slider to the **Enable** setting, then tap **Next**.

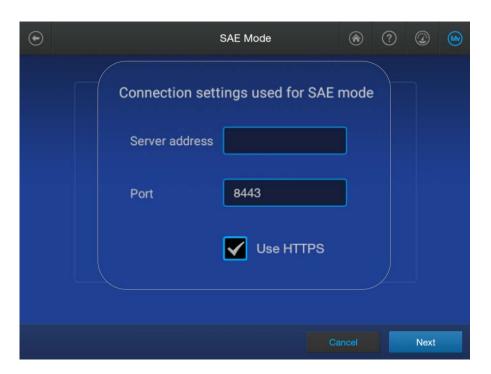


5. In the **Server address** field, enter the IP address of the computer on which the SAE Administrator Console is installed. Do not change the **Port** or **HTTPS** settings.

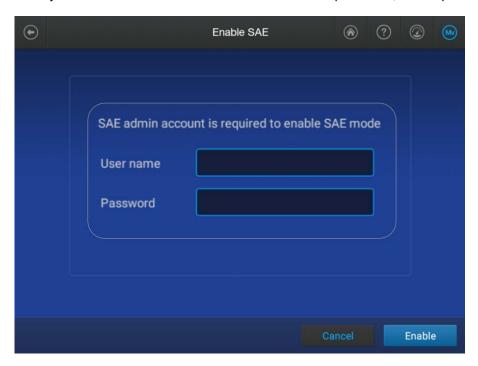
IMPORTANT! Specify a server with a static IP address.

For more information, see "Determine the IP address for a computer on a network" on page 450.





- 6. Tap Next.
- 7. Enter your SAE administrator account user name and password, then tap **Enable**.

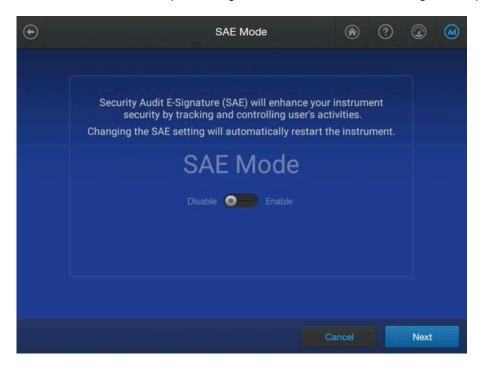


The instrument automatically restarts.

Disable SAE mode on the instrument (administrator only)

You can disable SAE mode when you are signed in with an SAE administrator account or a local administrator profile. You must enter your SAE administrator account user name and password to complete the procedure.

- 1. In the home screen, tap ⊕ Actions ➤ Settings ➤ SAE.
- 2. In the SAE Mode screen, press-drag the slider to the Disable setting, then tap Next.



3. Enter your SAE administrator account user name and password, then tap **Disable**.

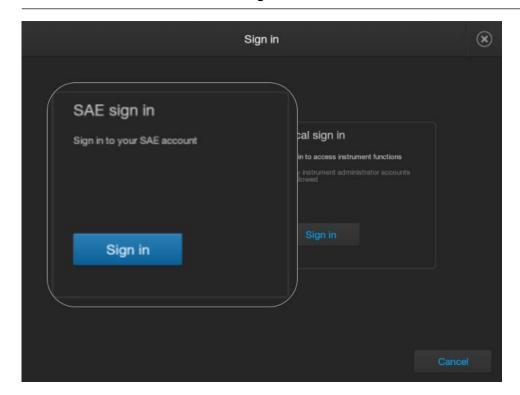
SAE mode is disabled. The home screen is displayed.

Sign in to the instrument with SAE enabled

This procedure requires an SAE account.

- 1. If another user is signed in, tap the user initials, then tap Sign out.
- 2. In the home screen, tap .
- 3. In the Sign in screen, tap Sign in, enter your SAE user name and password, then tap Sign in.

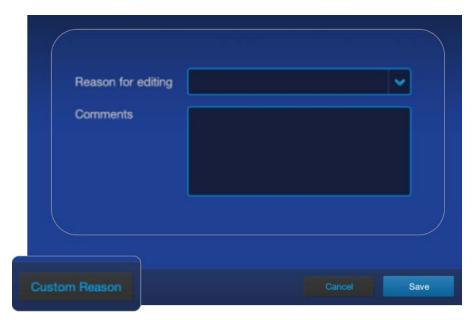
Note: When SAE mode is enabled, you cannot sign in with your local profile. Only an administrator can sign in with a local profile. The only functions that are available to a local administrator are the **About** and **SAE** functions on the **Settings** screen.



Audit reason requirements

Depending on the way that your SAE administrator configures audit settings, the **Enter Audit Reason** screen may be displayed when you make changes to a plate file or a library item.

Select a reason or add a custom reason, then click Save.



E-signature requirements for starting a spectral, install, or regular run

The e-signature function can be configured to require signed objects when you start a run.

Action that can be configured to require signed objects	Signed object that can be required for an action
Start a spectral run	Spatial calibration
Start an install run	Spectral calibration
Start a regular run	Sequencing install run
	Fragment analysis install run
	HID install run
	Plate file

Note: You can can perform a sequencing install run without performing calibration. For sequencing install runs, you do not need to configure the e-signature function for spectral calibration.

If a signed object is required, but has not yet been signed, you are prompted to sign the required object before you can start a run.

For example, your system could be configured to require a signed spatial calibration (object) before you can start a spectral calibration (action); or it could be configured to require a signed spectral calibration, a signed install run, and a signed plate file (objects) before you can start a regular run (action).

The objects that are required for an action can be signed at two different times:

- Before you start a run (see "Sign an object before a regular run is started" on page 250)
- When you start a run (see "Sign an object when a regular run is started" on page 251)

Sign an object before a regular run is started

Note: The Sign button is displayed only if your SAE account role has permission to sign objects.

If your system is configured to require a signature when you start a regular run (that is, not a calibration or an install run), you can sign the required objects at the time the objects are generated or created, instead of waiting to sign when you start a run. The objects that are required are configured by your SAE administrator.

When you run or create any of the objects listed below, you can sign any of the objects by selecting **Actions** • **Sign** in the associated screen.

- Spatial calibration
- Spectral calibration immediately after it runs, or by accessing it in Spectral calibration history
- Install run immediately after it runs, or by accessing it in Install run history
- Plate file when you create it, or by accessing it in the library

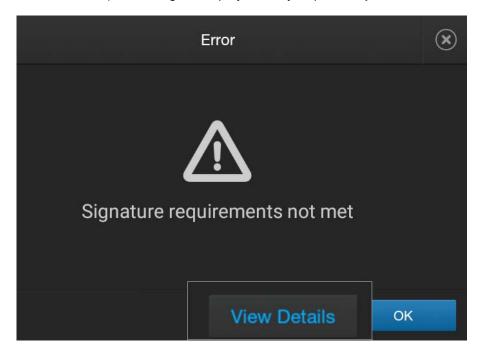
For example, if a signed spatial calibration is required, you can tap **Actions ▶ Sign** at the end of a spatial calibration. You can also open a spatial calibration after it is complete and sign it.



Sign an object when a regular run is started

Note: The Sign button is displayed only if your SAE account role has permission to sign objects.

If your system is configured to require a signature when you start a regular run (that is, not a calibration or an install run), a message is displayed if any required objects have not been signed.



Tap View Details to show the pending signatures.



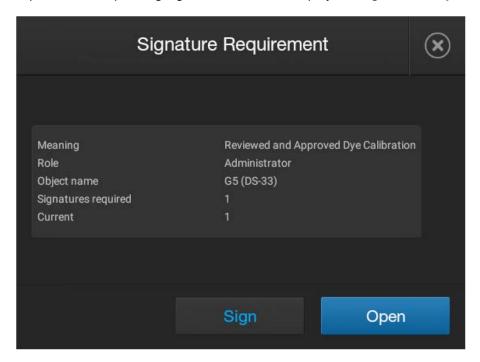
Each row corresponds to a required signature. If an item is listed two or more times, it indicates that two or more signatures are required for the item. See the example at the end of this section for an explanation of this screen.

The **Object Name** column lists the items that require signatures.



Object Name	Description of the object
A dye set name	The most recent spectral calibration for the dye set specified in the plate file.
An install run name	The most recent install run for the application specified in the plate file.
A plate name	The plate file used for the run.

Tap a row in the pending signatures screen to display the **Signature Requirement** screen.



Tap **Open** to display the results of the object that requires a signature.

Tap **Sign**, then enter your user name and password (or have a user with the required role enter their user name and password) to sign the object.

Example: You tap **View details** in the **Signature requirements not met screen** and see the pending signature requirements.



The following signatures are required before the run can start:

- 2 signatures for spectral calibration—Dye set is listed twice, and requires signatures from different roles. One of the spectral calibrations has been signed by an administrator.
- 1 signature for the install run
- 1 signature for the plate file

Signing during an automated barcode run

If your system is configured to require a signatures when you start a run and required objects are not signed, a **A** Signatures required alert is displayed. Tap the **A** icon to display the objects that require signing.

Note: Alternatively, you can manually link the plates. If signatures are required, a pre-run check message displays the objects that require signature.

Signatures can be required for the objects listed below.

To sign an object, tap **Sign**, then enter your user name and password (or have a user with the required role enter their user name and password) to sign the object. When signature requirements are met, the plate file is linked.

Note: The **Display signatures** and **Sign** buttons are displayed only if your SAE account role has permission to sign objects.

After the objects are signed, open, then close the drawer to trigger plate barcode scanning. Alternatively, you can tap a plate position, then navigate to and select a plate file for the position.

Object	How to access from the home screen
Spatial calibration	
Spectral calibration	⊕ Actions ➤ Maintenance ➤ Calibration ➤ Spectral calibration history
Install run	⊙ Actions ➤ Maintenance ➤ Install run ➤ Install run history
Plate file	⊙Actions ▶ Library ▶ Plate files

Displaying signatures

Note: The **Display signatures** button is displayed only if your SAE account role has permission to sign objects.

Note: An administrator can also view e-signature histories in the SAE module. For information, see *SAE Administrator Console v2.1 User Guide for Capillary Electrophoresis Products* (Pub. No. MAN0025849).

You can display the signatures for any of the objects listed below when the object is created. For example, at the end of a spectral calibration, you can tap **Actions ▶ Display signatures**. Tap a row to display details.

- Spatial calibration
- Spectral calibration
- Sequencing install run
- Fragment install run
- HID install run
- Plate file

To display signatures after an object is created, access the object, tap Actions ▶ Display signatures



Signing Record		
Object type	Calibration record	
Object name	G5 (DS-33)	
Meaning	Reviewed and Approved Dye Calibration	
Signed date	2020/12/30 08:31:16	
Host ID	936000786	
Signed by	User 1	
Role	Administrator	
- "		

Use the instrument when the SAE server is offline

The instrument can be configured to allow use when it is disconnected from an SAE server (**Client offline login** setting under the **System setting** pane in the SAE Administrator Console). When configured accordingly, you can use the instrument for the period of time specified by the SAE administrator.

Note: If you have previously signed in to the instrument with your SAE account, you can sign in when the instrument is disconnected from an SAE server. If you have not previously signed in with your SAE account, you cannot sign in when the instrument is disconnected from an SAE server.

All SAE records are retained if the instrument is disconnected from an SAE server. When the instrument is reconnected to the SAE server, SAE records are uploaded to the server.

The following functions are not available when the instrument is disconnected from an SAE server:

- Account lockout, password reminder, mandatory password change
- Disable SAE
- · Change password

SAE error messages and actions

Observation	Possible cause	Recommended action
Unable to connect to SAE server message	The SAE server connection settings are incorrect.	Check the SAE server IP address. See "Determine the IP address for a computer on a network" on page 450.
		In the instrument Sign In screen, sign in with a local administrator profile.
		 Set the correct IP address (in the home screen, tap



Observation	Possible cause	Recommended action
Unable to connect to SAE	There is a problem with	Troubleshoot computer or network problems.
server message (continued)	the computer on which the SAE Administrator Console is installed or a problem with the network.	If your SAE account has been configured to allow instrument operation when the SAE Administrator Console is offline, see "Use the instrument when the SAE server is offline" on page 255.
	The computer on which the SAE Administrator Console is installed has a dynamic IP address that is disconnecting the server when the computer is restarted.	Set a static IP address on the computer.
	Firewall settings are not correctly set.	Contact Technical Support.
The Open file from non-SAE system Setting from SAE server setting in the SAE Administrator Console does not change the software behavior	The Open file from non- SAE system Setting from SAE server function is not supported in this software.	No action.



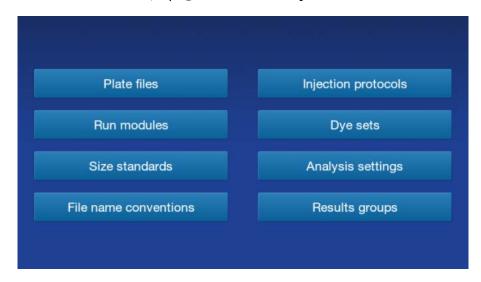
Manage library resources on the instrument

Overview of libraries	257
General library procedures	259
Plate files library	262
Run modules library	274
Size standards library	278
File Name Conventions library	282
Injection protocols library	286
Dye sets library	288
Analysis settings library	292
Results Groups library	304

Overview of libraries

The following libraries are available in the software.

To access the libraries, tap ⊕ **Actions ▶ Library** in the home screen.



Entries in the library may be flagged with the following symbols:

- **[Factory-provided]** (instrument icon) A factory-provided item cannot be edited, exported, or deleted. Can be copied, then edited.

Library	Description	For information, see
Plate files	A plate file associates sample attributes (sample information and analysis information) with a well position. A plate file also includes settings for data collection, analysis, sample file naming, and results file storage location.	page 262
Injection protocols	An injection protocol contains a run module, dye set, size standard (fragment/HID analysis only), and analysis settings.	page 286
	An injection protocol is an optional item in a plate file. You can alternatively select the individual items that are contained in an injection protocol.	
Run modules	A run module contains the parameters that control the instrument during data collection.	page 274
Dye sets	A dye set defines the number, dye color, and migration order of the dye peaks in the sample.	page 288
Size standards (fragment/HID analysis only)	A size standard defines the sizes of known fragments. It is used to generate a standard curve. The standard curve is used to determine the sizing of unknown samples.	page 278
Analysis settings	Analysis settings define basecalling (sequencing) and sizing (fragment/HID analysis) parameters.	page 292
File name conventions	A file name convention specifies the naming convention for sample data files. If you do not specify a file name convention for a plate, the following default file name conventions are used: • Sequencing—Well_Sample_TimeStamp • Fragment/HID analysis—Well_Sample_SampleType_TimeStamp	page 282
Results groups	A results group defines the folder name where sample data files are stored. If you do not specify a results group, the default results group is used: StartRuntime.	page 304

General library procedures

IMPORTANT! Enter only alpha-numeric characters in the software. Special characters may not be correctly displayed in some software screens, may cause problems with plate, file, folder, user account, and/or library item names, and may interfere with starting a run and/or importing and exporting library items.

Create a new entry from a factory-provided or locked entry

- 1. In the home screen, tap ⊕ Actions ➤ Library, then tap the library of interest.
- 2. Select the [(Factory-provided) entry or ((Locked) entry in the library.
- 3. Tap Open.
- 4. Tap **Copy**.

Note: *Dye set library only:* **Copy** is inactive if a user-created dye set is selected. Only factory-provided dye sets can be copied.

- 5. Enter a name for the item, then tap **Enter**.
- 6. Modify parameters as needed (see the following topics in this section for information).
- 7. Tap Save.

Lock or unlock a library entry

A locked item can be modified or deleted only by the user who created the item.

At the top right of a library screen, tap **(Lock)** or **(Unlock)**.



Copy a library entry

- 1. In the home screen, tap \odot **Actions > Library**, then tap the library of interest.
- Tap the item to edit, then tap Open.
 If the Copy button is inactive, you can edit this entry directly. See "Edit a library entry" on page 260.

Note: You cannot copy dye sets created by other users. You can only copy factory-provided dye sets.

- 3. Tap **Copy** to make a copy of the entry.
- 4. Tap a section, then modify the parameters as needed.
- 5. Tap Save.

Edit a library entry

Note: You cannot edit **(Factory-provided)** entry or **(Locked)** entries. You can copy the item, then edit the copy.

- 1. In the home screen, tap \odot Actions > Library, then tap the library of interest.
- Tap the item to edit, then tap Open.
 If the Copy button is active, you cannot edit this entry directly. See "Copy a library entry" on page 259.
- 3. Tap a section, then modify the parameters as needed.
- 4. Tap Save.

Import a library entry

- 1. In the home screen, tap \odot Actions > Library, then tap the library of interest.
- 2. Tap Import.
- 3. Tap the import location, tap the item to import, then tap **Next**.

A message is displayed when import is complete.

For information on connecting to a network drive, creating a folder, or changing the path, see "Connect the instrument to a network drive (software)" on page 452.

Export a library entry

Note: You cannot export 4 (Factory-provided) entries.

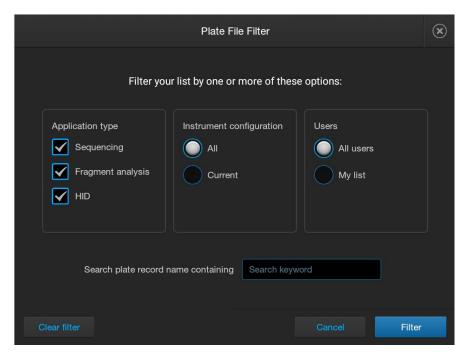
- 1. In the home screen, tap \odot **Actions > Library**, then tap the library of interest.
- 2. Tap one or more items to export.
- 3. Tap Actions > Export, tap the export location, then tap Next.

For information on connecting to a network drive, creating a folder, or changing the path, see "Connect the instrument to a network drive (software)" on page 452.

A message is displayed when the export is complete.

Filter library lists

1. In any library screen, tap **♥** (Filter).



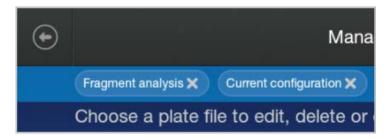
2. Make selections as needed.

Note: The **Current** setting under **Instrument configuration** refers to the polymer and capillary length that are currently installed on the instrument.

My list refers to items that the signed-in user has created.

3. Tap Filter.

The filtered library screen is displayed. The filter is listed at the top of the screen. You can tap X to remove a filter.



Delete a library entry

Note: You cannot delete factory-provided entries (♣) or locked (ఄ) entries.

- 1. In the home screen, tap \odot **Actions > Library**, then tap the library of interest.
- 2. Tap the item to delete, then tap Actions > Delete.

The software checks for dependencies on the item. If a library item is linked or used by another library item, a warning message is displayed and the item is not deleted. For example, if plate file is linked to a plate position, the plate file is not deleted.

Deleting a library entry does not affect existing items that contain the entry. For example, if you delete a run module, the injection protocols that specify the run module are not affected. If you delete an injection protocol, the run module is not deleted from the run module library.

Plate files library

The **Plate files** library contains all plates that have been saved in the instrument software (plates that have been run and plates that have not yet been run).

IMPORTANT! The Plate Manager software does not include SAE functionality. If SAE mode is enabled for the instrument, auditing for a plate file begins when it is linked or when it is imported into the **Plate files** library.

This section describes:

- "Plate file definition" on page 262
- "Create a plate file" on page 263
- "Define custom fields" on page 266
- "Export or delete a plate file" on page 267
- "Import a plate setup from a CSV or PSM file" on page 267
- "Plate file Properties tab" on page 268
- "Plate file Plate tab" on page 269
- "Plate file Edit Injection Properties screen" on page 270
- "Plate file Edit Well Properties screen (sample name entry)" on page 273

Plate file definition

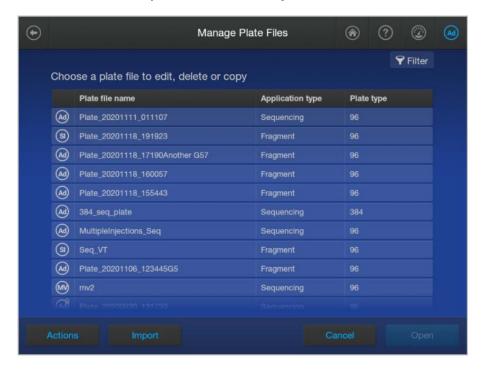
A plate file associates sample attributes (sample information and analysis information) with a well position. A plate file also includes settings for data collection, analysis, sample file naming, and results file storage location.

Create a plate file

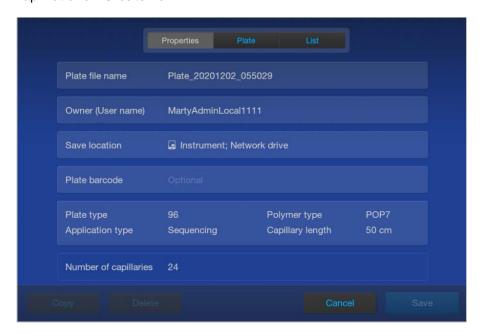
This section describes how to create a plate file from the library. You can also create plate files from the **Link Plate** screen (accessed by tapping a plate position in the home screen) or by using the

••• **Actions > Create plate file** option (accessible from the home screen, see "Create a plate file" on page 85). All options create a plate file in the library.

1. In the home screen, tap ⊕ Actions ➤ Library ➤ Plate files.



2. Tap Actions ➤ Create new.





- 3. Tap any section on the screen, then change settings as needed. For a description of settings, see "Plate file Properties tab" on page 268 and the remaining plate file screens on the following pages.
- 4. Tap the **Plate** tab at the top of the screen.



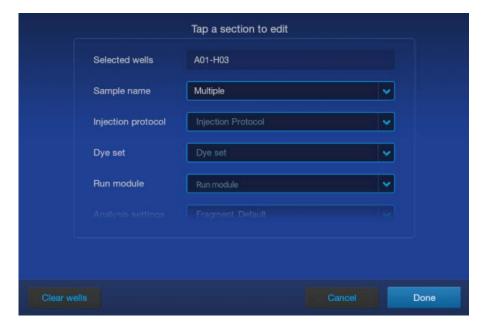
- 5. Select additional injection groups as needed.
 - Tap a well to select a single injection group.
 - Press-drag to select multiple injection groups or the entire plate.
 - Tap (Select/deselect) at the top left of the plate to select or deselect all wells on the plate.

Note: All settings in the remaining steps will be assigned to all selected injection groups. If different injection groups require different settings, repeat these steps for each injection group.

6. Tap the injection pane to display the **Edit Injection Properties** screen.



- 7. In the **Edit Injection Properties** screen, specify the settings for the injection by doing either of the following:
 - In the Injection protocol field, select a protocol.
 An injection protocol contains the elements listed below. When you select an injection protocol, these elements are automatically selected. However, you can tap any of the fields below the Injection protocol field to select a different element for the plate file as described below. Swipe up to display the rest of the screen.
 - Select individual elements in the following fields. Selecting an individual element overrides an
 injection protocol selection and clears the Injection protocol field.
 - Dye set
 - Run module
 - Analysis settings
 - Size standard (fragment/HID analysis only)

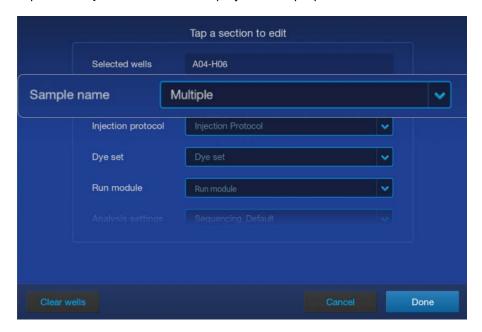


- 8. (Optional) Select a file name convention or a results group.
 - A file name convention determines the naming of results files.
 The default sequencing file name convention appends _WellID_SampleName_Timestamp to the file name. The default fragment/HID file name convention appends _WellID_SampleName_SampleType_Timestamp to the file name.
 - A results group determines the organization of results files.
 The default results group organizes and groups files by start run time. On the instrument, results are not grouped into subfolders specified by the results group, but you can view results by results group name.
- 9. (Optional) Specify replicate injections. See "Specify replicate injections" on page 94.
- **10.** Tap the **Sample name** field, then proceed to "Enter sample names, sample types, and custom fields" on page 95.

Define custom fields

Custom fields are text fields in which you can include additional sample attributes or identifiers. Custom fields can be used in file name conventions or by some secondary analysis applications.

- 1. Open a plate file, then tap the **Plate** tab.
- 2. Tap to select one or more injection groups.
- 3. Tap the **Injections** pane.
- 4. Tap the **Sample name** field to display the well properties fields.

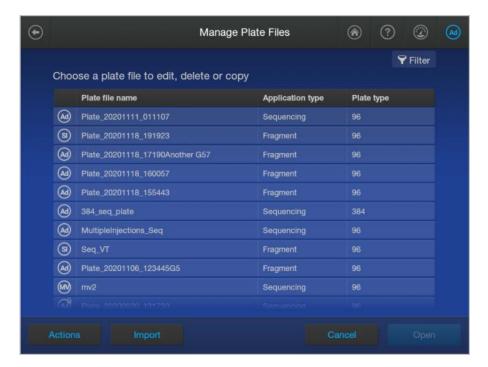




- 5. Tap a custom field, then enter the definition for the selected wells.
- 6. Tap Done.

Export or delete a plate file

1. In the home screen, tap ⊙ Actions ➤ Library ➤ Plate files.



- 2. Select one or more plate files.
- 3. Follow the instructions on the screen to export or delete the selected files.

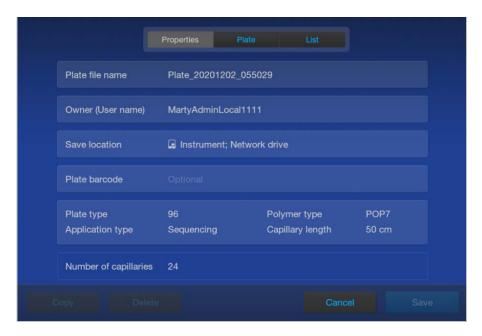
Import a plate setup from a CSV or PSM file

Note: You can create a plate file in CSV or PSM format in the Plate Manager software.

Before importing a plate file, see "PSM and CSV plate files for import into the instrument" on page 87.

- 1. In the home screen, tap ⊕ Actions ➤ Library ➤ Plate files ➤ Import.
- **2.** Tap the location of the plate file.
- 3. Navigate to, then select a CSV or PSM file.

Plate file Properties tab



Tap any section to edit the settings.

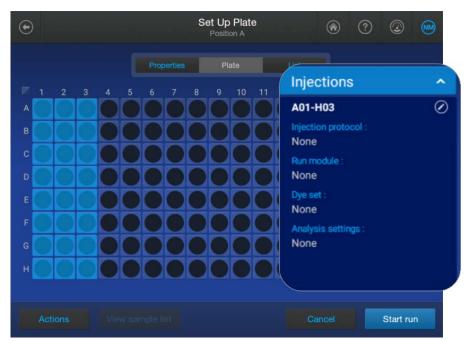
Setting	Description
Plate file name	Plate file name. Names must be unique. The default name assigned to a plate is Plate_YYYMMDD_Timestamp. You can change the name.
	(Timestamp is the date and time on which the item was created or generated, unless otherwise specified. It is also applied to exported results, reports, logs, and so on.)
Owner	The user name of the signed in user is displayed by default. You can change the name. This is a text-only entry and is not used by the software.
Save location	The plate file and the results are always saved to the instrument.
	In addition, you can save the results to a network drive, a USB drive, or the Connect Platform. The save location for results can be changed when the plate file is linked before a run.
	Note: If you open a previously saved plate file and the Save location field displays strikethrough text, it means that the instrument is no longer connected to the originally specified save location.
	You cannot run the plate file until the instrument is connected to the save location again. Alternatively, make a copy of the plate file without the disconnected save location. To make a copy, select Actions ▶ Library ▶ Plate files, select the plate file, then tap Open ▶ Copy.
	For more information, see "Set the default save location for results" on page 477, Chapter 9, "Use the instrument with the Thermo Fisher™ Connect Platform", and/or "Connect the instrument to a network drive (software)" on page 452.
Plate barcode (optional)	Optional text entry. If an external USB barcode reader is in use, you can tap this field, then scan the plate barcode.

(continued)

Setting	Description
Plate type	96—For standard 96-well plates, standard reaction plates, and 8-strip standard tubes with retainers.
	96 Fast — For Fast 96-well plates and Fast 8-strip tubes with retainers.
	384 — For 384-well plates (24-capillary instruments only).
Application type	Sequencing, Fragment analysis, HID, or Mixed plate (a plate that contains sequencing samples and fragment analysis samples).
	This selection determines the options that are available in the other plate file screens.
Capillary Length and Polymer	Capillary length and polymer type with which the plate will be used. Referred to as Instrument configuration in the Filter screen.
Cloud analysis (displayed only if you are signed in with a cloud profile)	Allows automatic loading of results to the Connect Platform and automatic secondary analysis with a supported cloud application.
	This field is displayed only if you are signed in with a profile that is linked to the Connect Platform. It is active only for a plate file that is created in the Plate Manager software (cloud). See "Get started with the Plate Manager software (cloud)" on page 107.
	For more information, see "Set up cloud analysis in the Plate Manager software (cloud)" on page 125 and Chapter 9, "Use the instrument with the Thermo Fisher™ Connect Platform".

Plate file Plate tab

To display this screen, tap the Plate tab.



To assign settings, tap an injection group, then tap under the injections heading. For information on settings, see "Plate file Edit Injection Properties screen" on page 270.

Tap the **List** tab at the top of the screen to view wells and attributes.

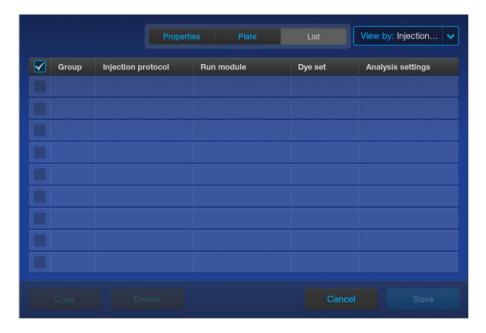
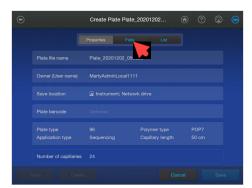
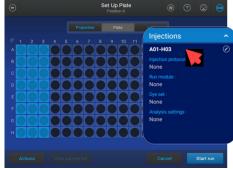
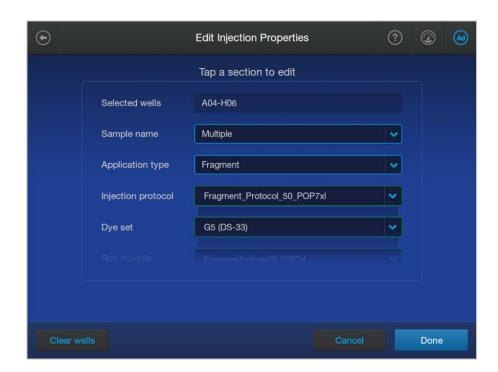


Plate file Edit Injection Properties screen

To display the **Edit Injection Properties** screen, tap the **Plate** tab, then tap under the **Injections** heading.



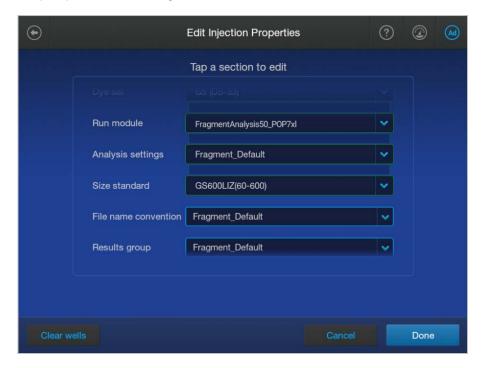




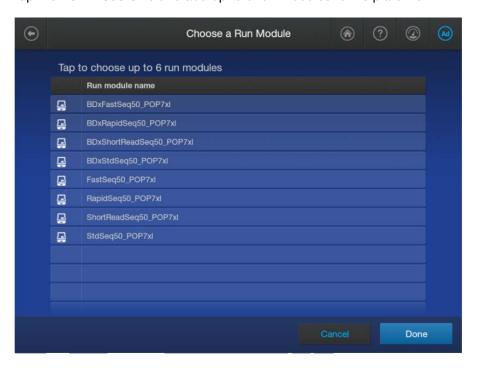
When you select an injection protocol, the remaining fields are automatically filled in with the names of the items in the injection protocol. You can override any item.

Alternatively, you can select the individual items. Selecting a field below the **Injection protocol** field overrides an injection protocol selection and clears the injection protocol field and all of the elements specified by the injection protocol.

Swipe up to see all settings.



Tap the Run module field to add up to 6 run modules to the plate file.



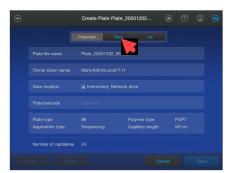
Setting	Description	
Sample name	See "Plate file Edit Well Properties screen (sample name entry)" on page 273.	
Injection protocol	An injection protocol contains a run module, dye set, size standard (fragment/HID analysis only), and analysis settings.	
	An injection protocol is an optional item in a plate file. You can alternatively select the individual items that are contained in an injection protocol.	
	For more information, see "Injection protocols library" on page 286.	
Dye sets	A dye set defines the number, dye color, and migration order of the dye peaks in the sample.	
	For more information, see "Dye sets library" on page 288.	
Run module	A run module contains the parameters that control the instrument during data collection.	
	For more information, see "Run modules library" on page 274.	
Analysis settings	Analysis settings define basecalling (sequencing) and sizing (fragment/HID analysis) parameters.	
	For more information, see "Analysis settings library" on page 292.	
Size standards (fragment/HID	A size standard defines the sizes of known fragments. It is used to generate a standard curve. The standard curve is used to determine the sizing of unknown samples.	
analysis only)	For more information, see "Size standards library" on page 278.	

(continued)

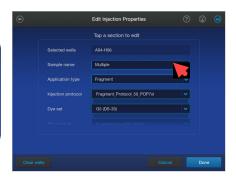
Setting	Description
File name	A file name convention specifies the naming convention for sample data files.
conventions	If you do not specify a file name convention for a plate, the following default file name conventions are used:
	Sequencing—Well_Sample_TimeStamp
	Fragment/HID analysis—Well_Sample_SampleType_TimeStamp
	For more information, see "File Name Conventions library" on page 282.
Results groups	A results group defines the folder name where sample data files are stored.
	If you do not specify a results group, the default results group is used: StartRuntime.
	For more information, see "Results Groups library" on page 304.

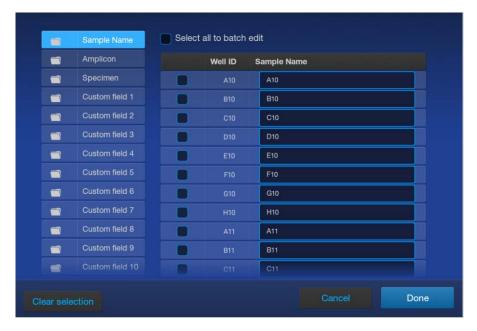
Plate file Edit Well Properties screen (sample name entry)

To display the **Edit Well Properties** screen, tap the **Plate** tab, tap under the **Injections** heading, then tap the **Sample Name** field.









Attributes	Settings
Sample name	Names for samples. To assign the same name to multiple wells, select multiple wells or all wells, tap the Sample Name field, then enter a name.
Sequencing only Amplicon Specimen	Text-only fields that can be used by secondary sequencing analysis software.
Fragment/HID analysis only Panel Size standard Sample type	Panel is a text-only field that can be used by secondary fragment analysis software Size standard is the definition file for the standard that is present in the well. Sample type identifies the sample as a Sample, Positive Control, Negative Control, or Allelic Ladder.
Custom field 1 through Custom field 10	Text-only fields that can be used by filename conventions and secondary analysis software. See "Define custom fields" on page 266.

Run modules library

Run module overview

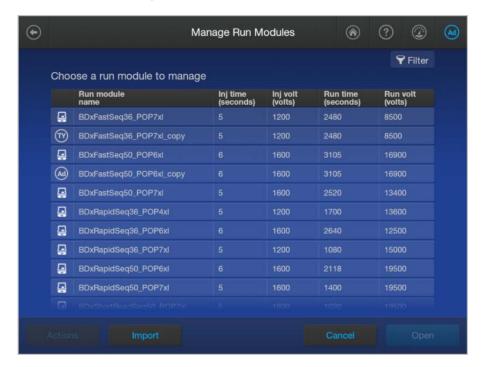
A run module contains the parameters that control the instrument during data collection.

Run modules provided

For a list of the run modules that are provided in the software, see "Run modules, read lengths, size ranges, and run times" on page 534.

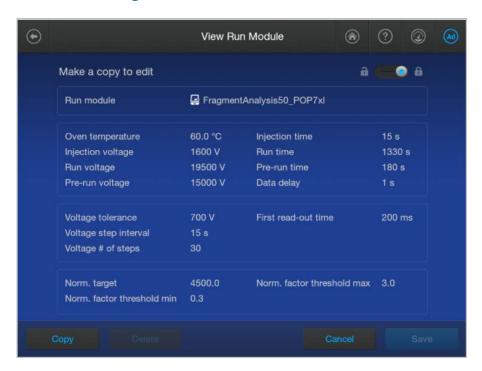
Create a new run module

1. In the home screen, tap ⊕ Actions ➤ Library ➤ Run module.



- 2. Tap a row, tap **Open**, then tap **Copy**.
- 3. Enter a name for the run module, then tap Enter.
- **4.** Tap sections of the screen and modify settings as needed (see "Run module settings" on page 276).
- 5. Tap Save.

Run module settings



Setting	Description	
€ (Lock)	See "Lock or unlock a library entry" on page 259.	
Oven temperature (°C)	Temperature setting for the instrument oven and the detection cell throughout the run.	
Injection voltage (volts)	Injection voltage setting for sample injection.	
Run voltage (volts)	Final sample electrophoresis separation run voltage.	
Pre-run voltage (volts)	Pre run voltage setting before sample injection.	
Injection time (sec)	Sample injection time.	
Run time (sec)	Length of time data is collected after voltage is ramped up to the run voltage and the run starts.	
Pre-Run time (sec)	Prerun voltage time.	
Data delay (sec)	Time from the start of separation to the start of sample data collection.	
Do not change the following settings unless advised to do so by support person.		
Voltage tolerance (volts)	Maximum allowed voltage variation.	
Voltage step interval (sec)	Dwell time at each voltage ramp step.	
Voltage # of steps	Number of voltage ramp steps to reach run voltage.	
First read-out time (ms)	The interval of time for a data point to be produced.	

(continued)

Setting	Description	
Fragment/HID analysis only: Normalization parameters. For information on how these parameters are used, see "Size standard normalization feature" on page 281.		
Norm. target	Normalization target. The expected average RFU for the subset of peaks in the GeneScan™ 600 LIZ™ Size Standard v2.0 used for normalization. The default value for each run module has been experimentally determined based on the average peak height of selected peaks in the GS600 size standard with a specific injection time. Optimize the normalization target for your size standard peak heights under	
	your run conditions.	
Norm. factor threshold min Norm. factor threshold max	Normalization factor thresholds. The passing range for the normalization factor (the default range is 0.3–3.0). IMPORTANT! Increasing the factor threshold above 3.0 may cause	
	amplification of noise. If the calculated normalization factor is outside the normalization factor range, the software multiplies the peak heights of the sample by the min or max normalization factor threshold setting. For example, if the normalization factor range is 0.3–3.0 and the calculated normalization factor is 5, the software applies a normalization factor of 3.0.	
Normalization factor calculated by the software (this value is not displayed in the software)	Average peak height of the subset of peaks in the GeneScan™ 600 LIZ™ Size Standard v2.0 used for normalization divided by the normalization target.	

Size standards library

Size standard overview

A size standard defines the sizes of known fragments. It is used to generate a standard curve. The standard curve is used to determine the sizing of unknown samples.

For example, the **GS600 LIZ** size standard in the software is used for GeneScan[™] 600 LIZ[™] Size Standard. It is used to generate a standard curve. The standard curve is used to determine the sizing of unknown samples.

Size standard definition files provided

The library contains factory-provided size standard definition files.

For information on selecting a size standard for your application, see the *DNA Fragment Analysis by Capillary Electrophoresis User Guide* (Pub. No. 4474504).

Note: The GeneScan[™] 600 LIZ[™] Size Standard and the GeneScan[™] 600 LIZ[™] Size Standard v2.0 contain the same peaks. The GeneScan[™] 600 LIZ[™] Size Standard v2.0 can be used for size standard normalization. For more information, see "Size standard normalization feature" on page 281.

Size standard definition	For use with GeneScan™ size standard	Analysis range
GS1200LIZ	GeneScan™ 1200 LIZ™ Size Standard	20–1,200 bp
GS120LIZ	GeneScan™ 120 LIZ™ Size Standard	15–120 bp
GS500(-250)LIZ ^[1]	GeneScan™ 500 LIZ™ Size Standard	35–500 bp
GS500(-250)ROX ^[1]	GeneScan™ 500 ROX™ Size Standard	35–500 bp; the 250 bp peak is not included
GS600_LIZ_(60-460)	GeneScan™ 600 LIZ™ Size Standard	60-460 bp
GS600_LIZ_(60-460)+Normalization GS600_LIZ+Normalization_(60-460 ^[2]	GeneScan™ 600 LIZ™ Size Standard v2.0	60–460 bp with size standard normalization
GS600_LIZ_(80-400)	GeneScan™ 600 LIZ™ Size Standard	80–400 bp
GS600_LIZ_(80-400)+Normalization GS600_LIZ+Normalization_(80-400) ^[2]	GeneScan™ 600 LIZ™ Size Standard v2.0	80–400 bp with size standard normalization
GS600LIZ	GeneScan™ 600 LIZ™ Size Standard	20–600 bp
GS600_LIZ_(60-580)	GeneScan™ 600 LIZ™ Size Standard	60-580 bp
GS600_LIZ_(60-580)+Normalization GS600_LIZ+Normalization_(60-580 ^[2]	GeneScan™ 600 LIZ™ Size Standard v2.0	60–580 bp with size standard normalization

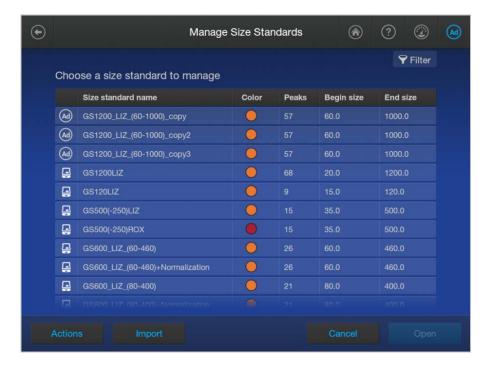
(continued)

Size standard definition	For use with GeneScan™ size standard	Analysis range
GS600LIZ(60-600)	GeneScan™ 600 LIZ™ Size Standard	60–600 bp, for applications that have primer peaks that obscure the 20-mer and 40-mer peaks of the GS600 size standard
GS600LIZ(60-600)+Normalization	GeneScan™ 600 LIZ™ Size Standard v2.0	60–600 bp with normalization, for applications that have primer peaks that obscure the 20-mer and 40-mer peaks of the GS600 size standard
GS600LIZ+Normalization	GeneScan™ 600 LIZ™ Size Standard v2.0	20–600 bp with size standard normalization

^[1] The 250-bp peak is not included in the size standard definition because it is sensitive to small temperature variations.

Create a new size standard

1. In the home screen, tap ⊕ Actions ➤ Library ➤ Size standard.



2. Tap Actions ➤ Create new.

Note: You can also create a new size standard by opening, then copying, a factory-provided or user-created size standard.

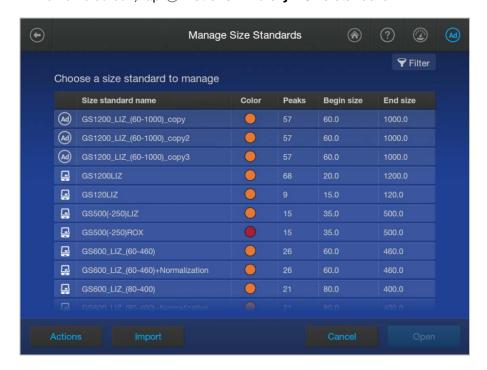
3. Enter a Size Standard Name.

^[2] Compatible with HID secondary analysis.

- 4. Select a dye color, then tap Next.
- 5. Specify the number of peaks in the standard.
- 6. Enter peak sizes.
- 7. Tap Save.

Modify a factory-provided normalization size standard

1. In the home screen, tap \odot Actions > Library > Size standard.



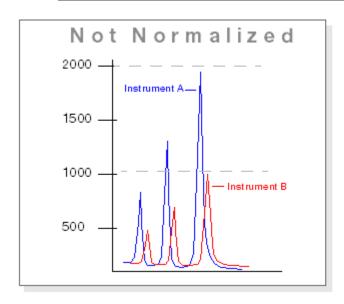
- 2. Tap a normalization size standard, click Open, then tap Copy.
- 3. Enter a name for the size standard, then tap **Enter**.
- 4. Tap the dye color to assign to the standard.
- 5. Specify the number of peaks in the standard.
- 6. Enter sizes of the peaks in the standard.
- 7. Tap Save.

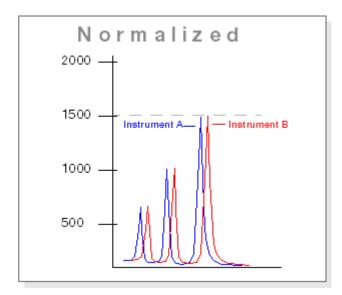
Size standard normalization feature

For fragment/HID analysis applications, the software includes an optional normalization feature for use with the GeneScan[™] 600 LIZ[™] Size Standard v2.0. This feature attenuates signal variations associated with instrument, capillary array, sample salt load, and injection variability between capillaries and instruments. Normalization can be applied during data collection.

Based on the settings specified in the run module and the data collected for GeneScan[™] 600 LIZ[™] Size Standard v2.0, the software calculates a normalization factor for each sample based on a threshold setting. The normalization factor is used as a multiplier to adjust the peak height of the sample peaks relative to the GeneScan[™] 600 LIZ[™] Size Standard v2.0 peaks.

IMPORTANT! Normalization is not applied to samples with failing sizing quality. Select a size standard definition file appropriate for your application that accurately sizes samples. For example, if your application includes small fragments that may be obscured by primer peaks, or large fragments that may not be present due to slower migration rates, specify a size standard definition file that eliminates these fragments from sizing.





To use the normalization feature:

- Prepare each sample with the GeneScan™ 600 LIZ™ Size Standard v2.0.
- Use a run module with optimized normalization settings (see the normalization settings as described in "Run module settings" on page 276).
- Select the appropriate normalization size standard in the plate file (see "Size standard definition files provided" on page 278).

File Name Conventions library

File name convention overview

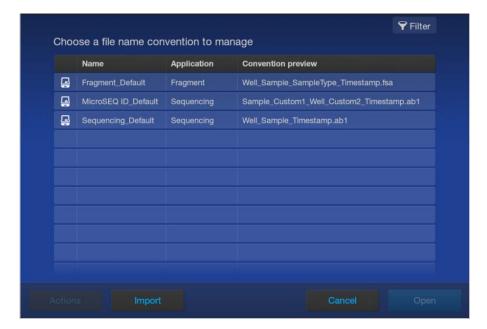
A file name convention specifies the naming convention for sample data files.

If you do not specify a file name convention for a plate, the following default file name conventions are used:

- Sequencing—Well_Sample_TimeStamp
- Fragment/HID analysis—Well_Sample_SampleType_TimeStamp

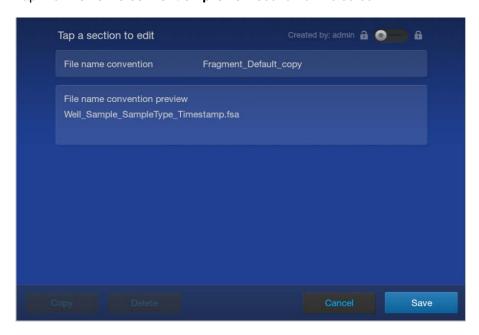
Create a new file name convention

1. In the home screen, tap ⊙ Actions ➤ Library ➤ File name conventions.

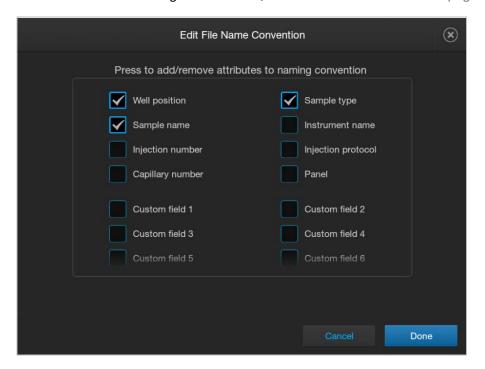


- 2. Tap a row, tap Open, then tap Copy.
- 3. Enter a name for the file name convention, then tap **Enter**.

4. Tap the File name convention preview section of the screen.



- 5. Tap Attributes.
- Select attributes, then tap **Done**.
 For information on creating custom fields, see "Define custom fields" on page 266.





7. To change the order of the attributes in the list, press-drag \equiv (Move) for the attribute and move it up or down.



8. Tap **Done**, then tap **Save**.

File name convention settings

IMPORTANT! The maximum allowed length of a file name, including the path, is 240 characters. The software warns you if your selections may exceed the maximum, but allows you to save the file name convention. However, a pre-check validation error is displayed when you start a run if the file name exceeds 240 characters.

Setting	Description
Preview of name	Interactively displays the attributes you select.
Attributes	For a description of these fields, see Well position Sample name Capillary number Injection number (Sequencing only) Amplicon (Sequencing only) Specimen (Fragment/HID analysis only) Sample type Instrument name (Fragment/HID analysis only) Panel Injection protocol Custom field 1–10 For information on creating custom fields, see "Define custom fields" on page 266.

Injection protocols library

Injection protocol overview

An injection protocol contains the parameters that control the instrument during data collection and the settings for analysis of the data:

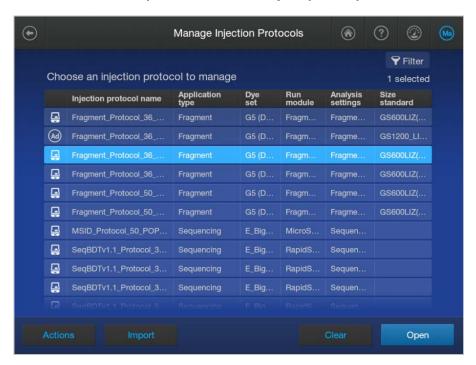
- Dye set
- Run module
- Analysis settings
- (Fragment/HID analysis only) Size standard

Alternatively, you can individually select the elements listed above in a plate file.

An injection protocol is an optional setting in a plate file.

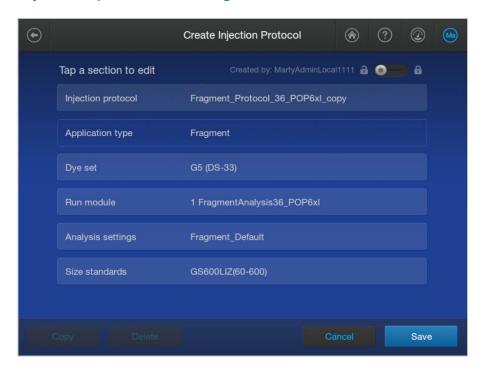
Create a new injection protocol

1. In the home screen, tap ⊕ Actions ➤ Library ➤ Injection protocols.



- 2. Tap an injection protocol, tap **Open**, then tap **Copy**.
- 3. Enter a name for the injection protocol, then tap **Enter**.
- 4. Tap sections of the screen and modify settings as needed (see "Injection protocol settings" on page 287).
- 5. Tap Save.

Injection protocol settings



Setting	Description
Application type	Read-only setting that specifies Sequencing, HID, or Fragment analysis.
Dye set	For information, see "Dye sets library" on page 288.
Run module	For information, see "Run modules library" on page 274.
	You can specify up to 6 run modules for a plate. If you specify 6 run modules, 6 injections are added to the Run queue when you start a run.
Analysis settings	For information, see "Analysis settings library" on page 292.
Size standard	For information, see "Size standards library" on page 278.

Dye sets library

Dye set overview

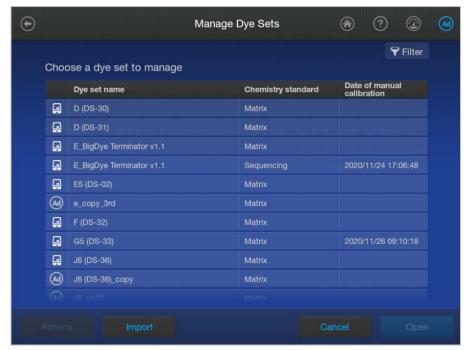
A dye set defines the following:

- Dye color or colors
- · Order of the dye peaks in the standard
- Spectral analysis parameters

For information on the **Z_BigDye Direct** dye set in the library, see "Using BigDye™ Direct Cycle Sequencing Kit chemistry" on page 314.

Create a new dye set

1. In the home screen, tap ⊕ Actions ➤ Library ➤ Dye sets.



The **Date of manual calibration** column lists the date on which a spectral calibration was run (see "Run a spectral calibration" on page 312). It does not refer to the autocalibration that is performed with each run.

2. Tap a dye set, tap **Open**, then tap **Copy**.

Note: You cannot copy dye sets created by other users. You can only copy factory-provided dye sets.

3. Enter a Dye Set Name.

- 4. Tap sections of the screen and modify settings as needed (see "Dye set settings" on page 291).
- 5. Tap **Save**.

Create a custom dye set

A custom dye set defines the dyes and the dye migration order for dyes that are not provided by Thermo Fisher Scientific. For more information, see System dye sets versus custom dye sets.

To create a custom dye set, make a copy of a factory-provided dye set, then modify it for the custom dye set. The custom dye set will be listed in the library and available for selection during spectral calibration.

Edit a dye set

To edit a dye set, first copy a factory-provided dye set, make changes, then save the new dye set.

Note: You can only copy factory-provided dye sets.

- 1. In the home screen, tap ⊙ Actions ➤ Library ➤ Dye sets.
- 2. Tap a dye set, tap Open, then tap Copy.
- 3. Change the system-generated name, if needed, then tap **Enter**.
- 4. In the Create Dye Set screen, tap sections of the screen and modify settings.



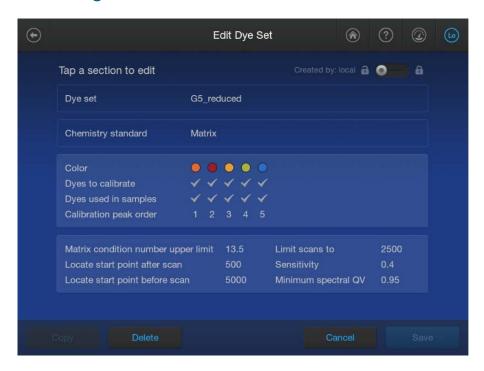
Setting	Description
Color	Displays the color for each dye in the dye set.
Dyes to calibrate	Select the dyes to use for calibration.

(continued)

Setting	Description
Dyes used in samples	Select the dyes to use in the samples. You can edit a dye set to use a reduced selection of dyes. That is, a dye set for only the dyes that are used in your samples. For example, if you use a 5-dye kit and have samples with only blue peaks, you can "reduce" or deconvolute with blue and orange (size standard) dyes only. To limit the dyes to the dyes for your samples complete the following steps.
	 Tap Dye selected. In the Edit Dye Set screen, in the Dyes to calibrate column, keep all dyes selected. In the Dyes used in samples column, keep only the dyes used in the samples selected. Deselect the dyes that are not used in the samples. Tap Done to return to the Create Dye Set screen.
	The dyes used in samples that you have selected are specified in the Reduced selection list in the View Dye Set screen.
Calibration peak order	Select the peak order for the dye set. Peak order is the order in which matrix standard peaks appear in the spectral calibration electropherogram. "1" is the first peak to appear (shortest fragment, left-most in the electropherogram), and so on.
Uniform binning	This option is available for matrix standard custom dye sets. Custom dye sets are any dye sets that are not available from Thermo Fisher Scientific, or any user-created dye set definitions. Variable binning uses bin sizes that are optimized for the dyes. Uniform binning uses bins of the same size for all dyes. A custom dye set inherits the binning setting from the system dye set it was copied from. System dye sets for fragment/HID analysis D, F, G5, J6, and J6T use variable binning. If variable binning does not yield acceptable results, select Uniform binning for the custom dye set.
Off-scale recovery	The off-scale recovery feature can be used to decrease data loss caused by an occasional off-scale peak. This feature can accurately estimate peaks up to 65,000 RFU when the frequency of off-scale data is relatively low. This feature is enabled by default in all system dye sets for fragment/HID analysis. If you do not want to use this feature, create a custom dye set, then deselect this option.
Auto Spectral	Keep this setting enabled for the instrument to perform the auto-spectral calibration function with the dye set. You can deselect this setting when you create a custom dye set, if needed. If the auto-spectral calibration function is deselected, the system will require manual calibrations if any of the following actions are performed or observations are made: • The capillary array is changed. • The instrument is moved. • The optical system is adjusted by Service. • A decrease in spectral separation (pull-up/pull-down in peaks) in the raw or analyzed data is observed. For more information, see "Auto-spectral calibration overview" on page 150.

5. Tap Save.

Dye set settings



Setting	Description
Chemistry standard	The standard for which you are creating the dye set: Sequencing Standard or Matrix standard.
Color	Displays the color for each dye in the dye set.
Dyes to calibrate	Displays the dyes used for calibration.
Dyes used in samples	Displays the dyes used in the samples.
	For example, if you have samples with only blue peaks, you can "reduce" or deconvolute with blue and orange (size standard) dyes only.
Calibration peak order	Displays the peak order for the dye set.
	Peak order is the order in which matrix standard peaks appear in the spectral calibration electropherogram. "1" is the first peak to appear (shortest fragment, leftmost in the electropherogram), and so on.
Matrix condition number upper limit	For information, see "Spectral QV (quality value) and Condition number definitions and limits" on page 324.
Locate start point after scan, Locate start point before scan	Settings that determine peak detection.
Limit scans to	

(continued)

Setting	Description
Sensitivity	Settings that determine peak detection.
Minimum spectral QV	For information, see "Spectral QV (quality value) and Condition number definitions and limits" on page 324.

Analysis settings library

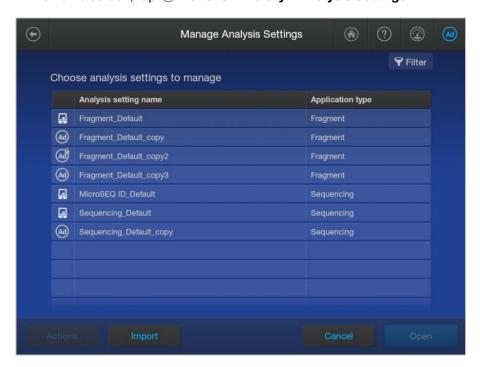
Analysis settings overview

- **Sequencing**—Analysis settings define the settings used by the sequencing basecallers to assign basecalls to each detected peak and assign a quality value.
- Fragment/HID analysis Analysis settings define the settings for peak detection and sizing.

Create a new analysis settings

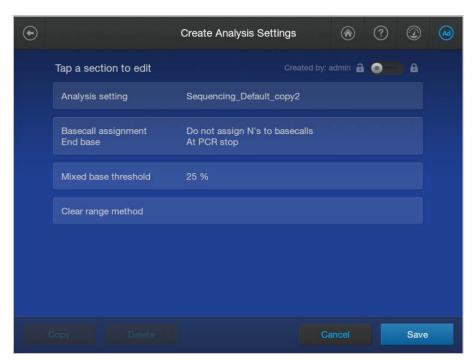
Note: The default sequencing analysis settings are optimized for PCR amplicon sequencing. For sequencing of plasmid templates, create analysis settings with the following selections.

- For the **End base** setting, deselect **At PCR stop**.
- For the Mixed base threshold setting, deselect Use Mixed base identification.
- 1. In the home screen, tap ⊙ Actions ➤ Library ➤ Analysis settings.

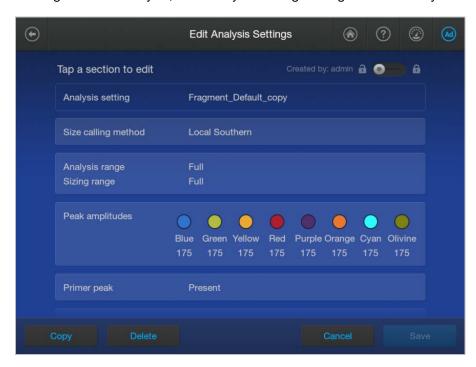


2. Tap a default analysis setting for your application, tap **Open**, then tap **Copy**.

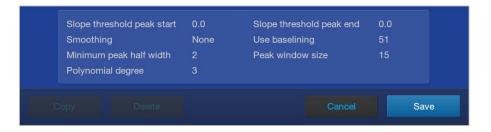
- 3. Enter a name for the analysis settings, then tap **Enter**.
- 4. Tap sections of the screen and modify settings as needed.
 - For sequencing analysis, see "Analysis settings—Sequencing" on page 294.



• For fragment/HID analysis, see "Analysis settings—Fragment/HID analysis" on page 297.



IMPORTANT! Swipe up to see additional settings.

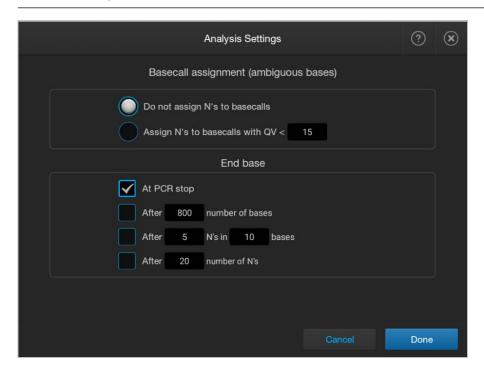


5. Tap Save.

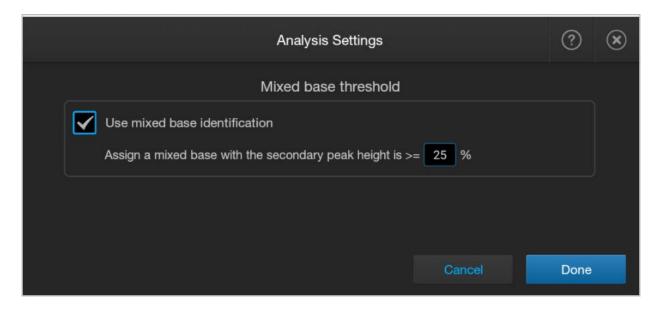
Analysis settings—Sequencing

Note: In other Applied Biosystems™ genetic analyzer software, for example, 3500 Series Data Collection Software, you have to specify a mobility file in analysis settings.

In the SeqStudio™ Flex Series Instrument Software, the mobility information is automatically selected based on the dye set that is used to collect the data.

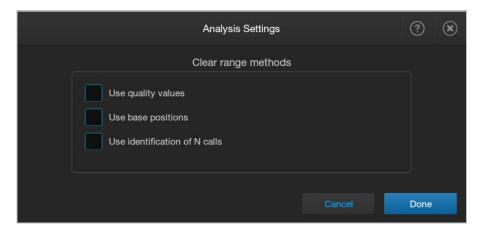


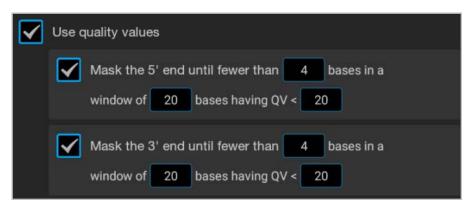
Setting	Description
Basecall assignment	The basecaller assigns one basecall per position from IUPAC code options: A, C, G, T, R, Y, S, W, K, M. This setting determines how to analyze a basecall with a low quality value (QV), where N is any call, per IUPAC code.
	Do not assign Ns to basecalls (default)
	 Assign Ns to basecalls with QV<x—basecalls a="" base="" display="" instead="" less="" letter<="" li="" n="" of="" qv="" than="" the="" threshold="" with="" x=""> </x—basecalls>
End base	At PCR stop (default)
	After X number of bases
	After X number of Ns in X number of bases
	After X number of Ns
	Note: If you have PCR products with sequences that end while data is still being collected, select the At PCR stop checkbox.
	Note: The default sequencing analysis settings are optimized for PCR amplicon sequencing. For sequencing of plasmid templates, create analysis settings with the following selections. • For the End base setting, deselect At PCR stop.
	For the Mixed base threshold setting, deselect Use Mixed base identification.

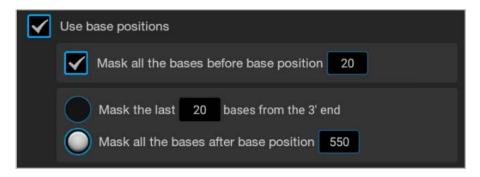


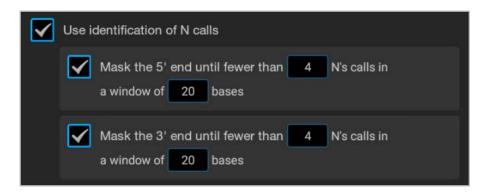


Setting	Description
Mixed base threshold	When selected (default), determines the secondary peak height ratio, where the secondary peak is considered a potential mixed base. Reaching the threshold is a necessary but not sufficient condition for the basecalling algorithm to call a mixed basecall.
	For example, with the default setting of 25%, a secondary peak that is 10% of the main peak is not identified as a mixed basecall.
	Note: The default sequencing analysis settings are optimized for PCR amplicon sequencing. For sequencing of plasmid templates, create analysis settings with the following selections. • For the End base setting, deselect At PCR stop.
	For the Mixed base threshold setting, deselect Use Mixed base identification.







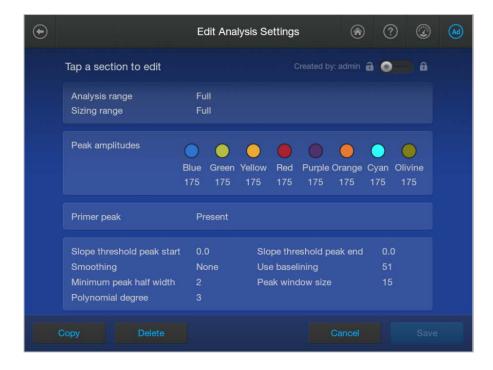


Setting	Description
Clear range method	 Use quality values—Sets a window with a specified number of allowed low-quality bases by removing bases until there are <x <y.<="" bases="" li="" number="" of="" per="" qv="" with="" z=""> </x>
	• Use base positions—Specifies the first and last basecalls in the range to consider, or trims the specified number of basecalls from the 3' end.
	 Use identification of N calls—Sets a window with a specified number of allowed ambiguous basecalls (Ns) by removing bases until there are <x bases.<="" li="" ns="" number="" of="" per="" y=""> </x>

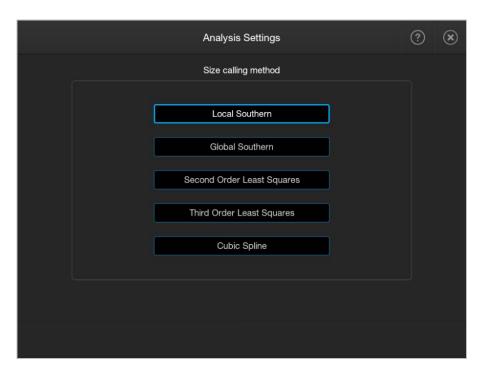
Analysis settings-Fragment/HID analysis

For detailed information on size calling methods and other analysis parameters, see *DNA Fragment Analysis by Capillary Electrophoresis User Guide* (Pub. No. 4474504).

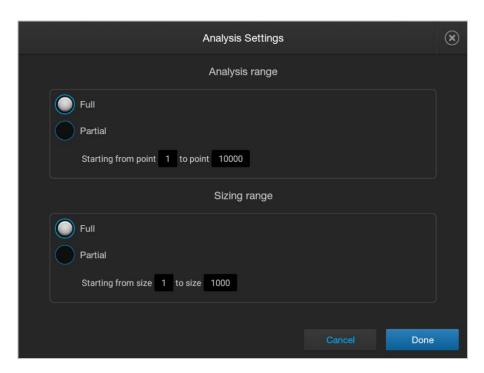
Tap a section to change a setting.





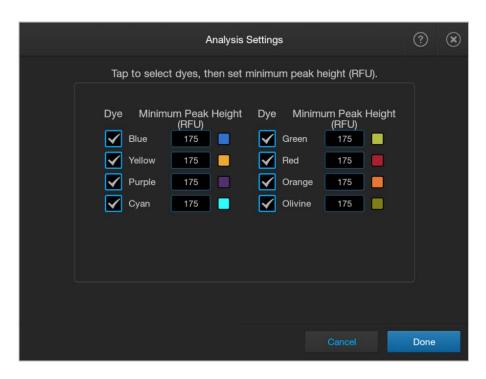


Description	Setting
Size calling method	 Local Southern (default)—Determines the fragment sizes using the reciprocal relationship between fragment length and electrophoretic mobility.
	 Global Southern—Compensates for standard fragments with anomalous electrophoretic mobility (similar to least squares methods).
	Second Order Least Squares – Uses regression analysis to build a best-fit size calling curve.
	Third Order Least Squares—Uses regression analysis to build a best-fit size calling curve.
	 Cubic Spline Forces the sizing curve through all the known points of the selected size standard.

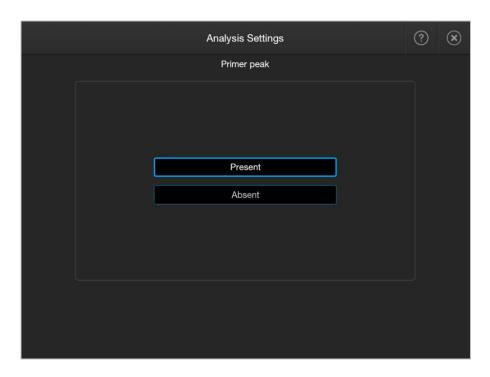


Description	Setting
Analysis range	The range (in data points) to analyze:
	• Full (default)—Analyze the entire scan region as collected by the genetic analysis instrument, including the primer peak.
	 Partial—Analyze only data points within a specified range. Enter Starting from point in data points after the primer peak and before the first required size standard peak. Enter an end point after the last required size standard fragment. Start and stop points may vary from instrument to instrument and platform to platform. Display raw data to determine the appropriate analysis range.
	Data points outside the specified analysis range are ignored.
	 Note: Ensure that the analysis range contains both of the following: All size standard fragments that are included in the sizing range (described in the next row in this table). All observed size standard peaks that are identified in the Size Standard definition specified for
	data collection.
Sizing range	The size range (in base pairs) appropriate for the kit you are using:
	Full — Analyze fragments of all sizes in the analysis range.
	 Partial —Analyze only fragments within a specified range. Enter a Starting from size and an end size appropriate for the size standard used.



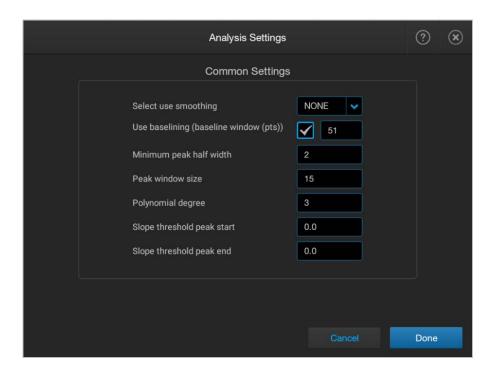


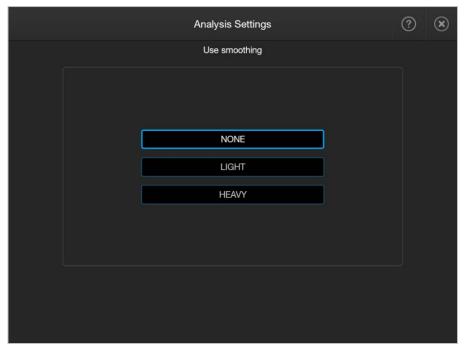
Description	Setting
Peak amplitudes	Specify the threshold (RFU) for peak detection for each dye color. Peaks below the threshold are not detected. Defaults are 175 RFU for all dyes.
	For example, if you use the default value of 175, peaks with heights ≥175 are detected. Peaks with heights <175 are still displayed in the electropherogram plots but are not detected or labeled.
	Note: Use the same peak amplitude thresholds in secondary analysis software.



Description	Setting
Primer peak	Select Present (default) if the primer peaks in your application obscure peaks of interest. This selection instructs the algorithm to ignore primer peaks. Primer peaks are still displayed in the electropherogram plots.
	Note: If this setting does not allow detection of the 20- and 40-mer peaks for samples that use the GeneScan™ 600 LIZ™ Size Standard v2.0, analyzing samples with the GS600(60-600)LIZ+Normalization size standard definition may allow detection of the peaks.







Description	Setting
Slope thresholds peak start Slope thresholds peak end	 Peak start—The peak starts when the first derivative (slope of the tangent) in the beginning of the peak signal before the inflection point becomes equal to or exceeds this setting. This threshold is set to 0 by default, which means that the peak will normally start at the leftmost point where the slope of the tangent is closest to 0° (horizontal line). A value other than 0 moves the peak start point toward its center. The value entered must be non-negative. Peak end—The peak ends when the first derivative (slope of the tangent) in the end of the peak signal after the inflection point becomes equal to or exceeds this setting. This value is set to 0 by default, which means that the peak will normally end at the rightmost point where the slope of the tangent is closest to 0° (horizontal line). A value other than 0 moves the peak end point toward its center. The value entered in this field must be non-positive.
Smoothing	 Select an option to smooth the outline of peaks and reduce the number of false peaks detected: None (default)—Use for data with sharp, narrow peaks of interest. Light—Use for typical data. Light smoothing slightly reduces peak height. Heavy—Use for data with very sharp, narrow peaks of interest. Heavy smoothing can significantly reduce peak height. Note: Smoothing is applied before peaks are detected.
Use baselining	 Specify a window to adjust the baseline signals of all detected dye colors to the same level for an improved comparison of relative signal intensity. Note the following: A small baseline window relative to the width of a cluster, or grouping of peaks spatially close to each other, can result in shorter peak heights. Larger baseline windows relative to the peaks being detected can create an elevated baseline, resulting in peaks that are elevated or not resolved to the baseline.
Minimum peak half width	Specify the number of scans across which the minimum full peak width at half maximum required for peak detection.
Peak window size	Enter a window width in data points for peak detection sensitivity. If more than one peak apex is within the window, all are labeled as a single peak. Note the following: • The maximum value is the number of data points between peaks. • The setting is limited to odd numbers. To increase peak detection sensitivity: Increase polynomial degree, decrease peak window size. To decrease peak detection sensitivity: Decrease polynomial degree, increase peak window size.
Polynomial degree	Polynomial degree cannot be greater than the peak window size. Adjust to affect the sensitivity of peak detection. You can adjust this parameter to detect a single base pair difference while minimizing the detection of shoulder effects and/or noise. The peak detector calculates the first derivative of a polynomial curve fitted to the data within a window that is centered on each data point in the analysis range. Using curves with larger polynomial degree values allows the curve to more closely approximate the signal and, therefore, captures more of the peak structure in the electropherogram.

Results Groups library

Results group overview

A results group defines the folder name where sample data files are stored.

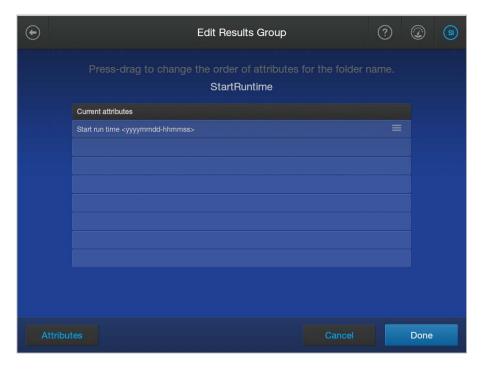
If you do not specify a results group, the default results group is used: **StartRuntime**.

Create a new results group

1. In the home screen, tap ⊙ Actions ➤ Library ➤ Results groups.

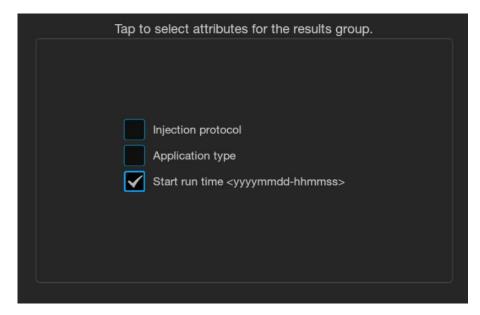


- 2. Tap a row, tap **Open**, then tap **Copy**.
- 3. Enter a name for the results group, then tap **Enter**.
- 4. Tap the **Results group preview** section of the screen.

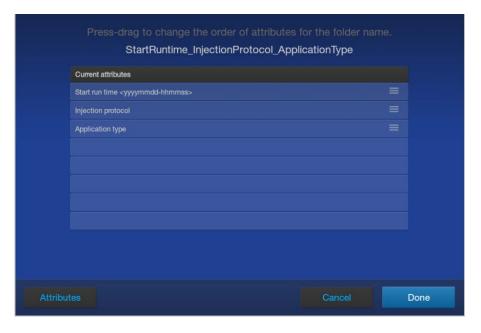


5. Tap Attributes.

6. Select attributes, then tap **Done**.



7. To change the order of the attributes in the results group, press-drag \equiv (Move) for the attribute and move it up or down.



8. Tap **Done**, then tap **Save**.



Run calibrations and install checks

Run a spatial calibration	306
Run a spectral calibration	312
Perform an install run	333

Run a spatial calibration

Spatial calibration overview

A spatial calibration associates the signal from each capillary to a specific position on the CCD camera.

When to perform a spatial calibration

Perform a spatial calibration if you perform any of the following actions:

- · Re-install a capillary array
- · Replace a capillary array when it expires
- Move the instrument
- Open the detection cell heater door or move the detection cell

Note: If you perform any of the first two actions, the software requires you to run a spatial calibration before you perform a regular run. If you open the detection cell heater door and move the detection cell, the software does not detect that the capillary array is no longer calibrated. It is critical to run a spatial calibration before performing a regular run if you have opened the detection cell heater door or moved the detection cell.

Note: If you use a maintenance wizard to change the capillary array, a spatial calibration is automatically performed during the procedure.

For more information on the maintenance wizards, see "Maintenance wizard overview" on page 364.

Perform a spatial calibration

A spatial calibration is automatically performed when you use maintenance wizards to install a capillary array.

This section describes how to manually perform a spatial calibration if you interact with the capillary array without using a wizard (for example, if you move the instrument or open the detection cell heater door). You can alternatively run the spatial calibration maintenance wizard.

For more information on the maintenance wizards, see "Maintenance wizard overview" on page 364.

- 1. From the home screen, tap ⊕ Actions ➤ Maintenance ➤ Calibration ➤ Spatial calibration.
- 2. Use the default **Fill** setting to fill the capillary array with polymer before starting the calibration. Filling the capillary array ensures that no residual fragments are present in the capillary array that can interfere with the spatial calibration and signal optimization.

Note: If you have previously run a spatial calibration and know that the capillary array is filled with fresh polymer, you can select **No Fill**.

3. Tap Recalibrate.

Note: If a spatial calibration has not previously been performed for the installed capillary array, the button displays **Start calibration**.

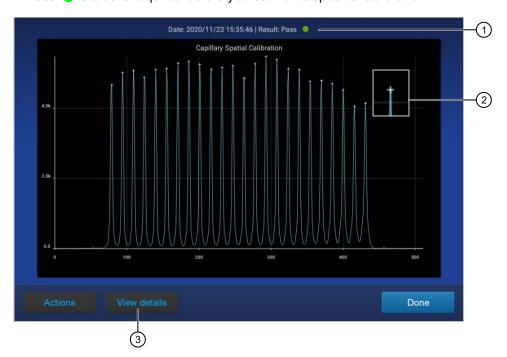
When the spatial calibration is complete, the **Spatial Calibration** screen is displayed.



Evaluate the spatial calibration results

See also "Spatial calibration troubleshooting" on page 530.

Note the pass/fail status of the calibration at the top of the screen.
 A Pass status is required before you can run a spectral calibration.



- 1 Pass/fail result
- 2 Capillary CCD pixel marker
- (3) Tap for more results
- 2. Evaluate the spatial calibration profile. Ensure you see the following:
 - One sharp peak for each capillary. Small shoulders are acceptable.
 - One marker (+) at the apex of every peak. No off-apex markers.
 - An even peak profile (all peaks about the same height).

3. Tap View details to view the results for each capillary.



Attribute	Calculation	Threshold
Average peak height	(sum of all peak heights) divided by (number of peaks)	8-cap: ≥6,400 RFU24-cap: ≥2,500 RFU
Uniformity (peak height similarity)	(standard deviation) divided by (average peak height)	0.2
Spacing (capillary spacing)	Maximum spacing – minimum spacing	2 pixels
Intensity (individual peak height)	Peak height	1,000 RFU
Signal optimization factor	Described below	_

Fragment/HID analysis on 24-capillary instruments only: A signal optimization factor is calculated for each capillary during spatial calibration. The factor for each capillary is applied during data collection to minimize optical variation effects and to increase signal uniformity between capillaries.

Note: The signal optimization factor is calculated using a fitted curve method. The fitted curve method minimizes background and reduces noise. The adjusted spatial intensity, not the spatial intensity displayed for the capillary, is used to calculate the signal optimization factor.

4. Tap Done.

Example spatial profiles

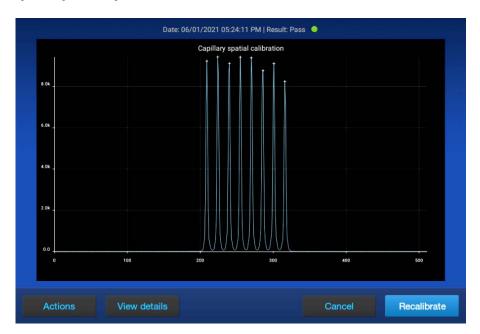


Figure 15 Example 8-capillary array spatial calibration profile



Figure 16 Example 24-capillary array spatial calibration profile

Export spatial calibration results or report

This statement appears in the footer of spatial calibration reports: When used for purposes other than Human Identification the instruments cited are for Research Use Only. Not for use in diagnostic procedures.

Note: Spatial and spectral calibration reports show the date of first installation. Install run reports show the date of the most recent installation.

- 1. In the **Spatial calibration** screen, tap **Actions**.
- 2. Tap the item to export:
 - **Results** (ZIP)—Contains the spatial calibration run file (CID), log files, and information that can be used for troubleshooting.

- Report (PDF)—Contains the results of the spatial calibration for your records.

 Report file name format: <InstrumentName>_<ArraySerialNumber>_<RunDate>_
 <Timestamp>.pdf, for example: Instrument1_M323A0C03_20201021_121952.pdf
- Select the export location, then tap Next.
 For information on connecting to a network drive, see "Connect the software to a network drive (software settings)" on page 450.
- 4. When the export is complete, click **Close** to close the message box.

Run a spectral calibration

This section includes the following topics:

- Overview of spectral calibration
- System dye sets versus custom dye sets
- Using BigDye[™] Direct Cycle Sequencing Kit chemistry
- Estimated spectral calibration run times
- When to perform a spectral calibration
- Prepare for custom dye set spectral calibration
- Prepare for spectral calibration
 - Prepare the instrument
 - Prepare the spectral calibration standard
 - Prepare the standard plate
 - Load a plate into the instrument
- Perform a spectral calibration

- View spectral calibration results
 - Spectral QV (quality value) and Condition number definitions and limits
 - Spectral calibration sharing between capillaries
 - Spectral calibration with Allow borrowing disabled
 - Spectral calibration with Allow borrowing enabled
- Example spectral calibration data
- Export spectral calibration logs or report
- View and export the spectral calibration history

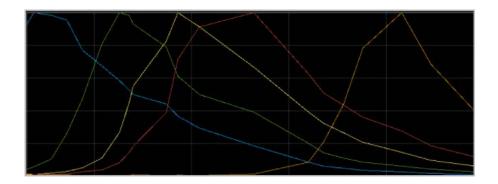
Overview of spectral calibration

During data collection, the instrument detects the signal of fluorescent dyes that are attached to DNA amplicons. Although each dye emits its maximum fluorescence at a different wavelength, there is some overlap in the emission spectra between the dyes. A spectral calibration creates a reference deconvolution matrix (also referred to as a dye matrix) that corrects for the overlapping fluorescence emission spectra of the dyes. A deconvolution matrix is created for each capillary in a capillary array. A dye matrix is created when you run the manual spectral calibration function. The dye matrix is then optimized and updated by the auto-spectral calibration function, which is performed automatically for each capillary during each injection.

In the auto-spectral calibration process, the instrument uses spectral data from the samples to optimize and update the dye matrix from the manual calibration, which generates an auto-spectral dye matrix. This feature optimally reduces pull-up (false secondary peaks under a true peak) that can be caused by changes in the spectral characteristics from the original manual calibration dye matrix. The instrument performs an auto-spectral calibration for factory-provided and custom dyes.

For more information, see "Auto-spectral calibration during an injection" on page 150.

An example of the dye emission spectral overlap in the DS-33 Matrix Standard Kit (Dye Set G5) is shown below.



When to perform a spectral calibration

Perform a spectral calibration if you do any of the following actions.

- Use a dye set/polymer combination that you have not previously calibrated
- Use a custom dye set (a dye set that is not available from Thermo Fisher Scientific) or a dye set definition that is not factory-provided
- Observe a decrease in spectral separation (pull-up/pull-down in peaks) in the raw or analyzed data
- After performance of maintenance by Service that affects the optical systems
- After the instrument is moved
- You frequently run samples for which auto-spectral calibration cannot be performed (these samples generate a "Calibration from manual..." calibration status)

Under most conditions, manual spectral calibrations are not needed after the capillary array is changed because of the auto-spectral calibration feature (see "Auto-spectral calibration during an injection" on page 150). However, in applications with overlapping peaks that are labeled with different dyes, such as microsatellite instability, the spectral characteristics may not meet the requirements of the auto-spectral calibration algorithm. If an auto-spectral calibration cannot be performed and no saved auto-spectral calibration is available for the capillary position, the most recent manual spectral calibration is applied to the samples. When routinely running samples for which auto-spectral calibration cannot be performed, it is important to perform a manual spectral calibration after you change the capillary array or move the instrument, to provide a valid manual calibration for samples.

Note: For sequencing applications, you can skip the spectral calibration process, and perform the sequencing install run. If you select **Keep Spectral Calibration Data** in the install run, the software runs a spectral calibration for the dye set during a sequencing install check and saves the updated dye matrix as a manual spectral calibration. For information, see Perform an install run. Routine manual calibrations are not required for sequencing applications.

System dye sets versus custom dye sets

System dye sets are available from Thermo Fisher Scientific. See "Fragment/HID analysis reagents" on page 549.

System dye sets			
Fragment/HID analysis dye sets	Sequence analysis dye sets		
• D (DS-30, DS-31)	E_BigDye™ Terminator v1.1		
• E5 (DS-02)	Z_BigDye™ Terminator v3.1		
• F (DS-32)	Z_BigDye [™] Direct		
• G5 (DS-33)			
• J6 (DS-36)			
• J6-T (DS-37)			

Custom dye sets are any dyes that are not available from Thermo Fisher Scientific or any user-created dye set definitions. For example, if you open a factory-provided dye set and make a copy of it, the copy is considered a custom dye set.

Note: If an application uses a subset of the dyes in a factory-provided dye set, you can still use the factory-provided dye set definition. The following options are available.

- If your application uses only two of the dyes in the DS-33 Matrix Standard Kit (Dye Set G5), you can perform the spectral calibration using the DS-33 Matrix Standard Kit (Dye Set G5) and the factory-provided G5(DS-33) dye set definition.
- If your assay contains a subset of the dyes in a dye set, use the Edit Dye Set screen to create a
 custom dye set, assign a unique name to the custom dye set, and apply it to the assay. In the Edit
 Dye Set screen, select the following (see "Dye set settings" on page 291).
 - In the **Dyes to calibrate** column, select all dyes in the factory-provided dye set.
 - In the Dyes used in samples column, select the subset of dyes present in your assay.

Using BigDye™ Direct Cycle Sequencing Kit chemistry

The dyes that are used in the BigDye™ Direct Cycle Sequencing Kit are spectrally equivalent to the dyes used in the BigDye™ Terminator v3.1 Cycle Sequencing Kit. Therefore, when running a spectral calibration (or performing an install run and saving the spectral calibration), you use BigDye™ v3.1 chemistry.

The BigDye™ Direct dye set is automatically calibrated when you generate a spectral calibration using either of the methods stated previously.

When you perform a spectral calibration, install run, or create a plate file for use with the BigDye™ Direct Cycle Sequencing Kit, select the appropriate chemistry or dye set for each type of run:

- Spectral calibration with matrix standards—Z_BigDye Terminator v3.1 dye set
- Install run from which you save the spectral calibration—BDT v3.1 chemistry
- Regular run with samples—Z_BigDye Direct dye set

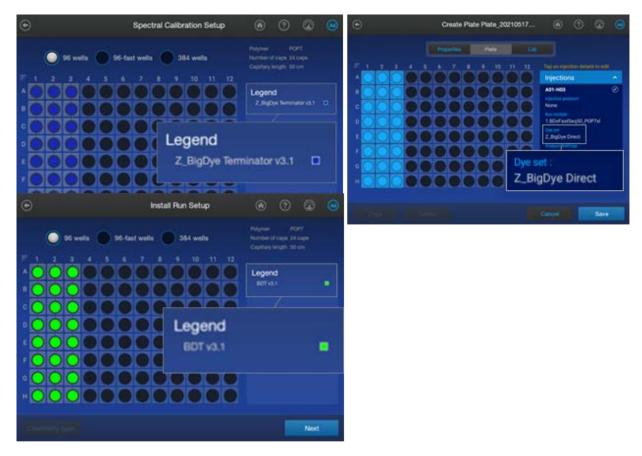


Figure 17 Spectral calibration (left top), install run (left bottom), and regular run (right) dye set and chemistry selections when using the BigDye™ Direct Cycle Sequencing Kit

Estimated spectral calibration run times

Note: The run times listed below do not include the time for the oven to preheat.

Standard	Polymer type and capillary array configuration Approximate run time					
Otanaa a	POP-4™36 cm	POP-4™ 50 cm	POP-6™ 36 cm	POP-6™ 50 cm	POP-7™ 36 cm	POP-7™ 50 cm
Sequencing standard	36 minutes	Not supported	65 minutes	95 minutes	62 minutes	52 minutes
Sequencing or fragment/HID analysis matrix standard	28 minutes		44 minutes	63 minutes	27 minutes	33 minutes

Note: A sequencing *standard* can be used for a sequencing install run. A spectral calibration can also be obtained from the sequencing install run. The sequencing standard contains DNA that has been sequenced with a BigDye™ chemistry. The spectral calibration is obtained from the sequencing install run by evaluating the dyes associated with the 4 nucleotides in the sequencing standard. A sequencing *matrix* standard contains 4 nucleotide/dye combinations, with one labeled peak per dye label, and is used for spectral calibration.

Prepare for custom dye set spectral calibration

Before you begin, create a custom dye set in the dye set library. See "Create a custom dye set" on page 289.

Prepare for spectral calibration

Prepare the instrument

- 1. Display the consumables dashboard by tapping ② (Dashboard) at the top right of the home screen (if the consumables dashboard is not displayed, tap < or >).
- 2. Check consumables status (see "Check consumables status" on page 67). Ensure that:
 - · Consumables are not expired
 - Adequate injections remain for consumables

IMPORTANT! For install runs, use polymer that has been on the instrument ≤48 hours. Slight peak shifts can occur with polymer that has been on the instrument >48 hours.

- 3. Ensure that buffer levels are at the fill lines (see "Check buffer fill levels" on page 71).
- 4. Check the oven and detection cell temperature to ensure that they are at the correct temperature (see "Preheat the instrument oven and the detection cell" on page 68).
- 5. Check the pump assembly for bubbles and run the **Remove Bubble wizard** if needed (see "Remove bubbles from the polymer pump (wizard)" on page 383).

Prepare the spectral calibration standard

For the instructions to prepare the standard, see the product information sheet. To find the product information sheet, go to www.thermofisher.com, search for the product, then scroll to the bottom of the product page.

Prepare the matrix standard appropriate for your application as described in the product insert.

Note: If you use the BigDye[™] Direct Cycle Sequencing Kit, perform the spectral calibration with BigDye[™] v3.1 matrix standards. For more information, see Using BigDye[™] Direct Cycle Sequencing Kit chemistry.

Name	Cat. No.
DS-02 Matrix Standard Kit (Dye Set E5)	4323014
DS-30 Matrix Standard Kit (Dye Set D)	4345827
DS-31 Matrix Standard Kit (Dye Set D with VIC™ dye)	4345829
DS-32 Matrix Standard Kit (Dye Set F)	4345831
DS-33 Matrix Standard Kit (Dye Set G5)	4345833
DS-36 Matrix Standard Kit (Dye Set J6)	4425042
DS-37 Matrix Standard Kit (Dye set J6-T, 6-dye)	A31234
Matrix Standards Kit, BigDye™ Terminator v3.1 if you use the BigDye™ Direct Cycle Sequencing Kit or the BigDye™ Terminator v3.1 Cycle Sequencing Kit ^[1]	4336974
Matrix Standards Kit, BigDye™ Terminator v1.1 if you use the BigDye™ Terminator v1.1 Cycle Sequencing Kit ^[1]	4337449

^[1] Alternatively, you can save the spectral calibration from a sequencing install run. See Perform an install run.

Prepare the standard plate

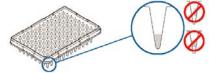
IMPORTANT! Do not use warped or damaged plates.

Load the standards in any injection position in the plate.
 The example below shows injection position 1, but you can specify the starting well for an injection position. For information on other injection positions, see "Plate and strip-tube layout" on page 76.

8-capillary	24-capillary	24-capillary
96-well plate	96-well plate	384-well plate
A1 through H1 1 2 A 1 0 B 2 0 C 3 0 D 4 0 E 5 0 F 6 0 G 7 0 H 8 0	A1 through H1, A2 through H2, and A3 through H3 1 2 3 4 A 1 2 3 4 A 5 6 6 C 7 8 9 D 10 11 12 E 13 14 15 F 16 17 18 G 19 20 21 H 22 23 24	Note: 384-well plates are not supported on 8-capillary instruments. Columns 1, 3, and 5 in rows A, C, E, G, I, K, M, O 1 2 3 4 5 6 A 2 3 B B B B B B B B B B B B B B B B B B

- 2. Briefly centrifuge the plate that contains the standards.
- **3.** Verify that each standard is positioned correctly in the bottom of its well.

IMPORTANT! If the contents of any well contain bubbles or are not located at the bottom of the well, briefly centrifuge the plate, remove the plate from the centrifuge, and verify that each standard is positioned correctly in the bottom of its well.

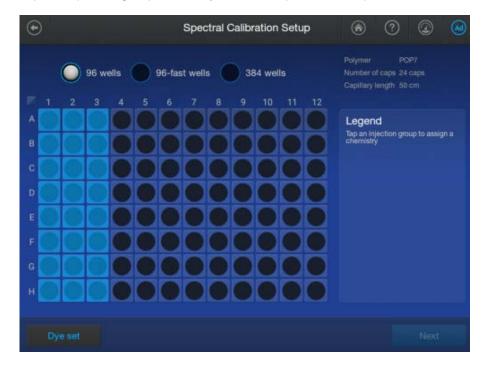


- 4. Store the plate on ice until you prepare the plate assembly and load the plate in the instrument.
- 5. Prepare the plate assembly as described in "Prepare the plate assembly" on page 78.

Perform a spectral calibration

Note: The first time you perform a spectral calibration (required for each dye set/polymer configuration), you may notice pull-down peaks (or mirror image peaks). While the run is in progress, these pull-down peaks will eventually correct themselves. When the run is complete, the pull-down peaks disappear.

- 1. Load the calibration plate in the instrument. See Load a plate into the instrument.
- 2. In the home screen, tap . Actions > Maintenance > Calibration > Spectral Calibration.
- 3. Tap the screen to select the plate type you are using for calibration.
- 4. Tap the injection group for the dye set in the plate, then tap **Dye set**.



5. Tap **Sequencing** or **Matrix**, then tap the appropriate calibration standard.

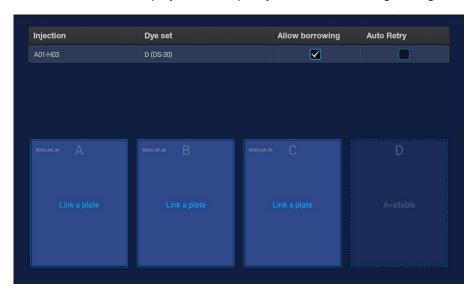
IMPORTANT! The **Matrix** tab for fragment/HID analysis is displayed by default. If you are performing a sequencing spectral calibration, tap the **Sequencing** tab before selecting the dye set.



Note: If you use the BigDye[™] Direct Cycle Sequencing Kit, perform the install run with select **BDT v3.1**. For more information, see Using BigDye[™] Direct Cycle Sequencing Kit chemistry.

6. Tap Next.

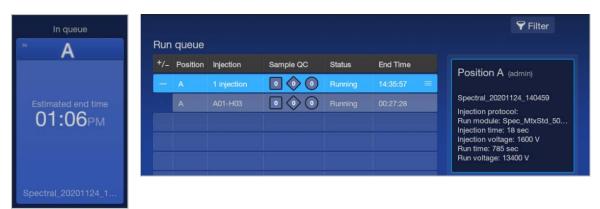
The home screen is displayed with capillary information sharing settings.



- 7. Select capillary information sharing settings as needed:
 - Allow borrowing—Determines whether the software can use spectral calibration data from
 an adjacent capillary if the spectral calibration from a capillary does not meet the quality
 thresholds. If Auto Retry is also enabled, spectral calibration information can also be borrowed
 from the additional runs that can be performed. For information, see "Spectral calibration
 sharing between capillaries" on page 325.
 - **Auto Retry**—Determines whether up to 3 calibration runs are performed if the first calibration run fails.
- 8. Tap the plate position that corresponds to the location of the spectral calibration plate in the instrument.

9. Tap Start calibration.

The home screen is displayed. The status of the spectral calibration is shown in the appropriate plate position. The spectral calibration run is also listed in the **Run queue**.



When the spectral calibration finishes, the status changes to **Completed** in the home screen and the **Run queue**.

View spectral calibration results

See also "QC errors—Fragment/HID analysis" on page 499 and "QC errors—Sequencing" on page 499.

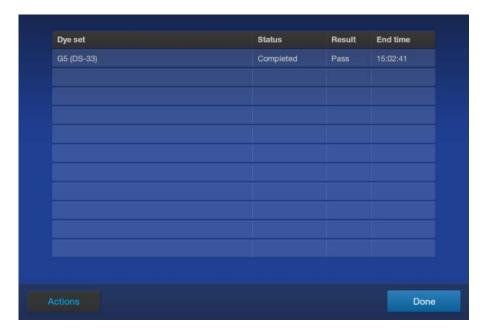
1. When the spectral calibration is complete, tap the plate position in the home screen or in the **Run Queue** screen.



Note: If data for a capillary is borrowed, it is listed in the \diamond (caution) category. Example of Calibration QC with a borrowed capillary:



2. In the Run Details screen, tap the spectral calibration of interest.



The **Spectral Calibration** electropherogram screen is displayed.

The thumbnail pane is at the far left of the screen. Press-drag the pane to the right until the calibration spectra are displayed.



Note: Wells with borrowed spectral calibration are flagged in yellow (caution).



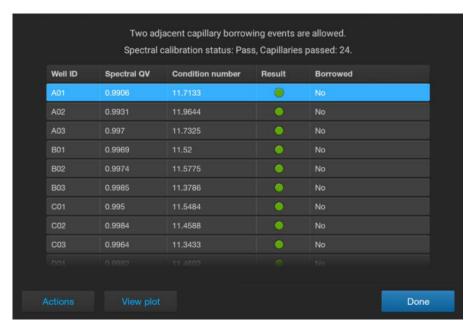
In this screen, you can:

- Tap a well to view the results for the well. The results for the well are displayed below the well positions.
- Tap the Raw, EPT, or Dye Matrix tab to display different views of the data.
- Tap Actions, then tap Pause instrument, Export logs, or Export report.
- Tap View details to display the details for each well.

For more information, see "Use the electropherogram screen" on page 173.

3. Tap View details to display the details for each capillary.

For a description of results, see "Spectral QV (quality value) and Condition number definitions and limits" on page 324 and "Spectral calibration sharing between capillaries" on page 325.



Spectral QV (quality value) and Condition number definitions and limits

Spectral QV

A **Spectral QV** (quality value) reflects the confidence that the individual dye emission signals can be separated from the overall measured fluorescence signal. It is a measure of the consistency between the final matrix and the data from which it was computed. A **Spectral QV** of 1.0 indicates high consistency, providing an ideal matrix with no detected pull-up/pull-down peaks.

In rare cases, a high **Spectral QV** can be computed for a poor matrix. This can happen if the matrix standard contains artifacts, leading to the creation of one or more extra peaks. The extra peaks cause the true dye peak to be missed by the algorithm, and can lead to a higher **Spectral QV** than would be computed with the correct peak.

Condition number

A **Condition number** indicates the amount of overlap between the dye peaks in the fluorescence emission spectra of the dyes in the dye set.

If there is no overlap in a dye set, the **Condition number** is 1.0 (ideal conditions), the lowest possible value. The condition number increases with increasing peak overlap.

Spectral QV and Condition number limits

Dye set	Minimum spectral QV	Matrix condition number upper limit	
D (DS-30)	0.95	8.5	
D (DS-31)	0.95	8.5	
E_BigDye Terminator v1.1 ^[1]	0.95	5.5	
E5 (DS-02)	0.95	6.0	
F (DS-32)	0.95	8.5	
G5 (DS-33)	0.95	13.5	
J6 (DS-36)	0.95	8.0	
J6-T (DS-37)	0.95	8.0	
Z_BigDye Terminator v3.1 ^[1]	0.95	5.5	
Z_BigDye Direct ^[2]	0.95	5.5	

^[1] The E_BigDye Terminator v1.1 limits are also used for the optional spectral calibration during sequencing install run. Borrowing is automatically enabled for the optional calibration.

^[2] For information on the Z_BigDye Direct dye set, see Using BigDye™ Direct Cycle Sequencing Kit chemistry.

Spectral calibration sharing between capillaries

If spectral borrowing is enabled, a spectral calibration can share capillary information:

- Between injections (only when Auto-retry is enabled)—If a capillary in an injection does not meet
 the Spectral QV (quality value) and Condition number limits, the software automatically uses the
 spectral calibration from that capillary in a different injection.
- Within an injection—If a capillary in an injection does not meet the Spectral QV (quality value) and
 Condition number limits and the Allow borrowing option is selected, the software can also use
 the spectral calibration from a capillary to the left, right, above, or below that capillary, if the values
 are more optimal than those for that capillary in a different injection.

Spectral calibration with Allow borrowing enabled

Table 7 Overview of spectral calibration options with Allow borrowing enabled

Option	Action	
Allow borrowing enabled Auto Retry disabled Allow borrowing Auto Retry (default)	 All capillaries must pass (must meet the Spectral QV and Condition number limits set internally in the software) and meet the borrowing limits listed below. 8-capillary instruments—One adjacent-capillary borrowing event is allowed 24-capillary instruments—Up to two adjacent-capillary borrowing events are allowed. One run is performed (see Injection 1 below). If the limits are not met, the calibration fails. This option is not illustrated in the table below. 	
Allow borrowing enabled Auto Retry enabled Allow borrowing Auto Retry	Same as above, except up to 3 runs are performed if injections 1 and 2 fail (see Injections 1 through 3 below).	

Table 8 Details of spectral calibration injections with Allow borrowing enabled and Auto Retry enabled

Injection	Process
Injection 1	The software evaluates the Spectral QV and Condition number of all capillaries.
	 If all capillaries pass, the calibration is complete, and injections 2 and 3 are not performed.
	If any capillaries fail, the software borrows from an adjacent capillary.
	 If, after borrowing, >1 (8-capillary instruments) or > 2 capillaries (24-capillary instruments) fail, injection 2 is performed.

Table 8 Details of spectral calibration injections with Allow borrowing enabled and Auto Retry enabled *(continued)*

Injection	Process	
Injection 2 (listed as \bigcirc re-injection in Run	 The software evaluates the Spectral QV and Condition number results between adjacent capillaries in injection 2 and for each capillary across injections 1 and 2. It uses the result with the highest Spectral QV for each capillary. 	
queue)	If all capillaries pass, the calibration is complete and injection 3 is not performed.	
	 If, after borrowing, >1 (8-capillary instruments) or > 2 capillaries (24-capillary instruments) from injection 1 or 2 do not pass, injection 3 is performed. 	
Injection 3 (listed as \bigcirc reinjection in Run queue)	 The software evaluates the Spectral QV and Condition number results between adjacent capillaries in injection 3 and for each capillary across injections 1, 2, and 3. It uses the information with the highest Spectral QV for each capillary. 	
	If all capillaries now pass, the calibration passes.	
	 If after borrowing, >1 (8-capillary instruments) or > 2 capillaries (24-capillary instruments) from injection 1, 2, or 3 do not pass, the calibration fails. 	

Spectral calibration with Allow borrowing disabled

Table 9 Overview of spectral calibration options with Allow borrowing disabled

Option	Action
Allow borrowing disabled Auto Retry disabled Allow borrowing Auto Retry	 All capillaries must pass (must meet the Spectral QV and Condition number limits set internally in the software). One run is performed (see Injection 1 below). If the limits are not met, the calibration fails. This option is not illustrated in the table below.
Allow borrowing disabled Auto Retry enabled Allow borrowing Auto Retry	Same as above, except up to 3 runs are performed (see Injections 1 through 3 below).

Table 10 Details of spectral calibration injections with Allow borrowing disabled and Auto Retry enabled

Injection	Process
Injection 1	 The software evaluates the Spectral QV and Condition number of all capillaries. If all capillaries pass, the calibration is complete, and injections 2 and 3 are not performed.
	If any capillaries fail and Auto Retry is disabled, the calibration fails. If any capillaries fail and Auto Retry is enabled, injection 2 is performed.

Table 10 Details of spectral calibration injections with Allow borrowing disabled and Auto Retry enabled *(continued)*

Injection	Process	
Injection 2 (listed as \bigcirc re-injection in Run queue)	 The software evaluates the Spectral QV and Condition number for each capillar across injections 1 and 2 and uses the information from the capillary with the highest Spectral QV. 	
	 If all capillaries now pass, the calibration is complete and injection 3 is not performed. 	
	If the same capillary fails in both injection 1 and 2, injection 3 is performed.	
Injection 3 (listed as \bigcirc re-injection in Run queue)	 The software evaluates the Spectral QV and Condition number for each capillary across injections 1, 2, and 3 and uses the information from the capillary with the highest Spectral QV. 	
	If all capillaries now pass, the calibration passes.	
	If the same capillary fails in injection 1, 2, or 3 and the calibration fails.	

Example spectral calibration data

Dye set E generated from a sequencing install run (dye matrix view)



Dye set Z generated from a sequencing install run (dye matrix view)



Dye Set G5 created from Matrix Standard Set DS-33 (dye matrix and raw data views)



Export spectral calibration logs or report

This statement appears in the footer of spatial calibration reports: When used for purposes other than Human Identification the instruments cited are for Research Use Only. Not for use in diagnostic procedures.

Note: Spatial and spectral calibration reports show the date of first installation. Install run reports show the date of the most recent installation.

Note: You can also export these items from the Spectral calibration history option.

- 1. In the **Spectral Calibration** plot screen or the results per capillary screen, tap **Actions**.
- 2. Tap the item to export:
 - Logs (ZIP)—Contains the spectral calibration report (PDF), data files (FSA or AB1), spectral calibration run file (CID), and log files that can be used for troubleshooting.
 Log file name format: <InstrumentName>_<DyeSet>_<RunDate>_<Timestamp>.zip, for example: Instrument1_J6 (DS-36)_20230220_202403.zip
 - Report (PDF)—QC report Contains the results of the spectral calibration for your records.
 Report file name format: <InstrumentName>_<DyeSet>_<RunDate>_<Timestamp>.pdf, for example: Instrument1 J6 (DS-36) 20230220 202403.pdf
- 3. Select the export location, then tap Next.

Note: It can take up to 15 seconds for the instrument to recognize a USB drive after the drive is inserted in a USB port. exFAT-formatted USB drives are recommended.

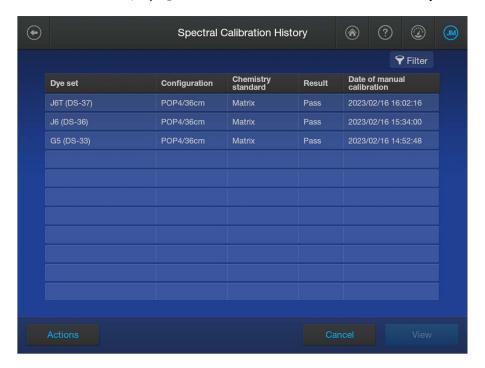
For information on connecting to a network drive, see "Connect the software to a network drive (software settings)" on page 450.

4. When the export is complete, click **Close** to close the message box.

View and export the spectral calibration history

This statement appears in the footer of spatial calibration reports: When used for purposes other than Human Identification the instruments cited are for Research Use Only. Not for use in diagnostic procedures.

1. In the home screen, tap . Actions > Maintenance > Calibration > Spectral calibration history.



- 2. (Optional) Tap \(\begin{align*} \begin{align*}
- 3. To export the list of calibrations that have been run on the instrument, tap **Actions ▶ Export** report.

The spectral calibration history report contains the results of all spectral calibrations performed on the instrument.

Report file name format: <InstrumentName>_SpectralHistoryReport_ <ReportGenerationDate>_<Timestamp>.pdf, for example: Instrument1_SpectralHistoryReport_20201124_162247.pdf \odot G5 (DS-33) Spectral Calibration View by D03 A03 B02 C01 C03 D01 D02 (H03) E02 F02 F03 G01 G03 H01 H02 E03 Condition number 11.7133 Spectral QV 0.9906 0 Done

4. To view the details of an individual spectral calibration, tap a dye set, then tap View.

- 5. To export the log or report for the individual spectral calibration, tap **Actions**, then tap the item to export (these options generate the same files you can generate at the end of a spectral calibration):
 - Logs (ZIP)—Contains the spectral calibration report (PDF), data files (FSA or AB1), spectral calibration run file (CID), and log files that can be used for troubleshooting.
 Log file name format: <InstrumentName>_<DyeSet>_<RunDate>_<Timestamp>.zip, for example: Instrument1_J6 (DS-36)_20230220_202403.zip
 - Report (PDF)—Contains the results of the spectral calibration for your records.
 Report file name format: <InstrumentName>_<DyeSet>_<RunDate>_<Timestamp>.pdf, for example: Instrument1_J6 (DS-36)_20230220_202403.pdf

Perform an install run

This section includes the following topics:

- Overview of install run
- Estimated install run times
- Prepare for the install run
 - Prepare the instrument
 - Prepare the install run standard
 - Prepare the standard plate
 - Load a plate into the instrument
- Perform an install run
- · View sequencing install run results
 - Pass/fail criteria for the sequencing install run
 - Export sequencing install run logs or report
 - View the spectral calibration generated by an install run
- View fragment/HID analysis install run results
 - Pass/fail criteria and results for the fragment/HID install checks
 - Per-capillary passing criteria
 - Per-allele passing criteria
 - Export fragment/HID analysis install run logs or report
- · View, export, or delete an install run history

Overview of install run

Install runs ensure that the instrument meets specifications for sequencing and fragment/HID analysis. For more information, see "QV20 CRL limits—sequencing install run" on page 350 and "Pass/fail criteria and results for the fragment/HID install checks" on page 354.

You can include multiple chemistries on an install run plate.

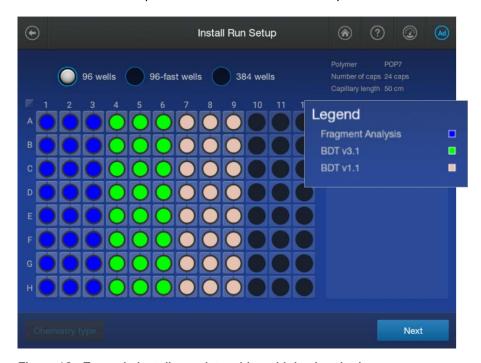


Figure 18 Example install run plate with multiple chemistries

When to perform an install run

You can perform an install run under the following conditions:

- If at least one install run for the application type (sequencing or fragment/HID analysis) is not
 present in the Install Run History list. This can occur if the install run for the application type
 has never been performed, or if all install runs for the application type have been deleted from the
 instrument.
- At any time to verify that the instrument meets specifications.

Estimated install run times

Note: The run times listed below do not include the time for the oven to preheat.

	Polymer-capillary length configuration				
	POP-4™	POF	POP-6™ POP-7™		
Install standard	36 cm ^[1]	36 cm	50 cm	36 cm	50 cm
BDT v1.1	Not supported	66 minutes	135 minutes	~40 minutes	125 minutes
BDT v3.1	Not supported	66 minutes	90 minutes	~40 minutes	40 minutes
Fragment	60 minutes	Not supported	100 minutes	~40 minutes	40 minutes
HID	~37 minutes	Not supported	Not supported	Not supported	Not supported

^[1] A 50-cm configuration is not supported.

The number of capillaries on the instrument does not affect run time.

Prepare for the install run

Prepare the instrument

- 1. Display the consumables dashboard by tapping ② (Dashboard) at the top right of the home screen (if the consumables dashboard is not displayed, tap < or >).
- 2. Check consumables status (see "Check consumables status" on page 67). Ensure that:
 - Consumables are not expired
 - Adequate injections remain for consumables

IMPORTANT! For install runs, use polymer that has been on the instrument ≤48 hours. Slight peak shifts can occur with polymer that has been on the instrument >48 hours.

- 3. Ensure that buffer levels are at the fill lines (see "Check buffer fill levels" on page 71).
- 4. Check the oven and detection cell temperature to ensure that they are at the correct temperature (see "Preheat the instrument oven and the detection cell" on page 68).
- 5. Check the pump assembly for bubbles and run the **Remove Bubble wizard** if needed (see "Remove bubbles from the polymer pump (wizard)" on page 383).

Prepare the install run standard

For the instructions to prepare the standard, see the product information sheet. To find the product information sheet, go to www.thermofisher.com, search for the product, then scroll to the bottom of the product page.

Prepare the appropriate standard according to the procedure in the product information sheet.

Note: If you use the BigDye™ Direct Cycle Sequencing Kit, perform the install run with BigDye™ v3.1 sequencing standards. For more information, see "Using BigDye™ Direct Cycle Sequencing Kit chemistry" on page 314.

Install check type	Reagent
Sequencing	 Sequencing Standards, BigDye[™] Terminator v1.1 (Cat. No. 4404314)
	 Sequencing Standards, BigDye™ Terminator v3.1 (Cat. No. 4404312)
Sequencing for MicroSEQ™ ID applications	Sequencing Standards, BigDye™ Terminator v1.1 (Cat. No. 4404314)
Fragment	DS-33 GeneScan™ Installation Standards with GeneScan™ 600 LIZ™
Note: A manual calibration for the G5 dye is required before the install check.	Size Standard v2.0 (Cat. No. 4376911)
HID	GeneScan™ 600 LIZ™ Size Standard v2.0 (Cat. No. 4408399)
Note: A manual calibration for	Hi-Di™ Formamide (Cat. No. 4311320 or 4440753)
the J6 dye is required before the install check.	 GlobalFiler™ Allelic Ladder (from the GlobalFiler™ PCR Amplification Kit (Cat No. 4476135), or ordered separately Cat. No. 4476033)

Prepare the standard plate

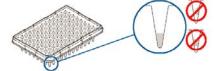
IMPORTANT! Do not use warped or damaged plates.

Load the standards in any injection position in the plate.
 The example below shows injection position 1, but you can specify the starting well for an injection position. For information on other injection positions, see "Plate and strip-tube layout" on page 76.

8-capillary	24-capillary	24-capillary
96-well plate	96-well plate	384-well plate
A1 through H1 1 2 A 1	A1 through H1, A2 through H2, and A3 through H3 1 2 3 4 A 1 2 3 4 A 5 6 6 C 7 8 9 D 10 11 12 E 13 14 15 F 16 17 18 G 19 20 21 H 22 23 24	Note: 384-well plates are not supported on 8-capillary instruments. Columns 1, 3, and 5 in rows A, C, E, G, I, K, M, O 1 2 3 4 5 6 A 1 2 3 A 5 6 A 1 2 3 A 5 6 A 1 2 A 1 A 1 A 1 A 1 A 1 A 1 A 1 A 1 A

- 2. Briefly centrifuge the plate that contains the standards.
- **3.** Verify that each standard is positioned correctly in the bottom of its well.

IMPORTANT! If the contents of any well contain bubbles or are not located at the bottom of the well, briefly centrifuge the plate, remove the plate from the centrifuge, and verify that each standard is positioned correctly in the bottom of its well.

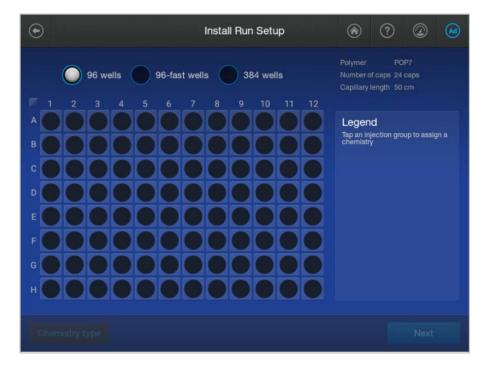


- 4. Store the plate on ice until you prepare the plate assembly and load the plate in the instrument.
- 5. Prepare the plate assembly as described in "Prepare the plate assembly" on page 78.

Perform an install run

IMPORTANT! Ensure that polymer has been installed for <48 hours before you run a fragment/HID install check. If you use older polymer, the install run may fail because allele peaks may not align with the expected system-specified bins.

- 1. Load the install run plate in the instrument. See Load a plate into the instrument.
- 2. In the home screen, tap ⊙ Actions ➤ Maintenance ➤ Install run ➤ Install run.
- 3. Tap the screen to select the plate type you are using for the install run.
- 4. Tap the injection group for the install standard in the plate, then tap Chemistry type.

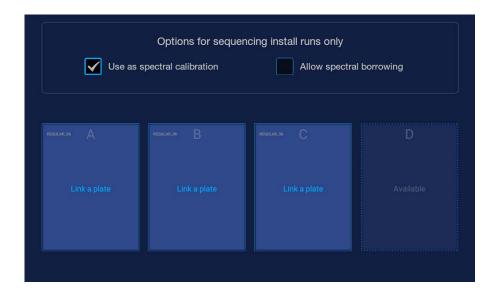


5. Tap the **Chemistry Type** for install run.

Note: If you use the BigDye[™] Direct Cycle Sequencing Kit, select **BDTv3.1**. For more information, see Using BigDye[™] Direct Cycle Sequencing Kit chemistry.

6. Tap Next.

The home screen is displayed with capillary information sharing settings.



- 7. (Sequencing install runs only) Select capillary information sharing settings:
 - Use as spectral calibration—Uses the sequencing data for spectral calibration.
 - Allow borrowing—Determines whether the software can use spectral calibration data from an adjacent capillary if the data from a capillary does not meet the quality thresholds. For information, see "Spectral calibration sharing between capillaries" on page 325. (The Auto Retry function from spectral calibration is not performed if you allow borrowing for the install run.)
- 8. Tap the plate position that corresponds to the location of the plate in the instrument.
- 9. Tap Start Run.

The home screen is displayed and shows the status of the install run in the appropriate plate position. The install run is also listed in the **Run queue**.



When the install run is complete, the home screen and the **Run queue** status displays **Completed**.

Proceed to the appropriate section:

- "View sequencing install run results" on page 340
- View fragment/HID analysis install run results

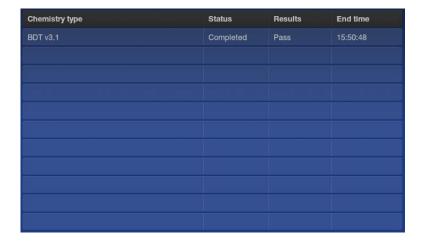
View sequencing install run results

See also "QC errors—Sequencing or fragment/HID analysis install run" on page 502.

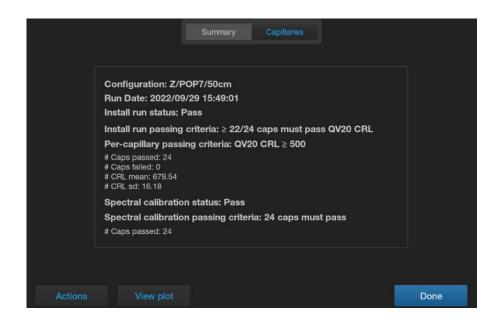
1. When the install run is complete, tap the plate position in the home screen or in the Run queue.



2. In the Run Details screen, tap the install run of interest.



The install run results screen is displayed with **Summary** tab selected (a tab is gray when it is selected).



This screen displays the install run status and passing criteria. If you selected **Use as spectral calibration** when you performed the sequencing install run, the spectral calibration status and passing criteria is also displayed. For a description of the results on this screen, see "Summary tab—sequencing install run" on page 344.

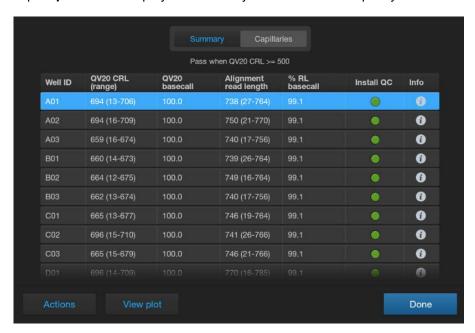
3. (Optional) Tap Actions > View spectral calibration, then tap Raw, EPT, or Dye matrix as needed.



For information on the results on this screen, see "Summary tab—sequencing install run" on page 344.

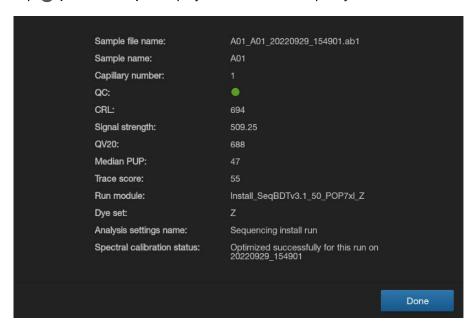
4. Tap **Done** to return to the install run results screen.

5. Tap Capillaries to display the summary results for each capillary.



For a description of the results on this screen, see "Capillaries tab—sequencing install run" on page 346.

6. Tap (Information) to display the details for a capillary.



For a description of the results on this screen, see "Details screen—sequencing install run" on page 347.

7. Tap **Done** to return to the **Capillaries** tab.

8. Tap **View plot** in the **Summary** tab or the **Capillaries** tab to display the plot for each capillary (**Raw**, **Analyzed**, and **Sequencing** tabs are shown below).

You can tap **View by** to filter results by Pass () or Flagged (or).

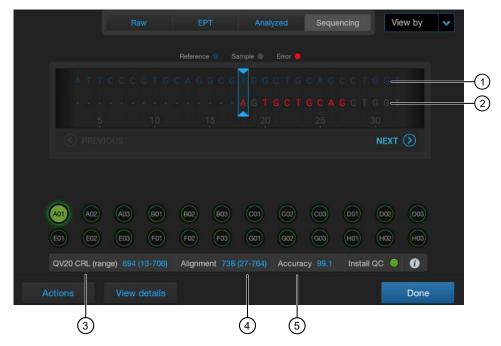
For a description of the results on this screen, see "Plot view—sequencing install run" on page 348.

For more information, see "Use the electropherogram screen" on page 173.









- 1) Reference sequence of the sequencing install standard
- (2) Basecalls from the run. Basecalls that do not match the known bases in the reference sequence are marked in red.
- (3) QV20 CRL is referred to as CRL on the Capillaries tab.
- (4) Alignment range. The starting base is determined by the software. In the example above, the alignment range starts at 27 because of the contiguous bases before 27 that do not match the reference sequence.
- (5) Accuracy is referred to as %RL basecall on the Capillaries tab.

Pass/fail criteria for the sequencing install run

Summary tab—sequencing install run

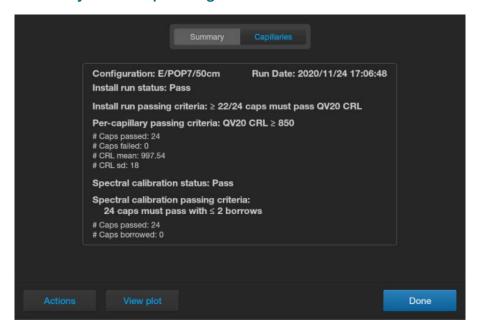


Table 11 Summary tab - sequencing install run

Result	Description	
Install run		
Install run status	Pass or fail.	
Install run passing criteria	The number of capillaries that must pass the QV20CRL limit (described below). If spectral borrowing is enabled, 22 capillaries must pass for 24-capillary instruments and 7 capillaries must pass for 8-capillary instruments.	
Per-capillary passing criteria QV20 CRL	The longest uninterrupted segment of basecalls with an average Quality Value (QV) ≥20.	
(contiguous read length) limit	In addition to evaluating the QV of a basecall, the software considers the QV of adjacent basecalls within a 21-bp moving window to determine a contiguous read length based on quality values: the software starts from the 5' end and calculates the average QV across a moving window size of 21, sliding 1 bp at a time, to the 3' end. The resulting longest contiguous segment is determined as the CRL.	
	For QV20CRL limits, see "QV20 CRL limits—sequencing install run" on page 350.	
# Caps passed and # Caps failed	The number of capillaries that met or did not meet the QV20CRL limit.	
# CRL mean and # CRL sd	The QV20 mean and standard deviation for all capillaries in the injection.	
Spectral calibration		
Spectral calibration status	Pass or fail.	
Spectral calibration passing criteria The number of capillaries that can be borrowed: 2 for 24-capillary instruments for more information, see "Spectral calibration between capillaries" on page 325 and "Spectral calibration with Allow borrowenabled" on page 325.		
# caps passed/# caps borrowed	The number of capillaries that met the spectral QV and condition number limits. See "Spectral QV (quality value) and Condition number definitions and limits" on page 324.	
	The number of capillaries that were borrowed.	

Capillaries tab-sequencing install run



Table 12 Capillaries tab-sequencing install run

Result	Description
QV20 CRL (range)	The QV20 CRL result and the base number range in which the QV20 CRL was determined.
QV20 basecall (This result is referred to as QV20 on the Details screen.)	The percent accuracy of the basecalls in the sample sequence within the QV20 CRL range relative to the known reference sequence of the sequencing install standard.
Alignment read length	Length and range of the sample sequence in which basecalling accuracy is >99% relative to the known reference sequence of the sequencing install standard. It does not consider QV. It does consider the entire sequence.
	The Alignment read length value is derived from basecall accuracy (% RL basecall), and not from quality values.
% RL basecall (This result is referred to as Accuracy in the plot view.)	The percent of basecalling accuracy within the alignment read length and range.
Install QC (This result is referred to as QC on the info/details screen.)	 —All QC tests passed. —At least 1 warning quality alert was triggered. —At least 1 failing quality alert was triggered. For more information, see "Sample QC and quality alerts" on page 172

Details screen-sequencing install run



Table 13 (Information) details screen—sequencing install run

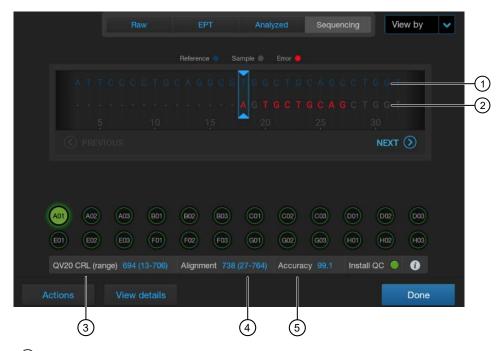
Result	Description
Sample file name, Sample name, and Capillary number	Identification for the results.
QC	The Install QC result described above.
(This result is referred to as Install QC on the Capillaries tab.)	
CRL	The QV20 CRL result described above.
(This result is referred to as QV20 CRL on the Capillaries tab.)	
Signal strength	The average signal Intensity in the raw data.
QV20	The total number of bases in the sequence with a QV≥20.

Table 13 (Information) details screen—sequencing install run (continued)

Result	Description
Median PUP	A measure of noise or pull-up that is determined by taking the mean of the ratios of signal strength calculated for each basecalled peak: primary peak/secondary peak under the primary peak.
	A higher value indicates less baseline or secondary noise. A lower value indicates an elevated baseline or secondary noise.
	Example 1: Main called base signal strength is 1,000 RFU and the largest secondary peak beneath it is 10 RFU; PUP=100
	Example 2: Main called base signal strength is 1,000 RFU and the largest secondary peak beneath it is 100 RFU; PUP=10
Trace score	The average basecall Quality Value (QV) of basecalls in the clear range sequence of a trace.
	The <i>clear range</i> is the region of the sequence that remains after excluding the low-quality or error-prone sequence at the 5' and 3' ends. The clear range is calculated by the KB Basecaller using QVs.
Run module, Dye set, and Analysis settings name	The settings from the plate file that were used to collect and analyze the data.
Spectral calibration status	For information, see "Auto-spectral calibration during an injection" on page 150.

Plot view-sequencing install run





- 1 Reference sequence of the sequencing install standard
- (2) Basecalls from the run. Basecalls that do not match the known bases in the reference sequence are marked in red.
- 3 QV20 CRL is referred to as CRL on the Capillaries tab.
- (4) Alignment range. The starting base is determined by the software. In the example above, the alignment range starts at 27 because of the contiguous bases before 27 that do not match the reference sequence.
- (5) Accuracy is referred to as %RL basecall on the Capillaries tab.

Table 14 Plot view results—sequencing install run

Result	Description
QV20 CRL (range)	The same value that is displayed on the Capillaries tab.
Alignment (This result is referred to as Alignment read length on the Capillaries tab.)	The Alignment read length that is displayed on the Capillaries tab.
Signal strength	The average signal Intensity in the raw data.
Accuracy (This result is referred to as % RL basecall on the Capillaries tab.)	The % RL basecall that is displayed on the Capillaries tab.
Install QC	The same result that is displayed on the Capillaries tab.

QV20 CRL limits—sequencing install run

Table 15 Sequencing Standards, BigDye™ Terminator v1.1

	Instrument configuration			
Passing criteria	36-cm capillary array POP-6™	36-cm capillary array POP-7™	50-cm capillary array POP-6™	50-cm capillary array POP-7™
QV20 CRL	600	600	600	850
QV20 CRL (range)	20–619	20–619	20–619	20–869

Table 16 Sequencing Standards, BigDye™ Terminator v3.1

		Instrument configuration		
Passing criteria	36-cm capillary array POP-6™	36-cm capillary array POP-7™	50-cm capillary array POP-6™	50-cm capillary array POP-7™
QV20 CRL	600	500	600	500
QV20 CRL (range)	40–639	40–539	40–639	40–539

View the spectral calibration generated by an install run

- 1. In any install run screen, tap Actions.
- 2. Tap View spectral calibration.

The spectral calibration plot is displayed.

For more information, see "View spectral calibration results" on page 321.

Export sequencing install run logs or report

- 1. In the plot screen or the results per capillary screen, tap **Actions**.
- 2. Tap the item to export:
 - Logs (ZIP)—Contains the install run report (PDF), data files (AB1), install run file (CID), and log files.

Log file name format: InstrumentName_ChemistryType_RunDate_Timestamp.zip, for example: Instrument1_BDTv3.1_20201021_121952.zip

• **Report** (PDF)—Contains the results of the install run.

Report file name format: $InstrumentName_ChemistryType_RunDate_Timestamp.pdf$, for example: $Instrument1_BDTv3.1_20201021_121952.pdf$

3. Select the export location, then tap **Next**.

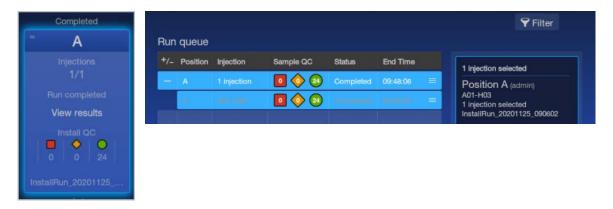
Note: It can take up to 15 seconds for the instrument to recognize a USB drive after the drive is inserted in a USB port. exFAT-formatted USB drives are recommended.

For information on connecting to a network drive, see "Connect the software to a network drive (software settings)" on page 450.

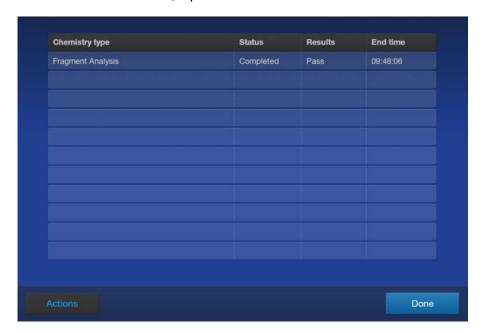
4. When the export is complete, click **Close** to close the message box.

View fragment/HID analysis install run results

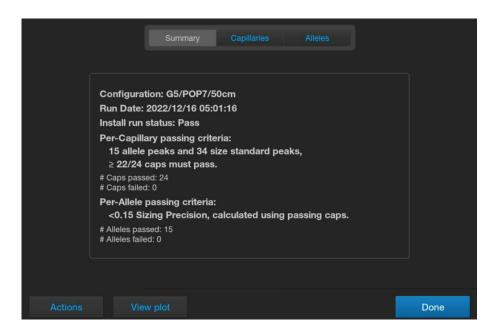
1. When the install run is complete, tap the plate position in the home screen or in the **Run queue**.



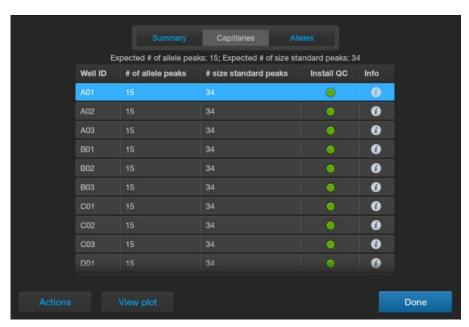
2. In the Run Details screen, tap the install run of interest.



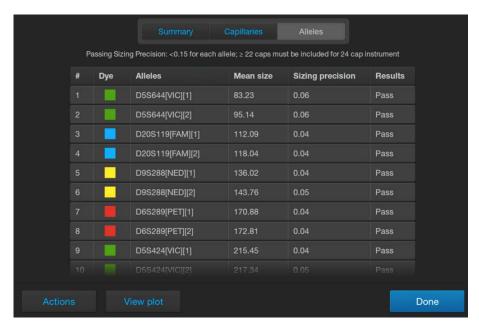
The install run results screen is displayed with summary results.



3. Tap Capillaries to view results for each capillary. Tap (information) to display the Sizing quality and other information for a capillary.



4. Tap **Alleles** to display the sizing information for alleles.



For a description of results, see "Pass/fail criteria and results for the fragment/HID install checks" on page 354.

IMPORTANT! If fewer than 15 alleles per capillary are identified, ensure that polymer has been installed on the instrument for <48 hours. Older polymer can cause the fragment install run to fail.

5. Tap View plot to display the plot for each capillary (Raw and Analyzed tabs are shown below).





The red line in the plot is the sizing curve. The install run uses the **Local Southern** sizing method.

You can tap **View by** to filter results by Pass () or Flagged (or).

For more information, see "Use the electropherogram screen" on page 173.

Pass/fail criteria and results for the fragment/HID install checks

The fragment/HID install run passes if both the capillary passing criteria and the allele passing criteria are met. The fragment/HID install check passing criteria includes the following:

- The required number of capillaries must pass the per-capillary passing criteria (see "Per-capillary passing criteria" on page 354).
- All alleles in the passing capillaries must pass the per-allele passing criteria (see "Per-allele passing criteria" on page 356).

Per-capillary passing criteria

The per-capillary passing criteria includes the following:

- Alleles are within their expected size range (see Table 17).
- The required number of allele peaks and size standard peaks must be present.
 - For fragment analysis, see Table 18.
 - For HID analysis, see Table 19.
- The required number of capillaries must pass per injection (see Table 20).

The software evaluates peaks in the data for each capillary. To be identified as an acceptable allele, peaks must be within the following ranges. The nominal allele size, or reference bin size, is hard-coded in the software.

Table 17 Fragment/HID markers

Fragment analysis	HID analysis
All markers are between ±0.5 bp of nominal size for the allele	 All markers except D1S1656, D12S391, D2S441, and TH01: ±0.7 bp of nominal size for the allele D1S1656 Ten markers are ±0.7 bp of the nominal size for the allele Six markers are ±0.5 bp of the nominal size for the allele D12S391 Thirteen markers are ±0.7 bp of the nominal size for the allele
	 Two markers are ±0.5 bp of the nominal size for the allele D2S441 Nine markers are ±0.7 bp of the nominal size for the allele Two markers are ±0.5 bp of the nominal size for the allele TH01: Seven markers are ±0.7 bp of nominal size for the allele Three markers are ±0.5 bp of nominal size for the allele

Table 18 Required number of allele peaks and size standard peaks (fragment)

Result	Acceptance criteria	
# Allele peaks	15 per capillary	
# Size standard peaks	34 per capillary	

Table 19 Required number of allele peaks and size standard peaks (HID)

Result	Acceptance criteria
# Allele peaks	343 per capillary
# Size standard peaks	26 per capillary

Table 20 Required number of capillaries that must pass (fragment/HID)

Instrument type	Number of capillaries required to pass
24-capillary instrument	≥22 out of 24 capillaries
8-capillary instrument	≥7 out of 8 capillaries

Per-allele passing criteria

Only alleles from passing capillaries are used to calculate the **Average Peak Height** and the **Sizing Precision** passing criteria. For the install run to pass, all alleles in the passing capillaries must pass the per-allele passing criteria.

See the tables below for the fragment/HID per-allele passing criteria.

Table 21 Fragment per-allele passing criteria

Result	Threshold passing criteria
Minimum peak height	>175 RFU
Sizing precision (standard deviation of the observed allele fragment sizes for all capillaries)	<0.15 base pairs (bp)

Table 22 HID per-allele passing criteria

Result	Threshold passing criteria
Average peak height	>400 RFU
Sizing precision (standard deviation of the observed allele fragment sizes for all capillaries)	<0.15 base pairs (bp)

The following information is included in an exported install report.

Table 23 Install report

Result	Description	Threshold
Min Peak Height	Minimum of peak heights for observed allele peaks of the included capillaries.	>175 RFU
Sizing precision	Standard deviation per allele of the observed allele fragment sizes for all capillaries	<0.15 for expected alleles
Pass/Fail	Alleles with a sizing precision and required peak height that fail.	t do not meet thresholds
For information only		
Nominal Size	Expected allele fragment peak size (bp).	
Mean size	Average fragment size for the observed allele peaks.	
Mean peak height	Average peak height for the observed allele peaks.	
Peak Height % >Min	Percentage of observed allele peaks with a peak height above the minimum threshold.	
Sizing Precision	Standard deviation of the observed allele fragment sizes vs the expected fragment sizes.	
Sizing Accuracy	Difference between the expected allele size and the mean allele size.	

Export fragment/HID analysis install run logs or report

- 1. In the plot screen or the results per capillary screen, tap **Actions**.
- 2. Tap the item to export:
 - Logs (ZIP)—Contains the install run report (PDF), data files (FSA), peak tables (CSV), install run file (CID), and log files.

 $\label{logfile} \begin{tabular}{ll} Log file name format: $$ InstrumentName_Fragment/HID $$ Analysis_RunDate_Timestamp.zip, for example: Instrument1_Fragment $$ Analysis_20201021_121952.zip $$ $$ Analysis_20201021_121952.zip $$ Analysis_20201021_12192.zip $$ Analysis_20201021192.zip $$ Analysis_20201021_12192.zip $$ Analysis_20201021$

• Report (PDF)— Contains the results of the install run.

Report file name format: $\label{local_local_local_local} $$ Report file name format: InstrumentName_Fragment/HID $$ Analysis_RunDate_Timestamp.pdf, for example: Instrument1_Fragment Analysis_20201021_121952.pdf$

3. Select the export location, then tap **Next**.

Note: It can take up to 15 seconds for the instrument to recognize a USB drive after the drive is inserted in a USB port. exFAT-formatted USB drives are recommended.

For information on connecting to a network drive, see "Connect the software to a network drive (software settings)" on page 450.

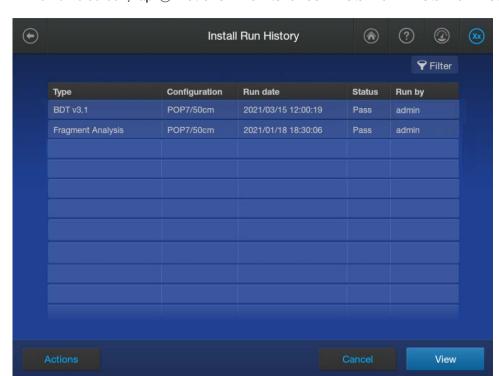
4. When the export is complete, click **Close** to close the message box.

View, export, or delete an install run history

The footer that is shown in the install run report depends on the type of install run.

Install run	Footer	
Sequencing install run	For Research Use Only. Not for use in diagnostic procedures.	
Fragment install run		
HID install run	When used for purposes other than Human Identification the instruments cited are for Research Use Only. Not for use in diagnostic procedures.	

Note: Spatial and spectral calibration reports show the date of first installation. Install run reports show the date of the most recent installation.



1. In the home screen, tap ⊕ Actions ➤ Maintenance ➤ Install run ➤ Install run history.

- 2. (Optional) Tap Filter to filter the list by polymer, result, and/or dye set.
- 3. To export an individual install run that has been run on the instrument, tap a row, then tap **Actions** > **Export report**.

The install run history report contains the results of the install run performed on the instrument.

Report file name format: <InstrumentName>_InstallHistoryReport_ <ReportGenerationDate>_<Timestamp>.pdf, for example: Instrument1 InstallHistoryReport 20201124 162247.pdf

4. To delete an install run history, tap a row, then tap ⊙ Actions > Delete.

IMPORTANT! At least one history for each chemistry type must be retained. If you delete the only run history for a chemistry type, it cannot be retrieved. You will have to perform a new install run for the chemistry type before you can perform regular runs.

5. To view the details of an individual install run, tap a row, then tap **View**.

- **6.** To export the log or report for the individual install run, tap **Actions**, then tap the item to export (these options generate the same files you can generate at the end of an install run):
 - Logs (ZIP)—Contains the install report (PDF), data files (FSA or AB1), install run file (CID), and log files that can be used for troubleshooting.
 - Log file name format: <InstrumentName>_<InstallRunType>_<RunDate>_ <Timestamp>.zip, for example: Instrument1_HID_J6 (DS-36)_20230220_230248.zip
 - **Report** (PDF)—Contains the results of the install run for your records.

Report file name format: <InstrumentName>_<InstallRunType>_<RunDate>_ <Timestamp>.pdf, for example: Instrument1_HID_J6 (DS-36)_20230220_230248.pdf



Maintain the instrument

Maintenance schedule	360
Maintenance wizard overview	364
Clean the instrument	366
Export consumables log files	368
Install buffers (wizard)	369
Replenish, change, flush, and store polymer (wizards)	375
Change and store a capillary array (wizards)	377
Maintain the pump (wizards)	382
Shut down, move, and reactivate the instrument	387
Maintenance wizard procedures	388

Maintenance schedule



WARNING! This section lists the common tasks required to maintain the instrument in good working condition. Wear appropriate protection, including gloves, laboratory goggles, and coat whenever you work with the fluids used on this instrument, or parts that may come into contact with these fluids.

IMPORTANT! Perform the procedures in this section as specified to ensure optimum instrument performance.

Note: The end user is responsible for complying with the maintenance prompts that are displayed in the software and for completing the maintenance tasks at the recommended frequencies as shown in the following sections.

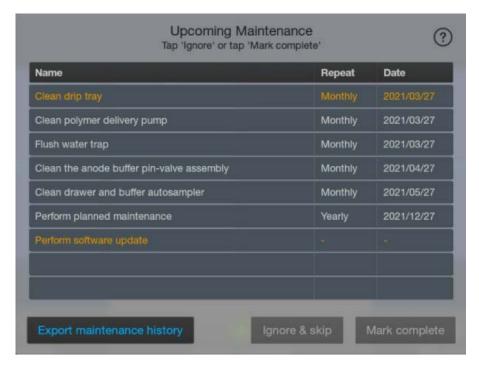
Review upcoming maintenance

Review the upcoming maintenance task list daily, perform the scheduled tasks, then mark the tasks as complete. In addition to the upcoming maintenance list, the home screen displays an alert when a task is due to be performed. For information on maintenance tasks, see Chapter 13, "Maintain the instrument".

Note: For HID applications, monthly maintenance tasks should be completed weekly to ensure minimal loss of resolution.



1. Display the upcoming maintenance tasks by tapping ② (Dashboard) at the top right of the home screen. If the Upcoming Maintenance screen is not displayed, tap < or >.



Tasks are displayed. Note the following:

- Overdue tasks are displayed in orange.
- The software update reminder is displayed only if a software update is available on the Thermo
 Fisher™ Connect Platform or on a USB drive. For more information, see "Update the software
 (administrator only)" on page 471.
- The yearly planned maintenance task can be updated by Service only.

Chapter 13 Maintain the instrument Maintenance schedule

2. Tap any of the following buttons as needed.

Note: Buttons are active only if you sign in to the software.

- (Toggle button) Ignore & skip or Smart help —When Perform planned maintenance is selected, the Ignore & skip button changes to the Smart help button.
 - **Ignore & skip**—To acknowledge a task without marking it as complete.
 - Smart help—To access the Smart Help screen to contact Service for yearly planned maintenance. For more information, see "Use Smart Help to request assistance from Technical Support or Service" on page 483.
- Mark complete To mark a task as complete. Marking as complete updates the due date listed on the screen.
- Export maintenance history—To generate a CSV file

 (InstrumentName_Maintenance_History_Log_Date_Timestamp.csv) that lists all skipped and completed events.

Daily instrument maintenance tasks

IMPORTANT! Use only the cleaning agents listed in this guide. Use of cleaning agents not listed in this guide can impair instrument function.

Frequency	Task	For information, see
Daily	Clean the instrument surfaces of dried residue, spilled buffer, or dirt.	"Clean the instrument" on page 366
	Check for leaks and dried residue around the buffer-pin valve, check valve, and array port lock. If leaks persist, contact Technical Support.	Figure 23 on page 382 "Use Smart Help to request assistance from Technical Support or Service" on page 483
	If you use custom run modules that specify an oven temperature that is below the ambient temperature, empty the oven condensation reservoir.	"Instrument interior components" on page 21
Daily or before each run	Check for bubbles in the pump block and channels. Use the Remove bubbles wizard to remove bubbles. Note: A polymer pouch includes a small reserve volume that is used for the Remove bubbles maintenance wizard, which consumes ~350 µL of polymer. The reserve volume is sufficient to run the wizard ~4 times (including the remove bubbles step during other maintenance wizards). If you manually run the Remove bubbles maintenance wizard >4 times, the volume of polymer that is available for samples may be depleted.	"Remove bubbles from the polymer pump (wizard)" on page 383
	Visually inspect the capillary tips to ensure that none are crushed or damaged.	"Instrument interior components" on page 21

(continued)

Frequency	Task	For information, see	
Before each run	Check consumables status to see the status for anode buffer container, cathode buffer container, polymer, and capillary array.	"Check consumables status" on page 67	
	Visually inspect the level of fluid inside the anode buffer container and the cathode buffer container. The fluid must line up with the fill line.	"Check buffer fill levels" on page 71	
	Ensure that the anode buffer container and the cathode buffer container are properly installed.	"Install buffers (wizard)" on page 369	
	Ensure that the array port lock on the capillary array is secured.	Figure 23 on page 382	
	Ensure that the CBC septa are properly seated on the container.	"Ensure proper installation of CBC septa" on page 72	
	Ensure that the plate assemblies are properly assembled.	"Prepare the plate assembly"	
	Align the holes in the plate retainer with the holes in the septum to avoid damaging capillary tips.	on page 78	
	IMPORTANT! Ensure that the plate retainer is firmly snapped in place on top of the plate (see "Prepare the plate assembly" on page 78). If the retainer is not snapped in place, the plate assembly can become jammed in the drawer.		
	Ensure that the plate assemblies are properly positioned in the drawer. Plates should sit securely in the drawer with the notched corner of the plate positioned in the notched corner of the plate holder.	Load a plate into the instrument	
	Ensure that each plate corresponds to the plate file that is linked to the position.	"Link a plate file and start a run" on page 140	

Monthly instrument maintenance tasks

Note: For HID applications, monthly maintenance tasks should be completed weekly to ensure minimal loss of resolution.

Task	For information, see
Clean the anode buffer pin-valve assembly with a moistened, lint-free lab wipe.	"Instrument interior components" on page 21
Clean the drawer and buffer autosampler (CBC holder on the buffer autosampler).	"Clean the instrument" on page 366
Clean the drip tray.	

Chapter 13 Maintain the instrument Maintenance wizard overview

(continued)

Task	For information, see
Clean the polymer delivery pump. Note: If the polymer type was changed within the month, this procedure can be skipped. The wizard that is used to change the polymer type automatically performs the wash pump and channels procedure.	"Wash the pump chamber and channels (wizard)" on page 385
Flush the water trap.	"Flush the water trap (pump trap)" on page 385

Annual planned maintenance tasks

Contact your support representative to schedule annual planned maintenance. For information, see "Use Smart Help to request assistance from Technical Support or Service" on page 483.

IMPORTANT! Failure to perform planned maintenance can affect instrument performance.

As-needed instrument maintenance tasks

Task	For information, see
Perform an install run.	Perform an install run
Remove dried polymer from the capillary tips with a lint-free tissue moistened with deionized water.	"Clean the instrument" on page 366
Empty the oven condensation reservoir.	"Instrument interior components" on page 21

Maintenance wizard overview

Step-by-step wizards are available for many of the required maintenance tasks. The materials required to run the wizard are listed in the first few wizard screens.

If the software is configured to prevent running if a consumable has expired or exceeded the usage limit, you must replace the consumable before you can start a run.

If a consumable expires during a run, the instrument pauses. You can run the **Replenish buffers** wizard and **Replenish Polymer** wizard while the instrument is paused.

Note: Close the instrument drawer before you start a maintenance wizard. Do not open the drawer unless instructed to do so, or until all steps of the wizard are complete.

To access the wizards, tap ⊕ **Actions > Maintenance > Maintenance wizards**.



The times that are listed in the following table are for use with the POP-7[™] Polymer. When used with other polymers, the amount of time needed to complete a wizard can be longer.

Maintenance wizard	Task	Time required	Procedure
Routine functions			
Change capillary array	Change the capillary array with store and discard options.	~15 minutes	page 388
Change polymer type with option	Install a different polymer type with the option to change the capillary array.	60–75 minutes	page 400
to change the capillary array	Allow the polymer to equilibrate to room temperature (15–30°C) before you run the wizard.		
Replenish buffers	Install fresh anode buffer container (ABC) and cathode buffer container (CBC).	~4 minutes	page 420
	Allow buffers to equilibrate to room temperature (15–30°C) before you run the wizard.		
Replenish polymer	Install a new pouch of the currently installed polymer type.	~12 minutes	page 424
	Allow the polymer to equilibrate to room temperature (15–30°C) before you run the wizard.		
Remove bubbles	Remove bubbles from the fluid pathway. This function is automatically performed during other wizards as needed.	~7 minutes	page 416
	IMPORTANT! Running this wizard consumes polymer. Do not run this wizard unless bubbles are observed in the fluid pathway.		

(continued)

Maintenance wizard	Task	Time required	Procedure
Wash pump and channels	Prime the polymer pump with conditioning reagent, then polymer. This function is automatically performed during other wizards as needed.	~45 minutes	page 422
	Run this wizard if you observe that polymer has dried in the polymer block or if you suspect contamination in the pump block.		
Special functions			
Shut down instrument	Shut down the instrument for a storage period >2 weeks. This wizard instructs you to remove the capillary array and polymer, and to install conditioning reagent.	~55 minutes	page 427
Reactivate instrument	Reactivate the instrument after storage. This wizard assumes that the Shut down instrument wizard was run before storage, that the pump and channels are filled with conditioning reagent, and that no capillary array is installed.	~50 minutes	page 434
Troubleshooting			
Fill array with polymer	Fill the capillary array with polymer. This function is automatically performed during other wizards as needed.	~5 minutes	page 416
Spatial calibration	This wizard performs the same procedure as a manual spatial calibration described in "Run a spatial calibration" on page 306).	~4 minutes	page 419
	This function is automatically performed during other wizards as needed.		

Clean the instrument

IMPORTANT! Wear appropriate protection, including gloves, laboratory goggles, and coat whenever you work with the fluids used on this instrument, or parts that may come into contact with these fluids.

IMPORTANT! Do not leave the doors open when the CBC is in the home position. If the doors are left open, the capillary array and pump can dry out.

IMPORTANT! Use only the cleaning agents listed in this guide. Use of cleaning agents not listed in this guide can impair instrument function.

Do a quick cleaning every day. Do a full cleaning monthly.

1. Clean the exterior of the instrument using lint-free wipes and pure water.

IMPORTANT! Do not use organic solvents for cleaning.

- 2. Clean the CBC holder on the buffer autosampler:
 - a. Move the CBC holder to the forward, home position: In the home screen, tap ② (Dashboard), then tap ∢ to display the Instrument Status screen.
 - b. Tap Manual commands, tap Move buffer container, then tap Send command.



CBC in the forward, load position



Empty CBC holder

- c. Open the instrument doors.
- d. Remove the CBC and place it on a clean, flat surface.
- e. Clean the CBC holder with a moistened lint-free lab wipe, wipe off any liquid on the CBC, then replace the CBC.

IMPORTANT! To avoid injury, do not place your hands into any empty spaces in the drawer.

If you observe liquid on any surface that you cannot wipe, contact Technical Support.

- 3. Clean off any polymer crystals on the instrument, including the capillary tips, with deionized water and lint-free tissue.
- 4. Clean the array port lock with deionized water and lint-free tissue. See Figure 19 on page 368.

Chapter 13 Maintain the instrument Export consumables log files

5. Clean the drip tray with deionized water and a lint-free tissue.

Note: The drip tray can be removed. See Figure 19 on page 368.

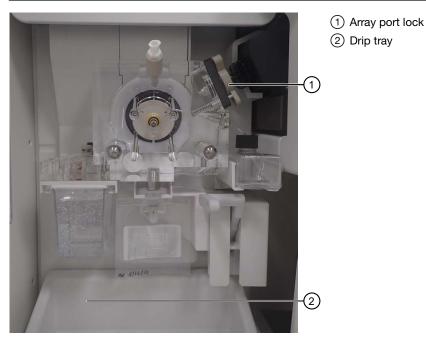


Figure 19 Array port lock and drip tray location

Export consumables log files

- 1. In the home screen, tap ⊙ Actions ➤ Maintenance.
- 2. Tap the log to export:
 - Consumables install log—Exports a list of consumables installed, serial numbers, the name
 of the signed in user at the time of install, and additional information. (If a consumable is
 changed without signing in, no user name is displayed.)
 - Log format: InstrumentName Consumable Log Date Timestamp.csv
 - Consumables usage log Displays daily, weekly, monthly, and yearly statistics for number
 and type of runs, number of plates, and number of polymer pouches and capillary arrays that
 were installed on the instrument.
 - Log format: InstrumentName_UsageStatisticsReport_Date_Timestamp.pdf
- 3. Select the location for the export, then tap **Next**.
 - A message is displayed indicating that the file was exported. You can tap **Details** to view information about the name and location of the exported file.

Install buffers (wizard)

If the software is configured to prevent running if a consumable has expired or exceeded the usage limit, you must replace the consumable before you can start a run. If a consumable expires during a run, the instrument pauses. You can run the **Replenish buffers** wizard while the instrument is paused.

IMPORTANT! Wear appropriate protection, including gloves, laboratory goggles, and coat whenever you work with the fluids used on this instrument, or parts that may come into contact with these fluids.

IMPORTANT! Use only the parts listed in Appendix D, "Catalog numbers".



Figure 20 Location of ABC and CBC

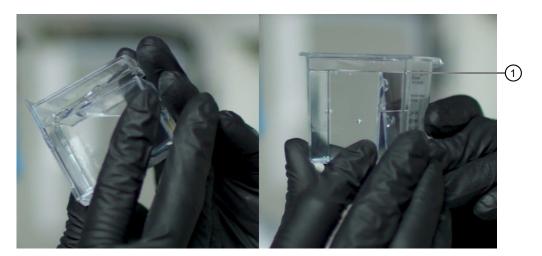
1 Anode buffer container (ABC)

(2) Cathode buffer container (CBC)

Install the anode buffer container (ABC)

- 1. Check the expiration date on the ABC label to ensure that it is not expired and will not expire during use.
- 2. Allow the refrigerated ABC to equilibrate to room temperature (15–30°C).
- 3. In the home screen, tap ⊙ Actions ▶ Maintenance ▶ Maintenance wizards ▶ Replenish buffers.
- 4. Follow the wizard instructions. See "Replenish Buffers maintenance wizard" on page 420. When instructed to install the ABC, refer to this procedure.
- 5. Verify that the seal is intact. Do not use if the buffer level is too low or the seal has been compromised. A fill tolerance of ± 1 mm is acceptable.

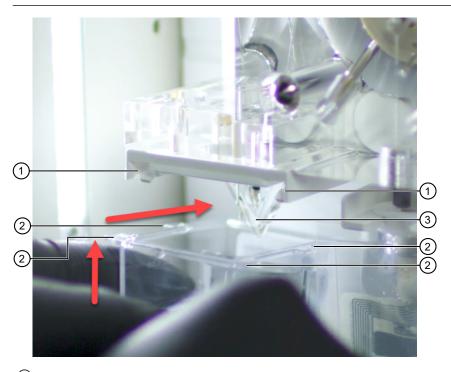
6. Invert the ABC, then tilt it to move most of the buffer to the larger chamber of the container. The smaller chamber of the container should contain <1 mL of the buffer.



- 1 Buffer is at fill line in larger chamber of the container
- 7. Verify that the buffer is at the fill line.
- 8. Peel off the seal at the top of the ABC.

9. With the RFID label facing toward the instrument, position the anode in the large chamber of the ABC.

IMPORTANT! The RFID label must be facing the instrument (away from you) to ensure that the RFID information is read accurately by the instrument.



- 1 Channels in ABC holder
- 2 Tabs on container
- 3 Anode
- **10.** Align the tabs at the end of the ABC with the channels in the holder, then slide the ABC into the holder.

Be careful not to damage the exposed anode tip or the channels in the holder.

- 11. Ensure that the ABC is pushed all the way back, and that the container is not tilted.

 If the container or the fluid level is tilted, remove the ABC. Re-install it and make sure that all tabs on the container are properly positioned inside the notches in the holder.
- **12.** Follow the instructions in the wizard to finish the procedure.

Install the cathode buffer container (CBC)

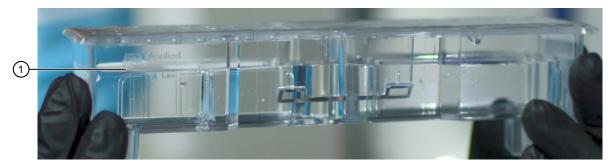
- 1. Check the expiration date on the CBC label to ensure that it is not expired and will not expire during use.
- 2. Allow refrigerated CBC to equilibrate to room temperature (15–30°C).
- 3. In the home screen, tap ⊕ Actions ➤ Maintenance ➤ Maintenance wizards ➤ Replenish buffers.
- **4.** Follow the wizard instructions. See "Replenish Buffers maintenance wizard" on page 420. When instructed to install the CBC, refer to this procedure.
- 5. Remove the installed CBC by gripping the center of the container and squeezing the clip at the front, then lift the container from the instrument. Set aside for disposal.

IMPORTANT! If an autosampler error or a "power save" message is displayed, or if the CBC is not in the forward, home position when you need to install the CBC, see "Check the position of the cathode buffer container (CBC)" on page 492.

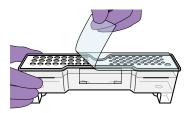


6. Wipe away condensation on the new CBC exterior with a lint-free tissue. Condensation can cause arcing and termination of the run.

7. Check that the seal is intact. Do not use if the buffer level is too low or the seal has been compromised. A fill tolerance of ±0.5 mm is acceptable.

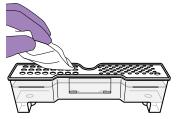


- 1) Fill line
- 8. Tilt the CBC back and forth gently and carefully to ensure that the buffer is evenly distributed across the top of the baffles. If you do not tilt the CBC back and forth, the buffer sticks to the baffles because of surface tension.
- 9. Verify that the buffer is at or above the fill line.
- 10. When ready to install the CBC, place the container on a flat surface (such as a lab bench) and peel off the seal.



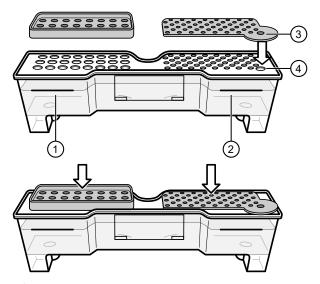
IMPORTANT! Make sure that all pieces of the seal are removed. Remnants of the seal can block holes in the CBC.

11. Wipe off any buffer on top of the CBC with a lint-free tissue. Ensure that the top of the container is dry. Moisture can cause arcing and termination of a run.



- **12.** Place the appropriate septum on each side of the CBC:
 - a. Align the buffer septum (the part that is symmetrical) over the 24 holes of the CBC.
 - **b.** Push the septum lightly into the holes to start, then push firmly to seat it.

- c. Align the capillary washing septum over the other chamber of the CBC. Position the rounded starter tab of the septum over the larger orientation hole on the washing chamber then press down. Press down on the remaining holes in the septum.
- d. Push the septum lightly into the holes to start, then push firmly to seat it.



- 1) Buffer chamber and septum
- 2 Washing chamber and septum
- (3) Starter tab
- (4) Starter hole

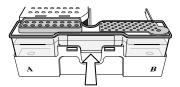
Note: In the image below, the buffer chamber is on the right, which is the opposite of the position in which it is installed.



IMPORTANT! Look at the CBC from the side and ensure that there is no gap between the container and the lip of the septum.

IMPORTANT! Ensure that the washing septum is securely seated to prevent displacement of the septum during operation. If you cannot correctly seat the septum, remove it and check that no remnants of the seal remain and are blocking holes in the CBC.

13. With the tab facing you and the RFID label to the right, install the CBC in the CBC holder. When properly installed, the CBC tabs click as you snap them into place on the autosampler.



14. Follow the instructions in the wizard to finish the procedure.

Replenish, change, flush, and store polymer (wizards)

IMPORTANT!

- Wear appropriate protection, including gloves, laboratory goggles, and coat whenever you work with the fluids used on this instrument, or parts that may come into contact with these fluids.
- Use only the parts listed in Appendix D, "Catalog numbers".
- To minimize background fluorescence, use clean, powder-free gloves whenever you handle the pump assembly or any item in the polymer path.

Precautions for use

- Do not reuse a polymer pouch that has been installed on another type of instrument. For example, if you remove a partially used polymer pouch from an 8-capillary instrument, do not install that polymer pouch on a 24-capillary instrument.
- If you remove a polymer pouch for storage (2–8°C), place a pouch cap (Cat. No. 4462785) onto the pouch. Install an empty pouch or conditioning reagent pouch on the instrument to prevent desiccation of any residual polymer on the connector. Follow the instructions in the maintenance wizards to ensure proper installation of the polymer pouch.

Replenish polymer or change polymer type (wizard)

For the time required, see "Maintenance wizard overview" on page 364.

IMPORTANT! During the **Change polymer type** wizard, you can optionally replace the buffers and/or the capillary array. If the CBC is not in the forward, home position when you need to install or remove the CBC or capillary array, see "Check the position of the cathode buffer container (CBC)" on page 492.

If the software is configured to prevent running if a consumable has expired or exceeded the usage limit, you must replace the consumable before you can start a run. If a consumable expires during a run, the instrument pauses. You can run the **Replenish Polymer** wizard while the instrument is paused.

- 1. Allow the refrigerated polymer to equilibrate to room temperature (15–30°C) before use.
- 2. In the home screen, tap ⊕ Actions ➤ Maintenance ➤ Maintenance wizards ➤ Change polymer type or Replenish polymer.
- 3. Follow the wizard instructions. See "Replenish Polymer maintenance wizard" on page 424 or "Change Polymer Type (with change array option) maintenance wizard" on page 400. When instructed to install the polymer, refer to this procedure.
- 4. Check the expiration date on the label to ensure that the polymer is not expired and will not expire during intended use.

IMPORTANT! Do not use if the product is expired, if the pouch or label is damaged, or if the top seal is missing or damaged.

5. When instructed to install the polymer, peel off the seal at the top of the pouch fitting.
Ensure that you completely remove the seal. If remnants of the seal are attached to the pouch inlet when you install the polymer, the remnants can be pushed into the pouch and clog the pouch fitting.

Note: You may notice a tiny droplet of polymer inside the fitting (residual from the pouch filling process). This is *not* expected to cause any performance issues.

6. With the RFID label facing toward the instrument, slide the pouch fitting onto the slot of the lever assembly. Push the lever up to snap the pouch into the connector end of the instrument pump.



- 1) Slot of the lever assembly
- 2 Label facing the instrument
- (3) Lever

Note: The RFID label must face the instrument (away from you) to ensure that the RFID information is read accurately by the instrument.

7. Follow the instructions in the wizard to finish the procedure.

Store partially used polymer

If you remove a polymer pouch for storage (2–8°C), place a pouch cap (Cat. No. 4462785) onto the pouch. Install an empty pouch or conditioning reagent pouch on the instrument to prevent desiccation of any residual polymer on the connector. Follow the instructions in the maintenance wizards to ensure proper installation of the polymer pouch.

Change and store a capillary array (wizards)



WARNING! SHARP The electrodes on the load-end of the capillary array have small, blunt ends that can lead to piercing injury.

IMPORTANT! Wear appropriate protection, including gloves, laboratory goggles, and coat whenever you work with the fluids used on this instrument, or parts that may come into contact with these fluids.

Parts of the capillary array



Figure 21 Capillary array with detection cell heater door closed

- 1 Capillary array tip in array port
- 2 Array port lock
- 3 Detection cell heater door fastener
- 4 Snap-pin connector and capillary array latch arm
- 5 Header-end of capillary array
- (6) RFID label tab

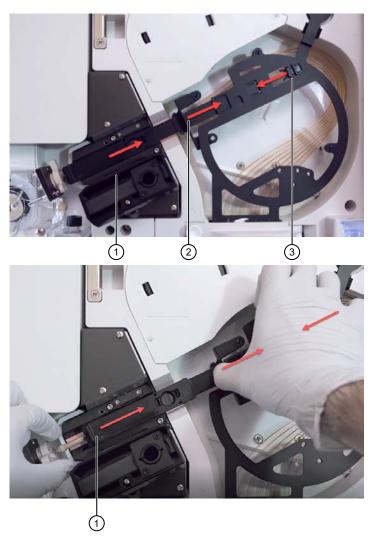


Figure 22 Capillary array with detection cell heater door open, unretracted (top) and retracted (bottom) positions

- 1 Retractable end of capillary array that protects the tip (slides to the right when you squeeze tab 1 and tab 2 toward each other)
- ② Tab 1
- ③ Tab 2

Install or change the capillary array (wizards)

IMPORTANT! Before installing a capillary array, examine the loading-end header to ensure that the capillary tips are not crushed or damaged.

For the time required, see "Maintenance wizard overview" on page 364.

- 1. In the home screen, tap ⊕ Actions ▶ Maintenance ▶ Maintenance wizards.
- 2. In the Maintenance Wizards screen, tap Change capillary array.

IMPORTANT! Before installing a capillary array, ensure that the capillary tips are not crushed or damaged. After installing the capillary array, ensure that the fastener on the detection cell heater door is firmly tightened. If the fastener is not firmly tightened, peaks may be incorrectly detected.

3. Follow the instructions in the wizard to finish the procedure. See "Change Capillary Array maintenance wizard" on page 388.

IMPORTANT! If an autosampler error or a "power save" message is displayed, or if the CBC is not in the forward, home position when you need to install the CBC, see "Check the position of the cathode buffer container (CBC)" on page 492.

Store a capillary array

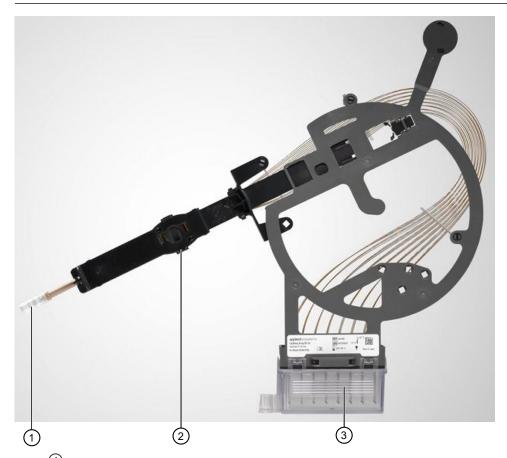


WARNING! SHARP The electrodes on the load-end of the capillary array have small, blunt ends that can lead to piercing injury.

If you remove a capillary array for storage, insert the loading-end of the capillary array and the array tip in distilled water to prevent the polymer from drying in the capillaries.

Check periodically and add distilled water as needed.

IMPORTANT! If the loading-end of the capillary array and the array tip are not kept submerged in distilled water, residue can dry and block the capillaries.



- 1 Array tip cover
- Detection cell cover (on the back of the assembly)
- 3 Array electrode cover with capillary tips submerged in distilled water

Maintain the pump (wizards)

IMPORTANT! Wear appropriate protection, including gloves, laboratory goggles, and coat whenever you work with the fluids used on this instrument, or parts that may come into contact with these fluids.

IMPORTANT! To minimize background fluorescence, use clean, powder-free gloves whenever you handle the pump assembly or any item in the polymer path.

Parts of the polymer delivery pump

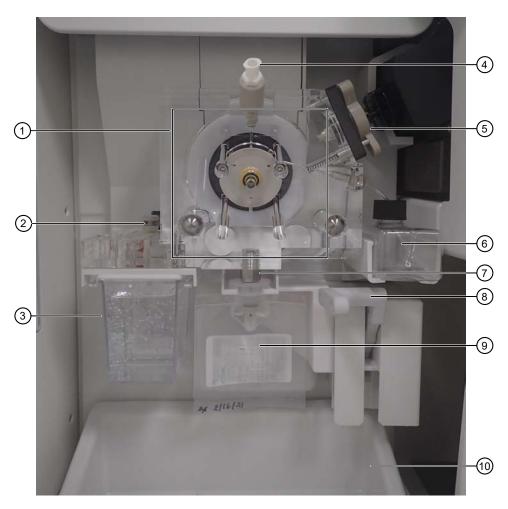


Figure 23 Polymer delivery pump (PDP)

- 1 Polymer block
- 2 Buffer-pin valve
- 3 Anode buffer container (ABC)
- 4 Port used to flush the water trap
- (5) Array port lock

- (6) Water trap waste container
- (7) Check valve fitting
- 8 Polymer pouch lever
- 9 Polymer pouch
- 10 Drip tray

Avoiding damage to the pump assembly

The polymer delivery pump can be irreversibly damaged if any of the following conditions occur:

- Polymer dries in the polymer channels of the pump assembly, which can cause blockage.
- The pump assembly is exposed to organic solvent, which can cause cracking and clouding of the acrylic pump material and valves.
- The pump assembly is exposed to temperatures >40°C, which can damage the pump components.
- There is arcing in the pump assembly, which can damage the acrylic pump material.
- The water trap does not contain water. Polymer can escape past the pump seal and crystallize inside the pump. Flush the water trap monthly. See "Flush the water trap (pump trap)" on page 385.

Remove bubbles from the polymer pump (wizard)

Before each run, check the polymer pump fluidic pathway for bubbles. If necessary, run the **Remove bubbles** maintenance wizard.

Note: A polymer pouch includes a small reserve volume that is used for the **Remove bubbles** maintenance wizard, which consumes ~350 μ L of polymer. The reserve volume is sufficient to run the wizard ~4 times (including the remove bubbles step during other maintenance wizards). If you manually run the **Remove bubbles** maintenance wizard >4 times, the volume of polymer that is available for samples may be depleted.

- 1. In the home screen, tap \odot Actions > Maintenance > Maintenance wizards > Remove bubbles.
- 2. Follow the wizard instructions to perform the procedure. See "Remove bubbles maintenance wizard" on page 416.

When instructed to examine the fluidic pathway, ensure that all bubbles are removed from the following locations:

- Pump channels (Figure 24)
- Anode channels (Figure 25)

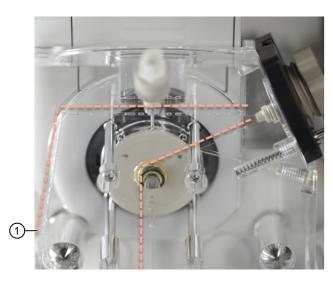




Figure 24 Examine pump channels for bubbles (the left image includes bubbles, the right image does not include bubbles)

1 To anode channels

Dotted lines are shown above and to the left of channels that can contain bubbles



Figure 25 Examine anode channels for bubbles

1 To pump channels

Dotted lines are shown to the left and right sides of the channels that can contain bubbles. No bubbles are shown in the image.

Wash the pump chamber and channels (wizard)

For the time required, see "Maintenance wizard overview" on page 364.

- 1. In the home screen, tap ⊙ Actions ➤ Maintenance ➤ Maintenance wizards ➤ Wash pump and channels wizard.
- 2. Follow the steps in the wizard to perform the procedure. See "Wash Pump and Channels maintenance wizard" on page 422.

In the following situations, use the Polymer Delivery Pump Cleaning Kit (Cat. No. 4461875) in addition to the wash pump wizard. The cleaning kit helps to thoroughly clean the polymer delivery pump:

• White residue is present in pump channels, which indicates polymer has dried in the channels of the pump. This can occur if the instrument is not used for >2 weeks and the shutdown procedure is not run (polymer is installed). Mechanical malfunctions can also cause dried polymer to appear in the pump channel.

Note: If this procedure does not clean the pump channels, the pump may need replacement.

• A contaminant in the polymer delivery pump is suspected of causing problems. The check valve fitting might be clogged or contaminated.

For information on using the pump cleaning kit, see *Polymer Delivery Pump Cleaning Kit RUO Product Information Sheet* (Pub. No. 4414004).

Flush the water trap (pump trap)

Flush the water trap monthly to prolong the life of the pump and to remove diluted polymer from the pump.

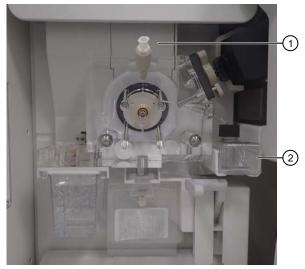
Note: Leave the water trap filled with distilled or deionized water.

1. Fill the supplied 20 mL, all-plastic Luer lock syringe (in the Polymer Delivery Pump Cleaning Kit, Cat. No. 4461875) with distilled or deionized water. Expel any bubbles from the syringe.

IMPORTANT! Do not use a syringe smaller than 20 mL. Doing so may generate excessive pressure within the trap.

2. Open the Luer fitting by grasping the body of the fitting and turning it to loosen.

3. Attach the syringe to the forward-facing Luer fitting at the top of the pump block. Hold the fitting with one hand while threading the syringe onto the fitting with the other hand.





- 1 Luer fitting
- 2 Water trap waste
 - 4. Grasp the attached syringe and turn counterclockwise approximately one-half turn.
 - 5. Slowly depress the plunger.

IMPORTANT! DO NOT USE EXCESSIVE FORCE when you push the syringe plunger which can damage the water trap seals. Take approximately 30 seconds to flush 5 mL of distilled or deionized water through the trap.

Note: Because the water trap volume is approximately 325 μ L, a relatively small volume of water is adequate for complete flushing. However, a larger volume improves flushing as long as force and flow rate are kept within the limits given above.

- 6. Remove the syringe from the Luer fitting. Hold the fitting with one hand while turning the syringe counterclockwise with the other hand.
- 7. Close the Luer fitting by lightly turning clockwise until the fitting seals snugly against the block. Do not overtighten.
- 8. Empty the water trap waste container, then reinstall it.

Shut down, move, and reactivate the instrument

Shutdown the instrument (wizard)

Use this procedure to shut down the instrument >2 weeks.

For shut down <2 weeks, no action is needed.

For the time required, see "Maintenance wizard overview" on page 364.

During this wizard, you remove the CBC and the capillary array.

IMPORTANT! If an autosampler error or a "power save" message is displayed, or if the CBC is not in the forward, home position when you need to install the CBC, see "Check the position of the cathode buffer container (CBC)" on page 492.

Remove plates from the drawer before you start the wizard.

- 1. In the home screen, tap ⊙ Actions ➤ Maintenance ➤ Maintenance wizards ➤ Shut down instrument.
- 2. Follow the instructions in the wizard to complete the procedure. See "Shut Down Instrument maintenance wizard" on page 427.

Move and level the instrument

IMPORTANT! If you relocate the instrument, we recommend that you have an IQ OQ performed. Contact support to schedule the IQ OQ service.



WARNING! PHYSICAL INJURY HAZARD. Do not attempt to lift the instrument or any other heavy objects unless you have received related training. Incorrect lifting can cause painful and sometimes permanent back injury. Use proper lifting techniques when lifting or moving the instrument. Two or three people are required to lift the instrument, depending upon instrument weight.

- 1. Run the **Shut down instrument** wizard before moving the instrument. See "Shutdown the instrument (wizard)" on page 387.
- 2. Disconnect the power cord and the network cable.

3. Move the instrument.

IMPORTANT! While moving the instrument, avoid any shock or vibration.

- 4. Turn the instrument legs to level the instrument.
- 5. Reconnect the power cord and the network cable.
- 6. Run the Reactivate instrument wizard. See "Reactivate the instrument (wizard)" on page 388.
- Contact technical support to request an IQ OQ (installation qualification and operation qualification) service. See "Use Smart Help to request assistance from Technical Support or Service" on page 483.

Reactivate the instrument (wizard)

During this wizard, you install the CBC and the capillary array.

IMPORTANT! If an autosampler error or a "power save" message is displayed, or if the CBC is not in the forward, home position when you need to install the CBC, see "Check the position of the cathode buffer container (CBC)" on page 492.

- 1. In the home screen, tap ⊙ Actions ➤ Maintenance ➤ Maintenance wizards ➤ Reactivate instrument.
- 2. Follow the instructions in the wizard to perform the procedure. See "Reactivate Instrument maintenance wizard" on page 434.

Maintenance wizard procedures

Change Capillary Array maintenance wizard

Change Capillary Array—Time and materials required

Use the **Change Capillary Array** maintenance wizard to change capillary array.

Note: To change the capillary array and the polymer type, run the **Change Polymer Type** maintenance wizard.

Item	Requirements
Time required	~12—15 minutes when used with the POP-7™ Polymer. When used with other polymers, the wizard can take longer to complete.
Materials required to change the capillary array	 New or previously stored capillary array Purified water (distilled or deionized) Lint-free lab wipes

(continued)

Item	Requirements
Materials required to store the capillary array (retained from a previously used capillary array or obtained from a new capillary array)	 Detection cell cover Array tip cover Array electrode cover

Tap **Next** to continue.

Change Capillary Array or Shut Down Instrument—Select action for the capillary array

Tap Store or Discard to select the option for the capillary array after it is removed from the instrument.

Change Capillary Array—Remove capillary array



WARNING! SHARP The electrodes on the load-end of the capillary array have small, blunt ends that can lead to piercing injury.

IMPORTANT! If an autosampler error or a "power save" message is displayed, or if the CBC is not in the forward, home position when you need to remove the capillary array, see "Check the position of the cathode buffer container (CBC)" on page 492.

In this procedure, you fill capillary array covers with purified water (if you will store the capillary array) and remove the capillary array from the instrument.

1. Prepare for array storage: Fill an array tip cover and array electrode cover with purified water.

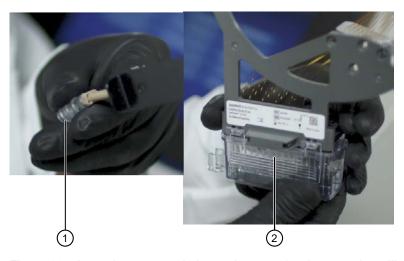


Figure 26 Array tip cover and electrode cover for the stored capillary array

- 1 Array tip cover
- (2) Electrode cover

2. Open the instrument, oven, and detection cell heater doors.

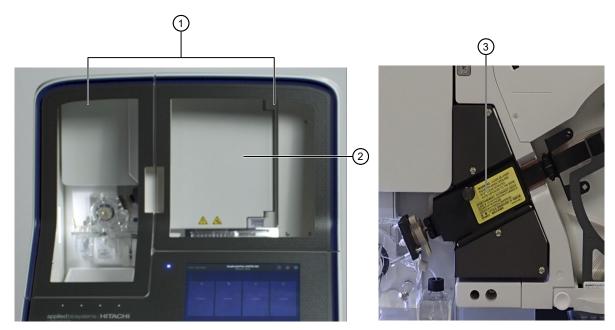


Figure 27 Location of instrument, oven, and detection cell heater doors

- 1 Instrument doors
- 2 Oven door
- 3 Detection cell heater door (with oven door open)

3. Remove the capillary array:

a. Loosen the array port lock by turning it ~1/4 turn counter-clockwise until it stops. Adjust it until the rectangular opening aligns with the rectangular head of the array tip.

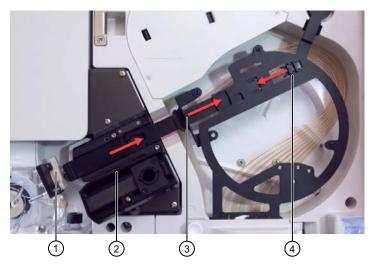


Figure 28 Array port lock

- 1 Array port lock and array-port end of the capillary array
- ② Retractable end of capillary array that protects the tip (slides to the right when you squeeze tab 1 and tab 2 toward each other)
- (3) Tab 1
- 4 Tab 2
- b. Grasp the array-port end of the array and ease the tip out of the pump block.
- **c.** Slide the retractor tab on the array to the right until it clicks into place in the retracted position.

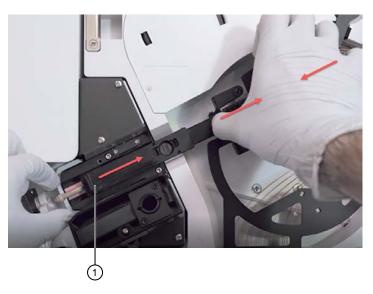


Figure 29 Retracted end of the capillary array exposes the array tip

1 End retracted

d. Open the array header latch: pull the snap-pin connector to release it, then swing the latch arm to the right.

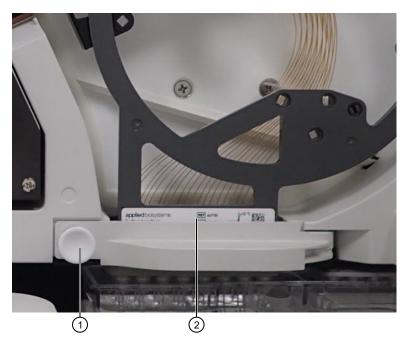


Figure 30 Array header latch and array housing

- 1 Snap-pin connector on the array header latch
- 2 Array header
- **e.** Grasp the tab on the array header and slide the array out of the instrument.



Figure 31 Tab on capillary array

f. Tap **Next** to continue.

Change Capillary Array or Shut Down Instrument—Store the capillary array

In this procedure, you place covers on the capillary array.

Use covers from the new capillary array or from a previously used capillary array.

Fill the array tip cover and the array electrode cover with purified water if you have not done so already.

- 1. Clip the array electrode cover onto the array header.
- 2. Clean the array tip with a moistened lab wipe, then attach the array tip cover.
- 3. Attach the cover to the detection cell.
- 4. Tap **Next** to continue.

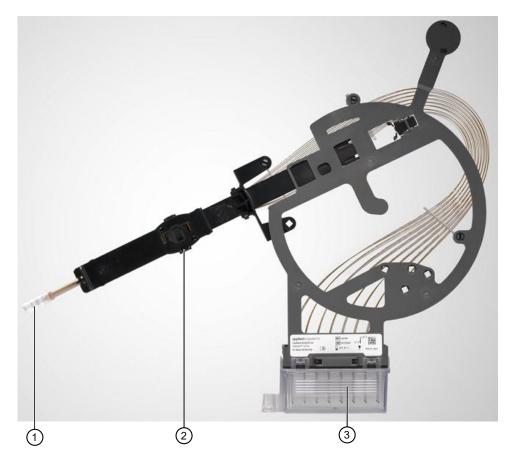


Figure 32 Capillary array covers

- 1 Array tip cover
- 2 Detection cell cover (on the back of the assembly)
- 3 Array electrode cover with capillary tips submerged in distilled water

Change Capillary Array or Shut Down Instrument - Discard capillary array



WARNING! SHARP The electrodes on the load-end of the capillary array have small, blunt ends that can lead to piercing injury.

- 1. Discard the capillary array according to your laboratory protocol.
- 2. Tap Next to continue.

Change Capillary Array—Install capillary array



WARNING! SHARP The electrodes on the load-end of the capillary array have small, blunt ends that can lead to piercing injury.

In this procedure, you install a capillary array in the instrument.

1. Clean the bottom surfaces of the detection cell heater with a moistened, lint-free lab wipe.



Figure 33

- 1 Heat dissipation sheet
- (2) Bottom surfaces
- 3 Detection cell heater door (open)

 Obtain the capillary array to install. Carefully remove the covers from the capillary array tip, detection cell, and array header. Retain the covers for future use.
 Ensure that the capillary tips are not crushed or damaged.

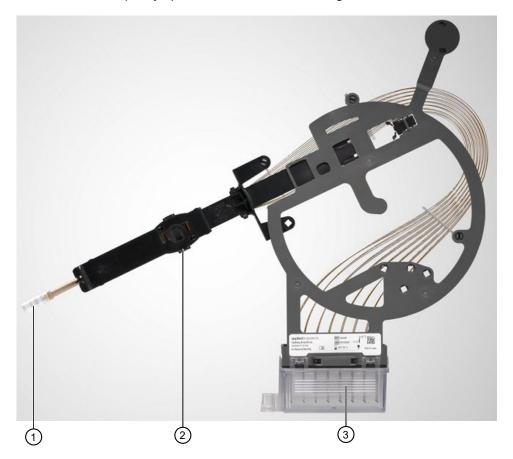


Figure 34 Capillary array covers

- (1) Array tip cover
- 2 Detection cell cover (on the back of the assembly)
- 3 Array electrode cover with capillary tips submerged in distilled water
- 3. Open the array header latch by pulling the snap-pin connector.

4. Slide the array header into the housing at the bottom edge of the oven.

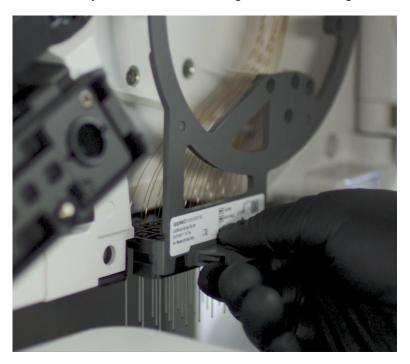


Figure 35 Slide the array header into the housing

5. Close the array header latch: swing the latch arm to the left, then push the snap-pin connector to lock it.



Figure 36 Array header latch and array housing

- 1 Snap-pin connector on the array header latch
- 2 Array header

6. Slide the retractor tab on the array to the right until it releases.



Figure 37 Slide the retractor tab to the right

- 7. Insert the array tip into the array port:
 - a. Slide the retractor tab to the left until the array tip reaches the array port lock.
 - **b.** Align the rectangular part of the array tip with the opening in the array port lock.
 - c. Insert the array tip into the array port. Press firmly to seat the array tip in the port.
 - d. Turn the array port lock ~1/4 turn clockwise to tighten it. Do not overtighten it.



Figure 38 Insert the array tip into the array port

8. Press the detection cell into the detection cell heater.



Figure 39 Press the detection cell into the detection cell heater

9. Close the detection cell heater door, then tighten the fastener.

IMPORTANT! Ensure that the fastener on the detection cell heater door is firmly tightened. If the fastener is not firmly tightened, peaks may be incorrectly detected.



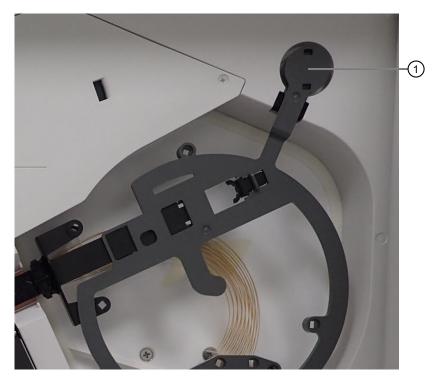


Figure 40 Press the RFID tag into place

- 1 RFID tag
- 11. Close the oven door.
- 12. Tap **Verify array** to update the array information.
- 13. Tap Next to continue.

Change Capillary Array—Prime pump

The **Prime pump** step in the maintenance wizard primes the pump with polymer.

- 1. Close the instrument doors.
- 2. Tap Prime pump.
- 3. Wait 3 minutes for the prime pump procedure to complete.

Change Capillary Array or Reactivate Instrument—Fill array and spatial calibration

- 1. Close the instrument doors.
- 2. Tap Fill array and spatial calibration.
- 3. Wait ~4 minutes for the fill array and spatial calibration procedures to complete.

Change Polymer Type (with change array option) maintenance wizard

Change Polymer Type—Time and materials required

Use the **Change Polymer Type** maintenance wizard to change type of polymer that is installed on the instrument. You can also optionally change the capillary array.

Item	Requirements
Time required to change the polymer type	~1 hour for the POP-7™ Polymer. When used with other polymers, the wizard can take longer to complete.
Time required to change the polymer type and change the capillary array	~1 hour 10 minutes for the POP-7™ Polymer. When used with other polymers, the wizard can take longer to complete.
Materials required to change the polymer type	 Polymer pouch, optional new ABC or CBC equilibrated to room temperature (15–30°C) Purified water (distilled or deionized) Empty Anode Buffer Container (ABC) Conditioning reagent pouch Lint-free lab wipes
Materials required to change the capillary array	 Capillary array Array port plug (from the holder on the pump block near the buffer valve)
Materials required to store the capillary array	 Detection cell cover Array tip cover Array electrode cover

Tap **Next** to continue.

Change Polymer Type—Select action for the wizard

Allow polymer to equilibrate to room temperature (15-30°C) before you run the wizard.

Tap Change polymer type or Change polymer type and array.

Change Polymer Type—Select action for the capillary array

Tap **Store** or **Discard** to select the option for the capillary array after it is removed from the instrument.

Change Polymer Type—Remove capillary array



WARNING! SHARP The electrodes on the load-end of the capillary array have small, blunt ends that can lead to piercing injury.

IMPORTANT! If an autosampler error or a "power save" message is displayed, or if the CBC is not in the forward, home position when you need to remove the capillary array, see "Check the position of the cathode buffer container (CBC)" on page 492.

In this procedure, you fill capillary array covers with purified water (if you will store the capillary array), replace the anode buffer container (ABC) with a waste ABC, and remove the capillary array from the instrument.

1. Prepare for array storage: Fill an array tip cover and array electrode cover with purified water.

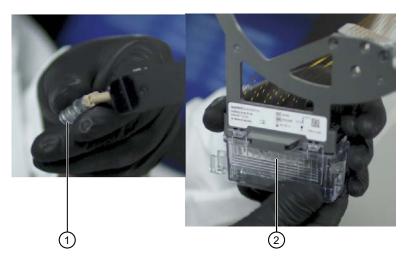


Figure 41 Array tip cover and electrode cover for the stored capillary array

- (1) Array tip cover
- 2 Electrode cover

2. Open the instrument, oven, and detection cell heater doors.

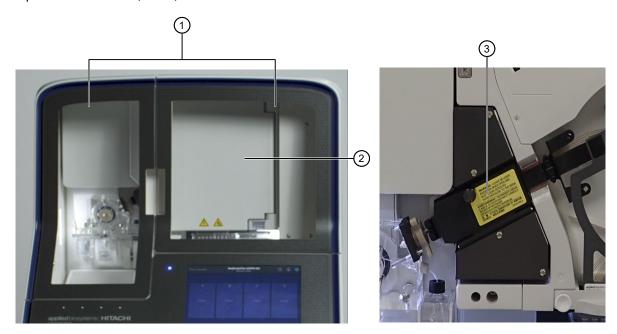


Figure 42 Location of instrument, oven, and detection cell heater doors

- 1 Instrument doors
- 2 Oven door
- 3 Detection cell heater door (with oven door open)

3. Remove the capillary array:

a. Loosen the array port lock by turning it ~1/4 turn counter-clockwise until it stops. Adjust it until the rectangular opening aligns with the rectangular head of the array tip.

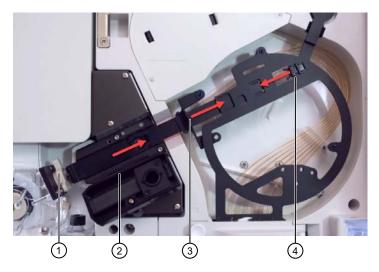


Figure 43 Array port lock

- 1 Array port lock and array-port end of the capillary array
- ② Retractable end of capillary array that protects the tip (slides to the right when you squeeze tab 1 and tab 2 toward each other)
- (3) Tab 1
- 4 Tab 2
- b. Grasp the array-port end of the array and ease the tip out of the pump block.
- **c.** Slide the retractor tab on the array to the right until it clicks into place in the retracted position.

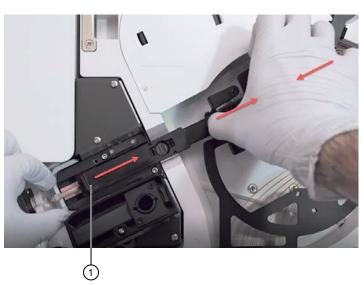


Figure 44 Retracted end of the capillary array exposes the array tip

1 End retracted

d. Open the array header latch: pull the snap-pin connector to release it, then swing the latch arm to the right.

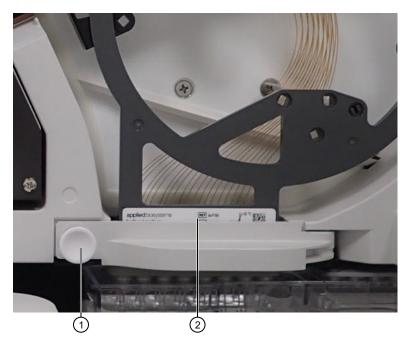


Figure 45 Array header latch and array housing

- 1 Snap-pin connector on the array header latch
- 2 Array header
- e. Grasp the tab on the array header and slide the array out of the instrument.



Figure 46 Tab on capillary array

f. Tap Next to continue.

Change Polymer Type or Shut Down Instrument—Insert array port plug

In this procedure, you install a plug in the array port. This plug allows pump washing without a capillary array installed.

1. Obtain the array port plug.

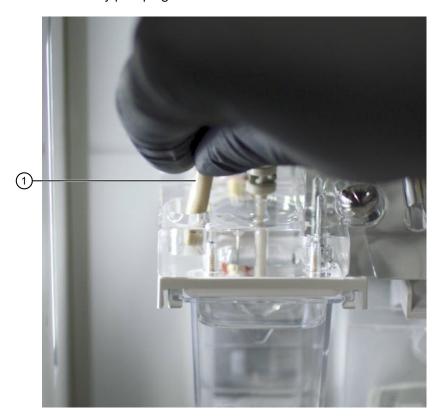


Figure 47 Obtain the array port plug

1 Obtain the array port plug in holder on pump block above the ABC

- 2. Insert the array port plug into the array port:
 - a. Insert the array port plug into the array port. Press firmly to seat the array port plug in the port.

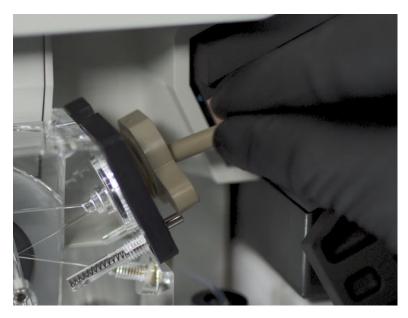


Figure 48 Insert the array port plug

- b. Align the rectangular part of the array port plug with the opening in the array port lock.
- **c.** Turn the array port lock ~1/4 turn clockwise to tighten it. Do not overtighten it.
- 3. Close the detection cell heater door, then tighten the fastener.

IMPORTANT! Ensure that the fastener on the detection cell heater door is firmly tightened. If the fastener is not firmly tightened, peaks may be incorrectly detected.

- 4. Close the array snap-pin connector.
- 5. Close the oven door.
- Tap Next to continue.

Change Polymer Type—Prepare for wash, remove polymer pouch, install conditioning reagent

In this procedure, you install an empty anode buffer container (ABC) to capture waste, replace the polymer pouch with a conditioning reagent pouch, then wash the pump and channels with conditioning reagent.

- 1. Allow polymer to equilibrate to room temperature (15–30°C) before you run the wizard.
- 2. Open the instrument doors.

3. Remove and retain the ABC. Insert an empty ABC to capture waste.

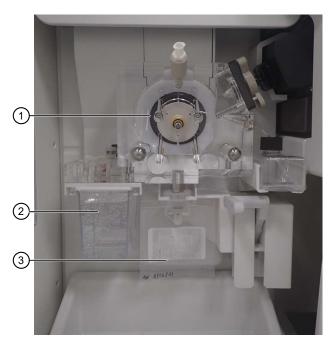


Figure 49 Location of pump, ABC, and pouch

- 1 Polymer pump block
- (2) Anode Buffer Container (ABC), remove and replace with an empty ABC to capture waste
- 3 Pouch, remove polymer and replace with conditioning reagent
- 4. Remove the polymer pouch by pressing the polymer pouch lever down.



Figure 50 Pouch slot and lever

- 1 Slot of the lever assembly
- 2 Label facing the instrument
- (3) Lever

- 5. Place a cap on the polymer, then store at 2-8°C.
- **6.** Wipe the pouch connector on the instrument with a moistened lab wipe.
- 7. Insert the conditioning reagent pouch:
 - a. Remove the seal from the conditioning reagent pouch.
 - **b.** With the label facing the rear of the instrument, insert the pouch fitting into the slot on the pump lever mechanism.
 - c. Push the polymer pouch lever up.
- 8. Tap **Verify pouch** to update the pouch information.
- 9. Close the instrument doors.
- 10. Tap Wash pump and channels.

IMPORTANT! After you tap **Wash pump and channels** you cannot cancel the procedure. When used with the POP-7[™] Polymer, the wash procedure takes ~45 minutes to complete.

When used with other polymers, the wash procedure can take longer to complete.

Change Polymer Type—Install capillary array



WARNING! SHARP The electrodes on the load-end of the capillary array have small, blunt ends that can lead to piercing injury.

IMPORTANT! If an autosampler error or a "power save" message is displayed, or if the CBC is not in the forward, home position when you need to slide the array header into the housing, see "Check the position of the cathode buffer container (CBC)" on page 492.

In this procedure, you remove the array port plug, install a new or previously used capillary array, close the detection cell heater door, and press the RFID tag in place.

- 1. Open the instrument, oven, and detection cell heater doors.
- 2. Loosen the array port lock by turning it ~1/4 turn counter-clockwise until it stops.

3. Remove the array port plug from the array port. Clean it with a moistened lab wipe. Store it in the holder on the pump block near the buffer valve.

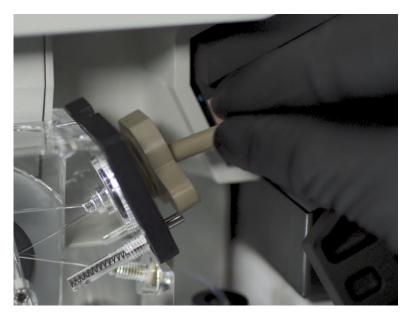


Figure 51 Remove the array port plug

4. Obtain the capillary array to install. Carefully remove the covers from the capillary array tip, detection cell, and array header. Retain the covers for future use.
Ensure that the capillary tips are not crushed or damaged.

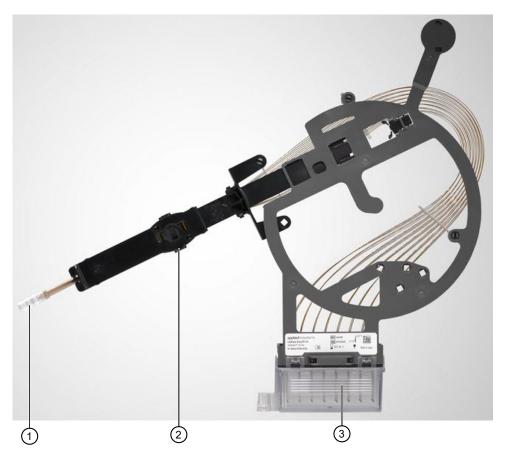


Figure 52 Capillary array covers

- 1 Array tip cover
- 2 Detection cell cover (on the back of the assembly)
- 3 Array electrode cover with capillary tips submerged in distilled water
- 5. Open the array header latch by pulling the snap-pin connector.

6. Slide the array header into the housing at the bottom edge of the oven.

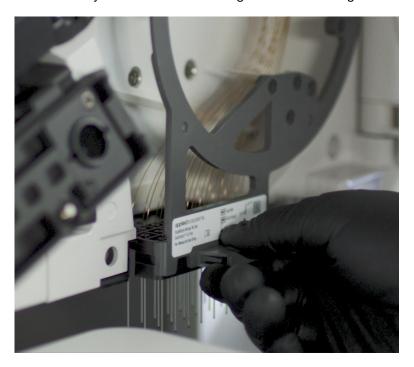


Figure 53 Slide the array header into the housing

7. Close the array header latch: swing the latch arm to the left, then push the snap-pin connector to lock it.



Figure 54 Array header latch and array housing

- ① Snap-pin connector on the array header latch
- 2 Array header

8. On the array to be installed, slide the retractor tab on the array to the right until it releases.



Figure 55 Slide the retractor tab to the right

- **9.** Insert the array tip into the array port:
 - a. Slide the retractor tab to the left until the array tip reaches the array port lock.
 - **b.** Align the rectangular part of the array tip with the opening in the array port lock.
 - c. Insert the array tip into the array port. Press firmly to seat the array tip in the port.
 - **d.** Turn the array port lock ~1/4 turn clockwise to tighten it. Do not overtighten it.

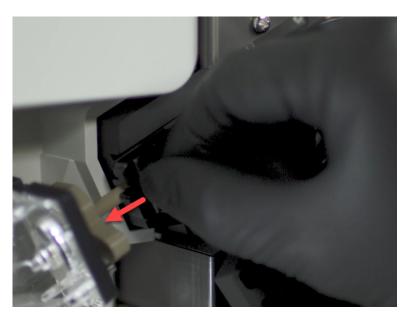


Figure 56 Insert the array tip into the array port

10. Press the detection cell into the detection cell heater.



Figure 57 Press the detection cell into the detection cell heater

11. Press the array RFID tag into place.

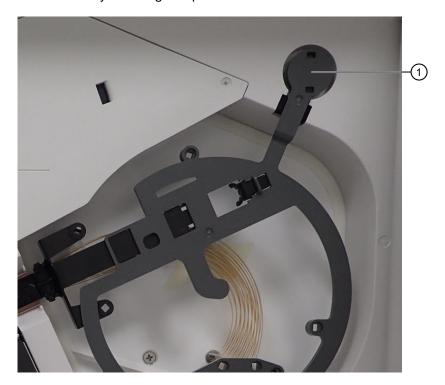


Figure 58 Press the RFID tag into place

1 RFID tag

12. Close the detection cell heater door, then tighten the fastener.

IMPORTANT! Ensure that the fastener on the detection cell heater door is firmly tightened. If the fastener is not firmly tightened, peaks may be incorrectly detected.

- 13. Close the oven door.
- 14. Tap **Verify array** to update the array information.
- 15. Tap Next to continue.

Change Polymer Type or Wash Pump and Channels—Install polymer

In this procedure, you remove the conditioning reagent that was used to wash the pump and channels. You then install the new polymer pouch.

- 1. Open the instrument doors.
- 2. Remove the conditioning reagent pouch by pushing the polymer pouch lever down.

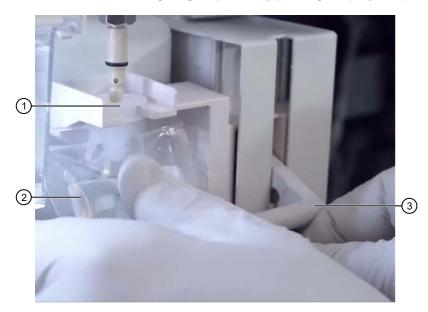


Figure 59 Pouch slot and lever

- 1 Slot of the lever assembly
- 2 Label facing the instrument
- 3 Lever
- 3. Wipe the pouch connector on the instrument with a moistened lab wipe.
- 4. Install the new polymer pouch:
 - a. Peel off the seal on the pouch fitting.
 - **b.** With the label facing the rear of the instrument, insert the pouch fitting into the slot on the pump lever mechanism.
 - c. Push the polymer pouch lever up.

- 5. Tap **Verify pouch** to update the pouch information.
- 6. Tap **Next** to continue.

Change Polymer Type—Install ABC and CBC

In this procedure, you install the anode buffer container (ABC) and the cathode buffer container (CBC), then flush the pump and channels with polymer.

1. Remove the waste ABC.



Figure 60 Location of ABC and CBC

1) Anode buffer container (ABC)

- (2) Cathode buffer container (CBC)
- 2. Re-install the ABC that was removed earlier, or install a new ABC. See "Install the anode buffer container (ABC)" on page 369.
- 3. (Optional) Install a new CBC. See "Install the cathode buffer container (CBC)" on page 372.
- 4. Close the instrument doors.
- 5. Tap **Verify buffer** to update the buffer information.
- Tap Flush pump and channels.
 Wait ~1 minute for the flush procedure to complete.

Change Polymer Type—Flush array and spatial calibration

The final step in the wizard is to flush the capillary array with polymer and perform a spatial calibration.

A spatial calibration associates the signal from each capillary to a specific position on the CCD camera.

Tap Flush array and spatial calibration.

For the POP-7™ Polymer, wait ~15 minutes for the flush array and spatial calibration procedures to complete. When used with other polymers, the procedures can take longer to complete.

Fill Array with Polymer maintenance wizard

Fill Array with Polymer

Use the **Fill Array with Polymer** maintenance wizard to fill the capillary array with polymer. This wizard can be useful for troubleshooting.

Note: The capillary array is automatically filled with polymer during each injection and when running other maintenance wizards that affect the pump.

Item	Requirements
Time required	~5 minutes for the POP-7™ Polymer.
	When used with other polymers, the wizard can take longer to complete.
Materials required	None

Tap **Next** to continue.

Remove bubbles maintenance wizard

Remove bubbles—Time and materials required

Use the **Remove bubbles** maintenance wizard to remove bubbles from the fluid pathway. This function is automatically performed during other wizards as needed.

Run this wizard if you observe bubbles in the fluidic path.

IMPORTANT! Running this wizard consumes polymer. Do not run this wizard excessively.

Note: A polymer pouch includes a small reserve volume that is used for the **Remove bubbles** maintenance wizard, which consumes $\sim\!350~\mu\text{L}$ of polymer. The reserve volume is sufficient to run the wizard $\sim\!4$ times (including the remove bubbles step during other maintenance wizards). If you manually run the **Remove bubbles** maintenance wizard $>\!4$ times, the volume of polymer that is available for samples may be depleted.

Item	Requirements
Time required	~7 minutes for the POP-7™ Polymer.
	When used with other polymers, the wizard can take longer to complete.
Materials required	None

Tap Next to continue.

Remove bubbles - Locate and remove bubbles



WARNING! SHARP The electrodes on the load-end of the capillary array have small, blunt ends that can lead to piercing injury.

- 1. Examine the fluid pathway from the polymer pouch through the pump channels, pump chamber, array port, and inlet to the Anode Buffer Container (ABC).
- 2. Ensure that all bubbles are removed from the fluidic pathway in the following locations:
 - Pump channels (Figure 61)
 - Anode channels (Figure 62)
- 3. Tap an option:
 - If bubbles are present, tap Remove bubbles.
 Wait ~2 minutes for the remove bubbles procedure to complete.
 - If no bubbles are present, tap All bubbles are gone.

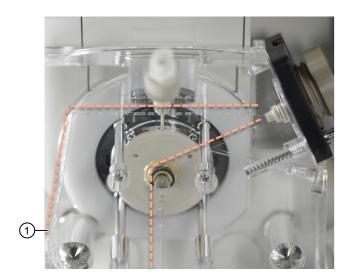




Figure 61 Examine pump channels for bubbles (the left image includes bubbles, the right image does not include bubbles)

1 To anode channels

Dotted lines are shown above and to the left of channels that can contain bubbles

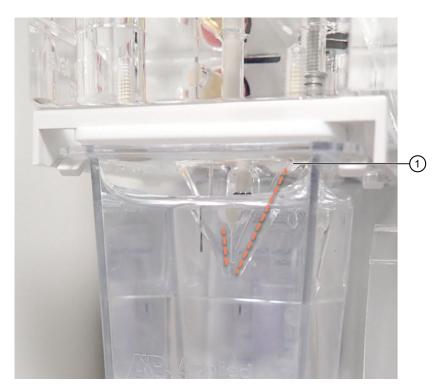


Figure 62 Examine anode channels for bubbles

1 To pump channels

Dotted lines are shown to the left and right sides of the channels that can contain bubbles. No bubbles are shown in the image.

Fill Array with Polymer

Tap an option:

- To fill the capillary array with polymer, tap Fill array.
 Wait ~5 minutes for the fill array procedure to complete.
- To close the wizard, tap Finish.

Spatial Calibration maintenance wizard

Spatial Calibration—Time and materials required

Use the Spatial Calibration maintenance wizard to perform a spatial calibration of the capillary array.

This wizard performs the same function described in "Run a spatial calibration" on page 306.

Note: In maintenance wizards that install a capillary array, a spatial calibration is performed as a step in the wizard.

Item	Requirements
Time required	~2–7 minutes when used with the POP-7™ Polymer. When used with other polymers, spatial calibration can take longer to complete.
Materials required	None

Tap Next to continue.

Spatial Calibration

Tap the option for the spatial calibration.

• Fill and spatial calibration—Use this option ensures that no residual fragments are present in the capillary array that can interfere with the spatial calibration and signal optimization.

When used with the POP-7™ Polymer, wait ~7 minutes for the fill array procedure and spatial calibration procedure to complete.

Note: When used with other polymers, spatial calibration can take longer to complete.

• **Spatial calibration**—Use this option if you have previously run a spatial calibration and know that the capillary array is filled with polymer.

Wait ~2 minutes for the spatial calibration procedure to complete.

Spatial Calibration—Results

1. Tap **View details** to evaluate the results for the spatial calibration.

For information, see the following sections:

- "Evaluate the spatial calibration results" on page 308
- "Export spatial calibration results or report" on page 311
- "Spatial calibration troubleshooting" on page 530
- 2. Tap **Finish** to exit the wizard.

Replenish Buffers maintenance wizard

Replenish Buffers—Time and materials required

Use the **Replenish Buffers** maintenance wizard to Install a fresh anode buffer container (ABC) and cathode buffer container (CBC).

Allow the refrigerated buffers to equilibrate to room temperature (15–30°C) before you run the wizard.

Item	Requirements
Time required	~4 minutes
Materials required	 Anode Buffer Container (ABC) Cathode Buffer Container (CBC) Cathode Buffer Container septa Allow ABC and CBC to equilibrate to room temperature (15–30°C).

Tap **Next** to continue.

Replenish Buffers



WARNING! SHARP The electrodes on the load-end of the capillary array have small, blunt ends that can lead to piercing injury.

IMPORTANT! If an autosampler error or a "power save" message is displayed, or if the CBC is not in the forward, home position when you need to install the CBC, see "Check the position of the cathode buffer container (CBC)" on page 492.

In this procedure, you install the anode buffer container (ABC) and the cathode buffer container (CBC).

- 1. Allow the refrigerated buffers to equilibrate to ambient temperature (15–30°C) before use.
- 2. Open the instrument doors.

3. Remove the ABC, then install the new ABC. See "Install the anode buffer container (ABC)" on page 369.



Figure 63 Location of ABC and CBC

1 Anode buffer container (ABC)

- 2 Cathode buffer container (CBC)
- **4.** Remove the CBC, then install a new CBC. See "Install the cathode buffer container (CBC)" on page 372.
- 5. Close the instrument doors.
- 6. Tap Finish.

If you replenished a buffer during a run, tap **Resume Run** to continue the run.

Wash Pump and Channels maintenance wizard

Wash Pump and Channels—Time and materials required

Use the **Wash Pump and Channels** maintenance wizard to prime the polymer pump with conditioning reagent, then fill the polymer pump with fresh polymer. This function is automatically performed during other wizards as needed.

Run this wizard if you observe that polymer has dried in the polymer block or if you suspect contamination in the pump block.

Item	Requirements
Time required	~45 minutes when used with the POP-7™ Polymer. When used with other polymers, the wizard can take longer to complete.
Materials required	 Conditioning reagent pouch Empty Anode Buffer Container (ABC) Polymer pouch equilibrated to room temperature (15–30°C) Purified water (distilled or deionized) Lint-free lab wipe

Tap **Next** to continue.

Wash Pump and Channels—Remove polymer pouch, install conditioning reagent pouch, then wash pump

In this procedure, you replace the polymer pouch with a conditioning reagent pouch, install an empty anode buffer container (ABC) to capture waste, then wash the pump and channels with conditioning reagent.

- 1. Allow the refrigerated polymer to equilibrate to ambient temperature (15–30°C) before use.
- 2. Open the instrument doors.



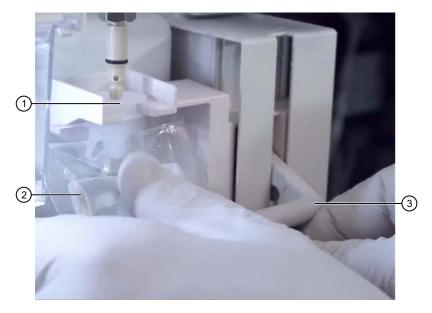


Figure 64 Pouch slot and lever

- (1) Slot of the lever assembly
- 2 Label facing the instrument
- (3) Lever
- 4. Place a cap on the polymer, then store at 2–8°C.
- 5. Wipe the pouch connector on the instrument with a moistened lab wipe.
- **6.** Install the conditioning reagent pouch:
 - a. Remove the seal from the conditioning reagent pouch.
 - **b.** With the label facing the rear of the instrument, insert the pouch fitting into the slot on the pump lever mechanism.
 - c. Push the polymer pouch lever up.
- 7. Tap **Verify pouch** to update the pouch information.
- 8. Remove the ABC and install an empty ABC to capture waste.
- 9. Close the instrument doors.
- 10. Tap Wash pump and channels.

IMPORTANT! After you tap **Wash pump and channels** you cannot cancel the operation. When used with the POP-7[™] Polymer, the wash procedure takes ~45 minutes to complete. When used with other polymers, the wash procedure can take longer to complete.

Wash Pump and Channels or Reactivate Instrument - Flush pump and channels

This step of the wizard flushes the pump and channels with polymer.

- 1. Close instrument doors.
- 2. Tap **Flush pump and channels** to flush the pump and channels with polymer. Wait ~1 minute for the flush procedure to complete.

Wash Pump and Channels—Replace ABC

In this procedure, you replace the waste anode buffer container (ABC) with the previously installed ABC or a new ABC.

- 1. Open instrument doors.
- 2. Remove the waste ABC.
- 3. Re-install the ABC that was removed earlier, or install a new ABC. See "Install the anode buffer container (ABC)" on page 369.
- 4. Tap **Verify buffer** to update the buffer information.
- 5. Tap Next to continue.

Replenish Polymer maintenance wizard

Replenish Polymer—Time and materials required

Use the **Replenish Polymer** maintenance wizard to install a new pouch of the currently installed polymer type.

Note: To change polymer type, use the Change Polymer Type maintenance wizard.

Item	Requirements
Time required	~12 minutes
	When used with other polymers, the wizard can take longer to complete.
Materials required	 New polymer pouch of the same type that is installed on the instrument, equilibrated to room temperature (15–30°C)
	Purified water (distilled or deionized)
	Lint-free lab wipes

Tap **Next** to continue.

Replenish Polymer-Install polymer and prime pump

In this procedure, you install a new polymer pouch and prime the pump with fresh polymer.

- 1. Allow the refrigerated polymer to equilibrate to ambient temperature (15–30°C) before use.
- 2. Open the instrument doors.
- 3. Remove the polymer pouch by pressing the polymer pouch lever down.

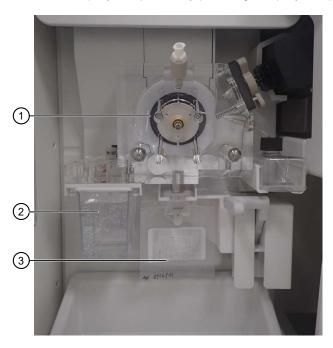


Figure 65 Location of pump, ABC, and pouch

- 1) Polymer pump block
- (2) Anode Buffer Container (ABC), remove and replace with an empty ABC to capture waste
- 3 Pouch, remove polymer and replace with conditioning reagent

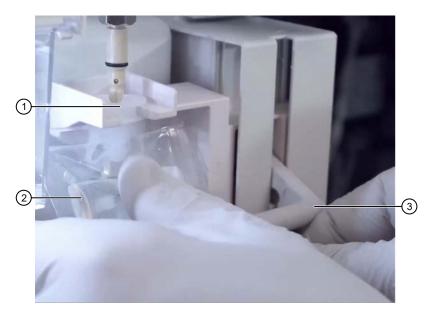


Figure 66 Pouch slot and lever

- 1) Slot of the lever assembly
- 2 Label facing the instrument
- 3 Lever
- 4. Wipe the pouch connector on the instrument with a moistened lab wipe.
- 5. Install the new polymer pouch:
 - a. Remove the seal from the conditioning reagent pouch.
 - **b.** With the label facing the rear of the instrument, insert the pouch fitting into the slot on the pump lever mechanism.
 - c. Push the polymer pouch lever up.
- **6.** Tap **Verify pouch** to update the pouch information.
- 7. Close the instrument doors.
- 8. Tap Prime pump.

Wait ~3 minutes for the prime pump procedure to complete.

If you replenished a polymer during a run, tap **Resume Run** to continue the run.

Shut Down Instrument maintenance wizard

Shut Down Instrument—Time and materials required

Use the **Shut Down Instrument** maintenance wizard to shut down the instrument for a storage period >2 weeks.

This wizard instructs you to remove the capillary array and polymer, install conditioning reagent, and wash the pump and channels with conditioning reagent.

Item	Requirements
Time required	~55 minutes
Materials required	 Detection cell cover Array tip cover Array electrode cover Conditioning reagent pouch Empty Anode Buffer Container (ABC) Array port plug (from the holder on the pump block near the buffer valve) Purified water (distilled or deionized)
	Lint-free lab wipes

Tap Next to continue.

Shut Down Instrument—Remove capillary array



WARNING! SHARP The electrodes on the load-end of the capillary array have small, blunt ends that can lead to piercing injury.

IMPORTANT! If an autosampler error or a "power save" message is displayed, or if the CBC is not in the forward, home position when you need to remove the capillary array, see "Check the position of the cathode buffer container (CBC)" on page 492.

In this procedure, you fill capillary array covers with purified water (if you will store the capillary array) and remove the capillary array from the instrument.

1. Open the instrument, oven, and detection cell heater doors.

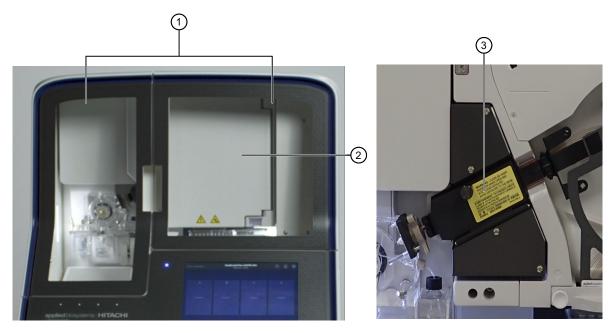


Figure 67 Location of instrument, oven, and detection cell heater doors

- (1) Instrument doors
- 2 Oven door
- 3 Detection cell heater door (with oven door open)
- 2. Remove and discard the ABC. Insert an empty ABC to capture waste.
- 3. Remove and discard the CBC.

4. Prepare for array storage: Fill an array tip cover and array electrode cover with purified water.

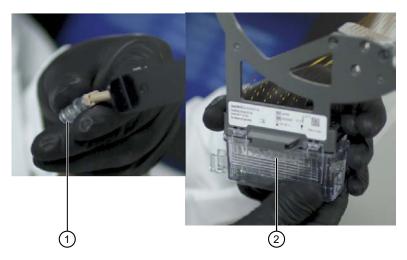


Figure 68 Array tip cover and electrode cover for the stored capillary array

- 1 Array tip cover
- 2 Electrode cover
- 5. Remove the capillary array:
 - a. Loosen the array port lock by turning it ~1/4 turn counter-clockwise until it stops. Adjust it until the rectangular opening aligns with the rectangular head of the array tip.

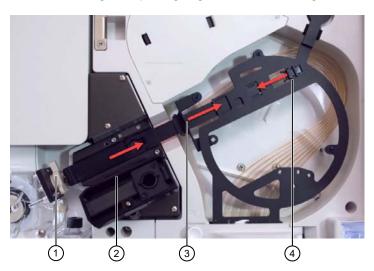


Figure 69 Array port lock

- 1 Array port lock and array-port end of the capillary array
- (2) Retractable end of capillary array that protects the tip (slides to the right when you squeeze tab 1 and tab 2 toward each other)
- ③ Tab 1
- (4) Tab 2
- **b.** Grasp the array-port end of the array and ease the tip out of the pump block.

c. Slide the retractor tab on the array to the right until it clicks into place in the retracted position.

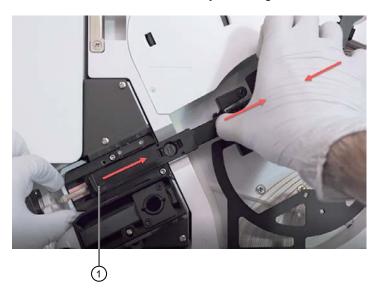


Figure 70 Retracted end of the capillary array exposes the array tip

- 1 End retracted
- **d.** Open the array header latch: pull the snap-pin connector to release it, then swing the latch arm to the right.

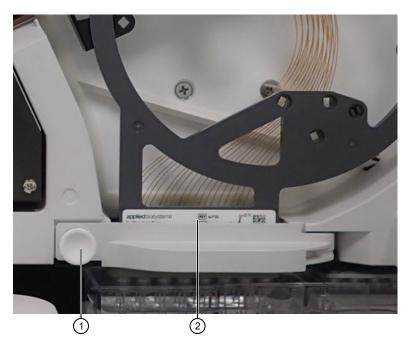


Figure 71 Array header latch and array housing

- 1 Snap-pin connector on the array header latch
- 2 Array header

e. Grasp the tab on the array header and slide the array out of the instrument.



Figure 72 Tab on capillary array

f. Tap **Next** to continue.

Shut Down Instrument—Remove polymer pouch, install conditioning reagent pouch, then wash pump

In this procedure, you install an empty anode buffer container (ABC) to capture waste, replace the polymer pouch with a conditioning reagent pouch, then wash the pump and channels with conditioning reagent.

1. Remove the polymer pouch by pressing the polymer pouch lever down.

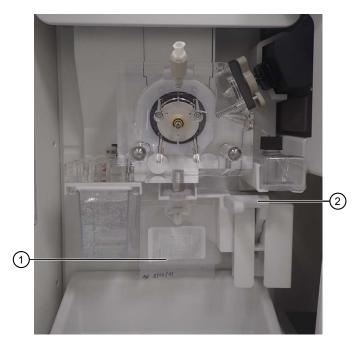


Figure 73 Location of polymer pouch and lever

- 1 Polymer pouch
- (2) Lever
- 2. Place a cap on the polymer, then store at 2–8°C.
- 3. Wipe the pouch connector on the instrument with a moistened lab wipe.
- 4. Install the conditioning reagent pouch:
 - a. Remove the seal from the conditioning reagent pouch.
 - **b.** With the label facing the rear of the instrument, insert the pouch fitting into the slot on the pump lever mechanism.
 - c. Push the polymer pouch lever up.
- 5. Tap **Verify pouch** to update the pouch information.
- 6. Close the instrument doors.

7. Tap Wash pump and channels.

IMPORTANT! After you tap **Wash pump and channels** you cannot cancel the procedure. When used with the POP-7[™] Polymer, the wash procedure takes ~45 minutes to complete. When used with other polymers, the wash procedure can take longer to complete.

Shut Down Instrument - Clean the instrument interior

In this procedure, you empty the waste ABC and fill it with purified water, clean the instrument interior, then manually flush the water trap. Refer to the procedures below for more information.

- 1. Open the instrument doors.
- 2. Remove the ABC and discard the waste.
- 3. Fill the empty ABC with water, then re-install it.

Note: Check the fluid level in the ABC every 2 weeks. Refill as needed.

- 4. Leave the installed conditioning reagent pouch installed in the instrument during storage.
- 5. Flush the water trap. See "Flush the water trap (pump trap)" on page 385.
- 6. Clean the instrument interior. See "Clean the instrument" on page 366.
- 7. Tap **Next** to continue.

Shut Down Instrument - Power off instrument

In this procedure, you power off the instrument.

- 1. Close the instrument doors.
- 2. Press the On/Off button on the front panel to power off the instrument.



Figure 74 Front panel of instrument

1 On/Off button

Reactivate Instrument maintenance wizard

Reactivate Instrument – Time and materials required

Use the **Reactivate Instrument** maintenance wizard to prepare the instrument for operation after storage.

This wizard assumes that the **Shut down instrument** wizard was run before storage, that the pump and channels are filled with conditioning reagent, and that no capillary array is installed.

Item	Requirements
Time required	~50 minutes
	When used with other polymers, the wizard can take longer to complete.
Materials required	Capillary array
	Anode Buffer Container (ABC)
	Cathode Buffer Container (CBC)
	Polymer, ABC, and CBC equilibrated to room temperature (15–30°C)
	Conditioning reagent pouch
	Purified water (distilled or deionized)
	Lint-free lab wipes
	Lint-free swab
	20 mL Leur lock syringe

Tap **Next** to continue.

Reactivate Instrument—Fill the water trap and install the conditioning reagent pouch

In this procedure, you flush the water trap, replace the installed conditioning reagent pouch with a fresh conditioning reagent pouch, empty the waste ABC, and remove the array port plug.

- 1. Allow the refrigerated polymer, ABC and CBC to equilibrate to ambient temperature (15–30°C) before use.
- 2. Open the instrument doors.
- 3. Flush the water trap. For information, see "Flush the water trap (pump trap)" on page 385.
- 4. Remove the installed conditioning reagent pouch by pressing the polymer pouch lever down.
- 5. Wipe the pouch connector on the instrument with a moistened lab wipe.
- 6. Install the new conditioning reagent pouch:
 - a. Remove the seal from the conditioning reagent pouch.
 - **b.** With the label facing the rear of the instrument, insert the pouch fitting into the slot on the pump lever mechanism.

- **c.** Push the polymer pouch lever up.
- 7. Tap **Verify pouch** to update the pouch information.
- 8. Remove the ABC, discard the contents, then re-install the empty ABC in the instrument.
- 9. Open the oven and detection cell heater doors.

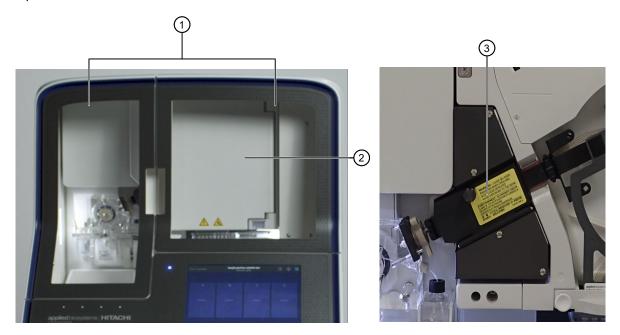


Figure 75 Location of instrument, oven, and detection cell heater doors

- 1 Instrument doors
- 2 Oven door
- (3) Detection cell heater door (with oven door open)
- 10. Loosen the array port lock by turning it ~1/4 turn counter-clockwise until it stops.

11. Remove the array port plug from the array port. Clean it with a moistened lab wipe. Store it in the holder on the pump block near the buffer valve.

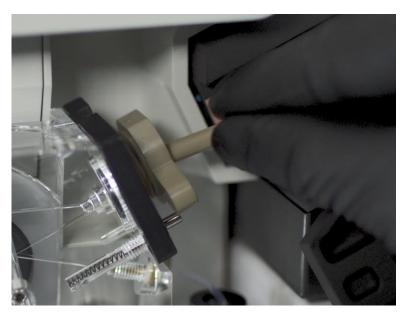


Figure 76 Remove the array port plug

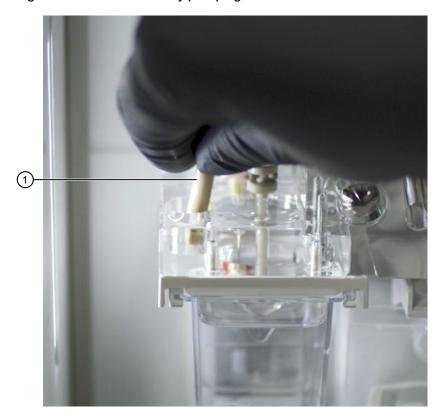


Figure 77 Obtain the array port plug

1 Obtain the array port plug in holder on pump block above the ABC

- 12. Clean the array port with a moistened lint-free swab.
- **13.** Tap **Next** to continue.

Reactivate Instrument—Install capillary array



WARNING! SHARP The electrodes on the load-end of the capillary array have small, blunt ends that can lead to piercing injury.

IMPORTANT! If an autosampler error or a "power save" message is displayed, or if the CBC is not in the forward, home position when you need to slide the array header into the housing, see "Check the position of the cathode buffer container (CBC)" on page 492.

In this procedure, you install a capillary array in the instrument, press the detection cell in place, close the detection cell heater door, press the RFID tag in place, then close the oven door.

 Obtain the capillary array to install. Carefully remove the covers from the capillary array tip, detection cell, and array header. Retain the covers for future use.

Ensure that the capillary tips are not crushed or damaged.

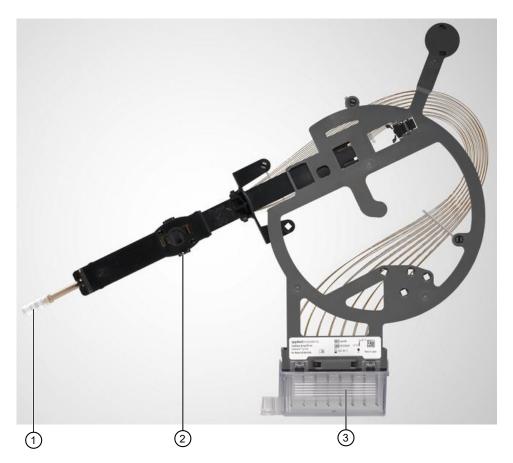


Figure 78 Capillary array covers

- 1 Array tip cover
- 2 Detection cell cover (on the back of the assembly)
- 3 Array electrode cover with capillary tips submerged in distilled water
- 2. Open the array header latch by pulling the snap-pin connector.

3. Slide the array header into the housing at the bottom edge of the oven.



Figure 79 Slide the array header into the housing

4. Close the array header latch: swing the latch arm to the left, then push the snap-pin connector to lock it.



Figure 80 Array header latch and array housing

- 1 Snap-pin connector on the array header latch
- 2 Array header

5. Slide the retractor tab on the array to the right until it releases.



Figure 81 Slide the retractor tab to the right

- **6.** Insert the array tip into the array port:
 - a. Slide the retractor tab to the left until the array tip reaches the array port lock.
 - **b.** Align the rectangular part of the array tip with the opening in the array port lock.
 - c. Insert the array tip into the array port. Press firmly to seat the array tip in the port.
 - d. Turn the array port lock ~1/4 turn clockwise to tighten it. Do not overtighten it

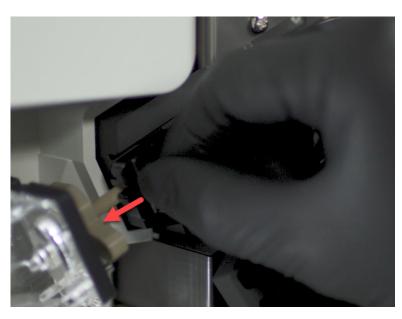


Figure 82 Insert the array tip into the array port





Figure 83 Press the detection cell into the detection cell heater

8. Close the detection cell heater door, then tighten the fastener.

IMPORTANT! Ensure that the fastener on the detection cell heater door is firmly tightened. If the fastener is not firmly tightened, peaks may be incorrectly detected.

9. Press the array RFID tag into place.

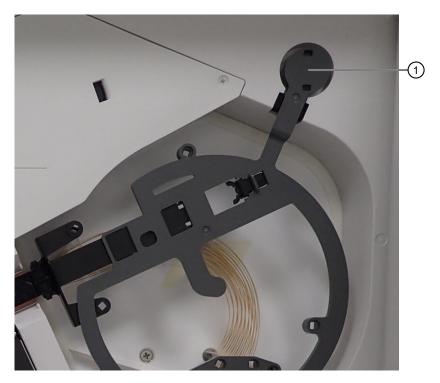


Figure 84 Press the RFID tag into place

- 1 RFID tag
- 10. Close the oven door.
- 11. Tap Next to continue.

Reactivate Instrument—Wash pump and channels

In this procedure, you install a cathode buffer container (CBC), then wash the pump and channels with conditioning reagent.

- 1. Install the CBC. See "Install the cathode buffer container (CBC)" on page 372.
- 2. Close the instrument doors.
- 3. Tap Wash pump and channels.

IMPORTANT! After you tap **Wash pump and channels** you cannot cancel the procedure. When used with the POP-7[™] Polymer, the wash procedure takes ~45 minutes to complete. When used with other polymers, the wash procedure can take longer to complete.

Reactivate Instrument—Install polymer

In this procedure, you replace the conditioning reagent pouch with a fresh polymer pouch.

- 1. Allow the refrigerated polymer to equilibrate to ambient temperature (15–30°C) before use.
- 2. Open the instrument doors.
- 3. Remove the conditioning reagent pouch by pressing the polymer pouch lever down.

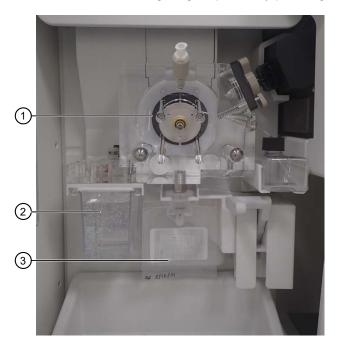


Figure 85 Location of pump, ABC, and pouch

- 1) Polymer pump block
- 2 Anode Buffer Container (ABC), remove and replace with an empty ABC to capture waste
- 3 Pouch, remove polymer and replace with conditioning reagent

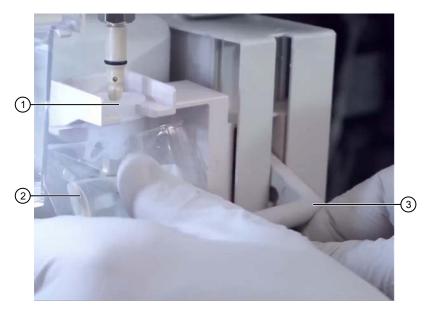


Figure 86 Pouch slot and lever

- (1) Slot of the lever assembly
- 2 Label facing the instrument
- (3) Lever
- 4. Wipe the pouch connector on the instrument with a moistened lab wipe.
- 5. Install the new polymer pouch:
 - a. Remove the seal from the conditioning reagent pouch.
 - **b.** With the label facing the rear of the instrument, insert the pouch fitting into the slot on the pump lever mechanism.
 - c. Push the polymer pouch lever up.
- 6. Tap **Verify pouch** to update the pouch information.
- 7. Tap Next to continue.

Reactivate Instrument-Install ABC

In this procedure, you install the anode buffer container (ABC).

IMPORTANT! If an autosampler error or a "power save" message is displayed, or if the CBC is not in the forward, home position when you need to install the CBC, see "Check the position of the cathode buffer container (CBC)" on page 492.

- 1. Open the instrument doors.
- 2. Remove the waste ABC.

3. Re-install the ABC that was removed earlier, or install a new ABC. See "Install the anode buffer container (ABC)" on page 369.



Figure 87 Location of ABC and CBC

1 Anode buffer container (ABC)

- 2 Cathode buffer container (CBC)
- 4. Tap **Verify buffer** to update the buffer information..
- 5. Tap **Next** to continue.



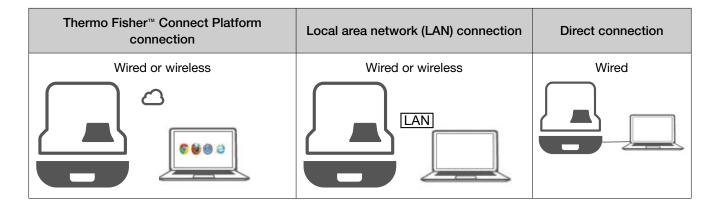
Manage the software (instrument)

Connect the instrument to a computer or network (hardware connections)	446
Connect the software to a network drive (software settings)	450
Manage sign-in profiles	453
Manage settings	459
Manage instrument settings	470
Configure, check status, and cancel background exports and backups	475
Set the default save location for results	477
Manage storage space	477

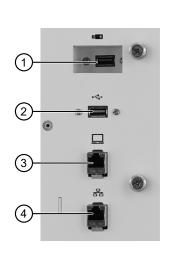
Connect the instrument to a computer or network (hardware connections)

Wired and wireless network options

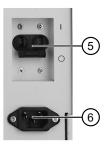
IMPORTANT! Do not connect any other external devices to the computer that you connect to the instrument.



Wired and wireless network connections on the instrument







- (1) Recessed USB port (for use with the wireless network adapter; adapter not shown)
- (2) USB port (for optional USB barcode scanner connection)
- ③ Direct connection port ____ (to allow computer connection without a network)
- (4) Wired network port 器
- (5) Circuit breaker (rear power switch; use the power switch on the front panel for normal operation)
- (6) Power receptacle

Antivirus recommendations for direct connection of the computer to the instrument

Before you connect a computer to the instrument, install antivirus software on the computer, then perform a virus scan.

The following antivirus software applications have been tested for use with an optional computer:

- Symantec™ Endpoint Protection
- Norton Internet Security™
- Microsoft™ Defender antivirus software

Connect the instrument directly to a computer

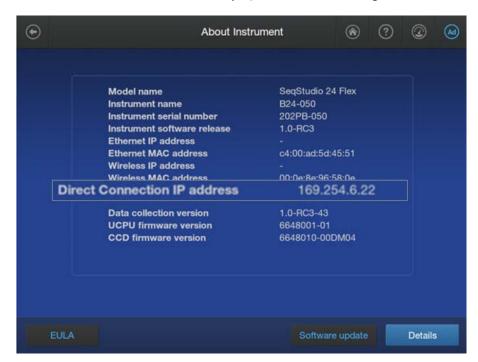
- 1. Perform a virus scan on the computer before connecting it to the instrument.
- 2. Connect a cable to the direct connection port on the instrument.



IMPORTANT! Ensure that you use the correct ports for direct connection (#2 in the figure). The default configuration of the ports is different and ports cannot be used interchangeably.

- 1 Direct connection port
- 3. Connect the other end of the cable to the $\, \rightleftarrows \,$ network port on the computer.

- 4. Wait a few minutes, then check the IP addresses on the instrument and the computer. Both the IP addresses must start with '169'.
 - Instrument—In the home screen, tap ⊕ ➤ Actions ➤ Settings ➤ About.



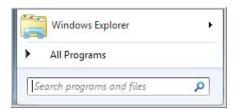
If the **Direct Connection IP address** field is blank or the IP address does not start with 169, ensure that the cable is connected to the correct ports on the instrument and the computer. If the cable is correctly connected and the IP addresses do not match, contact Technical Support.

- Computer—See "Determine the IP address for a computer on a network" on page 450.
- 5. Verify the connection by doing any of the following:
 - Connect the instrument to a network drive (see "Connect the software to a network drive (software settings)" on page 450).
 - If the Plate Manager software is installed on the computer, send a plate from Plate Manager to the instrument (see "Send a plate file to the Inbox on the instrument" on page 127).
 - If the SAE Administrator Console is installed on the computer, enable SAE mode on the instrument (see "Enable SAE mode on the instrument and specify the SAE server (administrator only)" on page 245).
- 6. If necessary, adjust the default network settings. See "Manage the network configuration (administrator only)" on page 474.

Connect the software to a network drive (software settings)

Determine the IP address for a computer on a network

- 2. In the search field at the bottom of the pane, type command prompt, then press Enter.



```
Microsoft Windows [Version 6.1.7601]
Copyright (c) 2009 Microsoft Corporation. All rights reserved.
C:\Users>
```

3. At the command prompt, type **ipconfig**, then press **Enter**.

```
Command Prompt

Microsoft Windows [Version 6.1.7601]
Copyright (c) 2009 Microsoft Corporation. All rights reserved.

C:\Usersipconfig_
```

4. Note the IP address listed.

Note: The location and number of digits in your IP address may differ from the **IPv4 Address** example shown below.

```
Microsoft Windows [Version 6.1.7601]
Copyright (c) 2009 Microsoft Corporation. All rights reserved.

C:\Users\vreelamm>ipconfig
Windows IP Configuration

Ethernet adapter Local Area Connection* 11:

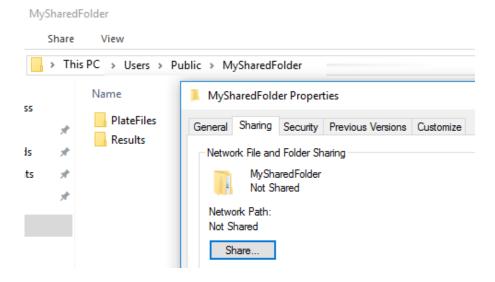
Connection-specific DNS Suffix : amer.thermo.com
Link-local IPu6 Address : xxxxxxx
Subnet Mask : xxxxxxxx

Subnet Mask : xxxxxxxx

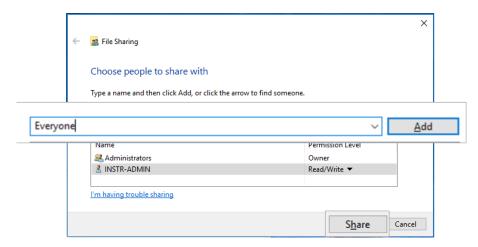
Default Gateway : :
```

Create folders and enable network folder sharing

- 1. On a Windows[™] computer, server, or network drive, create a folder to store your plates and results. Example: C:/Users/Your Name/MySharedFolder.
- 2. Create subfolders in the MySharedFolder folder. Example: PlateFiles and Results.



- 3. Open the folder, then right-click.
- 4. Select Customize this folder.
- 5. Select the **Sharing** tab.
- 6. Click Share.
- 7. In the **Type a name** field, type **Everyone**, click **Add**, then click **Share**.



Connect the instrument to a network drive (software)

See your laboratory administrator for the information below that you need to connect to a network drive.

From any screen that displays the **Security** Network drive option or the **Save location** field, you can connect to the drive.

IMPORTANT! Before connecting to a specific folder on a network drive, ensure that the folder is shared (see "Create folders and enable network folder sharing" on page 451).

1. Tap See Network drive in the Link Plate File screen or the Save location field in the Plate Properties screen.

For information on how to display these screens, see the following sections:

- "Link a plate file and start a run" on page 140
- "Enter plate properties" on page 89
- 2. Tap the **Destination** field, tap the appropriate field to enter the IP address and the shared folder name, then tap **Done**.

Note: Do not include the drive name in the drive location. For example, if you created folder C:/Users/Your Name/SharedData, type IPaddress/Users/Your Name/SharedData, (do not include C:/).

For more information, see "Determine the IP address for a computer on a network" on page 450.

- 3. If required by your network, tap the appropriate fields to enter information in the **Domain name**, **User name**, and **Password** fields.
- 4. Tap Connect.

Manage sign-in profiles

Local profile roles (standard and administrator) and functions

Table 24 Functions allowed when SAE is disabled

Local profile/location	Functions allowed
Standard/Local	Create, save, open, import, and run plate files
	Create and modify library entries
	View, export, and delete results
	Use the dashboard to view instrument status and consumables information
	 Use the dashboard to view upcoming maintenance tasks, mark tasks as complete, and export maintenance history
	Access all support functions other than Service tools
	Run spatial and spectral calibrations, run install runs, view and export histories
	Export results, reports, and logs
	Perform all library functions except the ability to delete library items that are created by other users
	Run all maintenance wizards
	Set default save location for plate files
	View Background Export status
	Access the Learning Center
	• (When the Thermo Fisher™ Connect Platform is enabled) Configure email notifications (for more information, see Chapter 9, "Use the instrument with the Thermo Fisher™ Connect Platform")
Administrator/Local ^[1]	All standard user functions, plus:
	 View profiles for all users, disable/enable profiles, grant administrator rights to profiles, delete user profiles, change PIN for other users
	Set the date and time on the instrument and select a language
	Configure the instrument for: Consumables warnings settings, external barcode reader, power save settings, and SAE
	 Configure the instrument for Thermo Fisher™ Connect Platform access (for more information, see Chapter 9, "Use the instrument with the Thermo Fisher™ Connect Platform")
	 Change instrument settings for: Instrument name, software updates, connection to a network
	Back up user data (instrument settings, library items, and results)
	Delete a cloud profile from the instrument

^[1] The first user who signs in to the instrument is assigned a local administrator profile. This is typically created when the instrument is installed.

Table 25 Functions allowed when SAE is enabled

Local profile/location	Functions allowed
Standard/Local	Not applicable. There is no standard/local profile option when SAE is enabled.
Administrator/Local ^[1]	 View the About screen View the SAE server settings

^[1] The first user who signs in to the instrument is assigned a local administrator profile. This is typically created when the instrument is installed.

Change the role of a local profile (administrator only)

- 1. In the home screen, tap (xx) (your initials).
- 2. Tap All accounts, then enter your PIN.
- 3. Tap the account of interest.
- 4. Press-drag the slider from Standard to Administrator or from Administrator to Standard.
- 5. Tap Done.

Edit your own local profile

You can edit your own local profile when you are signed in.

- 1. In the instrument home screen, tap (xx) (your initials).
- 2. In the My Profile screen, tap Edit, then enter your PIN.
- 3. As needed, update the settings in the PIN, email, and phone number fields.
- 4. As needed, link or relink your profile by clicking **Connect profile**.

For more information, see:

- "Link a local profile to your Thermofisher.com account (one time)" on page 223
- "Re-link the instrument to your cloud profile" on page 226

Delete a local profile or a cloud profile from an instrument (administrator only)

If you are signed in with a local administrator profile, you can delete local and cloud profiles from the instrument.

IMPORTANT! Deleting a cloud profile on the instrument also deletes the local profile that is associated with the cloud profile. Deleting a profile deletes library items and results that were created with the profile. Before proceeding, back up user data to retain instrument settings, library items, and results created with the profile (see "Back up user data (instrument settings, library items, and results) (administrator only)" on page 479).

- 1. In the home screen, tap (xx) (your initials).
- 2. Tap All accounts, then enter your PIN.
- 3. Tap the instrument profile to delete.
- 4. Tap **Delete account**.
- 5. Tap Yes to confirm.
- 6. Tap Done.

If you delete a cloud profile, the user must re-create the local profile and relink it. See "Link a local profile to your Thermofisher.com account (one time)" on page 223.

After a user relinks to the Thermo Fisher™ Connect Platform, the Connect Platform cloud profile is displayed on the home screen and the instrument is listed in InstrumentConnect.

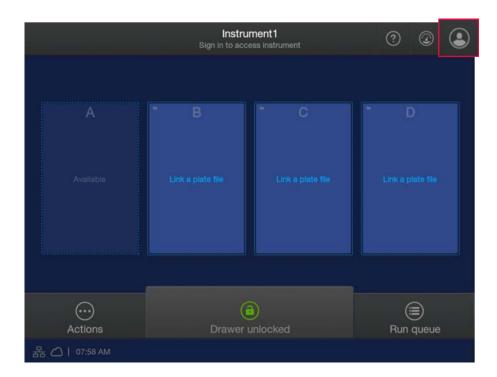
Create a local profile (one time only)

A profile that you create on the instrument is referred to as a local profile.

Note: If you will use the instrument with the Thermo Fisher[™] Connect Platform, skip this step and connect the instrument to your Connect Platform account. See Chapter 9, "Use the instrument with the Thermo Fisher[™] Connect Platform".

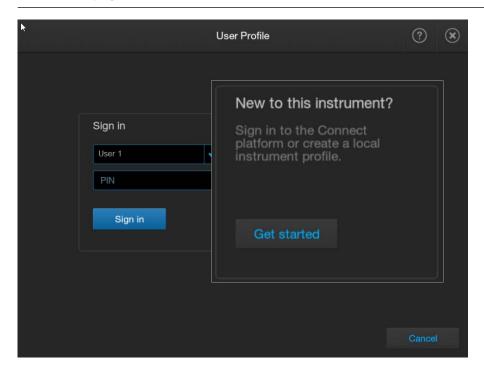
1. In the home screen, tap (Profile).

If user initials are displayed instead of (Profile), see "Switch user or sign out" on page 34.

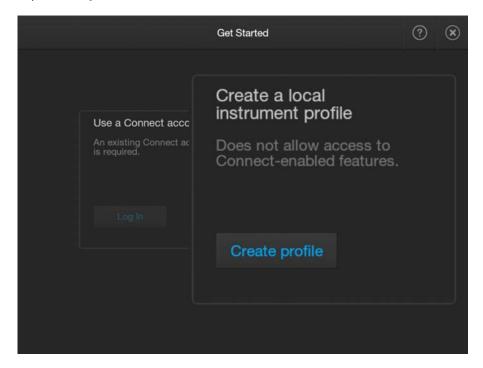


2. In the User Profile screen, tap Get Started.

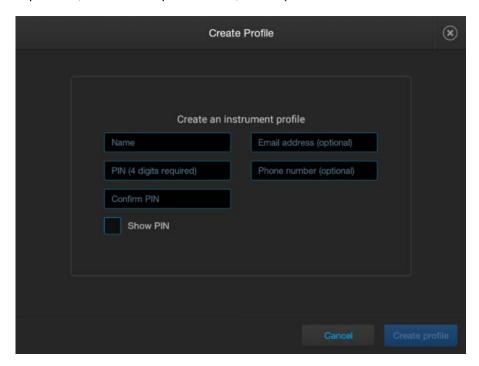
Note: If **SAE Sign in** is displayed instead of **Sign in**, see "Sign in to the instrument with SAE enabled" on page 248.



3. Tap Create profile.



4. Tap Name, enter a local profile name, then tap Done.



5. Tap **PIN** (4 digits required), enter a four-digit numerical PIN, then tap **Enter**.

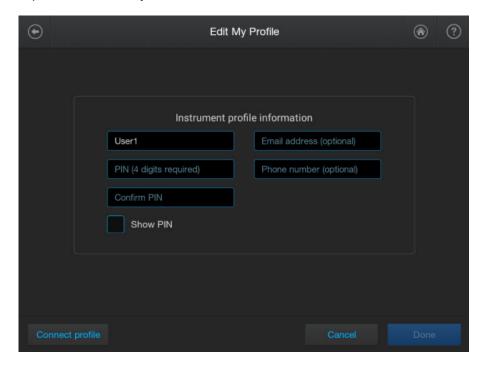
- 6. Tap Confirm PIN, reenter the PIN, then tap Enter.
- 7. Tap Create profile.

The home screen is displayed with your user initials (for example, (xx)) in place of (a) (Profile).

For more information on profiles, see "Local profile and cloud profile: when to use, user name, and user initials" on page 215.

Change your own local profile PIN

- 1. In the home screen, tap (xx) (your initials).
- 2. Tap Edit, then enter your PIN.



- 3. Tap PIN (4 digits required), enter a new four-digit numerical PIN, then tap Enter.
- 4. Tap Confirm PIN, reenter your new PIN, then tap Enter.
- 5. Tap Done.

Manage settings

Access the **Settings** screen from the home screen by tapping ⊕ **Actions** ▶ **Settings**.

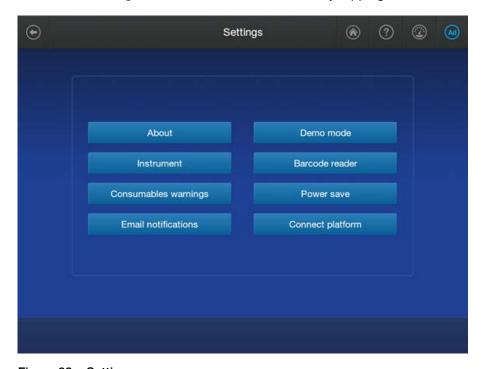


Figure 88 Settings screen

If you are signed in with a local administrator profile and only the **About** and **SAE** buttons are enabled, it indicates that SAE mode is enabled on the instrument.

If the SAE button is not displayed, the function has not been enabled by Service. Contact Service.

If you are signed in with a cloud profile and only the **About**, **Instrument**, **Email notifications**, and **Demo mode** buttons are enabled, it indicates that the Thermo Fisher™ Connect Platform is enabled on the instrument.

Display instrument hardware and software information

- 1. In the home screen, tap ⊙ Actions ➤ Settings ➤ About to access the instrument information:
 - Model name
 - Instrument name
 - Instrument serial number
 - Instrument software release
 - Ethernet IP address
 - Ethernet MAC address
 - Wireless IP address
 - Wireless MAC address

- Direct connection IP address (not displayed if the instrument is not connected to the computer)
- Firmware versions
- 2. *(Optional)* Tap **EULA** to display the end-user license agreement or tap **Details** to display additional instrument information.

Configure consumables usage and warnings (administrator only)

The settings on the screen determine the following:

- Whether a warning message is displayed in the bottom right of the home screen when a consumable is about to expire. See "Instrument conditions in the home screen" on page 41.
- Whether a run can start if consumables are expired or have exceeded the on-instrument life.
- 1. In the home screen, tap ⊕ ▶ Actions ▶ Settings ▶ Consumables warnings.



2. Configure the settings as needed, then tap **Done**.

IMPORTANT! Before allowing runs with expired consumables, see "Important notice regarding use of consumables that exceed supported limits" on page 25.

For more information, see:

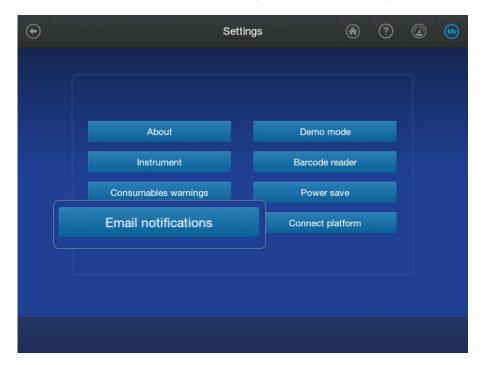
- "Check consumables status" on page 67
- "Instrument consumables handling, usage limits, and expiration" on page 25

Set up email notifications from the instrument

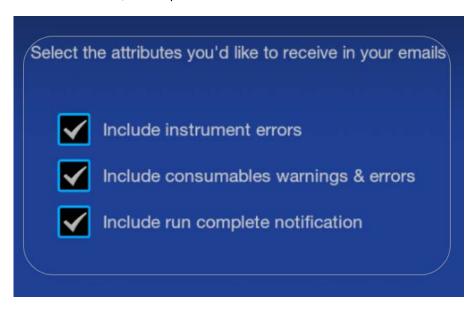
When an instrument is linked to your cloud profile, email notifications from the instrument are automatically sent to the email address that is associated with your Thermofisher.com account.

Note: Plate alerts are not instrument errors. Therefore, plate alert information is not emailed to you. For more information, see "View alert and notification details" on page 149.

- 1. Sign in to the instrument with your cloud profile and PIN.
- 2. In the home screen of the instrument, tap \odot Actions > Settings > Email notifications.



3. In the **Email Notifications** screen, select or deselect the options for which you want to receive email notifications, then tap **Done**.



Enable SAE mode on the instrument and specify the SAE server (administrator only)

Before you enable SAE mode, install the SAE Administrator Console on a computer with a static IP address.

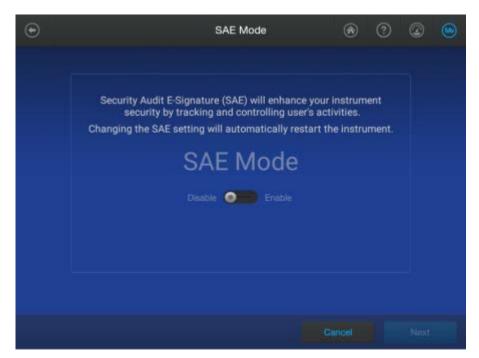
After you enable SAE mode, the instrument automatically restarts.

This procedure requires a local administrator profile and an SAE administrator account. For information on creating SAE accounts, see *SAE Administrator Console v2.1 User Guide for Capillary Electrophoresis Products* (Pub. No. MAN0025849).

- 1. Sign in to the instrument with a local administrator profile.
- 2. Ensure that there are no runs in progress and that no plate positions are linked.
- 3. Tap ⊙ Actions ➤ Settings ➤ SAE.

Note: The **SAE** button is not displayed in the **Settings** screen unless the function has been enabled by Service.

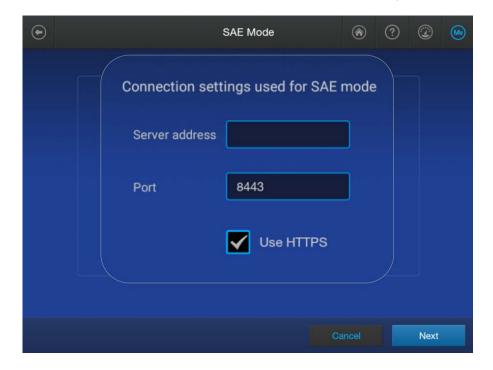
4. In the **SAE Mode** screen, press-drag the slider to the **Enable** setting, then tap **Next**.



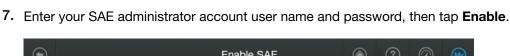
5. In the **Server address** field, enter the IP address of the computer on which the SAE Administrator Console is installed. Do not change the **Port** or **HTTPS** settings.

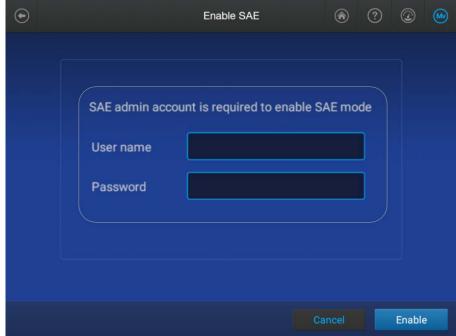
IMPORTANT! Specify a server with a static IP address.

For more information, see "Determine the IP address for a computer on a network" on page 450.



6. Tap Next.





The instrument automatically restarts.

Enable and set up Demo mode (SAE disabled)

Demo mode allows you to use many features of the system and provides simulated real-time data and results.

Changing the mode automatically restarts the instrument.

The following features are *not* available in **Demo mode**:

- The following options in the Settings screen: Instrument, Consumable warnings, Barcode reader, Power save, Connect platform
- The following options in the Support screen: Smart Help, Remote support
- Maintenance wizards
- Link the instrument to the Thermo Fisher™ Connect Platform

In addition, plate files, user profiles, and settings that you save in **Demo mode** are not retained.

1. If you want to activate Connect Platform features in **Demo mode**, sign in to the instrument with a cloud profile before you enable **Demo mode**. See "Sign in to apps.thermofisher.com and access the InstrumentConnect software" on page 217.

Note: Some Connect Platform functions may generate alerts. However, these functions are executed correctly.

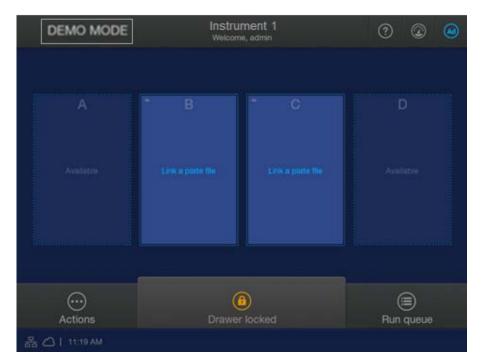
Examples: In the home screen, notification that the result was not saved to the **Connect Platform**. In **Remote Monitoring**, notification that a re-inject command was not sent to the instrument.

2. In the home screen, tap · Actions · Settings · Demo mode.

3. Press-drag the slider to On, then tap OK.

The instrument automatically restarts in **Demo mode**.

The home screen displays **DEMO MODE** in the top left of the screen.



- 4. Sign in to the instrument.
- 5. In the home screen, tap ⊙ Actions ➤ Settings ➤ Demo mode.
- **6.** Select the plate positions to enable linking to a plate file, and specify expiration for polymer and capillary array as needed.

Positions that are not enabled for linking display Available.



7. Tap **OK**.

Enable and set up Demo mode (SAE enabled)

This procedure requires an SAE account.

Demo mode allows you to use many features of the system and provides simulated real-time data and results.

Changing the mode automatically restarts the instrument.

The following features are *not* available in **Demo mode**:

- The following options in the **Settings** screen: **Instrument**, **Consumable warnings**, **Barcode** reader, **Power save**, **Connect platform**
- The following options in the Support screen: Smart Help, Remote support
- Maintenance wizards
- Audit and e-signature functions in the SAE module
- Link the instrument to the Thermo Fisher™ Connect Platform

In addition, plate files, user profiles, and settings that you save in **Demo mode** are not retained.

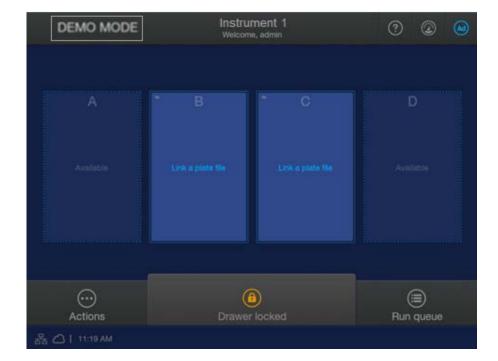
- 1. If another user is signed in, tap the user initials, then tap **Sign out**.
- 2. In the home screen, tap .

3. In the Sign in screen, tap Sign in, enter your SAE user name and password, then tap Sign in.

Note: If you want to activate Connect Platform features in **Demo mode**, sign in to the instrument with a cloud profile before you enable **Demo mode**. See "Connect the instrument to your Thermofisher.com account" on page 221. Some Connect Platform functions may generate alerts. However, these functions are executed correctly.

Note: When SAE mode is enabled, you cannot sign in with your local profile.

- 4. In the home screen, tap ⊕ Actions ➤ Settings ➤ Demo mode.
- 5. Press-drag the slider to **On**, then tap **OK**.
- 6. Enter your PIN.
 - a. In the Enter PIN screen, tap PIN, enter a 4-digit numerical PIN, then tap Enter.
 - b. Tap Confirm PIN, reenter your PIN set in substep 6a, then tap Enter.
 - c. Tap Done.
- The screen displays an alert. Tap Proceed.
 A confirmation message is displayed when Demo mode is enabled.
- Restart the instrument.
 The home screen displays **DEMO MODE** in the top left of the screen.

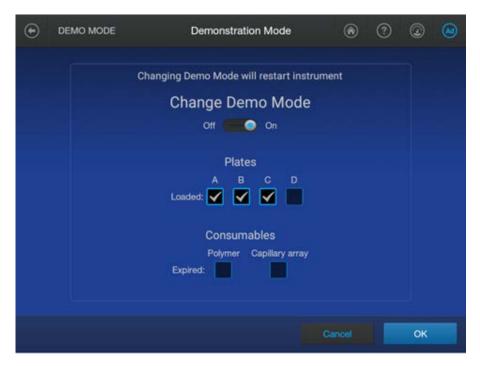


- 9. Sign in to the instrument.
 - a. Tap 😩.

In the **User Profile** screen, the user name used for enabling demo mode is displayed by default.

- b. Tap the PIN field, enter your PIN set in step 6, tap Enter, then tap Sign in.
- 10. In the home screen, tap ⊙ Actions ➤ Settings ➤ Demo mode.
- 11. Select the plate positions to enable linking to a plate file, and specify expiration for polymer and capillary array as needed.

Positions that are not enabled for linking display Available.



12. Tap **OK**.

Enable/disable the internal barcode reader (administrator only)

IMPORTANT! Before changing this setting, make sure no plate files are linked in the home screen.

Enable the internal barcode reader if you want to use the automated barcode workflow. See "Run plates with the automated barcode workflow" on page 147.

- 1. In the home screen, tap ⊙ ▶ Actions ▶ Settings ▶ Barcode reader.
- 2. Tap Enable, then tap Done.

Set the power save duration (administrator only)

This setting determines when the instrument enters power save mode. The duration you specify starts after the latest completed run.

In power save mode, the following components are turned off: laser, oven heater, and detection cell heater.

The instrument screens are displayed while the instrument is in power save mode. Starting a run removes turns off power save mode.

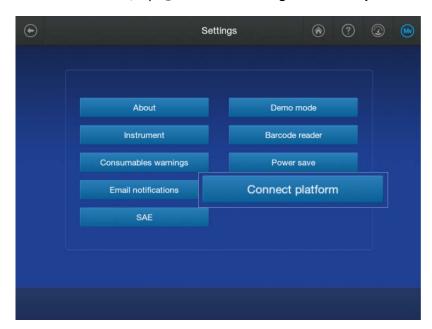
- 1. In the home screen, tap ⊙ ➤ Actions ➤ Settings ➤ Power save.
- 2. Tap a duration, then tap **Done**.

Enable or disable Thermo Fisher™ Connect Platform access on the instrument (administrator only)

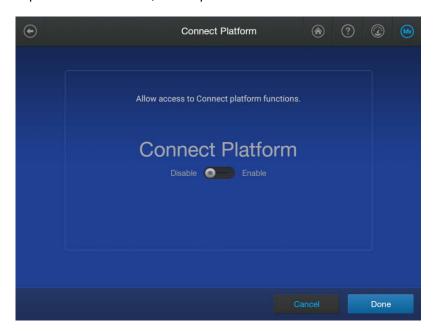
You can change this setting if the permission has been granted to you in the SAE Administrator Console.

Note: The **Connect Platform** button is inactive if you are not an administrator.

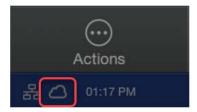
1. In the home screen, tap ⊕ Actions > Settings > Connect platform.



2. Tap Enable or Disable, then tap Done.



The home screen is displayed with a cloud icon in the lower left corner if Connect Platform access is enabled on the instrument.



For more information, see Chapter 9, "Use the instrument with the Thermo Fisher™ Connect Platform".

Manage instrument settings

Access the **Instrument Settings** screen from the home screen by tapping ⊙ **Actions** ▶ **Settings** ▶ **Instrument**.



Figure 89 Instrument Settings screen

Change the instrument name (administrator only)

Note: The instrument name can also be changed in the InstrumentConnect software by a cloud administrator. See "Change the instrument name in the InstrumentConnect software (cloud administrator only)" on page 235.

- 1. In the home screen, tap ⊙ Actions ➤ Settings ➤ Instrument ➤ Instrument name.
- 2. Tap the **Instrument name** field, enter an instrument name, then tap **Done**.
- 3. Tap **OK**.

Manage date and time settings (administrator only)

When you change the date and time setting, you are required to restart the instrument by powering off, then powering on.

Note: Any changes made to the date and time settings are automatically applied.

- In the home screen, tap ⊙ Actions ➤ Settings ➤ Instrument ➤ Date and time.
 By default, the time is set to Automatic and the instrument automatically obtains the time from the network. The Automatic setting is required to use the voice command function. See "Use Alexa™ voice commands" on page 236.
- 2. Press-drag the slider to **Off** if you want to enter the time manually.
- 3. Tap **Time zone**, then select a time zone.
- 4. Tap **Date/Format**, then select the display order for the month, day, and year.
- 5. Tap **Time/Format**, then select a 12-Hour or 24-Hour time display format.
- 6. Tap Done.

When you exit the screen, a message is displayed instructing you to restart the instrument. See "Power off or power on the instrument" on page 495.

Update the software (administrator only)

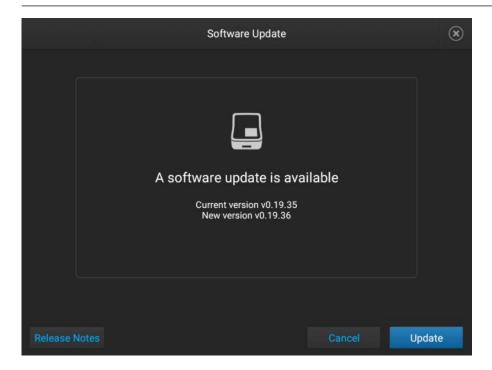
All data is retained on the instrument when you update the software.

- 1. Select the software update option in any of the following locations:
 - About Instrument screen—Tap ⊕ Actions Settings About Software update.
 - Instrument Settings screen—Tap ⊕ Actions > Settings > Instrument > Software update.
 - Upcoming Maintenance screen—Tap ② (Dashboard) at the top right of the home screen. If the Upcoming Maintenance screen is not displayed, tap < or ➤. Tap Perform software update, then tap View info.

The instrument automatically determines if a software update is available on the Thermo Fisher™ Connect Platform or on a USB drive. If the update is available in both locations, it uses the installation from the USB drive.

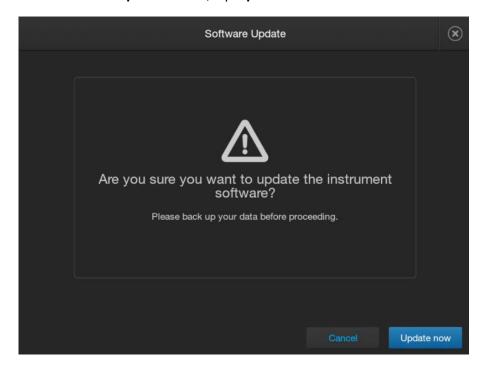
IMPORTANT! Perform a virus scan on a USB drive before inserting it into a port on the instrument.

Note: It can take up to 15 seconds for the instrument to recognize a USB drive after the drive is inserted in a USB port. exFAT-formatted USB drives are recommended.



2. Tap Release Notes, then select a location for the export of the release notes. Release notes list the changes included in the software update.

3. In the Software Update screen, tap Update now.



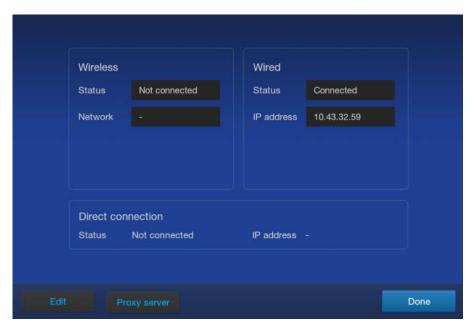
You are prompted to accept the End User License Agreement (EULA). After you accept, the software update begins.

4. Power off, then power on the instrument. See "Power off or power on the instrument" on page 495.

Manage the network configuration (administrator only)

For information on connections, see "Connect the instrument to a computer or network (hardware connections)" on page 446.

1. In the home screen, tap \odot Actions > Settings > Instrument > Network configuration.



The IP address for the instrument is automatically displayed for all current connections.

- 2. (Wireless or Wired connections only) To edit default network settings, tap **Edit**, or tap one of the network settings fields.
- 3. (Wireless connections only) Edit the Wireless network settings.
 - a. Select a network that was automatically detected by the instrument.
 - b. Enter a password, if prompted.
 - c. Click Join.
 - d. Click **OK** when the authentication is completed.
- 4. (Wired connections only) Edit the Wired network settings.
 - a. Select DHCP or Static IP.
 - An IP address is automatically assigned if **DHCP** is selected.
 - b. (Static IP only) Enter information in the following fields: IP address, Subnet mask, Default gateway, Primary DNS server, and Secondary DNS server.
 - For more information, see "Determine the IP address for a computer on a network" on page 450.

- If necessary, connect the instrument to a proxy server.Consult your Network or IT specialist before linking the instrument to a proxy server.
- 6. Tap **OK**.

Select a language (local administrator or SAE administrator only)

- 1. In the home screen, tap ⊕ ➤ Actions ➤ Settings ➤ Instrument ➤ Language.
- 2. Select a language.

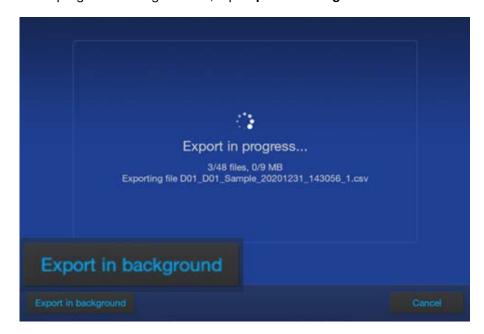
Configure, check status, and cancel background exports and backups

Configuring the instrument to export or back up information in the background is useful when exporting large files or groups of files such as results or user data. See these sections for starting the export or backup:

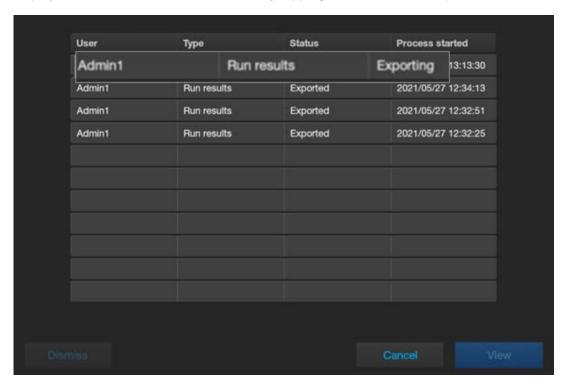
- "Export results from the instrument Results and data files, logs, and reports" on page 171
- "Back up user data (instrument settings, library items, and results) (administrator only)" on page 479
- 1. Start an export or back up.

When a file starts exporting, or when a backup of user data starts, a progress message is displayed. This is useful for exports that take time to complete (such as run results). A message is also displayed at the bottom-right of the home screen. Background export allows you to continue using the instrument while the export continues.

2. In the progress message screen, tap **Export in background**.



The **Background Export Status** screen is displayed with the export job listed. You can also display this screen from the home screen by tapping ⊕ **Actions** ▶ **Background export**.



Entries are displayed in the list for 24 hours, or until the user who initiated the export dismisses the item.

Note: When files are actively exporting, a message is displayed in the bottom-right of the home screen. See "Instrument conditions in the home screen" on page 41.

- 3. Perform any of the following actions as needed.
 - To cancel a job—Tap a row with a status of **Exporting**, tap **View**, then tap **Cancel**.
 - To view a list of exported files—Tap a row with a status of Exported, then tap View.
 - To remove a job from the list—Tap a row, then tap **Dismiss**. The **Dismiss** button is active only if the user who initiated the export is signed in and selects the item.
 - To close the screen—Tap Cancel.

Set the default save location for results

This option sets the default save location for results. This setting is saved for each user.

Note: This preference does not affect the save location for plate files. If you create a plate file on the instrument, the plate file is saved on the instrument only.

- 1. In the home screen, tap ⊙ Actions ▶ My preference.
- 2. Tap Save location.
- Select the default save location for results, then tap **Done**.
 For information on connecting to a network drive, see "Connect the software to a network drive (software settings)" on page 450.

When you create or link a plate file, you can change the default save location.

If the plate file is linked by another user, the save location is retained, but updated for the other user's default location, if specified.

Example:

- User 1 default save location is Instrument; Network drive with Location A specified on the network
- User 2 default save location is Instrument; Network drive with Location B specified on the network.
- User 1 creates a plate file.
- User 2 links the plate file. The save location of **Instrument; Network drive** is retained, but is updated to Location B.

Manage storage space

Automatic file cleanup (autopurge)

Note: Autopurge must be enabled in the SAE Administrator Console by an SAE Administrator.

Before starting a run, the instrument calculates the total amount of storage space required to save the results on the instrument. If the required storage space is not available, the instrument identifies the oldest run histories that have been saved to a location other than the instrument, or that have been manually exported. It deletes these run histories until sufficient space is available (this function is also referred to as autopurge).

If the required storage space is not available and no run histories have been saved to a location other than the instrument or exported, the instrument displays a notification indicating that there is not enough storage space.

To proceed, export run histories for older plates, delete run histories, then start the run again. For information, see "Export results from the instrument—Results and data files, logs, and reports" on page 171 and "Delete a run history" on page 478.

Export results from the instrument—Results and data files, logs, and reports

- 1. In the home screen, tap ⊕ ▶ Actions ▶ Run history.
- 2. Select one or more plates from the **Run History** table.
- Tap Actions.
- 4. Tap the item to export:
 - Run results folder—Contains:
 - Fragment/HID analysis-FSA (data) and CSV (sizing) file for each sample
 - Sequencing-AB1 file for each sample
 - PSM (plate) file
 - (Sequencing only) ZIP file that contains FASTA, PHD.1, and QUAL files for each sample

Results folder name format: PlateName StartRunDate timestamp

• Logs (ZIP)—Contains the run results, auto-spectral calibration information, injection logs, PSM plate file, CID raw data files, EPT information, and post-processing files.

```
Log file name format: PlateName\_date\_UniqueID.zip, for example: Plate\_20201021\_121952.pdf
```

• Report (PDF)—Contains the results of the plate run.

Report file name format: InstrumentName_PlateName_StartRunDate_timestamp.pdf, for example: Instrument1_Plate_20201021_121952.pdf

5. Select an export location, then tap Next.

IMPORTANT! Perform a virus scan on a USB drive before inserting it into a port on the instrument.

Note: It can take up to 15 seconds for the instrument to recognize a USB drive after the drive is inserted in a USB port. exFAT-formatted USB drives are recommended.

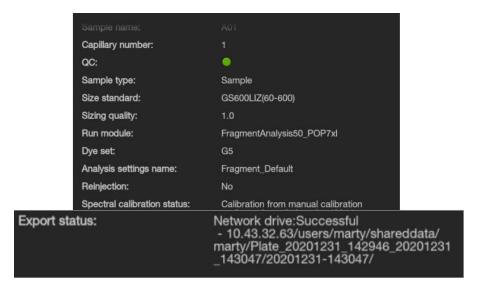
A message is displayed when the file is exporting. If you are exporting many files, see "Configure, check status, and cancel background exports and backups" on page 475.

Delete a run history

This procedure describes how to manually delete run histories. For information about when run histories are automatically deleted, see "Automatic file cleanup (autopurge)" on page 477.

- 1. In the home screen, tap ⊕ ▶ Actions ▶ Run history.
- 2. Tap one or more plates from the **Run History** screen.
- 3. Tap **Delete**, then tap **OK** to confirm.
 - If the **Delete** button is inactive, the plate may be linked in the home screen, or you do not have permission to perform this function.

- If a message is displayed indicating that results will be permanently deleted and may not
 have been exported, it indicates that the results were saved to the instrument only (instead of
 additionally saving to the Thermo Fisher™ Connect Platform, a network drive, or a USB drive).
 To check if results have been also saved in another location:
 - a. Tap No in the message box.
 - b. Select the plate in the Run History screen, then tap View.
 - c. Tap (Information) for any sample, then swipe up to display the Export status result.



Back up user data (instrument settings, library items, and results) (administrator only)

- 1. In the home screen, tap ⊕ Actions ➤ Maintenance ➤ Back up user data.
- 2. Tap the profiles that you want to back up.
- 3. Tap Backup.
- 4. Specify a storage location, then tap Export.A folder containing the plate file and the sample data files is backed up to the specified location.

(Optional) After backing up, you can do any of the following:

- Delete the run histories that you backed up from the instrument (see "Delete a run history" on page 478).
- Delete library items from the instrument (see "Delete a library entry" on page 262).
- Open the backed-up CSV files in the folder on another instrument or in the Plate Manager software.



Troubleshooting

Troubleshooting workflow	481
Troubleshooting resources	483
Use Smart Help to request assistance from Technical Support or Service	483
Start a remote support session	484
Inspect the data—Troubleshooting procedures	485
Inspect the instrument —Troubleshooting procedures	489
Additional troubleshooting procedures	492
Instrument interior components	496
QC error and alert troubleshooting	498
Cloud analysis troubleshooting	503
Consumables troubleshooting	503
Home screen and general instrument software troubleshooting	504
Install run troubleshooting	506
Instrument troubleshooting	507
Library troubleshooting	508
Maintenance wizard troubleshooting	509
Plate troubleshooting	509
Plate file troubleshooting	509
Plate Manager software troubleshooting	510
Remote Monitoring software troubleshooting	513
RFID troubleshooting	515
Run troubleshooting	515
Run history troubleshooting	519
Run queue troubleshooting	519
SAE troubleshooting	519
Sample and data troubleshooting	520
Settings screen troubleshooting	527
Sign in troubleshooting	528
Software troubleshooting	529
Spatial calibration troubleshooting	530

Spectral calibration troubleshooting	531
Thermo Fisher™ Connect Platform troubleshooting	532
Voice command troubleshooting	533

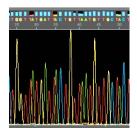
Troubleshooting workflow

Follow this general workflow when you are troubleshooting.

Troubleshooting workflow

Inspect the data

- 1. Review the analyzed data
- 2. Review the raw data, then review the EPT plot (page 485).
- 3. (Fragment analysis) Check size standard quality (page 486).
- **4.** Confirm that the correct injection settings were used to generate the data (run module, dye set, analysis settings, and size standard definition (*fragment analysis*)). See the following sections:
 - "Sequencing results and well details" on page 176
 - "Fragment/HID analysis results and well details" on page 180



Samples

Data

Inspect the samples

- 1. Confirm that the correct samples are present in the wells that are specified in the plate file.
- 2. Ensure that the samples are at the bottom of wells and that no bubbles are present.







Inspect the instrument

- 1. Check that capillary tips are not bent or damaged.
- 2. Check the pump for bubbles or debris (page 490).
- 3. Check consumables status (see "Check consumables status" on page 67).
- **4.** Follow any troubleshooting instructions displayed in the instrument error messages or plate alerts.
- Perform any pending maintenance tasks (see "Review upcoming maintenance" on page 65).



Help

Request assistance

- 1. Export the log files generated by the instrument (page 492).
- 2. Request assistance (page 483).
- 3. If instructed to do so, start a remote support session (page 484).



Troubleshooting resources

Document	Pub. No.
Troubleshooting Sanger sequencing data User Bulletin	MAN0014435
DNA Sequencing by Capillary Electrophoresis Chemistry Guide Second Edition	4305080
DNA Fragment Analysis by Capillary Electrophoresis User Guide	4474504

See also:

- "Use Smart Help to request assistance from Technical Support or Service" on page 483
- "Start a remote support session" on page 484
- "Run self tests to check the touchscreen, speakers, microphone, and proximity sensor" on page 494

Use Smart Help to request assistance from Technical Support or Service

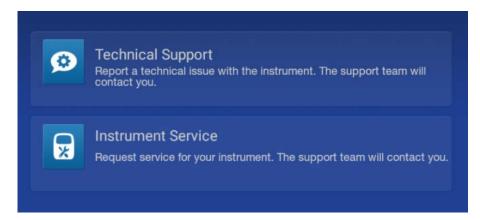
Access to the Thermo Fisher™ Connect Platform must be enabled to use this function. For information, see "Enable or disable Thermo Fisher™ Connect Platform access on the instrument (administrator only)" on page 232.

1. In the home screen, tap ⊕ Actions > Support > Smart help.

Note: You can also access this screen by tapping (a) (Smart Help) at the top of a help window.



2. Select a support option.



3. Enter a description of the issue, or tap (1) (microphone) and record a description.

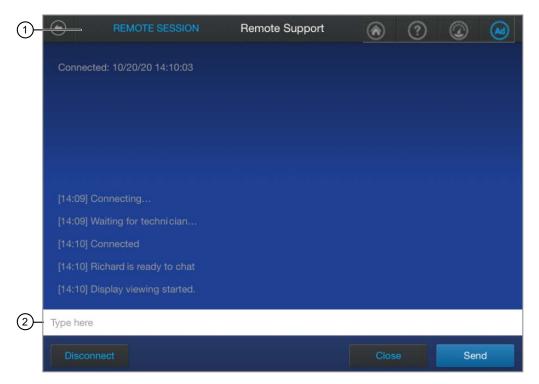
- 4. Fill in the contact information.
- (Recommended) Select the Include instrument log file checkbox to automatically attach the instrument log file to this request.
- 6. If appropriate, tap Attach run files, then select files for a regular run, install run, or calibration run.

Start a remote support session

The **Remote support** feature allows a support representative to access the instrument remotely. During a remote support session, a Technical Support representative can control the touchscreen and perform other functions.

The instrument must be connected to the internet to use remote support. Access to the Thermo Fisher™ Connect Platform is not required.

- 1. Contact Technical Support to obtain a PIN that you will need to start the session. See "Use Smart Help to request assistance from Technical Support or Service" on page 483.
- 2. In the home screen, tap ⊙ Actions ➤ Support ➤ Remote support.
- In the Remote Support screen, tap Start remote session, then enter the PIN provided by Support.



- (1) Remote Session indicates that a remote session is in progress
- (2) Text field

REMOTE SESSION is displayed at the top of the touchscreen when a successful connection is established. A chat is displayed on the touchscreen.

- 4. Tap the text field to type a message, then tap **Send**.
- 5. *(Optional)* Navigate to another screen on the instrument by tapping the **(home)** icon at the top right of the screen.

REMOTE SESSION is displayed at the top of the touchscreen to indicate that the session is active.

Tap **REMOTE SESSION** to return to the remote support session.

Tap View to return to the chat.

6. To end the remote support session, tap the active session, then tap **Disconnect**.
A Technical Support representative can also end the remote support session. **REMOTE SESSION** is not displayed after a session has been disconnected.

Inspect the data—Troubleshooting procedures

Review the analyzed data

- View results for a completed run.
 For more information, see "View results for a completed run (Run history)" on page 170.
- 2. For results with (yellow, caution) or (red, error) sample QC, view the QC error message in the well details.

For more information, see "Sample QC and quality alerts" on page 172, "Sequencing results and well details" on page 176, and "Fragment/HID analysis results and well details" on page 180.

View the raw data and the EPT plot

View the raw data and EPT plot to troubleshoot issues with a run.

The EPT view (ElectroPhoresis Telemetry) shows instrument data conditions (current, temperatures, electrophoresis voltage) as a function of time.

This EPT plot is useful for troubleshooting problems with specific runs.

- 1. In the home screen, tap ⊕ Actions ➤ Run history.
- 2. Tap the plate of interest, then tap View.
- 3. Tap a well, tap View, then tap the Raw tab.
- 4. Tap the **EPT** tab.

Check size standard quality (fragment/HID analysis)

This procedure describes how to check the size standard quality in the instrument software.

- 1. In the home screen, tap the plate position for an active run, or tap ⊙ Actions ➤ Run history.
- 2. Tap a fragment analysis plate name, then tap View.

QC and **SQ** values are listed for each well. For information on how these values are determined, see "Sample QC and quality alerts" on page 172.



A ullet QC indicates all QC criteria were met. An SQ of >0.75 is a passing result. If any wells have a ullet QC (indicating that a quality alert was triggered), or an SQ of \leq 0.74, review the data and the details for the well as described below.

3. Tap a well, then tap View.



By default, the **Analyzed** tab is selected and the size standard peaks are shown. If the size standard peaks are not visible, you can tap $\stackrel{*}{:}$ on the left border of the trace, then deselect all dyes except the size standard dye (red or orange). You can also move the thumbnail window to the size standard peak region.

А

4. Ensure that all expected peaks are detected.

Note: To determine the size standard that was used, tap (Information). To determine the expected peaks, view the size standard in the size standard library. See "Size standards library" on page 278.

5. As needed, tap on the right border of the trace to zoom.

Example of a size standard electropherogram

The results show **Sample QC** status, **SQ** 0.86.

Although no alerts were triggered, the low SQ should be investigated. In this example, the low SQ is caused by the issues with peak resolution later in the electropherogram.



Check size standard quality (fragment/HID analysis) in the Remote Monitoring software

This procedure describes how to check the size standard quality in the Remote Monitoring software.

Note: To determine the size standard that was used for a sample, view the run history for the sample on the instrument.

1. In the **Plates** tab, select an injection group. Alternatively, you can click a row in the **Run History** tab, then select a plate.

The electropherogram screen is displayed with the **RAW** tab selected.

The sample list displays **QC** and **SQ** values for each well. For information on how these values are determined, see "Sample QC and quality alerts" on page 172.

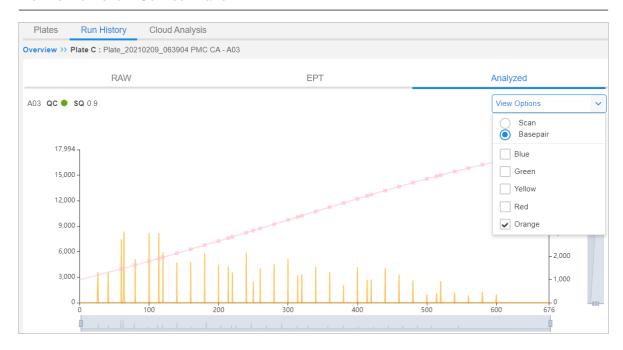
A OC status indicates all QC criteria were met. An SQ of >0.75 is a passing result.

If any wells have a \bigcirc or \bigcirc QC status (indicating that a quality alert was triggered), or an SQ of \leq 0.74, review the data for the well as described below.

Well ID	Sample N	Туре	SQ	QC	Add to Clo
A01	A01_A01_S	SAMPLE	0.9	•	
A02	A02_A02_S	SAMPLE	0.0	6	
A03	A03_A03_S	SAMPLE	0.9	•	
B01	B01_B01_S	SAMPLE	0.9	•	
B02	B02_B02_S	SAMPLE	0.9	•	
B03	B03_B03_S	SAMPLE	0.9	•	
C01	C01_C01_S	SAMPLE	0.0	6	

2. Select a sample to investigate, then click the **Analyzed** tab.

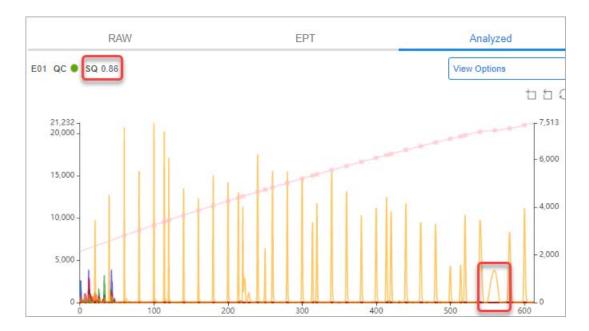
Note: The **Analyzed** tab is blank if the analysis is not complete or if the results were not saved to the Thermo Fisher™ Connect Platform.



- 3. Click View Options, then deselect all dyes except the size standard dye.
- 4. Ensure that all expected peaks are detected.

Example of a size standard electropherogram

The results show • Sample QC status, SQ 0.86.



Although no alerts were triggered, the low SQ should be investigated. In this example, the low SQ is caused by the issues with peak resolution later in the electropherogram.

Inspect the instrument —Troubleshooting procedures

View the instrument sensor details and EPT plot

The EPT view (ElectroPhoresis Telemetry) shows instrument data conditions (current, temperatures, electrophoresis voltage) as a function of time.

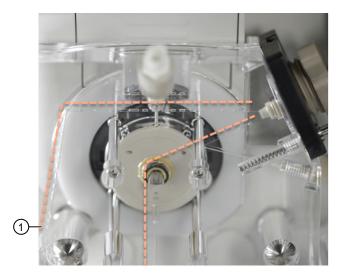
This EPT plot is useful for troubleshooting instrument issues that are not related to runs.

- 1. In the top-right of the home screen, tap ② (Dashboard).
- 2. Tap < .
- 3. Tap View sensor details.
- 4. Tap View EPT.
- 5. Tap **Start** to generate the EPT plot.

Check the pump for bubbles or debris

- 1. Examine the fluidics pathway for bubbles or debris.
 - Check for small opaque or white debris that could be caused by polymer precipitation or crystallization (typically observed only under cold temperatures). Check for dark particles or specks of dust or dried polymer that could originate from the array-port end of the capillary array.
- 2. Ensure that all bubbles are removed from the fluidic pathway in the following locations:
 - Pump channels (Figure 24)
 - Anode channels (Figure 25)

The orange dotted line in the first image below shows the fluidic pathway with bubbles.



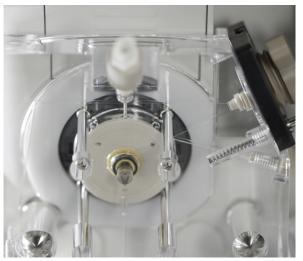


Figure 90 Examine pump channels for bubbles (the left image includes bubbles, the right image does not include bubbles)

1 To anode channels

Dotted lines are shown above and to the left of channels that can contain bubbles



Figure 91 Examine anode channels for bubbles

1 To pump channels

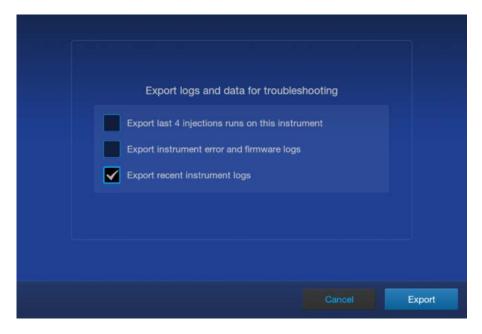
Dotted lines are shown to the left and right sides of the channels that can contain bubbles. No bubbles are shown in the image.

- 3. If you observe bubbles, see "Remove bubbles from the polymer pump (wizard)" on page 383.
- 4. If you observe debris, see "Wash the pump chamber and channels (wizard)" on page 385.

Additional troubleshooting procedures

Export troubleshooting logs

1. In the home screen, tap ⊙ Actions ➤ Support ➤ Export logs.



- 2. Select the items to export.
 - Export last 4 injections run on this instrument (injection log)—File name format: InstrumentName_InjectionLog_Date_Timestamp.zip
 - Export instrument error and firmware logs (error log)—File name format: InstrumentName ErrorLog Date Timestamp.zip
 - Export recent instrument logs (instrument log)—File name format: InstrumentName_InstrumentLog_Date_Timestamp.zip
- Tap Export, tap the export location, then tap Next.A message is displayed when the export is complete.

Check the position of the cathode buffer container (CBC)

When the instrument makes an injection, it moves the CBC to the load position. The load position places the CBC under the oven and in position for the capillary array tips to aspirate from the CBC.

When you run a maintenance wizard that accesses the CBC or the capillary array, the CBC is automatically placed in the home position when needed. Under normal conditions, the CBC is in the correct home position when you need to access the CBC or capillary array. However, if you close the instrument doors before the wizard instructs you to, or if power save mode starts, the CBC moves



to the load position. (For more information on power save mode, see "Set the power save duration (administrator only)" on page 469.)

IMPORTANT! Do not leave the doors open when the CBC is in the home position. If the doors are left open, the capillary array and pump can dry out.





Figure 92 CBC load position (left) and home position (right)

If the CBC is not in the home position when you need to access the CBC or capillary array, perform the following procedure.

- 1. Close the instrument doors, then wait until the instrument initializes the CBC position and the initializing message is no longer displayed.
- 2. In the wizard screen, tap ② (Dashboard), then tap < to display the Instrument Status screen.
- 3. Tap Manual commands, tap Move buffer container, then tap Send command.
- 4. When the CBC is in the home position, close the **Manual Commands** screen.
- 5. Open the instrument doors, then continue with the wizard procedure.

Use the Manual commands function to move instrument components

The **Manual commands** functions perform control the following functions:

Move the CBC to the home position

IMPORTANT! Do not leave the doors open when the CBC is in the home position. If the doors are left open, the capillary array and pump can dry out.

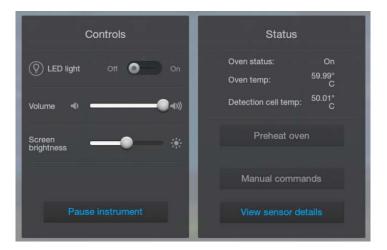
Note: No command is needed to move the CBC to the load position. When the instrument doors are closed, the CBC automatically moves to the load position.

Open and close the buffer valve

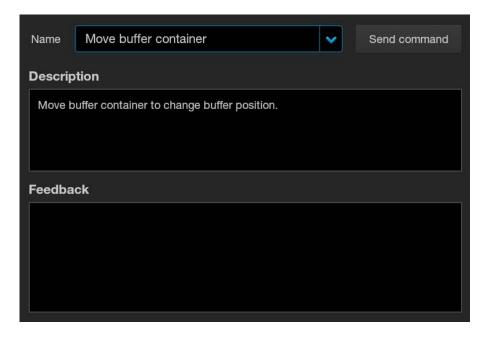
The **Manual commands** functions can be used for maintenance procedures and for troubleshooting. Use these commands when instructed to do so in a maintenance procedure or by Service.

IMPORTANT! Do not use manual commands when the instrument is running a plate or when an initializing message is displayed.

1. Display the **Instrument Status** screen by tapping ② (**Dashboard**) at the top right of the screen (if the **Instrument Status** screen is not displayed, tap **〈** or **〉**).



2. Tap Manual commands.



3. Select a command as needed, then tap **Send command**.

Run self tests to check the touchscreen, speakers, microphone, and proximity sensor

You can run these tests if you suspect that the touch screen is not responsive or if you cannot hear responses from Alexa™ when you are using voice commands.

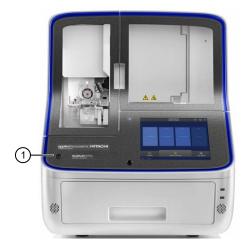
- 1. In the home screen, tap ⊙ Actions ➤ Support ➤ Self test.
- 2. Tap **Start**, then follow the instructions on the screens to complete the tests. If any tests fail, contact Technical Support.

Power off or power on the instrument

Under normal circumstances, there is no need to power off the instrument. Power off only when instructed to do so in a procedure in this guide or by Service. For more information, see "Shut down, move, and reactivate the instrument" on page 387.

The power switch is located on the front panel.

- 1. Move the power switch to the off position.
- 2. Wait a few minutes, then move the power switch to the on position.



1) Front panel on/off switch

Instrument interior components

Figure 93 and Figure 94 are provided below for reference in this section. See also page 382 and "Parts of the capillary array" on page 378.

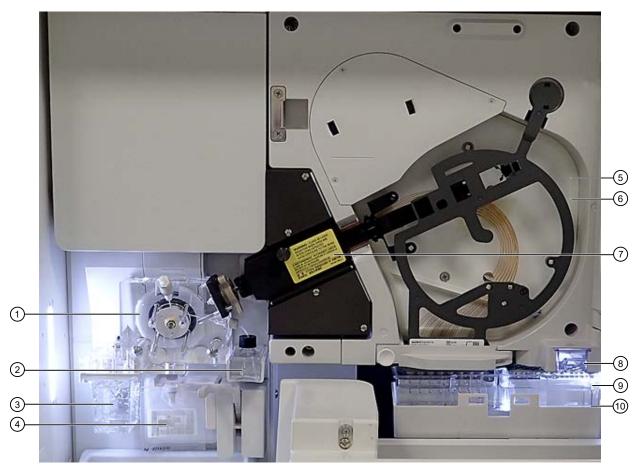


Figure 93 Instrument interior (includes the pump compartment and capillary array compartment)

- 1) Polymer delivery pump (PDP)
- ② Water trap waste container
- 3 Anode buffer container (ABC)
- 4 Polymer or conditioning pouch
- (5) Oven compartment (the oven door is open and not shown)
- (6) Capillary array
- (7) Detection cell heater (with the door closed)
- 8 Oven condensation reservoir
- (9) Cathode buffer container (CBC)
- 10 CBC autosampler

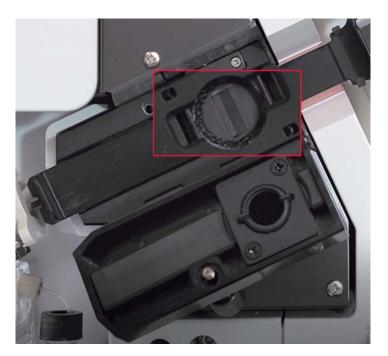


Figure 94 Detection cell heater with the door open and a capillary array installed. The detection cell in the capillary array is shown in the red box.

QC error and alert troubleshooting

QC errors—Sequencing and fragment analysis

See also "Sample QC and quality alerts" on page 172.

QC error	Description	Action
Analysis failure due to signal strength is too low for analysis.	Sample is not present in the well.	Ensure that the sample is present in the well.
	Sample is not properly prepared.	Ensure that samples are properly prepared.
	Injection run time or voltage is too low.	Edit the run module to increase run time or voltage. See "Run modules library" on page 274.
Offscale peaks. Offscale peaks: Adjust the injection parameters and/or the sample concentration.	The sample has a small number of peaks that are offscale.	If you are not using a factory-provided dye set, turn on the Off-scale Recovery function in the dye set. (This function is enabled by default in factory-provided dye sets.) For information, see "Dye sets library" on page 288.
	The sample concentration is too high.	Dilute the sample, prepare a new plate, then start a new run.
		Quantitate the sample before adding reagents for capillary electrophoresis.
		Re-inject the samples with adjusted injection conditions.
		Injection time, voltage, or a combination of these conditions can be adjusted.
Spectral calibration dye matrix is significantly different from	The incorrect dye set definition is specified in	Select the dye set definition that matches the dye set chemistry used for the samples.
expected. Tap the help icon for complete information on this quality flag.	the plate file.	If the dye sets do not match, the results for the entire injection are invalid, even for samples with a QC status of (green, good). Repeat the injection with the correct dye set.
		If the dye sets match, see the following problem for data quality.
	Data quality problem.	Review the data. Examine the data for possible contaminating dye and/or low signal levels.

QC errors—Sequencing

See also "Sample QC and quality alerts" on page 172.

QC error	Description	Action
Basecalling failed due to poor quality data.	Poor quality data is	Ensure that no consumables have expired.
or	present.	See "Check consumables status" on page 67.
Basecalling failed, possibly due to		Re-inject the sample.
insufficient data collected, or incorrect analysis settings.		If the problem persists, prepare fresh sample.
or		Check the sample quality.
The trace score is lower than 30.		Check the template quality and quantity.
The trace score is lower than 15.		Troubleshoot upstream PCR and sequencing steps.
	The sequence in the sample is too short to basecall.	Use a longer amplicon.
	The incorrect dye set definition is	Select the dye set that matches the chemistry that you are running.
	specified in the plate file.	If you use the BigDye™ Direct Cycle Sequencing Kit, use the Z_BigDye Direct dye set, not the Z_BigDye Terminator v3.1 dye set. For more information, see "Using BigDye™ Direct Cycle Sequencing Kit chemistry" on page 314.

QC errors—Fragment/HID analysis

See also "Sample QC and quality alerts" on page 172.

QC error	Description	Action
Sizing quality value is low due to poor size standard peak quality. Peak height uniformity is low or the fitting quality in sizing is poor.	Low resolution or poor-quality data is present.	 Ensure that no consumables have expired. See "Check consumables status" on page 67. Re-inject the sample. If the problem persists, check the sample quality.
Sizecaller found broad peak(s) in the size standard peak(s).		
Sizing quality value is in the intermediate range; check size standard data quality.	 Pass ≥0.75 Intermediate 0.25 to <0.75 Fail <0.25 	

Appendix A Troubleshooting QC error and alert troubleshooting

(continued)

QC error	Description	Action
Sizing quality value is in the failing range; check size standard data quality.	 Pass ≥0.75 Intermediate 0.25 to <0.75 Fail <0.25 	 Ensure that no consumables have expired. See "Check consumables status" on page 67. Re-inject the sample. If the problem persists, check the sample quality.
Sizing quality value is zero.	Various causes.	Check the data quality of the size standard peaks, such as the peak height and the peak shape. See "Check size standard quality (fragment/HID analysis)" on page 486.
The number of size standard peaks detected is less than the number of peaks defined in the size standard.	The size standard definition that is specified in the plate file includes peaks that are not present in the sample. Example: In a run that uses GeneScan™ 600 LIZ™ Size Standard, you used the GS600LIZ(60-600) size standard definition, but the run module collects data only up to 520 bp. The GS600_LIZ_(60-460) size standard definition could be used instead.	 Check the raw data to ensure that size standard peaks are present at the expected peak height ("Check size standard quality (fragment/HID analysis)" on page 486). Use or create a size standard definition with the appropriate number of peaks and peak sizes. Create a run module with a longer run time. If the run module has previously detected the appropriate size standard peaks, ensure that the run module was not edited to reduce the run time.
The analysis range is too small. Correct the analysis range in analysis settings and re-analyze in secondary analysis software or re-inject sample.	Various causes.	Correct the analysis settings, then re-analyze in secondary analysis software or re-inject the sample.
The sample does not contain the dye specified in the size standard.	The incorrect size standard definition is specified in the plate file.	Use a size standard that specifies all the dyes that are present in a sample.



QC errors—Spectral calibration (manual)

QC error	Description	Action
Insufficient number of dye spectra detected.	An incorrect calibration standard or setting was used for calibration.	 Ensure that the matrix standard or sequencing standard that you use matches the dye set you select for calibration. Sequencing calibration— Ensure that you select the dye set from the Matrix tab if you are calibrating with a matrix standard. Ensure that you select the dye set from the Sequencing tab if you are calibrating with a sequencing standard.
	The calibration standard has degraded or was incorrectly prepared. Figure 95 shows an example where a peak is missing, possibly due to degraded matrix standard.	 Ensure that all of the following conditions are met: The calibration standard is not expired. The calibration standard is prepared and stored as specified in the product information sheet for the calibration standard. The calibration plate was prepared within 24 hours of the calibration run. Ensure that you used fresh Hi-Di™ Formamide. See "Hi-Di™ Formamide storage and usage" on page 28. Older formamide can break down to generate formic acid, which can degrade the calibration standard. Ensure that plate septa are not being reused.

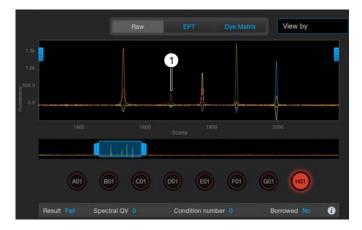


Figure 95 DS-33 Matrix Standard with low PET™ dye (red) peak

1 Low peak height caused by degraded matrix standard

QC errors—Sequencing or fragment/HID analysis install run

QC error	Description	Action
Sequencing Failed the CRL specification.	Low quality data, did not meet Contiguous Read Length requirements for an Install run.	 Ensure that instrument consumables are not expired and have not exceeded the on-instrument limits. See "Instrument consumables handling, usage limits, and expiration" on page 25. Ensure that the capillary array has not exceeded the number of injections limit. Ensure that the install standard was prepared according to the product information sheet.
		 Ensure that the install standard was prepared in the appropriate volume of fresh Hi-Di™ Formamide to ensure adequate signal. See "Hi-Di™ Formamide storage and usage" on page 28.
Fragment/HID analysis Failed allele Bin specification.	Peaks have shifted outside the software-defined bins.	 Ensure that polymer has been installed on the instrument for <48 hours. Ensure that instrument consumables are not expired and have not exceeded the on-instrument limits. See "Instrument consumables handling, usage limits, and expiration" on page 25.

Cloud analysis troubleshooting

See:

- "Plate file troubleshooting" on page 509
- "Remote Monitoring software troubleshooting" on page 513
- "Thermo Fisher™ Connect Platform troubleshooting" on page 532

Consumables troubleshooting

Observation	Possible cause	Recommended action
A message is displayed that indicates that insufficient polymer volume is available when you start a run, even though the injection limit and the sample limit have not been met	The Remove bubbles maintenance wizard was used excessively. Note: A polymer pouch includes a small reserve volume that is used for the Remove bubbles maintenance wizard, which consumes ~350 µL of polymer. The reserve volume is sufficient to run the wizard ~4 times (including the remove bubbles step during other maintenance wizards). If you manually run the Remove bubbles maintenance wizard >4 times, the volume of polymer that is available for samples may be depleted.	Replace the polymer pouch. In the future, use the Remove bubbles maintenance wizard sparingly.

displayed in orange in the Consumables Status screen displayed in orange if any of the following conditions are met. • One or more consumables has expired or exceeded the on-instrument usage limit (the maximum number of days that	Observation	Possible cause	Recommended action
be installed on the instrument). • The consumable is within the following days of product expiration: - Capillary array—1 day - Polymer—14 days - Buffer—7 days • The percentage of maximum number of injections remaining for a consumable is ≤10%. • The polymer and/or the buffer is within 1 day of the on-instrument usage	Consumables information is displayed in orange in the	Consumables information is displayed in orange if any of the following conditions are met. • One or more consumables has expired or exceeded the on-instrument usage limit (the maximum number of days that the consumable can be installed on the instrument). • The consumable is within the following days of product expiration: - Capillary array—1 day - Polymer—14 days - Buffer—7 days • The percentage of maximum number of injections remaining for a consumable is ≤10%. • The polymer and/or the buffer is within 1 day of	If the software is configured to prevent running if a consumable has expired or exceeded the usage limit, we recommend that you replace

Home screen and general instrument software troubleshooting

Observation	Possible cause	Recommended action
Buttons are inactive on the touchscreen	A run is in progress.	No action. Normal occurrence.
	You are a standard user and the function is accessible only to an administrator. For more information, see "Local profile roles (standard and administrator) and functions" on page 453.	No action. Normal occurrence.



Observation	Possible cause	Recommended action
Buttons are inactive on the touchscreen (continued)	If your system includes the SAE module, you do not have permission to access the function. For more information, see Chapter 10, "Use the instrument with the SAE Administrator Console".	No action. Normal occurrence.
The microphone icon is not displayed at the top right of the touchscreen	You are not signed in with a cloud profile.	Sign in with cloud profile to use voice commands. See "Sign in to apps.thermofisher.com and access the InstrumentConnect software" on page 217. See also "Use Alexa™ voice commands" on page 236.
	Access to the Thermo Fisher™ Connect Platform is not enabled on the instrument.	Enable access. See "Enable or disable Thermo Fisher™ Connect Platform access on the instrument (administrator only)" on page 232.
The microphone icon is disabled at the top right of the touchscreen	Voice commands are not registered for your cloud profile.	See "Use Alexa™ voice commands" on page 236.
The network drive icon is not displayed in the home screen	The network connection has not been configured or has been interrupted.	Configure the network connection. See "Connect the software to a network drive (software settings)" on page 450.
Plate alerts are displayed for a plate position	Various causes.	See "Run troubleshooting" on page 515.
In Demo mode, plate position is listed as Available, but does not respond to tapping	The plate position is not selected in settings.	See "Enable and set up Demo mode (SAE disabled)" on page 464.
Unable to display the Properties tab for a linked or running plate	Normal occurrence	To view plate properties, open the plate file in the Plates file library. See "Plate files library" on page 262.

Install run troubleshooting

See also "QC errors—Sequencing or fragment/HID analysis install run" on page 502.

Observation	Possible cause	Recommended action
Install run fails (sequencing or fragment/HID)	A capillary is blocked.	Run the Fill array with polymer maintenance wizard. (In the home screen, tap Output Actions > Maintenance > Maintenance wizards > Fill array with polymer.)
	Insufficient filling of capillary	Check for broken capillaries.
	array.	Run the Fill array with polymer maintenance wizard. (In the home screen, tap Output Actions > Maintenance > Maintenance wizards > Fill array with polymer.)
	The install run standards and reagents are expired or degraded.	Use fresh standards and reagents. Use fresh Hi-Di™ Formamide. See "Hi-Di™ Formamide storage and usage" on page 28.
	Bubbles are present in the pump channels.	Run the Remove bubbles maintenance wizard. (In the home screen, tap
	Crystal deposits are present in the polymer because the polymer was not at room temperature during the run.	Allow the polymer to reach room temperature. Do not heat it.
Install run—no signal is observed	Incorrect preparation of reagents and standards.	Prepare fresh reagents and standards. Use fresh Hi-Di™ Formamide.
	Bubbles are present in the sample wells.	Centrifuge the plate before running.
	Capillary tips are not touching the sample or are hitting the bottom of the wells.	Contact Technical Support.
Fragment/HID install run fails because all expected peaks are not detected	Polymer has been installed on the instrument for >48 hours.	Install fresh polymer, then repeat the install run.

Instrument troubleshooting

Observation	Possible cause	Recommended action
The instrument lost power	A power failure occurred.	Restart the instrument. See "Power off or power on the instrument" on page 495.
		A run that was in progress at the time of the power failure must be restarted.
		Run a control sample or perform an install run to ensure that the consumables have not degraded.
		Replace the consumables if the results with a control sample show that the consumables have degraded.
The electrophoresis failed or Current check failed is displayed	Bubbles are present in the pump.	Run the Remove bubbles wizard. See "Remove bubbles from the polymer pump (wizard)" on page 383.
	The Cathode Buffer Container 3500/Flex Series (CBC) has been installed on the instrument for >2 weeks or used for more than the allowed number of injections (see "Buffer storage, usage, and limits" on page 26).	Replace the CBC.
	There is insufficient cathode or anode buffer.	Check the fill line on the ABC and the CBC to ensure that the buffer is above the fill line. See "Check buffer fill levels" on page 71. Replace a buffer if the buffer is at or below the fill line.
	The septum on the CBC or the sample plate is not installed correctly.	Ensure that the septa are fully inserted into the CBC and the sample plate.
	Buffer or other liquid was spilled on top of the reservoir septum or on top of the autosampler.	Wipe the spill with a lint-free cloth.
	There is condensation on the CBC or around the reservoir	Wipe the condensation with a lint-free cloth.
	septum.	Ensure that the humidity in the lab is non-condensing.
The electrophoresis current is fluctuating or unstable, or Current check failed is displayed	A bubble is present in the polymer path.	Run the Remove bubbles wizard. See "Remove bubbles from the polymer pump (wizard)" on page 383.
чорич	Arcing has occurred in the pump. Look for black scorch marks on the pump block.	Contact Technical Support.

Observation	Possible cause	Recommended action
Instrument failed message is displayed	The connection between the instrument and the firmware	Restart the instrument (see "Power off or power on the instrument" on page 495).
	has been interrupted.	Contact Technical Support.
Unable to pull open the instrument drawer	The plate autosampler (the internal mechanism that moves plates into position for	Restart the instrument. See "Power off or power on the instrument" on page 495. Repeat if the drawer still cannot be opened.
	sampling) is in a position that is preventing the drawer from opening.	If the drawer still cannot be opened, contact Technical Support.
	The plate retainer (cover) is separated from the plate assembly.	Open the drawer as far as possible. Insert a long, flat head screwdriver into the slot (red circle) in the retainer, then press the retainer back on to the assembly.
	1) Plate vetsines (sever) is	IMPORTANT! To avoid injury, do not place your hands into any empty spaces in the drawer.
	Plate retainer (cover) is separated from the plate assembly Slot	IMPORTANT! To avoid injury, keep your hands away from any empty spaces in the drawer when you push the drawer closed.

Library troubleshooting

Observation	Possible cause	Recommended action
In the dye set library, the Copy button is inactive	You are viewing a dye set that was created by another user. Only factory-provided dye sets can be copied.	Select a factory-provided dye set to copy.
	Note: Other libraries do allow copying of user-created items.	
Error deleting records message is displayed when you delete a library entry	Item is owned by another user.	Check the initials that are displayed for the entry, or open the entry to see the owner. Have the owner delete the entry.
Details: At least one of the selected item(s) is factory-provided, locked, or owned by another user.	Library objects cannot be deleted because dependencies are present.	Review the dependencies. Delete the dependencies that are preventing deletion of the library objects. See "Delete a library entry" on page 262.
	Item is locked.	Check the initials that are displayed for the entry, to see if the locked icon is displayed.
		If you own the item, open the item, unlock it, then delete the item.
		If you do not own the item, have the owner unlock, then delete the entry.

Maintenance wizard troubleshooting

Observation	Possible cause	Recommended action
Error! Unable to move the autosampler to the home position message is displayed	The autosampler for the CBC is not in the correct position for the next step in the wizard.	Move the CBC. See "Check the position of the cathode buffer container (CBC)" on page 492.
in a maintenance wizard screen	The doors and/or drawer are open.	Close the doors and/or drawer, then allow the system to initialize.

Plate troubleshooting

See "Run troubleshooting" on page 515.

Plate file troubleshooting

Observation	Possible cause	Recommended action
Strikethrough text is displayed in the Save location field in the Plate properties screen	The save location for results (that was specified when the plate file was created) is no longer accessible by the	No action.
Save location Instrument; Network drive	instrument.	
(1) Strikethrough text The Cloud analysis field in the Proportion tab is	The Cloud analysis feeture	Sat up aloud analysis is s
The Cloud analysis field in the Properties tab is listed as Disabled. The Cloud analysis checkbox in the Edit Properties screen is <i>inactive</i> .	The Cloud analysis feature can be enabled only in plate files that are created in the Plate Manager software	Set up cloud analysis in a plate file that you create in the Plate Manager software (cloud) . See "Set up
Plate type 96	(cloud).	cloud analysis in the Plate
Application type Sequencing		Manager software (cloud)" on
Cloud analysis Disabled Cloud analysis Disabled		page 125.
Capillary length 50 cm		
Cloud analysis Disabled 2		
Cloud analysis Disabled		
1 The Cloud analysis field in the Properties tab is listed as Disabled		
② The Cloud analysis checkbox in the Edit Properties screen is inactive		

Observation	Possible cause	Recommended action
The Cloud analysis field in the Properties tab is listed as Disabled. The Cloud analysis checkbox in the Edit Properties screen is active. Application type Sequencing Cloud analysis Disabled Cloud analysis Disabled	The plate file was created in the Plate Manager software (cloud) and the Cloud analysis feature was set to On. The plate file was opened on the instrument, and the Cloud analysis checkbox in the Edit Properties screen was deselected.	Enable the Cloud analysis checkbox as needed. For more information, see "Set up cloud analysis in the Plate Manager software (cloud)" on page 125.
Capillary length 50 cm Cloud analysis Disabled Cloud analysis Disabled	The plate file was created in the Plate Manager software (cloud) and the Cloud analysis feature was set to On. The Cloud analysis checkbox was automatically deselected in the plate file because the injection	Enable the Cloud analysis checkbox as needed. For more information, see "Set up cloud analysis in the Plate Manager software (cloud)" on page 125.
 The Cloud analysis field in the Properties tab is listed as Disabled The Cloud analysis checkbox in the Edit Properties screen is active 	properties were edited. The injection properties were edited when the plate file linked or the plate file was opened in the Plate files library and the injection properties were edited.	

Plate Manager software troubleshooting

Observation	Possible cause	Recommended action
Import failed message when you select a CSV plate setup on the instrument	The CSV file specifies the name	Add the run module, dye set, and/or size standard to the instrument by selecting a
Details:	of a run module,	PSM file that contains the items, or by
The message also indicates that a valid injection protocol, run module, dye set, analysis settings and/or size standard is not present.	dye set, and/or size standard that does not exist on the instrument.	creating the items manually.
	IMPORTANT! A	
	CSV file contains	
	only the name of	
	the run module,	
	dye set, and/or size	
	standard, it does	
	not contain the	
	settings.	

Observation	Possible cause	Recommended action
When saving a PSM file in the Plate Manager software (cloud), "You do not have edit permission to the cloud group" message is displayed	You are saving to a Thermo Fisher™ Connect Platform group and you do not have edit permissions for the group.	Save to a different location, or request edit permissions from the group administrator.
Import CSV fails but import PSM with the same settings imports with no errors	The run module, dye set, analysis settings, size standard, file name convention, or results group specified in the CSV file does not exist on the instrument.	Create the size standard, dye set, or run module on the instrument.
	The CSV file contains the names only of the run module, dye set, analysis settings, size standard, file name convention, or results group. It does not contain the settings.	
	The PSM file contains the names and settings of the size standard, dye set, or run module. The size standard, dye set, or run module are automatically created when the PSM file is imported.	

Observation	Possible cause	Recommended action
The Set up plate file dialog box is displayed when you click Create a plate file Set up a plate Plate Set up a plate Create from a template 1 If the Set up a plate dialog box is displayed, the instrument type is not set to SeqStudio Flex.	The instrument type is set to SeqStudio.	Click (Switch instrument) at the top right of the screen, then select SeqStudio Flex.
The Failed to send status is shown in the Recent plate files list	Multiple causes are possible.	1. Place the cursor over the status to display the reason for the failure. 2. Correct the cause. See "About the Inbox on the instrument" on page 43. 3. Send the plate file again. Failed to send 936000786: Failed to send (Duplicate plate name)
	Firewall settings are not correctly set.	Contact Technical Support.
A plate file is listed with Sent status, but it is not listed in the Inbox on the instrument	The configuration in the plate file does not match the configuration of the instrument to which you sent the plate file.	You can access the plate file in the Plate files library on the instrument. For more information, see "About the Inbox on the instrument" on page 43.
	For example, if a 50-cm capillary array is installed on the instrument, the Inbox does not accept a plate file that specifies a 36-cm capillary array.	

Remote Monitoring software troubleshooting

Observation	Possible cause	Recommended action
When you click *** (Actions) in the Injection List table, nothing happens	More than one injection is selected.	Select one injection.
A plate is not listed in the Run History tab	The results were not saved to the Thermo Fisher™ Connect Platform.	Review the results on the instrument or in a secondary analysis software application. Results cannot be uploaded to the Remote Monitoring software Run History tab after a plate is run.
		For future runs when you link a plate file, set the Save location to Connect Platform.
	The plate is for a spectral calibration or an install run.	Spectral calibration and install run plates are not saved in the Run History tab.
A project is not listed in the Cloud Analysis tab	The results were not saved to the Thermo Fisher™ Connect Platform.	Review the results on the instrument or in a secondary analysis software application. Results cannot be uploaded to the Remote Monitoring software after a plate is run.
		When you link a plate file for future runs, set the Save location field to Connect Platform.
	Cloud analysis was not specified for the plate file in the Properties tab or the Plates tab.	Enable and set up cloud analysis in a plate file that you create in the Plate Manager software (cloud). See "Set up cloud analysis in the Plate Manager software (cloud)" on page 125.
	Cloud analysis was specified when the plate file was created in the Plate Manager software (cloud), but the injection properties in the plate file were changed on the instrument. Changing the injection properties for the plate file on the instrument automatically disables cloud analysis.	Review the results on the instrument or in a secondary analysis software application. Results cannot be uploaded to the Remote Monitoring software after a plate is run.

Observation	Possible cause	Recommended action
A project is not listed in the Cloud Analysis tab (continued)	The plate is for a spectral calibration or an install run.	Spectral calibration and install run plates are not saved in the Cloud Analysis tab.
Loading data is displayed in the Analyzed tab	Data collection is in process.	No action. Normal occurrence.
No data available is displayed in the Analyzed tab	The results were not saved to the Thermo Fisher™ Connect Platform.	In the plate file, set the Save location to Connect.
The Cloud Analysis Status field in Run History tab does not update when analysis is complete Cloud Analysis Status	The Cloud Analysis Status field indicates the status of the plate file. The field displays (data folder) if cloud analysis is enabled in the plate file.	No action. Normal occurrence.
6	The Cloud Analysis Status field does not reflect the status of the cloud analysis.	
The Export results report option on the Actions menu is inactive	The results were not saved to the Thermo Fisher™ Connect Platform.	Review the results on the instrument or in a secondary analysis software application. Results cannot be uploaded to the Remote Monitoring software Run History tab after a plate is run.
		When you link a plate file for future runs, set the Save location to Connect Platform.
	The results files are not yet uploaded to the Thermo Fisher™ Connect Platform.	Wait until analysis has completed.
Re-injection request or cancel request was not sent to instrument	A different user is signed in to the instrument.	Sign in to the Thermo Fisher™ Connect Platform and the instrument with the same cloud profile that was used to start the run.

RFID troubleshooting

Observation	Possible cause	Recommended action
Unable to read RFID information or Failure to Read from RFID tag is displayed	Consumable is improperly installed or label is defective. The polymer/conditioning reagent pouch is not positioned properly.	Ensure that the RFID label is not visibly damaged and the pouch is properly installed. Ensure that the label is close and parallel to the instrument. Reposition or re-install the pouch with the label facing towards the instrument (away from the user). Close the instrument door to update the RFID information.
		Install a new consumable (if available). If problem persists, contact Technical Support.
	Malfunctioning RFID label or reader.	Install a used CBC, ABC, pouch, or array on the instrument:
		If the instrument can read the RFID label, install a new CBC, ABC, pouch, or array.
		If the instrument cannot read the RFID label, contact Technical Support.

Run troubleshooting

Observation	Possible cause	Recommended action
Pre-run check messages are displayed when you start a run	An error condition is preventing a run from starting.	Close the message screen, fix the error condition, then start the run again.
	A warning condition has occurred.	Tap OK to start the run.

Plate alert troubleshooting

Note: This information also applies if you are using barcoded plates, but the barcode reader function is not enabled.

To display the description of plate alerts, tap \bigwedge (Plate alert).

Observation	Possible cause	Recommended action
exceed of flave exceeded 24	The plate has been installed in the instrument drawer for >24 hours when you start the run. For information only.	Samples are stable for 16–24 hours. Consider whether results are affected by installation on the instrument for >24 hours.

Observation	Possible cause	Recommended action
to the network drive location because the connection has been interrupted, or the destination folder has been	destination folder has been	Results are always saved to the instrument. If needed, export the run history to the drive save location. See "Export results from the instrument—Results and data files, logs, and reports" on page 171.
	deleted or renamed.	Check that the network icon is displayed in the home screen. If the icon is not displayed, the network connection is interrupted. Contact your instrument administrator.
Network drive save location is not writable	The results could not be saved to the network drive location because the location is not a shared folder or the shared folder was modified after you	Results are always saved to the instrument. If needed, export the run history to the drive save location. See "Export results from the instrument—Results and data files, logs, and reports" on page 171.
	started the run.	For future runs, ensure that the network drive location specifies a valid location and that the location is shared. See "Create folders and enable network folder sharing" on page 451.
Failed to save result to network drive	Results for at least one sample were not saved to the network drive location that is specified	Check run history to determine which results were not saved. See "View results for a completed run (Run history)" on page 170.
	in the plate file. The network connection was interrupted before all results were saved.	Check network connection.
▲ Injection was canceled by UserX	Another user cancelled a run that you started.	No action. For information only.
▲ Injection was re-injected by UserX	Another user re-injected an injection in a run that you started.	No action. For information only.
▲ Injection order was changed by UserX	Another user changed the injection order in the Run Queue screen for a run that you started.	No action. For information only.
Not enough polymer to complete all injections in plate	The volume of polymer in the pouch is not sufficient for all injections that are specified for the plate. The run pauses.	Run the Replenish polymer maintenance wizard to install new polymer. Tap Resume run in the home screen or the Run Queue screen to restart the run. For more information, see "Replenish polymer or change polymer type (wizard)" on page 375.

Observation	Possible cause	Recommended action
Polymer in the plate file does not match polymer on instrument	A run was paused, a different polymer type was installed, then the run was resumed. Note: The software does not allow you to link a plate file with a polymer type that is not installed on the instrument. This message can be displayed only if you pause a run, change the polymer installed on the instrument, then resume the run.	This error pauses the instrument and cancels all remaining injections. Install the correct polymer, then add injections back in to the Run queue.

Plate alert troubleshooting (automated barcode workflow)

To display the description of automated barcode workflow plate alerts, tap \triangle or \triangle (Barcode workflow alert) .

Observation	Possible cause	Recommended action
⚠ Pre-run check failed	The remaining polymer volume is below the minimum volume that is required.	Tap Link a plate to return to the Link Plate File screen. Tap (home) to return to the home screen. Run the Replenish polymer maintenance wizard to install new polymer. Tap Resume run in the home screen or the Run Queue screen to restart the run. For more information, see "Replenish polymer or change polymer type (wizard)" on page 375.

Observation	Possible cause	Recommended action
Pre-run check failed (continued)	A consumable is expired or has exceeded the on-instrument limit. The instrument is configured to prevent runs with expired consumables or consumables that have exceeded their on-instrument life. For more information, see "Configure consumables usage and warnings (administrator only)" on page 460. • If this condition is detected before the plate run starts, the plate is not added to the run queue. • If this condition is detected after the plate run starts (for example, the pre-run check passed and allowed the plate run to start, but you paused the instrument or added injections and the consumable will expire during the run), the instrument is paused and all remaining injections are cancelled.	Replenish the consumables as described in the following sections. • "Replenish polymer or change polymer type (wizard)" on page 375 • "Install the anode buffer container (ABC)" on page 369 • "Install the cathode buffer container (CBC)" on page 372 • "Change and store a capillary array (wizards)" on page 377
A Plate type error	The installed plate does not match the plate type specified in the plate file.	Tap Unlink then link a plate in the message screen to return to the Link Plate File screen. Select a location, change plate type, and edit injection properties. Alternatively, select Create a new plate file.
A Barcode error	The internal barcode reader could not read the barcode on the installed plate.	Check the plate.
	The plate does not have a barcode label or the label is damaged.	
	The incorrect plate retainer is installed on the plate. The plate retainer is blocking the barcode on the plate.	Use the correct plate base and retainer. See "Plate retainer required for the SeqStudio™ Flex Series Genetic Analyzer" on page 78.
	There is no plate file with the barcode X read on the plate.	Manually link a plate file.

Observation	Possible cause	Recommended action
Signatures required (displayed only if SAE mode is enabled on the instrument)	Signature requirements are not met.	Sign the required objects. See "Signing during an automated barcode run" on page 253.
(Plate alert)	A consumable will expire during the run.	For information only. No action.

Run history troubleshooting

Observation	Possible cause	Recommended action
The View button is inactive	No plate or injection is selected.	Select a plate or injection.
	More than one plate or injection is selected.	Tap Deselect all , then select one plate or injection.

Run queue troubleshooting

Observation	Possible cause	Recommended action
The Edit & inject button is inactive in the Run Queue screen	More than one injection is selected.	Select one injection.
	A spectral calibration or install run plate is selected.	Re-injection is not allowed for a spectral calibration or install run plate.
Run status is Aborted but result status is Passed Chemistry type Fragment Analysis Aborted Pass G7:26:49	The injection was canceled but sufficient data was collected to analyze and generate a result.	No action. Normal occurrence.

SAE troubleshooting

See also "SAE error messages and actions" on page 255.

Observation	Possible cause	Recommended action
The SAE button is not displayed in the Instrument Settings screen	SAE has not been enabled by Service.	Contact Service.

Appendix A Troubleshooting Sample and data troubleshooting

Observation	Possible cause	Recommended action
Unable to connect to SAE server message	The SAE server connection settings are incorrect.	Check the SAE server IP address. See "Determine the IP address for a computer on a network" on page 450.
		In the instrument Sign In screen, sign in with a local administrator profile.
		 Set the correct IP address (in the home screen, tap
	There is a problem with	Troubleshoot computer or network problems.
	the computer on which the SAE Administrator Console is installed or a problem with the network.	If your SAE account has been configured to allow instrument operation when the SAE Administrator Console is offline, see "Use the instrument when the SAE server is offline" on page 255.
	The computer on which the SAE Administrator Console is installed has a dynamic IP address that is disconnecting the server when the computer is restarted.	Set a static IP address on the computer.
	Firewall settings are not correctly set.	Contact Technical Support.
The Open file from non-SAE system Setting from SAE server setting in the SAE Administrator Console does not change the software behavior	The Open file from non- SAE system Setting from SAE server function is not supported in this software.	No action.

Sample and data troubleshooting

Observation	Possible cause	Recommended action
"Calibration from sample" is reported for spectral calibration status	Auto-spectral calibration is run on all samples and generates the status. See "Auto-spectral calibration during an injection" on page 150.	No action. Normal occurrence.
"Calibration from manual" is reported for spectral calibration status, but no pull-up peaks are observed	Auto-spectral calibration was not used. For more information, see "Auto-spectral calibration during an injection" on page 150.	No action. Normal occurrence.

Observation	Possible cause	Recommended action
"Calibration from manual" is reported for spectral calibration status and pull-up peaks are	Auto-spectral calibration was not used because the sample possibly contains overlapping	Perform a manual spectral calibration, then repeat the run. See "Run a spectral calibration" on page 312.
observed	peaks that are labelled with	1 3
	different dyes. For more	IMPORTANT! When running samples that
	information, see "Auto-spectral	contain overlapping peaks that are labelled
	calibration during an injection"	with different dyes, manual spectral calibration
	on page 150.	is required after changing the capillary array or moving the instrument.
	IMPORTANT! Spectral	moving the instrument.
	calibration status is reported	
	for informational and tracking	
	purposes only. This calibration	
	status does not reflect the quality of the sample or affect	
	the results. However, use of	
	the manual spectral calibration	
	instead of the auto-spectral	
	calibration can increase the	
	likelihood of pull-up peaks.	

Sequencing and fragment/HID applications

Observation	Possible cause	Recommended action
Spikes are present in raw and/or analyzed fluorescence data	Trace impurities passed the detector.	For fragment analysis, increasing the Minimum peak half width setting in the analysis settings (under Common settings) can reduce the identification of spikes as peaks.
		Note: Secondary sequencing and fragment analysis software can recognize and ignore spikes.
		Repeat the injection if necessary.
Poor resolution, low size quality, or a low-quality sequencing result is observed	The samples degraded over time while on the instrument.	Thermal breakdown of samples is normal. Samples are stable for 16–24 hours on the instrument.
Details: Results are color- coded based on quality. For more information, see "Sample		Use Hi-Di™ Formamide to prepare the samples. Sample stability is optimal in Hi-Di™ Formamide.
QC and quality alerts" on page 172.		Prepare the sample according to the protocol provided with the kits for sample preparation. See "Sample preparation guidelines" on page 74.
		IMPORTANT! Do not resuspend samples in water.

Observation	Possible cause	Recommended action
Poor resolution, low size quality, or a low-quality sequencing result is observed	Consumables are past on- instrument and/ or product expiration.	Install new, unexpired consumables.
Details: Results are color- coded based on quality. For more information, see "Sample	The temperature and/or humidity in the lab is too high for optimal sample and polymer stability.	Ensure that the conditions in the lab are within the operating range for the instrument (15–30°C and 20–80% relative humidity).
QC and quality alerts" on page 172. (continued)		Sample stability can be lower near the high end of the operating range of the instrument for temperature and humidity.
		The polymer has been verified for use for up to 14 days on the instrument at the following temperature ranges:
		 15–25°C—POP-4™ and POP-7™ 15–30°C—POP-6™
		At higher temperatures, the limit is 7 days on the instrument.
		Use 20 μL of sample instead of 10 μL.
		A larger sample volume can reduce sample breakdown under hot and humid conditions.
	There was a sporadic data quality failure.	Re-inject the sample.
	Note: A sporadic data quality failure can happen occasionally.	
No signal or a low signal is	The sample volume was	Use the recommended sample volume.
Note: Samples are stable	insufficient.	See "Sample preparation guidelines" on page 74.
on the instrument for 16–24 hours. Determine if samples will be stable if a re-injection is recommended, then plan the re-injection accordingly.	The sample concentration was too low.	Adjust the injection parameters, then re-inject the samples.
		Injection time, voltage, or a combination of these parameters can be adjusted.
	There were bubbles in the sample wells.	Centrifuge the sample plate or tubes to remove the bubbles before loading onto the instrument.
		If the samples have been run, centrifuge the plate or tubes, then set up a re-injection.
	The sequencing reaction failed.	Review the sequencing protocol, the template quality, and the template quantity. Set up a new plate and repeat the reaction.
		See Troubleshooting Sanger sequencing data User Bulletin (Pub. No. MAN0014435).

Observation	Possible cause	Recommended action
No signal or a low signal is detected Note: Samples are stable on the instrument for 16–24	The Hi-Di™ Formamide used to prepare the samples was degraded.	Prepare the samples with fresh Hi-Di™ Formamide and repeat the experiment. See "Sample preparation guidelines" on page 74.
hours. Determine if samples will be stable if a re-injection is recommended, then plan the re-injection accordingly.	The sample was prepared with the BigDye XTerminator™ Purification Kit but a BDX run module was not selected.	Re-inject the sample with the correct module.
(continued)	The sample was degraded.	Prepare the sample according to the protocol provided with the kits for sample preparation. See "Sample preparation guidelines" on page 74.
		IMPORTANT! Do not resuspend samples in water.
		Thermal breakdown of samples is normal. Samples are stable for 16–24 hours on the instrument.
		Use Hi-Di™ Formamide to prepare the samples. Sample stability is optimal in Hi-Di™ Formamide.
	The sample had a high concentration of salt, or There was an excess of unlabeled template competing with the fragments labeled with dye during the injection.	Dilute or desalt the samples.
		For more information, see the following publications:
		DNA Sequencing by Capillary Electrophoresis Chemistry Guide Second Edition (Pub. No. 4305080)
		 DNA Fragment Analysis by Capillary Electrophoresis User Guide (Pub. No. 4474504)
	A capillary array tip is blocked.	Run the Fill array with polymer maintenance wizard. (In the home screen, tap
		Replace the capillary array if the problem persists.
	The capillary array is damaged.	Inspect the capillary array for damage. Replace the capillary array if there is damage.
		If replacing the capillary array does not resolve the issue, and the issue is occurring in all capillaries, contact Technical Support.
Pull-up or pull-down peaks are present in the data	The incorrect dye set was selected in the plate file.	Correct the dye set and repeat the injection.

Observation	Possible cause	Recommended action
Pull-up or pull-down peaks are present in the data (continued)	Auto-spectral calibration was not used because the sample possibly contains overlapping peaks that are labelled with different dyes. For more information, see "Auto-spectral calibration during an injection" on page 150.	Perform a manual spectral calibration, then repeat the run. See "Run a spectral calibration" on page 312.
Noise is present in the baseline	Fluorescent contamination has built up in the CBC.	Replace the CBC. Use new CBC septa when assembling the new CBC.
	The plate septum has been used more than one time and has introduced contamination.	Repeat the run with a new plate septum.
	Contamination from a source other than the CBC is present.	Wash the pump. See "Wash the pump chamber and channels (wizard)" on page 385.
		Install fresh consumables.
Sample carryover from a previous injection	Sample carryover can occur in trace amounts when	Replace the CBC septa before the next injection to minimize the carryover effect.
	previous injections are off- scale. Very strong peaks, for example, primer peaks in a fragment analysis sample, are typically visible in subsequent injections.	If sample carryover is from samples with signal >25,000–30,000 RFU, consider diluting the sample.
Poor resolution in some capillaries	Poor-quality samples were used.	See "Sample preparation guidelines" on page 74.
		Use a control sample to determine if the poor resolution is due to the samples or another factor.
	A capillary was damaged or is blocked.	Run the Fill array with polymer maintenance wizard to clear the capillary. (In the home screen, tap O Actions > Maintenance > Maintenance wizards > array with polymer.)
		If the poor resolution is due to the capillary array and not the sample, run the Change capillary array maintenance wizard. (In the home screen, tap
Poor resolution in all the capillaries	The polymer has been used for more than the stated number of injections, it is past the labeled expiration date, or has degraded polymer from incorrect storage.	Install fresh polymer with the Replenish polymer maintenance wizard. (In the home screen, tap ⊙ Actions ➤ Maintenance ➤ Maintenance ➤ wizards ➤ Replenish polymer.)

Observation	Possible cause	Recommended action
Poor resolution in all the capillaries (continued)	The Hi-Di™ Formamide that was used to prepare the samples was degraded.	Prepare the samples with fresh Hi-Di™ Formamide and repeat the reaction. See:
		"Sample preparation guidelines" on page 74
		 DNA Fragment Analysis by Capillary Electrophoresis User Guide (Pub. No. 4474504)
	Sample contains high amount of DNA.	Dilute the sample and re-inject it.
	Problem with capillary array.	Run the Change capillary array maintenance wizard to uninstall, then re-install the capillary array. (In the home screen, tap Actions Maintenance Maintenance wizards Change capillary array.)

Sequencing applications

Observation	Possible cause	Recommended action
Short read length and uneven	The incorrect dye set was selected in the plate file.	Correct the dye set and repeat the injection.
peak spacing is observed in the sequence data		Select from the following:
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		E_BigDye™ Terminator v1.1
		• Z_BigDye™ Terminator v3.1
		• Z_BigDye™ Direct
		Reanalyze the data in the Sequencing Analysis Software, using the correct mobility file.
Dye blobs are seen in the sequencing data	Impurities remained in the sample after the sample purification. The impurities caused dye blobs to appear in the sequencing data.	Improve the sample purification method. See "Sample preparation guidelines" on page 74.
Extra peaks are present in the sequencing traces	There was renaturation of the sample.	Heat-denature the samples prepared with fresh Hi-Di™ Formamide, then immediately place the samples on ice.

Observation	Possible cause	Recommended action
Extra peaks are present in the sequencing traces (continued)	There is low signal. With very low signal, the peaks are barely visible in the baseline noise.	Check the analyzed data, the raw data, the raw data signal intensity, and average raw signal-to-noise ratio, then:
		 Increase the injection time and re-inject. Or Remake the sample. Ensure that you are using: Enough sequencing template Enough primer and/or a sufficient concentration of primer
	There is a heterozygous insertion-deletion (het indel) that is causing multiple peaks to appear at the same basecall position. The sequence can appear "clean" for some number of bases until the het	Examine the analyzed trace. A het indel typically has single peaks at the 5' end, then part-way through the trace, two peaks appear in almost every position to the end of the trace. This pattern occurs when one copy of the gene has an insertion or deletion relative to the other copy of the gene.
	indel is encountered.	When aligning your sequence to a reference sequence, a series of bases may have been inserted or deleted in an allele. These indels can be encountered in any number of bases after the gene-specific priming region. To confirm that the het indel is present in both directions of your target, check the sequencing in the opposite direction.
	Primer-dimer has occurred.	You can often diagnose primer-dimer by looking at the raw trace data for questionable sequences. When primer-dimer exists, the 5' sequence signal may be significantly higher for a region of bases spanning the length of the forward and reverse gene-specific primers.
		Primer-dimer is the annealing of the 3' end of primers during PCR. The resulting short annealed fragment may amplify more efficiently than fully extended template. Primer-dimer fragments amplified during PCR can display increased 5' signal and extra peaks when multiple PCR products are sequenced simultaneously. In some instances, the secondary or extra peaks can be read as the reverse compliment of the PCR primers in this noisy 5' region. The secondary sequence or multiple PCR product sequences appear as far as 100–200 bp into the sequence, then suddenly disappear.

Observation	Possible cause	Recommended action
Extra peaks are present in the sequencing traces (continued)	The PCR amplification primers do not have specificity and are sequencing two different regions of the genome. The analyzed trace shows extra peaks throughout the entire length of the trace.	Redesign the primers or increase the amplification temperature.
	You accidentally contaminated the DNA and are sequencing two templates at the same time. The analyzed trace shows extra peaks throughout the entire length of the trace.	Repeat the amplification and sequencing reactions with uncontaminated DNA.
	There were impure or contaminated primers.	Primer stocks may have inadvertently had other primer solution introduced. For best results, use HPLC to purify the primers.
	There was a contaminated sample well.	Use a new sample plate and buffer/wash septa whenever possible.
		To avoid getting sample into adjacent wells, centrifuge the plates before you remove the adhesive seal.

Fragment analysis applications

Observation	Possible cause	Recommended action
Fragment analysis peaks are sized differently than previously observed	Aging of the polymer, which can cause small (≤0.5 bp) changes in fragment size.	Use a reference marker (for example, an allelic ladder) for auto bin adjustment. Or
		 In secondary analysis software, manually adjust the fragment bin positions to account for the size change.

Settings screen troubleshooting

Observation	Possible cause	Recommended action
All buttons except About and SAE are inactive	SAE mode is enabled on the instrument and you are signed in as a local administrator.	No action. Normal occurrence.
The SAE button is not displayed in the Instrument Settings screen	SAE has not been enabled by Service.	Contact Service.

Observation	Possible cause	Recommended action
All buttons except About, Instrument, Email notifications, and Demo mode are inactive	The Thermo Fisher™ Connect Platform is enabled on the instrument and you are signed in with a cloud profile.	No action. Normal occurrence.

Sign in troubleshooting

Observation	Possible cause	Recommended action
Your local instrument profile name is not listed in the User Profile screen	Your local instrument profile is linked to your Thermofisher.com account and is replaced by your cloud profile.	See "Local profile and cloud profile: when to use, user name, and user initials" on page 215.
		Sign in with your cloud profile.
The (Cloud) icon is not displayed next to your profile in the Select instrument profile screen	Access to the Thermo Fisher™ Connect Platform has been interrupted or disabled.	Contact your cloud administrator.
	A cloud administrator removed the user from an instrument or disconnected the instrument from the InstrumentConnect software.	See "Local profile and cloud profile: when to use, user name, and user initials" on page 215.
		Relink your profile. See "Relink the instrument to your cloud profile" on page 226.
Your profile is not listed in the Select instrument profile screen	Access to the Thermo Fisher™ Connect Platform has been interrupted or disabled, and your original local profile name has replaced your cloud profile name.	Contact your cloud administrator.
	A cloud administrator removed the user from an instrument or disconnected the instrument from the	See "Local profile and cloud profile: when to use, user name, and user initials" on page 215.
	InstrumentConnect software. Your original local profile name has replaced your cloud profile name.	Relink your profile. See "Relink the instrument to your cloud profile" on page 226.

Obser	vation	Possible cause	Recommended action
The Log in button is inactive in the Get Started screen Get Started (7) (8)		Access to the Thermo Fisher™ Connect Platform is not enabled on the instrument.	Enable access. See "Enable or disable Thermo Fisher™ Connect Platform access on the instrument (administrator only)" on page 232.
Use a Connect account An existing Connect account is required.	Create a local instrument profile Does not allow access to Connect-enabled features.		
Log in	Create profile		

Software troubleshooting

Obse	rvation	Possible cause	Recommended action
The Sample QC status is	s (green) in the home	The Plate tab and the Wells tab display the first injection	Tap the Injections tab, then select an injection that
screen but the Plate tab (green) wells	does not display	by default, which may not contain samples with (green) Sample QC status.	contains samples with the (green) Sample QC status.
* A			
Injections 4/5			
Estimated end time 03:19AM			
Sample QC 48 0 24			
Plate_20210125_144524			

Observation	Possible cause	Recommended action
Sample data files from the instrument can be opened but not analyzed in secondary analysis software • Sequencing Analysis Software	An updated version of the secondary analysis software is required.	Download and run the latest version of secondary analysis software. See "Secondary analysis software" on
SeqScape™ Software		page 51.
 Variant Reporter™ Software Minor Variant Finder Software MicrobeBridge Software GeneMapper™ Software 		Note: In the secondary analysis software, the SeqStudio™ Genetic Analyzer is listed as 3600 .
Files cannot be imported into Thermo Fisher™ Connect Platform applications or cannot be analyzed in Connect Platform sequencing apps	The sample name or file name used a special character.	Rename the sample name or file name. Note: Special characters (/, &, @, %) will impact file import into Connect Platform applications.

Spatial calibration troubleshooting

Observation	Possible cause	Recommended action
Spatial and spectral calibration reports list original date of capillary array installation (not the date of re-installation)	_	No action. Normal occurrence.
Persistently bad spatial calibration results	The capillary array is damaged.	Run the Change capillary array maintenance wizard to uninstall, then re-install the capillary array. (In the home screen, tap Actions > Maintenance > Maintenance wizards > Change capillary array.)
		Contact Technical Support.
Unusual peaks or a flat line for the spatial calibration	The capillary array window is not properly positioned in the detection cell (see Figure 3).	Open the detection cell heater door and manually reposition the detection cell within the holder. Ensure that the fastener on the detection cell heater door is firmly tightened. Repeat the spatial calibration.
		Run the Change capillary array maintenance wizard to uninstall, then re-install the capillary array. (In the home screen, tap Actions > Maintenance > Maintenance wizards > Change capillary array.)
		If the calibration fails again, run the Fill array with polymer maintenance wizard. (In the home screen, tap

Spectral calibration troubleshooting

See also "QC errors—Spectral calibration (manual)" on page 501.

Observation	Possible cause	Recommended action
"Calibration from manual" is reported for spectral calibration status, but no pull- up peaks are observed	Auto-spectral calibration was not used. For more information, see "Auto-spectral calibration during an injection" on page 150.	No action. Normal occurrence.
"Calibration from manual" is reported for spectral calibration status and pull-up peaks are observed	Auto-spectral calibration was not used because the sample possibly contains overlapping peaks that are labelled with different dyes. For more information, see "Auto-spectral calibration during an injection" on page 150. IMPORTANT! Spectral calibration status is reported for informational and tracking purposes only. This calibration status does not reflect the quality of the sample or affect the results. However, use of the manual spectral calibration instead of the auto-spectral calibration can increase the likelihood of pull-up peaks.	Perform a manual spectral calibration, then repeat the run. See "Run a spectral calibration" on page 312. IMPORTANT! When running samples that contain overlapping peaks that are labelled with different dyes, manual spectral calibration is required after changing the capillary array or moving the instrument.
"Calibration from sample" is reported for spectral calibration status	Auto-spectral calibration is run on all samples and generates the status. See "Auto-spectral calibration during an injection" on page 150.	No action. Normal occurrence.
Spatial and spectral calibration reports list original date of capillary array installation (not the date of re-installation)	_	No action. Normal occurrence.
Spectral calibration failed	The dye set definition that is selected for the spectral calibration does not match the spectral calibration standard used for the run.	Specify the correct dye set for the spectral calibration.

Observation	Possible cause	Recommended action	
Spectral calibration failed (continued)	You are running a spectral calibration and selected the dye set from the Matrix tab instead of the Sequencing	When setting up a sequencing spectral calibration, tap the Sequencing tab before selecting the dye set.	
	tab.	None	
	The matrix standard has degraded.	Repeat the spectral calibration with fresh matrix standard.	
Unable to re-inject from a spectral calibration or install run plate because the Edit & Re-inject button is inactive in the Run Queue screen	Re-injection is not allowed for a spectral calibration or install run plate.		

Thermo Fisher™ Connect Platform troubleshooting

Observation	Possible cause	Recommended action
The △ (Cloud) icon is not displayed in the home screen or the Thermo Fisher™ Connect Platform icon does not appear in the software • △ (Cloud) is not displayed at the bottom left of the home screen. • ఆ is not displayed in save or open	The Thermo Fisher™ Connect Platform option is not enabled in the software.	Contact the instrument administrator to enable. See "Enable or disable Thermo Fisher™ Connect Platform access on the instrument (administrator only)" on page 232.
Thermo Fisher Connect	A cloud administrator removed you from the instrument, disconnected the instrument in the InstrumentConnect software (which unlinks all users), or you disconnected yourself.	Contact the instrument administrator to determine your next action. For more information, see "Re-link the instrument to your cloud profile" on page 226.
	Access to the Thermo Fisher™ Connect Platform was interrupted.	Contact the instrument administrator to determine your next action. For more information, see "Re-link the instrument to your cloud profile" on page 226.

Observation	Possible cause	Recommended action
Timeout error is displayed when you link to the Thermo Fisher™ Connect Platform	The Connect Platform option is not enabled in the software.	Check the home screen to ensure that the \triangle (Cloud) icon is displayed.
		Contact the instrument administrator.
	Firewall settings are not correctly set.	Contact Support.

Voice command troubleshooting

Observation	Possible cause	Recommended action
The blue bar indicating that Alexa can accept a command is not displayed on the instrument touchscreen How can I help you? You can ask me, "Show commands", to see a list of useful commands. Here are some other popular asks:	Voice commands are not enabled. A gray or amber microphone icon is displayed in the home screen.	Register voice commands. See "Enable (register) the voice command function" on page 236.
"Check results group" "Check plate Ist" "Turn L. E. D. off" "Go to libraries" "Check run module" "Go to run results" "Check polymer" "Show the dyeset"	You are signed in with a local profile. The microphone icon is not displayed in the home screen.	Sign in with a cloud profile. See "Sign in to apps.thermofisher.com and access the InstrumentConnect software" on page 217.
Blue bar at the top of the touchscreen indicates that Alexa can accept a command	Alexa is not active.	Say Alexa. When the blue bar is displayed, say Open flex instrument.
	Alexa is active, but does not respond.	Say <i>Alexa stop</i> , then start again.
	The microphone is muted. A blue icon with a strikethrough is displayed in the home screen.	Unmute the microphone. See "Microphone icon indicators for voice commands" on page 240.
	Alexa did not understand the command.	Speak clearly and slowly when you say commands.



Run modules and dye sets

Run modules, read lengths, size ranges, and run times	534
Dye sets	538

Run modules, read lengths, size ranges, and run times

IMPORTANT! Use BDX run modules only if you prepare samples with the BigDye XTerminator™ Purification Kit. Use non-BDX run modules for samples purified with other methods.

Table 26 Sequencing analysis run modules

		Config	guration	23 ho	urs throu	ghput ^[1]	Perform- ance
Run module type	Run module name	Cap. length (cm)	Polymer type	Run time (min)	(8-cap.)	(24-cap.)	Contig. Read Length (CRL) ^[2]
Short read	ShortReadSeq50_POP7	50	POP-7™	≤30	≥368	≥1,104	≥300
sequencing	ShortReadSeq50_POP7xl						
Short read sequencing BigDye XTerminator™	BDxShortReadSeq50_POP7 BDxShortReadSeq50_POP7xl	50	POP-7™	≤30	≥368	≥1,104	≥300
Rapid sequencing	RapidSeq50_POP6 RapidSeq50_POP6xl	50	POP-6™	≤65	≥168	≥504	≥450
	RapidSeq50_POP7 RapidSeq50_POP7xl	50	POP-7™	≤40	≥280	≥840	≥500
Rapid sequencing	RapidSeq36_POP4 RapidSeq36_POP4xl	36	POP-4™	≤45	≥240	≥720	≥400
	RapidSeq36_POP6 RapidSeq36_POP6xI	36	POP-6™	≤70	≥168	≥504	≥600
	RapidSeq36_POP7 RapidSeq36_POP7xl	36	POP-7™	≤30	≥368	≥1,104	≥600

Table 26 Sequencing analysis run modules (continued)

		Config	guration	23 ho	Perform- ance		
Run module type	Run module name	Cap. length (cm)	Polymer type	Run time (min)	(8-cap.)	(24-cap.)	Contig. Read Length (CRL) ^[2]
Rapid sequencing BigDye XTerminator™	BDxRapidSeq50_POP6 BDxRapidSeq50_POP6xl	50	POP-6™	≤68	≥160	≥480	≥450
	BDxRapidSeq50_POP7 BDxRapidSeq50_POP7xl	50	POP-7™	≤40	≥280	≥840	≥500
Rapid sequencing BigDye XTerminator™	BDxRapidSeq36_POP4 BDxRapidSeq36_POP4xl	36	POP-4™	≤45	≥240	≥720	≥400
713.11.11.12.5	BDxRapidSeq36_POP6 BDxRapidSeq36_POP6xl	36	POP-6™	≤70	≥156	≥468	≥600
	BDxRapidSeq36_POP7 BDxRapidSeq36_POP7xl	36	POP-7™	≤33	≥328	≥984	≥600
Fast sequencing	FastSeq50_POP6 FastSeq50_POP6xl	50	POP-6™	≤90	≥122	≥368	≥600
	FastSeq50_POP7 FastSeq50_POP7xl	50	POP-7™	≤65	≥168	≥504	≥700
Fast sequencing	FastSeq36_POP7 FastSeq36_POP7xl	36	POP-7™	≤60	≥184	≥552	≥750
Fast sequencing BigDye XTerminator™	BDxFastSeq50_POP6 BDxFastSeq50_POP6xl	50	POP-6™	≤90	≥122	≥368	≥600
Xiominator	BDxFastSeq50_POP7 BDxFastSeq50_POP7xl	50	POP-7™	≤65	≥168	≥504	≥700
Fast sequencing BigDye XTerminator™	BDxFastSeq36_POP7 BDxFastSeq36_POP7xl	36	POP-7™	≤60	≥184	≥552	≥750
Standard sequencing	StdSeq50_POP6 StdSeq50_POP6xI	50	POP-6™	≤135	≥80	≥240	≥600
	StdSeq50_POP7 StdSeq50_POP7xI	50	POP-7™	≤125	≥88	≥264	≥850

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Table 26 Sequencing analysis run modules (continued)

		Configuration		23 ho	Perform- ance		
Run module type	Run module name	Cap. length (cm)	Polymer type	Run time (min)	(8-cap.)	(24-cap.)	Contig. Read Length (CRL) ^[2]
Standard sequencing BigDye	BDxStdSeq50_POP6 BDxStdSeq50_POP6xl	50	POP-6™	≤140	≥72	≥216	≥600
XTerminator™	BDxStdSeq50_POP7 BDxStdSeq50_POP7xl	50	POP-7™	≤125	≥88	≥264	≥850
Microbial sequencing for MicroSEQ™ ID kits	MicroSeqID50_POP6 MicroSeqID50_POP6xI	50	POP-6™	≤135	≥80	≥240	≥600

^[1] Throughput (samples/day): The total number of samples run in 23 hours (0.5 hour is required for user interaction and 0.5 hour is required for warm-up time).

Table 27 Fragment analysis run modules

		Configuration		23 hours throughput ^[1]			Performance			
Run module	Run module name	0						Sizing precision ^[3]		
type		Cap. length (cm)		Run time (min)	(8- cap.)	(24- cap.)	Range ^[2]	50- 400bp	401- 600bp	601– 1,200 bp
Fragment analysis	FragmentAnalysis50_POP7 FragmentAnalysis50_POP7xl	50	POP-7™	≤45	≥280	≥840 ^[4]	≥40 to ≤520	<0.15	<0.30	NA ^[5]
	FragmentAnalysis50_POP6 FragmentAnalysis50_POP6xI	50	POP-6™	≤100	≥112	≥336	≥20 to ≤550	<0.15	<0.30	NA ^[5]
	FragmentAnalysis36_POP4 FragmentAnalysis36_POP4xI	36	POP-4™	≤35	≥312	≥936	≥60 to ≤400	<0.15	NA	NA ^[5]
	FragmentAnalysis36_POP7 FragmentAnalysis36_POP7xI	36	POP-7™	≤30	≥368	≥1,104	≥60 to ≤400	<0.15	NA	NA ^[5]
Fragment analysis	FragAnalysis36_POP6 FragAnalysis36_POP6xl	36	POP-6™	≤66	≥160	≥480	≥60 to ≤500	<0.15	<0.30	NA ^[5]

^[2] The maximum number of contiguous bases in the analyzed sequence with an average QV ≥20, calculated over a sliding window 20 base pairs wide from an AB Long Read Standard sequencing sample. This calculation starts with base number 1. The read length is counted from the middle base of the first good window to the middle base of the last good window, where a "good" window is one in which the average QV is ≥20.

Table 27 Fragment analysis run modules (continued)

		Configuration		23 hours throughput ^[1]			Performance			
Run module	Run module name	Con		Run				Sizing precision ^[3]		
type		Cap. length (cm)	Pol. type	time (min)	(8- cap.)	(24- cap.)	Range ^[2]	50– 400bp	401– 600bp	601- 1,200 bp
Long fragment analysis	LongFragAnalysis50_POP7 LongFragAnalysis50_POP7xl	50	POP-7™	≤125	≥88	≥264	≥40 to ≤700	<0.15	<0.30	<0.45
SNaPshot™	SNaPshot50_POP7 SNaPshot50_POP7xl	50	POP-7™	≤30	≥368	≥1,104	≥40 to ≤120	<0.50	NA	NA ^[5]

^[1] Throughput (samples/day): The total number of samples run in 23 hours (0.5 hour is required for user interaction and 0.5 hour is required for warm-up time).

Table 28 HID analysis run modules

	Config	guration	23 hours throughput ^[1]			Performance		
Run module	Can langth		Run time				Sizing precision ^[3]	
	Cap. length (cm)	Polymer type	(min)	(8-cap.)	(24-cap.)	Range ^[2]	60– 460bp	461- 580bp
HID_J6_36_POP4xI	36	POP-4™	≤37	≥298	≥895	≥60 to ≤460	<0.15	NA ^[4]
HID_J6_36_POP4	36	POP-4™	≤37	≥298	≥895	≥60 to ≤460	<0.15	NA ^[4]
HID_G5_36_POP4xI	36	POP-4™	≤32	≥345	≥1,035	≥60 to ≤460	<0.15	NA ^[4]
HID_G5_36_POP4	36	POP-4™	≤32	≥345	≥1,035	≥60 to ≤460	<0.15	NA ^[4]
HID_J6T_36_POP4xI	36	POP-4™	≤37	≥298	≥895	≥60 to ≤460	<0.15	NA ^[4]
HID_J6T_36_POP4	36	POP-4™	≤37	≥298	≥895	≥60 to ≤460	<0.15	NA ^[4]

^[2] Resolution range: The range of bases over which the resolution (peak spacing interval divided by the peak width at half-maximum in a GeneScan™ 600 LIZ™ Size Standard or GeneScan™ 1200 LIZ™ Size Standard sample sized with a third order fit) is ≥1. The table shows the resolution range in ≥90% of samples.

^[3] Sizing precision: Standard deviation of sizes for one allele in the DS-33 install standard sized with the GS600 LIZ size standard across multiple capillaries in the same run. For one injection to pass, 100% of the alleles in that injection must meet the intra-run sizing precision specifications. The table shows the sizing precision of 100% of alleles in ≥90% of samples.

^[4] Throughput is an estimate extrapolated from average run time.

^[5] Not applicable because of the size of the fragments collected in the run.

Table 28 HID analysis run modules (continued)

	Configuration		23 hour	s through	nput ^[1]	Performance		
Run module	Can langth		Dun tina				Sizing pr	ecision ^[3]
	Cap. length (cm)	Polymer type	Run time (min)	(8-cap.)	(24-cap.)	Range ^[2]	60- 460bp	461- 580bp
HID_J6_36_POP6xI	36	POP-6™	≤58	≥190	≥571	≥60 to ≤580	<0.15	<0.15
HID_J6_36_POP6	36	POP-6™	≤58	≥190	≥571	≥60 to ≤580	<0.15	<0.15

^[1] Throughput (samples/day): The total number of samples run in 23 hours (0.5 hour is required for user interaction and 0.5 hour is required for warm-up time).

Dye sets

Table 29 Sequence analysis dye sets

Dye set	Application
E (v1.1 BigDye™ Terminator)	Rapid DNA sequencing
Z (v3.1 BigDye™ Terminator)	DNA sequencing

Table 30 Fragment analysis dye sets

Dye set	Application
E5	SNaPshot™ kit
G5	DNA sizing for 5-dye chemistry
J6 or J6-T	DNA sizing for 6-dye chemistry
F	DNA sizing for 4-dye chemistry
D	DNA sizing for 4-dye chemistry

Table 31 HID analysis dye sets

Dye set	Application
G5	DNA sizing for 5-dye chemistry
J6 or J6-T	DNA sizing for 6-dye chemistry

^[2] Resolution Range: The range of bases over which the resolution (peak spacing interval divided by the peak width at half-max in a GS600 size standard sample sized with a third order fit) is ≥1.

^[3] Sizing precision: Standard deviation of sizes for one allele in the HID install standard or GlobalFiler™ Allelic Ladder, sized with the GeneScan™ 600 LIZ™ Size Standard v2.0 across multiple capillaries in the same run. For one injection to pass, 100% of the alleles in that injection must meet the intra-run sizing precision specifications. The table shows the sizing precision of 100% of alleles in ≥90% of samples.

^[4] Not applicable because of the size of the fragments collected in the run.



Instrument specifications

Instrument dimensions and clearance	539
Operating specifications	541
Environmental requirements	541
Electrical requirements	542
Wired and wireless network options and requirements	543
Network and firewall requirements	544
Power and communication connections	545

Instrument dimensions and clearance

Parameter	Instrument footprint	Recommended clearance
Depth	~68 cm (27 inches)	~25 cm (10 inches) at the rear of the instrument to ensure adequate airflow and cooling
Width	~70 cm (28 inches) with doors closed	~18 cm (7 inches) from wall
	~99 cm (39 inches) with doors open	~36 cm (14 inches) from other instruments or computers
Height	87 cm (35 inches)	~60 cm (24 inches) from the top of the instrument
		~150 cm (60 inches) from the bench top
Weight	~115 kg (254 lbs)	
	A bench that is rated for ~150 kg (331 lb) is recommended.	

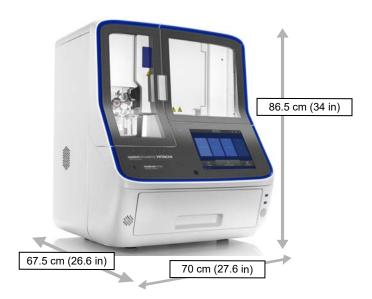


Figure 96 Instrument dimensions

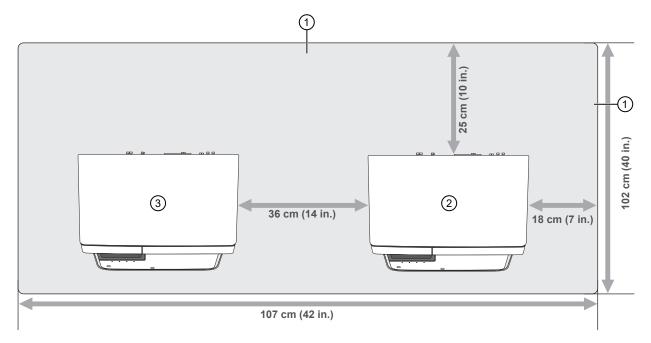


Figure 97 Bench layout, top view

- 1 Wall
- 2 Instrument

Approximately 60 cm (24 inches) of space is required above the instrument.

Operating specifications

Component	Specification	
Laser	Long-life, single-line 505 nm, solid-state or optically pumped semiconductor laser excitation source	
	Laser Output power:	
	- (Normal maximum) 20 mW	
	 (Maximum when failed) 54 mW 	
	Beam divergence 1.4 mrad	
LED	Emitting color Natural White	
	Luminous Intensity 30 Cd	
Electrophoresis voltage	e Up to 20 kV	
Oven temperature	Active temperature control from 18°C–70°C	

Environmental requirements

Condition	Acceptable range	
Installation site	Indoor use only	
Electromagnetic interference	Do not use this device in close proximity to sources of strong electromagnetic radiation (for example, unshielded intentional RF sources). Strong electromagnetic radiation may interfere with the proper operation of the device.	
	This equipment has been designed and tested to CISPR 11 Class A. In a domestic environment it may cause radio interference. You may need to take measures to mitigate the interference.	
Altitude	Safety tested up to 2,000 m (6,500 ft.)	
Operating conditions	15-30°C (59-86°F), 20-80% relative humidity (noncondensing)	
	Room temperature should not fluctuate ±2°C during an instrument run.	
Transport and storage conditions	-30 to +60°C (−22 to +140°F), 5–95% relative humidity	
Transient category	Installation categories II	
Overvoltage category	Installation categories II	
Vibration	Ensure that the instrument is not adjacent to strong vibration sources, such as a centrifuge, pump, or compressor. Excessive vibration will affect instrument performance.	

(continued)

Condition	Acceptable range	
Pollution degree	II	
	Install the instrument in an environment that is free of pollutants other than non-conductive pollutants such as dust particles or wood chips. Typical environments with Pollution Degree II rating are laboratories and sales and commercial areas.	
Liquid waste collection	Dispose of the polymer, buffer, reagents and any liquid waste as hazardous waste in compliance with local and national regulations.	
Other conditions	Ensure the room is away from any vents that could expel particulate material on the components.	
	Avoid placing the instrument and computer adjacent to heaters, cooling ducts, or in direct sunlight.	



WARNING! Portable RF communications equipment (including peripherals such as antenna cables and external antennas) should be used no closer than 30 cm (12 inches) to any part of the instrument, including cables specified by the manufacturer. Otherwise, degradation of the performance of this equipment could result.



WARNING! Use of this equipment adjacent or stacked with other equipment should be avoided because it could result in improper operation.



WARNING! Use of accessories, transducers, and cables other than those specified or provided by the manufacturer of this equipment could result in increased electromagnetic emissions or decreased electromagnetic immunity of this equipment and result in improper operation.

Electrical requirements



CAUTION! Do not unpack or plug in any components until they are configured for the proper operating voltage by the service representative.



WARNING! For safety, the power outlet for the instrument must be accessible at all times. The instrument must be ~18 cm (7 in.) from a wall or ~36 cm (14 in.) from other instruments or computers.

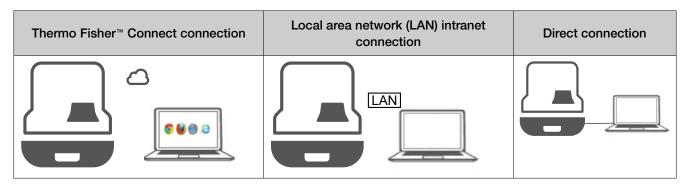
In case of emergency, you must be able to immediately disconnect the main power supply to all the equipment. Allow adequate space between the wall and the equipment so that the power cords can be disconnected in case of emergency.

- · Dedicated line and ground between the instrument and the main electrical service
- Maximum power dissipation: 1,000 VA, 1,000 W (not including computer or monitor)
- Mains AC line voltage tolerances must be up to ±10 percent of nominal voltage

Device	Rated voltage	Maximum power	Rated frequency	Rated power
Instrument	100-240 ±10% VAC ^[1]	10 A (1,000 VA)	50/60 Hz	4.2 A (418 VA)

^[1] If the supplied power fluctuates beyond the rated voltage, a power line regulator may be required. High or low voltages can adversely affect the electronic components of the instrument.

Wired and wireless network options and requirements



Network connection	Requirement
Wireless	A wireless adapter (also referred to as a dongle) is provided with the instrument. The wireless connection conforms to 802.11 b/g/n wireless standards.
Wired	The instrument is factory-configured for IPv4 TCP/IP communication and uses an Ethernet adapter (100/1,000 Mbps) with an RJ45-type connector for local area network (LAN) connection.
	An active, tested network jack must be in place before the scheduled installation date.
	 The assigned IT or network specialist from your organization must be available during the installation to help connect the instrument to your network.
Direct	No network is required.

Network and firewall requirements

All options require specific firewall exceptions to support features of the software.

Network connection	Requirement
Wireless	An wireless adapter (also referred to as a dongle) is provided with the instrument. The wireless connection conforms to 802.11 b/g/n wireless standards.
Wired	The instrument is factory-configured for IPv4 TCP/IP communication and uses an Ethernet adapter (100/1,000 Mbps) with an RJ45-type connector for local area network (LAN) connection.
	An active, tested network jack must be in place before the scheduled installation date.
	The assigned IT or network specialist from your organization must be available during the installation to help connect the instrument to your network.
Direct	No network is required.

Networking requirements

Firewall exception requirements

The system should be configured behind a firewall. If outbound traffic is limited, these firewall exceptions are required to support system features:

URL	Port	Purpose	Required for functions
*.logmein.com	outbound 443	To support remote access and support.	 Thermo Fisher™ Connect or LAN connection with internet access
*.logmeinrescue.com	outbound 443	To support remote access and support.	 Thermo Fisher™ Connect or LAN connection with internet access
*.instrumentconnect.com	outbound 443	To support instrument management and identity.	Thermo Fisher™ Connect only
*.thermofisher.com	outbound 443	To support instrument management and identity.	 Thermo Fisher™ Connect or LAN connection with internet access

(continued)

Networking requirements			
*.s3-us-east-1.amazonaws.com	outbound 443	To support telemetry and log files.	 Thermo Fisher™ Connect or LAN connection with internet access
*.iot.us-east-1.amazonaws.com	outbound 443	To support telemetry and log files.	 Thermo Fisher™ Connect or LAN connection with internet access
Allowed port requirements			
_	TCP 445 (SMB v3 or higher)	To support file sharing.	LAN connection orDirect connection
_	8443	To support communication between the instrument and the SAE server v2.1.	Any connection, Security, Auditing, and E-signature (SAE)

Power and communication connections

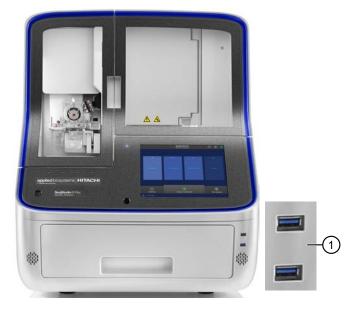
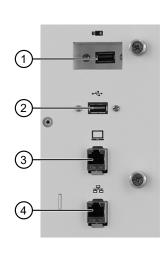


Figure 98 Instrument front panel connections

1 USB ports used for transferring data



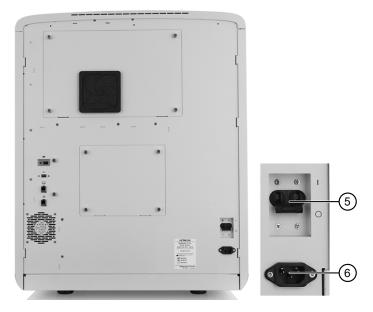


Figure 99 Instrument rear panel connections

- (1) Recessed USB port (for use with the wireless network adapter; adapter not shown)
- (2) USB port (for optional USB barcode scanner connection)
- ③ Direct connection port ____ (to allow computer connection without a network)
- ④ Wired network port 器
- (5) Circuit breaker (rear power switch; use the power switch on the front panel for normal operation)
- 6 Power receptacle



Catalog numbers

Plates bases retainers and septa	547
Instrument consumables	548
Sequencing analysis reagents and consumables	548
Fragment/HID analysis reagents	549

Plates bases retainers and septa

Table 32 Plates, bases, retainers, and septa

Name	Cat. No.	
96-well plates		
MicroAmp™ Fast Optical 96-Well Reaction Plate with Barcode, 0.1 mL (Qty 20)	4346906	
MicroAmp™ Fast Optical 96-Well Reaction Plate, 0.1 mL	4346907	
MicroAmp™ Optical 96-Well Reaction Plate	N8010560	
MicroAmp™ Optical 96-Well Reaction Plate with Barcode (Qty 20)	4306737	
96-Well Septa 3500/Flex Series (Qty 20)	4412614	
96-Well Standard Retainer & Base Set SeqStudio™ Flex Series	A49316	
96-Well Fast Retainer & Base Set SeqStudio™ Flex Series	A49495	
8-tube strip tubes		
MicroAmp™ Reaction Tube without Cap, 0.2 mL	N8010533	
MicroAmp™ Fast 8-Tube Strip, 0.1 mL	4358293	
8-Strip Septa 3500/Flex Series (Qty 24)	4410701	
8-Tube Standard Retainer & Base Set SeqStudio™ Flex Series	A49296	
8-Tube Fast (0.1 mL) Retainer & Base Set SeqStudio™ Flex Series	A49298	
384-well plates		
MicroAmp™ Optical 384-Well Reaction Plate with Barcode	4309849	
384-Well Septa 3500/Flex Series (Qty 20)	4412520	
384-Well Retainer & Base Set SeqStudio™ Flex Series	A49496	

Instrument consumables

Name	Cat. No.
Anode Buffer Container 3500/Flex Series	4393927
Capillary array 36-cm SeqStudio™ 8 Flex	A49104
Capillary array 50-cm SeqStudio™ 8 Flex	A49106
Capillary array 36-cm SeqStudio™ 24 Flex	A49105
Capillary array 50-cm SeqStudio™ 24 Flex	A49107
Cathode Buffer Container 3500/Flex Series	4408256
Septa Cathode Buffer Container 3500/Flex Series	4410715
Conditioning Reagent Kit 3500/Flex Series	4393718
POP-6™ (960) Performance Optimized Polymer	4393712
POP-6™ (384) Performance Optimized Polymer	4393717
POP-7™ (960) Performance Optimized Polymer	4393714
POP-7™ (384) Performance Optimized Polymer	4393708
POP-4™ (960) Performance Optimized Polymer	4393710
POP-4™ (384) Performance Optimized Polymer	4393715
Polymer Pouch Cap	4412619
Hi-Di™ Formamide, 5 mL	4401457
Hi-Di™ Formamide, 4 × 5 mL	4440753
Hi-Di™ Formamide, 25 mL	4311320

Sequencing analysis reagents and consumables

Name	Cat. No.
BigDye™ Terminator v1.1	
Sequencing Standards, BigDye™ Terminator v1.1, SeqStudio™/3500/Flex Series	4404314
Matrix Standards Kit, BigDye™ Terminator v1.1, 31xx/SeqStudio™/3500/Flex Series	4336824
BigDye™ Terminator v1.1 Cycle Sequencing Kit (100 reactions)	4337450
BigDye™ Terminator v3.1	·
Sequencing Standards, BigDye™ Terminator v3.1	4404312

(continued)

Name	Cat. No.	
Matrix Standards Kit, BigDye™ Terminator v3.1, 31xx/SeqStudio™/3500/Flex Series	4336974	
BigDye™ Terminator v3.1 Cycle Sequencing Kit (100 reactions)		
BigDye™ Direct		
BigDye™ Direct Cycle Sequencing Kit (100 reactions)		

Fragment/HID analysis reagents

Name	Cat. No.
DS-02 Matrix Standard Set (Dye Set E5)	4323014
DS-30 Matrix Standard Kit (Dye Set D)	4345827
DS-31 Matrix Standard Kit (Dye Set D with VIC™ dye)	4345829
DS-32 Matrix Standard Kit (Dye Set F)	4345831
DS-33 Matrix Standard Kit (Dye Set G5)	4345833
DS-36 Matrix Standard (Dye Set J6)	4425042
DS-37 Matrix Standard Kit (Dye set J6-T, 6-dye)	A31234
DS-33 GeneScan™ Installation Standards with GeneScan™ 600 LIZ™ Size Standard v2.0	4376911
GeneScan™ 120 LIZ™ Size Standard	4324287
GeneScan™ 500 LIZ™ Size Standard	4322682
GeneScan™ 500 ROX™ Size Standard	401734
GeneScan™ 600 LIZ™ Size Standard v2.0	4408399
GeneScan™ 600 LIZ™ Size Standard	4366589
GeneScan™ 1200 LIZ™ Size Standard	4379950



Radio Frequency Identification (RFID) technology

RFID precautions for use	550
Locations of RFID read/write units	551
RFID function	551
RFID specifications	552
RFID troubleshooting	553

The instrument uses four identical wireless radio frequency identification (RFID) read/write units to monitor instrument consumables.

RFID precautions for use



WARNING! Radio frequency identification (RFID) could possibly disrupt the operation of patient-worn and/or implanted active medical devices. To minimize such effects, do not come within 10 cm of this instrument if you have a patient-worn and/or implanted active medical device.



WARNING! Radio frequency identification (RFID) signals from external devices could possibly disrupt the operation of the instrument read/write units. RFID signals from the instrument RFID read/write units could possibly disrupt the operation of external RFID devices. To minimize such effects, do not bring external RFID devices within 10 cm of this instrument during instrument operation.

Locations of RFID read/write units

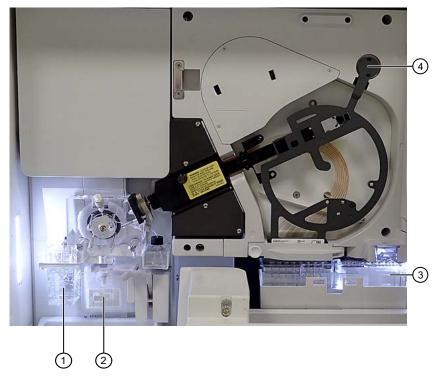


Figure 100 RFID read/write unit locations within instrument interior (shown with door open)

- 1) ABC RFID read/write unit (behind ABC)
- 2 Pouch RFID read/write unit (behind pouch)
- (3) CBC RFID read/write unit (behind CBC)
- 4 Capillary array RFID read/write unit (behind RFID label)

RFID function

The RFID read/write units perform the following actions at the start of each run:

- 1. Read up to 256 bytes from the RFID consumables tags.
- 2. Write up to 256 bytes to the RFID consumables tags.
- 3. Re-read the written data on the tags to confirm that it is accurate, using a checksum to verify data integrity.

RFID specifications

Table 33 RFID read/write unit specifications

Component	Specification
RFID read/write unit	 Ultra-Compact Proximal-Type RFID Reader / Writer Model ASI4000 R2X Manufactured by ART Finex Co., Ltd.
RF frequency	13.56 MHz
RF output power	~67 mW
RFID tags	Texas Instruments RI-I03-112A-03 tags, tested by the manufacturer to reliably read and write 100,000 times with zero data loss and retain written data for more than 10 years
Effective range between RFID tag and internal RFID read/write units	 ABC tag: 8.8–9.6 mm CBC tag: 10.2–10.9 mm Capillary array tag: 8.3 mm Polymer pouch tag: 18.4 mm
Typical use range between RFID tag and internal RFID read/write units	0.5 cm
Minimum separation distance of the instrument from external RFID read/write units	10 cm
Minimum separation distance of the instrument from other wireless technologies such as WiFi, Bluetooth, or Cellular	92 cm
Minimum separation distance of the instrument from other laboratory equipment such as centrifuge or thermal cycler	1 m
Wireless security	 RFID tag read/write/re-read with checksum Password access for use of software Base-64 encoding of data between the instrument and the computer

FCC / IC Regulation

Contains FCC ID: 2AM8P-3668

Contains IC: 7805A-3668

This device complies with part 15 of FCC Rules and Innovation, Science and Economic Development Canada's licence-exempt RSS(s). Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Le présent appareil est conforme à la partie 15 des règles de la FCC et aux normes des CNR d'Innovation, Sciences et Développement économique Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'appareil doit accepter tout brouillage subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

FCC CAUTION

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

RFID troubleshooting

Table 34 RFID troubleshooting

Symptom	Possible cause	Action
Unable to read RFID information. "Failure to Read from RFID tag"	Consumable is improperly installed or label is defective. Polymer/Conditioning reagent pouch is not positioned properly.	Ensure that the RFID label is not visibly damaged and consumable package is properly installed. Ensure that label is close, and parallel, to the instrument. close the instrument door to update the RFID information. Install a new consumable (if available).
		If problem persists, contact Technical Support.
	Malfunctioning RFID label or reader.	 Install a used CBC, ABC, pouch, or array on the instrument: If the instrument can read the RFID label, install a new CBC, ABC, pouch, or array. If the instrument cannot read the RFID label, contact Technical Support.

Safety



Symbols on this instrument	554
Safety information for instruments not manufactured by Thermo Fisher Scientific	558
Instrument safety	558
Safety and electromagnetic compatibility (EMC) standards	562
Chemical safety	565
Biological hazard safety	566



WARNING! GENERAL SAFETY. Using this product in a manner not specified in the user documentation may result in personal injury or damage to the instrument or device. Ensure that anyone using this product has received instructions in general safety practices for laboratories and the safety information provided in this document.

- Before using an instrument or device, read and understand the safety information provided in the user documentation provided by the manufacturer of the instrument or device.
- Before handling chemicals, read and understand all applicable Safety Data Sheets (SDSs) and use appropriate personal protective equipment (gloves, gowns, eye protection, and so on). To obtain SDSs, visit thermofisher.com/support.

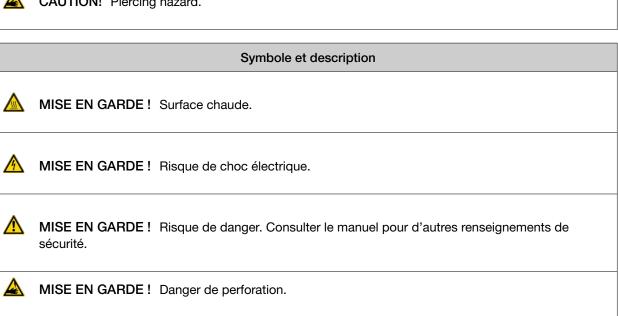
Symbols on this instrument

Symbols may be found on the instrument to warn against potential hazards or convey important safety information. In this document, the hazard symbol is used along with one of the following user attention words.

- **CAUTION!**—Indicates a potentially hazardous situation that, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.
- **WARNING!**—Indicates a potentially hazardous situation that, if not avoided, could result in death or serious injury.
- **DANGER!**—Indicates an imminently hazardous situation that, if not avoided, will result in death or serious injury.

Standard safety symbols

	Symbol and description		
	CAUTION!	Hot surface.	
A	CAUTION!	Risk of electrical shock.	
⚠	CAUTION!	Risk of danger. Consult the manual for further safety information.	
	CAUTION!	Piercing hazard.	



Location of safety labels

Safety labels are located on the rear panel, the oven door, and the detection cell heater block.

IMPORTANT! If any of the labels are not present on the instrument, contact Technical Support for replacements.



Figure 101 Rear panel



Figure 102 Oven door



Figure 103 Detection cell heater door (visible only when the oven door is open)

Control and connection symbols

Symbols and descriptions	
	On (Power)
	Off (Power)
(h)	On-Off (Power)
<u>_</u>	Earth (ground) terminal
	Protective conductor terminal (main ground)
===	Direct current
\sim	Alternating current
$\overline{\sim}$	Both direct and alternating current

Conformity symbols

Conformity mark	Description	
c UL us	Indicates conformity with safety requirements for Canada and U.S.A.	
25	Indicates conformity with China RoHS requirements.	
C€	Indicates conformity with European Union requirements.	
	Indicates conformity with Australian standards for electromagnetic compatibility.	
	Indicates conformity with the WEEE Directive 2012/19/EU.	
	CAUTION! To minimize negative environmental impact from disposal of electronic waste, do not dispose of electronic waste in unsorted municipal waste. Follow local municipal waste ordinances for proper disposal provision and contact customer service for information about responsible disposal options.	

Safety information for instruments not manufactured by Thermo Fisher Scientific

Some of the accessories provided as part of the instrument system are not designed or built by Thermo Fisher Scientific. Consult the manufacturer's documentation for the information needed for the safe use of these products.

Instrument safety

General



CAUTION! Do not remove instrument protective covers. If you remove the protective instrument panels or disable interlock devices, you may be exposed to serious hazards including, but not limited to, severe electrical shock, laser exposure, crushing, or chemical exposure.

If covers are removed, do not use the instrument. Contact Technical Support.

Physical injury



CAUTION! Moving and Lifting Injury. The instrument is to be moved and positioned only by the personnel or vendor specified in the applicable site preparation guide. Improper lifting can cause painful and permanent back injury.

Things to consider before lifting or moving the instrument or accessories:

- Depending on the weight, moving or lifting may require two or more persons.
- If you decide to lift or move the instrument after it has been installed, do not attempt to do so
 without the assistance of others, the use of appropriate moving equipment, and proper lifting
 techniques.
- Ensure you have a secure, comfortable grip on the instrument or accessory.
- Make sure that the path from where the object is to where it is being moved is clear of obstructions.
- Do not lift an object and twist your torso at the same time. Keep your spine in a good neutral position while lifting with your legs.
- · Participants should coordinate lift and move intentions with each other before lifting and carrying.
- For smaller packages, rather than lifting the object from the packing box, carefully tilt the box on its side and hold it stationary while someone else slides the contents out of the box.



CAUTION! Moving Parts. Moving parts can crush, pinch and cut. Keep hands clear of moving parts while operating the instrument. Disconnect power before servicing.

Appendix F Safety Instrument safety

Electrical safety



WARNING! Ensure appropriate electrical supply. For safe operation of the instrument:

- Plug the system into a properly grounded receptacle with adequate current capacity.
- Ensure the electrical supply is of suitable voltage.
- Never operate the instrument with the ground disconnected. Grounding continuity is required for safe operation of the instrument.



AVERTISSEMENT! Veiller à utiliser une alimentation électrique appropriée. Pour garantir le fonctionnement de l'instrument en toute sécurité :

- Brancher le système sur une prise électrique correctement mise à la terre et de puissance adéquate.
- S'assurer que la tension électrique est convenable.
- Ne jamais utiliser l'instrument alors que le dispositif de mise à la terre est déconnecté. La continuité de la mise à la terre est impérative pour le fonctionnement de l'instrument en toute sécurité.



WARNING! Power Supply Line Cords. Use properly configured and approved line cords for the power supply in your facility. If the line cord is damaged, contact Technical Support.



AVERTISSEMENT! Cordons d'alimentation électrique. Utiliser des cordons d'alimentation adaptés et approuvés pour raccorder l'instrument au circuit électrique du site.



WARNING! Disconnecting Power. To fully disconnect power either detach or unplug the power cord, positioning the instrument such that the power cord is accessible.



AVERTISSEMENT! Déconnecter l'alimentation. Pour déconnecter entièrement l'alimentation, détacher ou débrancher le cordon d'alimentation. Placer l'instrument de manière à ce que le cordon d'alimentation soit accessible.

Cleaning and decontamination



CAUTION! Cleaning and Decontamination. Use only the cleaning and decontamination methods that are specified in the manufacturer user documentation. It is the responsibility of the operator (or other responsible person) to ensure that the following requirements are met:

- No decontamination or cleaning agents are used that can react with parts of the equipment or with material that is contained in the equipment. Use of such agents could cause a HAZARD condition.
- The instrument is properly decontaminated a) if hazardous material is spilled onto or into the equipment, and/or b) before the instrument is serviced at your facility or is sent for repair, maintenance, trade-in, disposal, or termination of a loan. Request decontamination forms from customer service.
- Before using any cleaning or decontamination methods (except methods that are recommended by the manufacturer), confirm with the manufacturer that the proposed method will not damage the equipment.



MISE EN GARDE! Nettoyage et décontamination. Utiliser uniquement les méthodes de nettoyage et de décontamination indiquées dans la documentation du fabricant destinée aux utilisateurs. L'opérateur (ou toute autre personne responsable) est tenu d'assurer le respect des exigences suivantes:

- Ne pas utiliser d'agents de nettoyage ou de décontamination susceptibles de réagir avec certaines parties de l'appareil ou avec les matières qu'il contient et de constituer, de ce fait, un DANGER.
- L'instrument doit être correctement décontaminé a) si des substances dangereuses sont renversées sur ou à l'intérieur de l'équipement, et/ou b) avant de le faire réviser sur site ou de l'envoyer à des fins de réparation, de maintenance, de revente, d'élimination ou à l'expiration d'une période de prêt (des informations sur les formes de décontamination peuvent être demandées auprès du Service clientèle).
- Avant d'utiliser une méthode de nettoyage ou de décontamination (autre que celles recommandées par le fabricant), les utilisateurs doivent vérifier auprès de celui-ci qu'elle ne risque pas d'endommager l'appareil.

Instrument component and accessory disposal

To minimize negative environmental impact from disposal of electronic waste, do not dispose of electronic waste in unsorted municipal waste. Follow local municipal waste ordinances for proper disposal provision and contact customer service for information about responsible disposal options.

Laser safety



WARNING! LASER HAZARD. Under normal operating conditions, the SeqStudio™ Flex Series Genetic Analyzer is categorized as a Class 1 laser product. However, removing the protective covers and (when applicable) defeating the interlock(s) may result in exposure to the internal Class 3B laser. Lasers can burn the retina, causing permanent blind spots. To ensure safe laser operation, observe the following precautions:

- · Never look directly into the laser beam.
- Do not remove safety labels, instrument protective panels, or defeat safety interlocks.
- The system must be installed and maintained by a Thermo Fisher Scientific Technical Representative.
- Use of controls or adjustments or performance of procedures other than those provided in this guide may result in hazardous radiation exposure.
- · Remove jewelry and other items that can reflect a laser beam into your eyes or those of others
- Wear proper eye protection and post a laser warning sign at the entrance to the laboratory if the laser protection is defeated for servicing
- DO NOT operate the laser when it cannot be cooled by its cooling fan; an overheated laser can cause severe burns on contact.

The following table lists laser safety symbols and alerts that may be present on the instrument.

Alert



DANGER! Class 3B visible and/or invisible laser radiation is present when open and interlocks defeated. Avoid exposure to beam.

Alerte



DANGER! Rayonnement laser visible ou invisible de classe 3B présent en position ouverte et avec les dispositifs de sécurité non enclenchés. Éviter toute exposition au faisceau.

Safety and electromagnetic compatibility (EMC) standards

The instrument design and manufacture complies with the following standards and requirements for safety and electromagnetic compatibility.



Safety standards

Reference	Description
IEC 61010-1	Safety requirements for electrical equipment for measurement, control, and
EN 61010-1	laboratory use – Part 1: General requirements
UL 61010-1: 3rd Edition	
CAN/CSA C22.2 No. 61010-1-12	
IEC 61010-2-081	Safety requirements for electrical equipment for measurement, control and
EN 61010-2-081	laboratory use – Part 2-081: Requirements for automatic and semi-automatic laboratory equipment for analysis and other purposes
IEC 60825-1 Ed.3 (2014)	Radiation safety of laser products – Equipment classification, requirements, and user's guide
IEC 60825-1: 2014+A11: 2021	Radiation safety of laser products equipment classification, requirements, and user's guide
21 CFR 1040.10	Radiation Control for Health and Safety Act of 1968 Performance Standard
IEC 61010-2-010	Safety requirements for electrical equipment for measurement, control and
EN 61010-2-010	laboratory use – Part 2-010: Particular requirements for laboratory equipment for the heating of materials
EU Directive 2014/35/EU	European Union "Low Voltage Directive"

EMC standards

Reference	Description
EU Directive 2014/30/EU	European Union "EMC Directive"
EN 61326-1 IEC 61326-1	Electrical Equipment for Measurement, Control and Laboratory Use – EMC Requirements
AS/NZS CISPR 11	Limits and Methods of Measurement of Electromagnetic Disturbance Characteristics of Industrial, Scientific, and Medical (ISM) Radiofrequency Equipment
ICES-001, Issue 4	Industrial, Scientific and Medical (ISM) Radio Frequency Generators
FCC Part 15 Subpart B (47 CFR)	U.S. Standard Radio Frequency Devices This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Environmental design standards

Reference	Description
Directive 2012/19/EU	European Union "WEEE Directive" - Waste electrical and electronic equipment
Directive 2011/65/EU Commission Delegated Directive (EU) 2015/863	European Union "RoHS Directive"—Restriction of hazardous substances in electrical and electronic equipment
Ministry of Information Industry Order #32 (China)	PRC "Management Methods for Controlling Pollution by Electronic Information Products"
SJ/T 11364-2014	People's Republic of China Electronic Industry Standard For instrument specific certificates, visit our customer resource page at www.thermofisher.com/us/en/home/technical-resources/rohs- certificates.html.
Regulation (EC) No 1907/2006	Regulation, Evaluation, Authorization and Restriction of Chemicals (REACH)

Radio compliance standards

Reference	Description	
Directive 2014/53/EU	European Union "RE Directive" — Radio equipment	
RFID	FCC Notice (for U.S. Customers):	
	This device complies with Part 15 of the FCC Rules:	
	Operation is subject to the following conditions:	
	1. This device may not cause harmful interference, and	
	2. This device must accept any interference received, Including interference that may cause undesired operation.	
	Changes and modifications not expressly approved by Thermo Fisher Scientific can void your authority to operate this equipment under Federal Communications Commissions rules.	
RFID	Canada (English):	
	This device complies with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions:	
	(1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.	
RFID	Canada (Français):	
	Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes :	
	(1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage adioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.	

Chemical safety



WARNING! GENERAL CHEMICAL HANDLING. To minimize hazards, ensure laboratory personnel read and practice the general safety guidelines for chemical usage, storage, and waste provided below. Consult the relevant SDS for specific precautions and instructions:

- Read and understand the Safety Data Sheets (SDSs) provided by the chemical manufacturer before you store, handle, or work with any chemicals or hazardous materials. To obtain SDSs, see the "Documentation and Support" section in this document.
- Minimize contact with chemicals. Wear appropriate personal protective equipment when handling chemicals (for example, safety glasses, gloves, or protective clothing).
- Minimize the inhalation of chemicals. Do not leave chemical containers open. Use only with sufficient ventilation (for example, fume hood).
- Check regularly for chemical leaks or spills. If a leak or spill occurs, follow the manufacturer cleanup procedures as recommended in the SDS.
- · Handle chemical wastes in a fume hood.
- Ensure use of primary and secondary waste containers. (A primary waste container holds the immediate waste. A secondary container contains spills or leaks from the primary container.
 Both containers must be compatible with the waste material and meet federal, state, and local requirements for container storage.)
- After emptying a waste container, seal it with the cap provided.
- Characterize (by analysis if needed) the waste generated by the particular applications, reagents, and substrates used in your laboratory.
- Ensure that the waste is stored, transferred, transported, and disposed of according to all local, state/provincial, and/or national regulations.
- **IMPORTANT!** Radioactive or biohazardous materials may require special handling, and disposal limitations may apply.



AVERTISSEMENT! PRÉCAUTIONS GÉNÉRALES EN CAS DE MANIPULATION DE PRODUITS CHIMIQUES. Pour minimiser les risques, veiller à ce que le personnel du laboratoire lise attentivement et mette en œuvre les consignes de sécurité générales relatives à l'utilisation et au stockage des produits chimiques et à la gestion des déchets qui en découlent, décrites ci-dessous. Consulter également la FDS appropriée pour connaître les précautions et instructions particulières à respecter:

- Lire et comprendre les fiches de données de sécurité (FDS) fournies par le fabricant avant de stocker, de manipuler ou d'utiliser les matériaux dangereux ou les produits chimiques. Pour obtenir les FDS, se reporter à la section « Documentation et support » du présent document.
- Limiter les contacts avec les produits chimiques. Porter des équipements de protection appropriés lors de la manipulation des produits chimiques (par exemple : lunettes de sûreté, gants ou vêtements de protection).
- Limiter l'inhalation des produits chimiques. Ne pas laisser les récipients de produits chimiques ouverts. Ils ne doivent être utilisés qu'avec une ventilation adéquate (par exemple, sorbonne).
- Vérifier régulièrement l'absence de fuite ou d'écoulement des produits chimiques. En cas de fuite ou d'écoulement d'un produit, respecter les directives de nettoyage du fabricant recommandées dans la FDS.
- · Manipuler les déchets chimiques dans une sorbonne.

Appendix F Safety Biological hazard safety

- Veiller à utiliser des récipients à déchets primaire et secondaire. (Le récipient primaire contient les déchets immédiats, le récipient secondaire contient les fuites et les écoulements du récipient primaire. Les deux récipients doivent être compatibles avec les matériaux mis au rebut et conformes aux exigences locales, nationales et communautaires en matière de confinement des récipients.)
- · Une fois le récipient à déchets vidé, il doit être refermé hermétiquement avec le couvercle fourni.
- Caractériser (par une analyse si nécessaire) les déchets générés par les applications, les réactifs et les substrats particuliers utilisés dans le laboratoire.
- Vérifier que les déchets sont convenablement stockés, transférés, transportés et éliminés en respectant toutes les réglementations locales, nationales et/ou communautaires en vigueur.
- **IMPORTANT!** Les matériaux représentant un danger biologique ou radioactif exigent parfois une manipulation spéciale, et des limitations peuvent s'appliquer à leur élimination.



WARNING! HAZARDOUS WASTE (from instruments). Waste produced by the instrument is potentially hazardous. Follow the guidelines noted in the preceding General Chemical Handling warning.

Biological hazard safety



WARNING! Potential Biohazard. Depending on the samples used on this instrument, the surface may be considered a biohazard. Use appropriate decontamination methods when working with biohazards.



WARNING! BIOHAZARD. Biological samples such as tissues, body fluids, infectious agents, and blood of humans and other animals have the potential to transmit infectious diseases. Conduct all work in properly equipped facilities with the appropriate safety equipment (for example, physical containment devices). Safety equipment can also include items for personal protection, such as gloves, coats, gowns, shoe covers, boots, respirators, face shields, safety glasses, or goggles. Individuals should be trained according to applicable regulatory and company/ institution requirements before working with potentially biohazardous materials. Follow all applicable local, state/provincial, and/or national regulations. The following references provide general guidelines when handling biological samples in laboratory environment.

- U.S. Department of Health and Human Services, Biosafety in Microbiological and Biomedical Laboratories (BMBL), 6th Edition, HHS Publication No. (CDC) 300859, Revised June 2020 https://www.cdc.gov/labs/pdf/CDC-BiosafetymicrobiologicalBiomedicalLaboratories-2020-P.pdf
- Laboratory biosafety manual, fourth edition. Geneva: World Health Organization; 2020 (Laboratory biosafety manual, fourth edition and associated monographs)
 www.who.int/publications/i/item/9789240011311



Documentation and support

Related documentation	567
Customer and technical support	567
Limited product warranty	568

Related documentation

Document	Publication number
Software help that is accessible in all applications	NA
SeqStudio™ Flex Series Genetic Analyzer with Instrument Software v1.0 Quick Reference	100104690
SeqStudio™ Flex Series Genetic Analyzer with Instrument Software v1.0 Site Prep Guide	100104691
SAE Administrator Console v2.1 User Guide for Capillary Electrophoresis Products	MAN0025849
DNA Fragment Analysis by Capillary Electrophoresis User Guide	4474504
DNA Sequencing by Capillary Electrophoresis Chemistry Guide Second Edition	4305080
DNA Sequencing by Capillary Electrophoresis Chemistry Guide Third Edition	COL02120 0716 thermofisher.com/ sangerhandbook

Note: For additional documentation, see "Customer and technical support" on page 567.

Customer and technical support

Visit thermofisher.com/support for the latest service and support information.

- Worldwide contact telephone numbers
- Product support information
 - Product FAQs
 - Software, patches, and updates
 - Training for many applications and instruments

Appendix G Documentation and support Limited product warranty

- Order and web support
- Product documentation
 - User guides, manuals, and protocols
 - Certificates of Analysis
 - Safety Data Sheets (SDSs; also known as MSDSs)

Note: For SDSs for reagents and chemicals from other manufacturers, contact the manufacturer.

Limited product warranty

Life Technologies Corporation and/or its affiliate(s) warrant their products as set forth in the Life Technologies' General Terms and Conditions of Sale found at www.thermofisher.com/us/en/home/global/terms-and-conditions.html. If you have any questions, please contact Life Technologies at http://www.thermofisher.com/support.

Index

Special Characters	on-instrument limits 26
%RL basecall 346, 348	antivirus software 447
·	array. See capillary array as-needed instrument maintenance 364
Numerica	audit reason, specify 249
Numerics	auto-spectral calibration, results 152
384-well	auto-spectral calibration for each capillary position
catalog numbers 547	150, 151
plate assembly 81	autoanalysis. See cloud analysis
plate base 81	automated barcode run, signatures required 253
retainer required 78	automated barcode workflow
8-tube strip	troubleshooting plate alerts 517
catalog numbers 547 plate assembly 80	with barcoded plates 147
plate assembly 60 plate base 80	automatic analysis after run. See cloud analysis
retainer required 78	automatic screen locking 34, 60
96-well	autopurge 477
catalog numbers 547	autosampler, error
plate assembly 79	
plate base 79	В
retainer required 78	
·	instrument settings, user-created library items,
Λ	and run history 479
A	user data 479
AB1 file, export 171, 478	background export
ABC. See anode buffer	cancel 475
Accuracy. See %RL basecall	check status 475
alarm clock icon, Remote Monitoring 185	configure 475
alerts during run 149	barcode
alignment read length 346, 348	automated workflow 147
All Variants list, download 208 Amazon Alexa. See voice commands	automated workflow troubleshooting plate alerts
analysis settings	517
create 292	in plate file 268
defined 292	barcode reader, internal, enable or disable 468
fragment analysis 297	basepair accuracy. See %RL basecall
library 292	bases for plates, catalog numbers 547
select in plate file 90, 93	BigDye Direct Cycle Sequencing Kit
sequencing 294	catalog numbers 548 chemistry for spectral calibration or install run
analysis software, secondary 51, 111	314
anode buffer	dye set for regular run 314
catalog numbers and storage 26	guidelines for use 314
check fill line 71	BigDye Terminator kits and standards, catalog num-
install 369	bers 548
maintenance wizard 420	20.0 0.10

BigDye XTerminator Purification Kit, sample volume 74	wizard 372 CBC. See cathode buffer
biohazard safety 566 borrowing, spectral calibration. See spectral calibration	CBC position, move 492 change capillary array, maintenance wizard 388 circuit breaker locations 22, 545
bubbles, remove, maintenance wizard 416 buffer. See anode buffer, cathode buffer	clock icon, Run queue 45, 160 cloud analysis
С	See also Thermo Fisher Connect access results 208
	plate file requirements 187
calibration. See spatial calibration Calibration from manual, spectral calibration status 152	set up, plate file on instrument 268 set up, Plate Manager (cloud) 125 set up, Remote Monitoring software, for a com-
Calibration from sample, spectral calibration status 150, 152	pleted run 206 troubleshooting 503, 513
Calibration status in results 152	use 203
calibration, spatial, troubleshooting 530 calibration, spectral, troubleshooting 501, 531	with secondary analysis cloud applications 203 workflow 204
cancel injections or plate	See also Thermo Fisher Connect
home screen 157	cloud profile
Remote Monitoring software 192	administrator functions 233
Remote Monitoring software, command not sent	assign administrator role to a user 234
to instrument 192	create name 218, 223
Run queue 165	disconnect from instrument, administrator 234
capillary array	link to instrument 218
catalog numbers and limits 28	link to local profile 223
change 377, 380 install 380	PIN, change 228
maintenance 377	relink to instrument 226
maintenance 377 maintenance wizard, change 388	computer antivirus software 447
maintenance wizard, change 366	connect directly to instrument (hardware)
parts of 378	446–448, 543
remove 389, 394, 401, 405, 406, 408, 414, 415,	IP address 450
419, 422, 424, 425, 427, 432, 434, 437,	condition number, spectral calibration 324
442, 443	conditioning reagent
store 381	catalog numbers and storage 27
catalog numbers	on-instrument limits 27
buffers, anode and cathode 548	Confirmed Variants list, download 208
capillary array 548	conformity symbols 558
cathode buffer container septa 548	Connect platform. See Thermo Fisher Connect
conditioning reagent 548	consumables
fragment analysis standards 549	See also catalog numbers
Hi-Di formamide 548	anode buffer 369
HID analysis standards 549	capillary array 377
plates, bases, retainers, and septa 547	cathode buffer 372
polymer 548	fragment analysis catalog numbers, HID analysis
sequencing reagents 548	catalog numbers 549
cathode buffer	logs, export 368
catalog numbers and storage 26	polymer 375, 377
check fill line 71	prevent use of consumables that exceed limits
ensure proper installation of CBC septa 72 install 372	460 sequencing analysis 548
maintenance wizard 420	status 67
on-instrument limits 26	troubleshooting 503

use when supported limits are exceeded 25 warnings, configure 460 See also catalog numbers	uniform binning and off-scale recovery settings 291
contiguous read length. See CRL	_
control and connection symbols 557	E
CRL	e-signature
defined 176	displaying signatures 254
install check 346, 348	signature requirements not met 251, 253
CRL accuracy. See %RL basecall	signing at run time 251
CSV plate file	signing at run time for an automated barcode run
contents 87, 101, 112	253
create 130	signing before run time 250
import failed	electropherogram
when to use 87, 101, 112	fragment analysis 179
custom dye set	sequencing 175
create 289	electropherogram screen, use 173
spectral calibration 316	email notifications from instrument 189, 230, 461
custom field	EPT plot
assign to well 95	view 485
define in Plate Manager software 130	view for instrument sensor 489
define on instrument 266	error messages
	QC errors 498
Ъ	RFID 553
D	Error Unable to move the autosampler to the home
daily instrument maintenance 362	position
data, troubleshooting 520	expired consumables, prevent run 460
date and time, setting 471	export
Demo mode	AB1 or FSA 171, 478
enable and set up 464, 466	in background 475
options that are not available 464, 466	install run history 357
troubleshooting	install run logs, fragment analysis 357
detection cell	install run logs, sequencing 350
location 21, 22, 496, 545	library items 260
	· · · · · · · · · · · · · · · · · · ·
oven, preheat 68 direct connection	log files, troubleshooting 492
	maintenance history 65, 361
connection on rear panel 22, 545	plate file 267
in Network Configuration screen (software) 474	results 171, 478
instrument to computer (hardware) 448	run history 171, 478
disposal of instrument components and accessories	spatial calibration report 311
561	spatial calibration results 311
documentation, related 483, 567	spatial calibration results or report 308
dye calibration. See spectral calibration	spectral calibration history 331
dye sets	spectral calibration logs 329
Copy button inactive	spectral calibration report 329
create 288	exported, status in results 180
dynamic range, default 291	
edit 289	_
fragment analysis 538	F
library 288	file location
overview 288	default for plate file in Plate Manager 120
select in plate file 90, 93	default for results 477
sequencing 538	in file name convention 285
settings 291	with results group 304
36ttill93 231	· · · · · · · · · · · · · · · · · · ·
	without results group 304

file name conventions	cancel, Remote Monitoring software 192
create 282	cancel, Remote Monitoring software, cancel
defined 282	command not sent to instrument 192
file location 285	export 492
library 282	order, default 76
select in plate file 90, 93	replicate, instrument plate file 94
settings 285	replicate, Plate Manager 129
file name format, with file name convention 282	injection group, definition 90, 93
file name maximum length 285	injection list
fill capillary array, maintenance wizard 416	change order 47, 163
filter library lists 261	view 47
firmware version 459	injection properties, change during a run 165
flags, quality 172	injection protocol
fragment analysis	create 286
See also install run	defined 286
dye sets 538	library 286
•	select in plate file 90, 93
electropherogram 179	•
install run 333	settings 287
reagents, catalog numbers 549	Install Capillary Array maintenance wizard 377
results, instrument 180	install run
results, Remote Monitoring software 192	estimated run time 335
run module, size ranges and run times 534	history 357
troubleshooting 499, 520, 521, 527	log files, fragment analysis 357
See also install run	log files, sequencing 350
FSA file, export 171, 478	overview 334
	pass fail criteria, sequencing 344
•	perform 338
G	plate, prepare 318, 337
GS600 LIZ v2.0 size standard, catalog numbers 549	results, fragment analysis 351
GS600(60-600)LIZ+Normalization 278	results, sequencing 340
GS600(80-400)LIZ+Normalization 278	sequence and fragment in same run 334
GS600LIZ+Normalization 278	sequencing, quality alerts 502
	signing 250
1.1	troubleshooting 502, 506
Н	view spectral calibration 350
Help, Smart Help 483	when to perform 334
Hi-Di formamide	instrument
≤8 freeze/thaw cycles validated 28	circuit breaker 22, 545
catalog numbers and storage 28	clean 366
HID analysis, reagents, catalog numbers 549	connect to network (software) 450
home screen	connect to Plate Manager cloud 116
parts of 37–39, 41	connect to Plate Manager cloud 110 connect to Plate Manager desktop 105
view data for a run 153	· · · · · · · · · · · · · · · · · · ·
view data for a full 155	connect to wired or wireless network (hardware)
	446–448, 543
1	direct connection to computer (hardware) 448
	disconnect from InstrumentConnect 234
import	interior components 21, 496
library items 260	IP address 459
plate file, CSV or PSM file 267	load plate 136
Inbox	move and level 387
description 42	network connection 22, 545
requirements and limitations 42	pause, home screen 157
injection	pause, Remote Monitoring software 193
cancel, instrument 165	pause, Run Queue 166

power connection 22, 545	LED light, turn on and off 73
power off, power on 495	library, back up 479
prepare 316, 335	library, instrument
reactivate 388	analysis settings 292
rear panel connections 22, 545	copy entry 259
relink to Thermo Fisher Connect 226	create new item 259
remove a user cloud profile 234	delete entry 262
routine cleaning 366	delete entry, auditing 262
safety 555	dye sets 288
serial number 459	edit entry 260
shutdown 387	export entry 260
startup after storage 388	factory-provided, create new item from 259
storage space for results 477	file name conventions 282
theory of operation 23	filter entries 261
troubleshooting 507	import entry 260
unload plate 139	injection protocols 286
instrument maintenance. See maintenance	lock entry 259
instrument name	locked, create new item from 259
change in InstrumentConnect software 235	overview 257
change on instrument 471	plate files 262
<u> </u>	•
instrument profile. See profile	results groups 304 size standards 278
instrument sensor	
details 489	troubleshooting 508
EPT plot 489	library, Plate Manager
Instrument Service, contact 483	delete 132, 134
instrument software	import or export 134
during a run 24	overview 133
overview 29	plate files 132, 134
instrument status	limited product warranty 568
instrument 68	link a plate file 140
InstrumentConnect 184	link instrument
InstrumentConnect	to Thermo Fisher Connect Platform 221
See also Thermo Fisher Connect	to Thermo Fisher Connect, directly 218
access 217	to Thermo Fisher Connect, local profile 223
assign administrator role to a user 234	Link Plate File, screen description 42
change instrument name 235	load plate in instrument 136
disconnect instrument 234	local profile. See profile
mobile app, download 193	locked item in library 259
Remote Monitoring software, open 184	log files
remove a user 234	consumables installation and usage 368
See also Thermo Fisher Connect	error 492
IP address	fragment analysis install run 357
computer 450	injection 492
instrument 459	install run, sequencing 350
	instrument 492
K	maintenance 65, 361
	spatial calibration 311
keyboard shortcuts, Plate Manager 122	spectral calibration 329
	troubleshooting 492
1	
L	N.A.
language, select 475	M
laser specifications 539, 541	maintenance wizard
leaks and spills 69	change capillary array 388

fill capillary array 416	self test 494
procedures 388	voice commands 237-239
reactivate the instrument 434	Microsatellite Analysis software, results, download
remove bubbles 416	208
replenish buffers 420	Min. Peak Half Width 297
replenish polymer 424	MOB (mobility) file for sequencing analysis 294
shut down the instrument 427	mobile device
spatial calibration 419	monitor a run 194
wash pump and channels 422	register on InstrumentConnect 193
maintenance wizards	view results 194
change capillary array 364, 377	monitor a run
change polymer type 364	instrument 153
fill array with polymer 364	mobile device 194
instrument reactivate 388	Run queue 160
overview 364	Thermo Fisher Connect 182
reactivate instrument 364	
	monthly instrument maintenance 363 move the instrument 387
remove bubbles 364, 383	
replenish buffers 364, 369	MSA software. See Microsatellite Analysis software
replenish polymer 364, 375	My preference 477
shut down instrument 364	
spatial calibration 364	N
troubleshooting 509	
wash pump and channels 364, 385	network
maintenance, consumables	configure settings for instrument connection
anode buffer, change 369	(software) 474
capillary array, change 377	connect instrument to 452
capillary array, check stored 381	connection (hardware) 446-448, 543
cathode buffer, change 372	connection on rear panel 22, 545
polymer, replenish 375	icon is not displayed in the home screen
polymer, store partially used pouch 377	network configuration and security 53, 101, 112
maintenance, instrument	network folder
annual planned 364	create 451
as-needed 364	share 451
daily 362	Next Generation Confirmation software, results,
history, export 65, 361	download 208
monthly 363	NGC software. See Next Generation Confirmation
move and level the instrument 387	software
pump 382	normalization
pump, flush water trap 385	See also size standard normalization
pump, remove bubbles 383	GS600 LIZ v2.0 size standard 278
pump, wash chamber and channels 385	size standards 278
reactivate 388	See also size standard normalization
routine cleaning 366	notifications
schedule 360	during run 149
shut down 387	from instrument, email 189, 230, 461
upcoming 65, 361	from instrument, view on cloud 188
manual commands	nom mediament, new en eleda 100
move buffer position 492	
move instrument components 493	0
matrix standards, catalog numbers 549	off-scale recovery, custom dye set 291
Median PUP, defined 176	Optimized successfully, spectral calibration status
microphone	150, 152
icon, troubleshooting	oven temperature
icons 240	in run module 276
100110 - 10	

preheat, with detection cell 68	library 262
owner, plate 268	link and run 140
	print plate layout in Plate Manager 126
P	properties 268 sample names, custom fields, sample type, am-
part numbers. See catalog numbers	plicon, specimen 269, 270, 273
password security 53, 102, 113, 243	signing 250
pause, run 157	troubleshooting 509
pause instrument	unlink from plate position 144
home screen 157	See also plate file, Plate Manager
	plate file, Plate Manager
Remote Monitoring software 193 Run Queue 166	•
	assign wells 118
PDP. See pump	create a plate file 117
Peak Amplitude Thresholds 297	plate properties 117
Peak Scanner software, results, download 208 Peak Window Size 297	PSM and CSV format 87, 101, 112
	send to Inbox on instrument from Plate Manager
PIN	127
change 228	plate loading 136
change for profile 458	Plate Manager
planned maintenance schedule 364	cloud, access 113
plasmid template sequencing, analysis settings 292	cloud, connect to instrument 116
plate	cloud, parts of home screen 108, 114
384-well assembly 78, 81	desktop, access 102
8-tube strip assembly 80	desktop, connect to instrument 105
96-well assembly 79	desktop, parts of home screen 99, 103
assembly 78	keyboard shortcuts 122
base, standard 78	print plate layout 126
catalog numbers 547	PSM file, download 130
check alignment and seating of septa 83	save plate file 120
layout 76	troubleshooting 510
load into instrument 136	plate properties
retainer required for SeqStudio Flex Series in-	enter, instrument 89
struments 78	instrument, description 268
run 140	plate type
sample plate, prepare 77	specify 268
troubleshooting. See run troubleshooting	supported 547
unload from instrument 139	PNG file, save for electropherogram 190
plate barcode. See barcode	polymer
plate file	catalog numbers and storage 26
See also plate file, Plate Manager	handling 375
change after linking 140	maintenance wizard 424
change the linked plate file before a run 144	on-instrument limits 26
copy on instrument 86	precautions for use 375
create 263	replenish 375
create CSV in Excel 130	store 377
create on instrument 85	storing partially used pouch 377
create with default settings 84	Polynomial Degree 297
defined 262	power on or power off the instrument 495
download example from Plate Manager 128	power requirements 539, 541
export or delete 267	power save duration 469
import from CSV or PSM file 267	pre-run checks
import on instrument 88	automated barcode run 149
injection protocol, run module, dye set, size	regular run 146
standard 269, 270	precautions for use 17

preheat the oven and detection cell 68	sizecalling 499
primer peak, eliminating 297	spectral calibration (manual) 501
print plate layout, Plate Manager 126	Quality Check software, results, download 208
prioritize an injection in the injection list 47, 163	quality flag 180
probability of error, QV 178	quality tests, data 172
profile	quality value
change local profile from standard to administra-	See also QV
tor 454	pure base vs mixed base 178
create local 30, 56, 455	spectral calibration 324
delete local or cloud from instrument 455	See also QV
local and cloud, comparison 215	QV, probability of error 178
local, administrator and standard 453	QV range
local, edit 454	bar color 178
options 30, 56	bar height 178
PIN, change 458	values 178
user initials displayed in software 215	QV20 CRL, defined 176
when to use local vs cloud 215	QV20 CRL and range for sequencing standards 350
	QV20 CRL basecall 346, 348
proximity sensor, self test 494 PS software. See Peak Scanner software	QV20 Che basecali 340, 346
PSM file	
	R
contents 87, 101, 112	
create or open in Plate Manager 117	raw data 485
download, Plate Manager 130	re-injection specify
export or delete 267	plate file 94
when to use 87, 101, 112	Remote Monitoring software 192
pump	Remote Monitoring software, re-injection com-
avoid damage 383	mand not sent to instrument 192
bubbles, remove 383	Run queue 165
check for bubbles or debris 490	reactivate the instrument, maintenance wizard 434
flush water trap 385	related documentation 483, 567
maintenance 382	release notes for software update, export from in-
maintenance wizard 422	strument 471
parts of 21, 382, 496	Remote Monitoring software
trap, flush 385	See also cloud analysis
wash chamber and channels 385	alarm clock icon 185
water trap, flush 385	cancel command not sent to instrument 192
push plate file. See send plate file	cloud analysis, set up 206
	open from InstrumentConnect 184
^	open from Plate Manager (cloud 182
Q	parts of 185
QC, sample 172	pause instrument 193
QC error and alert troubleshooting 498	PNG, save 190
QC errors	re-inject 192
fragment analysis 498, 499	re-inject command not sent to instrument 192
sequencing 498, 499	requirements for viewing results 187
sequencing install run 502	results, download 202
spectral calibration (manual) 501	results, export 202
QC report 171, 478	results, view cloud analysis 208
QC software. See Quality Check software	results, view completed (Run history) 199
quality alerts	results, view real-time 190
basecalling 498, 499	spectral calibration or install run results are not
fragment analysis 499	displayed in Run history tab 203
sequencing 499	troubleshooting 513
sequencing install run) 502	See also cloud analysis

remote support, request 484 remove bubbles, maintenance wizard 416 Remove bubbles maintenance wizard 383 remove plate associated with inactive user 479	precautions for use 17, 550 required position for label 375 specifications 552 troubleshoot 553
replenish buffers, maintenance wizard 420	troubleshooting 515
Replenish Buffers maintenance wizard 369, 372	run
replenish polymer, maintenance wizard 424	
	pause 157, 166
Replenish Polymer maintenance wizard 375	resume 157, 166
replicate injection, instrument plate file 94	start 140
reports	troubleshooting 515
cloud analysis 208	run history
install run 357	back up 479
results, instrument 171, 478	delete automatically 477
results, Remote Monitoring software 202	delete manually 478
spatial calibration 311	instrument 170
spectral calibration 329	Remote Monitoring software 199, 202
reprioritize an injection in the injection list 47, 163	troubleshooting 519
restart the instrument 495	run module
results	create 275
access cloud analysis in Remote monitoring	defined 274
software 208	instrument protocol 274
back up 479	library 274
delete automatically 477	read length and run time 534
delete manually 478	select in plate file 90, 93
download from Remote Monitoring software	settings 276
202	size range and run time 534
export, instrument 171, 478	Run queue
export, Remote Monitoring software 202	alarm clock icon 45, 160
	features 47
fragment analysis, instrument 180	
fragment analysis, Remote Monitoring software	parts of 45, 160
192	re-inject 165
Run history 170	troubleshooting 519
Run history, Remote monitoring software 199	view data for a run 162
save location, set default 477	run voltage 276
sequencing 176	
sequencing, Remote Monitoring software 192	S
troubleshooting 520	
view in home screen 153	SAE module
view in Run Monitoring software 190	configuring 244
view in Run queue 162	disable on instrument 247
view on mobile device 194	enable on instrument 245, 462
results group	error messages 255
create 304	overview 243
defined 304	server offline 255
library 304	server, specify 245, 462
select in plate file 90, 93	troubleshooting 519
resume run, home screen 157	safety, biohazard 566
retainers for plates, catalog numbers 547	safety symbols 555
RFID	
defined 18	sample plates and tubes supported 74
	•
error message 553	preparation guidelines 74
function 551	purification 74
location of read/write units 551	troubleshooting 520
overview 550	volume requirements 74

sample name, assign to well 95 sample plate. See plate	size standards provided 278 target 276
Sample QC, determining 172	size standard quality
sample type, assign to well 95	check in Remote Monitoring software 487
save location, default	check on instrument 486
for plate file in Plate Manager 120	size standards
for results on instrument 477	catalog numbers 549
scheduled maintenance	defined 278
notifications 360	in analysis settings 297
tasks 360	library 278
	normalization 278
screen locking. See automatic screen locking	
secondary analysis software 51, 111 self tests 494	select in plate file (fragment analysis only) 90, 93
send plate file to instrument	Sizing software. See Microsatellite Analysis software
cancel 127	Slope Thresholds Peak Start and End 297
failed 127	Smart Help 483
start 127	smart phone. See mobile device
septa	smoothing 297
cathode buffer container 548	software
ensure proper installation on CBC 72	See also Instrument software
plate, catalog numbers 547	troubleshooting 529
septum, check alignment and seating on loaded	update 471
plate 83	See also Instrument software
sequence quality 178	spatial calibration
sequencing	export report 308
See also install run	export results 308
dye sets 538	export results or reports 311
electropherogram 175	maintenance wizard 419
install run 333	perform 307
reagents, catalog numbers 548	purpose 306
results 176	results 308
results, Remote Monitoring software 192	signal optimization factor 308
run module, read lengths and run times 534	signing 250
troubleshooting 499, 520, 521, 525	when to perform 306
See also install run	speaker
sequencing analysis settings 294	adjust volume 73
serial number, instrument 459	self test 494
shut down the instrument, maintenance wizard 427	specifications, RFID 552
sign in	spectral autocalibration for each capillary position
cloud profile 225	150, 151
create local profile 30, 56, 455	spectral calibration
if another user is signed in 35, 61	auto retry 325, 326
options 30, 56	borrowing disabled 326
PIN, change 228	borrowing enabled 325
switch user 34, 60	condition number 324
troubleshooting 528	custom dye set 316
when SAE is enabled 248	custom dye set, create 289
with local profile 32, 54, 58	dye set E example 328
sign out of instrument 34, 60	dye set Z example 328
signal optimization factor in spatial calibration 308	estimated run time 315
Size Quality, defined 180	examples 328
size standard normalization	history 331
factor and thresholds 276	overview 312
overview 281	quality alerts 501
0.011010 201	quanty alorto ou i

report 329	on plate files, reports, and exported files 268
save from sequencing install run 338	touchscreen
signing 250	adjust brightness 73
Spectral QV (quality value) 324	self test 494
standard 317	Trace score
view results 321	defined 176
when to perform 313	limits 172
SQ	troubleshooting
determining 172	buttons are inactive on touchscreen
in software 180	calibration, install run 506
limits 172	calibration, spatial 530
standby. See power save	calibration, spectral 531
storage space on instrument 477	CBC position, check 492
strip-tube, layout 76	cloud analysis 503
support	consumables 503
customer and technical 567	data 520
remote support 484	fragment analysis 521, 527
Smart Help 483	home screen 504
switch user signed in to instrument 34, 60	instrument 507
symbols	instrument interior components, location 21,
conformity 558	496
control and connection 557	library 508
safety 555	•
•	log files, export 492 maintenance wizards 509
system dye calibration. See spectral calibration	
system specifications 539, 541	manual commands, use 493
	microphone icon
T	network drive icon is not displayed in the home
	screen
tablet. See mobile device	plate. See run troubleshooting
Technical Support	plate file 509
contact 483	Plate Manager 510
remote session 484	power on or power off the instrument 495
Smart Help 483	QC error and alert 498
terms and conditions 568	rear panel connections 22, 545
theory of operation 23	Remote Monitoring software 513
Thermo Fisher Connect	remote support, request 484
access 217	resources 483
analysis software 51, 111	RFID 553
cloud administrator functions 233	run history 519
dashboard, display 217	run queue 519
email notifications from instrument 189, 230,	SAE module 519
461	sample 520
enable or disable 232, 469	sequencing 521, 525
features 212	Settings screen 527
InstrumentConnect, access 217	sign in 528
link to instrument directly 218	Smart Help, request assistance 483
link to instrument with local profile 223	software 529
relink to instrument 226	Thermo Fisher Connect 532
set up, administrator 212	voice commands 533
set up, user 214	workflow 481
troubleshooting 532	tube type supported 74
Thermo Fisher Connect Platform 227, 228, 232	21 11
timestamp	
defined 268	

U	enable (register) 236
uniform binning, custom dye set 291 UNKNOWN instrument status, InstrumentConnect 184 unlink cloud profile from instrument 234 plate file from plate position 144 user from instrument 234 unload plate from instrument 139 update software 471	indicators 240 interactive - start run 239 list of 238 microphone states 240 self tests to check speakers, microphone, and proximity sensor 494 troubleshooting 533 use 237 volume, speaker, adjust 73
USB drive, recommended format 41 user, unlink from instrument 234 user-defined fields define in Plate Manager software 130 define on instrument 266 including in file name 285	W warranty 568 wash pump and channels, maintenance wizard 422 Wash Pump and Channels maintenance wizard 385 wifi, connection on rear panel 22, 545 wired or wireless network
V VA software. See Variant Analysis software Variant Analysis software, results, download 208 VCF file, download 208 voice commands adjust volume 73 automatic time setting, requirement 236 disable 236	configure (software) 474 connect instrument (hardware) 446–448, 543 wireless, connection on rear panel 22, 545 workflow cloud analysis 204 create plate, start run, view results 63 troubleshooting 481

