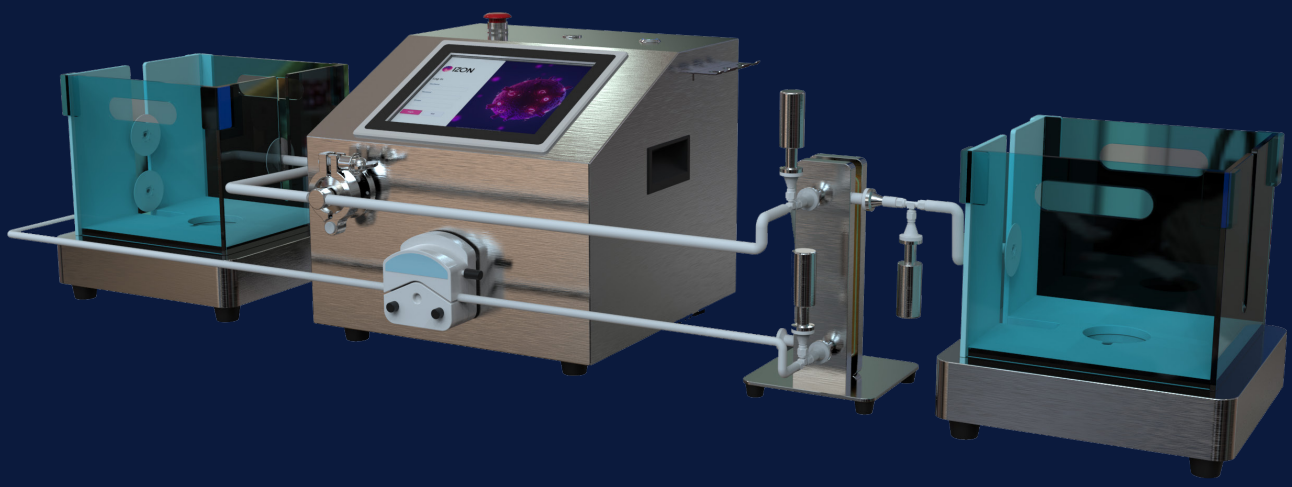
qEV TANGENTIAL FLOW FILTRATION (TFF) BETA

USER MANUAL



IZON

www.izon.com

Izon Science Limited
PO Box 9292
Addington
Christchurch 8024
New Zealand

Telephone: +64 3 357 4270
Email: support@izon.com
Website: www.izon.com

TABLE OF CONTENTS

1 DEFINITIONS AND WRITING CONVENTIONS

This manual contains warnings and precautionary statements to help prevent personal injury and/or damage to the TFF system when properly followed. Safety and special notices, including the symbols described in Table 1, are presented in boxes throughout the guide.

Table 1: Safety and Hazard Symbols

	This symbol indicates general advice on how to improve procedures or recommends measures to take in specific situations.
	WARNING: Indicates a hazardous situation that could result in death or serious injury if not avoided. Do not proceed until all specified conditions are fully understood and met.
	CAUTION: Indicates a hazardous situation that could result in minor or moderate injury if not avoided. Ensure all specified conditions are fully understood and met before proceeding.

Table 2: Terminology Used in this Manual

TERM	DEFINITION
MWCO	Molecular weight cut-off
Permeate	The fluid that passes though the filter membrane
qEV	Izon's size exclusion chromatography columns
Retentate	The retained fluid (concentrate)
TFF	Tangential flow filtration

2 SAFETY AND HAZARDS

2.1 Safe Use Requirements and Specifications

WARNING

Users must thoroughly review the complete User Manual before assembling, setting up, or operating the TFF system, and keep it readily accessible during operation. Operate the system strictly as outlined in the documentation to avoid potential hazards that could result in personal injury or equipment damage. Adhere to the safe use requirements specified in Table 3 below. Using the equipment in an unspecified manner may compromise the protection it provides.

Table 3: Safe Use Requirements and Specifications

SAFE USE REQUIREMENT		SPECIFICATION
Voltage and frequency		110~220 V, 50-60 Hz
Rated power		120 W
Console	Dimension (W*H*D)	437*388*474 mm
	Weight	18.3 kg
Scale	Dimension (W*H*D)	308*87.3*308 mm
	Weight	6.3 kg
	Maximum load weight	15 kg
	Accuracy	±0.5%
Minimum working volume		Tubing dependant
Minimum hold-up volume		Tubing dependant
Maximum system operating pressure		20 psi
Storage and transport temperature range		5 °C to 55 °C
Humidity range for storage and transport		0% to 50%
Operating temperature range		4 °C to 40 °C
Operating humidity range		0% to 90%

Do not attempt to run the TFF outside of these conditions.

Liquid will be in contact with the following materials as it flows through the TFF instrument. Please ensure that the materials listed in Table 4 are compatible with your application.

Table 4: Composition of materials in contact with the liquid

COMPONENT	MATERIALS
Tubing	Platinum cured silicone
Pressure sensor	Stainless steel SUS316
Tri clamp tee	Stainless steel SUS316
Gasket	Silicone
Tri clamp adapter	Polyethylene (PE)
Hose barb fittings	Polypropylene (PP)
Pressure control valve	Stainless steel SUS316

Table 5: Pump Specifications

PROPERTY	VALUE
Pump type	Peristaltic pump
Flow rate	Tubing dependant, <550 mL/min
Maximum speed	600 rpm
Motor accuracy	±1%
Working temperature	0 °C to 40 °C
Motor power	40 W
Maximum operation pressure	Tubing dependant 20 psi for SGG00000AE01 tubing set
Tubing compatibility	Only applicable for 1.6 mm wall thickness tubing
Pump tubing lifetime	2 hours / 10 cycles, whichever comes first

2.2 Hazards

The qEV TFF is a laboratory product, however if any biohazardous samples are present then adhere to current Good Laboratory Practices (cGLPs) and comply with any local guidelines specific to your laboratory and location.

	Before running the instrument, make sure it is clean and clear of any obstructions. Check that the surrounding environment complies with operating and regulatory requirements.
	Repair of the instrument must only be carried out by an Izon-approved technician.
	Be careful of electrocution.
	High pressure. Please set an appropriate high-pressure alarm threshold based on the pressure resistance performance of the tubing.
	The use of the protective glasses and other appropriate Personal Protective Equipment (PPE) is always recommended when operating and maintaining this product.
	Hazardous chemical or biological agents. Please ensure your safety by wearing appropriate protective clothing, glasses, and gloves that are resistant to the substances used. Take care to avoid spillage. Follow local and national regulations for safe operation and maintenance of this product.
	Tubing damage may result in fluid being sprayed from pump. Use appropriate measures to protect operator and instrument.
	Izon instruments are only to be operated with Izon supplied leads and power supplies. Failure to use the correct power supply may result in invalid operation. The TFF must be installed into Earth Grounded Protected Outlets ONLY. To minimise the influence of external noise from the environment, position equipment away from electrical switching gear and interfering equipment
	Before each use, carefully observe all tubing for kinks or blockages, as this may cause tubing breakage.
	Tubing and moving parts may fail if maintenance is not performed as detailed in Section 9: Maintenance.
	The system C drive contains necessary components for running the program. Please do not delete files on the hard disk without authorisation, as this may cause failure to start. Please note that the qEV TFF File folder contains historical process data and editing it may result in data loss.
	The pressure value of the overpressure warning and protection shutdown shall be set according to the requirements, and the system should not be operated above this pressure.
	Administrators should regularly check whether the system and the transitory disk are infected with viruses, and back up the data regularly.

	If the height of the solution inlet is higher than the pump by more than 5 m, in order to ensure the stability of the system flow and prolong the service life of the pump, a buffer tank should be used at the inlet to reduce the pressure.
	After each use of the instrument, please use a large amount of purified water to rinse, especially in the presence of high salt buffers.

Stop operation of the instrument if any of the following conditions occur:

1. The instrument smells of burning;
2. Electrical fault or damage to any cables;
3. The instrument is wet;
4. The supply voltage flashes off and the power supply is unstable;
5. Electrical parts damage or function failure;
6. The instrument has not been switched on or used for more than three months.
7. The instrument is in a non-compliant installation or operating environment;

If any of the above occur, please contact Izon Science Support immediately.

2.3 Unpacking

We recommend that you keep the box and packaging materials in case the instrument needs to be returned for servicing.

If you choose not to keep the materials, please recycle them wherever cardboard recycling services are provided.

Exercise caution and use proper manual handling techniques when lifting or moving the TFF as it is heavy and may cause injury if incorrectly handled.

2.4 Disposal

The TFF contains electrical materials; it should be disposed of as unsorted waste and must be collected separately, according to the European Union Directive: Waste Electrical and Electronic Equipment. The user is fully responsible for ensuring that the obsolete Equipment and/or Consumables are recycled or disposed of in accordance with this and/or any other relevant laws and regulations in the countries where the instrument is being recycled or disposed of. Contact your local Izon Science representative for more information.

3 INTRODUCTION TO THE TFF

3.1 Intended Use

The qEV TFF is a tangential flow filtration system designed for concentration, clarification, and diafiltration of biological and pharmaceutical solutions.

The system is compatible with both membrane cassettes and hollow fibre filters.

The system offers programmable functionality, allowing users to customise filtration workflows based on specific process requirements. Its software provides real-time monitoring, data logging, and visualisation to track key process parameters.

This instrument is for use by professional personnel only who are experienced in operating bioprocessing equipment and handling biological materials.

For system verification, it is recommended that cGLPs are followed to ensure reliable and reproducible results.

4 SYSTEM DESCRIPTION

4.1 System Configuration

Console

Figure 1. Front layout.

Figure 2. Back layout.

Scale

Figure 3. Scale.

The following components are required for operation and/or maintenance of the instrument but are not provided.

- tubing: 1/8" and 1/4" ID
- 3/4" gaskets
- luer connectors
- 3/4" TC connectors
- 3/4" clamps
- racks
- zip ties
- labtainers
- trays (optional)
- reducers 1/4in to 1/8in

Table 6: Filter Specifications

PROPERTY	VALUE
MWCO	10-750 kDa, commonly 100 kDa and 300 kDa
Volume	1 L, 10 L, 20 L
Surface area	13-3700 cm^2
Flow rate	>100 mL/min at 1 bar with RO water at 25 °C
Compatibility	Suitable for use with SEC process and cleaning fluids

4.2 P&ID Diagram

The main part of the Piping & Instrumentation Diagram (P&ID) for the qEV TFF System is shown in Figure 4 below.

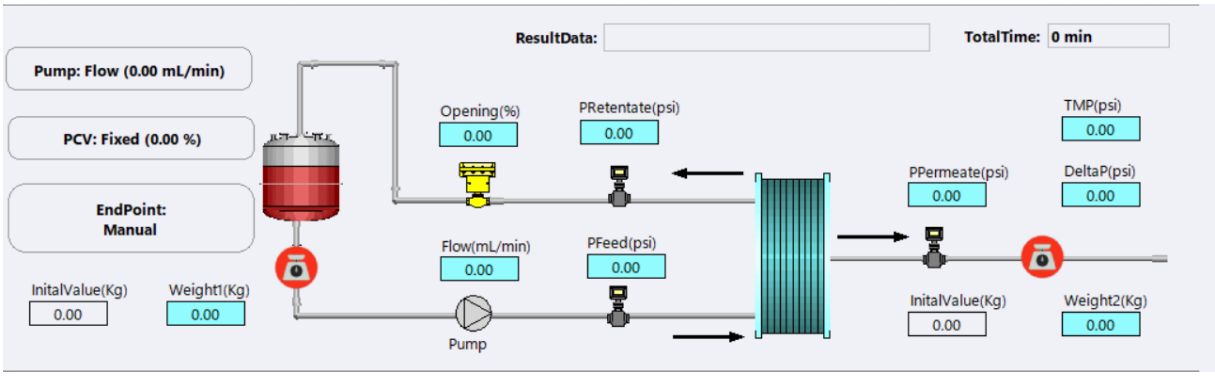


Figure 4. PI&D of the qEV TFF System.

5 ASSEMBLING THE SYSTEM COMPONENT

5.1 Installation of System Hardware

1. Place the console and the scales on a flat, horizontal bench top.
2. Plug the Feed Scale connection cable into the “KM01” port, tighten the threaded ring to prevent loosening.
3. Plug the Permeate Scale connection cable into the “KM02” port, tighten the threaded ring to prevent loosening.
4. Plug the Feed Pressure Sensor connection cable to the “Press 1” port, tighten the threaded ring to prevent loosening. Place the sensor on the sensor holder on the right side of the console.
5. Plug the Retentate Pressure Sensor connection cable to the “Press 2” port, tighten the threaded ring to prevent loosening. Place the sensor on the sensor holder on the right side of the console.
6. Plug the Permeate Pressure Sensor connection cable to the “Press 3” port, tighten the threaded ring to prevent loosening. Place the sensor on the sensor holder on the right side of the console.
7. Connect power cable to the console.

5.2 Installation of System Tubing

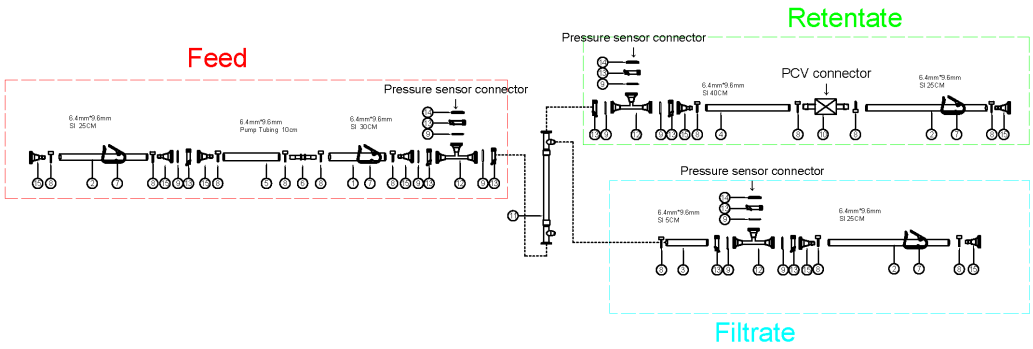


Figure 5. Tubing set (part number SGG00000AE01).

1. Load the Feed tubing into the pump, and connect the Feed Pressure Sensor to the Tri clamp tee. (Note: please replace the pump tubing after it has completed 10 operational cycles.)
2. Connect the Retentate Pressure Sensor to the Tri clamp tee on the Retentate tubing, and connect the tubings to the PCV.
3. Connect the Permeate Pressure Sensor to the Tri clamp tee on the Permeate tubing.
4. Connect the Feed tubing, the Retentate tubing and the Permeate tubing to the TFF filter.

6 EMERGENCY SHUTDOWN

The following tables describe how to perform an emergency shutdown, what happens in the event of power failure, and the procedure for restarting the system.

STEP	ACTION	RESULT
1	Press the EMERGENCY STOP button.	1.The pump motor stops immediately. 2.The built-in computer and other components remain powered. 3.The curves pause, but no data is lost.
2	If required, also switch off the mains power supply using the SYSTEM POWER SWITCH, disconnect the power cord or switch off the fixed power supply circuit breaker.	1.Power to the entire system, including the computer, is lost. 2.Data and run status may be lost.

Table 8: Restart Instructions

Follow the instructions below to restart qEV TFF after emergency shutdown or power failure.

STEP	ACTION	
1	Make sure that the condition that caused the power failure or emergency stop is corrected.	
2		Reset the EMERGENCY STOP button by turning it clockwise.
3	Click Continue button in qEV TFF.	

7 SOFTWARE OPERATION

7.1 System Login

Turn the POWER SWITCH to the "I" position. Wait for the initialisation screen to load. The Login screen will open (Figure 6). **The default user name for the first login is 'ad' and the password is empty.** Clicking 'Login' will start the login to the system.

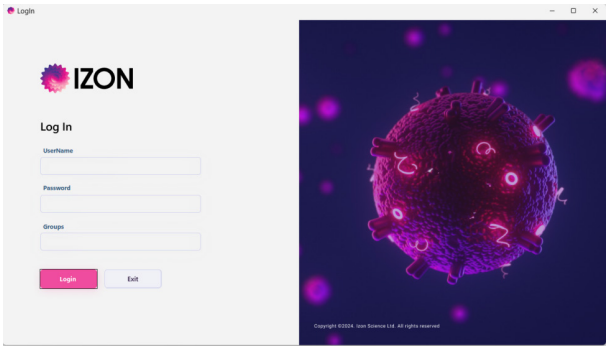


Figure 6. Login screen

For user creation and privilege management, refer to Users and permission management for details.

Press the PLC button to turn on the PLC.

7.2 Main Interface

The main interface consists of 3 parts, ① function control area, ② process control area, and ③ status display area, as shown in Figure 7 below.

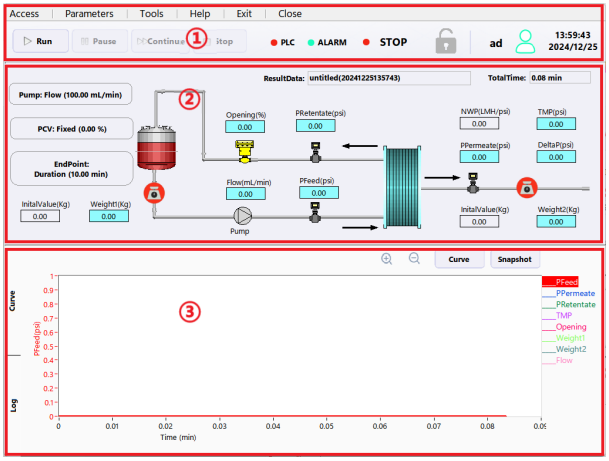


Figure 7. Main interface

The Function Control Area

The function control area includes the menu bar, 4 run control buttons, LED lights, lock screen button, and display user name and system date and time.

The specific content of menu items is shown in Table 9.

Table 9: Content of Menu Items

MENU	SUBMENU	DESCRIPTION
Access	User Setup	Create or edit user, and assign authority. Refer to Users and permission management for details.
	Audit Trail	View or export audit trail. Refer to Audit trail for details.
	Change User	Change login user
	Change Login Password	Change Login Password
	Change Signature Password	Change Signature Password
Parameters	Settings	Set parameters. Refer to Parameter setting for details.
	Calibrate	Calibrate sensors. Refer to Calibration for details.
Tools	History	View historical data. Refer to View historical data for details.
	AlarmMessage	View alarm message. Refer to Alarm for details.
Help	User Manual	View user manual
	About	View software version
Exit	/	Exit the software
Close	/	Shut down the computer

The four operation control buttons are used to control the operating state of the system.

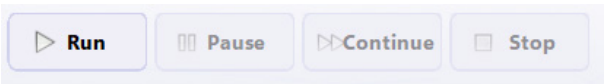


Figure 8. Operation control buttons

- Run: used to start a manual run or run a method;
- Pause: Pause the system control, the pump will stop, all curves are in a stopped state, and the method will be suspended;
- Continue: Resume running the control;

- Stop: The running will be stopped. At this point the data is saved as a complete document.

There are three LED lights in the middle of the function control area.

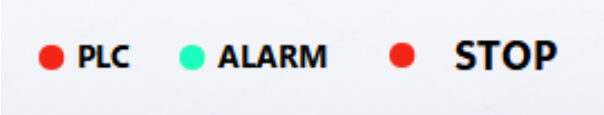


Figure 9. LED lights

- PLC indicates whether PLC is connected correctly.
- ALARM indicates whether there are monitor signals exceeding or falling below the specified limits. If red, please check the alarm information by clicking Tools → AlarmMessage.
- The third LED light indicates the instrument status, bright green for running (RUN) or holding (HOLD), bright yellow for pausing (PAUSE), and red for stopping (STOP).

Lockout control can prevent other people from operating the controls incorrectly during a shift change or temporary absence.

Clicking the icon  on the right of the function control area will lock system control, including valves, pumps, and all other operations, but the system will continue running. Click any control button at this time to bring up the User Login screen. After logging in again, the controls can be unlocked.

The Process Control Area

The process control area is used for direct control of the system's hardware such as valves, pumps, etc., as well as for observing the real-time data and status of all the sensors, etc.

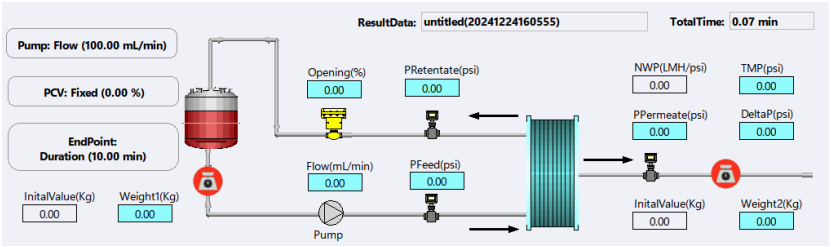


Figure 10. The process control area

In the process control area, a blue path indicates actual flow paths that are currently available for flow, and grey indicates flow paths that are currently blocked.

The buttons are described in Table 10 below.

Table 10: Process Control Buttons

ICON	COLOUR	FUNCTION
Pump	Green: ON Gray: OFF	Click to set flow rate. Only applicable under manual mode.
Weight1	Green: Online Red: Disconnected	Click to tare or zero scale reading.
Weight2	Green: Online Red: Disconnected	Click to tare or zero scale reading.
PCV	Yellow	Click to adjust the opening % of the Pressure Control Valve. Only applicable under manual mode.

The Status Display Area

There are two tabs in the status display area, the Curve tab, and the Log tab. Click the corresponding text button to switch.

1. The Curve tab is used to display all collected signal values and calculated data in real time, and for curve setting. Refer to Real-time curve operation for details.

2. The Log tab is used to view all operation and alarm information.

System logs are recorded in absolute time. In addition to recording the timestamp, each log also records the current user, event type, event, relative time of occurrence, and accumulated volume, as shown in Figure 11.

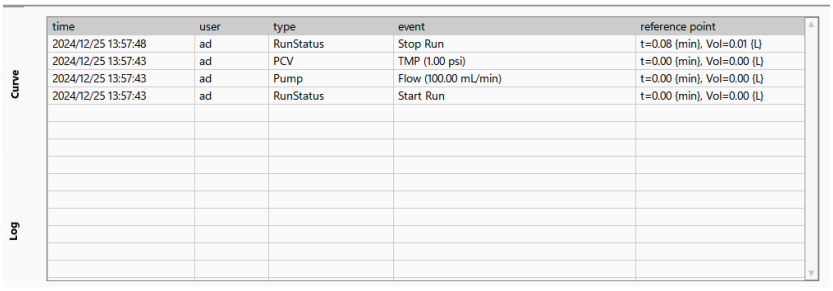


Figure 11. System logs

Logs are used for traceability. Logs and curve data are saved to the acquisition file in real time. When historical data is loaded, corresponding logs can also be retrieved. Logs are stored in encrypted mode. Users cannot modify or delete a log.

7.3 Users and Permission Management

Only an administrator can assign users to different permission groups, which defines the functions that the user is permitted to use.

Permission Group Description

The system has 5 permission groups: Administrator, Engineer, Power User, Operator and Guest. Click

Access → User Setup → Group Manage... to open the Group Manager screen.

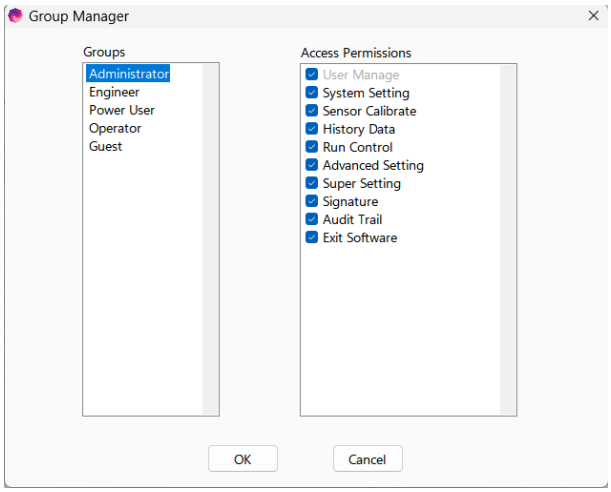


Figure 12. Group manager screen

Each permission is described in Table 11 below.

Table 11: Permissions

PERMISSION	DESCRIPTION
User Manage	Whether the user can access Access → User Setup ONLY administrators have this permission.
System Setting	Whether the user can access Parameters → Settings
Sensor Calibrate	Whether the user can access Parameters → Calibrate
History Data	Whether the user can access Tools → History
Run Control	Whether the user can access 4 operation control buttons
Advanced Setting	Users with this permission can view the Advanced settings tab and set up parameters.
Super Setting	Users with this permission can view the Super settings tab and set up parameters.
Signature	Users with this permission can sign off on the data.
Audit Trail	Whether the user can access Access → Audit Trail
Exit Software	Whether the user can exit qEV TFF software.

After clicking Access → Change User to re-login to the system, the changed permissions will take effect immediately.

User Management

Click Access → User Setup to pop up the User Manager screen. If users don't have the User Manage permission, Access → User Setup is displayed in grey and cannot be accessed.

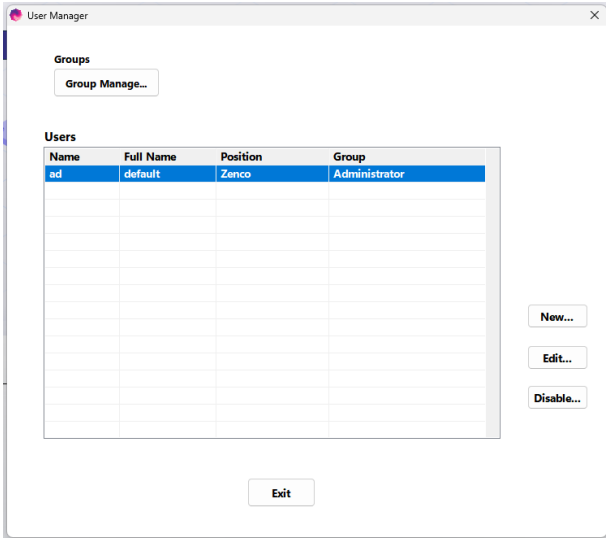


Figure 13. User Management screen

Users can be added, modified, or deleted on this screen.

When adding a user, enter Username, Full Name, Position, and select permission Group. Administrators can also modify permission groups for the listed users by clicking Edit.

The default password of the new added user is empty, that is, new users do not need to enter the password during login. However, it is strongly recommended that new users click Access → Change Login Password and Access → Change Signature Password to change the login password and the signature password after their first login.

When deleting users, ensure that there is always an Administrator group user in the users list. If all Administrator users are deleted, you will no longer be able to perform user management.

When adding or modifying users, do not use special characters, such as: / \ : *? "<> | Enter key and other characters in the username.

7.4 Parameter Settings

Click Parameters → Settings to pop up the Parameters Settings screen, including three tabs, the Basic settings tab, the Advanced settings tab and the Super settings tab.

Basic Settings

Basic Settings is used to specify the alarms for the pressure limits. The setting value should be no more than the SetPreMax set on the Super settings tab.

Ensure you set Pressure upper limits.

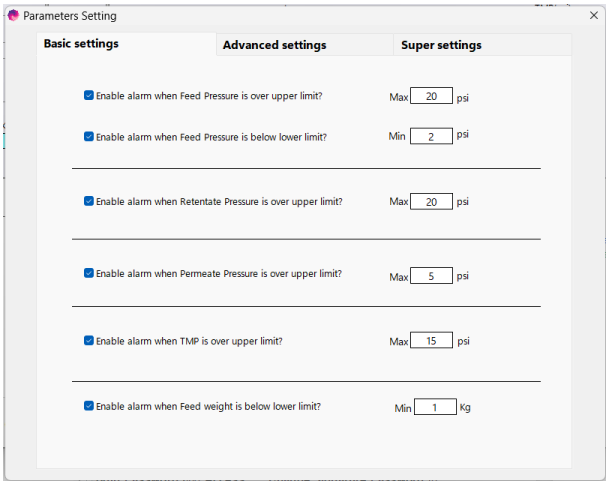


Figure 14. Basic settings tab

An Alarm information box will be displayed on the screen if the monitored values exceed or fall below specified limits, and the alarm will be recorded in the log. The system will be paused.

Advanced Settings

Access to the Advanced settings tab depends on whether a user has the 'Advanced Setting' permission.

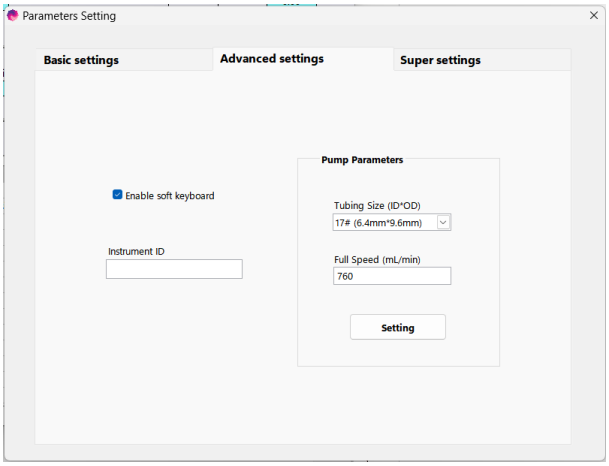


Figure 15. Advanced settings tab

In the Advanced settings tab, users can modify the following internal system parameters:

- Enable soft keyboard: Enable soft keyboard;
- Instrument ID: Set the ID of the instrument;
- Tubing Size: Select tubing size;
- Full speed: Set the flow rate under 100% speed of the pump. For SGG00000AE01 tubing set, the full speed is 550 mL/min; For other tubing, please click the Setting button to open the screen as below and follow the steps to set full speed.

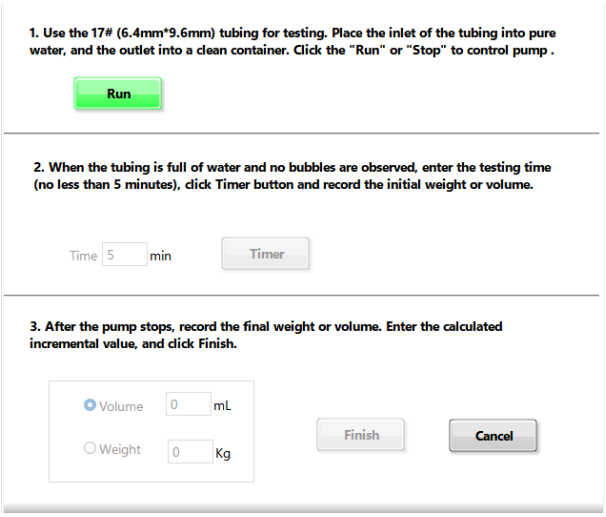


Figure 16. Speed setting screen

Super Settings

Access to the Super settings tab depends on whether a user has the 'Super Setting' permission.

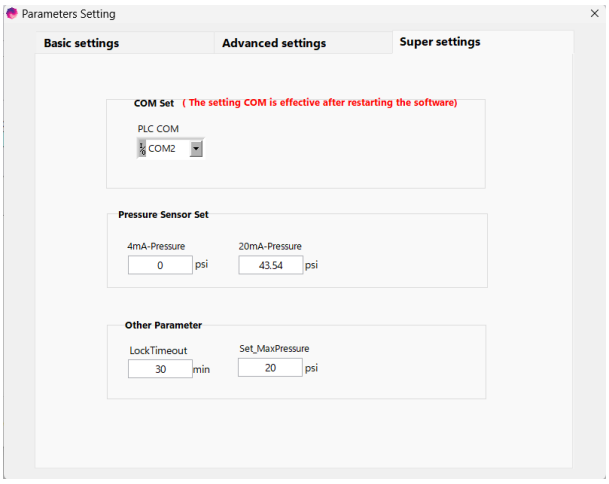


Figure 17. Super settings tab

WARNING Ensure Set_MaxPressure <= 20psi

PERMISSION	DESCRIPTION
PLC COM	Set up COM address of the instrument. The above figure shows the default COM settings.
4mA_Pressure	The pressure corresponding to the minimum current of the pressure sensor.
20mA_Pressure	The pressure corresponding to the maximum current of the pressure sensor. For SGE-801A-3BAR, it should be set as 43.54 psi (3 bar).
LockTimeout	Set the screen interval, the default setting is 30 minutes.
Set_MaxPressure	The maximum value of settable alarm pressure

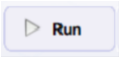
7.5 Start a Run

WARNING

Please set the correct full speed and tubing size prior to initiating a manual run. Refer to Advanced settings for details.

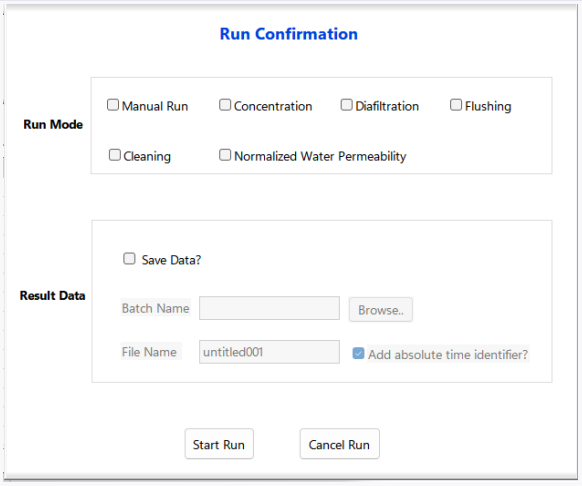
Please ensure that the necessary pressures alarms are activated prior to initiating a manual run. Refer to Basic settings for details.

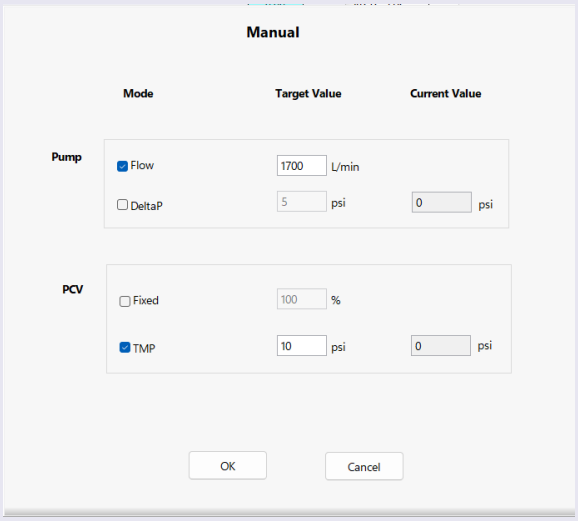
Manual Run

Click the button 

to open Run Confirmation screen.

Table 13: Manual Run Process

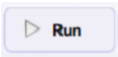
STEP	ACTION	FUNCTION
1	Click the Manual Run checkbox	
2	[Optional] Click the Save Data checkbox, and select the path of data saving by clicking Browse, then type the file name in the Daq Name field	The data saving step can be skipped if desired. The data will be temporarily stored in the Temp folder.

3	[Optional] Click the Add absolute time identifier checkbox	To avoid the occurrence of file duplication or overwriting. A suffix of absolute time will be automatically added to the end of each file name, such as demo _ Run 1 (20150116112233). tdms
4	Click Start Run to open Manual screen	
5	Select the control mode of Pump	Flow mode: The pump speed will be automatically adjusted to reach the target flow rate. Please refer to filter manufacturer for the recommended flow rate. DeltaP mode: The pump speed will be automatically adjusted to maintain 90 - 110% of the target DeltaP.
6	Select the control mode of PCV	Fixed mode: Set the fixed opening % of the PCV. Less than 10% is the effective opening %. TMP mode: The opening % of the PCV will be automatically adjusted to maintain 95 - 105% of the target TMP.
7	Click OK	Start a manual run.

Once started, the pump icon in the process control area turns green, indicating that the pump has started.

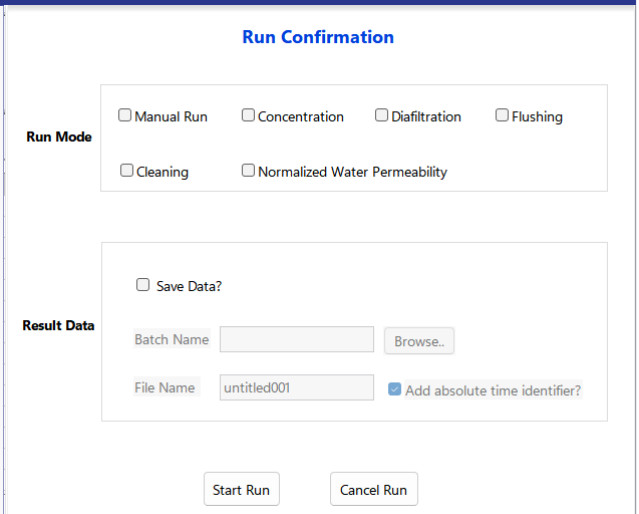
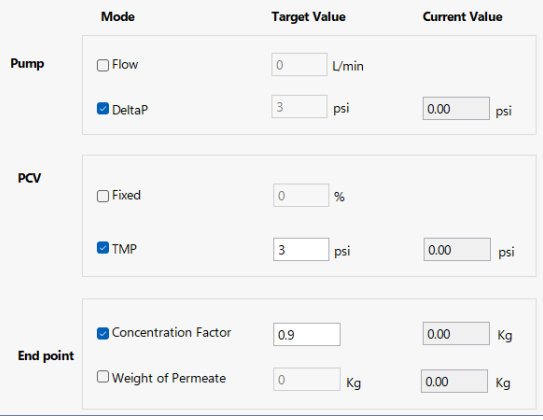
If the flow path is blocked, or the pump speed is set to 0 mL/min, the colour of the pump icon is grey, indicating that the pump is not turned on, while the system is under running, and the curves and operations have begun to be recorded.

Concentration Run

Click the button 

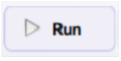
to open Run Confirmation screen.

Table 14: Concentration Run Process

STEP	ACTION	FUNCTION
1	Click the Concentration checkbox	
2	[Optional] Click the Save Data checkbox, and select the path of data saving by clicking Browse, then type the file name in the Daq Name field	The data saving step can be skipped if desired. The data will be temporarily stored in the Temp folder.
3	[Optional] Click the Add absolute time identifier checkbox	To avoid the occurrence of file duplication or overwriting. A suffix of absolute time will be automatically added to the end of each file name, such as demo _ Run 1 (20150116112233). tdms
4	Click Start Run to open Concentration screen	

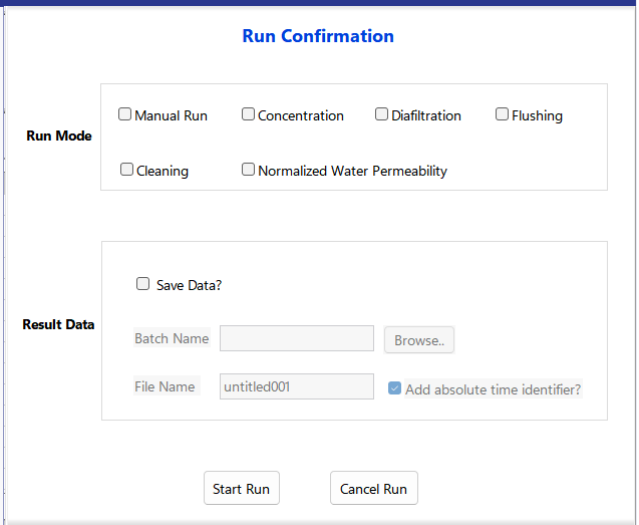
5	Select the control mode of Pump	Flow mode: The pump speed will be automatically adjusted to reach the target flow rate. Please refer to filter manufacturer for the recommended flow rate. DeltaP mode: The pump speed will be automatically adjusted to maintain 90 - 110% of the target DeltaP.
6	Select the control mode of PCV	Fixed mode: Set the fixed opening % of the PCV. Less than 10% is the effective opening %. TMP mode: The opening % of the PCV will be automatically adjusted to maintain 95 - 105% the target TMP.
7	Select the End point mode	If the Concentration Factor is used as the endpoint, please ensure that the sample container is tared first to obtain the net weight of the sample.
8	Click OK	Start a concentration run.

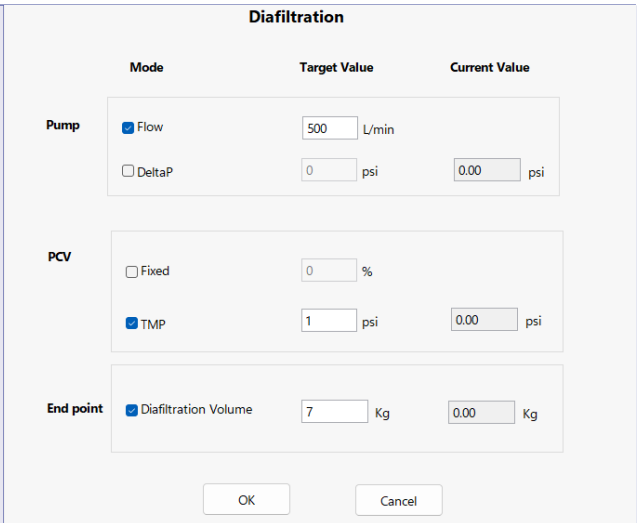
Diafiltration Run

Click the button 

to open Run Confirmation screen.

Table 15: Diafiltration Run Process

STEP	ACTION	FUNCTION
1	Click the Diafiltration checkbox	
2	[Optional] Click the Save Data checkbox, and select the path of data saving by clicking Browse, then type the file name in the Daq Name field	The data saving step can be skipped if desired. The data will be temporarily stored in the Temp folder.
3	[Optional] Click the Add absolute time identifier checkbox	To avoid the occurrence of file duplication or overwriting. A suffix of absolute time will be automatically added to the end of each file name, such as demo _ Run 1 (20150116112233). tdms

4	Click Start Run to open Diafiltration screen	
5	Select the control mode of Pump	Flow mode: The pump speed will be automatically adjusted to reach the target flow rate. Please refer to filter manufacturer for the recommended flow rate. DeltaP mode: The pump speed will be automatically adjusted to maintain 90 - 110% of the target DeltaP.
6	Select the control mode of PCV	Fixed mode: Set the fixed opening % of the PCV. Less than 10% is the effective opening %. TMP mode: The opening % of the PCV will be automatically adjusted to maintain 95 - 105% the target TMP.
7	Type the target permeate weight for End point	The value should not exceed 20 kg.
8	Click OK	Start a diafiltration run.

Flushing

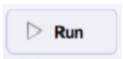
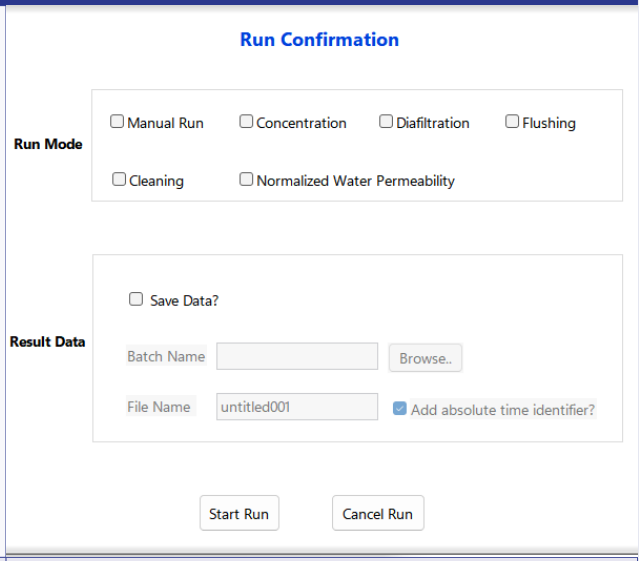
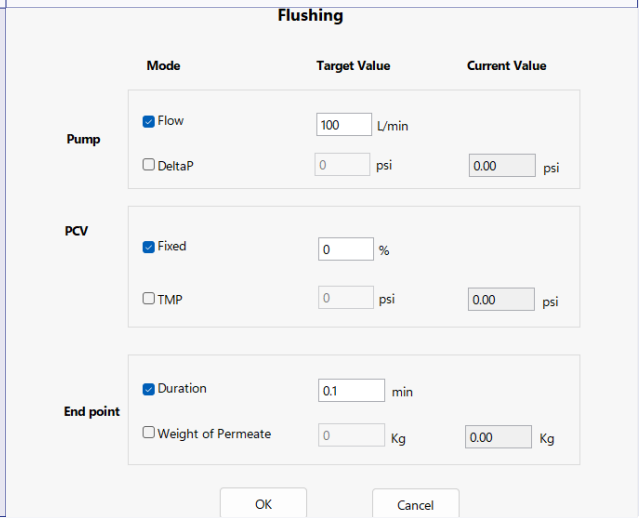
Click the button  to open Run Confirmation screen.

Table 16: Flushing Run Process

STEP	ACTION	FUNCTION
1	Click the Flushing checkbox	
2	[Optional] Click the Save Data checkbox, and select the path of data saving by clicking Browse, then type the file name in the Daq Name field	The data saving step can be skipped if desired. The data will be temporarily stored in the Temp folder.
3	[Optional] Click the Add absolute time identifier checkbox	To avoid the occurrence of file duplication or overwriting. A suffix of absolute time will be automatically added to the end of each file name, such as demo _ Run 1 (20150116112233). tdms
4	Click Start Run to open Flushing screen	

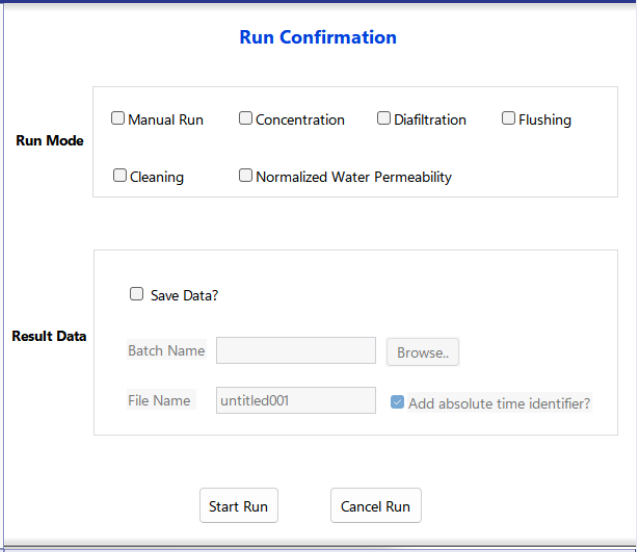
5	Select the control mode of Pump	Flow mode: The pump speed will be automatically adjusted to reach the target flow rate. Please refer to filter manufacturer for the recommended flow rate. DeltaP mode: The pump speed will be automatically adjusted to maintain 90 - 110% of the target DeltaP.
6	Select the control mode of PCV	Fixed mode: Set the fixed opening % of the PCV. Less than 10% is the effective opening %. TMP mode: The opening % of the PCV will be automatically adjusted to maintain 95 - 105% the target TMP.
7	Select and set the End point	
8	Click OK	Start a flushing.

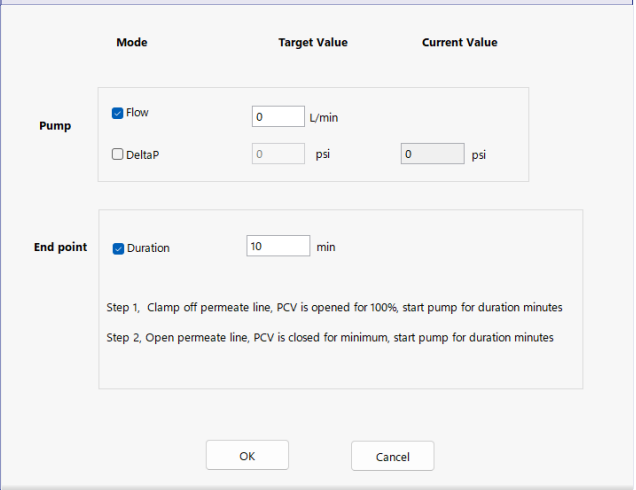
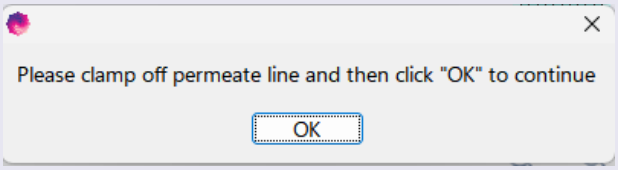
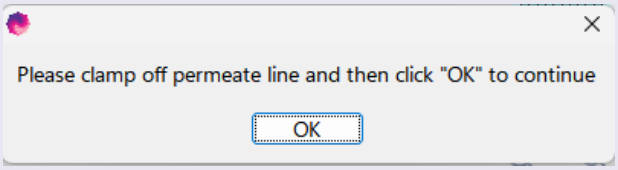
Cleaning

Click the button 

to open Run Confirmation screen.

Table 17: Cleaning Run Process

STEP	ACTION	FUNCTION
1	Click the Cleaning checkbox	
2	[Optional] Click the Save Data checkbox, and select the path of data saving by clicking Browse, then type the file name in the Daq Name field	The data saving step can be skipped if desired. The data will be temporarily stored in the Temp folder.
3	[Optional] Click the Add absolute time identifier checkbox	To avoid the occurrence of file duplication or overwriting. A suffix of absolute time will be automatically added to the end of each file name, such as demo _ Run 1 (20150116112233). tdms

4	Click Start Run to open Cleaning screen	
5	Set the control mode of Pump	
6	Type the target duration as the End point	
7	Click OK	
8	Clamp off the permeate tubing	
9	Click OK	
10	Open the permeate tubing	
11	Click OK	
12	The system will automatically stops when the cleaning process is finished.	

Normalized Water Permeability

Normalized Water Permeability (NWP) is a method used to determine filter cleanliness after cleaning. NWP is also used to determine the water flux of a new module.

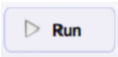
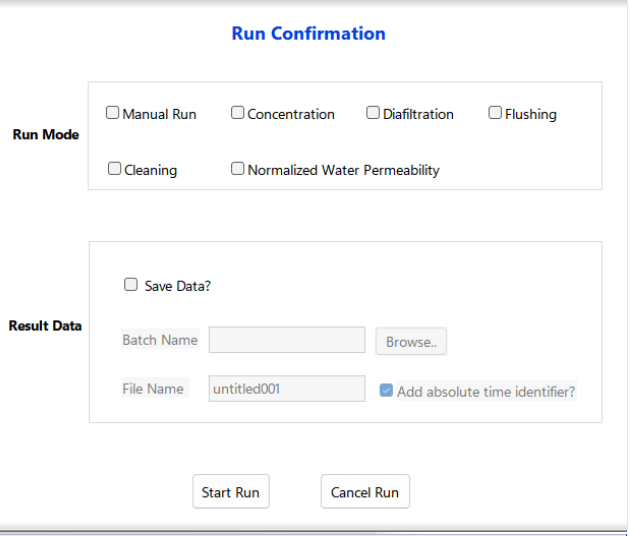
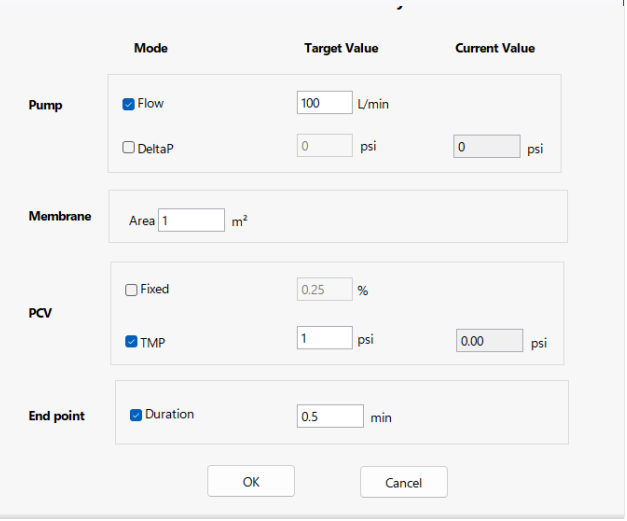
Click the button  to open Run Confirmation screen.

Table 18: NWP Run Process

STEP	ACTION	FUNCTION
1	Click the Normalized Water Permeability checkbox	
2	[Optional] Click the Save Data checkbox, and select the path of data saving by clicking Browse, then type the file name in the Daq Name field	The data saving step can be skipped if desired. The data will be temporarily stored in the Temp folder.
3	[Optional] Click the Add absolute time identifier checkbox	To avoid the occurrence of file duplication or overwriting. A suffix of absolute time will be automatically added to the end of each file name, such as demo _ Run 1 (20150116112233). tdms
4	Click Start Run to open Normalized Water Permeability screen	

5	Select the control mode of Pump	Flow mode: The pump speed will be automatically adjusted to reach the target flow rate. Please refer to filter manufacturer for the recommended flow rate. DeltaP mode: The pump speed will be automatically adjusted to maintain 90 - 110% of the target DeltaP.
6	Type the membrane area of the filter	
7	Select the control mode of PCV	Fixed mode: Set the fixed opening % of the PCV. Less than 10% is the effective opening %. TMP mode: The opening % of the PCV will be automatically adjusted to maintain 95 - 105% the target TMP.
8	Type the target duration as the End point	When the set conditions are met, the system will automatically start timing and stop the program when the set duration is reached.
9	Click OK	Start NWP

7.6 Real-time Curve Operation

Curve Setting

The real-time curve is used to present the data measured by each sensor in the form of a real-time plot. Click the curve name on the right of the status display area, the Y-axis scale changes to the unit applicable for the selected curve.

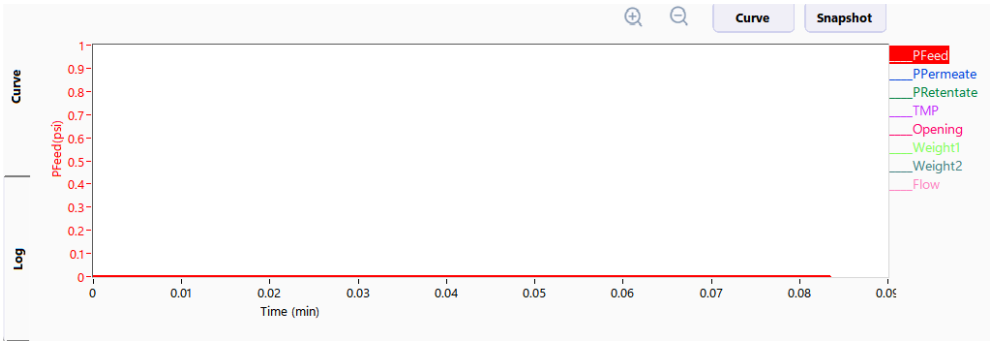


Figure 18. The Y-Axis Setting

WARNING Check for leaks at all the connections. If any leaks are detected, please tighten the relevant connectors. If leaks continue to be detected, please contact Izon Support for further guidance.

Click 'Curve' to open Curve Settings screen. There are three tabs in the screen for setting the curve display, Y-axis scale, and X-axis signal.

1. The Curves tab

On this tab, users can select which curves to be displayed in the plot by clicking the checkbox in front of the signal name, and select the desired style and colour through the drop-down list.

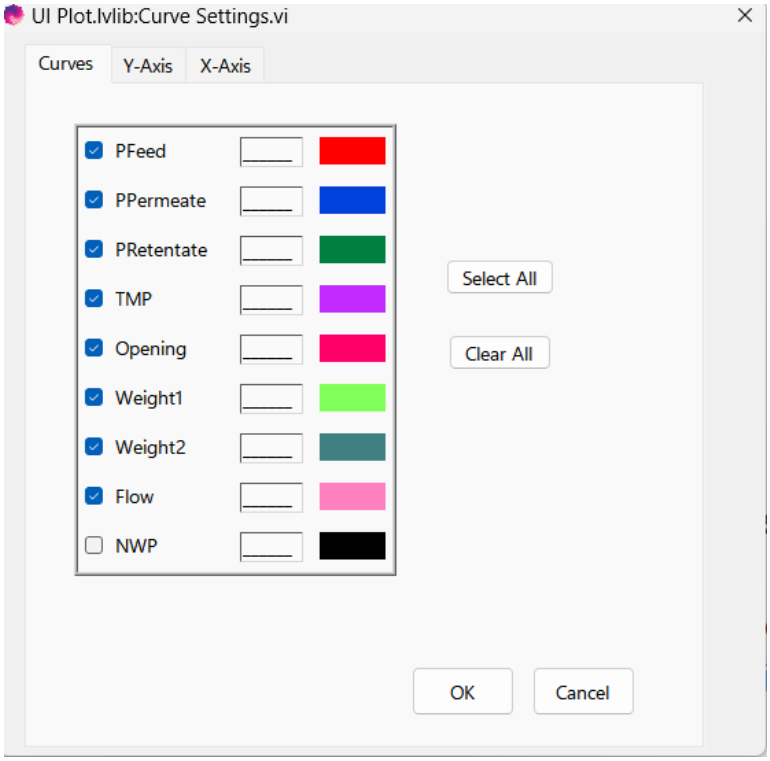


Figure 19. The Curves tab

2. The Y-Axis tab

This tab is used to set the Y-axis scale for different curves. There are two modes of Y-axis scale, Auto Scale and Fixed Scale. Auto mode means that the scale of the curve will be adjusted according to the size of the signal in order to present the whole curve in the plot. Fixed mode indicates that the curve has a fixed scale range. This mode is used to observe details within a certain range of the curve.

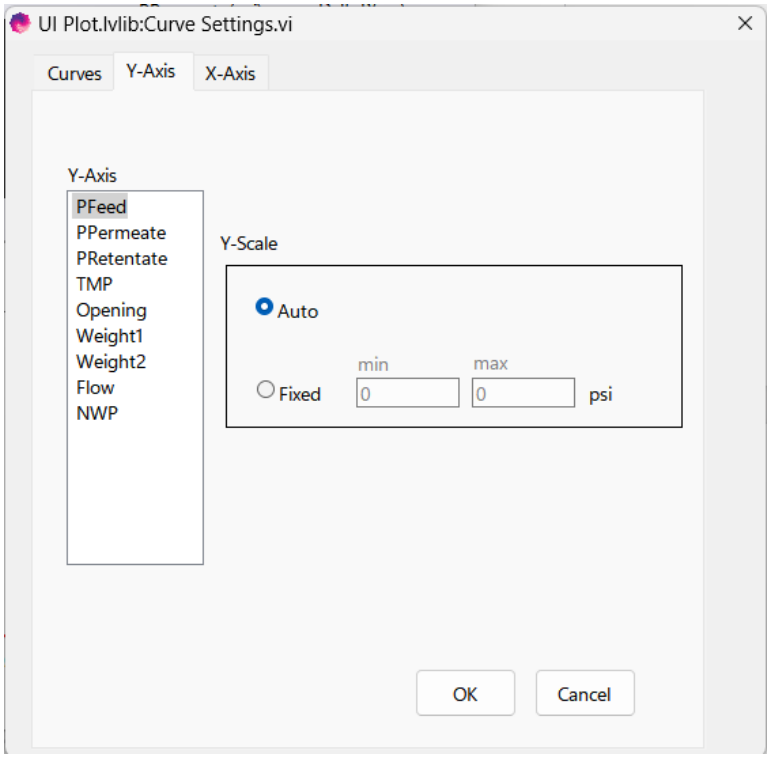


Figure 20. The Y-Axis tab

3. The X-Axis tab

This tab is used to select base unit and set the scale of the X-axis. There are three modes of X-axis scale, Total, Zoom and Window modes. Total mode displays all data from the start of the run in the plot; Zoom mode allows the plot to be zoomed in and out arbitrarily; Window mode displays a fixed x-axis length.

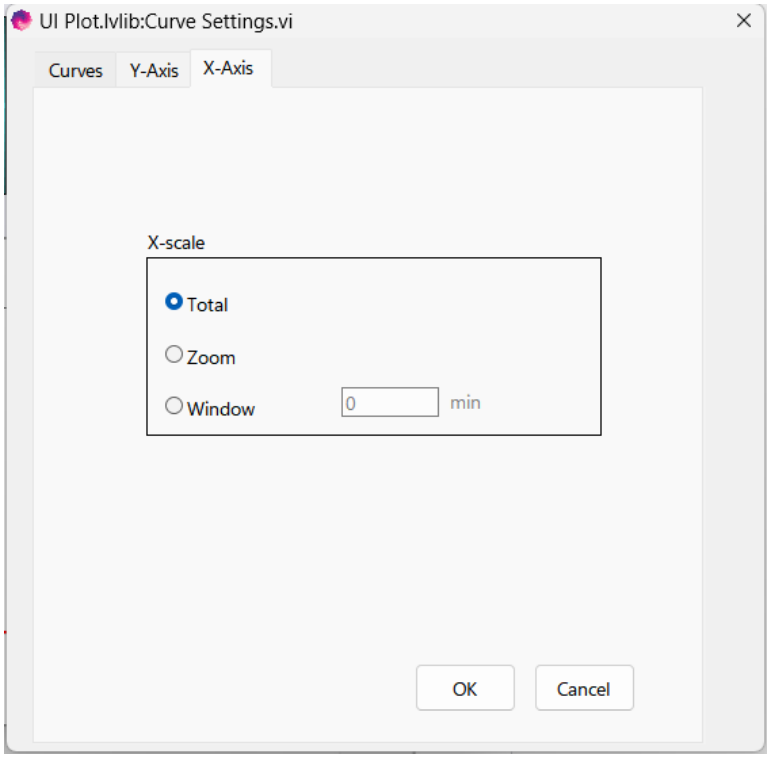


Figure 21. The X-Axis tab

Snapshot

A screen will pop up if you click 'Snapshot' on the right of the Curve pane. Type the name in the screen and click 'OK' to save the current plot as a snapshot.

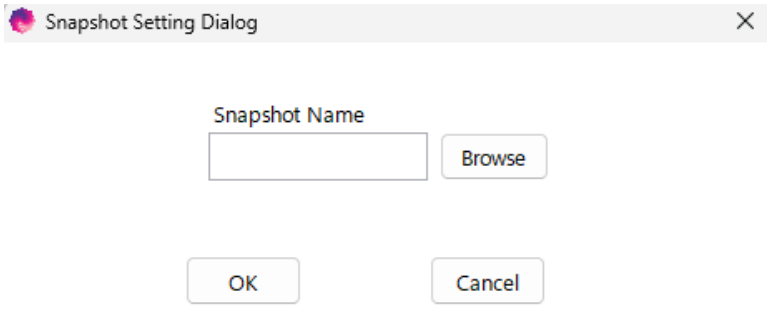


Figure 22. The Snapshot screen

Zoom

Click the button on the right of the Curve pane, and then click within the desired area on the plot to either enlarge or shrink a specific portion of the current plot.

7.7 Alarm

When alarms start or stop, the system will automatically pop up an alarm screen to display the new alarm information or the existing alarm information. When alarms stop they will be marked in green in the popup alarm screen. Users can click OK to exit the alarm screen.

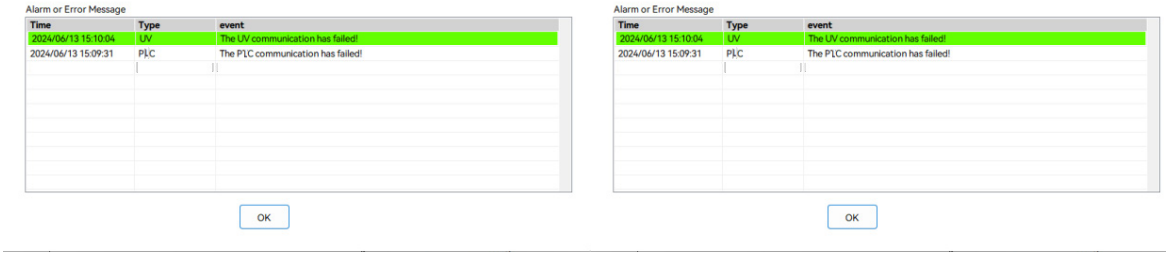


Figure 23. Alarm screen

Users can click Tools → MessageAlarm to query the alarm type and alarm information. For valve alarms, users can also retrieve which valve has failed, so as to better locate the fault.

7.8 Audit Trail

Click Access → Audit Trail, the Audit Trail screen will pop up, as shown below.

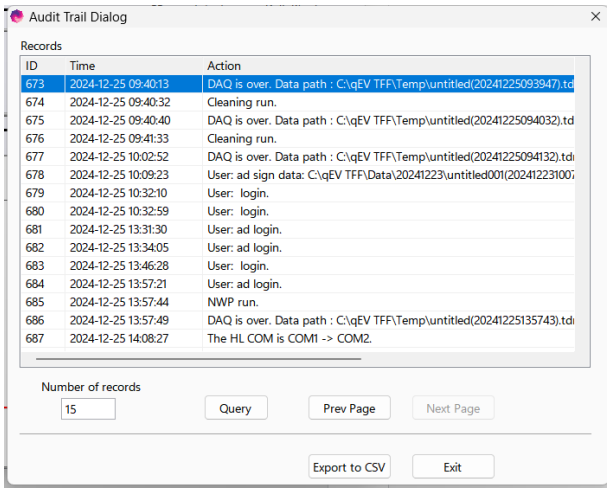


Figure 24. Audit Trail screen

Audit trails are used to view all system activities, such as logins, run logs, and data information. Once qEV TFF is started, the actions are captured into the database in a sequential manner using absolute time stamps. Thus, if system time is changed, data is modified, or even a file is deleted, it can be traced back through the Audit Trail function.

Users can set the number of records per page. Click 'Query' to go to the last page. Click 'Export to CSV' to export the filtered records as a CSV file to a user-specified folder.

7.9 Historical Data

View Historical Data

All data are saved on the system disk. Click Tools → History to open the historical data screen. Click 'Select Daq File' on the Basic Message tab to select the data file to be viewed or exported. On the tab, users can view the basic information, such as start time, end time, flow rate of the pump and other records of the system running

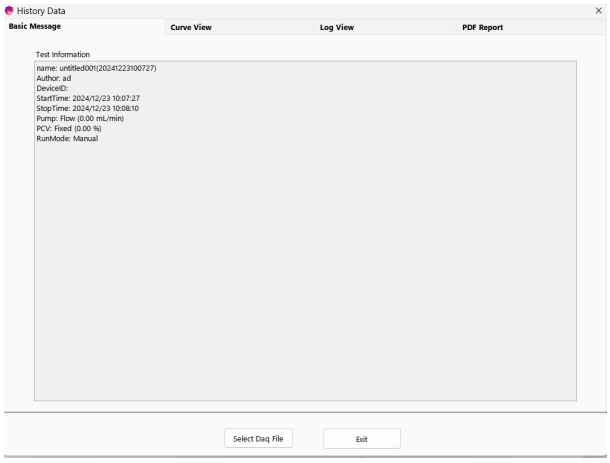


Figure 25. Historical data screen

1. Curve information

In the historical data screen, users can view the curves collected by all the sensors on the Curve View tab. Click 'Curve' to select which curves should be displayed and set the scale of X-axis and Y-axis.

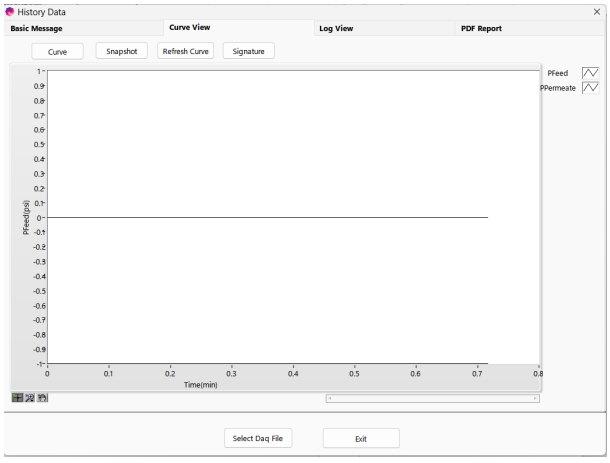


Figure 26. Curve view tab

2. Signature

Click 'Signature' on the Curve View tab to open Signature screen.

The "Signature User" displays the current user. If signed by the current logged in user, please type the Signature Description and the Signature Password, then click 'Sign' to complete the signature. If choosing another user from the droplist, the Login Password is also required.

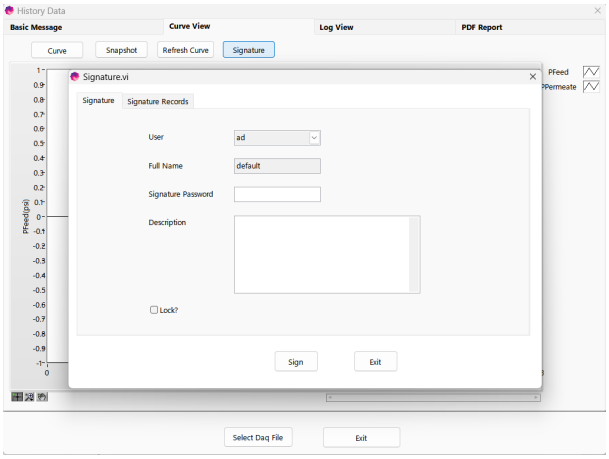


Figure 27. Signature screen

If users select the lock checkbox, the data file will be locked after the signature is executed. The locked file cannot be signed again. To unlock the file, open the Signature dialog again, deselect the lock checkbox, and the following screen will pop up (Figure 28). Log in to the account that locked the file or an administrator account, or log in two user accounts with the same permission group, and the locked data file can be unlocked.

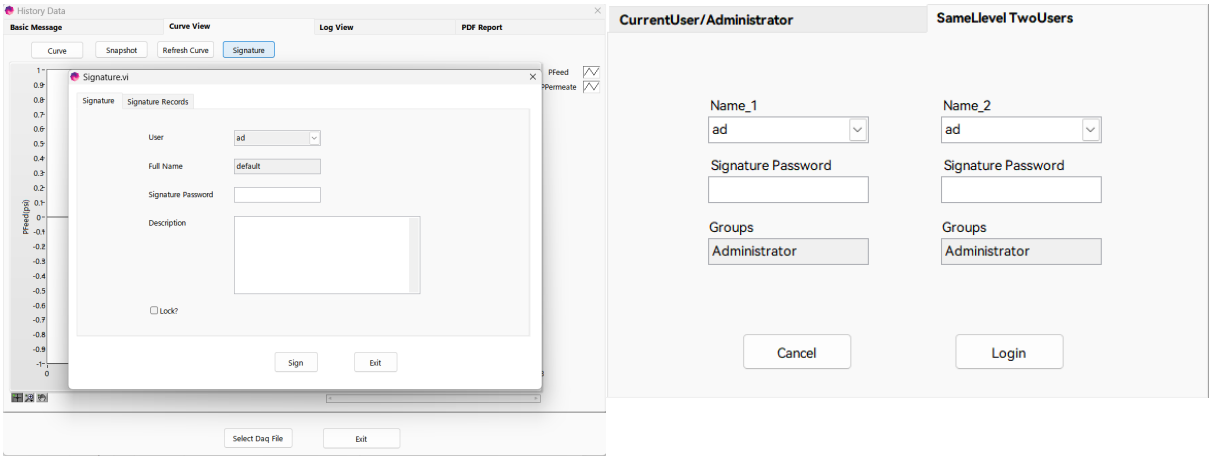


Figure 28. Unlock screen

On the Signature Record tab, users can view the history records of all signatures.

3. System logs

In the historical data screen, users can view all system logs on the Log View tab. The system logs all the operations and alarms from the beginning to the end of each run.

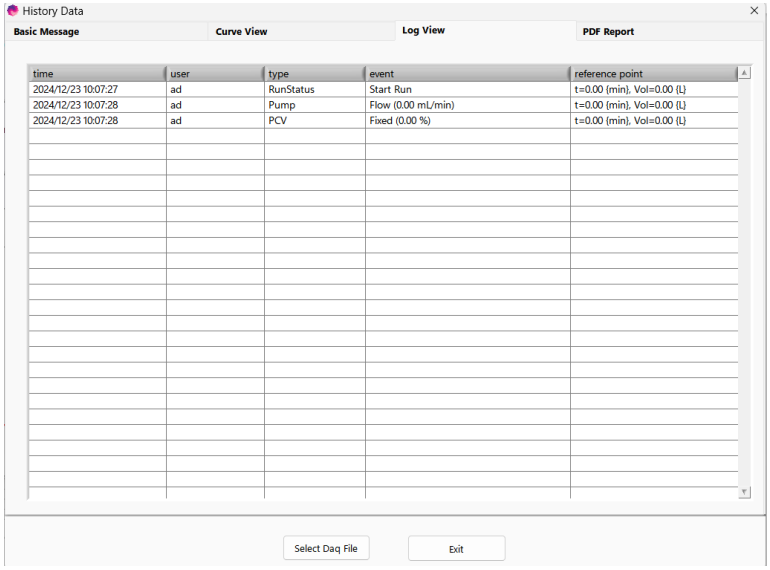


Figure 29. Log view tab

4. Generate PDF report

Users can click the checkbox to select the content to be added to the report on the right side of the PDF Report tab. Then click 'Generate PDF Report' to open the Signature and Naming screen, and refer to Signature to complete the signature.

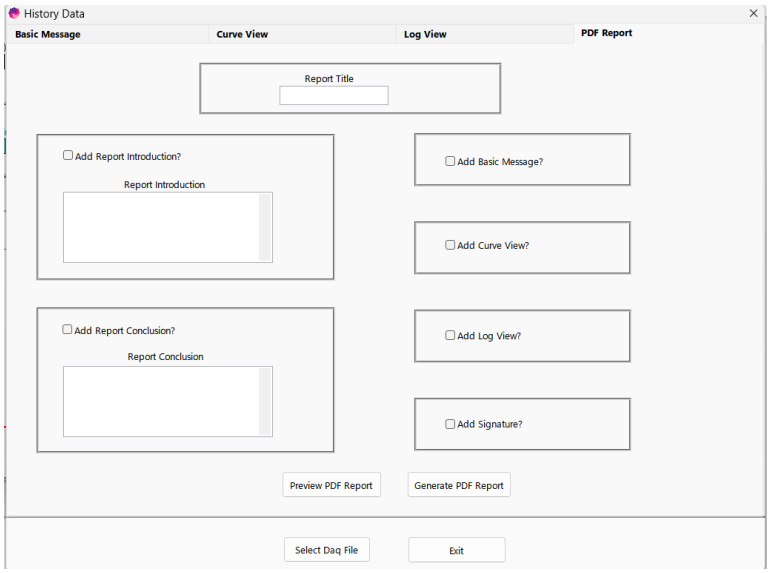


Figure 30. PDF report tab

After generating a report, click 'Preview PDF Report' to display the report on the left side.

7.10 Calibration

Scale Calibration

Click Parameters → Calibrate to open the Sensor Calibration screen, and select the scale to be calibrated in the top right corner. Calibrate the scales following the instructions on the screen, as shown below (Figure 31).

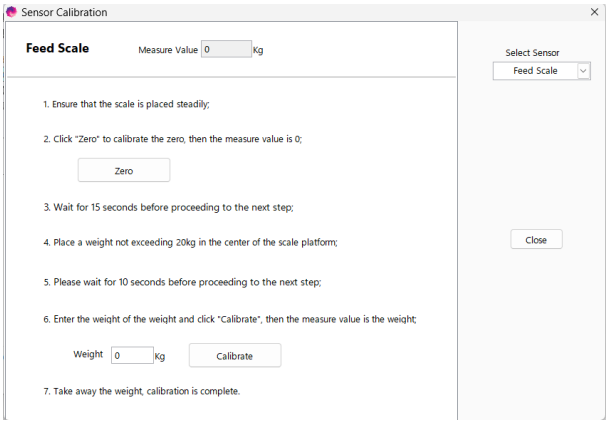


Figure 31. Scale calculation

Reset PCV

Click Parameters → Calibrate to open the Sensor Calibration screen, select pressure control valve on the top right corner, and then reset the PCV based on the following instructions (Figure 32).

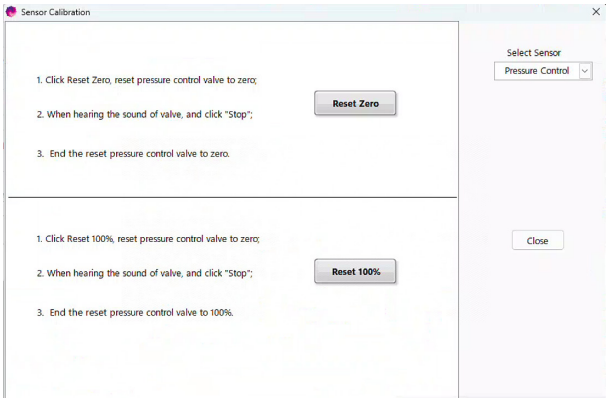


Figure 32. Reset PCV

7.11 Exit Procedure

Click 'Exit' on the menu bar, a screen will pop up to confirm exit from qEV TFF if the user has permission.

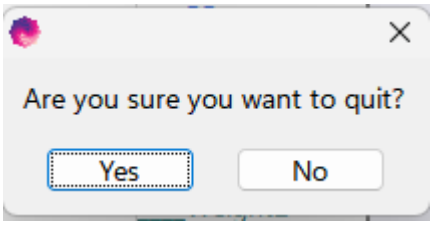


Figure 33. Exit qEV TFF screen

If the user does not have the permission to exit qEV TFF, the Exit menu will be grey. In this case, the user can click 'Close' on the menu bar and a screen will pop up to confirm shut down of the computer.

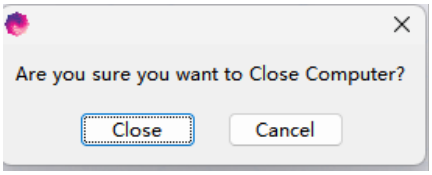


Figure 34. Close computer screen

8 MAINTENANCE

8.1 Daily Maintenance

1. Clean and wipe the exterior surface of the instrument.
2. Check pump tubing, PCV seals, and sensor connections for leaks or wear.
3. The flexible tubing provided with the TFF system requires regular replacement. The tubing is exposed to wear and friction in the peristaltic feed pump and high pressure from the feed pump. Before operating the system, inspect the tubing to ensure the following:
    - Tubing sections are installed at the correct locations.
    - All fittings are properly installed and locked.
    - Tubing sections and connections are free of visual damages, leaks and wearing.
    - Tubing is not kinked.
4. Replace the pump tubing after it has completed 10 operational cycles.

8.2 Quarterly Maintenance

1. Inspect for leaks in valve, connections and pump.
2. Check condition of gaskets.
3. Replace the seals of the PCV.

8.3 Semi-Annual Maintenance

1. Dismantle and clean all fittings.
2. Verify that all safety elements are not damaged and are working properly.
3. Inspect the pump.

8.4 Annual Maintenance

1. Visual inspection of corrosion, and material degradation in all components.
2. Verify tightening of the main connections of the console.

9 TROUBLESHOOTING

Troubleshooting

SYMPTOM	REMEDY
Touch screen does not work	Restart the system
Reading deviation between the pressure sensor and the other calibrated pressure meter is over 0.25%.	Replace the pressure sensor

If you are unable to solve the problem, please contact Izon Science Support.

10 PARTS AND ACCESSORIES

Replacement parts

DESCRIPTION	PART NUMBER
PCV	SGE-PCV-17#
Pressure sensor, 3 bar	SGE-801A-3BAR
Scale, 20kg	SGE-KM01-20KG
Pump head	SGE-PUMP-600RMP
Tubing set	SGG00000AE01

Annual maintenance parts

DESCRIPTION	NUMBER
PCV seal	12 (3 for each quarter)

11 CONTACT US

Additional support material is available at support.izon.com

If you have any questions that are not answered on the support portal, or your instrument requires repairs/ maintenance, please contact our support staff via the online support portal by raising a support ticket.

When reporting qEV TFF issues to Izon support, please provide the serial number, which can be found on the rear of the TFF as in Figure 35.

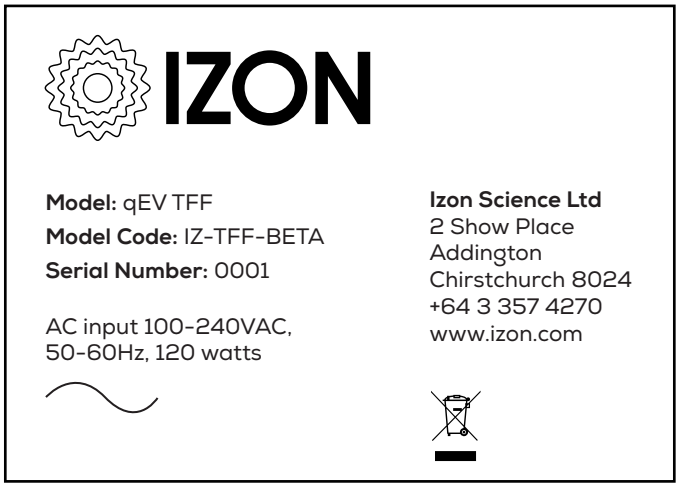


Figure 35. The TFF serial number sticker.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