User Guide

Cogent® µScale Tangential Flow Filtration System

Notice

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The Cogent® µScale TFF System

Introduction

The Cogent® µScale TFF system is designed to enable scalable tangential flow filtration (TFF), ultrafiltration (UF) concentration and diafiltration (DF) process development in laboratory settings. The system uses up to three Pellicon® 3 88 cm² cassettes, with a total membrane area of 264 cm² or up to three Pellicon® XL50 devices for a total membrane area of 150 cm².

Each system includes one each of the following: Pellicon® holder, recycle tank, tank mixer, feed pump, tubing, pinch valves, instrumentation and control panel.

Operational procedures, data management and pump and mixer speeds are controlled via a touch screen.

Figure 1: Cogent® µScale TFF System

This product is intended for laboratory or industrial use only. The power cable provided is only for this instrument and must not be used with other devices.

Operator and Equipment Safety

Anyone operating or working near the Cogent® µScale TFF system must be aware of the following:

⚠	Read and understand this Operators Manual before performing maintenance on the system. Failure to follow instructions could result in user injury or system damage.
	Read and understand all maintenance instructions in this User Manual before performing maintenance on the system. Failure to follow instructions could result in user injury or system damage.
	Prior to operation, ensure the Cogent® µScale TFF system is fully assembled as described in <u>Assembling the System</u>. Ensure that the tank, filter holder and tubing are properly installed and the feed pump and flow cells are properly connected.
	Never operate the Cogent® µScale TFF system in a hazardous environment or use with flammable, combustible or solvent liquids.
	Any alteration of the Cogent® µScale TFF system from factory specification may cause unsafe conditions and will void the product warranty.
	Use appropriate power supply cable and fuses for the area where the Cogent® µScale TFF system is operated for information, see <u>Connecting the System Power and Fuses</u>. Ensure that the system is grounded properly.
⚡	Unplug power cord prior to opening the system's main cabinet (back door).
	There are no user-serviceable parts inside the Cogent® µScale TFF system. Service should be performed only by trained and authorized personnel.
	Use caution when opening and closing pinch valves. Failure to open or close pinch valves at the appropriate times could result in trapped high pressure, product loss, damaged cassettes, chemical spills, and pump damage. Carefully follow all operating instructions.
	Prior to each use, carefully inspect all hoses and tubing for kinks or restrictions that could result in pressure buildup and possible rupture of hoses or tubing.
	Never operate the Cogent® µScale TFF System with all the pinch valves closed. The tubing of the system may become over pressurized.
	Never attempt to lift or move the Cogent® µScale TFF System without assistance. Two people are required to lift the Cogent® µScale TFF system base unit. For weight specifications see <u>Hardware System Parameters</u>. The base unit is designed for placement on a bench top capable of supporting at least 30 kg (67 lbs).
	Never move the system while there is liquid in the tank, while system processes are running or the holder is in place. Detach the weigh scale before moving system.
	To prevent tipping, ensure that the back service door and system are fully supported while the door is open.
	Never operate the system without the tank cover in place. Never operate the system if any moving parts are exposed. Never operate the system with the pump housing open.
	Use appropriate personal protective equipment, including eye protection, when operating the system.

Operating Requirements

The system needs to be connected to electrical power and have fuses installed to operate.

The system is provided with two plastic bags, each containing two fuses, a fuse drawer and power cables. Each is labeled according to voltage:

- 100 – 120 V power supply set (using 2 x 1.6 A fuses)
- 240 V power supply set (using 2 x 0.8 A fuses)

Use fuses and power cables appropriate for the electrical power supply:

Location	Power Supply	Bag Label
North America	120 VAC ±10% 60Hz, 1-phase	**100 - 120 V power supply set**
Japan		
Europe	240 VAC ±10%, 50Hz, 1-phase	**240 V power supply set**
United Kingdom		
China		

System Components
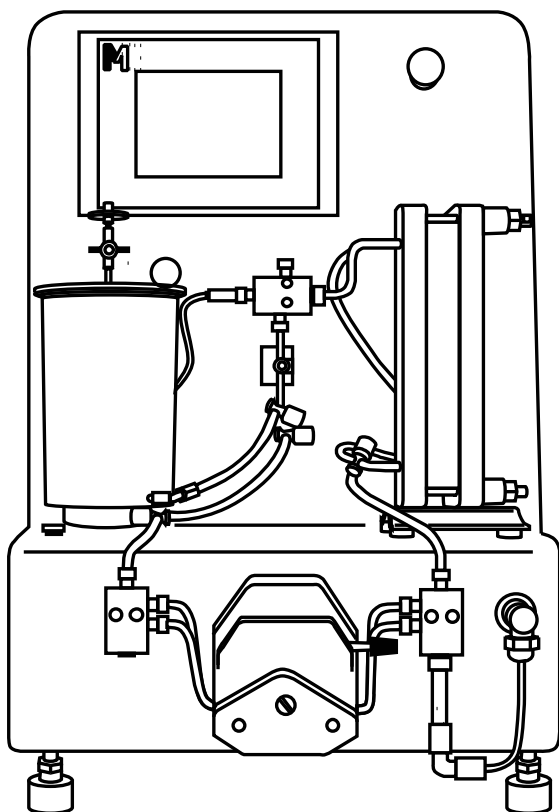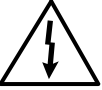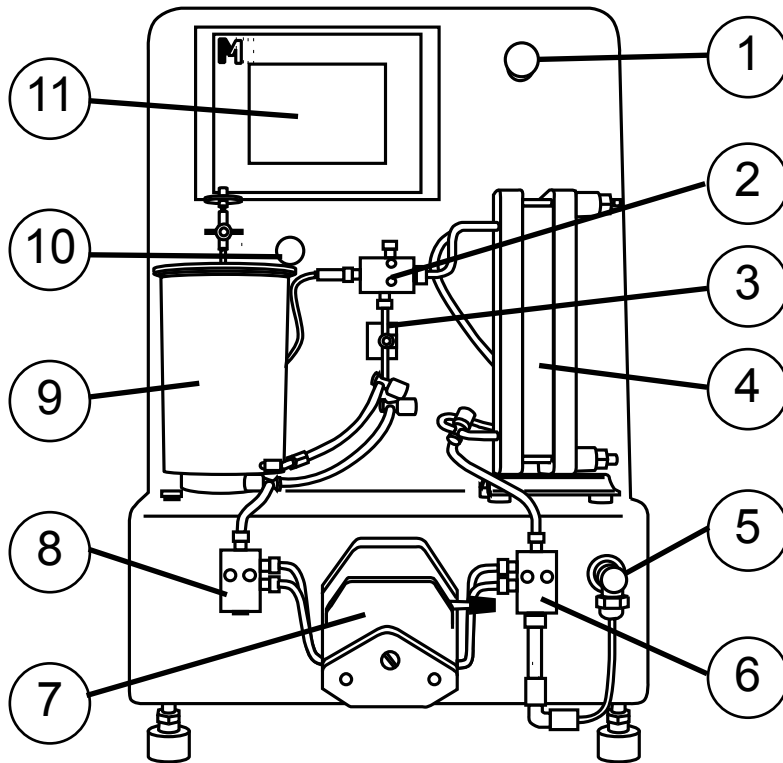
This product is intended for laboratory or industrial use only. The power cable provided is only for this instrument and must not be used with other devices.

Key No.	Component	Description
1	Emergency Stop Button	Push this button to stop the unit in case of an emergency. To release, turn the button clockwise until it pops up.
2	Flow Cell with Pressure Sensor	Transmits retentate pressure
3	Retentate valve	Valve for applying and adjusting system backpressure.
4	Filter Holder	Holds Pellicon® cassettes
5	Connection Port	Connects the feed Temp./Pressure sensor to the system electronics.
6	Flow Cell with Temperature/ Pressure Sensor	Transmits feed temperature and pressure.
7	Peristaltic Feed Pump	Pumps the solution across the filter membranes.
8	Manifold	Flow cell connecting tank tubing to the pump tubing.
9	Tank	Process vessel
10	Connection Port	Connects the retentate pressure sensor to the system electronics.
11	Touch Screen	User interface to run batch processes, manual processes and configure system settings.
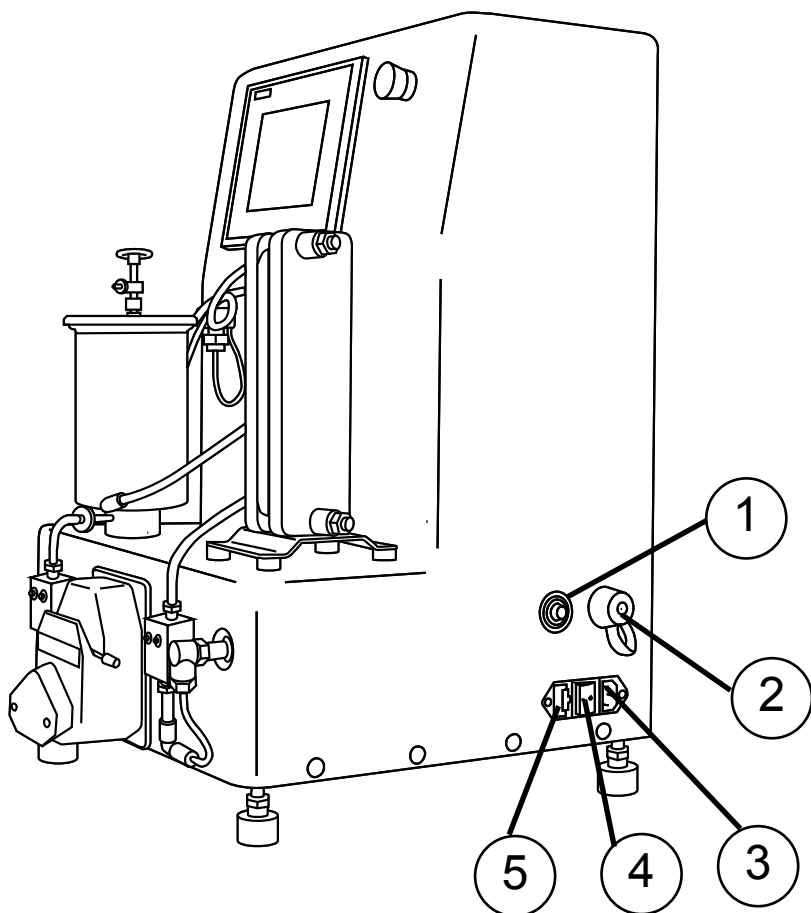
Figure 3: Right Side View Cogent® µScale TFF System

Key No.	Component	Description
1	Weight Scale Connection Port	Connection port with cap for connecting the optional filtrate weight scale to the system electronics. Enables the system software to interface with the filtrate weigh scale
2	Ethernet connector	Connection port for Ethernet cable with cap. Provides interface for data transfer to external PC.
3	Power cable receptacle	Port where power cord connects to the system
4	Main power switch	Powers system on or off
5	Fuse receptacle	Houses the fuse drawer with system fuses
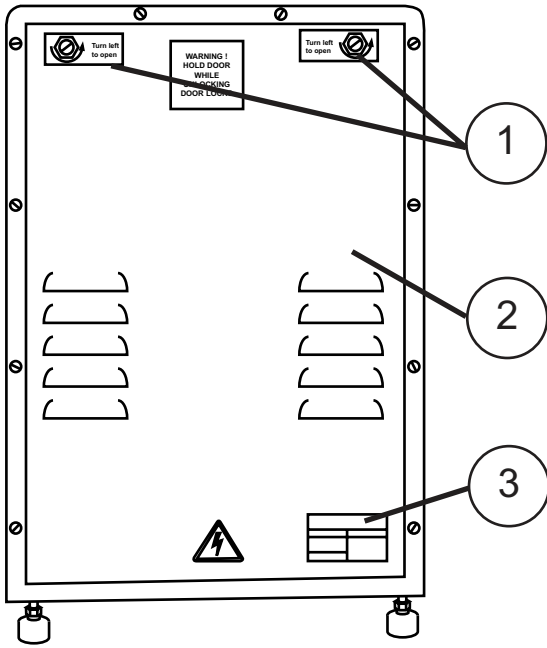
Figure 4: Rear Side View Cogent® µScale TFF System

Key No.	Component	Description
1	Back Panel Door Locks	Locks the door in position – turn counter clockwise to unlock, turn clockwise to lock; the door opens downward and must be supported at all times while opening.
2	Back Panel Door	Provides access to the internal components of the Cogent® µScale TFF system including feed pump motor and drive, mixer motor and drive, electrical circuits, fuses for 24VDC circuit and pressure switch.
3	Factory Plate	Provides System information: • Product name • Catalogue number • Lot number • Voltage, current and frequency • Year and place of manufacturing • CE marking

Filter Holder

The Filter Holder holds up to three Pellicon® 3 88 cm^2 cassettes, for a maximum filtration area of 264 cm². Refer to the filter holder user guide for details and installation instructions.

Tank Components

The tank assembly has a maximum working volume of one liter and is equipped with a tank lid with O-ring.
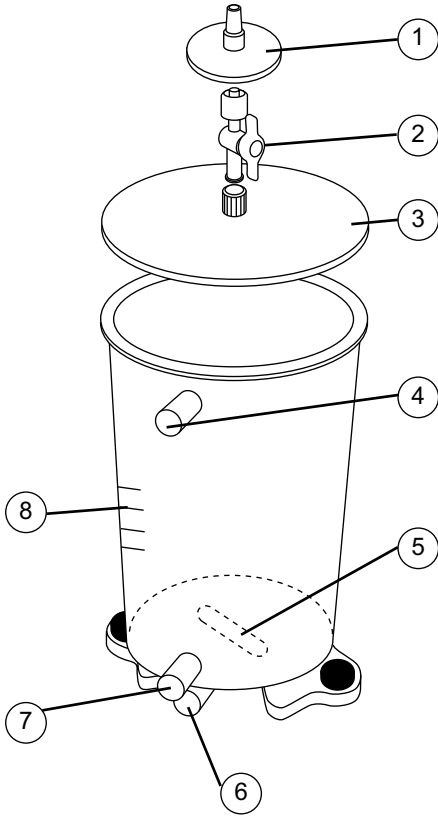
Figure 5: Tank Components

Key No.	Component	Description
1	Vent Filter	Filters air entering the tank.
2	Vent Valve	Valve with male luer (capped with female luer lock) for closing the vent during vacuum procedures.
3	Tank Lid	Removable tank lid with O-ring.
4	Spare Inlet	Port with male luers (capped with female luer lock) for connecting tubing for cycling solution through the tank.
5	Stir Bar	Dropped into tank and spun magnetically.
6	Feed Outlet	Port with male luer (capped with female luers lock) for connecting tubing for cycling solution through the tank.
7	Retentate Inlet	Port with male luer (capped with female luer lock) for connecting tubing for cycling solution through the tank.
8	Fluid Level Indicator	Visual indicator of the volume level of solution in the tank.

Filtrate Weight Scale (optional)

The filtrate weight scale is an optional accessory used with the Cogent® µScale system. The scale enables users to weigh the filtrate collected from the filter holder filtrate outlet, enables automatic shut off and allows the calculation of filtrate flow based on the collected filtrate volume measured over time.
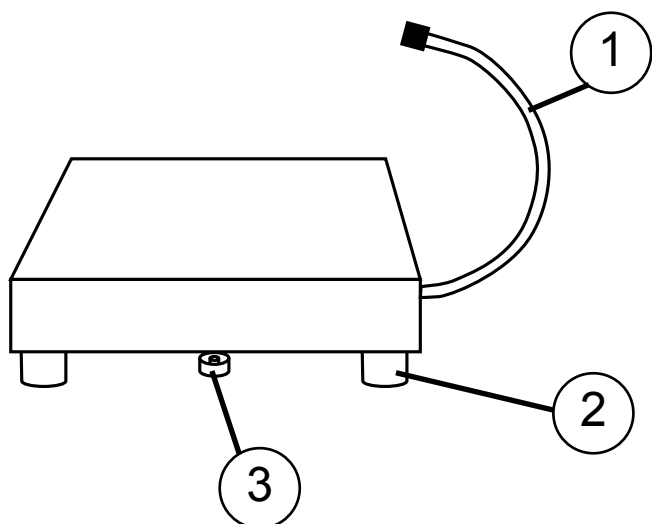
Figure 6: Filtrate Weight Scale

Key No.	Component	Description
1	Connection Cable with Connector	Enables the filtrate weight scale to interface with the weigh transmitter in the system.
2	Height Adjustable Feet (4 ea per unit)	Allows height adjustment and leveling of the filtrate weight scale.
3	Bubble Level	Indicates the horizontal position of the filtrate weight scale.

Touch Screen Overview

The Cogent® µScale TFF system is manually controlled via the touch screen located on the front of the system. The screen give users direct control over system components, such as the pump and the mixer, and provides an automated function for running batch TFF processes. The screen also allows users to set and view process speeds, temperatures, flow and other process settings.

The Alarm Setpoint screens allow entry of threshold values for key process parameters. Alarms are triggered when a process value exceeds an alarm set point.

Network screens are used to save or access batch information from the system memory card or network (if connected). The system is password protected to prevent information from being altered by unauthorized personnel.

NOTE
For detailed operating instructions see Operating the System.
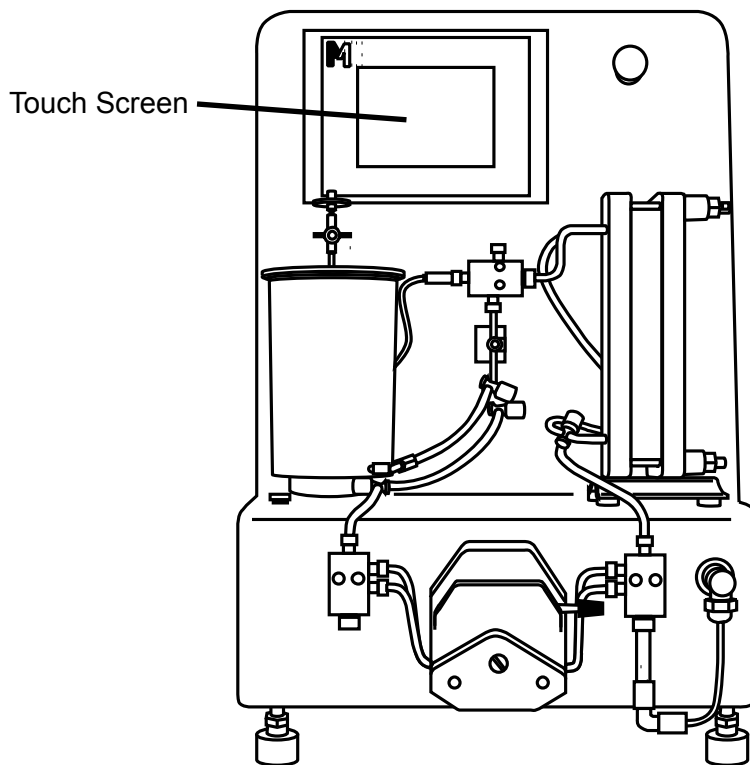
Figure 7: Touch Screen Location

Start Up Screen

The **start up** screen opens during the initial system setup or when the power supply has been interrupted. During a typical power up, using the **ON** switch, a series of boot screens will load before the **START** screen opens. Do not use the touch screen during this initialization.
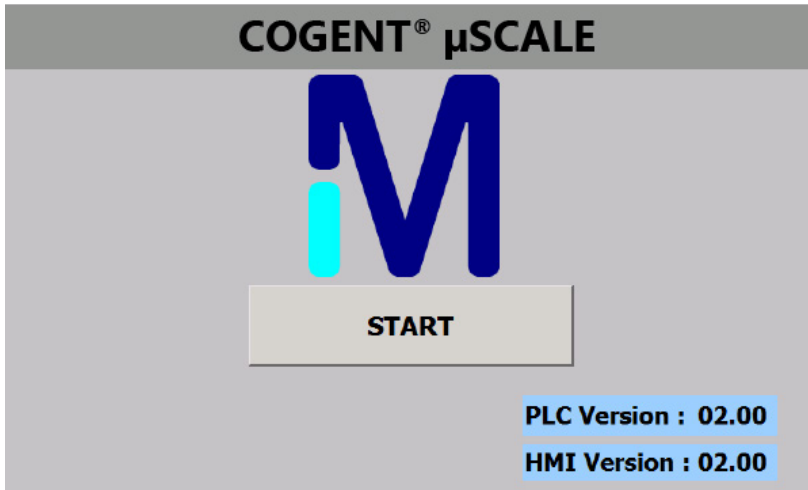
Figure 8: Start Up Screen

Button	Function
START	Press to access the P & ID Screen.

Piping & Instrumentation Diagram (P & ID) Screen

The P & ID screen is the default screen for the Cogent® µScale TFF system that displays the system status, pressures, alarms, warnings, temperature and weight (if optional scale is attached). The display is updated continuously to provide an accurate depiction of the system and process status.
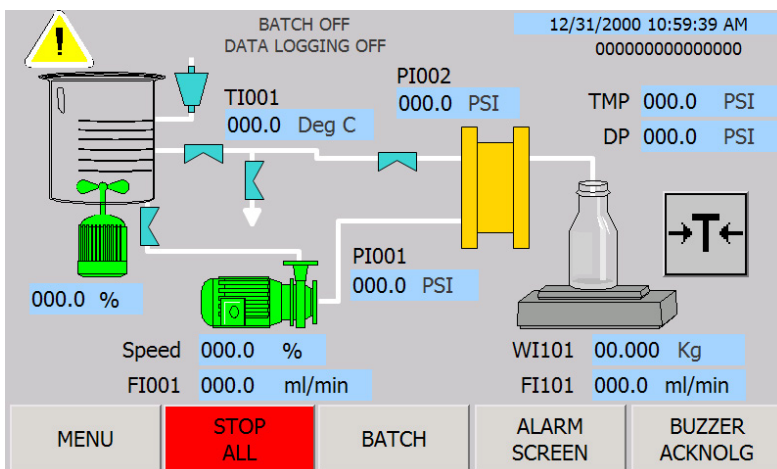
Figure 9: P & ID Screen with Scale Display
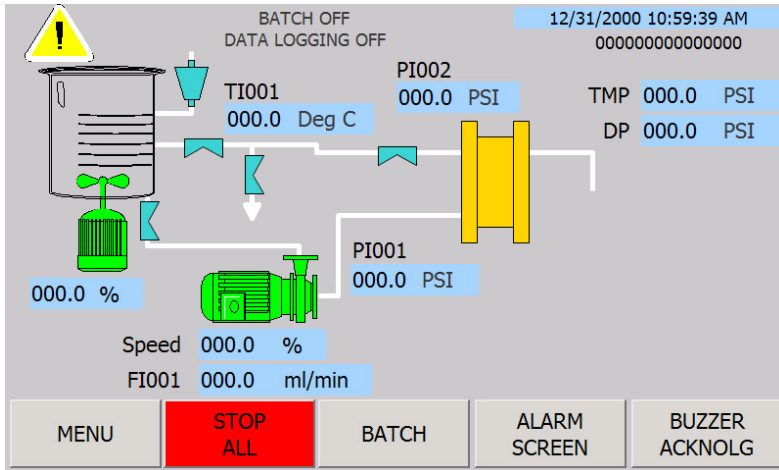
Figure 10: P & ID Screen without Scale Display

Button	Function
MENU	Opens the Main Menu Screen.
STOP ALL	Stops pump and mixer.
BATCH	Opens the Batch screen. Starts, stops and adjusts stop the batch settings.
ALARM SCREEN	View active alarms.
BUZZER ACKNOLG	Stops the buzzer when an alarm or warning is signaled. This button is visible only if the buzzer function is enabled.

Main Menu Screen

The **Main Menu** screen buttons provide access to all the functional screens.
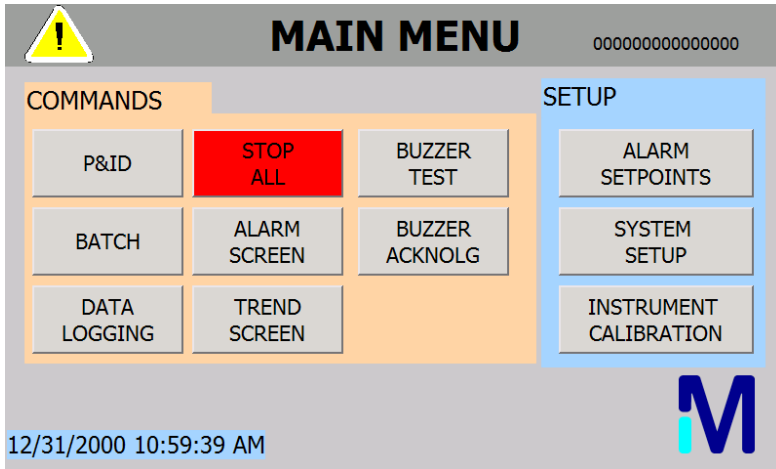
Figure 11: Main Menu Screen

System Setup Menu Screen

The **System Setup Menu** screen buttons provides access to all the screens used to setup the system default functions and settings prior to performing processes.

NOTE
    The Stop runtime button is for Millipore Service Personnel only.
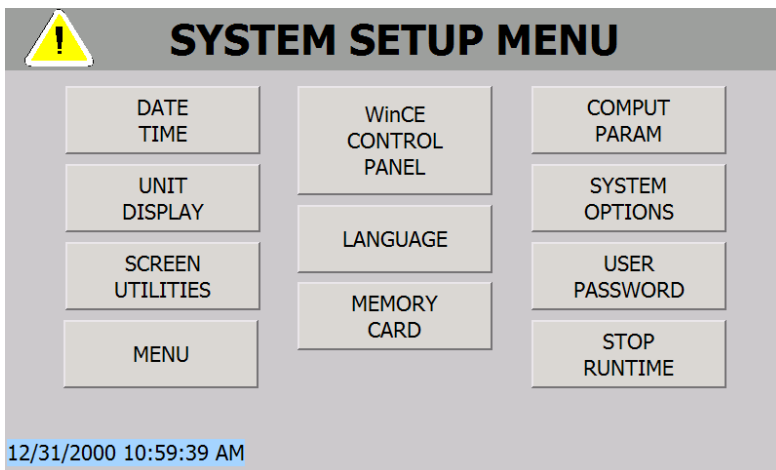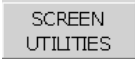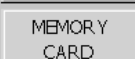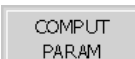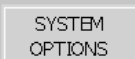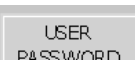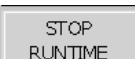
Figure 12: System Setup Screen

Button	Function
DATE TIME	Sets or changes the default time and date display.
UNIT DISPLAY	Changes the pressure, temperature and weight engineering unit display.
SCREEN UTILITIES	Opens the clean or calibrate the touch screens.
MENU	Opens the Main Menu screen.
WinCE CONTROL PANEL	Opens the Windows® Control Panel. Adjusts network settings.
LANGUAGE	Changes the default language for all display text.
MEMORY CARD	Views memory storage space and set percentage alarms.
COMPUT PARAM	Changes the feed pump controller parameters: gain, integral, derivation and sample time.
SYSTEM OPTIONS	Opens the Options Menu screen.
USER PASSWORD	Sets or resets the touch screen access passwords or access the advance setup menu.
STOP RUNTIME	For Millipore Technician use only.

Assembling the System

Unpacking the Cogent® µScale TFF System

CAUTION	
⚠	Two people are required to lift the Cogent® µScale TFF system base unit. For weight specifications see Specifications. The base unit is designed for placement on a bench top capable of supporting at least 30 kg (67 lbs). Do not block the cooling vents located on the back of the Cogent® µScale TFF system.

The Cogent® µScale TFF System is shipped in a crate or carton that contains all parts and accessories needed to fully assemble and operate the system. If purchased, the filtrate weight scale is shipped in a separate carton.

The system should be unpacked only when assembly is about to begin.

NOTE
> If anything is damaged, stop the unpacking procedure and contact a Millipore representative.

1. Remove the plastic straps which hold the main cardboard box to the wooden pallet.

2. Remove the 4x plastic locks at the lower side of the min cardboard box.

3. Lift off the main cardboard box.

4. Remove the manual to follow the instructions for the unpacking of the system.

5. Remove the transparent bag with the Power Supply Subassembly from the card board tray.

6. Remove the transparent bag with the Tubing Subassembly from the card board tray.

7. Remove the cardboard tray and the foam support.

8. Remove the cardboard box with the Tank Subassembly.

9. Remove the cardboard box with the Filter Holder Assembly.

10. With at least two people, lift the Cogent® µScale TFF system base unit and the two side mounted foam elements, out of the lower part of the main cardboard and place on a stable and level bench. Lift the base unit at the following points:
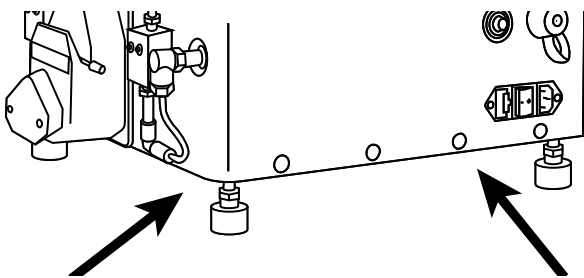
Figure 13: Cogent® µScale TFF System Lifting Points

Remove the two side mounted foam elements by carefully tilting the system to the left side and then to the right side.

System Components

NOTE

If any components are missing, stop the unpacking procedure and contact a Millipore representative.

The P & ID labels referred to in the tables below are used for identifying components on the Cogent® µScale TFF System assembly drawings. For catalogue numbers, see Parts and Accessories.

Tubing Assemblies

P & ID Label	Item Description	Qty
FLX001	85 mm Silicone (translucent) tubing with one pinch valve (HV001) and one female luer at each end.	1
FLX002	300 mm Sta-Pure® 14 (white) tubing with two female luers at each end.	1
FLX003	280 mm Sta-Pure 14 (white) tubing with two female luers at each end.	1
FLX004	165 mm Sta-Pure 16 (white) tubing with two female luers at each end.	1
FLX005	70 mm Sta-Pure 16 (white) tubing with two female luers at each end and one luer elbow at one end.	1
FLX006	Three tubing parts (joined by a tee connector): 65 mm Sta-Pure 16 (white) tubing with a female luer at one end. 165 mm Sta-Pure 16 (white) tubing with a pinch valve (HV003) and a female luer at one end, and a luer elbow on the other end. 135mm Sta-Pure 16 (white) tubing with a pinch valve (HV004) and 465mm Silicone (translucent) tubing	1
FLX101	600 mm Silicone (translucent) tubing with a female luer on one end.	1
FLX102	600 mm Silicone (translucent) tubing with a pinch valve (HV101) and a female luer on one end.	1
	Male luer adapter for connecting the Pellicon® XL cassette to the tubing assembly	4
	Spare male luer adaptors	20
	Spare O-rings	10

Power Supply Assembly

Bag Label	Contents	Qty
100 - 120 V power supply set	one bag with fuse drawer and two fuses labeled 100 - 120 V fuse set one US power cable one Japan power cable	1
240 V power supply set	one bag with fuse drawer two fuses labeled 240 V fuse set one European power cable one UK power cable one Chinese power cable	1

Filter Holder Assembly (Catalog Number XX42PMICRO)

P & ID Label	Item Description	Qty
FH001	Pellicon® Filter Holder with 4 male luers	1
NA	Torque wrench	1
NA	Socket drive	1
00104781PU	User Guide	1

Tank Assembly

P & ID Label	Item Description	Qty
TNK001	Tank with lid, lid O-ring, and four male luers with luer locks	1
HV701	Vent valve	1
FH003	Vent filter (Millex® filter)	1
NA	Stir bar	1
NA	Thumb screws (M5x16)	2

Filtrate Weight Scale Assembly (optional)

P & ID Label	Item Description	Qty
WE101	Filtrate weight scale with cable and M12 male connector	1

NOTE
  Dispose of all packing materials according to local regulations.

Assembling the System

NOTE

Do not block the cooling vents located on the back of the Cogent® µScale TFF system.
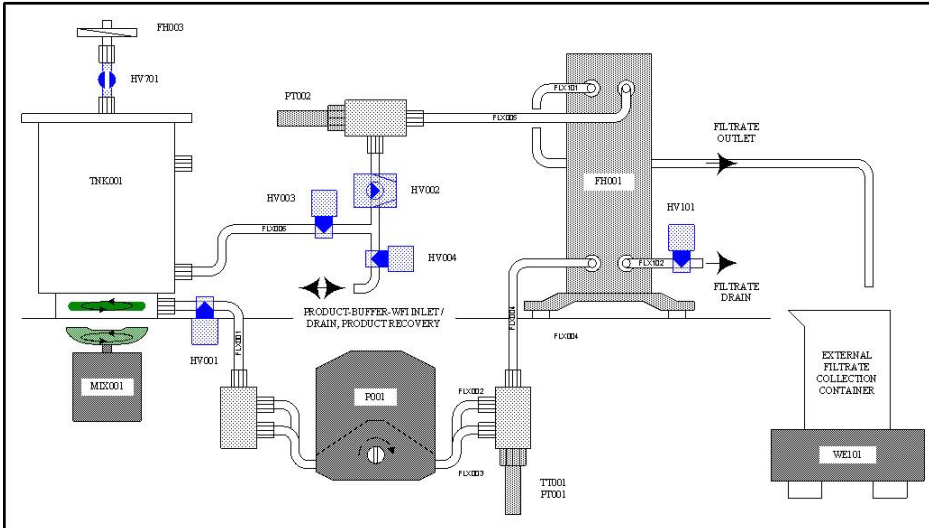
Figure 14: System Assembly

Leveling the System

To ensure proper operation, level the system before performing any operations. A standard bubble level (user supplied) is recommended for leveling the system.

NOTE

Two people are needed for the base unit leveling procedure.

1. Place a bubble level on a flat surface of the Cogent® µScale TFF system. Determine which of the four bottom feet need to be adjusted.

2. Grasp the system by the top and tilt to gain access to the adjustable feet (see Fig 16).

3. Loosen the top jam nut with a 13 mm box wrench (see Fig. 16). Adjust bottom nut with a 14 mm box wrench to the desired height. Gently lower base unit down and re-check the level. Repeat the adjustment procedure for each foot necessary until the Cogent® µScale TFF System is level.
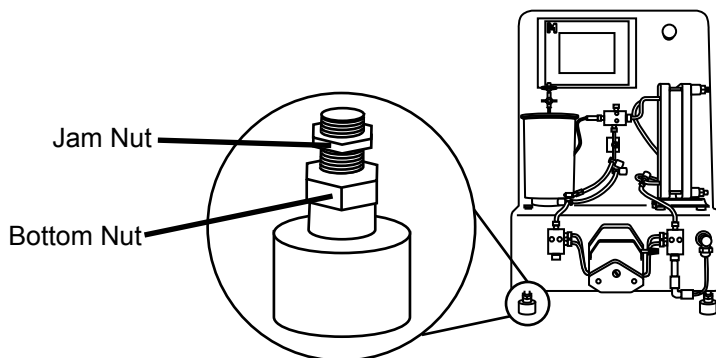
Figure 15: Cogent® µScale TFF System Adjustable Feet

Installing the Tank Assembly

NOTE
Attach all components to the tank subassembly before connecting it to the base unit.

1. Remove all components from the Tank Subassembly (CUP0301) package.

2. Remove the tank lid and all the components from inside the tank.

3. Remove the luer lock plug from the male luer on the top of the tank lid.

4. Insert the female end of the vent valve (the end without a nut) into the male luer at the top of the tank lid. Secure it by turning the locking nut of the male luer.

5. Assemble the vent filter on the vent valve.

6. Place the tank on the left side of the system base unit. The two holes in the tank bottom flange will corresponded with the threaded holes on the base unit platform.

7. Use the thumb screws to attach the tank on the Cogent® µScale TFF system platform.

8. Drop the magnetic stir bar into the tank and replace the tank cover.
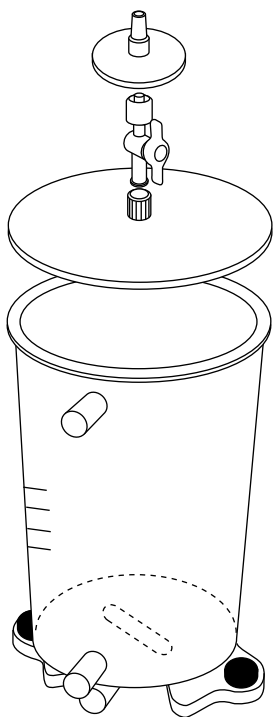
Figure 16: Tank Assembly Overview

Installing the Filter Holder Assembly

Refer to the filter holder user guide for cassette installation instructions.

Assembling the System Tubing

The tubing subassembly consists of eight pieces of tubing that are cut to length and are equipped with luer connections to connect to the flow path components. A complete luer connection consists of a male part with lock nut and a female part.
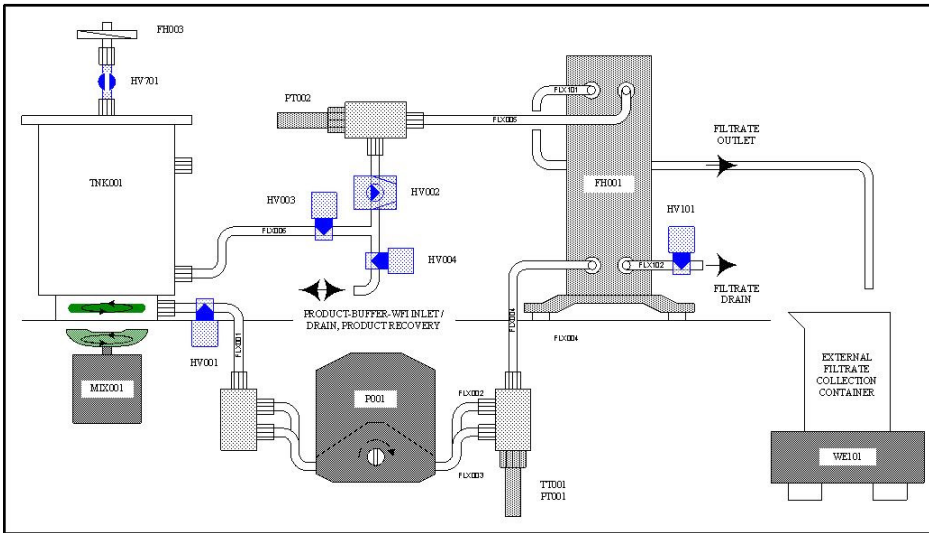
Figure 17: Tubing Subassembly Connection Configuration

Tubing Connections

Tubing	Connects From	Connects To
FLX001	Tank TNK001 feed outlet	Manifold top inlet
FLX002	Manifold right side (upper connection)	Temperature/pressure flow cell left side (upper connection)
FLX003	Manifold right side (lower connection)	Temperature/pressure flow cell left side (lower connection)
FLX004	Temp/Pressure flow cell top outlet	Filter holder feed inlet
FLX005	Filter holder FH001 retentate outlet	Pressure flow cell
FLX006	Pressure flow cell	Tank (TNK001) retentate inlet
FLX101	Filter holder FH001 filtrate/permeate outlet	Filtrate outlet
FLX102	Filter holder FH001 filtrate/permeate drain	Filtrate drain

Assembling the Tubing in the Pump Drive

Caution
The system and pump drive must be shut off before installing or changing the position of the tubing in the pump drive. Never open the pump drive while system is running.

1. Rotate the loading lever on the system pump drive counter-clockwise as far as it will go.

Loading Lever
(shown in
open position)
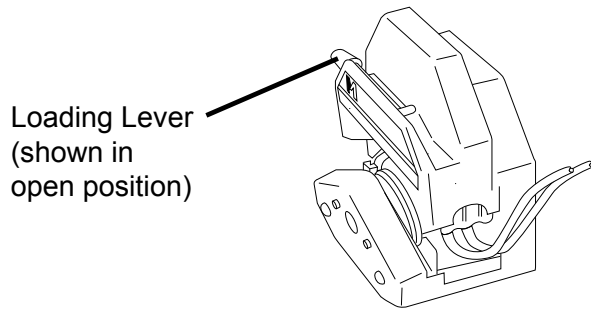
Figure 18: Pump Drive - Open and Load

2. Center the FLX002 tubing in the pump head between the two back retainers. Ensure that the free length of tubing on each side of the pump is equal.

3. Center the FLX003 tubing it in the pump head between the two forward retainers. Ensure that the free length of tubing on each side of the pump is equal.

NOTE
The luer connectors are the same on either end of the tubing.

Correct

Incorrect
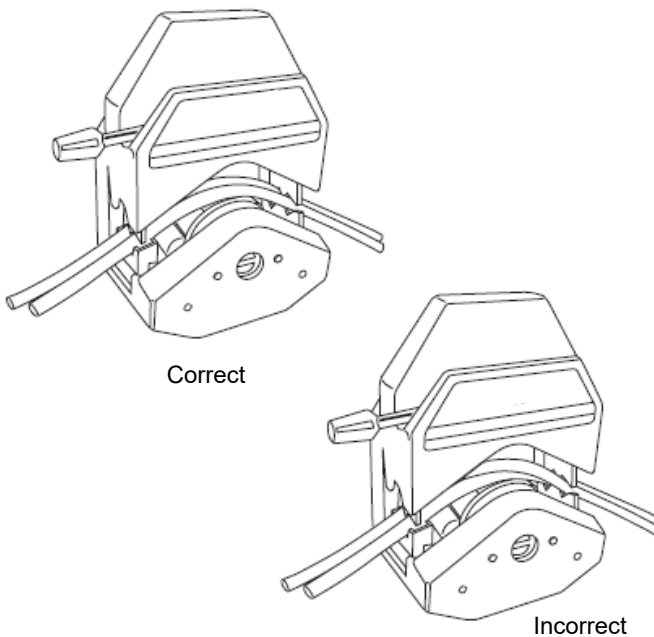
Figure 19: Proper Tubing Installation

4. Close the pump head by turning the loading lever clockwise as far as it will go.

Loading Lever
(shown in
closed position)
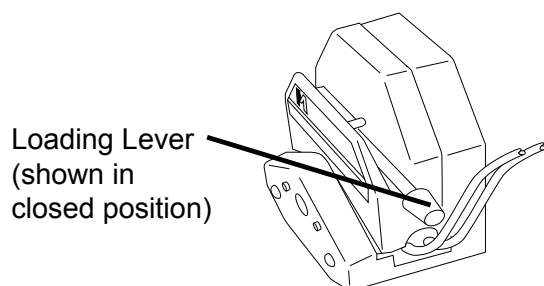
Figure 20: Closed Pump Drive

5. Remove the luer locks and caps from the luer connections on the manifold.

6. Remove the luer locks and caps from the luer connections on the temperature/pressure flow cell.

7. Connect the FLX002 tubing to the upper luer connections on the manifold and the temperature/pressure flow cell.

8. Connect the FLX003 tubing to the lower luer connections on the manifold and the temperature/pressure flow cell.
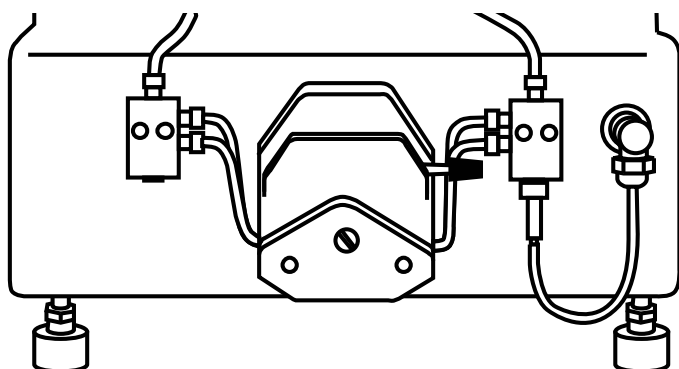
Figure 21: Pump Drive Tubing Connections

Assembling the Tubing to the Tank
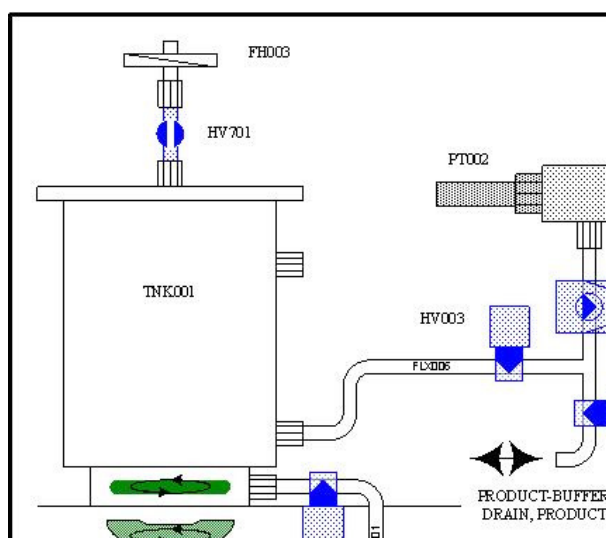
Figure 22: Tank Tubing Connections

NOTE

Do not twist, bend or deform tubing while assembling.

1. Remove the caps from the male luer at the feed outlet of the tank and the male luer at the top of the manifold block.

2. Insert the ends of FLX001 tubing onto the male luers of the tank and the manifold block. Tighten the male luer locks to secure the tubing.

3. Remove the caps from the male luer at the retentate inlet of the tank and the male luer at the bottom of the pressure sensor flow cell.

4. Insert the assembled tubing FLX006 (tubing with tee connector) in the male luer on the tank. Tighten the male luer locks to secure the tubing.

5. Insert female luer of the assembled tubing FLX006 in the male luer of the Pressure Sensor flow cell. Tighten the lock of male luers to secure the tubing.

Assembling the Tubing to the Holder

Figure 23: Holder Tubing Connections

1. Remove luer lock caps from the male luer at the retentate outlet of the filter holder and the male luer at the top of the pressure sensor flow cell.

2. Insert female luer of the FLX005 tubing in the uncapped male luer of the filter holder. Tighten the male luer locks to secure the tubing.

3. Insert FLX005 tubing into the male luer of the Pressure Sensor flow cell. Tighten the male luer locks to secure the tubing.

4. Remove caps from the male luer at the filtrate port of the filter holder.

5. Insert the female luer of the FLX101 tubing into the male luer of the filter holder. Tighten the male luer locks to secure the tubing.

6. Remove the caps from the male luer at the feed inlet of the filter holder and the male luer at the top of the temperature/pressure sensor flow cell.

7. Insert FLX101 tubing (without pinch valve) in the male luer of the filter holder and the temperature/pressure flow cell. Tighten the male luer locks to secure the tubing.

8. Remove the caps from the male luer at the drain port of the filter holder.

9. Insert FLX102 in the male luer of the filter holder. Tighten the male luer locks to secure the tubing.

Connecting the Filtrate Weight Scale (optional)
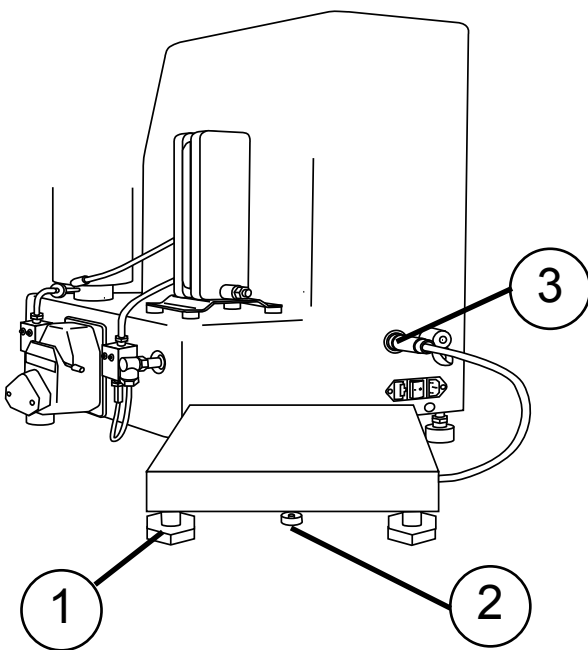
Figure 24: Filtrate Weight Scale Connection

1. Unpack the Filtrate Weight Scale Subassembly (CUP0308).

2. Adjust the weight scale feet (1) until the bubble indicator (2) indicates level.

3. Plug the filtrate weight scale connection cable into its connection port (3) on the left side of the main cabinet. This connection allows the system software to interface with the filtrate weight scale.

NOTE
Before using the filtrate weight scale:
- Setup Software (see Setting up the Weight Scale).
- Calibrate (see Calibrating the Filtrate Weight Scale)

Connecting the System Power and Fuses

NOTE

The main power switch must be in the OFF position before proceeding.

Main ON/OFF Switch

Fuse Draw

Power Cord Connector
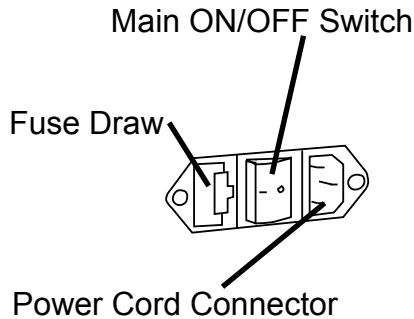
Figure 25: Fuse Drawer/Power Receptacle

1. From the Power Supply Assembly bag, select the appropriate fuses and power cable in accordance with your electrical requirements.

2. On the right side of the base unit (see Fig. 26), locate and remove the fuse drawer.

3. Insert the appropriate fuses inside the fuse drawer.

4. Insert the fuse drawer with fuses inside the receptacle to the left of the main switch.

5. Plug the appropriate power cable into the connector to the right of the main switch.

Fuse Specifications

The system needs to have fuses installed to operate. Specifications for fuses are amended as follows:

Location	Power Supply	Fuses
North America	120 VAC ±10% 60Hz, 1-phase	2 x 2.0 Amp fuses
Japan	100 VAC ±10%, 50/60Hz, 1-phase	2 x 2.0 Amp fuses
Europe		
United Kingdom	240 VAC ±10%, 50Hz, 1-phase	2 x 1.6 Amp fuses
China		

Connecting Optional 100 mL Tank

The Cogent® µScale Tangential Flow Filtration (TFF) system can be fitted with the Pellicon® XL 100 mL reservoir (XX42RES05).

Installation of the 100 mL Reservoir to the System

NOTE

The 100 mL reservoir can be easily installed on the Cogent® µScale TFF system following the instructions below:

1. Unscrew the 2 standoff from the 100 mL reservoir stand.
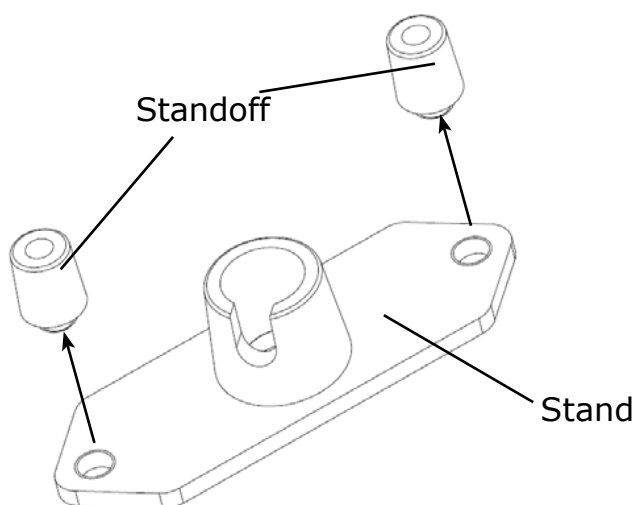
Figure 26: Reservoir Stand

2. Remove the 2 thumbscrews and the 1L tank.
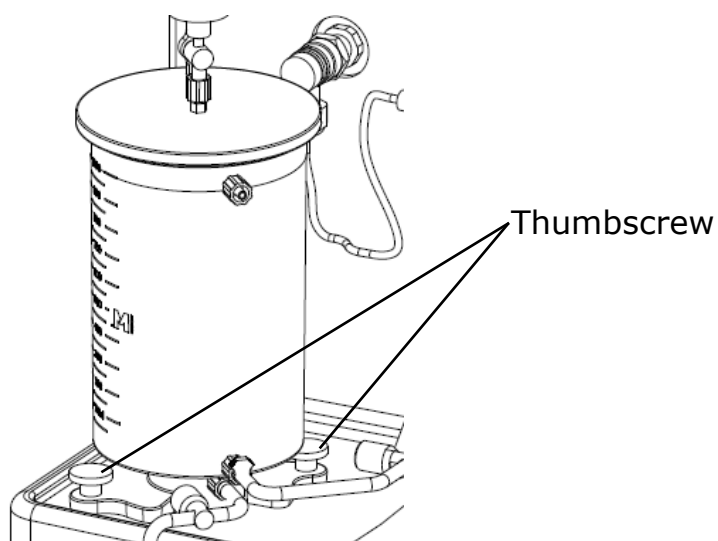
Figure 27: Thumbscrews location

3. Install the 100 mL reservoir stand using the 2 thumbscrews. It is recommended to add 2 stainless steel M5 large round hole washers (not delivered with the reservoir).
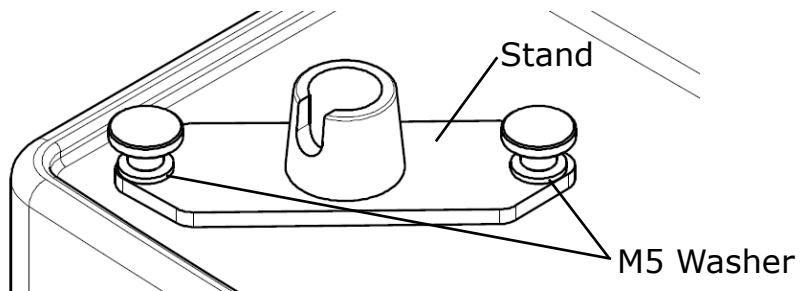
Figure 28: Reservoir Stand

4. Install the 100 mL reservoir on the stand.
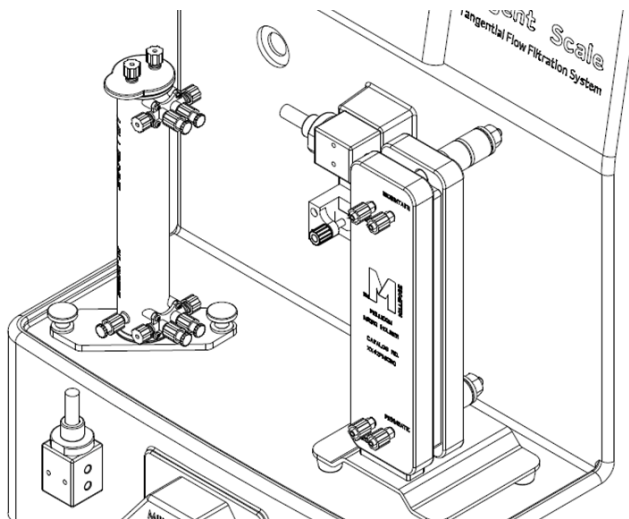
Figure 29: 100 mL Reservoir on System

Setting Up the System

Starting Up the System

NOTE

> The system must be completely assembled and connected with the correct power cord before starting up the system.
>
> The emergency stop may be activated during shipping. Release (pull out) the emergency stop before starting the system.

1. Turn the main switch to the ON position. Wait for the initialization screens to load. The **START** screen opens:
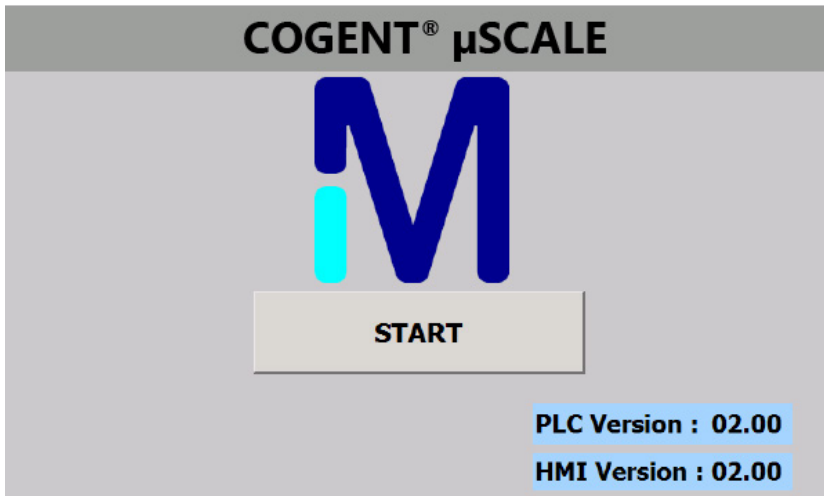
Figure 30: Start Up Screen

2. Touch the **START** button. The **P & ID** screen opens:
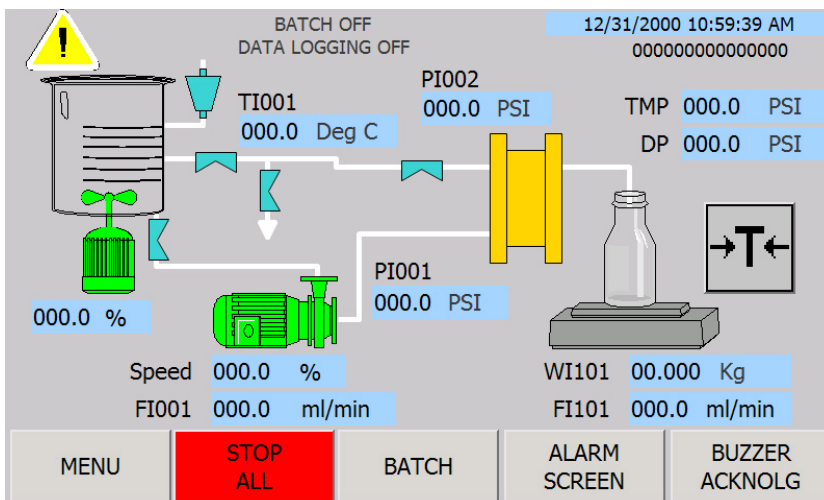
Figure 31: P & ID Screen

The system is now ready for setup and operations.

Setting Up the System Functions

Caution
⚠️   If the Cogent® µScale System is not powered up within 200 days, it is possible that it may lose date and time settings. See Troubleshooting for corrective action.

The System Setup Menu screen buttons provide access to all the screens used to setup the default functions for the scale and to customize settings prior to performing processes.
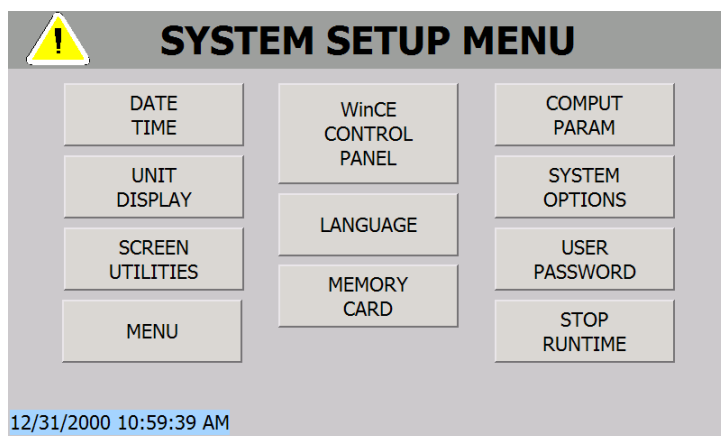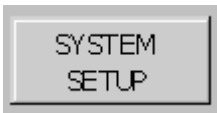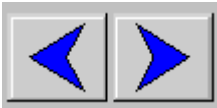
Figure 32: SYSTEM SET-UP MENU Screen

NOTE
    The **STOP RUNTIME** button is reserved for Millipore Service Personnel.

The functions of navigation buttons at the bottom of each setup screen are:

Button	Function
SYSTEM SETUP	Go back to the system setup menu.
MENU	Go directly to the main menu
◀ ▶	Go to the previous or next screen.

Setting Up the User and Password Settings

NOTE

Only managers can change passwords and logoff times.

1. On the system setup menu, touch **USER PASSWORD**. The **USER AND PASSWORD** screen opens:
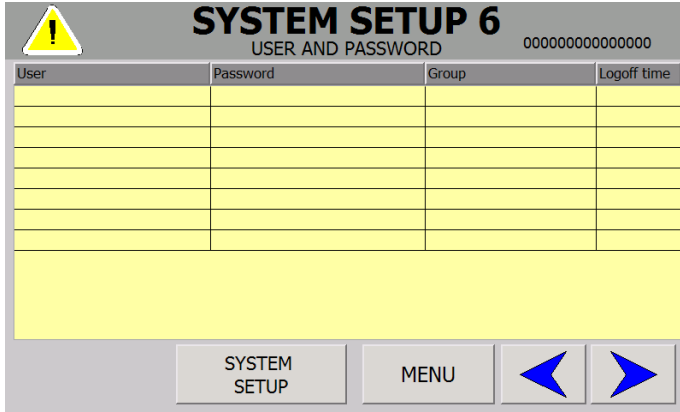
Figure 33: USER AND PASSWORD Menu Screen

The default users and passwords are:

Level	Login	Password
Manager/Customer Administrator	MANAGER1	MANAGER1
Manager/Customer Administrator	MANAGER2	MANAGER2
Manager/Customer Administrator	MANAGER3	MANAGER3

2. Select a tab at the top of the screen to change the current user, password, group or logoff time information.

3. Use the desired navigation button to exit the screen.

NOTE

If login and password are lost contact Millipore

Setting Up the Weight Scale (optional)

Follow this procedure to set up the scale in the system.
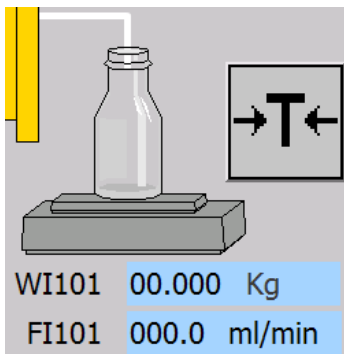
Figure 34: Scale Icons

1. On the P & ID screen, touch **MENU**. The **MAIN MENU** screen opens:
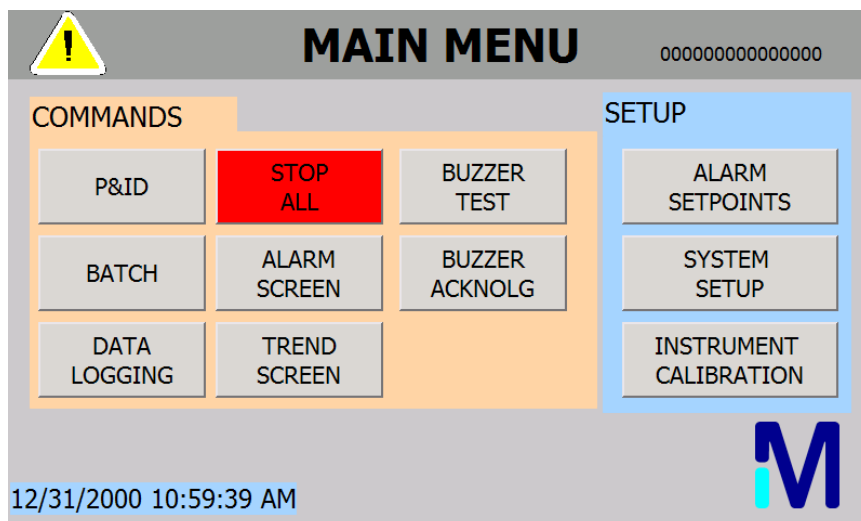
Figure 35: MAIN MENU Screen

2. On the main menu screen, touch SYSTEM SETUP. The **SYSTEM SETUP MENU** screen opens:
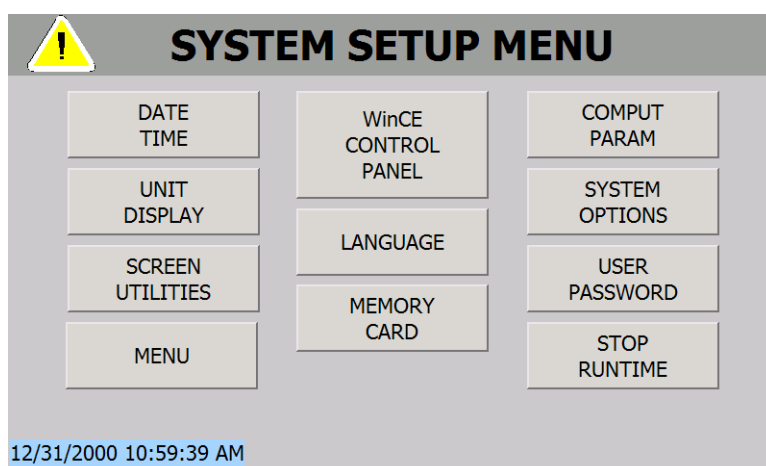
Figure 36: SYSTEM SETUP MENU Screen

3. On the **SYSTEM SETUP MENU**, touch **SYSTEM OPTIONS**. The **SYSTEM SETUP 4** screen opens:
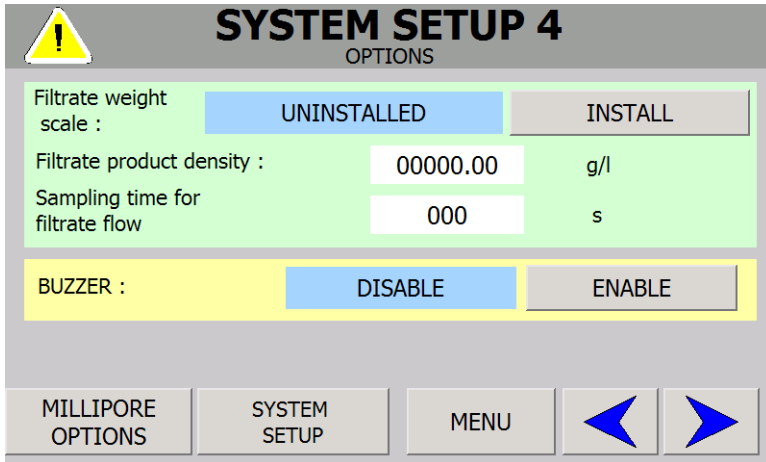
Figure 37: SYSTEM SETUP 4 OPTIONS Screen

4. On the **SYSTEM SETUP 4** screen, touch **INSTALL**.

5. Touch **ENABLE** to enable the buzzer.

6. Touch **MENU** then **P & ID** to return to the P & ID screen.
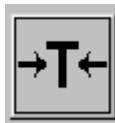
7. Touch the [icon] icon to tare the weight scale. The **WEIGHT SCALE TARE** screen opens:
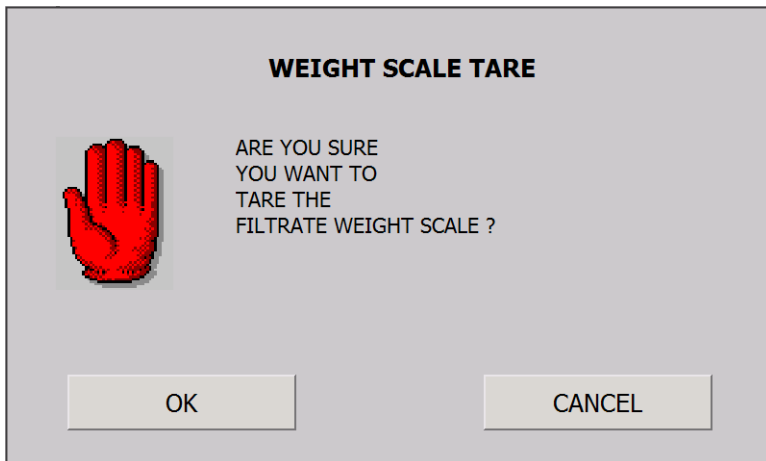
Figure 38: WEIGHT SCALE TARE Screen

8. Touch **OK** to tare weight scale or **CANCEL** to exit the screen. The weight scale is now operational. See Calibrating the Filtrate Weight Scale for calibration instructions.

Setting the Date and Time

1. On the **SYSTEM SETUP MENU** screen, touch **DATE TIME**. The **DATE & TIME** setup screen opens:

2. Touch the field under **MM** (month) to open the numeric keypad.

3. Enter the numeric value for the current date, i.e. January = 01.

4. Repeat the procedure for all date and time fields.

NOTE
> The date and time fields each have maximum and minimum value. If an invalid date, i.e. February 31, 2007 (02/31/07), is entered, the fields will reset to 00 when the **SET DATE & TIME** button is touched.
>
> Touch the **SET DATE & TIME** button to update date and time displays after entering any correct value. It takes approximately 15 seconds for the system to update the display.

5. Touch **SET DATE & TIME** button when finished entering values.

6. Use the desired navigation button to exit the screen.

Selecting the Units Displayed

1. On the **SYSTEM SETUP MENU**, touch **UNIT DISPLAY**. The **DISPLAYED UNIT SELECTION** screen opens:
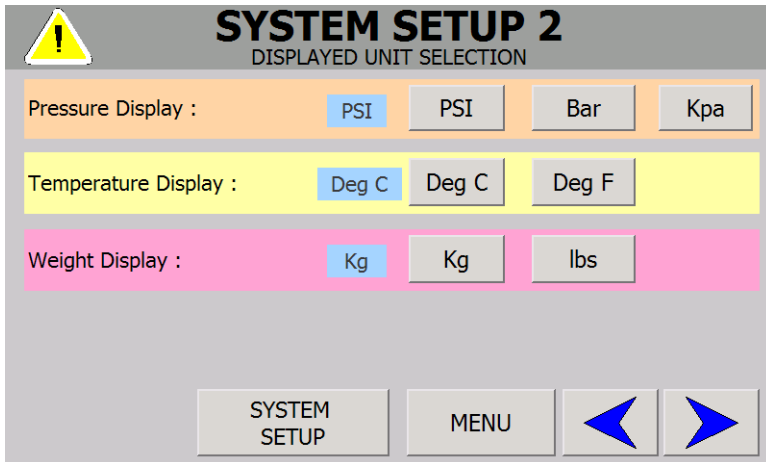
Figure 40: DISPLAYED UNIT SELECTION Screen

2. Touch the desired pressure sensor display unit: **PSI**, **Bar** or **Kpa.**

3. Touch the desired temperature sensor display unit: **Deg C** (°C) or **Deg F** (°F).

4. Touch the desired weight display unit: **kg** or **lbs**. The weight display field will only be visible if the optional filtrate weight scale has been attached to the system.

5. Touch the desired navigation button to exit the screen.

After selecting or changing the displayed unit, the values will automatically be updated on all screens, alarm set points and batch set points.

Cleaning and Calibrating the HMI Screen

NOTE
>   This procedure should also be performed during annual system maintenance.

1. On the **SYSTEM SETUP MENU** screen, touch **SCREEN UTILITIES**. The **SCREEN UTILITIES** opens:
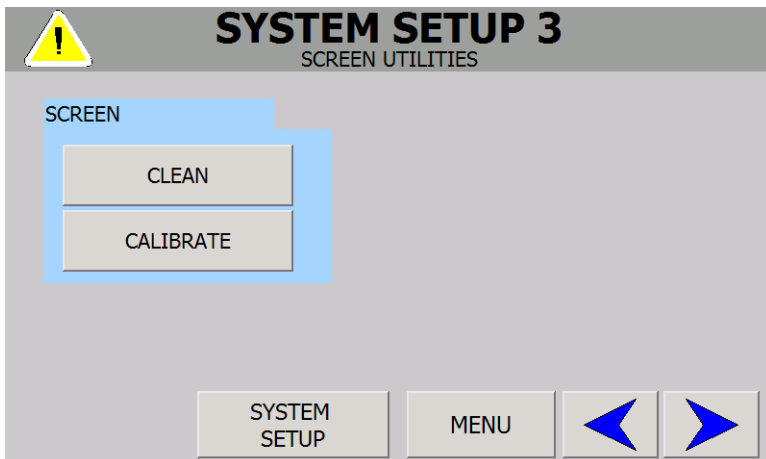
Figure 41: SCREEN UTILITIES Screen

2. Touch **CLEAN.** This disables the touch screen for 30 seconds to allow cleaning. A status bar screen opens to monitor the cleaning time:

Please clean the screen.
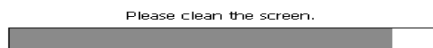
Figure 42: Clean Screen

3. Clean and dry the screen with a damp cloth.

Caution	
⚠	Do not use corrosive solvents or abrasive cloths to clean the screen. Use only a dry soft cloth to clean the screen.
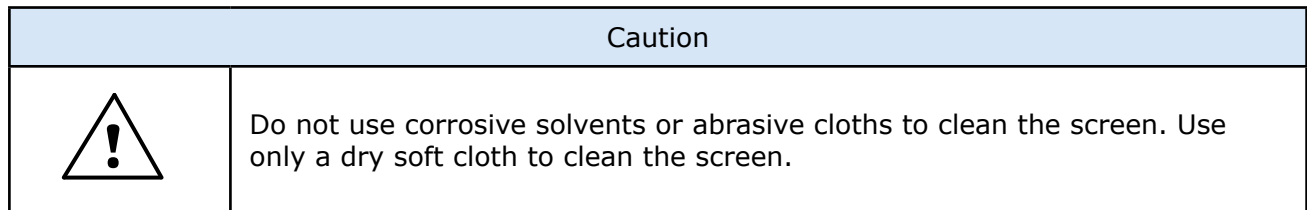
When 30 seconds have passed, the utilities screen will automatically re-open.

4. Touch **CALIBRATE**. The **CALIBRATION TOUCH SCREEN** menu opens:

Carefully press and briefly hold stylus on the center of the target. Repeat as the target moves around the screen.
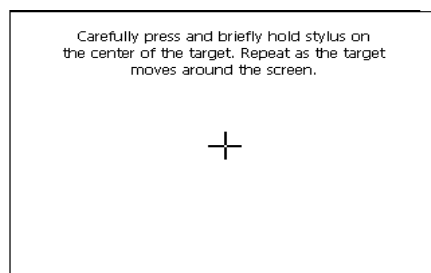
Figure 43: Calibration Touch Screen

5. Follow directions on the screen. When finished, the screen below opens:

New calibration settings have been measured. Tap the screen to register saved data. Wait for 30 seconds to cancel saved data and keep the current setting.
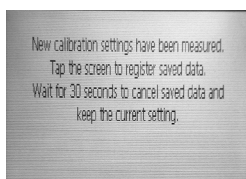
Figure 44: Calibration Registration Screen

6. Touch the screen within 30 seconds to register the new calibration settings.

NOTE
If the screen is not touched within this time frame, the system will revert to the old calibration parameters.

7. Use the desired navigation button to exit the screen.

Setting Up System Options

NOTE

    See Setting Up the Weight Scale section of this chapter for filtrate weight scale setup instructions.

1. On the **SYSTEM SETUP MENU** screen, touch **SYSTEM OPTIONS**. The **OPTIONS** screen opens:
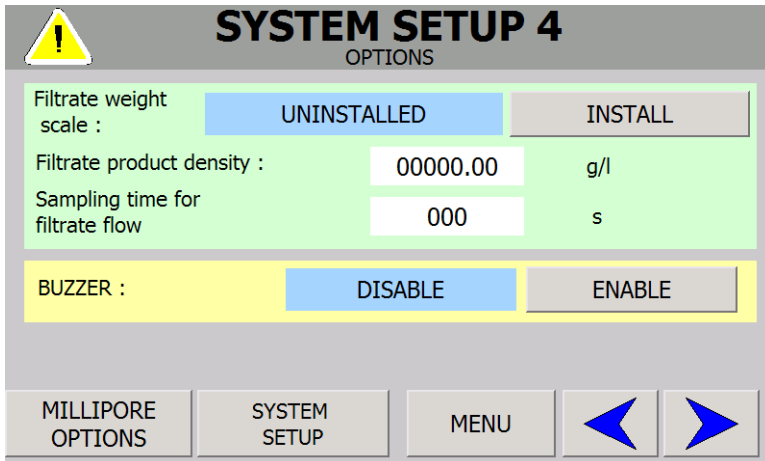
Figure 45: SYSTEM SETUP 4 OPTIONS Screen

To Define the Filtrate Density and Flow:

1. Touch the field to the right of **Filtrate product density** to open the numeric keypad. Enter the desired value.

2. Touch the field to the right of **Sampling time for filtrate flow** to open the numeric keypad. Enter the desired value.

To Enable or Disable the Buzzer Sounds:

1. Press **ENABLE** to turn on the buzzer sounds. When enabled, the buzzers will sound whenever an alarm is generated.

2. Press **DISABLE** to turn off the buzzer sounds. When disabled, the **BUZZER TEST** and **BUZZER ACKNOWLEDGE** buttons will not be displayed.

3. Use the desired navigation button to exit the screen.

Setting Up the Feed Pump Controller

1. On the **SYSTEM SETUP MENU** screen, touch **COMPUT PARAM**. The (feed pump controller) **CALCULATION** screen opens:
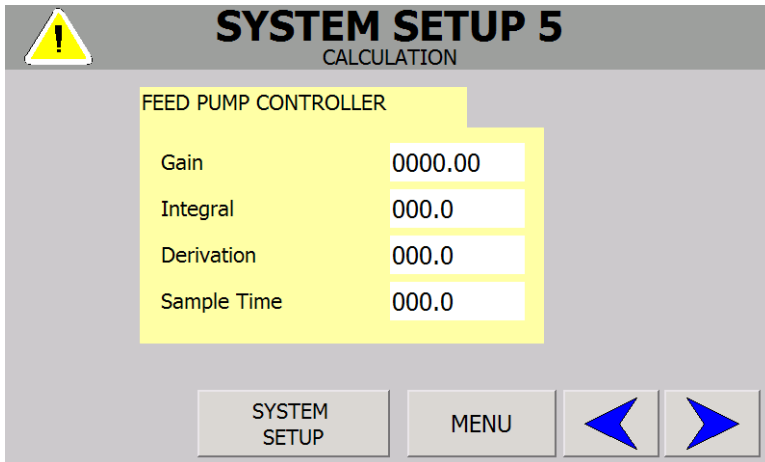
Figure 46: Feed Pump Controller CALCULATION Setup Screen

This screen allows you to tune the reaction of feed pump controller when using deltaP control value for a batch. The default values are:

Control	Default value
Gain	0.7
Integral	20.0
Derivation	0.0
Sample Time	5.0

2. Touch the field to the right of each value to open the numeric keypad.
    Enter the desired value.

NOTE
    The default values cannot be recovered if the wrong values are entered. Ensure modified values are correct before entering them into the system

3. Use the desired navigation button to exit the screen.

Setting Up the Language Displayed

1. On the **SYSTEM SETUP MENU**, touch **LANGUAGE**. The **LANGUAGE SELECTION** screen opens:
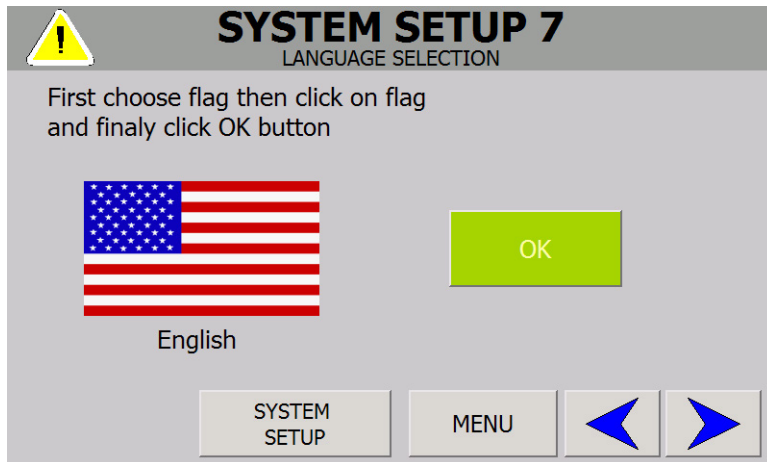
Figure 47: LANGUAGE SELECTION Screen

This screen allows you to change displayed language. There are seven languages available:

- English (default)
- French
- German
- Italian
- Spanish
- Chinese
- Japanese

2. To select language, touch the flag icon then touch the slide bar up and down arrows to the right of flag until the desired flag is displayed.

3. Tap again on chosen flag and press the **OK** button.

4. Use the desired navigation button to exit the screen.

Setting Up the Memory Card

For Memory Card information, see [Replacing the PLC Battery and the HMI Memory Card](#).

1. On the system setup menu, touch **MEMORY CARD**. The **MMC Memory Card Size** memory card screen opens:
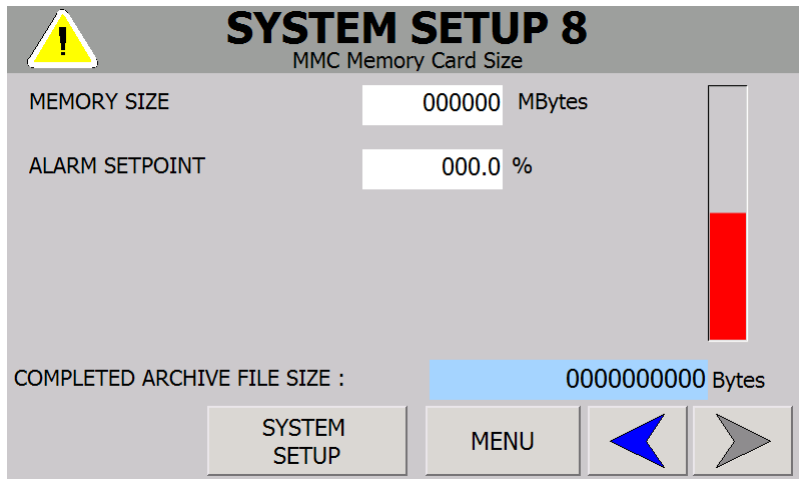
Figure 48: MMC Memory Card Size Setup Screen

2. Enter the size of the memory card (in megabytes).

3. Enter the percentage of memory to allocate to data logging before an alarm is triggered.

4. Use the desired navigation button to exit the screen.

Advanced System Setup: Settings for Data File Transfer

HMI Configuration

For a direct connection between the HMI and a PC, connect them with a crossover Ethernet cable.

For a connection over a network, connect the HMI on the network using a standard Ethernet cable. Do the same for the PC.

Specify an Ethernet IP address on the HMI

1. On the SYSTEM SETUP MENU screen, touch the WinCE control panel button.

2. Double-touch the network and Dial-up connections icon:
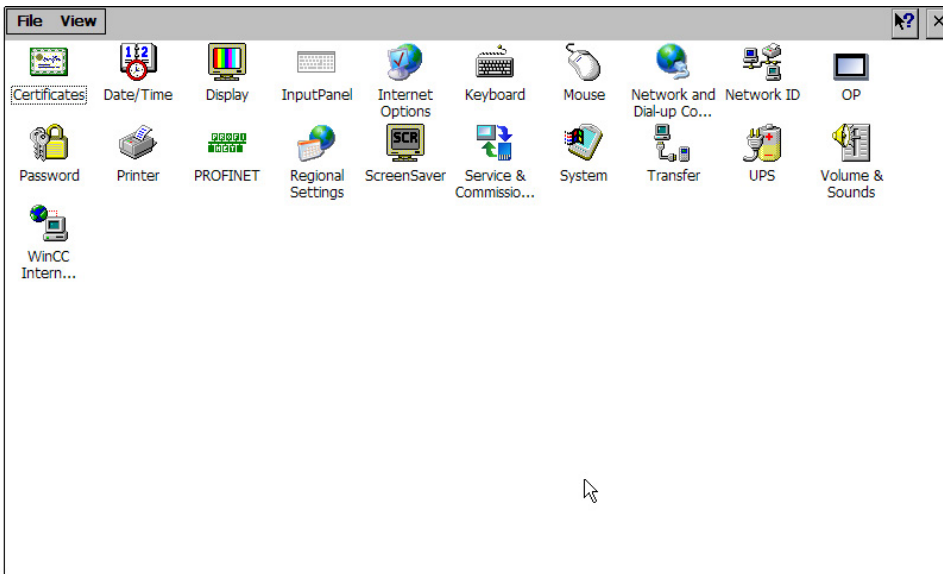
Figure 49: Control Panel Screen

3. Double click on PN_X1 icon.

Figure 50: Network and Dial-up Connection Screen

4. Select Specify an IP address
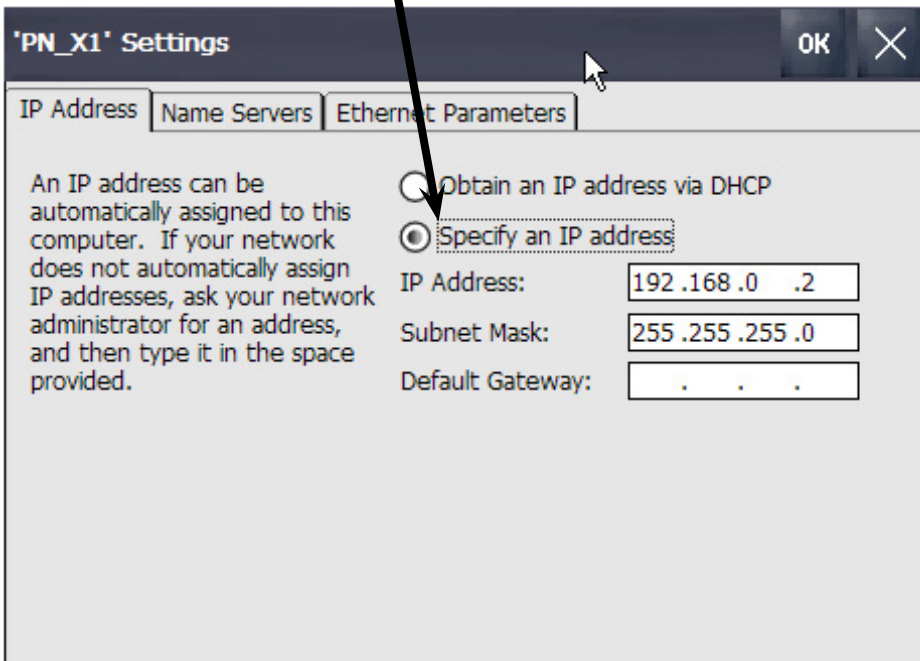
Figure 51: PN-X1 Settings Screen

Touch the field on the right of IP Address to open the numeric keypad. Drag it on the top of the screen so as to see the 3 IP configuration parameter fields. Enter **192.168.0.2** in the IP Address field (use the keypad arrows if necessary). Touch the field on the right of Subnet Mask and enter **255.255.255.0**.

PC Configuration

Specify an Ethernet IP address on the PC.

Caution
⚠ Paths used to access the screens described below may vary by operating system

1. Select **Start** and **Control Panel**.

2. Double click on **Network and Sharing Center**:

3. In the left pane, click on Change Adapter Settings:
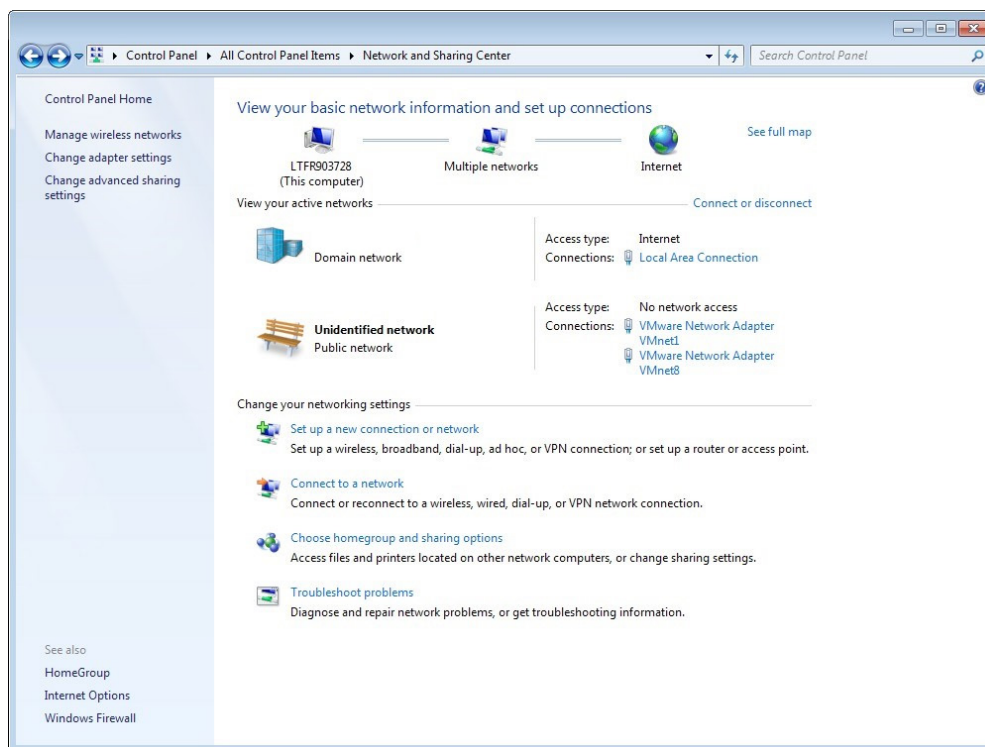
Figure 52: Network and Sharing Center Screen

4. Right click on **Local Area Connection** and select **Properties**.
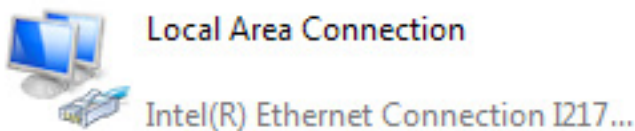
5. Select **Internet Protocol Version 4 (TCP/IPv4)** and click on **Properties.**
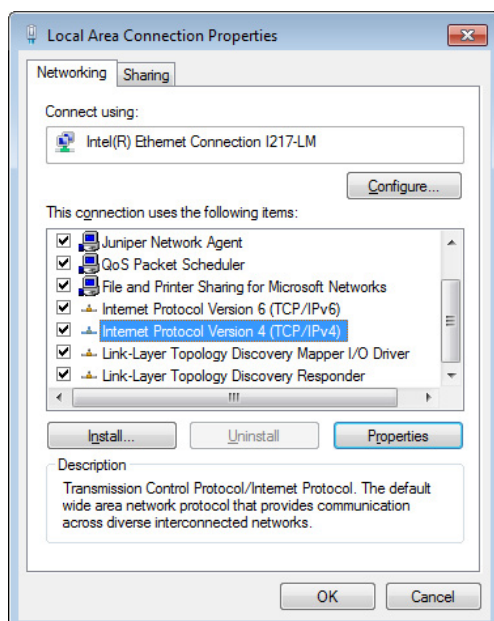
Figure 53: Local Area Connection Properties Screen

6.   Select **Use the following IP address**

7.   Enter the following IP Address and Subnet Mask:

    IP Address: 192.168.0.15
    Subnet Mask: 255.255.255.0

8.   Select **OK** and Close buttons to apply changes.

Caution	
⚠	Any IP addresses can be set on the HMI and the PC. The only conditions are: • The 3 first digits of the IP addresses must be the same and the last one must be different • The subnet mask must be identical on the HMI and the PC
	Example of correct settings: • HMI IP address : 192.168.0.2 • HMI subnet mask : 255.255.255.0 • PC IP address : 192.168.0.15 • PC subnet mask : 255.255.255.0

Connecting to the HMI

On the PC, launch a web navigator (Internet Explorer® or Firefox® for example), type the IP address of the HMI in the address bar (example: http://192.168.0.2). The Start page appears:
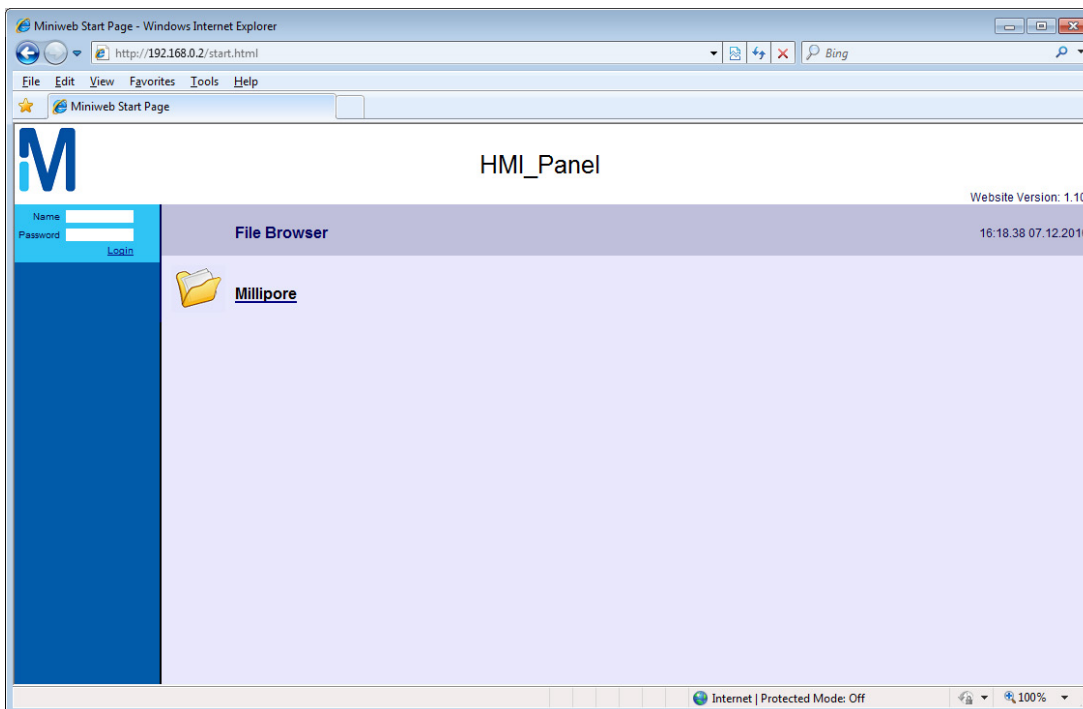
Figure 54: Millipore Miniweb Start Page

Login using the following:

Name: **Administrator**
Password: **100**
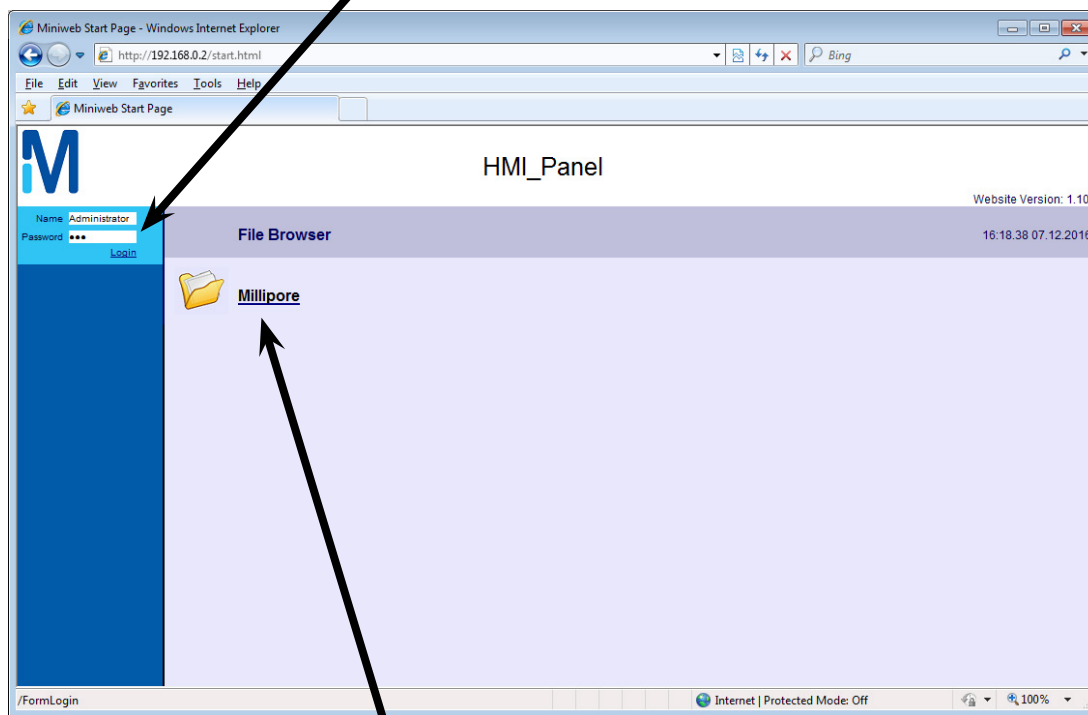
Click on the Millipore folder

Figure 55: Millipore Miniweb Start Page

The Archives folder browser screen appears:
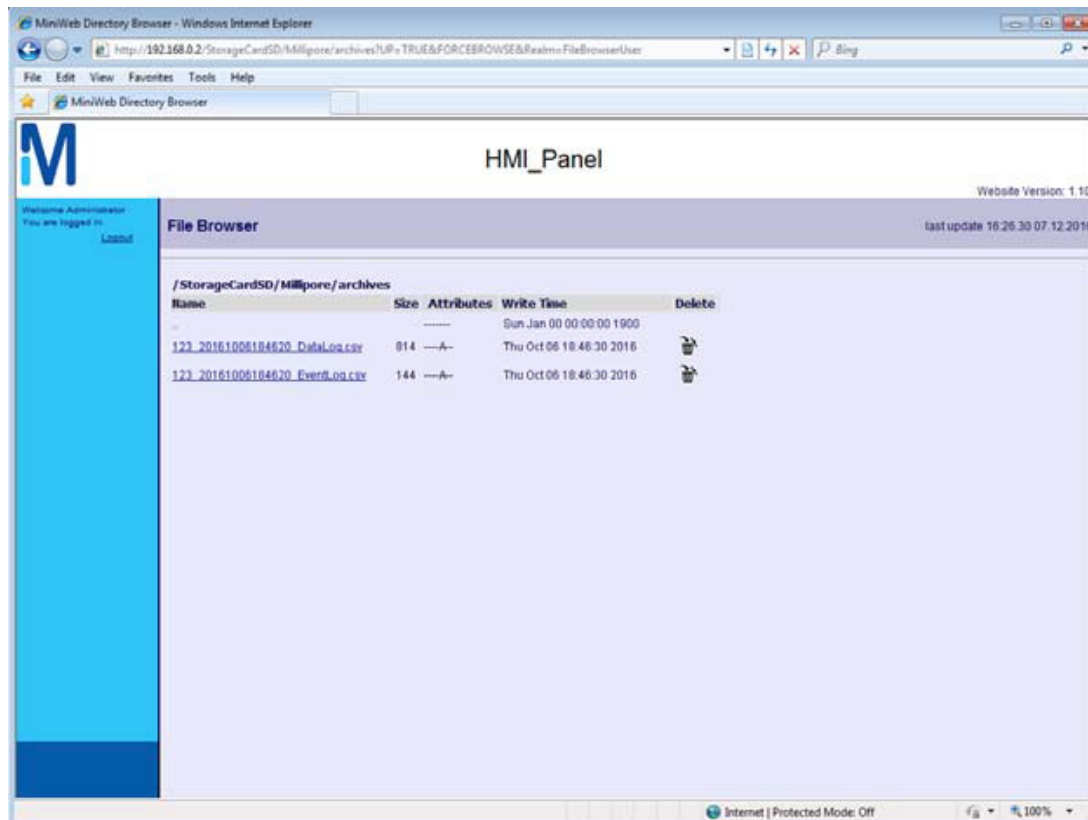
Figure 56: Archived Files Screen

The files can be saved on the computer: Right click on the file >> save target as

To delete a file click on the corresponding trash icon and on OK.
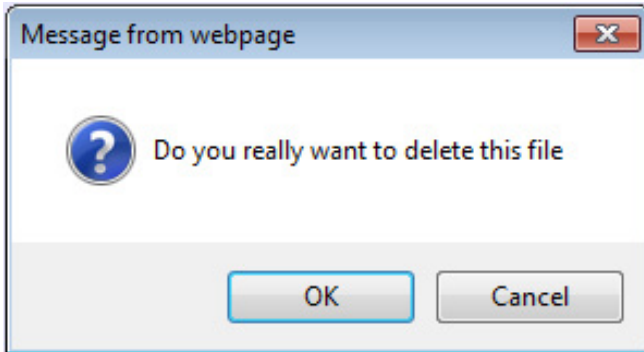
Caution
⚠   The saving and deleting operations can only be done for one file at a time.

PLC and HMI IP Addresses Configuration

All the IP addresses of the system can be modified using the HMI interface.

PLC IP Address

1. On the HMI go to the WINCE control panel.

2. Double click on **Service & Commissioning** icon.
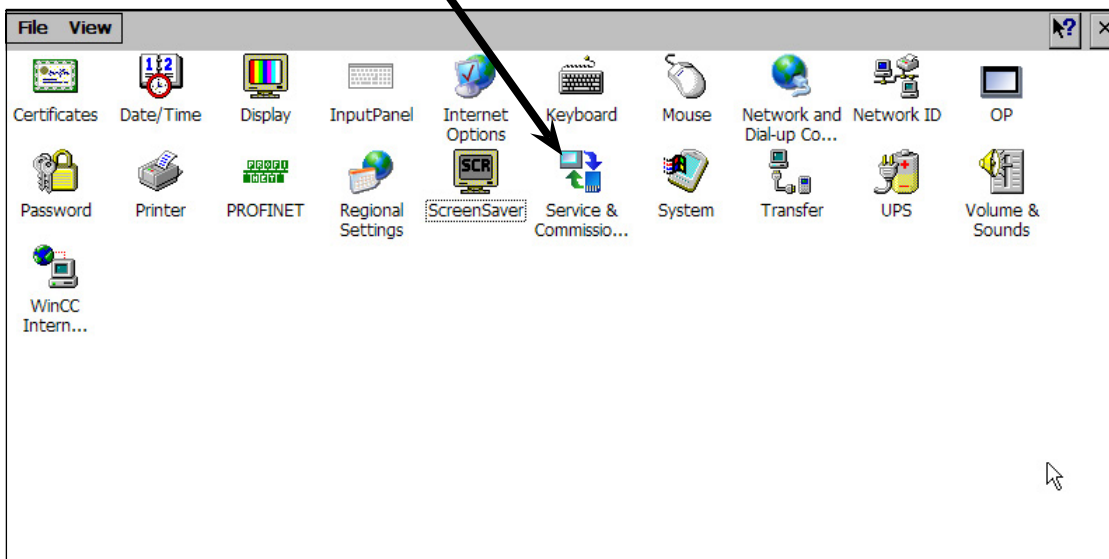
Figure 57: Control Panel Screen

3. Click on the right arrow.
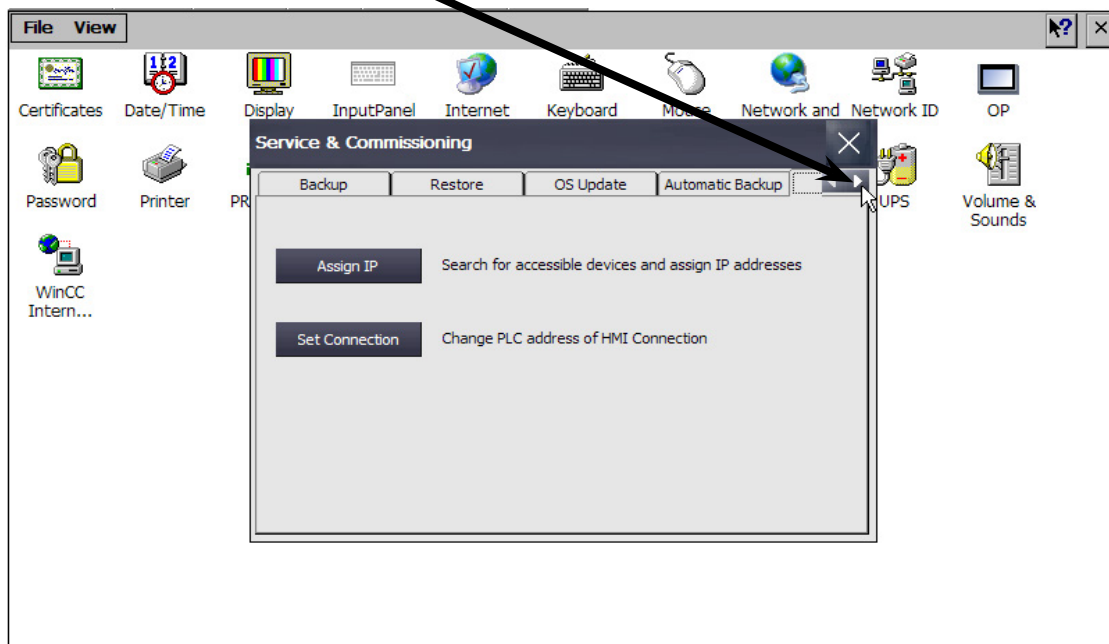
Figure 58: Service & Commissioning Screen

4. Go in the IP Config tab. Click on **Assign IP**.
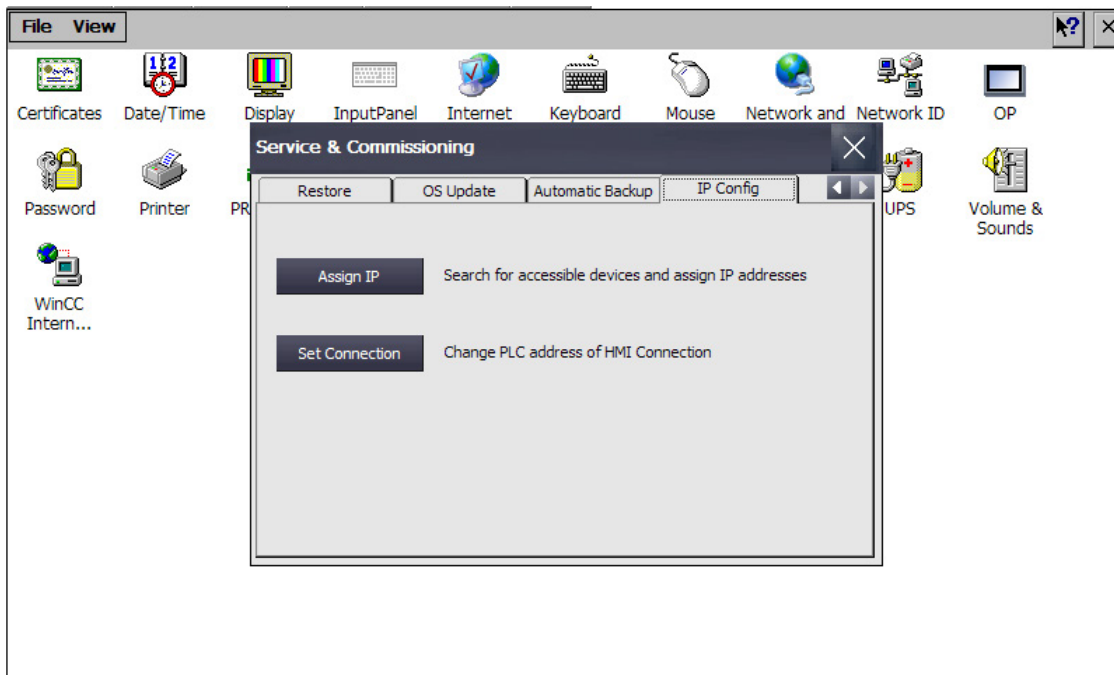
Figure 59: Service & Commissioning (IP configuration) Screen

5. Go in Network >> Scan >> Start.
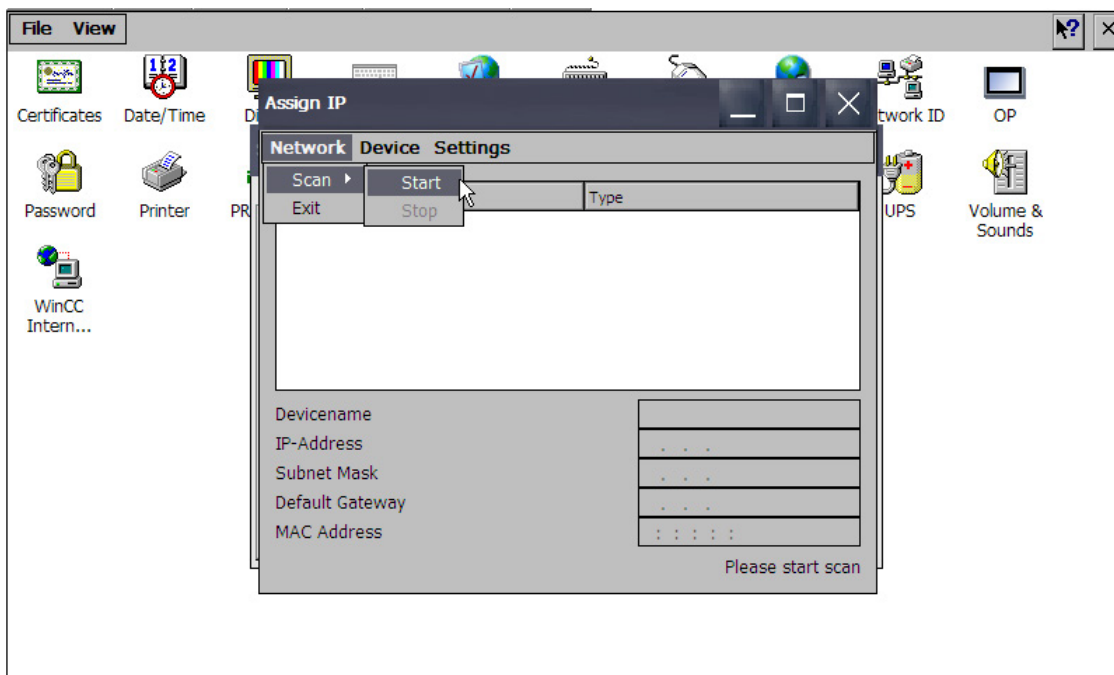
Figure 60: Service & Commissioning (Scan) Screen

6. Scan in progress.
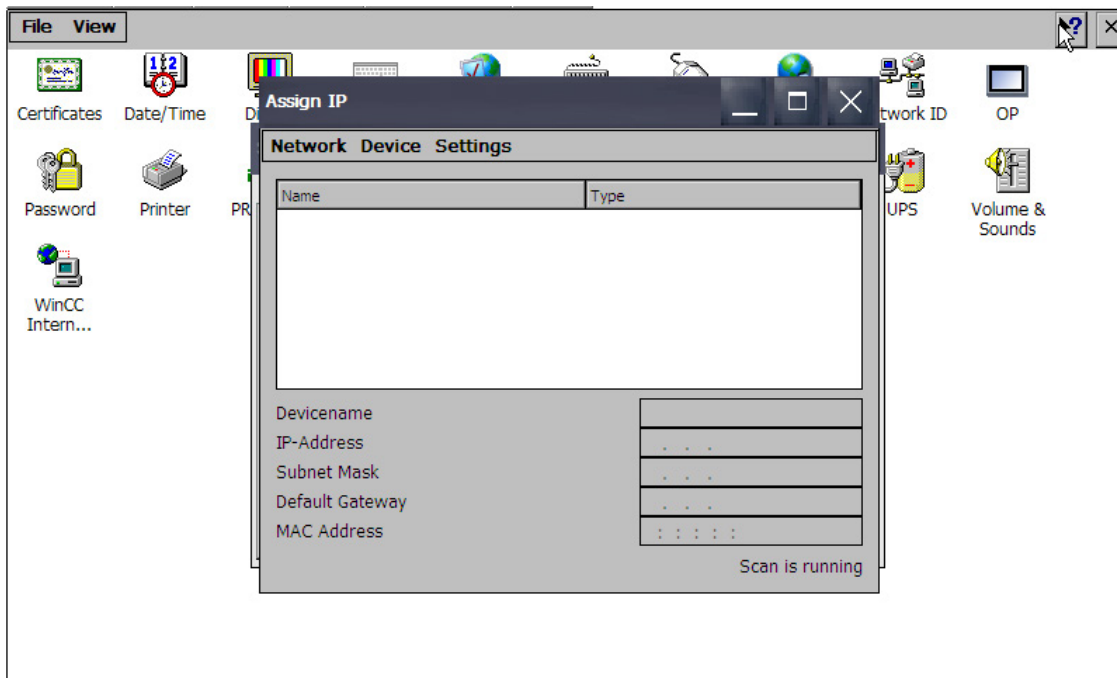
Figure 61: Service & Commissioning (Scan in Progress) Screen

7. Select the PLC and enter the new IP settings in the associated fields.
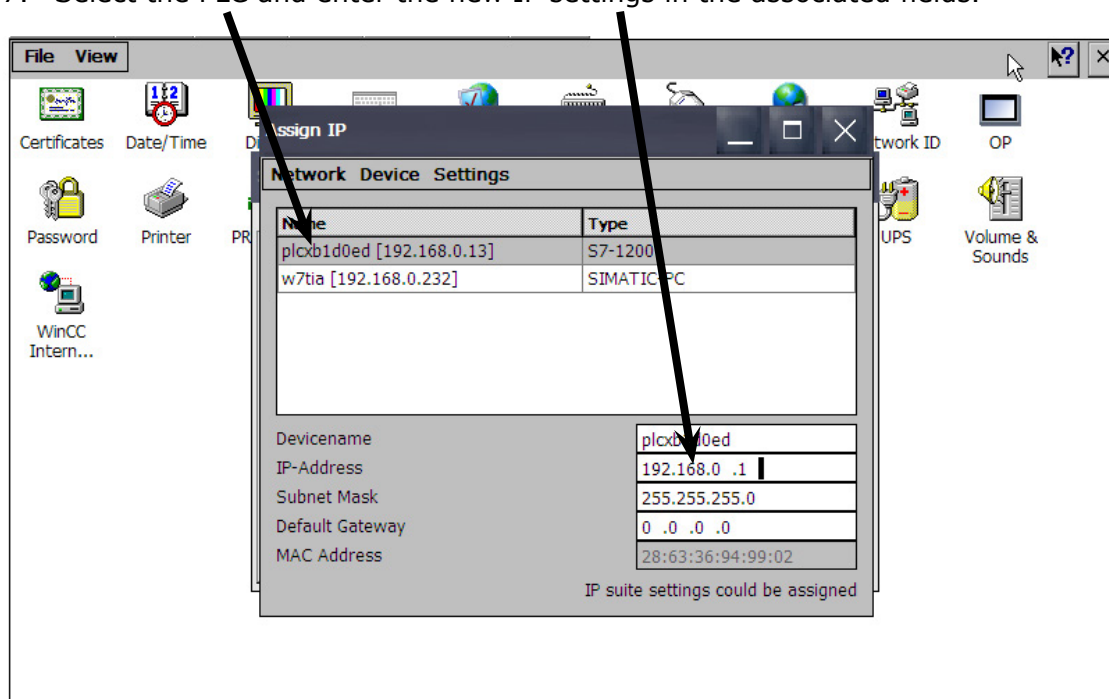
Figure 62: Service & Commissioning (Scan Completed) Screen

8. Go in Device >> Download and click on IP to download the settings to the PLC.
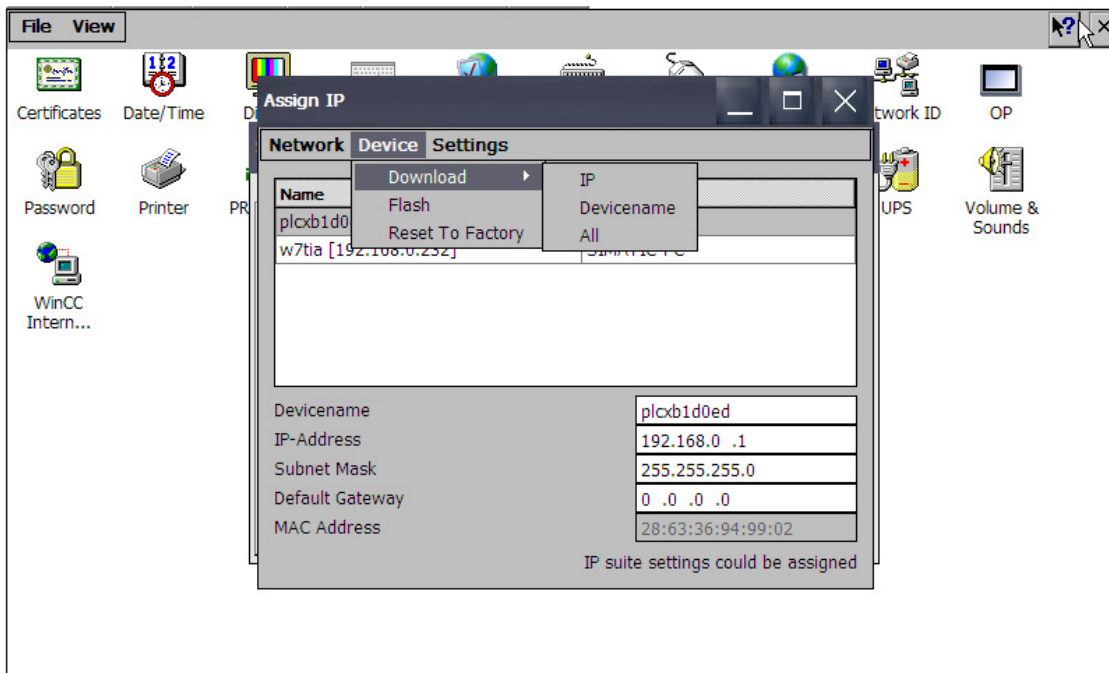
Figure 63: Service & Commissioning (Setting Download) Screen

9. The new IP settings were applied.
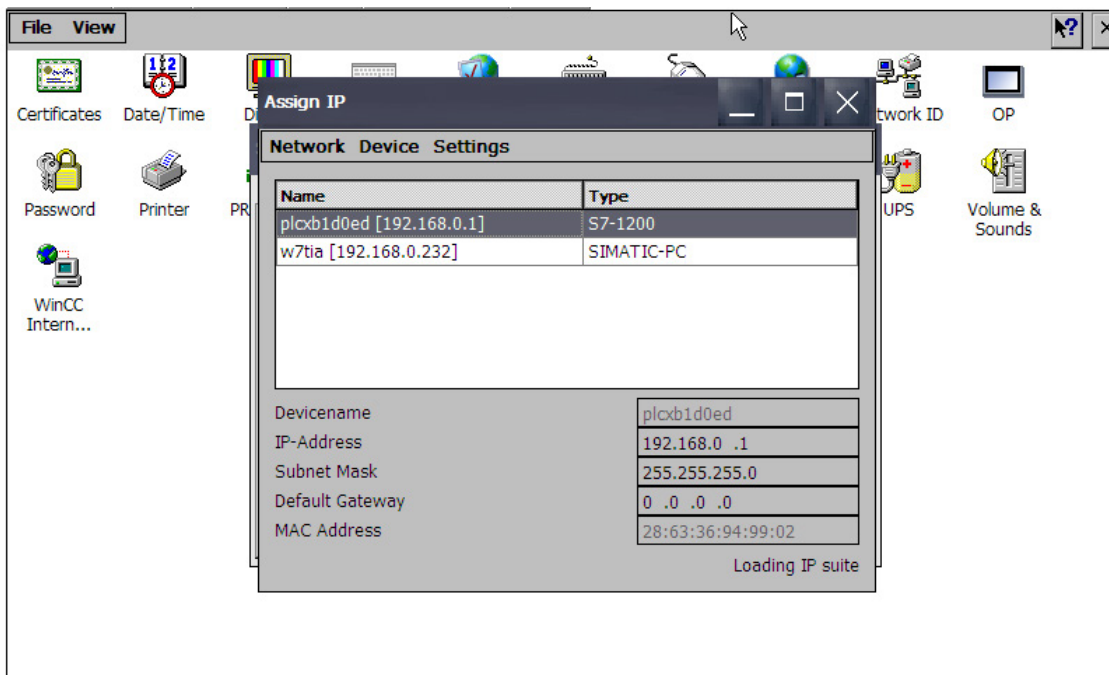
Figure 64: Service & Commissioning (Download Completed) Screen

10. Close the assign IP window.

HMI Connection PLC IP Address

1. Click on Set Connection.
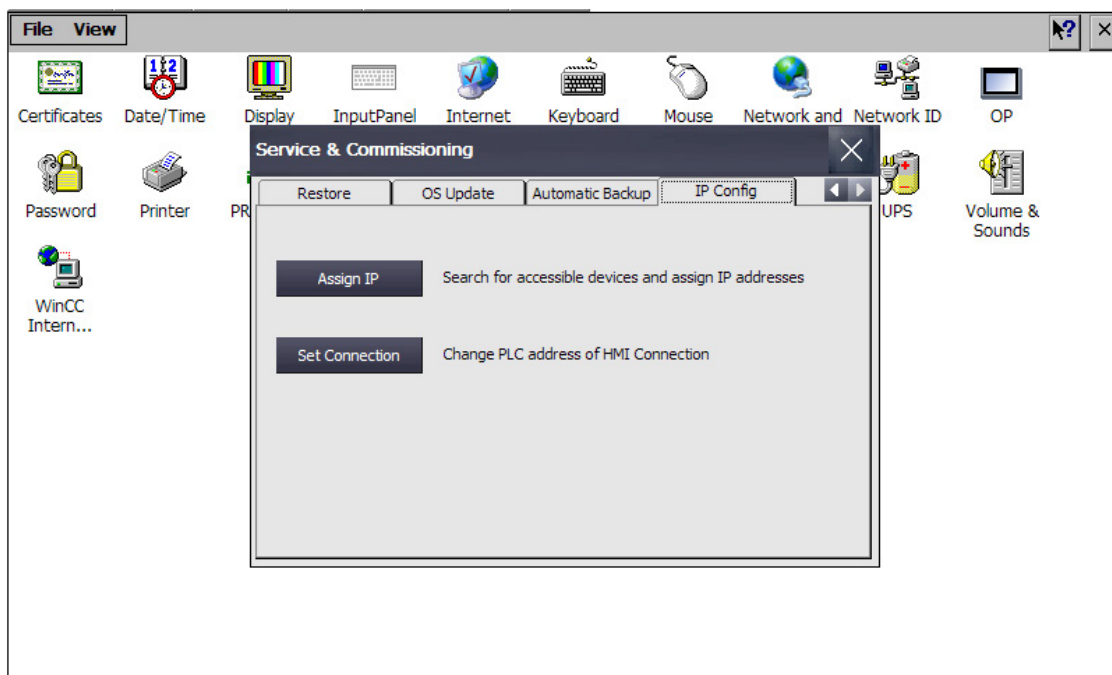
Figure 65: Service & Commissioning Screen

2. Select the HMI liaison and enter the address of the PLC (it must correspond to the address that was set in the first chapter of this procedure).

   Then click on save button.
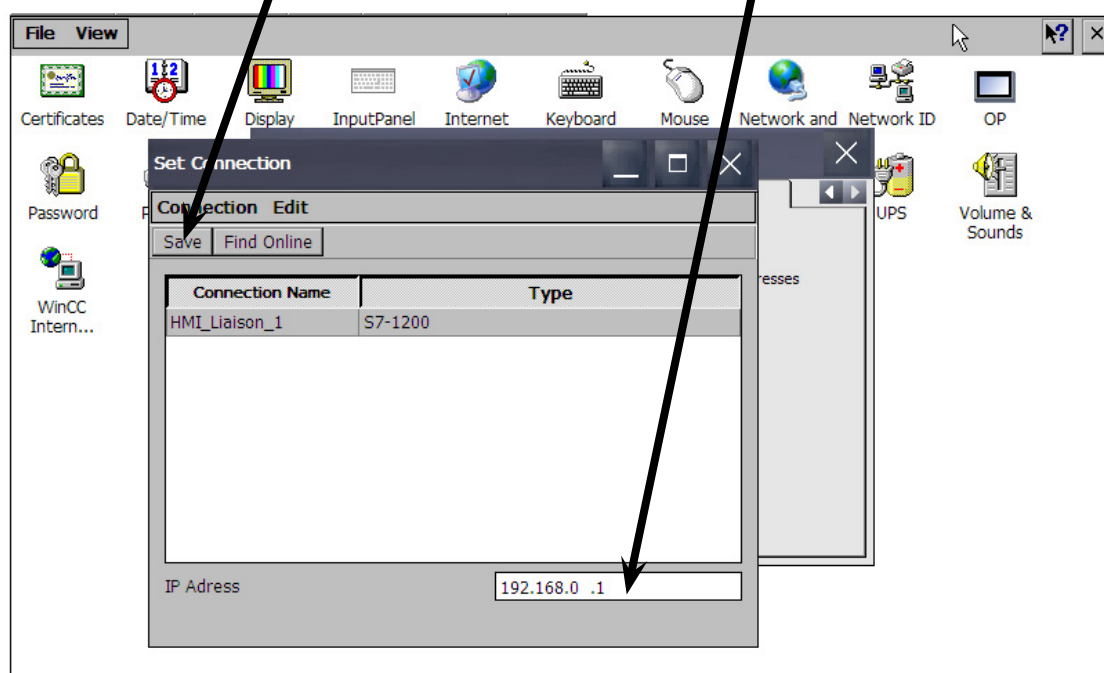
Figure 66: Service & Commissioning (Set Connection) Screen

3. The PLC IP address of the HMI-PLC connection has been set.
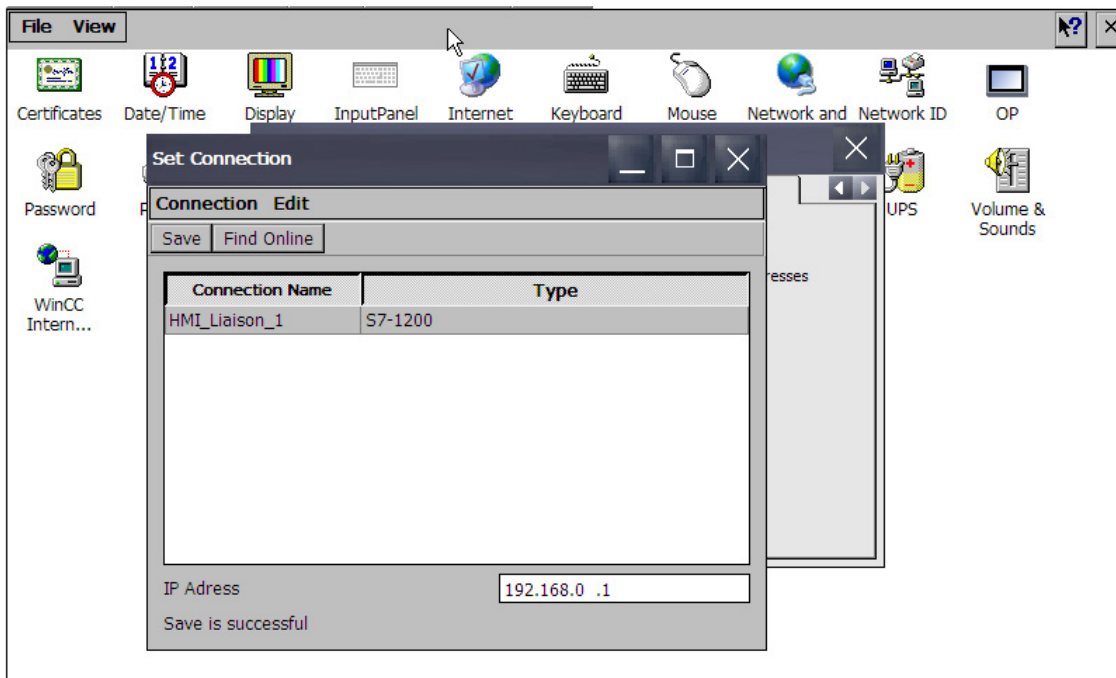
Figure 67: Service & Commissioning (Connection Set) Screen

HMI IP Address

1. On the HMI go to the WINCE control panel. Double click on Network and Dial-up Connection icon.
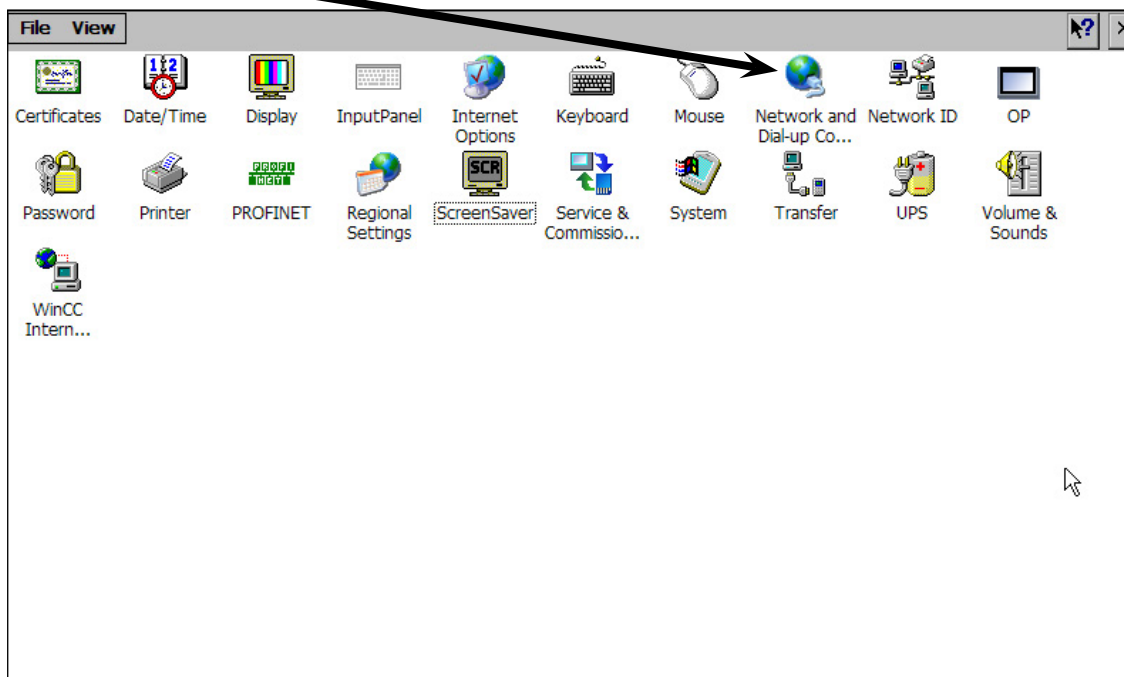
Figure 68: Control Panel Screen

2. Double click on the PN_X1 icon.
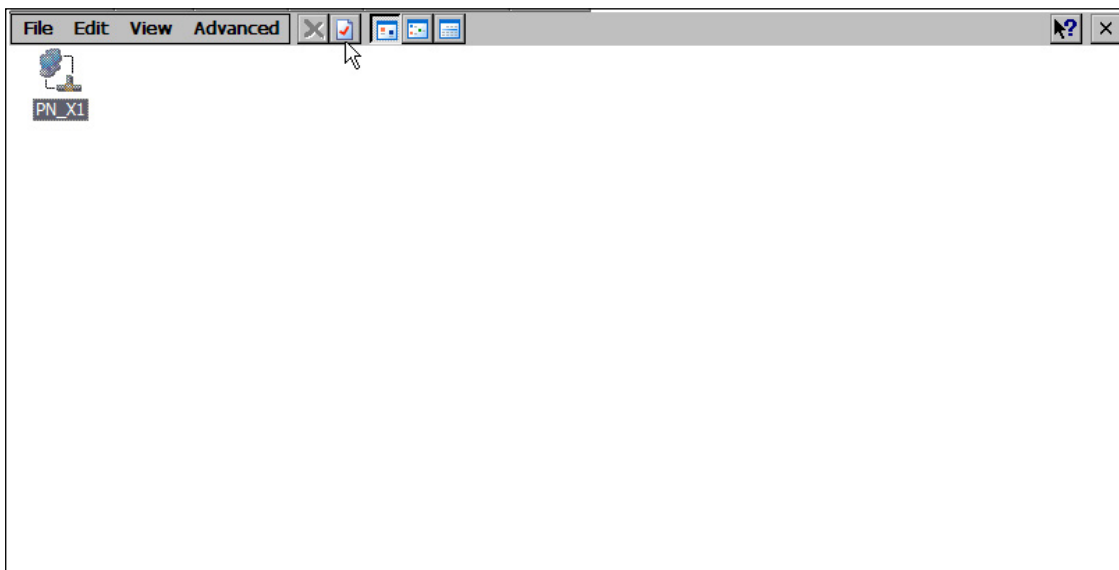
Figure 69: Network and Dial-up Connection Screen

3. Enter the new HMI IP settings, and click on OK.
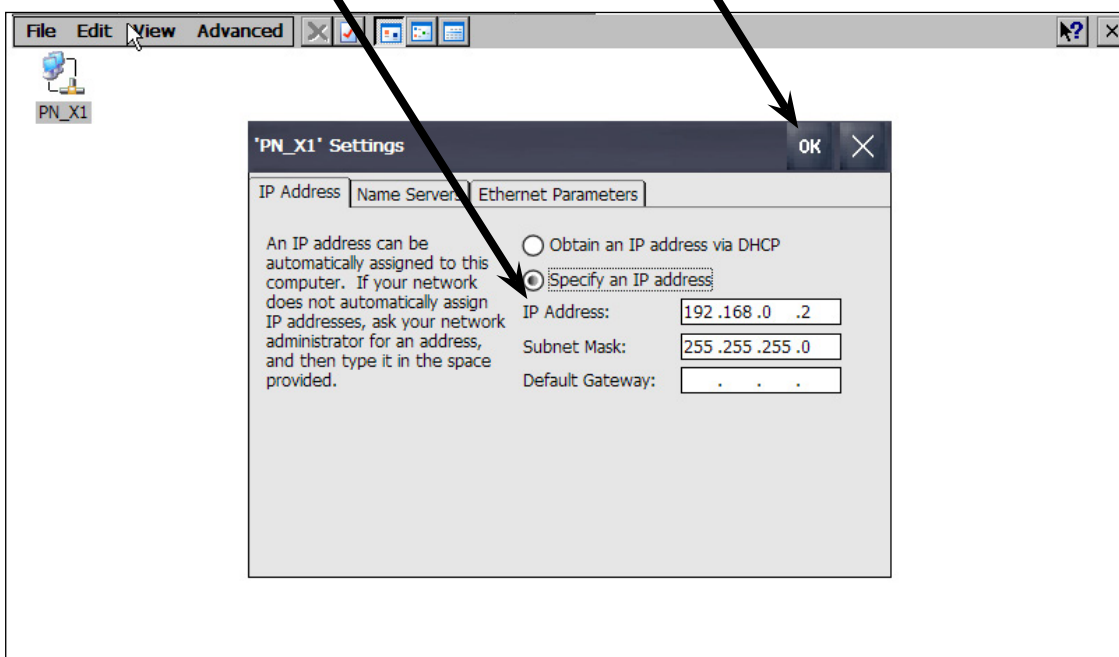
Figure 70: PN-X1 Settings Screen

Starting Up the Holder

The Filter Holder holds up to three Pellicon® 3 88 cm^2 cassettes.

The holder is shipped with a torque wrench and socket that are required for installation.
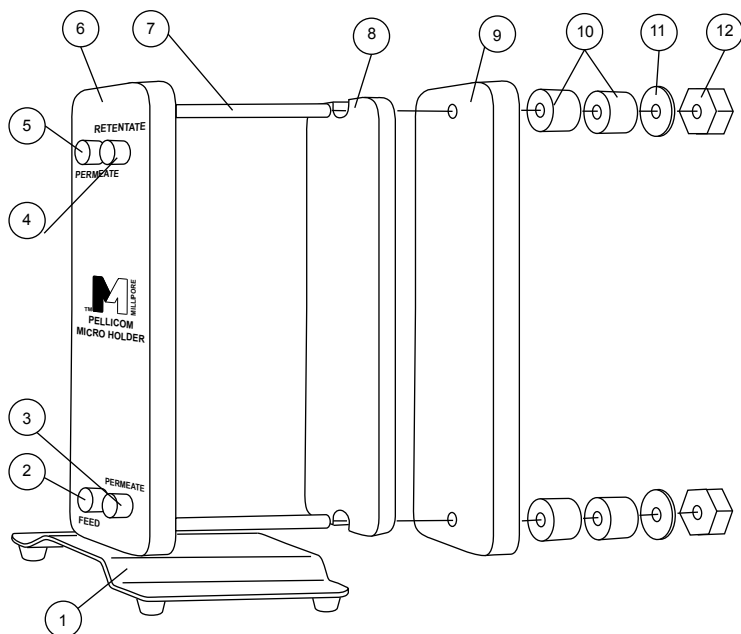
Figure 71: Pellicon® holder exploded view

Key No.	Description
1	Base
2	Feed inlet port with male luer
3	Permeate (filtrate) outlet port with male luer
4	Retentate outlet port with male luer
5	Permeate (filtrate) port with male luer
6	Manifold
7	Tie rod
8	Pellicon® 3 filter cassette (user supplied)
9	End plate
10	Tie rod spacers
11	Washer
12	Nut

Installation

1. Loosen the nuts on the tie rods. Remove the nuts, washers, spacers, and end plate from the manifold.

2. Inspect the tie rods and nuts for signs of burrs or stripped threads. The nuts must turn freely on the tie rods to ensure proper tightening of the holder.

3. Slide the Pellicon® 3 Cassette onto the holder so that the tie rods pass through the cutouts in the Pellicon® 3 Cassette. Repeat to install one or two additional Pellicon® 3 Cassettes if required

4. Slide the end plate onto the tie rods and press the end plate against the filter.

5. Install the tie rod spacers, washers and nuts. Hand-tighten the nuts, alternating from one nut to the other nut.

NOTE

Uneven tightening of the nuts can damage the Pellicon® Cassette.
Nonparallel plates or compression of the filters at one end can cause leakage.

6. Tighten the end plate using the torque wrench and socket provided. The torque wrench is preset to 180–200 inch-pounds (20.3–22.6 newton-meters). Verify the torque wrench setting prior to use.

7. Attach the deep socket to the torque wrench by firmly pressing the deep socket onto the torque wrench drive.

8. Brace the holder with one hand. With a continuous motion, turn each nut ¼ turn with the torque wrench, alternating from one nut to the other until the torque wrench "clicks" which will indicate it has reached the set force.

9. Wait five to ten minutes, then re-torque to 180 – 200 inch-pounds.

10. Re-torque to a maximum of 200 inch-pounds as needed to create a liquid-tight seal.

CAUTION
⚠ Non-uniform tightening of the nuts can damage the filter. Non-parallel plates or compression of the filter(s) at one end may result in leakage.

Operating the System

Using the Emergency Stop

CAUTION
⚠	If the Cogent® µScale TFF system is not powered up within 200 days, the date and time settings may be lost. See Troubleshooting for corrective action. The system must be flushed with purified water prior to initial use. See the Flush Procedure in this chapter.

1. In an emergency, push the red emergency stop button which will cause all system motors to stop and the buzzer (if enabled) to sound.

2. To release the emergency stop, turn it clockwise until it pops up. Touch **ALARM SCREEN** on the Main Menu screen or on the P & ID screen. The **CURRENT ALARM** screen opens:
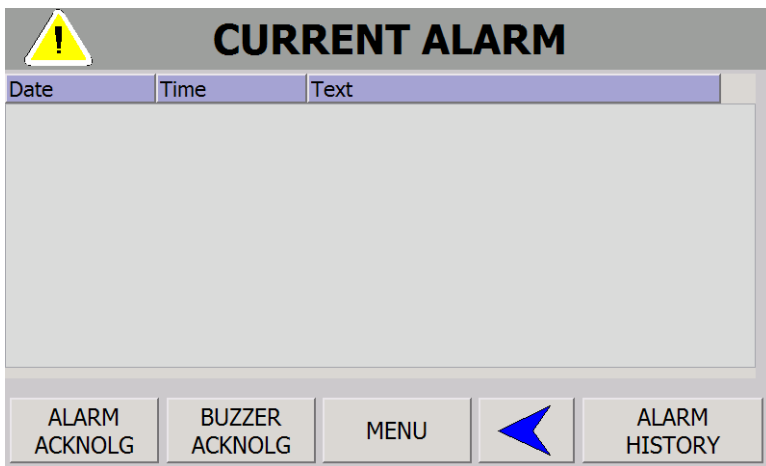
Figure 72: Current Alarm Screen

3. Touch **ALARM ACKNOLG** to resume operations.

NOTE
Any batch process that was running will be paused. To resume, see next section.

Manually Operating the System

Accessing the Piping & Instrumentation Diagram (P & ID)

Touch **START** on the startup screen or **P & ID** on the main menu to access the P & ID.
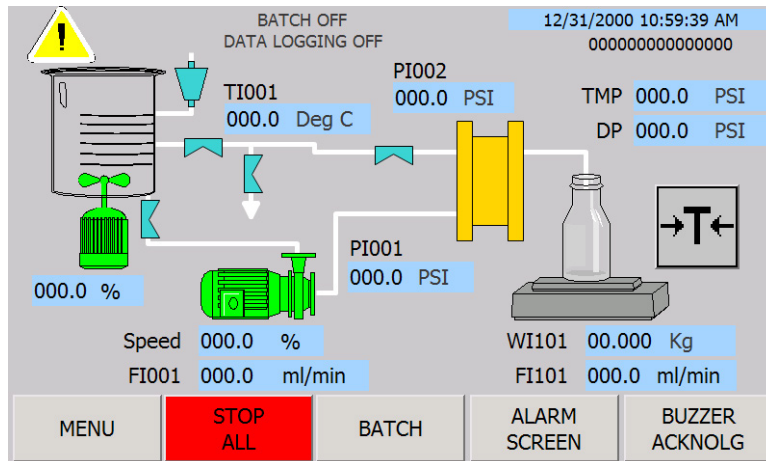
Figure 73: P & ID Screen

Starting and Stopping the Feed Pump

CAUTION
⚠ Always verify that the appropriate valves are OPEN to create a valid flow path to the tank before turning on the feed pump. Operating the feed pump without an open flow path will damage tubing and causes leakage.

1. Touch the feed pump icon ⊞ to open the **FEED PUMP** manual command screen:
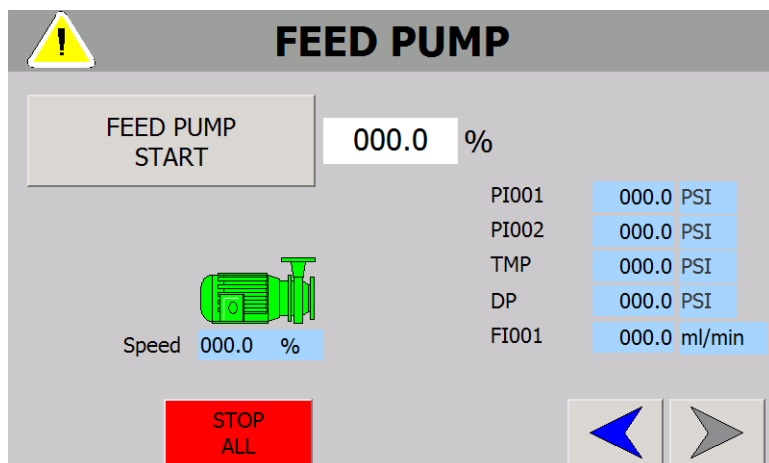
Figure 74: FEED PUMP Screen

NOTE

    Pressures are displayed on the right of the screen during operations. Manually adjust pump speed and/or retentate valve pressure to meet your application requirements.

2. Touch the speed value below the feed pump icon to open the numeric keypad. Enter the desired percent value.

3. Start or Stop the feed pump by touching **FEED PUMP START/STOP** (this button toggles from start to stop depending on the pump status.)

4. Touch the left arrow icon to return to the P & ID screen.
Touch **STOP ALL** to stop the feed pump and mixer.

Starting and Stopping the Mixer

1. On the P & ID screen, touch the mixer icon. The **MIXER** manual command screen opens:
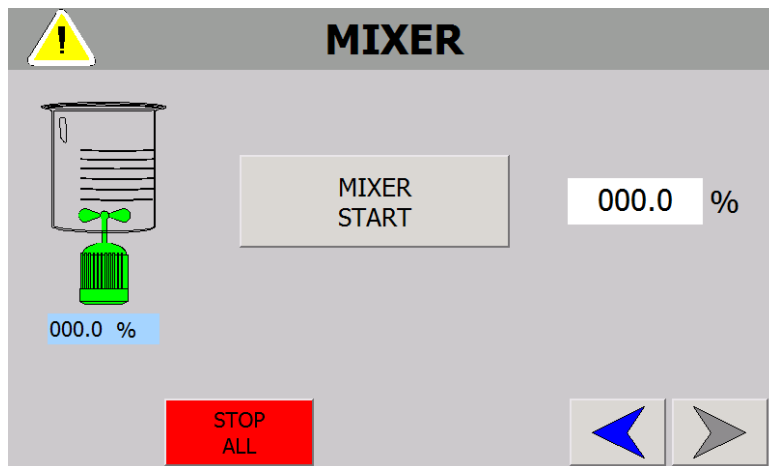
Figure 75: MIXER Manual Command Screen

2. Touch the white field to open the numeric keypad. Enter the desired percent value.

3. Start or stop the mixer by touching **MIXER START/STOP** (this button toggles from start to stop depending on the mixer status).

CAUTION
Visually verify that the tank level is appropriate to the mixer settings. There are no automatic controls to prevent the stir bar from causing foaming if the tank level is too low.

4. Touch the left arrow icon to return to the P & ID screen. Touch **STOP ALL** to stop the feed pump and mixer.

Filling the Tank

Fill Procedure A

Follow this procedure when using an external container to fill the tank.
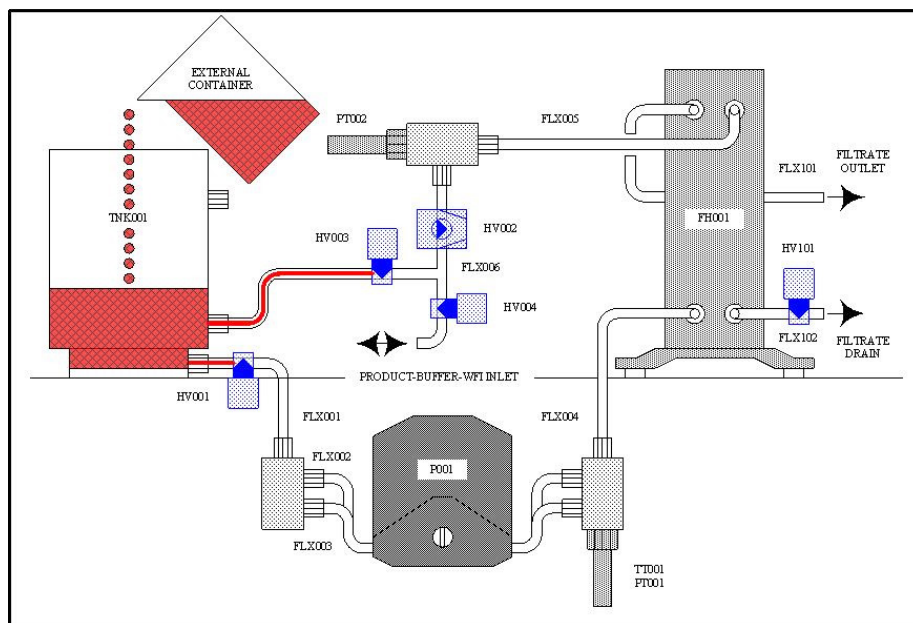
Figure 76: Fill (A) Function Flow Path

1. Close the HV001 and HV003 valves.

2. Verify that the spare inlet in the upper part of the tank is plugged.

3. Remove tank lid from the tank (TNK001).

4. Transfer the liquid from the external container into the tank. Do not fill with more than 1.0 liter.

5. Place the tank lid back on the tank.

Fill Procedure B

Follow this procedure when using an external peristaltic transfer pump to fill the tank.

NOTE
> Always verify that appropriate valves are OPEN to create a valid flow path to the tank. Use pressure for transfer in accordance with the system specifications.
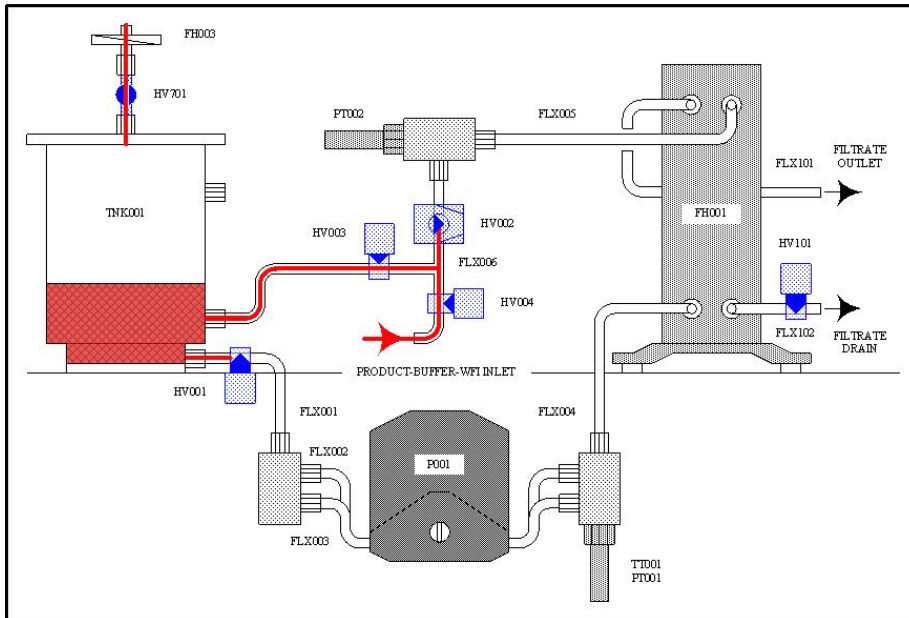
Figure 77: Fill (B) Function Flow Path

1. Connect the product-buffer inlet tubing located on FLX006 to the external transfer pump.

2. Open the HV003, HV004 and HV701 valves.

3. Close the HV001 and HV002 valves.

4. Transfer the liquid using an external peristaltic transfer pump from the external container. Stop the external peristaltic transfer pump when the one liter mark on the tank (TNK001) is reached.

Draining the System

This procedure is also used for product recovery.
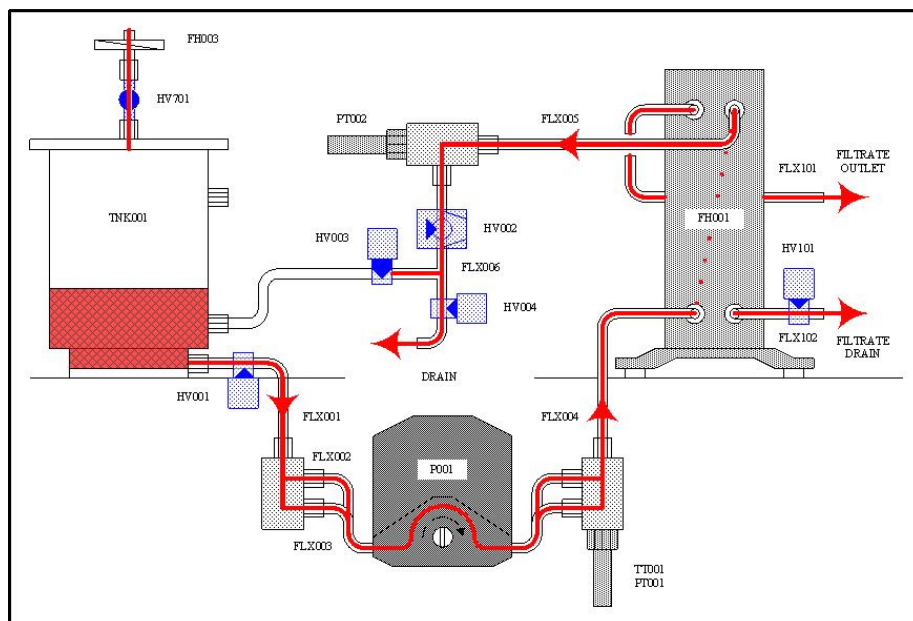
Figure 78: Drain Flow Path

NOTE
   Ensure that the external drain tubing is directed to a collection container.

1. Connect the filtrate outlet tubing (FLX101), the filtrate drain tubing (FLX102) and the retentate drain tubing (FLX006) to the external drain collection container.

2. Open the HV001, HV002, HV004, HV101 and HV701 valves.

3. Close valve HV003.

4. Touch the feed pump icon . The **FEED PUMP** screen opens:
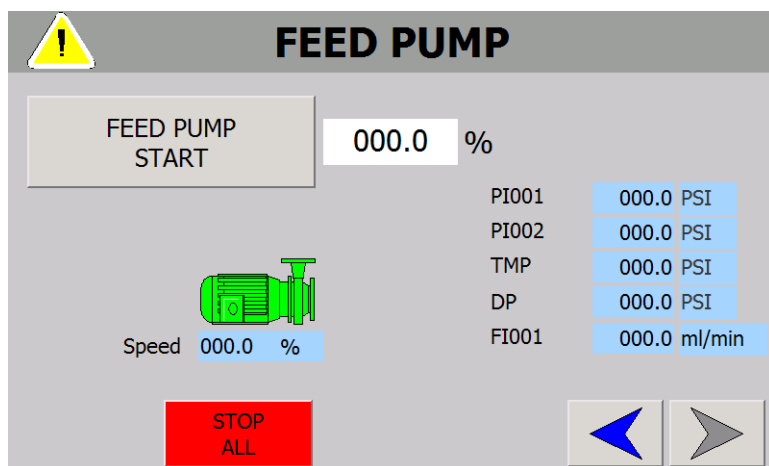
Figure 79: FEED PUMP Screen

5. Set the appropriate feed pump speed.

6. Verify that the valves are OPEN and that there is an open flow path from
    the tank to the drain tank. Press **START**.

7. Operate the system until the tank (TNK001) is empty and the system is fully drained.

Running Batch Processes

NOTE
    Before starting a batch, stop the feed pump and mixer.

1. Touch **BATCH** on the main menu. The batch screen opens.
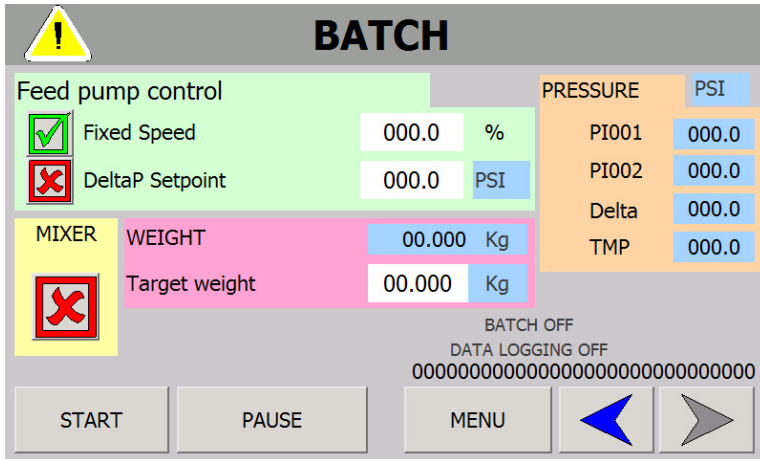
Figure 80: BATCH Screen

Batch screen information:

- The information in the **WEIGHT** field is not displayed if the optional filtrate weight scale is disabled. If active, a weight set point can be entered by touching the **Target Weight** field. The batch will automatically stop if the actual weight exceeds the weight set point entered. The **ACTUAL** weight field displays a current filtrate weight during the batch process.

- Use the **DELTA P REGUL.** button for speed regulation around a pressure set point if required. Use **Fixed Speed** if the pump speed must remain at a fixed set point. The display switches between **Delta P** and **Fixed speed** according to the option chosen.

- Touch the **MIXER** button to activate/deactivate the mixer while running a batch. The red X ▣ is displayed when the mixer is off. The green check ☑ is displayed when the mixer is on.

NOTE
    The feed pump, mixer activity and filtrate weight scale set point can
    be changed during the batch process.

2. Touch the **START** button to begin a batch. The **BATCH QUESTION!** screen may open:
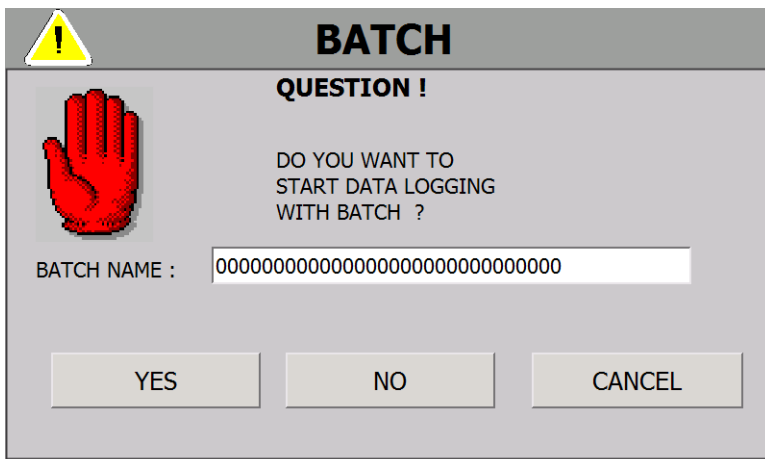
Figure 81: BATCH (Data Logging) Question Screen

NOTE

If there is no data logging running, no alarm remaining and no file uploading in progress, then the batch start confirmation question above appears; otherwise, a message describing a reason why batch start is not possible appears.

3. Touch one of the following buttons:

● **NO** to start the batch without data logging

● **YES** to start batch with data logging

● **CANCEL** to return to the batch setup screen

If you start batch with data logging, you can fill in a batch name. If no batch name is entered, the batch name is automatically generated with 20 characters, date and a time stamp (see Data Logging).

Recirculation Procedure
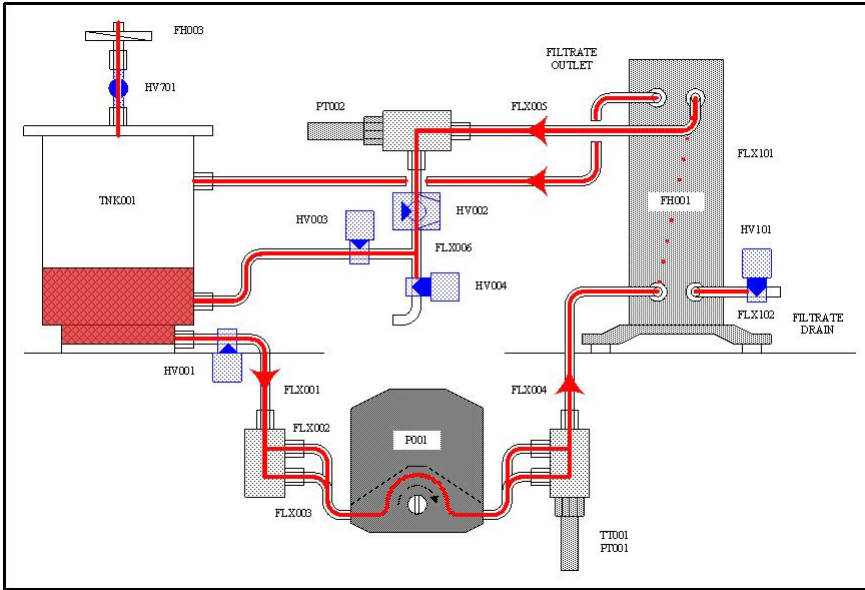
Figure 82: Recirculation Flow Path

1. Connect filtrate outlet tubing (FLX101) to the spare inlet in the upper part of the tank (TNK001).

2. Open the HV001, HV002, HV003 and HV701 valves.

3. Close the HV004 and HV101 valves.

4. Verify that there is liquid in the tank (TNK001).

5. At the Main Menu or P & ID screen, touch **BATCH CONTROL,** then **BATCH**. The **BATCH** screen opens:
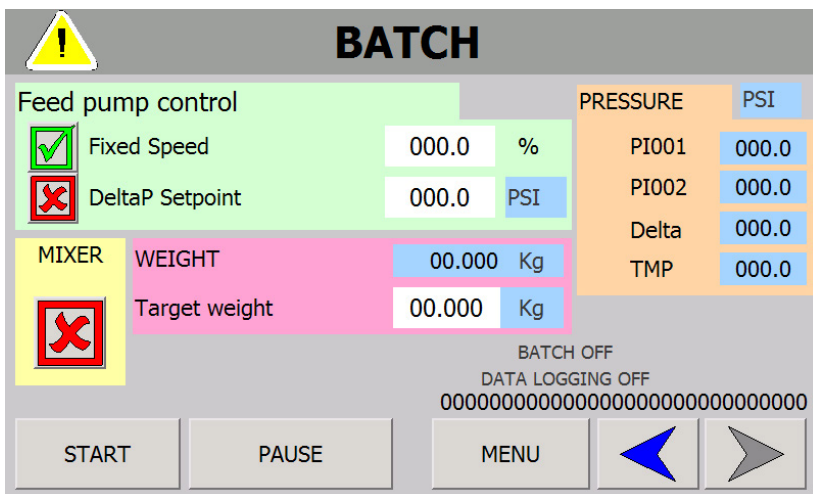
Figure 83: BATCH Screen

6. Enter the feed pump speed, fixed speed or pressure for delta P regulation.

7. Verify that the valves are OPEN and that there is an open flow path to the tank. Press
    START. The liquid is now recirculated from the tank through the pump, filter holder and
    retentate back into the tank. The filtrate from the filter holder is also returned to the tank
    through the filtrate outlet.

Vacuum Fed Batch Procedure
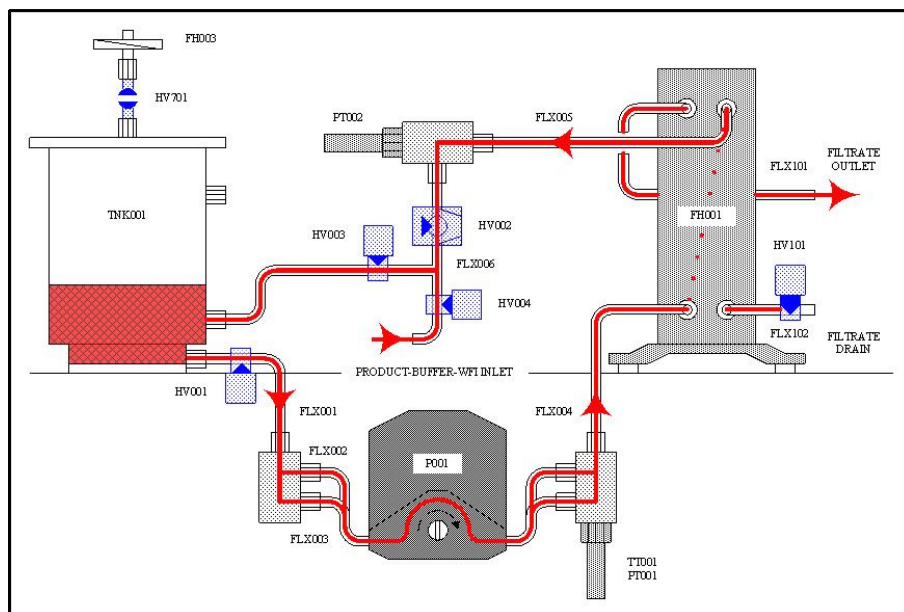
Figure 84: Fed Batch Flow Path

NOTE
Ensure the filtrate collection container is vented.

1. Connect filtrate outlet tubing (FLX101) to the external filtrate collection container.

2. Connect product-buffer inlet tubing (FLX006) to an external container.

3. Open the HV001, HV002, HV003 and HV004 valves.

4. Close the HV101 and HV701 valves.

5. Verify that there is liquid in the tank.

6. At the Main Menu or P & ID screen, touch **BATCH CONTROL,** then **BATCH.** The **BATCH** screen opens:
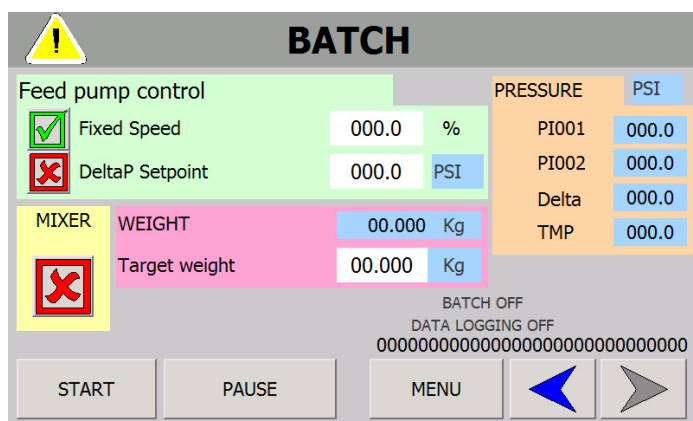
Figure 85: BATCH Screen

7. Enter the feed pump speed (either fixed speed or delta P regulation).

8. Verify that the valves are open and that there is an open flow path to the tank. Press **START**.

   Liquid is now recirculated from the tank (TNK001) through the pump, filter holder and retentate back into the tank. The filtrate from the filter holder is collected externally. Due to the closed tank vent valve V701, product is transferred from the external container through HV004 into the tank.

   If necessary, manipulate the set point for the feed pump speed or delta P and the back pressure regulator to obtain the correct delta P and TMP for the solution being concentrated (the actual pressures are displayed on the P & ID screen).

9. Stop the fed batch process manually.

NOTE

Operating the mixer (MIX001) will improve the homogenization of the liquid in the tank (TNK001).

Concentration Procedure
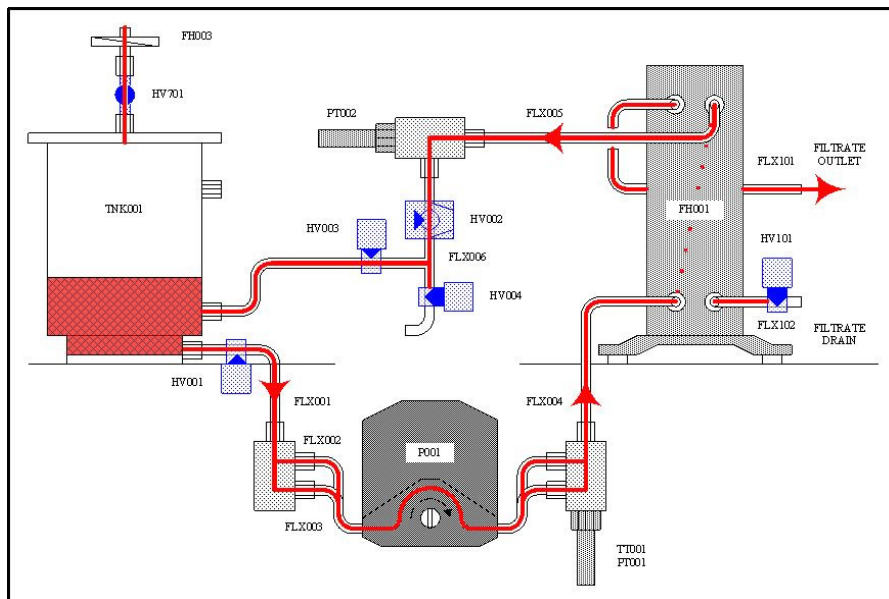
Figure 86: Concentration Flow Path

NOTE

Before starting, confirm that the **TARGET WEIGHT** value is higher than the actual weight.

Ensure the filtrate collection container is vented. The weight scale must be used for this procedure.

1. Connect the filtrate outlet tubing (FLX101) to the external filtrate collection container.

2. Open the HV001, HV002, HV003 and HV701 valves.

3. Close the HV004 and HV101 valves.

4. Verify that there is liquid in the tank (TNK001).

5. At the Main Menu or P & ID screen, touch **BATCH CONTROL,** then **BATCH**. This **BATCH** screen opens:
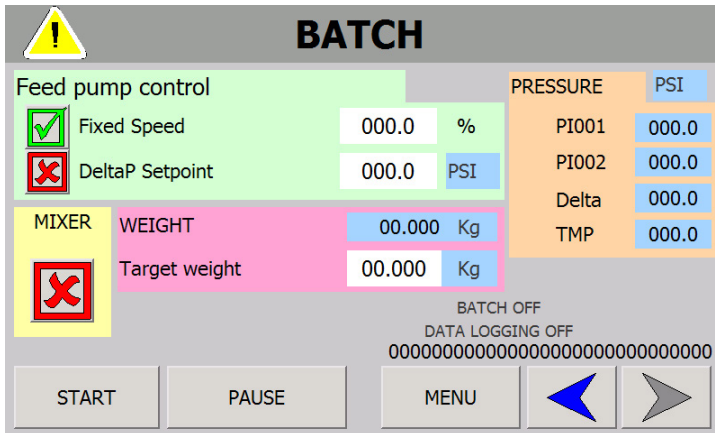
6. Enter the feed pump speed (either fixed speed or delta P regulation).

7. Enter a target weight for the filtrate weight scale.

8. Verify that the valves are open and that there is an open flow path to the tank. Press **START**.

    Liquid is now recirculated from the tank (TNK001) through the pump, filter holder and retentate back into the tank. Filtrate is directed through the filter holder filtrate outlet in the external filtrate collection container. The liquid in the tank (TNK001) is now concentrated.

    If necessary, manipulate the set point for the feed pump speed or delta P and the back pressure regulator to obtain the correct delta P and TMP for the solution being concentrated (the actual pressures are displayed on the P & ID screen).

    If the optional filtrate weight scale is enabled, the concentration function can be stopped through the filtrate weight collection function.

    When the filtrate weight is above the **TARGET WEIGHT** value, the batch will stop automatically.

NOTE

Operating the mixer (MIX001) will improve the homogenization of the liquid in the tank (TNK001).

Diafiltration Procedure
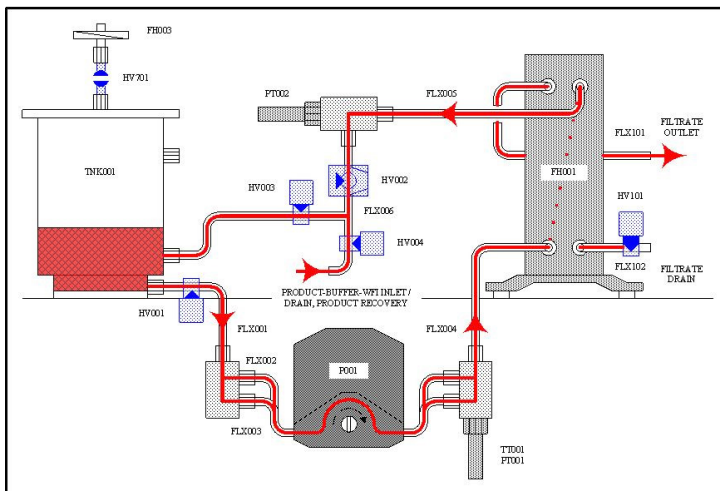
Figure 88: Diafiltration Flow Path

NOTE
    Ensure that the external drain collection container is vented.

1. Connect the filtrate outlet tubing (FLX101) to the external filtrate collection container.

2. Connect the product-buffer inlet tubing (FLX006) to an external container.

3. Open the HV001, HV002, HV003 and HV004 valves.

4. Close the HV101 and HV701 valves.

5. Verify that there is liquid in the tank (TNK001).

6. At the Main Menu or P & ID screen, touch **BATCH CONTROL,** then **BATCH**. This opens the **BATCH** screen:
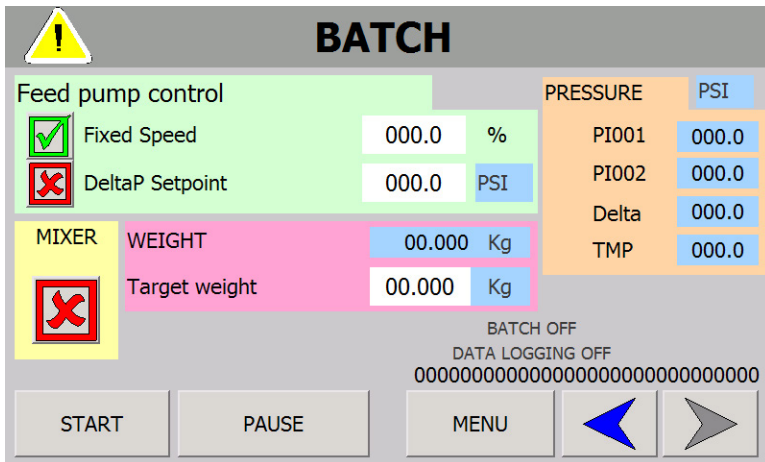
Figure 89: BATCH Screen

7. Enter the desired target weight.

8. Enter the feed pump speed (either fixed speed or delta P regulation).

9. Verify that the valves are open and that there is an open flow path to the tank. Press **START**.

    Liquid is now recirculated from the tank (TNK001) through the pump, filter holder and retentate back into the tank. Filtrate is directed through the filter holder filtrate outlet in the external filtrate collection container. Due to the closed tank vent valve V701 product/buffer/ WFI is transferred from the external container through HV004 into the tank.

    At this point, it may be necessary to manipulate the set point for the feed pump speed or delta P and the back pressure regulator to obtain the correct delta P and TMP for the solution being concentrated (the actual pressures are displayed on the **P & ID** screen). Stop the process manually.

NOTE

   Operating the mixer (MIX001) will improve the homogenization of the liquid in the tank (TNK001).

Flush Procedure
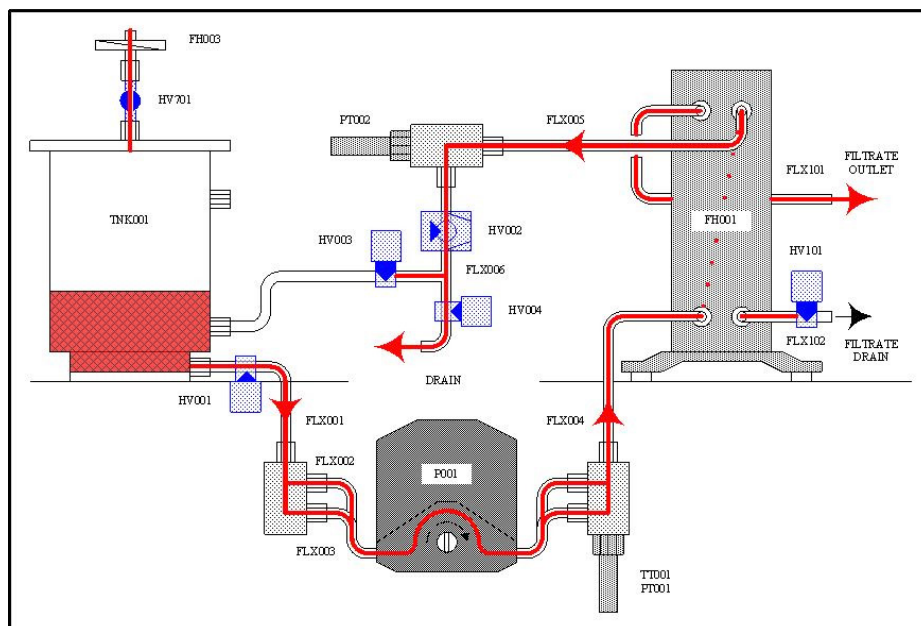
Figure 90: Flush Flow Path

NOTE
Ensure that the external drain collection container is vented.

1. If required, follow the Fill procedure to add buffer into the tank.

2. Connect the filtrate outlet tubing (FLX101) to the external filtrate collection container.

3. Connect the drain tubing located on (FLX006) to an external collection container.

4. Open the HV001, HV002, HV004, HV101 and HV701 valves.

5. Close the HV003 valve.

6. Touch the feed pump icon. The **FEED PUMP** manual command screen opens:
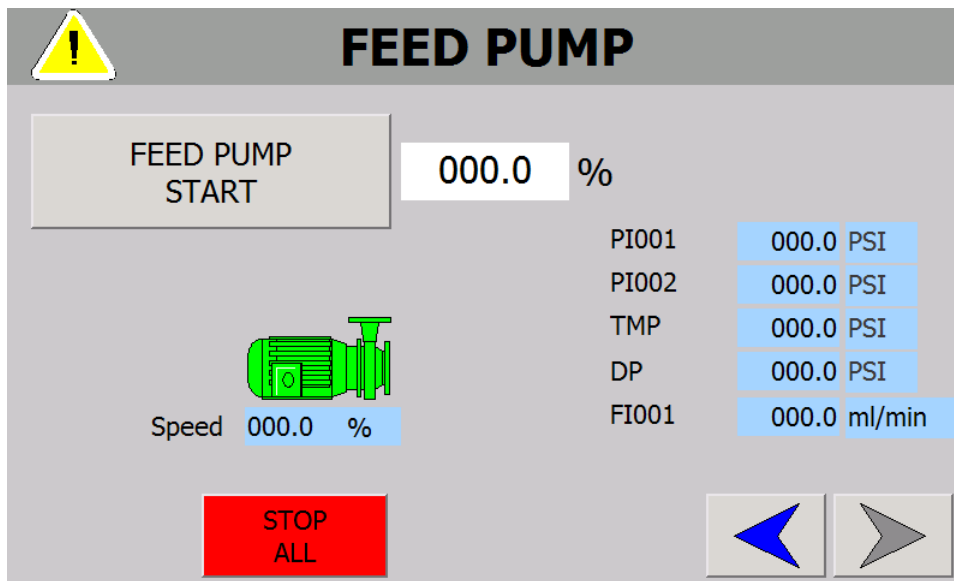
Figure 91: FEED PUMP Screen

7. Set the feed pump speed to the required setting.

8. Verify that the valves are open and that there is an open flow path to the tank.
    Press **START**.

9. Operate the system until the tank is empty and all the liquid is fully drained.

Cleaning Procedure

1. Install at least one Pellicon® 3 88 cm^2 cassette into the holder.

2. Fill re-circulation tank with 1 liter of cleaning solution.

3. Set tubing and valves to full recirculation with filtrate returning to the tank.

4. Recirculate at $\geq$ 200 ml/min. for ten minutes. See recirculating procedure on .

5. Follow the drain procedure to drain all tubing.

6. Pour one liter of rinse water into the tank.

7. Recirculate at $\geq$ 200 ml/min. for ten minutes.

8. Follow drain procedure to empty all tubing.

9. Repeat steps 6-8 as required to ensure the system is rinsed thoroughly.

10. Manually wipe down tank and components to complete cleaning procedure.

Integrity Testing

Instructions for performing integrity testing on the Pellicon® 3 88 cm² cassettes can be found in the Pellicon® 3 Cassettes Installation and User Guide (AN1065EN00), which is available on the Millipore website.

Data Logging

Entering the Batch Name

When starting data logging, a batch name is assigned by the system if one is not entered manually. Manually entered batch names are truncated at 20 characters.

File name convention is as follows:

If you are filling in the batch name:

<User batch name>_ YYYY MM DD HH MM SS

Year
Month
Day
Hour
Minute
Second
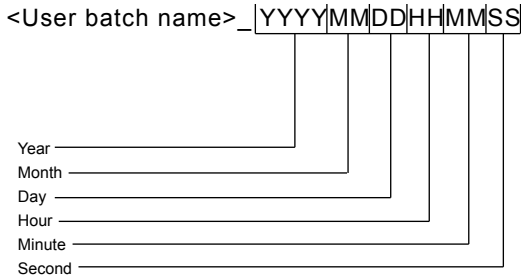
If you are not filling in batch name:

YYYY MM DD HH MM SS

Year
Month
Day
Hour
Minute
Second
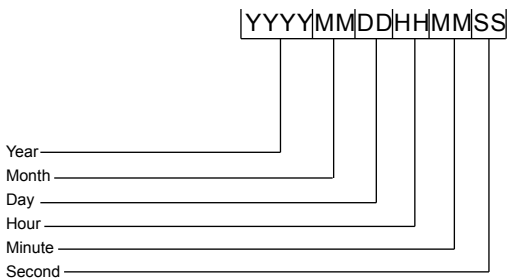
This naming convention is used to avoid duplicate file names.

When data logging starts, there are three files created:

- <User batch name>**_YYYYMMDDHHMMSS_Datalog.csv** : for analogical data recording.

- <User batch name>**_YYYYMMDDHHMMSS_EventLog.csv** : for events on HMI (mostly user actions).

- <User batch name>**_YYYYMMDDHHMMSS_Alarm.txt** : for alarms appearing during data log.

These file are stored on an MMC memory card inserted in the touch screen. At the default system settings, the data logging files size are approximately 0.3 Mb for one hour recording.

NOTE
   For file recovery and data export in other software programs see Recovering Data.

The files are formatted as Comma Separated Value (CSV) files and are in ASCII text format readable with any text reader. These files can be imported in any spreadsheet program.

Alarm Log File Structure Field Explanations	
Alarm	Explanation
Time_ms	Time stamp in decimal number
MsgProc	Alarm procedures: 0 = Unknown alarm procedure 1 = System alarm 2 = Alarm bit procedure (operating alarms) 3 = Alarm number procedure ALARM_S 4 = Diagnostic event 7 = Analog alarm procedure 100 = Alarm bit procedure (fault alarms)
StateAfter	Alarm event: 0 = Arrived/Departed 1 = Arrived 2 = Arrived/Acknowledged/Departed 3 = Arrived/Acknowledged 6 = Arrived/Departed/Acknowledged
MsgClass	Alarm class: 0 = No alarm classes 1 = "Interruption" 2 = "Operation" 3 = "System" 64 … = User configured alarm classes
MsgNumber	Alarm number.
Var1 to Var8	Alarm tag value as STRING.
TimeString	Time stamp as STRING, i.e., readable date format.
MsgText	Alarm in a readable STRING.
PLC	Alarm localisation (relevant PLC).

Event Log File Structure Field Explanations	
Alarm	Explanation
Date	Date string in format: Day/month/year.
Time	Time string in format: Hour:Minute:second (in 24 hour format).
User	Current user logged in. No user logged in this field display: default user.
EventDescription	Event description or value of changed field.

Data Log File Structure Field Explanations	
Alarm	Explanation
Date	Date string in format: Day/month/year.
Time	Time string in format: Hour:Minute:second (in 24 hour format).
FeedPressure	Feed pressure value in current pressure unit.
RetentatePressure	Retentate pressure value in current pressure unit
Delta P	Delta P value in current pressure unit.
TMP	TMP value in current pressure unit.
FeedFlow	Feed flow value in ml/min.
PumpSpeed	Feed pump speed in percent.
Temperature	Feed temperature in current temperature unit.
FiltrateFlow	Filtrate flow value in ml/min.
FiltratWeight	Filtrate weight value in current weight value.

NOTE

If the weight scale is not installed, the related field (filtrate weight and calculated filtrate flow) are not logged into the data log file.

Running a Batch with Data Logging

1. On the **BATCH** screen, set up the target weight, mixer use, feed pump handling and the set point.

2. Touch **START**. If all the required conditions are ok, the **BATCH QUESTION!** screen opens:
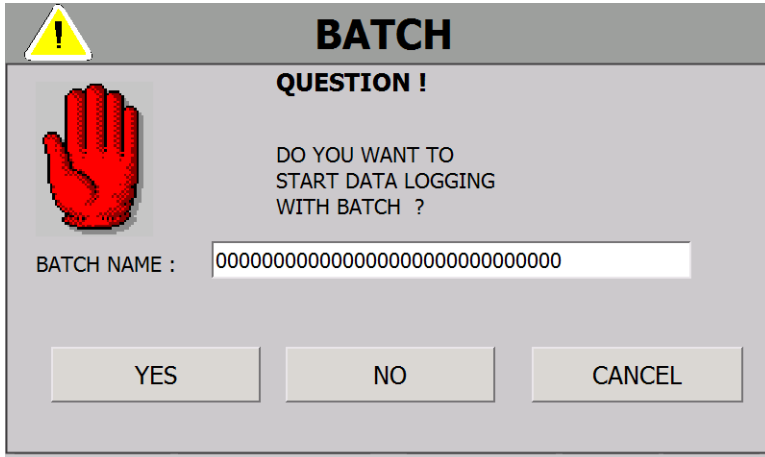
Figure 92: BATCH (Data Logging) Question Screen

3. If desired, enter a batch name. It will be added to the batch file name.

4. Touch **YES** to start batch with data logging or **NO** to start without data logging.

Using Stand Alone Data Logging

1. To use the data logging feature in manual mode, touch DATA LOGGING on the main menu to open the DATA LOGGING screen:
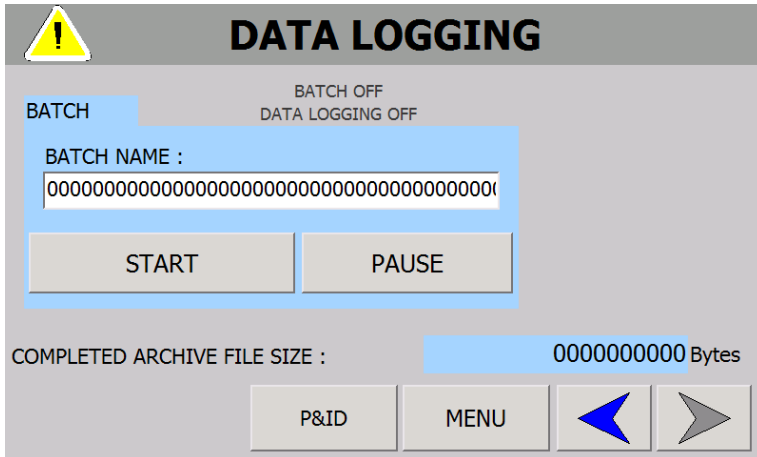
Figure 93: DATA LOGGING Screen

2. Enter a batch name if desired. This batch name will automatically be completed with a date stamp to avoid overwriting existing files.

    Once data logging is started, every test can be run with the system and will be recorded. The only restriction is when data logging has been activated and a batch needs to be recorded. In this case, stop data logging, start the batch and then re-activate data logging on the **BATCH** screen. This will create a new file with an updated time stamp.

Recovering Data

See Advanced System Setup to configure the Cogent® μScale TFF System and PC for data transfer.

Checking System Status & Alarms

Viewing System Status

The **P & ID** is used for viewing the system status, pressures, weight, temperatures and alarms displayed on a single screen:
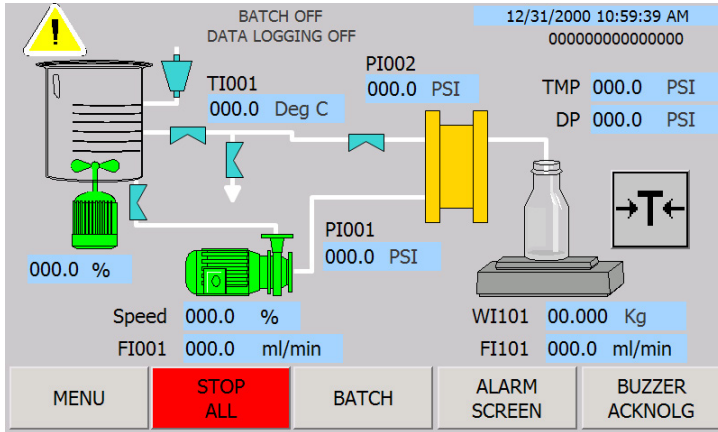
Figure 94: P & ID Screen

The pressures, temperatures and weight displays are updated continuously to provide an accurate description of the system/process status. Use the buttons along the bottom to view the alarm screen, access the batch control (to start a batch) or stop all current processes.

During Cogent® µScale TFF system operations, it is possible to follow analogical values in the trending screen. These screens are accessed from the P & ID screen by touching any of the analog values displayed or by touching **TREND** on the main menu.

In the example screen below, the first trend screen displays the pressure and feed pump speed:
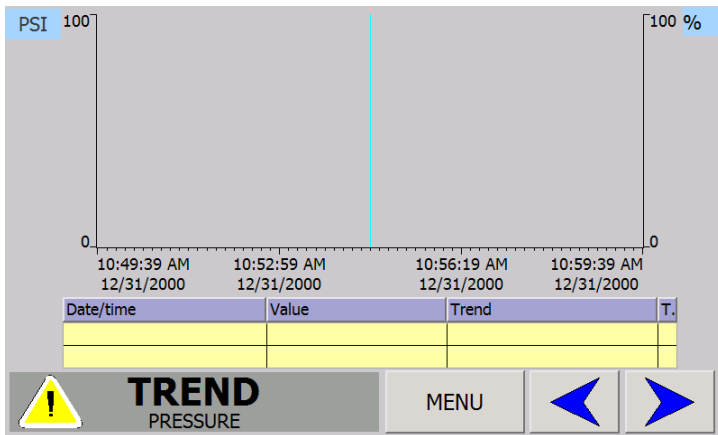
Figure 95: Trend Screen Example

In the center of the trend there is a vertical blue cursor that when touched and held verifies the values from the system sensors.

Beneath the trend screen is an array with the different analog values. The first column represents the name of trend (i.e. feed pressure), the second column represents the date & time and the third column represents the value displayed in the selected unit. Moving the trend cursor from right to left updates the array values. The second trend screen follows the other analogical values: temperature, feed flow, filtrate weight and filtrate flow.
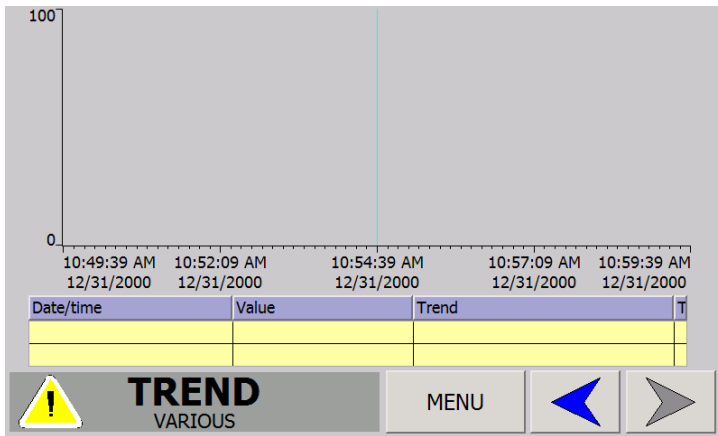
Figure 96: Analogical Trend Screen Example

If the weight scale is not installed, relevant information (filtrate weight and filtrate flow) is not displayed.

Setting Alarms

The alarm set point feature allows the entry of threshold values for the Feed Pressure, Retentate Pressure, TMP, Delta P, Weight and Temperature parameters. This feature ensures that the proper operating parameters are maintained. When an alarm is triggered, the screen displays a warning and, in some cases, the system stops all current processes.

1. At the main menu, touch **ALARM SETPOINTS.** The **ALARM SETPOINT MENU** opens:
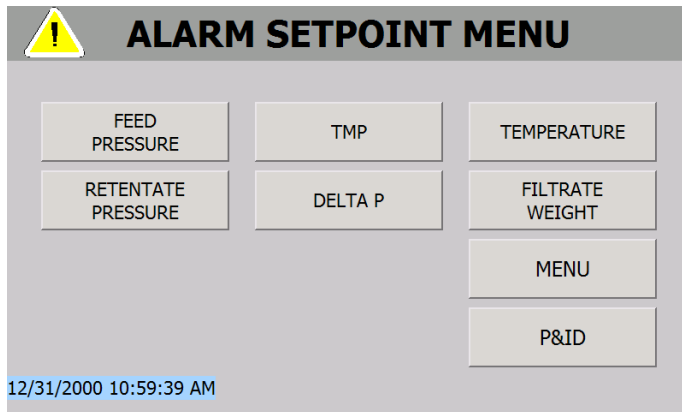
Figure 97: ALARM SETPOINT MENU Screen

2. Touch any of the buttons to change the set points. Note the following:

● **PRESSURE:** If different pressure display units for the touch screen are selected (see Setting Up the System), these alarm set points will automatically convert to the new pressure display units. However, the system also has a built in maximum high pressure value of 86 psi (5.93 kPa, 5.9 bar).

● **TEMPERATURE:** If different temperature display units for the touch screen are selected (see Setting Up the System), these alarm set points will be automatically convert to the new temperature display units. The system, however, also has a built in maximum high temperature value of 55 °C.

● **WEIGHT:** If different weight display units for the touch screen are selected (see Setting Up the System), these alarm set points will automatically convert to the new weight display units.

Alarm Setpoints

Figure 98: Alarm Setpoint Screen

NOTE

> All alarm set point screens are similar to the example in figure 78. The screen above is used as an example.

- The **HIHI** and **LOLO** columns are alarms. If an alarm occurs, the current functions may be stopped or paused.

- The **HI** and **LO** columns are warnings. If a warning occurs the current functions keep running – the system only warns that set point has been reached.

- The first row of button allows you to enable or disable an alarm or warning. The only alarm that is maintained enable by the system (not modifiable by the user) is the **HIHI** feed pressure alarm.

- Below the row of buttons are the set point fields. The set points are displayed and entered in the current displayed unit.

The last row is the timer linked to each alarm/warning. Timer value allows you to delay alarm/warning up coming. Therefore, the value must exceed the timer value before the alarm/warning occurs. Each parameter's button shows its current alarm set point values.

Touching ☑ activates an alarm/warning.

Touching ☒ deactivates an alarm/warning.

Refer to the tables on the following pages for alarm parameter and interlock settings.

Alarm Parameters

Each of the following is used to set the maximum/minimum allowed for each parameter.

Parameter	Limit	Number	Warning appears when
Feed Pressure	HIHI	1	feed pressure reaches the maximum value and holds for the delay specified (in seconds).
	HI	2	
	LO	3	feed pump is running and feed pressure reaches the minimum value and holds for the delay specified (in seconds).
	LOLO	4	
Retentate Pressure	HIHI	5	retentate pressure reaches the maximum value and holds for the delay specified (in seconds).
	HI	6	
	LO	7	feed pump is running and retentate pressure reaches the minimum value and holds for the delay specified (in seconds).
	LOLO	8	
TMP	HIHI	17	TMP reaches the maximum value and holds for the delay specified (in seconds).
	HI	18	
	LO	19	TMP reaches the minimum value and holds for the delay specified (in seconds).
	LOLO	20	
Delta P	HIHI	13	the Delta pressure reaches the maximum value and holds for the delay specified (in seconds).
	HI	14	
	LO	15	feed pump is running and the Delta pressure reaches the minimum value and holds for the delay specified (in seconds).
	LOLO	16	
Filtrate Weight	HIHI	29	the filtrate weight reaches the maximum value and holds for the delay specified (in seconds).
	HI	30	
	LO	31	feed pump is running and the filtrate weight reaches the minimum value and holds for the delay specified (in seconds).
	LOLO	32	
Temperature	HIHI	21	the temperature reaches the maximum value and holds for the delay specified (in seconds).
	HI	22	
	LO	23	the temperature reaches the minimum value and holds for the delay specified (in seconds).
	LOLO	24	

Numbers are used in place of Limits for non-Latin character based languages.

Permanent Alarms/Warning

Parameter	Number	Description
PI001 PSH	41	Feed pressure above pressure switch set point.
PI001 sensor disconnected	45	Feed pressure sensor disconnected
PI002 sensor disconnected	46	Retentate pressure sensor disconnected
TI001 sensor disconnected	48	Temperature sensor disconnected
WI101 sensor disconnected	50	Filtrate weight scale plate disconnected
Pump defect	43	Feed pump defect (run command and pump not running)
Mixer defect	44	Mixer defect
Emergency stop	42	Emergency stop pushed
Memory limit reached	53	Space used by data logging file is above specified set point.

NOTE
Alarms cannot be disabled on system.

Alarm Interlock Table

When Alarms/Warnings occur, they have an effect on the system. The Interlock table below shows what is happening when an alarm or warning appears in different function modes.

Alarm	Manual Mode		Auto Mode	
	Stops Feed Pump	Stops Mixer	Stops Feed Pump and pauses batch	Stops Mixer
PI001 HiHi feed pressure alarm	YES	NO	YES	NO
PI001 Hi feed pressure warning	NO	NO	NO	NO
PI001 Lo feed pressure warning	NO	NO	NO	NO
PI001 LoLo feed pressure alarm	YES	NO	YES	NO
PI002 HiHi Retentate pressure alarm	YES	NO	YES	NO
PI002 Hi Retentate pressure warning	NO	NO	NO	NO
PI002 Lo Retentate pressure warning	NO	NO	NO	NO
PI002 LoLo Ret. pressure alarm	YES	NO	YES	NO
HiHi Delta P alarm	YES	NO	YES	NO
Hi Delta P warning	NO	NO	NO	NO
Lo Delta P warning	NO	NO	NO	NO
LoLo Delta P alarm	YES	NO	YES	NO
HiHi TMP alarm	YES	NO	YES	NO
Hi TMP warning	NO	NO	NO	NO
Lo TMP warning	NO	NO	NO	NO
LoLo TMP alarm	YES	NO	YES	NO
TI001 HiHi alarm	YES	NO	YES	NO
TI001 Hi warning	NO	NO	NO	NO
TI001 Lo warning	NO	NO	NO	NO
TI001 LoLo alarm	YES	NO	YES	NO
WI101 HiHi alarm	YES	NO	YES	NO
WI101 Hi Warning	NO	NO	NO	NO
WI101 Lo Warning	NO	NO	NO	NO
WI101 LoLo Alarm	YES	NO	YES	NO
Digital HiHi feed (PSH) pressure alarm	YES	NO	YES	NO

Alarm	Manual Mode		Auto Mode	
	Stops Feed Pump	Stops Mixer	Stops Feed Pump and pauses batch	Stops Mixer
Emergency stop alarm	YES	YES	YES	YES
Feed pump defect alarm	YES	NO	YES	NO
Mixer defect alarm	YES	YES	YES	YES
Feed pres. sensor disconnected alarm	YES	NO	YES	NO
Retentate pressure sensor disconnected alarm	YES	NO	YES	NO
Temperature sensor disconnected alarm	YES	NO	YES	NO
Weight scale disconnected alarm	YES	NO	YES	NO
Memory limit reached for archive file warning	NO	NO	NO	NO

Checking Alarm Status

1. Touch **ALARM SCREEN** on the Main Menu or on the **P & ID** screen. The **CURRENT ALARM** screen opens:
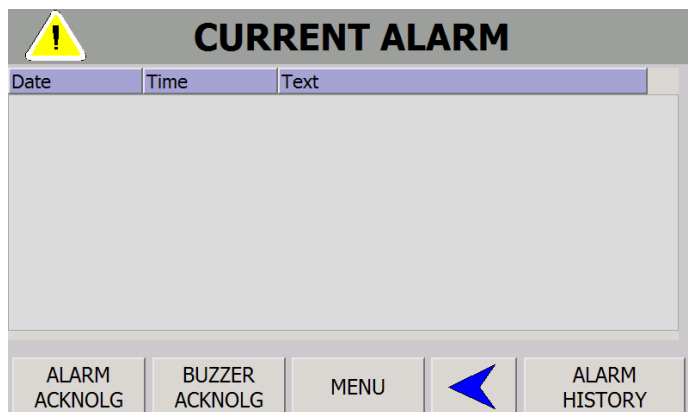
Figure 99: CURRENT ALARM Screen

NOTE

When an alarm occurs, a pop-up screen appears showing the new current active alarms.

2. Touch **ALARM ACKNOLG** to acknowledge the alarm and return to the current alarm screen.

3. If buzzer is enabled, touch **BUZZER ACKNOLG** to shut if off.

NOTE

The alarm symbol is displayed in the top left corner of all the screens except the trend screen, where it will be displayed in the lower left corner.

4. Resolve an alarm by adjusting the relevant condition. For example, if the Feed Pressure alarm is triggered, reduce the feed pump speed accordingly.

5. For complete instructions see Troubleshooting.

Acknowledging Alarms

An alarm can only be acknowledged when an actual event has been corrected. If the buzzer is enabled, touch **BUZZER ACKNOLG** to quiet the buzzer prior to acknowledging alarms. At the main menu or **P & ID** screen, touch **ALARM SCREEN** button to access the alarm screen, and then touch the **ALARM ACKNOLG** button. All resolved alarms will disappear from the list. Any others, stay in the list. A new batch cannot be started until the alarm list is empty.

Alarm History

1. Touch **ALARM HISTORY** on the alarm screen. The **ALARM HISTORY** screen opens:
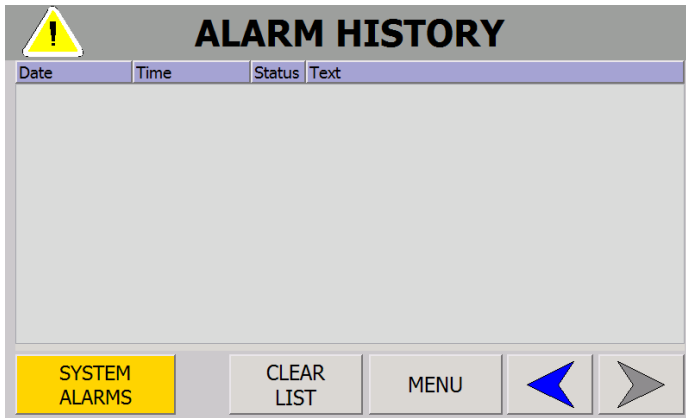
Figure 100: ALARM HISTORY Screen

The alarm history screen shows the history of alarms since it was last emptied.

Alarm History Display Information	
Display	Explanation
date	The date when the event occurred
time	The time when the event occurred
state	The state of the event
A	Alarm/Warning appeared
D	Alarm/Warning disappeared
Q	Alarm/Warning was acknowledged
AD	Alarm/Warning appeared and disappeared
AQ	Alarm/Warning appeared and was acknowledged
AQD	Alarm/Warning appeared

2. To empty the buffer list, touch **CLEAR LIST**.

NOTE
This action cannot be undone.

3. To go back to ALARM SCREEN, touch the button.

Maintenance

Caution	
⚠	**Due to risk of electric shock, unplug the power cord prior to opening the system's main cabinet.** **When the system is switched off (main switch in OFF position), both the phase and the neutral are cut off. The system is protected by one fuse on the phase and one fuse on the neutral.**

NOTE

A User must be logged on as a manager to execute any of the maintenance procedures performed using the touch screen.

Cleaning and calibrating the screen is recommended as part of the annual maintenance. See Setting Up the System.

Use standard industry procedures to clean the system and components.

Instrument Calibration

The instrument calibration should be performed annually by a Millipore Service Technician as part of annual system maintenance. (Calibrations were performed initially at the factory as part of acceptance testing prior to shipment.) If additional calibration is required, follow the instructions below to calibrate the temperature, feed, and retentate pressure sensors or the filtrate weight scale.

All calibration screens can be viewed by all users, but the user must be logged as a manager to update the values.

To access the calibration menu:

1. Touch **MENU** on the P & ID screen to open the main menu.

2. Select **INSTRUMENT CALIBRATION.** To open the **PRESSURE CALIBRATION** screen:
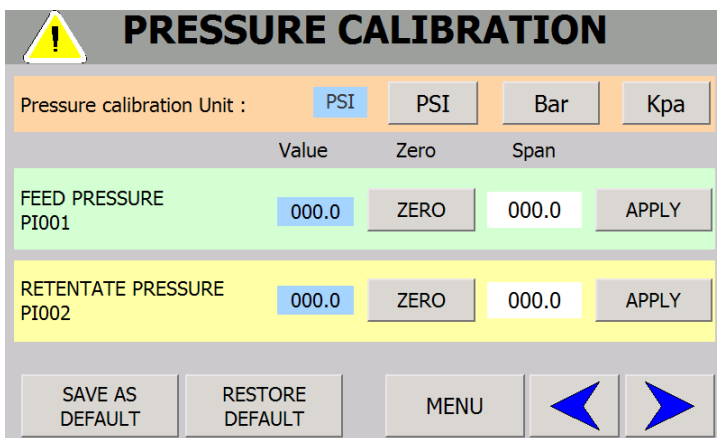
Figure 101: Pressure Calibration Screen

Calibrating the Temperature Sensor

Calibrate the temperature sensor using a temperature calibration bath and a reference temperature sensor. The temperature sensor TT001 must be calibrated before the pressure sensor PT001.

1. Ensure that the system is properly cleaned and drained.

2. Remove the temperature/pressure sensor from the flow cell.

3. Connect the temperature calibration extension cable between the temperature/pressure sensor and the connector in the enclosure.

4.   Set the lower temperature in the temperature calibration bath.

5. Insert the temperature/pressure sensor TT001/PT001 into the temperature calibration bath.

6. From the instrument calibration screen, touch the right arrow until you reach the **TEMPERATURE CALIBRATION** screen:
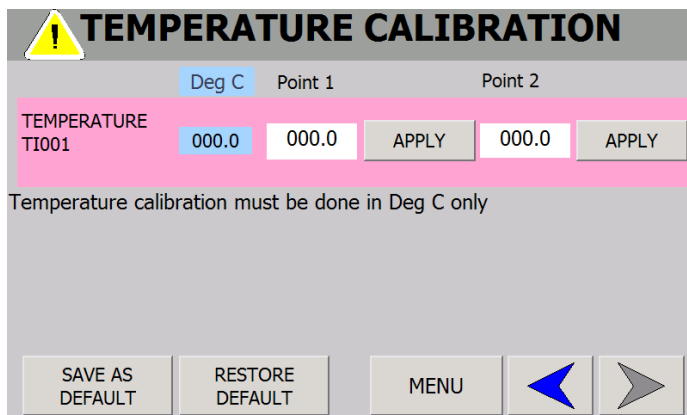
Figure 102: TEMPERATURE CALIBRATION Screen

7. Log on as **MANAGER** to access to the calibration fields and commands.

8. Wait until the temperature indication TI001 on the system touch screen is stable.

9. Read the temperature from the reference temperature gauge in the temperature calibration bath.

10. Enter the value of the reference temperature gauge in the **Point 1** entry field on the touch screen and confirm the values using the **APPLY** button.

11. Set the higher temperature in the temperature calibration bath. Wait until the temperature indication TI001 on the system touch screen is stable.

12. Read the temperature from the reference temperature gauge in the temperature calibration bath.

13. Enter the value of the reference temperature gauge in the **Point 2** entry field on the touch screen and confirm the values using the **APPLY** button.

14. Remove the temperature/pressure sensor TT001/PT001 from the temperature calibration bath. Temperature calibration is now complete.

15. Remove the temperature calibration extension cable.

Mount the temperature/pressure sensor back into the temperature/pressure flow cell using the following steps:
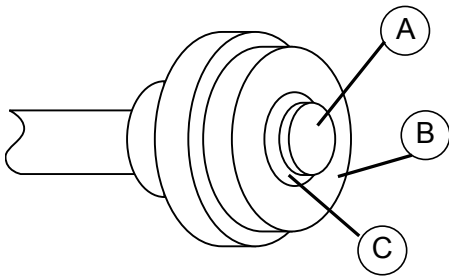
Figure 103: Temperature/Pressure sensor with gland and captive screw

Mount one O-ring **(C)** over the tip of the pressure sensor **(A)** against the face of the captive screw **(B)**. Use a new O-ring (included in the tubing subassembly delivered with the system).
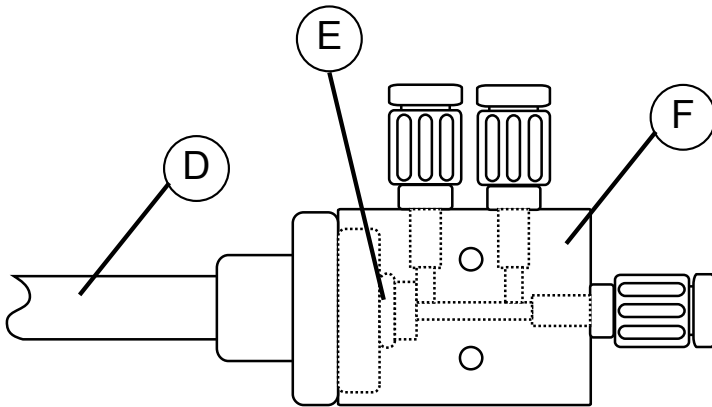
Figure 104: Temperature/Pressure sensor with gland, captive screw and O-ring

16. Carefully insert the pressure sensor with the O-ring and captive screw in the bore **(E)** of the flow cell **(F)**.

17. Screw the captive screw in the internal thread of the flow cell and hand tighten the captive screw.

18. Tighten the captive screw, then retighten the gland **(D)**.

19. Connect the electrical connector to the corresponding connector on the enclosure.

Calibrating the Feed Pressure Sensor

Calibration requires a hand pump and a calibrated pressure reference sensor. Tubing is needed to connect the hand pump and a calibrated pressure reference sensor/gauge to the temperature/pressure cells.

1. Ensure that the system is properly cleaned (see Cleaning Procedure).

2. Drain the system (see Draining the System).

3. Ensure that the pump is switched off and pressure is released from the tubing.

4. Disconnect the tubing FLX002, FLX003 and FLX004 from the temperature/pressure flow cell.

5. Plug one of the connections with one luer lock female plug.

6. Connect the hand pump and calibrated pressure reference sensor/gauge to the two remaining connections.
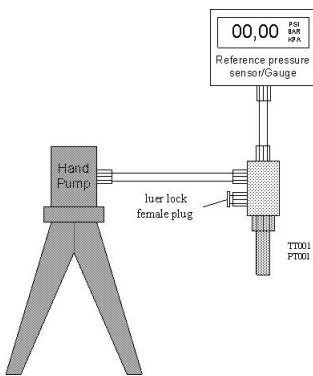
Figure 105: PT001 Pressure Calibration set-up

7. In the **PRESSURE CALIBRATION SCREEN**, select pressure unit in **psi**, **bar** or **kPA**.
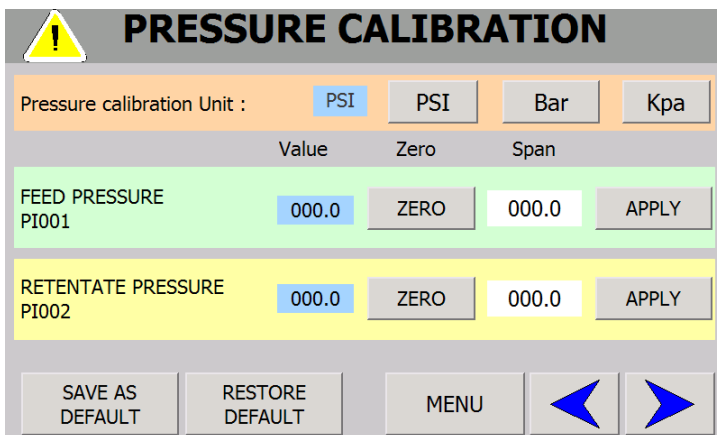
Figure 106: PRESSURE CALIBRATION Screen

8. Set the hand pump test pressure to zero.

9. For feed pressure PI001, touch **ZERO** to set its reading to zero.

10. Slowly apply pressure with hand pump up to the maximum pressure reading of 100 psi, 6.9 bar or 690 kPA on the reference sensor.

11. Enter the same value as reference sensor in feed pressure PI001 **SPAN** field of touch screen and touch **APPLY**.

12. Disconnect the hand pump and the reference pressure sensor, then reconnect the tubing.

13. If required, repeat the above procedure on the retentate sensor.

Calibrating the Retentate Pressure Sensor

Calibration requires a hand pump and a calibrated pressure reference sensor. Tubing is needed to connect the hand pump and a calibrated pressure reference sensor/gauge to the pressure cells.

1. Ensure that the system is properly cleaned (see Cleaning Procedure).

2. Drain the system using the drain procedure (see Draining the System).

3. Ensure that the pump is switched off and pressure is released from the tubing.

4. Disconnect the tubing FLX005, FLX006 from the pressure flow cell.

5. Connect the hand pump and calibrated pressure reference sensor/gauge to the two remaining connections.
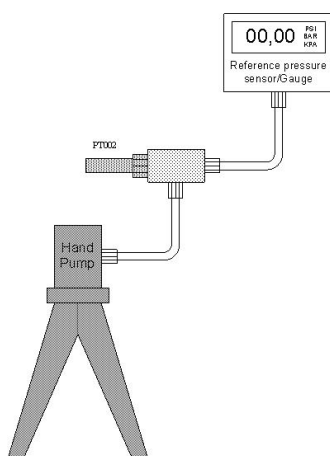
Figure 107: PT002 Pressure Calibration set-up

6. In the **PRESSURE CALIBRATION SCREEN**, select pressure unit in **psi**, **bar** or **kPA**.
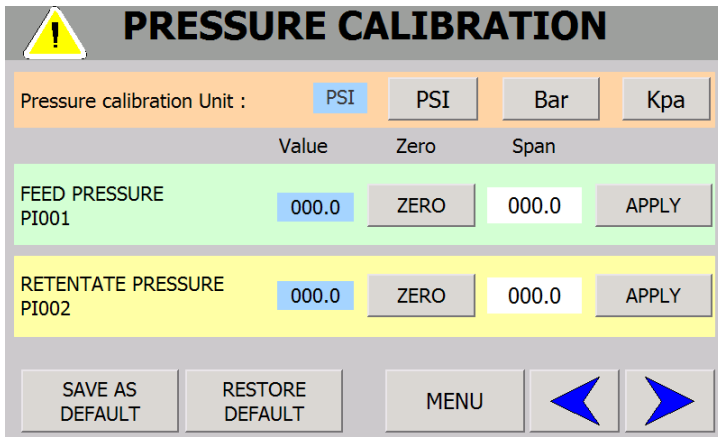
Figure 108: PRESSURE CALIBRATION screen

7. Set the hand pump test pressure to zero.

8. For retentate pressure PI002, touch **ZERO** to set its reading to zero.

9. Slowly apply pressure with hand pump up to the maximum pressure reading of 100 psi, 6.9 bar or 690 kPA on the reference sensor.

10. Enter the same value as reference sensor in retentate pressure PI002 **SPAN** field of the touch screen and touch **APPLY**.

11. Disconnect the hand pump and the reference pressure sensor and reconnect the tubing.

Restoring Default Calibration Settings

Use this function to replace the current calibration settings with the last saved defaults.

1. Touch **RESTORE DEFAULTS** on the calibration screen. The **RESTORE DEFAULTS** screen opens:
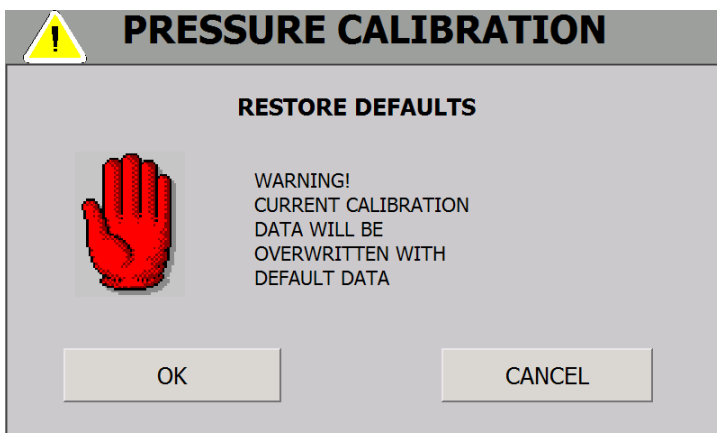
Figure 109: RESTORE DEFAULTS Screen

2. Touch **OK** to confirm and return to the Calibration screen.

Saving Default Calibration Settings

Use this function to save the current calibration settings as the default settings.

1. Touch **SAVE AS DEFAULTS** on the **PRESSURE CALIBRATION SCREEN**. The **SAVE AS DEFAULT** screen opens:
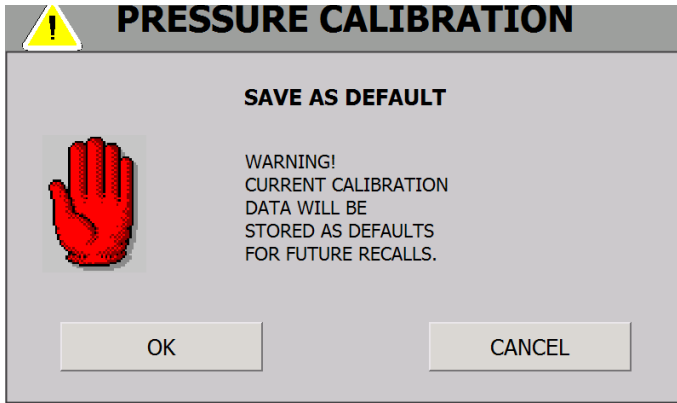
Figure 110: SAVE AS DEFAULTS Screen

2. Touch **OK** to confirm and return to the Instrument Calibration screen.

Calibrating the Filtrate Weight Scale

If installed, the optional filtrate weight scale needs to be calibrated with the internal weight transmitter. This transmitter is an integral part of the Cogent® µScale TFF System. Before it can be calibrated, the weight scale function must be activated. The filtrate weight scale function is not installed at system delivery. For instructions on installing the filtrate weight scale option, see Connecting the Filtrate Weight Scale.

1. From the instrument calibration scene, use the right arrow to skip to the (third screen) **WEIGHT SCALE CALIBRATION** screen:
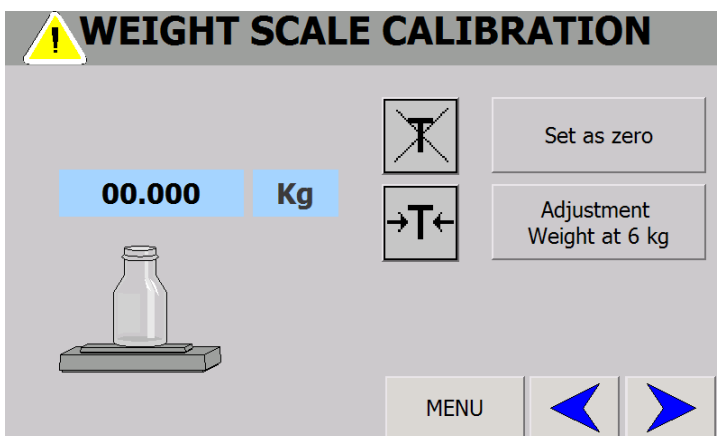
Figure 111: WEIGHT SCALE CALIBRATION Screen

2. Log on as **MANAGER** to access the calibration fields and commands.

3. Level the weight scale by adjusting the feet until bubble is centered in target circle.

4. Empty the weight scale and touch **Set as zero**.

5. Displayed weight should go to 0.0.

6. Place a reference weight of 6 Kg in middle of filtrate weight platform. Touch **Adjustment Weight at 6 kg**.

7. The displayed weight will indicated 6.0 kg.

8. Remove reference weight. The filtrate weight scale is now calibrated.

Replacing the PLC Battery and the HMI Memory Card

PLC Battery

The PLC lithium battery is located in the system's enclosure and should be replaced by a Millipore Service Technician as part of annual system maintenance.

When the Cogent® μScale TFF system is not powered up within 200 days, date and time settings may be lost and should be reset.

Memory Card

The memory card is located in the system's main cabinet and should be replaced only in case off malfunction. It should be replaced by a Millipore Service Technician.

Maintaining the Tubing

Maintenance and Inspections

The flexible tubing provided with the Cogent® µScale TFF system requires regular replacement. All tubing sections are clamped to luer fittings. These fittings cannot be removed.

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 luer fittings are properly installed and locked.

- Tubing sections and luer connections are free of visual damages, leaks and wearing.

- Tubing is not kinked.

Replacement

Note For tubing installation or removal instructions, see Installing the Tubing.

- Before installing new tubing sections, drain the system by following the instructions in Operating the System.

- Remove the used tubing from the system by unlocking the luer fittings from the flow path components (tank, manifold, flow cells and filter holder).

- Dispose of tubing in accordance with local regulations.

Maintaining the Pump Head

Maintenance and Cleaning

- No lubrication is required for the Pump Head.

- Use a mild detergent solution to wipe down the pump head.

- Do not immerse in or use excessive fluid while cleaning.

Replacement

- Before installing a new pump head, drain the system by following the instructions in Running the Drain Procedure.

- Remove the tubing from the pump head by reversing the instructions in Assembling the System Tubing.

- Remove the two mounting screws in the pump head to detach the head from the front of the Cogent® μScale TFF System.

- Dispose of the used pump head in accordance with local regulations.
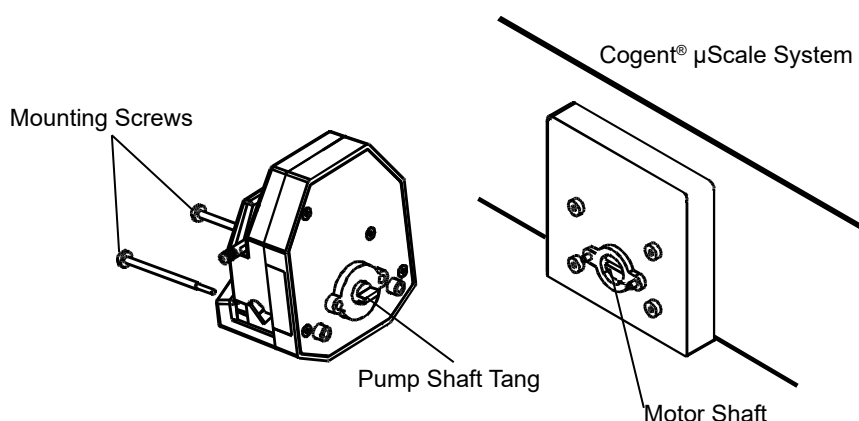
Figure 112: Feed pump Head Installation

To install the new pump head:

1. Verify that the pump shaft tang is aligned with the slot in the motor shaft. Turn the pump shaft manually to align it with the motor shaft.

2. Place the back to the enclosure; make sure that the notches on the pump head fit in the mounting holes in the enclosure.

3. Secure the pump head using the two mounting screws supplied with the pump head.

Maintaining the Tank

Maintenance and Cleaning

- Manually clean the tank using standard industry procedures.

- Inspect the tank connections, inlets and outlets regularly for leakage.

- Inspect the vent filter FH003 regularly for blockage. Wetting of the filter with product or solutions could potentially cause blockage of the vent filter. Replace the filter if it is compromised.

Replacement

NOTE
For installation or removal instructions, see Assembling the System Tubing.

- Before installing a new tank, drain the system by following the instructions in Running the Drain Procedure.

- The used tank can be removed from the system by unlocking the luer fittings at the feed outlet and retentate inlet connections and the unscrewing the thumbscrews which fix the tank to the enclosure platform.

- Dispose of the used tank subassembly in accordance with local regulations.

- For installation of a new tank subassembly, follow the instructions in Installing the Tank.

Maintaining the Temperature/ Pressure Feed Sensors

Maintenance and Cleaning

- The Temperature/Pressure sensor PT001/TT001 is installed in a flow cell. Perform the cleaning of the Temperature/Pressure sensor together with the filters and the tubing. For instructions on cleaning, see Cleaning Procedure.

- Calibrate the sensors as described in Instrument Calibration.

Replacement

- The temperature/pressure sensor subassembly consists of the temp/pressure sensor, a cable and a connector. The temp/pressure sensor is mounted in the flow cell and sealed with an O-ring. The flow cell is connected with Luer male connectors and plugged with female luer lock plugs.

- Before installing a new temperature/pressure sensor subassembly, drain the system by following the instructions in Running the Drain Procedure.

- Disconnect the male electrical connector **(B)** from the female electrical connector in the enclosure, unlocking the luer fittings at the inlet and outlet connections and the unscrew the two hexagon cap screws (which secure the flow cell to the enclosure) to remove the used subassembly.

- Dispose of the used temperature/pressure sensor subassembly in accordance with local regulations.

To install the new temp./pressure sensor subassembly:

1. Mount the flow cell **(A)** of the temperature/pressure sensor subassembly to the enclosure using the 2 M3x40 hexagon cap screws with M3 washers and spring washers. Ensure that the sensor **(C)** is facing downward.

2. Secure connector **(B)** to the enclosure.
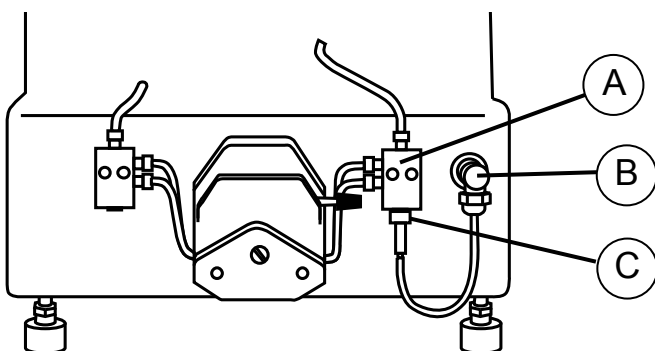
Figure 113: Temperature/Pressure flow cell installation

3. After the installation of the temperature/pressure sensor, both the temperature circuit and pressure circuit will need to be calibrated by following the calibration procedures in this chapter.

Maintaining the High Pressure Switch

The Cogent® µScale TFF System is equipped with a High Pressure switch (PSH001), which switches off the pump if the pressure of the pump P001 is higher than 86 psi (5.9 bar or 590 kPA). The pressure switch is driven by the feed pressure sensor PT001. The high pressure switch is located in the enclosure.

The setting of this high pressure switch should be verified by a Millipore Service Technician as part of annual system maintenance.

Troubleshooting

Symptom	Solution
Pump and Mixer	
Feed pump and mixer do not operate	• Ensure that the power cords are plugged into live receptacles with the appropriate voltage. • Check the fuses and replace any if required. • Ensure that the E-Stop button is released and system has been reset. • Check alarms and resolve them if necessary.
Feed pump operates but the mixer does not	• Check alarms and resolve them if necessary. • Have a qualified technician check the function of the mixer speed controller and the mixer motor.
Mixer operates but the feed pump does not	• Check alarms and resolve them if necessary. • Have a qualified technician check the function of the feed pump speed controller and the pump motor.
Pump flow is too low	• Verify that the pump head is closed. • Verify that the tubing is correctly installed. • Verify that the correct dimension of tubing is installed. • Verify that the tubing is not broken or damaged, replace if necessary • Verify that the valve HV001 on the suction side of the pump is opened. • Have a qualified technician check the functionality of the pump speed controller.
No flow, but the feed pump is operating	• Verify that the pump head is closed. • Verify that the tubing is correctly installed. • Verify that the tubing is not broken or damaged, replace if necessary.
Mixer shuts off	• Check the alarms and resolve them if necessary. • Check the mixer shutoff and delta set points.
Mixer speed is too slow	• Verify the setpoint of the mixer on the touch screen. • Have a qualified technician check the function of the mixer speed controller.

Symptom	Solution
Pressure Temperature	
Feed pressure is too low	• Verify that the pump head is closed. • Verify that the tubing is correctly installed in the pump head. • Verify the pressure sensor calibration. • Ensure that the pinch valve HV001 on the tank outlet is open. • Ensure that the pump inlet and outlet tubing is connected correctly. • Verify that the tubing is not broken, damaged or leaking, replace if necessary. • Check the filter holder for leaks.
Feed pressure is too high	• Ensure that the feed flow rate recommendations match the installed filters. • Verify the pressure sensor calibration. • Check the retentate back pressure valve. • Check the position of the valves HV003 and HV004. • Check the pinch clamps on the retentate return hose.
Process temperature is too low/high	• Check the temperature alarm set points. • Check the calibration.
Cassette Holder	
Cassette holder is leaking	• Ensure that bolts are not over/under torqued, resulting in deflection of plates. Re-torque bolts to 180–200 inch-pounds (20.3 – 22.6 Newton-meters). • Ensure that the filters' sealing surfaces are clean.
Weight Scale	
Weigh scale reads too high or too low	• With tank completely empty, press the Tare button on the weigh scale control pad to reset display to 0.00. • Varify calibration. • Perform calibration procedure. • Call a technician to check the weigh scale function.

Symptom	Solution
Network Connection	
There is no communication between the system and the PC.	• Review and confirm network setup in <u>Advanced System Setup: Settings for Data File Transfer</u>. • Verify that the PC networking card is capable of 100 mbps. • Ensure that the ethernet communications cable meets the recommendations set forth in <u>Advanced System Setup: Settings for Data File Transfer</u>. • Ensure that PC is not connected to another network (including a wireless connection). • Contact a network administrator for help.
Alarms	
Feed Pressure is too high TMP (Trans-Membrane Pressure) is too high Delta P is too high	1. Determine the cause of the high pressure and correct problem. Some likely causes are fully closed valves, fouled membrane, kinked hose or debris in a line. 2. Relieve pressure by opening all the valves. 3. Ensure the cassette is not faulty and is installed properly in the holder (see Pellicon® cassette manual). 4. Check pump speeds and valve positions, then restart process.

Alarm Numbers

Alarm Number	Parameter	Description	Actions
41	PI001 PSH	Feed pressure is above pressure switch set point.	Check if the feed flow rate matches the filter recommendations. Verify the pressure sensor calibration. Check the retentate back pressure valve. Check the position of the valve HV003 and HV004. Check the pinch clamps on retentate return hose.
45	PI001 sensor disconnected	Feed pressure sensor is disconnected	Check if the feed temperature/pressure sensor is connected correctly. If the sensor is connected correctly, have a qualified technician check the functionality of the sensor.
46	PI002 sensor disconnected	Retentate pressure sensor is disconnected	Check if the retentate pressure sensor is connected correctly. If the sensor is connected correctly, have a qualified technician check the functionality of the sensor.
48	TI001 sensor disconnected	Temperature sensor is disconnected	Check if the feed temperature/pressure sensor connector is plugged in securely. If the sensor is connected correctly, have a qualified technician check the functionality of the sensor.
50	WI101 sensor disconnected	Filtrate weight scale is disconnected	Ensure that the Filtrate weight scale connector is plugged in. Ensure that the filtrate weight scale is configured correctly in the System software, see Setting Up the Weight Scale.
43	Pump defect	Feed pump defect (run command and pump not running)	Ensure that the E-Stop button is released and system has been reset. Have a qualified technician check the function of the pump.
44	Mixer defect	Mixer defect	Ensure that the E-Stop button is released and system has been reset. Check the fuses and replace any that are blown. Have a qualified technician check the function of the pump.
42	Emergency stop	Emergency stop pushed	Ensure that the E-Stop button is released and the system has been reset.
53	Memory limit reached	Space used by data logging file is above specified set point.	Transfer the files to from the Touch Screen memory to a PC, see Setting up the Memory Card.

Specifications

Hardware System Parameters

Parameter	Value/Range
Footprint (nominal)	Width: 41 cm (16 in.) Depth: 48 cm (19 in.)
Height (nominal)	62 cm (25 in.)
Weight (nominal)	Without filter holder & tank: • Approximately 24 kg (53 lbs) With filter holder & tank: • Approximately 30 kg (66 lbs)
Membrane area	Pellicon® 3 Cassettes: 88 to 264 cm^2 Pellicon® XL Cassettes: 50 to 150 cm^2
Minimum working volume	16 mL (excluding filters)
Starting volume	Maximum tank volume of 1 liter
Hold up volume	< 3 mL (excluding filters)
Process temperature range	4 º to 50 ºC (39-122 °F)
Maximum feed flowrate	330 mL/min
Minimum feed flowrate	17 mL/min
Maximum operating pressure	5.5 bar g (80 psi)
Maximum system pressure	5.9 bar g (86 psi) before pump shut-off
Materials of Construction	Wetted Parts: • 316L stainless steel (Filter holder) • Sta-Pure® (white) Pump Tubing • Silicone (translucent) Tubing • Polyphenylsulfone (Flow cells) • Polypropylene (Luer fittings) • PTFE (Stir bar) • Titanium (Pressure Sensors) • Silicone (O-rings) • Polycarbonate (Vent valve)

Power Requirements

Parameter	Value/Range
Supply Voltage: Europe, China Japan North America	240 VAC, 50Hz, 1-phase 100 VAC, 50 or 60Hz, 1-phase 120 VAC, 60Hz, 1-phase
Amperage (maximum): Europe Japan North America	0.8 A 1.6 A 1.6 A
Interrupt protection	10 A circuit breaker

Back-up Battery

Parameter	Value/Range
Type	Lithium < 0.6 g
Support time	A fully charged new battery supports the PLC retentive memory for 200 days.
Warranty	1 year
Stored data	Date & Time

Environmental Performance

Parameter	Value/Range
Temperature Limits Operational (ambient)	4 to 25 ºC (39 to 77 °F) non-condensing environment
Storage	-10 º to 55 ºC (14 to 131 °F) non-condensing environment
Maximum Altitude	2000 meters
Pollution degree	2

Instrument Service Ranges

Tag no.	Instrumentation	Service Range	Service Range
PT001 PT002	Feed pressure Retentate pressure	0.0 to 6.5 barg or 0 to 650 kPa or 0.0 to 95.0 psig	± 0.2 barg ± 25 kPa ± 3 psig
TT001	Feed temperature	0 to 55 °C 32 to 131 °F	± 3 °C ± 37 °F
WE101	Filtrate Weight Scale	0.0 to 6.0 kg	± 10 g

Parts and Accessories

Catalogue Number	Description
CUP0300	Cogent® µScale TFF system 100 -230VAC, 50/60Hz
CUP0301	**Tank kit for Cogent® µScale, includes:** Tank Tank cover Cover O-ring Vent filter Vent valve Stir bar 3x luer female end caps 1x Luer male end cap 3x Luer nut 2x Thumbscrews
CUP0302	**Cogent® µScale Tubing Assembly, includes:** FLX001 with fittings and pinch valve FLX002 with fittings FLX003 with fittings FLX004 with fittings FLX005 with fittings FLX006 with fittings and 2x pinch valves FLX101 with fittings FLX102 with fittings and pinch valve Spare male luer fittings (20 each) Spare O-rings (10 each) Spare male luer adapters (4 each)
CUP0303	Pump Head
CUP0304	PT001/TT001 with gland, M12 male connector, O-ring for sealing installed into the flow cell assembled with Luer fittings and Luer caps.
CUP0305	PT002 with gland, M12 male connector, O-ring for sealing installed into the flow cell assembled with Luer fittings and Luer caps.
CUP0306	Manifold assembled with Luer fittings and luer caps Cogent® µScale TFF system Manifold kit, includes Feed pump inlet manifold assembled with Luer fittings and luer caps, Retentate Pinch valve
CUP0307	**Set of fuses for Main switch - Cogent® µScale TFF system, includes:** 2x fuses for 100-110 VAC 2x fuses for 230 VAC
CUP0308	Weigh Scale with cable and M12 connector
CUP0309	Cogent® µScale System User Manual

Catalogue Number	Description
CUP0310	**Cogent® µScale System Annual Maintenance Kit, includes:** 1x PLC Battery 12x Pressure/Temperature Sensor O-rings
CUP0311	**Cogent® µScale System Pump Tubing Assembly, includes:** FLX002 with fittings FLX003 with fittings
CUP0312A	Cogent® MICROSCALE, HMI, V1.10
CUP0312B	Cogent® MICROSCALE, HMI, V2.00
XX42PMICRO	Pellicon® holder assembly (includes the luer fittings, torque wrench and user manual)
CMP0415	PLC Battery
SLFG025LS	Vent Filters (50/pk)

Holder Parts

Catalogue Number	Description
XX42MT073	4 washers 3/8 & 4 HEX silicone Bronze nuts 3/8-16
XX42PMCLI	SST luer male connector (set of 4)
XX42PMCLP	Plastic Male luer with rotating lock ring (set of 100)
XX42PMISR	Socket
XX42PMITW	Torque wrench
XX42PMSP	Stainless Steel spacers (set of 4)
XX42PMTIE	kits for short tie rods for XX42PMICRO (set of 2)

Holder Parts

We provide information and advice to our customers on application technologies and regulatory matters to the best of our knowledge and ability, but without obligation or liability. Existing laws and regulations are to be observed in all cases by our customers. This also applies in respect to any rights of third parties. Our information and advice do not relieve our customers of their own responsibility for checking the suitability of our products for the envisaged purpose.

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