AmeriWater®
The Water Purification Specialists

Operation & Maintenance Manual

MediQA

Reverse Osmosis System

MODELS MSP AND MDP

3345 Stop 8 Rd, Dayton, OH 45414 | 800 535 5585 | www.ameriwater.com
Manufactured With Pride in the USA

98-0157 Rev Q

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1 CONTACT DETAILS

We trust the unit meets all your expectations but in the event of any problems please do not hesitate to contact us as follows:

For all spares and consumables contact:

AmeriWater
3345 Stop 8 Rd
Dayton, Ohio 45414
Tel No. 800-535-5585

(Or your local authorized **AmeriWater** dealer)

Useful Telephone Nos.

Tel No.....Contact Name:.....

Tel No.....Contact Name:.....

2 INTRODUCTION AND SAFETY INFORMATION

2.1 Indications for Use

The AmeriWater MediQA Reverse Osmosis System is one component of a water treatment system designed to pre-treat and purify potable water using reverse osmosis for making dialysate for hemodialysis applications. The device is intended to be a component in a complete water purification system, and is not a complete water treatment system. It must be preceded by pre-treatment devices, and may need to be followed by post-treatment devices as well to meet current AAMI and Federal (U.S.) standards. The AmeriWater MediQA is intended for use in water rooms in a hospital, clinic, or dialysis center. The device includes an integrated heat sanitization process.

The MediQA is available in both single pass (MSP) and double pass (MDP) models that supply from 5.5 to 12 gallons per minute (gpm) of product water. Model MSP2 is a single pass, dual-membrane RO that produces up to 9 gpm of product water. Model MSP3 is a single pass, 3-membrane RO that produces up to 12 gpm of product water. Model MSP3HF is a single pass, 3-membrane RO that produces up to 16 gpm of product water. Model MDP2 is a double pass, 3-membrane RO that produces up to 5.5 gpm of product water. Model MDP4 is a double pass, 5-membrane RO that produces up to 10 gpm of product water.

The MediQA is a Medical Device; as such modifications to the device are not permitted. Modifications to the machine by anyone other than AmeriWater personnel will invalidate the marketing clearance for the device.

WARNING: **This Reverse Osmosis System (RO) contains a preservative solution to prevent microbiological growth and freezing. Discard all product water for at least two hours of operation before placing the RO in service.**

CAUTION: ***When used as a medical device, Federal law restricts this device to sale by or on the order of a physician per 21 CFR 801.109(b)(1)!***

2.2 Controls

The processes of the **MediQA** units are controlled automatically. The **MediQA** is operated via a touch screen display panel which also displays system performance data. Process water is constantly monitored for:

Water quality (µS/cm)	Temperature (°F)
Flowrate (gpm)	Pressure (psi)

These parameters can be viewed via the touch screen display. A data logger is provided and the data logger information can be downloaded via a memory stick to a PC.

2.3 Alarms and Maintenance

The MediQA incorporates monitoring devices and will report alarms and warnings via the touch screen display. These indicate malfunctions or that preventative action is required. This ensures the

unit is maintained and operated correctly. Reference to these alarms and appropriate actions can be found in Section 7.

2.4 Caution and Warning Statements

These instructions provide information on safe working practices. These should be adopted to ensure safe and continuing operation of the equipment. The manual should be read and understood before the equipment is placed into service.

AmeriWater reserves the right to make engineering refinements to the equipment that may not be described herein. Any questions that cannot be answered specifically by these instructions should be addressed to AmeriWater or their agents for a response.

AmeriWater will not accept any responsibility for any equipment supplied or the actions of such equipment or associated system when the customer has made a modification that is considered by AmeriWater to compromise the integrity of the original design philosophy.

If the unit's performance becomes impaired and any remedial work appears to be outside the scope of this manual, then seek advice from **AmeriWater Technical Support** at telephone number **1-800-535-5585.** Be prepared to provide the unit's serial number.

The unit must not be dismantled unless carried out by AmeriWater personnel or authorized trained personnel.

Under no circumstances should the unit be connected to the electrical supply with the front control panel open.

Always refer to the Material Safety Data Sheets before handling any of the recommended cleaning chemicals.

There is the potential for sensitive equipment/devices located in close proximity to the ***MediQA*** unit to be affected by electromagnetic or other interference generated from other units. If affected by interference the relevant equipment/device should be relocated.

The use of mobile phones in close proximity to the ***MediQA*** unit should be avoided where possible.

The ***MediQA*** unit should only be pushed via the frame when the casters are down. Pushing on the plumbing, the control panel, or the pump could result in damage to the unit.

The **'Caution'** symbol is used throughout this manual to highlight where particular care must be taken to ensure the safety of the operator, and the protection provided by the equipment, is not impaired.

2.5 General Safety Information

Explanation of symbols and references

DANGER: **This symbol refers to any immediate dangers that may threaten the safety and life of persons. Failure to observe these notices will have severe consequences on health and safety, including life-threatening injuries.**

WARNING: **This symbol refers to a possible danger that threatens the safety and life of persons.**

CAUTION: **This symbol refers to a possibly hazardous situation. Failure to observe these references may result in minor injuries and/or damage to property.**

NOTE: This symbol points out important information for working with the system in a proper manner.

This symbol indicates possible hot surface. Touching parts of the machine showing this label should be avoided. Failure to observe these references may result in malfunctions in the system or impact on the environment.

Additional safety requirements
Country-specific requirements standards and regulations must be observed.

Usage in accordance with intended purpose.
The ***MediQA*** units are used to purify water for the purpose of feeding medical devices (dialysis machines). The water produced must not be used for drinking as it may be harmful to the body or for any other purpose not described in this manual. The units must only be operated in accordance with this operating manual**.** The units must not be operated unless in proper working order. Any malfunctions must be rectified immediately.

- Indoor use only.
- Not to be used in an explosive atmosphere.
- Refer to environmental conditions Section 3.3.

Operating staff
Only persons who have read and understand these Operation Instructions should be permitted to operate the unit. When operating the unit, it is particularly important to observe the safety information strictly.

Mechanical force
Some parts of the system could be under pressure of up to 300 psi. Always make sure the pressure has dispersed from the unit before repairs and maintenance tasks are carried out.

Bringing the system to a stop in the event of an emergency

- Depress the Emergency stop button
- Turn off the electrical supply and isolate.
- Shut off the water supply.

After remedying the fault:

- Open the water supply.
- Turn on the electrical supply.
- Reset to emergency stop button
- Clear on main screen of touch panel
- Restart/operate the unit via the main touch screen panel.

Safety information for maintenance tasks

The operator must take care to ensure that authorized and qualified professionals who have been sufficiently trained for the task at hand by thoroughly studying the Operating Instructions perform all maintenance, inspection and assembly tasks. Professionally trained staff must properly perform these tasks.

The system must be shut down and protected from being placed in operation again unintentionally before all repair and maintenance tasks have been completed. It is essential to observe the procedure described in these Operating Instructions for shutting down the system.

Before beginning tasks on the electrical equipment of the system, a check must confirm that power has been disconnected from the corresponding section of the system. In addition, the system must be secured to prevent it from being turned on again unintentionally. Follow proper Lock Out Tag Out (LOTO) procedures.

Disposing of system parts and operating materials

When they need to be discarded, consumables must be disposed of according to local requirements.

Unauthorized conversion and manufacturing replacement parts

Conversion or modification of the system is only permitted with the approval of the manufacturer. The same applies to making changes in the programming for the control system. Original replacement parts and accessories authorized by the manufacturer enhance safety. Use of other parts will void the warranty.

Warranty claims and liability

The buyer has a one-year warranty on all equipment and parts, excluding non-durable components (e.g., filter cartridges, reverse osmosis membranes, filter media, consumable chemicals, etc.); provided that the system is not subject to abuse, misuse, alteration, neglect, freezing, accident or negligence; and provided further that the system is not damaged as the result of any unusual force of nature such as, but not limited to, flood, hurricane, tornado, or earthquake.

The warranty covers the replacement of equipment and/or parts only. The warranty does not cover labor charges or travel expenses resulting from the service of equipment. The manufacturer is excused if failure to perform its warranty obligations is the result of strikes, government regulation, materials shortages, or other circumstances beyond its control.

To obtain warranty service, notice must be given to the manufacturer within 30 days of the discovery of the defect.

There are no warranties on the AmeriWater system beyond those specifically described above. All implied warranties, including any implied warranty of merchantability or of fitness for a particular purpose are disclaimed to the extent they might extend beyond the above periods. The sole obligation of the manufacturer under these warranties is to replace or repair the component or part which proves to be defective within the specified time period, and the manufacturer is not liable for consequential or incidental damages. No dealer, agent, representative, or other person is authorized to extend or expand the warranties expressly described above.

Some states do not allow limitations on how long an implied warranty lasts or exclusions or limitations of incidental or consequential damage, so the limitations and exclusions in the warranty may not apply to you. This warranty gives you specific legal rights, and you may also have other rights, which vary from state to state.

Manufacturer:

AmeriWater
3345 Stop 8 Road
Dayton, OH 45414
United States of America

Telephone: 1-800-535-5585
Fax: 1-937-461-1988

3 STANDARD FEATURES

3.1 MediQA Standard Features

- Flow rate, temperature, pressure and water quality monitoring.
- System status alarms.
- Semi - automated chemical cleaning
- Touch screen user interface.
- Heat sanitization feature

3.2 Electrical Specifications / Connections

3.2.1 Mains Supply

See supply specification in section 3.5.

DANGER: The earth leakage current of this equipment can exceed **3.5mA (<5mA).** Therefore, it is essential that the earth connection is made before the supply is established.

A warning label on the equipment *states:*

DANGER!
DISCONNECT THE MAINS
SUPPLY BEFORE SERVICE

3.2.2 USB Connection Details

Standard USB port suitable for FAT16 formatted USB drive, 2GB max.

3.3 Environmental

Applicable to all product variants

Parameter	Value
Operating temperature range.	41-90°F (5 to 32°C)
Relative humidity.	30 to 80%
Maximum altitude.	6562 ft
Transport and storage temperature (limited by RO membranes).	41-104°F (5 to 40°C)
RFI/EMI radiation	The EMC environment must be within the limits to which the RO has been tested. Care must be taken not to have sources of RFI/EMI, which are liable to cause electromagnetic disturbance of the unit. If the RO is affected by such disturbance, the source must be suppressed or moved.

3.4 Standards Applied

Applicable to all product variants

Type	Standard
EMC	BS EN 61326:1998/IEC 61326-1 :1997; Class A Electrical equipment, for measurement, control and laboratory use EMC requirements. BSEN 61000-3-2:1995, Incorporating Amendments 1 & 2. Mains Harmonic Emissions. BS EN 61000-3-2:1995, Incorporating Amendment 1 Mains Flicker Emissions.
LVD	BS EN 61010-1:2001, Incorporating Amendment 1 Safety requirements for electrical equipment, for measurement control and laboratory use.
MDD	BS EN ISO 13485:2003 Medical Devices Quality Management System

3.5 Specification Data

		Single Pass MediQA			Dual Pass MediQA	
Catalog Number		00MSP2-230	00MSP3-230	00MSP3HF-230	00MDP2-230	00MDP4-230
Performance						
Permeate flow rate @ 77°F**	gpm	9.0	12.0	16.0	5.5	10.0
Dimensions						
Height	Inches	73 5/8				73 5/8
Width	Inches	37				37
Depth	Inches	62 9/16				74 5/16
Weights						
Working	lbs	1310	1375	1395	1660	2285
Shipping*	lbs	1050	1100	1120	1370	1970
Services-Feed Water						
Pressure	30/80 psi					
Free Chlorine	Following activated carbon, total chlorine level must be < 0.1 ppm					
Temperature	For best performance feed water temperature should be 55°F to 90°F					
TDS	Maximum feed water total dissolved solids 1000 ppm					
Total Hardness	Softened feed water with a total hardness of < 4 ppm as $CaCO_3$					
S.D.I.	Silt density index following final 5 micron filtration should be < 5					
Fluoride	< 1.2 ppm for “Hi Recovery Mode”					
Services - Power						
Supply	V/ph/Hz	All units require 3-phase supply 208/230V,with Neutral, 60 Hz				
Max Current Draw	Amps	44	44	44	44	59

* Un-crated weight.

** Variations in feed water temperature can affect output by up to ±3% per degree Fahrenheit.

3.6 Performance Parameters

MediQA Performance Parameters					
Model	Single Pass			Dual Pass	
Model Number	**MSP2**	**MSP3**	**MSP3HF**	**MDP2**	**MDP4**
Flow Rates					
Product Flow Specification (GPM)	9	12	16	6	10
Product Flow Range (GPM)	7.2-10.8	9.6-14.4	12.8-19.2	4.8-7.2	8-12
Stage 1 Concentrate Flow (GPM)	Nominal: 6.5 3.8-9	Nominal: 6.5 5-12	Nominal: 6.5 5-12	Nominal: 6.5 3.8-9	Nominal: 6.5 5-12
Stage 2 Concentrate Flow (GPM)	N/A	N/A	N/A	1-3	1-3
Stage 1 Recovery (%)	Nominal: 65 50-70	Nominal: 65 50-70	Nominal: 65 50-70	Nominal: 65 50-70	Nominal: 65 50-70
Stage 2 Recovery (%)	N/A	N/A	N/A	Nominal: 80 75-85	Nominal: 80 75-85
Pressure					
Stage 1 Pump Pressure (PSI)	140-180			140-180	
Stage 2 Pump Pressure (PSI)	N/A			140-180	
Feed Water Pressure (PSI)	30-80			30-80	
Interstage Pressure [Bar] (PSI)	N/A			2-5 (30-70)	
Temperature					
Feed Water Temperatures (F)*	55-95				
Conductivity					
Output Conductivity**	>94% Rejection of Incoming Water Conductivity				

- Based on Standard Recovery Mode
- Each MediQA should perform within these parameters. Pressures may vary depending on the age and condition of the membrane.
- The DOW heat disinfection membranes are manufactured with a ±20% tolerance for flow rate. This is factored into the Product Flow Range category.
- *The ideal Feed water temperature is 77 degrees Fahrenheit. This will be the optimal operation temperature of the system.
- **Output conductivity is based on the quality of the feed water; the membranes should reject greater than 94% of the incoming conductivity.

4 OPERATIONAL OVERVIEW

The MediQA is available as a single pass or dual pass reverse osmosis (RO) unit to be used for purification of potable water for renal dialysis applications.

Potable water enters the MediQA through an inlet solenoid valve filling the feed water tank. A high pressure pump delivers water from the feed water tank through the 1st stage RO module set (may comprise of two or more modules), with each module containing a high performance membrane.

The water entering the RO module is split into two flows. The water which passes through the RO module (membrane) is known as permeate and is purified water. The rest of the water, rejected by the membrane, passes out of the RO module as a second flow stream. The rejected water contains an increased level of dissolved salts and is known as concentrate. A portion of the concentrate will be recovered and directed back into the tank for re-processing.

Hi Recovery Mode allows periods of time where no water is going to drain, which yields a higher percentage of reject water to be recovered. Standard Operation has a consistent recovery rate, the default target recovery percentage is 65%.

In the dual pass system, permeate water from the 1st stage is pressurized by a second high pressure pump and fed to the second stage RO module set (may comprise of one or more RO modules). A portion of the concentrate from the 1st stage RO module set is discharged to drain while the balance is recirculated to the tank. Concentrate from the 2nd stage RO module set is returned to the feed water tank for reprocessing.

Permeate from the 2nd stage RO module set is fed via a manifold to the distribution loop. Permeate returning from the loop is fed back into the feed tank.

The feed and permeate water flows are monitored at various points in the process to verify temperature, conductivity, and flow.

The dual pass system has an Emergency Single Pass Mode (ESPM). In the event of a membrane or pump failure, the dual pass will be able to bypass the failed stage to continue operation. Either stage will be able to send permeate water to the loop.

This data is displayed on a touch screen panel to give instant feedback of water quality and process activity.

4.1 MediQA Basic Operation

When TIMER or CONTINUOUS is activated by touch buttons on the touch screen display the MediQA initially performs an *AutoFlush* followed by an *AutoRinse* routine, once completed purified water will be available (supplied through connection pipe work) to the distribution loop or attached medical device. This feature of the system prevents inadvertent supply of poor water quality to the loop or attached device (typically dialysis machines). System operation can be switched OFF by pressing the OFF button on the touch screen display.

Purification of the incoming softened water supply is achieved by employing reverse osmosis membranes technology.

The MediQA can be set to “POWER ON STANDBY” for occasions when there are long periods (typically days during shut down periods) without use. In standby mode the MediQA is factory set to perform 10 minutes of operation in every 2 hours, these values are adjustable. This enables water to be circulated through the MediQA and distribution loop, in order to maintain water quality.

The MediQA has two modes of operation, TIMER and CONTINUOUS. If TIMER is selected an internal time clock activates operation and heat disinfects, determined by the timer clock settings. When not scheduled to operate, the device will turn on every 2 hours for 10 minutes of operation to maintain the quality of the water in the distribution loop. If CONTINUOUS is selected the MediQA will supply water to the attached distribution loop / medical devices on a 24/7 basis.

MediQA units have the capability to run in HI RECOVERY MODE, which uses up to 40% less water than STANDARD RECOVERY MODE. HI RECOVERY MODE is the default setting. See Section 6.4.1 for navigation instructions.

The MediQA also features routines to enable chemical cleaning of its RO membranes (but not the connected distribution loop).

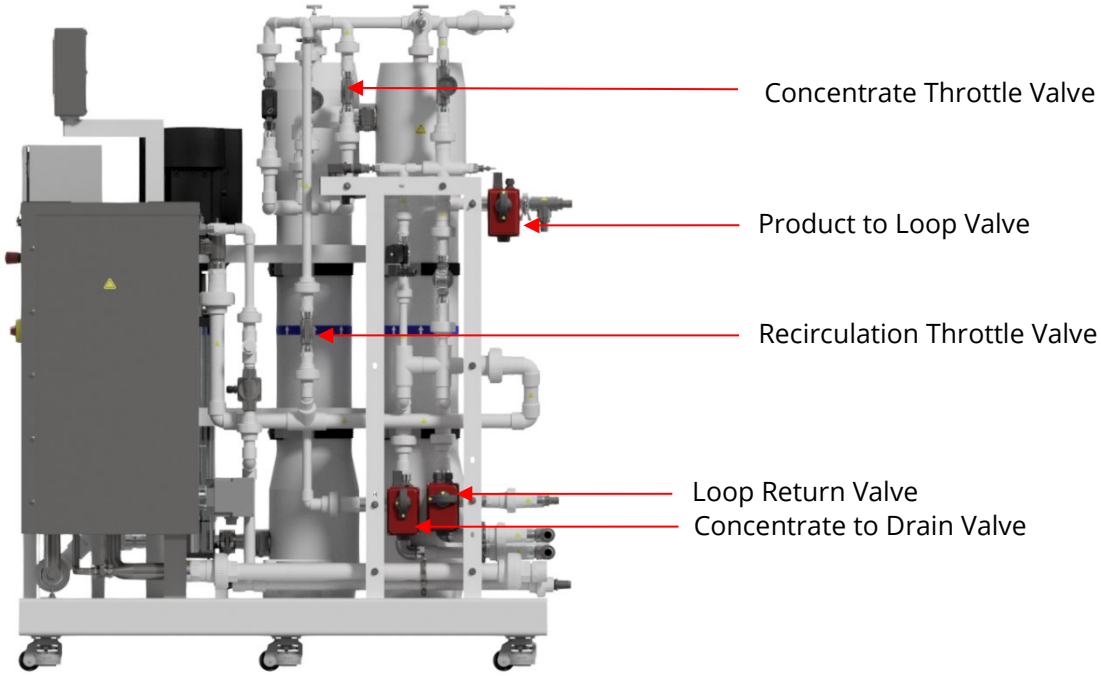
In addition to the above, the MediQA incorporates process elements to enable heat disinfection of the reverse osmosis membranes and its pipe work. Heat disinfection can be activated manually using the RO Heat Disinfection button on the touch screen display or automatically if timer clock settings are implemented.

Regular cleaning and sanitization of the unit is recommended to maximize the life of the RO membranes and ensure high performance.

Once CHEMICAL CLEAN has been selected the process is semi-automatic and requires only the provision of specified cleaning. The touch screen display will give prompts at appropriate stages of the routine.

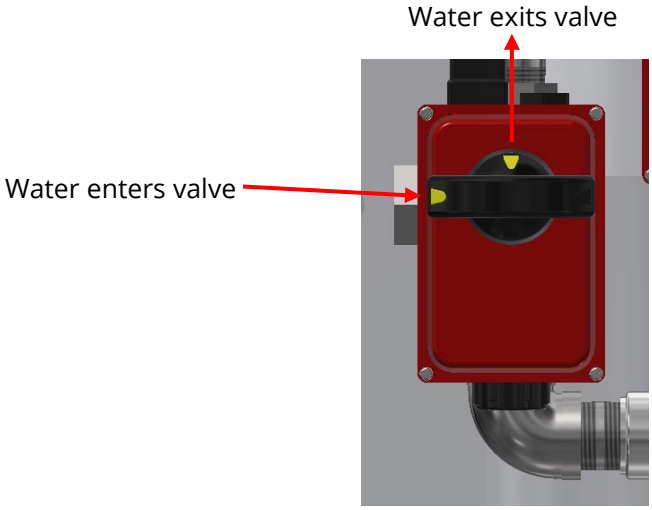
Frequency of heat disinfection will depend upon usage and application demands. Monitoring of the system for bacterial content should be conducted at regular intervals to determine the optimum frequency for heat disinfection. Recommended weekly disinfections and monthly monitoring of bacteria and endotoxins.

4.2 Sequence of Operations



4.2.1 Introduction

There are two modes of operation, Hi Recovery Mode and Standard Recovery Mode. Hi Recovery Mode is the default and can be toggled to Standard Recovery Mode on the RO Supply screen (see Section 6.4.1). The MediQA system uses a series of automated 2 and 3-way stainless steel valves to direct the water flow through the unit during each of the various stages of operation. These valves are marked with yellow indicators that represent the openings of the valve. The yellow markers are used as a visual indicator of the position of the ball valve as it relates to the flow of the water through the valve. The following pictures illustrate the valves during operation.



4.2.2 Hi Recovery Mode

This mode of operation is designed to limit water usage while still meeting water quality standards. Hi Recovery Mode uses up to 40% less water than Standard Recovery Mode. The mode is comprised of Flush, Rinse, and Supply.

FLUSH

Before the MediQA provides water to the loop for dialysis use, the system goes through a flush. This isolates the water from the loop and dumps all of the water down the drain for a preset time. The following figures show the valve positioning during this process. Positioning of the valves is controlled via the PLC.

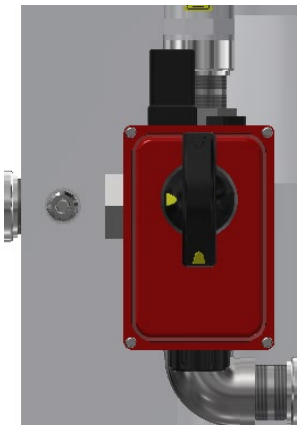


Figure 1
Concentrate to Drain Valve

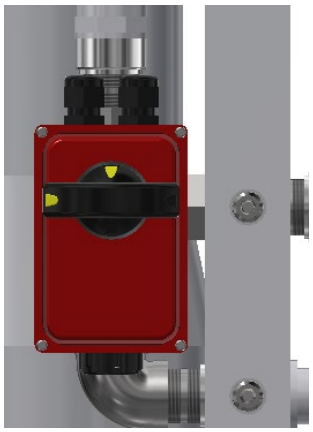


Figure 2
Loop Return Valve

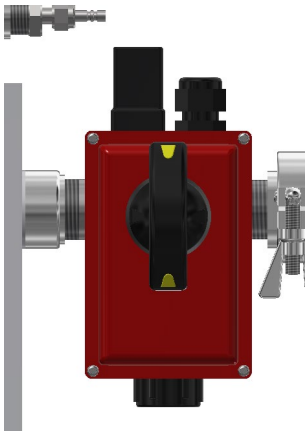


Figure 3
Product to Loop Valve

RINSE

After the flush cycle is completed, the RO will go into a rinse. During Rinse the unit continues to run the pump(s) at a high pressure. Water is flushed down the drain similar to the flush of the membranes. The position of the valves during this process is the same as Figure 1 through Figure 3. The Rinse Mode continues until the unit meets a predetermined quality level or until the Rinse cycle runs for the max time. If it reaches the max time and has not rinsed down to quality level, an alarm will be triggered. If it reaches quality, it moves to the Supply Mode.

SUPPLY

After Flush and Rinse cycles are completed, the MediQA will go into Supply. Supply is when the RO begins providing water to the loop for use with the Dialysis machines. This is the process the RO will be in for a majority of its usage. During the supply mode, valve position is critical as product flow rate is directly dependent on the valves. Water returning from the loop is redirected to the MediQA tank via the loop return valve shown in Figure 5. The following figures show the expected position of these valves during normal operation and are instructed to be fully open via the PLC. This mode is split into two parts to conserve water, reject to tank and reject to drain. During this period of operation, the reject water will be sent to drain at a target of 65% recovery.

Reject to Tank:
Concentrate and permeate water will recirculate to the feed water break tank until the permeate quality reaches the HI RECOVERY QUALITY HIGH LIMIT or BREAK TANK TEMPERATURE HIGH LIMIT set-points. When these set-points are reached the reject to drain period will begin and the RO will dump the reject water to drain. During times of low water usage in the RO distribution loop, the feed water quality in the break tank will remain close to incoming water quality. See Section 6.4.1 for more information.

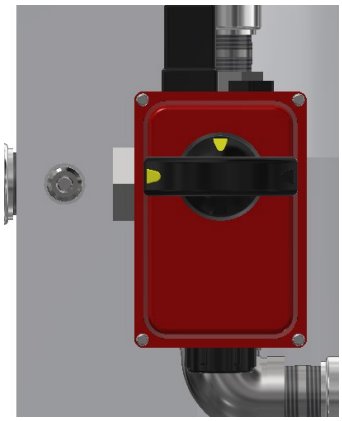


Figure 4
Concentrate to Drain Valve

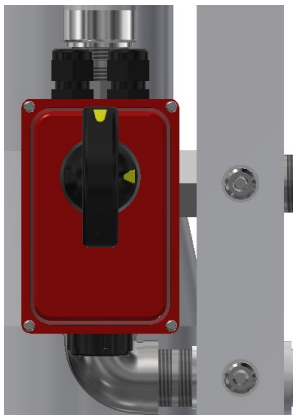


Figure 5
Loop Return Valve

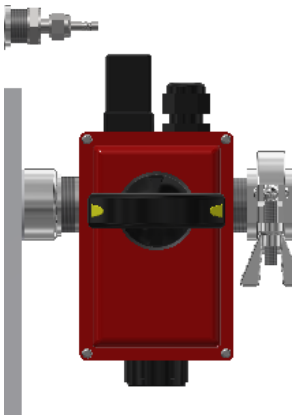


Figure 6
Product to Loop Valve

Reject to Drain:
Reject water is dumped to the drain until the permeate quality reaches the HI RECOVERY QUALITY LOW LIMIT or BREAK TANK TEMPERATURE LOW LIMIT set-point. Valve position will remain the same for Loop Return and Product to Loop Valves. The Concentrate to Drain Valve will rotate as shown in Figure 7.

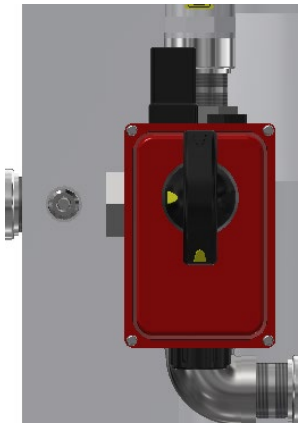


Figure 7
Concentrate to Drain Valve

4.2.3 Standard Recovery Mode

Standard Recovery Mode is also comprised of Flush, Rinse, and Supply mode. Flush and Rinse operations remain the same, see Figure 1 through Figure 3. However, when operating in Standard Recovery Mode, there is no Reject to Tank step of Supply. There will be more water usage due to less water being recovered during this period. See Figure 4 through Figure 6 for valve positioning.

4.2.4 Cleaning Procedure

CHEMICAL CLEAN

The MediQA is equipped with the ability to perform a chemical cleaning of itself once chemicals have been added in the tank. This consists of 4 main steps, **circulation**, **tank drain**, **high pressure rinse**, and **low pressure rinse**. Valve positions are shown in the following figures.

Recirculation:

During the recirculation phase of the chemical clean process, the valves redirect all of the water back into the MediQA tank. The pump(s) turn on at a low speed to keep the pressure in the system below the alarm set-point of the pressure switch.

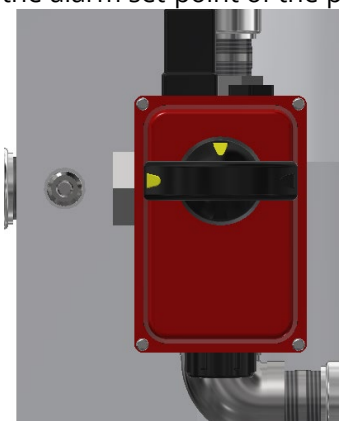


Figure 8
Concentrate to Drain Valve

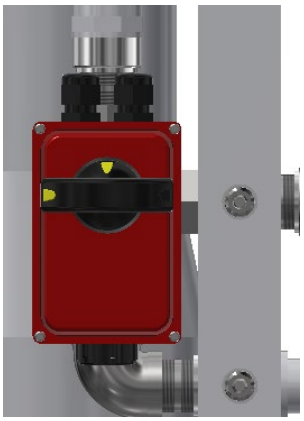


Figure 9
Loop Return Valve

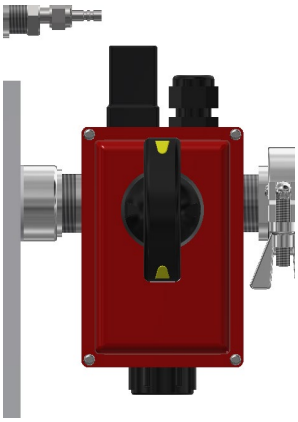


Figure 10
Product to Loop Valve

Tank Drain, High/ Low Pressure Rinse:

During the Tank Drain, High Pressure Rinse, and Low Pressure Rinse, the concentrate drain valve shown in Figure 11 opens allowing all of the residual chemicals in the system to go to the drain. The tank will drain completely and then refill before the rinse processes occur. During these 3 phases all other valves remain in the same position as the recirculation procedure.

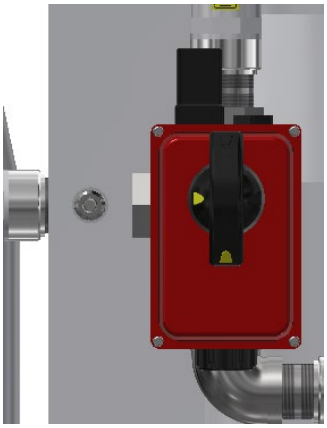


Figure 11
Concentrate to Drain Valve

4.2.5 Disinfection Procedure

HEAT DISINFECTION

The MediQA is capable of a heat disinfection of its plumbing and membranes. During the heat disinfection process the RO circulates water within itself at 185˚F for 30 minutes (adjustable). The valves on the unit are programmed to act in similar fashion to the valves during a chemical disinfection of the unit. Once the hold period of the unit is met, the unit undergoes a cool down process where it calls for fresh cold water and dumps the hot water in the unit down the drain. The following pictures will show the valve positioning during preheat, hold, and cool down phases.

Preheat/Hold Period:

During the pre-heat and hold period, the RO disables its ability to call for water from its water supply. The water in the unit is circulated throughout the plumbing and membranes until it reaches 185 ˚F. Once the temperature is reached, the water is circulated for 30 minutes (adjustable). The valve positioning remains the same for both phases of the heat disinfection.

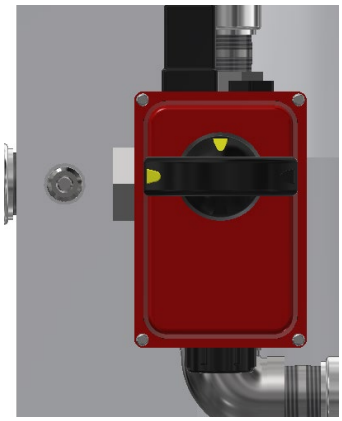


Figure 12
Concentrate to Drain Valve

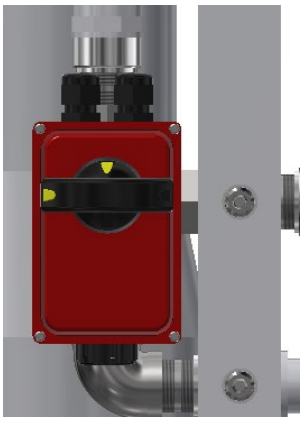


Figure 13
Loop Return Valve

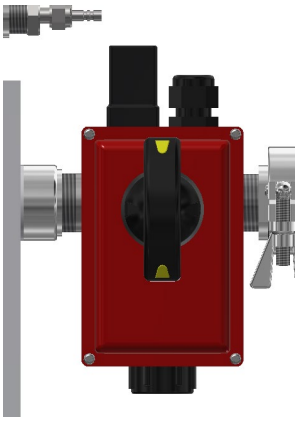


Figure 14
Product to Loop Valve

Cool Down:

During cool down of the MediQA after the heat disinfection, the concentrate to drain valve opens periodically to allow the hot water in the RO to go to the drain. This allows cool water to refill the tank, gradually cooling the unit down to its operational temperature. All other valves remain in the same position throughout the entire heat disinfect procedure.

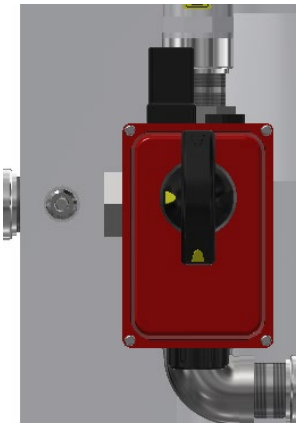


Figure 15
Concentrate to Drain Valve

4.2.6 Heatsan Control

The Heatsan is capable of turning the MediQA on when requesting water and locking the unit out when hot water is in the loop.

HEATSAN FILL

The MediQA can be called on to provide water to the Heatsan. Be sure that MINT cable is connected between MediQA and Heatsan for fill procedure to function.

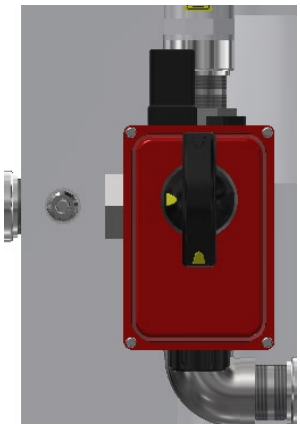


Figure 16
Concentrate to Drain Valve

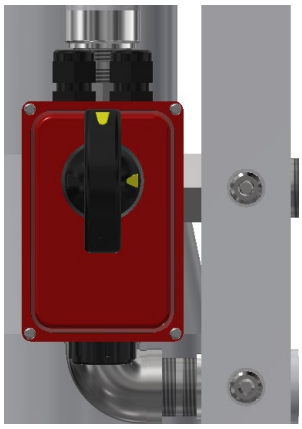


Figure 17
Loop Return Valve

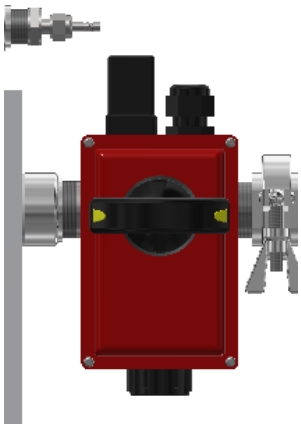


Figure 18
Product to Loop Valve

LOOP HEATSAN

During the Loop Heatsan mode, the Heatsan prevents the MediQA from operating to make sure the loop can properly achieve the disinfection temperature.

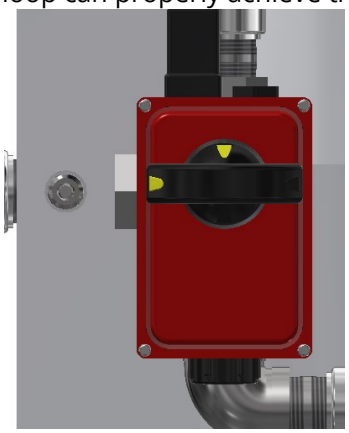


Figure 19
Concentrate to Drain Valve

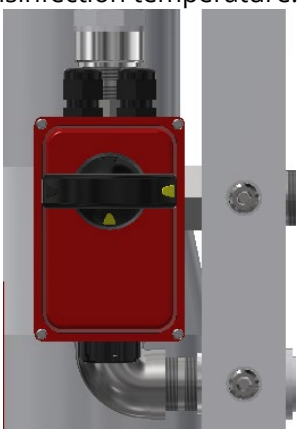


Figure 20
Loop Return Valve

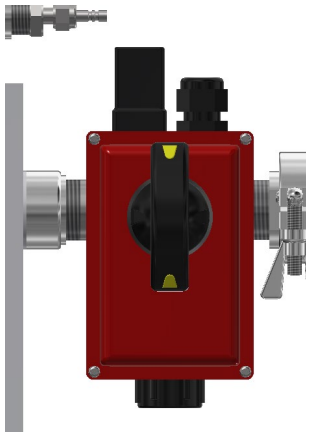


Figure 21
Product to Loop Valve

LOOP HEATSAN (COOLDOWN AFTER HEAT DISENFECTION OF THE LOOP)

When the Heatsan unit performs a disinfection of the loop, the unit must be cooled down to allow cold water from the RO to be supplied to the Dialysis machines. By connecting the MediQA to the Heatsan via the MINT cable, the Heatsan unit can call for a fill from the MediQA when it needs to be cooled down. When this occurs, the MediQA will position the valves so water is pushed through the loop to gradually cool the unit. Once this procedure is completed, the MediQA is free to go back into normal operation. The loop return valve, shown in Figure 23, is positioned to redirect water back to the Heatsan unit. This keeps the hot water from entering the tank of the MediQA.

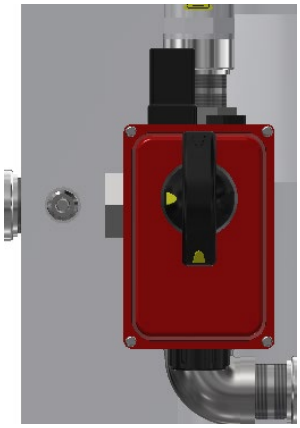


Figure 22
Concentrate to Drain Valve

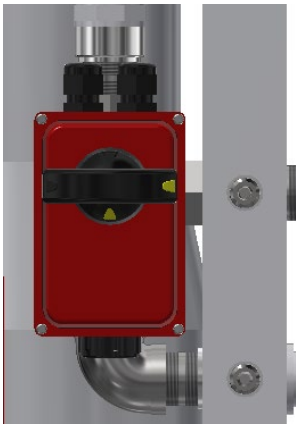


Figure 23
Loop Return Valve

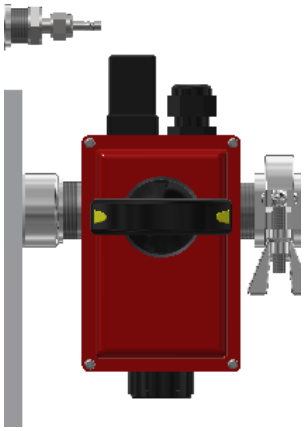


Figure 24
Product to Loop Valve

4.3 Pump Operation

The pump is automated and operates according to a factory installed program. If there are up and down arrows on the face of the pump, it is advised not to use these to adjust the run percentage.

Pump Models with screen:

If there is a yellow or red light on the pump face, the alarm or warning message should be displayed with a description and Alarm Code. For additional information, the Alarm Code information can be found on the Grundfos website, www.grundfos.com. The 'TYPE' of pump can be determined by looking at the nameplate on the pump, which is located on the rear of the pump head.

Pump Models with no screen:

If there is a yellow or red light on the pump face, use a Grundfos Dongle to determine the error message. The Alarm Code description can be found on the Grundfos website, www.grundfos.com. The 'TYPE' of pump can be determined by looking at the nameplate on the pump, which is located on the rear of the pump head.

See Section 13.2 for instructions on connecting to the pump.

4.4 Hi Recovery Temperature Guidance

Hi Recovery Mode yields the best results when catered to the individual site and the properties of the provided water. The water conservation during Hi Recovery Mode is dependent on the Conductivity and Temperature set-points on the MediQA Operation screen. The table below is guidance for setting the temperature set-points to work cohesively.

Parameter	Default	Guidance	Maximum set-point
Break Tank Temp Low	80	If incoming temp is greater than default, should be set to 1°F greater than the incoming water temp	91
Break Tank Temp High	85	Should be 3-6°F greater than the Break Tank Temp Low set-point	94
Loop Over Temp Warning	86	Should be 1°F greater than the Break Tank Temp High set-point so Refresh doesn't occur in High Recovery	95
Loop Over Temp Alarm	95	Should always be 95°F	95
Cool Down End Temp	86	Should be the same as the Loop Over Temp Warning set-point	95
Pump Run Slow Temp	90	If incoming temp is greater than default, can be adjusted up to 95°F	95

4.5 Emergency Single Pass Mode

On dual pass models, there is an Emergency Single Pass Mode (ESPM) option that allows the system to operate as a single pass when a component failure isolated to one stage is preventing operation. This permits the system to continue to provide water to the distribution loop via either Stage 1 or Stage 2 components. The failed stage is bypassed, allowing time to diagnose and correct the problem.

Anytime the unit is operating in ESPM mode there will be a scrolling banner across the bottom of the screen that reads "ESPM mode" and a yellow border that signifies the "Unit Operating in ESPM" Warning. The Operating Status will still be visible and all modes except Chemical Clean are available.

ESPM is intended to be a temporary solution while waiting for diagnostics to be carried out and replacement components to be installed. ESPM is not intended to be used for long periods of time. See section 8.5 for steps to take when switching out of ESPM mode.

ESPM is automatically triggered when a RO1 or RO2 Pump Fault Alarm is triggered (see Section 0 to see pop-up messages). Enabling ESPM disables the RO1 and RO2 Pump Fault Alarms and enables the RO1 and RO2 Pump Fault Warnings, which allows the unit to continue running as a single pass. The automatic triggering can be disabled on the MediQA Operation Mode screen (see Section 6.4.1).

When automatically triggered, the mode can be terminated by pushing the Alarm Reset button on the Alarm screen. The alarm can only be reset once the Pump Fault signal has been cleared.

ESPM can also be manually initiated on the Overrides 2 screen if the user detects a failure such as membrane fouling (see Section 6.5.8).

5 INSTALLATION

5.1 Environment

The unit should be installed in a clean and dry indoor, non-hazardous, ventilated environment (see Section 3.3).

5.2 Unpacking

Two people are required for this operation. Manual handling requirements should be observed.

The ***MediQA*** is shipped on a wooden pallet. Before removing it, ensure the MediQA is as close to the final location as possible on a smooth level surface.

DANGER: **Take great care as the weight of the machine (depending on the model) is 1050 to 1970 lbs.**

Move the ***MediQA*** into its final position (the ground must be level).

Ensure the following items have been provided.

•*MediQA* Unit
•Key for control panel
•Operation Manual

5.3 Connections

5.3.1 Electrical Supply

DANGER: **An electrical supply (see specification Section 3.5) should be made to the control panel of the MediQA using a suitable armored cable. The cable should be fitted using the gland provided and terminated to the Isolator connections L1, L2, L3, N and Earth.**

5.3.2 Water connections

Softened potable water supply:	1.25” NPT female thread
Overflow drain connection:	1.5” NPT female thread
All other connections:	1” NPT female thread

5.3.3 Drainage

A suitable, unrestricted, drain is required, capable of handling the discharge flow of the MediQA (see specification). The drain should be capable of accepting 194°F (90°C) water.

5.4 Commissioning

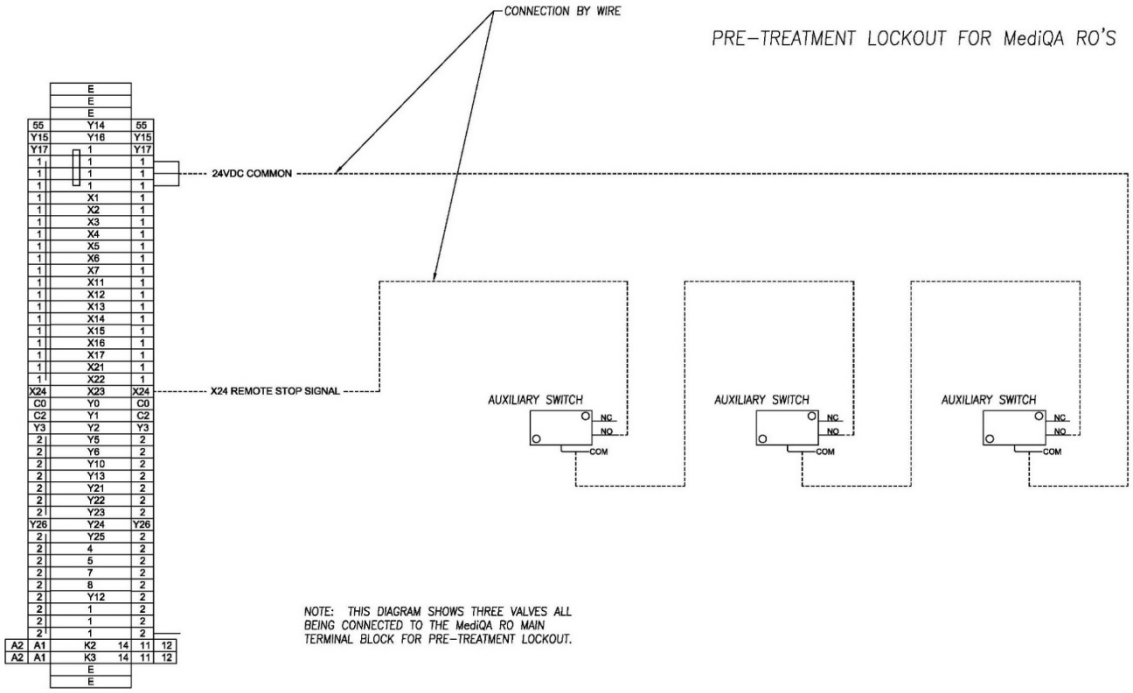
ONLY BY CERTIFIED AMERIWATER REPRESENTATIVES.

WARNING: This Reverse Osmosis System (RO) contains a preservative solution to prevent microbiological growth and freezing. Discard all product water for at least two hours of operation before placing the RO in service.

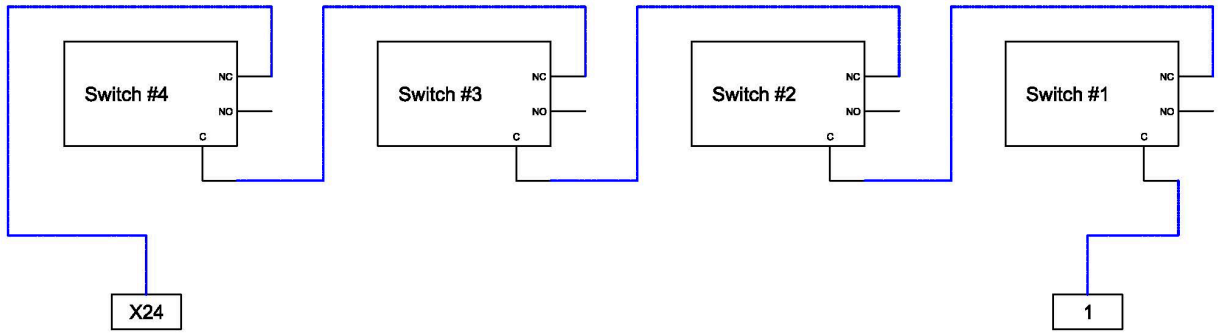
5.4.1 Pre-treatment Lockout

The ***MediQA*** can utilize pre-treatment lockout. Pre-treatment lockout will prevent the device from operating while the pre-treatment is going through regeneration. The MediQA is shipped from the factory with a jumper installed between wire terminal X24 and wire terminal 1. To enable the pre-treatment lockout functionality, remove the jumper wire between wire terminal X24 and wire terminal 1. After removing the jumper wire, wire the normally closed side of the pre-treatment lockout switch or switches (located in the pre-treatment controller) as shown below.

For Clack Valves:



For Fleck Valves:



NOTE: This diagram can be adapted for any number of devices so long as when any one opens, the connection to the MediQA is opened.

WARNING: **Failure to remove the jumper between X24-1 will prevent pre-treatment lockout. This will allow the MediQA to operate at all times, regardless of the status of the pre-treatment.**

5.4.2 Heatsan Water Loss Lockout

Heatsan water loss lockout will prevent the MediQA from operating while the water loss alarm is active on the Heatsan. This feature stops the flow of water to allow a leak to be dealt with. Once the leak is fixed, the alarm can be cleared on the Heatsan and confirmed on the MediQA. This feature is enabled by the MINT cable connection between the Heatsan and the MediQA.

5.4.3 Alarm Panel Connections

The ***MediQA*** utilizes fail safe connections for the Alarm Panel. The alarm output is normally closed, so that when there is an alarm, this opens. AmeriWater supplies an alarm panel that can be set to either normally open or normally closed contacts. As shipped, the alarm panel will look for a closure to indicate an alarm condition. See the manual for the AmeriWater alarm panel for detailed instructions on changing the input type.

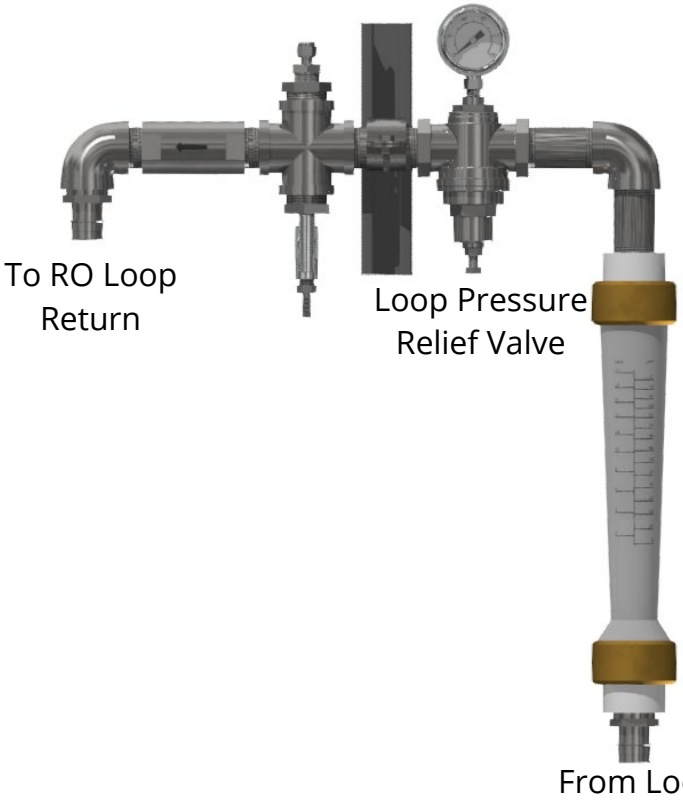
To connect the ***MediQA*** to the alarm panel, run a signal wire from Y15-55 to the input on the alarm panel for RO alarm. When the MediQA goes into alarm, the connection will open.

5.4.4 Installation Kit Details

Each ***MediQA*** will be shipped with an installation kit.

The temperature probe will need to be installed into the top port of the cross. The compression fitting will need to be loosened (do not remove) to allow the probe to slide into place. When installed properly, the ridge on the probe will be flush with the top of the fitting. Secure this connection to be tight by hand, then use a wrench to tighten 1-2 turns.

The check valve must be oriented to allow flow into the loop return port of the RO, but no flow from the RO to the loop.



Portions of the kit are shipped loose to allow flexibility based on space constraints at installation.

To adjust the back pressure on the loop, loosen the lock nut on the bottom of the back pressure regulator. Then adjust the bolt to the right to increase or left to decrease the pressure to the desired range. Once set, secure the lock nut to prevent inadvertent adjustment.

5.5 Initial Startup

The MediQA should not be started until the entire system is installed and ready for water. All 6 leveling casters need the leveling pad lowered until it is pressed against the floor to relieve the wheel of the RO weight. Pre-treatment devices should already be in service and filter cartridges installed. Post treatment equipment will be exposed to water the first time, ensure all union fittings are tight. Ensure all electrical connections are safe and secure.

The MediQA has been factory calibrated and tested. No calibrations are required during the RO startup. Make sure all breakers inside the control panel are in the up position.

Turn main power supply to the MediQA on at the disconnect or breaker switch.

Turn the MediQA on at the disconnect switch on the RO controller. The HMI screen should boot displaying the main screen to the RO.

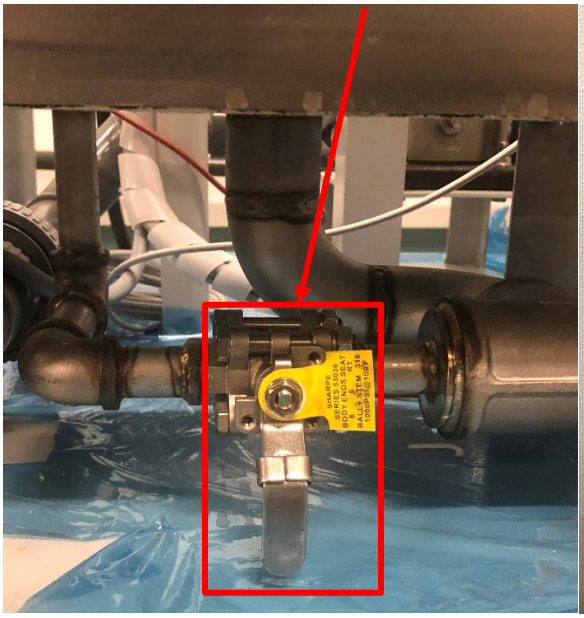
Installer shall verify polarity for pump(s) rotation before proceeding with RO startup. The rotational direction can be found on the name plate on the pump(s). Navigate to the CALIBRATION MENU >

OVERRIDES and toggle “RO1 PUMP” on then off, view the rotation of the green light on the face of the pump. Do the same with “RO2 PUMP” if installing a Dual Pass.

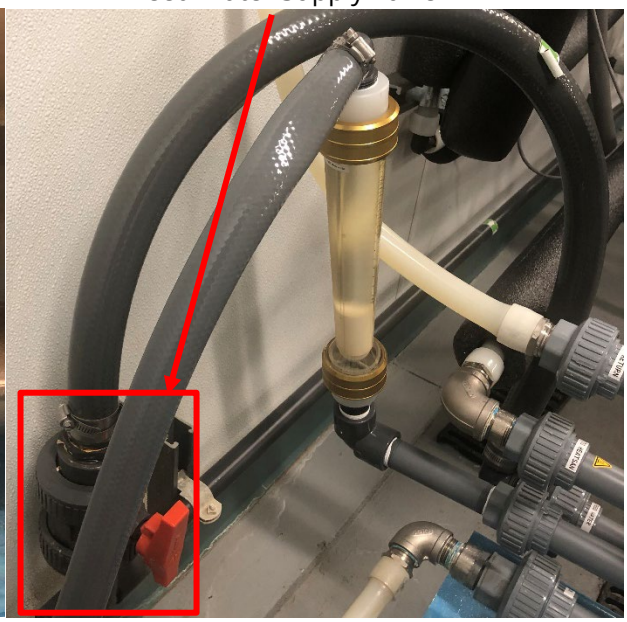
Remove the lid to the MediQA tank, and open the tank drain valve on the bottom of the tank.

Slowly open the feed water supply valve to the MediQA. Watch the tank as it fills, water may be cloudy and contain piping debris. Flush debris from the break tank thru the overflow until water is clear and free of debris. **May need to close feed water supply valve periodically to allow tank to empty.**

Tank Drain Valve

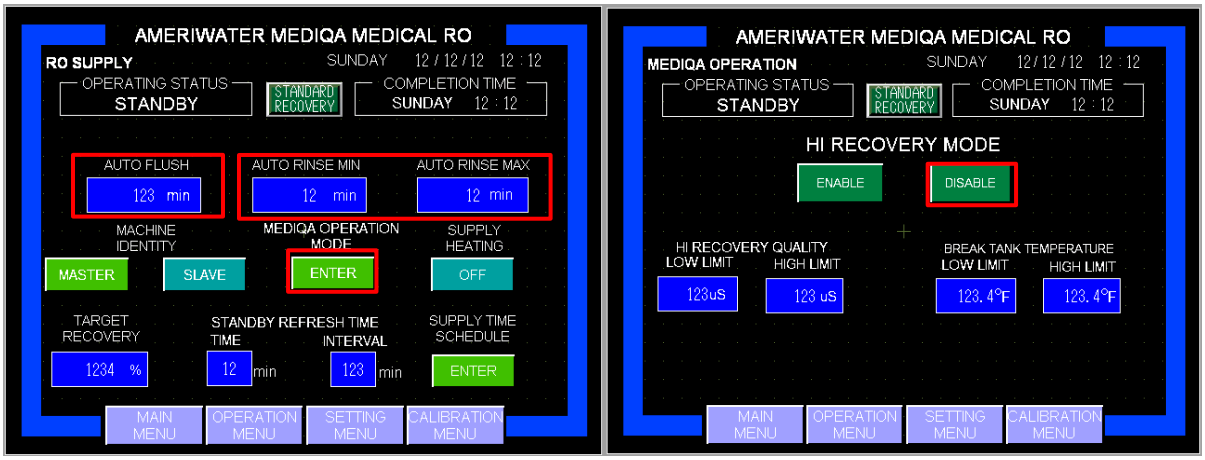


Feed Water Supply Valve

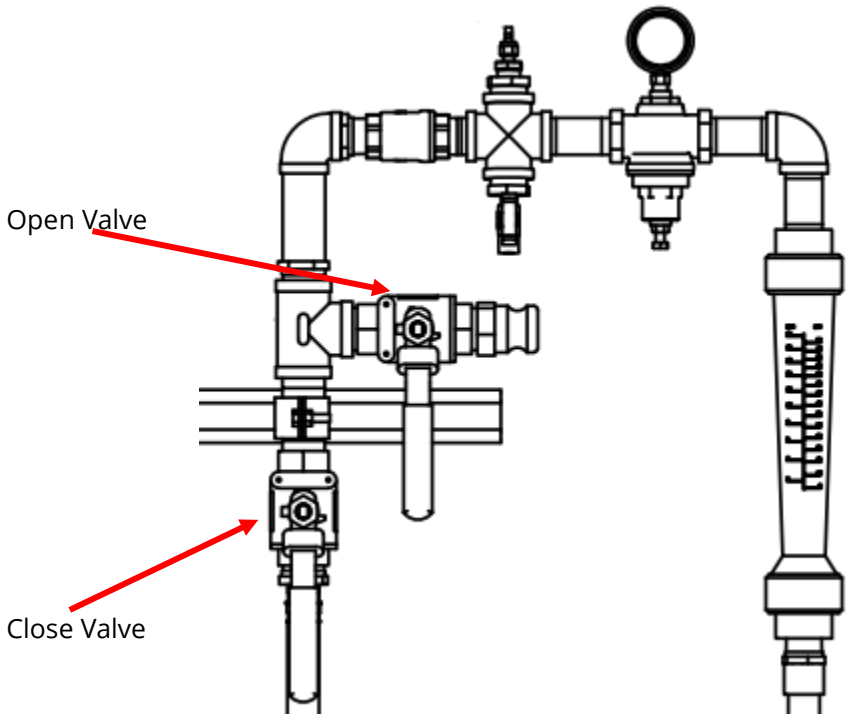


Once water is clear close the tank drain valve and install the tank lid.

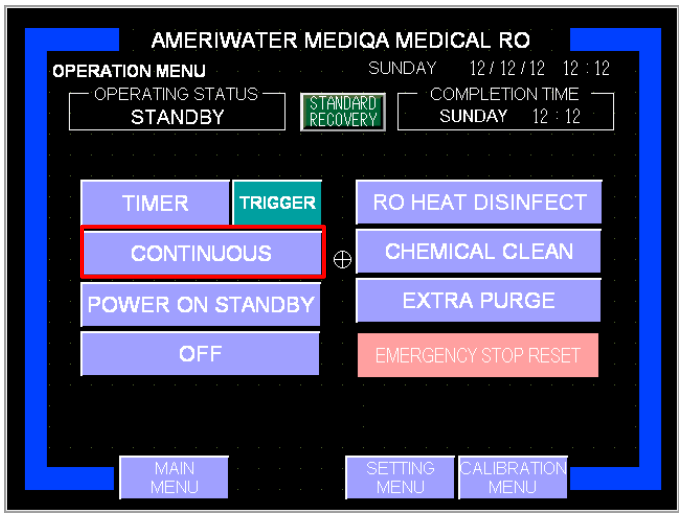
Navigate SETTINGS MENU > RO SUPPLY and increase the Auto Flush time to 15 minutes and Auto Rinse time to 5 minutes. Level 3 User Login will be required for this step. Also, click the *ENTER* button under MEDIQA OPERATION MODE. Hold the disable button for 2 seconds to put the unit into Standard Recovery Mode.



Open the bypass to drain valves located at the end of the loop after the product recovery kit, before the loop return to MediQA. This will allow water to run to drain to flush any construction debris from the loop.



Navigate to the OPERATIONS MENU and start the RO by pressing the CONTINUOUS button. The RO will begin to flush then rinse to the drain.

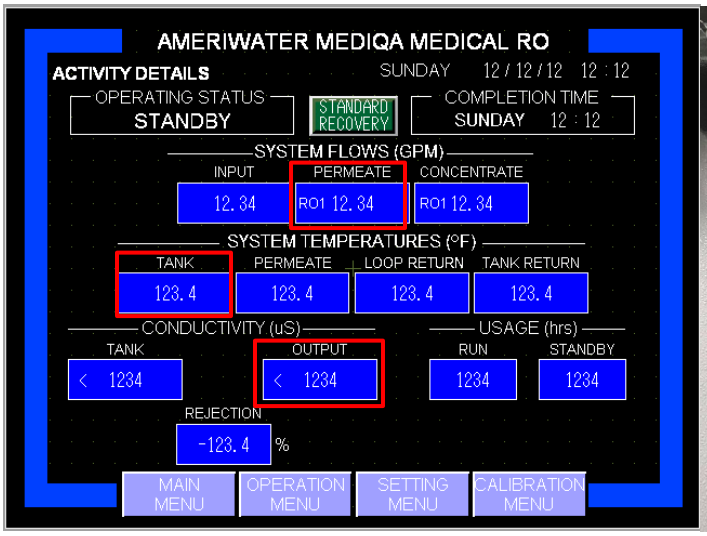


WARNING: **This Reverse Osmosis System (RO) contains a preservative solution to prevent microbiological growth and freezing. Discard all product water for at least two hours of operation before placing the RO in service.**

After the flush and rinse stages finish, the unit will pause and the permeate valve will shift and the RO will go into Supply mode. Water will begin to flow through the distribution loop.

After 2 hours close the bypass to drain valve. Allow the RO to continue to operate.

Monitor the status of the RO on the Activity Details screen under the Main Menu. During this time there are a few things that need to be noted and checked. Note the steady state conductivity level of the permeate water by looking at the OUTPUT CONDUCTIVITY. Also, note the steady range of values for TANK TEMPERATURE. Verify the measured recovery is at or near 65% on the RO Parameters screen (CALIBRATION MENU > RO PARAMETERS). Verify permeate flow on screen matches the return flow on the product recovery kit flowmeter. If the flow values do not match, then call AmeriWater for the Gain and Offset values for the permeate flowmeter on the unit.



Product Recovery Kit Flowmeter

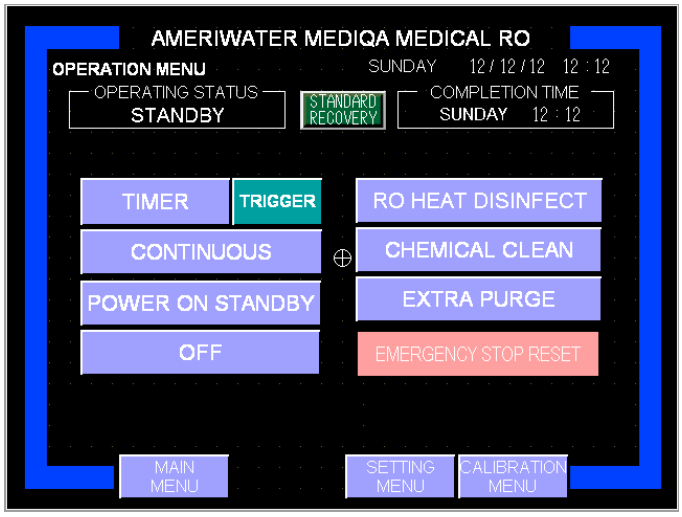
Navigate SETTINGS MENU > RO SUPPLY > MEDIQA OPERATION MODE ENTER and hold ENABLE for 2 seconds to return to Hi Recovery Mode upon completion of the 2 hours. Hi Recovery Quality is default to a low limit of 8 µS and a high limit of 12 µS during RO Supply. Break Tank Temperature is default to a low limit of 80 °F and a high limit of 90°F. If the value for conductivity or tank temperature recorded during standard recovery operation is higher than the limits set above, adjust the defaults to fit.

Check the post treatment and distribution loop for leaks.
Once unit has successfully been placed into service, it is recommended to heat disinfect the RO unit prior to disinfecting the loop.

Installation timing may affect at what stage a heat disinfection is conducted on the RO. May decide to program an automatic heat disinfect.

Make sure the pre-treatment is not programmed to backwash or regenerate during the MediQA heat cycle. May be necessary to unplug the pre-treatment during this first initial heat disinfect.

To manually begin a heat disinfect from the OPERATION MENU, press RO HEAT DISINFECT. The controller will ask for confirmation, press YES. The MediQA will automatically complete the heat disinfect cycle.

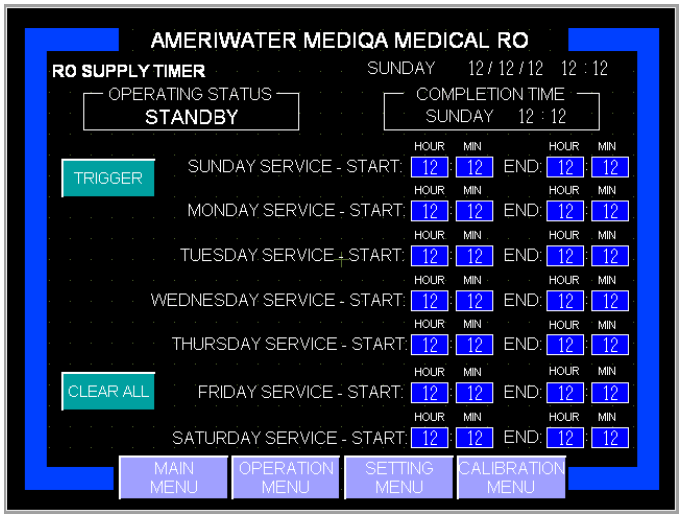


Upon completion of the RO heat disinfect, verify the unit reached the disinfect temperature. Go to MAIN MENU > ACTIVITY LOG and scroll through the data until seeing the tank temperature in RED numbers. Ensure the unit held 185°F for 30 minutes.

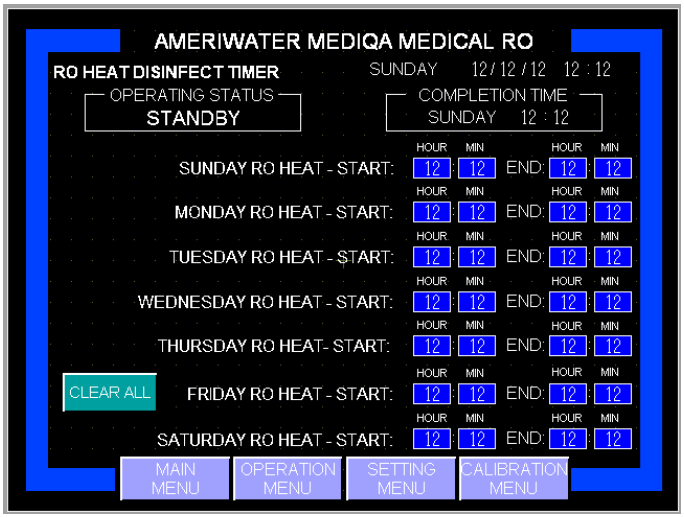
Before programming the MediQA, consult the facility manager for operating and maintenance schedules that require water to complete.

WARNING: **The supply schedule and heat disinfect schedule may not interfere with pre-treatment backwash/regeneration schedule.**

To complete set up, navigate SETTINGS MENU > RO SUPPLY > SUPPLY TIME SCHEDULE ENTER to get to the screen shown below. Enter the times necessary for the RO to supply water each day, using 24:00 clock. If there are days no operation is necessary, then enter a start and end time of 00:00. When in TIMER mode the machine will operate on this schedule. See Section 6.4.1 for details about this screen. See Section 6.1.1 for information about CONTINUOUS versus TIMER mode. **It is recommended to start the RO at least 30 minutes before staff arrives. This will allow the staff to take water system readings immediately upon arrival instead of waiting the required 15 minutes.**



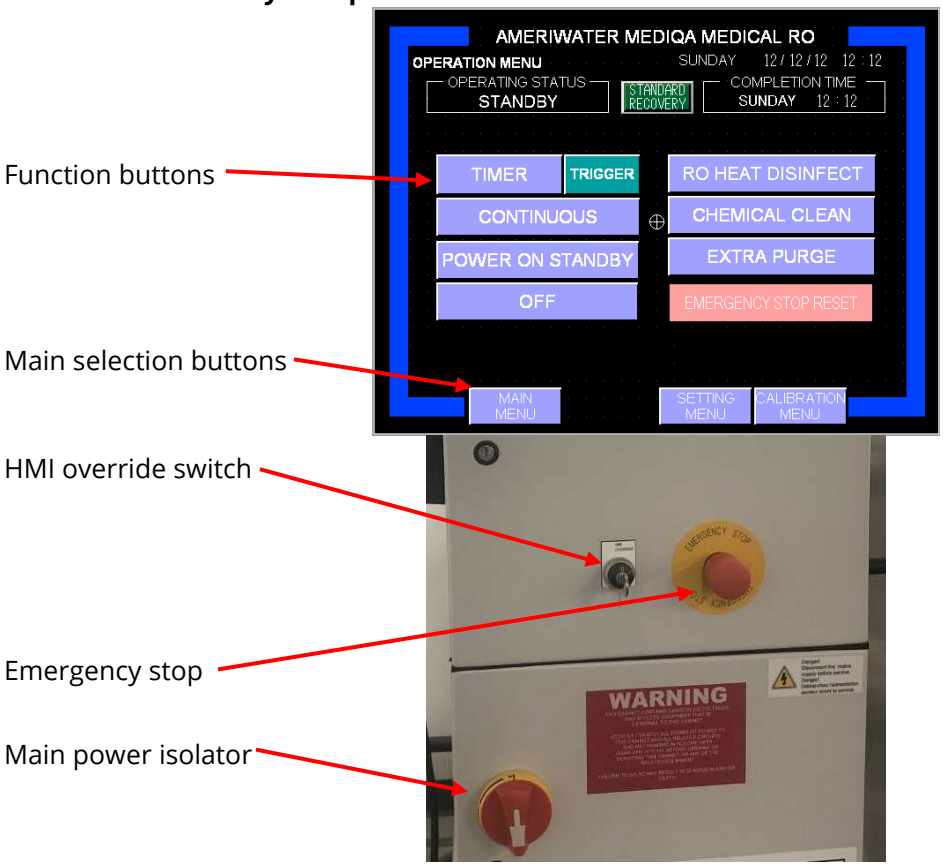
Once in the RO SUPPLY screen, reset the flush and rinse times to 2 minutes each. Navigate SETTINGS MENU > RO HEAT DISINFECT > RO HEAT DISINFECT SCHEDULE ENTER and set the desired day to heat disinfect the RO.



Once programming is complete, return to the OPERATION MENU and press TIMER. Unit will now operate on the schedule. If it is wished to start the RO immediately within the schedule press TRIGGER. RO will start automatically and continue to operate until the set end time.

6 OPERATOR INTERFACE

The MediQA is controlled and operated by the touch screen mounted on the end of the machine. **Some of the screens differ in appearance between the MDP and MSP models based on the parameters necessary for operation.**



6.1 Operation Menu

The OPERATION MENU is displayed when the MediQA is switched ON or is displayed if the touch screen has not been used for 30 minutes.

The OPERATION MENU features eight function buttons. Pressing any one of these selects the named function. Only one function may be selected at any one time. To switch between functions, the OFF button must first be pressed.

Some functions, when switched off using the OFF button, will need to complete some process cycles. It will not be possible to select another function until these process cycles have been completed.

6.1.1 Operation Menu Screen

On all screens the title of the screen is shown in the top left hand corner, below this the current MediQA operating status is shown (STANDBY in the example shown above).

In addition, there is a colored border which is common to most screens. The color indicates the current status as follows:

Blue:	Function operating to specification
Amber:	Warning active
Red:	Alarm active

“Warning” alarms are advisory; they do not stop system operation. They indicate that some element of the system needs attention.

“Alarms” stop the system. The system will only restart once the problem giving rise to the Alarm has been corrected.

The top right of the screen displays the date and time and below this a completion time for the current operation (only available for certain functions).

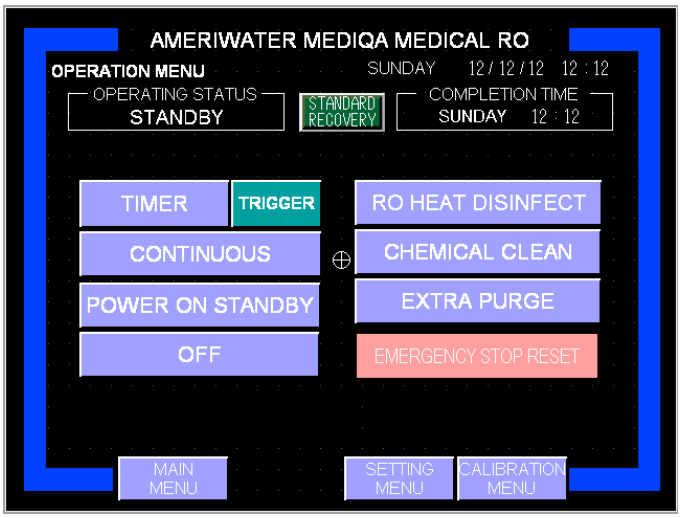


Figure 25

TIMER button
TIMER provides timed operation for the MediQA. Operation only commences when reaching times programmed in the RO SUPPLY TIMER screen and Heat Disinfect occurs at time programmed in the RO HEAT DISINFECT screen. If the timer button is pressed part way through a timer period, pressing the TRIGGER button will start operation.

CONTINOUS button
Starts system operation whether times have or haven’t been programmed to the RO SUPPLY TIMER screen. Operation is continuous until OFF is selected. Since starting and stopping incorporate essential flushing of the membrane, CONTINUOUS operation should not be used for extended periods or damage to the membranes may occur.

POWER ON STANDBY button
Energizes the system but does not start operation. The system will perform a flush and rinse for a predetermined time, see Section 13.1.

OFF button
Deselects and switches off selected functions. The button will illuminate red while ending certain functions.

RO HEAT DISINFECT button
Starts a manual heat sanitization of the MediQA
CAUTION: Supply to the distribution loop will cease while RO heat disinfect is in process.

CHEMICAL CLEAN button
Starts a manual chemical clean of the MediQA
CAUTION: Supply to the distribution loop will cease while chemical clean is in process. Chemical clean process cannot be aborted once started.

During the chemical clean process, prompts will appear that require buttons to be pressed to acknowledge certain key stages in order to complete the process (see Section 6).
(i) ADD CLEANING CHEMICAL
(ii) TEST FOR RESIDUE CHEMICALS
(iii) PASS WATER QUALITY

EXTRA PURGE button
Flushes purified water through the MediQA.

EMERGENCY STOP RESET button
Only appears if the emergency stop button on the control panel has been pressed. To clear the emergency stop, pull out (reset the emergency stop button) and press the EMERGENCY STOP RESET button on the screen.

OPERATION MENU button operation.
When powered up, the OFF button will be illuminated red. To select another function, press the OFF button (this will turn gray) and then press the desired function button. The function button will illuminate green to show it has been selected.

To switch off a function, press the OFF button, this will illuminate red and the function button will turn gray.

If both the OFF button and the function button remain illuminated, the function selected is completing shut down processes, when these are complete the function button will turn gray. It will not be possible to select other functions until only the red OFF button is illuminated red.

If a manual RO HEAT DISINFECT is selected it can be aborted by pressing the OFF button.

MAIN MENU button
Switches screen to Main Menu

STATUS MONITOR button
Switches screen to status monitor (see Figure 31)

SETTING MENU button
Switches screen to Settings Menu (see Figure 38)

CALIBRATION MENU button
Only accessible by AmeriWater technicians.

6.1.2 Operation Periods

MediQA Operation Periods	
Operating Status	Explanation
Standby	When the MediQA is not scheduled to be on and in TIMER mode, the system will be in Standby. The MediQA can also be set to "POWER ON STANDBY" for occasions when there are long periods without use. In standby mode the MediQA operates for 10 minutes every 2 hours, these values are user settable. This enables water to be circulated through the MediQA and distribution loop, in order to maintain water quality.
System OFF	System operation has been switched OFF via the button on the touch screen.
Flush	Before the MediQA provides water to the loop for dialysis use, the system goes through a flush. This isolates the water from the loop and dumps water down the drain for a preset time.
Rinse	After the flush cycle is completed, the RO will go into a rinse. During rinse the unit continues to run the pump(s) at a high pressure. Water is flushed down the drain similar to the flush of the membranes.
Supply	Supply is when the RO begins providing water to the loop for use with the Dialysis machines. This is the process the RO will be in for a majority of its usage. Can be operated in continuous or a set schedule.
Refresh (MSP Only)	Loop has exceeded the LOOP OVER TEMP WARNING set-point and is refreshing the water to lower the temperature.
Clean Recirc	During the recirculation phase of the chemical clean process, all of the water is redirected back into the MediQA tank. RECIRC PERIOD is user settable.
Clean (Tank Drain)	The MediQA is equipped with the ability to perform a chemical cleaning of itself once chemicals have been added in the tank. This mode is also displayed after Clean Recirc, when the Tank drains completely then refills.
Clean Rinse	After the clean (tank drain) is completed, the RO will go into a clean rinse to purge the chemicals from the system.
RO Heat Disinfect	The MediQA is capable of heat disinfecting itself. During the heat disinfection process the RO circulates water within itself at 185˚F.
Temp Hold	Once the temperature is reached in the RO Heat Disinfect period, the water is circulated for a set period. HOLD PERIOD is user settable.
Cool Down	RO Heat Disinfect enters this mode to cool down break tank and membranes at the end of the Temp Hold cycle. Cool down temperature is user settable. The MediQA returns to standby after the cool down temp is reached.
Heatsan Fill	The MediQA has been called on to provide water to the Heatsan.
Loop Heatsan	Heatsan unit is performing a heat disinfection by cycling hot water through the loop. MediQA locked out from operating. RO turns on during Cool Down Period of Heatsan.
Override	HMI override key switch is turned, the system goes into continuous mode.
Remote ON	The MediQA is in slave mode and the master MediQA is telling it to operate.
Emergency Stop	System operation has been halted via the Emergency Stop button on the control panel. Alarm is generated on the touch screen. To Reset, pull the E-Stop out and clear the alarm from the Main Menu screen.

6.2 Main Menu Screen

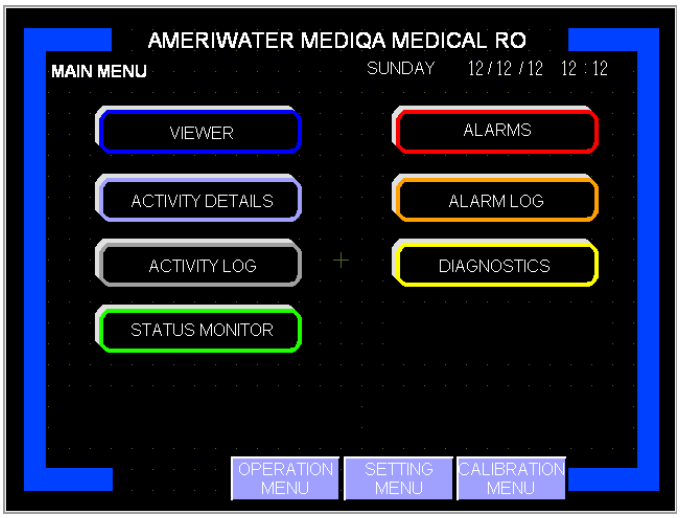


Figure 26

Accessed by pressing MAIN MENU button on the bottom of any screen.

6.2.1 Viewer Screen

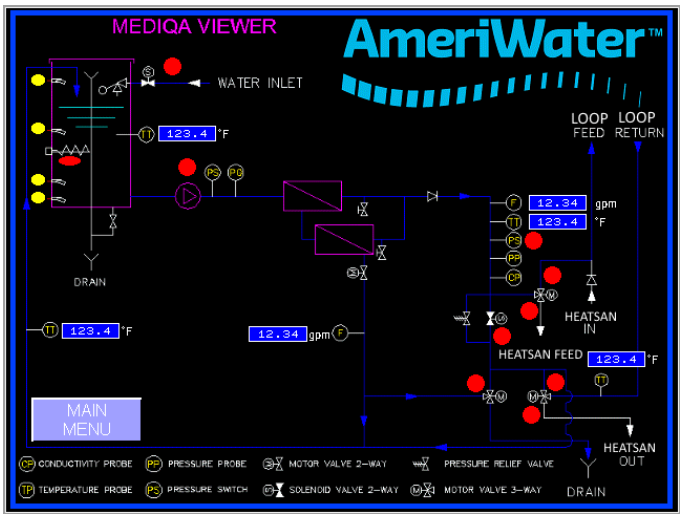


Figure 27

The VIEWER screen displays a flow schematic and highlights with colored indicators the status of specific process elements.

Red: OFF

Green: ON

Tank level switches are shown

Yellow: OPEN (water level has not triggered float switch)

Green: CLOSED (water level has closed float switch)

MAIN MENU BUTTON Returns to the main menu screen.

6.2.2 Activity Details Screen

Single Pass Screen

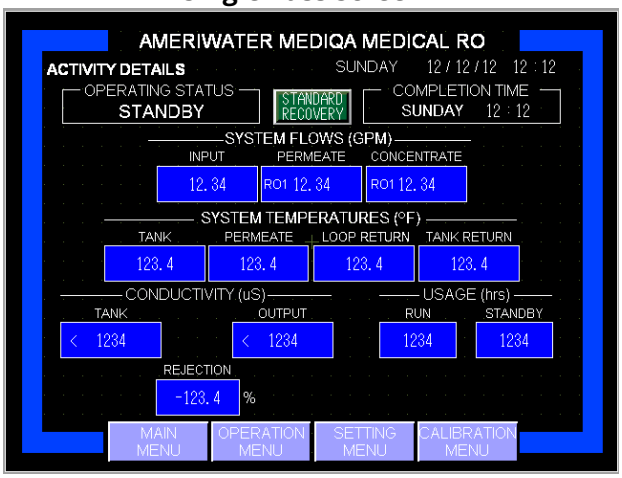


Figure 28

Dual Pass Screen

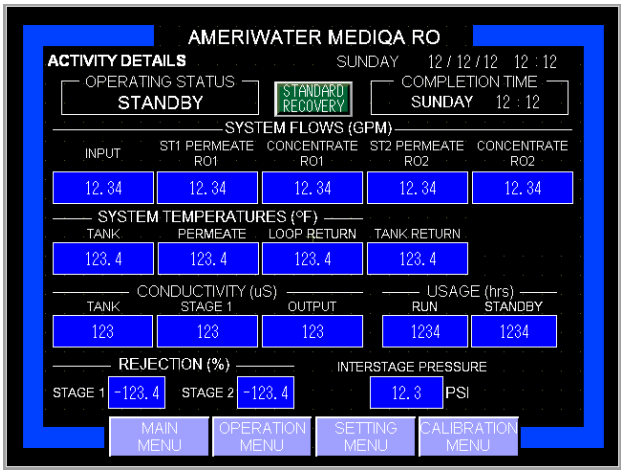


Figure 29

The ACTIVITY DETAILS screen shows specific performance data relating to system processing elements. It also displays the number of hours the MediQA has been running or has been in standby. These can be reset to zero by pressing ZERO button on the RO PARAMETERS screen (see Section 6.5.2). Needs reset after 9999 run hours for MSP or 8760 run hours on MDP.

6.2.3 Activity Log Screen

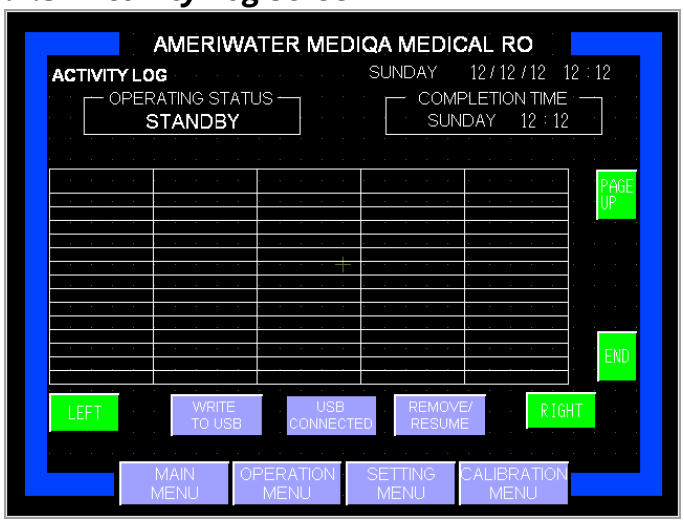


Figure 30

The activity log displays data recorded to the MediQA internal data logger. Records are displayed in chronological order. Scroll buttons are provided to move through the data shown on screen. Pressing the down button goes to the most recent data, while the up button moves back in time, one page at a time.

This data may be downloaded to a data bar / memory stick. Insert a memory stick into the USB port found on the touch screen mounting arm. Press the WRITE TO USB button, wait 5 seconds to press the REMOVE USB button. Data is recorded to the memory stick in the form of a .csv file. This can be opened using Microsoft Excel. Files are saved to the memory stick root directory named SAMP01. The file name is SA followed by the machine serial number. USB stick must be formatted as FAT16 (2GB max) to be recognized by the touch screen.

6.2.4 Status Monitor Screen

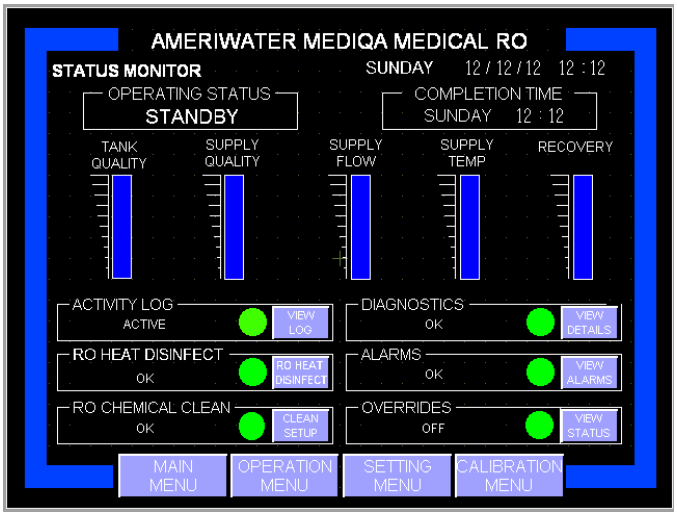


Figure 31

The STATUS MONITOR shows, via bar graphs, an overview of the system. This can be used as guide to when preventative maintenance may be required.

In addition, it shows the status of certain system functions (ACTIVITY LOG, RO HEAT DISINFECT, etc.). The status of which is shown with colored indicators and text stating the function condition. A short cut button to access relevant details appears next to each indicator.

Green:	Function operating to specification
Amber:	Warning active
Red:	Alarm active

"Warning" alarms are advisory; they do not affect system operation. They indicate that some element of the system needs attention.
"Alarms" stop the system. The system will only restart once the problem giving rise to the Alarm has been corrected.

6.2.5 Alarms Screen

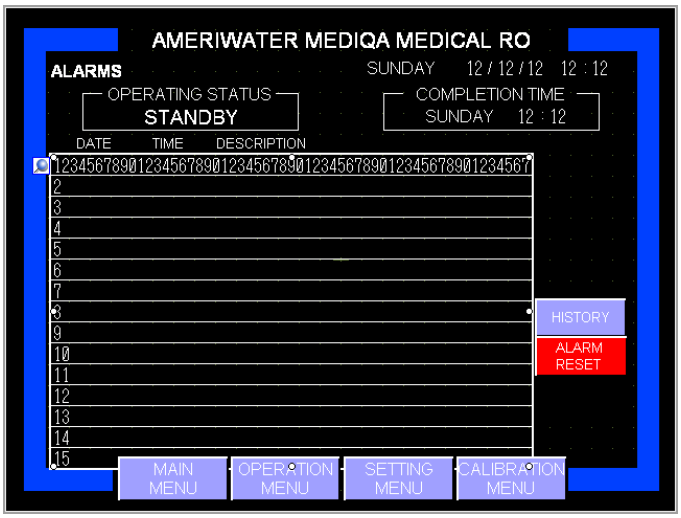


Figure 32

When triggered, alarms and warnings are detailed in the table. Alarms can be deactivated by correcting the indicated fault and pressing the ALARM RESET button. Alarms will remain present until the fault is corrected. If the fault is not corrected the alarm cannot be reset with the ALARM RESET button.

The HISTORY button drills down to the ALARM LOG screen.

6.2.6 Alarm Log Screen

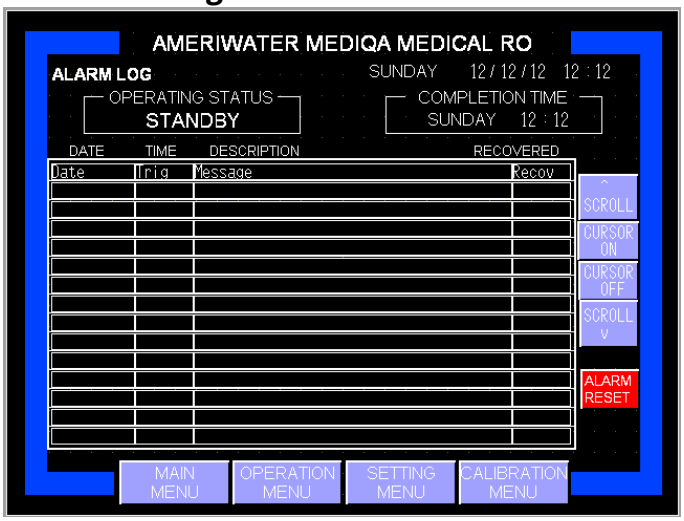


Figure 33

Alarm log retains all alarms that have been triggered.

Use scroll buttons to move through the data. First press CURSOR ON and when completed CURSOR OFF.

6.2.7 Diagnostics Screen

Single Pass Screen

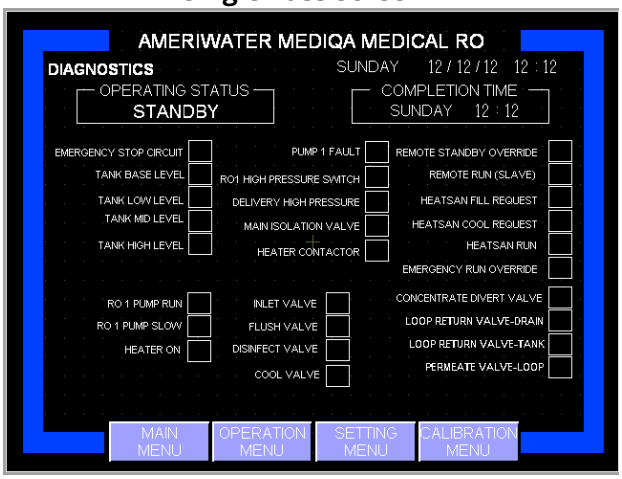


Figure 34

Dual Pass Screen

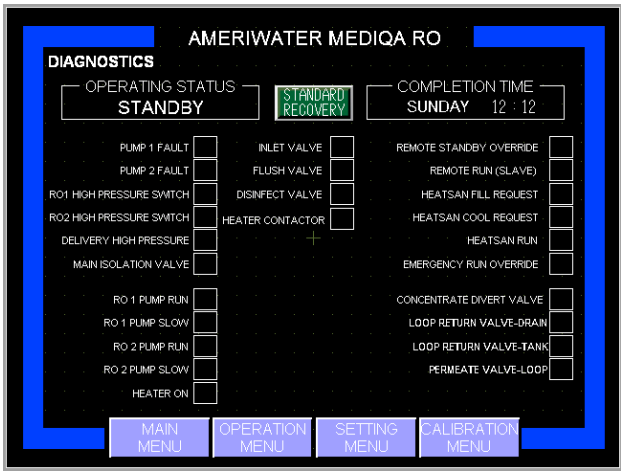


Figure 35

The DIAGNOSTICS screen details active system elements. Active elements are highlighted with green markers in each of the indicator boxes.

6.3 Operation Menu Screen

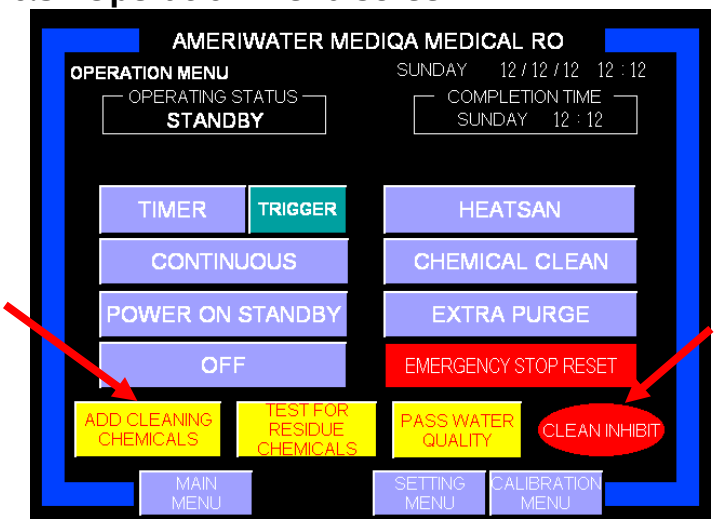


Figure 36

NOTE: The yellow and red buttons only appear when a given process has been activated.

6.4 Settings Menu Screen

Figure 37

When the SETTING MENU button is pressed, the unit will request a password.

The password to enter the SETTINGS MENU is 01844.

Punch in the number and press ENT. If an error is made, press backspace (BS), clear (CLR), or escape (ESC).

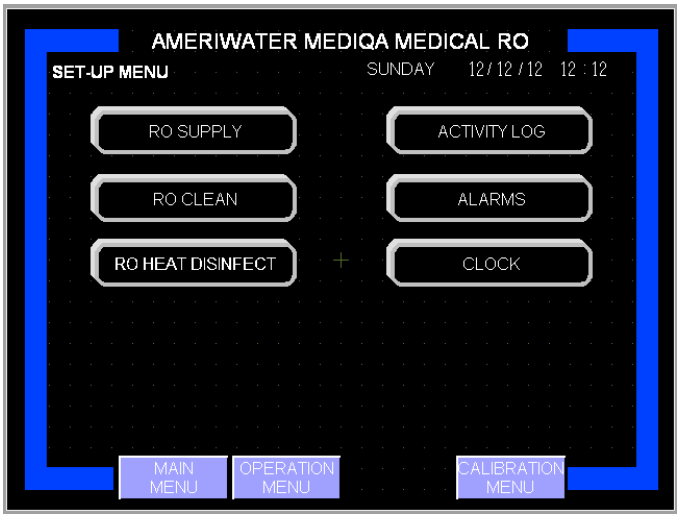


Figure 38

The SETTINGS MENU allows key operating parameters and system alarms to be set.

6.4.1 RO Supply Screen

Single Pass Screen

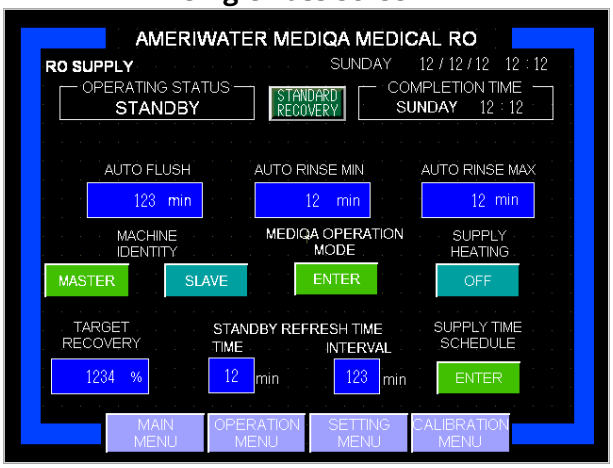


Figure 39

Dual Pass Screen

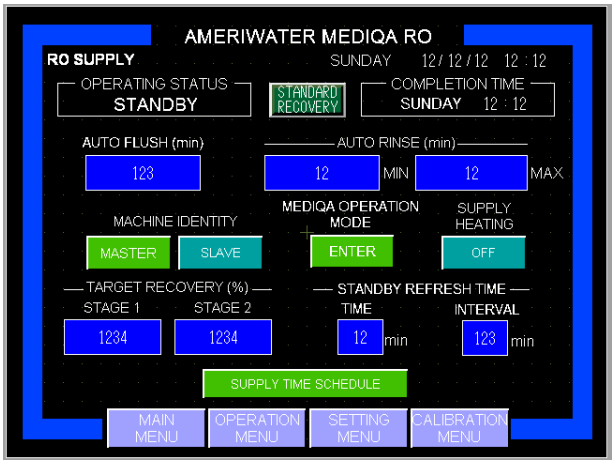


Figure 40

AUTO RINSE MIN defines the duration of initial rinse. If unit has not rinsed to quality set-point, system will rinse for an additional minute until max time has been reached. If unit has not reached the quality after max time elapsed an alarm is logged.

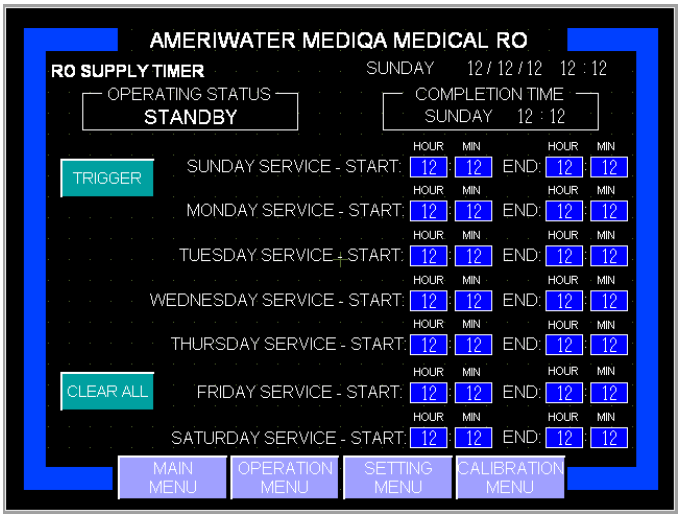
AUTO FLUSH defines the duration of flush.

TARGET RECOVERY RO1 sets target water recovery of stage 1 RO modules.

TARGET RECOVERY RO2 sets target water recovery of stage 2 RO modules.

SUPPLY HEATING defines whether the tank heater is to be used to warm the incoming water supply. When enabled, the heater is turned on at 48°F (9 °C) and off at 52°F (11°C).

ENTER under SUPPLY TIME SCHEDULE opens to the screen shown below and enables automatic operating times to be set. System operation is activated when TIMER is selected in the OPERATION MENU screen.



System operation to programmed times is activated when TIMER is selected in the OPERATION MENU screen.

Timed operation for the MediQA can be set by programming pre-set times.

To change pre-set times, press the highlighted blue boxes enter the time (24-hour clock) on the pop up key pad and press enter.

Enter a time of 00:00 to prevent operation on any particular day.

Figure 41

ENTER under MEDIQA OPERATION MODE opens to the screen shown below and allows the user to switch between recovery modes. HI RECOVERY MODE is the default and can be disabled by holding the DISABLE button for two seconds. Must have level 3 access to change the mode of operation.

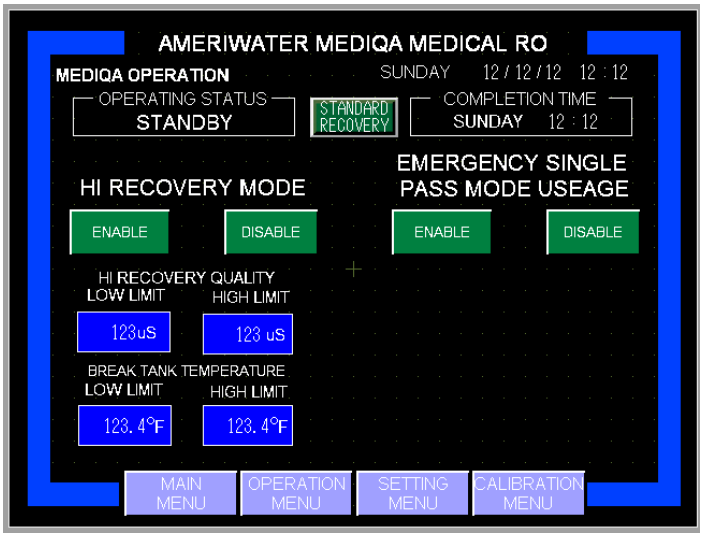


Figure 42

HI RECOVERY QUALITY defines the high and low limits of permeate conductivity that the water will maintain. The reject water will recirculate to the tank until the high limit of water quality is reached, when the concentrate to drain valve will open. The concentrate to drain valve will close when the low limit is reached.

BREAK TANK TEMPERATURE defines the high and low limits of the temperature that water will be maintained. The drain valve is opened when the temperature reaches the high limit and closes when the low limit is reached.

EMERGENCY SINGLE PASS MODE USAGE being Enabled is the default, which allows ESPM to be automatically triggered when getting a RO1 or RO2 Pump Fault Alarm. Holding the DISABLE button for 2 seconds means that ESPM will only occur when manually initiated.

6.4.2 RO Clean Screen

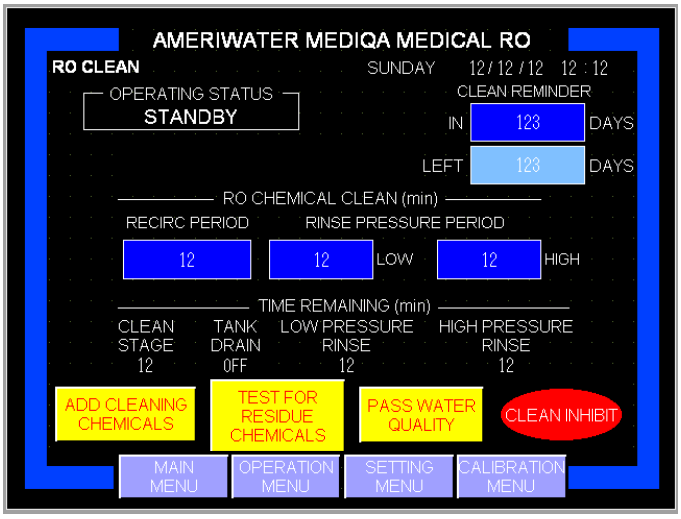


Figure 43

See Section 8 before operating this function

NOTE: **The yellow and red buttons only appear when a given process has been activated.**

RECIRC PERIOD define here the duration cleaning chemical is circulated around the system.

RINSE PRESSURE PERIOD LOW defines the duration of a low pressure rinse.

RINSE PRESSURE PERIOD HIGH defines the duration of a high pressure rinse

CLEANING REMINDER can be set to determine when the next clean should be completed. When the counter has counted down to zero a warning will be triggered to the ALARM LOG box and indicated on the status screen. This reminder will automatically reset after a clean has been carried out.

The TIME REMAINING status bar activates when a CHEMICAL CLEAN is started. This displays the time remaining to complete each of the clean cycle elements.

YELLOW prompt boxes pop up to instruct when to perform given activities during the clean cycle.

6.4.3 RO Heat Disinfect Screen

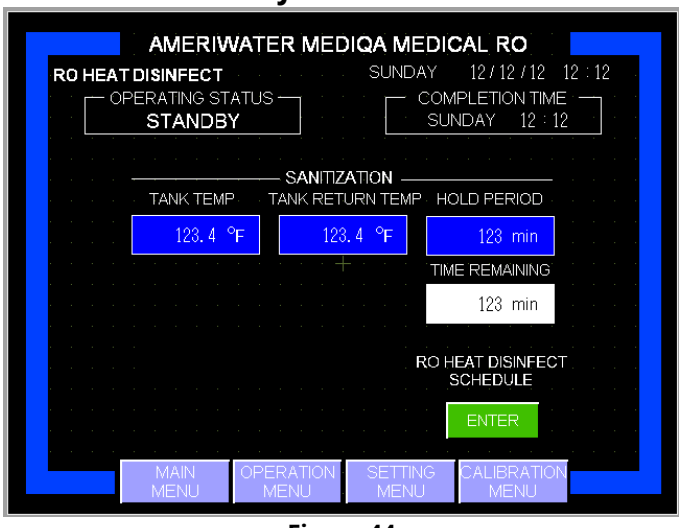


Figure 44

Here specific functions for the RO heat disinfect can be set.

TANK TEMP determines the maximum desired tank temperature during a heat disinfection cycle (max 185°F or 85°C).

TANK RETURN TEMP determines the actual disinfection temperature, maximum 185°F (85°C). Tank return temp should always be set 2°F below tank temp.
HOLD PERIOD is the time water is circulated around the system once it has reached the TANK RETURN TEMP i.e. the disinfection temperature.

TIME REMAINING shows time remaining to complete the hold period. The hold period is adjustable to as low as 15 minutes; the default hold time can be found in Section 13.1.

RO HEAT DISINFECT TIME SCHEDULE opens to the screen shown below and enables automatic operating times to be set. System operation is activated when TIMER is selected in the OPERATION MENU screen.

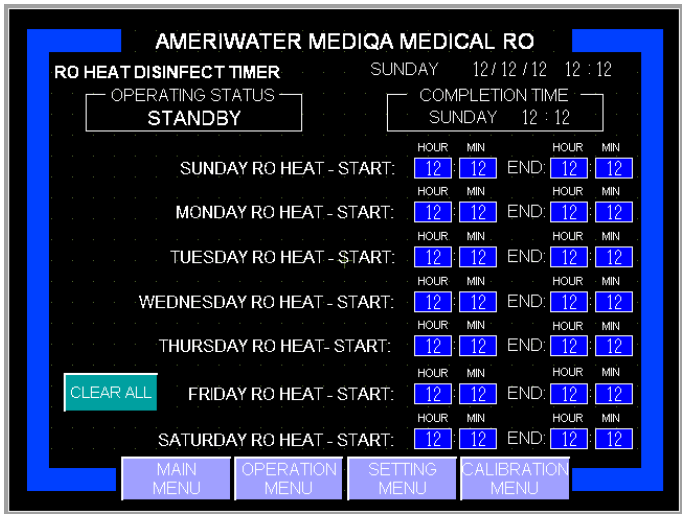


Figure 45

Heat disinfection will be postponed if these times conflict with RO SUPPLY TIMER settings (Figure 41). RO HEAT DISINFECTION will commence when SUPPLY ends.

To change pre-set times, press the highlighted blue boxes, enter the time (24-hour clock) on the pop up key pad and press enter. Enter a time of 00:00 to prevent operation on any particular day.

6.4.4 Activity Log Screen

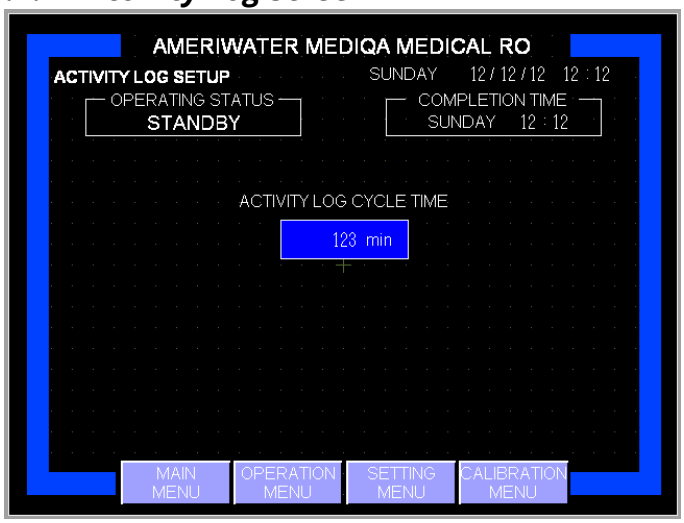


Figure 46

Setting a time to the ACTIVITY LOG CYCLE TIME determines the period by which data is stored to the activity log and data logger.

6.4.5 Alarms Screen

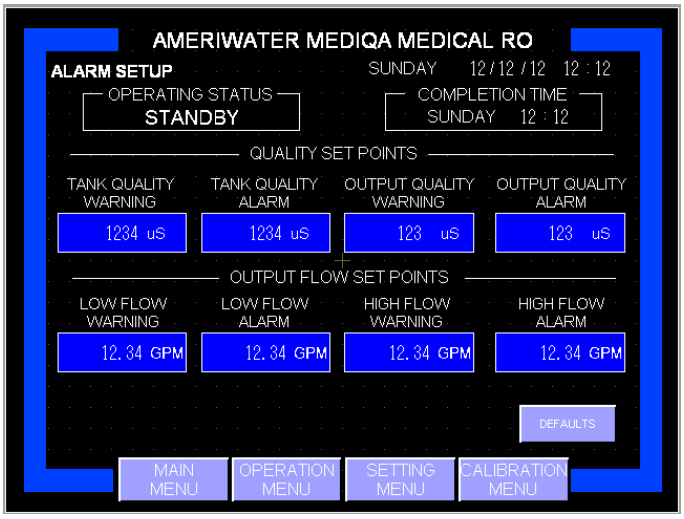


Figure 47

The set-points on this screen are triggers for system warnings and alarms. If a warning is triggered it will be displayed and the blue bars surrounding the screen will turn yellow. If an alarm is triggered it will be displayed, the bars will turn red, and the system will cease operation. The warning or alarm is triggered if the value falls below the LOW FLOW set-point or above the TANK QUALITY, OUTPUT QUALITY, or HIGH FLOW set-points.

6.4.6 Clock Screen

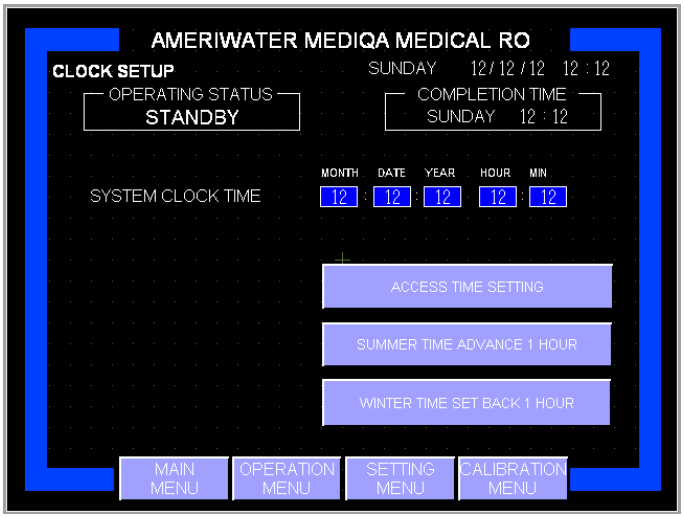


Figure 48

Clock set enables the system clock to be set. To adjust the clock press ACCESS TIME SETTING enter the desired time into the blue boxes adjacent to SYSTEM CLOCK TIME and press SET SYSTEM CLOCK to set the time.

The time can be advanced 1 hour by pressing SUMMER TIME ADVANCE 1 HOUR or reduced by 1 hour by pressing WINTER TIME SET BACK 1 HOUR.

6.5 Calibration Menu Screen

The Calibration Menu allows access to the calibration settings and alarm set-points for the unit. This menu is used for initial setup and fine tuning of the unit.

The Calibration Menu is password protected and requires a level 2 login (____). The menu should only be accessed by trained personnel and AmeriWater Techs.

Single Pass Screen

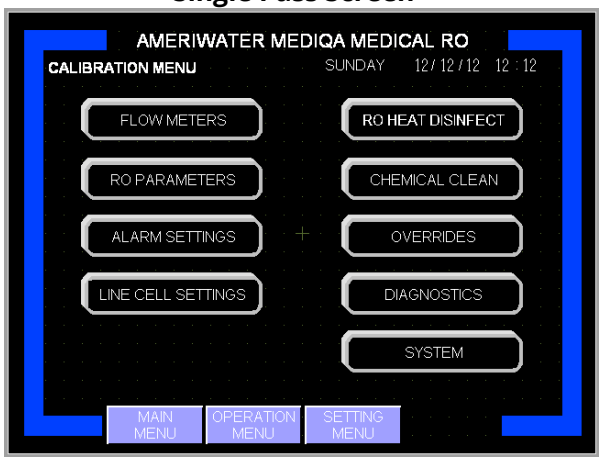


Figure 49

Dual Pass Screen

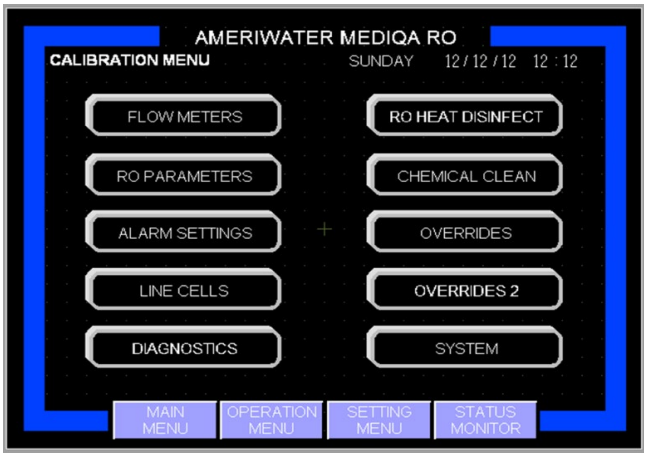


Figure 50

6.5.1 Flowmeters Screen

The Flow Meter menu allows access to the calibration settings.

Single Pass Screen

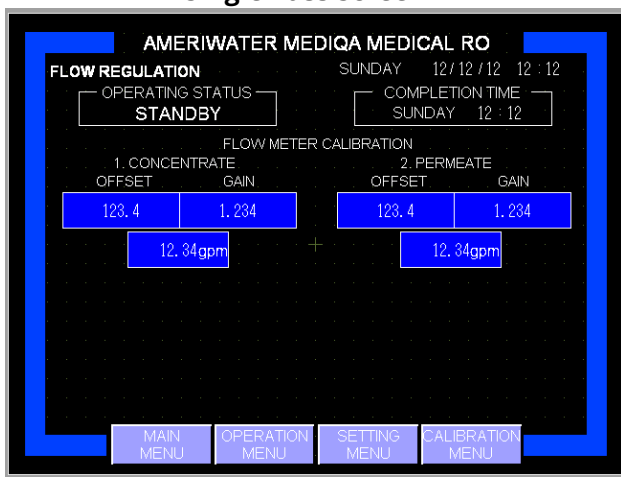


Figure 51

Dual Pass Screen

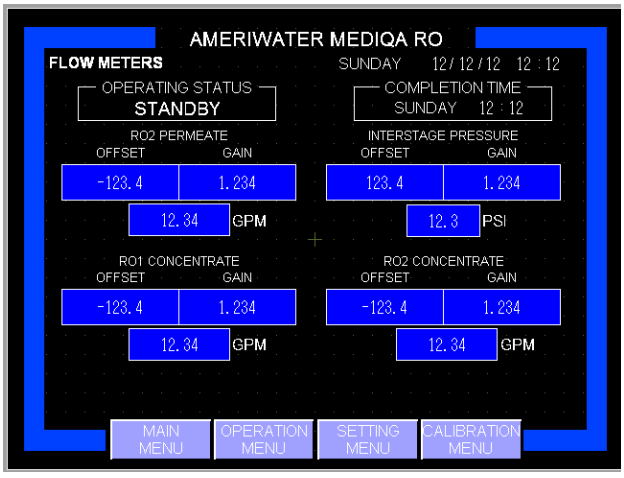


Figure 52

OFFSET and GAIN are calibration parameters. Offset adds or subtracts a constant value to the signal. Gain multiplies the signal by a constant factor.

6.5.2 RO Parameters Screen

In the RO parameters menu, the target percent recovery for the RO can be set. The default is 65% for stage 1 and 80% for stage 2 (if the unit is a dual pass). The run time clock can also be reset from this menu. The measured recovery value for the unit is displayed on this screen to verify that the unit is performing at, or exceeding, the target recovery.

Single Pass Screen

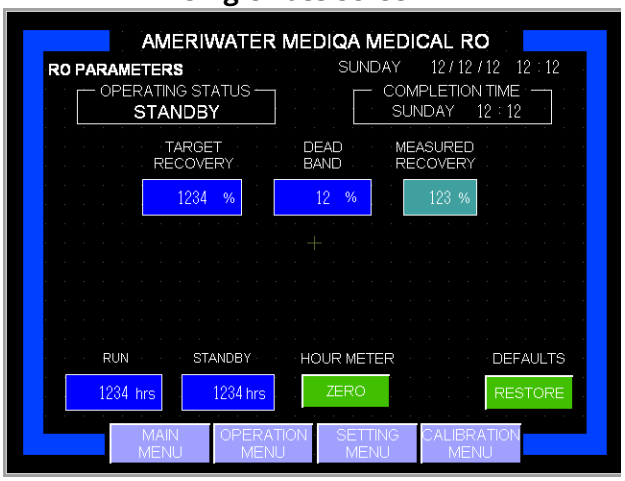


Figure 53

Dual Pass Screen

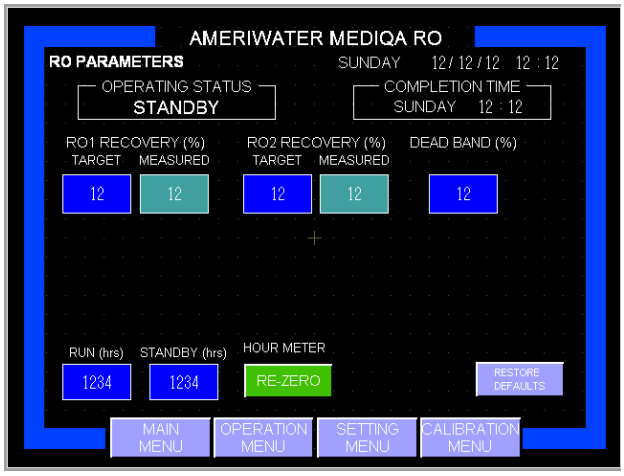


Figure 54

6.5.3 Alarm Settings Screen

The Alarm Settings menu allows access to the alarm set-points for various parameters of the unit. The set-points should be set before the unit is put into service and will only require alteration in special case situations.

Single Pass Screen

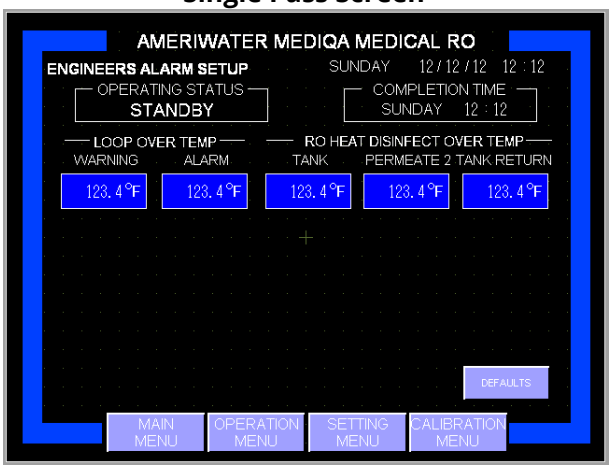


Figure 55

Dual Pass Screen

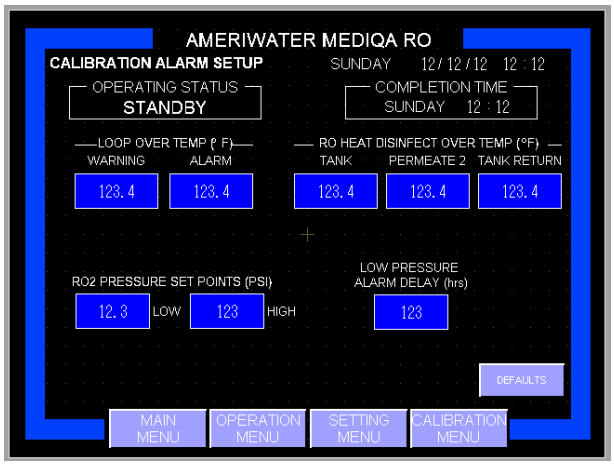


Figure 56

The set-points on this screen are triggers for system warnings and alarms. If a warning is triggered it will be displayed and the blue bars surrounding the screen will turn yellow. If an alarm is triggered it will be displayed, the bars will turn red, and the system will cease operation. The warning or alarm is triggered if the value exceeds the Loop, Tank, Permeate, or Tank Return Over Temp set-points.

6.5.4 Line Cells Screen

The Line Cell menu allows the user to access the calibrated numbers used to determine the conductivity of the water in the unit. This should not be altered.

Single Pass Screen

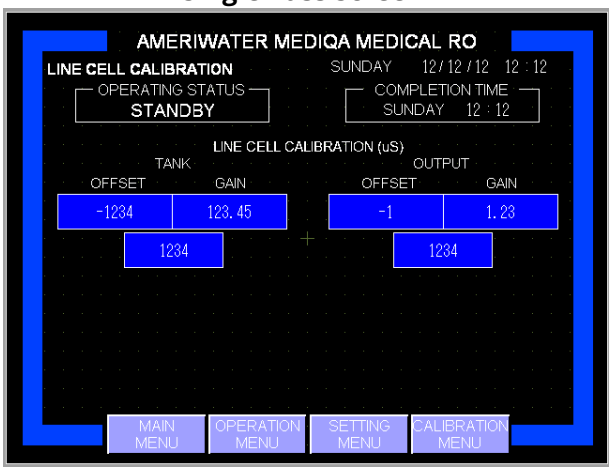


Figure 57

Dual Pass Screen

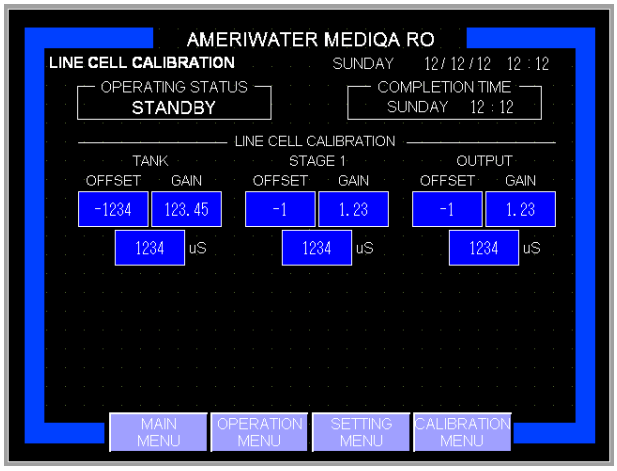


Figure 58

OFFSET and GAIN are calibration parameters. Offset adds or subtracts a constant value to the signal. Gain multiplies the signal by a constant factor.

6.5.5 RO Heat Disinfect Screen

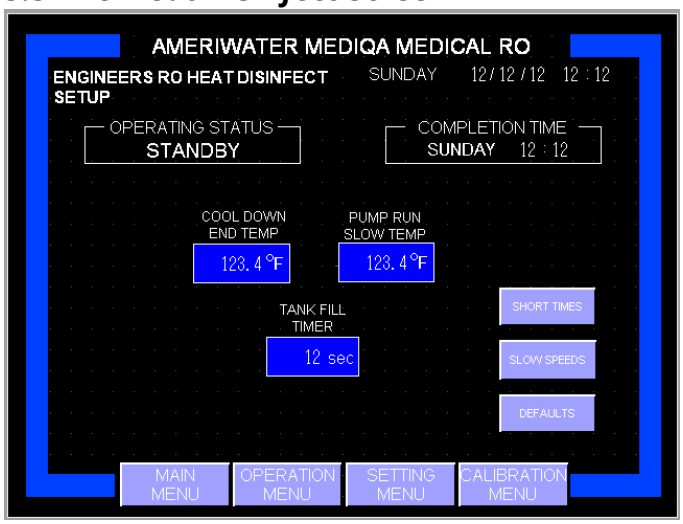


Figure 59

The RO Heat Disinfect menu allows access to the PUMP RUN SLOW and COOL DOWN END TEMP.

PUMP RUN SLOW TEMP is the set-point at which the pump on the system will run at a lower pressure than normal. This is required during a heat disinfection of the system because the membranes cannot handle high pressures with water over 113 degrees F at >45 psi of pressure.

COOL DOWN END TEMP is the temperature at which the cool down cycle will end after a heat disinfection of the RO. At this temperature, the RO will be able to supply water to the loop.

6.5.6 Chemical Clean Screen

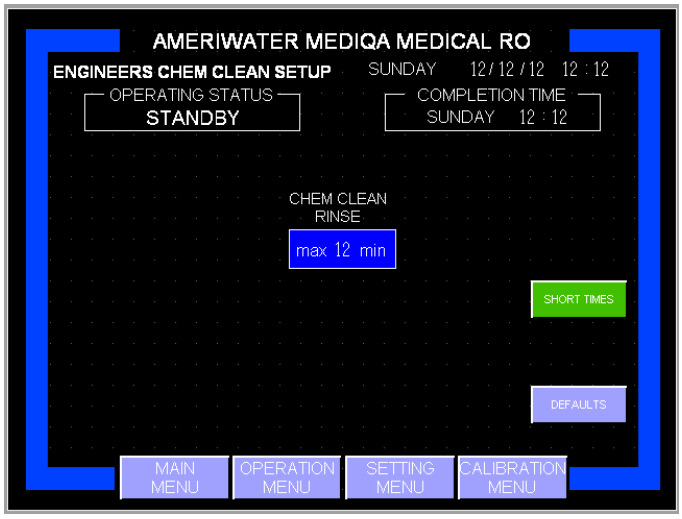


Figure 60

The Chemical Clean menu allows access to the CHEM CLEAN RINSE set-point. This set-point controls the amount of time the unit will perform a rinse to ensure all chemicals introduced to the RO are gone before supplying water to the loop.

6.5.7 Overrides Screen

The Overrides menu allows various components of the RO to be turned on while the unit is in standby. This is mainly used for testing or diagnostics purposes for the system. The overrides can only be used while the unit is not in operation. To reset any manual override, use the OVERRIDE RESET button.

Single Pass Screen

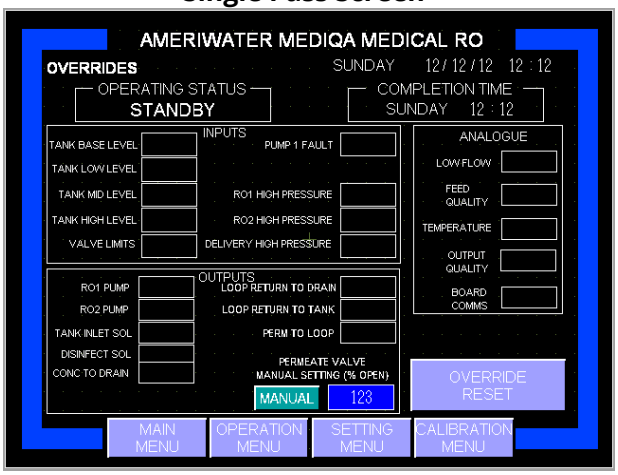


Figure 61

Dual Pass Screen

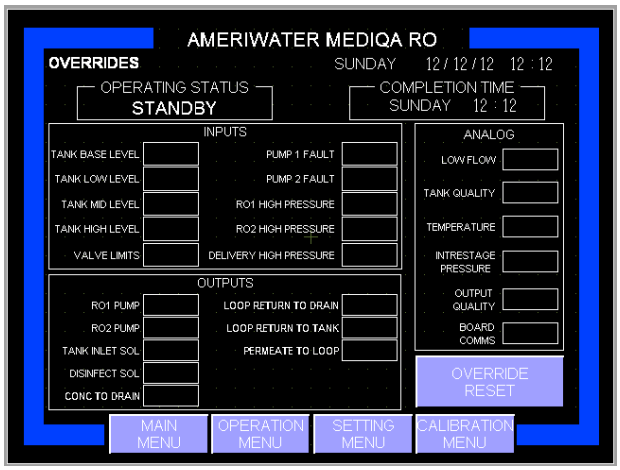


Figure 62

6.5.8 Overrides 2 Screen

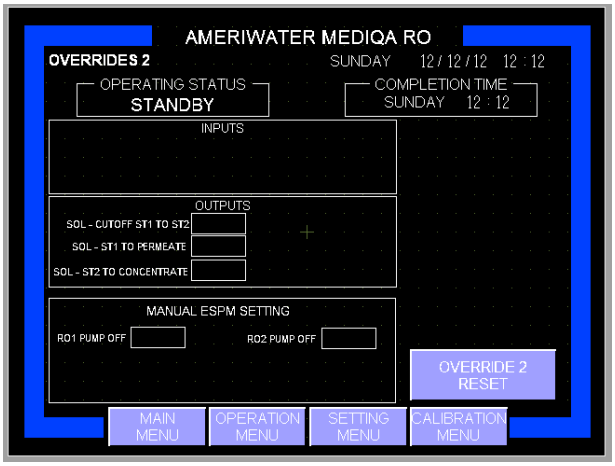


Figure 63

The Overrides 2 menu allows for the system to be manually put into Emergency Single Pass Mode (ESPM) by selecting which side (Stage 1 or Stage 2) to disable.

Selecting the OVERRIDE 2 RESET button will clear any overrides and take the system out of ESPM mode.

6.5.9 Diagnostics Screen

Single Pass Screen

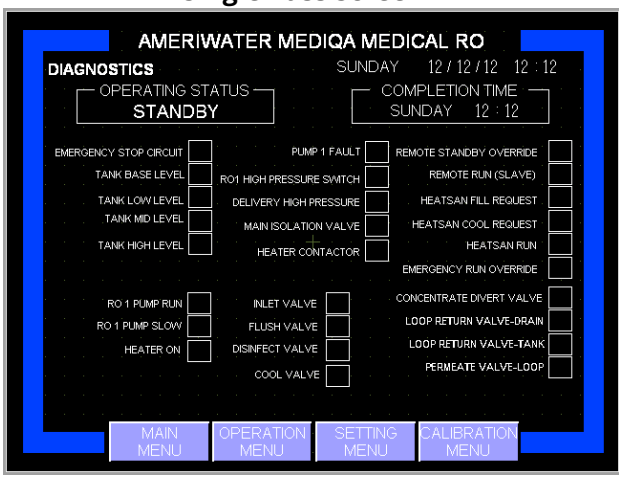


Figure 64

Dual Pass Screen

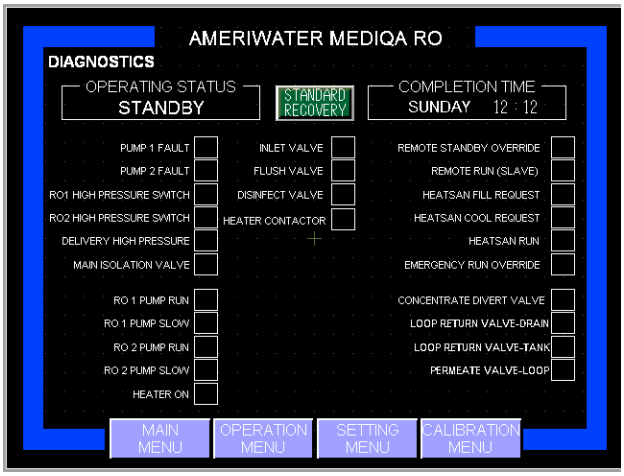


Figure 65

The DIAGNOSTICS screen details active system elements. Active elements are highlighted with green markers in each of the indicator boxes.

6.5.10 System Screen

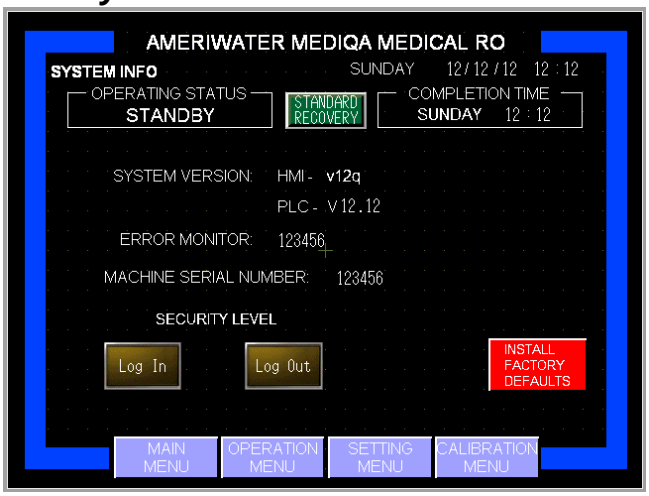


Figure 66

The system menu allows access to the software versions currently installed in the MediQA.

INSTALL FACTORY DEFAULTS will erase all current settings on the unit and replace them with the factory default values listed in Section 13.1. This button should not be pressed unless a critical problem with the system occurs. Requires level 6 access (restricted to AmeriWater service personnel) and 2 second hold to activate. The Security Level Buttons will let a person Log In or Out different levels of user access. If a user has logged into a level 6 access, it is suggested that they log out to prevent unauthorized access.

6.6 ESPM Confirmation Pop-up

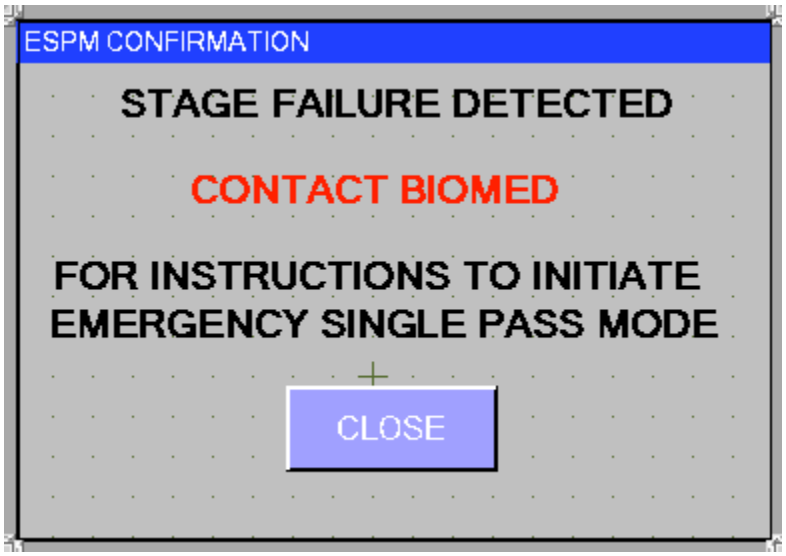


Figure 67

The ESPM Confirmation popup reminds the User to contact their Biomed if the system detects a problem that can be solved by using ESPM but needs to be manually initiated.

Figure 68

When the system automatically goes into ESPM, this reminder pops up to notify the User of the state of the system and to let the Biomed know that there is an issue with the equipment.

Figure 69

Whenever the system exits ESPM this reminder pops up to notify the User to perform the necessary procedures to bring the entire system back online. Reference Section 8.5 for these procedures.

7 FAULTS AND FAULT FINDING

See the Diagnostic Guide, 098-0010, for Checks and Proposed Actions for each alarm.
ALARMS will stop machine operation. It is not possible to restart the machine without addressing the fault.

Alarm Description	Reason
ALARMS	
RO1 Pump Over Pressure Alarm	Stage 1 Pump pressure switch (PS2) registers value higher than set-point on pressure switch for 5 seconds – X7 off
RO2 Pump Over Pressure Alarm (MDP only)	Stage 2 Pump pressure switch (PS3) registers value higher than set-point on pressure switch for 5 seconds – X11 off
RO1 Pump Fault Alarm	Stage 1 Pump communicating fault condition – X1 on
RO2 Pump Fault Alarm (MDP only)	Stage 2 Pump communicating fault condition – X2 on
Pump Fault Alarm (MDP only)	Both Stage 1 and Stage 2 pumps are communicating a fault condition – X1 and X2 on
Temperature High Alarm	Loop Over Temp Alarm Set-point Exceeded
Output Quality Alarm	Output Quality Alarm Set-point Exceeded
Tank Quality Alarm	Tank Quality Alarm Set-point Exceeded
Water Loss Alarm	Low Level Tank Float Switch opened during Chemical Clean or RO Heat Disinfect process – X4 off
Over Temperature Fault Alarm	Any RO Heat Disinfection Temp Set-point Exceeded
Emergency Stop Activated Alarm	E Stop button pressed on front of control panel – X0 off
PLC Analogue Card Error Alarm	PLC Analog Card communicating fault condition
PLC to PCB Comms Error Alarm	Communication port where conductivity board connects to PLC not receiving information
Output High Pressure Alarm	Delivery pressure switch registers value higher than set-point on pressure switch for 5 seconds – X12 off
Loop Return Valve Position Alarm	Loop Return M. Valve not sending close limit 30 seconds after being told to close during RO Heat Disinfect or Chemical clean – Y23 on, X22 off
Permeate Valve Position Alarm	Permeate M. Valve being told to open to loop during RO Heat Disinfection or Chemical Clean
Heater Over Temperature Alarm	Thermostat Over Temperature signal from Heater – X23 off
Feed Water Alarm	Base Level Tank Float Switch opened during operation – X3 off
Output Quality Rinse Alarm	Output Quality exceeds the Output Quality Alarm Set-point after the Auto Rinse Max time is met
Output Flow Rate High Alarm	Output flow detected above High Flow Alarm set-point

Output Flow Rate Low Alarm	Output flow detected lower than Low Flow Alarm set-point
Heatsan Unit -Water Loss Alarm Detected	Heatsan system detected water loss and is in alarm condition, locking out the RO – X25 on

Warnings are advisories. The machine will not stop but action should be taken to correct the fault.

Warning Description	Reason
WARNINGS	
RO1 Pump Fault Warning (ESPM Enabled – MDP Only)	Stage 1 Pump communicating fault condition – X1 on
RO2 Pump Fault Warning (ESPM Enabled – MDP Only)	Stage 2 Pump communicating fault condition – X2 on
Unit Operating In ESPM Warning (MDP Only)	System is running in Emergency Single Pass Mode
Time Date Not Set Warning	Timer mode is on but there are no schedules set for either Supply or Heat Disinfection
Operation Reset Error Warning	A function button on the Operation Menu screen has been selected more than 3 times in 3 minutes
Feed Tank Low Level Warning	Low Level Float Switch (second from bottom) opened during operation – X4 off
Level Sensor Error Warning	Float switches operated out of sequence
High Pressure RO1 Warning	Stage 1 Pump Pressure Switch (PS2) registers value higher than set-point on pressure switch – X7 off
High Pressure RO2 Warning (MDP only)	Stage 2 Pump Pressure Switch (PS3) registers value higher than set-point on pressure switch – X11 off
Output High Pressure Warning	Delivery Pressure Switch (PS1) registers value higher than set-point on pressure switch – X12 off
High Water Temperature Warning	Loop Over Temp Warning Set-point Exceeded
Output Quality Warning	Output Quality Warning Set-point Exceeded
Output Quality out of Range Warning	Output Conductivity Sensor transmitting the maximum detectable value for 30 seconds
Output Line Cell Error Warning	Output Conductivity Sensor transmitting over the maximum detectable value for 30 seconds
Tank Quality Warning	Tank Quality Warning Set-point Exceeded
Tank Quality out of Range Warning	Tank Conductivity Sensor transmitting the maximum detectable value for 30 seconds
Tank Line Cell Error Warning	Tank Conductivity Sensor transmitting over the maximum detectable value for 30 seconds

Loop Supply Sampling Error Warning (MDP only)	During operation, the Stage 1 Conductivity Sensor is detecting value greater than Loop Quality Warning Set-point for 30 seconds
Loop Flow Rate High Warning (MSP only)	High Flow Warning Set-point Exceeded
Loop Flow Rate Low Warning (MSP only)	Low Flow Warning Set-point Exceeded
Heater Contactor Fault Warning	Heater Contactor not closed – Y4 on, X10 off
Loop Return Valve Position Warning	In operation, the Loop Return Valve is not sending close limit after 30 seconds – X22 on, Y21 off
Permeate Valve Position Warning	Permeate Valve not closed after 30 seconds – X13 off
Chemical Clean Overdue Warning	Zero days left on Clean Reminder
RO Heat Disinfect 3 Failed Attempts Warning	Heat Disinfect not complete 3 consecutive weeks
Pre-treatment Lockout Enabled	Pre-treatment communicating it is regenerating – X24 off
RO1 Quality Over Range Warning (MDP only)	Stage 1 Permeate Conductivity Sensor transmitting the maximum detectable value for 300 seconds
RO1 Quality Line Cell Error Warning (MDP only)	Stage 1 Permeate Conductivity Sensor transmitting over the maximum detectable value for 300 seconds
Leak Detected Warning	Conductivity Board
Temperature Rise Warning	After 30 minutes, tank temperature is lower than previous reading during RO Heat Disinfection
Temperature Hold Low Warning	Tank Temperature Probe reading is lower than Tank Return Probe reading

NOTE: The pumps will run slow during the RO Heat Disinfection and chemical clean process. If the pumps are running slow in normal operation, ensure that the water temperature is below the Pump Run Slow set-point, factory set to 90 °F.

NOTE: If the permeate to the loop is over the alarm set-point, the MediQA will attempt to rectify this by closing the permeate valve and performing a rinse. If this does not bring the quality within the allowable range, the RO will shut down and there will be an output quality alarm.

8 SANITIZING & CLEANING

It is recommended that the ***MediQA*** unit be chemically cleaned at regular intervals to ensure performance is maintained. The RO membranes should be chemically cleaned when there is a significant decrease in product water flowrate or an increase in product conductivity up to output quality warning limit.

It is recommended that RO heat disinfection is completed at least weekly in order to protect against possible bio-film formulation. AAMI requires that the unit be disinfected at least once every 4 weeks.

8.1 Exterior Surface Cleaning

When cleaning the exterior surfaces of the device, it is recommended to use a soft non-marking cloth dampened with water. Do not use chemical cleaning agents. If it is necessary to use a chemical cleaning agent, contact AmeriWater for permission prior to use.

8.2 Chemical Cleaning

Test equipment required:
•Hand held conductivity meter or chemical test strips
•Approved cleaning chemical

The quantity of chemical required is calculated according to the volume of water in the MediQA, not to exceed the maximum concentration stated. **STIR SOLUTION WELL WHEN USING AMERICLEAN A AND B POWDER.**

Chemical Volumes:

Unit	MediQA Water Volume when full (Gal)	AmeriClean A Liquid P/N: 95810140 (ml)	AmeriClean B Liquid P/N: 95810141 (ml)	AmeriClean A Powder P/N: 37-0004 (ml)	AmeriClean B Powder P/N: 37-0005 (ml)
00MSP2-230	30	2839	2839	800 (3.0 lbs.)	1110 (3.0 lbs.)
00MSP3-230	32	3028	3028	800 (3.0 lbs.)	1110 (3.0 lbs.)
00MSP3HF-230	32	3028	3028	800 (3.0 lbs.)	1110 (3.0 lbs.)
00MDP2-230	32	3028	3028	800 (3.0 lbs.)	1110 (3.0 lbs.)
00MDP4-230	37	3502	3502	1064 (4.0 lbs.)	1488 (4.0 lbs.)

AmeriClean A/B Liquid 1:40; AmeriWater recommends 2365 ml per 25 Gal.
AmeriClean A Powder 1 lbs. (266 ml) to 10 gal water; AmeriClean B Powder 1 lbs. (372 ml) to 10 gal water. Case will include 10-1 lbs. bags of cleaner.
Recommended cleaning regimes:

Iron, Bacteria, Scale: AmeriClean A.
For hard water areas even on systems operating on a softened water supply it is recommended that the unit is chemically cleaned using AmeriClean A.

For soft water areas, cleaning using AmeriClean B, organic removal formulation is recommended in place of AmeriClean A.

WARNING: **Failure to test sample may lead to chemicals entering the distribution loop.**

DANGER: **Please read the appropriate material safety data sheets and always wear the recommended personnel protective equipment before handling any of the chemicals.**

CAUTION: **(i) Warn all end users that chemical cleaning is taking place.**
(ii) Stop dialysis, check with Renal technicians.
(iii) Isolate distribution loop main or other systems by closing appropriate manual isolation valves.

WARNING: **Wear personal protective equipment when conducting the chemical clean process EYE WEAR, CLOTHING, GLOVES.**

Method:
Test the pH of the water before beginning to know the end point of the cleaning. When the water returns to this pH that means the chemical has been rinsed out.

Chemical cleaning of the unit can be initiated from the OPERATION MENU of the touch screen.

Stop the MediQA by pressing the OFF button on the OPERATION MENU.

Depress CHEMICAL CLEAN button.

Wait for prompt to ADD CLEANING CHEMICAL. Remove the lid of the tank and add chemical to tank. Slowly add the chemical in the amount listed in the above table. **IF USING POWDER, AGITATE THE SOLUTION UNTIL ALL OF THE POWDER HAS DISSOLVED PRIOR TO ADDING TO BREAK TANK**. Replace the tank lid.

Depress ADD CLEANING CHEMICAL button. Once added, the cleaning chemical will be automatically circulated around the MediQA.

On completion of the automatic circulation and drain down / flush, a prompt TEST FOR RESIDUE CHEMICALS is displayed.

A permeate water sample **must** be taken and tested for any presence of cleaning chemical. Check with renal clinical / technicians that water quality is acceptable for use.

If acceptable for use depress TEST FOR RESIDUE CHEMICALS once the sample is found to be satisfactory.

A final prompt is displayed PASS WATER QUALITY. Depress to accept water quality. This acknowledges acceptance that the samples have passed water quality test (see above). If water does not meet standards additional rinses are preformed until it does.

If any alarm messages are displayed during the clean, then refer to the fault finding section in this manual.

8.3 Approved Chemicals

AmeriWater supplies a comprehensive range of chemicals for management and cleaning of RO membranes and distribution loops. Clean with AmeriClean B first then A.

The following chemicals are approved for use on the ***MediQA***:

AmeriClean A

This is a low pH RO membrane cleaner to remove hardness scale and iron oxide deposits.

To test for the presence of AmeriClean A in permeate, check that the conductivity is less than 30µS/cm and pH is at or near 7.

AmeriClean B

This is an alkaline liquid cleaner containing organic sequestrant, inorganic sequestrant, detergent and emulsifiers. AmeriClean B is used for removing organics, Silica, inorganic colloids, and biological material.
To test for the presence of AmeriClean B in permeate, check that the conductivity is less than 30 µS/cm and pH is at or near 7.

NOTE: **Always refer to Safety Data Sheets before handling any of the cleaning chemical products. Wear the safety equipment recommended. Follow the instructions on the pack.**

8.4 RO Heat Disinfect Procedure

A heat disinfection routine is provided to kill waterborne bacteria. Heat disinfection, when completed regularly, reduces the potential for harmful biofilms to generate within the machine pipe work and system components.

The MediQA unit can be set up to complete automatic heat disinfections or heat disinfections can be started manually.

8.4.1 Manual RO Heat Disinfection

From the OPERATION MENU select RO HEAT DISINFECTION. Heat disinfection settings must be established in the SETTINGS MENU (see Section 6).

Manual heat disinfections can be aborted by pressing the emergency stop, pressing the OFF button, or switching the main isolator to off.

DANGER: **When the system is restored (switched back ON via isolator or resetting Emergency stop) the system may contain HOT water (subject to the duration of OFF time). When either**

CONTINUOUS or TIMER operation is selected the system will first perform a cool down routine before going into service (i.e. supply of water to the distribution loop).

8.4.2 Automatic RO Heat Disinfection

Heat disinfections can be started automatically when times have been programmed to the RO heat disinfection timer schedule (see Section 6.4.3).

Automatic heat disinfections will only commence if the unit is running in TIMER operation.

8.5 ESPM Start-Up Procedure

If the unit operated in Emergency Single Pass Mode (ESPM) for more than 72 hours or any service was performed on the unit, a heat disinfection should be performed before putting the unit back into service. See section 8.4.

9 MAINTENANCE

Frequency	Maintenance
Yearly	Thermostat Testing (see Section 9.1).
5 years	Replace battery in PLC to maintain time when power is turned off (reference TSB-0053). Replacement P/N is 999-0224.

9.1 Thermostat Testing

AmeriWater recommends the thermostat on the heating element be tested annually by qualified personnel. To conduct this testing, access the device when no patients are under treatment.

To begin, remove the lid from the MediQA storage tank. Select the calibration menu and log in (see Section 6.5). Access the OVERRIDES menu and open the fill solenoid valve. Allow the tank to fill to between 50-75% and close the fill valve. Ensure that the heater is completely submerged.

Place a known good thermometer into the tank away from the heater. Turn on the heater on the OVERRIDES page.

CAUTION: **During testing, water temperature will be sufficient to create steam, which is hot enough to scald. Ensure the temperature can be determined without reaching into the tank.**

Verify that the heater shuts off between 185 – 210° F.

If the thermometer on the heater does not shut off at the prescribed temperature, contact AmeriWater for guidance.

Navigate to the OVERRIDES screen and open the fill solenoid valve and allow the tank to completely fill. Close the fill solenoid. Doing this will reduce the temperature of the water. Open the drain valve and allow the tank to completely drain. Close the drain valve and remove the thermometer from the tank and refill the tank before replacing the lid.

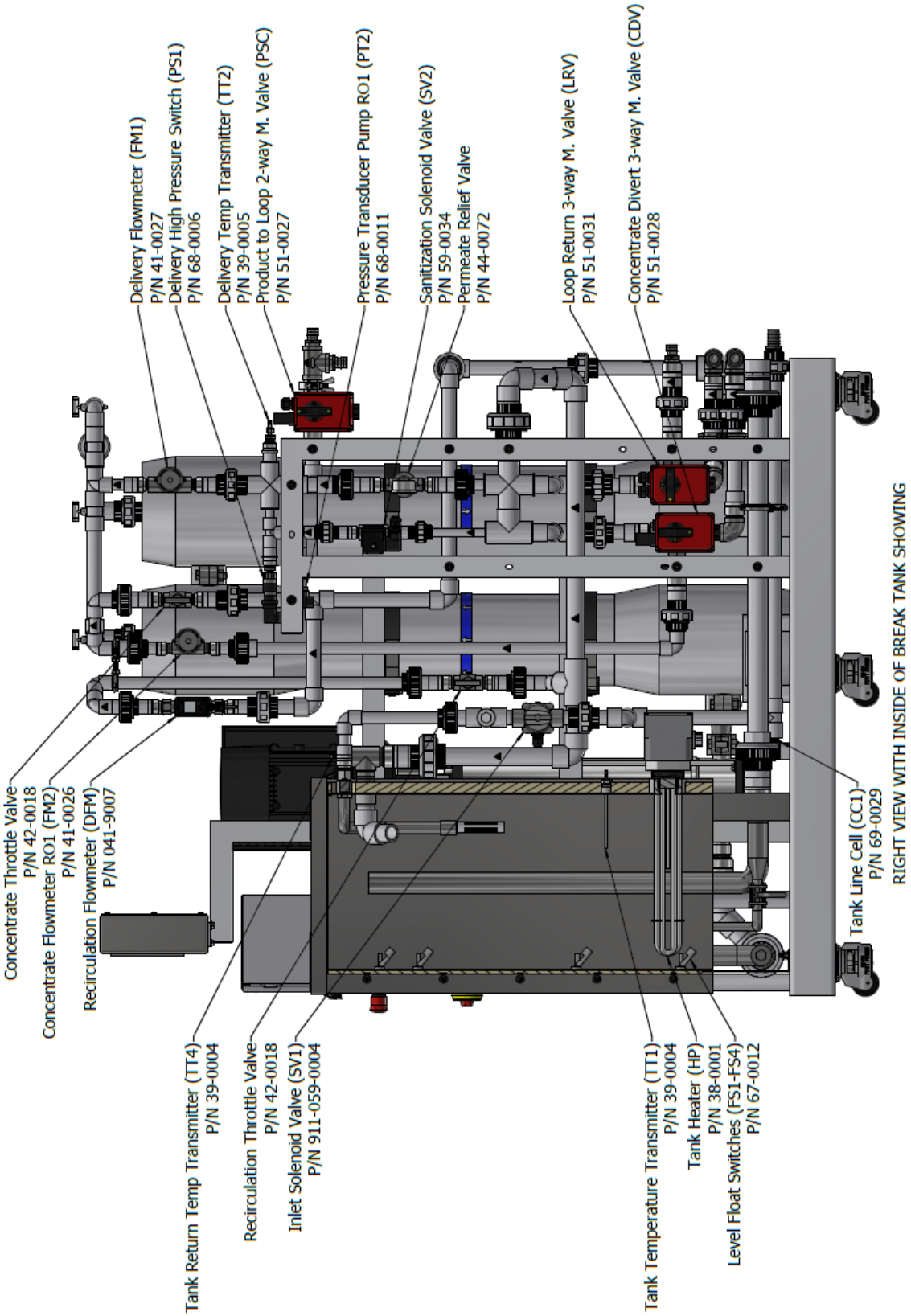
9.2 Spare Parts

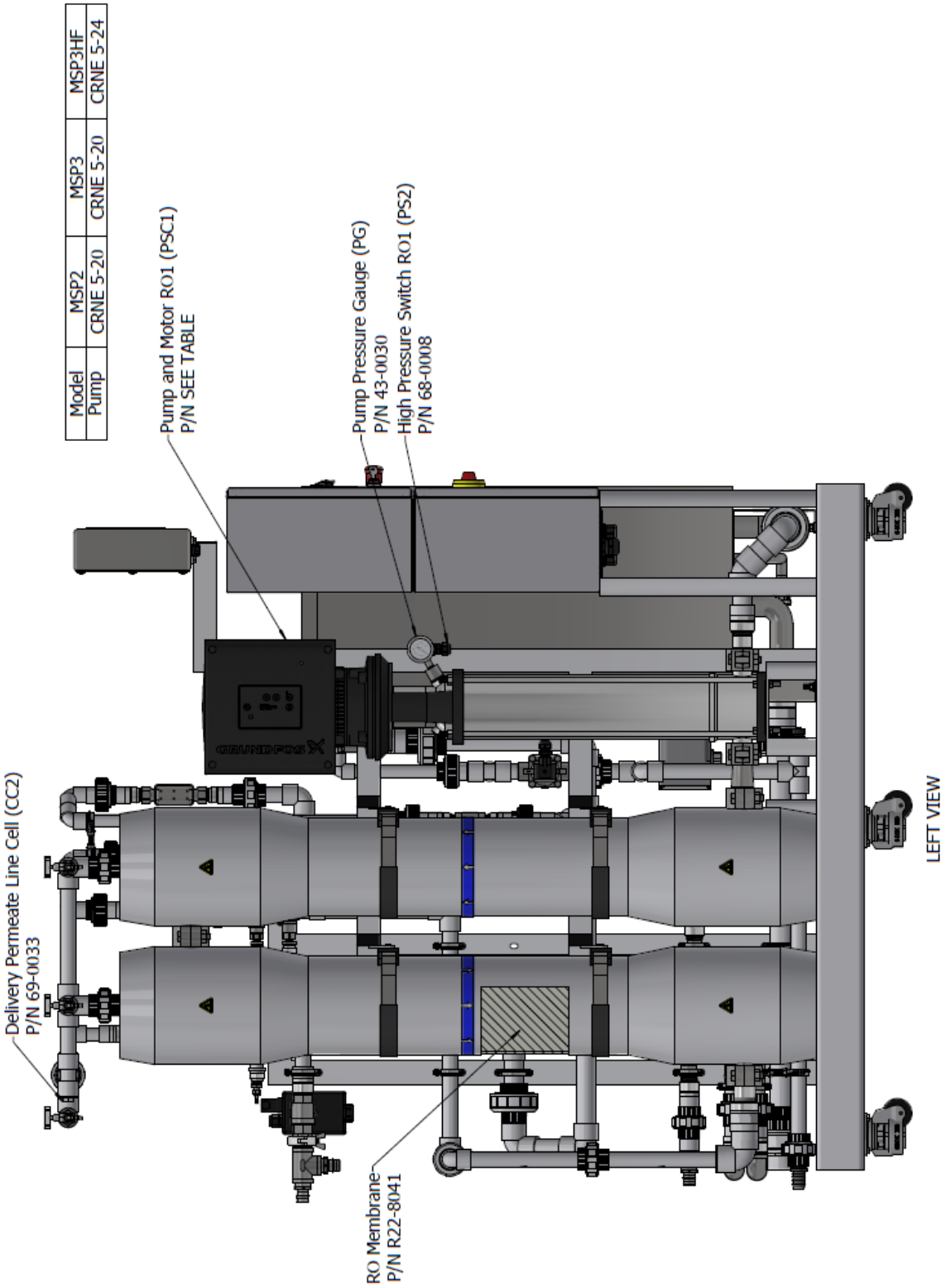
Should a faulty item be identified, please notify our service department of the item part number.

The MediQA is classified as a medical device. Replacement parts should be recorded using the log sheet in Section 9.3. This must be done in order to maintain the integrity of the machine throughout its operational life in accordance with medical device regulations.

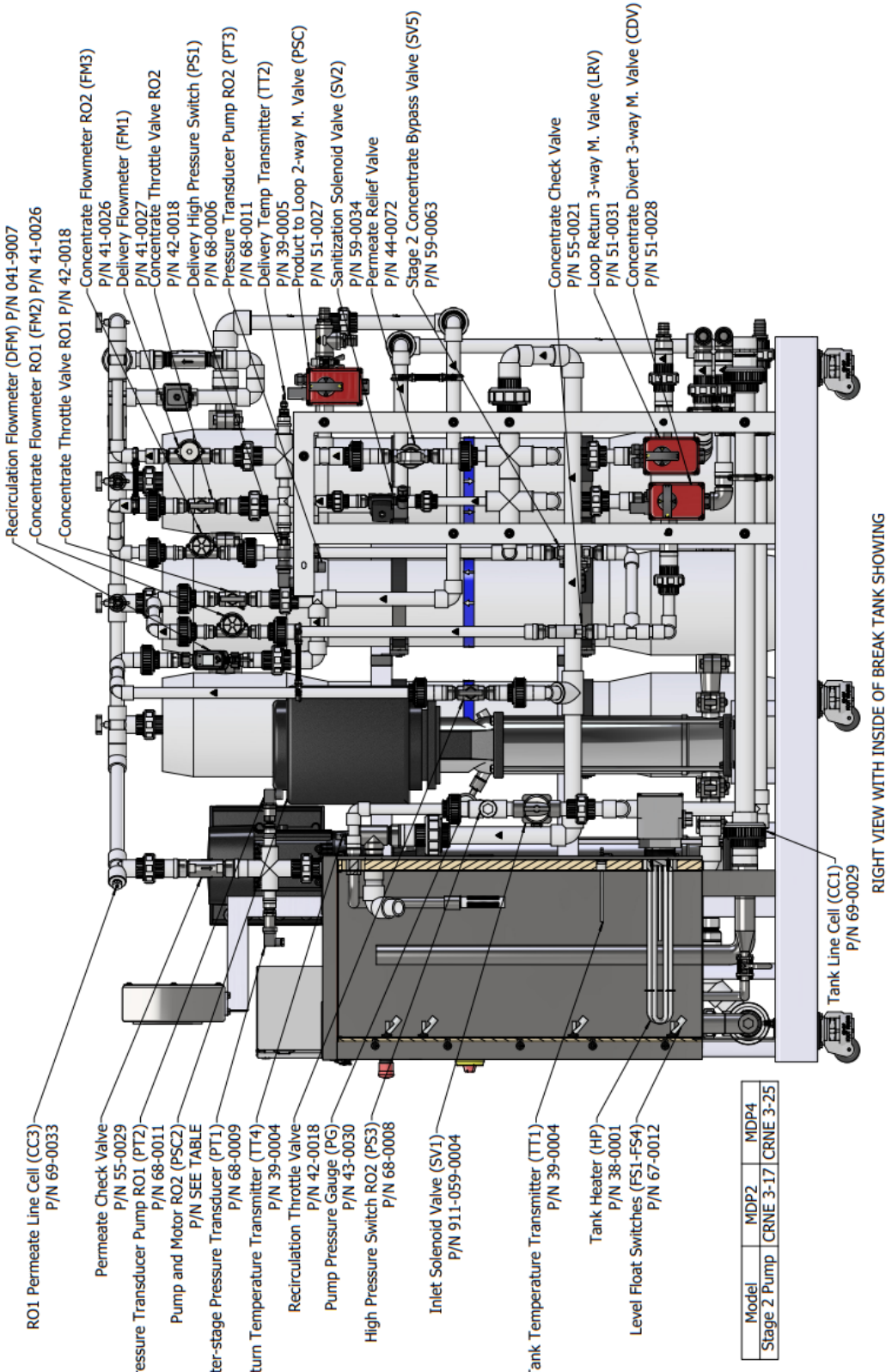
Failure to install AmeriWater supplied replacement parts will invalidate the warranty. If replacement parts are not installed, then the responsibility for any subsequent incidents linked to the replaced part or affected parts rest with the buyer / hospital / maintenance staff or service provider.

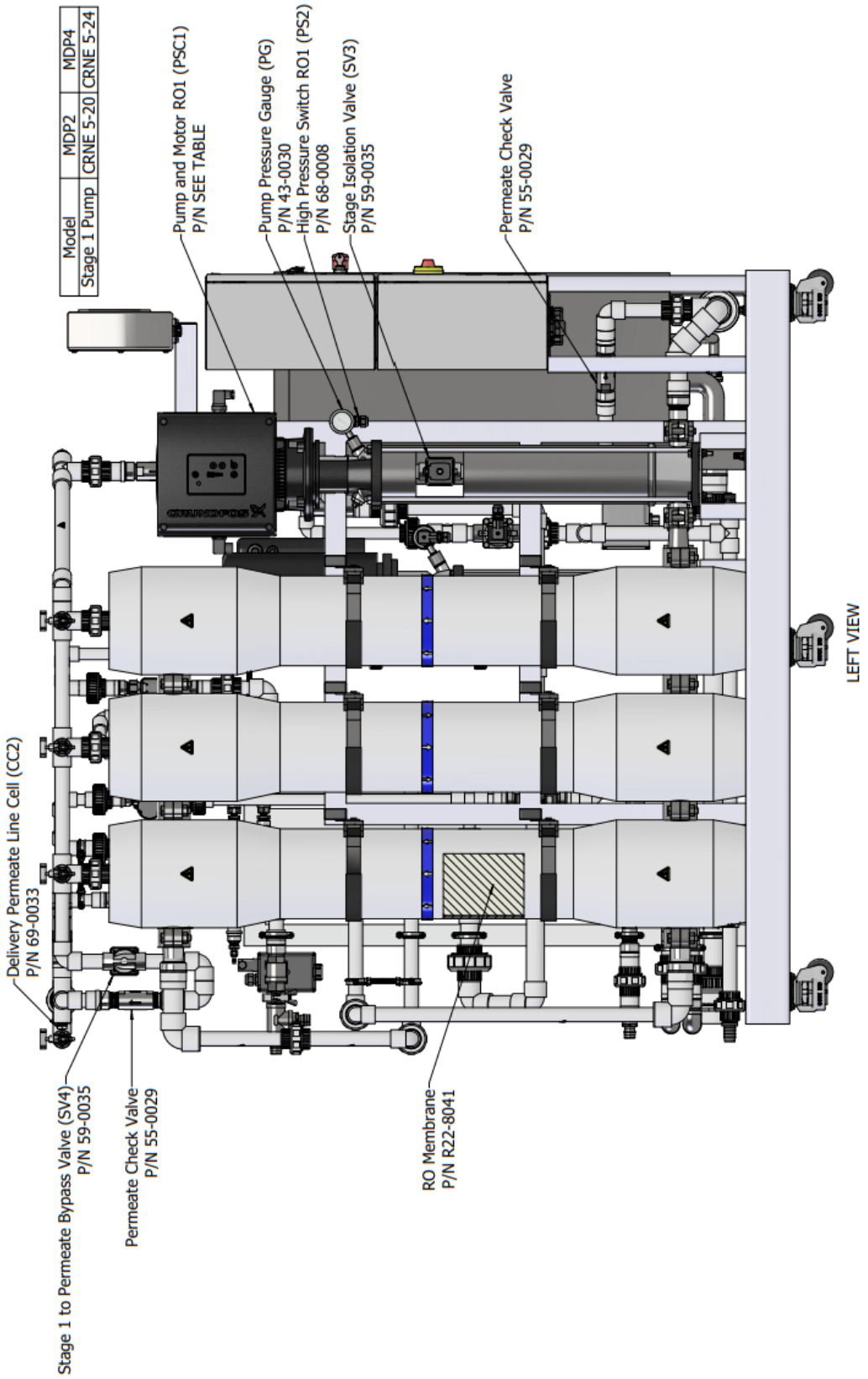
9.2.1 MSP Spare Parts




Model
Pump
MSP2
CRNE 5-20
MSP3
CRNE 5-20
MSP3HF
CRNE 5-24
Pump and Motor RO1 (PSC1)
P/N SEE TABLE
Pump Pressure Gauge (PG)
P/N 43-0030
High Pressure Switch RO1 (PS2)
P/N 68-0008
Delivery Permeate Line Cell (CC2)
P/N 69-0033
RO Membrane
P/N R22-8041
LEFT VIEW

9.2.2 MDP Spare Parts




Model
Stage 1 Pump
MDP2
CRNE 5-20
MDP4
CRNE 5-24
Pump and Motor RO1 (PSC1)
P/N SEE TABLE
Pump Pressure Gauge (PG)
P/N 43-0030
High Pressure Switch RO1 (PS2)
P/N 68-0008
Stage Isolation Valve (SV3)
P/N 59-0035
Permeate Check Valve
P/N 55-0029
Delivery Permeate Line Cell (CC2)
P/N 69-0033
Stage 1 to Permeate Bypass Valve (SV4)
P/N 59-0035
Permeate Check Valve
P/N 55-0029
RO Membrane
P/N R22-8041
LEFT VIEW

9.3 Replacement Part History Log Sheet

MediQA Replacement Parts Record

Unit Serial No. | **Location**

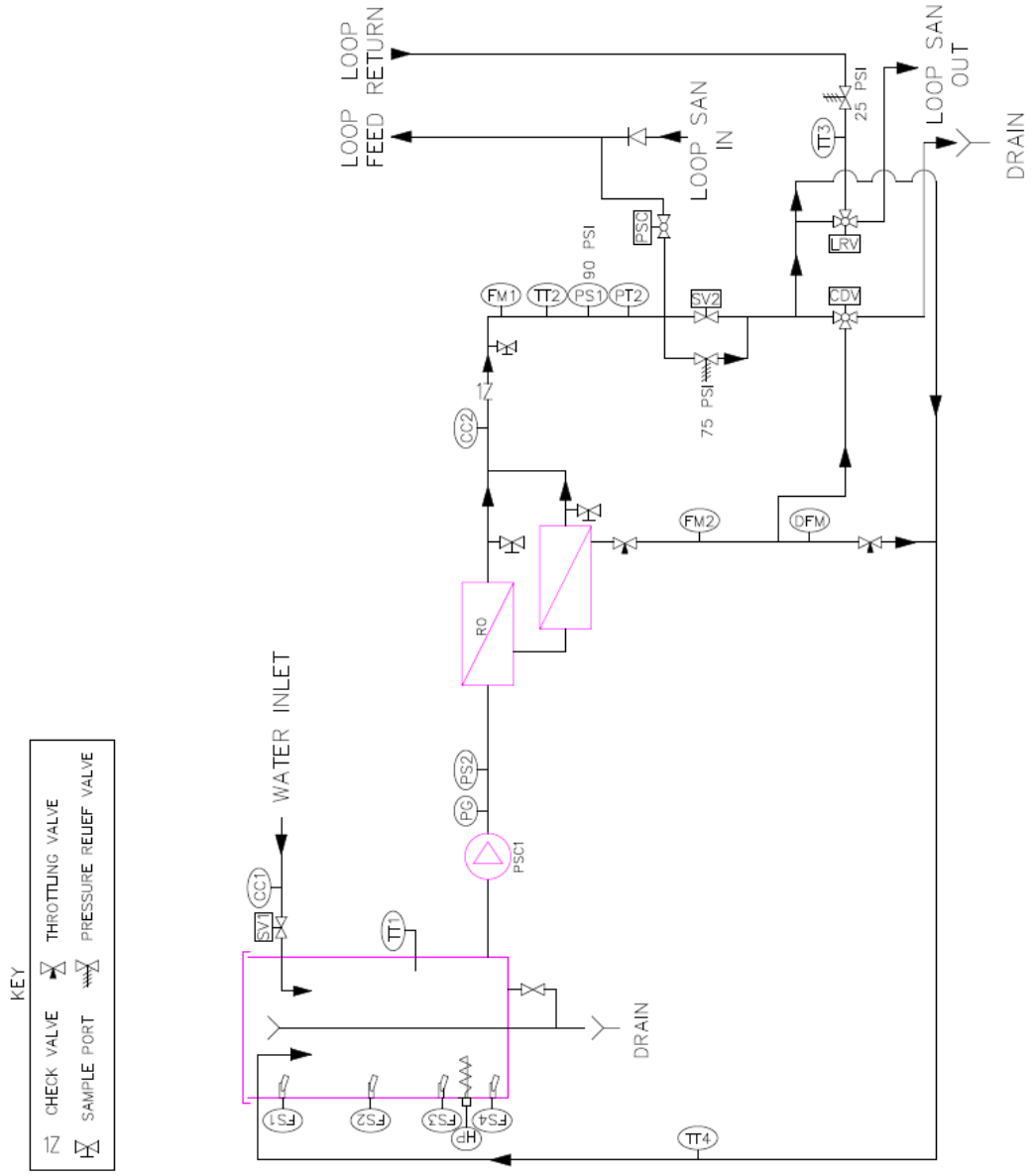
Date Replaced	Description	Reason for replacement	Tech Initials

10 FLOW DIAGRAMS

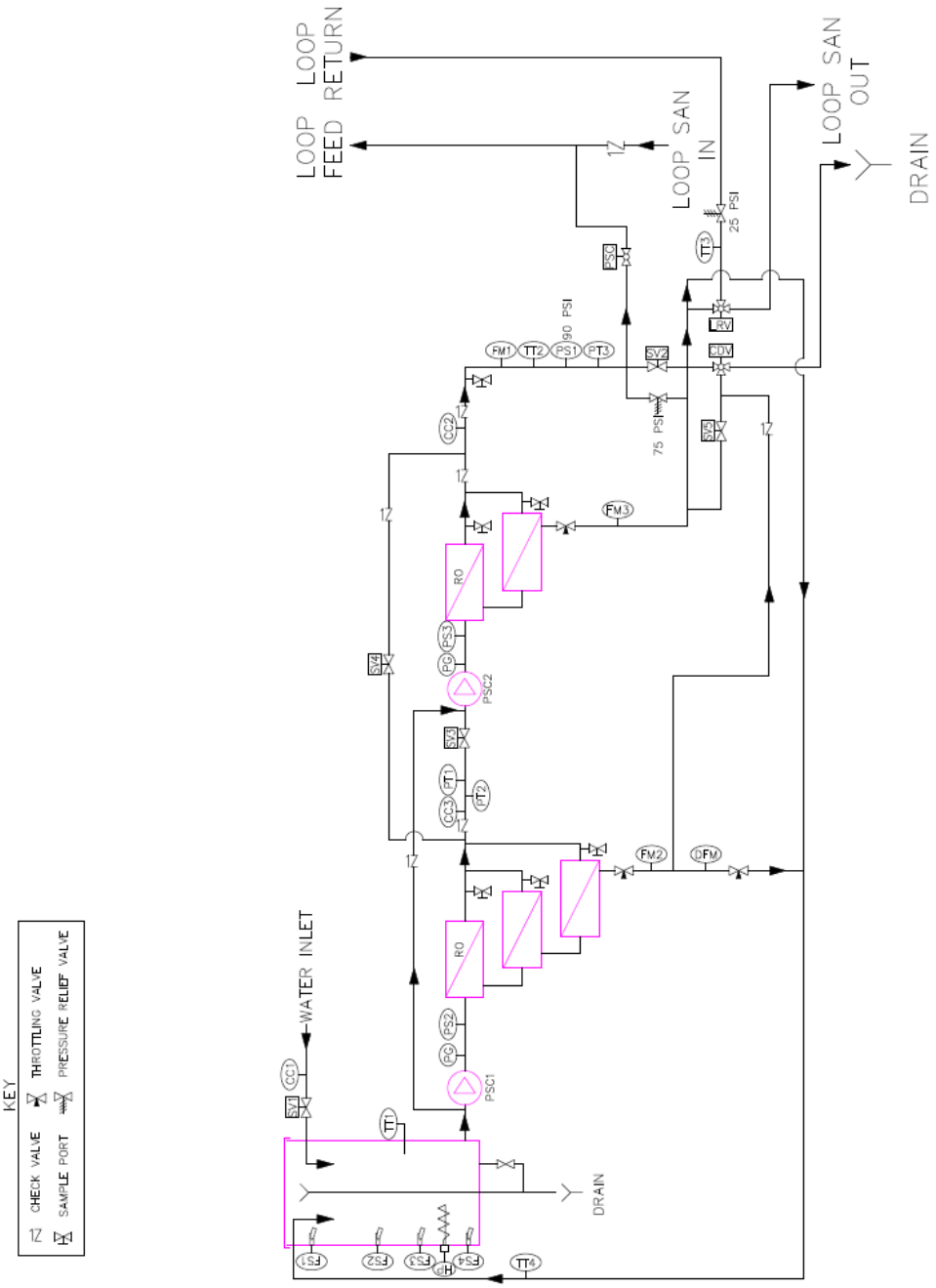
MSP UNITS

COMPONENTS

ITEM	DESCRIPTION
SV1	INLET SOLENOID VALVE
SV2	SANITIZATION SOLENOID VALVE
HP	TANK HEATER
FS1	HIGH LEVEL FLOAT SWITCH
FS2	MID LEVEL FLOAT SWITCH
FS3	LOW LEVEL FLOAT SWITCH
FS4	BASE LEVEL FLOAT SWITCH
PSC1	PUMP AND MOTOR RO1
PG	PUMP PRESSURE GAUGE
PS1	DELIVERY HIGH PRESSURE SWITCH
PS2	HIGH PRESSURE SWITCH RO1
TT1	TANK TEMPERATURE TRANSMITTER
TT2	DELIVERY TEMPERATURE TRANSMITTER
TT3	LOOP RETURN TEMPERATURE TRANSMITTER
TT4	TANK RETURN TEMPERATURE TRANSMITTER
CC1	TANK LINE CELL
CC2	DELIVERY PERMEATE LINE CELL
PSC	PRODUCT TO LOOP 2-WAY M. VALVE
LRV	LOOP RETURN 3-WAY M. VALVE
CDV	CONCENTRATE DIVERT 3-WAY M. VALVE
FM1	DELIVERY FLOWMETER
FM2	CONCENTRATE FLOWMETER
DFM	RECIRCULATION FLOWMETER
PT2	PRESSURE TRANSDUCER PUMP RO1



MDP UNITS

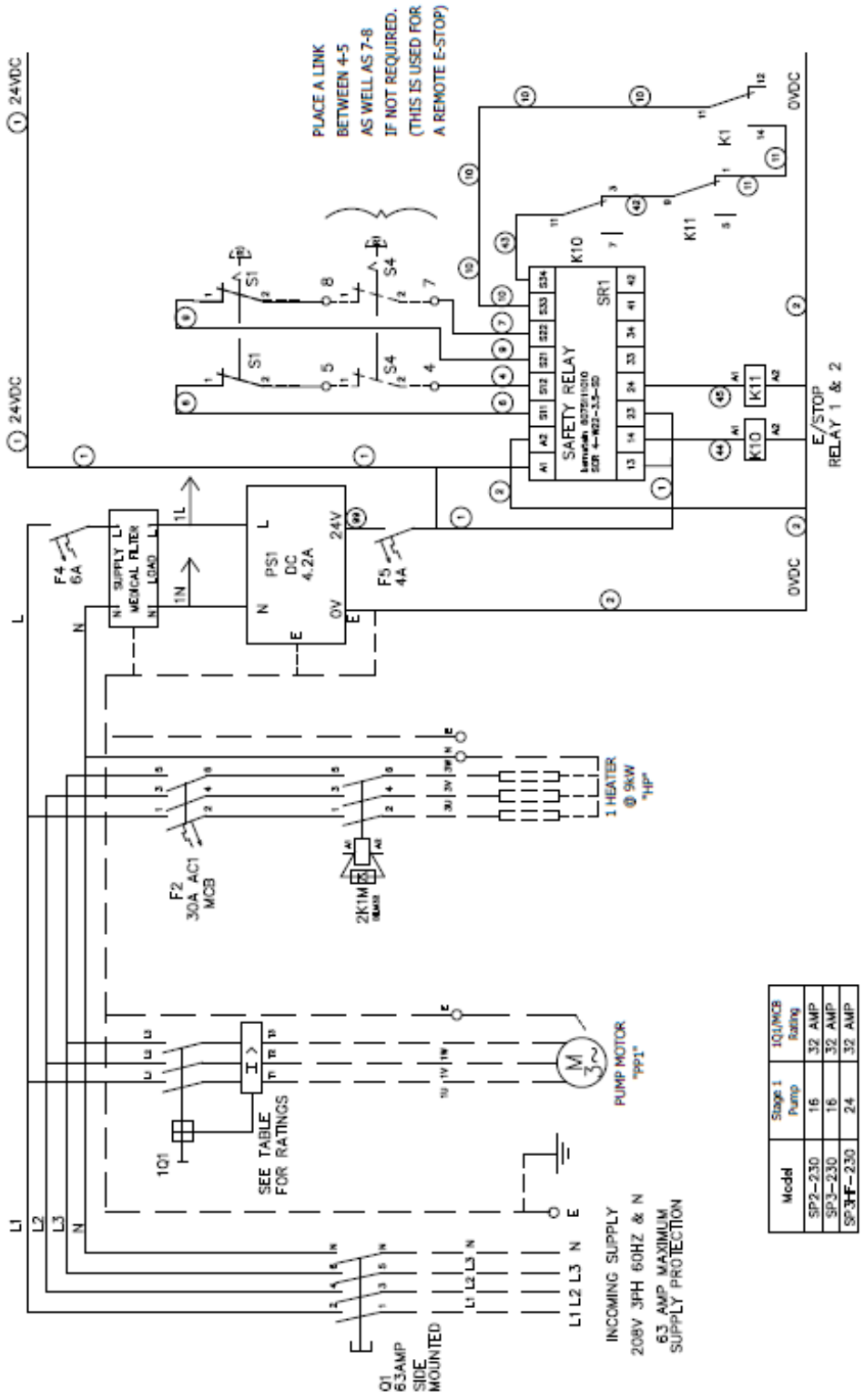


COMPONENTS

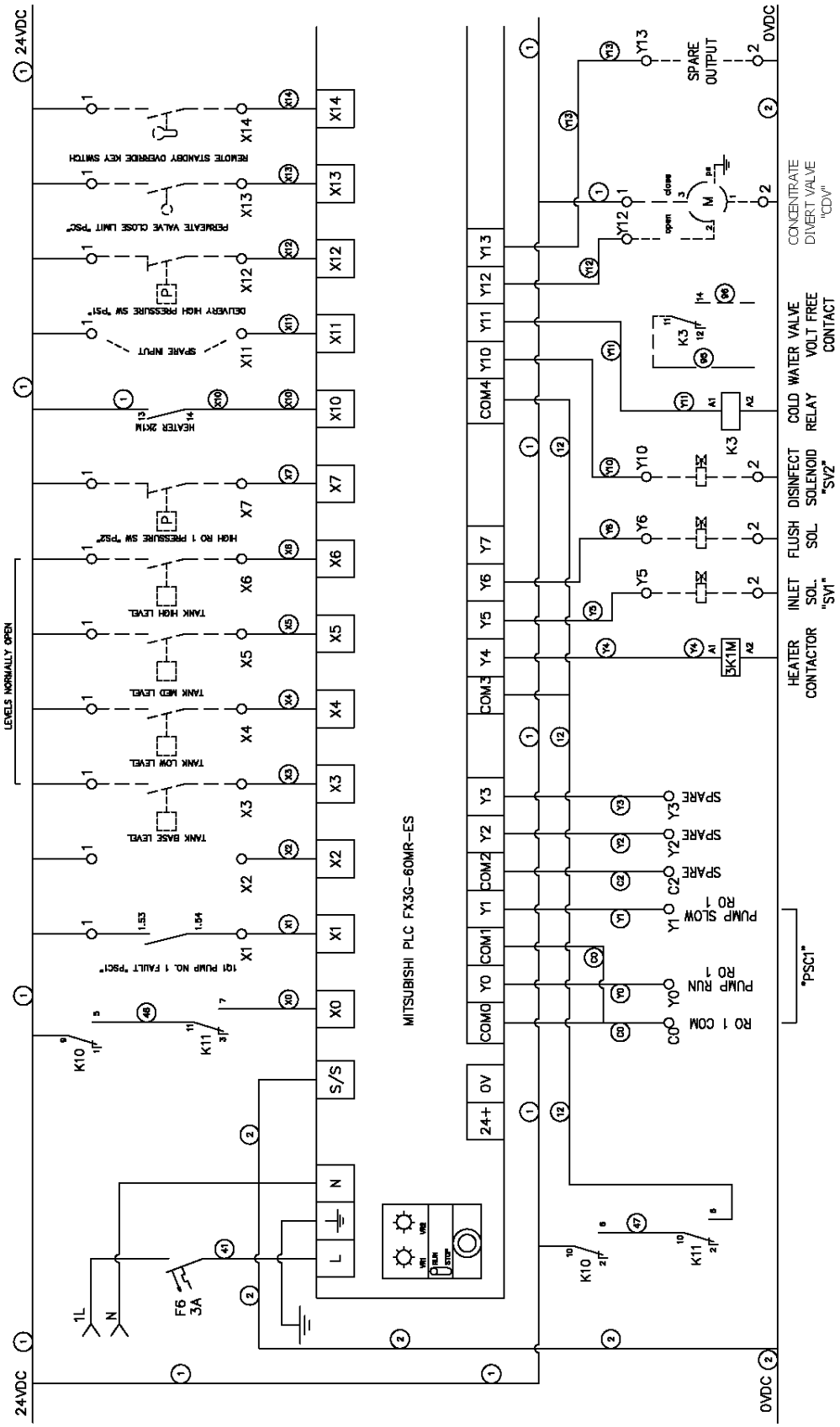
ITEM	DESCRIPTION
SV1	INLET SOLENOID VALVE
SV2	SANITIZATION SOLENOID VALVE
SV3	STAGE ISOLATION VALVE
SV4	STAGE 1 TO PERMEATE BYPASS VALVE
SV5	STAGE 2 CONCENTRATE BYPASS VALVE
HP	TANK HEATER
FS1	HIGH LEVEL FLOAT SWITCH
FS2	MID LEVEL FLOAT SWITCH
FS3	LOW LEVEL FLOAT SWITCH
FS4	BASE LEVEL FLOAT SWITCH
PSC1	PUMP AND MOTOR RO1
PSC2	PUMP AND MOTOR RO2
PG	PUMP PRESSURE GAUGE
PS1	DELIVERY HIGH PRESSURE SWITCH
PS2	HIGH PRESSURE SWITCH RO1
PS3	HIGH PRESSURE SWITCH RO2
TT1	TANK TEMPERATURE TRANSMITTER
TT2	DELIVERY TEMPERATURE TRANSMITTER
TT3	LOOP RETURN TEMPERATURE TRANSMITTER
TT4	TANK RETURN TEMPERATURE TRANSMITTER
CC1	TANK LINE CELL
CC2	DELIVERY PERMEATE LINE CELL
CC3	RO1 PERMEATE LINE CELL
PSC	PRODUCT TO LOOP 2-WAY M. VALVE
LRV	LOOP RETURN 3-WAY M. VALVE
CDV	CONCENTRATE DIVERT 3-WAY M. VALVE
FM1	DELIVERY FLOWMETER
FM2	CONCENTRATE FLOWMETER RO1
FM3	CONCENTRATE FLOWMETER RO2
DFM	RECIRCULATION FLOWMETER
PT1	INTER-STAGE PRESSURE TRANSDUCER
PT2	PRESSURE TRANSDUCER PUMP RO1
PT3	PRESSURE TRANSDUCER PUMP RO2

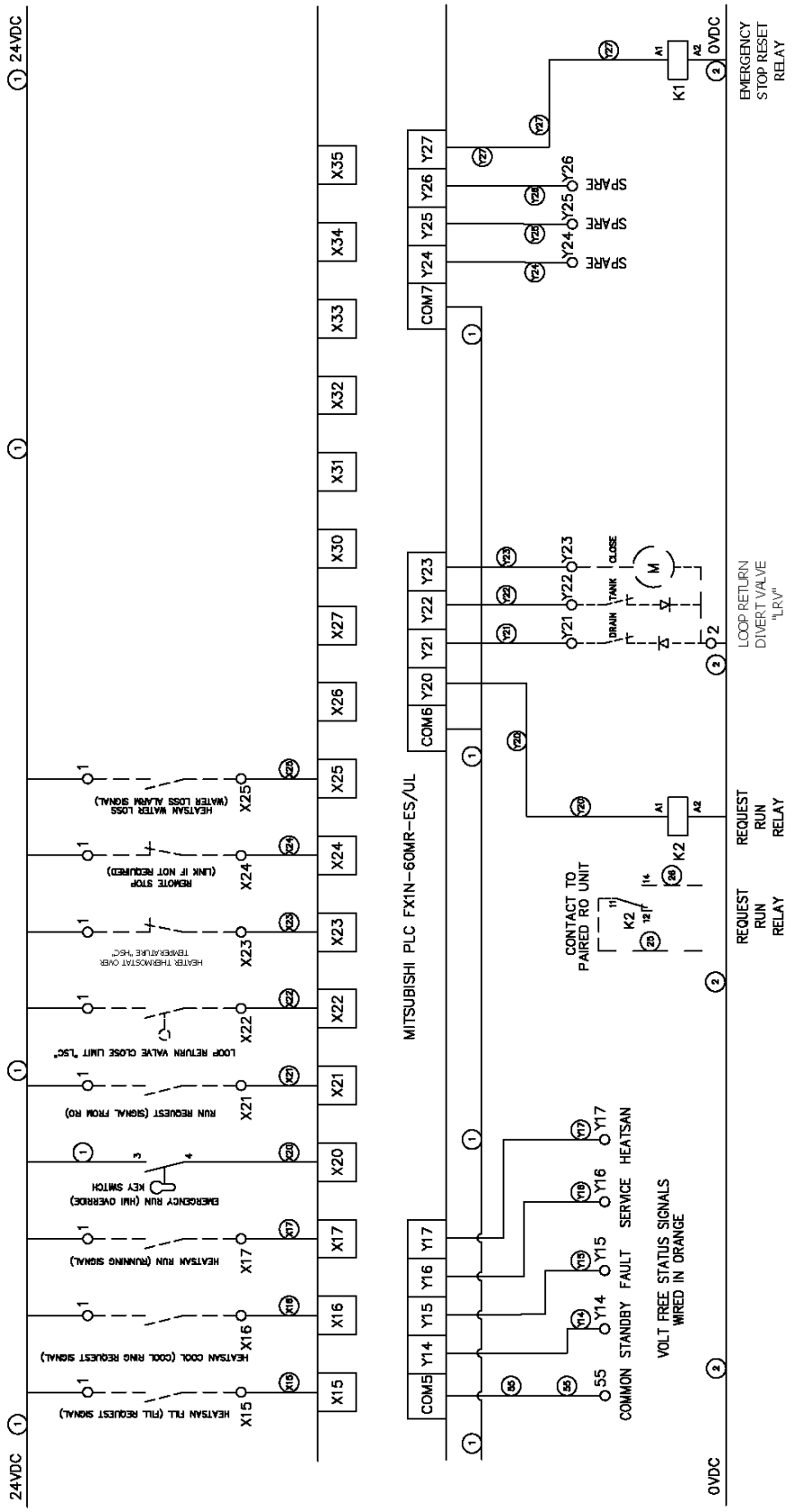
11 WIRING SCHEMATIC

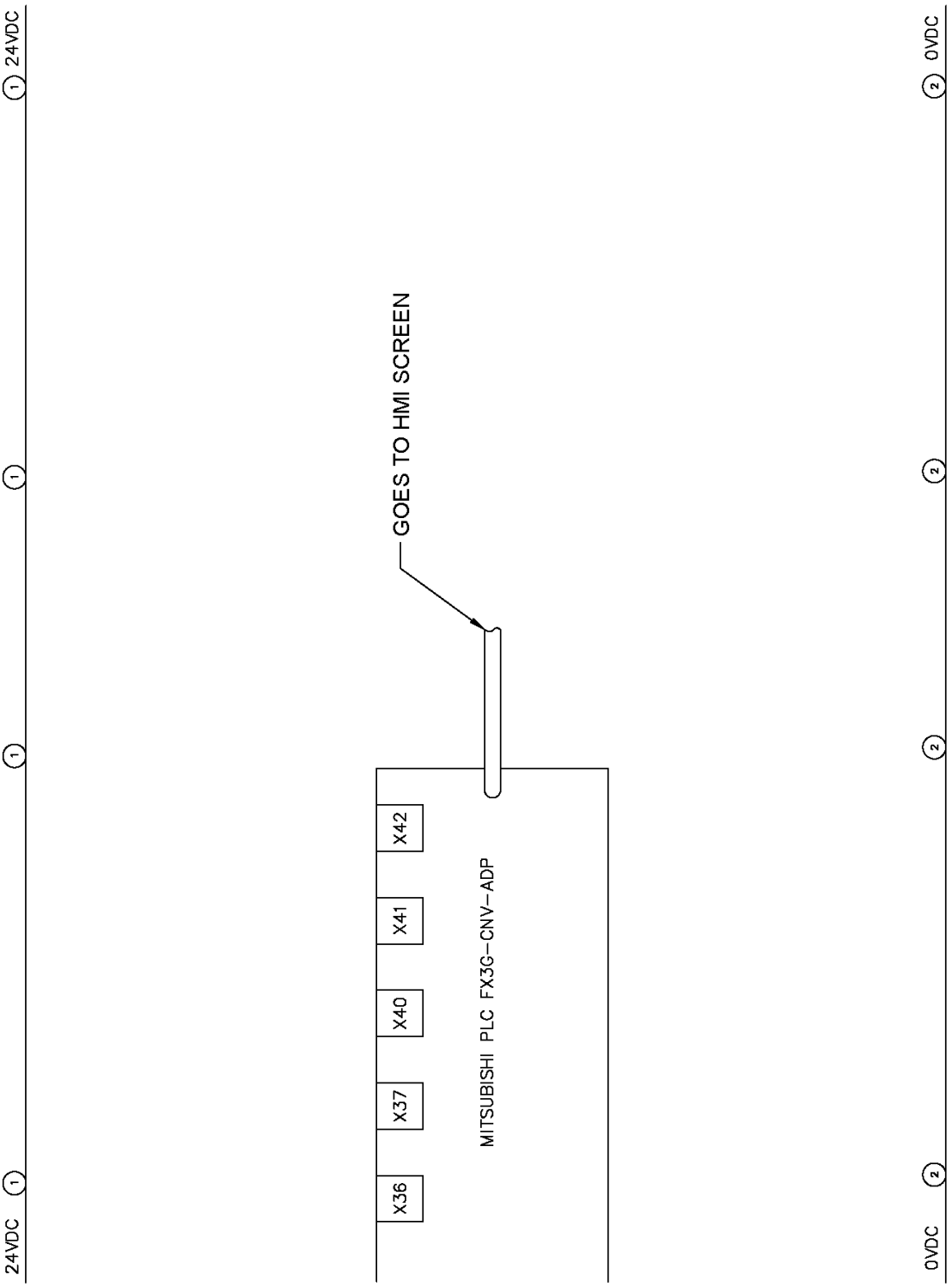
MSP UNITS



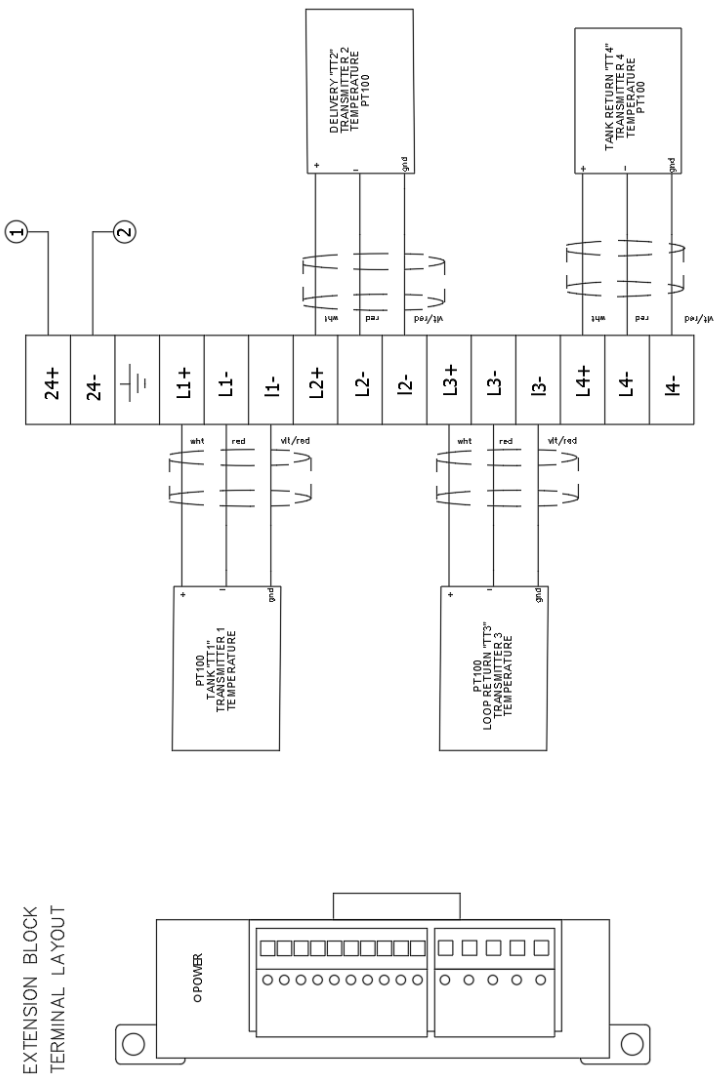
Model	Stage 1 Pump	1Q1/MCB Rating
SP2–230	16	32 AMP
SP3–230	16	32 AMP
SP3HF–230	24	32 AMP


24VDC
0VDC
LEVELS NORMALLY OPEN
TANK BASE LEVEL
TANK LOW LEVEL
TANK MED LEVEL
TANK HIGH LEVEL
HIGH RO 1 PRESSURE SW "PS2"
DELIVERY HIGH PRESSURE SW "PS1"
REMOTE STANDBY OVERRIDE KEY SWITCH
HEATER 2K1M
SPARE INPUT
PERMEATE VALVE CLOSE LIMIT "PSC"
101 PUMP NO. 1 FAULT "PSC1"
MITSUBISHI PLC FX3G-60MR-ES
PUMP RUN RO 1
PUMP SLOW RO 1
RO 1 COM
SPARE
SPARE
SPARE
SPARE OUTPUT
HEATER CONTACTOR
INLET SOL. "SV1"
FLUSH SOL
DISINFECT SOLENOID "SV2"
COLD WATER VALVE RELAY
VOLT FREE CONTACT
CONCENTRATE DIVERT VALVE "CDV"
"PSC1"
F6 3A
1L
N

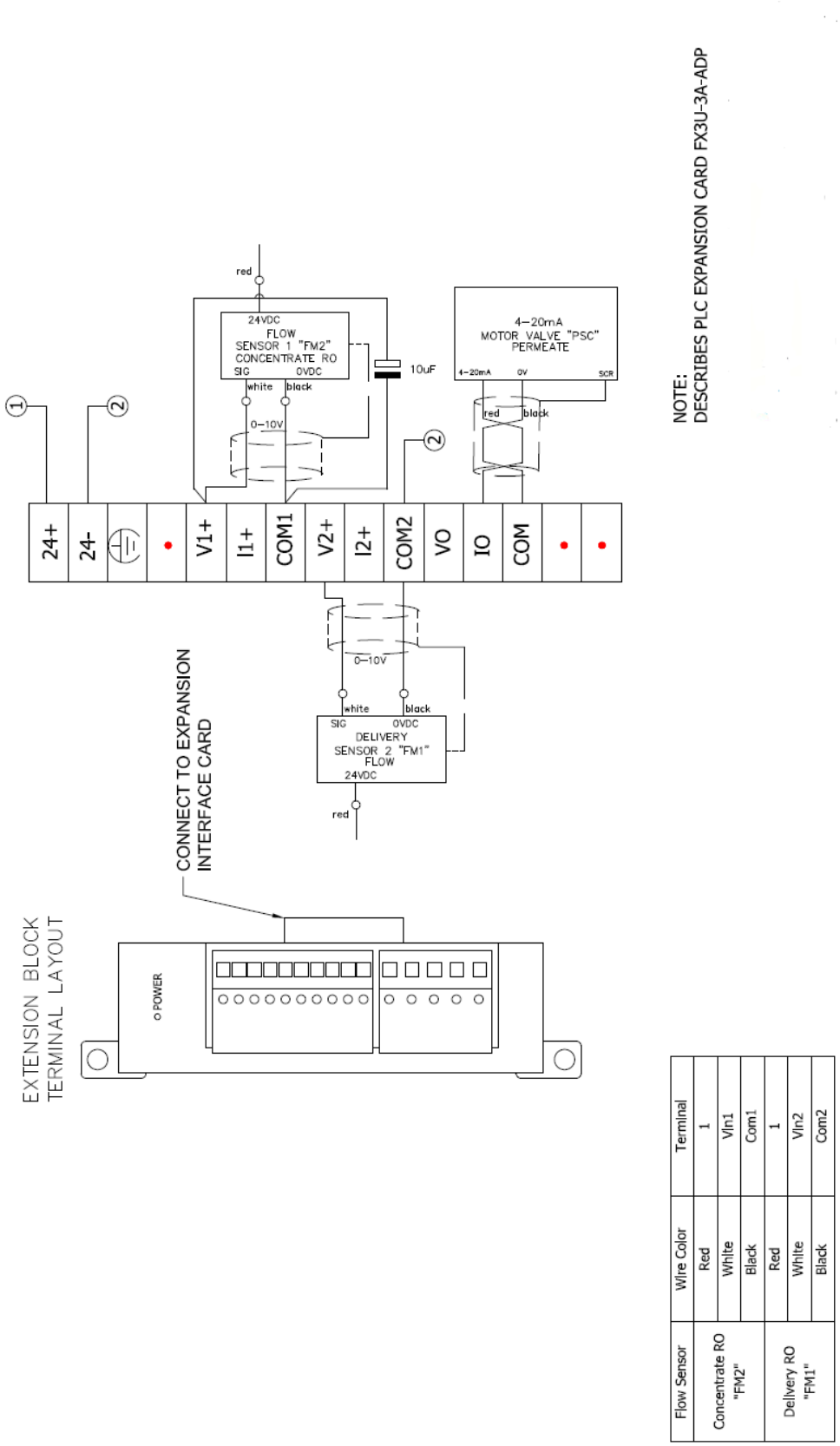

24VDC
0VDC
MITSUBISHI PLC FX1N-60MR-ES/UL
HEATSAN FILL (FILL REQUEST SIGNAL)
HEATSAN COOL (COOL RNG REQUEST SIGNAL)
HEATSAN RUN (RUNNING SIGNAL)
EMERGENCY RUN (HWI OVERRIDE) KEY SWITCH
RUN REQUEST (SIGNAL FROM RO)
LOOP RETURN VALVE CLOSE LIMIT "LSC"
HEATER THERMOSTAT OVER TEMPERATURE "HSC"
REMOTE STOP (LINK IF NOT REQUIRED)
HEATSAN WATER LOSS (WATER LOSS ALARM SIGNAL)
X15
X16
X17
X20
X21
X22
X23
X24
X25
X26
X27
X30
X31
X32
X33
X34
X35
COM5
COM6
COM7
Y14
Y15
Y16
Y17
Y20
Y21
Y22
Y23
Y24
Y25
Y26
Y27
COMMON
STANDBY
FAULT
SERVICE
HEATSAN
VOLT FREE STATUS SIGNALS
WIRED IN ORANGE
CONTACT TO
PAIRED RO UNIT
K2
REQUEST
RUN
RELAY
LOOP RETURN
DIVERT VALVE
"LRV"
DRAIN
TANK
CLOSE
M
K1
EMERGENCY
STOP RESET
RELAY
SPARE


24VDC
1
1
1
24VDC
1
GOES TO HMI SCREEN
X36
X37
X40
X41
X42
MITSUBISHI PLC FX3G-CNV-ADP
0VDC
2
2
2
0VDC
2

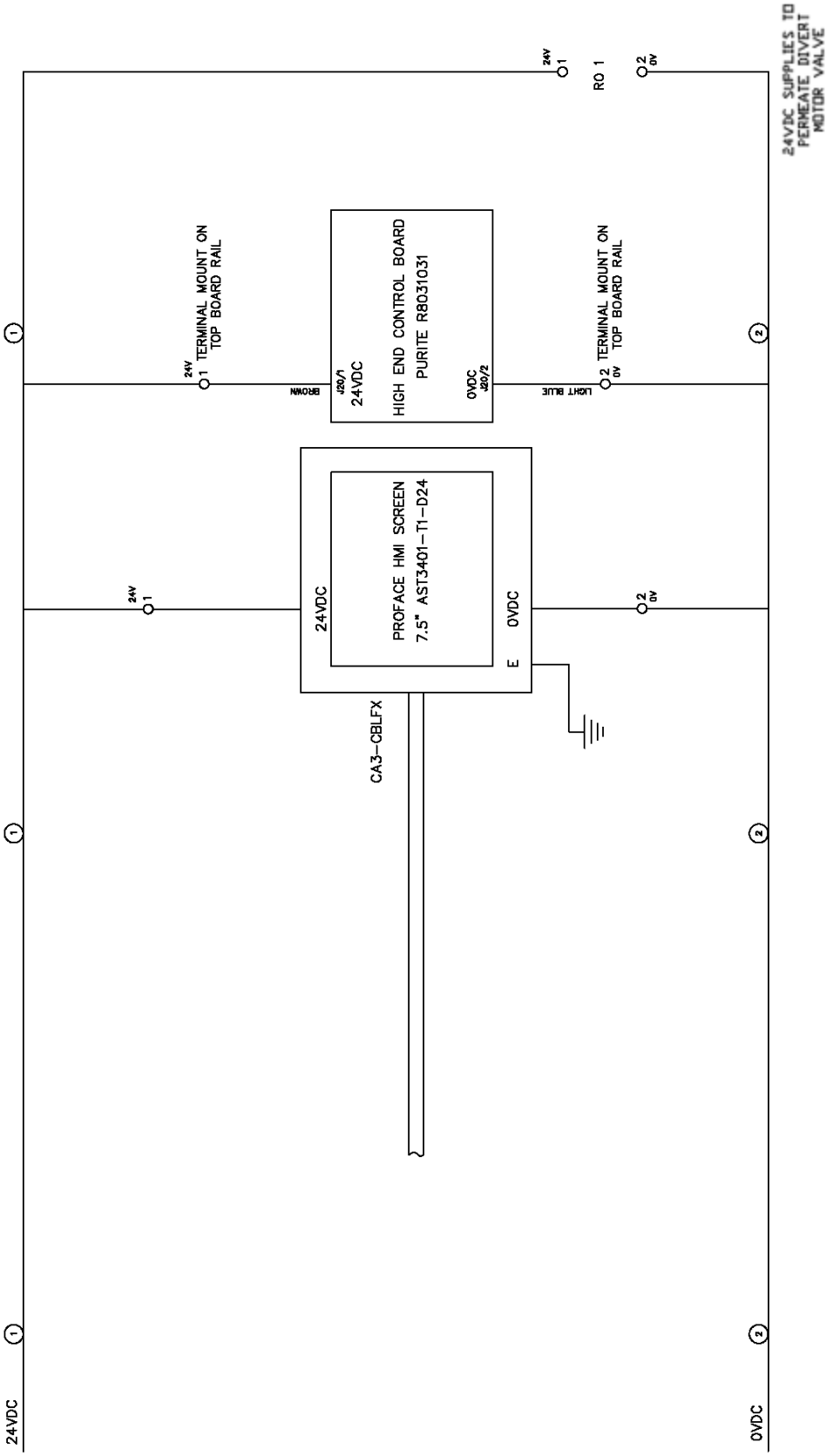
Temperature Tramsmitter	Flow Sensor Wire Color	Terminal
Tank "TT1"	Violet/Red	I- CH1
	Red	L- CH1
	White	L+ CH1
Delivery "TT2"	Violet/Red	I- CH2
	Red	L- CH2
	White	L+ CH2
Loop Return "TT3"	Violet/Red	I- CH3
	Red	L- CH3
	White	L+ CH3
Tank Return "TT4"	Violet/Red	I- CH4
	Red	L- CH4
	White	L+ CH4

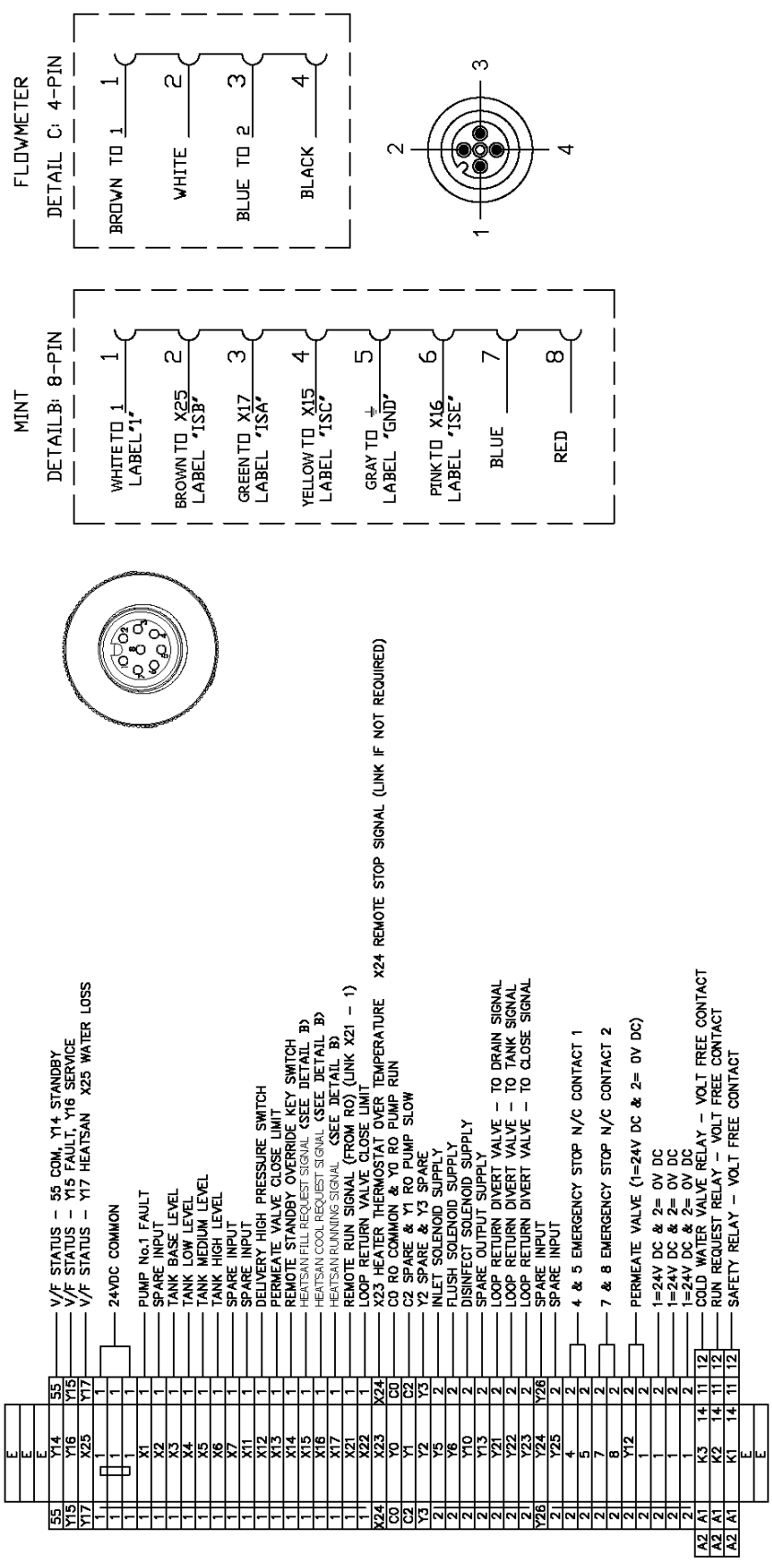


NOTES:
DESCRIBES PLC EXPANSION CARD FX3U-4AD-PT-ADP

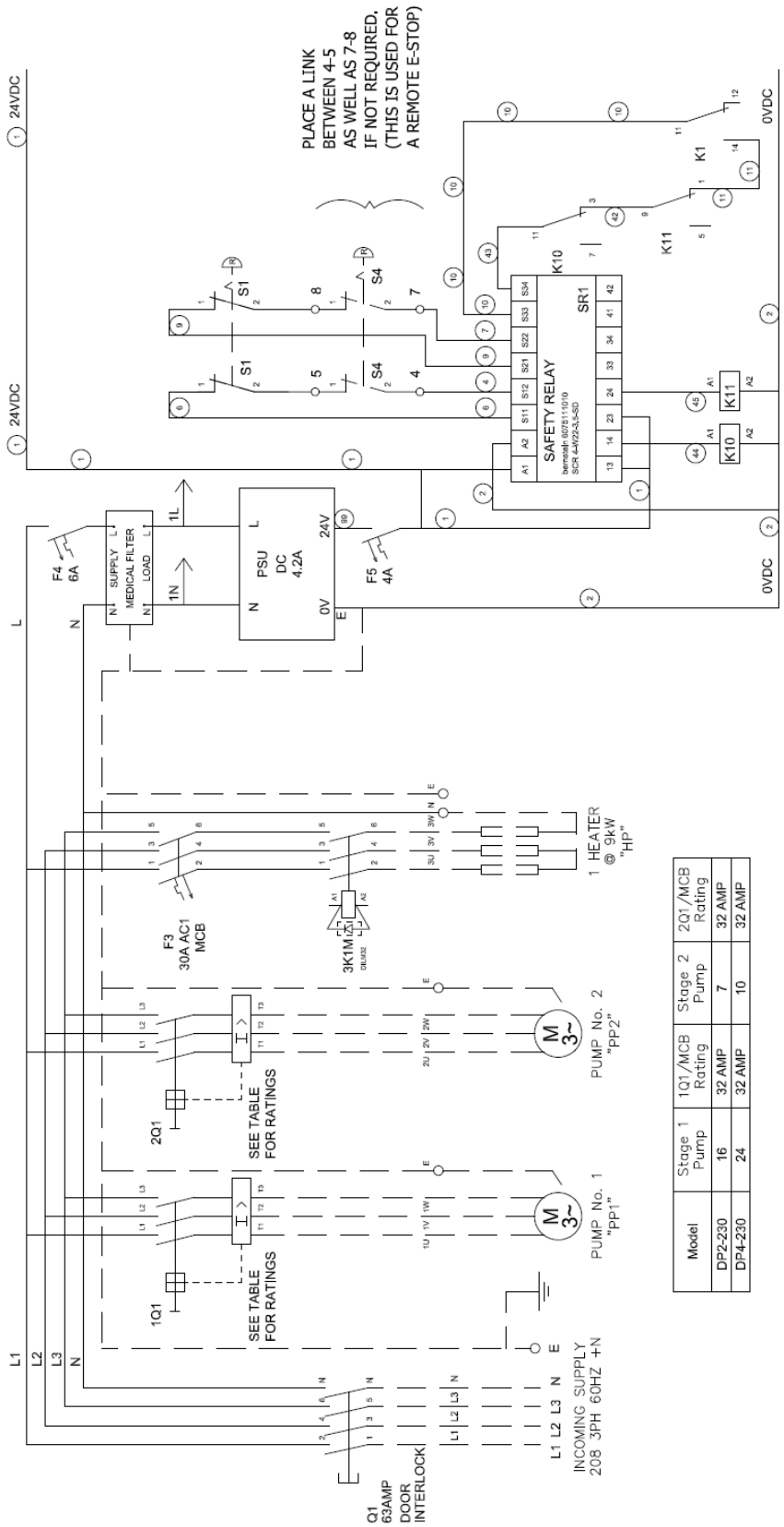


Flow Sensor	Wire Color	Terminal
Concentrate RO "FM2"	Red	1
	White	Vin1
	Black	Com1
Delivery RO "FM1"	Red	1
	White	Vin2
	Black	Com2

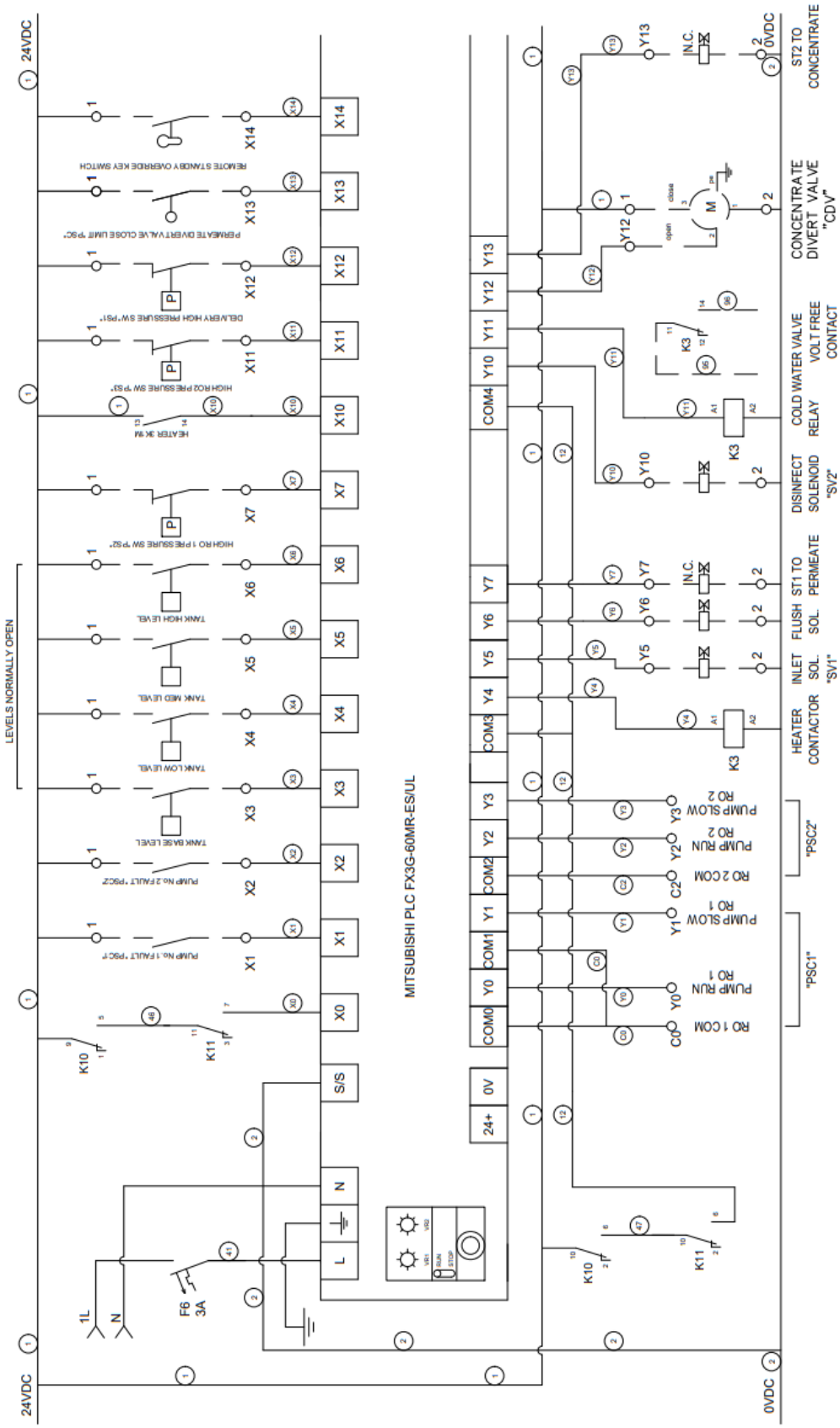

24VDC SUPPLIES TO PERMEATE DIVERT MOTOR VALVE
24V
1
RO 1
2
0V
TERMINAL MOUNT ON TOP BOARD RAIL
HIGH END CONTROL BOARD
PURITE R8031031
24VDC
0VDC
BROWN
LIGHT BLUE
PROFACE HMI SCREEN
7.5" AST3401-T1-D24
CA3-CBLFX
E
24VDC
0VDC

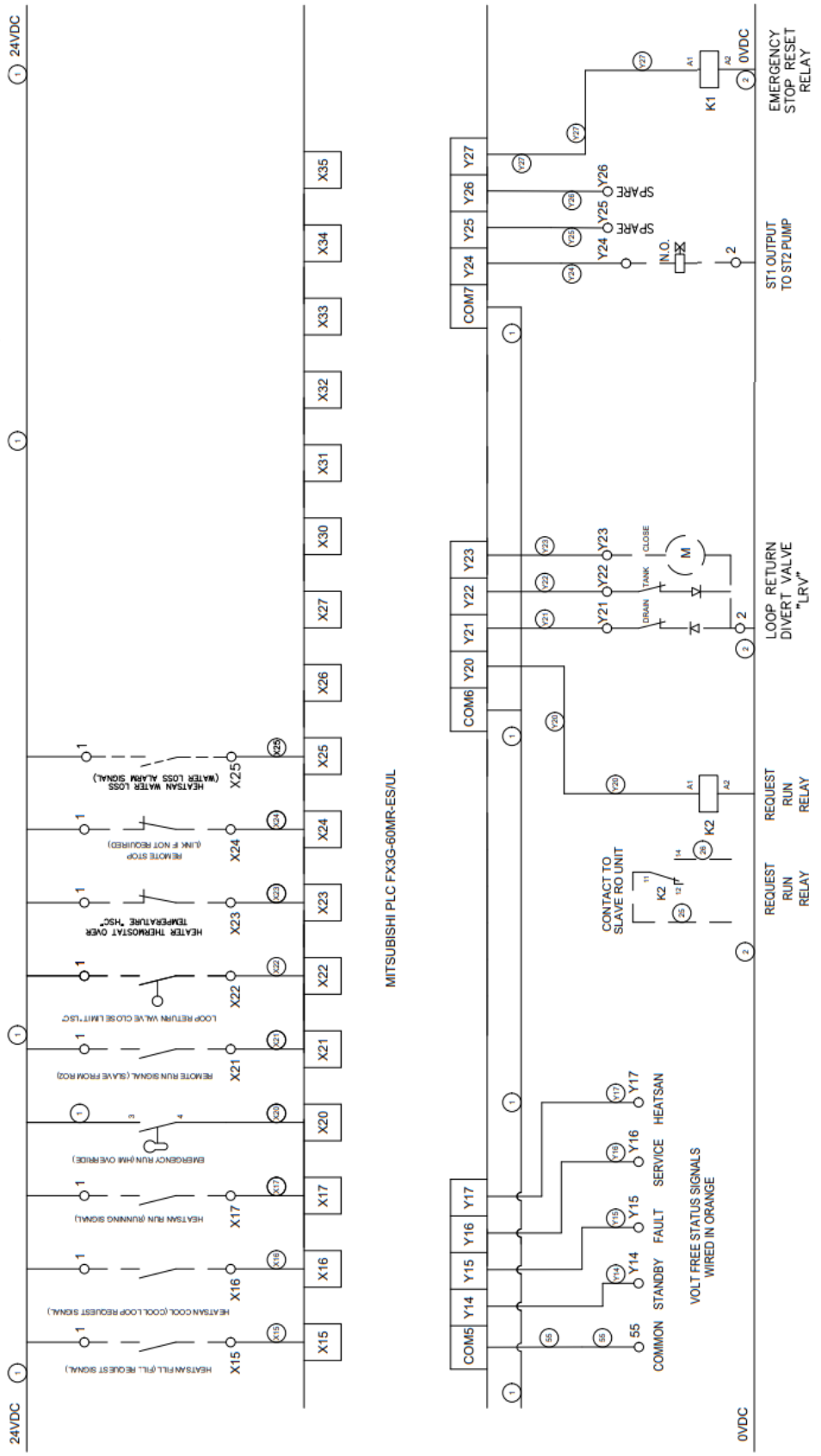

MINT
DETAIL B: 8-PIN
WHITE TO 1 LABEL "1"
BROWN TO X25 LABEL "ISB"
GREEN TO X17 LABEL "ISA"
YELLOW TO X15 LABEL "ISC"
GRAY TO ⏚ LABEL "GND"
PINK TO X16 LABEL "ISE"
BLUE
RED
FLOWMETER
DETAIL C: 4-PIN
BROWN TO 1
WHITE
BLUE TO 2
BLACK
V/F STATUS - 55 COM, Y14 STANDBY
V/F STATUS - Y15 FAULT, Y16 SERVICE
V/F STATUS - Y17 HEATSAN X25 WATER LOSS
24VDC COMMON
PUMP No.1 FAULT
SPARE INPUT
TANK BASE LEVEL
TANK LOW LEVEL
TANK MEDIUM LEVEL
TANK HIGH LEVEL
SPARE INPUT
SPARE INPUT
DELIVERY HIGH PRESSURE SWITCH
PERMEATE VALVE CLOSE LIMIT
REMOTE STANDBY OVERRIDE KEY SWITCH
HEATSAN FILL REQUEST SIGNAL (SEE DETAIL B)
HEATSAN COOL REQUEST SIGNAL (SEE DETAIL B)
HEATSAN RUNNING SIGNAL (SEE DETAIL B)
REMOTE RUN SIGNAL (FROM RO) (LINK X21 - 1)
LOOP RETURN VALVE CLOSE LIMIT
X23 HEATER THERMOSTAT OVER TEMPERATURE X24 REMOTE STOP SIGNAL (LINK IF NOT REQUIRED)
C0 RO COMMON & Y0 RO PUMP RUN
C2 SPARE & Y1 RO PUMP SLOW
Y2 SPARE & Y3 SPARE
INLET SOLENOID SUPPLY
FLUSH SOLENOID SUPPLY
DISINFECT SOLENOID SUPPLY
SPARE OUTPUT SUPPLY
LOOP RETURN DIVERT VALVE - TO DRAIN SIGNAL
LOOP RETURN DIVERT VALVE - TO TANK SIGNAL
LOOP RETURN DIVERT VALVE - TO CLOSE SIGNAL
SPARE INPUT
SPARE INPUT
4 & 5 EMERGENCY STOP N/C CONTACT 1
7 & 8 EMERGENCY STOP N/C CONTACT 2
PERMEATE VALVE (1=24V DC & 2= 0V DC)
1=24V DC & 2= 0V DC
1=24V DC & 2= 0V DC
1=24V DC & 2= 0V DC
COLD WATER VALVE RELAY - VOLT FREE CONTACT
RUN REQUEST RELAY - VOLT FREE CONTACT
SAFETY RELAY - VOLT FREE CONTACT

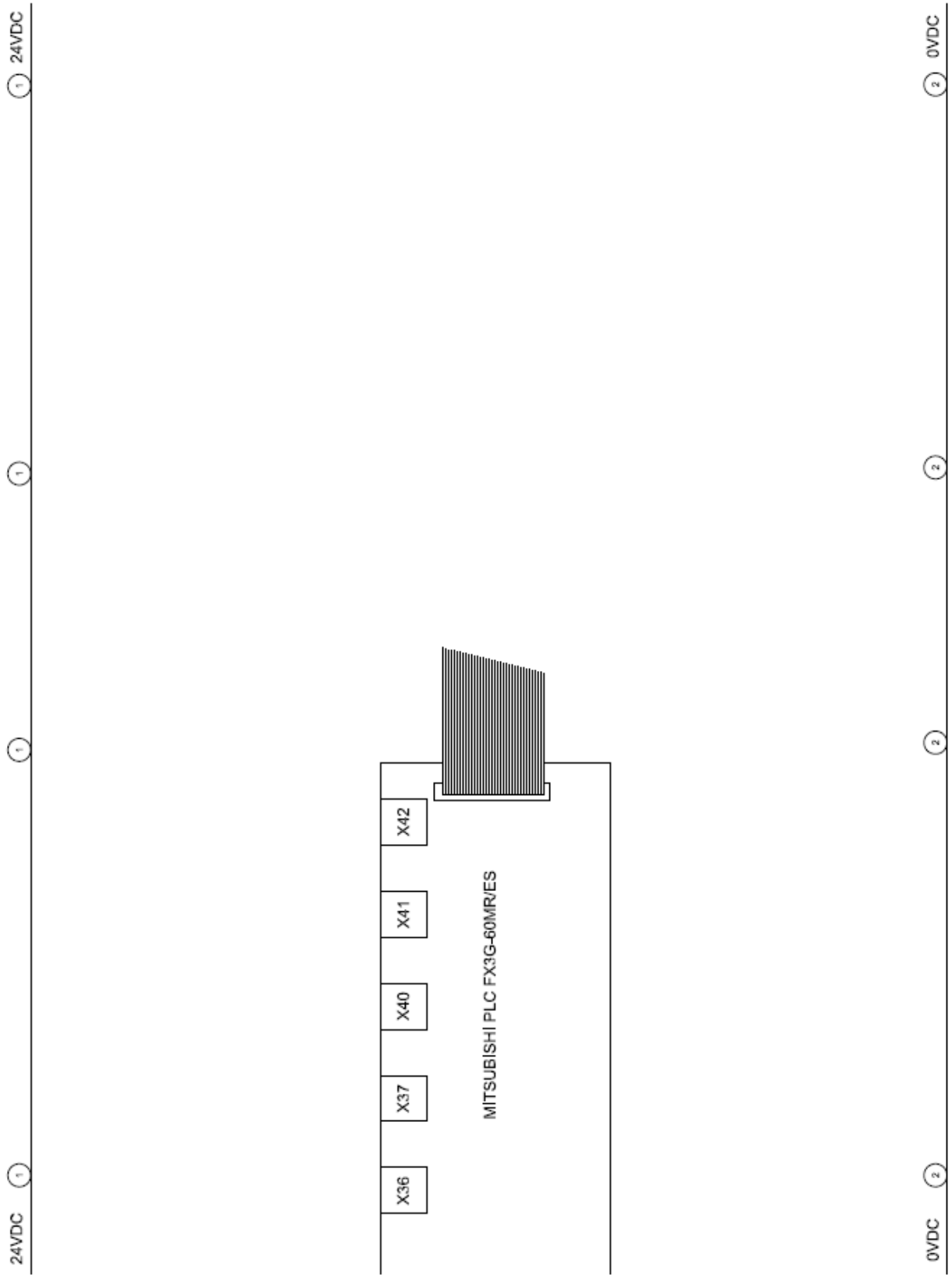
MDP Units



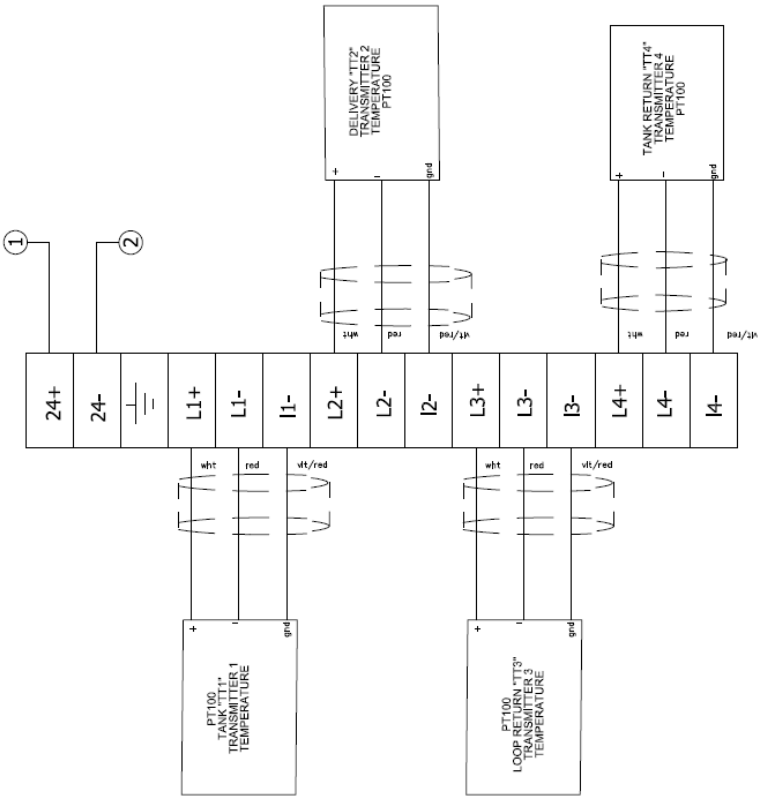
Model	Stage 1 Pump	1Q1/MCB Rating	Stage 2 Pump	2Q1/MCB Rating
DP2-230	16	32 AMP	7	32 AMP
DP4-230	24	32 AMP	10	32 AMP


24VDC
0VDC
LEVELS NORMALLY OPEN
MITSUBISHI PLC FX3G-60MR-ES/UL
X0
X1
X2
X3
X4
X5
X6
X7
X10
X11
X12
X13
X14
S/S
24+
0V
COM0
COM1
COM2
COM3
COM4
Y0
Y1
Y2
Y3
Y4
Y5
Y6
Y7
Y10
Y11
Y12
Y13
L
N
1L
F6 3A
K10
K11
K3
PUMP No.1 FAULT "PSC1"
PUMP No.2 FAULT "PSC2"
TANK BASE LEVEL
TANK LOW LEVEL
TANK MED LEVEL
TANK HIGH LEVEL
HIGH RO 1 PRESSURE SW "PS2"
HIGH RO2 PRESSURE SW "PS3"
DELIVERY HIGH PRESSURE SW "PS1"
PERMEATE DIVERT VALVE CLOSE LIMIT "PSC"
REMOTE STANDBY OVERRIDE KEY SWITCH
HEATER 3KW
HEATER CONTACTOR
INLET SOL. "SV1"
FLUSH SOL.
ST1 TO PERMEATE
DISINFECT SOLENOID "SV2"
COLD WATER VALVE RELAY
VOLT FREE CONTACT
ST2 TO CONCENTRATE
CONCENTRATE DIVERT VALVE "CDV"
PUMP RUN RO 1
PUMP SLOW RO 1
RO 1 COM
RO 2 COM
PUMP RUN RO 2
PUMP SLOW RO 2
N.C.
open
close

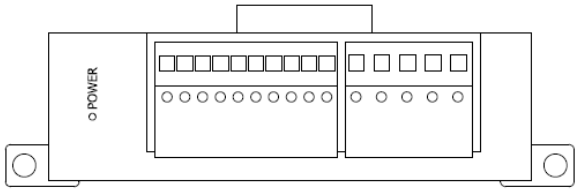

24VDC
0VDC
MITSUBISHI PLC FX3G-60MR-ES/UL
X15
X16
X17
X20
X21
X22
X23
X24
X25
X26
X27
X30
X31
X32
X33
X34
X35
HEATSAN FILL (FILL REQUEST SIGNAL)
HEATSAN COOL (COOL LOOP REQUEST SIGNAL)
HEATSAN RUN (RUNNING SIGNAL)
EMERGENCY RUN (HMI OVERRIDE)
REMOTE RUN SIGNAL (SLAVE FROM RO2)
LOOP RETURN VALVE CLOSE LIMIT (LSC
HEATER THERMOSTAT OVER TEMPERATURE (HSC
REMOTE STOP (LINK IF NOT REQUIRED)
HEATSAN WATER LOSS (WATER LOSS ALARM SIGNAL)
COM5 Y14 Y15 Y16 Y17
COM6 Y20 Y21 Y22 Y23
COM7 Y24 Y25 Y26 Y27
COMMON
STANDBY
FAULT
SERVICE
HEATSAN
VOLT FREE STATUS SIGNALS WIRED IN ORANGE
CONTACT TO SLAVE RO UNIT
K2
REQUEST RUN RELAY
LOOP RETURN DIVERT VALVE "LRV"
CLOSE
TANK
DRAIN
M
N.O.
SPARE
ST1 OUTPUT TO ST2 PUMP
K1
EMERGENCY STOP RESET RELAY


24VDC
24VDC
0VDC
0VDC
X36
X37
X40
X41
X42
MITSUBISHI PLC FX3G-60MR/ES

Temperature Tramsmltter	Flow Sensor Wlre Color	Termlnal
Tank "TT1"	Violet/Red	I- CH1
	Red	L- CH1
	White	L+ CH1
Delivery "TT2"	Violet/Red	I- CH2
	Red	L- CH2
	Whlte	L+ CH2
Loop Return "TT3"	Violet/Red	I- CH3
	Red	L- CH3
	White	L+ CH3
Tank Return "TT4"	Violet/Red	I- CH4
	Red	L- CH4
	Whlte	L+ CH4

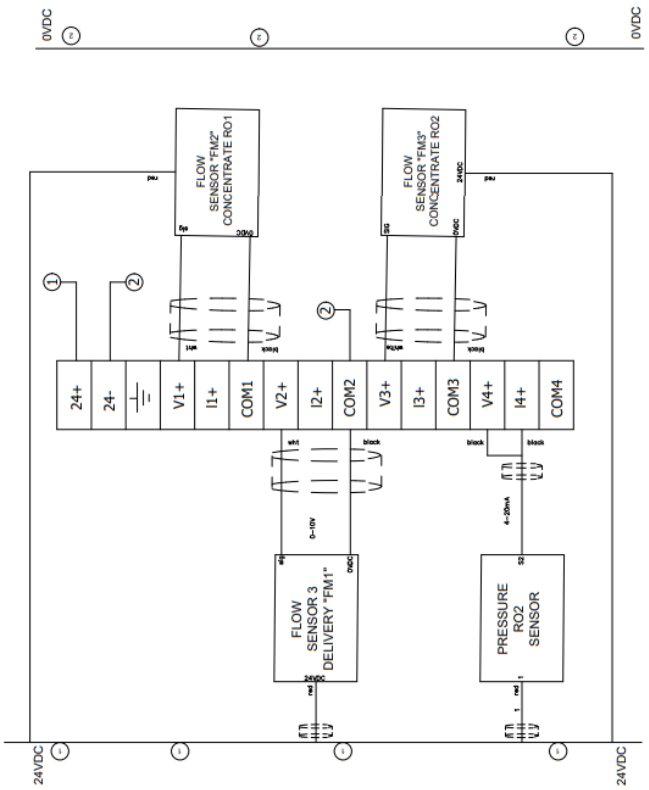


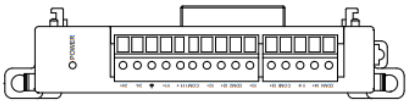
EXTENSION BLOCK
TERMINAL LAYOUT



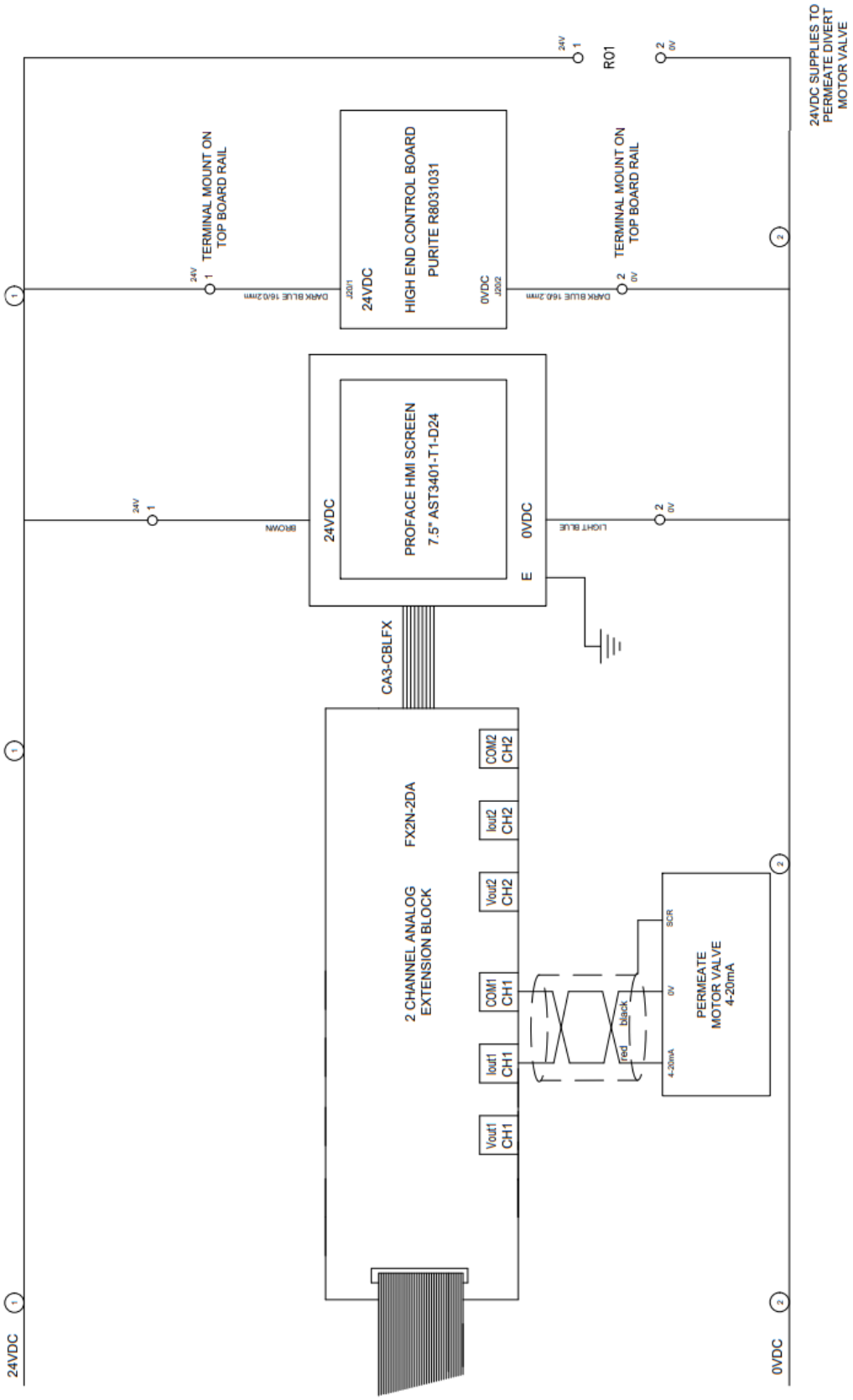
NOTES:
DESCRIBES PLC EXPANSION CARD FX3U-4AD-PT-ADP

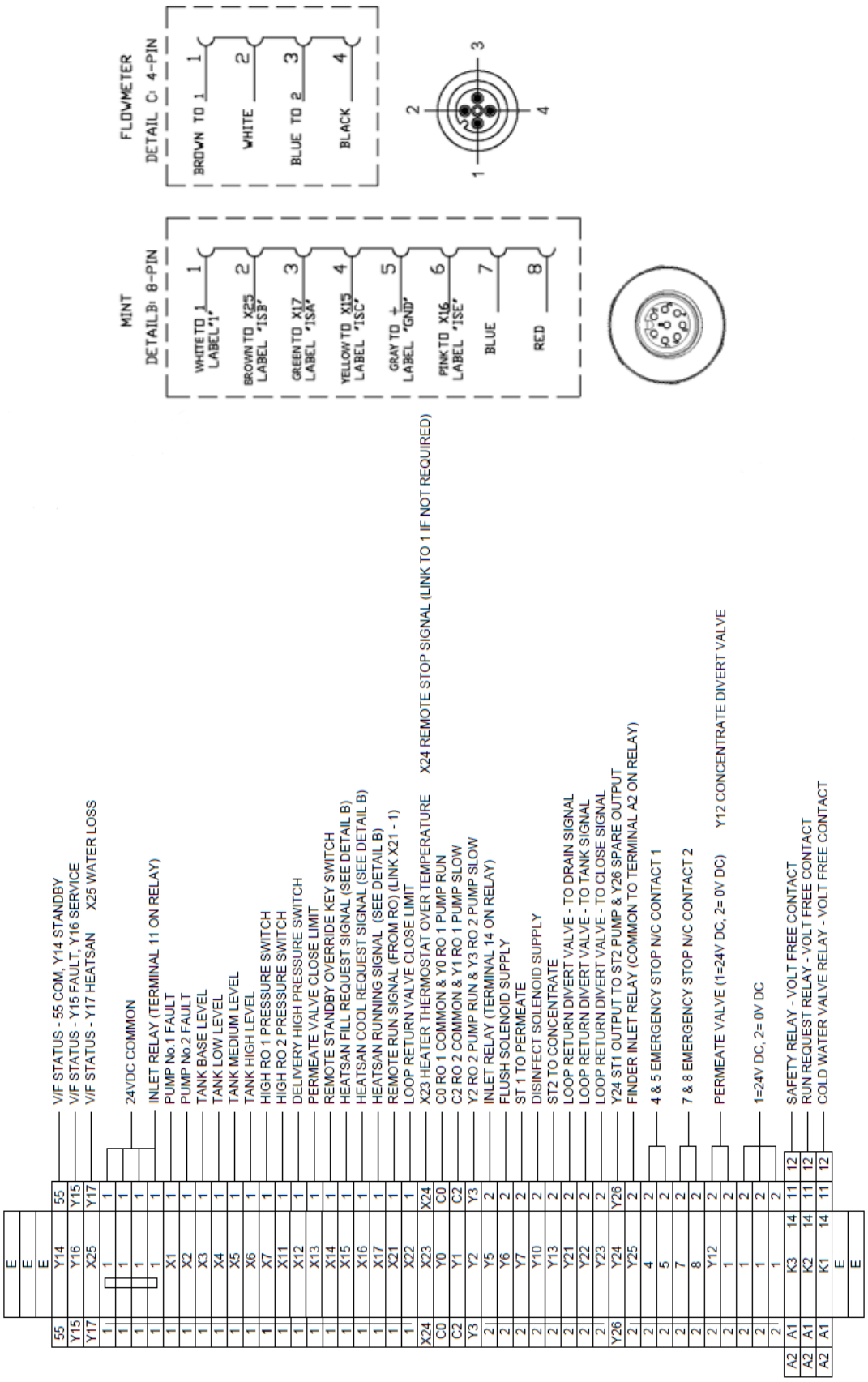
Flow Sensor	Wire Color	Terminal
Concentrate RO1 "FM2"	Red	1
	White	V+ CH1
	Black	COM1 CH1
Delivery RO "FM1"	Red	1
	White	V+ CH2
	Black	COM2 CH2
Concentrate RO2 "FM3"	Red	1
	White	V+ CH3
	Black	COM3 CH3
Pressure RO2 Sensor	Red	1
	Black	I+ CH4
	BLack	V+ CH4



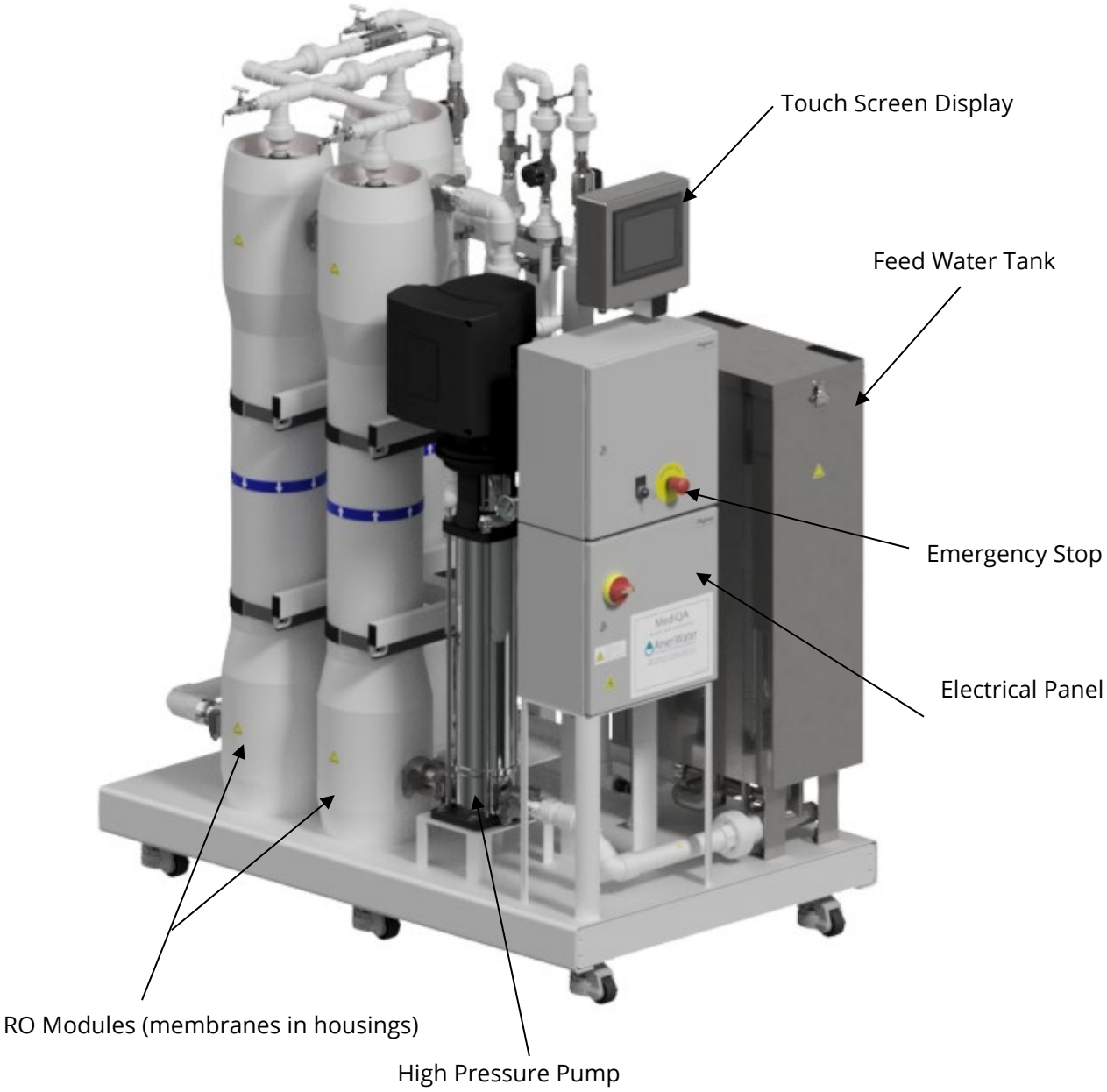


DRAWING NOTES:
1. DESCRIBES PLC EXPANSION CARD FX3U-4AD-ADP


24VDC SUPPLIES TO PERMEATE DIVERT MOTOR VALVE
R01
TERMINAL MOUNT ON TOP BOARD RAIL
HIGH END CONTROL BOARD
PURITE R8031031
24VDC
0VDC
TERMINAL MOUNT ON TOP BOARD RAIL
PROFACE HMI SCREEN
7.5" AST3401-T1-D24
24VDC
0VDC
CA3-CBLFX
2 CHANNEL ANALOG EXTENSION BLOCK
FX2N-2DA
Vout1 CH1
Iout1 CH1
COM1 CH1
Vout2 CH2
Iout2 CH2
COM2 CH2
PERMEATE MOTOR VALVE 4-20mA
red
black
24VDC
0VDC


FLOWMETER
DETAIL C: 4-PIN
BROWN TO 1
WHITE
BLUE TO 2
BLACK
MINT
DETAIL B: 8-PIN
WHITE TO J1 LABEL "1"
BROWN TO X25 LABEL "ISB"
GREEN TO X17 LABEL "ISA"
YELLOW TO X15 LABEL "ISC"
GRAY TO ⏚ LABEL "GND"
PINK TO X16 LABEL "ISE"
BLUE
RED
V/F STATUS - 55 COM, Y14 STANDBY
V/F STATUS - Y15 FAULT, Y16 SERVICE
V/F STATUS - Y17 HEATSAN X25 WATER LOSS
24VDC COMMON
INLET RELAY (TERMINAL 11 ON RELAY)
PUMP No.1 FAULT
PUMP No.2 FAULT
TANK BASE LEVEL
TANK LOW LEVEL
TANK MEDIUM LEVEL
TANK HIGH LEVEL
HIGH RO 1 PRESSURE SWITCH
HIGH RO 2 PRESSURE SWITCH
DELIVERY HIGH PRESSURE SWITCH
PERMEATE VALVE CLOSE LIMIT
REMOTE STANDBY OVERRIDE KEY SWITCH
HEATSAN FILL REQUEST SIGNAL (SEE DETAIL B)
HEATSAN COOL REQUEST SIGNAL (SEE DETAIL B)
HEATSAN RUNNING SIGNAL (SEE DETAIL B)
REMOTE RUN SIGNAL (FROM RO) (LINK X21 - 1)
LOOP RETURN VALVE CLOSE LIMIT
X23 HEATER THERMOSTAT OVER TEMPERATURE X24 REMOTE STOP SIGNAL (LINK TO 1 IF NOT REQUIRED)
C0 RO 1 COMMON & Y0 RO 1 PUMP RUN
C2 RO 2 COMMON & Y1 RO 1 PUMP SLOW
Y2 RO 2 PUMP RUN & Y3 RO 2 PUMP SLOW
INLET RELAY (TERMINAL 14 ON RELAY)
FLUSH SOLENOID SUPPLY
ST 1 TO PERMEATE
DISINFECT SOLENOID SUPPLY
ST2 TO CONCENTRATE
LOOP RETURN DIVERT VALVE - TO DRAIN SIGNAL
LOOP RETURN DIVERT VALVE - TO TANK SIGNAL
LOOP RETURN DIVERT VALVE - TO CLOSE SIGNAL
Y24 ST1 OUTPUT TO ST2 PUMP & Y26 SPARE OUTPUT
FINDER INLET RELAY (COMMON TO TERMINAL A2 ON RELAY)
4 & 5 EMERGENCY STOP N/C CONTACT 1
7 & 8 EMERGENCY STOP N/C CONTACT 2
PERMEATE VALVE (1=24V DC, 2= 0V DC) Y12 CONCENTRATE DIVERT VALVE
1=24V DC, 2= 0V DC
SAFETY RELAY - VOLT FREE CONTACT
RUN REQUEST RELAY - VOLT FREE CONTACT
COLD WATER VALVE RELAY - VOLT FREE CONTACT

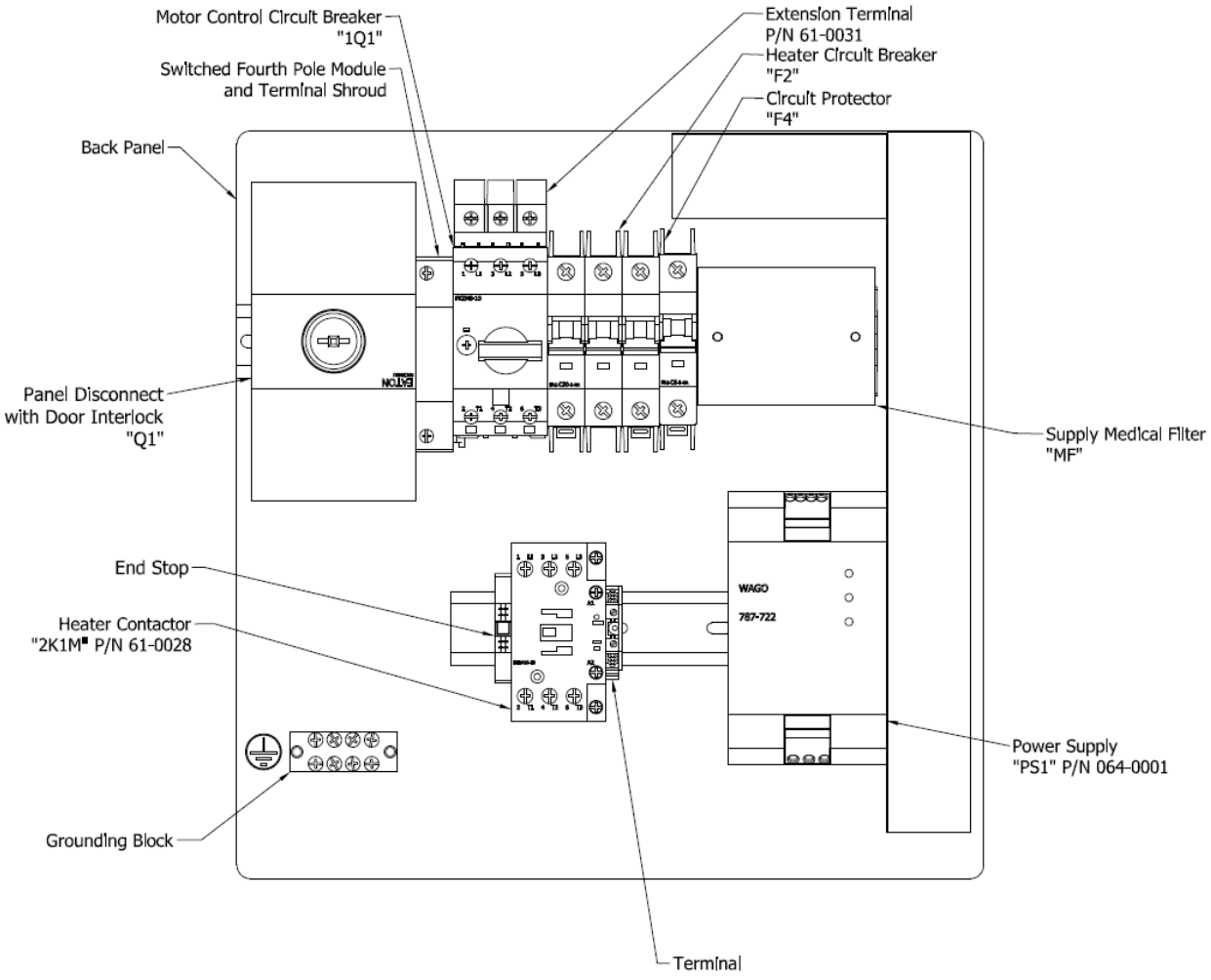
12 COMPONENT IDENTIFICATION

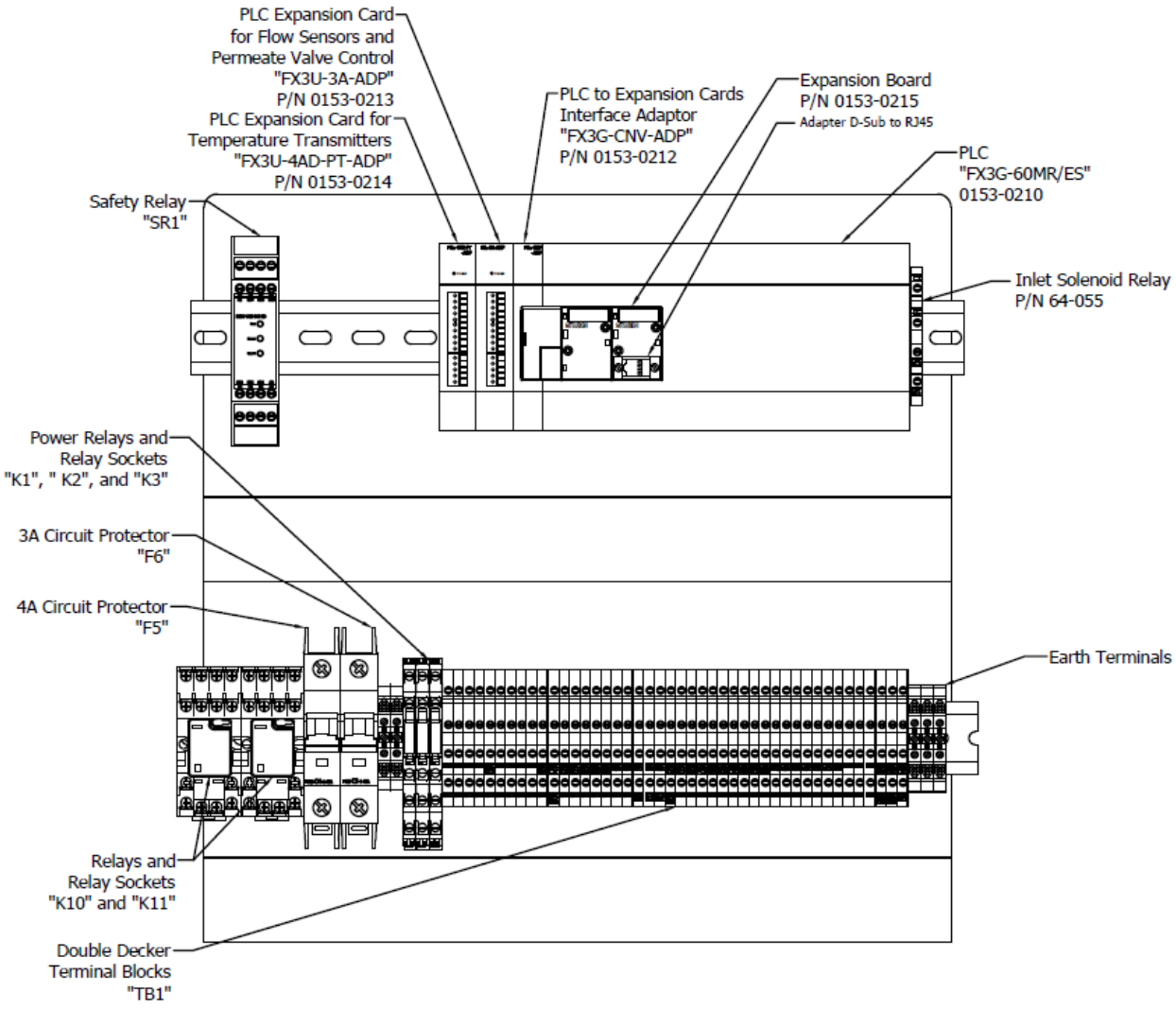


12.1 Control Panel

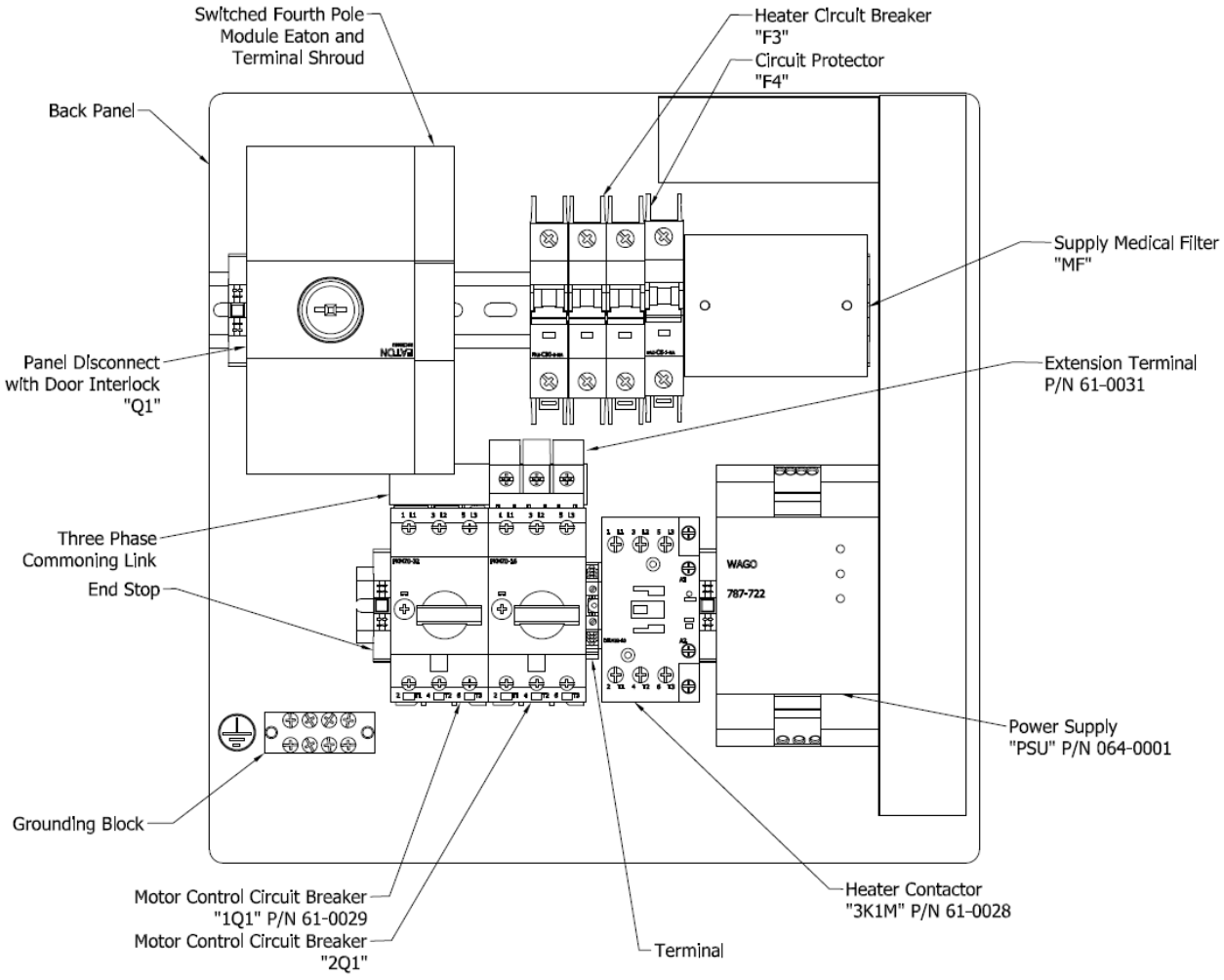
Labeling inside the control panel can be found on the back panel, above the corresponding component.

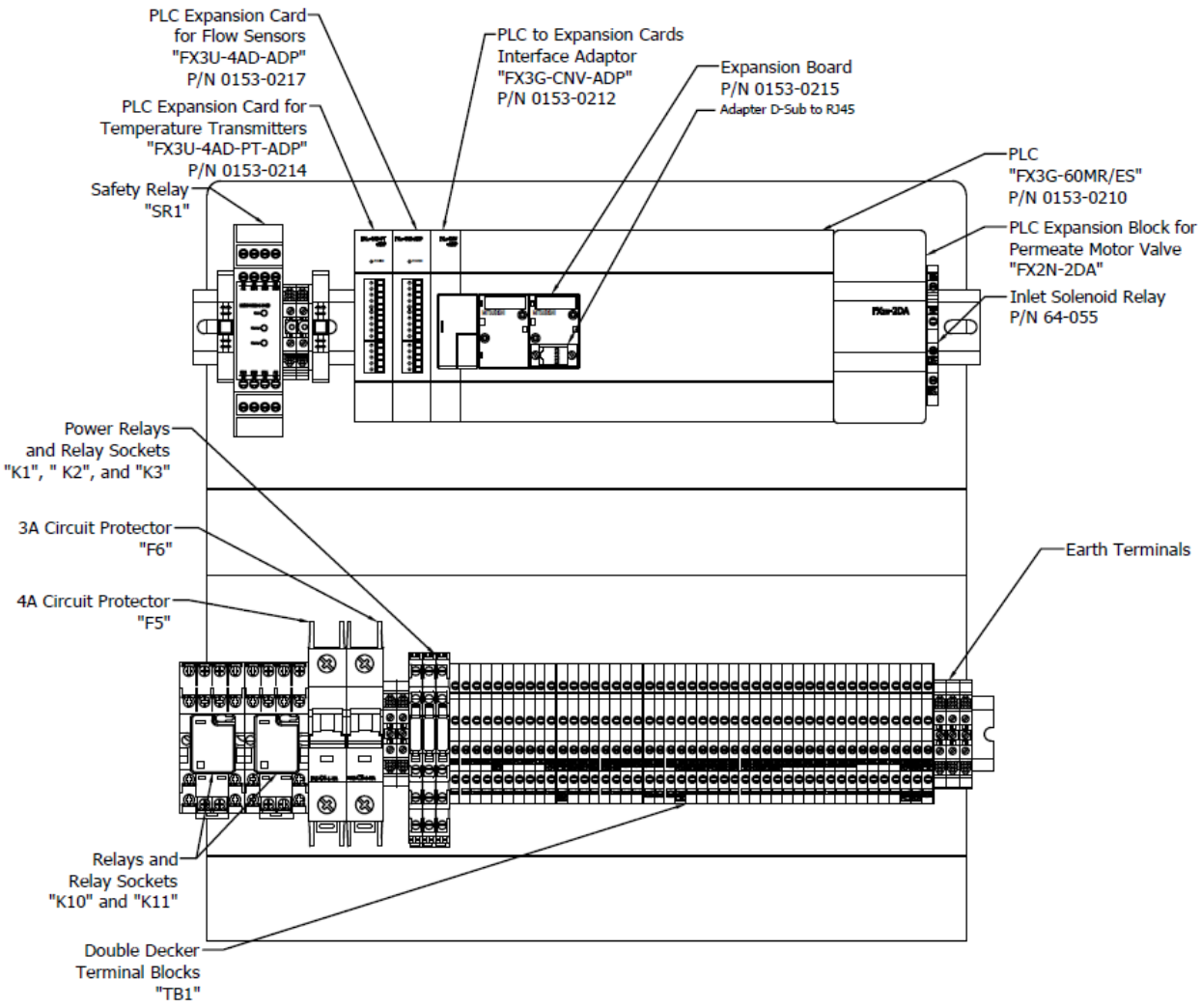
MSP Units




PLC Expansion Card
for Flow Sensors and
Permeate Valve Control
"FX3U-3A-ADP"
P/N 0153-0213
PLC Expansion Card for
Temperature Transmitters
"FX3U-4AD-PT-ADP"
P/N 0153-0214
PLC to Expansion Cards
Interface Adaptor
"FX3G-CNV-ADP"
P/N 0153-0212
Expansion Board
P/N 0153-0215
Adapter D-Sub to RJ45
PLC
"FX3G-60MR/ES"
0153-0210
Safety Relay
"SR1"
Inlet Solenoid Relay
P/N 64-055
Power Relays and
Relay Sockets
"K1", " K2", and "K3"
3A Circuit Protector
"F6"
4A Circuit Protector
"F5"
Earth Terminals
Relays and
Relay Sockets
"K10" and "K11"
Double Decker
Terminal Blocks
"TB1"

MDP Units


Switched Fourth Pole Module Eaton and Terminal Shroud
Heater Circuit Breaker "F3"
Circuit Protector "F4"
Back Panel
Supply Medical Filter "MF"
Panel Disconnect with Door Interlock "Q1"
Extension Terminal P/N 61-0031
Three Phase Commoning Link
End Stop
WAGO
787-722
Power Supply "PSU" P/N 064-0001
Grounding Block
Motor Control Circuit Breaker "1Q1" P/N 61-0029
Motor Control Circuit Breaker "2Q1"
Heater Contactor "3K1M" P/N 61-0028
Terminal


PLC Expansion Card
for Flow Sensors
"FX3U-4AD-ADP"
P/N 0153-0217
PLC Expansion Card for
Temperature Transmitters
"FX3U-4AD-PT-ADP"
P/N 0153-0214
Safety Relay
"SR1"
PLC to Expansion Cards
Interface Adaptor
"FX3G-CNV-ADP"
P/N 0153-0212
Expansion Board
P/N 0153-0215
Adapter D-Sub to RJ45
PLC
"FX3G-60MR/ES"
P/N 0153-0210
PLC Expansion Block for
Permeate Motor Valve
"FX2N-2DA"
Inlet Solenoid Relay
P/N 64-055
Power Relays
and Relay Sockets
"K1", " K2", and "K3"
3A Circuit Protector
"F6"
4A Circuit Protector
"F5"
Earth Terminals
Relays and
Relay Sockets
"K10" and "K11"
Double Decker
Terminal Blocks
"TB1"

13 APPENDIX

13.1 Default Settings List

MSP SETTINGS:

Screen	Setting	Default	Initial Setting	User Setting	Units
SETTINGS MENU					
RO Supply	Auto Flush	1			min
	Auto Rinse Min	1			min
	Auto Rinse Max	10			min
	Target Recovery Stage 1	65			%
	Standby Refresh Time	10			min
	Standby Refresh Interval	120			min
MediQA Operation Mode	Hi Recovery Quality Low	8			uS
	Hi Recovery Quality High	12			uS
	Break Tank Temp Low	80			°F
	Break Tank Temp High	85			°F
RO Clean	Clean Reminder	999			days
	Recirc Period	25			min
	Rinse Pressure Period Low	40			min
	Rinse Pressure Period High	15			min
RO Heat Disinfect	Tank Temp	185			°F
	Tank Return Temp	180			°F
	Hold period	30			min
Activity Log	Activity Log Cycle Time	10			min
Alarms	Tank Quality Warning	1100			uS
	Tank Quality Alarm	1200			uS
	Output Quality Warning	30			uS
	Output Quality Alarm	100			uS
	Low Flow Warning	2			gpm
	Low Flow Alarm	1			gpm
	High Flow Warning (HF)	15 (20)			gpm
	High Flow Alarm (HF)	18 (25)			gpm
CALIBRATION MENU					
Flowmeters	Concentrate Offset	N/A			
	Concentrate Gain	N/A			
	Permeate Offset	N/A			
	Permeate Gain	N/A			
RO Parameters	RO1 Target Recovery	65			%
	Dead Band	20			%
Alarm Settings	Loop Over Temp Warning	86			°F
	Loop Over Temp Alarm	95			°F
	RO Heat Disinfect Over Temp – Tank	194			°F

	RO Heat Disinfection Over Temp – Permeate 2	183			°F
	RO Heat Disinfection Over Temp – Tank Return	183			°F
Line Cell Settings	Tank Offset	N/A			
	Tank Gain	N/A			
	Output Offset	N/A			
	Output Gain	N/A			
RO Heat Disinfect	Cool Down End Temp	86			°F
	Pump Run Slow Temp	90			°F
Chemical Clean	Chem Clean Rinse	45			min

MDP SETTINGS:

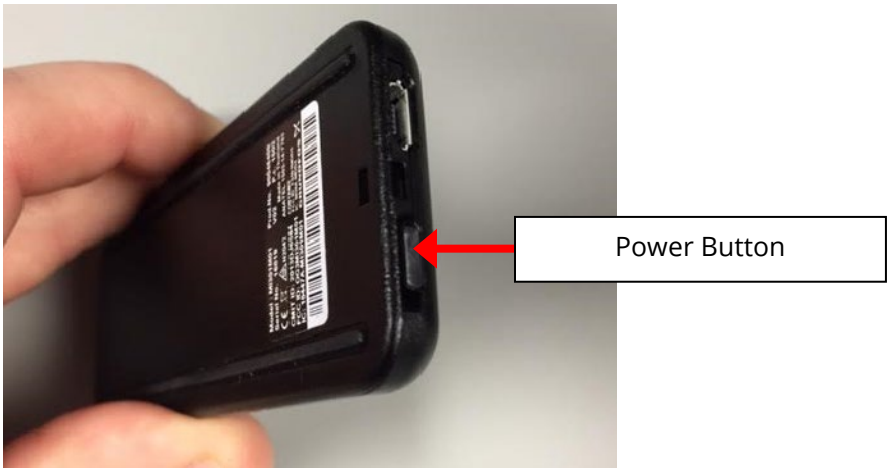
Screen	Setting	Default	Initial Setting	User Setting	Units
SETTINGS MENU					
RO Supply	Auto Flush	1			min
	Auto Rinse Min	1			min
	Auto Rinse Max	10			min
	Target Recovery Stage 1	65			%
	Target Recovery Stage 2	80			%
	Standby Refresh Time	10			min
	Standby Refresh Interval	120			min
MediQA Operation Mode	Hi Recovery Quality Low	8			uS
	Hi Recovery Quality High	12			uS
	Break Tank Temp Low	80			°F
	Break Tank Temp High	85			°F
RO Clean	Clean Reminder	999			days
	Recirc Period	25			min
	Rinse Pressure Period Low	40			min
	Rinse Pressure Period High	15			min
RO Heat Disinfect	Tank Temp	185			°F
	Tank Return Temp	180			°F
	Hold period	30			min
Activity Log	Activity Log Cycle Time	10			min
Alarms	Tank Quality Warning	1100			uS
	Tank Quality Alarm	1200			uS
	Output Quality Warning	30			uS
	Output Quality Alarm	100			uS
	Loop Supply Flow Low	1			gpm
	Loop Supply Flow High	18			gpm
CALIBRATION MENU					
Flowmeters	RO1 Concentrate Offset	N/A			
	RO1 Concentrate Gain	N/A			

	RO2 Concentrate Offset	N/A			
	RO2 Concentrate Gain	N/A			
	RO2 Permeate Offset	N/A			
	RO2 Permeate Gain	N/A			
	Interstage Pressure Offset	N/A			
	Interstage Pressure Gain	N/A			
RO Parameters	RO1 Target Recovery	65			%
	RO2 Target Recovery	80			%
	Dead Band	20			%
Alarm Settings	Loop Over Temp Warning	86			°F
	Loop Over Temp Alarm	95			°F
	RO Heat Disinfect Over Temp – Tank	194			°F
	RO Heat Disinfection Over Temp – Permeate 2	183			°F
	RO Heat Disinfection Over Temp – Tank Return	183			°F
	RO2 Pressure setpoint Low	1			psi
	RO2 Pressure setpoint High	145			psi
	Low Pressure Alarm Delay	0			hrs
Line Cells	Tank Offset	N/A			
	Tank Gain	N/A			
	Stage 1 Offset	N/A			
	Stage 1 Gain	N/A			
	Output Offset	N/A			
	Output Gain	N/A			
RO Heat Disinfect	Cool Down End Temp	86			°F
	Pump Run Slow Temp	90			°F
Chemical Clean	Chem Clean Rinse	45			min

- 'Default' refers to the settings that are recommended on the system
- 'Initial Setting' refers to the settings that are entered in the system when it leaves the factory.
- 'User Setting' refer to the settings on the unit when it is put into service. This should be filled out when the unit is put into service and should be updated any time settings change

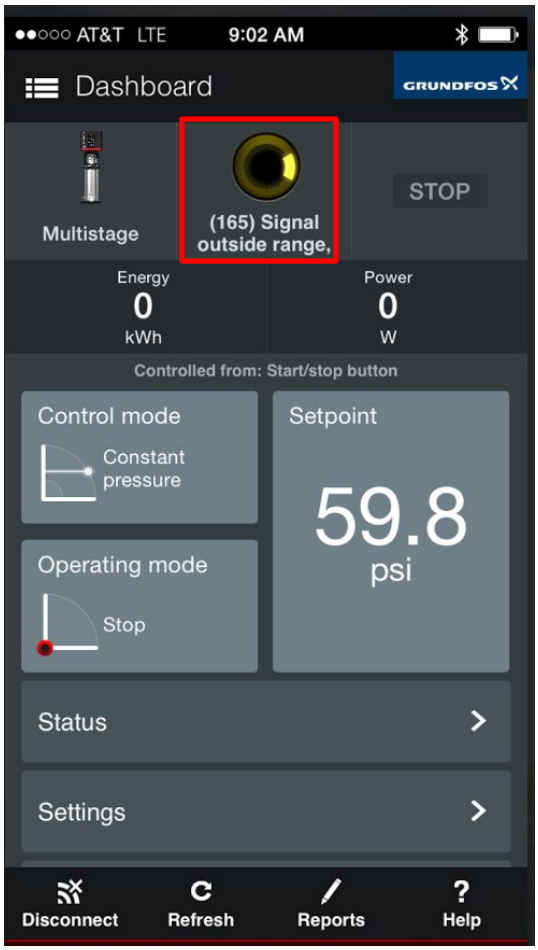
13.2 Connecting to Pump

- On the smartphone or iPod® that has the Grundfos “GO Remote” app, enable Bluetooth.
- Turn on Grundfos Dongle, part MI 301, by pressing the power button on the top of the device. A green power button illumination light will signal the activation of the Dongle, and will continue blinking every few seconds while the Dongle is on:



- Connect the smartphone or iPod® to the Grundfos dongle via Bluetooth.
- Open the “GO Remote” app.
- To connect the smartphone or iPod® to the pump, hold the Dongle end opposite of the power button close to the pump Infrared Receiver (see picture below) and go to the “Connect” tab in the Grundfos “GO Remote” app and connect via the “IR” connection option. This first screen the user sees in the “GO Remote” app after connecting to the pump is known as the “Dashboard”.

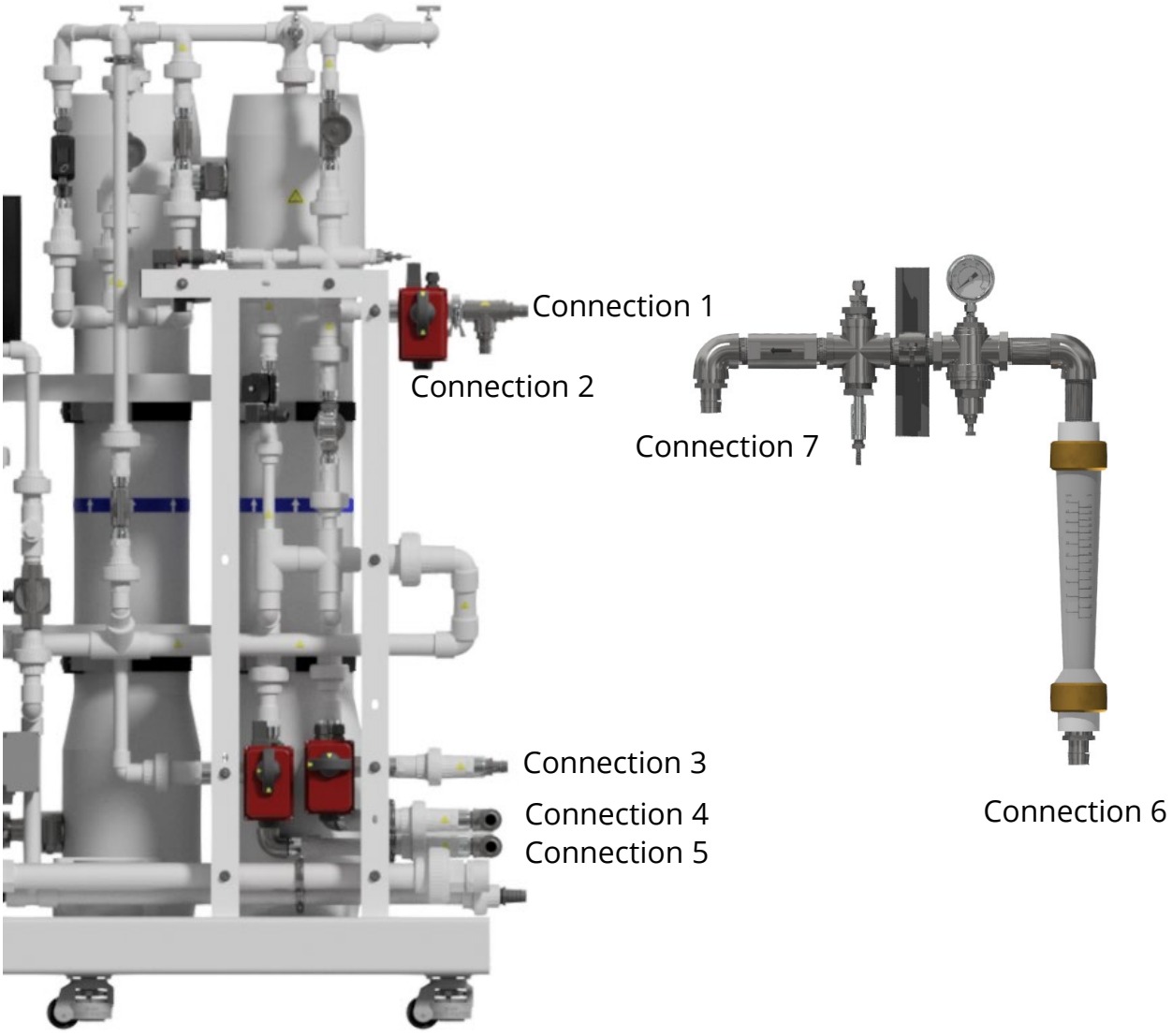
“Dashboard” Screen:



- Any alarms or warnings will be displayed at the top of the Dashboard screen, under the Grundfos Eye as shown above.
- Do not change any of the pump parameters, these are factory set.
- The Grundfos Dongle can be turned off by pressing and holding the power button on the top of the device until the green power button illumination light goes off.

13.3 Optional Sanitary Adapter Installation Kit

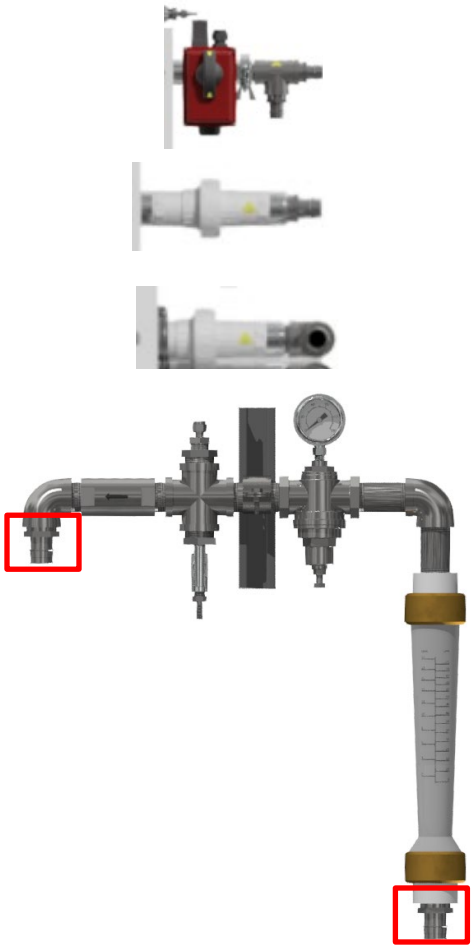
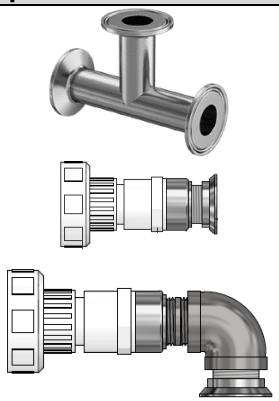
The MediQA comes with PEX adapters already installed in 5 locations on the unit (connections 1-5) and an additional 2 locations on the Product Recovery kit (connections 6-7). These connections may be replaced with an alternate option to connect the water room fittings via sanitary fittings and heat rated SS braided hosing.



Installation kit P/N 0088-0028 has the proper components to offer connection points via sanitary clamps. To install the kit, the installer removes the PEX adapters from connections 6 and 7. These connections can be replaced with NPT by sanitary fittings from the kit (see Table 1).

Then the installer can simply unscrew the unions for connections 1-5 and replace with the corresponding assembly from 0088-0028. Make sure when reconnecting, the o-ring or gasket is in place.

Table 1

Current connection	Replacement connection
	 Remove PEX adapters and replace with P/N 049-0002 using thread tape. 

13.4 Diagnostic Guide

The MediQA has a Diagnostic Guide, 098-0010, to consult for troubleshooting assistance. The contents of the diagnostic guide include, but is not limited to:

- Component Identification
- Flow Schematics for each mode of operation
- PLC Input and Output Identification
- Valve Positions in each mode of operation
- Alarm and Warning Checks and Proposed Actions
- Electrical & Mechanical Faults
- Component Failures
- Instruction on the following topics:
    - Setting MediQA Pressure Relief Valve
    - Changing HMI Clock
    - Reference to IFUs pertaining to the product

CALIFORNIA PROPOSITION 65

⚠ WARNING

This product can expose you to chemicals such as vinyl chloride (used in the production of PVC) or Nickel (used in the production of stainless steel), that are known to the State of California to cause cancer. For more information, go to www.P65Warnings.ca.gov.

Dear Valued Customer,

California Proposition 65 (Prop 65) is the Safe Water and Toxic Enforcement Act of 1986. The State of California began enforcing amendments to California Prop 65 at the end of August 2018. Prop 65 requires manufacturers to provide a clear and reasonable warning to residents of California about chemicals used in products that they purchase that are included on the Prop 65 Chemical List. The chemicals included on the list are chemicals that are known to the State of California to cause cancer, birth defects, or other reproductive harm. One such chemical is Vinyl Chloride, a compound used to produce Polyvinyl Chloride (PVC). The AmeriWater system you have purchased may contain PVC or stainless steel parts.

While warnings are only required in the State of California, AmeriWater has initiated the use of Prop 65 labeling for all products to ensure compliance with California regulations. Please note that the above warning does not necessarily mean that the product that you have purchased is unsafe. Products that have been cleared for market by FDA have been determined to be safe and effective by the United States Food and Drug Administration. The warning is simply a requirement by the State of California. If you wish to obtain additional information, please visit: p65warnings.ca.gov. You may also contact your AmeriWater representative if you have any questions.

Thank you for your understanding and we look forward to continuing to serve you.