

MediQA

Reverse Osmosis System

MODELS MSP AND MDP



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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:

Customer Service Tel No: 1-800-535-5585

For all service or technical support contact:

Technical Support Tel No: 1-800-535-5585

Web address: www.amerewater.com

(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 and double pass models that supply from 5.5 to 12.0 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 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 10.0 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.



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.



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 ($\mu\text{S}/\text{cm}$)
- Temperature ($^{\circ}\text{F}$)
- 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.



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



This symbol indicate 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 specification.



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	00MDP2-230	00MDP4-230
Performance					
Permeate flow rate @ 77°F**	gpm	9.0	12.0	5.5	10.0
Dimensions					
Height	Inches	79	79	79	79
Width	Inches	43	43	43	43
Depth	Inches	64	64	64	76
Weights					
Working	lbs	1310	1375	1660	2285
Shipping*	lbs	1050	1100	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 95°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	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				
	Single Pass		Dual Pass	
Catalog Number	MSP2	MSP3	MDP2	MDP4
Flow Rates				
Product Flow Specification (GPM)	9	12	6	10
Product Flow Range (GPM)	7.2-10.8	9.6-14.4	4.8-7.2	8-12
Stage 1 Concentrate Flow (GPM)	Nominal: 5 3.8-9	Nominal: 6.5 5-12	Nominal: 5 3.8-9	Nominal: 6.5 5-12
Stage 2 Concentrate Flow (GPM)	NA	NA	1-3	1-3
Stage 1 Recovery (%)	Nominal: 65 50-70	Nominal: 65 50-70	Nominal: 65 50-70	Nominal: 65 50-70
Stage 2 Recovery (%)	NA	NA	Nominal: 80 75-85	Nominal: 80 75-85
Pressure				
Stage 1 Pump Pressure (PSI)	140-180	140-180	140-180	140-180
Stage 2 Pump Pressure (PSI)	NA	NA	140-180	140-180
Feed Water Pressure (PSI)	30-80	30-80	30-80	30-80
Interstage Pressure [Bar] (PSI)	NA	NA	2-5 (30-70)	2-5 (30-70)
Temperature				
Feed Water Temperatures (F)	40-90	40-90	40-90	40-90
Conductivity				
Output Conductivity	>94% Incoming Water	>94% Incoming Water	>94% Incoming Water	>94% Incoming Water

- 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 ideal Feed water temperature is 77 degrees Fahrenheit. This will be the optimal operation temperature of the system.
- The DOW heat disinfection membranes are manufactured with a ±20% tolerance for flow rate. This is factored into the Product Flow Range category.
- Output conductivity is based on the quality of the feed water. The output conductivity should be greater than 94% of the incoming feed water.

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 one 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.

In the single pass system, Hi Recovery Mode allows a higher percentage of reject water to be recovered. The default target recovery percentage is 65%.

In the dual pass system, process water (permeate) 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).

In the dual pass (two RO stages) MediQA, a portion of the concentrate (reject water) from the 1st stage RO module set is discharged to drain while the balance is returned 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.

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.

The single pass 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).

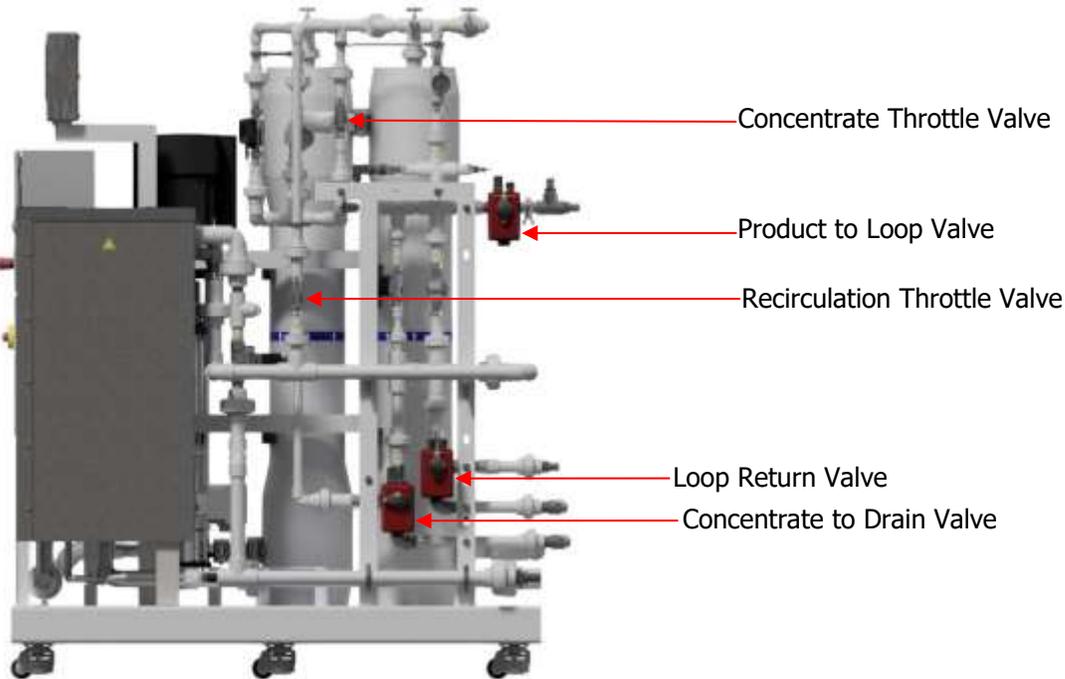
In addition to the above, the MediQA incorporates process elements to enable heat disinfection of the reverse osmosis membranes and its pipe work. Heat disinfection can be activated manually using the RO Heat Disinfection button on the touch screen display or automatically if timer clock settings are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

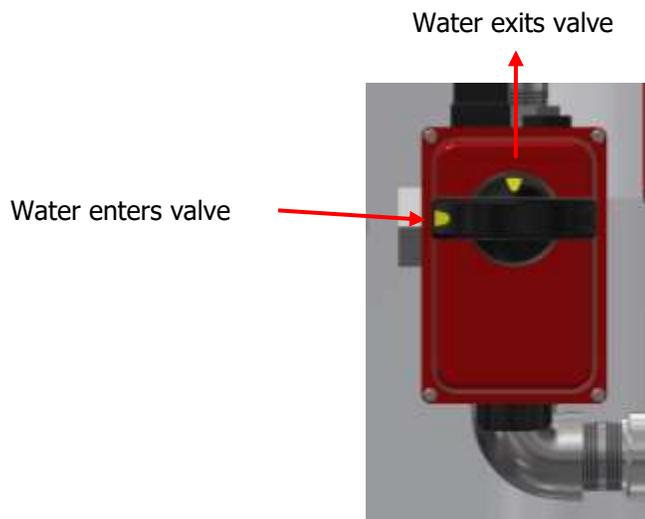
Frequency of heat disinfection will depend upon usage and application demands. Monitoring of the system for bacterial content should be conducted at regular intervals to determine the optimum frequency for heat disinfection. Recommended weekly disinfections and monthly monitoring of bacteria and endotoxins.

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 High 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 Figures 1-3. 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 water 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 water to drain period will begin and the RO will dump 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.

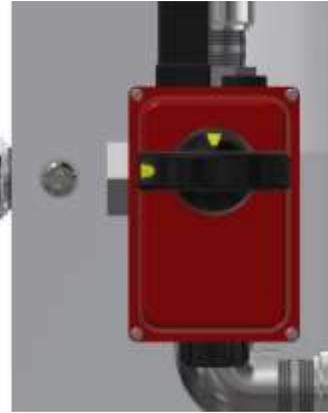


Figure 4
Concentrate to Drain Valve



Figure 5
Loop Return Valve

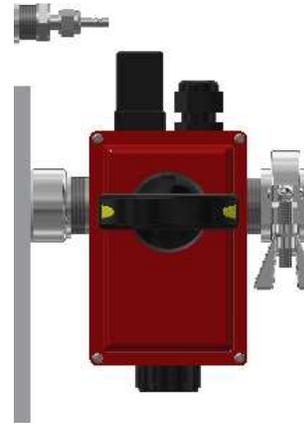


Figure 6
Product to Loop Valve

Water 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.



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 Figures 1 through 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 Figures 4-6 for valve positioning.

4.2.4 Heatsan Fill Procedure

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 8
Concentrate to Drain Valve



Figure 9
Loop Return Valve



Figure 10
Product to Loop Valve

4.2.5 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 vary slightly for each step in the cleaning process. The valves 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 pumps turn on at a low speed to keep the pressure in the system below the alarm set point.



Figure 11
Concentrate to Drain Valve



Figure 12
Loop Return Valve



Figure 13
Product to Loop Valve

Tank Drain, High/ Low Pressure Rinse:

During the tank drain, high pressure rinse or low pressure rinse, the concentrate drain valve shown in Figure 14 opens fully allowing all of the residue chemicals in the system to go to the drain. The tank will drain completely before the rinse process occurs. Once the rinse process occurs, the fill line opens allowing the tank to refill with clean water. During these 3 phases all other valves remain in the same position as the recirculation procedure.



Figure 14
Concentrate to Drain Valve

4.2.6 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.

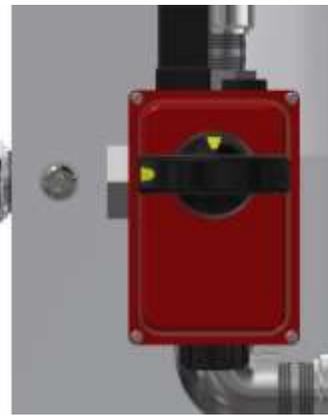


Figure 15
Concentrate to Drain Valve



Figure 16
Loop Return Valve



Figure 17
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 18
Concentrate to Drain Valve



Figure 19
Loop Return Valve



Figure 20
Product to Loop Valve

COOLDOWN OF HEATSAN 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 22, is positioned to redirect water back to the Heatsan unit. This keeps the hot water from entering the tank of the MediQA.



Figure 21
Concentrate to Drain Valve



Figure 22
Loop Return Valve

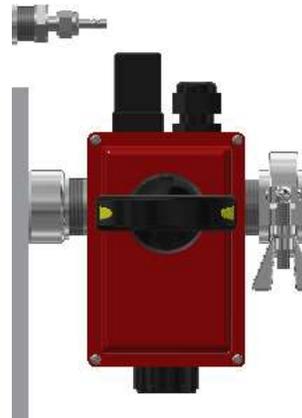


Figure 23
Product to Loop Valve

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.



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
- Operators' Manual

5.3 CONNECTIONS

5.3.1 Electrical Supply



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 AMERI WATER REPRESENTATIVES.

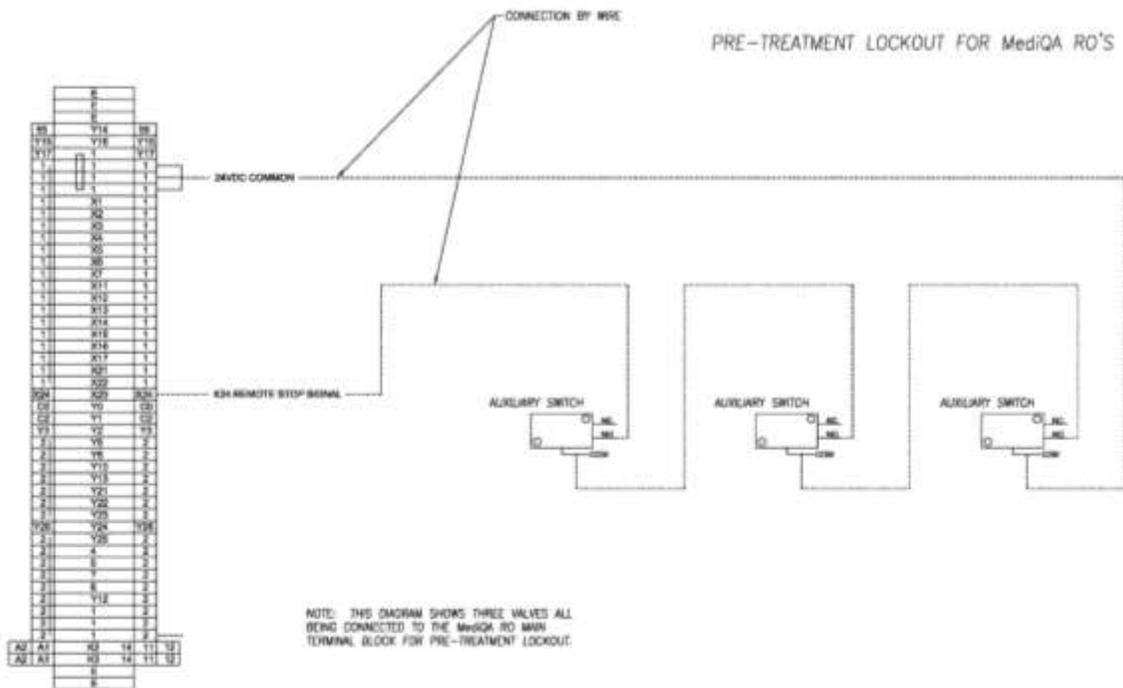


This Reverse Osmosis System (RO) contains a preservative solution to prevent microbiological growth and freezing. Discard all product water for at least two hours of operation before placing the RO in service.

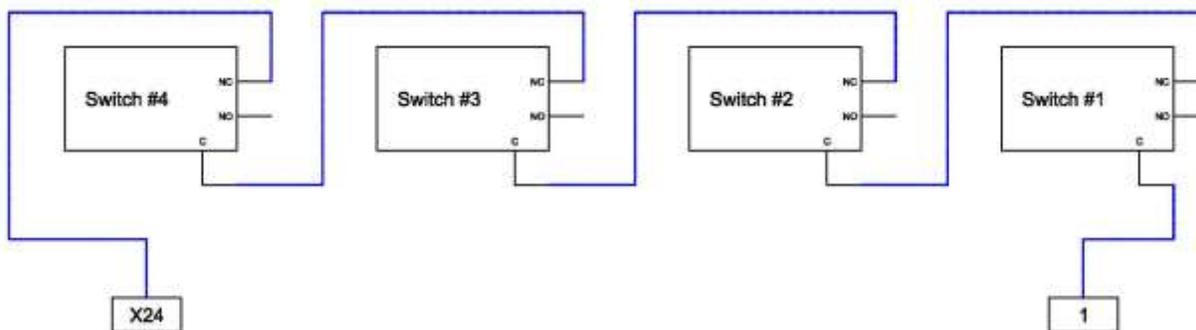
5.4.1 Pretreatment Lockout

The **MediQA** can utilize pretreatment lockout. Pretreatment lockout will prevent the device from operating while the pretreatment 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 pretreatment 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 pretreatment lockout switch or switches (located in the pretreatment 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.



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

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.

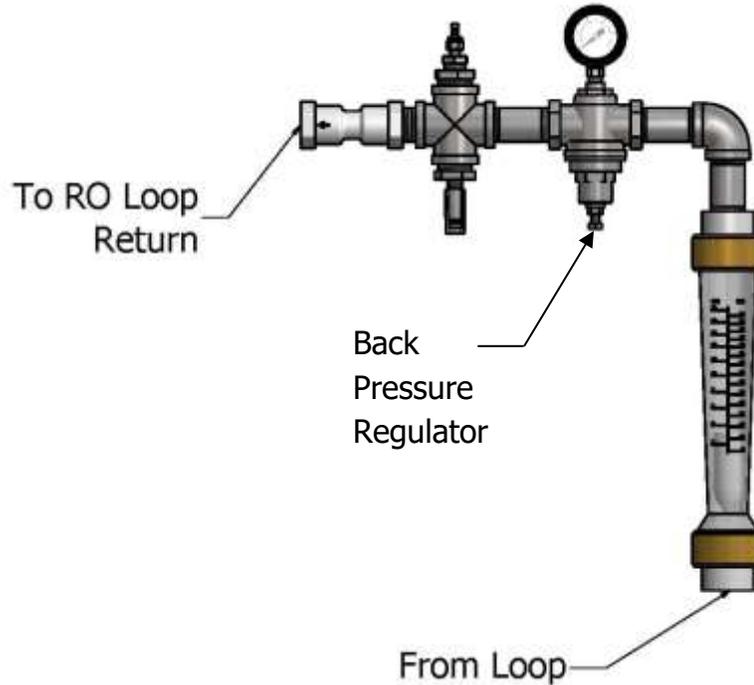
5.4.4 Installation Kit Details

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. You can 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. Pretreatment devices should already be in service and filter cartridges installed. Post treatment equipment will be exposed to water the first time, insure all union fittings are tight. Insure 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 at the main power supply 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.

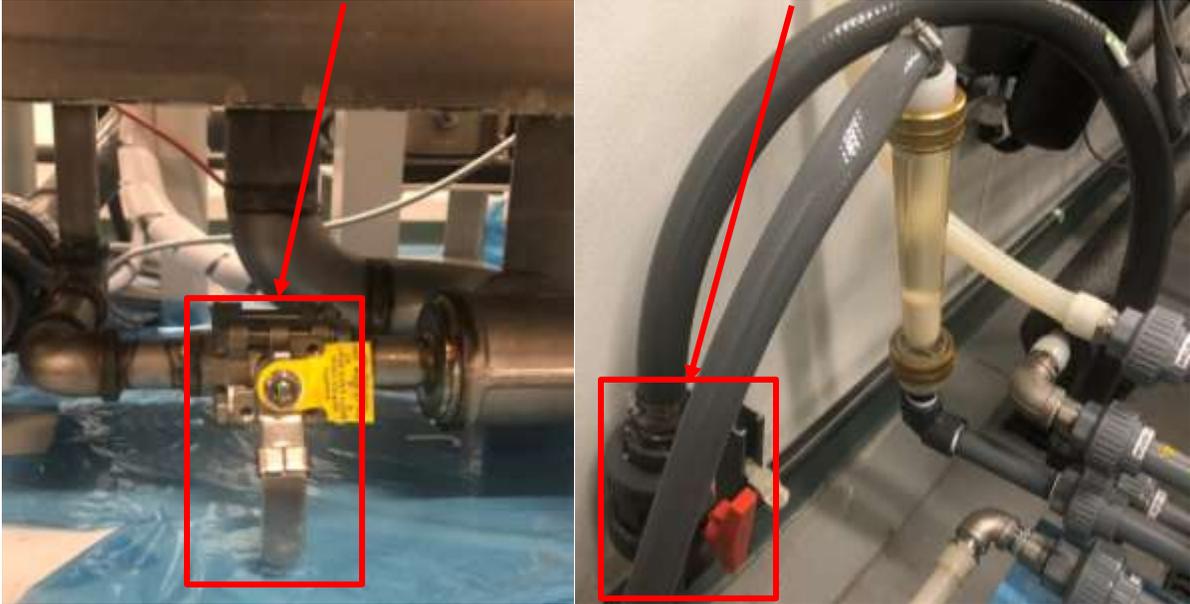


Remove the lid to the MediQA tank, and open the tank drain valve on the bottom of the tank.

Slowly open the feed water supply valve to the MediQA. Watch the tank as it fills, water maybe 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

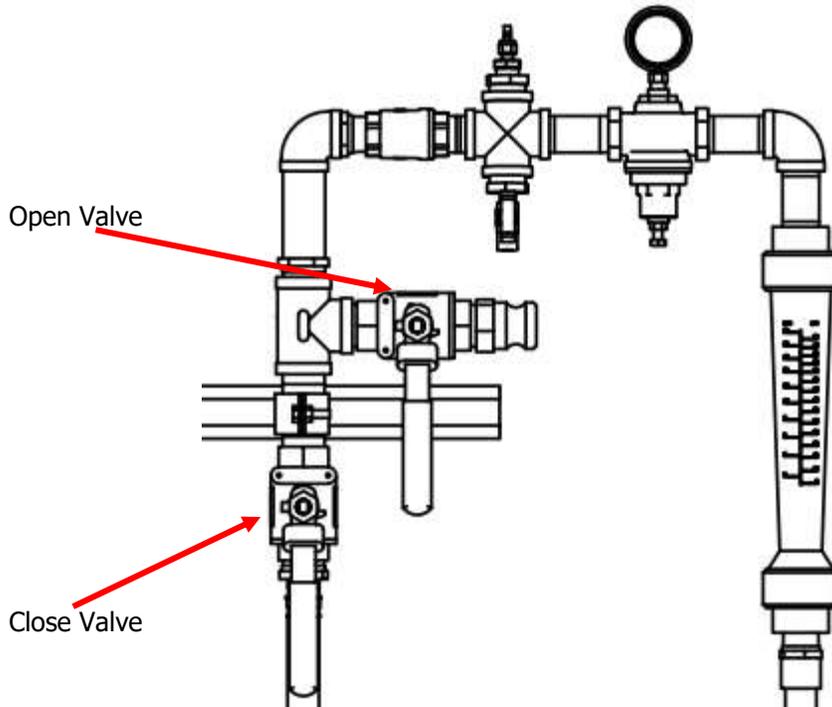


Once water is clear close the tank drain valve and install the tank lid.

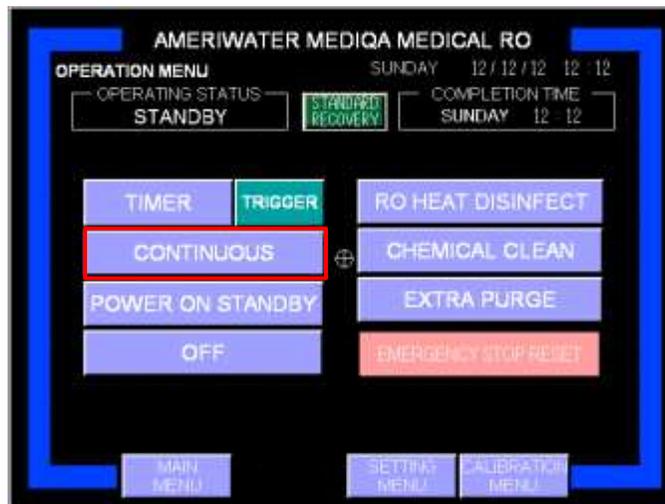
Navigate SETTINGS MENU > RO SUPPLY and increase the Flush and Rinse time to 10 minutes each. Level 3 User Login will be required for this step. Also, click the *ENTER* button under MEDIQA OPERATION MODE. Hold the disable button for 2 seconds to put the unit into Standard Recovery Mode.



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.



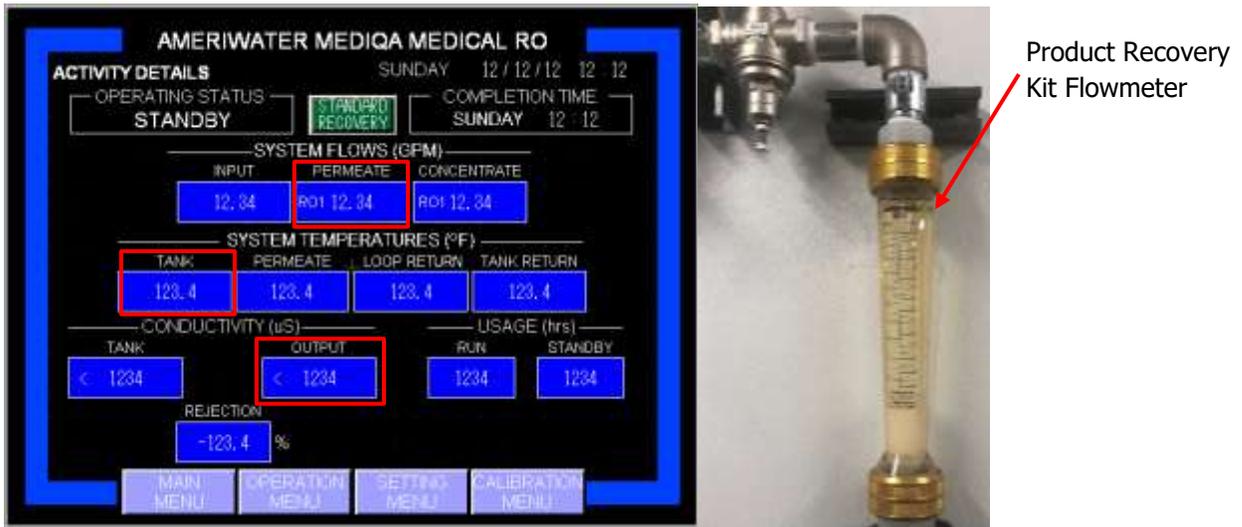
Warning

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 your unit.



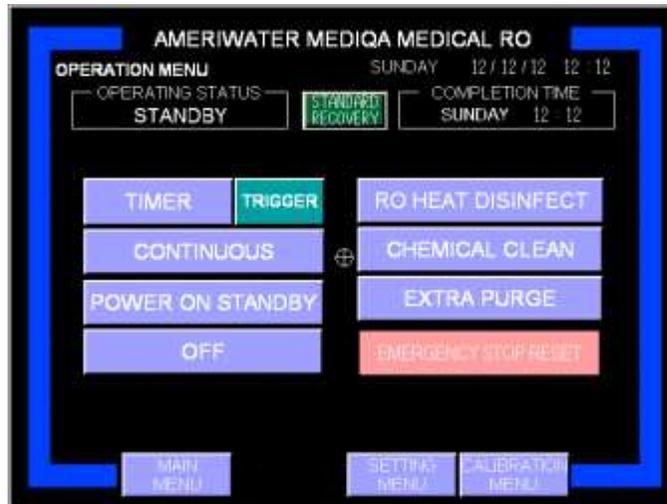
Navigate SETTINGS MENU > RO SUPPLY > MEDIQA OPERATION MODE ENTER and hold ENABLE for 2 seconds to return to Hi Recovery Mode upon completion of the 2 hours. Hi Recovery Quality is default to a low limit of 6 μS and a high limit of 10 μS during RO Supply. Break Tank Temperature is default to a low limit of 77 $^{\circ}\text{F}$ and a high limit of 85 $^{\circ}\text{F}$. 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 effect at what stage a heat disinfection is conducted on the RO. May decide to program an automatic heat disinfect.

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

To manually begin a heat disinfect from the OPERATION MENU, press RO HEAT DISINFECT. The controller will ask you to confirm, 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 you see the tank temperature in RED numbers. Insure the unit held 185°F for 30 minutes.

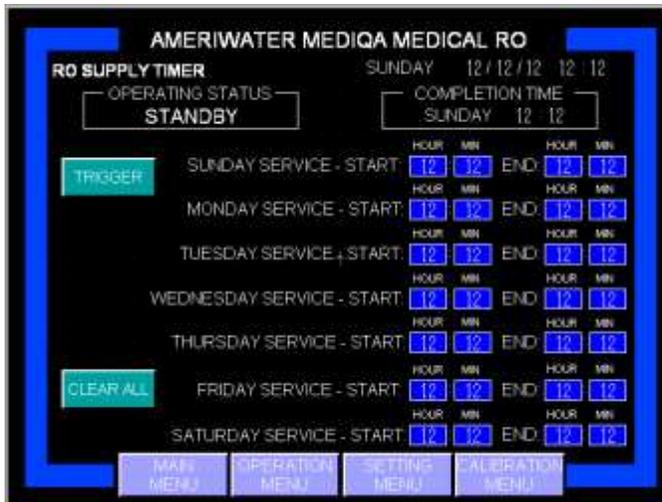
Before programming the MediQA, consult the facility manager for operating and maintenance schedules that require water to complete.



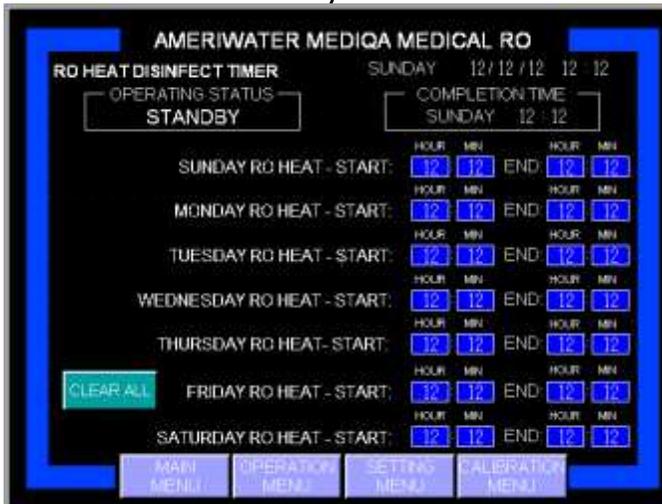
Warning

The supply schedule and heat disinfect schedule may not interfere with pretreatment 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.**



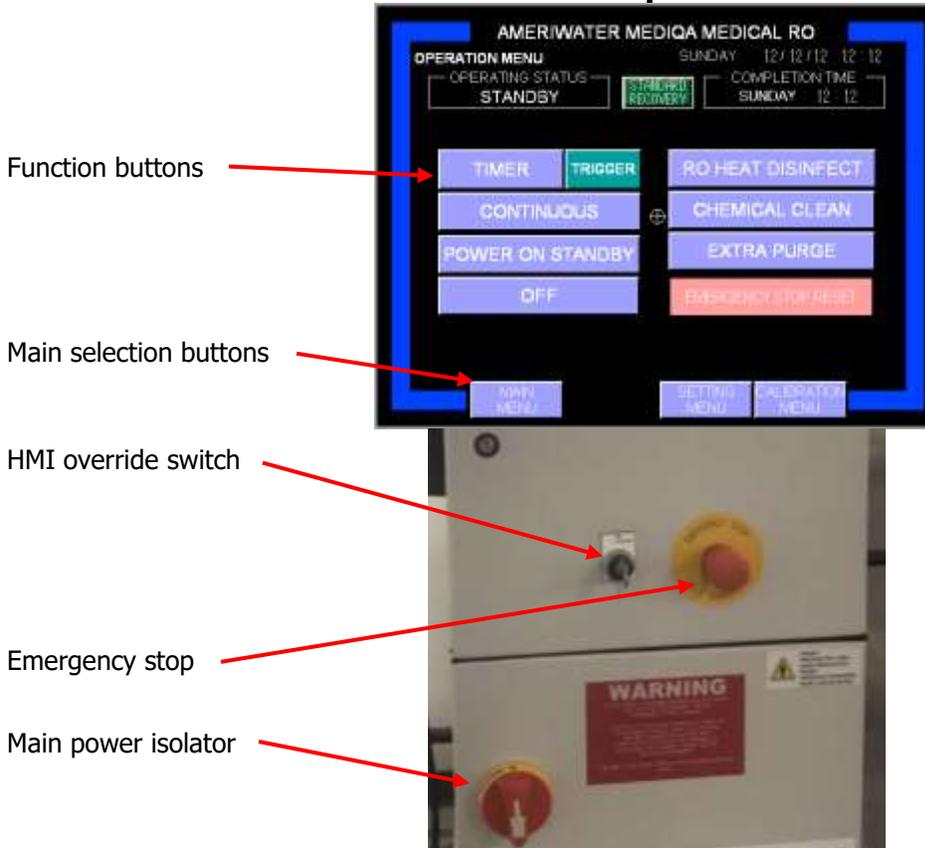
Once in the RO SUPPLY screen, reset the flush and rinse times to 2 minutes each. Navigate SETTINGS MENU > RO HEAT DISINFECT > RO HEAT DISINFECT SCHEDULE ENTER and set the desired day to heat disinfect the RO.



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 DPH and SPH models based on the parameters necessary for operation.**



6.1 OPERATIONS 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:

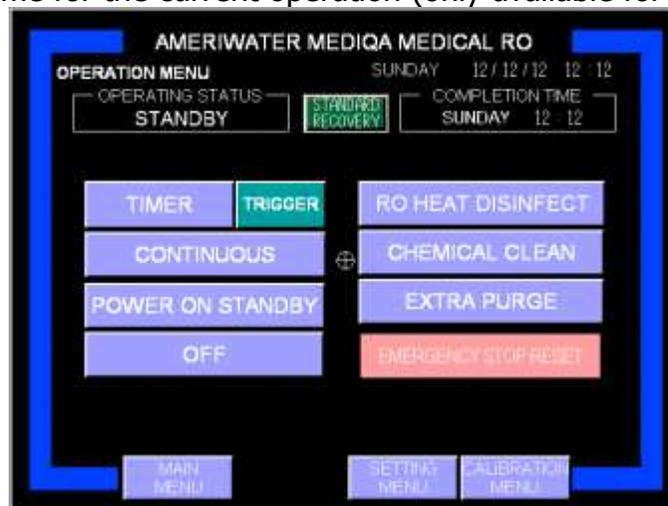
- Blue – Function operating to specification.
- Amber – Warning active
- Red – Alarm active

“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 24



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.

CONTINUOUS button

i 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

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 you will be prompted and required to press buttons 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 29)

SETTING MENU button
Switches screen to Settings Menu (see Figure 35)

CALIBRATION MENU button
Only accessible by AmeriWater technicians.

6.1.2 Operation Periods

MediQA Operation Periods	
Period	Explanation
Standby	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 performs 10 minutes of operation in every 2 hours. The duration and interval are user settable. This enables water to be circulated through the MediQA and distribution loop, in order to maintain water quality.
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.
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.
Rinse	After the flush cycle is completed, the RO will go into a rinse. During rinse the unit continues to run the pumps at a high pressure. Water is flushed down the drain similar to the flush of the membranes.
Refresh	Loop has exceeded the temperature set point and is refreshing the water to lower the temperature.
RO Heat Disinfect	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.
Temp Hold	Once the temperature is reached in the RO Heat Disinfect period, the water is circulated for a set period. Hold time is user settable, see Section 13.1 for default.
Cool Down	RO Heat Disinfect enters this mode to cool down break tank and membranes at the end of the RO Disinfect cycle. Cool down temperature is user settable, see Section 13.1 for default. The MediQA can return to normal operation after the cool down temp is reached.

Clean	The MediQA is equipped with the ability to perform a chemical cleaning of itself once chemicals have been added in the tank. Recirculation time is user settable, see Section 13.1 for default.
Clean Recirc	During the recirculation phase of the chemical clean process, all of the water is redirected back into the MediQA tank. Clean time is user settable, see Section 13.1 for default.
Clean Rinse	After the clean recirc cycle is completed, the RO will go into a clean rinse to purge the chemicals from the system.
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.
Loop Heatsan	Heatsan unit is performing a heat disinfection by cycling hot water through the loop. MediQA locked out from operating.
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.
System OFF	System operation has been switched OFF via the button on the touch screen display.
Standby HS Over	Heatsan disinfection just completed and the unit is returning to standby.
Heatsan Fill	The MediQA has been called on to provide water to the Heatsan.

6.2 MAIN MENU

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

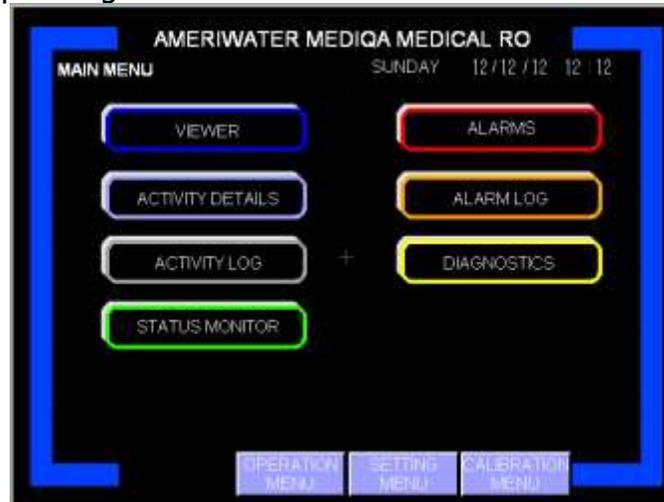


Figure 25

6.2.1 VIEWER button

Takes you to the viewer screen shown below.

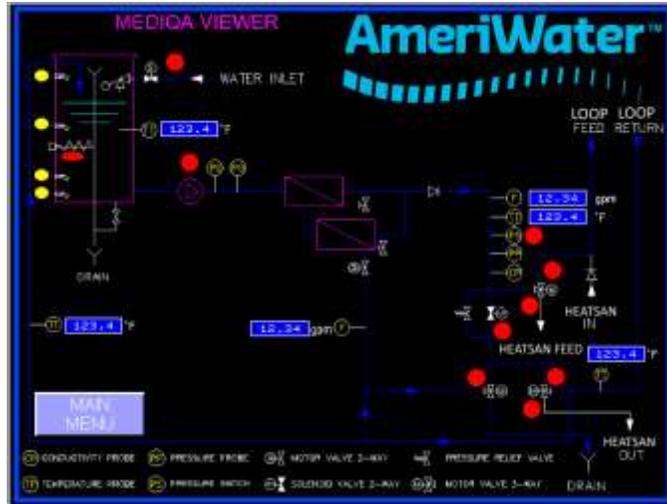


Figure 26

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 button

Takes you to the activity details screen shown below.

Single Pass Screen

Figure 27

Dual Pass Screen

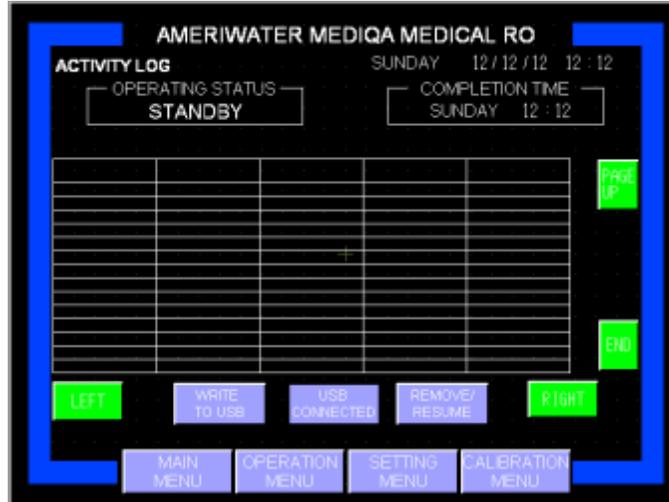


The ACTIVITY DETAILS screen shows specific performance data relating to system processing elements. It also displays the number of hours the MediQA has been running or has been in standby. These can be reset to zero by pressing

ZERO button on the RO PARAMETERS screen (see Section 6.5.2). Needs reset after 9999 run hours for SPH or 8760 run hours on DPH.

6.2.3 ACTIVITY LOG button

Takes you to the ACTIVITY LOG screen shown below.



Figure

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 button

Takes you to the STATUS MONITOR screen shown below.

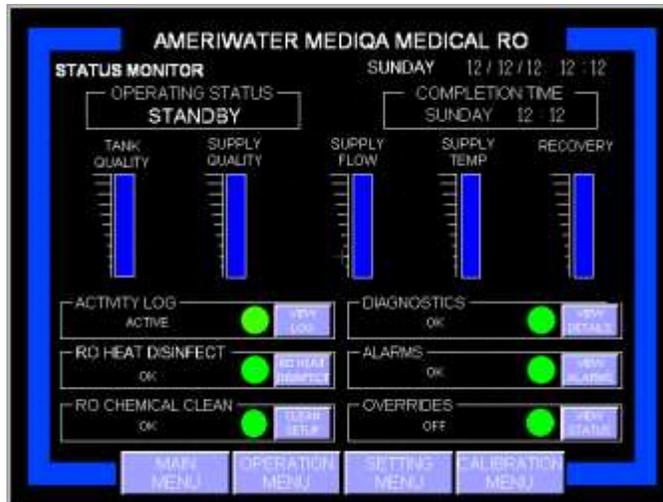


Figure 29

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....). 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.

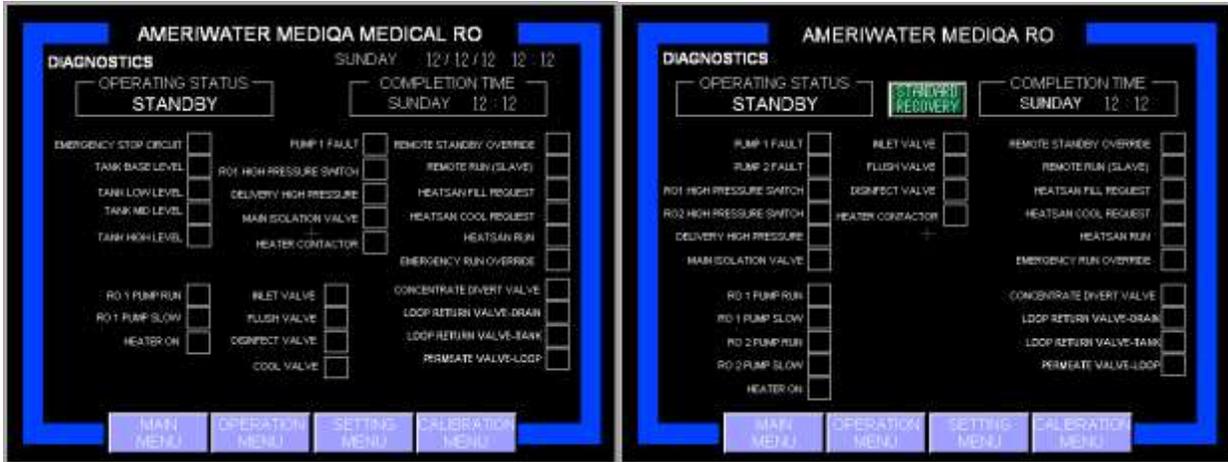
- Green – Function operating to specification.
- Amber – Warning active
- Red – Alarm active

“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 button

Takes you to the alarm screen shown below.



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

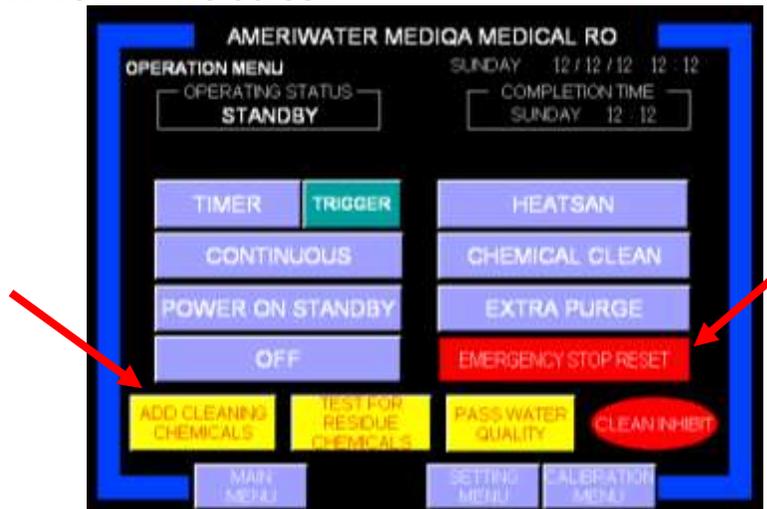


Figure 33
Note: The yellow and red buttons only appear when a given process has been activated.

6.4 SETTINGS MENU screen

The SETTINGS MENU allows key operating parameters and system alarms to be set. When the button is pressed you will be prompted for a password.

Takes you to the set-up menu screen shown on the following page.

The password to enter the SETTINGS MENU is 01844.

Punch in the number and press ENT. If you make an error press ESC.

Figure 34



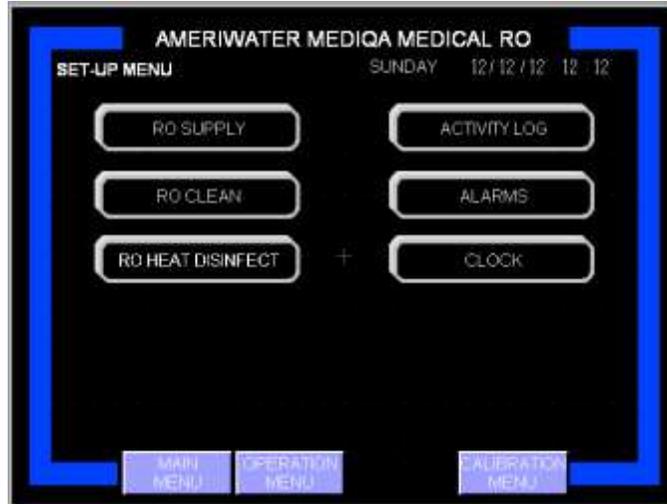


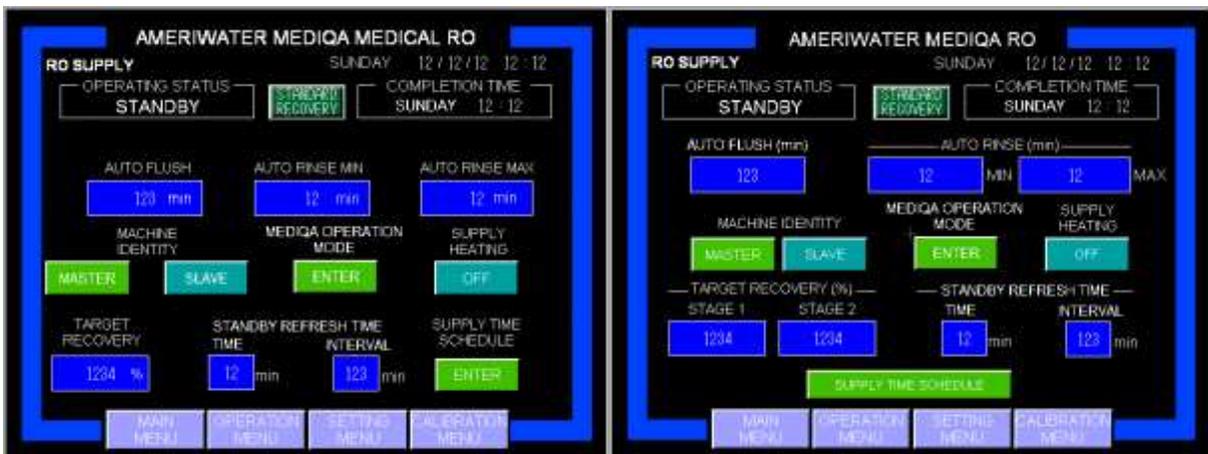
Figure 35

6.4.1 RO SUPPLY button

Single Pass Screen

Figure 36

Dual Pass Screen



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 takes you 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.

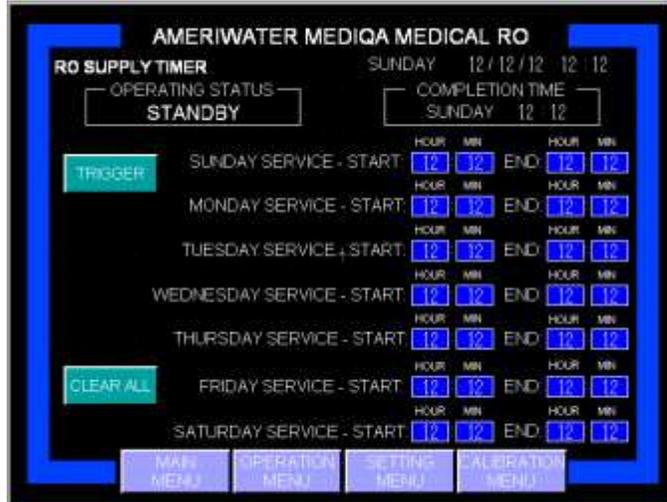


Figure 37

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.

ENTER under MEDIQA OPERATION MODE takes you 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.

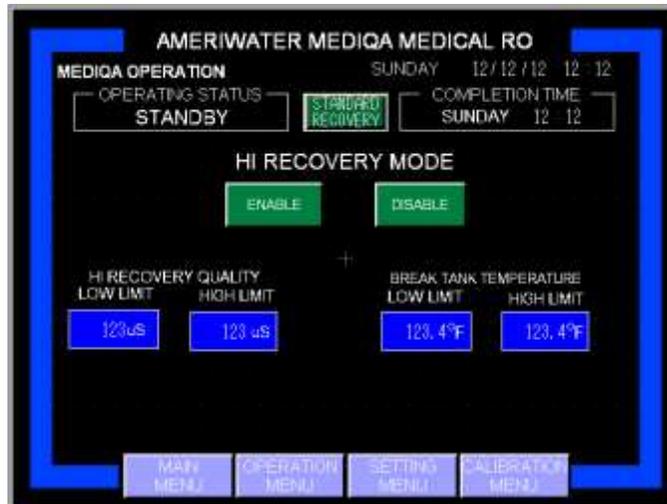


Figure 38

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.

6.4.2 RO CLEAN button

Takes you to the RO CLEAN screen. (See Section 8 before operating this function)

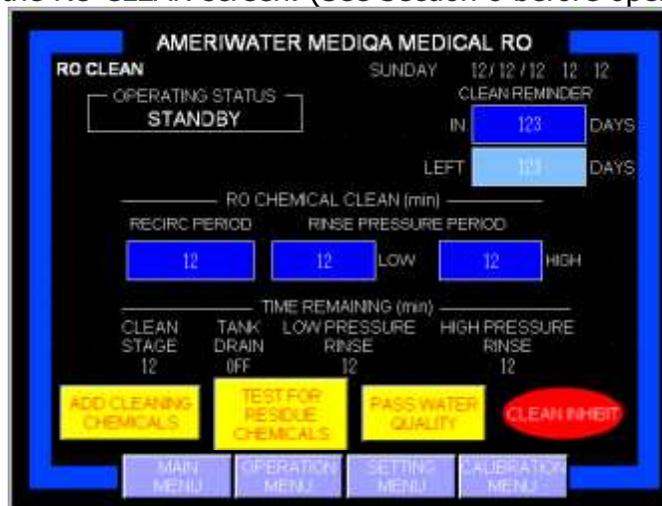


Figure 39
Note: The yellow and red buttons only appear when a given process has been activated.

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 button

Takes you to the RO HEAT DISINFECT screen shown below. Here specific functions for the RO heat disinfect can be set.

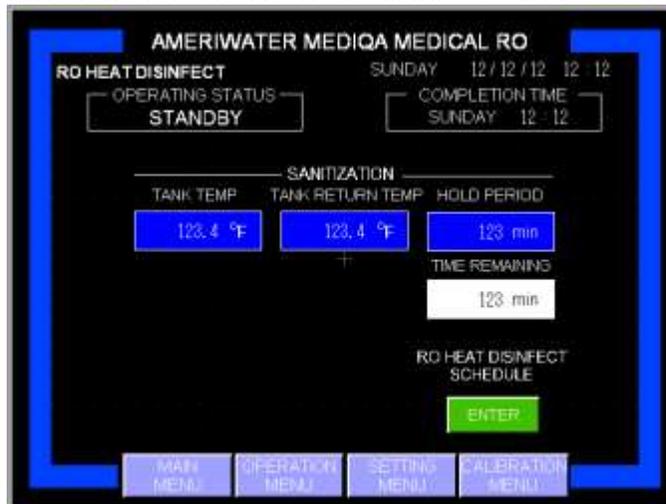


Figure 40

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 takes you 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.

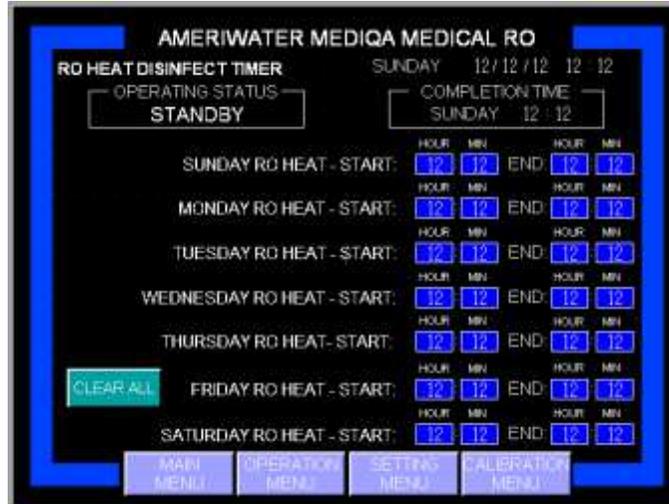


Figure 41

Heat disinfection will be postponed if these times conflict with RO SUPPLY TIMER settings (Figure 37). RO HEAT DISINFECT 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 button

Takes you to the activity log setup screen shown below.

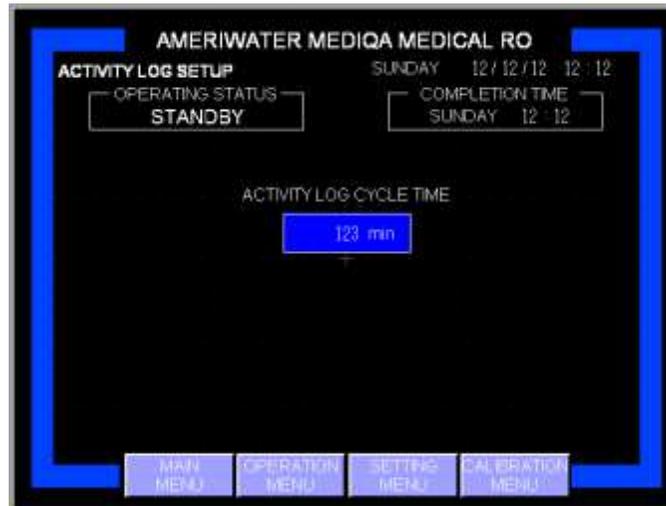


Figure 42

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 button

Takes you to the alarm setup screen shown below.

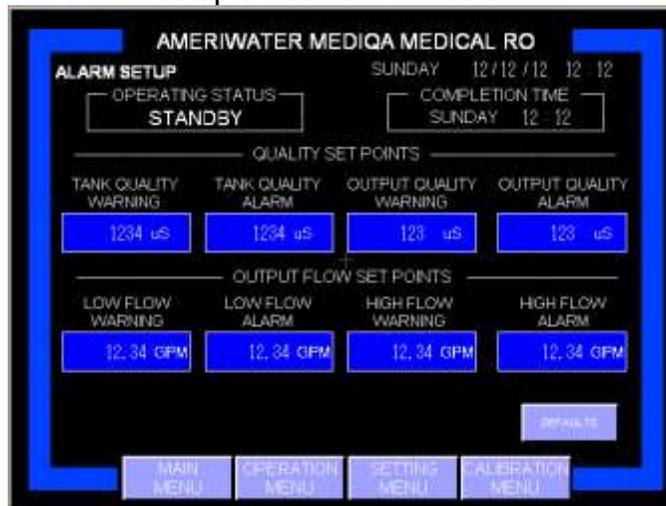


Figure 43

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 button

Takes you to the clock setup screen shown below.

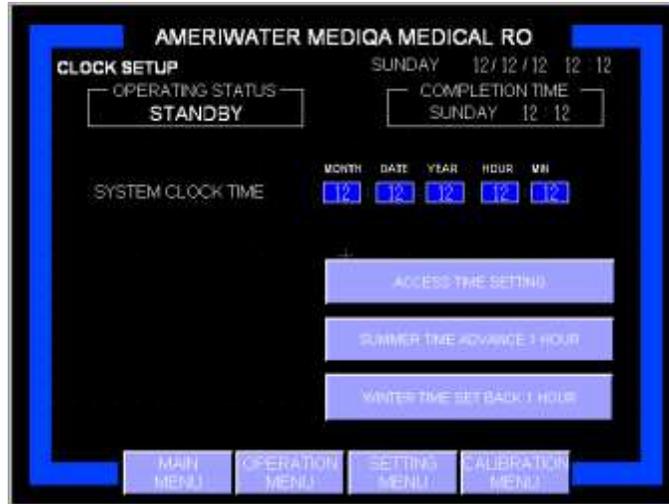


Figure 44

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

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.

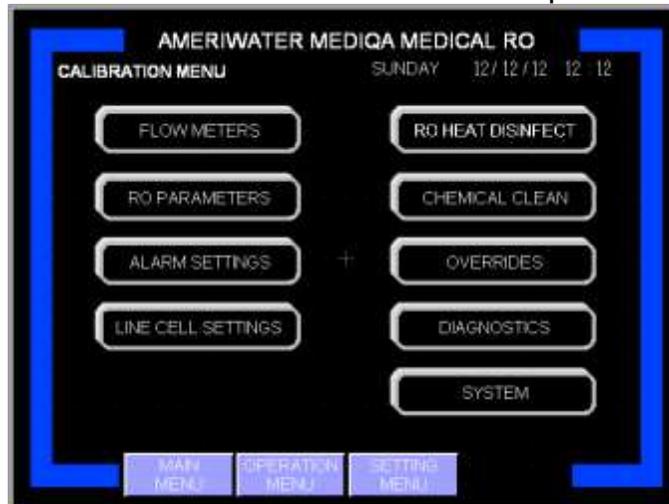


Figure 45

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

6.5.1 FLOW METERS button

The Flow Meter menu allows access to the calibration settings.

Single Pass Screen

Figure 47

Dual Pass Screen



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

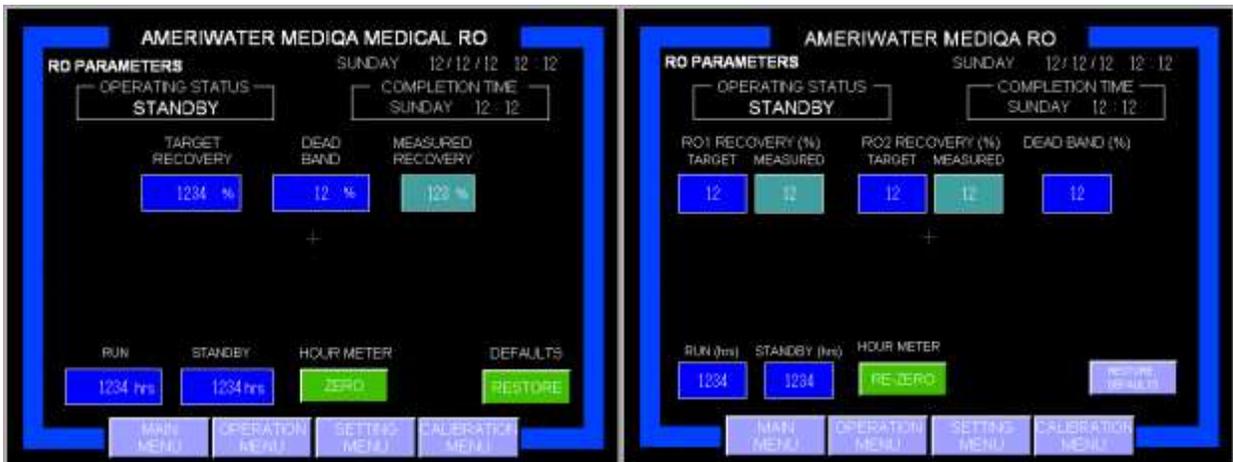
6.5.2 RO PARAMETERS button

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 48

Dual Pass Screen



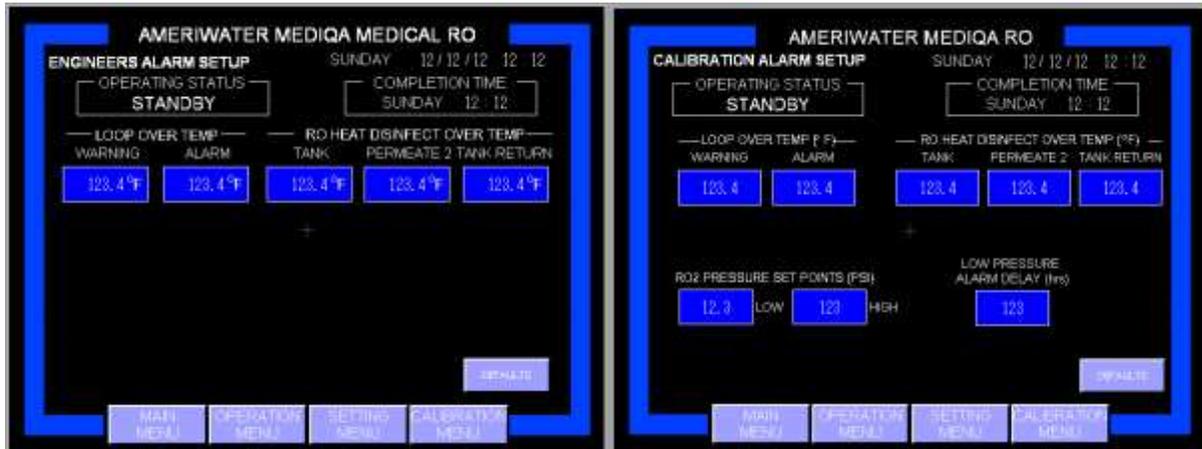
6.5.3 ALARM SETTINGS button

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 49

Dual Pass Screen



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 button

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 after initial set up of the system.

Single Pass Screen

Figure 50

Dual Pass Screen



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 button

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

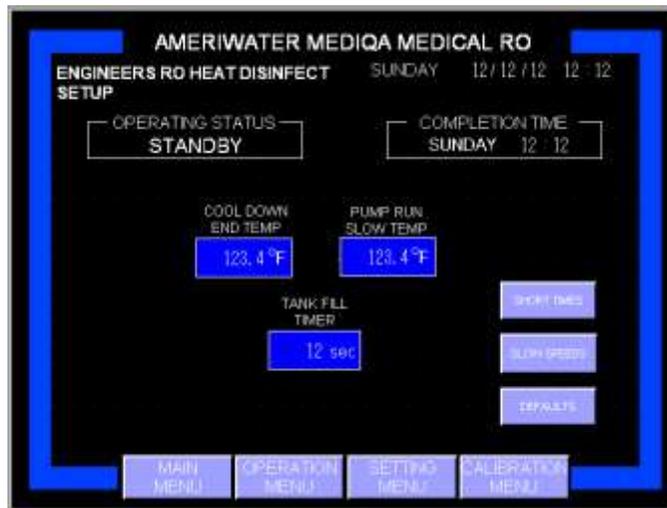


Figure 51

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 button

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.

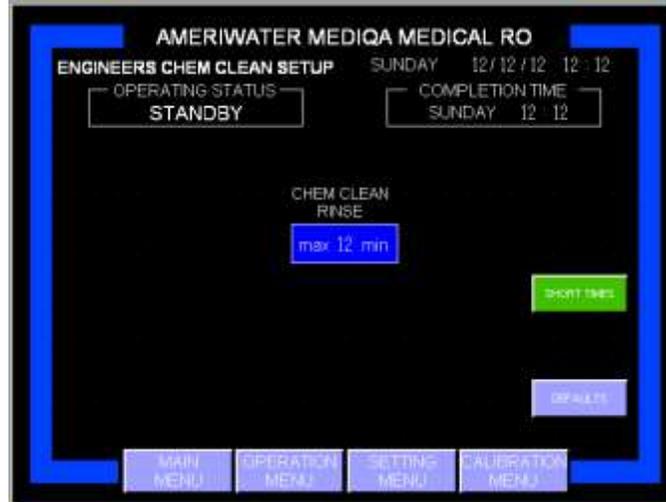


Figure 52

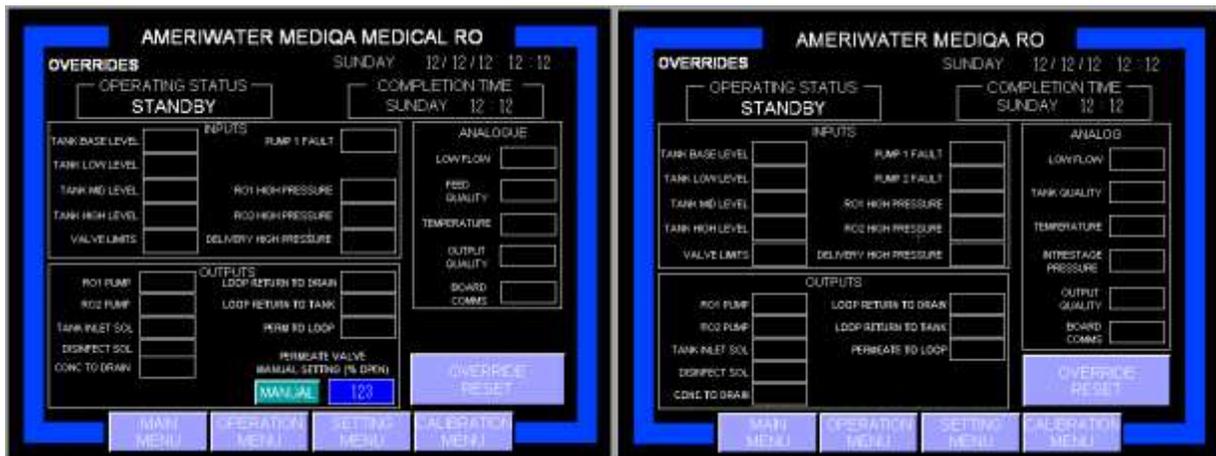
6.5.7 OVERRIDES button

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 53

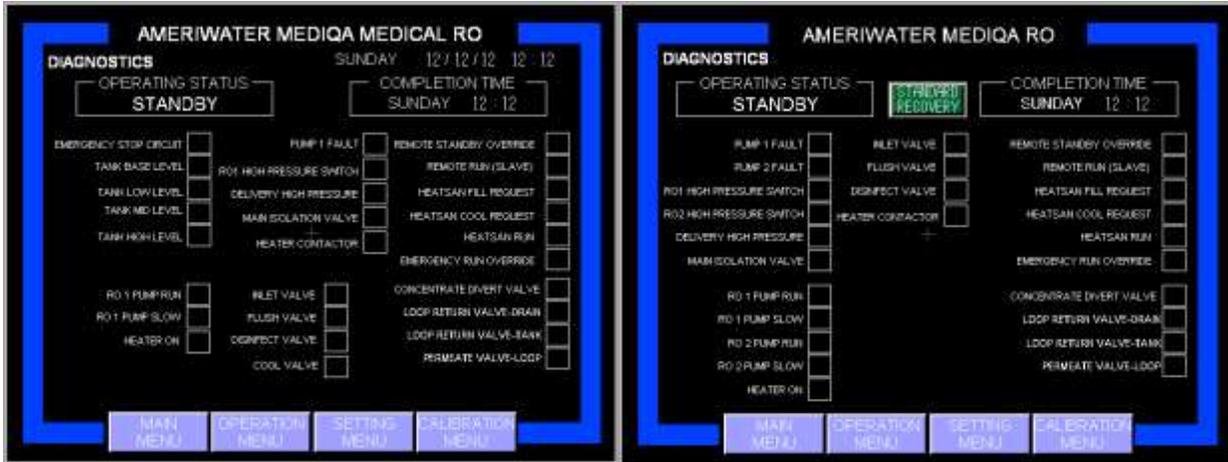
Dual Pass Screen



6.5.8 DIAGNOSTICS button

Takes you to the diagnostics screen shown below.

Single Pass Screen **Figure 54** **Dual Pass Screen**



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

6.5.9 SYSTEM button

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



Figure 55

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.

7. FAULTS AND FAULT FINDING

ALARMS will stop machine operation. It is not possible to restart the machine without addressing the fault.

Alarm Description	Trigger	Review and Check	Corrective Action
ALARMS			
RO1 Pump Over Pressure Alarm	Pump pressure transducer	1) RO1 Membranes are blocked 2) Concentrate valve on RO1 closed 3) Pressure switch faulty	1) Check valve status 2) Perform chemical clean,
RO2 Pump Over Pressure Alarm (DPH only)	Pump pressure transducer	1) RO2 Membranes are blocked 2) Concentrate valve on RO2 closed 3) Pressure switch faulty	1) Check valve status 2) Perform chemical clean,
RO1 Pump Fault Alarm		1) Check and inspect pump RO1	1) Contact AmeriWater service
RO2 Pump Fault Alarm (DPH only)		1) Check and inspect pump RO2	1) Contact AmeriWater service
Temperature High Alarm	Loop Over Temp Alarm Set-point Exceeded	1) Supply to loop over limit - check setting in CALIBRATION MENU > ALARM SETUP screen LOOP OVER TEMP ALARM 2) Softened Potable incoming water supply too hot	1) Check incoming water supply
Output Quality Alarm	Output Quality Alarm Set-point Exceeded	1) Rinse period exceeded max time RO PARAMETERS SCREEN AUTO RINSE 2) Loop supply quality over range 3) Loop supply line cell error	1) Check line cell 2) Perform chemical clean
Tank Quality Alarm	Tank Quality Alarm Set-point Exceeded	1) Tank line cell out of range RO SUPPLY screen TANK QUALITY settings 2) Tank supply quality over range RO SUPPLY screen LOOP QUALITY settings	1) Drain tank refill and perform extra rinse 2) Check line cell
Water Loss Alarm	Base Tank Float Switch	1) Tank empty - check water supply to machine 2) Check tank drain valve is closed 3) Check tank ball valve operational 4) Check tank float switches 5) Check inlet solenoid valve	
Over Temperature Fault Alarm	Tank temperature probe	1) Tank over temperature check 2) Check loop return temp 3) Check loop supply temp	
Emergency Stop Activated Alarm	E Stop	1) Reset E stop on Control Panel 2) reset E stop on touch screen	
PLC Analogue Card Error Alarm	PLC	Contact AmeriWater	Contact AmeriWater
PLC to PCB Comms Error Alarm		Contact AmeriWater	Contact AmeriWater
Output High Pressure Alarm	Delivery High Pressure Switch	1) Check if valve in the loop is closed 2) Check Permeate M. Valve is open 3) Verify Permeate relief valve is working	1) Increase setting on pressure switch using adjustment screw

Loop Return Valve Position Alarm	Loop Return M. Valve	1) Loop Return M. Valve is out of position 2) Limit switch failure	
Permeate Valve Position Alarm	Permeate M. Valve	1) Valve is out of position	
Heater Over Temperature Alarm	Thermostat	1) Adjustment for thermostat 2) Tank over temperature	
Feed Water Alarm	Float Switch	1) Check Tank level is actually empty 2) Check feed water supply 3) Verify inlet solenoid valve is working 4) Check strength of flow 5) Check if diffuser is plugged	
Output Quality Rinse Alarm	Delivery Permeate Line Cell	1) Use handheld conductivity meter to check calibration 2) Check membrane conductivity levels	1) Replace membrane
Output Flow Rate High Alarm	High Flow Alarm Set-point Exceeded	1) Check calibration of RO	
Output Flow Rate Low Alarm	Low Flow Alarm Set-point Exceeded	1) Check calibration of RO	
Heatsan Unit - Water Loss Alarm Detected	Heatsan Alarm	1) Leakage 2) Control valve failure	

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

Warning Description	Trigger	Review and Check	Corrective Action
WARNINGS			
Time Date Not Set Warning	Empty schedule fields	1) RO Supply Schedule and RO Heat Disinfect Schedule have no times set for Mon thru Sunday setups. An Operator put the RO unit into Timer Mode with no schedules set.	1) Program times to schedule 2) Run in Continuous Mode
Operation Reset Error Warning	Function button	1) Function button depressed more than 3 times in 3 minutes.	1) Alarm Reset
Feed Tank Low Level Warning	Float Switch (second from bottom)	1) Tank is nearly empty. If it loses more water, unit will shut down with Water Loss alarm 2) Check water supply to machine 3) Check valve positions 4) Check for leaks	
Level Sensor Error Warning	Float switches moved out of sequence	1) Check PLC for X6-High Level; X5-Mid Level; X4-Low Level; X3-Base Level	1) Check float switches.
High Pressure RO1 Warning (DPH only)	Pressure Switch (PS2) X7	1) RO1 Membranes are blocked / failed 2) Concentrate valve on RO1 closed 3) Check pressure switch set-point	1) Check valve status 2) Perform chemical clean 3) Adjust set-point
High Pressure RO2 Warning (DPH only)	Pressure Switch (PS3) X11	1) RO2 Membranes are blocked / failed 2) Concentrate valve on RO1 closed 3) Check pressure switch set-point	1) Check valve status 2) Perform chemical clean 3) Adjust set-point
Output High Pressure Warning (DPH only)	Pressure Switch (PS1) X12	1) Permeate valve relief set too high 2) Check pressure switch set-point	1) Adjust valve Max 30Psi 2) Adjust set-point
High Water Temperature Warning	Loop Over Temp Warning Set-point Exceeded	1) Check set point 2) Check loop temperature	1) Call AmeriWater
Output Quality Warning	Output Quality Warning Set-point Exceeded	1) Check conductivity with myron-I meter	1) Check line cell 2) Perform chemical clean 3) Replace membrane
Output Quality out of Range Warning	Permeate Conductivity Sensor	1) Check set point 2) Check sensor and wiring 3) Check conductivity board 4) Check cables between board	1) Check line cell 2) Perform chemical clean
Output Line Cell Error Warning	Permeate Conductivity Sensor	1) Check set-point 2) Check sensor and wiring 3) Check conductivity board 4) Check cables between conductivity board	1) Check line cell 2) Perform chemical clean
Tank Quality Warning	Tank Quality Warning Set-point Exceeded	1) Check conductivity with Myron-I meter 2) Check water softener and any pretreatment tanks 3) Check tank sensor and wiring	1) Check line cell 2) Perform chemical cleaning

Tank Quality out of Range Warning	Tank Conductivity Sensor	1) Check set-point 2) Check sensor and wiring 3) Check conductivity board 4) Check cables between conductivity board	1) Check line cell 2) Perform chemical clean
Tank Line Cell Error Warning	Tank Conductivity Sensor	1) Check set-point 2) Check sensor and wiring 3) Check conductivity board 4) Check cables between conductivity board	1) Check line cell 2) Perform chemical clean
Loop Supply Sampling Error Warning (DPH only)	Permeate Conductivity Sensor	1) Loop supply line cell error 2) Perform heat disinfection	1) Check line cell 2) Replace membrane
Loop Flow Rate High Warning (SPH only)	High Flow Warning Set-point Exceeded	1) Check set-point 2) Check loop flowmeter reading on Activity Details screen 3) Check wiring to flowmeter 4) With no HD machines running, check loop return flow meter and compare to screen reading	
Loop Flow Rate Low Warning (SPH only)	Low Flow Warning Set-point Exceeded	1) Check set-point 2) Check loop flowmeter reading on Activity Details screen 3) Check wiring to flowmeter 4) With no HD machines running, check loop return flow meter and compare to screen reading	
Heater Contactor Fault Warning	Heater Contactor not closed	1) Check the controller to validate that output Y4 has fired. 2) Check input X10 3) Check contactor for closure	1) Replace as necessary
Loop Return Valve Position Warning	Loop Return Valve not closed	1) Check the controller to validate that output Y23 has fired. 2) Check input X22 3) Check valve for closure	1) Replace as necessary
Permeate Valve Position Warning	Permeate Valve not closed	1) Check the controller to validate that output Y14 has fired. 2) Check input X13 3) Check valve for closure	1) Replace as necessary
Chemical Clean Overdue Warning	Clean Reminder Set-point	1) review chemical clean clock setting	1) Conduct chemical clean
RO Heat Disinfect 3 Failed Attempts Warning	Heat Disinfect not carried out	1) Review alarm log 2) Check RO Heat Disinfect is not manually aborted.	1) Complete manual RO Heat Disinfect
Pretreatment Lockout Enabled	X24	1) Check input for illumination and wiring 2) Check head on unit that is backwashing	
RO1 Quality Over Range	Stage 1 Permeate	1) Check set-point 2) Check sensor and wiring	1) Check line cell 2) Perform chemical clean

Warning (DPH only)	Conductivity Sensor	3) Check conductivity board 4) Check cables between conductivity board	
Output Line Cell Error Warning (DPH only)	Stage 1 Permeate Conductivity Sensor	1) Check set-point 2) Check sensor and wiring 3) Check conductivity board 4) Check cables between conductivity board	1) Check line cell 2) Perform chemical clean
Leak Detected Warning	Conductivity Board	1) Check connection between board and PLC 2) Check conductivity sensors wiring 3) Check plug-in locations	
Temperature Rise Warning	Break Tank Temperature Probe	1) After 30 min break tank temp is lower than previous reading during RO Heat Disinfect. Check sensor wiring 2) Check sensor is inserted properly 3) Check temperature card for power and wiring	
Temperature Hold Low Warning	Break Tank Temperature Probe is lower than Tank Return Probe	1) Check the temp in the tank with a calibrated measuring device 2) Check the return temperature 3) Check wiring to temperature card 4) Check probe is inserted all the way	

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 setpoint, factory set to 86 °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 you will have a permeate quality alarm.

8. SANITIZING & CLEANING

It is recommended that your **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 that you 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.**

MediQA water volumes – when full

00MSP2-230 = 30 gallons

00MDP2-230 = 32 gallons

00MSP3-230 = 32 gallons

00MDP4-230 = 37 gallons

Chemical Volumes:

Unit	Water Volume (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.)
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 950 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.



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

Warning



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

Danger



**(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.**

Caution



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

Warning

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 30 μ S/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 μ S/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 DISINFECTION 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 DISINFECTIOIN. 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.



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.

9. MAINTENANCE

There are no user replaceable parts on the MediQA.

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 marketing clearance for the device.

For all service enquiries contact AmeriWater at:

Tel No: 1-937-461-8833

Fax No: 1-937-461-1988

9.1 THERMOSTAT TESTING

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

To begin, remove the lid from the MediQA storage tank. Gain access to 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 this testing, the temperature of the water will be sufficient to create steam, which is hot enough to scald. Ensure that you will be able to determine the temperature 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 FAULTY ITEMS

Should a faulty item be identified please notify our service department of the item part number (see table below).

Description	AmeriWater Part Number	Qty	User replacement code	Batch controlled spare
Heater	38-0001	1	AT	No
Pump*	Model dependent	1	AT	No
Membranes	22-8041	1	AT	No
Flush solenoid	59-0034	1	AT	No
Inlet sol. 1"	911-059-0004	1	AT	No
Concentrate return motorized valve	51-0028	1	AT	No
Permeate motorized valve	51-0027	1	AT	No
Loop return motorized valve	51-0031	1	AT	No
Pressure gauge	430001	1	AT	No
Level switch	See below	1	P	No
Pressure switch	See below	1	P	No
Pressure transducer	See below	1	P	Yes
Flow transducer	See below	1	P	Yes
Feed line cell	See below	1	P	Yes
Permeate line cell	See below	1	P	Yes
Temp transducer	See below	1	P	No

* The pumps by model are listed in the table below.

Model	Pass #1	Pass #2
00MSP2-230	CRNE 5-20	N/A
00MSP3-230	CRNE 5-20	N/A
00MDP2-230	CRNE 5-20	CRNE 3-17
00MDP4-230	CRNE 5-24	CRNE 3-25

9.3 MEDICAL DEVICE TRACEABLE COMPONENTS

Description	AmeriWater Part Number	User replacement code	Batch controlled spare
Control Panel	Contact AmeriWater	AT	Yes
Tank Line Cell	69-0029	AT	Yes
High Pressure Switch RO1/RO2 (Pump Pressure Switch)	68-0008	AT	No
Delivery High Pressure Switch (Product Pressure Switch)	68-0006	AT	No
Product Line Cell	69-0033	AT	Yes
Tank / Tank Return Temp Sensor	39-0004	AT	No
Permeate Temp Probe	39-0005	AT	No
Loop Return Temp Probe	39-0007	AT	No
Tank Float Switch	67-0012	AT	No
Conductivity Board	69-0098	AT	Yes
Pressure Transducer	68-0009	AT	Yes
Permeate Flow Meter	41-0027	AT	Yes
Concentrate Flow Meter	41-0026	AT	Yes
Recirculation Flow Meter	041-9007	AT	Yes

AT: AmeriWater technician level (AmeriWater trained Technician: special tools required plus additional instructions outside of the scope of this manual. Only AmeriWater trained technician or biomed must replace parts with this assigned code for health and safety reasons. These parts are critical part of the system.)

The MediQA is classified as a medical device. Any person replacing a batch controlled spare, as identified above must, as a matter of due diligence, request from AmeriWater, that it is supplied with a clearly identifiable batch number. Also the authorized person who will install the component must quote the serial number of the machine in which it will be installed at order placement.

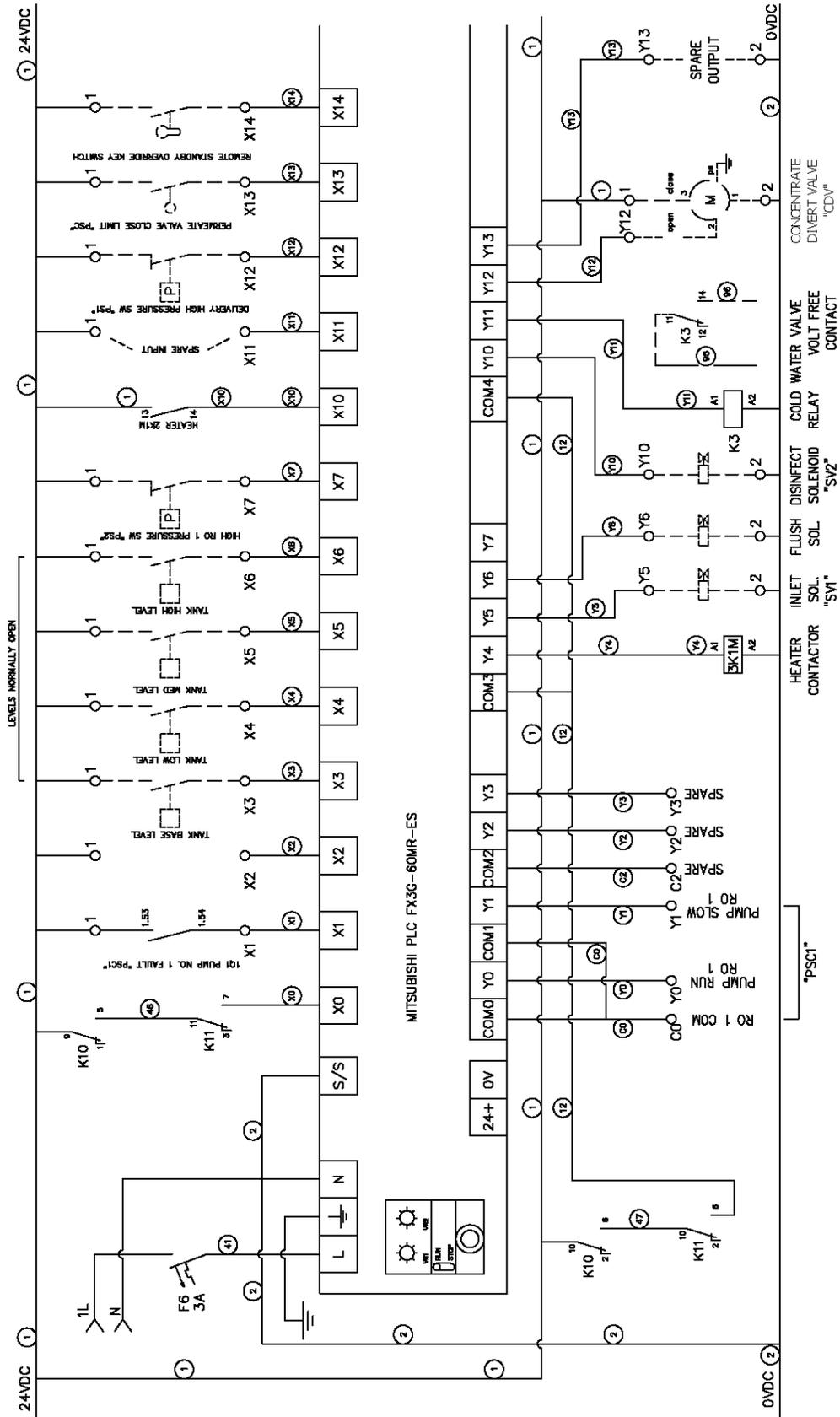
The replacement of the batch controlled spare must be recorded using the log sheet (below). This must be done in order to maintain the integrity of the machine throughout its operational life in accordance with medical device regulations.

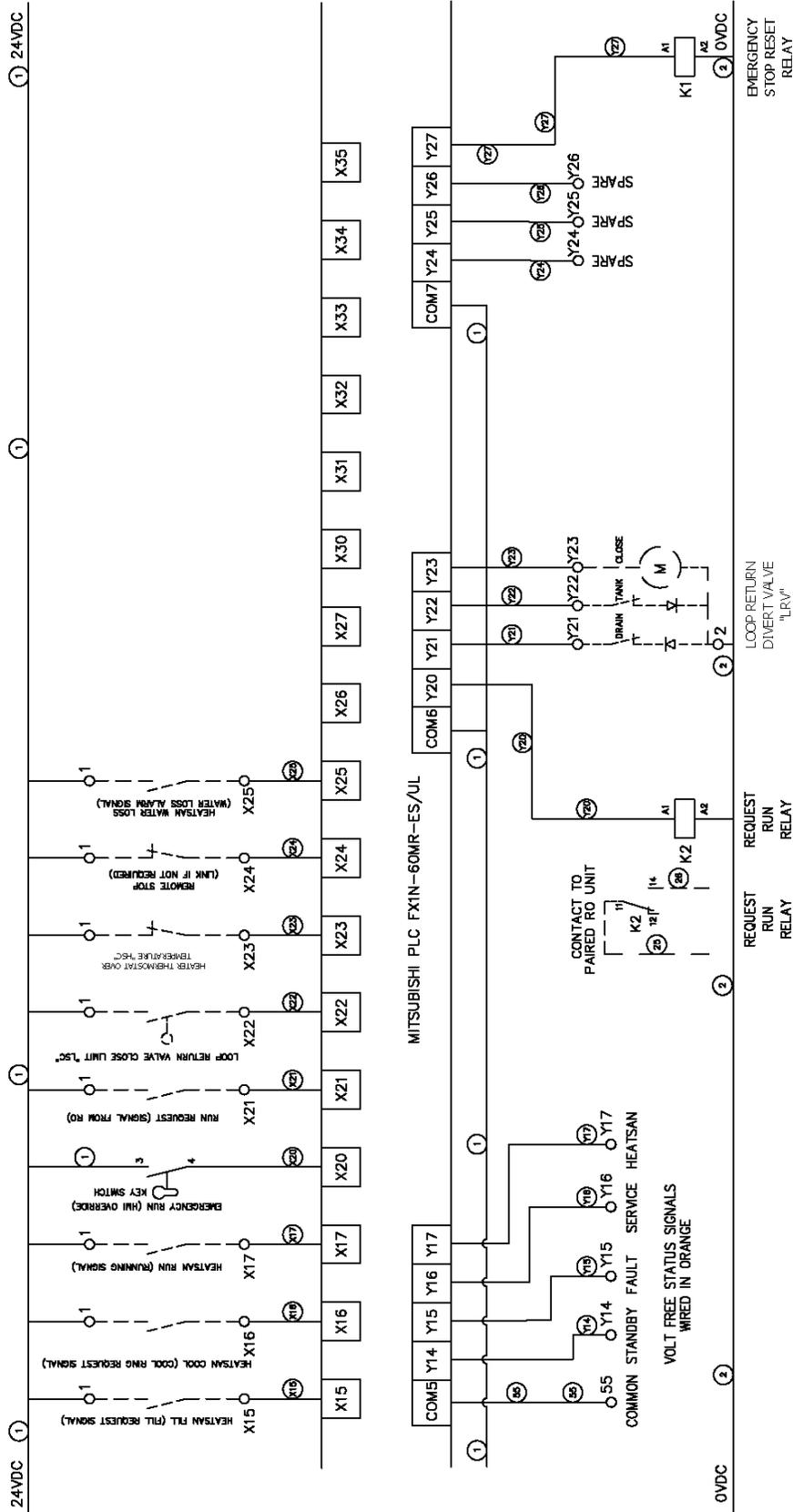
If batch controlled parts are not installed, or are not installed by approved AmeriWater Technicians, then the responsibility for any subsequent incidents linked to the replaced part or affected parts rest with the buyer / hospital / maintenance staff or service provider.

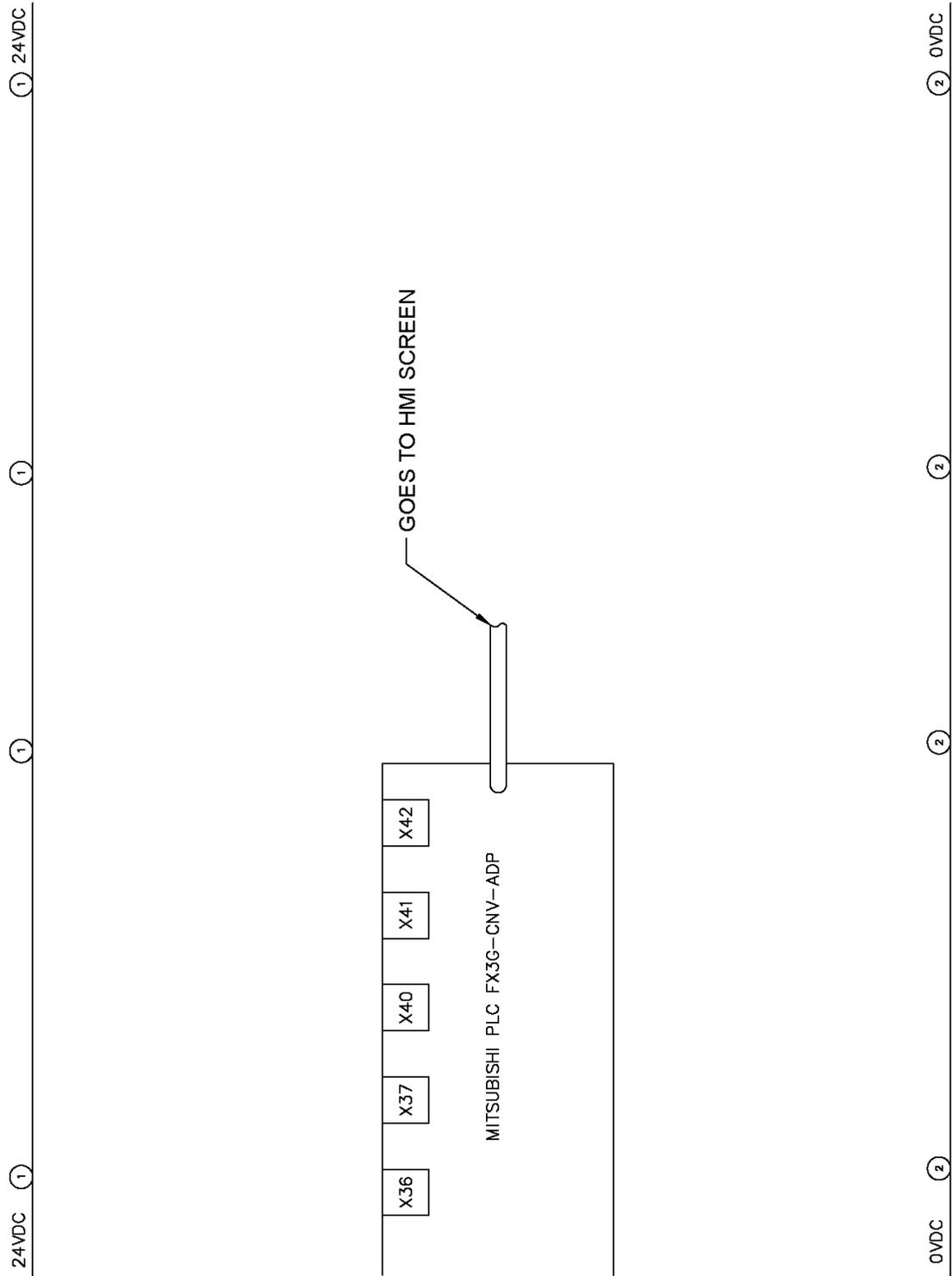
Failure to install AmeriWater supplied replacement parts will invalidate the warranty.

9.4 REPLACEMENT PART HISTORY LOG SHEET

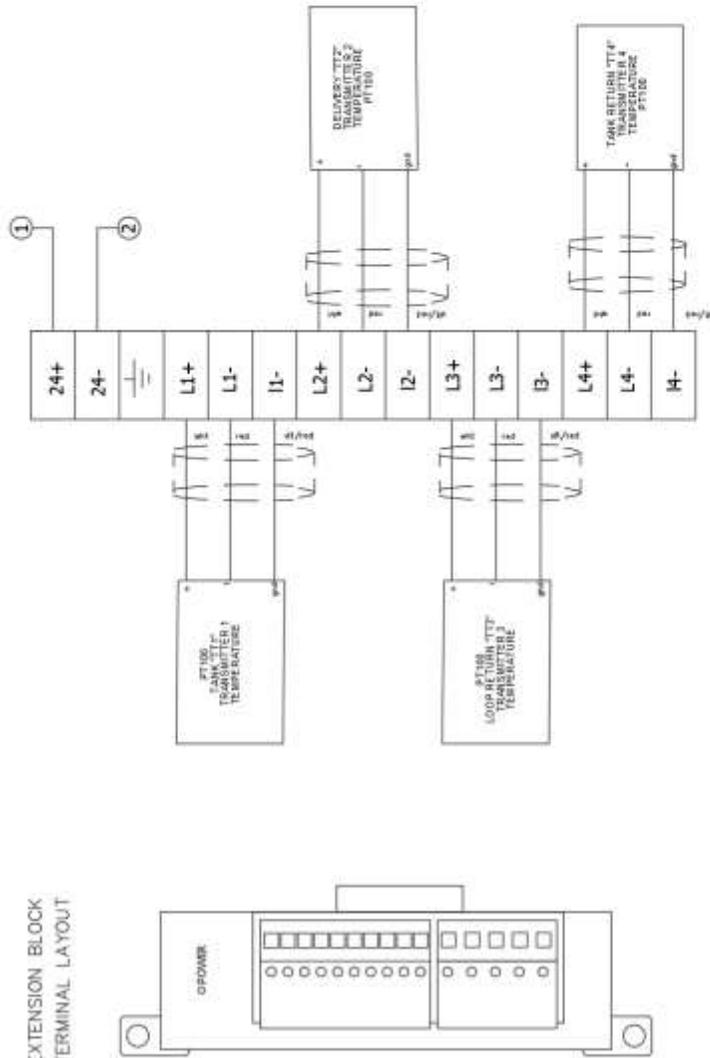
MediQA Replacement Parts Record
--





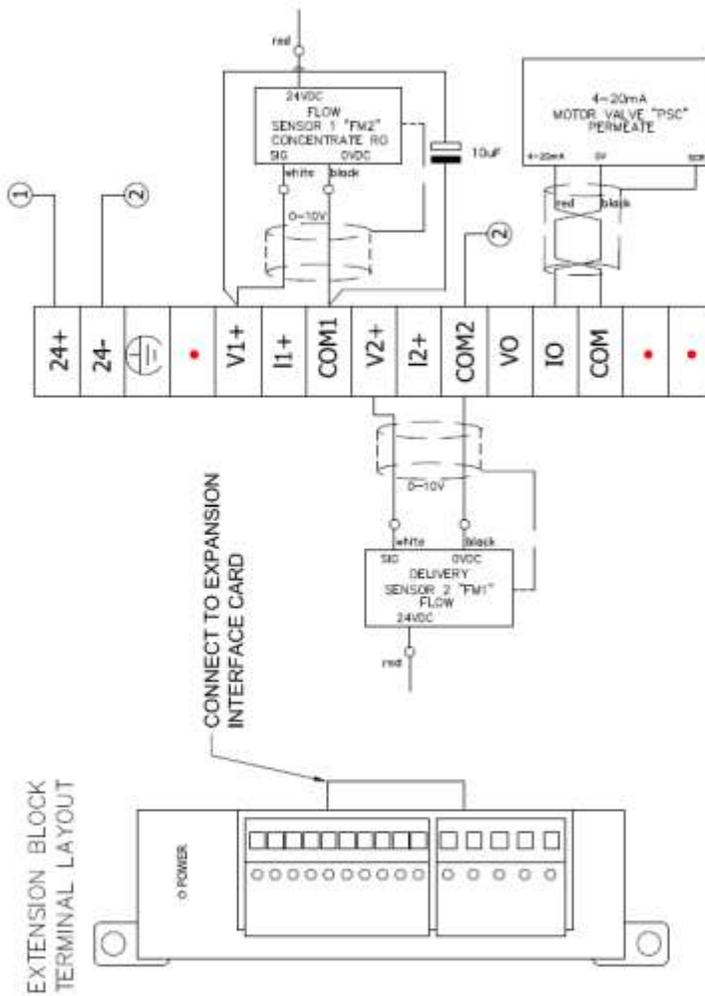


EXTENSION BLOCK
TERMINAL LAYOUT



Temperature Transmitter	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

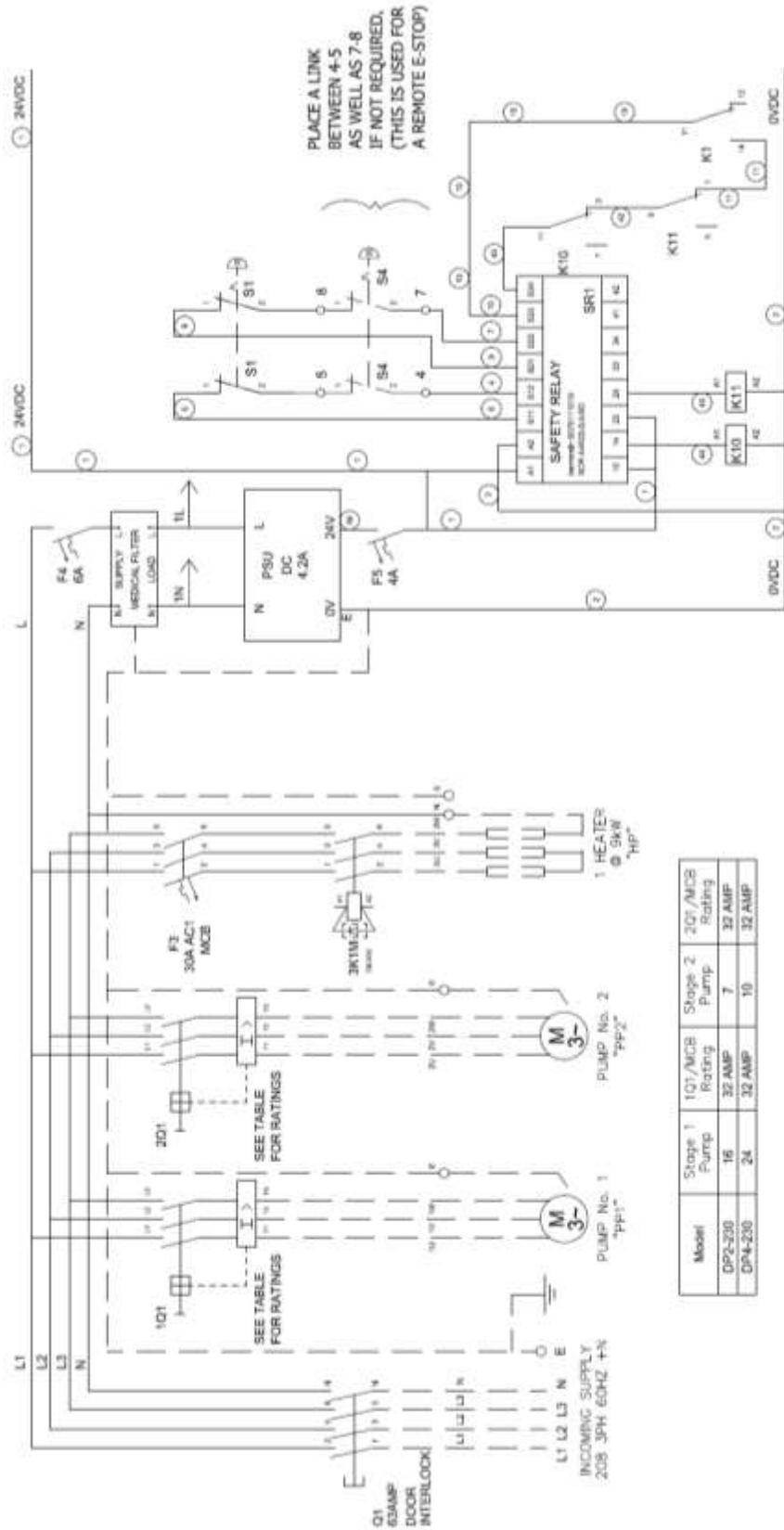


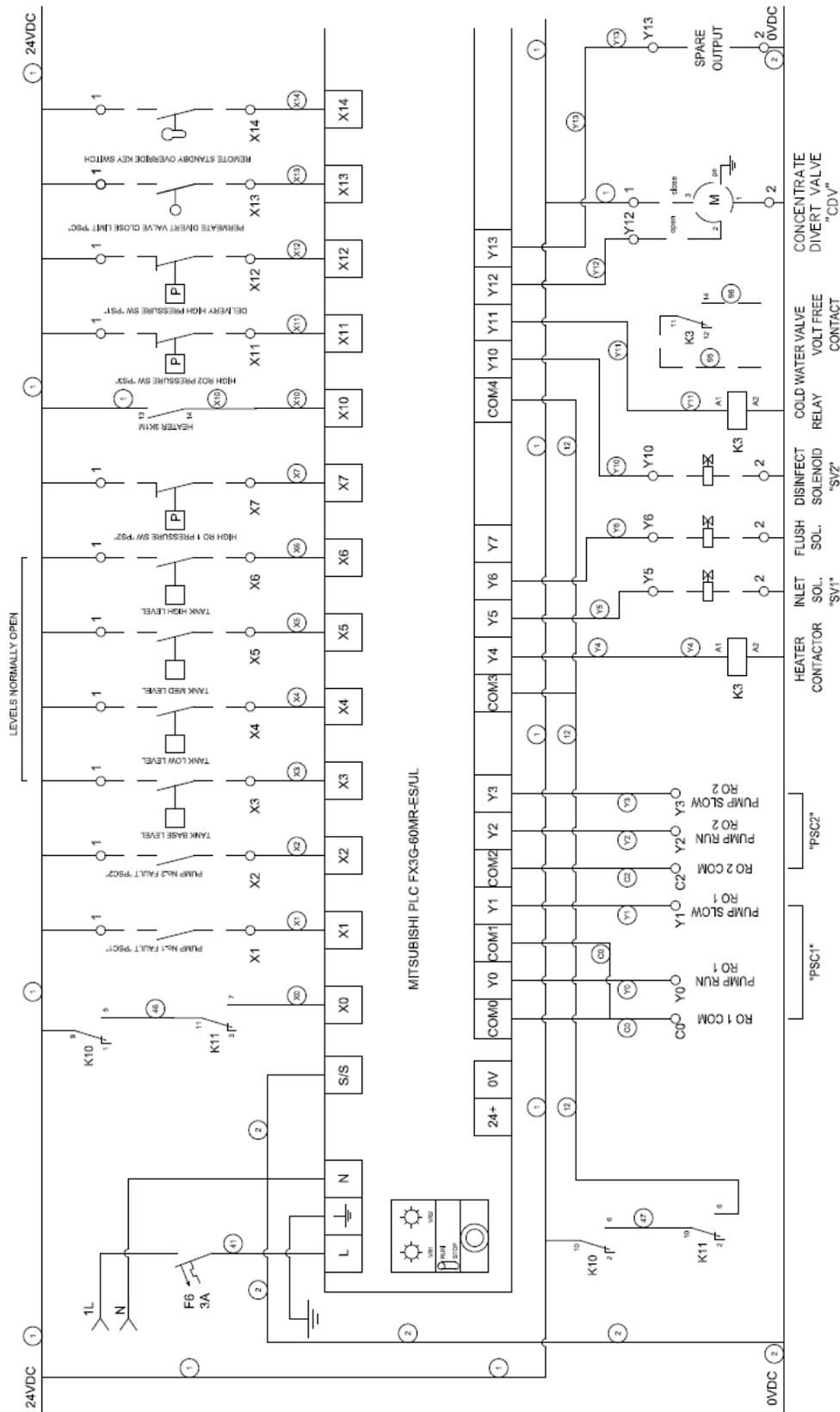
NOTE:
DESCRIBES PLC EXPANSION CARD FX3U-3A-ADP

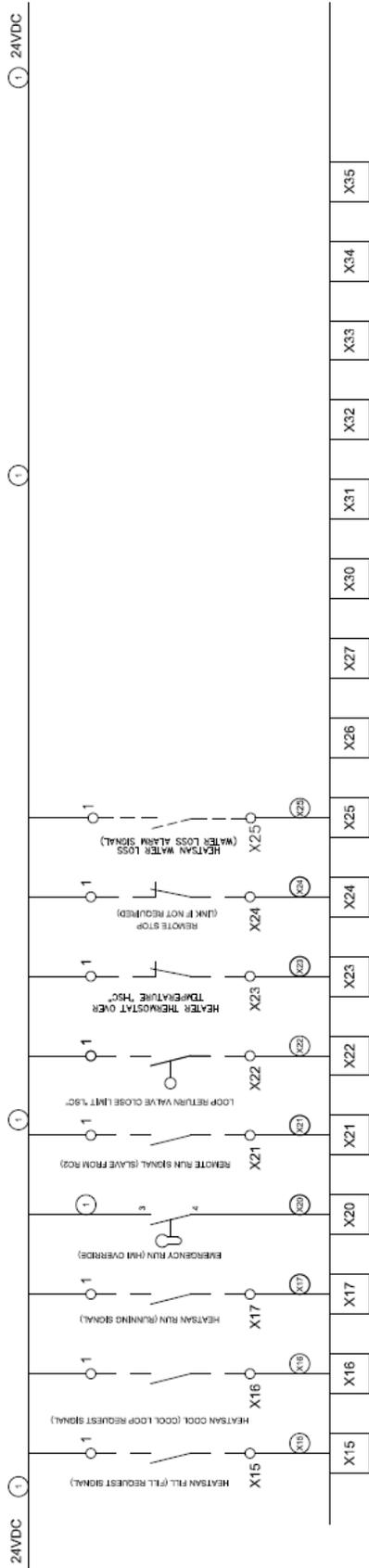
EXTENSION BLOCK
TERMINAL LAYOUT

Flow Sensor	Wire Color	Terminal
Concentrate RO "FM2"	Red	1
	White	Vfn1
	Black	Com1
Delivery RO "FM1"	Red	1
	White	Vfn2
	Black	Com2

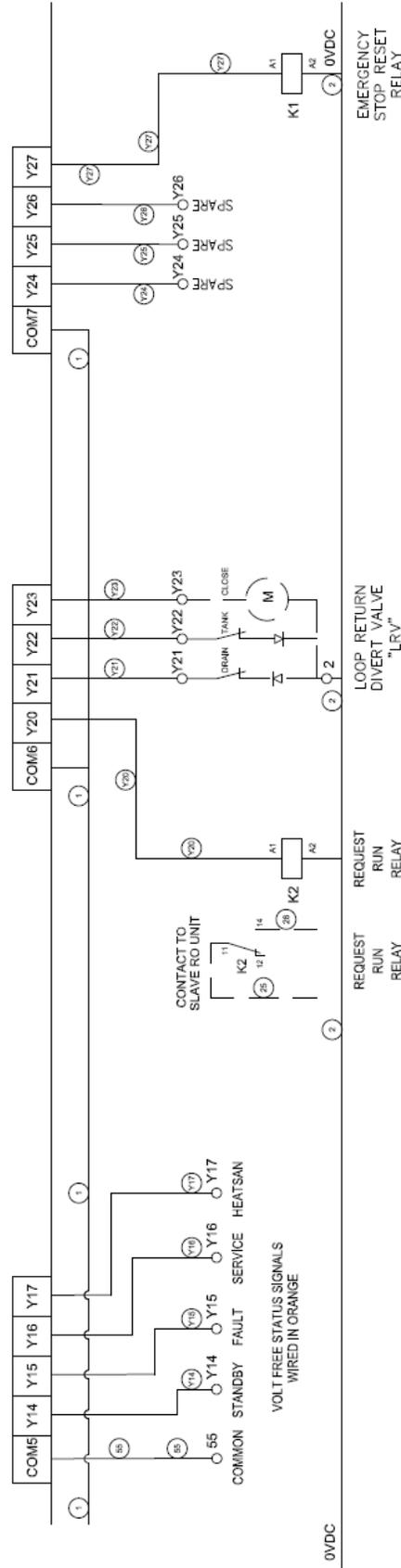
DPH Units

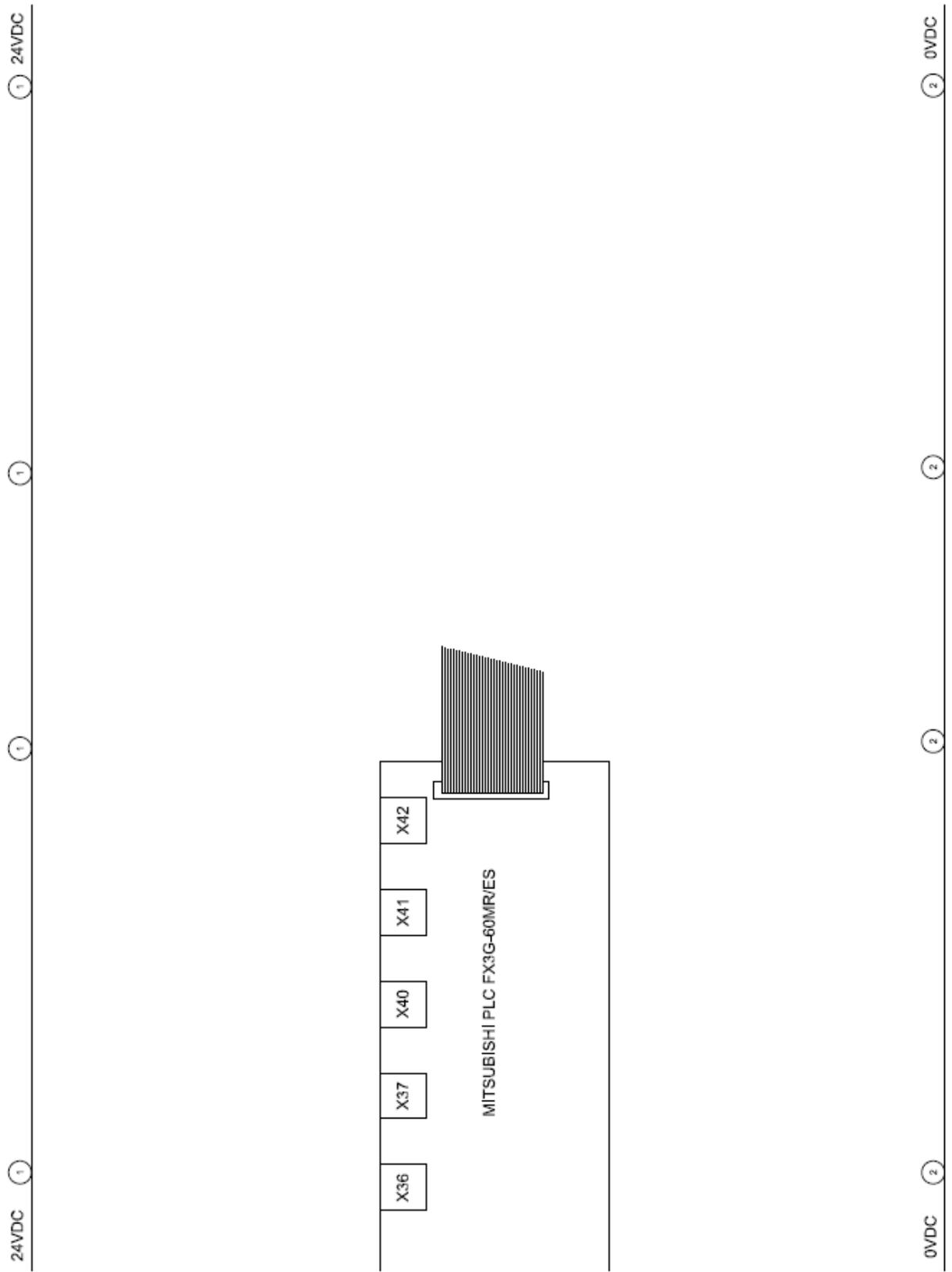




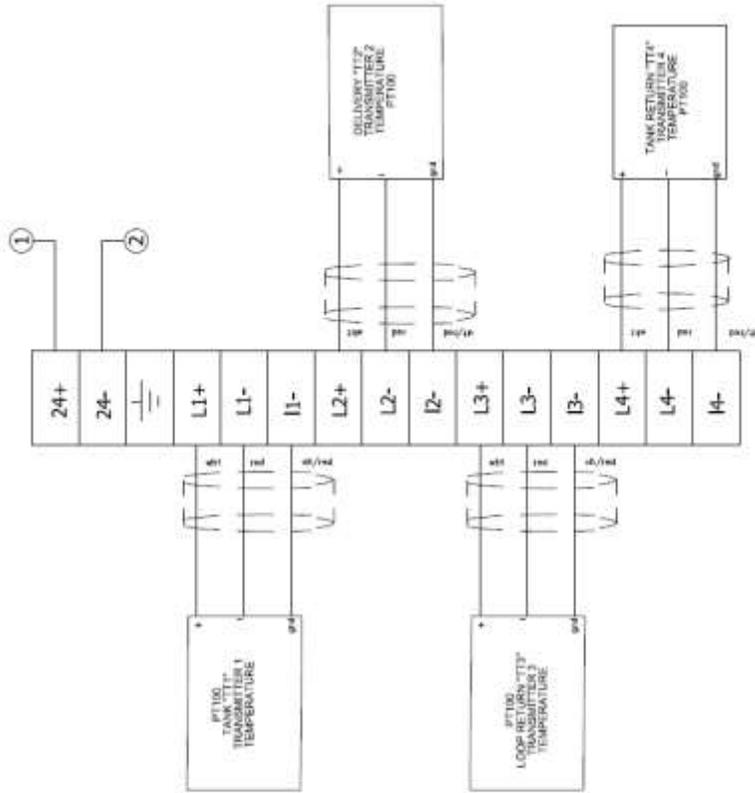
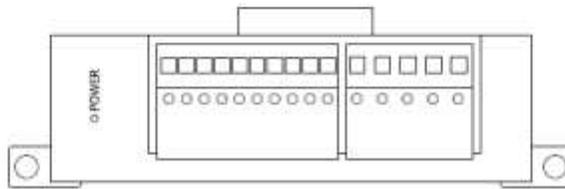


MITSUBISHI PLC FX3G-60MR-ES/UL



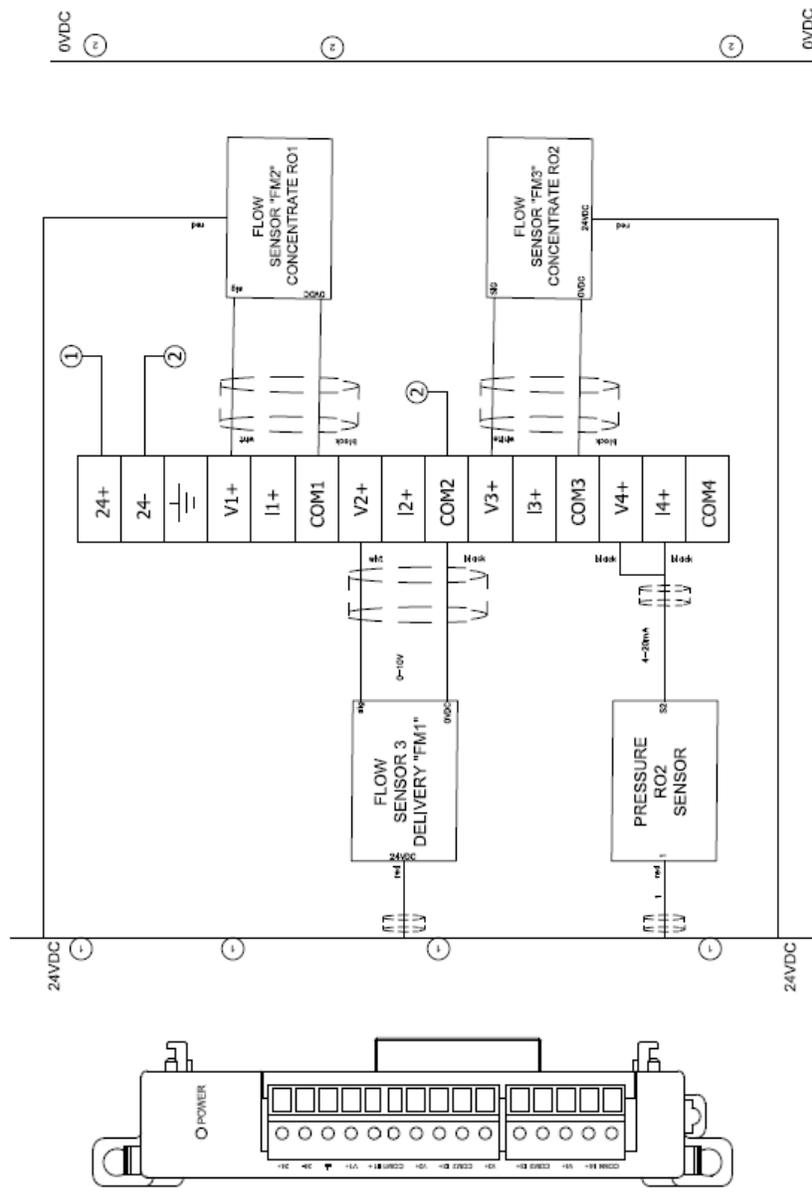


EXTENSION BLOCK
TERMINAL LAYOUT

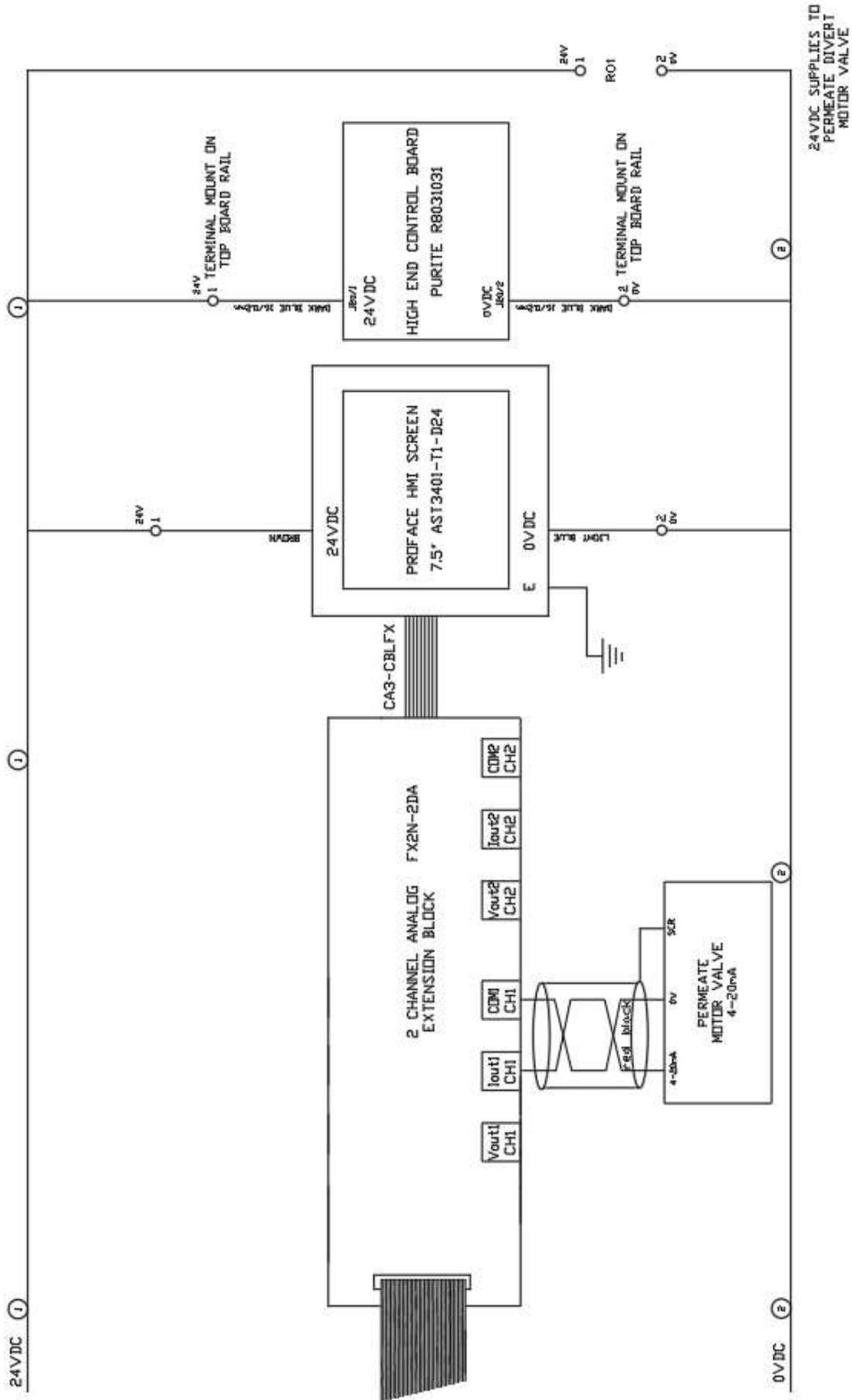


Temperature Transmitter	Flow Sensor Wire Color	Terminal
Tank "TT1"	Violet/Red	I- CH1
	Red	L- CH1
	White	L+ CH1
Delivery "TT2"	Violet/Red	I- CH2
	Red	L- CH2
	White	L+ CH2
Loop Return "TT3"	Violet/Red	I- CH3
	Red	L- CH3
	White	L+ CH3
Tank Return "TT4"	Violet/Red	I- CH4
	Red	L- CH4
	White	L+ CH4

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

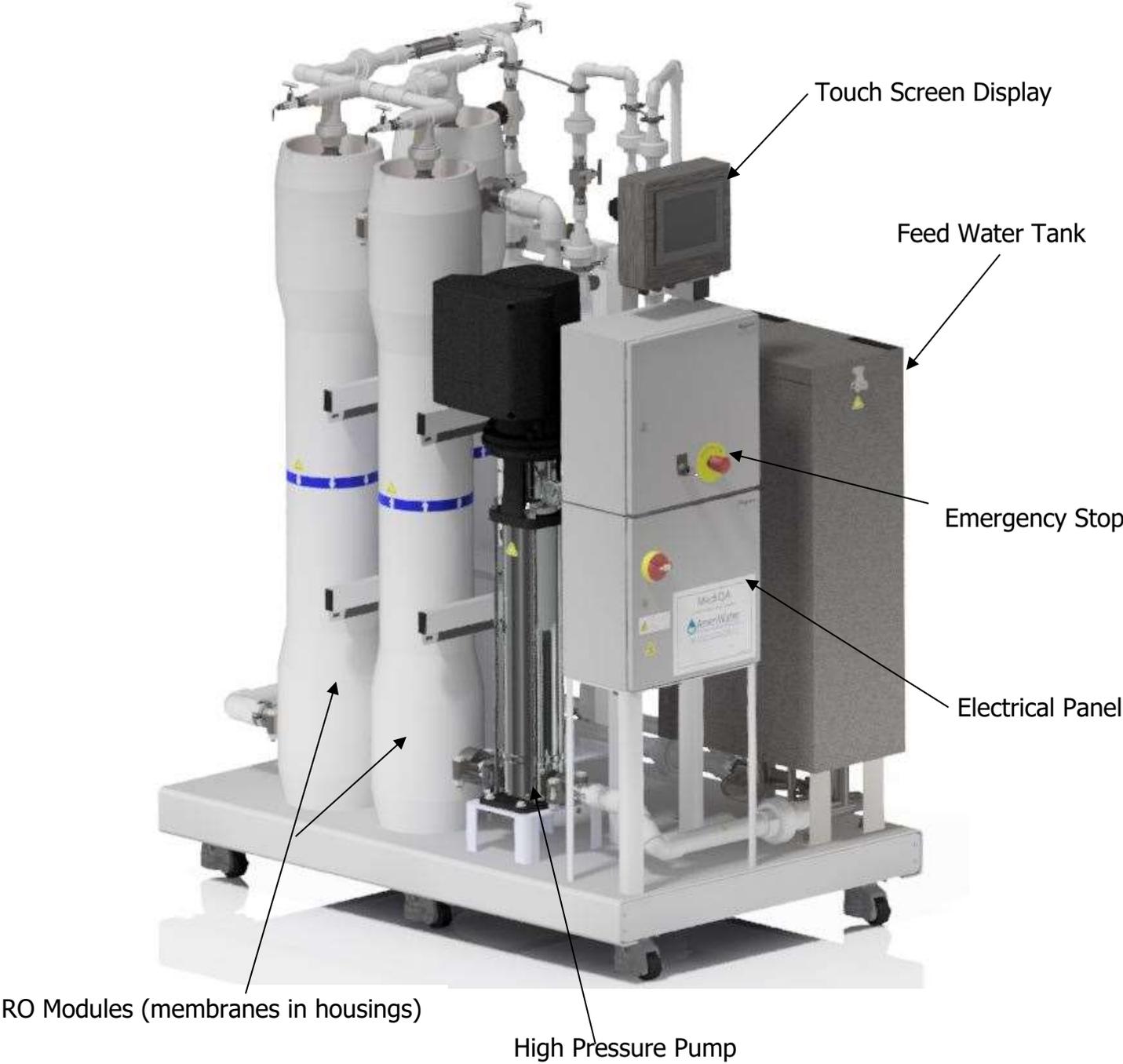


NOTE:
DESCRIBES PLC EXPANSION CARD FX3U-4AD-ADP



	E					
	E					
	E					
55	Y14	55			V/F STATUS - 55 COM, Y14 STANDBY	
Y15	Y16	Y15			V/F STATUS - Y15 FAULT, Y16 SERVICE	
Y17	X25	Y17			V/F STATUS - Y17 HEATSAN X25 WATER LOSS	
1	1	1				
1	1	1				
1	1	1			24VDC COMMON	
1	1	1				
1	X1	1			PUMP No,1 FAULT	
1	X2	1			PUMP No,2 FAULT	
1	X3	1			TANK BASE LEVEL	
1	X4	1			TANK LOW LEVEL	
1	X5	1			TANK MEDIUM LEVEL	
1	X6	1			TANK HIGH LEVEL	
1	X7	1			HIGH RO 1 PRESSURE SWITCH	
1	X11	1			HIGH RO 2 PRESSURE SWITCH	
1	X12	1			DELIVERY HIGH PRESSURE SWITCH	
1	X13	1			PERMEATE VALVE CLOSE LIMIT	
1	X14	1			REMOTE STANDBY OVERRIDE KEY SWITCH	
1	X15	1			HEATSAN FILL REQUEST SIGNAL (SEE DETAIL B)	
1	X16	1			HEATSAN COOL REQUEST SIGNAL (SEE DETAIL B)	
1	X17	1			HEATSAN RUNNING SIGNAL (SEE DETAIL B)	
1	X21	1			REMOTE RUN SIGNAL (FROM RO) (LINK X21 - 1)	
1	X22	1			LOOP RETURN VALVE CLOSE LIMIT	
X24	X23	X24			X23 HEATER THERMOSTAT OVER TEMPERATURE X24 REMOTE STOP SIGNAL (LINK TO 1 IF NOT REQUIRED)	
C0	Y0	C0			C0 RO 1 COMMON & Y0 RO 1 PUMP RUN	
C2	Y1	C2			C2 RO 2 COMMON & Y1 RO 1 PUMP SLOW	
Y3	Y2	Y3			Y2 RO 2 PUMP RUN & Y3 RO 2 PUMP SLOW	
2	Y5	2			INLET SOLENOID SUPPLY	
2	Y6	2			FLUSH SOLENOID SUPPLY	
2	Y10	2			DISINFECT SOLENOID SUPPLY	
2	Y13	2			SPARE OUTPUT SUPPLY	
2	Y21	2			LOOP RETURN DIVERT VALVE - TO DRAIN SIGNAL	
2	Y22	2			LOOP RETURN DIVERT VALVE - TO TANK SIGNAL	
2	Y23	2			LOOP RETURN DIVERT VALVE - TO CLOSE SIGNAL	
Y26	Y24	Y26			SPARE INPUT	
2	Y25	2			SPARE INPUT	
2	4	2				
2	5	2			4 & 5 EMERGENCY STOP N/C CONTACT 1	
2	7	2				
2	8	2			7 & 8 EMERGENCY STOP N/C CONTACT 2	
2	Y12	2				
2	1	2			PERMEATE VALVE (1=24V DC, 2= 0V DC) Y12 CONCENTRATE DIVERT VALVE	
2	1	2				
2	1	2			1=24V DC, 2= 0V DC	
2	1	2				
A2	A1	K3	14	11	12	SAFETY RELAY - VOLT FREE CONTACT
A2	A1	K2	14	11	12	RUN REQUEST RELAY - VOLT FREE CONTACT
A2	A1	K1	14	11	12	COLD WATER VALVE RELAY - VOLT FREE CONTACT
	E					
	E					

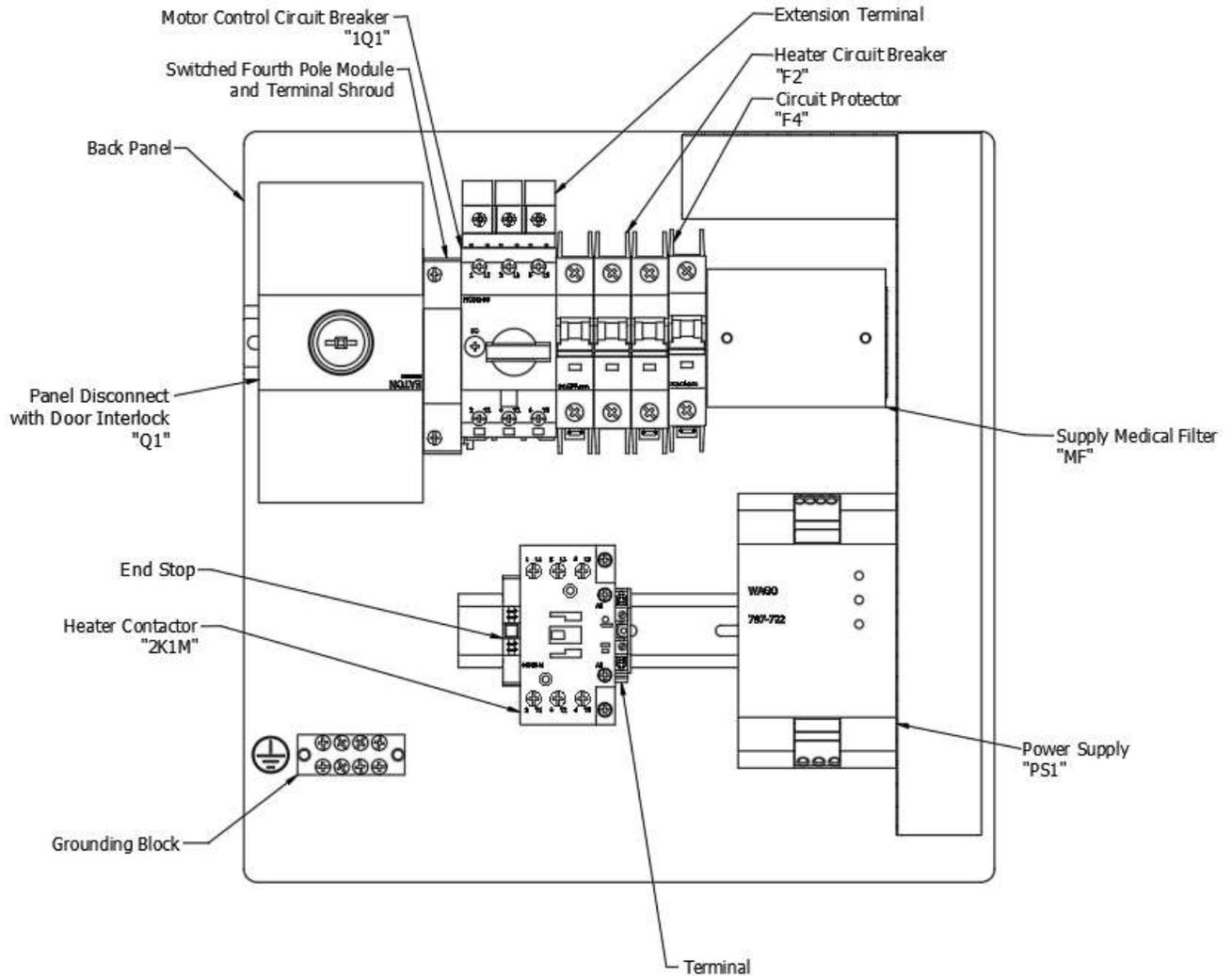
12. COMPONENT IDENTIFICATION

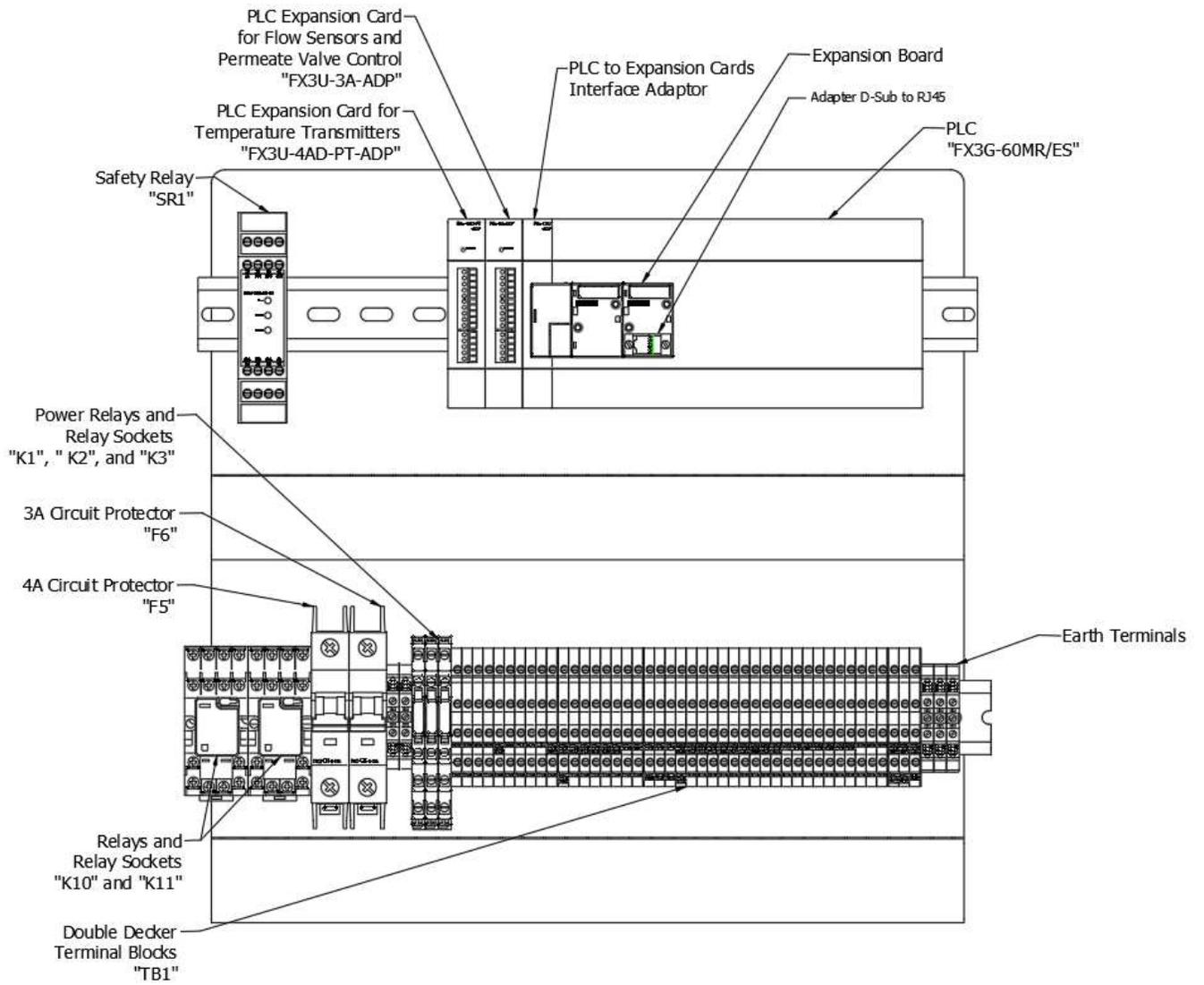


12.1 CONTROL PANEL

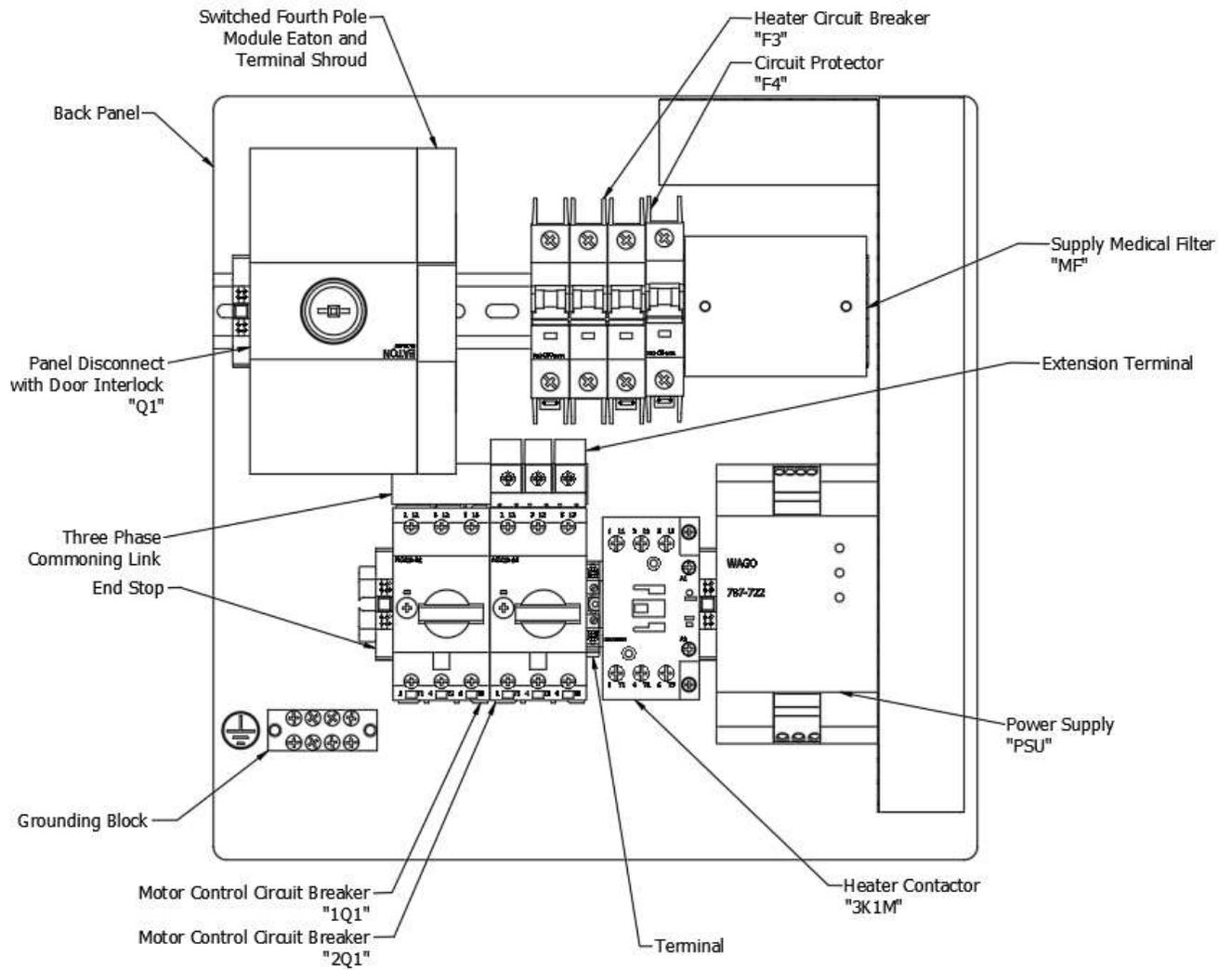
Labeling inside the control panel can be found on the back panel, above the corresponding component.

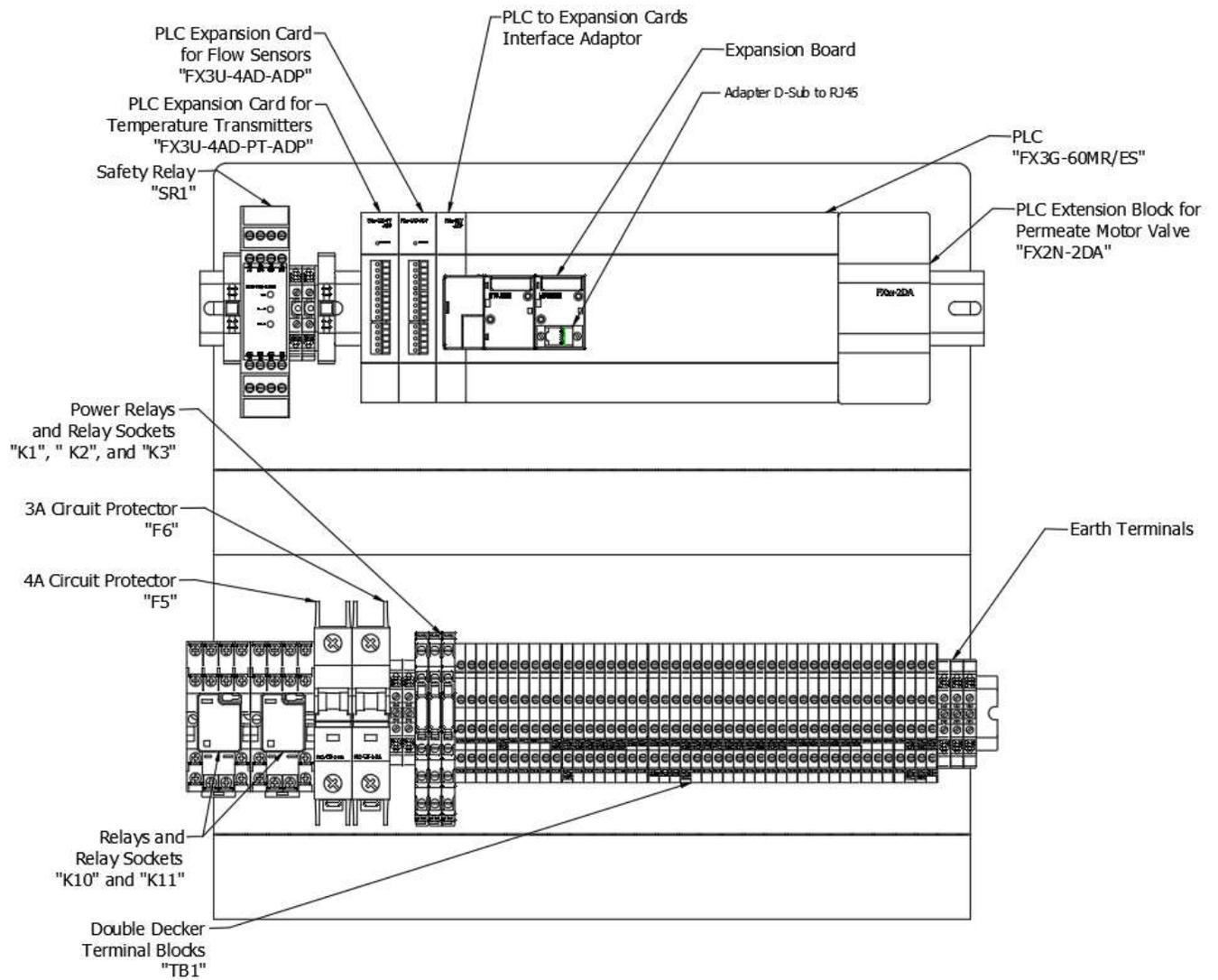
SPH Units





DPH Units





13. APPENDIX

13.1 DEFAULT SETTINGS LIST FOR SINGLE AND DUAL PASS MEDIQA

SINGLE PASS:

MediQA Settings SPH									
RO Supply					Alarm Setup				
Setting	Default	Initial Setup	User Setting	Units	Setting	Default	Initial Setup	User Setting	Units
Auto Flush	1			min	Tank Quality Warning	1100			uS
Auto Rinse Min	1			min	Tank Quality Alarm	1200			uS
Auto Rinse Max	10			min	Output Quality Warning	30			uS
Target Recovery Stage 1	65			%	Output Quality Alarm	100			uS
Standby Refresh Time	10			min	Low Flow Warning	2			gpm
Standby Refresh Interval	120			min	Low Flow Alarm	1			gpm
Hi Recovery Quality Low	8			uS	High Flow Warning	15			gpm
Hi Recovery Quality High	12			uS	High Flow Alarm	18			gpm
Break Tank Temp Low	80			°F	Flow Regulation				
Break Tank Temp High	90			°F	Setting	Default	Initial Setup	User Setting	Units
Ro Heat Disinfection					Concentrate offset	200			
Setting	Default	Initial Setup	User Setting	Units	Concentrate Gain	4.3			
Tank Temp	185			°F	Permeate Offset	350			
Tank Return Temp	180			°F	Permeate Gain	130			
Hold period	30			min	Engineers Alarm Setup				
RO Clean					Setting	Default	Initial Setup	User Setting	Units
Setting	Default	Initial Setup	User Setting	Units	Loop Over Temp Warning	86			°F
Clean Reminder	999			days	Loop Over Temp Alarm	95			°F
Recirc Period	25			min	RO Heat Disinfect Over Temp Tank	194			°F
Rinse Pressure Period Low	40			min	RO Heat Disinfect Over Temp permeate 2	183			°F
Rinse Pressure Period High	15			min	RO Heat Disinfect Over Temp Tank return	183			°F
Line Cell Calibration					Engineers RO Heat Disinfect Setup				
Setting	Default	Initial Setup	User Setting	Units	Setting	Default	Initial Setup	User Setting	Units
Tank Offset	0				Cool Down End Temp	86			°F
Tank Gain	90				Pump Run Slow Temp	90			°F
Output Offset	0				Engineers Chem Clean Setup				
Output Gain	95				Setting	Default	Initial Setup	User Setting	Units
RO Parameters					Chem Clean Rinse	45			min
Setting	Default	Initial Setup	User Setting	Units					
RO1 Target Recovery	65			%					
Dead Band	20			%					

DUAL PASS:

MediQA Settings DPH									
RO Supply					Alarm Setup				
Setting	Default	Initial Setup	User Setting	Units	Setting	Default	Initial Setup	User Setting	Units
Auto Flush	1			min	Tank Quality Warning	1100			uS
Auto Rinse Min	1			min	Tank Quality Alarm	1200			uS
Auto Rinse Max	10			min	Output Quality Warning	30			uS
Target Recovery Stage 1	65			%	Output Quality Alarm	100			uS
Target Recovery Stage 2	85			%	Low Flow Alarm	1			gpm
Standby Refresh Time	10			min	High Flow Alarm	18			gpm
Standby Refresh Interval	120			min	Flow Meters				
Hi Recovery Quality Low	8			uS	Setting	Default	Initial Setup	User Setting	Units
Hi Recovery Quality High	12			uS	R01 Concentrate Offset	217.3			
Break Tank Temp Low	80			°F	R01 Concentrate Gain	1.132			
Break Tank Temp High	90			°F	R02 Concentrate Offset	217			
Ro Heat Disinfection					R02 Concentrate Gain	3.487			
Setting	Default	Initial Setup	User Setting	Units	R02 Permeate Offset	316			
Tank Temp	185			°F	R02 Permeate Gain	5.6			
Tank Return Temp	180			°F	Interstage Pressure Offset	0			
Hold period	30			min	Interstage Pressure Gain	1			
RO Clean					Engineers Alarm Setup				
Setting	Default	Initial Setup	User Setting	Units	Setting	Default	Initial Setup	User Setting	Units
Clean Reminder	999			days	Loop Over temp Warning	86			°F
Recirc Period	25			min	Loop Over temp Alarm	95			°F
Rinse Pressure Period Low	40			min	RO Heat Disinfect Overtemp Tank	194			°F
Rinse Pressure Period High	15			min	RO Heat Disinfection Over Temp Permeate 2	183			°F
Line Cell Calibration					RO Heat Disinfection Over Temp Tank return	183			°F
Setting	Default	Initial Setup	User Setting	Units	R02 Pressure setpoint Low	14			psi
Tank Offset	0				R02 Pressure setpoint High	725			psi
Tank Gain	90				Low Pressure Alarm Delay	0			hrs
Stage 1 Offset	5				Engineers RO Heat Disinfection Setup				
Stage 1 Gain	1.5				Setting	Default	Initial Setup	User Setting	Units
Output Offset	0				Cool Down End Temp	86			°F
Output Gain	0.95				Pump Run Slow Temp	90			°F
RO Parameters					Engineers Chem Clean Setup				
Setting	Default	Initial Setup	User Setting	Units	Setting	Default	Initial Setup	User Setting	Units
RO1 Target Recovery	65			%	Chem Clean Rinse	45			min
RO2 Target Recovery	80			%					
Dead Band	20			%					

- 'Default' refers to the settings that will be entered if the "Install Factory Defaults" button is pressed
- 'Initial Setup' refers to the settings that are entered in the system when it leaves the factory.
- 'User Settings' 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

13.2IFU – Updating Mitsubishi FX3G PLC Software with the FX3G-EEPROM-32L Module

(IFU # 98-9078A)

BACKGROUND:

The Mitsubishi FX3G-EEPROM-32L module offers a means of updating the Mitsubishi FX3G PLC software without the need of a PC, programming cabling or special software.

PROCEDURE FOR SOFTWARE UPDATING:

WARNING: This procedure requires that the electrical panel door be open while power is on. Always use caution while working in live electrical panels.

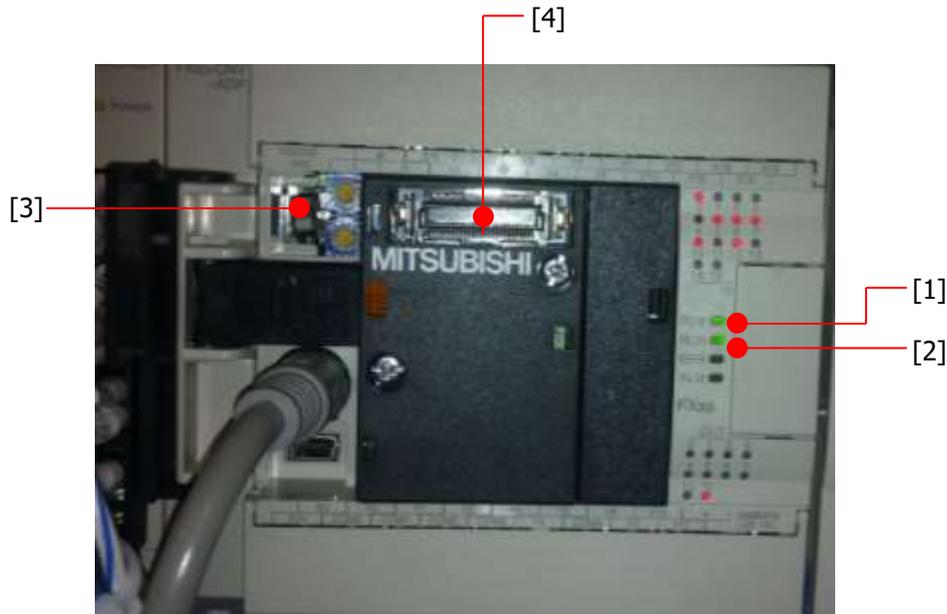
Refer to the 'NAMES AND FUNCTIONS OF PARTS' section of this document for pictorial references.

1. Navigate to the unit's SOFTWARE VERSIONS HMI screen. Write down current PLC software version.
 - MediQA:
CALIBRATION MENU (Password Required)
SYSTEM – "SYSTEM VERSION"
 - Heatsan:
CURRENT SETUP (Password Required)
SYSTEM SETUP
FACTORY SETUP
NEXT PAGE (until FACTORY SETUP PAGE 6 is reached)
SOFTWARE VERSIONS – "PLC"
2. Turn the panel power OFF via the power disconnect switch.
3. Verify that the PLC Power Status LED is OFF.
4. Place the PLC RUN/STOP switch in the STOP position.
5. Remove plastic cover from expansion board on the PLC.
6. Gently install the FX3G-EEPROM-32L module into the Optional Equipment Connector.
7. With the electrical panel door open, turn the panel power ON.
8. Verify that the PLC Power Status LED is ON.
9. Verify the PLC Run Status LED is OFF.
10. Raise the FX3G-EEPROM-32L module's front cover.
11. Press the [WR] key one time. The [WR] LED will illuminate.
12. Press the [WR] key again. The [WR] LED will blink. Writing is executing. Depending on program size, the program writing can take several seconds to complete. The [WR] LED will blink as long as data is written. When the [WR] LED stops blinking the writing is complete.
13. When writing is complete, turn the panel power OFF.
14. Verify that the PLC Power Status LED is OFF.
15. Remove the FX3G-EEPROM-32L module from the expansion board by gently pulling on the front cover.
16. Install the plastic cover back on to the expansion board.
17. Place the PLC RUN/STOP switch in the RUN position.
18. Turn the panel power ON.
19. Verify that the PLC Power Status LED is ON.

20. Verify the PLC Run Status LED is ON.
21. Shut and secure the panel front door.
22. Navigate to the unit's SOFTWARE VERSIONS HMI screen. Verify that the PLC software version matches the version upgrade documentation.

NAMES AND FUNCTIONS OF PARTS:

PLC



- | | |
|-----------------------------------|--|
| [1] PLC Power Status LED: | Illuminated green while power is on the PLC. |
| [2] PLC Run Status LED: | Illuminated green while the PLC is running. |
| [3] RUN/STOP switch: | Starts or stops PLC code execution. |
| [4] Optional Equipment Connector: | FX3G-EEPROM-32L module connection point. |

FX3G-EEPROM-32L module



- [1] Front Cover: Can be used to remove module from PLC.
- [2] [WR] Pushbutton: Initiates module writing to PLC.
- [3] [WR] LED: Writing indicator.

13.3IFU – Updating MediQA HMI Software with Jump Drive (IFU # 98-9160A)

SCOPE

This document walks the reader through installing new software to a Pro-Face HMI on a MediQA.

REQUIRED ITEMS

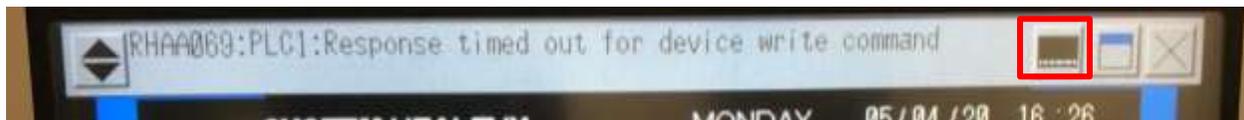
- Flash Drive With Current project release of the HMI program ready for loading

PROCEDURE

1. Take the USB drive that has the project files loaded onto it and plug it into the USB slot on the Pro-Face HMI.
2. Disconnect the black cable that attaches the Pro-Face HMI to the PLC. Wait about 1 minute for the PLC response timed out error on the HMI.



3. There are three buttons on the right side of the error text string, press the button that looks like a black box window.



4. Another window will open up below the error window that shows some more buttons; Select SD/USB.
5. Select USB_Starting and the HMI will start loading system files and open another screen for Language Selection.
6. Select English and press the button marked Download (Storage > Display).
7. Another window will open; select start.
8. A message box will open to ask to download the data; select yes. The project will begin writing from the USB drive to the HMI. When completed push the back button in the bottom right corner of the screen. Select back again and then exit.
9. A message will ask to restart the system; select yes.
10. When the HMI reboots, the new program will be loaded. Pull the USB jump drive out of the USB port and store for backup.
11. Plug the communication cable from the HMI back into the port on the PLC.
12. Confirm the software version by navigating CALIBRATION MENU > SYSTEM and checking the System Version of the HMI is correct.

 **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.