AmeriWater
The Water Purification Specialists

Operation & Maintenance Manual

Heatsan

Heat Sanitization System

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

98-0156 Rev J

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1 CONTACT DETAILS

For all service, spares and consumables enquiries contact:

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

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

Useful Telephone Nos.

Tel No……Contact Name:…….

Tel No……Contact Name:…….

2 HEALTH AND SAFETY

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 used.

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 if un-authorized modifications are carried out that are 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, quoting the unit's serial number (Refer to Section 1 Contact Details).

The unit must not be disassembled in any way unless carried out by an AmeriWater technician or authorized trained personnel.

During normal operation, the unit must not be operated with the control panel door open. If access is required to the control panel, always isolate the power supply using the door isolator.

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.

2.1 Explanation of Symbols and References

DANGER: This symbol refers to any immediate dangers. Failure to follow the specified procedure could result in serious personal Injury. Extreme caution should be observed when conducting any activity where this symbol is shown. Work should be completed by a trained competent person.

WARNING: This symbol refers to a possible danger that threatens the safety and life of persons. Caution should be observed when conducting any activity where this symbol is shown. It is recommended work should be completed by a trained competent person.

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

NOTE: This symbol points out important information for working with the system properly.

This symbol indicates a 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 or result in injuries.

2.2 Additional Safety Requirements

National or provincial specific requirements/standards and regulations must be observed.

2.3 Usage in Accordance with Intended Purpose

This equipment is intended for indoor use only in a non-hazardous environment to provide hot water, up to 194 °F for the purposes of disinfection of water treatment equipment or other equipment.

CAUTION: When in use this equipment produces pressurized water at a scalding temperature, up to 194 °F. Before using or working on the equipment, ensure that personnel are aware of potential hot surface areas on the equipment, identified by the hot surface symbol below.

Allow sufficient time after use for the water to have cooled to a safe working temperature before carrying out any remedial works. The un-flagged parts connected to parts marked with this symbol may also have hot surfaces.

The unit should be wired to the electrical supply via an external isolator or circuit breaker located near to the equipment.

When wiring AC three phase supplies to the equipment, the 'Live' wires should be connected to the 'L1', 'L2' and 'L3' terminals.

DANGER: "RISK OF ELECTRICAL SHOCK". ONLY QUALIFIED/APPROVED ELECTRICAL ENGINEERS SHOULD BE USED TO CONNECT THE UNIT TO THE ELECTRICAL SUPPLY.

Any references in this manual to installation requirements/procedures are provided as information only. Installation of the unit will only be carried out by AmeriWater or an approved installation technician.

If the unit is used in a manner not specified by AmeriWater or procedures not followed as detailed in this manual, the protection provided by this equipment may be impaired.

WARNING: DO NOT USE THIS EQUIPMENT IN ANY OTHER MANNER THAN THOSE SPECIFIED UNDER THIS SECTION.

CAUTION: Some parts of the system could be under pressure. Always make sure the pressure has dispersed from the unit before repairs and maintenance tasks are carried out.

2.4 Operating Staff

Only persons who have read and understood these Instructions should operate the unit. When operating the unit, it is important to strictly observe the safety information.

2.5 Bringing the System to a Stop in the Event of an Emergency

To shut the unit down in the event of an emergency rotate the yellow/red door isolator switch to the "OFF" position. Isolate the 3-phase electrical supply to the unit at source. There will be no requirement to isolate any of the hydraulic lines as all valves close when de-energised.

2.6 Safety Information for Maintenance Tasks

The owner of the unit must take care to ensure that only authorized personnel who have been sufficiently informed for the task at hand perform all maintenance and inspection tasks.

Before beginning tasks on the electrical equipment of the system, a check must confirm that power has been disconnected. In addition, the system must be secured to prevent it from being turned on again unintentionally. The isolator switch can accept a lock-out padlock when in its "OFF" position. The unit may contain water at scalding temperatures; ensure it is drained down and safe to work on before carrying out any maintenance tasks.

2.7 Disposing of System Parts and Operating Materials

Refer to Section 10.1 for details.

2.8 Unauthorized Conversion and Manufacturing Replacement Parts

Conversion or modification of the system is only permitted with the approval of AmeriWater. Original replacement parts authorized / supplied by the manufacturer enhance safety and ensure design performance. The use of unauthorized parts may void the warranty on the unit, impair its performance or compromise the safety of those operating it.

2.9 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.

3 SPECIFICATION

The *Heatsan* Integrated hot water disinfection unit incorporates equipment to heat water received from a water purification system and circulate around a distribution loop at a controlled sanitizing temperature for a specified length of time. On completion of disinfection the water is then made available to be taken off to dialysis machines for their heat disinfect cycle. At the end of the cycle the water is discharged from the system to drain, and the loop is cooled.

Models available:

00HS20809	3-phase, 208V, 60hz, 9kW Heater
00HS20815	3-phase, 208V, 60hz, 15kW Heater

3.1 Controls

All the processes of the *Heatsan* unit are controlled automatically and the unit operates via a touch screen which displays systems performance data and unit status.

3.2 Alarms and Maintenance

The *Heatsan* unit incorporates monitoring devices and will report alarms and warning messages via the user display. Reference to these alarms and appropriate actions to be taken to rectify them can be found in **Section 7 "Fault Finding".**

3.3 Weights and Dimensions

Weight (lbs)	Height (in)	Width (in)	Depth (in)
Shipping (700)	70	28	35
Working (1580)			

3.4 Water Services Connection Schedule

Drain:	1½" sanitary Tri-clamp coupling
Overflow:	1½" sanitary Tri-clamp coupling
Fill:	½" sanitary Tri-clamp coupling
Hot water flow:	1½" sanitary Tri-clamp coupling
Hot water return:	1½" sanitary Tri-clamp coupling

3.5 Electrical Supply Requirements

Model	Electrical Supply*	Operation**	kW Rating	Current draw (amps) per phase
00HS20809	3-phase +E,208V, 60hz	Heatsan / Recirculation	10kW	32
00HS20815	3-phase +E,208V, 60hz	Heatsan / Recirculation	16kW	47

NOTE:
* Circuit isolation of the incoming supply should be provided external to the unit.
** Maximum duty with all three heaters on plus recirculation pump.

WARNING: **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:

WARNING
HIGH LEAKAGE CURRENT
Earth connection essential before connecting to mains supply

3.6 IP Ratings

Control Panel	Type 2
Recirculation pump	IP55

3.7 Feedwater

Quality:	RO permeate/Softened
Temperature:	55-194 °F

3.8 Performance

Working tank volume:	100 Gallons
Pump output range:	317 Gallons/hr @ 5.5 Bar (80 psi) to 1160 Gal/hr @ 2 Bar (30 psi)
Designed max water temp:	203 °F
Maximum no. Dialysis m/cs:	See note below:

NOTE: The maximum number of dialysis machines that the unit can supply depends on the volume of hot water required per machine and the rate at which they draw water. So long as the total volume of water required does not exceed the maximum available for draw off and the maximum draw rate does not exceed the pump performance. See pump limits above.

3.9 Environment

Parameter	Limits
Room storage and operating temperature range	(41-104°F)
Relative humidity	30 to 80%
Maximum altitude	6562 ft (2000m)
Transport and storage temperature	23°F to 203°F (Dry unit)
RFI/EMI radiation	The EMC environment must be within the limits to which the unit has been tested, see **Section 3.10** below. Care must be taken not to place near the unit any source of RFI/EMI, which is liable to cause electromagnetic disturbance. If the unit is affected by such disturbance, the source must be suppressed or moved.

3.10 Classification and Standards Applied

Class 1 equipment	Electrical
Insulation	Category II
Pollution	Degree II
Type IIB applied part	
EMC	UL 61010-1, Issue 07/12/2004, Ed:2, Rev:10/28/2008 Standard for Electrical Equipment for Measurement, Control, and Laboratory Use Part 1: General Requirements and CSA C22.2# 61010-1, Issue: 07/12/2004, Ed:2 (R2009) Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use Part 1: General Requirements, with general instruction No. 1:2008/10/28 – R2009.

4 PROCESS DESCRIPTION

This section provides general information regarding the heat disinfection process utilized by the *Heatsan* unit.

4.1 Operation

General philosophy of operation:

The unit can be configured to disinfect up to two distribution loops, either individually or together. The user can set for each day of the week which loop is to be disinfected and in what configuration.

The unit has been designed to provide up to 95 gallons of hot water for the purposes of sanitizing connected dialysis equipment.

The number of machines that can be disinfected at any one time will be dependent on the requirement of those machines regarding the amount of water each machine needs for disinfection, the time taken to perform heat disinfection and the flow at which they require the hot water.

The system allows the user to input the specific requirements of the dialysis machines to be disinfected, the days requiring heat disinfection and the times which heat disinfection can occur.

If the system detects that any of the entered user values cannot be achieved by the Heatsan unit, the unit will raise an **"Invalid number"** alarm warning the user that the parameters loaded cannot be achieved.

The typical stage duration times for disinfection can be found in Section 6.9 Factory Default Settings.

NOTE: These values can be adjusted to fit requirements of your particular distribution system. Verification of the efficacy of changes is the responsibility of the medical director.

4.1.1 (Tank) Preheat

The preheat stage is initiated prior to the Heatsan start time. The start and return to service times being set by the clinical staff. Water is taken off the loop during the preheat stage. During this stage the unit fills the tank with only the amount of permeate needed for the number of machines programmed in by the operator. This feature saves on power and water consumption.

The heaters then raise the temperature to the tank preheat temperature and hold it until the timed Heatsan start period is reached. The pre-heat stage reduces the risk of thermal shock to pipework and reduces the time taken to achieve disinfection temperature.

4.1.2 Loop Preheat (Heatsan Operation)

CAUTION: Once the Heatsan Start time is reached, hot water *will* be directed into the loop. Ensure that no patients will be online when the "Heatsan Start" time is reached.

Once the pre-programmed "Heatsan Start" time has been reached the Heatsan will isolate the RO from the distribution loop. The Heatsan will then be automatically connected to the loop using the motorized valves on the associated manifold. The internal pump will circulate the preheated water around the distribution loop(s) to be disinfected. The system will continue to heat the water until the pre-set disinfection temperature is achieved. The circulation period is set by the loop pre-heat value on the HMI, the factory default can be found in Section 6.9.

4.1.3 Hold Period (Heatsan Operation)

After the "loop pre-heat" stage has timed out, the system is then held at the disinfection temperature for the hold time. The default hold time can be found in Section 6.9. The temperature is maintained by switching on 1, 2, or 3 heaters, depending on the selection of loop size in Section 6.6 Factory set-up.

4.1.4 Draw Off Period

The default time for this stage can be found in Section 6.9. The minimum time is adjustable. The maximum time is calculated from the times pre-programmed in by the user relating to the stop/start times and the duration for the heat disinfection cycle on the connected dialysis machines.

4.1.5 Cool Down Period

Once the water availability stage has timed out the system will proceed into automatic "Cool down". The system will perform a series of tank drain downs and introduce cold RO permeate into the distribution loops until the return temperature on the system falls below the "maximum service temperature" setting. The factory default for this can be found in Section 6.9. On reaching this temperature the system automatically disconnects itself from the loop(s) and re-introduces the RO unit(s).

4.1.6 Drain in Operation

Following the Cool down period, the tank drain valve will remain open until the tank level falls to zero at which point the unit will return to **STANDBY.** To ensure that the tank remains empty during **STANDBY** the drain valve will open for 5 minutes every 2 hours.

4.1.7 Standby

STANDBY will be displayed to indicate that the unit is "healthy" and waiting for the next heat disinfection routine to initiate.

4.2 Remote Light

A four-tier remote light is available to clearly and easily show the operational state of the Heatsan.

4.2.1 Light Pattern

Light	Light Pigtail Wire	Termination	Heatsan PLC Output	Illumination		
				Description	Pattern	Time
Green	Green	K2 (12)	Y21	System is in standby mode	▬▬▬	Steady
Amber	Orange	K3 (14)	Y22	System is in tank preheat	▬▬▬	Steady
Blue	Blue	K4 (14)	Y23	System is preparing to send hot water to distribution loop	▪▪▪▪▪▪▪	1 sec on 1 sec off
				Hot water is circulating in distribution loop	▬▬▬	Steady
Red	Red	KAB (14)	Y6	General Alarm condition	▬▬▬	Steady
Common	Yellow	TB1, 24C	N/A	N/A	N/A	N/A

5 INSTALLATION

This section provides the recommended method of installation for the ***Heatsan*** unit.

5.1 Environment

The unit should be installed in a clean and dry, indoor, non-hazardous, ventilated environment (see Section 3.9).

5.2 Unpacking

WARNING: **When transporting the unit either by pallet truck or by forklift observe the centre of gravity markings and prevent from tipping. The dry weight of the unit is 700 lbs.**

Ensure the ground is level and can take the loading of the unit when full. The maximum weight of the unit when full will be approximately 1580 lbs.

With the unit in its final position, remove all protective wrapping from the metalwork and hydraulic connections. Inspect for any damage. Ensure that the installation kit has been provided with the unit.

5.3 Electrical Supply

WARNING: An electrical supply (see specification Section 3.5) should be made to the control panel of the ***Heatsan 400*** unit using suitably sized 3-phase cable based upon the maximum current draw of the unit while considering the length of the cable between the disconnect and the Heatsan 400 unit by an authorized electrician. Please follow local electrical code (for example NEC or CEC) for mains wiring connections using a 40 A maximum service for 00HS20809 or a 60 A maximum service for 00HS20815. The cable should be fitted using appropriately sized gland and terminated to the isolator connections L1, L2, L3 and Earth.

5.4 Water Connections

Refer to Section 10.4.

5.5 Drain

A suitable, unrestricted, drain is required, capable of handling the discharge flow of the Heatsan unit (see specification). The drain should be capable of accepting 203°F water.

5.6 Overflow

An unrestricted overflow must be provided which terminates with an air gap that conforms to any local or National regulations. The overflow pipework must be capable of withstanding water up to 203°F. Overflow and drain **MUST** be independently run to drain.

5.7 Hot Water Flow/Return

The flow and return connections should be connected directly to the distribution loop via a manifold assembly with valves.

5.8 Fill

The source of the "Fill" water should be taken directly off the end of the distribution loop. The choice of pipework material depends on maximum likely water temperature. Use Stainless steel or PEX for high temperature systems (up to 203°F).

5.9 Input/Outputs

Refer to wiring diagram (see Section 10.3.1) for details of all inputs/outputs.

Outputs: (available for connection to external devices)
All outputs are 24VDC

Y20	Loop-1 operation
Y21	Standby
Y22	Preheat indicator
Y23	Heatsan operation indicator
Y24	Water loss alarm
Y25	Connection to RO (System run either Loop 1 or 2)
Y26	Cool down required
Y27	RO run

NOTE: If connecting to external panel or override panels the maximum cable length should be restricted to 330 ft.

Inputs:

X10	Heatsan Interlock Signal
X14	Connection from key switch on remote override panel
X15	Heatsan to RO Interface, Power Supply Fault

5.10 Installation Plan Layout

Refer to Section 10.4 for suggested installation plan layout.

5.11 Commissioning

Commissioning of the *Heatsan* unit should only be carried out by either an AmeriWater technician or authorized trained personnel.

6 OPERATING PROCEDURES

6.1 Operator Interface

The operation of the ***Heatsan*** unit is controlled entirely through the touch screen located on the front of the main control box.

To access menus simply touch the area on the screen. Only use your finger to touch the screen DO NOT use pens, pencils, or other sharp implements to touch the screen or you could cause irreversible damage to the display.

During an "Alarm" condition the screen will change to **"Red"** and display the active alarm screen.

Access to the operating menus is password protected, see Section 6.2 Operation, for details of level of access available.

6.2 Operation (Levels of Access)

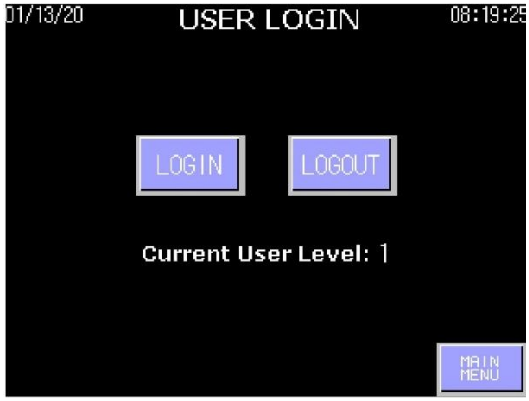
There are five levels of user access: **LEVEL 0, 1, 2, 3, & 5**

NOTE: **Level 5 access is reserved for AmeriWater technical staff.**

User Level	Password	Access
Level 0	No password	Today Current Setup Menu (view only)
		Monitor Menu (View Time & Rate screens)
		Alarm/Event History (view only)
		Heatsan Abort
Level 1	141	Today Current Setup Menu (view & change settings)
		Monitor Menu
		Alarm/Event History (view only)
		Daily Default Menu (View & change settings)
		Heatsan Abort
		Access Data Logging Screen
Level 2	44810	As per Level 1
		System Setup Menu (View & change settings)
		Reset Alarms
Level 3	Contact AmeriWater	As per Level 2
		Factory Setup Menu (view & change settings)
		Alarm/Event History (View/Reset and Clear/Delete Event history listings)
Level 5	Contact AmeriWater	As per Level 3
		Calibration Menu (view & change settings)

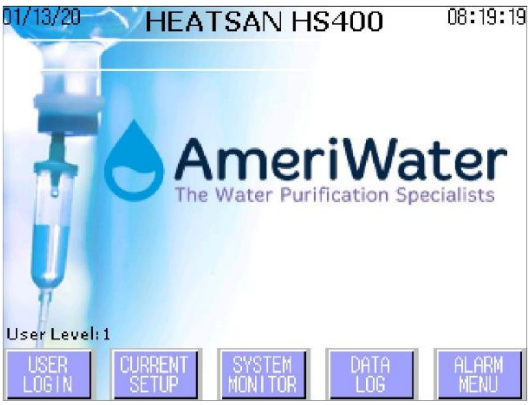
6.3 Operation (password entry)

6.3.1 Log In

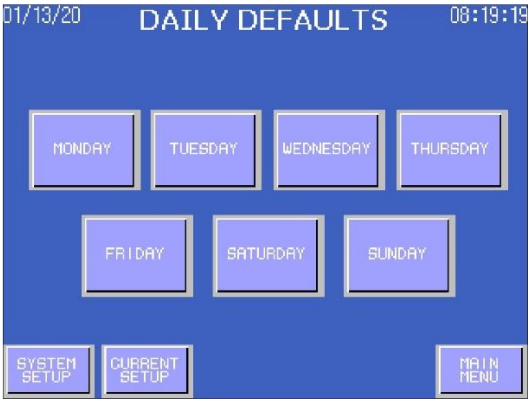
Screen Display	Action
	When power is applied to the Heatsan unit the **MAIN MENU** screen will be displayed. The first step will be to log in. Press ***"USER LOGIN"*** to access the **USER LOGIN** screen.
	On pressing *"LOGIN"* you will be asked to enter your Password code. Use the pop-up keypad to enter your code. Then press ***"ENTER"***. You will be notified of security level change success. Press "***OK***", then close the menu by depressing the X in the upper right corner. Depress, ***MAIN MENU"*** to return to the **MAIN MENU**. Details of User passwords can be found in Section 6.2. After 20 minutes the Login screen will automatically logout any users.

6.4 Operation

6.4.1 Daily Defaults Menu

Screen Display	Action
	To access the **CURRENT SETUP** menu, press ***"CURRENT SETUP"***. Or to view the **MONITOR** or **ALARM MENU** screens, press the appropriate button. Information provided by these two screens can be found in 0 and 0.

Press ***"DAILY DEFAULTS"***.



For every day of the week, Monday-Sunday, the disinfection program times and conditions for the distribution loops and the dialysis machines will need to be entered. For example, press ***"MONDAY"***. The following screen will be displayed; identical screens exist for the other days of the week.

Firstly, enter the "***NUMBER OF MACHINES***". This indicates the number of dialysis machines that will take water for disinfection on this day. Next, enter the ***"HEATSAN START"*** time. To change the time, select each digit to be changed individually. A pop-up number keypad will appear on the screen, select the correct number and press ***"ENTER"***.

After entering the Heatsan start time enter a time that the water system must be available for normal service. Press the desired digit next to ***"SERVICE"*** and input correct values until the correct time is displayed.

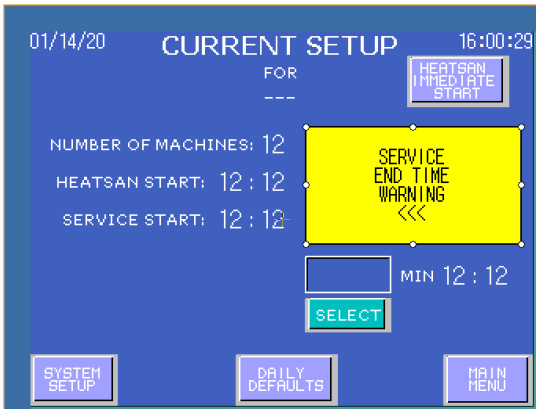
NOTE: If NO heat disinfection is to take place on a particular day enter 00:00 for the ***"HEATSAN START"*** time.

The **DRAW OFF START** time will be calculated by the unit. This represents the time water will be available for heat sanitising the dialysis machines.

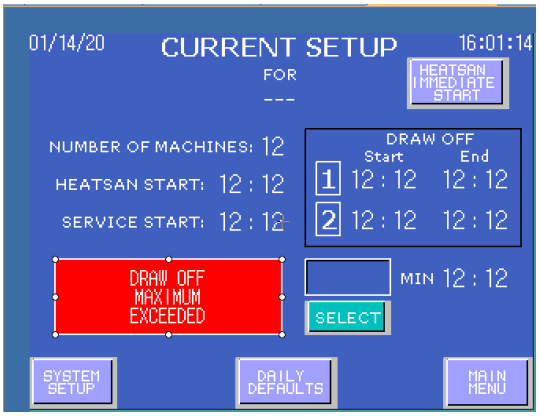
The **DRAW OFF END** time, the time draw off period finishes, is also calculated by the unit and automatically displayed. This time represents the time water draw off for the dialysis machines will cease.

NOTE: If no machines are to be heat disinfected but the selected distribution loop requires disinfection input a value of **1** against "***NUMBER OF MACHINES***". **Do not enter a, zero, value.**

When details for **MONDAY** have been entered press **"NEXT"** to move to **TUESDAY SETUP**, and so on until the program for every day of the week has been completed.

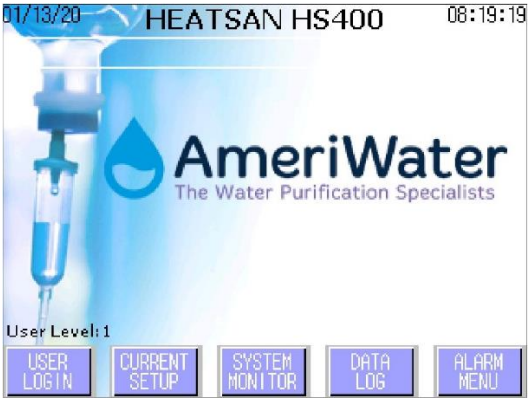
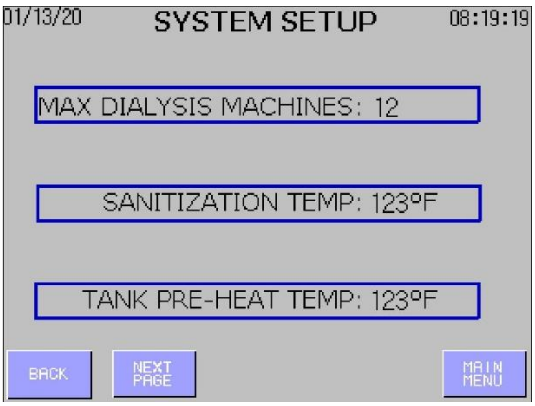


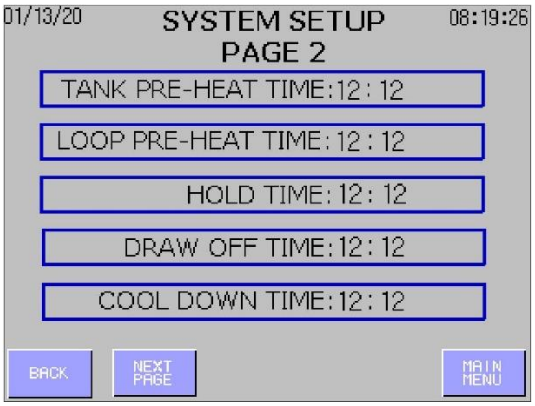
NOTE: If time values are entered that will prevent operation, a **SERVICE END TIME WARNING** message will be shown.



NOTE: If excess water is drawn off, a message of **DRAW OFF MAXIMUM EXCEEDED** message will be displayed as shown.

6.4.2 System Set-up

Screen Display	Action
	Once the daily set up parameters have been entered as detailed in 6.4.1 the next stage is to program in **SYSTEM SETUP** parameters. Press ***"CURRENT SETUP"*** to access **CURRENT SETUP** screen.
	Press ***"SYSTEM SETUP"*** to access the **SYSTEM SETUP** menu. **NOTE: The "SYSTEM SETUP" button can only be accessed by those users with Level 2 log-in clearance.**
	Enter the required **SANITIZATION TEMP**. The minimum default temperature can be found in Section 6.9. **TANK PRE-HEAT TEMP** is the programmed temperature that the tank will heat up to prior to Heatsan Operation. Press ***"NEXT PAGE"*** to enter **SYSTEM SETUP PAGE 2**.



Enter the **HOLD TIME**. This time represents the time the distribution loop is held at the entered sanitization temperature. The minimum default hold time can be found in Section 6.9.

Finally press ***"MAIN MENU"*** to go back to the **MAIN MENU**.

6.4.3 Today Current Set-up Menu

Screen Display	Action

As an option in this screen, you can run a **TODAY** program which gives you the facility to run the program only for **TODAY** but will not affect the pre-set parameters set for the **DAILY DEFAULTS**. Press "***CURRENT SETUP***".

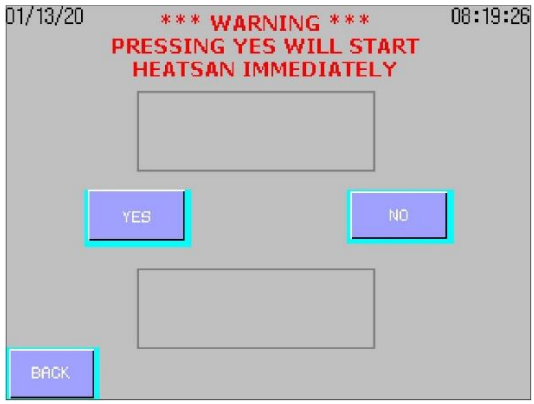
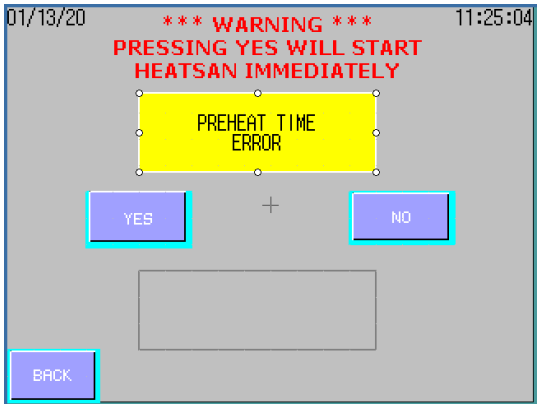
Change parameters to suit.

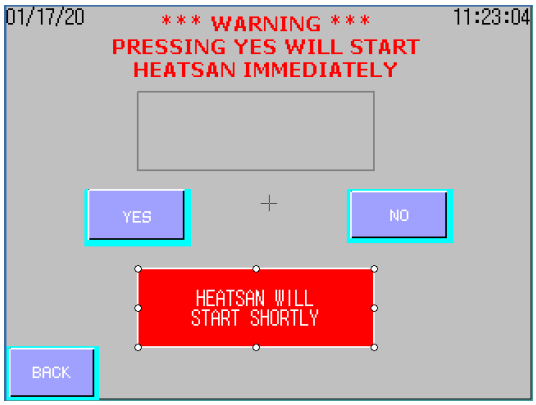
NOTE: The operating parameters for that day will be automatically loaded into **TODAY** at midnight.

This screen can be accessed to view without the need to log in. To edit will require logging in as a Level 1 user or above.

Once you have entered all the required parameters the system is ready for automatic operation, further set up is not required. During Heat disinfection other screens are available which monitor the unit's status and display any alarm conditions. See 0 to 6.5 for further details of these screens.

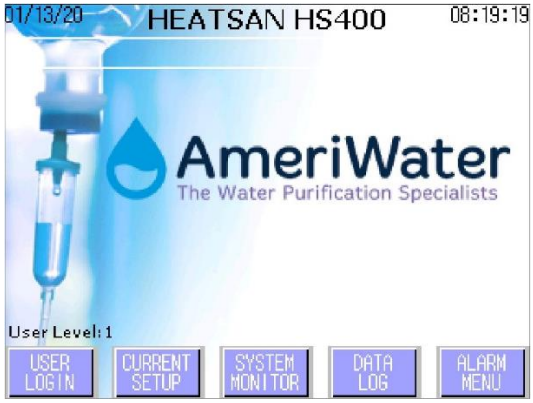
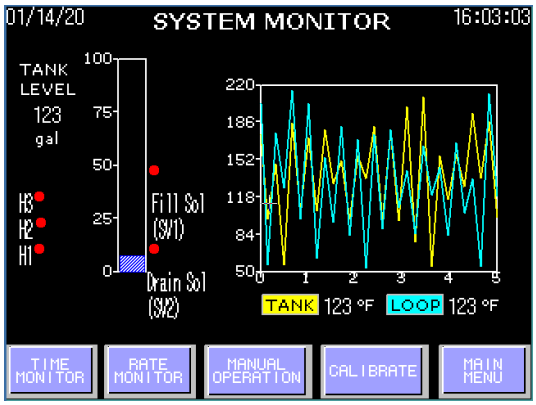
6.4.4 Heatsan Immediate Start

Screen Display	Action
	Logged into the system as a user Level 2. The **CURRENT SETUP** screen provides a way to immediately start the unit. At any time on pressing ***"HEATSAN IMMEDIATE START"*** the following screen will be displayed.
	If an immediate start is desired press and hold **"YES"** until a single beep is heard. The **CURRENT SETUP** screen will be populated with the necessary times. If **"NO"** is pressed it will return to the **CURRENT SETUP** screen and display 00:00 for all times.
	**NOTE:** The unit needs to start the Loop Pre-Heat process within the same day as the Tank Preheat. If the calculated "Heatsan Start" exceeds 24:00, then this error message will come up on the screen. The message is not sent to the alarm Log. The message blinks for 10 seconds and then the user is sent back to the Current Day setup screen.



Upon selecting to start the Heatsan, the message "HEATSAN WILL START SHORTLY" appears.

6.4.5 Monitor – Rates

Screen Display	Action
	At any time on pressing ***"SYSTEM MONITOR"*** the following screen will be displayed.
	This screen will display information relating to the tank level in the form of a bar chart and actual volume reading in gallons. A graph is also displayed indicating the temperature of the water in the tank and the returning distribution loop water temperature. The lights next to H1, H2, and H3 correspond to which heaters are on at the time. Red signifies off, while green signifies that the heater is on.

On selecting *"RATE MONITOR"* the **RATE MONITOR** screen will be displayed and will indicate the volume of water remaining for the disinfection of the dialysis machines. Press *"MAIN MENU"* to return to the **MAIN MENU** or press *"TIME MONITOR"* to gain access to time information or press **"SYSTEM MONITOR"** to return to the **SYSTEM MONITOR** screen.

6.4.6 Monitor – Times

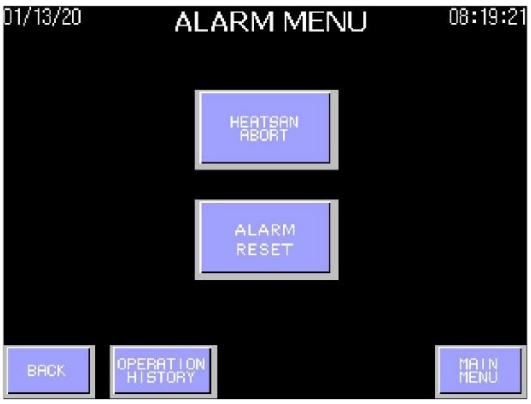
Screen Display	Action

The **TIME MONITOR** screen provides information regarding the unit's status during heat disinfection indicating remaining times for each step of the process. Press *"MAIN MENU"* to return to the **MAIN MENU** screen or *"RATE MONITOR"* to return to the **RATE MONITOR** screen or *"SYSTEM MONITOR"* to return to the **SYSTEM MONITOR** screen.

6.5 Alarms and Events

Screen Display	Action

To access alarms and event history from the **MAIN MENU**, press *"ALARM MENU".*



Within this screen, there are the options of aborting a heat disinfection cycle, resetting an active alarm, and viewing operation history. By pressing ***"HEATSAN ABORT"*** the unit will immediately go into a Cool down phase and return the system to STANDBY mode upon completion. The "***ALARM RESET***" will acknowledge an active alarm, clear it from the main screen and add it to the operation history.

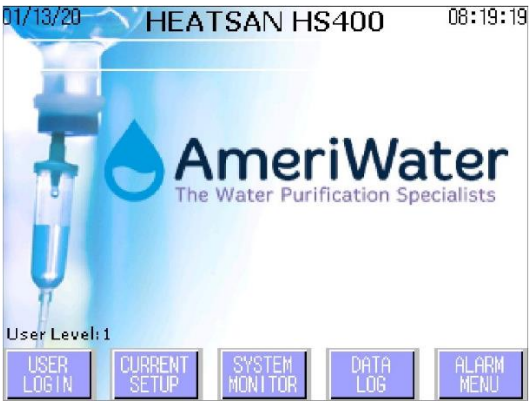
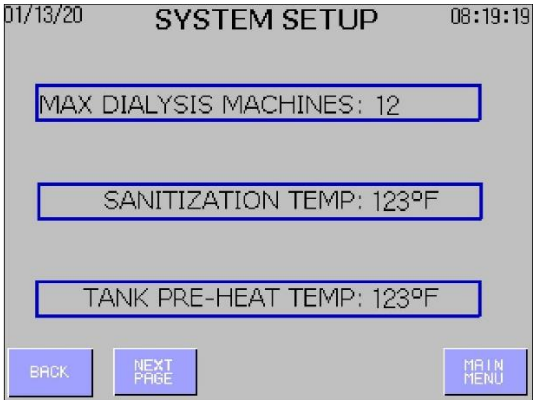
To view the **OPERATION HISTORY**, press ***"OPERATION HISTORY"***. This screen will list in date and time order all recorded raised alarms and system events. By pressing the ▲ ▼ arrows you will be able to navigate the listed entries. The selected entry's message will scroll. Users with **Level 2** access or above can ***Clear All*** or ***Delete*** alarm/event message(s).

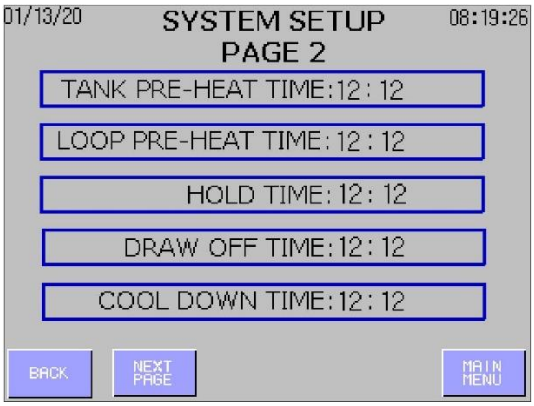
If an alarm is raised by the unit, the screen will change to red and display the message **ALARM ACTIVE**.

A secondary message will appear and scroll giving more details of the alarm condition. Users with Level 1 or 2 access can reset / acknowledge the alarm. Only users with Level 3 access can clear the alarm record from the event log by depressing the "***ALARM RESET***" button.

6.6 Factory Set-up

This is the highest level of user access giving the operator full rights to change factory default settings and clear alarm and event logs. This level is password protected and should only be available to AmeriWater technicians or an approved/authorized third party.

Screen Display	Action
	To gain access as a Level 2 or 3 user, press ***"USER LOGIN"*** and login as detailed in 6.3.1. Enter the appropriate, password, _ _ _ _ _ _ Then press **"ENTER"**. The password will only be available to authorized personnel; contact AmeriWater if this level of access is required.
	Once logged in press ***"CURRENT SETUP"*** then select ***"SYSTEM SETUP"*** this will take you into the three system setup screen menus as follows.
	Refer to Section 6.9 for SYSTEM SETUP PAGE 1 values. Press ***"NEXT PAGE"*** to enter **SYSTEM SETUP PAGE 2.**



Refer to Section 6.9 for SYSTEM SETUP PAGE 2 values.

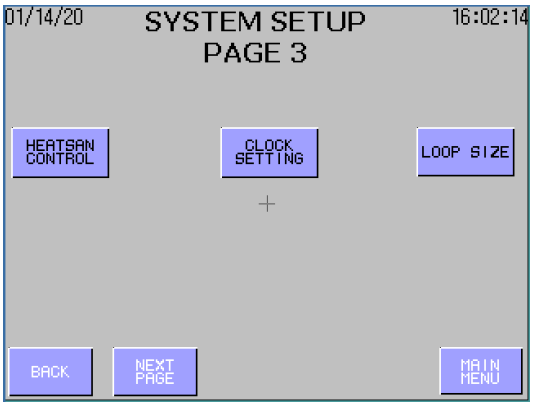
TANK PRE-HEAT TIME is the allotted time for the tank to heat up to the Tank Pre-Heat Temp.

LOOP PRE-HEAT TIME is the allotted time for the loop to heat up to the Sanitization Temp.

DRAW OFF TIME is the minimum time for draw off to occur, which allows disinfection of dialysis machines and the connecting lines.

COOL DOWN TIME is the minimum time for the loop and tank to cool down.

Press ***"NEXT PAGE"*** to enter **SYSTEM SETUP PAGE 3.**



In this final set up screen you will be able to change the date and time settings, by pressing ***"CLOCK SETTINGS"***. This will take you to **TIME SETTING AND DISPLAY** screen. The clock is a 24hr clock. The date is displayed as mm/dd/yyyy. Press X in the upper right corner of the window when finished.

If the unit is coupled to a MediQA or MROZ unit select "***INTERFACE CONTROL***". This instructs the unit that the Heatsan will control the initiation of the Heatsan process. To initiate this change, you must press and hold the button for 5 seconds.

Pressing ***"LOOP SIZE"*** will take you to the **LOOP SIZE** screen. There is the option of defining the loop as small medium, or large. This loop size designation will tell the program how many heaters need to kick on during the Hold Period to maintain temperature.

To enter the **FACTORY SETUP** screens press ***"NEXT PAGE"***. This will take you into the six factory setup screen menus as follows.

NOTE: Changing any default value will affect the operation of the unit; always

refer to AmeriWater before changing any values.

The unit will already have been programmed with a set of factory default values. Details of these can be found in Section 6.9. To change any values simply press the relevant digit, a number keypad will be displayed, select the desired value and press ***"ENTER".***

MAXIMUM OPERATING TEMP is the temperature that the "Over Temperature" Alarm will appear.

MAXIMUM SERVICE TEMP is the temperature that the Cool Down Period ends at.

MINIMUM HOLD TIME sets the minimum time for the hold period.

Press "***NEXT PAGE***" to enter **FACTORY SETUP PAGE 2**.

Refer to Section 6.9 for FACTORY SETUP PAGE 2 values.

DRAW OFF, is the volume of water, in gallons, each dialysis machine requires for disinfection.

RATE in US gal/min that each machine draws water from the loop.

Press ***"NEXT PAGE"*** to enter **FACTORY SETUP PAGE 3**.

Refer to Section 6.9 for FACTORY SETUP PAGE 3 values.

TIME PER DIALYSIS MACHINE, in hrs/min. This is the time each machine takes to carry out a heat disinfection cycle.

Press ***"NEXT PAGE"*** to enter **FACTORY SETUP PAGE 4**.

Refer to Section 6.9 for FACTORY SETUP PAGE 4 values.

COOL DOWN DROP is the pre-set value that controls the opening of the cold-water fill valve during cool down cycle.

Press ***"NEXT PAGE"*** to enter **FACTORY SETUP PAGE 5**.

Refer to Section 6.9 for FACTORY SETUP PAGE 5 values.

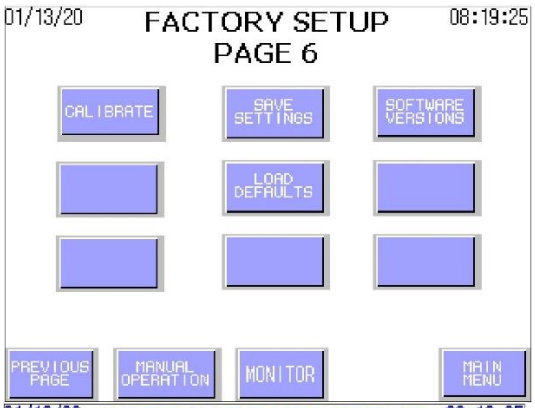
WATER FEED ON, is the temperature at which the fill water feed is turned on.

WATER FEED OFF, during "dual" disinfection refill stage this pre-set value controls the filling of the tank, closing the water fill valve should the tank temperature fall below this value.

REFILL PERIOD LIMIT, is the maximum time, calculated and displayed by the unit that the Heatsan will allow for 2nd stage refill between the first and second heat disinfection cycle when in "dual" mode.

DRAW OFF END WARNING, during draw off the external panel will flash to indicate that the time remaining is insufficient to disinfect the dialysis machines.

Press ***"NEXT PAGE"*** to enter **FACTORY SETUP PAGE 6**.

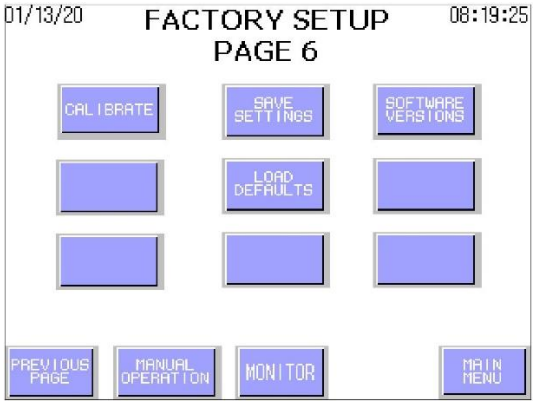


To save default settings press ***"SAVE SETTINGS"*** *button for 5-10 seconds until you hear a single "beep".* This will overwrite previously saved settings.

To recall the factory default settings press ***"LOAD DEFAULTS".***

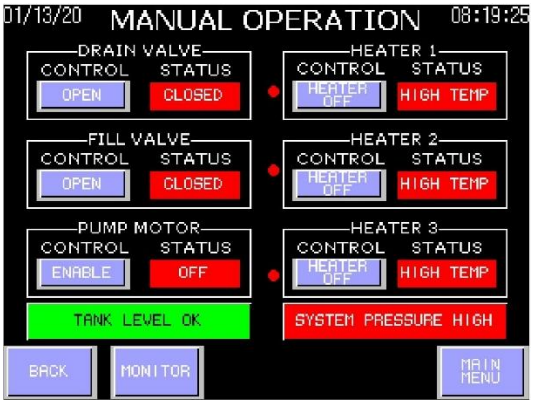
To check on current versions of software loaded press ***"SOFTWARE VERSIONS"*** to access the following screen.

Details current software versions loaded on to the HMI and PLC. These will automatically update every time new code is uploaded into the unit. Press the ***"BACK"*** button to return to **FACTORY SETUP PAGE 6** screen or "***MAIN MENU***" to return to the **MAIN MENU**



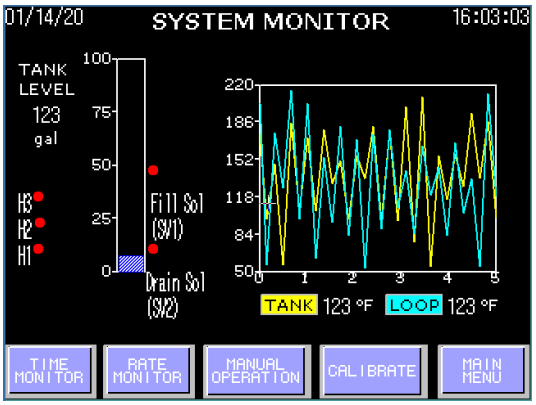
To gain access to sensor calibration screen press "***CALIBRATE***" refer to **Section 9.4** for details.

Pressing ***"MANUAL OPERATION"*** will give you access to the manual control screen. See below for details.



The **MANUAL OPERATION** screen gives you the ability to manually operate certain control components, when operated protection is still provided by any associated interlocks and safety control devices.

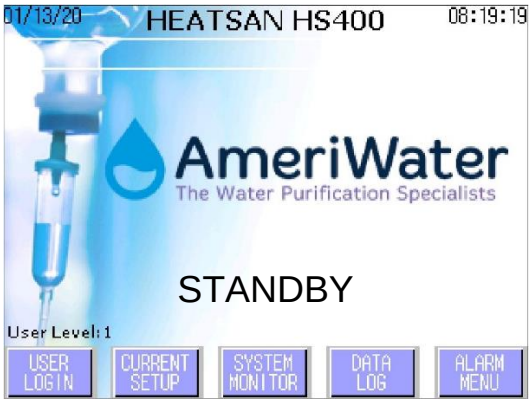
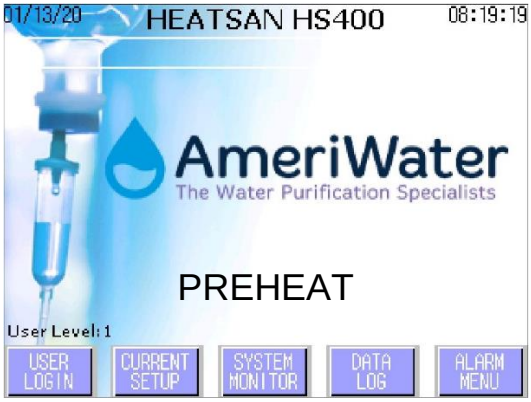
Pressing ***"MONITOR"*** will take you directly to the temperature and tank volume screen. Press "***MAIN MENU***" to return to the **MAIN MENU**. Press ***"BACK"*** button to return to the previous screen.

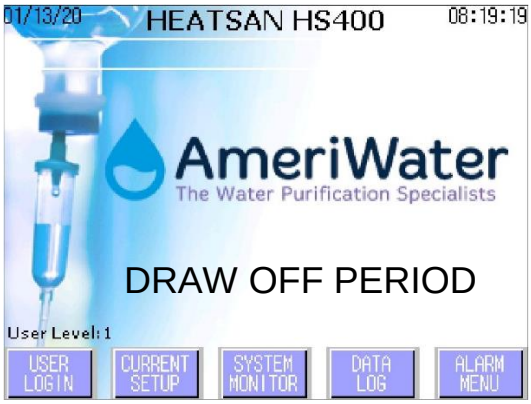
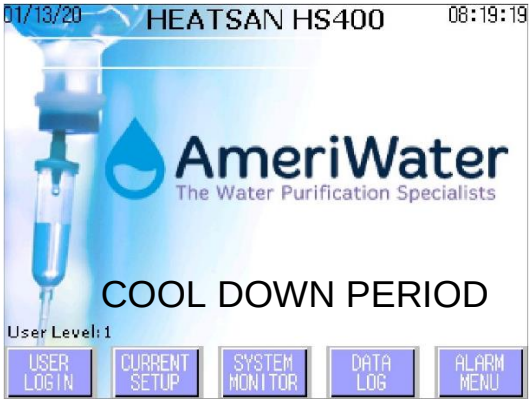
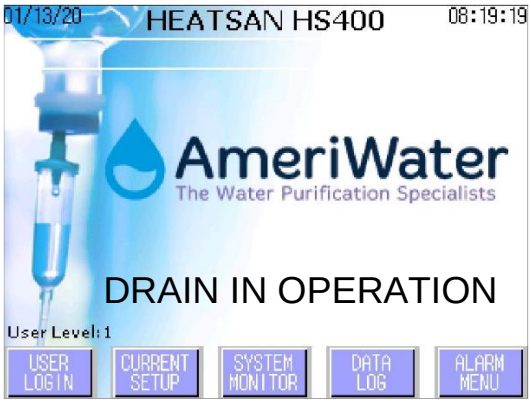


The "***SYSTEM MONITOR***" screen displays both tank level, tank and loop return temperatures. Press "***MANUAL OPERATION***" to go back to **MANUAL OPERATION** screen.

6.7 Normal Operation

During normal operation and during heat disinfection the HMI panel will indicate the current status of the unit displaying the following screens.

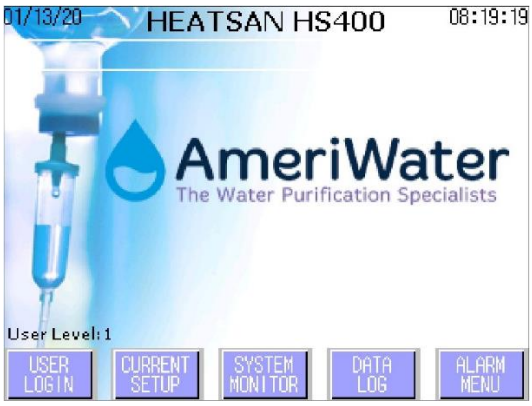
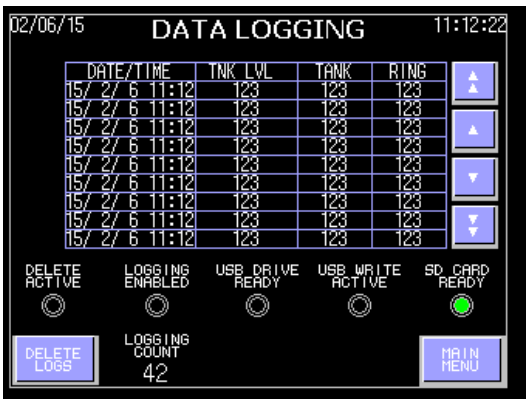
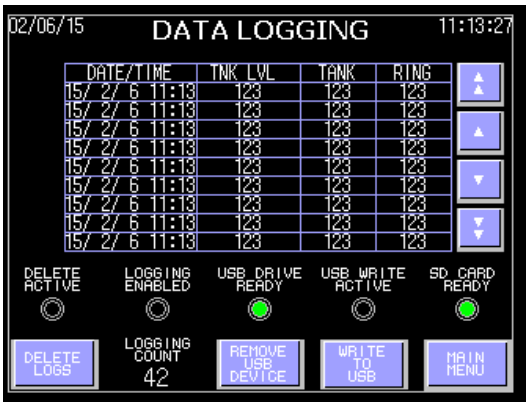
	**STAGE 1:** When the Heatsan unit is powered up and not in the process of heat disinfection the **STANDBY** screen will be displayed.
	**STAGE 2:** The **PREHEAT** screen will be displayed during the first stage of heat disinfection to indicate the initial preheating of the stored water.
	**STAGE 3:** Once the timed heat disinfection phase commences **HEATSAN OPERATION** message will be displayed. This message will continue throughout the *"heat up"* and *"hold"* phases of the disinfection cycle.

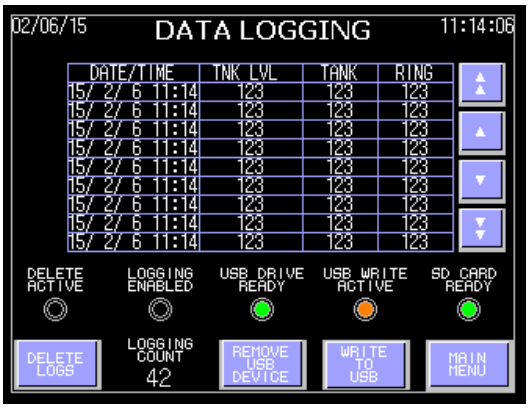
	**STAGE 4:** This screen indicates when the **DRAW OFF PERIOD** is available for water to be drawn off by the dialysis machines.
	**STAGE 5:** Once the **DRAW OFF PERIOD** has completed the system will enter its **COOL DOWN PERIOD**, introducing cold RO water into the system until the accept temperature is reached.
	**STAGE 6:** The final part of the heat disinfection cycle is to fully drain down the integral tank on the unit. **DRAIN IN OPERATION** indicating that this stage is in process. On completion the screen will revert to **STANDBY**.

6.8 Data Logging

The *Heatsan* disinfection system will automatically log data every 5 minutes during operation. This will capture the information from the **SYSTEM MONITOR** screen.

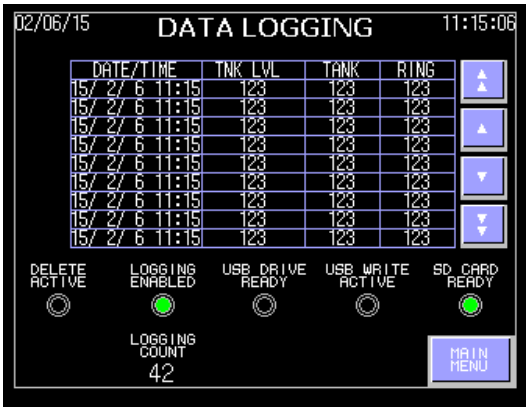
It is recommended that this data be periodically transferred to a USB drive and stored on a computer for diagnostics. The memory on the HMI can then be cleared without fear of data loss.

Screen Display	Action
	Log into the system at level 1 or higher. Upon returning to the **MAIN MENU**, you will have access to the "*DATA LOG*" button. Press this to go to the **DATA LOGGING** screen.
	The **DATA LOGGING** screen will have a green light in the lower right corner that indicates **SD CARD READY**. If this is not illuminated, contact AmeriWater for assistance.
	Install a USB drive into the port on the front of the control panel. The USB must be FAT 16 formatted. After a short period of time, the **USB DRIVE READY** light should illuminate green and the "*REMOVE USB DEVICE*" and "*WRITE TO USB*" buttons will appear. Depress "*WRITE TO USB*" to write the data files to the USB drive.

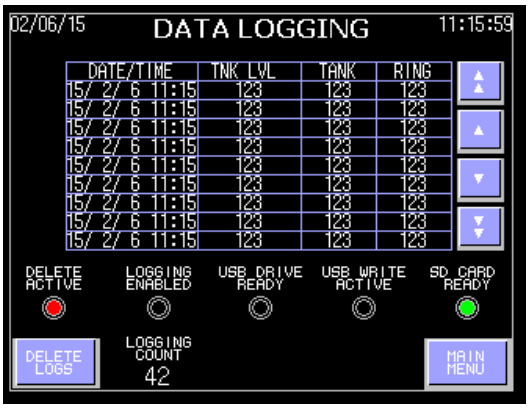


The **USB WRITE ACTIVE** light will illuminate orange while data is being written to the USB drive. Do not remove the USB drive while this is illuminated.

Once the data has been written, you can depress the "***REMOVE USB DEVICE***" button to prepare the drive for removal. When the **USB DRIVE READY** light is extinguished, you may safely remove the USB drive from the device.

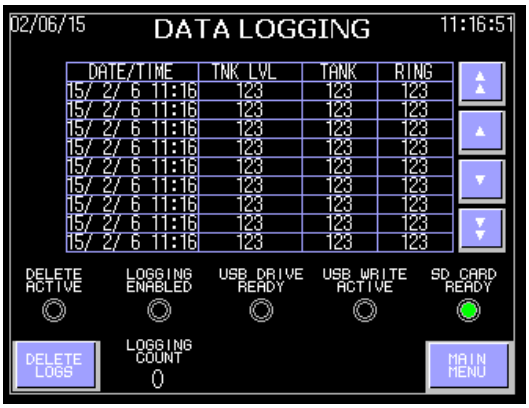


While the Heatsan is in **OPERATION**, the **LOGGING ENABLED** light will be illuminated green. While this is on, the "***WRITE TO USB***" or "***DELETE LOGS***" button will not be available.



When you are ready to clear the data from the HMI, simply depress the "***DELETE LOGS***" button in the lower left corner of the screen.

NOTE: Once the "***DELETE LOGS***" button is depressed, all data stored on the HMI will be deleted. Ensure that the data has been transferred to a USB drive prior to commencing.



Once the information has been deleted, the logging count displayed on the bottom of the screen will be "0".

6.9 Factory Default Settings

Refer to Section 6.6 Factory set-up to change and save default values.

Parameter	Unit	Factory Default	Screen Location
Number of Machines	Number	1	Current Setup
Heatsan Start	Time	0:00	Current Setup
Service Start	Time	0:00	Current Setup
Maximum Dialysis Machines	Number	17	System Setup Page 1
Sanitization Temp	ºF	185	System Setup Page 1
Tank Pre-Heat Temp	ºF	150	System Setup Page 1
Tank Pre-Heat Time	Hr/min	2:00	System Setup Page 2
Loop Pre-Heat Time	Hr/min	2:00	System Setup Page 2
Hold Time	Hr/min	0:30	System Setup Page 2
Draw Off Time	Hr/min	0:30	System Setup Page 2
Cool Down Time	Hr/min	1:00	System Setup Page 2
Maximum Operating Temp	ºF	197	Factory Setup Page 1
Minimum Operating Temp	ºF	50	Factory Setup Page 1
Maximum Service Temp	ºF	88	Factory Setup Page 1
Minimum Hold Time	Hr/min	0:30	Factory Setup Page 1
Maximum Draw Off Available	UsGal	Not Adjustable	Factory Setup Page 2
Draw Off	Gal/Mach	3	Factory Setup Page 2
Rate	GPM	1	Factory Setup Page 2
Time per Dialysis Machine	Hr/min	0:15	Factory Setup Page 3
Water Loss in Hold	UsGal	5	Factory Setup Page 3
Heater 1 Level	UsGal	15	Factory Setup Page 3
Heater 2 Level	UsGal	21	Factory Setup Page 3
Heater 3 Level	UsGal	32	Factory Setup Page 3
Cool Down Temperature Drop	ºF	8	Factory Setup Page 4
(Upper Limit) Temp Hysteresis	ºF	2	Factory Setup Page 4
(Lower Limit) Heat Loss	ºF	7	Factory Setup Page 4
Maximum Tank Level	UsGal	Not Adjustable	Factory Setup Page 4
Minimum Tank Level	UsGal	Not Adjustable	Factory Setup Page 4
Water Feed On	ºF	189	Factory Setup Page 5
Water Feed Off	ºF	184	Factory Setup Page 5
Refill Period Limit	Hr/min	0:30	Factory Setup Page 5
Draw Off End Warning	Secs	Display only	Factory Setup Page 5

NOTE: After making any changes to the information in the Factory Setup screens save it by accessing the "Save Defaults" and pressing the button for a minimum of 5 seconds or until you hear a confirmation "bleep".

7 FAULT FINDING

CAUTION: This section provides general details for diagnosing possible faults that may occur during normal operation of the Heatsan. Some of the remedial actions can only be carried out by qualified personnel. Do not attempt to carry out any action if it involves inspecting/ replacing an electrical/mechanical component without in the first instance contacting AmeriWater for advice. Please be aware that the unit/system may under certain fault conditions still be under pressure and contain water at scalding temperature. When investigating any alarm take appropriate precautions to prevent possible injury. NEVER attempt to dismantle the unit under these conditions. Always contact AmeriWater for advice.

7.1 Data Alarm List

See the Diagnostic Guide, 098-0009, for Checks and Proposed Actions for each Alarm.

To return the unit back into service the alarm(s) will have to be individually reset and acknowledged. Before acknowledging any alarm, the fault should be thoroughly investigated and cleared.

Alarm Description	Reason
"Pump Fault Trip Condition"	Caused by motor overload (1Q1) tripping, due to short circuit or thermal overload. X0 on.
"Pump Fault – Contactor Error"	Caused by the motor contactor (1K1M) not switching when requested. The PLC should signal the contactor to operate, when the contactor switches, an auxiliary contact should give the PLC a signal. If the PLC does not receive a return signal within a preset time, then a fault alarm is raised. Y0 on, X1 off.
"Heater 1 – Contactor Error"	Caused by heater#1 contactor (2K1M) not switching when requested. The PLC should signal the contactor to operate, when the contactor switches, an auxiliary contact should give the PLC a signal. If the PLC does not receive a return signal within a preset time, then a fault alarm is raised. Y1 on, X2 off.
"Heater 1 – Over Temp"	Caused by the heater internal temperature switch opening. Heater #1 thermostat detected a temperature higher than the set value on the dial. X5 off.
"Heater 2 – Contactor Error"	Caused by heater#2 contactor (3K1M) not switching when requested. The PLC should signal the contactor to operate, when the contactor switches, an auxiliary contact should give the PLC a signal. If the PLC does not receive a return signal within a preset time, then a fault alarm is raised. Y2 on, X3 off.
"Heater 2 – Over Temp"	Caused by the heater internal temperature switch opening. Heater #1 thermostat detected a temperature higher than the set value on the dial. X6 off.
"Heater 3 – Contactor Error"	Caused by heater#3 contactor (4K1M) not switching when requested. The PLC should signal the contactor to operate, when the contactor switches, an auxiliary contact should give the PLC a signal. If the PLC does not receive a return signal within a preset time, then a fault alarm is raised. Y3 on, X4 off.

"Heater 3 – Over Temp"	Caused by the heater internal temperature switch opening. Heater #1 thermostat detected a temperature higher than the set value on the dial. X7 off.
"Loop Alarm: High Pressure"	Triggered by the loop high pressure switch set-point being exceeded. X12 off.
"Loop Alarm: Excess Temperature"	Caused by the loop or tank temperature sensors exceeding preset MAXIMUM OPERATING TEMPERATURE set-point.
"Excess water loss during hold period"	Caused by the reduction of water level in the tank exceeding WATER LOSS IN HOLD set point. Losing that volume of water in Heatsan Operation mode doesn't leave enough water for draw off to be completed.
"Minimum tank level reached"	Caused by water level reading being below the MINIMUM TANK LEVEL set-point following draw off period. The minimum tank level is not adjustable and is set to 5 gallons.
"Manual Heatsan abort"	Remote key switch or manual override via touch screen being activated.
"Heatsan aborted until following day"	Heatsan Abort button in alarm menu was pressed while the system was in "Standby".
"Low water temperature"	In Hold or Draw Off Period, temperature transmitter in return line detects water temperature below 177 °F.
"Excess water loss during Draw Off period"	Detected the draw off of too much water during Draw Off Period.
"Preheat failure"	Occurs if Tank or Loop Preheat failure is detected. Tank Preheat fails based on water level, while Loop Preheat fails based on the set Sanitization Temp.
"System fault"	If any ALARM is detected while the Heatsan is in Operation. Y6 on.
"Drain operation failed"	Pressure level transmitter detected positive water volume after being in Drain in Operation for 54 minutes.
"Heatsan to RO Interface: Power supply fault"	Heatsan to RO Interface enclosure has a malfunction. X15 on.

7.2 Event Listings

Period	Explanation of Each Period
Tank Preheat	Heatsan tank fills with water and raises temperature to programmed Tank Pre-Heat Temp. The Tank Pre-Heat mode start time is determined by taking the programmed Tank Pre-Heat time and subtracting it from the Heatsan start time.
Heatsan Start Time	The time at which an operator wants the Heatsan to take control of the loop and start to flood the loop with hot water.
Loop Preheat	This period starts at the same time as the Heatsan Start Time. Heatsan tank opens the valve to the loop, the hot water inside the tank is flushed into the loop and all the water in the loop is raised to the programmed Sanitization Temp.
Hold Period Started	Loop Preheat was Successful, loop is up to Sanitization Temp. Now, the Heatsan cycles the hot water through the loop and maintains temperature.
Minimum Hold Period Reached	Loop has been maintaining temperature and cycling the water through it for the duration of the programmed Minimum Hold Time. 30 minutes is the default Minimum Hold Period, and it is a value that can be found on Factory Setup Page 1.
Hold Time Complete	Loop has been maintaining temperature and cycling the water through it for the required time that is set by the parameter Hold Time on the System Setup Page 2 screen.
Draw Off Period	When the Hold Period is complete there is a Draw Off Period. This time is used by the Biotech to run hot water from the loop through the line that connects the wall box to the Dialysis Machine. This will sanitize that line; water will pass through the Dialysis Machine and go down the drain. The time allotted for the Draw Off Period is determined by the Service Start Time minus the Cool Down Time minus the Hold Time.
Cool Down Period	When Draw Off Period is complete, Cool Down starts by opening the fill valve and auto starting the RO. The RO will begin to flush cold water through the loop and into the Heatsan tank. As the water drops 8 degrees, the Fill Valve closes, and the Drain Valve opens to allow water to be dumped. The loop will continue to fill through Heatsan Return. This process will cycle until the tank has reached the Maximum Service Temp (Factory Setup Page 1).
Drain In Operation	When the tank has reached the Maximum Service Temp, the RO turns off and the Drain Valve is left open until the tank is empty.
Disinfect Complete	Cycle is determined to be complete when Cool Down is finished.
Service Start Time = Standby	Drain in Operation has completed so the tank is empty, system goes back to Standby and is waiting for the next scheduled operation.

8 DISINFECTION AND CLEANING

8.1 Advisory Note

The *Heatsan* unit during normal operation will not require being chemically cleaned or disinfected.

The heat disinfection process will also serve to disinfect the unit's integral tank and internal pipework.

Over a period of time (12 months) scale deposits could build up on the internal tank walls and heater elements. De-scaling of the unit must only be carried out by AmeriWater or under instruction by AmeriWater. Chemical cleaning of the unit by un-trained personnel or the use of un-approved chemicals is strictly forbidden and may invalidate any guarantees or warranty.

It is recommended that the tank and heaters are inspected annually for signs of fouling/scaling and general integrity.

If the unit is to be decommissioned and placed in long term storage, >6 months, it should be fully drained, i.e., drain the pipework and recirculation pump fully and isolate its feedwater supply. DO NOT fill the unit with any form of preservative.

8.2 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.

9 MAINTENANCE

The *Heatsan* unit does not contain any consumables that require replacement on a regular basis.

WARNING: **Only approved spare parts provided by AmeriWater are to be used. If un-authorized spare parts are supplied or fitted this could invalidate the warranty guarantee, affect the unit's performance or compromise the safe operation of the unit.**

Maintenance on the unit must only be carried out by AmeriWater or by an approved/authorized third party. It is recommended that should any fault occur with the unit that it is reported to the appropriate party responsible for maintaining the water treatment system.

Annually: Clear Operation Log. Record with pictures if necessary.

9.1 Thermostat Testing

AmeriWater recommends that the thermostats on the heating elements be tested annually by qualified personnel. To conduct this testing, you will need access to a loop with no patients under treatment.

CAUTION: During this testing, the temperature of the water will be sufficient to create steam, which is hot enough to scald during this test. Ensure that you will be able to determine the temperature without reaching into the tank.

To begin, remove the lid from the Heatsan system. Log in as user level # 3 (see Section 6.2). Access the manual operation menu and open the fill solenoid valve. Allow the unit to fill to 16 gallons of water and close the fill valve.

Using a calibrated thermometer, insert this into the tank away from the heaters. Use caution once the heater has turned on as the water will become hot enough to scald. Turn on the recirculation pump as well as Heater #1. Verify that this heater (2K1M) shuts off between 185 – 210° F.

Turn off Heater #1. Open the fill valve and allow the tank to fill to 24 gallons. The added water will lower the temperature in the tank. Close the fill valve and turn on Heater #2. Verify that this heater (3K1M) shuts off between 185 – 210° F.

Turn off Heater #2. Open the fill valve and allow the tank to fill to 32 gallons. Close the fill valve and turn on Heater #3. Verify that this heater (4K1M) shuts off between 185 – 210° F.
Turn off Heater #3. Open the fill valve and allow the tank to fill to 65 gallons. Close the fill valve and turn off the recirculation pump. Open the drain valve and allow the tank to completely drain. Remove the calibrated thermometer from the device and replace the lid.

If any of the thermometers on the heaters did not kick out at the prescribed values, contact AmeriWater for guidance.

9.2 Spare Parts

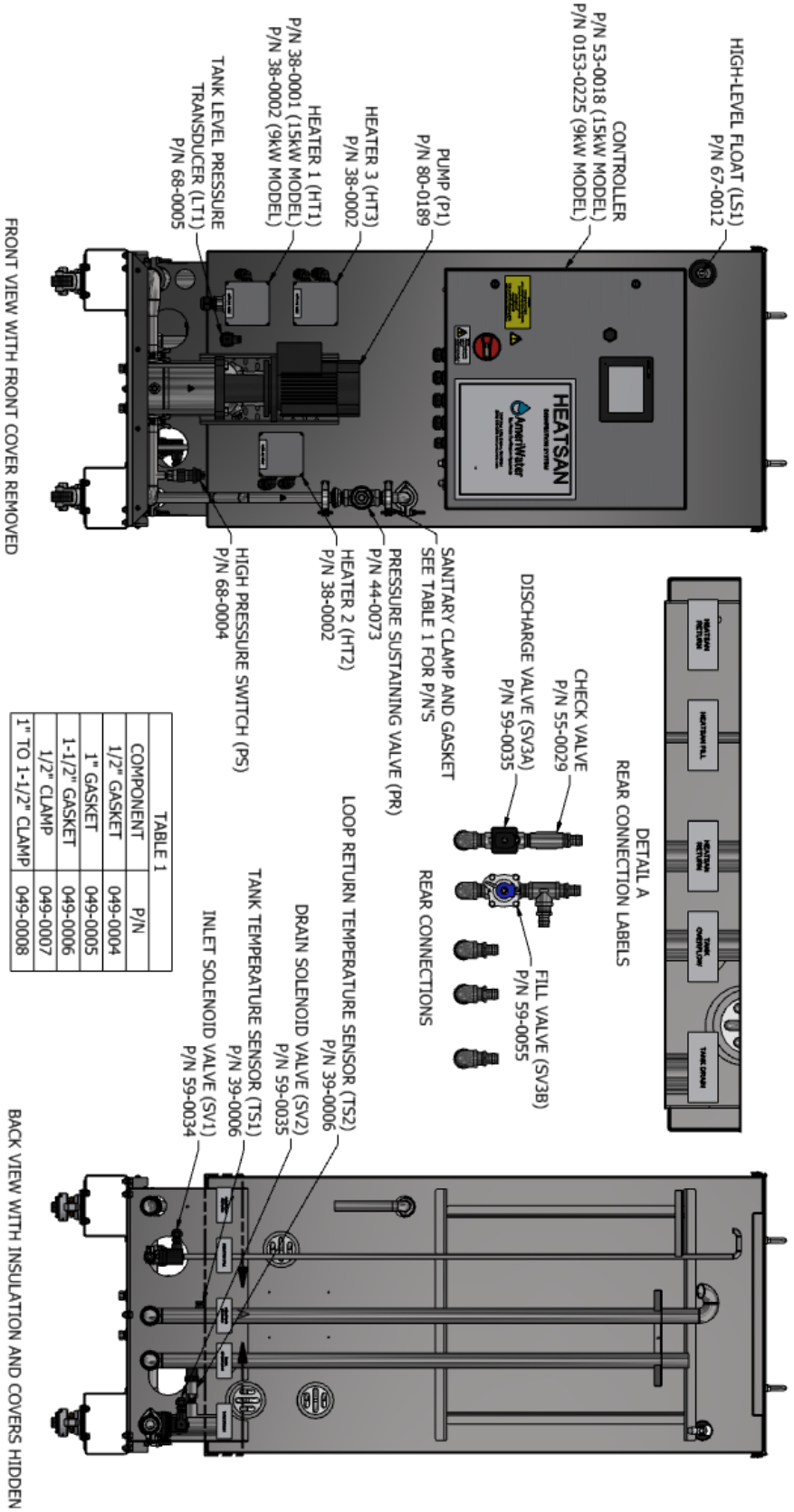
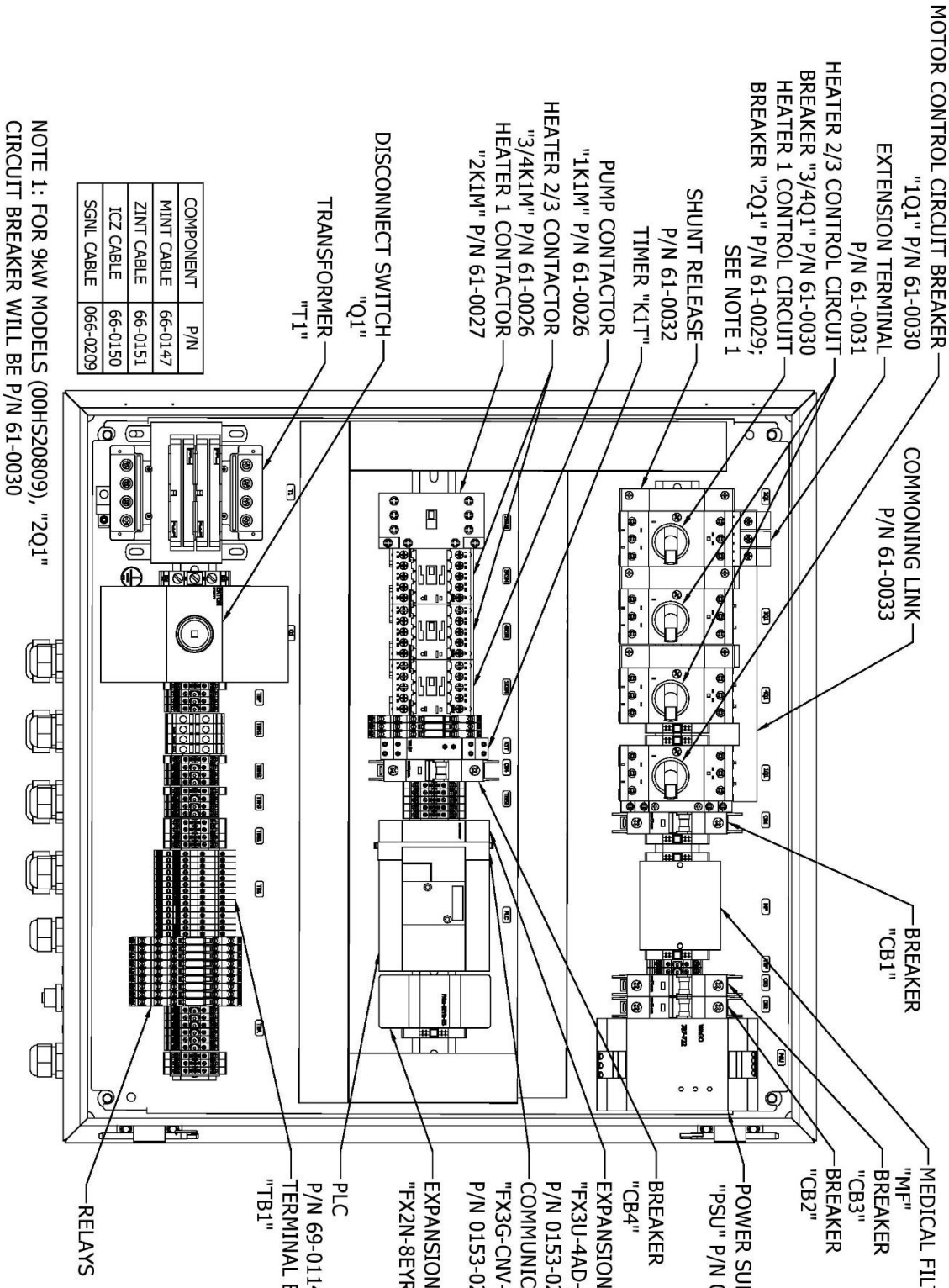


TABLE 1	
COMPONENT	P/N
1/2" GASKET	049-0004
1" GASKET	049-0005
1-1/2" GASKET	049-0006
1/2" CLAMP	049-0007
1" TO 1-1/2" CLAMP	049-0008

9.3 Control Panel



COMPONENT	P/N
MINT CABLE	66-0147
ZINT CABLE	66-0151
ICZ CABLE	66-0150
SGNL CABLE	066-0209

NOTE 1: FOR 9kW MODELS (00HS20809), "2Q1" CIRCUIT BREAKER WILL BE P/N 61-0030

Please contact AmeriWater for your spares and servicing requirements.

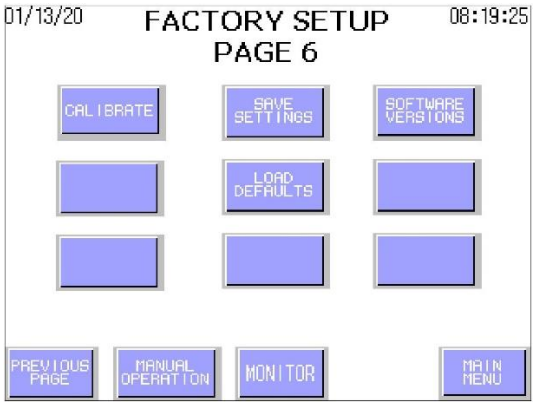
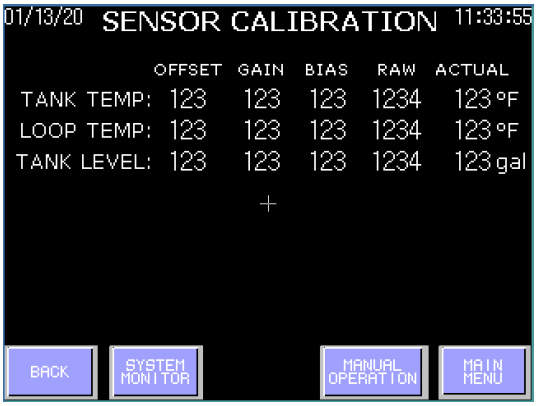
WARNING: Only trained approved personnel or an AmeriWater technician should fit replacement spare parts.

CAUTION: ALWAYS ISOLATE THE POWER SUPPLY AND ENSURE THE SYSTEM IS NOT UNDER PRESSURE OR CONTAIN WATER LIKELY TO SCALD BEFORE REPLACING ANY SPARE PART. IF IN DOUBT, CONTACT AMERIWATER FOR ADVICE OR ASSISTANCE.

*** NOTE: Pressure and temperature transmitters require calibration upon installation.**

Fuses are only to be replaced with like type:
208V – KLDR- 7 Amp 600 Volt, 200,000 IAC, Time Delay, Class CC

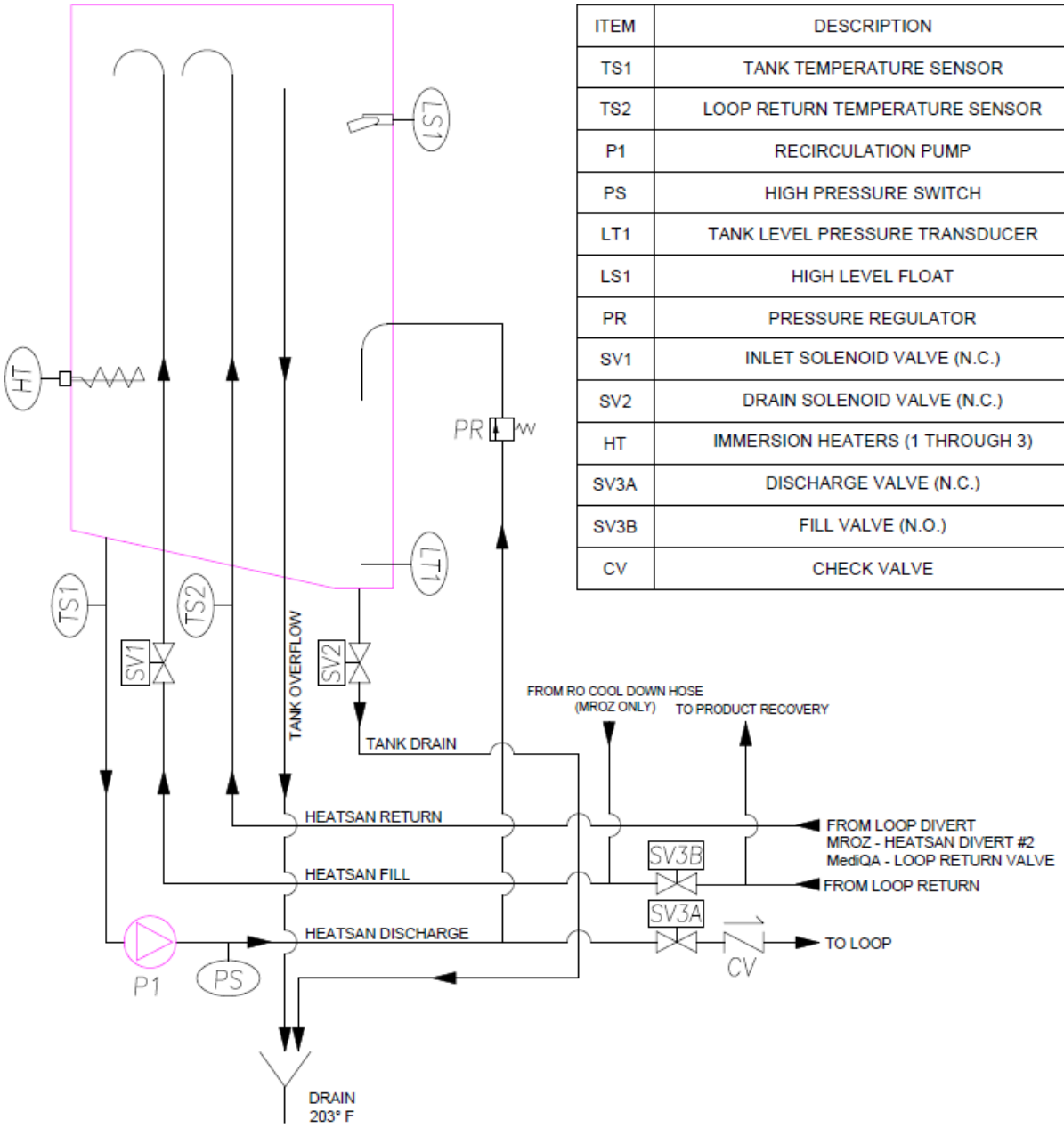
9.4 Calibration of Sensors

	Login at USER 5 level. The password will only be available to authorized personnel; contact AmeriWater if this level of access is required. Enter test screen **FACTORY SETUP PAGE 6** and select "***CALIBRATE***".
	Three sensor options are displayed. Identify the sensor to be calibrated. Adjust the "Offset " To check/adjust calibration of the temperature sensors the actual water temperature should be measured using an independent calibrated device. Adjust the Gain and Bias such that the sensors match the reading of the independent device.

10 APPENDIX
10.1 Disposal of Electrical Parts

Disposal of the unit or any electrical component from the unit must be in accordance with local requirements in your province or state for the disposal of electrical waste (E-Waste).

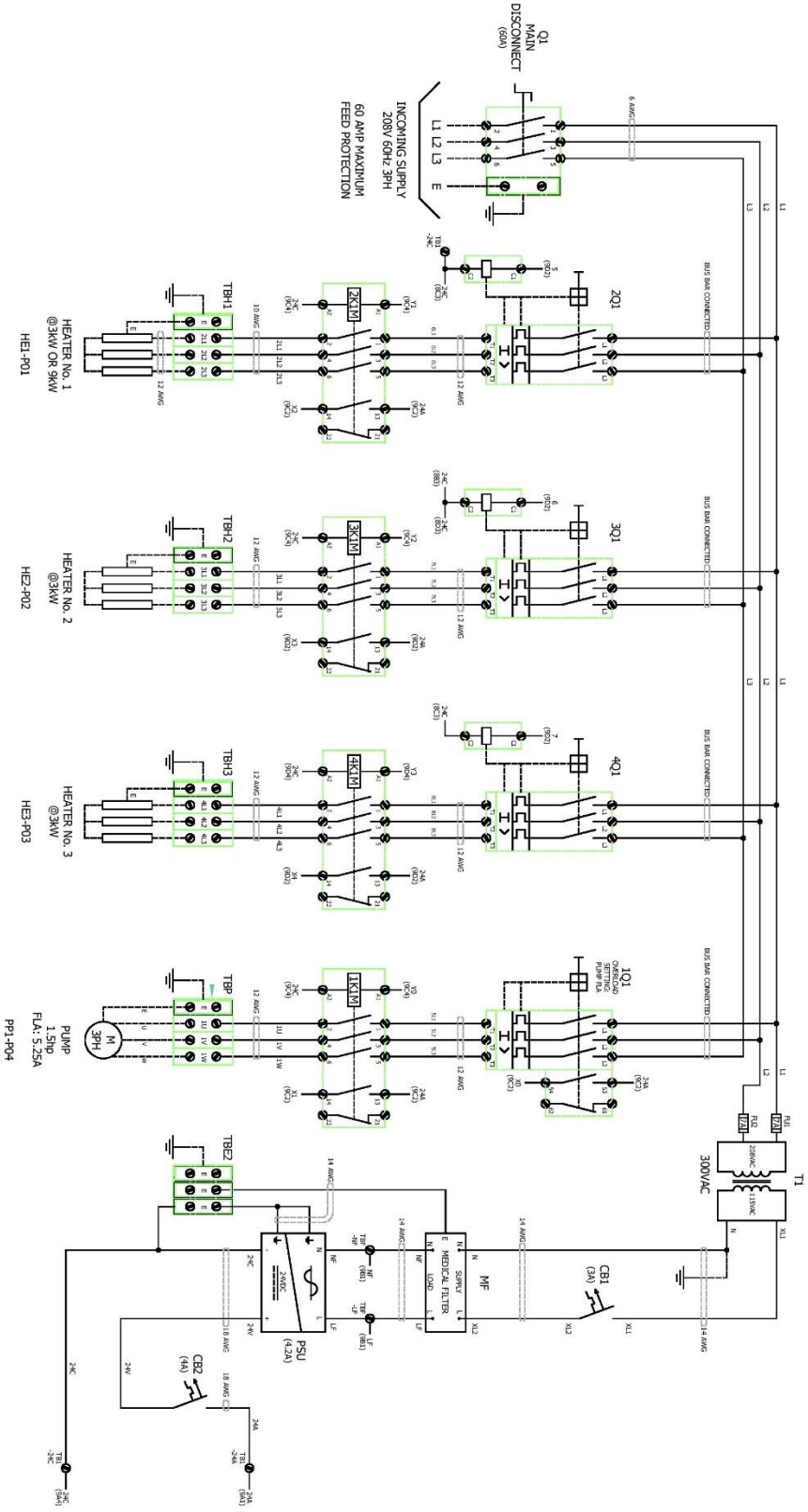
10.2 Heatsan Process Flow Diagram



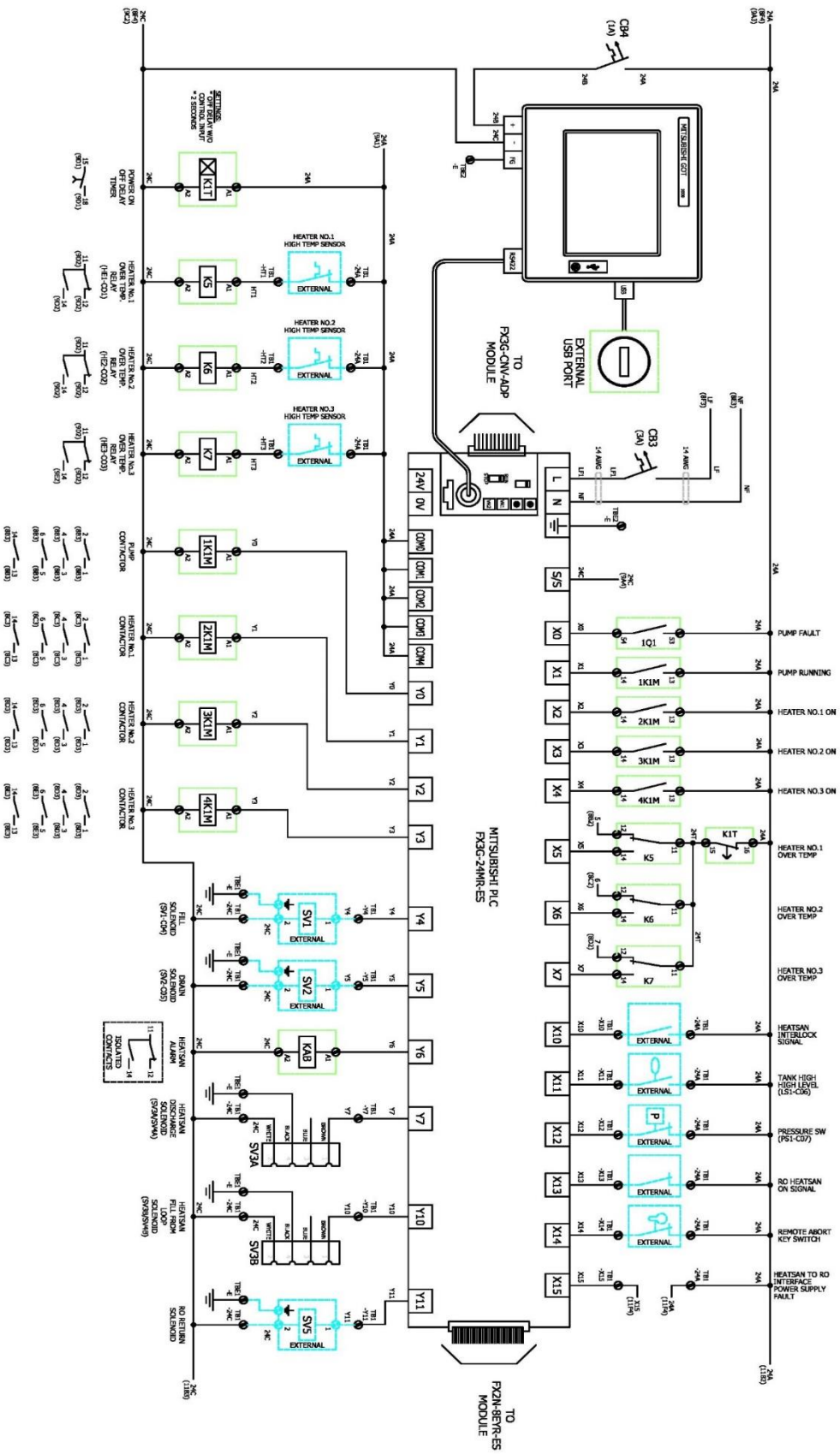
ITEM	DESCRIPTION
TS1	TANK TEMPERATURE SENSOR
TS2	LOOP RETURN TEMPERATURE SENSOR
P1	RECIRCULATION PUMP
PS	HIGH PRESSURE SWITCH
LT1	TANK LEVEL PRESSURE TRANSDUCER
LS1	HIGH LEVEL FLOAT
PR	PRESSURE REGULATOR
SV1	INLET SOLENOID VALVE (N.C.)
SV2	DRAIN SOLENOID VALVE (N.C.)
HT	IMMERSION HEATERS (1 THROUGH 3)
SV3A	DISCHARGE VALVE (N.C.)
SV3B	FILL VALVE (N.O.)
CV	CHECK VALVE

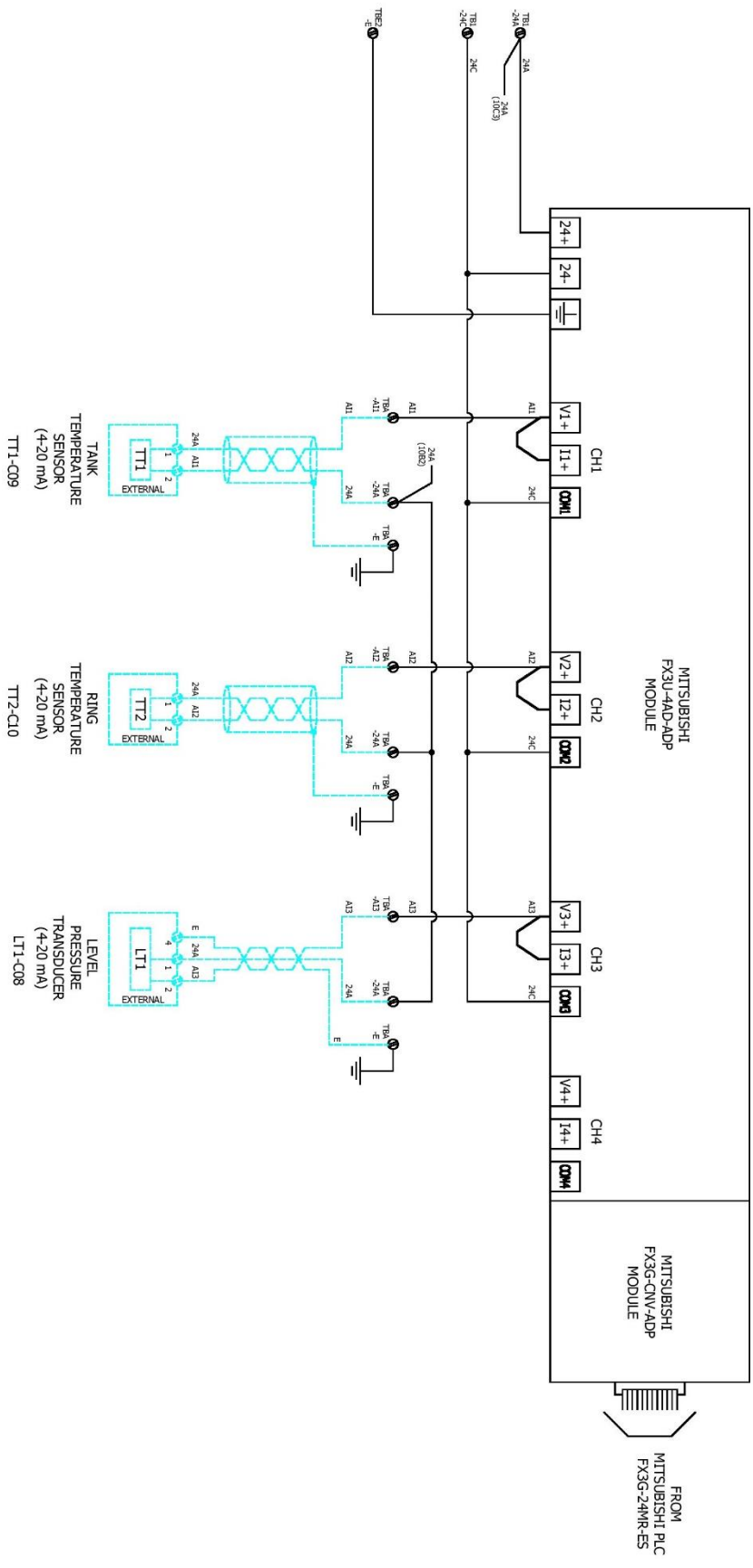
10.3 Wiring Diagrams

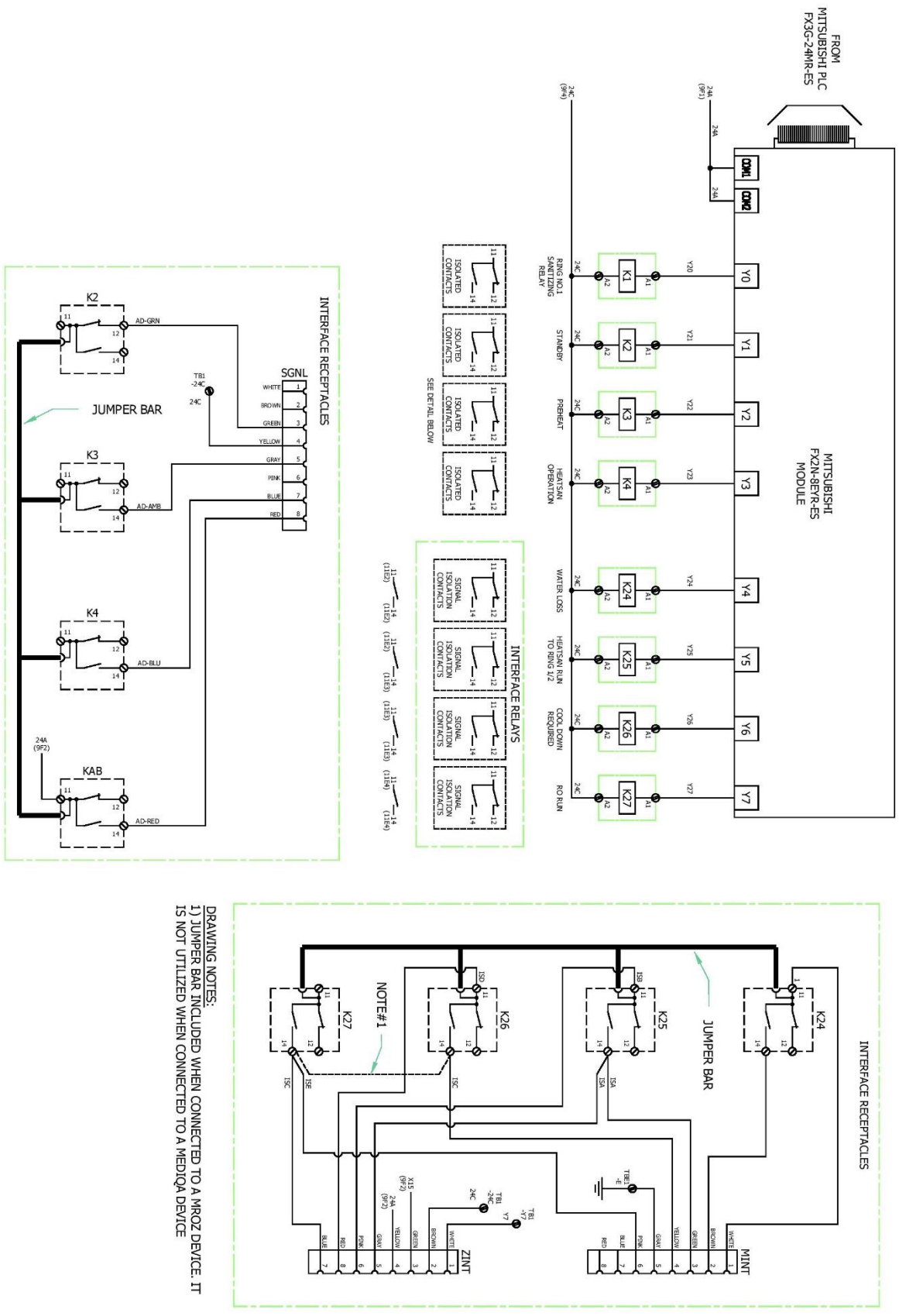
10.3.1 Electrical Schematic

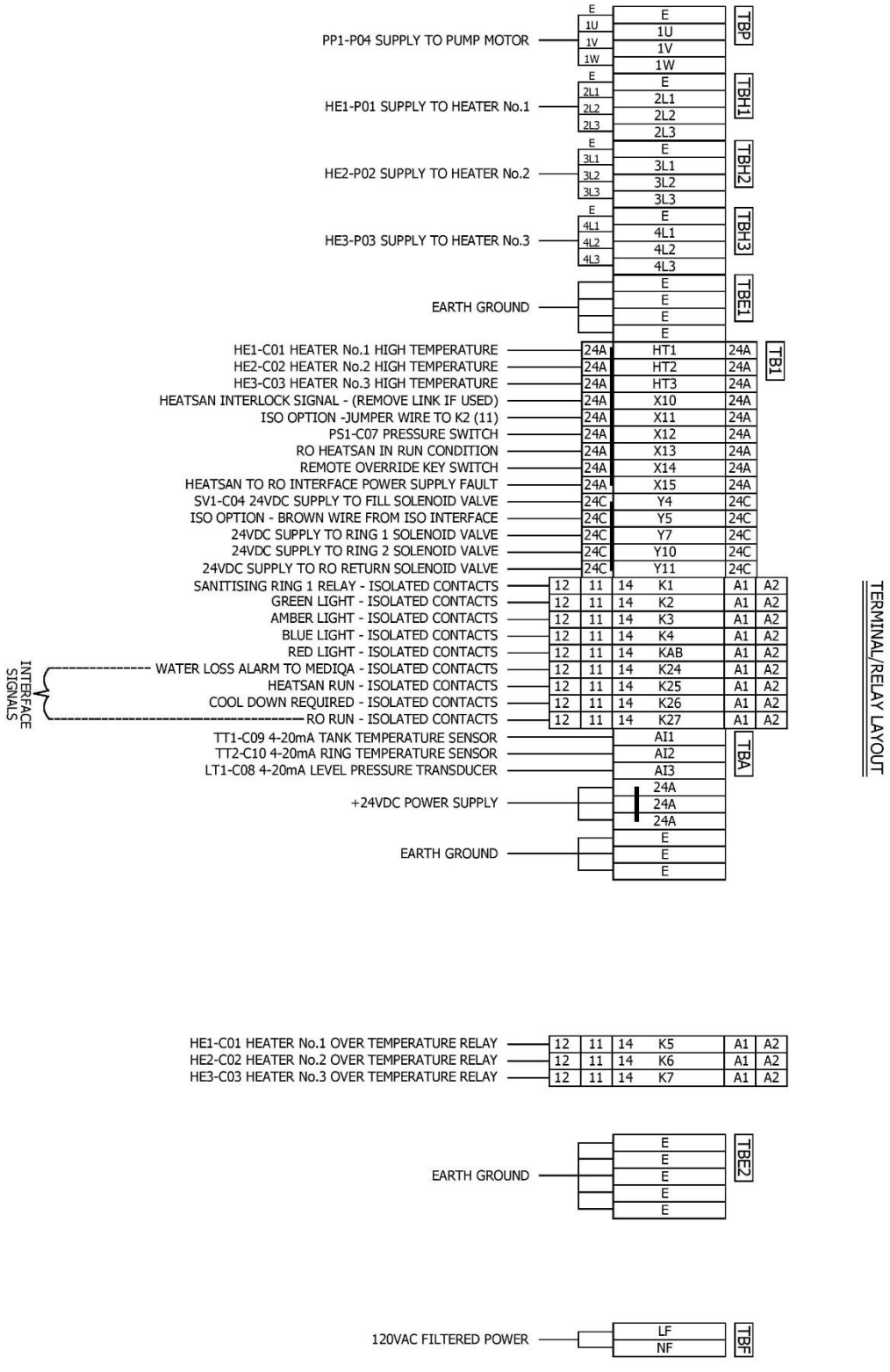


SETTINGS						
MODEL	VOLTAGE (V)	PUMP (AMPS)	HEATER 1 (AMPS)	HEATER 2 (AMPS)	HEATER 3 (AMPS)	FUSE 1 & 2 (AMPS)
00HS20809	208	5.25	8.3	8.3	8.3	7
00HS20815	208	5.25	27	8.3	8.3	7

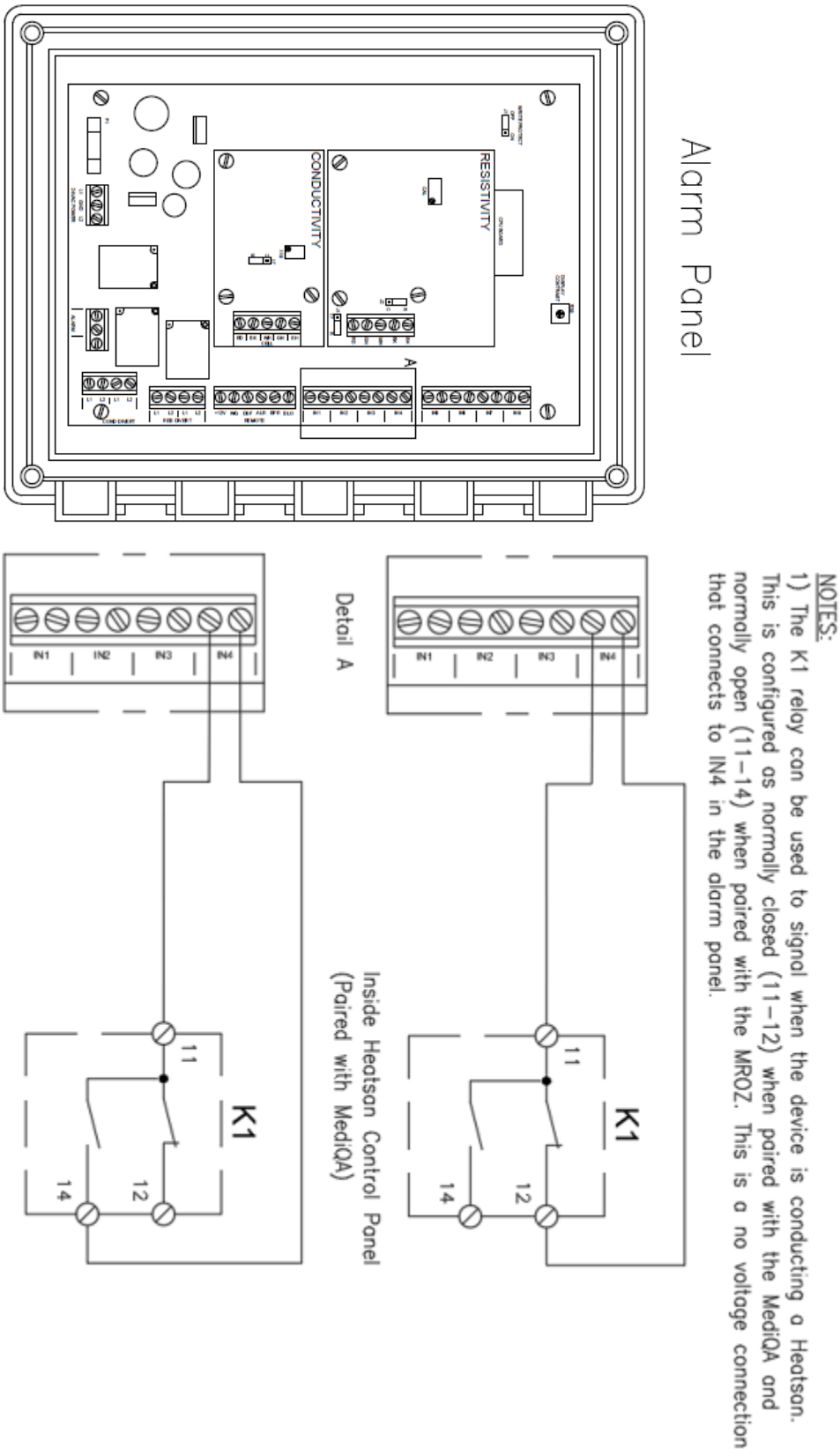

MITSUBISHI PLC
FX3G-24MR-ES
TO
FX3G-CNV-ADP
MODULE
EXTERNAL
USB PORT
TO
FX2N-8EYR-ES
MODULE
CB4
(1A)
CB3
(3A)
K1T
POWER ON
OFF DELAY
TIMER
HEATER NO.1
HIGH TEMP SENSOR
HEATER NO.2
HIGH TEMP SENSOR
HEATER NO.3
HIGH TEMP SENSOR
EXTERNAL
1K1M
PUMP
CONTACTOR
2K1M
HEATER NO.1
CONTACTOR
3K1M
HEATER NO.2
CONTACTOR
4K1M
HEATER NO.3
CONTACTOR
SV1
FILL
SOLENOID
(SV1-C04)
SV2
DRAIN
SOLENOID
(SV2-C05)
SV3A
HEATSAN
FEED
SOLENOID
(SV3A/SV4A)
SV3B
HEATSAN
RETURN
LOOP
SOLENOID
(SV3B/SV4B)
SV5
RO RETURN
SOLENOID
K4B
HEATSAN
ALARM
RELAY
ISOLATED
CONTACTS
PUMP FAULT
PUMP RUNNING
HEATER NO.1 ON
HEATER NO.2 ON
HEATER NO.3 ON
HEATER NO.1
OVER TEMP
HEATER NO.2
OVER TEMP
HEATER NO.3
OVER TEMP
HEATSAN
INTERLOCK
SIGNAL
TANK HIGH
HIGH LEVEL
(LS1-C06)
PRESSURE SW
(PS1-C07)
RO HEATSAN
ON SIGNAL
REMOTE ABORT
KEY SWITCH
HEATSAN TO RO
INTERFACE
POWER SUPPLY
FAULT


MITSUBISHI
FX3U-4AD-ADP
MODULE
MITSUBISHI
FX3G-CNV-ADP
MODULE
FROM
MITSUBISHI PLC
FX3G-24MR-ES
CH1
CH2
CH3
CH4
TANK
TEMPERATURE
SENSOR
(4-20 mA)
TT1-C09
RING
TEMPERATURE
SENSOR
(4-20 mA)
TT2-C10
LEVEL
PRESSURE
TRANSDUCER
(4-20 mA)
LT1-C08
EXTERNAL

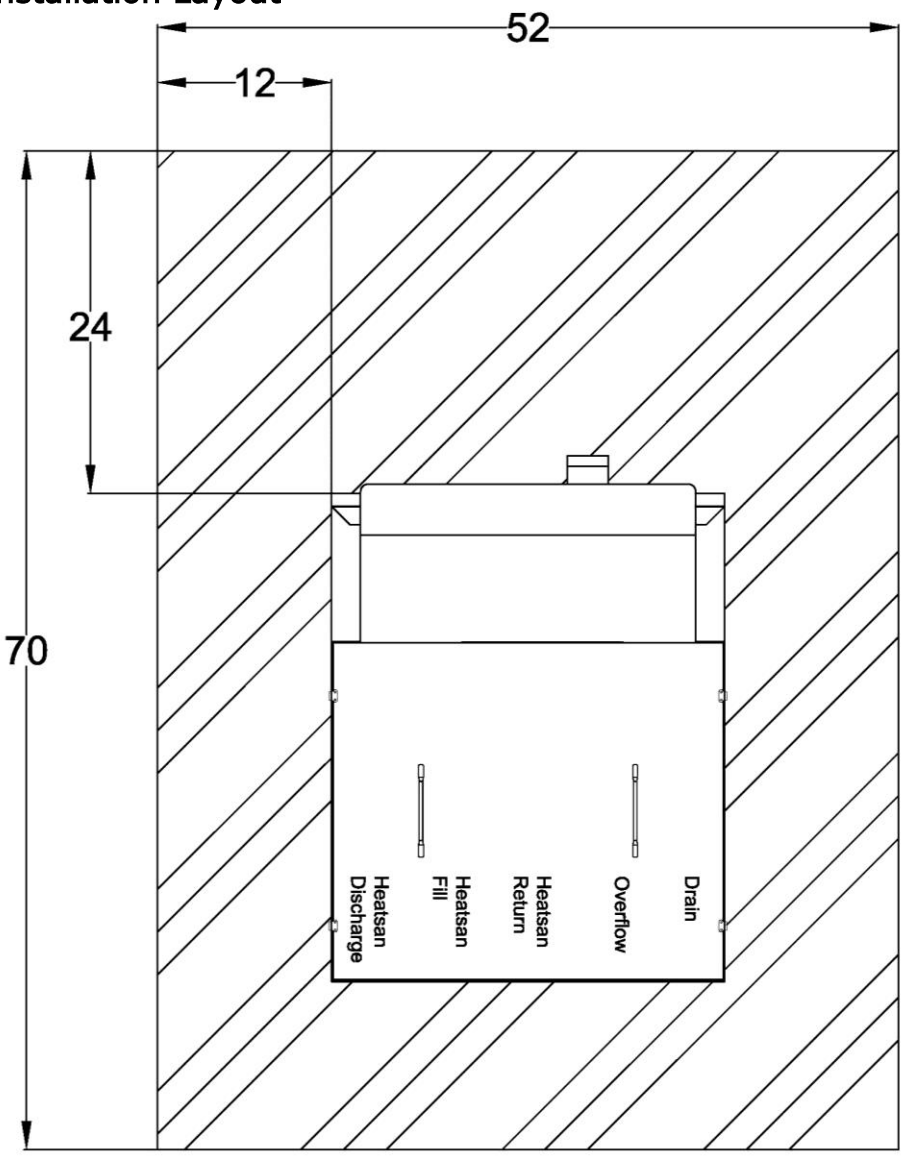

FROM MITSUBISHI PLC FX3G-24MR-ES
MITSUBISHI FX2N-8EYR-ES MODULE
COM1
COM2
Y0
Y1
Y2
Y3
Y4
Y5
Y6
Y7
K1
K2
K3
K4
K24
K25
K26
K27
RING NO.1 SANITIZING RELAY
STANDBY
PREHEAT
HEATSAN OPERATION
WATER LOSS
HEATSAN RUN TO RING 1/2
COOL DOWN REQUIRED
RO RUN
ISOLATED CONTACTS
SEE DETAIL BELOW
INTERFACE RELAYS
SIGNAL ISOLATION CONTACTS
INTERFACE RECEPTACLES
SGNL
WHITE
BROWN
GREEN
YELLOW
GRAY
PINK
BLUE
RED
JUMPER BAR
AD-GRN
AD-AMB
AD-BLU
AD-RED
KAB
TB1 -24C
24C
24A (9F2)
NOTE#1
ZINT
MINT
TB1 -E
TB1 Y7
X15 (9F2)
DRAWING NOTES:
1) JUMPER BAR INCLUDED WHEN CONNECTED TO A MROZ DEVICE. IT IS NOT UTILIZED WHEN CONNECTED TO A MEDIQA DEVICE


TERMINAL/RELAY LAYOUT
INTERFACE SIGNALS
PP1-P04 SUPPLY TO PUMP MOTOR
HE1-P01 SUPPLY TO HEATER No.1
HE2-P02 SUPPLY TO HEATER No.2
HE3-P03 SUPPLY TO HEATER No.3
EARTH GROUND
HE1-C01 HEATER No.1 HIGH TEMPERATURE
HE2-C02 HEATER No.2 HIGH TEMPERATURE
HE3-C03 HEATER No.3 HIGH TEMPERATURE
HEATSAN INTERLOCK SIGNAL - (REMOVE LINK IF USED)
ISO OPTION -JUMPER WIRE TO K2 (11)
PS1-C07 PRESSURE SWITCH
RO HEATSAN IN RUN CONDITION
REMOTE OVERRIDE KEY SWITCH
HEATSAN TO RO INTERFACE POWER SUPPLY FAULT
SV1-C04 24VDC SUPPLY TO FILL SOLENOID VALVE
ISO OPTION - BROWN WIRE FROM ISO INTERFACE
24VDC SUPPLY TO RING 1 SOLENOID VALVE
24VDC SUPPLY TO RING 2 SOLENOID VALVE
24VDC SUPPLY TO RO RETURN SOLENOID VALVE
SANITISING RING 1 RELAY - ISOLATED CONTACTS
GREEN LIGHT - ISOLATED CONTACTS
AMBER LIGHT - ISOLATED CONTACTS
BLUE LIGHT - ISOLATED CONTACTS
RED LIGHT - ISOLATED CONTACTS
WATER LOSS ALARM TO MEDIQA - ISOLATED CONTACTS
HEATSAN RUN - ISOLATED CONTACTS
COOL DOWN REQUIRED - ISOLATED CONTACTS
RO RUN - ISOLATED CONTACTS
TT1-C09 4-20mA TANK TEMPERATURE SENSOR
TT2-C10 4-20mA RING TEMPERATURE SENSOR
LT1-C08 4-20mA LEVEL PRESSURE TRANSDUCER
+24VDC POWER SUPPLY
EARTH GROUND
TBP
TBH1
TBH2
TBH3
TBE1
TB1
TBA
HE1-C01 HEATER No.1 OVER TEMPERATURE RELAY
HE2-C02 HEATER No.2 OVER TEMPERATURE RELAY
HE3-C03 HEATER No.3 OVER TEMPERATURE RELAY
EARTH GROUND
TBE2
120VAC FILTERED POWER
TBF

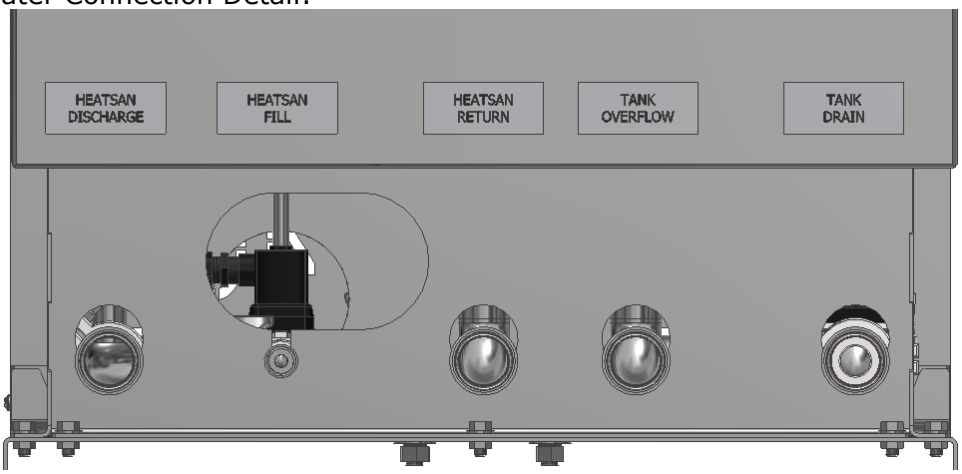
10.3.2 Alarm Panel



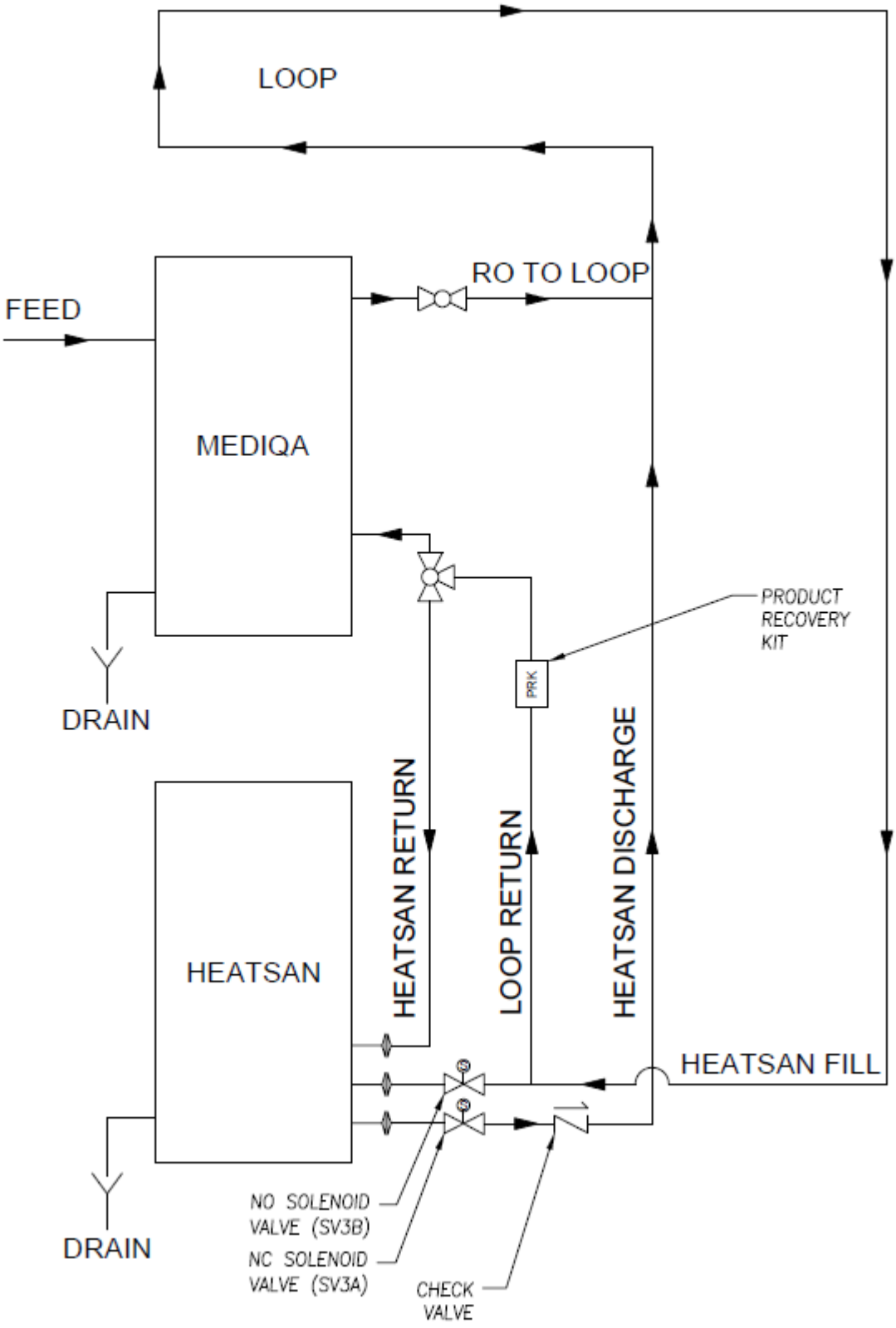
10.4 Installation Layout

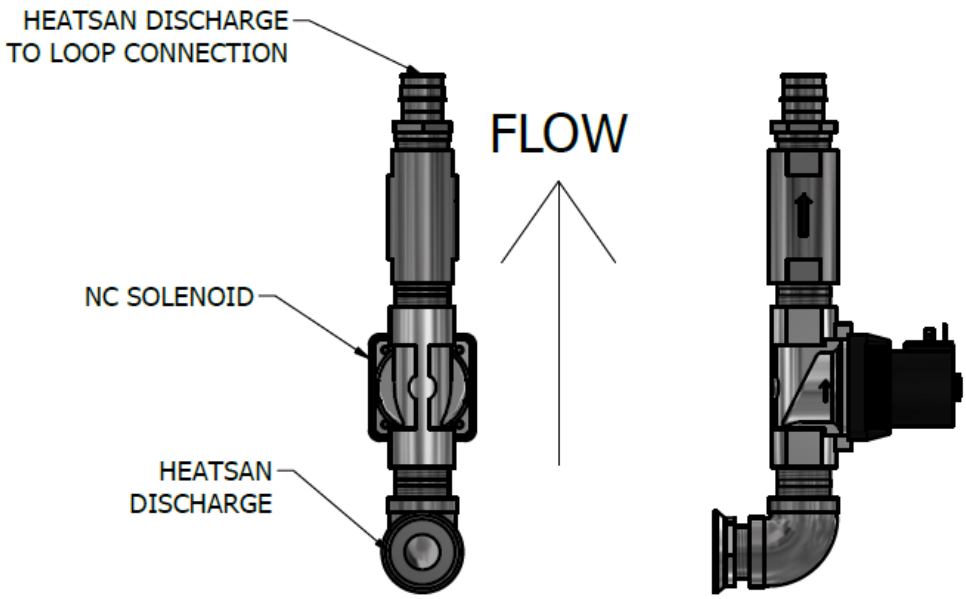


Water Connection Detail:

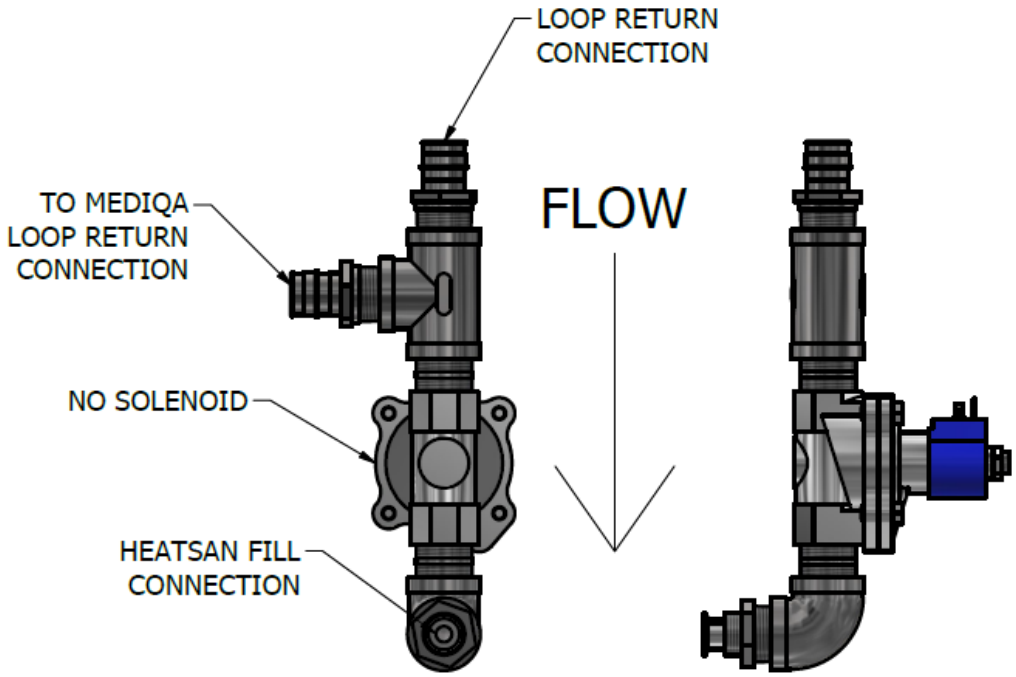


10.5 MediQA to Heatsan Interface





Heatsan Discharge Solenoid SV3A (NC)

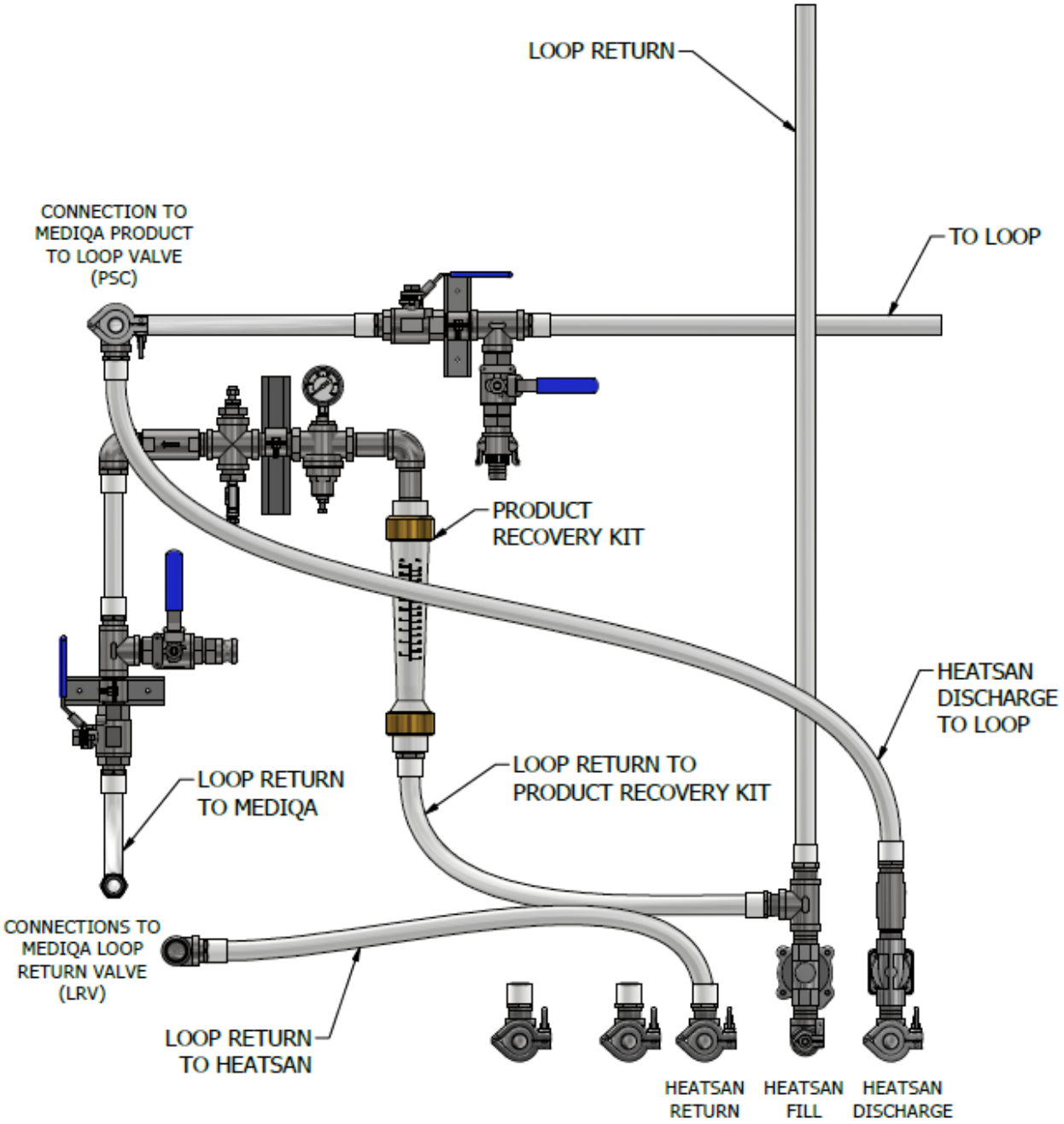


Heatsan Fill Solenoid SV3B (NO)

Connect the Loop Return to Heatsan port on the MediQA to the Loop Return on the Heatsan.

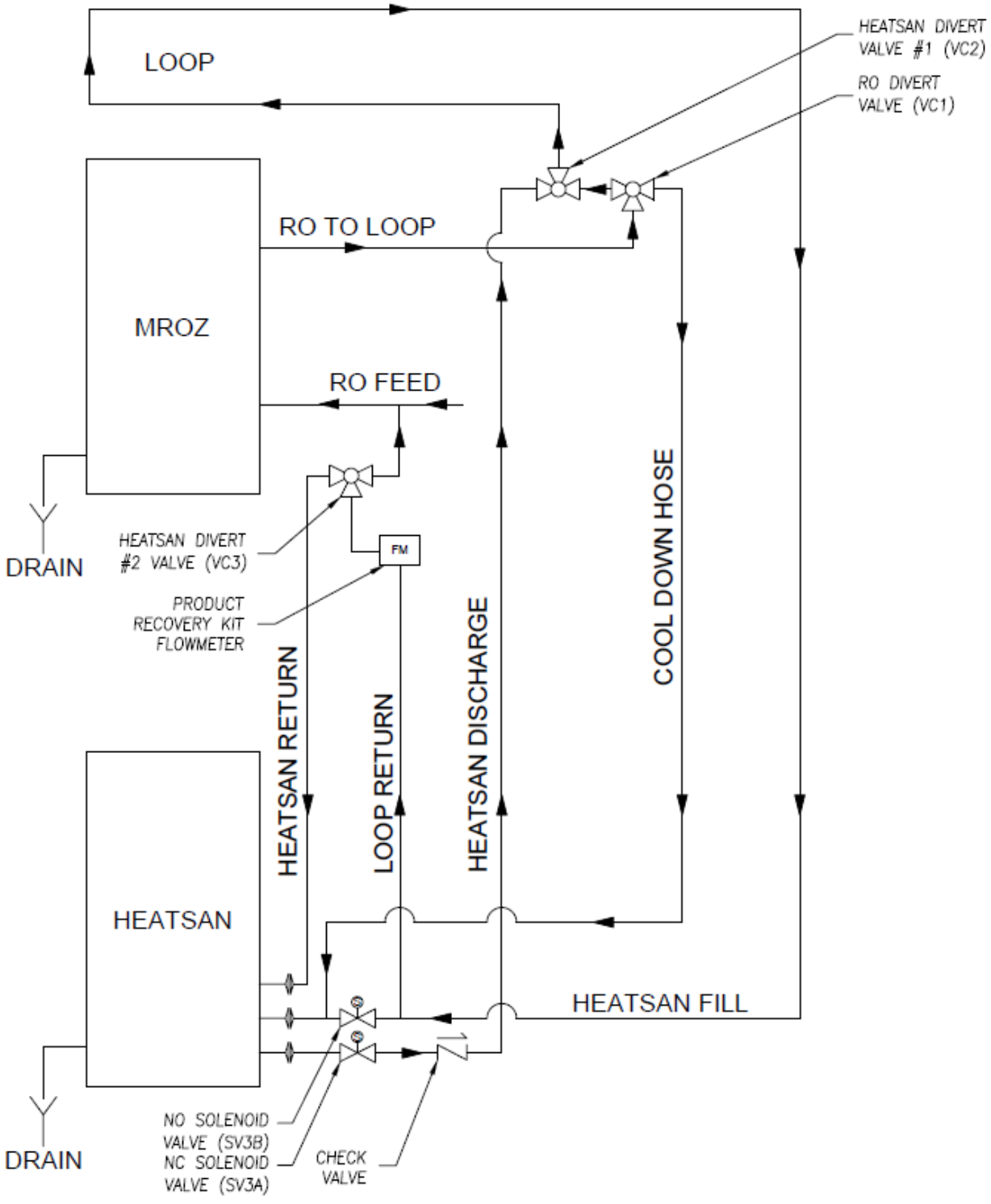
Connect the straight end of the cable labelled as “MINT” to “MINT” on the Heatsan control panel. Connect the 90° end of the “MINT” cable to the “MINT” connection made on the MediQA.

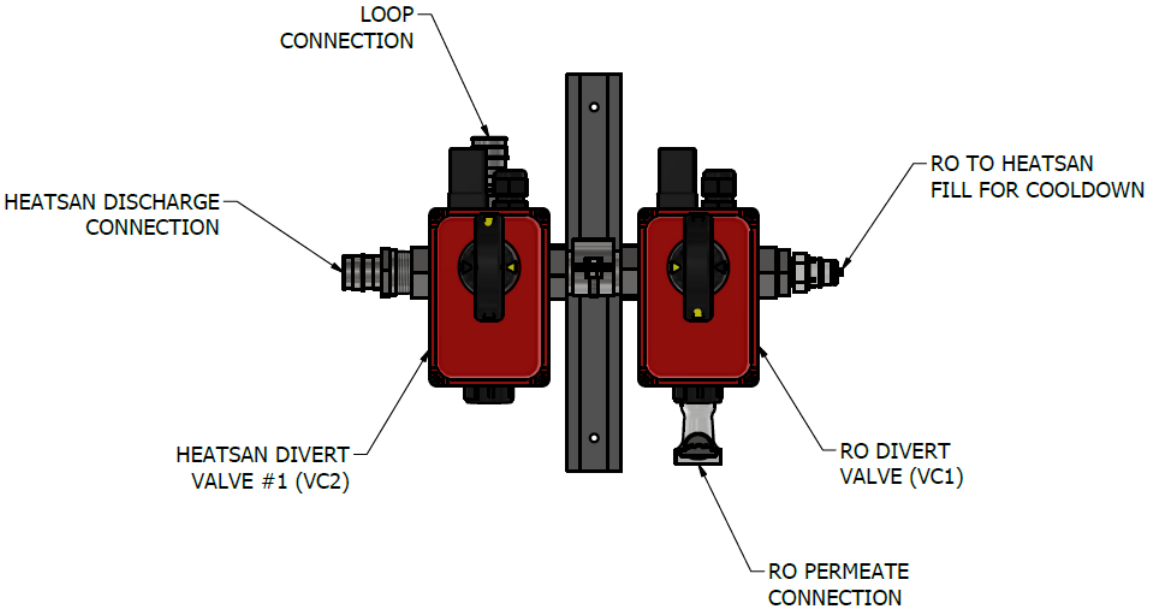
The remaining 2 sanitary connections are for the Heatsan drain and overflow connections.



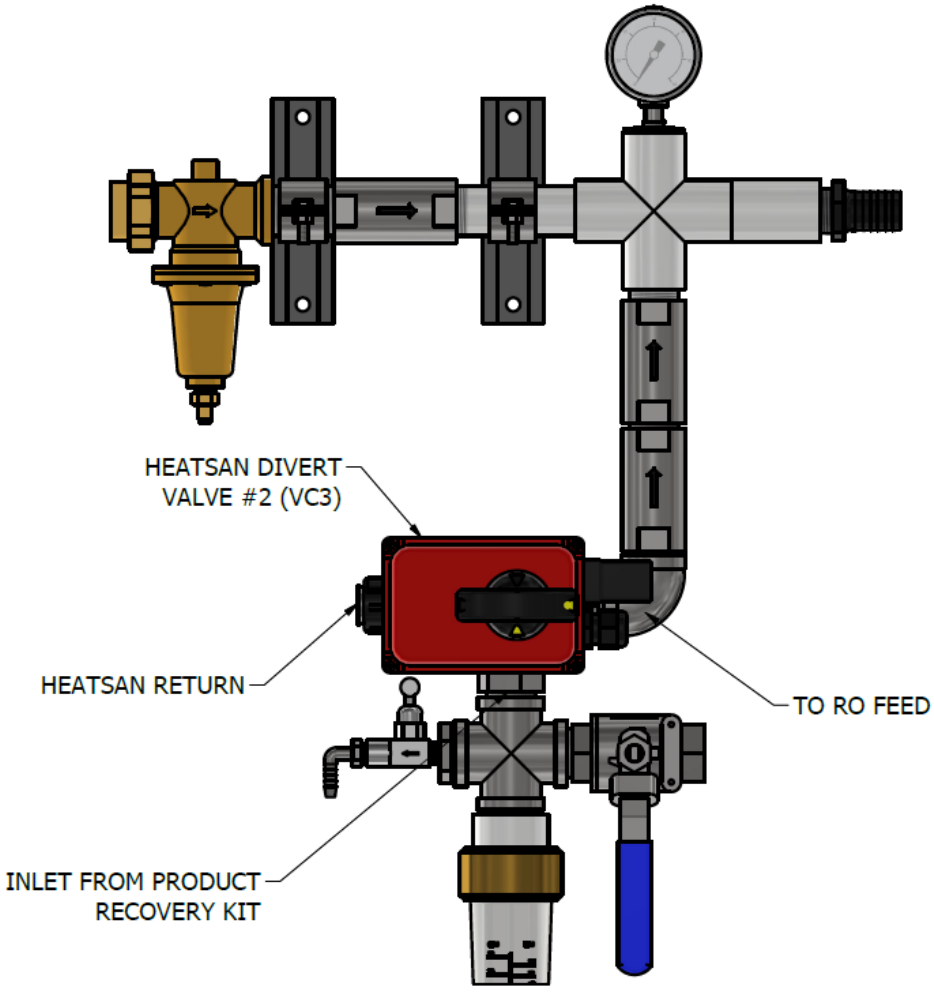
Tubing with Heatsan and MediQA Hidden

10.6 MROZ to Heatsan Interface

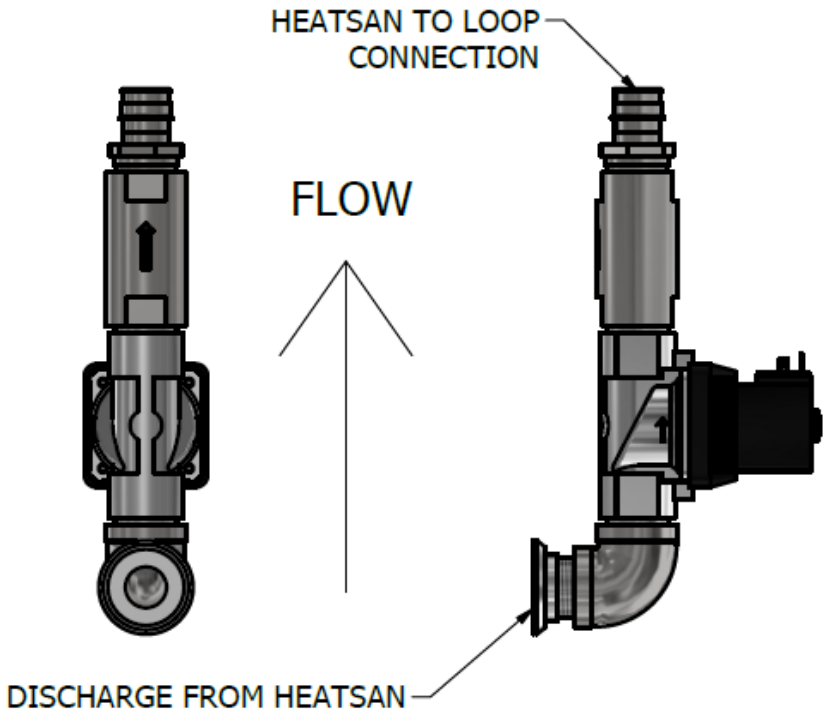




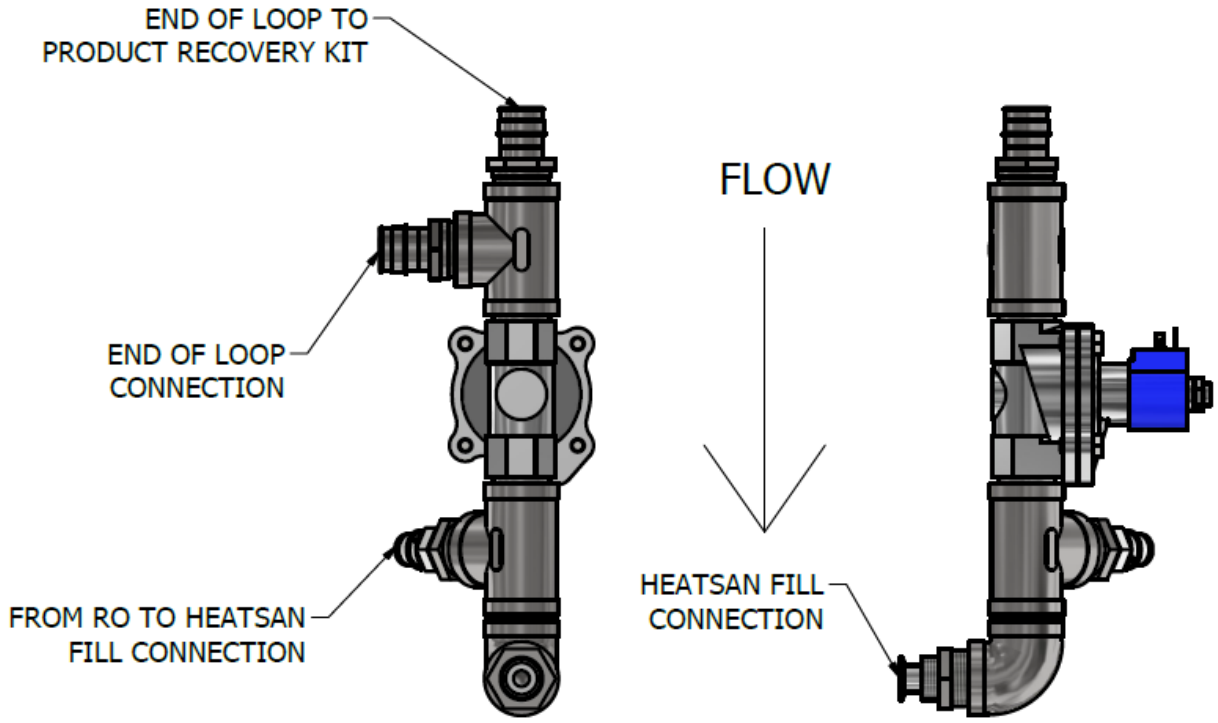
RO Divert Valve and Heatsan Divert Valve #1



Heatsan Divert Valve #2



Heatsan Discharge Solenoid SV3A (NC)



Heatsan Fill Solenoid SV3B (NO)

The remaining sanitary connections are for the drain and overflow connections.

Mount the interface box between the MROZ and Heatsan close to the control valves. Ensure that the cables for the valves will be able to reach the interface box (25’ maximum cable length).

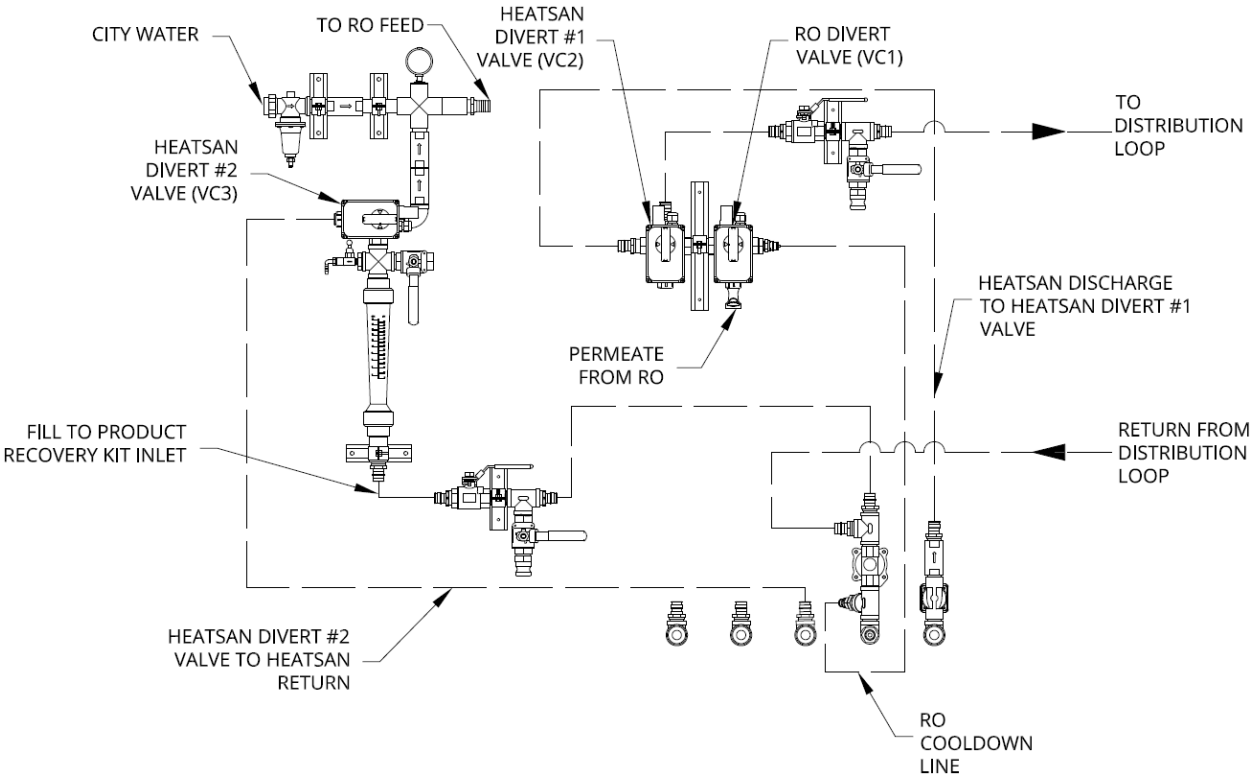
Connect the cables to the following connectors: VC1 (RO Divert Valve) to VC1, VC2 (Heatsan Divert Valve #1) to VC2 and VC3 (Heatsan Divert Valve #2) to VC3.

Run cable ICZ to the control panel interface connector ICZ. Terminate the flying leads into the MROZ side entry hood at the tank full high (terminals 1 & 6) and tank full low (terminals 2 & 7). Conductor 1 to terminal 1, conductor 2 to terminal 6, conductor 3 to terminal 2, and conductor 4 to terminal 7.

Run cable ZINT from the Heatsan connector ZINT to the interface box ZINT connector.

Plug the interface box in to an 115V outlet.

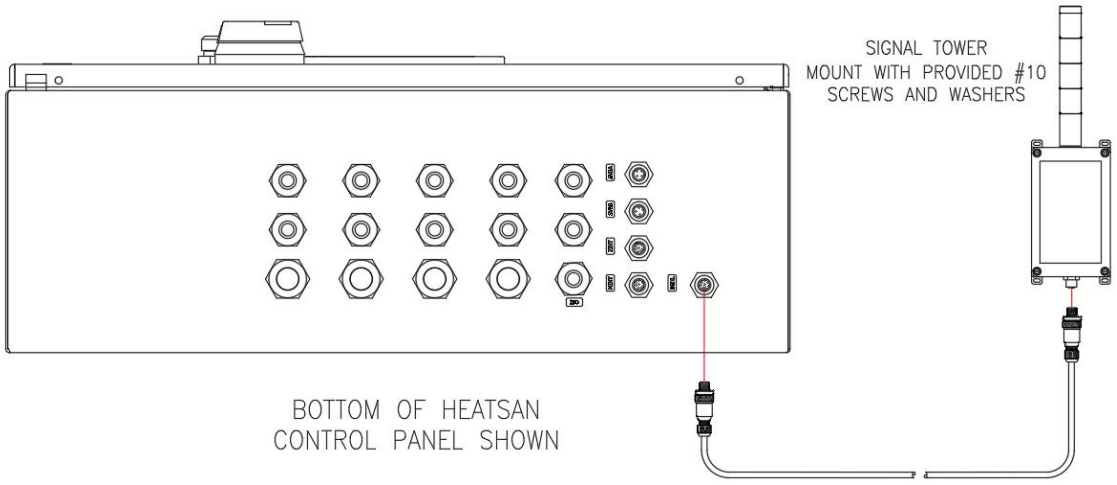
Mount the final bypass header as close to the product recovery kit as possible.



Tubing with Heatsan and MROZ Hidden

NOTE: PEX tubing, and cooldown hose represented by dashed lines

10.7 Optional Signal Tower Installation



Mount enclosure on wall with provided screws and washers.

Connect male connector to connector labeled SGNL on the bottom side of the enclosure.

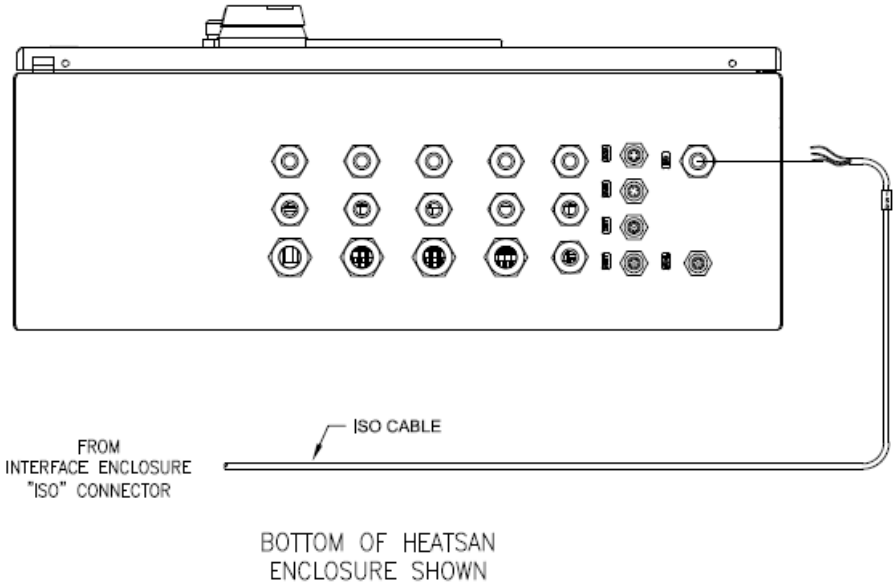
Route cable to Heatsan control panel.

Connect other male connector on cable to connector labeled SGNL on the bottom side of the control panel, as shown in figure above.

10.8 Optional Heatsan Valve Isolation Interface Kit

The Heatsan Valve Isolation Interface Kit is used with the Heatsan to isolate any external equipment that is connected to the loop. There are 4 valves that can be installed in the plumbing to send loop flow to equipment such as Bicarb Mixers, Acid Mixers, or wash out sinks requiring RO water. The valves will close when the Heatsan needs to take control of the loop and send hot water into the loop for disinfection. By stopping the flow of hot water to external equipment, several issues can be prevented. If the equipment is operated while hot water is in the loop, damage can occur to the external equipment not rated for high heat operations. Removes the risk to personnel if they come into contact with equipment that might dispense hot water. Prevents causing an error on the Heatsan for water loss and aborting a cycle before proper disinfection has occurred.

The side of the ISO cable with flying leads needs to be wired into the Heatsan Control Panel according to the drawing shown below. Verify the Disconnect that feeds power to Heatsan unit is turned off. Route the ISO cable to entryway in control panel labelled “ISO”. Route cabling away from known high heat sources. Cover any wires not connected inside the panel with electrical tape and store in the panel.



WIRE COLOR	CONNECTION
WHITE	HEATSAN RELAY K2 (14)
BROWN	HEATSAN TERMINAL BLOCK 24C
GREEN	NOT USED
YELLOW	NOT USED
BLACK	NOT USED
ORANGE	NOT USED
BLUE	NOT USED
RED	NOT USED

If you have purchased the Heatsan Valve Isolation Interface kit reference manual 98-2025 for installation steps and more information.

10.9 Diagnostic Guide

The Heatsan has a Diagnostic Guide, 098-0009, to consult for troubleshooting assistance. The contents of the diagnostic guide include, but is not limited to:

- Component Identification
- Flow Schematics for each mode of operation
- PLC Input and Output Identification
- Valve Positions in each mode of operation
- Alarm Checks and Proposed Actions
- Electrical & Mechanical Faults
- Component Failures
- Instruction for Use (IFU) on the following topics:
    - Updating PLC or HMI Software
    - Disinfecting the Cool Down Hose (on old units)

⚠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.