

Section II

APPENDIX



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8.0 Appendix

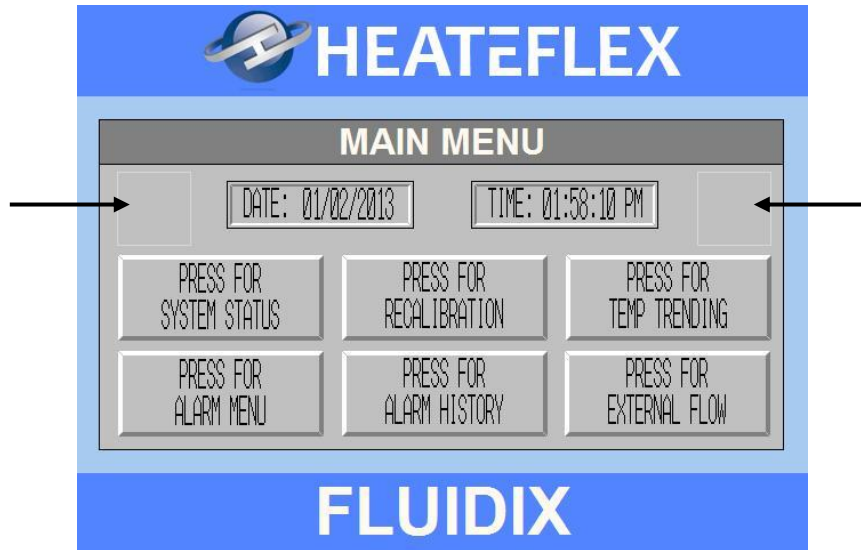
8.1 Important Touch Screen Notes

1. Main Menu screen is loaded onto the display upon power up of the unit.
2. The “operational password” needs to be entered to operate/run the unit.
3. The “administrative password” needs to be entered to change temperature control parameters or alarm set points or alarm delays.
4. Upon initial power up, the “ALARM RESET” button needs to be pressed prior to the operation of the unit.
5. All screens have keys for direct access back to the System Status and Main Menu screens.
6. Any alarm condition will automatically illuminate the “ALARM MENU” button.
7. The active alarm conditions will be illuminated on the Alarm Menu screen.
8. The Read Only Parameters screen is ONLY accessible with a special password provided by Heateflex Corporation at its discretion.

Note: All default parameters can be found in Section 8.3.2: Fluidix PC Factory Default Parameters and in the Appendix Section 8.6 Parameter Log.

8.2 Touch Screen Displays

8.2.1 Main Menu

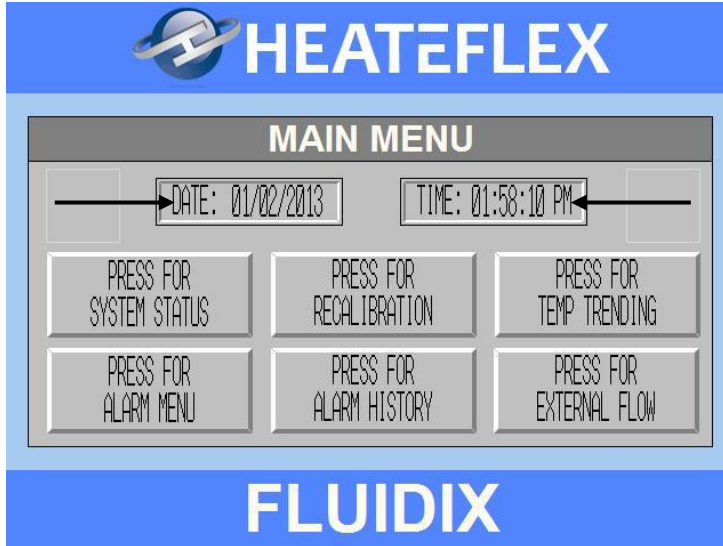


- **Operational Password:** The operational password is entered by simultaneously pressing the two areas shown above which is illustrated by the arrows. Enabling this password will allow access to operate the Auto-Isolation System and valves, the Auto Shutdown System or steam supply valve, and the Actuator Controls. See Section 3.2 Touch Screen Display and Section 3.2.1 Main Menu for more information.
- **Administrative Password:** The administrative password is required to change any parameter or set point on the touchscreen. The administrative password is entered by pressing the box of the desired parameter or set point to be changed, i.e. D.I. Temperature Set Point. This password will remain active for 5 minutes at which time any parameter or set point can be changed and then reset. The factory default for the administrative password is **HOT**.

Please note that the password system is case sensitive.

- **Note:** The "ALARM RESET" button must be pressed prior to the initial operation of the unit or after the unit has been shut off and restarted.
- **Date/Time Set Up:** To adjust the date or time, press the area where the date and time is located. The Date/Time Set Up is detailed in Section 8.2.2.

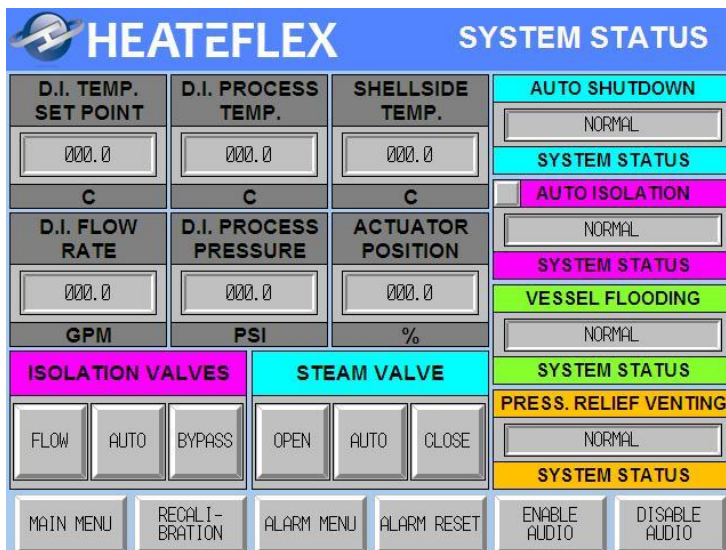
8.2.2 Date/Time Set Up



- **Date:** To adjust/change the date press the date box and enter the date in the following format: year, month, day (xxxx.xx.xx).
- **Time:** To adjust/change the time press the time box and enter the time in the following format: hour, minute, sec (xx.xx.xx). Please note that the hour is based on a military time format, i.e. for 1:00 P.M. enter 13.

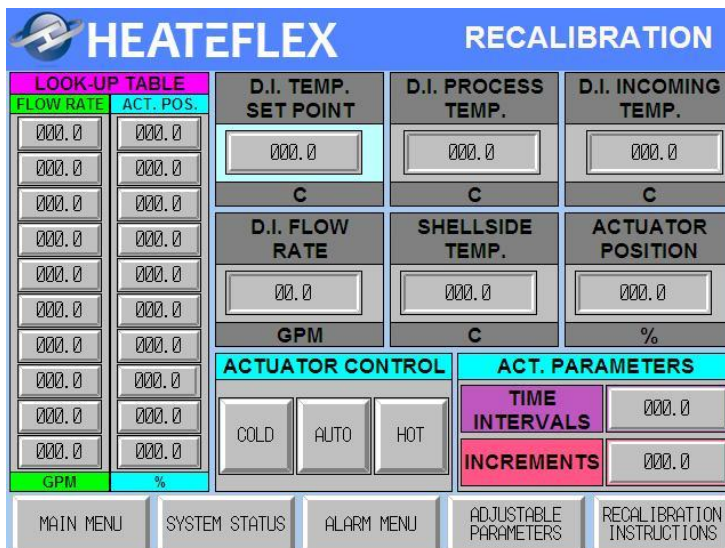
Note: An “administrative password” is required in order to change the date or the time.

8.2.3 System Status



- See Section 3.2.2 for more information on the System Status Screen.
- **Auto Isolation System:** See Section 4.4 Auto Isolation System.
- **Auto Shutdown System:** See Section 4.2 Shellside (steam) Safety Mechanisms.
- **Audio Alarm:** To enable/disable the Audio Alarm press the “ENABLE AUDIO” or “DISABLE AUDIO” buttons respectively.
- **Note:** The “ALARM RESET” button must be pressed prior to the initial operation of the unit or after the unit has been shut off.

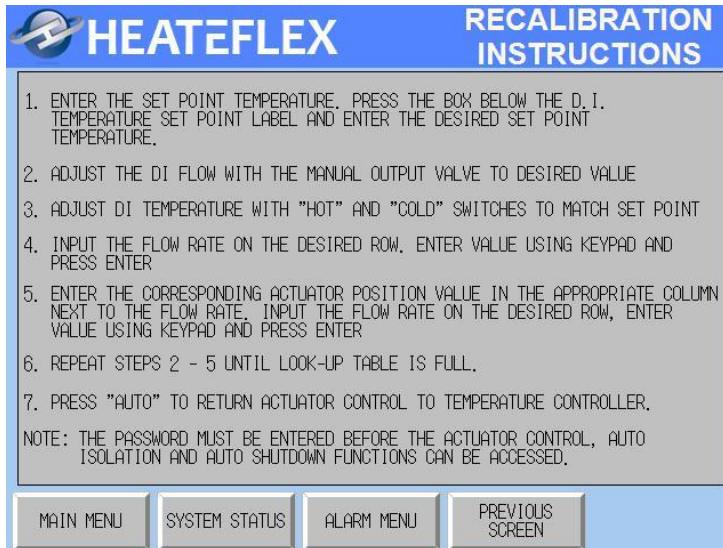
8.2.4 Recalibration



- **D.I. Temperature Set Point:** Press the box under “D.I. Temperature Set Point” to enter the desired temperature set point. An “administrative password” is required.
- **Actuator Control:** The actuator can be manually operated to open or close the valves as desired. The “operational password” detailed in Section 8.2.1 needs to be enabled in order to operate or change the Actuator Control System. Please note that the “AUTO” button must be pressed (“Auto enabled”) in order to switch the control of the actuator to the PLC for temperature control.
- **“Time Intervals”:** This parameter allows the temperature to stabilize after a move of the actuator. To adjust the value, press the box to the right of “Time Intervals”. An “administrative password” is required in order to change this parameter. The Factory Default value for “Time Intervals” is 7 seconds. See Section 3.1.1 Temperature Control Specifics for more information.
- **“Actuator Increments”:** To adjust the value, press the boxes to the right of “Actuator Increments”. This parameter controls the incremental change of the actuator. An “administrative password” is required in order to change this parameter. The Factory Default value for “Actuator Increments” is 1. See Section 3.1.1 Temperature Control Specifics for more information.
- **Look Up Table:** The Look Up Table can be modified by pressing the areas underneath “Flow Rate” and “Act. Pos.” (Actuator Position). For more information on Recalibration press the “Recalibration Instructions” button or see Section 3.2.3 Recalibration Look-Up Table for instructions on calibrating the Look-Up Table.
- The factory default values for the Look-Up Table can be found on the Quality Control Documentation, Section 8.3.2 Factory Default Parameters. Note: that the factory default values are based upon conditions from the factory and may need to be changed with respect to the actual customer factory conditions.

- Factory Adjustable Parameters Menu: The Factory Adjustable Parameters Menu can be accessed by pressing the “ADJUSTABLE PARAMETERS” button. This screen allows access to the Factory Adjustable Parameters screen and the Temperature Dead Band screen (a “special” password is required).

A. Recalibration Instructions



HEATEFLEX RECALIBRATION INSTRUCTIONS

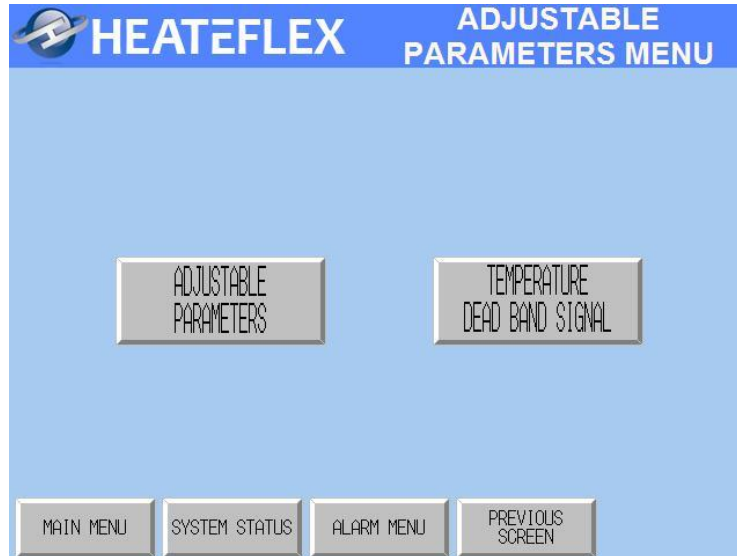
1. ENTER THE SET POINT TEMPERATURE. PRESS THE BOX BELOW THE D.I. TEMPERATURE SET POINT LABEL AND ENTER THE DESIRED SET POINT TEMPERATURE.
2. ADJUST THE DI FLOW WITH THE MANUAL OUTPUT VALVE TO DESIRED VALUE
3. ADJUST DI TEMPERATURE WITH "HOT" AND "COLD" SWITCHES TO MATCH SET POINT
4. INPUT THE FLOW RATE ON THE DESIRED ROW. ENTER VALUE USING KEYPAD AND PRESS ENTER
5. ENTER THE CORRESPONDING ACTUATOR POSITION VALUE IN THE APPROPRIATE COLUMN NEXT TO THE FLOW RATE. INPUT THE FLOW RATE ON THE DESIRED ROW, ENTER VALUE USING KEYPAD AND PRESS ENTER
6. REPEAT STEPS 2 - 5 UNTIL LOOK-UP TABLE IS FULL.
7. PRESS "AUTO" TO RETURN ACTUATOR CONTROL TO TEMPERATURE CONTROLLER.

NOTE: THE PASSWORD MUST BE ENTERED BEFORE THE ACTUATOR CONTROL, AUTO ISOLATION AND AUTO SHUTDOWN FUNCTIONS CAN BE ACCESSED.

MAIN MENU SYSTEM STATUS ALARM MENU PREVIOUS SCREEN

- For more information see Section 3.2.3 Recalibrate Look-Up Table and Section 8.2.4.A for “Recalibration Instructions”.

B. Factory Adjustable Menu



- The Factory Adjustable Parameters screen can be accessed by pressing the “FACTORY ADJUSTABLE PARAMETERS” button.
- The Temperature Dead Band screen can be accessed by pressing the “TEMPERATURE DEAD BAND SIGNAL” button (a “special” password is required).

C. Factory Adjustable Parameters

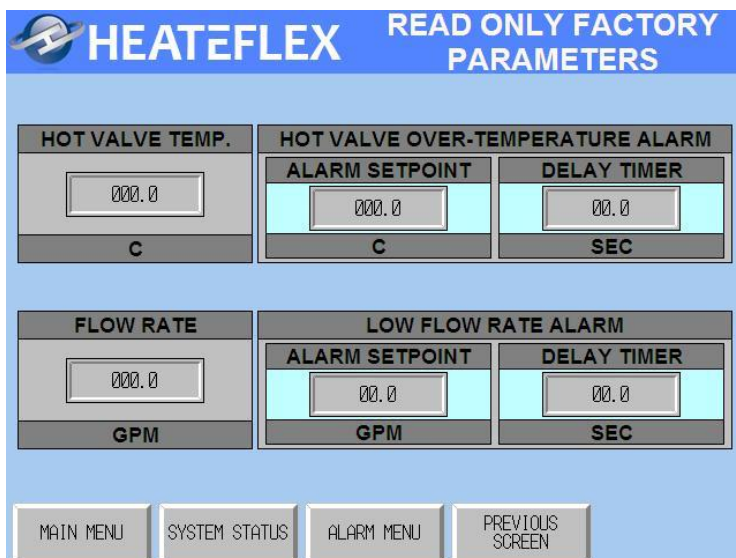
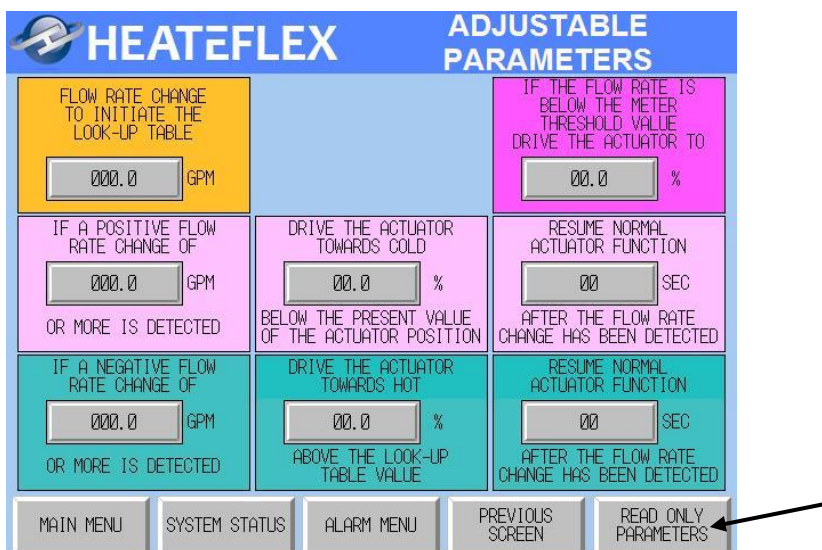
HEATEFLEX			ADJUSTABLE PARAMETERS		
FLOW RATE CHANGE TO INITIATE THE LOOK-UP TABLE <input type="text" value="000.0"/> GPM					IF THE FLOW RATE IS BELOW THE METER THRESHOLD VALUE DRIVE THE ACTUATOR TO <input type="text" value="00.0"/> %
IF A POSITIVE FLOW RATE CHANGE OF <input type="text" value="000.0"/> GPM OR MORE IS DETECTED	DRIVE THE ACTUATOR TOWARDS COLD <input type="text" value="00.0"/> % BELOW THE PRESENT VALUE OF THE ACTUATOR POSITION				RESUME NORMAL ACTUATOR FUNCTION <input type="text" value="00"/> SEC AFTER THE FLOW RATE CHANGE HAS BEEN DETECTED
IF A NEGATIVE FLOW RATE CHANGE OF <input type="text" value="000.0"/> GPM OR MORE IS DETECTED	DRIVE THE ACTUATOR TOWARDS HOT <input type="text" value="00.0"/> % ABOVE THE LOOK-UP TABLE VALUE				RESUME NORMAL ACTUATOR FUNCTION <input type="text" value="00"/> SEC AFTER THE FLOW RATE CHANGE HAS BEEN DETECTED
MAIN MENU	SYSTEM STATUS	ALARM MENU	PREVIOUS SCREEN	READ ONLY PARAMETERS	

- **NOTE:** Changing the values in the “Factory Adjustable Parameters” screen may affect the temperature control of the system.
- **“Flow Rate Change to Initiate Look-Up Table”:**
This is a programmable “Change in the Flow Rate Value”, which is used to control the process temperature. Once the system detects a change in flow rate, for example greater than 1 gpm, the Look-Up Table will be initiated. The Factory Default value is 1 gpm.
- For positive flow rate changes, the following three parameters are related:
 - **“If A Positive Flow Rate Change of XXX.X GPM or More is Detected”:**
This is also another programmable “Change in the Flow Rate Value”, which will drive the actuator to a certain percentage considering that the flow rate change detected is positive and greater or equal to the specified value. The Factory Default value is 5 gpm.
 - **“Drive the Actuator Towards Cold XX.X% Below the Present Value of the Actuator Position”:**
This parameter is the amount the actuator will be driven towards the cold direction if a flow rate greater than or equal to the “If a Positive Flow Rate Change of XXX.X GPM or More is Detected” value occurs. For example, if the actuator is currently at 70% and the “Drive the Actuator Towards Cold XX.X% Below the Present Value of the Actuator Position” parameter is set to 15%. Once a positive flow rate change is detected the actuator will move to an actuator position of 55% (70% - 15% = 55%). The Factory Default value is 10%.

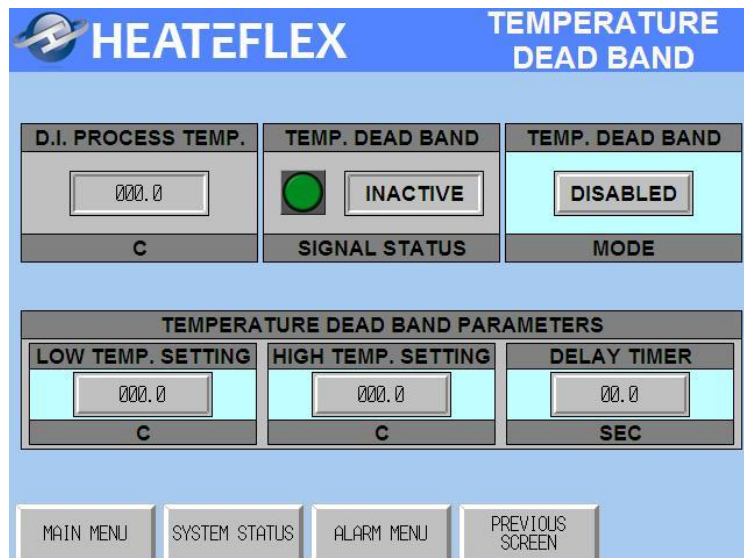
- **“Resume Normal Actuator Function XX Sec After the Flow Rate Change Has Been Detected”:**
This parameter will hold the actuator at the calculated position for the specified amount of time entered. This time begins once the positive flow rate change has been detected. Once the timer has completed the Fluidix system will refer to the Look-Up Table and move the actuator accordingly based on the current flow rate of the system and the values entered in the Look-Up Table. The Factory Default value is 20 seconds.
- For negative flow rate changes, the following three parameters are related:
 - **“If A Negative Flow Rate Change of XXX.X GPM or More is Detected”:**
This is also another programmable “Change in the Flow Rate Value”, which will drive the actuator to a certain percentage considering that the flow rate change detected is positive and greater or equal to the specified value. The Factory Default value is 5 gpm.
 - **“Drive the Actuator Towards Hot XX.X% Above the Look-Up Table Value”:**
This parameter is the amount the actuator will be driven towards the hot direction if a flow rate greater than or equal to the “If a Negative Flow Rate Change of XXX.X GPM or More is Detected” value occurs. Once a negative flow rate change is detected the Fluidix system will take into account the current flow rate of the system, refer to the Look-Up Table and move the actuator accordingly. For example, if a negative flow rate change occurs from 25 gpm to 7 gpm, the Fluidix system will move the actuator based on the values entered in the Look-Up Table for that specific flow rate. Let’s say, that the actuator is currently at 70%, the “Drive the Actuator Towards Hot XX.X% Above the Look-Up Table Value” parameter is set to 15%, and the Actuator Position entered in the Look-Up Table for 7 gpm is 65%. The actuator will then move from the current position of 70% to 80% (65% + 15% = 80%). The Factory Default value is 10%.
 - **“Resume Normal Actuator Function XX Sec After the Flow Rate Change Has Been Detected”:**
This parameter will hold the actuator at the calculated position for the specified amount of time entered. This time begins once the negative flow rate change has been detected. Once the timer has completed the Fluidix system will refer to the Look-Up Table and move the actuator accordingly based on the current flow rate of the system and the values entered in the Look-Up Table. The Factory Default value is 20 seconds.
- **“If Flow Rate is Below the Meter Threshold Value Drive Actuator to XX.X%”:**
If the Flow Rate is less than the Flow Meter Threshold value or PLC ‘hard-coded’ value the actuator will be driven to the specified value entered for this parameter. The Factory Default is 50%.

- Factory Read Only Parameters:**

The Read Only Factory Parameters screen can be accessed by pressing the “READ ONLY PARAMETER” button indicated by the arrow. Upon depression of the “Read Only Parameter” button a password needs to be entered in order to access the Read Only Factory Parameters screen. This screen is illustrated below. The values on this screen are for read only purposes and cannot be modified. The “special” password for accessing the Factory Parameters (Read Only) screen is **0256**.

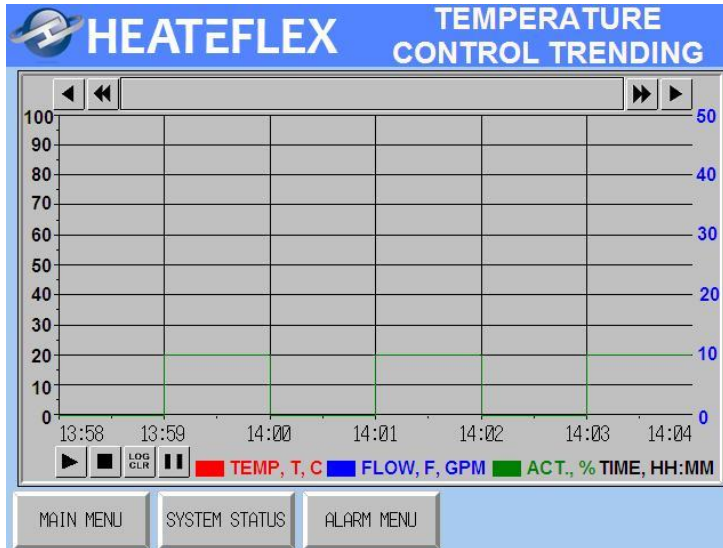


D. Temperature Dead Band



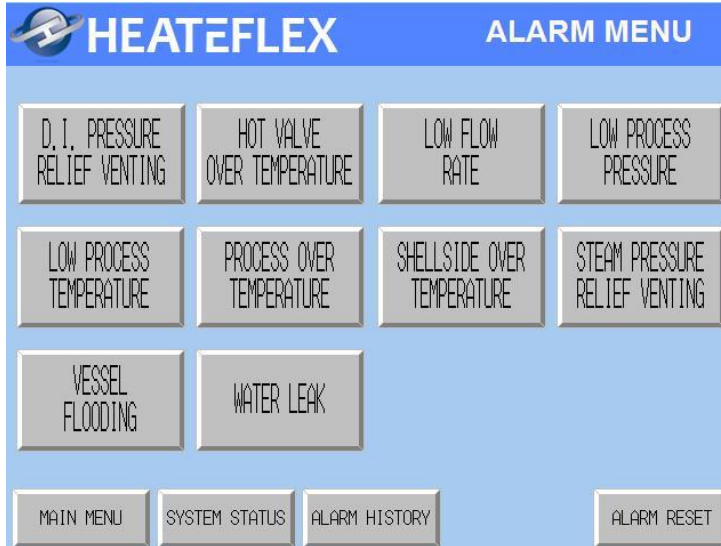
- **Note:** A “special” password is required in order to access the Temperature Dead Band screen or to change/modify the Temperature Dead Band parameters. The “special” password is **0256**.
- **“Temp. Dead Band Mode”:** To enable the Temperature Dead Band Signal this feature must be enabled by pressing the button located in the “Temp. Dead Band Mode” box.
- **“Low Temp. Setting”:** To change the lower dead band range parameter, press the box under “Low Temp. Setting” to the desired value.
- **“High Temp. Setting”:** To change the higher dead band range parameter, press the box under “High Temp. Setting” to the desired value.
- **“Delay Timer”:** To change delay timer setting, press the box under “Delay Timer” to the desired value.
- The “INACTIVE” label and indicating lamp located in the “Temp. Dead Band Signal Status” box will change to “ACTIVE” and illuminate green respectively when the D.I. Process Temperature is within the temperature dead band range.
- NOTE: The D.I. Process Temperature must be greater than the “Low Temp. Setting” and less than the “High Temp. Setting” in order for the Temperature Dead Band Signal to become active.
- When active, the Temperature Dead Band Signal is sent through as a dry contact signal and through the Ethernet communications (if available).

8.2.5 Temperature Control Trending



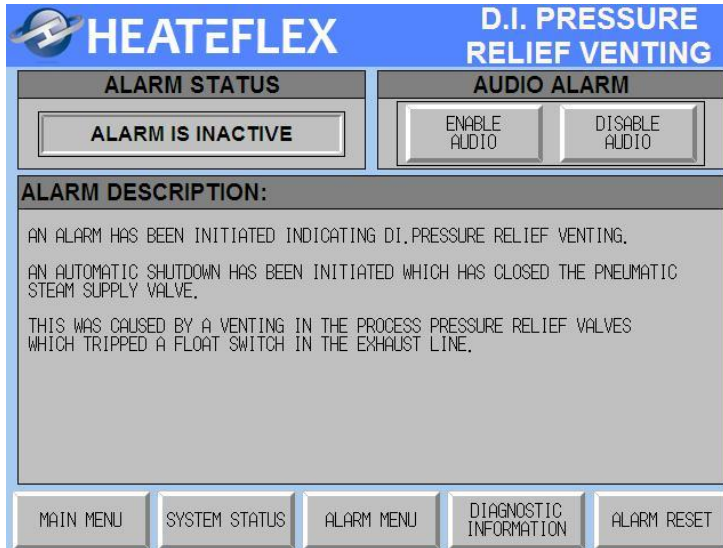
- This screen displays the process temperature, flow rate, and actuator position in real time. To reset the graph press the “Pause” or “Stop” button followed by the “Log Clear” button. To start the graph, press the “Start” button.

8.2.6 Alarm Menu



- See Section 4.7 Summary of Alarm Conditions and System Responses for a detailed list of critical alarms and alarms.
- The alarm set points or alarm delays can be modified on their respective Diagnostic Information screens, if applicable.
- More information on specific Alarms and Diagnostic Information can be found on the respective Alarm Screens.

A. D.I. Pressure Relief Venting Alarm



HEATEFLEX D.I. PRESSURE RELIEF VENTING

ALARM STATUS
 ALARM IS INACTIVE

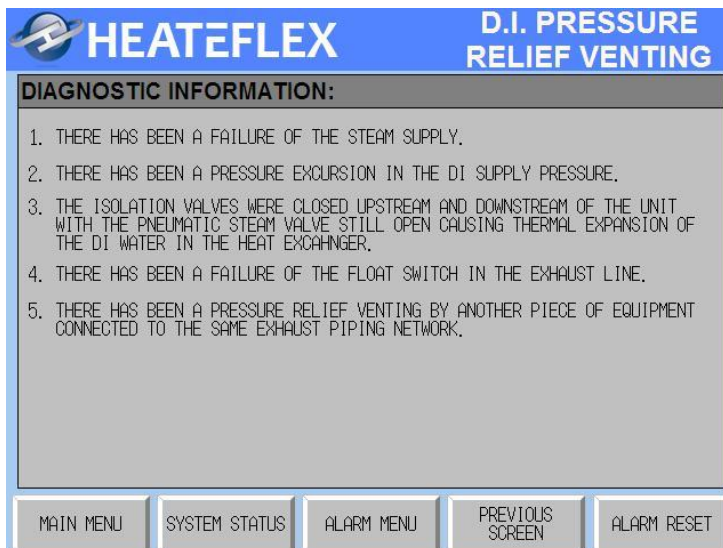
AUDIO ALARM
 ENABLE AUDIO DISABLE AUDIO

ALARM DESCRIPTION:

AN ALARM HAS BEEN INITIATED INDICATING DI.PRESSURE RELIEF VENTING.
 AN AUTOMATIC SHUTDOWN HAS BEEN INITIATED WHICH HAS CLOSED THE PNEUMATIC STEAM SUPPLY VALVE.
 THIS WAS CAUSED BY A VENTING IN THE PROCESS PRESSURE RELIEF VALVES WHICH TRIPPED A FLOAT SWITCH IN THE EXHAUST LINE.

MAIN MENU SYSTEM STATUS ALARM MENU DIAGNOSTIC INFORMATION ALARM RESET

B. D.I. Pressure Relief Venting Diagnostic Information



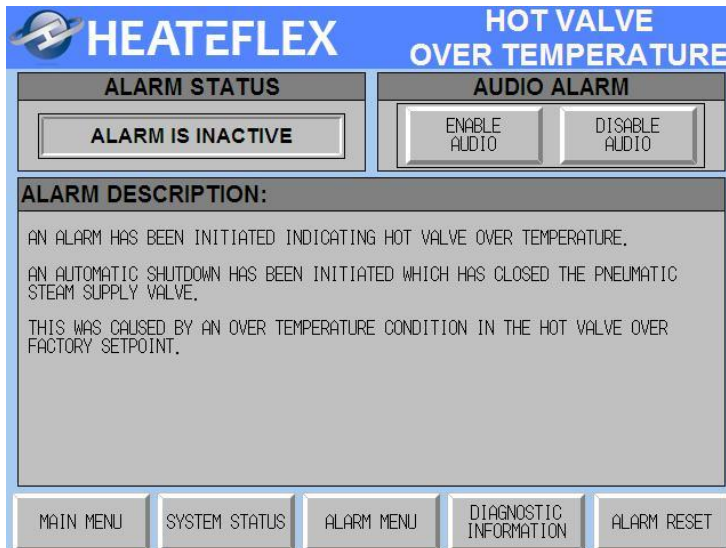
HEATEFLEX D.I. PRESSURE RELIEF VENTING

DIAGNOSTIC INFORMATION:

1. THERE HAS BEEN A FAILURE OF THE STEAM SUPPLY.
2. THERE HAS BEEN A PRESSURE EXCURSION IN THE DI SUPPLY PRESSURE.
3. THE ISOLATION VALVES WERE CLOSED UPSTREAM AND DOWNSTREAM OF THE UNIT WITH THE PNEUMATIC STEAM VALVE STILL OPEN CAUSING THERMAL EXPANSION OF THE DI WATER IN THE HEAT EXCHANGER.
4. THERE HAS BEEN A FAILURE OF THE FLOAT SWITCH IN THE EXHAUST LINE.
5. THERE HAS BEEN A PRESSURE RELIEF VENTING BY ANOTHER PIECE OF EQUIPMENT CONNECTED TO THE SAME EXHAUST PIPING NETWORK.

MAIN MENU SYSTEM STATUS ALARM MENU PREVIOUS SCREEN ALARM RESET

C. Hot Valve Over Temperature Alarm



The screenshot shows the HEATEFLEX interface for a Hot Valve Over Temperature alarm. The top header includes the HEATEFLEX logo and the text "HOT VALVE OVER TEMPERATURE". Below the header, there are two main sections: "ALARM STATUS" and "AUDIO ALARM".

ALARM STATUS: A button indicates "ALARM IS INACTIVE".

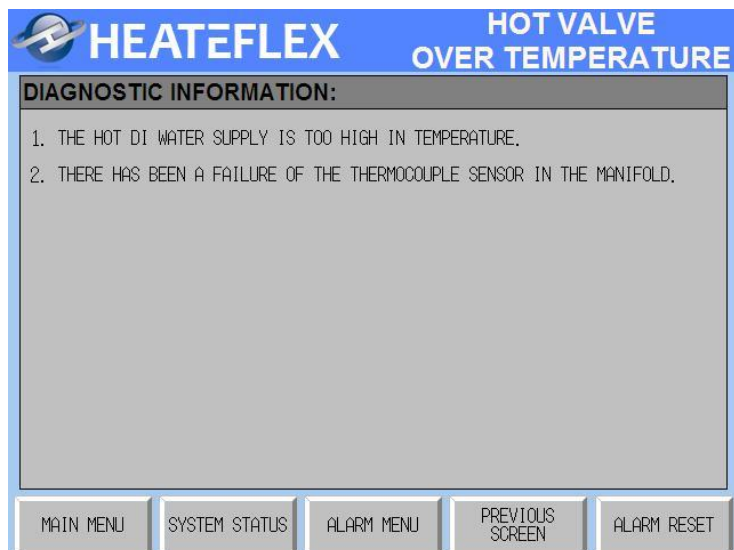
AUDIO ALARM: Two buttons are present: "ENABLE AUDIO" and "DISABLE AUDIO".

ALARM DESCRIPTION: A text area contains the following information:

AN ALARM HAS BEEN INITIATED INDICATING HOT VALVE OVER TEMPERATURE.
 AN AUTOMATIC SHUTDOWN HAS BEEN INITIATED WHICH HAS CLOSED THE PNEUMATIC STEAM SUPPLY VALVE.
 THIS WAS CAUSED BY AN OVER TEMPERATURE CONDITION IN THE HOT VALVE OVER FACTORY SETPOINT.

At the bottom of the screen, there are five navigation buttons: "MAIN MENU", "SYSTEM STATUS", "ALARM MENU", "DIAGNOSTIC INFORMATION", and "ALARM RESET".

D. Hot Valve Over Temperature Diagnostic Information



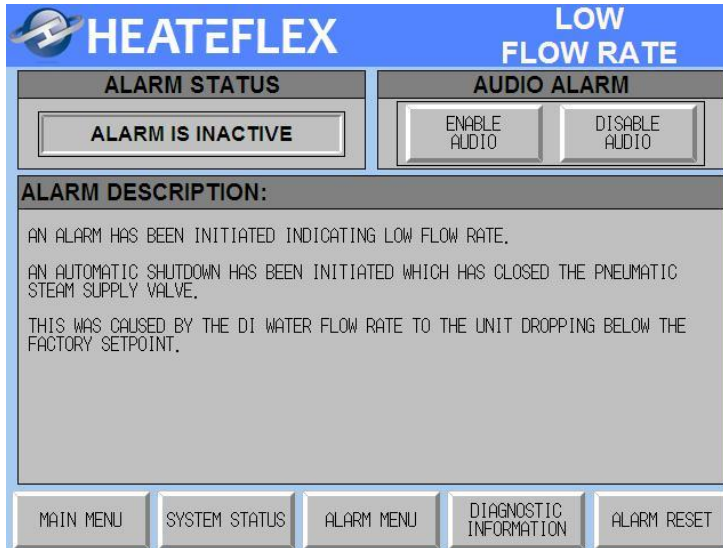
The screenshot shows the HEATEFLEX interface for Hot Valve Over Temperature diagnostic information. The top header includes the HEATEFLEX logo and the text "HOT VALVE OVER TEMPERATURE".

DIAGNOSTIC INFORMATION: A text area contains the following information:

1. THE HOT DI WATER SUPPLY IS TOO HIGH IN TEMPERATURE.
2. THERE HAS BEEN A FAILURE OF THE THERMOCOUPLE SENSOR IN THE MANIFOLD.

At the bottom of the screen, there are five navigation buttons: "MAIN MENU", "SYSTEM STATUS", "ALARM MENU", "PREVIOUS SCREEN", and "ALARM RESET".

E. Low Flow Rate Alarm



The screenshot shows the HEATEFLEX control panel interface for a Low Flow Rate Alarm. The top header includes the HEATEFLEX logo and the text "LOW FLOW RATE". Below the header, there are two main sections: "ALARM STATUS" and "AUDIO ALARM".

ALARM STATUS: A button labeled "ALARM IS INACTIVE" is displayed.

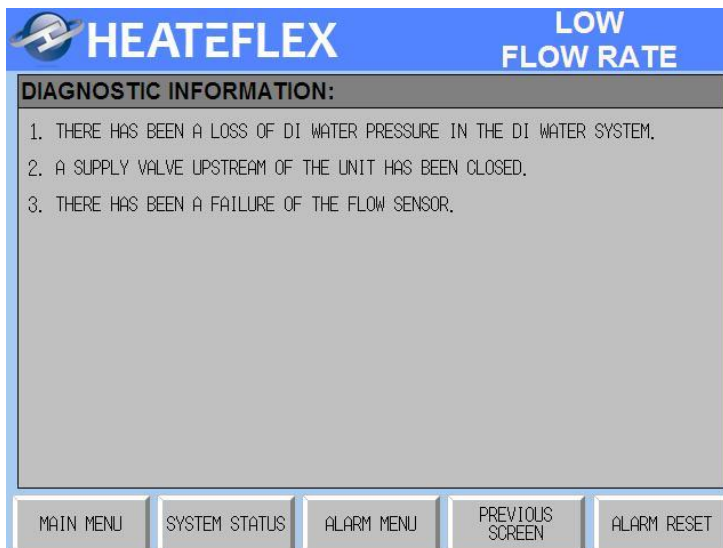
AUDIO ALARM: Two buttons are shown: "ENABLE AUDIO" and "DISABLE AUDIO".

ALARM DESCRIPTION: A text area contains the following information:

AN ALARM HAS BEEN INITIATED INDICATING LOW FLOW RATE.
 AN AUTOMATIC SHUTDOWN HAS BEEN INITIATED WHICH HAS CLOSED THE PNEUMATIC STEAM SUPPLY VALVE.
 THIS WAS CAUSED BY THE DI WATER FLOW RATE TO THE UNIT DROPPING BELOW THE FACTORY SETPOINT.

At the bottom of the screen, there is a navigation bar with five buttons: "MAIN MENU", "SYSTEM STATUS", "ALARM MENU", "DIAGNOSTIC INFORMATION", and "ALARM RESET".

F. Low Flow Rate Diagnostic Information



The screenshot shows the HEATEFLEX control panel interface for Low Flow Rate Diagnostic Information. The top header includes the HEATEFLEX logo and the text "LOW FLOW RATE".

DIAGNOSTIC INFORMATION: A text area contains a list of three diagnostic points:

1. THERE HAS BEEN A LOSS OF DI WATER PRESSURE IN THE DI WATER SYSTEM.
2. A SUPPLY VALVE UPSTREAM OF THE UNIT HAS BEEN CLOSED.
3. THERE HAS BEEN A FAILURE OF THE FLOW SENSOR.

At the bottom of the screen, there is a navigation bar with five buttons: "MAIN MENU", "SYSTEM STATUS", "ALARM MENU", "PREVIOUS SCREEN", and "ALARM RESET".

G. Low Process Pressure Alarm

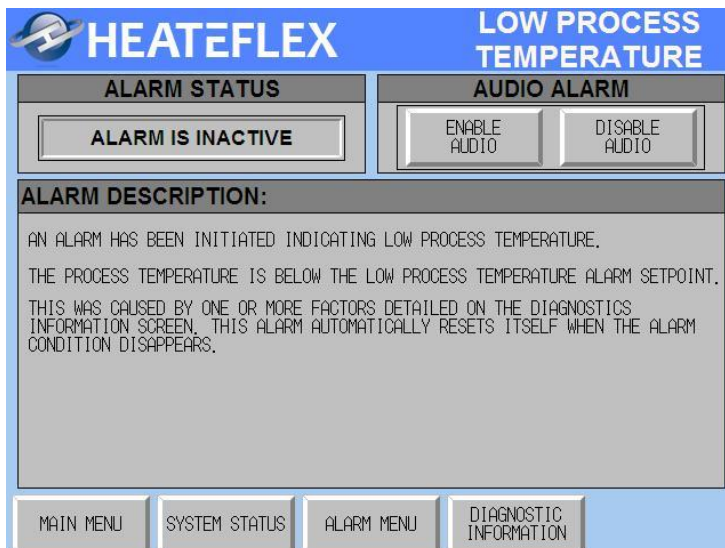
HEATEFLEX		LOW PROCESS PRESSURE	
ALARM STATUS		AUDIO ALARM	
ALARM IS INACTIVE		ENABLE AUDIO	DISABLE AUDIO
ALARM DESCRIPTION:			
<p>AN ALARM HAS BEEN INITIATED INDICATING LOW PROCESS PRESSURE.</p> <p>AN AUTOMATIC SHUTDOWN HAS BEEN INITIATED WHICH HAS CLOSED THE PNEUMATIC STEAM SUPPLY VALVE.</p> <p>THIS WAS CAUSED BY THE DI PRESSURE TO THE UNIT DROPPING BELOW THE PROCESS PRESSURE SETPOINT.</p>			
MAIN MENU	SYSTEM STATUS	ALARM MENU	DIAGNOSTIC INFORMATION
			ALARM RESET

H. Low Process Pressure Diagnostic Information

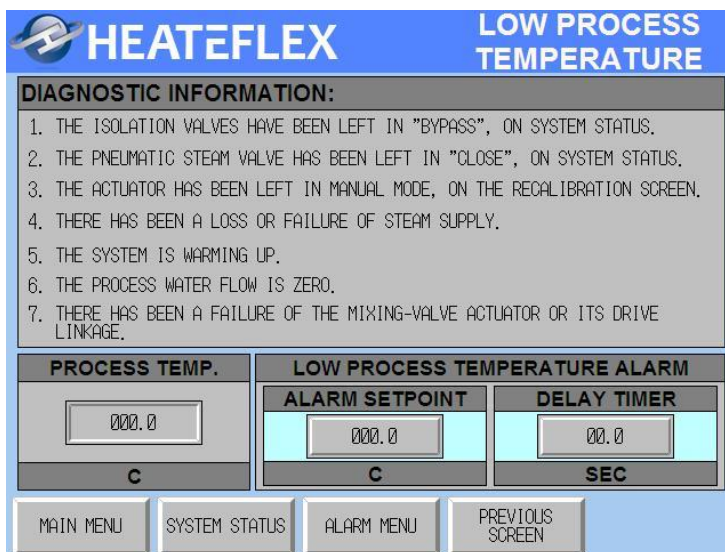
HEATEFLEX		LOW PROCESS PRESSURE	
DIAGNOSTIC INFORMATION:			
<ol style="list-style-type: none"> 1. THERE HAS BEEN A LOSS OF DI WATER PRESSURE IN THE DI WATER SYSTEM. 2. A SUPPLY VALVE UPSTREAM OF THE UNIT HAS BEEN CLOSED. 3. THERE HAS BEEN A FAILURE OF THE PRESSURE TRANSDUCER OR TRANSMITTER. 4. THE PRESSURE SETPOINT TO INITIATE AN AUTOMATIC ISOLATION HAS BEEN SET TOO HIGH COMPARED TO THE NORMAL VARIATIONS IN THE DI SUPPLY PRESSURE. 			
PROCESS PRESSURE	LOW PROCESS PRESSURE ALARM		
000.0	ALARM SETPOINT	DELAY TIMER	
PSI	000.0	00.0	
	PSI	SEC	
MAIN MENU	SYSTEM STATUS	ALARM MENU	PREVIOUS SCREEN
			ALARM RESET

- **Low Process Pressure Alarm Set Point:** To change this parameter, press the box under “Low Process Pressure Alarm” to the desired value. The default value is 10 psi.
- **Low Process Pressure Delay Timer:** To change, this parameter, press the box under “Low Process Pressure Alarm” to the desired value. The default value is 20 seconds.

I. Low Process Temperature Alarm

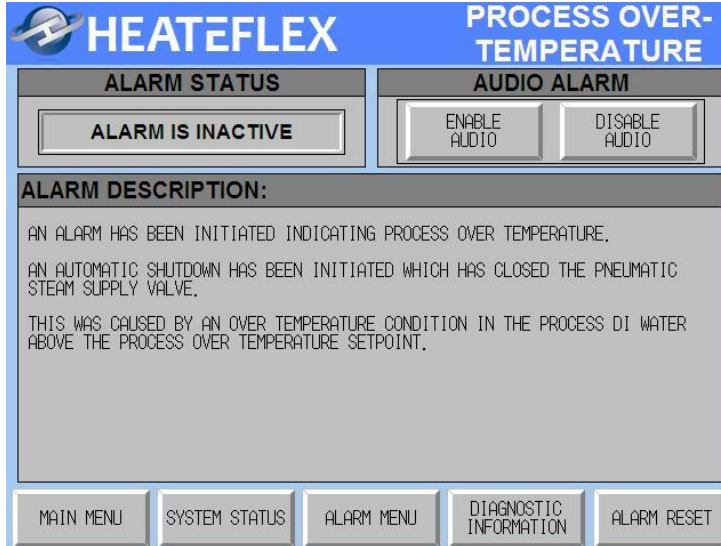


J. Low Process Temperature Diagnostic Information

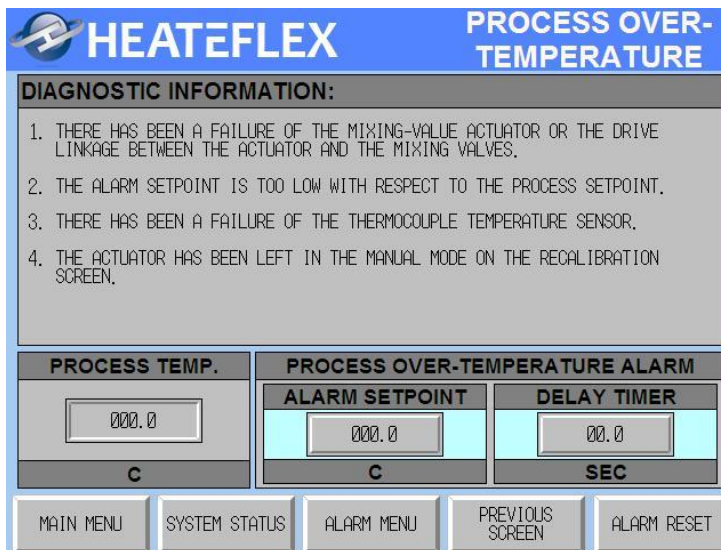


- **Low Process Temperature Set Point:** To change this parameter, press the box under “Low Process Temperature Alarm” to the desired value. The default value is 20 °C.
- **Low Process Temperature Delay Timer:** To change, this parameter, press the box under “Low Process Temperature Alarm” to the desired value. The default value is 20 seconds.

K. Process Over Temperature Alarm

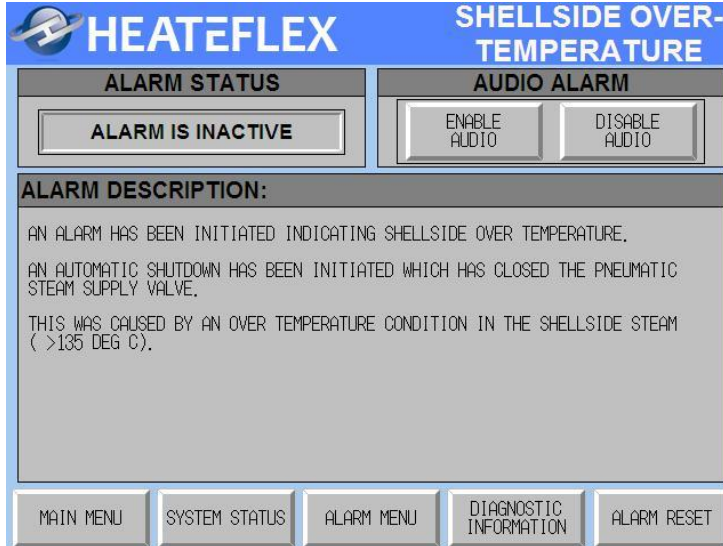


L. Process Over Temperature Diagnostic Information



- **Process Over Temperature Set Point:** To change this parameter, press the box under “Process Over Temperature Alarm” to the desired value. The default value is 95 °C.
- **Process Over Temperature Set Point Delay Timer:** To change, this parameter, press the box under “Process Over Temperature Alarm” to the desired value. The default value is 20 seconds.

M. Shellside Over Temperature Alarm



HEATEFLEX SHELLSIDE OVER-TEMPERATURE

ALARM STATUS
 ALARM IS INACTIVE

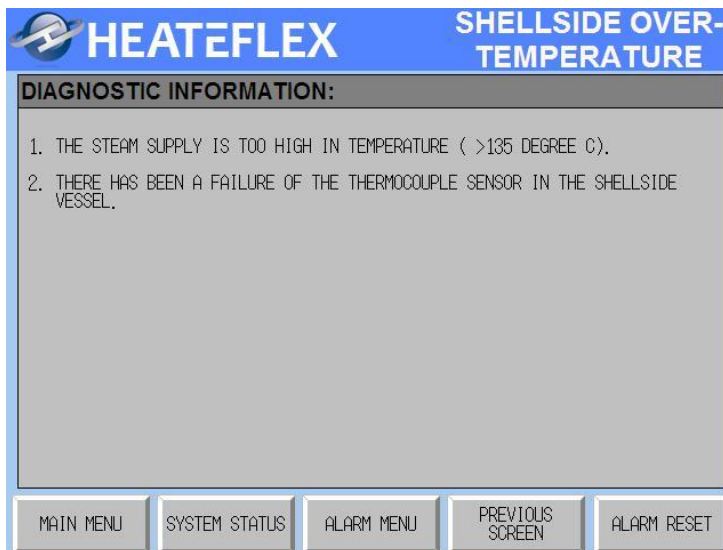
AUDIO ALARM
 ENABLE AUDIO DISABLE AUDIO

ALARM DESCRIPTION:

AN ALARM HAS BEEN INITIATED INDICATING SHELLSIDE OVER TEMPERATURE.
 AN AUTOMATIC SHUTDOWN HAS BEEN INITIATED WHICH HAS CLOSED THE PNEUMATIC STEAM SUPPLY VALVE.
 THIS WAS CAUSED BY AN OVER TEMPERATURE CONDITION IN THE SHELLSIDE STEAM (>135 DEG C).

MAIN MENU SYSTEM STATUS ALARM MENU DIAGNOSTIC INFORMATION ALARM RESET

N. Shellside Over Temperature Diagnostic Information



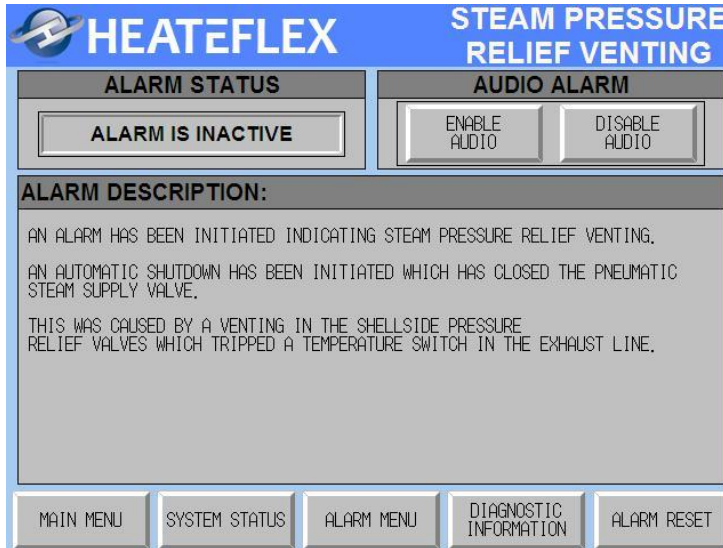
HEATEFLEX SHELLSIDE OVER-TEMPERATURE

DIAGNOSTIC INFORMATION:

1. THE STEAM SUPPLY IS TOO HIGH IN TEMPERATURE (>135 DEGREE C).
2. THERE HAS BEEN A FAILURE OF THE THERMOCOUPLE SENSOR IN THE SHELLSIDE VESSEL.

MAIN MENU SYSTEM STATUS ALARM MENU PREVIOUS SCREEN ALARM RESET

O. Steam Pressure Relief Venting Alarm



HEATEFLEX STEAM PRESSURE RELIEF VENTING

ALARM STATUS	AUDIO ALARM
ALARM IS INACTIVE	<input type="button" value="ENABLE AUDIO"/> <input type="button" value="DISABLE AUDIO"/>

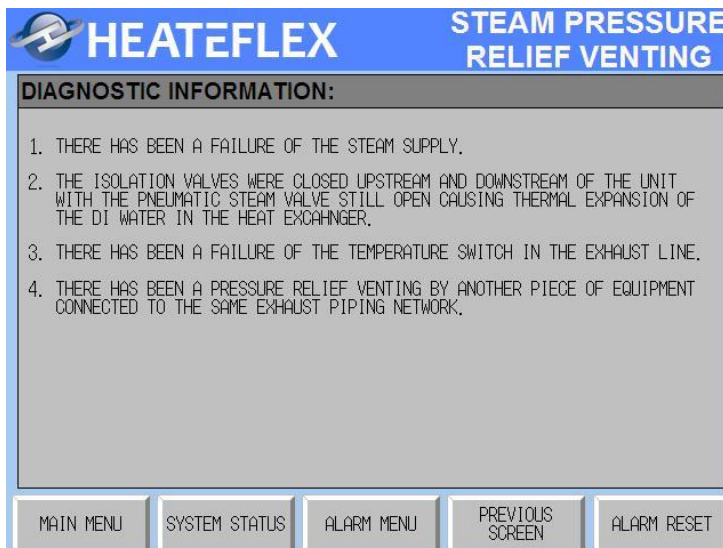
ALARM DESCRIPTION:

AN ALARM HAS BEEN INITIATED INDICATING STEAM PRESSURE RELIEF VENTING.

AN AUTOMATIC SHUTDOWN HAS BEEN INITIATED WHICH HAS CLOSED THE PNEUMATIC STEAM SUPPLY VALVE.

THIS WAS CAUSED BY A VENTING IN THE SHELLSIDE PRESSURE RELIEF VALVES WHICH TRIPPED A TEMPERATURE SWITCH IN THE EXHAUST LINE.

P. Steam Pressure Relief Venting Diagnostic Information

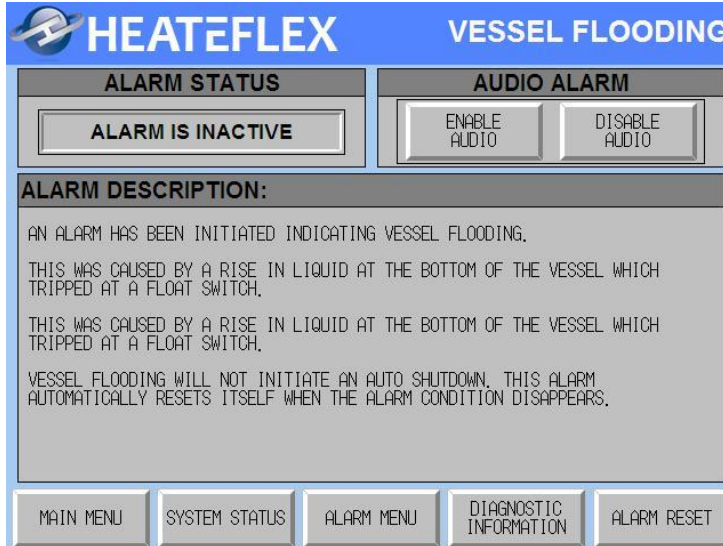


HEATEFLEX STEAM PRESSURE RELIEF VENTING

DIAGNOSTIC INFORMATION:

1. THERE HAS BEEN A FAILURE OF THE STEAM SUPPLY.
2. THE ISOLATION VALVES WERE CLOSED UPSTREAM AND DOWNSTREAM OF THE UNIT WITH THE PNEUMATIC STEAM VALVE STILL OPEN CAUSING THERMAL EXPANSION OF THE DI WATER IN THE HEAT EXCHANGER.
3. THERE HAS BEEN A FAILURE OF THE TEMPERATURE SWITCH IN THE EXHAUST LINE.
4. THERE HAS BEEN A PRESSURE RELIEF VENTING BY ANOTHER PIECE OF EQUIPMENT CONNECTED TO THE SAME EXHAUST PIPING NETWORK.

Q. Vessel Flooding Alarm



HEATEFLEX VESSEL FLOODING

ALARM STATUS
 ALARM IS INACTIVE

AUDIO ALARM
 ENABLE AUDIO DISABLE AUDIO

ALARM DESCRIPTION:

AN ALARM HAS BEEN INITIATED INDICATING VESSEL FLOODING.

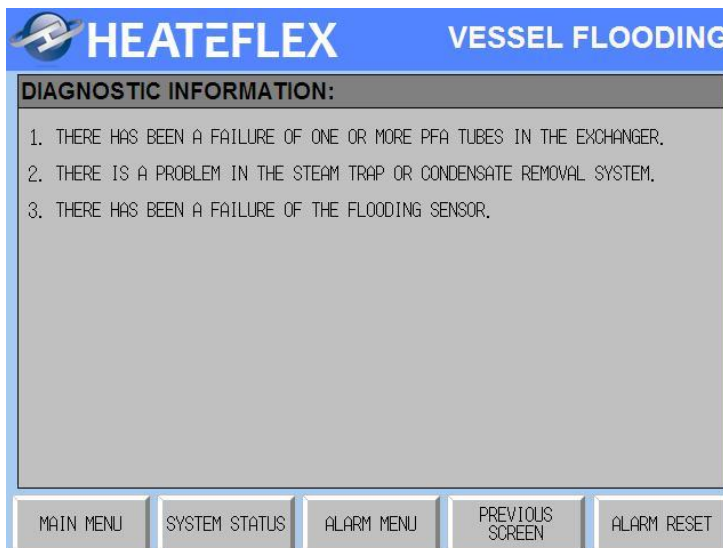
THIS WAS CAUSED BY A RISE IN LIQUID AT THE BOTTOM OF THE VESSEL WHICH TRIPPED AT A FLOAT SWITCH.

THIS WAS CAUSED BY A RISE IN LIQUID AT THE BOTTOM OF THE VESSEL WHICH TRIPPED AT A FLOAT SWITCH.

VESSEL FLOODING WILL NOT INITIATE AN AUTO SHUTDOWN. THIS ALARM AUTOMATICALLY RESETS ITSELF WHEN THE ALARM CONDITION DISAPPEARS.

MAIN MENU SYSTEM STATUS ALARM MENU DIAGNOSTIC INFORMATION ALARM RESET

R. Vessel Flooding Diagnostic Information



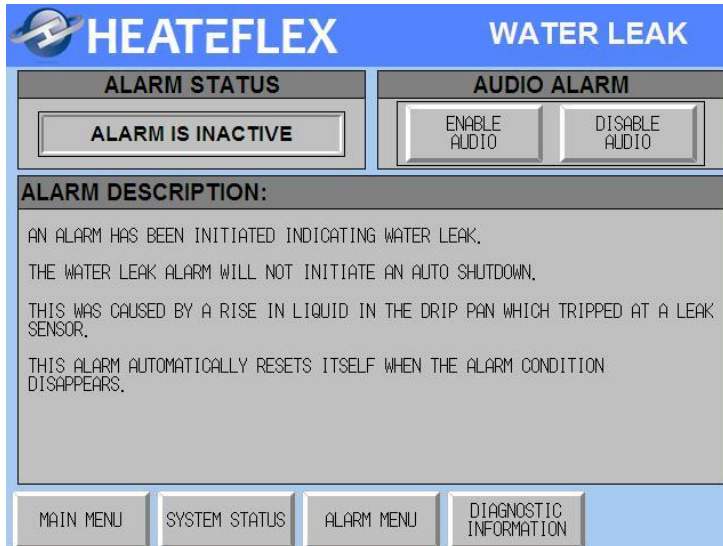
HEATEFLEX VESSEL FLOODING

DIAGNOSTIC INFORMATION:

1. THERE HAS BEEN A FAILURE OF ONE OR MORE PFA TUBES IN THE EXCHANGER.
2. THERE IS A PROBLEM IN THE STEAM TRAP OR CONDENSATE REMOVAL SYSTEM.
3. THERE HAS BEEN A FAILURE OF THE FLOODING SENSOR.

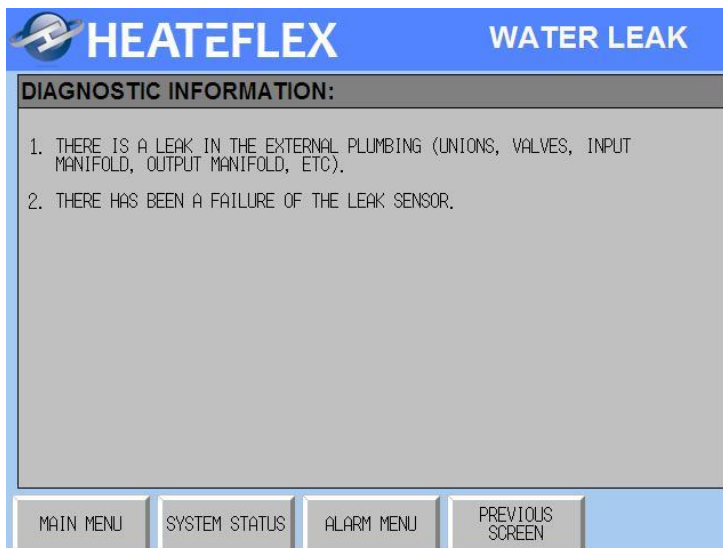
MAIN MENU SYSTEM STATUS ALARM MENU PREVIOUS SCREEN ALARM RESET

S. Water Leak Alarm



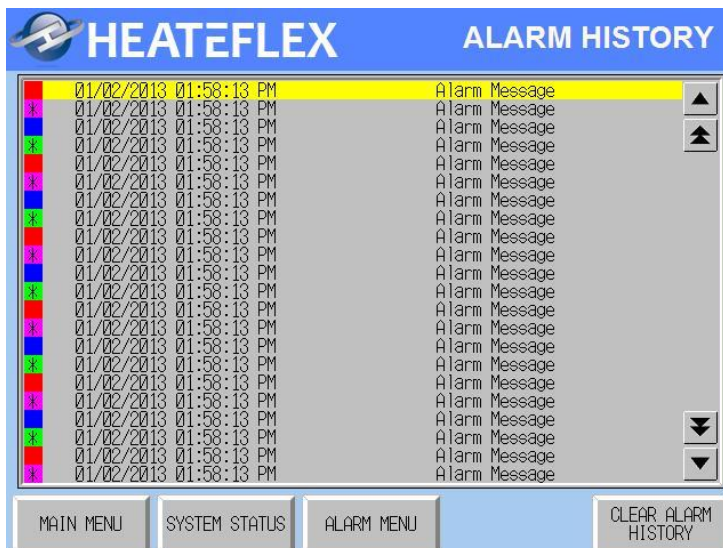
The screenshot shows the HEATEFLEX Water Leak Alarm interface. At the top, the HEATEFLEX logo and 'WATER LEAK' are displayed. Below this, there are two main sections: 'ALARM STATUS' and 'AUDIO ALARM'. The 'ALARM STATUS' section shows 'ALARM IS INACTIVE'. The 'AUDIO ALARM' section has 'ENABLE AUDIO' and 'DISABLE AUDIO' buttons. Below these is an 'ALARM DESCRIPTION' box containing the following text: 'AN ALARM HAS BEEN INITIATED INDICATING WATER LEAK. THE WATER LEAK ALARM WILL NOT INITIATE AN AUTO SHUTDOWN. THIS WAS CAUSED BY A RISE IN LIQUID IN THE DRIP PAN WHICH TRIPPED AT A LEAK SENSOR. THIS ALARM AUTOMATICALLY RESETS ITSELF WHEN THE ALARM CONDITION DISAPPEARS.' At the bottom, there are four navigation buttons: 'MAIN MENU', 'SYSTEM STATUS', 'ALARM MENU', and 'DIAGNOSTIC INFORMATION'.

T. Water Leak Diagnostic Information



The screenshot shows the HEATEFLEX Water Leak Diagnostic Information interface. At the top, the HEATEFLEX logo and 'WATER LEAK' are displayed. Below this is a 'DIAGNOSTIC INFORMATION' section containing a list of two items: '1. THERE IS A LEAK IN THE EXTERNAL PLUMBING (UNIONS, VALVES, INPUT MANIFOLD, OUTPUT MANIFOLD, ETC).' and '2. THERE HAS BEEN A FAILURE OF THE LEAK SENSOR.' At the bottom, there are four navigation buttons: 'MAIN MENU', 'SYSTEM STATUS', 'ALARM MENU', and 'PREVIOUS SCREEN'.

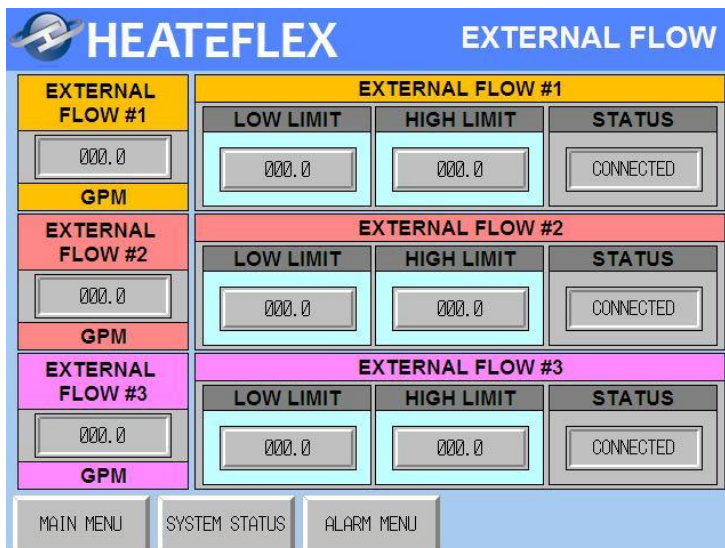
8.2.7 Alarm History



- See Section 3.2 .7 Alarm History for more information.
- The Alarm History keeps a log of all alarm occurrences and records the date, time, and alarm type in the order that they appear.
- The box located at the left of each entry designates the status of the alarm. A red box would indicate that an active alarm condition exists, while a blue box would designate that the alarm condition is no longer active and has been resolved/reset.
- To scroll up and down the log entries press the arrows located on the right of the box. To clear the Alarm History log entries press the “CLEAR ALARM HISTORY” button.

Note: An “administrative password” is required in order to clear the Alarm History log.

8.2.8 External Flow Sensors



- This primary function of this screen is to monitor the flow reading of three external flow sensors. These flow sensors do not affect the operation of the Fluidix and serve as a read only screen.
- If an external flow sensor is connected the label under “Status” will change to connected. Alternatively if no flow sensor is connected or there is a signal loss from a flow sensor the label under “Status” will display “Disconnected” and will be illuminated in yellow.
- Refer to the electrical schematic for external flow sensor connections.
- Flow sensors with various ranges can be used. The “Low Limit” and “High Limit” parameters allow you to enter the flow sensor range anywhere from 0 gpm to 100 gpm.
- To connect external flow sensors please refer to Section 8.5 Drawings – Electrical Schematic (pg. 8 of 8).

Note: An “administrative password” is required in order to set the value for the and low limit for external flow sensors.

8.3 Pressure Relief Valve Calibration Procedure

Recommended Procedure for Setting the Pressure Relief Valve (PRV):

1. Connect the inlet of the PRV to a pressure regulated water source and a pressure gauge.
2. Connect the outlet of the PRV to drain.
3. Regulate the incoming water pressure to the desired pressure setting. (Factory setting 60 psi)
 - a. PRV will start to weep from approximately 3-5 psi below actual pressure setting.
 - b. PRV will fully vent (open) at the pressure setting.
4. Turn the locking nut counter clockwise (CCW) direction to loosen the locking nut.
5. Turn the knob to adjust the pressure setting.
 - a. Clockwise (CW) – to increase the pressure setting.
 - b. Counter clockwise (CCW) to decrease the pressure setting.
6. Adjust until the desired pressure setting is reached.
7. Once the desired pressure setting is achieved tighten the locknut by turning it in the clockwise (CW) direction.

See Section 4.3.2 Tube Side Over-Pressure for more information.

8.4 Fluidix PC Quality Control Documentation

8.4.1 Fluidix Equipment Specifications

FLUIDIX P5911C304/118S63D-B/P502 EQUIPMENT SPECIFICATIONS

<p>THIS EQUIPMENT MUST ONLY BE USED WITHIN THE RANGE OF ENVIRONMENTAL CONDITIONS LISTED IN THE EQUIPMENT SPECIFICATIONS. THIS EQUIPMENT MUST BE INSTALLED WITH CUSTOMER SUPPLIED EXTERNAL SWITCH OR CIRCUIT BREAKER. SWITCH OR CIRCUIT BREAKER MUST BE:</p> <ol style="list-style-type: none"> 1. IN CLOSE PROXIMITY TO THE EQUIPMENT. 2. WITHIN EASY REACH OF THE OPERATOR. 3. MARKED AS THE DISCONNECTING DEVICE FOR THE EQUIPMENT. 	
Electrical Voltage:	120 VAC +/-10%
Amperage:	3 Amps/Safety Current 3.75Amps
Phases:	1 Phase Current
Frequency:	60 HZ
Maximum flow rate & heating capacity:	30 GPM / 114ℓ / MIN
Minimum operating flow rate:	3.5 GPM / 13.3ℓ / MIN
Temperature setting range:	25°C ~ 95°C
Temperature control accuracy:	±1 °C
D.I. water inlet & outlet connector:	50 mm, Union
Steam supply inlet connector:	3" ANSI Flange
Steam pressure relief vent connector:	2" NPT
Condensation return connector:	1" NPT
Drain port connector:	1" NPT
Manifold pressure relief venting connector:	¼" NPT
Drip pan drain outlet connector:	1" FNPT
Air supply input connector:	¼" Compression Fitting
Foot print (H x W x D):	76 1/2" x 48" x 57" / 1943 mm x 1219 mm x 1448 mm
Weight:	1200 lbs / 544 kg
External communication function:	Ethernet and Dry Contacts
Safety Controls:	<ol style="list-style-type: none"> 1. DOOR INTERLOCK SWITCH 2. LOW PROCESS TEMPERATURE ALARM 3. PROCESS OVER TEMPERATURE ALARM 4. LOW PROCESS PRESSURE ALARM 5. SHELLSIDE OVER TEMPERATURE ALARM 6. VESSEL FLOODING ALARM 7. STEAM PRESSURE RELIEF VENTING ALARM 8. HOT VALVE OVER TEMPERATURE ALARM 9. LOW FLOW RATE ALARM 10. WATER LEAK ALARM 11. D.I. PRESSURE RELIEF VENTING 12. AUTO ISOLATION / REMOTE AUTO ISOLATION 13. AUTO SHUTDOWN / REMOTE AUTO SHUTDOWN 14. EMERGENCY OFF (EMO) / REMOTE EMO 15. GLOBAL ALARM

Operational usage:	INDOOR USE ONLY
Maximum operating pressure:	60 psi (STANDARD) @ 75°C; 70 psi (MODIFIED) @ 75°C
Maximum fluid temperature:	95°C
Maximum shellside steam pressure:	15 psi
Maximum shellside steam temperature:	135°C
Maximum air supply pressure:	70 psi
Temperature resolution:	± 0.1°C
Maximum operating altitude:	6,600 feet (2,000meters)
Ambient temperature range:	5°C ~ 40°C (operating) -40°C ~ 60°C (storage)
Maximum relative humidity:	80% up to 31°C 76.7% @ 32°C 73.3% @ 33°C 70.0% @ 34°C 66.7% @ 35°C 63.3% @ 36°C 60.0% @ 37°C 56.7% @ 38°C 53.3% @ 39°C 50.0% @ 40°C and above

8.4.2 Fluidix PC Factory Default Parameters**QUALITY CONTROL DOCUMENTATION
FLUIDIX ULTRA-PURE D.I. WATER HEATING SYSTEM**

DATE:

HEATEFLEX JOB ORDER: SO

CUSTOMER PO:

CUSTOMER:

JOB DESCRIPTION: FLUIDIX, 120VAC/1-PH/60Hz

MODEL NO.: P5911C304/118S63D-B/P502

SERIAL NO.: USA-PC

I. MECHANICAL COMPONENT SETTINGS:

- a. Temperature Switch..... 155 °F
- b. Steam Pressure Relief Valve 15 psi
- c. Pressure Regulators (Standard) 60 psi
- d. Air Supply Pressure Regulator 65 -70 psi

II. DIGITAL PRESSURE TRANSDUCER/GAUGE SETTINGS:

- a. CMP..... HYS
- b. OPC NPN
- c. FIL F-1
- d. ECO EOF
- e. LRG LR0
- f. UNI..... PSI
- g. A-L 0.00
- h. A-H..... 100.0
- i. US1 NOU

III. FACTORY PRESET CONTROLLER PARAMETERS:

a. Adjustable Parameters screen

- Flow rate change to initiate look up table..... 1 gpm
- If a positive flow rate change of *XXX.X GPM* or more is detected..... 5 gpm
- Drive the actuator towards cold *XX.X%* below the present value of the actuator position..... 10 %
- Resume normal actuator function *XX* sec after the flow rate change has been detected..... 20 sec
- If a negative flow rate change of *XXX.X GPM* or more is detected..... 5 gpm
- Drive the actuator towards hot *XX.X%* above the Look-Up Table value..... 10 %
- Resume normal actuator function *XX* sec after the flow rate change has been detected..... 20 sec
- If the flow rate is below the meter threshold value drive the actuator to *XX.X%*..... 50 %

b. Temperature Control screen

- Time interval..... 7 sec
- Actuator Increments..... 1 sec

c. Recalibration screen ³

	<u>Flow</u>	<u>Actuator Position</u>
1.	4	65
2.	7.5	70
3.	10	71
4.	12	72
5.	15	75
6.	17.5	81
7.	20	82
8.	22.5	83
9.	25	85
10.	30	90

- d. Alarm Set Points (Customer Definable)
 - Low Process Temperature Alarm.....20 °C
 - Low Process Temperature Alarm Delay.....20 sec
 - Process Over Temperature Alarm ¹.....95 °C
 - Process Over Temperature Alarm Delay.....20 sec
 - Low Process Pressure Alarm.....15 psi
 - Low Process Pressure Alarm Delay.....20 sec
- e. Alarm Set Points (Factory)
 - Shellside Over Temperature Alarm.....135°C
 - Hot Valve Over Temperature Alarm.....121 °C
 - Hot Valve Over Temperature Delay.....10 sec
 - Low Flow Rate Alarm Set Point ².....3.5 gpm
 - Low Flow Rate Alarm Delay.....20 sec
 - Initiate External Auto-Isolation Delay.....20 sec
 - Auto Isolation Delay.....20 sec
 - Auto Isolation Temperature.....100 °C
- f. Temperature Dead Band Signal
 - Temperature Dead BandDISABLED
 - Low Temperature Setting.....50.0 °C
 - High Temperature Setting.....70.0 °C
 - Delay Timer.....00.0 sec

NOTE: (1) IT IS RECOMMENDED THAT YOU SET THE HIGH TEMPERATURE SETPOINT TO 10° ABOVE PROCESS SETPOINT.
 (2) THE FLOW METER DOES NOT READ FLOW RATES BELOW 2 GPM. THE D.I. FLOW RATE VALUE DISPLAYED ON THE SYSTEM STATUS SCREEN WILL READ 2.00 GPM IF FLOWS OF LESS THAN 2 GPM ARE PRESENT.
 (3) IT IS RECOMMENDED THAT YOU CALIBRATE THE LOOK UP TABLE BASED ON THE DESIRED PROCESS REQUIREMENTS.

IV. ETHERNET SETTINGS:

- a. IP Address (Default)..... 192.168.1.1
- b. Sub-net Mask (Default)..... 255.255.255.0
- c. HTTP Server Setting
 - Password (Default)..... 1234
 - Port..... 0

8.4.3 Fluidix Ultra-pure D.I. Water Heating System Quality Assurance Checklist

QUALITY CONTROL DOCUMENTATION

FLUDIX ULTRA-PURE D.I. WATER HEATING SYSTEM QUALITY ASSURANCE CHECKLIST

Serial Number: USA-PC

		<u>PASS</u>	<u>TECHNICIAN / TESTER</u>	<u>DATE</u>
1	<u>MECHANICAL TEST</u>			
1.1	Pressure test all manifolds.	OK	_____	_____
1.2	Calibrate the manifold pressure relief valves to 60 psi.	OK	_____	_____
1.3	Actuator			
	A. Install the actuator.	OK	_____	_____
	B. Set the mechanical limits for the actuator.	OK	_____	_____
	C. Install the actuator linkages.	OK	_____	_____
1.4	Plumbing			
	A. Install cold side plumbing.	OK	_____	_____
	B. Install hot side plumbing.	OK	_____	_____
	C. Install process plumbing.	OK	_____	_____
	D. Install Auto-Isolation System plumbing (optional).		_____	_____
1.5	Prime the process gauge guard.	OK	_____	_____
1.6	Mixing Valves			
	A. Install mixing valves.	OK	_____	_____
	B. Orient the mixing valves in the correct orientation.	OK	_____	_____
1.7	Install all sensors, gauges, PRV's, Thermocouples, etc.			
	A. D.I. Process Thermocouple	OK	_____	_____
	B. D.I. Cold Input Thermocouple	OK	_____	_____
	C. D.I. Hot Input Thermocouple	OK	_____	_____
	D. Steam Thermocouple	OK	_____	_____
	E. D.I. Flow Sensor	OK	_____	_____
	F. D.I. Pressure Transducer/Gauge	OK	_____	_____
	G. Vessel Liquid Level Float	OK	_____	_____
	H. Leak Sensor	OK	_____	_____
	I. Manifold Pressure Relief Valves	OK	_____	_____
	J. Steam Pressure Relief Valves	OK	_____	_____
	K. Temperature Switch	OK	_____	_____
	L. D.I. Temperature Gauge	OK	_____	_____

M.	Steam Temperature Gauge	OK	_____	_____
N.	Vessel Pressure/Vacuum Gauge	OK	_____	_____
O.	D.I. Liquid Level Float (if applicable)	_____	_____	_____
P.	Vacuum Breaker (optional)	_____	_____	_____
1.8	Install Chem-Raz O-rings and torque to specification. (Refer to O-ring Check List Drawing if necessary)			
A.	Mixing Valves	OK	_____	_____
B.	Flow Sensor	OK	_____	_____
C.	Manifold Unions	OK	_____	_____
D.	Plumbing Unions	OK	_____	_____
E.	Input/Output Unions	OK	_____	_____
1.9	Install Steam Valve (optional).	OK	_____	_____
1.10	Pneumatics			
A.	Install solenoid valves.	OK	_____	_____
B.	Install pressure regulator.	OK	_____	_____
C.	Install air lines and tighten.	OK	_____	_____
D.	Check steam valve.	OK	_____	_____
E.	Check isolation AOV's (optional).	_____	_____	_____
1.11	Check that all the mounting hardware is in place and tightened properly.	OK	_____	_____
1.12	Check drip pan for leaks.	OK	_____	_____
1.13	Test the vessel for leaks by performing an air pressure test.	OK	SAFNA	See Data Report
1.14	Hydro-test the D.I. process plumbing.	OK	_____	_____
1.15	Generate D.I. water in the reservoir.	OK	_____	_____

2 ELECTRICAL TEST

2.1	Initial PLC Set Up			
A.	Verify module orientation.	OK	_____	_____
B.	Configure communications module for settings, dip switches, etc. (optional).	OK	_____	_____
C.	Configure analog module for settings, dip switches, etc.	OK	_____	_____
D.	Configure temperature module for settings, dip switches, etc.	OK	_____	_____
2.2	Provide power to the unit and troubleshoot if needed.	OK	_____	_____
2.3	Download PLC programs.			
A.	PLC Program Name: _____	OK	_____	_____
B.	HMI/Touchscreen Program Name: _____	OK	_____	_____
C.	Data Memory Name: _____	OK	_____	_____
D.	I/O Table	OK	_____	_____
2.4	Check the power ON & OFF switches.	OK	_____	_____

2.5	Check the Emergency Off (EMO) switch.	OK	_____	_____
2.6	Check the door interlock switch.	OK	_____	_____
2.7	Enter pressure transducer settings.	OK	_____	_____
2.8	Verify all analog inputs are present and properly scaled.			
	A. D.I. Pressure	OK	_____	_____
	B. D.I. Flow	OK	_____	_____
	C. Actuator Position Feedback	OK	_____	_____
	D. D.I. Process Thermocouple	OK	_____	_____
	E. D.I. Cold Input Thermocouple	OK	_____	_____
	F. D.I. Hot Input Thermocouple	OK	_____	_____
	G. Steam Thermocouple	OK	_____	_____
2.9	Verify all analog outputs are present and properly scaled.			
	A. Steam Temperature	OK	_____	_____
	B. Process Temperature	OK	_____	_____
	C. Pressure Transducer	OK	_____	_____
	D. D.I. Process Thermocouple	OK	_____	_____
2.10	Verify actuator functions on touch screen.			
	A. Cold button	OK	_____	_____
	B. Hot button	OK	_____	_____
	C. Auto button	OK	_____	_____
2.11	Verify isolation valve functions on touch screen.			
	A. Flow button		_____	_____
	B. Bypass button		_____	_____
	C. Auto button		_____	_____
2.12	Verify steam valve functions on touch screen.			
	A. Open button	OK	_____	_____
	B. Close button	OK	_____	_____
	C. Auto button	OK	_____	_____
2.13	Simulate and check the alarms for functionality.			
	A. D.I. Pressure Relief Venting	OK	_____	_____
	B. Hot Valve Over Temperature	OK	_____	_____
	C. Low Flow Rate	OK	_____	_____
	D. Low Process Pressure	OK	_____	_____
	E. Low Process Temperature	OK	_____	_____
	F. Process Over Temperature	OK	_____	_____
	G. Shellside Over Temperature	OK	_____	_____
	H. Steam Pressure Relief Venting	OK	_____	_____
	I. Vessel Flooding	OK	_____	_____
	J. Water Leak	OK	_____	_____
2.14	Check the Auto-Shutdown System for functionality.		_____	_____
2.15	Check the Auto-Isolation System for functionality.		_____	_____

2.16	Check the Customer Interface Signals Terminal Strip for functionality.			
	A. Steam Temperature (0-130°C, 4-20mA)	OK	_____	_____
	B. Process Temperature (0-130°C, 4-20mA)	OK	_____	_____
	C. Pressure Transducer (0-100psi, 4-20mA), jumper req.	OK	_____	_____
	D. Flow Sensor (4-20mA), jumper req.	OK	_____	_____
	E. Vessel Flood Alarm	OK	_____	_____
	F. Global Alarm	OK	_____	_____
	G. Remote Auto-Shutdown, jumper req.	OK	_____	_____
	H. Remote Auto-Isolation, jumper req.		_____	_____
	I. Remote Emergency Off (EMO), jumper req.	OK	_____	_____
2.17	Check additional system communications (optional).			
	A. Remote touch screen.		_____	_____
	B. Ethernet or similar device		_____	_____
	C. RS232		_____	_____
2.18	External Flow Sensor (if applicable)			
	A. Flow Sensor #1		_____	_____
	B. Flow Sensor #2		_____	_____
	C. Flow Sensor #3		_____	_____
2.19	Temperature Dead Band Signal (if applicable)			
	A. Functionality		_____	_____
	B. Dry Contact Signal		_____	_____
3	<u>PERFORMANCE TEST</u>			
3.1	Verify that the settings for all components are set.			
	A. Manifold PRV's	OK	_____	_____
	B. Temperature switch	OK	_____	_____
	C. Actuator	OK	_____	_____
3.2	Verify PLC parameters	OK	_____	_____
3.3	Set up the boiler/steam exchanger.	OK	_____	_____
3.4	Install test fixtures, plumbing, pump, etc.	OK	_____	_____
3.5	Warm up the Fluidix unit.	OK	_____	_____
3.6	Heat the D.I. water in the Fluidix to set point.	OK	_____	_____
3.7	Cool down the Fluidix unit	OK	_____	_____
3.8	Repeat Steps 3.5, 3.6 & 3.7	OK	_____	_____
3.9	Repeat Steps 3.5, 3.6 & 3.7	OK	_____	_____
3.10	Verify that the actuator follows the parameters set in the Factory Adjustable Parameters screen.	OK	_____	_____
3.11	Verify the following alarms mechanically.			
	A. D.I. Pressure Relief Venting	OK	_____	_____
	B. Steam Pressure Relief Venting	OK	_____	_____
	C. Vessel Flooding	OK	_____	_____
	D. Water Leak	OK	_____	_____

- | | | | | |
|------|--|----|--|--|
| 3.12 | Verify the Temperature Control Trending Graph for functionality. | OK | | |
| 3.13 | Verify the Alarm History for functionality. | OK | | |
| 3.14 | Verify the vacuum breaker functionality (optional). | | | |

4 FINAL DETAIL

- | | | | | |
|------|--|----|--|--|
| 4.1 | Cool Fluidix unit | OK | | |
| 4.2 | Drain the Fluidix tube bundle and plumbing. | OK | | |
| 4.3 | Blow the Fluidix tube bundle and plumbing with nitrogen. | OK | | |
| 4.4 | Disconnect all test fixtures, plumbing, pump, etc. | OK | | |
| 4.5 | Install steam valve blind flange. | OK | | |
| 4.6 | Verify that the factory default parameters are set. | OK | | |
| 4.7 | Install splash shield. | OK | | |
| 4.8 | Install insulation jacket. | OK | | |
| 4.9 | Install all labels, stickers, and serial numbers | | | |
| A. | Electrical box | OK | | |
| B. | Vessel | OK | | |
| 4.10 | Verify that all wiring, cables, or hoses is secure. | | | |
| A. | Electrical box | OK | | |
| B. | Vessel | OK | | |
| 4.11 | Clean the Fluidix Unit. | OK | | |
| 4.12 | Prepare the unit for shipping. (DO NOT forget to place shipping tip over indicators on the unit or crate.) | OK | | |
| 4.13 | Provide the instruction manual or any required documentation with the unit. | OK | | |
| 4.14 | Ship the Input/Output O-rings. | OK | | |
| 4.15 | Ship the 70psi PRV (Freescale ONLY). | | | |

8.4.4 Freescale Fluidix Source Inspection

QUALITY CONTROL DOCUMENTATION

Serial Number: USA-PC

Test Criteria	Under Steam pressure	Under Cold DI flow	Under Hot DI flow	Pass/Fail	FSL Rep	Heateflex Rep	Comments
Software							
Confirm DI mixed temp.							
Confirm DI mixed temp Min/Max alarms							
Confirm Ethernet com							
Confirm all charts/graphing (temp, Actuator position deg, flow, etc.)							
Confirm vessel flooding alarm.							
Confirm min DI flow alarm.							
Confirm DI pressure error.							
Confirm Cold DI input temp.							
Confirm Hot DI input Temp.							
Confirm pan leak detect error							
Confirm Steam PRV pressure release error.							
Confirm Steam overtemp alarm error.							
Confirm DI PRV leak detect error.							
Confirm Shell side flooding error.							
Confirm Global alarm error.							
Confirm SVID file transfer.							
Confirm External Flowmeter inputs							
Control Screen fully functional?							

Test Criteria	Under Steam pressure	Under Cold DI flow	Under Hot DI flow	Pass/Fail	FSL Rep	Heateflex Rep	Comments
Electrical							
Drip pan leak detect working properly?							
Are all Thermocouples (4) operational?							
Is Vessel flooding switch (float switch) operational?							
Is all wire inside cabinet secured?							
Is all wire connection terminated and secured properly?							
Is all D-sub/data com connections secured properly?							
On/OFF switch functional?							
Interlock at door functional?							
EMO functional.							

Test Criteria	Under Steam pressure	Under Cold DI flow	Under Hot DI flow	Pass/Fail	FSL Rep	Heateflex Rep	Comments
Mechanical							
Does Drawing match Fluidix physical layout?							
Does documentation match functionality?							
Are all mechanical connection secure?							
Is Steam PRV oriented in a vertical plain?							
Is all plumbing secured properly?							
Are all components inside fluidix foot print?							
Are Supports for GF AOV's removable?							
Is DI pressure level assy installed correctly?							
Is pressure relief temp sensor mounted correctly?							
Are all Lid bolts torque to the specified torque?							
Are all Thermocouples (4) mounted correctly?							
Temp gauge mounted correctly?							
Steam AOV mounted correctly and Functional?							
Vessel insulation mounted securely to vessel?							
Lid blanket mounted correctly to vessel?							
Flow switch mounted correctly?							
Drip pan tested for leaks?							
No Manual Valves installed at Upper Hot/Cold manifold?							
Vacuum break installed.							
Are all Manifold/plumbing welds clean and free of voids?							
Vessel painted on the outside?							

Test Criteria	Under Steam pressure	Under Cold DI flow	Under Hot DI flow	Pass/Fail	FSL Rep	Heateflex Rep	Comments
Fluid path connections							
Are all connection leak free.							
Are all wetted path connections sealed with Chemraz o-rings?							
What is the Chemraz compound type							
Are 70 psi PRV's supplied with fluidix (4)							
Are all HOT circuits at Manifolds secured properly?							
DI PRV's (60 psi) functional?							
Functionality							
Does all GF AOV's operate properly?							
DI Pressure gauge functional?							
Flow read out functional?							
Vacuum break functional?							
Pressure gauge on vessel is functional?							
Temperature gauge on vessel functional?							



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8.4.5 Flow Meter Configuration

See attached document.



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8.5 Drawings

NOTE: The drawings are shown in the order below:

- 8.5.1 Facility Connections
- 8.5.2 Mechanical Drawing
- 8.5.3 Plumbing Diagram
- 8.5.4 Electrical Component Layout
- 8.5.5 Electrical Schematics



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8.6 Parameter Log

8.6.1 Generic Parameter Log

ITEM	PARAMETER	PARAMETER COMMENTS	FACTORY DEFAULT	DATE	DATE	DATE	DATE	DATE
Mechanical Components								
1	Manifold Pressure Regulator (psi)	Mechanical	60					
2	Temperature Switch (°F)	Mechanical	155					
Actuator Parameters								
3	Time Intervals (sec)	Administrative Password	7					
4	Actuator Increments (sec)	Administrative Password	1					
Alarms								
5	Low Process Temperature Alarm Set Point (°C)	Administrative Password	20					
6	Low Process Temperature Alarm Delay Timer (sec)	Administrative Password	20					
7	Process Over Temperature Alarm Set Point (°C)	Administrative Password	95					
8	Process Over Temperature Alarm Delay Timer (sec)	Administrative Password	20					
9	Low Process Pressure Alarm Set Point (psi)	Administrative Password	15					
10	Low Process Temperature Alarm Delay Timer (sec)	Administrative Password	20					
11	Hot Valve Over Temperature Alarm Set Point (°C)	Factory Definable Only	121					
12	Hot Valve Over Temperature Alarm Delay Timer (sec)	Factory Definable Only	10					
13	Low Flow Rate Alarm Set Point (gpm)	Factory Definable Only	3.5					
14	Low Flow Rate Alarm Delay Timer (sec)	Factory Definable Only	20					
15	Shellside Over Temperature Alarm Set Point (°C)	Factory Definable Only	135					

Factory Adjustable Parameters								
16	Flow Rate Change to Initiate the Look-Up Table XXX.X gpm	Administrative Password	1					
17	If a Positive Flow Rate Change of XXX.X GPM or More is Detected	Administrative Password	5					
18	Drive the Actuator Towards Cold XX.X% Below the Present Value of the Actuator Position	Administrative Password	10					
19	Resume Normal Actuator Function XX sec After the Flow Rate Change Has Been Detected	Administrative Password	20					
20	If a Negative Flow Rate Change of XXX.X GPM or More is Detected	Administrative Password	10					
21	Drive the Actuator Towards Hot XX.X% Above the Look-Up Table Value	Administrative Password	10					
22	Resume Normal Actuator Function XX sec After the Flow Rate Change Has Been Detected	Administrative Password	20					
23	If the Flow Rate is Below the Meter Threshold Value Drive the Actuator to XX.X%	Administrative Password	50					
24	External Flow # 1 Low Limit	Administrative Password	0					
25	External Flow # 1 High Limit	Administrative Password	0					
26	External Flow # 2 Low Limit	Administrative Password	0					
27	External Flow # 2 High Limit	Administrative Password	0					
28	External Flow # 3 Low Limit	Administrative Password	0					
29	External Flow # 3 High Limit	Administrative Password	0					
30	Temperature Dead Band Mode	Special Password	DISABLED					
31	Low Temperature Setting	Special Password	0					

32	High Temperature Setting	Special Password	0						
33	Delay Timer	Special Password	0						

Look-Up Table												
ITEM	DEFAULT		DATE		DATE		DATE		DATE		DATE	
	FLOW RATE	ACT. POS.	FLOW RATE	ACT. POS.	FLOW RATE	ACT. POS.	FLOW RATE	ACT. POS.	FLOW RATE	ACT. POS.	FLOW RATE	ACT. POS.
1	4	65										
2	7.5	70										
3	10	71										
4	12	72										
5	15	75										
6	17.5	81										
7	20	82										
8	22.5	83										
9	25	85										
10	30	90										



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8.7 Ethernet Communications

The memory registers to obtain the Fluidix values, set points, system status and alarms have been provided and are detailed in the following sections. NOTE: The customer will need to develop a protocol to retrieve the data from the memory registers. Kepware OPC server or similar is recommended.

8.7.1 Ethernet System Values & Set Points

ETHERNET SYSTEM VALUES & SET POINTS	TYPE	MEMORY REGISTER	UNITS
D.I. Process Temperature	Value	D9002	°C
D.I. Flow Rate	Value	D9003	gpm
Shellside Temperature	Value	D9004	°C
D.I. Temperature Set Point	Set Point	D9005	°C
Actuator Position	Value	D9006	%
D.I. Process Pressure	Value	D9007	psi
D.I. Incoming Temperature	Value	D9008	°C
Hot Valve Temperature	Value	D9009	°C
Low Process Temperature Alarm Set Point	Set Point	D9010	°C
Process Over-Temperature Alarm Set Point	Set Point	D9011	°C
Low Process Pressure Alarm Set Point	Set Point	D9012	psi
Hot Valve Over-Temperature Alarm Set Point	Set Point	D9013	°C
Low Flow Rate Alarm Set Point	Set Point	D9014	gpm
External Flow #1	Value	D9015	gpm
External Flow #2	Value	D9016	gpm
External Flow #3	Value	D9017	gpm

8.7.2 Ethernet System Status & Alarms

ETHERNET SYSTEM STATUS & ALARMS	POWER OFF	INACTIVE	ACTIVE	MEMORY REGISTER
Low Process Temperature Alarm	0	0	1	100.00
Process Over-Temperature Alarm	0	0	1	100.01
Low Process Pressure Alarm	0	0	1	100.02
Shellside Over-Temperature Alarm	0	0	1	100.03
Vessel Flooding Alarm	0	0	1	100.04
D.I. Pressure Relief Venting Alarm	0	0	1	100.05
Steam Pressure Relief Venting Alarm	0	0	1	100.06
Hot Valve Over-Temperature Alarm	0	0	1	100.07
Low Flow Rate Alarm	0	0	1	100.08
Water Leak Alarm	0	0	1	100.09
External Flow #1 Connection	0	0	1	100.10
External Flow #2 Connection	0	0	1	100.11
External Flow #3 Connection	0	0	1	100.12
Global Alarm	0	0	1	100.15
Remote Auto Shutdown	0	1	0	101.00
Remote Auto Isolation	0	1	0	101.01
Steam Valve	0	0	1	101.02
Temperature Dead Band Signal	0	0	1	101.03

NOTE:

- 0 - Open Signal
1 - Closed Signal

8.8 Manual Revisions

Revision:	File:	Program:	Description:
0	USA-PC0906-1&2	PC300_REV1 HMI_PC300_REV1	
1	USA-PC0906-1&2-R01	PC300_REV1 HMI_PC300_REV1	*Added Equipment & Pressure Relief Valve Calibration
2	USA-PC0906-1&2-R02	PC300_REV1 HMI_PC300_REV1	*Updated manual to current
3	USA-PC0906-1&2-R03	PC300_REV1 HMI_PC300_REV3	*Added Alarm History screen and information & noted door interlock.
4	Fluidix Instruction Manual for Omron (Freescale)-R04	FDX_V01, FDX_TS_V01, FDX_DM_V01	*Updated manual to current configuration as of 6/3/2008.
5	Fluidix Instruction Manual for Omron (Freescale)-R05	FDX_V01, FDX_TS_V01, FDX_DM_V01	*Revised Low Flow Alarm Set Point to 3.5gpm.
6	Fluidix Instruction Manual for Omron (Freescale)-R06	FDX_V02, FDX_TS_V02, FDX_DM_V02	*Added Temp. Dead Band Signal, Increased Shellside Over-Temp. Set Point, Revised Screens & Drawings
7	Fluidix Instruction Manual for Omron (Freescale)-R07	FDX_V02, FDX_TS_V02, FDX_DM_V02	*New Pressure Transducer/Gauge Settings & included ethernet settings
8	Fluidix Instruction Manual for Omron (Freescale)-R08	FDX_V02, FDX_TS_V02, FDX_DM_V02	*Parameter setting revision
9	Fluidix Instruction Manual for Omron (Freescale)-R09	FDX_V02, FDX_TS_V02, FDX_DM_V02	*Manual Format and Corrections
10	Fluidix Instruction Manual for Omron (Freescale)-R10	FDX_V02, FDX_TS_V03, FDX_V06, FDX_DM_V02	*Revised Ethernet Option, Temperature Dead Band Signal, Actuator/Temp. Control



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8.9 ASME Data Report

See attached document (if applicable)



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