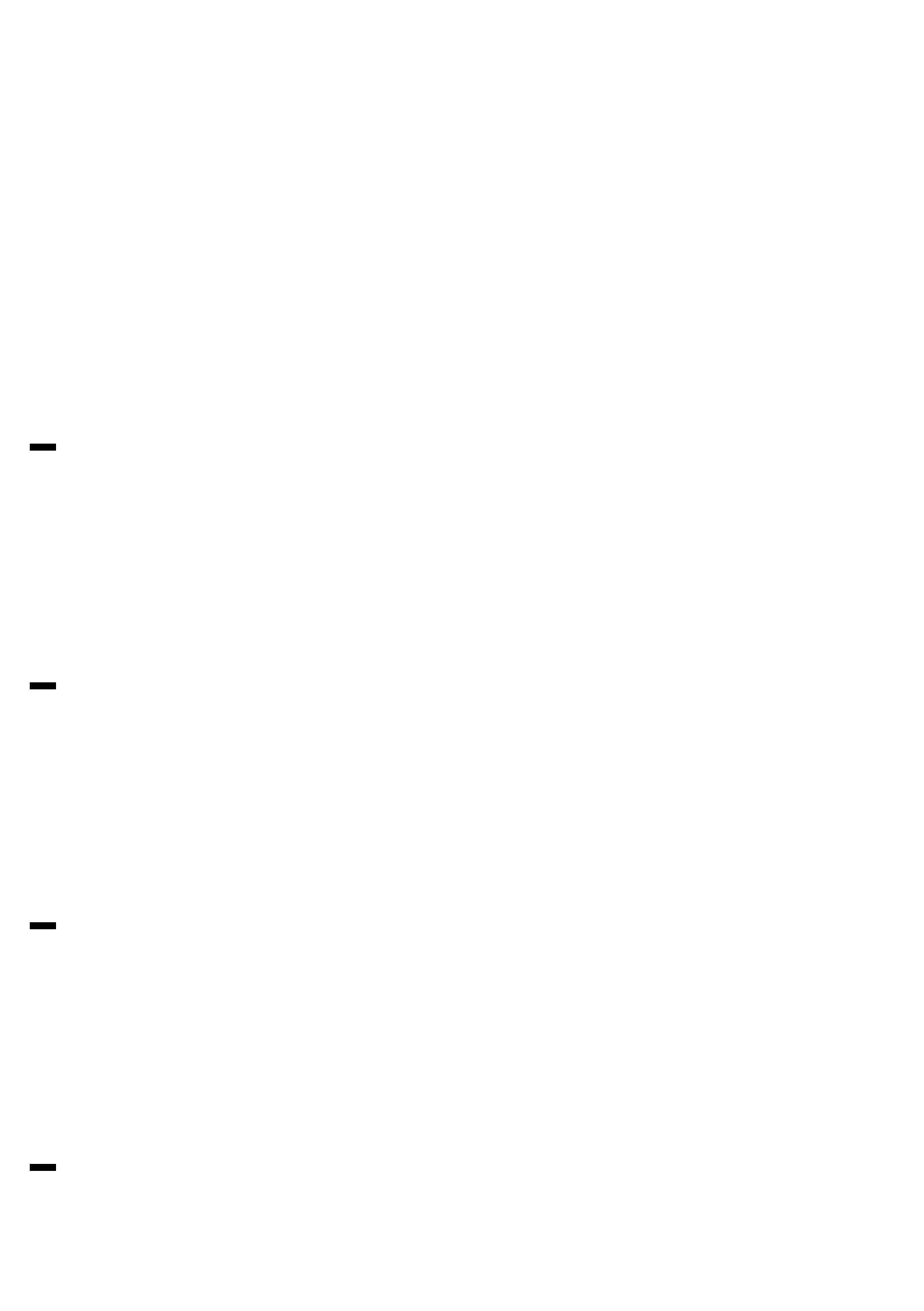


# 3750 Pulpress Pressurisation unit

## Installation and operating instructions

**File No:** 37.856IEC  
**Date:** JANUARY 17, 2022  
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## 1.0 CE CONFORMITIES

LVD	BS EN 61010-1
Low voltage switchgear	BS EN 61439-1
Safety of machinery	BS EN ISO 12100
Safety of machinery	BS EN 60204-1
Electromagnetic compatibility	
Harmonic emissions	BS EN 61000-3-2
Electrostatic discharge	BS EN 61000-4-2
Radiated RF immunity	BS EN 61000-4-3
Fast transient bursts	BS EN 61000-4-4
Voltage surges	BS EN 61000-4-5
Conducted RF immunity	BS EN 61000-4-6
Voltage dips	BS EN 61000-4-11
Generic immunity	BS EN 61000-6-1
Generic immunity	BS EN 61000-6-2
Generic emissions	BS EN 61000-6-3
Generic emissions	BS EN 61000-6-4
Safety of stationary circulation pumps for heating and service water installation.	BS EN 60335-2-51

## 2.0 PREFACE

- 1 The 3750 Pulpress pressurisation unit has been designed for ease of setting and operation.
- 2 All packaged pump systems are pre-wired and fully tested prior to dispatch.
- 3 If ordered with system criteria, all parameter data has been entered into the controller in accordingly. Once on-site connections have been made, and all pre-checks carried out, the system is ready for commissioning.
- 4 During commissioning if system conditions are found to vary from those set out in the design criteria, the parameters can be easily changed.

## 3.0 INTRODUCTION

- 1 This installation and operation manual contains specific information regarding safe installation, operation and maintenance of the 3750 Pulpress pressurisation unit. These instructions must be read and understood by anyone responsible for the installation and maintenance of this equipment.
- 2 Prior to connect the unit to the power supply, it is essential that all Pre-commissioning procedures are carried out in full.
- 3 Operators and installers must familiarise themselves with the operation and controls of the equipment.

## 4.0 WARNING SYMBOLS



Safety instruction where an electrical hazard is involved.



Safety instruction where non-compliance would affect safety.



Safety instruction relating to safe operation of the equipment. (Attention)

## 5.0 SAFETY INSTRUCTION

- 1 This equipment has been designed for the pressurisation of sealed heating, chilled water and closed condenser water systems to the operating conditions shown.
- 2 This equipment should not be installed until operation and maintenance instructions has been studied and understood by the person(s) responsible.
- 3 Handling, transportation and installation of this equipment shall only be undertaken with the use of appropriate lifting gear.
- 4 The set shall not be used for any purpose other than that for which it was designed and sized.
- 5 The set shall not be operated with the cover removed and the cover interlocked isolator overridden.

### NOTE



During normal operation, the pumps will only generate pressures sufficient to satisfy system demand. However, abnormal running conditions may cause closed valve pressures to be experienced.

## 6.0 RANGE DEFINITION

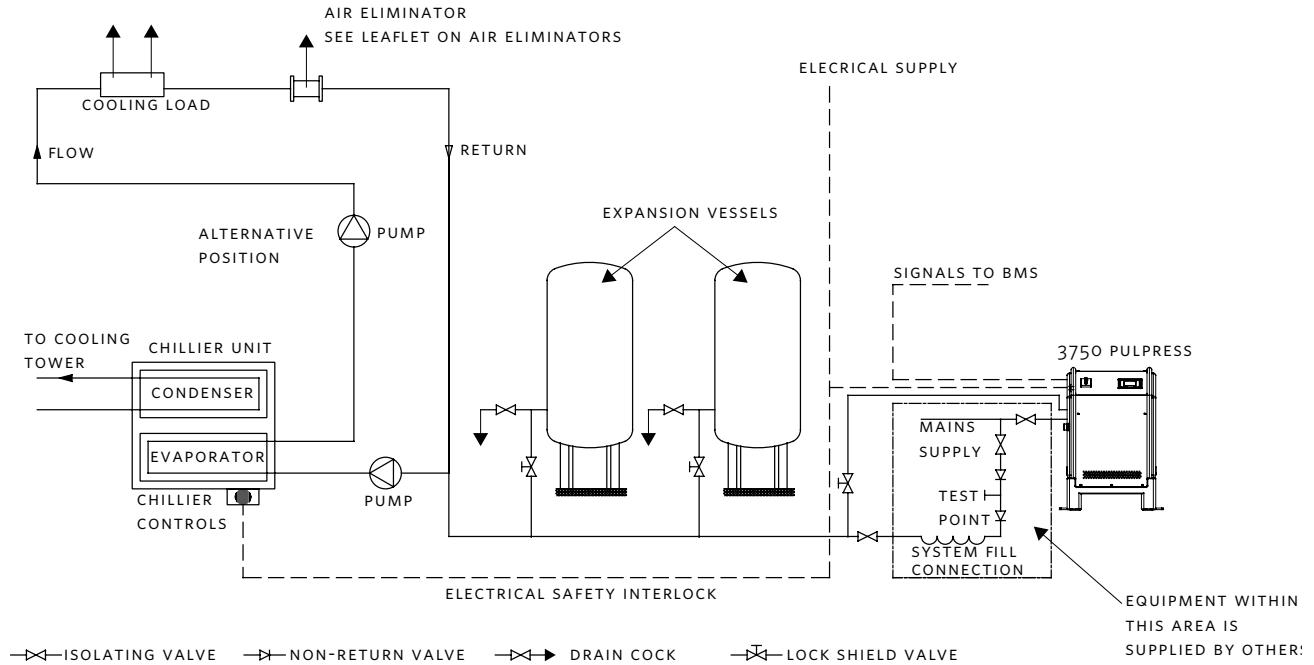
SYSTEM(S)	PUMP(S)	PRESSURE RANGE
1	1	Low
		Med
		High
	2	Low
		Med
		High
2	1	Low
		Med
		High
	2	Low
		Med
		High

Low Pressure = 0.5-2.7 bar

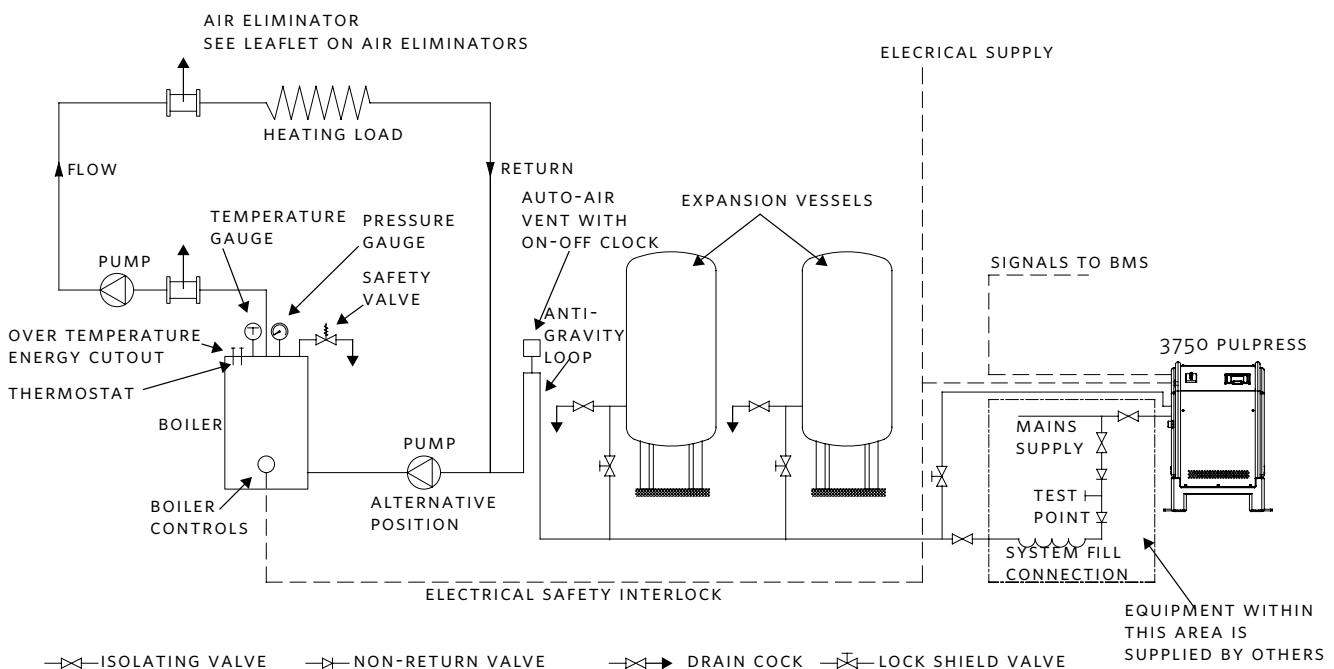
Med Pressure = 0.5-5.5 bar

High Pressure = 0.5-8.0 bar

## 7.0 TYPICAL CHILLED WATER SEALED SYSTEM



## 8.0 TYPICAL LTHW SEALED SYSTEM- MAX. 100°C



## 9.0 TYPICAL MTHW SEALED SYSTEM MAX. 120°C

The arrangement of the MTHW scheme is similar to the LTHW system above but has, in addition, an intermediate vessel installed between the expansion vessels and the system connection. The volume of water contained in this vessel ensures that the return temperatures at the boiler are not transferred to the expansion vessel, where damage to the diaphragm would otherwise occur.

### WARNING NOTES

- 1 Pressure vessels are supplied as loose items with the pre-charge pressure of 4 bar. If the unit is not being commissioned by Armstrong please make sure the vessel is charged to the correct pressure.
- 2 Packed-gland circulating pumps must not be used in sealed systems.
- 3 Water treatment must not be added to the system via the 3750 Pulpress break tank.
- 4 No part of the set, expansion vessel, intermediate vessel or connecting pipe is to be lagged.
- 5 Precautions should be taken to ensure that Lock Shield Valves are protected against unauthorized closure.
- 6 In any case, the 3750 pressurisation unit should not be used to fill up an empty system.

## 10.0 STORAGE

Store in a dry place. Protect against dirt, damage and frost.

## 11.0 FEATURES

- 1 **Maximum system working pressure:** 10 bar.
- 2 **Maximum flow temperature:** 120°C.
- 3 **Electrical supplies:** 1 phase, 50 or 60 Hz, 240 volts.
- 4 **Power supply fluctuation:** ±10% maximum.
- 5 **Humidity non-condensing:** 80% rh up to 31°C decreasing linearly to 50% rh at 40°C.
- 6 **Ambient temperature:** +5°C to +40°C.
- 7 **Water supply pressure:** 0.8 bar minimum to 6.8 bar maximum with ballcock fully open.
- 8 **Pump pressure range:** 0.5 to 2.7 bar, 0.5 to 5.5 bar and 0.5 to 8.0 bar.
- 9 **System fill pressure:** System set point pressure, within the pump pressure range
- 10 **Maximum water temperature for expansion vessels:**
  - A Continuous 70°C: Above this, intermediate vessels must be used.
  - B Intermittent : 100°C
- 11 **Maximum total boiler rating:** Refer to graph
- 12 **Break Tank:** 21 litre active capacity and manufactured from polyethylene complete with ball valve to BS 1212 part

2 with type AB air gap to comply with BS EN 13076:2003, WRAS and model water Bye-laws

## 12.0 PROTECTION

The set must be protected from the formation of condensation. If there is a likelihood of condensation forming on or in the control panel then an anti-condensation heater (option available to order) should be fitted. Contact our service department for details.

## 13.0 GENERAL NOTES

- 1 The sets comprise one or two pumps operating on a duty/Stand-by arrangement.
- 2 Each set is sized to BS7074 and custom built for a specific application, any change in the system conditions shown may necessitate a change in the design or settings.
- 3 System must be completely flushed out prior to installing the unit, to remove any metal particles, dirt etc., which may damage the set.
- 4 The system should be pressure tested, to eliminate leaks.
- 5 Under no circumstances must any attempt be made to introduce water treatment to the system via the break-tank.
- 6 No part of the set, connecting pipe or expansion vessel(s) are to be lagged.
- 7 Fill the system via the quick-fill connection (Supplied by others). Do not use the set to fill the system

## 14.0 INSTALLATION

### 14.1 MECHANICAL

- 1 Install the set on a flat and even surface.
- 2 Site set with sufficient space to the front, left and right sides of the unit for maintenance purposes.
- 3 Connect the cold water mains supply, via a stopcock, to the ballcock in the break tank. (Water supply pressure 0.8 bar minimum with ballcock fully open).
- 4 Arrange break tank overflow pipe to discharge into a convenient drain in line with clause 30 of the Water supply Bye-laws 1989 edition.
- 5 Make a connection from the set to the return side of the boiler and suction side of the circulating pump(s). If intermediate vessels are provided these should be fitted in this connection with the set and expansion vessels connected to the bottom of the vessel and the system to the top of the vessel. A manual air vent should be fitted in the pipe work close to the top of the vessel, see general arrangement drawing provided. Ensure pump(s) are vented by loosening the vent cap on top of the delivery branch of the pump. Care must be taken not to over tighten the system or water inlet connections.

- 6 Never dry run the pump.
- 7 For wall mounting, wall structure will need to be determined to select appropriate fasteners. Ensure there are no pipes or electrical cables running behind where the wall bracket is to be secured.

#### 14.2 ELECTRICAL

- 1 The power supply required is 240 volt  $\pm 10\%$ , 1 phase, 50 Hz or 60 Hz to suit motors fitted.
- 2 The incoming supply should be connected to the door interlocked isolator from a local 10 amp switched fused spur and if possible an ELCB unit.
- 3 All incoming cable glands should be IP54 rated as a minimum.
- 4 Wire the set control systems (see enclosed wiring diagram) from the volt free terminals to the boiler control system.
- 5 Boiler/chiller interlock provided via normally open volt free contact.
- 6 The set must be earthed.

#### ATTENTION



It is the user's or certified electrician's responsibility to ensure correct earthing and protection in accordance with applicable national and local requirements and standards.

#### IMPORTANT SAFETY INFORMATION

- 1 The voltage on the 3750 Pulpress unit is dangerous when it is connected to the mains. Incorrect installation of the set may lead to material damage or serious injury or death. Consequently, you must comply with the instructions in this manual as well as the local rules and safety regulations.
- 2 Touching the electrical parts may be fatal, even after the mains supply has been disconnected, wait at least 4 minutes.
- 3 The installation must be fused and isolated correctly.
- 4 Covers and cable glands must be fitted.

#### 15.0 SAFETY REGULATIONS

- 1 The 3750 Pulpress unit must be disconnected from the mains if repair work is to be carried out. Check the mains supply has been disconnected and the necessary time has passed (4 minutes).
- 2 The correct protective earthing of the equipment must be established, the user must be protected against supply voltage, and the set must be protected against overload in accordance with applicable national and local regulations.

- 3 RCDs (ELCB relays), multiple protective earthing or earthing can be used as extra protection, provided that local safety regulations are complied with.

#### 16.0 COMMISSIONING

- 1 Fill the system with water via the quick fill connector. It is essential that all air in the system is allowed to escape freely through automatic air vents and radiator bleeds, failure to remove air could result in a system malfunction.
- 2 Turn on the water supply feeding the 3750 Pulpress unit and fill the break tank.
- 3 Check pumps are primed by loosening cap on the delivery side of the pump—let water escape until no air is present, put back caps and pressurize to the ambient temperature set pressure. **Never dry run the pumps.**
- 4 With cover interlock isolating switch in the off position switch on the power supply to the unit.

#### 17.0 OPERATION

Turn the main isolating switch to the **On** position. The system pressure will be displayed on the digital readout. The unit will automatically maintain pressure in the system as set out in the design criteria and will only operate when the pressure falls between the systems fill pressure and the pump cut-in pressure. For twin system unit, both the system pressures will be displayed on the digital readout. The unit will operate on both the systems simultaneously.

#### 18.0 HEATING SYSTEM

Start the boiler(s). The water from the system will flow into the vessel(s) and the system pressure will rise slowly and settle at a pressure below the maximum pressure shown on the nameplate. If the boiler safety valve lifts, check the valve setting and the system details, against the ordering specification for the 3750 Pressurisation unit.

#### 19.0 CHILLER SYSTEMS

When the chiller(s) are started the water contracts as it cools and the expansion vessels will pass water to the system to bring the pressure up to the ambient temperature setting pressure. When the chiller is switched off the expanding water will pass into the expansion vessel, the pressure will rise and settle at a pressure below the maximum pressure shown on the nameplate.

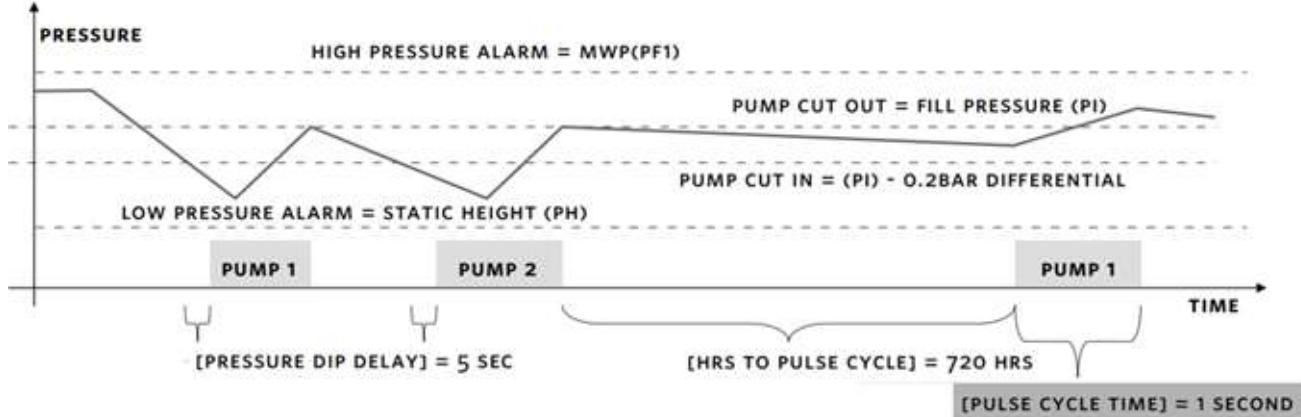
**NOTES**

On chiller sets, the highest system pressure will occur when the system is at ambient temperature after operation, whereas on heating sets the highest pressure occurs at maximum system operating temperature.

If the system pressure falls due to a slow leak, water in the expansion vessel(s) will run back into the systems.

If the system leakage continues causing a drop in pressure below the initial system pressure the pump(s) will start to restore the initial system pressure.

In the event of a leak exceeding the pump(s) capacity then, providing the set's volt free contacts have been wired accordingly, the boiler burners will be shut down and the circulating pumps are stopped. The system should then be closed down and the leak rectified.

**20.0 CONTROLLER FUNCTIONS****21.0 FUNCTIONAL DISPLAY**

The 3750 Controller displays are divided in two set of screens: Operation and Setup. The operation screens are used by the operators to monitor and control the operation. The Setup Screens are used to set and view the system specific settings (i.e. number of pumps, pressure settings, sensor range, etc.)

**21.1 OPERATION SCREENS**

21.1.1 Main screen/Twin-system screen

21.1.2 Test screen

21.1.3 System overview

21.1.4 Pump control screen

**Diagnostics**

21.1.5 Support information

21.1.6 System information

**Alarms**

21.1.7 Alarm screen

21.1.8 Alarm log screen

21.2.6 Pressure Setup (Twin system only)

21.2.7 BAS communication

21.2.8 Date/Time change

21.2.9 Password screen

21.2.10 Valve setup (Twin system only)

**Standard keys: work same in all screens**

	Navigates to Alarm and Log screens  Solid White when there are no active alarms  Flashing Red when Alarm is activated and On Buzzer.  Solid Red when all alarms are reset and still some active alarms
	Navigates to Main Menu display,in all screens.
	When cursor is at top left corner of the screen pressing <b>up</b> or <b>down</b> key navigates b/w screen
	When cursor over digital value pressing <b>up</b> or <b>down</b> will toggle the value
	When cursor over analog value pressing <b>up</b> or <b>down</b> will increase or decrease value
	Pressing Enter key move cursor to next field within display
	Set the value changed by up/down keys and save the respective value

**21.2 SETUP SCREENS**

21.2.1 Login

21.2.2 Pump setup - 1

21.2.3 Pump setup - 2

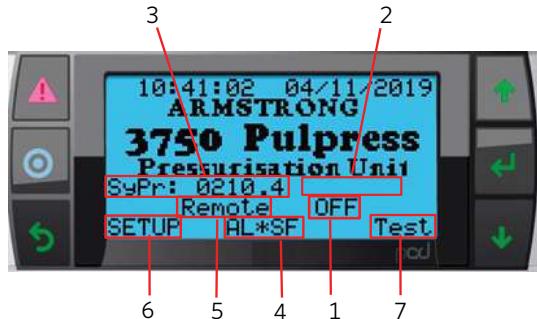
21.2.4 Pump setup - 2 (Twin system only)

21.2.5 Pressure Setup

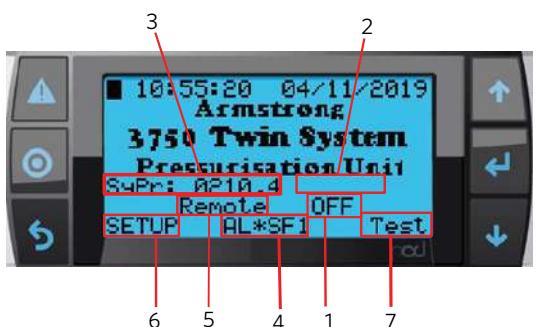
## 21.1 OPERATION SCREENS

### 21.1.1 MAIN SCREEN

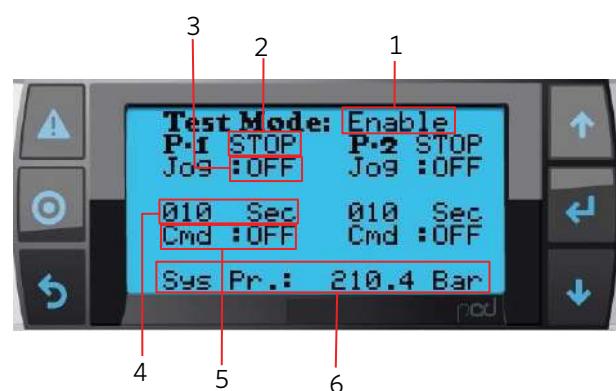
#### SINGLE-SYSTEM SCREEN



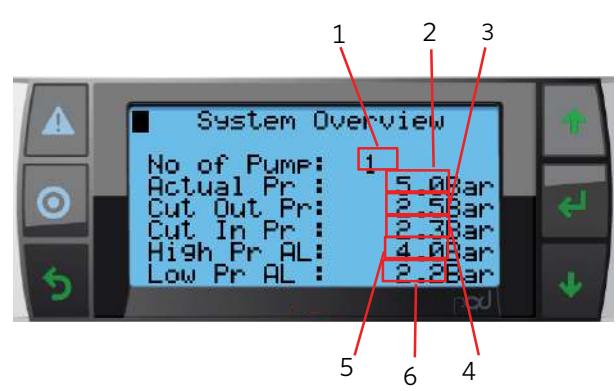
#### TWIN-SYSTEM SCREEN



### 21.1.2 TEST SCREEN



### 21.1.3 SYSTEM OVERVIEW



#### DESCRIPTION

This screen appears when powering up the unit. Show status of system's most important variables and navigation to all system screens.

#### DATA

<b>1</b> 3750 Status	Status Indicates whether system is ON or OFF.
<b>2</b> Pump Run Status	Indicates the pump number(s) which is/are running. Blank when no pumps running.
<b>3</b> Sy Pr	Indicates Actual system pressure
<b>4</b> Active Alarm	Indicates with text the active alarm with the highest priority. Blank when no active alarms

#### BUTTONS

<b>5</b> Local-Remote	Navigator button that allows changing the 3750 to Remote or Local. Local will turn on the system immediately. Remote causes the 3750 to follow the BAS signal (Serial communication) to turn on or OFF
<b>6</b> Setup	Navigates to Setup screen. Access to Setup screens requires a password
<b>7</b> Test	Navigates to Test screen

#### DATA

<b>1</b> Test Mode	Navigator button that allows to Enable/Disable the test mode. When user exit from the screen, Test mode automatically get disabled.
<b>2</b> Pump status (P1 & P2)	Indicates the Pump Run/Stop Status.
<b>3</b> Jog mode	Navigator button that allows to ON/OFF the Pump (Momentary Operation).

#### TIMER MODE

<b>4</b> Time	Allows User to Set Pump Runtime in seconds.
<b>5</b> Command	Navigator button that allows to ON/OFF the Pump. The on State will be active until the timer expires.
<b>6</b> Sy Pr	Indicates actual system pressure

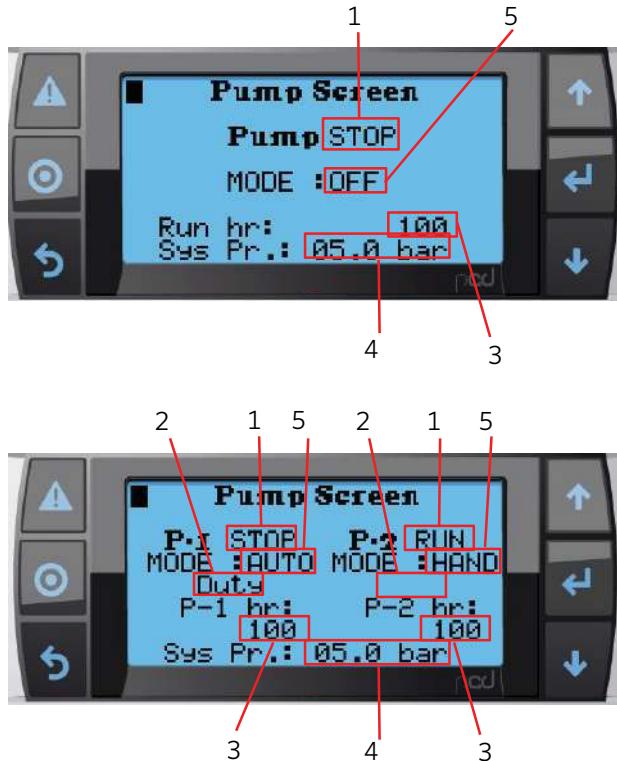
#### DESCRIPTION

This screen show the overview of system parameters

#### DATA

<b>1</b> No of Pumps	Indicates number is pumps configured
<b>2</b> Actual Pr	Indicates actual pressure from the probe
<b>3</b> Cut Out Pr	Indicates pressure at which pumps will stop
<b>4</b> Cut in Pr	Indicates the pump at which pump triggers ON
<b>5</b> High Pr	Indicates maximum pressure pump trip and generating max Pr alarm
<b>6</b> Low Pr	Indicates minimum pressure for alarm generation.

#### 21.1.4 PUMP CONTROL SCREEN



#### DESCRIPTION

This screen allows user to control Pump operations.

#### DATA

<b>1</b> Pump (P-1, P-2) Status	Indicates the Pump Run/Stop status
<b>2</b> Duty / Standby	Indicates Duty/Standy status of Pump if Pump is placed in Auto Mode Blank in Hand or Off mode
<b>3</b> Run hr	Indicates the total Pump running hours
<b>4</b> System Pressure	Indicates actual system pressure at the Probe

#### BUTTONS

<b>5</b> Mode	Navigator button that allows changing Pump Mode for Hand, off and Auto Modes.
---------------	---

#### DIAGNOSTICS

#### 21.1.5 SUPPORT INFORMATION



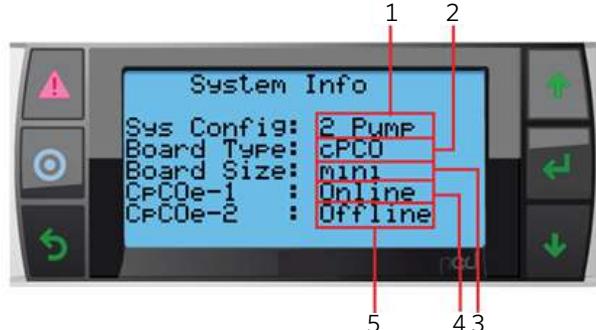
#### DESCRIPTION

This screen show support information

#### DATA

<b>1</b> E-mail ID	Displays email ID for requesting a support for 3750 unit or any other clarifications
<b>2</b> Sw Ver	Indicates current version of control software installed into controller
<b>3</b> OS Ver	Indicates os installed into controller
<b>4</b> Boot Ver	Indicates boot version installed into controller

#### 21.1.6 SYSTEM INFORMATION



#### DESCRIPTION

This screen show system information

#### DATA

<b>1</b> Sys Config	Indicates the number of pumps configured.
<b>2</b> Board Type	Indicates type of controller board used.
<b>3</b> Board Size	Indicates Size of controller board used.
<b>4</b> CpCoe-1	Indicates the expansion-1 module status (Online/Offline).
<b>5</b> CpCoe-2 (for twin system only)	Indicates the expansion-2 module status (Online/Offline).

**ALARMS****21.1.7 ALARM SCREEN****DESCRIPTION**

This screen allows user view and reset alarms

**DATA**

<b>1</b> Alarms	Alarms will be displayed based on priority shown in alarm section below.
<b>2</b> No Alarm	Indicate there is no alarm

**BUTTONS**

<b>3</b> Alarm Reset	Reset can be done pressing the alarm button a single time to reset current alarm and long press (3 sec) to reset all alarms at once.
<b>4</b> Data Logger	If no alarms are present, pressing the <b>Enter</b> button will navigate to the data logger screen

**21.1.8 ALARM LOG SCREEN****DESCRIPTION**

This screen allows user view alarm logs

**DATA**

<b>1</b> Alarm logs	System can keep logs in this screen
<b>2</b> No Logs	Indicate there is no alarm log

**BUTTONS**

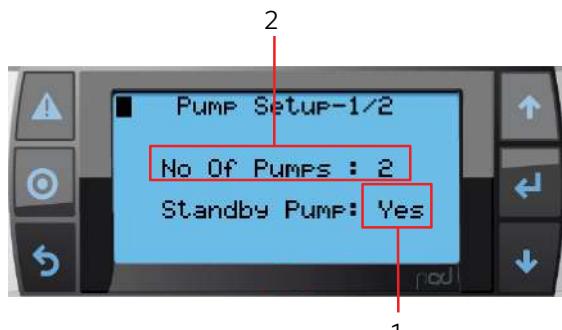
<b>3</b> Up and Down Keys	Scrolls between recent alarm logs
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**21.2 SETUP SCREENS****21.2.1 LOGIN****DESCRIPTION**

This screen allows user to login to access setting screens

**BUTTONS**

<b>1</b> Password	Allows user to enter the password. after entering the correct password press enter key its navigates to settings screens.
<b>2</b> Wrong Password	If user enter wrong password and press Enter key, then system will be reset to default <b>2300</b>
<b>3</b> Level-1 Password	<b>2323</b> is the level-1 password. Using this password operator can change the basic parameters of the system

**21.2.2 PUMP SETUP - 1****DESCRIPTION**

This screen allows user to access Pump Setup

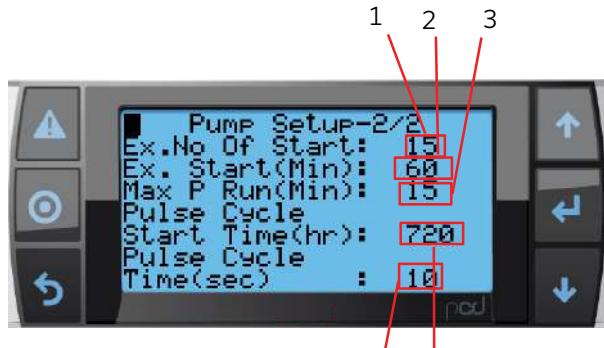
**DATA**

<b>1</b> Standby Pump	If 1 Pump selected, then standby pump is NO. If 2 pump selected then standby pump is YES
-----------------------	--

**BUTTONS**

<b>2</b> No. of Pumps	Allows user to change number of pumps based on system configuration.
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### 21.2.3 PUMP SETUP - 2



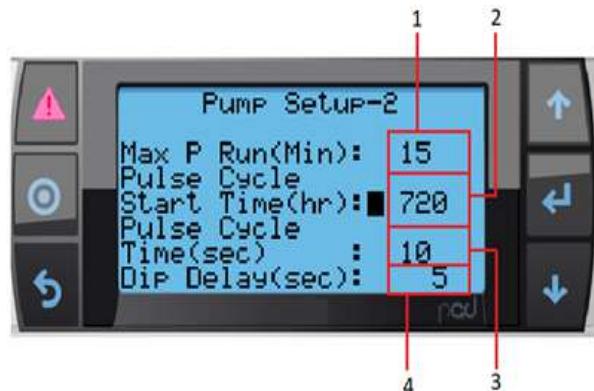
#### DESCRIPTION

This screen allows user to access extended Pump Setup

#### BUTTONS

<b>1</b> Ex. No. of Start	Allows user to change excessive number of starts in a desired amount of time.
<b>2</b> Ex. Start (Min)	Allows user to change time in Min for monitoring Ex. No. of starts in desired time.
<b>3</b> Max P Run (Min)	Allows user to set max pump run time for Auto Operation
<b>4</b> Pulse Cycle Start Time (Hr)	Allows user to set time to pulse Pump for maintaining the healthiness of system.
<b>5</b> Pulse Cycle Time (Sec)	Allows user to Set time for which Pump should run in Pulse cycle mode

### 21.2.4 PUMP SETUP - 2 (TWIN SYSTEM ONLY)



#### DESCRIPTION

This screen allows user to access Pump Setup

#### BUTTONS

<b>1</b> Max P Run (MIN)	Allows user to set max pump run time for Auto Operation.
<b>2</b> Pulse Cycle Start Time (Hr)	Allows user to set time to pulse Pump for maintaining the healthiness of system.
<b>3</b> Pulse Cycle Time (Hr)	Allows user to Set time for which Pump should run in Pulse cycle mode.
<b>4</b> Dip Delay	Allows user to set time for pump to monitor pressure before starting.

### 21.2.5 PRESSURE SETUP

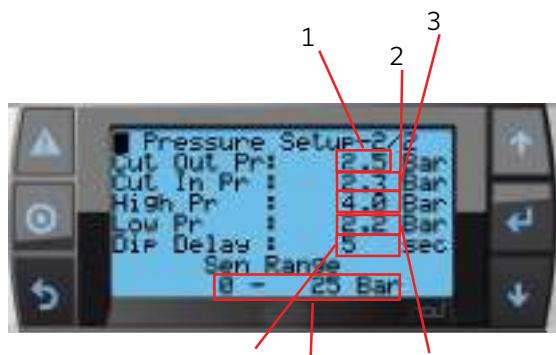


#### DESCRIPTION

This screen allows user to select pressure & sensor unit.

#### BUTTONS

Pressure unit	Allows user to navigate units between Bar, PSI, KPa, m and ft.
Sensor unit	Allows user to navigate units between Bar, PSI, KPa, m and ft.

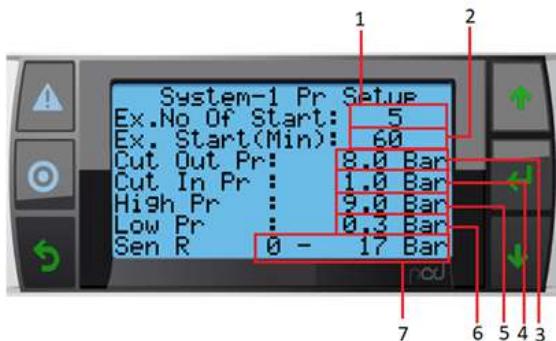


#### DESCRIPTION

This screen allows user to access Pressure Setup

#### BUTTONS

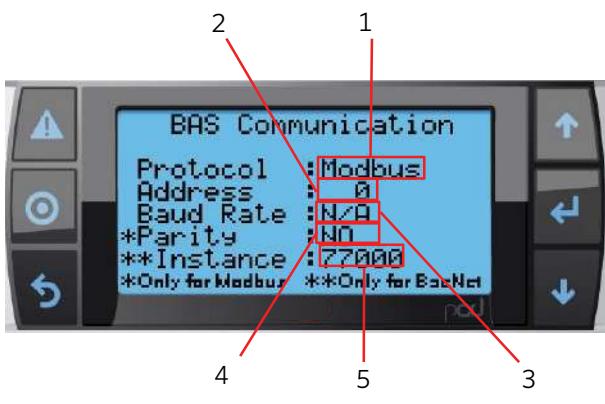
<b>1</b> Cut Out Pr	Allows user to change the Cut Out pressure for the Pump to stop operating
<b>2</b> Cut In Pr	value from 0.2 Bar to 2.3 Bar
<b>3</b> High Pr	Allows user to set High Pressure limit for Pump safety and generate alarm
<b>4</b> Low Pr	Allows user to set Low Pressure limit and to generate alarm
<b>5</b> Dip Delay	Allows user to set time for pump to monitor pressure before starting.
<b>6</b> Sen Range	Allows user to scale pressure sensor for different ranges

**21.2.6 PRESSURE SETUP (TWIN SYSTEM ONLY)****DESCRIPTION**

This screen allows user to access Pressure Setup

**BUTTONS**

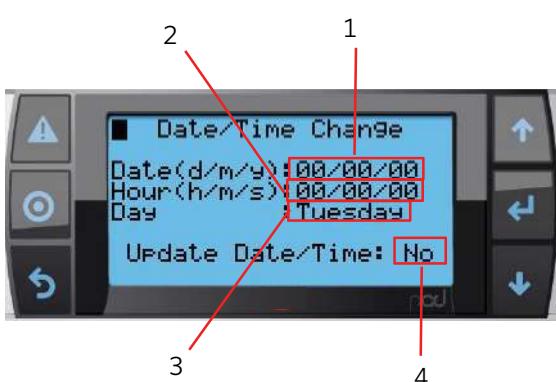
<b>1</b> Ex.No of Start	Allows user to change excessive number of starts in a desired duration of time.
<b>2</b> Ex.No of Start (MIN)	Allows user to change time (in Min) for monitoring Ex. No. of starts in desired time.
<b>3</b> Cut Out Pr	Allows user to change the Cut-Out pressure for the Pump to stop operating.
<b>4</b> Cut In Pr	Allows user to change the Cut In at which pump will start.
<b>5</b> High Pr	Allows user to set High Pressure limit for Pump safety and generate alarm.
<b>6</b> Low Pr	Allows user to set Low Pressure limit and to generate alarm.
<b>7</b> Sen Range	Allows user to scale pressure sensor for different ranges.

**21.2.7 BAS COMMUNICATION****DESCRIPTION**

This screen allows user to access BAS communication Setup

**BUTTONS**

<b>1</b> Protocol	Allows user to navigate between Modbus, BACnet or No select (N/A)
<b>2</b> Address	Allows to change Address for Modbus and BACnet
<b>3</b> Baud Rate	Allows user to Navigate baud Rate between 9600, 19200, 38400
<b>4</b> Parity	Allows user to Navigate Parity between ODD, EVEN and NO. This is only for Modbus connection
<b>5</b> Instance	Allows user to Set BACnet Instance. This is only for BACnet Connection

**21.2.8 DATE/TIME CHANGE****DESCRIPTION**

This screen allows user to access to change controller Date and Time

**BUTTONS**

<b>1</b> Date	Allows user to update Date to a controller in format DD/MM/YY
<b>2</b> Hour	Allows user to update Hour to a controller in format HH/MM/SS
<b>3</b> Day	Upon entering Date and Time system will update the Day for that Date
<b>4</b> Update Settings	Allows user to Navigate Parity between ODD, EVEN and NO. This is only for Modbus connection

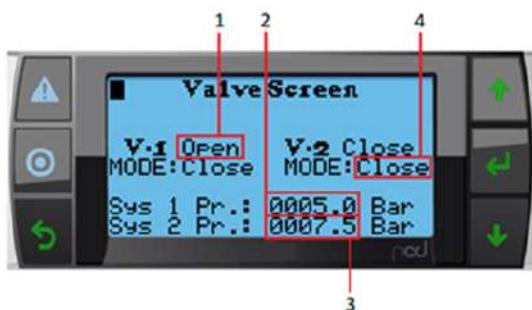
### 21.2.9 PASSWORD SCREEN



#### DATA

Password Protection	Allows user to Enable/Disable the Password protection.
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### 21.2.10 VALVE SETUP (TWIN SYSTEM ONLY)



#### DESCRIPTION

This screen allows user to access VALVE Setup

#### DATA

1 Valve 1	Indicates the Valve 1 status.
2 Sys 1 Pr	Indicates the system 1 pressure.
3 Sys 2 Pr	Indicates the system 2 pressure.

#### BUTTONS

4 MODE	Can command the Isolation Valve when the pumps are not running.
--------	---

## 22.0 PARAMETERS

SINGLE SYSTEM PARAMETERS				
PARAMETER	DEFAULT	MIN	MAX	UNIT OF MEASURE
Number of Pumps	2	1	2	Numeric
Excessive No. of Start	15	1	99	Numeric
Excessive Start minutes	60	1	720	Minutes
Maximum Pump Run time	15	1	990	Minutes
Pulse Cycle Start Time (Hour)	720	1	8640	Hours
Pulse Cycle Time (Sec)	10	1	99	Seconds
Cut out Pressure	1	0	Pump COP High Limit	Bar/PSI/Kpa/m/ft
Cut In Pressure	0.7	0	Pump COP High Limit	Bar/PSI/Kpa/m/ft
High Pressure Alarm	1.3	0	Pressure Transducer High Range	Bar/PSI/Kpa/m/ft
Low Pressure Alarm	0.3	0	Pressure Transducer High Range	Bar/PSI/Kpa/m/ft
Dip Delay	5	0	100	Seconds
Pressure Transducer Range	0-25(4-20mA) / 0-17(0-5V)	0	9999	Bar/PSI/Kpa/m/ft
BAS Protocol	Modbus	-	-	-
BAS Address	2	1	127	Numeric
BAS Baud Rate	19200	-	-	-
BAS Modbus Parity	NO	-	-	-
BAS BACnet Instance	77000	77000	77999	Numeric

#### NOTE:

**PARAMETER BAS PROTOCOL:** N/A, Modbus or BACnet

**PARAMETER BAS BAUD RATE:** 9600, 19200 or 38400

**PARAMETER BAS MODBUS PARITY:** NO, ODD or EVEN

**TWIN SYSTEM PARAMETERS**

PARAMETER	DEFAULT	MIN	MAX	UNIT OF MEASURE
Number of Pumps	2	1	2	Numeric
System-1 Excessive No. of Start	5	1	99	Numeric
System-1 Excessive Start minutes	60	1	720	Minutes
System-2 Excessive No. of Start	5	1	99	Numeric
System-2 Excessive Start minutes	60	1	720	Minutes
Maximum Pump Run time	15	1	990	Minutes
Pulse Cycle Start Time(Hour)	720	1	8640	Hours
Pulse Cycle Time(Sec)	10	1	99	Seconds
System-1 Cut out Pressure	1	0	Pump COP High Limit	Bar / PSI / Kpa / m / ft
System-1 Cut In Pressure	0.7	0	Pump COP High Limit	Bar / PSI / Kpa / m / ft
System-1 High Pressure Alarm	1.3	0	Pressure Transducer High Range	Bar / PSI / Kpa / m / ft
System-1 Low Pressure Alarm	0.3	0	Pressure Transducer High Range	Bar / PSI / Kpa / m / ft
System-2 Cut out Pressure	1	0	Pump COP High Limit	Bar / PSI / Kpa / m / ft
System-2 Cut In Pressure	0.7	0	Pump COP High Limit	Bar / PSI / Kpa / m / ft
System-2 High Pressure Alarm	1.3	0	Pressure Transducer High Range	Bar / PSI / Kpa / m / ft
System-2 Low Pressure Alarm	0.3	0	Pressure Transducer High Range	Bar / PSI / Kpa / m / ft
Dip Delay	5	0	100	Seconds
System-1 Pressure Transducer Range	0-25(4-20mA) / 0-17(0-5V)	0	9999	Bar / PSI / Kpa / m / ft
System-2 Pressure Transducer Range	0-25(4-20mA) / 0-17(0-5V)	0	9999	Bar / PSI / Kpa / m / ft
BAS Protocol	N/A	-	-	-
BAS Address	1	1	127	Numeric
BAS Baud Rate	19200	-	-	-
BAS Modbus Parity	NO	-	-	-
BAS BACnet Instance	77000	77000	77999	Numeric

**NOTE:****PARAMETER BAS PROTOCOL:** N/A, Modbus or BACnet**PARAMETER BAS BAUD RATE:** 9600, 19200 OR 38400**PARAMETER BAS MODBUS PARITY:** NO, ODD OR EVEN

## 23.0 WARNINGS AND ALARMS

The 3750 constantly monitors its own performance and will alarm in the event that a fault is detected. These alarms are communicated through the HMI and can be monitored in complete detail by a BMS system through the Modbus or BACnet connection.

In addition, a basic monitoring can be setup using the volt free contacts.

The 3750-single system has 9, whereas twin system has 13 volt-free contacts (VFC) for communicating faults in the unit or the system alarms it is fitted to. Pump Run VFCs are provided as Optional.

The General/Common alarm (G) - NO<sub>3</sub> (Main) is triggered by any kind of alarm on the unit which may require immediate attention.

The other alarms indicate a major fault with either the 3750 itself or the system it is monitoring. These alarms should be acted on immediately and could be appropriate to use as a Boiler Interlock.

### 23.1 BREAK TANK LOW/HIGH WATER LEVEL

#### 23.1.1 LOW WATER LEVEL

The low water level alarm will be activated when the break tank level low switch tripped.

##### FUNCTIONS

- All pump(s) will stop running
- Activates LLL alarm on display
- Activates Low water alarm and Common Alarm VFCs.

##### NOTE

This is a major alarm. In Low level alarm condition the system will stop (pumps) until the water level returns to normal.

Once level rises above the switch, the unit will then auto reset and operate as normal.

#### 23.1.2 HIGH WATER LEVEL

The high water level alarm will be activated when the break tank high level switch tripped.

##### FUNCTIONS

- Activates HLL alarm on display
- Activates High water alarm and Common Alarm VFCs.

##### NOTE

This is a minor alarm. In High Level alarm condition the system will not stop, pumps operation will be unaffected.

Once level drops below the switch, the unit will then auto reset and operate as normal.

### 23.2 LOW SYSTEM PRESSURE

The low system pressure alarm will be activated when the pressure at the respective transducer drops below the value set for low pressure Parameter.

##### FUNCTIONS

- Activates LPr alarm on display
- Activates Boiler Interlock alarm on display
- Activates Low system pressure, Boiler interlock and Common Alarm VFCs.

##### NOTE

This is a major alarm. The unit will stop pumping to the system with the low pressure until the pressure returns to normal, if the low pressure is due to a system leak, it needs to be rectified and system fill pressure restored.

The unit will then auto reset and operate as normal.

### 23.3 HIGH SYSTEM PRESSURE

The high system pressure alarm will be activated when the pressure at the transducer rises above the value set for High Pressure Parameter.

##### FUNCTIONS

- Activates HPr alarm on display
- Activates Boiler Interlock alarm on display
- Activates High system pressure, Boiler interlock and Common Alarm VFCs.

##### NOTE

This is a major alarm. The unit will stop pumping to the system with the high pressure alarm until it returns to normal.

The unit will then auto reset and operate as normal.

### 23.4 TRANSDUCER FAILURE

The transducer failure alarm will be activated when the transducer loses its signal.

##### FUNCTIONS

- All pump(s) will stop running
- Activates SF alarm on display
- Transducer failure - if the sensor exceeds check values, activates Common Alarm contact (G)

##### NOTE

This is a major alarm. The system will stop all pumps, fault must be rectified before the unit can operate as normal.

This alarm must be manually reset.

### 23.5 PUMP 1 TRIPPED

In 1 Pump configuration system, Pump-1 trip alarm is activated, if the pump is tripped during operation, either in hand or auto.

#### FUNCTIONS

- Pump will stop running.
- Activates **PF1** alarm on display
- Activates Pump 1 tripped and Common Alarm VFCs

#### NOTE

Pump fault need to be rectified and alarm to be manually reset before the unit can resume operation of the tripped pump.

### 23.6 PUMP 2 TRIPPED

In 2 Pumps configuration system, if a single pump is tripped during operation, either in hand or auto, it will activate the following:

#### FUNCTIONS

- Pump 2 will stop running.
- Activates either **PF2** alarm on display
- Activates Pump 2 tripped and Common Alarm VFCs

#### NOTE

Pump fault need to be rectified and alarm to be manually reset before the unit can resume operation of the tripped pump.

### 23.7 ALL PUMPS TRIPPED

If all the pumps on the unit are tripped during the operation, either in hand or auto mode, it will activate the following:

#### FUNCTIONS

- Activates **PFA** alarm on display
- Activates Pump 1 & 2 tripped Common Alarm VFCs.

#### NOTE

This is a major alarm. The unit will not operate with the pumps tripped. The fault will need to be rectified and alarm to be manually reset before the unit can resume operation.

### 23.8 PUMP RUN

If the pump(s) is running it will activate the following:

#### FUNCTIONS

- Shows Pump run status on the main screen
- Activates Pump Run VFC (Optional).

### 23.8 MAXIMUM PUMP RUN TIME

The maximum pump run time alarm will be activated if the pump runs for an excessive amount of time.

#### FUNCTIONS

- Pump(s) will stop running.
- Activates **Prt** alarm on display
- Activates Common Alarm contact (G)

#### NOTE

This is a major alarm. Excessive pump run time may indicate a system fault such as a slow leak. The problem must be rectified and this alarm must be reset manually.

### 23.9 EXCESSIVE STARTS

The excessive start alarm will be activated if any pump starts an excessive number of times over a certain period of time for a particular system (Hand mode starts are not counted).

#### FUNCTIONS

- Activates **Est** alarm on display
- Activates Excessive starts and Common Alarm VFCs

#### NOTE

This is a major alarm. Excessive pump starts may indicate a system fault such as a slow leak. The problem must be rectified and this alarm must be reset manually.

### 23.10 BOILER INTERLOCK

Boiler interlock alarm would be activated when the pressure at the transducer rises above the set high pressure limit, drops below the set low pressure limit or the unit loses the power.

#### FUNCTIONS

- Activates Boiler interlock alarm on display
- Activates Boiler interlock and Common Alarm VFCs

#### NOTE

This is a major alarm. The system will stop pumping to the system with the low or high pressure alarm until it returns to normal.

The unit will then auto reset and operate as normal.

**23.11 OFFLINE ALARM \_ CPCOE**

The offline alarm(s) would be activated if the expansion modules loses the communication to the main controller c.pco. mini.

**FUNCTIONS**

- Activates Device offline and Common Alarm on display
- Activates Common Alarm contact (G)

**NOTE**

This is a major alarm. This would cause all the contacts on the Expansion modules including Boiler interlock(s) to stop working. It will not stop the unit from pumping but would require an immediate action.

All the VFCs are NO contacts except for the Boiler Interlocks which have both NO and NC contacts. To achieve the open contact in the case of power loss a signal of 10V is provided to the Boiler Interlock contacts in healthy condition and 0V in the case of **low pressure, high pressure or power failure alarms**, see **TABLE 1**.

**TABLE 1**

TYPE OF CONTACT (ON J12)	HEALTHY STATUS	ALARM STATUS
NC6 (Exp.1)	open	close
NO6 (Exp.1)	close	open
NC6 (Exp.2)	open	close
NC6 (Exp.2)	close	open

See the wiring diagram for other volt-free contacts.

**SERVICE REMINDER**

The service reminder warning is displayed ten months after being activated.

**FUNCTIONS**

- Activates **Ser** on display

**NOTE**

This is not an alarm and does not indicate a system or unit fault, but will continue to be displayed until the unit receives a service from an Armstrong Service Engineer or a registered Armstrong Service provider.

Call Armstrong service to arrange service Visit.

**24.0 ALARM LIST**

SINGLE SYSTEM ALARMS						
ALARM	DESCRIPTION	PRIORITY	BLINKING	DISPLAY	PUMP	STOP RESET
Pressure transducer	Transducer failure (SF) - If the sensor exceeds check values	2	Yes	SF	Yes	ONLY MAN
Power pump all	Pump 1&2 Tripped (PFA)	3	Yes	PFA	Yes	ONLY MAN
Max pump time	Max Pump Run Time (Prt)	4	Yes	Prt	Yes	ONLY MAN
Excessive starts	Excessive Pump Start (Est) - Programmable	5	Yes	Est	Yes	ONLY MAN
Low pressure	Low System Pressure (Lpr) - When the system pressure is below the required set point	6	Yes	LPr	Yes	ONLY AUTO
High pressure	High System Pressure (Hpr) - When the system pressure is above the required set point	7	Yes	HPr	Yes	ONLY AUTO
Low water	Low Water Level (LLL) - Not enough water in break tank	8	Yes	LLL	Yes	ONLY AUTO
High water	High Water Level (HLL)	9	Yes	HLL	No	ONLY AUTO
Power pump 1	Pump 1 Tripped (PF1)	10	Yes	PF1	Yes	ONLY MAN
Power pump 2	Pump 2 Tripped (PF2)	11	Yes	PF2	Yes	ONLY MAN
Service reminder	Service Reminder (ser) - When Commissioned, date for service reminder will be set. Armstrong service team can reset after new.	12	Yes	ser	No	ONLY MAN
Device offline	Device offline alarm - If the communication is lost between cPCO-mini and cPCOe expansion unit.	13	Yes	13	No	ONLY AUTO
Boiler interlock	Boiler interlock (HPr/LPr) - If the pressure above or below the required setpoint for system.	15	Yes	15	Yes	ONLY AUTO

TWIN SYSTEM ALARMS						
ALARM	DESCRIPTION	PRIORITY	BLINKING	DISPLAY	PUMP	STOP RESET
Pressure Transducer - 1	Sys1 Transducer failure (SF1) - If the sensor exceeds check values	2	Yes	SF1	Yes	ONLY MAN
Pressure Transducer - 2	Sys2 Transducer failure (SF2) - If the sensor exceeds check values	3	Yes	SF2	Yes	ONLY MAN
Power Pump all	Pump 1&2 tripped (PFA)	4	Yes	PFA	Yes	ONLY MAN
Max Pump time	Max Pump run Time (Prt)	5	Yes	Prt	Yes	ONLY MAN
Excessive starts - 1	Sys1 Excessive Pump Start (Est1) - Programmable	6	Yes	Est1	Yes	ONLY MAN
Excessive starts - 2	Sys2 Excessive Pump Start (Est2) - Programmable	7	Yes	Est2	Yes	ONLY MAN
System - 1 Low Pressure	Sys1 Low System Pressure (LPr1) - When the system pressure is below the required set point	8	Yes	LPr1	Yes	ONLY AUTO
System - 2 Low Pressure	Sys2 Low System Pressure (LPr2) - When the system pressure is below the required set point	9	Yes	LPr2	Yes	ONLY AUTO
System - 1 High Pressure	Sys1 High System Pressure (HPr1) - When the system pressure is above the required set point	10	Yes	HPr1	Yes	ONLY AUTO
System - 2 High Pressure	Sys2 High System Pressure (HPr2) - When the system pressure is above the required set point	11	Yes	HPr2	Yes	ONLY AUTO
Low water	Low Water Level (LLL) - Not enough water in break tank	12	Yes	LLL	Yes	ONLY AUTO
High water	High Water Level (HLL)	13	Yes	HLL	No	ONLY AUTO
Power Pump 1	Pump 1 Tripped (PF1)	14	Yes	PF1	Yes	ONLY MAN
Power Pump 2	Pump 2 Tripped (PF2)	15	Yes	PF2	Yes	ONLY MAN
Device Offline - 1	Device 1 Offline - If the communication is lost between cPCO-mini and cPCOe-1 expansion unit.	16	Yes	16	Yes	ONLY AUTO

**TWIN SYSTEM ALARMS**

ALARM	DESCRIPTION	PRIORITY	BLINKING	DISPLAY	PUMP	STOP RESET
Service Reminder	Service Reminder(ser) - When Commissioned, date for service reminder will be set. Armstrong service team can reset after new.	17	Yes	ser	No	ONLY MAN
Device Offline - 2	Device 2 Offline - If the communication is lost between cPCO-mini and cPCOe-2 expansion unit.	19	Yes	19	No	ONLY AUTO
Boiler Interlock - 1	Boiler Interlock 1 - If the pressure above or below the required setpoint for system - 1	20	Yes	BI1	Yes	ONLY AUTO
Boiler Interlock - 2	Boiler Interlock 2 - If the pressure above or below the required setpoint for system - 2	21	Yes	BI2	Yes	ONLY AUTO

**25.0 MAINTENANCE CHECK**

Regular check (Every 3 Months)

- Check the pump(s) are developing the correct pressure and are not noisy or vibrating or air-locked.
- Check that the mechanical seal is not leaking.
- Check that the motor is not overheating.
- Checks at six monthly intervals
- Check electrical installation thoroughly for defects. Ensure that the earth connections are making good contact.
- Check that the break tank is clean.
- Check the operation of the high and low pressure set points.
- Check low level float switch, (high if fitted).
- Check vessel air charge

**MAINTENANCE**

For Maintenance Please contact our Service division on [service@armstrongfluidtechnology.com](mailto:service@armstrongfluidtechnology.com)

Phone: +44(0)8444 145 145

**26.0 FAULT FINDING CHART**

SECTION	PROBLEM
1	Pump(s) run continuously
2	Pump(s) will not run
3	High pressure
4	Low pressure
5	Low water level

**26.1 PUMP(S) RUN CONTINUOUSLY**

SYMPTOM/CAUSE	ACTION
Very high leakage rate	Check system for leaks. Check for split in vessel bag via the air valve. Check non-return valve is not bypassing through second pump.
Faulty electrical circuit	Check that all wiring is in place and not loose at any connections
System pressure setting set too high	Compare system setting pressure (System data on display nameplate). With Fill pressure ( $\rho_f$ ) on data plate. To reset consult Armstrong Service Dept.
Air lock	Check the pumps for presence of air and ensure that the air is removed.

**26.2 PUMP(S) WILL NOT RUN**

SYMPTOM/CAUSE	ACTION
Pump(s) tripped	Check miniature circuit breakers and Reset if necessary.
Faulty electrical circuit	Check that all wiring is in place and not loose at any connections
Pump(s) burnt-out seized	Repair or replace pumps.
Mode of operation	Check if the unit is enabled for bas control or local control.

**26.3 HIGH PRESSURE**

SYMPTOM/CAUSE	ACTION
Incorrect capacity of vessel or larger system than originally specified	Check system and vessel capacity by recalculating sizes.
Failure to maintain air charge	Isolate and drain the vessel. Adjust the air charge to match the fill pressure of the system

**26.4 LOW PRESSURE**

SYMPTOM/ CAUSE	ACTION
Pump(s) tripped	Check miniature circuit breakers and reset if necessary
Pump(s) burnt-out seized	Repair or replace pumps
System leakage rate very high	Check system for leaks. Check for split vessel bag via the air valve. Check non-return valve is not bypassing through second pump

SYMPTOM/ CAUSE	ACTION
No water in tank or spasmodic water supply	Ensure that incoming water supply is functioning i.e. check isolating valve is open, ballcock operates and water is clean
Delivery/suction isolating valve closed	Open valves.
Suction strainer(s) obstructed	Repair or replace strainers
Air lock	Check the pumps for presence of air and ensure that the air is removed.

**26.5 LOW WATER LEVEL****BREAK TANK**

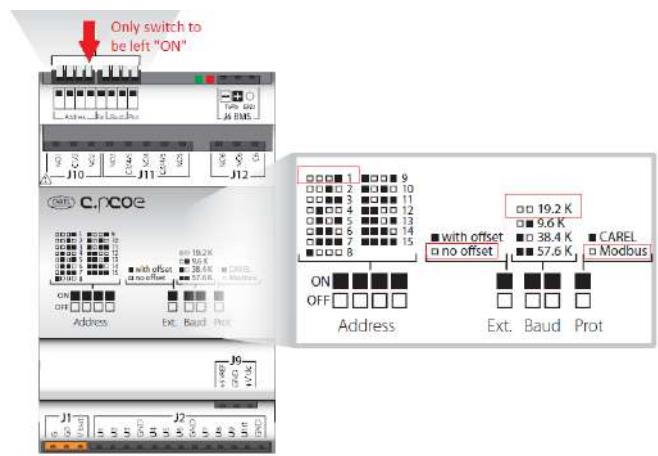
SYMPTOM/CAUSE	ACTION
No water in break tank or intermittent water supply	Ensure that incoming water supply is functioning (i.e. check isolating valve is open, ballcock operates and water is clean).
Incoming water pressure is not sufficient	Increase the water pressure, Consult Armstrong Service Dept.

**ALARM**

SYMPTOM/CAUSE	ACTION
Faulty electrical circuit	Check that all wiring is in place and not loose at any connections
Broken or damaged float switch	Replacement float switch required

**26.6 OFFLINE ALARM \_ CPCOE**

SYMPTOM/CAUSE	ACTION
c.pcoe loses connection to c.pco. mini	Check the wiring. All the dip switches on c.pcoe under J10 port must be off except the one highlighted in the below picture  i.e. Address=1. For a twin-system unit cpcoe-1 needs to have Address=1 and cpcoe-2 needs to have Address=2.



**Building Automation System (Single System) - Modbus RTU**

<b>MODBUS ADDRESS</b>	<b>SIGNAL TYPE</b>	<b>DATA TYPE</b>	<b>READ/ WRITE</b>	<b>DESCRIPTION</b>	<b>RANGE</b>	<b>UNITS</b>
1	Digital	Bool	R/W	Remote Start	ON/OFF	Toggle
2	Digital	Bool	R/W	Alarm Reset	ON/OFF	Toggle
40001	Analog	Integer	R/W	Pump 1 Mode	0- Off, 1-Hand,2-Auto	Numeric
40002	Analog	Integer	R/W	Pump 2 Mode	0- Off, 1-Hand,2-Auto	Numeric
40003	Analog	Integer	R/W	Number of Pumps	1 to 2	Numeric
40005	Analog	Integer	R/W	Excessive Number of Start NUM	1 to 99	Numeric
40007	Analog	Integer	R/W	Excessive Start MIN	1 to 720	Minute
40009	Analog	Real	R/W	Max Pump Run Time	1 to 990	Minute
40011	Analog	Real	R/W	Pump Pulse Cyc Start interval	1 to 8640	Hours
40014	Analog	Integer	R/W	Pump Pulse Cycle Time	1 to 99	Seconds
40015	Analog	Real	R/W	Pump Cut Out Fill Pressure	0 to Pump cop High Limit	Bar/PSI/Kpa/m/ft
40017	Analog	Real	R/W	Pump Cut In Fill Pressure	0 to Pump cop High Limit	Bar/PSI/Kpa/m/ft
40019	Analog	Real	R/W	High Pressure Alarm Setting	0 to Pressure Transducer High Range	Bar/PSI/Kpa/m/ft
40021	Analog	Real	R/W	Low Pressure Alarm Setting	0 to Pressure Transducer High Range	Bar/PSI/Kpa/m/ft
40023	Analog	Real	R/W	Pressure Dip Delay	0 to 100	Seconds
40025	Analog	Real	R/W	Pressure Transducer Zero Range	0 to 9999	Bar/PSI/Kpa/m/ft
40027	Analog	Real	R/W	Pressure Transducer High Range	0 to 9999	Bar/PSI/Kpa/m/ft
40030	Analog	Integer	R/W	BAS Protocol	0-Modbus, 1-BACnet, 2-N/A	Numeric
40031	Analog	Integer	R/W	BAS Address	1 to 127	Numeric
40032	Analog	Integer	R/W	BAS Baudrate	0-9600, 1-19200, 2-38400	Numeric
40033	Analog	Integer	R/W	Pressure Unit Selection	0-Bar, 1-PSI, 2-KPa, 3-meter, 4-foot	Units
40034	Analog	Integer	R/W	Pressure Unit Selection for Sensor	0-Bar, 1-PSI, 2-KPa, 3-meter, 4-foot	Units
30001	Analog	Real	R	Pressure Transducer		Bar/PSI/Kpa/m/ft
30004	Analog	Integer	R	Pump 1 Hour Run		Hours
30006	Analog	Integer	R	Pump 2 Hour Run		Hours
30008	Analog	Integer	R	Pump 1 HOA	0-Off, 1-Hand, 2-Auto	Numeric
30010	Analog	Integer	R	Pump 2 HOA	0-Off, 1-Hand, 2-Auto	Numeric
10001	Digital	Bool	R	Pump 1 Command	ON/OFF	
10002	Digital	Bool	R	Pump 1 Command	ON/OFF	
10003	Digital	Bool	R	Heater on Panel	ON/OFF	
10004	Digital	Bool	R	General Alarm	ON/OFF	
10005	Digital	Bool	R	Transducer Failure Alarm	ON/OFF	
10006	Digital	Bool	R	Both Pumps Tripped Alarm	ON/OFF	
10007	Digital	Bool	R	Max Pump Run Time Alarm	ON/OFF	
10008	Digital	Bool	R	Excessive Pump Start Alarm	ON/OFF	
10009	Digital	Bool	R	Low System Pressure Alarm	ON/OFF	
10010	Digital	Bool	R	High System Pressure Alarm	ON/OFF	
10011	Digital	Bool	R	Low Water Level Alarm	ON/OFF	
10012	Digital	Bool	R	High Water Level Alarm	ON/OFF	
10013	Digital	Bool	R	Pump 1 Tripped Alarm	ON/OFF	
10014	Digital	Bool	R	Pump 2 Tripped Alarm	ON/OFF	
10015	Digital	Bool	R	Service Reminder Alarm	ON/OFF	
10016	Digital	Bool	R	Boiler Interlock Alarm	ON/OFF	
10017	Digital	Bool	R	Device Offline Alarm	ON/OFF	

**Building Automation System (Single System) - BACnet MS/TP**

BACNET ADDRESS	SIGNAL TYPE	DATA TYPE	READ/WRITE	DESCRIPTION	RANGE	UNITS
0	Digital	Bool	R/W	Remote Start	ON/OFF	Toggle
1	Analog	Integer	R/W	Pump 1 Mode	0- Off, 1-Hand, 2-Auto	
2	Analog	Integer	R/W	Pump 2 Mode	0- Off, 1-Hand, 2-Auto	
3	Analog	Integer	R/W	Number of Pumps	1 to 2	Numeric
4	Analog	Integer	R/W	Excessive Number of Start NUM	1 to 99	Numeric
5	Analog	Integer	R/W	Excessive Start MIN	1 to 720	Minute
6	Analog	Real	R/W	Max Pump Run Time	1 to 990	Minute
7	Analog	Real	R/W	Pump Pulse Cyc Start interval	1 to 8640	Hours
8	Analog	Integer	R/W	Pump Pulse Cycle Time	1 to 99	Seconds
9	Analog	Real	R/W	Pump Cut Out Fill Pressure	0 to Pump COP High Limit	Bar/PSI/Kpa/m/ft
10	Analog	Real	R/W	Pump Cut In Fill Pressure	0 to Pump COP High Limit	Bar/PSI/Kpa/m/ft
11	Analog	Real	R/W	High Pressure Alarm Setting	0 to Pressure Transducer High Range	Bar/PSI/Kpa/m/ft
12	Analog	Real	R/W	Low Pressure Alarm Setting	0 to Pressure Transducer High Range	Bar/PSI/Kpa/m/ft
13	Analog	Real	R/W	Pressure Dip Delay	0 to 100	Seconds
14	Analog	Real	R/W	Pressure Transducer Zero Range	0 to 9999	Bar/PSI/Kpa/m/ft
15	Analog	Real	R/W	Pressure Transducer High Range	0 to 9999	Bar/PSI/Kpa/m/ft
16	Analog	Integer	R/W	BAS Protocol	0-Modbus, 1-BACnet, 2-N/A	
17	Analog	Integer	R/W	BAS Address	1 TO 127	
18	Analog	Integer	R/W	BAS Baudrate	0-9600, 1-19200, 2-38400	
19	Analog	Integer	R/W	BACnet Instance	0-999	Numeric
41	Analog	Integer	R/W	Pressure Unit Selection	0-Bar, 1-PSI, 2-KPa, 3-meter, 4-foot	Units
42	Analog	Integer	R/W	Pressure Unit Selection for Sensor	0-Bar, 1-PSI, 2-KPa, 3-meter, 4-foot	Units
20	Analog	Real	R	Pressure Transducer		Bar/PSI/Kpa/m/ft
21	Analog	Integer	R	Pump 1 Hour Run		Hours
22	Analog	Integer	R	Pump 2 Hour Run		Hours
23	Analog	Integer	R	Pump 1 HOA	0-Off, 1-Hand, 2-Auto	
24	Analog	Integer	R	Pump 2 HOA	0-Off, 1-Hand, 2-Auto	
25	Digital	Bool	R	Pump 1 Command	ON/OFF	
26	Digital	Bool	R	Pump 2 Command	ON/OFF	
27	Digital	Bool	R	Heater ON Panel	ON/OFF	
28	Digital	Bool	R	General Alarm	ON/OFF	
29	Digital	Bool	R	Transducer Failure Alarm	ON/OFF	
30	Digital	Bool	R	Both Pumps Tripped Alarm	ON/OFF	
31	Digital	Bool	R	Max Pump Run Time Alarm	ON/OFF	
32	Digital	Bool	R	Excessive Pump Start Alarm	ON/OFF	
33	Digital	Bool	R	Low System Pressure Alarm	ON/OFF	
34	Digital	Bool	R	High System Pressure Alarm	ON/OFF	
35	Digital	Bool	R	Low Water Level Alarm	ON/OFF	
36	Digital	Bool	R	High Water Level Alarm	ON/OFF	
37	Digital	Bool	R	Pump 1 Tripped Alarm	ON/OFF	
38	Digital	Bool	R	Pump 2 Tripped Alarm	ON/OFF	
39	Digital	Bool	R	Service Reminder Alarm	ON/OFF	
40	Digital	Bool	R/W	Alarm Reset	ON/OFF	Toggle
43	Digital	Bool	R	Boiler Interlock Alarm	ON/OFF	
44	Digital	Bool	R	Device Offline Alarm	ON/OFF	

**Building Automation System (Twin System) - Modbus RTU**

<b>MODBUS ADDRESS</b>	<b>SIGNAL TYPE</b>	<b>DATA TYPE</b>	<b>READ/WRITE</b>	<b>DESCRIPTION</b>	<b>RANGE</b>	<b>UNITS</b>
1	Digital	Bool	R/W	Remote Start	ON/OFF	Toggle
2	Digital	Bool	R/W	Alarm Reset	ON/OFF	Toggle
40001	Analog	Integer	R/W	Pump 1 Mode	0-Off, 1-Hand, 2-Auto	Numeric
40002	Analog	Integer	R/W	Pump 2 Mode	0-Off, 1-Hand, 2-Auto	Numeric
40003	Analog	Integer	R/W	Number of Pumps	1 to 2	Numeric
40005	Analog	Integer	R/W	System 1 Excessive Number of Start NUM	1 to 99	Numeric
40007	Analog	Integer	R/W	System 1 Excessive Start MIN	1 to 720	Minute
40009	Analog	Integer	R/W	System 2 Excessive Number of Start NUM	1 to 99	Numeric
40011	Analog	Integer	R/W	System 2 Excessive Start MIN	1 to 720	Minute
40013	Analog	Integer	R/W	Pump Pulse Cycle Time	1 to 99	Seconds
40015	Analog	Real	R/W	Max Pump Run Time	1 to 990	Minute
40017	Analog	Real	R/W	Pump Pulse Cyc Start interval	1 to 8640	Hours
40019	Analog	Real	R/W	System 1 Pump Cut Out Fill Pressure	0 to Pump cop High Limit	Bar/PSI/Kpa/m/ft
40021	Analog	Real	R/W	System 1 Pump Cut In Fill Pressure-Diff	0 to Pump cop High Limit	Bar/PSI/Kpa/m/ft
40023	Analog	Real	R/W	System 1 High Pressure Alarm Setting	0 to System 1 Pressure Transducer High Range	Bar/PSI/Kpa/m/ft
40025	Analog	Real	R/W	System 1 Low Pressure Alarm Setting	0 to System 1 Pressure Transducer High Range	Bar/PSI/Kpa/m/ft
40027	Analog	Real	R/W	System 2 Pump Cut Out Fill Pressure	0 to Pump cop High Limit	Bar/PSI/Kpa/m/ft
40029	Analog	Real	R/W	System 2 Pump Cut In Fill Pressure-Diff	0 to Pump cop High Limit	Bar/PSI/Kpa/m/ft
40031	Analog	Real	R/W	System 2 High Pressure Alarm Setting	0 to System 2 Pressure Transducer High Range	Bar/PSI/Kpa/m/ft
40033	Analog	Real	R/W	System 2 Low Pressure Alarm Setting	0 to System 2 Pressure Transducer High Range	Bar/PSI/Kpa/m/ft
40035	Analog	Real	R/W	Pressure Dip Delay	0 to 100	Seconds
40037	Analog	Real	R/W	System 1 Pressure Transducer Zero Range	0 to 9999	Bar/PSI/Kpa/m/ft
40039	Analog	Real	R/W	System 1 Pressure Transducer High Range	0 to 9999	Bar/PSI/Kpa/m/ft
40041	Analog	Real	R/W	System 2 Pressure Transducer Zero Range	0 to 9999	Bar/PSI/Kpa/m/ft
40043	Analog	Real	R/W	System 2 Pressure Transducer High Range	0 to 9999	Bar/PSI/Kpa/m/ft
40046	Analog	Integer	R/W	BAS Protocol	1-N/A, 2-N/A, 3-Modbus, 4-BacNet	Numeric
40047	Analog	Integer	R/W	BAS Address	1 to 127	Numeric
40048	Analog	Integer	R/W	BAS Baudrate	0-9600, 1-19200, 2-38400	Numeric
40049	Analog	Integer	R/W	Pressure Unit Selection	0-Bar, 1-PSI, 2-KPa, 3-meter, 4-foot	Units
40050	Analog	Integer	R/W	Pressure Unit Selection for Sensor	0-Bar, 1-PSI, 2-KPa, 3-meter, 4-foot	Units
30001	Analog	Real	R	System 1 Pressure Transducer		Bar/PSI/Kpa/m/ft
30003	Analog	Real	R	System 2 Pressure Transducer		Bar/PSI/Kpa/m/ft
30006	Analog	Integer	R	Pump 1 Hour Run		Hours
30008	Analog	Integer	R	Pump 2 Hour Run		Hours
30010	Analog	Integer	R	Pump 1 HOA	0-Off, 1-Hand, 2-Auto	Numeric
30012	Analog	Integer	R	Pump 2 HOA	0-Off, 1-Hand, 2-Auto	Numeric
10001	Digital	Bool	R	Pump 1 Command	ON/OFF	
10002	Digital	Bool	R	Pump 1 Command	ON/OFF	

MODBUS ADDRESS	SIGNAL TYPE	DATA TYPE	READ/ WRITE	DESCRIPTION	RANGE	UNITS
10003	Digital	Bool	R	Heater ON Panel	ON/OFF	
10004	Digital	Bool	R	System 1 General Alarm	ON/OFF	
10005	Digital	Bool	R	System 1 Transducer Failure Alarm	ON/OFF	
10006	Digital	Bool	R	System 2 Transducer Failure Alarm	ON/OFF	
10007	Digital	Bool	R	Both Pumps Tripped Alarm	ON/OFF	
10008	Digital	Bool	R	Max Pump Run Time Alarm	ON/OFF	
10009	Digital	Bool	R	System 1 Excessive Pump Start Alarm	ON/OFF	
10010	Digital	Bool	R	System 2 Excessive Pump Start Alarm	ON/OFF	
10011	Digital	Bool	R	System 1 Low System Pressure Alarm	ON/OFF	
10012	Digital	Bool	R	System 1 High System Pressure Alarm	ON/OFF	
10013	Digital	Bool	R	System 2 Low System Pressure Alarm	ON/OFF	
10014	Digital	Bool	R	System 2 High System Pressure Alarm	ON/OFF	
10015	Digital	Bool	R	Low Water Level Alarm	ON/OFF	
10016	Digital	Bool	R	High Water Level Alarm	ON/OFF	
10017	Digital	Bool	R	Pump 1 Tripped Alarm	ON/OFF	
10018	Digital	Bool	R	Pump 2 Tripped Alarm	ON/OFF	
10019	Digital	Bool	R	Service Reminder Alarm	ON/OFF	
10020	Digital	Bool	R	System 1 Boiler Interlock Alarm	ON/OFF	
10021	Digital	Bool	R	System 2 Boiler Interlock Alarm	ON/OFF	
10022	Digital	Bool	R	Device 1 Offline Alarm	ON/OFF	
10023	Digital	Bool	R	Device 2 Offline Alarm	ON/OFF	

**Building Automation System (Twin System) - BACnet MS/TP**

BACNET ADDRESS	SIGNAL TYPE	DATA TYPE	READ/ WRITE	DESCRIPTION	RANGE	UNITS
0	Digital	Bool	R/W	Remote Start	ON/OFF	Toggle
1	Digital	Bool	R/W	Alarm Reset	ON/OFF	Toggle
2	Analog	Integer	R/W	Pump 1 Mode	0-Off, 1-Hand, 2-Auto	Numeric
3	Analog	Integer	R/W	Pump 2 Mode	0-Off, 1-Hand, 2-Auto	Numeric
4	Analog	Integer	R/W	Number of Pumps	1 to 2	Numeric
5	Analog	Integer	R/W	System 1 Excessive Number of Start NUM	1 to 99	Numeric
6	Analog	Integer	R/W	System 1 Excessive Start MIN	1 to 720	Minute
7	Analog	Integer	R/W	System 2 Excessive Number of Start NUM	1 to 99	Numeric
8	Analog	Integer	R/W	System 2 Excessive Start MIN	1 to 720	Minute
9	Analog	Real	R/W	Max Pump Run Time	1 to 990	Minute
10	Analog	Real	R/W	Pump Pulse Cyc Start interval	1 to 8640	Hours
11	Analog	Integer	R/W	Pump Pulse Cycle Time	1 to 99	Seconds
12	Analog	Real	R/W	System 1 Pump Cut Out Fill Pressure	0 to Pump cop High Limit	Bar/PSI/Kpa/m/ft
13	Analog	Real	R/W	System 1 Pump Cut In Fill Pressure-Diff	0 to Pump cop High Limit	Bar/PSI/Kpa/m/ft
14	Analog	Real	R/W	System 1 High Pressure Alarm Setting	0 to System 1 Pressure Transducer High Range	Bar/PSI/Kpa/m/ft

BACNET ADDRESS	SIGNAL TYPE	DATA TYPE	READ/WRITE	DESCRIPTION	RANGE	UNITS
15	Analog	Real	R/W	System 1 Low Pressure Alarm Setting	0 to System 1 Pressure Transducer High Range	Bar/PSI/Kpa/m/ft
16	Analog	Real	R/W	System 2 Pump Cut Out Fill Pressure	0 to Pump cop High Limit	Bar/PSI/Kpa/m/ft
17	Analog	Real	R/W	System 2 Pump Cut In Fill Pressure-Diff	0 to Pump cop High Limit	Bar/PSI/Kpa/m/ft
18	Analog	Real	R/W	System 2 High Pressure Alarm Setting	0 to System 2 Pressure Transducer High Range	Bar/PSI/Kpa/m/ft
19	Analog	Real	R/W	System 2 Low Pressure Alarm Setting	0 to System 2 Pressure Transducer High Range	Bar/PSI/Kpa/m/ft
20	Analog	Real	R/W	Pressure Dip Delay	0 to 100	Seconds
21	Analog	Real	R/W	System 1 Pressure Transducer Zero Range	0 to 9999	Bar/PSI/Kpa/m/ft
22	Analog	Real	R/W	System 1 Pressure Transducer High Range	0 to 9999	Bar/PSI/Kpa/m/ft
23	Analog	Real	R/W	System 2 Pressure Transducer Zero Range	0 to 9999	Bar/PSI/Kpa/m/ft
24	Analog	Real	R/W	System 2 Pressure Transducer High Range	0 to 9999	Bar/PSI/Kpa/m/ft
25	Analog	Integer	R/W	BAS Protocol	1-N/A, 2-N/A, 3-Modbus, 4-BacNet	Numeric
26	Analog	Integer	R/W	BAS Address	1 to 127	Numeric
27	Analog	Integer	R/W	BAS Baudrate	0-9600, 1-19200, 2-38400	Numeric
28	Analog	Integer	R/W	Pressure Unit Selection	0-Bar, 1-PSI, 2-KPa, 3-meter, 4-foot	Units
29	Analog	Integer	R/W	Pressure Unit Selection for Sensor	0-Bar, 1-PSI, 2-KPa, 3-meter, 4-foot	Units
30	Analog	Integer	R	System 1 Pressure Transducer		Bar/PSI/Kpa/m/ft
31	Analog	Integer	R	System 2 Pressure Transducer		Bar/PSI/Kpa/m/ft
32	Analog	Integer	R	Pump 1 Hour Run		Hours
33	Analog	Integer	R	Pump 2 Hour Run		Hours
34	Analog	Integer	R	Pump 1 HOA	0-Off, 1-Hand, 2-Auto	Numeric
35	Analog	Integer	R	Pump 2 HOA	0-Off, 1-Hand, 2-Auto	Numeric
36	Digital	Bool	R	Pump 1 Command	ON/OFF	
37	Digital	Bool	R	Pump 1 Command	ON/OFF	
38	Digital	Bool	R	Heater ON Panel	ON/OFF	
39	Digital	Bool	R	System 1 General Alarm	ON/OFF	
40	Digital	Bool	R	System 1 Transducer Failure Alarm	ON/OFF	
41	Digital	Bool	R	System 2 Transducer Failure Alarm	ON/OFF	
42	Digital	Bool	R	Both Pumps Tripped Alarm	ON/OFF	
43	Digital	Bool	R	Max Pump Run Time Alarm	ON/OFF	
44	Digital	Bool	R	System 1 Excessive Pump Start Alarm	ON/OFF	
45	Digital	Bool	R	System 2 Excessive Pump Start Alarm	ON/OFF	
46	Digital	Bool	R	System 1 Low System Pressure Alarm	ON/OFF	
47	Digital	Bool	R	System 1 High System Pressure Alarm	ON/OFF	
48	Digital	Bool	R	System 2 Low System Pressure Alarm	ON/OFF	
49	Digital	Bool	R	System 2 High System Pressure Alarm	ON/OFF	
50	Digital	Bool	R	Low Water Level Alarm	ON/OFF	
51	Digital	Bool	R	High Water Level Alarm	ON/OFF	
52	Digital	Bool	R	Pump 1 Tripped Alarm	ON/OFF	
53	Digital	Bool	R	Pump 2 Tripped Alarm	ON/OFF	
54	Digital	Bool	R	Service Reminder Alarm	ON/OFF	
55	Digital	Bool	R	System 1 Boiler Interlock Alarm	ON/OFF	
56	Digital	Bool	R	System 2 Boiler Interlock Alarm	ON/OFF	
57	Digital	Bool	R	Device 1 Offline Alarm	ON/OFF	
58	Digital	Bool	R	Device 2 Offline Alarm	ON/OFF	



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