Meets the Requirements of
NSF/ANSI 372

INLINE 1100 SPECPAK

Owner's Manual

Franklin Electric

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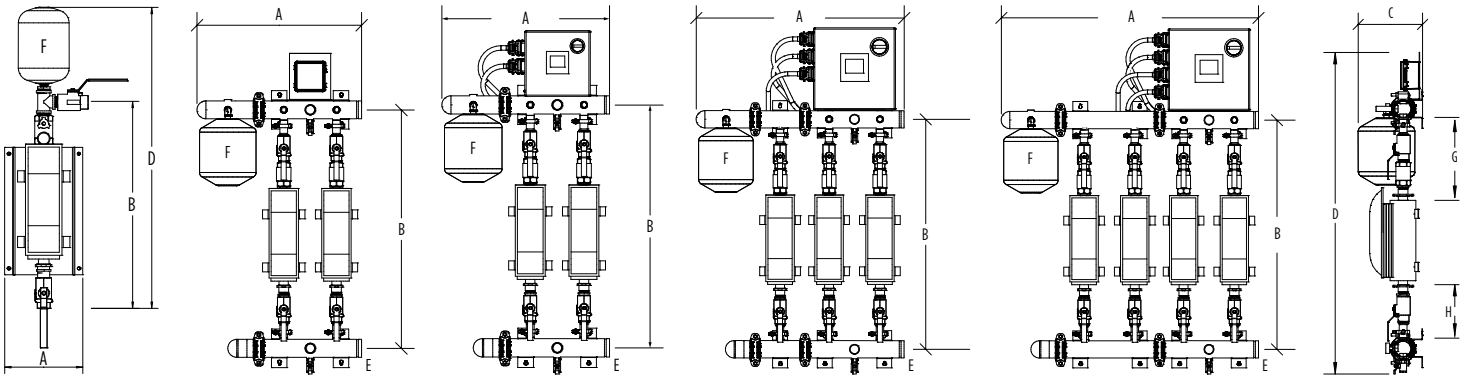
SPECIFICATIONS



Simplex **Duplex** **Duplex** **Triplex** **Quad** **Side View**

Model Nomenclature

2 I L - 2 3 0 3 3 - G 1 T - C

- (C) Suction-Side Check Valve (Blank: No Check Valve)
- (T) Transducer, (S) Switch
- (1) with Tank, (0) without Tank
- (G) Grooved (T) Threaded Connection Style
- Outlet Plumbing side in Inches (14, 1-1/4"; 3, 3.0")
- Inlet Plumbing Size in Inches (14, 1-1/4"; 3, 3.0")
- Input Voltage
- Product Family Type (Inline 1100)
- Number of Pumps in Package (1, 2, 3, 4)

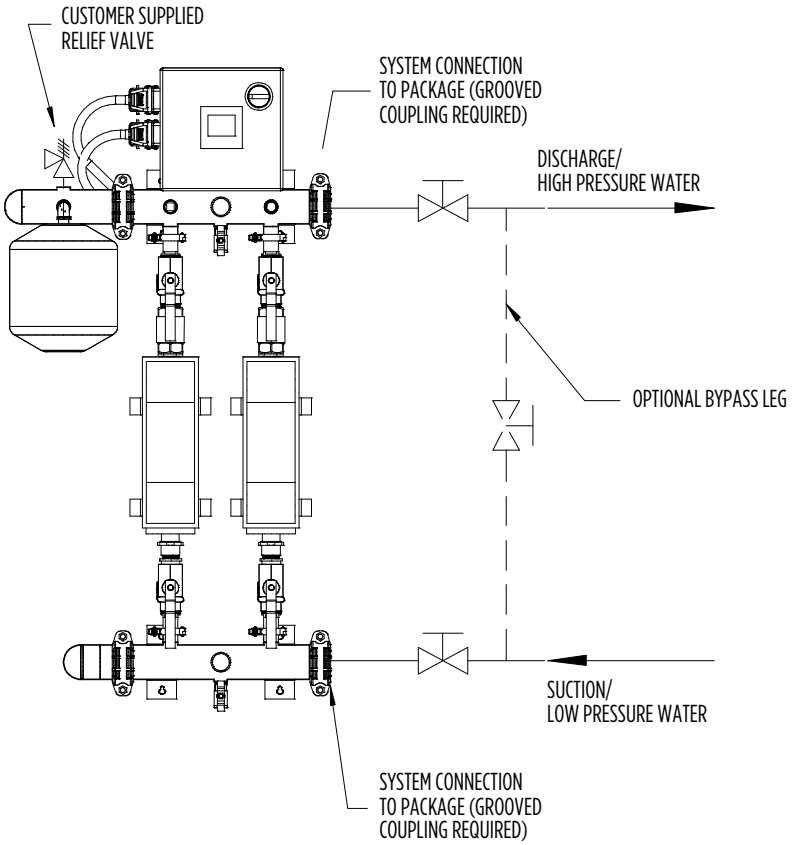
Standard Version

Description	Order #	Model #	Width A	Manifold Distance B	Depth C	Overall Height D	Site Connection E	Tank Capacity F	Discharge Circuit G	Suction Circuit H	# Pumps	Max Flow GPM	Max Boost PSI	Volts	Max Amps
Simplex	574705900	1IL-2301414-T1S	12-1/8"	32-1/2"	14-1/2"	47-1/4"	1-1/2" FNPT	2.0 Gal	NA	NA	1	40	60	230 V	12.0
Duplex - with alternator	574705901	2IL-23033-G1S	32-1/8"	44-3/16"	14-1/2"	64-1/2"	3" Groove	4.8 Gal	13.41"	8.25"	2	80	60	230 V	26.5
Duplex - with CP and pressure transducer	574705902	2IL-23033-G1T	32-1/8"	44-3/16"	14-1/2"	64-1/2"	3" Groove	4.8 Gal	13.41"	8.25"	2	80	60	230 V	26.5
Triplex - with CP and pressure transducer	574705903	3IL-23033-G1T	42-1/8"	44-3/16"	14-1/2"	68-1/2"	3" Groove	4.8 Gal	13.41"	8.25"	3	120	60	230 V	38.5
Quad - with CP and pressure transducer	574705904	4IL-23033-G1T	51-1/8"	44-3/16"	14-1/2"	68-1/2"	3" Groove	4.8 Gal	13.41"	8.25"	4	160	60	230 V	50.5

With Suction-Side Check Valve Included

Description	Order #	Model #	Width A	Manifold Distance B	Depth C	Overall Height D	Site Connection E	Tank Capacity F	Discharge Circuit G	Suction Circuit H	# Pumps	Max Flow GPM	Max Boost PSI	Volts	Max Amps
Simplex	574705900C	1IL-2301414-T1S-C	12-1/8"	37-13/16"	14-1/2"	52-9/16"	1-1/2" FNPT	2.0 Gal	NA	NA	1	40	60	230 V	12.0
Duplex - with alternator	574705901C	2IL-23033-G1S-C	32-1/8"	49-1/2"	14-1/2"	67-1/8"	3" Groove	4.8 Gal	13.41"	8.25"	2	80	60	230 V	26.5
Duplex - with CP and pressure transducer	574705902C	2IL-23033-G1T-C	32-1/8"	49-1/2"	14-1/2"	69-7/8"	3" Groove	4.8 Gal	13.41"	8.25"	2	80	60	230 V	26.5
Triplex - with CP and pressure transducer	574705903C	3IL-23033-G1T-C	42-1/8"	49-1/2"	14-1/2"	73-7/8"	3" Groove	4.8 Gal	13.41"	8.25"	3	120	60	230 V	38.5
Quad - with CP and pressure transducer	574705904C	4IL-23033-G1T-C	51-1/8"	49-1/2"	14-1/2"	73-7/8"	3" Groove	4.8 Gal	13.41"	8.25"	4	160	60	230 V	50.5

Typical Site Plumbing Configuration



INSTALLING THE UNIT

1. Inspecting the Supplied Equipment

The package includes the following items:

CRATE #1

a. The pre assembled Base Module two pump package with piping, pumps, wire whips, check valves, isolation valves, suction and discharge headers, instrumentation, integral mounting frame, and drain valves. Two additional grooved connections are included to connect the extension header with the Triplex package

b. A pre assembled Discharge Header End Cap with bladder tank and spare 1-1/4" port for use in air purging or installation of relief valve (not included)

c. A Suction Header End Cap

d. Control panel – wrapped separately to protect the electronics.

e. Accessories kit which includes (2) 3" Victaulic flex couplings, a 1-1/4" 304 stainless hex plug, and control mounting hardware.

CRATE #2 (QUAD PACKAGES ONLY)

a. QUAD UNITS – A pre assembled Two Pump Extension Module Package with piping, pumps, wire whips, check valves, isolation valves, suction and discharge headers, instrumentation, integral mounting frame, and drain valves.

b. Accessory kit which includes (4) 3" Victaulic flex couplings for connecting the Base Module with the Extension Module and control mounting hardware.

2. Location Selection and Mounting

⚠WARNING

The pump pack is heavy and may require additional technicians to support and move the unit during installation.

Use extreme caution in selecting an appropriate vertical surface to mount the unit and consult with a structural professional to verify that the selected wall can safely support the weight of the unit.

Identify a suitable wall location for mounting the package. The Base Module and Extension Modules were designed to be hung on either framed or brick/block walls which can accommodate a 500 pound hanging load. The frames have keyways to allow the package to be hung on lag screws. The Base Module and Two Pump Extension Modules must each be hung on 8 screws with an upper and lower screw on both the left and right sides of each manifold. The One Pump Extension Module requires 4 screws (an upper and lower required for each manifold). If the site has a different wall assembly than either of those two or if you are unsure about the load capabilities of the wall, consult a building professional for help in mounting this package.

Drill pilot holes for the screw locations, and install the lag screws leaving approximately ¼" space between the screw head and the wall as shown in Figure 1. See Figure 2 for lag screw pilot hole locations.

Figure 1

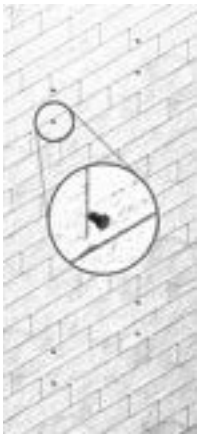
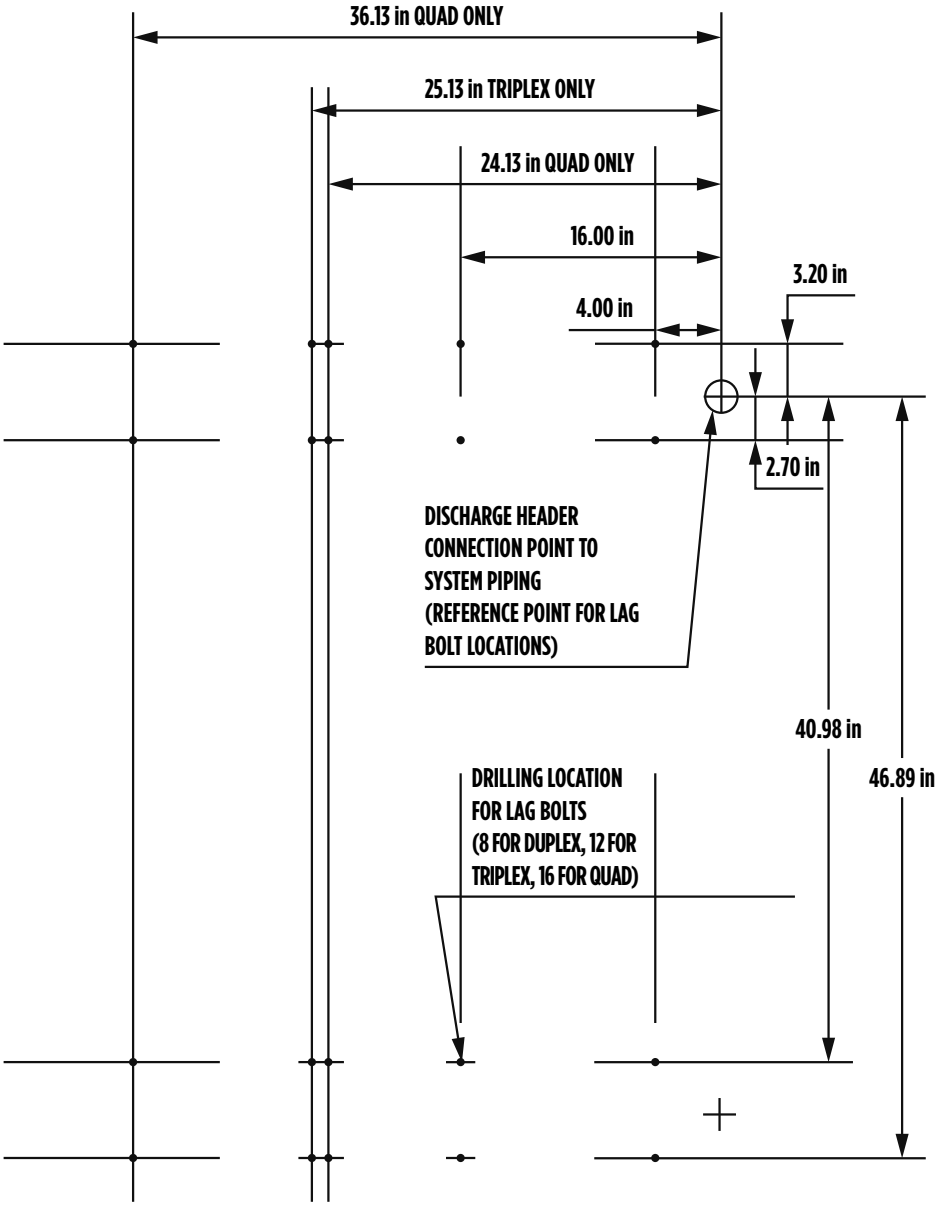


Figure 2



LAG BOLT PILOT HOLE DRILLING LOCATIONS

Once the pilot holes have been drilled and the lag screws have been installed as per Figure 1, lift the Base Module unit and hang the unit on the lag screws. Tighten the screws fully to secure the unit.

For installing a TRIPLEX or QUAD package, mount the Base Module Package first. The Extension Module is designed to be installed to the left of the Base Module Package. Place a 3" Victaulic flex coupling on the left end of the Base Module manifolds, drill pilot holes for the screw locations supporting the Extension Module, and install the lag screws leaving approximately ¼" space between the screw head and the wall. Lift the Extension Module onto the screws and then link the manifolds by tightening down the Vic coupling. Once the manifolds are attached, tighten down all of the lag screws.

2. Header End Cap Installation

1. Discharge End Cap Header – This end cap piece is equipped with the bladder tank and a 1-1/4" open threaded port and is configured for installation on the left end of the discharge header. If the end cap is to be installed on the right end, the bladder tank can be easily moved to the open 1-1/4" port. Attach the Discharge End Cap Header to the discharge header using a 3" Victaulic flex coupling.
2. Suction End Cap – Attach this end cap to the opposite side of the suction header from the incoming site water connection using a 3" Victaulic flex coupling.

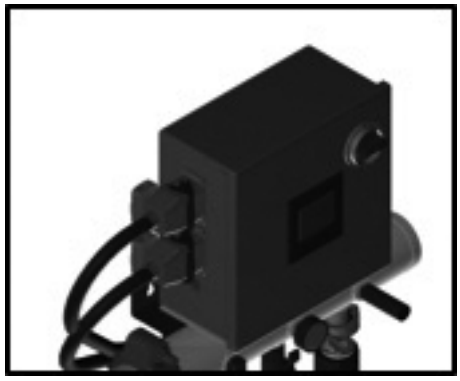
3. Mount and Install the Control Panel

Unpack the control panel and place the panel on the upper base module discharge header such that the mounting studs on the upper header can pass through the holes located on the bottom of the control panel. Using the hardware found in the accessory kit (remove Hardware Bag #2), place washer, then lock washer and nut on each stud and tighten each nut down firmly.

Each pump comes equipped with a pre wired electrical whip. At the end of the electrical whip is a quick connection fitting which will be attached to a mating piece located on the left side edge of the panel. The connections and the electrical whips are marked with the pump they are associated with. For each pump whip, open the dust cover protecting the panel side connection, plug in the whip and close the cam lock on the panel side connection (see Figure 3).

Finally, connect the pressure transducer cable (extends from the panel and has a package fitting at the end) to the transducer via the snap fitting.

Figure 3



4. Connect Site Power to the Control Panel

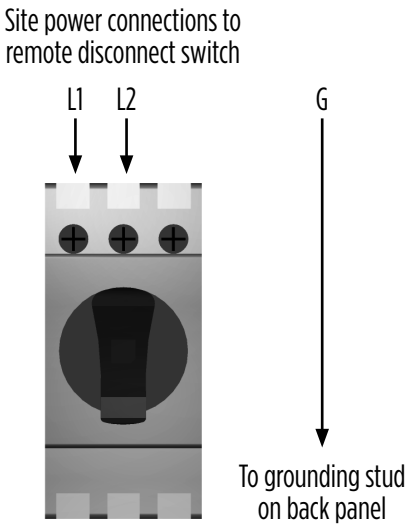
⚠WARNING The control panel contains two (2) hot leads, L1 & L2 for 230VAC, 60 Hz electric supply. Failure to properly wire the unit and changing the wiring of the unit can result in serious bodily harm, death and major equipment damage.

The electrical system consists of the control panel, pumps, and pressure transducer. The control panel consists of an HMI, PLC, and electrical components, such as fuse protections, panel and motor disconnects, and system wiring.

The control panel must be provided a 230VAC, 1P dedicated circuit feed. Any circuit that is shared for other systems could cause potential issues with the power of this system. This wiring should be completed by a certified electrician.

Bring 230VAC wiring and a ground wire to the control panel. Pass through the appropriate hole on the right side of the panel. L1 and L2 are terminated directly to the disconnect switch shown in Figure 4 and G is connected to the grounding stud on the back panel.

Figure 4



5. Site Piping to the Package

⚠CAUTION Do not over tighten piping connections on the fittings used to connect the site plumbing to each header as this could damage the equipment and/or headers.

As mentioned earlier, the site water (suction and discharge) can be connected to either end of the suction and discharge manifolds.

User installed isolation valves are required near the inlet and outlet to the packaged assembly. This will allow the user to isolate the entire package from the site plumbing network which can be helpful in simulating the different site demand loads during start up and also to prevent draining of the discharge piping during times of major maintenance to the unit.

The pressure tank supplied on the package is sized to allow adequate pressure sensing for smooth pump operation. It is not meant to be a buffer tank and in cases where sudden large demand swings occur, an external pressure tank may be needed to minimize any drops in pressure on the discharge side of the pump package.

Finally, install an appropriately sized pressure relief valve sized discharge piping from the pressure relief valve to an appropriate drain with the pipe sized for the max pump outlet at the relief valve discharge pressure. A 1-1/4" NPT female connection is provided on Discharge Header End Cap for installing the relief valve. If the relief valve is placed in a different area in the system, this connection will need to be closed using the 1-1/4" plug provided in the Accessory Kit.

UNIT OPERATION

1. How the System Works

The pump system is controlled by a pressure control loop. When the measured pressure is below the user setpoint, the control panel will enable pump operations based on set up selections made by the user in the control program.

2. Turning the Unit On

⚠WARNING Once site power has been provided to the control panel and those feeds are live, there will be energized electrical lines in the control panel up to the remote disconnect terminals even when the panel's remote disconnect switch is off. Always de-energize the site power feeding the control panel when opening the panel otherwise an electrical shock hazard will still exist which can cause serious injury, death and major property damage.

Prior to turning the unit on, the following should be checked.

a. The electrical incoming voltage should be verified that it meets the electrical requirements and that an adequate ground connection exists.

b. The overall system should be inspected to verify no damage was found during shipment or installation.

c. After plumbing the system, pressurize the booster system Suction Header with site water. To remove any trapped air in the package, start with the pump isolation valves closed on all but one pump. Air can be vented by loosening the 1-1/4" plug located on the Discharge Header End Cap or, if a relief valve is installed there, by lifting the relief valve poppet. After venting, close an isolation valve on the first pump, open both isolation valves on the next pump to be vented, and repeat the air venting process. Continue venting air in this manner until all pumps have been vented. After the air has been removed from all pumps, tighten the plug.

d. If there are any water leaks, isolate the location and tighten the connections. If the leaks are at the threaded connections in the pump piping circuits, tighten down each fitting in the other pump piping circuits by an equal amount to ensure that the suction and discharge manifolds are maintained at a uniform distance.

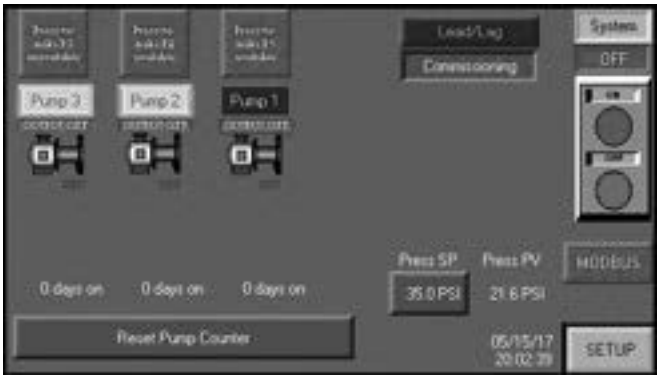
e. Engage the fused disconnections for each pump, close the control panel door and turn the remote disconnect to the 1 (or ON) position.

3. System Control

When the control panel is powered up by turning the electrical disconnect on, the PLC panel will turn on and display the SYSTEM screen. The screen name is shown in the upper right corner of this screen.

An overall On/Off selection switch is shown on the right side of the SYSTEM screen as shown in Figure 5. Touching the green light will activate the system and allow it to operate while touching the red light will stop the system operation. The light associated with the current selection will be illuminated to show which state the system is currently in.

Figure 5



PUMP ICONS: Icons for each of the pumps as well as the pump numbers are also shown on the System Screen. The currently designated lead pump has a blue background field behind the Pump # label and the lag pump labels have a white background with green border.

The pump icons will change color depending on their current operating status. If the pump is not available for operation the icon will remain with a solid red color, if it is a solid green color it is available for operation but not currently in use. A green and red flashing icon means the pump is in operation.

MAKE P1/P2/P3 AVAILABLE: Colored buttons above the pump icons allow the user to enable the pump to be placed in operation. When the button is RED the pump will be placed in an offline status, when it is GREEN, it will be permitted to run when the operating conditions permit. The only exception to this is when the pumps are in Commissioning Mode (discussed later). In this Mode, and when the pump is MADE AVAILABLE, a START/STOP button appears under the pump. This redundant feature is provided to facilitate the starting and stopping of pumps during startup and maintenance activities.

PRESSURE: The current pressure reading in the discharge manifold is displayed under the PRESS PV tag. Adjacent to this field is the PRESS SP reading. Users can update the selection (limited to 0-100 PSI) by pressing the button below the PRESS SP label.

MODBUS: An optional card can be provided with the controller which has a Modbus connection port. Users can use this port to remotely operate the controller. To enable this, the MODBUS button can be selected. A red background to the MODBUS field indicates the controller is in local control while a GREEN background indicates the unit is operated remotely.

PUMP COUNTER: A time counter provided below each pump icon indicates the number of days a pump has been in active operation (running and not just available for operation). These timers can be reset for one or more of the pumps by pressing the RESET PUMP COUNTER and following the subsequent instructions on the reset pump timer page.

SETUP: Users press this button to jump to SETUP PAGE 1 where the mode of operation is selected for the unit.

The system has three main operation methods, Commissioning Mode (where pumps can be started and stopped individually for startup/maintenance purposes), Multipump Mode (all pumps running in parallel) or Active/Idle Mode (where a lead pump will run as the primary pump and lag pumps are brought online as needed to meet the setpoint). Additionally, there are 3 different means of rotating the lead pump role in Active/Idle Mode.

The User can select whether to run the pumps in parallel (Multipump Mode) by pressing the button in the upper right corner labeled PRESS FOR DUPLEX/TRIPLEX/QUAD MODE. The text field to the left of this button indicates whether the system is in Commissioning or Active/Idle Mode (where it will display SINGLE PUMP OPTION SELECTED) Multipump Mode (where it will display DUPLEX/TRIPLEX/QUAD OPTION SELECTED).

When displaying SINGLE PUMP OPTION SELECTED, the user has additional choices presented on how to set up the pump operation. These choices are shown in Figure 6 and are explained on the next page.

Figure 6

COMMISSIONING MODE: Pressing button to the right of the choice menu and selecting "1" will set the system to operate in this mode. As described previously, this will enable the user, on the SYSTEM SCREEN, to toggle pumps ON and OFF to support startup or maintenance activities. The system will also default to this mode when only 1 pump is selected as AVAILABLE.

MANUAL MODE: In this mode, the system will recognize a LEAD pump as well as LAG pumps (in the case of the Triplex and Quad system there will be LAG 1, LAG 2, and/or LAG 3 pumps). The LEAD pump will always operate first to try and achieve the pressure setpoint. A Pressure Differential from Setpoint is set by the user (on SETUP PAGE 2) for each lag pump. If the Pressure Value read by the transducer drops below the Pressure Setpoint MINUS the LEAG/LAG Pump 1 Pressure Differential from Setpoint value, the LAG 1 Pump will turn on. In like turn the other lag pumps will turn on if the Pressure Value drops below their trigger points. The lag pumps will continue to operate until the Pressure Value reaches setpoint. After the system has operated for 10 seconds at the Pressure Setpoint, the lag pumps will turn off. When operating in MANUAL MODE, the user can switch the lead pump (as well as LAG 1, LAG2, and LAG3) by pressing the SWITCH ACTIVE/IDLE pump button located on the SYSTEM PAGE. Note this switching button is only shown when the system is in this mode of operation.

TIME BASED MODE: This mode is similar to the MANUAL MODEL except that the lead pump (and lag pumps) will rotate once a day at the time selected by the user. The user is prompted to input this trigger time when selecting this mode.

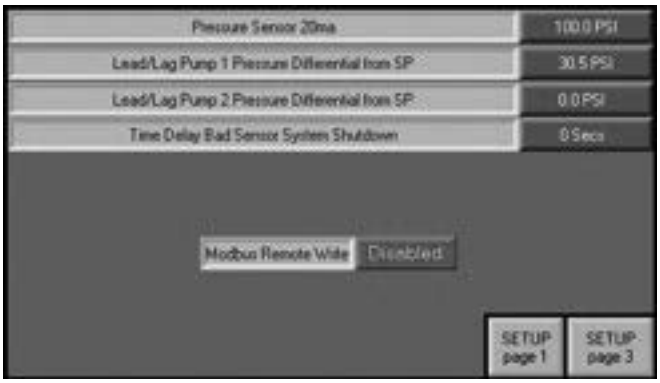
DAY/TIME MODE: This mode is similar to the TIME BASED MODE except that it allows the user to designate which days of the week (SUN through SAT) and time of day the change will occur. These choices are presented when selecting this mode,

While in this SETUP PAGE 1, the user can also select how much time the previous LEAD pump stays on when the lead pump has now rotated to next pump in line. This selection can be made by pressing the time button immediately to the left of the PUMP SHUTDOWN TIMER label. This timer will enable for a smooth transfer between the lead pumps immediately following a rotation.

The user can return to the SYSTEM screen by pressing the SYSTEM button located at the lower right side of the screen or they can go to SETUP PAGE 2 Screen.

SETUP PAGE 2 screen is shown in Figure 7 and contains a number of different pressure control inputs for the user to select. Each is mentioned below:

Figure 7



PRESSURE SENSOR 20 MA - The unit is shipped with a 4-20 MA/0-150 PSI pressure transducer. If a user elects to install a 4-20 MA transducer with a different pressure range then the upper end of that range needs to be identified here. For example, with a 4-20 MA/0-200 PSI transducer the user would enter a 200 PSI value in this field.

LEAD/LAG PUMP 1 PRESSURE DIFFERENTIAL FROM SP - LAG 1 pump will turn on when the Pressure Value goes below the Pressure Setpoint MINUS this value.

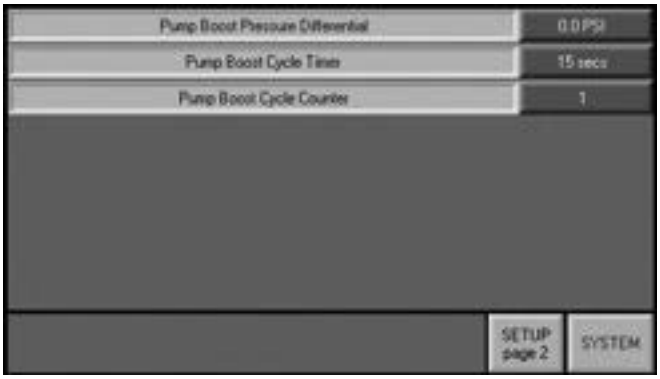
LEAD/LAG PUMP 2 PRESSURE DIFFERENTIAL FROM SP - LAG 2 (in TRIPLEX and QUAD models) pump will turn on when the Pressure Value goes below the Pressure Setpoint MINUS this value. This controller will require this value to be equal to or greater than the LEAD/LAG PUMP 1 DIFFERENTIAL.

LEAD/LAG PUMP 3 PRESSURE DIFFERENTIAL FROM SP - LAG 3 (in QUAD models) pump will turn on when the Pressure Value goes below the Pressure Setpoint MINUS this value. This controller will require this value to be equal to or greater than the LEAD/LAG PUMP 2 DIFFERENTIAL.

TIME DELAY BAD SENSOR SYSTEM SHUTDOWN – The system will shut down when the pressure transducer signal reads less than 4 MA. One reason this value can occur is if there is a failure in the sensor or sensor cabling. To limit the possibility of over pressurization, the control will shut down the pumps in this instance. To prevent nuisance shutdowns when there is a calibration issue with the transducer, the user can select a time period for the pumps to continue operating when this condition occurs. The user is limited to a time selection between 0 – 10 seconds.

MODBUS REMOTE WRITE: For convenience, the user can select the MODBUS remote operation here on this screen and it operates in the same manner as if the selection were made on the SYSTEM SCREEN.

Figure 8



The user can return to the SETUP PAGE 1 screen by pressing the SETUP PAGE 1 button located at the lower right side of the screen or they can go to SETUP PAGE 3 Screen.

SETUP PAGE 3 screen is shown in Figure 8. On this screen the user can select inputs to facilitate pump shut off when the water use load is removed.

PUMP BOOST PRESSURE DIFFERENTIAL – this input defines the pressure level above setpoint the pumps will drive to ensure smooth pump shutdown.

PUMP BOOST TIMER – this defines the time interval between shutdown and startup which defines potential hunting for shutdown.

PUMP BOOST CYCLE COUNTER – the pump will count the number of times the PUMP BOOST TIMER has been exceeded and when it reaches this value the pressure setpoint will be temporarily increased by the PUMP BOOST PRESSURE DIFFERENTIAL.

The user can return to the SETUP PAGE 2 screen by pressing the SETUP PAGE 2 button located at the lower right side of the screen or they can go to the SYSTEM SCREEN.

TROUBLESHOOTING

Reminder! Use this troubleshooting guide in conjunction with the Franklin Electric Inline Constant Pressure Owner's Manual to help with resolving operational issues with the package/pumps.

Fault	Possible Causes	Corrective Action
PLC Screen Does Not Turn On	Site power to the control panel may be interrupted	Verify that site power is live to the panel
	Main control panel disconnect may be in the OFF (0) position	Turn control panel disconnect to the ON (1) position
	The main fuses may be blown	Check fuses and replace if necessary
	The fuses for the PLC may be blown	Check fuses and replace if necessary
	PLC may be malfunctioning	Replace PLC
Pump Does Not Turn On	<u>If the GREEN power light for the pump IS NOT ON:</u>	
	Site power to the control panel may be interrupted	Verify that site power is live to the panel
	Main control panel disconnect may be in the OFF (0) position	Turn control panel disconnect to the ON (1) position
	The pump power disconnect may be in the OFF position	Turn the pump disconnects to the on position
	The main control panel fuses may be blown	Check fuses and replace if necessary
	The fuses for the pump may be blown	Check fuses and replace if necessary
	PLC may be malfunctioning	Replace PLC
	<u>If the Green power light for the pump IS ON:</u>	
	Pressure setpoint may be met and there is no current demand	No action required
	The enable signal wiring from the controller to the pump may be damaged.	Check continuity and if bad replace electrical whip

Fault	Possible Causes	Corrective Action
Noise in the Discharge Header When Pumps are Operating	Air pocket in the discharge header	Remove the air in the manner described in the set up instructions.
Leaking Connections	Fittings and/or threaded connections may be loose	Retighten fittings. When tightening any of the fittings in any one pump circuit, the corresponding fittings in the other circuits must be tightened by an equal number of turns. This ensures that the spacing within the pump circuits remains equal. If tightening does not stop the leak then use the controller to make that pump unavailable, isolate the pump, completely loosen the fitting, clean the threads and then retighten. Return the pump to active status.

Setup Page 1 – Pump Lead/Lag vs. Parallel Operation Selection, Lead Pump Rotation Options

SETUP

Use this selection to select either single pump operation (i.e. Lead/lag) or parallel pump operation (i.e. Duplex, triplex or quadplex pump operation)

Quaplex Pump Option Selected	Press for Single Pump

Use this selection to pick the method of controlling the lead pump rotation when operating the pumps in a lead/lag format

Active/Idle Mode Selection: 1=Commisioning, 2=Manual, 3=Time base, 4=Day/Time	9

Selecting "1" will allow the user to start and stop the pumps using buttons on the system screen under the pump icons (note - the pumps must be made available by selecting the "pump available/unavailable" selection button over the pump icon

Selecting "2" will enable a "switch lead pump" button to appear on the system screen. Pressing this button will switch which pump is designated as the lead pump

Select "3" to have the lead pump change daily based on the time of day

Enter Time (HH:MM) for Time base Configuration	99.99

Select "4" to have the lead pump change based on a time of day and day of week.

Enter Day (Sun-Sat) and Time (HH:MM) for Day/Time Configuration	Days of the week (CW)
99.99	

This settings dictates the amount of time the outgoing and incoming lead pumps concurrently run when changing the lead status of a pump. Choose a long enough time to prevent undue pressure drops during the switch period

Pump Shutdown Timer	999 Secs

Go to setup page 2 of setup options

SETUP PAGE 2

Return to main systems screen

SYSTEM

Setup Page 2 – Lag Pump Differential Setting and Pressure Transducer Setups

While on the system screen press

SETUP

SETUP PAGE 2

If a 4-20 ma pressure transducer is used in this system and it has an upper pressure other than 150 psi, input the upper pressure range of the transducer (in psi) in this input box.

Pressure Sensor 20ma	-999.9 PSI

Enter a pressure differential off of pressure set point for each lag pump in these fields.

Lead/Lag Pump 1 Pressure Differential from SP	99.9 PSI

The program will immediately pause pump operation if the transducer reading drops below 3.8 ma. This prevents run away operation in case of a bad sensor. The user can delay this pause from occurring by up to 10 seconds by using this field to prevent nuisance shut downs from transient ma readings.

Time Delay Bad Sensor System Shutdown	99.9 Secs

Go to setup page 3 of setup options

SETUP PAGE 3

Return to setup page 1 of setup options

SETUP PAGE 1

Setup Page 3 – Pump Boost to Prevent Shut Down Hunting

While on the system screen press

SETUP

SETUP PAGE 2

SETUP PAGE 3

If a pressure boost is desired to prevent potential nuisance shut down hunting, enter the pressure differential in this field. This differential will be added to the original set point to create a new, temporary, higher set point.

Pump Boost Pressure Differential	**99.9 PSI**

The new temporary set point will be activated only after the pump has attempted to shutdown for lack of demand only to turn back on because of a minor drop in pressure after shutoff. Use this field to define the time period between stop and start cycles which would indicate that hunting is occurring (usually 1-5 seconds). If the system has a stop and start cycle within this time period it will index a counter by 1 and when the counter hits the number inputted in the next field, the higher set point will be activated for one start-stop cycle.

Pump Boost Cycle Timer	**999 Secs**

Use this field to set the number of short time period stop-start cycles (which may indicate shut off hunting) which would need to occur before a boost setting is applied to the set point to prevent any hunting when no demand exists.

Pump Boost Cycle Counter	**99**

Return to set up page 2 of set up options

SETUP PAGE 2

Return to main system screen

SYSTEM

Modbus Setup Instructions for HMI-PLC

1. While the SpecPak is powered OFF, the HMI removed from the control panel and the GREEN terminal strips removed from the HMI, install the Modbus Communication Card in the SpecPak HMI as shown in the instructions provided with the card.

2. Once the card has been installed, fasten the HMI back cover in place, install the HMI back in the control panel cover and insert the GREEN terminal strips back into the input and output terminal slots on the HMI.

3. Turn the power on to the control panel and keep the pump system in the OFF state (the System On/Off button should be Red and the work OFF should be displayed above the buttons (see Figure 9).

4. Press down and hold on any part of the SYSTEM screen and until the INFO MODE screen appears (see Figure 10).

Figure 9

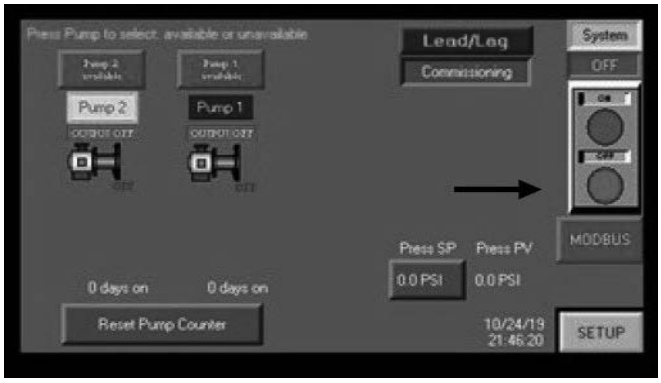
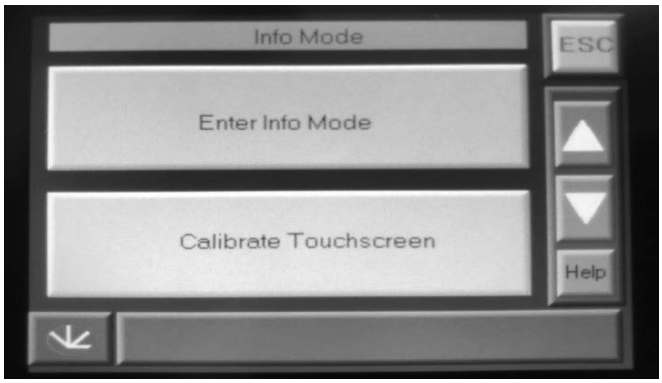


Figure 10



5. Press ENTER INFO MODE Button, enter the password 1111 and press the return key.

6. In the INFORMATION MAIN MENU screen (see Figure 11) press the OPERAND button.

7. On the OPERAND MODE screen press the MEM BIT button.

8. Use the Arrow Keys to scroll down to the last line with the address 504 which will be the last row displayed. Press the 5th button from the left (which is the cell containing Memory Bit 508) and it will become highlighted as shown in Figure 12.

9. With Memory Bit 508 highlighted, press the RESET button at which time the cell will change from "1" to "0".

10. Press the ESC button on this screen and successive screens to return to pump system screens.

Figure 11

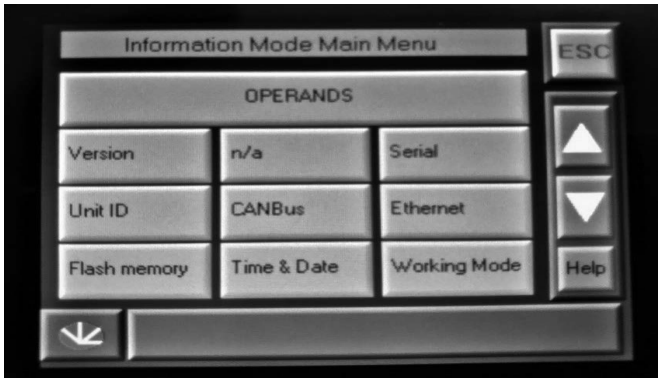
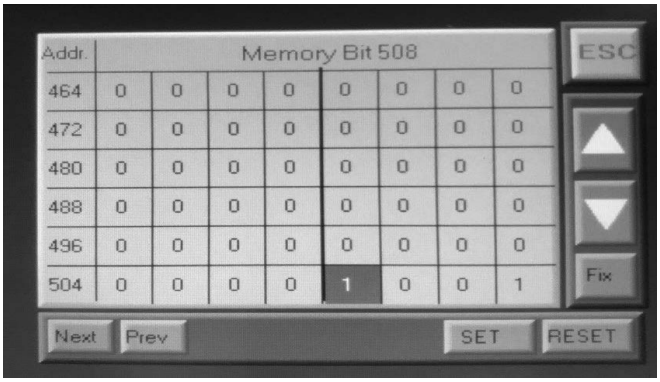


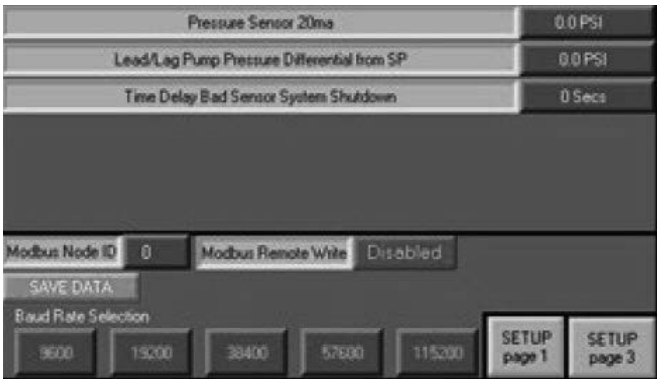
Figure 12



11. Go to SETUP PAGE 2 and now the Modbus set up cells are visible (see Picture 5)

12. Enter the address (from 1 – 255) that this device will use in the external Modbus programming used to control this SpecPak controller.

Figure 13



13. Press the desired communication speed button.

14. Press the SAVE DATA button at which time the set up cells will be removed from the screen.

15. In establishing the communication protocol with the SpecPak HMI through modbus, select 8 data bits, no parity, and 1 stop bit.

16. Refer to the SpecPak user manual for the Read and Write Parameter addresses which can be used to read and write information to the SpecPak.

17. Once the system is ready to be controlled through modbus, Press the MODBUS button on the SYSTEM screen. The button will turn GREEN and local control of the SpecPak will be disabled and local setting of the SYSTEM ON/Off BUTTON and pressure set point will be disabled. The user will need to press the MODBUS button again (at which time it will turn RED) to gain local access to those two control items (System ON/OFF and pressure set point).

Modbus Configuration

Item	Options
Com Port	Port 2
Modbus Device ID	Selectable: 1-255
Baud Rate	Selectable: 9600, 19200, 38400, 57600, or 115200
Data Bits	8
Parity	None
Stop Bits	1
Standard	RS-485

Read Parameters

Preset Holding Registers	
Register 0240h	Pressure SP (Pressure SP /10) (Example 800 = 80.0 PSI)
Register 0241h	Actual Pressure (Pressure PV / 10) (Example 786 = 78.6 PSI)
Register 0242h	Pump System Mode (0=Lead/Lag; 1=Duplex, Triplex, Quadplex based on model)
Register 0243h	Pump System State (0=Maintenance, 1=Commissioning, 2=Manual, 3=Time Based, 4=Day/Time Based)
Register 0244h	Pump 1 State OP (0=Off, 1=On)
Register 0245h	Pump 2 State OP (0=Off, 1=On)
Register 0246h	Pump 3 State OP (0=Off, 1=On)
Register 0247h	Pump 4 State OP (0=Off, 1=On)

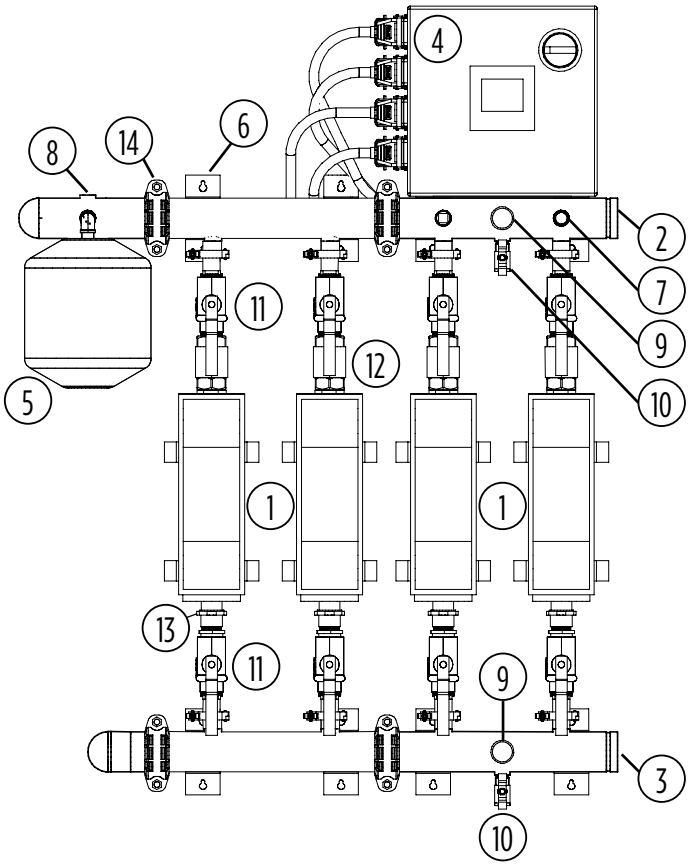
Read Coils	
Register 0240h	System Alarm
Register 0241h	Pump System State (0=System Off, 1=System On)

Write Parameters

Writing Multiple Registers	
Register 0250h	Pressure SP (Pressure SP /10) (Example 800 = 80.0 PSI)

Read Coils	
Register 0250h	Pump System State (0=System Off, 1=System On)

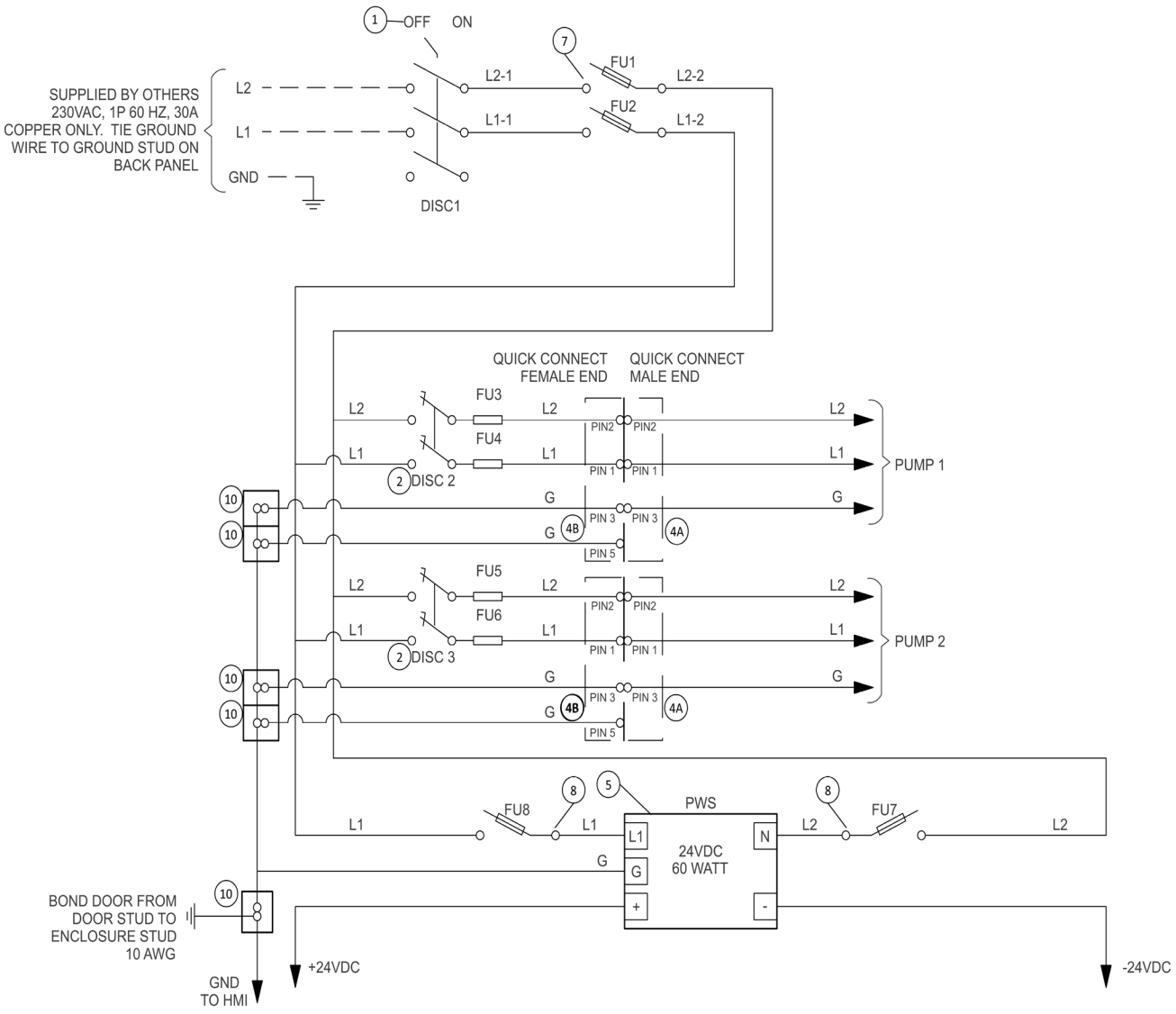
REPLACEMENT PARTS



System Replacement Parts

Connections and Major Component List		
1	Franklin Electric Inline 1100 Variable Speed Pump	304SS/316SS
2	Discharge Connection	3" Grooved 150# flange - 304SS
3	Inlet Connection	3" Grooved 150# flange - 304SS
4	Control/Electrical Panel 16" x 16" x 6"	Touch-screen HMI, lead/lag, alternating pump control
5	Pressure Tank	10.3 gal tank with rubber bladder
6	Mounting Frame	304SS 12 gauge, 8 frame pieces welded to manifolds
7	Pressure Switch	
8	Capped 1-1/2" NPT Male Conn. for OPT RV (Provided by Others)	
9	Pressure Gauge	
10	Drain Valve	3/4" SS drain valve
11	Isolation Valve	1-1/2" SS full port ball valve
12	Check Valve	1-1/2" SS inline spring check valve
13	Pump Connection	1-1/4" 150# flange - 304SS
14	Header Couplings	3" Grooved couplings

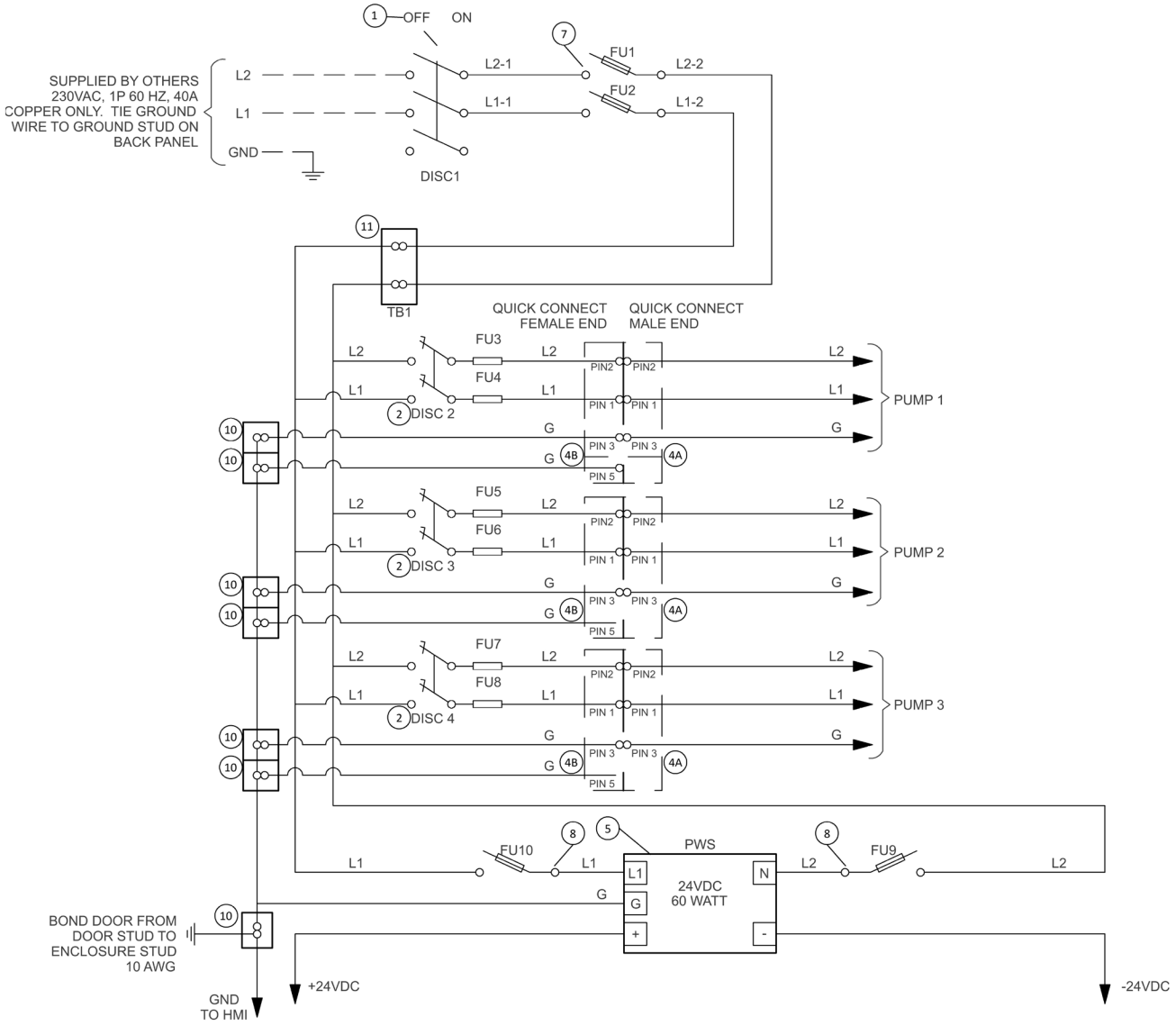
WIRING DIAGRAMS



Fuse Table				
Fuse	**Volt Rating**	**Model**	**Size**	**Class**
FU1, FU2	600AC/300DC	Bussman FNQ-R-30	30 AMP	CC
FU3, FU4	600AC/300DC	Bussman FNQ-R-15	15 AMP	CC
FU5, FU6	600AC/300DC	Bussman FNQ-R-15	15 AMP	CC
FU7, FU8	600AC/300DC	Bussman FNQ-R-5	5 AMP	CC

Samba Jumper Settings	
Jumper #	**Setting**
1	B (PNP Source all inputs)
5	B (Analog input on input 10)
6	B (Analog input on input 11)
3	B (AN0 input)
4	A(AN1 input)
-	-

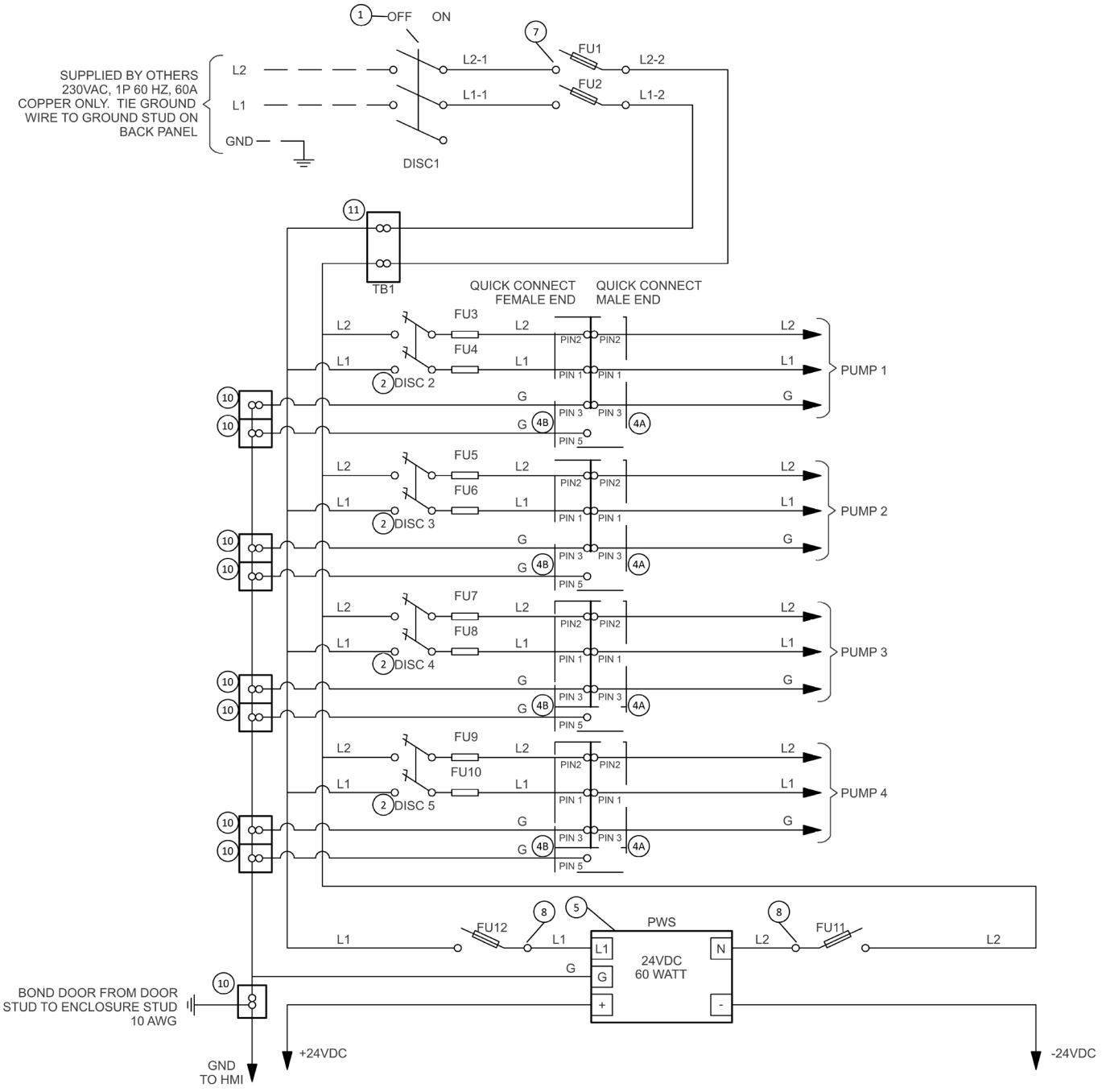
Item #	Manufacturer	Model #	Description
1	Lovato	GA032A	Disconnect switch, non fusible, 32 AMP, 3PH, 600V, UL508
		GAX61	Disconnect, remote handle, red-yellow
		GAX7150	Disconnect, remote shaft
2	Gladiator	CFS-2PM30	Disconnect switch, fusible, 2PH, midget CLASS, 240VAC, 30 AMP, UL508, din rail mount
3	Phoenix Contact	2966265	Screw terminal base AU plated 6A at 24VDC SPDT PLC-RSC relay module
4A	Phoenix Contact	1412577	Heavycon sleeve housing B6 for single locking latch 1/2" NPT
		1648115	Heavycon male insert, B6 series 6-POS screw connection
4B	Phoenix Contact	1411318	Heavycon B6 panel mounting base with single locking latch and protective dust cover
		1648128	Heavycon socket female insert B6 series 6-POS screw connection
5	Mean Well Ent. or Equal	MDR-60-24	60 watt. 24VDC, 2.5 AMP power supply unit with enclosure
6	Unitronics	Samba SM43-J-T20	PLC with HMI
7	Edison	CHCC2DU	2P, 30A, 600V rated fuse holder for use with CC class fuses
8	Lovato	FB01G1P	1P, 30A, 600V rated fuse holder for use with class CC fuses
9	Wiegmann or Equal	N1C121206	Enclosure, 12 x 12 x 6 in, wall mount, steel, ANSI 61, SGL door with hinge. Completed panel to be UL508 labeled.
		N1P1212	Subpanel, 10.2 x 10.2 in, carbon steel
10	Automation Direct or Equal	Konnect T-IT KN-G10	Terminal block ground, GRN-YEL 26-10 AWG screw down
11	-	-	-
12	Franklin Electric	Sensata 71CP0350	4-20 MA, 0-150 PSI, 1/4" NPT male, 2 pin packard pressure transducer with cable
13	-	-	-
14	Thomas & Betts or Equal	CC-NPT-38-G	Nylon liquid tight cord connector 3/8" NPT



Fuse Table				
Fuse	**Volt Rating**	**Model**	**Size**	**Class**
FU1, FU2	600AC/300DC	Bussman LP J-40SP	40 AMP	J
FU3, FU4	500VAC	Bussman FNQ-R-15	15 AMP	CC
FU5, FU6	500VAC	Bussman FNQ-R-15	15 AMP	CC
FU7, FU8	500VAC	Bussman FNQ-15	15 AMP	CC
FU9, FU10	600AC/300DC	Bussman LP-CC-5	5 AMP	CC

Samba Jumper Settings	
Jumper #	**Setting**
1	B (PNP Source all inputs)
5	B (Analog input on input 10)
6	B (Analog input on input 11)
3	B (AN0 input)
4	A(AN1 input)
-	-

Item #	Manufacturer	Model #	Description
1	Lovato	GA063A	Disconnect switch, non fusible, 63 AMP, 3PH, 600V, UL508
		GAX61	Disconnect, remote handle, red-yellow
		GAX7150	Disconnect, remote shaft
2	Gladiator	CFS-2PM30	Disconnect switch, fusible, 2PH, midget CLASS, 240VAC, 30 AMP, UL508, din rail mount
3	Phoenix Contact	2966265	Screw terminal base AU plated 6A at 24VDC SPDT PLC-RSC relay module
4A	Phoenix Contact	1412577	Heavycon sleeve housing B6 for single locking latch 1/2" NPT
		1648115	Heavycon male insert, B6 series 6-POS screw connection
4B	Phoenix Contact	1411318	Heavycon B6 panel mounting base with single locking latch and protective dust cover
		1648128	Heavycon socket female insert B6 series 6-POS screw connection
5	Mean Well Ent. or Equal	MDR-60-24	60 watt. 24VDC, 2.5 AMP power supply unit with enclosure
6	Unitronics	Samba SM-45-J-T20	PLC with HMI
7	Edison	CH60J2	2P, 60A, 600V rated fuse holder for use with CC class fuses
8	Lovato	FB01G1P	1P, 30A, 600V rated fuse holder for use with class CC fuses
9	Wiegmann or Equal	N1C121206	Enclosure, 16 x 16 x 6 in, wall mount, steel, ANSI 61, SGL door with hinge. Completed panel to be UL508 labeled.
		N1P1212	Subpanel, 13 x 14.5 in, carbon steel
10	Automation Direct or Equal	Konnect T-IT KN-G10	Terminal block ground, GRN-YEL 26-10 AWG screw down
11	McMaster	9473T69	Terminal block
		9473T143	Terminal block cover plate
12	Franklin Electric	Sensata 71CP0350	4-20 MA, 0-150 PSI, 1/4" NPT male, 2 pin packard pressure transducer with cable
13	-	-	-
14	Thomas & Betts or Equal	CC-NPT-38-G	Nylon liquid tight cord connector 3/8" NPT
15	-	-	-



Fuse Table				
Fuse	**Volt Rating**	**Model**	**Size**	**Class**
FU1, FU2	600AC/300DC	Bussman LP J-60SP	60 AMP	J
FU3 to FU10	500VAC	Bussman FNQ-R-15	15 AMP	CC
FU11, FU12	600AC/300DC	Bussman LP-CC-5	5 AMP	CC

Samba Jumper Settings	
Jumper #	**Setting**
1	B (PNP Source all inputs)
5	B (Analog input on input 10)
6	B (Analog input on input 11)
3	B (AN0 input)
4	A(AN1 input)
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Item #	Manufacturer	Model #	Description
1	Lovato	GA063	Disconnect switch, non fusible, 63A, 3PH, 600V, UL508
		GAX61	Disconnect, remote handle, red-yellow
		GAX7150	Disconnect, remote shaft
2	Gladiator	CFS-2PM30	Disconnect switch, fusible, 2PH, midget CLASS, 240VAC, 30 AMP, UL508, din rail mount
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13	-	-	-
14	Thomas & Betts or Equal	CC-NPT-38-G	Nylon liquid tight cord connector 3/8" NPT
15	-	-	-

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