Installation and Operation Manual

Condensate Recovery

Spartan

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Safety Instructions

Read this manual carefully to learn how to safely install and operate your pump. Throughout this manual there are a number of SAFETY HAZARDS that must be read and adhered to in order to prevent possible personal injury and/or damage to the equipment.

Three keywords, "DANGER" ,"WARNING", and "CAUTION", are used to indicate the potential severity of the hazard, and are preceded by a SAFETY ALERT SYMBOL. Failure to follow the safety-related instructions may result in a safety hazard.

DANGER Indicates an imminently hazardous situation which, if not avoided, WILL result in serious injury or death.

WARNING Indicates a potentially hazardous situation which, if not avoided,

Could result in serious injury or death.

CAUTION Indicates a potentially hazardous situation which, if not avoided,

May result in minor or moderate injury.

THOROUGHLY REVIEW ALL INSTRUCTIONS AND WARNINGS PRIOR TO PERFORMING ANY WORK ON THIS PUMP.

Introduction:

Because panel installations are seldom identical, this manual cannot possibly provide detailed instructions and precautions for each specific application. Therefore, it is the responsibility and the duty of all personnel involved in the installation, operation and maintenance of the equipment to ensure that applications not addressed in this manual are performed only after establishing that neither operator safety nor panel integrity are compromised by the installation.

Pre-Installation Check:

Open all cartons and inspect for shipping damage. Report any damage to your supplier or shipping carrier immediately. Always verify that the panel nameplate Voltage, Phase, and HP ratings as well as Amps rating on panel match your pumps and power supply. Warranty does not cover damage caused by connecting panels to an incorrect power source (i.e., voltage and phase).

Installation:

Electrical connections are to be made by a qualified electrician in accordance with the National Electrical Code (NEC) or the Canadian Electrical Code, as well all national, state and local codes. Code questions should be directed to your local electrical inspector. Failure to follow electrical codes and OSHA safety standards may result in personal injury or equipment damage. Failure to follow manufacturer's installation instructions may result in electrical shock, fire hazard, personal injury or death, damaged equipment, provide unsatisfactory performance, and may void the manufacturer's warranty.

Motor must have a properly sized starter with a properly sized heater to provide overload and under voltage protection unless motor meets following two conditions: single phase and motor horsepower is 1HP or less. Motors that satisfy these two conditions have built-in thermal overload protection.

Operating personnel should be trained in the operation of the pump and any associated system.

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Sequence of Operations

Sequence of Operation (Three Float Operation)

A. The System shall be configured for three (3) normally open float switch operation. The bottom float will provide the Pump(s) OFF level. The second float shall provide the "Lead ON" level. The top float shall provide the "High Level Alarm". With the Lead Pump selector in the "AUTO", after each pumping cycle, the panel shall alternate the lead pump.

Should the level in the wet well rise to the actuation point of the High Level Alarm float, the following will occur:

1. The Lag Pump will be called to run
2. General Alarm Red LED Beacon will illuminate
3. Alarm Buzzer will sound
4. General Alarm Auxiliary contact for the BAS will close

The Alarm Buzzer can be silenced by placing the Alarm Buzzer selector switch in the "OFF", center, position; however, the Alarm Beacon will remain on and the auxililary alarm contact will remain closed until the level in the wet well pumps down and the High Level Alarm float resets.

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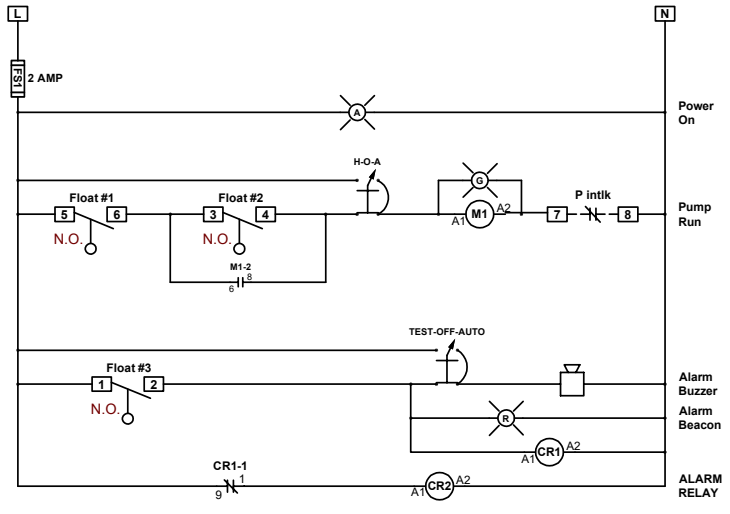
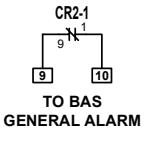
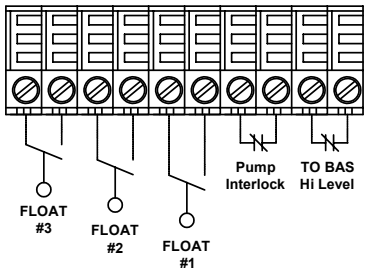
CONTROLS DIAGRAM

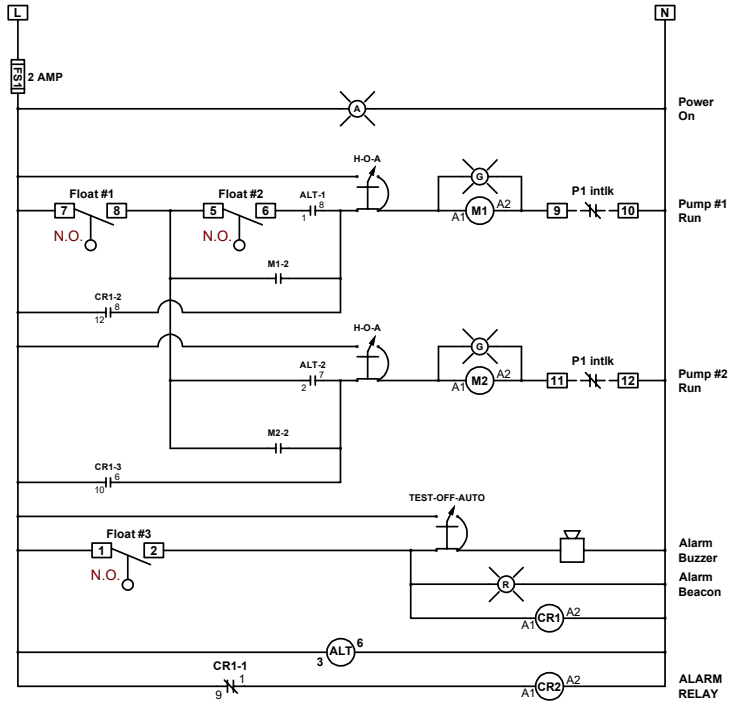
SIMPLEX

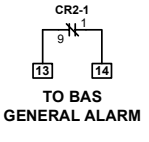


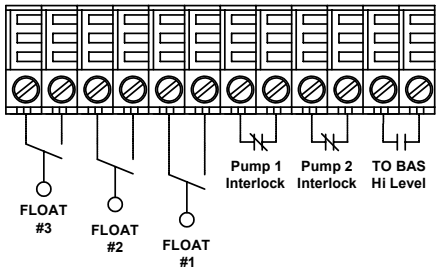




DUPLEX







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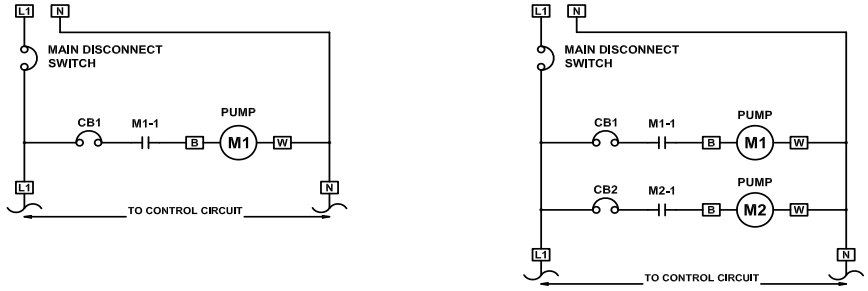
The Lone Star in Water Control

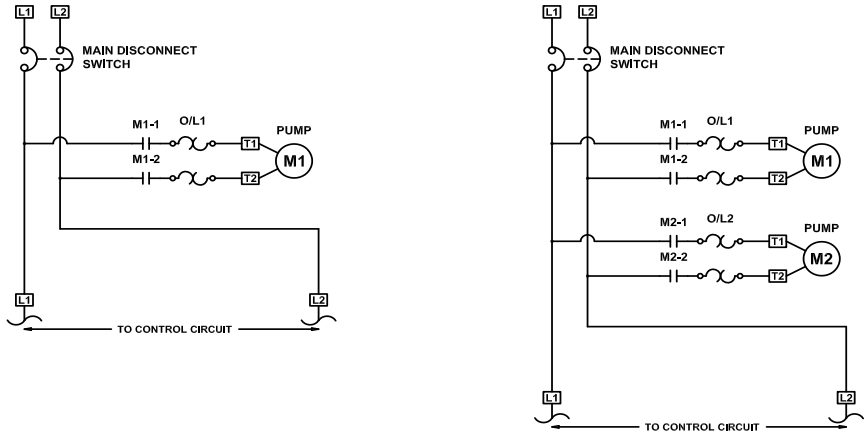
MOTOR CONTROLS

Figure 1



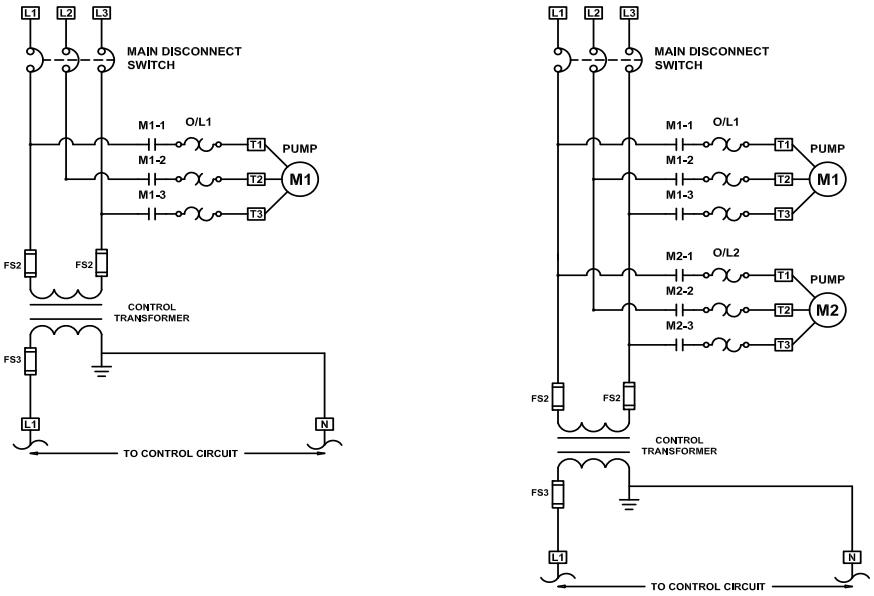
1. Standard Motor Controls Incoming Power Service of 115/120vac - 1 phase. Simplex and Duplex setup (Figure 1). Adder Options Available.

Figure 2



1. Standard Motor Controls Incoming Power Service of 200/240vac - 1 phase. Simplex and Duplex setup (Figure 2). Adder Options Available.

Figure 3



1. Standard Motor Controls Incoming Power Service of 200/240/480vac - 3 phase. Simplex and Duplex setup (Figure 2). Adder Options Available.

Vent Connection:
Install a full sized vent to atmosphere from the receiver. DO NOT install any shut-off valves or other type of valves in the vent line.

Overflow:
Install overflow piping to drain. (An overflow loop and anti-siphoning orifice can be installed to prevent venting through the overflow.)

Return Piping:
Properly pitched gravity return lines are piped to the unit as shown in the Typical Piping Diagram (Figure 4). An isolation valve should be installed for servicing. An inlet strainer should be installed to remove foreign material and prolong the pump life.

Discharge Piping:

If the pump does not have a flanged discharge, install a union immediately beyond the pump discharge.

A spring-loaded check valve should be installed in the discharge piping near to the pump to prevent backflow into the unit. Next, a manual flow control valve (e.g., ball valve, globe valve, or steam cock) must be installed after the spring-loaded check valve and near to the pump discharge flange or union (see Figure 4) to “balance the pump” (i.e.,adjusting discharge flow of the pump to keep it running at the design operating conditions for flow rate and discharge pressure). A gate valve should not be used as a manual flow control valve. Note that some people refer to the term “balancing the pump” as either “throttling thepump” or “choking the pump”.

For specific installation, operation and maintenance instructions of pump/motor assemblies fitted to receiver, refer to IOM Manual for the appropriate pump Model (e.g., Model D).

Notes on Piping:
1. All piping connections must be externally supported. The CRU is not designed to carry piping loads.
2. When installing the discharge connections to a threaded pump housing, a Teflon tape sealer or a high quality thread sealant is recommended.

Electrical Wiring:
LP units are furnished with single-phase motors only. Single-phase motors are usually furnished as dual 115/230/1/60. Motors should be connected according to manufacturer’s instructions for correct voltage.

LPC units can be either single-phase or three-phase. Three-phase motors are usually furnished as tri-voltage 208/230/460/3/60. Motors should be connected according to manufacturer’s instructions for correct voltage.

If a control panel is furnished, confirm that the nameplate data on the control panel[s] matches the supply current. If the nameplate data does not match the power source, consult factory.

Verify controls, starter coils, etc., match the control voltages before installing. The secondary side of transformer is the control circuit.

Wire in accordance with the National Electrical Code, state and local codes where applicable. See typical wiring diagrams (Figure 3).

Short Circuit Protection:
According to the National Electrical Code, branch circuit over-current protection must be provided for each contactor or starter. The following table is provided as a guide. DO NOT EXCEED MAXIMUM PROTECTIVE DEVICE RATINGS.

PUTTING THE PUMP INTO SERVICE:

Flush unit to drain to remove any debris from receiver. Reinstall drain plug.

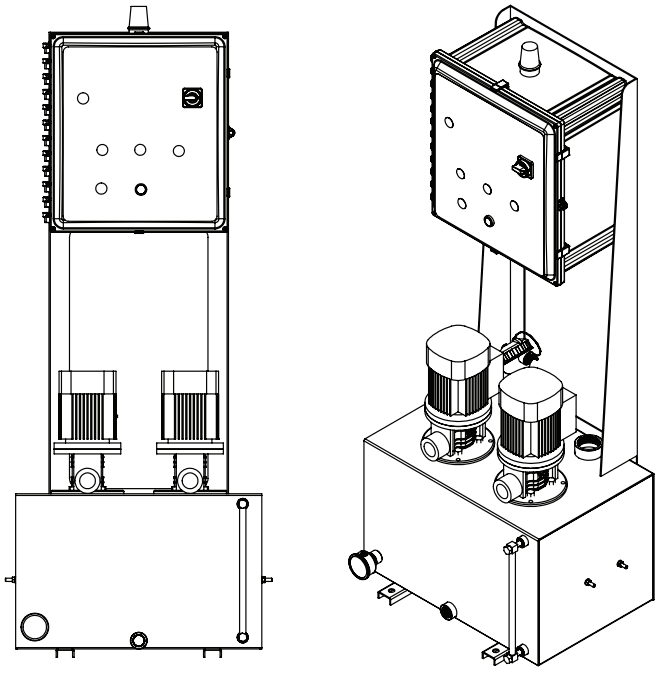
A. Per instructions on tag attached to float switch[es], remove shipping bracket (See Figure 2) from each float switch or mechanical alternator as per manufacturer's instructions. If needed, reference Technical Articles that provide detailed instructions on how to adjust either a float switch or mechanical alternator:

B. The float switch has been factory set for maximum capacity of the receiver. Should an alternate setting be required, refer to the float switch manufacturer's instructions.

C. Adjust the throttling valve (closed) installed in pump discharge to bring pump discharge pressure to design conditions.When proper conditions have been met, tighten valve and remove handle.

D. Priming of Pump: Refer to IOM for appropriate pump (e.g., Model MTR).

E. Motor Lubrication: The pump is a close-coupled centrifugal unit. The pump has no internal bearings. Refer to IOM for appropriate pump (e.g., Model MTR) for additional information.



TROUBLESHOOTING CHECKLIST

PUMP WILL NOT RUN

1. Power supply has been interrupted. Disconnect switch is open or selector switch improperly positioned.
2. Improper voltage supplied to motor. Check voltage and wiring with motor characteristics.
3. Incorrect starter coil for power supply.
4. Overload relays in starter have tripped out and must be reset. Ambient temperature may be excessive.
5. Wiring to power source is incorrect or connections may be loose.
6. Control signals are for pump to be "off."

PUMP GPM CAPACITY IS REDUCED

1. Pump is running backwards. Rotation should be clockwise looking down upon motor toward the pump. Rotation of three-phase motors can be corrected by interchanging any 2 of the 3 wires. (Note: Any electrical service should be performed by a qualified electrician.)
2. Pump is **not throttled** to the design condition for the pump.
3. Total pressure at pump discharge is greater than that which the pump was designed for. Check pressure requirements which include system back pressure, and friction and static head.
4. Excessive suction lift, incorrect piping or undersized piping from the pump.
5. A valve in the pump suction line or discharge line is closed or throttled too much. Check valve in the pump discharge piping is installed backwards.
6. The impeller eye is blocked with trash or debris.
7. Pump is undersized for the system.
8. A strainer is dirty, causing a reduction in flow.
9. Pump has lost its prime. Release trapped air in the pump and reprime.
10. Steam traps are blowing through, causing the condensate to return at excessive temperatures. Depending on the unit and type of pump furnished, this could greatly reduce the capacity of the pump below its stated rating. Traps should be repaired or replaced.
11. Excessive temperatures. Capacity of pump may be reduced below its rating. Use SHIPCO® P-Type pumps for low NPSH conditions.

EXCESSIVE PUMP NOISE

1. Pump is running backwards. Check rotation by bumping the motor. Rotation should be clockwise while looking down at the rear of the motor.
2. Pump is working against a lower pressure than it was designed for. (The pump is not balanced or throttled.) Install a balancing valve, plug cock or steam cock in the discharge line following the gate valve. **Do not use a gate valve for balancing the pump.The seats in the valve will wear over time, causing the valve to lose its design condition point.** Throttle the balancing valve until the operating pressure at the pump discharge approaches the rated pump pressure.
3. Magnetic hum or bearing noise in motor. Consult the motor manufacturer's authorized service technician.
4. Starter chatters. Trouble is caused by low line voltage, poor connections, defective starter coil, or burned contacts.
5. Excessive ambient temperature. Correct the system conditions.
6. Entrained air. Release the trapped air pocket.

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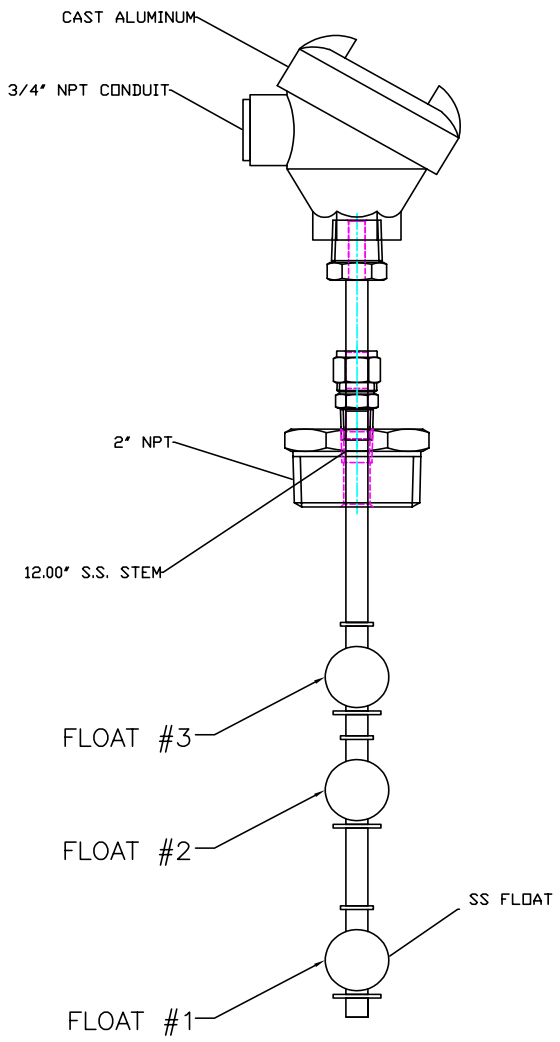
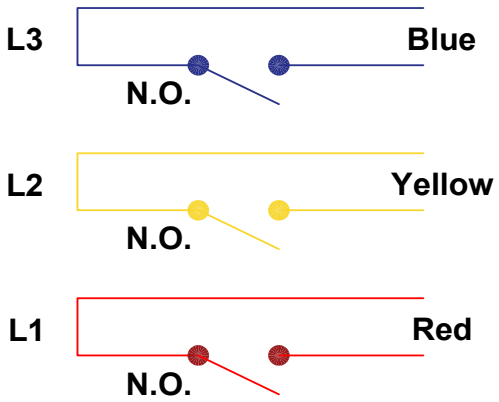
FLOAT DETAIL

Multi-Float Switch Assembly. Construction is Stainless Steel. Standard 3-Float assembled *see Figure 2.1*. Sizing options upon request.

Figure 2.1



Wiring Schematic



Notes:

1. Media: Water
2. Stem Material: AISI Type 316L Stainless Steel
3. Electrical Specs:
   - 3.1. Switching Voltage: 300 vac/vdc max
   - 3.2. Switching Current: .5amps ac/ .7amp dc
4. Float Specs:
   - 4.1. Float Material: 316 SS
   - 4.2. PSI rating: 600 PSI max
   - 4.3. Temp rating: 300F max

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