# Hart Engineering Corporation

**SUBMITTAL:**
15400-04

**PROJECT: 9722. - Veolia/Taunton WWTP Solids Handling Improvements** **DATE: 04/13/2023**

**SUBMITTAL:** 15400-04 - Sump Pump O&M Manual
**REVISION:** 0
**STATUS:** Eng
**SPEC #:** 15400

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| Item | Revision | Description | Status | Date Sent | Date Returned |
|---|---|---|---|---|---|
| 15400-04 | 0 | Sump Pump O&M Manual | Eng | 04/13/2023 | |
| Notes: | | | | | |

Additional Notes:

**Status Codes**
1-APP – No Exceptions Taken
2-ANR – Make Corrections Noted
3-R&R – Revise and Resubmit
4-REJ – Rejected
5-IPO – For Information Purposes Only
6-NRR – Not Required for Review
ENG – Submitted to Engineer

Sincerely,
Hart Engineering Corporation

_____ DATE: 04/13/2023

WEIL

# Taunton Wastewater Treatment Facility

## Solids Handling Improvements

## Contract: S-2020-3, SWSRF No. 6690

## 825 West Water Street

## Taunton, MA 02780

# Weil Submersible Wastewater Pump – Operation & Maintenance Manual

## Spec. Section 15400

# WEIL SUBMERSIBLE WASTEWATER PUMP
## INSTALLATION OPERATION MAINTENANCE

1400
2400

**OWNERS INFORMATION**

| Manufacturer's Number | Date Code |
|---|---|

Weil SO# 563.906 W2443 7SP-1 IOM June 2022

*

Project: Taunton WWTF, Taunton, MA

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Prepared for: Aqua Solutions, Inc.

*

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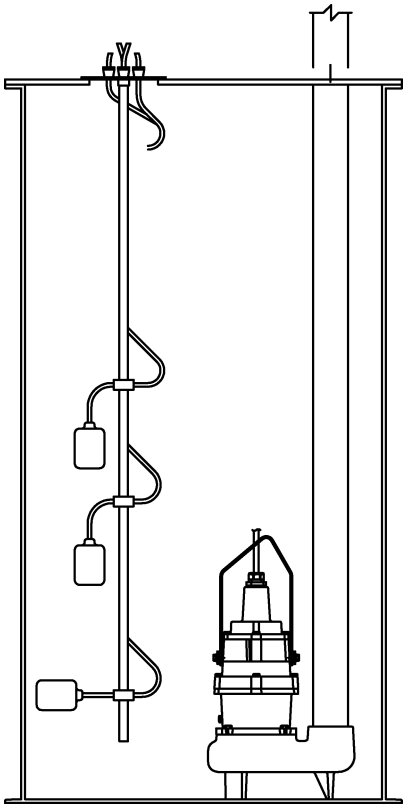

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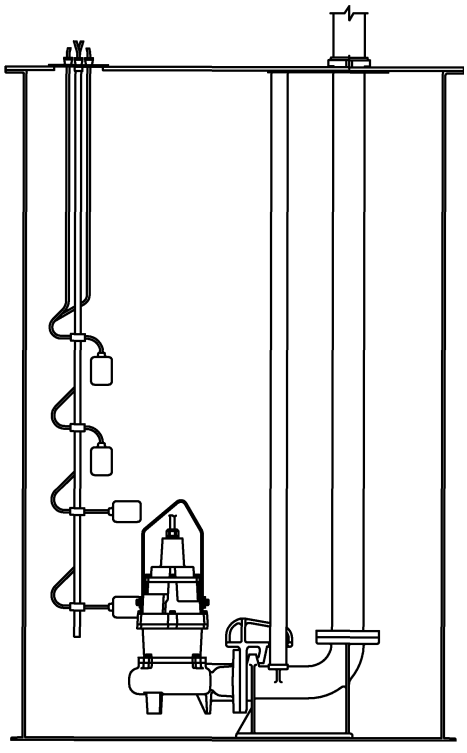
|---|---|



IOM JACKET (SINGLE SEAL)-A

# WEIL SUBMERSIBLE WASTEWATER PUMP
## INSTALLATION OPERATION MAINTENANCE

### INTRODUCTION

This manual contains instruction for installation, operation and maintenance of your pump equipment. Read and study this manual before using the equipment. The pump is a well designed and sturdily constructed machine. When properly installed and given reasonable care and maintenance, it will give many years of service.

### SAFETY PRECAUTIONS

Always disconnect the electrical power supply to the motor before working on the unit. **Failure to do so can cause severe electrical shock or death.** If the basement floor is wet or flooded, do not walk on floor until the electrical power has been disconnected. Exercise caution when working in the exposed areas of rotating parts.

### RECEIVING

Immediately upon arrival, the equipment should be checked for any shortages and/or damage. Any shortages or damage should be noted on the bill of lading and freight bill, and promptly reported to the Transportation Company. Claims for shortages or damage must be made in writing to Weil Pump Company Inc., Cedarburg, Wisconsin within 14 days of receipt of equipment.

### STORAGE

Pumping equipment should be installed and put into operation as soon as possible. If it is necessary to store the equipment for extended periods, precautions should be taken to prevent corrosion or oxidation. It is recommended that the equipment be stored indoors. The storage area should be dry and have a relatively constant temperature. Exposed machined surfaces should be coated with a rust preventative. The entire unit should be sealed in heavy plastic bag. A desiccant should be placed in the bag before it is sealed. Before sealing the bag, arrange the power cable, and moisture/temperature sensor cable, (if so equipped) in gently curved loops to prevent cables from taking a permanent set.

During storage, the plastic bag should be opened at least once a month, and the rotating assembly of the pump turned several times by hand. This helps prevent point of contact corrosion and maintains rotational integrity. Add desiccant before the bag is resealed. For additional information regarding rust prevention, refer to the American Society for Metals Handbook, under **"Rust Prevention Compounds."**

### INSTALLATION

Clean wet well thoroughly before installing pump. Sand, mud, cinders, etc. are abrasives which will damage the mechanical seals.

The pump is ready for installation as shipped. Except as noted above, no lubrication or adjustment is required before initial operation.

Raise and lower the unit by means of a chain or steel cable fastened to the lifting handle provided. **Do not raise, lower, or support the unit by means of the electrical power cable or the moisture sensor cable.** When moving the pump, avoid putting strain on the electrical cables. Set the pump in its final location before connecting the cable(s). Provide adequate headroom above the wet well for future maintenance of the equipment. Install the associated level controls so that the pump is properly immersed. for **intermittent service**, the minimum liquid level must be at least 1" above the pump case.

### POWER CABLE

The electrical characteristics shown on the pump nameplate describes the power supply required to operate the pump motor. The user is responsible for providing appropriate branch circuit, motor starter, and overload protection in accordance with local code requirements.

Electrical connections made in the pit, even though above the highest water level, must be sealed to prevent moisture penetration into power or sensor cables through junction boxes or other. Wiring diagrams for the pump motor are provided. It is important to make connections according to the diagram provided. Incorrect electrical connections will void the warranty.

## PIPING

(Refer to Figure 1)

1. Piping should be as short as possible using a minimum number of fittings to avoid excessive friction loss.
2. Pipes should line up "naturally" with the pump discharge and should never be forced together.
3. Discharge piping must be supported by appropriate supports.
4. In a duplex installation, each pump must have its own check valve.

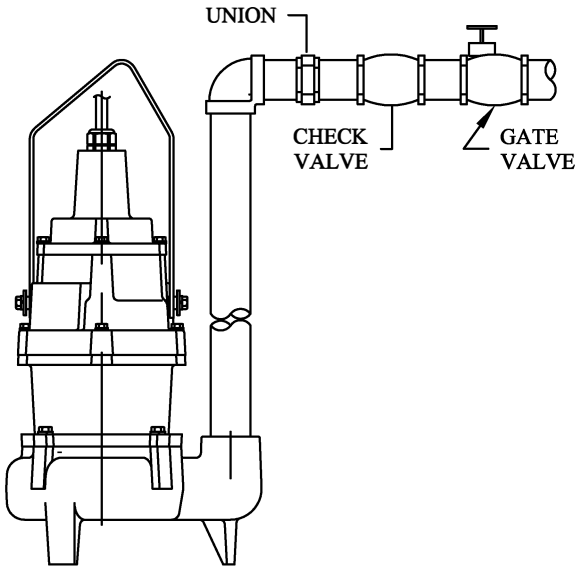



Figure 1

ES-1096

## MOISTURE SENSOR OPTION

(Refer to Figure 2)

The pump is equipped with a moisture sensor when this option is ordered. Connect the moisture sensor to the Weil Alarm-Test Panel as shown in Figure 2. Power supplied to the Alarm-Test Panel must be 115 volts, regardless of the voltage supplied to the pump motor.

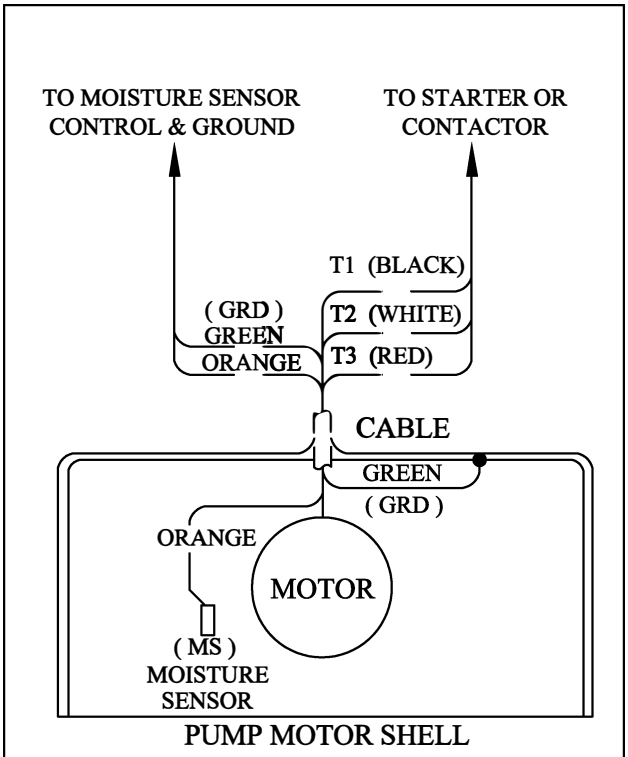



Figure 2

## START-UP PROCEDURE

Before placing pump into general operation, check the following items to insure that no damage will occur to pump motor.

1. Turn shaft manually to ensure it is turning freely.
2. Check voltage, phase, and frequency of the motor, making sure that the same is supplied to unit.
3. Make sure there is proper motor circuit protection.
4. Review piping installation, per "Piping" instructions.
5. Recheck basin to make sure it is free of debris.
6. With pump laying down on its side, apply momentary power to confirm proper impeller rotation.
7. Verify proper operation in a "wet" test startup: check GPM, Pressure, amps, volts, audible noise and vibration.
8. Check measured parameters to design conditions.

## SAFETY PRECAUTIONS

1. Disconnect and lockout the electrical supply to the motor before working on the unit, or if maintenance is to be performed on the pump in a flooded area.
2. Exercise caution when working in the exposed areas of the rotating parts.
3. In case of severe vibration or unusual noise, shut off pump at once and determine the case.
4. If frequent tripping of the overload protection occurs, troubleshoot the pump to correct the problem.

## TROUBLESHOOTING PUMP

| Problem | Probable Cause |
|---|---|
| Insufficient or No Water Flow | 1. Blown fuses or open circuit breakers<br>2. Poor switch contact<br>3. Discharge head too high<br>4. Clogged or damaged impeller<br>5. Binding shaft<br>6. Check or gate valve closed<br>7. Water level below casing |
| Insufficient pressure | 1. Low voltage<br>2. Clogged or damaged impeller<br>3. Motor incorrectly wired<br>4. Pump maybe air-bound |
| Noisy or Vibrating Pump | 1. Misaligned or bent shaft<br>2. Worn bearings<br>3. Lack of lubrication<br>4. Water level below casing<br>5. Impeller rubbing or damaged<br>6. Clogged impeller |

**NOTE**

Submersible motors have an air relief slot on the lower mounting flange area. This slot is to prevent air lock. Under normal operation water will spray out of the air relief slot. The normal water level should be above the slot at shut off.

## PERIODIC INSPECTION

Periodic inspection of the pump should be performed at six month intervals. The pump should be cleaned of accumulated abrasive particles and debris. The wet well should also be cleaned of accumulated abrasive particles.

Check the motor housing and the seal chamber for moisture in the following manner:

1. Place the pump in a horizontal position in a V-block with the seal chamber plugs facing downward.
2. Remove the plugs and drain the contents of the seal chamber in a transparent container and allow the drained liquid to settle.
3. If no water settles to the bottom of the container, the chamber can be refilled with clean oil and the plugs replaced.
4. If water settles in the container, the source of the liquid must be determined and worn and/or damaged seals, O-rings, etc., must be replaced.
5. Turn the pump over, remove the motor shell plug, drain the motor housing into a transparent container.
6. If no liquid is present, replace the plug.
7. If oil or oil and water are present, the upper seal must be inspected.
8. If only water is present the leakage source is most likely in the motor housing and the condition of the O-rings should be inspected.

**REPLACEMENT PUMPS**

Single phase units have starting modules built into the motor. When replacing existing pumps, check for any existing external modules, control panel mounted or separately mounted. These must be removed or bypassed for proper operation of the pumping unit.

**IMPORTANT NOTICE**

For warranty consideration contact your local Weil representative before disassembly or repair.

**NOTE**

See seperate instructions for pump assembly and disassembly.

# WEIL PUMP COMPANY INC

# WEIL

INSTALLATION
OPERATION
MAINTENANCE

# Submersible Wastewater Pump

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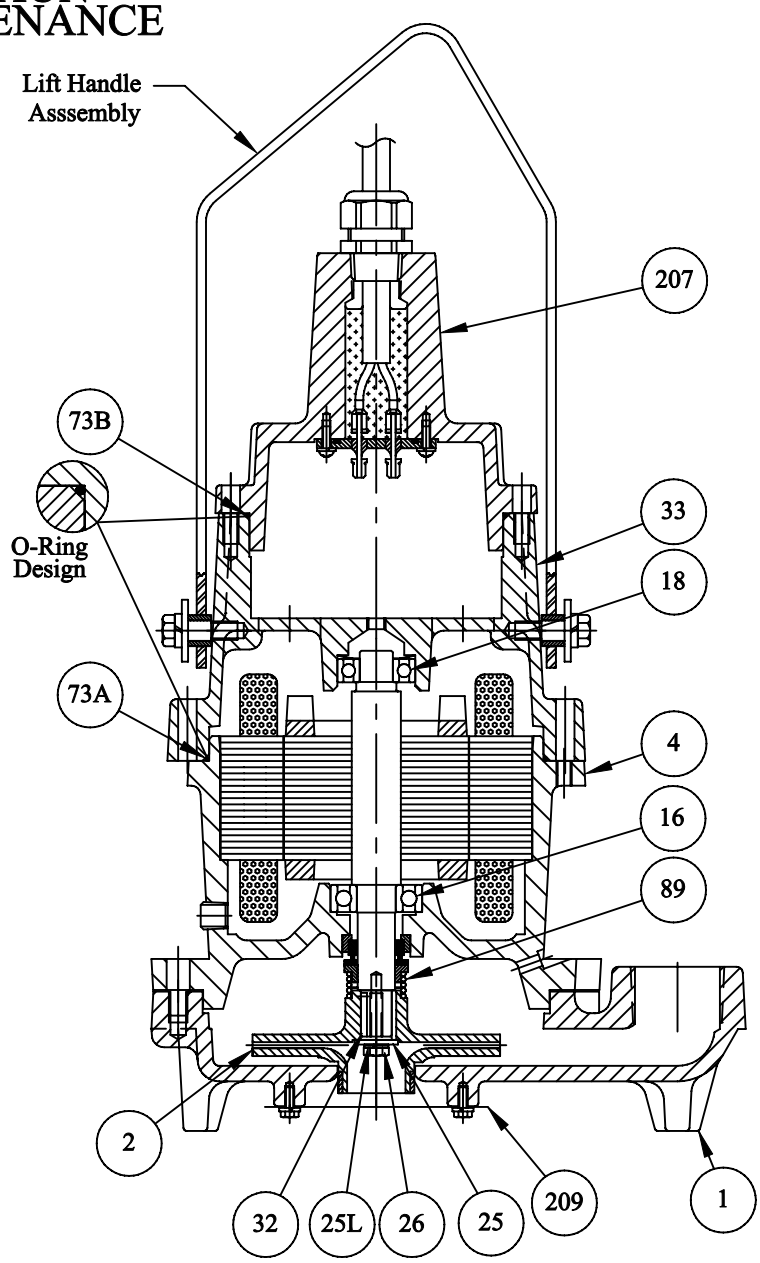
1421 2427
1422 2428
1451 2429
1452 2443
2445
2476




## PARTS BREAKDOWN

| KEY NO. | | DESCRIPTION |
|---|---|---|
| 1 | | Case |
| 2 | | Impeller |
| 4 | | Motor |
| 16 | ● | Ball Bearing, Lower |
| 18 | ● | Ball Bearing, Upper |
| 25 | ● | Washer |
| 26 | ● | Impeller Retaining Screw |
| 32 | ● | Impeller Key |
| 33 | | Bearing Support |
| 73A | ● | Gasket, Motor (O-Ring) |
| 73B | ● | Gasket, Cover (O-Ring) |
| 89 | ● | Seal, Lower |
| 207 | | Motor Cover Assembly |
| 209 | | Strainer (1400 Models Only) |
| | | Lift Handle Assembly |
| | | Suction Cover 2443 Model Only |

Items marked with (●) are included in repair kit 206.706.001 for pumps with motor W-9725.

## ASSEMBLY AND DISASSEMBLY INSTRUCTIONS
## SAFETY PRECAUTIONS

1. Disconnect and lock out the electrical supply to the motor before working on the unit.
2. Lift the pump from the pit with a steel cable or chain attached to the lifting handle at the top of the pump. DO NOT USE THE POWER CABLE FOR THIS PURPOSE.
3. Move the pump to a clean and dry location.

## LUBRICATION

The Weil submersible pump is equipped with double sealed prelubricated bearings which require no further lubrication.

## CLEANING OR REPLACEMENT OF IMPELLER

1. With the pump standing vertically, remove the screws holding the motor (4) to the case (1).
2. Carefully lift the motor assembly out of the case.
3. Lay the unit on its side in V-blocks with the impeller (2) overhanging.
4. Remove the impeller retaining screw (26) with a socket wrench.
5. Tap the impeller hub with a soft hammer to loosen and pry the impeller off the shaft using opposed pry bars. Set aside the square key (32). Do not remove the mechanical seal parts above the impeller.
6. Scrape off any deposits on the impeller and inspect it for any breaks, cracks, or wear.
7. To reassemble the impeller on the shaft, insert the impeller key in its seat and coat exposed areas of shaft with anti-seize compound. Align the impeller keyway with the key and carefully push the impeller onto the shaft, tapping gently with a soft hammer.
8. When the impeller is seated on the shaft, place washer over impeller retaining screw and insert and tighten the screw. Rotate the impeller by hand to ensure that it turns freely.
9. Set the motor assembly into the case and insert and tighten the screw.

## REPLACEMENT OF MECHANICAL SEAL

1. Disassemble case and remove impeller as described in "CLEANING OR REPLACEMENT OF IMPELLER".
2. Pry the mechanical seal off the shaft with opposed straight bladed screwdrivers. TAKE CARE NOT TO SCORE THE SHAFT.
3. Clean the shaft and the seat for the stationary ring of any adhering particles or deposits before installing the replacement seal.
4. Check the replacement seal to ensure that it is the same type, shaft size and length as the original seal.
5. Apply a thin coating of lubricating oil or glycerin to the stationary ring. TAKE CARE NOT TO MAR OR DAMAGE THE SEAL FACE.
6. Position the stationary ring with its face toward the end of the shaft. Using a seal pusher, gently press the seal ring into its seat until it is fully seated. APPLY EVEN PRESSURE TO SEAL FACE.
7. Install the rotating ring with spring and bellows over the shaft until seal faces touch.
8. Assemble the impeller and case as described under "CLEANING OR REPLACEMENT OF IMPELLER."

## DISASSEMBLY - BALL BEARINGS

1. Disassemble case and remove impeller as described in "REPLACEMENT OF IMPELLER".
2. Remove mechanical seal as described in "REPLACEMENT OF MECHANICAL SEAL."
3. Match mark motor cover (207), bearing support (33) and motor (4).
4. Remove motor cover and disconnect wiring between motor cover and motor.
5. Remove hex head cap screws holding the bearing support to the motor.
6. Remove bearing support and locate wave spring inside bearing bore. Remove o-ring.
7. Lift rotor assembly out of the motor housing.
8. Using a bearing puller, remove small upper bearing (18), and large lower bearing (16).

## ASSEMBLY - BALL BEARINGS

1. Clean shaft of any dirt and deposits, making sure that it is free of any burrs.
2. Check replacement bearings to ensure that they are the same type and sizes as the originals.
3. Press on new bearings until seated. APPLY NO FORCE TO OUTER RACE OF EITHER BEARING. PRESS ONLY ON INNER RACE.
4. Insert rotor into motor shell until lower bearing is seated.
5. Place new o-ring into position at top of motor housing and place wave spring into bearing bore using a small dab of grease to hold it in position. Tabs on wave spring must face toward bearing.
6. Align match marks on motor and bearing support. Run all wires from stator up thru bearing support. Carefully lower bearing support over upper bearing while keeping the wiring to the stator taut.
7. When mating surfaces of motor and bearing support touch, insert and tighten the hex head cap screws.
8. Place new o-ring into postion on motor cover and reconnect wiring. Use wiring diagram supplied to connect wires to terminal strip.
9. Align match marks on motor cover and bearing support and insert and tighten the hex head cap screws.
10. Assemble mechanical seal and impeller as previously describe.

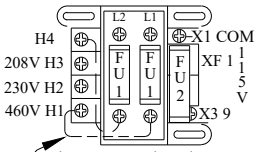
**NOTE**

See separate submersible Sewage Pump sheet for general Installation Operation and Maintenance instructions.

# WEIL CEDA 3/22/2019 5:56 AM H8138-T11 Schematic 3 Phase Duplex Panel .dwg

PANEL NAME PLATE INCLUDES:
- -System Voltage
- -Motor Amp Range
- -MAX Panel Amps
- -Phase & HZ
- -Enclosure Type

Control Transformer Is Connected For Proper Line Voltage At Factory




Change Panel Voltage By Moving Wire To New Voltage Terminal

Installer to Supply Branch Circuit Protection in accordance with NEC and local codes.

Fuses (LP-J or Equivalent) for Branch Circuit Protection 1.25 X full load amps of both motors, Plus 1 Amp for C.P..

Pump should rotate in the direction of the Arrow on the pump case. Change rotation of the pump at the control panel. Interchange wires:
T1 And T2 On M1 For Pump 1.
T1 And T2 On M2 For Pump 2.

Wires are Individually Numbered.
M1 & M2 = Motor Contactors
MP1 & MP2 = Motor Circuit Protectors
SS1 & SS2 = Spring Return Test To Off
SS3 = Spring Return Test and Silence To Auto

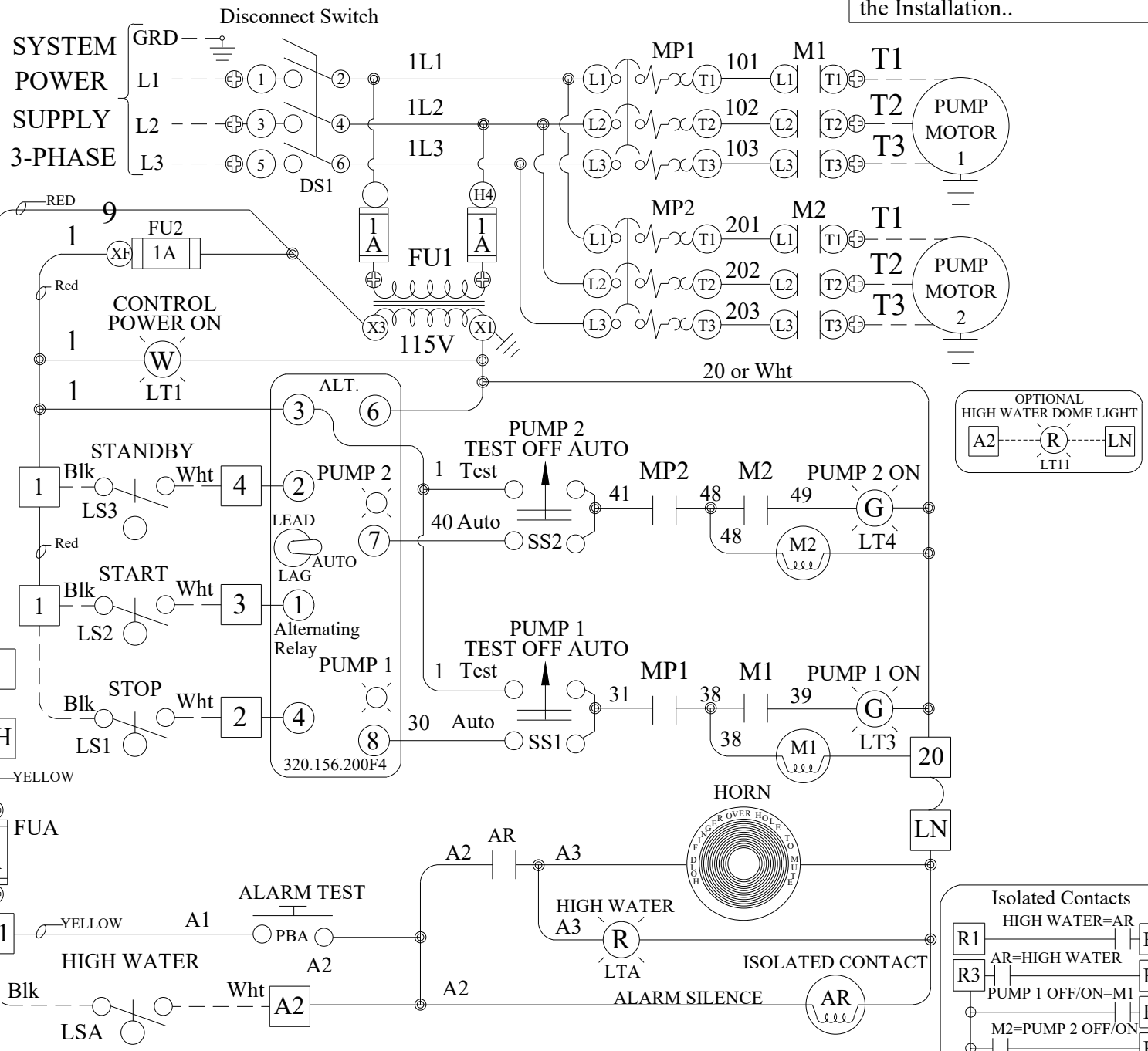
= Component Coil
= Numbers on Terminal Blocks (TB1 or TB2).
= Numbers on Components.
= Normally Open Contact on Components.
= Normally Closed Contact on Components.

Caution: Connection of any other device to the Control Power Source of this Panel will cause improper operation and Void the Warranty.

CAUTION:
Bonding between conduit connection is not automatic and must be provided as part of the Installation..

Dotted lines (– — — — –) represent Field Connections.

Wire Colors: Black = Power Green = Ground
Red = Control White = Common (Neutral)
Yellow = Alarm Circuit and Isolated Contacts




Isolated Contacts
- HIGH WATER=AR (R1 – R2)
- AR=HIGH WATER (R3 – R4)
- PUMP 1 OFF/ON=M1 (R5)
- M2=PUMP 2 OFF/ON (R6)
- P1 OVERLOAD=MP1 (R7)
- MP2=P2 OVERLOAD (R8)

Customer To Supply Power for Operation Of External Device's

LS3 & LSA float positions May Be Changed to activate High Water Alarm, before Lag Pump is called for.

OPTIONAL: External Alarm Power
1. WARNING: Disconnect Power TO PANEL
2. Remove Jumpers Between 9 & LH and LN & 20
3. Connect 115 VAC Between LH & LN

REV: Added overload ic's by gnd 10/25/20

GND 04/06/2017

# LIMITED WARRANTY

WEIL PUMP COMPANY warrants this equipment to be free from defects in workmanship and material and that it will remain so during normal and proper use for the period of one year from the date of shipment. If any defects appear within this period, the Company reserves the right to determine the best manner in which repairs or corrections will be made, and may elect to remedy any defects by having the equipment returned to our plant, freight prepaid. The Company will not be responsible for any unauthorized labor or repairs. Nothing in this warranty shall obligate WEIL PUMP COMPANY for costs of equipment removal or re-installation, rental of temporary equipment, shipping charges, or any damages to equipment other than that furnished by WEIL PUMP COMPANY. There are no warranties, express or implied, other than those contained in this paragraph.

This warranty will be considered voided by the following:

1) Evidence of quantities of sand, mud, and construction debris in the installation. Sand and mud are abrasives and will damage the mechanical seal and bearings. Construction debris may lock impeller and cause the motor to burn out.
2) Pumping industrial wastes, corrosive liquids, paints, plaster, and sludge unless specifically designed for this service.
3) Use of this equipment for temporary dewatering purposes on construction jobs.
4) Careless handling, accidental damage, faulty or improper installation or wiring.
5) Pumping liquids in excess of 150° Fahrenheit unless specifically designed for this service.

Weil PUMP COMPANY