



NEP-ZL132106

INSTALLATION OPERATION & MAINTENANCE

NEPTUNE Glycol Feed System

**Models GFS-50-1,
GFS-50-1A,
GFS-50-2A,
G-100-1A,
G-100-2A**

PSG
22069 Van Buren Street
Grand Terrace, CA 92313 USA
P: +1 (909) 222-1343 F: +1 (909) 783-3440
neptune1.com

NEP-ZL132106
10.2025_REV 1



Table of Contents

- I. WARNING..... 3
- II. GENERAL DESCRIPTION..... 4
- III. MODELS..... 4
- IV. INSTALLATION INSTRUCTIONS 5
- V. OPERATION 6
- VI. TROUBLESHOOTING..... 6
- VII. Bronze Pump..... 7
- VIII. Pressure Switch..... 9
- IX. INSTALLATION INSTRUCTIONS LL-3 (L-30N)..... 10
- X. System Schematics..... 12
- XI. Drawings 15

I. WARNING

Please read thoroughly before installation, operation or maintenance of any Neptune pump

EQUIPMENT MISUSE HAZARD

Equipment misuse can cause the equipment to rupture, malfunction and result in serious injury. • This equipment is for professional use only. • Read all instruction manuals, tags, and labels before operating the equipment. • Use the equipment only for its intended use. • Do not alter or modify this equipment. • Be certain all operators of this equipment have been trained for safe working practices, understand its limitations, and wear safety goggles and or equipment when required. • Do not exceed the maximum working pressure of the system as mentioned on the pump tag. • Do not use the pump head or the suction or discharge piping to pull the equipment. • Do not move pressurized pump. • Use fluids or cleaning agents for cleaning that are compatible with the pump parts. Read the fluid and cleaning agent manufacturers warnings and also refer to the material compatibility chart • Comply with all applicable local, state and national safety regulations. • Do not allow pump to run dry for a long period of time.

PRESSURIZED EQUIPMENT HAZARD

Spray from leaks or ruptured components can splash fluid in the eyes or on the skin and cause serious injury. • Shut off the pump and depressurize before performing any maintenance. • Do not tamper with or perform unspecified alteration of this device. • Use only pipe, hose, and hose fittings rated for maximum rated pressure of the pump or the pressure at which the pressure relief valve is set at. • Always wear protective clothing, face shield, safety glasses and gloves when working or near your metering pump. • Additional precautions should be taken depending on the solution being pumped. Refer to MSDS precautions from your solution supplier. • Do not stop or deflect fluid leaks with your hand, body, glove, or rag. • Tighten all fluid connections before operating the equipment. • Replace worn, damaged, or loose parts immediately. • Before performing any maintenance requiring pump head and or valve (wetted parts) disassembly, be sure to relieve pressure from the piping system and where hazardous process chemicals are present. • Make the pump safe to handle for the personnel and the environment by cleaning and chemically neutralizing the pump as appropriate. • Wear protective clothing and use proper tools as appropriate to avoid any injury. • If the diaphragm has failed, process chemical may have contaminated the pump hydraulic oil. Handle with appropriate care. Clean the pump and replace oil as necessary. Discard the contaminated oil as per the local code. • If the diaphragm fails in a double diaphragm pump, pressurized process chemical can be present in the Neptune leak detection vacuum system. Take proper care to clean and handle them.

FIRE AND EXPLOSION HAZARD

Improper grounding, poor air ventilation, open flames, or sparks can cause hazardous conditions and result in fire or explosion and serious injury. • Ground the equipment. See motor installation instruction for grounding procedure. • Do not pump non recommended flammable or explosive fluids. • Static electricity may generate by fluid moving through pipes and hoses. A static spark could be produced by high fluid flow rate. Earthing of the pump is a must. • Provide fresh air ventilation to avoid the possible buildup of flammable fumes from the process chemicals. • Keep the pump area free of debris, including cleaning agent, rags, and any flammable material. • Follow the cleaning agent and other cleaning recommendations as mentioned in the operation and instruction manuals. • Use cleaning agent with the highest possible flash point to clean the pump parts if needed. • If there is any static sparking while using the equipment, stop operation at once. Identify and correct the problem before starting up the pump.

TOXIC FLUID HAZARD

Hazardous fluids or toxic fumes can cause serious injury or death if splashed in eyes or on the skin, swallowed, or inhaled. • Know the specific hazards of the fluid you are using. Read the fluid manufacturers warnings. • Store hazardous fluid in an approved container. Dispose of hazardous fluid according to all local, state and national guidelines. • Wear the appropriate protective clothing, gloves, eyewear and respirator. • Pipe and dispose of the exhaust air safely. If diaphragm fails, the fluid may be exhausted along with the air in mechanical diaphragm pump. Also, oil vapor may breathe out of the air breather installed on the gear box.

SOUND HAZARD

The sound pressure level of the pump may exceed 80dBA in some of the pumps. • Observe all safety precautions when operating the pump within close proximity for extended periods by wearing hearing protectors. • Extended exposure to elevated sound levels will result in permanent loss of hearing acuteness, tinnitus, tiredness, stress, and other effects such as loss of balance and awareness.

MECHANICAL HAZARD

The pump may shake or vibrate during operation.

II. GENERAL DESCRIPTION

Neptune Glycol Feeders are designed for the addition of glycol solution to closed-loop chilled or hot water systems to maintain pressure in the loop by making up for losses that occur due to leakage.

Glycol addition is controlled by a pressure switch with adjustable low and high set points (adjustable). When the pressure in the loop reaches the low set point, the pump begins to feed glycol into the system until the high-pressure set point is achieved, and the switch stops the pump

III. MODELS

The new GFS Series Model GFS-50 is provided with a 50-gallon polyethylene tank mounted in a steel frame, 1.6 gpm @ 100 psi bronze rotary gear pump (optional 3.6 gpm @ 100 psi pump), float switch and NEMA 4X control panel. The control panel features a HAND/OFF/AUTO selector switch for the pump motor, ON indication light for the pump, LOW tank level indication light and power cord with plug (115V, 60c). The pump suction piping includes a PVC ball valve and cast iron "Y" strainer. The pump discharge assembly includes a PVC ball valve, brass check valve, pressure switch, bronze relief valve and pressure gauge.

The Model GFS-XX-1A is identical to the GFS-XX-1 and has the addition of an audible alarm, as well as light for low level tank indication.

The Model G-XX-2A is capable of feeding glycol to two separate closed loop systems and includes two separate pumps, as well as suction and discharge assemblies.

The LP designation at the end of a model number (ex. G-XX-1-LP) indicates that a 3.6 gpm @ 100 psi pump has been provided in place of our standard 1.6 gpm @ 100 psi pump.

All glycol systems are provided with a dry contact for remote alarm.

IV. INSTALLATION INSTRUCTIONS

Site Preparation

Choose a site that allows easy access to the unit for maintenance. Consider protection from the elements. Guard against drips and spray from nearby equipment. Choose a solid foundation for mounting. If noise is a concern, consider a rubber pad under the unit base to dampen.

New unit Receipt Inspection

Upon receipt, check for obvious shipping damage and completeness to purchase order requirements. Shortages or damage should be reported immediately to the carrier and to Neptune. Occasionally during shipment, possible misalignment or other damage including loosen fittings can occur. As such, customers are advised to test the unit with water in a convenient location prior to installing to check for any leakages at connection points and Control System responses.

Unit Installation

Set the Glycol Feeder “GFS-50-1” on a secure and level base.

Using the mounting holes (4 in total) on the frame to secure the unit on the platform.

Connect the Glycol Unit outlet, which is located at the front left of the unit, with your existing supplied with the feeder to your system connection point.

At the connection point, consider using a union and isolation valve (not supplied) to allow for future service.

Caution

WARNING: “Risk of electrical shock” The Glycol Feed System pump is supplied with a grounding type plug. To reduce the risk of electrical shock, make certain that it is only connected to a properly grounded receptacle. Before initiating any work disconnect power to prevent electrical shock. In case of pump failure, the motor housing and or the pumped fluid may carry high voltage to components normally considered safe.

The initial setting of the pressure switch is critical to the proper operation of the glycol feeder.

The pressure relief valve is factory set at 100 psi. **DO NOT** operate the glycol feeder above 100 psi. If your application requires higher operating pressure, consult the factory.

START UP PROCEDURE

1. Connect system outlet to the main system
2. Before filling the tank, inspection around unit for any damages or loosen connectors.
3. Fill the tank (Encourage to start with half a tank during the startup procedure, and fill it up later after completing the system dial-in)
4. Open Glycol Unit valves. There is one tank isolation valve under the tank, and one Glycol System isolation valve after the pump discharge)
5. Open system isolation valve between the main system and the Glycol Feeder
6. Validate pressure gauge reading, it should match with main system pressure (slight variation is reasonable, considering the differences in system connection and piping pressure loss)
7. Check for any system leakage at the discharge piping.
8. Plug control panel power cord to power outlet
9. Turn system to auto mode and run the main system
10. Validate Pressure switch setting. The switch is factory set to Cut-in at 20 PSI and Cut-off at 40 PSI (which means it will operate when the system pressure drops below 20 PSI and once it reaches 40 PSI, the pump will shut off.)
11. If the setting does not fit your need, adjust it accordingly (see Pressure Switch section in this user manual)
12. The system is now ready to operate automatically.

V. OPERATION

The glycol feeder is provided with a control panel with HAND/OFF/AUTO selector switch.

When the panel is switched to:

1. The AUTO position, the pump is actuated via the pressure switch, which is mounted in the discharge assembly and sensing the pressure in the loop. The pressure switch is pre-set to start the pump at 20 psi and stop the pump when 40 psi in the loop is achieved. If adjustment is needed, the minimum starting pressure of the switch is 10 PSI, with a minimal differential of 15 PSI (Ex: 10PSI / 25 PSI) and maximum differential of 50 PSI (Ex: 10 PSI / 60 PSI)
The float switch in the bottom of the tank will stop the pump if the glycol solution in the tank gets to low level.
For Alarm equipped unit (GFS-XX-XA), noise alarm will trigger when float switch detects low tank level. Customers have option to press the LOW-LEVEL light button to silence the alarm without unplugging the control panel
2. The MANUAL position of the selector switch in the panel will allow the pumps to run and inactivate both the pressure switch and the level switch.

Each set of discharge piping is equipped with a over-pressure protection relief-valve, which is set to 100 PSI to protect downstream piping. Excessive process liquid will channel back to the tank with a return line. It is abnormal for the relief valve to be activated frequently. Customers should check on the return line periodically. If the check valve is triggered often and liquids start accumulating in the line, customers should inspect both the main and the glycol system for any potential malfunction components

VI. TROUBLESHOOTING

PROBLEM

Pump is running but is not pumping anything

PROBABLE CAUSE

1. The motor rotation is incorrect. Wiring the motor should be for clockwise rotation on single pump systems. Check the wiring diagram on the motor or the attached motor diagram for proper wiring.
Dual pump systems Model GFS-50-2A should have the pump on the right when looking from the front of the system (discharge piping) wired for counterclockwise rotation and the pump on the left wired for clockwise rotation. Again, consult the wiring diagram on the motor or the attached motor diagram for proper wiring.

Pump is not running when HOA switch is in the AUTO position

1. The low-level float switch may be actuated. The low light will be on, and the audible alarm will sound on some models. Add glycol to the tank until the level switch is satisfied.
2. The pressure switch in the discharge piping has been satisfied. The pressure switch is factory set to actuate the pump at 20 psi and shut off at 40 psi. See pressure switch information for pressure switch adjustment, which can be found on the inside cover of the pressure switch.

VII. Bronze Pump

Introduction

Neptune Selected heavy duty gear pumps feature self-priming, bidirectional, positive displacement, designed to operate with nearly pulseless flow.

Construction

Our Lead-Free Bronze type pumps are ideal for handling Glycol. The shafts are made of 303-SS grade with bronze spur gear for chemical compatibility. Wet end parts are brass 303-SS, bronze, Buna-N, ceramic and carbon. These models can withstand temperatures from -20 to 210°F.

Pump technical Spec

For standard model

Port Size: 1/4"
Motor HP required: 1/3
Motor RPM for rated flow rate: 1725
Maximum Allowable Working Pressure: 100 PSI
Suction Lift: 3.2
Free Flow (w/ 500 SSU Liquid): 2.2 GPM
Flow @ 100 PSI (w/ 500 SSU Liquid): 1.6 GPM

For LP model

Port Size: 3/8"
Motor HP required: 1/2
Motor RPM for rated flow rate: 1725
Maximum Allowable Working Pressure: 100 PSI
Suction Lift: 3.6
Free Flow (w/ 500 SSU Liquid): 4.4 GPM
Flow @ 100 PSI (w/ 500 SSU Liquid): 3.6 GPM

Internal Pressure Relief Valve

This Pump is equipped with integral internal bypass relief valves are intended as a safety device against intermittent over pressurization if needed. This valve is delivered in close condition, and the system is protected by the system relief valve near the system discharge (Pre-set @ 100 PSI, See Warning section)

The setting of the internal relief valve can be modified by adjusting the set screw on the pump cap.

They are not designed for continuous use and can lead to overheating.

Storage

If the pump is to be stored prior to installation, it is recommended that it be left in the original shipping carton with all shipping plugs in place and stored in a dry environment avoiding temperature variations. Contact the motor manufacturer for specific motor storage information.

Records

These instructions should be kept in a convenient location for ready reference. The manual should be read carefully by people responsible for installation, operation, and maintenance of the equipment. For ease of reference, a copy of the order should be kept with the manual. Write down the pump model number as shown on the pump nametag, and the date the unit was placed into service.

Operation and installation

Neptune always pre-test the glycol unit to ensure the pump is ready for operation after delivery. The following operation procedure is intended for pump and motor retro-fitting or future replacement.

Before changing and maintenance, please ensure power is disconnected with the unit to prevent electrical shock or injury due to sudden motor operation.

Assembly

Each box contains a coupler with set screw that is suitable for the motor and pump assembly.

Apply anti seize to the motor shaft and spine teeth in the coupling.

Fit the key into the motor shaft and align it to the coupling. Gently slide the coupling to the maximum limit.

Use the two set screw and tighten the coupler. Key and screw should be inline and it is flush with back edge of the coupling prior to tightening.

Now coupling is ready for assembly. coat grease or anti-seize on the spine before inserting the pump head into the motor shaft.

Secure the pump to the motor and it is ready for operation.

Pre-Startup

Prior to start-up,

ensure system is isolated from the main system and control panel is disconnected from power source.

Shut all valves off within the system, tank isolation valve under the tank, and System isolation valve after the pump discharge

Prepare a drip tray for any residuals in the pump head and the connection line

If the reason for this start up includes replacement in motor, please verify desired rotation by jogging the motor and make corrections if necessary. Before initial startup, pre-wet the gears and make sure the pump is adequately primed. Failure to do so could cause immediate damage to pump components.

Before powering up the unit, make sure that discharge valves are open.

Startup

Start pump and check for proper operation. Adjust packing (if applicable) as necessary, allowing adequate time to run in. Do not over-tighten the packing else damage to the packing and the shaft can occur

It is encouraged to have flooded suction for the gear pump and ensure all pumps must be primed before start -up

The liquid must be free of dirt, abrasives, sand, silt, etc. as they may damage the pump and the piping system

Never operate discharge valve at shut-off conditions it will overheat and damage pump.

During start-up, maintain a minimum of 1 bar (15 PSI) operating pressure on the pump. This will bleed off all the air in the seal chamber and will ensure liquid circulation to the mechanical seal.

Proper pump rotation is clockwise looking up from front of the pump and pressure relief valve is always on discharge side

If the pump's bearing areas or seal area runs hot, shut the pump down and determine the cause. For units equipped with integral pressure relief valve, the factory setting is usually 50 psig. It is recommended that the setting should be 5 psig above the operating pressure in the discharge line. To increase the set point, turn the by-pass valve adjusting screw clockwise. If start-up screens were used, be sure they are removed prior to placing the system into regular operation. Depending on suction conditions, it may be necessary to re-prime the pump for subsequent restarts.

MAINTENANCE

Frequency

Since each installation differs, the frequency and extent of pump maintenance is best established based upon past performance.

Keeping

detailed maintenance records of past performance aids in determining future preventative maintenance intervals. During routine operating inspections, pay particular attention to seal and bearing areas of the pump. Consult the motor manufacturer for motor maintenance instructions.

Inspect for Wear

If your Bronze Gear Pump exhibits reduced flow, an inability to maintain pressure, is noisy or performs otherwise abnormally, first refer to the Troubleshooting Matrix on back. If the problem persists, the pump should be inspected for wear or damage. Neptune Selected Bronze Gear

pump internals may be readily inspected in the field usually without removal from the drive or system plumbing. Simply remove the cover

screws to pull the cover. Full pump removal and complete disassembly may be needed for a comprehensive inspection.

VIII. Pressure Switch

Dayton Pressure Switch

Model 12T081

Minimum Cut -in 10 PSI
Maximum Cut-Out 100 PSI
Differential Range: 15-50

PRESSURE CONNECTION: ¼” NPT EXTERNAL

TECHNICAL TERMS

Operating Points (Settings)

Every pressure switch has two operating points: one on rising pressure and one of falling pressure. The operating point on rising pressure is referred to as the TRIP POINT or cut out for pumps and compressors and the operating point on falling pressure is referred to as the RESET POINT or cut in for pumps and compressors. These operating points are called the SETTINGS of the switch.

- TRIP POINT (rising pressure)
- RESET POINT (falling pressure)

Differential

The differential is the difference in pressure between the trip point (cut-out) and the reset point (cut-in). It can be adjustable or nonadjustable (fixed).

Example: Cut-in 30 psi
 Cut-out 50 psi
 Differential 20 psi (50-30 psi)

Range

The range is the pressure limits within which the operating points (settings) can be adjusted. The range of the pressure switch is referenced to the operating point on rising pressure (trip point). The differential subtracts from the trip point setting. During the normal operating cycle, system pressure should never exceed the upper limit of the range when using a diaphragm actuated switch. This will greatly reduce the life of the diaphragm.

Maximum Allowable Pressure

Maximum allowable pressure is the pressure to which a switch can be subjected without causing a change in operating characteristics, shift in settings, or damage to the device. Pressure surges may occur in a system during the start up of a machine or from valve operation. Surges are not normally detrimental to the life of a switch if the surge is within the maximum allowable pressure rating of the switch. Diaphragm actuated switches should not be subjected to surges that greatly reduce the life of the diaphragm.

SET POINT ADJUSTMENTS

The pressure switch is set at the factory to the operating point(s) marked on the outside of the switch housing. Before readjusting the switch, cycle it to determine actual operating points.

Adjust in the proper sequence:

1. Range: Turn nut down (CW) for higher cut in pressure, or up (CCW) for lower cut-in
2. Differential: Turn nut down (CW) for higher cut-out pressure, or up (CCW) for lower cut-out.

Check switch operation several times after adjustment to ensure proper pressure setting

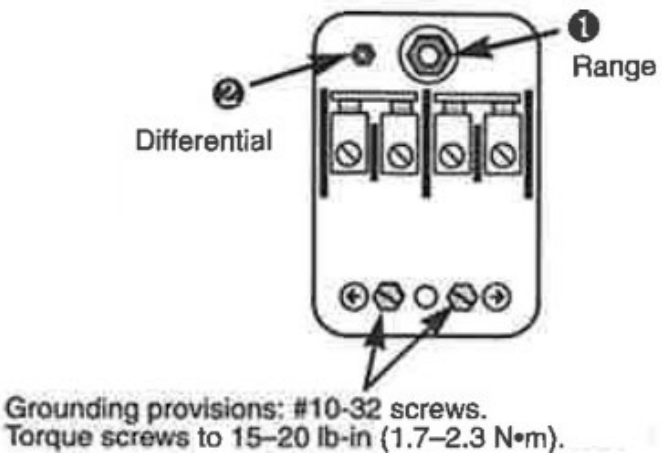


FIGURE 1

IX. INSTALLATION INSTRUCTIONS LL-3 (L-30N)

LIQUID LEVEL SWITCH

Installation

MODEL L30N LIQUID LEVEL SWITCH INSTALLATION AND OPERATING INSTRUCTION

The L-30 liquid level switch is supplied with a 1-1/2" or 1-1/4" X 1" bushing threaded in place with 2 to 3 wraps of Teflon tape, which must be intact or renewed if bushing and switch are separated before assembly in tank. Care must be exercised when threading the bushing into plastic or metal fittings. Apply a minimum of 2 to a maximum of 3 wraps of Teflon tape to threads of bushing - this is especially important if unit is to be used in metal fittings where coarse METAL THREADS could gall plastic if not lubricated. The plastic bushing CAN BE CRACKED if the main body of the flow switch is tightened into it FIRST. Cracking will not occur if the bushing is FIRST tightened into the pipe or tank fitting and THEN the L-30 body is tightened into the bushing.

Thus:

- 1). Teflon tape thread and tighten plastic bushing into pipe or tank fitting.
- 2). Teflon tape thread and tighten L-30 switch into PLASTIC bushing by applying wrench to hexagon section. Repeat steps 1 and 2 until ARROW on body points to UPWARD and threads are, leak tight.

Plumbers' tools such as pipe wrenches are not recommended. If possible, use a "Ridged" type wrench where the smooth jaws closely fit the hexagon section.

Electrical Wiring:

- 1). Remove gland nut, grommet and switch cover.
- 2). Strip outer jacket of electrical cord back
- 3). Slip on terminals are individual conductors supplied with each switch. approximately 1-1/4". Strip insulation from back approximately 1/4". Remove from switch terminals and crimp on or solder to electrical leads.
- 4). Feed electrical cable through gland nut, grommet and switch cover as shown in figure 2.

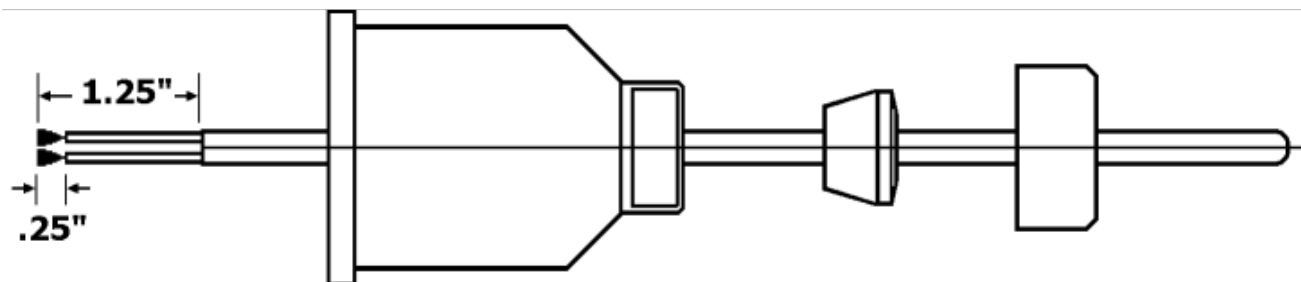


FIGURE 2

5). Apply slip on terminals to appropriate contacts of micro switch. Slide cover down cable and fasten to body of switch with four screws provided. Slide grommet down cable until outer jacket is level with small end of grommet per illustration page 2. Push grommet into tapered end of cover. Hold cable jacket to prevent rotation and thread gland nut firmly on to cover.

Fig. 3: Wiring schematic for power applied to load when liquid level is less than set point (power to load interrupted when level increases to above set point).

Fig. 4: Wiring schematic for power applied to load when liquid level is greater than set point (power to load interrupted when level decreases to below set point).

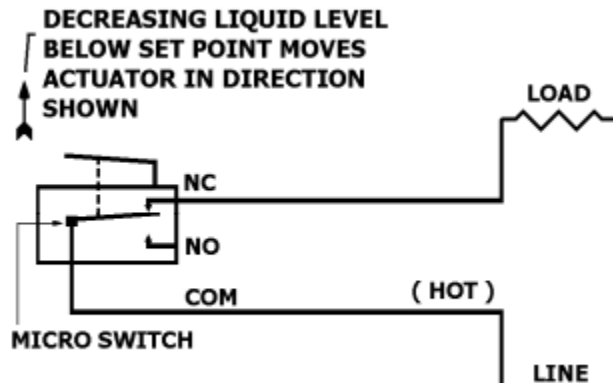


FIGURE 3

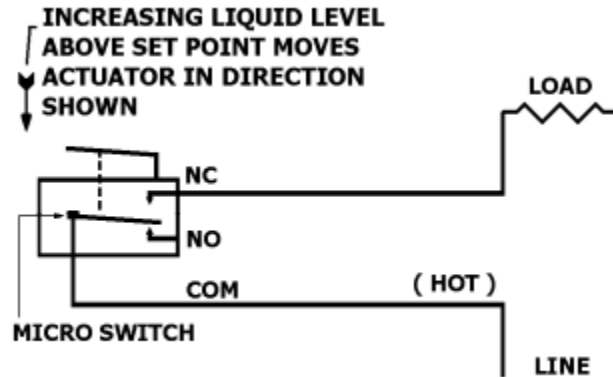
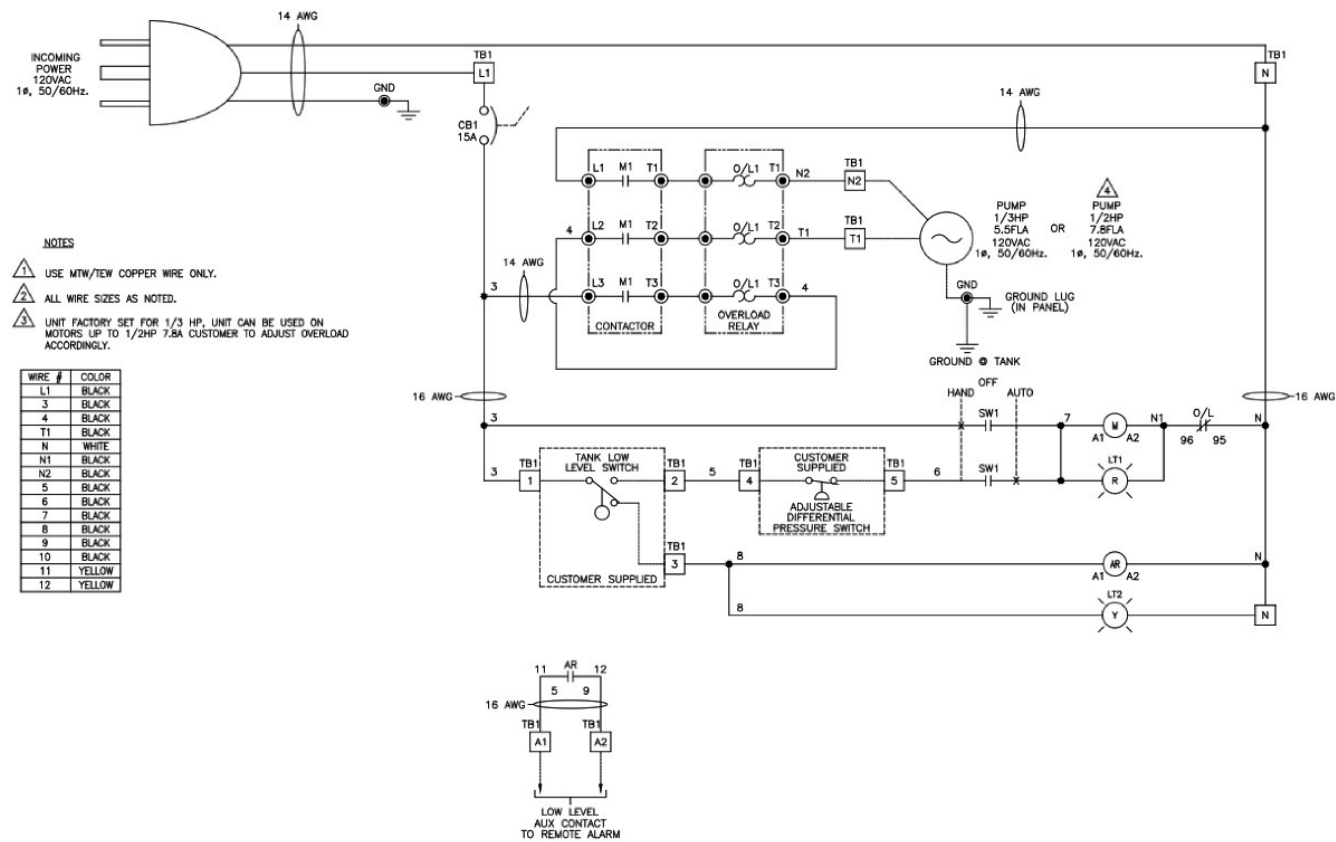
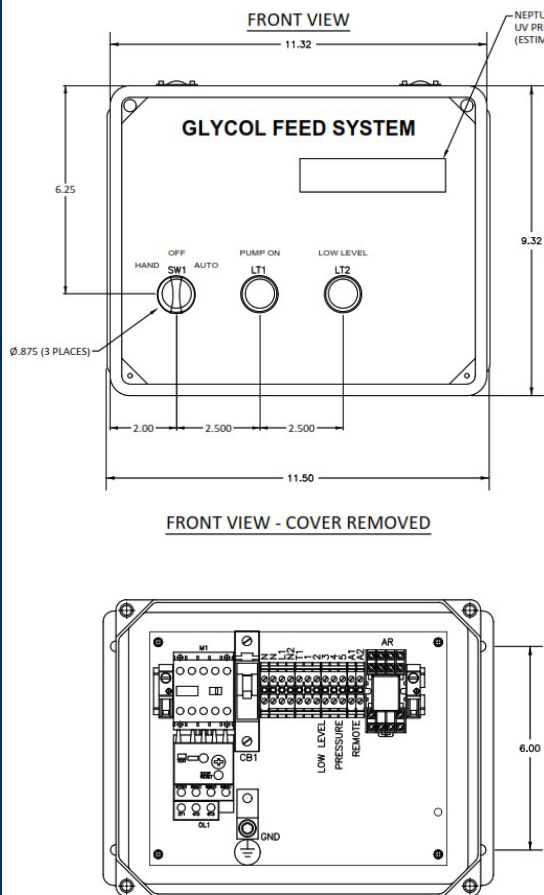


FIGURE 3

Microswitch actuation point may be monitored by an audible click or with an OHM meter before connecting line power to the terminal strip or by monitoring the voltage supplied to the load through the microswitch.

X.

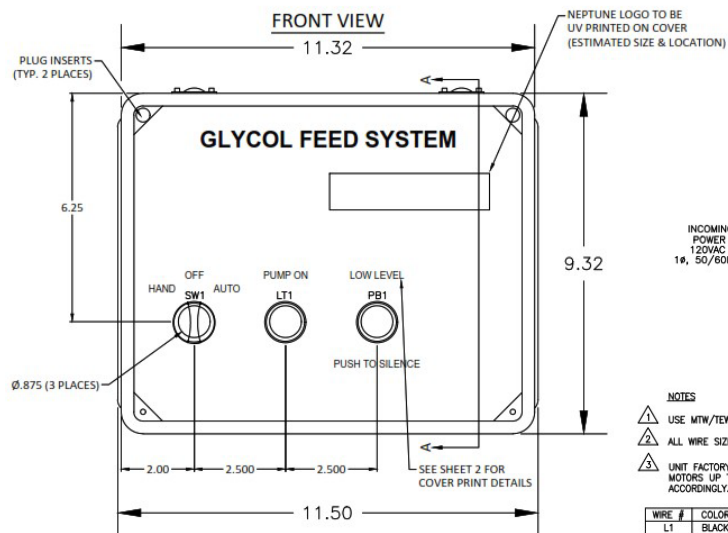


DESCRIPTION:

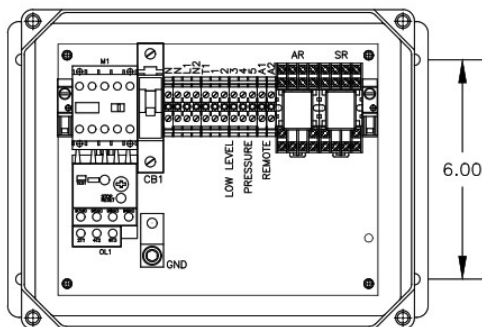
WIRING SCHEMATIC – SINGLE PUMP, W/O ALARM

DRAWING NUMBER:

126626 GFS-50-1



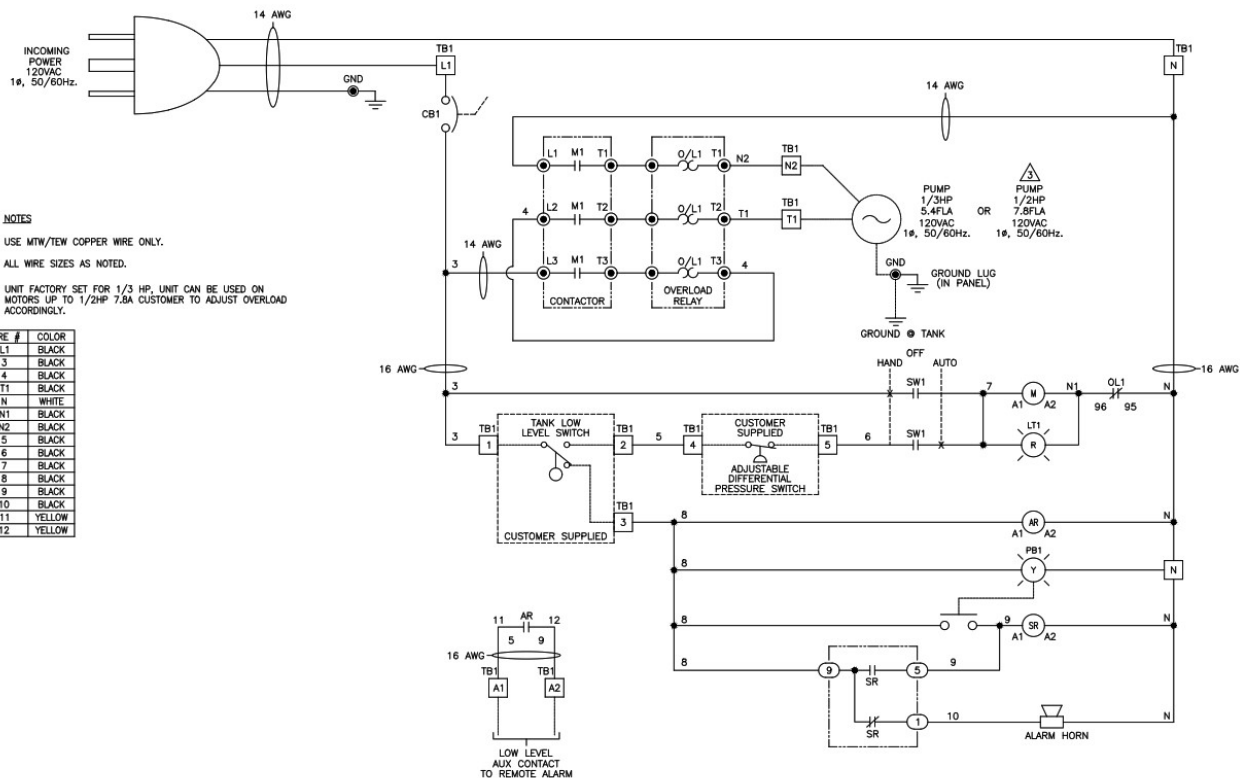
FRONT VIEW - COVER REMOVED



NOTES

- 1 USE MTW/TEW COPPER WIRE ONLY.
- 2 ALL WIRE SIZES AS NOTED.
- 3 UNIT FACTORY SET FOR 1/3 HP. UNIT CAN BE USED ON MOTORS UP TO 1/2HP 7.8A CUSTOMER TO ADJUST OVERLOAD ACCORDINGLY.

WIRE #	COLOR
L1	BLACK
3	BLACK
4	BLACK
T1	BLACK
N	WHITE
N1	BLACK
N2	BLACK
5	BLACK
6	BLACK
7	BLACK
8	BLACK
9	BLACK
10	BLACK
11	YELLOW
12	YELLOW

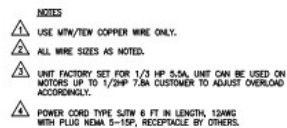


DESCRIPTION:

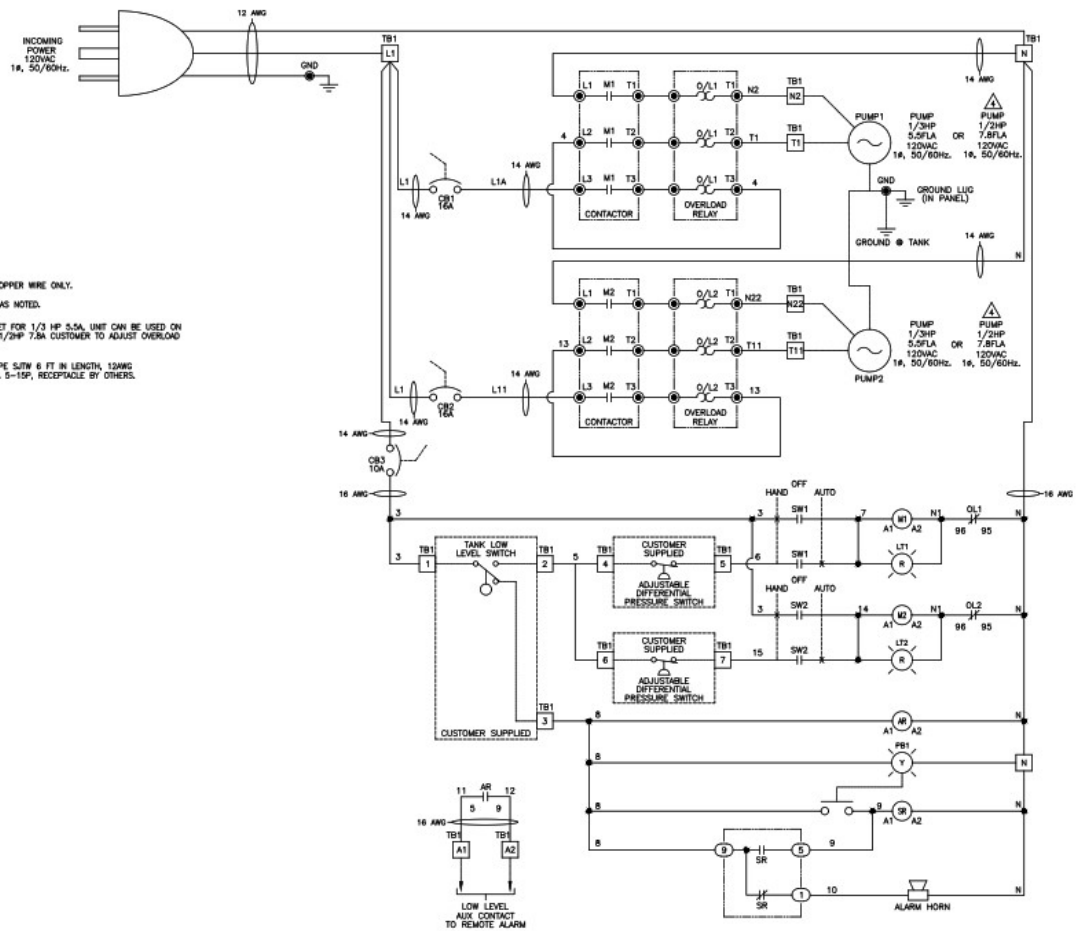
WIRING SCHEMATIC –
SINGLE PUMP, W/ ALARM

DRAWING NUMBER:

126627 GFS-50-1A



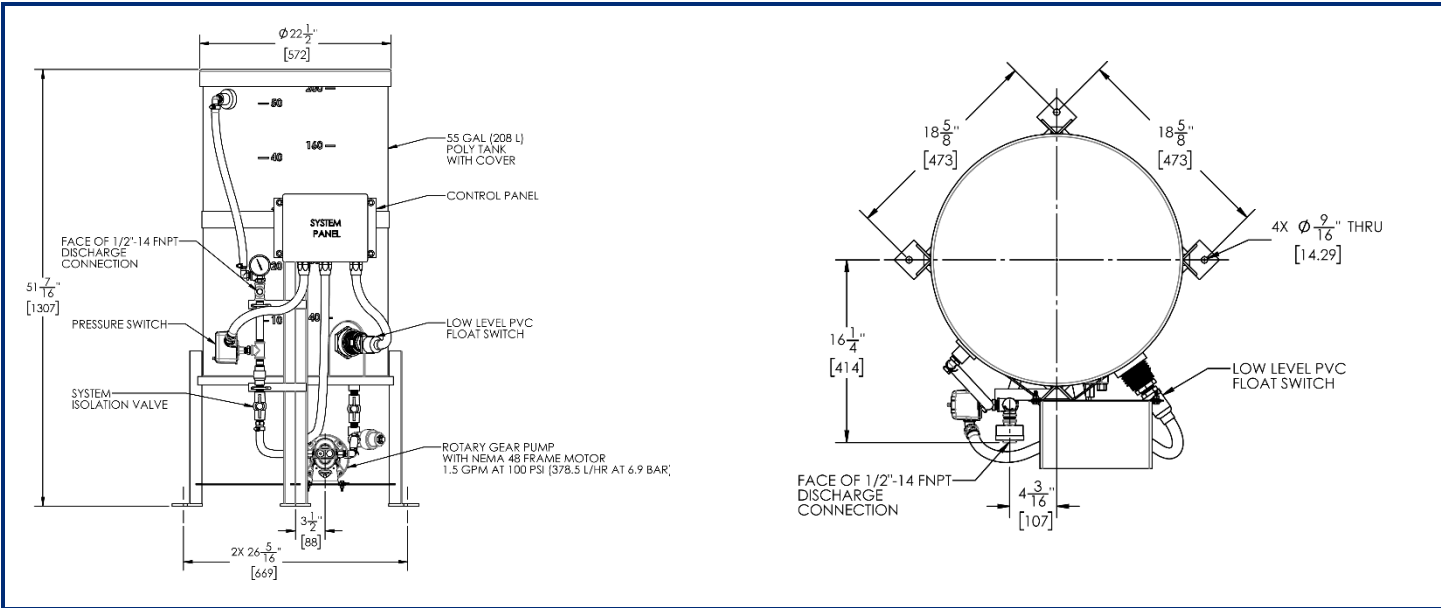
WIRE #	COLOR
L1	BLACK
L1A	BLACK
4	BLACK
T1	BLACK
L11	BLACK
13	BLACK
T11	BLACK
N	WHITE
N2	BLACK
N22	BLACK
N1	BLACK
N11	BLACK
3	BLACK
5	BLACK
6	BLACK
7	BLACK
8	BLACK
9	BLACK
10	BLACK
11	YELLOW
12	YELLOW
14	BLACK
15	BLACK



WIRING SCHEMATIC – DUO PUMP, W/ ALARM

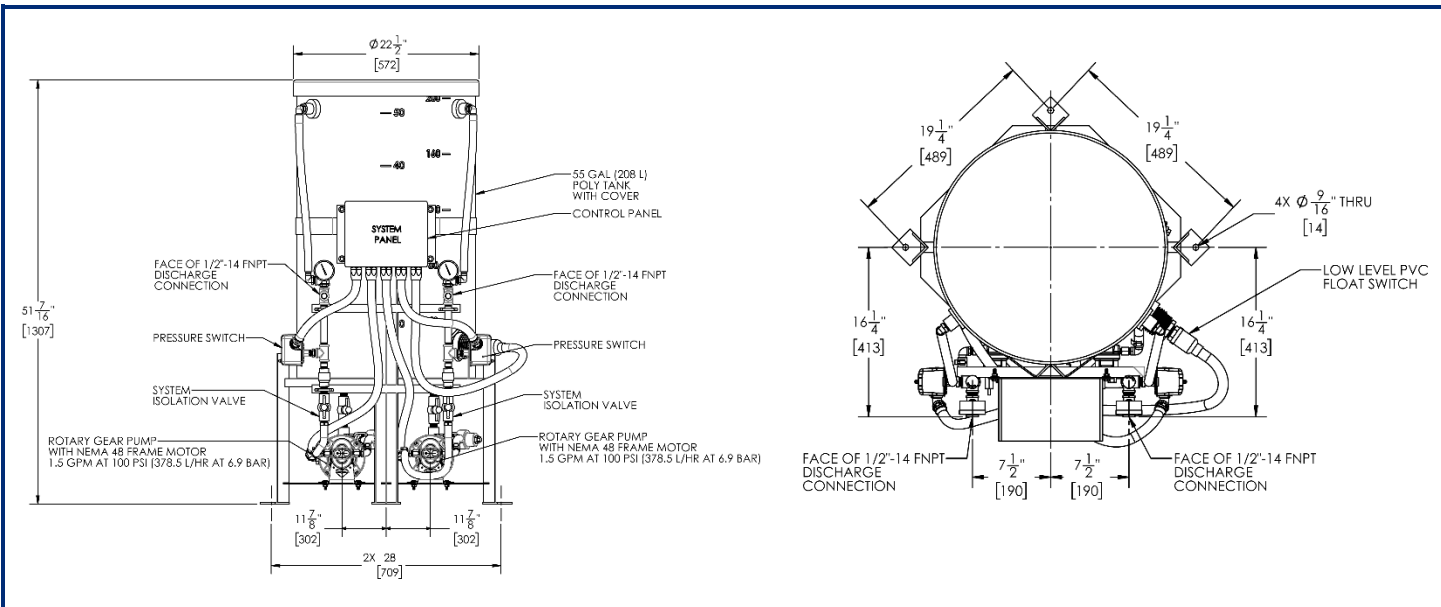
126627 GFS-50-2A

XI. Drawings



DESCRIPTION:
DIMENSIONAL DRAWING –
GLYCOL FEEDER, SINGLE PUMP

DRAWING NUMBER:
LN0011 REV A



DESCRIPTION:
DIMENSIONAL DRAWING –
GLYCOL FEEDER, DUO PUMP

DRAWING NUMBER:
LN0013 REV A