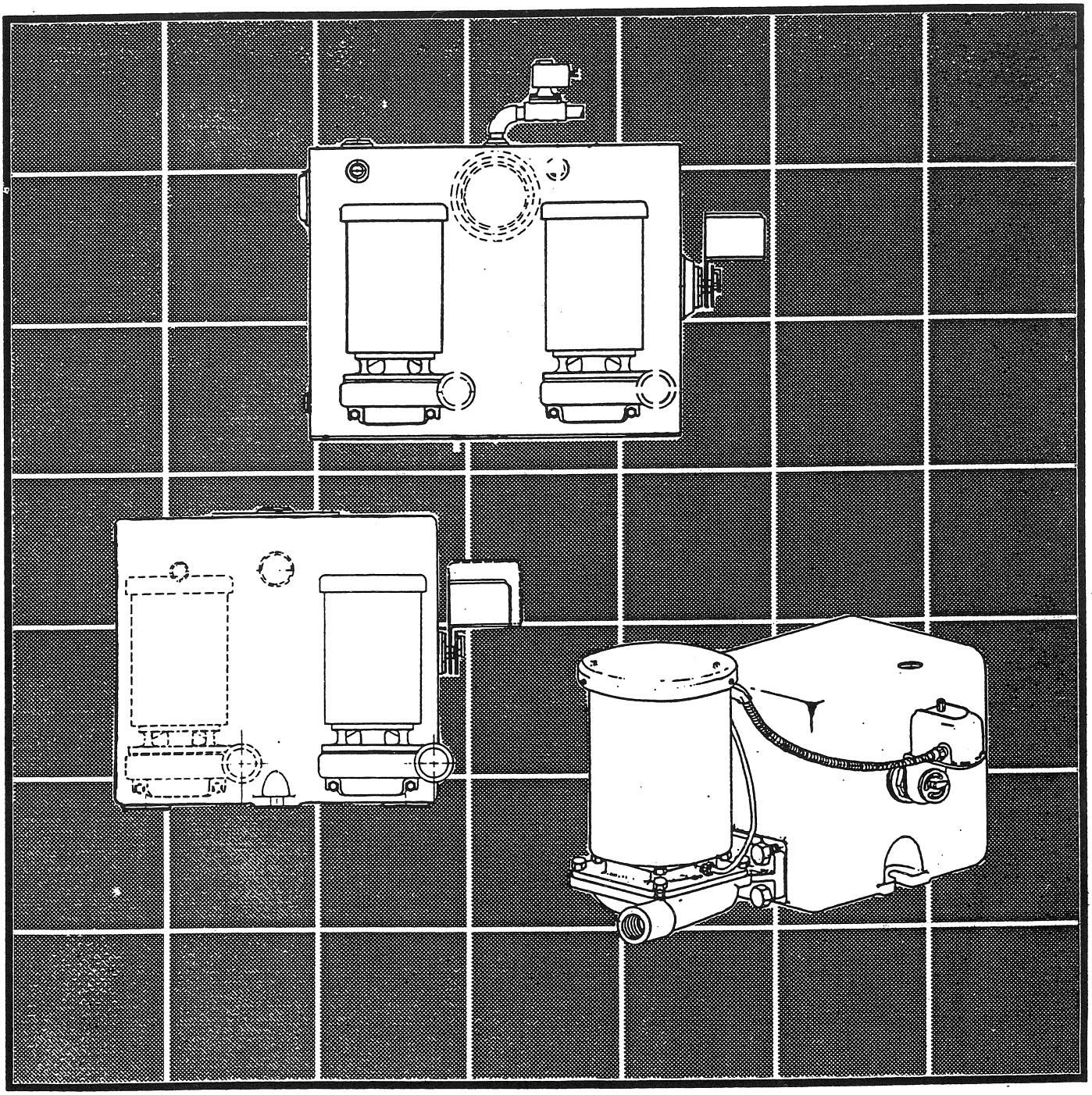
Form SM3618C

Vent-Rite

Manufacturer of MEPCO Pump Packages

Condensate Pump, Type *Guardian*® Unit

Installation and Maintenance Instructions



1875 Dewey Avenue
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INTRODUCTION

This form contains information necessary to install, operate and maintain ***Guardian®*** Condensate Units manufactured by MEPCO. The information is assembled in order, from receiving the product to its proper maintenance, to enable you to follow the product through the various steps necessary to implement.

The ***Guardian®*** Condensate Units are complete assemblies for returning condensate to low pressure boilers from gravity heating systems, low pressure steam process equipment, or from combinations of both. They are used where low return mains are located at elevations which do not permit gravity flow of condensate to the boiler.

INSTALLATION

A. Receiving Inspection When the unit is delivered, an immediate visual inspection of the unit and its accessories should be made in the presence of the carrier's representative. If there is any evidence of rough handling or damage, a notation should be made on the delivery receipt. Shipping damages are the responsibility of the carrier, and it is the customer's responsibility to file claim.

B. Uncrating When uncrating the unit be sure that all temporary plugs remain in their tapping until you are ready to connect the pump to the system, and all instructional tags are attached. Locate the unit in a clean, dry, well ventilated and drained location. The top of the pump receiver should be below the lowest return to maintain dry return lines. If receiver is above the lowest return, the returns will be wet and the system will not free itself of air.

C. Rigging Each unit has been carefully tested and inspected at the factory where every precaution was taken to assure that it reaches its destination in perfect condition. It is very important that the installers, movers, and riggers use the same care in handling of the unit. Chains, cables, or other moving equipment should be placed to avoid damage to any part of the unit.

D. Piping Connections All piping should be tight and properly supported by hangers, not by connections. Connect returns to inlet of receiver with a MEPCO gate valve in each return and a union or flange joint next to the receiver. Connect discharge of pump to boiler using a union, swing check valve and gate valve; with the swing check valve as close to pump as possible. Piping must be of proper length and size to prevent any strain upon the unit.

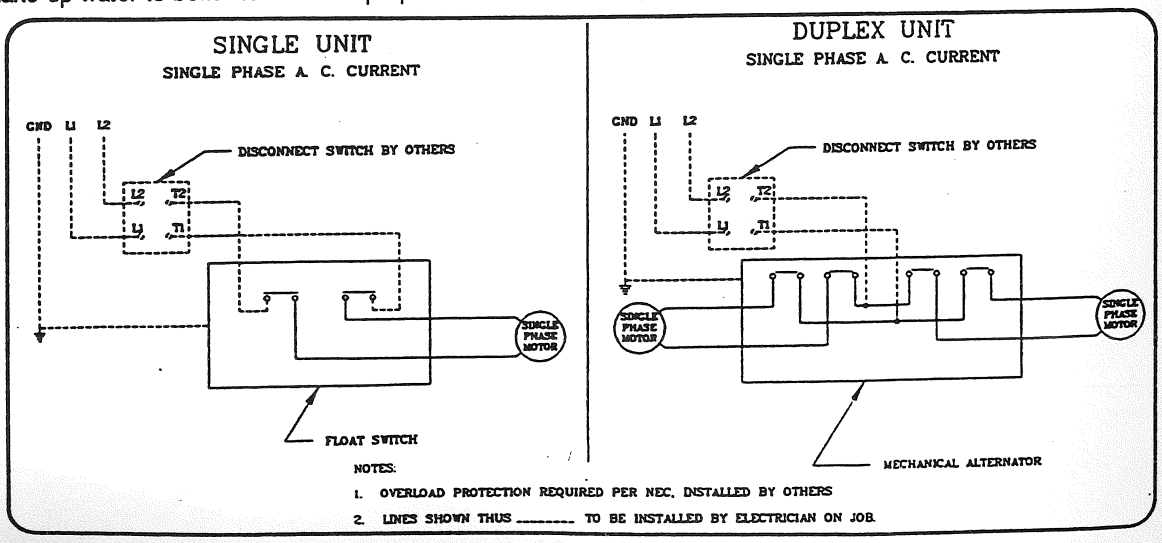
E. WIRING (see diagram) Check motor nameplate to see that motor voltage corresponds properly with the voltage of the current supply. Select the proper wiring diagram below and wire accordingly. All wiring must be in accordance with local regulations. Connect the electric service to the float switch using conduit and wire sizes as required by local power companies. Provide a fused main line switch in motor circuit. **CAUTION: OVERLOAD PROTECTION REQUIRED PER NATIONAL ELECTRICAL CODE.**

F. Fuses Be sure fuses are installed which comply in size with NEC (National Electrical Code) recommendations. When a fuse blows out, it indicates that something is wrong either in the motor, pump, switch, fuse rating or electric service. Do not replace fuse until the cause has been determined. If a thermal cut-out is used, an element with a maximum tripping current rating 50% greater than motor nameplate Amperes may be selected. Condensate boiler feed pumps operate intermittently and are therefore permissible.

OPERATION

Before placing the unit in service, operate the system for a period of time (a few days - two weeks) wasting the condensate to the sewer through draw-off to remove dirt, grease, scale and other foreign matter. When discharging condensate to sewer, supply make-up water to boiler to maintain proper water line.

On installations equipped with manually operated coal, oil or gas-fired boilers an automatic water feeder is recommended. A low water cut-out of fuel supply should be installed on all installations equipped with automatically operated stoker, oil or gas-fired boilers.



For Trial Operation Of Unit, Proceed As Follows:

- 1) Shut power off to unit.
- 2) Remove plug on rear of motor and with large bladed screwdriver rotate shaft to be sure pump is free.
- 3) Fill the receiver tank with enough water to close the float switch.
- 4) Open gate valve.
- 5) Do not operate pump without water in the receiving tank as the pump is equipped with a mechanical shaft seal. Operating the pump dry may ruin seal.
- 6) The pump will discharge water from the receiving tank into the boiler stopping automatically when water in receiving tank reaches a low level.

OPERATING POINTS

- 1) Check motor speed. If motor speed is low check wiring connections to motor. If wired for 230 volt current, but actually operating on 115 volt current, the motor will never come up to proper speed, and motor may burn out.
- 2) Lack of capacity may indicate that passageways of pump impeller have become clogged with foreign matter.
- 3) If the pump fails to start, it may be due to the float ball having lost its buoyancy. This can be checked by operating the float head lever manually. If the float ball is not buoyant, replace with new float ball.
- 4) If after long service, water flows from around the motor shaft out through the space between the pump head motor flange and the pump head case flange, it is an indication of a mechanical seal failure and the complete mechanical shaft seal should be replaced. Motor(s) not provided with grease fittings have bearings greased for life by motor manufacturer.
- **PARTS** - When ordering parts, **give type, size and serial number shown on the pump nameplate.**

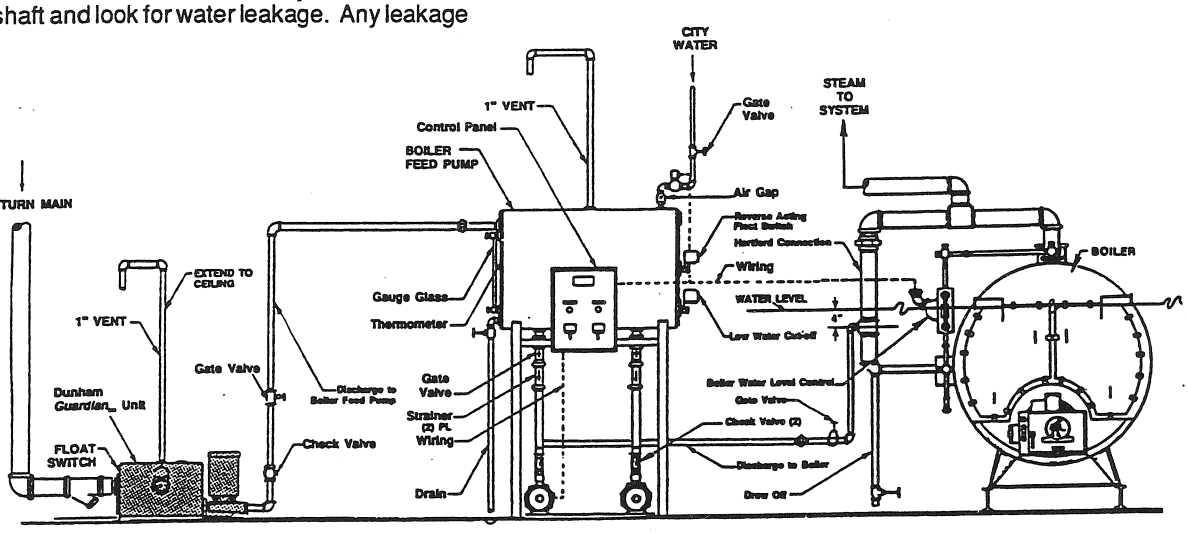
MAINTENANCE

INSPECTION - To insure best operation of unit, make a systematic inspection at least once a week. **CLEANLINESS** - Keep the interior and exterior of motor and automatic switches free from moisture, oil and dirt. If necessary, use compressed air for blowing out dirt. **FLOAT SWITCH (Simplex) or MECHANICAL ALTERNATOR (Duplex)**- Occasionally examine contacts of automatic switches and see that they make a full firm contact and break the circuit quickly. Be sure all terminal connections are tight and not corroded.

MECHANICAL SHAFT SEAL - Occasionally examine water slinger on motor shaft and look for water leakage. Any leakage will also be visible on seal plate. Leakage indicates that the seal surfaces are worn and will need replacing. **CAUTION:** Never operate pump when receiver is empty, because the seal will be damaged if run dry.

SHUT DOWN - At the end of the heating season, open main line switch, close valves in return line and discharge piping, and drain receiver and pump. If necessary, cover electric motor and automatic switches to protect them against dirt, oil and moisture. **CAUTION** - Never operate pump when receiver is empty or expose it to freezing temperature when filled with water.

TYPICAL CONNECTIONS



Note, external piping by others.

TROUBLESHOOTING

A troubleshooting chart is shown below to enable you to isolate any problems you may encounter when operating the ***Guardian®*** Condensate Unit.

SYMPTOM	POSSIBLE CAUSE	REMEDY
1. No condensate discharge	1a. Not enough condensate in tank to prime pump.	1a. Check return lines from boiler.
	1b. Speed to low.	1b. Check wiring connections to motor.
	1c. Discharge head too high.	1c. Open discharge valve.
	1d. Impeller loose on shaft, plugged or worn.	1d. Inspect pump end and motor. Repair and/or replace.

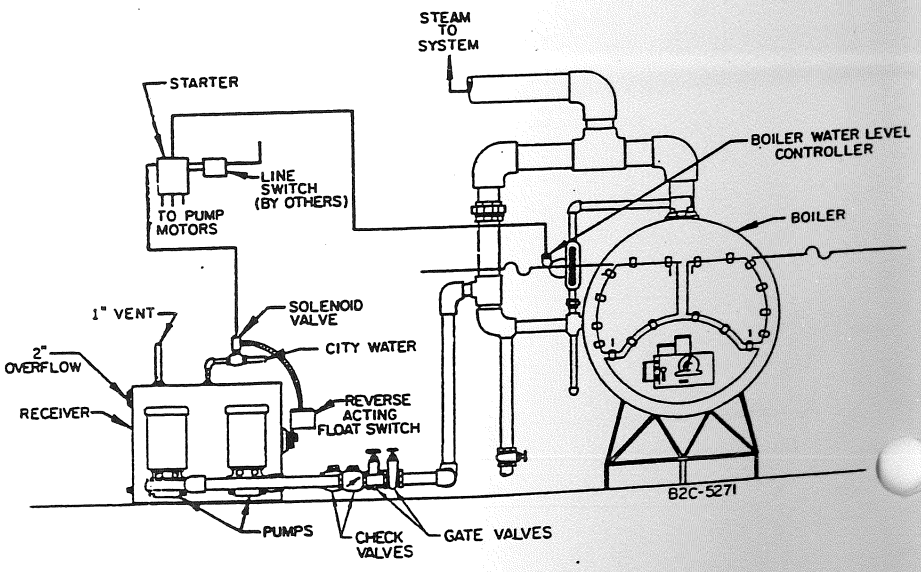
(continued next page)

2. Insufficient condensate discharge	2a. Air or water leak. 2b. Plugged pump vent line. 2c. Speed to low. 2d. Impeller loose on shaft, plugged or worn.	2a. Check bleeder line. 2b. Disconnect vent line from Guradian Pump - Reconnect. 2c. Check motor wiring. 2d. Replace impeller. Check with manufacturer.
3. Pump does not start	3a. Motor lead connections may be wired wrong. 3b. Blown fuses in disconnect switch. 3c. Loose connection. 3d. Rotating assembly is bound.	3a. Check wiring diagram, page 2. 3b. Check fuses. 3c. Check wiring. 3d. Try turning motor shaft from top side of motor with screwdriver or open wrench.
4. Excessive power consumption	4a. Speed to high. 4b. Loose wiring connections. 4c. Mechn'l defects: (1) Motor shaft bent (2) Rotating element binds (3) Foreign elements between impeller and wearing ring.	4a. Check voltage 4b. Check wiring connections. 4c. (1) Replace motor. 4c. (2) Reassemble & tighten parts. 4c. (3) Disassemble & check condition.
5. Pump is noisy	5a. Bearings bad (sealed bearings in motor) 5b. Pump may be operating at a low enough head to be in cavitation range. Cavitation sounds like pebbles rattling in a pail. 5c. Pump is operating too near shut-off head. 5d. Internal parts rubbing. 5e. Motor has magnetic hum or high windage noises.	5a. Check with motor manufacturer. 5b. Throttle discharge valve to correct pressure and lock. (If cavitation noise disappears it may be wise to install a smaller diameter impeller, reduce speed, or install on orifice on discharge). 5c. Check discharge piping to lower the head. 5d. Disassemble and check internal parts. 5e. Check with motor manufacturer.
6. Loss of Suction following period of satisfactory operation.	6a. Air leak at mechanical shaft seal or pump gasket. 6b. Pump vent line plugged. 6c. Air gasses in condensate or condensate too hot.	6a. Disassemble pump and motor unit. Replace mech. shaft seal or gasket. Be sure all parts are clean. DO NOT scratch or mar seal component rings. Reassemble. NEVER RUN PUMP WITH RECEIVER EMPTY. DAMAGE TO SEAL MAY RESULT. 6b. Flush. 6c. Check mechanical shaft seal and gasket.

Guardian® Boiler Feed Pumps (WITH MAKE-UP WATER VALVE)

The **Model GSB** (simplex unit) or **GSBD** (duplex unit) ***Guardian®*** *Boiler Feed Pump* is designed for those installations where it is important to maintain the boiler water line within narrow limits, and to automatically supply "make-up" water from an outside source. Precise boiler line control is accomplished by governing the pump operation with a *Boiler Water Line Controller* installed at the boiler water line.

When the boiler requires water, the float operated switch in the *Controller* starts the pump motor(s) through magnetic starters that can be furnished as an optional extra. Water level is maintained in the pump receiver by an electric solenoid water make-up valve activated by a reverse acting float switch. The contruction of these pumps is similar to the **GS model** except that a water make-up circuit (solenoid valve and reverse acting float switch) is furnished.



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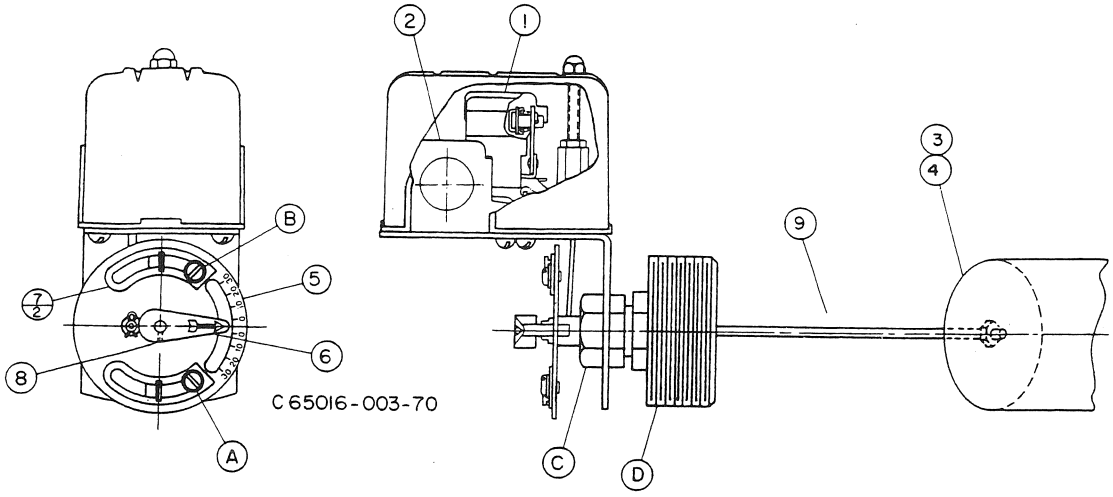
Class 9037 Type HG Series A
FLOAT SWITCH



CAUTION: Switches are shipped with a bracket attached to the mounting plate. This bracket prevents the float and rod from moving in the tank during shipment. When installing the system, this clearly marked shipping bracket must be removed and discarded.

APPLICATIONS: For automatically controlling the liquid level in a closed tank by float movement.

MOUNTING: The Type HG Screw-in Tank Float Switches are mounted directly to the tank by means of the 2½" I.P.S. threaded fitting (D). Before screwing this fitting into the tank, loosen Nut (C) so that the fitting (D) is free to rotate in the switch bracket. Tighten the fitting (D) so that there will be no leak past the threads. Then revolve the switch case until it is horizontal and tighten Nut (C).

ENCLOSURE RATING: NEMA 1 ENCLOSURES ARE INTENDED FOR INDOOR USE PRIMARILY TO PROVIDE A DEGREE OF PROTECTION AGAINST CONTACT WITH THE ENCLOSED EQUIPMENT IN LOCATIONS WHERE UNUSUAL SERVICE CONDITIONS DO NOT EXIST.

WARNING: TO AVOID SHOCK HAZARD, DISCONNECT ALL POWER BEFORE INSTALLING OR SERVICING DEVICE.

ADJUSTMENTS: Switches are shipped from the factory set for a specified float travel. Reasonable adjustment of float travel can be made in the field by moving adjusting strips (7) which are held in place by Screws (A) and (B). Loosening Screw (B) and moving upper adjustment strip (7) will affect the upper limit of float travel only. Loosening Screw (A) and moving lower adjusting strip (7) will affect the lower limit of float travel.

REPLACEMENT PARTS LIST

Item Number	Description	Number Req'd.	Part Number
1	Set of Movable and Stationary Contacts	2	9998 PC-242
2	Switch Mechanism*	1	65079-502-51
3	Float (304 SS)	1	9049 HF3
4	Float (316 SS)	1	9049 HF4
5	Adjusting Plate Assembly	1	2810-D7-G1
6	Operating Lever	1	65079-042-01
7	Adjusting Strip	2	2810-X8
8	Set Screw	1	21801-14080
9	45° — Connector and Rod Assy.	1	2810-C3-G9
9	90° Offset 3" Connector and Rod Assy.	1	2810-C3-G15
9	90° Offset 4¼" Connector and Rod Assy.	1	2810-C3-G19
9	90° Offset 5" Connector and Rod Assy.	1	2810-C3-G18
9	90° Offset 7" Connector and Rod Assy.	1	2810-C3-G6
—	Seal and Installation Kit (Buna-N)	1	9998 PC-337
—	Seal and Installation Kit (Viton)	1	9998 PC-338

*Orders for mechanisms must show class and type so nameplate on replacement can be correctly stamped.

9037-891
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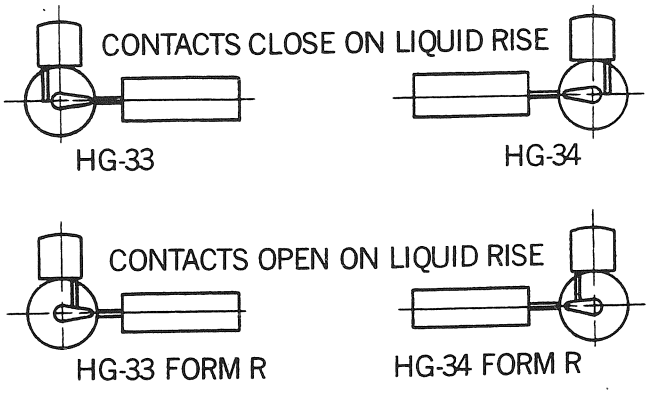
FLOAT & LINK POSITIONS



2810-D22

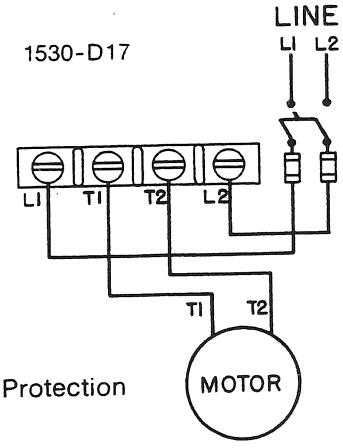
PRESSURE: In the use of any of these Float Switches, the pressure limit within the closed tank must not exceed 100 lbs.

MOTOR PROTECTION: A float switch of this type does not afford motor protection, however it is quite frequently used as a pilot to operate a starter providing these desirable features. The Square D Co. manufactures a complete line of motor protective switches, information on which will be sent upon request.

REVERSE ACTION: To change, relocate operating link as shown in table 2810-D22 above to the opposite slot in base plate and corresponding hole in adjusting plate (Item 5).

TYPICAL WIRING DIAGRAMS

1530-D17



Inherent Protection

DOUBLE POLE
SINGLE PHASE

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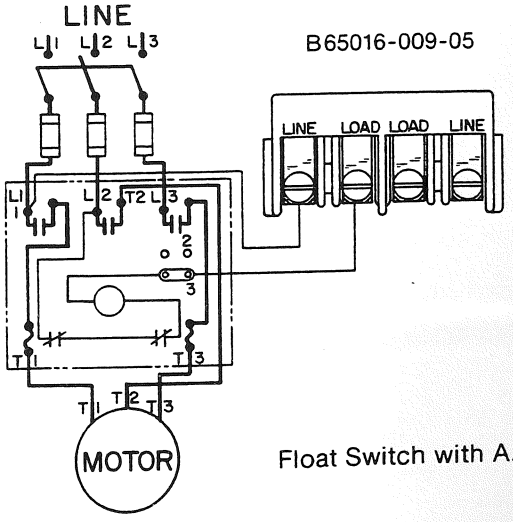

Float Switch with A.C. Starter

ELECTRICAL RATINGS (HORSEPOWER)

Voltage	Single Phase AC	Polyphase AC	DC
115	2HP	3HP	½HP
230	3HP	5HP	½HP
460/575		1HP	
32			¼HP

Control Circuit Rating: A600

9038-893
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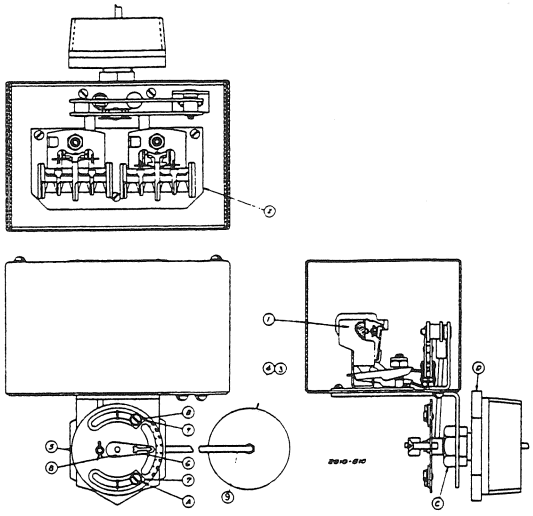
Class 9038 Type CG Series A MECHANICAL ALTERNATOR

CAUTION: Switches are shipped with a bracket attached to the mounting plate. This bracket prevents the float and rod from moving in the tank during shipment. When installing the system, this clearly marked shipping bracket must be removed and discarded.

APPLICATIONS: The Class 9038 Type C Mechanical Alternators serve to open and close an electric circuit by an upward and downward float movement. The forces are applied by means of a float operating between different liquid levels. The action is such that two switch units are alternated on successive cycles. If the liquid level continues to rise or fall with one pump in operation, the lever will continue to travel to a further position at which point the "second" switch will be operated, throwing the stand-by pump across the line.

MOUNTING: The Class 9038 Type C Mechanical Alternators are mounted directly to the tank by means of the 2½" NPT threaded fitting (D). Before screwing this fitting into the tank, loosen Nut (C) so that the fitting (D) is free to rotate in the switch bracket. Tighten the fitting (D) so that there will be no leak past the threads. Then revolve the switch case until it is horizontal and tighten Nut (C).

PRESSURE: In the use of the CG Alternators, the pressure limit within the closed tank must not exceed 100 psi.



ELECTRICAL RATINGS (HORSEPOWER)

Voltage	Single Phase AC	Polyphase AC	DC
115	2HP	3HP	½HP
230	3HP	5HP	½HP
460/575		1HP	
32			¼HP

Control Circuit Rating: A600

REVERSE OPERATION: Form R controls are arranged for reverse action. In this form, the contacts will open on increase in liquid level. It is not recommended that a change be made in the field from standard to reverse operation or vice versa.

MANUAL TRANSFER (LEAD-LAG) SELECTOR: Form N3 switches have a manually engaged selector which voids alternation. The pump selected to lead always comes on first. With selector disengaged, the unit reverts to normal alternation.

MOTOR PROTECTION: A control of this type does not afford motor protection. However, it is quite frequently used as a pilot to operate a starter providing this desirable feature. The Square D Company manufactures a complete line of motor protective devices, information on which will be sent upon request.

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WARNING: TO AVOID SHOCK HAZARD, DISCONNECT ALL POWER BEFORE INSTALLING OR SERVICING DEVICE.

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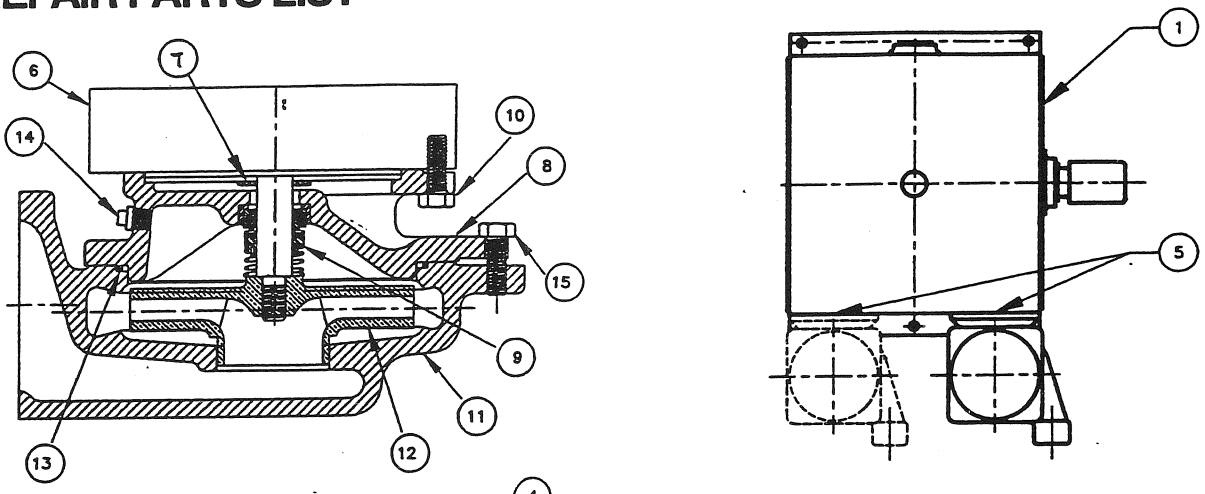
REPLACEMENT PARTS LIST

Item Number	Description	Number Req'd.	Part Number
1	Set of Movable and Stationary Contacts	2	9998 PC-242
2	Switch Mechanism CG Types (including Form R)	1	1551-C7-G1
3	Float (304 SS)	1	9049 HF3
4	Float (316 SS)	1	9049 HF4
5	Adjusting Plate Assembly	1	2810-D7-G1
6	Operating Lever	1	65079-042-01
7	Adjusting Strip	2	2810-X8
8	Set Screw	1	21801-14080
9	4¼" Connector and Rod Assy.	1	2810-C3-G19
9	5" Connector and Rod Assy.	1	2810-C3-G18
9	7" Connector and Rod Assy.	1	2810-C3-G6
—	Seal and Installation Kit (Buna-N)	1	9998 PC-337
—	Seal and Installation Kit (Viton)	1	9998 PC-338

MEPCO

Condensate Pump, Type *Guardian*® Unit

REPAIR PARTS LIST



2. PUMP & MOTOR ASSEMBLY

ASSEMBLY MODEL GSA CONDENSATE PUMP

ITEM NO.	PART NO.	DESCRIPTION
1.	**B2-5177**	**Tank** - GCA6
	C2-4373	- GCA15
	C2-4372	- GCA21
	B2-5177	- GCAD6
	C2-4373	- GCAD15
	C2-4372	- GCAD21
	C2-4526	- GSA10
	C2-4533	- GSA16
	C2-4529	- GSAD10
	C2-4536	- GSAD16
	C2-4385	- GSB44
	C2-4386	- GSB70
	C2-4387	- GSB100
	C2-4385	- GSBD44
	C2-4386	- GSBD70
	C2-4387	- GSBD100
2.	**G00312**	Pump & Motor
3.	**S-3654**	Float Switch (GC, GS Models)
	S-3655	Alternator (GCD, GSD Models)
	S-3654R	Reverse Acting Float (GSB & GSBD)
4.	**90021**	Bleeder Assy
5.	**A2-8394**	Gasket-Tank
6.	**S-402**	Motor (1/3 HP 1-60-115/230V, 3450 RPM)
7.	**C8854**	Slinger
8.	**C2-4375**	Adapter
9.	**S-472**	Seal-Mechanical (Req'd when replacing seal)
10.	**102S06A1**	Washer HD SCR
11.	**D2-1731**	Case
12.	**B2-5171** x 3-11/16	Impeller
13.	**S-4837**	O-Ring, Case (Req'd when replacing seal)
14.	**S-4238**	Plug
15.	**102S06A2**	Washer HD SCR
	NOTE: Part **S-3883**, 3/4" make-up valve required for Guardian Boiler Feed Pump (Simplex-GSB,Duplex-GSBD)	

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