

Float controls and high water alarm for sump and sewage pumps

Instructions

- Installation
- Operation
- Maintenance

Read this entire book

before attempting to install, operate or repair these controls. Properly installed, your Peerless Pump controls will give you satisfactory, dependable service. We urge that you read carefully these step-by-step instructions, to simplify any problems of installation or operation.

Failure to read and comply with installation and operating instructions will void the responsibility of

the manufacturer and may also result in bodily injury as well as property damage.

This book is intended to be a permanent part of your pump installation and should be preserved in a convenient location for ready reference. If these instructions should become soiled, obtain a new copy from Peerless Pump.

WARRANTY

New equipment manufactured by Seller is warranted to be free from defects in material and workmanship under normal use and service for a period of one year from date of shipment; Seller's obligation under this warranty being limited to repairing or replacing at its option any part found to its satisfaction to be so defective provided that such part is, upon request, returned to Seller's factory from which it was shipped, transportation prepaid. This warranty does not cover parts damaged by decomposition from chemical action or wear caused by abrasive materials, nor does it cover damage resulting from misuse, accident, neglect, or from improper operation, maintenance, installation, modification or adjustment. This warranty does not cover parts repaired outside Seller's factory without prior written approval. Seller makes no warranty as to starting equipment, electrical apparatus or other material not of its manufacture, since the same are usually covered by warranties of the respective manufacturers thereof.

In the event, notwithstanding the terms of this agreement, it is determined by a court of competent jurisdiction that an express warranty has been given by Seller to Purchaser with respect to the head, capacity or other like performance characteristics of said equipment, Seller's liability for breach of the same shall be limited to accepting return of such equipment F.O.B. plant of manufacture, refunding any amount paid thereon by Purchaser (less depreciation at the rate of 15% per year if Purchaser has used equipment for more than thirty (30) days) and cancelling any balance still owing on the equipment.

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IMPORTANT SAFETY PRECAUTIONS

Pump controls, and the tools and lifting equipment used in control installation, are heavy and may easily cause personal injury if dropped or carelessly handled. The normal precautions and safety rules associated with the erection of machinery, in regard to manual lifting, use of power equipment, and handling of tools, must be observed in the installation.

Petroleum-base cleaning solvents are flammable. Open flame or smoking by personnel in the vicinity of these solvents is extremely hazardous and must not be permitted.

Do not work under a heavy suspended object unless there is a positive support under it to stop its fall in

event of sling or hoist failure. Disregard of this warning could result in grave personal injury.

Before opening the conduit box of an electric motor, a switch cover, starter or panel door, be certain that the power supply is shut off. An electrical shock from contact with live leads can be fatal.

Before attempting repairs to installation disconnect power supply. Controls are automatic. This prevents accidental running of pump motor. Starting motor during repair activities could damage pump and may cause personal injury.

INTRODUCTION

UPON RECEIPT OF EQUIPMENT: Check carefully to see that all of the equipment has been received. Report immediately any shortages or damages to the transportation company handling the shipment, noting the extent of the damage or shortage on the freight bill and bill of lading.

Do not leave the unit exposed to weather or construction hazards.

The satisfactory operation of controls depends to a large extent upon proper installation. These instructions cannot answer every question that may arise as each installation will be different. The installer and the operator of this equipment must use good judgement to adapt these procedures to his installation.

FLOAT CONTROL OPERATION: The float control provides automatic operation of the pump unit. On liquid level rise the float raises the float rod until the lower button trips the switch closing the electric

circuit for starting the pump. As the liquid level drops, the upper button trips the switch to the off position, opening the electric circuit and thereby stopping the pump.

PUMP ALTERNATION FOR DUPLEX UNITS: When the pumping unit consists of two pumps in a common basin it is desirable to provide alternation of the pumps. Alternate operation of the pumps insures equal wear and keeps both units in good running condition. There are three types of alternation. They are manual transfer, automatic electrical alternating, and automatic mechanical alternating. Further explanation and operations are given in figures 2 through 3.

Automatic alternating controls provide alternate operation of two pumping units on successive cycles as long as one pump can handle the pump load. However, under peak flow conditions, when the liquid level continues to rise more rapidly than can

TABLE 1 — FLOAT SWITCH ELECTRICAL RATING

Switch Type	Volts AC	*Single Phase AC Motor HP	Poles	Available NEMA Enclosures
Standard Duty	115	1-1/2	2	1, 4 and 7
	230	2	2	
Heavy Duty	115	2	2	1
	230	3	2	
	460/575	5	2	
Alternating	115	1-1/2	2	1, 4 and 7
	230	2	2	

*All switch use in three phase installation is to be pilot duty only. These switches may be used as pilot switches up to 600 VAC maximum.

be handled by one pump, both units are automatically placed in operations.

FLOAT SWITCHES: The electrical rating of the switch is based on motor HP and voltage of electrical supply (see table 1). This is the maximum HP rating at which the switch may be wired direct to the motor as its primary starting device. For HP and voltage ratings over those listed, and for all three phase motors, wiring must be through a magnetic starter as the primary starting device, with the float switch serving as a pilot only. All table-referenced float

switches may be used as pilot switches up to 600 volts AC max.

Switches are available in various NEMA enclosures. Contacts in switches close on liquid rise. Some switches are furnished with compensating springs. These springs allow for limited field adjustment of the weight force needed by the lever arm to open the switch contacts on decrease of liquid level. Do not substitute float switches without consulting Peerless Pump. Float switches furnished by Peerless Pump have been modified or adjusted for use with these controls.

INSTALLATION

WARNING

Before opening the float switch cover be certain that the current is shut off. An electrical shock from contact with live switch parts or wires can be fatal.

STARTER CONTROLS: It is recommended that a suitable overload protector, or an across-the-line magnetic starter be installed in the motor circuit to prevent motor burn-outs if for some reason an overload should occur. Float switches cannot protect a circuit from overload.

WIRING: Connect the electric service to the controls and make intercontrol electrical connections where necessary according to wiring instructions accompanying the switches, using conduit and wire size as required by local power companies and applicable electrical codes.

Be sure the voltage and frequency indicated on switches are the same as those of the service provided.

CAUTION

Do not allow the float and rod assembly to hang on the float switch arm. Do not raise and drop the float rod assembly on the float switch arm. Damage to float switch will occur and system failure will result.

WARNING

Do not work under a suspended object unless there is a positive support under it to stop its fall in event of sling or hoist failure. Disregard of this warning could result in grave personal injury.

FLOAT CONTROL: Locate the float switch assembly where provided for on the basin cover. This should be so arranged that the float is not disturbed by strong water currents and the moving element is able to rise and fall freely.

The usual float switch assembly consists of: float rod, float, guide pipe for float rod, compression spring (on C93A only), switch stand assembly and float rod adjusting buttons.

Install the float control in the following manner:

1. Bolt the switch stand assembly to the basin cover over the hole provided.
2. Saturate the felt washer on the oil seal assembly with S.A.E. 30 oil.

3. Start the second float rod section (dimension A, figures 5 thru 9) down through the oil seal assembly. For C93A float control, slide the compression spring and washer on the top end of the second float rod section sticking out above the oil seal assembly. Put a locknut and coupling on the rod end and allow this rod section to rest on the washer and compression spring for a C93A, or on the seal assembly for a C84A.

4. Slide one button on the lower (threaded) end of the upper float rod, 39 inches long, and retain temporarily with a coupling locknut. Insert the top end of rod up through the float switch lever eye and couple the upper float rod to the lower float rod coupling. Secure both coupling locknuts.

5. From below the basin cover, couple the existing float rods and float rod guide pipes together. Use locknuts on both sides of the float rod couplings. Alternate the assembly of float rod sections and guide pipes (see figures 5 thru 9).

NOTE: From this point, installation of the C84A and C93A float controls differ.

C84A Float Control: Install float locknut and the float, tightening against each as a jam lock. Proceed as follows:

1. Fill the basin to the minimum low liquid level.
2. From above the basin cover, while the basin is filling, guide the float rod thru the float switch lever eye, if not already engaged. The weight of the float rod will now be supported by the float.
3. Push the float switch lever arm down to the off position.
4. Slide a second button on the top end of the float rod and lock into position against the lever arm eye. This sets the minimum low liquid level.
5. Slide the first button already on the rod beneath the lever arm to the required maximum liquid level rise (pump start) and lock into position. The distance between buttons is now the float travel between pump on and pump off points.

C93A Float Control: If an 8-inch diameter float guide is required, secure it to the float rod guide pipe. Proceed as follows:

1. Slide adjusting button onto button float rod section and lock into position at highest, or pump cut in fluid level in basin.
2. Slide the float on rod and follow with the other adjusting button and lock into position at lowest, or pump cut-off, fluid level in basin.
3. Push the float switch lever arm down to the off position.
4. Slip the button under the switch lever arm up and slide a second button on the float rod above the float switch lever arm and lock both buttons into position. Leave space between the buttons to allow the float switch lever arm to operate freely for movement between the on-off position.

When the basin depth exceeds 13 feet, a counter balance device is furnished. This device consists of a counterweight, pulley and chain mounted on the switch stand. There must be no omission of this system when supplied, or counter weight substitution, since each one is designed especially for the installation and is required for proper operation.

FLOAT ROD LENGTH: Float rod length as assembled is furnished to accommodate the customer's maximum basin depth. However the liquid level in the sump may vary according to the customer's requirement. Therefore, if desired, the length of the float rod and float rod guide pipe may be shortened by either removing a lower section(s) of float rod and guide pipe or by cutting float rod and guide pipe to the desired length. Do not increase the length of float rod because the system may not be capable of lifting the heavier float rod weight and still trip the switch, due to insufficient float buoyancy.

HIGH WATER ALARM: The high water alarm is a diaphragm operated switch. The switch is fastened to a 1-inch diameter pipe and mounted on the basin cover. High water alarms may be adjusted within limits for basin fluid level by means of adjustable mounting. When the liquid in the sump rises to a predetermined position, air trapped in the 1-inch diameter pipe is compressed and trips the switch in a circuit which sounds an alarm. Snap action switches operate on 10 inches liquid rise when mounted on a six-foot length of pipe. Longer pipe mounting requires proportionately greater rise in

liquid. Mercury activated switches operate on 1-1/4-inch rise in liquid. Snap action switches are used in wet sump application and mercury activated switches are used for dry sump application. Alarm switches are single pole and are available in different enclosures.

Install high water alarm in the following manner (see figure 10):

1. Fasten the switch to a 1-inch diameter pipe 4 feet long. Slip the packing plate and packing onto the pipe (style A mounting).
2. Slip this assembly down through the adjustable mounting assembly which is secured to the basin cover.
3. Slide the assembly to the desired basin depth and lock into position with lock screw on mounting flange or by tightening mounting assembly cap according to the style of mounting provided. Tighten packing plate to mounting assembly (style A mounting).
4. From below the basin cover fasten coupling to pipe and add additional pipe length to obtain required depth if necessary. Coupling joints must be airtight.
5. Wire bell or other alarm indicator thru switch contacts to battery box or proper electrical service source. Make sure bell transformer is correct for service voltage supplied. Be sure to use a length of flexible conduit near the alarm so that the unit may be either raised or lowered for regulation.

HIGH WATER ALARM REGULATION: Allow basin water to rise about 11 inches above the level at which the float switch is adjusted to start the pump. The lock screws or mounting assembly cap are then loosened and the high water alarm is lowered until the bell rings. The regulation is fixed at this point by tightening the lock screws or mounting assembly cap. For best results, the regulation should be such that the end of the 1-inch pipe is entirely out of water at the normal (pump-on) water level in the basin.

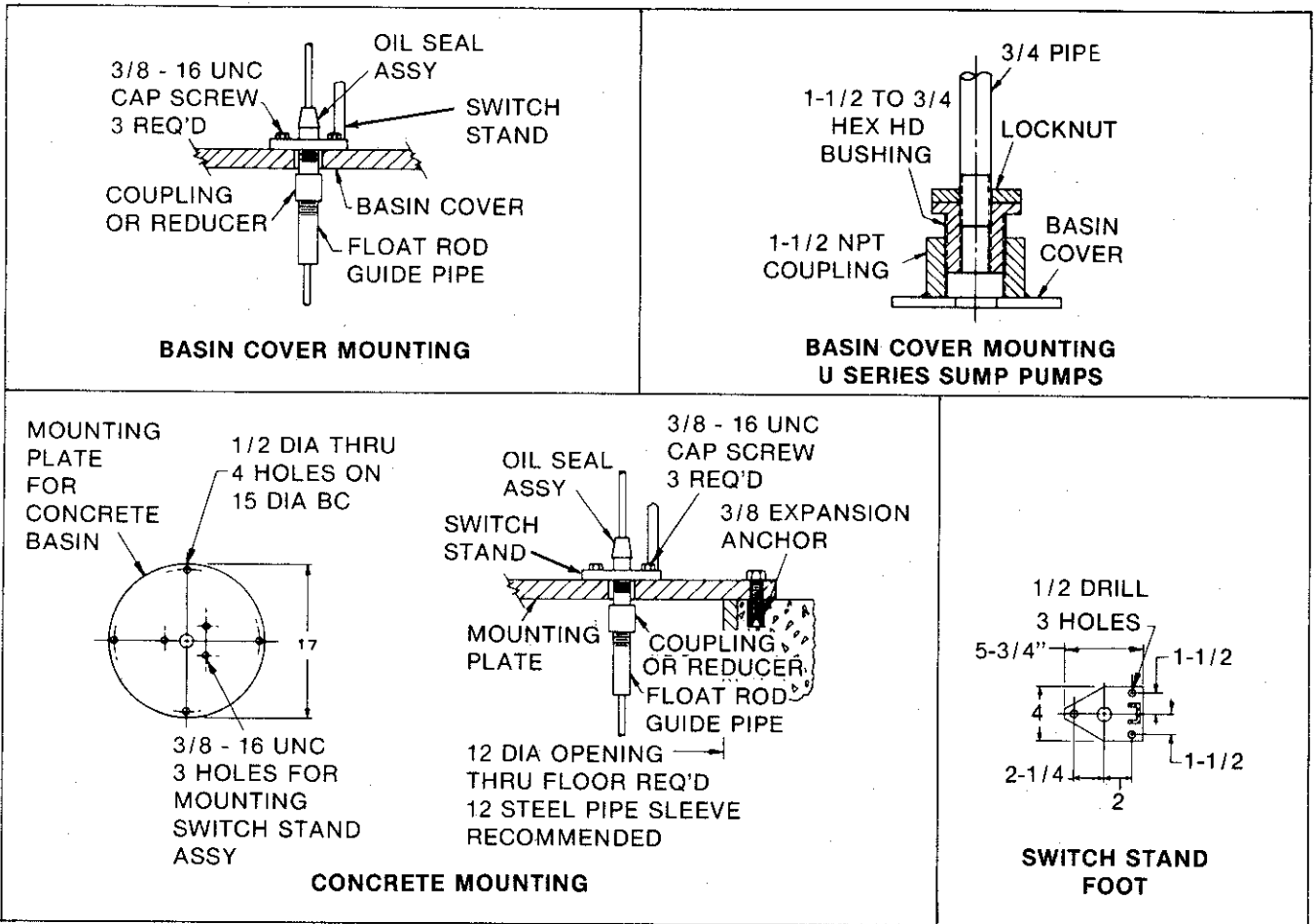


Figure 1. Typical Mountings for C84A and C93A Float Controls

MAINTENANCE

LUBRICATION, FLOAT CONTROL: Before starting the pump and at weekly intervals thereafter, saturate the felt-washer on the oil seal assembly with S.A.E. 30 oil.

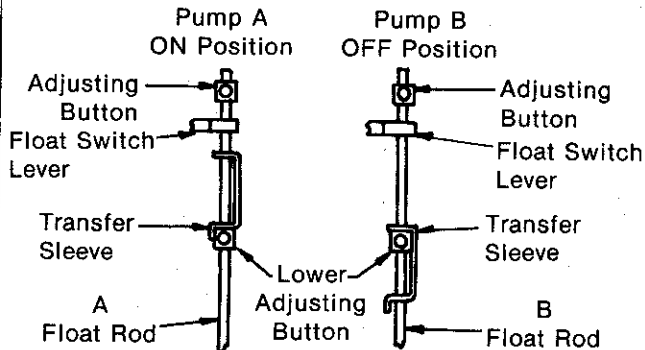
DESCRIPTION AND OPERATION OF ALTERNATING FLOAT CONTROLS

TRANSFER SLEEVE TYPE:

The manual transfer sleeves furnished with C84A-D and C93A-D duplex pump float controls are used for manually transferring the operation of lead-lag pumps to equalize wear on both units. This is accomplished by proper positioning of the transfer sleeves as illustrated below.

Installation and Operation:

1. Hang the transfer sleeves on the float rods over the lower adjusting buttons as shown below.



2. Set the corresponding adjusting buttons on float rods A and B at identical levels, so that when both transfer sleeves are at the same position, both pumps cut in and cut out at the same time as water level rises and falls in the basin.

3. Set the transfer sleeve on float rod A in ON position as shown for Pump A and set transfer sleeve on float rod B in OFF position as shown for Pump B. With this setting the transfer sleeve on float rod A will engage its float switch lever ahead of B. If the pump controlled by A fails to start or, when water entering basin exceeds capacity of pump controlled by A, the transfer sleeve on float rod B will engage its float switch lever after a further 2-7/8-inch rise of water in the basin.

4. To alternate or transfer operation of lead pump to lag pump operation, reverse the transfer sleeve settings so that the sleeve on rod A is in the OFF position as shown for Pump B and so that the sleeve on rod B is in the ON position as shown for Pump A. At this setting the pump controlled by B will start first.

5. At regular intervals alternate the operation of the pumps to equalize the wear to maximize the operating life of the units.

Figure 2. Manual Transfer Sleeves for C84A-D and C93A-D Float Controls

ALTERNATING SWITCH TYPE:

The basic alternating float switch consists of two 2-pole switches in a single enclosure. The switches are mechanically connected through linkage which causes alternate operation of the two pumping units on successive cycles. The switch is controlled by a single float which actuates the switch on rise and fall of the liquid level. If the liquid level continues to rise with one pump in operation, the switch lever arm will continue to travel upward to a further position at which point the second switch will operate, starting the standby pump. An optional version of the basic switch, available only in NEMA 1 enclosure, contains an extra, single pole contact for activating a high water alarm circuit if liquid level continues to rise beyond the second pump turn-on point. Only one float assembly is required.

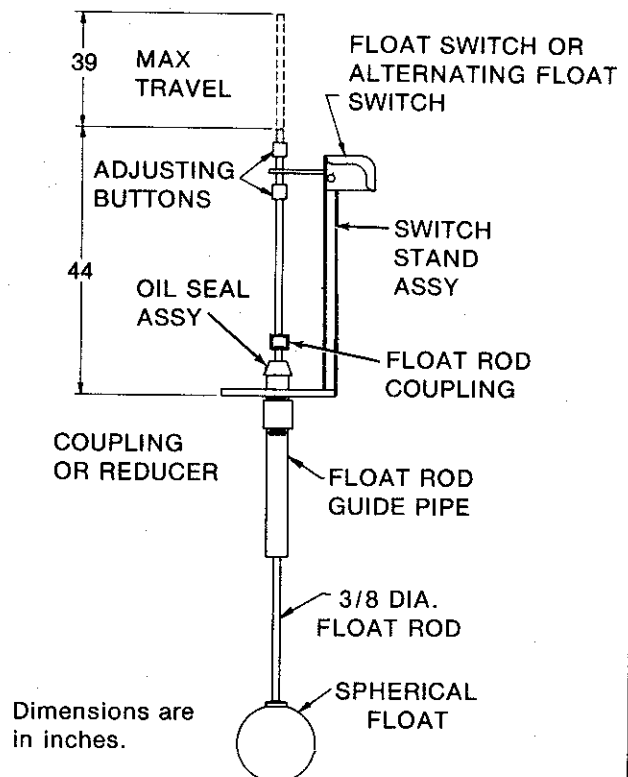


Figure 3. C84A Float Control and Alternating Switch for C84A Float Control

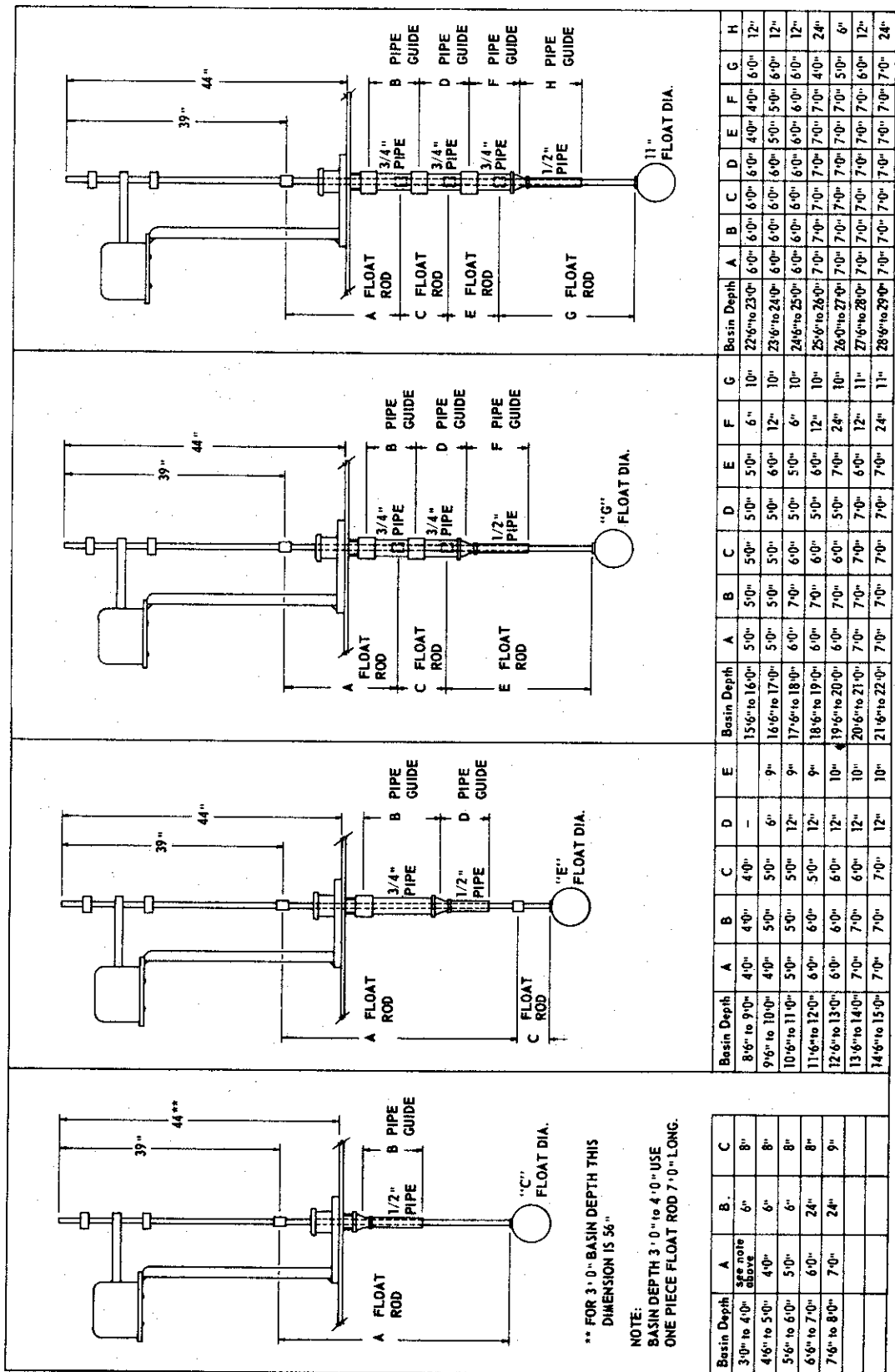


Figure 5. Installation Dimensions, C84A

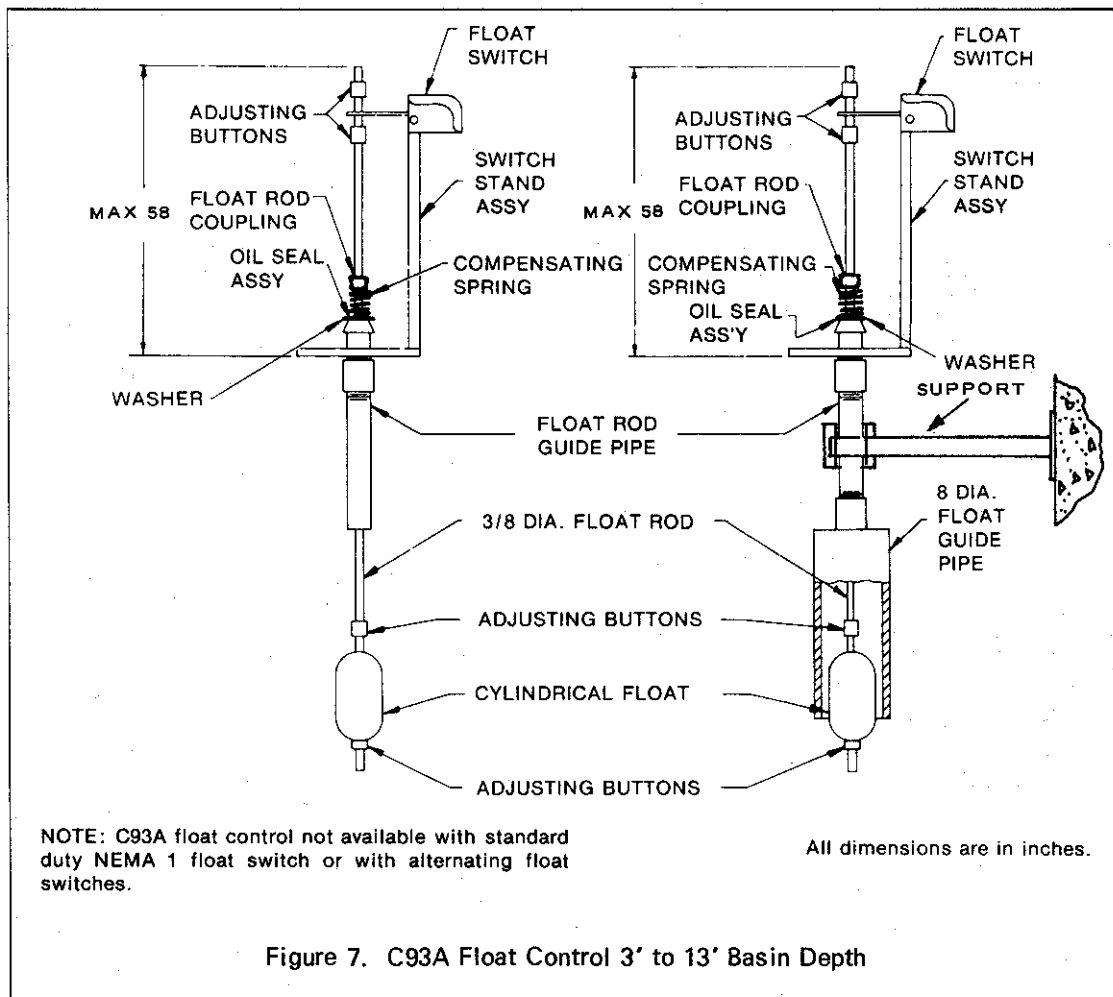
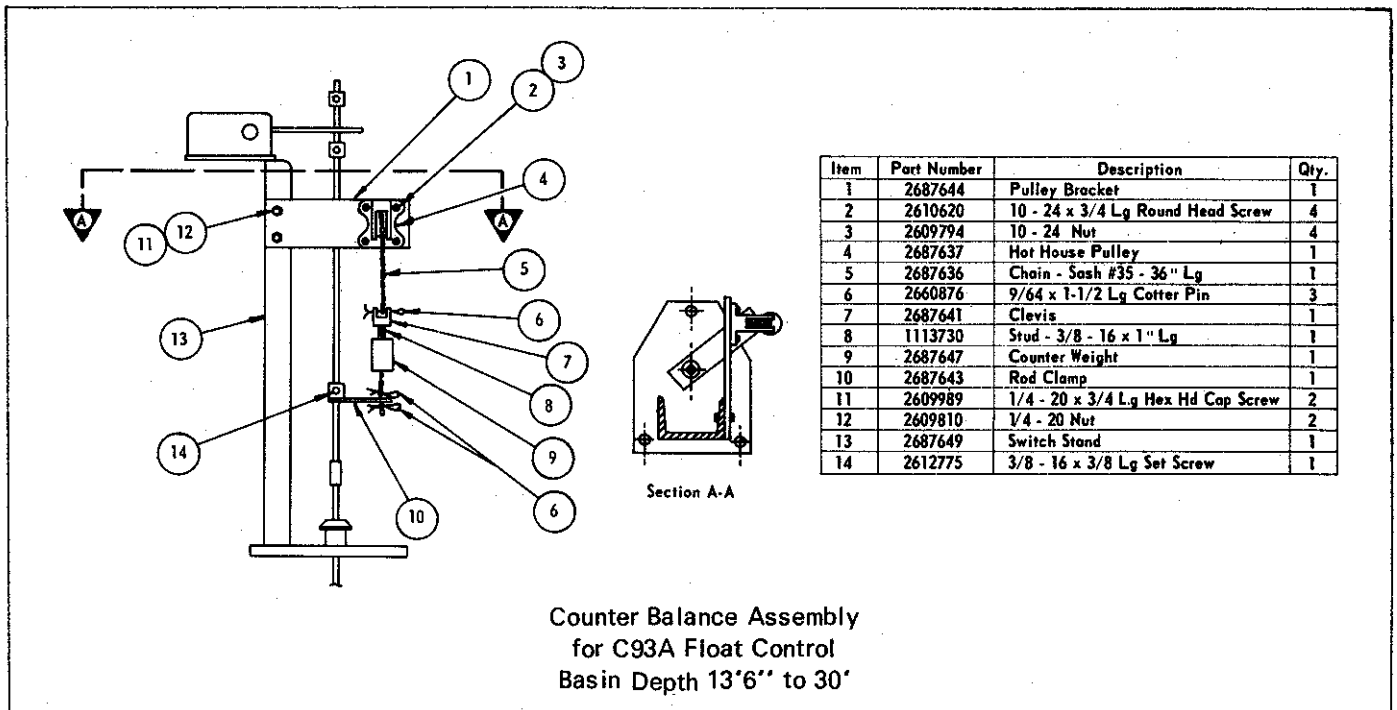


Figure 7. C93A Float Control 3' to 13' Basin Depth



ALL DIMENSIONS ARE IN INCHES

LIST OF AVAILABLE EQUIPMENT

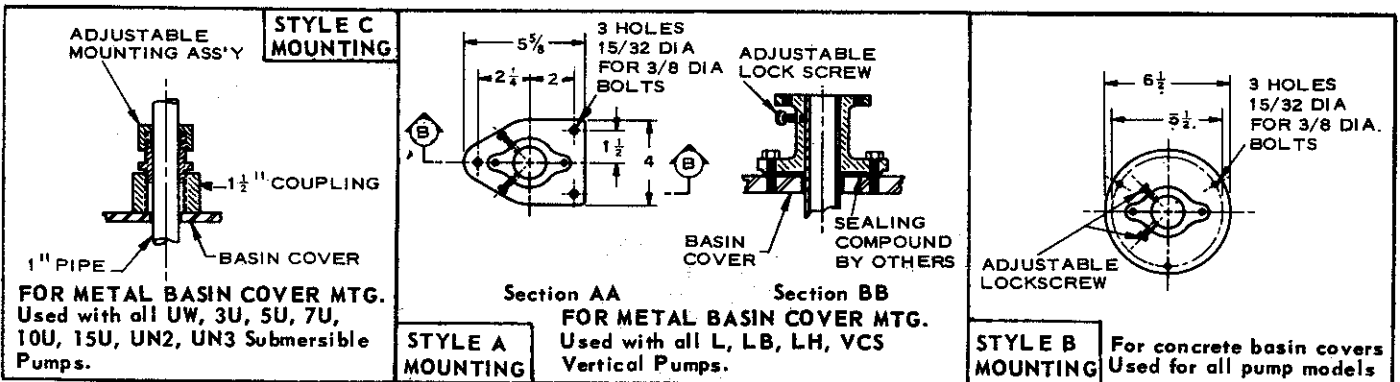
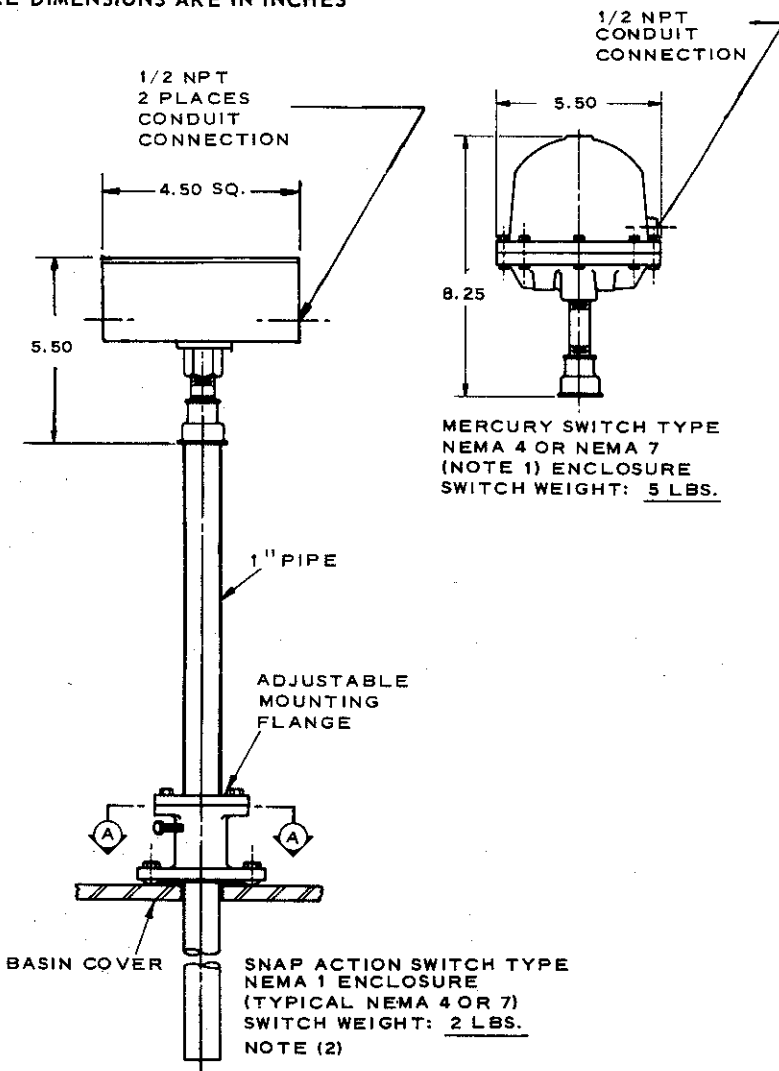
- NEMA 1 Enclosure Snap Action Switch without Alarm Horn 115/230 VAC
- NEMA 1 Enclosure Snap Action Switch with Alarm Horn 115 VAC
- NEMA 4 Enclosure Snap Action Switch without Alarm Horn 115/230 VAC
- NEMA 7 Enclosure Snap Action Switch without Alarm Horn 115/230 VAC Note (1).
- NEMA 4 Enclosure Mercury Switch without Alarm 115/230 VAC
- NEMA 7 Enclosure Mercury Switch without Alarm 115/230 VAC Note (1).

- Style "A" Mounting _____ Basin depth
- Style "B" Mounting _____ Basin depth
- Style "C" Mounting _____ Basin depth

Note 1: Not available on 3U, 5U, 7U, 10U, 15U, UN2, UN3 Submersible Pumps.

Note 2: Snap Action Switch type HWA. Contacts close on a 3-inch liquid level rise. Double pole, double throw, 5 amp max @ 115v.

Note 3: Mercury Switch type HWA. Contacts close on a 1¼-inch max liquid level rise. Single pole, double throw, 10 amp max @ 115v.



Assembly Weight (less switch) for 3 ft. basin depth, 9 lbs.; for each additional foot of basin depth add 1.7 lbs.

Figure 10. Installation, High Water Alarm



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