

# TPM SYSTEM INSTALLATION & OPERATION MANUAL

(Manual Part No. 101-0850-08-0)

## RETROFIT

If you are retrofitting the TPM System to an older pump, call the Hale Pump Service Department, with the pump Serial Number to verify that the pump has the proper openings for the TPM System before attempting retrofit.

## PMD CONTROL VALVE

1. Cut the mounting holes in the truck panel as shown on Plate No. 742C. The new PMD Control Valve must be located higher than the top of the midship pump to allow for proper drainage.
2. Install the indicator bracket assembly (519-0071-10-0) to the PMD Control Valve by placing the slot in the bracket and white pressure indicator over the pin in the PMD Control Valve. The (4) mounting holes in the indicator bracket should align with the tapped holes in the PMD Control Valve. The top view of the PMD Control Valve with the indicator bracket assembly installed is shown in *Figure 1*.
3. The PMD Control Valve assembly can now be mounted to the truck panel as shown in *Figure 2*. The PMD Control Valve Assembly is installed on the inside of the truck panel while the instruction plate is on the outside. Attach the instruction plate to the PMD Control Valve Assembly using the (4) 3/4-20 x 5/8 Lg. Phillips Head Screws (018-1205-44-0). Tighten securely.
4. Attach the adjusting handwheel (512-0070-00=0) to the PMD Control Valve Shaft using the screw (018-1214-45-0) and lock nut (110-1205-11-0) provided. Turn the adjusting handwheel in both directions to verify that the pressure indicator moves freely to both extremes. If the pressure indicator does not move freely, check for binding from the indicator lock nut (110-1008-06-0). There should be approximately a 1/64-1/32 space between the washer (097-0750-01-0) and the lock nut.

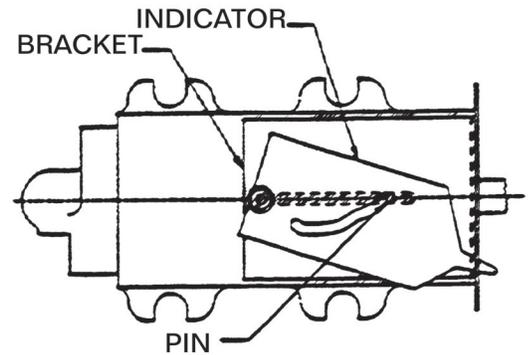


FIGURE 1

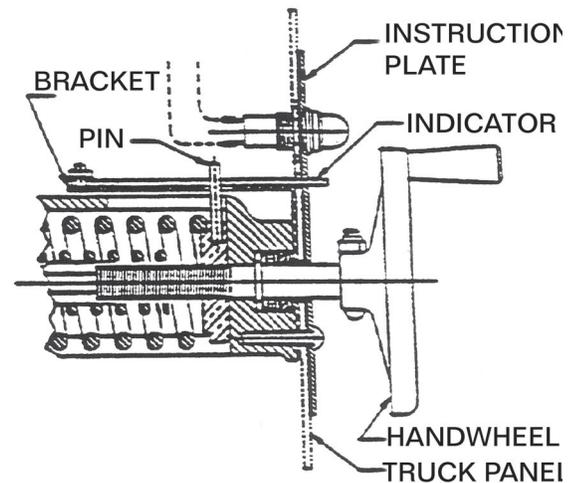


FIGURE 2



## QG RELIEF VALVE

On new pumps, the QG (internal) relief valve is shipped completely installed. If you are installing a TPM on a new pump, skip to the next Section, “PG30 Relief Valve € Sensing valve Assembly”. If you are retrofitting, follow Steps 1, 2, 3, below:

1. The existing QD Relief Valve must be removed from the Midship pump body. Disconnect the old PM control tubing line. Disconnect the drain line if used. Disconnect the electric switch leads. Remove the four 7/16” hex head capscrews holding the cover, switch bracket, and relief valve in place. Remove the retaining ring holding the spring in place. Remove the spring and cast iron cover. The brass cage with piston and valve stem must be removed from the pump. The best method here is to **CAREFULLY** get pry bars under the lip of the cage, at the pump surface. Pry the cage out, taking care not to mar any of the cast iron pump surfaces. The brass parts will all be discarded, so do not be concerned about destroying them during the removal.
2. Once the brass parts are removed, the bore in the pump body **MUST** be cleaned to remove any rust or mineral deposits that may have accumulated on the machined surfaces. Use a wire brush and emery cloth if required. Be sure these surfaces are **PERFECTLY CLEAN** before proceeding to the next step, because they are o-ring sealing surfaces.
3. Locate the new QG relief valve assembly. Install the two large o-rings provided in the two grooves at the outside diameter, and coat these o-rings and pump bores with a general purpose grease before inserting. The new valve must slide in smoothly. If it does not, clean the pump bore more thoroughly. Once installed, rotate the valve so the compression tube fitting is locate UP and the red cap plug DOWN. Attach with four 7/16-14 B 1-1/4 LG. hex head capscrews (018-1812-02-0) and tighten to 48 ft. lbs. torque.
4. Instructions to install a replacement 200-2261-00-0 Indicator Light Switch. This switch is a proximity switch and senses the position of the piston and valve. Connect the leads of the switch to a test light. The test light should be lit. Screw the switch into the 044-0122-00-0 cover. The cover and the rest of the QG Relief Valve parts should be completely assembled. As the switch is screwed into the cover, the test light will go off. Thread the switch in an additional 3/4 to 1-1/4 turns. The switch location is now set. Tighten the switch lock nut.



## PG30 RELIEF VALVE & SENSING VALVE ASSEMBLY

1. You must find an open discharge pad on the midship pump to mount the PG30 Relief Valve and Sensing Valve Assembly. One typical location is shown in **Figure 3**. Any available opening can be used including any of the “four-bolt” openings on the top of the pump if space permits. In deciding which opening to use, remember that a 3” pipe line directing the water to the ground must be threaded into the PG30 outlet flange. Note that the PG30 relief valve can be rotated into four different positions on any given pump discharge opening.
2. Once you have determined the proper outlet and orientation, mount the PG30 relief valve using a greased gasket (046-0050-00-0) and, attach using the two “C” Washers (097-0440-00-0) and four 7/16-14 x 1-1/2” I.G. hex head capscrews (018-1814-02-0). Tighten to 48 ft. lbs. torque.
3. The sensing valve (bolted to the PG30 relief valve) must now be checked for proper orientation. Regardless of where the PG30 is mounted on the pump, the sensing valve must be bolted to a boss on the **SIDE** of the relief valve, **NOT** the top or bottom. In addition, the connections marked “A” and “PM” must point “UP” as shown in **Figure 4**. The sensing valve is moved or rotated by removing the 7/16” capscrew shown, and reinstalling after it is in the proper orientation. **NOTE** that this “UP” position is **CRITICAL** to the proper operation of the TPM System.
4. Attach the switch/flasher bracket to the PG30 relief valve cover as shown in **Figure 5**. This is done by removing two of the cover capscrews opposite each other. Reinstall the capscrews and washers securing the switch bracket as shown. Adjust the bolts in the side of the bracket until the switch plunger is depressed in the normal position shown. Tighten all bolts securely.

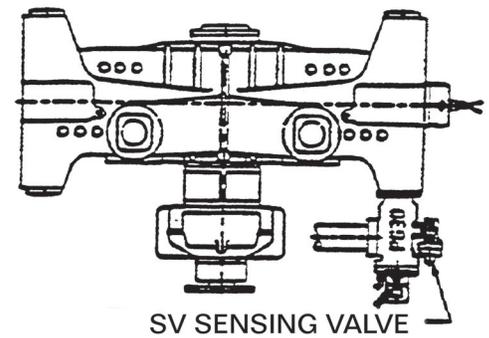


FIGURE 3

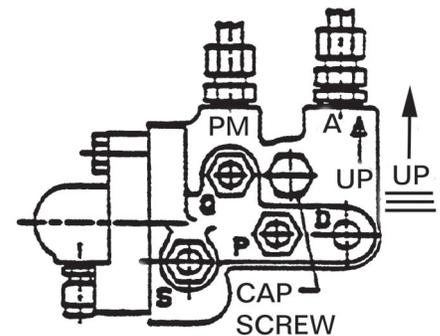


FIGURE 4

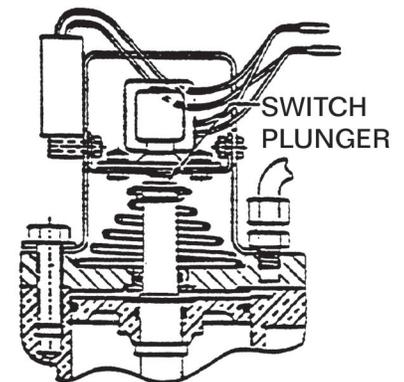


FIGURE 5



## PLUMBING CONNECTIONS

### Tubing:

The tubing connections must be made with 3/8" copper tubing or 3/8" nylon tubing having a 1/16" wall and using compression tube fittings. If nylon tubing is used, it must be a flexible grade of Nylon-11, and tubing inserts must be used to keep the wall from collapsing when the fittings are tightened. Care should be taken when using thread sealant on the tubing connections because excess thread sealant can clog small orifices located throughout the TPM system.

The following 3/8" tubing connections must be made. (Reference Plate No. 743C).

1. Connect a line from the strainer in the top of the Midship pump marked "**DISCHARGE**" to the compression fitting closest to the handwheel in the PMD Control (on the panel). You must use the pencil strainer in the pump to protect the small flow passages in the PMD control and sensing valve
2. Connect a line from the other compression fitting in the PMD control (on the panel) to the port marked "PM" on the top of the sensing valve (bolted on the PG30 relief valve).
3. Connect a line from the sensing valve port marked "Q" to the QG relief valve compression fitting that is on top of the bronze casting. If the truck will not be subjected to freezing temperatures, install a 1/4" NPT pipe plug in the bottom of the QG relief valve by removing the red cap plug. If the PUMP will see freezing temperatures, refer to the next section regarding **DRAIN LINES**.
4. Connect a line from the sensing valve port marked "P" to the fitting on the cover of the PG30 relief valve.
5. Connect a line from the sensing valve port marked "A" (located at the top) to the truck's water tank, preferably near the top of the tank, above the normal water level. (Note that this line will need either a drain or heat tape in freezing climates).
6. Connect a line from the sensing valve port marked "S" to one of the pump taps marked "Vacuum" using the pencil strainer provided and threaded into the pump. You must use this strainer to protect the small flow passages in the sensing valve. Discard the 1/4" NPT pipe plug removed where the strainer was installed.
7. If the pump will not be subjected to freezing temperatures, remove the red cap plug from the sensing valve port marked "D" and install a 1/4" pipe plug. If the pump will be subjected to freezing temperatures, refer to the next section regarding **DRAIN LINES**.



**Drain Lines:**

The following drains should be installed if the truck will see freezing temperatures. Do not connect any of these drains to a ganged or multi-drain valve. Each line must have a separate drain valve or the TPM system will not operate properly.

1. Install a drain line in the bottom of the QG relief valve by removing the red cap plug and running a line to a panel drain valve.
2. Install a drain line in the sensing valve port marked “D”, by removing the red cap plug and running a line to a panel drain valve.
3. Install a tee in the sensing valve port marked “A”, with one leg of the tee going to the top of the water tank and the other leg to a panel mounted drain valve. If the pump will never be kept as a “wet pump”, then the line from port “A” may go to atmosphere.

**Relief Valve Plumbing:**

Attach a 3” pipe to the discharge outlet flange of the PG30 relief valve. This pipe is to direct the water to the ground in a direction that will not get the operator wet (toward the back of the truck). Do not restrict this pipe with any smaller piping or fittings. Remember that over 1000 gallons per minute may flow through it, so it must be properly supported through its entire length and capable of withstanding the reaction force from the flowing water.

**Electrical Connections:**

All wiring should be done in accordance with NFPA specifications. Do not use smaller than 16 gauge for these connections. All Hale switches have .156” diameter female receptacle snap connections, use .156” male snap plugs to connect. (Reference Plate No. 743C).

1. Run one wire from the battery (+) to one of the QG relief valve switch leads located in the center of the cover, using a snap connector.
2. Run one wire from the other QG relief valve switch lead using a snap connector, to the indicator light on the PMD Control Instruction Plate mounted on the pump panel using a ring terminal.
3. Run one wire from the other indicator light connection using a ring terminal to the red wire lead on the switch/flasher unit located on the switch guard (019-0110-00-0) on the PG30 relief valve, using a snap connector.
4. Run one wire from the other lead on the PG30 switch/flasher unit using a snap connector to a convenient ground (-).



## OPERATION

The TPM Relief Valve System is set as follows:

1. Set the red pressure indicator on the PMD control valve to a position slightly above the normal operating pressure (even before you are flowing water)
2. Once you have reached normal operating pressure (as indicated on your master pressure gage) slowly move the adjusting handwheel counterclockwise until the QG relief valve opens and the amber indicator light comes on.
3. Then turn the handwheel about 1/2 turn clockwise until the indicator light goes off. The relief valve will now operate at the “set pressure”.
4. When the pump is not in operation, the handwheel should be turned clockwise back to a position slightly above the normal operating pressure.
5. Remember that the red indicator on the panel is only a **ROUGH** indication of what pressure the TPM is set for. Always use the above procedure to properly set the system,

### Operation with TPM and DDEC Pressure Governor

Set the TPM red pressure indicator on the PMD control valve to a position slightly above the normal operating pressure (even before you are flowing water).

1. Power on the governor control.
2. Set the discharge pressure using the RPM mode of the pressure governor control.
3. Move the TPM handwheel counterclockwise until the QG relief valve opens and the amber indicator light comes on. Then turn the handwheel 1 to 1-1/4 turns clockwise and the amber light goes out.
4. Put the Governor Control in the “pressure governor” mode. The system is now set.
5. When changing the “set pressure” while running, follow this procedure:



### Increasing Pressure

- a. Set TPM to a pressure (by the indicator) slightly higher than the desired new pressure
- b. Put the Governor Control in the RPM mode and increase the speed to the new pressure
- c. Follow Steps 4 and 5 above.

### Decreasing Pressure.

- a. Put the Governor Control in the RPM mode and reduce the speed to the new pressure.
- b. Follow Steps 4 and 5 above.

### **Drafting**

When operating from draft, the QG Internal Relief Valve alone is usually capable of recirculating enough water to keep the pressure rise within 20 psig of the “set pressure”. When this valve is open, the indicator light on the panel will be on.

### **Hydrant or Relay**

When operating with positive suction pressure it may be necessary for the external PG30 relief valve to dump water on the ground in addition to the water the QG relief valve recirculates in order to limit the pressure rise above the “set pressure.” The internal QG relief valve will always open first and if it cannot handle the pressure rise, the external PG30 relief valve will dump water on the ground. When the Internal QG relief valve opens, the Panel light will be on and when the external PG30 dump valve opens, the indicator light on the Panel will flash.

In some cases, when you are on the receiving end of a relay, it may help to set the pressure indicator very low in order to limit the incoming pump pressure by dumping water on the ground before you have discharge hose lines connected and are flowing water. Then as you are able to USE the incoming water, the PMD-relief valve control can be moved up, to the desired operating pressure and “set” as instructed above. This technique will also help to purge the AIR from the incoming hose and the pump before it can get to dangerous high pressure.



## MAINTENANCE/SERVICE

Every 6 months:

- Test relief valve system for proper operation.
- If operation is sluggish, check the pencil strainers in discharge and suction at the top of the pump. Clean or replace if clogged.
- 1.
  - Check all tubing, connections and fittings for leaks. Tighten or replace as required.
  - Check panel light bulb, replace if burned out. The bulb is a No. 1891, Hale Part No. 200-0540-02-0.
  - Lubricate the PMD control as outlined under “MAINTENANCE” on Plate No. 742C.

## HYDROSTATIC TEST NOTE

NFPA 1901 requires a hydrostatic test of 250 psig on the pump and related piping at the time the truck is delivered. To accomplish this with the TPM system requires that you remove the pencil strainer in the pump suction marked “vacuum” and temporarily install a 1/4” NPT pipe plug for the hydrostatic test. In addition, you must turn the PMD control handwheel clockwise all the way to the highest pressure to “lock it out”. After the hydrostatic test, return the PMD control back to its normal setting and reinstall the pencil strainer and line to the sensing valve.

If you do not disconnect the strainer and lock-out the PMD control valve, water will leak into the tank and the PG30 relief valve will open dumping water on the ground, making a hydrostatic test impossible.

### Replacement Parts:

Replacement Part Numbers are called out on Plate No. 742C (attached). To order parts, contact Hale Fire Pump Company, Service Department at 1-800-220-HALE or contact any authorized Hale Parts/Service Center.



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