

H Series Relief Valves Instruction Manual



WARNING

Failure to follow these instructions or to properly install and maintain this equipment could result in an explosion, fire and/or chemical contamination causing property damage and personal injury or death.

A person should NEVER stand directly over or in front of, or look directly into a relief valve when the tank is pressurized. The relief valve could suddenly “pop” open blowing gas, dirt, and other debris into the person’s face and eyes.

Fisher equipment must be installed, operated, and maintained in accordance with federal, state, and local codes and Fisher instructions. In addition, in most states the installation must also comply with NFPA No. 58, US Department of Transportation (DOT), and/or ANSI K61.1 standards.

Only personnel trained in the proper procedures, codes, standards, and regulations of the LP-gas, Anhydrous Ammonia or other applicable industry should install and inspect this equipment.

Introduction

Scope of Manual

This manual covers instructions for the “H282, H722, H732, H822, H832, H882, H5112, and H8112” series relief valves which shall be used only in vapor applications. The valves are typically installed in ASME tanks and Department Of Transportation (DOT) cargo tanks. (See Figures 2, 3 and 4.)

Type H282: Used on LP-Gas bulk storage tanks. Not applicable for Anhydrous Ammonia service. Standard UL and ASME set points are available.

Type H5112: Used on LP-Gas or Anhydrous Ammonia Bulk Storage tanks. Standard UL and ASME set points are available.

Type H722 and H732: Used on LP-Gas or Anhydrous Ammonia Cargo tanks. Standard UL and ASME set points are available.

Type H882, H8112: Contact the Factory for product compatibility. Used on various compressed gas bulk storage tanks. ASME set points and flow capacities are available. Special disc materials are available. Type numbers are serialized for the intended service.

Type H822, H832: Contact the Factory for product compatibility. Used on various compressed gas cargo tanks. ASME set points and flow capacities are available. Special disc materials are available. Type numbers are serialized for the intended service.

Things To Tell The Gas Customer

1. The purpose of a relief valve is to keep the tank from rupturing from excessive tank pressure by venting gas to the atmosphere until the tank pressure drops. The following can cause excessive tank pressure:

- Exposure to fire or radiant heat including hot summer days.
- New or refilled tanks not fully purged of air.
- Tank colors (other than white) increase the heat absorption of the tank raising the pressure in the tank.
- Propane or other service products with "vapor pressures" out of specification, i.e., "Hot Gas."
- Overfilling the tank.

2. Do not beat, pound, or hit the relief valve with hammers or other tools or attempt to force the valve closed as this will not stop gas discharge and could damage relief valve parts or rupture the tank.

3. Call your gas dealer if the relief valve discharges gas.

Specifications



WARNING

If the valve is to be for service other than LP-gas or anhydrous ammonia, contact the factory to determine if the valve materials are suitable for the particular service. H282 and H882 Relief Valves contain brass and must not be used on anhydrous ammonia service. Failure to do so could result in personal injury, property damage, explosion, fire or chemical contamination.

Specifications for these relief valves are in Table 1.



H282, H722, H732, H822, H832, H882, H5112, and H8112 Series Relief Valves

Table 1. Specifications

Body Size, Tank Connection	H282, H722, H882, H5112, H8112: 2-inch NPT H732, H832: 3-inch NPT	Temperature Range	-40° to 180°F (-40° to 82°C)
Discharge Stack Outlet Connection. (Weep Hole Deflector Included as Standard Construction)	Available only on H282, H882, H5112, H8112: 3-inch NPT	Start to Discharge Pressure and Spring(s) Range(s)	100 to 400 psig (6,9 to 27,5 bar)
Maximum Inlet Pressure (Body Rating)	480 psig (33,0 bar)	Materials of Construction	Body: H282, H882: Brass H5112, H8112: Stainless Steel H722, H732, H822, H832: Stainless Steel Stem: Stainless Steel Disc Holder: Stainless Steel Disc: H282, H722, H732, H5112: Nitrile H822, H832, H882, H8112: Nitrile standard. Contact factory for other disc materials that are available: Viton, Ethylene Propylene, Neoprene and Kalrez. Springs: Stainless Steel
Rain Cap and Installation Tool	H722, H822: P297 Rain Cap P304 (1 ½" Hex bar) Wrench H732, H832: P298 Rain Cap P305 (2 ½" Hex bar) Wrench H282, H882, H5112, H8112: Rain Cap not available.		
Approximate Unit Weight, lb (kg)	H282, H882: 10 (4.5) H5112, H8112: 10 (4.5) H722, H822: 2.75 (1.25) H732, H832: 7.5 (3.4)		

Set pressures and flow capacity requirements vary by product service. Actual flow capacities vary by relief valve size and set point. For special service applications other disc material and set points are available from the factory. Consult the factory or your Fisher Catalog for size, set pressure and flow capacity combinations.

Set point is denoted by the suffix numbers following the dash (-). Disc material is denoted by a letter following the type number: H882V-250 has a Viton disc and set point of 250 psi.

Nitrile	No letter
Viton	V
Ethylene Propylene	E
Neoprene	N
Kalraz	K

For Liquefied Petroleum Gas service, Underwriters Laboratories (UL) listed valves are required by most states, although some states require ASME capacity rated valves. Be sure the valve is rated and stamped to meet the requirements of the state where it will be used. The valve should also have sufficient capacity for the container size in which it is used. Required relief valve capacity is a function of the container surface area. For Liquefied Petroleum Gas applications consult NFPA #58. For other product applications consult appropriate product standards.

The start-to-discharge pressure stamped on the valve must be correct for the design pressure of the container. **Do not use a valve with a start-to-discharge pressure higher than that allowed by the design pressure of the container.**

If a relief valve is installed in a tank with an inlet dip tube, be sure that the dip tube does not restrict the inlet flow area as this may restrict the relief valve flow capacity to less than the stamped capacity on the valve. If a H282, H882, H5112 or H8112 relief valve has an outlet pipe-away stack (such as used in bulk storage applications), a restriction may result that reduces valve capacity below that stamped on the valve. In these cases, the total system capacity must be sufficient to meet the sizing requirements for the container being used.

Installation



WARNING

Install these relief valves only in the container vapor space to provide relief capacity for the tank. Failure to do so could result in improper relief capacity that could cause the tank to rupture in the event of an emergency condition. A ruptured tank may cause property damage and personal injury or death.

H282, H722, H732, H822, H832, H882, H5112, and H8112 Series Relief Valves

All containers must be purged to remove air from the container. Failure to properly purge may result in excessive pressure and the possibility of “popping” the relief valve when the container is filled. Follow recognized procedures for purging air from storage tanks. A good reference is NPGA #133, PURGING LP-GAS CONTAINERS.

Relief valves must have direct contact with the vapor space of the containers. Install the valve so that flow is unobstructed on both the inlet and outlet of the relief valve. Be certain that any discharge from the valve will not impinge on the container, adjacent containers, or any source of ignition.

Coat the male threads of the valve with an UL listed sealing compound. Do not use Teflon tape. Do not allow excess compound to drip into the container or flow around the bottom edge of the pipe threads. Screw the valve into the coupling hand tight and then wrench tighten it for approximately two additional turns. Do not install the valve with such extreme torque that the coupling cuts additional threads into the valve. This could cause valve distortion and affect the internal working parts. Larger size valves may require an additional amount of torque to obtain a leak-free connection. The type H722, H732, H822 and H832 will require an installation tool. See Specifications in Table 1.

Raincaps are required on all valves. The raincap should be kept in place to keep moisture and dirt out of the relief valve discharge area. An out-of-place raincap indicates the valve may have opened to relieve over-pressure. H282, H882, H5112 or H8112 relief valves have a drain hole in the body, which must remain open at all times. It is located under the deflector on the side of the relief valve body. Type H722, H732, H822 and H832 relief valves on cargo tank applications do not have drain holes and must be protected as specified by DOT, NFPA #58, and other applicable laws, codes, and standards. **Do not pack the outlet side of the H722, H732, H822 and H832 relief valves with grease or other material to keep out dirt and moisture.**

CAUTION

Greases and other materials placed in relief valve outlet chambers may harden and prevent the opening of the relief valve or attack the rubber disc materials causing premature leakage or possibly tank rupture.

Each application will dictate whether discharge stacks or deflectors are required. These are separate devices mounted to the outlet of the valve to control discharge direction. The types H282, H882, H5112 or H8112 are equipped with deflectors as standard. They also have a 3-inch NPT thread on the outlet so that a coupling and

discharge stack can be added as needed. Consult the applicable standard to determine if these additional devices are required. H722, H732, H822 and H832 relief valves can not be equipped with deflectors or discharge stacks.

Principle of Operation

The relief valve (refer to Figure 1) is held closed by the spring force seating the O-Ring seal against the orifice.

When the tank pressure exceeds the spring force, the valve O-Ring lifts off the orifice allowing gas to discharge through the valve to the air.

Gas discharge initially may be small producing only seepage and a light “hissing” sound. As pressure increases and gas volume discharge continues, a “popping” condition occurs with large volumes of gas discharging and a loud “hissing or roaring” sound.

When the tank pressure decreases enough, the spring force closes the valve O-Ring back against the orifice stopping further discharge.

Maintenance, Repair and/or Replacement

WARNING

Any valve that has fully opened (popped) should be tested to see if it is within the allowable start-to-discharge pressure setting. If it is not within the correct range, it must be replaced. Relief valve start-to-discharge and reseal pressures may be lower if the valve has fully opened (popped).

Some relief valve installations require periodic testing or replacement, such as those required by DOT, NFPA #58, NFPA Pamphlet 59 (LP-Gas Utility Gas Plants) and ANSI K61.1. It is recommended that all relief valves be regularly inspected for visible damage, dirt, corrosion, missing raincaps, paint inside outlet, tampering, etc. If any of the preceding is evident or questionable, the valve should be retested and repaired if necessary or replaced immediately.

The discharge side of the relief valve body must be kept free of dirt, water, and other foreign matter which can damage the valve O-Ring or block the valves closed and can prevent the valve from opening. Remove the blockage and/or replace the valves or retest and repair as necessary.

Relief valves are precisely set and wire sealed by the manufacturer for the correct start-to-discharge setting. Repair and resetting the relief valve should never be attempted except by a repair facility that has an ASME VR stamp or has been approved to repair and reset relief valves by the appropriate governmental authority.

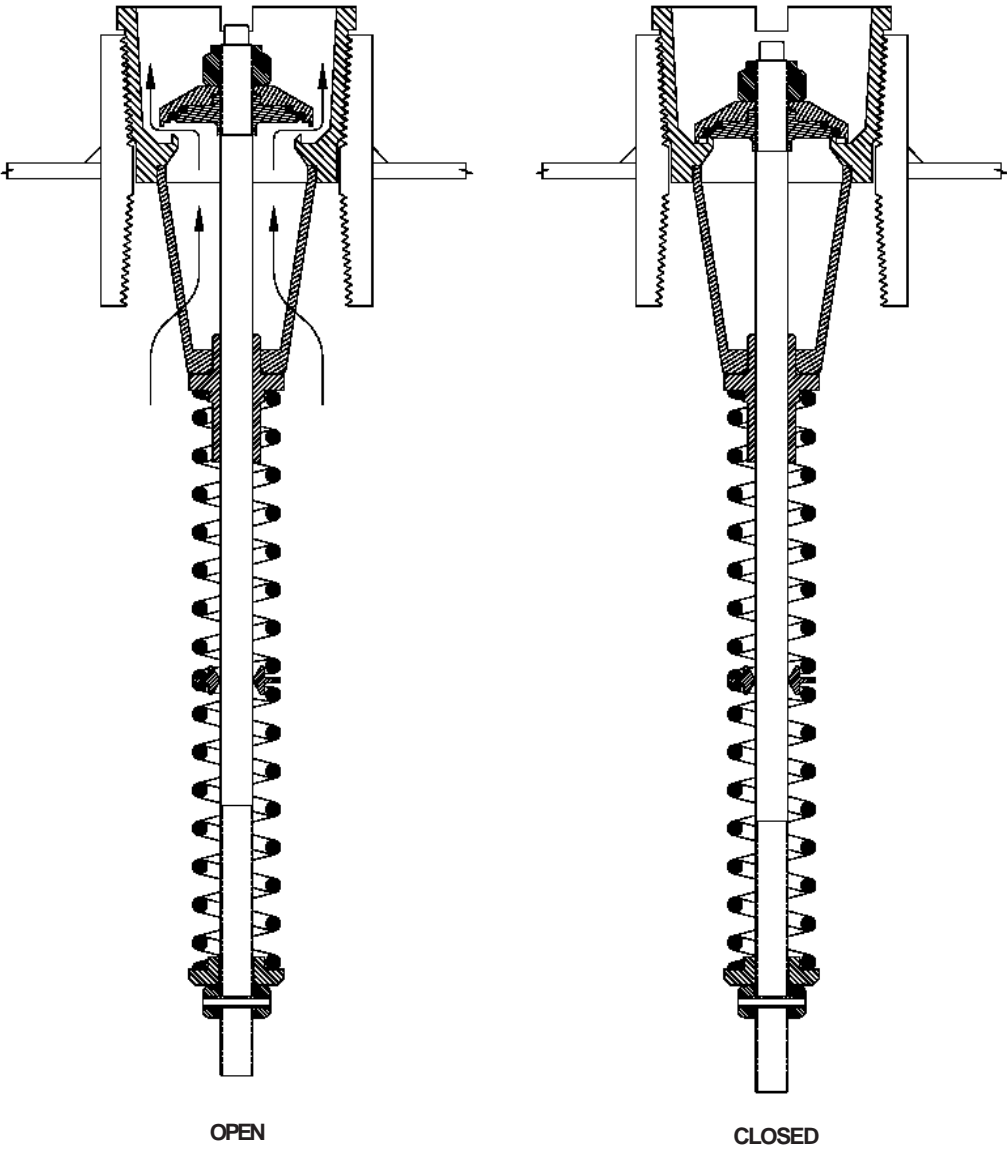


Figure 1. Principle of Operation

Since the O-Ring in a relief valve is subject to normal deterioration, Fisher recommends that a relief valve not be used for longer than 15 years without repair, retest or replacement. (All Fisher valves carry the date of manufacture.) Earlier replacement may be required due to severe service conditions or code requirements. The O-Ring seals in the relief valves covered by this manual can be replaced in the field without effecting the relief valve start to discharge. Refer to the Sections on Relief Valve Testing and Seal Replacement.

Relief Valve Testing

The following procedure describes how to determine the set point and reseal of a relief valve.

- If the set point or reseal does not comply with the requirements after removal from service, replacement of the O-Ring seals may be needed.
- If the set point or reseal does not comply with the requirements after O-Ring seal replacement and retest, then resetting or complete replacement of the relief valve is required.
- If resetting the relief valve is required, send it to a repair facility that has an ASME VR stamp or has been approved to repair and reset relief valves by the appropriate governmental authority.



WARNING

A person should NEVER stand directly over or in front of, or look directly into a relief valve when the tank or test fixture is pressurized. The relief valve could suddenly “pop” open blowing gas, dirt, and other debris into the person’s face and eyes.

1. Install relief valve in the tester. Fill the relief valve body outlet with water. A calibrated pressure gauge should be used to indicate relief valve inlet pressure readings. The gauge should be at least 6 inches in diameter with 2 psi increments and the anticipated start to discharge should be readable in the middle third of the gauge range.
2. Slowly apply air pressure at the rate of 2 psi/second to the relief valve inlet until start to discharge. Start-to-discharge pressure is the point at which the 1st bubbles appear in a water seal not to exceed 4".
3. Repeat the start to discharge tests at least 3 times to ensure set point accuracy. Set point readings

should be within 1 to 2 psi of each other for consistency.

4. Start-to-discharge pressure should be within 0 to 10% of stamped set pressure on valve. Example - stamped pressure = 250 psi. Start-to-discharge minimum pressure: = 250 psi and Start-to-discharge pressure maximum: = 275 psi.
5. Verify Reseat pressure. After the reaching the start to discharge setting, reduce pressure to 90% of the observed set pressure. There should be no bubbles visible through the water seal at that pressure.



WARNING

These relief valves must be removed from service before attempting to check set point, replace O-Ring seals or repair. Failure to do so could result in the discharge of high-pressure gas and possible personal injury.



CAUTION

Only a qualified repair facility should test and replace the relief valve seat O-Rings. Only a qualified repair facility with an ASME VR stamp or authorized by a governmental agency should rebuild and reset relief valves.

Replacing O-Ring Seals in Relief Valves



CAUTION

Only Fisher repair parts should be used in the repair of these valves. See Tables 2 and 3 for part numbers for the O-Ring seals and Hexagon Lock Nuts.

If the relief valve start to discharge is below or above the limits defined in the Testing Section or the reseal pressure is low, then the O-Ring seals may need to be replaced.

To replace the O-Ring Seals, Refer to Figures 2, 3 & 4.

1. Securely hold nut, item 8, on the end of the stem assembly, item 14 and remove the Hexagon Lock Nut, item 11. Discard the Hexagon Lock Nut and replace with a new Lock Nut .
2. Remove the Top Disc Holder, item 2 and the 2 O-Rings, items 17 and 18. Discard the 2 O-Rings.

H282, H722, H732, H822, H832, H882, H5112, and H8112 Series Relief Valves

Table 2. O-Ring Part Numbers

Type Number	Item #	NITRILE	ETHYL PROP	VITON	KALREZ	NEOPRENE
H282, H732, H5112	17	T14332T0012				
	18	1H993806992				
H832, H882, H8112	17	T14332T0012	T14332T0022	T14332T0032	T14332T0042	T14332T0052
	18	1H993806992	1H9938X0022	1H9938X0012	1H9938X0052	1H9938X0032
H722	17	T14333T0012				
	18	T14334T0012				
H822	17	T14333T0012	T14333T0022	T14333T0032	T14333T0042	T14333T0052
	18	T14334T0012	T14334T0022	T14334T0032	T14334T0042	T14334T0052

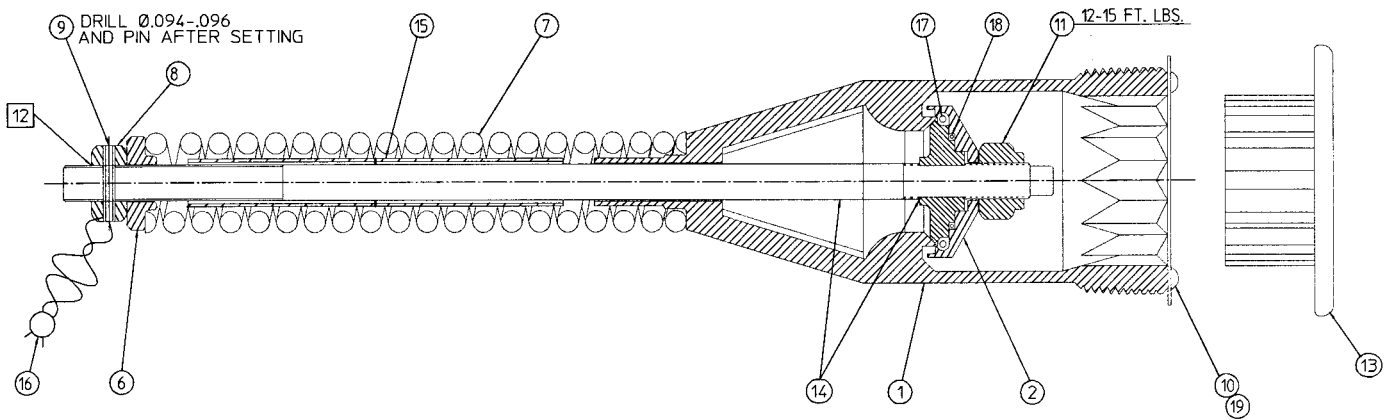
Table 3. Hexagon Lock Nut Part Numbers

Type Number	Item #	Part Number
H282, H732, H5112, H832, H882 & H8112	11	1D5309X0052
H722 & H822	11	1D5297X0022

Parts List by Item Number Refer to Figures 2, 3, & 4

Item #	Part Description	Qty
1	Body	1
2	Top Disc Holder	1
3	Yoke-(H282, H882, H5112, H8112 Only)	1
4	Guide Bushing -(H282, H882, H5112, H8112 Only)	1
4	Drain Deflector -(H282, H882, H5112, H8112 Only)	1
6	Spring Seat (H732 and H832 only)	1
7	Spring	1
8	Hex Adjusting Nut	1
9	Roll Pin	1
10	Drive Screw (H282, H882, H5112, H8112) H722, H732, H822 & H832 Drive Screw	2 4
11	Hex Lock Nut	1
12	Lube - 9	
13	Rain Cap (H722, H732, H822 and H832 only)	1
14	Bottom Disc / Stem Weld Assembly	1
15	Spring Tube	1
16	Lead seal and wire	1
17	Large O-Ring	1
18	Small O-Ring	1
19	Nameplates (H722, H732, H822 & H832)	2
20	Instruction Manual	1

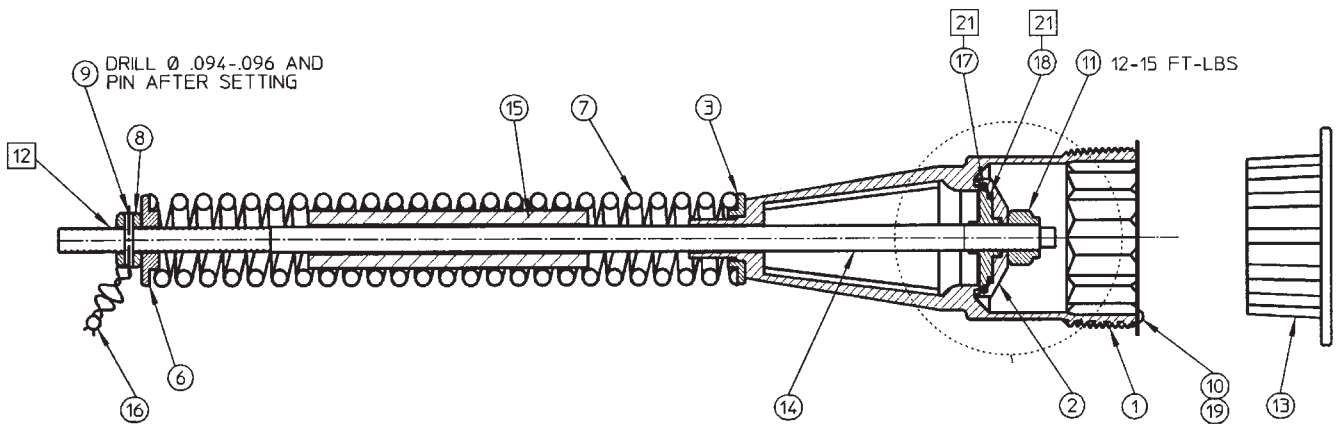
- Refer to Figure 5. Apply Dow Corning #111 lubricant to O-Rings, item 17 and 18. Install the larger O-Ring, item 17, into the outer groove and the smaller O-Ring, item 18, into the inner groove of the Top Disc Holder, item 2.
- Place the Top Disc Holder and O-Rings over the Bottom Disc/Stem Weld Assembly, item 14, slowly guiding and compressing O-Rings onto lower disc holder. Install Hexagon Lock Nut, item 11.
- While still securely holding the Nut, item 8 on the end of the Stem Assembly, item 14 to prevent rotation, tighten the Hexagon Nut, item 11 to the Stem Assembly, item 14. Torque the new Hexagon Lock Nut to 12-15 ft-lb. force.
- Recheck relief valve for start to discharge and reset as described in the Test Section.
- Remove existing wire seal and replace with new seal. Stamp lead seal with repair facility mark and date of repair.



NOTES:

- 1) = APPLY LUBE.

Figure 2. H722 and H822 Relief Valves



NOTES:

1. = LUBE

Figure 3. H732 and H832 Relief Valve

H282, H722, H732, H822, H832, H882, H5112, and H8112 Series Relief Valves

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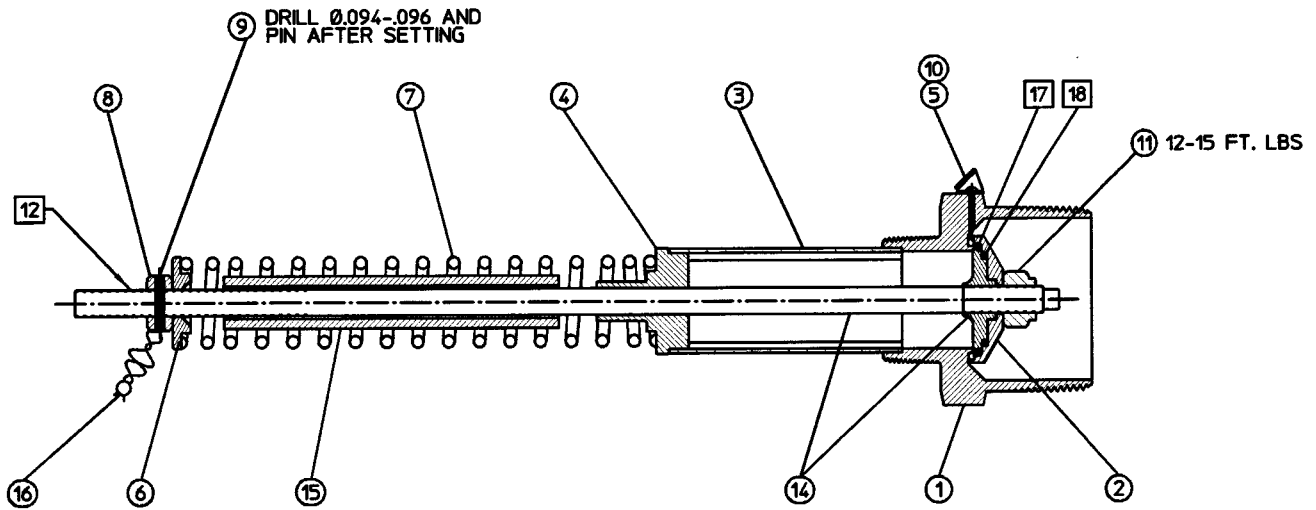


Figure 4. H282, H882, H5112 and H8112 Relief Valve

NOTES:

1.) □ = APPLY LUBE.

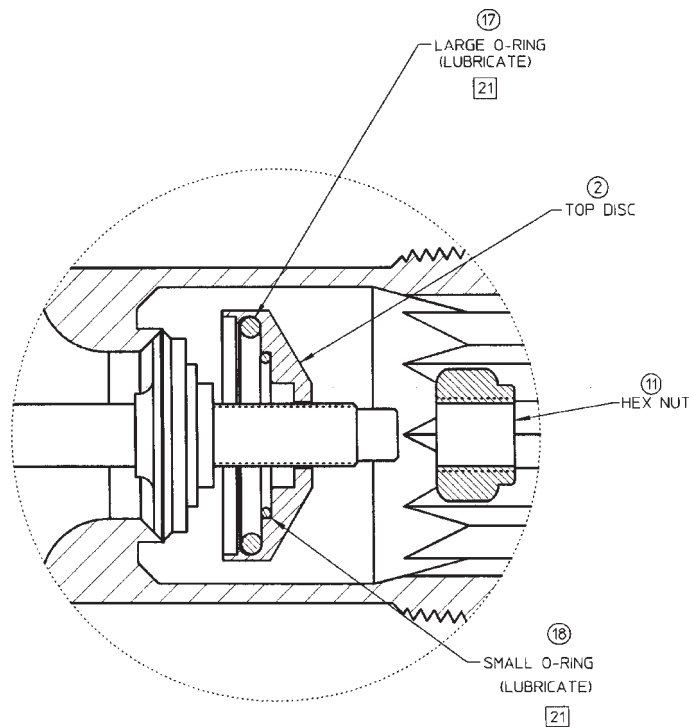


Figure 5.

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