

# INSTALLATION INSTRUCTIONS



## H900-HP SERIES HIGH-PRESSURE RELIEF VALVES



### INTRODUCTION

The H-900HP Series Relief Valves are designed and tested in accordance with MSS standard SP-99-1994 (R2005) - (Instrument Valves). This type of valves is intended for use under extremely high operating pressures (ranging from 50 psig to 6000 psig) and unfavorable working conditions, and can be implemented in either gas or liquid applications. The valves are manufactured from ASTM-A276 body construction, and are available in male and female NPT / BSPT pipe threads and Let-Lok (compression) connectors.

### General

H-900HP series is a relief valve intended for use in high-pressure applications. The valve is normally closed and opens when system pressure reaches a set level. It then returns to the closed position when the system pressure falls below the set level.

### Features

- Made from St.St 316.
- Service pressure up to 6000 psig.
- Available set pressures between 50 psig and 6,000 psig (3.44 to 413.8 Bar).
- Color-coded springs for each pressure range
- Replaceable springs for a wide range of pressures
- Available in male and female NPT / BSPT pipe threads and Let-Lok (compression) connectors.
- Available sizes: 1/4" or 6mm.

### Cleaning / Packaging

Ham-Let H-900HP Series Relief Valves are treated with Ham-Let Passivation Cleaning and Packaging (Procedure 8075); Oxygen Cleaning and Packaging (Procedure 8055) is available upon request.

### Testing

The designs of the Ham-Let H-900HP Series Relief Valves have been tested for proof, burst and leakage. Every relief valve is factory-tested for proper set and resealing performance.

### SAFETY INSTRUCTIONS

#### General

- All installation and / or maintenance operations must be obtained when the system pressure is fully relieved.
- All installation and / or maintenance operations must be followed with User manual instructions.
- Use only appropriate tools, which are designed and built for the specific operation.
- Plan your action carefully in advance, especially when dealing with extreme temperature, pressure and corrosive materials.
- Use a proper protection and safety devices during maintenance.

#### Volume considerations

While evaluating volume to be relieved, all system volumes should be considered, i.e.: system lines, pumps, bulk tanks etc.

#### Warning!

**When selecting individual components, the total design of the system must be taken into consideration in order to ensure that your Ham-Let product will provide a safe and trouble-free operation. It is the responsibility of both the system designer and user to consider the inter-compatibility of the materials, components and systems, and the intended function of each component. Please ensure the component's appropriate ratings and their proper installation, operation and maintenance.**

**Improper selection or use of products may cause property damage or personal injury, in regard of which the system designer and/or the user shall be solely liable and responsible.**

**Follow all enclosed instructions and refer to the product catalog for detailed product specifications.**



## H900-HP SERIES HIGH-PRESSURE RELIEF VALVES (Cont'd)



### Disassembly and Seal Removal

**Warning:** Relieve system pressure before any valve maintenance.

1. Clamp the valve body in a vise.
2. Remove adjustment cap (3).
3. Remove bonnet (7) from the body (15) - use a 3/4" wrench and rotate counter-clockwise for opening.
4. Remove poppet (11) by pulling it from the bonnet (7) bore.
5. Remove O-ring (8) from the bonnet (7).
6. Remove carefully the retaining ring (10) from the bonnet (7).  
**Caution:** The retaining ring is a spring stainless clips. Do not direct it a person.
7. Remove the Quad-ring (9) from the bonnet (7).
8. Remove the clamp screw (12) from the body (15). Rotate the clamp screw counter-clockwise for opening. Use a 1/4" Allen (hex) key.
9. Remove O-ring (13) from the body (7).
10. Discard all soft (wetted) parts.
11. Inspect all parts for nicks, scratches and dents. Discard as appropriate. Replace with Ham-Let parts only

### Reassembly and seal installation

1. Clamp the valve body in a vise.
2. Make sure all parts are clean before installation.
3. Install new O-ring (13) in the body (7) (Lubricate with system compatible lubricant).
4. Thread clamp screw (12) in the body (15). Tight permanently with 1/4" Allen (hex) key.
5. Install new quad-ring (9) (Lubricate with system compatible lubricant) into the bonnet (7).
6. Install new retaining ring (10) (make sure the teeth are pointing away from the quad-ring).
7. Insert the poppet (11) into the bonnet (7) through the quad-ring (9) until it bottoms.
8. Install new o-ring (8) on the bonnet (7) (Lubricate with system compatible lubricant).
9. Install bonnet (7) into body (15) and tighten bonnet to 68N\*m (600lb.\*in).
10. Perform adjustment procedure before installing in the system.

### Trouble shooting

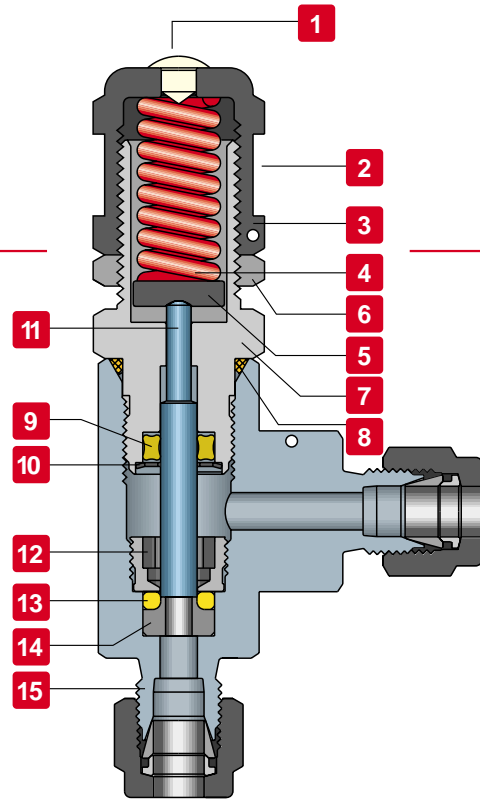
**Warning:** Relieve system pressure before any valve maintenance.

Symptom	Possible Causes	Corrective Action
Relief valve remains open.	Leakage through o-ring seal (13)	Replace o-ring (13)
Relief valve opens below set pressure	Loss of spring force/ Mechanical grip.	Remove adjustment cap (3). Clean spring (4), bonnet (7) and adjustment cap (3) from particles.
Relief valve opens above set pressure	Friction on the mechanical working mechanism. Leakage through any attached auxiliary system such as emergency shutdown system, remote operators, etc.	Check auxiliary systems for leaks, and readjust pressure. Disassembly, clean parts and perform Cracking pressure adjustment procedure.
Unable to control the valve for cracking.	The spring range is too high.	Choose a spring with lower pressure range.
Unable to control the valve for shut-off.	The spring range is too low.	Choose a spring with Higher-pressure range.
Unable to relief the pressure from the system after cracking.	Relief valve too small. Too much gas capacity to complete cycle.	Choose a larger size of Relief valve.

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## H900-HP SERIES HIGH-PRESSURE RELIEF VALVES (Cont'd)



### H900 - MATERIALS

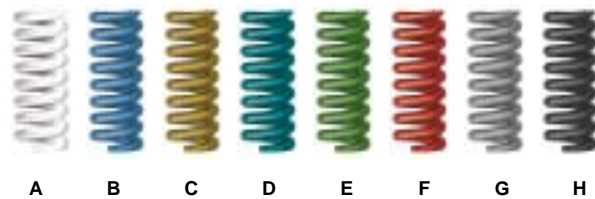
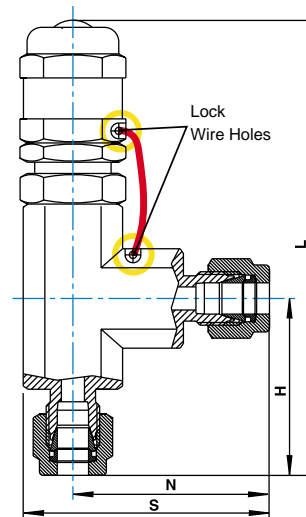
Item No.	Components	Qty.	Valve Body Material
1	Cap Plug	1	PTFE
2	Label	1	PVC
3	Adjustment Cap	1	St.St 316
4	Spring	1	St.St. 302,17-7PH
5	Lower Spring Button	1	St.St 316
6	Locking Nut	1	St.St 316
7	Bonnet	1	St.St 316
8	O-ring	1	Viton® (Fluorocarbon)
9	Quad Ring	1	Viton® (Fluorocarbon)
10	Retaining Ring	1	PH15-7Mo
11	Poppet	1	St.St 316
12	Clamps Screw	1	St.St 316
13	O-ring	1	Viton® (Fluorocarbon)
14	Insert	1	St.St 316
15	Body	1	St.St 316

### DIMENSIONS

Description	Connection / size		Dimensions mm:			
	inlet	outlet	H	N	S	L
H900-HP	1/4 LET-LOK®	1/4 LET-LOK®	37	39	50	105
H900-HP	6MM LET-LOK®	6MM LET-LOK®	37	39	50	105
H985-HP	1/4 Male NPT	1/4 Female NPT	32	30	40	100
H995-HP	1/4 Male NPT	1/4 LET-LOK®	32	39	50	100

### NOMINAL CRACKING - PRESSURE RANGE

psig	Bars	Spring Designator	Color
50-350	3.4 - 24	A	White
350-750	24 - 51.5	B	Blue
750-1500	51.5 - 103	C	Gold
1500-2250	103 - 155	D	Turquoise
2250-3000	155 - 206	E	Green
3000-4000	206 - 275	F	Red
4000-5000	275 - 344	G	Silver
5000-6000	344 - 413	H	Black



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### MAINTENANCE

#### Tool requirement

- 3/4" wrench for.
- 1/4" Allen (Hex) key.
- O-ring installation and removal tools.
- Retaining ring installation and removal tool.

#### Cracking Pressure Adjustment

1. Thread adjustment cap (3) onto the bonnet (7) - 9 full turns.
2. Tighten locking nut (6) against the adjustment cap (3) and test for set pressure.
3. Relieve system pressure; unthread the adjustment cap (3) as needed (use manual or 3/4" wrench). Repeat procedure as necessary to obtain desired set pressure.
  - 3.1 A clockwise rotary of the adjustment cap (3) will increase the spring force and the cracking pressure of the valve.
  - 3.2 A counter-clockwise rotary of the adjustment cap (3) will decrease the spring force and the cracking pressure of the valve.
4. Tighten locking nut (6) against the adjustment cap (3).
5. Lock wire the adjustment cap (3) and valve body (15) to maintain relief setting.

#### H-900HP Series - Spring installation / replacement

**Warning:** Relieve system pressure before any valve maintenance.

##### Content:

- 1 x Spring (4)
- 1 x Label (3)
- 1 x Lock wire
- 1 x Lead

1. Select the desired spring according to the Nominal Cracking Pressure Range as shown at the "material of construction" section above.
2. Loosen the locking nut (6) with a 3/4" wrench (clockwise) and remove the adjustment cap (3) with a 3/4" wrench (counter-clockwise) from the bonnet (7).
3. Remove the spring (4).

4. Make sure all components are clean of burrs.
5. Insert the selected spring (4) inside the bonnet (7).
6. Replace existing cracking pressure range label (2) with a new one. Ensure that the pressure range, which is written on the Label (2) is compliance with the installed spring (4) range.
7. Screw adjustment cap (3) onto bonnet (7) with 3/4" wrench.
8. Perform Cracking Pressure Adjustment procedure described above.

#### Valve Testing guidelines.

1. Connect the Relief valve's inlet to the pressure source.
2. Connect Relief valve's outlet to any leak detecting device.
3. Increase the inlet pressure slowly.
4. Verify that an initial flow from the outlet will occur at the pre-saturated pressure.
5. Repeat adjustment procedure as necessary to set the desired cracking pressure.

##### Note:

For proper maintenance of the H-900HP Series Relief Valves, a service cycle and setting validation of at least once each 1/2 year is recommended. The inspection, maintenance and testing can be incorporated into the annual inspection procedure to ensure proper operation and many years of trouble-free service.

The life span of the main valve seal depends upon varied factors, such as:

- Chemical resistance of the seal to the system medium
- The volume of fluid, passed through the valve
- The operating pressure
- The quantity of dirt and other foreign particles present

#### H-900 SERIES SEAL KIT REPLACEMENT.

##### Content:

- 1 x O-ring (8)
- 1 x Quad-ring (9)
- 1 x Retaining ring (10)
- 1 x O-ring (13)