

Fisher Controls

Instruction Manual

Type 98HH Back Pressure and Relief Valves



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Form 1930

WARNING

Fisher relief valves must be installed, operated, and maintained in accordance with federal, state, and local codes, rules and regulations, and Fisher instructions.

If the spring case develops a leak or if the outlet continually vents gas, service to the unit may be required. Failure to correct trouble could result in a hazardous condition. Only a qualified person must install or service the unit.



W2592-1

Figure 1. Type 98HH Relief Valve

Introduction

Type 98HH (see figure 1) valve provides relief or differential relief in liquid, gas, air, and steam service applications. Outlet pressure settings range from 150 to 375 psig (10.3 to 26 bar). Bodies are available in 1/4, 1/2, 3/4 and 1-inch sizes.

Specifications

Specifications for the Type 98HH are given in table 1.

Installation

Unbox and inspect the valve. Remove pipe scale and other foreign material from the connecting pipeline. Apply a suitable pipe compound to the male threads.

The relief valve can be installed in any position as long as the flow is in the direction indicated by the arrow cast on the body. The design of the valve isolates the diaphragm and pressure response chamber from the main flow stream. High pressure is measured inside the body through a registration hole on the inlet side of the body. If loading pressure is required, connect the loading pressure line to the NPT connection in the spring case. This connection is 1/8-inch NPT for 1/4-inch bodies, 1/4-inch NPT for 1/2-inch bodies. If loading pressure is not required, this connection should be vented to atmosphere.

Maximum operating temperatures for the Type 98HH relief valves are as follows:

Elastomer diaphragm or seat: 150°F (66°C)
 Metal diaphragm or seat: 406°F (208°C) with a cast iron body and spring case or 450°F (232°C) with a steel or stainless steel body and spring case.

Table 1. Specifications

Available Constructions Self-operated with standard adjusting screw.		Relief Pressure Range 150 to 375 psig (10.3 to 29 bar)													
End Connection Style NPT screwed, socket weld, or ANSI flanged-14 inches face to face (DIN flanged-356mm face to face)		Allowable Temperature Ranges⁽⁵⁾ Nitrile Parts: -20 to 200°F (-29 to 93°C) Neoprene Parts: -40 to 150°F (-40 to 66°C) Fluoroelastomer Parts: 0 to 300°F (-18 to 149°C) Metal Diaphragm and Seat <i>Cast Iron Body and Spring Case:</i> -40 to 406°F (-40 to 208°C) <i>Steel Body and Spring Case:</i> -20 to 450°F (-29 to 232°C) <i>Stainless Steel Body and Spring Case:</i> -40 to 450°F (-40 to 232°C)													
Body Sizes ■ 1/4, ■ 1/2, ■ 3/4, ■ 1															
Maximum Inlet Pressures, Psig^(1,5) (Set Pressure Plus Buildup)		Approximate Weight, lb (kg) <i>1/4-inch Body:</i> 8 (3.6) <i>1/2-inch Body:</i> 8 (3.6) <i>3/4-inch Body:</i> 20 (9.1) <i>1-inch Body:</i> 20 (9.1)													
	<table border="1"> <thead> <tr> <th rowspan="3">TYPE NUMBER</th> <th rowspan="3">STEEL (WCB) OR STAINLESS STEEL SPRING CASE ALL TRIMS TO 150°F⁽²⁾ (66°C)</th> <th colspan="2">CAST IRON SPRING CASE</th> </tr> <tr> <th rowspan="2">All Trims to 150°F⁽³⁾ (66°C)</th> <th>Metal Trims⁽⁴⁾</th> </tr> <tr> <th>To 315°F (66°C)</th> <th>To 406°F (208°C)</th> </tr> </thead> <tbody> <tr> <td>98HH</td> <td>400 (204)</td> <td>400 (204)</td> <td>300 (149) 250 (121)</td> </tr> </tbody> </table>	TYPE NUMBER	STEEL (WCB) OR STAINLESS STEEL SPRING CASE ALL TRIMS TO 150°F ⁽²⁾ (66°C)	CAST IRON SPRING CASE		All Trims to 150°F ⁽³⁾ (66°C)	Metal Trims ⁽⁴⁾	To 315°F (66°C)	To 406°F (208°C)	98HH	400 (204)	400 (204)	300 (149) 250 (121)		
TYPE NUMBER	STEEL (WCB) OR STAINLESS STEEL SPRING CASE ALL TRIMS TO 150°F ⁽²⁾ (66°C)			CAST IRON SPRING CASE											
				All Trims to 150°F ⁽³⁾ (66°C)	Metal Trims ⁽⁴⁾										
		To 315°F (66°C)	To 406°F (208°C)												
98HH	400 (204)	400 (204)	300 (149) 250 (121)												
1. Relief pressure setting plus maximum allowable buildup over setting. 2. Or fluoroelastomer trims to 300°F (149°C) or metal trims to 450°F (232°C). 3. Or fluoroelastomer trims to 300°F (149°C).		4. Interpolate for intermediate pressure ratings. 5. The pressure/temperature limits in this bulletin and any applicable standard limitation should not be exceeded.													

Vents



If the process fluid is hazardous, install remote vent lines to carry fluid to a safe area.

If remote venting is necessary, install a remote vent line in the spring case and outlet connections of Type 98HH relief valve. The vent lines must have the largest practical diameter and be as short as possible with a minimum number of bends or elbows.

Overpressure



Overpressuring any portion of this equipment may cause equipment damage, leaks in the relief valve, or personal injury due to bursting of pressure-containing parts. The system should be inspected after any overpressure condition.

Relief pressure settings range from 150 to 375 psig (10.3 to 25.9 bar).

Adjustment

Each unit is factory set for the pressure setting specified on the order. If adjustment is necessary, use a pressure gauge to monitor the pressure. Turn the adjusting screw (key 15) clockwise to increase the pressure or differential pressure setting. To decrease the setting, turn the adjusting screw counterclockwise.

Principle Of Operation

See figure 2. Type 98HH relief and back pressure valves relieves excessive pressures upstream of the main regulator. If the upstream pressure rises above the setting of the relief valve, pressure on the underside of the diaphragm overcomes the spring compression. The valve plug moves away from the orifice and allows the excess pressure to escape. When the upstream pressure returns to normal, the plug resumes a closed position.

Maintenance



To avoid personal injury and equipment damage, isolate the valve from all pressure.

Cautiously release pressure from the relief valve before attempting disassembly.

Due to normal wear and damage that may occur from external sources, relief valve parts such as the O-rings, gaskets, diaphragm, orifice, and valve plug should be inspected periodically and replaced as necessary. The frequency of inspection and replacement depends upon the severity of service conditions or the requirements of state and federal laws.

Instructions are given below for disassembly of the Type 98HH relief and back pressure valves. These valves do not have to be removed from the pipeline to inspect internal parts. Suitable lubricants are indicated on the assembly drawings. Apply the lubricants as the relief valve is being reassembled. Refer to figure 3 while servicing the relief valve.

Disassembly to Replace Diaphragm and Seats

If the relief valve is leaking, the diaphragm may be ruptured or the seating surfaces nicked or scratched. Proceed as follows to replace or repair the diaphragm, orifice, and valve plug.

1. Release all spring compression from the diaphragm by turning the adjusting screw (key 15) counterclockwise.
2. Remove capscrews (key 16) and lift off the spring case (key 2), spring (key 11), upper spring seat (key 9) and diaphragm assembly. (The diaphragm assembly includes the locknut, key 26; pusher post, key 6; lock washer, key 23; lower spring seat, key 8; diaphragm, key 12; gasket, key 10; washer, key 7.)

Note

There are two diaphragms if the diaphragm material is metal or fluoroelastomer.

3. Check the orifice (key 3). If it needs replacing or repairing, unscrew the valve plug guide (key 5) and then the orifice. The valve plug can be removed by sliding it off of the pusher post.

Note

If damage to elastomer or metal seating surfaces is severe, replace the orifice and valve plug O-ring with new parts. However, by following the lapping procedure below, it is possible to repair metal seating surfaces if they are only slightly worn or scratched.

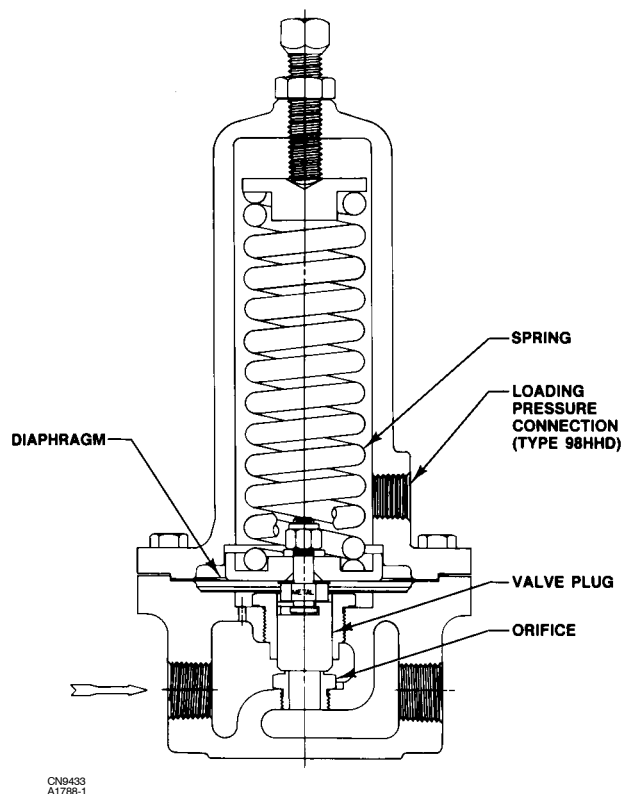


Figure 2. Operational Schematic for Type 98HH Relief Valves

4. Lapping procedure:
 - a. Place a small amount of 500-grit silicon carbide or aluminum oxide lapping compound on a flat surface such as a piece of heavy plate glass.
 - b. Take the valve plug or orifice and move it in a figure 8 motion on the lapping compound. Do not allow the part to tip or rock since this would round the corners.
 - c. Repeat step b for each part, using an 800-grit or 1000-grit silicon carbide or aluminum oxide lapping compound.
 - d. Wash away all traces of the lapping compound. To help prevent scratching the seating surfaces, a light coat of oil may be applied before returning the valve plug and ring to the body.
5. Return the orifice and valve plug guide to the body.
6. To replace the valve plug O-ring (key 22), remove the screw (key 24) and O-ring retainer (key 21) from the plug. Remove and replace the O-ring.
7. Remove the locknut from the pusher post in order to separate the parts of the diaphragm assembly. Inspect, and replace if necessary, the diaphragm, diaphragm gasket (key 19), and pusher post gaskets (key 10).

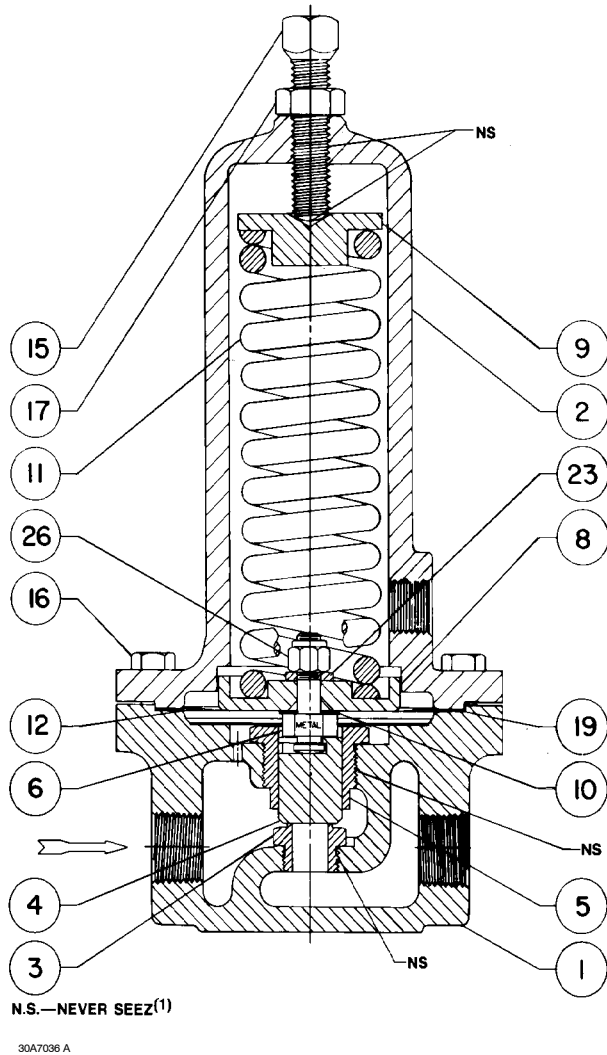


Figure 3. Type 98HH Relief Valve Assembly with Metal Seals

Note

These valves have either a metal or elastomer diaphragm. If a metal diaphragm is to be replaced with an elastomer diaphragm or a elastomer diaphragm with a metal diaphragm, a new pusher post is required.

8. Slip the plug back onto the pusher post and return the rest of the diaphragm assembly parts to the pusher post in the following order: gasket, diaphragm, O-ring, lower spring seat, and washer. Screw on the locknut.

9. Place the diaphragm gasket on the body and put the diaphragm assembly into position in the body.

10. Set the spring and upper spring seat over the lower spring seat. Place the upper casing on the body, tightening the cap screws finger-tight only.

11. To ensure proper slack in the diaphragm, apply some spring compression by turning the adjusting screw clockwise. Tighten the cap screws.

Parts Ordering

When corresponding with your Fisher sales office or sales representative about this equipment, be sure to include the type number and other information stamped on the nameplate.

When ordering replacement parts, reference the key number of each needed part and specify the eleven-character part number as found in the following parts list.

1. Never-Seez mark owned by Never-Seez Corp.

Parts List

Key	Description	Part Number	Key	Description	Part Number
	Parts kit (included are keys 3, 4, 10, 12, 19, 21, 22 and 24)				
	Elastomer Trim				
	1/4-inch body	R98H X000012			
	1/2-inch body	R98H X000022			
	3/4 and 1-inch bodies	R98H X000032			
	Metal Trim				
	1/4-inch body	R98H X000042			
	1/2-inch body	R98H X000052			
	3/4 and 1-inch body	R98H X000062			
1	Body		4*	Valve Plug	
	Cast iron			Metal to metal seat	
	1/4-inch NPT	1L3464 19012		416 stainless steel	
	1/2-inch NPT	2L3395 19012		1/4-inch body	1L3452 46172
	3/4-inch NPT	2L3425 19012		1/2-inch body	1L3441 46172
	1-inch NPT	2L3426 19012		3/4 and 1-inch bodies	1L3437 46172
	Steel			316 stainless steel	
	1/4-inch NPT	1L3721 22012		1/4-inch body	1L3452 35072
	1/2-inch NPT	2L3687 22012		1/2-inch body	1L3441 35162
	3/4-inch NPT	2L3734 22012		3/4 and 1-inch bodies	1L3437 35162
	1-inch NPT	2L3735 22012		Elastomer Seat	
	316 stainless steel			416 stainless steel	
	1/4-inch NPT	1L3721 33092		1/4-inch body	1L3451 35132
	1/2-inch NPT	2L3687 33092		1/2-inch body	1L3443 35132
	3/4-inch NPT	2L3734 33092		3/4 and 1-inch bodies	1L3436 35132
	1-inch NPT	2L3735 33092		316 stainless steel	
2	Spring Case		5	Valve Plug Guide	
	Cast iron			416 stainless steel	
	1/4-inch body	2N9418 19012		1/4-inch body	1L3458 35132
	1/2-inch body	2N9428 19012		1/2-inch body	1L3416 35132
	3/4 and 1-inch bodies	3N9436 19012		3/4 and 1-inch bodies	1L3429 35132
	Steel			316 stainless steel	
	1/4-inch body	2P1819 22012		1/4-inch body	1L3458 35072
	1/2-inch body	2P1821 22012		1/2-inch body	1L3416 35072
	3/4 and 1-inch bodies	3P1824 22012		3/4 and 1-inch bodies	1L3429 35072
3*	Orifice		6	Pusher Post	
	Metal to metal seat			Elastomer Diaphragm	
	416 stainless steel			416 stainless steel	
	1/4-inch body	1E3916 46172		1/4-inch body	1L3456 35132
	1/2-inch body	1E3950 46172		1/2-inch body	1L3442 35132
	3/4 and 1-inch bodies	1E3980 46172		3/4 and 1-inch bodies	1L3438 35132
	316 stainless steel			316 stainless steel	
	1/4-inch body	1E3916 35072		1/4-inch body	1L3456 35072
	1/2-inch body	1E3950 35072		1/2-inch body	1L3442 35072
	3/4 and 1-inch bodies	1E3980 35072		3/4 and 1-inch bodies	1L3438 35072
	Elastomer Seat			Metal Diaphragm	
	416 stainless steel			416 stainless steel trim	
	1/4-inch body	1L3459 35132		1/4-inch body	1L3457 35132
	1/2-inch body	1L3417 35132		1/2-inch body	1L3445 35132
	3/4 and 1-inch bodies	1L3431 35132		3/4 and 1-inch bodies	1L3439 35132
	316 stainless steel			316 stainless steel trim	
	1/4-inch body	1L3459 35072		1/4-inch body	1L3457 35072
	1/2-inch body	1L3417 35072		1/2-inch body	1L3445 35072
	3/4 and 1-inch bodies	1L3431 35072		3/4 and 1-inch bodies	1L3439 35072
			7	Washer (elastomer diaphragm only)	
				416 stainless steel trim	
				1/4-inch body	1L3447 36012
				1/2-inch body	1L3398 36012
				3/4 and 1-inch bodies	1L3428 36012
				316 stainless steel trim	
				1/4-inch body	1L3447 36142
				1/2-inch body	1L3398 35072
				3/4 and 1-inch bodies	1L3428 36142

*Recommended spare part.

Type 98HH



Key	Description	Part Number	Key	Description	Part Number
8	Lower Spring Seat		18	Drive Screw, stainless steel not shown (2 req d)	1A3682 28982
	1/4-inch body, aluminum	1N9420 09012			
	1/2-inch body, steel zn pl	1N9430 24272			
	3/4 and 1-inch bodies, steel zn pl	1N9438 24272	19*	Diaphragm Gasket, elastomer Use w/302 stainless steel diaphragm	
9	Upper Spring Seat, steel			1/4-inch body	1E3931 04022
	1/4-inch body	1N9421 24092		1/2-inch body	1E3961 04022
	1/2-inch body	1N9431 24092		3/4 and 1-inch bodies	1E3993 04022
	3/4 and 1-inch bodies	1N9439 24092	21	O-Ring Retainer (elastomer seat only)	
10*	Gasket, elastomer			1/4-inch body	
	1/4-inch body	1L3448 04022		416 stainless steel	1L3460 35132
	1/2-inch body	1L3411 04022		316 stainless steel	1L3460 35072
	3/4 and 1-inch bodies	1L3434 04022		1/2-inch body	
11	Relief Valve Spring, steel zinc pl			416 stainless steel	1L3415 35232
	1/4-inch body	1N9422 27142		316 stainless steel	1L3415 35072
	1/2-inch body	1N9434 27142		3/4 and 1-inch bodies	
	3/4 and 1-inch bodies	1N9441 27182		416 stainless steel	1L3430 35132
12*	Diaphragm			316 stainless steel	1L3430 35072
	1/4-inch body		22*	O-Ring (elastomer seat only)	
	Neoprene	1L3449 02112		1/4-inch body	
	Fluoroelastomer (2 req d)	1L3449 02402		Nitrile	1C8538 06992
	302 stainless steel (2 req d)	1L3450 36012		Fluoroelastomer	1C8538 X0052
	1/2-inch body			1/2-inch body	
	Neoprene	1L3412 02112		Nitrile	1D2888 06992
	Fluoroelastomer (2 req d)	1L3412 02402		Fluoroelastomer	1N5301 06382
	302 stainless steel (2 req d)	1L3399 36012		3/4 and 1-inch bodies	
	3/4 and 1-inch bodies			Nitrile	1C7821 06992
	Neoprene	1L3433 02112		Fluoroelastomer	1N1632 06382
	Fluoroelastomer (2 req d)	1L3433 X0032			
	302 stainless steel (2 req d)	1L3432 36012	23	Lockwasher, steel	
15	Adjusting Screw, steel pl			1/4 and 1/2-inch bodies	1C2256 28982
	1/4-inch body	1E6399 28982		3/4 and 1-inch bodies	1H6243 28992
	1/2-inch body	1E2680 28982	24	Machine Screw, stainless steel (elastomer seat only)	
	3/4 and 1-inch bodies	1N9440 28982		1/4-inch body	1L3462 38992
16	Cap Screw, steel zinc pl			1/2-inch body	1L3444 38992
	1/4-inch body (6 req d)	1K7646 24052		3/4 and 1-inch bodies	1L3435 38992
	1/2-inch body (8 req d)	1P3169 24052	26	Locknut, steel zinc pl	
	3/4 and 1-inch bodies (8 req d)	1C4038 24052		1/4 and 1/2-inch bodies	1L8723 24122
17	Jam Nut, steel zinc pl			3/4 and 1-inch bodies	1L8722 24122
	1/4-inch body	1A3522 24122			
	1/2-inch body	1A3524 24122			
	3/4 and 1-inch bodies	1A3192 24122			

*Recommended spare part.

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