

English - May 2024

Introduction

This Installation Guide provides instructions for installation, startup and adjustment. To receive a copy of the instruction manual, contact your local Sales Office or view a copy at www.fisher.com. For further information refer to MR98 Series Backpressure Regulators, Relief and Differential Relief valves Instruction Manual, D103588X012.

PED/PE(S)R Category

This product may be used as a safety accessory with pressure equipment in the following categories. It may also be used outside of these Directives using Sound Engineering Practice (SEP) per table below. For information on the current PED/PE(S)R revision, see Bulletin: [D103053X012](#).

TYPE	PRODUCT SIZE	BODY MATERIAL	CATEGORY
All	1/4 NPT, DN 15 to 25 / 1/2 to 1 in.	All available materials	SEP
MR98H/MR98HD/MR98HDP	DN 40 and 50 / 1-1/2 and 2 in.	Steel and Stainless Steel	II

Specifications

Available Constructions

Type MR98L: Backpressure regulator/relief valve for spring settings range from 0.14 to 2.6 bar / 2 to 38 psig, available for 1/4 NPT to DN 25 / 1 in. body sizes only

Type MR98H: Backpressure regulator/relief valve for spring settings range from 0.34 to 13.8 bar / 5 to 200 psig

Type MR98HH: Backpressure regulator/relief valve for spring settings range from 10.3 to 25.9 bar / 150 to 375 psig

Type MR98LD: Differential pressure relief valve for differential set pressures range from 0.14 to 2.6 bar / 2 to 38 psi with maximum inlet/outlet pressure up to 10.3 bar / 150 psi, available for 1/4 NPT to DN 25 / 1 in. body sizes only

Available Constructions (continued)

Type MR98HD: Differential pressure relief valve for differential set pressures from 0.34 to 13.8 bar / 5 to 200 psi with maximum inlet/outlet pressure up to 20.7 bar / 300 psi

Type MR98HDP: Differential pressure relief valve for differential set pressures range from 0.34 to 13.8 bar / 5 to 200 psi with maximum inlet/outlet pressure up to 41.4 bar / 600 psi

Type MR98HHD: Differential pressure relief valve for differential set pressures range from 10.3 to 25.9 bar / 150 to 375 psi with maximum inlet/outlet pressure up to 27.6 bar / 400 psi

Body and Orifice Sizes

1/4 NPT body: 7.22 mm / 0.284 in. orifice

DN 15 / 1/2 in. body:
10.56 mm / 0.416 in. orifice

DN 20 and 25 / 3/4 and 1 in. bodies:
16.02 mm / 0.631 in. orifice

DN 40 and 50 / 1-1/2 and 2 in. bodies:
29 mm / 1.142 in. orifice

End Connection Styles

NPT, SWE and Welded and Integral CL150 RF, CL300 RF and PN 16/25/40 RF; all sizes are fabricated with slip-on flanges (for welded end connections) and are EN flanged 356 mm / 14 in. face-to-face

Set Pressure Ranges⁽¹⁾

See Table 1

Maximum Cold Working Pressures of Body Size and Materials⁽¹⁾

See Table 2

Maximum Inlet, Outlet and Spring Case Pressure Ratings⁽¹⁾

See Table 2

1. The pressure/temperature limits in this Installation Guide and any applicable standard or code limitation should not be exceeded.

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Specifications (continued)

Temperature Capabilities of Trim Materials and Body Materials⁽¹⁾⁽²⁾⁽⁴⁾

TRIM MATERIAL	SEAT	DIAPHRAGM	O-RING	DIAPHRAGM PROTECTOR	GASKET	INNER VALVE SPRING	CONTROL SPRING	TEMPERATURE	
								°F	°C
Nitrile (NBR)	✓		✓					-40 to 180	-40 to 82
Neoprene (CR)		✓						-40 to 180	-40 to 82
Fluorocarbon (FKM) ⁽³⁾	✓	✓	✓					0 to 300, Limited to 200°F for hot water	-18 to 149, Limited to 93°C for hot water
Ethylenepropylene (EPDM)	✓	✓	✓					20 to 275	-7 to 135
Sanitary Ethylenepropylene (EPDM) ⁽⁷⁾	✓	✓	✓					20 to 275	-7 to 135
Fluorosilicone (FVMQ)		✓						-76 to 104	-60 to 40
Perfluoroelastomer (FFKM)	✓		✓					0 to 425	-18 to 218
PTFE	✓			✓				-40 to 400	-40 to 204
Stainless Steel (400 Series)	✓	✓						-40 to 650	-40 to 343
Stainless Steel (300 Series)	✓	✓				✓	✓	-40 to 450 for Inner Valve Spring -320 to 650 for other trim parts	-40 to 232 for Inner Valve Spring -196 to 343 for other trim parts
Inconel [®] Metal	✓	✓				✓	✓	-320 to 650	-196 to 343
Composition ⁽⁶⁾					✓			-40 to 650	-40 to 343
Graphite					✓			-40 to 406	-40 to 208
								-320 to 650	-196 to 343
BODY MATERIAL								TEMPERATURE	
								°F	°C
Gray cast iron								-20 to 406	-29 to 208
WCC Steel ⁽⁴⁾								-20 to 650	-29 to 343
LCC Steel ⁽⁴⁾								-40 to 650	-40 to 343
Stainless steel ⁽⁴⁾ , Monel [®] or Hastelloy [®] C								-320 to 650	-196 to 288
Aluminum-Bronze								-40 to 500	-40 to 260

1. The pressure/temperature limits in this Installation Guide and any applicable standard limitation should not be exceeded.
2. The temperature limits given are based on the body size and body materials only. Actual temperature limits of the assembled regulator may decrease and vary depending on the body end connection, diaphragm, seat and/or trim material of the regulator.
3. Not for use on steam service.
4. Meets API 614 requirements (with Stainless steel trim).
5. Special Cryogenic constructions for process temperatures as low as -320°F / -196°C are available by request. The cryogenic temperature constructions passed laboratory testing for external leakage down to -320°F / -196°C.
6. Temperature rating can be increased up to 232°C / 450°F but may require increased gasket maintenance.
7. Sanitary EPDM elastomers meet FDA, USP Class VI, and ADI Free requirements.

Flow Coefficients

BODY SIZE		C _v	C _g	C _t
DN	In.			
----	1/4 NPT	1.4	48	34.3
15	1/2	3.4	120	35.3
20 and 25	3/4 and 1	6.5	250	38.5
40 and 50	1-1/2 and 2	20.0	780	39.0

Pressure Registration

Internal or External

Shutoff Classification Per ANSI/FCI 70-3-2004

Metal Seats: Class IV

PTFE: Class IV

Elastomer Seats: Class VI or better

IEC Sizing Coefficients

BODY SIZE		X _r	F _d	F _L	K _m
DN	In.				
----	1/4 NPT	0.743	0.74	0.95	0.90
15	1/2	0.787	0.78	0.94	0.88
20 and 25	3/4 and 1	0.935	0.70	0.91	0.83
40 and 50	1-1/2 and 2	0.961	0.69	0.94	0.88

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Hastelloy[®] C is a mark owned by Haynes International, Inc.

Table 1. MR98 Series Body Sizes and Pressure Ranges

TYPE	BODY SIZE		CONTROL PRESSURE RANGE ⁽¹⁾	
	DN	In.	bar	psig
MR98L and MR98LD	15, 20 and 25	1/4 NPT, 1/2, 3/4 and 1	0.14 to 0.48	2 to 7
			0.41 to 0.97	6 to 14
			0.83 to 1.7	12 to 25
			1.4 to 2.6	20 to 38
MR98H, MR98HD and MRR98HDP	15, 20 and 25	1/4 NPT, 1/2, 3/4 and 1	1.0 to 2.4	15 to 35
			1.7 to 5.2	25 to 75
			4.8 to 9.7	70 to 140
			9.0 to 13.8	130 to 200
	40 and 50	1-1/2 and 2	0.34 to 2.4	5 to 35
			1.4 to 4.5	20 to 65
			3.4 to 6.9	50 to 100
			5.2 to 11.7	75 to 170
MR98HH and MR98HHD	15, 20 and 25	1/4 NPT, 1/2, 3/4 and 1	10.3 to 25.9	150 to 375

1. All springs may be backed off to 0 bar / 0 psig. However, highest capacities and best performances are obtained by using these springs in their recommended ranges.

Table 2. Maximum Cold Working Pressures of Body Size and Materials⁽¹⁾⁽²⁾

REGULATOR TYPE	BODY SIZE		BODY AND SPRING CASE MATERIAL	MAXIMUM INLET PRESSURE ⁽³⁾		MAXIMUM OUTLET PRESSURE		MAXIMUM SPRING CASE PRESSURE	
	DN	In.		bar	psig	bar	psig	bar	psig
MR98L/ MR98LD	---- 15, 20, 25	1/4 1/2, 3/4, 1	Gray Cast Iron	4.1	60	4.1	60	3.4	50
			Steel ⁽⁴⁾ ; Stainless Steel ⁽⁴⁾ ; Monel ⁽⁵⁾ ; Hastelloy [®] C ⁽⁵⁾	10.3	150	10.3	150	8.6	125
MR98H/ MR98HD	---- 15, 20, 25, 40, 50	1/4, 1/2, 3/4, 1, 1-1/2, 2	Gray Cast Iron	20.7	300	20.7	300	17.2	250
			Steel ⁽⁴⁾ ; Stainless Steel ⁽⁴⁾ ; Monel ⁽⁵⁾ ; Hastelloy [®] C ⁽⁵⁾ ; Aluminum-Bronze ⁽⁵⁾	20.7	300	20.7	300	20.7	300
MR98HDP ⁽⁶⁾	---- 15, 20, 25, 40, 50	1/4, 1/2, 3/4, 1, 1-1/2, 2	Steel ⁽⁴⁾	41.4	600	41.4	600	41.4	600
			Stainless Steel ⁽⁴⁾ ; Monel ⁽⁵⁾ ; Hastelloy [®] C ⁽⁵⁾ ; Aluminum-Bronze ⁽⁵⁾	37.9	550	37.9	550	37.9	550
MR98HH/ MR98HHD ⁽⁶⁾	---- 15, 20, 25	1/4, 1/2, 3/4, 1	Steel ⁽⁴⁾ ; Stainless Steel ⁽⁴⁾ ; Monel ⁽⁵⁾ ; Hastelloy [®] C ⁽⁵⁾ ; Aluminum-Bronze ⁽⁵⁾	27.6	400	27.6	400	27.6	400

1. The pressure/temperature limits in this Installation Guide and any applicable standard limitation should not be exceeded.
2. Temperature, trim material and/or the body end connection may decrease these maximum pressures.
3. Maximum inlet pressure equals set pressure plus build-up.
4. Steel and stainless steel body and spring case constructions meet API 614 requirements with SST trim.
5. Not available for 1/4 NPT body size.
6. Maximum differential pressure between inlet pressure and loading pressure should never exceed 20.7 bar / 300 psig.

Installation



WARNING

Only qualified personnel shall install or service a relief valve or backpressure regulator. Relief valve or backpressure regulator should be installed, operated and maintained in accordance with international and applicable codes and regulations and Emerson Process Management Regulator Technologies, Inc. instructions.

If using a relief valve or backpressure regulator on a hazardous or flammable fluid service, personal injury and property damage could occur due to fire

or explosion of vented fluid that may have accumulated. To prevent such injury or damage, provide piping or tubing to vent the fluid to a safe, well-ventilated area or containment vessel. Also, when venting a hazardous fluid, the piping or tubing should be located far enough away from any buildings or windows so to not create a further hazard and the vent opening should be protected against anything that could clog it.

Personal injury, equipment damage or leakage due to escaping fluid or bursting of pressure-containing parts may result if this relief valve or backpressure regulator is overpressured

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or is installed where service conditions could exceed the limits given in the Specifications section or where conditions exceed any ratings of the adjacent piping or piping connections.

To avoid such injury or damage, provide pressure-relieving or pressure-limiting devices (as required by the appropriate code, regulation or standard) to prevent service conditions from exceeding limits.

Additionally, physical damage to the relief valve or backpressure regulator could result in personal injury and property damage due to escaping fluid. To avoid such injury and damage, install the relief valve or backpressure regulator in a safe location.

Clean out all pipelines before installation of the relief valve or backpressure regulator and check to be sure the relief valve or backpressure regulator has not been damaged or has collected foreign material during shipping. For NPT bodies, apply pipe compound to the external pipe threads. For flanged bodies, use suitable line gaskets and approved piping and bolting practices. Install the relief valve or backpressure regulator in any position desired, unless otherwise specified, but be sure flow through the body is in the direction indicated by the arrow on the body.

Note

It is important that the relief valve or backpressure regulator be installed so that the vent hole in the spring case is unobstructed at all times. For outdoor installations, the relief valve or backpressure regulator should be located away from vehicular traffic and positioned so that water, ice and other foreign materials cannot enter the spring case through the vent. Avoid placing the relief valve or backpressure regulator beneath eaves or downspouts and be sure it is above the probable snow level.

Overpressure Protection

Maximum inlet pressure depend upon body materials and temperatures. See Specifications section or the maximum inlet pressure of the valve and the maximum spring case loading pressures stamped on the nameplate of Types MR98LD, MR98HD, MR98HDP and MR98HHD. The valve should be inspected for damage after any overpressure condition. **Fisher™ relief valve or backpressure regulators are NOT ASME safety relief valves.**

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Startup

The relief valve or backpressure regulator is factory set at approximately the midpoint of the spring range or the pressure requested, so an initial adjustment may be required to give the desired results. With proper installation completed and relief valves properly adjusted, slowly open the upstream and downstream shutoff valves (if applicable).

Adjustment

To change the control pressure, remove closing cap or loosen the jam nut and turn the adjusting screw clockwise to increase control pressure or counterclockwise to decrease pressure. Monitor the control pressure with a test gauge during the adjustment. Replace closing cap or tighten the jam nut to maintain the desired setting.

Taking Out of Service (Shutdown)



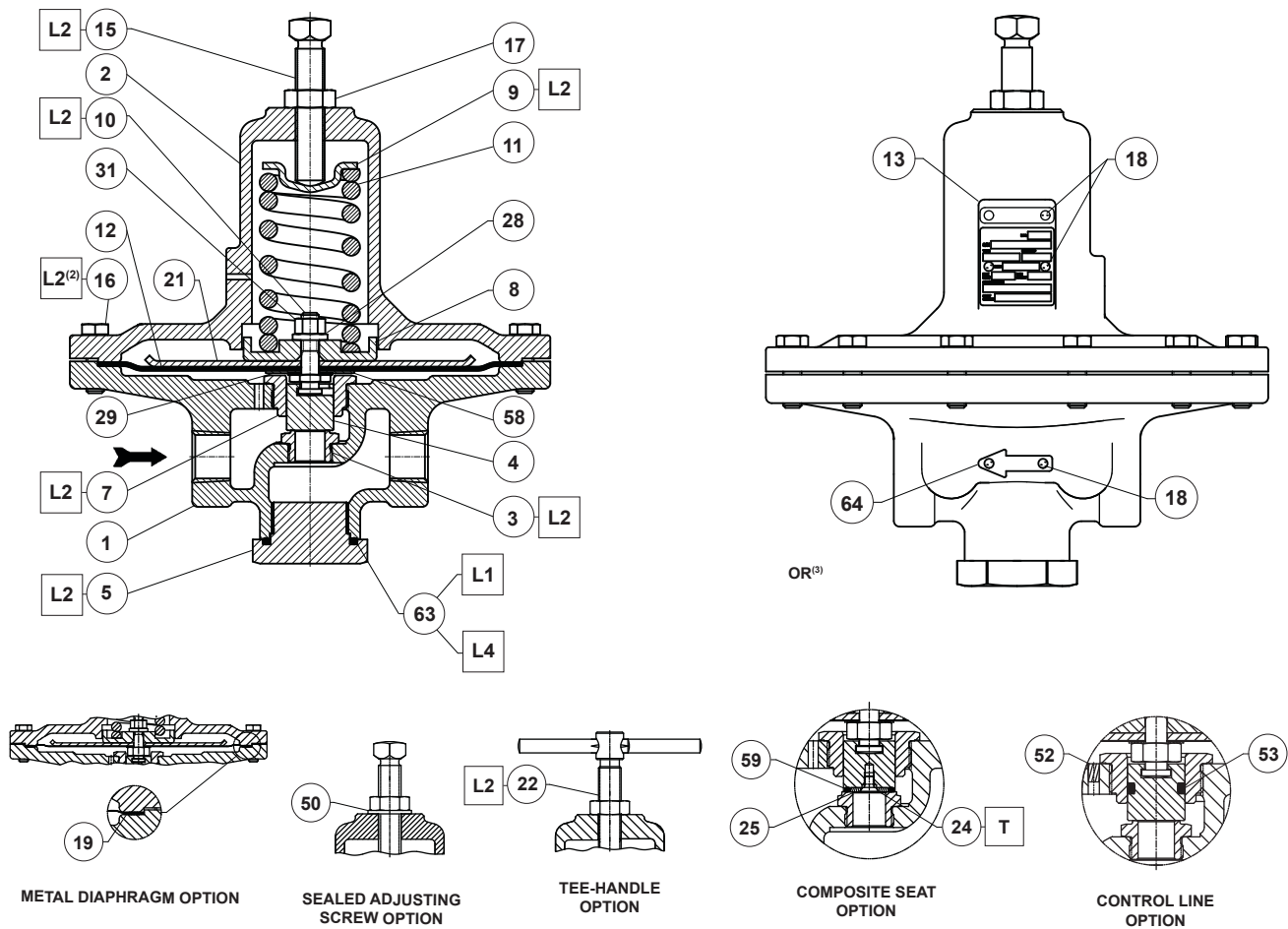
To avoid personal injury resulting from sudden release of pressure, isolate the relief valve or backpressure regulator from all pressure before attempting disassembly.

Parts List

Key Description

1	Body
2	Spring Case
3*	Orifice
4*	Valve Plug
5	Bottom Plug
7	Valve Plug Guide
8	Lower Spring Seat
9	Upper Spring Seat
10	Pusher Post
11	Control Spring
12*	Diaphragm (2 required for metal, FKM and EPDM diaphragms)
13	Nameplate
14	Diaphragm Protector (not shown)
15	Adjusting Screw
16	Cap Screws
	Types MR98L and MR98LD
	1/4 NPT; DN 15 / 1/2 in. bodies - 10 required
	DN 20 and 25 / 3/4 and 1 in. bodies - 12 required
	Types MR98H, MR98HD, MR98HH, MR98HDP and MR98HHD
	1/4 NPT body - 6 required
	DN 15 to 50 / 1/2 to 2 in. bodies - 8 required
17	Jam Nut
18	Drive Screw (4 required)
19*	Diaphragm Gasket (2 required for pressure loaded spring case)
21	Diaphragm Head
22	Adjusting Screw Assembly
23	Handwheel (not shown)
24	Machine Screw
25	O-ring Retainer
25	Seat Retainer

*Recommended Spare Part



GF04917

□ APPLY⁽¹⁾:

T = THREAD LOCKER

L1 = GENERAL PURPOSE PTFE OR LITHIUM GREASE FOR O-RINGS

L2 = ANTI-SEIZE COMPOUND

L4 = GRAPHITE SEALANT FOR GRAPHITE RING

1. Lubricants and sealants must be selected such that they meet the temperature requirements.
2. Apply L2 (anti-seize compound) on key 16 for Stainless Steel bolts.
3. Apply L4 (graphite sealant) instead of L1 (general purpose PTFE or lithium grease) on key 63 for graphite ring.

Figure 1. Type MR98L Assembly

Key Description

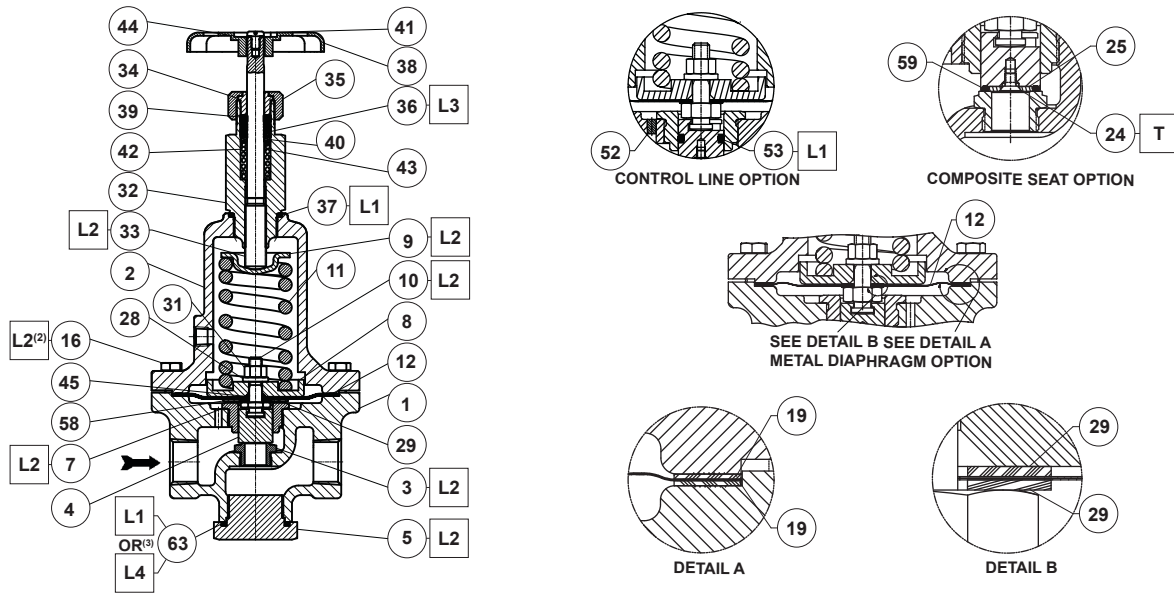
- 28 Lockwasher
- 29* Gasket
- 31 Locknut
- 32 Stuffing Box
- 33 Adjusting Screw
- 34 Packing Follower
- 35 Stuffing Box Nut
- 36 Packing V-Ring (3 required)
- 37* Stuff Box Gasket
- 38 Handwheel / Handle
- 39 Internal Adaptor
- 40 External Adaptor
- 41 Machine Screw
- 41 Jam Nut
- 42 Spring
- 43 Washer
- 44 Washer
- 45* O-ring
- 47 NACE Tag (not shown)

Key Description

- 48 Tag Wire (not shown)
- 49 Lockwasher (not shown)
- 50* Sealing Washer
- 51 Vent (not shown)
- 52 Plug
- 53* Valve Plug O-ring
- 57 Jam Nut (not shown)
- 58 Washer
- 59* O-ring
- 59* L-ring
- 62 Adaptor (not shown)
- 63* Bottom Plug Seal
- 64 Flow Arrow
- 65 Pipe Plug (not shown)
- 66 Pressure Gauge (not shown)
- 68 Restriction (not shown)
- 69 ATEX Tag (not shown)
- 70 PED Tag (not shown)

*Recommended Spare Part

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GF04920

APPLY⁽¹⁾:

- T = THREAD LOCKER
- L1 = GENERAL PURPOSE PTFE OR LITHIUM GREASE FOR O-RINGS
- L2 = ANTI-SEIZE COMPOUND
- L3 = SILICONE GREASE
- L4 = GRAPHITE SEALANT FOR GRAPHITE RING

1. Lubricants and sealants must be selected such that they meet the temperature requirements.
2. Apply L2 (anti-seize compound) on key 16 for Stainless Steel bolts.
3. Apply L4 (graphite sealant) instead of L1 (general purpose PTFE or lithium grease) on key 63 for graphite ring.

Figure 2. Type MR98HD Assembly with 1/4 NPT, DN 15 to 25 / 1/2 to 1 In. Bodies

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For further information on the current PED/PE(S)R revision see Bulletin: [D103053X012](#) or scan the QR code.

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