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MR98 Series Backpressure Regulators, Relief and Differential Relief Valves

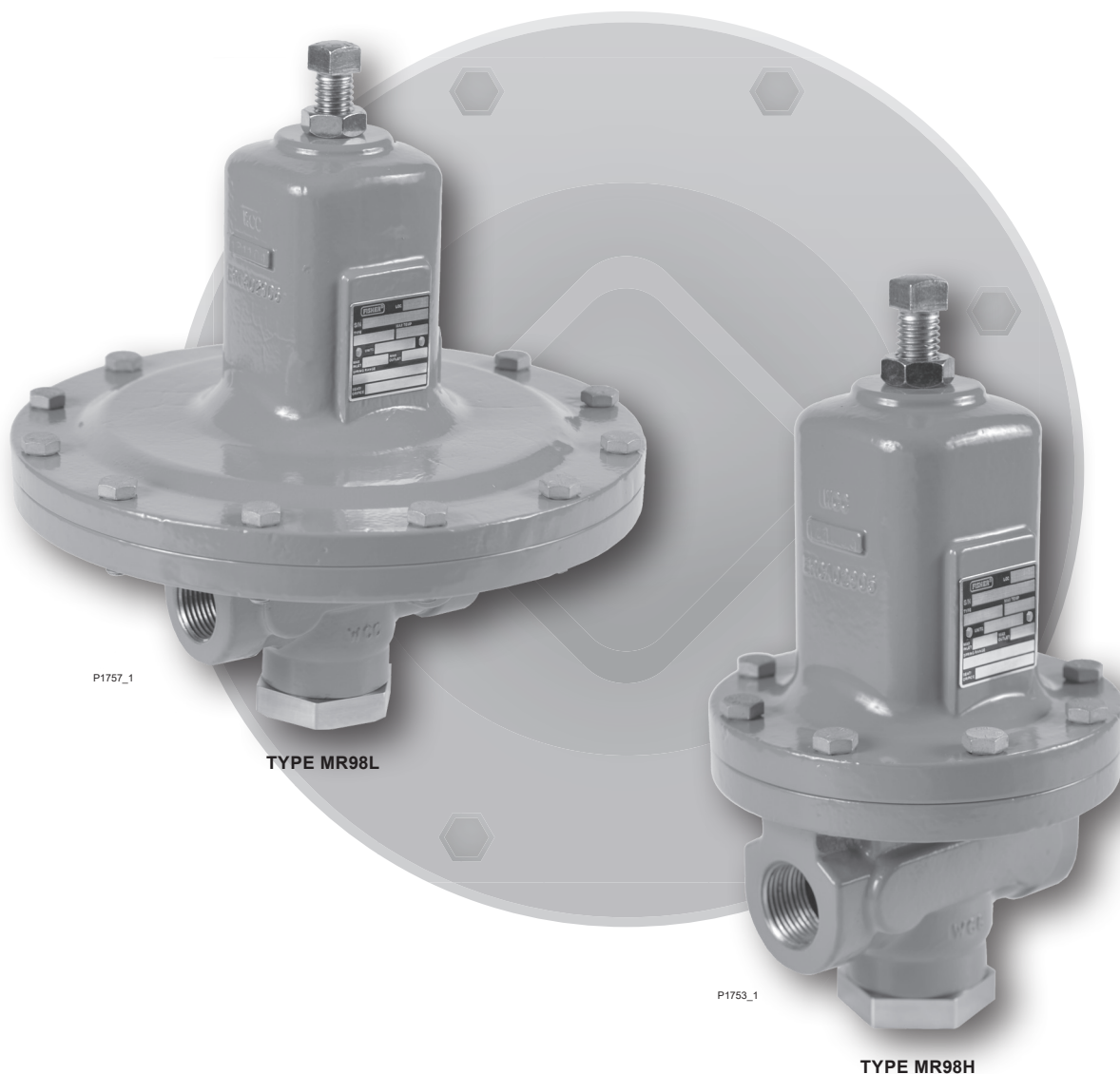


Figure 1. Typical MR98 Series Backpressure Regulators, Relief and Differential Relief Valves

MR98 Series

Specifications

This section lists the specifications for the MR98 Series regulators. Factory specification such as type, maximum inlet pressure, maximum temperature, maximum outlet pressure, spring range, orifice size and seat material are stamped on the nameplate fastened on the regulator at the factory.

Available Constructions

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

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

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

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

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

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

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

Body and Orifice Sizes

1/4 NPT: 0.284 in. / 7.22 mm

NPS 1/2 / DN 15: 0.416 in. / 10.56 mm

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

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

Body End Connections

See Tables 1 and 2

Set Pressure Ranges⁽¹⁾

See Table 3

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

See Table 4

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

See Table 4

Maximum Temperature Ranges of Diaphragm, Seat, Trim and Body Materials⁽¹⁾⁽²⁾⁽³⁾⁽⁴⁾

See Table 5

Flow Coefficients

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

IEC Sizing Coefficients

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

Pressure Registration

Internal or External

Shutoff Classification Per ANSI/FCI 70-3-2004

Metal Seats: Class IV

Polytetrafluoroethylene (PTFE): Class IV

Elastomer Seats: Class VI or better

Sour Gas Service Capability

Optional materials are available for applications handling sour gases. These constructions comply with the recommendations of NACE International Standards MR0175-2002, NACE MR0103 and/or NACE MR0175/ISO 15156.

API 614 Compliant

Steel or Stainless steel constructions with Stainless steel trim meet API 614 Requirements.

FDA, USP Class VI and ADI Free Ethylene Propylene Diene (EPDM) Elastomers

For use in applications requiring clean regulator solutions (wetted components only)

Approximate Weights

MR98H Series:

1/4 NPT: 5 lbs / 2.3 kg

NPS 1/2 / DN 15: 10 lbs / 4.5 kg

NPS 3/4 and 1 / DN 20 and 25: 22 lbs / 10 kg

NPS 1-1/2 and 2 / DN 40 and 50: 55 lbs / 25 kg

MR98L Series:

1/4 NPT: 7 lbs / 3.2 kg

NPS 1/2 / DN 15: 15 lbs / 6.8 kg

NPS 3/4 and 1 / DN 20 and 25: 35 lbs / 16 kg

1. The pressure/temperature limits in this Instruction Manual and any applicable standard limitation should not be exceeded.

2. Pressure and/or the body end connection may decrease the maximum temperatures.

3. 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.

4. The Fluorocarbon (FKM) diaphragm is designed to operate within its rated temperature range, but has the potential to soften in hotter applications. It is recommended to perform regular torque flange cap screw inspections to ensure that sufficient clamping load is maintained on the diaphragm seal. (See page 14.)

Table 1. Types MR98L and MR98LD Regulators Body Constructions

BODY SIZE	BODY CONSTRUCTION	END CONNECTION STYLE	BODY MATERIAL				
			Gray Cast Iron	WCC or LCC Steel ⁽¹⁾	CF8M Stainless steel ⁽¹⁾	CF3M Stainless steel ⁽¹⁾	Monel® or Hastelloy® C ⁽¹⁾
1/4 NPT	Without Control Line and Gauge Port	NPT					
NPS 1/2 / DN 15	Without Control Line and Gauge Port	NPT					
		SWE					
		Welded CL150 RF					
		Welded CL300 RF					
		Welded PN 16/25/40 RF					
	With Control Line but Without Gauge Port	NPT					
NPS 3/4 / DN 20	Without Control Line and Gauge Port	NPT					
		SWE					
		Welded CL150 RF					
		Welded CL300 RF					
		Welded PN 16/25/40 RF					
	With Control Line but Without Gauge Port	NPT					
	With Gauge Port but Without Control Line	NPT					
		Welded CL150 RF					
		Welded CL300 RF					
		Welded PN 16/25/40 RF					
NPS 1 / DN 25	Without Control Line and Gauge Port	NPT					
		SWE					
		Welded CL150 RF					
		Welded CL300 RF					
		Welded PN 16/25/40 RF					
	With Control Line but Without Gauge Port	NPT					
	With Gauge Port but Without Control Line	NPT					
		Welded CL150 RF					
		Welded CL300 RF					
		Welded PN 16/25/40 RF					

 - Shaded areas indicate that the construction is available.
 - Blank areas indicate that you need to contact your local Sales Office for the availability of the constructions.
 1. Meets the chemical and physical requirements of NACE MR0175-2002, NACE MR0103 and NACE MR0175/ISO 15156.

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MR98 Series

Table 2. Types MR98H, MR98HD, MR98HH, MR98HDP and MR98HHD Regulators Body Constructions

BODY SIZE	BODY CONSTRUCTION	END CONNECTION STYLE	BODY MATERIAL				
			Gray Cast Iron ⁽²⁾	WCC or LCC Steel ⁽¹⁾	CF8M Stainless steel ⁽¹⁾	CF3M Stainless steel ⁽¹⁾	Monel [®] or Hastelloy [®] C ⁽¹⁾
1/4 NPT	Without Control Line and Gauge Port	NPT					
NPS 1/2 / DN 15	Without Control Line and Gauge Port	NPT					
		SWE					
		Welded CL150 RF					
		Welded CL300 RF					
		Welded PN 16/25/40 RF					
		Integral CL150 RF					
		Integral CL300 RF					
		Integral PN 16/25/40 RF					
	With Control Line but Without Gauge Port	NPT					
		Welded CL150RF					
		Welded CL300RF					
NPS 3/4 / DN 20	Without Control Line and Gauge Port	NPT					
		SWE					
		Welded CL150 RF					
		Welded CL300 RF					
		Welded PN 16/25/40 RF					
	With Control Line but Without Gauge Port	NPT					
		Welded CL150 RF					
		Welded CL300 RF					
	With Gauge Port but Without Control Line	NPT					
		Welded CL150 RF					
		Welded CL300 RF					
		Welded PN 16/25/40 RF					
NPS 1 / DN 25	Without Control Line and Gauge Port	NPT					
		SWE					
		Welded CL150 RF					
		Welded CL300 RF					
		Welded PN 16/25/40 RF					
		Integral CL150 RF					
		Integral CL300 RF					
		Integral PN 16/25/40 RF					
	With Control Line but Without Gauge Port	NPT					
		Welded CL150 RF					
		Welded CL300 RF					
	With Gauge Port but Without Control Line	NPT					
		Welded CL150 RF					
		Welded CL300 RF					
		Welded PN 16/25/40 RF					
		Welded PN 16/25/40 RF					

■ - Shaded areas indicate that the construction is available.

□ - Blank areas indicate that you need to contact your local Sales Office for the availability of the constructions.

1. Meets the chemical and physical requirements of NACE MR0175-2002, NACE MR0103 and NACE MR0175/ISO 15156.

2. Available for Types MR98H and MR98HD only.

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Table 2. Types MR98H, MR98HD, MR98HH, MR98HDP and MR98HHD Regulators Body Constructions (continued)

BODY SIZE	BODY CONSTRUCTION	END CONNECTION STYLE	BODY MATERIAL				
			Gray Cast Iron	WCC or LCC Steel ⁽¹⁾	CF8M Stainless steel ⁽¹⁾	CF3M Stainless steel ⁽¹⁾	Monel [®] or Hastelloy [®] C ⁽¹⁾
NPS 1-1/2 / DN 40 Types MR98H and MR98HD only	Without Control Line and Gauge Port	NPT					
		SWE					
		Welded CL150 RF					
		Welded CL300 RF					
		Welded PN 16/25/40 RF					
	With Control Line but Without Gauge Port	NPT					
		Welded CL150 RF					
		Welded CL300 RF					
	With Gauge Port but Without Control Line	NPT					
		Welded CL150 RF					
		Welded CL300 RF					
		Welded PN 16/25/40 RF					
NPS 2 / DN 50 Types MR98H and MR98HD only	Without Control Line and Gauge Port	NPT					
		SWE					
		Welded CL150RF					
		Welded CL300RF					
		Welded PN 16/25/40 RF					
		Integral CL150 RF					
		Integral CL300 RF					
		Integral PN 16/25/40 RF					
	With Control Line but Without Gauge Port	NPT					
		Welded CL150 RF					
		Welded CL300 RF					
	With Gauge Port but Without Control Line	NPT					
		Welded CL150 RF					
		Welded CL300 RF					
		Welded PN 16/25/40 RF					

- Shaded areas indicate that the construction is available.
 - Blank areas indicate that you need to contact your local Sales Office for the availability of the constructions.
 1. Meets the chemical and physical requirements of NACE MR0175-2002, NACE MR0103 and NACE MR0175/ISO 15156.

MR98 Series

Table 3. MR98 Series Body Sizes, Pressure Ranges and Spring Information

TYPE	BODY SIZE		CONTROL PRESSURE RANGE ⁽¹⁾		SPRING WIRE DIAMETER		SPRING FREE LENGTH		SPRING MATERIAL ⁽²⁾	SPRING PART NUMBER	SPRING COLOR
	NPS	DN	psig	bar	In.	mm	In.	mm			
MR98L and MR98LD	1/4 NPT	----	2 to 7	0.14 to 0.48	0.148	3.76	2.00	50.8	Zinc-plated steel	1E392527022	Yellow
			6 to 14	0.41 to 0.97	0.170	4.32	2.00	50.8	Zinc-plated steel	ERAA01888A0	Green
			12 to 25	0.83 to 1.7	0.207	5.26	1.938	49.2	Powder-coated steel	ERAA01889A0	Red
			20 to 38	1.4 to 2.6	0.225	5.72	2.086	53.0	Powder-coated steel	ERAA01929A0	Blue
	1/2	15	2 to 7	0.14 to 0.48	0.207	5.26	2.50	63.5	Powder-coated steel ⁽³⁾	ERCA04288A0	Yellow
			6 to 14	0.41 to 0.97	0.234	5.94	2.595	65.9	Powder-coated steel ⁽³⁾	ERAA01910A0	Green
			12 to 25	0.83 to 1.7	0.283	7.19	2.44	62.0	Powder-coated steel ⁽³⁾	ERAA01911A0	Red
			20 to 38	1.4 to 2.6	0.331	8.41	2.250	57.2	Powder-coated steel ⁽³⁾	ERAA02889A0	Blue
	3/4 and 1	20 and 25	2 to 7	0.14 to 0.48	0.306	7.77	4.00	102	Powder-coated steel ⁽³⁾	1E398927022	Yellow
			6 to 14	0.41 to 0.97	0.343	8.71	4.00	102	Powder-coated steel ⁽³⁾	1E399027142	Green
			12 to 25	0.83 to 1.7	0.406	10.3	4.00	102	Powder-coated steel ⁽³⁾	1E399127162	Red
			20 to 38	1.4 to 2.6	0.468	11.9	3.75	95.3	Powder-coated steel	1L380127082	Blue
	3/4 and 1	20 and 25	2 to 7	0.14 to 0.48	0.306	7.77	4.00	102	Powder-coated Stainless steel	1E3989X0052	Yellow
			6 to 14	0.41 to 0.97	0.375	9.53	3.88	98.6	Stainless steel	1K762537022	Unpainted
			12 to 25	0.83 to 1.7	0.437	11.1	4.00	102	Stainless steel	11A8269X012	Unpainted
MR98H, MR98HD and MR98HDP	1/4 NPT	----	15 to 35	1.0 to 2.4	0.148	3.76	2.00	50.8	Zinc-plated steel	1E392527022	Yellow
			25 to 75	1.7 to 5.2	0.170	4.32	2.00	50.8	Zinc-plated steel	ERAA01888A0	Green
			70 to 140	4.8 to 9.7	0.207	5.26	1.938	49.2	Powder-coated steel	ERAA01889A0	Red
			130 to 200	9.0 to 13.8	0.225	5.72	2.086	53.0	Powder-coated steel	ERAA01929A0	Blue
	1/2	15	15 to 35	1.0 to 2.4	0.207	5.26	2.50	63.5	Powder-coated steel ⁽³⁾	ERCA04288A0	Yellow
			25 to 75	1.7 to 5.2	0.234	5.94	2.595	65.9	Powder-coated steel ⁽³⁾	ERAA01910A0	Green
			70 to 140	4.8 to 9.7	0.283	7.19	2.44	62.0	Powder-coated steel ⁽³⁾	ERAA01911A0	Red
			130 to 200	9.0 to 13.8	0.331	8.41	2.250	57.2	Powder-coated steel ⁽³⁾	ERAA02889A0	Blue
	3/4 and 1	20 and 25	15 to 35	1.0 to 2.4	0.306	7.77	4.00	102	Powder-coated steel ⁽³⁾	1E398927022	Yellow
			25 to 75	1.7 to 5.2	0.343	8.71	4.00	102	Powder-coated steel ⁽³⁾	1E399027142	Green
			70 to 140	4.8 to 9.7	0.406	10.3	4.00	102	Powder-coated steel ⁽³⁾	1E399127162	Red
			130 to 200	9.0 to 13.8	0.468	11.9	3.75	95.3	Powder-coated steel	1L380127082	Blue
	3/4 and 1	20 and 25	15 to 35	1.0 to 2.4	0.306	7.77	4.00	102	Powder-coated Stainless steel	1E3989X0052	Yellow
			25 to 75	1.7 to 5.2	0.375	9.53	3.88	98.6	Stainless steel	1K762537022	Unpainted
			70 to 140	4.8 to 9.7	0.437	11.1	4.00	102	Stainless steel	11A8269X012	Unpainted
	1-1/2 and 2	40 and 50	5 to 35	0.34 to 2.4	0.468	11.9	6.562	167	Powder-coated steel ⁽⁴⁾	1E792327092	Dark gray
			20 to 65	1.4 to 4.5	0.500	12.7	6.50	165	Powder-coated steel ⁽⁴⁾	ERCA04290A0	Black with light blue stripe
			50 to 100	3.4 to 6.9	0.562	14.3	6.562	167	Powder-coated steel ⁽⁵⁾	ERAA01893A0	Light gray
			75 to 170	5.2 to 11.7	0.625	15.9	6.565	167	Powder-coated steel ⁽⁵⁾	1P7888X0022	Black
MR98HH and MR98HHD	1/4 NPT	----	150 to 375	10.3 to 25.9	0.281	7.14	4.125	105	Powder-coated steel	1N942227142	Unpainted
	1/2	15	150 to 375	10.3 to 25.9	0.394	10.0	5.063	129	Powder-coated steel	1N943427142	Unpainted
	3/4 and 1	20 and 25	150 to 375	10.3 to 25.9	0.593	15.1	6.380	162	Chromium-silicon steel	1N9441X0022	Light gray

1. All springs may be backed off to 0 psig / 0 bar. However, highest capacities and best performances are obtained by using these springs in their recommended ranges.
2. Springs meet NACE MR0175-2002, NACE MR0103 and NACE MR0175/ISO 15156 requirements only for applications in which the spring is not exposed to the sour gas.
3. Available in Inconel®.
4. Spring range changes to 5 to 60 psig / 0.34 to 4.1 bar for the Inconel® option.
5. Spring range changes to 50 to 120 psig / 3.4 to 8.3 bar for the Inconel® option.

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Table 4. Maximum Cold Working Pressures of Body Size and Materials⁽¹⁾⁽²⁾

REGULATOR TYPE	BODY SIZE		BODY AND SPRING CASE MATERIALS	MAXIMUM INLET PRESSURE ⁽³⁾		MAXIMUM OUTLET PRESSURE		MAXIMUM SPRING CASE PRESSURE	
	NPS	DN		psig	bar	psig	bar	psig	bar
MR98L/LD	1/4 NPT 1/2, 3/4, 1	---- 15, 20, 25	Gray cast iron	60	4.1	60	4.1	50	3.4
			Steel	150	10.3	150	10.3	125	8.6
			Stainless steel	150	10.3	150	10.3	125	8.6
	1/2, 3/4, 1	15, 20, 25	Monel®	150	10.3	150	10.3	125	8.6
			Hastelloy® C	150	10.3	150	10.3	125	8.6
MR98H/ MR98HD	1/4 NPT 1/2, 3/4, 1, 1-1/2, 2	---- 15, 20, 25, 40, 50	Gray Cast iron	300	20.7	300	20.7	250	17.2
			Steel	300	20.7	300	20.7	300	20.7
			Stainless steel	300	20.7	300	20.7	300	20.7
	1/2, 3/4, 1, 1-1/2, 2	15, 20, 25, 40, 50	Monel®	300	20.7	300	20.7	300	20.7
			Hastelloy® C	300	20.7	300	20.7	300	20.7
			Aluminum-Bronze	300	20.7	300	20.7	300	20.7
			Steel	600	41.4	600	41.4	600	41.4
MR98HDP ⁽⁴⁾⁽⁵⁾	1/4 NPT 1/2, 3/4, 1, 1-1/2, 2	---- 15, 20, 25, 40, 50	Stainless steel	550	37.9	550	37.9	550	37.9
			Monel®	550	37.9	550	37.9	550	37.9
			Hastelloy® C	550	37.9	550	37.9	550	37.9
	1/2, 3/4, 1, 1-1/2, 2	15, 20, 25, 40, 50	Aluminum-Bronze	550	37.9	550	37.9	550	37.9
			Steel	400	27.6	400	27.6	400	27.6
MR98HH/ MR98HHD ⁽⁴⁾	1/4 NPT 1/2, 3/4, 1	---- 15, 20, 25	Stainless steel	400	27.6	400	27.6	400	27.6
			Monel®	400	27.6	400	27.6	400	27.6
			Hastelloy® C	400	27.6	400	27.6	400	27.6
	1/2, 3/4, 1	15, 20, 25	Hastelloy® C	400	27.6	400	27.6	400	27.6
			Aluminum-Bronze	400	27.6	400	27.6	400	27.6

1. The pressure/temperature limits in this Instruction Manual 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. Maximum differential pressure between inlet pressure and loading pressure should never exceed 300 psig / 20.7 bar.
5. Meets API 614 requirements (with Stainless steel trim).

Table 5. Temperature Capabilities⁽¹⁾⁽²⁾⁽⁵⁾

TRIM MATERIAL	SEAT	DIAPHRAGM	O-RING	DIAPHRAGM PROTECTOR	GASKET	CONTROL SPRING	TEMPERATURE	
							°F	°C
Nitrile (NBR)	✓		✓				-40 to 180	-40 to 82
Neoprene (CR)		✓					-40 to 180	-40 to 82
Fluorocarbon (FKM) ⁽³⁾⁽⁸⁾	✓	✓	✓				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)	✓	✓					-320 to 650	-196 to 343
Steel (Chromium plated)						✓	-40 to 450	-40 to 232
Inconel®						✓	-320 to 650	-196 to 343
Composition ⁽⁶⁾					✓		-40 to 406	-40 to 208
Graphite					✓		-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 550	-196 to 288
Aluminum-Bronze							-40 to 500	-40 to 260

1. The pressure/temperature limits in this Instruction Manual and any applicable standard limitation should not be exceeded.
2. Pressure and/or the body end connection may decrease these maximum temperatures.
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 450°F / 232°C but may require increased gasket maintenance.
7. Sanitary EPDM elastomers meet FDA, USP Class VI and ADI Free requirements.
8. The Fluorocarbon (FKM) diaphragm is designed to operate within its rated temperature range, but has the potential to soften in hotter applications. It is recommended to perform regular torque flange cap screw inspections to ensure that sufficient clamping load is maintained on the diaphragm seal. (See page 14.)

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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.

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

If a leak develops 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 shall install or service the unit.

Installation, operation and maintenance procedures performed by unqualified person may result in improper adjustment and unsafe operation. Either condition may result in equipment damage or personal injury. Call a qualified person when installing, operating and maintaining the MR98 Series backpressure regulators, relief and differential relief valves.

Introduction

Scope of the Manual

This manual provides instructions for the installation, adjustment, maintenance and parts ordering information of MR98 Series backpressure regulators, relief and differential relief valves. Instructions and parts lists for other equipment mentioned in this Instruction Manual are found in separate manuals.

Product Description

The MR98 Series backpressure regulator, relief and differential relief valves are suitable for multiple fluid mediums including liquid, gas, air and steam services.

Typical applications include use in but not limited to wash tanks, small heaters, fuel and oil lines, air supply system, test fixtures and sterilizers.

Backpressure Regulator / Pressure Relief Valve—

Types MR98L, MR98H and MR98HH regulators are direct-operated backpressure regulator/relief valve for pressure control requiring constant outlet pressures between 2 to 375 psig / 0.14 to 25.9 bar.

Differential Pressure Relief Valve—Types MR98LD, MR98HD, MR98HDP and MR98HHD regulators are direct-operated differential relief valve with differential pressure range from 2 to 600 psig / 3.4 to 41.4 bar.

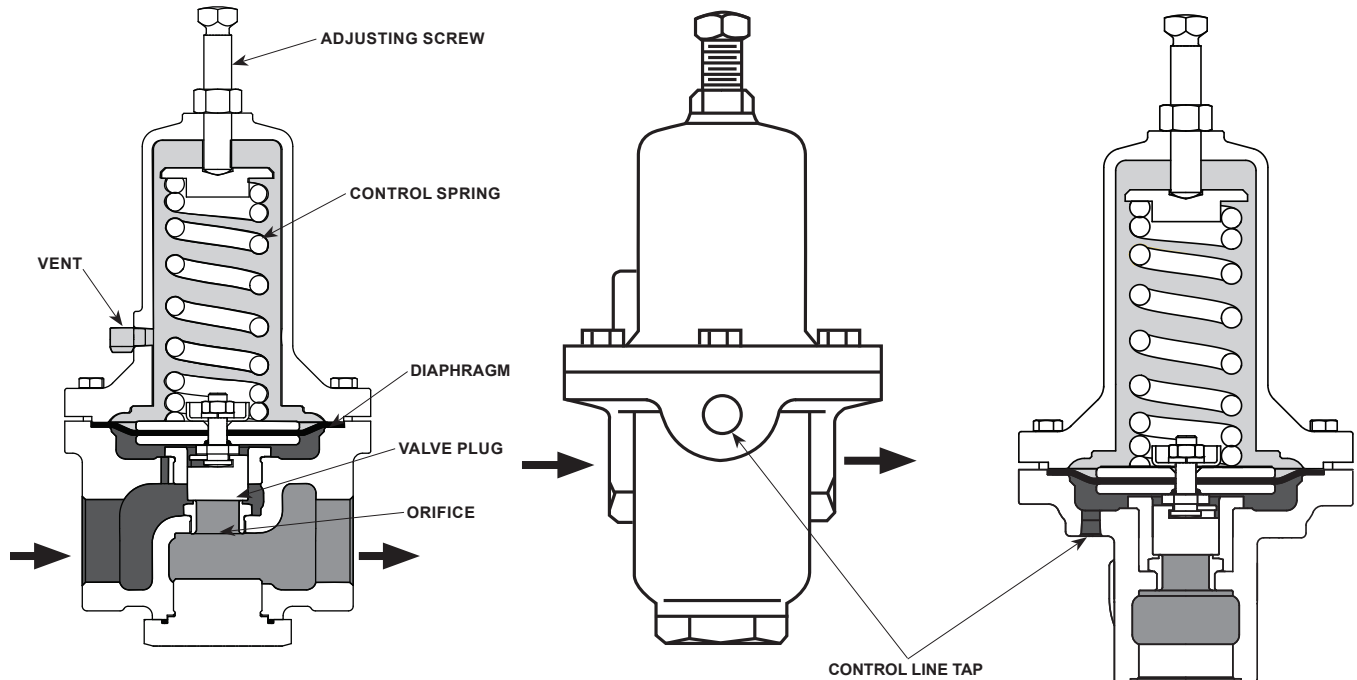
See Tables 1 through 5 for detailed breakdown of the various construction offerings.

Principle of Operation

Relief or backpressure valves respond to changes in upstream pressure. Pressure changes register under the diaphragm (see Figure 2) through a registration hole in the valve body or through an external control line. When the pressure increases above the spring setting, the pressure underneath the diaphragm overcomes the spring compression. This causes the valve plug to move away from the orifice. The flow path through the valve is open and excess pressure is vented. When upstream pressure drops below setpoint, the valve closes.

Differential relief valves are used to maintain a differential pressure between the controlled pressure and loading pressure of a system. The spring setting determines the differential.

The differential relief valve responds to both controlled pressure and loading pressure and opens or closes as these pressures change. If the loading pressure increases, pressure on the upper side of the diaphragm increases. The valve plug moves closer to the orifice and restricts the flow through the relief valve. When loading pressure decreases, pressure on the upper side of the diaphragm decreases. This allows the valve plug to move away from the orifice and allow more flow through the differential relief valve (to atmosphere or back into the system). The differential relief valve opens and closes in response to changes in the controlled pressure. In this way, the differential pressure between the controlled and uncontrolled pressures is maintained.



M1240_12/2019

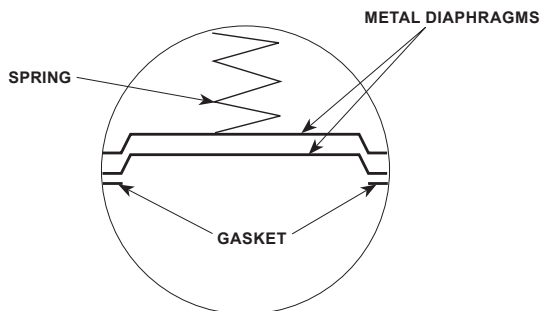
**TYPE MR98H WITH INTERNAL
PRESSURE REGISTRATION**

**NPS 1/2 / DN 15 TYPE MR98H
WITH EXTERNAL
PRESSURE REGISTRATION**

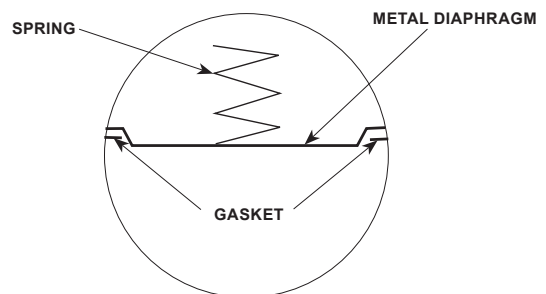
M1239_12/2019

**SIDE AND INTERNAL VIEW OF
NPS 3/4 TO 2 / DN 20 TO 50
TYPE MR98H WITH EXTERNAL
PRESSURE REGISTRATION
(ALSO TYPICAL OF TYPE MR98L,
NPS 1/2 TO 2 / DN 15 TO 50 BODIES)**

■ INLET PRESSURE
 ■ OUTLET PRESSURE
 ■ ATMOSPHERIC PRESSURE



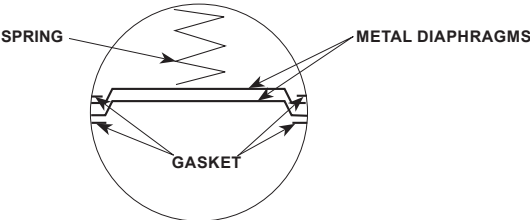
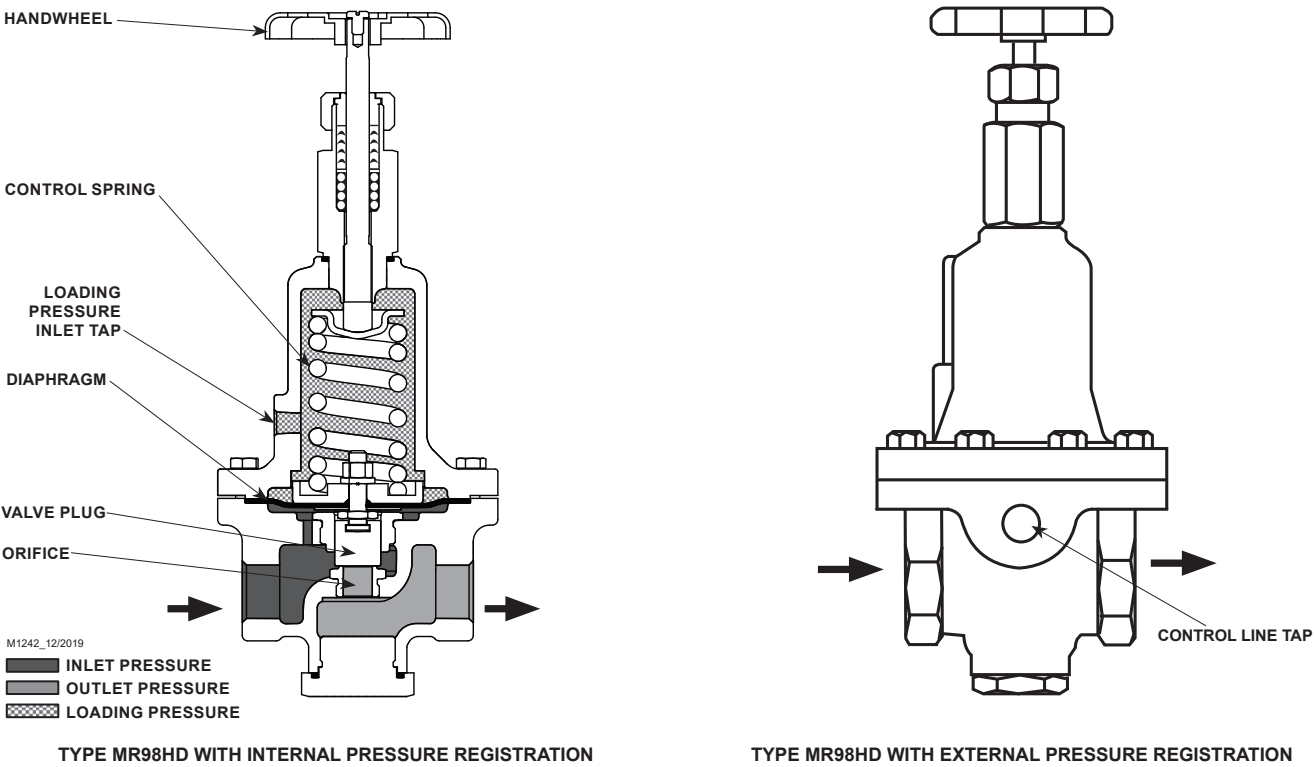
**FOR TYPE MR98H WITH TWO METAL DIAPHRAGMS
(ALSO TYPICAL OF TYPES MR98L AND MR98HH EXCEPT FOR
TYPE MR98L, 1/4 NPT BODY, 2 TO 7 psi / 0.1 TO 0.48 bar RANGE)**



**TYPE MR98L (1/4 NPT BODY, 2 TO 7 psi / 0.14 TO 0.48 bar RANGE)
WITH ONE METAL DIAPHRAGM**

Figure 2. MR98 Series Operational Schematics

MR98 Series



FOR TYPES MR98HD, MR98LD, MR98HDP AND MR98HHD WITH TWO METAL DIAPHRAGMS, ASSEMBLE DIAPHRAGM GASKETS UNDER AND ABOVE THE METAL DIAPHRAGMS AS SHOWN ABOVE

Figure 2. MR98 Series Operational Schematics (continued)

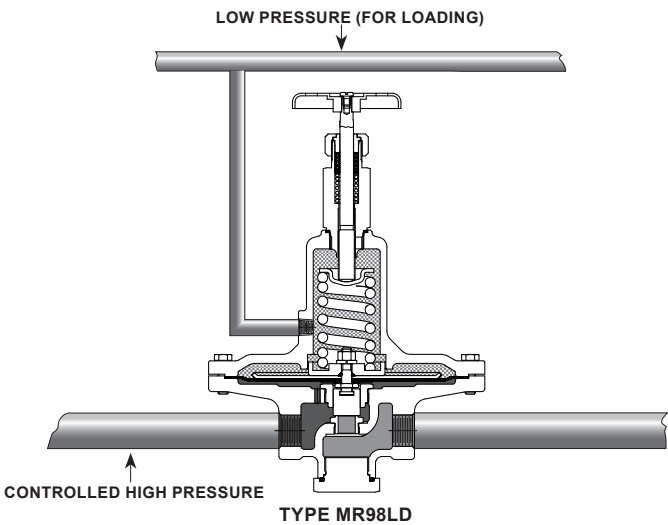


Figure 3. Installation Schematics for Types MR98LD and MR98HD Relief Valves

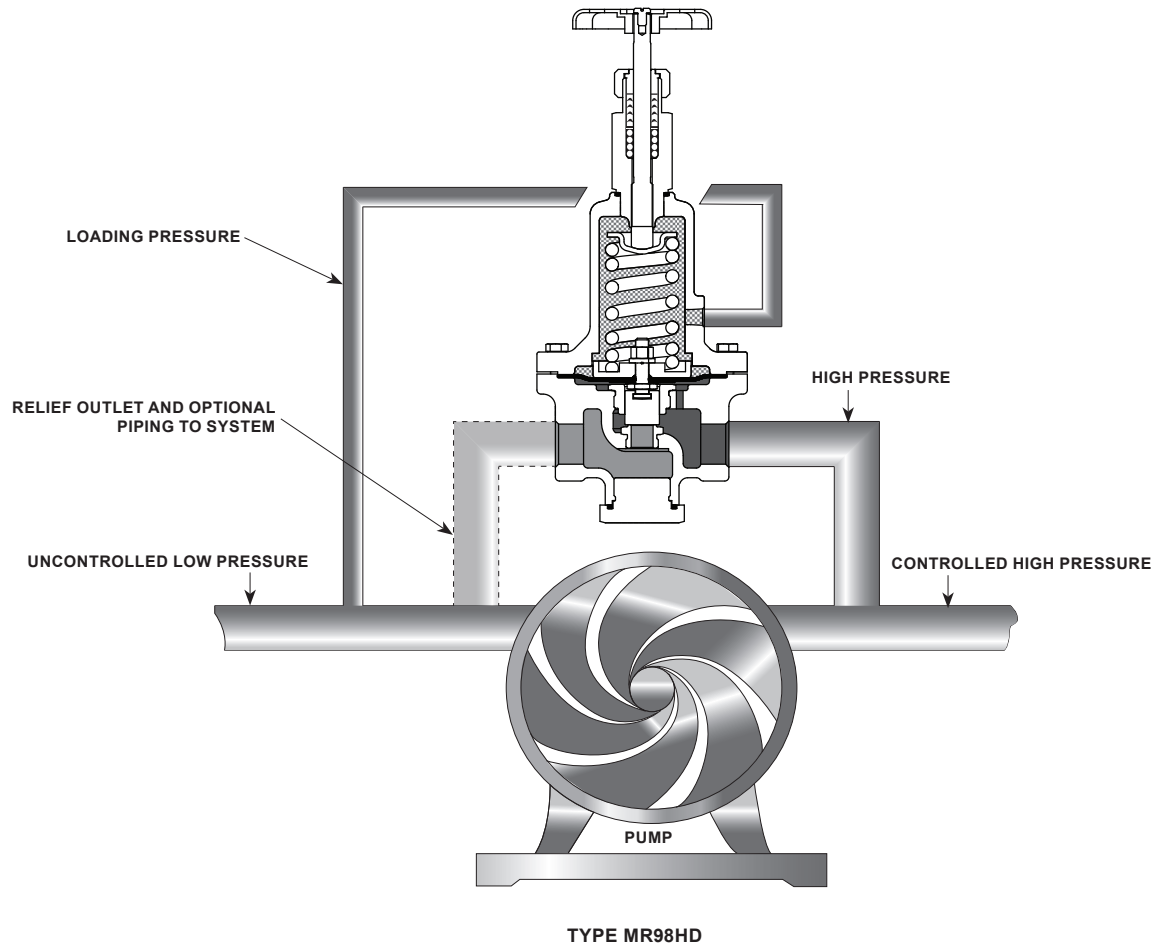


Figure 3. Installation Schematics for Types MR98LD and MR98HD Relief Valves (continued)

Installation



WARNING

Personal injury or system damage may result if this backpressure regulator, relief or differential relief valve is installed where service conditions could exceed the limits given on the Specifications section and/or regulator nameplate.

Additionally, physical damage to the backpressure regulator or relief valve may result in personal injury or property

damage due to escaping of accumulated gas. To avoid such injury and damage, install the backpressure regulator or relief valve in a safe location.

Under enclosed conditions or indoors, escaping gas may accumulate and be an explosion hazard. In this case, the vent should be piped outdoors.

For regulator constructions with a spring case vent, the vent should be kept open to permit free flow of gas to the atmosphere. Protect openings against entrance of rain, snow, insects or any other foreign material that may plug the spring case vent or vent line.

MR98 Series

Before installing the regulator:

- Unpack the backpressure regulator or relief valve and remove the protective shipping plugs from the end connections of the body and the pressure connection in the spring case.
- Check the backpressure regulator or relief valve and make sure it has not been damaged or collected foreign material during shipping.
- Remove any debris or dirt in the tubing and the pipeline.
- Apply pipe compound to the external pipe thread for NPT bodies or use appropriate gaskets for flanged bodies.
- Make sure gas flow through the backpressure regulator or relief valve is in the same direction as the arrow on the body.
- For a differential relief valve, the design of the valve isolates the diaphragm and pressure loading spring case from the main flow stream. The higher pressure is measured inside the body through a registration hole on the inlet side of the body or through the external control line. If loading pressure is required, connect the loading pressure line to the 1/4 NPT connection in the spring case. If loading pressure is not required, vent this connection to the atmosphere.

Overpressure Protection



WARNING

Overpressuring any portion of this equipment may result in equipment damage, leaks in the relief valve/backpressure regulator or personal injury due to bursting of pressure-containing parts.

Relief, differential relief or backpressure ranges are from 2 to 375 psig / 0.14 to 25.9 bar. The individual spring range of your valve is stamped on the nameplate.

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.

Vents and Relief Valve Outlet



WARNING

If using an MR98 Series backpressure regulator, relief or differential relief valve on hazardous or flammable gas service, personal injury and property damage could occur due to fire or explosion of vented gas that may have accumulated.

To prevent such injury or damage, provide piping or tubing to vent the gas to a safe, well-ventilated area. All vents should be kept open to permit free flow of gas to the atmosphere. Protect openings against entrance of rain, snow, insects or any other foreign material that may plug the vent or vent line.

If remote venting is necessary, an optional tapped vent in the spring case is available. Install remote vent lines in the spring case and outlet openings. The vent lines must have the largest practical diameter and be as short as possible with a minimum number of bends or elbows. Install the vent line according to applicable federal, state and local codes and regulations.

Startup

Note

The Specifications section and Tables 4 shows the maximum inlet and the differential pressures for specific constructions. Use pressure gauges to monitor inlet pressure, outlet pressure and any loading pressure during startup.

Special care should be taken during startup when using a differential relief valve to ensure the differential pressure between the inlet and spring case of the regulator does not exceed the maximum allowable value.

Key numbers are shown in Figures 4 through 10.

1. Check that proper installation is completed and downstream equipment has been properly adjusted.
2. Make sure all block and vent valves are closed.
3. Decompress the control spring by turning the adjusting screw (for Types MR98L, MR98H and MR98HH) or handwheel (for Types MR98LD, MR98HD, MR98HDP and MR98HHD) counterclockwise.
4. Slowly open the valves in the following order:
 - a. Loading supply and control line valve(s), if used
 - b. Inlet block valve
 - c. Outlet block valve
5. Set the regulator to the desired set pressure according to the Adjustment procedure.

Adjustment

Each unit is factory set for the pressure setting specified on the order or at the mid-point of the spring range. The allowable spring range is stamped on the nameplate. If a pressure setting beyond the indicated range is required, replace with the appropriate spring. Be sure to label the regulator/valve to indicate the new pressure range.

Always use a pressure gauge to monitor pressure when making adjustments.

All MR98 Series regulator springs can be backed off to zero pressure. Recommended set pressure ranges available, maximum inlet pressures and temperatures and color codes of the respective springs are shown in the Specifications section and Table 3.

Types MR98L, MR98H and MR98HH

1. Loosen the jam nut (key 17, Figures 4, 6, 7 and 10).
2. To increase the set pressure or pressure setting, turn the adjusting screw (key 15) clockwise. Turn the adjusting screw counterclockwise to decrease the set pressure or pressure setting.
3. Tighten the jam nut (key 17).

Types MR98LD, MR98HD, MR98HDP and MR98HHD

Turn the handwheel (key 38, Figures 5, 8 and 9) clockwise to increase differential pressure setting. Turn the handwheel counterclockwise to decrease the differential pressure setting.

Shutdown

Relief Valve

1. Close the upstream shutoff valve to the regulator inlet.
2. Close the downstream shutoff valve to the regulator outlet.
3. Slowly open the downstream vent valve to vent downstream pressure.
4. Leave the downstream vent valve open to vent inlet pressure and to release all remaining pressure in the regulator by opening the upstream vent valve or by turning the adjusting screw fully counterclockwise.

Differential Valve (Pressure-Loaded System)

1. Close the upstream shutoff valve to the regulator inlet.
2. Close the downstream shutoff valve to the regulator outlet.



WARNING

To avoid damage of internal parts from a pressure-loaded actuator, carefully vent the regulator spring case pressure while monitoring both inlet and loading pressure to ensure the differential pressure between inlet and loading does not exceed 300 psid / 20.1 bar d.

3. Vent the loading pressure slowly to release pressure in the spring case.
4. Slowly open the downstream vent valve to vent downstream pressure.
5. Leave the downstream vent valve open to vent inlet pressure and to release all remaining pressure in the regulator by opening the upstream vent valve or by turning the adjusting screw fully counterclockwise.

Table 6. Torque Specifications

BODY SIZE		SPRING CASE BOLTS ⁽¹⁾		ORIFICE		VALVE PLUG GUIDE		BOTTOM PLUG	
NPS	DN	Ft-lbs	N•m	Ft-lbs	N•m	Ft-lbs	N•m	Ft-lbs	N•m
1/4 NPT	----	6 to 8	8 to 11	6 to 8	8 to 11	40 to 50	53 to 68	50 to 58	68 to 79
1/2	15	10 to 13	13 to 18	34 to 38	46 to 51	70 to 90	94 to 122	75 to 90	102 to 122
3/4 and 1	20 and 25	24 to 30	33 to 41	50 to 60	68 to 81	85 to 100	115 to 136	100 to 125	136 to 169
1-1/2 and 2	40 and 50	40 to 50	54 to 68	180 to 200	244 to 271	125 to 150	169 to 203	170 to 200	230 to 271

1. Reduce spring case bolt's torque by 30% when using EPDM diaphragms.
 Note: Pusher post lock nut (key 31) should be installed with an additional 1/8 to 1/4 turn when washer is flat. See step 10 in the "Disassembly to Replace Diaphragm and Seats" section or detailed instruction.

Backpressure Regulator

1. Close the upstream shutoff valve to the regulator inlet.
2. Close the downstream shutoff valve to the regulator outlet.
3. To avoid internal damage due to reverse pressurization of main valve components, bleed backpressure regulator inlet pressure first before bleeding outlet pressure.

Maintenance



WARNING

To avoid personal injury, property damage or equipment damage caused by sudden release of pressure or explosion of accumulated gas, do not attempt any maintenance or disassembly without first isolating the relief valve or regulator from system pressure and relieving all internal pressure from the relief valve or regulator.

To avoid possible personal injury from spring or pressure-loaded actuator, make sure that the adjusting screw is completely backed off or the spring case pressure is vented prior to disassembly. Otherwise, the spring load or loading pressure could forcefully eject the spring case.

Relief valves or regulators that have been disassembled for repair must be tested for proper operation before being returned to service. Only parts manufactured by Emerson should be used for repairing Fisher™ relief valves and regulators.

Due to normal wear or damage that may occur from external sources, this relief valve or backpressure regulator should be inspected and maintained periodically. The frequency of inspection and replacement of parts depends upon the severity of service conditions or the requirement of local, state and federal rules and regulations.

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 MR98 Series. 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 recommended lubricants as the relief valve is being reassembled. Refer to Figures 4 to 10 while servicing the relief valve.

Flange Cap Screw Torque Inspection

Retorquing of spring case cap screws may be necessary for some MR98 Series regulators after a period of use. Retorque the cap screws as follows:

1. Shut down the relief valve or backpressure regulator. Refer to Shutdown section for the proper procedure.
2. Retighten the cap screws (key 16) in a crisscross pattern. See Table 6 for proper torque values.
3. Follow the Startup section to repressurize the relief valve or backpressure regulator.
4. Refer to the Disassembly to Replace Diaphragm and Seats section as needed.

Table 7. Number of Diaphragms Required

BODY SIZE	TYPE	SPRING RANGE	DIAPHRAGM MATERIAL	NUMBER OF DIAPHRAGM
1/4 NPT	MR98L and MR98LD	All	Neoprene (CR)	1
			Fluorocarbon (FKM)	2
		2 to 7 psi / 0.1 to 0.5 bar	EPDM	1
		All except 2 to 7 psi / 0.1 to 0.5 bar	Metal	1
	MR98H, MR98HH, MR98HD, MR98HDP and MR98HHD	All	Metal	2
			Neoprene (CR)	1
			Fluorocarbon (FKM)	2
			EPDM	1
NPS 1/2 to 2 / DN 15 to 50	All	All	Metal	2
			Neoprene (CR)	1
			Fluorocarbon (FKM)	2
			EPDM	1
			Metal	2

Disassembly to Replace Diaphragm and Seats



CAUTION

Metal diaphragms have thin sharp edges. To avoid hand cuts, be careful when handling the diaphragm, particularly the diaphragm edge.

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

1. Shut down the backpressure regulator or relief valve. Refer to Shutdown section for the proper procedure.
2. **For Types MR98LD, MR98HD, MR98HDP and MR98HHD:** Release all spring compression by turning the adjusting screw or handwheel (key 33 or 38) counterclockwise until it turns freely without resistance from the spring.
For Types MR98L, MR98H and MR98HH: Relieve the spring tension by loosening the jam nut (key 17) and turning the adjusting screw (key 15) counterclockwise.
3. Remove cap screws (key 16) and lift off the spring case (key 2), upper spring seat (key 9) and relief valve spring (key 11). Lift out the diaphragm unit which includes the lock nut (key 31), lock washer (key 28), pusher post (key 10), gasket (key 29), lower spring seat (key 8), diaphragm (key 12), diaphragm head (key 21 for Types MR98L and MR98LD, all body sizes and for Types MR98H, MR98HD and MR98HDP, NPS 1-1/2 and 2 / DN 40 and 50 body sizes), valve plug (key 4) and Type MR98HD has another washer (key 58) and an O-ring (key 45).
4. Check the orifice (key 3) for wear or damage. If it needs to be replaced, unscrew the valve plug guide (key 7) and then the orifice. The valve plug (key 4) can be removed by sliding it off of the pusher post (key 10).
5. Place a small amount of sealant on the threads of the orifice (key 3) and valve plug guide (key 7) and reinstall these to the body (key 1). See Table 6 for torque specifications.
6. To replace the valve plug O-ring (key 53), remove the machine screw (key 24) and O-ring retainer (key 25) from the plug. Remove and replace the O-ring.
7. Separate the remainder of the diaphragm unit parts. Take the lock nut (key 31) off of the pusher post (key 10). Slide off the lock washer (key 28), lower spring seat (key 8), diaphragm head (key 21) for Types MR98L and MR98LD, all body sizes and for Types MR98H and MR98HD, NPS 1-1/2 and 2 / DN 40 and 50 body sizes), diaphragm (key 12), washer (key 58) and gasket (key 29).
8. Slip the valve plug (key 4) onto the pusher post (key 10). Place a gasket (key 29) on the shaft of the pusher post over the threaded portion until it rests on the base of the post. If elastomer diaphragm (key 12) is used, place a metal washer (key 58) on top of the gasket. For Type MR98H, NPS 1-1/2 to 2 / DN 40 to 50 with metal diaphragm, place another gasket on the shaft of the pusher post until it rests on the bottom diaphragm head (key 21), see Figure 7.

Note

If a metal diaphragm is to be replaced by an elastomer diaphragm or an elastomer diaphragm by a metal diaphragm, a new pusher post is required. Each diaphragm material requires a different pusher post length and make sure the proper number of metal or elastomer diaphragm that will be used is followed. Refer to the Parts List section or Table 7 for the correct number of diaphragm to be used.

9. See Figures 4 to 10. For the metal diaphragms (key 12), replace the large diaphragm gasket (key 19) on the surface of the body (key 1) that will support the diaphragms. There will be two diaphragms used per regulator, except for 1/4 NPT Types MR98L and MR98LD with 2 to 7 psi / 0.1 to 0.5 bar spring range, which use only one metal diaphragm. The raised surfaces of the metal diaphragms should be placed in the unit so that they are facing toward the assembler (toward the spring) except only when one diaphragm is being used then the raised surface should be facing down (towards the body) (see Figure 2). For elastomer diaphragms, the printed side should be facing upwards when installed.
10. Slip the lower spring seat (key 8) and lock washer (key 28) back onto the pusher post (key 10). Lubricate the threads of the pusher post and tighten the pusher post lock nut (key 31) until the lock washer is flat and then turn the nut an additional 1/8 to 1/4 turn. Return the diaphragm (key 12), spring seat and pusher post assembly to the body (key 1).
11. Set the relief valve spring (key 11) in the lower spring seat and place the upper spring seat (key 9) on the spring.
12. Put the spring case (key 2) over the spring (key 11) and onto the body (key 1). Tighten the cap screws (key 16) finger tight only.
13. To ensure proper slack in the diaphragm (key 12), apply some spring compression by turning the adjusting screw (key 15) or handwheel (key 38) clockwise. Finish tightening the cap screws. See Table 6 for recommended torque values.

Replacement or Maintenance of Bottom Plug O-ring

If there is any external leakage from the bottom plug, the bottom plug O-ring could be worn out or damaged. Proceed as follows to check and/or replace it.

1. Shut down the regulator. Refer to Shutdown section for the proper procedure.
2. Unscrew the bottom plug (key 5) from the body (key 1). Inspect the bottom plug seal (key 63) for damage. Replace the bottom plug seal if damage is noted. Lightly lubricate the bottom plug O-ring or graphite ring before installing it onto the bottom plug.
3. Reassemble the regulator in the reverse order of the above steps. When installing the bottom plug (key 5), coat the threads and sealing surface with anti-seize compound to ensure an adequate metal-to-metal seal. Reference Table 6 for proper torque values.

Disassembly to Replace Packing (For Types MR98LD, MR98HD, MR98HDP and MR98HHD)

Leakage around the adjusting screw may be caused by worn packing in the stuffing box. To check the packing, perform the following procedures.

1. Before returning the upper spring case (key 2) to the body (key 1), replace the packing (key 36) in the packing/stuffing box (key 32).
2. Take out the machine screw (key 41) and lift off the washer (key 44) and handwheel (key 38).
3. Unscrew the packing/stuffing box (key 32). Unscrew the packing/stuffing box nut (key 35) and take it and the packing follower (key 34) off of the adjusting screw (key 33).
4. Unscrew and pull the adjusting screw (key 33) out through the bottom of the packing/stuffing box (key 32).
5. Pull out the packing (key 36) and replace it. Replace the packing/stuffing box gasket (key 37).

6. Reassemble the packing/stuffing box (key 32) unit by returning the adjusting screw (key 33) to the inside of the stuffing box. Slip the packing follower (key 34) onto the adjusting screw and into the stuffing box. Screw on the packing nut (key 35). See Table 6 for torque specifications.
7. Put the packing/stuffing box (key 32) onto the spring case (key 2). Set the handwheel (key 38) and washer (key 44) on the adjusting screw (key 33) and screw in the machine screw (key 41).
8. Set the spring (key 11) and upper spring seat (key 9) over the lower spring seat (key 8). Place the spring case (key 2) on the body (key 1), tightening the cap screws (key 16) finger-tight only.
9. To ensure proper slack in the diaphragm (key 12), apply some spring compression by turning the adjusting screw (key 15) or handwheel (key 38) clockwise. Tighten the cap screws (key 16).

Parts Ordering

When corresponding with your local Sales Office about this equipment, always reference the equipment serial number stamped on the nameplate.

When ordering replacement parts, specify the complete 11-character part number of each required part as found in the following parts list. Separate kits containing all recommended spare parts are available.

Note

In this parts list, parts marked NACE are intended for corrosion-resistant service as detailed in the NACE International Standard MR0175, NACE MR0103 and/or NACE MR0175/ISO 15156.

Parts List

Key	Description	Part Number
	Parts Kit (included are keys 3, 4, 12, 29, 59 and 63) Types MR98H, MR98HD, MR98HH and MR98HDP	
	With Stainless steel diaphragm and trim	
	1/4 NPT Body Size	RMR98HX0042
	NPS 1/2 / DN 15 Body Size	RMR98HX0052
	NPS 3/4 and 1 / DN 20 and 25 Body Sizes	RMR98HX0062
	NPS 1-1/2 and 2 / DN 40 and 50 Body Sizes	RMR98HX0082
	With Neoprene (CR) diaphragm and	
	Nitrile (NBR)/416 Stainless steel trim	
	1/4 NPT Body Size	RMR98HX0012
	NPS 1/2 / DN 15 Body Size	RMR98HX0022
	NPS 3/4 and 1 / DN 20 and 25 Body Sizes	RMR98HX0032
	NPS 1-1/2 and 2 / DN 40 and 50 Body Sizes	RMR98HX0072
	Types MR98L and MR98LD	
	With Stainless steel diaphragm and plug	
	1/4 NPT Body Size	RMR98LX0042
	NPS 1/2 / DN 15 Body Size	RMR98LX0052
	NPS 3/4 and 1 / DN 20 and 25 Body Sizes	RMR98LX0062
	With Neoprene (CR) and	
	Nitrile (NBR)/Brass Disk	
	1/4 NPT Body Size	RMR98LX0012
	NPS 1/2 / DN 15 Body Size	RMR98LX0022
	NPS 3/4 and 1 / DN 20 and 25 Body Sizes	RMR98LX0032
1	Body	See Following Tables
2	Spring Case	See Following Tables
3*	Orifice	
	Metal-to-metal seat	
	1/4 NPT Body Size	
	416 Stainless steel	GF04856X022
	316 Stainless steel, NACE	GF04856X032
	Hastelloy® C, NACE	GF04856X052
	Monel®, NACE	GF04856X042
	NPS 1/2 / DN 15 Body Size	
	416 Stainless steel	GF04841X022
	316 Stainless steel, NACE	GF04841X032
	Alloy 6, NACE	GF04841X062
	Hastelloy® C, NACE	GF04841X052
	Monel®, NACE	GF04841X042
	NPS 3/4 and 1 / DN 20 and 25 Body Sizes	
	416 Stainless steel	GF04821X022
	316 Stainless steel, NACE	GF04821X032
	Alloy 6, NACE	GF04821X062
	Hastelloy® C, NACE	GF04821X052
	Monel®, NACE	GF04821X042

*Recommended Spare Part
Monel® is a mark owned by Special Metals Corporation.
Hastelloy® C is a mark owned by Haynes International, Inc.

MR98 Series

Key	Description	Part Number	Key	Description	Part Number
3*	Orifice (continued) Metal-to-metal seat (continued) NPS 1-1/2 and 2 / DN 40 and 50 Body Sizes 416 Stainless steel 316 Stainless steel, NACE Alloy 6, NACE Hastelloy® C, NACE Monel®, NACE 1/4 NPT Body Size 416 Stainless steel 316 Stainless steel, NACE, Oxygen Service NPS 1/2 / DN 15 Body Size 416 Stainless steel 316 Stainless steel, NACE, Oxygen Service Hastelloy® C, NACE NPS 3/4 and 1 / DN 20 and 25 Body Sizes 416 Stainless steel 316 Stainless steel, NACE, Oxygen Service Hastelloy® C, NACE NPS 1-1/2 and 2 / DN 40 and 50 Body Sizes 416 Stainless steel 316 Stainless steel, NACE, Oxygen Service Hastelloy® C, NACE	GF04896X022 GF04896X032 GF04896X062 GF04896X052 GF04896X042 GF05036X022 GF05036X032 GF05552X022 GF05552X032 GF05552X052 GF04824X022 GF04824X032 GF04824X052 GF05513X022 GF05513X032 GF05513X052	8	Lower Spring Seat, NACE Types MR98L, MR98H, MR98LD, MR98HD and MR98HDP 1/4 NPT Body Size Aluminum ⁽¹⁾ Stainless steel NPS 1/2 / DN 15 Body Size Aluminum ⁽¹⁾ Stainless steel NPS 3/4 and 1 / DN 20 and 25 Body Sizes Aluminum ⁽¹⁾ Stainless steel NPS 1-1/2 and 2 / DN 40 and 50 Body Sizes Steel ⁽¹⁾ Stainless steel Types MR98HH, MR98HDP and MR98HHD 1/4 NPT Body Size Aluminum ⁽¹⁾ Stainless steel NPS 1/2 / DN 15 Body Size Aluminum ⁽¹⁾ Stainless steel NPS 3/4 and 1 / DN 20 and 25 Body Sizes Steel ⁽¹⁾ Stainless steel	1L344609012 1L3446X0012 1L339708012 1L3397X0012 1L342708012 1L3427X0012 1P787724152 1P7877X0012 1N942009012 1N9420X0012 1N943024272 1N9430X0012 1N943824272 1N9438X0012
4*	Valve Plug	See Following Tables	9	Upper Spring Seat, NACE Types MR98L, MR98H, MR98LD, MR98HD and MR98HDP 1/4 NPT Body Size Steel ⁽¹⁾ Stainless steel NPS 1/2 / DN 15 Body Size Steel ⁽¹⁾ Stainless steel NPS 3/4 and 1 / DN 20 and 25 Body Sizes Steel ⁽¹⁾ Stainless steel NPS 1-1/2 and 2 / DN 40 and 50 Body Sizes Steel ⁽¹⁾ Stainless steel Types MR98HH and MR98HHD 1/4 NPT Body Size Steel ⁽¹⁾ Stainless steel NPS 1/2 / DN 15 Body Size Steel ⁽¹⁾ Stainless steel NPS 3/4 and 1 / DN 20 and 25 Body Sizes Steel ⁽¹⁾ Stainless steel	ERCA00383A0 ERCA00383A1 ERCA00823A0 ERCA00823A1 1E398725072 1E3987X0012 1P787624092 1P7876X0012 1N942124092 1N9421X0012 ERCA00430A0 ERCA00430A1 1N943924092 1N9439X0012
5	Bottom Plug 1/4 NPT Body Size 416 Stainless steel 316 Stainless steel, NACE, Oxygen Service Hastelloy® C, NACE Monel®, NACE NPS 1/2 / DN 15 Body Size 416 Stainless steel 316 Stainless steel, NACE, Oxygen Service Hastelloy® C, NACE Monel®, NACE NPS 3/4 and 1 / DN 20 and 25 Body Sizes 416 Stainless steel 316 Stainless steel, NACE, Oxygen Service Hastelloy® C, NACE Monel®, NACE NPS 1-1/2 and 2 / DN 40 and 50 Body Sizes 416 Stainless steel 316 Stainless steel, NACE, Oxygen Service Hastelloy® C, NACE Monel®, NACE	GF05500X022 GF05500X032 GF05500X052 GF05500X042 GF05532X022 GF05532X032 GF05532X052 GF05532X042 GF05496X022 GF05496X032 GF05496X052 GF05496X042 GF05511X022 GF05511X032 GF05511X052 GF05511X042	10	Pusher Post Composition Diaphragm 1/4 NPT Body Size 416 Stainless steel 316 Stainless steel, NACE, Oxygen Service Hastelloy® C, NACE Monel®, NACE NPS 1/2 / DN 15 Body Size 416 Stainless steel 316 Stainless steel, NACE, Oxygen Service Hastelloy® C, NACE Monel®, NACE	1L345635132 1L345635072 1L3456X0032 1L3456X0022 ERCA01344A0 ERCA01344A1 ERCA01344A3 ERCA01344A2
7	Valve Plug Guide 1/4 NPT Body Size 416 Stainless steel 316 Stainless steel, NACE, Oxygen Service Hastelloy® C, NACE Monel®, NACE NPS 1/2 / DN 15 Body Size 416 Stainless steel 316 Stainless steel, NACE, Oxygen Service Hastelloy® C, NACE Monel®, NACE NPS 3/4 and 1 / DN 20 and 25 Body Sizes 416 Stainless steel 316 Stainless steel, NACE, Oxygen Service Hastelloy® C, NACE Monel®, NACE NPS 1-1/2 and 2 / DN 40 and 50 Body Sizes 416 Stainless steel 316 Stainless steel, NACE, Oxygen Service Hastelloy® C, NACE Monel®, NACE	GF04882X022 GF04882X032 GF04882X052 GF04882X042 GF05534X022 GF05534X032 GF05534X052 GF05534X042 GF05529X022 GF05529X032 GF05529X052 GF05529X042 GF05539X022 GF05539X032 GF05539X052 GF05539X042			

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1. Part meets NACE requirements only for applications in which the part is not exposed to sour gas.

Key	Description	Part Number	Key	Description	Part Number
10	Pusher Post (continued)		15	Adjusting Screw, NACE ⁽¹⁾ (continued)	
	Composition Diaphragm (continued)			Stainless steel Square Head Adjustment	
	NPS 3/4 and 1 / DN 20 and 25 Body Sizes			1/4 NPT Body Size	GF05533X022
	416 Stainless steel	1L343835132		NPS 1/2 / DN 15 Body Size	
	316 Stainless steel, NACE, Oxygen Service	1L343835072		Types MR98L and MR98H	GF05553X022
	Hastelloy® C, NACE	1L3438X0012		Type MR98HH	ERAA02340A1
	Monel®, NACE	1L3438X0022		NPS 3/4 and 1 / DN 20 and 25 Body Sizes	
	NPS 1-1/2 and 2 / DN 40 and 50 Body Sizes			Types MR98L and MR98H	GF05543X022
	416 Stainless steel	1P788435132		Type MR98HH	ERCA01483A1
	316 Stainless steel, NACE, Oxygen Service	1P788435072		NPS 1-1/2 and 2 / DN 40 and 50 Body Sizes	GF05522X022
	Hastelloy® C, NACE	1P7884X0012		Handwheel	
	Monel®, NACE	1P7884X0022		NPS 1/2 / DN 15 Body Size	ERAA02331A0
	Metal Diaphragm		16	Cap Screws, NACE ⁽¹⁾	
	1/4 NPT Body Size			Types MR98L and MR98LD	
	416 Stainless steel	GF04910X022		1/4 NPT Body Size	
	316 Stainless steel, NACE, Oxygen Service	GF04910X032		Steel (10 required)	ERCA00651A0
	Hastelloy® C, NACE	GF04910X052		Stainless steel (10 required)	ERCA00651A1
	Monel®, NACE	GF04910X042		NPS 1/2 / DN 15 Body Size	
	NPS 1/2 / DN 15 Body Size			Steel (10 required)	ERCA00100A0
	416 Stainless steel	ERCA01343A0		Stainless steel (10 required)	ERCA00100A1
	316 Stainless steel, NACE, Oxygen Service	ERCA01343A1		NPS 3/4 and 1 / DN 20 and 25 Body Sizes	
	Hastelloy® C, NACE	ERCA01343A3		Steel (12 required)	GF05446X012
	Monel®, NACE	ERCA01343A2		Stainless steel (12 required)	GF05446X022
	NPS 3/4 and 1 / DN 20 and 25 Body Sizes			Types MR98H, MR98HD,	
	416 Stainless steel	1L343935132		MR98HH and MR98HHD	
	316 Stainless steel, NACE, Oxygen Service	1L343935072		1/4 NPT Body Size	
	Hastelloy® C, NACE	1L343940152		Steel (6 required)	ERCA04149A0
	Monel®, NACE	1L343940032		Stainless steel (6 required)	ERCA04149A1
	NPS 1-1/2 and 2 / DN 40 and 50 Body Sizes			B8M Class 2 Stainless steel (6 required)	ERCA04149A3
	416 Stainless steel	1P788335132		NPS 1/2 / DN 15 Body Size	
	316 Stainless steel, NACE, Oxygen Service	1P788335072		Steel (8 required)	ERCA00100A0
	Hastelloy® C, NACE	1P7883X0012		Stainless steel (8 required)	ERCA00100A1
	Monel®, NACE	1P7883X00A2		NPS 3/4 and 1 / DN 20 and 25 Body Sizes	
11	Control Spring, NACE ⁽¹⁾	See Table 3		Steel (8 required)	GF05446X012
12*	Diaphragm	See Following Tables		Stainless steel (8 required)	GF05446X022
13	Nameplate	-----		NPS 1-1/2 and 2 / DN 40 and 50 Body Sizes	
14	Diaphragm Protector, PTFE, NACE			Steel (8 required)	ERCA00601A0
	Types MR98L and MR98LD			Stainless steel (8 required)	ERCA00601A3
	1/4 NPT Body Size	11A5132X012		Type MR95HDP	
	NPS 1/2 / DN 15 Body Size	11A5133X012		1/4 NPT Body Size	
	NPS 3/4 and 1 / DN 20 and 25 Body Sizes	11A5134X012		Steel (6 required)	ERCA04149A2
	Types MR98H, MR98HD, MR98HH,			Stainless steel (6 required)	ERCA04149A3
	MR98HDP and MR98HHD			NPS 1/2 / DN 15 Body Size	
	1/4 NPT Body Size	11A5135X012		Steel (8 required)	ERCA00100A2
	NPS 1/2 / DN 15 Body Size	11A5136X012		Stainless steel (8 required)	ERCA00100A3
	NPS 3/4 and 1 / DN 20 and 25 Body Sizes	11A5137X012		NPS 3/4 and 1 / DN 20 and 25 Body Sizes	
	NPS 1-1/2 and 2 / DN 40 and 50 Body Sizes	11A5527X012		Steel (8 required)	GF05446X032
				Stainless steel (8 required)	GF05446X042
15	Adjusting Screw, NACE ⁽¹⁾			NPS 1-1/2 and 2 / DN 40 and 50 Body Sizes	
	Square Head Adjustment			Steel (8 required)	ERCA00601A2
	1/4 NPT Body Size	GF05533X012		Stainless steel (8 required)	ERCA00601A3
	NPS 1/2 / DN 15 Body Size		17	Jam Nut, NACE ⁽¹⁾	
	Types MR98L and MR98H	GF05553X012		Square Head Adjustment	
	Type MR98HH	ERAA02340A0		1/4 NPT Body Size	ERCA00652A0
	NPS 3/4 and 1 / DN 20 and 25 Body Sizes			NPS 1/2 / DN 15 Body Size	ERCA00380A0
	Types MR98L and MR98H	GF05543X012		NPS 3/4 and 1 / DN 20 and 25 Body Sizes	GF05453X012
	Type MR98HH	ERCA01483A0		NPS 1-1/2 and 2 / DN 40 and 50 Body Sizes	ERCA00633A0
	NPS 1-1/2 and 2 / DN 40 and 50 Body Sizes	GF05522X012		Stainless steel Square Head Adjustment	
	Sealed Square Head Adjustment			1/4 NPT Body Size	ERCA00652A1
	NPS 1/2 / DN 15 Body Size	GF05553X012		NPS 1/2 / DN 15 Body Size	ERCA00380A1
	NPS 3/4 and 1 / DN 20 and 25 Body Sizes	GF05543X012		NPS 3/4 and 1 / DN 20 and 25 Body Sizes	GF05453X022
	NPS 1-1/2 and 2 / DN 40 and 50 Body Sizes	GF05522X012		NPS 1-1/2 and 2 / DN 40 and 50 Body Sizes	ERCA00633A1

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1. Part meets NACE requirements only for applications in which the part is not exposed to sour gas.

MR98 Series

Key	Description	Part Number	Key	Description	Part Number
17	Jam Nut, NACE ⁽¹⁾ (continued) Sealed Square Head Adjustment NPS 1/2 / DN 15 Body Size NPS 3/4 and 1 / DN 20 and 25 Body Sizes NPS 1-1/2 and 2 / DN 40 and 50 Body Sizes Tee Handle Adjustment 1/4 NPT Body Size NPS 3/4 and 1 / DN 20 and 25 Body Sizes NPS 1-1/2 and 2 / DN 40 and 50 Body Sizes Handwheel Adjustment NPS 1/2 / DN 15 Body Size	ERCA00380A0 GF05453X012 ERCA00633A0 ERCA00652A0 GF05453X012 ERCA00633A0 ERCA00380A0	22	Adjusting Screw Assembly, NACE Tee Handle Adjustment 1/4 NPT Body Size NPS 3/4 and 1 / DN 20 and 25 Body Sizes NPS 1-1/2 and 2 / DN 40 and 50 Body Sizes	ERAA01707A0 ERAA01716A0 ERAA01694A0
18	Drive Screw (4 required), NACE	ERAA01884A0	23	Handwheel, NACE, (NPS 1/2 / DN 15 Body)	ERAA02088A0
19*	Diaphragm Gasket (2 required for pressure loaded spring case) 302 Stainless steel diaphragm Types MR98L and MR98LD 1/4 NPT Body Size NPS 1/2 / DN 15 Body Size NPS 3/4 and 1 / DN 20 and 25 Body Sizes Types MR98H, MR98HD, MR98HH, MR98HDP and MR98HHD 1/4 NPT Body Size NPS 1/2 / DN 15 Body Size NPS 3/4 and 1 / DN 20 and 25 Body Sizes NPS 1-1/2 and 2 / DN 40 and 50 Body Sizes 302 Stainless steel - Oxygen Service diaphragm Type MR98L 1/4 NPT Body Size NPS 1/2 / DN 15 Body Size NPS 3/4 and 1 / DN 20 and 25 Body Sizes Types MR98H and MR98HH 1/4 NPT Body Size NPS 1/2 / DN 15 Body Size NPS 3/4 and 1 / DN 20 and 25 Body Sizes NPS 1-1/2 and 2 / DN 40 and 50 Body Sizes 302 Stainless steel - Steam Service, Monel [®] and Hastelloy [®] C Diaphragms Types MR98L and MR98LD 1/4 NPT Body Size NPS 1/2 / DN 15 Body Size NPS 3/4 and 1 / DN 20 and 25 Body Sizes Types MR98H, MR98HD, MR98HH, MR98HDP and MR98HHD 1/4 NPT Body Size NPS 1/2 / DN 15 Body Size NPS 3/4 and 1 / DN 20 and 25 Body Sizes NPS 1-1/2 and 2 / DN 40 and 50 Body Sizes	ERCA00655A0 ERCA00491A0 ERCA00556A0 1E393104022 ERCA00485A0 ERCA00510A0 ERCA00526A0 ERCA00655A2 ERCA00491A2 ERCA00556A2 1E3931X0022 ERCA00485A2 ERCA00510A2 ERCA00526A2 ERCA00655A1 ERCA00491A1 ERCA00556A1 1E3931X0012 ERCA00485A1 ERCA00510A1 ERCA00526A1	24	Machine Screw 1/4 NPT Body Size 416 Stainless steel 316 Stainless steel, NACE, Oxygen Service NPS 1/2 / DN 15 Body Size 416 Stainless steel 316 Stainless steel, NACE, Oxygen Service Hastelloy [®] C, NACE NPS 3/4 and 1 / DN 20 and 25 Body Sizes 416 Stainless steel 316 Stainless steel, NACE, Oxygen service Hastelloy [®] C, NACE NPS 1-1/2 and 2 / DN 40 and 50 Body Sizes 416 Stainless steel 316 Stainless steel, NACE, Oxygen Service Hastelloy [®] C, NACE	GF05033X012 GF05033X022 1J4159X0012 1J4159X0012 1J4159X0062 1L343538992 1L3435X0012 1L3435X0052 1P788638992 1P788638992 1P7886X0022
21	Diaphragm Head 1/4 NPT Body Size Steel, NACE ⁽¹⁾ Stainless steel, NACE NPS 1/2 / DN 15 Body Size Steel, NACE ⁽¹⁾ Stainless steel, NACE NPS 3/4 and 1 / DN 20 and 25 Body Sizes Steel, NACE ⁽¹⁾ Stainless steel, NACE NPS 1-1/2 and 2 / DN 40 and 50 Body Sizes (2 required) 416 Stainless steel 316 Stainless steel, NACE, Oxygen Service Hastelloy [®] C, NACE Monel [®] , NACE	1L345525072 1L3455X0012 1L339625072 1L3396X0012 1L342125072 1L3421X0012 ERCA00578A0 ERCA00578A1 ERCA00578A3 ERCA00578A2	25	O-ring Retainer 1/4 NPT Body Size 416 Stainless steel 316 Stainless steel, NACE, Oxygen Service NPS 1/2 / DN 15 Body Size 416 Stainless steel 316 Stainless steel, NACE, Oxygen Service Hastelloy [®] C, NACE NPS 3/4 and 1 / DN 20 and 25 Body Sizes 416 Stainless steel 316 Stainless steel, NACE, Oxygen Service Hastelloy [®] C, NACE	GF05031X022 GF05031X032 1L341535232 GF05078X032 GF05078X052 1L343035132 1L343035072 1L3430X0022
			25	Seat Retainer NPS 1-1/2 and 2 / DN 40 and 50 Body Sizes 416 Stainless steel 316 Stainless steel, NACE, Oxygen Service Hastelloy [®] C, NACE	ERCA00377A0 ERCA00377A1 ERCA00377A3
			28	Lockwasher, NACE ⁽¹⁾ 1/4 NPT and NPS 1/2 / DN 15 Body Sizes Steel Stainless steel NPS 3/4 and 1 / DN 20 and 25 Body Sizes Steel Stainless steel NPS 1-1/2 and 2 / DN 40 and 50 Body Sizes Steel Stainless steel	ERAA01919A0 ERAA01919A1 1H624328992 1H6243X0012 ERCA00379A0 ERCA00379A1
			29*	Gasket, NACE Composition Diaphragm 1/4 NPT Body Size NPS 1/2 / DN 15 Body Size NPS 3/4 and 1 / DN 20 and 25 Body Sizes Metal Diaphragm 1/4 NPT Body Size (2 required for pressure loaded spring case) 302 Stainless steel 302 Stainless steel - Oxygen Service 302 Stainless steel - Steam Service, Monel [®] and Hastelloy [®] C	GF04913X012 ERAA02651A0 ERCA00502A0 GF04913X012 GF04913X032 GF04913X022

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1. Part meets NACE requirements only for applications in which the part is not exposed to sour gas.

MR98 Series

Key	Description	Part Number	Key	Description	Part Number
29*	Gasket, NACE (continued) Metal Diaphragm (continued) NPS 1/2 / DN 15 Body Size (2 required for pressure loaded spring case) 302 Stainless steel 302 Stainless steel - Oxygen Service 302 Stainless steel - Steam Service, Monel® and Hastelloy® C NPS 3/4 and 1 / DN 20 and 25 Body Sizes (2 required for pressure loaded spring case) 302 Stainless steel 302 Stainless steel - Oxygen Service 302 Stainless steel - Steam Service, Monel® and Hastelloy® C NPS 1-1/2 and 2 / DN 40 and 50 Body Sizes (2 required) 302 Stainless steel 302 Stainless steel - Oxygen Service 302 Stainless steel - Steam Service, Monel® and Hastelloy® C	ERAA02651A0 ERAA02651A2 ERAA02651A1 ERCA00502A0 ERCA00502A2 ERCA00502A1 ERCA00579A0 ERCA00579A2 ERCA00579A1	34	Packing Follower (continued) Handwheel adjustment (continued) Type MR98HHD 1/4 NPT and NPS 1/2 / DN 15 Body Sizes NPS 3/4 and 1 / DN 20 and 25 Body Sizes Handwheel adjustment with Stainless steel trim Types MR98LD, MR98HD and MR98HDP 1/4 NPT Body Size NPS 1/2 to 2 / DN 15 to 50 Body Sizes Type MR98HHD 1/4 NPT and NPS 1/2 / DN 15 Body Sizes NPS 3/4 and 1 / DN 20 and 25 Body Sizes	ERAA01632A0 1P144024092 ERAA01632A0 1K8849X0012 ERAA01632A0 1P1440X0012
31	Locknut, NACE ⁽¹⁾ 1/4 NPT and NPS 1/2 / DN 15 Body Sizes NPS 3/4 and 1 / DN 20 and 25 Body Sizes NPS 1-1/2 and 2 / DN 40 and 50 Body Sizes	ERCA00663A0 1L872224122 1P788724122	35	Stuffing Box Nut Handwheel adjustment Types MR98LD, MR98HD and MR98HDP Type MR98HHD 1/4 NPT and NPS 1/2 / DN 15 Body Sizes NPS 3/4 and 1 / DN 20 and 25 Body Sizes Handwheel adjustment with Stainless steel trim Types MR98LD, MR98HD and MR98HDP Type MR98HHD 1/4 NPT and NPS 1/2 / DN 15 Body Sizes NPS 3/4 and 1 / DN 20 and 25 Body Sizes	ERAA01633A0 1P144124092 ERAA01633A1 ERAA01633A1 1P1441X0012
32	Stuffing Box Handwheel adjustment Types MR98LD, MR98HD and MR98HDP 1/4 NPT Body Size NPS 1/2 / DN 15 Body Size NPS 3/4 and 1 / DN 20 and 25 Body Sizes NPS 1-1/2 and 2 / DN 40 and 50 Body Sizes Type MR98HHD 1/4 NPT Body Size NPS 1/2 / DN 15 Body Size NPS 3/4 and 1 / DN 20 and 25 Body Sizes Handwheel adjustment with Stainless steel Trim Types MR98LD, MR98HD and MR98HDP 1/4 NPT Body Size NPS 1/2 / DN 15 Body Size NPS 3/4 and 1 / DN 20 and 25 Body Sizes Type MR98HHD 1/4 NPT Body Size NPS 1/2 / DN 15 Body Size NPS 3/4 and 1 / DN 20 and 25 Body Sizes	ERAA02699A0 ERAA01655A0 ERAA01655A0 ERAA01662A0 ERAA02699A0 ERAA02700A0 ERAA02696A0 ERAA02699A1 ERAA01655A1 ERAA01655A1 ERAA01662A1 ERAA02699A1 ERAA02700A1 ERAA02696A1	36	Packing V-Ring (3 required) Types MR98LD, MR98HD and MR98HDP 1/4 NPT Body Size NPS 1/2 to 2 / DN 15 to 50 Body Sizes Type MR98HHD 1/4 NPT Body Size NPS 1/2 / DN 15 Body Size NPS 3/4 and 1 / DN 20 and 25 Body Sizes	ERAA01634A0 ERAA01657A0 ERAA01634A0 ERAA01657A0 ERAA02108A0
33	Adjusting Screw Types MR98LD, MR98HD and MR98HDP 1/4 NPT Body Size NPS 1/2 / DN 15 Body Size NPS 3/4 and 1 / DN 20 and 25 Body Sizes NPS 1-1/2 and 2 / DN 40 and 50 Body Sizes Type MR98HHD 1/4 NPT Body Size NPS 1/2 / DN 15 Body Size NPS 3/4 and 1 / DN 20 and 25 Body Sizes	ERAA01631A0 ERAA02333A0 ERAA01673A0 ERAA01677A0 ERAA01631A0 ERAA01874A0 ERAA02107A0	37*	Stuff Box Gasket 1/4 NPT Body Size NPS 1/2 to 2 / DN 15 to 50 Body Sizes	ERAA01635A0 1P494106242
34	Packing Follower Handwheel adjustment Types MR98LD, MR98HD and MR98HDP 1/4 NPT Body Size NPS 1/2 to 2 / DN 15 to 50 Body Sizes	ERAA01632A0 1K884924092	38	Handwheel / Handle Handwheel adjustment Types MR98LD, MR98HD and MR98HDP 1/4 NPT Body Size NPS 1/2 / DN 15 Body Size NPS 3/4 and 1 / DN 20 and 25 Body Sizes NPS 1-1/2 and 2 / DN 40 and 50 Body Sizes Type MR98HHD 1/4 NPT Body Size NPS 1/2 / DN 15 Body Size NPS 3/4 and 1 / DN 20 and 25 Body Sizes Handwheel adjustment with Stainless steel Trim Types MR98LD and MR98HD 1/4 NPT Body Size NPS 1/2 / DN 15 Body Size NPS 3/4 and 1 / DN 20 and 25 Body Sizes NPS 1-1/2 and 2 / DN 40 and 50 Body Sizes Type MR98HHD 1/4 NPT Body Size NPS 1/2 / DN 15 Body Size NPS 3/4 and 1 / DN 20 and 25 Body Sizes	ERAA01636A0 ERAA01669A0 ERAA01669A0 1J410819042 ERAA01636A0 ERAA01669A0 ERAA02109A0 ERAA02956A1 ERAA02957A1 ERAA02957A1 ERAA02959A1 ERAA02956A1 ERAA02957A1 ERAA02958A1
34	Packing Follower Handwheel adjustment Types MR98LD, MR98HD and MR98HDP 1/4 NPT Body Size NPS 1/2 to 2 / DN 15 to 50 Body Sizes	ERAA01632A0 1K884924092	39	Internal Adaptor Types MR98LD, MR98HD and MR98HDP 1/4 NPT Body Size NPS 1/2 to 2 / DN 15 to 50 Body Sizes	ERAA01637A0 ERAA01666A0

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MR98 Series

Key	Description	Part Number	Key	Description	Part Number
39	Internal Adaptor (continued) Type MR98HHD 1/4 NPT Body Size NPS 1/2 / DN 15 Body Size NPS 3/4 and 1 / DN 20 and 25 Body Sizes	ERAA01637A0 ERAA01666A0 ERAA02111A0	45*	O-ring (continued) NPS 3/4 and 1 / DN 20 and 25 Body Sizes Nitrile (NBR) Sanitary EPDM ⁽¹⁾ NPS 1-1/2 and 2 / DN 40 and 50 Body Sizes Nitrile (NBR) Fluorocarbon (FKM) EPDM Sanitary EPDM ⁽¹⁾	ERAA02070A0 ERCA00502A3 ERCA00664A0 ERCA00664A1 ERCA00664A2 ERCA00664A5
40	External Adaptor Types MR98LD, MR98HD and MR98HDP 1/4 NPT Body Size NPS 1/2 to 2 / DN 15 to 50 Body Sizes Type MR98HHD 1/4 NPT Body Size NPS 1/2 / DN 15 Body Size NPS 3/4 and 1 / DN 20 and 25 Body Sizes	ERAA01638A0 ERAA01667A0 ERAA01638A0 ERAA01667A0 ERAA02112A0	47	NACE Tag	-----
41	Machine Screw Handwheel adjustment 1/4 NPT Body Size NPS 1/2 / DN 15 Body Size NPS 3/4 and 1 / DN 20 and 25 Body Sizes Handwheel adjustment with Stainless steel Trim 1/4 NPT Body Size NPS 1/2 / DN 15 Body Size NPS 3/4 and 1 / DN 20 and 25 Body Sizes	ERAA01639A0 ERAA01670A0 ERAA01670A0 ERAA01639A1 ERAA01670A1 ERAA01670A1	48	Tag Wire	-----
41	Jam Nut NPS 1-1/2 and 2 / DN 40 and 50 Body Sizes Handwheel Handwheel adjustment with Stainless steel Trim	ERAA01688A0 ERAA01688A1	49	Lockwasher, For Types MR98HD and MR98HDP NPS 3/4 and 1 / DN 20 and 25 Body Sizes Steel Stainless steel	ERCA00379A0 ERCA00379A1
42	Spring Types MR98LD, MR98HD and MR98HDP Type MR98HHD 1/4 NPT and NPS 1/2 / DN 15 Body Sizes NPS 3/4 and 1 / DN 20 and 25 Body Sizes	ERAA01640A0 ERAA01640A0 ERAA02110A0	50*	Sealing Washer NPS 1/2 / DN 15 Body Size NPS 3/4 and 1 / DN 20 and 25 Body Sizes NPS 1-1/2 and 2 / DN 40 and 50 Body Sizes	1V205699012 11A9681X012 1V424699012
43	Washer Types MR98LD, MR98HD and MR98HDP 1/4 NPT Body Size NPS 1/2 to 2 / DN 15 to 50 Body Sizes Type MR98HHD 1/4 NPT Body Size NPS 1/2 / DN 15 Body Size NPS 3/4 and 1 / DN 20 and 25 Body Sizes	ERAA01641A0 ERAA01660A0 ERAA01641A0 ERAA01660A0 1H941736042	51	Vent Type MR98HH 1/4 NPT Body NPS 1/2 to 1 / DN 15 to 25 Body Sizes Type MR98H NPS 1-1/2 and 2 / DN 40 and 50 Body Sizes	0L078343062 ERAA02123A0 ERAA02123A0
44	Washer Handwheel adjustment 1/4 NPT Body Size NPS 1/2 / DN 15 Body Size NPS 3/4 and 1 / DN 20 and 25 Body Sizes NPS 1-1/2 and 2 / DN 40 and 50 Body Sizes Handwheel adjustment with Stainless steel Trim 1/4 NPT Body Size NPS 1/2 / DN 15 Body Size NPS 3/4 and 1 / DN 20 and 25 Body Sizes NPS 1-1/2 and 2 / DN 40 and 50 Body Sizes	ERAA01642A0 ERAA01671A0 ERAA01671A0 ERAA01689A0 ERAA01642A1 ERAA01671A1 ERAA01671A1 ERAA01689A1	52	Plug, NPS 1/2 to 2 / DN 15 to 50 Body Sizes	ERAA01942A0
45*	O-ring 1/4 NPT Body Size Nitrile (NBR) Fluorocarbon (FKM) EPDM Sanitary EPDM ⁽¹⁾ NPS 1/2 / DN 15 Body Size Nitrile (NBR) Fluorocarbon (FKM) EPDM Sanitary EPDM ⁽¹⁾	ERAA01672A0 ERAA01672A1 ERAA01672A2 GF04913X052 ERAA01672A0 ERAA01672A1 ERAA01672A2 ERAA02651A5	53*	Valve Plug O-ring NPS 1/2 / DN 15 Body Size EPDM Fluorocarbon (FKM) Perfluoroelastomer (FFKM) Nitrile (NBR) NPS 3/4 and 1 / DN 20 and 25 Body Sizes EPDM Fluorocarbon (FKM) Perfluoroelastomer (FFKM) Nitrile (NBR) NPS 1-1/2 and 2 / DN 40 and 50 Body Sizes EPDM Fluorocarbon (FKM) Perfluoroelastomer (FFKM) Nitrile (NBR)	ERCA02968A2 ERCA02968A1 ERCA02968A3 ERCA02968A0 ERCA00973A2 ERCA00973A1 ERCA00973A3 ERCA00973A0 ERCA01406A2 ERCA01406A1 ERCA01406A3 ERCA01406A0
			57	Jam Nut, Type MR98HHD, NPS 3/4 and 1 / DN 20 and 25 Body Sizes Handwheel adjustment Handwheel adjustment with Stainless steel trim	ERCA00380A0 ERCA00380A1
			58	Washer 1/4 NPT Body Size 416 Stainless steel 316 Stainless steel, NACE, Oxygen Service Hastelloy® C, NACE Monel®, NACE NPS 1/2 / DN 15 Body Size 416 Stainless steel 316 Stainless steel, NACE, Oxygen Service Hastelloy® C, NACE Monel®, NACE NPS 3/4 and 1 / DN 20 and 25 Body Sizes 416 Stainless steel 316 Stainless steel, NACE, Oxygen Service Hastelloy® C, NACE Monel®, NACE	GF05050X012 GF05050X022 GF05050X032 GF05050X042 GF05050X012 GF05050X022 GF05050X042 GF05050X032 GF05525X012 GF05525X022 GF05525X042 GF05525X032

*Recommended Spare Part

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1. EPDM meets FDA, USP Class VI and ADI Free requirements.

Key	Description	Part Number	Key	Description	Part Number
59*	O-ring 1/4 NPT Body Size Nitrile (NBR) seat Fluorocarbon (FKM) seat EPDM seat Sanitary EPDM seat ⁽¹⁾ NPS 1/2 / DN 15 Body Size Nitrile (NBR) seat Fluorocarbon (FKM) seat EPDM seat Sanitary EPDM seat ⁽¹⁾ Perfluoroelastomer (FFKM) seat NPS 3/4 and 1 / DN 20 and 25 Body Sizes Nitrile (NBR) seat Fluorocarbon (FKM) seat EPDM seat Sanitary EPDM seat ⁽¹⁾ Perfluoroelastomer (FFKM) seat	ERCA02967A0 ERCA02967A1 ERCA02967A2 ERCA02967A6 ERCA02974A0 ERCA02974A1 ERCA02974A2 ERCA02974A5 ERCA02974A3 ERCA00974A0 ERCA00974A1 ERCA00974A2 ERCA00974A7 ERCA00974A3	63*	Bottom Plug Seal (continued) NPS 1-1/2 and 2 / DN 40 and 50 Body Sizes Nitrile (NBR) Fluorocarbon (FKM) EPDM Sanitary EPDM ⁽¹⁾ Graphite 64 Flow Arrow 65 Pipe Plug NPS 3/4 to 2 / DN 20 to 50 Body Sizes Steel Stainless steel 66 Pressure Gauge NPS 3/4 to 2 / DN 20 to 50 Body Sizes 0 to 15 psig / 0 to 1.0 bar Brass Stainless steel 0 to 30 psig / 0 to 2.1 bar Brass Stainless steel 0 to 60 psig / 0 to 4.1 bar Brass Stainless steel 0 to 160 psig / 0 to 11.0 bar Brass Stainless steel 0 to 300 psig / 0 to 20.7 bar Brass Stainless steel 0 to 1000 psig / 0 to 68.9 bar Brass Stainless steel 68 Restriction, NACE Types MR98HH and MR98HHD, NPS 3/4 and 1 / DN 20 and 25 Body Sizes 69 ATEX Tag 70 PED Tag	ERCA00630A0 ERCA00630A1 ERCA00630A2 ERCA00630A5 ERCA01407A0 ----- ERAA03130A0 ERAA03131A0 11B8579X012 ERAA03132A0 11B8579X022 ERAA03132A1 11B8579X032 ERAA03132A2 11B8579X042 ERAA03132A3 11B8579X052 ERAA03132A4 11B8579X102 ERAA03132A5 ERAA03257A0 ----- -----
59*	L-ring NPS 1-1/2 and 2 / DN 40 and 50 Body Sizes Nitrile (NBR) seat Fluorocarbon (FKM) seat EPDM seat Sanitary EPDM seat ⁽¹⁾ Perfluoroelastomer (FFKM) seat	ERCA00668A1 ERCA00668A2 ERCA00668A3 ERCA00668A6 ERCA00668A5			
62	Adaptor, NACE Types MR98L and MR98LD, NPS 3/4 and 1 / DN 20 and 25 Body Sizes	ERAA01930A0			
63*	Bottom Plug Seal 1/4 NPT Body Size Nitrile (NBR) Perfluoroelastomer (FFKM) Fluorocarbon (FKM) EPDM Sanitary EPDM ⁽¹⁾ Graphite NPS 1/2 / DN 15 Body Size Nitrile (NBR) Fluorocarbon (FKM) EPDM Sanitary EPDM ⁽¹⁾ Graphite NPS 3/4 and 1 / DN 20 and 25 Body Sizes Nitrile (NBR) Perfluoroelastomer (FFKM) Fluorocarbon (FKM) EPDM Sanitary EPDM ⁽¹⁾ Graphite	ERCA03017A0 ERCA03017A3 ERCA03017A1 ERCA03017A2 ERCA03017A5 ERCA02976A0 ERCA03016A0 ERCA03016A1 ERCA03016A2 ERCA03016A7 ERCA02978A0 ERCA00628A0 ERCA00628A3 ERCA00628A1 ERCA00628A2 ERCA00628A5 ERCA00517A0			

*Recommended Spare Part
Monel® is a mark owned by Special Metals Corporation.
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1. EPDM meets FDA, USP Class VI and ADI Free requirements.

MR98 Series

Key 1, Types MR98L and MR98LD Body Part Numbers

BODY SIZE	END CONNECTION STYLE	BODY MATERIAL						
		Gray Cast Iron	WCC Steel ⁽¹⁾	LCC Steel ⁽¹⁾	CF8M Stainless Steel ⁽¹⁾	CF3M Stainless Steel ⁽¹⁾	Monel ^{®(1)}	Hastelloy [®] C ⁽¹⁾
1/4 NPT	NPT	ERCA03713A0	ERCA03713A1	ERCA03713A7	ERCA03713A4	ERCA03713A3	-----	-----
NPS 1/2 / DN 15 Without Control Line	NPT	ERCA03819A0	ERCA03819A1	ERCA03819A7	ERCA03819A4	ERCA03819A3	ERCA03819A9	ERCA03819B1
	SWE	-----	ERAA01848A0	ERAA01848A4	ERAA01848A2	ERAA01848A1	-----	-----
	Welded CL150 RF	-----	ERAA01830A0	ERAA01830A3	ERAA01830A2	ERAA01830A1	-----	-----
	Welded CL300 RF	-----	ERAA01832A0	ERAA01832A3	ERAA01832A2	ERAA01832A1	-----	-----
	Welded PN 16/25/40 RF	-----	ERAA01834A0	ERAA01834A2	-----	ERAA01834A1	-----	-----
NPS 1/2 / DN 15 With Control Line	NPT	-----	ERAA01932A1	ERAA01932A4	ERAA01932A3	ERAA01932A2	-----	-----
NPS 3/4 / DN 20 Without Gauge Port and Control Line	NPT	ERCA01384A0	ERCA01384A1	ERCA01384A7	ERCA01384A4	ERCA01384A3	ERCA01384A9	ERCA01384B1
	SWE	-----	ERAA01785A1	ERAA01785A6	ERAA01785A4	ERAA01785A3	-----	-----
	Welded CL150 RF	-----	ERAA01797A0	ERAA01797A3	ERAA01797A2	ERAA01797A1	-----	-----
	Welded CL300 RF	-----	ERAA01799A0	ERAA01799A3	ERAA01799A2	ERAA01799A1	-----	-----
	Welded PN 16/25/40 RF	-----	ERAA01801A0	ERAA01801A2	-----	ERAA01801A1	-----	-----
NPS 3/4 / DN 20 With Control Line but Without Gauge Port	NPT	-----	ERAA02175A1	ERAA02175A4	ERAA02175A3	ERAA02175A2	-----	-----
NPS 3/4 / DN 20 With Gauge Port but Without Control Line	NPT	ERAA02176A0	ERAA02176A1	ERAA02176A4	ERAA02176A3	ERAA02176A2	-----	-----
	Welded CL150 RF	-----	ERAA02177A1	ERAA02177A4	ERAA02177A3	ERAA02177A2	-----	-----
	Welded CL300 RF	-----	ERAA02178A1	ERAA02178A4	ERAA02178A3	ERAA02178A2	-----	-----
	Welded PN 16/25/40 RF	-----	ERAA02179A1	ERAA02179A3	-----	ERAA02179A2	-----	-----
NPS 1 / DN 25 Without Gauge Port and Control Line	NPT	ERCA03676A0	ERCA03676A1	ERCA03676A7	ERCA03676A4	ERCA03676A3	ERCA03676A9	ERCA03676B1
	SWE	-----	ERAA01787A1	ERAA01787A6	ERAA01787A4	ERAA01787A3	-----	-----
	Welded CL150 RF	-----	ERAA01803A0	ERAA01803A3	ERAA01803A2	ERAA01803A1	-----	-----
	Welded CL300 RF	-----	ERAA01805A0	ERAA01805A3	ERAA01805A2	ERAA01805A1	-----	-----
	Welded PN 16/25/40 RF	-----	ERCA00553A0	ERCA00553A2	-----	ERCA00553A1	-----	-----
NPS 1 / DN 25 With Control Line but Without Gauge Port	NPT	-----	ERAA02218A1	ERAA02218A4	ERAA02218A3	ERAA02218A2	-----	-----
NPS 1 / DN 25 With Gauge Port but Without Control Line	NPT	ERAA02219A0	ERAA02219A1	ERAA02219A4	ERAA02219A3	ERAA02219A2	-----	-----
	Welded CL150 RF	-----	ERAA02220A1	ERAA02220A4	ERAA02220A3	ERAA02220A2	-----	-----
	Welded CL300 RF	-----	ERAA02221A1	ERAA02221A4	ERAA02221A3	ERAA02221A2	-----	-----
	Welded PN 16/25/40 RF	-----	ERAA02222A1	ERAA02222A3	-----	ERAA02222A2	-----	-----
1. Meets the chemical and physical requirements of NACE MR0175-2002, NACE MR0103 and NACE MR0175/ISO 15156. Note: Contact your local Sales Office if additional gauge and control line options are needed.								

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Key 1, Types MR98H, MR98HD, MR98HDP, MR98HH and MR98HHD Body Part Numbers (continued)

BODY SIZE	END CONNECTION STYLE	BODY MATERIAL							
		Gray Cast Iron ⁽²⁾	WCC Steel ⁽¹⁾	LCC Steel ⁽¹⁾	CF8M Stainless Steel ⁽¹⁾	CF3M Stainless Steel ⁽¹⁾	Monel [®] (1)	Hastelloy [®] C ⁽¹⁾	Aluminum-Bronze
1/4 NPT	NPT	ERCA03697A0	ERCA03697A1	ERCA03697A7	ERCA03697A4	ERCA03697A3	-----	-----	-----
NPS 1/2 / DN 15 Without Control Line	NPT	ERCA03818A0	ERCA03818A1	ERCA03818A7	ERCA03818A4	ERCA03818A3	ERCA03818A9	ERCA03818B1	-----
	SWE	-----	ERAA01829A0	ERAA01829A4	ERAA01829A2	ERAA01829A1	-----	-----	-----
	Welded CL150 RF	-----	ERAA01831A0	ERAA01831A3	ERAA01831A2	ERAA01831A1	-----	-----	-----
	Welded CL300 RF	-----	ERAA01833A0	ERAA01833A3	ERAA01833A2	ERAA01833A1	-----	-----	-----
	Welded PN 16/25/40 RF	-----	ERAA01835A0	ERAA01835A2	-----	ERAA01835A1	-----	-----	-----
	Integral CL150 RF	-----	-----	-----	-----	ERAA02400A0	ERAA02400A1	ERAA02400A2	ERAA02400A3
	Integral CL300 RF	-----	-----	-----	-----	ERAA02401A0	ERAA02401A1	ERAA02401A2	ERAA02401A3
NPS 1/2 / DN 15 With Control Line	NPT	-----	ERAA01934A1	ERAA01934A4	ERAA01934A3	ERAA01934A2	-----	-----	-----
	Welded CL150 RF	-----	ERAA01936A0	ERAA01936A3	ERAA01936A2	-----	-----	-----	-----
	Welded CL300 RF	-----	ERAA01937A0	ERAA01937A3	ERAA01937A2	-----	-----	-----	-----
NPS 3/4 / DN 20 Without Gauge Port and Control Line	NPT	ERCA01383A0	ERCA01383A1	ERCA01383A7	ERCA01383A4	ERCA01383A3	ERCA01383A9	ERCA01383B1	-----
	SWE	-----	ERAA01786A1	ERAA01786A6	ERAA01786A4	ERCA01786A3	-----	-----	-----
	Welded CL150 RF	-----	ERAA01798A0	ERAA01798A3	ERAA01798A2	ERAA01798A1	-----	-----	-----
	Welded CL300 RF	-----	ERAA01800A0	ERAA01800A3	ERAA01800A2	ERAA01800A1	-----	-----	-----
	Welded PN 16/25/40 RF	-----	ERAA01802A0	ERAA01802A2	-----	ERAA01802A1	-----	-----	-----
NPS 3/4 / DN 20 With Control Line but Without Gauge Port	NPT	-----	ERAA02211A1	ERAA02211A4	ERAA02211A3	ERAA02211A2	-----	-----	-----
	Welded CL150 RF	-----	ERAA02477A0	ERAA02477A3	ERAA02477A2	-----	-----	-----	-----
	Welded CL300 RF	-----	ERAA02478A0	ERAA02478A3	ERAA02478A2	-----	-----	-----	-----
NPS 3/4 / DN 20 With Gauge Port but Without Control Line	NPT	ERAA02212A0	ERAA02212A1	ERAA02212A4	ERAA02212A3	ERAA02212A2	-----	-----	-----
	Welded CL150 RF	-----	ERAA02215A1	ERAA02215A4	ERAA02215A3	ERAA02215A2	-----	-----	-----
	Welded CL300 RF	-----	ERAA02216A1	ERAA02216A4	ERAA02216A3	ERAA02216A2	-----	-----	-----
	Welded PN 16/25/40 RF	-----	ERAA02217A1	ERAA02217A3	-----	ERAA02217A2	-----	-----	-----
NPS 1 / DN 25 Without Gauge Port and Control Line	NPT	ERCA03673A0	ERCA03673A1	ERCA03673A7	ERCA03673A4	ERCA03673A3	ERCA03673A9	ERCA03673B1	-----
	SWE	-----	ERAA01788A1	ERAA01788A6	ERAA01788A4	ERAA01788A3	-----	-----	-----
	Welded CL150 RF	-----	ERAA01804A0	ERAA01804A3	ERAA01804A2	ERAA01804A1	-----	-----	-----
	Welded CL300 RF	-----	ERAA01806A0	ERAA01806A3	ERAA01806A2	ERAA01806A1	-----	-----	-----
	Welded PN 16/25/40 RF	-----	ERAA01793A0	ERAA01793A2	-----	ERAA01793A1	-----	-----	-----
	Integral CL150 RF	-----	-----	-----	-----	ERAA01792A0	ERAA01792A4	ERAA01792A5	ERAA01792A6
	Integral CL300 RF	-----	-----	-----	-----	ERCA04332A2	ERCA04332A4	ERCA04332A5	ERCA04332A6
	Integral PN 16/25/40 RF	-----	-----	-----	-----	ERAA01794A2	ERAA01794A4	ERAA01794A5	ERAA01794A6
NPS 1 / DN 25 With Control Line but Without Gauge Port	NPT	-----	ERAA02214A1	ERAA02214A4	ERAA02214A3	ERAA02214A2	-----	-----	-----
	Welded CL150 RF	-----	ERAA02479A0	ERAA02479A3	ERAA02479A2	-----	-----	-----	-----
	Welded CL300 RF	-----	ERAA02480A0	ERAA02480A3	ERAA02480A2	-----	-----	-----	-----
NPS 1 / DN 25 With Gauge Port but Without Control Line	NPT	ERAA02213A0	ERAA02213A1	ERAA02213A4	ERAA02213A3	ERAA02213A2	-----	-----	-----
	Welded CL150 RF	-----	ERAA02223A1	ERAA02223A4	ERAA02223A3	ERAA02223A2	-----	-----	-----
	Welded CL300 RF	-----	ERAA02224A1	ERAA02224A4	ERAA02224A3	ERAA02224A2	-----	-----	-----
	Welded PN 16/25/40 RF	-----	ERAA02225A1	ERAA02225A3	-----	ERAA02225A2	-----	-----	-----

1. Meets the chemical and physical requirements of NACE MR0175-2002, NACE MR0103 and NACE MR0175/ISO 15156.

2. Available for Types MR98H, MR98HD and MR98HDP only.

Note: Contact your local Sales Office if additional gauge and control line options are needed.

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MR98 Series

Key 1, Types MR98H, MR98HD and MR98HDP Body Part Numbers (continued)

BODY SIZE	END CONNECTION STYLE	BODY MATERIAL							
		Gray Cast Iron	WCC Steel ⁽¹⁾	LCC Steel ⁽¹⁾	CF8M Stainless Steel ⁽¹⁾	CF3M Stainless Steel ⁽¹⁾	Monel ^{®(1)}	Hastelloy [®] C ⁽¹⁾	Aluminum-Bronze
NPS 1-1/2 / DN 40 Without Gauge Port and Control Line	NPT	ERCA01385A0	ERCA01385A1	ERCA01385A7	ERCA01385A3	ERCA01385A2	ERCA01385A4	ERCA01385A9	-----
	SWE	-----	ERAA01795A0	ERAA01795A4	ERAA01795A2	ERAA01795A1	-----	-----	-----
	Welded CL150 RF	-----	ERAA01770A0	ERAA01770A3	ERAA01770A2	ERAA01770A1	-----	-----	-----
	Welded CL300 RF	-----	ERAA01771A0	ERAA01771A3	ERAA01771A2	ERAA01771A1	-----	-----	-----
	Welded PN16/25/40 RF	-----	ERAA01772A0	ERAA01772A2	-----	ERAA01772A1	-----	-----	-----
NPS 1-1/2 / DN 40 With Control Line but Without Gauge Port	NPT	-----	ERAA01944A1	ERAA01944A4	ERAA01944A3	ERAA01944A2	-----	-----	-----
	Welded CL150 RF	-----	ERAA01948A0	ERAA01948A3	ERAA01948A2	-----	-----	-----	-----
	Welded CL300 RF	-----	ERAA01949A0	ERAA01949A3	ERAA01949A2	-----	-----	-----	-----
NPS 1-1/2 / DN 40 With Gauge Port but Without Control Line	NPT	ERAA02511A0	ERAA02511A1	ERAA02511A4	ERAA02511A3	ERAA02511A2	-----	-----	-----
	Welded CL150 RF	-----	ERAA02502A0	ERAA02502A3	ERAA02502A2	ERAA02502A1	-----	-----	-----
	Welded CL300 RF	-----	ERAA02503A0	ERAA02503A3	ERAA02503A2	ERAA02503A1	-----	-----	-----
	Welded PN 16/25/40 RF	-----	ERAA02504A0	ERAA02504A2	-----	ERAA02504A1	-----	-----	-----
NPS 2 / DN 50 Without Gauge Port and Control Line	NPT	ERCA03767A0	ERCA03767A1	ERCA03767A7	ERCA03767A4	ERCA03767A3	ERCA03767A9	ERCA03767B1	-----
	SWE	-----	ERAA01796A0	ERAA01796A4	ERAA01796A2	ERAA01796A1	-----	-----	-----
	Welded CL150 RF	-----	ERAA01773A0	ERAA01773A3	ERAA01773A2	ERAA01773A1	-----	-----	-----
	Welded CL300 RF	-----	ERAA01774A0	ERAA01774A3	ERAA01774A2	ERAA01774A1	-----	-----	-----
	Welded PN 16/25/40 RF	-----	ERAA01775A0	ERAA01775A2	-----	ERAA01775A1	-----	-----	-----
	Integral CL150 RF	-----	-----	-----	-----	ERAA01781A0	ERAA01781A1	ERAA01781A2	ERAA01781A3
	Integral CL300 RF	-----	-----	-----	-----	ERCA04258A0	ERCA04258A1	ERCA04258A2	ERCA04258A3
NPS 2 / DN 50 With Control Line but Without Gauge Port	Integral PN 16/25/40 RF	-----	-----	-----	-----	ERAA01782A0	ERAA01782A1	ERAA01782A2	ERAA01782A3
	NPT	-----	ERAA01945A1	ERAA01945A4	ERAA01945A3	ERAA01945A2	-----	-----	-----
	Welded CL150 RF	-----	ERAA01951A0	ERAA01951A3	ERAA01951A2	-----	-----	-----	-----
NPS 2 / DN 50 With Gauge Port but Without Control Line	Welded CL300 RF	-----	ERAA01952A0	ERAA01952A3	ERAA01952A2	-----	-----	-----	-----
	NPT	ERAA02512A0	ERAA02512A1	ERAA02512A4	ERAA02512A3	ERAA02512A2	-----	-----	-----
	Welded CL150 RF	-----	ERAA02505A0	ERAA02505A3	ERAA02505A2	ERAA02505A1	-----	-----	-----
	Welded CL300 RF	-----	ERAA02506A0	ERAA02506A3	ERAA02506A2	ERAA02506A1	-----	-----	-----
NPS 2 / DN 50 With Gauge Port but Without Control Line	Welded PN 16/25/40 RF	-----	ERAA02507A0	ERAA02507A2	-----	ERAA02507A1	-----	-----	-----

1. Meets the chemical and physical requirements of NACE MR0175-2002, NACE MR0103 and NACE MR0175/ISO 15156.
Note: Contact your local Sales Office if additional gauge and control line options are needed.

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Key 2, Spring Case Part Numbers

TYPE	BODY SIZE		STYLE	SPRING CASE MATERIAL					
	In.	DN		Gray Cast Iron	WCC Steel ⁽¹⁾	LCC Steel ⁽¹⁾	CF8M Stainless Steel ⁽¹⁾	Monel [®] (1)	Hastelloy [®] C ⁽¹⁾
MR98L	1/4 NPT	----	Drilled Hole (standard)	ERCA03546A0	ERCA02874A0	ERCA02874A3	ERCA02874A2	-----	-----
			1/4 NPT Vent	ERCA00609A1	ERAA01872A2	ERAA01872A3	ERAA01872A3	-----	-----
	1/2	15	Drilled Hole (standard)	ERCA03564A0	ERCA02883A0	ERCA02883A3	ERCA02883A2	-----	-----
			1/4 NPT Vent	ERCA00615A0	ERAA01885A0	ERAA01885A4	ERAA01885A1	ERAA01885A2	ERAA01885A3
	3/4 and 1	20 and 25	Drilled Hole (standard)	ERCA03497A0	ERCA02908A0	ERCA02908A3	ERCA02908A2	-----	-----
			1/4 NPT Vent	ERCA00623A0	ERCA00621A2	ERCA00621A6	ERCA00621A3	ERCA00621A4	ERCA00621A5
MR98LD	1/4 NPT	----	1/4 NPT Vent (standard)	-----	ERCA03517A0	ERCA03517A3	ERCA03517A2	-----	-----
	1/2	15	1/4 NPT Vent (standard)	-----	ERCA03531A0	ERCA03531A3	ERCA03531A2	-----	-----
	3/4 and 1	20 and 25	1/4 NPT Vent (standard)	-----	ERCA04405A0	ERCA04405A2	ERCA04405A1	-----	-----
MR98H	1/4 NPT	----	Drilled Hole (standard)	ERCA03544A0	ERCA02872A0	ERCA02872A3	ERCA02872A2	-----	-----
			1/4 NPT Vent	ERCA00610A1	ERAA01873A2	ERAA01873A4	ERAA01873A3	-----	-----
	1/2	15	Drilled Hole (standard)	ERCA03562A0	ERCA02881A0	ERCA02881A3	ERCA02881A2	-----	-----
			1/4 NPT Vent	ERCA00616A0	ERAA01886A0	ERAA01886A4	ERAA01886A1	ERAA01886A2	ERAA01886A3
	3/4 and 1	20 and 25	Drilled Hole (standard)	ERCA03496A0	ERCA02907A0	ERCA02907A3	ERCA02907A2	-----	-----
			1/4 NPT Vent	ERCA00624A0	ERCA00622A2	ERCA00622A6	ERCA00622A3	ERCA00622A4	ERCA00622A5
	1-1/2 and 2	40 and 50	1/4 NPT Vent	ERCA03641A0	ERCA02900A0	ERCA02900A5	ERCA02900A2	ERCA02900A3	ERCA02900A4
			1/4 NPT Vent (standard)	-----	ERCA03515A0	ERCA03515A3	ERCA03515A2	-----	-----
MR98HD and MR98HDP	1/4 NPT	----	1/4 NPT Vent (standard)	-----	ERCA03529A0	ERCA03529A3	ERCA03529A2	-----	-----
	1/2	15	1/4 NPT Vent (standard)	-----	ERCA03529A0	ERCA03529A3	ERCA03529A2	-----	-----
	3/4 and 1	20 and 25	1/4 NPT Vent (standard)	-----	ERCA03499A0	ERCA03499A3	ERCA03499A2	-----	-----
	1-1/2 and 2	40 and 50	1/4 NPT Vent (standard)	-----	ERCA03691A0	ERCA03691A3	ERCA03691A2	-----	-----
MR98HH	1/4 NPT	----	1/4 NPT Vent	-----	ERCA01262A0	ERCA01262A3	ERCA01262A2	-----	-----
	1/2	15	1/4 NPT Vent	-----	ERCA00619A0	ERCA00619A3	ERCA00619A2	-----	-----
	3/4 and 1	20 and 25	1/4 NPT Vent	-----	ERCA03279A0	ERCA03279A3	ERCA03279A2	-----	-----
MR98HHD	1/4 NPT	----	1/4 NPT Vent (standard)	-----	ERCA01358A0	ERCA01358A3	ERCA01358A2	-----	-----
	1/2	15	1/4 NPT Vent (standard)	-----	ERCA01381A0	ERCA01381A3	ERCA01381A2	-----	-----
	3/4 and 1	20 and 25	1/4 NPT Vent (standard)	-----	ERCA01360A0	ERCA01360A3	ERCA01360A2	-----	-----

1. Meets the chemical and physical requirements of NACE MR0175-2002, NACE MR0103 and NACE MR0175/ISO 15156.

Key 4*, Valve Plug, Metal Seat

BODY SIZE		BODY STYLE	VALVE PLUG MATERIAL				
In.	DN		416 Stainless Steel	316 Stainless Steel ⁽¹⁾	Alloy 6 ⁽¹⁾	Hastelloy [®] C ⁽¹⁾	Monel [®] (1)
1/4 NPT	----	Without control line	GF04909X022	GF04909X032	-----	GF04909X052	GF04909X042
1/2	15	Without control line	ERCA01337A0	ERCA01337A1	ERCA01337A4	ERCA01337A3	ERCA01337A2
		With control line	ERCA01305A0	ERCA01305A1	-----	ERCA01305A3	ERCA01305A2
3/4 and 1	20 and 25	Without control line	GF04828X022	GF04828X032	GF04828X062	GF04828X052	GF04828X042
		With control line	GF05479X022	GF05479X032	-----	GF05479X052	GF05479X042
1-1/2 and 2	40 and 50	Without control line	GF04899X022	GF04899X032	GF04899X062	GF04899X052	GF04899X042
		With control line and with composition diaphragm	GF05514X022	GF05514X032	-----	GF05514X052	GF05514X042
		With control line and with metal diaphragm	GF05514X022	GF05514X032	-----	GF05518X052	GF05518X042

1. NACE MR0175-2002, NACE MR0103 and NACE MR0175/ISO 15156.

*Recommended Spare Part

Monel[®] is a mark owned by Special Metals Corporation.
Hastelloy[®] C is a mark owned by Haynes International, Inc.

MR98 Series

Key 4, Valve Plug, Composition Seat*

BODY SIZE		BODY STYLE	VALVE PLUG MATERIAL		
In.	DN		416 Stainless Steel	316 Stainless Steel ⁽¹⁾⁽²⁾	Hastelloy® C ⁽¹⁾
1/4 NPT	----	Without control line	GF05032X022	GF05032X032	-----
1/2	15	Without control line	ERCA01338A0	ERCA01338A1	-----
		With control line	ERCA01333A0	ERCA01333A1	ERCA01333A3
3/4 and 1	20 and 25	Without control line	GF04829X022	GF04829X032	-----
		With control line	GF05547X022	GF05547X032	GF05547X052
1-1/2 and 2	40 and 50	Without control line	GF05520X022	GF05520X032	-----
		With control line	GF05518X022	GF05518X032	GF05518X052

*Recommended Spare Part
1. NACE MR0175-2002, NACE MR0103 and NACE MR0175/ISO 15156.
2. Oxygen Service

Key 12, Composition Diaphragm, NACE*

TYPE	BODY SIZE		DIAPHRAGM MATERIAL			
	In.	DN	Neoprene (CR)	Fluorocarbon (FKM) (2 required)	EPDM	Sanitary EPDM ⁽¹⁾
MR98L and MR98LD	1/4 NPT	----	GF05051X012	GF05051X022	GF05051X032	GF05051X042
	1/2	15	ERCA00514A0	ERCA00514A1	ERCA00514A2	ERCA00514A4
	3/4 and 1	20 and 25	ERCA00603A0	ERCA00603A1	ERCA00603A2	ERCA00603A4
MR98H, MR98HH, MR98HD, MR98HDP and MR98HHD	1/4 NPT	----	GF05045X012	GF05045X022	GF05045X032	GF05045X042
	1/2	15	ERCA00512A0	ERCA00512A1	ERCA00512A2	ERCA00512A5
	3/4 and 1	20 and 25	ERCA00518A0	ERCA00518A1	ERCA00518A2	ERCA00518A5
	1-1/2 and 2	40 and 50	ERCA00661A0	ERCA00661A1	ERCA00661A2	ERCA00661A5

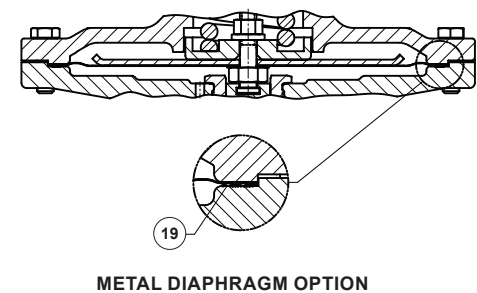
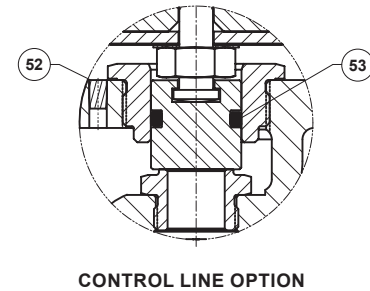
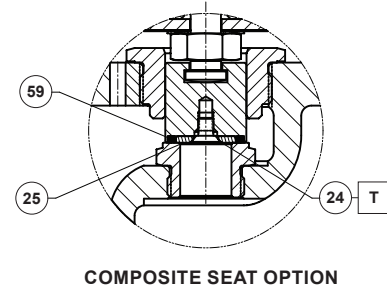
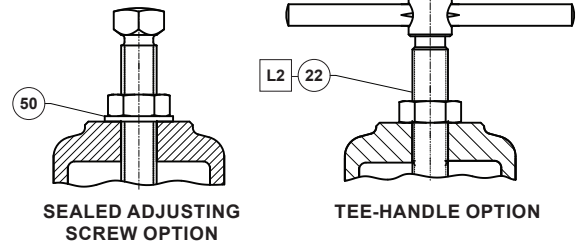
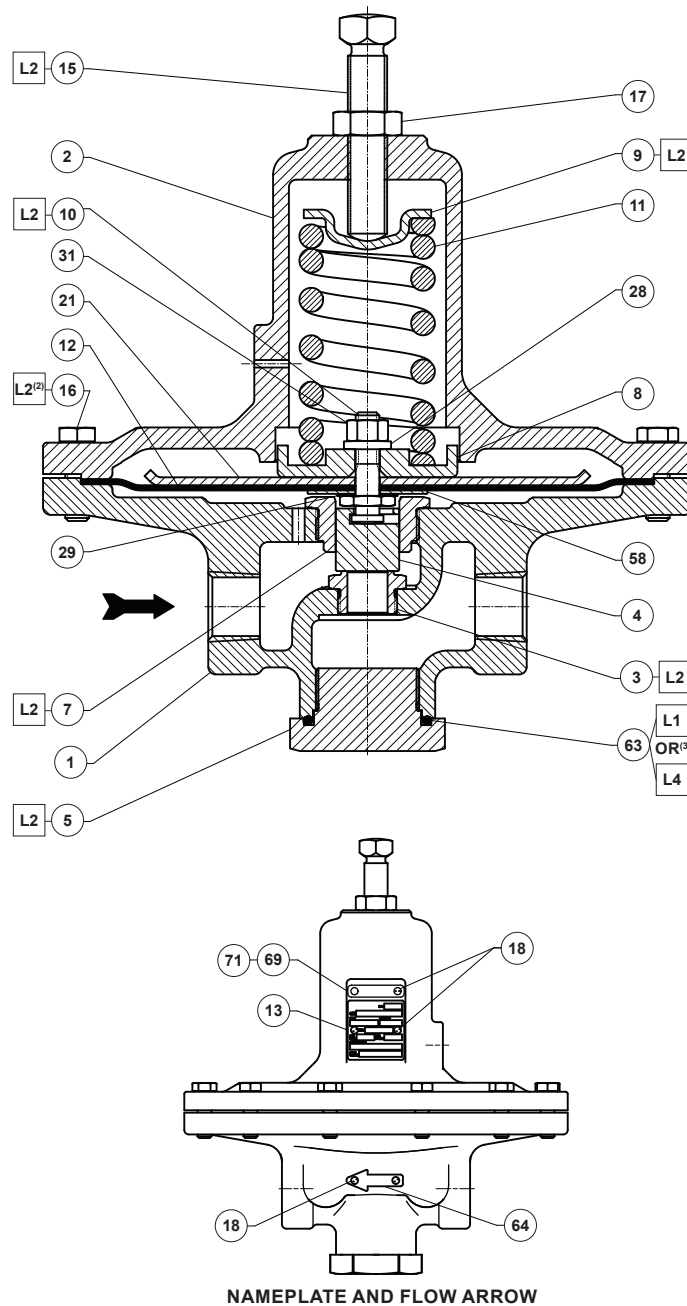
*Recommended Spare Part
1. EPDM meets FDA, USP Class VI and ADI Free requirements.

Key 12, Metal Diaphragm*

TYPE	BODY SIZE		BODY MATERIAL (2 REQUIRED)			
	In.	DN	302 Stainless Steel	302 Stainless Steel (Oxygen Service)	Monel®	Hastelloy® C
MR98L	1/4 NPT	----	GF05030X012 ⁽¹⁾	GF05030X022 ⁽¹⁾	GF05030X032 ⁽¹⁾	GF05030X042 ⁽¹⁾
	1/2	15	ERCA00506A0	ERCA00506A1	ERCA00506A2	ERCA00506A3
	3/4 and 1	20 and 25	ERCA00112A0	ERCA00112A1	ERCA00112A2	ERCA00112A3
MR98H	1/4 NPT	----	GF04912X012	GF04912X022	GF04912X032	GF04912X042
	1/2	15	ERCA00496A0	ERCA00496A1	ERCA00496A2	ERCA00496A3
	3/4 and 1	20 and 25	GF05737X022	GF05737X032	GF05737X042	GF05737X052
	1-1/2 and 2	40 and 50	ERCA00527A0	ERCA00527A1	ERCA00527A2	ERCA00527A3
MR98LD	1/4 NPT	----	GF05030X012 ⁽¹⁾	-----	GF05030X032 ⁽¹⁾	GF05030X042 ⁽¹⁾
	1/2	15	ERCA00506A0	-----	ERCA00506A2	ERCA00506A3
	3/4 and 1	20 and 25	ERCA00112A0	-----	ERCA00112A2	ERCA00112A3
MR98HD and MR98HDP	1/4 NPT	----	GF04912X012	-----	GF04912X032	GF04912X042
	1/2	15	ERCA00496A0	-----	ERCA00496A2	ERCA00496A3
	3/4 and 1	20 and 25	GF05737X022	-----	GF05737X042	GF05737X052
	1-1/2 and 2	40 and 50	ERCA00527A0	-----	ERCA00527A2	ERCA00527A3
MR98HH	1/4 NPT	----	GF04912X012	GF04912X022	GF04912X032	GF04912X042
	1/2	15	ERCA00496A0	ERCA00496A1	ERCA00496A2	ERCA00496A3
	3/4 and 1	20 and 25	GF05737X022	GF05737X032	GF05737X042	GF05737X052
MR98HHD	1/4 NPT	----	GF04912X012	-----	GF04912X032	GF04912X042
	1/2	15	ERCA00496A0	-----	ERCA00496A2	ERCA00496A3
	3/4 and 1	20 and 25	GF05737X022	-----	GF05737X042	GF05737X052

*Recommended Spare Part
1. Only one metal diaphragm is needed for Types MR98L and MR98LD with 1/4 NPT body size and 2 to 7 psi / 0.14 to 0.48 bar spring range.

Monel® is a mark owned by Special Metals Corporation.
Hastelloy® C is a mark owned by Haynes International, Inc.



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.

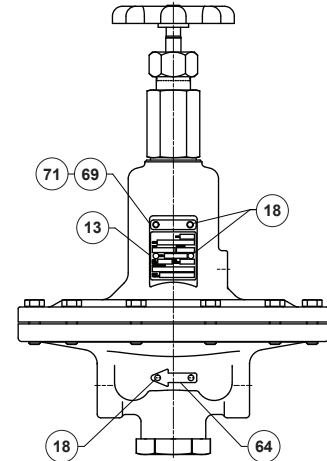
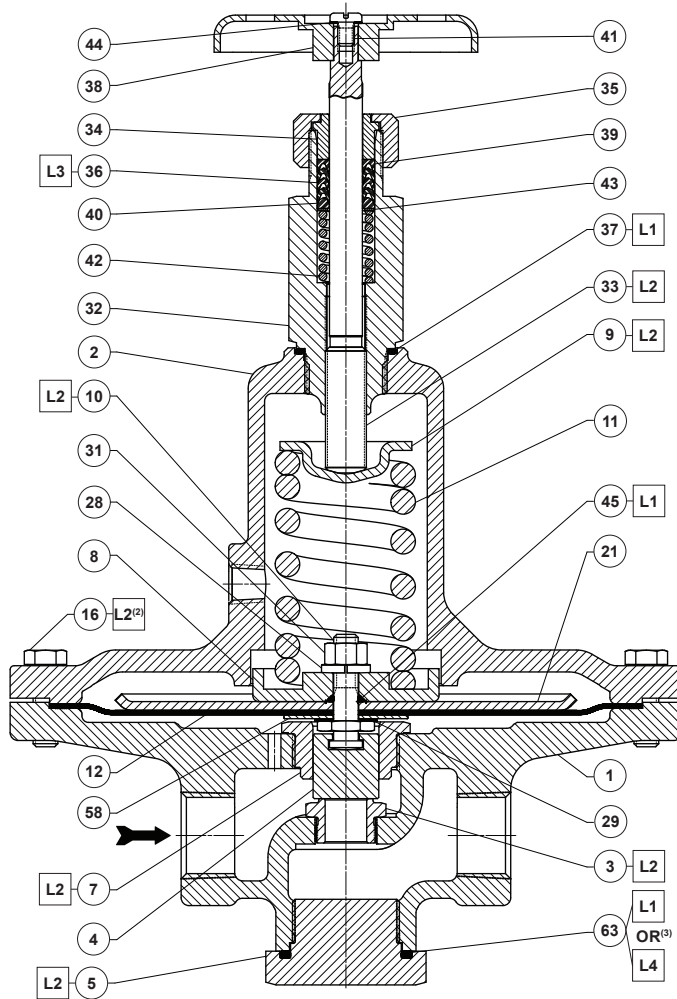
2. Apply L2 (anti-seize compound) on key 16 for Stainless steel bolts.

3. Apply L4 (graphite sealant) instead of L1 (general purpose PTFE or lithium grease) on key 63 for graphite ring.

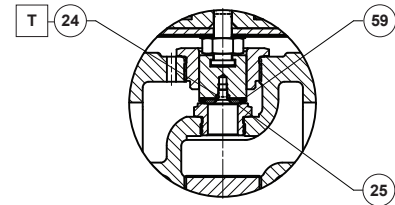
Note: Use key 69 or 71 only when specified.

Figure 4. Type MR98L Assembly

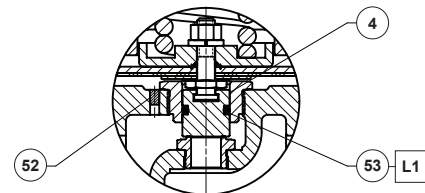
MR98 Series



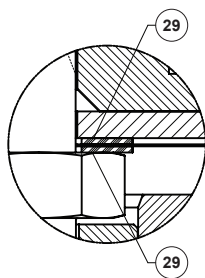
NAMEPLATE AND FLOW ARROW



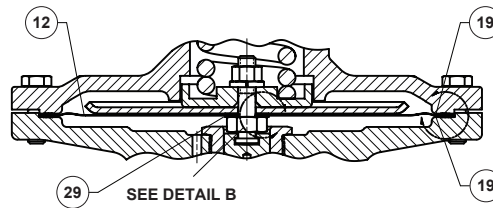
COMPOSITE SEAT OPTION



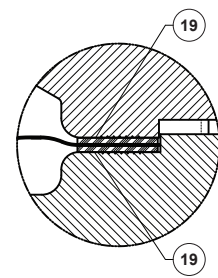
CONTROL LINE OPTION



DETAIL B



METAL DIAPHRAGM OPTION



DETAIL A

GF04921

□ 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

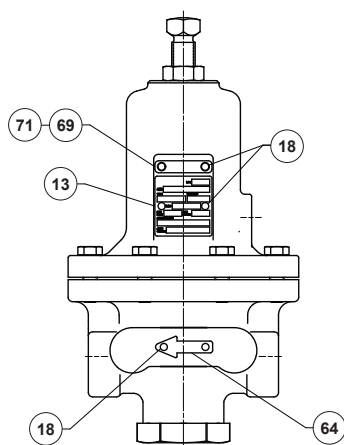
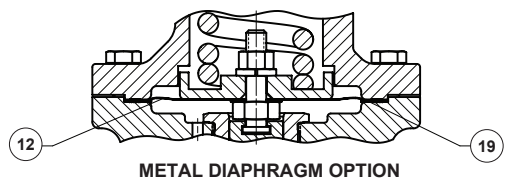
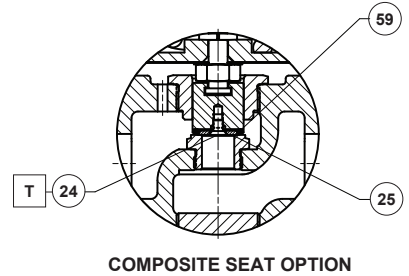
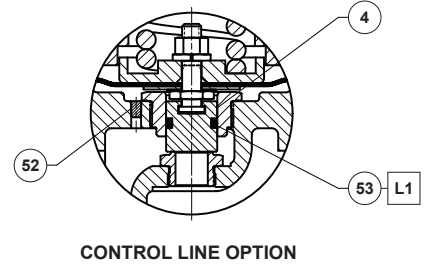
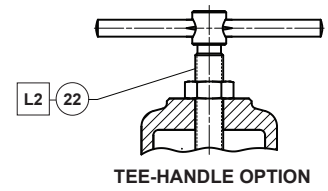
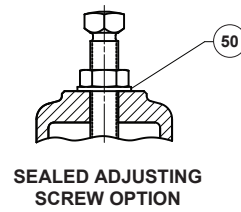
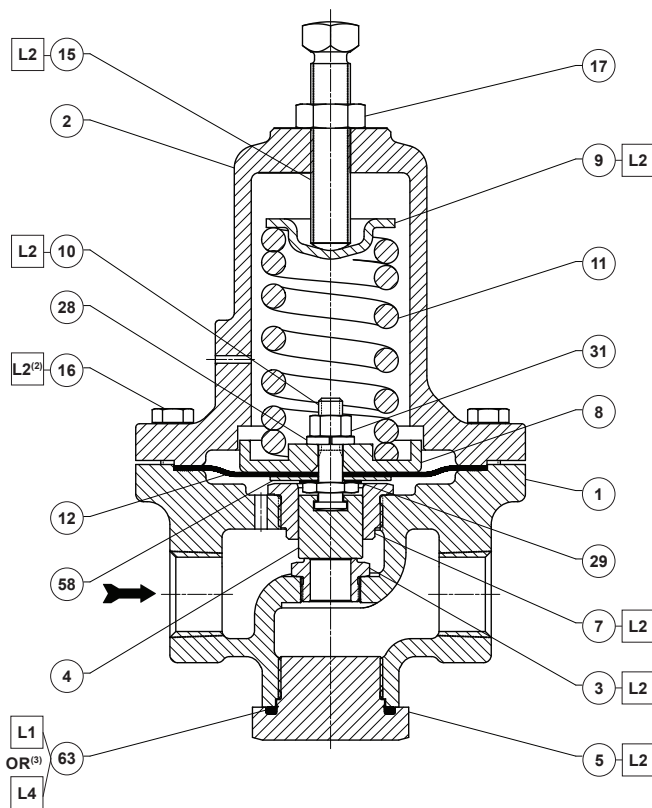
1. Lubricants and sealants must be selected such that they meet the temperature requirements.

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.

Note: Use key 69 or 71 only when specified.

Figure 5. Type MR98LD Assembly



NAMEPLATE AND FLOW ARROW

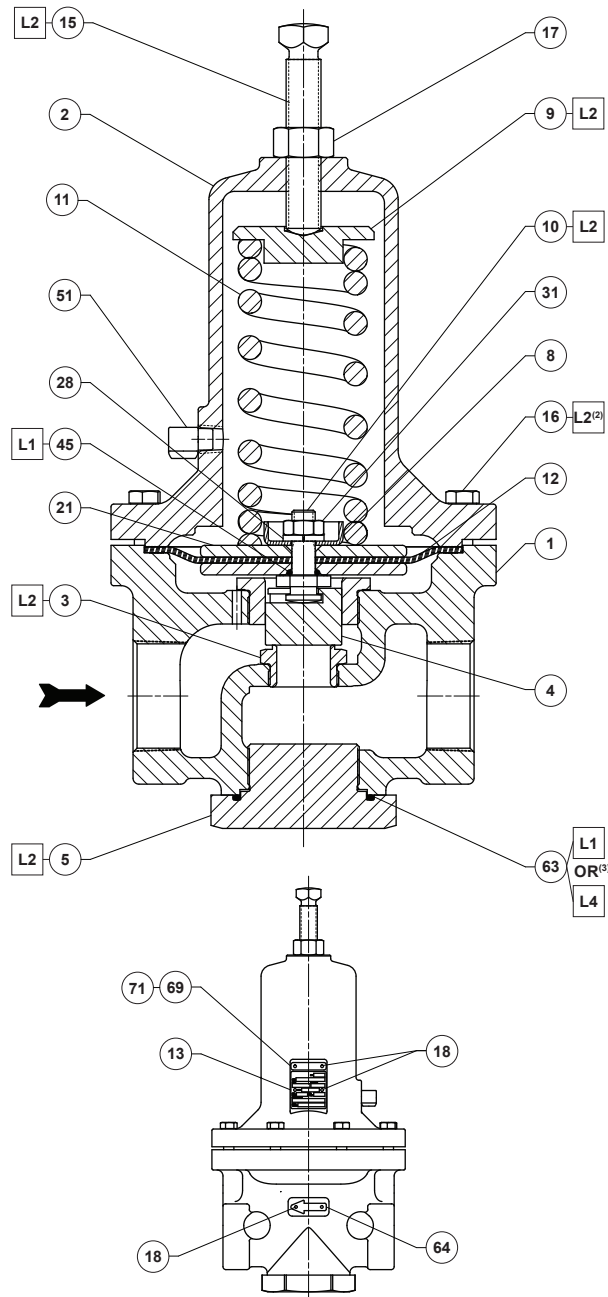
GF04916

- ☐ **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

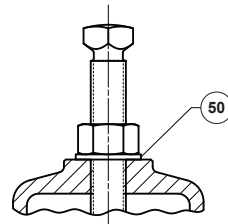
1. Lubricants and sealants must be selected such that they meet the temperature requirements.
 2. Apply L2 (anti-seize compound) on key 16 for Stainless steel bolts.
 3. Apply L4 (graphite sealant) instead of L1 (general purpose PTFE or lithium grease) on key 63 for graphite ring.
- Note: Use key 69 or 71 only when specified.

Figure 6. Type MR98H Assembly with 1/4 NPT to NPS 1 / DN 25 Body Sizes

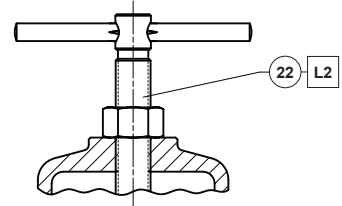
MR98 Series



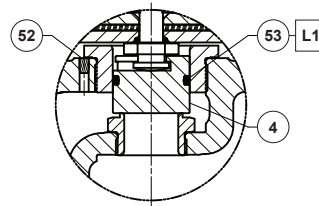
NAMEPLATE AND FLOW ARROW



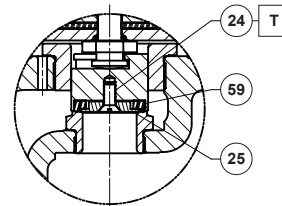
SEALED ADJUSTING SCREW OPTION



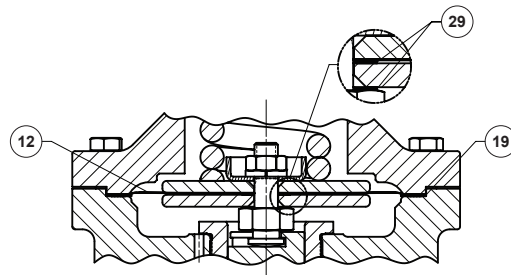
TEE-HANDLE OPTION



CONTROL LINE OPTION



COMPOSITE SEAT OPTION



METAL DIAPHRAGM OPTION

ERAA03248

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

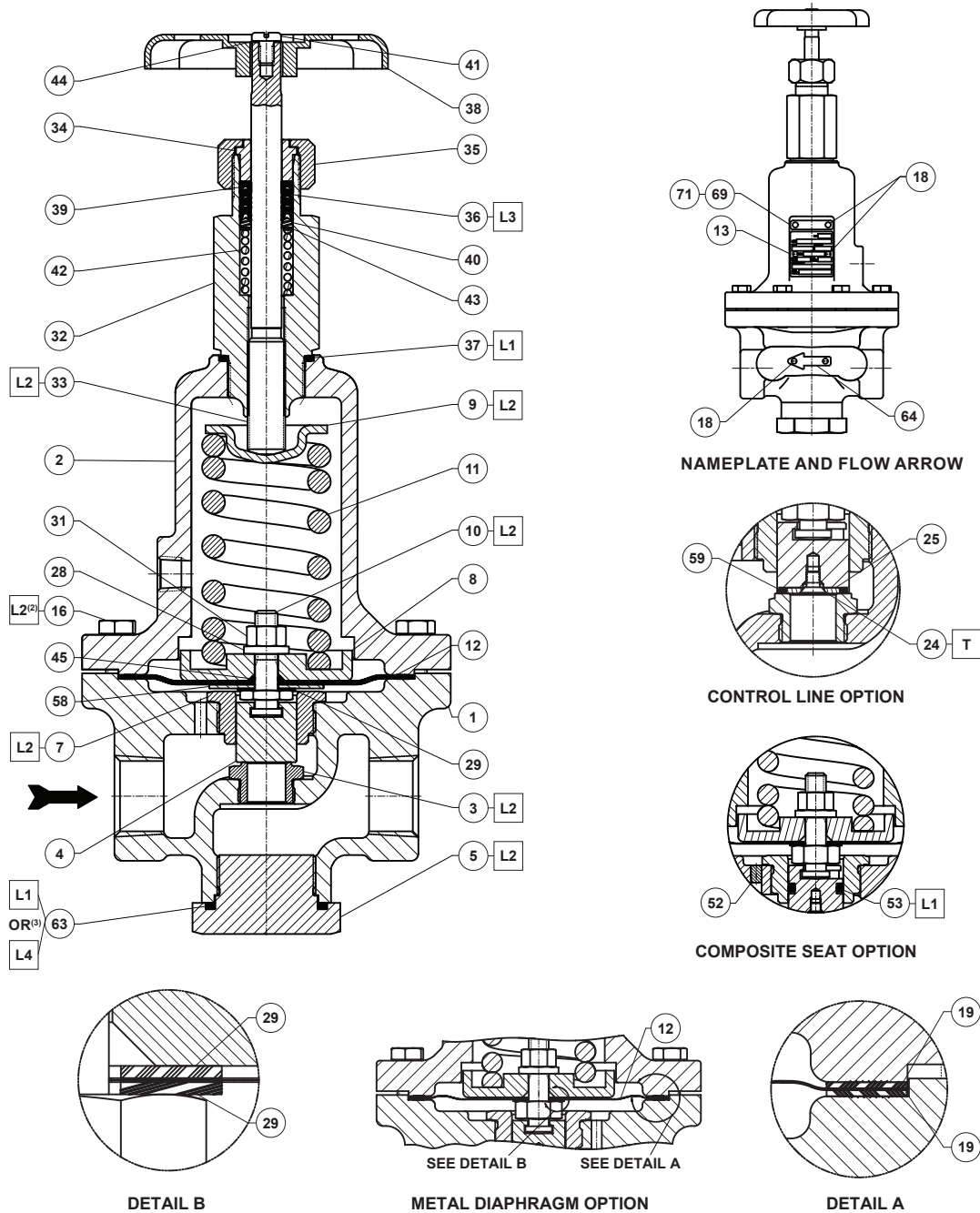
1. Lubricants and sealants must be selected such that they meet the temperature requirements.

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.

Note: Use key 69 or 71 only when specified.

Figure 7. Type MR98H Assembly with NPS 1-1/2 to 2 / DN 40 to 50 Body Sizes



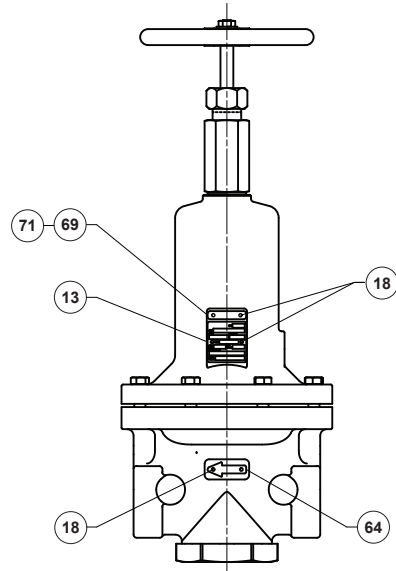
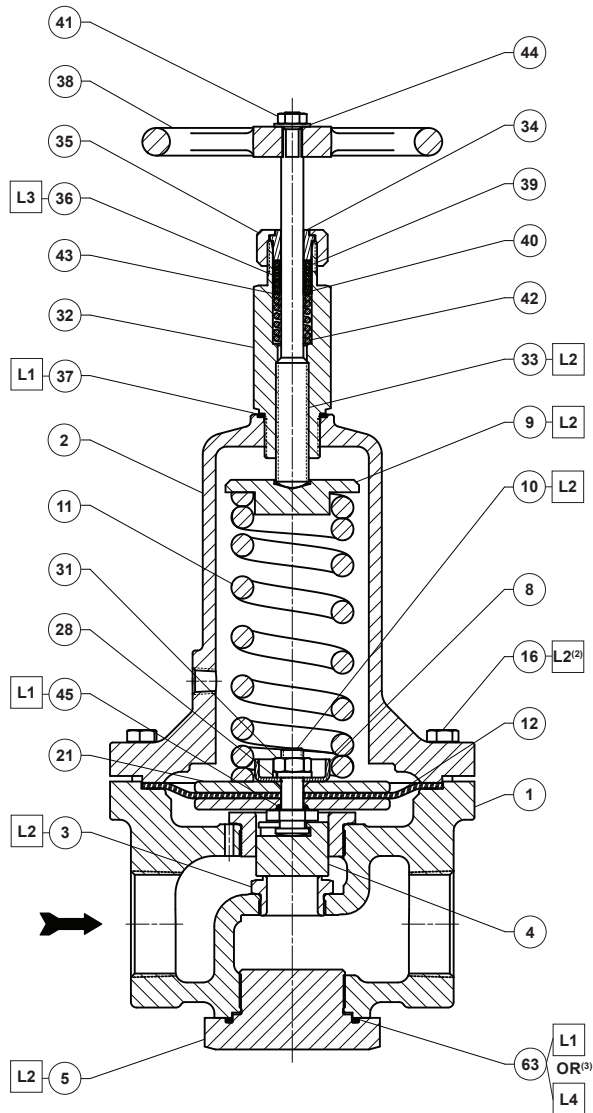
GF04920

- ☐ **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

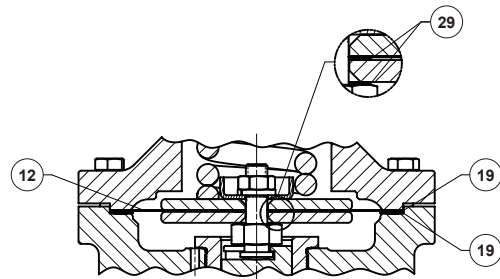
1. Lubricants and sealants must be selected such that they meet the temperature requirements.
 2. Apply L2 (anti-seize compound) on key 16 for Stainless steel bolts.
 3. Apply L4 (graphite sealant) instead of L1 (general purpose PTFE or lithium grease) on key 63 for graphite ring.
 Note: Use key 69 or 71 only when specified.

Figure 8. Type MR98HD Assembly with 1/4 NPT to NPS 1 / DN 25 Body Sizes

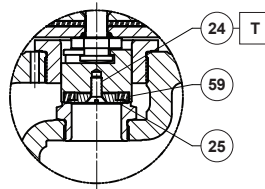
MR98 Series



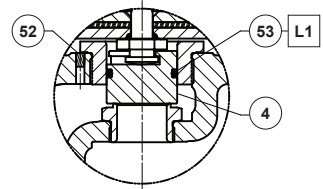
NAMEPLATE AND FLOW ARROW



METAL DIAPHRAGM OPTION



COMPOSITE SEAT OPTION



CONTROL LINE OPTION

ERAA03271

□ APPLY⁽¹⁾:

T = THREAD LOCKER

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

L3 = SILICONE GREASE

L2 = ANTI - SEIZE COMPOUND

L4 = GRAPHITE SEALANT FOR GRAPHITE RING

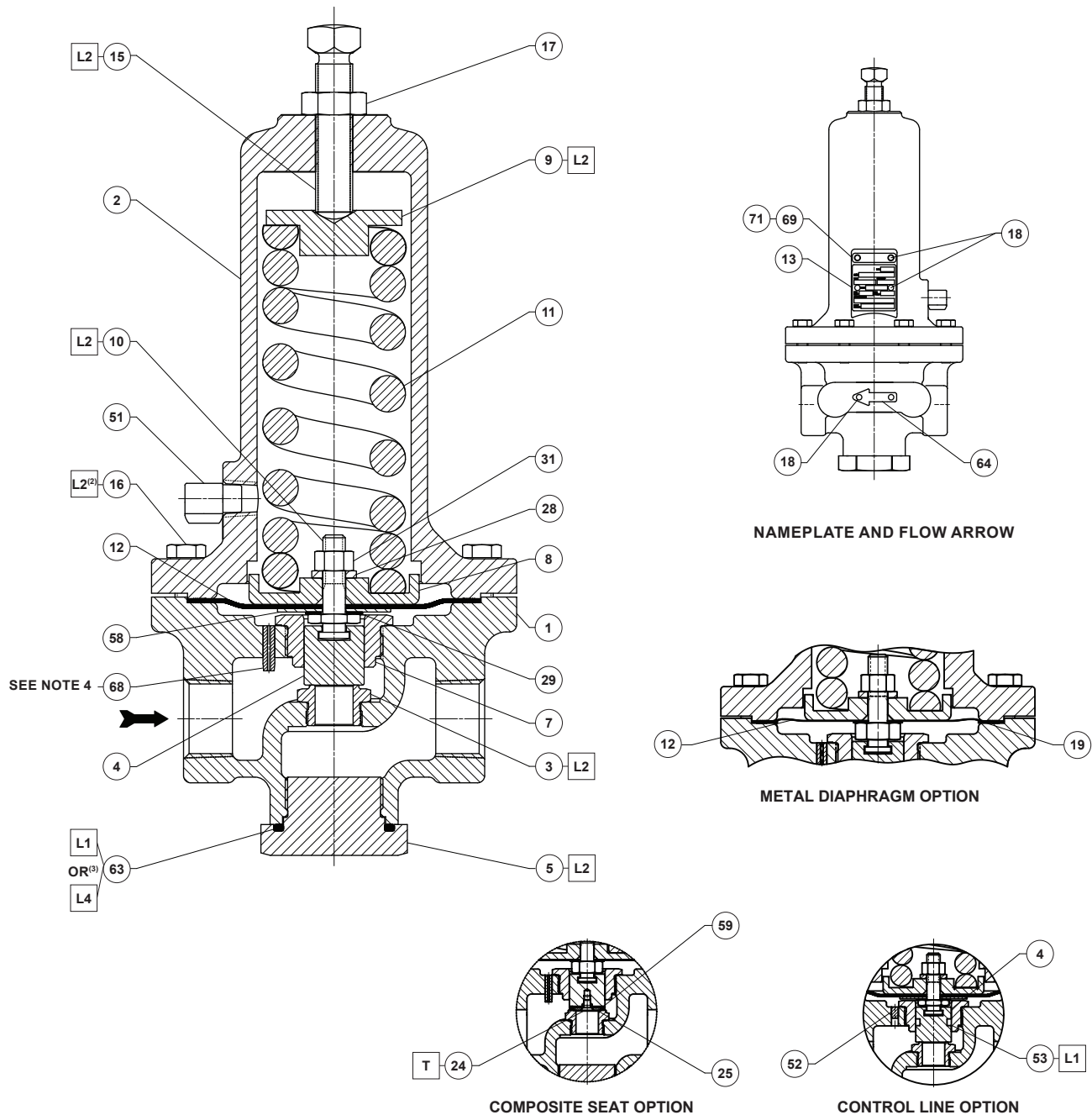
1. Lubricants and sealants must be selected such that they meet the temperature requirements.

2. Apply L2 (anti-seize compound) on key 16 only for Stainless steel bolts.

3. Apply L4 (graphite sealant) instead of L1 (general purpose PTFE or lithium grease) on key 63 for graphite ring.

Note: Use key 69 or 71 only when specified.

Figure 9. Type MR98HD Assembly with NPS 1-1/2 to 2 / DN 40 to 50 Body Sizes



ERCA00605

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 only for Stainless steel bolts.

3. Apply L4 (graphite sealant) instead of L1 (general purpose PTFE or lithium grease) on key 63 for graphite ring.

4. Key 68 is available for Type MR98HH with NPS 3/4 and 1 / DN 20 and 25 bodies only.

Note: Use key 69 or 71 only when specified.

Figure 10. Type MR98HH Assembly with 1/4 NPT to NPS 1 / DN 25 Body Sizes

MR98 Series

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