Bulletin 71.4
D103743X012

October 2026

MR98 Series Backpressure Regulators, Relief and Differential Relief Valves

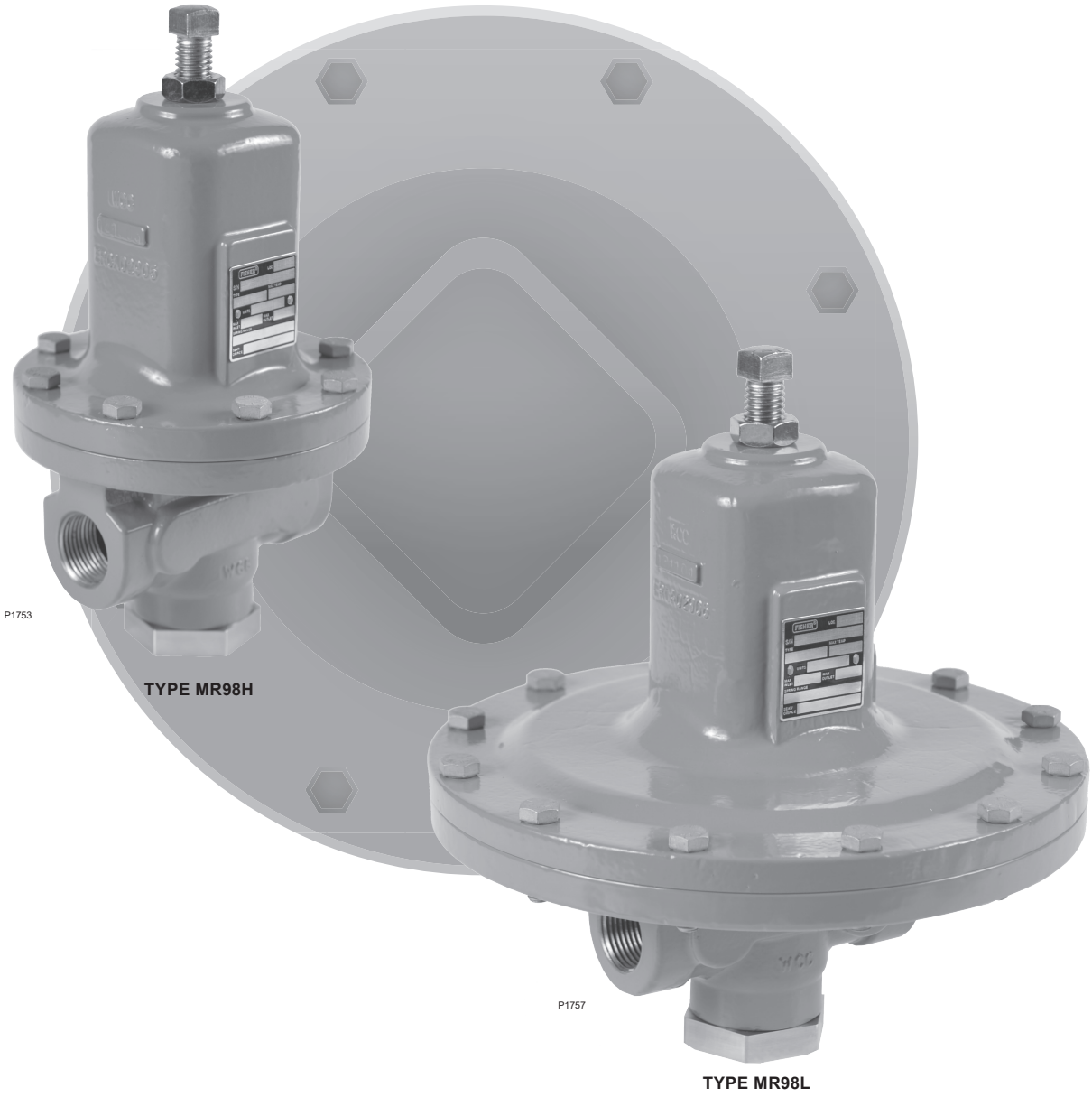


Figure 1. *Typical MR98 Series Backpressure Regulators, Relief and Differential Relief Valves*

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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. 1/4 in. to 1 in. 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. 1/4 in. to 1 in. 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 Sizes and End Connection Styles

See Tables 1 and 2

Relief Pressure Ranges(1)

See Table 3

Trim Materials

See Tables 4 and 5

Main Valve Materials

See Table 5

Body and Orifice Sizes

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

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

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

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

Maximum Cold Working Pressures of Body Size and Material(1)(3)

See Table 6

Maximum Inlet and Outlet Pressure Ratings(1)(4)

See Table 6

Maximum Spring Case Loading Pressure for Types MR98LD, MR98HD, MR98HDP and MR98HHD (Spring Setting Plus Loading Pressure)(1)(2)

See Table 6

Temperature Capabilities for Elastomer Parts(1)(5)(6)

See Table 7

Temperature Capabilities of Body Materials(1)(5)(6)

See Table 7

Flow Coefficients

BODY SIZE		C_v	C_g	C_1
In.	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
In.	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

Regulating C_v Values

Types MR98L and MR98LD: See Tables 8 and 9

Types MR98H, MR98HD and MR98HDP: See Tables 10 and 11

Types MR98HH and MR98HHD: See Tables 12 and 13

Flow Capacities

Types MR98L and MR98LD: See Tables 14 through 18

Types MR98H, MR98HD and MR98HDP: See Tables 19 through 23

Types MR98HH and MR98HHD: See Tables 24 through 28

Shutoff Classification Per ANSI/FCI 70-3-2004

Metal Seats: Class IV

Polytetrafluoroethylene (PTFE): Class IV

Elastomer Seats: Class VI or better

1. The pressure/temperature limits in this Bulletin and any applicable standard limitation should not be exceeded.
2. Loading pressure plus spring setting should not exceed maximum inlet pressure.
3. Temperature and/or the body end connection may decrease these maximum pressures.
4. Maximum inlet pressure equals set pressure plus build-up.
5. Pressure and/or the body end connection may decrease these maximum temperatures.
6. 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.

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Specifications (continued)

Pressure Registration
Internal or External

Approximate Weights
MR98H Series:
1/4 NPT body: 5 lbs / 2.3 kg
1/2 in. / DN 15 body: 10 lbs / 4.5 kg
3/4 and 1 in. / DN 20 and 25 bodies: 22 lbs / 10 kg
1-1/2 and 2 in. / DN 40 and 50 bodies:
55 lbs / 25 kg
MR98L Series:
1/4 NPT body: 7 lbs / 3.2 kg

Approximate Weights (continued)
MR98L Series: (continued)
1/2 in. / DN 15 body: 15 lbs / 6.8 kg
3/4 and 1 in. / DN 20 and 25 bodies: 35 lbs / 16 kg

Options
- Handwheel or tee handle for Types MR98L, MR98H and MR98HH
- Tapped spring case vent for Types MR98L, MR98H and MR98HH
- Seal washer to permit spring case pressure loading for Types MR98L, MR98H and MR98HH

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Introduction

MR98 Series (Figure 1) is used for backpressure or relief applications in liquid, gas, air and steam service. The Types MR98L, MR98H and MR98HH are direct-operated and spring-loaded. The Types MR98LD, MR98HD, MR98HDP and MR98HHD use additional pressure loading to maintain relief differential pressures, backpressures or for remote setpoint adjustment.

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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 in.	Without Control Line and Gauge Port	NPT	■	■	■	■	
1/2 in. / 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		■	■	■	
3/4 in. / 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		■		■	
1 in. / 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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Table 2. *Types MR98H, MR98HD, MR98HDP, MR98HH 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]	Aluminum-Bronze
1/4 in.	Without Control Line and Gauge Port	NPT	■	■	■	■		
1/2 in. / 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 CL150 RF		■	■			
		Welded CL300 RF		■	■			
3/4 in. / 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		■		■		
1 in. / 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		■		■		

■ – 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.

- continued -

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

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]	Aluminum-Bronze
1-1/2 in. / DN 40 Types MR98H, MR98HD and MR98HDP 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		■		■		
2 in. / DN 50 Types MR98H, MR98HD and MR98HDP only	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		■		■		

■ – 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 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	SPRING PART NUMBER	SPRING COLOR
	In.	DN	psig	bar	In.	mm	In.	mm			
MR98L and MR98LD	1/4	- - - -	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	ERCA04288A0	Yellow
			6 to 14	0.41 to 0.97	0.234	5.94	2.595	65.9	Powder-coated steel	ERAA01910A0	Green
			12 to 25	0.83 to 1.7	0.283	7.19	2.44	62.0	Powder-coated steel	ERAA01911A0	Red
			20 to 38	1.4 to 2.6	0.331	8.41	2.250	57.2	Powder-coated steel	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	1E398927022	Yellow
			6 to 14	0.41 to 0.97	0.343	8.71	4.00	102	Powder-coated steel	1E399027142	Green
			12 to 25	0.83 to 1.7	0.406	10.3	4.00	102	Powder-coated steel	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	- - - -	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	ERCA04288A0	Yellow
			25 to 75	1.7 to 5.2	0.234	5.94	2.595	65.9	Powder-coated steel	ERAA01910A0	Green
			70 to 140	4.8 to 9.7	0.283	7.19	2.44	62.0	Powder-coated steel	ERAA01911A0	Red
			130 to 200	9.0 to 13.8	0.331	8.41	2.250	57.2	Powder-coated steel	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	1E398927022	Yellow
			25 to 75	1.7 to 5.2	0.343	8.71	4.00	102	Powder-coated steel	1E399027142	Green
			70 to 140	4.8 to 9.7	0.406	10.3	4.00	102	Powder-coated steel	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	1E792327092	Dark Gray
			20 to 65	1.4 to 4.5	0.500	12.7	6.50	165	Powder-coated steel	ERCA04290A0	Black with light blue stripe
			50 to 100	3.4 to 6.9	0.562	14.3	6.562	167	Powder-coated steel	ERAA01893A0	Light Gray
			75 to 170	5.2 to 11.7	0.625	15.9	6.565	167	Powder-coated steel	1P7888X0022	Black
MR98HH and MR98HHD	1/4	- - - -	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.

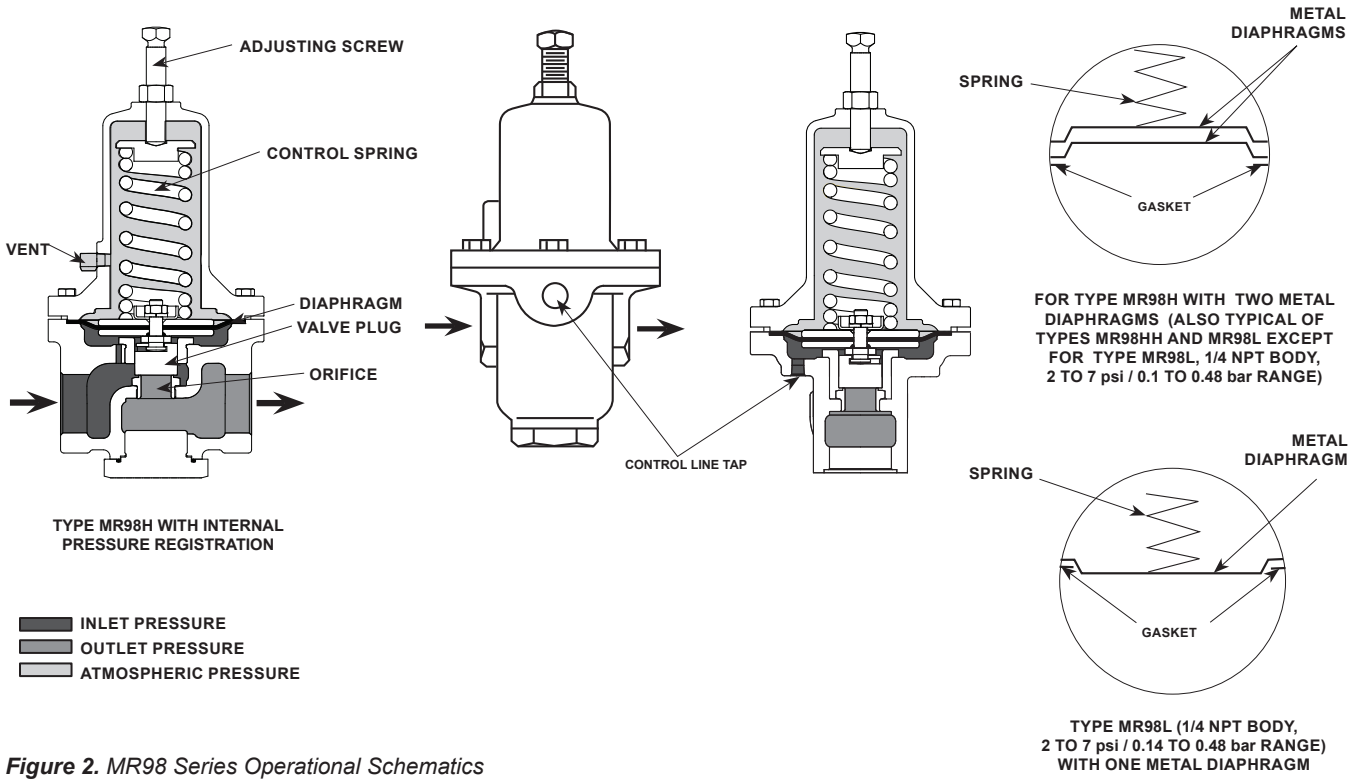


Figure 2. *MR98 Series Operational Schematics*

Features

- **Versatility—**Typical applications include control and maintenance of backpressure on pumps, differential pressure across lubricated seals, steam header pressure, fuel and oil lines pressure, air supply systems pressure, pump bypass applications for API general and special purpose lube and seal oil systems, relief applications for flash tanks and accumulators and other process and industrial uses.
- **Excellent Fluid Compatibility—**Diaphragms come in stainless steel, Monel®, Hastelloy® C or elastomers and body is available in gray cast iron, steel, stainless steel, Aluminum-bronze, Hastelloy® C and Monel®. Corrosion-resistant trims are available.
- **Close, Stable Regulation—**Diaphragm is isolated from the main flow stream. Slotted valve plug and pusher post assembly provides positive guiding for improved shutoff.
- **Compact Design—**Small size allows easy installation in limited spaces.
- **Differential Pressure Capability—**Spring-loaded PTFE packing and tapped connections permit pressure loading of Types MR98LD, MR98HD, MR98HDP and MR98HHD spring cases.
- **Handwheels—**Handwheels (standard on the Types MR98LD, MR98HD, MR98HDP and MR98HHD and optional on some sizes of the Types MR98L and MR98H) allow easy pressure setting changes.
- **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. Environmental limitations may apply and shall be determined by the user.
- **Arctic Temperature Constructions—**for process temperatures as low as -76°F / -60°C.
- **API 614 Compliant—**Steel and stainless steel constructions with stainless steel trim meet API 614 requirements.
- **FDA, USP Class VI and ADI Free EPDM Elastomers—**for use in applications requiring clean regulator solutions (wetted components only)
- **Hydrogen Ready—**Products have been evaluated for material compatibility, potential leakage and permeation and susceptibility to embitterment for Hydrogen applications. Based on an extensive evaluation and testing program, MR98 Series configurations are available for use in Hydrogen applications.

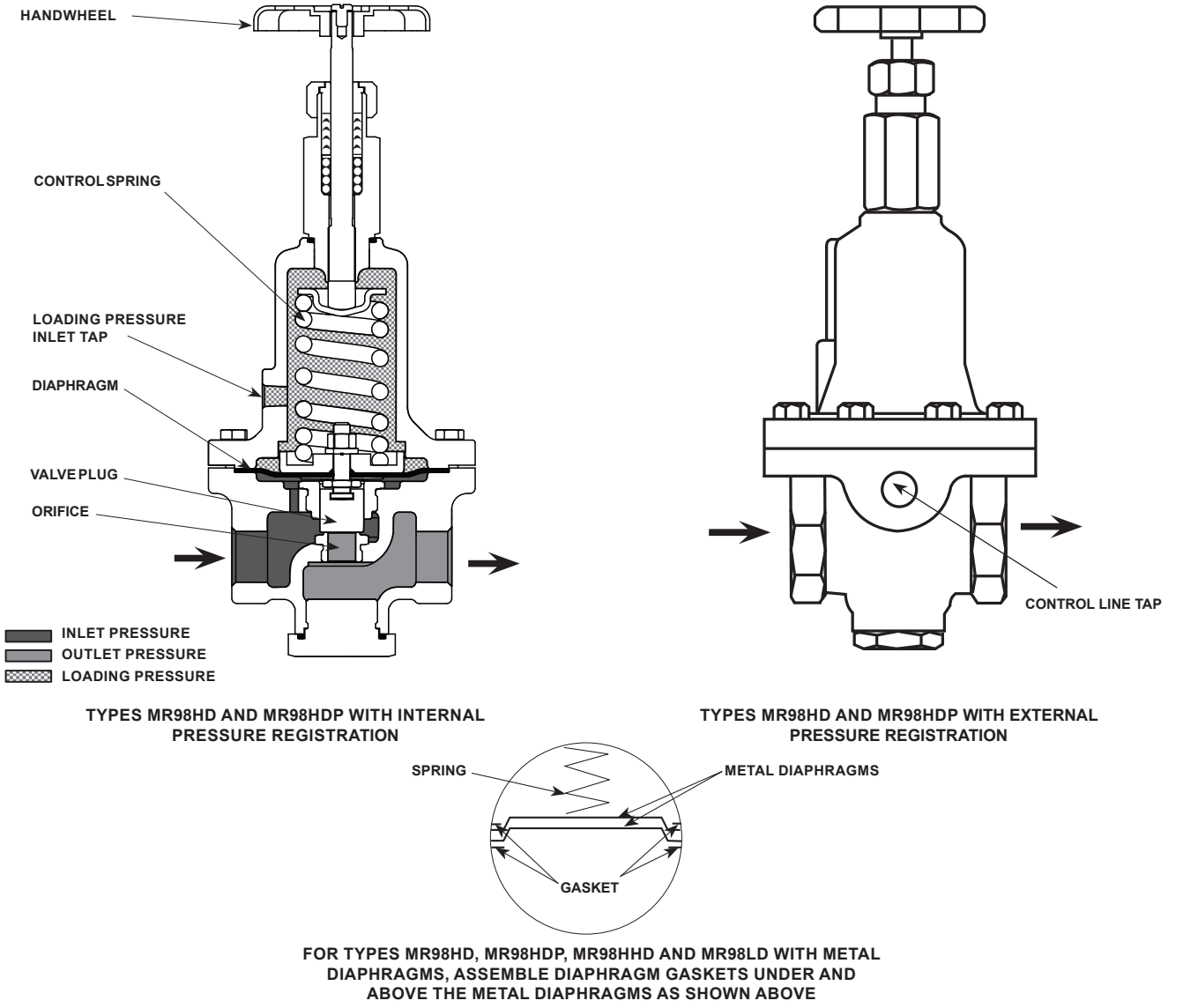


Figure 2. *MR98 Series Operational Schematics (continued)*

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 beyond the spring setting, the diaphragm pressure 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 resumes its closed position.

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 outlet pressures is maintained.

Capacity Information

Relieving capacities at selected pressures and outlet pressure flows are given in SCFH (60°F and 14.7 psia) of air in Tables 17, 18, 22, 23, 27 and 28. To determine the equivalent capacities for other gases, multiply the table capacities by the following appropriate conversion factors: 1.29 for 0.6 specific gravity natural gas, 0.808 for propane, 0.707 for butane or 1.018 for nitrogen. For gases of other specific gravities, divide by the square root of the appropriate specific gravity.

Then, if capacity is desired in normal cubic meters per hour (Nm^3/h) at 0°C and 1.01325 bar, multiply SFCH by 0.0268.

Typical relieving capacities in lbs per hour and kilogram per hour of saturated steam are shown in Tables 16, 21 and 26.

Tables 14, 15, 19, 20, 24 and 25 give relieving capacities in U.S. gallons per minute and in liters per minute of water.

Sizing

Determine Flow Rates for units used as differential relief valves as follows:

Air and Steam Service

When the Capacity Information section do not cover the actual service conditions, it will be necessary to calculate the flow rate available from the relief valve.

Step 1.

From the Capacity Information section determine a flow rate using the closest available data for setpoint and build-up. With this information, calculate a flow coefficient using the following:

Equation 1:

$$C_g = \frac{Q}{\sqrt{\frac{520}{GT}}\, P_{1a} SIN\left(\frac{3417}{C_1}\sqrt{\frac{\Delta P}{P_{1a}}}\right) DEG}$$

C_g = Calculated flow coefficient
Q = Flow rate from tables (SCFH)
P_{1a} = Inlet pressure from table (set pressure and build-up) converted to absolute pressure
G = Specific gravity
T = Absolute temperature of gas at inlet, °Rankine = °F + 460
P_1 = Absolute inlet pressure, psia = psig + 14.7
C_1 = See specifications section
ΔP = $P_1 - P_2$, psid

Calculate the C_g coefficient for the setting and build-up **nearest** to the desired service conditions **within the selected spring range**. Then use this C_g to calculate the approximate flow available for the actual setpoint and build-up desired. Available C_g will vary based upon setpoint, differential pressure, build-up and spring range.

Step 2.

Calculate the actual flow rate available using the coefficient from Step 1 and the actual inlet pressure (setpoint plus build-up) and actual outlet pressure (if not atmospheric).

Equation 2:

$$Q_{SCFH} = \sqrt{\frac{520}{GT}}\, C_g P_{1a} SIN\left(\frac{3417}{C_1}\sqrt{\frac{\Delta P}{P_{1a}}}\right) DEG$$

Liquid Sizing for Liquids Other than Water

Step 1.

Determine C_v at build-up conditions of application.

$$C_v = \frac{Q}{\sqrt{\Delta P}}$$

Q = Flow in GPM from capacity tables
ΔP = Pressure drop in psi (setpoint and build-up)
C_v = Valve sizing coefficient

Step 2.

To determine flow rate for liquids other than water or flow rate for differential relief service:

$$Q = C_v\sqrt{\Delta P/G}$$

G = Specific gravity of fluid

Maximum Allowable Pressure Drop for Liquid Service

Pressure drops in excess of allowable will result in choked flow and possible cavitation damage.

To determine maximum allowable pressure drop for water:

$\Delta P(allow)$ = $K_m (P_1)$
ΔP = Valve differential - psi
K_m = Valve recovery coefficient from table
P_1 = Valve inlet pressure psig

To determine maximum allowable pressure drop for fluids other than water, see Fisher™ Sizing Program.

Table 4. *MR98 Series Trim Materials*

TRIM NUMBER	SEAT	ORIFICE/ VALVE PLUG	VALVE PLUG GUIDE	STEM/STEM GUIDE	BOTTOM PLUG	WASHER
1	416 Stainless Steel	416 Stainless Steel	416 Stainless Steel	416 Stainless Steel	416 Stainless Steel	302 Stainless Steel
2	316 Stainless Steel	316 Stainless Steel	316 Stainless Steel	316 Stainless Steel	316 Stainless Steel	316 Stainless Steel
3	Alloy 6[1]	Alloy 6[1]	316 Stainless Steel	316 Stainless Steel	316 Stainless Steel	316 Stainless Steel
4	Hastelloy® C	Hastelloy® C	Hastelloy® C	Hastelloy® C	Hastelloy® C	Hastelloy® C
5	Monel®	Monel®	Monel®	Monel®	Monel®	Monel®
6	Nitrile (NBR)	416 Stainless Steel	416 Stainless Steel	416 Stainless Steel	416 Stainless Steel	302 Stainless Steel
7	Nitrile (NBR)	316 Stainless Steel	316 Stainless Steel	316 Stainless Steel	316 Stainless Steel	316 Stainless Steel
8	Fluorocarbon (FKM)	416 Stainless Steel	416 Stainless Steel	416 Stainless Steel	416 Stainless Steel	302 Stainless Steel
9	Fluorocarbon (FKM)	316 Stainless Steel	316 Stainless Steel	316 Stainless Steel	316 Stainless Steel	316 Stainless Steel
10	Ethylenepropylene (EPDM)	416 Stainless Steel	416 Stainless Steel	416 Stainless Steel	416 Stainless Steel	302 Stainless Steel
11	Ethylenepropylene (EPDM)	316 Stainless Steel	316 Stainless Steel	316 Stainless Steel	316 Stainless Steel	316 Stainless Steel
S10	Ethylenepropylene (EPDM)[2]	416 Stainless Steel	416 Stainless Steel	416 Stainless Steel	416 Stainless Steel	302 Stainless Steel
S11	Ethylenepropylene (EPDM)[2]	316 Stainless Steel	316 Stainless Steel	316 Stainless Steel	316 Stainless Steel	316 Stainless Steel

1. Alloy 6 is not available for 1/4 in. size.
2. EPDM meets FDA, USP Class VI and ADI Free requirements.

Table 5. *MR98 Series Construction Materials*

MAIN VALVE MATERIAL		
Body	**Spring Case**	**Control Spring**
Gray cast iron, WCC/LCC steel, CF8M/CF3M stainless steel, Monel®, Hastelloy® C or Aluminum-Bronze	Gray cast iron, WCC/LCC steel, CF8M stainless steel, Monel® or Hastelloy® C	Zinc-plated steel, Stainless steel, Powder-coated steel or Powder-coated stainless steel

TRIM MATERIAL		
Part Name	**Standard**	**Optional**
Elastomer Seat		
Seat	Nitrile (NBR)	Fluorocarbon (FKM), EPDM[4] or Perfluoroelastomer (FFKM)
Diaphragm	Neoprene (CR)	302 Stainless steel[1], Fluorocarbon (FKM)[2], Ethylenepropylene (EPDM)[2][4], Monel®[1], Hastelloy® C[1] or with PTFE protector[3]
Orifice	416 Stainless steel	316 Stainless steel, Monel® or Hastelloy® C
Valve Plug	416 Stainless steel	316 Stainless steel, Monel® or Hastelloy® C
Valve Plug Guide	416 Stainless steel	316 Stainless steel, Monel® or Hastelloy® C
Pusher Post	416 Stainless steel	316 Stainless steel, Monel® or Hastelloy® C
Washer	302 Stainless steel	316 Stainless steel, Monel® or Hastelloy® C
Metal Seat		
Seat	416 Stainless steel	316 Stainless steel, Monel®, Hastelloy® C or Alloy 6
Diaphragm	302 Stainless steel[1]	Monel®[1], Hastelloy® C[1], Fluorocarbon (FKM)[2], Ethylenepropylene (EPDM)[2][4], Neoperene (CR) or with PTFE protector[3]
Orifice	416 Stainless steel	316 Stainless steel, Monel®, Hastelloy® C or Alloy 6
Valve Plug	416 Stainless steel	316 Stainless steel, Monel®, Hastelloy® C or Alloy 6
Valve Plug Guide	416 Stainless steel	316 Stainless steel, Monel® or Hastelloy® C
Pusher Post	416 Stainless steel	316 Stainless steel, Monel® or Hastelloy® C
Washer	302 Stainless steel	316 Stainless steel, Monel® or Hastelloy® C

1. Two diaphragms are required if metal diaphragm is to be used except for Types MR98L and MR98LD, 2 to 7 psi / 0.1 to 0.5 bar which use only one.
2. Two diaphragms are required if Fluorocarbon (FKM) or Ethylenepropylene (EPDM) diaphragm is to be used.
3. PTFE protector is only available for Fluorocarbon (FKM), Neoprene (CR) or 302 Stainless steel diaphragm.
4. EPDM meets FDA, USP Class VI and ADI Free requirements.

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Table 6. *Maximum Cold Working Pressures of Body Size and Materials[1][2]*

REGULATOR TYPE	BODY SIZE		BODY AND SPRING CASE MATERIAL	MAXIMUM INLET PRESSURE[3]		MAXIMUM OUTLET PRESSURE		MAXIMUM SPRING CASE PRESSURE	
	In.	DN		psig	bar	psig	bar	psig	bar
MR98L/LD	1/4 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, 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
MR98HDP[4]	1/4, 1/2, 3/4, 1, 1-1/2, 2	- - - - 15, 20, 25, 40, 50	Steel	600	41.4	600	41.4	600	41.4
			Stainless steel	550	37.9	550	37.9	550	37.9
	1/2, 3/4, 1, 1-1/2, 2	15, 20, 25, 40, 50	Monel®	550	37.9	550	37.9	550	37.9
			Hastelloy® C	550	37.9	550	37.9	550	37.9
			Aluminum-Bronze	550	37.9	550	37.9	550	37.9
MR98HH/ MR98HHD[4]	1/4, 1/2, 3/4, 1	- - - - 15, 20, 25	Steel	400	27.6	400	27.6	400	27.6
			Stainless steel	400	27.6	400	27.6	400	27.6
	1/2, 3/4, 1	15, 20, 25	Monel®	400	27.6	400	27.6	400	27.6
			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 Bulletin 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.

Installation

These valves may be installed in any position, as long as flow will be in the same direction as that of the arrow cast on the body. For dimensional information see Figure 3.

Emerson Process Management Regulator Technologies, Inc. (Emerson), provides an instruction manual with every valves shipped. Refer to this for complete installation, operation and maintenance instructions. Included is a complete listing of individual parts and recommended spare parts.

NACE Compliance

Optional materials are available for applications handling sour gases. These constructions comply with the recommendations of NACE International sour service standards.

The manufacturing processes and materials used by Emerson assure that all products specified for sour gas service comply with the chemical, physical and metallurgical requirements of NACE MR0175-2002, NACE MR0103 and/or NACE MR0175/ISO 15156. Customers have the responsibility to specify correct materials. Environmental limitations may apply and shall be determined by the user.

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Table 7. *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 450	-40 to 232
Stainless Steel (300 Series)	✓	✓					-320 to 450	-196 to 232
Steel (Chromium plated)						✓	-40 to 450	-40 to 232
Inconel®						✓	-320 to 450	-196 to 232
Composition[6]					✓		-40 to 406	-40 to 208
Graphite					✓		-320 to 450	-196 to 232

BODY MATERIAL	TEMPERATURE	
	°F	°C
Gray cast iron	-20 to 406	-29 to 208
WCC Steel[4]	-20 to 450	-29 to 232
LCC Steel[4]	-40 to 650	-40 to 343
Stainless steel[4], Monel® or Hastelloy® C	-320 to 450	-196 to 232
Aluminum-Bronze	-40 to 500	-40 to 260

1. The pressure/temperature limits in this Bulletin 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 MR98 Instruction Manual, D103743X012.)

Table 8. *Water Relief Capacities in C_v, Types MR98L and MR98LD with Elastomer Diaphragm*

NOMINAL BODY SIZE, In. / DN	SPRING RELIEF PRESSURE RANGE		COLOR CODE	RELIEF PRESSURE SETTING		PRESSURE BUILD-UP OVER RELIEF SETTING, psig / bar								
						2 / 0.14	4 / 0.28	6 / 0.41	8 / 0.55	10 / 0.69	15 / 1.0	20 / 1.4	25 / 1.7	30 / 2.1
	psi	bar		psig	bar	C_v								
1/4 NPT	2 to 7	0.14 to 0.48	Yellow	2	0.14	1.20	1.23	1.27	1.28	1.30	1.31	1.34	1.33	1.33
				5	0.34	1.21	1.25	1.30	1.32	1.34	1.32	1.32	1.32	1.34
	6 to 14	0.41 to 0.97	Green	10	0.69	1.10	1.23	1.35	1.32	1.30	1.32	1.35	1.34	1.34
	12 to 25	0.83 to 1.7	Red	15	1.0	0.75	1.00	1.22	1.25	1.28	1.31	1.34	1.34	1.36
				20	1.4	0.70	0.94	1.16	1.24	1.32	1.33	1.34	1.35	1.36
				25	1.7	0.65	0.89	1.11	1.20	1.29	1.32	1.36	1.35	1.35
	20 to 38	1.4 to 2.6	Blue	25	1.7	0.64	0.87	1.10	1.18	1.27	1.31	1.36	1.35	1.35
				30	2.1	0.58	0.82	1.05	1.15	1.25	1.30	1.34	1.36	1.37
				35	2.4	0.59	0.82	1.03	1.13	1.22	1.28	1.34	1.34	1.35
1/2 / 15	2 to 7	0.14 to 0.48	Yellow	2	0.14	3.00	3.00	3.08	3.12	3.18	3.14	3.18	3.20	3.24
				5	0.34	3.14	3.12	3.14	3.13	3.15	3.16	3.22	3.23	3.26
	6 to 14	0.41 to 0.97	Green	10	0.69	2.63	2.94	3.23	3.22	3.22	3.24	3.29	3.27	3.27
	12 to 25	0.83 to 1.7	Red	15	1.0	2.01	2.56	3.06	3.20	3.34	3.29	3.26	3.25	3.25
				20	1.4	1.92	2.52	3.08	3.19	3.31	3.27	3.26	3.26	3.27
				25	1.7	1.79	2.41	3.00	3.14	3.28	3.27	3.27	3.26	3.26
	20 to 38	1.4 to 2.6	Blue	25	1.7	1.06	1.64	2.19	2.47	2.74	3.00	3.25	3.27	3.29
				30	2.1	1.03	1.61	2.17	2.45	2.72	2.97	3.20	3.24	3.28
				35	2.4	1.09	1.63	2.16	2.43	2.68	2.95	3.20	3.24	3.29
3/4 and 1 / 20 and 25	2 to 7	0.14 to 0.48	Yellow	2	0.14	5.50	5.68	5.94	5.93	5.98	6.00	6.14	6.17	6.24
				5	0.34	5.67	5.85	6.06	6.09	6.15	6.13	6.20	6.20	6.24
	6 to 14	0.41 to 0.97	Green	10	0.69	4.76	5.51	6.18	6.18	6.19	6.20	6.26	6.25	6.28
	12 to 25	0.83 to 1.7	Red	15	1.0	3.66	4.68	5.61	5.88	6.14	6.18	6.25	6.27	6.31
				20	1.4	3.62	4.61	5.53	5.83	6.12	6.18	6.26	6.28	6.31
				25	1.7	3.66	4.60	5.48	5.76	6.03	6.16	6.29	6.29	6.31
	20 to 38	1.4 to 2.6	Blue	25	1.7	2.68	3.73	4.72	5.17	5.60	5.95	6.29	6.29	6.30
				30	2.1	2.63	3.66	4.63	5.09	5.52	5.90	6.27	6.28	6.30
				35	2.4	2.65	3.65	4.61	5.07	5.52	5.91	6.28	6.29	6.31

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Table 9. *Water Relief Capacities in C_v, Types MR98L and MR98LD with Metal Diaphragm*

NOMINAL BODY SIZE, In. / DN	SPRING RELIEF PRESSURE RANGE		COLOR CODE	RELIEF PRESSURE SETTING		PRESSURE BUILD-UP OVER RELIEF SETTING, psig / bar								
						2 / 0.14	4 / 0.28	6 / 0.41	8 / 0.55	10 / 0.69	15 / 1.0	20 / 1.4	25 / 1.7	30 / 2.1
	psi	bar		psig	bar	C_v								
1/4 NPT	2 to 7	0.14 to 0.48	Yellow	2	0.14	0.75	0.88	0.99	1.08	1.16	1.18	1.22	1.23	1.26
				5	0.34	0.79	0.95	1.09	1.10	1.11	1.16	1.22	1.22	1.23
	6 to 14	0.41 to 0.97	Green	10	0.69	0.55	0.76	0.95	1.01	1.07	1.14	1.21	1.22	1.23
	12 to 25	0.83 to 1.7	Red	15	1.0	0.51	0.71	0.90	0.97	1.04	1.10	1.15	1.17	1.19
				20	1.4	0.49	0.69	0.88	0.95	1.02	1.08	1.14	1.18	1.22
				25	1.7	0.48	0.68	0.86	0.93	1.00	1.06	1.12	1.15	1.17
	20 to 38	1.4 to 2.6	Blue	25	1.7	0.42	0.61	0.79	0.86	0.93	1.00	1.07	1.11	1.15
				30	2.1	0.42	0.61	0.78	0.86	0.93	1.00	1.06	1.10	1.14
				35	2.4	0.36	0.56	0.75	0.84	0.92	1.00	1.08	1.12	1.17
1/2 / 15	2 to 7	0.14 to 0.48	Yellow	2	0.14	2.45	2.65	2.86	2.94	3.03	3.13	3.26	3.27	3.31
				5	0.34	2.46	2.67	2.86	2.95	3.05	3.12	3.22	3.25	3.30
	6 to 14	0.41 to 0.97	Green	10	0.69	1.93	2.31	2.65	2.77	2.89	3.00	3.12	3.16	3.21
	12 to 25	0.83 to 1.7	Red	15	1.0	1.50	1.97	2.40	2.58	2.74	2.89	3.03	3.07	3.12
				20	1.4	1.51	1.97	2.39	2.55	2.70	2.86	3.00	3.05	3.10
				25	1.7	1.37	1.85	2.30	2.48	2.65	2.81	2.95	3.01	3.06
	20 to 38	1.4 to 2.6	Blue	25	1.7	0.87	1.29	1.69	1.95	2.20	2.45	2.68	2.78	2.87
				30	2.1	0.83	1.24	1.62	1.88	2.14	2.41	2.66	2.76	2.85
				35	2.4	0.81	1.19	1.55	1.81	2.06	2.33	2.59	2.71	2.82
3/4 and 1 / 20 and 25	2 to 7	0.14 to 0.48	Yellow	2	0.14	4.45	4.80	5.16	5.34	5.54	5.65	5.84	5.86	5.92
				5	0.34	4.16	4.60	5.01	5.21	5.42	5.61	5.84	5.87	5.93
	6 to 14	0.41 to 0.97	Green	10	0.69	3.61	4.24	4.80	5.01	5.21	5.48	5.75	5.82	5.91
	12 to 25	0.83 to 1.7	Red	15	1.0	2.60	3.42	4.17	4.42	4.66	4.97	5.27	5.42	5.58
				20	1.4	2.45	3.25	3.99	4.27	4.54	4.88	5.20	5.36	5.52
				25	1.7	2.27	3.05	3.79	4.10	4.40	4.75	5.08	5.26	5.43
	20 to 38	1.4 to 2.6	Blue	25	1.7	2.00	2.81	3.57	3.95	4.31	4.70	5.07	5.29	5.50
				30	2.1	1.82	2.62	3.37	3.74	4.10	4.55	4.98	5.19	5.40
				35	2.4	1.74	2.50	3.22	3.60	3.97	4.44	4.88	5.11	5.32

Table 10. *Water Relief Capacities in C_v, Types MR98H, MR98HD and MR98HDP with Elastomer Diaphragm*

NOMINAL BODY SIZE, In. / DN	SPRING RELIEF PRESSURE RANGE		COLOR CODE	RELIEF PRESSURE SETTING		PRESSURE BUILD-UP OVER RELIEF SETTING, psi / bar								
						5 / 0.34	7 / 0.48	10 / 0.69	15 / 1.0	20 / 1.4	30 / 2.1	50 / 3.4	75 / 5.2	100 / 6.9
	psi	bar		psig	bar	C_v								
1/4 NPT	15 to 35	1.0 to 2.4	Yellow	15	1.0	1.01	1.11	1.26	1.27	1.29	1.27	1.29	1.28	1.29
				25	1.7	0.95	1.07	1.23	1.27	1.30	1.29	1.31	1.24	1.21
				35	2.4	0.85	1.00	1.21	1.27	1.34	1.32	1.30	1.23	1.19
	25 to 75	1.7 to 5.2	Green	35	2.4	0.76	0.89	1.07	1.17	1.27	1.28	1.32	1.30	1.30
				50	3.4	0.63	0.78	0.99	1.13	1.26	1.27	1.31	1.30	1.31
				75	5.2	0.58	0.72	0.92	1.07	1.20	1.24	1.32	1.31	1.32
	70 to 140	4.8 to 9.7	Red	75	5.2	0.43	0.53	0.68	0.83	0.96	1.08	1.29	1.30	1.32
				100	6.9	0.41	0.49	0.61	0.77	0.91	1.03	1.26	1.29	1.33
				125	8.6	0.35	0.44	0.57	0.73	0.88	1.02	1.26	1.31	1.35
	130 to 200	9.0 to 13.8	Blue	150	10.3	0.36	0.43	0.53	0.66	0.79	0.94	1.21	1.28	1.35
				175	12.1	0.33	0.39	0.49	0.62	0.75	0.90	1.17	1.26	1.34
				200	13.8	0.31	0.38	0.48	0.59	0.71	0.86	1.15	1.21	1.27
1/2 / 15	15 to 35	1.0 to 2.4	Yellow	15	1.0	2.75	2.99	3.32	3.37	3.40	3.40	3.40	3.40	3.40
				25	1.7	2.54	2.80	3.18	3.31	3.40	3.40	3.40	3.40	3.40
				35	2.4	2.39	2.71	3.18	3.31	3.40	3.40	3.40	3.40	3.40
	25 to 75	1.7 to 5.2	Green	35	2.4	1.82	2.17	2.67	2.97	3.25	3.31	3.40	3.40	3.40
				50	3.4	1.67	2.01	2.51	2.85	3.17	3.26	3.40	3.40	3.40
				75	5.2	1.45	1.82	2.37	2.75	3.12	3.22	3.40	3.40	3.40
	70 to 140	4.8 to 9.7	Red	75	5.2	1.12	1.43	1.88	2.32	2.75	2.97	3.40	3.40	3.40
				100	6.9	1.20	1.46	1.85	2.29	2.71	2.94	3.38	3.40	3.40
				125	8.6	1.07	1.29	1.62	2.08	2.52	2.81	3.35	3.39	3.40
	130 to 200	9.0 to 13.8	Blue	150	10.3	0.70	0.84	1.06	1.39	1.71	2.10	2.82	3.10	3.36
				175	12.1	0.67	0.83	1.06	1.37	1.68	2.06	2.79	3.03	3.26
				200	13.8	0.65	0.78	0.97	1.27	1.56	1.96	2.71	3.00	3.27
3/4 and 1 / 20 and 25	15 to 35	1.0 to 2.4	Yellow	15	1.0	5.19	5.66	6.32	6.40	6.50	6.41	6.44	6.38	6.45
				25	1.7	5.11	5.56	6.19	6.32	6.46	6.36	6.39	6.39	6.46
				35	2.4	4.95	5.39	6.02	6.24	6.45	6.36	6.43	6.41	6.46
	25 to 75	1.7 to 5.2	Green	35	2.4	3.83	4.40	5.20	5.78	6.31	6.28	6.43	6.42	6.47
				50	3.4	3.60	4.19	5.04	5.63	6.19	6.27	6.46	6.44	6.47
				75	5.2	3.27	3.91	4.84	5.47	6.08	6.21	6.46	6.45	6.48
	70 to 140	4.8 to 9.7	Red	75	5.2	2.54	3.12	3.97	4.69	5.38	5.74	6.40	6.41	6.45
				100	6.9	2.28	2.87	3.74	4.55	5.34	5.69	6.35	6.39	6.46
				125	8.6	2.32	2.96	3.90	4.62	5.32	5.69	6.37	6.42	6.48
	130 to 200	9.0 to 13.8	Blue	150	10.3	1.60	2.00	2.59	3.36	4.11	4.77	5.98	6.21	6.43
				175	12.1	1.66	2.05	2.62	3.40	4.15	4.77	5.95	6.20	6.44
				200	13.8	1.67	2.04	2.58	3.37	4.14	4.74	5.87	6.15	6.41
1-1/2 and 2 / 40 and 50	5 to 35	0.34 to 2.4	Dark gray	5	0.34	13.69	15.43	17.74	18.56	19.46	19.34	20.00	19.68	19.85
				10	0.69	14.38	16.01	18.22	19.15	20.00	19.83	20.00	19.80	19.93
				15	1.0	14.00	15.68	17.98	18.86	19.73	19.66	20.00	19.79	19.94
				25	1.7	12.53	14.50	17.28	18.43	19.51	19.48	19.83	19.61	19.87
				35	2.4	12.68	14.57	17.25	18.46	19.59	19.59	19.88	19.68	19.96
	20 to 65	1.4 to 4.5	Black with light blue stripe	25	1.7	10.37	12.32	15.04	16.88	18.56	19.00	20.00	19.76	19.96
				35	2.4	9.20	11.33	14.34	16.14	17.81	18.50	19.87	19.68	19.97
				50	3.4	8.37	10.66	13.96	15.91	17.74	18.46	19.85	19.84	20.00
				65	4.5	8.41	10.66	13.91	15.65	17.30	18.05	19.55	19.81	20.00
	50 to 100	3.4 to 6.9	Light gray	50	3.4	7.19	9.11	11.86	14.14	16.27	17.32	19.24	19.53	19.99
				75	5.2	6.62	8.49	11.20	13.55	15.78	16.90	19.11	19.59	20.00
				100	6.9	6.34	8.22	10.99	13.09	15.12	16.44	18.88	19.48	20.00
	75 to 170	5.2 to 11.7	Black	75	5.2	5.14	6.33	8.06	10.62	13.05	14.64	17.63	18.69	19.69
				100	6.9	5.03	6.15	7.81	10.25	12.60	14.29	17.39	18.53	19.60
				125	8.6	4.99	6.13	7.82	10.06	12.24	13.93	17.08	18.37	19.57
				170	11.7	5.03	5.94	7.29	9.25	11.17	12.94	16.27	17.73	19.11

Table 11. *Water Relief Capacities in C_v, Types MR98H, MR98HD and MR98HDP with Metal Diaphragm*

NOMINAL BODY SIZE, In. / DN	SPRING RELIEF PRESSURE RANGE		COLOR CODE	RELIEF PRESSURE SETTING		PRESSURE BUILD-UP OVER RELIEF SETTING, psi / bar								
						5 / 0.34	7 / 0.48	10 / 0.69	15 / 1.0	20 / 1.4	30 / 2.1	50 / 3.4	75 / 5.2	100 / 6.9
	psi	bar		psig	bar	C_v								
1/4 NPT	15 to 35	1.0 to 2.4	Yellow	15	1.0	0.51	0.63	0.78	0.92	1.05	1.10	1.20	1.19	1.20
				25	1.7	0.49	0.60	0.74	0.89	1.01	1.07	1.18	1.15	1.15
				35	2.4	0.44	0.54	0.67	0.81	0.94	1.03	1.17	1.10	1.05
	25 to 75	1.7 to 5.2	Green	35	2.4	0.41	0.52	0.67	0.80	0.92	1.01	1.17	1.20	1.23
				50	3.4	0.35	0.42	0.53	0.69	0.84	0.95	1.15	1.18	1.22
				75	5.2	0.34	0.40	0.50	0.63	0.75	0.87	1.08	1.15	1.22
	70 to 140	4.8 to 9.7	Red	75	5.2	0.30	0.36	0.45	0.56	0.67	0.80	1.05	1.12	1.19
				100	6.9	0.25	0.31	0.39	0.50	0.60	0.73	0.98	1.08	1.18
				125	8.6	0.25	0.30	0.37	0.47	0.56	0.69	0.93	1.05	1.16
	130 to 200	9.0 to 13.8	Blue	150	10.3	0.24	0.28	0.34	0.42	0.50	0.62	0.85	0.99	1.12
				175	12.1	0.22	0.26	0.31	0.39	0.47	0.59	0.81	0.95	1.08
				200	13.8	0.23	0.26	0.31	0.38	0.44	0.56	0.78	0.93	1.06
1/2 / 15	15 to 35	1.0 to 2.4	Yellow	15	1.0	2.64	2.74	2.88	2.92	2.98	2.98	3.08	3.09	3.16
				25	1.7	1.99	2.27	2.67	2.80	2.92	2.94	3.03	3.06	3.15
				35	2.4	1.53	1.86	2.33	2.57	2.79	2.85	2.99	3.03	3.13
	25 to 75	1.7 to 5.2	Green	35	2.4	0.87	1.15	1.54	2.04	2.50	2.63	2.89	2.96	3.09
				50	3.4	0.89	1.17	1.58	1.98	2.36	2.54	2.88	2.97	3.08
				75	5.2	0.81	1.00	1.28	1.66	2.01	2.28	2.78	2.91	3.04
	70 to 140	4.8 to 9.7	Red	75	5.2	0.67	0.80	1.00	1.34	1.67	1.99	2.59	2.79	2.98
				100	6.9	0.67	0.81	1.02	1.33	1.63	1.96	2.56	2.77	2.97
				125	8.6	0.64	0.75	0.92	1.19	1.44	1.78	2.41	2.68	2.92
	130 to 200	9.0 to 13.8	Blue	150	10.3	0.54	0.60	0.69	0.87	1.05	1.33	1.86	2.23	2.57
				175	12.1	0.53	0.60	0.69	0.86	1.04	1.31	1.82	2.18	2.51
				200	13.8	0.52	0.59	0.68	0.84	0.99	1.25	1.75	2.11	2.44
3/4 and 1 / 20 and 25	15 to 35	1.0 to 2.4	Yellow	15	1.0	3.47	3.83	4.32	4.56	4.78	4.93	5.30	5.42	5.61
				25	1.7	3.01	3.44	4.04	4.36	4.65	4.83	5.23	5.40	5.59
				35	2.4	2.53	3.00	3.67	4.09	4.48	4.70	5.21	5.39	5.60
	25 to 75	1.7 to 5.2	Green	35	2.4	2.34	2.76	3.35	3.85	4.32	4.56	5.10	5.36	5.62
				50	3.4	2.13	2.52	3.07	3.61	4.12	4.45	5.04	5.30	5.57
				75	5.2	1.75	2.11	2.63	3.21	3.76	4.18	4.93	5.21	5.47
	70 to 140	4.8 to 9.7	Red	75	5.2	1.53	1.83	2.26	2.80	3.32	3.82	4.72	5.04	5.34
				100	6.9	1.44	1.70	2.09	2.62	3.14	3.65	4.58	4.95	5.29
				125	8.6	1.30	1.56	1.93	2.42	2.88	3.43	4.45	4.85	5.23
	130 to 200	9.0 to 13.8	Blue	150	10.3	1.18	1.35	1.61	2.02	2.41	2.96	3.98	4.48	4.94
				175	12.1	1.14	1.30	1.55	1.92	2.29	2.84	3.87	4.38	4.86
				200	13.8	1.08	1.24	1.48	1.84	2.19	2.73	3.75	4.29	4.80
1-1/2 and 2 / 40 and 50	5 to 35	0.34 to 2.4	Dark gray	5	0.34	11.13	12.64	14.64	15.07	15.62	15.73	16.59	16.44	16.70
				10	0.69	11.49	12.71	14.38	15.12	15.87	15.94	16.62	16.43	16.64
				15	1.0	10.93	12.23	14.00	14.89	15.74	15.87	16.52	16.37	16.59
				25	1.7	9.55	11.08	13.24	14.37	15.41	15.69	16.42	16.41	16.76
				35	2.4	8.41	9.91	12.03	13.59	15.04	15.41	16.25	16.32	16.73
	20 to 65	1.4 to 4.5	Black with light blue stripe	25	1.7	7.76	9.32	11.49	13.14	14.64	15.20	16.36	16.36	16.72
				35	2.4	7.56	8.86	10.72	12.66	14.44	15.05	16.25	16.36	16.82
				50	3.4	6.77	8.01	9.80	11.73	13.53	14.37	15.93	16.32	16.83
				65	4.5	6.45	7.59	9.25	11.16	12.97	14.00	15.93	16.41	16.92
	50 to 100	3.4 to 6.9	Light gray	50	3.4	5.87	7.01	8.66	10.67	12.55	13.66	15.64	16.20	16.85
				75	5.2	5.28	6.24	7.65	9.55	11.36	12.74	15.34	16.10	16.84
				100	6.9	4.39	5.30	6.64	8.58	10.45	12.05	14.99	15.90	16.77
	75 to 170	5.2 to 11.7	Black	75	5.2	4.43	5.21	6.35	8.21	9.97	11.68	14.83	15.78	16.67
				100	6.9	4.33	5.10	6.23	7.90	9.51	11.32	14.63	15.71	16.72
				125	8.6	4.06	4.78	5.83	7.38	8.88	10.72	14.14	15.39	16.56
				170	11.7	3.89	4.55	5.53	6.87	8.18	10.05	13.57	15.02	16.38

Table 12. *Water Relief Capacities in C_v, Types MR98HH and MR98HHD with Elastomer Diaphragm*

NOMINAL BODY SIZE, In. / DN	SPRING RELIEF PRESSURE RANGE		RELIEF PRESSURE SETTING		PRESSURE BUILD-UP OVER RELIEF SETTING, psig / bar										
					5 / 0.34	10 / 0.69	15 / 1.0	20 / 1.4	25 / 1.7	30 / 2.1	35 / 2.4	40 / 2.8	50 / 3.4	75 / 5.2	100 / 6.9
	psi	bar	psig	bar	C_v										
1/4 NPT	150 to 375	10.3 to 25.9	150	10.3	0.37	0.59	0.77	0.95	1.03	1.11	1.15	1.19	1.27	1.31	1.34
			175	12.1	0.39	0.61	0.78	0.95	1.04	1.12	1.16	1.19	1.27	1.31	1.35
			200	13.8	0.38	0.59	0.76	0.92	1.02	1.13	1.17	1.21	1.29	1.32	1.35
			250	17.2	0.37	0.58	0.76	0.93	1.02	1.11	1.14	1.17	1.22	1.25	1.27
			300	20.7	0.38	0.59	0.76	0.93	1.03	1.13	1.16	1.18	1.23	1.25	1.26
			375	25.9	0.39	0.59	0.76	0.94	1.05						
1/2 / 15	150 to 375	10.3 to 25.9	150	10.3	0.72	1.07	1.38	1.67	1.90	2.12	2.26	2.40	2.67	2.93	3.18
			175	12.1	0.71	1.07	1.38	1.68	1.91	2.13	2.26	2.40	2.66	2.92	3.16
			200	13.8	0.71	1.07	1.38	1.68	1.92	2.14	2.27	2.40	2.64	2.90	3.15
			250	17.2	0.70	1.02	1.32	1.62	1.84	2.05	2.19	2.34	2.62	2.87	3.11
			300	20.7	0.66	0.95	1.29	1.63	1.91	2.18	2.29	2.40	2.62	2.86	3.08
			375	25.9	0.64	0.96	1.27	1.58	1.92						
3/4 and 1 / 20 and 25	150 to 375	10.3 to 25.9	150	10.3	1.33	1.94	2.48	3.00	3.44	3.86	4.17	4.48	5.08	5.63	6.15
			175	12.1	1.25	1.82	2.37	2.90	3.40	3.88	4.19	4.48	5.06	5.60	6.11
			200	13.8	1.34	1.85	2.40	2.94	3.37	3.79	4.11	4.43	5.04	5.60	6.11
			250	17.2	1.31	1.78	2.32	2.86	3.33	3.79	4.09	4.39	4.97	5.55	6.09
			300	20.7	1.54	1.83	2.27	2.71	3.26	3.80	4.11	4.41	5.01	6.13	6.50
			375	25.9	1.58	1.82	2.27	2.71	3.28						

– Shaded areas show where maximum inlet pressures are exceeded.

Table 13. *Water Relief Capacities in C_v, Types MR98HH and MR98HHD with Metal Diaphragm*

NOMINAL BODY SIZE, In. / DN	SPRING RELIEF PRESSURE RANGE		RELIEF PRESSURE SETTING		PRESSURE BUILD-UP OVER RELIEF SETTING, psig / bar										
					5 / 0.34	10 / 0.69	15 / 1.0	20 / 1.4	25 / 1.7	30 / 2.1	35 / 2.4	40 / 2.8	50 / 3.4	75 / 5.2	100 / 6.9
	psi	bar	psig	bar	C_v										
1/4 NPT	150 to 375	10.3 to 25.9	150	10.3	0.26	0.38	0.48	0.58	0.66	0.74	0.79	0.85	0.95	1.05	1.13
			175	12.1	0.26	0.37	0.47	0.57	0.64	0.70	0.76	0.82	0.93	1.03	1.13
			200	13.8	0.26	0.37	0.45	0.54	0.61	0.67	0.73	0.79	0.89	1.01	1.11
			250	17.2	0.27	0.34	0.42	0.49	0.56	0.63	0.69	0.74	0.84	0.97	1.10
			300	20.7	0.27	0.33	0.39	0.46	0.53	0.60	0.65	0.70	0.79	0.94	1.09
			375	25.9	0.29	0.32	0.37	0.43	0.49						
1/2 / 15	150 to 375	10.3 to 25.9	150	10.3	0.47	0.59	0.65	0.72	0.82	0.91	0.97	1.06	1.25	1.56	2.00
			175	12.1	0.46	0.59	0.66	0.72	0.82	0.91	0.97	1.05	1.25	1.55	1.96
			200	13.8	0.46	0.59	0.65	0.72	0.82	0.92	0.98	1.05	1.24	1.51	1.89
			250	17.2	0.43	0.56	0.63	0.70	0.79	0.88	0.94	1.03	1.23	1.49	1.80
			300	20.7	0.42	0.53	0.62	0.70	0.81	0.92	1.00	1.07	1.23	1.51	1.78
			375	25.9	0.43	0.51	0.61	0.71	0.82						
3/4 and 1 / 20 and 25	150 to 375	10.3 to 25.9	150	10.3	1.01	1.42	1.66	1.90	2.14	2.37	2.56	2.75	3.11	3.67	4.19
			175	12.1	1.01	1.29	1.57	1.85	2.07	2.28	2.48	2.68	3.06	3.63	4.15
			200	13.8	0.97	1.25	1.51	1.76	1.98	2.20	2.40	2.60	2.97	3.56	4.10
			250	17.2	1.03	1.24	1.48	1.71	1.92	2.13	2.32	2.50	2.85	3.44	3.99
			300	20.7	0.92	1.17	1.41	1.64	1.87	2.10	2.30	2.50	2.88	3.65	4.37
			375	25.9	0.86	1.06	1.28	1.49	1.81						

– Shaded areas show where maximum inlet pressures are exceeded.

Table 14. *Water Relief Capacities in Gallons per Minute / L/min, Types MR98L and MR98LD with Elastomer Diaphragm*

NOMINAL BODY SIZE, In. / DN	SPRING RELIEF PRESSURE RANGE		COLOR CODE	RELIEF PRESSURE SETTING		PRESSURE BUILD-UP OVER RELIEF SETTING, psig / bar									
						2 / 0.14		4 / 0.28		6 / 0.41		8 / 0.55		10 / 0.69	
	psi	bar		psig	bar	GPM	l/min	GPM	l/min	GPM	l/min	GPM	l/min	GPM	l/min
1/4 NPT	2 to 7	0.14 to 0.48	Yellow	2	0.14	2.4	9.08	3	11.3	3.6	13.6	4.1	15.3	4.5	17
				5	0.34	3.2	12.1	3.8	14.2	4.3	16.3	4.8	18	5.2	19.7
	6 to 14	0.41 to 0.97	Green	10	0.69	3.8	14.4	4.6	17.4	5.4	20.4	5.6	21.2	5.8	21.9
	12 to 25	0.83 to 1.7	Red	15	1.0	3.1	11.7	4.4	16.5	5.6	21.2	6	22.7	6.4	24.2
				20	1.4	3.3	12.5	4.6	17.4	5.9	22.3	6.6	24.8	7.2	27.2
				25	1.7	3.4	12.9	4.8	18.2	6.2	23.5	6.9	26.1	7.6	28.8
	20 to 38	1.4 to 2.6	Blue	25	1.7	3.3	12.5	4.7	17.8	6.1	23.1	6.8	25.7	7.5	28.4
				30	2.1	3.3	12.5	4.8	18.2	6.3	23.8	7.1	26.9	7.9	29.9
				35	2.4	3.6	13.6	5.1	19.3	6.6	25	7.4	28	8.2	31
1/2 / 15	2 to 7	0.14 to 0.48	Yellow	2	0.14	6	22.7	7.4	27.8	8.7	32.9	9.9	37.3	11	41.6
				5	0.34	8.3	31.4	9.4	35.4	10	39.3	11	42.7	12	46.2
	6 to 14	0.41 to 0.97	Green	10	0.69	9.1	34.4	11	41.6	13	48.8	14	51.6	14	54.5
	12 to 25	0.83 to 1.7	Red	15	1.0	8.3	31.4	11	42.2	14	53	15	58.1	17	63.2
				20	1.4	9	34	12	46.7	16	59.4	17	63.9	18	68.5
				25	1.7	9.3	35.2	13	49.2	17	63.2	18	68.3	19	73.4
	20 to 38	1.4 to 2.6	Blue	25	1.7	5.5	20.8	8.9	33.5	12	46.2	14	53.7	16	61.3
				30	2.1	5.8	21.9	9.4	35.6	13	49.2	15	57.1	17	65.1
				35	2.4	6.6	25	10	38.6	14	52.2	16	60.1	18	68.1
3/4 and 1 / 20 and 25	2 to 7	0.14 to 0.48	Yellow	2	0.14	11	41.6	14	52.6	17	63.6	19	70.9	21	78.3
				5	0.34	15	56.7	18	66.4	20	76	22	83	24	90
	6 to 14	0.41 to 0.97	Green	10	0.69	17	62.4	21	77.9	25	93.4	26	99.1	28	105
	12 to 25	0.83 to 1.7	Red	15	1.0	15	57.1	20	77.2	26	97.2	28	107	31	116
				20	1.4	17	64.3	23	85.5	28	107	31	117	34	127
				25	1.7	19	71.9	25	93.6	31	115	33	125	36	135
	20 to 38	1.4 to 2.6	Blue	25	1.7	14	52.6	20	76	26	99.5	30	112	33	125
				30	2.1	15	56.4	21	80.8	28	105	31	119	35	132
				35	2.4	16	60.9	23	86.3	30	112	33	126	37	140

Table 14. *Water Relief Capacities in Gallons per Minute / L/min, Types MR98L and MR98LD with Elastomer Diaphragm (continued)*

NOMINAL BODY SIZE, In. / DN	SPRING RELIEF PRESSURE RANGE		COLOR CODE	RELIEF PRESSURE SETTING		PRESSURE BUILD-UP OVER RELIEF SETTING, psig / bar							
						15 / 1.0		20 / 1.4		25 / 1.7		30 / 2.1	
	psi	bar		psig	bar	GPM	l/min	GPM	l/min	GPM	l/min	GPM	l/min
1/4 NPT	2 to 7	0.14 to 0.48	Yellow	2	0.14	5.4	20.4	6.3	23.8	6.9	26.1	7.5	28.4
				5	0.34	5.9	22.3	6.6	25	7.3	27.4	7.9	29.9
	6 to 14	0.41 to 0.97	Green	10	0.69	6.6	25	7.4	28	8	30.1	8.5	32.2
	12 to 25	0.83 to 1.7	Red	15	1.0	7.2	27	7.9	29.9	8.5	32.2	9.1	34.4
				20	1.4	7.9	29.7	8.5	32.2	9.1	34.2	9.6	36.3
				25	1.7	8.4	31.6	9.1	34.4	9.6	36.1	10	37.8
	20 to 38	1.4 to 2.6	Blue	25	1.7	8.3	31.4	9.1	34.4	9.6	36.1	10	37.8
				30	2.1	8.7	32.9	9.5	35.9	10	38	11	40.1
				35	2.4	9.1	34.2	9.9	37.5	10	39.3	11	41.2
1/2 / 15	2 to 7	0.14 to 0.48	Yellow	2	0.14	13	49	15	56.4	17	62.8	18	69.2
				5	0.34	14	53.5	16	60.9	18	67	19	73
	6 to 14	0.41 to 0.97	Green	10	0.69	16	61.3	18	68.1	19	73.2	21	78.3
	12 to 25	0.83 to 1.7	Red	15	1.0	18	68.1	19	73	21	77.7	22	82.5
				20	1.4	19	73.2	21	77.9	22	82.7	23	87.4
				25	1.7	21	78.1	22	82.8	23	87.2	24	91.5
	20 to 38	1.4 to 2.6	Blue	25	1.7	19	71.9	22	82.5	23	87.4	24	92.3
				30	2.1	20	75.3	23	85.5	24	90.8	25	96.1
				35	2.4	21	78.9	24	89.7	25	95	27	100
3/4 and 1 / 20 and 25	2 to 7	0.14 to 0.48	Yellow	2	0.14	25	93.6	29	109	32	121	35	134
				5	0.34	27	104	31	117	34	128	37	140
	6 to 14	0.41 to 0.97	Green	10	0.69	31	117	34	130	37	140	40	150
	12 to 25	0.83 to 1.7	Red	15	1.0	34	128	37	140	40	150	42	160
				20	1.4	37	138	40	150	42	159	45	169
				25	1.7	39	147	42	160	45	168	47	177
	20 to 38	1.4 to 2.6	Blue	25	1.7	38	142	42	160	44	168	47	177
				30	2.1	40	150	44	168	47	176	49	185
				35	2.4	42	158	47	176	49	184	51	193

Table 15. *Water Relief Capacities in Gallons per Minute / L/min, Types MR98L and MR98LD with Metal Diaphragm*

NOMINAL BODY SIZE, In. / DN	SPRING RELIEF PRESSURE RANGE		COLOR CODE	RELIEF PRESSURE SETTING		PRESSURE BUILD-UP OVER RELIEF SETTING, psig / bar									
						2 / 0.14		4 / 0.28		6 / 0.41		8 / 0.55		10 / 0.69	
	psi	bar		psig	bar	GPM	l/min	GPM	l/min	GPM	l/min	GPM	l/min	GPM	l/min
1/4 NPT	2 to 7	0.14 to 0.48	Yellow	2	0.14	1.5	5.67	2.2	8.13	2.8	10.6	3.4	12.9	4	15.1
				5	0.34	2.1	7.94	2.9	10.8	3.6	13.6	4	14.9	4.3	16.3
	6 to 14	0.41 to 0.97	Green	10	0.69	1.9	7.19	2.9	10.8	3.8	14.4	4.3	16.3	4.8	18.2
	12 to 25	0.83 to 1.7	Red	15	1.0	2.1	7.94	3.1	11.7	4.1	15.5	4.7	17.6	5.2	19.7
				20	1.4	2.3	8.7	3.4	12.9	4.5	17	5.1	19.1	5.6	21.2
				25	1.7	2.5	9.46	3.7	13.8	4.8	18.2	5.4	20.2	5.9	22.3
	20 to 38	1.4 to 2.6	Blue	25	1.7	2.2	8.32	3.3	12.5	4.4	16.6	5	18.7	5.5	20.8
				30	2.1	2.4	9.08	3.6	13.4	4.7	17.8	5.3	20	5.9	22.3
				35	2.4	2.2	8.32	3.5	13.2	4.8	18.2	5.5	20.8	6.2	23.5
1/2 / 15	2 to 7	0.14 to 0.48	Yellow	2	0.14	4.9	18.5	6.5	24.6	8.1	30.6	9.3	35.2	11	39.7
				5	0.34	6.5	24.6	8	30.3	9.5	35.9	11	40.3	12	44.6
	6 to 14	0.41 to 0.97	Green	10	0.69	6.7	25.3	8.7	32.7	11	40.1	12	44.5	13	48.8
	12 to 25	0.83 to 1.7	Red	15	1.0	6.2	23.5	8.6	32.5	11	41.6	12	46.7	14	51.8
				20	1.4	7.1	26.9	9.7	36.5	12	46.2	14	51.1	15	56
				25	1.7	7.1	26.9	10	37.6	13	48.4	14	53.9	16	59.4
	20 to 38	1.4 to 2.6	Blue	25	1.7	4.5	17	7	26.3	9.4	35.6	11	42.4	13	49.2
				30	2.1	4.7	17.8	7.2	27.2	9.7	36.7	12	43.9	14	51.1
				35	2.4	4.9	18.5	7.4	28	9.9	37.5	12	44.8	14	52.2
3/4 and 1 / 20 and 25	2 to 7	0.14 to 0.48	Yellow	2	0.14	8.9	33.7	12	44.5	15	55.2	17	63.9	19	72.6
				5	0.34	11	41.6	14	52.2	17	62.8	19	71.1	21	79.4
	6 to 14	0.41 to 0.97	Green	10	0.69	13	47.3	16	60	19	72.6	21	80.4	23	88.1
	12 to 25	0.83 to 1.7	Red	15	1.0	11	40.6	15	56.4	19	72.2	21	80.1	23	88
				20	1.4	11	43.5	16	60.2	20	76.9	23	85.5	25	94.2
				25	1.7	12	44.6	16	62.2	21	79.8	24	89.1	26	98.5
	20 to 38	1.4 to 2.6	Blue	25	1.7	10	39.3	15	57.3	20	75.3	23	85.9	26	96.5
				30	2.1	10	39	15	57.7	20	76.4	23	87.2	26	98
				35	2.4	11	40.1	16	59	21	77.9	24	89.3	27	101

Table 15. *Water Relief Capacities in Gallons per Minute / L/min, Types MR98L and MR98LD with Metal Diaphragm (continued)*

NOMINAL BODY SIZE, In. / DN	SPRING RELIEF PRESSURE RANGE		COLOR CODE	RELIEF PRESSURE SETTING		PRESSURE BUILD-UP OVER RELIEF SETTING, psig / bar							
						15 / 1.0		20 / 1.4		25 / 1.7		30 / 2.1	
	psi	bar		psig	bar	GPM	l/min	GPM	l/min	GPM	l/min	GPM	l/min
1/4 NPT	2 to 7	0.14 to 0.48	Yellow	2	0.14	4.9	18.3	5.7	21.6	6.4	24.2	7.1	26.9
				5	0.34	5.2	19.7	6.1	23.1	6.7	25.3	7.3	27.6
	6 to 14	0.41 to 0.97	Green	10	0.69	5.7	21.6	6.6	25	7.2	27.2	7.8	29.5
	12 to 25	0.83 to 1.7	Red	15	1.0	6	22.7	6.8	25.7	7.4	28	8	30.3
				20	1.4	6.4	24.2	7.2	27.2	7.9	29.9	8.6	32.5
				25	1.7	6.7	25.3	7.5	28.4	8.1	30.6	8.7	32.9
	20 to 38	1.4 to 2.6	Blue	25	1.7	6.4	24	7.2	27.2	7.9	29.7	8.5	32.2
				30	2.1	6.7	25.3	7.5	28.4	8.2	30.8	8.8	33.3
				35	2.4	7.1	26.9	8	30.3	8.7	32.9	9.4	35.6
1/2 / 15	2 to 7	0.14 to 0.48	Yellow	2	0.14	13	48.8	15	57.9	17	64.3	19	70.7
				5	0.34	14	52.8	16	60.9	18	67.3	20	73.8
	6 to 14	0.41 to 0.97	Green	10	0.69	15	56.7	17	64.7	19	70.7	20	76.8
	12 to 25	0.83 to 1.7	Red	15	1.0	16	59.8	18	67.7	19	73.4	21	79.1
				20	1.4	17	63.9	19	71.9	20	77.4	22	82.8
				25	1.7	18	67.1	20	74.9	21	80.4	23	85.9
	20 to 38	1.4 to 2.6	Blue	25	1.7	16	58.6	18	68.1	20	74.3	21	80.6
				30	2.1	16	61.1	19	71.1	20	77.4	22	83.6
				35	2.4	17	62.4	19	72.6	21	79.3	23	85.9
3/4 and 1 / 20 and 25	2 to 7	0.14 to 0.48	Yellow	2	0.14	23	88.1	27	104	30	115	34	127
				5	0.34	25	95	29	110	32	122	35	133
	6 to 14	0.41 to 0.97	Green	10	0.69	27	104	32	119	34	130	37	141
	12 to 25	0.83 to 1.7	Red	15	1.0	27	103	31	118	34	130	37	142
				20	1.4	29	109	33	124	36	136	39	148
				25	1.7	30	114	34	129	37	141	40	152
	20 to 38	1.4 to 2.6	Blue	25	1.7	30	113	34	129	37	141	41	154
				30	2.1	31	116	35	133	39	146	42	158
				35	2.4	31	119	36	137	40	150	43	162

Table 16. *Steam Relief Capacities in Lbs per Hour / kg/h, Types MR98L and MR98LD with Metal Diaphragm Only*

NOMINAL BODY SIZE, In. / DN	SPRING RELIEF PRESSURE RANGE		COLOR CODE	RELIEF PRESSURE SETTING		PRESSURE BUILD-UP OVER RELIEF SETTING, psig / bar									
						2 / 0.14		4 / 0.28		6 / 0.41		8 / 0.55		10 / 0.69	
	psi	bar		psig	bar	lbs/h	kg/h	lbs/h	kg/h	lbs/h	kg/h	lbs/h	kg/h	lbs/h	kg/h
1/4 NPT	2 to 7	0.14 to 0.48	Yellow	2	0.14	13	5.85	22	10.1	31	14.3	39	17.6	46	20.9
				5	0.34	15	6.64	24	11	34	15.3	42	18.9	49	22.5
	6 to 14	0.41 to 0.97	Green	10	0.69	13	5.78	22	10.2	32	14.6	41	18.6	50	22.6
	12 to 25	0.83 to 1.7	Red	15	1.0	12	5.49	21	9.58	30	13.6	39	17.5	47	21.4
				20	1.4	14	6.52	25	11.2	35	15.9	44	20.1	53	24.2
				25	1.7	16	7.1	26	12	37	16.9	47	21.3	56	25.6
	20 to 38	1.4 to 2.6	Blue	25	1.7	15	6.76	24	10.7	32	14.7	41	18.6	50	22.6
				30	2.1	17	7.66	26	11.8	35	15.9	44	20	53	24.1
				35	2.4	18	8.21	28	12.6	37	17	47	21.2	56	25.3
1/2 / 15	2 to 7	0.14 to 0.48	Yellow	2	0.14	66	29.9	83	37.9	100	45.8	110	52.1	130	58.3
				5	0.34	88	40	110	48.1	120	55.9	140	61.6	150	67
	6 to 14	0.41 to 0.97	Green	10	0.69	78	35.4	100	47	130	58.6	140	65.8	160	73
	12 to 25	0.83 to 1.7	Red	15	1.0	44	20.1	75	34.1	110	48	130	57.1	150	66.2
				20	1.4	64	29.2	100	46.2	140	63	160	71.9	180	80.7
				25	1.7	65	29.5	100	47.7	140	65.9	170	76.5	190	87.1
	20 to 38	1.4 to 2.6	Blue	25	1.7	54	24.7	100	45.4	150	66	180	83	220	100
				30	2.1	64	29.1	110	51.6	160	74.2	200	91.7	240	109
				35	2.4	71	32.1	120	55.9	180	79.7	220	99	260	118
3/4 and 1 / 20 and 25	2 to 7	0.14 to 0.48	Yellow	2	0.14	88	40	130	57	160	73.9	190	87.2	220	100
				5	0.34	120	53.1	150	70.4	190	87.5	220	100	250	112
	6 to 14	0.41 to 0.97	Green	10	0.69	120	52.8	170	77.2	220	102	260	117	290	133
	12 to 25	0.83 to 1.7	Red	15	1.0	110	50	160	74.7	220	99.3	260	117	300	135
				20	1.4	110	49.5	170	77.2	230	105	280	125	320	145
				25	1.7	110	50.1	180	80.1	240	110	290	131	340	153
	20 to 38	1.4 to 2.6	Blue	25	1.7	91	41.3	150	67.5	210	93.7	250	113	290	133
				30	2.1	100	45.6	160	72.2	220	98.7	260	120	310	141
				35	2.4	110	49.1	170	75.3	220	102	270	124	320	146

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Table 16. *Steam Relief Capacities in Lbs per Hour / kg/h, Types MR98L and MR98LD with Metal Diaphragm Only (continued)*

NOMINAL BODY SIZE, In. / DN	SPRING RELIEF PRESSURE RANGE		COLOR CODE	RELIEF PRESSURE SETTING		PRESSURE BUILD-UP OVER RELIEF SETTING, psig / bar							
						15 / 1.0		20 / 1.4		25 / 1.7		30 / 2.1	
	psi	bar		psig	bar	lbs/h	kg/h	lbs/h	kg/h	lbs/h	kg/h	lbs/h	kg/h
1/4 NPT	2 to 7	0.14 to 0.48	Yellow	2	0.14	59	26.8	72	32.6	82	37.3	93	42.1
				5	0.34	63	28.5	76	34.5	86	39.3	97	44.1
	6 to 14	0.41 to 0.97	Green	10	0.69	66	29.9	82	37.2	94	42.7	110	48.2
	12 to 25	0.83 to 1.7	Red	15	1.0	67	30.3	86	39.2	100	45.3	110	51.5
				20	1.4	73	33	92	41.8	110	48.2	120	54.5
				25	1.7	77	35.2	98	44.7	110	51.6	130	58.5
	20 to 38	1.4 to 2.6	Blue	25	1.7	70	32	91	41.5	110	48.8	120	56.2
				30	2.1	74	33.9	96	43.7	110	51.4	130	59
				35	2.4	78	35.4	100	45.5	120	53.6	140	61.7
1/2 / 15	2 to 7	0.14 to 0.48	Yellow	2	0.14	160	72.2	190	84.9	210	97.1	240	109
				5	0.34	180	79.9	200	92.3	230	104	260	116
	6 to 14	0.41 to 0.97	Green	10	0.69	190	88.2	230	103	250	116	280	128
	12 to 25	0.83 to 1.7	Red	15	1.0	180	81.6	210	97	240	110	270	123
				20	1.4	210	94.6	240	108	270	121	290	133
				25	1.7	230	102	260	118	290	130	310	142
	20 to 38	1.4 to 2.6	Blue	25	1.7	260	120	310	140	330	151	360	163
				30	2.1	290	130	330	150	360	163	380	175
				35	2.4	310	140	360	162	380	175	410	187
3/4 and 1 / 20 and 25	2 to 7	0.14 to 0.48	Yellow	2	0.14	280	128	340	156	410	187	480	219
				5	0.34	310	142	380	171	440	201	510	231
	6 to 14	0.41 to 0.97	Green	10	0.69	360	165	430	197	510	230	580	262
	12 to 25	0.83 to 1.7	Red	15	1.0	370	168	440	201	550	248	640	290
				20	1.4	400	181	480	216	600	271	690	315
				25	1.7	420	192	510	232	650	293	750	339
	20 to 38	1.4 to 2.6	Blue	25	1.7	380	174	470	216	630	285	750	339
				30	2.1	400	184	500	227	670	305	800	364
				35	2.4	420	191	520	236	710	324	850	389

Table 17. *Air Relief Capacities in SCFH / Nm³/h, Types MR98L and MR98LD with Elastomer Diaphragm*

NOMINAL BODY SIZE, In. / DN	SPRING RELIEF PRESSURE RANGE		COLOR CODE	RELIEF PRESSURE SETTING		PRESSURE BUILD-UP OVER RELIEF SETTING, psig / bar									
						2 / 0.14		4 / 0.28		6 / 0.41		8 / 0.55		10 / 0.69	
	psi	bar		psig	bar	SCFH	Nm³/h	SCFH	Nm³/h	SCFH	Nm³/h	SCFH	Nm³/h	SCFH	Nm³/h
1/4 NPT	2 to 7	0.14 to 0.48	Yellow	2	0.14	720	19.4	880	23.5	1000	27.5	1100	30.7	1300	34
				5	0.34	890	24	1000	27.9	1200	31.7	1300	34.9	1400	38.1
	6 to 14	0.41 to 0.97	Green	10	0.69	1100	29.9	1300	35.4	1500	40.8	1600	43.8	1700	46.8
	12 to 25	0.83 to 1.7	Red	15	1.0	810	21.6	1200	32.6	1600	43.5	1800	47.7	1900	51.9
				20	1.4	730	19.5	1300	33.8	1800	48.1	2000	53.1	2200	58
				25	1.7	790	21.3	1400	37	2000	52.8	2200	57.7	2300	62.6
	20 to 38	1.4 to 2.6	Blue	25	1.7	820	21.9	1300	36.1	1900	50.2	2100	56.3	2300	62.4
				30	2.1	890	23.8	1500	39	2000	54.3	2300	61.3	2500	68.3
				35	2.4	970	26	1600	42.5	2200	59.1	2500	66.4	2800	73.8
1/2 / 15	2 to 7	0.14 to 0.48	Yellow	2	0.14	1500	39.2	1900	49.9	2300	60.6	2600	69.2	2900	77.7
				5	0.34	2000	52.9	2400	63.8	2800	74.7	3100	82.8	3400	90.9
	6 to 14	0.41 to 0.97	Green	10	0.69	2200	60.3	2900	77.1	3500	93.9	3800	102	4100	110
	12 to 25	0.83 to 1.7	Red	15	1.0	2000	54.7	3000	80.1	3900	106	4300	116	4700	126
				20	1.4	2400	63.2	3400	92.4	4500	122	5000	133	5400	144
				25	1.7	2300	62.2	3700	98	5000	134	5500	146	5900	159
	20 to 38	1.4 to 2.6	Blue	25	1.7	1200	33.5	2300	61.7	3400	89.8	4200	113	5100	137
				30	2.1	1500	39.6	2600	70.4	3800	101	4700	125	5600	149
				35	2.4	1600	43.8	2900	76.5	4100	109	5100	135	6000	162
3/4 and 1 / 20 and 25	2 to 7	0.14 to 0.48	Yellow	2	0.14	2600	69.2	3400	92.2	4300	115	4900	132	5600	149
				5	0.34	3600	96.6	4500	120	5300	143	5900	159	6500	175
	6 to 14	0.41 to 0.97	Green	10	0.69	4000	106	5400	144	6800	181	7300	196	7900	211
	12 to 25	0.83 to 1.7	Red	15	1.0	3700	100	5500	148	7300	196	8200	221	9200	246
				20	1.4	4400	118	6500	173	8500	228	9500	255	11,000	282
				25	1.7	4600	123	6900	184	9200	246	10,000	278	12,000	311
	20 to 38	1.4 to 2.6	Blue	25	1.7	3200	86.2	5300	143	7400	199	9000	240	10,000	281
				30	2.1	3400	91.9	5900	158	8400	225	10,000	268	12,000	310
				35	2.4	4000	107	6500	175	9100	244	11,000	286	12,000	328

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Table 17. *Air Relief Capacities in SCFH / Nm^3/h, Types MR98L and MR98LD with Elastomer Diaphragm (continued)*

NOMINAL BODY SIZE, In. / DN	SPRING RELIEF PRESSURE RANGE		COLOR CODE	RELIEF PRESSURE SETTING		PRESSURE BUILD-UP OVER RELIEF SETTING, psig / bar							
						15 / 1.0		20 / 1.4		25 / 1.7		30 / 2.1	
	psi	bar		psig	bar	SCFH	Nm^3/h	SCFH	Nm^3/h	SCFH	Nm^3/h	SCFH	Nm^3/h
1/4 NPT	2 to 7	0.14 to 0.48	Yellow	2	0.14	1500	41.2	1800	48.4	2000	54	2200	59.7
				5	0.34	1700	44.8	1900	51.5	2100	57.6	2400	63.7
	6 to 14	0.41 to 0.97	Green	10	0.69	2000	53.2	2200	59.6	2400	64.9	2600	70.2
	12 to 25	0.83 to 1.7	Red	15	1.0	2200	58.9	2500	65.8	2600	70.7	2800	75.7
				20	1.4	2400	65	2700	72.1	2900	77.4	3100	82.8
				25	1.7	2600	69.9	2900	77.1	3100	83.2	3300	89.3
	20 to 38	1.4 to 2.6	Blue	25	1.7	2600	70.5	2900	78.6	3100	83.9	3300	89.2
				30	2.1	2800	76.3	3100	84.2	3400	90.3	3600	96.4
				35	2.4	3100	82.2	3400	90.6	3600	96.9	3800	103
1/2 / 15	2 to 7	0.14 to 0.48	Yellow	2	0.14	3600	97	4300	116	5000	134	5600	151
				5	0.34	4100	109	4800	128	5400	144	6000	161
	6 to 14	0.41 to 0.97	Green	10	0.69	4800	128	5400	145	6000	161	6600	177
	12 to 25	0.83 to 1.7	Red	15	1.0	5400	144	6000	162	6600	178	7300	195
				20	1.4	6000	162	6700	180	7300	197	8000	213
				25	1.7	6600	177	7300	196	7900	212	8500	228
	20 to 38	1.4 to 2.6	Blue	25	1.7	6100	164	7100	191	7800	209	8500	228
				30	2.1	6600	178	7700	206	8400	225	9100	244
				35	2.4	7200	192	8300	222	8900	240	9600	258
3/4 and 1 / 20 and 25	2 to 7	0.14 to 0.48	Yellow	2	0.14	6700	181	7900	212	9700	259	11,000	306
				5	0.34	7900	212	9300	249	11,000	288	12,000	327
	6 to 14	0.41 to 0.97	Green	10	0.69	9200	247	11,000	284	12,000	325	14,000	366
	12 to 25	0.83 to 1.7	Red	15	1.0	11,000	283	12,000	320	13,000	360	15,000	401
				20	1.4	12,000	318	13,000	353	15,000	391	16,000	429
				25	1.7	13,000	349	14,000	387	16,000	427	17,000	466
	20 to 38	1.4 to 2.6	Blue	25	1.7	12,000	334	14,000	386	17,000	447	19,000	508
				30	2.1	14,000	367	16,000	424	18,000	480	20,000	536
				35	2.4	15,000	390	17,000	451	19,000	507	21,000	562

Table 18. *Air Relief Capacities in SCFH / Nm³/h, Types MR98L and MR98LD with Metal Diaphragm*

NOMINAL BODY SIZE, In. / DN	SPRING RELIEF PRESSURE RANGE		COLOR CODE	RELIEF PRESSURE SETTING		PRESSURE BUILD-UP OVER RELIEF SETTING, psig / bar									
						2 / 0.14		4 / 0.28		6 / 0.41		8 / 0.55		10 / 0.69	
	psi	bar		psig	bar	SCFH	Nm³/h	SCFH	Nm³/h	SCFH	Nm³/h	SCFH	Nm³/h	SCFH	Nm³/h
1/4 NPT	2 to 7	0.14 to 0.48	Yellow	2	0.14	290	7.68	500	13.3	710	18.9	870	23.4	1000	27.9
				5	0.34	330	8.77	550	14.6	760	20.5	940	25.3	1100	30.2
	6 to 14	0.41 to 0.97	Green	10	0.69	290	7.72	510	13.7	730	19.6	930	25.1	1100	30.5
	12 to 25	0.83 to 1.7	Red	15	1.0	280	7.39	480	12.9	690	18.5	890	23.8	1100	29.1
				20	1.4	330	8.83	570	15.3	810	21.7	1000	27.4	1200	33.1
				25	1.7	360	9.68	610	16.4	860	23.1	1100	29.1	1300	35.1
	20 to 38	1.4 to 2.6	Blue	25	1.7	340	9.21	550	14.6	750	20.1	950	25.5	1200	30.9
				30	2.1	390	10.5	600	16.1	810	21.8	1000	27.4	1200	33
				35	2.4	420	11.2	640	17.3	870	23.3	1100	29	1300	34.7
1/2 / 15	2 to 7	0.14 to 0.48	Yellow	2	0.14	1500	39.2	1900	49.9	2300	60.6	2600	69.2	2900	77.7
				5	0.34	2000	52.9	2400	63.8	2800	74.7	3100	82.8	3400	90.9
	6 to 14	0.41 to 0.97	Green	10	0.69	1800	47.2	2300	62.9	2900	78.6	3300	88.5	3700	98.4
	12 to 25	0.83 to 1.7	Red	15	1.0	1000	27	1700	45.9	2400	64.8	2900	77.3	3300	89.7
				20	1.4	1500	39.5	2300	62.5	3200	85.5	3600	97.7	4100	110
				25	1.7	1500	40	2400	64.9	3300	89.7	3900	104	4400	119
	20 to 38	1.4 to 2.6	Blue	25	1.7	1200	33.5	2300	61.7	3400	89.8	4200	113	5100	137
				30	2.1	1500	39.6	2600	70.4	3800	101	4700	125	5600	149
				35	2.4	1600	43.8	2900	76.5	4100	109	5100	135	6000	162
3/4 and 1 / 20 and 25	2 to 7	0.14 to 0.48	Yellow	2	0.14	2000	52.3	2800	74.9	3600	97.5	4300	115	5000	133
				5	0.34	2600	69.9	3500	92.9	4300	116	5000	133	5600	150
	6 to 14	0.41 to 0.97	Green	10	0.69	2600	70	3800	103	5000	135	5800	157	6600	178
	12 to 25	0.83 to 1.7	Red	15	1.0	2500	66.7	3700	99.7	5000	133	5900	157	6800	181
				20	1.4	2500	66.3	3900	104	5300	141	6300	168	7300	195
				25	1.7	2500	67.3	4000	108	5500	148	6600	177	7700	206
	20 to 38	1.4 to 2.6	Blue	25	1.7	2100	55.5	3400	90.8	4700	126	5700	153	6700	180
				30	2.1	2300	61.4	3600	97.4	5000	133	6000	162	7100	190
				35	2.4	2500	66.3	3800	102	5100	137	6200	167	7400	197

- continued -

Table 18. *Air Relief Capacities in SCFH / Nm³/h, Types MR98L and MR98LD with Metal Diaphragm (continued)*

NOMINAL BODY SIZE, In. / DN	SPRING RELIEF PRESSURE RANGE		COLOR CODE	RELIEF PRESSURE SETTING		PRESSURE BUILD-UP OVER RELIEF SETTING, psig / bar							
						15 / 1.0		20 / 1.4		25 / 1.7		30 / 2.1	
	psi	bar		psig	bar	SCFH	Nm³/h	SCFH	Nm³/h	SCFH	Nm³/h	SCFH	Nm³/h
1/4 NPT	2 to 7	0.14 to 0.48	Yellow	2	0.14	1300	36.1	1700	44.2	1900	50.9	2100	57.5
				5	0.34	1400	38.5	1700	46.9	2000	53.7	2300	60.4
	6 to 14	0.41 to 0.97	Green	10	0.69	1500	40.7	1900	50.8	2200	58.4	2500	66
	12 to 25	0.83 to 1.7	Red	15	1.0	1500	41.4	2000	53.6	2300	62.1	2600	70.6
				20	1.4	1700	45.2	2100	57.3	2500	66	2800	74.8
				25	1.7	1800	48.2	2300	61.3	2600	70.7	3000	80.2
	20 to 38	1.4 to 2.6	Blue	25	1.7	1600	43.9	2100	56.8	2500	66.9	2900	77
				30	2.1	1700	46.4	2200	59.8	2600	70.4	3000	80.9
				35	2.4	1800	48.6	2300	62.4	2700	73.5	3200	84.6
1/2 / 15	2 to 7	0.14 to 0.48	Yellow	2	0.14	3600	97	4300	116	5000	134	5600	151
				5	0.34	4100	109	4800	128	5400	144	6000	161
	6 to 14	0.41 to 0.97	Green	10	0.69	4500	120	5200	141	5900	158	6500	175
	12 to 25	0.83 to 1.7	Red	15	1.0	4100	111	4900	132	5600	150	6300	169
				20	1.4	4800	129	5500	148	6200	166	6800	183
				25	1.7	5200	140	6000	161	6600	178	7300	195
	20 to 38	1.4 to 2.6	Blue	25	1.7	6100	164	7100	191	7800	209	8500	228
				30	2.1	6600	178	7700	206	8400	225	9100	244
				35	2.4	7200	192	8300	222	8900	240	9600	258
3/4 and 1 / 20 and 25	2 to 7	0.14 to 0.48	Yellow	2	0.14	6400	171	7800	209	9400	252	11,000	295
				5	0.34	7100	189	8500	229	10,000	270	12,000	311
	6 to 14	0.41 to 0.97	Green	10	0.69	8300	221	9900	265	12,000	310	13,000	355
	12 to 25	0.83 to 1.7	Red	15	1.0	8400	226	10,000	271	13,000	335	15,000	400
				20	1.4	9100	244	11,000	293	14,000	367	16,000	441
				25	1.7	9700	260	12,000	315	15,000	398	18,000	482
	20 to 38	1.4 to 2.6	Blue	25	1.7	8800	236	11,000	292	14,000	387	18,000	482
				30	2.1	9300	249	11,000	308	15,000	415	19,000	522
				35	2.4	9700	259	12,000	320	16,000	442	21,000	563

Table 19. *Water Relief Capacities in Gallons per Minute / L/min, Types MR98H, MR98HD and MR98HDP with Elastomer Diaphragm*

NOMINAL BODY SIZE, In. / DN	SPRING RELIEF PRESSURE RANGE		COLOR CODE	RELIEF PRESSURE SETTING		PRESSURE BUILD-UP OVER RELIEF SETTING, psig / bar									
						5 / 0.34		7 / 0.48		10 / 0.69		15 / 1.0		20 / 1.4	
	psi	bar		psig	bar	GPM	l/min	GPM	l/min	GPM	l/min	GPM	l/min	GPM	l/min
1/4 NPT	15 to 35	1.0 to 2.4	Yellow	15	1.0	4.5	17	5.2	19.7	6.3	23.8	7	26.3	7.6	28.8
				25	1.7	5.2	19.7	6	22.8	7.3	27.6	8	30.3	8.7	32.9
				35	2.4	5.4	20.4	6.5	24.5	8.1	30.6	9	34	9.9	37.5
	25 to 75	1.7 to 5.2	Green	35	2.4	4.8	18.2	5.8	21.8	7.2	27.2	8.3	31.4	9.4	35.6
				50	3.4	4.7	17.8	5.9	22.3	7.7	29.1	9.1	34.4	11	39.7
				75	5.2	5.2	19.7	6.5	24.7	8.5	32.2	10	38.2	12	44.3
	70 to 140	4.8 to 9.7	Red	75	5.2	3.8	14.4	4.8	18.2	6.3	23.8	7.9	29.7	9.4	35.6
				100	6.9	4.2	15.9	5.1	19.2	6.4	24.2	8.2	31	10	37.8
				125	8.6	4	15.1	5	19.1	6.6	25	8.6	32.5	11	40.1
	130 to 200	9.0 to 13.8	Blue	150	10.3	4.4	16.6	5.3	20.1	6.7	25.3	8.5	32	10	38.6
				175	12.1	4.4	16.6	5.2	19.8	6.5	24.6	8.4	31.8	10	39
				200	13.8	4.3	16.3	5.3	20	6.8	25.7	8.6	32.3	10	39
1/2 / 15	15 to 35	1.0 to 2.4	Yellow	15	1.0	12	46.5	14	53	17	62.8	18	69.8	20	76.8
				25	1.7	14	52.6	16	60	19	71.1	21	79.3	23	87.4
				35	2.4	15	57.1	18	66.5	21	80.6	23	88.5	26	96.5
	25 to 75	1.7 to 5.2	Green	35	2.4	12	43.5	14	53.2	18	67.7	21	79.4	24	91.2
				50	3.4	12	46.9	15	57.5	19	73.4	23	86.8	27	100
				75	5.2	13	49.2	17	62.5	22	82.5	26	98.7	30	115
	70 to 140	4.8 to 9.7	Red	75	5.2	10	37.8	13	48.9	17	65.4	22	83.4	27	101
				100	6.9	12	46.5	15	57.3	19	73.4	24	92.5	30	112
				125	8.6	12	45.8	15	55.6	19	70.4	24	91.7	30	113
	130 to 200	9.0 to 13.8	Blue	150	10.3	8.5	32.2	10	39.3	13	49.9	18	66.2	22	82.5
				175	12.1	8.8	33.3	11	41.2	14	53	18	69.6	23	86.3
				200	13.8	9.1	34.4	11	41.4	14	51.8	18	68.5	23	85.1
3/4 and 1 / 20 and 25	15 to 35	1.0 to 2.4	Yellow	15	1.0	23	87.8	27	100	32	120	35	133	39	146
				25	1.7	28	106	31	119	37	138	40	151	43	164
				35	2.4	31	118	35	132	40	153	44	167	48	181
	25 to 75	1.7 to 5.2	Green	35	2.4	24	91.5	28	108	35	132	41	155	47	177
				50	3.4	27	101	32	120	39	148	45	172	52	196
				75	5.2	29	109	35	132	44	166	51	192	58	219
	70 to 140	4.8 to 9.7	Red	75	5.2	22	84.7	28	105	36	136	44	165	51	194
				100	6.9	23	85.9	29	109	38	143	47	178	56	213
				125	8.6	25	96.1	33	123	43	164	52	198	61	231
	130 to 200	9.0 to 13.8	Blue	150	10.3	19	71.5	24	90	31	118	41	155	51	192
				175	12.1	21	79.8	26	98.9	34	127	44	167	55	207
				200	13.8	23	85.1	28	104	35	133	46	176	58	218
1-1/2 and 2 / 40 and 50	5 to 35	0.34 to 2.4	Dark gray	5	0.34	43	164	53	202	69	260	83	314	97	368
				10	0.69	56	211	66	250	82	308	96	362	110	416
				15	1.0	63	237	74	278	90	340	100	391	120	441
				25	1.7	69	260	82	310	100	387	120	441	130	495
				35	2.4	80	303	94	357	120	438	130	494	150	550
	20 to 65	1.4 to 4.5	Black with light blue stripe	25	1.7	57	215	70	264	89	337	110	404	120	471
				35	2.4	58	220	73	278	96	364	110	432	130	500
				50	3.4	62	235	81	305	110	409	130	485	150	561
				65	4.5	70	266	90	342	120	456	140	530	160	603
	50 to 100	3.4 to 6.9	Light gray	50	3.4	53	202	69	260	92	348	110	431	140	515
				75	5.2	59	224	77	291	100	391	130	486	150	582
				100	6.9	65	246	85	322	120	435	140	529	160	623
	75 to 170	5.2 to 11.7	Black	75	5.2	46	174	57	217	74	281	100	381	130	481
				100	6.9	52	195	64	241	82	309	110	414	140	519
				125	8.6	56	213	70	264	90	340	120	445	150	549
				170	11.7	65	246	77	292	96	361	120	464	150	567

- continued -

Table 19. *Water Relief Capacities in Gallons per Minute / L/min, Types MR98H, MR98HD and MR98HDP with Elastomer Diaphragm (continued)*

NOMINAL BODY SIZE, In. / DN	SPRING RELIEF PRESSURE RANGE		COLOR CODE	RELIEF PRESSURE SETTING		PRESSURE BUILD-UP OVER RELIEF SETTING, psig / bar							
						30 / 2.1		50 / 3.4		75 / 5.2		100 / 6.9	
	psi	bar		psig	bar	GPM	l/min	GPM	l/min	GPM	l/min	GPM	l/min
1/4 NPT	15 to 35	1.0 to 2.4	Yellow	15	1.0	8.5	32.3	10	39.3	12	45.8	14	52.2
				25	1.7	9.6	36.2	11	42.7	12	46.9	14	51.1
				35	2.4	11	40.1	12	45.4	13	48.8	14	52.2
	25 to 75	1.7 to 5.2	Green	35	2.4	10	39.1	12	46.2	14	51.6	15	57.1
				50	3.4	11	43	13	49.6	15	55	16	60.5
				75	5.2	13	48	15	55.6	16	60.3	17	65.1
	70 to 140	4.8 to 9.7	Red	75	5.2	11	41.9	14	54.5	16	59.8	17	65.1
				100	6.9	12	44.5	15	57.9	17	63.9	19	70
				125	8.6	13	47.5	17	62.4	18	68.9	20	75.3
	130 to 200	9.0 to 13.8	Blue	150	10.3	12	46.9	17	63.6	19	71.1	21	78.7
				175	12.1	13	47.7	17	65.1	19	73.4	22	81.7
				200	13.8	13	48.3	18	67	20	73.8	21	80.6
1/2 / 15	15 to 35	1.0 to 2.4	Yellow	15	1.0	23	86.3	28	105	32	122	37	140
				25	1.7	25	96.1	30	113	34	129	38	145
				35	2.4	28	105	32	121	36	135	40	150
	25 to 75	1.7 to 5.2	Green	35	2.4	27	101	32	121	36	135	40	150
				50	3.4	29	110	35	131	38	144	42	157
				75	5.2	33	125	38	145	41	156	45	168
	70 to 140	4.8 to 9.7	Red	75	5.2	30	115	38	143	41	156	45	169
				100	6.9	33	126	41	154	44	167	48	180
				125	8.6	34	130	43	164	47	177	50	190
	130 to 200	9.0 to 13.8	Blue	150	10.3	27	104	39	147	45	170	51	194
				175	12.1	29	109	41	153	46	175	52	197
				200	13.8	29	109	41	157	48	181	54	206
3/4 and 1 / 20 and 25	15 to 35	1.0 to 2.4	Yellow	15	1.0	43	163	52	196	59	224	67	252
				25	1.7	47	178	55	208	62	235	69	263
				35	2.4	51	194	58	221	65	246	72	272
	25 to 75	1.7 to 5.2	Green	35	2.4	51	192	58	221	65	246	72	272
				50	3.4	55	210	63	238	69	262	76	286
				75	5.2	62	233	69	263	75	285	81	307
	70 to 140	4.8 to 9.7	Red	75	5.2	57	216	69	260	75	283	81	306
				100	6.9	62	235	74	280	80	303	86	325
				125	8.6	67	255	80	302	85	323	91	345
	130 to 200	9.0 to 13.8	Blue	150	10.3	60	229	80	302	87	331	95	360
				175	12.1	64	243	84	317	92	347	100	377
				200	13.8	67	255	87	328	95	360	100	391
1-1/2 and 2 / 40 and 50	5 to 35	0.34 to 2.4	Dark gray	5	0.34	110	433	150	563	180	666	200	769
				10	0.69	130	474	160	591	180	690	210	790
				15	1.0	130	499	160	614	190	710	210	806
				25	1.7	140	547	170	650	200	742	220	834
				35	2.4	160	598	180	693	210	780	230	867
	20 to 65	1.4 to 4.5	Black with light blue stripe	25	1.7	140	533	170	657	200	747	220	838
				35	2.4	150	564	180	693	210	780	230	867
				50	3.4	170	625	200	751	220	832	240	914
				65	4.5	180	666	210	790	230	875	250	959
	50 to 100	3.4 to 6.9	Light gray	50	3.4	150	586	190	728	220	819	240	911
				75	5.2	170	655	210	802	240	893	260	984
				100	6.9	190	702	230	861	250	953	280	1050
	75 to 170	5.2 to 11.7	Black	75	5.2	150	567	200	740	230	852	250	963
				100	6.9	160	610	210	793	240	906	270	1020
				125	8.6	170	645	220	835	250	956	280	1080
				170	11.7	180	673	230	885	270	1020	300	1150

Table 20. *Water Relief Capacities in Gallons per Minute / L/min, Types MR98H, MR98HD and MR98HDP with Metal Diaphragm*

NOMINAL BODY SIZE, In. / DN	SPRING RELIEF PRESSURE RANGE		COLOR CODE	RELIEF PRESSURE SETTING		PRESSURE BUILD-UP OVER RELIEF SETTING, psig / bar									
						5 / 0.34		7 / 0.48		10 / 0.69		15 / 1.0		20 / 1.4	
	psi	bar		psig	bar	GPM	l/min	GPM	l/min	GPM	l/min	GPM	l/min	GPM	l/min
1/4 NPT	15 to 35	1.0 to 2.4	Yellow	15	1.0	2.3	8.7	2.9	11.1	3.9	14.8	5.1	19.1	6.2	23.5
				25	1.7	2.7	10.2	3.4	12.8	4.4	16.6	5.6	21.2	6.8	25.7
				35	2.4	2.8	10.6	3.5	13.2	4.5	17	5.8	21.8	7	26.5
	25 to 75	1.7 to 5.2	Green	35	2.4	2.6	9.84	3.4	12.7	4.5	17	5.7	21.4	6.8	25.7
				50	3.4	2.6	9.84	3.2	12.1	4.1	15.5	5.6	21	7	26.5
				75	5.2	3	11.3	3.6	13.8	4.6	17.4	6	22.5	7.3	27.6
	70 to 140	4.8 to 9.7	Red	75	5.2	2.7	10.2	3.3	12.3	4.1	15.5	5.3	20	6.5	24.6
				100	6.9	2.6	9.84	3.2	12.1	4.1	15.5	5.4	20.2	6.6	25
				125	8.6	2.9	11	3.5	13.1	4.3	16.3	5.5	20.8	6.7	25.3
	130 to 200	9.0 to 13.8	Blue	150	10.3	3	11.3	3.5	13.2	4.2	15.9	5.4	20.2	6.5	24.6
				175	12.1	2.9	11	3.4	12.9	4.2	15.9	5.4	20.2	6.5	24.6
				200	13.8	3.2	12.1	3.7	13.9	4.4	16.6	5.4	20.4	6.4	24.2
1/2 / 15	15 to 35	1.0 to 2.4	Yellow	15	1.0	12	44.6	13	48.6	14	54.5	16	60.5	18	66.6
				25	1.7	11	41.2	13	48.6	16	59.8	18	67	20	74.1
				35	2.4	9.7	36.7	12	45.6	16	59	18	68.7	21	78.3
	25 to 75	1.7 to 5.2	Green	35	2.4	5.5	20.8	7.4	28.1	10	39	14	54.5	19	70
				50	3.4	6.6	25	8.8	33.4	12	46.2	16	60.3	20	74.5
				75	5.2	7.2	27.2	9	34.2	12	44.6	16	59.4	20	74.1
	70 to 140	4.8 to 9.7	Red	75	5.2	6	22.7	7.3	27.5	9.2	34.8	13	48.2	16	61.7
				100	6.9	6.9	26.1	8.4	31.9	11	40.5	14	53.9	18	67.3
				125	8.6	7.2	27.2	8.6	32.4	11	40.1	14	52.4	17	64.7
	130 to 200	9.0 to 13.8	Blue	150	10.3	6.6	25	7.4	28	8.6	32.5	11	41.6	13	50.7
				175	12.1	7	26.5	7.8	29.7	9.1	34.4	12	43.9	14	53.3
				200	13.8	7.3	27.6	8.2	31.1	9.6	36.3	12	45	14	53.7
3/4 and 1 / 20 and 25	15 to 35	1.0 to 2.4	Yellow	15	1.0	16	58.6	18	67.9	22	81.7	25	94.4	28	107
				25	1.7	17	62.4	19	73.6	24	90.4	28	104	31	118
				35	2.4	16	60.5	19	73.5	25	93.1	29	109	33	126
	25 to 75	1.7 to 5.2	Green	35	2.4	15	56	18	67.6	23	85.1	27	103	32	121
				50	3.4	16	59.8	19	71.9	24	90	29	110	34	130
				75	5.2	16	58.6	19	71.2	24	90	30	113	36	135
	70 to 140	4.8 to 9.7	Red	75	5.2	14	51.1	16	61.7	21	77.6	26	98.5	32	120
				100	6.9	14	54.1	17	64.5	21	80.2	27	103	33	125
				125	8.6	14	53.7	17	64.8	22	81.3	27	103	33	125
	130 to 200	9.0 to 13.8	Blue	150	10.3	14	53	16	61	19	73	25	92.9	30	113
				175	12.1	14	54.5	17	62.8	20	75.3	25	94.6	30	114
				200	13.8	15	55.2	17	63.7	20	76.4	25	95.9	31	115
1-1/2 and 2 / 40 and 50	5 to 35	0.34 to 2.4	Dark gray	5	0.34	35	133	44	166	57	214	67	255	78	295
				10	0.69	45	168	52	198	64	243	76	286	87	329
				15	1.0	49	185	57	217	70	265	82	309	93	352
				25	1.7	52	198	63	237	78	296	91	344	100	391
				35	2.4	53	201	64	243	81	305	96	364	110	422
	20 to 65	1.4 to 4.5	Black with light blue stripe	25	1.7	43	161	53	199	68	257	83	314	98	371
				35	2.4	48	181	57	217	72	272	90	339	110	405
				50	3.4	50	190	60	229	76	287	95	358	110	428
				65	4.5	54	204	64	244	80	303	100	378	120	452
	50 to 100	3.4 to 6.9	Light gray	50	3.4	44	165	53	200	67	254	86	326	110	397
				75	5.2	47	179	57	214	71	267	91	343	110	419
				100	6.9	45	170	55	207	70	263	92	347	110	431
	75 to 170	5.2 to 11.7	Black	75	5.2	40	150	47	178	59	221	78	295	97	368
				100	6.9	44	168	53	200	65	247	84	319	100	392
				125	8.6	46	173	54	205	67	253	86	326	110	398
				170	11.7	50	190	59	224	73	274	91	345	110	416

- continued -

***Table 20**. Water Relief Capacities in Gallons per Minute / L/min, Types MR98H, MR98HD and MR98HDP with Metal Diaphragm (continued)*

NOMINAL BODY SIZE, In. / DN	SPRING RELIEF PRESSURE RANGE		COLOR CODE	RELIEF PRESSURE SETTING		PRESSURE BUILD-UP OVER RELIEF SETTING, psig / bar							
						30 / 2.1		50 / 3.4		75 / 5.2		100 / 6.9	
	psi	bar		psig	bar	GPM	l/min	GPM	l/min	GPM	l/min	GPM	l/min
1/4 NPT	15 to 35	1.0 to 2.4	Yellow	15	1.0	7.4	27.9	9.7	36.7	11	42.7	13	48.8
				25	1.7	7.9	30	10	38.6	12	43.5	13	48.4
				35	2.4	8.3	31.3	11	40.9	12	43.5	12	46.2
	25 to 75	1.7 to 5.2	Green	35	2.4	8.1	30.8	11	40.9	13	47.5	14	54.1
				50	3.4	8.5	32.2	12	43.5	13	49.9	15	56.4
				75	5.2	8.9	33.7	12	45.8	14	53.2	16	60.5
	70 to 140	4.8 to 9.7	Red	75	5.2	8.2	31.1	12	44.3	14	51.6	16	59
				100	6.9	8.4	31.7	12	45	14	53.5	16	62
				125	8.6	8.5	32.3	12	46.2	15	55.4	17	64.7
	130 to 200	9.0 to 13.8	Blue	150	10.3	8.3	31.3	12	44.6	15	55	17	65.4
				175	12.1	8.3	31.4	12	45	15	55.6	18	66.2
				200	13.8	8.3	31.3	12	45.4	15	56.6	18	67.7
1/2 / 15	15 to 35	1.0 to 2.4	Yellow	15	1.0	20	75.7	25	93.8	29	111	34	128
				25	1.7	22	82.5	26	99.1	31	116	35	132
				35	2.4	23	87	28	104	32	120	36	136
	25 to 75	1.7 to 5.2	Green	35	2.4	21	80.2	27	101	31	117	36	134
				50	3.4	23	86	29	109	33	125	37	140
				75	5.2	23	88.3	31	117	35	133	39	149
	70 to 140	4.8 to 9.7	Red	75	5.2	20	77.3	29	109	34	127	39	146
				100	6.9	22	83.7	31	117	36	136	41	155
				125	8.6	22	82.5	31	118	37	139	42	160
	130 to 200	9.0 to 13.8	Blue	150	10.3	17	66.1	26	96.8	32	123	39	149
				175	12.1	18	69	27	100	33	126	40	152
				200	13.8	18	69.6	27	101	34	128	41	154
3/4 and 1 / 20 and 25	15 to 35	1.0 to 2.4	Yellow	15	1.0	33	125	43	162	50	190	58	219
				25	1.7	36	135	45	170	53	199	60	227
				35	2.4	38	143	47	179	55	207	62	235
	25 to 75	1.7 to 5.2	Green	35	2.4	37	139	46	175	54	206	63	236
				50	3.4	39	149	49	185	57	215	65	246
				75	5.2	42	157	53	200	61	230	69	259
	70 to 140	4.8 to 9.7	Red	75	5.2	38	144	51	192	59	222	67	253
				100	6.9	40	151	53	202	62	234	70	266
				125	8.6	41	154	56	211	65	245	74	278
	130 to 200	9.0 to 13.8	Blue	150	10.3	38	142	53	200	63	239	73	277
				175	12.1	38	145	55	206	65	245	75	284
				200	13.8	39	147	55	210	66	251	77	293
1-1/2 and 2 / 40 and 50	5 to 35	0.34 to 2.4	Dark gray	5	0.34	93	352	120	465	150	556	170	647
				10	0.69	100	381	130	487	150	573	170	659
				15	1.0	110	403	130	504	160	587	180	671
				25	1.7	120	440	140	538	160	621	190	703
				35	2.4	120	470	150	567	170	647	190	727
	20 to 65	1.4 to 4.5	Black with light blue stripe	25	1.7	110	426	140	536	160	619	190	702
				35	2.4	120	459	150	567	170	649	190	730
				50	3.4	130	486	160	603	180	685	200	767
				65	4.5	140	516	170	644	190	725	210	805
	50 to 100	3.4 to 6.9	Light gray	50	3.4	120	462	160	592	180	680	200	768
				75	5.2	130	494	170	643	190	734	220	824
				100	6.9	140	515	180	683	210	778	230	873
	75 to 170	5.2 to 11.7	Black	75	5.2	120	453	160	622	190	719	220	816
				100	6.9	130	484	180	667	200	769	230	870
				125	8.6	130	496	180	692	210	801	240	911
				170	11.7	140	523	200	738	230	860	260	982

Table 21. *Steam Relief Capacities in Lbs per Hour / kg/h, Types MR98H, MR98HD and MR98HDP with Metal Diaphragm Only*

NOMINAL BODY SIZE, In. / DN	SPRING RELIEF PRESSURE RANGE		COLOR CODE	RELIEF PRESSURE SETTING		PRESSURE BUILD-UP OVER RELIEF SETTING, psig / bar									
						5 / 0.34		7 / 0.48		10 / 0.69		15 / 1.0		20 / 1.4	
	psi	bar		psig	bar	lbs/h	kg/h	lbs/h	kg/h	lbs/h	kg/h	lbs/h	kg/h	lbs/h	kg/h
1/4 NPT	15 to 35	1.0 to 2.4	Yellow	15	1.0	22	10.1	32	14.4	46	20.8	69	31.2	91	41.6
				25	1.7	26	11.8	36	16.5	52	23.5	78	35.6	100	47.6
				35	2.4	31	14	42	18.9	58	26.3	87	39.7	120	53.1
	25 to 75	1.7 to 5.2	Green	35	2.4	28	12.9	38	17.3	52	23.9	78	35.6	100	47.4
				50	3.4	34	15.4	44	20	59	26.9	86	39.2	110	51.5
				75	5.2	42	19.2	53	24.2	70	31.9	99	44.9	130	58
	70 to 140	4.8 to 9.7	Red	75	5.2	35	15.9	43	19.7	56	25.4	80	36.1	100	46.9
				100	6.9	42	19.2	52	23.7	67	30.4	92	42	120	53.5
				125	8.6	48	21.9	59	26.7	74	33.8	100	46.6	130	59.4
	130 to 200	9.0 to 13.8	Blue	150	10.3	55	25.1	65	29.4	79	35.9	130	60.1	190	84.3
				175	12.1	61	27.5	71	32.3	87	39.5	140	64.9	200	90.2
				200	13.8	68	31	79	35.8	95	43	150	69.6	210	96.1
1/2 / 15	15 to 35	1.0 to 2.4	Yellow	15	1.0	23	10.5	63	28.9	120	56.2	170	78.5	220	101
				25	1.7	47	21.2	90	41	160	70.5	210	95.3	260	120
				35	2.4	64	29.1	100	47.6	170	75.3	230	105	300	134
	25 to 75	1.7 to 5.2	Green	35	2.4	36	16.2	55	25	84	38.1	150	67.4	210	96.7
				50	3.4	60	27.4	84	38	120	53.9	180	81.7	240	110
				75	5.2	78	35.7	99	45.1	130	59.2	200	88.7	260	118
	70 to 140	4.8 to 9.7	Red	75	5.2	72	32.7	89	40.5	110	52	170	77.7	230	103
				100	6.9	87	39.3	100	47.3	130	59.2	190	85	240	111
				125	8.6	99	45.2	120	54.1	150	67.4	200	92.2	260	117
	130 to 200	9.0 to 13.8	Blue	150	10.3	120	54.3	140	61.6	160	72.4	200	92.3	250	112
				175	12.1	140	61.4	150	69.1	180	80.6	220	102	270	123
				200	13.8	150	66.6	160	74.4	190	86.2	240	109	290	131
3/4 and 1 / 20 and 25	15 to 35	1.0 to 2.4	Yellow	15	1.0	160	73.2	200	91.7	260	119	330	148	390	177
				25	1.7	160	74.7	210	96.1	280	128	370	166	450	204
				35	2.4	190	85.6	240	107	310	139	400	184	500	228
	25 to 75	1.7 to 5.2	Green	35	2.4	150	66.9	190	88.4	270	121	360	163	450	205
				50	3.4	160	71.7	210	93.6	280	126	380	174	490	222
				75	5.2	200	90.9	250	112	320	144	440	201	570	258
	70 to 140	4.8 to 9.7	Red	75	5.2	170	76.5	210	97.4	280	129	390	176	490	224
				100	6.9	210	93.7	250	115	320	147	440	202	560	256
				125	8.6	220	101	270	123	340	156	470	213	600	271
	130 to 200	9.0 to 13.8	Blue	150	10.3	270	124	310	143	380	173	500	225	610	278
				175	12.1	310	142	360	163	430	193	560	255	690	316
				200	13.8	340	156	390	178	460	211	590	270	720	328
1-1/2 and 2 / 40 and 50	5 to 35	0.34 to 2.4	Dark gray	5	0.34	320	144	420	191	580	261	760	345	940	428
				10	0.69	500	229	620	281	790	358	950	431	1100	503
				15	1.0	540	247	650	295	810	368	1000	464	1200	560
				25	1.7	680	311	820	371	1000	461	1200	560	1400	659
				35	2.4	780	355	930	422	1100	521	1400	641	1700	761
	20 to 65	1.4 to 4.5	Black with light blue stripe	25	1.7	500	228	610	278	780	352	1000	462	1300	572
				35	2.4	580	264	740	334	970	440	1200	561	1500	682
				50	3.4	660	299	820	371	1100	478	1400	620	1700	762
				65	4.5	750	341	910	412	1100	519	1500	687	1900	854
	50 to 100	3.4 to 6.9	Light gray	50	3.4	480	219	600	274	780	356	1100	492	1400	629
				75	5.2	690	312	840	380	1100	481	1400	656	1800	830
				100	6.9	860	393	1000	470	1300	585	1700	764	2100	943
	75 to 170	5.2 to 11.7	Black	75	5.2	540	244	630	286	770	349	1000	476	1300	604
				100	6.9	730	330	860	390	1100	479	1400	627	1700	774
				125	8.6	840	381	1000	459	1300	575	1600	743	2000	911
				170	11.7	1100	508	1300	597	1600	731	2000	928	2500	1120

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Table 21. *Steam Relief Capacities in Lbs per Hour / kg/h, Types MR98H, MR98HD and MR98HDP with Metal Diaphragm Only (continued)*

NOMINAL BODY SIZE, In. / DN	SPRING RELIEF PRESSURE RANGE		COLOR CODE	RELIEF PRESSURE SETTING		PRESSURE BUILD-UP OVER RELIEF SETTING, psig / bar							
						30 / 2.1		50 / 3.4		75 / 5.2		100 / 6.9	
	psi	bar		psig	bar	lbs/h	kg/h	lbs/h	kg/h	lbs/h	kg/h	lbs/h	kg/h
1/4 NPT	15 to 35	1.0 to 2.4	Yellow	15	1.0	110	52.2	160	73.5	220	98.1	270	122
				25	1.7	130	59.2	180	82.4	240	108	290	131
				35	2.4	150	66	200	91.8	260	117	310	140
	25 to 75	1.7 to 5.2	Green	35	2.4	140	61.7	200	90.4	260	117	310	140
				50	3.4	150	68.3	220	102	280	129	340	154
				75	5.2	170	79	270	121	330	150	390	178
	70 to 140	4.8 to 9.7	Red	75	5.2	150	68.3	240	111	310	143	380	174
				100	6.9	170	77.5	280	126	350	160	430	195
				125	8.6	190	85.3	300	137	390	178	480	218
	130 to 200	9.0 to 13.8	Blue	150	10.3	220	101	300	134	400	182	510	230
				175	12.1	240	108	310	143	430	195	550	248
				200	13.8	250	114	330	150	440	202	560	254
1/2 / 15	15 to 35	1.0 to 2.4	Yellow	15	1.0	280	125	390	175	520	237	660	298
				25	1.7	320	145	430	196	570	258	700	320
				35	2.4	360	162	480	218	620	281	760	344
	25 to 75	1.7 to 5.2	Green	35	2.4	270	125	400	181	520	236	640	291
				50	3.4	310	143	460	210	580	265	700	319
				75	5.2	350	160	540	244	660	302	790	361
	70 to 140	4.8 to 9.7	Red	75	5.2	330	148	520	237	650	297	790	357
				100	6.9	350	161	580	262	720	329	870	396
				125	8.6	370	170	610	277	790	358	970	439
	130 to 200	9.0 to 13.8	Blue	150	10.3	350	160	560	256	810	369	1100	482
				175	12.1	380	173	600	272	860	391	1100	510
				200	13.8	400	183	630	285	910	414	1200	543
3/4 and 1 / 20 and 25	15 to 35	1.0 to 2.4	Yellow	15	1.0	490	224	700	317	940	426	1200	536
				25	1.7	560	253	770	352	1000	463	1300	575
				35	2.4	620	282	850	388	1100	503	1400	619
	25 to 75	1.7 to 5.2	Green	35	2.4	580	263	830	378	1100	499	1400	621
				50	3.4	640	290	940	426	1200	551	1500	676
				75	5.2	750	340	1100	504	1400	637	1700	771
	70 to 140	4.8 to 9.7	Red	75	5.2	680	309	1100	480	1400	617	1700	755
				100	6.9	770	352	1200	543	1500	697	1900	850
				125	8.6	830	377	1300	589	1700	765	2100	940
	130 to 200	9.0 to 13.8	Blue	150	10.3	850	387	1300	604	1800	839	2400	1080
				175	12.1	940	429	1400	655	2000	900	2500	1140
				200	13.8	990	450	1500	693	2100	960	2700	1230
1-1/2 and 2 / 40 and 50	5 to 35	0.34 to 2.4	Dark gray	5	0.34	1300	579	1900	878	2700	1210	3400	1540
				10	0.69	1400	650	2100	944	2800	1280	3600	1620
				15	1.0	1500	703	2200	990	2900	1330	3700	1680
				25	1.7	1800	805	2400	1100	3200	1430	3900	1770
				35	2.4	2000	910	2700	1210	3400	1550	4200	1900
	20 to 65	1.4 to 4.5	Black with light blue stripe	25	1.7	1600	721	2200	1020	3000	1370	3800	1710
				35	2.4	1800	840	2500	1150	3300	1490	4000	1830
				50	3.4	2100	936	2800	1290	3600	1620	4300	1960
				65	4.5	2300	1040	3100	1410	3900	1780	4700	2140
	50 to 100	3.4 to 6.9	Light gray	50	3.4	1700	785	2400	1100	3300	1490	4200	1890
				75	5.2	2300	1040	3200	1450	4000	1820	4800	2200
				100	6.9	2600	1190	3700	1690	4600	2100	5500	2510
	75 to 170	5.2 to 11.7	Black	75	5.2	1800	797	2600	1180	3600	1630	4600	2080
				100	6.9	2300	1040	3500	1570	4400	2000	5300	2430
				125	8.6	2700	1210	4000	1810	5000	2260	6000	2720
				170	11.7	3300	1510	5000	2280	6100	2790	7300	3300

Table 22. *Air Relief Capacities in SCFH / Nm³/h, Types MR98H, MR98HD and MR98HDP with Elastomer Diaphragm*

NOMINAL BODY SIZE, In. / DN	SPRING RELIEF PRESSURE RANGE		COLOR CODE	RELIEF PRESSURE SETTING		PRESSURE BUILD-UP OVER RELIEF SETTING, psig / bar									
						5 / 0.34		7 / 0.48		10 / 0.69		15 / 1.0		20 / 1.4	
	psi	bar		psig	bar	SCFH	Nm³/h	SCFH	Nm³/h	SCFH	Nm³/h	SCFH	Nm³/h	SCFH	Nm³/h
1/4 NPT	15 to 35	1.0 to 2.4	Yellow	15	1.0	1200	32.2	1500	39.8	1900	51.3	2200	59.3	2500	67.2
				25	1.7	1500	40.7	1900	49.7	2400	63.1	2700	72.4	3000	81.7
				35	2.4	1600	42.4	2000	54.6	2700	72.9	3100	83.4	3500	93.8
	25 to 75	1.7 to 5.2	Green	35	2.4	1200	31.4	1600	44.2	2400	63.4	2900	77.8	3400	92.2
				50	3.4	1300	33.8	1900	50.2	2800	74.9	3400	92.4	4100	110
				75	5.2	1800	47.5	2500	66.8	3600	95.7	4400	118	5200	141
	70 to 140	4.8 to 9.7	Red	75	5.2	1400	36.3	1800	48.2	2500	66.2	3500	92.7	4400	119
				100	6.9	1600	42.3	2100	56	2900	76.6	4100	109	5300	141
				125	8.6	1900	51	2400	65.7	3300	87.6	4500	122	5800	155
	130 to 200	9.0 to 13.8	Blue	150	10.3	1900	51.2	2400	64.3	3100	84.1	4300	115	5400	146
				175	12.1	2100	56.6	2700	71.9	3500	94.8	4400	118	5300	142
				200	13.8	2500	66.6	3100	82.2	3900	106	4800	129	5700	153
1/2 / 15	15 to 35	1.0 to 2.4	Yellow	15	1.0	2400	64.5	3300	87.8	4600	123	5400	145	6300	168
				25	1.7	3100	82.8	4100	110	5700	152	6600	176	7500	200
				35	2.4	3700	98	4900	132	6800	182	7800	209	8800	235
	25 to 75	1.7 to 5.2	Green	35	2.4	2500	68.4	3700	98.5	5400	144	6800	183	8300	222
				50	3.4	3200	86.6	4600	122	6600	176	8300	222	10,000	269
				75	5.2	4200	114	5700	152	7900	211	10,000	279	13,000	346
	70 to 140	4.8 to 9.7	Red	75	5.2	3600	97.5	4900	131	6700	181	9400	251	12,000	322
				100	6.9	4500	121	6000	161	8300	222	11,000	308	15,000	394
				125	8.6	5200	140	6900	185	9400	251	13,000	349	17,000	446
	130 to 200	9.0 to 13.8	Blue	150	10.3	4000	107	4800	130	6100	164	8400	226	11,000	287
				175	12.1	4400	117	5300	143	6800	182	9300	248	12,000	315
				200	13.8	5500	147	6600	176	8200	220	11,000	298	14,000	376
3/4 and 1 / 20 and 25	15 to 35	1.0 to 2.4	Yellow	15	1.0	5700	153	6900	185	8700	233	10,000	276	12,000	320
				25	1.7	7100	191	8800	235	11,000	300	13,000	340	14,000	379
				35	2.4	8500	228	10,000	277	13,000	351	15,000	401	17,000	451
	25 to 75	1.7 to 5.2	Green	35	2.4	6500	173	8500	227	11,000	307	14,000	374	16,000	441
				50	3.4	7600	203	10,000	269	14,000	367	17,000	446	20,000	526
				75	5.2	9000	241	12,000	327	17,000	456	21,000	558	25,000	661
	70 to 140	4.8 to 9.7	Red	75	5.2	8000	215	10,000	276	14,000	368	18,000	494	23,000	620
				100	6.9	9900	264	13,000	340	17,000	453	22,000	597	28,000	741
				125	8.6	12,000	314	15,000	405	20,000	542	26,000	708	33,000	873
	130 to 200	9.0 to 13.8	Blue	150	10.3	8700	232	11,000	286	14,000	368	19,000	515	25,000	662
				175	12.1	10,000	280	13,000	349	17,000	452	23,000	620	29,000	789
				200	13.8	7100	191	10,000	279	15,000	410	22,000	603	30,000	795
1-1/2 and 2 / 40 and 50	5 to 35	0.34 to 2.4	Dark gray	5	0.34	7900	212	12,000	311	17,000	460	22,000	596	27,000	733
				10	0.69	12,000	323	16,000	421	21,000	569	26,000	706	31,000	844
				15	1.0	16,000	428	19,000	515	24,000	644	30,000	792	35,000	939
				25	1.7	20,000	534	23,000	626	29,000	765	35,000	940	42,000	1110
				35	2.4	22,000	583	27,000	730	35,000	950	42,000	1130	49,000	1310
	20 to 65	1.4 to 4.5	Black with light blue stripe	25	1.7	13,000	362	18,000	472	24,000	636	31,000	829	38,000	1020
				35	2.4	17,000	442	21,000	569	28,000	759	36,000	961	43,000	1160
				50	3.4	22,000	579	28,000	756	38,000	1020	47,000	1250	55,000	1470
				65	4.5	23,000	620	31,000	840	44,000	1170	53,000	1420	62,000	1660
	50 to 100	3.4 to 6.9	Light gray	50	3.4	15,000	399	21,000	555	29,000	789	40,000	1060	50,000	1340
				75	5.2	20,000	536	27,000	711	36,000	973	50,000	1340	64,000	1710
				100	6.9	26,000	698	34,000	915	46,000	1240	63,000	1680	79,000	2120
	75 to 170	5.2 to 11.7	Black	75	5.2	15,000	404	19,000	507	25,000	661	36,000	959	47,000	1260
				100	6.9	20,000	524	24,000	650	31,000	840	46,000	1220	60,000	1610
				125	8.6	25,000	672	31,000	830	40,000	1070	56,000	1490	72,000	1920
				170	11.7	30,000	814	39,000	1040	51,000	1380	71,000	1900	90,000	2420

- continued -

Table 22. *Air Relief Capacities in SCFH / Nm³/h, Types MR98H, MR98HD and MR98HDP with Elastomer Diaphragm (continued)*

NOMINAL BODY SIZE, In. / DN	SPRING RELIEF PRESSURE RANGE		COLOR CODE	RELIEF PRESSURE SETTING		PRESSURE BUILD-UP OVER RELIEF SETTING, psig / bar							
						30 / 2.1		50 / 3.4		75 / 5.2		100 / 6.9	
	psi	bar		psig	bar	SCFH	Nm³/h	SCFH	Nm³/h	SCFH	Nm³/h	SCFH	Nm³/h
1/4 NPT	15 to 35	1.0 to 2.4	Yellow	15	1.0	3000	81	4000	108	5300	142	6600	176
				25	1.7	3600	95.6	4600	123	5800	156	7000	189
				35	2.4	4000	108	5100	136	6300	169	7500	202
	25 to 75	1.7 to 5.2	Green	35	2.4	4000	106	5000	135	6300	168	7500	201
				50	3.4	4700	126	5900	157	7100	190	8300	223
				75	5.2	5900	158	7200	194	8400	225	9600	256
	70 to 140	4.8 to 9.7	Red	75	5.2	5300	142	7000	187	8300	222	9600	257
				100	6.9	6300	168	8200	221	9500	256	11,000	291
				125	8.6	7000	187	9300	250	11,000	287	12,000	324
	130 to 200	9.0 to 13.8	Blue	150	10.3	7700	207	10,000	271	11,000	307	13,000	343
				175	12.1	7000	188	11,000	282	12,000	319	13,000	357
				200	13.8	7500	201	11,000	296	12,000	331	14,000	366
1/2 / 15	15 to 35	1.0 to 2.4	Yellow	15	1.0	7400	200	9800	264	13,000	346	16,000	429
				25	1.7	8700	232	11,000	298	14,000	381	17,000	464
				35	2.4	10,000	268	12,000	333	16,000	417	19,000	501
	25 to 75	1.7 to 5.2	Green	35	2.4	9600	257	12,000	327	15,000	411	18,000	495
				50	3.4	11,000	307	14,000	383	17,000	466	20,000	548
				75	5.2	15,000	391	18,000	479	21,000	556	24,000	634
	70 to 140	4.8 to 9.7	Red	75	5.2	14,000	372	18,000	472	20,000	544	23,000	616
				100	6.9	17,000	448	21,000	556	24,000	638	27,000	720
				125	8.6	19,000	507	24,000	630	27,000	717	30,000	804
	130 to 200	9.0 to 13.8	Blue	150	10.3	15,000	402	23,000	630	28,000	751	33,000	873
				175	12.1	17,000	443	26,000	699	31,000	825	36,000	952
				200	13.8	19,000	512	29,000	785	34,000	915	39,000	1040
3/4 and 1 / 20 and 25	15 to 35	1.0 to 2.4	Yellow	15	1.0	14,000	381	19,000	505	25,000	671	31,000	838
				25	1.7	17,000	445	21,000	576	28,000	739	34,000	901
				35	2.4	19,000	517	24,000	648	30,000	809	36,000	969
	25 to 75	1.7 to 5.2	Green	35	2.4	19,000	508	24,000	643	30,000	803	36,000	963
				50	3.4	22,000	600	28,000	746	34,000	905	40,000	1060
				75	5.2	28,000	745	34,000	915	40,000	1070	46,000	1220
	70 to 140	4.8 to 9.7	Red	75	5.2	27,000	718	34,000	916	40,000	1080	46,000	1240
				100	6.9	32,000	850	40,000	1070	46,000	1230	52,000	1390
				125	8.6	37,000	995	46,000	1240	52,000	1400	58,000	1570
	130 to 200	9.0 to 13.8	Blue	150	10.3	33,000	876	49,000	1300	57,000	1530	66,000	1760
				175	12.1	38,000	1010	54,000	1450	63,000	1690	72,000	1920
				200	13.8	39,000	1060	59,000	1580	65,000	1750	71,000	1910
1-1/2 and 2 / 40 and 50	5 to 35	0.34 to 2.4	Dark gray	5	0.34	35,000	951	52,000	1390	72,000	1940	93,000	2490
				10	0.69	39,000	1050	54,000	1450	75,000	2020	96,000	2580
				15	1.0	43,000	1160	60,000	1600	80,000	2130	99,000	2660
				25	1.7	50,000	1330	66,000	1770	86,000	2310	106,000	2840
				35	2.4	57,000	1530	74,000	1990	91,000	2440	108,000	2900
	20 to 65	1.4 to 4.5	Black with light blue stripe	25	1.7	47,000	1250	63,000	1700	83,000	2230	103,000	2760
				35	2.4	53,000	1410	71,000	1910	90,000	2420	110,000	2940
				50	3.4	64,000	1710	82,000	2200	101,000	2710	120,000	3220
				65	4.5	72,000	1930	92,000	2470	112,000	3010	132,000	3540
	50 to 100	3.4 to 6.9	Light gray	50	3.4	61,000	1620	82,000	2190	102,000	2740	122,000	3280
				75	5.2	75,000	2020	98,000	2630	120,000	3220	142,000	3810
				100	6.9	91,000	2450	116,000	3100	138,000	3710	161,000	4320
	75 to 170	5.2 to 11.7	Black	75	5.2	61,000	1640	89,400	2400	111,000	2980	133,000	3560
				100	6.9	76,000	2030	107,000	2880	130,000	3480	152,000	4080
				125	8.6	88,000	2360	121,000	3250	145,000	3900	170,000	4550
				170	11.7	111,000	2970	151,000	4060	178,000	4790	206,000	5510

Table 23. *Air Relief Capacities in SCFH / Nm³/h, Types MR98H, MR98HD and MR98HDP with Metal Diaphragm*

NOMINAL BODY SIZE, In. / DN	SPRING RELIEF PRESSURE RANGE		COLOR CODE	RELIEF PRESSURE SETTING		PRESSURE BUILD-UP OVER RELIEF SETTING, psig / bar									
						5 / 0.34		7 / 0.48		10 / 0.69		15 / 1.0		20 / 1.4	
	psi	bar		psig	bar	SCFH	Nm³/h	SCFH	Nm³/h	SCFH	Nm³/h	SCFH	Nm³/h	SCFH	Nm³/h
1/4 NPT	15 to 35	1.0 to 2.4	Yellow	15	1.0	510	13.7	730	19.5	1100	28.3	1600	42.6	2100	56.9
				25	1.7	600	16.1	840	22.5	1200	32.2	1800	48.7	2400	65.3
				35	2.4	710	19.1	970	25.9	1300	36.1	2000	54.4	2700	72.8
	25 to 75	1.7 to 5.2	Green	35	2.4	660	17.7	880	23.7	1200	32.7	1800	48.8	2400	65
				50	3.4	790	21.1	1000	27.4	1400	36.9	2000	53.7	2600	70.6
				75	5.2	980	26.3	1200	33.2	1600	43.7	2300	61.6	3000	79.5
	70 to 140	4.8 to 9.7	Red	75	5.2	810	21.7	1000	26.9	1300	34.8	1800	49.5	2400	64.3
				100	6.9	980	26.3	1200	32.5	1600	41.7	2100	57.5	2700	73.4
				125	8.6	1100	30.1	1400	36.6	1700	46.3	2400	63.8	3000	81.4
	130 to 200	9.0 to 13.8	Blue	150	10.3	1300	34.4	1500	40.3	1800	49.1	3100	82.3	4300	115
				175	12.1	1400	37.7	1700	44.3	2000	54.2	3300	88.9	4600	124
				200	13.8	1600	42.5	1800	49.1	2200	59	3600	95.3	4900	132
1/2 / 15	15 to 35	1.0 to 2.4	Yellow	15	1.0	530	14.2	1500	39	2800	76.2	4000	107	5100	138
				25	1.7	1100	28.9	2100	55.8	3600	96.2	4900	130	6100	165
				35	2.4	1500	39.7	2400	65.1	3800	103	5400	144	6900	184
	25 to 75	1.7 to 5.2	Green	35	2.4	830	22.2	1300	34.2	1900	52.2	3400	92.4	4900	132
				50	3.4	1400	37.6	1900	52.1	2800	73.9	4200	112	5600	150
				75	5.2	1800	48.9	2300	61.8	3000	81.1	4500	122	6000	162
	70 to 140	4.8 to 9.7	Red	75	5.2	1700	44.9	2100	55.4	2700	71.3	4000	107	5300	142
				100	6.9	2000	53.9	2400	64.8	3000	81.2	4300	116	5700	152
				125	8.6	2300	61.9	2800	74.1	3400	92.4	4700	126	6000	160
	130 to 200	9.0 to 13.8	Blue	150	10.3	2800	74.4	3100	84.4	3700	99.3	4700	127	5700	154
				175	12.1	3100	84.2	3500	94.7	4100	111	5200	140	6300	169
				200	13.8	3400	91.3	3800	102	4400	118	5600	149	6700	180
3/4 and 1 / 20 and 25	15 to 35	1.0 to 2.4	Yellow	15	1.0	3600	97.9	4600	123	6000	160	7400	199	8900	239
				25	1.7	3800	101	4800	129	6400	173	8400	224	10,000	276
				35	2.4	4300	116	5400	145	7000	188	9300	249	12,000	310
	25 to 75	1.7 to 5.2	Green	35	2.4	3400	90.5	4500	120	6100	163	8200	221	10,000	278
				50	3.4	3600	97.4	4700	127	6400	172	8900	237	11,000	303
				75	5.2	4600	124	5700	153	7400	197	10,000	275	13,000	352
	70 to 140	4.8 to 9.7	Red	75	5.2	3900	104	5000	133	6600	176	9000	241	11,000	306
				100	6.9	4800	128	5900	158	7500	202	10,000	276	13,000	351
				125	8.6	5200	139	6300	169	8000	214	11,000	292	14,000	371
	130 to 200	9.0 to 13.8	Blue	150	10.3	6300	169	7300	196	8800	237	12,000	309	14,000	381
				175	12.1	7300	194	8300	223	9900	265	13,000	349	16,000	433
				200	13.8	8000	213	9100	244	11,000	289	14,000	370	17,000	450
1-1/2 and 2 / 40 and 50	5 to 35	0.34 to 2.4	Dark gray	5	0.34	7100	191	9500	253	13,000	348	17,000	461	21,000	574
				10	0.69	11,000	304	14,000	374	18,000	478	22,000	577	25,000	676
				15	1.0	12,000	330	15,000	395	18,000	493	23,000	624	28,000	754
				25	1.7	16,000	418	19,000	499	23,000	621	28,000	756	33,000	891
				35	2.4	18,000	479	21,000	570	26,000	705	32,000	869	39,000	1030
	20 to 65	1.4 to 4.5	Black with light blue stripe	25	1.7	11,000	307	14,000	374	18,000	475	23,000	624	29,000	773
				35	2.4	13,000	357	17,000	452	22,000	595	28,000	760	35,000	925
				50	3.4	15,000	406	19,000	503	24,000	650	31,000	843	39,000	1040
				65	4.5	17,000	464	21,000	561	26,000	707	35,000	936	43,000	1170
	50 to 100	3.4 to 6.9	Light gray	50	3.4	11,000	297	14,000	372	18,000	484	25,000	670	32,000	855
				75	5.2	16,000	425	19,000	518	24,000	656	33,000	895	42,000	1130
				100	6.9	20,000	536	24,000	642	30,000	800	39,000	1040	48,000	1290
	75 to 170	5.2 to 11.7	Black	75	5.2	12,000	333	15,000	390	18,000	476	24,000	650	31,000	825
				100	6.9	17,000	451	20,000	532	24,000	655	32,000	857	39,000	1060
				125	8.6	19,000	522	23,000	628	29,000	786	38,000	1020	46,000	1250
				170	11.7	26,000	695	30,000	817	37,000	1000	47,000	1270	57,000	1540

- continued -

Table 23. *Air Relief Capacities in SCFH / Nm³/h, Types MR98H, MR98HD and MR98HDP with Metal Diaphragm (continued)*

NOMINAL BODY SIZE, In. / DN	SPRING RELIEF PRESSURE RANGE		COLOR CODE	RELIEF PRESSURE SETTING		PRESSURE BUILD-UP OVER RELIEF SETTING, psig / bar							
						30 / 2.1		50 / 3.4		75 / 5.2		100 / 6.9	
	psi	bar		psig	bar	SCFH	Nm³/h	SCFH	Nm³/h	SCFH	Nm³/h	SCFH	Nm³/h
1/4 NPT	15 to 35	1.0 to 2.4	Yellow	15	1.0	2700	71.5	3800	101	5100	137	6400	173
				25	1.7	3000	81.2	4200	113	5600	149	6900	185
				35	2.4	3400	90.5	4700	126	6000	162	7400	198
	25 to 75	1.7 to 5.2	Green	35	2.4	3200	84.6	4600	124	6000	160	7300	196
				50	3.4	3500	93.7	5200	140	6600	177	8000	215
				75	5.2	4000	108	6200	166	7700	205	9100	245
	70 to 140	4.8 to 9.7	Red	75	5.2	3500	93.6	5700	152	7300	196	8900	239
				100	6.9	4000	106	6400	172	8200	220	10,000	267
				125	8.6	4400	117	7000	188	9100	244	11,000	299
	130 to 200	9.0 to 13.8	Blue	150	10.3	5200	138	6900	184	9300	249	12,000	315
				175	12.1	5500	148	7300	196	10,000	268	13,000	340
				200	13.8	5800	156	7700	206	10,000	277	13,000	349
1/2 / 15	15 to 35	1.0 to 2.4	Yellow	15	1.0	6400	172	9000	240	12,000	324	15,000	409
				25	1.7	7400	199	10,000	269	13,000	354	16,000	439
				35	2.4	8300	223	11,000	299	14,000	385	18,000	471
	25 to 75	1.7 to 5.2	Green	35	2.4	6400	171	9200	248	12,000	323	15,000	398
				50	3.4	7300	196	11,000	288	14,000	363	16,000	437
				75	5.2	8200	219	12,000	334	15,000	414	18,000	494
	70 to 140	4.8 to 9.7	Red	75	5.2	7600	203	12,000	325	15,000	407	18,000	489
				100	6.9	8200	221	13,000	359	17,000	451	20,000	542
				125	8.6	8700	233	14,000	379	18,000	491	22,000	602
	130 to 200	9.0 to 13.8	Blue	150	10.3	8200	220	13,000	351	19,000	506	25,000	660
				175	12.1	8800	237	14,000	373	20,000	536	26,000	699
				200	13.8	9300	250	15,000	391	21,000	568	28,000	744
3/4 and 1 / 20 and 25	15 to 35	1.0 to 2.4	Yellow	15	1.0	11,000	303	16,000	432	22,000	583	27,000	734
				25	1.7	13,000	344	18,000	480	24,000	634	29,000	788
				35	2.4	14,000	384	20,000	530	26,000	689	32,000	847
	25 to 75	1.7 to 5.2	Green	35	2.4	13,000	358	19,000	517	25,000	684	32,000	850
				50	3.4	15,000	396	22,000	582	28,000	754	35,000	926
				75	5.2	17,000	465	26,000	690	33,000	873	39,000	1060
	70 to 140	4.8 to 9.7	Red	75	5.2	16,000	423	25,000	657	32,000	845	39,000	1030
				100	6.9	18,000	482	28,000	744	36,000	954	43,000	1160
				125	8.6	19,000	517	30,000	807	39,000	1050	48,000	1290
	130 to 200	9.0 to 13.8	Blue	150	10.3	20,000	530	31,000	827	43,000	1150	55,000	1470
				175	12.1	22,000	588	34,000	898	46,000	1230	58,000	1570
				200	13.8	23,000	617	35,000	950	49,000	1320	63,000	1680
1-1/2 and 2 / 40 and 50	5 to 35	0.34 to 2.4	Dark gray	5	0.34	29,000	780	44,000	1190	62,000	1650	79,000	2110
				10	0.69	33,000	878	48,000	1280	65,000	1750	82,000	2210
				15	1.0	35,000	951	50,000	1350	68,000	1820	86,000	2290
				25	1.7	41,000	1090	56,000	1490	73,000	1960	90,000	2420
				35	2.4	46,000	1240	61,000	1650	79,000	2120	97,000	2600
	20 to 65	1.4 to 4.5	Black with light blue stripe	25	1.7	36,000	978	52,000	1390	70,000	1870	87,000	2340
				35	2.4	43,000	1140	59,000	1570	76,000	2040	93,000	2510
				50	3.4	48,000	1280	65,000	1750	83,000	2220	100,000	2690
				65	4.5	53,000	1420	72,000	1930	91,000	2430	109,000	2930
	50 to 100	3.4 to 6.9	Light gray	50	3.4	40,000	1070	56,000	1500	76,000	2040	96,500	2590
				75	5.2	53,000	1420	74,000	1980	93,000	2500	112,000	3010
				100	6.9	61,000	1630	86,000	2310	107,000	2880	128,000	3440
	75 to 170	5.2 to 11.7	Black	75	5.2	41,000	1090	60,000	1620	83,000	2240	106,000	2850
				100	6.9	53,000	1420	80,000	2150	102,000	2740	124,000	3330
				125	8.6	62,000	1660	92,000	2480	116,000	3100	139,000	3730
				170	11.7	77,000	2070	116,000	3120	142,000	3820	169,000	4520

Table 24. *Water Relief Capacities in Gallons per Minute / L/min, Types MR98HH and MR98HHD with Elastomer Diaphragm*

NOMINAL BODY SIZE, In. / DN	SPRING RELIEF PRESSURE RANGE		RELIEF PRESSURE SETTING		PRESSURE BUILD-UP OVER RELIEF SETTING, psig / bar									
					5 / 0.34		10 / 0.69		15 / 1.0		20 / 1.4		25 / 1.7	
	psi	bar	psig	bar	GPM	l/min	GPM	l/min	GPM	l/min	GPM	l/min	GPM	l/min
1/4 NPT	150 to 375	10.3 to 25.9	150	10.3	4.6	17.4	7.4	28	9.9	37.3	12.3	46.5	13.5	51.1
			175	12.1	5.1	19.3	8.2	31	10.7	40.3	13.1	49.6	14.4	54.5
			200	13.8	5.3	20	8.4	31.8	10.9	41.2	13.4	50.7	15.1	56.9
			250	17.2	5.8	21.9	9.1	34.4	12	45.4	14.9	56.4	16.5	62.4
			300	20.7	6.4	24.2	10	37.8	13.1	49.4	16.1	60.9	18	68.1
			375	25.9	7.3	27.6	11.1	42	14.6	55	18	68.1	20.2	76.4
1/2 / 15	150 to 375	10.3 to 25.9	150	10.3	8.8	33.3	13.3	50.3	17.3	65.4	21.3	80.6	24.6	92.9
			175	12.1	9.3	35.2	14.2	53.7	18.6	70.2	22.9	86.6	26.3	99.3
			200	13.8	9.9	37.5	15	56.7	19.6	74.1	24.2	91.5	27.9	105
			250	17.2	10.8	40.9	15.8	59.8	20.8	78.5	25.7	97.2	29.4	111
			300	20.7	11	41.6	16	60.5	22	83.2	28	106	33	125
			375	25.9	12	45.4	18	68.1	24	90.8	30	113	36.7	139
3/4 and 1 / 20 and 25	150 to 375	10.3 to 25.9	150	10.3	15.7	59.4	23.3	88.1	30.2	114	37.1	140	43	163
			175	12.1	15.8	59.8	23.4	88.5	30.8	117	38.2	145	45.3	171
			200	13.8	18	68.1	25.2	95.3	33.1	125	40.9	155	47.4	179
			250	17.2	19.6	74.1	26.8	101	35.3	134	43.8	166	51.5	195
			300	20.7	25	94.6	30	113	37.5	142	45	170	54.6	207
			375	25.9	28.6	108	33	125	41.4	157	49.9	189	60.8	230

Table 24. *Water Relief Capacities in Gallons per Minute / L/min, Types MR98HH and MR98HHD with Elastomer Diaphragm (continued)*

NOMINAL BODY SIZE, In. / DN	SPRING RELIEF PRESSURE RANGE		RELIEF PRESSURE SETTING		PRESSURE BUILD-UP OVER RELIEF SETTING, psig / bar											
					30 / 2.1		35 / 2.4		40 / 2.8		50 / 3.4		75 / 5.2		100 / 6.9	
	psi	bar	psig	bar	GPM	l/min	GPM	l/min	GPM	l/min	GPM	l/min	GPM	l/min	GPM	l/min
1/4 NPT	150 to 375	10.3 to 25.9	150	10.3	14.7	55.6	15.5	58.4	16.2	61.3	17.7	67	19.2	72.6	20.7	78.3
			175	12.1	15.7	59.4	16.4	62.1	17.2	64.9	18.6	70.4	20.2	76.4	21.8	82.5
			200	13.8	16.7	63.2	17.5	66.2	18.3	69.2	19.9	75.3	21.4	80.8	22.8	86.3
			250	17.2	18.1	68.5	18.7	70.8	19.4	73.2	20.6	77.9	21.8	82.5	23	87
			300	20.7	19.9	75.3	20.5	77.6	21.1	79.8	22.3	84.4	23.4	88.3	24.4	92.3
			375	25.9												
1/2 / 15	150 to 375	10.3 to 25.9	150	10.3	27.8	105	30	114	32.3	122	36.7	139	42.7	161	48.6	184
			175	12.1	29.6	112	31.9	120	34.1	129	38.6	146	44.6	169	50.5	191
			200	13.8	31.5	119	33.7	127	35.9	136	40.3	152	46.4	176	52.5	199
			250	17.2	33	125	35.7	135	38.4	145	43.7	165	49.7	188	55.7	211
			300	20.7	38	144	40.3	152	42.5	161	47	178	53	200	59	223
			375	25.9												
3/4 and 1 / 20 and 25	150 to 375	10.3 to 25.9	150	10.3	48.9	185	53.6	203	58.3	221	67.7	256	79.3	300	90.9	344
			175	12.1	52.3	198	57	216	61.8	234	71.2	269	82.9	313	94.5	357
			200	13.8	53.9	204	59.1	223	64.3	243	74.6	282	86.6	328	98.6	373
			250	17.2	59.2	224	64.5	244	69.7	264	80.2	303	93	352	106	400
			300	20.7	64.2	243	69.9	264	75.6	286	87	329	110	417	133	504
			375	25.9												

– Shaded areas show where maximum inlet pressures are exceeded.

Table 25. *Water Relief Capacities in Gallons per Minute / L/min, Types MR98HH and MR98HHD with Metal Diaphragm*

NOMINAL BODY SIZE, In. / DN	SPRING RELIEF PRESSURE RANGE		RELIEF PRESSURE SETTING		PRESSURE BUILD-UP OVER RELIEF SETTING, psig / bar									
					5 / 0.34		10 / 0.69		15 / 1.0		20 / 1.4		25 / 1.7	
	psi	bar	psig	bar	GPM	l/min	GPM	l/min	GPM	l/min	GPM	l/min	GPM	l/min
1/4 NPT	150 to 375	10.3 to 25.9	150	10.3	3.2	12.1	4.8	18.2	6.2	23.3	7.5	28.4	8.7	32.7
			175	12.1	3.5	13.2	4.9	18.5	6.4	24	7.8	29.5	8.9	33.5
			200	13.8	3.6	13.6	5.2	19.7	6.5	24.6	7.8	29.5	8.9	33.7
			250	17.2	4.2	15.9	5.3	20	6.6	25	7.9	29.9	9.1	34.4
			300	20.7	4.6	17.4	5.6	21.2	6.8	25.7	8	30.3	9.3	35
			375	25.9	5.4	20.4	6	22.7	7.1	26.9	8.2	31	9.56	36.2
1/2 / 15	150 to 375	10.3 to 25.9	150	10.3	5.72	21.6	7.32	27.7	8.22	31.1	9.16	34.6	10.6	39.9
			175	12.1	6.05	22.9	7.81	29.5	8.81	33.3	9.85	37.3	11.3	42.7
			200	13.8	6.44	24.3	8.25	31.2	9.31	35.2	10.4	39.4	12	45.3
			250	17.2	6.7	25.3	8.69	32.9	9.86	37.3	11.1	41.8	12.6	47.7
			300	20.7	7	26.5	9	34	10.5	39.7	12	45.4	14	53
			375	25.9	8	30.3	9.5	35.9	11.5	43.5	13.5	51.1	15.8	59.7
3/4 and 1 / 20 and 25	150 to 375	10.3 to 25.9	150	10.3	12	45.4	17	64.3	20.3	76.6	23.5	88.9	26.8	101
			175	12.1	12.8	48.4	16.5	62.4	20.5	77.4	24.4	92.3	27.6	104
			200	13.8	13.1	49.6	17	64.3	20.8	78.5	24.5	92.7	27.9	106
			250	17.2	15.3	57.9	18.7	70.7	22.5	84.9	26.2	99.1	29.8	113
			300	20.7	14.9	56.4	19.2	72.6	23.2	87.8	27.2	103	31.4	119
			375	25.9	15.6	59	19.3	73	23.4	88.5	27.5	104	33.6	127

Table 25. *Water Relief Capacities in Gallons per Minute / L/min, Types MR98HH and MR98HHD with Metal Diaphragm (continued)*

NOMINAL BODY SIZE, In. / DN	SPRING RELIEF PRESSURE RANGE		RELIEF PRESSURE SETTING		PRESSURE BUILD-UP OVER RELIEF SETTING, psig / bar											
					30 / 2.1		35 / 2.4		40 / 2.8		50 / 3.4		75 / 5.2		100 / 6.9	
	psi	bar	psig	bar	GPM	l/min	GPM	l/min	GPM	l/min	GPM	l/min	GPM	l/min	GPM	l/min
1/4 NPT	150 to 375	10.3 to 25.9	150	10.3	9.8	37.1	10.7	40.3	11.5	43.5	13.2	49.9	15.4	58.1	17.5	66.2
			175	12.1	9.9	37.5	10.9	41	11.8	44.6	13.7	51.8	16	60.3	18.2	68.9
			200	13.8	10	37.8	11	41.4	11.9	45	13.8	52.2	16.3	61.5	18.7	70.7
			250	17.2	10.3	39	11.3	42.6	12.2	46.2	14.1	53.3	17.1	64.5	20	75.7
			300	20.7	10.5	39.7	11.5	43.4	12.5	47.1	14.4	54.5	17.7	67	21	79.4
			375	25.9												
1/2 / 15	150 to 375	10.3 to 25.9	150	10.3	12	45.2	12.9	48.8	14.2	53.7	17.2	65.3	22.6	85.5	30.6	116
			175	12.1	12.7	48.2	13.7	51.8	15	56.8	18.1	68.6	23.6	89.3	31.3	118
			200	13.8	13.5	51.2	14.5	54.8	15.8	59.8	18.9	71.7	24.1	91.3	31.5	119
			250	17.2	14.2	53.7	15.3	58	16.9	63.8	20.5	77.7	25.8	97.8	32.3	122
			300	20.7	16	60.5	17.5	66.2	19	71.9	22	83.2	28	106	34	129
			375	25.9												
3/4 and 1 / 20 and 25	150 to 375	10.3 to 25.9	150	10.3	30	113	32.9	124	35.7	135	41.4	157	51.7	196	62	235
			175	12.1	30.7	116	33.8	128	36.9	140	43.1	163	53.7	203	64.2	243
			200	13.8	31.3	118	34.5	130	37.7	142	44	166	55.1	208	66.1	250
			250	17.2	33.3	126	36.5	138	39.6	150	45.9	174	57.6	218	69.3	262
			300	20.7	35.5	134	39.1	148	42.8	162	50	189	65.5	248	81	306
			375	25.9												

▭ – Shaded areas show where maximum inlet pressures are exceeded.

Table 26. *Steam Relief Capacities in Lbs per Hour / kg/h, Types MR98HH and MR98HHD with Metal Diaphragm Only*

NOMINAL BODY SIZE, In. / DN	SPRING RELIEF PRESSURE RANGE		RELIEF PRESSURE SETTING		PRESSURE BUILD-UP OVER RELIEF SETTING, psig / bar									
					5 / 0.34		10 / 0.69		15 / 1.0		20 / 1.4		25 / 1.7	
	psi	bar	psig	bar	lbs/h	kg/h	lbs/h	kg/h	lbs/h	kg/h	lbs/h	kg/h	lbs/h	kg/h
1/4 NPT	150 to 375	10.3 to 25.9	150	10.3	53.2	24.2	75.2	34.2	96.7	43.9	118	53.7	139	63.4
			175	12.1	61.1	27.8	83.5	37.9	108	49	132	60.1	155	70.3
			200	13.8	67	30.4	92	41.8	116	52.6	140	63.4	165	74.9
			250	17.2	80.3	36.5	108	49	134	60.8	159	72.5	186	84.7
			300	20.7	92.6	42.1	120	54.6	148	67.3	176	80	205	93
			375	25.9	113	51.1	144	65.4	175	79.4	206	93.5	238	108
1/2 / 15	150 to 375	10.3 to 25.9	150	10.3	119	54.2	165	74.8	211	95.8	257	117	316	144
			175	12.1	148	67.3	197	89.7	248	113	298	135	351	160
			200	13.8	160	72.8	205	93.2	263	119	321	146	382	174
			250	17.2	189	85.7	243	111	301	137	360	163	422	192
			300	20.7	217	98.5	271	123	342	155	413	188	472	215
			375	25.9	268	122	336	153	410	186	483	220	550	250
3/4 and 1 / 20 and 25	150 to 375	10.3 to 25.9	150	10.3	245	111	329	149	419	191	510	232	604	274
			175	12.1	283	128	366	166	466	212	565	257	673	306
			200	13.8	316	144	411	187	513	233	615	279	719	327
			250	17.2	369	168	487	222	603	274	720	327	835	379
			300	20.7	435	198	549	249	675	307	802	364	921	419
			375	25.9	518	235	658	299	797	362	935	425	1090	494

Table 26. *Steam Relief Capacities in Lbs per Hour / kg/h, Types MR98HH and MR98HHD with Metal Diaphragm Only (continued)*

NOMINAL BODY SIZE, In. / DN	SPRING RELIEF PRESSURE RANGE		RELIEF PRESSURE SETTING		PRESSURE BUILD-UP OVER RELIEF SETTING, psig / bar											
					30 / 2.1		35 / 2.4		40 / 2.8		50 / 3.4		75 / 5.2		100 / 6.9	
	psi	bar	psig	bar	lbs/h	kg/h	lbs/h	kg/h	lbs/h	kg/h	lbs/h	kg/h	lbs/h	kg/h	lbs/h	kg/h
1/4 NPT	150 to 375	10.3 to 25.9	150	10.3	161	73	181	82.3	201	91.5	242	110	310	141	377	171
			175	12.1	177	80.5	199	90.5	221	101	265	121	337	153	409	186
			200	13.8	190	86.4	213	96.8	236	107	282	128	362	164	442	201
			250	17.2	213	97	238	108	263	120	314	143	405	184	496	225
			300	20.7	233	106	260	118	287	131	342	155	449	204	557	253
			375	25.9												
1/2 / 15	150 to 375	10.3 to 25.9	150	10.3	375	170	430	195	484	220	594	270	854	388	1110	506
			175	12.1	405	184	465	211	525	239	645	293	943	428	1240	564
			200	13.8	444	202	504	229	565	257	686	312	982	446	1280	581
			250	17.2	484	220	552	251	620	282	756	343	1080	491	1410	639
			300	20.7	531	241	602	274	673	306	814	370	1150	521	1480	672
			375	25.9												
3/4 and 1 / 20 and 25	150 to 375	10.3 to 25.9	150	10.3	698	317	793	361	889	404	1080	491	1540	698	1990	905
			175	12.1	780	355	874	397	967	440	1150	525	1610	733	2070	940
			200	13.8	824	374	934	424	1040	474	1260	575	1740	793	2230	1010
			250	17.2	950	432	1060	480	1160	529	1380	625	1960	891	2540	1160
			300	20.7	1040	473	1170	530	1290	588	1550	703	2150	977	2750	1250
			375	25.9												

– Shaded areas show where maximum inlet pressures are exceeded.

Table 27. *Air Relief Capacities in SCFH / Nm³/h, Types MR98HH and MR98HHD with Elastomer Diaphragm*

NOMINAL BODY SIZE, In. / DN	SPRING RELIEF PRESSURE RANGE		RELIEF PRESSURE SETTING		PRESSURE BUILD-UP OVER RELIEF SETTING, psig / bar									
					5 / 0.34		10 / 0.69		15 / 1.0		20 / 1.4		25 / 1.7	
	psi	bar	psig	bar	SCFH	Nm³/h	SCFH	Nm³/h	SCFH	Nm³/h	SCFH	Nm³/h	SCFH	Nm³/h
1/4 NPT	150 to 375	10.3 to 25.9	150	10.3	1450	38.8	2320	62.1	3640	97.5	4950	133	6780	182
			175	12.1	1910	51.1	2930	78.5	4400	118	5870	157	7630	205
			200	13.8	2370	63.4	3530	94.8	5160	138	6780	182	8470	227
			250	17.2	2800	75.2	4750	127	6680	179	8610	231	10,200	272
			300	20.7	3720	99.7	5970	160	8200	220	10,400	280	11,900	318
			375	25.9	5570	149	7800	209	10,500	281	13,200	353	14,400	386
1/2 / 15	150 to 375	10.3 to 25.9	150	10.3	3330	89.2	5220	140	7530	202	9840	264	12,100	325
			175	12.1	3870	104	6000	161	8210	220	10,400	280	12,900	346
			200	13.8	4150	111	6560	176	9070	243	11,600	310	14,300	382
			250	17.2	5100	137	7320	196	10,100	269	12,800	343	16,000	429
			300	20.7	5870	157	8470	227	11,900	319	15,400	412	19,000	509
			375	25.9	7210	193	9840	264	13,300	357	16,800	449	22,100	593
3/4 and 1 / 20 and 25	150 to 375	10.3 to 25.9	150	10.3	7510	201	10,800	290	14,600	390	18,300	491	22,400	599
			175	12.1	8300	222	12,100	324	16,400	440	20,800	556	25,400	680
			200	13.8	9380	252	13,900	373	18,500	496	23,100	619	27,600	739
			250	17.2	11,500	308	16,500	442	21,900	588	27,300	733	32,800	878
			300	20.7	13,300	357	20,100	538	26,500	711	33,000	884	39,300	1050
			375	25.9	18,200	487	26,300	706	34,500	924	42,600	1140	47,200	1270

Table 27. *Air Relief Capacities in SCFH / Nm³/h, Types MR98HH and MR98HHD with Elastomer Diaphragm (continued)*

NOMINAL BODY SIZE, In. / DN	SPRING RELIEF PRESSURE RANGE		RELIEF PRESSURE SETTING		PRESSURE BUILD-UP OVER RELIEF SETTING, psig / bar											
					30 / 2.1		35 / 2.4		40 / 2.8		50 / 3.4		75 / 5.2		100 / 6.9	
	psi	bar	psig	bar	SCFH	Nm³/h	SCFH	Nm³/h	SCFH	Nm³/h	SCFH	Nm³/h	SCFH	Nm³/h	SCFH	Nm³/h
1/4 NPT	150 to 375	10.3 to 25.9	150	10.3	8610	231	9130	245	9660	259	10,700	287	13,300	357	15,900	427
			175	12.1	9390	252	9870	265	10,300	277	11,300	303	13,700	368	16,100	432
			200	13.8	10,200	273	10,600	284	11,000	296	11,900	320	14,100	378	16,300	437
			250	17.2	11,700	314	12,200	328	12,800	342	13,800	371	15,400	412	16,900	453
			300	20.7	13,300	356	14,000	375	14,700	395	16,200	434	16,800	449	17,300	465
			375	25.9												
1/2 / 15	150 to 375	10.3 to 25.9	150	10.3	14,400	385	16,300	436	18,200	487	22,000	589	27,600	741	33,300	894
			175	12.1	15,400	413	17,600	472	19,800	531	24,200	650	30,200	811	36,300	972
			200	13.8	17,000	455	19,300	516	21,600	578	26,200	702	32,100	860	37,900	1020
			250	17.2	19,300	516	22,000	589	24,700	662	30,100	808	37,300	1000	44,500	1190
			300	20.7	22,600	607	25,800	691	29,000	776	35,300	946	43,200	1160	51,200	1370
			375	25.9												
3/4 and 1 / 20 and 25	150 to 375	10.3 to 25.9	150	10.3	26,400	708	30,200	809	34,000	910	41,500	1110	52,700	1410	63,900	1710
			175	12.1	30,000	804	34,200	918	38,500	1030	47,000	1260	58,200	1560	69,400	1860
			200	13.8	32,000	859	36,800	988	41,700	1120	51,300	1370	64,500	1730	77,800	2080
			250	17.2	38,200	1020	43,700	1170	49,200	1320	60,300	1620	74,900	2010	89,500	2400
			300	20.7	45,700	1220	51,900	1390	58,200	1560	70,800	1900	84,300	2260	97,800	2620
			375	25.9												

▭ – Shaded areas show where maximum inlet pressures are exceeded.

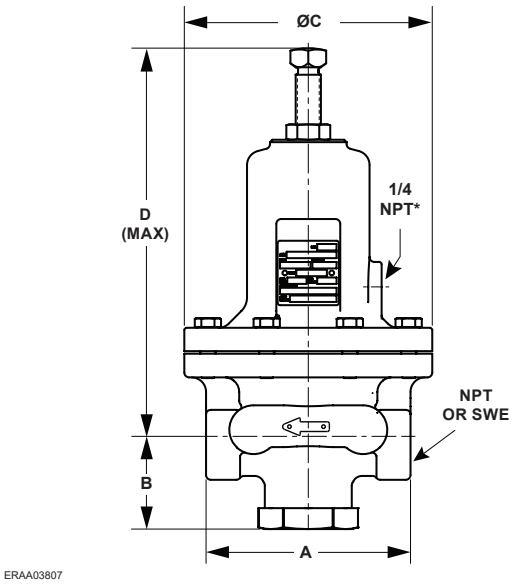
Table 28. *Air Relief Capacities in SCFH / Nm³/h, Types MR98HH and MR98HHD with Metal Diaphragm*

NOMINAL BODY SIZE, In. / DN	SPRING RELIEF PRESSURE RANGE		RELIEF PRESSURE SETTING		PRESSURE BUILD-UP OVER RELIEF SETTING, psig / bar									
					5 / 0.34		10 / 0.69		15 / 1.0		20 / 1.4		25 / 1.7	
	psi	bar	psig	bar	SCFH	Nm³/h	SCFH	Nm³/h	SCFH	Nm³/h	SCFH	Nm³/h	SCFH	Nm³/h
1/4 NPT	150 to 375	10.3 to 25.9	150	10.3	1240	33.2	1750	46.9	2250	60.2	2740	73.6	3240	86.8
			175	12.1	1420	38.1	1940	52	2510	67.2	3070	82.3	3590	96.3
			200	13.8	1560	41.7	2140	57.3	2690	72.1	3240	87	3830	103
			250	17.2	1870	50	2510	67.2	3110	83.3	3710	99.4	4330	116
			300	20.7	2150	57.7	2790	74.8	3440	92.2	4090	110	4750	127
			375	25.9	2610	70.1	3340	89.7	4060	109	4780	128	5540	148
1/2 / 15	150 to 375	10.3 to 25.9	150	10.3	2770	74.3	3830	103	4900	131	5970	160	7340	197
			175	12.1	3440	92.2	4580	123	5760	154	6930	186	8170	219
			200	13.8	3720	99.8	4760	128	6110	164	7450	200	8880	238
			250	17.2	4380	117	5660	152	7010	188	8360	224	9800	263
			300	20.7	5040	135	6290	169	7950	213	9610	258	11,000	294
			375	25.9	6220	167	7810	209	9520	255	11,200	301	12,800	342
3/4 and 1 / 20 and 25	150 to 375	10.3 to 25.9	150	10.3	5690	153	7630	205	9740	261	11,800	318	14,000	376
			175	12.1	6560	176	8500	228	10,800	290	13,100	352	15,600	419
			200	13.8	7340	197	9560	256	11,900	320	14,300	383	16,700	448
			250	17.2	8590	230	11,300	304	14,000	376	16,700	448	19,400	520
			300	20.7	10,100	271	12,800	342	15,700	421	18,600	500	21,400	574
			375	25.9	12,000	323	15,300	410	18,500	497	21,700	583	25,300	677

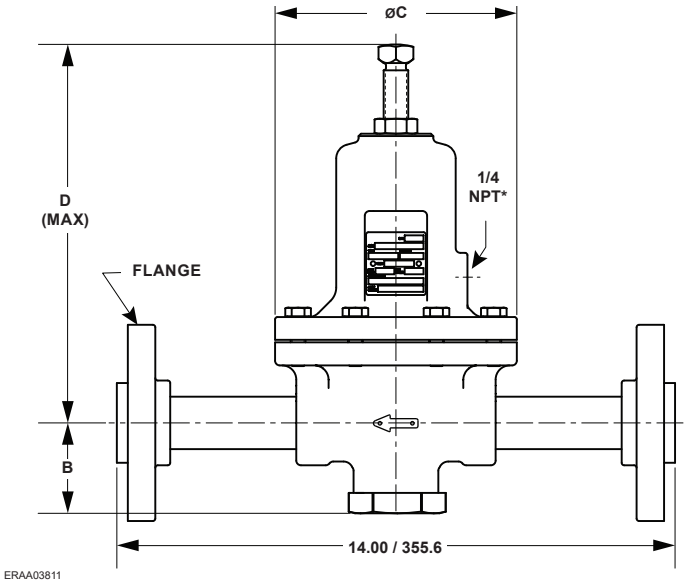
Table 28. *Air Relief Capacities in SCFH / Nm³/h, Types MR98HH and MR98HHD with Metal Diaphragm (continued)*

NOMINAL BODY SIZE, In. / DN	SPRING RELIEF PRESSURE RANGE		RELIEF PRESSURE SETTING		PRESSURE BUILD-UP OVER RELIEF SETTING, psig / bar											
					30 / 2.1		35 / 2.4		40 / 2.8		50 / 3.4		75 / 5.2		100 / 6.9	
	psi	bar	psig	bar	SCFH	Nm³/h	SCFH	Nm³/h	SCFH	Nm³/h	SCFH	Nm³/h	SCFH	Nm³/h	SCFH	Nm³/h
1/4 NPT	150 to 375	10.3 to 25.9	150	10.3	3730	100	4210	113	4680	125	5630	151	7190	193	8760	235
			175	12.1	4110	110	4630	124	5140	138	6170	165	7840	210	9510	255
			200	13.8	4410	118	4950	133	5480	147	6550	176	8410	225	10,300	275
			250	17.2	4960	133	5540	149	6120	164	7290	195	9400	252	11,500	309
			300	20.7	5420	145	6050	162	6680	179	7940	213	10,400	280	12,900	347
			375	25.9												
1/2 / 15	150 to 375	10.3 to 25.9	150	10.3	8710	234	9980	268	11,300	302	13,800	370	19,800	532	25,900	694
			175	12.1	9400	252	10,800	290	12,200	327	15,000	402	21,900	587	28,800	773
			200	13.8	10,300	276	11,700	314	13,100	352	15,900	427	22,800	612	29,700	797
			250	17.2	11,200	301	12,800	344	14,400	386	17,600	471	25,100	673	32,700	876
			300	20.7	12,300	331	14,000	375	15,600	419	18,900	507	26,600	714	34,300	921
			375	25.9												
3/4 and 1 / 20 and 25	150 to 375	10.3 to 25.9	150	10.3	16,200	434	18,400	494	20,700	554	25,100	673	35,700	957	46,300	1240
			175	12.1	18,100	486	20,300	544	22,500	603	26,800	720	37,500	1000	48,100	1290
			200	13.8	19,100	513	21,700	582	24,300	650	29,400	788	40,500	1090	51,700	1390
			250	17.2	22,100	592	24,500	658	27,000	724	32,000	857	45,500	1220	59,100	1580
			300	20.7	24,200	648	27,100	727	30,000	805	35,900	963	50,000	1340	64,000	1720
			375	25.9												

▭ – Shaded areas show where maximum inlet pressures are exceeded.



TYPE MR98H (DIMENSIONS ALSO APPLY TO TYPES MR98L AND MR98HH)



TYPE MR98H FLANGED BODIES AVAILABLE IN 1/2 TO 2 IN. / DN 15 TO 50 BODY SIZES (DIMENSIONS ALSO APPLY TO TYPE MR98L)

IN. / mm

*Only when specified.

Figure 3. *Dimensions*

Table 29. *Dimensions*

BODY SIZE, In. / DN	A				B		C		D (Max)		SWE				Tee Handle	
	Gray Cast Iron		Steel/SST								E		F		G	
	In.	mm	In.	mm	In.	mm	In.	mm	In.	mm	In.	mm	In.	mm	In.	mm
TYPE MR98L																
1/4 NPT	2.75	69.9	2.75	69.9	2.04	51.9	5.06	128.5	6.17	156.7	- - - -	- - - -	- - - -	- - - -	3.00	76.2
1/2 / 15	3.88	98.6	4.00	101.6	1.85	47.1	7.00	177.8	7.84	199.2	0.86	21.8	0.38	9.7	- - - -	- - - -
3/4 / 20	4.88	124.0	5.00	127.0	2.27	57.6	10.19	258.8	9.86	250.4	1.07	27.2	0.50	12.7	5.00	127.0
1 / 25	4.88	124.0	5.00	127.0	2.27	57.6	10.19	258.8	9.86	250.4	1.34	34.0	0.50	12.7	5.00	127.0
TYPE MR98H																
1/4 NPT	2.75	69.9	2.75	69.9	2.04	51.9	3.19	81.0	6.36	161.5	- - - -	- - - -	- - - -	- - - -	3.00	76.2
1/2 / 15	3.88	98.6	4.00	101.6	1.85	47.1	4.25	108.0	8.29	210.6	0.86	21.8	0.38	9.7	- - - -	- - - -
3/4 / 20	4.88	124.0	5.00	127.0	2.27	57.6	6.06	154.0	10.21	259.4	1.07	27.2	0.50	12.7	5.00	127.0
1 / 25	4.88	124.0	5.00	127.0	2.27	57.6	6.06	154.0	10.21	259.4	1.34	34.0	0.50	12.7	5.00	127.0
1-1/2 / 40	7.25	184.2	7.38	187.4	3.06	77.7	8.19	208.0	14.78	375.4	1.92	48.8	0.50	12.7	5.00	127.0
2 / 50	7.25	184.2	7.38	187.4	3.06	77.7	8.19	208.0	14.78	375.4	2.07	52.6	0.62	15.8	5.00	127.0
TYPE MR98HH																
1/4 NPT	2.75	69.9	2.75	69.9	1.98	50.4	3.19	81.0	8.64	219.4	- - - -	- - - -	- - - -	- - - -	3.00	76.2
1/2 / 15	3.88	98.6	4.00	101.6	1.81	46.1	4.25	108.0	10.82	274.9	0.86	21.8	0.38	9.7	- - - -	- - - -
3/4 / 20	4.88	124.0	5.00	127.0	2.27	57.6	6.06	154.0	12.10	307.3	1.07	27.2	0.50	12.7	- - - -	- - - -
1 / 25	4.88	124.0	5.00	127.0	2.27	57.6	6.06	154.0	12.10	307.3	1.34	34.0	0.50	12.7	- - - -	- - - -

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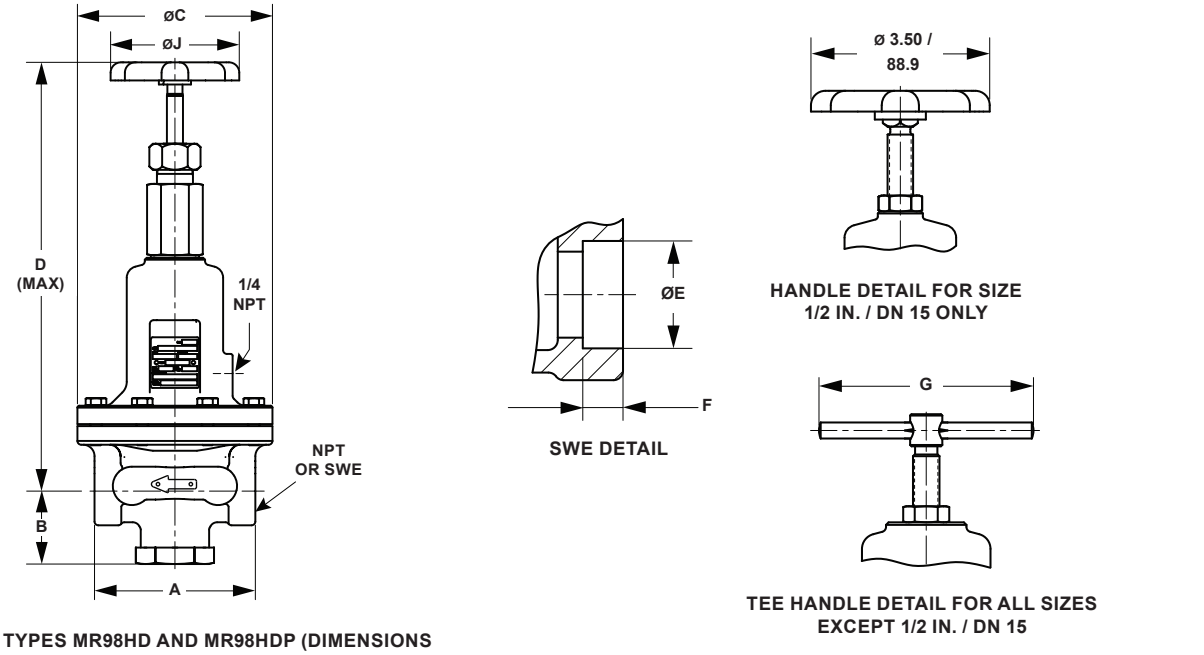


Figure 3. *Dimensions (continued)*

Table 29. *Dimensions (continued)*

BODY SIZE, In. / DN	A				B		C		D (Max)		SWE				J	
	Gray Cast Iron		Steel/SST								E		F			
	In.	mm	In.	mm	In.	mm	In.	mm	In.	mm	In.	mm	In.	mm	In.	mm
1/4 NPT	2.75	69.9	2.75	69.9	2.04	51.9	5.06	128.5	10.46	265.6	- - - -	- - - -	- - - -	- - - -	4.00	101.6
1/2 / 15	3.88	98.6	4.00	101.6	1.85	47.1	7.00	177.8	11.62	295.2	0.86	21.8	0.38	9.7	4.00	101.6
3/4 / 20	4.88	124.0	5.00	127.0	2.27	57.6	10.19	258.8	13.89	352.8	1.07	27.2	0.50	12.7	4.00	101.6
1 / 25	4.88	124.0	5.00	127.0	2.27	57.6	10.19	258.8	13.89	352.8	1.34	34.0	0.50	12.7	4.00	101.6
TYPES MR98HD AND MR98HDP																
1/4 NPT	2.75	69.9	2.75	69.9	2.04	51.9	3.19	81.0	10.38	263.7	- - - -	- - - -	- - - -	- - - -	4.00	101.6
1/2 / 15	3.88	98.6	4.00	101.6	1.85	47.1	4.25	108.0	11.52	292.5	0.86	21.8	0.38	9.7	4.00	101.6
3/4 / 20	4.88	124.0	5.00	127.0	2.27	57.6	6.06	154.0	13.76	349.4	1.07	27.2	0.50	12.7	4.00	101.6
1 / 25	4.88	124.0	5.00	127.0	2.27	57.6	6.06	154.0	13.76	349.4	1.34	34.0	0.50	12.7	4.00	101.6
1-1/2 / 40	7.25	184.2	7.38	187.4	3.06	77.7	8.19	208.0	18.62	472.9	1.92	48.8	0.50	12.7	8.00	203.2
2 / 50	7.25	184.2	7.38	187.4	3.06	77.7	8.19	208.0	18.62	472.9	2.07	52.6	0.62	15.8	8.00	203.2
TYPE MR98HHD																
1/4 NPT	2.75	69.9	2.75	69.9	1.98	50.4	3.19	81.0	13.74	349.0	- - - -	- - - -	- - - -	- - - -	4.00	101.6
1/2 / 15	3.88	98.6	4.00	101.6	1.81	46.1	4.25	108.0	15.06	382.6	0.86	21.8	0.38	9.7	4.00	101.6
3/4 / 20	4.88	124.0	5.00	127.0	2.27	57.6	6.06	154.0	17.35	440.7	1.07	27.2	0.50	12.7	8.76	222.5
1 / 25	4.88	124.0	5.00	127.0	2.27	57.6	6.06	154.0	17.35	440.7	1.34	34.0	0.50	12.7	8.76	222.5

Ordering Information

When ordering, complete the ordering guide on this page. Refer to the Specifications section on pages 2 and 3. Review the description to the right of each specification and the information in each referenced table or figure. Specify your choice whenever a selection is offered.

Ordering Guide

Type (Select One, see Specification section)
- ☐ MR98L
- ☐ MR98H
- ☐ MR98HH
- ☐ MR98LD
- ☐ MR98HD
- ☐ MR98HDP
- ☐ MR98HHD

Body Size (Select One)
- ☐ 1/4 NPT(1)
- ☐ 1/2 in. / DN 15
- ☐ 3/4 in. / DN 20
- ☐ 1 in. / DN 25
- ☐ 1-1/2 in. / DN 40 (not available for MR98L Series)
- ☐ 2 in. / DN 50 (not available for MR98L Series)

Body Material and End Connection Style (See Tables 1 and 2, Select One)

Gray Cast Iron
- ☐ NPT***

WCC Steel
- ☐ NPT***
- ☐ SWE**
- ☐ Welded CL150 RF**
- ☐ Welded CL300 RF**
- ☐ Welded PN 16/25/40**

LCC Steel
- ☐ NPT***
- ☐ SWE**
- ☐ Welded CL150 RF**
- ☐ Welded CL300 RF**
- ☐ Welded PN 16/25/40**

CF8M Stainless steel
- ☐ NPT***
- ☐ SWE**
- ☐ Welded CL150 RF**
- ☐ Welded CL300 RF**

CF3M Stainless steel
- ☐ NPT***
- ☐ SWE**
- ☐ Welded CL150 RF**
- ☐ Welded CL300 RF**
- ☐ Welded PN 16/25/40**
- ☐ Integral CL150 RF(2)*
- ☐ Integral CL300 RF(2)*
- ☐ Integral PN 16/25/40(2)*

Hastelloy® C
- ☐ NPT*
- ☐ Integral CL150 RF(2)*
- ☐ Integral CL300 RF(2)*
- ☐ Integral PN 16/25/40 RF(2)*

Monel®
- ☐ NPT*
- ☐ Integral CL150 RF(2)*
- ☐ Integral CL300 RF(2)*
- ☐ Integral PN 16/25/40 RF(2)*

Aluminum-Bronze
- ☐ Integral CL150 RF(2)*
- ☐ Integral CL300 RF(2)*
- ☐ Integral PN 16/25/40 RF(2)*

Spring Case Material (Select One)
- ☐ Gray Cast Iron (**standard** for Gray cast iron bodies)***
- ☐ WCC Steel (**standard** for Steel or Stainless steel bodies)***
- ☐ LCC Steel***
- ☐ CF8M Stainless steel (optional for Stainless steel bodies)**
- ☐ Monel®
- ☐ Hastelloy® C

Diaphragm
- ☐ Neoprene (CR) (**standard** for elastomer seat)***
- ☐ 302 Stainless steel (**standard** for metal seat)***
- ☐ Fluorocarbon (FKM)***
- ☐ Ethylenepropylene (EPDM)*
- ☐ Sanitary Ethylenepropylene (EPDM)(3)
- ☐ Hastelloy® C*
- ☐ Monel®*

Trim Number (See Table 4, Select One)
- ☐ Trim 1
- ☐ Trim 2
- ☐ Trim 3
- ☐ Trim 4
- ☐ Trim 5
- ☐ Trim 6
- ☐ Trim 7
- ☐ Trim 8
- ☐ Trim 9
- ☐ Trim 10
- ☐ Trim 11
- ☐ Trim S10(3)
- ☐ Trim S11(3)

Relief/Differential Relief Pressure Range (Select One)

Type MR98L or MR98LD

Steel, 1/4 NPT to 1 in. / DN 25 Bodies
- ☐ 2 to 7 psig/psi / 0.14 to 0.48 bar
- ☐ 6 to 14 psig/psi / 0.41 to 0.97 bar
- ☐ 12 to 25 psig/psi / 0.83 to 1.7 bar
- ☐ 20 to 38 psig/psi / 1.4 to 2.6 bar

Stainless steel, 3/4 and 1 in. / DN 20 and 25 Bodies
- ☐ 2 to 7 psig/psi / 0.14 to 0.48 bar
- ☐ 6 to 14 psig/psi / 0.41 to 0.97 bar
- ☐ 12 to 25 psig/psi / 0.83 to 1.7 bar

1. Available in threaded (NPT) end connection only.
2. Integral flanges are available for MR98H Series only.
3. Sanitary EPDM elastomers meet FDA, USP Class VI, and ADI Free requirements

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Ordering Guide (continued)

Relief/Differential Relief Pressure Range
(Select One) (continued)

Type MR98H, MR98HD or MR98HDP

Steel

1/4 NPT to 1 in. / DN 25 Bodies

- ☐ 15 to 35 psig/psi / 1.0 to 2.4 bar
- ☐ 25 to 75 psig/psi / 1.7 to 5.2 bar
- ☐ 70 to 140 psig/psi / 4.8 to 9.7 bar
- ☐ 130 to 200 psig/psi / 9.0 to 13.8 bar

1-1/2 and 2 in. / DN 40 and 50 Bodies

- ☐ 5 to 35 psig/psi / 0.34 to 2.4 bar
- ☐ 20 to 65 psig/psi / 1.4 to 4.5 bar
- ☐ 50 to 100 psig/psi / 3.4 to 6.9 bar
- ☐ 75 to 170 psig/psi / 5.2 to 11.7 bar

Stainless steel

3/4 and 1 in. / DN 20 and 25 Bodies

- ☐ 15 to 35 psig/psi / 1.0 to 2.4 bar
- ☐ 25 to 75 psig/psi / 1.7 to 5.2 bar
- ☐ 70 to 140 psig/psi / 4.8 to 9.7 bar

Type MR98HH or MR98HHD

Steel (1/4 NPT to 1 in. / DN 25 Bodies)

- ☐ 150 to 375 psig/psi / 10.3 to 25.9 bar

Replacement Parts Kit (Optional)

- ☐ Yes, send one replacement parts kit to match this order.

Regulators Quick Order Guide	
* * *	Readily Available for Shipment
* *	Allow Additional Time for Shipment
*	Special Order, Constructed from Non-Stocked Parts. Consult your local Sales Office for Availability.
Availability of the product being ordered is determined by the component with the longest shipping time for the requested construction.	

Specification Worksheet

Application:

Specific Use _____
Line Size _____
Fluid Type and Specific Gravity _____
Fluid Temperature _____

Upstream Regulator Specifications:

Brand of upstream regulator? _____
Orifice size of the upstream regulator? _____
Wide-open coefficient of the upstream regulator? _____
Maximum Inlet Pressure (P_{1max}) _____
Downstream Pressure Setting(s) (P_2) _____
Maximum Flow (Q_{max}) _____

Relief Valve Specifications:

Relief Valve Setpoint _____
Accuracy Requirements? _____
Need for Extremely Fast Response? _____

Other Requirements: _____

Webadmin.Regulators@emerson.com
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Emerson

Americas
McKinney, Texas 75069 USA
T +1 800 558 5853
+1 972 548 3574

Asia Pacific
Singapore 128461, Singapore
T +65 6777 8211

Europe
Bologna 40013, Italy
T +39 051 419 0611

Middle East and Africa
Dubai, United Arab Emirates
T +971 4 811 8100

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