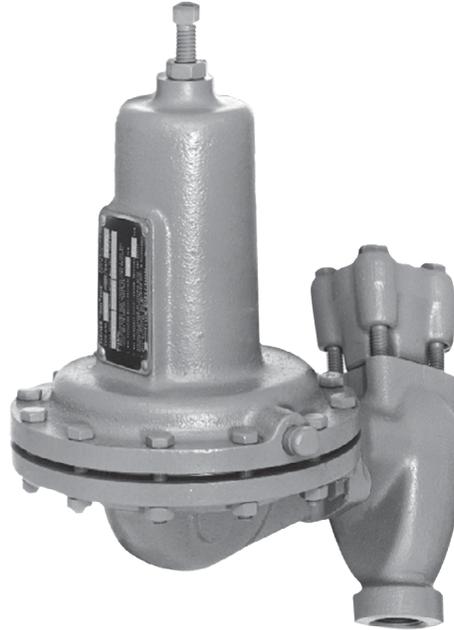


April 2024

Type 630R Relief Valve



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Figure 1. Type 630R Relief Valve

Introduction

The Type 630R is a general relief valve that is available in NPS 1 and 2 / DN 25 and 50 body sizes. It is frequently used at compressor stations, refineries and similar plants requiring a backpressure gas regulator for relief pressure settings up to 250 psig / 17.2 bar.

Features

- **Tight Shutoff**—Provided by an O-ring seat.
- **Easy Maintenance**—The inlet adaptor acts as a union nut enabling speedy inspection of trim parts.
- **Ease of Use**—The Type 630R is available in both high-pressure and low pressure constructions; the low pressure units have larger diaphragm area to provide more accurate control of low pressure settings while the high-pressure units can withstand inlet pressure up to 550 psig / 37.9 bar and can control pressures up to 250 psig / 17.2 bar.
- **Interchangeability**—The Type 630R relief valve can be easily converted in the field to a Type 630 regulator by reversing the body 180°. The flow arrow on the spring case will point downstream in the new application. Refer to Figure 2 for spring case orientation. Additionally, a new valve carrier, disk and orifice are required for the conversion.
- **Sour Gas Service Capability**—Optional materials are available for applications handling sour gases. These constructions comply with the recommendations of NACE International Standards MR0175 and MR0103.
- **Hydrogen Ready**—Products have been evaluated for material compatibility, potential leakage and permeation and susceptibility to embrittlement for Hydrogen applications. Based on an extensive evaluation and testing program, 630 Series configurations are available for use in Hydrogen applications.

Type 630R

Specifications

This section lists the specifications for the Type 630R relief valve. Factory specifications are stamped on the nameplate fastened on the relief valve at the factory.

Regulator Construction

Low-Pressure
High-Pressure

Body Sizes

NPS 1 and 2 / DN 25 and 50

End Connection Style

NPT, CL150 RF, CL300 RF or CL600 RF

Maximum Inlet Pressure⁽¹⁾

Low-Pressure Construction: 66 psig / 4.6 bar
High-Pressure Construction: 550 psig / 37.9 bar

Maximum Inlet Pressure Build-up above Setpoint (Internal Damage)

Low-Pressure Construction: 25 psig / 1.7 bar
High-Pressure Construction: 250 psig / 17.2 bar

Maximum Outlet Pressure⁽¹⁾

See Table 1

Pressure Registration

Internal

Orifice Size

1/2 in. / 13 mm

Flow Coefficients

Wide-open C_g : 216.0
Wide-open C_v : 8.18
 C_1 : 26.4

IEC Sizing Coefficients

F_d : 0.50
 F_i : 0.89
 X_i : 0.441

Temperature Capabilities⁽¹⁾

Nitrile (NBR), Nylon (PA) and Neoprene (CR):
-20 to 180°F / -29 to 82°C
**Fluorocarbon (FKM) and
Polytetrafluoroethylene (PTFE):**
0 to 300°F / -18 to 149°C

Construction Materials

Body: Cast iron or steel
Spring Case and Diaphragm Adaptor:
Cast iron or steel
Orifice: Brass or Stainless steel
O-ring Holder: Brass or Stainless steel
Valve Carrier: Brass or Stainless steel
Diaphragm: Neoprene (CR) or Fluorocarbon (FKM)
Diaphragm Head: Zinc-plated steel
Pitot Tube: Stainless steel
Regulator Spring: Plated steel
Adjusting Screw: Steel
Inlet Body Gaskets: Copper with Brass trim or
Stainless steel with Stainless steel trim
All Other Gaskets: Composition
Upper Spring Seat: Zinc-plated steel
Lower Spring Seat: Aluminum (low-pressure) or
Zinc (high-pressure)

Spring Case Vent

1/4 NPT

Option

- Polytetrafluoroethylene (PTFE) diaphragm protector

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

Principle of Operation

Refer to Figure 2. Inlet pressure registers beneath the diaphragm. As long as the inlet pressure is less than the set pressure, spring force causes the lever to hold the valve closed. When the inlet pressure exceeds the set pressure, the diaphragm moves to compress the spring and the lever opens the valve allowing inlet pressure to bleed into the downstream line or to atmosphere until the inlet pressure returns to set pressure.

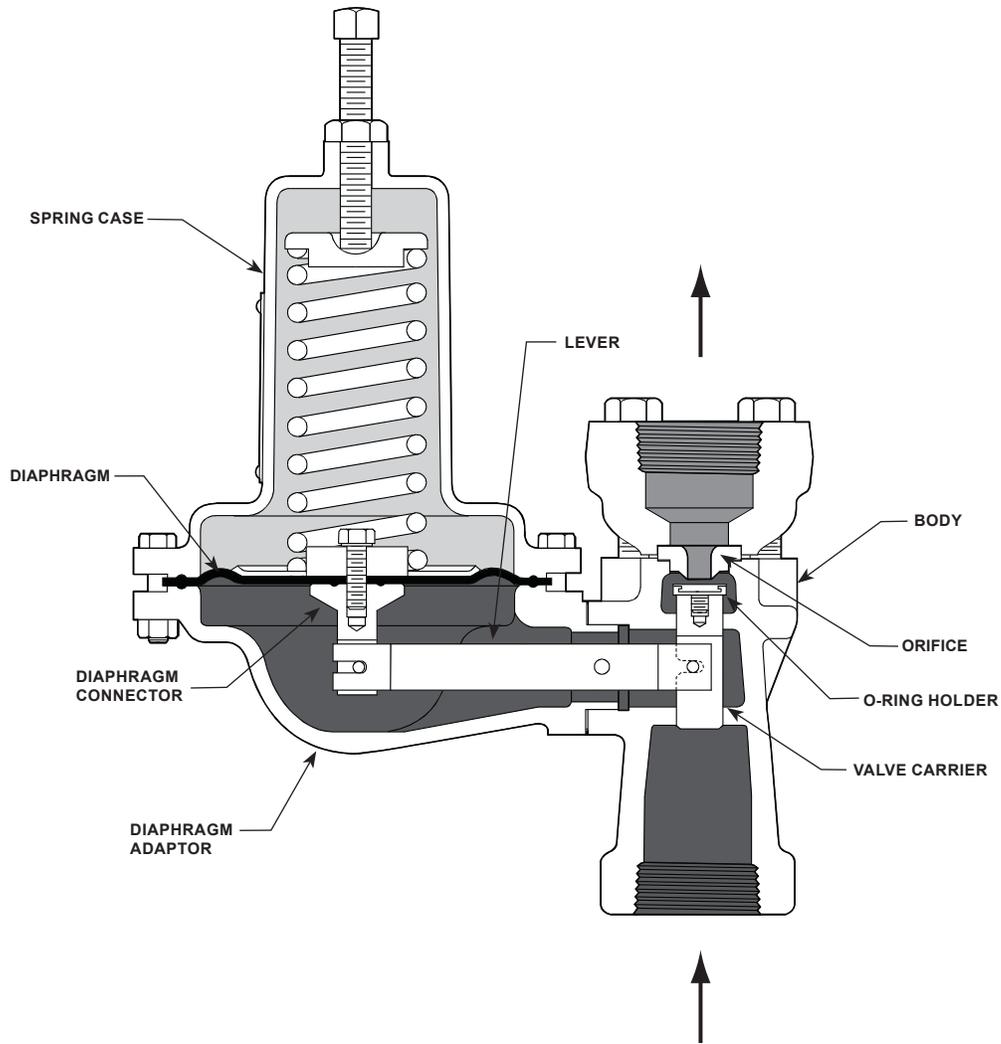
Installation

The Type 630R relief valve may be installed in any position. However, the outlet connection and vents

must be protected against the entrance of rain, snow, insects or any other foreign material that may plug the outlet or affect the opening and closing of the valve. If it is necessary to pipe away the outlet, remove the outlet screen (if one is present).

Flow through the valve must be as indicated by the flow direction arrow on the spring case. For dimensional information see Figure 3.

Fisher™ 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.



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- INLET PRESSURE
- OUTLET (EXHAUST) PRESSURE
- ATMOSPHERIC PRESSURE

Figure 2. Type 630R Relief Valve Operational Schematic

Table 1. Relief Set Pressure Ranges

REGULAR CONSTRUCTION	RELIEF SET PRESSURE RANGE		SPRING PART NUMBER	SPRING COLOR CODE	SPRING WIRE DIAMETER		SPRING FREE LENGTH	
	psig	bar			In.	mm	In.	mm
Low-Pressure	3 to 8	0.21 to 0.55	0W019227022	Red	0.225	5.71	6	152
	6 to 17	0.41 to 1.2	0W019127022	Olive Drab	0.281	7.14		
	15 to 22	1.0 to 1.5	0W019027022	Unpainted	0.337	8.56		
	20 to 35	1.4 to 2.4	0Y066427022	Green Stripe	0.363	9.22		
	35 to 50	2.4 to 3.4	1J146927142	Blue Stripe	0.375	9.52	6.19	157
High-Pressure	30 to 70	2.1 to 4.8	0W019127022	Olive Drab	0.281	7.14	6	152
	50 to 95	3.4 to 6.6	0W019027022	Unpainted	0.337	8.56		
	75 to 175	5.2 to 12.1	0Y066427022	Green Stripe	0.363	9.22		
	150 to 250	10.3 to 17.2	1J146927142	Blue Stripe	0.375	9.52	6.19	157

Type 630R

Table 2. Capacities in SCFH / Nm³/h of 0.6 Specific Gravity Natural Gas at 14.7 psia and 60°F / 1.01325 bar and 0°C

LOW-PRESSURE CONSTRUCTION						HIGH-PRESSURE CONSTRUCTION					
Relief Pressure Setting		Capacities, SCFH / Nm ³ /h				Relief Pressure Setting		Capacities, SCFH / Nm ³ /h			
psig	bar	10% Build-up		20% Build-up		psig	bar	10% Build-up		20% Build-up	
5	0.34	640	17.2	2710	72.6	50	3.4	2900	77.7	7100	190
10	0.69	1420	38.1	2900	77.7	75	5.2	2700	72.4	7480	200
15	1.0	2000	53.6	4200	113	100	6.9	3260	87.4	9670	259
20	1.4	2130	57.1	4450	119	125	8.6	5500	147	14,200	381
35	2.4	3030	81.2	7230	194	175	12.1	5480	147	19,000	509
50	3.4	4900	131	14,000	375	250	17.2	13,500	362	48,000	1286

Note: Maximum Working Pressure Above Setting is 25 psig / 1.7 bar.

Note: Maximum Working Pressure Above Setting is 250 psig / 17.2 bar.

Universal 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 Process Management Regulator Technologies, Inc. assure that all products specified for sour gas service comply with the chemical, physical and metallurgical requirements of NACE MR0175 and/or NACE MR0103. Customers have the responsibility to specify correct materials. Environmental limitations may apply and shall be determined by the user.

Capacity Information

Table 2 gives relief capacities at selected set pressures for the Type 630R relief valve. Flows are in SCFH (60°F and 14.7 psia) and Nm³/h (0°C and 1.01325 bar) of 0.6 specific gravity natural gas. To determine equivalent capacities for air, propane, butane or nitrogen, multiply the Table 2 capacity by the following appropriate conversion factor: 0.775 for air, 0.625 for propane, 0.547 for butane or 0.789 for nitrogen. For gases of other specific gravities, multiply the given capacity by 0.775, and divide by the square root of the appropriate specific gravity.

- To determine capacities at set pressures or build-ups not given in Table 2, use one of the following formulas, and convert according to the factors in the preceding paragraph if necessary:

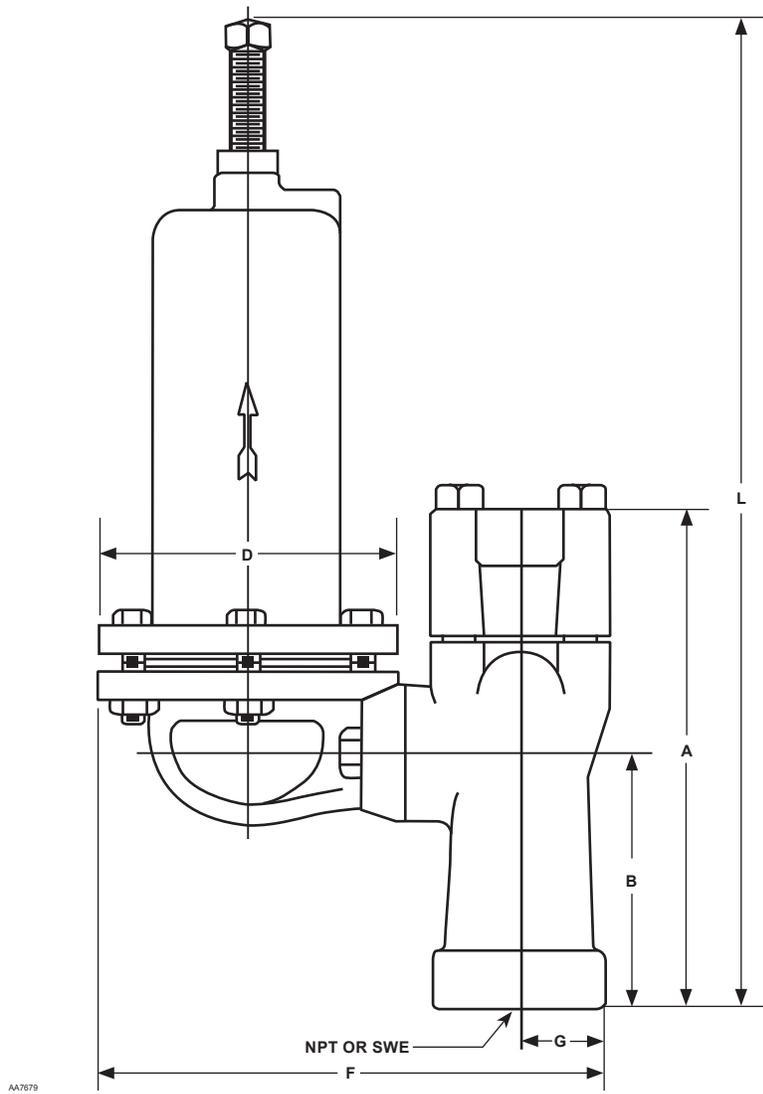
$$Q = (P_1 + \text{build-up})_{\text{abs}} C_g \sqrt{\frac{520}{GT}}$$

- For pressure drops lower than critical (absolute outlet pressure greater than one-half of absolute inlet pressure), use the following formula:

$$Q = \sqrt{\frac{520}{GT}} C_g (P_1 + \text{build-up})_{\text{abs}} \text{SIN} \left(\frac{3417}{C_1} \sqrt{\frac{\Delta P}{P_1}} \right) \text{Deg.}$$

where,

- Q = flow capacity in SCFH
- G = specific gravity of gas
- T = absolute temperature of gas at inlet in °Rankine (°Rankine = °Fahrenheit + 460)
- C_g = sizing coefficient (See Specifications section)
- P_{1abs} = absolute inlet pressure in psig (P₁ gauge + 14.7)
- C = C_g/C_v (See Specifications section)
- ΔP = pressure drop across the valve in psig



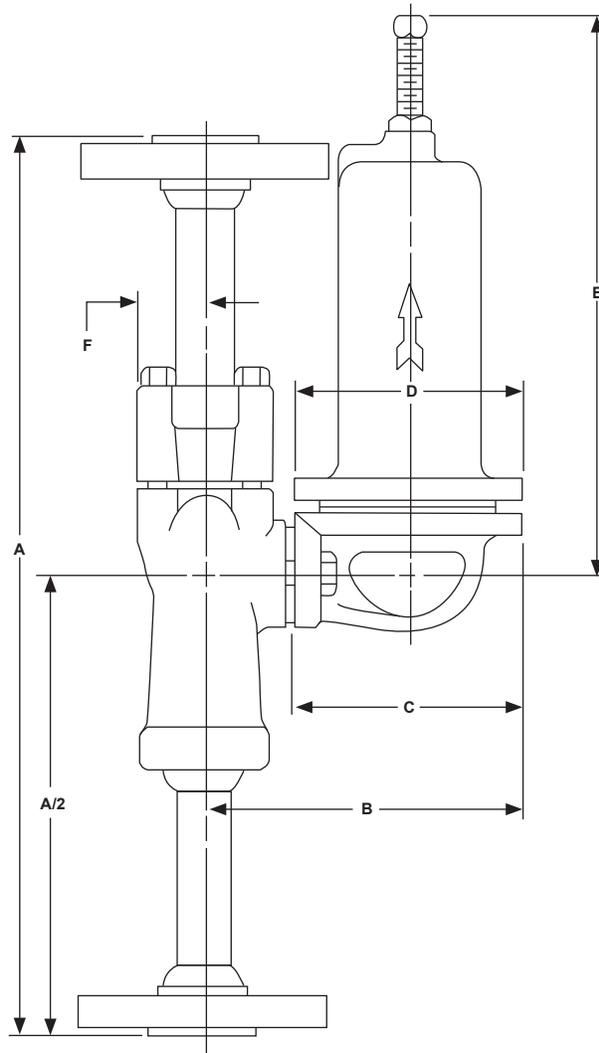
TYPE 630R WITH NPT BODY

Figure 3. NPT Dimensions

Table 3. NPT Dimensions

BODY SIZE, NPS	NPT DIMENSIONS, In. / mm					
	Low-Pressure Assembly					
	A	B	D	F	G	L
1	7.38 / 187	3.69 / 94	7.12 / 181	10.31 / 262	1.38 / 35	15.88 / 403
2	7.88 / 200	3.94 / 100	7.12 / 181	10.94 / 278	2.00 / 51	16.38 / 416
BODY SIZE, NPS	High-Pressure Assembly					
1	7.38 / 187	3.69 / 94	4.62 / 117	7.81 / 198	1.38 / 35	15.88 / 403
2	7.88 / 200	3.94 / 100	4.62 / 117	8.44 / 214	2.00 / 51	16.38 / 416

Type 630R



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TYPE 630R WITH FLANGED BODY

Figure 4. Flange Dimensions

Table 4. Flange Dimensions

BODY SIZE, NPS / DN	FLANGED DIMENSIONS, In. / mm										
	Low-Pressure Assembly										
	A			A/2			B	C	D	E	F
CL150	CL300	CL600	CL150	CL300	CL600						
1 / 25	17.94 / 456			8.97 / 228			8.97 / 228	7.19 / 183	7.12 / 181	11.69 / 297	1.75 / 44
2 / 50	21.9 / 556			10.95 / 278							
BODY SIZE, NPS / DN	High-Pressure Assembly										
1 / 25	19.59 / 498			9.80 / 249			6.44 / 163	4.69 / 119	4.62 / 117	12.19 / 310	1.38 / 35
2 / 50	17.6 / 447			8.8 / 223							

Ordering Information

When ordering, specify the following information:

1. Complete Type number
2. Body Size
3. Relief Setting
4. Body Material
5. Trim

Ordering Guide

Regulator Construction (Select One)

- Low-Pressure
- High-Pressure

Body Size (Select One)

- NPS 1 / DN 25**
- NPS 2 / DN 50**

Body and End Connection Style (Select One)

- NPT**
- CL150 RF**
- CL300 RF**
- CL600 RF**

Diaphragm (Select One)

- Neoprene (CR)***
- Fluorocarbon (FKM)**

Trim Material (Select One)

- Brass***
- Stainless steel**

Valve Carrier and Holder (Select One)

- Brass***
- Stainless steel**

Orifice (Select One)

- Brass***
- Stainless steel**

Relief Set Pressure Range (Select One)

Low-Pressure

- 3 to 8 psig / 0.21 to 0.55 bar***
- 6 to 17 psig / 0.41 to 1.2 bar***
- 15 to 22 psig / 1.0 to 1.5 bar***
- 20 to 35 psig / 1.4 to 2.4 bar***
- 35 to 50 psig / 2.4 to 3.4 bar***

High-Pressure

- 30 to 70 psig / 2.1 to 4.8 bar***
- 50 to 95 psig / 3.4 to 6.6 bar***
- 75 to 175 psig / 5.2 to 12.1 bar***
- 150 to 250 psig / 10.3 to 17.2 bar***

Replacement Parts Kit (Optional)

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

Type 630R

Ordering Guide (continued)

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	_____
Gas Type and Specific Gravity	_____
Gas Temperature	_____
Relief Valve Size:	
Brand of upstream regulator?	_____
Orifice size of the upstream regulator?	_____
Wide-open coefficient of the upstream regulator?	_____
Pressure:	
Maximum Inlet Pressure (P_{1max})	_____
Minimum Inlet Pressure (P_{1min})	_____
Downstream Pressure Setting(s) (P_2)	_____
Maximum Flow (Q_{max})	_____
Performance Required:	
Accuracy Requirements?	_____
Need for Extremely Fast Response?	_____
Other Requirements: _____	

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