October 2011

1805 Series Relief Valves

WARNING

Failure to follow these instructions or to properly install and maintain this equipment could result in an explosion and/or fire causing property damage and personal injury or death.

Fisher® relief valves must be installed, operated and maintained in accordance with federal, state, and local codes, rules and regulations, and Emerson Process Management Regulator Technologies, Inc. instructions.

If a leak develops or if the outlet continually vents gas, service to the unit may be required.

Failure to correct trouble could result in a hazardous condition. Only a qualified person must install or service the unit.

Call a gas service person to service the unit. Only a qualified person must install or service the 1805 Series Relief Valves.

P1026

Figure 1. *1805 Series Relief Valve*

Introduction

Scope of the Manual

This Instruction Manual provides installation, adjustment, maintenance, and parts ordering information for 1805 Series relief valves.

Description

The 1805 Series relief valves are primarily designed for use in farm tap applications where a safety relief valve is needed between the first and second stage regulators. The 1805 Series is suitable for service on natural gas, air, propane, or any operating medium that is not corrosive to the internal parts. Relief pressure ranges from 5 to 125 psi / 0,34 to 8,6 bar. Maximum pressure, including buildup, is 150 psi / 10,3 bar.

Specifications

The Specifications section lists the specifications for the 1805 Series relief valve. The following information is stamped on the relief valve at the factory: type number, date of manufacture, spring range, maximum inlet pressure, and maximum allowable inlet pressure.

D100345X012

Specifications

Available Constructions

Type 1805-2 - Cast iron spring case, closing cap with 1/4 NPT vent placed over the adjusting screw. Available in 3/4 and 1 NPT body sizes.

Type 1805-3 - Cast iron spring case, closing cap with 1/4 NPT vent placed over the adjusting screw. Available in 1-1/2 and 2 NPT body sizes.

Type 1805-4 - Cast iron spring case. Available in 3/4 and 1 NPT body sizes.

Type 1805-5 - Cast iron spring case. Available in 1-1/2 and 2 NPT body sizes.

Type 1805-7 - Cast iron spring case, closing cap with 1/4 NPT vent placed over the adjusting screw, screen in outlet. Available in 3/4 and 1 NPT body sizes.

Body Style

Globe body

Body Sizes and End Connection Style

3/4, 1, 1-1/2, or 2 NPT

Maximum Inlet Pressure(1)

150 psig / 10,3 bar including buildup

Relief Valve Set Pressure Ranges

See Table 1

Flow and IEC Sizing Coefficients

See Table 2

Temperature Capabilities(1)

-20° to 150°F / -29° to 66°C

Approximate Shipping Weights

3/4 to 1 NPT bodies: 5 pounds / 2 kg

1-1/2 to 2 NPT bodies: 13 pounds / 6 kg

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

Table 1. *Relief Set Pressure Ranges*

BODY SIZE	RELIEF PRESSURE RANGE		SPRING PART NUMBER	SPRING COLOR CODE	SPRING FREE LENGTH		SPRING WIRE DIAMETER	
	psig	bar			Inches	mm	Inches	mm
3/4 or 1 NPT	5 to 35 10 to 60 20 to 125	0,34 to 2,4 0,69 to 4,1 1,4 to 8,6	1B986027212 1B788327022 1B788427022	Green Silver Blue	2.25 2.13 1.94	57,2 54,1 49,3	0.12 0.14 0.18	3,05 3,56 4,57
1-1/2 or 2 NPT	5 to 20 10 to 50 35 to 125	0,34 to 1,4 0,69 to 3,5 2,4 to 8,6	1D892327022 1D665927022 1E543627142	Red Blue Yellow	2.94 2.50 2.31	74,7 63,5 58,7	0.17 0.22 0.28	4,32 5,59 7,11

Table 2. *Flow and IEC Sizing Coefficients*

BODY SIZE	C_1	K_m	IEC SIZING COEFFICIENTS		
			X_T	F_D	F_L
3/4 to 1 NPT	35	0.79	0.73	0.39	0.89
1-1/2 to 2 NPT			0.94	0.44	

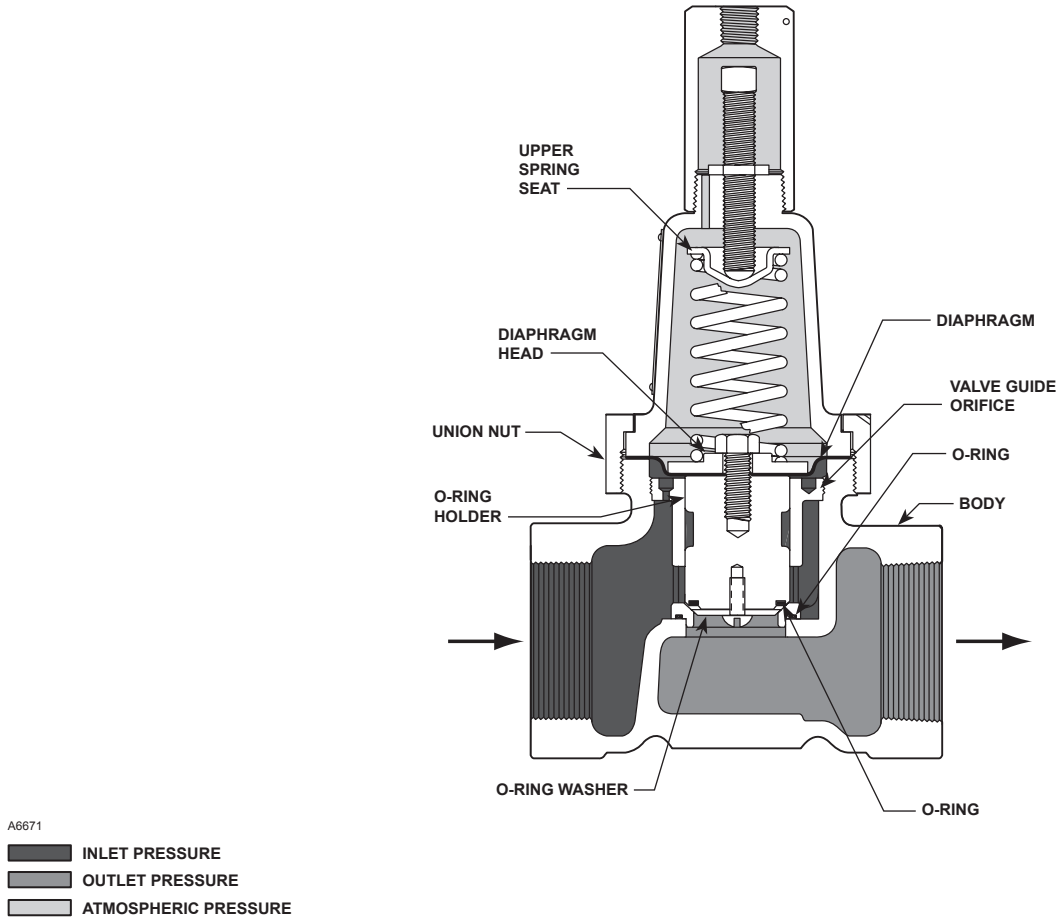

Figure 2. *1805 Series Operational Schematic*

Principle of Operation

See Figure 2. Relief valves respond to changes in upstream pressure. If upstream pressure increases and exceeds the relief valve setting, the valve will open and allow gas to vent to the atmosphere. When upstream pressure returns to normal level (below the setting of the relief valve), the relief valve automatically closes and normal system operation resumes.

In the 1805 Series relief valves, the upstream pressure registers underneath the diaphragm. Gas reaches the diaphragm through the space between the O-ring holder and the valve guide orifice in 3/4 and 1 NPT bodies or through registration holes in the valve guide orifice in 1-1/2 and 2 NPT bodies. When the upstream pressure increases beyond the spring setting, the force on the diaphragm overcomes spring compression. The O-ring holder moves upward, carrying the O-ring away from the valve seat. This opens the flow line, allows gas to flow to the atmosphere, and relieves the overpressure condition. When upstream pressure registered on the diaphragm decreases to a level below that of the spring setting of the relief valve, the spring force pushes the diaphragm plate and O-ring holder toward the valve seat. Contact between O-ring and valve seat prevents further flow to atmosphere.

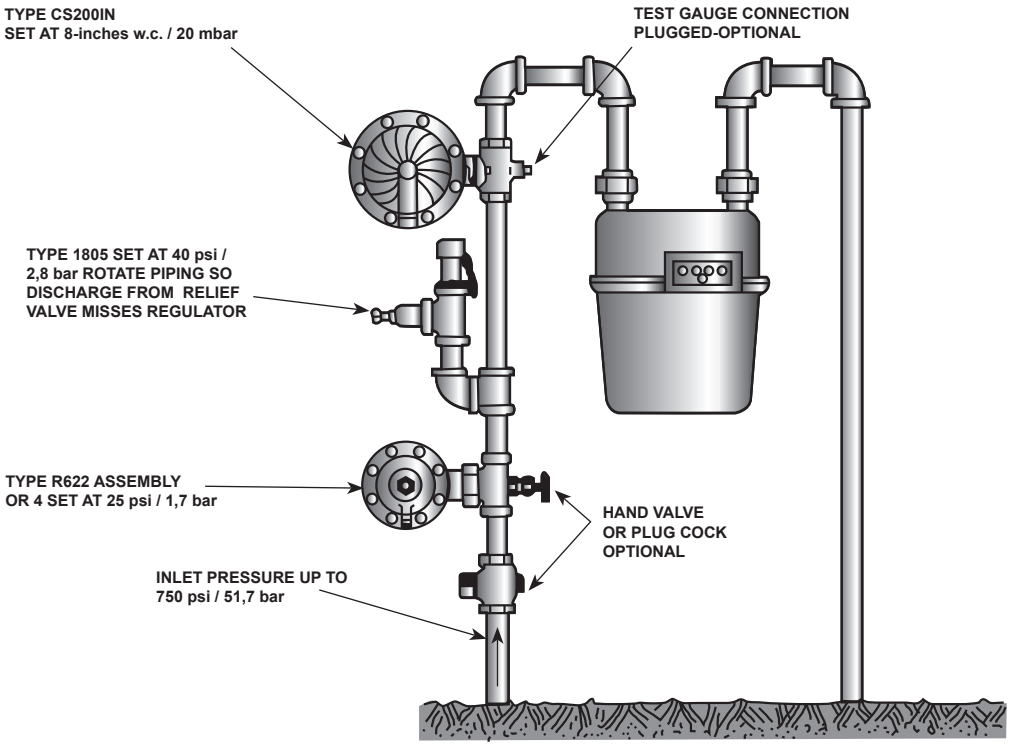

Figure 3. *Typical Farm Tap Installation*

Installation

After unpacking, check the relief valve for shipping damage. Remove pipe scale and other foreign material from the connecting pipeline. Coat the male pipe threads with a suitable pipe compound. The unit can be installed in any position as long as the flow is in the direction indicated by the arrow cast on the body.

Protect the outlet and vents from entrance of rain, snow, or other foreign material that may plug them.

Outdoor installations should include a rain cap over the vents and outlet if they point upward. Periodically check the openings to ensure that they are not plugged.

Protect the relief valve against damage from vehicles or other external sources.

Vents

⚠ WARNING

Venting gas may accumulate and be an explosion hazard under enclosed conditions such as in pit or underground installations. Install remote vent lines to carry gas to a safe area.

If remote vent lines are necessary, use the Type 1805-2, -3, or -7 which have 1/4 NPT vent connections in the closing cap. Remove the screen, if one is present in the outlet, and install remote vent lines in the outlet and closing cap openings. Remote vent lines must have the largest practical diameter as possible. The vent lines should be as short as possible with a minimum number of bends or elbows.

Overpressure

Relief pressure ratings are from 5 to 125 psi / 0,34 to 8,6 bar. The maximum inlet pressure, including buildup, is 150 psi / 10,3 bar. System operation within these limitations does not eliminate the possibility of damage from external sources or from debris in the gas line. The relief valve should be inspected for damage regularly and after any overpressure condition.

Startup

Key numbers are shown in Figure 4. With proper installation completed and system equipment properly adjusted, close any vent valves, and slowly open the upstream shut-off valve while using pressure gauges to monitor pressure.

If set pressure adjustment is necessary, monitor the inlet pressure with a gauge during the adjustment procedure.

Adjustment

The range of allowable pressure settings is stamped on the spring case (Types 1805-2, -4, and -7) or on the nameplate (Types 1805-3 and -5). If a pressure setting beyond the indicated range is required, substitute the appropriate spring. Be sure to label the relief valve to indicate the new pressure range. Always use a pressure gauge to monitor pressure when making adjustments.

1. On Types 1805-2, -3, and -7 remove the closing cap (key 17).
2. Loosen hex nut (key 15).
3. To increase the relief setting, turn the adjusting screw (key 14) clockwise. To decrease the relief setting, turn the adjusting screw counterclockwise.
4. Tighten the hex nut.

Shutdown

Close the upstream shut-off valve, and release all pressure from the relief valve.

Maintenance

⚠ WARNING

To avoid personal injury and equipment damage, isolate the relief valve from all pressure. Cautiously release pressure from the relief valve before attempting disassembly.

Due to normal wear that may occur in relief valves, the O-rings and diaphragm must be inspected periodically and replaced as necessary. The frequency of inspection and replacement depends upon the severity of service conditions or the requirements of state and federal laws. Instructions are given below for disassembly of the relief valve and replacement of the O-rings and diaphragm. The 1805 Series relief valves do not have to be removed from the pipeline to inspect internal parts. Refer to Figure 4 while servicing the relief valves.

Disassembly/Assembly

1. To ease spring compression, remove the closing cap (key 17, Types 1805-2, -3, and -7), loosen the hex nut (key 15), and turn the adjusting screw (key 14) counterclockwise.
2. Unscrew the union nut (key 16) and remove it with the spring case (key 13), spring (key 11), and upper spring seat (key 12).
3. Pull the O-ring holder (key 4) out of the valve guide orifice (key 2).
4. Remove the diaphragm cap screw (key 10) from the O-ring holder. Take off the diaphragm plate (key 9) and inspect the diaphragm (key 8).
5. Take the machine screw (key 7) out of the opposite end of O-ring holder, remove the O-ring washer (key 6) and inspect the O-ring (key 5).
6. Remove the valve guide orifice (key 2) from the body and check the Tetraseal® O-ring (key 3).
7. Reassemble the relief valve in reverse order of the above steps. To ensure proper slack in the diaphragm, tighten the union nut finger-tight only. Turn the adjusting screw clockwise to apply some spring force to the diaphragm. Complete the tightening of the union nut.

Parts Ordering

When corresponding with your local Sales Office or the factory concerning these relief valves, include the type number and all other pertinent information stamped on the spring case, closing cap, or on the nameplate. Specify the eleven-character part number when ordering new parts from the following parts list.

When ordering replacement parts, reference the key number of each needed part as found in the following parts list. Separate kit containing all recommended spare parts is available.

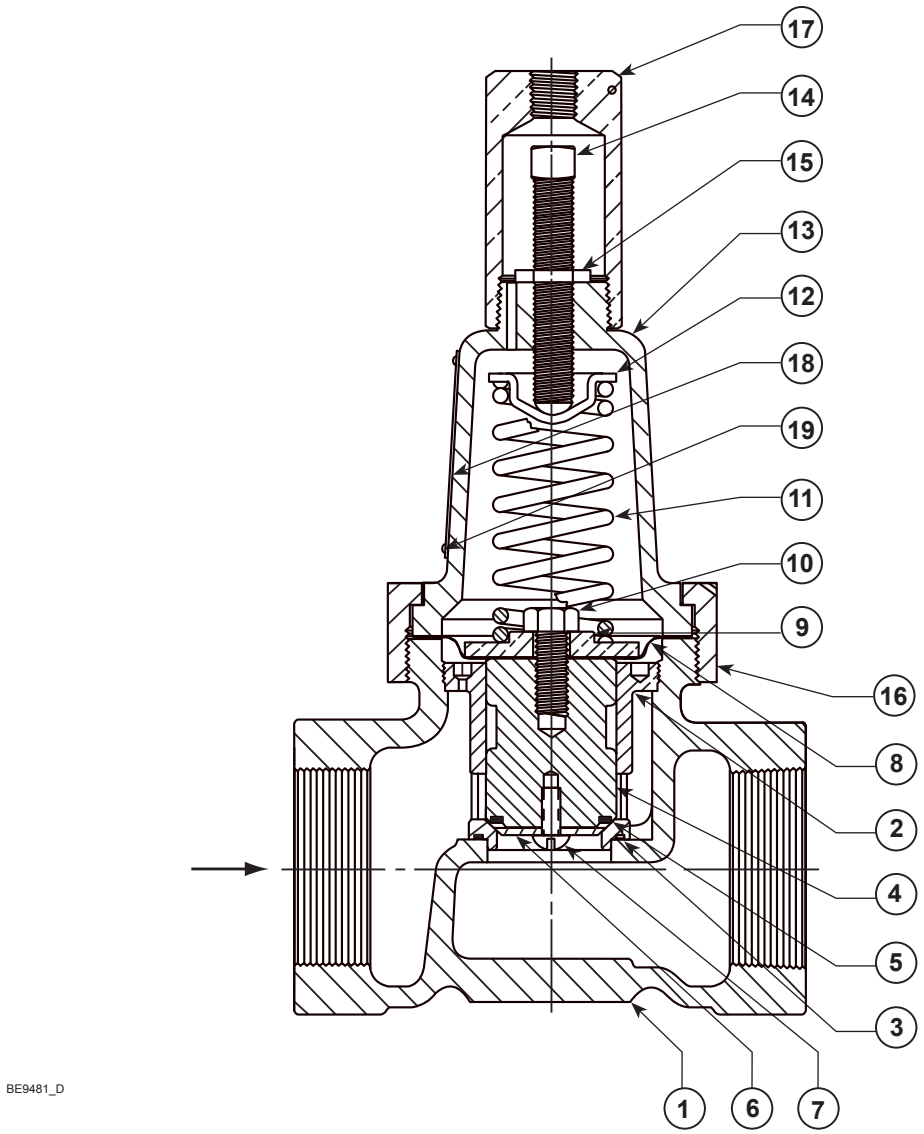

Figure 4. *Type 1805-3 Relief Valve Assembly (Also typical of 1805 relief valves)*

Parts List

Key	Description	Part Number
	Parts kit	
	(included are keys 3, 5, and 8)	
	3/4 and 1 NPT body sizes	R1805X00012
	1-1/2 and 2 NPT body sizes	R1805X00022
1	Valve Body	
	Types 1805-2 and -4	
	3/4 NPT	
	Cast iron	1E621119012
	Ductile iron (NACE)	1F192019062
	1 NPT	
	Cast iron	1E621219012
	Ductile iron (NACE)	1F192119062
	Types 1805-3 and -5	
	1-1/2 NPT Cast iron	1E824019012
	2 NPT Cast iron	1E824319012
	Type 1805-7	
	3/4 NPT Cast iron	1H242519012
	1 NPT Cast iron	1H242619012
2	Valve Guide Orifice, Aluminum	
	3/4 and 1 NPT body sizes	1K314709012
	1-1/2 and 2 NPT body sizes	1N939909012
3*	Tetraseal®/O-ring, Nitrile (NBR)	
	3/4 and 1 NPT body sizes	1K314806992
	1-1/2 and 2 NPT body sizes	1N940306562
4	O-Ring Holder, Aluminum	
	3/4 and 1 NPT body sizes	1E621609092
	1-1/2 and 2 NPT body sizes	1E824609092
5*	O-Ring, Nitrile (NBR)	
	3/4 and 1 NPT body sizes	1D288806992
	1-1/2 and 2 NPT body sizes	1C5622X0022
6	O-Ring Washer Stainless steel	
	3/4 and 1 NPT body sizes	1D335935072
	1-1/2 and 2 NPT body sizes	1E824235072
7	Machine Screw, Steel	
	3/4 and 1 NPT body sizes	16A0429X012
	1-1/2 and 2 NPT body sizes	1B420428982
8*	Diaphragm, Nitrile (NBR)	
	3/4 and 1 NPT body sizes	1E621702052
	1-1/2 and 2 NPT body sizes	1E824102052
9	Diaphragm Plate, Brass	
	3/4 and 1 NPT body sizes	1E621814012
	1-1/2 and 2 NPT body sizes	1E824714012
10	Cap Screw, Zinc-plated steel	
	3/4 and 1 NPT body sizes	1B290524052
	1-1/2 and 2 NPT body sizes	1E760324052
11	Spring, Zinc-plated steel	
	3/4 and 1 NPT body sizes	
	5 to 35 psig / 0,34 to 2,4 bar	1B986027212
	10 to 60 psig / 0,69 to 4,1 bar	1B788327022
	20 to 125 psig / 1,4 to 8,6 bar	1B788427022
	1-1/2 and 2 NPT body sizes	
	5 to 20 psig / 0,34 to 1,4 bar	1D892327022
	10 to 50 psig / 0,69 to 3,5 bar	1D665927022
	35 to 125 psig / 2,4 to 8,6 bar	1E543627142
12	Upper Spring Seat, Steel	
	3/4 and 1 NPT body sizes	1B798525062
	1-1/2 and 2 NPT body sizes	1D667125072
13	Spring Case, Cast Iron	
	3/4 and 1 NPT body sizes	2E770819012
	1-1/2 and 2 NPT body sizes	2E824919042
14	Adjusting Screw, Brass	
	3/4 and 1 NPT body sizes	1E770914012
	1-1/2 and 2 NPT body sizes	1E543214012
15	Hex Nut, Zinc-plated steel	
	3/4 and 1 NPT body sizes	1A946324122
	1-1/2 and 2 NPT body sizes	1D667728982
16	Union Nut, Ductile iron	
	3/4 and 1 NPT body sizes	1E471119062
	1-1/2 and 2 NPT body sizes	1E766619062
17	Closing Cap, Brass	
	Types 1805-2 and -7	1E770614012
	Type 1805-3	1E823914012
19	Drive Screw, Steel (4 required)	
	1-1/2 and 2 NPT body sizes	1E501728982
20	Screen, Stainless steel (not shown)	
	Type 1805-7	1E564843122
21	Snap Ring, 302 Stainles steel (not shown)	
	Type 1805-7	1E564937022
22	NACE Tag, 18-8 Stainless steel (not shown)	19A6034X012
23	Tag Wire, 304 Stainless steel (not shown)	1U7581X0022
24	Pipe Plug, Alloy-plated steel	1C333528992

* Recommended spare part.

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