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T208 Series Tank Blanketing Vapor Recovery Regulator

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Figure 1. Type T208 Tank Blanketing Vapor Recover Regulator



WARNING

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

Fisher™ Vapor Recovery Regulator must be installed, operated and maintained in accordance with federal, state and local codes, rules and regulations and Emerson Process Management Regulator Technologies Inc. (Emerson) instructions.

If the regulator discharges process fluid or a leak develops in the system, service to the unit may be required. Failure to correct trouble could result in a hazardous condition.

Call a qualified service person to service the unit. Installation, operation and maintenance procedures performed by unqualified person may result

in improper adjustment and unsafe operation. Either condition may result in equipment damage or personal injury. Only a qualified person shall install or service the T208 Series Vapor Recovery Regulator.

Introduction

Scope of the Manual

This Instruction Manual provides instructions for installation, startup, maintenance and parts ordering information for the T208 Series Vapor Recovery Regulator. Instructions and parts list for other equipment used with these regulators are found in separate manuals.

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Specifications

The Specifications section on this page provides the ratings and other specifications for the T208 Series. Factory specification such as type, maximum inlet pressure, maximum temperature, maximum outlet pressure, spring range and orifice size are stamped on the nameplate fastened on the regulator at the factory.

Product Configurations

Type T208: Tank Blanketing Vapor Recovery regulator with control pressure range of 2 in. w.c. to 7 psig / 5 mbar to 0.48 bar in six different spring ranges and has internal pressure registration requiring no control line.

Type T208M: Similar to Type T208 but has a blocked throat and a control line connection for external pressure registration.

Body Sizes and End Connection Styles

See Table 1

Maximum Outlet Pressure⁽¹⁾

35 psig / 2.4 bar

Maximum Emergency Inlet Pressure to Avoid Internal Parts Damage⁽¹⁾

See Table 1

Control Pressure Ranges⁽¹⁾

See Table 2

Shutoff Classification per ANSI/FCI 70-3-2004

Class VI (Soft Seat)

Pressure Registration

Type T208: Internal

Type T208M: External

Material Temperature Capabilities⁽¹⁾⁽²⁾⁽³⁾

Elastomer Parts

Nitrile (NBR): -40 to 180°F / -40 to 82°C

Fluorinated Ethylene Propylene (FEP):

-20 to 180°F / -29 to 82°C

Fluorocarbon (FKM): 40 to 300°F / 4 to 149°C

EPDM: -20 to 225°F / -29 to 107°C

Perfluoroelastomer (FFKM): 0 to 300°F /

-18 to 149°C

Body Materials

Gray cast iron: -20 to 300°F / -29 to 149°C

WCC Carbon steel: -20 to 300°F / -29 to 149°C

LCC Carbon steel or CF8M/CF3M

Stainless steel: -40 to 300°F / -40 to 149°C

Spring Case Vent Connection

1/4 NPT

Diaphragm Case Control Line Connection

(Type T208M)

1/2 NPT

Approximate Weight

17.7 lbs / 8 kgs

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

2. See Table 4 for operating temperature ranges for available trim combinations.

3. Special low temperature constructions for process temperatures between -76 to 180°F / -60 to 82°C are available by request. The low temperature construction passed Emerson laboratory testing for lockup and external leakage down to -76°F / -60°C.

Product Description

The T208 Series Vapor Recovery Regulators are direct-operated. They are used to sense an increase in vessel pressure and vent excessive internal vessel pressure to an appropriate vapor recovery disposal or reclamation system. They may also be used as backpressure regulators or relief valves.

Type T208—The Type T208 has internal registration requiring no control line.

Type T208M—The Type T208M has a blocked throat and a control line connection for external registration.

Principle of Operation

The T208 Series Vapor Recovery Regulators are used to maintain a constant inlet (blanket) pressure with the outlet flowing to a system whose pressure is lower than that at the inlet. When vessel pressure increases above the setpoint of the regulator due to pumping in or thermal heating, the force of the control spring is overcome by pressure acting on the diaphragm. This moves the disk away from the orifice, allowing gas to flow from the vessel to the vapor recovery system. As vessel pressure is reduced, the force of the back disk spring causes the disk to move toward the orifice, decreasing the flow of gas out of the vessel. As vessel pressure drops below the setpoint of the regulator, the disk will seat against the orifice, shutting off the gas flow.

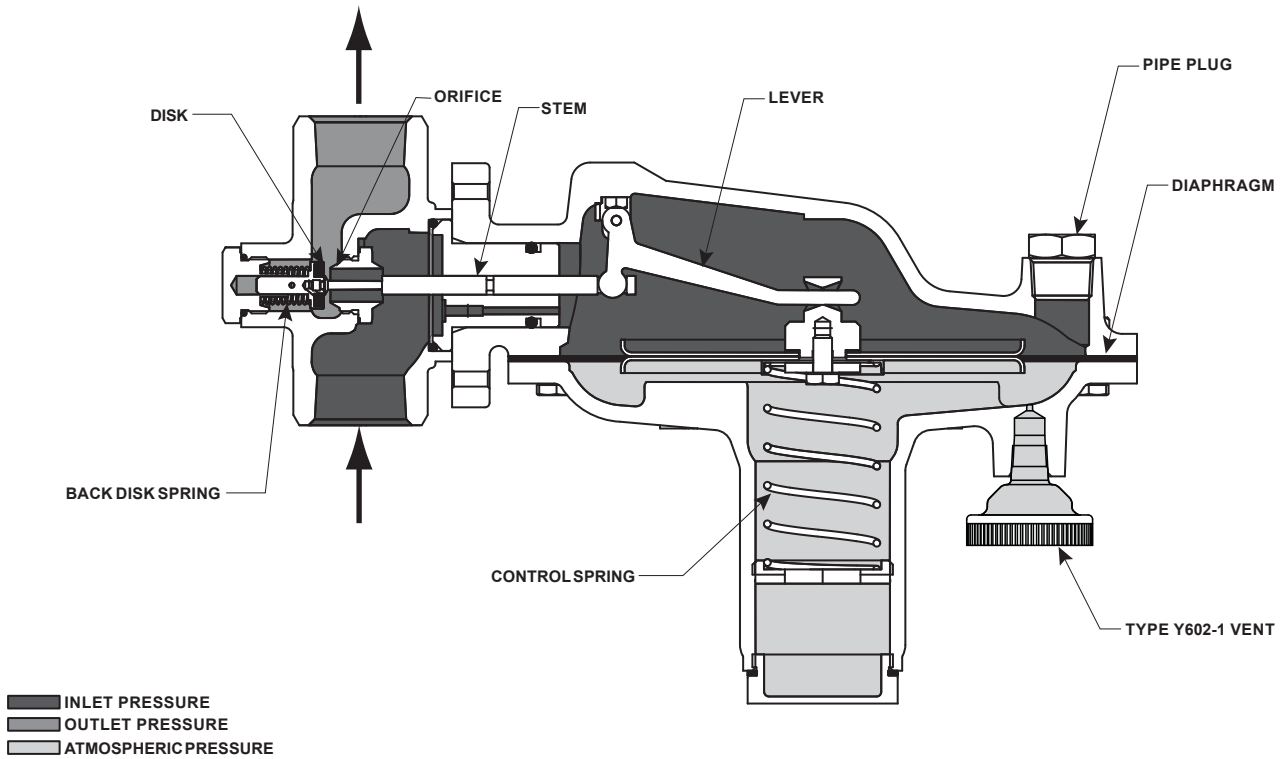


Figure 2. Type T208 with Internal Registration Operational Schematics

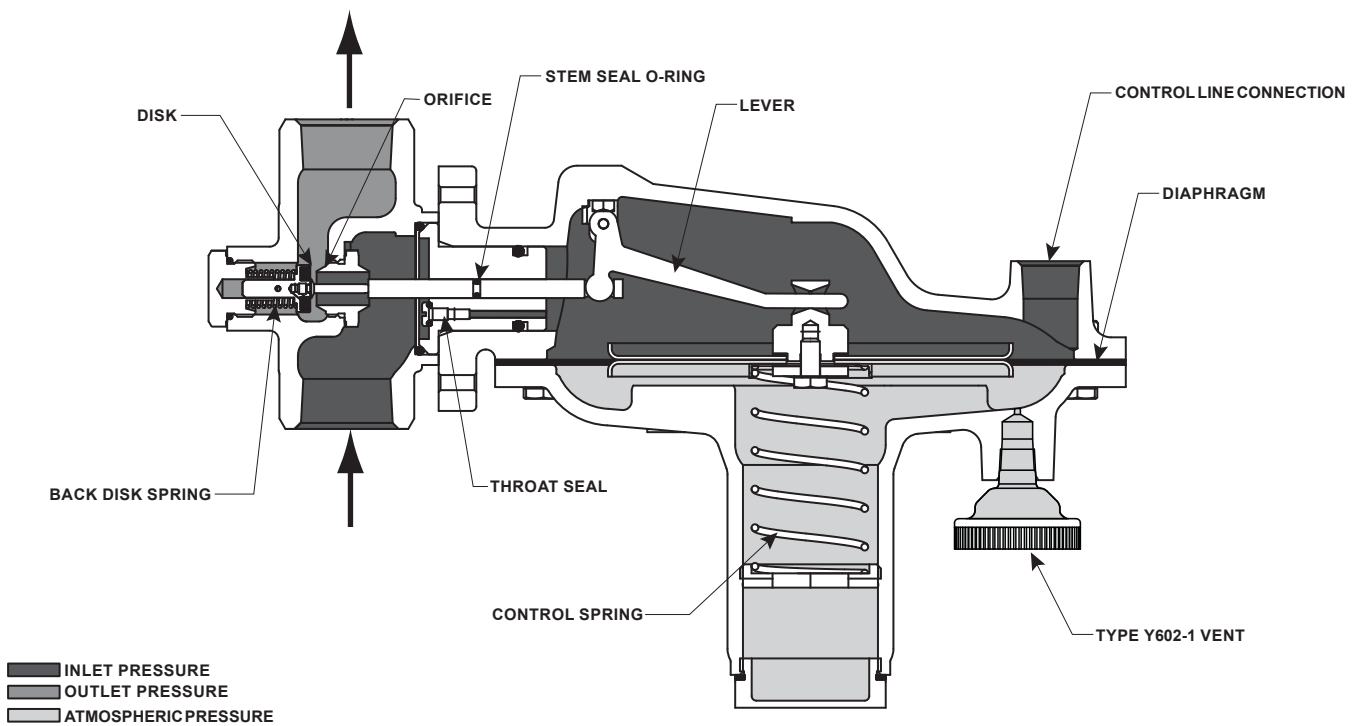


Figure 3. Type T208M with External Registration Operational Schematics

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Table 1. Body Sizes, End Connection Styles and Maximum Allowable Inlet Pressures

BODY SIZE	BODY MATERIAL	END CONNECTION STYLES ⁽¹⁾	MAXIMUM ALLOWABLE EMERGENCY INLET PRESSURE TO AVOID CASING DAMAGE ⁽¹⁾	MAXIMUM INLET PRESSURE TO AVOID INTERNAL PARTS DAMAGE ⁽¹⁾
3/4 or 1 in. / DN 20 or 25	Gray cast iron	NPT	35 psig / 2.4 bar	With Nitrile (NBR), EPDM or Fluorocarbon (FKM) diaphragm: 35 psig / 2.4 bar With Fluorinated Ethylene Propylene (FEP) diaphragm: 10 psig / 0.69 bar
	WCC Carbon steel	NPT, CL150 RF, CL300 RF or PN 16/25/40 RF	75 psig / 5.2 bar	
	LCC Carbon steel			
	CF8M/CF3M Stainless steel ⁽²⁾			
<p>1. All flanges are welded. Weld-on flange dimension is 14 in. / 356 mm face-to-face. 2. Pipe nipples and flanges are 316 Stainless steel for flanged body assemblies.</p>				

Table 2. Control Pressure Ranges and Spring Information

CONTROL PRESSURE RANGE		SPRING PART NUMBER	SPRING COLOR	SPRING WIRE DIAMETER		SPRING FREE LENGTH	
In. w.c.	mbar			In.	mm	In.	mm
2 to 7 ⁽¹⁾⁽²⁾	5 to 17 ⁽¹⁾⁽²⁾	1B653827052	Red	0.085	2.2	3.63	92.2
3 to 13 ⁽¹⁾⁽²⁾	7 to 32 ⁽¹⁾⁽²⁾	1B653927022	Unpainted	0.105	2.7	3.75	95.3
10 to 26	25 to 65	1B537027052	Yellow	0.114	2.9	4.31	109
0.9 to 2.5 psig	62 to 172	1B537127022	Green	0.156	4.0	4.06	103
1.3 to 4.5 psig	90 to 310	1B537227022	Light blue	0.187	4.8	3.94	100
3.8 to 7 psig	0.26 to 0.48 bar	1B537327052	Black	0.218	5.5	3.98	101
<p>1. To achieve the published control pressure range, the spring case must be installed pointing down. 2. Do not use Fluorocarbon (FKM) diaphragm with this spring at diaphragm temperatures lower than 60°F / 16°C.</p>							

Installation

WARNING

Personal injury, property damage, equipment damage or leakage due to escaping gas or bursting of pressure-containing parts may result if this regulator is overpressured or installed where service conditions could exceed the limits given in the Specifications section (page 2) or where conditions exceed any ratings of the adjacent piping or piping connections.

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

Additionally, physical damage to the regulator could cause personal injury or property damage due to escaping gas. To avoid such injury or damage, install the regulator in a safe location.

1. Only personnel qualified through training and experience shall install, operate and maintain

a regulator. For a regulator that is shipped separately, make sure there is no damage to or debris in the regulator. Also ensure that all tubing and piping are clean and unobstructed.

2. Install the regulator using a straight run of pipe the same size or larger as the regulator body. Flow through the regulator body is indicated by the flow arrow attached to the body. If a block valve is required, install a full flow valve between the regulator and the blanketed vessel. For proper operation, the regulators should be installed with the spring case barrel pointed down. Key numbers referenced in this section are shown in Figures 4, 5 and 6.

WARNING

A regulator may vent some gas to the atmosphere. In hazardous or flammable gas service, vented gas may accumulate and cause personal injury, death or property damage due to fire or explosion. Vent a regulator in hazardous gas service to a remote, safe location away from air intakes or any hazardous area. The vent line or stack opening must be protected against condensation or clogging.

3. To keep the vent assembly (key 26) from being plugged or the spring case (key 3) from collecting moisture, corrosive chemicals or other foreign material, point the vent down or otherwise protect it. The diaphragm casing (key 4, Figure 6) may be rotated in order to obtain desired positioning.
4. To remotely vent the regulator, remove the vent assembly (key 26) and install obstruction-free tubing or piping into the 1/4 NPT vent tapping. Provide protection on a remote vent by installing a screened vent cap into the remote end of the vent pipe. If continuous operation of the system is required during inspection or maintenance, install a three-way bypass valve around the regulator.
5. The Type T208M requires a control line. Be sure to install the control line before putting the regulator into operation. Make the control line as short and straight as possible and do not install it in a location where flow may be turbulent. Significant restrictions in the control line can prevent proper pressure registration. When using a hand valve, it should be a full flow valve, such as a full port ball valve. Install the control line sloping downward toward the tank to prevent condensation buildup and avoid low points (or traps) that could catch liquid. The sensing line must enter the tank above the liquid level at a point that senses the vapor space pressure and is free from turbulence associated with tank nozzles or vents. The control line pipe should be at least 1/2 in. / 13 mm in diameter and increase 1 pipe size for every 10 ft. / 3.05 m of control line, with setpoint less than 5 in. w.c / 12 mbar.
6. Vapor recovery regulators are used to maintain a constant inlet (blanket) pressure with the outlet flowing to a system whose pressure is lower than that at the inlet. The recovery regulators are not intended to be used as an ASME certified relief device for overpressure protection on a tank. They are to be used as part of a gas blanketing system to control outflow of blanketing gas under normal conditions and collect tank vapors for the vapor disposal reclamation system. Provide alternate methods of emergency overpressure protection.

Startup, Adjustment and Shutdown

Note

The Specifications section and Table 1 provide the maximum pressure capabilities for each regulator

construction. Use pressure gauges to monitor inlet pressure and control pressure during startup.

Startup

1. Slowly open the outlet block valve, if used, to vapor recovery system and leave it fully open.
2. Slowly open the shutoff valve (for Type T208M, open the control line shutoff valve first followed by the inlet shutoff valve) between the tank and vapor recovery regulator.
3. Use gauges to monitor pressure.

Adjustment



WARNING

To avoid personal injury, property damage, or equipment damage caused by bursting of pressure containing parts or explosion of accumulated gas, never adjust the control spring to maintain a control pressure higher than the upper limit of the control pressure range for that particular spring. If the desired control pressure is not within the range of the spring, install a spring of the proper range according to the Diaphragm and Spring Case Area section of the maintenance procedure.

Adjust the regulator control pressure setting to meet the requirements of the specific application. The range of allowable pressure setting is stamped on the nameplate. If a pressure setting beyond the stamped range is required, install a spring with the desired range by following the procedures for changing the spring in the Maintenance section. To adjust the pressure setting, perform the following steps (key numbers are referenced in Figures 4, 5 and 6).

For internal flat circular adjusting screw

1. Remove the closing cap (key 22).
2. Use a 1 in. / 25 mm hex rod or flat screwdriver to turn the adjusting screw (key 35) either clockwise to increase control pressure or counterclockwise to decrease control pressure. The regulator will go into immediate operation. To ensure correct operation, always use a pressure gauge to monitor the vapor recovery pressure when making adjustments.
3. After making the adjustment, replace the closing cap gasket (key 25) and install the closing cap (key 22).

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For external square head adjusting screw

1. Loosen the locknut (key 20).
2. Turn the adjusting screw (key 35) either clockwise to increase outlet pressure or counterclockwise to decrease outlet pressure. The regulator will go into immediate operation. To ensure correct operation, always use a pressure gauge to monitor the vapor recovery pressure when making adjustments.
3. After making the adjustment, tighten the locknut (key 20).

Shutdown

1. Close the nearest upstream shutoff valve.
2. Close the nearest downstream shutoff valve to vent the regulator properly.
3. Open the vent valve on both the upstream and downstream sides of the regulator. All pressure between these shutoff valves is released through the open vent valve. For a regulator with control line, close the valve in the control line and vent the diaphragm casing to the atmosphere.

Maintenance

Regulator parts are subject to normal wear and must be inspected and replaced as necessary. The frequency of inspection and replacement of parts depends upon the severity of service conditions or the requirements of local, state and federal regulations. Due to the care Emerson takes in meeting all manufacturing requirements (heat treating, dimensional tolerances, etc.), use only replacement parts manufactured or furnished by Emerson.



WARNING

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

Regulators that have been disassembled for repair must be tested for proper operation before being returned to service. Only parts manufactured by Emerson should be used for repairing Fisher regulators. Restart gas utilization equipment according to normal startup procedures.

General Maintenance

1. Visually inspect the regulator and its parts for any damage.
2. Ensure tight connections, tight seals and safe operation. If there is an evidence of leakage or unstable internal motion, a rebuild with seal replacement and relubrication may be necessary.
3. Observe the blanketing pressure.
4. Inspect the inlet pressure for the proper pressure (stamped on the regulator nameplate).

Body Area

Perform the following procedure to gain access to the disk assembly, orifice and body seal O-ring. Release all pressure from the regulator before performing the following steps. Key numbers are referenced in Figures 4, 5 and 6.

1. To inspect and replace the disk assembly (key 13), remove the back body cap (key 43).
2. Remove the disk assembly (key 13) from the disk spacer (key 44) and replace if necessary.
3. To inspect the orifice (key 5) on Types T208 and T208M or throat seal O-ring (key 31) and machine screw (key 34) on the Type T208M, remove the cap screws (key 2) and separate the diaphragm casing (key 4) from the body (key 1).
4. Remove and inspect the body seal O-ring (key 11) and the backup ring (key 49). Replace if damaged.
5. For a Type T208M, inspect the throat seal O-ring (key 31) by removing the machine screw (key 34). Replace if necessary. To install a throat seal, place the throat seal O-ring on the machine screw and thread into guide insert (key 18) to seal.
6. Inspect and replace the orifice (key 5) if necessary. Lightly lubricate the threads of the replacement orifice with a good quality lubricant and install with 340 to 470 in-lbs / 38.5 to 53.1 N•m of torque.
7. Place back-up ring (key 49) into the body (key 1). Then place the body seal O-ring (key 11) into the body.

Note

In the following steps, be sure to install the spring case barrel pointed down as shown in Figure 1.

8. Place the diaphragm casing (key 4) on the body (key 1). Secure the diaphragm casing to the body with the cap screws (key 2) using 90 to 126 in-lbs / 10.2 to 14.2 N•m of torque.

9. Secure the disk assembly (key 13) to the disk spacer (key 44). Place the back disk spring (key 41) and a new back body seal O-ring (key 42) on the back body cap (key 43).
10. Lightly lubricate the threads when replacing the body cap assembly. Use 340 to 470 in-lbs / 38.5 to 53.1 N•m of torque.

Diaphragm and Spring Case Area

Perform the following procedure to gain access to the spring, diaphragm, lever assembly and stem. Release all pressure from the diaphragm casing before performing the following steps. Key numbers are referenced in Figures 4, 5 and 6.

To Change the Control Spring

For internal flat circular adjusting screw

1. Remove the closing cap (key 22) and closing cap gasket (key 25). Turn the adjusting screw (key 35) counterclockwise to remove all the compression from the control spring (key 6).
2. Remove the adjusting screw (key 35) and change the control spring (key 6) to match the desired spring range.
3. Install the adjusting screw (key 35).
4. Adjust the outlet pressure to the desired control pressure setting, refer to steps 2 and 3 of Adjustment section.
5. Change the stamped spring range on the spring case nameplate.

For external square head adjusting screw

1. Loosen the locknut (key 20) and turn the adjusting screw (key 35) counterclockwise to remove all the compression from the control spring (key 6).
2. Remove the adjusting screw (key 35), locknut (key 20), closing cap (key 22), closing cap gasket (key 25) and upper spring seat (key 19).
3. Take out the control spring (key 6) and replace with the desired spring.
4. Reinstall the upper spring seat (key 19), closing cap gasket (key 25), closing cap (key 22), locknut (key 20) and adjusting screw (key 35).
5. Adjust the outlet pressure to the desired control pressure setting, refer to steps 2 and 3 of Adjustment section.
6. Change the stamped spring range on the nameplate.

To Disassemble and Reassemble Diaphragm Parts

Use this procedure to gain access to the control spring, diaphragm assembly, valve stem and stem O-ring. All pressure must be released from the diaphragm case assembly before performing these steps. Key numbers are referenced in Figures 4, 5 and 6.

1. **For internal flat circular adjusting screw** - remove the closing cap (key 22), closing cap gasket (key 25) and adjusting screw (key 35). **For external square head adjusting screw** - remove the adjusting screw (key 35), locknut (key 20), closing cap (key 22), closing cap gasket (key 25) and upper spring seat (key 19).
2. Remove the hex nuts (key 23) and cap screws (key 24). Lift off the spring case (key 3) and remove the control spring (key 6).
3. Remove the diaphragm (key 10) plus attached parts by tilting them so that the pusher post (key 8) slips off the lever assembly (key 16). To separate the diaphragm assembly from the attached parts, unscrew the cap screw (key 38) from the pusher post. If the only maintenance is to replace the diaphragm components, skip to step 7.
4. To replace the lever assembly (key 16), remove the machine screws (key 17). To replace the stem (key 14) or stem seal O-ring (key 30), also perform Body Area Maintenance procedure steps 1 through 3 and pull the stem (key 14) out of the guide insert (key 18).
5. Install the stem (key 14) into the guide insert (key 18) and perform Body Area Maintenance procedure steps 7 through 10 as necessary.
6. Install the lever assembly (key 16) into the stem (key 14) and secure the lever assembly with the machine screws (key 17).
7. Reassemble the diaphragm parts as follows:
 - Pusher post (key 8)
 - Diaphragm head gasket (key 45)
 - Diaphragm head (key 7)
 - Diaphragm (key 10)
 - Diaphragm head
 - Lower spring seat (key 50)
 - Washer (key 36)

Secure the parts with diaphragm plate cap screw (key 38) using 60 to 72 in-lbs / 6.8 to 8.1 N•m of torque.
8. Install the pusher post (key 8) and attached diaphragm parts onto the lever assembly (key 16).

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9. Install the spring case (key 3) on the lower casing (key 4) so that the vent assembly (key 26) is correctly oriented and secure them with the cap screws (key 24) and hex nuts (key 23) to finger tightness only.
10. Install the parts into the spring case (key 3). Follow the order below:
 - For internal flat circular adjusting screw**
 - a. Control spring (key 6)
 - b. Adjusting screw (key 35)
 - For external square head adjusting screw**
 - a. Control spring (key 6)
 - b. Upper spring seat (key 19)
 - c. Closing cap gasket (key 25)
 - d. Closing cap (key 22)
 - e. Locknut (key 20)
 - f. Adjusting screw (key 35)
11. Turn the adjusting screw (key 35) clockwise until there is enough control spring (key 6) force to provide proper slack to diaphragm (key 10). Using a crisscross pattern, finish tightening the cap screws (key 24) and hex nuts (key 23) to 98 to 126 in-lbs / 11.1 to 14.2 N•m of torque. Adjust the control pressure to the desired pressure setting, refer to the Adjustment section.
12. For Type T208M, connect the control line. Refer to the Startup section before putting the regulator back in operation.

To Convert Constructions

From Type T208 to Type T208M

A control line is needed. New parts required: keys 30, 31 and 34. Key numbers are referenced in Figures 4, 5 and 6.

1. Remove pipe plug (key 27) from the diaphragm casing (key 4). Use this port to connect the control line from upstream. See item number 5 in the Installation section.
2. Refer to steps 1 through 3 in the Body Area Maintenance section.
3. Insert the throat seal O-ring (key 31) and machine screw (key 34).
4. Insert the stem seal O-ring (key 30) by following steps 1 through 6 and 8 through 11 in the “To Disassemble and Reassemble Diaphragm Part” under Diaphragm and Spring Case Area Maintenance section.
5. Reassemble following steps 7 through 10 of the Body Area Maintenance section.

From Type T208M to Type T208

New part required: key 27. Key numbers are referenced in Figures 4, 5 and 6.

1. Insert pipe plug (key 27) in the diaphragm casing (key 4).
2. Follow steps 1 through 6 and 8 through 11 in the “To Disassemble and Reassemble Diaphragm Part” under Diaphragm and Spring Case Area Maintenance section to remove the stem O-ring (key 30).
3. Follow steps 1 through 5 of Body Area Maintenance to remove the throat seal O-ring (key 31) and machine screw (key 34).
4. Reassemble following steps 7 through 10 of Body Area Maintenance section.

Parts Ordering

When corresponding with your local Sales Office about this regulator, include the type number and all other pertinent information stamped on the nameplate. Specify the 11-character part number when ordering new parts from the following parts list.

Parts List

Key	Description	Part Number
	Spare Parts Kit, included are keys 9, 10, 11, 12, 25, 42 and 45 (see Table 4 for Trim Option Codes)	
	Standard Trim	RT208XXDD12
	VV Trim	RT208XXVV12
	TN Trim	RT208XXTN12
	TV Trim	RT208XXTV12
	TK Trim	RT208XXTK12
	TE Trim	RT208XXTE12
	EE Trim	RT208XXEE12
	FDA Trim	RT208XFDA12
1	Body	See Table 3
2	Cap Screw (2 required) For Gray cast iron or WCC Carbon steel casing For LCC Carbon steel or CF8M/CF3M Stainless steel casing	1C856228992 18B3456X012
3	Spring Case Gray cast iron WCC Carbon steel, NACE ⁽²⁾ CF8M/CF3M Stainless steel, NACE ⁽²⁾ LCC Carbon steel	ERSA02558A0 ERSA00195A1 ERSA00195A0 ERSA00195B0
4	Lower Casing Gray cast iron WCC Carbon steel CF8M/CF3M Stainless steel, NACE ⁽²⁾ LCC Carbon steel	47B2271X012 ERSA00196A1 ERSA00196A0 ERSA00196C3
5*	Orifice, 7/16 in. / 11 mm Stainless steel	0L0832X0012
6	Spring	See Table 2
7	Diaphragm Head (2 required) Stainless steel	17B9723X032

*Recommended Spare Part

1. Use for optional external square head adjusting screw assembly recommended for 0.9 to 2.5 psig / 62 to 172 mbar, 1.3 to 4.5 psig / 90 to 310 mbar and 3.8 to 7 psig / 0.26 to 0.48 bar spring ranges only.

2. NACE Standard MR0175-2002.

3. FDA/USP Class VI approved/ADI-free.

Parts List (continued)

Key	Description	Part Number	Key	Description	Part Number
8	Pusher Post For Nitrile (NBR), EPDM or Fluorocarbon (FKM) Diaphragm Stainless steel, NACE ⁽²⁾	18B3462X012	26	Vent Assembly Spring Case Down (Type Y602-1) (standard) Spring Case Up (Type Y602-11)	17A6570X012 17A5515X012
	For Fluorinated Ethylene Propylene (FEP) Diaphragm Stainless steel, NACE ⁽²⁾	ERSA00876A0	27	Pipe Plug (Type T208 only) (not shown) Carbon steel (standard) Stainless steel, NACE ⁽²⁾	1A369224492 1A369235072
9	Diaphragm Gasket, Nitrile (NBR) (For Fluorinated Ethylene Propylene (FEP) Diaphragm)	ERSA00713A0	30*	Stem Seal O-ring (Type T208M only) Nitrile (NBR) Fluorocarbon (FKM) Perfluoroelastomer (FFKM) EPDM EPDM ⁽³⁾	1H2926G0012 1H2926X0022 1H2926X0042 1H2926X0012 1H2926X00A0
10*	Diaphragm Nitrile (NBR) Fluorocarbon (FKM) Fluorinated Ethylene Propylene (FEP) EPDM ⁽³⁾	17B9726X012 23B0101X052 ERSA00193A0 17B9726X032	31*	Throat Seal O-ring (Type T208M only) Nitrile (NBR) Fluorocarbon (FKM) Perfluoroelastomer (FFKM) EPDM EPDM ⁽³⁾	1D682506992 1D6825X0012 1D6825X0032 1D6825X0042 1D6825X0102
11*	Body Seal O-ring Nitrile (NBR) Fluorocarbon (FKM) Perfluoroelastomer (FFKM) EPDM EPDM ⁽³⁾	1H993806992 1H9938X0012 1H9938X0042 1H9938X0022 1H9938X0112	34	Machine Screw (Type T208M only) Stainless steel	18A0703X022
12*	Insert Seal O-ring Nitrile (NBR) Fluorocarbon (FKM) Perfluoroelastomer (FFKM) EPDM EPDM ⁽³⁾	1B885506992 1B8855X0012 1B8855X0062 1B8855X0022 1B8855X0112	35	Adjusting Screw Internal Flat Circular (standard) External Square Head ⁽¹⁾ For Green and Light blue spring For Black spring	1B537944012 10B3080X012 1D995448702 18B3440X012 1B290524052
13*	Disk Assembly Stainless steel with Nitrile (NBR) Fluorocarbon (FKM) Perfluoroelastomer (FFKM) EPDM EPDM ⁽³⁾	ERSA01112A0 ERSA01112A1 ERSA01112A2 ERSA01112A3 ERSA01112B8 ERSA00200A0	36	Washer, Plated Carbon steel	18B3440X012
14	Stem, Stainless steel	1B5375000B2	38	Cap Screw, Zinc-plated steel	1B290524052
16	Lever Assembly, Stainless steel		41	Back Disk Spring Stainless steel Inconel®, NACE ⁽²⁾	1E984637022 18B0255X012
17	Machine Screw (2 required) Stainless steel	19A7151X022	42*	Back Body Seal O-ring Nitrile (NBR) Fluorocarbon (FKM) Perfluoroelastomer (FFKM) EPDM EPDM ⁽³⁾	13A1584X012 13A1584X022 13A1584X032 13A1584X042 13A1584X112
18	Guide Insert, Stainless steel	27B4028X022	43	Back Body Cap Stainless steel	1F2737X0012
19	Upper spring seat ⁽¹⁾ , Steel	1J618124092	44	Disk Spacer Stainless steel	ERSA00198A0
20	Lock Nut ⁽¹⁾	1A413224122	45*	Diaphragm Head Gasket Composition EPDM ⁽³⁾	18B3450X012 18B3450X042
22	Closing Cap Plastic (standard) Steel Stainless steel Carbon steel ⁽¹⁾	T11069X0012 1E422724092 1E422735072 ERSA01809A0	46	Nameplate	-----
23	Hex Nut (8 required) For Gray cast iron or WCC Carbon steel casing For LCC Carbon steel or CF8M/CF3M Stainless steel casing	1A345724122 1A3457K0012	47	Drive screw, Stainless steel (2 required)	1A368228982
24	Cap Screw (8 required) For Gray cast iron or WCC Carbon steel casing For LCC Carbon steel or CF8M/CF3M Stainless steel	1A579724052 1A5797T0012	48	Flow arrow	-----
25*	Closing Cap Gasket, Neoprene (CR)	1P753306992	49	Backup Ring, Stainless steel	18B3446X012
			50	Lower Spring Seat, Zinc-plated steel	1B636325062
			51	NACE Tag	-----
			52	Tag Wire	-----

***Recommended Spare Part**

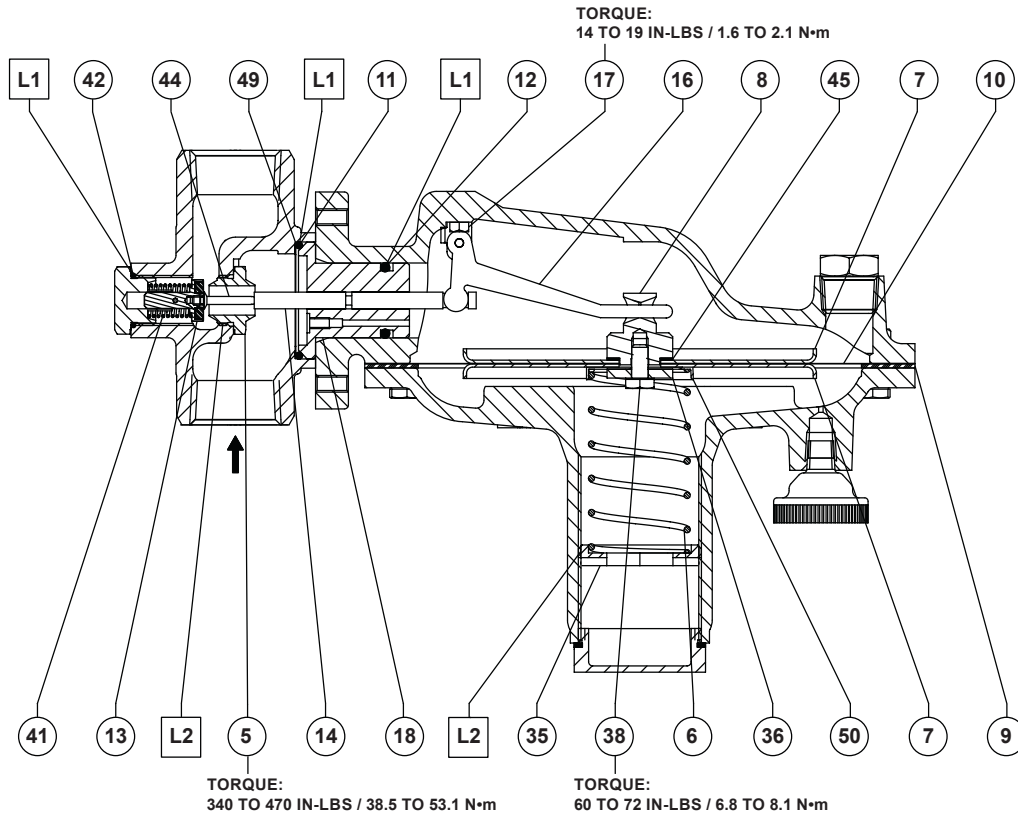
1. Use for optional external square head adjusting screw assembly recommended for 0.9 to 2.5 psig / 62 to 172 mbar, 1.3 to 4.5 psig / 90 to 310 mbar and 3.8 to 7 psig / 0.26 to 0.48 bar spring ranges only.

2. NACE Standard MR0175-2002.

3. FDA/USP Class VI approved/ADI-free.

Inconel® is a mark owned by Special Metals Corporation.

T208 Series



ERSA02737

- ☐ APPLY LUBRICANT (L)⁽¹⁾:
 L1 = SILICONE GREASE
 L2 = ANTI-SEIZE COMPOUND

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

Figure 4. Type T208 Section Drawing (Internal Registration)

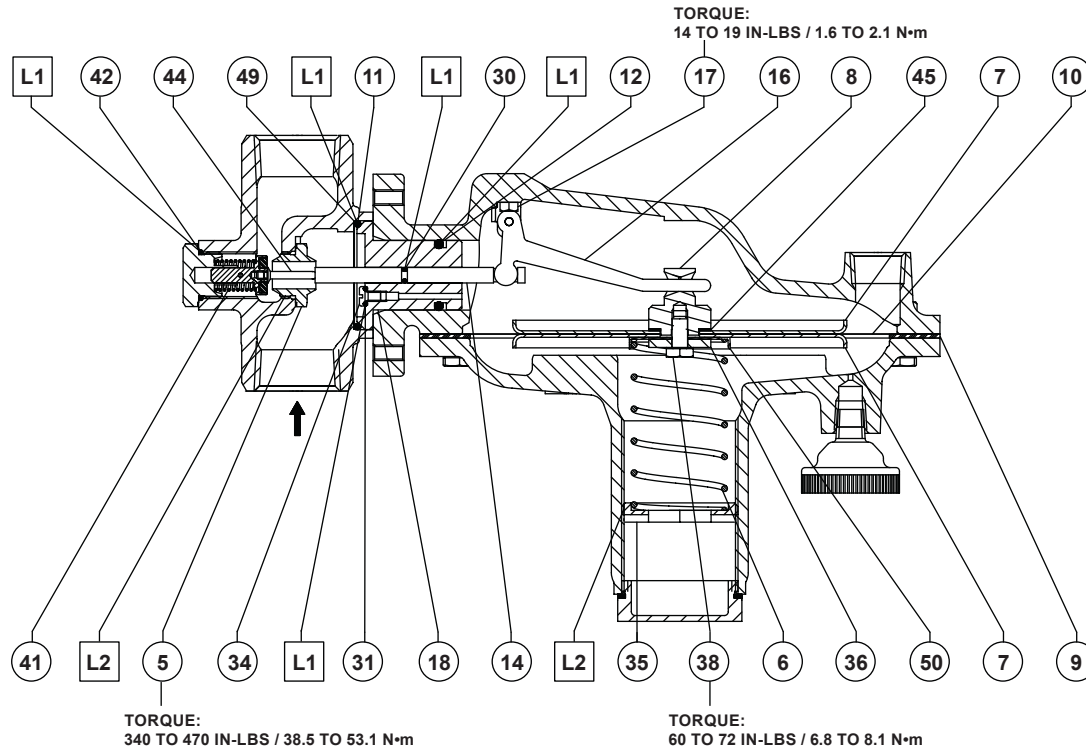
Table 3. Body Materials and Part Numbers (Body, key 1)

BODY MATERIAL	END CONNECTION STYLE ⁽¹⁾	PART NUMBER	
		3/4 In. / DN 20 Body	1 In. / DN 25 Body
Gray cast iron	NPT	ERSA03695A0	ERSA03697A0
WCC Carbon steel	NPT	ERSA00231A1	ERSA00764A1
	CL150 RF	ERSA01470A0	ERSA01470A1
	CL300 RF	ERSA01470A2	ERSA01470A3
	PN 16/25/40 RF	ERSA01470A4	ERSA01470A5
CF8M/CF3M Stainless steel ⁽³⁾	NPT ⁽²⁾	ERSA00231A0	ERSA00764A0
	CL150 RF	ERSA01470A6	ERSA01470A7
	CL300 RF	ERSA01470A8	ERSA01470A9
	PN 16/25/40 RF	ERSA01470B0	ERSA01470B1
LCC Carbon steel	NPT	ERSA00231A5	ERSA00764A3

1. All flanges are welded. Weld-on flange dimension is 14 in. / 356 mm face-to-face.

2. NACE Standard MR0175-2002.

3. Pipe nipples and flanges are 316 Stainless steel for flanged body assemblies.



ERSA02738

APPLY LUBRICANT (L)⁽¹⁾:
 L1 = SILICONE GREASE
 L2 = ANTI-SEIZE COMPOUND

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

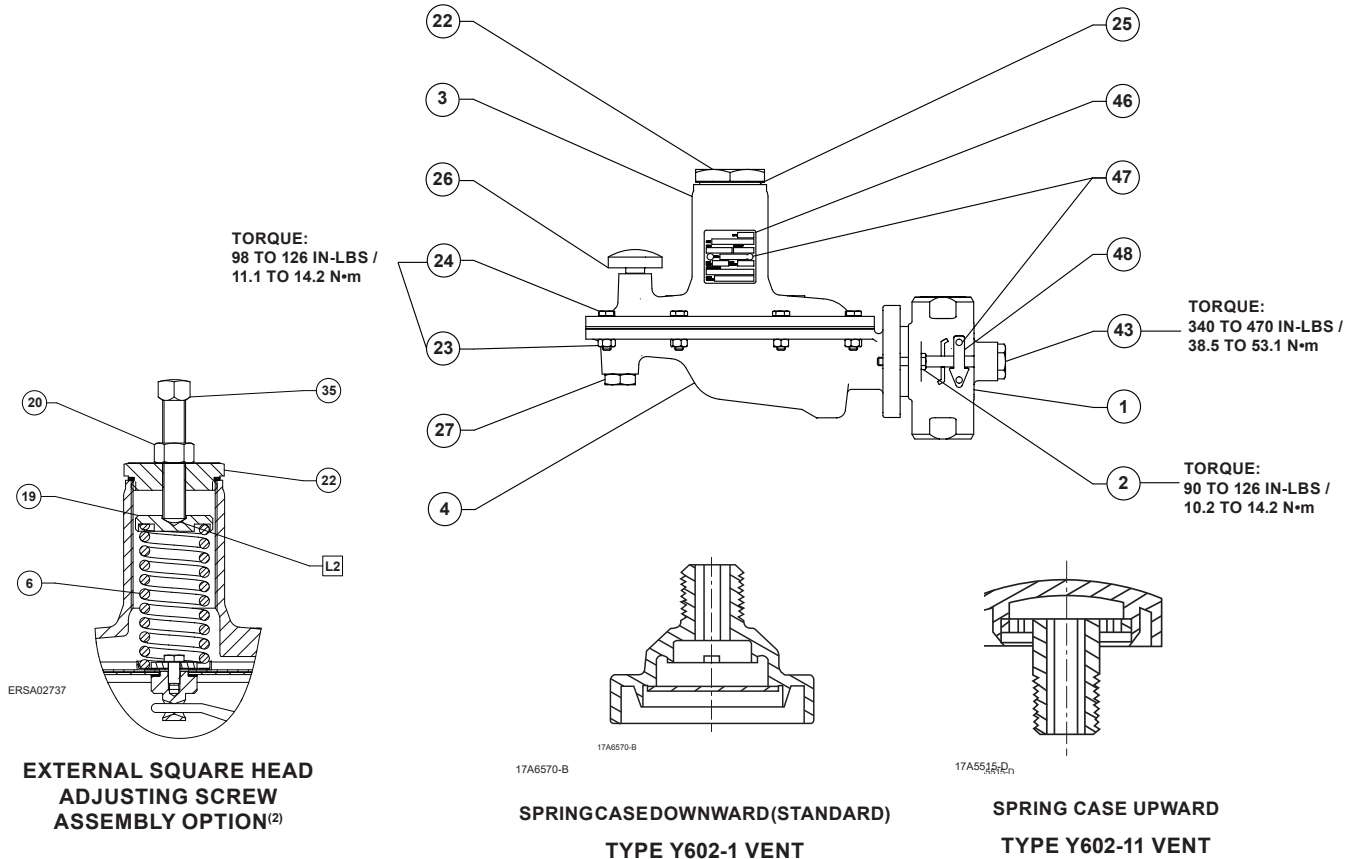
Figure 5. Type T208M Section Drawing (External Registration)

Table 4. Type T208 Trim Option Code

TRIM OPTION CODE	DIAPHRAGM MATERIAL	DISK AND O-RING MATERIAL	OPERATING TEMPERATURE RANGES
Standard	Nitrile (NBR)	Nitrile (NBR)	-40 to 180°F / -40 to 82°C
VV	Fluorocarbon (FKM)	Fluorocarbon (FKM)	40 to 300°F / 4 to 149°C
TN	Fluorinated Ethylene Propylene (FEP)	Nitrile (NBR)	-20 to 180°F / -29 to 82°C
TV	Fluorinated Ethylene Propylene (FEP)	Fluorocarbon (FKM)	40 to 180°F / 4 to 82°C
TK	Fluorinated Ethylene Propylene (FEP)	Perfluoroelastomer (FFKM)	0 to 180°F / -18 to 82°C
TE	Fluorinated Ethylene Propylene (FEP)	EPDM	-20 to 180°F / -29 to 82°C
EE	EPDM	EPDM	-20 to 225°F / -29 to 107°C
FDA ⁽¹⁾	EPDM	EPDM	-20 to 225°F / -29 to 107°C

1. EPDM option available with FDA/USP Class VI approved/ADI-free elastomers (wetted components only).

T208 Series



APPLY LUBRICANT (L)⁽¹⁾:
L2 = ANTI-SEIZE COMPOUND

1. Lubricant must be selected such that they meet the temperature requirements.
2. For 0.9 to 2.5 psig / 62 to 172 mbar, 1.3 to 4.5 psig / 90 to 310 mbar and 3.8 to 7 psig / 0.26 to 0.48 bar spring ranges only.

Figure 6. Type T208 Assembly Drawing

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