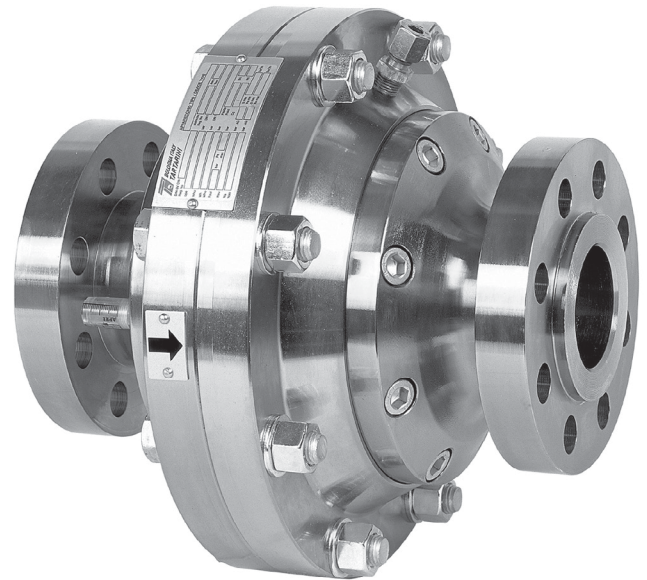


FLA1 Series Pressure Reducing Regulators

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E0820

Figure 1. Type FLA1 Regulator

Asia Pacific Only

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.

Emerson regulators 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 vents gas or a leak develops in the system, service to the unit may be required. Failure to correct trouble could result in a hazardous condition.

Installation, operation and maintenance procedures performed by unqualified personnel may result in improper adjustment and unsafe operation. Either condition may result in equipment damage or personal injury. Call qualified personnel when installing, operating and maintaining the FLA1 Series regulator.

Introduction

Scope of the Manual

This manual provides instructions for installation, adjustment, maintenance and parts ordering for the FLA1 Series regulators, its pilots, booster valves and filter.

Description

The FLA1 Series regulators are accurate pilot-operated, pressure balanced, soft seated regulators designed for Natural Gas high pressure transmission/city gate, large capacity distribution systems and power plant feeds. The FLA1 Series provides smooth, quiet operation, tight shutoff and long life. The regulator utilizes a main valve actuator, a PRX or PSA Series pressure reducing pilot, and/or a Type SA/2 pilot supply pressure regulator.

Types SR, SR11, SRS and SRS11 silencers are also available.

All standard gas pressure devices (regulators and safety shut-off devices) used in assemblies will comply to EN 12186 and EN 12279 standards.

FLA1 Series

Specifications

The Specifications section gives some general specifications for the FLA1 Series regulators. The nameplates give detailed information for a particular regulator as built in the factory.

Body Sizes and End Connection Styles

Type FLA1: DN 25, 40, 50, 80, 100, 150, 200 and 250 / NPS 1, 1-1/2, 2, 3, 4, 6, 8 and 10 CL300 and CL600 RF Flanged

Type FLA1 with Type SRS/SRSII Silencer (Inlet x Outlet): DN 25 x 100, 40 x 150, 50 x 150, 80 x 250, 100 x 250, 150 x 300, 200 x 400 and 250 x 500 / NPS 1 x 4, 1-1/2 x 6, 2 x 6, 3 x 10, 4 x 10, 6 x 12, 8 x 16 and 10 x 20 CL300 and CL600 RF Flanged

Maximum Inlet and Outlet (Casing) Pressure⁽¹⁾

CL300: 50 bar / 740 psig

CL600: 100 bar / 1450 psig

Minimum Operating Differential Pressure⁽²⁾

0.50 bar d / 7.3 psid

Outlet Pressure Ranges

See Table 2

Accuracy Class

AC: up to $\pm 1\%$

Lock-up Pressure Class

SG: up to +5%

Class of Lock-up Pressure Zone

SZ: up to 5%

Pressure Registration

External

Construction Materials

Covers and Flanges: Steel

Sleeve: Steel

Diaphragm Plates: Steel

Diaphragm: Nitrile (NBR) with PVC coating

Seal: Nitrile (NBR) or Fluorocarbon (FKM)

Seal Pad: Nitrile (NBR), Fluorocarbon (FKM) or Polyurethane (PU) Disk

Minimum/Maximum Allowable Temperature (TS)⁽¹⁾⁽²⁾

Class 1: -10 to 60°C / 14 to 140°F

Class 2: -20 to 60°C / -4 to 140°F

Working Temperature Capabilities⁽¹⁾

Standard Version, Nitrile (NBR) or

Fluorocarbon (FKM): -10 to 60°C / 14 to 140°F

Low Temperature Version, Nitrile (NBR): -20 to 60°C / -4 to 140°F

Options

Spacer

Travel Transducer

Proximity or Micro Switch

Booster Valve

Pneumatic or Electric Remote Control Drive Unit

Swagelok SST Fitting

Pilot Type

PSA Series

PRX Series⁽³⁾

Pilot Connection

1/4 NPT

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

2. When using a Type SA/2 pilot supply filter regulator, the differential pressure across the regulator must be at least 3.10 bar d / 45 psid for optimum regulator performance.

3. Use Type SA/2 Pilot Supply Filter Regulator when using PRX Series Pilots.

Any accessories (e.g. pilots or filters) used on the Emerson range of pressure regulators, with or without built-in safety shut-off devices, must be manufactured by one of the Emerson companies and bear that label.

If this is not respected, Emerson will not be responsible in the case of any inefficiency.

In a configuration with integrated safety shut-off device and pilot, when the maximum allowable pressures are different, the slam-shut device is the differential strength type.

PED Categories and Fluid Group

The FLA1 Series regulators without built-in safety slam-shut devices may be used as a stand-alone safety accessory in a fail close configuration to protect pressure equipment under the Pressure Equipment Directive 2014/68/EU categories.

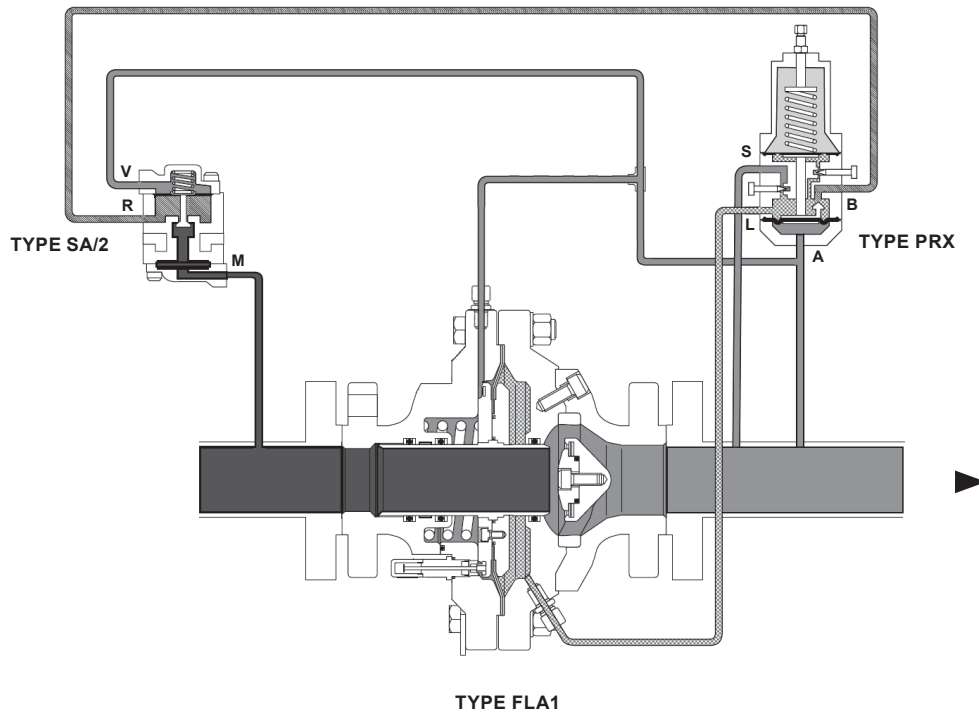
The technical features of the downstream equipment, protected by this regulator, should be classified under a higher category according to the Pressure Equipment Directive 2014/68/EU.

The built-in pressure accessories (e.g. pilots PRX, PSA, and V/31-2 Series or filters Type SA/2) conform to Pressure Equipment Directive 2014/68/EU Article 4 Section 3 were designed and manufactured in accordance to the Sound Engineering Practice (SEP).

Principle of Operation

Pilot-Operated Regulator

The pilot-operated Type FLA1 (Figure 2) uses inlet pressure as the operating medium, which is reduced through pilot operation to load the actuator diaphragm. Outlet or downstream pressure opposes loading pressure in the actuator and also opposes the pilot control spring.



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- INLET PRESSURE
 - OUTLET PRESSURE
 - LOADING PRESSURE
 - PILOT SUPPLY PRESSURE
 - ATMOSPHERIC PRESSURE
- TYPE PRX:
- S - BLEED PORT
 - B - SUPPLY PORT
 - L - LOADING PORT
 - A - SENSING PORT
- TYPE SA/2:
- V - SENSING PORT
 - R - PILOT SUPPLY PORT
 - M - INLET PORT

Figure 2. Type FLA1 Pilot-Operated Regulator Operational Schematic

Table 1. PED Category for FLA1 Series Regulators

TYPE	BODY SIZE	CATEGORY	FLUID GROUP
FLA1	DN 25, 40, 50, 80, 100, 150, 200 and 250 / NPS 1-1/2, 2, 3, 4, 6, 8 and 10	IV	1

When outlet pressure drops below the setting of the pilot control spring, pilot control spring force on the pilot diaphragm opens the pilot valve plug, providing additional loading pressure to the actuator diaphragm. This diaphragm loading pressure opens the main valve plug, supplying the required flow to the downstream system. Any excess loading pressure on the actuator diaphragm escapes downstream through the exhaust restriction in the pilot.

When the gas demand in the downstream system has been satisfied, the outlet pressure increases. The increased pressure is transmitted through the downstream control line and acts on the pilot diaphragm. This pressure exceeds the pilot spring setting and moves the diaphragm, closing the orifice. The loading pressure acting on the main diaphragm bleeds to the downstream system through the exhaust restriction in the pilot.

Monitoring Systems

Monitoring regulation is overpressure protection by containment; therefore, there is no relief valve to continuously vent gas to the atmosphere. When the working regulator fails to control the pressure, a monitor regulator installed in series, which has been sensing the downstream and control pressure, goes into operation to maintain the downstream pressure at a slightly higher than normal pressure. During an overpressure situation, monitoring keeps the fluid gas in line. Also, testing is relatively easy and safe. To perform a periodic test on a monitoring regulator, increase the outlet set pressure of the working regulator and watch the outlet pressure to determine if the monitoring regulator takes over at the appropriate outlet pressure.

Table 2. Pilot Types and Outlet Pressure Ranges

PILOT FOR REGULATOR OR MONITOR	PILOT FOR WORKING MONITOR APPLICATION		ALLOWABLE PRESSURE, bar / psig	SET PRESSURE RANGE, bar / psig	COVER AND FLANGES MATERIAL
	Regulator	Monitor			
Type PSA/79 ⁽¹⁾	Type PSOA/79	Type REOA/79	100 / 1450	0.50 to 40.0 / 7 to 580	Steel
Type PSA/79-AP	Type PSOA/79-AP	Type REOA/79-AP	100 / 1450	40.0 to 65.0 / 580 to 942.75	
Type PSA/80 ⁽¹⁾	Type PSOA/80	Type PSOA/80	100 / 1450	1.5 to 40.0 / 22 to 580	
Type PSA/80-AP	Type PSOA/80-AP	Type REOA/80-AP	100 / 1450	40.0 to 65.0 / 580 to 942.75	
Type PRX/120 ⁽²⁾	Type PRX/120	Type PRX/125	100 / 1450	1.0 to 40.0 / 15 to 580	
Type PRX-AP/120 ⁽²⁾	Type PRX-AP/120	Type PRX-AP/125	100 / 1450	30.0 to 80.0 / 435 to 1160	

1. All PSA Series pilots are supplied with a filter (5 micron) and built-in pressure stabilizer, with the exception of Types PSOA/79 and PSOA/80.
 2. Type SA/2 pilot supply pressure regulator must be used with PRX Series pilots.

Wide-Open Monitoring Systems (Figure 3)

There are two types of wide-open monitoring systems: upstream and downstream. The difference between upstream and downstream monitoring is that the functions of the regulators are reversed.

Systems can be changed from upstream to downstream monitoring, and vice-versa, by simply reversing the setpoints of the two regulators. The decision to use either an upstream or downstream monitoring system is largely a matter of personal preference or company policy.

In normal operation of a wide-open configuration, the working regulator controls the system's outlet pressure. With a higher outlet pressure setting, the monitor regulator senses a pressure lower than its setpoint and tries to increase outlet pressure by going wide-open. If the working regulator fails, the monitoring regulator assumes control and holds the outlet pressure at its outlet pressure setting.

Working Monitoring Regulators (Figure 3)

In a working monitoring system, the upstream regulator requires two pilots and it is always the monitoring regulator. The additional pilot permits the monitoring regulator to act as a series regulator to control an intermediate pressure during normal operation. In this way, both units are always operating and can be easily checked for proper operation.

In normal operation, the working regulator controls the outlet pressure of the system. The monitoring regulator's working pilot controls the intermediate pressure and the monitoring pilot senses the system's outlet pressure. If the working regulator fails, the monitoring pilot will sense the increase in outlet pressure and take control.

Note

The working regulator must be rated for the maximum allowable operating pressure of the system because this will be its inlet pressure if the monitoring regulator fails. Also, the outlet pressure rating of the monitoring pilot, and any other components that are exposed to the intermediate pressure must be rated for full inlet pressure.

Adjustment

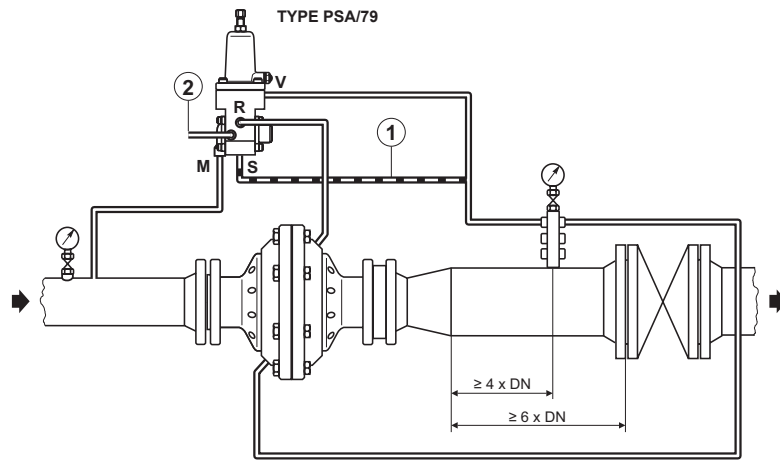
The adjustment of the regulator is performed by means of the pilot adjusting screw, which varies the compression of the control spring. Adjustment is performed while the regulator is in operation with the aid of a test pressure gauge to monitor downstream pressure. The shutoff valve downstream of the regulator must not be completely closed; it is necessary that a small quantity of gas flows downstream to allow the outlet side to vent down, when it is necessary to lower the pressure.

Loosen the locknut and turn the adjusting screw slowly to adjust outlet pressure. Use a pressure gauge to check the outlet pressure until the desired pressure is reached.

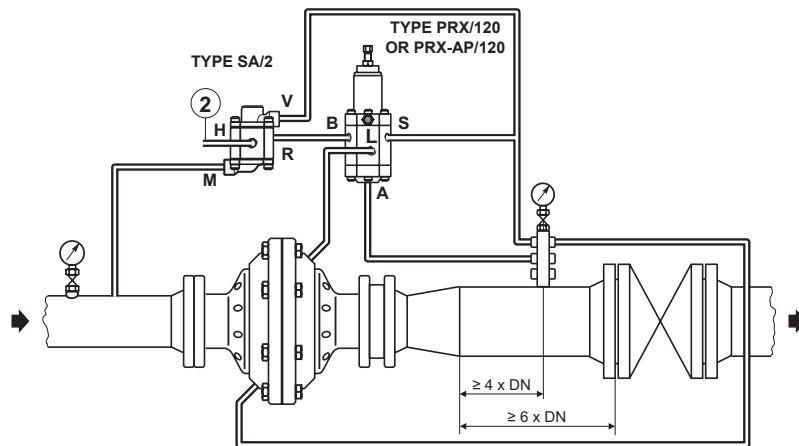
Installation and Startup



Personal injury or equipment damage, due to bursting of pressure-containing parts may result if this regulator is overpressured or is installed where service conditions could exceed the



TYPE FLA1 REGULATOR WITH TYPE PSA/79 PILOT



TYPE FLA1 REGULATOR WITH TYPE PRX/120 OR PRX-AP/120 PILOT

PSA SERIES:

- V - SENSING PORT
- M - SUPPLY PORT
- R - LOADING PORT
- S - BLEED PORT

① - TO DOWNSTREAM OR SAFE AREA

② - TO HEATING

PRX SERIES:

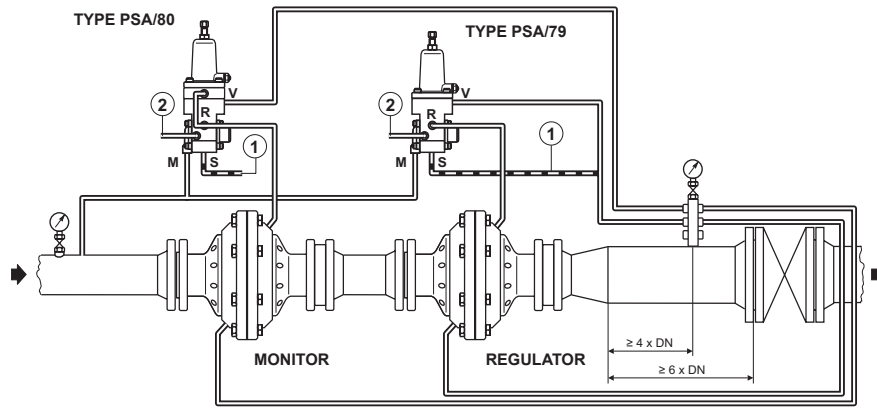
- A - SENSING PORT
- B - SUPPLY PORT
- L - LOADING PORT
- S - BLEED PORT

TYPE SA/2:

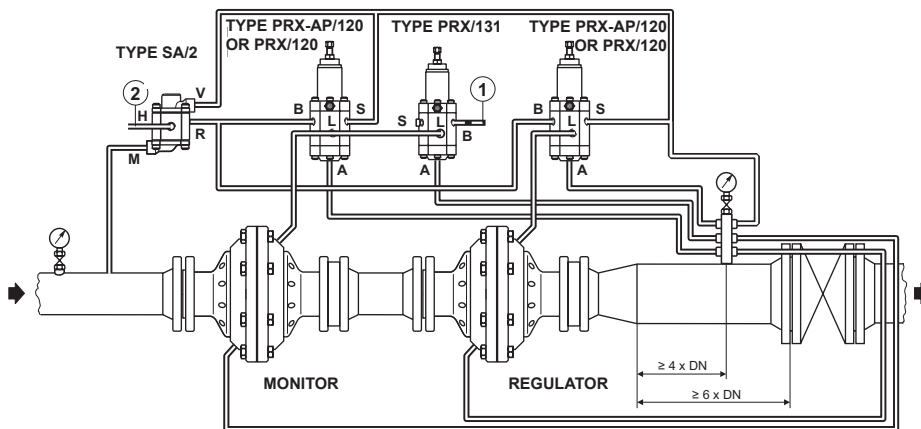
- V - SENSING PORT
- M - INLET PORT
- R - PILOT SUPPLY PORT
- H - WATER INLET/OUTLET

Figure 3. FLA1 Series DN 25 to 200 / NPS 1 to 8 Connection/Installation Schematics

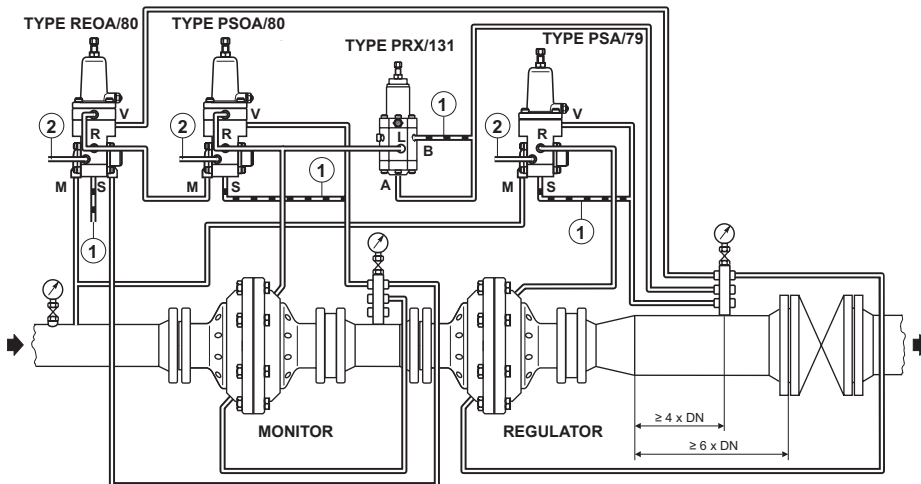
FLA1 Series



TYPE FLA1 REGULATOR AND MONITOR WITH TYPES PSA/79 AND PSA/80 PILOTS



TYPE FLA1 REGULATOR AND MONITOR WITH TYPE PRX/120 PILOT AND TYPE PRX/131 BOOSTER VALVE



TYPE FLA1 REGULATOR AND WORKING MONITOR WITH TYPES PSA/79, PSOA/80 AND REOA/80 PILOTS AND TYPE PRX/131 BOOSTER VALVE

PSA SERIES:
 V - SENSING PORT
 M - SUPPLY PORT
 R - LOADING PORT
 S - BLEED PORT

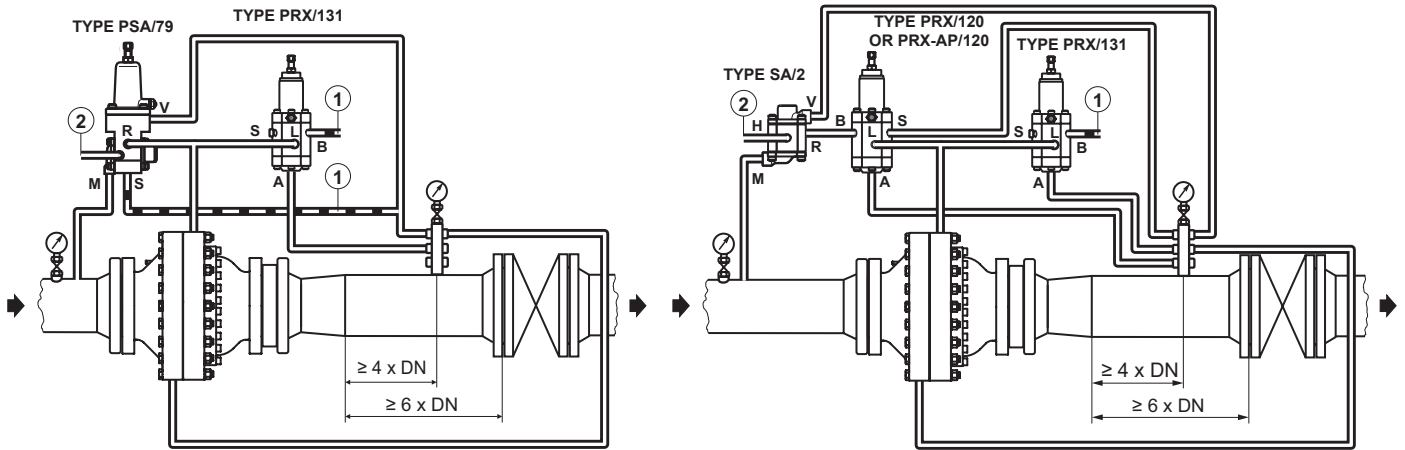
PRX SERIES:
 A - SENSING PORT
 B - SUPPLY PORT
 L - LOADING PORT
 S - BLEED PORT

TYPE SA/2:
 V - SENSING PORT
 M - INLET PORT
 R - PILOT SUPPLY PORT
 H - WATER INLET/OUTLET

① - TO DOWNSTREAM OR SAFE AREA

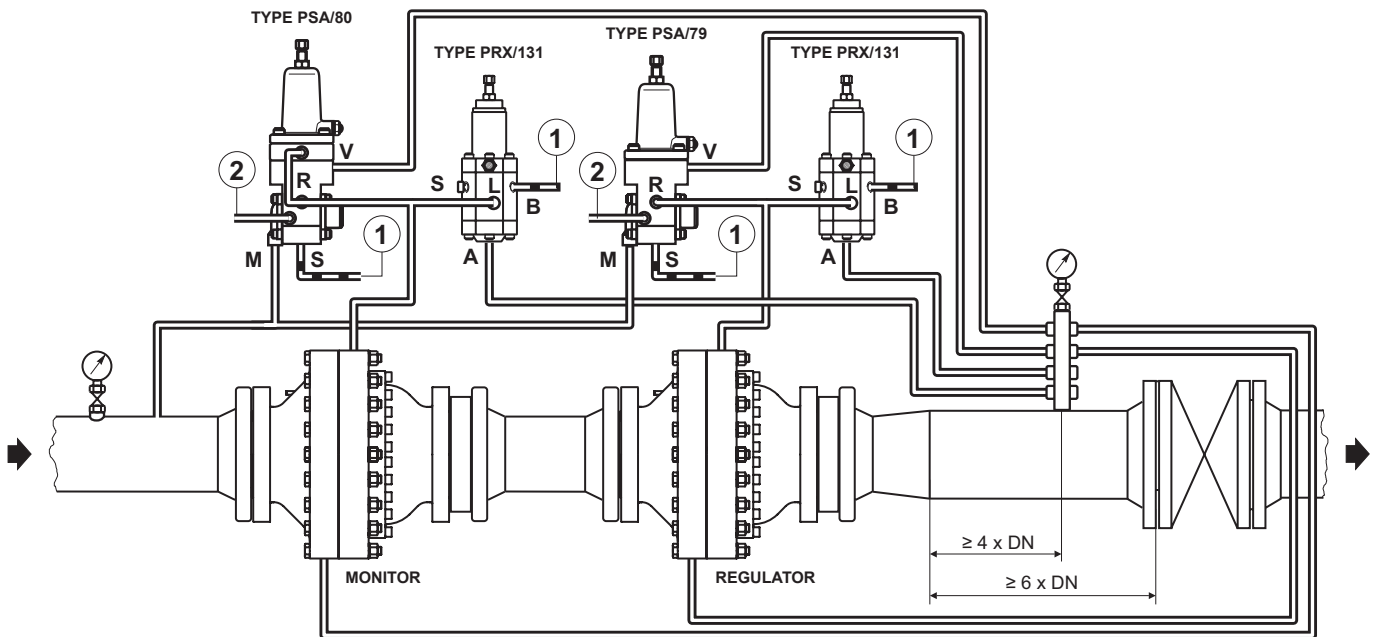
② - TO HEATING

Figure 3. FLA1 Series DN 25 to 200 / NPS 1 to 8 Connection/Installation Schematics (continued)



TYPE FLA1 DN 250 / NPS 10 REGULATOR WITH TYPE PSA/79 PILOT AND TYPE PRX/131 BOOSTER VALVE

TYPE FLA1 DN 250 / NPS 10 REGULATOR WITH TYPE PRX/120 OR PRX-AP/120 PILOT AND TYPE PRX/131 BOOSTER VALVE



TYPE FLA1 DN 250 / NPS 10 REGULATOR WITH TYPE PSA/79 PILOT, TYPE PRX/131 BOOSTER VALVE, TYPE PSA/80 MONITOR WITH PILOT AND TYPE PRX/131 BOOSTER VALVE

PSA SERIES:
 V - SENSING PORT
 M - SUPPLY PORT
 R - LOADING PORT
 S - BLEED PORT

PRX SERIES:
 A - SENSING PORT
 B - SUPPLY PORT
 L - LOADING PORT
 S - BLEED PORT

TYPE SA/2:
 V - SENSING PORT
 M - INLET PORT
 R - PILOT SUPPLY PORT
 H - WATER INLET/OUTLET

① - TO DOWNSTREAM OR SAFE AREA

② - TO HEATING

Figure 4. FLA1 Series DN 250 / NPS 10 Connection/Installation Schematics

limits given in the Specification section and on the appropriate nameplate or where conditions exceed any rating of the adjacent piping or piping connections. To avoid such injury or damage, provide pressure-relieving or pressure-limiting devices to prevent service conditions from exceeding those limits. Also, be sure that the installation is in compliance with all applicable codes and regulations.

Additionally, physical damage to the regulator may result in personal injury or property damage due to escaping of accumulated gas. To avoid such injury and damage, install the regulator in a safe location.

All vents should be kept open to permit free flow of gas to the atmosphere. Protect openings against entrance of rain, snow, insects or any other foreign material that may plug the vent or vent line. Under enclosed conditions or indoors, escaping gas may accumulate and be an explosion hazard. In these cases, the vent should be piped away from the regulator to the outdoors.

Examine the unit on arrival to make sure no damage has occurred in shipment. Clean and blow out pipelines to be sure no welding slag or other foreign material is present.

Pilot-Operated Regulator

Installation



WARNING

A regulator may vent some gas to the atmosphere. In hazardous or flammable gas service, vented gas may accumulate, causing personal injury, death, or property damage due to bursting of pressure-retaining parts. Vent a regulator in hazardous gas service to a remote, safe location away from air intakes or any hazardous location. The vent line or stack opening must be protected against condensation or clogging.

A Type FLA1 regulator bleeds no gas to atmosphere during normal operation, thus making the regulator suitable for installation in pits and other enclosed locations without elaborate venting system, if the outlet pressure sensing lines are connected to the downstream pipeline. This regulator also can be installed in pits subject to flooding by venting the pilot spring case above the expected flood level so that the pilot setting can be referenced to atmospheric pressure.

1. Use qualified personnel when installing, maintaining, or operating this regulator. Inspect the regulator and the pipeline to be certain both are free of foreign materials.
2. Install the regulator so that the flow arrow cast on the main valve matches the flow direction of process fluid through the regulator.
3. Apply pipe compound to the male pipeline threads before installing a regulator with screwed end connections. Use gaskets between pipeline and regulator flanges when installing a regulator with flanged end connections.
4. The PRX and PSA Series pilots have a 1/4 NPT vent connection at the spring case and at the side of the body respectively. To remotely vent the pilots, remove the vent and install obstruction-free tubing or piping into the 1/4 inch NPT vent tapping. Provide protection on a remote vent by installing a screened vent cap onto the remote end of the vent pipe. The piping or tubing should vent to a safe location, have as few elbows as possible, and have a screened vent on its exhaust. Install the regulator and any remote vent piping or tubing so that the vent is protected from condensation, freezing, or any substance that could clog it. (The PSA Series pilots have an internal relief valve to protect the internal parts of the pilot in case of overpressure.)
5. If Type PRX is used, connect a pilot supply line from the upstream piping to the lower port of the Type SA/2 filter/stabilizer regulator.
6. Connect a downstream control line to a straight run of pipe 4 pipe diameters from the regulator outlet as shown in Figure 3. If such a distance is not practical, connect the control line away from elbows, swages, nipples, or any area where abnormal flow velocities occur.
7. Install a full flow hand valve, such as a full port ball valve, in the control line.
8. Install the other end of the downstream control line to the 1/2 NPT connection in the upstream side of the case body.

- Consult the appropriate instruction manual for installation of an optional pneumatic or electric remote control-drive unit. For optional remote pneumatic loading of PRX and PSA Series pilots, make the spring case piping connections just as they would be made for remote venting.

Pre-startup Considerations

CAUTION

Pilot supply pressure must be introduced into the regulator before introduction of any downstream pressure, or internal damage may occur due to reverse pressurization of the pilot and main valve components.

Pressure gauges should always be used to monitor downstream pressure during startup. Procedures used in putting this regulator into operation must be planned accordingly if the downstream system is pressurized by another regulator or by a manual bypass.

Each regulator is factory-set for the outlet pressure specified on the order. If no setting was specified, outlet pressure was factory-set at the mid-range of the pilot control spring. Before beginning the startup procedure in this section, make sure the following conditions are in effect:

- Block valves isolate the regulator
- Vent valves are closed
- A bypass, if any, is in operation

In all cases, check the control spring setting to make sure it is correct for the application.

Note

Pilot supply pressure must be at least 1.03 bar / 15 psig greater than control pressure to operate the regulator at rated travel.

Although remote loading or control constructions may require separate adjustments on associated equipment, the only adjustment normally necessary on a Type FLA1 regulator is the pressure setting of the pilot control spring. Turning the adjusting screw clockwise into the spring case increases the spring compression and pressure setting. Turning the adjusting screw counterclockwise decreases the spring compression and pressure setting.

Pilot Adjustment

To change the regulator outlet pressure, loosen the locknut, and turn the adjusting screw clockwise to increase pressure or counterclockwise to decrease pressure. Then tighten the locknut to maintain the adjustment position.

Startup

- Open the upstream block (isolating) valve. Open the hand valve in the external pilot supply line before opening the downstream isolating valve.
- Open the downstream block (isolating) valve for minimum flow.
- Slowly open the hand valve in the downstream control line, while at the same time adjusting the pilot setting, if necessary.
- Completely open the downstream block valve.
- Slowly close the bypass valve, if any.

Wide-Open Monitor Regulator

Installation

- For both the wide-open monitoring regulator and the working regulator, perform the pilot-operated regulator installation procedures through Step 9.
- Connect the control line of a wide-open monitoring regulator (Figure 3) to downstream piping near the working regulator control line connection. During normal operation, the wide-open monitoring regulator stands wide open with the pressure reduction being taken across the working regulator. Only in case of working regulator failure does the wide-open monitoring regulator take control at its slightly higher setting.

Pre-startup Considerations

CAUTION

Introduce pilot supply pressure into the regulator before introducing any downstream pressure, or internal damage may occur due to reverse pressurization of the pilot and main valve components.

Always use pressure gauges to monitor downstream pressure during startup. If the downstream is pressurized by another regulator, plan startup procedures accordingly.

FLA1 Series

Each regulator is factory-set for the outlet pressure specified on the order. If no setting was specified, outlet pressure was factory-set at the mid-range of the pilot control spring. Before beginning the startup procedures in this section, make sure the following conditions are in effect:

- Block valves isolate the regulator
- Vent valves are closed
- Hand valves are closed
- A bypass, if any, is in operation

In all cases, check the control spring setting to make sure it is correct for the application.

Note

Pilot supply pressure must exceed control pressure by at least 1.03 bar / 15 psig in order to operate the regulator at rated travel.

Although remote loading or control constructions may require separate adjustments on associated equipment, the only adjustment normally necessary on a Type FLA1 regulator is the pressure setting of the pilot control spring. Turning the adjusting screw clockwise into the spring case increases the spring compression and pressure setting. Turning the adjusting screw counterclockwise decreases the spring compression and pressure setting.

Pilot Adjustment

To change the regulator outlet pressure, loosen the locknut, and turn the adjusting screw clockwise to increase pressure or counterclockwise to decrease pressure. Then tighten the locknut to maintain the adjustment position.

Startup

This procedure is to be repeated in turn for each regulator in the installation.

1. Slowly open the hand valve in the pilot supply line.
2. Slowly open the upstream block (isolating) valve and partially open the downstream block valve for minimum flow.
3. Slowly open the hand valve in the control line while, at the same time, adjusting the pilot setting if necessary.
4. Completely open the downstream block valve.
5. Slowly close the bypass valve, if any.

Working Monitor Regulator

Installation

All Type FLA1 working monitor regulators are bench set at the factory according to the service conditions specified on the customer's order.

Install the Type FLA1 using adequate gaskets for flanged regulator units and good piping practices. Be sure to provide suitable pressure gauges where appropriate, block valves, bypass valves and piping, and bleed valves to permit safe and easy maintenance of both the working monitor regulator and the second-stage working regulator. Be sure flow will be in the direction indicated by the arrow cast on the body.

Refer to Figures 3 and 4, and proceed in the following steps.

1. Connect control lines as shown in Figure 3.
2. Connect the pilot supply pressure to the Type SA/2 and from the Type SA/2 to the pilots (Figure 3). Supply pressure should be filtered.
3. Install downstream working regulator per guidelines.

Startup



Pilot supply pressure must be introduced into the regulator prior to introduction of any downstream pressure or internal damage may occur due to reverse pressurization of the pilot and main valve components. Pilot supply pressure must be at least 1.03 bar / 15 psi greater than control pressure for proper operation.

1. Before introducing any pressure to the unit, close the hand valve in the distribution pressure control line and the hand valve in the intermediate pressure control line.
2. Slowly open the hand valve in the pilot supply line.
3. Slowly open the upstream block valve and partially open the downstream block valve for minimum flow.
4. Slowly open the hand valve and allow the intermediate pressure to increase to the working pilot setting.
5. Put the second-stage working regulator into operation according to recommended procedures and instructions furnished with the second-stage working regulator.

6. After the distribution pressure has been established slowly open the hand valve.

Pilot Adjustment

The second-stage working regulator must be set to operate at a lower pressure than the monitoring pilot or the monitoring pilot will try to take control of the distribution pressure. Follow the steps listed to obtain the desired results.

1. Increase the setting of the monitoring pilot by loosening the locknut and turning the adjusting screw clockwise (into the spring case cap) until the working pilot is in control of the intermediate pressure and the second-stage working regulator is in control of the distribution pressure.
2. Adjust the setting of the working pilot by loosening the locknut and turning the adjusting screw clockwise (into the spring case cap) to increase the intermediate pressure, or counterclockwise (out of the spring case cap) to reduce the intermediate pressure. Adjust until desired intermediate pressure is reached.
3. Adjust the second-stage working regulator to the desired distribution pressure by following instructions for that particular regulator.
4. Adjust the setting of the monitoring pilot to establish the desired emergency distribution pressure, which is to be maintained in the event of failure of the second-stage working regulator. The steps followed may vary with each piping situation. The basic method remains the same.

The following procedure serves as an example which can be used or modified to make monitoring pilot adjustments in any installation.

Increase the outlet pressure setting of the second-stage working regulator until the monitoring pilot takes control of the distribution pressure. Adjust the monitoring pilot setting until the desired emergency distribution pressure is achieved.

With settings as desired on both the monitoring and the working pilots, tighten the locknuts to maintain proper adjustment screw positions. Then re-adjust the second-stage working regulator to the desired distribution pressure.

Shutdown

In any installation, it is important to slowly open and close the valves and to vent the outlet pressure before venting the inlet pressure to prevent damage caused by reverse pressurization of the pilot or main valve.

Pilot-Operated Regulators and Wide-Open Monitor Regulators

As well as applying to a pilot-operated regulator, the steps in this procedure also are valid for a wide-open monitoring installation and should be repeated for each regulator in such an installation.

1. Close the upstream isolating valve.
2. Close the hand valve in the supply line.
3. Close the downstream isolating valve.
4. If the downstream control line taps into the pipeline above the downstream isolating valve, open vent valve between the regulator and the downstream isolating valve. Permit all pressure to bleed out of the regulator.
If the downstream control line taps into the pipeline below the downstream isolating valve, close hand valves and open vent valves, permitting all pressure to bleed out of the regulator.
5. Release any inlet pressure that may be trapped in the regulator.

Working Monitor Regulators

1. Close the upstream isolating valve.
2. Close hand valve in pilot supply line.
3. Close the downstream isolating valve.
4. Open a bleed valve between the second-stage working regulator and the downstream isolating valve. Permit all pressure to bleed out of the working monitor regulator and the second-stage working regulator.
5. Open vent valve to vent any intermediate pressure trapped in the system.
6. Open vent valve to release any inlet pressure trapped in the regulator.

Maintenance



WARNING

To avoid personal injury or property damage from sudden release of pressure, isolate the regulator from the pressure system, and release all pressure from the pilot and main valve before performing maintenance operations.

To prevent personal injury or damage to the equipment during storage, installation or maintenance operations, proper supports shall be used to keep the Type FLA1 regulator from rolling while it is sitting on a flat surface.

Installation, operation and maintenance procedures performed by unqualified personnel may result in improper adjustment and unsafe operation. Either condition may result in equipment damage or personal injury. Call qualified personnel when installing, operating and maintaining the unit.

The regulator parts are subject to normal wear and must be inspected periodically and replaced as necessary. The frequency of inspection and replacement depends on the severity of service conditions and on applicable federal, state and local codes and regulations.

Main Valve (See Figures 5, 6 and 7)

Main Valve Pad Replacement

1. Remove outlet flange (key 22) by removing socket head cap screws (key 5).
2. Remove pad holder assembly and O-ring (key 18).
3. Remove pad (key 20) from pad holder (key 19) by removing cap screw (key 25) and pad retainer (key 21), replace pad if necessary.
4. Reinstall the pad.

Main Valve Diaphragm Maintenance

1. Place main valve with inlet side up.
2. Remove the travel indicator assembly by removing the indicator cover (key 40) and indicator bushing (key 38). Check O-ring (key 37), replace if necessary. Remove the indicator support (key 36). Check O-ring (key 35), replace if necessary. Lift out indicator stem assembly (keys 33 and 34).
3. Remove inlet flange (key 1) by removing hex head cap screws, washers, and nuts (keys 9, 14, and 15). Due to force created by the spring (key 6), always remove inlet flange with caution.
4. Lift out spring (key 6).
5. Remove diaphragm assembly by removing screws (key 27) to separate the outlet and the inlet plates (keys 12 and 8). Check diaphragm (key 10) and

O-rings (keys 26 and 28) for damage and replace if necessary. Check sleeve (key 16) seating surface for damage. Check O-rings (keys 3) and anti-friction rings (key 2), replace if necessary.

6. Reassemble in reverse order.

PRX Series Pilot (See Figure 8)



Always remove spring (key 7) tension before performing maintenance on this unit. To remove spring tension, loosen locknut (key 2) and back out adjusting screw (key 1) until compression is removed from the spring.

Lower Case Maintenance

1. Remove pressure from the pilot.
2. Remove screws (key 10) from lower cover (key 21) and the separate lower cover from the body (key 16).
3. Use a wrench to hold the stem (key 23) and break loose the stem nut (key 20). Remove the stem nut and washer (key 11).
4. Remove the diaphragm plate (key 13), diaphragm (key 14), pad holder (key 22) and O-ring (key 18). Inspect the parts for damage or wear, and replace if necessary.
5. Remove orifice (key 19) and O-ring (key 17). Inspect the parts for damage or wear, and replace if necessary. Lightly lubricate the O-ring and place in the body (key 16). Install the orifice.
6. Set the pad holder (key 22) in the body (key 16).
7. Lightly lubricate the rims of the diaphragm (key 14) and place it on top of the pad holder (key 22). Set the diaphragm plate (key 13) on the diaphragm (key 14).
8. Lightly lubricate the O-ring (key 18) and place it in the lower case (key 21).
9. Place the washer (key 11) and stem nut (key 20) on the stem (key 23) and tighten. If performing Upper Case Maintenance, skip to step 2 of the Upper Case Maintenance section below.
10. Insert machine screws (key 10) in the lower cover (key 21) and tighten uniformly to ensure proper seal.

Upper Case Maintenance

1. Remove pressure from the pilot.
2. Loosen locknut (key 2) and back out adjusting screw (key 1) until compression is removed from the spring. Remove cap (key 3).
3. Lift the spring carrier (key 6), spring (key 7), and O-ring (key 4) out of the upper cover (key 8). Inspect O-ring and replace if necessary.
4. Remove machine screws (key 10) from lower cover (key 21) and the separate lower cover from the body (key 16), unless removed during lower diaphragm maintenance. Use a wrench to hold stem (key 23) securely while removing the stem nut (key 26).
5. Remove remaining loose components: washer, upper diaphragm plate, diaphragm, lower diaphragm plate, and O-rings (keys 11, 13, 14, 15, 18 and 25). Inspect diaphragm and O-rings for damage or wear, and replace if necessary.
6. Lightly lubricate the O-ring (key 25). Place O-ring over the stem (key 23) and press it down into the body (key 16).
7. Set the lower diaphragm plate (key 15) into the body (key 16).
8. Lightly lubricate the rims of the diaphragm (key 14) and place it in the body (key 16) on top of the lower diaphragm plate (key 15).
9. Set the upper diaphragm plate (key 13) on top of the diaphragm (key 14).
10. Place washer (key 11) and stem nut (key 26) on the stem (key 23) and tighten using a wrench to hold the stem.
11. Set the spring carrier (key 6).

Damper and Restrictor Maintenance

1. Remove screw (key 31) and plate (key 29).
2. Remove ring nuts (key 30).
3. Remove damper adjusting screw (key 27). Remove and inspect O-ring (key 28) for damage or wear, and replace if necessary. Lightly lubricate O-ring before placing on the adjusting screw. Insert damper adjusting screw into the body (key 16) and tighten. Insert ring nut (key 30) and tighten. Back out damper adjusting screw until it stops.

4. Remove restrictor adjusting screw (with hole) (key 32). Remove and inspect O-ring (key 28) for damage or wear, and replace if necessary. Lightly lubricate O-ring before placing on the adjusting screw. Insert restrictor adjusting screw into the body (key 16) and completely tighten. Insert ring nut (key 30) and completely tighten. Back out restrictor adjusting screw 1/2 turn.

Note

When using a Type PRX/120 pilot with a Type PRX/125 pilot as a monitor, use the following settings:

- **Restrictor - completely tighten and then back out three full turns.**
- **Damper - back out until it stops.**

5. Install plate (key 29) and screw (key 31).

PSA/79 and PSA/80 Series Pilot (See Figure 9)

Before servicing, cut off regulator inlet and outlet and release any trapped pressurized gas. Use suds to check that there are no leaks.

Replacing Filter

1. Remove the screws (key 41), cover (key 59), and replace filter (key 61). Reassemble by reversing the above sequence.

Replacing Stabilizer Diaphragm and Seal Pad

1. Remove screws (key 41), cover (key 64), spring (key 47) and diaphragm assembly (keys 48, 49, 50, 51, 52, and 53). Replace diaphragm if necessary.
2. Unscrew seat (key 54) and replace pad holder (key 56).
3. Reassemble by reversing the above sequence.

Replacing Valve Seal Pads

1. Remove plug (key 27) and seat (key 30). Slide out spring (key 32), pad holder (key 34) and forked stem (key 35).
2. Replace pad holder (key 34) and O-ring (key 37).
3. Reassemble by reversing above sequence.

General Maintenance

1. Completely release spring (key 5) by turning the adjusting screw (key 1) counterclockwise.
2. Remove screws (key 7) and cover (key 4).
3. Keep plate (key 9) blocked with a box wrench, unscrew nut (key 6). This must be done exactly as described to prevent damage to or breaking of safety valve (key 20).
4. Unscrew plate (key 9) from stem (key 13) remove diaphragm, plate, and O-ring (keys 10, 11, and 12) and slide off split pin (key 40).
5. Remove locknut (key 16) with appropriate wrench and slide out GACO ring, thrust bearing, spring, and safety valve (keys 17, 18, 19, and 20).
6. Make sure that the surface of seat (key 26) which is sealed by pad (key 21) is in proper condition.
7. Replace diaphragm (key 10) and all seals.
8. Proceed as directed in the replacement of filter, stabilizer diaphragm and seal pad, and valve seal pads (see instructions above).

Reassembly



CAUTION

The stated clearance can be checked by gently pulling stem (key 13) upward. Use the proper tool to make sure that the top plate (key 9) is on the same plane as that supporting the diaphragm (key 10) in the body (key 25).

The pilot has a wide range of self-adjustment values. However, given actual operating conditions, it may necessary to assist it at times by finding the best setting of pin screw/register (key 29) or the most suitable calibration orifice/jet (key 15).

Lubricate the static O-rings with a thin layer of Silicone based lubricant, be very careful not to damage the O-rings when reassembling. No other pilot parts are to be lubricated. Reassemble parts by reversing the above steps. As you proceed, make sure that parts move freely and without friction. In addition:

1. Once lever (key 39) and stem (key 13) have been mounted, check lever with stem against body (key 25). Clearance between forked stem (key 35) and register of lever (key 39) is 0.2 to 0.3 mm / 8 to 12 milli-inch. If not, use register to correct.

2. Mount diaphragm (key 10) and screw on plate (key 9), first by hand then with box wrench, (always holding upper diaphragm (key 10) firmly in place) to avoid damage to stem (key 13) and levers below.
3. Hold plate (key 9) firmly in place with box wrench, tighten nut (key 6).
4. Before remounting cover (key 4), center diaphragm as follows: mark a reference point (with pencil) on the diaphragm; turn it to the right without forcing and mark another reference on body. Now turn diaphragm to the left and mark a further reference. Position the diaphragm mark midway between the two marks on the body.
5. Tighten all screws uniformly to ensure proper sealing.

Type PRX/131 Booster Valve Booster Valve (See Figure 10)

Ordinary Maintenance

1. Disconnect and remove the pilot from the line.
2. Fully unscrew the adjusting screw (key 1).
3. Unscrew the cap (key 3), remove the spring holder (key 6) and the spring (key 7). Replace the O-rings (keys 4 and 5).
4. Loosen screws (key 10), remove the upper cover (key 8) and the lower cover (key 21). Replace the O-ring (key 18).
5. Lock the stem (key 23) by inserting a key into the notches and unscrew nuts (keys 20 and 26).
6. Disassemble the parts and replace the diaphragm (key 14) and the pad (key 22).
7. Unscrew the seat (key 19) and replace the O-ring (key 17).
8. Use petrol to cleanse the pilot body and all metal parts. Blow them thoroughly with compressed air and check for clear holes along gas conduits. Replace any worn parts.

Reassembly

Reassemble all parts by following in reverse order the assembly as described above (see Ordinary Maintenance section).

As parts are assembled, make sure they move freely causing no friction.



CAUTION

- a. O-rings and diaphragms should be lubricated by applying a thin layer of 'Molykote 55 M' grease. Pay attention not to damage them during reassembly. All other pilot parts require no lubrication.
- b. The cover clamping screws (key 10) should be tightened evenly to ensure proper tightness.
- c. Pilot operation, calibration, and tightness should be tested as described under periodical checks.
- d. Previously disassembled fittings must be connected. Check for leaks by using suds.

Type V/31-1 Booster Valve (See Figure 11)

Overhaul booster valve when servicing monitor. Remove cover (key 4) and replace pad (key 19), diaphragms (keys 10 and 23) and O-ring (key 18). When remounting, make sure that the tightening of the ring nut (key 25) does not put undue stress on diaphragm (key 23). Set valve at no less than 5 mbar / 0.73 psig over monitor's pilot pressure. Any value below this will result in a lower than desired flow rate.

Type SA/2 Filter/Stabilizer (See Figure 12)

Note

The ports marked H in the top view of Figure 12 are optional heating ports.

1. Remove pressure from the Type SA/2.
2. Remove cap screws, washers, and nuts (keys 2, 9, and 10) from body (key 7) and the separate upper and lower covers (keys 11 and 19) from the body (key 7). When separating the covers from the body, be aware of loose components: (keys 1, 3, 4, 8, 12, 18, 20 and 21).

3. Remove and inspect O-ring (key 13) for damage or wear, and replace if necessary. Lightly lubricate the O-ring before placing it back in the cover (key 11).
4. Clean filter net (key 8). Replace filter pad (key 12).
5. Inspect diaphragm (key 18) for damage or wear, and replace if necessary. Check the seating surface of the orifice in the screw (key 17) for erosion, scratches, spurs, or other damage, and replace if necessary.
6. Unscrew and remove the seat (key 5). Inspect O-ring (key 6) for damage or wear, and replace if necessary. Lightly lubricate the O-ring and place it on the seat (key 5).
7. Pull the pad holder (key 15) out of the body (key 16). Inspect the seat for damage, and replace if necessary.
8. Set the pad holder (key 15) on the spring (key 14) and insert the seat (key 5). Tighten the seat (key 5) until it stops.
9. Lightly lubricate the outer and inner rims of the diaphragm (key 18). Place the diaphragm assembly on top of the seat (key 5). The screw (key 17) will slide into the seat (key 5). Use care to avoid damage to parts when reassembling.
10. Set the spring (key 1) on top of the nut (key 21).
11. Align the cover (key 19) over the body (key 7) with the sensing port (V) opposite the pilot supply port (R).
12. Place the filter pad (key 12) and filter net (key 8), one on each side of the filter pad, on the inlet cover (key 11).
13. Pick up the body (key 7) and place it on the inlet cover (key 11) with the inlet port (M) aligned vertically with the sensing port (V).
14. Insert cap screws (key 2). Place washers (key 9) and nuts (key 10) on the end of the screws. Tighten the nuts.

Parts Ordering

Contact your local Sales Office when ordering replacement parts. Separate kits containing all recommended spare parts are available.

The type number, spring range, the date of manufacture and other pertinent information are stamped on the nameplate. Always provide this information in any correspondence with your local Sales Office regarding replacement parts or technical assistance.

FLA1 Series

Table 3. FLA1 Series Pressure Reducing Regulator Spare Parts Kit - Nitrile (NBR) O-rings

BODY SIZES		PAD MATERIAL	SILENCER TYPE	SPARE KIT CODE
DN	NPS			
25	1	Nitrile (NBR)	NONE	M2200576X12
			SR/SRS	M2200750X12
			SRII/SRSII	M2201115X12
		PU	NONE/SR/SRS/SRII/SRSII	RFL1XNFP22
40	1.5	Nitrile (NBR)	NONE	M2200742X12
			SR/SRS	M2200790X12
			PU	NONE/SR/SRS
50	2	Nitrile (NBR)	NONE	M2200580X12
			SR/SRS	M2200754X12
			SRII/SRSII	M2201118X12
		PU	NONE/SR/SRS/SRII/SRSII	RFL2XNFP22
80	3	Nitrile (NBR)	NONE	M2200584X12
			SR/SRS	M2200758X12
			SRII/SRSII	M2201121X12
		PU	NONE/SR/SRS/SRII/SRSII	RFL3XNFP22
100	4	Nitrile (NBR)	NONE	M2200586X12
			SR/SRS	M2200762X12
			SRII/SRSII	M2201124X12
		PU	NONE/SR/SRS/SRII/SRSII	RFL4XNFP22
150	6	Nitrile (NBR)	NONE	M2200588X12
			SR/SRS	M2200766X12
			SRII/SRSII	M2201127X12
		PU	NONE/SR/SRS/SRII/SRSII	RFL6XNFP22
200	8	Nitrile (NBR)	NONE	M2200948X12
			SRII	M2201130X12
			SRSII	M2201132X12
		PU	NONE/SRII	RFL8XNFP22
			SRSII	RFL8XNFP32
250	10	Nitrile (NBR)	NONE/SRII	ERCA00558A0
		PU	NONE/SRII	RFL10NFP22

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Table 4. FLA1 Series Pressure Reducing Regulator Travel Indicator Kit - Nitrile (NBR) O-rings

BODY SIZES		INDICATOR TYPE	KIT CODE
DN	NPS		
25	1	Travel Indicator (NBR)	ERSA01557A1
		Transducer (Model PA1/25)	ERAA05258A0
		Proximity Switch Eexia type	ERAA05284A0
		Microswitch XCW Steute type	ERAA09508A0
40	1.5	Travel Indicator (NBR)	ERAA05385A1
		Transducer (Model PA1/25)	ERAA05259A0
		Proximity Switch Eexia type	ERAA05285A0
		Microswitch XCW Steute type	ERAA09512A0
50	2	Travel Indicator (NBR)	ERSA01558A1
		Transducer (Model PA1/25)	ERAA05260A0
		Proximity Switch Eexia type	ERAA05286A0
		Microswitch XCW Steute type	ERAA09514A0
80	3	Travel Indicator (NBR)	ERSA01559A1
		Transducer (Model PA1/25)	ERAA05262A0
		Proximity Switch Eexia type	ERAA05288A0
		Microswitch XCW Steute type	ERAA09518A0
100	4	Travel Indicator (NBR)	ERSA01561A1
		Transducer (Model PA1/25)	ERAA05263A0
		Proximity Switch Eexia type	ERAA05289A0
		Microswitch XCW Steute type	ERAA09374A0
150	6	Travel Indicator (NBR)	ERSA01569A1
		Transducer (Model PA1/25)	ERAA05264A0
		Proximity Switch Eexia type	ERAA05290A0
		Microswitch XCW Steute type	ERAA09960A0
200	8	Travel Indicator (NBR)	ERSA01572A1
		Transducer (Model PA1/25)	ERAA05265A0
		Proximity Switch Eexia type	ERAA05291A0
		Microswitch XCW Steute type	ERAA09911A0
250	10	Travel Indicator (NBR)	ERAA06426A1
		Transducer (Model PA1/25)	M2007647X12
		Proximity Switch Eexia type	ERAA03019A0

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FLA1 Series

Table 5. FLA1 Series Pressure Reducing Regulator Conversion Kit - Nitrile (NBR) O-rings

BODY SIZES		INDICATOR TYPE	KIT CODE
DN	NPS		
25	1	Standard to SR	M2800040X12
		Standard to SRII	M2800253X12
		SR to SRII (NBR Pad)	M2800239X12
		SR to SRII (PU Pad)	RFL1X000012
40	1.5	Standard to SR	M2800041X12
50	2	Standard to SR	M2800042X12
		Standard to SRII	M2800251X12
		SR to SRII (NBR Pad)	M2800243X12
		SR to SRII (PU Pad)	RFL2X000012
80	3	Standard to SR	M2800044X12
		Standard to SRII	M2800255X12
		SR to SRII (NBR Pad)	M2800237X12
		SR to SRII (PU Pad)	RFL3X000012
100	4	Standard to SR	M2800045X12
		Standard to SRII	M2800257X12
		SR to SRII (NBR Pad)	M2800247X12
		SR to SRII (PU Pad)	RFL4X000012
150	6	Standard to SR	M2800046X12
		Standard to SRII	M2800259X12
		SR to SRII (NBR Pad)	M2800249X12
		SR to SRII (PU Pad)	RFL6X000012
200	8	Standard to SRII (NBR Pad)	M2800263X12
		Standard to SRII (PU Pad)	M2800284X12

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Parts List

The sizes indicated here refer to DN sizes unless otherwise specified.



WARNING

Use only genuine Emerson replacement parts. Components that are not supplied by Emerson should not, under any circumstances, be used in any Emerson regulator, because they will void your warranty, might adversely affect the performance of the valve and could give rise to personal injury and property damage.

Parts List

Type FLA1 Main Valve (Figure 5 and 6)

Key	Description
1	Inlet flange
2*	Anti-friction ring
3*	O-ring
5	Screw
6	Spring
7	Fitting
8	Inlet plate
9	Screw
10*	Diaphragm
12	Outlet plate
13	Outlet cover
14	Washer
15	Nut
14	Washer
15	Nut
16	Sleeve (Shutter)
17	Fitting
18*	O-ring
19	Pad holder
20*	Pad unit
21	Pad retainer
22	Outlet flange
23	Gasket
24	Disassembly spacer
25	Screw

Type FLA1 Main Valve (Figure 5 and 6) (continued)

Key	Description
26*	O-ring
27	Screw
28*	O-ring
29	Label support
30	Label
31	Rivet
32	Label
33	Spring collet
34	Indicator
35*	O-ring
36	Support
37*	O-ring
38	Bushing
39	Indicator label
40	Cap
41	Stub pipe
42	Plug
43	SR/SRII silencer
46*	O-ring
47*	O-ring
48	Washer
59	Eyebolt
61	Special screw
62	Screw
63	Elastic washer
64	Screw
65	Elastic pin
66	Eyebolt
67	Pad support

Type SRS Main Valve (Figure 7)

Key	Description
23*	Gasket
24	Flange Spacer
200	Widened Outlet Flange
201	Retainer
202	Nut
203	Attenuator Late
204	Spring Pin
205	Flange
206	Nut
207	Attenuator Plate
208	Attenuator Plate
209	Stud Bolt
210	Spring Cage
211	Spring

*Recommended Spare Parts

FLA1 Series

Types PRX/120, PRX/125, PRX-AP/120, and PRX-AP/125 Pilot (See Figure 8)

Key	Description
1	Adjusting Screw
2	Locknut
3	Cap
4*	Upper Cover O-ring
5*	O-ring
6	Spring Carrier Plate
7	Spring
8	Upper Cover
9	Spring Carrier Plate
10	Machine Screw
11	Washer
12	Filter
13	Diaphragm Plate
14*	Diaphragm
15	Diaphragm Plate
16	Body
17*	Seat O-ring
18*	Lower Cover O-ring
19	Orifice
20	Nut
21	Lower Cover
22*	Pad Holder
23	Stem
24	Nameplate
25*	Stem O-ring
26	Upper Diaphragm Nut
27	Damper Adjusting Screw
28*	Restrictor/Damper O-ring
29	Plate
30	Ring Nut
31	Damper/Restrictor Screw
32	Restrictor Adjusting Screw with Hole
33	Plug
34	Plug
35	Spring Barrel Extension for AP version

Types PSA/79 and PSA/80 (See Figure 9)

Key	Description
1	Adjusting screw
2	Nut
3	Spring holder
4	Cover
5	Spring
6	Nut
7	Screw
8	Washer
9	Plate
10*	Diaphragm
11	Plate
12*	O-ring
13	Stem
14*	O-ring
15*	Jet

Types PSA/79 and PSA/80 (See Figure 9) (continued)

Key	Description
16	Locknut
17*	"GACO" Ring
18	Thrust bearing
19	Spring
20	Safety valve
21*	Pad
22*	O-ring
23*	O-ring
24	Plug
25	Body
26	Seat
27	Plug
28*	O-ring
29	Pin screw
30	Seat
31*	O-ring
32	Spring
34*	Pad holder
35	Forked stem
36	Spacer
37*	O-ring
38*	O-ring
39	Lever
40	Split pin
41	Screw
42	Washer
43	Seeger
44	Data plate
45	Silencer
46	Pin
47	Spring
48	Autolocking nut
49	Washer
50	Washer
51	Plate
52*	Diaphragm
53	Screw
54	Seat
55*	O-ring
56*	Pad holder
57	Spring
58*	O-ring
59	Filter cover
60	Filter net
61*	Felt
62*	O-ring
63	Pawl
64	Cover
65	Plug

*Recommended Spare Parts

Type PSA/80 Pilot Only

Key	Description
66	Elbow Fitting
67	Screw
68	Middle flange
69	Hub

Type REOA/79 AND REOA/80

Key	Description
15	Plug

Type PSA/79-AP AND PSA/80-AP

Key	Description
75	Plate
76	Spacer
77	Plate
78*	O-ring
79	Spring holder

Type PRX/131 Booster Valve (See Figure 10)

Key	Description
1	Adjusting screw
2	Nut
3	Cap
4*	O-ring
5*	O-ring
6	Spring carrier plate
7	Spring
8	Upper cover
9	Spring carrier plate
10	Screw
11	Washer
12	Filter
13	Plate
14*	Diaphragm
15	Plate
16	Body
17*	O-ring
18*	O-ring
19	Seat
20	Nut
21	Lower cover
22*	Pad holder
23	Stem
24	Plate
25*	O-ring
26	Nut
28*	O-ring
29	Plate
31	Screw
33	Plug
34	Plug

Type V/31-1 Booster Valve (See Figure 11)

Key	Description
1	Adjusting screw
2	Nut
3	Cap
4	Cover
5	Spring holder
6	Spring
7	Nut
8	Washer
9	Plate
10*	Diaphragm
11	Plate
12	Washer
13	Nut
14	Screw
15*	Gasket
16	Fitting
17	Seat
18*	O-ring
19*	Pad
20	Stem
21	Stem Guide
22	Plate
23*	Diaphragm
24	Washer
25	Ring nut
26	Body
27*	Gasket
28	Screw
29	Data Plate

Type SA/2 Pilot Supply Filter Regulator (Figure 12)

Key	Description
1	Spring
2	Socket head cap screw
3	Washer
4	Plate
5	Regulator seat
6*	O-ring
7	Body
8	Filter Net
9	Washer
10	Nut
11	Filter cover
12*	Filter Pad
13*	O-ring
14	Spring
15*	Pad holder
16	Nameplate
17	Screw
18*	Diaphragm
19	Regulator cover
20	Spring washer
21	Nut

*Recommended Spare Parts

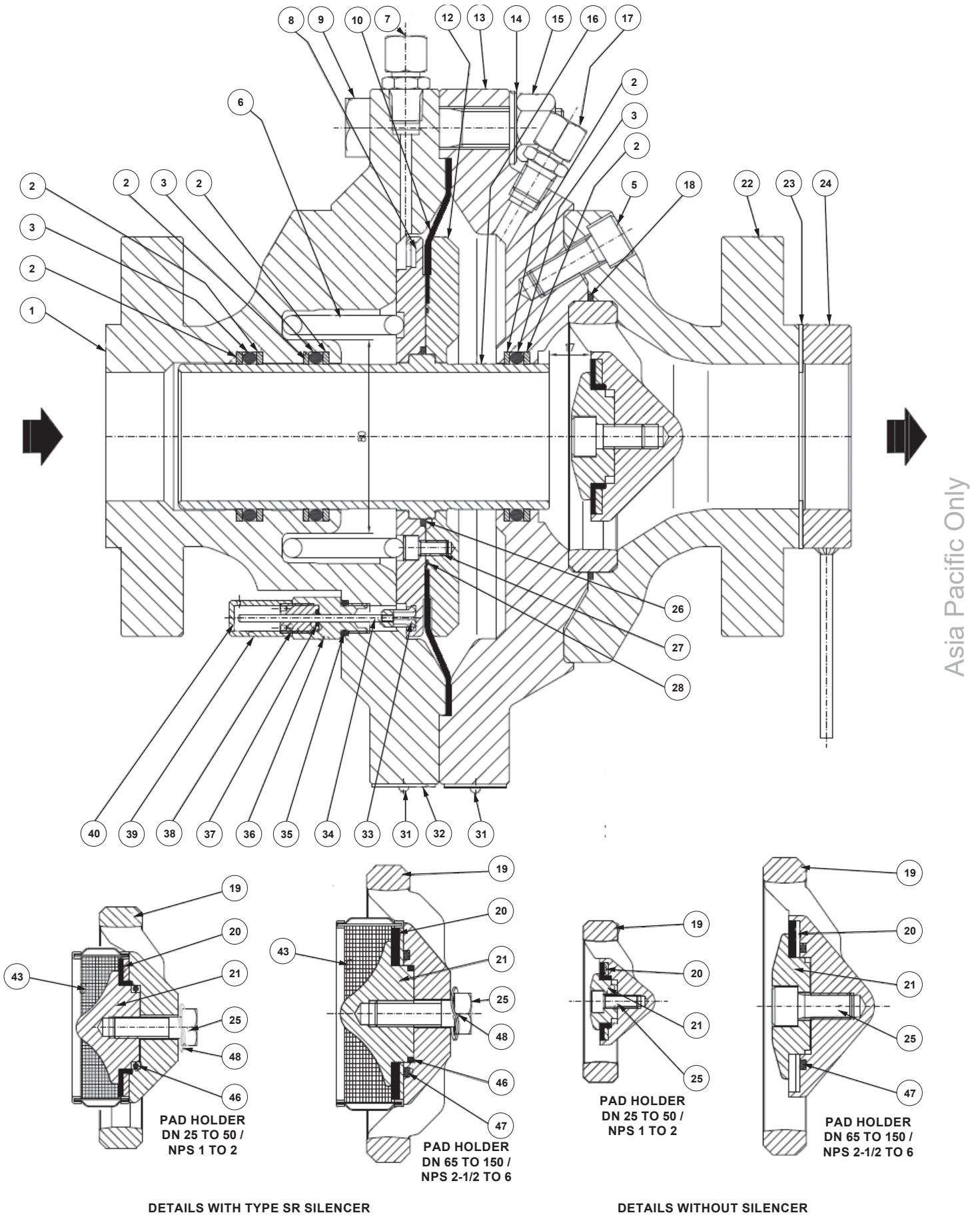
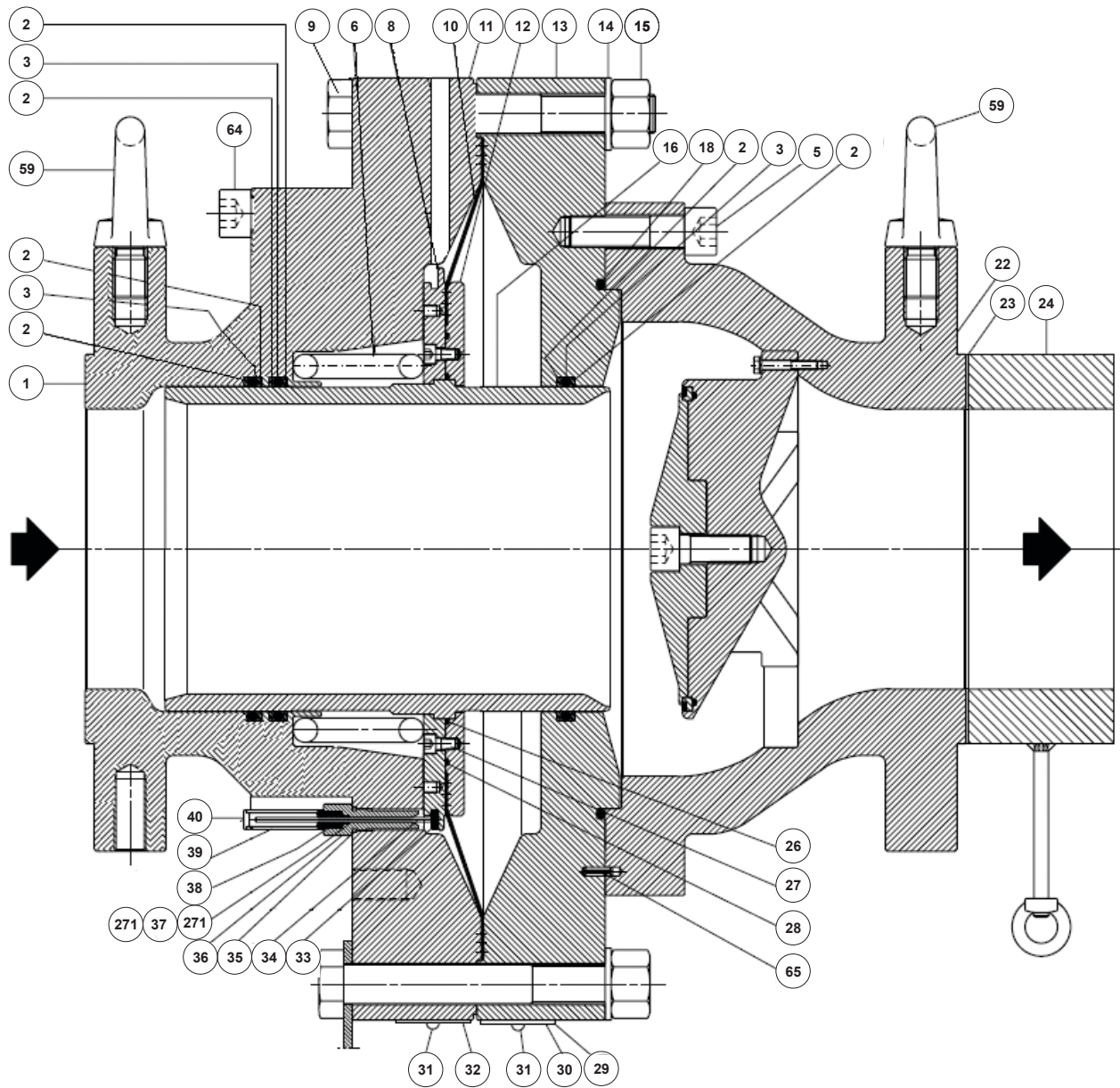
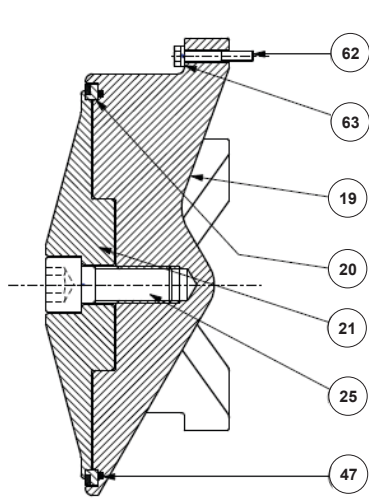


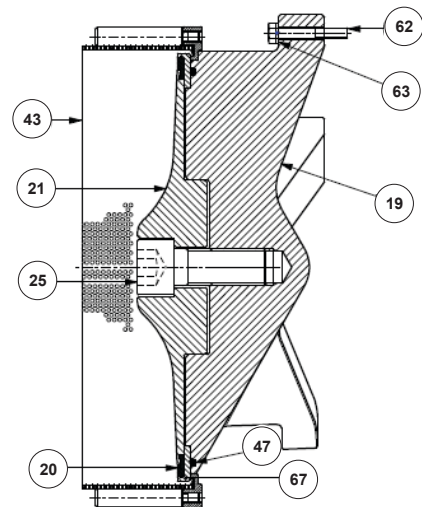
Figure 5. Type FLA1 Main Valve Assembly



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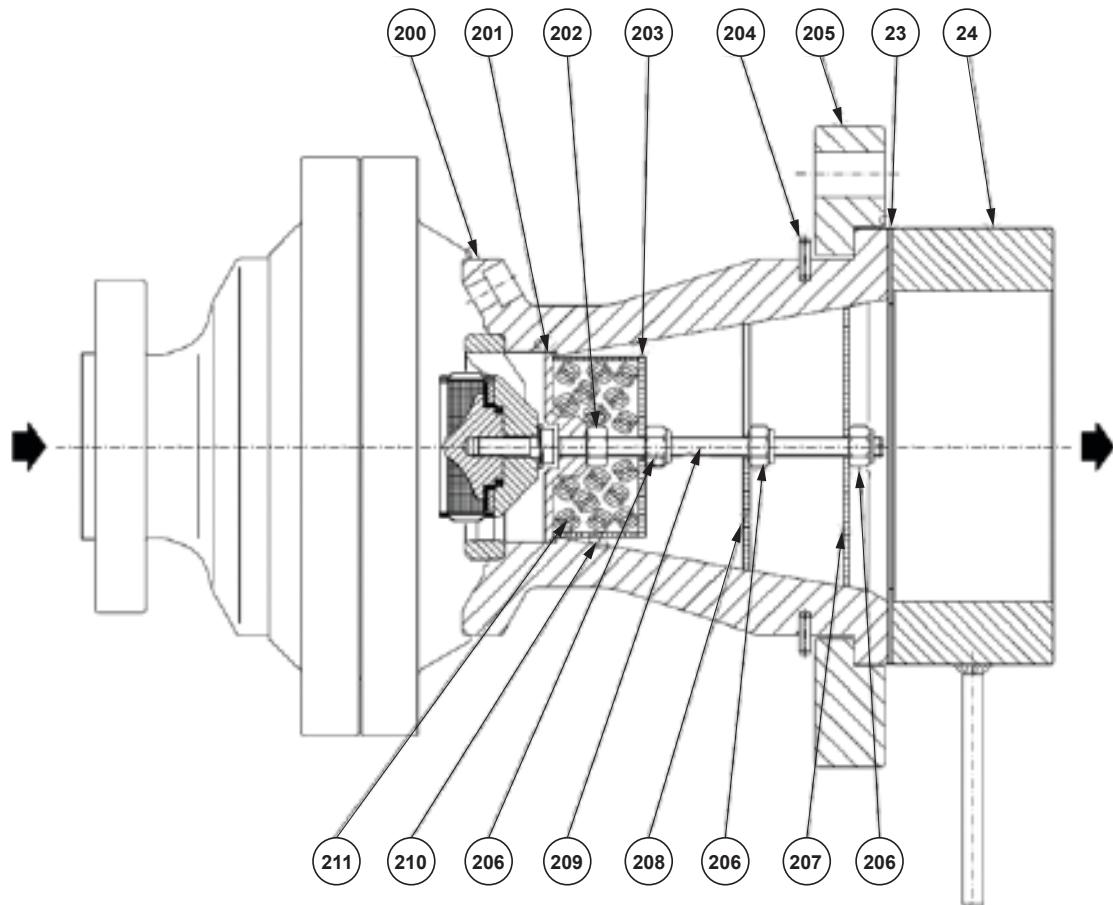


DETAILS WITHOUT SILENCER



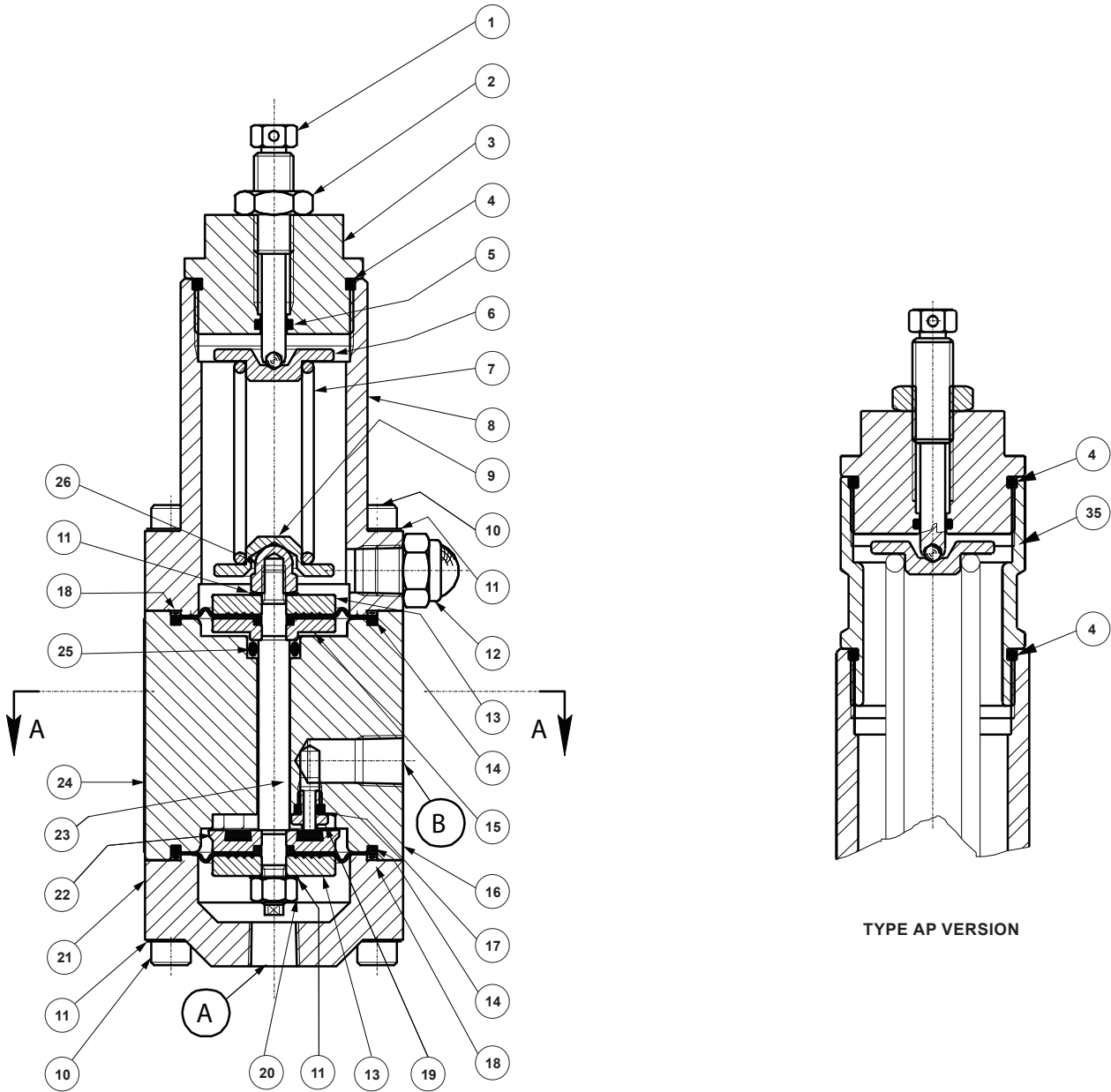
DETAILS WITH SR11 SILENCER

Figure 6. Detail for DN 200~DN 250



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Figure 7. Type SRS Assembly

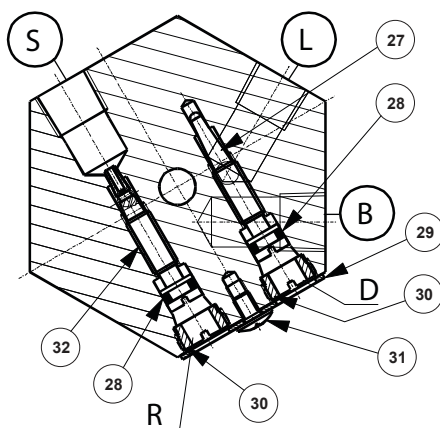


TYPES PRX/120 AND PRX/125 PILOT ASSEMBLY

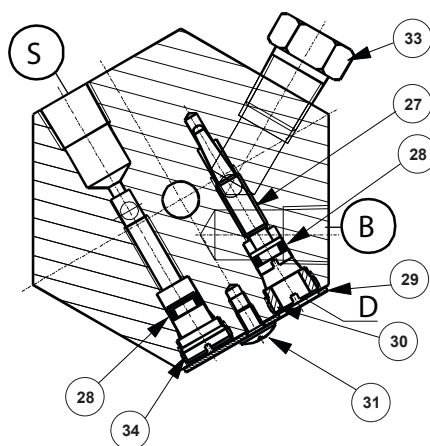
TYPE AP VERSION

Figure 8. PRX/120 and PRX/125 Series Pilot Assemblies

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TYPE PRX/120 - SECTION A-A

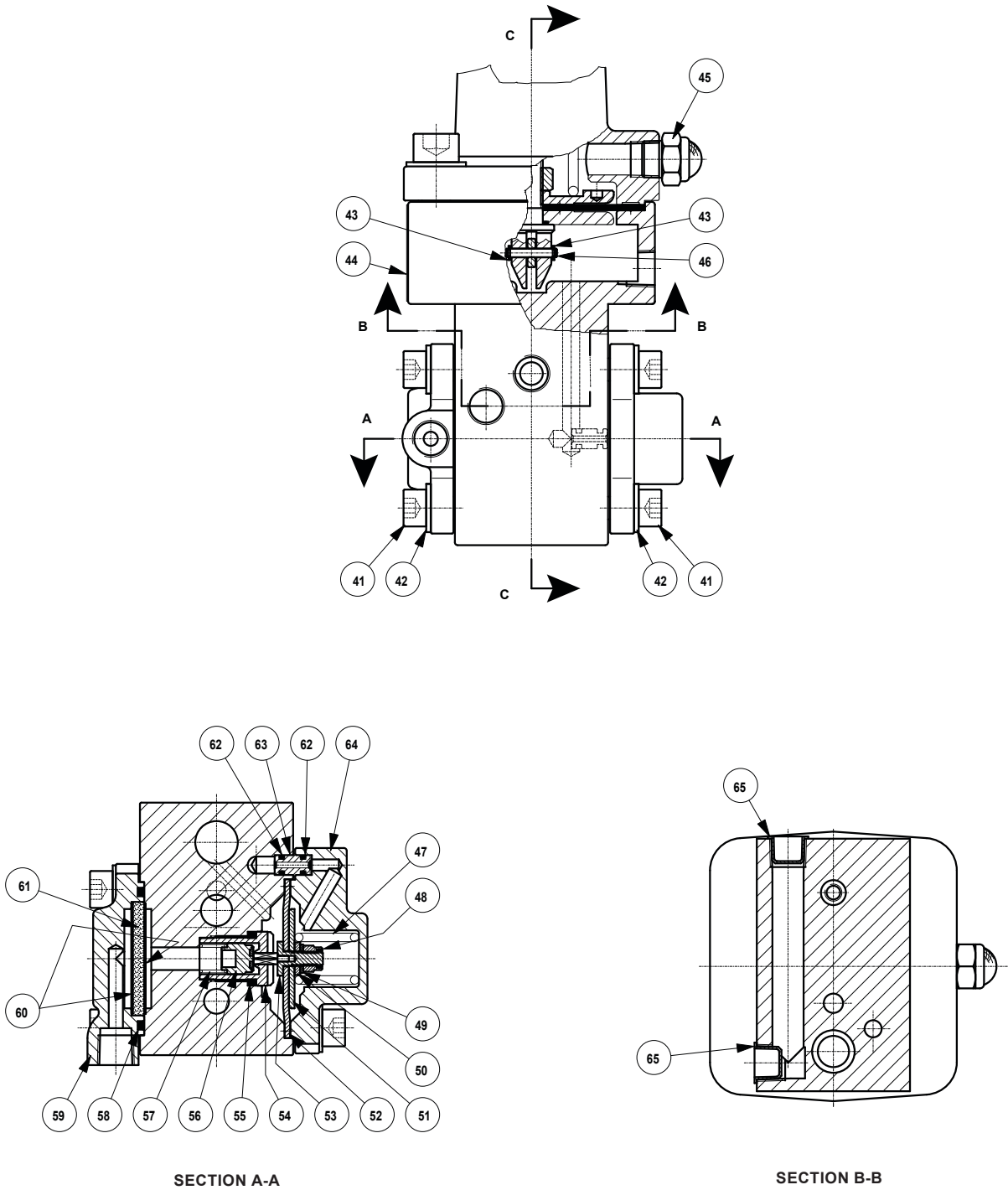


TYPE PRX/125 - SECTION A-A

Figure 8. PRX/120 and PRX/125 Series Pilot Assemblies (continued)

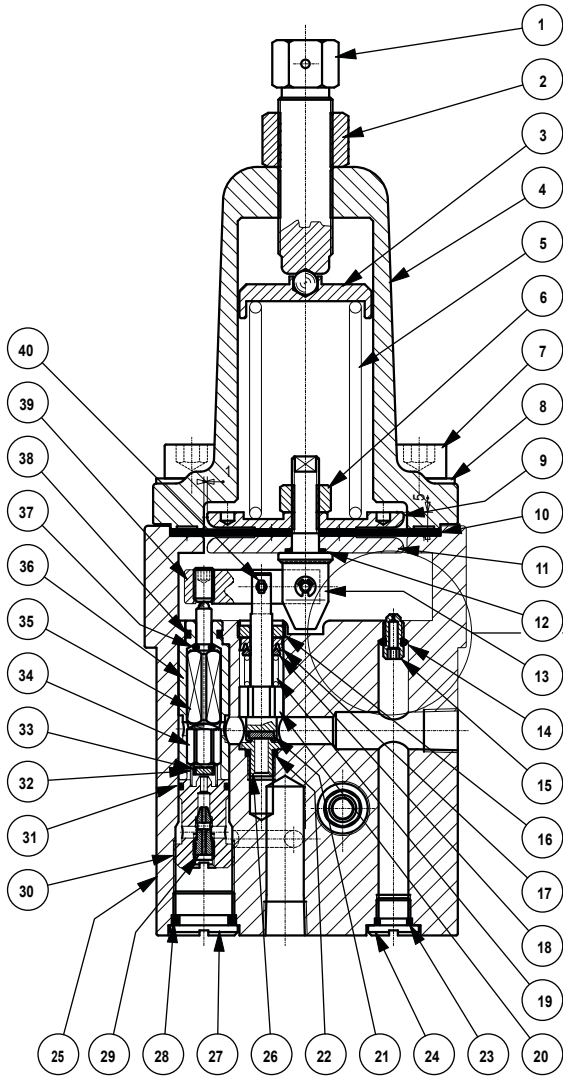
Table 6. Type PRX/120 Connections

CODE	BOOT TRIM	TUBE AND HARD TRIM
A	Downstream impulse	Downstream impulse
B	Outlet discharge	Pilot feed
S	Pilot feed	Outlet discharge
L	To regulator loading pressure chamber	To regulator loading pressure chamber

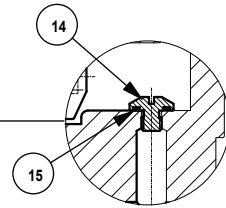


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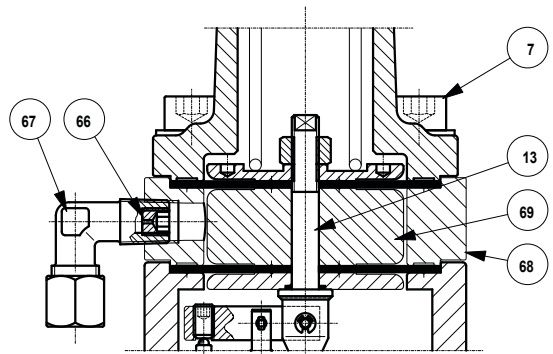
Figure 9. Types PSA/79 and PSA/80 Detailed Pilot Assemblies



TYPE PSA/79 (SECTION C-C)



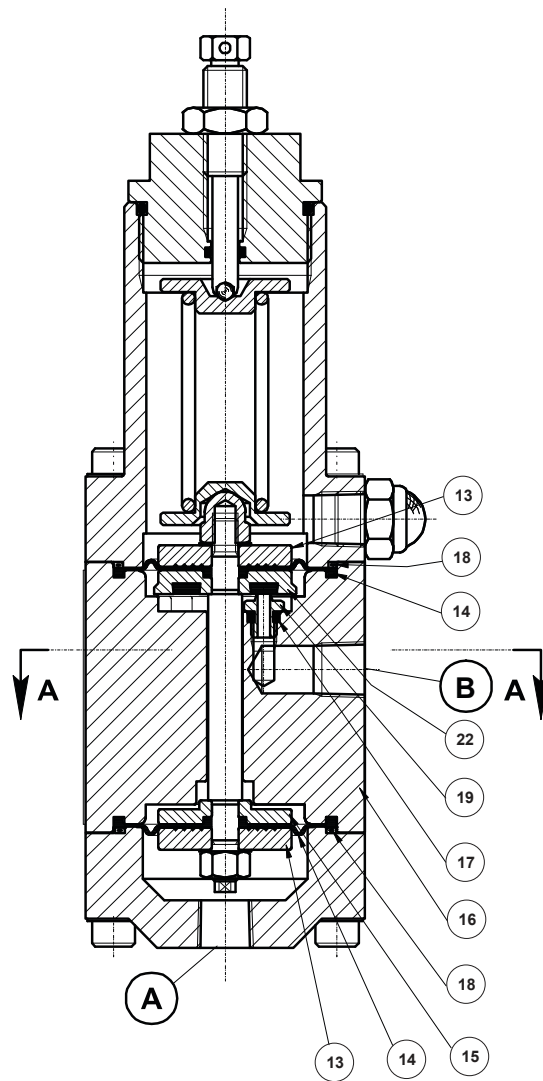
TYPES REO/79 AND REO/80 DETAIL



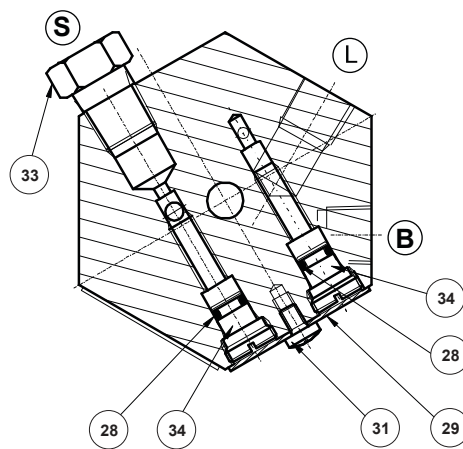
TYPES PSA/80 AND PSOA/80
(PARTIAL SECTION C-C)

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Figure 9. Types PSA/79 and PSA/80 Detailed Pilot Assemblies (continued)

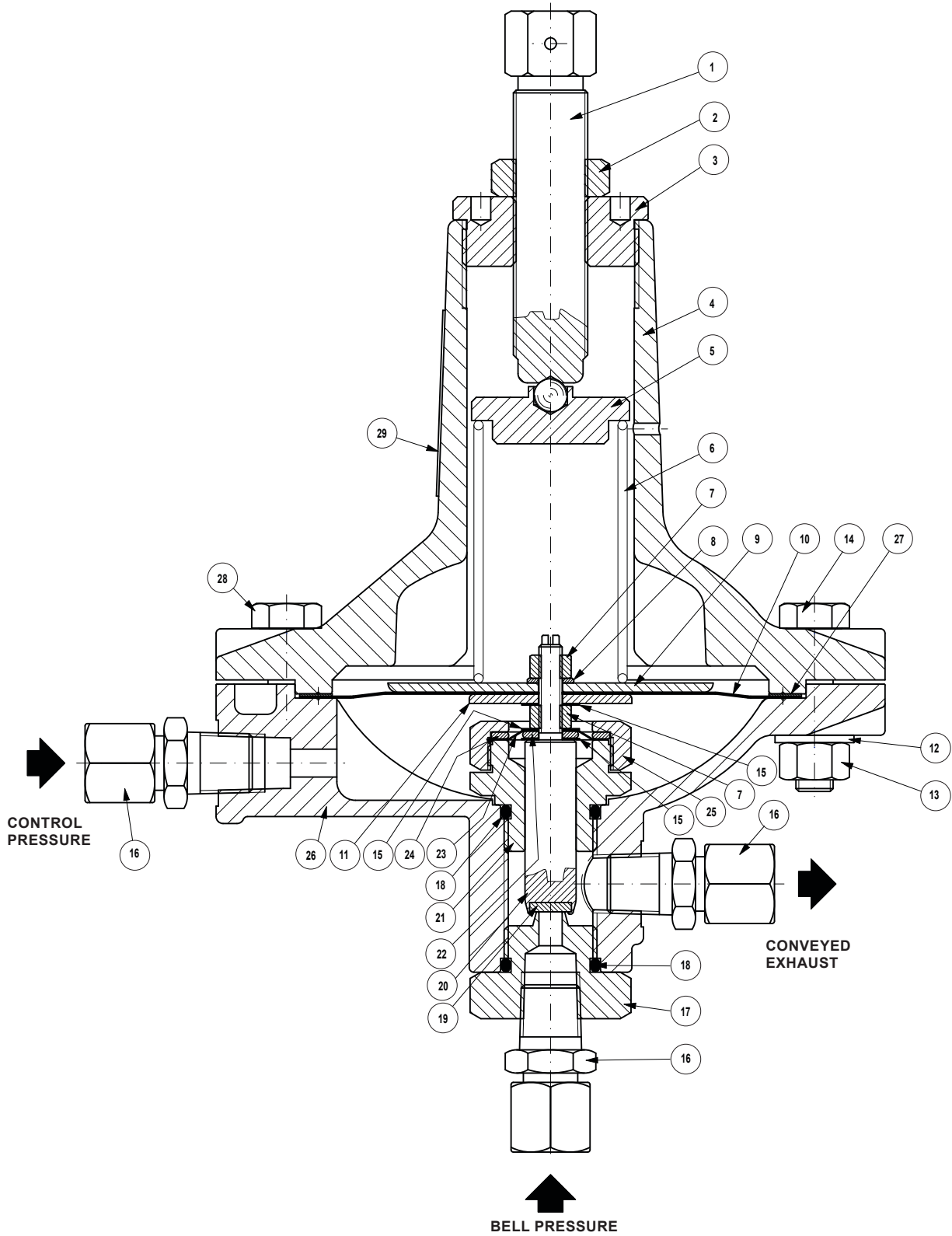


TYPE PRX/131 BOOSTER VALVE ASSEMBLY



SECTION A-A

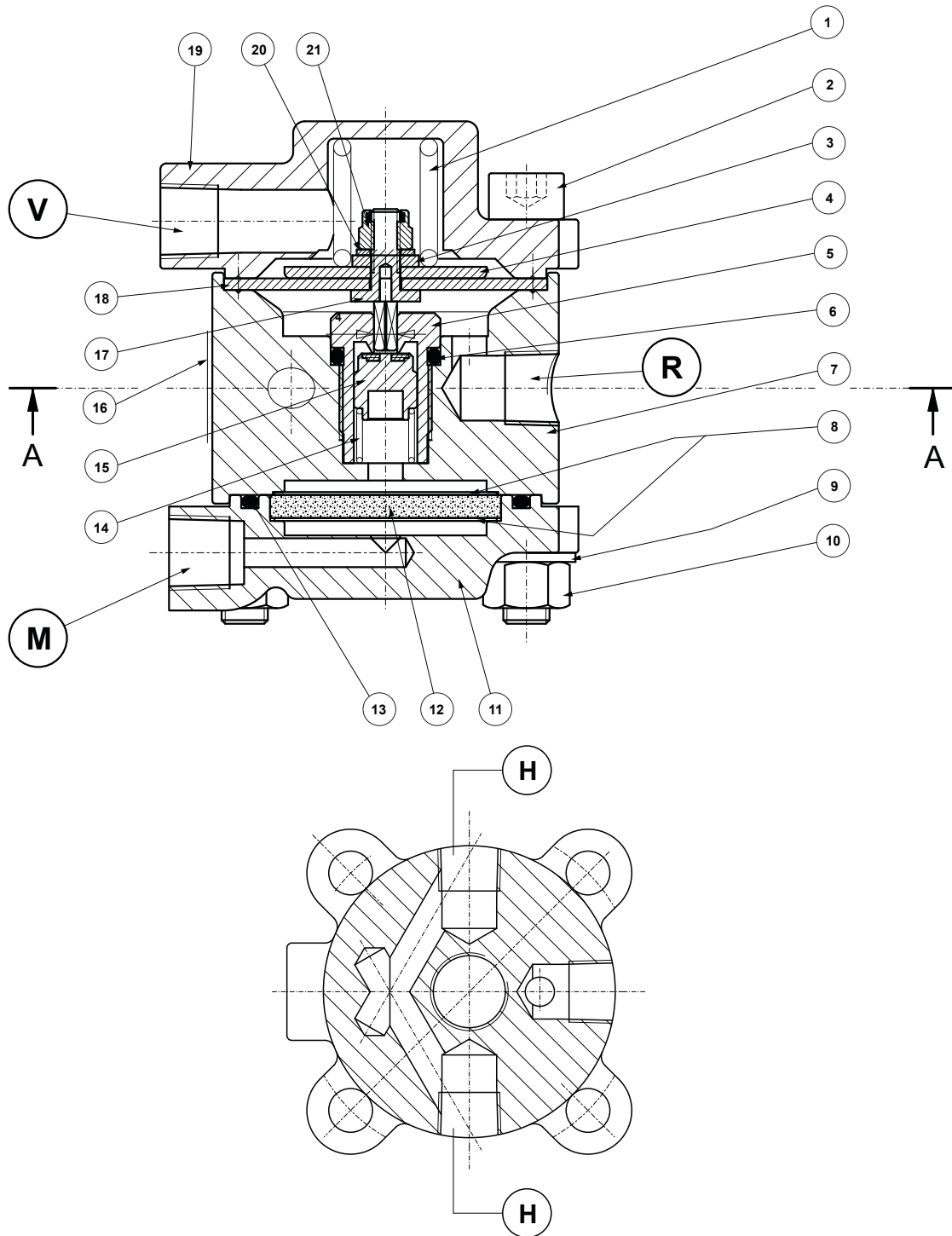
Figure 10. Type PRX/131 Booster Valve Assembly



Asia Pacific Only

LM/0916

Figure 11. Type V/31-1 Booster Valve Assembly



H - WATER INLET/OUTLET
M - UPSTREAM OF THE REGULATOR
R - TO THE FEEDING OF THE PILOT
V - DOWNSTREAM OF THE REGULATOR

SECTION A-A

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Figure 12. Type SA/2 Pilot Supply Filter/Stabilizer Assembly

FLA1 Series

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