

# Type PS/79 and PS/80 Pilots

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## INTRODUCTION

### Scope of Manual

This manual provides installation, startup, maintenance, troubleshooting and spare parts for the pilot series PS/79 and PS/80.

### Product Description

Designed for pressure regulators control, the following types are available:

- **PS/79** - single diaphragm pilot for pilot controlled gas pressure regulator (active or wide-open monitor)
- **PSO/79** - single diaphragm pilot for setting of first pressure reducing step of pilot controlled gas pressure regulator (working monitor)
- **REO/79** - single diaphragm pilot for setting of downstream pressure reducing step of pilot controlled gas pressure regulator (working monitor)

In case of failures, these pilots with single diaphragm will cause a fail open reaction of the regulator.

- **PS/80** - double diaphragm pilot for pilot controlled gas pressure regulator (active or wide-open monitor)
- **PSO/80** - double diaphragm pilot for setting of first pressure reducing step of pilot controlled gas pressure regulator (working monitor)
- **REO/80** - double diaphragm pilot for setting of downstream pressure reducing step of pilot controlled gas pressure regulator (working monitor)

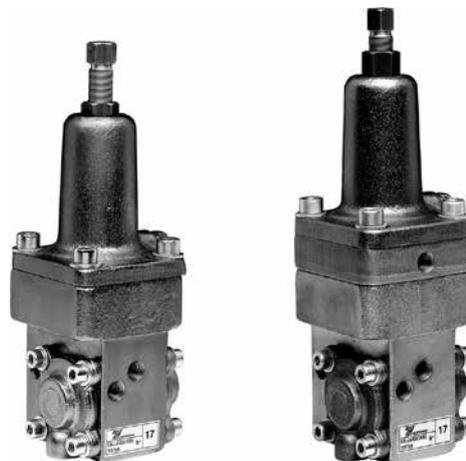


Figure 1. Type PS/79 and PS/80 Pilots

In case of failures, these pilots with double diaphragms will cause a fail close reaction of the regulator.

RE/79 and RE/80 versions are in accordance with specific requirements of Italian market applications.

Tightness cover version available on request (e.g. PS/79-D and PS/80-D).

The full range of PS pilots can be installed in the following pressure regulators:

FL Series - Cronos Series - EZH Series - 971 Model

This product has been designed to be used with fuel gases of 1st and 2nd family according to EN 437, and with other non aggressive and non fuel gases. For any other gases, other than natural gas, please contact your local sales agent.

## CHARACTERISTICS

APPLICATION			ALLOWABLE PRESSURE PS (bar)	SET RANGE W <sub>d</sub> (bar)	BODY AND COVERS MATERIAL
REGULATOR OR MONITOR	WORKING MONITOR				
		REGULATOR	MONITOR		
PS/79	PSO/79	REO/79	100	0.5 - 40 *	Steel
PS/80	PSO/80	REO/80		1.5 - 40 *	

(\* PS/79-AP and PS/80-AP versions are available on request with a set range up to 60 bar.

Table 1. Technical features

1/4" NPT female threaded connections.

All PS/ series pilots are supplied with a filter (5μ filtering degree) and built-in pressure stabilizer, with the exception of pilots PSO/79 and PSO/80.

# PS/79 and PS/80

## LABELLING

		APPARECCHIO TIPO / DEVICE TYPE	
MATICOLA		Note 1	
SERIAL Nr.		DN1	
ANNO	Note 2	DN2	
YEAR		Wa	
NORME ARMONIZ.	EN		bar
HARMONIZED STD.		Wao	
CLASSE DI PERDITA			bar
LEAKAGE CLASS		Wau	
CLASSE FUNZIONALE			bar
FUNCTIONAL CLASS	Cg		
FLUIDO GRUPPO	1	pmax	
FLUID GROUP			bar
TS	Note 3	PS body	Note 4
		bar covers	-
		bar	PT= 1.5 x PS bar

Figure 2. Label for Type PS/79 and PS/80 Series

**Note 1:** See “Characteristics”

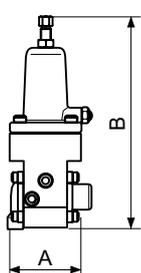
**Note 2:** Year of Manufacture

**Note 3:** Class 1: -10° to 60°C  
Class 2: -20° to 60°C

**Note 4:** See “Characteristics”

## DIMENSIONS AND WEIGHTS

Table 2. Dimensions (mm) and weights (Kg)



	PS/79 full range	PS/80 full range
A	90	90
B	265	290
Weight	8	9

## INSTALLATION

- Check that data on the pilot's plate are compatible with actual working conditions.
- Install in accordance with regulator instruction manual.

## STARTUP

See the set-up and pilot adjustment instructions applying to the equipment where the pilot is fitted.

## PERIODIC CHECKS

Slowly close the outlet slam-shut and check line pressure between it and regulator.

A slight increase in pressure should be detected: this results from overload due to closing, and is followed by pressure stabilization. If outlet pressure continues to rise, then seal is defective. Check if leak is coming from regulator or pilot, and service.

## SEP STATEMENT

Emerson Process declares this product conforms to Pressure Equipment Directive (PED) 97/23/EC.

Article 3 section 3 and was designed and manufactured in accordance with sound engineering practice (SEP).

Per Article 3 section 3, this “SEP” product must not bear the CE marking.

## ATEX REQUIREMENTS



### WARNING

**If the provisions of EN 12186 & EN 12279, national regulations, if any, and specific manufacturer recommendations are not put into practice before installation and if purge by inert gas is not carried out before equipment's start-up and shut-down operations, a potential external and internal explosive atmosphere can be present in equipment & gas pressure regulating/measuring stations/installations.**

If a presence of foreign material in the pipelines is foreseen and purge by inert gas is not carried out, the following procedure is recommended to avoid any possible external ignition source inside the equipment due to mechanical generated sparks:

- drainage to safe area via drain lines of foreign materials, if any, by inflow of fuel gas with low velocity in the pipe-work (5m/sec)

In any case,

- provisions of Directive 1999/92/EC and 89/655/EC shall be enforced by gas pressure regulating/measuring station/installation's end user
- with a view to preventing and providing protection against explosions, technical and/or organizational measures appropriate to the nature of the operation shall be taken (e.g. : filling/exhausting of fuel gas of internal volume of the isolated part/entire installation with vent lines to safe area - 7.5.2 of EN 12186 & 7.4 of EN 12279 ; monitoring of settings with further exhaust of fuel gas to safe area ; connection of isolated part/entire installation to downstream pipeline; ...)
- provision in 9.3 of EN 12186 & 12279 shall be enforced by pressure regulating/measuring station/installation's end user
- external tightness test shall be carried out after each reassembly at installation site using testing pressure in accordance with national rules
- periodical check/maintenance for surveillance shall be carried out complying with national regulations, if any, and specific manufacturer recommendations.

## MAINTENANCE



### CAUTION

**Servicing should be carried out by qualified, skilled personnel only. For further information, please contact our Technical Support Representatives or our authorized dealers.**

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

- a. Remove the screws (key 41), cover (key 59), and replace felt (key 61). Reassemble by reversing the above sequence.

### Replacing Stabilizer Diaphragm and Seal Pad

- a. Remove screws (key 41), cover (key 64), spring (key 47) and diaphragm assembly (key 48, 49, 50, 51, 52, and 53). Replace diaphragm if necessary.
- b. Unscrew seat (key 54) and replace pad holder (key 56).
- c. Reassemble by reversing the above sequence, make sure not to "pinch" O-rings (key 55).

### Replacing Valve Seal Pads

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

### General Maintenance

- a. Completely release spring (key 5) by turning the adjusting screw (key 1) counterclockwise.
- b. Remove screws (key 7) and cover (key 4).
- c. Keep plate (key 9 or 75 for the AP version) 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).
- d. Unscrew plate (key 9 or 75 for the AP version) from stem (key 13) remove parts (key 10, 11 and 12 or 76, 78, 10, 77 and 12 for the AP version).
- e. For PS/80 and PS/80-AP version:  
Unscrew plate (key 9 or 75 for the AP version) from stem (key 13) remove parts (key 10, 68, 69, 11 and 12 or 76, 78, 68, 69, 10, 77 and 12 for the AP version).
- f. Slide off split pin (key 40). Remove locknut (key 16) with appropriate wrench and slide out parts (key 17, 18, 19 and 20). Make sure that the surface of seat (key 26) which is sealed by pad (key 21) is in proper condition.

- g. Replace diaphragms (key 10) and all seals.

- h. Proceed as directed in the replacement of filter, stabilizer diaphragm, seal pad, and valve seal pads.

### Reassembly

Lubricate the static O-rings with a thin layer of Molykote 55 M, 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:

- a. Once lever (key 39) and stem (key 13) have been mounted, check that, with stem (key 13) against body (key 25), clearance between forked stem (key 35) and registered (A) of lever (key 39) is 0.2 to 0.3 mm. If not, use register to correct.



### CAUTION

**The above 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).**

- b. 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) in order to avoid damage to stem (key 13) and levers below.
- c. Holding plate (key 9) firmly in place with box wrench, tighten nut (key 6).
- d. 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.
- e. Tighten all screws uniformly to ensure proper sealing.



### CAUTION

**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 register/ pin screw (key 29) or the most suitable calibration jet (key 15).**

# PS/79 and PS/80

## TROUBLESHOOTING

**Table 3. Troubleshooting for Type PS/79 and PS/80 Pilots**

SYMPTOMS	CAUSE	ACTIONS
Desired setpoint is not reached	Calibration spring (key 5) is too weak	Check the springs catalog and replace it with a stronger one
	Leaks from pilot connections	Check pilot feed connections and proper gas flow feeding
Outlet pressure drops well below setpoint	Filter (key 61) is clogged preventing proper through-flow of gas	Clean or replace it
	Pad holder (key 56) is swollen preventing proper feed flow	To be replaced
	Pad holder (key 34) is swollen preventing proper feed flow	To be replaced
Outlet pressure increases over setpoint	Faulty sealing of pad holder (key 56)	To be replaced
	Faulty sealing of pad holder (key 34)	To be replaced
Slow response to changes in gas demand	Insufficient flow rate of valve seat (key 30)	Increase flow by means of register/pin screw (key 29)
	Overly large calibration jet (key 15) (only for Types PS/79 and PS/80)	To be replaced with a smaller one
Overly rapid response to changes in gas demand, i.e. Hunting	Excessive flow rate of valve seat (key 30)	Reduce flow by means of a pin screw (key 29)
	Calibration jet (key 15) is too small (only for Types PS/79 and PS/80)	To be replaced with a larger one
	Not proper internal parts assembly	Check clearance between lever (key 39) and forked stem (key 35)
Gas continually escaping from relief (S)	Defective seal of pad (key 21)	To be replaced
The outlet pressure is not within the usual values	Diaphragms (key 10) are damaged	Replace diaphragms (key 10) that show signs of wear
	Upper diaphragm (key 10) is damaged	If gas escapes from silencer (key 45), replace upper diaphragm (key 10)

## PARTS LISTS

### Type PS/79 (See Figure 3)

Key	Description	Key	Description
1	Adjusting screw	14*	O-ring
2	Nut	15*	Jet
3	Spring holder	16	Locking nut
4	Cover	17*	"GACO" Ring
5	Spring	18	Thrust bearing
6	Nut	19	Spring
7	Screw	20	Safety valve
8	Washer	21*	Pad
9	Plate	22*	O-ring
10*	Diaphragm	23*	O-ring
11	Plate	24	Plug
12*	O-ring	25	Body
13	Stem	26	Seat

**Key Description**

27	Plug
28*	O-ring
29	Pin screw
30	Seat
31*	O-ring
32	Spring
34*	Pad holder unit
35	Forked stem
36	Spacer
37*	O-ring
38*	O-ring
39	Lever unit
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 unit
54	Seat
55*	O-ring
56*	Pad holder unit
57	Spring
58*	O-ring
59	Filter cover
60	Filter net
61*	Felt
62*	O-ring
63	Pawl
64	Cover
65	Plug

**Type PS/80**

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

**Type RE/79, RE/80, REO/79 and REO/80 Only**

Key	Description
15	Plug

**Type PS/79-D and PS/80-D Only**

Key	Description
70	Extension
71*	O-ring
72	Seeger
73*	O-ring

**Type PS/79-AP and PS/80-AP Only**

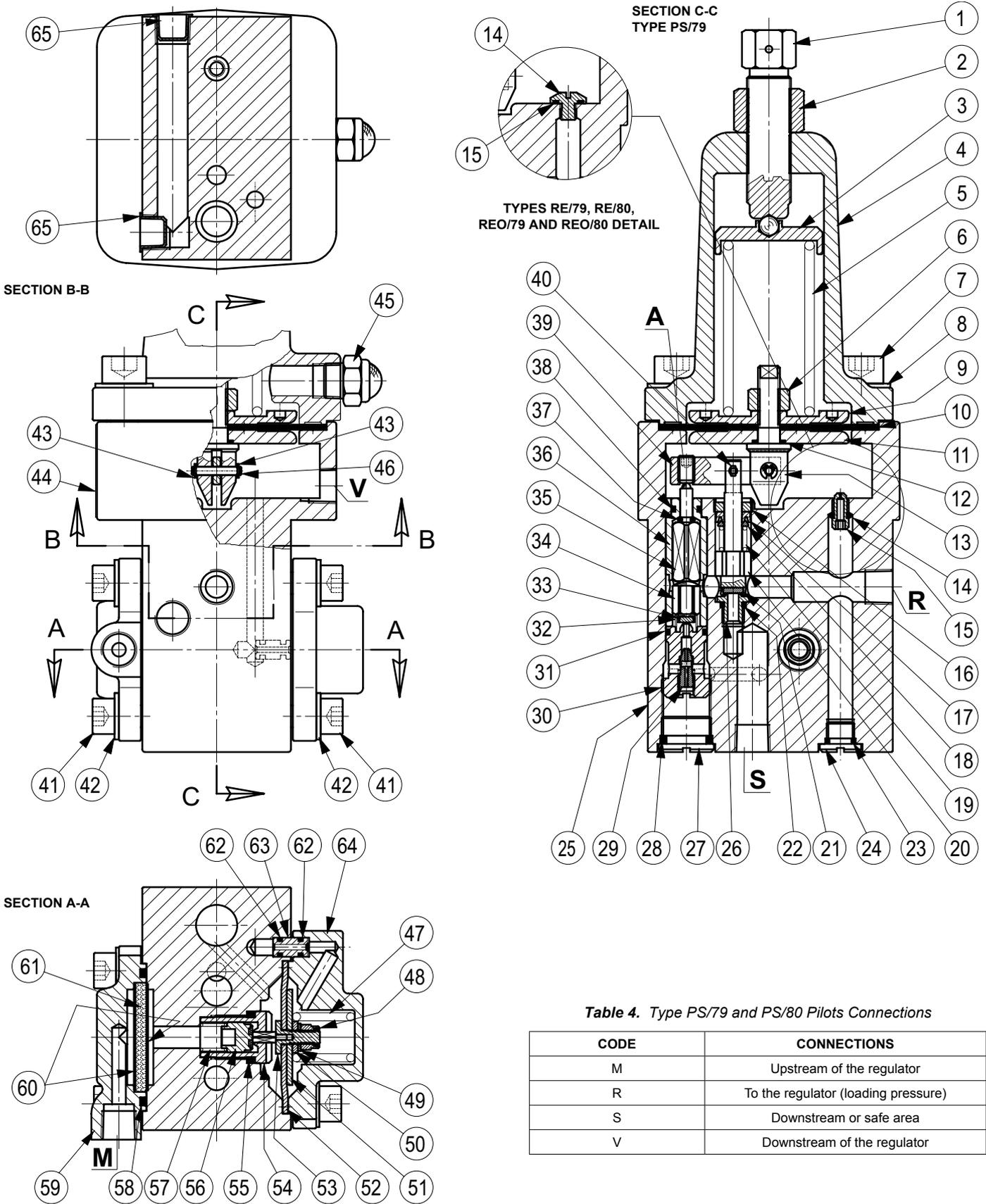
Key	Description
75	Plate
76	Spacer
77	Plate
78*	O-ring
79	Spring holder

Rubber parts marked with (\*) are supplied in the "spare parts kit", recommended as stock.

To order the kit it is necessary to communicate to us the type of the pilot and its serial number.

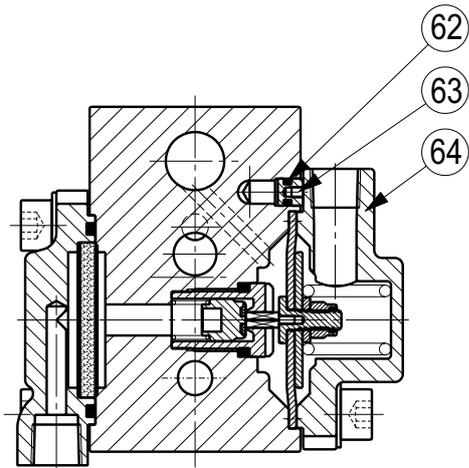
# PS/79 and PS/80

## SCHEMATIC ASSEMBLIES

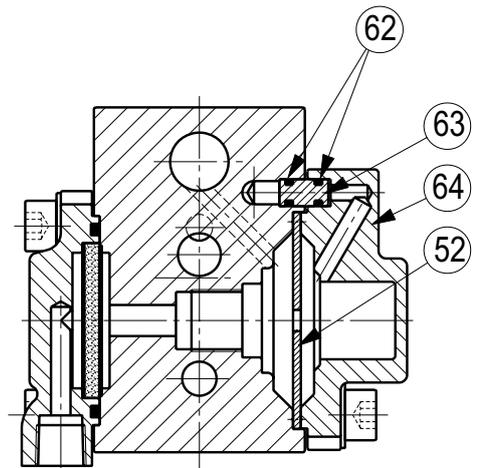


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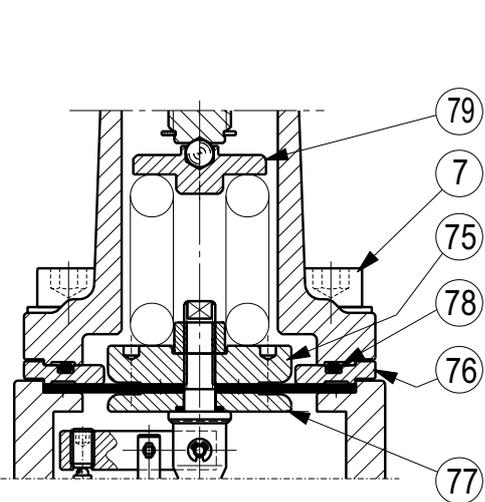
Figure 3. Type PS/79 and PS/80 Series Detailed Pilots Assemblies



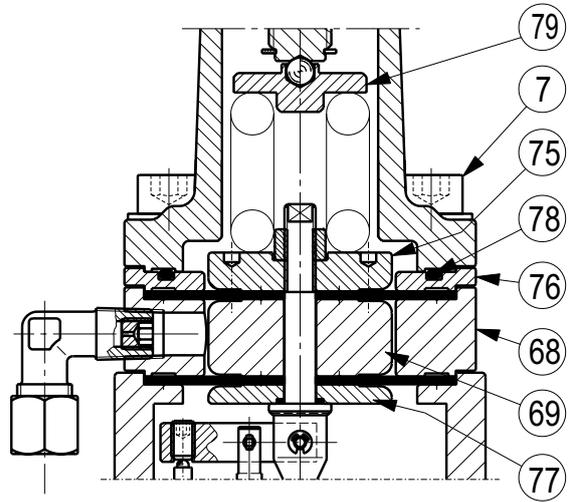
TYPES REO/79 AND REO/80



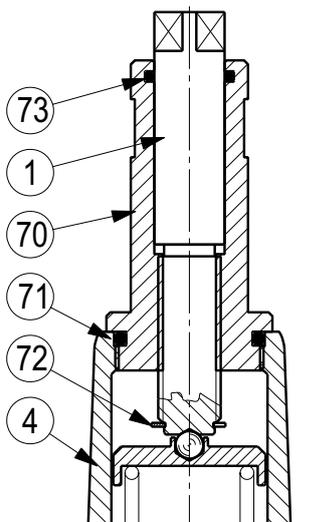
TYPES PSO/79 AND PSO/80



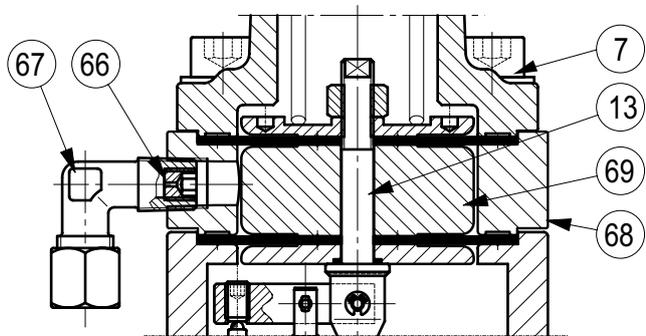
TYPE PS/79-AP



TYPE PS/80-AP



TYPES PS/79-D AND PS/80-D



TYPE PS/80

# PS/79 and PS/80

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