

Instruction Manual

Pneumatic actuator
PA 30 – PA 90

The technical data is not binding and not an expressly warranted characteristic of the goods. It is subject to change. Please consult our General Conditions of Supply.

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1. Introduction

This instruction manual contains the technical data as well as instructions for installation, operation and maintenance of the pneumatic actuators type PA30 - PA 90.

2. General Information

2.1 Hazard notices

Hazard notices are used in this manual to warn you of possible injuries or damages to property. Please read and abide by these warnings at all times!

Warning symbols



Danger



Warning



Caution

Meaning

Imminent acute danger!

Failure to comply could result in death or extremely serious injury.

Possible acute danger!

Failure to comply could result in serious injury.

Dangerous situation!

Failure to comply could lead to injury or damage to property.

2.2 Abbreviations

DA	Double acting
FC	Fail-safe to close
FO	Fail-safe to open
DN	Dimension

The Planning Fundamentals referred to in the text may be obtained from your sales company or on the Internet at www.piping.georgfischer.com.

3. EU declaration by manufacturer

The manufacturer: **Georg Fischer Piping Systems Ltd, 8201 Schaffhausen (Switzerland)**, declares that the **pneumatic actuators type PA 30 - PA 90** are not machines ready for use as defined by the EU machine guideline and cannot therefore comply fully with the requirements of this guideline.

Commissioning of this actuator is only forbidden until the conformity of the complete system in which the valve and actuator are fitted corresponds with the specified EU guidelines 98/37/EU.

Employed EU guidelines:
98/37 EG machine guideline

Modifications to the actuator and to control assemblies installed, which influence the technical data specified in this instruction manual and use for the intended purpose, and therefore significantly modify the actuator, invalidate this manufacturer declaration.



Warning

4. Intended Use

The descriptions and instructions in the following apply to the pneumatic actuators:

Type PA30 - PA 90 part-turn valve actuator DA/FC/FO

When built into GF Piping Systems valves and connected to a system control, the purpose of these actuators is to

- actuate fittings with a control pressure of 2.8 to 7 bar and up to a driving torque of 20 Nm, and
- depending on the type of pneumatic actuator, double acting (type designation DA) or single acting with spring for fail-safe to CLOSE (type designation FC) or single acting for fail-safe to OPEN (type designation FO),
- control these valves to the OPEN and CLOSED positions via a built-in solenoid valve. The solenoid valve must be either supplied ex GF Piping Systems works or already mounted by the customer,
- indicate these positions OPEN and CLOSED via an electric signal to the system control, if the actuator is equipped for this with the respective sub assembly,
- enable control of these positions through manual operation in case of failure in the compressed air supply, if the actuator is equipped for this with the respective subassembly.

The actuator **is not intended** for applications other than those specified here.

Prohibited in particular are:

- control pressures above 7.5 bar,
- manual operation with forces higher than permitted according to prEN12570 (maximum retention forces for operation of valves),



Warning

- operating solenoid valves and position feedback units under water.

The actuator can only function properly if it has been connected professionally as per the Control Diagrams on page 43 for **double acting operation** and for **failsafe OPEN or fail-safe CLOSE operation**, respectively.



If the information contained in these instructions is not observed, the manufacturer cannot accept liability for the above products.

5. Safety Tips

5.1 Due care required of the operator

The pneumatic actuators described herein were designed and manufactured with consideration to a risk analysis and the respective harmonized European standards. They correspond to the latest technology and meet the mentioned prescribed safety standards.

Safety on the job can, however, only be realized if all the necessary measures have been taken. It is therefore the responsibility of the system engineer and the operator of such systems into which the valve with pneumatic actuator has been built to plan such measures and make sure they are carried out.





Warning

The operator must make certain in particular that

- the valve with pneumatic actuator is only used as it was intended for (see Section 3),
- the design parameters control air pressure and voltage of electric subassemblies of the pneumatic actuator, as indicated in the scope of order and delivery, are true and accurate,
- the pneumatic actuator is only operated when in perfect working condition and the safety devices for the system supply of compressed air are regularly checked to make sure they are in perfect order,
- only qualified and authorized personnel plan, connect, and work with the actuator and that employees are instructed periodically in job safety matters according to the local regulations – especially as pertaining to electrical equipment, and
- personnel is familiar with and observes this instruction manual and the information contained herein.

5.2 Special hazards

Single acting, fail-safe **OPEN** and **CLOSE** (type description **FO** and **FC**) pneumatic actuators have pre-loaded springs that bring the valve into the predefined position in case of compressed air loss. Dismantling these actuators is dangerous and may only be done by following special repair instructions (available from GF Piping Systems!) and under the guidance of a safety expert. Dismounting from the valve may only be done in the safety position after cutting off the compressed air supply.

Prior to any work on the electric subassemblies of the pneumatic actuator, the electrical connections of the control voltage should be disconnected.



Warning

Any necessary live-line adjustments may only be done with special insulated tools.

In addition, the operating instructions of the manual valve must also be observed. They are an integral component of this manual.

5.3 Transport and storage

The actuators must be handled, transported and stored with care. Please note the following points:

- The actuators should be transported and/or stored in their original unopened packaging.
- The actuators must be protected from harmful physical influences such as dust, heat (humidity).
- It is important that the connections are neither damaged by mechanical nor thermal influences.
- Prior to installation, the actuators should be inspected for transport damages. Damaged actuators must not be installed.



Warning

6. Technical Data

6.1 The Actuator

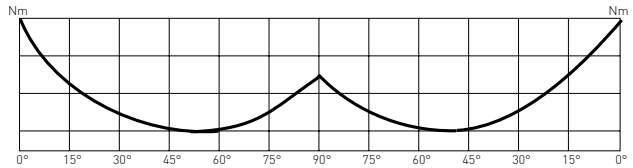
Control medium	Neutral, non-aggressive gases, preferably slightly oily compressed air	
Control pressure	Single acting	Double acting
	min. 5,6* bar	5,6* bar
	max. 7 bar	7 bar
Control connection	R 1/8" mit Namur-Platte R 1/4"	
Control time	ca. 0,5 – 4s	
Control angle	90°	
Mode of operation	<ul style="list-style-type: none"> - Fail-safe close (FC) - Fail-safe open (FO) - Double acting (DA) 	
Permissible operating temperature	- 10 °C to + 80 °C	
Permissible humidity	0 – 95 %	
Indicator	optical	
Housing material	Aluminum hard anodized	

* Standard series, for lower control pressures (min 2,8) special springs are available.

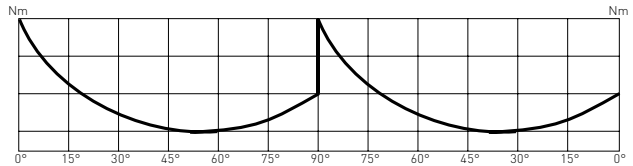
6.2 Torque characteristics

Torque diagram proportional to angle of rotation

Double acting



Single acting



Torque chart [Nm]

α° = angle of rotation

Dimension	Double acting		Fail-safe close/ Fail-safe open			Fail-safe open *		
	α°	5.6 bar	α°	5.6 bar air	5.6 bar spring	α°	5.6 bar air	5.6 bar spring
PA 30	0°	30.0	0°	30.0	20.0	0°	25.0	35
	45°	15.0	50°	15.0	15.0	50°	15.0	16
	90°	22.5	90°	20.0	30.0	90°	22.5	18
PA 35	0°	45.0	0°	45.0	30.0	0°	37.5	42
	45°	22.5	50°	22.5	22.5	50°	22.5	23
	90°	34.0	90°	30.0	45.0	90°	33.8	24
PA 40	0°	60.0	0°	60.0	40.0	0°	50.0	67
	45°	30.0	50°	30.0	30.0	50°	30.0	30
	90°	45.0	90°	40.0	60.0	90°	45.0	33
PA 45	0°	90.0	0°	90.0	60.0	0°	78.0	95
	45°	45.0	50°	45.0	45.0	50°	46.8	48
	90°	68.0	90°	60.0	90.0	90°	70.2	49
PA 50	0°	120.0	0°	120.0	120.0	0°	100.0	135
	45°	60.0	50°	60.0	60.0	50°	60.0	65
	90°	90.0	90°	80.0	120.0	90°	90.0	67
PA 55	0°	180.0	0°	180.0	120.0	0°	150.0	200
	45°	90.0	50°	90.0	90.0	50°	90.0	92
	90°	135.0	90°	120.0	180.0	90°	135.0	95
PA 60	0°	240.0	0°	180.0	160.0	0°	-	-
	45°	120.0	50°	120.0	120.0	50°	-	-
	90°	180.0	90°	160.0	240.0	90°	-	-
PA 65	0°	360.0	0°	360.0	240.0	0°	-	-
	45°	180.0	50°	180.0	180.0	50°	-	-
	90°	270.0	90°	240.0	360.0	90°	-	-
PA 70	0°	480.0	0°	480.0	320.0	0°	400	510
	45°	240.0	50°	240.0	240.0	50°	240	250
	90°	360.0	90°	320.0	480.0	90°	350	255
PA 75	0°	720.0	0°	720.0	480.0	0°	-	-
	45°	360.0	50°	360.0	360.0	50°	-	-
	90°	540.0	90°	480.0	720.0	90°	-	-
PA 80	0°	960.0	0°	960.0	640.0	0°	-	-
	45°	480.0	50°	480.0	480.0	50°	-	-
	90°	720.0	90°	640.0	960.0	90°	-	-
PA 85	0°	1440.0	-	-	-	-	-	-
	45°	720.0	-	-	-	-	-	-
	90°	1080.0	-	-	-	-	-	-
PA 90	0°	1920.0	-	-	-	-	-	-
	45°	960.0	-	-	-	-	-	-
	90°	1440.0	-	-	-	-	-	-

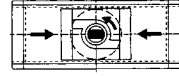
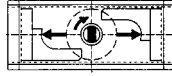
* Torque data for the function „fail safe to open“ only valid for the butterfly valve type 240, 241, 242 and ball valve type 230 - 235.

6.3 Direction of rotation of the actuator

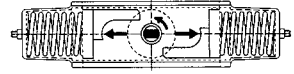
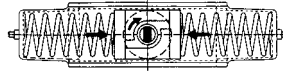
Valve closes

Valve opens

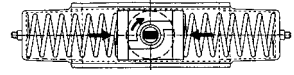
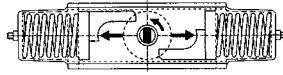
Double acting



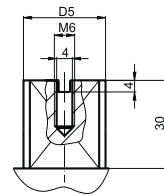
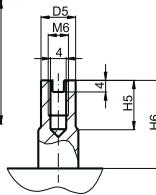
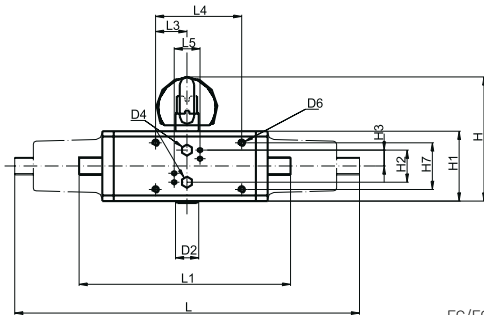
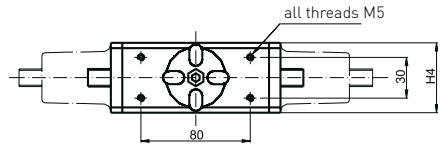
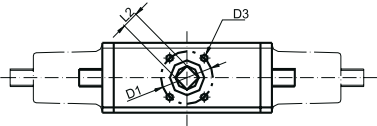
Fail-safe close



Fail-safe open

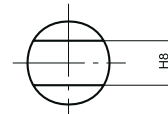


6.4 Actuator Dimensions



FC/FO: PA 30/35/40/45
PA 50/55/60

DA: PA 30/35/40/45
PA 50/55/60/65/70



FC/FO: PA 65/70/75/80
DA: PA 75/80/85/90

Single acting (FC/F0)

Type		D1 mm	D2 mm	D3 mm	D4 mm	D5 mm	L mm	L2 mm	L3 mm	L4 mm
PA 30	F03/05	36/50	30	M5/6	1/8"	10	276	11	35	70
PA 35	F05/07	50/70	35	M6/8	1/8"	12	326	14	35	70
PA 40	F05/07	50/70	35	M6/8	1/8"	12	370	14	35	70
PA 45	F05/07	50/70	55	M6/8	1/8"	15	411	17	35	70
PA 50	F05/07	50/70	55	M6/8	1/8"	15	423	17	35	70
PA 55	F07/10	70/102	70	M8/10	1/8"	19	452	22	35	70
PA 60	F07/10	70/102	70	M8/10	1/8"	19	503	22	35	70
PA 65	F010/12	102/125	85	M10/12	1/8"	-	648	27	-	-
PA 70	F12	125	85	M12	1/4"	-	663	27	-	-
PA 75	F14	140	100	M16	1/4"	-	824	36	-	-
PA 80	F14	140	100	M16	1/4"	-	918	36	-	-
Type	L5 mm	H mm	H1 mm	H2 mm	H3 mm	H4 mm	H5 mm	H6 mm	H7 mm	H8 mm
PA 30	-	97	70	20,5	17,9	65,5	13	20	36	-
PA 35	-	104,5	77,5	20,5	17,9	72	13	20	36	-
PA 40	-	129	86	25	21	80,5	13	30	36	-
PA 45	-	139	96	25	21	90	16	30	36	-
PA 50	-	149	106	25	26	100,5	17	30	36	-
PA 55	-	161	118	25	25	112	19	30	36	-
PA 60	-	173	130	25	32	125	19	30	36	-
PA 65	32	191	148	24	34	136,5	-	-	-	22
PA 70	32	196	153	24	38	145	-	-	-	24
PA 75	32	229	186	24	43	166	-	-	-	27
PA 80	32	241	198	24	44	180	-	-	-	32

Double acting (DA)

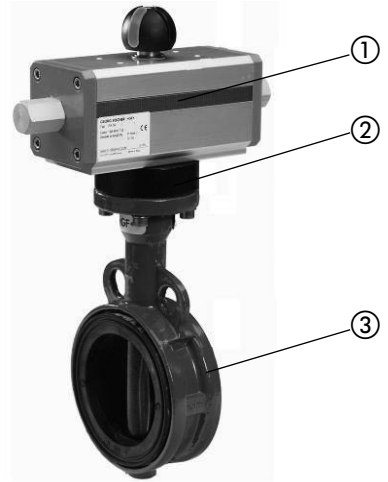
Type		D1 mm	D2 mm	D3 mm	D4 mm	D5 mm	L mm	L2 mm	L3 mm	L4 mm
PA 30	F03/05	36	25	M5/6	1/8"	9	177	9	35	70
PA 35	F03/05	42	30	M5/6	1/8"	10	190	11	35	70
PA 40	F03/05	42	30	M5/6	1/8"	10	198	11	35	70
PA 45	F05/07	50	35	M6/8	1/8"	12	235	14	35	70
PA 50	F05/07	50	35	M6/8	1/8"	12	250	14	35	70
PA 55	F05/07	70	55	M6/8	1/8"	15	279	17	35	70
PA 60	F05/07	70	55	M6/8	1/8"	15	341	17	35	70
PA 65	F07/10	102	70	M8/10	1/8"	19	350	22	35	70
PA 70	F07/10	102	70	M8/10	1/8"	19	381	22	35	70
PA 75	F10/12	125	85	M10/12	1/8"	-	416	27	-	-
PA 80	F12	125	85	M12	1/4"	-	466	27	-	-
PA 85	F14	140	100	M16	1/4"	-	555	36	-	-
PA 90	F14	140	100	M16	1/4"	-	581	36	-	-
Type	L5 mm	H mm	H1 mm	H2 mm	H3 mm	H4 mm	H5 mm	H6 mm	H7 mm	H8 mm
PA 30	-	87	60	25	12	55,5	10	20	36	-
PA 35	-	92,7	65,7	25	12,5	60	13	20	36	-
PA 40	-	97	70	20,5	17,9	65,5	13	20	36	-
PA 45	-	104,5	77,5	20,5	17,9	72	13	20	36	-
PA 50	-	129	86	25	21	80,5	13	30	36	-
PA 55	-	139	96	25	21	90	16	30	36	-
PA 60	-	149	106	25	26	100,5	17	30	36	-
PA 65	-	161	118	25	25	112	19	30	36	-
PA 70	-	173	130	25	32	124	19	30	36	-
PA 75	32	191	148	24	34	137	-	-	-	22
PA 80	32	197	153	24	38	145	-	-	-	24
PA 85	32	229	186	24	43	166	-	-	-	27
PA 90	32	241	198	24	44	180	-	-	-	32

7. Valve Components

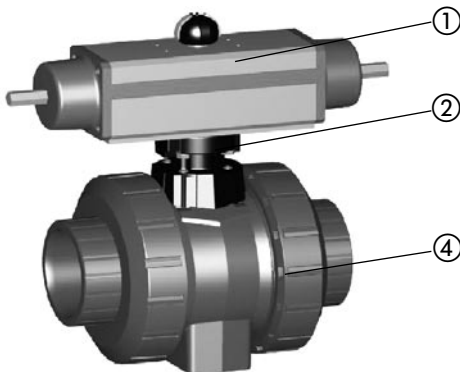
Butterfly valve type 240/241/242
Dimension DN50 - DN300



Butterfly valve type 037/038
Dimension DN50 - DN300

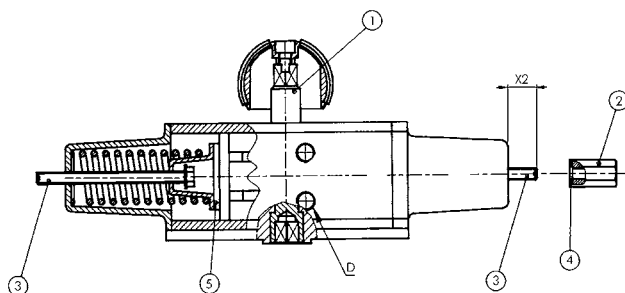


Ball valve type 230 (replaces Type 208) Dimension DN50 - DN150



- ① Actuator PA 30-PA 90
- ② Inermedia part with screws
- ③ Butterfly valve
- ④ Ball valve

7.1 Setting the End Stops



7.2 Stroke limiter «close» (max. 10° ↯, 0 – 10° ↯)

- a) Make sure the springs are in the position of rest; the groove in the shaft (part 1) should be in the same position as in the diagram. Also check that there is no compressed air in the bore «D».
- b) Unscrew the special nut (part 2).
- c) Put compressed air in the bore «D».
- d) With a screwdriver, turn the screws (part 3) in a counterclockwise direction until the desired setting is reached.
- e) Release the compressed air from the bore «D».
- f) Check the setting and, if necessary, repeat the procedure from Step c).
- g) Replace the special nut (part 2) and press the O-ring seals in the corresponding grooves (part 4).

7.3 Stroke limiter «open» (max. 10° ↯, 90 – 80° ↯)

- Make sure the springs are in the position of rest; the groove in the shaft (part 1) should be in the same position as in the diagram. Also check that there is no compressed air in the bore «D».
- Unscrew the special nut (part 2).
- With a screwdriver, turn the screws (part 3) in a clockwise direction until the desired setting is reached.
- Put compressed air in the bore «D» and check that the pistons (part 5) hit against the screws (part 3).
- Replace the special nut (part 2) and press the O-ring seals in the corresponding grooves (part 4).

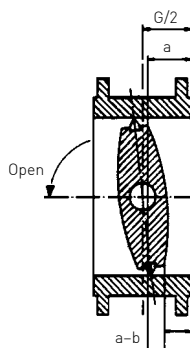
Attention Please: Regulating the stroke limiter for the two pistons can **only** be done in one direction [close or open]!



7.4 Setting the «close» position of the butterfly valve type 037

In the «close» position of the butterfly valve, the disc is not exactly vertical to the pipe axis. The deviation can be seen in the table below.

DN mm	d mm	36 a-b mm	37 b mm
50	63	-	16
65	75	4	16
80	90	4	16
100	110	5	18
125	140	5	17
150	160	6	17
200	225	6	17
250	280	0	25
300	315	-	25



8. Installation of Supplementary Kits



Namur connecting plate (for 5/2 way pilot valve)	199 190 275
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3/2 way pilot valve PV 93	
230 V ~	199 190 263
115 V ~	199 190 264
24 V =	199 190 265
24 V ~	199 190 266



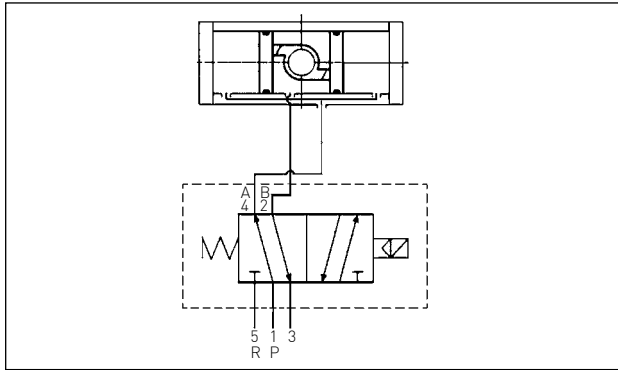
4/2 way pilot valve type 470	
230 V AC/DC	199 190 302
115 V AC/DC	199 190 303
24 V AC/DC	199 190 304



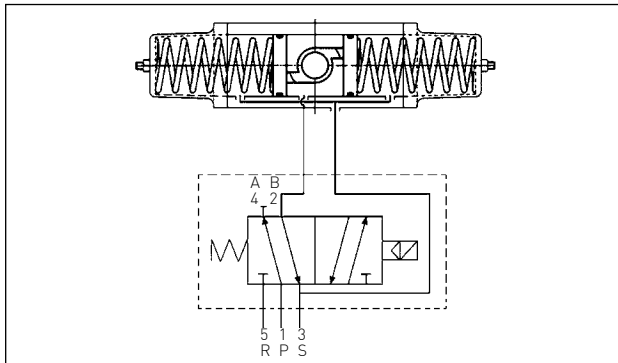
Namur mounting flange			199 190 281
2 mechanical auxiliary switches	mech.	250Vp/10 A	199 190 282
2 inductive auxiliary switches with luminous diode	NPN	10...30V/0.1 A	199 190 283
2 inductive auxiliary switches with luminous diode	PNP	10...30V/0.1 A	199 190 284
2 inductive auxiliary switches	Namur	5 - 24V	199 190 285
2 auxiliary switches	EExd	250Vp/5A	199 190 286
Additional 2 auxiliary switches with gold contact		30V = max. 1-100 mA	199 190 287

The connection diagram is printed onto the limit switch box.

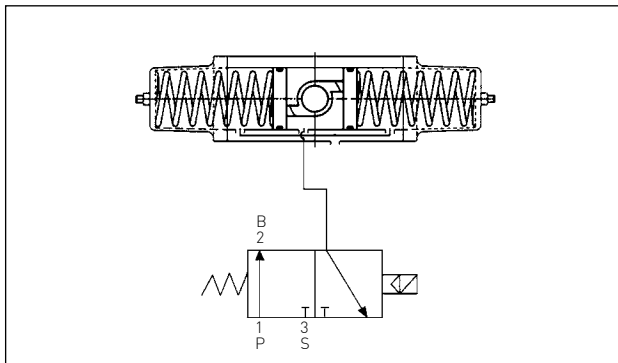
9. Control Diagrams



Double acting with Namur 5/2 way valve



Single acting with Namur 5/2 way valve



Single acting with 3/2 way valve

10. Spare Part List

Actuator types PA 30 – PA 90

Type	FC/FO	DA	FO *
PA 30	198 800 757	198 800 737	198 811 025
PA 35	198 800 037	198 800 758	198 811 026
PA 40	198 800 728	198 800 759	198 811 027
PA 45	198 800 039	198 800 040	198 811 028
PA 50	198 800 729	198 800 733	198 811 029
PA 55	198 800 041	198 800 042	198 811 030
PA 60	198 800 730	198 800 734	-
PA 65	198 800 043	198 800 044	-
PA 70	198 800 731	198 800 735	198 811 198 **
PA 75	198 800 045	198 800 046	-
			-
PA 80	198 800 047	198 800 048	-
PA 85	-	198 800 050	-
PA 90	-	198 800 051	-

* only for valve types 230, 231, 232, 233, 234, 235, 240, 241 and 242.

** only for valve type 240.

Visual position indicator

198 806 672

PA 30/PA 35 (FC/FO); PA 30 – PA 45 (DA)

198 806 459

PA 40 – PA 80 (FC/FO); PA 50 – PA 80 (DA)

Assignment of actuators and intermediate parts for types 230-235

FC			
DN mm	Type	Actuator	Intermediate part
65	PA 30	198 800 757	198 000 595
80	PA 35	198 800 037	198 000 596
100	PA 40	198 800 728	198 000 599
150	PA 40	198 800 728	198 000 599

FO			
DN mm	Type	Actuator	Intermediate part
65	PA 30	198 811 025	198 000 595
80	PA 35	198 811 026	198 000 596
100	PA 40	198 811 027	198 000 599
150	PA 40	198 811 027	198 000 599

DA			
DN mm	Type	Actuator	Intermediate part
65	PA 35	198 800 758	198 000 595
80	PA 40	198 800 759	198 000 595
100	PA 45	198 800 040	198 000 599
150	PA 45	198 800 040	198 000 599

Assignment of actuators and intermediate parts for types 240, 241, 242

FC				
DN mm	Type	Actuator	Intermediate part	Intermediate part with manual emergency operation
50	PA 30	198 800 757	198 000 595	198 000 630
65	PA 30	198 800 757	198 000 595	198 000 630
80	PA 35	198 800 037	198 000 596	198 000 631
100	PA 40	198 800 728	198 000 600	198 000 628
125	PA 45	198 800 039	198 000 597	198 000 629
150	PA 50	198 800 729	198 000 599	198 000 625
200	PA 55	198 800 041	198 000 598	198 000 627
250	PA 65	198 800 043	198 000 730	-
300	PA 70	198 800 731	198 000 730	-

FO				
DN mm	Type	Actuator	Intermediate part	Intermediate part with manual emergency operation
50	PA 30	198 811 025	198 000 595	198 000 630
65	PA 30	198 811 025	198 000 595	198 000 630
80	PA 35	198 811 026	198 000 596	198 000 631
100	PA 40	198 811 027	198 000 600	198 000 628
125	PA 45	198 811 028	198 000 597	198 000 629
150	PA 50	198 811 029	198 000 599	198 000 625
200	PA 55	198 811 030	198 000 598	198 000 627
250	PA 70	198 811 198	198 000 730	-
300	PA 70	198 811 198	198 000 730	-

DA				
DN mm	Type	Actuator	Intermediate part	Intermediate part with manual emergency operation
50	PA 35	198 800 758	198 000 595	198 000 630
65	PA 35	198 800 758	198 000 595	198 000 630
80	PA 40	198 800 759	198 000 595	198 000 630
100	PA 45	198 800 040	198 000 600	198 000 628
125	PA 50	198 800 733	198 000 600	198 000 628
150	PA 55	198 800 042	198 000 600	198 000 625
200	PA 55	198 800 042	198 000 600	198 000 625
250	PA 65	198 800 044	198 000 731	-
300	PA 70	198 800 735	198 000 731	-

Assignment of actuators and intermediate parts for types 037/038

FC/F0			
DN mm	Type	Actuator	Intermediate part
50	PA 30	198 800 757	198 000 382
65	PA 30	198 800 757	198 000 382
80	PA 35	198 800 037	198 000 383
100	PA 40	198 800 728	198 000 385
125	PA 45	198 800 039	198 000 386
150	PA 50	198 800 729	198 000 388
200	PA 55	198 800 730	198 000 389
250	PA 60	198 800 730	198 000 391
300	PA 70	198 800 731	198 000 392

DA			
DN mm	Type	Actuator	Intermediate part
50	PA 35	198 800 758	198 000 382
65	PA 35	198 800 758	198 000 382
80	PA 35	198 800 758	198 000 384
100	PA 45	198 000 040	198 000 385
125	PA 45	198 800 040	198 000 387
150	PA 50	198 800 042	198 000 388
200	PA 60	198 800 734	198 000 390
250	PA 65	198 800 044	198 000 391
300	PA 70	198 800 735	198 000 393

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