

SERVING THE GAS INDUSTRY WORLDWIDE

Operation and Maintenance / Spare Parts

PILOT RMG 650

650.20

Edition 01/2009



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1. General information

All persons involved with the assembly, operation and/or maintenance of gas pressure regulators must read and understand all of the following documents:

- **Technical product information (brochure *.00)** – it contains the technical data and dimensions of the equipment as well as instructions concerning construction and mode of operation.
- **General operating manual for gas pressure regulators and safety devices** – this RMG document contains information on assembly and operation as well as general information on troubleshooting.
- **Operating and maintenance instructions / spare parts (brochure 650.20)** – this document contains more detailed information on assembly and operation of the gas pressure regulator. It also contains the maintenance instructions, spare parts drawings and lists of the actuator unit.
- **Pilot RMG 650 is an integral component of the control unit** and is described in this document, "Operating and maintenance instructions, spare parts".
- other components:

Filter	RMG 905	905.20
Overpressure protection	RMG 925	925.20

There are **national laws** and regulations for all sorts of jobs on gas pressure regulators, from planning to maintenance. Be sure to comply. (In Germany, for instance, DVGW working instructions G 600, G 459/II, G 491 and G 495.)

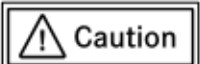
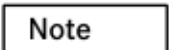
Inspection and maintenance intervals depend mostly on operating conditions and the nature and properties of the gas. There are no fixed rules or recommendations for intervals. For Germany, we recommend you start by complying with maintenance intervals as stated in DVGW, working instruction G 495. However, in the mid-term, intervals must be adapted to the requirements of each specific station.

During maintenance, components must be cleaned and then checked thoroughly. This is necessary even if there have been any unusual observations during operation and/or functional testing. Checks must focus, in particular, on diaphragms and sealing rings and all movable parts and their respective bearings. Any and all defective parts must be replaced with new ones. The same applies to O rings removed during dismantling.

Item numbers mentioned in the specific operating and maintenance instructions correspond with the numbers in the spare parts lists and drawings. Some parts in the lists and drawings are marked with a letter "W". We recommend you always have a reserve of those parts in stock for maintenance purposes. Those spare parts are given separately at the end of the spare parts list.

1.1 Safety information

In this manual, safety information is highlighted by means of the following titles and eye catchers:

Eye catcher used for:	
 Danger	Danger to life and limb
 Caution	Danger of damage to property and/or the environment
 Note	Important additional information

2. Specific operating instructions

2.1 Adjusting auxiliary pressure

The selected auxiliary pressure settings have a significant influence on the control behaviour of the equipment. In order to achieve the best possible control precision at a low closing pressure, the auxiliary pressure should be set as high as the stability of the gas pressure regulator will allow.

2.2 Discharge valve

There is no need, in most cases, to change the settings made by RMG.

Note

Difference between auxiliary and outlet pressure: about 5 to 10 bar higher

3. Specific maintenance instructions

- **Bead diaphragm (119, 169, 219, 260)**

During assembly, observe the correct mounting position of the loop (see spare parts drawings of the various stages)

- **Diaphragm disc (107, 154, 207, 276)**

When tightening the sealing cap (103, 167, 203, 258), hex nut (123, 223, 280), use an SW 24 wrench to secure the diaphragm disc so it doesn't move.

- **Adjusting diaphragm system**

During assembly, the diaphragm system must be secured in a suitable manner:

Find the centre position by first turning all the way to the right and to the left. This is where the transverse bores of the junction piece (122, 158, 222, 263) and the valve housing (121, 171, 221, 261) align.

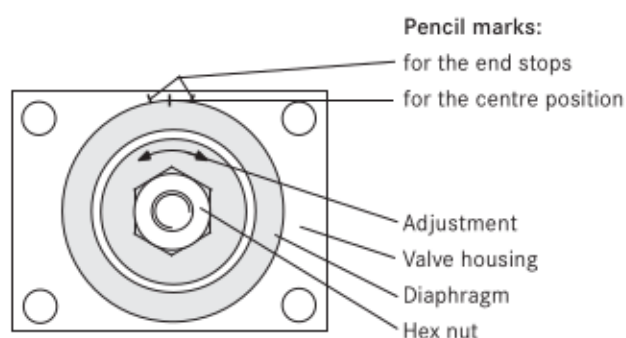
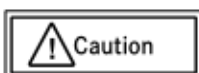


Fig. 2: Diaphragm system

- **Junction piece (158)**

Completely assemble the junction piece. Grease with LOCTITE to the threaded stem and introduce it into the connection cone of the metal harmonica (173) until the transverse bore of the junction piece is 0.5 to 1.0 mm deeper than the transverse bore of the valve housing (171).



The two transverse bores must align precisely.

- **Valve core (105, 156, 205, 278)**

Use the adjusting screw (234, 185, 284) to adjust the diaphragm system so that the valve core can be mounted.

- **Base plate (1)**

In all the stages, the contact faces must be aligned perfectly parallel to the base plates.

- **Spindle (29) of the booster valve**

For the basic setting of the booster valve: adjust the spindle (29) until the groove marked in black aligns with the front edge of the guide screw (30) of the fixed sleeve (31).

3.1 Tightening torques MA

Item number	Torque figures MA in Nm
176	6
2, 115, 132, 138, 165, 183, 195, 215, 232, 238, 251, 267, 272	12
103, 123, 167, 223, 258, 280	20
270	10

3.2 Lubricants

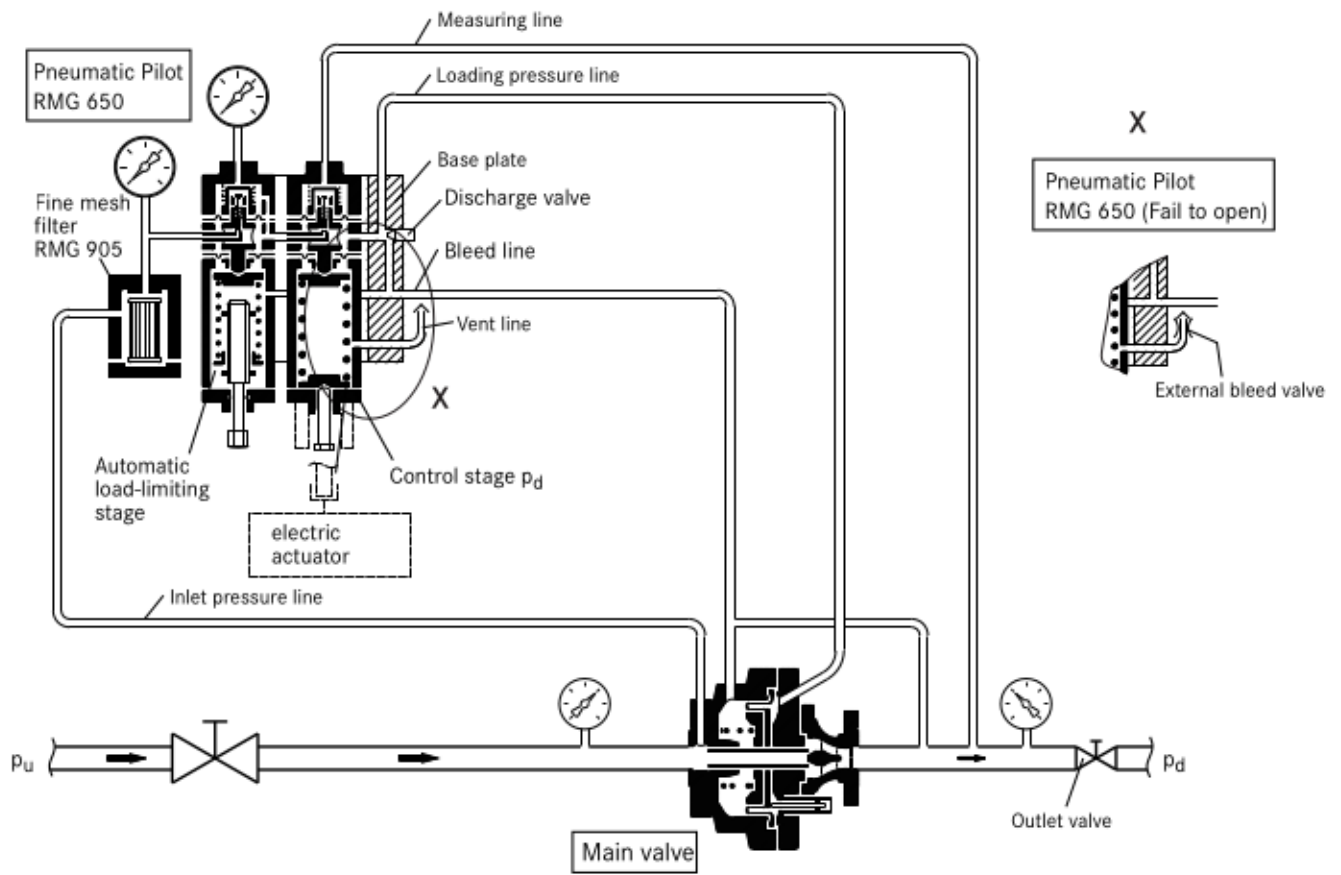
Components (grease lightly)	Lubricants	RMG part no.
All O rings, slip guides, slip faces and switching elements	Silicone grease	27081 (tube 0.1 kg)
Hollow of the spring plate (108, 208, 161) Thread of the cap (130, 230) Thread of the plate (181) All fastening screws and screwed pipe connections	Assembly paste	27091

3.3 Threadlocking adhesives

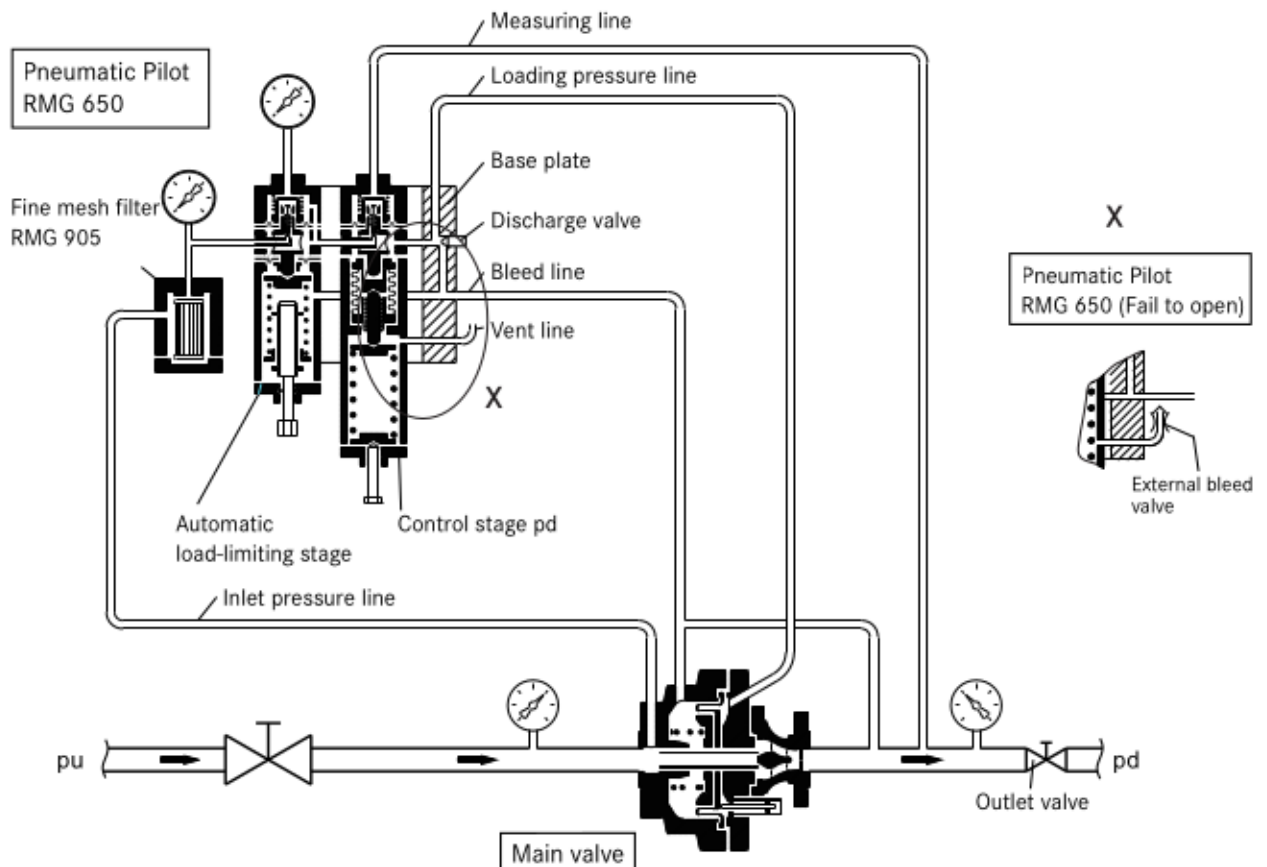
Components (grease lightly)	Safeguards	RMG part no.
Thread of the sealing cap (103, 167, 203, 258) Thread of the hex nut (123, 223, 208) Thread of the junction piece (158, 263)	LOCTITE	26688 (tube 0.1 kg)

4.1 Flow diagram

Pilot with diaphragm measuring unit = W_d 0.5 bar to 40 bar. *FO execution, see "X".*

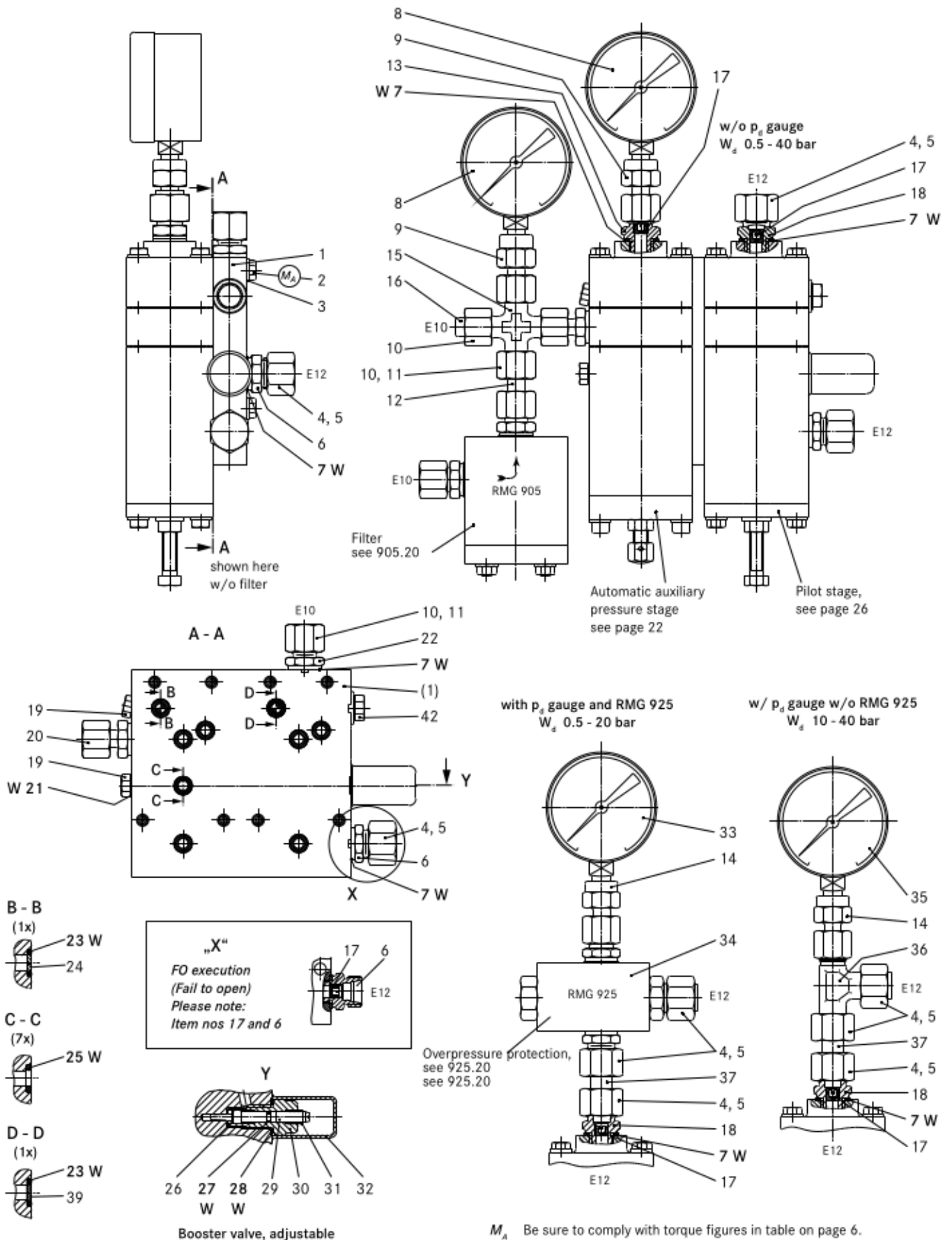


Pilot with metal-harmonica measuring unit = W_d 20 bar to 90 bar. *FO execution, see "X".*



4.1.1.1 Pilot with diaphragm measuring unit. FO execution, see "X".

Outlet pressure range = Wd 0.5 to 40 bar

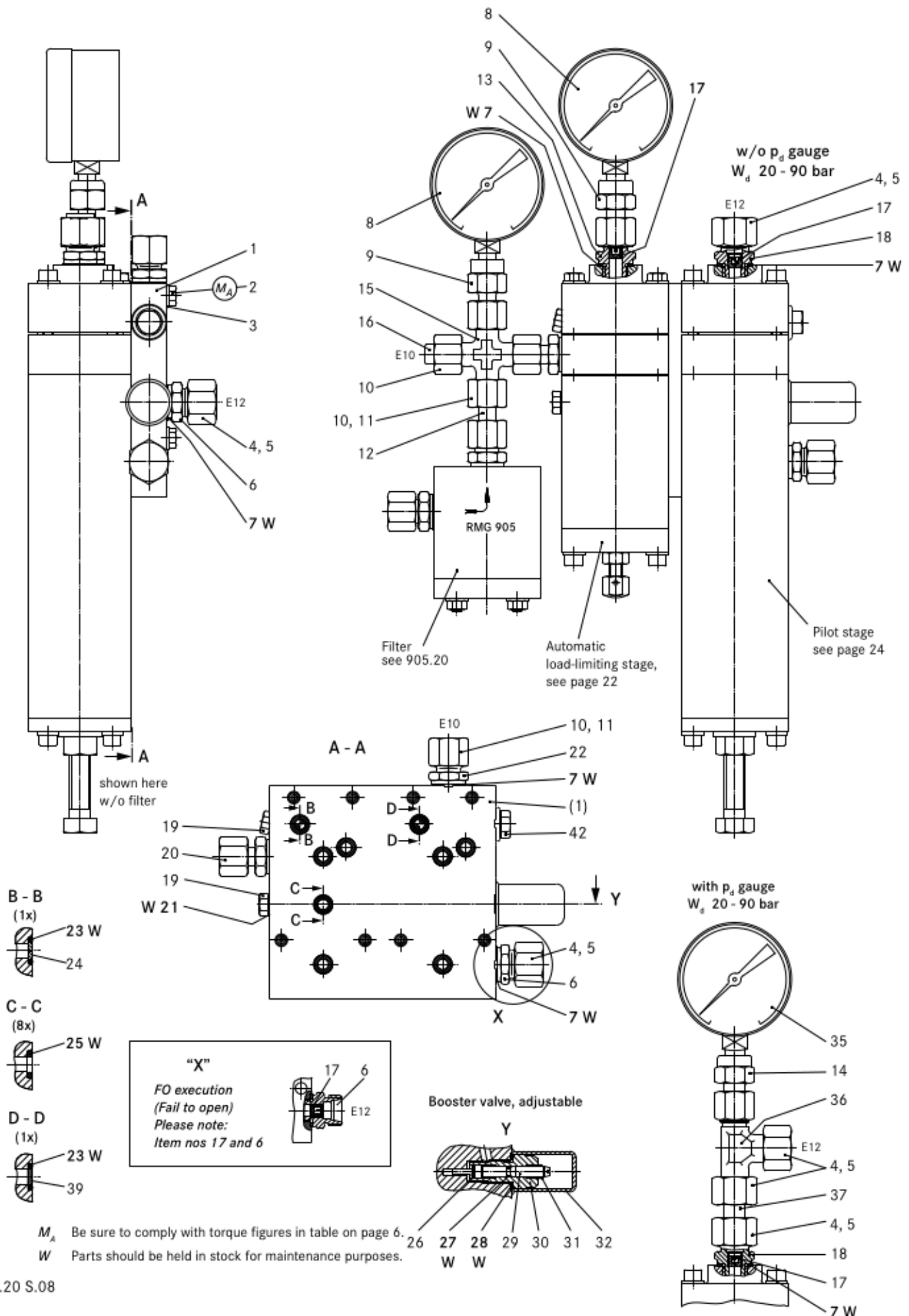


M_A Be sure to comply with torque figures in table on page 6.

W Parts should be held in stock for maintenance purposes.

4.1.1.2 Pilot with metal-harmonica measuring unit. *FO execution, see "X".*

Outlet pressure range = W_d 20 to 90 bar



4.1.2 Pilot with diaphragm measuring unit W_d 0,5 bar to 40 bar with metal-harmonica measuring unit W_d 20 bar to 90 bar

Item no.	Denomination	No.	W	Materials	Part number	
					W_d 0.5 to 40 bar	W_d 20 to 90 bar
1	Base plate	1		LM	10030482	10030482
2	Hex screw	4		St	10336	10336
3	Washer	4		St	8279	8279
4	Union nut	5		St	30804	30804
5	Cutting ring	5		St	30904	30904
6	Connection pipe	2		St	30074	30074
7	Sealing ring	5	W	LM	18842	18842
8	Pressure gauge, optional:					
8	Pressure gauge pressure stage PN 16	2		NSt/Ms	100418	100418
8	Pressure gauge pressure stage PN 25, ANSI 150	2		NSt/Ms	100418	100418
8	Pressure gauge pressure stage PN 40	2		NSt/Ms	26283	26283
8	Pressure gauge pressure stage ANSI 300	2		NSt/Ms	26283	26283
8	Pressure gauge pressure stage ANSI 600	2		NSt/Ms	26285	26285
9	Connection pipe	1		St	31810	31810
10	Union nut	4		St	30803	30803
11	Cutting ring	3		St	30903	30903
12	Straight length of pipe	1		St	32101	32101
13	Connection pipe	1		St	10000714	10000714
15	Connection pipe	1		St	31609	31609
16	Stop cane	1		St	32004	32004
17	Metering screw $\varnothing$ 0.5	2		Ms	10014015	10014015
18	Connection pipe	1		St	10009683	10009683
19	Sealing cap	3		Ms	10000121	10000121
20	Connection pipe	1		St	30023	30023
21	Sealing ring	1	W	LM	18710	18710
22	Connection pipe	1		St	30111	30111
23	O ring	2	W	KG	20231	20231
24	Disc with bore	1		LM	10022218	10022218
25	O ring	7	W	KG	20225	
25	O ring	8	W	KG		20225
26	Lock washer	1		FSt	19065	19065
27	O ring	1	W	KG	20283	20283
28	O ring	1	W	KG	20332	20332
29	Spindle	1		NSt	10000145	10000145
30	Guide screw	1		Ms	10000144	10000144
31	Sleeve	1		PGI	10000171	10000171
32	Protective cap	1		K	26343	26343

W Parts should be held in stock for maintenance purposes.

German abbreviations stand for the following materials:

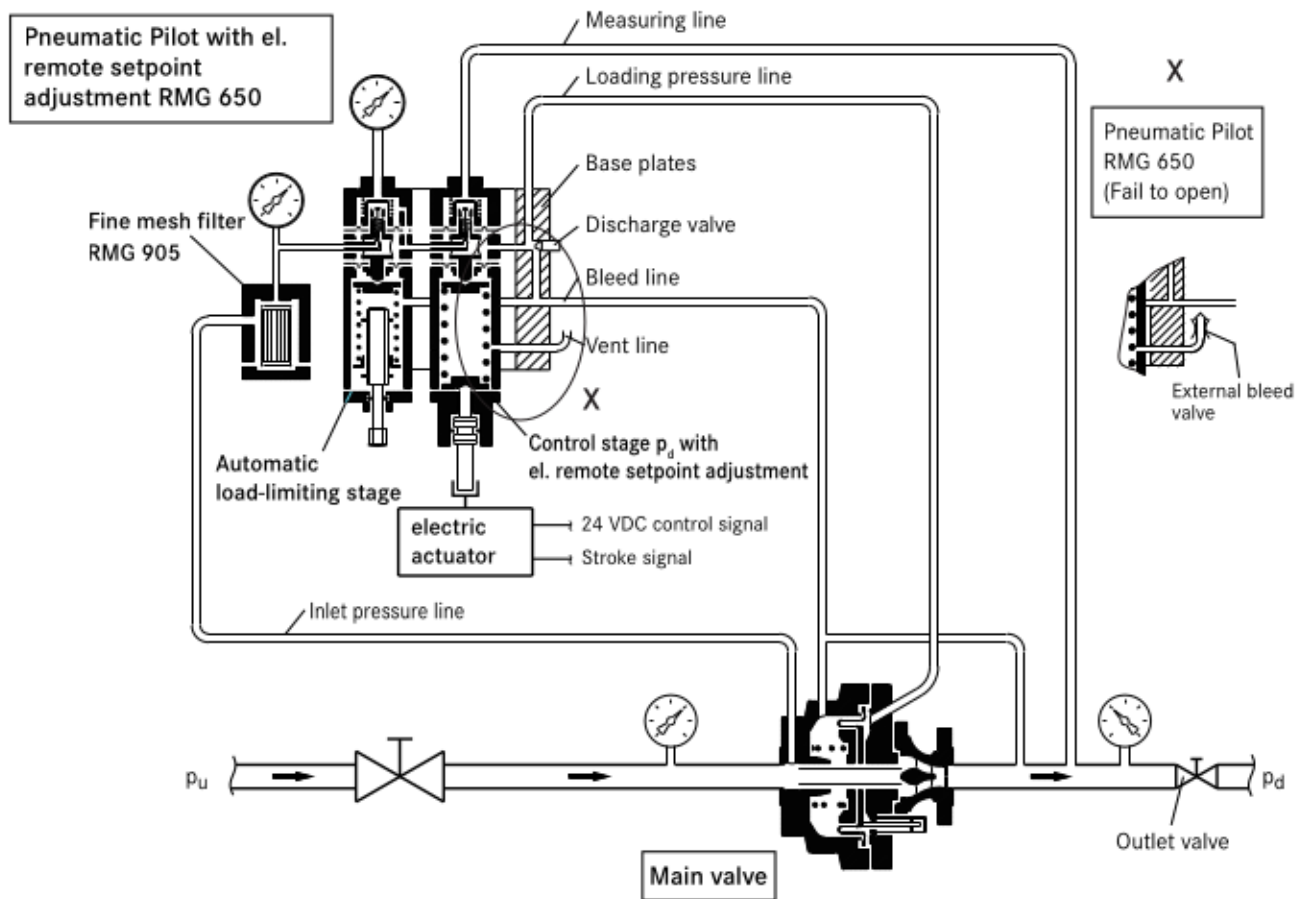
St ... steel	LM ... light metal / alloy	GMs ... cast brass
NSt ... stainless steel	Ms ... brass	GZn ... cast zinc
FSt ... spring steel	GS ... cast steel	AlBz ... aluminium bronze
NFSt ... stainless spring steel	GGG ... spheroidal graphite cast iron	K ... synthetic materials
Bz ... bronze	GBz ... cast bronze	KG ... gummous synthetic materials
Cu ... copper	GLM ... cast light metal	SSt ... foamed materials

Item no.	Denomination	No.	W	Materials	Part number	
					W _d 0.5 to 40 bar	W _d 20 to 90 bar
33	Pressure gauge, optional:					
33	Pressure gauge W _{ds} 0.5 bar to 2 bar	1		NSt/Ms	26891	
33	Pressure gauge W _{ds} 1 bar to 5 bar	1		NSt/Ms	26281	
33	Pressure gauge W _{ds} 2 bar to 10 bar	1		NSt/Ms	26890	
33	Pressure gauge W _{ds} 5 bar to 20 bar	1		NSt/Ms	100418	
34	Overpressure protection, optional:					
34	Overpressure protection W _{ds} 0.5 bar to 2 bar	1			10023335	
34	Overpressure protection W _{ds} 1 bar to 5 bar	1			10023336	
34	Overpressure protection W _{ds} 2 bar to 10 bar	1			10023337	
34	Overpressure protection W _{ds} 5 bar to 20 bar	1			10023338	
35	Pressure gauge, optional:					
35	Pressure gauge W _{ds} 10 bar to 40 bar	1		NSt/Ms	26282	
35	Pressure gauge W _{ds} 20 bar to 90 bar	1		NSt/Ms		26285
36	Connection pipe	1		St		31455
37	Straight length of pipe	2		St	32141	32141
39	Disc without bore	1		LM	10010479	10010479
42	Sealing cap	1		St	26175	26175
	FO (Fail to open) execution					
6	Connection pipe	1		St	10009683	10009683
17	Metering screw Ø 1.0	1		Ms	10014025	10014025

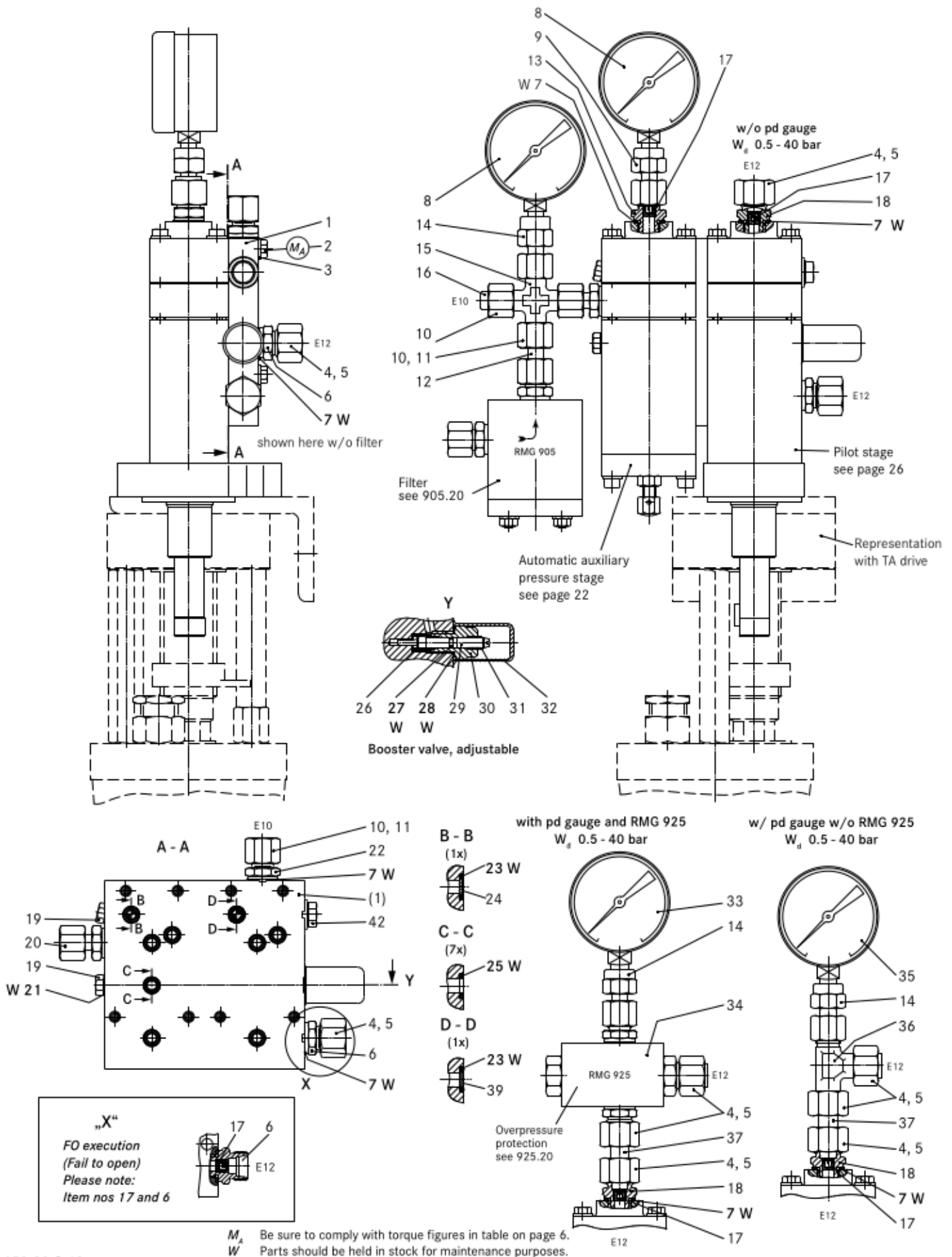
4.2 Flow diagram

Pilot with el. remote setpoint adjustment and diaphragm measuring unit W_d 0.5 bar to 40 bar.

FO execution, see "X".

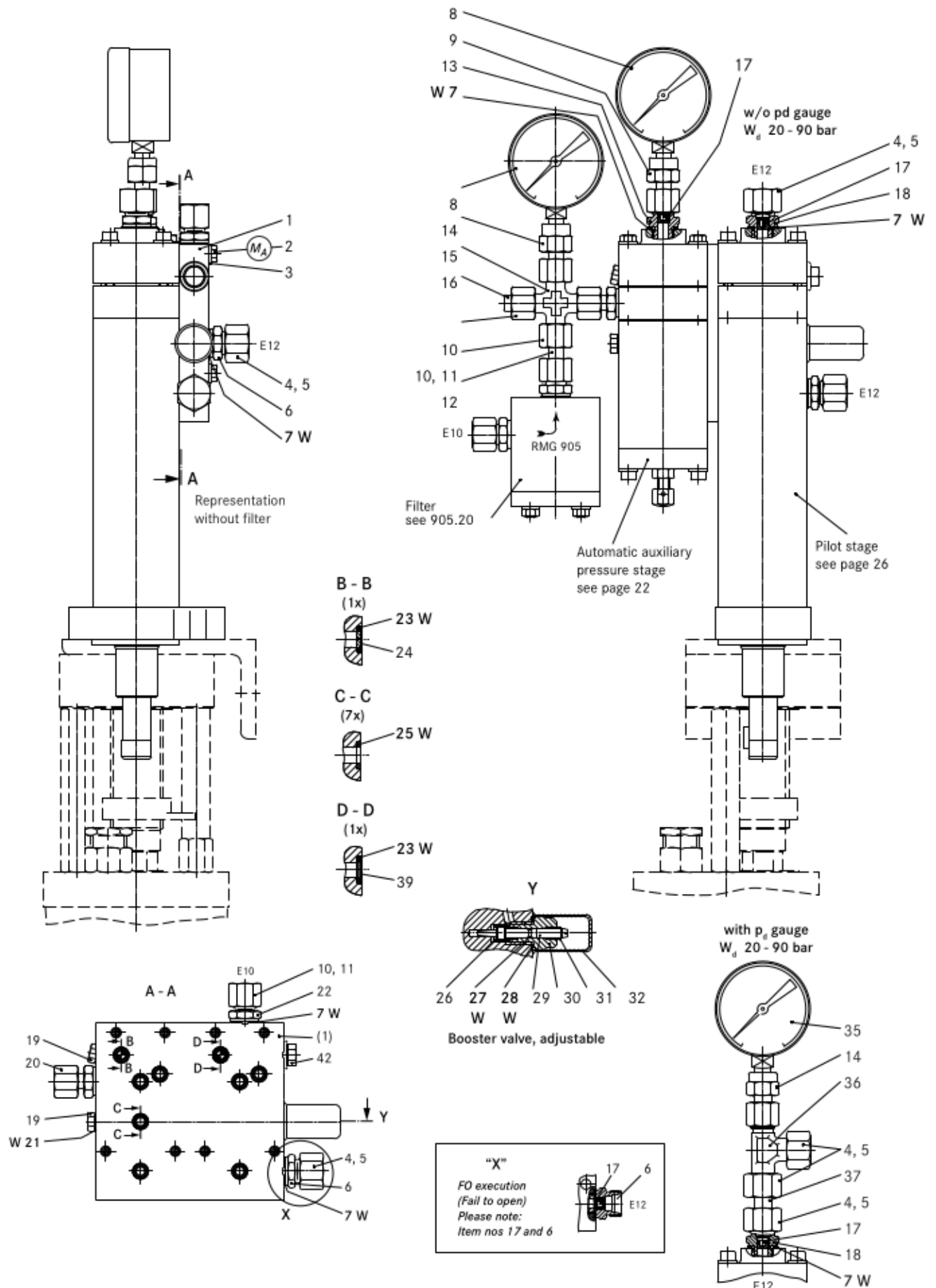


4.2.1.1 Pilot with el. remote setpoint adjustment diaphragm measuring unit. **FO execution, see "X"**
Outlet pressure range w_d 0.5 to 40 bar



4.2.1.2 Pilot with el. remote setpoint adjustment metal-harmonica measuring unit.

FO execution, see "X" Outlet pressure range W_d 20 to 90 bar



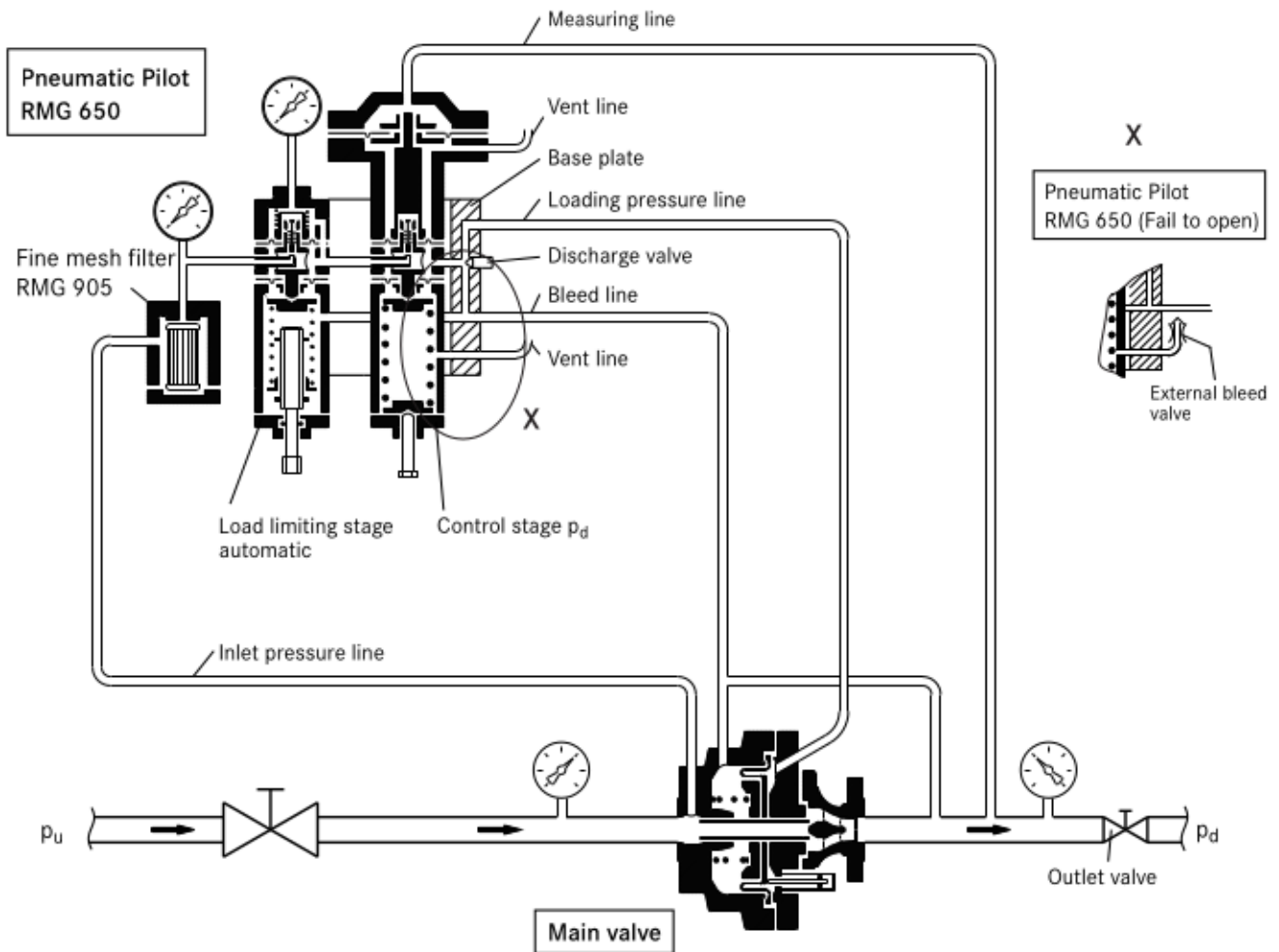
4.2.2 Pilot with el. remote setpoint adjustment – Diaphragm measuring unit W_d 0,5 bar to 40 bar
– Metal-harmonica measuring unit W_d 20 bar to 90 bar

Item no.	Denomination	No.	W	Materials	Part number	
					W_d 0.5 to 40 bar	W_d 20 to 90 bar
1	Base plate	1		LM	10030482	10030482
2	Hex screw	4		St	10336	10336
3	Washer	4		St	8279	8279
4	Union nut	4		St	30804	30804
5	Cutting ring	4		St	30904	30904
6	Connection pipe	2		St	30074	30074
7	Sealing ring	5	W	LM	18842	18842
8	Pressure gauge, optional:					
8	Pressure gauge pressure stage PN 16	2		NSt/Ms	100418	100418
8	Pressure gauge pressure stage PN 25, ANSI 150	2		NSt/Ms	100418	100418
8	Pressure gauge pressure stage PN 40	2		NSt/Ms	26283	26283
8	Pressure gauge pressure stage ANSI 300	2		NSt/Ms	26283	26283
8	Pressure gauge pressure stage ANSI 600	2		NSt/Ms	26285	26285
9	Connection pipe	1		St	31810	31810
10	Union nut	4		St	30803	30803
11	Cutting ring	3		St	30903	30903
12	Straight length of pipe	1		St	32101	32101
13	Connection pipe	1		St	10000714	10000714
14	Connection pipe	1		St	31810	31810
15	Connection pipe	1		St	31609	31609
16	Stop cane	1		St	32004	32004
17	Metering screw $\varnothing$ 0.5	2		Ms	10014015	10014015
18	Connection pipe	1		St	10009683	10009683
19	Sealing cap	3		Ms	10000121	10000121
20	Connection pipe	1		St	30023	30023
21	Sealing ring	1	W	LM	18710	18710
22	Connection pipe	1		St	30111	30111
23	O ring	2	W	KG	20231	20231
24	Disc with bore	1		LM	10022218	10022218
25	O ring	7	W	KG	20225	20225
26	Lock washer	1		FSt	19065	19065
27	O ring	1	W	KG	20283	20283
28	O ring	1	W	KG	20332	20332
29	Spindle	1		NSt	10000145	10000145
30	Guide screw	1		Ms	10000144	10000144
31	Sleeve	1		PGI	10000171	10000171
32	Protective cap	1		KG	26343	26343

Item no.	Denomination	No.	W	Materials	Part number	
					W _d 0.5 to 40 bar	W _d 20 to 90 bar
33	Pressure gauge, optional:					
33	Pressure gauge W _{ds} 0.5 bar to 2 bar	1		NSt/Ms	26891	
33	Pressure gauge W _{ds} 1 bar to 5 bar	1		NSt/Ms	26281	
33	Pressure gauge W _{ds} 2 bar to 10 bar	1		NSt/Ms	26890	
33	Pressure gauge W _{ds} 5 bar to 20 bar	1		NSt/Ms	100418	
34	Overpressure protection, optional:					
34	Overpressure protection W _{ds} 0.5 bar to 2 bar	1			10023335	
34	Overpressure protection W _{ds} 1 bar to 5 bar	1			10023336	
34	Overpressure protection W _{ds} 2 bar to 10 bar	1			10023337	
34	Overpressure protection W _{ds} 5 bar to 20 bar	1			10023338	
35	Pressure gauge, optional:					
35	Pressure gauge W _{ds} 10 bar to 40 bar	1		NSt/Ms	26282	
35	Pressure gauge W _{ds} 20 bar to 90 bar	1		NSt/Ms		26285
36	Connection pipe	1		St	31455	31455
37	Straight length of pipe	2		St	32141	32141
39	Disc without bore	1		LM	10010479	10010479
42	Locking screw	1		St	26175	26175
	FO (Fail to open) execution					
6	Connection pipe	1		St	10009683	10009683
17	Metering screw Ø 1.0	1		Ms	10014025	10014025

4.3 Flow diagram

Pilot with enlarged diaphragm measuring unit Wd 0.3 bar to 1.0 bar. *FO execution, see "X".*

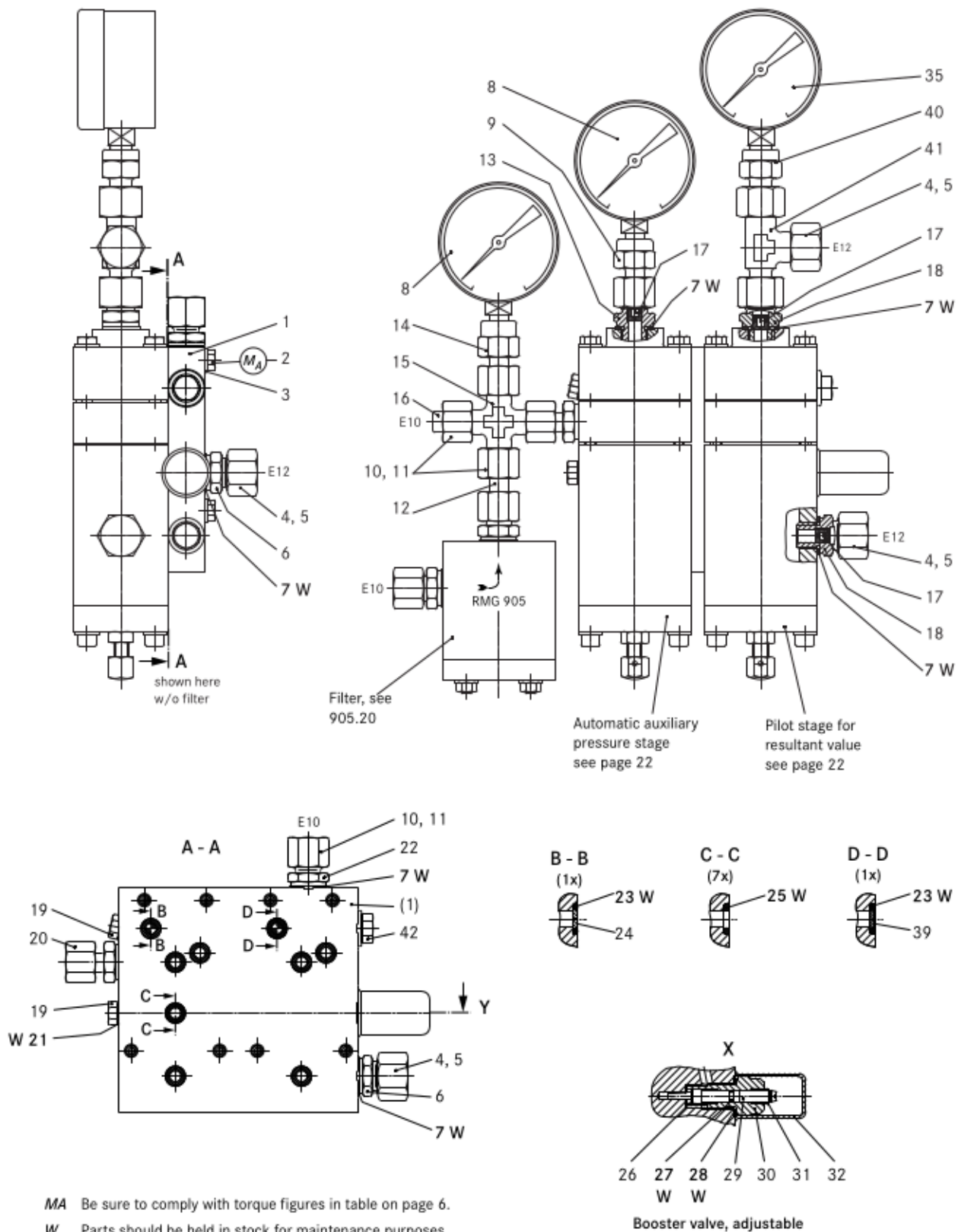


4.3.2 Pilot with enlarged diaphragm measuring unit W_d 0.3 to 1.0 bar

Item no.	Denomination	No.	W	Materials	Part number
1	Base plate	1		LM	10030482
2	Hex screw	4		St	10336
3	Washer	4		St	8279
4	Union nut	4		St	30804
5	Cutting ring	4		St	30904
6	Connection pipe	3		St	30074
7	Sealing ring	5	W	LM	18842
8	Pressure gauge, optional:				
8	Pressure gauge pressure stage PN 16	2		NSt/Ms	100418
8	Pressure gauge pressure stage PN 25, ANSI 150	2		NSt/Ms	100418
8	Pressure gauge pressure stage PN 40	2		NSt/Ms	26283
8	Pressure gauge pressure stage ANSI 300	2		NSt/Ms	26283
8	Pressure gauge pressure stage ANSI 600	2		NSt/Ms	26285
10	Union nut	3		St	30803
11	Cutting ring	2		St	30903
12	Straight length of pipe	1		St	32101
13	Connection pipe	1		St	10000714
14	Connection pipe	3		St	31810
15	Connection pipe	1		St	31609
16	Stop cane	1		St	32004
17	Metering screw $\varnothing$ 0.5	1		Ms	10014015
18	Connection pipe	1		St	10009683
19	Sealing cap	3		Ms	10000121
20	Connection pipe	1		St	30023
21	Sealing ring	1	W	LM	18710
22	Connection pipe	1		St	30111
23	O ring	2	W	KG	20231
24	Disc with bore	1		LM	10022218
25	O ring	7	W	KG	20225
26	Lock washer	1		FSt	19065
27	O ring	1	W	KG	20283
28	O ring	1	W	KG	20332
29	Spindle	1		NSt	10000145
30	Guide screw	1		Ms	10000144
31	Sleeve	1		PGI	10000171
32	Protective cap	1		K	26343
33	Pressure gauge	1		NSt/Ms	26891
34	Overpressure protection	1			10023335
39	Washer	1		LM	10010479
40	Connection pipe	1		St	31817

4.4.1 Pilot with diaphragm measuring unit – for pn. resultant value

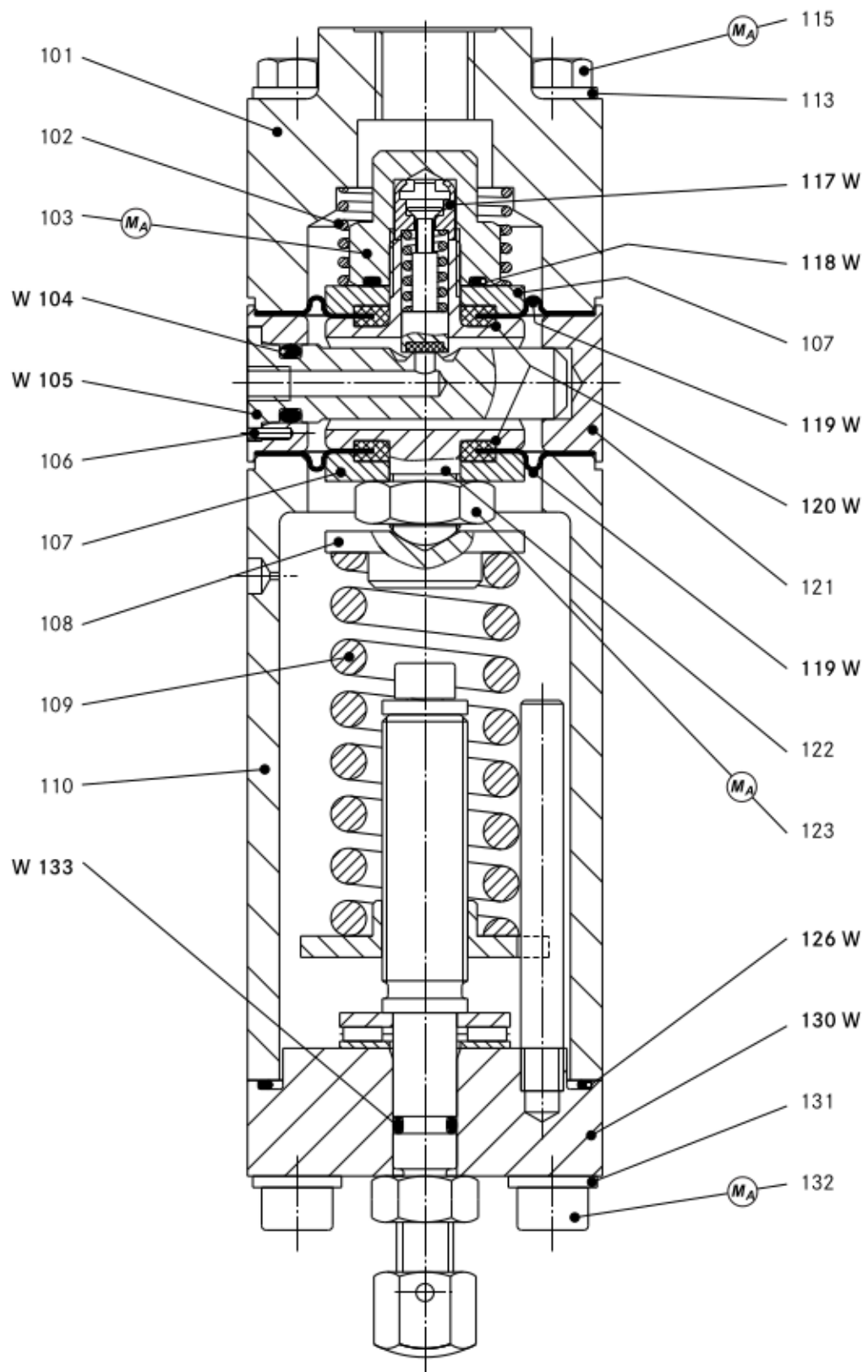
Outlet pressure range w_a 0.1 to 1.5 bar



4.4.2 Pilot with diaphragm measuring unit – for pn. resultant value W_d 0.1 to 1.5 bar

Item no.	Denomination	No.	W	Materials	Part number
1	Base plate	1		LM	10030482
2	Hex screw	4		St	10336
3	Washer	4		St	8279
4	Union nut	4		St	30804
5	Cutting ring	4		St	30904
6	Connection pipe	1		St	30074
7	Sealing ring	5	W	LM	18842
8	Pressure gauge, optional:				
8	Pressure gauge pressure stage PN 16	2		NSt/Ms	100418
8	Pressure gauge pressure stage PN 25, ANSI 150	2		NSt/Ms	100418
8	Pressure gauge pressure stage PN 40	2		NSt/Ms	26283
8	Pressure gauge pressure stage ANSI 300	2		NSt/Ms	26283
8	Pressure gauge pressure stage ANSI 600	2		NSt/Ms	26285
9	Connection pipe	1		St	31810
10	Union nut	5		St	30803
11	Cutting ring	4		St	30903
12	Straight length of pipe	2		St	32101
13	Connection pipe	1		St	10000714
14	Connection pipe	1		St	31810
15	Connection pipe	1		St	31609
16	Stop cane	1		St	32004
17	Metering screw Ø 0.5	3		Ms	10014015
18	Connection pipe	3		St	10009683
19	Sealing cap	2		Ms	10000121
20	Connection pipe	1		St	30023
21	Sealing ring	1	W	LM	18710
22	Connection pipe	1		St	30111
23	O ring	2	W	KG	20231
24	Disc with bore	1		LM	10022218
25	O ring	7	W	KG	20225
26	Lock washer	1		FSt	19065
27	O ring	1	W	KG	20283
28	O ring	1	W	KG	20332
29	Spindle	1		NSt	10000145
30	Guide screw	1		Ms	10000144
31	Sleeve	1		PGI	10000171
32	Protective cap	1		K	26343
35	Pressure gauge	1		NSt/Ms	26286
39	Disc without bore	1		LM	10010479
40	Connection pipe	1		St	31877
41	Connection pipe	1		St	30608
42	Locking screw	1		St	26175

4.5.1.1 Load limiting stage – automatic
Pilot stage – for pn Resultant value



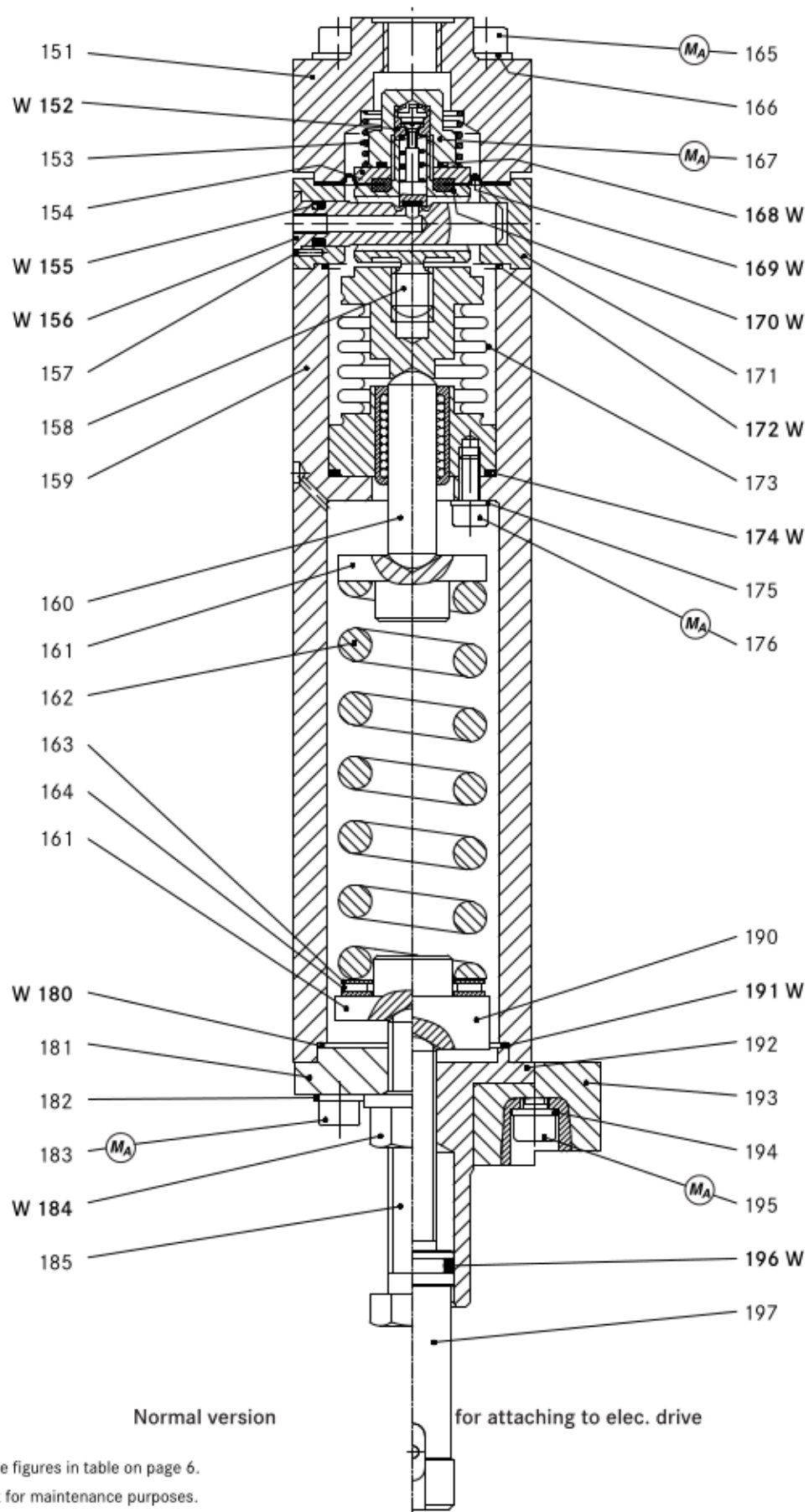
M_A Be sure to comply with torque figures in table on page 6.

W Parts should be held in stock for maintenance purposes.

4.5.1.2 Automatic load – limiting stage
Pilot stage – for pn Resultant value

Item no.	Denomination	No.	W	Materials	Part number	
					Load limiting stage Valve seat – Ø 3	Pilot stage Valve seat – Ø 3
101	Cover	1		LM	10000190	10000190
102	Control spring	1		NSt	10010463	10010463
103	Sealing cap	1		NSt	10000188	10000188
104	O ring	1	W	KG	20225	20225
105	Valve insert	1	W	LM	10000061	10000061
106	Half length reserve taper grooved dowel pin	1		ST	17197	17197
107	Diaphragm disc	2		LM	10000110	10000110
108	Spring plate	1		LM	10000073	10000073
109	Control spring	1		NFSt	10000072	10000088
110	Spring housing	1		LM	10000071	10000087
113	Washer	4		St	8279	8279
115	Hex screw	4		St	10377	10377
117	Piston, pre-assembled	1	W	NSt/NFSt/KV	10000186	10000186
118	O ring	1	W	KG	20332	20332
119	Pre-formed diaphragm	2	W	KG	10000191	10000191
120	Stem seal	2	W	KG	10000066	10000066
121	Valve housing	1		LM	10000137	10000137
122	Joining piece	1		NSt	10000108	10000108
123	Hex nut	1		St	13114	13114
126	O ring	1	W	KG	20293	20293
130	Plate, pre-assembled	1		Ms/Al/Bz/NSt...	10010480	10010080
131	Washer	4		St	8279	8279
132	Cheese head screw	4		St	10150	10150
133	O ring	1	W	KG	20226	20226

4.5.2.1 Control stage with metal-harmonica measuring unit – characteristic line down



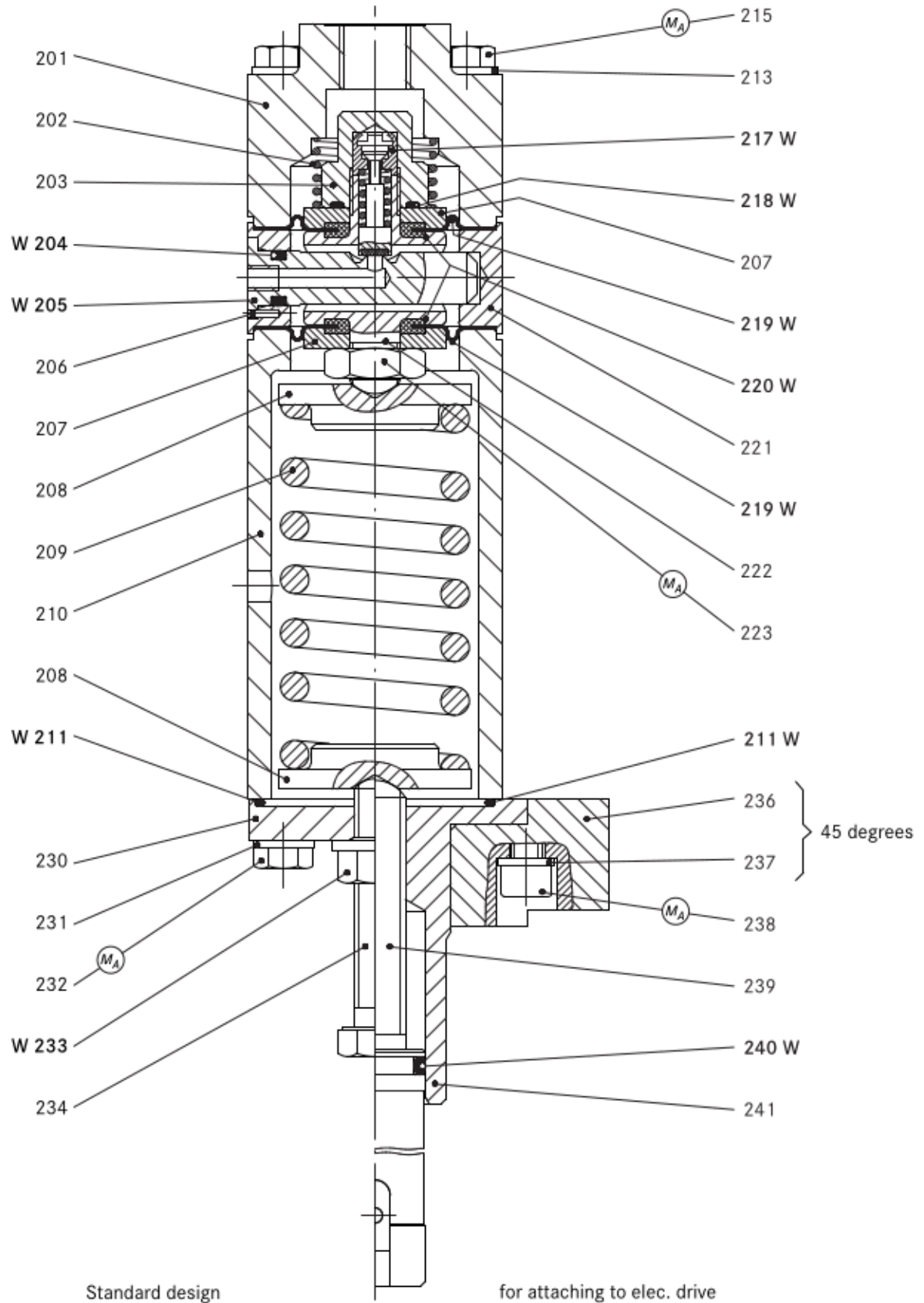
M_A Be sure to comply with torque figures in table on page 6.

W Parts should be held in stock for maintenance purposes.

4.5.2.2 Control stage with metal-harmonica measuring unit – characteristic line down

Item no.	Denomination	No.	W	Materials	Part number	
					without el. drive Valve seat – $\varnothing$ 3	with el. drive Valve seat – $\varnothing$ 3
151	Cover	1		LM	10011768	10011768
152	Piston, pre-assembled	1	W	NSt/NFSt/K	10000186	10000186
153	Control spring	1		NFSt	10010463	10010463
154	Diaphragm disc	2		LM	10000110	10000110
155	O ring	1	W	KG	20225	20225
156	Valve insert	1	W	LM	10011775	10011775
157	Half length reserve taper grooved dowel pin	1		St	17197	17197
158	Joining piece	1		NSt	10011773	10011773
159	Spring housing	1		LM	10011767	10011767
160	Guide bolt	1		St	10011772	10011772
161	Spring plate	1		NSt	10011774	10011774
162	Control spring, at option:					
162	Control spring W _{ds} 20 bar to 90 bar	1		FSt	10010444	10010444
162	Control spring W _{ds} 10 bar to 50 bar	1		FSt	10000149	10000149
163	Axial disc	2		St	26385	26385
164	Axial needle bearing	1		St	26384	26384
165	Cheese head screw	4		St	10548	10548
166	Washer	4		St	8279	8279
167	Sealing cap	1		NSt	10000188	10000188
168	O ring	1	W	KG	20332	20332
169	Pre-formed diaphragm	1	W	KG	10000191	10000191
170	Stem seal	1	W	KG	10000066	10000066
171	Valve housing	1		LM	10011769	10011769
172	O ring	1	W	KG	20416	20416
173	Metal harmonica, complete	1		NSt/St	10011764	10011764
174	O ring	1	W	KG	20317	20317
175	Washer	3		St	6157	6157
176	Cheese head screw	3		St	10318	10318
180	O ring	1	W	KG	20293	20293
181	Plate	1		St	10011770	10011770
182	Washer	4		St	8279	8279
183	Cheese head screw	4		St	10097	10097
184	Hex collar nut	1	W	St/K	13145	13145
185	Hex screw	1		NSt	10010447	10010447
190	Spring plate, at option:					
190	Spring plate Wds 20 bar to 90 bar	1		LM	10011774	10011774
190	Spring plate Wds 10 bar to 50 bar	1		LM		19084400
For attachment to elec. drive						
191	O ring	1	W	K		20293
192	Bush	1		AlBz		10030898
193	Plate	1		St		10020393
194	Washer	3		St		14156
195	Cheese head screw	3		St		10150
196	O ring	1	W	KG		20326
197	Clutch member, pre-assembled	1		St/NSt		10010538

4.5.3.1 Pilot stage with diaphragm measuring unit – characteristic line down



MA Be sure to comply with torque figures in table on page 6.

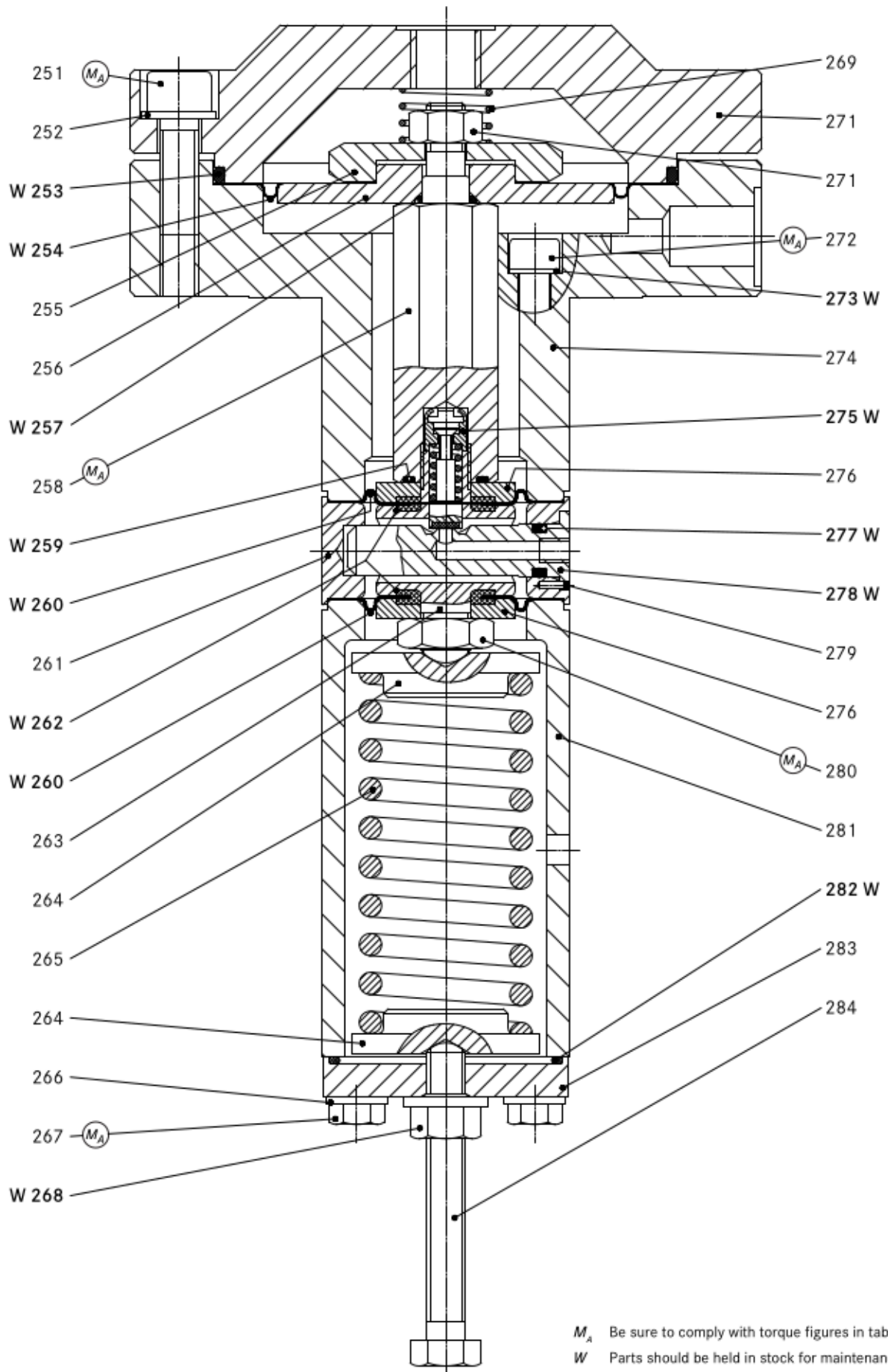
W Parts should be held in stock for maintenance purposes.

4.5.3.2 Pilot stage with diaphragm measuring unit – characteristic line down

Item no.	Denomination	No.	W	Material	Part number
201	Cover	1		LM	10000190
202	Control spring	1		NSt	10010463
203	Sealing cap	1		NSt	10000188
204	O ring	1	W	KG	20225
205	Valve insert	1	W	LM	10000061
206	Half length reserve taper grooved dowel pin	1		ST	17197
207	Diaphragm disc	2		LM	10000110
208	Spring plate, at option:				
208	Spring plate W _{ds} 0.5 bar to 10 bar	2		LM	10000114
208	Spring plate W _{ds} 10 bar to 40 bar	2		LM	10000148
209	Control spring, at option:				
209	Control spring W _{ds} 0.5 bar to 2 bar	1		FSt	10000156
209	Control spring W _{ds} 1.0 bar to 5 bar	1		FSt	10009671
209	Control spring W _{ds} 2.0 bar to 10 bar	1		FSt	10000139
209	Control spring W _{ds} 5 bar to 20 bar	1		FSt	10000115
209	Control spring W _{ds} 10.0 bar to 40 bar	1		FSt	10000064
210	Spring housing	1		LM	10000062
211	O ring	1	W	KG	20293
215	Hex screw	4		St	10377
216	Washer	4		St	8279
217	Piston, pre-assembled	1	W	NSt/NFSt/KV	10000186
218	O ring	1	W	KG	20332
219	Pre-formed diaphragm	2	W	KG	10000191
220	Stem seal	2	W	KG	10000066
221	Valve housing	1		LM	10000137
222	Joining piece	1		NSt	10000108
223	Hex nut	1		St	13114
230	Cover	1		St	10000116
231	Washer	4		St	8279
232	Hex screw	4		St	6179
233	Hex collar nut	1	W	St/K	13136
234	Adjusting screw	1		NSt	10002795
For attachment to elec. drive					
236	Plate	1		St	10020393
237	Washer	3		St	14146
238	Cheese head screw	3		St	10150
239	Clutch member, pre-assembled	1		St/NSt	10010538
240	O ring	1	W	KG	20326
241	Bush	1		AlBz	10010549

4.5.4.1 Pilot stage with enlarged diaphragm measuring unit – characteristic line down

W_d 0.3 to 1.0 bar



4.5.4.2 Pilot stage with enlarged diaphragm measuring unit – characteristic line down

W_d 0.3 to 1.0 bar

Item No.	Denomination	No.	W	Materials	Part number
251	Cheese head screw	8		St	10551
252	Washer	8		St	14153
253	O ring	1	W	KG	20518
254	Diaphragm	1	W	KG	10008547
255	Pressurized section	1		LM	10011939
256	Diaphragm disc	1		LM	10011938
257	O ring	1	W	KG	20595
258	Joining piece	1		Ms	10011935
259	O ring	1	W	KG	20332
260	Pre-formed diaphragm	2	W	KG	10000191
261	Valve housing	1		LM	10000137
262	Stem seal	2	W	KG	10000066
263	Joining piece	1		NSt	10000108
264	Spring plate	2		LM	10000114
265	Control spring	1		FSt	10000156
266	Washer	4		St	8279
267	Hex screw	4		St	6493
268	Hex collar nut	1	W	St/K	13136
269	Control spring	1		NFSt	10011928
270	Diaphragm cap	1		LM	10011937
271	Hexagon nut	1		St	5559
272	Cheese head screw	4		St	10550
273	USIT ring	4	W	St/KG	20908
274	Diaphragm housing	1		LM	10011936
275	Piston, pre-assembled	1	W	NFSt/NSt/K	10000186
276	Diaphragm disc	2		LM	10000110
277	O ring	1	W	KG	20225
278	Valve insert	1	W	LM	10000061
279	Half length reserve taper grooved dowel pin	1		St	17197
280	Hex nut	1		St	13114
281	Spring housing	1		LM	10000062
282	O ring	1	W	K	20293
283	Cover	1		St	10000116
284	Adjusting screw	1		NSt	10021331

4.6 Parts for maintenance purposes

Item no.	Denomination	Number	Part number
7	Sealing ring	6	18842
23	O ring	1	20341
25	O ring	7	20225
27	O ring	2	20285
28	O ring	2	20332
<i>Pilot control stage for pn. resultant value</i> <i>Automatic auxiliary pressure stage</i>			
104	O ring	1	20225
105	Valve insert	1	10000061
117	Piston, pre-assembled	1	10000186
118	O ring	1	20332
119	Pre-formed diaphragm	2	10000191
120	Stem seal	2	10000066
126	O ring	1	20293
133	O ring	1	20226
<i>Pilot stage with metal-harmonica measuring unit</i>			
152	Piston, pre-assembled	1	10000186
155	O ring	1	20225
156	Valve insert	1	10011775
168	O ring	1	20332
169	Pre-formed diaphragm	1	10000191
170	Stem seal	1	10000066
172	O ring	1	20416
174	O ring	1	20317
180	O ring	1	20293
184	Hex collar nut	1	13145
<i>For attachment to elec. drive</i>			
191	O ring	1	20293
196	O ring	1	20326
<i>Pilot stage with diaphragm measuring unit</i>			
204	O ring	1	20225
205	Valve insert	1	10000061
211	O ring	1	20293
217	Piston, pre-assembled	1	10000186
218	O ring	1	20332
219	Pre-formed diaphragm	2	10000191
220	Stem seal	2	10000066
233	Hex collar nut	1	13136
<i>For attachment to elec. drive</i>			
240	O ring	1	20326

Item no.	Denomination	No.	Part number
<i>Pilot stage with enlarged diaphragm measuring unit</i>			
253	O ring	1	20518
254	Diaphragm	1	10008547
257	O ring	1	20595
259	O ring	1	20332
260	Pre-formed diaphragm	2	10000191
262	Stem seal	2	10000066
268	Hex collar nut	1	13136
273	USIT ring	4	20908
275	Piston, pre-assembled	1	10000186
277	O ring	1	20225
278	Valve insert	1	10000061
282	O ring	1	20293