Pilot HON 655

655.20

OPERATING AND MAINTENANCE INSTRUCTIONS/
SPARE PARTS

EDITION 01/2017

Serving the Gas Industry Worldwide

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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 655.00 –** it contains the technical data and dimensions of the equipment as well as instructions concerning set-up and mode of operation.

– **General operating manual for gas pressure regulators and safety devices** – this Honeywell document contains information on assembly and operation as well as general information on troubleshooting.

– **Operating and maintenance instructions / spare parts (brochure*.20)** – this document contains more detailed information on assembly and operation of the gas pressure regulator. It contains, furthermore, the maintenance instructions and spare parts drawings and lists of the actuator unit.

– **Pilot HON 655 is an integral component of the control unit and is described in this document,** "Operating and maintenance instructions, spare parts".

– other components:

Filter	HON 905	905.20
Overpressure protection	HON 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 work sheets 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 general rules or recommendations for intervals. For Germany, we recommend to consider maintenance intervals as stated in DVGW work sheet G 495 in a first instance. However, in the mid-term, intervals must be adapted to the requirements of each specific equipment.

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 seals 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 disassembly.

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 put together in another separate list 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.

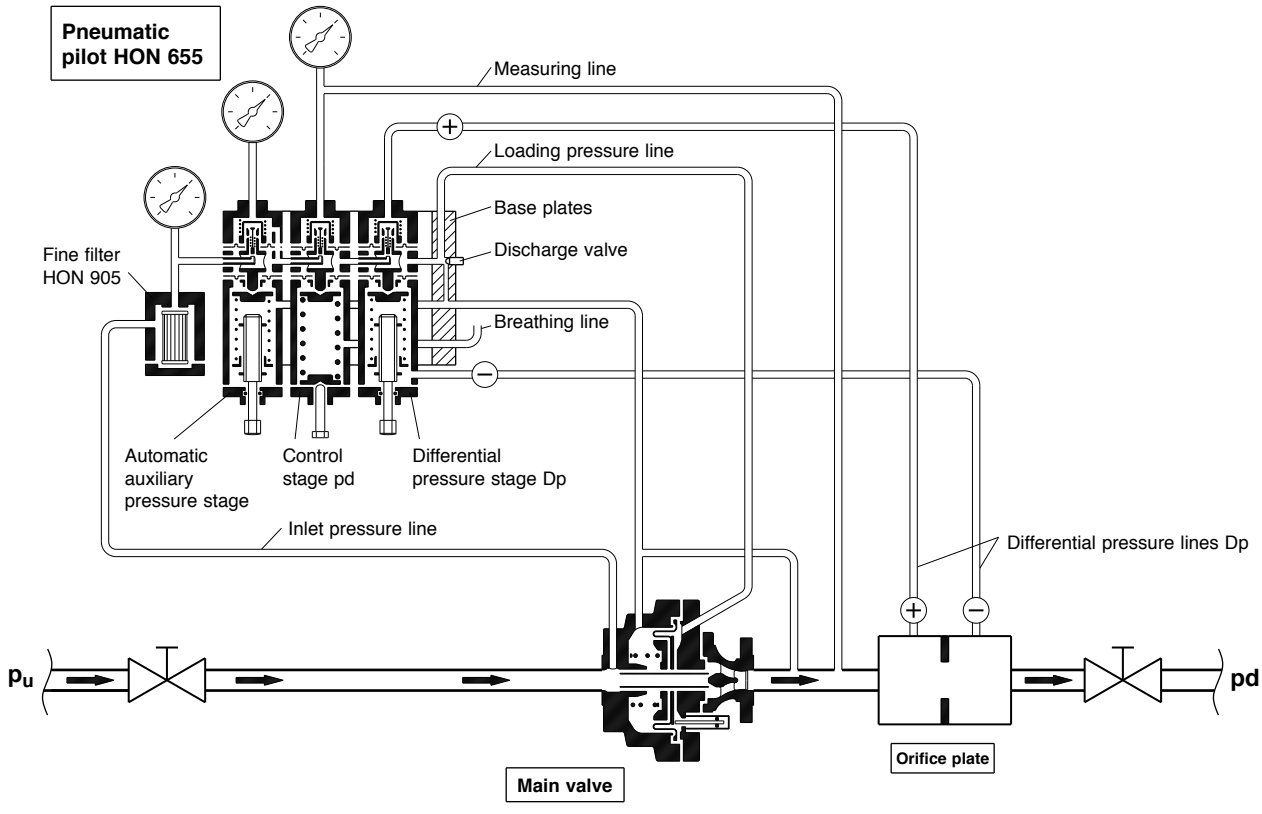
2.2 Discharge valve

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

Note

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

Pilot for outlet and differential pressures



3. Specific maintenance instructions

- **Bead diaphragm (119, 169, 219, 319)**

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

- **Diaphragm disc (107, 154, 207, 307)**

  When tightening the sealing cap (103, 167, 203), hex nut (123, 223), 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, 322) and the valve housing (121, 171, 221, 321) align.

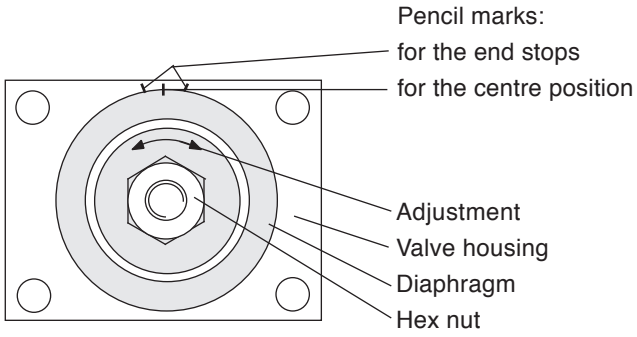


Fig. 2: Diaphragm system

- **Junction piece (158)**

  Completely assemble the junction piece. Apply 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).

Caution The two transverse bores must align precisely.

- **Valve core (105, 156, 205, 305)**

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

- **Base plate (20, 27)**

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

- **Spindle (37) of the booster valve**

  For the basic setting of the booster valve: adjust the spindle (37) until the groove marked in black aligns with the front edge of the guide screw (32) of the fixed sleeve (35).

3.1 Screws and bolts – tightening torques M_A

Item no.	Tightening torque M_A in Nm
176	6
2, 22, 115, 132, 165, 183, 215, 223, 232, 315, 332	12
103, 123, 167, 203, 303, 323	20

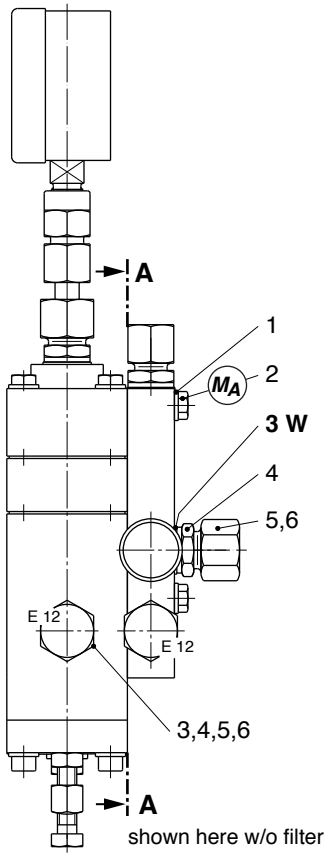
3.2 Lubricants

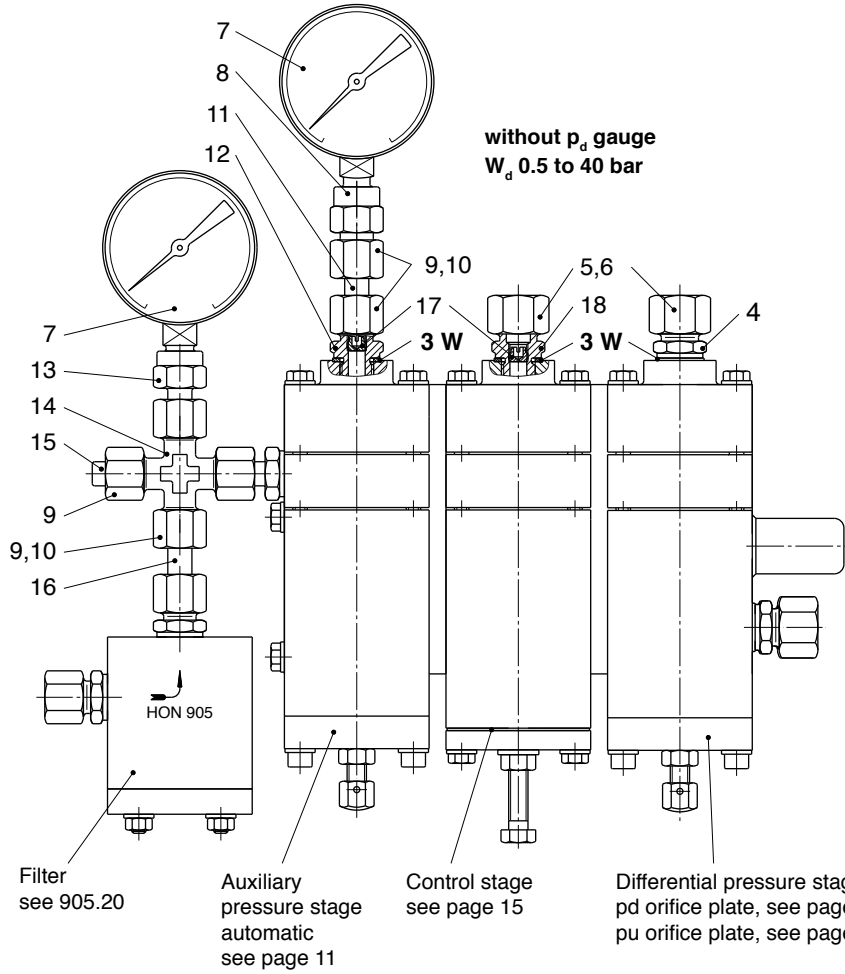
Components (cover with thin layer)	Lubricants	HON part no.
all O rings, slip guides, slip faces and switching elements	Silicone grease	27,081 (tube 0.1 kg)
Hollow of the spring plate (108, 208, 161) Thread of the cap (130, 230) Thread of the plate (181)	Assembly paste	27 091
All fastening screws and screwed pipe connections	Assembly grease	28 267

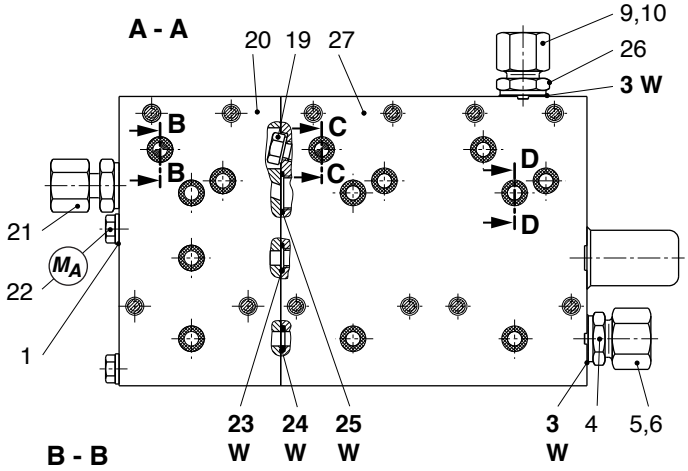
3.3 Threadlocking adhesives

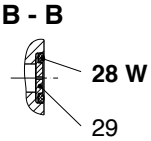
Components (cover with thin layer)	Threadlocking adhesives	HON part no.
Thread of the sealing cap (103, 167, 203, 303) Thread of the hex nut (123, 223, 308) Thread of the junction piece (158)	LOCTITE	26,688 (tube 0.1 kg)

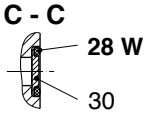
4.1.1 Pilot with diaphragm measuring unit
Outlet pressure range W_d 0.5 to 40 bar

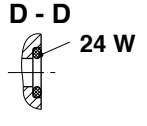


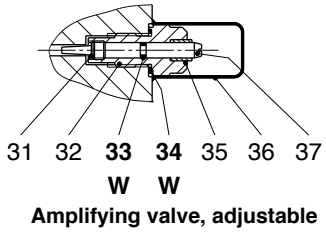


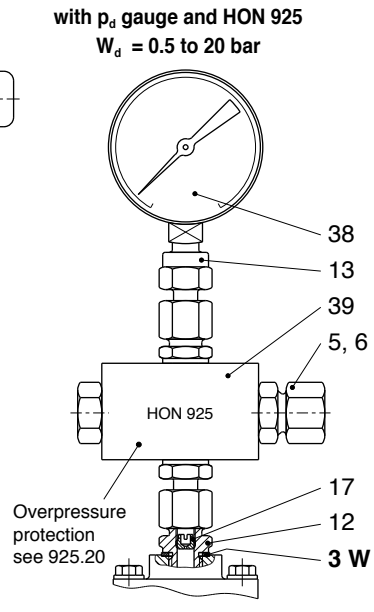


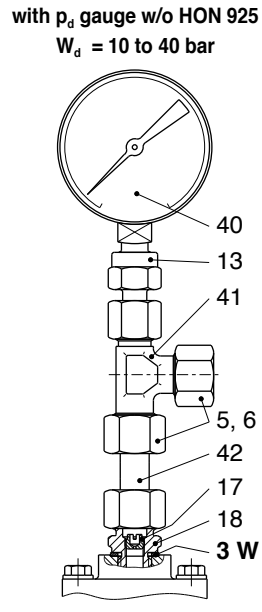








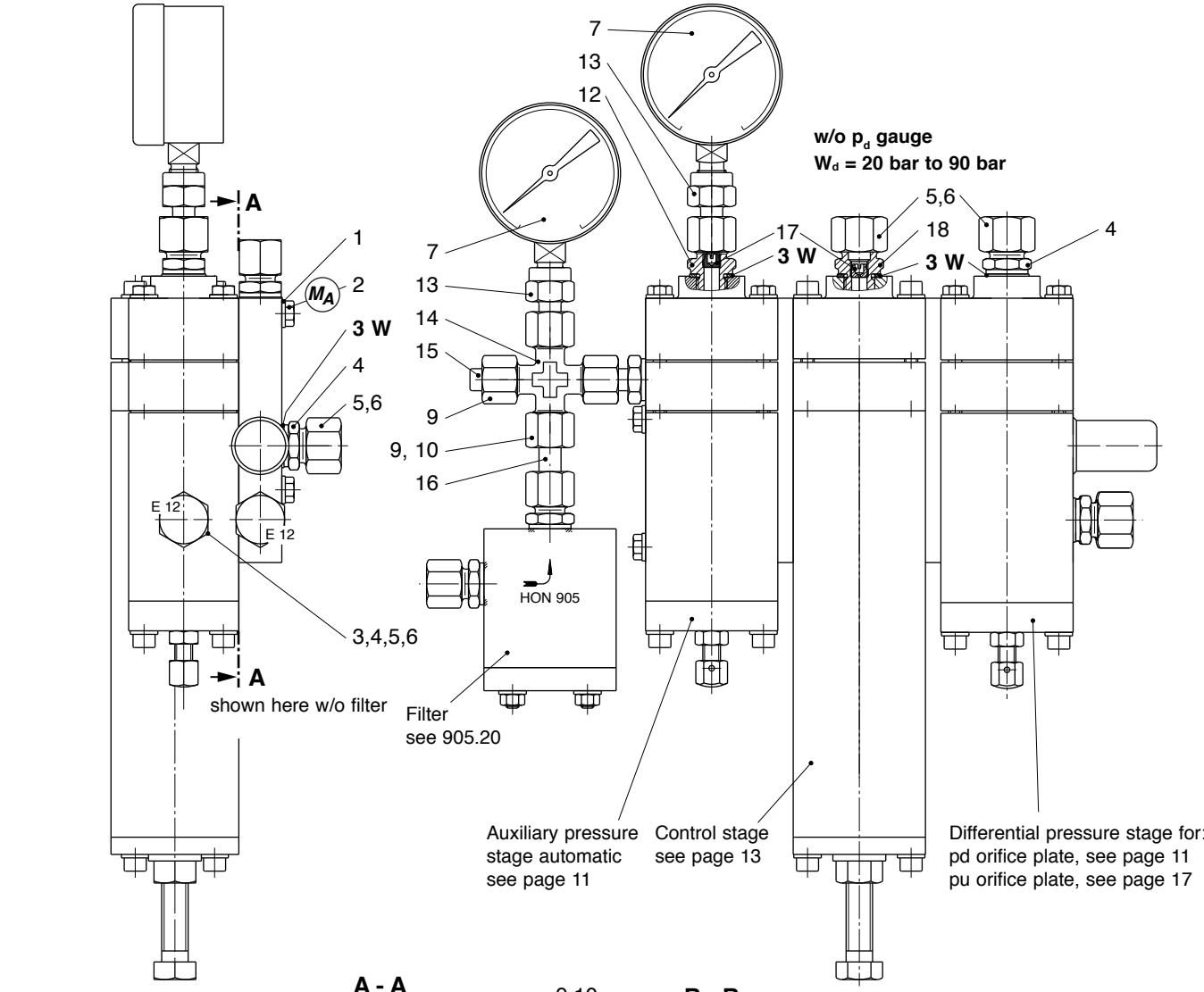


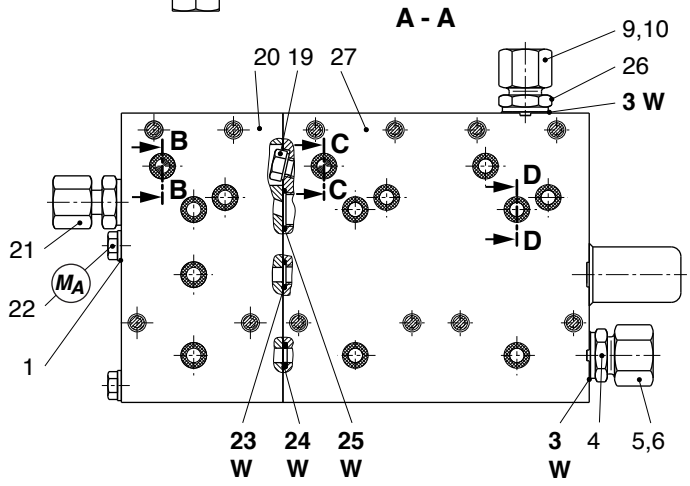


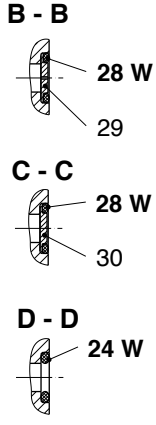
M_A Be sure to comply with tightening torques in table on page 6.

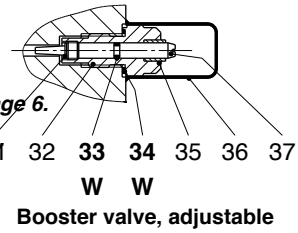
W Parts should be held in stock for maintenance purposes.

4.1.2 Pilot with metal-harmonica measuring unit
Outlet pressure range W_d 20 to 90 bar

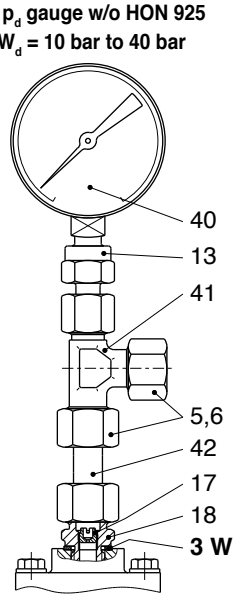








Booster valve, adjustable



M_A Be sure to comply with tightening torques in table on page 6.

W Parts should be held in stock for maintenance purposes

4.2 Spare pare list – pilot HON 655

Item no.	Denomination	No.	W	Materials	Part no. Wd 0.5 to 40 bar	Part no. Wd 20 to 90 bar, 0
1	Washer	14		St	8279	8279
2	Hex screw	12		St	10336	10336
3	**Sealing ring**	**7**	**W**	**LM**	**18842**	**18842**
4	Connection pipe	4		St	30074	30074
5	Union nut	7		St	30804	30804
6	Cutting ring	7		St	30904	30904
7	Pressure gauge, at option:					
7	Equipment pressure stage PN 16	2		NSt/Ms	26284	
7	Equipment pressure stage PN 25, ANSI 150	2		NSt/Ms	26284	
7	Equipment pressure stage PN 40	2		NSt/Ms	26283	
7	Equipment pressure stage ANSI 300	2		NSt/Ms	26283	26285
7	Equipment pressure stage ANSI 600	2		NSt/Ms	26285	26285
8	Connection pipe	1		St	31865	
9	Union nut	5		St	30803	30803
10	Cutting ring	4		St	30903	30903
11	Straight length of pipe	1		St	32101	
12	Connection pipe	1		St	10000714	10000714
13	Connection pipe	3		St	31810	31810
14	Connection pipe	1		St	31609	31609
15	Stop cane	1		St	32004	32004
16	Straight length of pipe	1		St	32101	32101
17	Metering screw Δ 0.5	2		Ms	10014015	10014015
18	Connection pipe	1		St	10009683	10009683
19	Sealing cap	1		Ms	10000121	10000121
20	Base plate	1		LM	10000084	10000084
21	Connection pipe	1		St	30023	30023
22	Hex screw	2		St	10383	10383
23	**O ring**	**1**	**W**	**KG**	**20341**	**20341**
24	**O ring**	**12**	**W**	**KG**	**20225**	**20225**
25	**O ring**	**1**	**W**	**KG**	**20332**	**20332**
26	Connection pipe	1		St	30111	30111
27	Base plate	1		LM	10000082	10000082

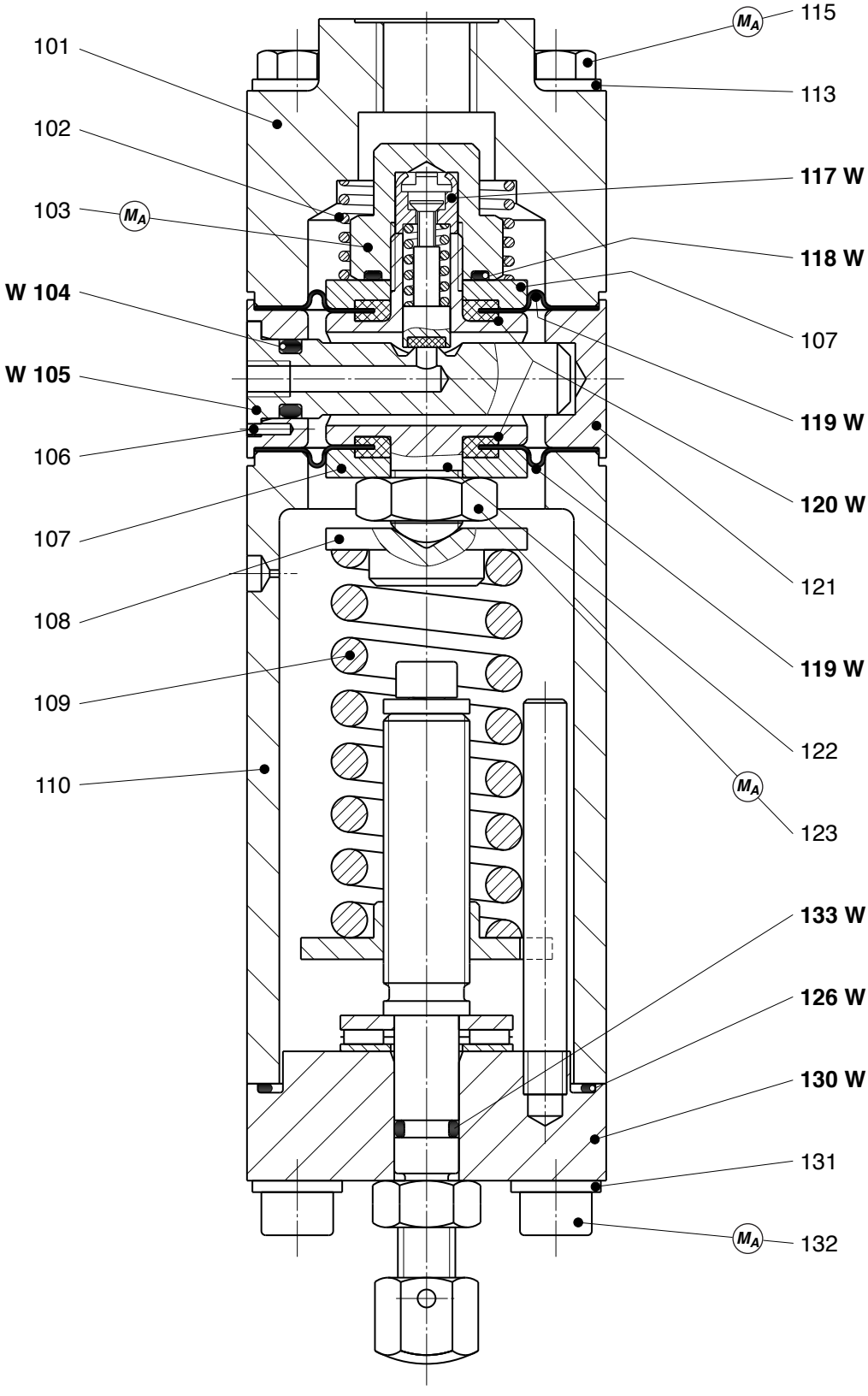
W Parts should be held in stock for maintenance purposes.

German abbreviations stand for the following materials:

St ... steel
NSt ... stainless steel
FSt ... spring steel
NFSt ... stainless spring steel
GS ... cast steel
GGG ... spheroidal graphite cast iron
GZn ... cast zinc
GBz ... cast bronze
LM ... light metal / alloy
Ms ... brass
Cu ... copper
Bz ... bronze
GLM ... cast light metal
GMs ... cast brass
AlBz ... aluminium bronze
SSt ... foamed materials
K ... synthetic materials
KG ... gummous synthetic materials
KGT ... Gummous synthetic resin with teflon
KV ... Viton
KT ... Teflon
PGL ... plexiglass

Item no.	Denomination	No.	W	Materials	Part no. Wh 0.5 to 40 bar	Part no. Wh 20 to 90 bar
28	**O ring**	**2**	**W**	**KG**	**20231**	**20231**
29	Washer	1		LM	10022218	10022218
30	Washer	1		LM	10010479	10010479
31	Washer	1		FSt	19065	19065
32	Guide screw	1		Ms	10000144	10000144
33	**O ring**	**1**	**W**	**KG**	**20283**	**20283**
34	**O ring**	**1**	**W**	**KG**	**20332**	**20332**
35	Sleeve	1		PGI	10000171	10000171
36	Protective cap	1		KG	26343	26343
37	Spindle	1		Niro	10000145	10000145
38	Pressure gauge, at option:					
38	Wd 0.5 to 2 bar	1		NSt/Ms	26891	
38	Wd 1 to 5 bar	1		NSt/Ms	26281	
38	Wd 2 to 10 bar	1		NSt/Ms	26314	
38	Wd 5 to 20 bar	1		NSt/Ms	26284	
39	Overpressure protection, at option:					
39	Wd 0.5 to 2 bar	1			10023355	
39	Wd 1 to 5 bar	1			10023336	
39	Wd 2 to 10 bar	1			10023337	
39	Wd 5 to 20 bar	1			10023338	
40	Pressure gauge, at option:					
40	Wd 10 to 40 bar	1		NSt/Ms	26282	
40	Wd 20 to 90 bar	1		NSt/Ms		26285
41	Connection pipe	1		St	31455	31455
42	Straight length of pipe	1		St	32141	32141

4.3.1.1 Automatic auxiliary pressure stage
Differential pressure stage, orifice plate in p_d line



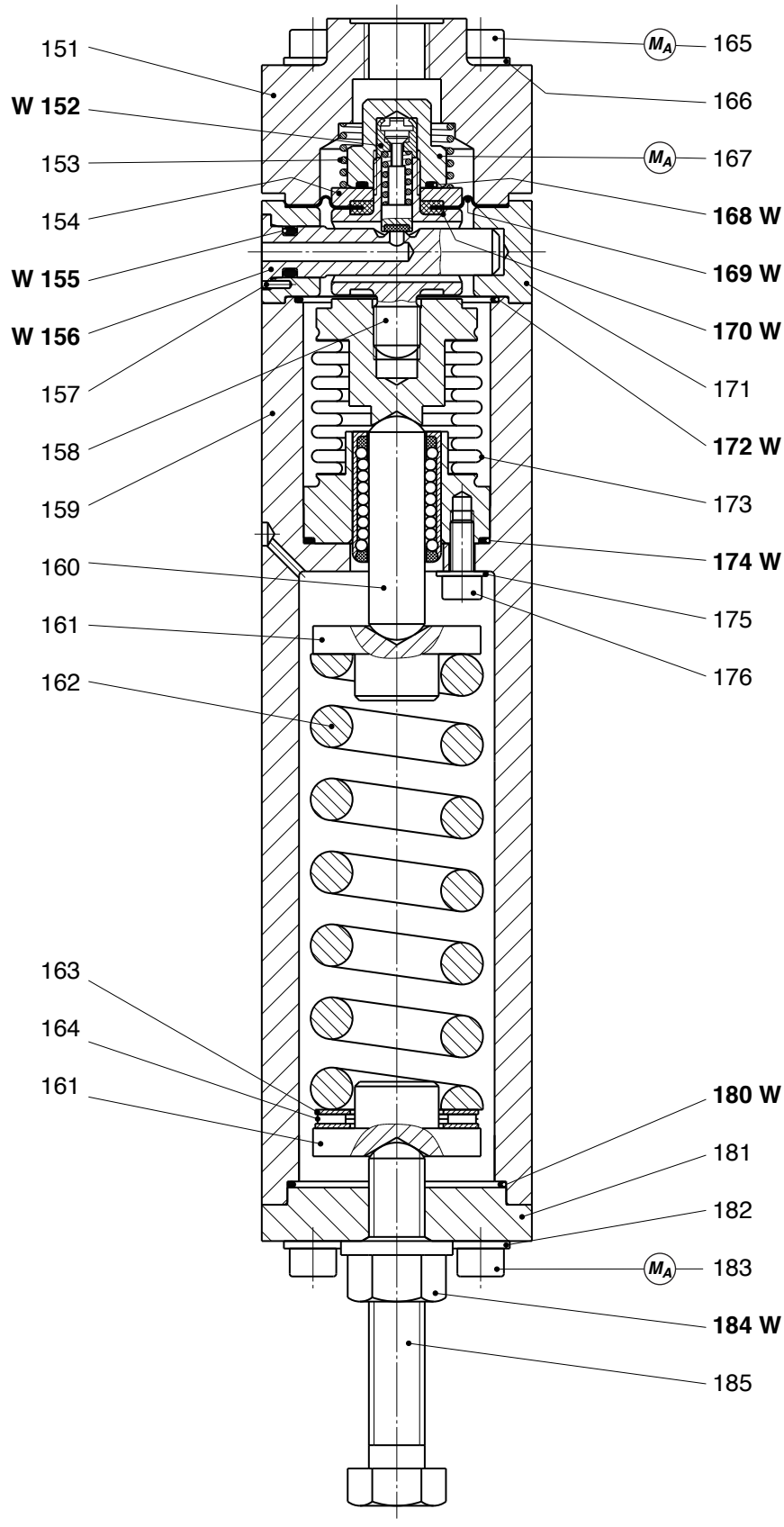
M_A Be sure to comply with tightening torques in table on page 6.

W Parts should be held in stock for maintenance purposes.

4.3.1.2 Automatic auxiliary pressure stage Differential pressure stage, orifice plate in p_d line

Item no.	Denomination	No.	W	Materials	Part no. Aux. pressure stage Valve seat – Δ 3	Part no. Differ. pressure stage Valve seat – Δ 3
101	Cap	1		LM	10000190	10000190
102	Pressure spring	1		NSt	10010463	10010463
103	Sealing cap	1		NSt	10000188	10000188
104	**O ring**	**1**	**W**	**KG**	**20225**	**20225**
105	**Valve core**	**1**	**W**	**LM**	**10000061**	**10000061**
106	Half length reserve taper grooved dowel pin	1		ST	17197	17197
107	Diaphragm disk	2		LM	10000110	10000110
108	Spring plate	1		LM	10000073	10000073
109	Pressure 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/K**	**10000186**	**10000186**
118	**O ring**	**1**	**W**	**KG**	**20332**	**20332**
119	**Bead diaphragm**	**2**	**W**	**KG**	**10000191**	**10000185**
120	**Integration gasket**	**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	10010480
131	Washer	4		St	8279	8279
132	Cheese head screw	4		St	10150	10150
133	**O ring**	**1**	**W**	**KG**	**20226**	**20226**

4.3.2.1 Control stage with metal-harmonica measuring unit



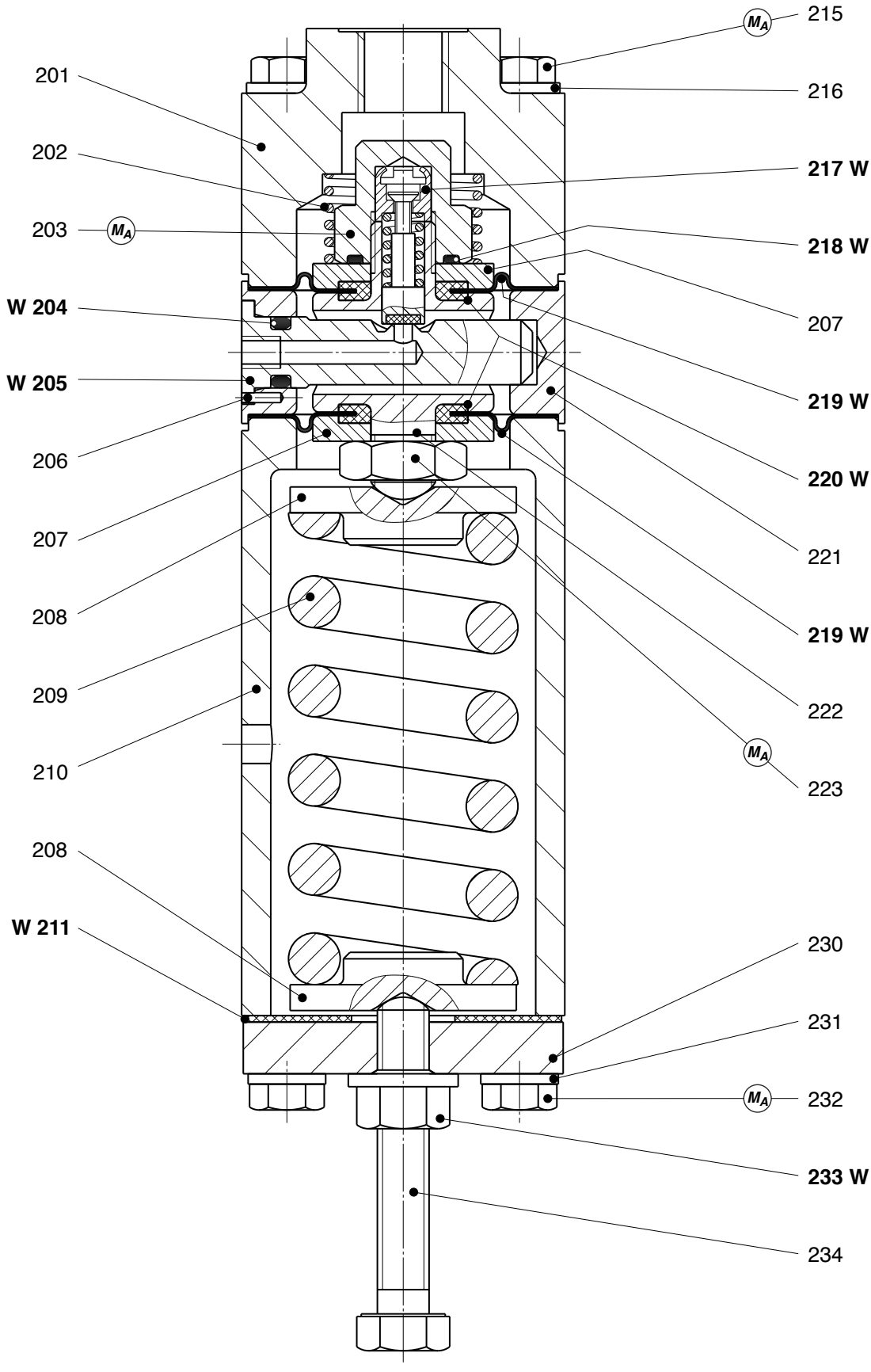
M_A Be sure to comply with tightening torques in table on page 6.

W Parts should be held in stock for maintenance purposes.

4.3.2.2 Control stage with metal-harmonica measuring unit

Item no.	Denomination	No.	W	Materials	Part no.
151	Cap	1		LM	10 011 768
152	**Piston, pre-assembled**	**1**	**W**	**NSt/NFSt/KV**	**10 000 186**
153	Pressure spring	1		NFSt	10 010 463
154	Diaphragm disk	2		LM	10 000 110
155	**O ring**	**1**	**W**	**KG**	**20 225**
156	**Valve core**	**1**	**W**	**LM**	**10 011 775**
157	Half length reserve taper grooved dowel pin	1		St	17 197
158	Joining piece	1		NSt	10 011 773
159	Spring housing	1		LM	10 011 767
160	Guide bolt	1		St	10 011 772
161	Spring plate	2		NSt	10 011 774
162	Pressure spring	1		FSt	10 010 444
163	Axial disc	2		St	26 385
164	Axial needle bearing	1		St	26 384
165	Cheese head screw	4		St	10 548
166	Washer	4		St	8 279
167	Sealing cap	1		NSt	10 00 188
168	**O ring**	**1**	**W**	**KG**	**20 332**
169	**Bead diaphragm**	**1**	**W**	**KG**	**10 000 191**
170	**Integration gasket**	**1**	**W**	**KG**	**10 000 066**
171	Valve housing	1		LM	10 011 769
172	**O ring**	**1**	**W**	**KG**	**20 416**
173	Metal harmonica, complete	1		NSt/St	10 011 764
174	**O ring**	**1**	**W**	**KG**	**20 317**
175	Washer	3		St	6 157
176	Cheese head screw	3		St	10 318
180	**O ring**	**1**	**W**	**KG**	**20 293**
181	Plate	1		St	10 011 770
182	Washer	4		St	8 279
183	Cheese head screw	4		St	10 097
184	**Hex collar nut**	**1**	**W**	**St/K**	**13 145**
185	Adjusting screw	1		NSt	10 010 447

4.3.3.1 Control stage with diaphragm measuring unit



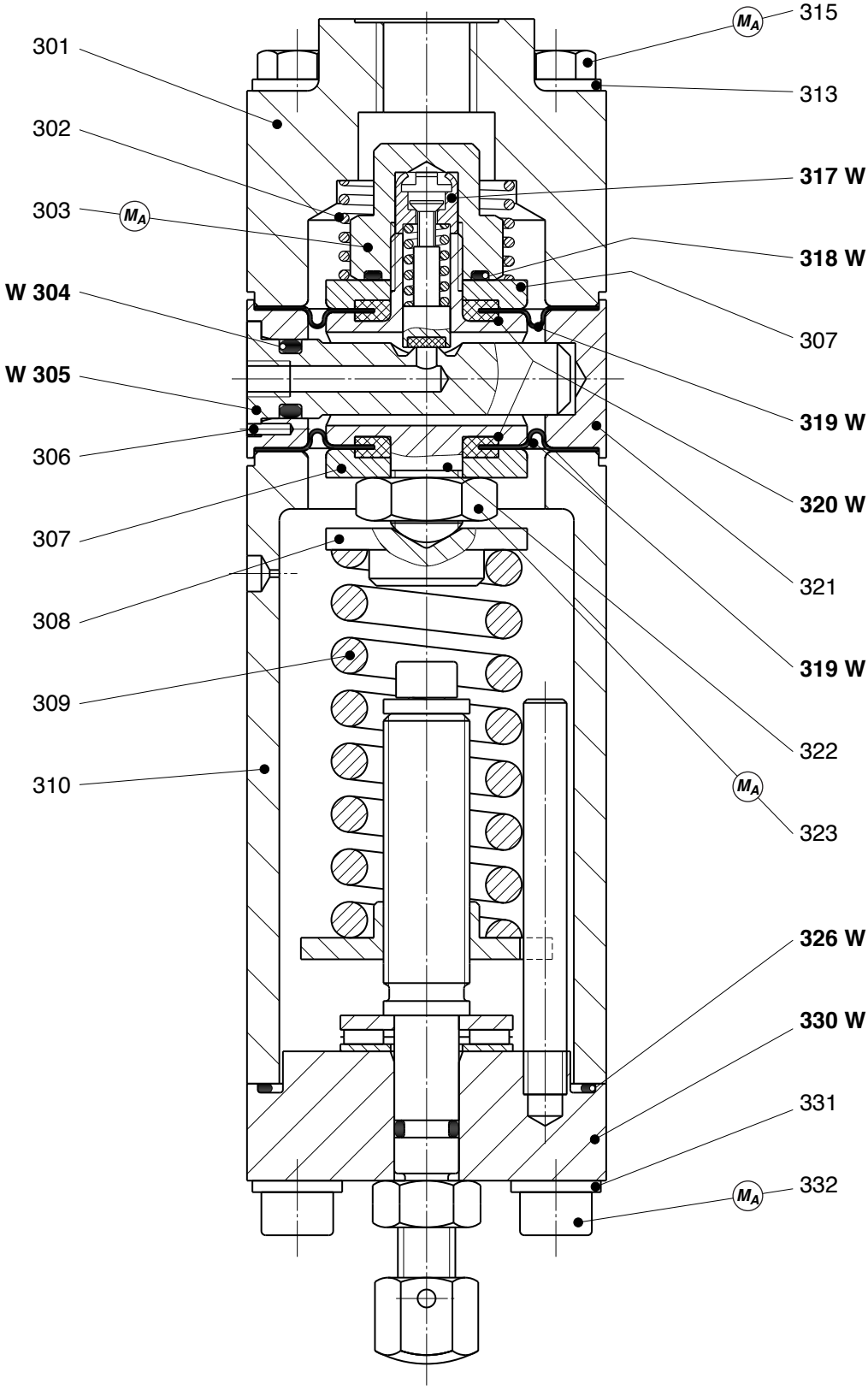
M_A Be sure to comply with tightening torques in table on page 6.

W Parts should be held in stock for maintenance purposes.

4.3.3.2 Control stage with diaphragm measuring unit

Item no.	Denomination	No.	W	Materials	Part no.
201	Cap	1		LM	10 000 190
202	Pressure spring	1		NSt	10 010 463
203	Sealing cap	1		NSt	10 000 188
204	**O ring**	**1**	**W**	**KG**	**20 225**
205	**Valve core**	**1**	**W**	**LM**	**10 000 061**
206	Half length reserve taper grooved dowel pin	1		ST	17 197
207	Diaphragm disk	2		LM	10 000 110
208	Spring plate, at option:				
208	W_a 0.5 to 10 bar	2		LM	10 000 114
208	W_a 10 to 40 bar	2		LM	10 000 148
209	Pressure spring, at option:				
209	W_a 0.5 to 2 bar	1		FSt	10 000 156
209	W_a 1.0 to 5 bar	1		FSt	10 009 671
209	W_a 2.0 to 10 bar	1		FSt	10 000 139
209	W_a 5.0 to 20 bar	1		FSt	10 000 115
209	W_a 10.0 to 40 bar	1		FSt	10 000 064
210	Spring housing	1		LM	10 000 062
211	**Seal**	**1**	**W**	**K**	**10 000 100**
215	Hex screw	4		St	10 377
216	Washer	4		St	8 279
217	**Piston, pre-assembled**	**1**	**W**	**NSt/NFSt/KV**	**10 000 186**
218	**O ring**	**1**	**W**	**KG**	**20 332**
219	**Bead diaphragm**	**2**	**W**	**KG**	**10 000 191**
220	**Integration gasket**	**2**	**W**	**KG**	**10 000 066**
221	Valve housing	1		LM	10 000 137
222	Joining piece	1		NSt	10 000 108
223	Hex nut	1		St	13 114
230	Cap	1		St	10 000 116
231	Washer	4		St	8 279
232	Hex screw	4		St	6 493
233	**Hex collar nut**	**1**	**W**	**St/K**	**13 136**
234	Adjusting screw	1		NSt	10 002 795

4.3.4.1 Differential pressure stage, orifice plate in p_u line



M_A Be sure to comply with tightening torques in table on page 6.

W Parts should be held in stock for maintenance purposes.

4.3.4.2 Differential pressure stage, orifice plate in p_u line

Item no.	Denomination	No.	W	Materials	Part no.
301	Cap	1		LM	10000190
302	Pressure spring	1		NSt	10010463
303	Sealing cap	1		NSt	10000188
304	**O ring**	**1**	**W**	**KG**	**20225**
305	**Valve core**	**1**	**W**	**LM**	**10000061**
306	Half length reserve taper grooved dowel pin	1		ST	17197
307	Diaphragm disk	2		LM	10000110
308	Spring plate	1		LM	10000073
309	Pressure spring	1		NFSt	10000088
310	Spring housing	1		LM	10000087
313	Washer	4		St	8279
315	Hex screw	4		St	10377
317	**Piston, pre-assembled**	**1**	**W**	**NSt/NFSt/KV**	**10000186**
318	**O ring**	**1**	**W**	**KG**	**20332**
319	**Bead diaphragm**	**2**	**W**	**KG**	**10000191**
320	**Integration gasket**	**2**	**W**	**KG**	**10000066**
321	Valve housing	1		LM	10000137
322	Joining piece	1		NSt	10000108
323	Hex nut	1		St	13114
326	**O ring**	**1**	**W**	**KG**	**20293**
330	Plate, pre-assembled	1		Ms/Al/Bz/NSt...	10010480
331	Washer	4		St	8279
332	Cheese head screw	4		St	10150

4.4 Parts for maintenance purposes

Item no.	Denomination	No.	Part no.
3	Sealing ring	7	18842
23	O ring	1	20341
24	O ring	12	20225
25	O ring	1	20332
28	O ring	2	20231
33	O ring	1	20283
34	O ring	1	20332
Automatic auxiliary pressure stage, differential pressure stage for p_d line			
104	O ring	1	20 225
105	Valve core	1	10 000 061
117	Piston, pre-assembled	1	10 000 186
118	O ring	1	20 332
119	Pre-formed diaphragm	2	10 000 191
120	Integration gasket	2	10 000 066
126	O ring	1	20 293
Control stage with metal-harmonica measuring unit			
152	Piston, pre-assembled	1	10 000 186
155	O ring	1	20 225
156	Valve core	1	10 011 775
168	O ring	1	20 332
169	Pre-formed diaphragm	1	10 000 191
170	Integration gasket	1	10 000 066
172	O ring	1	20 416
174	O ring	1	20 317
180	O ring	1	20 293
184	Hex collar nut	1	13 145
Control stage with diaphragm measuring unit			
204	O ring	1	20 225
205	Valve core	1	10 000 061
211	Seal	1	10 000 100
217	Piston, pre-assembled	1	10 000 186
218	O ring	1	20 332
219	Pre-formed diaphragm	2	10 000 191
220	Integration gasket	2	10 000 066
233	Hex collar nut	1	13 136
Differential pressure stage for p_u line			
304	O ring	1	20 225
305	Valve core	1	10 000 061
317	Piston, pre-assembled	1	10 000 186
318	O ring	1	20 332
319	Pre-formed diaphragm	2	10000185
320	Integration gasket	2	10000066
326	O ring	1	20293

For More Information

To learn more about Honeywell's Advanced Gas Solutions, visit www.honeywellprocess.com or contact your Honeywell account manager

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