



Zertifiziertes  
QM-System  
DIN EN ISO 9001  
Zertifikat-Nr. 01017

## Bourdon Tube Pressure Gauges

acc. to EN 837 · for Industrial Applications



measuring  
·  
monitoring  
·  
analysing



- Housing:  
63 mm, 80 mm, 100 mm, 160 mm  
Rectangular Casing:  
96 x 96 mm, 144 x 144 mm  
Options:  
40 mm, 50 mm, 250 mm, 400 mm
- Connection:  
G 1/4 (housing 63, 80 mm)  
G 1/2 (housing 100, 160 mm)
- Material  
Housing: stainless steel, aluminium  
Connection: brass
- Measuring ranges:  
-1...0 bar to 0...+1000 bar
- Options: liquid filling;  
contacts; transmitter



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**Model:**  
MAN-R  
MAN-Q

### Application

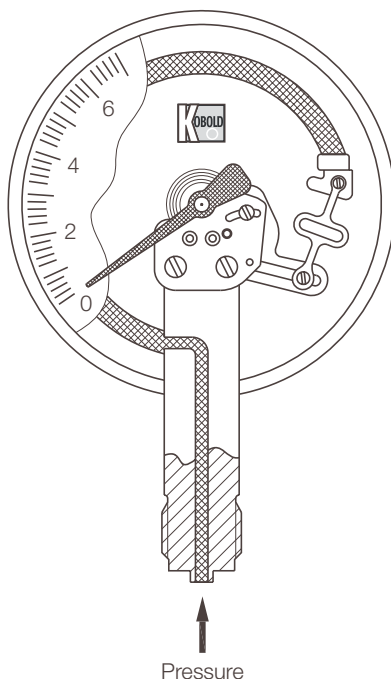
These KOBOLD pressure gauges can be used for all applications where accuracy, repeatability and long-term stability are of special importance. They can be used for liquid or gaseous substances which do not crystallize, are not highly viscous and do not corrode brass.

The extensive range of options allows the user to adapt the instruments to his own special requirements. All the pressure gauges comply with general international guidelines and take account of standard as well as application-specific requirements. KOBOLD Bourdon tube pressure gauges are the result of over 70 years experience in building pressure gauges.

### Measuring principle

Mechanical pressure measurement uses the principle of an elastic measuring element, which generates a precisely defined, reproducible deflection when subjected to pressure. The motion works convert this into a rotary motion of the pointer. The pressure at the measuring element can be read on the scale of the dial.

### Unifilar drawing



### Fields of application

- Mechanical engineering
- Hydraulics
- Compressors
- Pumps
- Plant construction

### Housing

The following housing diameters are available: 63 mm, 80 mm, 100 mm and 160 mm. The housing is made of stainless steel. As an alternative to the 100 mm or 160 mm diameter pressure gauge, the devices can also be supplied with a robust aluminium housing. This option is only available from KOBOLD and has proven ideal for very robust use in filled equipment, e.g. in ship's diesel engines. It is also available with a rectangular profile housing for integration into control panels. This is available as 96 x 96 mm and 144 x 144 mm versions. Housings are optionally available with 40 mm, 50 mm, 250 mm or 400 mm nominal diameters.

### Installation

The gauges are most often installed straight into the customer's screw necks. Optional gauge models with an installation border on the front are also available for installation into or onto control panels.

### Connection

The gauges with 63 and 80 mm housing diameter are supplied with a G $\frac{1}{4}$  connecting thread as standard, gauges with housing diameter of 100 mm and above with G $\frac{1}{2}$  connecting thread. The connection is made of brass. Diaphragm seals can be mounted for viscous, crystallising, aggressive materials or higher temperature materials to prevent the material being measured from penetrating into the measuring system. Other connection types are available on request.

### Measuring ranges

The measuring ranges are graduated according to DIN recommendations and lie between -1...0 bar and 0...1000 bar. Other scales with measuring ranges in PSI, Pa or with your company logo are available on request.

### Damping liquid





Pressure gauges with liquid filling are used in locations with high alternating dynamic loads, strong vibrations and pulses. The filling ensures easy readability through steady pointer movement even when subjected to extreme loading and heavy vibration. The lubricating effect of the glycerine also keeps wear to a minimum. Glycerine is always used as a matter of principle. In gauges with a contact or an electrical measuring transducer, liquid paraffin is used as a non-conductive alternative. Silicon fillings of various viscosities are also optionally available.

### Contacts

For monitoring the system pressure, gauges with 100 mm or 160 mm diameter can be fitted with up to four limit contacts. Slow action, magnetic spring, inductive and pneumatic contacts are also available (see Chapter »Contact Fittings for Pressure Gauges«).



Technical Data · NG 63/80, Rectangular Casing





Connection/Housing	Round housing			Profile housing		
	NG 63	NG 63	NG 80	96x96	144x144	
<b>Model</b>						
Bottom connection 	MAN-...	...RD21...	...RD71...	...RE22...	-	-
Back connection 	MAN-...	...RD23... central	...RD73... central	...RE24... eccentric	-	-
Triangular front ring with clamp, Back connection 	MAN-...	...RD23B... central	...RD73B... central	...RE24K... eccentric	...QF14B...	...QG14B...
Front flange Back connection 	MAN-...	...RD23V... central	...RF73V... central	-	-	-
Accuracy class	1.6			1.0		
Housing version	stainless steel 1.4301			steel, ni-plated		
Filling	-	glycerine	-	-	-	
Ring/housing	stainless steel 1.4301			light metal/ steel ni-plated		
Pointer	aluminium, black anodized, partly plastic			aluminium, black anodized		
Movement	brass					
Throttle	from 60 bar D = 0.5 mm					
Window	Polycarbonate			instrument glass		
Measuring element	CuSn (from 100 bar stainless steel 1.4571)					
Protection	IP 65	IP 67	IP 65	IP 54 von vorne		
Overrange protection	1,2 times		short term 1.3 times (from 1000 bar 1.1 times) of F.S.			
Weight	see table		0.4 kg	0.7 kg	1.2 kg	
Ambient temperature	-20 ... +60°C					
Connection	brass					
Thread connection	G 1/4 male			G 1/2 male		
Max. medium temperature	80°C					
Contacts	no			yes, max. 4 contacts		
Options	Trailing pointer, marking pointer, oil-free and decreased, special scale					
<b>Indicating range</b>		<b>Code of indicating range</b>				
-0.6...0 bar	-	-	..AC	..AC	..AC	
-1...0 bar	..AD	..AD	..AD	..AD	..AD	
-1...+0.6 bar	..A0	..A0	..A0	..A0	..A0	
-1...+1.5 bar	..A1	..A1	..A1	..A1	..A1	
-1...+3 bar	..A2	..A2	..A2	..A2	..A2	
-1...+5 bar	..A3	..A3	..A3	..A3	..A3	
-1...+9 bar	..A4	..A4	..A4	..A4	..A4	
-1...+15 bar	..A5	..A5	..A5	..A5	..A5	
0...0.6 bar	-	-	-	..B1	..B1	
0...1 bar	..B2	..B2	..B2	..B2	..B2	
0...1.6 bar	..B3	..B3	..B3	..B3	..B3	
0...2.5 bar	..B4	..B4	..B4	..B4	..B4	
0...4 bar	..B5	..B5	..B5	..B5	..B5	
0...6 bar	..B6	..B6	..B6	..B6	..B6	
0...10 bar	..B7	..B7	..B7	..B7	..B7	
0...16 bar	..B8	..B8	..B8	..B8	..B8	
0...25 bar	..B9	..B9	..B9	..B9	..B9	
0...40 bar	..B0	..B0	..B0	..B0	..B0	
0...60 bar	..C1	..C1	..C1	..C1	..C1	
0...100 bar	..C2	..C2	..C2	..C2	..C2	
0...160 bar	..C3	..C3	..C3	..C3	..C3	
0...250 bar	..C4	..C4	..C4	..C4	..C4	
0...400 bar	..C5	..C5	..C5	..C5	..C5	
0...600 bar	..C6	..C6	..C6	..C6	..C6	
0...1000 bar	-	-	-	..D7	..D7	



Technical Data · NG 100

Connection/Housing		Model				
Bottom connection		MAN-...	...RF22...	...RF32...	...RF72...	...RF62...
Back connection		MAN-...	...RF24... eccentric	...RF34... eccentric	...RF74... eccentric	...RF64... eccentric
Triangular front ring with clamp, back connection		MAN-...	...RF24K... eccentric	...RF34K... eccentric	-	...RF64K... eccentric
Front flange Back connection		MAN-...	...RF24V... eccentric	...RF34V... eccentric	...RF74V... eccentric	...RF64V... eccentric
Accuracy class	1.0					
Housing version	st. steel 1.4301		aluminium	st. steel 1.4301		aluminium
Filling	-		-	glycerine (paraffin with contact)		
Ring	st. steel 1.4301		steel black	st. steel 1.4301		steel black
Pointer	aluminium, black anodized					
Movement	brass					
Throttle	from 60 bar D = 0.5 mm					
Window	instrument glass					
Measuring element	CuSn (from 100 bar stainless steel 1.4571)					
Protection	IP 65		IP 67			
Overrange protection	short term 1.3 times (from 1000 bar 1.1 times) of F. S.					
Weight	see table					
Ambient temperature	-20 ... +60 °C					
Connection	brass					
Thread connection	G 1/2 male					
Max. medium temperature	80 °C					
Contacts	max. 3		max. 4		max. 3	max. 4
Options	Trailing pointer, marking pointer, oil-free and decreased, special scale					
<b>Indicating range</b>		<b>Code of indicating range</b>				
-0.6...0 bar		..AC	..AC	..AC	..AC	
-1...0 bar		..AD	..AD	..AD	..AD	
-1...+0.6 bar		..A0	..A0	..A0	..A0	
-1...+1.5 bar		..A1	..A1	..A1	..A1	
-1...+3 bar		..A2	..A2	..A2	..A2	
-1...+5 bar		..A3	..A3	..A3	..A3	
-1...+9 bar		..A4	..A4	..A4	..A4	
-1...+15 bar		..A5	..A5	..A5	..A5	
0...0.6 bar		..B1	..B1	..B1	..B1	
0...1 bar		..B2	..B2	..B2	..B2	
0...1.6 bar		..B3	..B3	..B3	..B3	
0...2.5 bar		..B4	..B4	..B4	..B4	
0...4 bar		..B5	..B5	..B5	..B5	
0...6 bar		..B6	..B6	..B6	..B6	
0...10 bar		..B7	..B7	..B7	..B7	
0...16 bar		..B8	..B8	..B8	..B8	
0...25 bar		..B9	..B9	..B9	..B9	
0...40 bar		..B0	..B0	..B0	..B0	
0...60 bar		..C1	..C1	..C1	..C1	
0...100 bar		..C2	..C2	..C2	..C2	
0...160 bar		..C3	..C3	..C3	..C3	
0...250 bar		..C4	..C4	..C4	..C4	
0...400 bar		..C5	..C5	..C5	..C5	
0...600 bar		..C6	..C6	..C6	..C6	
0...1000 bar		..D7	..D7	..D7	..D7	

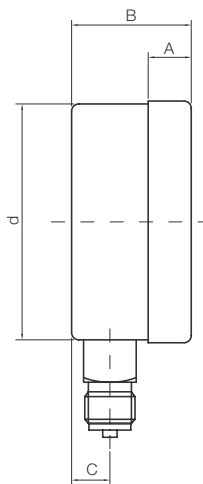
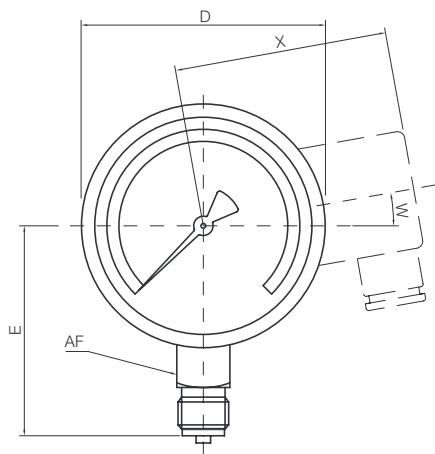
Technical Data · NG 160

Connection/Housing		Model				
Bottom connection		MAN-...	...RG22...	...RG32...	...RG72...	...RG62...
Back connection		MAN-...	...RG24... eccentric	...RG34... eccentric	...RG74... eccentric	...RG64... eccentric
Triangular front ring and clamp, back connection		MAN-...	-	...RG34K... eccentric	-	...RG64K... eccentric
Front flange Back connection		MAN-...	...RG24V... eccentric	...RG34V... eccentric	...RG74V... eccentric	...RG64V... eccentric
Accuracy class	1.0					
Housing version	st. steel 1.4301		aluminium	st. steel 1.4301		Aluminium
Filling	-		-	glycerine (paraffine with contact)		
Ring	st. steel 1.4301		steel black	st. steel 1.4301		steel black
Pointer	aluminium, black anodized					
Movement	brass					
Throttle	from 60 bar D = 0,5 mm					
Window	instrument glass					
Measuring element	CuSn (from 100 bar stainless steel 1.4571)					
Protection	IP 65		IP 67			
Overrange protection	short term 1.3 times (from 1000 bar 1.1 times) of F. S.					
Weight	see table					
Ambient temperature	-20 ... +60 °C					
Connection	brass					
Thread connection	G 1/2 male					
Max. medium temperature	80 °C					
Contacts	max. 3		max. 4		max. 4	
Options	Trailing pointer, marking pointer, oil-free and decreased, special scale					
<b>Indicating range</b>		<b>Code of indicating range</b>				
-0.6...0 bar		..AC	..AC	..AC	..AC	
-1...0 bar		..AD	..AD	..AD	..AD	
-1...+0.6 bar		..A0	..A0	..A0	..A0	
-1...+1.5 bar		..A1	..A1	..A1	..A1	
-1...+3 bar		..A2	..A2	..A2	..A2	
-1...+5 bar		..A3	..A3	..A3	..A3	
-1...+9 bar		..A4	..A4	..A4	..A4	
-1...+15 bar		..A5	..A5	..A5	..A5	
0...0.6 bar		..B1	..B1	..B1	..B1	
0...1 bar		..B2	..B2	..B2	..B2	
0...1.6 bar		..B3	..B3	..B3	..B3	
0...2.5 bar		..B4	..B4	..B4	..B4	
0...4 bar		..B5	..B5	..B5	..B5	
0...6 bar		..B6	..B6	..B6	..B6	
0...10 bar		..B7	..B7	..B7	..B7	
0...16 bar		..B8	..B8	..B8	..B8	
0...25 bar		..B9	..B9	..B9	..B9	
0...40 bar		..B0	..B0	..B0	..B0	
0...60 bar		..C1	..C1	..C1	..C1	
0...100 bar		..C2	..C2	..C2	..C2	
0...160 bar		..C3	..C3	..C3	..C3	
0...250 bar		..C4	..C4	..C4	..C4	
0...400 bar		..C5	..C5	..C5	..C5	
0...600 bar		..C6	..C6	..C6	..C6	
0...1000 bar		..D7	..D7	..D7	..D7	

**Dimensions**

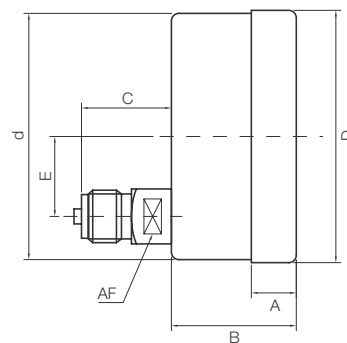
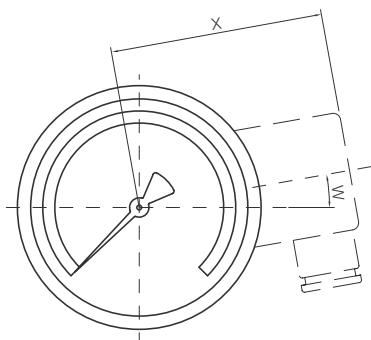
**Bottom connection**

Code	NG	A	B without contacts	B 1 or 2 contacts	B 3 contacts	B 4 contacts	C	d	D	E	AF	W	X
MAN-RD 21/71	63 mm	6	31	-	-	-	13	62	68	55	14	-	-
MAN-RE 22	80 mm	5	43,5	-	-	-	16	80	84	76	22	-	-
MAN-RF 22/72	100 mm VA	17	48	82	97	110	15	100	101	86.5	22	0	88
MAN-RF 32/62	100 mm Alu	-	43	91	107	107	15	100	-	86.5	27	0	88
MAN-RG 22/72	160 mm VA	21	50	101	120	120	15	159	162	117	22	0	118
MAN-RG 32/62	160 mm Alu	-	48	101	127	127	18.5	160	-	115	27	25°	118



**Back connection**

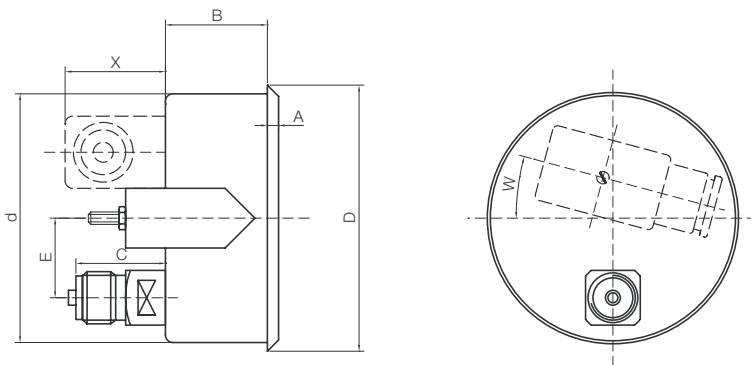
Code	NG	A	B without contacts	B 1 or 2 contacts	B 3 contacts	B 4 contacts	C	d	D	E	AF	W	X
MAN-RD 23/73	63 mm	6	28	-	-	-	26	63	68	0	14	-	-
MAN-RE 24	80 mm	5	43.5	-	-	-	35	80	84	0	22	-	-
MAN-RF 24/74	100 mm VA	17	49	82	97	110	36	100	101	32.5	17	0	88
MAN-RF 34/64	100 mm Alu	-	43	91	107	107	34	100	-	32.5	27	0	88
MAN-RG 24/74	160 mm VA	21	50	101	120	120	34	159	162	32.5	17	0	118
MAN-RG 34/64	160 mm Alu	-	48	101	127	127	30	160	-	50	27	25°	118



**Dimensions**

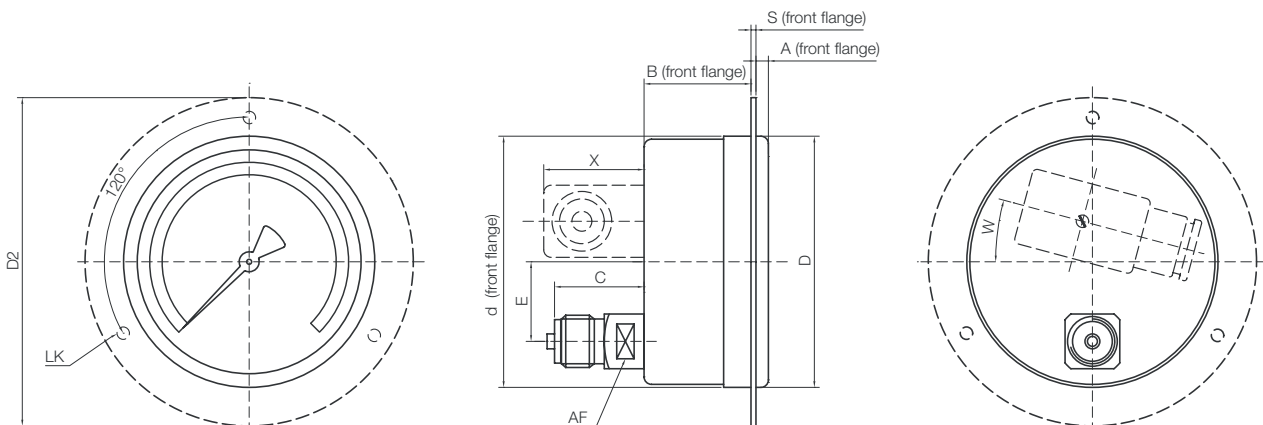
**Triangular front ring with clamp**

Code	NG	A	B without contacts	B 1 or 2 contacts	B 3 contacts	B 4 contacts	C	d	D	E	AF	W	X
MAN-RD 23/73 B	63 mm	6	26	-	-	-	26	62	68	0	14	-	-
MAN-RE 24 K	80 mm	5	43.5	-	-	-	35	80	84	0	22	-	-
MAN-RF 24 K	100 mm VA	5	41	88	105	105	36	101	107	32.5	17	0	42
MAN-RF 34/64 K	100 mm Alu	5	41	88	105	105	34	100	107	32.5	27	0	42
MAN-RG 34/64 K	160 mm VA	5	45	98	145	145	30	160	162	50	27	0	42



**Front ring**

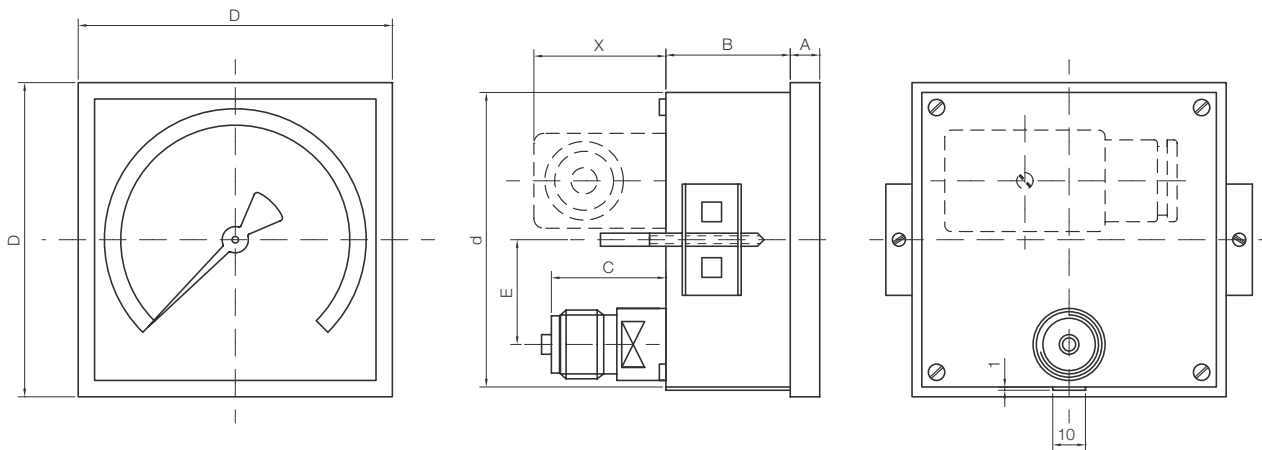
Code	NG	A	B without contacts	B 1 or 2 contacts	B 3 contacts	B 4 contacts	C	d	D	D2	E	LK	S	AF	W	X
MAN-RD 23/73 V	63 mm	7	24	-	-	-	26	62	68	85	0	75	1	14	-	-
MAN-RF 24/74 V	100 mm VA	6	43	86	92	105	36	104	101	132	32.5	116	2	17	15	42
MAN-RF 34/64 V	100 mm Alu	5	40	86	102	102	34	100	100	132	32.5	116	2	27	15	42
MAN-RG 24/74 V	160 mm VA	6	43	95	110	110	34	164	161	196	32.5	178	2	17	15	42
MAN-RG 34/64 V	160 mm Alu	9	42	93	118	118	30	160	160	196	50	178	2	27	15	42



**Dimensions**

**Rectangular casing**

Code	NG	A	B without contacts	B 1 or 2 contacts	B 3 contacts	B 4 contacts	C	d	D	E	AF	X
MAN-QF	96x96	9	40	81	85	92	34	90	96	32	17	42
MAN-QG	144x144	9	47	90	97	127	34	156	145	52	17	42



**Weight**

NG 63			without contacts	up to 2 contacts	3 contacts	4 contacts
Code	Housing- filling	Weight [kg]	Weight [kg]	Weight [kg]	Weight [kg]	Weight [kg]
MAN-RD21	without	0.14	-	-	-	-
MAN-RD23	without	0.15	-	-	-	-
MAN-RD23B	without	0.18	-	-	-	-
MAN-RD23V	without	0.18	-	-	-	-
MAN-RD71	with	0.21	-	-	-	-
MAN-RD73	with	0.22	-	-	-	-
MAN-RD73B	with	0.25	-	-	-	-
MAN-RD73V	with	0.25	-	-	-	-

NG 80						
Code	Housing- filling	Weight [kg]	Weight [kg]	Weight [kg]	Weight [kg]	Weight [kg]
MAN-RE22	without	0.4	-	-	-	-
MAN-RE24	without	0.4	-	-	-	-
MAN-RE24K	without	0.4	-	-	-	-
MAN-RE24V	without	0.4	-	-	-	-
MAN-RE72	with	0.55	-	-	-	-
MAN-RE74	with	0.55	-	-	-	-
MAN-RE74K	with	0.55	-	-	-	-
MAN-RE74V	with	0.55	-	-	-	-

NG 100						
Code	Housing- filling	Weight [kg]	Weight [kg]	Weight [kg]	Weight [kg]	Weight [kg]
MAN-RF22	without	0.5	0.7	0.75	0.8	-
MAN-RF24	without	0.5	0.7	0.75	0.8	-
MAN-RF24K	without	0.6	0.8	0.85	0.9	-
MAN-RF24V	without	0.6	0.8	0.85	0.9	-
MAN-RF32	without	0.6	0.8	0.85	0.9	-

NG 100 (continued)

Code	Housing- filling	Weight [kg]	Weight [kg]	Weight [kg]	Weight [kg]
MAN-RF34	without	0.7	0.9	0.95	1.0
MAN-RF34K	without	0.7	0.9	0.95	1.0
MAN-RF34V	without	0.7	0.9	0.95	1.0
MAN-RF62	with	0.9	1.3	1.4	1.5
MAN-RF64	with	1.0	1.4	1.5	1.6
MAN-RF64K	with	1.0	1.4	1.5	1.6
MAN-RF64V	with	1.0	1.4	1.5	1.6
MAN-RF72	with	0.8	1.2	1.3	-
MAN-RF74	with	0.8	1.2	1.3	-
MAN-RF74V	with	0.9	1.3	1.4	-

NG 160			without contacts	up to 2 contacts	3 contacts	4 contacts
Code	Housing- filling	Weight [kg]	Weight [kg]	Weight [kg]	Weight [kg]	Weight [kg]
MAN-RG22	without	1.0	1.3	1.4	1.5	-
MAN-RG24	without	1.0	1.3	1.4	1.5	-
MAN-RG24V	without	1.1	1.4	1.5	1.6	-
MAN-RG32	without	1.1	1.5	1.6	1.7	-
MAN-RG34	without	1.2	1.5	1.7	1.8	-
MAN-RG34K	without	1.3	1.6	1.7	1.8	-
MAN-RG34V	without	1.3	1.6	1.7	1.8	-
MAN-RG62	with	1.9	2.9	3.4	3.6	-
MAN-RG64	with	1.9	2.9	3.4	3.6	-
MAN-RG64K	with	2.0	3.0	3.5	3.7	-
MAN-RG64V	with	2.0	3.0	3.5	3.7	-
MAN-RG72	with	1.8	2.8	3.2	-	-
MAN-RG74	with	1.8	2.8	3.2	-	-
MAN-RG74V	with	1.9	2.9	3.3	-	-