

Technical data Part-turn gearboxes with primary reduction gearings, version with worm wheel made of bronze for modulating application

**GS 50.3 – GS 125.3/VZ
GS 160.3 – GS 250.3/GZ
Bronze**

Application

For motor and manual operation of valves (e.g. butterfly and ball valves), especially suitable for modulating duty. For special applications, e.g. dampers or gas diverters, special sizing is required.

Worm gearboxes GS 50.3 – GS 125.3 with primary reduction gearings VZ 2.3 – VZ 4.3

Valve				Gearboxes						
Max. valve torque		Valve attachment		Gearbox/ prim. red. gearing	Reduction ratio	Factor ²⁾	Turns for 90°	Input shaft ³⁾	Max. input torques ⁴⁾	Weight ⁵⁾
in Nm up to	Modulating torque ¹⁾ in Nm up to	Flange acc. to EN ISO 5211	Max. shaft diameter in mm							
350	125	F05 ⁶⁾	20	GS 50.3	51:1	17.9	12.75	16	20	7
		F07 ⁶⁾	38							
		F10 ⁶⁾								
700	250	F10 ⁶⁾	50	GS 63.3	51:1	17.3	12.75	20	41	12
		F12 ⁶⁾								
1,400	500	F12 ⁶⁾	60	GS 80.3	53:1	19.3	13.25	20	73	16
2,800	1,000	F14 ⁶⁾ F16	80	GS 100.3	52:1	20.2	13	30/(20)	139	33
				GS 100.3/ VZ 2.3	126:1	44.4	31.5	20	63	39
				GS 100.3/ VZ 3.3	160:1	55.5	40	20	50	39
				GS 100.3/ VZ 4.3	208:1	77	52	20	37	39
5,600	2,000	F16 ⁶⁾ F25	90	GS 125.3	52:1	20.8	13	30	269	40
				GS 125.3/ VZ 2.3	126:1	45.4	31.5	20/(30)	123	46
				GS 125.3/ VZ 3.3	160:1	57.9	40	20/(30)	97	46
				GS 125.3/ VZ 4.3	208:1	77	52	20	73	46

Gearbox/ prim.red. gearing	Possible combinations with multi-turn actuators										Multi-turn actuators	Flange ³⁾ for mounting of multi-turn actuator		Max. weight ⁸⁾	
	Operating times for 50 Hz ⁷⁾ in second for 90° at actuator speed rpm											Actuator for max. input torque	EN ISO 5210		DIN 3210
	4	5,6	8	11	16	22	32	45	63 ⁹⁾	90 ⁹⁾					
GS 50.3	192	137	96	70	48	35	24	17	12	8	SAR 07.1 SAR 07.2	F07	G0	27.1	
												F10			
GS 63.3	192	137	96	70	48	35	24	17	12	9	SAR 07.5 SAR 07.6	F07	G0	33.1	
												F10			
GS 80.3	199	142	100	72	50	36	25	18	13	9	SAR 10.1 SAR 10.2	(F07)	–	41.4	
												F10			G0
GS 100.3	195	140	98	71	49	35	24	17	12	9	SAR 14.1 SAR 14.2	(F10)	(G0)	85.1	
												F14			G1/2
GS 100.3/ VZ 2.3	472	337	236	172	118	86	59	42	30	21	SAR 10.1 SAR 10.2	F10	G0	64.4	
GS 100.3/ VZ 3.3	600	429	300	218	150	109	75	53	38	27	SAR 07.5 SAR 07.6	F10	G0	60.1	
GS 100.3/ VZ 4.3	780	557	390	284	195	142	98	69	50	35	SAR 07.5 SAR 07.6	F10	G0	60.1	
GS 125.3	195	140	98	71	49	35	24	17	12	9	SAR 14.5 SAR 14.6	F14	G1/2	98.1	
GS 125.3/ VZ 2.3	472	338	236	172	118	86	59	42	30	21	SAR 14.1 SAR 14.2	(F10)	(G0)	98.1	
												F14			G1/2
GS 125.3/ VZ 3.3	600	429	300	218	150	109	75	53	38	27	SAR 10.1 SAR 10.2	F10	G0	71.4	
GS 125.3/ VZ 4.3	780	557	390	284	195	142	98	69	50	35	SAR 10.1 SAR 10.2	F10	G0	71.4	

1) Modulating torque = permissible, average torque for modulating duty

2) Conversion factor from output torque to input torque to determine the actuator size

3) Depending on the required input torque

4) In new condition approx. 15 % higher input torque required

5) With coupling (without bore) and grease filling in the gear housing

6) Observe output torque assignment according to EN ISO 5211.

7) Standard values at 50 Hz; at 60 Hz, the indicated operating time is reduced by 17 %.

8) With coupling (without bore) and grease filling in the gear housing, multi-turn actuator AUMA NORM with 3-phase AC motor, standard electrical connection, output drive type B3 and handwheel

9) Only available in combination with actuator range SAR 07.2 – SAR 16.2 and without primary reduction gearing in multi-turn version, without end stops

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Issue **1.12**

1/4

Y000.289/002/en

**GS 50.3 – GS 125.3/VZ
GS 160.3 – GS 250.3/GZ
Bronze**

**Technical data Part-turn gearboxes with primary reduction
gearing, version with worm wheel made of bronze for
modulating application**

Worm gearboxes GS 160.3 – GS 250.3 with primary reduction gearing GZ 160.3 – GZ 250.3

Valve				Gearboxes								
Max. valve torque		Valve attachment		Gearbox/ prim.red. gearing	Reduction ratio	Factor ²⁾	Turns for 90°	Input shaft ³⁾	Max. input torques ⁴⁾	Weight ⁵⁾		
in Nm up to	Modulating torque ¹⁾ in Nm up to	Flange acc. to EN ISO 5211	Max. shaft diameter in mm								mm	in Nm
11, 250	4,000	F25 ⁶⁾ F30	100	GS 160.3	54:1	22.7	13.5	30	496	80		
				GS 160.3/ GZ 4:1	218:1	83	54.5	30/(20)	136	91		
				GS 160.3/ GZ 8:1	442:1	167	110.5	20	68	91		
22,500	8,000	F30 ⁶⁾ F35	125	GS 200.3	53:1	22.3	13.5	40	1,009	140		
				GS 200.3/ GZ 4:1	214:1	81.3	53.5	30	277	160		
				GS 200.3/ GZ 8:1	434:1	165	108.5	30/(20)	137	160		
45,000	16,000	F35 ⁶⁾ F40	160	GS 200.3/ GZ 16:1	864:1	308	216	20	73	170		
				GS 250.3	52:1	21.9	13	50	2,060	273		
				GS 250.3/ GZ 4:1	210:1	80	52.5	40/(30)	563	296		
GS 250.3/ GZ 8:1	411:1	156	109	30	289	296	308	305	212	30/(20)	148	308

Gearbox/ prim. red. gearing	Possible combinations with multi-turn actuators										Multi-turn actuator	Flange ³⁾ for mounting of multi-turn actuator		Max. Weight ⁸⁾		
	Operating times for 50 Hz ⁷⁾ in seconds for 90° at actuator speed in rpm											Actuator for max. input torque	EN ISO 5210		DIN 3210	GS+GZ+SA max. kg
	4	5,6	8	11	16	22	32	45	63 ⁹⁾	90 ⁹⁾						
GS 160.3	203	145	102	74	51	37	25	18	13	9	SAR 14.5 SAR 14.6	F14	G1/2	138.1		
GS 160.3/ GZ 4:1	818	584	409	297	204	149	102	73	52	36	SAR 14.1 SAR 14.2	(F10) F14	(G0) G1/2	143.1		
GS 160.3/ GZ 8:1	–	–	829	603	414	301	207	147	105	74	SAR 10.1 SAR 10.2	F10	G0	116.4		
GS 200.3	199	142	100	72	–	–	–	–	–	–	SAR 25.1	(F16) F25	(G3) –	295.1		
GS 200.3/ GZ 4:1	803	573	401	292	201	146	100	71	51	36	SAR 14.5 SAR 14.6	F14	G1/2	218.1		
GS 200.3/ GZ 8:1	–	–	814	592	407	296	203	145	103	72	SAR 14.1 SAR 14.2	(F10) F14	(G0) G1/2	212.1		
GS 200.3/ GZ 16:1	–	–	–	–	810	589	405	288	206	144	SAR 10.1 SAR 10.2	F10	G0	195.4		
GS 250.3	195	140	98	71	–	–	–	–	–	–	SAR 30.1	(F25) F30	–	471.6		
GS 250.3/ GZ 4:1	788	563	394	286	197	143	98	70	50	35	SAR 16.1 SAR 16.2	(F14) F16	(G1/2) G3	384.4		
GS 250.3/ GZ 8:1	–	–	773	562	386	281	193	137	98	69	SAR 14.5 SAR 14.6	F14	G1/2	354.1		
GS 250.3/ GZ 16:1	–	–	–	–	795	578	398	283	202	141	SAR 14.1 SAR 14.2	(F10) F14	(G0) G1/2	360.1		

1) Modulating torque = permissible, average torque for modulating duty

2) Conversion factor from output torque to input torque to determine the actuator size

3) Depending on the required input torque

4) In new condition approx. 15 % higher input torque required

5) With coupling (without bore) and grease filling in the gear housing

6) Observe output torque assignment according to EN ISO 5211.

7) Standard values at 50 Hz; at 60 Hz, the indicated operating time is reduced by 17 %.

8) With coupling (without bore) and grease filling in the gear housing, multi-turn actuator AUMA NORM with 3-phase AC motor, standard electrical connection, output drive type B3 and handwheel

9) Only available in combination with actuator range SAR 07.2 – SAR 16.2 and without primary reduction gearing in multi-turn version, without end stops

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Technical data Part-turn gearboxes with primary reduction gearings, version with worm wheel made of bronze for modulating application	GS 50.3 – GS 125.3/VZ GS 160.3 – GS 250.3/GZ Bronze
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Features and functions	
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Version	Standard: clockwise rotation RR, counterclockwise rotation LL, option: RL or LR																																																									
Housing material	Standard: cast iron (GJL-250), option: spheroidal cast iron (GJS-400-15)																																																									
Self-locking	The gearboxes are self-locking when at stand-still under normal service conditions; strong vibrations may cancel the self-locking effect. While in motion, safe breaking is not guaranteed. If this is required, a separate brake must be used.																																																									
End stops	Positive for both end positions by travelling nut, sensitive adjustment																																																									
Strength of end stop	Guaranteed strength of end stop (in Nm) for input side operation according to AWWA <table border="1" style="width:100%; border-collapse: collapse; margin-top: 5px;"> <tr> <th style="width: 10%;">Type</th> <th style="width: 10%;">GS 50.3</th> <th style="width: 10%;">GS 63.3</th> <th style="width: 10%;">GS 80.3</th> <th colspan="3" style="width: 20%;">GS 100.3</th> <th colspan="3" style="width: 20%;">GS 125.3</th> </tr> <tr> <td>Prim.red.gearing</td> <td style="text-align: center;">–</td> <td style="text-align: center;">–</td> <td style="text-align: center;">–</td> <td style="text-align: center;">VZ 2.3</td> <td style="text-align: center;">VZ 3.3</td> <td style="text-align: center;">VZ 4.3</td> <td style="text-align: center;">VZ 2.3</td> <td style="text-align: center;">VZ 3.3</td> <td style="text-align: center;">VZ 4.3</td> </tr> <tr> <td>Nm</td> <td style="text-align: center;">(250)¹⁰⁾</td> <td style="text-align: center;">450</td> <td style="text-align: center;">450</td> <td colspan="3" style="text-align: center;">500</td> <td colspan="3" style="text-align: center;">250¹⁰⁾</td> </tr> </table> <table border="1" style="width:100%; border-collapse: collapse; margin-top: 5px;"> <tr> <th style="width: 10%;">Type</th> <th colspan="2" style="width: 20%;">GS 160.3</th> <th colspan="3" style="width: 20%;">GS 200.3</th> <th colspan="3" style="width: 20%;">GS 250.3</th> </tr> <tr> <td>Prim.red.gearing</td> <td colspan="2" style="text-align: center;">GZ 160.3</td> <td colspan="3" style="text-align: center;">GZ 200.3</td> <td colspan="3" style="text-align: center;">GZ 250.3</td> </tr> <tr> <td>Reduction ratio</td> <td style="text-align: center;">4:1</td> <td style="text-align: center;">8:1</td> <td style="text-align: center;">4:1</td> <td style="text-align: center;">8:1</td> <td style="text-align: center;">16:1</td> <td style="text-align: center;">4:1</td> <td style="text-align: center;">8:1</td> <td style="text-align: center;">16:1</td> </tr> </table>	Type	GS 50.3	GS 63.3	GS 80.3	GS 100.3			GS 125.3			Prim.red.gearing	–	–	–	VZ 2.3	VZ 3.3	VZ 4.3	VZ 2.3	VZ 3.3	VZ 4.3	Nm	(250) ¹⁰⁾	450	450	500			250 ¹⁰⁾			Type	GS 160.3		GS 200.3			GS 250.3			Prim.red.gearing	GZ 160.3		GZ 200.3			GZ 250.3			Reduction ratio	4:1	8:1	4:1	8:1	16:1	4:1	8:1	16:1
Type	GS 50.3	GS 63.3	GS 80.3	GS 100.3			GS 125.3																																																			
Prim.red.gearing	–	–	–	VZ 2.3	VZ 3.3	VZ 4.3	VZ 2.3	VZ 3.3	VZ 4.3																																																	
Nm	(250) ¹⁰⁾	450	450	500			250 ¹⁰⁾																																																			
Type	GS 160.3		GS 200.3			GS 250.3																																																				
Prim.red.gearing	GZ 160.3		GZ 200.3			GZ 250.3																																																				
Reduction ratio	4:1	8:1	4:1	8:1	16:1	4:1	8:1	16:1																																																		
Swing angle GS 50.3 – GS 125.3	Standard: Fixed swing angle between 10° and max. 100°; set in the factory to 92° unless ordered otherwise. Options: Adjustable ins steps of: 10° – 35°, 35° – 60°, 60° – 80°, 80° – 100°, 100° – 125°, 125° – 150°, 150° – 170°, 170° – 190° Swing angle > 190°, multi-turn version without end stops, GSD version special sizing necessary																																																									
Swing angle GS 160.3 – GS 250.3	Standard: Adjustable 80° – 100°; set in the factory to 92° unless ordered otherwise. Options: Adjustable in steps of: 0° – 20°, 20° – 40°, 40° – 60°, 60° – 80°, 90° – 110°, 110° – 130°, 130° – 150°, 150° – 170°, 170° – 190° Swing angle > 190°, multi-turn version without end stops, GSD version special sizing necessary																																																									
Mechanical position indicator	Standard: Pointer cover for continuous position indication Options: Sealed pointer cover for horizontal outdoor installation ¹¹⁾ Protection cover for buried service instead of pointer cover Sealed pointer cover with air vent ¹¹⁾ , not for GS 50.3																																																									
Input shaft	Cylindrical with parallel key according to DIN 6885.1 (refer to tables page 1 and page 2)																																																									

Operation	
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Motor operation	With electric multi-turn actuator, directly or through primary reduction gearing VZ/GZ Flanges for mounting of actuator, refer to tables page 1 and page 2.																																																																
Type of duty	Intermittent duty S4 - 25 % (modulating duty) Push-to-run operation permissible, max. 10 steps in one direction and max. of 30 starts per hour																																																																
Manual operation	Via handwheel in aluminium, directly or through primary reduction gearing VZ/GZ Available handwheel diameters, selection according to the output torque: <table border="1" style="width:100%; border-collapse: collapse; margin-top: 5px;"> <tr> <th style="width: 10%;">Type</th> <th style="width: 10%;">GS 50.3</th> <th style="width: 10%;">GS 63.3</th> <th style="width: 10%;">GS 80.3</th> <th colspan="3" style="width: 20%;">GS 100.3</th> <th colspan="3" style="width: 20%;">GS 125.3</th> </tr> <tr> <td>Prim.red.gearing</td> <td style="text-align: center;">–</td> <td style="text-align: center;">–</td> <td style="text-align: center;">–</td> <td style="text-align: center;">–</td> <td style="text-align: center;">VZ 2.3</td> <td style="text-align: center;">VZ 3.3</td> <td style="text-align: center;">VZ 4.3</td> <td style="text-align: center;">–</td> <td style="text-align: center;">VZ 2.3</td> <td style="text-align: center;">VZ 3.3</td> <td style="text-align: center;">VZ 4.3</td> </tr> <tr> <td>Handwheel Ø mm</td> <td style="text-align: center;">160 200 250</td> <td style="text-align: center;">250 315</td> <td style="text-align: center;">315 400</td> <td style="text-align: center;">400 500</td> <td style="text-align: center;">315 400</td> <td style="text-align: center;">315 400</td> <td style="text-align: center;">250 315</td> <td style="text-align: center;">500 630 800</td> <td style="text-align: center;">400 500</td> <td style="text-align: center;">400 500</td> <td style="text-align: center;">315 400</td> </tr> </table> <table border="1" style="width:100%; border-collapse: collapse; margin-top: 5px;"> <tr> <th style="width: 10%;">Type</th> <th colspan="2" style="width: 20%;">GS 160.3</th> <th colspan="3" style="width: 20%;">GS 200.3</th> <th colspan="3" style="width: 20%;">GS 250.3</th> </tr> <tr> <td>Prim.red.gearing</td> <td style="text-align: center;">–</td> <td style="text-align: center;">GZ 160.3</td> <td style="text-align: center;">–</td> <td colspan="3" style="text-align: center;">GZ 200.3</td> <td style="text-align: center;">–</td> <td colspan="2" style="text-align: center;">GZ 250.3</td> </tr> <tr> <td>Handwheel Ø mm</td> <td style="text-align: center;">630 800</td> <td style="text-align: center;">400 315</td> <td style="text-align: center;">–</td> <td style="text-align: center;">500 630</td> <td style="text-align: center;">400</td> <td style="text-align: center;">315</td> <td style="text-align: center;">–</td> <td style="text-align: center;">800</td> <td style="text-align: center;">500 630</td> <td style="text-align: center;">400</td> </tr> </table> Standard: Without ball handle Options: - With ball handle - Handwheel material GJL-200	Type	GS 50.3	GS 63.3	GS 80.3	GS 100.3			GS 125.3			Prim.red.gearing	–	–	–	–	VZ 2.3	VZ 3.3	VZ 4.3	–	VZ 2.3	VZ 3.3	VZ 4.3	Handwheel Ø mm	160 200 250	250 315	315 400	400 500	315 400	315 400	250 315	500 630 800	400 500	400 500	315 400	Type	GS 160.3		GS 200.3			GS 250.3			Prim.red.gearing	–	GZ 160.3	–	GZ 200.3			–	GZ 250.3		Handwheel Ø mm	630 800	400 315	–	500 630	400	315	–	800	500 630	400
Type	GS 50.3	GS 63.3	GS 80.3	GS 100.3			GS 125.3																																																										
Prim.red.gearing	–	–	–	–	VZ 2.3	VZ 3.3	VZ 4.3	–	VZ 2.3	VZ 3.3	VZ 4.3																																																						
Handwheel Ø mm	160 200 250	250 315	315 400	400 500	315 400	315 400	250 315	500 630 800	400 500	400 500	315 400																																																						
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Prim.red.gearing	–	GZ 160.3	–	GZ 200.3			–	GZ 250.3																																																									
Handwheel Ø mm	630 800	400 315	–	500 630	400	315	–	800	500 630	400																																																							

Primary reduction gearing	
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Primary reduction gearing	- Types VZ and GZ as planetary gear with various reduction ratios for reducing the input torques (refer to tables page 1 and page 2). - Combination with GK bevel gearbox directly on GS or on GS with VZ/GZ possible
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Valve attachment	
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Valve attachment	Dimensions according to EN ISO 5211 (refer to tables page 1 and page 2): Observe the maximum torques of the mounting flanges in accordance with EN ISO 5211. Standard: GS 50.3 – GS 125.3: without spigot GS 160.3 – GS 250.3: with spigot Options: GS 50.3 – GS 125.3: with spigot GS 160.3 – GS 250.3: without spigot
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10) Not qualified in accordance with AWWA
11) For gas applications with sealed pointer cover, an air vent in the pointer cover or venting keyways in the valve mounting flange must be provided.

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GS 50.3 – GS 125.3/VZ GS 160.3 – GS 250.3/GZ Bronze		Technical data Part-turn gearboxes with primary reduction gearings, version with worm wheel made of bronze for modulating application	
Coupling	Splined coupling for connection to the valve shaft Standard: Without bore or pilot bore from GS 160.3 Options: Worm gearbox can be repositioned 4 x 90° on coupling Machined with bore and keyway, square bore or bore with two-flats with grub screw for fixing on valve shaft		
Service conditions			
Mounting positions	Any position		
Enclosure protection according to EN 60529 ¹²⁾	Standard: IP 68-3, dust and water tight up to max. 3 m head of water Options ¹³⁾ : IP 68-6, dust and water tight up to max. 6 m head of water IP 68-10, dust and water tight up to max. 10 m head of water IP 68-20, dust and water tight up to max. 20 m head of water		
Corrosion protection	Standard: KN Suitable for installation in industrial units, in water or power plants with a low pollutant concentration Options: KS Suitable for installation in occasionally or permanently aggressive atmosphere with a moderate pollutant concentration (e.g. in wastewater treatment plants, chemical industry) KX Suitable for installation in extremely aggressive atmosphere with high humidity and high pollutant concentration		
Paint	Standard: GS 50.3 – GS 125.3: Two-component iron-mica combination GS 160.3 – GS 250.3: Primer coating Option: GS 160.3 – GS 250.3: Two component iron-mica combination		
Colour	Standard: AUMA silver-grey (similar to RAL 7037) if finish painted Option: Other colours on request		
Ambient temperature	Standard: -40 °C to +80 °C Options: -60 °C to +60 °C, version EL -0 °C to +120 °C, version H		
Lifetime	Modulating duty: 2.5 million modulating steps ¹⁴⁾		
Accessories			
Valve position indicators	WSG valve position indicator for signalling intermediate and end positions for precise and low-backlash feedback of swing angles ranging from 82° – 98° (refer to separate data sheet) WGD valve position indicator for signalling intermediate and end positions for swing angles > 180° (refer to separate data sheet)		
Limit switch device	WSH limit switching device for manually operated valves. For signalling intermediate and end positions (refer to separate data sheet)		
Special features for use in potentially explosive atmospheres			
Explosion protection according to ATEX 94/9/EC	Standard: II2G c IIC T4 II2D c T130 °C Options: II2G c IIC T3 II2D c T190 °C IM2 c		
Type of duty ¹⁵⁾	Standard: Intermittent duty S4 - 25 % with modulating torque and max. input speed of 45 rpm or 11 rpm for GS 200.3 and 250.3, refer to tables pages 1 and 2 Exception: GS 200.3 with modulating torque up to 4,800 Nm Option: GSD multi-turn version, special sizing required; please consult AUMA		
Ambient temperature	Standard: -40 °C to +60 °C (II2G c IIC T4; II2D c T130 °C) -50 °C to +60 °C (II2G c IIC T4; II2D c T130 °C) -60 °C to +60 °C (II2G c IIC T4; II2D c T130 °C) -40 °C to +40 °C (II2G c IIC T4; II2D c T130 °C) Options: -40 °C to +80 °C (II2G c IIC T3; II2D c T190 °C) 0 °C to +120 °C (II2G c IIC T3; II2D c T190 °C) -20 °C to +40 °C (IM2 c)		
Output speeds	Standard: 50 Hz, refer to table page 1 and 2 Option: 60 Hz with adapted output speed of the multi-turn actuator		
Further information			
EU directives	ATEX directive: (94/9/EC) Machinery directive: (2006/42/EC)		
Reference documents	Product description Part-turn gearboxes GS 50.3 – GS 250.3/GS 315 – GS 500 Dimension sheets GS 50.3 – GS 125.3, GS 160.3 – GS 250.3 Technical data SA, SAR, WSG, WGD, WSH		
Lever gearboxes	Refer to separate documents		
<p>12) Refer to information sheet "Enclosure protection IP 68 (submersible) for worm gearboxes and primary reduction gearings".</p> <p>13) Not available for GS 50.3</p> <p>14) The lifetime depends on the load and the number of starts. A high starting frequency will rarely improve the modulating accuracy. To reach the longest possible maintenance and fault-free operating time, the number of starts per hour chosen should be as low as possible for the process.</p> <p>15) The type of duty must not be exceeded.</p>			
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