Technical data Part-turn gearboxes for modulating duty and shorter operating times

Valve				Gearbox						
Max. valve torque		Valve attachment		Gearbox/primary reduction gearing	Reduct. ratio	Factor[1]	Turns for 90°	Input shaft[2]	Max. input torques	Weight[3]
to [Nm]	Modulating torque[4] to [Nm]	Flange according to EN ISO 5211	Max. shaft diameter [mm]					[mm]	[Nm]	GS + VZ/GZ [kg]
350	125	F05 F07 F10	20 38	GS 50.3	51:1	17.9	12.75	16	20	7.0
700	250	F10 F12	50	GS 63.3	51:1	17.3	12.75	20	41	12
1,400	500	F12 F14	60	GS 80.3	53:1	19.3	13.25	20	73	16
2,800	1,000	F14 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 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	30/(20)	123	46
				GS 125.3/ VZ 3.3	160:1	57.9	40	30/(20)	97	46
				GS 125.3/ VZ 4.3	208:1	77	52	20	73	46
11,250	4,000	F25 F30	100	GS 160.3	54:1	22.7	13.5	30	496	80
				GS 160.3/ GZ 160.3 - 4:1	218:1	83	54.5	30/(20)	136	91
				GS 160.3/ GZ 160.3 - 8:1	442:1	167	110.5	20	68	91
11,250	4,000	F25 F30	100	GS 160.3/ GZ 160.3 - 16:1[5]	880:1	320	220	20	36	91
22,500	8,000	F30 F35	125	GS 200.3	53:1	22.3	13.25	40	1,009	140
				GS 200.3[5]	67:1	28.2	16.75	40	621	140
				GS 200.3/ GZ 200.3 - 4:1	214:1	81.3	53.5	30	277	160
				GS 200.3/ GZ 200.3 - 8:1	434:1	165	108.5	30/(20)	137	160
				GS 200.3/ GZ 200.3 - 16:1	864:1	308	216	20	73	170
22,500	8,000	F30 F35	125	GS 200.3/ GZ 200.3 - 32:1[5]	1,752:1	640	438	20	35	170
45,000	16,000	F35 F40	160	GS 250.3	52:1	21.9	13	50	2,060	273
				GS 250.3/ GZ 250.3 - 4:1	210:1	80	52.5	40/(30)	563	296
				GS 250.3/ GZ 250.3 - 8:1	411:1	156	103	30	289	296
				GS 250.3/ GZ 250.3 - 16:1	848:1	305	212	30/(20)	148	308
45,000	16,000	F35 F40	160	GS 250.3/ GZ 250.3 - 32:1[5]	1,718:1	615	430	20	73	308

1) – 5) Refer to notes on page 3.

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		Possible combinations with multi-turn actuators												Multi-turn actuator	Input mounting flange for mounting multi-turn actuator		Max. weight[6]
Gearbox/primary reduction gearing	Reduct. ratio	Operating time for 50 Hz[7] in seconds for 90° at actuator output speed in rpm												Actuator for max. input torque	EN ISO 5210	DIN 3210	GS+VZ/ GZ+SA [kg]
		4	5.6	8	11	16	22	32	45	63	90	125	180				
GS 50.3	51:1	191	137	96	70	48	35	24	17	12[8]	9[8]	6[8]	4[8]	SAR 07.2	F07 F10	G0	27.1
GS 63.3	51:1	191	137	96	70	48	35	24	17	12[8]	9[8]	6[8]	4[8]	SAR 07.6	F07 F10	G0	33.1
GS 80.3	53:1	199	142	99	72	50	36	25	18	13[8]	9[8]	6[8]	4[8]	SAR 10.2	F07 F10	– G0	41.4
GS 100.3	52:1	195	139	98	71	49	35	24	17	12[8]	9[8]	6[8]	4[8]	SAR 14.2	F10 F14	G0 G1/2	85.1
GS 100.3/ VZ 2.3	126:1	473	338	236	172	118	86	59	42	30	21	15[8]	11[8]	SAR 10.2	F10	G0	65.4
GS 100.3/ VZ 3.3	160:1	600	429	300	218	150	109	75	53	38	27	19	13[8]	SAR 07.6	F10	G0	60.1
GS 100.3/ VZ 4.3	208:1	780	557	390	284	195	142	98	69	50	35	25	17[8]	SAR 07.6	F10	G0	60.1
GS 125.3	52:1	195	139	98	71	49	35	24	17	12[8]	9[8]	6[8]	4[8]	SAR 14.6	F14	G1/2	98.1
GS 125.3/ VZ 2.3	126:1	473	338	236	172	118	86	59	42	30	21	15[8]	11[8]	SAR 14.2	F10 F14	G0 G1/2	98.1
GS 125.3/ VZ 3.3	160:1	600	429	300	218	150	109	75	53	38	27	19	13[8]	SAR 10.2	F10	G0	71.4
GS 125.3/ VZ 4.3	208:1	780	557	390	284	195	142	98	69	50	35	25	17[8]	SAR 10.2	F10	G0	71.4
GS 160.3	54:1	203	145	101	74	51	37	25	18	13[8]	9[8]	6[8]	5[8]	SAR 14.6	F14	G1/2	138.1
GS 160.3/ GZ 160.3 - 4:1	218:1	818	584	409	297	204	149	102	73	52	36	26	18	SAR 14.2	F10 F14	G0 G1/2	143.1
GS 160.3/ GZ 160.3 - 8:1	442:1	–	–	829	603	414	301	207	147	105	74	53	37	SAR 10.2	F10	G0	116.4
GS 160.3/ GZ 160.3 - 16:1[5]	880:1	–	–	–	–	825	600	413	293	210	147	106	73[8]	SAR 07.6	F10	G0	111.1
GS 200.3	53:1	199	142	99	72	50	36	25	18	13[8]	9[8]	–	–	SAR 25.1	F16 F25	G3 –	295.1
GS 200.3[5]	67:1	251	179	126	91	63	46	31	22	16	11	8	6	SAR 16.2	F16	G3	228.4
GS 200.3/ GZ 200.3 - 4:1	214:1	803	573	401	292	201	146	100	71	51	36	26	18	SAR 14.6	F14	G1/2	218.1
GS 200.3/ GZ 200.3 - 8:1	434:1	–	–	814	592	407	296	203	145	103	72	52	36	SAR 14.2	F10 F14	G0 G1/2	212.1
GS 200.3/ GZ 200.3 - 16:1	864:1	–	–	–	–	810	589	405	288	206	144	104	72[8]	SAR 10.2	F10	G0	195.4
GS 200.3/ GZ 200.3 - 32:1[5]	1,752:1	–	–	–	–	–	–	821	584	417	292	210	146	SAR 07.6	F10	G0	191.1
GS 250.3	52:1	195	149	98	71	49	35	24	17[8]	12[8]	9[8]	–	–	SAR 30.1	F25 F30	–	471.6
GS 250.3/ GZ 250.3 - 4:1	210:1	788	563	394	286	197	143	98	70	50	35	25	18[8]	SAR 16.2	F14 F16	G1/2 G3	384.4
GS 250.3/ GZ 250.3 - 8:1	411:1	–	–	771	560	385	280	193	137	98	69	49	34	SAR 14.6	F14	G1/2	354.1
GS 250.3/ GZ 250.3 - 16:1	848:1	–	–	–	–	795	578	398	283	202	141	102	71	SAR 14.2	F10 F14	G0 G1/2	360.1
GS 250.3/ GZ 250.3 - 32:1[5]	1,718:1	–	–	–	–	–	–	805	573	409	286	206	143	SAR 10.2	F10	G0	334.4

5) – 8) Refer to notes on page 3.

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General information
For motor or manual operation of valves (e.g. butterfly valves, ball and plug valves), particularly suited for modulating duty and shorter operating times. Specific sizing is required for special applications e.g. dampers or gas diverters. For special applications, please consult AUMA.

Notes to table on pages 1 + 2	
1) Factor	Conversion factor from output torque to input torque to determine the actuator size For new gearboxes, input torques increased by 15 % are required due to lower efficiency.
2) Input shaft	Depending on the required input torque
3) Weight	Specified weight includes coupling (without bore) and grease filling in the gear housing
4) Max. valve torque for modulating torque	Modulating torque = permissible, average torque for modulating duty
5) Special reduction ratio	On request
6) Max. weight	Specified weight contains coupling (without bore) and grease filling in the gear housing, multi-turn actuator with 3-phase AC motor, standard electrical connection, output drive type B3 and handwheel
7) Operating time for 50 Hz	Standard values at 50 Hz; at 60 Hz, the indicated operating time is reduced by 17 %.
8)	Multi-turn version without end stop is recommended. Not feasible for modulating duty.

Features and functions

Worm wheel material	Bronze	
Version	Standard:	Clockwise rotation RR, counterclockwise rotation LL
	Option:	RL or LR
	For special reduction ratios, please contact us for availability.	
Housing material	Standard:	Cast iron (GJL-250)
	Option:	Spheroidal cast iron (GJS-400-15)
Self-locking	The gearboxes are self-locking when at standstill under normal service conditions; strong vibration may cancel the self-locking effect. While in motion, safe braking 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	

Type	GS 50.3	GS 63.3	GS 80.3	GS 100.3			GS 125.3		
Primary reduction gearing	–	–	–	VZ 2.3	VZ 3.3	VZ 4.3	VZ 2.3	VZ 3.3	VZ 4.3
[Nm]	250	450	450	500		250	500		250

Type	GS 160.3		GS 200.3			GS 250.3		
Primary reduction 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
[Nm]	500	450	500			500		

Strength of end stop for special reduction ratios	Guaranteed strength of end stop (in Nm) for input side operation

Type	GS 160.3 - 54:1	GS 200.3 - 67:1	GS 200.3 - 53:1	GS 250.3 - 52:1
Primary reduction gearing	GZ 160.3	–	GZ 200.3	GZ 250.3
Reduction ratio	16:1	–	32:1	32:1
[Nm]	250	250	250	250

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 in 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, specific sizing required

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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, specific sizing required
Swing angle at special reduction ratio GS 200.3 - 67:1	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° Swing angle > 100°, multi-turn version without end stops, GSD version, specific sizing required
Mechanical position indicator	Standard:	Pointer cover for continuous position indication
	Options:	• Sealed pointer cover for horizontal outdoor installation • Protection cover instead of pointer cover for buried service • Sealed pointer cover with air vent, not available for GS 50.3 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.
Input shaft	Cylindrical with parallel key according to DIN 6885-1 (refer to table on page 1)	

Operation		
Motor operation	• With electric multi-turn actuator, directly or through VZ/GZ primary reduction gearing • Input mounting flanges for multi-turn actuator (refer to table page 2)	
Type of duty	• Intermittent duty S4 - 25 % (modulating duty)	
Manual operation	Available handwheel diameters according to EN 12570, selection according to output torque:	

Type	GS 50.3	GS 63.3	GS 80.3	GS 100.3				GS 125.3			
Primary reduction gearing	–	–	–	–	VZ 2.3	VZ 3.3	VZ 4.3	–	VZ 2.3	VZ 3.3	VZ 4.3
Reduction ratio	51:1	51:1	53:1	52:1	126:1	160:1	208:1	52:1	126:1	160:1	208:1
Handwheel Ø [mm]	160 200 250	250 315	315 400	400 500	315 400		250 315	500 630 800	400 500		315 400

Type	GS 160.3				GS 200.3					
Primary reduction gearing	–	GZ 160.3			–	–	GZ 200.3			
Reduction ratio	54:1	218:1	442:1	880:1	53:1	67:1	214:1	434:1	864:1	1 752:1
Handwheel Ø [mm]	630 800	400	315	250	–	800	500 630	400	315	250

Type	GS 250.3				
Primary reduction gearing	–	GZ 250.3			
Reduction ratio	52:1	210:1	411:1	848:1	1 718:1
Handwheel Ø [mm]	–	800	500 630	400	315

	Standard:	• Handwheel made of aluminium • Handwheel with ball handle
	Options:	• Handwheel made of GJL-200 • Handwheel lockable • WSH for signalling position and end positions

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Primary reduction gearing		
Primary reduction gearing	• VZ and GZ types as planetary gears with various reduction ratios for reducing the input torques (refer to table page 1). • Combination with GK bevel gearbox directly on GS or on GS with VZ/GZ possible (90° deflection of input shaft)	

Valve attachment		
Valve attachment	Dimensions according to EN ISO 5211: The maximum torques according to EN ISO 5211 mounting flanges are to be met.	
	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
Splined coupling for connection to the valve shaft	Standard:	• Without bore or pilot bore from GS 160.3 • Worm gearbox can be mounted at 4 x 90° increments on coupling
	Options:	Finish machining with bore and keyway, square bore or two-flat with grub screw for secure fixing to valve shaft.

Service conditions			
Mounting position	Any position		
Ambient temperature	Standard:	–40 °C to +80 °C	
	Options:	–60 °C to +60 °C 0 °C to +120 °C	
Enclosure protection according to EN 60529	Standard:	IP68-8, dust and water tight up to max. 8 m head of water	
	Option:	IP68-20, 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 industrial units, in water or power plants with a low pollutant concentration as well as for installation in occasionally or permanently aggressive atmospheres with a moderate pollutant concentration (e.g. wastewater treatments plants, chemical industry)
		KX	Suitable for installation in extremely aggressive atmospheres with high humidity and high pollutant concentration
Paint	Two-component iron-mica combination		
Colour	Standard:	AUMA silver-grey (similar to RAL 7037)	
	Option:	Other colours are possible on request.	
Lifetime	Lifetime for 90° swing movement: 2.5 million modulating steps AUMA worm gearboxes meet or even exceed the lifetime requirements of EN 15714-2. Detailed information can be provided on request.		

Limit sensing for signalling position and end positions	
Valve position indicators	• WSG valve position indicator (hall sensors) for position and end position signalling to ensure precise and low-backlash feedback for swing angles ranging between 82° and 98°. • WGD valve position indicator (counter gear mechanism) for position and end position signalling for swing angles > 180°

Special features for use in potentially explosive atmospheres		
Explosion protection in accordance with 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	Standard:	Intermittent duty S4 - 25 % with modulating torque and max. input speed 90 rpm or 11 rpm for GS 200.3 and GS 250.3, refer to table on page 2.
	Exception:	GS 200.3 with modulating torque up to 4,800 Nm
	Option:	GSD multi-turn version, specific sizing required; please contact AUMA.

We reserve the right to alter data according to improvements made. Previous documents become invalid with the issue of this document.

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Ambient temperature	Standard:	–40 °C to +40 °C (II2G c IIC T4; II2D c T130 °C) –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)
	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)

Further information	
EU Directives	ATEX Directive: (94/9/EC) Machinery Directive: (2006/42/EC)
Reference documents	Product description Electric actuators for industrial valve automation Dimensions GS 50.3 – GS 125.3, GS 160.3 – GS 250.3 Technical data SA 07.2 – SA 16.2 with 3-phase AC motors Technical data SAR 07.2 – SAR 16.2 with 3-phase AC motors Technical data WSG 90.1 Technical data WGD 90.1 Technical data WSH 10.2 – WSH 16.2
Lever gearboxes	Refer to separate documents