

Technical data Part-turn gearboxes for modulating duty

General information

For motor or manual operation of valves (e.g. butterfly valves, ball and plug valves).

For special applications, e.g. dampers, gas diverters, flue gas dampers, toggle arm driven diverters and guillotine isolators, specific sizing is required. Specific technical data applies.

Valve				Gearbox								
Max. valve torque ¹⁾		Valve attachment		Type	Reduction ratio	Factor ²⁾	Turns for 90°	Input shaft	Input mounting flange for multi-turn actuator	Max. input torques	Weight ³⁾	Additional weight Extension flange
to [Nm]	Modulating torque ⁴⁾ to [Nm]	Flange according to EN ISO 5211	Max. Shaft diameter [mm]					[mm]		[Nm]	[kg]	
350	125	F05	20	GS 50.3	51:1	17.9	12.75	16	F07 (F10)	20	7.0	–
		F07 F10	38									
700	250	F10 F12	50	GS 63.3	51:1	17.3	12.75	20	F07 (F10)	41	12	–
1,400	500	F12 F14	60	GS 80.3	53:1	19.3	13.25	20	F07 (F10)	73	16	–
2,800	1,000	F14 F16	80	GS 100.3	52:1	20.2	13	30/(20)	F14 (F10)	139	33	–
					126:1 ⁵⁾	44.4	31.5	20/(30)	F10 (F14)	63	39	
					160:1 ⁵⁾	55.5	40	20/(30)	F10 (F14)	50	39	
					208:1 ⁵⁾	77	52	20/(30)	F10 (F14)	37	39	
5,600	2,000	F16 F25 F30 ⁶⁾	90	GS 125.3	52:1	20.8	13	30	F14 (F10)	269	40	F30: 18 kg
					126:1 ⁵⁾	45.4	31.5	30/(20)	F14 (F10)	123	46	
					160:1 ⁵⁾	57.9	40	30/(20)	F14 (F10)	97	46	
					208:1 ⁵⁾	77	52	20	F10 (F14)	73	46	
11,250	4,000	F25 F30 F35 ⁶⁾	100	GS 160.3	54:1	22.7	13.5	30	F16 (F14)	496	80	F35: 33 kg
					218:1 ⁵⁾	83	54.5	30/(20)	F14 (F10)	136	91	
					442:1 ⁵⁾	167	110.5	20	F10	68	91	
					880:1 ⁵⁾	320	220	20		36	91	
22,500	8,000	F30 F35 F40 ⁶⁾	135	GS 200.3	53:1	22.3	13.25	40	F25 (F16)	1,009	140	F40: 48 kg
17,500					67:1	28.2	16.75	40	F16	621	91	
22,500					214:1 ⁵⁾	81.3	53.5	30	F14	277	160	
					434:1 ⁵⁾	165	108.5	30/(20)	F14 (F10)	137	160	
					864:1 ⁵⁾	308	216	20	F10	73	170	
					1,752:1 ⁵⁾	640	438	20	F10	35	170	
45,000	16,000	F35 F40 F48 ⁶⁾	160	GS 250.3	52:1	21.9	13	50	F30 (F25)	2,060	273	F48: 75 kg
					210:1 ⁵⁾	80	52.5	40/(30)	F16 (F14)	563	296	
					411:1 ⁵⁾	156	103	30	F14	289	296	
					848:1 ⁵⁾	305	212	30/(20)	F14 (F10)	148	308	
					1,718:1 ⁵⁾	615	430	20/(30)	F10	73	308	

1) For a swing angle up to max. 90°.

2) Conversion factor from output torque to input torque for actuator size definition When new, the factor can fall short of the indicated value by up to 10 %.

3) Specified weight includes coupling (without bore) and grease filling in the gear housing.

4) Modulating torque = permissible, average torque for modulating duty.

5) Equipped with primary reduction gearing or planetary gearing to reduce input torques.

6) Screwed and doweled to housing by means of extension flange.

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Features and functions									
Worm wheel material	Bronze								
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 standstill under normal service conditions; strong vibration 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								
	Type	GS 50.3	GS 63.3	GS 80.3	GS 100.3				
	Reduction ratio	51:1	51:1	53:1	52:1	126:1	160:1	208:1	
	[Nm]	250	450	450	1,350	625	500	250	
	Type	GS 125.3			GS 160.3				
	Reduction ratio	52:1	126:1	160:1	208:1	54:1	218:1	442:1	880:1
	[Nm]	1,350	625	500	250	3,200	900	450	250
	Type	GS 200.3							
	Reduction ratio	53:1	67:1	214:1	434:1	864:1	1752:1		
	[Nm]	8,000	250	2,000	1,000	500	250		
	Type	GS 250.3							
	Reduction ratio	52:1	210:1	411:1	848:1	1718:1			
[Nm]	8,000	2,000	1,000	500	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° Worm wheel made of bronze; Multi-turn version without end stop, up to max. 10 turns of worm wheel permissible Heed special sizing!							
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° Worm wheel made of bronze; Multi-turn version without end stop, up to max. 10 turns of worm wheel permissible. Heed special sizing!							
Swing angle for special reduction ratio	Standard:	Adjustable 80° – 100°; set in the factory to 92° unless ordered otherwise.							
	Options:	Swing angle range different from standard range available on request Multi-turn version without end stop, up to max. 10 turns of worm wheel permissible. Heed special sizing!							
Mechanical position indicator	Standard:	Pointer cover for continuous position indication							
	Options:	- Sealed pointer cover for horizontal outdoor installation with perpendicular valve shaft (not available for GS 50.3) - Protection cover for buried services instead of pointer cover (without mechanical position indicator) - Sealed pointer cover with air vent valve, not available for GS 50.3 Heed notes on Information sheet Enclosure protection IP68 for part-turn gearboxes.							
Input shaft	Standard:	With corrosion protection, cylindrical with parallel key according to DIN 6885-1 (refer to table on pages 1 and 2).							
	Option:	Cylindrical with parallel key according to DIN 6885-1 with square adapter for power tool emergency operation.							

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Operation												
Motor operation	• Via electric multi-turn actuator • Input mounting flanges for multi-turn actuator (refer to table on pages 1 and 2)											
Type of duty	Intermittent duty S4 - 25 % Class C according to EN 15714-2: Modulating duty											
Maximum permissible input speeds and operating times	215 rpm For use in potentially explosive atmospheres, heed input speeds!											
	Calculation of operating time for a 90° swivel movement											
	$\text{Oper. time for } 90^\circ \text{ [s]} = \frac{\text{Reduction ratio [i]}}{n \text{ [input speed in rpm]}} \cdot 15$											
	Calculation of the operating time for a swivel movement [°]:											
	$\text{Oper. time for } \theta^\circ \text{ [s]} = \frac{\text{Swing angle } \theta \text{ [°]} \cdot \text{Reduction ratio [i]}}{6 \cdot n \text{ [input speed in rpm]}}$											
Manual operation	Standard:	• Handwheel made of aluminium with electrophoretic coating • Handwheel with ball handle										
	Option:	• Handwheel made of GJL-200 with electrophoretic coating and painting • Handwheel lockable • WSH for signalling position and end positions • Chainwheel										
	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				
	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						
	Reduction ratio	54:1	218:1	442:1	880:1	53:1	67:1	214:1	434:1	864:1	1752:1	
	Handwheel Ø [mm]	630 800	400	315	250	–	800	500 630	400	315	250	
	Type	GS 250.3										
	Reduction ratio	52:1		210:1		411:1		848:1		1718:1		
	Handwheel Ø [mm]	–		800		500 630		400		315		

Deflection of the input shaft

90° deflection of the input shaft

Combination with GK bevel gearbox directly mounted on GS or on planetary stage possible, refer to Mounting positions Part-turn gearboxes with multi-turn actuators

Base and lever

Base	Made of spheroidal cast iron; for mounting to base, 4 holes for fastening screws are available.
Lever	Made of spheroidal cast iron; with 2 or 3 bores for fixing lever arrangement. Considering the environmental conditions, the lever may be mounted to the output shaft in any desired position.
Ball joints	Two ball joints matching the lever, as an option including lock nuts and 2 welding nuts; suitable for pipe according to dimension sheet.
Mechanical position indicator	Standard: No position indicator (protection cover)
	Option: Pointer cover instead of protection cover for continuous position indication

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Valve attachment												
Valve attachment	Dimensions according to EN ISO 5211: The maximum torques of mounting flanges according to EN ISO 5211 are to be met.											
Spigot	Flanges with spigot. Up to GS 125.3, spigots are implemented by means of spigot rings (option). From GS 160.3 to GS 250.3, spigots are directly integrated into the housing.											
Plane flanges	Up to GS 125.3, plane flanges are implemented by means of recesses. From GS 160.3 to GS 250.3, the housing is plane machined (option).											
Bore for parallel pins (option)	Two bores for parallel pins shifted by 180°. The parallel pins are not included in the scope of delivery.											
	Type	GS 80.3		GS 100.3		GS 125.3			GS 160.3			
	Flange according to EN ISO 5211	F12	F14	F14	F16	F16	F25	F30	F25	F30	F35	
	Housing material	GJS	GJS	GJS	GJS	GJL	GJL	GJL	GJL	GJL	GJL	
	Type	GS 200.3				GS 250.3						
	Flange according to EN ISO 5211	F30		F35		F40		F35		F40		F48
	Housing material	GJL		GJL		GJL		GJL		GJL		
	Refer to Dimensions Output mounting flange GS 50.3 – GS 125.3 (Y000.854) and Dimensions Output mounting flange GS 160.3 – GS 250.3 (Y005.001). Further pitch circle diameters for locating pins on request.											
	Splined coupling for connection to the valve shaft	Standard:	- Without bore or pilot bore from GS 160.3 - Worm gearbox can be mounted 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, dust-tight and water-tight up to max. 8 m head of water	
	Options:	IP68-20, dust-tight and water-tight up to max. 20 m head of water	
Corrosion protection	Standard:	KS	Suitable for use in areas with high salinity, almost permanent condensation, and high pollution.
	Option:	KX	Suitable for use in areas with extremely high salinity, permanent condensation, and high pollution.
Coating	Double layer powder coating		
Colour		AUMA silver-grey (similar to RAL 7037)	
	Option:	Available colours on request	
AUMA load spectrum	A start consists of one movement of minimum 1 % in both directions at a load of 35 % of the maximum valve torque (modulating torque). AUMA worm gearboxes meet or exceed the lifetime requirements of EN 15714-2.		
Lifetime for motor operation in accordance with AUMA load spectrum	Duty class 2: Lifetime for 90° swivel movement for valves which are infrequently operated. 1.2 million modulating steps		

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Special features for use in potentially explosive atmospheres in accordance with ATEX 2014/34 EU

Explosion protection in accordance with ATEX 2014/34 EU	Standard:	II 2G Ex h IIC T4 Gb II 2D Ex h IIIC T130°C Db						
	Option:	II 2G Ex h IIC T3 Gb II 2D Ex h IIIC T190°C Db I M2 Ex h I Mb						
Type of duty	Standard:	Intermittent duty S4 – 25 % with modulating torque and max. input speed						
		Type	GS 50.3	GS 63.3	GS 80.3	GS 100.3		
		Reduction ratio	51:1	51:1	53:1	52:1	126:1	208:1
		Max. speed at GS input with SA [rpm]	45	45	45	45	90	125
							180	
		Type	GS 125.3			GS 160.3		
		Reduction ratio	52:1	126:1	160:1	209:1	54:1	218:1
		Max. speed at GS input with SA [rpm]	45	90	125	180	45	180
							180	180
		Type	GS 200.3					
		Reduction ratio	53:1	67:1	214:1	434:1	864:1	1,752:1
		Max. speed at GS input with SA [rpm]	11	11	45	90	180	180
		Type	GS 250.3					
		Reduction ratio	52:1	210:1	441:1	848:1	1,718:1	
		Max. speed at GS input with SA [rpm]	11	45	90	180	180	
Ambient temperature	Exception:	GS 200.3 with modulating torque up to 4,800 Nm						
	Option:	GSD multi-turn version, specific sizing required; please contact AUMA.						
	Standard:	–40 °C to +40 °C (II 2G Ex h IIC T4 Gb; II 2D Ex h IIIC T130°C Db) –40 °C to +60 °C (II 2G Ex h IIC T4 Gb; II 2D Ex h IIIC T130°C Db) –50 °C to +60 °C (II 2G Ex h IIC T4 Gb; II 2D Ex h IIIC T130°C Db) –60 °C to +60 °C (II 2G Ex h IIC T4 Gb; II 2D Ex h IIIC T130°C Db)						
	Options:	–40 °C to +80 °C (II 2G Ex h IIC T3 Gb; II 2D Ex h IIIC T190°C Db) 0 °C to +120 °C (II 2G Ex h IIC T3 Gb; II 2D Ex h IIIC T190°C Db) –20 °C to +40 °C (I M2 Ex h I Mb)						

Further information

EU Directives	Machinery Directive: (2006/42/EC)
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