Technical data Part-turn gearboxes for open-close duty

Duty class 1[1)]

Motor operation in accordance with EN 15714-2.

Valve			Gearbox							
Max. output torque[2)]	Valve attachment		Type	Reduct. ratio	Factor[3)]	Turns for 90°	Input shaft	Input mounting flange for multi-turn actuator	Max. input torques	Weight[4)]
to [Nm]	Flange according to EN ISO 5211	Max. shaft diameter [mm]					[mm]		[Nm]	[kg]
500	F07 F10	38	GS 50.3	51:1	16.7	12.75	16	F07 F10	30	7.0
1,000	F10 F12	50	GS 63.3	51:1	16.7	12.75	20	F07	60	12
750[5)]				82:1	17.0	20.5		F10	44	
2,000	F12 F14	60	GS 80.3	53:1	18.2	13.25	20	F07	110	16
1,500[5)]				82:1	17.0	20.5		F10	88	
4,000	F14 F16	80	GS 100.3	52:1	18.7	13	30/(20)	F14 (F10)	214	33
2,800[5)]				107:1	22.6	26.8		F14 (F10)	124	
4,000				126:1[7)]	42.8	31.5	20	F10	93	39
				160:1[7)]	54.0	40		F10	74	
				208:1[7)]	71.0	52		F10	57	
8,000	F16 F25 F30[6)]	90	GS 125.3	52:1	19.2	13	30	F14	417	40
				126:1[7)]	44.0	31.5	30/(20)	F14 (F10)	182	46
				160:1[7)]	56.0	40		F14 (F10)	143	
				208:1[7)]	72.7	52	20/(30)	F10 (F14)	110	
14,000	F25 F30 F35[6)]	100	GS 160.3	54:1	21.0	13.5	30	F16 (F14)	667	80
				218:1[7)]	76.0	54.5	30/(20)	F14 (F10)	184	91
				442:1[7)]	155	110.5	20	F10	90	
				880:1[7)]	276	220			51	
28,000	F30 F35 F40[6)]	125	GS 200.3	53:1	21.0	13.25	40	F25 (F16)	1,333	140
				214:1[7)]	75.0	53.5	30	F14	373	160
				434:1[7)]	152	108.5	30/(20)	F14 (F10)	184	
				864:1[7)]	268	216	20	F10	104	170
				1,752:1[7)]	552	438	20	F10	51	
56,000	F35 F40 F48[6)]	160	GS 250.3	52:1	20.3	13	50	F30 (F25)	2 759	273
				210:1[7)]	74.0	52.5	40/(30)	F16 (F14)	757	296
				411:1[7)]	144	103	30	F14	389	
				848:1[7)]	263	212	30/(20)	F14 (F10)	213	308
				1,718:1[7)]	533	430	20/(30)	F10	105	

Duty class 2[1)]

Motor operation for infrequently operated valves (max. 1,000 cycles)

Valve			Gearbox							
Max. output torque[2)]	Valve attachment		Type	Reduct. ratio	Factor[3)]	Turns for 90°	Input shaft	Input mounting flange for multi-turn actuator	Max. input torques	Weight[4)]
to [Nm]	Flange according to EN ISO 5211	Max. shaft diameter [mm]					[mm]		[Nm]	[kg]
625	F07 F10	38	GS 50.3	51:1	16.7	12.75	16	F07 F10	37	7.0
1,250	F10 F12	50	GS 63.3	51:1	16.7	12.75	20	F07 F10	75	12
2,200	F12 F14	60	GS 80.3	53:1	18.2	13.25	20	F07 F10	120	16
5,000	F14 F16	80	GS 100.3	52:1	18.7	13	30/(20)	F14 (F10)	267	33
				126:1[7)]	42.8	31.5	20	F10	117	39
				160:1[7)]	54.0	40			93	
				208:1[7)]	71.0	52			71	
10,000	F16 F25 F30[6)]	90	GS 125.3	52:1	19.2	13	30	F16	521	40
				126:1[7)]	44.0	31.5	30/(20)	F14 (F10)	227	46
				160:1[7)]	56.0	40			179	
				208:1[7)]	72.7	52	20	F10 (F14)	138	
17,500	F25 F30 F35[6)]	100	GS 160.3	54:1	21.0	13.5	30	F16 (F14)	833	80
				218:1[7)]	76.0	54	30/(20)	F14 (F10)	230	91
				442:1[7)]	155	110.5	20	F10	113	
				880:1[7)]	276	220				

1) – 7) Refer to notes on page 3.

Technical data Part-turn gearboxes for open-close duty

Valve			Gearbox							
Max. output torque[2]	Valve attachment		Type	Reduct. ratio	Factor[3]	Turns for 90°	Input shaft	Input mounting flange for multi-turn actuator	Max. input torques	Weight[4]
to [Nm]	Flange according to EN ISO 5211	Max. shaft diameter [mm]					[mm]		[Nm]	[kg]
35,000	F30 F35 F40[6]	125	GS 200.3	53:1	21.0	13.25	40	F25 (F16)	1,691	140
				214:1[7]	75.0	53.5	30	F14	467	160
				434:1[7]	152	108.5	30/(20)	F14 (F10)	230	
				864:1[7]	268	216	30	F14	131	170
				1,752:1[7]	552	438	20	F10	63	
70,000	F35 F40 F48[6]	160	GS 250.3	52:1	20.3	13	50	F30 (F25)	3,448	273
				210:1[7]	74.0	52.5	40/(30)	F16 (F14)	946	296
				411:1[7]	144	103	30	F14	486	
				848:1[7]	263	212	30/(20)	F14 (F10)	266	308
				1,718:1[7]	533	430	20	F14	131	

Duty class 3[1]

Manual operation in accordance with EN 1074-2 (max. 250 cycles)

Max. output torque[2]	Valve attachment		Type	Reduction ratio	Factor[3]	Input shaft	Max. input torques	Handwheel Ø[8]	Manual force	Weight[4]
to [Nm]	Flange according to EN ISO 5211	Max. shaft diameter [mm]				[mm]	[Nm]	[mm]	[N]	[kg]
750	F07 F10	38	GS 50.3	51:1	16.7	16	45	160	561	7.0
								200	449	
								250	359	
1,500	F10 F12	50	GS 63.3	51:1	16.7	20	90	250	720	12
								315	570	
750[5]				82:1	17.0		44	200	441	
								250	353	
3,000	F12 F14	60	GS 80.3	53:1	18.2	20	165	400	824	16
1,500[5]				82:1	17.0		88	315	560	
								400	441	
6,000	F14 F16	80	GS 100.3	52:1	18.7	30/(20)	321	800	802	33
2,800[5]				107:1	22.6		124	400	619	
								500	496	
6,000				126:1[7]	42.8	30	140	400	701	39
				160:1[7]	54.0		111	315	705	
								400	556	
				208:1[7]	71.0		85	250	679	
								315	539	
								400	424	
12,000	F16 F25 F30[6]	90	GS 125.3	126:1[7]	44.0	30/(20)	273	630	866	46
								800	682	
				160:1[7]	56.0		214	500	857	
								630	680	
								800	535	
				208:1[7]	72.7	20	165	400	825	
17,500	F25 F30 F35[6]	100	GS 160:3	218:1[7]	76.0	30/(20)	230	630	731	91
								800	576	
				442:1[7]	155	20	113	315	717	
								400	565	
				880:1[7]	276		63	200	634	
								250	507	
								315	403	
35,000	F30 F35 F40[6]	125	GS 200.3	434:1[7]	152	30/(20)	230	630	731	160
								800	576	
				864:1[7]	268	30	131	400	653	170
				1,752:1[7]	552	20	63	315	403	
								400	317	
70,000	F35 F40 F48[6]	160	GS 250.3	848:1[7]	263	30/(20)	266	630	845	308
								800	665	
				1,718:1[7]	533	20	131	400	657	

1) – 8) Refer to notes on page 3.

Technical data Part-turn gearboxes for open-close 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. Separate technical data apply for these applications.

Notes to table on pages 1 + 2	
1) Duty class	For further information on lifetime, refer to "Lifetime for motor operation" and "Lifetime for manual operation" on page 6. Duty class 3 is limited to manual operation only. Please refer to page 2 for the pertaining handwheel size.
2) Max. output torque	For a swing angle up to max. 90°.
3) Factor	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 %.
4) Weight	Indicated weight includes unfinished coupling and grease filling in the gear housing.

Type	GS 125.3	GS 160.3	GS 200.3	GS 250.3
Extension flange	F30	F35	F40	F48
Additional weight [kg]	18	33	48	75

5)	Toothing does not allow for higher loads.
6)	Screwed and doweled to housing by means of extension flange.
7)	Equipped with primary reduction gearing or planetary gearing to reduce input torques.
8)	Available handwheel diameters in accordance with EN 12570.

Features and functions		
Worm wheel material	Spheroidal cast iron	
Version	Standard:	Clockwise rotation RR, counterclockwise rotation LL as an option
	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 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	

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					GS 250.3				
Reduction ratio	53:1	214:1	434:1	864:1	1752:1	52:1	210:1	411:1	848:1	1,718:1
[Nm]	8,000	2,000	1,000	500	250	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° Swing angles > 190° are only possible with a worm wheel made of bronze and without end stops. For swing angles > 100°, we recommend a worm wheel made of bronze.

Technical data Part-turn gearboxes for open-close duty

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 angles > 190° are only possible with a worm wheel made of bronze and without end stops. For swing angles > 100°, we recommend a worm wheel made of bronze.
Mechanical position indicator	Standard:	Pointer cover for continuous position indication
	Options:	• Sealed pointer cover for horizontal outdoor installation (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, not available for GS 50.3 Observe notes on Information sheet Enclosure protection IP68 for part-turn gearboxes
Input shaft	Cylindrical with parallel key according to DIN 6885-1 (refer to table on pages 1 and 2)	

Operation

Motor operation
- Via electric multi-turn actuator
- Input mounting flanges for multi-turn actuator (refer to table pages 1 and 2)

Type of duty

Short-time duty S2 - 15 min

Class A according to EN 15714-2: OPEN-CLOSE

Class B according to EN 15714-2: Inching/positioning or positioning duty

Maximum permissible input speeds and operating times

Type	GS 50.3	GS 63.3		GS 80.3		GS 100.3				
Reduction ratio	51:1	51:1	82:1	53:1	82:1	52:1	107:1	126:1	160:1	280:1
Max. permissible input speed [rpm]	108	108		108		108		216		
Fastest operating time for 90° [s]	7	7	11	7	11	7	15	9	11	19

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
Max. permissible input speed [rpm]	108	216			108	216		
Fastest operating time for 90° [s]	7	9	11	19	8	15	31	61

Type	GS 200.3					GS 250.3				
Reduction ratio	53:1	214:1	434:1	864:1	1,752:1	52:1	210:1	411:1	848:1	1,718:1
Max. permissible input speed [rpm]	108	216				108	216			
Fastest operating time for 90° [s]	7	15	30	60	122	7	15	29	59	119

Shorter operating times can be achieved with worm wheels made of bronze, refer to Technical data GS 50.3 – GS 250.3 for modulating duty and shorter operating times.

Due to gear tooth geometry and the material characteristics of bronze, worm gearboxes with a worm wheel made of bronze can transmit lower torques.

Calculation of operating time for a 90° swivel movement:

$$\text{Oper. time for 90° [s]} = \frac{\text{Reduction ratio [i]}}{\text{n [input speed in rpm]}} \cdot 15$$

Calculation of the operating time for a swivel movement θ [°]:

$$\text{Oper. time for θ° [s]} = \frac{\text{Swing angle θ [°]} \cdot \text{reduction ratio [i]}}{6 \cdot \text{n [input speed in rpm]}}$$

Technical data Part-turn gearboxes for open-close duty

Manual operation	Standard:	• Handwheel made of aluminium with electrophoretic coating • Handwheel with ball handle
	Options:	• Handwheel made of GJL-200 with electrophoretic coating and painting • Handwheel lockable • WSH for signalling position and end positions • Chainwheel (only available for torques according to duty class 1)

Deflection of the input shaft	
Deflection	90° deflection of the input shaft Combination with GK bevel gearbox directly mounted on GS or planetary stage possible, refer to Mounting positions Part-turn gearboxes with multi-turn actuators

Base and lever		
Not suitable for duty class 3.		
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

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.	
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.

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	GJL	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	GJL

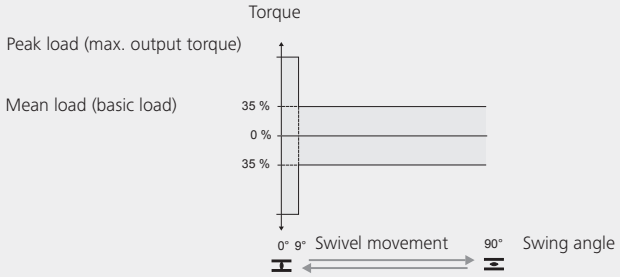
Refer to Dimensions Output mounting flange GS 50.3 – GS 125.3 (Y000.854) and Dimensions Output mounting flange GS 160.3 – GS 250.3 (Y005.001). Further pitch circle diameters for parallel pins on request.

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
	Option:	IP68-20, dust-tight and water-tight up to max. 20 m head of water

Technical data Part-turn gearboxes for open-close duty

Corrosion protection	Standard:	GS 50.3 – GS 80.3: KS GS 100.3 – GS 250.3: KN
	Option:	GS 50.3 – GS 80.3: KX GS 100.3 – GS 250.3: KS/KX
	KN	Suitable for installation in industrial units, in water or power plants with a low pollutant concentration
	KS	Suitable for use in areas with high salinity, almost permanent condensation, and high pollution.
	KX	Suitable for use in areas with extremely high salinity, permanent condensation, and high pollution.
Coating	GS 50.3 – GS 80.3:	Double layer powder coating
	GS 100.3 – GS 250.3:	Two-component iron-mica combination
Colour	Standard:	AUMA silver-grey (similar to RAL 7037)
	Option:	Available colours on request

AUMA load spectrum



AUMA worm gearboxes meet or exceed the lifetime requirements of EN 15714-2.

Lifetime for motor operation in accordance with AUMA load profile

Duty class 1: Lifetime for 90° swivel movement. Meets the lifetime requirement of EN 15714-2

Type	GS 50.3/ GS 63.3	GS 80.3/ GS100.3	GS 125.3 – GS 200.3	GS 250.3
Number of cycles for max. torque	10,000	5,000	2,500	1,200

Lifetime for larger swing angle on request

Duty class 2: Lifetime for 90° swivel movement for valves which are infrequently operated.

Type	GS 50.3/ GS 63.3	GS 80.3/ GS100.3	GS 125.3 – GS 200.3	GS 250.3
Number of cycles for max. torque	1,000			

Lifetime for larger swing angle on request

Lifetime for manual operation

Duty class 3: Meets the lifetime requirement of EN 1074-2

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°

Technical data Part-turn gearboxes for open-close duty

Special features for use in potentially explosive atmospheres in accordance with ATEX 94/9/EC		
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	Maximum 3 cycles (OPEN - CLOSE - OPEN) in accordance with AUMA load profile (90° swivel movement) and maximum permissible input speeds, or with mean constant output torques according to table:	
Ambient temperature	Duty classes 1 and 3	
	Standard:	–40 °C to +60 °C (II2G c IIC T4; II2D c T130 °C)
	Options:	–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) –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)
	Duty class 2	
	Standard:	–40 °C to +60 °C (II2G c IIC T3; II2D c T190 °C); T4 on request with individual test
	Options:	–60 °C to +40 °C (II2G c IIC T4; II2D c T130 °C) –60 °C to +60 °C (II2G c IIC T3; II2D c T190 °C); T4 on request with individual test –40 °C to +40 °C (II2G c IIC T4; II2D c T130 °C) –40 °C to +80 °C (II2G c IIC T3; II2D c T190 °C) –20 °C to +40 °C (IM2 c)
	Further temperature classes or loads exceeding the average torque of the AUMA load profile on request.	

Type	GS 50.3	GS 63.3		GS 80.3		GS 100.3		GS 125.3
Reduction ratio	-	51:1	82:1	53:1	82:1	-	107:1	-
Average output torque [Nm]	250	500	375	1,000	750	2,000	1,400	4,000

Type	GS 160.3	GS 200.3	GS 250.3
Average output torque [Nm]	8,000	16,000	32,000

Further information	
EU Directives	ATEX Directive: (94/9/EC) Machinery Directive: (2006/42/EC)
Reference documents	Brochure Electric actuators for industrial valve automation Dimensions GS 50.3 – GS 125.3, GS 160.3 – GS 250.3 Dimension sheet Chainwheel for part-turn gearboxes Technical data SA 07.2 – SA 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 Technical data Part-turn gearboxes Operating times for different reduction ratios and input speeds Information sheet Enclosure protection IP68 for part-turn gearboxes