

Technical data Part-turn gearboxes for modulating duty

Valve				Gearboxes							
Max. valve torque ¹⁾		Valve attachment		Gearbox	Reduct. ratio	Factor ²⁾	Turns for 90°	Input shaft	Input mounting flange for multi-turn actuator	Max. input torques	Weight ³⁾
to [ft-lb]	Modulating torque ⁴⁾ to [ft-lb]	Flange acc. to MSS SP 101	Max. shaft diameter [in]					[mm]		[ft-lb]	[lbs]
260	95	FA10	1.50	GS 50.3	51:1	17.9	12.75	16	FA10	15	15
520	185	FA12 (FA10)	1 15/16	GS 63.3	51:1	17.3	12.75	20	FA10	30	26
1,035	370	FA14	2 15/16	GS 80.3	53:1	19.3	13.25	20	FA10	54	35
2,065	740	(FA14) FA16	3 1/8	GS 100.3	52:1	20.2	13	30/(20)	FA14 (FA10)	103	73
					126:1 ⁶⁾	44.4	31.5	30/(20)	FA10 (FA14)	46	86
					160:1 ⁶⁾	55.5	40	20/(30)	FA10 (FA14)	37	86
					208:1 ⁶⁾	77	52	20/(30)	FA10 (FA14)	27	86
4,130	1,475	(FA16) FA25 (FA30)	3 1/2	GS 125.3	52:1	20.8	13	20/(30)	FA14	198	88
					126:1 ⁶⁾	45.4	31.5	30/(20)	FA14 (FA10)	91	100
					160:1 ⁶⁾	57.9	40	30/(20)	FA14 (FA10)	72	100
					208:1 ⁶⁾	77	52	20	FA10 (FA14)	54	100
8,300	2,950	FA25 (FA30) (FA35 ⁵⁾)	4 3/16	GS 160.3	54:1	22.7	13.5	30	FA16 (FA14)	366	176
					218:1 ⁶⁾	83	54.5	30/(20)	FA14 (FA10)	100	200
					442:1 ⁶⁾	167	110.5	20		50	200
					880:1 ⁶⁾	320	220	20	FA10	27	200
16,600	5,900	FA30 (FA35) (FA40 ⁵⁾)	5 1/4	GS 200.3	53:1	22.3	13.25	40	FA25 (16)	744	310
					67:1	28.2	16.75	40	FA16	458	200
					214:1 ⁶⁾	81.3	53.5	30	FA14	204	355
					434:1 ⁶⁾	165	108.5	30/(20)	FA14 (FA10)	101	355
					864:1 ⁶⁾	308	216	20	FA10	54	370
					1 752:1 ⁶⁾	640	438	20	FA10	26	370
33,200	11,800	FA35 (FA40) (FA48 ⁵⁾)	6	GS 250.3	52:1	21.9	13	50	FA30 (FA25)	1,520	600
					210:1 ⁶⁾	80	52.5	40/(30)	FA16 (FA14)	415	655
					411:1 ⁶⁾	156	103	30	FA14	213	655
					848:1 ⁶⁾	305	212	30/(20)	FA14 (FA10)	109	680
					1,718:1 ⁶⁾	615	430	20	FA10	54	680

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, special sizing is required. Available special applications on request.

Notes on table

1) Max. output torque	For a swing angle up to max. 90°.				
2) Factor	Conversion factor from output torque to input torque for actuator size definition When new, the transmission factor can fall short of the indicated value by up to 10%.				
3) Weight	Specified weight includes coupling (without bore) 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 [lbs] (kg)	[40] (18)	[75] (33)	[105] (48)	[165] (75)
4) Modulating torque	Permissible, average torque for modulating duty				
5)	Optional output flange. Solution may be screwed and doweled to housing by means of extension flange.				
6)	Equipped with primary reduction gearing or planetary gearing to reduce input torques.				

Features and functions

Worm wheel material	Bronze	
Version	Standard:	Clockwise rotation RR, counterclockwise rotation LL as an option
	Option:	RL or LR

Technical data Part-turn gearboxes for modulating duty

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	
	[ft-lb]	185	332	332	996	460	367	185	
	Type	GS 125.3			GS 160.3				
	Reduction ratio	52:1	126:1	160:1	208:1	54:1	218:1	442:1	
	[ft-lb]	996	460	367	185	2360	664	332	
	Type	GS 200.3							
	Reduction ratio	53:1	67:1	214:1	434:1	864:1	1752:1		
	[ft-lb]	5,900	185	1475	738	167	185		
	Type	GS 250.3							
	Reduction ratio	52:1	210:1	411:1	848:1	1718:1			
	[ft-lb]	5,900	1475	738	367	185			
	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°, refer to Technical data GS 50.3 – GS 250.3 for modulating duty and shorter operating times						
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°, refer to Technical data GS 50.3 – GS 250.3 for modulating duty and shorter operating times							
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:	<ul style="list-style-type: none">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 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)								

Technical data Part-turn gearboxes for modulating duty

Operation												
Motor operation	<ul style="list-style-type: none">• Via electric multi-turn actuator• Input mounting flanges for multi-turn actuator (refer to table 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	216 rpm											
	Calculation of operating time for a 90° swivel movement											
	$\text{Oper. time for 90° [s]} = \frac{\text{Reduction ratio [i]}}{n \text{ [input speed in rpm]}} \cdot 15$											
	Calculation of the operating time for a swivel movement θ [°]: $\text{Oper. time for } \theta^\circ \text{ [s]} = \frac{\text{Swing angle } \theta [^\circ] \cdot \text{reduction ratio [i]}}{6 \cdot n \text{ [input speed in rpm]}}$											
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				
	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 [in]	10	12	16	20	16		12	32	20		16
	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	1,752:1	
	Handwheel Ø [in]	32	16	12	10	–	32	25	15	12	10	
	Type	GS 250.3										
	Reduction ratio	52:1	210:1	411:1	848:1	1,718:1						
	Handwheel Ø [in]	–	32	25	16	12						
Standard:	<ul style="list-style-type: none">• Handwheel made of aluminium with electrophoretic coating• Handwheel with ball handle											
Options:	<ul style="list-style-type: none">• Handwheel made of GJL-200 with electrophoretic coating and painting• Handwheel lockable• WSH for signalling position and end positions											

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	
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

Technical data Part-turn gearboxes for modulating duty

Valve attachment												
Valve attachment	Dimensions according to MSS SP 101: The maximum torques of mounting flanges according to MSS SP 101 are to be met. Optional flanges in accordance with EN ISO 5211 are available. Consult factory.											
Bore for locating pins (option)	Two bore for locating pins shifted by 180° The locating 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 MSS SP 101	FA12	FA14	FA14	FA16	FA16	FA25	FA30	FA25	FA30	FA35	
	Housing material	GJS	GJS	GJS	GJS	GJL	GJL	GJL	GJL	GJL	GJL	
	Type	GS 200.3			GS 250.3							
	Flange according to MSS SP 101 or EN ISO 5211	F3A0	FA35	F40	FA35	F40	F48					
	Housing material	GJL	GJL	GJL	GJL	GJL	GJL					
	Refer to dimension drawing U4.4135. Further pitch circle diameters and bore depths for locating pins on request.											
	Splined coupling for connection to the valve shaft	Standard:	<ul style="list-style-type: none">Without bore or pilot bore from GS 160.3Worm 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 °F to +176 °F (–40 °C to +80 °C)
	Options:	–76 °F to +140 °F (–60 °C to +60 °C) +32 °F to +248 °F (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
Corrosion protection	Standard:	GS 50.3 – GS 160.3: KS GS 200.3 – GS 250.3: KN
	Option:	GS 50.3 – GS 160.3: KX GS 200.3 – 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.
Finish coating	GS 50.3 – GS 80.3:	Powder coating
	GS 100.3 – GS 250.3:	Two-component iron-mica combination
Color	Standard:	AUMA silver-grey (similar to RAL 7037)
	Option:	Available colours on request
AUMA load profile	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 even exceed the lifetime requirements of EN 15714-2.	
Lifetime for motor operation in accordance with AUMA load profile	1.2 million modulating steps	

Technical data Part-turn gearboxes for modulating duty

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 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

Standard:

Intermittent duty S4 - 25 % with modulating torque and max. input speed 45 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 3,540 ft-lb (4,800 Nm)

Option:

GSD multi-turn version, specific sizing required; please contact AUMA.

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
Information sheet GS Part-turn gearboxes Operating times for different reduction ratios and input speeds
Information sheet Enclosure protection IP68 for part-turn gearboxes