

Technical data Part-turn gearboxes and primary reduction gearings, version with worm wheel made of spheroidal castiron	GW 60 – GW 600/GWS GW 1080 – GW 3900/GWS Spheroidal castiron
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Application
Manual operation and motor operation of valves (e.g. butterfly valves and ball valves).
For special applications, please consult SCHWARZ

Worm gearboxes GW60 – GW 600 with primary reduction gearings GWS

Valve			Gearboxes							Weight ⁴⁾ GW/GWS kg						
Max.	Valve attachment		Gearbox/ prim. red. gearing	Reduction ratio	Turns for 90°	Factor	Input Shaft ²⁾ mm	Max. input Torques ³⁾ in Nm								
permissible valve torque ¹⁾	Flange acc. to EN ISO 5211	Max. shaft diameter in mm														
in Nm up to																
600	F10 ⁵⁾ F12	45							GW60	51:1	12.75	15.3	20	70	13	
1600	F12 ⁵⁾ F14	60	GW160	53:1	13.25	15.9	20	120	18							
			GWS160	106:1	26.5	31.8			18							
2700	F14 ⁵⁾ F16	80	GW270	60:1	15	18	20	120	47							
			GWS270	120:1	30	36			65							
				144:1	36	43.2			65							
				168:1	42	50.4			65							
				180:1	45	54			65							
				240:1	60	72			65							
300:1	75	90	65													
6000	F16 ⁵⁾ F25	90	GW600	60:1	15	18	20/30	300	66							
			GWS600	90:1	22.5	27			84							
				102:1	25.5	30.6			84							
				120:1	30	36			84							
				156:1	39	46.8			84							
				180:1	45	54			84							
				204:1	51	61.2			84							
				240:1	60	72			84							
300:1	75	90	84													
Possible combinations with multi-turn actuators					Multi-turn actuator		Flange²⁾ for mounting of multi-turn actuator		Max. Weight⁷⁾							
Gearboxes/ prim. red gearing	Operating times for 50 Hz ⁶⁾ in seconds for 90° at actuator speed in rpm											Actuator for max. input torque	EN ISO 5210 DIN 3210		GW/GWS+SM+SC max. kg	
	9	11	18	22	35	45	70	90	105	135	140					180
GW60	-	70	-	35	-	17	-	-	-	-	-	-	SM04 SM07	F07	-	38
	-	70	-	35	-	17	-	-	-	-	-	-		F10	G0	41
GW160	89	73	45	37	23	18	-	-	-	-	-	-	SM07 SM12	F10	G0	46
GWS160	177	145	89	73	45	36	23	18	-	-	-	-				50
GW270	100	82	49	41	26	20	-	-	-	-	-	-	SM07 SM12	F10	G0	79
GWS270	200	164	98	82	52	40	26	20	-	-	-	-				94
	240	197	118	99	63	48	31	24	21	16	-	-				99
	280	230	138	115	73	56	36	28	24	19	-	-				-
	300	246	147	123	78	60	39	30	26	20	19	15 ⁸⁾				-
	400	328	196	164	104	80	52	40	35	27	26	20 ⁸⁾				-
500	410	245	205	130	100	65	50	43	34	33	25 ⁸⁾	-				
GW600	100	82	49	41	26	20	-	-	-	-	-	-	SM07 SM12 SM30	F10 F14	G0 G1/2	122
GWS600	150	123	75	62	39	30	20	15	-	-	-	-				-
	170	140	84	70	45	34	22	17	-	-	-	-				-
	200	164	98	82	52	40	26	20	-	-	-	-				212
	260	214	128	107	68	52	34	26	23	18	-	-				217
	300	246	147	123	78	60	39	30	26	20	19	15 ⁸⁾				140
	342	281	168	141	89	69	44	34	30	23	22	17 ⁸⁾				-
	400	328	196	164	104	80	52	40	35	27	26	20 ⁸⁾				-
500	410	245	205	130	100	65	50	43	34	33	25 ⁸⁾	-				

1) For ball valve applications, sizing up to 80 % of the maximum permissible valve torque
2) Depending on the required input torque
3) In new condition approx. 15 % higher input torque required
4) With coupling (without bore) and grease filling in the gear housing
5) Observe the maximum torques of the mounting flanges in accordance with EN ISO 5211
6) Standard values at 50 Hz; at 60 Hz, the indicated operating time is reduced by 17 %.
7) With coupling (without bore) and grease filling in the gear housing, multi-turn actuator SCHWARZ with 3-phase AC motor, standard electrical connection, output drive type B3 and handwheel
8) Observe max. output torque of the multi-turn actuator

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GW 60 – GW 600/GWS GW 1080 – GW 3900/GWS Spheroidal castiron

Application

Manual operation and motor operation of valves (e.g. butterfly valves and ball valves).
For special applications, please consult SCHWARZ

Worm gearboxes GW60 – GW 600 with primary reduction gearings GWS

Valve			Gearboxes						
Max. permissible valve torque ¹⁾	Valve attachment		Gearbox/ prim. red. gearing	Reduction ratio	Turns for 90°	Factor	Input Shaft ²⁾ mm	Max. input Torques ³⁾ in Nm	Weight ⁴⁾ GW/GWS kg
in Nm up to	Flange acc. to EN ISO 5211	Max. shaft diameter in mm							
10800	F25 ⁵⁾ F30	100	GW1080	60:1	15	18	20/30	500	121
			GWS1080	90:1	22.5	27			151
				102:1	25.5	30.6			151
				120:1	30	36			151
				156:1	39	46.8			151
				180:1	45	54			151
				204:1	51	61.2			151
				240:1	60	72			151
				300:1	75	90			151
				360:1	90	108			151
420:1	105	126	151						
19500	F30 ⁵⁾ F35	125	GW1950	55:1	13.75	17.6	20/30/40	1000	197
			GWS1950	83:1	20.75	26.56			255
				110:1	27.5	35.2			255
				132:1	33	42.24			255
				165:1	41.25	52.8			255
				187:1	46.75	59.84			255
				220:1	55	70.4			255
				275:1	68.75	88			255
				330:1	82.5	105.6			255
				385:1	96.25	123.2			255
				440:1	110	140.8			255
				480:1	120	153.6			255
				550:1	137.5	176			255
				638:1	159.5	204.16			255
				688:1	172	220.16			255
				748:1	187	239.36			255
				811:1	202.75	259.52			255
880:1	220	281.6	255						
39000	F35 ⁵⁾ F40	160	GW3900	55:1	13.75	17.6	20/30/40	1000	288
			GWS3900	83:1	20.75	26.56			368
				110:1	27.5	35.2			368
				132:1	33	42.24			368
				165:1	41.25	52.8			368
				187:1	46.75	59.84			368
				220:1	55	70.4			368
				275:1	68.75	88			368
				330:1	82.5	105.6			368
				385:1	96.25	123.2			368
				440:1	110	140.8			368
				480:1	120	153.6			368
				550:1	137.5	176			368
				638:1	159.5	204.16			368
				688:1	172	220.16			368
				748:1	187	239.36			368
				811:1	202.75	259.52			368
880:1	220	281.6	368						

1) For ball valve applications, sizing up to 80 % of the maximum permissible valve torque

2) Depending on the required input torque

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

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

5) Observe the maximum torques of the mounting flanges in accordance with EN ISO 5211

Technical data Part-turn gearboxes and primary reduction gearings, version with worm wheel made of spheroidal castiron

GW 60 – GW 600/GWS GW 1080 – GW 3900/GWS Spheroidal castiron

Gearboxes/ prim. red gearing	Possible combinations with multi-turn actuators												Multi-turn actuator Actuator for max. input torque	Flange ²⁾ for mounting of multi-turn actuator		Max. Weight ⁷⁾
	Operating times for 50 Hz ⁶⁾ in seconds for 90° at actuator speed in rpm													EN ISO 5210	DIN 3210	
	9	11	18	22	35	45	70	90	105	135	140	180				
GW1080	100	82	49	41	26	20	–	–	–	–	–	–	SM07 SM12	F10	G0	153
GWS1080	150	123	75	62	39	30	20	15	–	–	–	–				179
	170	140	84	70	45	34	22	17	–	–	–	–				183
	200	164	98	82	52	40	26	20	–	–	–	–				
	260	214	128	107	68	52	34	26	23	18	–	–				
	300	246	147	123	78	60	39	30	26	20	19	–				
	342	281	168	141	89	69	44	34	30	23	22	17 ⁸⁾				
	400	328	196	164	104	80	52	40	35	27	26	20 ⁸⁾				
	500	410	245	205	130	100	65	50	43	34	33	25 ⁸⁾				
	600	491	300	246	155	120	78	60	52	40	39	30 ⁸⁾				
–	573	350	286	180	140	90	70	60	47	45	35 ⁸⁾					
GW1950	92	75	46	38	24	19	–	–	–	–	–	SM07 SM12 SM30 SM50	F10 F14	G0 G1/2	258	
GWS1950	139	114	70	57	36	28	18	–	–	–	–				283	
	184	150	92	75	48	37	24	19	–	–	–				288	
	220	180	110	90	57	44	29	22	19	–	–				311	
	275	225	138	113	71	55	36	28	24	19	–				316	
	312	255	156	128	81	63	41	32	27	21	20					
	367	300	184	150	95	74	48	37	32	25	24				283	
	459	375	230	188	118	92	59	46	40	31	30				288	
	550	450	275	225	142	110	71	55	48	37	36				311	
	642	525	321	263	165	129	83	65	55	43	42				316	
	–	600	367	300	189	147	95	74	63	49	48					
	–	–	400	328	206	160	103	80	69	54	53					
	–	–	459	375	236	184	118	92	79	62	59					
	–	–	532	435	274	213	137	107	92	71	69					
	–	–	574	470	295	230	148	115	99	77	74					
	–	–	624	510	321	249	161	125	107	84	81					
–	–	–	553	348	271	174	136	116	91	87						
–	–	–	600	378	294	189	147	126	98	95						
GW3900	92	75	46	38	24	19	–	–	–	–	–	SM07 SM12 SM30 SM50 SM100	F10 F14 F16	G0 G1/2 G3	376	
GWS3900	139	114	70	57	36	28	18	–	–	–	–				396	
	184	150	92	75	48	37	24	19	–	–	–				400	
	220	180	110	90	57	44	29	22	19	–	–				412	
	275	225	138	113	71	55	36	28	24	19	–				417	
	312	255	156	128	81	63	41	32	27	21	20				434	
	367	300	184	150	95	74	48	37	32	25	24					
	459	375	230	188	118	92	59	46	40	31	30					
	550	450	275	225	142	110	71	55	48	37	36					
	642	525	321	263	165	129	83	65	55	43	42					
	–	600	367	300	189	147	95	74	63	49	48					
	–	–	400	328	206	160	103	80	69	54	53					
	–	–	459	375	236	184	118	92	79	62	59					
	–	–	532	435	274	213	137	107	92	71	69					
	–	–	574	470	295	230	148	115	99	77	74					
	–	–	624	510	321	249	161	125	107	84	81					
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	–	–	–	600	378	294	189	147	126	98	95					

1) For ball valve applications, sizing up to 80 % of the maximum permissible valve torque
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 8) Observe max. output torque of the multi-turn actuator

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Issue

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Technical data Part-turn gearboxes and primary reduction gearings, version with worm wheel made of spheroidal cast iron		GW 60 – GW 600/GWS GW 1080 – GW 3900/GWS Spheroidal cast iron																																															
Features and functions																																																	
Version	Standard: Clockwise RR, counterclockwise 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 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																																																
	<table border="1"> <thead> <tr> <th>Type</th> <th>GW 60</th> <th>GW160</th> <th>GWS160</th> <th colspan="3">GWS270</th> <th colspan="3">GWS600</th> </tr> </thead> <tbody> <tr> <td>Nm</td> <td>250⁹⁾</td> <td>450</td> <td>450</td> <td colspan="3">500</td> <td colspan="3">500</td> </tr> </tbody> </table> <table border="1"> <thead> <tr> <th>Type</th> <th colspan="3">GWS1080</th> <th colspan="3">GWS1950</th> <th colspan="3">GWS3900</th> </tr> </thead> <tbody> <tr> <td>Nm</td> <td colspan="3">500</td> <td colspan="3">500</td> <td colspan="3">500</td> </tr> </tbody> </table>			Type	GW 60	GW160	GWS160	GWS270			GWS600			Nm	250 ⁹⁾	450	450	500			500			Type	GWS1080			GWS1950			GWS3900			Nm	500			500			500								
Type	GW 60	GW160	GWS160	GWS270			GWS600																																										
Nm	250 ⁹⁾	450	450	500			500																																										
Type	GWS1080			GWS1950			GWS3900																																										
Nm	500			500			500																																										
Swing angle GW 60 – GW 600	Standard: Fixed swing angle between 10° and max. 100°; set in the factory to 92° unless ordered otherwise. Options: Adjustable in steps: 10° – 35°, 35° – 60°, 60° – 80°, 80° – 100°, 100° – 125°, 125° – 150°, 150° – 170°, 170° – 190° Swing angle > 190°, see Technical data with worm wheel made of bronze																																																
Swing angle GW 1080 – GW 3900	Standard: Adjustable 80° – 100°; set in the factory to 92° unless ordered otherwise. Options: Adjustable in steps: 0° – 20°, 20° – 40°, 40° – 60°, 60° – 80°, 90° – 110°, 110° – 130°, 130° – 150°, 150° – 170°, 170° – 190° Swing angle > 190°, see Technical data with worm wheel made of bronze																																																
Mechanical position indicator	Standard: Pointer cover for continuous position indication Options: Sealed pointer cover for horizontal outdoor installation ¹⁰⁾ Protection cover for buried service instead of pointer cover																																																
Input shaft	Cylindrical with parallel key according to DIN 6885.1 (refer to tables page 1 and page 2)																																																
Operation																																																	
Motor operation	With electric multi-turn actuator, directly or through primary reduction gearing GWS Flanges for mounting of multi-turn actuator (refer to tables page 1 and page 2).																																																
Type of duty	Short-time duty S2 - 15 min (open-close 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 GWS Available handwheel diameters, selection according to the output torque:																																																
	<table border="1"> <thead> <tr> <th>Type</th> <th>GW 60</th> <th>GW 160</th> <th>GWS 160</th> <th colspan="3">GWS 270</th> <th colspan="4">GWS 600</th> </tr> </thead> <tbody> <tr> <td>Handwheel Ø mm</td> <td>160 200 250</td> <td>250 315</td> <td>315 400</td> <td>400 500</td> <td>315 400</td> <td>315 400</td> <td>250 315</td> <td>500 630 800</td> <td>400 500</td> <td>400 500</td> <td>315 400</td> </tr> </tbody> </table> <table border="1"> <thead> <tr> <th>Type</th> <th colspan="3">GWS 1080</th> <th colspan="3">GWS 1950</th> <th colspan="4">GWS 3900</th> </tr> </thead> <tbody> <tr> <td>Handwheel Ø mm</td> <td>630 800</td> <td>400</td> <td>315</td> <td>–</td> <td>500 630</td> <td>400</td> <td>315</td> <td>–</td> <td>800</td> <td>500 630</td> <td>400</td> </tr> </tbody> </table>			Type	GW 60	GW 160	GWS 160	GWS 270			GWS 600				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	GWS 1080			GWS 1950			GWS 3900				Handwheel Ø mm	630 800	400	315	–	500 630	400	315	–	800	500 630	400
Type	GW 60	GW 160	GWS 160	GWS 270			GWS 600																																										
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	GWS 1080			GWS 1950			GWS 3900																																										
Handwheel Ø mm	630 800	400	315	–	500 630	400	315	–	800	500 630	400																																						
	Standard: Without ball handle Options: - With ball handle - Handwheel material GJL-200																																																
Primary reduction gearing																																																	
Primary reduction gearing	- Types GWS as planetary gear with various reduction ratios for reducing the input torques (refer to tables page 1 and page 2). - Combination with GB bevel gearbox directly on GW or on GWS possible																																																
Valve attachment																																																	
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: GW 60 – GW 600: without spigot GW 1080 – GW 3900: with spigot Options: GW 60 – GW 600: with spigot GW 1080 – GW 3900: without spigot																																																
Splined coupling for connection to the valve shaft	Standard: Without bore or pilot bore from GW 1080 Worm gearbox can be repositioned 4 x 90° on coupling Options: Machined with bore and keyway, square bore or bore with two-flats including grub screw for fixing to valve shaft																																																

9) Not qualified in accordance with AWWA

10) 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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Service conditions

Mounting position	Any position				
Enclosure protection according to EN 60529 ¹¹⁾	Standard: IP 68-3, dust and water tight up to max 3 m head of water Options: 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: GW 60– GW 600: Two component iron mica combination GW 1080 – GW 3900: Primer coating Option: GW 1080 – GW 3900: Two component iron mica combination				
Colour	Standard: silver-grey Option: Other colours on request				
Ambient temperature	–40 °C to +80 °C				
Lifetime	Lifetime for 90° rotary movement				
	Gearbox size	GW 60	GW 160/GWS/ GW 270/GWS	GW 600/GWS – GW 1950/GWS	GW 3900/GWS
	No. of cycles¹²⁾ for max. torque	10000	5000	2500	1000

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)
Limit switching 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 ° Options: II2G c IIC T3 II2D c T190 °C IM2 c							
Type of duty ¹³⁾	Short-time duty S2 - 15 min, maximum of 3 cycles (OPEN-CLOSE-OPEN); 90° with the following average output torques							
	Gearbox size	GW 60	GW 160	GW 270	GW 600	GW 1080	GW 1950	GW 3900
	Average output torque in Nm	600	1600	2700	6000	10800	19500	39000
	then cooling down to ambient temperature							
Ambient temperature	–40 °C to +60 °C (II2G c IIC T4; II2D c T130 °C)							
Output speeds	Standard: 50 Hz, refer to tables on pages 1 and 3 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)
Lever gearboxes	Refer to separate documents

11) Refer to information sheet "Enclosure protection IP 68 (submersible) for worm gearboxes and primary reduction gearings".

12) Number of cycles according to standard EN 15714-2

13) The type of duty must not be exceeded.

