## Technical data Part-turn gearboxes for modulating duty

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

**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 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<br>When new, the 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 |
| 4) Modulating torque | Permissible, average torque for modulating duty |
| 5) | Screwed and doweled to housing by means of extension flange. |
| 6) | Equipped with primary reduction gearing or planetary gearing to reduce input torques. |

| 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 |

**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

<table>
<tr><td>Housing material</td><td>Standard:</td><td>Cast iron (GJL-250)</td></tr>
<tr><td></td><td>Option:</td><td>Spheroidal cast iron (GJS-400-15)</td></tr>
<tr><td>Self-locking</td><td colspan="2">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.</td></tr>
<tr><td>End stops</td><td colspan="2">Positive for both end positions by travelling nut, sensitive adjustment</td></tr>
<tr><td>Strength of end stop</td><td colspan="2">Guaranteed strength of end stop (in Nm) for input side operation
<table>
<tr><td>Type</td><td>GS 50.3</td><td>GS 63.3</td><td>GS 80.3</td><td colspan="4">GS 100.3</td></tr>
<tr><td>Reduction ratio</td><td>51:1</td><td>51:1</td><td>53:1</td><td>52:1</td><td>126:1</td><td>160:1</td><td>208:1</td></tr>
<tr><td>[Nm]</td><td>250</td><td>450</td><td>450</td><td>1350</td><td>625</td><td>500</td><td>250</td></tr>
</table>
<table>
<tr><td>Type</td><td colspan="4">GS 125.3</td><td colspan="4">GS 160.3</td></tr>
<tr><td>Reduction ratio</td><td>52:1</td><td>126:1</td><td>160:1</td><td>208:1</td><td>54:1</td><td>2,181</td><td>442:1</td><td>880:1</td></tr>
<tr><td>[Nm]</td><td>1350</td><td>625</td><td>500</td><td>250</td><td>3,200</td><td>900</td><td>450</td><td>250</td></tr>
</table>
<table>
<tr><td>Type</td><td colspan="6">GS 200.3</td></tr>
<tr><td>Reduction ratio</td><td>53:1</td><td>67:1</td><td>214:1</td><td>434:1</td><td>864:1</td><td>1,752:1</td></tr>
<tr><td>[Nm]</td><td>8000</td><td>250</td><td>2000</td><td>1000</td><td>500</td><td>250</td></tr>
</table>
<table>
<tr><td>Type</td><td colspan="5">GS 250.3</td></tr>
<tr><td>Reduction ratio</td><td>52:1</td><td>210:1</td><td>411:1</td><td>848:1</td><td>1,718:1</td></tr>
<tr><td>[Nm]</td><td>8,000</td><td>2,000</td><td>1,000</td><td>500</td><td>250</td></tr>
</table></td></tr>
<tr><td>Swing angle GS 50.3 – GS 125.3</td><td>Standard:</td><td>Fixed swing angle between 10° and max. 100°; set in the factory to 92° unless ordered otherwise.</td></tr>
<tr><td></td><td>Options:</td><td>Adjustable in steps of:<br>10° – 35°, 35° – 60°, 60° – 80°, 80° – 100°, 100° – 125°, 125° – 150°, 150° – 170°, 170° – 190°<br>Multi-turn version without end stop, up to max. 10 turns of worm wheel permissible Heed special sizing!</td></tr>
<tr><td>Swing angle GS 160.3 – GS 250.3</td><td>Standard:</td><td>Adjustable 80° – 100°; set in the factory to 92° unless ordered otherwise.</td></tr>
<tr><td></td><td>Options:</td><td>Adjustable in steps of:<br>0° – 20°, 20° – 40°, 40° – 60°, 60° – 80°, 90° – 110°, 110° – 130°, 130° – 150°, 150° – 170°, 170° – 190°<br>Multi-turn version without end stop, up to max. 10 turns of worm wheel permissible Heed special sizing!</td></tr>
<tr><td>Swing angle for special reduction ratio</td><td>Standard:</td><td>Adjustable 80° – 100°; set in the factory to 92° unless ordered otherwise.</td></tr>
<tr><td></td><td>Options:</td><td>Swing angle range different from standard range available on request<br>Multi-turn version without end stop, up to max. 10 turns of worm wheel permissible Heed special sizing!</td></tr>
<tr><td>Mechanical position indicator</td><td>Standard:</td><td>Pointer cover for continuous position indication</td></tr>
<tr><td></td><td>Options:</td><td>• Sealed pointer cover for horizontal outdoor installation (not available for GS 50.3)<br>• Protection cover for buried services instead of pointer cover (without mechanical position indicator)<br>• Sealed pointer cover with air vent, not available for GS 50.3<br>Observe notes on Information sheet Enclosure protection IP68 for part-turn gearboxes</td></tr>
<tr><td>Input shaft</td><td colspan="2">Corrosion-protected, cylindrical with parallel key according to DIN 6885-1 (refer to table on pages 1 and 2)</td></tr>
<tr><td colspan="3">Operation</td></tr>
<tr><td>Motor operation</td><td colspan="2">• Via electric multi-turn actuator<br>• Input mounting flanges for multi-turn actuator (refer to table pages 1 and 2)</td></tr>
<tr><td>Type of duty</td><td colspan="2">Intermittent duty S4 - 25 %<br>Class C according to EN 15714-2: Modulating duty</td></tr>
</table>

## Technical data Part-turn gearboxes for modulating duty

**Maximum permissible input speeds and operating times**

215 rpm

For use in potentially explosive atmospheres, heed input speeds on page 5!

Calculation of operating time for a 90° swivel movement:

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

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

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

**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 [mm] | 160<br>200<br>250 | 250<br>315 | 315<br>400 | 400<br>500 | 315<br>400 | | 250<br>315 | 500<br>630<br>800 | 400<br>500 | | 315<br>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 | 1,752:1 |
| Handwheel Ø [mm] | 630<br>800 | 400 | 315 | 250 | – | 800 | 500<br>630 | 400 | 315 | 250 |

| Type | GS 250.3 | | | | |
|---|---|---|---|---|---|
| Reduction ratio | 52:1 | 210:1 | 411:1 | 848:1 | 1,718:1 |
| Handwheel Ø [mm] | – | 800 | 500<br>630 | 400 | 315 |

| | |
|---|---|
| Standard: | • Handwheel made of aluminium with electrophoretic coating<br>• Handwheel with ball handle |
| Options: | • Handwheel made of GJL-200 with electrophoretic coating and painting<br>• Handwheel lockable<br>• WSH for signalling position and end positions<br>• Chain wheel |

**Deflection of the input shaft**

| | |
|---|---|
| Deflection | 90° deflection of the input shaft<br>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 |

**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. |

## Technical data Part-turn gearboxes for modulating duty

| | | |
|---|---|---|
| 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 | 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.

| | | |
|---|---|---|
| Splined coupling for connection to the valve shaft | Standard: | • Without bore or pilot bore from GS 160.3<br>• 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<br>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: | 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 | Standard: | 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).<br>AUMA worm gearboxes meet or exceed the lifetime requirements of EN 15714-2. | | |
| Lifetime for motor operation in accordance with AUMA load profile | 1.2 million modulating steps | | |

| **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°.<br>• 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<br>II2D c T130 °C |
| | Options: | II2G c IIC T3<br>II2D c T190 °C<br>IM2 c |

## Technical data Part-turn gearboxes for modulating duty

**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 | 160:1 | 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 | 208:1 | 54:1 | 218:1 | 442:1 | 880:1 |
| 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 | 411:1 | 848:1 | 1,718:1 |
| Max. speed at GS input with SA [rpm] | 11 | 45 | 90 | 180 | 180 |

Exception: GS 200.3 with modulating torque up to 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
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 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
Technical data Part-turn gearboxes Operating times for different reduction ratios and input speeds
Information sheet Enclosure protection IP68 for part-turn gearboxes