FROM STANDARD DRIVES TO CUSTOMISED PRECISION GEARBOXES

Originated from a traditional gear company with more than 100 years of experience in drive technology, today Melior Motion offers customised and individual solutions from our headquarters in Hamelin, Germany. We develop, produce, assemble and test innovative precision gearboxes for the global market.

Focus on precision gear under a new name

As one of the first movers in high precision gearboxes for the Robotics industry, we have supplied reliable and precise transmissions for various industry sectors for over 35 years.

Our customers benefit from our in-depth know-how in standard gearboxes as well as for individual customised solutions, ensuring that we are able to provide a fast and efficient response to the demanding needs of the various markets we serve.

At Melior Motion, you will find the newly developed standard series as well as the customised gearboxes for robotics and automation industry.

We look forward to a future as your strategic partners.

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## Gearbox overview

<table>
<thead>
<tr>
<th>PRODUCT</th>
<th>APPLICATIONS</th>
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</thead>
<tbody>
<tr>
<td>Gearbox sub-assembly PSC</td>
<td></td>
</tr>
</tbody>
</table>
  - Robotics  
  - Automation |

| Fully enclosed gearbox unit PSC |  
  - Robotics  
  - Automation  
  - Machine tools  
  - Printing industry  
  - Packaging machines  
  - Turntables  
  - Medical industry  
  - Defence |

| Special gearbox PSD |  
  - Delta robots  
  - Machine builders |

| Customized gearboxes |  
  - Robotics  
  - Automation  
  - Many other applications in different industry sectors |

## Low backlash precision gearboxes PSC

With 30 years experience in the development and production of highly precise precision gearboxes for industrial robots, the new compact gear range MELIOR MOTION® has been presented to the market. The unique advantages convince in robotics applications, as well as in medical industry, machine tools and other automation industries.

With a backlash of ≤ 0.1 arcmin, the MELIOR MOTION® range can be considered as zero backlash gearbox. They are available in seven sizes, each as sub-assembly or fully enclosed gearbox unit and as solid or hollow shaft version.

Sub-assemblies can be directly integrated into your drive system or machine design. As an alternative, we offer fully enclosed gearboxes which are filled with a standard mineral oil. Geared motors can be supplied on request.

Hollow shafts up to 75 mm dia. allow a feed-through of cables or similar.

**SPECIALS**

- Patented self-adjusting solution to regulate wear throughout the lifetime of the gearbox
- Newly developed main bearing where bearing running surface is integrated in gear components
- High quality, dynamic sealing
- Optimized macro and micro geometry for highest precision
Low backlash precision gearboxes PSC

Structural design PSC gearboxes

Features for your benefit

- **Backlash ≤ 0.1 arcmin**
  - Highest precision for your application

- **Lost Motion ≤ 0.6 arcmin**
  - Superior accuracy also for small torques

- **Self-regulating tooth contact system**
  - Constant precision throughout the whole lifetime

- **Fully-loaded lifetime of 20,000 operating hours**
  - Longer lifetime, greatly reduced maintenance costs

- **High torques in output, acceleration and emergency stops**
  - More safety for your application

- **Superior tilting and torsion stiffness**
  - Allows positioning straight-to-the-point

- **Low vibrations**
  - High repeatability

- **Lowest breakaway torque**
  - Better controllability of the whole system

- **Use of a standard mineral oil**
  - Reduced cost of lubrication

- **Low heat development**
  - Longer lifetime of components and lubricant

- **Low moments of inertia**
  - Excellent dynamic performance

- **Efficiency > 90%**
  - Use of motors / systems with less energy consumption

- **Small weight**
  - Lighter overall system

- **Compact design**
  - Smarter periphery design

- **Low noise**
  - Reduced noise exposure at workplaces

---

**PSC-GEARBOXES**

Our low backlash PSC precision gearboxes achieve a particularly high power density thanks to multiple teeth engagement (sun gear, planetary gears and housing gear). The efficiency of >90% and the extremely low breakaway torque ensure outstanding energy efficiency. Thanks to the high efficiency, the gearbox temperature remains unchanged at a particularly low level. For example, elastic seals, e.g. radial shaft seals have a significantly lower stress.

The result is an impressive lifetime of 20,000 hours. This is much more than with conventional precision gearboxes and has been verified in numerous tests. At the same time, the low backlash precision gearbox is extremely quiet. The noise in the work environment is thus reduced.

Not only quiet but also accurate, the design even works equally well in the range of small torques, ensuring high accuracy for small movements.
<table>
<thead>
<tr>
<th>GEARBOX</th>
<th>Nominal ratio</th>
<th>50</th>
<th>63</th>
<th>80</th>
<th>100</th>
<th>125</th>
<th>150</th>
<th>180</th>
<th>200</th>
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<td>PSC056-V</td>
<td>12x10</td>
<td>0.1</td>
<td>1.5</td>
<td>2.5</td>
<td>3.5</td>
<td>4.5</td>
<td>5.5</td>
<td>6.5</td>
<td>7.5</td>
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<td>PSC080-V</td>
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<td>2.5</td>
<td>3.5</td>
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<td>5.5</td>
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<td>3x10</td>
<td>0.1</td>
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<td>2.5</td>
<td>3.5</td>
<td>4.5</td>
<td>5.5</td>
<td>6.5</td>
<td>7.5</td>
</tr>
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<td>PSC160-V</td>
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<td>2.5</td>
<td>3.5</td>
<td>4.5</td>
<td>5.5</td>
<td>6.5</td>
<td>7.5</td>
</tr>
<tr>
<td>PSC224-V</td>
<td>0.75x10</td>
<td>0.1</td>
<td>1.5</td>
<td>2.5</td>
<td>3.5</td>
<td>4.5</td>
<td>5.5</td>
<td>6.5</td>
<td>7.5</td>
</tr>
<tr>
<td>PSC300-V</td>
<td>0.5x10</td>
<td>0.1</td>
<td>1.5</td>
<td>2.5</td>
<td>3.5</td>
<td>4.5</td>
<td>5.5</td>
<td>6.5</td>
<td>7.5</td>
</tr>
<tr>
<td>PSC400-V</td>
<td>0.25x10</td>
<td>0.1</td>
<td>1.5</td>
<td>2.5</td>
<td>3.5</td>
<td>4.5</td>
<td>5.5</td>
<td>6.5</td>
<td>7.5</td>
</tr>
</tbody>
</table>

**Backlash (arcmin) - output torque ≤ 0.1**
**Lost Motion (arcmin) - output torque ≤ 0.6**
**Angular transmission accuracy (arcsec) ≤ 50**
**Efficiency under full load ≥ 90%**
**Lifetime 20,000 operating hours**
**Noise level < 70 dB(A)**
**Lubrication** sub-assemblies: delivery without oil
fully enclosed gearboxes: filled with standard mineral oil, viscosity 320

1a) Referring to 12 million times during lifetime
1b) Referring to 6 million times during lifetime
1c) Referring to 3,000 times during lifetime
2a) Permanent tilting moment for load case Fa = 0 and Fr = 0
2b) Max. axial force for load case permanent tilting moment = 0 and Fr = 0
2c) Max. radial force for load case permanent tilting moment = 0 and Fa = 0
3) Higher max. speeds are possible - please contact us
4) at nominal torque and 20 °C ambient temperature
5) at 50% to 100% of nominal torque
6) The indicated mass refers in each case to gearbox sub-assemblies with nominal ratio 50
7) Calculation of the screw connection has to be provided by the user!
(permissible strength class 12.9 for housing and output flange and 10.9 for cover flange)
### Low backlash precision gearboxes PSC

#### Performance table PSC hollow shaft gearboxes

**valid for sub-assemblies and fully enclosed units**

<table>
<thead>
<tr>
<th></th>
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<tr>
<td>PSC056-H</td>
<td>35.5</td>
<td>242/185</td>
<td>15 152/175</td>
<td>58 280/230</td>
<td>35 128/155</td>
<td>30 488/435</td>
<td>235 1 070</td>
<td>76 234/260</td>
<td>10 342/370</td>
<td>1 480/530</td>
<td>2 090 185</td>
<td>152 55 18.0</td>
<td>11.0</td>
<td>5.78 7.7</td>
<td></td>
<td></td>
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<tr>
<td>PSC080-H</td>
<td>35.5</td>
<td>254/186</td>
<td>169/200</td>
<td>71 493/551</td>
<td>50 401/427</td>
<td>30 1 280</td>
<td>76 2 345</td>
<td>100 4 270</td>
<td>57 18.5</td>
<td>11.5 68.8 11.2</td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>PSC112-H</td>
<td>35.5</td>
<td>265/187</td>
<td>1 850</td>
<td>71 2 410</td>
<td>50 440/5</td>
<td>30 2 140</td>
<td>76 5 910</td>
<td>100 3.5 19.0 72.9 19.9</td>
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<td>2 030</td>
<td>71 2 410</td>
<td>50 440/5</td>
<td>30 2 140</td>
<td>76 5 910</td>
<td>100 3.5 19.0 72.9 19.9</td>
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<td></td>
</tr>
<tr>
<td>PSC224-H</td>
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<td>2 325</td>
<td>2 435</td>
<td>71 2 690</td>
<td>50 530/5</td>
<td>30 2 690</td>
<td>76 9 810</td>
<td>100 3.5 19.0 72.9 37.4</td>
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<td></td>
<td></td>
<td></td>
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<td>PSC300-H</td>
<td>35.5</td>
<td>2 495</td>
<td>2 495</td>
<td>71 2 690</td>
<td>50 530/5</td>
<td>30 2 690</td>
<td>76 9 810</td>
<td>100 3.5 19.0 72.9 37.4</td>
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<tr>
<td>PSC400-H</td>
<td>35.5</td>
<td>2 495</td>
<td>2 495</td>
<td>71 2 690</td>
<td>50 530/5</td>
<td>30 2 690</td>
<td>76 9 810</td>
<td>100 3.5 19.0 72.9 37.4</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

- **Backlash [arcmin]** - output torque ≤ 0.1
- **Lost Motion [arcmin]** - output torque ≤ 0.6
- **Angular transmission accuracy** ≤ 50 [arcsec]
- **Efficiency under full load** ≥ 90%
- **Lifetime** 20,000 operating hours
- **Noise level** < 70 dB(A)
- **Sub-assembly** delivery without oil fully enclosed gearboxes: filled with standard mineral oil, viscosity 320

1a) Referring to 12 million times during lifetime
1b) Referring to 6 million times during lifetime
1c) Referring to 3,000 times during lifetime
2a) Permissible bending moment for load case Fa = 0 and Fr = 0
2b) Max. axial force for load case permanent tilting moment = 0 and Fr = 0
2c) Max. radial force for load case permanent tilting moment = 0 and Fa = 0
3) Higher max. speeds are possible - please contact us
4) at nominal torque and 20 °C ambient temperature
5) at 50% to 100% of nominal torque
6) The indicated mass refers in each case to gearbox sub-assemblies with nominal ratio 50
7) Calculation of the screw connection has to be provided by the user! (permissible strength class 12.9 for housing and output flange and 10.9 for cover flange)

**General:**
Calculations are based on an output speed of n2 = 15 min⁻¹
Calculations are valid for S5 intermittent operation; for S1 continuous operation, please contact us
Further ratios are available on request.
The moments of inertia in kg\(\text{cm}^2\) are related to the input.

| Size | 50 | 56 | 63 | 71 | 80 | 90 | 100 | 112 | 125 | 140 | 160 | 180 | 200 |
|------|----|----|----|----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|
| 056V | 1.01 | 0.85 | 0.75 | 0.64 | 0.51 | 0.42 | 0.35 | 0.29 | 0.24 | 0.21 | 0.16 | 0.14 | 0.12 |
| 080V | 1.92 | 1.62 | 1.43 | 1.21 | 0.96 | 0.79 | 0.67 | 0.56 | 0.45 | 0.40 | 0.31 | 0.26 | 0.22 |
| 112V | 3.37 | 2.85 | 2.52 | 2.12 | 1.69 | 1.40 | 1.19 | 0.98 | 0.80 | 0.71 | 0.54 | 0.46 | 0.39 |
| 160V | 3.37 | 2.85 | 2.52 | 4.14 | 3.30 | 2.73 | 2.31 | 1.92 | 1.56 | 1.38 | 1.05 | 0.90 | 0.76 |
| 224V | 10.29 | 8.71 | 7.69 | 6.48 | 5.16 | 4.27 | 3.62 | 3.00 | 2.44 | 2.16 | 1.64 | 1.40 | 1.18 |
| 300V | 16.92 | 14.32 | 12.64 | 10.66 | 8.48 | 7.02 | 5.95 | 4.93 | 4.01 | 3.55 | 2.70 | 2.31 | 1.94 |
| 400V | 27.87 | 23.59 | 20.83 | 17.56 | 13.97 | 11.56 | 9.80 | 8.12 | 6.60 | 5.85 | 4.45 | 3.80 | 3.20 |

The moments of inertia are based on the gearbox with input pinion, option “R”. Housing is fixed and output shaft turns.

Breakaway / drag friction

<table>
<thead>
<tr>
<th>Breakaway / drag friction</th>
<th>PSC056</th>
<th>PSC080</th>
<th>PSC112</th>
<th>PSC160</th>
<th>PSC224</th>
<th>PSC300</th>
<th>PSC400</th>
</tr>
</thead>
<tbody>
<tr>
<td>Running friction torque on output</td>
<td>41</td>
<td>46</td>
<td>45</td>
<td>49</td>
<td>53</td>
<td>87</td>
<td>96</td>
</tr>
<tr>
<td>Standard deviation</td>
<td>25 %</td>
<td>20 %</td>
<td>15 %</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Breakaway torque</td>
<td>1.0 (\pm) 1.5* running friction torque (depending on size, mounting position, oil level and operating temperature)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

**Solid shaft**

- 056V
- 080V
- 112V
- 160V
- 224V
- 300V
- 400V

**Hollow shaft**

- 056H
- 080H
- 112H
- 160H
- 224H
- 300H
- 400H

*Other possibilities on request*
Low backlash precision gearboxes PSC

PSC sub-assembly dimensions

Gearbox size PSC056-V-E
(Solid shaft, sub-assembly)

Gearbox size PSC056-H-E
(Hollow shaft, sub-assembly)

Note: for the hollow shaft version we offer a protection sleeve on request. With protective sleeve the diameter of the hollow shaft of PSC056-H is reduced to 29 mm.

Gearbox size PSC080-V-E
(Solid shaft, sub-assembly)

Gearbox size PSC080-H-E
(Hollow shaft, sub-assembly)

Note: for the hollow shaft version we offer a protection sleeve on request. With protective sleeve the diameter of the hollow shaft of PSC080-H is reduced to 38 mm.
Low backlash precision gearboxes PSC

PSC sub-assembly dimensions

Gearbox size PSC112-V-E
(Solid shaft, sub-assembly)

[Diagram of PSC112-V-E]

Gearbox size PSC112-H-E
(Hollow shaft, sub-assembly)

[Diagram of PSC112-H-E]

Note: for the hollow shaft version we offer a protection sleeve on request. With protective sleeve the diameter of the hollow shaft of PSC112-H is reduced to 46 mm.

Gearbox size PSC160-V-E
(Solid shaft, sub-assembly)

[Diagram of PSC160-V-E]

Gearbox size PSC160-H-E
(Hollow shaft, sub-assembly)

[Diagram of PSC160-H-E]

Note: for the hollow shaft version we offer a protection sleeve on request. With protective sleeve the diameter of the hollow shaft of PSC160-H is reduced to 51 mm.

PSC sub-assembly dimensions
Low backlash precision gearboxes PSC

PSC sub-assembly dimensions

Gearbox size PSC224-V-E
(Solid shaft, sub-assembly)

Gearbox size PSC224-H-E
(Hollow shaft, sub-assembly)

Note: for the hollow shaft version we offer a protection sleeve on request. With protective sleeve the diameter of the hollow shaft of PSC224-H is reduced to 56 mm.

Gearbox size PSC300-V-E
(Solid shaft, sub-assembly)

Gearbox size PSC300-H-E
(Hollow shaft, sub-assembly)

Note: for the hollow shaft version we offer a protection sleeve on request. With protective sleeve the diameter of the hollow shaft of PSC300-H is reduced to 64.5 mm.
Low backlash precision gearboxes PSC

PSC sub-assembly dimensions

Gearbox size PSC400-V-E
(Solid shaft, sub-assembly)

Gearbox size PSC400-H-E
(Hollow shaft, sub-assembly)

PSC fully enclosed gearbox units
Possible motor adaptions

The basic sketches below show the possible motor adaptions

Motor adaption “1”
(plug in or slip-on pinion)

Motor adaption “2”
(free input shaft)

Motor adaption “0”
(with lantern and coupling)

Other options on request:
- Direct motor mount = motor adaption “4”
- With additional right angle gearbox
- With splined shaft
- With clamping hub and keyway

Note: for the hollow shaft version we offer a protection sleeve on request. With protective sleeve the diameter of the hollow shaft of PSC400-H is reduced to 71 mm.
As standard the following motor shafts can be adapted:

<table>
<thead>
<tr>
<th>Size motor shaft d x l [mm]</th>
<th>PSC056</th>
<th>PSC080</th>
<th>PSC112</th>
<th>PSC160</th>
<th>PSC224</th>
<th>PSC300</th>
<th>PSC400</th>
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<tr>
<td>11 x 23</td>
<td>✔</td>
<td>✔</td>
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<tr>
<td>14 x 30</td>
<td>✔</td>
<td>✔</td>
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<tr>
<td>16 x 40</td>
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<td>28 x 60</td>
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<td>✔</td>
<td>✔</td>
</tr>
</tbody>
</table>

Note: standard is smooth motor shaft. Motor shafts with keyway are not recommended. Further motor shaft dimensions are possible on request.

Dimensions of fully enclosed gearboxes PSC

Gearbox dimensions for motor adaption variant “1” / solid shaft

<table>
<thead>
<tr>
<th>Gearbox size</th>
<th>A</th>
<th>B</th>
<th>1</th>
<th>ØD1</th>
<th>ØD2</th>
<th>E</th>
<th>ZL*</th>
<th>X</th>
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<tbody>
<tr>
<td>PSC056-V</td>
<td>38.5</td>
<td>86.25</td>
<td>123.5</td>
<td>180</td>
<td>220</td>
<td>186</td>
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<td>65.75</td>
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<td>PSC080-V</td>
<td>42.5</td>
<td>97.5</td>
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<td>200</td>
<td>240</td>
<td>206</td>
<td>30</td>
<td>84.5</td>
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<tr>
<td>PSC112-V</td>
<td>48.75</td>
<td>111.75</td>
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<td>232</td>
<td>282</td>
<td>236</td>
<td>50</td>
<td>100.5</td>
</tr>
<tr>
<td>PSC160-V</td>
<td>52</td>
<td>117.25</td>
<td>164.75</td>
<td>248</td>
<td>297</td>
<td>254</td>
<td>60</td>
<td>110.5</td>
</tr>
<tr>
<td>PSC224-V</td>
<td>56.5</td>
<td>126.5</td>
<td>174.75</td>
<td>263</td>
<td>311</td>
<td>269</td>
<td>60</td>
<td>110.5</td>
</tr>
<tr>
<td>PSC300-V</td>
<td>65</td>
<td>145.75</td>
<td>196.75</td>
<td>301</td>
<td>330</td>
<td>307</td>
<td>60</td>
<td>111.5</td>
</tr>
<tr>
<td>PSC400-V</td>
<td>71</td>
<td>155</td>
<td>211.75</td>
<td>329</td>
<td>390</td>
<td>335</td>
<td>60</td>
<td>111.5</td>
</tr>
</tbody>
</table>

* ZL = length of the motor shaft

Dimensions of fully enclosed gearboxes PSC

Gearbox dimensions for motor adaption variant “1” / hollow shaft

<table>
<thead>
<tr>
<th>Gearbox size</th>
<th>A</th>
<th>B</th>
<th>1</th>
<th>ØD1</th>
<th>ØD2</th>
<th>E</th>
<th>F</th>
<th>ZL*</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSC056-H</td>
<td>50.8</td>
<td>98.55</td>
<td>123.5</td>
<td>180</td>
<td>220</td>
<td>186</td>
<td>30</td>
<td>68.5</td>
</tr>
<tr>
<td>PSC080-H</td>
<td>56.75</td>
<td>111.75</td>
<td>133.5</td>
<td>200</td>
<td>240</td>
<td>206</td>
<td>30</td>
<td>80</td>
</tr>
<tr>
<td>PSC112-H</td>
<td>58.75</td>
<td>121.75</td>
<td>154.75</td>
<td>232</td>
<td>282</td>
<td>236</td>
<td>40</td>
<td>100</td>
</tr>
<tr>
<td>PSC160-H</td>
<td>62</td>
<td>127.25</td>
<td>164.75</td>
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<td>297</td>
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</tr>
<tr>
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<td>307</td>
<td>60</td>
<td>111</td>
</tr>
<tr>
<td>PSC400-H</td>
<td>82</td>
<td>166</td>
<td>211.75</td>
<td>329</td>
<td>390</td>
<td>335</td>
<td>60</td>
<td>111</td>
</tr>
</tbody>
</table>

* ZL = length of the motor shaft; all dimensions are in mm

Gearbox dimensions for motor adaption variant “2” / identical for solid and hollow shaft

<table>
<thead>
<tr>
<th>Gearbox size</th>
<th>Y1</th>
<th>Y2</th>
<th>L1</th>
<th>L2</th>
<th>L3 [mm]</th>
<th>ØD3</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSC056-V/VH</td>
<td>75</td>
<td>27</td>
<td>22</td>
<td>2</td>
<td>6</td>
<td>19</td>
</tr>
<tr>
<td>PSC080-V/VH</td>
<td>90</td>
<td>30</td>
<td>20</td>
<td>2</td>
<td>8</td>
<td>24</td>
</tr>
<tr>
<td>PSC112-V/VH</td>
<td>90</td>
<td>30</td>
<td>20</td>
<td>2</td>
<td>8</td>
<td>24</td>
</tr>
<tr>
<td>PSC160-V/VH</td>
<td>100</td>
<td>40</td>
<td>20</td>
<td>2</td>
<td>8</td>
<td>30</td>
</tr>
</tbody>
</table>

All dimensions are in mm

Dimensions for motor adaption variant “0” and others on request.
TORSIONAL STIFFNESS

The torsional stiffness is defined as the quotient of the torsional torque coming from the outside of the gearbox and the resulting twisting angle at the output. This characteristic value is given in Nm / arc min. In order to determine this parameter, the gearbox is bi-directionally loaded with a continuously increasing torque up to the nominal value while the input shaft is blocked. By using a suitable measuring sensor system, the torsion torque as well as the angle of rotation at the output flange is recorded (hysteresis curve) and the value range between 50% to 100% of the nominal load is evaluated.

BACKLASH, LOST MOTION

The torsional backlash is the angle tolerance of torsion of the output shaft in relation to the input shaft at zero torque. The measurement is done when input shaft is blocked. The torsional backlash can also be seen in the hysteresis curve.

Lost Motion, also called positioning error, means the torsional angle on the output which is reached if all outer loads are removed. The measurement is taking place at +/-3% of nominal torque.

TILTING STIFFNESS

The tilting stiffness is defined as the quotient of the bending moment resulting from external forces and the resulting tilt angle between the output and housing flange. This characteristic value is given in Nm / arc min. To determine this parameter, the gear housing is attached to a sufficiently rigid structure. The output is bi-directionally loaded with a continuously increasing bending moment up to the maximum permissible value. By using a suitable measuring sensor system, the torque and the tilt at the output flange (hysteresis curve) and the entire range of values for the determination of the tilting stiffness are evaluated.

ANGULAR TRANSMISSION ACCURACY

The angular transmission accuracy defines the maximum transmission error (maximum amplitude of the variation) of the real output rotational movement, based on the value theoretically calculated over the transmission ratio. This parameter is specified in angle seconds [arc sec].

For the determination of this parameter, the gear unit is rotated without load during drag operation. By using a suitable measuring sensor system, the input and output rotary movements are recorded. The value range over a full revolution of the output is evaluated for determining the angular transmission accuracy.
### Low backlash precision gearboxes PSC

#### Mounting positions PSC

**Drive down, input up, input position optional**

**Drive up, input down, input position optional**

**Drive horizontal, input position optional**

<table>
<thead>
<tr>
<th>PSC</th>
<th>112</th>
<th>H</th>
<th>E</th>
<th>100</th>
<th>1</th>
<th>V1</th>
<th>F</th>
<th>0</th>
</tr>
</thead>
</table>

- **Gearbox series (PSC)**
- **Sizes**
  - (056 ... 400)
- **Execution:**
  - V = solid shaft
  - H = hollow shaft
- **Type:**
  - E = gearbox sub-assembly
  - B = fully enclosed gearbox with flange
  - M = geared motor
  - S = others
- **Ratios:**
  - (35.5 ... 200)
- **Input:**
  - 0 = coupling
  - 1 = clamped
  - 2 = keyway
  - 3 = clamped + keyway
  - 4 = integral motor
  - 5 = input shaft
  - 6 = bevel gear
  - 7 = additional gear
  - 8 = splined shaft
  - 0 = others
- **Mounting position:**
  - (V1, V3, ...) see page 26
- **Output:**
  - F = flange (standard)
  - R = pinion on output (to specify)
  - W = shaft end (to specify)
  - S = special (to specify)
- **Others:**
  - (0,1)

---

*For motor adaption motor data sheet has to be provided.*
The precision gearbox PSD is ideally suitable for use in Delta Robots. However, it may also be used in any other application where highest precision in combination with fast reverse movements are required.

In Delta Robot applications, varying product weights and differing pick & place distances play an important role when designing a gearbox. The challenges involve very high cycle numbers and short, highly dynamic motions in a high duty cycle. With the development of a high precision gearbox which may be used in robotics and automation industry, highly dynamic drive systems with constant precision can be offered.

The gearbox has a hollow shaft to allow a feed-through of cables. A variable motor interface allows individual motor adaption.

The precision gearbox PSD is a helical gearbox with a special tooth profile guaranteeing very low backlash, which remains on a constantly low level throughout the whole lifetime of the gearbox.

The housings are made of high-grade aluminium alloy which contributes to the low weight.

Only high quality bearings are used to secure the highest possible quality. The gearboxes can be assembled in any mounting position and are also available in solid shaft version.

### PSD – TECHNICAL DATA

<table>
<thead>
<tr>
<th>FEATURE</th>
<th>YOUR BENEFIT</th>
<th>TECHNICAL DATA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very low backlash</td>
<td>Constant precision throughout the whole lifetime of the gearbox</td>
<td>Scope of ratios: 20.044 ... 51.698</td>
</tr>
<tr>
<td>Compact design</td>
<td>Smarter periphery design</td>
<td>Number of stages: 2</td>
</tr>
<tr>
<td>Low noise level</td>
<td>Reduced noise exposure at workplaces</td>
<td>Nominal torque: Nm 100</td>
</tr>
<tr>
<td>Low friction</td>
<td>Higher energy efficiency</td>
<td>Permanent output torque (equivalent torque): Nm 130</td>
</tr>
<tr>
<td>High stiffness</td>
<td>Allows positioning straight-to-the-point</td>
<td>Acceleration torque: Nm 140</td>
</tr>
<tr>
<td>High efficiency</td>
<td>Use of motors/systems with less energy consumption</td>
<td>Emergency stop torque (1000 times): Nm 400</td>
</tr>
<tr>
<td>Gearbox with hollow shaft</td>
<td>With hollow shaft allowing a feed-through of cables</td>
<td>Rated input speed: min⁻¹ 4,800</td>
</tr>
<tr>
<td>Motor adaption via lantern and coupling</td>
<td>Easy motor adaption for all standard servo motors</td>
<td>Max. input speed: min⁻¹ 6,000</td>
</tr>
<tr>
<td>Special tooth profile allows fast reverse movements</td>
<td>S1 duty cycle is possible</td>
<td>Nominal speed: min⁻¹ 50</td>
</tr>
<tr>
<td>Lifetime lubrication</td>
<td>Maintenance-free</td>
<td>Admissible radial force (dynamic): N 1,000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Torsion stiffness: Nm/arcmin 42</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Weight approx.: kg 7.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Efficiency: % &gt;95 %</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Noise level: dB(A) 68</td>
</tr>
</tbody>
</table>
Melior Motion offers an unlimited range of tailored solutions especially designed for your application. From complete custom-made gear units to modification of standard gear units to optimize your equipment, we develop and manufacture precision gearboxes based on planetary, helical or bevel gear configurations.

Some examples are shown below:

**SP191 – Robotic gearbox**
- Dimensions: custom-made
- Hollow shaft: 80 mm
- Backlash: ≤ 0.1 arcmin
- Ratio: 100 / 130:1
- Torque: \( M_{\text{max}} = 2000 \text{ Nm} \)

**SP244 – Gearbox for linear axis**
- Dimensions: custom-made
- Backlash: < 4 arcmin
- Ratio: 10:1
- Torque: \( M_{\text{max}} = 800 \text{ Nm} \)
- Special feature: with output pinion for rack and pinion applications

**SP224 – Positioning gearbox**
- Dimensions: custom-made
- Backlash: < 0.1 arcmin
- Ratio: up to 130:1
- Hollow shaft: up to 95 mm dia.
- Positioning accuracy: +/- 0.03 mm

*Note: Dimensions C-K depend on the servo motor which is being used.*