

Datasheet



- Angular gearboxes with bevel and spiral bevel gears are suitable for transmitting the rotary motion between two shafts at right angles.
- Models with spiral bevel gears are available in all versions; spiral gearboxes achieve higher precision, silent operation and enable 30% higher efficiency.
- All bevel gears have ball-bearings; minimal angular and axial clearance.

Technical characteristics

Dimensions	overall, see section: versions and dimensions	
Diameter		
Shaft, Hollow shaft	Ø 6 mm (standard);	
Hollow shaft	Ø 8 mm and 10 mm (on request in version A)	
Length		
Hollow shaft	10,5 mm <u>effective length</u> , 5 mm <u>construction depth</u> with Ø 6 mm (standard);	
	11,5 mm <u>effective length</u> , 14 mm <u>construction depth</u> with Ø 8 mm and 10 mm (on request in version A)	
Shaft	12 mm (standard)	
Material		
Hollow shaft, shaft	Stainless steel (AISI 303)	
Housing	Die-cast aluminium housing, black anodized (standard)	
Bearing	Ball-bearings, hardened bevel gears	
Weight	50 g with 2 outputs	
	65 g with 3 outputs	
Version		
A	with 2 outputs	
B	with 3 outputs	
C	with 3 outputs (with opposite rotation)	
Reduction ratios	1:1 1 (standard)	
Torque	2 Nm	
Axle load	Radial load 7,5 kg	
	Axial load 0,7 kg (see Fig. 7)	
Gearbox		
Straight bevel gears	Straight gearing (standard), see Fig. 1	
Spiral bevel gears	Spiral-shaped gearing, see Fig. 2	
Tolerance between gears	0,1° to 0,75°	
Lubrication	Grease fitting (optional)	



To choose the most suitable gearbox, please refer to the following tables of technical characteristics, efficiency diagrams, as well as the corresponding versions with dimension drawings of the gearboxes.

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Direction of rotation

Version A	Version B	Version C		

The direction of rotation depends on the configuration and the positioning; see section Versions with dimension drawings.

Bevel gears

Fig. 1	Fig. 2	Spiral gearboxes	
Straight bevel gears	Spiral bevel gears	with 2 shafts	with 3 shafts

Spiral gearboxes (Fig. 2) achieve higher precision, silent operation and enable 30% higher efficiency.

Reduction and multiplying ratio

Fig. 3	Fig. 4	Fig. 5	Fig. 6
Clockwise	Clockwise	Example	

The ratio (Fig. 5 and 6) and configuration is determined by the **n1** shaft (which is always shown on the opposite side of the fixing bores), the others shaft following clockwise (Fig. 3 and 4).

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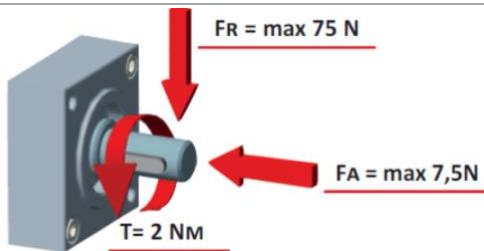
Loads

The loads on the gearbox must be considered as a whole and in relation to the superstructure, such as structural misalignments, vibrations, acceleration or deceleration, shocks, vibration, etc.

Two types of shaft loads must be considered:

radial **FR** (radial force) and axial **FA** (axial force) loads (Fig. 7).

Fig. 7



FR = radial load, FA = axial load

The radial load acts in a perpendicular direction to the shaft/axis.

The axial load acts in the same direction of the shaft/axis; when ordering please take into account, whether it is pull or push type.

T = torque

Grease fitting

Fig. 8

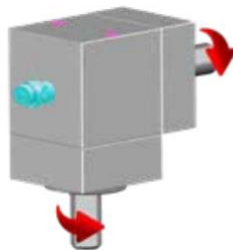


Fig. 9



The **grease fitting** is recommended when the working conditions do not correspond to the parameters indicated in the efficiency diagrams and tables (page 4); to extend the life cycle and in case the mounting position does not allow easy replacement.

The standard position of the grease fitting is shown in Fig. 8 and Fig. 9. If a different position is required, please contact our technical department.



Maintenance

Check at regular intervals that there are no leaks in the gearbox. Depending on the operating time, it is necessary to top up the correct amount of lubricant at variable intervals.

For an optimum operation we recommend the following **lubricants**:

- Long-life grease for use in continuous operation, with very good wear and corrosion protection behaviour (recommended for use in a temperature range from -20 °C to 150 °C).
- For applications in the food and pharmaceutical industry, synthetic H1 grease with good low- and high-temperature behaviour, good water resistance and corrosion protection as well as high ageing and oxidation stability (recommended for use in a temperature range from -40 °C to 140 °C).

If you have any further questions, please contact our technical department.

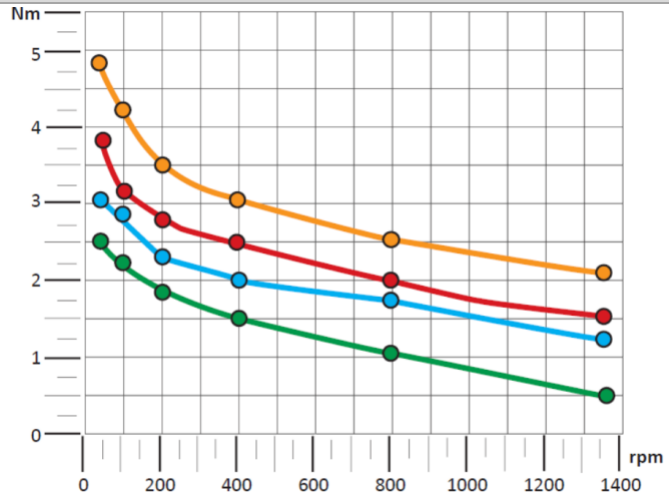
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Efficiency diagrams and tables

Output torque with ratio 1 (1:1)

OUTPUT TORQUE WITH RATIO 1/1 - DREHMOMENT MIT ÜBERSETZUNG 1/1				
● TM dc	● TR dc	● TM dsp	● TR dsp	rpm
3,8	2,5	4,9	3,2	50
3,3	2,2	4,3	2,9	100
2,7	1,8	3,5	2,3	200
2,4	1,6	3,1	2,1	400
2	1,3	2,6	1,7	800
1,6	1,1	2,1	1,4	1400

Efficiency - Leistung = 90%



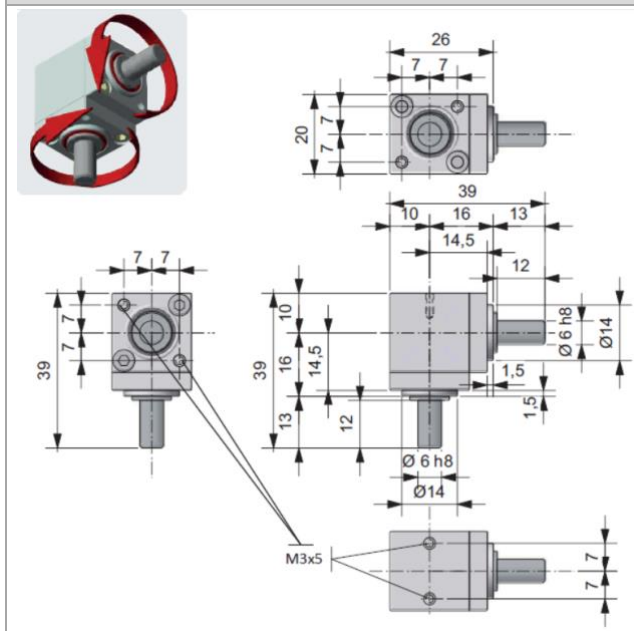
Glossary

F _R	Radial load
F _A	Axial load
R	Force
T	Torque
T _M	Maximum torque
T _R	Recommended torque
T _A	Actual torque
T _O	Output torque
T _I	Input torque
P _n	Power
N	Newton
Nm	Newton meter
f _u	Factor of use
i	Gear ratio
rpm	Revolutions per minute (rpm)
n1	Entry shaft
n2	Outlet shaft
dc	Straight bevel gears
dsp	Spiral bevel gears
M	Solid shaft
F	Hollow shaft
D	Through hollow shaft

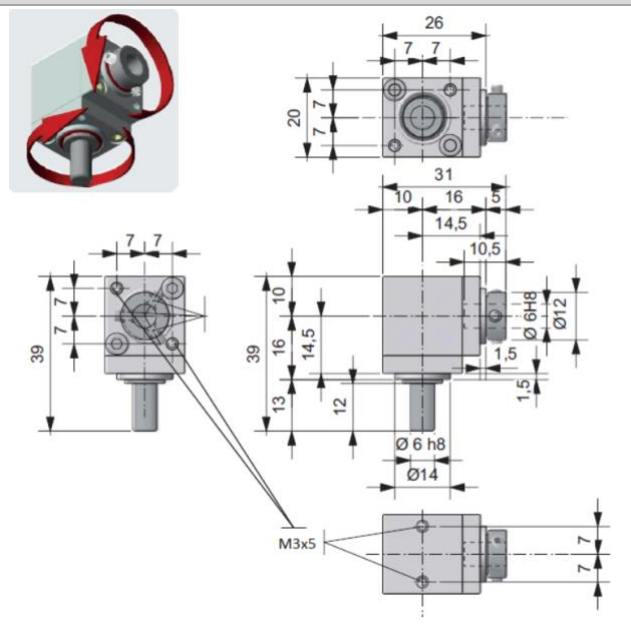
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Versions with dimension drawings

Version A V-V 2 x shaft



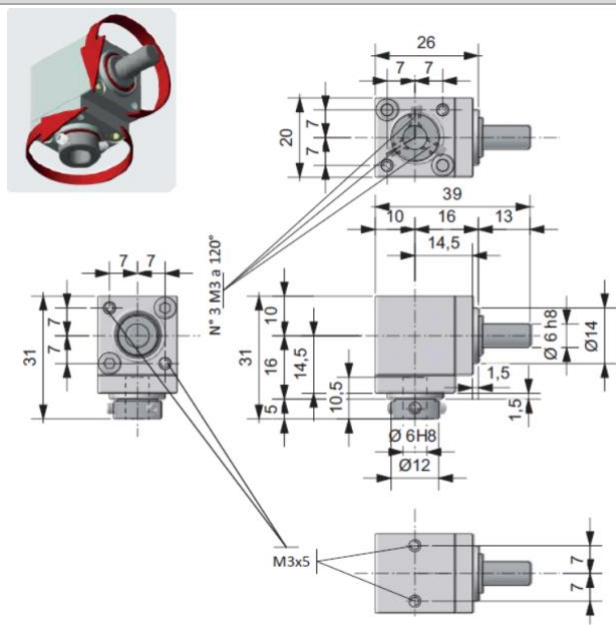
Version A V-H shaft-hollow shaft



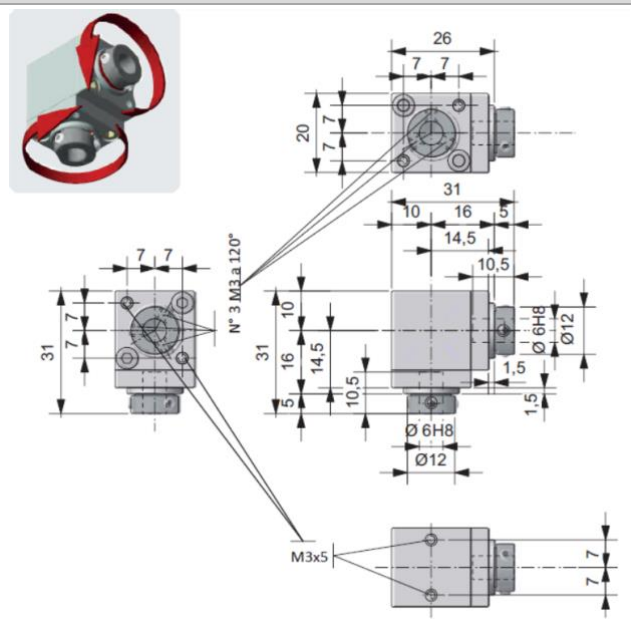
All dimensions in mm



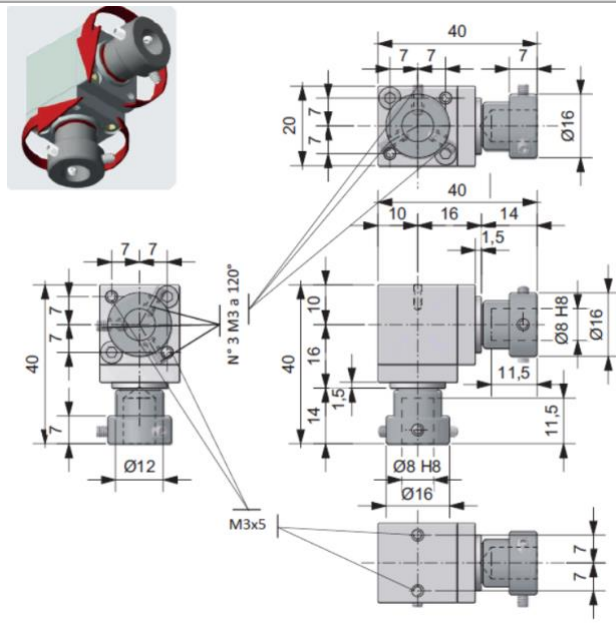
Version A H-V hollow shaft-shaft



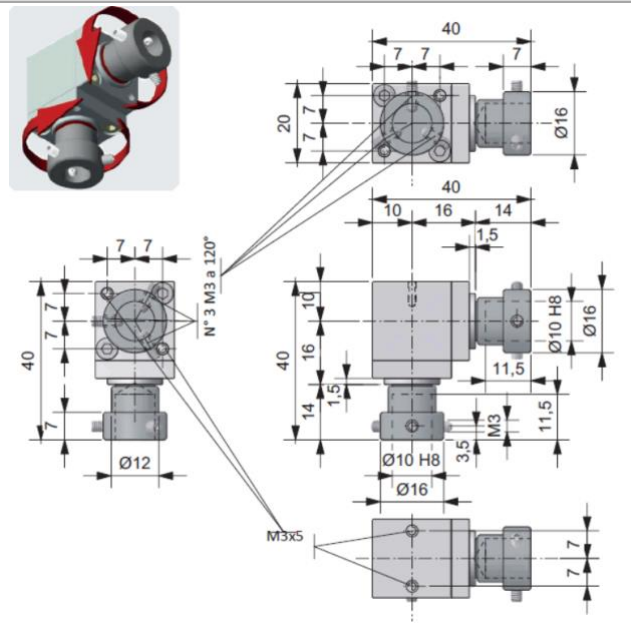
Version A H-H 2 x hollow shaft



Version A H(Ø8)-H(Ø8) 2 x hollow shaft



Version A H(Ø10)-H(Ø10) 2 x hollow shaft



The technical drawing shows three views of a mechanical component:

- Top View:** Shows a square base with a central circular feature. Dimensions include a total width of 32, two side flanges each 7 units wide, a central hole diameter of Ø6 h8, and a total height of 20. The distance from the center to the outer edge is 16.
- Front View:** Shows the profile of the part. It has a total length of 58. The top surface is flat at 13 units from the front face. There are two vertical steps: one 16 units high and another 12 units high. The bottom surface is flat at 13 units from the front face. The total height is 39. The bottom flange has a diameter of Ø14.
- Side View:** Shows the side profile. It has a total width of 32. The top surface is flat at 13 units from the left face. There are two vertical steps: one 16 units high and another 12 units high. The bottom surface is flat at 13 units from the left face. The total height is 39. The bottom flange has a diameter of Ø14.

A detailed view of the bottom flange shows it has a diameter of Ø14 and a thickness of 1.5 units. A callout indicates a thread of M3x5 on the bottom flange.

Technical drawing of a 3-position hydraulic valve with 32mm ports. The drawing includes a perspective view with red arrows indicating the valve's operation, and three orthographic views (front, side, and end) with detailed dimensions.

Key Dimensions:

- Port Diameter: 32
- Port Spacing: 7
- Body Width: 16
- End Flange Width: 13
- Angle between positions: 120°
- Mounting Hole Diameter: Ø6h8
- Base Mounting Hole Diameter: Ø12
- Base Mounting Hole Spacing: 14.5
- Base Mounting Hole Diameter: Ø14
- Base Mounting Hole Spacing: 10.5
- Base Mounting Hole Diameter: Ø12
- Base Mounting Hole Spacing: 10.5
- Base Mounting Hole Diameter: Ø12
- Base Mounting Hole Spacing: 10.5
- Base Mounting Hole Diameter: Ø12
- Base Mounting Hole Spacing: 10.5

Technical drawing of the 3M3 hydraulic valve, showing dimensions in millimeters (mm).

Front View Dimensions:

- Total height: 39
- Mounting hole diameter: Ø6 h8
- Mounting hole spacing: 7, 7, 7, 7

Side View Dimensions:

- Total length: 42
- Mounting hole diameter: Ø6 h8
- Mounting hole spacing: 7, 7, 7, 7
- Mounting hole diameter: Ø12

Top View Dimensions:

- Total width: 32
- Mounting hole diameter: Ø12
- Mounting hole spacing: 7, 7, 7, 7

Other Dimensions:

- Angle: 120°
- Thread: 3M3 x 5


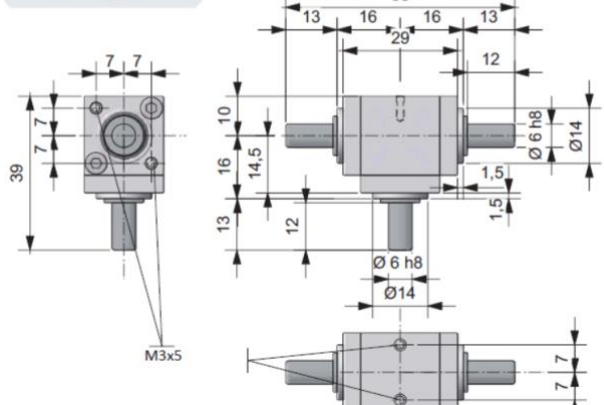

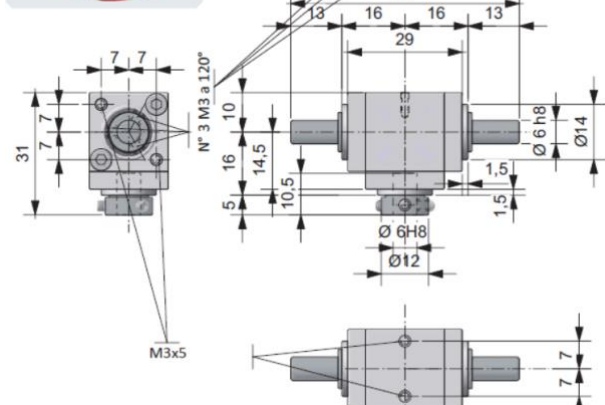

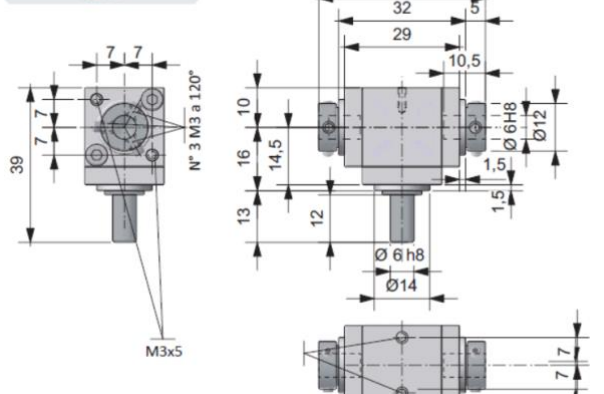

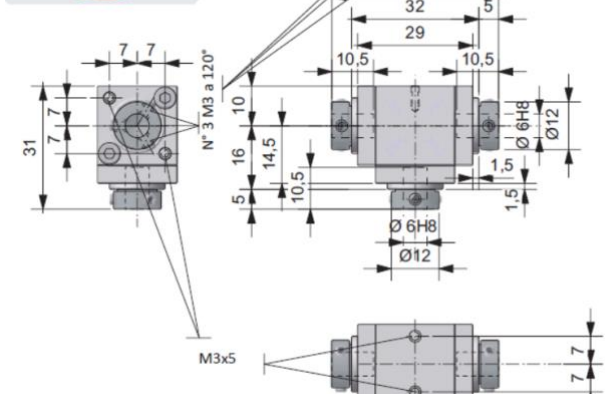
The technical drawing shows three views of a mechanical component with the following dimensions:

- Top View:** Overall width 32mm, two 7mm segments, central hole diameter Ø6H8, outer hole diameter Ø12, and a 5mm offset.
- Front View:** Total height 20mm, with 7mm segments above and below the centerline. The top flange has a diameter of 42.06mm.
- Side View:** Shows the profile with a total length of 31mm, a 7mm segment, and a 10mm distance from the end to the first hole.

Assembly Instructions:

- A red ribbon indicates the assembly sequence: 1. Insert the M3x5 screw into the bottom hole. 2. Tighten the screw. 3. Tighten the top nut.
- Labels include "N° 3 M3 a 120°" pointing to the top holes and "M3x5" pointing to the bottom hole.



Version C V-V-V 3 x shaft (opposite rotation)	Version C H-V-V hollow shaft-shaft-shaft (opposite rotation)
  <p>Technical drawing of Version C V-V-V gearbox showing front, side, and top views with dimensions. Key dimensions include: 32, 7, 7, 20, 58, 13, 16, 29, 13, 12, 10, 16, 14.5, 13, 12, 1.5, 1.5, Ø 6 h8, Ø 14, 39, 7, 7, 7, 7, M3x5.</p>	  <p>Technical drawing of Version C H-V-V gearbox showing front, side, and top views with dimensions. Key dimensions include: 32, 7, 7, 20, 58, 13, 16, 29, 13, 12, 10, 16, 14.5, 13, 12, 1.5, 1.5, Ø 6 h8, Ø 14, 31, 7, 7, 7, 7, M3x5, N° 3 M3 a 120°.</p>
Version C V-H-H shaft-hollow shaft-hollow shaft (opposite rotation))	Version C H-H-H 3 x hollow shaft (opposite rotation)
  <p>Technical drawing of Version C V-H-H gearbox showing front, side, and top views with dimensions. Key dimensions include: 32, 7, 7, 20, 42, 32, 29, 10.5, 5, 10, 16, 14.5, 13, 12, 1.5, 1.5, Ø 6 h8, Ø 12, 39, 7, 7, 7, 7, M3x5, N° 3 M3 a 120°.</p>	  <p>Technical drawing of Version C H-H-H gearbox showing front, side, and top views with dimensions. Key dimensions include: 32, 7, 7, 20, 42, 32, 29, 10.5, 5, 10, 16, 14.5, 13, 12, 1.5, 1.5, Ø 6 h8, Ø 12, 31, 7, 7, 7, 7, M3x5, N° 3 M3 a 120°.</p>

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Applications

The angular gearboxes are suited for industrial use and can be universally used for spindle drives in any mounting position.

- Compact and modular designs, adaptable, easy assembly. The favourable price-performance ratio and small installation space enable a cost-effective system solution.
- Manual or motorised adjustments with matching flange, adapter, flexible shafts and couplings or motor, optionally with position indicators and clamping elements, complete a sensible assembly group in machine and plant construction.

Angular gear with rigid shaft



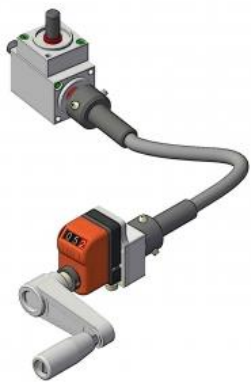

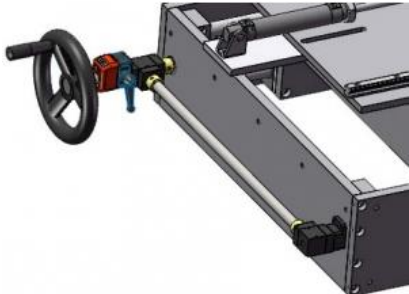
Transmitting the rotary motion, direct connection via rigid shaft.

Angular gear with flexible shaft



Transmitting rotary motion via one or more flexible shafts where a direct connection is not possible in any other case; for example, to connect two axes or shafts which are not perfectly aligned.

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Further applications		
		
Transmitting the rotary motion, connection via shaft block flange with flexible shaft to the coupling, and position indicator with crank handle.	Transmitting the rotary motion, direct connection via rigid shaft to the coupling and position indicator with handwheel.	



Figures show angular gear with flexible or rigid shaft, shaft block flange, clamping elements and position indicator.

Areas of application

Packaging, food, pharmaceutical, plastic, wood, sheet metal, glass, winding, construction road machines, also on traditional machines and special applications in metal construction, lifting technology, conveyor technology, linear technology, special plant engineering, etc.

