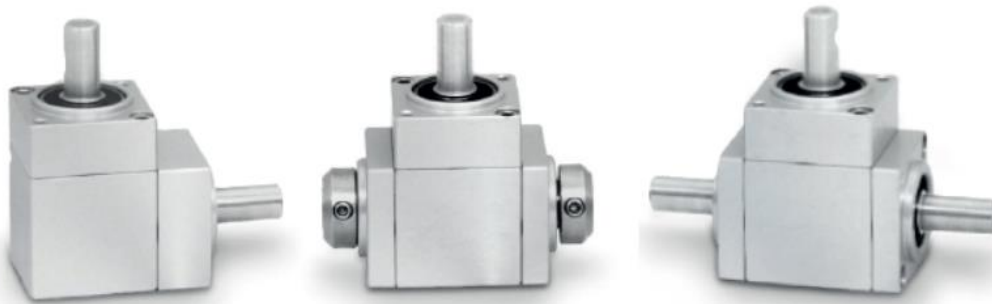


Datasheet



- 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	Ø 8 mm (standard); 10, 12 and 14 mm (optional)	
Hollow shaft, shaft	15 mm <u>effective length</u> , 16 mm <u>construction depth</u> (standard)	
Length Hollow shaft	16 mm (standard); at standard with keyways or on request	
Shaft		
Material		
Hollow shaft, shaft	Stainless steel (AISI 303)	
Housing	Die-cast aluminium housing, anodized natural (standard), black anodized or stainless steel (AISI 303) (optional)	
Bearing	Ball-bearings, hardened bevel gears	
Weight	145 g	with 2 outputs
	150 g	with 3 outputs
	200 g	with 4 outputs
Version		
A	with 2 outputs	
B	with 3 outputs	
C	with 3 outputs (with opposite rotation)	
D	with 3 outputs, 2 through hollow shafts	
E	with 4 outputs	
Reduction ratios ¹⁾	1:1	1 (standard)
	1:2	2 <i>in reducing</i> (standard)
	2:1	0,5 <i>in multiplying</i> (on request in version A, B, C, not available in version D), see Fig. 5, 6
Torque	4 Nm	
Axle load	Radial load	15 kg
	Axial load	1,5 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°	

¹⁾ Gear ratios of 1:2 and 2:1 are only available with spiral bevel gears.



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.

Datasheet



Direction of rotation				
Version A	Version B	Version C	Version D	Version E
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. Gear ratios of 1:2 and 2:1 are only available with spiral bevel gears.			

Reduction and multiplying ratio			
Fig. 3	Fig. 4	Fig. 5	Fig. 6
Clockwise	Clockwise	Example	
<u>Reduction ratios</u> $i = n1 : n2$ at $i > 1$ in reducing at $i < 1$ in multiplying		1:2 in reducing $n1 = 1.000 \text{ 1/min}$ $n2 = 500 \text{ 1/min}$ $i = 2$	* 2:1 in multiplying $n1 = 1.000 \text{ 1/min}$ $n2 = 2.000 \text{ 1/min}$ $i = 0,5$ * (not available in version D)
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).			

Datasheet



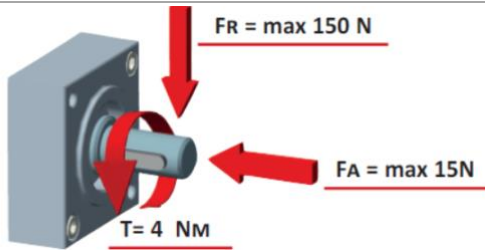
Loads

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

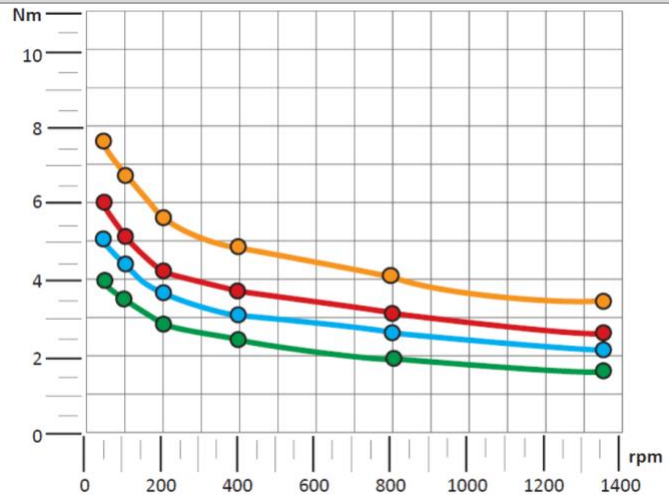
Datasheet

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
6	4	7,8	5,2	50
5,3	3,5	6,9	4,5	100
4,4	2,9	5,7	3,7	200
3,8	2,5	4,9	3,2	400
3,2	2,1	4,1	2,7	800
2,7	1,8	3,5	2,3	1400

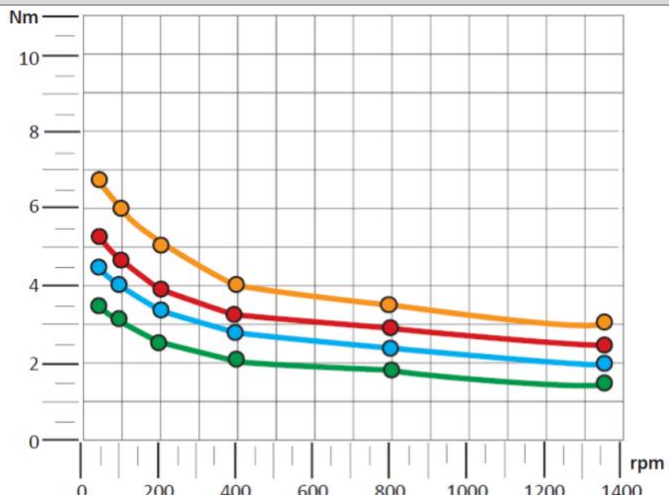
Efficiency - Leistung = 90%



Output torque with ratio 2 (1:2)

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

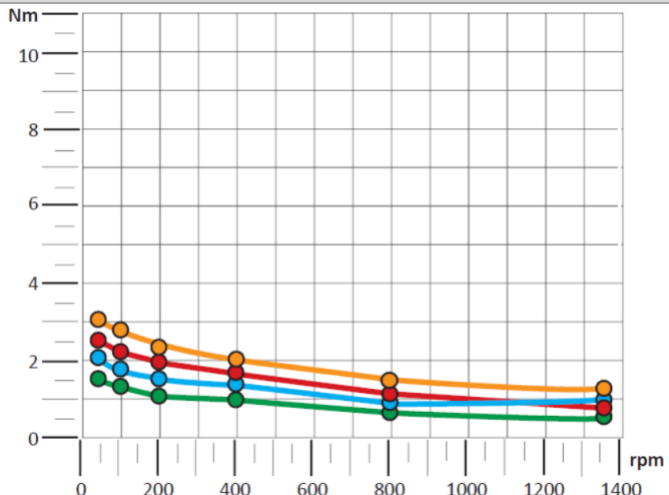
Efficiency - Leistung = 90%



Output torque with ratio 0,5 (2:1)

OUTPUT TORQUE WITH RATIO 2/1 DREHMOMENT MIT ÜBERSETZUNG 2/1				
TM dc	TR dc	TM dsp	TR dsp	rpm
2,4	1,6	3,1	2,1	50
2,1	1,4	2,7	1,8	100
1,8	1,2	2,3	1,5	200
1,5	1	2	1,3	400
1	0,8	1,3	1	800
0,8	0,7	1	0,9	1400

Efficiency - Leistung = 90%



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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

Available outputs

All dimensions in mm

Technical drawing of a 1/2" NPT x 1/2" NPT 90° elbow with 1/2" NPT x 1/2" NPT end connections. The drawing includes a 3D isometric view and three 2D orthographic views (front, side, and top). Dimensions are given in millimeters.

Front View: Shows a square body with a central port of diameter $\varnothing 22$ and a side port of diameter $\varnothing 8$. The overall height is 58 mm. The distance from the base to the side port centerline is 26 mm. The distance from the base to the top of the body is 16 mm. The distance from the side port centerline to the top of the body is 14 mm. The distance from the side port centerline to the bottom of the body is 14 mm. The distance from the side port centerline to the top of the body is 14 mm. The distance from the side port centerline to the bottom of the body is 14 mm. The distance from the side port centerline to the top of the body is 14 mm. The distance from the side port centerline to the bottom of the body is 14 mm.

Side View: Shows the overall height of 58 mm and the distance from the base to the side port centerline of 26 mm. The distance from the base to the top of the body is 16 mm. The distance from the side port centerline to the top of the body is 14 mm. The distance from the side port centerline to the bottom of the body is 14 mm. The distance from the side port centerline to the top of the body is 14 mm. The distance from the side port centerline to the bottom of the body is 14 mm. The distance from the side port centerline to the top of the body is 14 mm. The distance from the side port centerline to the bottom of the body is 14 mm.

Top View: Shows a square body with a side length of 28 mm and a central port of diameter $\varnothing 22$. The distance from the center of the port to the top and bottom edges is 11 mm. The distance from the center of the port to the left and right edges is 11 mm. The distance from the center of the port to the top and bottom edges is 11 mm. The distance from the center of the port to the left and right edges is 11 mm. The distance from the center of the port to the top and bottom edges is 11 mm. The distance from the center of the port to the left and right edges is 11 mm.

3D View: Shows the elbow with red arrows indicating the flow direction.

Technical drawing of the N°3 M4-120° valve, showing three views: isometric, front, and side. The drawing includes the following dimensions (in mm):

- Isometric View:** Shows the valve with red and grey components.
- Front View:**
 - Top: 28 (height), 11 (width), 11 (width)
 - Bottom: 11 (height), 11 (width), 11 (width)
 - Central Port: Ø8
 - Side Ports: Ø22
 - Bottom Port: Ø22
 - Bottom Flange: 28 (width)
- Side View:**
 - Top: 42 (width), 16 (height), 16 (height)
 - Bottom: 14 (width), 26 (width), 16 (height)
 - Central Port: Ø22
 - Side Ports: Ø8
 - Bottom Port: Ø8
 - Bottom Flange: 15 (width)
- Bottom View:**
 - Top: 58 (width), 14 (width), 14 (width)
 - Bottom: 11 (width), 11 (width), 11 (width)
 - Central Port: Ø21
 - Side Ports: Ø21
 - Bottom Port: Ø21
 - Bottom Flange: 58 (width)

The drawing also indicates the valve is N°3 M4-120° and includes a note M3x6.

Technical drawing of a 3-way ball valve, N°3 M4-120°. The drawing includes three views: front, side, and top. Dimensions are in millimeters.

Front View (Top Left):

- Overall width: 28 mm
- Overall height: 28 mm
- Port diameter: Ø21 mm
- Mounting hole diameter: Ø22 mm
- Mounting hole spacing: 11 mm (horizontal), 11 mm (vertical)
- Mounting hole diameter: M3x6

Side View (Bottom Left):

- Overall width: 28 mm
- Overall height: 28 mm
- Port diameter: Ø21 mm
- Mounting hole diameter: Ø22 mm
- Mounting hole spacing: 11 mm (horizontal), 11 mm (vertical)
- Mounting hole diameter: M3x6

Top View (Bottom Right):

- Overall width: 58 mm
- Overall height: 58 mm
- Port diameter: Ø21 mm
- Mounting hole diameter: Ø22 mm
- Mounting hole spacing: 11 mm (horizontal), 11 mm (vertical)
- Mounting hole diameter: M3x6

Technical drawing of a 3-position rotary valve. The drawing includes an isometric view and three orthographic views (top, front, and side) with dimensions in millimeters. The isometric view shows the valve in its 3-position configuration, with red arrows indicating the rotation. The orthographic views show the valve in its 1-position configuration. The dimensions are as follows:

- Top View:**
 - Overall width: 44 mm
 - Port diameter: Ø8 mm
 - Port-to-center distance: 16 mm
 - Center-to-center distance: 40 mm
 - Mounting hole diameter: Ø6 mm
 - Mounting hole-to-center distance: 11 mm
 - Mounting hole-to-port distance: 11 mm
 - Mounting hole-to-port distance (diagonal): 11 mm
- Front View:**
 - Overall height: 58 mm
 - Port diameter: Ø8 mm
 - Port-to-center distance: 16 mm
 - Center-to-center distance: 40 mm
 - Mounting hole diameter: Ø6 mm
 - Mounting hole-to-center distance: 11 mm
 - Mounting hole-to-port distance: 11 mm
 - Mounting hole-to-port distance (diagonal): 11 mm
- Side View:**
 - Overall width: 76 mm
 - Port diameter: Ø8 mm
 - Port-to-center distance: 16 mm
 - Center-to-center distance: 40 mm
 - Mounting hole diameter: Ø6 mm
 - Mounting hole-to-center distance: 11 mm
 - Mounting hole-to-port distance: 11 mm
 - Mounting hole-to-port distance (diagonal): 11 mm

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Datasheet

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



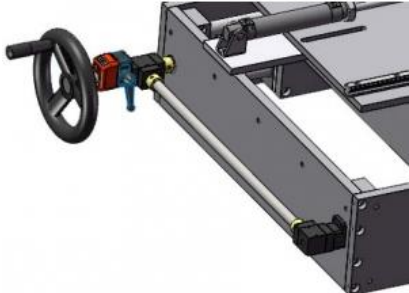
Transmitting the rotary motion, direct connection via rigid shaft.

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.

Ordering example

Type	66/4	-		-		-	A	-	1	-	V08-H08
------	------	---	--	---	--	---	---	---	---	---	---------

Gearbox ¹⁾

- = bevel gears (standard)
- SP = spiral bevel gears (optional)

Housing material

- = anodized transparent (standard)
- ES = anodized black (optional)
- VA = stainless steel (AISI 303) (optional)

Version

- A** = with 2 outputs
- B** = with 3 outputs
- C** = with 3 outputs (with opposite rotation)
- D** = with 3 outputs, 2 through hollow shafts
- E** = with 4 outputs

Reduction ratio ¹⁾

- | | | |
|-----|-------|--|
| 1 | = 1:1 | (standard) |
| 2 | = 1:2 | <i>in reducing</i> (standard) |
| 0,5 | = 2:1 | <i>in multiplying</i> (on request in version A, B, C,
not available in version D) |

Version shaft

- V** = Shaft; with keyway (at standard)
H = Hollow shaft with blind hole; through hollow shaft only with version D

Diameter shaft ²⁾

- 08** = Ø 8 mm (standard); 10, 12 und 14 mm (optional)

Length shaft ²⁾

- | | |
|---------------|---|
| Shaft: | 16 mm (standard) |
| Hollow shaft: | 15 mm <u>effective length</u> , 16 mm <u>construction depth</u> (standard); |



- 1) Gear ratios of 1:2 and 2:1 are only available with spiral bevel gears.
- 2) Further lengths and diameters are available on request.

Manufacturer:

The manufacturer reserves the right to make changes to the products that it deems necessary for their improvement without prior notice.