

Technical information for couplings

Note:

The zero backlash, flexible metal bellows or elastomer couplings are particularly suited to highly accurate drives with average torque values. They are the ideal solution for accurately connecting two shaft journals at a true angle. Axial, radial and angular displacement between two ends of a shaft can be compensated within defined limits. This produces minimal bearing stresses as a result of the low restoring forces. A strong shaft to hub connection guarantees zero backlash transmission of torque, even without additional parallel key. Low mass moments of inertia and a high quality kinetic energy guarantee excellent dynamic behaviour, even at high revolutions. As a basic principle, the couplings are wear and maintenance-free. The range of possible uses extends from challenging drive systems in general mechanical engineering through applications in metrology and automatic control to the spindle and axial drives of machine tools. Other typical examples of their use include textile, packaging and timber processing machines as well as industrial robots and multi-spindle drilling heads.

Specifications

| Comparison | Metal bellows couplings | Elastomer couplings | Beam couplings |
|-------------------------------------|--|--|---|
| Major functional features | <ul style="list-style-type: none"> – very high torsion resistance, therefore accurate transfer of the angle of rotation – low mass moments of inertia – full metal version – minimal restoring forces on the bearing | <ul style="list-style-type: none"> – plug-in (blind assembly is possible) – vibration dampening – no-play, due to pre-tensioning of the coupling star in the claws – 23021 DIN 69002 suitable for the highest speeds | <ul style="list-style-type: none"> – compact design – play-free, absolute synchronism – high torsion resistance – low mass moments of inertia – full metal version – models in aluminium and stainless steel |
| Connection or compensating elements | – stainless steel metal bellows | – polyurethane elastomer star | – full metal version with slotted structure |
| Hub version | – easy to assemble clamp hub (strong, no-play) | <ul style="list-style-type: none"> – easy to assemble clamp hub – conical connection to clamping ring hub | – easy to assemble clamp hub, fixed or removable (strong, no-play) |
| Temperature range | max. 200 °C | -30 °C to +90 °C | -50 °C to +150 °C |
| Speeds | Couplings are prebalanced. Additional balancing is recommended for revolutions in excess of 5000 r.p.m. | Version with clamping ring hub (23021) is suitable for up to 20000 r.p.m. | Depending on model, suitable for speeds up to 10000 r.p.m. |

Configuration

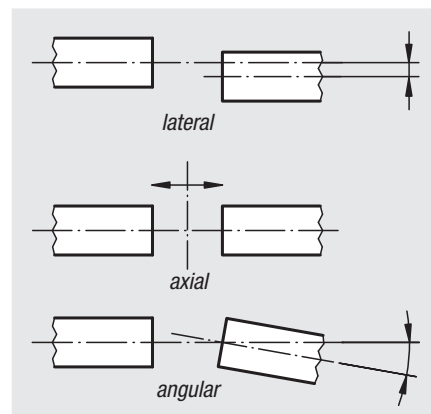
$$M_N \cong 1,5 \cdot M_{max.} \text{ [Nm]}$$

Rough calculation:

$$M_N \triangleq \text{nom. torque of coupling}$$

$$M_{max.} \triangleq \text{max. motor torque}$$

For accurate dimensioning the actual acting torques must be calculated from the cutting or acceleration forces. In exceptional cases and only for short periods, e.g. during a collision, increased loading of up to twice the nominal torque is possible.



Shaft displacement

Axial and angular displacement are generally not a problem and are also easy to check. Conversely, great attention should be paid to radial shaft displacement, i.e. the lateral parallel displacement of the axes of rotation. This error must not exceed the value prescribed in the table.