3.6 Universal joints
Fork joints
Angled ball joints
## 3.6 Universal joints, Angled ball joints, Fork joints, Ball joints

### DIN 808
Universal joints with friction bearing
- Page 938

### GN 648.1
Ball joint heads with female thread
- Page 948

### GN 752
Joint pieces
- Page 956

### GN 808.2
Universal joint shafts with friction bearing
- Page 939

### GN 648.2
Ball joint heads with threaded bolt
- Page 949

### GN 782
Ball joints
- Page 957

### DIN 808
Universal joints with friction bearing
- Page 940

### GN 648.5
Ball joint heads with female thread
- Page 950

### DIN 71802
Angled ball joints
- Page 958

### GN 751
Fork joints
- Page 952

### GN 710
Dust caps for angled ball joints
- Page 960

### GN 240
Quick-fit couplings
- Page 961

### GN 9080
Universal joints for ordinary applications
- Page 944

### GN 751
Fork joints
- Page 954

### GN 240.1
Quick-fit couplings
- Page 962

### GN 808.1
Gaiters for universal joints
- Page 945

### GN 751
Fork joints
- Page 955

### GN 240.2
Quick-fit couplings
- Page 963
For a smooth transfer of a rotating speed, the angle of inclination $\beta$ must be equal at both ends of the connecting shaft.

Due to a misconnection of the universal joint shafts, the irregular rotation of each joint is not compensated, but strengthened. This allows joint bearings and wedge profiles to be destroyed. For this reason, the markings of the universal joint shaft halves have to be opposite to each other.

Furthermore, the bearings must be as close as possible to the universal joints. For continuous operation of universal joints with friction bearings adequate lubrication is essential. If drip lubrication is not possible they should be lubricated at least once a day. It is also possible to fit the universal joint with a gaiter GN 808.1 which can be filled with oil or grease.

The single universal joints transfer the initial smooth rotation as an irregular rotation. One revolution of the drive shaft via single universal joint will cause the driven shaft to accelerate and decelerate twice. The extent of the irregularity depends on the operating angle $\beta$.

In order to obtain a smooth rotation of the driven shaft two single or one double universal joint is required. In such cases where minor irregularities in the movement are acceptable or where minor operating angles are the norm a single universal joint will do.
Universal joints with friction bearing, Type EG

Selection of the size

The table shows the transferable output $N$ and/or torques $M$ of universal joints DIN 808, type EG (single friction bearing) in relation to the r.p.m. $n$.

The values are only applicable to a constant speed of rotation, constant load and an operating inclination angle of max. 10°. They are not applicable to universal joints in Stainless Steel.

For larger inclination angles $\beta$ a nominal output $N$ increased by the correction coefficient $k$ and/or a nominal torque $M$ has to be selected (see example below).

Conversion formulae:

$$\text{Torque } M \text{ [Nm]} = \frac{9550 \cdot N \text{ [kW]}}{n \text{ [min}^{-1}]},$$

$$\text{Output } N \text{ [kW]} = \frac{M \text{ [Nm]} \cdot n \text{ [min}^{-1}]}{9550},$$

$$1 \text{ kW} = 1,36 \text{ PS} \quad 1 \text{ PS} = 0,736 \text{ kW}$$

**Example 1**

Output to be transferred $N = 0,65 \text{ kW}$

R.p.m. $n = 230 \text{ min}^{-1}$

Angle of inclination $\beta = 10^\circ$

Correction coefficient $k = 1$

Indicative output $N' = \text{Nominal output } N$

Intersection point $P$ is arrived at from 0,65 kW and 230 min$^{-1}$ (which corresponds to a torque of 27 Nm).

The next size up universal joint corresponding to point $P$ is the model with a diameter $d_1 = 25$.

**Example 2**

Torque to be transferred $M = 27 \text{ Nm}$

R.p.m. $n = 230 \text{ min}^{-1}$

Angle of inclination $\beta = 30^\circ$

Correction coefficient $k = 2,25$

Indicative torque $= 2,25 \times 27 \text{ Nm} = 60 \text{ Nm}$

Intersection point $P_1$ is arrived at from 61 Nm and 230 min$^{-1}$ (which is equivalent to an indicative output $N = 1,47 \text{ kW}$).

The next size up universal joint corresponding to $P_1$ is the model with a diameter $d_1 = 32$. 
Universal joints with needle bearing, Type EW
Selection of the size

The table shows the transferable output N and/or torques M of universal joints Kreuzgelenken DIN 808, type EW (single needle bearing) in relation to the r.p.m. n.

The values are only applicable to a constant speed of rotation, constant load and an operating inclination angle of max. 10°.

For larger inclination angles β a nominal output N increased by the correction coefficient k and/or a nominal torque M has to be selected (see example below).

Conversion formulae:

\[ \text{Torque } M \ [\text{Nm}] = \frac{9550}{n \ [\text{min}^{-1}]} \times N \ [\text{kW}] \]

\[ \text{Output } N \ [\text{kW}] = \frac{M \ [\text{Nm}] \times n \ [\text{min}^{-1}]}{9550} \]

1 kW = 1,36 PS 1 PS = 0,736 kW

Example 1
Torque to be transferred N = 5,5 kW
R.p.m. n = 2300 min\(^{-1}\)
Angle of inclination β = 10°
Correction coefficient k = 1
Indicative output N = Nominal output N
Intersection point P is arrived at from 5,5 kW and 2300 min\(^{-1}\) (which corresponds to a torque of 23 Nm).
The next size up universal joint corresponding to point P is the model with a diameter \(d_1 = 28\).

Example 2
Torque to be transferred M = 23 Nm
R.p.m. n = 2300 min\(^{-1}\)
Angle of inclination β = 18°
Correction coefficient k = 1,43
Indicative torque = 1,43 x 23 Nm = 33 Nm
Intersection point P1 is arrived at from 33 Nm and 2300 min\(^{-1}\) (which is equivalent to an indicative output N = 7,9 kW).
The next size up universal joint corresponding to P1 is the model with a diameter \(d_1 = 32\).
Universal joints with friction bearing

The permissible r.p.m. of universal joints with friction bearing DIN 808 is to a large extent dependent on the type of application such as load, duration, angular disposition as well as lubrication. For over 1000 r.p.m. universal joints with needle bearing should be used.

For continuous use ample lubrication is essential. This achieved by fitting the joint with a grease filled gaiter GN 808.1.

### Specification
- Steel blank
- Joint bearing areas / pins / bearing sleeves case hardened
- Keyway JS9 DIN 6885
- Cross holes GN 110
- ISO-Fundamental Tolerances
- RoHS compliant

### Information

The permissible r.p.m. of universal joints with friction bearing DIN 808 is to a large extent dependent on the type of application such as load, duration, angular disposition as well as lubrication. For over 1000 r.p.m. universal joints with needle bearing should be used.

For continuous use ample lubrication is essential. This achieved by fitting the joint with a grease filled gaiter GN 808.1.

### How to order

<table>
<thead>
<tr>
<th>d1</th>
<th>d2 H7 Bore</th>
<th>s H10 Square</th>
<th>l1 Type EG</th>
<th>l2 Type DG</th>
<th>l3</th>
<th>l4</th>
<th>t min.</th>
</tr>
</thead>
<tbody>
<tr>
<td>16</td>
<td>6</td>
<td>V 6*</td>
<td>34</td>
<td>56</td>
<td>17</td>
<td>22</td>
<td>8</td>
</tr>
<tr>
<td>16</td>
<td>8</td>
<td>V 8*</td>
<td>40</td>
<td>62</td>
<td>20</td>
<td>22</td>
<td>11</td>
</tr>
<tr>
<td>16</td>
<td>10</td>
<td>V 8*</td>
<td>52</td>
<td>74</td>
<td>26</td>
<td>22</td>
<td>14</td>
</tr>
<tr>
<td>22</td>
<td>10</td>
<td>V 10*</td>
<td>48</td>
<td>74</td>
<td>24</td>
<td>26</td>
<td>12</td>
</tr>
<tr>
<td>22</td>
<td>12</td>
<td>V 10*</td>
<td>62</td>
<td>88</td>
<td>31</td>
<td>26</td>
<td>18</td>
</tr>
<tr>
<td>25</td>
<td>12</td>
<td>V 12*</td>
<td>56</td>
<td>86</td>
<td>28</td>
<td>30</td>
<td>13</td>
</tr>
<tr>
<td>25</td>
<td>16</td>
<td>V 12*</td>
<td>74</td>
<td>104</td>
<td>37</td>
<td>30</td>
<td>21</td>
</tr>
<tr>
<td>28</td>
<td>14</td>
<td>V 14*</td>
<td>60</td>
<td>96</td>
<td>30</td>
<td>36</td>
<td>13</td>
</tr>
<tr>
<td>32</td>
<td>16</td>
<td>V 16*</td>
<td>68</td>
<td>104</td>
<td>34</td>
<td>36</td>
<td>16</td>
</tr>
<tr>
<td>32</td>
<td>20</td>
<td>V 16*</td>
<td>86</td>
<td>124</td>
<td>43</td>
<td>38</td>
<td>24</td>
</tr>
<tr>
<td>36</td>
<td>18</td>
<td>V 18*</td>
<td>74</td>
<td>114</td>
<td>37</td>
<td>40</td>
<td>17</td>
</tr>
<tr>
<td>42</td>
<td>20</td>
<td>V 20*</td>
<td>82</td>
<td>128</td>
<td>41</td>
<td>46</td>
<td>18</td>
</tr>
<tr>
<td>42</td>
<td>25</td>
<td>V 20*</td>
<td>108</td>
<td>156</td>
<td>54</td>
<td>48</td>
<td>31</td>
</tr>
<tr>
<td>45</td>
<td>22</td>
<td>V 22*</td>
<td>95</td>
<td>145</td>
<td>47,5</td>
<td>50</td>
<td>22</td>
</tr>
<tr>
<td>50</td>
<td>25</td>
<td>V 25*</td>
<td>108</td>
<td>163</td>
<td>54</td>
<td>55</td>
<td>26</td>
</tr>
<tr>
<td>50</td>
<td>30</td>
<td>V 25*</td>
<td>132</td>
<td>188</td>
<td>66</td>
<td>56</td>
<td>38</td>
</tr>
<tr>
<td>58</td>
<td>30</td>
<td>V 30*</td>
<td>122</td>
<td>190</td>
<td>61</td>
<td>68</td>
<td>29</td>
</tr>
<tr>
<td>58</td>
<td>32</td>
<td>V 30*</td>
<td>130</td>
<td>198</td>
<td>65</td>
<td>68</td>
<td>33</td>
</tr>
<tr>
<td>70*</td>
<td>35</td>
<td>V 35</td>
<td>140</td>
<td>212</td>
<td>70</td>
<td>72</td>
<td>35</td>
</tr>
</tbody>
</table>

* not available from stock, requires a minimum order quantity
**Universal joint shafts with friction bearing**

GN 808.2

with longitudinal compensation

---

**Table: Specifications**

<table>
<thead>
<tr>
<th>d1</th>
<th>d2</th>
<th>l1 - l2</th>
<th>d3</th>
<th>l3</th>
<th>l5</th>
<th>t</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>22</td>
<td>K 10 B 10* V 10*</td>
<td>140-30</td>
<td>160-40</td>
<td>180-60</td>
<td>-</td>
<td>22</td>
<td>30</td>
</tr>
<tr>
<td>22*</td>
<td>K 12 B 12</td>
<td>-</td>
<td>140-30</td>
<td>160-40</td>
<td>180-60</td>
<td>22</td>
<td>30</td>
</tr>
<tr>
<td>25</td>
<td>K 12 B 12* V 12*</td>
<td>160-30</td>
<td>180-45</td>
<td>200-70</td>
<td>250-105</td>
<td>26</td>
<td>40</td>
</tr>
<tr>
<td>25*</td>
<td>K 16 B 16</td>
<td>-</td>
<td>160-30</td>
<td>180-45</td>
<td>200-70</td>
<td>250-105</td>
<td>26</td>
</tr>
<tr>
<td>28</td>
<td>K 14 B 14* V 14*</td>
<td>170-30</td>
<td>200-60</td>
<td>220-80</td>
<td>280-140</td>
<td>29</td>
<td>40</td>
</tr>
<tr>
<td>32</td>
<td>K 16 B 16* V 16*</td>
<td>190-30</td>
<td>240-80</td>
<td>275-115</td>
<td>380-210</td>
<td>32</td>
<td>40</td>
</tr>
<tr>
<td>32*</td>
<td>K 20 B 20</td>
<td>-</td>
<td>190-30</td>
<td>240-80</td>
<td>275-115</td>
<td>380-210</td>
<td>32</td>
</tr>
<tr>
<td>36</td>
<td>K 18 B 18* V 18*</td>
<td>230-50</td>
<td>270-100</td>
<td>290-110</td>
<td>400-220</td>
<td>37</td>
<td>40</td>
</tr>
<tr>
<td>42</td>
<td>K 20 B 20* V 20*</td>
<td>250-50</td>
<td>320-120</td>
<td>420-220</td>
<td>-</td>
<td>42</td>
<td>45</td>
</tr>
<tr>
<td>45</td>
<td>K 22 B 22* V 22*</td>
<td>270-50</td>
<td>330-100</td>
<td>470-240</td>
<td>-</td>
<td>47</td>
<td>50</td>
</tr>
<tr>
<td>50*</td>
<td>K 30 B 30</td>
<td>-</td>
<td>295-50</td>
<td>350-100</td>
<td>420-170</td>
<td>-</td>
<td>52</td>
</tr>
<tr>
<td>58</td>
<td>K 30 B 30* V 30*</td>
<td>330-50</td>
<td>400-110</td>
<td>-</td>
<td>-</td>
<td>58</td>
<td>60</td>
</tr>
</tbody>
</table>

*not available from stock, requires a minimum order quantity

---

**Information**

Universal joint shafts with friction bearing GN 808.2 do not only bridge the misalignment of two shafts, but at the same time they offer a length compensation. The power transmission is achieved by two universal joints DIN 808 (type EG) a splined shaft and a sliding sleeve.

It is important to check the accuracy when connecting the splined shaft to the sliding sleeve. The markings have to be opposite to each other. Any kind of misconnection leads to an inhomogeneous output and to a quick abrasion.

**How to order**

<table>
<thead>
<tr>
<th>1</th>
<th>d1</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Bore code</td>
</tr>
<tr>
<td>3</td>
<td>d2 (s)</td>
</tr>
<tr>
<td>4</td>
<td>l1 - l2</td>
</tr>
</tbody>
</table>

**Permissible r.p.m. and torque**

Page 936

---

**On request**

- different lengths l1 - l2
- with other or unequal bores

---

**Steel blank**

- Joint bearing areas / pins / bearing sleeves case hardened
- Keyway JS9 DIN 6885
- Cross holes GN 110
- ISO-Fundamental Tolerances
- RoHS compliant
Stainless Steel-Universal joints with friction bearing

**How to order**

1. \( d_1 \)
2. Bore code
3. \( d_2, s \)
4. \( l_2, l_3 \)
5. Type
6. Material

DIN 808-32-B16-104-DG-NI

**Information**

Since the moveable parts are not surface treated, i.e. not case hardened, the possibilities of application of these universal joints are much more limited compared to the ones made of standard steel. Therefore, the guidelines for the selection of universal joints with friction bearing according to the diagram may be applied at a **limited extent only**. Rotational speeds over 200 min may become critical.

For continuous use of the Stainless Steel-Universal joints, ample lubrication is very important. This achieved by fitting the joint with a grease filled gaiter GN 808.1.

The order example refers to universal joints with equal bores both ends \( d_2 \) and \( s \).

**Specification**

- Stainless Steel AISI 304
- Keyway JS9 DIN 6885
- Cross holes GN 110
- ISO-Fundamental Tolerances
- Stainless Steel characteristics
- RoHS compliant

**On request**

- with other or unequal bores

**Not available from stock, requires a minimum order quantity**

### Table

<table>
<thead>
<tr>
<th>( d_1 )</th>
<th>( d_2 )</th>
<th>( s )</th>
<th>( l_1 )</th>
<th>( l_2 )</th>
<th>( l_3 )</th>
<th>( l_4 )</th>
<th>( t )</th>
</tr>
</thead>
<tbody>
<tr>
<td>16</td>
<td>6</td>
<td>V 6*</td>
<td>34</td>
<td>56</td>
<td>17</td>
<td>22</td>
<td>8</td>
</tr>
<tr>
<td>16</td>
<td>8</td>
<td>V 8*</td>
<td>40</td>
<td>62</td>
<td>20</td>
<td>22</td>
<td>11</td>
</tr>
<tr>
<td>22</td>
<td>10</td>
<td>V 10*</td>
<td>48</td>
<td>74</td>
<td>24</td>
<td>26</td>
<td>12</td>
</tr>
<tr>
<td>25</td>
<td>12</td>
<td>V 12*</td>
<td>56</td>
<td>86</td>
<td>28</td>
<td>30</td>
<td>13</td>
</tr>
<tr>
<td>32</td>
<td>16</td>
<td>V 16*</td>
<td>68</td>
<td>104</td>
<td>34</td>
<td>36</td>
<td>16</td>
</tr>
<tr>
<td>42</td>
<td>20</td>
<td>V 20*</td>
<td>82</td>
<td>128</td>
<td>41</td>
<td>46</td>
<td>18</td>
</tr>
<tr>
<td>50</td>
<td>25</td>
<td>V 25*</td>
<td>108</td>
<td>163</td>
<td>54</td>
<td>55</td>
<td>26</td>
</tr>
</tbody>
</table>

* not available from stock, requires a minimum order quantity
Universal joint shafts with longitudinal compensation
with friction bearing GN 808.2 → Page 939
with needle bearing GN 808.3 → Page 943
**DIN 808**

**Universal joints with needle bearing**

*Extract from* single or double

---

**How to order**

1. **d₁**
2. **Bore code**
3. **d₂** (s)
4. **l₂** (l₁)
5. **Type**

**Example**: DIN808-50-B25-163-DW

---

<table>
<thead>
<tr>
<th>d₁</th>
<th>d₂ (H7) Bore</th>
<th>s (H10) Square</th>
<th>l₁ (Type EW)</th>
<th>l₂ (Type DW)</th>
<th>l₃</th>
<th>l₄</th>
<th>t (min.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>22</td>
<td>10</td>
<td>V 10*</td>
<td>48</td>
<td>74</td>
<td>24</td>
<td>26</td>
<td>12</td>
</tr>
<tr>
<td>22</td>
<td>12</td>
<td>V 10*</td>
<td>62</td>
<td>88</td>
<td>31</td>
<td>26</td>
<td>18</td>
</tr>
<tr>
<td>25</td>
<td>12</td>
<td>V 12*</td>
<td>56</td>
<td>86</td>
<td>28</td>
<td>30</td>
<td>13</td>
</tr>
<tr>
<td>25</td>
<td>16</td>
<td>V 12*</td>
<td>74</td>
<td>104</td>
<td>37</td>
<td>30</td>
<td>21</td>
</tr>
<tr>
<td>28</td>
<td>14</td>
<td>V 14*</td>
<td>60</td>
<td>96</td>
<td>30</td>
<td>36</td>
<td>13</td>
</tr>
<tr>
<td>32</td>
<td>16</td>
<td>V 16*</td>
<td>68</td>
<td>104</td>
<td>34</td>
<td>36</td>
<td>16</td>
</tr>
<tr>
<td>32</td>
<td>20</td>
<td>V 16*</td>
<td>86</td>
<td>124</td>
<td>43</td>
<td>38</td>
<td>24</td>
</tr>
<tr>
<td>36</td>
<td>18</td>
<td>V 18*</td>
<td>74</td>
<td>114</td>
<td>37</td>
<td>40</td>
<td>17</td>
</tr>
<tr>
<td>42</td>
<td>20</td>
<td>V 20*</td>
<td>82</td>
<td>128</td>
<td>41</td>
<td>46</td>
<td>18</td>
</tr>
<tr>
<td>42</td>
<td>25</td>
<td>V 20*</td>
<td>108</td>
<td>156</td>
<td>54</td>
<td>48</td>
<td>31</td>
</tr>
<tr>
<td>45</td>
<td>22</td>
<td>V 22*</td>
<td>95</td>
<td>145</td>
<td>47,5</td>
<td>50</td>
<td>22</td>
</tr>
<tr>
<td>50</td>
<td>25</td>
<td>V 25*</td>
<td>108</td>
<td>163</td>
<td>54</td>
<td>55</td>
<td>26</td>
</tr>
<tr>
<td>50</td>
<td>30</td>
<td>V 25*</td>
<td>132</td>
<td>188</td>
<td>66</td>
<td>56</td>
<td>38</td>
</tr>
<tr>
<td>58</td>
<td>30</td>
<td>V 30*</td>
<td>122</td>
<td>190</td>
<td>61</td>
<td>68</td>
<td>29</td>
</tr>
<tr>
<td>58</td>
<td>32</td>
<td>V 30*</td>
<td>130</td>
<td>198</td>
<td>65</td>
<td>68</td>
<td>33</td>
</tr>
<tr>
<td>70</td>
<td>35</td>
<td>V 35</td>
<td>140</td>
<td>212</td>
<td>70</td>
<td>72</td>
<td>35</td>
</tr>
</tbody>
</table>

* not available from stock, requires a minimum order quantity

**Permissible r.p.m. and torque** → **Page 937**

---

**Specification**

- Steel blank
- Joint bearing areas, pins case hardened
- Keyway JS9 DIN 6885 → **Page 1124**
- Cross holes GN 110 → **Page 1127**
- ISO-Fundamental Tolerances → **Page 1132**
- RoHS compliant

**Information**

The permissible r.p.m. of universal joints with needle bearings DIN 808 is higher than for those with friction bearings, but is still dependent on the load, duration of use as well as angular disposition. Ideal applications allow speeds of up to 4000 r.p.m → **Page 937**.

Needle bearings give the universal joints at 3° to 5° angular disposition a considerably higher degree of efficiency than those fitted with friction bearings. The needle bearings have a permanent lubrication and thus do not require servicing. Information regarding the selection of universal joints with needle bearing.

---

**On request**

- with other or unequal bores

---
Universal joint shafts with needle bearing
with longitudinal compensation

**Information**

Universal joint shafts with needle bearing GN 808.3 do not only bridge the misalignment of two shafts, but at the same time they offer a length compensation. The power transmission is achieved by two universal joints DIN 808 (type EW) a splined shaft and a sliding sleeve.

It is important to check the accuracy when connecting the splined shaft to the sliding sleeve.

The markings must be opposite to each other. Any kind of misconnection leads to an inhomogeneous output and to a quick abrasion.

**Specification**

- Steel blank
- Joint bearing areas, pins case hardened
- Keyway JS9 DIN 6885
- Cross holes GN 110
- ISO-Fundamental Tolerances
- RoHS compliant

**How to order**

1. Bore code
2. d₂ (s)
3. l₁ - l₂

**Table**

<table>
<thead>
<tr>
<th>d₁</th>
<th>d₂ H7</th>
<th>d₁ - l₂</th>
<th>l₃ Guide length</th>
<th>l₅</th>
<th>t min.</th>
</tr>
</thead>
<tbody>
<tr>
<td>22</td>
<td>K 10</td>
<td>140-30</td>
<td>22 30</td>
<td>48</td>
<td>12</td>
</tr>
<tr>
<td>22*</td>
<td>K 12</td>
<td>140-30</td>
<td>22 30</td>
<td>62</td>
<td>18</td>
</tr>
<tr>
<td>25</td>
<td>K 12</td>
<td>160-30</td>
<td>25 40</td>
<td>56</td>
<td>13</td>
</tr>
<tr>
<td>25*</td>
<td>K 16</td>
<td>160-30</td>
<td>25 40</td>
<td>74</td>
<td>21</td>
</tr>
<tr>
<td>28</td>
<td>K 14</td>
<td>170-30</td>
<td>29 40</td>
<td>60</td>
<td>13</td>
</tr>
<tr>
<td>32</td>
<td>K 16</td>
<td>190-30</td>
<td>32 40</td>
<td>68</td>
<td>16</td>
</tr>
<tr>
<td>32*</td>
<td>K 20</td>
<td>190-30</td>
<td>32 40</td>
<td>86</td>
<td>24</td>
</tr>
<tr>
<td>36</td>
<td>K 18</td>
<td>230-50</td>
<td>37 40</td>
<td>74</td>
<td>17</td>
</tr>
<tr>
<td>42</td>
<td>K 20</td>
<td>250-50</td>
<td>42 45</td>
<td>84</td>
<td>18</td>
</tr>
<tr>
<td>42*</td>
<td>K 25</td>
<td>250-50</td>
<td>42 45</td>
<td>108</td>
<td>31</td>
</tr>
<tr>
<td>45</td>
<td>K 22</td>
<td>270-50</td>
<td>47 50</td>
<td>95</td>
<td>22</td>
</tr>
<tr>
<td>50</td>
<td>K 25</td>
<td>295-50</td>
<td>52 50</td>
<td>108</td>
<td>26</td>
</tr>
<tr>
<td>50*</td>
<td>K 30</td>
<td>295-50</td>
<td>52 50</td>
<td>132</td>
<td>38</td>
</tr>
<tr>
<td>58</td>
<td>K 30</td>
<td>330-50</td>
<td>58 60</td>
<td>122</td>
<td>29</td>
</tr>
</tbody>
</table>

* not available from stock, requires a minimum order quantity

**Permissible r.p.m. and torque**

**On request**

- different length l₁ - l₂
- with other or unequal bores
Universal joints GN 9080 are a simple and very competitively priced variant. They can only be used for applications with low revolutions. Typical applications are all types of manual operations such as the adjustment of louvers.

**Specification**

- Steel
  - not hardened
  - blackened
- Cross holes GN 110 → Page 1127
- ISO-Fundamental Tolerances → Page 1132
- RoHS compliant

**Information**

Universal joints GN 9080 are a simple and very competitively priced variant. They can only be used for applications with low revolutions. Typical applications are all types of manual operations such as the adjustment of louvers.

**How to order**

GN 9080-20-B12-EG

1. \( d_1 \)
2. \( d_2 \)
3. Type

<table>
<thead>
<tr>
<th>( d_1 )</th>
<th>( d_2 ) H8 Bore</th>
<th>( l_1 ) Type EG</th>
<th>( l_2 ) Type DG</th>
<th>( l_3 )</th>
<th>( l_4 )</th>
<th>( t )</th>
<th>max. torque in Nm</th>
</tr>
</thead>
<tbody>
<tr>
<td>13</td>
<td>B 8</td>
<td>42</td>
<td>60</td>
<td>21</td>
<td>18</td>
<td>12</td>
<td>2</td>
</tr>
<tr>
<td>16</td>
<td>B 10</td>
<td>52</td>
<td>74</td>
<td>26</td>
<td>22</td>
<td>15</td>
<td>3</td>
</tr>
<tr>
<td>20</td>
<td>B 12</td>
<td>62</td>
<td>88</td>
<td>31</td>
<td>26</td>
<td>18</td>
<td>6</td>
</tr>
<tr>
<td>25</td>
<td>B 16</td>
<td>74</td>
<td>104</td>
<td>37</td>
<td>30</td>
<td>22</td>
<td>12</td>
</tr>
<tr>
<td>32</td>
<td>B 20</td>
<td>86</td>
<td>124</td>
<td>43</td>
<td>38</td>
<td>25</td>
<td>24</td>
</tr>
</tbody>
</table>
Gaiters GN 808.1 give universal joints full protection against ingress of dirt. At the same time they can be filled with grease which gives long term lubrication for friction bearings. The gaiters are secured at each end with two cable ties, which are supplied each sleeve.

**Specification**

- Type E
  - Rubber (CR) black
- Type D
  - Elastomer plastic smooth PVC black

**Elastomer characteristics** [Page 1140]

- RoHS compliant

**Information**

**How to order**

GN808.1-25-E

<table>
<thead>
<tr>
<th>Type</th>
<th>d₁</th>
<th>Type</th>
<th>d₂</th>
<th>Type</th>
<th>d₃</th>
<th>Type</th>
<th>d₄</th>
<th>Type</th>
<th>d₅</th>
<th>Type</th>
<th>l₁</th>
<th>Type</th>
<th>l₂</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>E</td>
<td>16</td>
<td>E</td>
<td>15</td>
<td>E</td>
<td>28</td>
<td>E</td>
<td>16</td>
<td>D</td>
<td>35</td>
<td>E</td>
<td>34</td>
<td>D</td>
<td>55</td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>22</td>
<td>E</td>
<td>20,5</td>
<td>E</td>
<td>40</td>
<td>E</td>
<td>20</td>
<td>D</td>
<td>36</td>
<td>E</td>
<td>45</td>
<td>D</td>
<td>65</td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>25</td>
<td>E</td>
<td>24,5</td>
<td>E</td>
<td>48</td>
<td>D</td>
<td>24</td>
<td>D</td>
<td>44</td>
<td>D</td>
<td>50</td>
<td>D</td>
<td>70</td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>28</td>
<td>E</td>
<td>27,5</td>
<td>E</td>
<td>52</td>
<td>D</td>
<td>28</td>
<td>D</td>
<td>51</td>
<td>D</td>
<td>56</td>
<td>D</td>
<td>80</td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>32</td>
<td>E</td>
<td>30,5</td>
<td>E</td>
<td>56</td>
<td>D</td>
<td>32</td>
<td>D</td>
<td>62</td>
<td>D</td>
<td>65</td>
<td>D</td>
<td>90</td>
<td></td>
</tr>
<tr>
<td></td>
<td>36</td>
<td>D</td>
<td>35,5</td>
<td>D</td>
<td>66</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>42</td>
<td>E</td>
<td>40</td>
<td>E</td>
<td>75</td>
<td>D</td>
<td>40</td>
<td>D</td>
<td>73</td>
<td>D</td>
<td>82</td>
<td>D</td>
<td>120</td>
<td></td>
</tr>
<tr>
<td></td>
<td>45</td>
<td>E</td>
<td>45</td>
<td>E</td>
<td>84</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>50</td>
<td>E</td>
<td>50</td>
<td>E</td>
<td>92</td>
<td>D</td>
<td>50</td>
<td>D</td>
<td>90</td>
<td>D</td>
<td>108</td>
<td>D</td>
<td>155</td>
<td></td>
</tr>
<tr>
<td></td>
<td>58</td>
<td>E</td>
<td>56</td>
<td>E</td>
<td>100</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

E  Type

E  for single joints

D  for double joints
Ball joint heads DIN ISO 12240-4
Series K - Range

### Steel-Specification

- **Type N**
  - Housing: steel, zinc plated
  - Pairings: Internal ring steel, hardened
  - Bearing socket: brass
  - lubrication possible.

- **Type W**
  - Housing: steel, zinc plated
  - Pairings: Internal ring steel, hardened
  - Bearing socket: steel, zinc plated with PTFE-insert
  - self lubricated.

### Stainless Steel-Specification

- **Type NH**
  - Housing: Stainless Steel
  - Pairings: Internal ring, hardened, hard chrome plated
  - Bearing socket: bronze
  - lubrication possible.

- **Type WH**
  - Housing: Stainless Steel
  - Pairings: Internal ring steel, hardened
  - Bearing socket: bronze, with PTFE-insert
  - self lubricated.

- **Type WK**
  - Housing: Stainless Steel
  - Pairings: Internal ring Stainless Steel, hardened
  - Bearing socket: Stainless Steel, with PTFE-insert
  - self lubricated.

### Features of general use:

- For general use, and in particular for continuously changing thrust and shock loads in radial and axial plane.
- For general use, especially for application under dynamic operating conditions.
- Load bearing capacity than Type N.
- As Type N for use in corrosion endangered area.
- As Type W for use in corrosion endangered area.
- As Type W for use in areas where the highest degree of corrosion resistance is of paramount importance. Such as for instance in the food industry.
Bearing play
Bearing play refers to the amount of play by which the internal ring inside a bearing socket without lubrication can be moved either a radial or an axial plane.

<table>
<thead>
<tr>
<th>Types N, NH lubrication possible</th>
<th>Types W, WH, WK self lubricated</th>
</tr>
</thead>
<tbody>
<tr>
<td>(d_1) Bore internal ring</td>
<td>(d_1) Bore internal ring</td>
</tr>
<tr>
<td>5 ... 10</td>
<td>0,005 ... 0,035</td>
</tr>
<tr>
<td>12 ... 20</td>
<td>0,010 ... 0,040</td>
</tr>
<tr>
<td>22 ... 30</td>
<td>0,010 ... 0,050</td>
</tr>
</tbody>
</table>

Load applied to obtained the measured results: 100 N at room temperature.

Lubrication
Ball joint heads of type \(N\) (lubrication possible) require regular lubrication. On delivery the ball joint heads are not lubricated. The initial lubrication takes place when installed. Within the temperature range of \(-20 °C\) to \(+125 °C\), a multipurpose grease proved to be adequate. Under extreme conditions a high quality grease such as for instance Gleitmo 805 K should be used. Ball joint heads of the type \(W\) (self lubricated) must never be lubricated. The internal ring moves on a PTFE-insert of the bearing socket.

Operating temperature
Ball joint heads of the type \(N\) (lubrication possible) can be used within the temperature range \(-50 °C\) to \(+200 °C\) and if use with a high temperature grease even higher. Ball joint heads of the type \(W\) (self lubricated) can be used in the temperature range of \(-50 °C\) bis \(+200 °C\). In general use at higher temperature is possible, but this will of course shorten the working life of the head.

Load values
Load values are bearing related values, arrived at from the raw material data of the basic material of construction used. The latter is used to determine the choice of a ball joint head for a given load. These might, however, have to be reduced to meet the requirements of particular circumstances.

Static load values \(Co\) in kN
Co gives the permitted radial static load which can be applied to a ball joint head with the weakest cross section without causing permanent deformation. The Co-values quoted in the catalogue table have been calculated, based on the corresponding raw material specification. Subsequently a random number of the ball joint heads was stress tested at room temperature. Each and every time the stress tests were based on using up to 80 % before the onset of deformation thus leaving a safety factor of 1,25. The static value Co is used to obtain the permissible axial load which in general is limited by the mounting strength of the internal bearing. To obtain the maximum axial load \(Fa\) tests were carried out at the largest permissible slant angle and the results obtained are shown in the table below:

\[Fa = 0,4 \times Co\] for type \(N\)
\[Fa = 0,2 \times Co\] for types \(NH, W, WH, WK\)

Dynamic load value \(C\) in kN
They help to evaluate the length of life for ball joint heads when use under dynamic conditions.

<table>
<thead>
<tr>
<th>(d_1) Size</th>
<th>(\text{static load rating Co} )</th>
<th>(\text{static load rating Co} )</th>
<th>(\text{dynamic load rating C} )</th>
<th>(\text{dynamic load rating C} )</th>
<th>(\text{dynamic load rating C} )</th>
<th>(\text{dynamic load rating C} )</th>
<th>(\text{dynamic load rating C} )</th>
<th>(\text{dynamic load rating C} )</th>
</tr>
</thead>
<tbody>
<tr>
<td>(\text{GN 648.1 Type N})</td>
<td>(\text{GN 648.2 Type N})</td>
<td>(\text{Type W})</td>
<td>(\text{Type W})</td>
<td>(\text{Type NH/WH/WK})</td>
<td>(\text{Type NH/WH/WK})</td>
<td>(\text{Type N})</td>
<td>(\text{Type W})</td>
<td>(\text{Type W})</td>
</tr>
<tr>
<td>5</td>
<td>9,9</td>
<td>4,3</td>
<td>2,5</td>
<td>8</td>
<td>4,3</td>
<td>7,5</td>
<td>11,8</td>
<td>6,2</td>
</tr>
<tr>
<td>6</td>
<td>11,9</td>
<td>6</td>
<td>3,2</td>
<td>8,9</td>
<td>6</td>
<td>9,3</td>
<td>13,1</td>
<td>8,8</td>
</tr>
<tr>
<td>8</td>
<td>17,1</td>
<td>11</td>
<td>5,4</td>
<td>14,1</td>
<td>11</td>
<td>16,7</td>
<td>20,7</td>
<td>16,1</td>
</tr>
<tr>
<td>10</td>
<td>21,4</td>
<td>17,4</td>
<td>7,5</td>
<td>19,3</td>
<td>17,4</td>
<td>23,4</td>
<td>28,3</td>
<td>25,5</td>
</tr>
<tr>
<td>12</td>
<td>27</td>
<td>25,5</td>
<td>10</td>
<td>23,5</td>
<td>23,5</td>
<td>32</td>
<td>34,5</td>
<td>34,5</td>
</tr>
<tr>
<td>14</td>
<td>24,5</td>
<td>24,5</td>
<td>13</td>
<td>21</td>
<td>21</td>
<td>42</td>
<td>39,5</td>
<td>39,5</td>
</tr>
<tr>
<td>16</td>
<td>37</td>
<td>36,5</td>
<td>16</td>
<td>32</td>
<td>32</td>
<td>52,5</td>
<td>60,5</td>
<td>60,5</td>
</tr>
<tr>
<td>18</td>
<td>43</td>
<td>43</td>
<td>19,5</td>
<td>38,5</td>
<td>38,5</td>
<td>64</td>
<td>73</td>
<td>73</td>
</tr>
<tr>
<td>20</td>
<td>49,5</td>
<td>49,5</td>
<td>23,5</td>
<td>44</td>
<td>44</td>
<td>78</td>
<td>83</td>
<td>83</td>
</tr>
<tr>
<td>22</td>
<td>57</td>
<td>57</td>
<td>29</td>
<td>53</td>
<td>53</td>
<td>97</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>25</td>
<td>68</td>
<td>68</td>
<td>35</td>
<td>62</td>
<td>61</td>
<td>122</td>
<td>118</td>
<td>118</td>
</tr>
<tr>
<td>30</td>
<td>82</td>
<td>82</td>
<td>64</td>
<td>82</td>
<td>82</td>
<td>168</td>
<td>155</td>
<td>155</td>
</tr>
</tbody>
</table>
**GN 648.1**  
**Ball joint heads with female thread**

![Diagram of ball joint heads](image)

**Specifications**

1. **Housing Steel**  
   - Zinc plated, blue passivated  
   - \( d_1 = 5 \) up to 12: machined  
   - \( d_1 = 14 \) up to 25: forged

2. **Pairings**  
   - Type N (lubrication possible)  
     - Bearing socket: Brass, CuZn40Al1  
     - Internal ring: Steel, 100Cr6 hardened, ground, polished  
   - Type W (self-lubricated)  
     - Bearing socket: Steel, zinc plated with PTFE-Einlage  
     - Internal ring: Steel, 100Cr6 hardened, ground, polished

3. **ISO-Fundamental Tolerances**  
   - RoHS compliant

**Information**

Ball joint heads GN 648.1 are similar to DIN ISO 12240-4, series K (formerly DIN 648 K).

See also...

- More information to ball joints as well as load capacity ➤ Page 947
- Stainless Steel-Ball joint heads with female thread GN 648.5 ➤ Page 950

**On request**

- Narrow model (ISO 12240-1, series E)

---

<table>
<thead>
<tr>
<th>( d_1 )</th>
<th>( d_2 )</th>
<th>Left hand thread</th>
<th>CETOP-connector dimensions</th>
<th>( b_1 )</th>
<th>( b_2 )</th>
<th>( d_3 )</th>
<th>( d_4 )</th>
<th>( d_5 )</th>
<th>( d_6 )</th>
<th>( l_1 )</th>
<th>( l_2 )</th>
<th>( sw )</th>
<th>( t )</th>
<th>( w )</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>M 5</td>
<td>M 5L</td>
<td>M 4</td>
<td>8</td>
<td>6</td>
<td>7,7</td>
<td>18</td>
<td>9</td>
<td>11</td>
<td>27</td>
<td>36</td>
<td>9</td>
<td>10</td>
<td>13°</td>
</tr>
<tr>
<td>6</td>
<td>M 6</td>
<td>M 6L</td>
<td>-</td>
<td>9</td>
<td>6,75</td>
<td>8,9</td>
<td>20</td>
<td>10</td>
<td>13</td>
<td>30</td>
<td>40</td>
<td>11</td>
<td>12</td>
<td>13°</td>
</tr>
<tr>
<td>8</td>
<td>M 8</td>
<td>M 8L</td>
<td>-</td>
<td>12</td>
<td>9</td>
<td>10,4</td>
<td>24</td>
<td>12,5</td>
<td>16</td>
<td>36</td>
<td>48</td>
<td>13</td>
<td>16</td>
<td>14°</td>
</tr>
<tr>
<td>10</td>
<td>M 10</td>
<td>M 10L</td>
<td>M 10 x 1,25</td>
<td>14</td>
<td>10,5</td>
<td>12,9</td>
<td>28</td>
<td>15</td>
<td>19</td>
<td>43</td>
<td>57</td>
<td>17</td>
<td>20</td>
<td>13°</td>
</tr>
<tr>
<td>12</td>
<td>M 12</td>
<td>M 12L</td>
<td>M 12 x 1,25</td>
<td>16</td>
<td>12</td>
<td>15,4</td>
<td>32</td>
<td>17,5</td>
<td>22</td>
<td>50</td>
<td>66</td>
<td>19</td>
<td>22</td>
<td>13°</td>
</tr>
<tr>
<td>14</td>
<td>M 14</td>
<td>M 14L</td>
<td>-</td>
<td>19</td>
<td>13,5</td>
<td>16,8</td>
<td>36</td>
<td>20</td>
<td>25</td>
<td>57</td>
<td>75</td>
<td>22</td>
<td>25</td>
<td>16°</td>
</tr>
<tr>
<td>16</td>
<td>M 16</td>
<td>M 16L</td>
<td>M 16 x 1,5</td>
<td>21</td>
<td>15</td>
<td>19,3</td>
<td>42</td>
<td>22</td>
<td>27</td>
<td>64</td>
<td>85</td>
<td>22</td>
<td>28</td>
<td>15°</td>
</tr>
<tr>
<td>18</td>
<td>M 18 x 1,5</td>
<td>M 18 x 1,5L</td>
<td>-</td>
<td>23</td>
<td>16,5</td>
<td>21,8</td>
<td>46</td>
<td>25</td>
<td>31</td>
<td>71</td>
<td>94</td>
<td>27</td>
<td>32</td>
<td>15°</td>
</tr>
<tr>
<td>20</td>
<td>M 20 x 1,5</td>
<td>M 20 x 1,5L</td>
<td>-</td>
<td>25</td>
<td>18</td>
<td>24,3</td>
<td>50</td>
<td>27,5</td>
<td>34</td>
<td>77</td>
<td>102</td>
<td>32</td>
<td>33</td>
<td>14°</td>
</tr>
<tr>
<td>22</td>
<td>M 22 x 1,5</td>
<td>M 22 x 1,5L</td>
<td>-</td>
<td>28</td>
<td>20</td>
<td>25,8</td>
<td>54</td>
<td>30</td>
<td>37</td>
<td>84</td>
<td>111</td>
<td>32</td>
<td>37</td>
<td>15°</td>
</tr>
<tr>
<td>25</td>
<td>M 24 x 2</td>
<td>M 24 x 2L</td>
<td>-</td>
<td>31</td>
<td>22</td>
<td>29,6</td>
<td>60</td>
<td>33,5</td>
<td>42</td>
<td>94</td>
<td>124</td>
<td>36</td>
<td>42</td>
<td>15°</td>
</tr>
<tr>
<td>30</td>
<td>M 30 x 2</td>
<td>M 30 x 2L</td>
<td>-</td>
<td>37</td>
<td>25</td>
<td>34,8</td>
<td>70</td>
<td>40</td>
<td>51</td>
<td>110</td>
<td>145</td>
<td>41</td>
<td>51</td>
<td>17°</td>
</tr>
</tbody>
</table>

* only available in type W

---

**How to order**

1. GN 648.1-16-M16x1,5-N
2. \( d_1 \)
3. \( d_2 \)
4. Type

---

**Page 948**  
3.6 Universal joints, Fork joints, Angled ball joints
### Specification

- **Housing Steel**
  - zinc-plated, blue passivated
  - $d_1 = 5$ up to 12: machined
  - $d_1 = 14$ up to 25: forged
  
- **Pairings**
  - Type N (lubrication possible)
    - Bearing socket: Brass, CuZn40Al1
    - Internal ring: Steel, 100Cr6 hardened, ground, polished
  - Type W (self lubricated)
    - Bearing socket: Steel, zinc plated with PTFE-insert
    - Internal ring: Steel, 100Cr6 hardened, ground, polished

- **ISO-Fundamental Tolerances** → Page 1132
- **RoHS compliant**

### Information

Ball joint heads GN 648.2 are similar to DIN ISO 12240-4, series K (formerly DIN 648 K).

- **see also ...**
  - More information to ball joints as well as load capacity → Page 947
  - Stainless Steel-Ball joint heads with threaded bolt GN 648.6 → Page 951

### On request

- narrow model (ISO 12240-1, series E)

### How to order

**GN 648.2-10-M10L-W**

<table>
<thead>
<tr>
<th>$d_1$</th>
<th>$d_2$</th>
<th>$b_1 -0.12$</th>
<th>$b_2$</th>
<th>$d_3$</th>
<th>$d_4$</th>
<th>$l_1$</th>
<th>$l_2$</th>
<th>$l_3$</th>
<th>$w$</th>
</tr>
</thead>
<tbody>
<tr>
<td>5**</td>
<td>M 5</td>
<td>M 5L</td>
<td>8</td>
<td>6</td>
<td>7.7</td>
<td>18</td>
<td>33</td>
<td>42</td>
<td>20</td>
</tr>
<tr>
<td>6</td>
<td>M 6</td>
<td>M 6L</td>
<td>9</td>
<td>6,75</td>
<td>8.9</td>
<td>20</td>
<td>36</td>
<td>46</td>
<td>22</td>
</tr>
<tr>
<td>8</td>
<td>M 8</td>
<td>M 8L</td>
<td>12</td>
<td>9</td>
<td>10.4</td>
<td>24</td>
<td>42</td>
<td>54</td>
<td>25</td>
</tr>
<tr>
<td>10</td>
<td>M 10</td>
<td>M 10L</td>
<td>14</td>
<td>10,5</td>
<td>12.9</td>
<td>28</td>
<td>48</td>
<td>62</td>
<td>29</td>
</tr>
<tr>
<td>12</td>
<td>M 12</td>
<td>M 12L</td>
<td>16</td>
<td>12</td>
<td>15.4</td>
<td>32</td>
<td>54</td>
<td>70</td>
<td>33</td>
</tr>
<tr>
<td>14</td>
<td>M 14</td>
<td>M 14L</td>
<td>19</td>
<td>13.5</td>
<td>16.8</td>
<td>36</td>
<td>60</td>
<td>78</td>
<td>38</td>
</tr>
<tr>
<td>16</td>
<td>M 16</td>
<td>M 16L</td>
<td>21</td>
<td>15</td>
<td>19.3</td>
<td>42</td>
<td>66</td>
<td>87</td>
<td>40</td>
</tr>
<tr>
<td>18</td>
<td>M 18 x 1,5</td>
<td>M 18 x 1,5L</td>
<td>23</td>
<td>16,5</td>
<td>21.8</td>
<td>46</td>
<td>72</td>
<td>95</td>
<td>44</td>
</tr>
<tr>
<td>20</td>
<td>M 20 x 1,5</td>
<td>M 20 x 1,5L</td>
<td>25</td>
<td>18</td>
<td>24.3</td>
<td>50</td>
<td>78</td>
<td>103</td>
<td>47</td>
</tr>
<tr>
<td>22</td>
<td>M 22 x 1,5</td>
<td>M 22 x 1,5L</td>
<td>28</td>
<td>20</td>
<td>25.8</td>
<td>54</td>
<td>84</td>
<td>111</td>
<td>51</td>
</tr>
<tr>
<td>25</td>
<td>M 24 x 2</td>
<td>M 24 x 2L</td>
<td>31</td>
<td>22</td>
<td>29.6</td>
<td>60</td>
<td>94</td>
<td>124</td>
<td>58</td>
</tr>
<tr>
<td>30*</td>
<td>M 30 x 2</td>
<td>M 30 x 2L</td>
<td>37</td>
<td>25</td>
<td>34.8</td>
<td>70</td>
<td>110</td>
<td>145</td>
<td>71</td>
</tr>
</tbody>
</table>

* only available in type W  ** $d_1 = 5$ type N no lubrication possible
Stainless Steel-Ball joint heads with female thread

**Specification**

- Housing Stainless Steel AISI 431 forged, polished
- Pairings
  - Type NH (lubrication possible)
    - Bearing socket Bronze CuSn8
    - Internal ring Steel 100Cr6 hardened, ground, polished, **hard chrome plated**
  - Type WH (self lubricated)
    - Bearing socket Bronze CuSn8 with PTFE-insert
    - Internal ring Steel 100Cr6 hardened, ground, polished, **hard chrome plated**
  - Type WK (self lubricated)
    - Bearing socket, Stainless Steel AISI 316Ti with PTFE-insert
    - Internal ring Stainless Steel AISI 420 hardened, ground, polished
- RoHS compliant

**Information**

Stainless Steel-Ball joint heads GN 648.5 are similar to DIN ISO 12240-4, series K (formerly DIN 648 K).

- **How to order**
  - GN 648.5-10-M10L-WH

**On request**

- narrow model (ISO 12240-1, series E)
GN 648.6 | Stainless Steel-Ball joint heads with threaded bolt

**Type NH**

- **Housing** Stainless Steel AISI 431 forged, polished
- **Pairings**
  - Type NH (lubrication possible)
    - Bearing socket Bronze CuSn8
    - Internal ring Steel 100Cr6 hardened, ground, polished, **hard chrome plated**
  - Type WH (self lubricated)
    - Bearing socket Bronze CuSn8 with PTFE-insert
    - Internal ring Steel 100Cr6 hardened, ground, polished, **hard chrome plated**
  - Type WK (self lubricated)
    - Bearing socket, Stainless Steel AISI 316Ti with PTFE-insert
    - Internal ring, Stainless Steel AISI 420 hardened, ground, polished
  - Type (Pairings)
    - NH Bronze / Steel lubrication possible
    - WH Bronze-PTFE / Steel self lubricated
    - WK Stainless Steel-PTFE / self lubricated

**Specification**

- Housing Stainless Steel AISI 431 forged, polished
- Pairings
  - Type NH (lubrication possible)
    - Bearing socket Bronze CuSn8
    - Internal ring Steel 100Cr6 hardened, ground, polished, **hard chrome plated**
  - Type WH (self lubricated)
    - Bearing socket Bronze CuSn8 with PTFE-insert
    - Internal ring Steel 100Cr6 hardened, ground, polished, **hard chrome plated**
  - Type WK (self lubricated)
    - Bearing socket, Stainless Steel AISI 316Ti with PTFE-insert
    - Internal ring, Stainless Steel AISI 420 hardened, ground, polished
- RoHS compliant

**Information**

Stainless Steel-Ball joint heads GN 648.6 are similar to DIN ISO 12240-4, series K (formerly DIN 648 K).

**On request**

- narrow model (ISO 12240-1, series E)

**How to order**

```
1 d1
2 d2
3 Type
GN 648.6-16-M16-NH
```

* d1 = 5 type N no lubrication possible
GN 751  Fork joints
Fork head DIN 71752, Steel

Fork joints GN 751 consists of a fork head according DIN 71752 and a fork pin with KL-shaft (Type KL) or SL-shaft (Type SL) safety (only for d₁ = 4...16). Both versions can be dismantled without tools and monitor.

Size d₁ = 12 is supplied with a fine thread M12x1.5 according to DIN. In practice, however, M12x1.25 is preferred. Standard DIN 71752 does not foresee size d₁ = 20.

Specification
- Steel
  - Tensile strength class 5 (500 N/mm²)
  - Zinc plated, blue passivated
- Shaft safety
  - Spring sheet metal
  - Hardened and tempered
  - Zinc plated, blue passivated
- ISO-Fundamental Tolerances → Page 1132
- RoHS compliant

Information
Fork joints GN 751 consists of a fork head according DIN 71752 and a fork pin with KL-shaft (Type KL and SL) a fork pin with snap-on spring (Type B). Both versions can be dismantled without tools and monitor.

Size d₁ = 12 is supplied with a fine thread M12x1.5 according to DIN. In practice, however, M12x1.25 is preferred. Standard DIN 71752 does not foresee size d₁ = 20.

see also...
- Fork joints (Aluminium) GN 751 → Page 954

---

<table>
<thead>
<tr>
<th>d₁</th>
<th>l₁</th>
<th>d₂</th>
<th>Left hand thread</th>
<th>Fine thread</th>
<th>a</th>
<th>b</th>
<th>d₃</th>
<th>l₂</th>
<th>l₃</th>
<th>l₄</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>8</td>
<td>16*</td>
<td>M 4</td>
<td>M 4L</td>
<td>8</td>
<td>4</td>
<td>8</td>
<td>16</td>
<td>24</td>
<td>21</td>
</tr>
<tr>
<td>5</td>
<td>10</td>
<td>20</td>
<td>M 5</td>
<td>M 5L</td>
<td>10</td>
<td>5</td>
<td>9</td>
<td>20</td>
<td>30</td>
<td>26</td>
</tr>
<tr>
<td>6</td>
<td>12</td>
<td>24</td>
<td>M 6</td>
<td>M 6L</td>
<td>12</td>
<td>6</td>
<td>10</td>
<td>24</td>
<td>36</td>
<td>31</td>
</tr>
<tr>
<td>8</td>
<td>16</td>
<td>32</td>
<td>M 8</td>
<td>M 8L</td>
<td>16</td>
<td>8</td>
<td>14</td>
<td>32</td>
<td>48</td>
<td>42</td>
</tr>
<tr>
<td>10</td>
<td>20</td>
<td>40</td>
<td>M 10</td>
<td>M 10L</td>
<td>20</td>
<td>10</td>
<td>18</td>
<td>40</td>
<td>60</td>
<td>52</td>
</tr>
<tr>
<td>12</td>
<td>24</td>
<td>48</td>
<td>M 12</td>
<td>M 12L</td>
<td>24</td>
<td>12</td>
<td>20</td>
<td>48</td>
<td>72</td>
<td>62</td>
</tr>
<tr>
<td>14</td>
<td>28</td>
<td>56</td>
<td>M 14</td>
<td>M 14L</td>
<td>27</td>
<td>14</td>
<td>24</td>
<td>56</td>
<td>85</td>
<td>72</td>
</tr>
<tr>
<td>16</td>
<td>32</td>
<td>64</td>
<td>M 16</td>
<td>M 16L</td>
<td>32</td>
<td>16</td>
<td>26</td>
<td>64</td>
<td>96</td>
<td>83</td>
</tr>
<tr>
<td>20*</td>
<td>40</td>
<td>-</td>
<td>M 20</td>
<td>M 20L</td>
<td>40</td>
<td>20</td>
<td>34</td>
<td>80</td>
<td>105</td>
<td>-</td>
</tr>
</tbody>
</table>

Type B is not available from stock

---

Fork joint
GN 751-10-20-M10-B

Fork head without pin
DIN 71752-10-40-M10L
Types of fork joint shafts

The snap-on spring is easily mounted and dismantled. It is therefore particularly suitable for applications where the articulated connection needs to be loosened often.

The KL-shaft safety ring can be fitted and dismantled without tools, i.e. by hand.

The SL-shaft safety ring requires a tool for dismantling (e.g. a screw driver). It is therefore better secured.
Fork joints GN 751 in Aluminium consist of a fork head according DIN 71752 and a pin with KL-shaft safety or SL-shaft safety.

Owing to the anodized coating of the fork head and of the bolt, the bearing is virtually non-wearing.

**See also...**
- Fork joints (Steel) GN 751 → Page 952
- Stainless Steel-Fork joints GN 751 → Page 955

### Information

**Aluminium**
- anodized, black

**KL- / SL-shaft safety**
- Spring steel
- hardened and tempered
- zinc plated, blue passivated

**ISO-Fundamental Tolerances** → Page 1132

**RoHS compliant**

<table>
<thead>
<tr>
<th>d₁ (h₁₁)</th>
<th>l₁</th>
<th>d₂</th>
<th>a</th>
<th>b</th>
<th>d₃</th>
<th>l₂</th>
<th>l₃</th>
<th>l₄</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>8</td>
<td>16*</td>
<td>M 4</td>
<td>8</td>
<td>4</td>
<td>8</td>
<td>16</td>
<td>24</td>
</tr>
<tr>
<td>5</td>
<td>10</td>
<td>20*</td>
<td>M 5</td>
<td>10</td>
<td>5</td>
<td>9</td>
<td>20</td>
<td>30</td>
</tr>
<tr>
<td>6</td>
<td>12</td>
<td>24*</td>
<td>M 6</td>
<td>12</td>
<td>6</td>
<td>10</td>
<td>24</td>
<td>36</td>
</tr>
<tr>
<td>8</td>
<td>16</td>
<td>32*</td>
<td>M 8</td>
<td>16</td>
<td>8</td>
<td>14</td>
<td>32</td>
<td>48</td>
</tr>
<tr>
<td>10</td>
<td>20</td>
<td>40*</td>
<td>M 10</td>
<td>20</td>
<td>10</td>
<td>18</td>
<td>40</td>
<td>60</td>
</tr>
<tr>
<td>12</td>
<td>24</td>
<td>48*</td>
<td>M 12</td>
<td>24</td>
<td>12</td>
<td>20</td>
<td>48</td>
<td>72</td>
</tr>
<tr>
<td>14</td>
<td>28</td>
<td>56*</td>
<td>M 14</td>
<td>27</td>
<td>14</td>
<td>24</td>
<td>56</td>
<td>85</td>
</tr>
<tr>
<td>16</td>
<td>32</td>
<td>64*</td>
<td>M 16</td>
<td>32</td>
<td>16</td>
<td>26</td>
<td>64</td>
<td>96</td>
</tr>
</tbody>
</table>

* not available from stock, requires a minimum order quantity
Stainless Steel-Fork joints GN 751 consists of a fork head according to DIN 71752 and a pin with two safety circlips DIN 471.

Standard DIN 71752 does not foresee size $d_1 = 20$.

**Specification**
- Stainless Steel AISI 303 NI
  - matt, shot-blasted
- Safety circlip DIN 471 Stainless Steel
  - German Material No. 1.4122
- ISO-Fundamental Tolerances → Page 1132
- Stainless Steel characteristics → Page 1144
- RoHS compliant

**Information**
Stainless Steel-Fork joints GN 751 consists of a fork head according to DIN 71752 and a pin with two safety circlips DIN 471.

Standard DIN 71752 does not foresee size $d_1 = 20$.

**Stainless Steel-Fork joint**

<table>
<thead>
<tr>
<th>$d_1$</th>
<th>$l_1$</th>
<th>$d_2$</th>
<th>$a$</th>
<th>$b$</th>
<th>$d_3$</th>
<th>$l_2$</th>
<th>$l_3$</th>
<th>$l_4$</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>8</td>
<td>16</td>
<td>M 4</td>
<td>8</td>
<td>10</td>
<td>20</td>
<td>30</td>
<td>6</td>
</tr>
<tr>
<td>5</td>
<td>10</td>
<td>20</td>
<td>M 5</td>
<td>5</td>
<td>15</td>
<td>25</td>
<td>40</td>
<td>7.5</td>
</tr>
<tr>
<td>6</td>
<td>12</td>
<td>24</td>
<td>M 6</td>
<td>12</td>
<td>25</td>
<td>35</td>
<td>50</td>
<td>9</td>
</tr>
<tr>
<td>8</td>
<td>16</td>
<td>32</td>
<td>M 8</td>
<td>16</td>
<td>26</td>
<td>40</td>
<td>56</td>
<td>12</td>
</tr>
<tr>
<td>10</td>
<td>20</td>
<td>40</td>
<td>M 10</td>
<td>20</td>
<td>30</td>
<td>50</td>
<td>65</td>
<td>15</td>
</tr>
<tr>
<td>12</td>
<td>24</td>
<td>48</td>
<td>M 12</td>
<td>24</td>
<td>36</td>
<td>60</td>
<td>80</td>
<td>18</td>
</tr>
<tr>
<td>14</td>
<td>28</td>
<td>56</td>
<td>M 14</td>
<td>28</td>
<td>42</td>
<td>75</td>
<td>105</td>
<td>22.5</td>
</tr>
<tr>
<td>16</td>
<td>32</td>
<td>64</td>
<td>M 16</td>
<td>32</td>
<td>48</td>
<td>90</td>
<td>125</td>
<td>26</td>
</tr>
<tr>
<td>20</td>
<td>40</td>
<td>-</td>
<td>M 20</td>
<td>40</td>
<td>54</td>
<td>105</td>
<td>-</td>
<td>30</td>
</tr>
</tbody>
</table>

**Stainless Steel-Fork head without pin**

<table>
<thead>
<tr>
<th>$d_1$</th>
<th>$l_1$</th>
<th>$d_2$</th>
<th>$d_3$</th>
<th>$l_2$</th>
<th>$l_3$</th>
<th>$l_4$</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>d_1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>l_1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>d_2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Type</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Material</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Specification
- Steel
  - Tensile strength class 5 (500 N/mm²)
  - zinc plated, blue passivated
- Stainless Steel AISI 303
- ISO-Fundamental Tolerances → Page 1132
- Stainless Steel characteristics → Page 1144
- RoHS compliant

### Information
Joints pieces GN 752 are designed to be used in combination with fork heads DIN 71752 respectively fork joints GN 751.

see also...
- Swing nuts GN 444.2 → Page 518
- Fork head DIN 71752 (Steel) → Page 952
- Fork joints GN 751 (Steel) → Page 952

### Table
<table>
<thead>
<tr>
<th>d₁ H9</th>
<th>d₂</th>
<th>d₃</th>
<th>d₄</th>
<th>Length l</th>
<th>r</th>
<th>s ~0.2</th>
<th>t min.</th>
<th>w min.</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>M 6</td>
<td>10</td>
<td>14</td>
<td>22</td>
<td>8,5</td>
<td>6</td>
<td>12</td>
<td>218°</td>
</tr>
<tr>
<td>8</td>
<td>M 8</td>
<td>14</td>
<td>18</td>
<td>29</td>
<td>12</td>
<td>8</td>
<td>16</td>
<td>218°</td>
</tr>
<tr>
<td>10</td>
<td>M 10</td>
<td>18</td>
<td>23</td>
<td>35</td>
<td>14</td>
<td>10</td>
<td>20</td>
<td>212°</td>
</tr>
<tr>
<td>12</td>
<td>M 12</td>
<td>20</td>
<td>27</td>
<td>43</td>
<td>17</td>
<td>12</td>
<td>24</td>
<td>216°</td>
</tr>
<tr>
<td>14</td>
<td>M 14</td>
<td>24</td>
<td>30</td>
<td>50</td>
<td>19</td>
<td>14</td>
<td>28</td>
<td>214°</td>
</tr>
<tr>
<td>16</td>
<td>M 16</td>
<td>26</td>
<td>36</td>
<td>56</td>
<td>22</td>
<td>16</td>
<td>32</td>
<td>216°</td>
</tr>
</tbody>
</table>

### Steel-Joint piece
- GN 752-10-M10
  - 1 d₁
  - 2 d₂

### Stainless Steel-Joint piece
- GN 752-8-M8-NI
  - 1 d₁
  - 2 d₂
  - 3 Material
3.6 Universal joints, Fork joints, Angled ball joints

GN 782 Ball joints

1. Clamping nut
2. Version KS-1
3. Version KI-1
5. Version KI-2

Information

The clamping nut of the ball joints GN 782 can be set to give a required thrust on the Belleville spring washers in order to increase the resistance to the ball movement.

At the same time the Belleville spring washers act as safety washers for the screws.

Once the max. thrust to the Belleville spring washers is reached the ball arm is firmly immobilised in position over the clamping nut and screw.

Specification

- Steel
  zinc plated, blue passivated
- Brake piece
  Technopolymer (Polyamide PA)
- RoHS compliant

How to order

GN 782-M10-KS-1

<table>
<thead>
<tr>
<th>d₁</th>
<th>d₂</th>
<th>d₃</th>
<th>d₄</th>
<th>l₁</th>
<th>l₂</th>
<th>l₃</th>
<th>l₄</th>
<th>l₅ ≈</th>
<th>l₆ ≈</th>
<th>l₇ ≈</th>
<th>A/F₁</th>
<th>A/F₂</th>
<th>recommended tightening torque in Nm</th>
</tr>
</thead>
<tbody>
<tr>
<td>M 8</td>
<td>M 8</td>
<td>19</td>
<td>11</td>
<td>12</td>
<td>10</td>
<td>12,5</td>
<td>23</td>
<td>29,5</td>
<td>19,5</td>
<td>18</td>
<td>17</td>
<td>9</td>
<td>17</td>
</tr>
<tr>
<td>M 10</td>
<td>M 10</td>
<td>21</td>
<td>13</td>
<td>15</td>
<td>12</td>
<td>14</td>
<td>26</td>
<td>33,5</td>
<td>23,5</td>
<td>20</td>
<td>19</td>
<td>11</td>
<td>34</td>
</tr>
</tbody>
</table>
Angled ball joints DIN 71802 consist of a ball socket DIN 71805 and a ball shank DIN 71803.

The angle of rotation for the type with safety catch (Type CS, BS) is 15°, without safety catch (Type C, B) is 18°.

For assembly the ball is pushed through the circlip which acts as a retainer. Should the retaining force (see pull-off force in the table above) between ball and socket not be sufficient, this can be increased by adding a safety catch, which can easily be fitted.

To protect the angled ball point, a dust cap GN 710 can be added.

The hexagon nut is part of the angled ball joints.

Dust caps GN 710 → Page 960 have to be ordered separately.

### Specification
- **Steel**
  - Tensile strength class 5 (500 N/mm²)
  - zinc plated, colourless passivated
- **Ball**
  - hardened
  - ball seat lubricated
- **ISO-Fundamental tolerances → Page 1132**
- **RoHS compliant**

### On request
- smooth specification (Ball seat with play)
- Ball studs DIN 71803
- Ball sockets DIN 71805
- Axial joints (ball socket and ball shank in one axis)
Stainless Steel-Angled ball joints DIN 71802 consist of a ball socket DIN 71805 and a ball shank DIN 71803. The angle of rotation for the type with safety catch (Type CSN) is 15°, without safety catch (Type CN) is 18°.

For assembly the ball is pushed through the circlip which acts as a retainer. Should the retaining force (see pull-off force in the table above) between ball and socket not be sufficient, this can be increased by adding a safety catch, which can easily be fitted.

To protect the angled ball point, a dust cap GN 710 can be added. The hexagon nut is part of the angled ball joints. Dust caps GN 710 have to be ordered separately.

### Specification
- Stainless Steel AISI 303
- Ball
  - Stainless Steel
  - not hardened
  - ball seat greased
- ISO-Fundamental Tolerances ➔ Page 1132
- RoHS compliant

### Information
Stainless Steel-Angled ball joints DIN 71802 consist of a ball socket DIN 71805 and a ball shank DIN 71803. The angle of rotation for the type with safety catch (Type CSN) is 15°, without safety catch (Type CN) is 18°.

For assembly the ball is pushed through the circlip which acts as a retainer. Should the retaining force (see pull-off force in the table above) between ball and socket not be sufficient, this can be increased by adding a safety catch, which can easily be fitted.

To protect the angled ball point, a dust cap GN 710 can be added. The hexagon nut is part of the angled ball joints. Dust caps GN 710 ➔ Page 960 have to be ordered separately.

### How to order

DIN 71802-10-M6L-CN

<table>
<thead>
<tr>
<th>d1 (H9/h9)</th>
<th>d2</th>
<th>Left hand thread</th>
<th>d3</th>
<th>d4</th>
<th>l1</th>
<th>l2</th>
<th>l3</th>
<th>t min.</th>
<th>A/F</th>
<th>min. pull-off force in N</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>M 5</td>
<td>M 5L</td>
<td>M 5</td>
<td>8</td>
<td>10</td>
<td>9</td>
<td>22</td>
<td>10,5</td>
<td>7</td>
<td>30</td>
</tr>
<tr>
<td>10</td>
<td>M 6</td>
<td>M 6L</td>
<td>M 6</td>
<td>10</td>
<td>12,5</td>
<td>11</td>
<td>25</td>
<td>11,5</td>
<td>8</td>
<td>40</td>
</tr>
<tr>
<td>13</td>
<td>M 8</td>
<td>M 8L</td>
<td>M 8</td>
<td>13</td>
<td>16,5</td>
<td>13</td>
<td>30</td>
<td>14</td>
<td>11</td>
<td>60</td>
</tr>
<tr>
<td>16</td>
<td>M 10</td>
<td>M 10L</td>
<td>M 10</td>
<td>16</td>
<td>20</td>
<td>16</td>
<td>35</td>
<td>15,5</td>
<td>13</td>
<td>80</td>
</tr>
<tr>
<td>16</td>
<td>M 12</td>
<td>M 12L</td>
<td>M 12</td>
<td>16</td>
<td>20</td>
<td>16</td>
<td>35</td>
<td>15,5</td>
<td>13</td>
<td>80</td>
</tr>
<tr>
<td>19</td>
<td>M 14F M 14L</td>
<td>M 14FL M 14L</td>
<td>M 14F M 14L</td>
<td>22</td>
<td>28</td>
<td>20</td>
<td>45</td>
<td>21,5</td>
<td>16</td>
<td>100</td>
</tr>
</tbody>
</table>
3.6 Universal joints, Fork joints, Angled ball joints

**GN 710 Dust caps**
for angled ball joints DIN 71802

![Image of Dust caps GN 710](image)

<table>
<thead>
<tr>
<th>d₁</th>
<th>d₂</th>
<th>l₁</th>
<th>l₂</th>
<th>for angled ball joints DIN 71802</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>5,5</td>
<td>4,5</td>
<td>1,5</td>
<td>8</td>
</tr>
<tr>
<td>13,5</td>
<td>7</td>
<td>6,5</td>
<td>3,5</td>
<td>10</td>
</tr>
<tr>
<td>17,5</td>
<td>8,5</td>
<td>7,5</td>
<td>3,5</td>
<td>13</td>
</tr>
<tr>
<td>22</td>
<td>10,5</td>
<td>8,5</td>
<td>4,5</td>
<td>16</td>
</tr>
<tr>
<td>25,5</td>
<td>12,5</td>
<td>12,5</td>
<td>7</td>
<td>19</td>
</tr>
</tbody>
</table>

**Specification**
- Rubber (CR)
  - temperature resistant up to 110 °C
  - black
- **Elastomer characteristics → Page 1140**
- RoHS compliant

**Information**
Dust caps GN 710 prevent the entering of dirt into angled ball joints DIN 71802.

**see also...**
- Angled ball joints DIN 71802 → Page 958
- Stainless Steel-Angled ball joints DIN 71802 → Page 959

**On request**
- Angled ball joints with mounted dust cap

**How to order**

GN710-17,5 1 d₁
Quick-fit couplings GN 240 have been designed for the purpose of compensating a radial shaft off-set \( x \). A typical application is the axial link to a piston rod of a cylinder operating in any type of fixture or system. The coupling is **not** designed for the transfer of torque.

Quick-fit couplings GN 240 have been designed for the purpose of compensating a radial shaft off-set \( x \). A typical application is the axial link to a piston rod of a cylinder operating in any type of fixture or system. The coupling is **not** designed for the transfer of torque.

### Specification

- Steel
  - tempered
  - phosphated
- RoHS compliant

### Information

Quick-fit couplings GN 240 have been designed for the purpose of compensating a radial shaft off-set \( x \). A typical application is the axial link to a piston rod of a cylinder operating in any type of fixture or system. The coupling is **not** designed for the transfer of torque.

**see also...**

- Quick-fit couplings GN 240.1
  (with radial off-set compensation) ➔ Page 962
- Quick-fit couplings GN 240.2
  (with angle- and radial off set compensation) ➔ Page 963

### How to order

<table>
<thead>
<tr>
<th>1</th>
<th>d</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Type</td>
</tr>
</tbody>
</table>

**Type**

A with male thread
B with female thread

<table>
<thead>
<tr>
<th>( d )</th>
<th>( e_1 )</th>
<th>( e_2 \approx )</th>
<th>( l_1 \approx )</th>
<th>( l_2 )</th>
<th>( l_3 \text{ min.} )</th>
<th>( l_4 )</th>
<th>( l_5 +1 )</th>
<th>( A/F_1 )</th>
<th>( A/F_2 )</th>
<th>( x ) max. shaft off-set</th>
<th>max. pull- /push load in kN</th>
</tr>
</thead>
<tbody>
<tr>
<td>M 6</td>
<td>-</td>
<td>21</td>
<td>11</td>
<td>37,5</td>
<td>18</td>
<td>11</td>
<td>14</td>
<td>9</td>
<td>19</td>
<td>10</td>
<td>0,6</td>
</tr>
<tr>
<td>M 8</td>
<td>-</td>
<td>26</td>
<td>14,5</td>
<td>45</td>
<td>22,5</td>
<td>13,5</td>
<td>17</td>
<td>11,5</td>
<td>24</td>
<td>13</td>
<td>0,7</td>
</tr>
<tr>
<td>M 10</td>
<td>M 10 x 1,25</td>
<td>30</td>
<td>19</td>
<td>56</td>
<td>29</td>
<td>16</td>
<td>20</td>
<td>16</td>
<td>27</td>
<td>17</td>
<td>0,7</td>
</tr>
<tr>
<td>M 12</td>
<td>M 12 x 1,25</td>
<td>32,5</td>
<td>21</td>
<td>66,5</td>
<td>34</td>
<td>21</td>
<td>25</td>
<td>17</td>
<td>30</td>
<td>19</td>
<td>0,8</td>
</tr>
<tr>
<td>M 16</td>
<td>M 16 x 1,5</td>
<td>39</td>
<td>27</td>
<td>83</td>
<td>42</td>
<td>25</td>
<td>30</td>
<td>23</td>
<td>36</td>
<td>24</td>
<td>1</td>
</tr>
<tr>
<td>M 20</td>
<td>M 20 x 1,5</td>
<td>44</td>
<td>34</td>
<td>93,5</td>
<td>45,5</td>
<td>29</td>
<td>35</td>
<td>23,5</td>
<td>41</td>
<td>30</td>
<td>1</td>
</tr>
</tbody>
</table>
Quick-fit couplings
with radial off-set compensation

Information
Quick-fit couplings GN 240.1 have been designed for the purpose of compensating in radial shaft-off-set x. A typical application is the axial link to a piston rod of a cylinder operating any type of fixture or system.

The coupling is not designed for the transfer of torque.

see also...

- Quick-fit couplings GN 240 (with radial off-set compensation) → Page 961

Specification
- Steel
  - tempered
  - phosphated
- RoHS compliant

How to order
GN 240.1-M12x1,25-B

<table>
<thead>
<tr>
<th>d₁</th>
<th>d₂</th>
<th>d₃</th>
<th>e ≈</th>
<th>k₁</th>
<th>k₂</th>
<th>k₃</th>
<th>l₁ ≈</th>
<th>l₂</th>
<th>l₃ min.</th>
<th>A/F</th>
<th>x max.</th>
<th>pull-/push load in kN</th>
</tr>
</thead>
<tbody>
<tr>
<td>M 6</td>
<td>-</td>
<td>42</td>
<td>5,5</td>
<td>11</td>
<td>7</td>
<td>14</td>
<td>28</td>
<td>30,5</td>
<td>11</td>
<td>11</td>
<td>14</td>
<td>10</td>
</tr>
<tr>
<td>M 8</td>
<td>-</td>
<td>48</td>
<td>6,5</td>
<td>14,5</td>
<td>8</td>
<td>16</td>
<td>32</td>
<td>35,5</td>
<td>13</td>
<td>13,5</td>
<td>13,5</td>
<td>17</td>
</tr>
<tr>
<td>M 10 M 10 x 1,25</td>
<td>50</td>
<td>6,5</td>
<td>19</td>
<td>9</td>
<td>17</td>
<td>34</td>
<td>43</td>
<td>16</td>
<td>15</td>
<td>20</td>
<td>13</td>
<td>17</td>
</tr>
<tr>
<td>M 12 M 12 x 1,25</td>
<td>55</td>
<td>6,5</td>
<td>21</td>
<td>10</td>
<td>19</td>
<td>38</td>
<td>53</td>
<td>20,5</td>
<td>21</td>
<td>17,5</td>
<td>25</td>
<td>19</td>
</tr>
<tr>
<td>M 16 M 16 x 1,5</td>
<td>65</td>
<td>9</td>
<td>27</td>
<td>12,5</td>
<td>22,5</td>
<td>45</td>
<td>64</td>
<td>23</td>
<td>25</td>
<td>22</td>
<td>30</td>
<td>24</td>
</tr>
<tr>
<td>M 20 M 20 x 1,5</td>
<td>80</td>
<td>11</td>
<td>34</td>
<td>17</td>
<td>28</td>
<td>56</td>
<td>74</td>
<td>26</td>
<td>29</td>
<td>25</td>
<td>35</td>
<td>30</td>
</tr>
</tbody>
</table>

Steel - tempered - phosphated

Type
A with male thread
B with female thread
### GN 240.2

**Quick-fit couplings**  
with angle- and radial off-set compensation

---

**Quick-fit couplings GN 240.2** have been designed to compensate a radial and angular off-set. Furthermore they are axially **freely** adjustable via the set screw.

A typical application is the axial link to a piston rod of a cylinder operating in any type of fixture or system.

The coupling is renowned by its very compact construction without any loose components.

It is **not** designed for the transfer of torque.

**see also...**

- **Quick-fit couplings GN 240**  
  *(with radial off-set compensation) → Page 961*

---

### Specification

- **Steel**  
  - tempered  
  - phosphated
- **Retaining ring (spring)**  
  Stainless Steel AISI 631
- **RoHS compliant**

### Information

Quick-fit couplings GN 240.2 have been designed to compensate a radial and angular off-set. Furthermore they are axially **freely** adjustable via the set screw.

A typical application is the axial link to a piston rod of a cylinder operating in any type of fixture or system.

The coupling is renowned by its very compact construction without any loose components.

It is **not** designed for the transfer of torque.

---

### How to order

**GN 240.2-M20×1,5**  
$d_1$