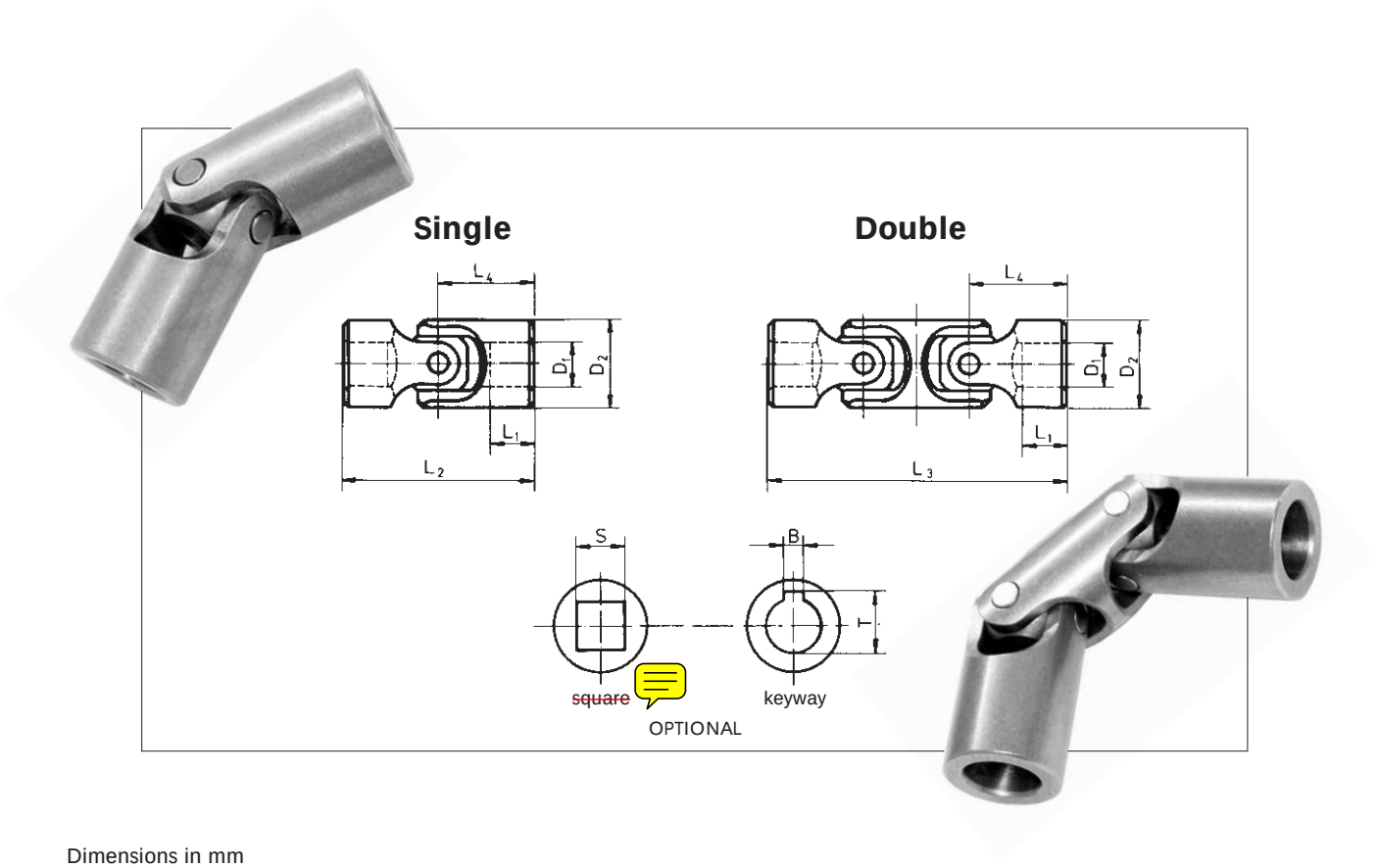
# Low Cost Universal Joints
# With Friction Bearings - DIN 808 - Series "G"

- Standard inch sized bores
- Low cost economy range
- Unhardened, unpolished
- Greater backlash
- Suitable for medium-low speed with limited torsional requirements
- Maximum speed 1000 RPM
- Round bore standard
- Optional square hole & keyways
- Maximum working angle:
  Single - 45º
  Double - 90º
- Most sizes generally in stock



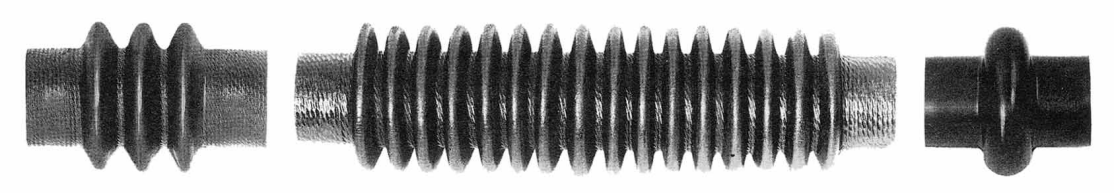

Dimensions in mm

| Part No. | | Bore Inch | O/D | Length | | | | Keyway | | ~~Square~~ | Weight lbs. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Single | *Double* | $D_1$ | $D_2$ | $L_1$ | $L_2$ | $L_3$ | $L_4$ | B | T | ~~S~~ | Single | *Double* |
| 101L | *121L* | 1/4" | 13 | 13 | 42 | *60* | 21 | 2 | 9.0 | ~~-~~ | .05 | *0.08* |
| 102L | *122L* | 3/8" | 16 | 17 | 52 | *74* | 26 | 3 | 11.4 | ~~8~~ | .10 | *0.15* |
| 103L | *123L* | 1/2" | 20 | 20 | 62 | *88* | 31 | 4 | 13.8 | ~~10~~ | .20 | *0.29* |
| 104L | *124L* | 5/8" | 25 | 23 | 74 | *104* | 37 | 5 | 18.3 | ~~14~~ | .35 | *0.52* |
| 105L | *125L* | 3/4" | 32 | 25 | 86 | *124* | 43 | 6 | 22.8 | ~~1~~ | .68 | *1.02* |

The Technical Appendix (pages 8, 9 and 12) describe how to calculate the dimensions of the joint and contain instructions for their application and maintenance. See page 7 for bellows to suit.

All dimensions are subject to change without notice.

# Folding Bellows for Universal Joints and Shaft Joints



These folding bellows are made of high quality chrome tanned, black impregnated leather. They are resistant to oil, water and weather and serve as a protection for the joints against dust, humidity and acidic vapours. By filling the folding bellows with lubrication grease and then securing them with band clamp fittings, you achieve life-long lubrication.
All dimensions in mm.

| for Single Universal Joints (Fig. 1) | | | | | |
|---|---|---|---|---|---|
| Part No. | Size D1 | Size D2 | Length L1 | Length L2 | No. of Folds |
| **20246** | 13 | 30 | 12 | 42 | 2 |
| **20262** | 16 | 32 | 15 | 40 | 2 |
| **20247** | 16 | 32 | 15 | 52 | 2 |
| **20248** | 20 | 35 | 20 | 62 | 2 |
| **20249** | 25 | 40 | 20 | 74 | 3 |
| **20250** | 32 | 55 | 20 | 86 | 3 |
| **20251** | 40 | 65 | 25 | 108 | 3 |
| **20263** | 50 | 75 | 25 | 105 | 3 |
| **20252** | 50 | 75 | 25 | 132 | 4 |
| **20264** | 63 | 95 | 30 | 130 | 4 |
| **20253** | 63 | 95 | 30 | 166 | 5 |
| **20265** | 75 | 105 | 40 | 160 | 5 |
| **20266** | 90 | 120 | 40 | 190 | 6 |
| temperature range: from -320ºF to +194ºF | | | | | |

| for Double Universal Joints (Fig. 1) | | | | | |
|---|---|---|---|---|---|
| Part No. | Size D1 | Size D2 | Length L1 | Length L2 | No. of Folds |
| **20254** | 13 | 30 | 12 | 60 | 3 |
| **20267** | 16 | 32 | 15 | 62 | 3 |
| **20255** | 16 | 32 | 15 | 74 | 3 |
| **20256** | 20 | 35 | 20 | 88 | 3 |
| **20257** | 25 | 40 | 20 | 104 | 5 |
| **20258** | 32 | 55 | 20 | 124 | 5 |
| **20259** | 40 | 65 | 25 | 156 | 6 |
| **20260** | 50 | 75 | 25 | 188 | 6 |
| **20261** | 63 | 95 | 30 | 238 | 9 |
| **20268** | 75 | 105 | 40 | 245 | 11 |
| **20269** | 90 | 120 | 40 | 290 | 11 |
| higher temperatures & other designs upon request | | | | | |

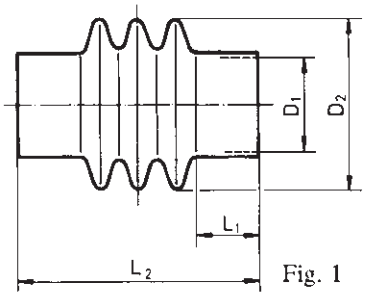


Fig. 1

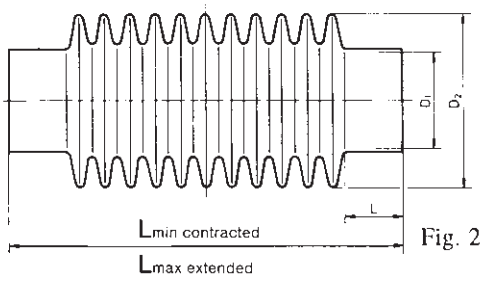


Fig. 2

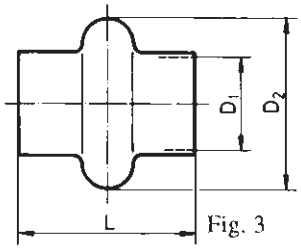


Fig. 3
Simrit
synthetic rubber

| for Single Universal Joints - (Fig. 1) | | | | | |
|---|---|---|---|---|---|
| Part No. | Size D1 | Size D2 | Length L1 | Length L2 | No. of Folds |
| **20491** | 16 | 32 | 12 | 34 | 2 |
| **20270** | 18 | 35 | 12 | 40 | 2 |
| **20271** | 22 | 40 | 12 | 48 | 2 |
| **20272** | 26 | 45 | 12 | 56 | 2 |
| **20273** | 29 | 50 | 12 | 60 | 3 |
| **20274** | 32 | 55 | 15 | 68 | 3 |
| **20275** | 37 | 65 | 15 | 74 | 3 |
| **20276** | 42 | 70 | 20 | 82 | 3 |
| **20277** | 47 | 75 | 20 | 95 | 3 |
| **20278** | 52 | 80 | 20 | 105 | 3 |
| **20279** | 58 | 90 | 25 | 122 | 4 |
| temperature range: from -320ºF to +194ºF | | | | | |

| for Universal Joints - extendable (Fig. 2) | | | | | | |
|---|---|---|---|---|---|---|
| Part No. | Size D1 | Size D2 | Length L1 | Length Lmin | Length Lmax | No. of Folds |
| **20254** | 13 | 30 | 12 | 40 | 80 | 3 |
| **20280** | 16 | 32 | 15 | 52 | 102 | 4 |
| **20281** | 20 | 35 | 20 | 62 | 122 | 6 |
| **20282** | 25 | 40 | 20 | 67 | 137 | 7 |
| **20283** | 32 | 55 | 20 | 70 | 150 | 6 |
| **20259** | 40 | 65 | 25 | 73 | 175 | 6 |
| **20284** | 50 | 75 | 25 | 95 | 245 | 9 |
| **20285** | 63 | 95 | 30 | 117 | 317 | 11 |
| **20286** | 75 | 105 | 40 | 137 | 337 | 11 |
| **20269** | 90 | 120 | 40 | 122 | 360 | 11 |
| higher temperatures & other designs upon request | | | | | | |

| for Universal Joints - Simrit (Fig. 3) | | | |
|---|---|---|---|
| Part No. | Size D1 | Size D2 | Length L |
| **20287** | 16 | 36 | 32 |
| **20288** | 18 | 38 | 38 |
| **20289** | 22 | 44 | 40 |
| **20290** | 26 | 50 | 45 |
| **20291** | 29 | 53 | 50 |
| **20292** | 32 | 58 | 60 |
| **20293** | 37 | 65 | 65 |
| **20294** | 42 | 71 | 75 |
| **20295** | 47 | 76 | 90 |
| **20296** | 52 | 88 | 95 |
| **20297** | 58 | 98 | 95 |
| temperature range: from -22ºF to +212ºF | | | |

All dimensions are subject to change without notice.

# Technical Appendix

## Installation Instructions

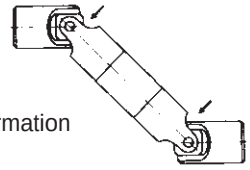
These universal joints and telescopic shafts are now, and will be in the future, indispensable and versatile components for transmitting rotary motion.

If two shafts, which are inclined towards each other at a given angle, are connected to each other via a universal joint, and if one of the shafts rotates with a constant regular speed, then the other shaft rotates with a variable angular velocity. This irregularity of motion - which is also called gimbal error - causes the rotating angle to advance and lag alternately, thus effecting the second shaft to rotate with sinusoidal fluctuations. The greater the deflection angle $\alpha$, the greater the non uniformity of the rotating motion.

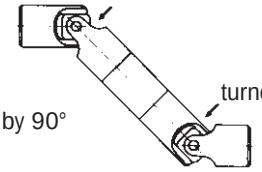
For this reason, single universal joints are only used when variable rotary motion is permissible. The non uniformity of motion can be compensated by using two single universal joints in sequence or by using a double universal joint. When properly installed, the second universal joint can compensate the irregular motion of the first one under the following conditions as enumerated by DIN 808.

1. Correct fork position: when using two single universal joints make sure that the two inside forks are in flat formation, as in the case of double universal joints.

right:
forks in flat formation

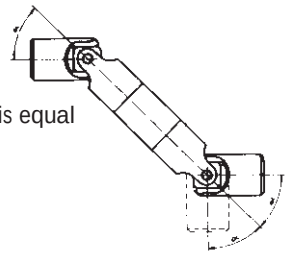


wrong:
fork plane turned by 90°

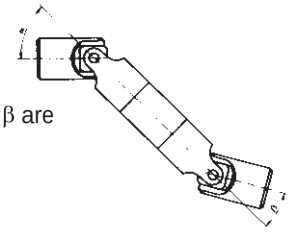



2. The deflection angles at both ends must be equal.

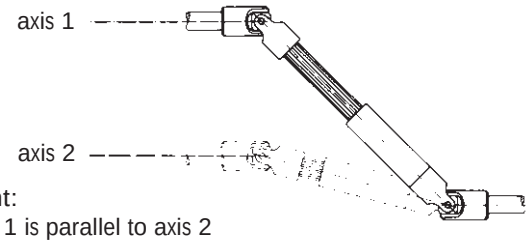
right:
the angle $\alpha$ is equal everywhere



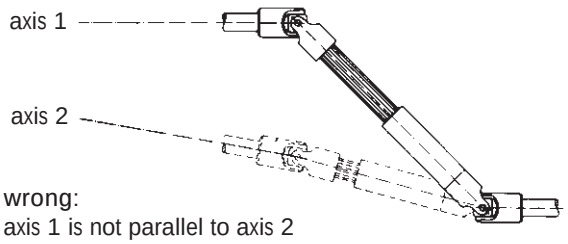
wrong:
the angles $\alpha$ and $\beta$ are not equal



3. The driving and driven shafts may only be shifted in directions parallel to the shafts.



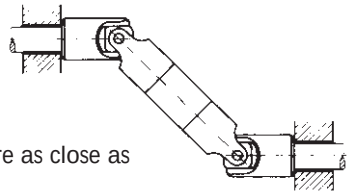

right:
axis 1 is parallel to axis 2



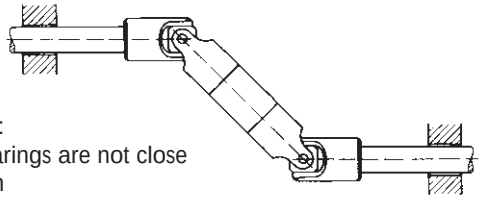

wrong:
axis 1 is not parallel to axis 2

4. The bearings of the shaft joint - or of the double universal joint - should be positioned as close as possible to the universal joints.

right:
the bearings are as close as possible



wrong:
the bearings are not close enough



The shaft joints are delivered without pinholes and clamping studs.
The length of the dowel pins is determined by the outer diameter of the universal joint; it must be flush when set.

We recommend dowel pins DIN 1481.

| Diam of bore | ø | 6 | 8 | 10 | 12 | 16 | 20 | 25 | 32 | 40 | 50 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Diam of dowel Pin | ø | 2 | 3 | 4 | 5 | 6 | 8 | 10 | 12 | 14 | 16 |

# Technical Appendix - for Universal joints on pages 2 and 5

## Calculating the Dimensions of the Universal Joints - Type 808 - Series "G"

The selection of a universal joint is not determined exclusively by the maximum torque to be transmitted. There are other operative conditions which must be taken into account, such as impact load, angular ratios, angular velocities, etc.

The diagrams presented below give approximate preliminary values for calculating the dimensions of the universal joints and contain the corresponding standard values.

Fig. 1 shows the power and torque values transmitted by single precision universal joints during permanent operation with a deflection angle of $\alpha = 10°$.

Fig. 2 shows the adjustment value to be taken into consideration for greater deflection angles. For deflection angles less than 10°, e.g. between 0° to 5° you may increase the standard power value shown in fig. 1 by 25%.

Notes: There are no general standard values for precision universal joints with friction bearings, for which it is possible to specify the service life, the stress and strain to which the friction surfaces are exposed is determined by the regularity of the lubrication intervals.
The loads to which double universal joints are exposed may only be about 90% of the corresponding values for single universal joints. This also applies to telescopic joints.

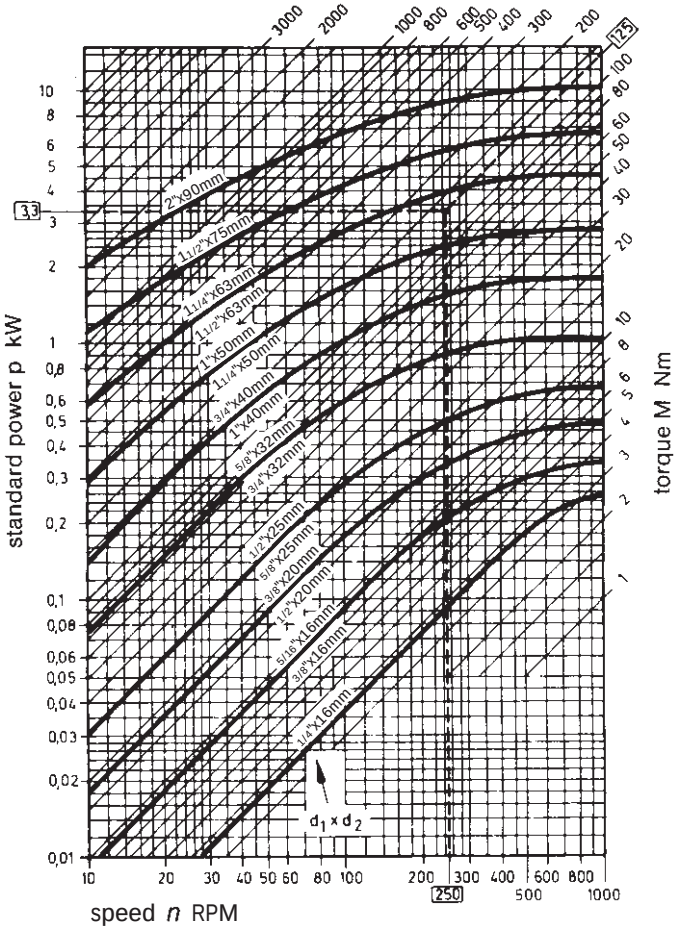



Figure 1: Power diagram for precision universal joints with friction bearings in accordance with DIN 808-G

Figure 1 yields for $n$ = 250 RPM. and 3.3 kW:
shaft joint E 32 x 63 (or E 40 x 63) with the admissible torque value of M = 125 Nm.

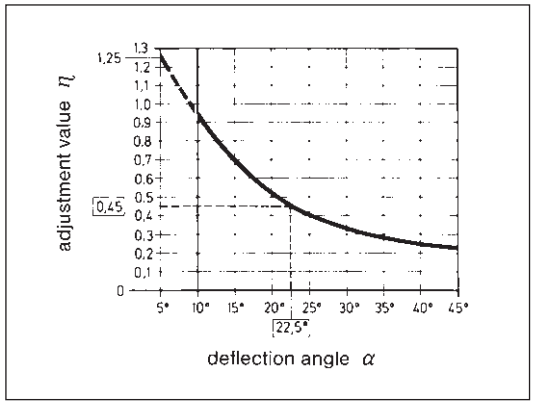



Figure 1: Adjustment value in relation to the deflection angle

Example

Given values:
the power to be transmitted P = 1.5 kW
speed $n$ = 250 RPM
defection angle $\alpha = 22° 30'$

Calculation:
adjustment value from figure 2 $\eta = 0.45$

standard power $P' = \frac{P}{\eta} = \frac{1.5}{0.45} = 3.3$ kW

Conversion Formulas

1Nm = 0.737561 (lbf.ft.)
1kW = 1.341022 (HP)

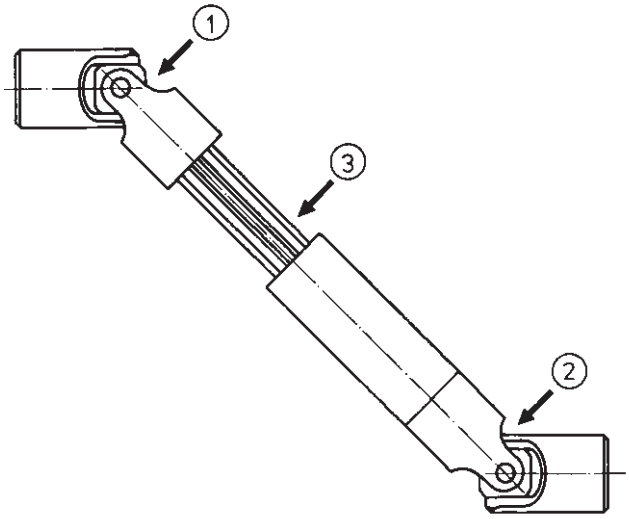
# Technical Appendix

## Maintenance & Lubrication for Universal Joints with Friction Bearings and Telescopic Universal Joints.

Needle roller bearing universal joints are maintenance free due to their permanent lubrication, and are ideal for use in machine components that are difficult to access.

Friction bearing universal joints, single, double and telescopic should be lubricated at regular intervals.

Telescopic universal joints are ready for immediate use. They are lubricated with a lithium saponified extreme pressure lubricant on a mineral oil base.
Temperature range: -22ºF - +250ºF
Peak temperature: Maximum 284ºF
Please use lubricants with the same specification when re-lubricating.




Lubricating Points:

Lubrication is required at least once daily for permanent operation at the lubricating points marked with arrows. For friction bearings, this means all the sliding parts on the cube, the fork piece and bearing pins (1) and (2), as well as, for telescopic joints, the sliding parts of the extendable splined profile (3).

In harsh environments, the sliding parts should be protected against fibrous particles and steam by means of a folding bellow. (See page 7) Permanent self-lubrication for an indefinite time is achieved by filling the folding bellow with the lubricating grease and clamping the ends tight.

Note: Maintenance work should be carried out at regular intervals; preferably while carrying out maintenance work on other machine parts. At such times, we also recommend that noise and backlash tests be conducted, or if the working noise and/or backlash of the joint and profile parts deviate from the standard values.

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