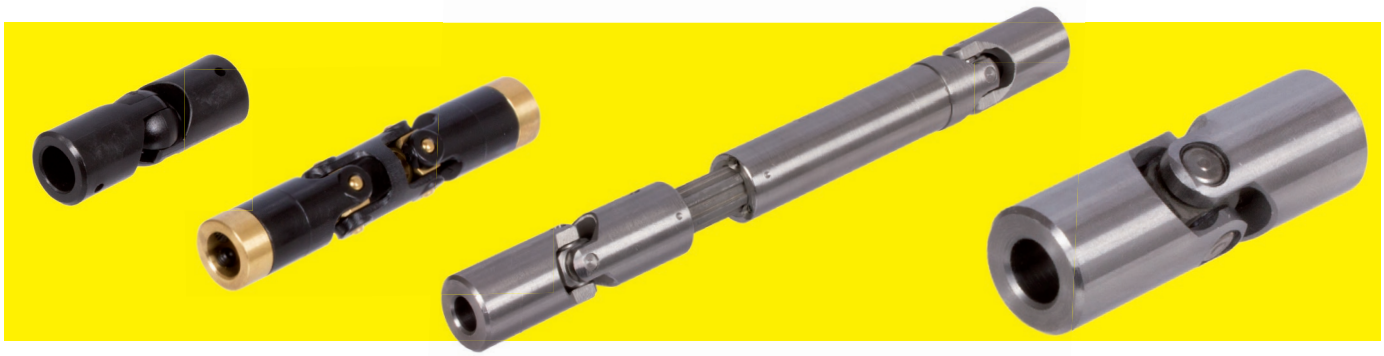
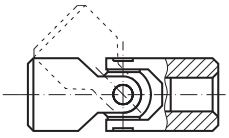
Overview Universal Joints

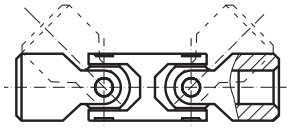


Single Universal Joints



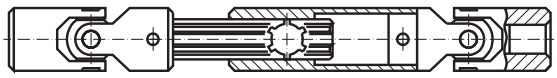
Type	Material	Bearings	Bores mm	Torques* max. Nm	Speeds* max. min^{-1}	Page
UKM	Plastic	Plain bearings	2 - 10	0,11 - 1,6	1000	442
GF	Plastic	Plain bearings	8 - 16	5 - 22	1000	441
KE	Steel	Plain bearings	0 - 40	2 - 550	1000	444
WEL	Steel	Plain bearings	6 - 30	8,5 - 559	800	445
RW	Steel	Plain bearings	6 - 45	6 - 820	500	450
WE	Steel	Plain bearings , hardened	6 - 40	7 - 655	800	446
WEN	Steel	Needle bearings, hardened	8 - 40	6,9 - 438	4000	447
WER	Stainless	Plain bearings	6 - 30	6,6 - 324	800	448
WENR	Stainless	Needle bearings, hardened	10 - 30	21 - 288	3600	449

Double Universal Joints



Type	Material	Bearings	Bores mm	Torques* max. Nm	Speeds* max. min^{-1}	Page
UKD	Plastic	Plain bearings	3 - 10	0,08 - 10	1000	442
WDL	Steel	Plain bearings	6 - 30	8,5 - 559	800	445
WD	Steel	Plain bearings , hardened	6 - 40	6,3 - 655	800	446
WDN	Steel	Needle bearings, hardened	10 - 40	26,4 - 438	4000	447
WDR	Stainless	Plain bearings	12 - 30	18,4 - 324	800	448
WDNR	Stainless	Needle bearings, hardened	10 - 30	21 - 288	3600	449

Telescopic Double Universal Joints



Type	Material	Bearings	Bores mm	Torques* max. Nm	Speeds* max. min^{-1}	Page
UW	Plastic	Plain bearings	2 - 20	0,36 - 10,7	800	443
LW	Steel	Plain bearings	6 - 45	20 - 930	500	450
PW	Steel	Plain bearings , hardened	10 - 30	33 - 562	800	451
PWN	Steel	Needle bearings, hardened	10 - 35	26 - 391	4000	451
PWR	Stainless	Plain bearings	10 - 25	18 - 288	800	452
PWNR	Stainless	Needle bearings, hardened	10 - 30	21 - 288	3600	452

* The max. permissible speeds can differ for each size.
The max. permissible torques depend on the speed and working angle.
See details and notes on the product pages.

Bellows Page 453

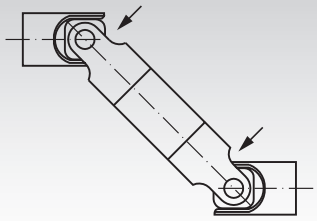
Universal Joints, General Information

Universal joints and universal shafts are today, and will be in future, absolutely essential and versatile components for transferring rotary motion and transmitting torque from the driving to the driven unit.

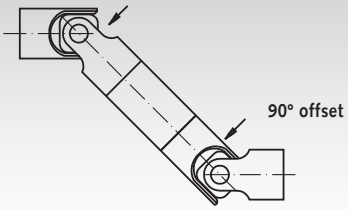
If two shafts set at a certain angle are connected using a single universal joint and one shaft turns with constant velocity, the other shaft will move irregularly. This non-uniformity – also called gimbal error – means that angle of rotation of the second shaft slightly lags behind or leads the movement off the first shaft, with kind of sinus-shaped variations. The greater the operating angle α, the greater the non-uniformity in motion of the second shaft.

Thus single universal joints are only used in applications where non-uniformity of rotation is acceptable. This non-uniformity can be compensated by either using two single universal joints in sequence - thus forming a universal shaft - or by using a double universal joint. When properly installed, the second universal joint can compensate the non-uniform rotation of the first universal joint, that is under the following preconditions, as described in DIN 808:

1. Correct yoke orientation: when two single universal joints are used, please make sure that the yokes of the inbound joints, or brackets for the bracket-version, are properly aligned – as for double universal joints.

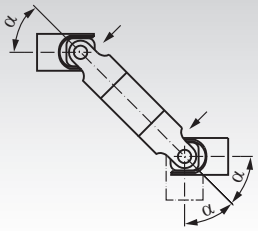


CORRECT: yoke orientation properly aligned

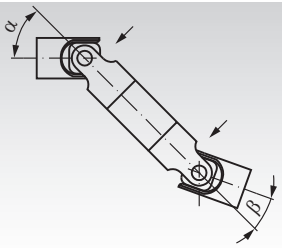


INCORRECT: yoke orientation offset by 90°

2. The operating angle must be the same at both ends.

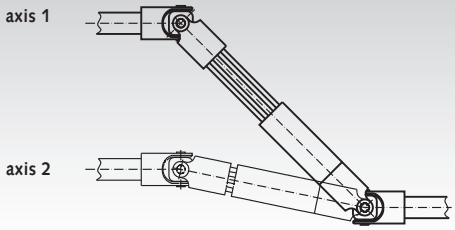


CORRECT : angle α is the same everywhere

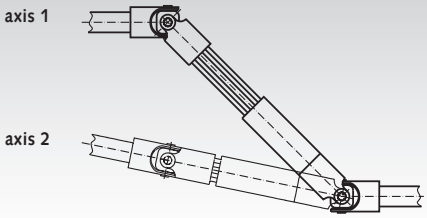


INCORRECT: angle α and β are different

3. When position of driving and driven shaft is changed, they must always be moved in parallel.

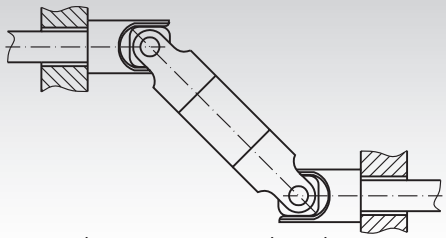


CORRECT : axis 1 is parallel to axis 2

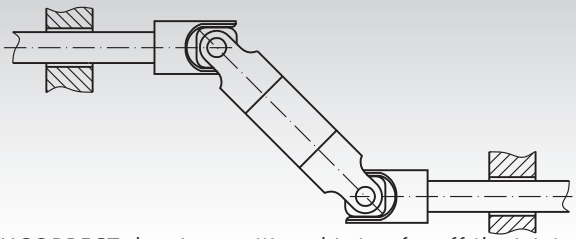


INCORRECT: axis 1 is not parallel to axis 2

4. The universal-joint shaft – or the double universal joint – should be supported as close as possible to the universal joints.



CORRECT : bearing positioned as close as possible



INCORRECT: bearing positioned is too far off the joint

The universal joints are supplied without pinholes and split pins. The length of the split pin is determined by the outer diameter of the universal joint, i.e. the pin must be flush when inserted.

We recommend Split Pins accord. to DIN 1481.

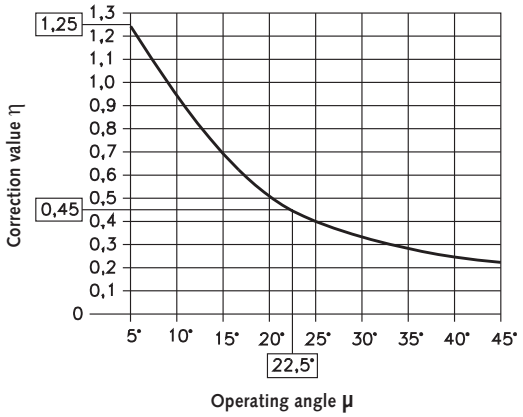
Bore Ø	6	8	10	12	16	20	25	32	40	50
Pin Ø	2	3	4	5	6	8	10	12	14	16

Calculating the Size of the Universal Joint

When selecting the most suitable universal joint, the highest transmittable torque is not the only decisive figure. Other operation conditions such as shock load, angle ratios, speeds etc. also need to be considered. The adjoining diagram therefore helps to determine a first rough sizing for the universal joint, and shows the respective reference values.

The respective reference value for smaller operating angles under 10°, between 0° and 5°, is 25% higher.

For larger operating angles above 40° to 45° (maximum) we can only recommend manual operation.



Corrective Values Subject to the Operating Angle.

Lubrication / Maintenance of Universal Joints

Maintenance of universal joints is limited to adequate lubrication, which has to be carried out at intervals (depending on the application). For dusty work environments, universal joints should be protected with bellows. The bellows can be filled with grease. This renders the joints maintenance-free.

Bellows
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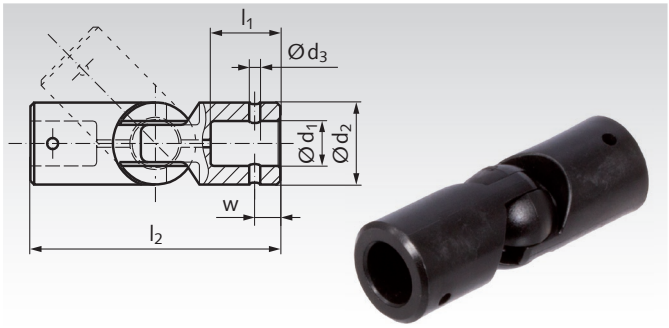
Ball Joints GF made from Plastic

Material: Polyacetal, glass-fibre reinforced.

Temperature range: -30°C to +50°C.

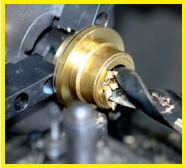
Max. operating angle 35°. Dimensions according to DIN 808.

For the joining, taper pins, dowel pins or grooved pins can be used. The joints are maintenance-free and can therefore be used in difficult-to-access parts of the machine. Other advantages compared to steel are less weight, corrosion resistance and chemical resistance.



Ordering Details: e.g.: Product No. 631 416 00, Ball joint GF, 8 mm bore

Product No.	d_1 mm	d_2 mm	d_3 mm	l_1 mm	l_2 mm	w mm	Torque max. Nm	Speed at Operation Angle 10° max. min^{-1}	Weight g
631 416 00	$8^{\pm 0,04}$	$16^{\pm 0,2}$	$3^{+0,1}$	10,5	40	$4^{-0,1}$	5	1000	9
631 420 00	$12^{\pm 0,05}$	$20^{\pm 0,2}$	$3^{+0,1}$	17,0	61	$6^{-0,1}$	15	1000	18
631 425 00	$16^{\pm 0,05}$	$25^{\pm 0,2}$	$6^{+0,1}$	20,5	74	$10^{-0,1}$	22	1000	35



Reworking within 24h-service possible. Custom made parts on request.