Cardan and double joints

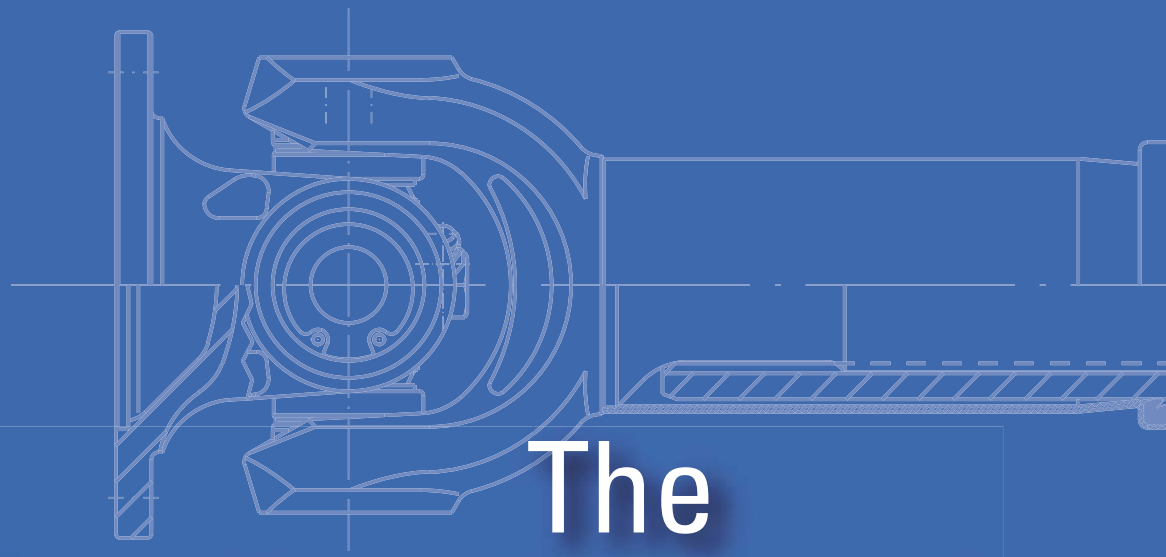
Pin and block cardan shafts

Drive and driven flanges

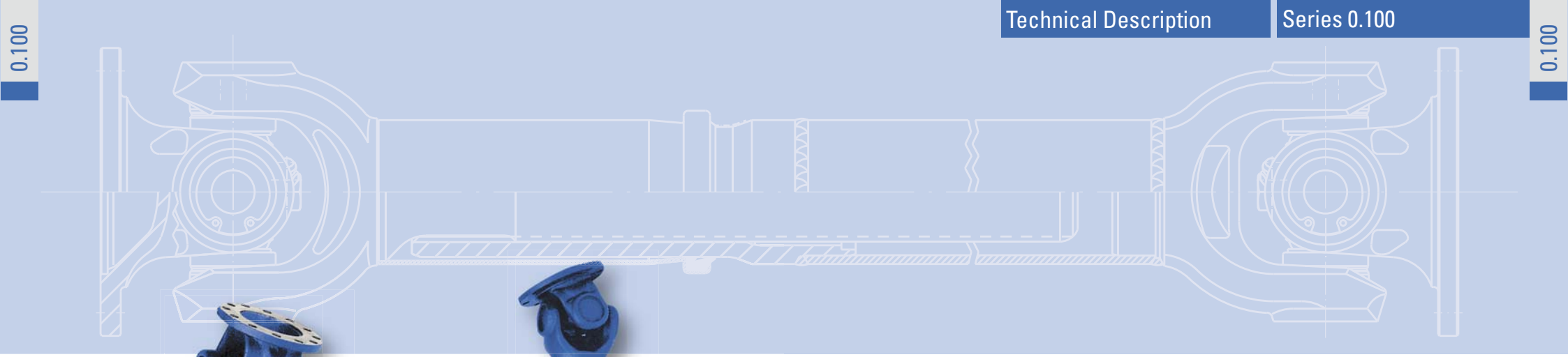
Ball and socket cardan shafts

Single pieces and repair of universal joint shafts

ORIGINAL elbe GELENKE



The Original since 1919



Depending on the configurations, the Original Elbe Universal Joint Shafts consist of fork parts, joint crosses, needle- or roller bearings, splined length extension and precision tubing.

Fork parts are made using closed die forgings while joint crosses are made from cold press or closed die forgings. Highly stressed areas of the universal drive shafts are heat treated to obtain an optimum combination of hardness and toughness. Subsequently, joint cross journals and bearing seats are ground to very fine tolerances.

Each fork part is bored to enable mounting of the needle- or roller bearing housings. Hub splines for length extension are broached and the mating external splines are rolled. If it becomes necessary to reduce the sliding force of the splines, they can be coated with a high quality plastic.

The rolling process for producing splines hardens the surface and obtains a higher load capacity which results in a lower wear at the tooth flanks compared to milled splines. This rolling process is advantageous because it does not interrupt the grain flow.

When assembling Universal Joint Shafts the bearing housings, and as a result the joint crosses, are locked into place with snap rings.

The U-Joints are greased according to customer specifications (i.e. with high temperature grease, extended life grease or low temperature grease).

There are three methods to maintain the u-joint bearing:

- Central Lubrication:
  Grease nipples are located inside at the joint crosses. The bearing housings are supplied with grease through lube passages.
- External Lubrication:
  The grease nipple is attached at the outside of one of the bearing housings with the grease distributed through lube passages.
- Maintenance-free:
  Under corresponding application conditions and/or using optimised sealing systems it is possible to waive lubrication.

Optimised sealing systems offer superior protection against the penetration of dirt and moisture so that they can be perfectly used under severe environmental conditions where mud, dust, sand and water are present. Furthermore the environment will also be protected since leaking of grease from the bearing housings is prevented.

As previously mentioned, there are two bearing versions available:

- Roller Bearings, using this type of bearings the service life is higher by a factor of 2 or 3 over the needle bearing version.
- Needle Bearings

After assembly, Cardan Shafts are balanced at the appropriate operating speed. This insures that troublesome vibrations resulting in damaged components are avoided.

General Specifications of Universal Joint Drive Shafts Series 0.100:

Maximum angle of deflection:	up to 35°
Torque range:	up to 35000 Nm
Flange or Hub Connection	

Md_{Nom}: Nominal torque for preselection on the basis of the operating moment. The respective permissible torque has to be calculated individually depending on the remaining operational characteristics, such as shock load, angle of deflection, rotation speed, etc. (see technical annex, item 6.2 and 6.3)

Md_{Lim}: Limit torque, which may be transmitted momentarily from the universal drive joint without functional damage if limited frequency is ensured.

For more detailed information please refer to the following datasheets.

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www.pstchina.com
www.hkfullyear@yahoo.cn

ORIGINAL elbe GELENKE

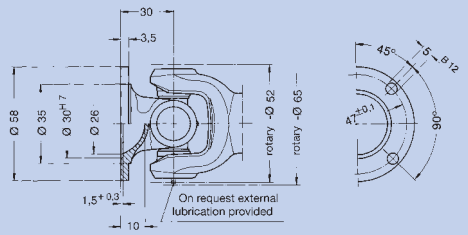
Cardan Drive-Shafts | Series 0.100 | Size 0.105 | Md_{Nom} 190 Nm | Md_{Lim} 250 Nm

FULL YEAR (INTERNATIONAL) TRADING COMPANY

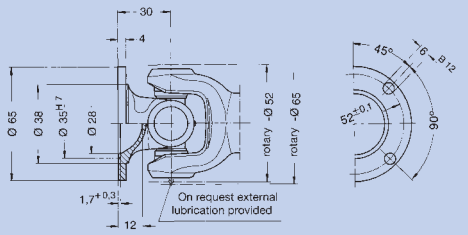
Needle bearing version

At utilisation of the nominal torque a verification of the flange connection is necessary.

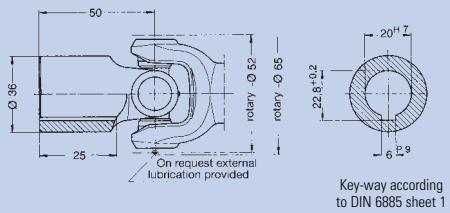
One keyway is not enough to transmit the max. torque. In such case a second keyway or an internal spline is recommended.



On both sides standard flange
end number: 0.105.XX0



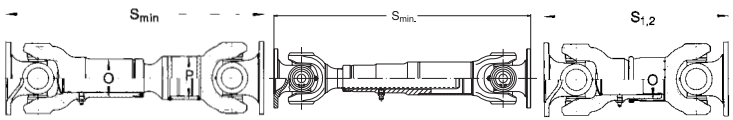
On both sides larger flange
end number: 0.105.XX1



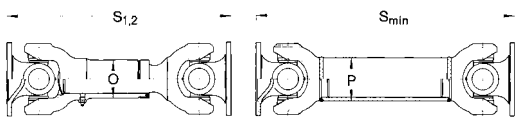
On both sides connecting hub
without key-way end number: 0.105.XX2
with key-way end number: 0.105.XX3

ß = Maximum angle of deflection per joint
J_m = Moment of inertia
G = Weight
S_{min} = Minimum length of tubular types
S_1 = Compressed lengths
S_2 = of short types
X_1 = Extension at S_{min} resp. S_1
X_2 = Extension at S_2
P_1 = Tube diameter. Dimensions in bold type for normal applications. Alternative dimensions are for long shafts at high speeds, see technical annex domain speed
P_2, P_3 = Alternative tube

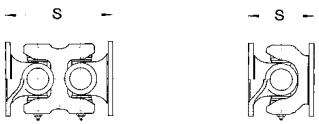
Universal Cardan Drive-Shafts with extension | **Cardan Drive-Shafts without extension** | **Universal Joints without extension**



additional spline protection on request — no spline protection available



additional spline protection on request



Please indicate requested length „S" and max. r.p.m. when ordering!		Tubular Type normal extension				Tubular Type larger extension				Short Type I		
Order number		**0.105.100**	**0.105.101**	**0.105.102**	–	**0.105.110**	**0.105.111**	**0.105.112**	–	**0.105.130**	**0.105.131**	**0.105.132**
Angle of deflection ß	°	30	25	30	–	30	25	30	–	30	25	30
Flange-Ø	mm	58	65	Hub	–	58	65	Hub	–	58	65	Hub
S_{min} resp. S_1	mm	240	240	280	–	257	257	297	–	165	165	205
S_2	mm	–	–	–	–	–	–	–	–	175	175	215
X resp. X_1	mm	25	25	25	–	40	40	40	–	20	20	20
X_2	mm	–	–	–	–	–	–	–	–	25	25	25
P_1	mm	**28 x 1,5**	**28 x 1,5**	**28 x 1,5**	–	**28 x 1,5**	**28 x 1,5**	**28 x 1,5**	–	–	–	–
P_2	mm	40 x 2	40 x 2	40 x 2	–	40 x 2	40 x 2	40 x 2	–	–	–	–
P_3	mm	–	–	–	–	–	–	–	–	–	–	–
Spline dim. DIN 5480	mm	20x1,5x12	20x1,5x12	20x1,5x12	–	20x1,5x12	20x1,5x12	20x1,5x12	–	20x1,5x12	20x1,5x12	20x1,5x12
Number of flange holes		4	4	–	–	4	4	–	–	4	4	–
J_m (at S_{min} resp. S_1)	kgm^2	0,000185	0,00022	0,00019	–	0,00019	0,000225	0,000195	–	0,00018	0,00021	0,000185
J_m (at S_2)	kgm^2	–	–	–	–	–	–	–	–	0,00021	0,00024	0,000215
J_m/100 mm standard tube	kgm^2	0,000017	0,000017	0,000017	–	0,000017	0,000017	0,000017	–	–	–	–
G (at S_{min} resp. S_1)	kg	1,18	1,25	1,31	–	1,26	1,33	1,39	–	0,93	1,00	1,07
G (at S_2)	kg	–	–	–	–	–	–	–	–	0,98	1,05	1,12
G/100 mm standard tube	kg	0,1	0,1	0,1	–	0,1	0,1	0,1	–	–	–	–

Please indicate requested length „S" and max. r.p.m. when ordering!		Short Type II				Tubular Type				Universal Joint Double			Universal Joint Single			
Order number		**0.105.140**	**0.105.141**	**0.105.142**	–	**0.105.200**	**0.105.201**	**0.105.202**	–	**0.105.300**	**0.105.301**	**0.105.302**	**0.105.400**	**0.105.401**	**0.105.402**	–
Angle of deflection ß	°	30	25	30	–	30	25	30	–	30	25	30	30	25	30	–
Flange-Ø	mm	58	65	Hub	–	58	65	Hub	–	58	65	Hub	58	65	Hub	–
S_{min} resp. S_1	mm	195	195	235	–	160	160	200	–	110	110	150	60	60	100	–
S_2	mm	215	215	255	–	–	–	–	–	–	–	–	–	–	–	–
X resp. X_1	mm	25	25	25	–	–	–	–	–	–	–	–	–	–	–	–
X_2	mm	25	25	25	–	–	–	–	–	–	–	–	–	–	–	–
P_1	mm	–	–	–	–	**28 x 1,5**	**28 x 1,5**	**28 x 1,5**	–	–	–	–	–	–	–	–
P_2	mm	–	–	–	–	40 x 2	40 x 2	40 x 2	–	–	–	–	–	–	–	–
P_3	mm	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Spline dim. DIN 5480	mm	20x1,5x12	20x1,5x12	20x1,5x12	–	–	–	–	–	–	–	–	–	–	–	–
Number of flange holes		4	4	–	–	4	4	–	–	4	4	–	4	4	–	–
J_m (at S_{min} resp. S_1)	kgm^2	0,00022	0,00025	0,000225	–	0,000152	0,000187	0,000157	–	0,00012	0,00015	0,000125	0,000072	0,00011	0,000077	–
J_m (at S_2)	kgm^2	0,00024	0,00027	0,000245	–	–	–	–	–	–	–	–	–	–	–	–
J_m/100 mm standard tube	kgm^2	–	–	–	–	0,000017	0,000017	0,000017	–	–	–	–	–	–	–	–
G (at S_{min} resp. S_1)	kg	0,99	1,06	1,12	–	0,88	0,95	1,01	–	0,69	0,76	0,83	0,40	0,47	0,53	–
G (at S_2)	kg	1,3	1,10	1,17	–	–	–	–	–	–	–	–	–	–	–	–
G/100 mm standard tube	kg	–	–	–	–	0,1	0,1	0,1	–	–	–	–	–	–	–	–

FULL YEAR (INTERNATIONAL) TRADING COMPANY
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ORIGINAL elbe GELENKE

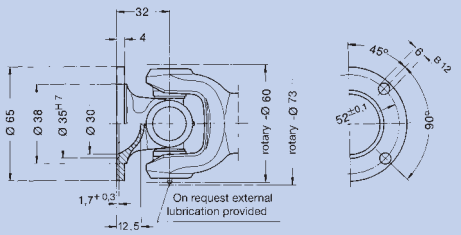
Cardan Drive-Shafts | Series 0.100 | Size 0.106 | Md_{Nom} 400 Nm | Md_{Lim} 520 Nm

FULL YEAR (INTERNATIONAL) TRADING COMPANY

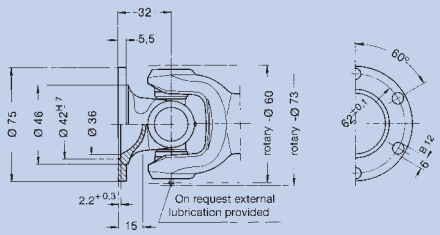
Needle bearing version

At utilisation of the nominal torque a verification of the flange connection is necessary.

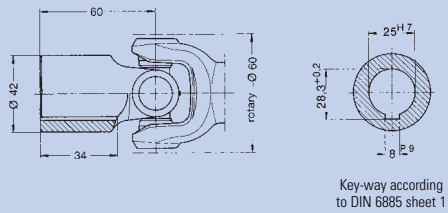
One keyway is not enough to transmit the max. torque. In such case a second keyway or an internal spline is recommended.



On both sides standard flange
end number: 0.106.XX0



On both sides larger flange
end number: 0.106.XX1

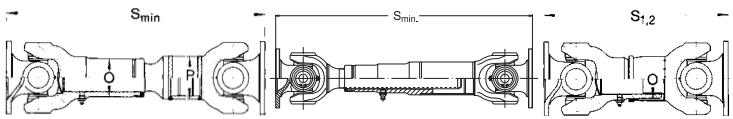


Key-way according to DIN 6885 sheet 1

On both sides connecting hub
without key-way end number: 0.106.XX2
with key-way end number: 0.106.XX3

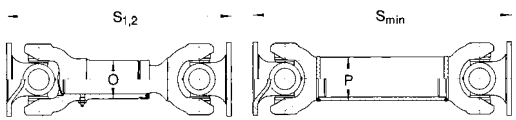
ß = Maximum angle of deflection per joint
J_m = Moment of inertia
G = Weight
S_{min} = Minimum length of tubular types
S_1 = Compressed lengths
S_2 = of short types
X_1 = Extension at S_{min} resp. S_1
X_2 = Extension at S_2
P_1 = Tube diameter. Dimensions in bold type for normal applications. Alternative dimensions are for long shafts at high speeds, see technical annex domain speed
P_2, P_3 = Alternative tube

Universal Cardan Drive-Shafts with extension



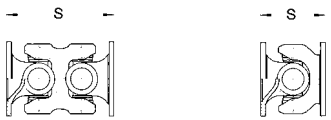
additional spline protection on request — no spline protection available

Cardan Drive-Shafts without extension



additional spline protection on request

Universal Joints without extension



Please indicate requested length „S" and max. r.p.m. when ordering!		Tubular Type normal extension				Tubular Type larger extension				Short Type I		
Order number		**0.106.100**	**0.106.101**	**0.106.102**	–	**0.106.110**	**0.106.111**	**0.106.112**	–	**0.106.130**	**0.106.131**	**0.106.132**
Angle of deflection ß	°	30	20	30	–	30	20	30	–	30	20	30
Flange-Ø	mm	65	75	Hub	–	65	75	Hub	–	65	75	Hub
S_{min} resp. S_1	mm	260	260	315	–	290	290	345	–	180	180	236
S_2	mm	–	–	–	–	–	–	–	–	200	200	256
X resp. X_1	mm	30	30	30	–	60	60	60	–	20	20	20
X_2	mm	–	–	–	–	–	–	–	–	30	30	30
P_1	mm	**32 x 1,5**	**32 x 1,5**	**32 x 1,5**	–	**32 x 1,5**	**32 x 1,5**	**32 x 1,5**	–	–	–	–
P_2	mm	50 x 2	50 x 2	50 x 2	–	50 x 2	50 x 2	50 x 2	–	–	–	–
P_3	mm	70 x 3	70 x 3	70 x 3	–	70 x 3	70 x 3	70 x 3	–	–	–	–
Spline dim. DIN 5480	mm	25x1,5x15	25x1,5x15	25x1,5x15	–	25x1,5x15	25x1,5x15	25x1,5x15	–	25x1,5x15	25x1,5x15	25x1,5x15
Number of flange holes		4	6	–	–	4	6	–	–	4	6	–
J_m (at S_{min} resp. S_1)	kgm^2	0,000415	0,000587	0,000448	–	0,00044	0,000612	0,00047	–	0,00039	0,00056	0,00042
J_m (at S_2)	kgm^2	–	–	–	–	–	–	–	–	0,00042	0,00059	0,00045
J_m/100 mm standard tube	kgm^2	0,000026	0,000026	0,000026	–	0,000026	0,000026	0,000026	–	–	–	–
G (at S_{min} resp. S_1)	kg	1,77	1,95	2,02	–	1,87	2,04	2,11	–	1,39	1,56	1,64
G (at S_2)	kg	–	–	–	–	–	–	–	–	1,54	1,71	1,78
G/100 mm standard tube	kg	0,11	0,11	0,11	–	0,11	0,11	0,11	–	–	–	–

Please indicate requested length „S" and max. r.p.m. when ordering!		Short Type II				Tubular Type				Universal Joint Double			Universal Joint Single			
Order number		**0.106.140**	**0.106.141**	**0.106.142**	–	**0.106.200**	**0.106.201**	**0.106.202**	–	**0.106.300**	**0.106.301**	**0.106.302**	**0.106.400**	**0.106.401**	**0.106.402**	–
Angle of deflection ß	°	30	20	30	–	30	20	30	–	30	20	30	30	20	30	–
Flange-Ø	mm	65	75	Hub	–	65	75	Hub	–	65	75	Hub	65	75	Hub	–
S_{min} resp. S_1	mm	220	220	276	–	165	165	220	–	120	120	176	64	64	120	–
S_2	mm	235	235	291	–	–	–	–	–	–	–	–	–	–	–	–
X resp. X_1	mm	30	30	30	–	–	–	–	–	–	–	–	–	–	–	–
X_2	mm	30	30	30	–	–	–	–	–	–	–	–	–	–	–	–
P_1	mm	–	–	–	–	**32 x 1,5**	**32 x 1,5**	**32 x 1,5**	–	–	–	–	–	–	–	–
P_2	mm	–	–	–	–	50 x 2	50 x 2	50 x 2	–	–	–	–	–	–	–	–
P_3	mm	–	–	–	–	70 x 3	70 x 3	70 x 3	–	–	–	–	–	–	–	–
Spline dim. DIN 5480	mm	25x1,5x15	25x1,5x15	25x1,5x15	–	–	–	–	–	–	–	–	–	–	–	–
Number of flange holes		4	6	–	–	4	6	–	–	4	6	–	4	6	–	–
J_m (at S_{min} resp. S_1)	kgm^2	0,00043	0,00060	0,00046	–	0,000336	0,00051	0,00036	–	0,00028	0,00045	0,00031	0,00015	0,00032	0,00018	–
J_m (at S_2)	kgm^2	0,00045	0,00062	0,00048	–	–	–	–	–	–	–	–	–	–	–	–
J_m/100 mm standard tube	kgm^2	–	–	–	–	0,000026	0,000026	0,000026	–	–	–	–	–	–	–	–
G (at S_{min} resp. S_1)	kg	1,58	1,75	1,83	–	1,16	1,34	1,41	–	0,99	1,16	1,24	0,56	0,73	0,80	–
G (at S_2)	kg	1,63	1,80	1,87	–	–	–	–	–	–	–	–	–	–	–	–
G/100 mm standard tube	kg	–	–	–	–	0,11	0,11	0,11	–	–	–	–	–	–	–	–

FULL YEAR (INTERNATIONAL) TRADING COMPANY
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www.hkfullyear@yahoo.cn

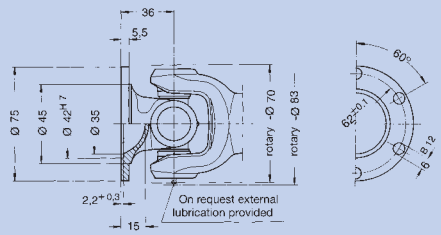
ORIGINAL elbe GELENKE

Cardan Drive-Shafts | Series 0.100 | Size 0.107 | Md_{Nom} 920 Nm | Md_{Lim} 1200 Nm

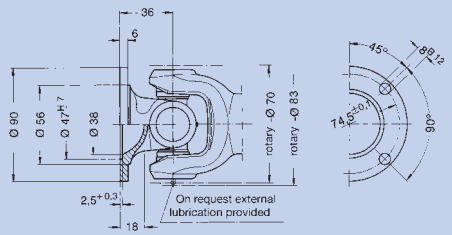
Needle bearing version

At utilisation of the nominal torque a verification of the flange connection is necessary.

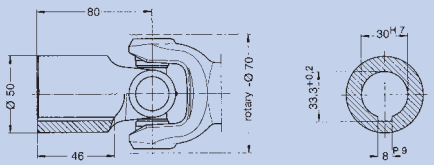
One keyway is not enough to transmit the max. torque. In such case a second keyway or an internal spline is recommended.



On both sides standard flange end number: 0.107.XX0



On both sides larger flange end number: 0.107.XX1

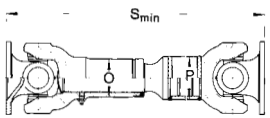


Key-way according to DIN 6885 sheet 1

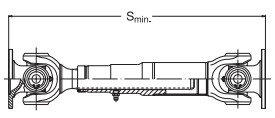
On both sides connecting hub
without key-way end number: 0.107.XX2
with key-way end number: 0.107.XX3

ß = Maximum angle of deflection per joint
J_m = Moment of inertia
G = Weight
S_{min} = Minimum length of tubular types
S_1 = Compressed lengths
S_2 = of short types
X_1 = Extension at S_{min} resp. S_1
X_2 = Extension at S_2
P_1 = Tube diameter. Dimensions in bold type for normal applications. Alternative dimensions are for long shafts at high speeds, see technical annex domain speed
P_2, P_3 = Alternative tube

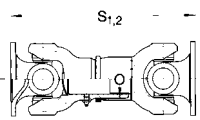
Universal Cardan Drive-Shafts with extension



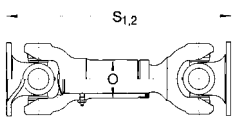
additional spline protection on request



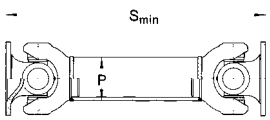
no spline protection available



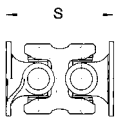
Cardan Drive-Shafts without extension

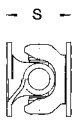


additional spline protection on request



Universal Joints without extension





Please indicate requested length „S" and max. r.p.m. when ordering!		Tubular Type normal extension				Tubular Type larger extension				Short Type I		
Order number		**0.107.100**	**0.107.101**	**0.107.102**	–	**0.107.110**	**0.107.111**	**0.107.112**	–	**0.107.130**	**0.107.131**	**0.107.132**
Angle of deflection ß	°	30	18	30	–	30	18	30	–	30	18	30
Flange-Ø	mm	75	90	Hub	–	75	90	Hub	–	75	90	Hub
S_{min} resp. S_1	mm	300	300	390	–	360	360	450	–	200	200	288
S_2	mm	–	–	–	–	–	–	–	–	225	225	313
X resp. X_1	mm	35	35	35	–	70	70	70	–	25	25	25
X_2	mm	–	–	–	–	–	–	–	–	35	35	35
P_1	mm	**40 x 2**	**40 x 2**	**40 x 2**	–	**40 x 2**	**40 x 2**	**40 x 2**	–	–	–	–
P_2	mm	50 x 2	50 x 2	50 x 2	–	50 x 2	50 x 2	50 x 2	–	–	–	–
P_3	mm	70 x 3	70 x 3	70 x 3	–	70 x 3	70 x 3	70 x 3	–	–	–	–
Spline dim. DIN 5480	mm	28x1,5x17	28x1,5x17	28x1,5x17	–	28x1,5x17	28x1,5x17	28x1,5x17	–	28x1,5x17	28x1,5x17	28x1,5x17
Number of flange holes		6	4	–	–	6	4	–	–	6	4	–
J_m (at S_{min} resp. S_1)	kgm^2	0,00098	0,00127	0,00121	–	0,00104	0,00133	0,00127	–	0,00089	0,00118	0,00112
J_m (at S_2)	kgm^2	–	–	–	–	–	–	–	–	0,00092	0,00120	0,00115
J_m/100 mm standard tube	kgm^2	0,000068	0,000068	0,000068	–	0,000068	0,000068	0,000068	–	–	–	–
G (at S_{min} resp. S_1)	kg	2,60	2,90	3,29	–	3,04	3,35	3,73	–	1,98	2,29	2,67
G (at S_2)	kg	–	–	–	–	–	–	–	–	2,21	2,51	2,90
G/100 mm standard tube	kg	0,19	0,19	0,19	–	0,19	0,19	0,19	–	–	–	–

Please indicate requested length „S" and max. r.p.m. when ordering!		Short Type II				Tubular Type				Universal Joint Double			Universal Joint Single			
Order number		**0.107.140**	**0.107.141**	**0.107.142**	–	**0.107.200**	**0.107.201**	**0.107.202**	–	**0.107.300**	**0.107.301**	**0.107.302**	**0.107.400**	**0.107.401**	**0.107.402**	–
Angle of deflection ß	°	30	18	30	–	30	18	30	–	30	18	30	30	18	30	–
Flange-Ø	mm	75	90	Hub	–	75	90	Hub	–	75	90	Hub	75	90	Hub	–
S_{min} resp. S_1	mm	250	250	338	–	200	200	290	–	140	140	228	72	72	160	–
S_2	mm	270	270	358	–	–	–	–	–	–	–	–	–	–	–	–
X resp. X_1	mm	35	35	35	–	–	–	–	–	–	–	–	–	–	–	–
X_2	mm	35	35	35	–	–	–	–	–	–	–	–	–	–	–	–
P_1	mm	–	–	–	–	**40 x 2**	**40 x 2**	**40 x 2**	–	–	–	–	–	–	–	–
P_2	mm	–	–	–	–	50 x 2	50 x 2	50 x 2	–	–	–	–	–	–	–	–
P_3	mm	–	–	–	–	70 x 3	70 x 3	70 x 3	–	–	–	–	–	–	–	–
Spline dim. DIN 5480	mm	28x1,5x17	28x1,5x17	28x1,5x17	–	–	–	–	–	–	–	–	–	–	–	–
Number of flange holes		6	4	–	–	6	4	–	–	6	4	–	6	4	–	–
J_m (at S_{min} resp. S_1)	kgm^2	0,00093	0,00121	0,00116	–	0,00078	0,00107	0,00101	–	0,00069	0,00098	0,00092	0,00031	0,00060	0,00054	–
J_m (at S_2)	kgm^2	0,00096	0,00124	0,00118	–	–	–	–	–	–	–	–	–	–	–	–
J_m/100 mm standard tube	kgm^2	–	–	–	–	0,000068	0,000068	0,000068	–	–	–	–	–	–	–	–
G (at S_{min} resp. S_1)	kg	2,27	2,58	2,96	–	1,89	2,20	2,58	–	1,51	1,82	2,21	0,81	1,12	1,50	–
G (at S_2)	kg	2,36	2,67	3,05	–	–	–	–	–	–	–	–	–	–	–	–
G/100 mm standard tube	kg	–	–	–	–	0,19	0,19	0,19	–	–	–	–	–	–	–	–

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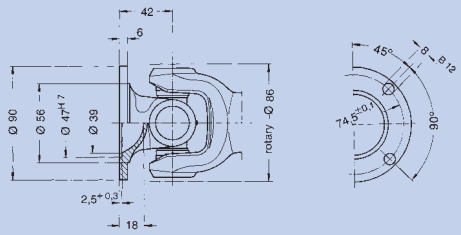
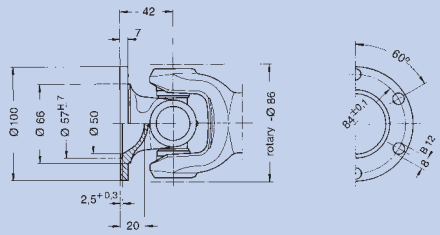
Needle bearing version

At utilisation of the nominal torque a verification of the flange connection is necessary.

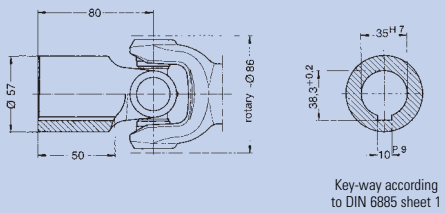
One keyway is not enough to transmit the max. torque. In such case a second keyway or an internal spline is recommended.



On both sides standard flange
end number: 0.109.XX0

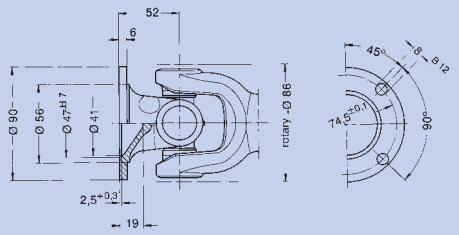


On both sides larger flange
end number: 0.109.XX1



Key-way according to DIN 6885 sheet 1

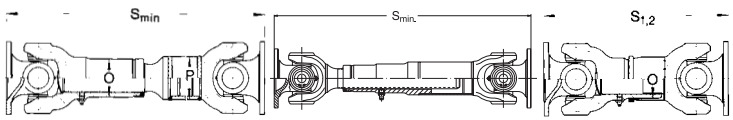
On both sides connecting hub
without key-way end number: 0.109.XX2
with key-way end number: 0.109.XX3



On both sides flange for larger angle deflection
end number: 0.109.XX5

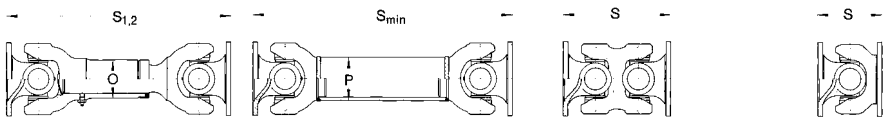
ß = Maximum angle of deflection per joint
J_m = Moment of inertia
G = Weight
S_{min} = Minimum length of tubular types
S_1 = Compressed lengths
S_2 = of short types
X_1 = Extension at S_{min} resp. S_1
X_2 = Extension at S_2
P_1 = Tube diameter. Dimensions in bold type for normal applications. Alternative dimensions are for long shafts at high speeds, see technical annex domain speed
P_2, P_3 = Alternative tube

Universal Cardan Drive-Shafts with extension



additional spline protection on request — no spline protection available

Cardan Drive-Shafts without extension / Universal Joints without extension



additional spline protection on request

Please indicate requested length „S" and max. r.p.m. when ordering!

		Tubular Type normal extension				Tubular Type larger extension				Short Type I		
Order number		**0.109.100**	**0.109.101**	**0.109.102**	**0.109.105**	**0.109.110**	**0.109.111**	**0.109.112**	**0.109.115**	**0.109.130**	**0.109.131**	**0.109.132**
Angle of deflection ß	°	20	18	20	35	20	18	20	35	20	18	20
Flange-Ø	mm	90	100	Hub	90	90	100	Hub	90	90	100	Hub
S_{min} resp. S_1	mm	348	348	423	375	393	393	468	425	225	225	301
S_2	mm	–	–	–	–	–	–	–	–	250	250	326
X resp. X_1	mm	40	40	40	40	80	80	80	80	25	25	25
X_2	mm	–	–	–	–	–	–	–	–	40	40	40
P_1	mm	**50 x 2**	**50 x 2**	**50 x 2**	**50 x 2**	**50 x 2**	**50 x 2**	**50 x 2**	**50 x 2**	**–**	**–**	**–**
P_2	mm	70 x 3	70 x 3	70 x 3	70 x 3	70 x 3	70 x 3	70 x 3	70 x 3	–	–	–
P_3	mm	80 x 4	80 x 4	80 x 4	80 x 4	80 x 4	80 x 4	80 x 4	80 x 4	–	–	–
Spline dim. DIN 5480	mm	32x2x14	32x2x14	32x2x14	32x2x14	32x2x14	32x2x14	32x2x14	32x2x14	32x2x14	32x2x14	32x2x14
Number of flange holes		4	6	–	4	4	6	–	4	4	6	–
J_m (at S_{min} resp. S_1)	kgm^2	0,00249	0,00286	0,00267	0,00281	0,00259	0,00296	0,00277	0,00291	0,00221	0,00258	0,00239
J_m (at S_2)	kgm^2	–	–	–	–	–	–	–	–	0,00226	0,00263	0,00244
J_m/100 mm standard tube	kgm^2	0,00014	0,00014	0,00014	0,00014	0,00014	0,00014	0,00014	0,00014	–	–	–
G (at S_{min} resp. S_1)	kg	4,91	5,12	5,68	5,10	5,41	5,61	6,18	5,71	3,80	4,00	4,57
G (at S_2)	kg	–	–	–	–	–	–	–	–	4,11	4,31	4,88
G/100 mm standard tube	kg	0,24	0,24	0,24	0,24	0,24	0,24	0,24	0,24	–	–	–

	Short Type II				Tubular Type				Universal Joint Double			Universal Joint Single			
Order number	**0.109.140**	**0.109.141**	**0.109.142**	**0.109.145**	**0.109.200**	**0.109.201**	**0.109.202**	**0.109.205**	**0.109.300**	**0.109.301**	**0.109.302**	**0.109.400**	**0.109.401**	**0.109.402**	**0.109.405**
Angle of deflection ß	20	18	20	35	20	18	20	35	20	18	20	20	18	20	35
Flange-Ø	90	100	Hub	90	90	100	Hub	90	90	100	Hub	90	100	Hub	90
S_{min} resp. S_1	280	280	356	315	216	216	291	235	152	152	228	84	84	160	104
S_2	310	310	386	345	–	–	–	–	–	–	–	–	–	–	–
X resp. X_1	40	40	40	40	–	–	–	–	–	–	–	–	–	–	–
X_2	40	40	40	40	–	–	–	–	–	–	–	–	–	–	–
P_1	**–**	**–**	**–**	**–**	**50 x 2**	**50 x 2**	**50 x 2**	**50 x 2**	**–**	**–**	**–**	**–**	**–**	**–**	**–**
P_2	–	–	–	–	70 x 3	70 x 3	70 x 3	70 x 3	–	–	–	–	–	–	–
P_3	–	–	–	–	80 x 4	80 x 4	80 x 4	80 x 4	–	–	–	–	–	–	–
Spline dim. DIN 5480	32x2x14	32x2x14	32x2x14	32x2x14	–	–	–	–	–	–	–	–	–	–	–
Number of flange holes	4	6	–	4	4	6	–	4	4	6	–	4	6	–	4
J_m (at S_{min} resp. S_1)	0,00238	0,00275	0,00256	0,00270	0,00239	0,00276	0,00257	0,00239	0,00166	0,00299	0,00184	0,00075	0,0011	0,00093	0,00107
J_m (at S_2)	0,00256	0,00293	0,00274	0,00288	–	–	–	–	–	–	–	–	–	–	–
J_m/100 mm standard tube	–	–	–	–	0,00014	0,00014	0,00014	0,00014	–	–	–	–	–	–	–
G (at S_{min} resp. S_1)	4,22	4,43	5,00	4,58	3,73	3,94	4,50	3,88	3,02	3,23	3,79	1,71	1,92	2,49	1,87
G (at S_2)	4,38	4,59	5,15	4,66	–	–	–	–	–	–	–	–	–	–	–
G/100 mm standard tube	–	–	–	–	0,24	0,24	0,24	0,24	–	–	–	–	–	–	–

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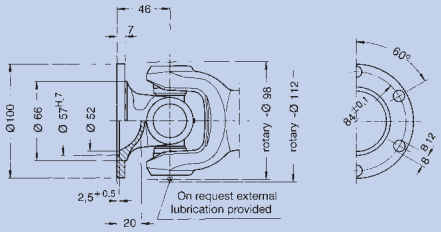
0.100

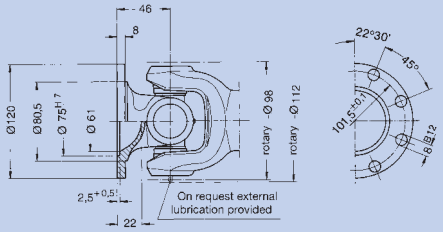
Roller bearing version

At utilisation of the nominal torque a verification of the flange connection is necessary.

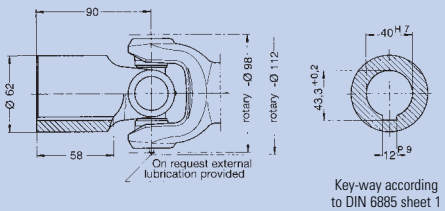
One keyway is not enough to transmit the max. torque. In such case a second keyway or an internal spline is recommended.



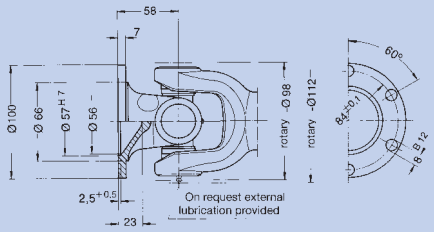
On both sides standard flange
end number: 0.110.XX0



On both sides larger flange
end number: 0.110.XX1



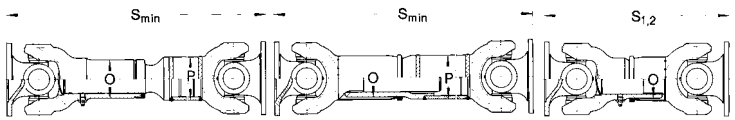
On both sides connecting hub
without key-way end number: 0.110.XX2
with key-way end number: 0.110.XX3



On both sides flange for larger angle deflection
end number: 0.110.XX5

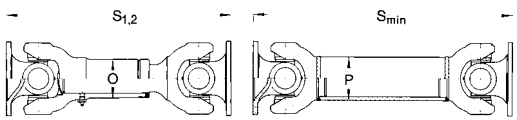
ß = Maximum angle of deflection per joint
J_m = Moment of inertia
G = Weight
S_{min} = Minimum length of tubular types
S_1 = Compressed lengths
S_2 = of short types
X_1 = Extension at S_{min} resp. S_1
X_2 = Extension at S_2
P_1 = Tube diameter. Dimensions in bold type for normal applications. Alternative dimensions are for long shafts at high speeds, see technical annex domain speed
P_2, P_3 = Alternative tube

Universal Cardan Drive-Shafts with extension



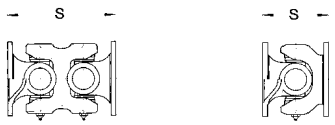
additional spline protection on request

Cardan Drive-Shafts without extension



additional spline protection on request

Universal Joints without extension



Please indicate requested length „S" and max. r.p.m. when ordering!		Tubular Type normal extension				Tubular Type larger extension				Short Type I		
Order number		**0.110.100**	**0.110.101**	**0.110.102**	**0.110.105**	**0.110.110**	**0.110.111**	**0.110.112**	**0.110.115**	**0.110.130**	**0.110.131**	**0.110.132**
Angle of deflection ß	°	20	18	20	35	20	18	20	35	20	18	20
Flange-Ø	mm	100	120	Hub	100	100	120	Hub	100	100	120	Hub
S_{min} resp. S_1	mm	374	374	464	405	464	464	554	490	255	255	343
S_2	mm	–	–	–	–	–	–	–	–	280	280	368
X resp. X_1	mm	40	40	40	40	95	95	95	95	30	30	30
X_2	mm	–	–	–	–	–	–	–	–	40	40	40
P_1	mm	**50 x 3**	**50 x 3**	**50 x 3**	**50 x 3**	**50 x 3**	**50 x 3**	**50 x 3**	**50 x 3**	**–**	**–**	**–**
P_2	mm	70 x 3	70 x 3	70 x 3	70 x 3	70 x 3	70 x 3	70 x 3	70 x 3	–	–	–
P_3	mm	80 x 4	80 x 4	80 x 4	80 x 4	80 x 4	80 x 4	80 x 4	80 x 4	–	–	–
Spline dim. DIN 5480	mm	35x2x16	35x2x16	35x2x16	35x2x16	35x2x16	35x2x16	35x2x16	35x2x16	35x2x16	35x2x16	35x2x16
Number of flange holes		6	8	–	6	6	8	–	6	6	8	–
J_m (at S_{min} resp. S_1)	kgm^2	0,00378	0,0051	0,0040	0,0041	0,00406	0,00538	0,00428	0,00438	0,00389	0,00521	0,00410
J_m (at S_2)	kgm^2	–	–	–	–	–	–	–	–	0,00404	0,00536	0,00426
J_m/100 mm standard tube	kgm^2	0,00019	0,00019	0,00019	0,00019	0,00019	0,00019	0,00019	0,00019	–	–	–
G (at S_{min} resp. S_1)	kg	6,32	6,77	7,08	6,56	7,48	7,93	8,23	7,62	5,12	5,57	5,87
G (at S_2)	kg	–	–	–	–	–	–	–	–	5,44	5,89	6,19
G/100 mm standard tube	kg	0,35	0,35	0,35	0,35	0,35	0,35	0,35	0,35	–	–	–

	Short Type II				Tubular Type				Universal Joint Double			Universal Joint Single			
Order number	**0.110.140**	**0.110.141**	**0.110.142**	**0.110.145**	**0.110.200**	**0.110.201**	**0.110.202**	**0.110.205**	**0.110.300**	**0.110.301**	**0.110.302**	**0.110.400**	**0.110.401**	**0.110.402**	**0.110.405**
Angle of deflection ß	20	18	20	35	20	18	20	35	18	18	18	20	18	20	35
Flange-Ø	100	120	Hub	100	100	120	Hub	100	100	120	Hub	100	120	Hub	100
S_{min} resp. S_1	310	310	398	355	250	250	338	270	160	160	248	92	92	180	116
S_2	340	340	428	385	–	–	–	–	–	–	–	–	–	–	–
X resp. X_1	40	40	40	40	–	–	–	–	–	–	–	–	–	–	–
X_2	40	40	40	40	–	–	–	–	–	–	–	–	–	–	–
P_1	**–**	**–**	**–**	**–**	**50 x 3**	**50 x 3**	**50 x 3**	**50 x 3**	**–**	**–**	**–**	**–**	**–**	**–**	**–**
P_2	–	–	–	–	70 x 3	70 x 3	70 x 3	70 x 3	–	–	–	–	–	–	–
P_3	–	–	–	–	80 x 4	80 x 4	80 x 4	80 x 4	–	–	–	–	–	–	–
Spline dim. DIN 5480	35x2x16	35x2x16	35x2x16	35x2x16	–	–	–	–	–	–	–	–	–	–	–
Number of flange holes	6	8	–	6	6	8	–	6	6	8	–	6	8	–	6
J_m (at S_{min} resp. S_1)	0,00415	0,00547	0,00437	0,00519	0,00352	0,00484	0,00374	0,00456	0,00319	0,00451	0,00340	0,00152	0,00284	0,00173	0,00204
J_m (at S_2)	0,00430	0,00562	0,00452	0,00542	–	–	–	–	–	–	–	–	–	–	–
J_m/100 mm standard tube	–	–	–	–	0,00019	0,00019	0,00019	0,00019	–	–	–	–	–	–	–
G (at S_{min} resp. S_1)	5,63	6,08	6,38	6,05	4,9	5,35	5,65	5,02	3,98	4,43	4,73	2,25	2,70	3,00	2,39
G (at S_2)	5,88	6,33	6,63	6,25	–	–	–	–	–	–	–	–	–	–	–
G/100 mm standard tube	–	–	–	–	0,35	0,35	0,35	0,35	–	–	–	–	–	–	–

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Cardan Drive-Shafts

Series 0.100

Size 0.112

Md_{Nom} 3350 Nm

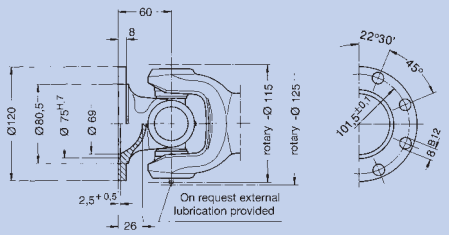
Md_{Lim} 4350 Nm

0.100

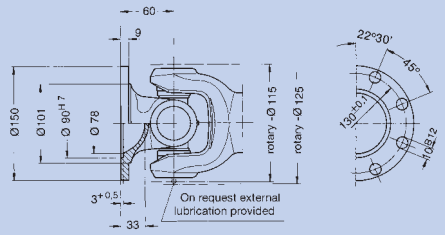
Needle or Roller bearing version

At utilisation of the nominal torque a verification of the flange connection is necessary.

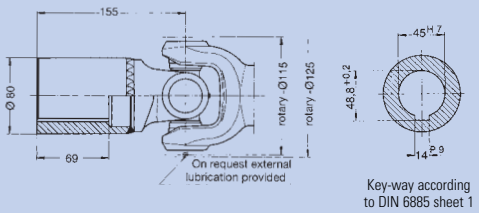
One keyway is not enough to transmit the max. torque. In such case a second keyway or an internal spline is recommended.



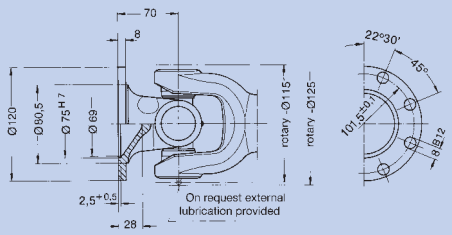
On both sides standard flange
end number: 0.112.XX0



On both sides larger flange
end number: 0.112.XX1



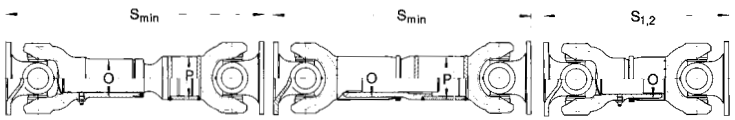
On both sides connecting hub
without key-way end number: 0.112.XX2
with key-way end number: 0.112.XX3



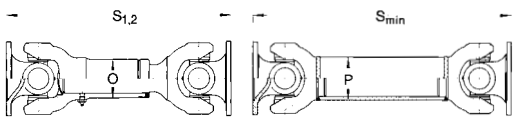
On both sides flange for larger angle deflection
end number: 0.112.XX5

ß = Maximum angle of deflection per joint
J_m = Moment of inertia
G = Weight
S_{min} = Minimum length of tubular types
S_1 = Compressed lengths
S_2 = of short types
X_1 = Extension at S_{min} resp. S_1
X_2 = Extension at S_2
P_1 = Tube diameter. Dimensions in bold type for normal applications. Alternative dimensions are for long shafts at high speeds, see technical annex domain speed
P_2, P_3 = Alternative tube

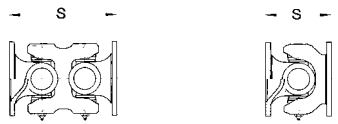
Universal Cardan Drive-Shafts with extension | **Cardan Drive-Shafts without extension** | **Universal Joints without extension**



additional spline protection on request



additional spline protection on request



Please indicate requested length „S" and max. r.p.m. when ordering!		Tubular Type normal extension				Tubular Type larger extension				Short Type I		
Order number		**0.112.100**	**0.112.101**	**0.112.102**	**0.112.105**	**0.112.110**	**0.112.111**	**0.112.112**	**0.112.115**	**0.112.130**	**0.112.131**	**0.112.132**
Angle of deflection ß	°	20	18	20	35	20	18	20	35	20	18	20
Flange-Ø	mm	120	150	Hub	120	120	150	Hub	120	120	150	Hub
S_{min} resp. S_1	mm	473	473	664	505	523	523	714	580	325	325	515
S_2	mm	–	–	–	–	–	–	–	–	360	360	550
X resp. X_1	mm	60	60	60	60	120	120	120	120	35	35	35
X_2	mm	–	–	–	–	–	–	–	–	50	50	50
P_1	mm	**60 x 4**	**60 x 4**	**60 x 4**	**60 x 4**	**60 x 4**	**60 x 4**	**60 x 4**	**60 x 4**	**–**	**–**	**–**
P_2	mm	80 x 4	80 x 4	80 x 4	80 x 4	80 x 4	80 x 4	80 x 4	80 x 4	–	–	–
P_3	mm	90 x 4	90 x 4	90 x 4	90 x 4	90 x 4	90 x 4	90 x 4	90 x 4	–	–	–
Spline dim. DIN 5480	mm	42x2x20	42x2x20	42x2x20	42x2x20	42x2x20	42x2x20	42x2x20	42x2x20	42x2x20	42x2x20	42x2x20
Number of flange holes		8	8	–	8	8	8	–	8	8	8	–
J_m (at S_{min} resp. S_1)	kgm^2	0,01021	0,01390	0,01210	0,01278	0,0108	0,01449	0,01270	0,01560	0,01039	0,01408	0,01230
J_m (at S_2)	kgm^2	–	–	–	–	–	–	–	–	0,01059	0,01797	0,01248
J_m/100 mm standard tube	kgm^2	0,00045	0,00045	0,00045	0,00045	0,00045	0,00045	0,00045	0,00045	–	–	–
G (at S_{min} resp. S_1)	kg	10,66	12,02	15,24	10,82	11,55	12,91	16,14	12,53	8,75	10,11	13,33
G (at S_2)	kg	–	–	–	–	–	–	–	–	9,22	10,58	13,80
G/100 mm standard tube	kg	0,55	0,55	0,55	0,55	0,55	0,55	0,55	0,55	–	–	–

	Short Type II				Tubular Type				Universal Joint Double			Universal Joint Single			
Order number	**0.112.140**	**0.112.141**	**0.112.142**	**0.112.145**	**0.112.200**	**0.112.201**	**0.112.202**	**0.112.205**	**0.112.300**	**0.112.301**	**0.112.302**	**0.112.400**	**0.112.401**	**0.112.402**	**0.112.405**
Angle of deflection ß	20	18	20	35	20	18	35	35	20	18	20	20	18	35	35
Flange-Ø	120	150	Hub	120	120	150	Hub	120	120	150	Hub	120	150	Hub	120
S_{min} resp. S_1	400	400	590	435	301	301	490	320	200	200	390	120	120	310	140
S_2	430	430	620	470	–	–	–	–	–	–	–	–	–	–	–
X resp. X_1	60	60	60	60	–	–	–	–	–	–	–	–	–	–	–
X_2	60	60	60	60	–	–	–	–	–	–	–	–	–	–	–
P_1	**–**	**–**	**–**	**–**	**60 x 4**	**60 x 4**	**60 x 4**	**60 x 4**	**–**	**–**	**–**	**–**	**–**	**–**	**–**
P_2	–	–	–	–	80 x 4	80 x 4	80 x 4	80 x 4	–	–	–	–	–	–	–
P_3	–	–	–	–	90 x 4	90 x 4	90 x 4	90 x 4	–	–	–	–	–	–	–
Spline dim. DIN 5480	42x2x20	42x2x20	42x2x20	42x2x20	–	–	–	–	–	–	–	–	–	–	–
Number of flange holes	8	8	–	8	8	8	–	8	8	8	–	8	8	–	8
J_m (at S_{min} resp. S_1)	0,01195	0,01564	0,01384	0,01323	0,00961	0,0133	0,0115	0,01089	0,00904	0,01273	0,0109	0,00354	0,00723	0,00543	0,00598
J_m (at S_2)	0,01199	0,01568	0,01388	0,01327	–	–	–	–	–	–	–	–	–	–	–
J_m/100 mm standard tube	–	–	–	–	0,00045	0,00045	0,00045	0,00045	–	–	–	–	–	–	–
G (at S_{min} resp. S_1)	9,66	11,02	14,24	9,99	7,88	9,24	12,45	8,13	6,44	7,8	11,02	3,71	5,07	8,29	3,97
G (at S_2)	9,99	11,35	14,57	10,32	–	–	–	–	–	–	–	–	–	–	–
G/100 mm standard tube	–	–	–	–	0,55	0,55	0,55	0,55	–	–	–	–	–	–	–

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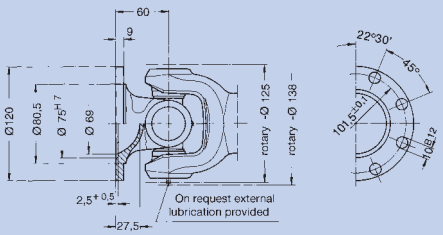
Cardan Drive-Shafts | Series 0.100 | Size 0.113 | Md_{Nom} 4100 Nm | Md_{Lim} 5350 Nm

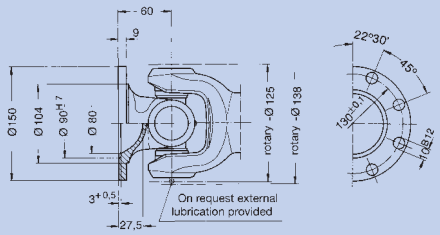
Needle or Roller bearing version

At utilisation of the nominal torque a verification of the flange connection is necessary.

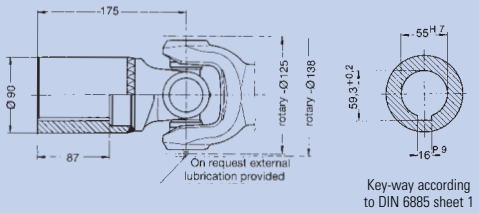
One keyway is not enough to transmit the max. torque. In such case a second keyway or an internal spline is recommended.



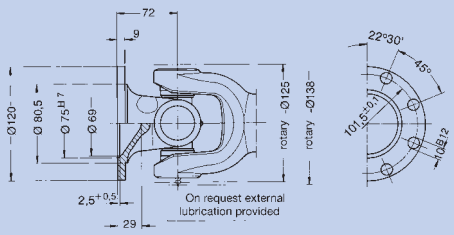
On both sides standard flange
end number: 0.113.XX0



On both sides larger flange
end number: 0.113.XX1



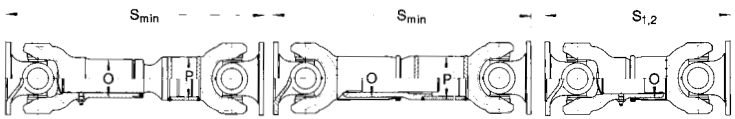
On both sides connecting hub
without key-way end number: 0.113.XX2
with key-way end number: 0.113.XX3



On both sides flange for larger angle deflection
end number: 0.113.XX5

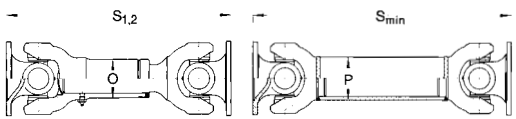
ß = Maximum angle of deflection per joint
J_m = Moment of inertia
G = Weight
S_{min} = Minimum length of tubular types
S_1 = Compressed lengths
S_2 = of short types
X_1 = Extension at S_{min} resp. S_1
X_2 = Extension at S_2
P_1 = Tube diameter. Dimensions in bold type for normal applications. Alternative dimensions are for long shafts at high speeds, see technical annex domain speed
P_2, P_3 = Alternative tube

Universal Cardan Drive-Shafts with extension



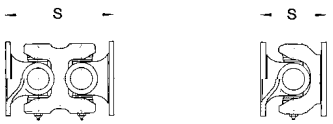
additional spline protection on request

Cardan Drive-Shafts without extension



additional spline protection on request

Universal Joints without extension



Please indicate requested length „S" and max. r.p.m. when ordering!		Tubular Type normal extension				Tubular Type larger extension				Short Type I		
Order number		**0.113.100**	**0.113.101**	**0.113.102**	**0.113.105**	**0.113.110**	**0.113.111**	**0.113.112**	**0.113.115**	**0.113.130**	**0.113.131**	**0.113.132**
Angle of deflection ß	°	20	18	20	35	20	18	20	35	20	18	20
Flange-Ø	mm	120	150	Hub	120	120	150	Hub	120	120	150	Hub
S_{min} resp. S_1	mm	491	491	721	530	556	556	786	580	345	345	575
S_2	mm	–	–	–	–	–	–	–	–	375	375	605
X resp. X_1	mm	60	60	60	60	130	130	130	130	35	35	35
X_2	mm	–	–	–	–	–	–	–	–	50	50	50
P_1	mm	**70 x 4**	**70 x 4**	**70 x 4**	**70 x 4**	**70 x 4**	**70 x 4**	**70 x 4**	**70 x 4**	**–**	**–**	**–**
P_2	mm	80 x 4	80 x 4	80 x 4	80 x 4	80 x 4	80 x 4	80 x 4	80 x 4	–	–	–
P_3	mm	100 x 4	100 x 4	100 x 4	100 x 4	100 x 4	100 x 4	100 x 4	100 x 4	–	–	–
Spline dim. DIN 5480	mm	50x2x24	50x2x24	50x2x24	50x2x24	50x2x24	50x2x24	50x2x24	50x2x24	50x2x24	50x2x24	50x2x24
Number of flange holes		8	8	–	8	8	8	–	8	8	8	–
J_m (at S_{min} resp. S_1)	kgm^2	0,01811	0,0218	0,01897	0,0199	0,02019	0,02388	0,02211	0,02324	0,01773	0,02142	0,02302
J_m (at S_2)	kgm^2	–	–	–	–	–	–	–	–	0,01807	0,02176	0,02336
J_m/100 mm standard tube	kgm^2	0,00071	0,00071	0,00071	0,00071	0,00071	0,00071	0,00071	0,00071	–	–	–
G (at S_{min} resp. S_1)	kg	13,66	15,02	19,88	14,55	15,46	16,82	21,75	16,12	11,31	12,67	17,53
G (at S_2)	kg	–	–	–	–	–	–	–	–	12,03	13,39	18,25
G/100 mm standard tube	kg	0,65	0,65	0,65	0,65	0,65	0,65	0,65	0,65	–	–	–

Please indicate requested length „S" and max. r.p.m. when ordering!		Short Type II				Tubular Type				Universal Joint Double			Universal Joint Single			
Order number		**0.113.140**	**0.113.141**	**0.113.142**	**0.113.145**	**0.113.200**	**0.113.201**	**0.113.202**	**0.113.205**	**0.113.300**	**0.113.301**	**0.113.302**	**0.113.400**	**0.113.401**	**0.113.402**	**0.113.405**
Angle of deflection ß	°	20	18	20	35	20	18	35	35	12	12	12	20	18	35	35
Flange-Ø	mm	120	150	Hub	120	120	150	Hub	120	120	150	Hub	120	150	Hub	120
S_{min} resp. S_1	mm	420	420	650	460	307	307	534	330	200	200	430	120	120	350	144
S_2	mm	450	450	680	495	–	–	–	–	–	–	–	–	–	–	–
X resp. X_1	mm	60	60	60	60	–	–	–	–	–	–	–	–	–	–	–
X_2	mm	60	60	60	60	–	–	–	–	–	–	–	–	–	–	–
P_1	mm	**–**	**–**	**–**	**–**	**70 x 4**	**70 x 4**	**70 x 4**	**70 x 4**	**–**	**–**	**–**	**–**	**–**	**–**	**–**
P_2	mm	–	–	–	–	80 x 4	80 x 4	80 x 4	80 x 4	–	–	–	–	–	–	–
P_3	mm	–	–	–	–	100 x 4	100 x 4	100 x 4	100 x 4	–	–	–	–	–	–	–
Spline dim. DIN 5480	mm	50x2x24	50x2x24	50x2x24	50x2x24	–	–	–	–	–	–	–	–	–	–	–
Number of flange holes		8	8	–	8	8	8	–	8	8	8	–	8	8	–	8
J_m (at S_{min} resp. S_1)	kgm^2	0,01512	0,01881	0,02041	0,01836	0,01436	0,01805	0,0156	0,01591	0,01336	0,01705	0,01465	0,00510	0,00879	0,01039	0,00998
J_m (at S_2)	kgm^2	0,01546	0,01915	0,02075	0,01866	–	–	–	–	–	–	–	–	–	–	–
J_m/100 mm standard tube	kgm^2	–	–	–	–	0,00071	0,00071	0,00071	0,00071	–	–	–	–	–	–	–
G (at S_{min} resp. S_1)	kg	12,60	13,96	18,83	13,47	9,36	10,72	15,56	10,02	7,97	9,33	14,04	4,42	5,78	10,66	5,10
G (at S_2)	kg	12,94	14,30	19,17	13,92	–	–	–	–	–	–	–	–	–	–	–
G/100 mm standard tube	kg	–	–	–	–	0,65	0,65	0,65	0,65	–	–	–	–	–	–	–

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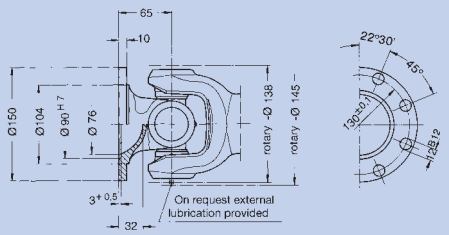
Cardan Drive-Shafts | Series 0.100 | Size 0.148 | Md_{Nom} 5500 Nm | Md_{Lim} 7050 Nm

0.100

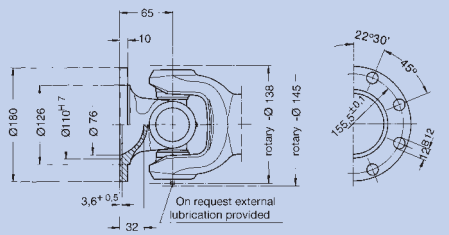
Roller bearing version

At utilisation of the nominal torque a verification of the flange connection is necessary.

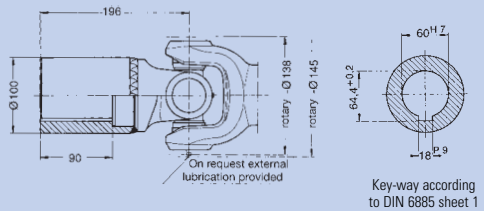
One keyway is not enough to transmit the max. torque. In such case a second keyway or an internal spline is recommended.



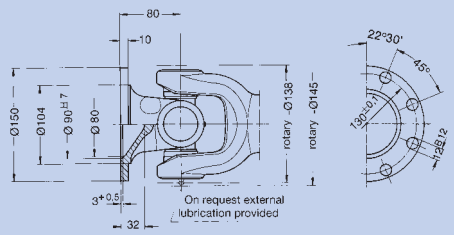
On both sides standard flange
end number: 0.148.XX0



On both sides larger flange
end number: 0.148.XX1



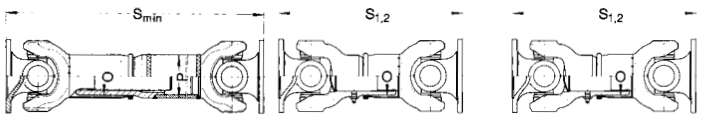
On both sides connecting hub
without key-way end number: 0.148.XX2
with key-way end number: 0.148.XX3



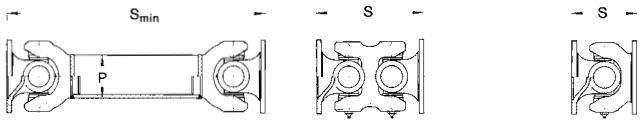
On both sides flange for larger angle deflection
end number: 0.148.XX5

ß = Maximum angle of deflection per joint
J_m = Moment of inertia
G = Weight
S_{min} = Minimum length of tubular types
S_1 = Compressed lengths
S_2 = of short types
X_1 = Extension at S_{min} resp. S_1
X_2 = Extension at S_2
P_1 = Tube diameter. Dimensions in bold type for normal applications. Alternative dimensions are for long shafts at high speeds, see technical annex domain speed
P_2, P_3 = Alternative tube

Universal Cardan Drive-Shafts with extension



Cardan Drive-Shafts without extension | Universal Joints without extension



Please indicate requested length „S" and max. r.p.m. when ordering!		Tubular Type larger extension				Short Type I			Short Type II			
Order number		**0.148.110**	**0.148.111**	**0.148.112**	**0.148.115**	**0.148.130**	**0.148.131**	**0.148.132**	**0.148.140**	**0.148.141**	**0.148.142**	**0.148.145**
Angle of deflection ß	°	20	20	35	35	20	20	20	20	20	20	35
Flange-Ø	mm	150	180	Hub	120/150	150	180	Hub	150	180	Hub	120/150
S_{min} resp. S_1	mm	550	550	812	580	360	360	622	460	460	722	490
S_2	mm	–	–	–	–	400	400	662	–	–	–	–
X resp. X_1	mm	110	110	110	110	40	40	40	80	80	80	80
X_2	mm	–	–	–	–	80	80	80	–	–	–	–
P_1	mm	**80 x 4**	**80 x 4**	**80 x 4**	**80 x 4**	–	–	–	–	–	–	–
P_2	mm	90 x 4	90 x 4	90 x 4	90 x 4	–	–	–	–	–	–	–
P_3	mm	100 x 4	100 x 4	100 x 4	100 x 4	–	–	–	–	–	–	–
Spline dim. DIN 5480	mm	55x2,5x20	55x2,5x20	55x2,5x20	55x2,5x20	55x2,5x20	55x2,5x20	55x2,5x20	55x2,5x20	55x2,5x20	55x2,5x20	55x2,5x20
Number of flange holes		8	8	–	8	8	8	–	8	8	–	8
J_m (at S_{min} resp. S_1)	kgm^2	0,0323	0,0342	0,0406	0,0332	0,0247	0,0267	0,03414	0,0294	0,0314	0,03884	0,0304
J_m (at S_2)	kgm^2	–	–	–	–	0,0267	0,0287	0,03614	–	–	–	–
J_m/100 mm standard tube	kgm^2	0,00109	0,00109	0,00109	0,00109	–	–	–	–	–	–	–
G (at S_{min} resp. S_1)	kg	20,87	22,17	29,77	22,19	15,63	16,93	24,53	18,37	19,67	27,27	19,69
G (at S_2)	kg	–	–	–	–	16,88	16,55	25,77	–	–	–	–
G/100 mm standard tube	kg	0,75	0,75	0,75	0,75	–	–	–	–	–	–	–

Please indicate requested length „S" and max. r.p.m. when ordering!		Tubular Type				Universal Joint Double			Universal Joint Single			
Order number		**0.148.200**	**0.148.201**	**0.148.202**	**0.148.205**	**0.148.300**	**0.148.301**	**0.148.302**	**0.148.400**	**0.148.401**	**0.148.402**	**0.148.405**
Angle of deflection ß	°	20	20	35	35	20	20	20	20	20	35	35
Flange-Ø	mm	150	180	Hub	120/150	150	180	Hub	150	180	Hub	120/150
S_{min} resp. S_1	mm	345	345	607	375	235	235	497	130	130	392	160
S_2	mm	–	–	–	–	–	–	–	–	–	–	–
X resp. X_1	mm	–	–	–	–	–	–	–	–	–	–	–
X_2	mm	–	–	–	–	–	–	–	–	–	–	–
P_1	mm	**80 x 4**	**80 x 4**	**80 x 4**	**80 x 4**	–	–	–	–	–	–	–
P_2	mm	90 x 4	90 x 4	90 x 4	90 x 4	–	–	–	–	–	–	–
P_3	mm	100 x 4	100 x 4	100 x 4	100 x 4	–	–	–	–	–	–	–
Spline dim. DIN 5480	mm	–	–	–	–	–	–	–	–	–	–	–
Number of flange holes		8	8	–	8	8	8	–	8	8	–	8
J_m (at S_{min} resp. S_1)	kgm^2	0,0217	0,0237	0,03144	0,0227	0,0149	0,0161	0,0162	0,0106	0,0126	0,02004	0,0117
J_m (at S_2)	kgm^2	–	–	–	–	–	–	–	–	–	–	–
J_m/100 mm standard tube	kgm^2	0,00109	0,00109	0,00109	0,00109	–	–	–	–	–	–	–
G (at S_{min} resp. S_1)	kg	14,53	15,83	23,43	15,85	11,92	13,22	20,82	6,75	8,05	15,54	8,08
G (at S_2)	kg	–	–	–	–	–	–	–	–	–	–	–
G/100 mm standard tube	kg	0,75	0,75	0,75	0,75	–	–	–	–	–	–	–

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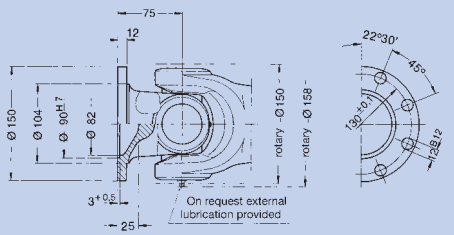
Cardan Drive-Shafts | Series 0.100 | Size 0.158 | Md_{Nom} 8200 Nm | Md_{Lim} 10650 Nm

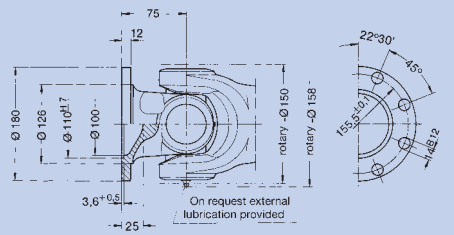
0.100

Roller bearing version

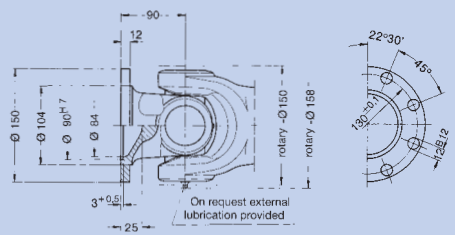
At utilisation of the nominal torque a verification of the flange connection is necessary.



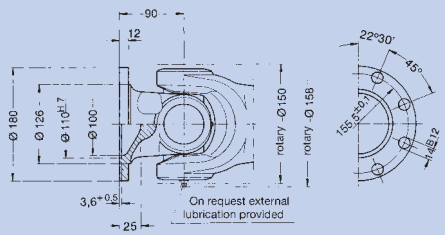
On both sides standard flange
end number: 0.158.XX0



On both sides larger flange
end number: 0.158.XX1



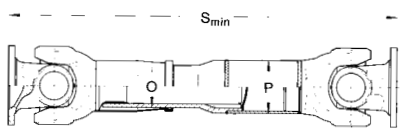
On both sides flange for larger angle deflection
end number: 0.158.XX5

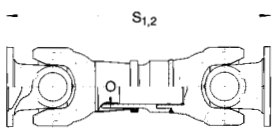


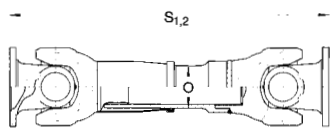
On both sides larger flange for larger angle deflection
end number: 0.158.XX6

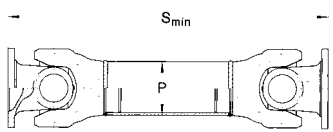
ß = Maximum angle of deflection per joint
J_m = Moment of inertia
G = Weight
S_{min} = Minimum length of tubular types
S_1 = Compressed lengths
S_2 = of short types
X_1 = Extension at S_{min} resp. S_1
X_2 = Extension at S_2
P_1 = Tube diameter. Dimensions in bold type for normal applications. Alternative dimensions are for long shafts at high speeds, see technical annex domain speed
P_2, P_3 = Alternative tube

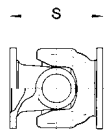
Universal Cardan Drive-Shafts with extension | **Cardan Drive-Shafts without extension** | **Universal Joints without extension**











Please indicate requested length „S" and max. r.p.m. when ordering!

		Tubular Type larger extension				Short Type I			
Order number		**0.158.110**	**0.158.111**	**0.158.115**	**0.158.116**	**0.158.130**	**0.158.131**	**0.158.135**	**0.158.136**
Angle of deflection ß	°	20	20	35	35	20	20	35	35
Flange-Ø	mm	150	180	150	180	150	180	150	180
S_{min} resp. S_1	mm	710	710	742	742	400	400	545	545
S_2	mm	–	–	–	–	465	465	585	585
X resp. X_1	mm	110	110	110	110	50	50	40	40
X_2	mm	–	–	–	–	80	80	80	80
P_1	mm	**90 x 4**	**90 x 4**	**90 x 4**	**90 x 4**	**–**	**–**	**–**	**–**
P_2	mm	100 x 4	100 x 4	100 x 4	100 x 4	–	–	–	–
P_3	mm	120 x 5	120 x 5	120 x 5	120 x 5	–	–	–	–
Spline dim. DIN 5480	mm	60x2,5x22	60x2,5x22	60x2,5x22	60x2,5x22	60x2,5x22	60x2,5x22	60x2,5x22	60x2,5x22
Number of flange holes		8	8	8	8	8	8	8	8
J_m (at S_{min} resp. S_1)	kgm^2	–	–	0,04531	0,05034	0,04114	0,0464	0,04291	0,04817
J_m (at S_2)	kgm^2	–	–	–	–	0,04193	0,0472	0,04340	0,04870
J_m/100 mm standard tube	kgm^2	0,00157	0,00157	0,00157	0,00157	–	–	–	–
G (at S_{min} resp. S_1)	kg	31,1	31,8	31,76	33,38	19,62	21,18	25,92	27,54
G (at S_2)	kg	–	–	–	–	22,05	23,61	27,27	28,89
G/100 mm standard tube	kg	0,85	0,85	0,85	0,85	–	–	–	–

	Short Type II				Tubular Type				Universal Joint Single			
Order number	**0.158.140**	**0.158.141**	**0.158.145**	**0.158.146**	**0.158.200**	**0.158.201**	**0.158.205**	**0.158.206**	**0.158.400**	**0.158.401**	**0.158.405**	**0.158.406**
Angle of deflection ß	20	20	35	35	20	20	35	35	20	20	35	35
Flange-Ø	150	180	150	180	150	180	150	180	150	180	150	180
S_{min} resp. S_1	610	610	640	640	425	425	455	455	150	150	180	180
S_2	650	650	680	680	–	–	–	–	–	–	–	–
X resp. X_1	110	110	110	110	–	–	–	–	–	–	–	–
X_2	130	130	130	130	–	–	–	–	–	–	–	–
P_1	**–**	**–**	**–**	**–**	**90 x 4**	**90 x 4**	**90 x 4**	**90 x 4**	**–**	**–**	**–**	**–**
P_2	–	–	–	–	100 x 4	100 x 4	100 x 4	100 x 4	–	–	–	–
P_3	–	–	–	–	120 x 5	120 x 5	120 x 5	120 x 5	–	–	–	–
Spline dim. DIN 5480	60x2,5x22	60x2,5x22	60x2,5x22	60x2,5x22	–	–	–	–	–	–	–	–
Number of flange holes	8	8	8	8	8	8	8	8	8	8	8	8
J_m (at S_{min} resp. S_1)	–	–	0,04409	0,04935	–	–	0,04340	0,04865	0,02055	0,02581	0,02417	0,02944
J_m (at S_2)	–	–	–	–	–	–	–	–	–	–	–	–
J_m/100 mm standard tube	–	–	–	–	0,00157	0,00157	0,00157	0,00157	–	–	–	–
G (at S_{min} resp. S_1)	28,72	30,28	29,14	30,76	20,26	21,82	21,12	22,74	8,34	9,90	9,20	10,82
G (at S_2)	30,32	31,8	31,09	32,71	–	–	–	–	–	–	–	–
G/100 mm standard tube	–	–	–	–	0,85	0,85	0,85	0,85	–	–	–	–

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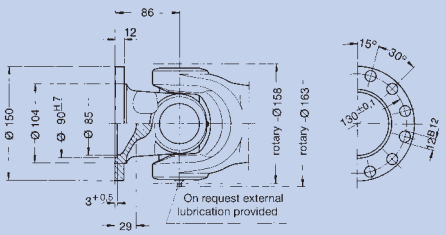
Cardan Drive-Shafts | Series 0.100 | Size 0.117 | Md_{Nom} 10000 Nm | Md_{Lim} 13000 Nm

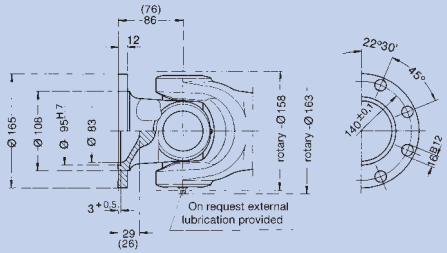
0.100

Roller bearing version

At utilisation of the nominal torque a verification of the flange connection is necessary.

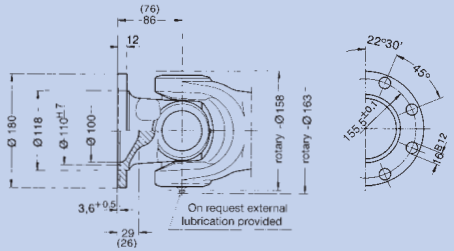


On both sides standard flange
end number: 0.117.XX0



On both sides larger flange (Ø 165 mm)
end number: 0.117.XX1

Dimensions in brackets are only valid for short type I

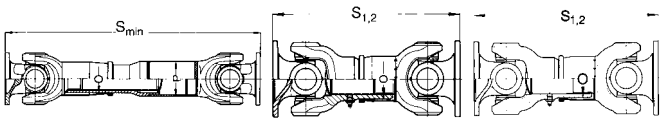


On both sides larger flange (Ø 180 mm)
end number: 0.117.XX1

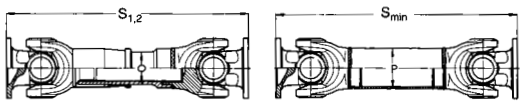
Dimensions in brackets are only valid for short type I

ß = Maximum angle of deflection per joint
J_m = Moment of inertia
G = Weight
S_{min} = Minimum length of tubular types
S_1 = Compressed lengths
S_2 = of short types
X_1 = Extension at S_{min} resp. S_1
X_2 = Extension at S_2
P_1 = Tube diameter. Dimensions in bold type for normal applications. Alternative dimensions are for long shafts at high speeds, see technical annex domain speed
P_2, P_3 = Alternative tube

Universal Cardan Drive-Shafts with extension



Cardan Drive-Shafts without extension



Universal Joints without extension

Please indicate requested length „S" and max. r.p.m. when ordering!		Tubular Type larger extension			Short Type I		Short Type II		
Order number		**0.117.110**	**0.117.111**	**0.117.111**	**0.117.121**	**0.117.121**	**0.117.130**	**0.117.131**	**0.117.131**
Angle of deflection ß	°	30	30	30	24	24	30	30	30
Flange-Ø	mm	150	165	180	165	180	150	165	180
S_{min} resp. S_1	mm	660	660	660	400	400	495	495	495
S_2	mm	–	–	–	440	440	555	555	555
X resp. X_1	mm	110	110	110	40	40	45	45	45
X_2	mm	–	–	–	50	50	80	80	80
P_1	mm	**100 x 5**	**100 x 5**	**100 x 5**	**–**	**–**	**–**	**–**	**–**
P_2	mm	120 x 5	120 x 5	120 x 5	–	–	–	–	–
P_3	mm	–	–	–	–	–	–	–	–
Spline dim. DIN 5480	mm	65x2,5x24	65x2,5x24	65x2,5x24	65x2,5x24	65x2,5x24	65x2,5x24	65x2,5x24	65x2,5x24
Number of flange holes		12	8	8	8	8	12	8	8
J_m (at S_{min} resp. S_1)	kgm^2	0,04834	0,05185	0,05463	0,0467	0,0491	0,04286	0,04678	0,04917
J_m (at S_2)	kgm^2	–	–	–	0,04898	0,05138	0,04439	0,04899	0,05139
J_m/100 mm standard tube	kgm^2	0,00265	0,00265	0,00265	–	–	–	–	–
G (at S_{min} resp. S_1)	kg	35,03	35,51	36,56	25,61	26,52	28,21	28,69	29,74
G (at S_2)	kg	–	–	–	27,29	28,20	30,88	31,36	32,41
G/100 mm standard tube	kg	1,17	1,17	1,17	–	–	–	–	–

Please indicate requested length „S" and max. r.p.m. when ordering!		Short Type III			Tubular Type			Universal Joint Double			Universal Joint Single		
Order number		**0.117.140**	**0.117.141**	**0.117.141**	**0.117.200**	**0.117.201**	**0.117.201**	**0.117.300**	**0.117.301**	**0.117.301**	**0.117.400**	**0.117.401**	**0.117.401**
Angle of deflection ß	°	30	30	30	30	30	30	15	15	15	30	30	30
Flange-Ø	mm	150	165	180	150	165	180	150	165	180	150	165	180
S_{min} resp. S_1	mm	600	600	600	430	430	430	296	296	296	172	172	172
S_2	mm	–	–	–	–	–	–	–	–	–	–	–	–
X resp. X_1	mm	110	110	110	–	–	–	–	–	–	–	–	–
X_2	mm	–	–	–	–	–	–	–	–	–	–	–	–
P_1	mm	**–**	**–**	**–**	**100 x 5**	**100 x 5**	**100 x 5**	**–**	**–**	**–**	**–**	**–**	**–**
P_2	mm	–	–	–	120 x 5	120 x 5	120 x 5	–	–	–	–	–	–
P_3	mm	–	–	–	–	–	–	–	–	–	–	–	–
Spline dim. DIN 5480	mm	–	–	–	–	–	–	–	–	–	–	–	–
Number of flange holes		12	8	8	12	8	8	12	8	8	12	8	8
J_m (at S_{min} resp. S_1)	kgm^2	0,04665	0,05125	0,05365	0,04054	0,04424	0,04796	0,037	0,0423	0,0468	0,01879	0,02133	0,02568
J_m (at S_2)	kgm^2	–	–	–	–	–	–	–	–	–	–	–	–
J_m/100 mm standard tube	kgm^2	–	–	–	0,00265	0,00265	0,00265	–	–	–	–	–	–
G (at S_{min} resp. S_1)	kg	33,45	33,93	34,98	25,31	25,79	26,84	21,02	21,50	22,57	10,99	11,47	12,52
G (at S_2)	kg	–	–	–	–	–	–	–	–	–	–	–	–
G/100 mm standard tube	kg	–	–	–	1,17	1,17	1,17	–	–	–	–	–	–

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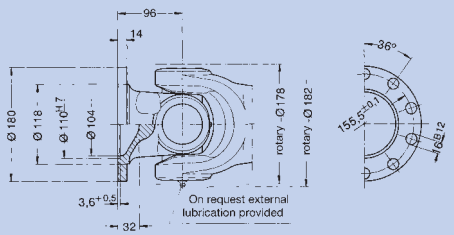
Cardan Drive-Shafts | Series 0.100 | Size 0.120 | Md_{Nom} 16850 Nm | Md_{Lim} 21900 Nm

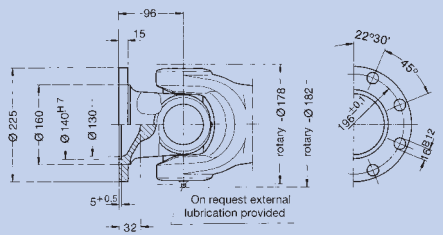
0.100

Roller bearing version

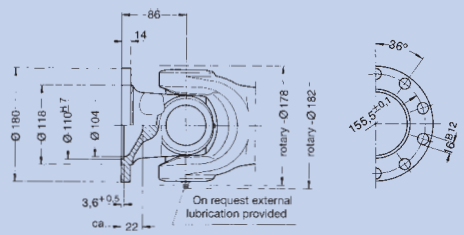
At utilisation of the nominal torque a verification of the flange connection is necessary.



On both sides standard flange
end number: 0.120.XX0



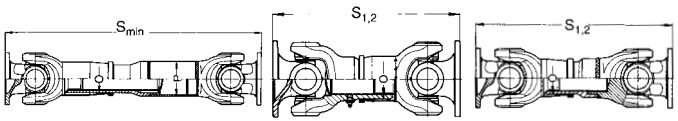
On both sides larger flange
end number: 0.120.XX1

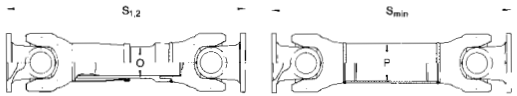


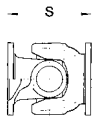
Shorter flange to short type I

ß = Maximum angle of deflection per joint
J_m = Moment of inertia
G = Weight
S_{min} = Minimum length of tubular types
S_1 = Compressed lengths
S_2 = of short types
X_1 = Extension at S_{min} resp. S_1
X_2 = Extension at S_2
P_1 = Tube diameter. Dimensions in bold type for normal applications. Alternative dimensions are for long shafts at high speeds, see technical annex domain speed
P_2, P_3 = Alternative tube

Universal Cardan Drive-Shafts with extension | **Cardan Drive-Shafts without extension** | **Universal Joints without extension**







Please indicate requested length „S" and max. r.p.m. when ordering!		Tubular Type larger extension		Short Type I	Short Type II		Short Type III		Tubular Type		Universal Joint Single	
Order number		**0.120.110**	**0.120.111**	**0.120.120**	**0.120.130**	**0.120.131**	**0.120.140**	**0.120.141**	**0.120.200**	**0.120.201**	**0.120.400**	**0.120.401**
Angle of deflection ß	°	30	30	16	30	30	30	30	30	30	30	30
Flange-Ø	mm	180	225	180	180	225	180	225	180	225	180	225
S_{min} resp. S_1	mm	740	740	470	560	560	650	650	465	465	192	192
S_2	mm	–	–	500	600	600	–	–	–	–	–	–
X resp. X_1	mm	110	110	55	45	45	110	110	–	–	–	–
X_2	mm	–	–	60	60	60	–	–	–	–	–	–
P_1	mm	**110 x 6**	**110 x 6**	**–**	**–**	**–**	**–**	**–**	**110 x 6**	**110 x 6**	**–**	**–**
P_2	mm	120 x 6	120 x 6	–	–	–	–	–	120 x 6	120 x 6	–	–
P_3	mm	–	–	–	–	–	–	–	–	–	–	–
Spline dim. DIN 5480	mm	75x2,5x28	75x2,5x28	75x2,5x28	75x2,5x28	75x2,5x28	75x2,5x28	75x2,5x28	–	–	–	–
Number of flange holes		10	8	10	10	8	10	8	10	8	10	8
J_m (at S_{min} resp. S_1)	kgm^2	0,10213	0,14413	0,07320	0,07839	0,12039	0,08228	0,12428	0,07247	0,11447	0,03696	0,07896
J_m (at S_2)	kgm^2	–	–	0,07493	0,08070	0,12270	–	–	–	–	–	–
J_m/100 mm standard tube	kgm^2	0,004175	0,004175	–	–	–	–	–	0,004175	0,004175	–	–
G (at S_{min} resp. S_1)	kg	48,75	52,89	36,26	40,27	44,41	45,10	49,24	33,90	38,05	14,10	18,88
G (at S_2)	kg	–	–	37,76	42,42	46,56	–	–	–	–	–	–
G/100 mm standard tube	kg	1,54	1,54	–	–	–	–	–	1,54	1,54	–	–

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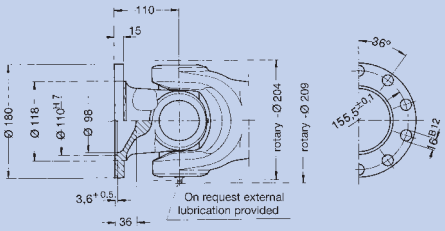
Cardan Drive-Shafts | Series 0.100 | Size 0.122 | Md_{Nom} 26750 Nm | Md_{Lim} 35000 Nm

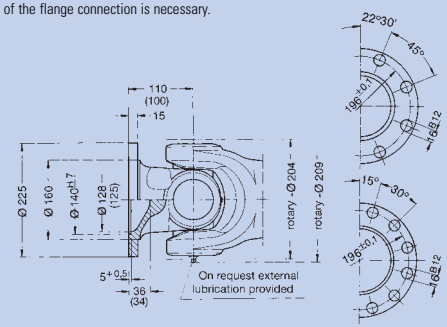
0.100

Roller bearing version

At utilisation of the nominal torque a verification of the flange connection is necessary.

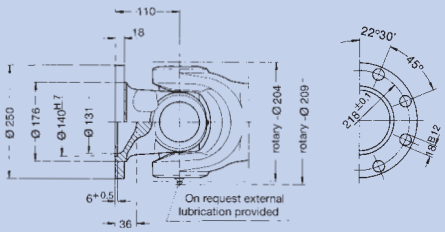


On both sides standard flange
end number: 0.122.XX0



On both sides larger flange (Ø 225 mm)
end number: 0.122.XX1

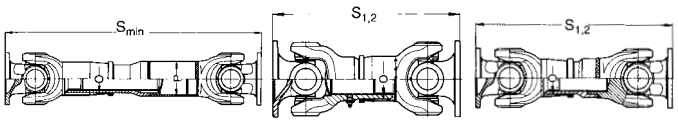
Dimensions in brackets are only valid for short type I

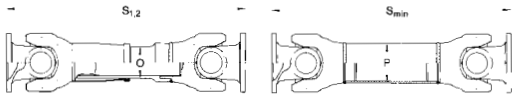


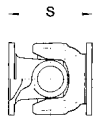
On both sides larger flange (Ø 250 mm)
end number: 0.122.XX1

ß = Maximum angle of deflection per joint
J_m = Moment of inertia
G = Weight
S_{min} = Minimum length of tubular types
S_1 = Compressed lengths
S_2 = of short types
X_1 = Extension at S_{min} resp. S_1
X_2 = Extension at S_2
P_1 = Tube diameter. Dimensions in bold type for normal applications. Alternative dimensions are for long shafts at high speeds, see technical annex domain speed
P_2, P_3 = Alternative tube

Universal Cardan Drive-Shafts with extension | **Cardan Drive-Shafts without extension** | **Universal Joints without extension**







Please indicate requested length „S" and max. r.p.m. when ordering!		Tubular Type larger extension				Short Type I			Short Type II			
Order number		**0.122.110**	**0.122.111**	**0.122.111**	**0.122.111**	**0.122.121**			**0.122.130**	**0.122.131**	**0.122.131**	**0.122.131**
Angle of deflection ß	°	30	30	30	25	25			30	30	30	25
Flange-Ø	mm	180	225	225	250	225			180	225	225	250
S_{min} resp. S_1	mm	830	830	830	830	550			650	650	650	650
S_2	mm	–	–	–	–	600			–	–	–	–
X resp. X_1	mm	140	140	140	140	40			80	80	80	80
X_2	mm	–	–	–	–	55			–	–	–	–
P_1	mm	**120 x 6**	**120 x 6**	**124 x 8**	**124 x 8**	**–**			**–**	**–**	**–**	**–**
P_2	mm	140 x 6,5	140 x 6,5	140 x 6,5	140 x 6,5	–			–	–	–	–
P_3	mm	–	–	–	–	–			–	–	–	–
Spline dim. DIN 5480	mm	90x2,5x34	90x2,5x34	90x2,5x34	90x2,5x34	90x2,5x34			90x2,5x34	90x2,5x34	90x2,5x34	90x2,5x34
Number of flange holes		10	8	12	8	8			10	8	12	8
J_m (at S_{min} resp. S_1)	kgm^2	0,1558	0,1781	0,1792	0,1884	0,1453			0,1202	0,1565	0,1565	0,1853
J_m (at S_2)	kgm^2	–	–	–	–	0,1509			–	–	–	–
J_m/100 mm standard tube	kgm^2	0,00550	0,00550	0,00774	0,00774	–			–	–	–	–
G (at S_{min} resp. S_1)	kg	72,05	76,93	77,49	80,82	61,04			60,67	65,55	65,55	68,79
G (at S_2)	kg	–	–	–	–	64,85			–	–	–	–
G/100 mm standard tube	kg	1,69	1,69	2,29	2,29	–			–	–	–	–

Please indicate requested length „S" and max. r.p.m. when ordering!		Short Type III				Tubular Type				Universal Joint Single			
Order number		**0.122.140**	**0.122.141**	**0.122.141**	**0.122.141**	**0.122.200**	**0.122.201**	**0.122.201**	**0.122.201**	**0.122.400**	**0.122.401**	**0.122.401**	**0.122.401**
Angle of deflection ß	°	30	30	30	25	30	30	30	25	30	30	30	25
Flange-Ø	mm	180	225	225	250	180	225	225	250	180	225	225	250
S_{min} resp. S_1	mm	720	720	720	720	520	520	520	520	220	220	220	220
S_2	mm	–	–	–	–	–	–	–	–	–	–	–	–
X resp. X_1	mm	110	110	110	110	–	–	–	–	–	–	–	–
X_2	mm	–	–	–	–	–	–	–	–	–	–	–	–
P_1	mm	**–**	**–**	**–**	**–**	**120 x 6**	**120 x 6**	**124 x 8**	**124 x 8**	**–**	**–**	**–**	**–**
P_2	mm	–	–	–	–	140 x 6,5	140 x 6,5	140 x 6,5	140 x 6,5	–	–	–	–
P_3	mm	–	–	–	–	–	–	–	–	–	–	–	–
Spline dim. DIN 5480	mm	90x2,5x34	90x2,5x34	90x2,5x34	90x2,5x34	–	–	–	–	–	–	–	–
Number of flange holes		10	8	12	8	10	8	12	8	10	8	12	8
J_m (at S_{min} resp. S_1)	kgm^2	0,1272	0,1636	0,1636	0,1840	0,1195	0,1642	0,1645	0,1846	0,05597	0,0923	0,0923	0,1211
J_m (at S_2)	kgm^2	–	–	–	–	–	–	–	–	–	–	–	–
J_m/100 mm standard tube	kgm^2	–	–	–	–	0,00550	0,00550	0,00774	0,00774	–	–	–	–
G (at S_{min} resp. S_1)	kg	66,07	70,95	70,95	74,19	45,70	50,58	50,91	54,24	20,77	25,64	25,64	28,86
G (at S_2)	kg	–	–	–	–	–	–	–	–	–	–	–	–
G/100 mm standard tube	kg	–	–	–	–	1,69	1,69	2,29	2,29	–	–	–	–

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Universal-Joint Intermediate Shafts

Series 0.100

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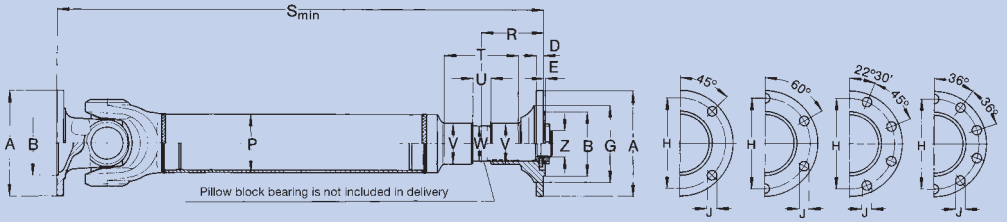
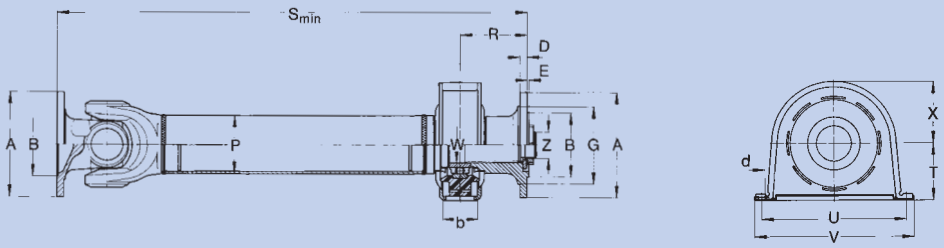
Universal-Joint Intermediate Shafts | Series 0.100 | Size 0.109–0.122 | Md_{Nom} 1700–26750 Nm | Md_{Lim} 2200–35000 Nm

At utilisation of the nominal torque a verification of the flange connection is necessary.



For missing dimensions and details see according series.



For missing dimensions and details see according series.
Flange illustrations see intermediate shafts without pillow block bearings.

Please indicate requested length „S" and max. r.p.m. when ordering!

Universal-Joint Intermediate Shaft for SKF-pillow block bearing (are not included in delivery)

Order number		0.109.250	0.110.250	0.112.250	0.113.250	0.148.250	0.158.250	0.117.251	0.120.250	0.122.250	0.122.251
Md_{Nom}	Nm	1700	2300	3350	4100	5500	8200	10000	16850	26750	26750
Angle of deflection ß	°	20	20	20	20	20	35	30	30	30	30
For pillow block bearing		SNH 207	SNH 207	SNH 209	SNH 209	SNH 211	SNH 211	SNH 213	SNH 215	SNH 216	SNH 216
A	mm	90	100	120	120	150	150	180	180	180	225
B^{H7}_{h6}	mm	47	57	75	75	90	90	110	110	110	140
D	mm	8	8	9	9	10	10	12	14	14	15
$E_{-0,2}$	mm	2,3	2,3	2,3	2,3	2,8	2,8	2,8	2,8	2,8	4,5
$G_{-0,3}$	mm	61,1	70,6	88,1	84,1	110,6	110,6	131	131	131	171,5
$H^{\pm 0,1}$	mm	74,5	84	101,5	101,5	130	130	155,5	155,5	155,5	196
J^{B12}	mm	8	8	8	10	12	12	16	16	16	16
P_1	mm	**50 x 2**	**50 x 3**	**60 x 4**	**70 x 4**	**80 x 4**	**90 x 4**	**100 x 5**	**110 x 6**	**120 x 6**	**124 x 8**
P_2	mm	70 x 3	70 x 3	80 x 4	80 x 4	90 x 4	100 x 4	120 x 5	120 x 6	124 x 8	140 x 6,5
P_3	mm	80 x 4	80 x 4	90 x 4	100 x 4	100 x 4	120 x 5	–	–	–	–
R	mm	68,5	68,5	71,5	71,5	87,5	87,5	105,5	115,5	135,5	135,5
S_{min}	mm	253	269	305	308	360	420	446	480	540	540
T	mm	100	100	100	100	112	112	125	142	147	147
U	mm	23	23	23	23	25	25	31	31	33	33
V_{h9}	mm	45	45	55	55	65	65	75	85	90	90
W	mm	35	35	45	45	55	55	65	75	80	80
Z	mm	M16 x 1,5	M16 x 1,5	M20 x 1,5	M20 x 1,5	M32 x 1,5	M32 x 1,5	M45 x 1,5	M45 x 1,5	M45 x 1,5	M45 x 1,5
Weight	kg	3,95	4,68	7,60	8,59	14,25	17,90	25,64	32,06	–	47,44
Tooth/spline dim.	mm	35 x 31	35 x 31	45 x 41	45 x 41	55 x 50	55 x 50	62x54x20	70x61x20	75x66x22	75x66x22
Number of flange holes		4	6	8	8	8	8	8	10	10	8
J_m (at S_{min})	kgm^2	0,000531	0,00324	0,008786	0,01198	0,02496	0,04510	0,04564	0,1089	–	–
J_m/100 mm standard tube	kgm^2	0,00014	0,00019	0,00044	0,00071	0,00109	0,00157	0,00265	0,00418	–	–
G (at S_{min})	kg	4,0	4,7	7,5	9,0	13,3	18,5	25,9	31,7	46,0	47,5
G/100 mm standard tube	kg	0,24	0,35	0,55	0,65	0,75	0,85	1,17	1,54	1,69	2,29

Please indicate requested length „S" and max. r.p.m. when ordering!

Universal-Joint Intermediate Shaft cpl. with elastic pillow block bearing

Order number		0.109.260	0.110.260	0.112.260	0.113.260	0.148.260	0.158.260	0.117.261	0.120.260
Md_{Nom}	Nm	1700	2300	3350	4100	5500	8200	10000	16850
Angle of deflection ß	°	20	20	20	20	20	35	30	30
For pillow block bearing		1000958350	1000958350	1000958450	1000958450	1000958500	1000958550	1000958600	1000958700
A	mm	90	100	120	120	150	150	180	180
B^{H7}_{h6}	mm	47	57	75	75	90	90	110	110
b	mm	45	45	58	58	58	60	60	63,5
D	mm	8	8	9	9	10	12	12	14
d	mm	12,8	12,8	13	13	14,2	15	15	16
$E_{-0,2}$	mm	2,3	2,3	2,3	2,3	2,3	2,8	2,8	2,8
$G_{-0,3}$	mm	61,1	70,6	88,1	84,1	110,6	110,6	133	131
$H^{\pm 0,1}$	mm	74,5	84	101,5	101,5	130	130	155,5	155,5
J^{B12}	mm	8	8	8	10	12	12	16	16
P_1	mm	**50 x 2**	**50 x 3**	**60 x 4**	**70 x 4**	**80 x 4**	**90 x 4**	**100 x 5**	**110 x 6**
P_2	mm	70 x 3	70 x 3	80 x 4	80 x 4	90 x 4	100 x 4	120 x 5	120 x 6
P_3	mm	80 x 4	80 x 4	90 x 4	100 x 4	100 x 4	120 x 5	–	–
R	mm	68,3	68,3	71,3	71,5	87,5	95	100	107
S_{min}	mm	238	254	293	296	339	410	405	425
T	mm	58,8	58,8	70	70	70	71,5	80	85,5
U	mm	168	168	193,6	193,6	193,6	193,6	200	219,2
V	mm	198	198	228	228	228	230	243	260
W	mm	35	35	45	45	50	55	60	70
X	mm	73	69	–	–	–	–	–	–
Z	mm	M16 x 1,5	M16 x 1,5	M20 x 1,5	M20 x 1,5	M32 x 1,5	M32 x 1,5	M45 x 1,5	M45 x 1,5
Tooth/spline dim.	mm	35 x 31	35 x 31	45 x 41	45 x 41	50 x 45	55 x 50	60x2,5x22	70x2,5x26
Number of flange holes		4	6	8	8	8	8	8	10
J_m (at S_{min})	kgm^2	0,000514	0,00322	0,008748	0,01194	0,02485	0,04503	0,04523	0,10788
J_m/100 mm standard tube	kgm^2	0,00014	0,00019	0,00044	0,00071	0,00109	0,00157	0,00265	0,00418
G (at S_{min})	kg	5,40	6,18	9,99	10,69	16,12	20,05	28,40	34,06
G/100 mm standard tube	kg	0,24	0,35	0,55	0,65	0,75	0,85	1,17	1,54

ß = Maximum angle of deflection per joint
J_m = Moment of inertia
G = Weight
S_{min} = Minimum length of tubular types

P_1 = Tube diameter. Dimensions in bold type for normal applications. Alternative dimensions are for long shafts at high speeds, see technical annex domain speed

P_2, P_3 = Alternative tube

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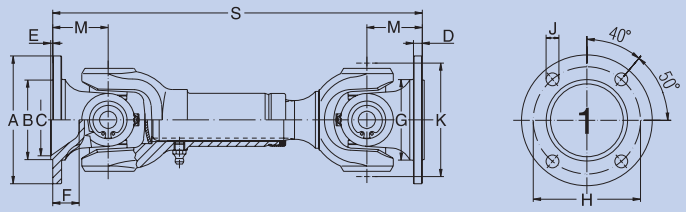
Cardan Drive-Shafts | Series 0.100 | Size 0.107–0.110 | Md_{Nom} 920–2300 Nm | Md_{Lim} 1200–3000 Nm

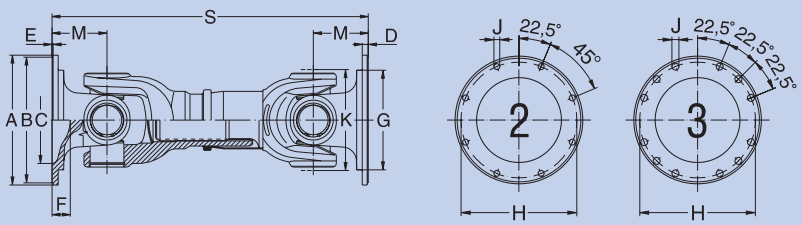
0.100

for SAE-flange-connection, with extension

At utilisation of the nominal torque a verification of the flange connection is necessary.



For missing dimensions and details see according series.



For missing dimensions and details see according series.

Please indicate compressed length „S" and max. r.p.m. when ordering!

		Cardan-Drive-Shafts for SAE-flange-connection, with extension; Size 0.107						Size 0.109	
Order number		**0.107.138.001**	**0.107.138.002**	**0.107.148.001**	**0.107.148.002**	**0.107.108.001**	**0.107.118.001**	**0.109.138.201**	**0.109.138.202**
SAE-flange-connection		**1100**	**1100**	**1100**	**1100**	**1100**	**1100**	**1310**	**1310**
Elbe joint size		**0.107**	**0.107**	**0.107**	**0.107**	**0.107**	**0.107**	**0.109**	**0.109**
Md_{Nom}	Nm	920	920	920	920	920	920	1700	1700
Angle of deflection ß	°	18	18	18	18	18	18	18	18
A	mm	87,3	87,3	87,3	87,3	87,3	87,3	96,8	96,8
$B_{-0,04}$	mm	57,15	57,15	57,15	57,15	57,15	57,15	60,32	60,32
C	mm	44	44	44	44	44	44	54	54
D	mm	5,2	5,2	5,2	5,2	5,2	5,2	6,7	6,7
E	mm	$1,5_{-0,1}$	$1,5_{-0,1}$	$1,5_{-0,1}$	$1,5_{-0,1}$	$1,5_{-0,1}$	$1,5_{-0,1}$	$1,5_{-0,1}$	$1,5_{-0,1}$
F	mm	18	18	18	18	18	18	21,5	21,5
G	mm	54	54	54	54	54	54	61	61
$H_{\pm 0,1}$	mm	69,85	69,85	69,85	69,85	69,85	69,85	79,4	79,4
J^{B12}	mm	7,9	7,9	7,9	7,9	7,9	7,9	9,5	9,5
K	mm	70	70	70	70	70	70	86	86
M	mm	36	36	36	36	36	36	42	42
S_{min}	mm	200	225	250	270	300	360	225	250
X (extension)	mm	25	35	35	35	35	70	25	40
Tooth/spline dim.	mm	28x1,5x17	28x1,5x17	28x1,5x17	28x1,5x17	28x1,5x17	28x1,5x17	32x2x14	32x2x14
Type of flange		1	1	1	1	1	1	1	1

		Size 0.109				Size 0.110					
Order number		**0.109.148.201**	**0.109.148.202**	**0.109.108.201**	**0.109.118.201**	**0.110.138.001**	**0.110.138.002**	**0.110.148.001**	**0.110.148.002**	**0.110.108.001**	**0.110.118.001**
SAE-flange-connection		**1310**	**1310**	**1310**	**1310**	**1350/1410**	**1350/1410**	**1350/1410**	**1350/1410**	**1350/1410**	**1350/1410**
Elbe joint size		**0.109**	**0.109**	**0.109**	**0.109**	**0.110**	**0.110**	**0.110**	**0.110**	**0.110**	**0.110**
Md_{Nom}	Nm	1700	1700	1700	1700	2300	2300	2300	2300	2300	2300
Angle of deflection ß	°	18	18	18	18	18	18	18	18	18	18
A	mm	96,8	96,8	96,8	96,8	116	116	116	116	116	116
$B_{-0,04}$	mm	60,32	60,32	60,32	60,32	69,85	69,85	69,85	69,85	69,85	69,85
C	mm	54	54	54	54	55	55	55	55	55	55
D	mm	6,7	6,7	6,7	6,7	7,5	7,5	7,5	7,5	7,5	7,5
E	mm	$1,5_{-0,1}$	$1,5_{-0,1}$	$1,5_{-0,1}$	$1,5_{-0,1}$	$1,5_{-0,1}$	$1,5_{-0,1}$	$1,5_{-0,1}$	$1,5_{-0,1}$	$1,5_{-0,1}$	$1,5_{-0,1}$
F	mm	21,5	21,5	21,5	21,5	20	20	20	20	20	20
G	mm	61	61	61	61	68	68	68	68	68	68
$H_{\pm 0,1}$	mm	79,4	79,4	79,4	79,4	95,25	95,25	95,25	95,25	95,25	95,25
J^{B12}	mm	9,5	9,5	9,5	9,5	11,2	11,2	11,2	11,2	11,2	11,2
K	mm	86	86	86	86	98	98	98	98	98	98
M	mm	42	42	42	42	46	46	46	46	46	46
S_{min}	mm	280	310	348	393	255	280	310	340	374	464
X (extension)	mm	40	40	40	80	30	40	40	40	40	100
Tooth/spline dim.	mm	32x2x14	32x2x14	32x2x14	32x2x14	35x2x16	35x2x16	35x2x16	35x2x16	35x2x16	35x2x16
Type of flange		1	1	1	1	1	1	1	1	1	1

ß = Maximum angle of deflection per joint
S = Compressed lengths; corresponds to the length of standard type

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Cardan Drive-Shafts

Series 0.100

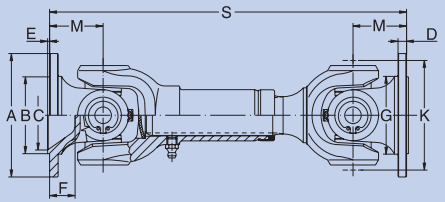
Size 0.112–0.122

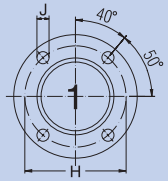
Md_{Nom} 3350–26750 Nm

Md_{Lim} 4350–35000 Nm

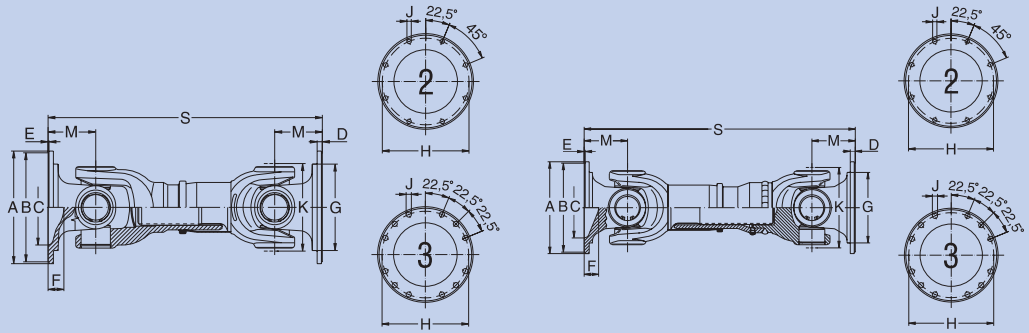
for SAE-flange-connection, with extension

At utilisation of the nominal torque a verification of the flange connection is necessary.





For missing dimensions and details see according series.



For missing dimensions and details see according series.

Please indicate compressed length „S" and max. r.p.m. when ordering!

		Cardan-Drive-Shafts for SAE-flange-connection, with extension; Size 0.112						Size 0.148		Size 0.120						Size 0.122		
Order number		**0.112.138.201**	**0.112.138.202**	**0.112.148.201**	**0.112.148.202**	**0.112.108.201**	**0.112.118.201**	**0.148.138.001**	**0.148.138.002**	**0.148.148.001**	**0.148.118.001**	**0.120.138.001**	**0.120.138.002**	**0.120.148.001**	**0.120.118.001**	**0.122.138.001**	**0.122.148.001**	**0.122.118.001**
SAE-flange-connection		**1510**	**1510**	**1510**	**1510**	**1510**	**1510**	**1600**	**1600**	**1600**	**1600**	**1800**	**1800**	**1800**	**1800**	**1900**	**1900**	**1900**
Elbe joint size		**0.112**	**0.112**	**0.112**	**0.112**	**0.112**	**0.112**	**0.148**	**0.148**	**0.148**	**0.148**	**0.120**	**0.120**	**0.120**	**0.120**	**0.122**	**0.122**	**0.122**
Md_{Nom}	Nm	3350	3350	3350	3350	3350	3350	5500	5500	5500	5500	16850	16850	16850	16850	26750	26750	26750
Angle of deflection ß	°	18	18	18	18	18	18	18	18	18	18	30	30	30	30	30	30	30
A	mm	146	146	146	146	146	146	174,6	174,6	174,6	174,6	203,2	203,2	203,2	203,2	276,2	276,2	276,2
$B_{-0,04}$	mm	95,25	95,25	95,25	95,25	95,25	95,25	168,22	168,22	168,22	168,22	196,82	196,82	196,82	196,82	222,2	222,2	222,2
C	mm	82	82	82	82	82	82	98	98	98	98	135	135	135	135	137,5	137,5	137,5
D	mm	9,1	9,1	9,1	9,1	9,1	9,1	9,5	9,5	9,5	9,5	11,1	11,1	11,1	11,1	14,2	14,2	14,2
E	mm	$1,5_{-0,1}$	$1,5_{-0,1}$	$1,5_{-0,1}$	$1,5_{-0,1}$	$1,5_{-0,1}$	$1,5_{-0,1}$	$1,6^{+0,2}$	$1,6^{+0,2}$	$1,6^{+0,2}$	$1,6^{+0,2}$	$2,3^{+0,2}$	$2,3^{+0,2}$	$2,3^{+0,2}$	$2,3^{+0,2}$	$2,4^{+0,2}$	$2,4^{+0,2}$	$2,4^{+0,2}$
F	mm	33	33	33	33	33	33	35	35	35	35	32	32	32	32	37	37	37
G	mm	90	90	90	90	90	90	132	132	132	132	156	156	156	156	190	190	190
$H_{\pm 0,1}$	mm	120,65	120,65	120,65	120,65	120,65	120,65	155,6	155,6	155,6	155,6	184,15	184,15	184,15	184,15	247,6	247,6	247,6
J^{B12}	mm	12,7	12,7	12,7	12,7	12,7	12,7	9,5	9,5	9,5	9,5	11,2	11,2	11,2	11,2	16	16	16
K	mm	115	115	115	115	115	115	145	145	145	145	178	178	178	178	204	204	204
M	mm	60	60	60	60	60	60	65	65	65	65	96	96	96	96	111	111	111
S_{min}	mm	325	360	400	430	473	523	360	400	460	550	560	600	650	740	652	720	830
X (extension)	mm	35	50	60	60	60	120	40	80	80	110	45	60	110	110	80	110	140
Tooth/spline dim.	mm	42x2x20	42x2x20	42x2x20	42x2x20	42x2x20	42x2x20	55x2,5x20	55x2,5x20	55x2,5x20	55x2,5x20	75x2,5x28	75x2,5x28	75x2,5x28	75x2,5x28	90x2,5x34	90x2,5x34	90x2,5x34
Type of flange		1	1	1	1	1	1	2	2	2	2	3	3	3	3	2	2	2

ß = Maximum angle of deflection per joint
S = Compressed lengths; corresponds to the length of standard type

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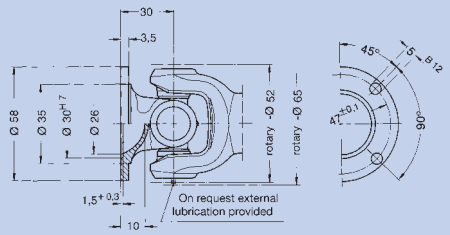
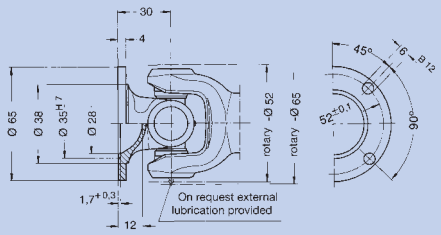
Components, Spares and Accessoires | Series 0.100 | Size 0.105 | Md_{Nom} 190 Nm | Md_{Lim} 250 Nm

At utilisation of the nominal torque a verification of the flange connection is necessary.

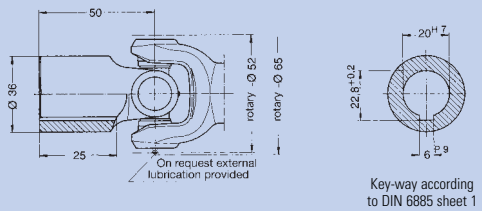
One keyway is not enough to transmit the max. torque. In such case a second keyway or an internal spline is recommended.



Standard flange
end number: 0.105.XX0

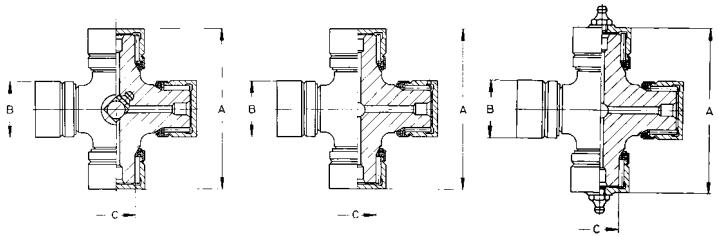


Larger flange
end number: 0.105.XX1



Connecting hub
without key-way end number: 0.105.XX2
with key-way end number: 0.105.XX3

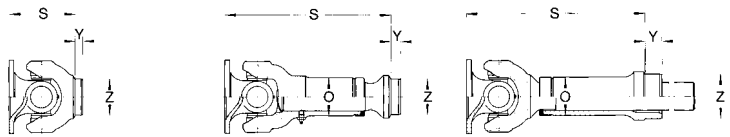
Cross Units, Needle bearing version



		Standard version Needle bearing		Lubrication for version 0.100.3XX Needle bearing		Version suitable for external lubrication Needle bearing	
Order number		**0.105.010**		**0.105.011**		**0.105.012**	
A	mm	41		41		41	
B	mm	17		17		17	
C	mm	9		9		9	
Snap rings included	mm	J 17 x 1		J 17 x 1		J 17 x 1	
Weight	kg	0,098		0,098		0,102	

ß = Maximum angle of deflection per joint
X = Preferred extension (larger extension available up to approx. 9 x spline o. D.)

Fixed joint | **Slip joint** | **Slip joint (sliding sleeve type)**



Please indicate compressed length „S", extension and required type of flange when ordering!

		Needle bearing version											
		without extension				standard extension				larger extension			
Order number		**0.105.050**	**0.105.051**	**0.105.052**	**–**	**0.105.060**	**0.105.061**	**0.105.062**	**–**	**0.105.070**	**0.105.071**	**0.105.072**	**–**
Angle of deflection ß	°	30	25	30	–	30	25	30	–	30	25	30	–
Weight	kg	0,42	0,46	0,49	–	0,73	0,77	0,80	–	0,79	0,83	0,86	–
Flange-Ø	mm	58	65	Hub	–	58	65	Hub	–	58	65	Hub	–
S	mm	62	62	82	–	150	150	170	–	160	160	180	–
X	mm	–	–	–	–	25	25	25	–	40	40	40	–
Y	mm	13	13	13	–	13	13	13	–	8	8	8	–
Z	mm	25,25	25,25	25,25	–	25,25	25,25	25,25	–	25,25	25,25	25,25	–
Spline dim. DIN 5480	mm	–	–	–	–	20x1,5x12	20x1,5x12	20x1,5x12	–	20x1,5x12	20x1,5x12	20x1,5x12	–
Number of flange holes		4	4	–	–	4	4	–	–	4	4	–	–

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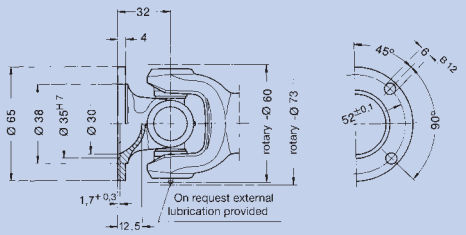
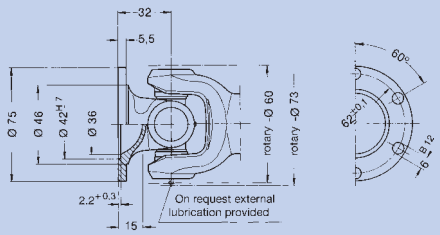
At utilisation of the nominal torque a verification of the flange connection is necessary.

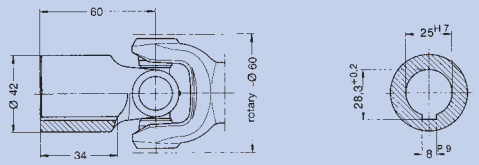
One keyway is not enough to transmit the max. torque. In such case a second keyway or an internal spline is recommended.



Standard flange
end number: 0.106.XX0



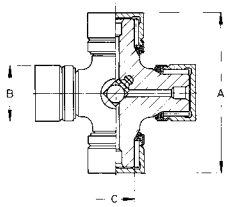
Larger flange
end number: 0.106.XX1

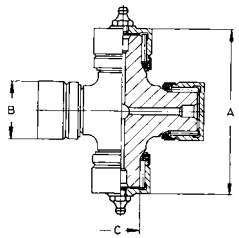


Key-way according to DIN 6885 sheet 1

Connecting hub
without key-way end number: 0.106.XX2
with key-way end number: 0.106.XX3

Cross Units, Needle bearing version

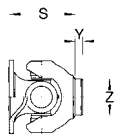




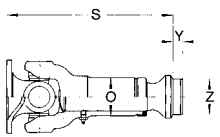
		Standard version Needle bearing			Version suitable for external lubrication Needle bearing	
Order number		**0.106.010**			**0.106.012**	
A	mm	48			48	
B	mm	19			19	
C	mm	12,7			12,7	
Snap rings included	mm	J 19 x 1			J 19 x 1	
Weight	kg	0,14			0,144	

ß = Maximum angle of deflection per joint
X = Preferred extension (larger extension available up to approx. 9 x spline o. D.)

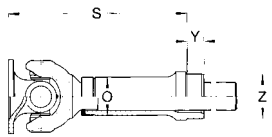
Fixed joint



Slip joint



Slip joint (sliding sleeve type)



Please indicate compressed length „S", extension and required type of flange when ordering!

		Needle bearing version											
		without extension				standard extension				larger extension			
Order number		**0.106.050**	**0.106.051**	**0.106.052**	**–**	**0.106.060**	**0.106.061**	**0.106.062**	**–**	**0.106.070**	**0.106.071**	**0.106.072**	**–**
Angle of deflection ß	°	30	20	30	–	30	20	30	–	30	20	30	–
Weight	kg	0,56	0,65	1,30	–	1,18	1,27	1,30	–	1,25	1,34	1,37	–
Flange-Ø	mm	65	75	Hub	–	65	75	Hub	–	65	75	Hub	–
S	mm	64	64	92	–	167	167	195	–	177	177	205	–
X	mm	–	–	–	–	30	30	30	–	60	60	60	–
Y	mm	13	13	13	–	13	13	13	–	9	9	9	–
Z	mm	29,25	29,25	29,25	–	29,25	29,25	29,25	–	29,25	29,25	29,25	–
Spline dim. DIN 5480	mm	–	–	–	–	25x1,5x15	25x1,5x15	25x1,5x15	–	25x1,5x15	25x1,5x15	25x1,5x15	–
Number of flange holes		4	6	–	–	4	6	–	–	4	6	–	–

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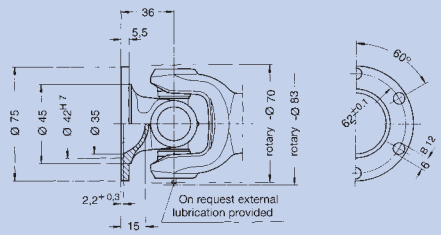
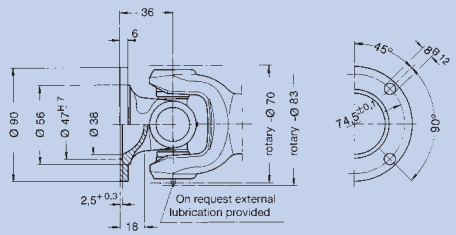
Components, Spares and Accessoires | Series 0.100 | Size 0.107 | Md_{Nom} 920 Nm | Md_{Lim} 1200 Nm

At utilisation of the nominal torque a verification of the flange connection is necessary.

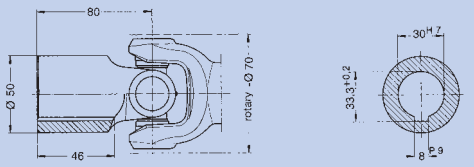
One keyway is not enough to transmit the max. torque. In such case a second keyway or an internal spline is recommended.



Standard flange
end number: 0.107.XX0



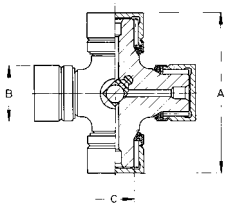
Larger flange
end number: 0.107.XX1

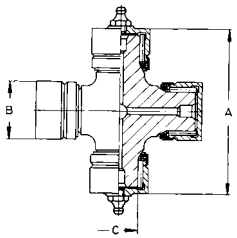


Key-way according to DIN 6885 sheet 1

Connecting hub
without key-way end number: 0.107.XX2
with key-way end number: 0.107.XX3

Cross Units, Needle bearing version

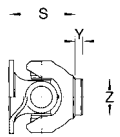




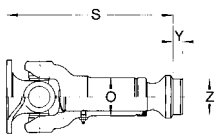
		Standard version Needle bearing			Version suitable for external lubrication Needle bearing	
Order number		**0.107.010**			**0.107.012**	
A	mm	58			58	
B	mm	22			22	
C	mm	13,35			16	
Snap rings included	mm	J 22 x 1			J 22 x 1	
Weight	kg	0,224			0,228	

ß = Maximum angle of deflection per joint
X = Preferred extension (larger extension available up to approx. 9 x spline o. D.)

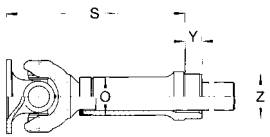
Fixed joint



Slip joint



Slip joint (sliding sleeve type)



Please indicate compressed length „S", extension and required type of flange when ordering!

		Needle bearing version											
		without extension				standard extension				larger extension			
Order number		**0.107.050**	**0.107.051**	**0.107.052**	**–**	**0.107.060**	**0.107.061**	**0.107.062**	**–**	**0.107.070**	**0.107.071**	**0.107.072**	**–**
Angle of deflection ß	°	30	18	30	–	30	18	30	–	30	18	30	–
Weight	kg	0,91	1,06	1,25	–	1,63	1,78	1,97	–	1,98	2,13	2,32	–
Flange-Ø	mm	75	90	Hub	–	75	90	Hub	–	75	90	Hub	–
S	mm	82	82	126	–	187	187	231	–	197	197	241	–
X	mm	–	–	–	–	35	35	35	–	70	70	70	–
Y	mm	13	13	13	–	13	13	13	–	15	15	15	–
Z	mm	36,25	36,25	36,25	–	36,25	36,25	36,25	–	36,25	36,25	36,25	–
Spline dim. DIN 5480	mm	–	–	–	–	28x1,5x17	28x1,5x17	28x1,5x17	–	28x1,5x17	28x1,5x17	28x1,5x17	–
Number of flange holes		6	4	–	–	6	4	–	–	6	4	–	–

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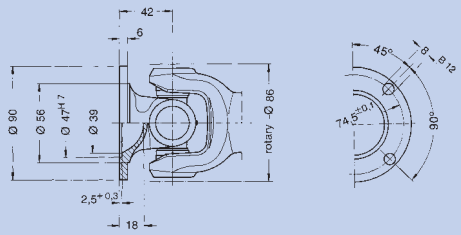
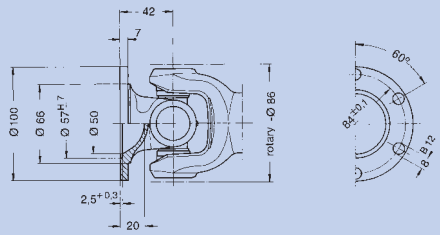
Components, Spares and Accessoires | Series 0.100 | Size 0.109 | Md_{Nom} 1700 Nm | Md_{Lim} 2200 Nm

At utilisation of the nominal torque a verification of the flange connection is necessary.

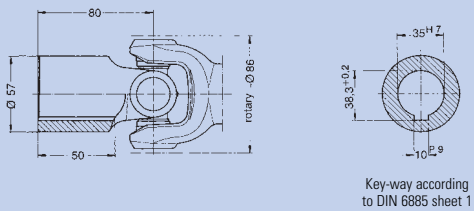
One keyway is not enough to transmit the max. torque. In such case a second keyway or an internal spline is recommended.



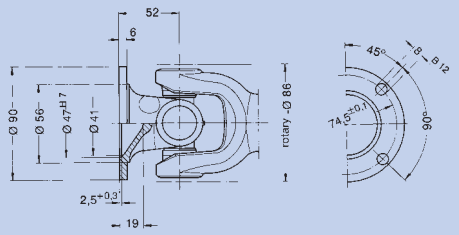
Standard flange
end number: 0.109.XX0



Larger flange
end number: 0.109.XX1

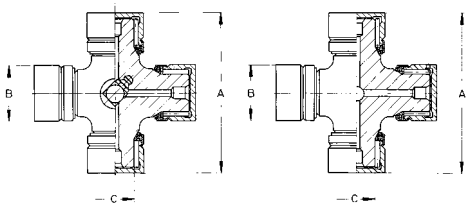


Connecting hub
without key-way end number: 0.109.XX2
with key-way end number: 0.109.XX3



Flange for larger deflection
end number: 0.109.XX5

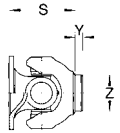
Cross Units, Needle bearing version



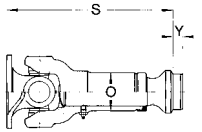
		Standard version Needle bearing		Lubrication for Version 0.100.3XX Needle bearing		
Order number		**0.109.010**		**0.109.011**		
A	mm	70,9		70,9		
B	mm	28,5		28,5		
C	mm	19,87		19,87		
Snap rings included	mm	J 29 x 1,2		J 29 x 1,2		
Weight	kg	0,508		0,504		

ß = Maximum angle of deflection per joint
X = Preferred extension (larger extension available up to approx. 9 x spline o. D.)

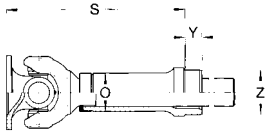
Fixed joint



Slip joint



Slip joint (sliding sleeve type)



Please indicate compressed length „S", extension and required type of flange when ordering!

		Needle bearing version											
		without extension				standard extension				larger extension			
Order number		**0.109.050**	**0.109.051**	**0.109.052**	**0.109.055**	**0.109.060**	**0.109.061**	**0.109.062**	**0.109.065**	**0.109.070**	**0.109.071**	**0.109.072**	**0.109.075**
Angle of deflection ß	°	20	18	20	35	20	18	20	35	20	18	20	35
Weight	kg	1,82	1,93	2,21	1,90	3,01	3,12	3,40	3,12	3,39	3,50	3,78	3,61
Flange-Ø	mm	90	100	Hub	90	90	100	Hub	90	90	100	Hub	90
S	mm	90	90	128	100	225	225	263	242	222	222	260	241
X	mm	–	–	–	–	40	40	40	40	80	80	80	80
Y	mm	14	14	14	14	15	15	15	15	18	18	18	18
Z	mm	46,25	46,25	46,25	46,25	46,25	46,25	46,25	46,25	46,25	46,25	46,25	46,25
Spline dim. DIN 5480	mm	–	–	–	–	32x2x14	32x2x14	32x2x14	32x2x14	32x2x14	32x2x14	32x2x14	32x2x14
Number of flange holes		4	6	–	4	4	6	–	4	4	6	–	4

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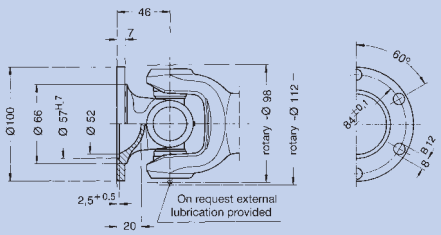
ORIGINAL elbe GELENKE

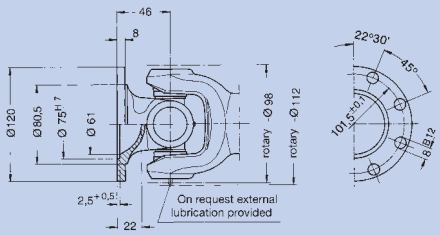
Components, Spares and Accessoires | Series 0.100 | Size 0.110 | Md_{Nom} 2300 Nm | Md_{Lim} 3000 Nm

At utilisation of the nominal torque a verification of the flange connection is necessary.

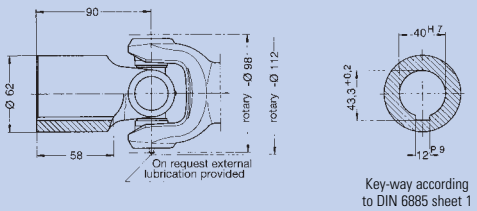
One keyway is not enough to transmit the max. torque. In such case a second keyway or an internal spline is recommended.



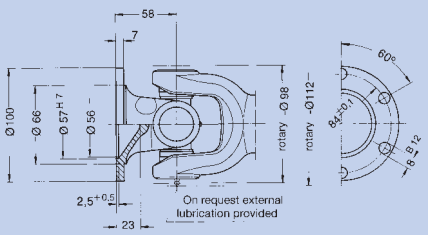
Standard flange
end number: 0.110.XX0



Larger flange
end number: 0.110.XX1



Connecting hub
without key-way end number: 0.110.XX2
with key-way end number: 0.110.XX3

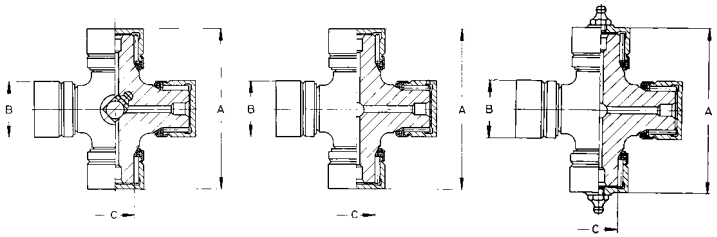


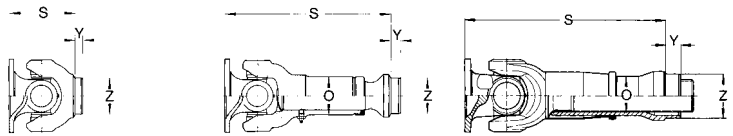
Flange for larger deflection
end number: 0.110.XX5

Cross Units, Roller bearing version

ß = Maximum angle of deflection per joint
X = Preferred extension (larger extension available up to approx. 9 x spline o. D.)

Fixed joint | **Slip joint** | **Slip joint (sliding sleeve type)**





		Standard version Roller bearing		Lubrication for version 0.100.3XX Roller bearing		Version suitable for external lubrication Roller bearing	
Order number		**0.110.015**		**0.110.017**		**0.110.016**	
A	mm	83		83,05		83	
B	mm	30		30		30	
C	mm	20,02		20,02		20,02	
Snap rings included	mm	J 30 x 1,2		J 30 x 1,2		J 30 x 1,2	
Weight	kg	0,66		0,65		0,66	

Please indicate compressed length „S", extension and required type of flange when ordering!

		Roller bearing version											
		without extension				standard extension				larger extension			
Order number		**0.110.050**	**0.110.051**	**0.110.052**	**0.110.055**	**0.110.060**	**0.110.061**	**0.110.062**	**0.110.065**	**0.110.070**	**0.110.071**	**0.110.072**	**0.110.075**
Angle of deflection ß	°	20	18	20	35	20	18	20	35	20	18	20	35
Weight	kg	2,38	2,60	2,75	2,45	3,83	4,06	4,20	4,01	4,70	4,92	5,07	4,77
Flange-Ø	mm	100	120	Hub	100	100	120	Hub	100	100	120	Hub	100
S	mm	105	105	149	117	237	237	281	256	244	244	288	256
X	mm	–	–	–	–	40	40	40	40	100	100	100	100
Y	mm	15	15	15	15	15	15	15	15	18	18	18	18
Z	mm	44,25	44,25	44,25	44,25	44,25	44,25	44,25	44,25	44,25	44,25	44,25	44,25
Spline dim. DIN 5480	mm	–	–	–	–	35x2x16	35x2x16	35x2x16	35x2x16	35x2x16	35x2x16	35x2x16	35x2x16
Number of flange holes		6	8	–	6	6	8	–	6	6	8	–	6

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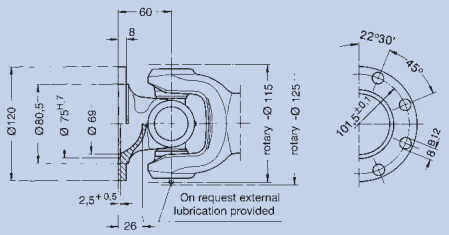
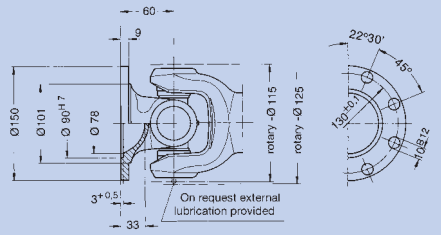
At utilisation of the nominal torque a verification of the flange connection is necessary.

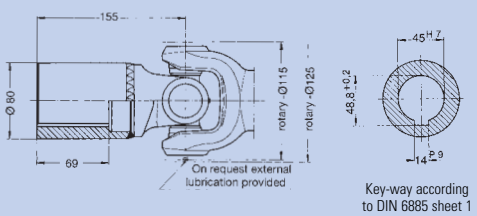
One keyway is not enough to transmit the max. torque. In such case a second keyway or an internal spline is recommended.



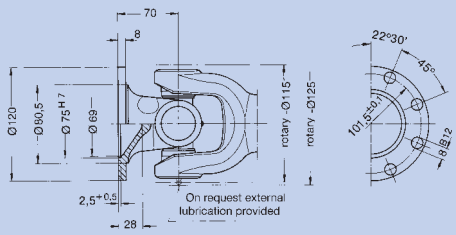
Standard flange
end number: 0.112.XX0



Larger flange
end number: 0.112.XX1



Connecting hub
without key-way end number: 0.112.XX2
with key-way end number: 0.112.XX3

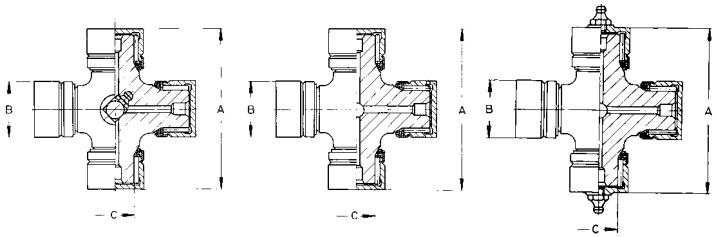


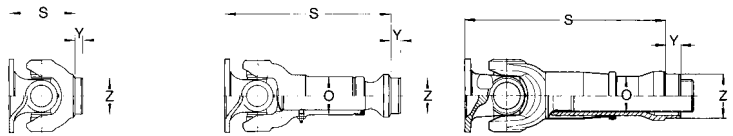
Flange for larger angle of deflection
end number: 0.112.XX5

Cross Units

ß = Maximum angle of deflection per joint
X = Preferred extension (larger extension available up to approx. 9 x spline o. D.)

Fixed joint | **Slip joint** | **Slip joint (sliding sleeve type)**





		Needle bearing version					
		Standard version Needle bearing		Lubrication for version 0.100.3XX Needle bearing		Version suitable for external lubrication Needle bearing	
Order number		**0.112.010**		**0.112.011**		**0.112.012**	
A	mm	97		97		97	
B	mm	35		35		35	
C	mm	23,04		23,04		23,04	
Snap rings included	mm	J 35 x 1,5		J 35 x 1,5		J 35 x 1,5	
Weight	kg	1,03		1,02		1,03	

		Roller bearing version					
		Standard version Roller bearing		Lubrication for version 0.100.3XX Roller bearing		Version suitable for external lubrication Roller bearing	
Order number		**0.112.015**		**0.112.017**		**0.112.016**	
A	mm	97		97		97	
B	mm	35		35		35	
C	mm	24,8		24,8		24,8	
Snap rings included	mm	J 35 x 1,5		J 35 x 1,5		J 35 x 1,5	
Weight	kg	1,06		1,05		1,06	

Please indicate compressed length „S", extension and required type of flange when ordering!

		Needle resp. Roller bearing version											
		without extension				standard extension				larger extension			
Order number		**0.112.050**	**0.112.051**	**0.112.052**	**0.112.055**	**0.112.060**	**0.112.061**	**0.112.062**	**0.112.065**	**0.112.070**	**0.112.071**	**0.112.072**	**0.112.075**
Angle of deflection ß	°	20	18	20	35	20	18	20	35	20	18	20	35
Weight	kg	3,80	4,48	6,09	3,93	6,63	7,31	8,92	6,73	7,26	7,94	9,55	7,94
Flange-Ø	mm	120	150	Hub	120	120	150	Hub	120	120	150	Hub	120
S	mm	125	125	220	135	306	306	401	330	308	308	403	325
X	mm	–	–	–	–	60	60	60	60	120	120	120	120
Y	mm	20	20	20	20	20	20	20	20	20	20	20	20
Z	mm	52,25	52,25	52,25	52,25	52,25	52,25	52,25	52,25	52,25	52,25	52,25	52,25
Spline dim. DIN 5480	mm	–	–	–	–	42x2x20	42x2x20	42x2x20	42x2x20	42x2x20	42x2x20	42x2x20	42x2x20
Number of flange holes		8	8	–	8	8	8	–	8	8	8	–	8

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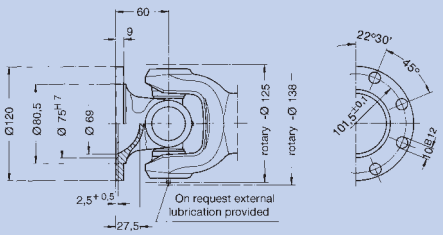
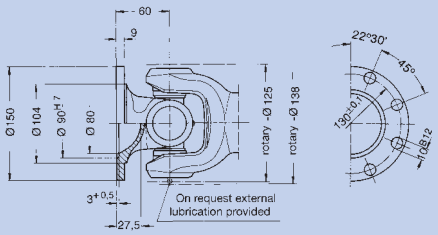
At utilisation of the nominal torque a verification of the flange connection is necessary.

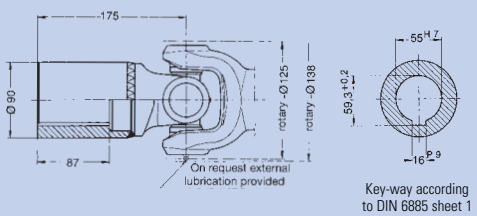
One keyway is not enough to transmit the max. torque. In such case a second keyway or an internal spline is recommended.



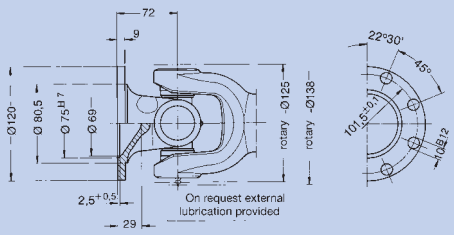
Standard flange
end number: 0.113.XX0



Larger flange
end number: 0.113.XX1

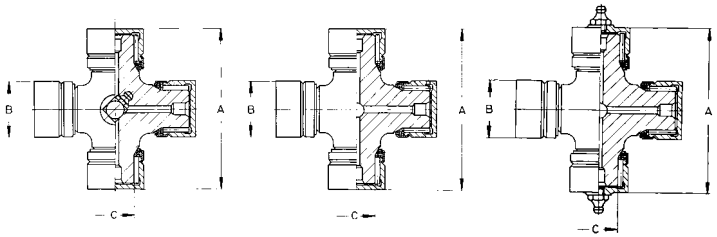


Connecting hub
without key-way end number: 0.113.XX2
with key-way end number: 0.113.XX3



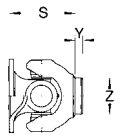
Flange for larger angle of deflection
end number: 0.113.XX5

Cross Units

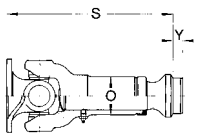


ß = Maximum angle of deflection per joint
X = Preferred extension (larger extension available up to approx. 9 x spline o. D.)

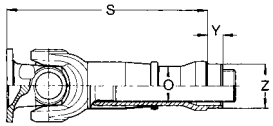
Fixed joint



Slip joint



Slip joint (sliding sleeve type)



		Needle bearing version					
		Standard version Needle bearing		Lubrication for version 0.100.3XX Needle bearing		Version suitable for external lubrication Needle bearing	
Order number		**0.113.010**		**0.113.011**		**0.113.012**	
A	mm	106		106		106	
B	mm	38		38		38	
C	mm	26,28		26,28		26,28	
Snap rings included	mm	J 38 x 1,5		J 38 x 1,5		J 38 x 1,5	
Weight	kg	1,32		1,32		1,33	

		Roller bearing version					
		Standard version Roller bearing				Version suitable for external lubrication Roller bearing	
Order number		**0.113.015**				**0.113.016**	
A	mm	106				106	
B	mm	38				38	
C	mm	25,7				25,7	
Snap rings included	mm	J 38 x 1,5				J 38 x 1,5	
Weight	kg	1,25				1,34	

Please indicate compressed length „S", extension and required type of flange when ordering!

		Needle resp. Roller bearing version											
		without extension				standard extension				larger extension			
Order number		**0.113.050**	**0.113.051**	**0.113.052**	**0.113.055**	**0.113.060**	**0.113.061**	**0.113.062**	**0.113.065**	**0.113.070**	**0.113.071**	**0.113.072**	**0.113.075**
Angle of deflection ß	°	20	18	20	35	20	18	20	35	20	18	20	35
Weight	kg	4,52	5,20	7,63	4,85	8,85	9,53	11,96	9,40	10,24	10,92	13,35	10,57
Flange-Ø	mm	120	150	Hub	120	120	150	Hub	120	120	150	Hub	120
S	mm	128	128	243	140	318	318	433	343	320	320	435	332
X	mm	–	–	–	–	60	60	60	60	130	130	130	130
Y	mm	20	20	20	20	22	22	22	22	22	22	22	22
Z	mm	62,25	62,25	62,25	62,25	62,25	62,25	62,25	62,25	62,25	62,25	62,25	62,25
Spline dim. DIN 5480	mm	–	–	–	–	50x2x24	50x2x24	50x2x24	50x2x24	50x2x24	50x2x24	50x2x24	50x2x24
Number of flange holes		8	8	–	8	8	8	–	8	8	8	–	8

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At utilisation of the nominal torque a verification of the flange connection is necessary.

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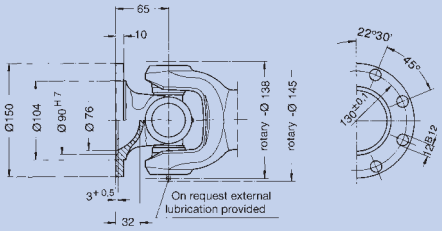
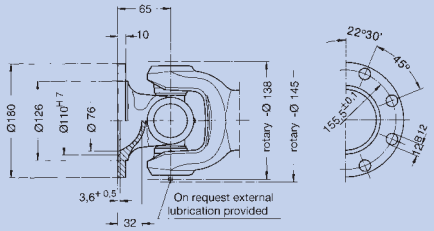
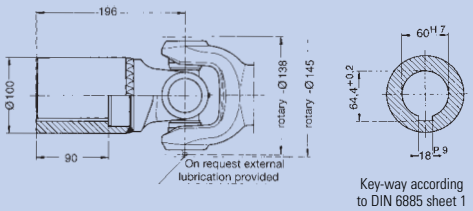


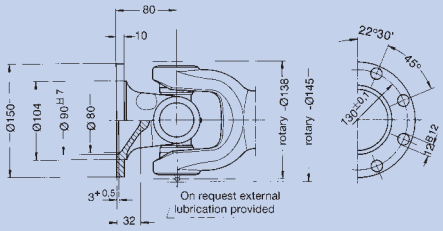
Standard flange
end number: 0.148.XX0



Larger flange
end number: 0.148.XX1

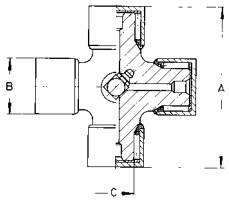


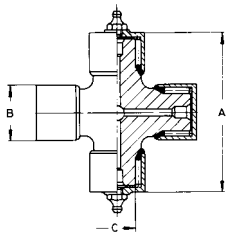
Connecting hub
without key-way end number: 0.148.XX2
with key-way end number: 0.148.XX3



Flange for larger angle of deflection
end number: 0.148.XX5

Cross Units, Roller bearing version

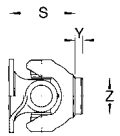




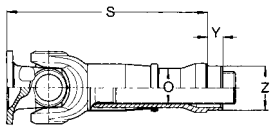
		Standard version Roller bearing			Version suitable for external lubrication Roller bearing	
Order number		**0.148.015**			**0.148.016**	
A	mm	117,5			117,5	
B	mm	42			42	
C	mm	27,8			27,8	
Snap rings included	mm	J 42 x 1,75			J 42 x 1,75	
Weight	kg	1,69			1,7	

ß = Maximum angle of deflection per joint
X = Preferred extension (larger extension available up to approx. 9 x spline o. D.)

Fixed joint



Slip joint (sliding sleeve type)



Please indicate compressed length „S", extension and required type of flange when ordering!

		Roller bearing version							
		without extension				larger extension			
Order number		**0.148.050**	**0.148.051**	**0.148.052**	**0.148.055**	**0.148.070**	**0.148.071**	**0.148.072**	**0.148.075**
Angle of deflection ß	°	20	20	35	35	20	20	20	35
Weight	kg	7,06	7,71	11,51	7,72	13,23	13,88	17,68	13,89
Flange-Ø	mm	150	180	Hub	120/150	150	180	Hub	120/150
S	mm	145	145	276	160	328	328	459	343
X	mm	–	–	–	–	110	110	110	110
Y	mm	25	25	25	25	25	25	25	25
Z	mm	72,25	72,25	72,25	72,25	72,25	72,25	72,25	72,25
Spline dim. DIN 5480	mm	–	–	–	–	55x2,5x20	55x2,5x20	55x2,5x20	55x2,5x20
Number of flange holes		8	8	–	8	8	8	–	8

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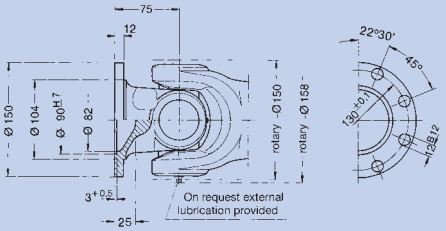
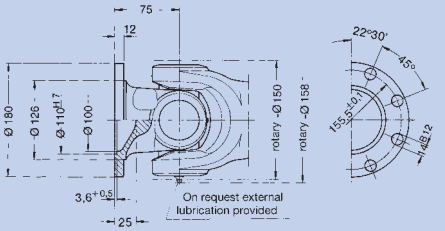
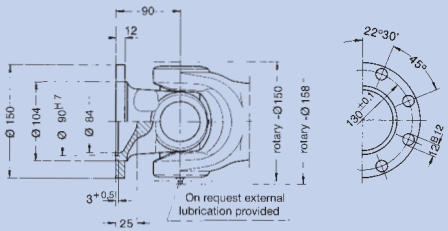
At utilisation of the nominal torque a verification of the flange connection is necessary.



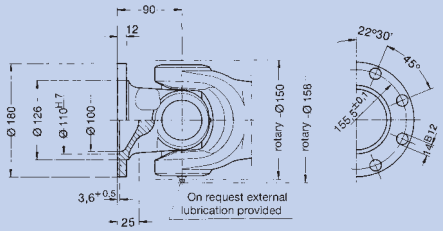
Standard flange
end number: 0.158.XX0



Larger flange
end number: 0.158.XX1

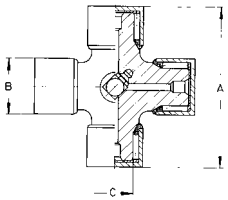


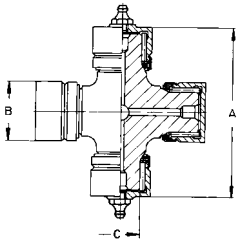
Flange for larger deflection
end number: 0.158.XX5



Larger flange for larger deflection
end number: 0.158.XX6

Cross Units, Roller bearing version

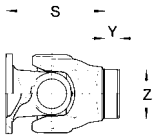




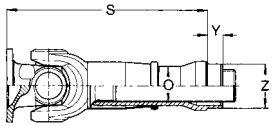
		Standard version Roller bearing			Version suitable for external lubrication Roller bearing	
Order number		**0.158.015**			**0.158.016**	
A	mm	126			126	
B	mm	48			48	
C	mm	33,15			33,15	
Snap rings included	mm	J 48 x 1,75			J 48 x 1,75	
Weight	kg	2,28			2,29	

ß = Maximum angle of deflection per joint
X = Preferred extension (larger extension available up to approx. 9 x spline o. D.)

Fixed joint



Slip joint (sliding sleeve type)



Please indicate compressed length „S", extension and required type of flange when ordering!

		Roller bearing version							
		without extension				larger extension			
Order number		**0.158.050**	**0.158.051**	**0.158.055**	**0.158.056**	**0.158.070**	**0.158.071**	**0.158.075**	**0.158.076**
Angle of deflection ß	°	20	20	35	35	20	20	35	35
Weight	kg	10,12	10,90	10,55	11,36	20,78	21,56	21,21	22,02
Flange-Ø	mm	150	180	150	180	150	180	150	180
S	mm	185	185	200	200	475	475	490	490
X	mm	–	–	–	–	110	110	110	110
Y	mm	22	22	22	22	25	25	25	25
Z	mm	82,25	82,25	82,25	82,25	82,25	82,25	82,25	82,25
Spline dim. DIN 5480	mm	–	–	–	–	60x2,5x22	60x2,5x22	60x2,5x22	60x2,5x22
Number of flange holes		8	8	8	8	8	8	8	8

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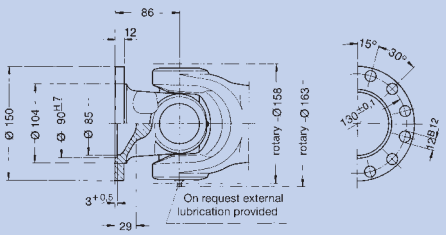
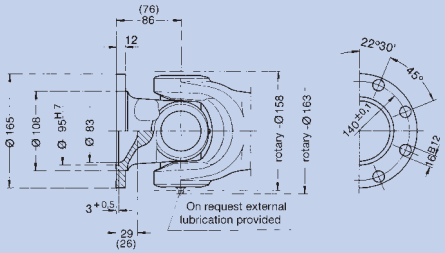
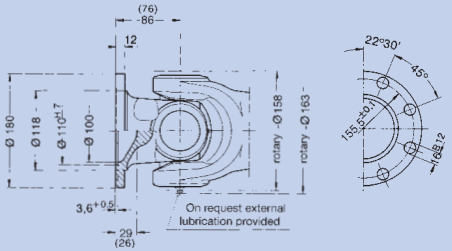


Standard flange
end number: 0.117.XX0



Larger flange (Ø 165 mm)
end number: 0.117.XX1

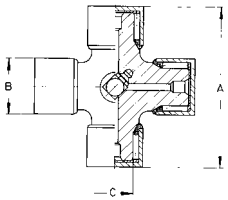
Dimensions in brackets are only valid for short type I

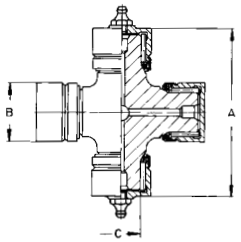


Larger flange (Ø 180 mm)
end number: 0.117.XX1

Dimensions in brackets are only valid for short type I

Cross Units, Roller bearing version

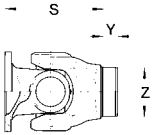




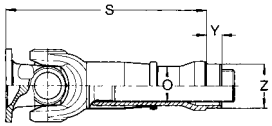
		Standard version Roller bearing			Version suitable for external lubrication Roller bearing	
Order number		**0.117.015**			**0.117.016**	
A	mm	135			135	
B	mm	53			53	
C	mm	37,34			37,34	
Snap rings included	mm	J 53 x 2			J 53 x 2	
Weight	kg	3,26			3,28	

ß = Maximum angle of deflection per joint
X = Preferred extension (larger extension available up to approx. 9 x spline o. D.)

Fixed joint



Slip joint (sliding sleeve type)



Please indicate compressed length „S", extension and required type of flange when ordering!

		Roller bearing version							
		without extension				larger extension			
Order number		**0.117.050**	**0.117.051**	**0.117.051**	**–**	**0.117.070**	**0.117.071**	**0.117.071**	**–**
Angle of deflection ß	°	30	30	30	–	30	30	30	–
Weight	kg	12,29	12,52	13,06	–	21,99	22,13	22,75	–
Flange-Ø	mm	150	165	180	–	150	165	180	–
S	mm	184	184	184	–	412/(457)	412/(457)	412/(457)	–
X	mm	–	–	–	–	110	110	110	–
Y	mm	28	28	28	–	30	30	30	–
Z	mm	90,25	90,25	90,25	–	90,25	90,25	90,25	–
Spline dim. DIN 5480	mm	–	–	–	–	65x2,5x24	65x2,5x24	65x2,5x24	–
Number of flange holes		12	8	8	–	12	8	8	–

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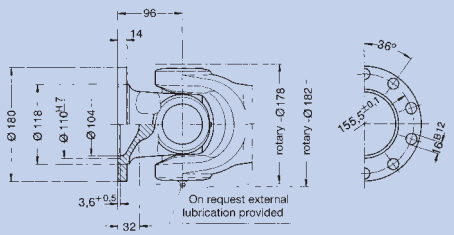
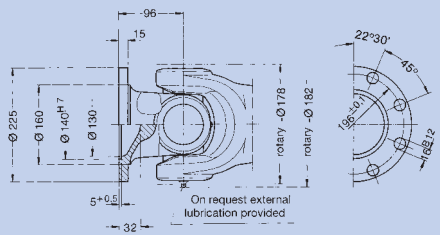
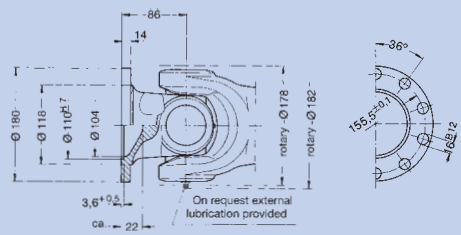
At utilisation of the nominal torque a verification of the flange connection is necessary.



Standard flange
end number: 0.120.XX0

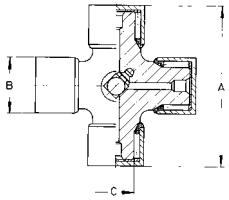


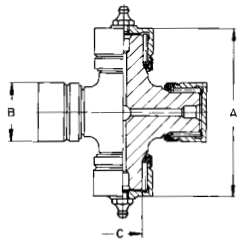
Larger flange
end number: 0.120.XX1



Shorter flange to short type I

Cross Units, Roller bearing version

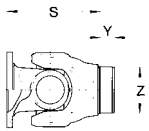




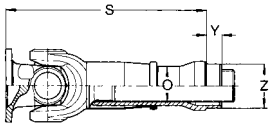
		Standard version Roller bearing			Version suitable for external lubrication Roller bearing	
Order number		**0.120.015**			**0.120.016**	
A	mm	152			152	
B	mm	57			57	
C	mm	40,9			40,9	
Snap rings included	mm	J 57 x 2			J 57 x 2	
Weight	kg	4,19			4,21	

ß = Maximum angle of deflection per joint
X = Preferred extension (larger extension available up to approx. 9 x spline o. D.)

Fixed joint



Slip joint (sliding sleeve type)



Please indicate compressed length „S", extension and required type of flange when ordering!

		Roller bearing version								
		without extension				larger extension				
Order number		**0.120.050**	**0.120.051**	–	–	**0.120.070**	**0.120.071**	–	–	
Angle of deflection ß	°	30	30	–	–	30	30	–	–	
Weight	kg	16,47	18,54	–	–	30,88	32,95	–	–	
Flange-Ø	mm	180	225	–	–	180	225	–	–	
S	mm	201	201	–	–	448/(486)	448/(486)	–	–	
X	mm	–	–	–	–	110	110	–	–	
Y	mm	30	30	–	–	30	30	–	–	
Z	mm	98,25	98,25	–	–	98,25	98,25	–	–	
Spline dim. DIN 5480	mm	–	–	–	–	75x2,5x28	75x2,5x28	–	–	
Number of flange holes		10	8	–	–	10	8	–	–	

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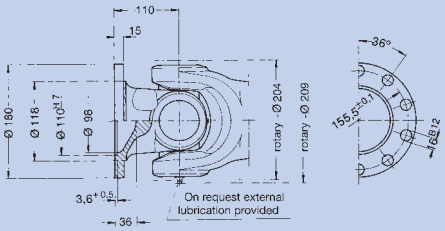
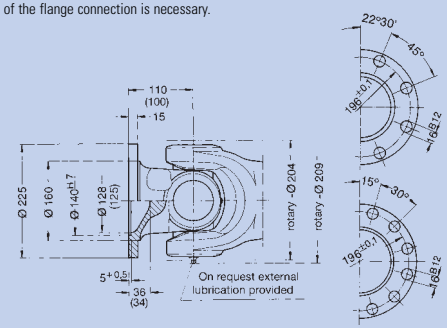
At utilisation of the nominal torque a verification of the flange connection is necessary.

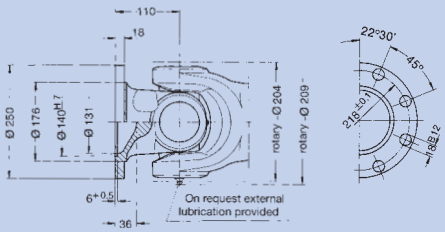


Standard flange
end number: 0.122.XX0



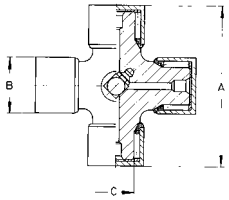
Larger flange (Ø 225 mm)
end number: 0.122.XX1

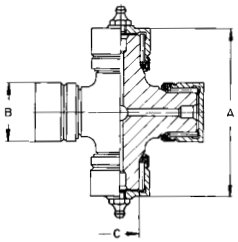
Dimensions in brackets are only valid for short type I



Larger flange (Ø 250 mm)
end number: 0.122.XX1

Cross Units, Roller bearing version

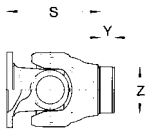




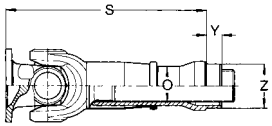
		Standard version Roller bearing			Version suitable for external lubrication Roller bearing	
Order number		**0.122.015**			**0.122.016**	
A	mm	172			172	
B	mm	65			65	
C	mm	47,7			47,7	
Snap rings included	mm	J 65 x 2,5			J 65 x 2,5	
Weight	kg	6,15			6,17	

ß = Maximum angle of deflection per joint
X = Preferred extension (larger extension available up to approx. 9 x spline o. D.)

Fixed joint



Slip joint (sliding sleeve type)



Please indicate compressed length „S", extension and required type of flange when ordering!

		Roller bearing version							
		without extension				larger extension			
Order number		**0.122.050**	**0.122.051**	**0.122.051**	**0.122.051**	**0.122.070**	**0.122.071**	**0.122.071**	**0.122.071**
Angle of deflection ß	°	30	30	30	25	30	30	30	25
Weight	kg	22,26	24,70	24,65	26,32	47,95	50,39	50,34	52,00
Flange-Ø	mm	180	225	225	250	180	225	225	250
S	mm	225	225	225	225	496	496	496	496
X	mm	–	–	–	–	140	140	140	140
Y	mm	30	30	30	30	28	28	28	28
Z	mm	108,25	108,25	108,25	108,25	108,25	108,25	108,25	108,25
Spline dim. DIN 5480	mm	–	–	–	–	90x2,5x34	90x2,5x34	90x2,5x34	90x2,5x34
Number of flange holes		10	8	12	8	10	8	12	8

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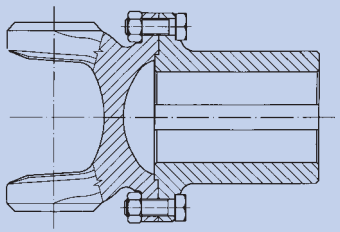


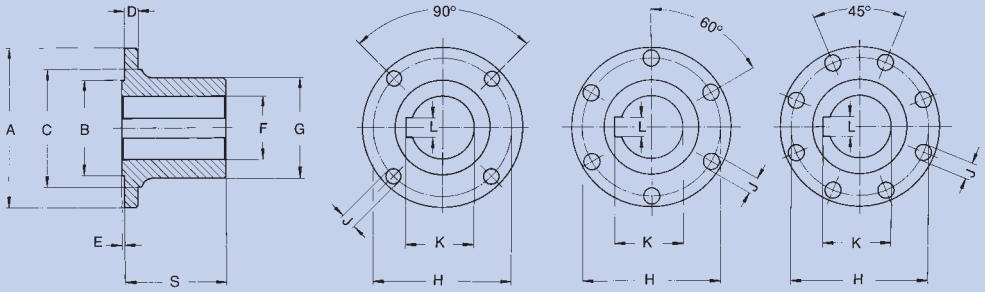
The tightening torque listed in the table are maximum values which are based on the combined stress from tension and torsion to reach 90 % of the minimum yield value. They are only valid for normal surface finishes and when slight lubrication is applied to the thread and contact surfaces of bolt heads and nuts. If threads have received special treatment, tightening torques must be reduced accordingly. To achieve maximum friction, flange faces should be clean, free of lubrication and the surface finish should not exceed 25 µm.

Bolts are normally inserted from the companion flange side and turned diameter „C" serves as a bolt head lock. Only on certain Universal Joint sizes can the bolts be inserted from the Universal Joint side without any reworking.

When encountering distinct reversing operation, it is advisable to reinforce the bolts with adapter sleeves or to employ serrated flanges.

The indicated numbers per Kit refer to a drive shaft having 2 flanges.

One keyway is not enough to transmit the max. torque. In such case a second keyway or an internal spline is recommended.



Flange bolt Kit

Order number		0.105.192.001	0.106.192.001	0.107.192.001	0.109.192.001	0.110.192.001	0.112.192.001	0.113.192.001	0.148.192.001	0.158.192.001	0.117.192.001
for joint size		105	105/106	106/107	107/109	109/110	110/112	112/113	148	158	117
Flange-Ø A	mm	58	65	75	90	100	120	120/150	150/180	150/180	150
Hexagon head bolts DIN EN 24014-10.9	mm	M5 x 14	M6 x 18	M6 x 18	M8 x 24	M8 x 24	M8 x 26	M10 x 30	M12 x 35	M12 x 40	M12 x 40
Number per Kit		8	8	12	8	12	16	16	16	16	24
Hexagon head bolts DIN EN ISO 7042-10	mm	M5	M6	M6	M8	M8	M8	M10	M12	M12	M12
Number per Kit		8	8	12	8	12	16	16	16	16	24
Tightening torque	Nm	8,5	14	14	35	35	35	69	120	120	120

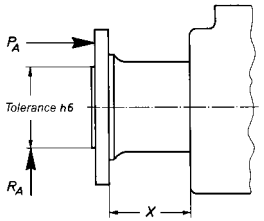
Order number		0.117.192.002	0.117.192.003	0.120.192.001	0.120.192.002	0.122.192.002	0.122.192.003
for joint size		117	158/117	120/122	120/122	120/122	122
Flange-Ø A	mm	165/180	165/180	180	180/225	225	250
Hexagon head bolts DIN EN 24014-10.9	mm	M16 x 46	M14 x 42	M16 x 50	M16 x 50	M16 x 50	M18 x 60
Number per Kit		16	16	20	16	24	16
Hexagon head bolts DIN EN ISO 7042-10	mm	M16	M14	M16	M16	M16	M18
Number per Kit		16	16	20	16	24	16
Tightening torque	Nm	295	190	295	295	295	450

Flange with cross serration

Order number		0.112.192.003	0.158.192.005	0.117.192.008
for joint size		112/113/148	158/117	117/120/122
Flange-Ø A	mm	120	150	180
Hexagon head bolts DIN EN 24014-10.9	mm	M10 x 40	M12 x 40	M14 x 45
Number per Kit		8	8	8
Hexagon head bolts DIN EN ISO 7042-10	mm	M10	M12	M14
Number per Kit		8	8	8
Tightening torque	Nm	46	79	125

Companion Flanges

Order number		1.105.240	1.106.240	1.107.240	1.109.240	1.110.240	1.112.240	1.113.240	1.148.240	1.158.240	1.117.240	1.120.240	1.122.240
for joint size	Nm	**0.105**	**0.106**/0.105	**0.107**/0.106	**0.109**/0.107	**0.110**/0.109	**0.112**/0.110	**0.113**	**0.148**	**0.158**	**0.117**	**0.120**	**0.122**
A	mm	58	65	75	90	100	120	120	150	150	180	225	250
B_{h6}	mm	30	35	42	47	57	75	75	90	90	110	140	140
$C_{-0,2}$	mm	38,8	41,8	51,8	61,2	70,7	88,2	84,1	110,6	110,6	131	171,5	190
D	mm	4	5	6	8	8	9	10	10	12	14	15	18
$E_{-0,2}$	mm	1,4	1,6	1,9	2,3	2,3	2,3	2,3	2,8	2,8	2,8	4,5	5,5
F^{H7}	mm	20	25	30	35	40	45	55	60	65	80	110	110
G	mm	32	40	45	52	60	80	80	95	95	118	165	188
$H_{\pm 0,1}$	mm	47	52	62	74,5	84	101,5	101,5	130	130	155,5	196	218
J^{B12}	mm	5	6	6	8	8	8	10	12	12	16	16	18
K	mm	22,8	28,3	33,3	38,3	43,3	48,8	59,3	64,4	69,4	85,4	116,4	116,4
L^{P9}	mm	6	8	8	10	12	14	16	18	18	22	28	28
S	mm	30	40	48	55	62	70	85	100	115	125	170	280
Number of flange holes		4	4	6	4	6	8	8	8	8	8	8	8



When companion flanges are produced in-house, the following shoud be observed:

1. Flange surface finish should not exceed 25 µm.
2. The configuration of the companion flanges must be such, that distance „X" is at least as long as tbe bolt, included the head.
3. To operate in a trouble-free manner, there must be a good concentricity between the companion flanges and Universal Joint flanges. On high speed shafts face P_A run out and concentricity deviation R_A should not exceed 0,04 mm .

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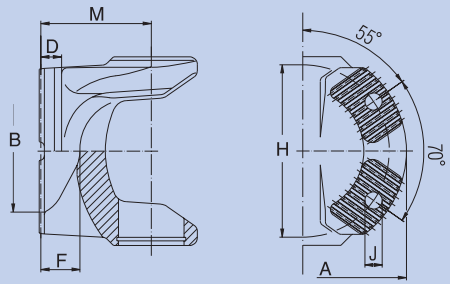
Components, Spares and Accessoires | Series 0.100 | Size 0.112–0.122

Md_{Nom} 3350–26750 Nm | Md_{Lim} 4350–35000 Nm



ß = Maximum angle of deflection per joint
Cross serration according DIN ISO 8667

Flanges, Cross-serrated

Order number		1.112.302	1.113.302	1.148.302	1.158.302	1.117.302	1.117.302	1.120.302	1.122.302
Md_{Nom}	Nm	3350	4100	5500	8200	10000	10000	16850	26750
Angle of deflection ß	°	20	20	30	20	30	30	30	30
A approx.	mm	122	120	120	150	150	180	180	180
B	mm	72	72	72	92	93	106	106	106
$D_{\pm 1}$	mm	13	13	13	15,5	15,5	18	18	19
F approx.	mm	26	37	24	28	33	33	34	34
$H_{\pm 0,1}$	mm	100	100	100	130	130	150	150	150
J	mm	11	11	11	13	13	15	15	15
M	mm	60	70	70	75	90	90	96	100
Weight	kg	1,83	2,10	2,37	3,36	4,40	5,32	6,36	7,36

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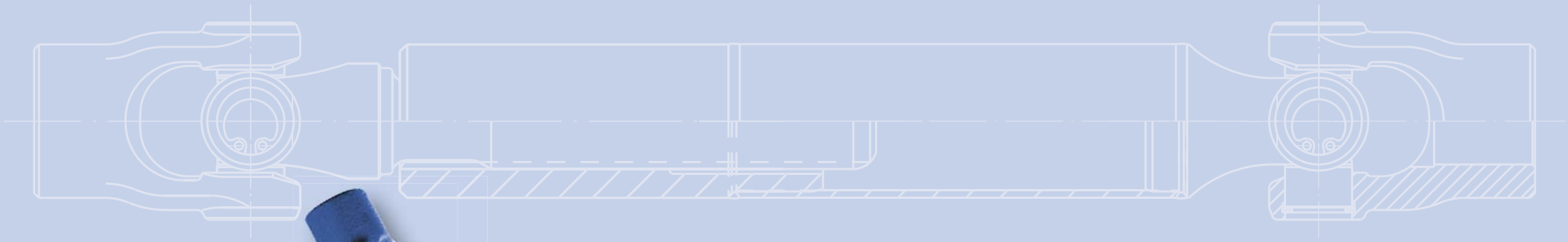

Series 0.200 Drive Shafts were developed to meet the specific demands of agricultural and engineering equipment and the use of the Cardan Shaft in powered steering axles.

Series 0.200 shafts are typified by large deflection angles and large length compensations.

Since agricultural equipment applications require fast and simple mounting arrangements, a flange version was not considered. Rather a hub arrangement was chosen.

Depending on the size, these drive shafts are equipped with needle bearings or roller bearings.

Upon request, series 0.200 Cardan Shafts can be equipped with fast disconnecting or clamping devices. Basic design and manufacturing are similar to the 0.100 series.

General technical data of series 0.200:

maximum angle of deflection:	up to 45°
Torque range:	up to 1300 Nm
Hub arrangement	

For more detailed information please refer to the following datasheets.

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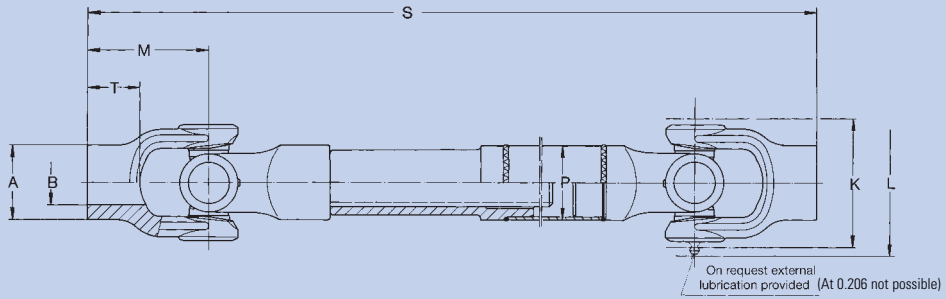
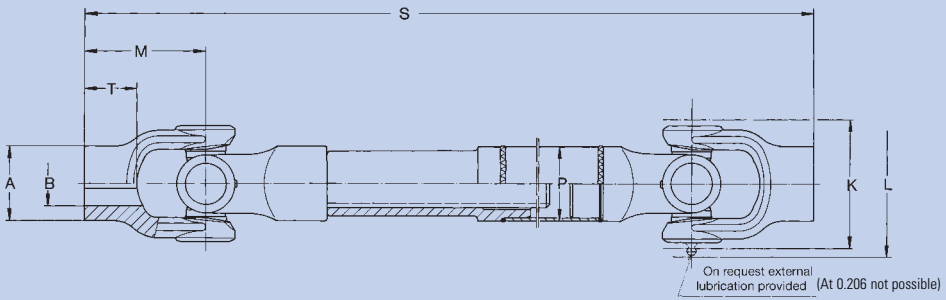
Needle bearing version



On both sides connecting hub without key-way end number: 0.204.XX0
0.204.XX1

One keyway is not enough to transmit the max. torque. In such case a second keyway or an internal spline is recommended.



On both sides connecting hub with key-way end number: 0.204.XX3 Key-way according to DIN 6885 sheet 1
0.204.XX4

Please indicate compressed length „S", extension and max. r.p.m. when ordering!

Universal Cardan Drive-Shafts with lenght compensation, without key-way

Order number		0.204.100	0.206.100	0.206.101	0.210.100
Md_{max}	Nm	100	250	250	1300
Angle of deflection ß	°	35	45	45	45
A approx.	mm	32	43	50	62
B^{H7}	mm	18	25	30	40
K approx.	mm	44	60	60	98
L approx.	mm	58	–	–	112
M	mm	45	60	75	115
P	mm	32x1,5	40x2	40x2	50x3
S_{min}	mm	260	337	367	655
T	mm	22	30	42	63
X	mm	45	35	35	100
Spline dim. DIN 5480	mm	20x1,5x12	25x1,5x15	25x1,5x15	35x2x16
G (at S_{min})	kg	1,18	2,28	2,77	9,78
G/100 mm standard tube	kg	0,11	0,14	0,14	0,35
G/100 mm extension	kg	0,20	0,31	0,31	0,63

Md_{max} = Maximum permitted torque. See technical annex
ß = Maximum angle of deflection
G = Weight (kg)
S_{min} = Minimum compressed length for preferrend extension range
X = Preferred extension (larger extensions available up to approx. 10 x spline o. D.)

Please indicate compressed length „S", extension and max. r.p.m. when ordering!

Universal Cardan Drive-Shafts with lenght compensation, with key-way on both sides

Order number		0.204.103	0.206.103	0.206.104	0.210.103
Md_{max}	Nm	100	250	250	1300
Angle of deflection ß	°	35	45	45	45
A approx.	mm	32	43	50	62
B^{H7}	mm	18	25	30	40
K approx.	mm	44	60	60	98
L approx.	mm	58	–	–	112
M	mm	45	60	75	115
P	mm	32x1,5	40x2	40x2	50x3
S_{min}	mm	260	337	367	655
T	mm	22	30	42	63
X	mm	45	35	35	100
Spline dim. DIN 5480	mm	20x1,5x12	25x1,5x15	25x1,5x15	35x2x16
G (at S_{min})	kg	1,18	2,28	2,77	9,78
G/100 mm standard tube	kg	0,11	0,14	0,14	0,35
G/100 mm extension	kg	0,20	0,31	0,31	0,63

Md_{max} = Maximum permitted torque. See technical annex
ß = Maximum angle of deflection
G = Weight (kg)
S_{min} = Minimum compressed length for preferrend extension range
X = Preferred extension (larger extensions available up to approx. 10 x spline o. D.)

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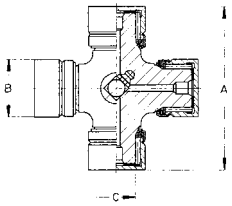
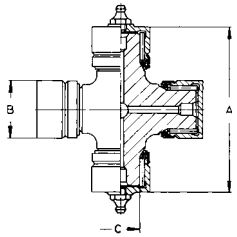
One keyway is not enough to transmit the max. torque. In such case a second keyway or an internal spline is recommended.

Cross Units





(At 0.206 not possible)

Md_{max} = Maximum permitted torque. See technical appendage
ß = Maximum angle of deflection
G = Weight (kg)

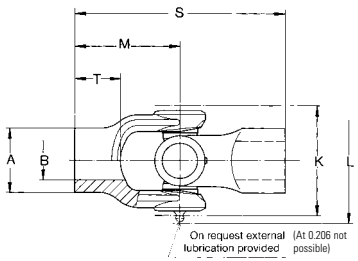
Needle bearing version

		Standard version Needle Bearing				Version for external lubrication Needle Bearing		
Order number		**0.204.010**	**0.106.010**			**0.204.012**		
A	mm	36	48			36		
B	mm	14	19			14		
C	mm	7,7	12,7			7,7		
Snap rings included	mm	J 14 x 1	J 19 x 1			J 14 x 1		
Weight	kg	0,064	0,143			0,669		
used for		**0.204**	**0.206**			**0.204**		

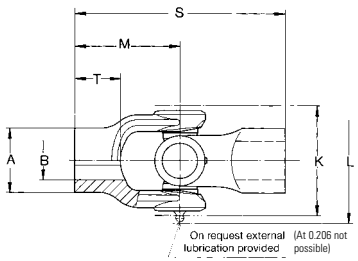
Roller bearing version

		Standard version Roller Bearing				Version for external lubrication Roller Bearing		
Order number		**0.110.015**				**0.110.016**		
A	mm	83				83		
B	mm	30				30		
C	mm	20,02				20,02		
Snap rings included	mm	J 30 x 1,2				J 30 x 1,2		
Weight	kg	0,66				0,66		
used for		**0.210**				**0.210**		

Cardan-Joints single, without key-way



Cardan-Joints single, with key-way



Key-way according to DIN 6885 sheet 1

Needle bearing version

Order number		**0.204.400**	**0.204.410**	**0.206.400**	**0.206.410**	**0.210.400**	**0.204.403**	**0.204.413**	**0.206.403**	**0.206.413**	**0.210.403**
Md_{max}	Nm	100	100	250	250	1300	100	100	250	250	1300
Angle of deflection ß	°	45	35	45	45	45	45	35	45	45	45
A approx.	mm	35	32	50	43	62	35	32	50	43	62
B^{H7}	mm	18	18	30	25	40	18	18	30	25	40
K approx.	mm	44	44	60	60	98	44	44	60	60	98
L approx.	mm	58	58	–	–	112	58	58	–	–	112
M	mm	54	45	75	60	115	54	45	75	60	115
S	mm	108	90	150	120	230	108	90	150	120	230
T	mm	35	22	42	30	63	35	22	42	30	63
G (at S)	kg	0,43	0,34	1,22	0,73	3,37	0,43	0,34	1,22	0,73	3,37

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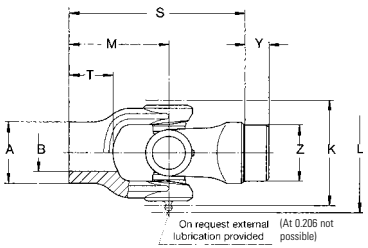
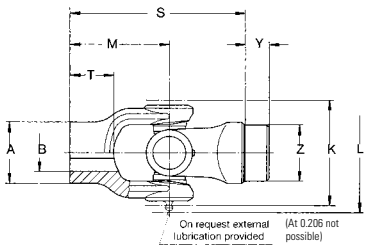
One keyway is not enough to transmit the max. torque. In such case a second keyway or an internal spline is recommended.

Md_{max} = Maximum permitted torque. See technical appendage
ß = Maximum angle of deflection

Fixed Joints, without key-way



Fixed Joints, with key-way



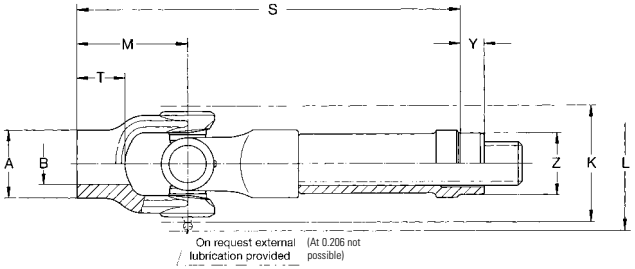
Key-way according to DIN 6885 sheet 1

		Needle bearing version							
Order number		**0.204.050**	**0.206.050**	**0.206.051**	**0.210.050**	**0.204.053**	**0.206.053**	**0.206.054**	**0.210.053**
Md_{max}	Nm	100	250	250	1300	100	250	250	1300
Angle of deflection ß	°	35	45	45	45	35	45	45	45
Weight	kg	0,34	0,82	1,07	3,16	0,34	0,82	1,07	3,16
A approx.	mm	32	43	50	62	32	43	50	62
B^{H7}	mm	18	25	30	40	18	25	30	40
K approx.	mm	44	60	60	98	44	60	60	98
L approx.	mm	58	–	–	112	58	–	–	112
M	mm	45	60	75	115	45	60	75	115
S	mm	74	100	115	185	74	100	115	185
T	mm	22	30	42	63	22	30	42	63
Y	mm	7	20	20	20	7	20	20	20
$Z_{k\,8}$	mm	29,25	37,25	37,25	44,25	29,25	37,25	37,25	44,25

Md_{max} = Maximum permitted torque. See technical appendage
ß = Maximum angle of deflection
X = Preferred extension (larger extensions available up to approx. 10 x spline o. D.)
G = Weight (kg)

Slip Joints, without key-way

Slip Joints, with key-way



Key-way according to DIN 6885 sheet 1

Please indicate extension range when ordering!

		Needle bearing version							
Order number		**0.204.070**	**0.206.070**	**0.206.071**	**0.210.070**	**0.204.073**	**0.206.073**	**0.206.074**	**0.210.073**
Md_{max}	Nm	100	250	250	1300	100	250	250	1300
Angle of deflection ß	°	35	45	45	45	35	45	45	45
Weight	kg	0,80	1,39	1,63	6,28	0,80	1,39	1,63	6,28
G/100 mm standard tube	kg	0,20	0,31	0,31	0,63	0,20	0,31	0,31	0,63
A approx.	mm	32	43	50	62	32	43	50	62
B^{H7}	mm	18	25	30	40	18	25	30	40
K approx.	mm	44	60	60	98	44	60	60	98
L	mm	52	–	–	112	52	–	–	112
M	mm	45	60	75	115	45	60	75	115
S	mm	158	190	205	371	158	190	205	371
T	mm	22	30	42	63	22	30	42	63
X	mm	45	35	35	100	45	35	35	100
Y	mm	18	15	15	18	18	15	15	18
$Z_{k\,8}$	mm	29,25	37,25	37,25	44,25	29,25	37,25	37,25	44,25
Spline dim. DIN 5480	mm	20x1,5x12	25x1,5x15	25x1,5x15	35x2x16	20x1,5x12	25x1,5x15	25x1,5x15	35x2x16

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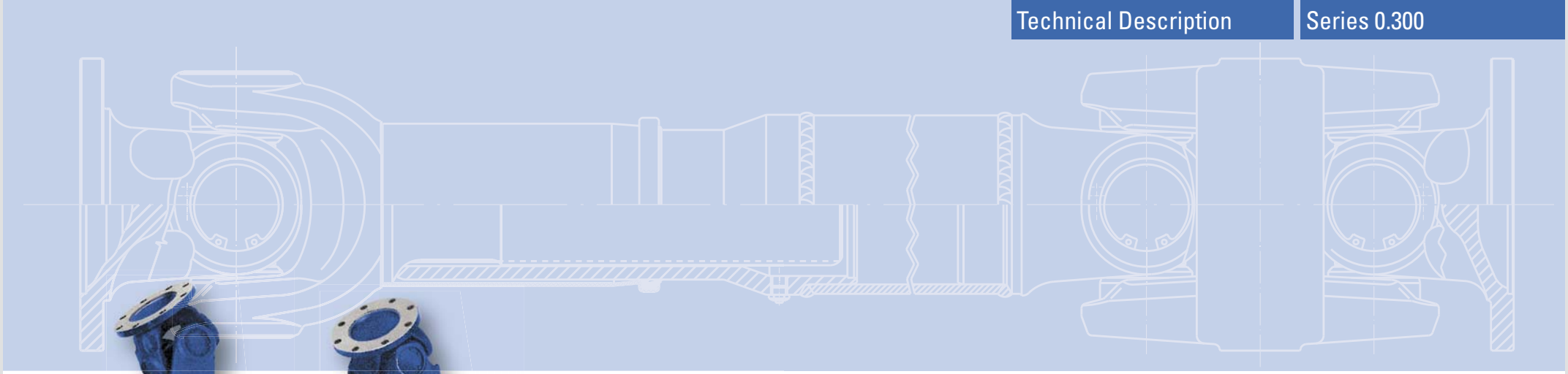

The series 0.300 is available in two configurations.

a) As a Centered Double Joint in connection with a single Joint with length compensation. This arrangement is mainly encountered on construction equipment with articulated steering. The centered double joint has the advantage of not requiring the support by an intermediate bearing. This results in a cost saving and in lower installation times for the drive lines.

b) The second configuration consists of two Centered Double Joints with length extension. Since the difference in an angle between both single joints is up to approximately 3 degrees, this configuration almost assures uniform speed and torque transmittal. The difference in angle creates a fluctuation smaller than 0,0027, an amount, so small that it can be disregarded. To determine the amount of fluctuation, see Application Guidelines.

The centred double joint consists of two fork parts which incorporate a centering device enclosed in a rubber boot for protection against dirt and moisture.

General technical data of series 0.300:

Maximum angle of deflection:	up to 42°
Torque Range:	up to 15200 Nm
Flange Connection	

For more detailed information please refer to the following datasheets.

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Roller bearing version

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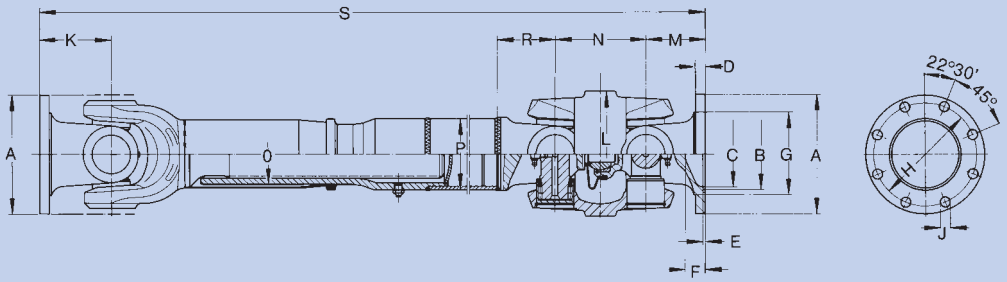
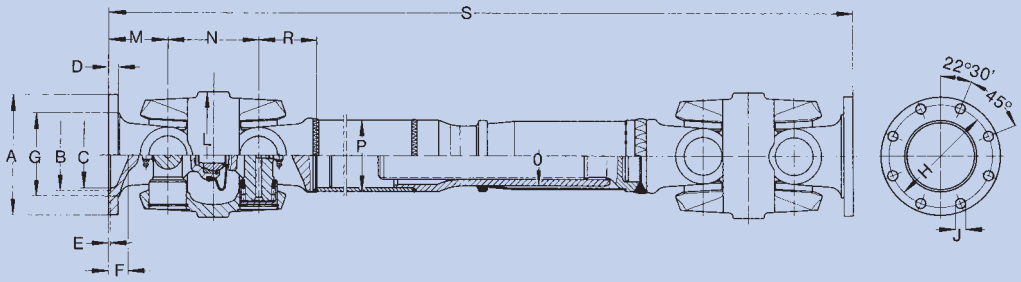


Single joint and centered double joint connected with each other by length extension



On both sides with centered double joint, connected with each other by length extension

Please indicate compressed length „S", extension and max. r.p.m. when ordering!

Cardan drive-shafts, double / single joint with length extension

Order number		**0.313.114**	**0.358.114**	**0.320.114**
Md_{max}	Nm	4000	7400	15200
Angle of deflection ß	°	35/40	35/42	30/42
A	mm	120	150	180
B^{H7}	mm	75	90	110
C	mm	70	82	104
D	mm	9	12	14
$E^{+0,5}$	mm	2,5	3	3,6
F	mm	27,5	25	22
G	mm	80,5	104	118
$H^{\pm 0,1}$	mm	101,5	130	155,5
$J^{B\,12}$	mm	10	12	16
K	mm	72	90	96
L	mm	138	158	180
M	mm	60	75	86
N	mm	105	115	140
O	mm	62	75	93
P_1	mm	**70x4**	**90x4**	**110x6**
P_2	mm	80x4	100x4	120x6
P_3	mm	100x4	120x5	–
R	mm	62	75	88
S_{min}	mm	670	810	822
X	mm	130	110	110
Weight	kg	–	39,37	–
Spline dim DIN 5480	mm	50x2,0x24	60x2,5x22	75x2,5x28
Number of flange holes		8	8	10

Please indicate compressed length „S", extension and max. r.p.m. when ordering!

Cardan drive-shafts, double joint with length extension

Order number		**0.313.115**	**0.358.115**	**0.320.115**
Md_{max}	Nm	4000	7400	15200
Angle of deflection ß	°	40	42	42
A	mm	120	150	180
B^{H7}	mm	75	90	110
C approx.	mm	70	84	104
D	mm	9	12	14
$E^{+0,5}$	mm	2,5	3	3,6
F	mm	27,5	25	22
G	mm	80,5	104	118
$H^{\pm 0,1}$	mm	101,5	130	155,5
$J^{B\,12}$	mm	10	12	16
L	mm	138	158	180
M	mm	60	75	86
N	mm	105	115	140
O	mm	62	75	93
P_1	mm	**70x4**	**90x4**	**110x6**
P_2	mm	80x4	100x4	120x6
P_3	mm	100x4	120x5	–
R	mm	62	75	88
S_{min}	mm	757	924	980
X	mm	130	110	110
Weight	kg	–	48,18	–
Spline dim DIN 5480	mm	50x2,0x24	60x2,5x22	75x2,5x28
Number of flange holes		8	8	10

Md_{max} = Maximum permitted torque. See technical appendage
ß = Maximum angle of deflection (per joint)
S_{min} = Minimum compressed length for preferred extension
X = Preferred extension (larger extensions available up to approx. 9 x spline o. D.)
P_1 = Tube diameter. Dimensions in bold type for normal applications. Alternative dimensions are for long shafts at high speeds, see technical annex domain speed
P_2, P_3 = Alternative tube
By **0.313** only external lubrication possible

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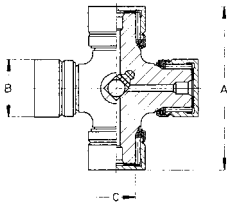
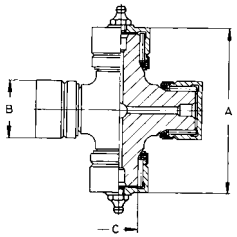
Md_{max} 4000 – 15200 Nm

Cross Units





Needle bearing version

					Version suitable for external lubrication Needle bearing	
Order number					**0.113.012**	
A	mm				106	
B	mm				38	
C	mm				26,28	
Snap rings included	mm				J 38 x 1,5	
Weight	kg				1,33	

Roller bearing version

		Standard version Roller bearing				Version suitable for external lubrication Roller bearing	
Order number		**0.158.015**	**0.120.015**			**0.113.016**	
A	mm	126	152			106	
B	mm	48	57			38	
C	mm	33,15	40,9			25,7	
Snap rings included	mm	J 48 x 1,75	J 57 x 2			J 38 x 1,5	
Weight	kg	2,28	4,21			1,34	
used for		**0.358**	**0.320**				

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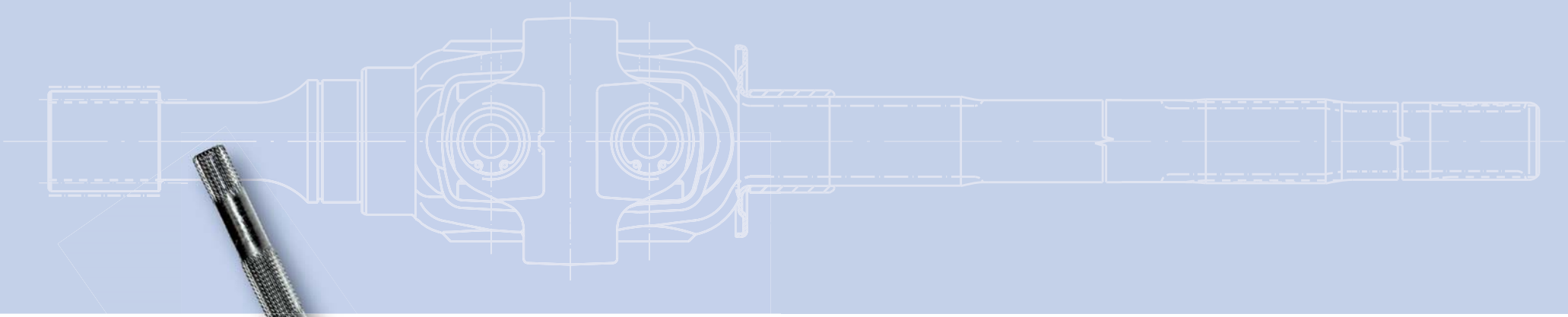

This Double Joint is used primarily in vehicles with powered steering axles.

As the design drawing shows, the forks can function as hubs and/or fork shafts. The connection between the forks and the center piece is provided by the cross, as is the case with all other Cardan Shafts.

Each hub is equipped with an internal spline which provides a positive connection to the input and output shaft. The outside diameter, which serves as a seat for support bearings, is ground to a very fine finish.

The fork shafts are equipped with a tooth system – that transfers the torque – and bearing points. Type and size of the tooth system can be designed individually. There are also different requirements on the surface characteristics of the bearing blocks which we can meet.

Since the principles of kinematics that apply to all Cardan Shafts are also valid for Double Joints, again measures must be taken to keep fluctuating output motions as low as possible.

For more information concerning fluctuating output motions please refer to the technical annex, Application Guidelines and Calculation Data, where you will find a detailed description of the necessary measures.

General technical data of series 0.400:
Maximum angle of deflection: up to 55°
Torque range: up to 6100 Nm
Hub Connection Fork Shafts Connection

For more detailed information please refer to the following datasheets.

0.400

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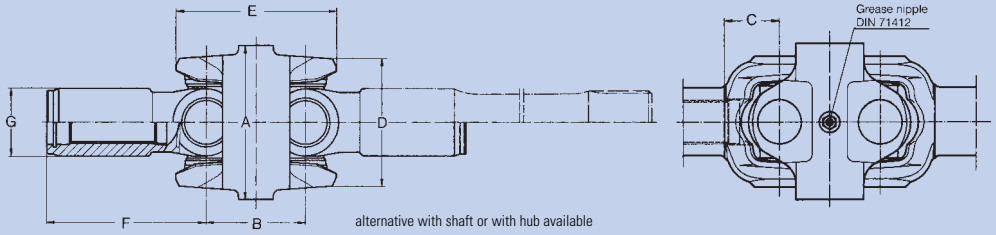
double-joint version for Steering Axles



All series are available with sun pinion-forkshaft.

Cardan Drive-Shafts, double-joint version for Steering Axles, Needle bearing version

Order number		0.403.300	0.408.500	0.409.500	0.411.500	0.412.500
Md_{max}	Nm	1650	2210	2860	4160	6110
Angle of deflection ß	°	55	52	50	50	50
A	mm	87	96	111	126	138
B	mm	57	63	70	81	89
C	mm	33	33	41,5	39	48
D	mm	68	78	90	105	114
E	mm	89	101	111,5	128	144
F	mm	–	89	100	113	143
G	mm	–	46	46	56	60

All series are available with sun pinion-forkshaft.

Cardan Drive-Shafts, double-joint version for Steering Axles, Roller bearing version

Order number		0.409.500	0.411.500
Md_{max}	Nm	3120	4680
Angle of deflection ß	°	52	52
A	mm	111	126
B	mm	70	81
C	mm	41,5	41
D	mm	90	105
E	mm	111,5	131
F	mm	100	112
G	mm	46	56

Other Dimensions and larger angles of deflection on request.
Angle of deflection up 55° on request.

Md_{max} = Maximum operating torque referring to center piece including spider-set by 0° position
ß = Maximum angle of deflection, when ordering, please indicate this together with required shaft dimension.
For application principles, Center offset and max. axial float see technical annex.

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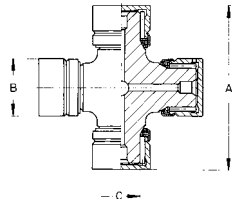
Cross Units



		Needle bearing version						
		Standard version Needle bearing						
Order number		**0.403**	**0.412**	**0.408.011.014**	**0.408.011.015**	**0.110.011**	**0.112.011**	**0.113.011**
A	mm	62,6	105,6	70,15	70,7	83	97	106
B	mm	23,8	40	27	28,5	30	35	38
C	mm	16	27,9	18,27	19,87	19,9	23,04	26,28
Snap ring included	mm	J 24 x 1,2	J 40 x 1,75	J 27 x 1,5	J 29 x 1,2	J 30 x 1,2	J 35 x 1,5	J 38 x 1,5
Weight	kg	–	–	0,45	0,51	0,66	0,98	1,30
used for		**0.403**	**0.412**	**0.408**	**0.408**	**0.409**	**0.411**	**0.412**

		Roller bearing version		
		Standard version Roller bearing		
Order number		**0.110.017**	**0.112.017**	
A	mm	83	97	
B	mm	30	35	
C	mm	20,02	24,08	
Snap ring included	mm	J 30 x 1,2	J 35 x 1,5	
Weight	kg	0,66	0,94	
used for		**0.409**	**0.411**	

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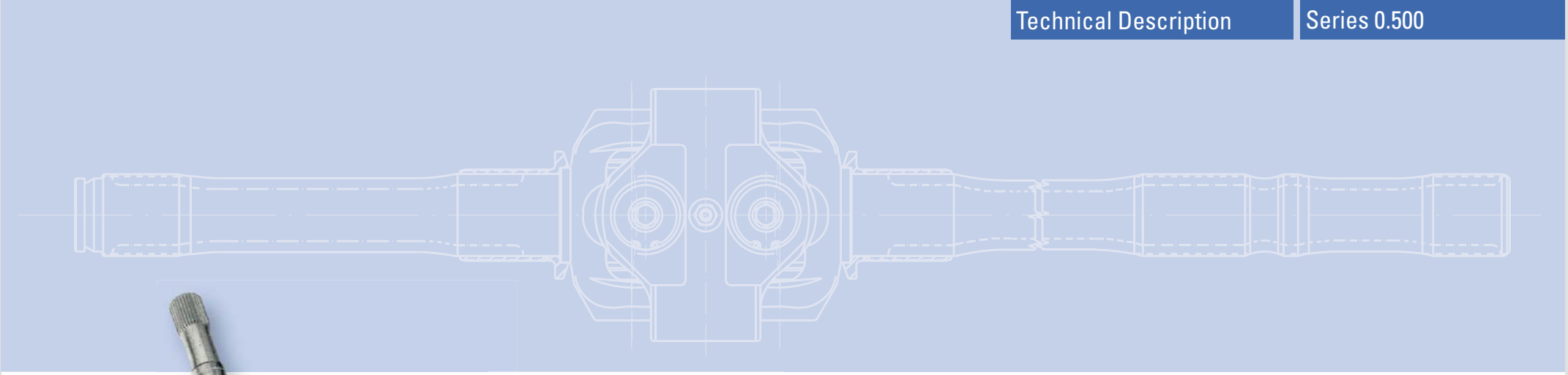

This Double Joint is used for the same application as series 0.400, namely in steering axles of all wheel drive vehicles. However, the design of series 0.500 differs slightly from that of series 0.400.

a) The joint pivots are not located in one plane thus enabling a more compact design. This feature shortens the distance between the centerpiece which results in a shorter installation length.
b) Series 0.500 offers more joint sizes than series 0.400 thus covering a wider torque range.

Since the same principles of kinematics apply to both series, please refer to the technical annex: Application Guidelines and Calculation Data. The measures to be taken to minimize fluctuation are described there.

General technical data of series 0.500:
Maximum angle of deflection: up to 50°
Torque range: up to 16900 Nm
Fork Shaft Design

For more detailed information please refer to the following datasheets.

0.500

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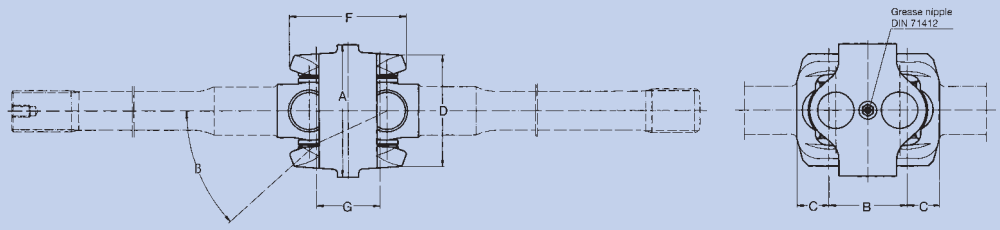
double-joint version for Steering Axles



Cardan Drive-Shafts, double-joint version for Steering Axles, Needle bearing version

Order number		0.509.3	0.511.3	0.512.3	0.513.3	0.515.3	0.516.3	0.518.3
Md_{max}	Nm	2860	5200	7150	8450	10920	13000	16900
Angle of deflection ß	°	42 / 47	42 / 47	42 / 47	42 / 47	42 / 47	42 / 47	42 / 47
A	mm	105	128	138	146	160	174	195
B	mm	63 / 66	73 / 77	81 / 86	86 / 90	94 / 100	103 / 108	110 / 116
C	mm	26	31	33	37	39	43	45
D	mm	86	104	115	118	134	145	162
F	mm	94 / 99	108 / 119	121 / 125	130 / 134	140 / 146	150 / 156	158 / 164
G	mm	53 / 56	61 / 65	66 / 71	71 / 75	78 / 84	83 / 88	90 / 96

Cardan Drive-Shafts, double-joint version for Steering Axles, Roller bearing version

Order number		0.510.3	0.511.3	0.512.3
Md_{max}	Nm	4160	5200	7150
Angle of deflection ß	°	* / 50	42 / 47	42 / 47
A	mm	115	128	138
B	mm	* / 77	73 / 77	84 / 89
C	mm	30	31	33
D	mm	95	104	116
F	mm	* / 109	108 / 119	125
G	mm	* / 63	61 / 65	69 / 74

Md_{max} = Maximum operating torque referring to center piece including spider-set by 0° position
ß = Maximum angle of deflection, when ordering, please indicate this together with required shaft dimension. For application principles, Center offset and max. axial float see technical annex.
* = on request

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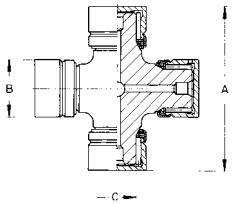
Cross Units



		Needle bearing version						
		Standard version Needle bearing						
Order number		**0.509.021**	**0.511.021**	**0.512.021**	**0.513.021**	**0.515.021**	**0.516.021**	**0.518.021**
A	mm	79	96	107	110	125	134	152
B	mm	30	35	38	42	45	50	50
C	mm	19,9	23,04	26,28	28,6	31,8	33,4	33,4
Snap rings included	mm	J 30 x 1,2	J 35 x 1,5	J 38 x 1,5	J 42 x 1,75	J 45 x 1,75	J 50 x 2	J 50 x 2
Weight	kg	0,60	0,95	1,32	1,70	2,20	3,00	3,40
used for		**0.509**	**0.511**	**0.512**	**0.513**	**0.515**	**0.516**	**0.518**

		Roller bearing version		
		Standard version Roller bearing		
Order number		**0.510.021**	**0.511.021**	
A	mm	87	96	
B	mm	35	35	
C	mm	24,8	24,8	
Snap rings included	mm	J 35 x 1,5	J 35 x 1,5	
Weight	kg	0,83	0,98	
used for		**0.510**	**0.511**	

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ORIGINAL elbe GELENKE

Precision needle bearing joints and shafts according to DIN 808 are used when precise power transmission at high speeds (up to 5000 min^{-1}) is to be ensured.

The hardened and ground spider journals rest in sealed needle bearing bushings.

Due to permanent lubricating with high-quality special roller bearing grease, the joints are entirely maintenance-free and are therefore preferably used in areas with limited access in mechanical engineering.

A considerable advantage compared to sliding bearing supported joints is the enormously high efficiency at a given deflection angle.

Further information on the use of needle bearing precision joints and shafts can be found under „Information on the use“ in the Technical Annex, chapter 8.

Page 152 also provides information on surface refinement processes.

General technical data of production series 0.600:
Max. angle of deflection: 45°
Torque range: 6 Nm up to 250 Nm

For more detailed information please refer to the following datasheets.

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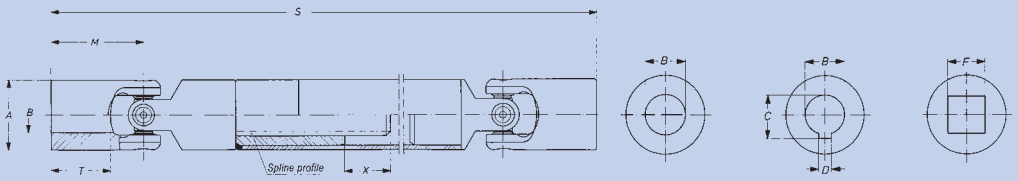
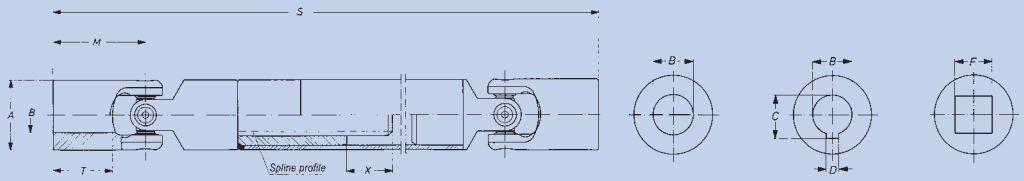
Needle bearing version, with length compensation



Standard bore | with key-way DIN 6885 sheet 1 | Inner square



Standard bore | with key-way DIN 6885 sheet 1 | Inner square

Please indicate compressed length „S", extension and required type of flange when ordering!

Precision Cardan Shafts, Standard bore

Order number		0.616.100	0.620.100	0.625.100	0.632.100	0.640.100	0.650.100	0.663.100
Md_{max}	Nm	6	15	20	40	80	120	250
Angle of deflection ß	°	45	45	45	45	45	45	45
Weight by S_1	kg	0,20	0,33	0,59	1,09	2,13	4,0	8,25
Weight by S_2	kg	0,24	0,39	0,68	1,21	2,28	4,44	8,75
Weight by S_3	kg	0,26	0,42	0,72	1,35	2,57	4,98	9,70
A	mm	16	20	25	32	40	50	63
$*B^{H7}$	mm	10	12	16	20	25	32	40
$*C^{+0,2}$	mm	–	–	–	–	–	–	–
$*D^{P9}$	mm	–	–	–	–	–	–	–
$*F^{H9}$	mm	–	–	–	–	–	–	–
M	mm	26	31	37	43	54	66	83
$S_1 + X_1$	mm	165 + 15	174 + 20	198 + 25	234 + 30	301 + 40	372 + 50	475 + 70
$S_2 + X_2$	mm	185 + 30	194 + 40	228 + 55	264 + 60	321 + 60	422 + 100	505 + 100
$S_3 + X_3$	mm	210 + 60	224 + 70	248 + 75	294 + 90	371 + 110	472 + 150	585 + 180
T	mm	15	18	22	25	32	40	50
Spline profile	mm	6x7,5x10,2	6x11x14	6x11x14	6x16x20	6x21x25	6x28x32	6x36x42

Precision Cardan Shafts, Bore with key-way DIN 6885, Sheet 1

Order number		0.616.103	0.620.103	0.625.103	0.632.103	0.640.103	0.650.103	0.663.103
Md_{max}	Nm	6	15	20	40	80	120	250
Angle of deflection ß	°	45	45	45	45	45	45	45
Weight by S_1	kg	0,20	0,33	0,59	1,09	2,13	4,0	8,25
Weight by S_2	kg	0,24	0,39	0,68	1,21	2,28	4,44	8,75
Weight by S_3	kg	0,26	0,42	0,72	1,35	2,57	4,98	9,70
A	mm	16	20	25	32	40	50	63
$*B^{H7}$	mm	10	12	16	20	25	32	40
$*C^{+0,2}$	mm	11,4	13,8	18,3	22,8	28,3	35,3	43,3
$*D^{P9}$	mm	3	4	5	6	8	10	12
$*F^{H9}$	mm	–	–	–	–	–	–	–
M	mm	26	31	37	43	54	66	83
$S_1 + X_1$	mm	165 + 15	174 + 20	198 + 25	234 + 30	301 + 40	372 + 50	475 + 70
$S_2 + X_2$	mm	185 + 30	194 + 40	228 + 55	264 + 60	321 + 60	422 + 100	505 + 100
$S_3 + X_3$	mm	210 + 600	224 + 70	248 + 75	294 + 90	371 + 110	472 + 150	585 + 180
T	mm	15	18	22	25	32	40	50
Spline profile	mm	6x7,5x10,2	6x11x14	6x11x14	6x16x20	6x21x25	6x28x32	6x36x42

Precision Cardan Shafts, Inner square

Order number		0.616.104	0.620.104	0.625.104	0.632.104	0.640.104	0.650.104	0.663.104
Md_{max}	Nm	6	15	20	40	80	120	250
Angle of deflection ß	°	45	45	45	45	45	45	45
Weight by S_1	kg	0,20	0,33	0,59	1,09	2,13	4,0	8,25
Weight by S_2	kg	0,24	0,39	0,68	1,21	2,28	4,44	8,75
Weight by S_3	kg	0,26	0,42	0,72	1,35	2,57	4,98	9,70
A	mm	16	20	25	32	40	50	63
$*B^{H7}$	mm	–	–	–	–	–	–	–
$*C^{+0,2}$	mm	–	–	–	–	–	–	–
$*D^{P9}$	mm	–	–	–	–	–	–	–
$*F^{H9}$	mm	8	10	12	16	20	25	32
M	mm	26	31	37	43	54	66	83
$S_1 + X_1$	mm	165 + 15	174 + 20	198 + 25	234 + 30	301 + 40	372 + 50	475 + 70
$S_2 + X_2$	mm	185 + 30	194 + 40	228 + 55	264 + 60	321 + 60	422 + 100	505 + 100
$S_3 + X_3$	mm	210 + 60	224 + 70	248 + 75	294 + 90	371 + 110	472 + 150	585 + 180
T	mm	15	18	22	25	32	40	50
Spline profile	mm	6x7,5x10,2	6x11x14	6x11x14	6x16x20	6x21x25	6x28x32	6x36x42

These drive shafts are also available with rapid-change coupling.
* = Customized bores, key-way and inner square dimensions possible
Md_{max} = Max. permissible torque
ß = Max. angle of deflection per joint
S_1
S_2 = preferred lengths, compressed
S_3
X_1 = Maximum extension for S_1
X_2 = Maximum extension for S_2
X_3 = Maximum extension for S_3
For application criteria and calculations refer to technical annex

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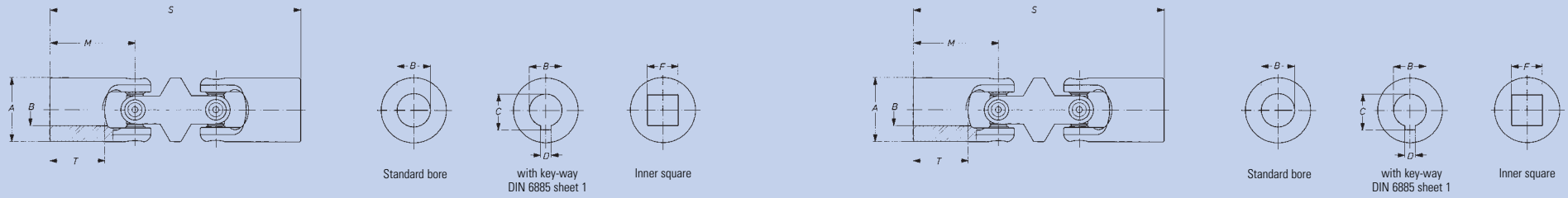
double, DIN 808, Needle bearing version



		Precision Cardan Shafts, Standard bore							Precision Cardan Shafts, Bore with key-way DIN 6885, Sheet 1								Precision Cardan Shafts, Inner square						
Order number		**0.616.300**	**0.620.300**	**0.625.300**	**0.632.300**	**0.640.300**	**0.650.300**	**0.663.300**	**0.616.303**	**0.620.303**	**0.625.303**	**0.632.303**	**0.640.303**	**0.650.303**	**0.663.303**	**0.616.304**	**0.620.304**	**0.625.304**	**0.632.304**	**0.640.304**	**0.650.304**	**0.663.304**
Md_{max}	Nm	6	15	20	40	80	120	250	6	15	20	40	80	120	250	6	15	20	40	80	120	250
Angle of deflection ß	°	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45
Weight	kg	0,08	0,14	0,24	0,50	0,95	1,71	3,06	0,08	0,14	0,24	0,50	0,95	1,71	3,06	0,08	0,14	0,24	0,50	0,95	1,71	3,06
A	mm	16	20	25	32	40	50	63	16	20	25	32	40	50	63	16	20	25	32	40	50	63
$*B^{H7}$	mm	10	12	16	20	25	32	40	10	12	16	20	25	32	40	–	–	–	–	–	–	–
$*C^{+0,2}$	mm	–	–	–	–	–	–	–	11,4	13,8	18,3	22,8	28,3	35,3	43,3	–	–	–	–	–	–	–
$*D^{P9}$	mm	–	–	–	–	–	–	–	3	4	5	6	8	10	12	–	–	–	–	–	–	–
$*F^{H9}$	mm	–	–	–	–	–	–	–	–	–	–	–	–	–	–	8	10	12	16	20	25	32
M	mm	26	31	37	43	54	66	83	26	31	37	43	54	66	83	26	31	37	43	54	66	83
S	mm	74	88	104	124	156	188	238	74	88	104	124	156	188	238	74	88	104	124	156	188	238
T	mm	15	18	22	25	32	40	50	15	18	22	25	32	40	50	15	18	22	25	32	40	50

* = Customized bores, key-way and inner square dimensions possible
Md_{max} = Max. permissible torque
ß = Max. angle of deflection per joint
For application criteria and calculations refer to technical annex

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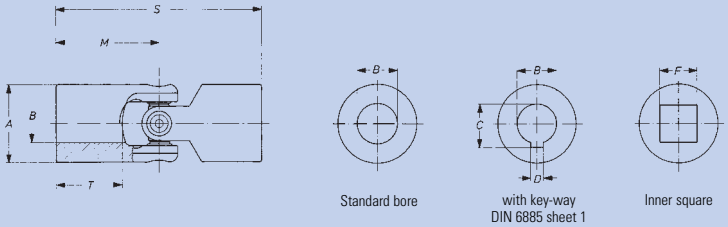
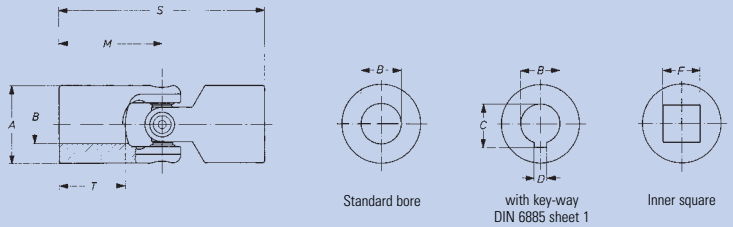
single, DIN 808, Needle bearing version





		Precision Cardan Shafts, Standard bore							Precision Cardan Shafts, Bore with key-way DIN 6885, Sheet 1								Precision Cardan Shafts, Inner square							
Order number		**0.616.400**	**0.620.400**	**0.625.400**	**0.632.400**	**0.640.400**	**0.650.400**	**0.663.400**	**0.616.403**	**0.620.403**	**0.625.403**	**0.632.403**	**0.640.403**	**0.650.403**	**0.663.403**	**0.616.404**	**0.620.404**	**0.625.404**	**0.632.404**	**0.640.404**	**0.650.404**	**0.663.404**
Md_{max}	Nm	6	15	20	40	80	120	250	6	15	20	40	80	120	250	6	15	20	40	80	120	250
Angle of deflection ß	°	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45
Weight	kg	0,05	0,10	0,16	0,31	0,61	1,15	2,17	0,05	0,10	0,16	0,31	0,61	1,15	2,17	0,05	0,10	0,16	0,31	0,61	1,15	2,17
A	mm	16	20	25	32	40	50	63	16	20	25	32	40	50	63	16	20	25	32	40	50	63
$*B^{H7}$	mm	10	12	16	20	25	32	40	10	12	16	20	25	32	40	–	–	–	–	–	–	–
$*C^{+0,2}$	mm	–	–	–	–	–	–	–	11,4	13,8	18,3	22,8	28,3	35,3	43,3	–	–	–	–	–	–	–
$*D^{P9}$	mm	–	–	–	–	–	–	–	3	4	5	6	8	10	12	–	–	–	–	–	–	–
$*E^{H9}$	mm	–	–	–	–	–	–	–	–	–	–	–	–	–	–	8	10	12	16	20	25	32
M	mm	26	31	37	43	54	66	83	26	31	37	43	54	66	83	26	31	37	43	54	66	83
S	mm	52	62	74	86	108	132	166	52	62	74	86	108	132	166	52	62	74	86	108	132	166
T	mm	15	18	22	25	32	40	50	15	18	22	25	32	40	50	15	18	22	25	32	40	50

* = Customized bores, key-way and inner square dimensions possible
Md_{max} = Max. permissible torque
ß = Max. angle of deflection per joint
For application criteria and calculations refer to technical annex

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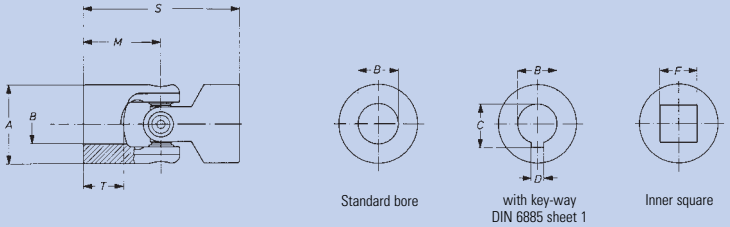
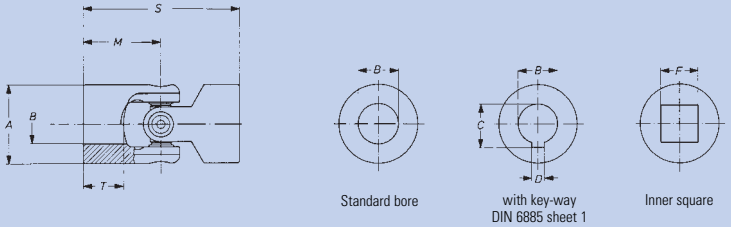
single, Short Version, DIN 808, Needle bearing version





		Precision Cardan Shafts, Standard bore							Precision Cardan Shafts, Bore with key-way DIN 6885, Sheet 1								Precision Cardan Shafts, Inner square						
Order number		**0.616.410**	**0.620.410**	**0.625.410**	**0.632.410**	**0.640.410**	**0.650.410**	**0.663.410**	**0.616.413**	**0.620.413**	**0.625.413**	**0.632.413**	**0.640.413**	**0.650.413**	**0.663.413**	**0.616.414**	**0.620.414**	**0.625.414**	**0.632.414**	**0.640.414**	**0.650.414**	**0.663.414**
Md_{max}	Nm	6	15	20	40	80	120	250	6	15	20	40	80	120	250	6	15	20	40	80	120	250
Angle of deflection ß	°	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45
Weight	kg	0,03	0,07	0,10	0,22	0,42	0,80	1,88	0,03	0,07	0,10	0,22	0,42	0,80	1,88	0,03	0,07	0,10	0,22	0,42	0,80	1,88
A	mm	16	20	25	32	40	50	63	16	20	25	32	40	50	63	16	20	25	32	40	50	63
$*B^{H7}$	mm	8	10	12	16	20	25	32	8	10	12	16	20	25	32	–	–	–	–	–	–	–
$*C^{+0,2}$	mm	–	–	–	–	–	–	–	9	11,4	13,8	18,3	22,8	28,3	35,3	–	–	–	–	–	–	–
$*D^{P9}$	mm	–	–	–	–	–	–	–	2	3	4	5	6	8	10	–	–	–	–	–	–	–
$*F^{H9}$	mm	–	–	–	–	–	–	–	–	–	–	–	–	–	–	6	8	10	14	19	24	30
M	mm	20	24	28	34	41	52,5	65	20	24	28	34	41	52,5	65	20	24	28	34	41	52,5	65
S	mm	40	48	56	68	82	105	130	40	48	56	68	82	105	130	40	48	56	68	82	105	130
T	mm	11	13	15	18**	20**	27**	36	11	13	15	18**	20**	27**	36	11	13	15	18**	20**	27**	36

* = Customized bores, key-way and inner square dimensions possible
** = Bore depth smaller than DIN 808
Md_{max} = Max. permissible torque
ß = Max. angle of deflection per joint
For application criteria and calculations refer to technical annex

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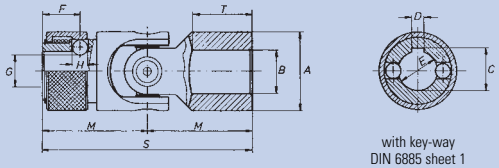
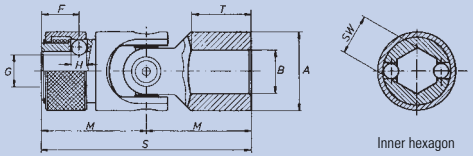
single, with rapid-change coupling, DIN 808, Needle bearing version



with key-way
DIN 6885 sheet 1



Inner hexagon

Precision Cardan Joints, with rapid-change coupling, Bore with key-way DIN 6885, Sheet 1

Order number		0.616.423	0.620.423	0.625.423	0.632.423	0.640.423	0.650.423	0.663.423
Md_{max}	Nm	6	15	20	40	80	120	250
Angle of deflection ß	°	45	45	45	45	45	45	45
Weight	kg	0,05	0,10	0,16	0,31	0,61	1,15	1,90
A	mm	16	20	25	32	40	50	63
*B^{H7}	mm	8	10	14	16	20	25	30
*$C^{+0,2}$	mm	9	11	15,3	17,3	21,7	26,7	31,7
*D^{H8}	mm	2	3	5	5	6	8	8
*E^{H7}	mm	8	10	14	16	20	25	30
F^{H9}	mm	9,5	11,5	13,5	14	19	20,5	25
G	mm	7	8,7	13	14,8	18	23	28
H	mm	3,5	4	4	6,35	8	10	10
M	mm	26	31	37	43	54	66	83
S	mm	52	62	74	86	108	132	166
*SW	mm	–	–	–	–	–	–	–
T	mm	15	18	22	25	32	40	50

Precision Cardan Joints, with rapid-change coupling, Inner hexagon

0.616.426	0.620.426	0.625.426	0.625.427	0.632.426	0.640.426	0.650.426	0.663.426	0.663.427
6	15	20	20	40	80	120	250	250
45	45	45	45	45	45	45	45	45
0,05	0,10	0,16	0,16	0,31	0,61	1,15	1,90	1,90
16	20	25	25	32	40	50	63	63
8	10	14	14	16	20	25	30	30
–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–
9,5	11,5	13,5	13,5	14	19	20,5	25	25
6,3	8	13	10,5	14,8	18	23	28	33
3,5	4	4	4	6,35	8	10	10	10
26	31	37	37	43	54	66	83	83
52	62	74	74	86	108	132	166	166
7,2	9,06	14,04	11,15	16	20	25	30	35
15	18	22	22	25	32	40	50	50

* = Customized bores, key-way and inner hexagon dimensions possible
Md_{max} = Max. permissible torque
ß = Max. angle of deflection per joint
For application criteria and calculations refer to technical annex

■ T I P ■

There are application examples in which frequent removal of the universal joint shaft or the joint from the drive or the output shaft is required.

In this case the use of a rapid-change coupling allows to change the shaft within very short time. This is done manually without any tools.

Torque transmission is ensured via a hexagonal profile or a feather key. Two steel balls which grip into a circular groove at the shaft connection provide axial locking of the shaft.

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Cardan joints and cardan shafts according to DIN 808 are supported by sliding bearings and their use is consequently restricted to low-speed drives.

The respective permissible maximum speeds depend on the deflection angle and the load, however, they must not exceed 1000 min^{-1}.

We strongly recommend to consult our Technical Advice Service in cases of uncertainty.

To ensure trouble-free operation, the joints must always be sufficiently lubricated. This may also be done by means of bellows and grease filling.

Further information on the use of cardan joints and cardan shafts can be found under "Information on the use" in the Technical Annex, chapter 8.

Page 152 provides information on surface refinement processes.

General technical description of production series 0.700:

Max. angle of deflection :	45°
Torque range:	6 Nm up to 450 Nm
Material:	9 SMn Pb 28 k
Material No.	1.0718
Special material:	X 17 CrNi 16-2
Material No.	1.4057 (corrosion- and acid-resistant)

For more detailed information please refer to the following datasheets.

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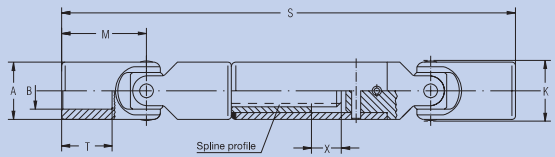
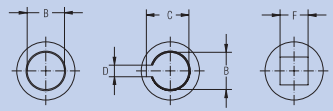
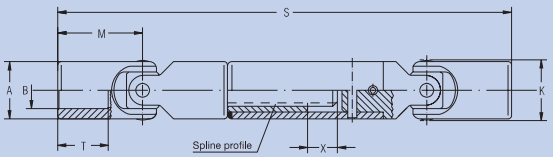
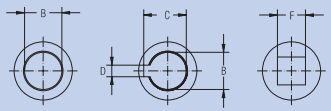
Needle bearing version, with length compensation





Standard bore | with key-way DIN 6885 sheet 1 | Inner square





Standard bore | with key-way DIN 6885 sheet 1 | Inner square

Please indicate compressed length „S", extension and required type of flange when ordering!

		Cross Cardan Shafts, Standard bore							Cross Cardan Shafts, Bore with key-way DIN 6885, Sheet 1							Cross Cardan Shafts, Inner square						
Order number		**0.716.100**	**0.720.100**	**0.725.100**	**0.732.100**	**0.740.100**	**0.750.100**	**0.763.100**	**0.716.103**	**0.720.103**	**0.725.103**	**0.732.103**	**0.740.103**	**0.750.103**	**0.763.103**	**0.716.104**	**0.720.104**	**0.725.104**	**0.732.104**	**0.740.104**	**0.750.104**	**0.763.104**
Md_{max}	Nm	8	20	30	60	160	290	450	8	20	30	60	160	290	450	8	20	30	60	160	290	450
Angle of deflection ß	°	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45
Weight by S_1	kg	0,20	0,33	0,59	1,09	2,13	4,0	8,24	0,20	0,33	0,59	1,09	2,13	4,0	8,24	0,20	0,33	0,59	1,09	2,13	4,0	8,24
Weight by S_2	kg	0,24	0,39	0,68	1,21	2,28	4,44	8,74	0,24	0,39	0,68	1,21	2,28	4,44	8,74	0,24	0,39	0,68	1,21	2,28	4,44	8,74
Weight by S_3	kg	0,26	0,42	0,72	1,35	2,57	4,98	9,72	0,26	0,42	0,72	1,35	2,57	4,98	9,72	0,26	0,42	0,72	1,35	2,57	4,98	9,72
A	mm	16	20	25	32	40	50	63	16	20	25	32	40	50	63	16	20	25	32	40	50	63
$*B^{H7}$	mm	10	12	16	20	25	32	40	10	12	16	20	25	32	40	–	–	–	–	–	–	–
$*C^{+0,2}$	mm	–	–	–	–	–	–	–	11,4	13,8	18,3	22,8	28,3	35,3	43,3	–	–	–	–	–	–	–
$*D^{P9}$	mm	–	–	–	–	–	–	–	3	4	5	6	8	10	12	–	–	–	–	–	–	–
$*F^{H9}$	mm	–	–	–	–	–	–	–	–	–	–	–	–	–	–	8	10	12	16	20	25	32
K	mm	17,5	21,5	26,5	33,5	42	52,5	65	17,5	21,5	26,5	33,5	42	52,5	65	17,5	21,5	26,5	33,5	42	52,5	65
M	mm	26	31	37	43	54	66	83	26	31	37	43	54	66	83	26	31	37	43	54	66	83
$S_1 + X_1$	mm	165 + 15	174 + 20	198 + 25	234 + 30	301 + 40	372 + 50	475 + 70	165 + 15	174 + 20	198 + 25	234 + 30	301 + 40	372 + 50	475 + 70	165 + 15	174 + 20	198 + 25	234 + 30	301 + 40	372 + 50	475 + 70
$S_2 + X_2$	mm	185 + 30	194 + 40	228 + 55	264 + 60	321 + 60	422 + 100	505 + 100	185 + 30	194 + 40	228 + 55	264 + 60	321 + 60	422 + 100	505 + 100	185 + 30	194 + 40	228 + 55	264 + 60	321 + 60	422 + 100	505 + 100
$S_3 + X_3$	mm	210 + 60	224 + 70	248 + 75	294 + 90	371 + 110	472 + 150	585 + 180	210 + 600	224 + 70	248 + 75	294 + 90	371 + 110	472 + 150	585 + 180	210 + 60	224 + 70	248 + 75	294 + 90	371 + 110	472 + 150	585 + 180
T	mm	15	18	22	25	32	40	50	15	18	22	25	32	40	50	15	18	22	25	32	40	50
Spline profile	mm	6x7,5x10,2	6x11x14	6x11x14	6x16x20	6x21x25	6x28x32	6x36x42	6x7,5x10,2	6x11x14	6x11x14	6x16x20	6x21x25	6x28x32	6x36x42	6x7,5x10,2	6x11x14	6x11x14	6x16x20	6x21x25	6x28x32	6x36x42

These drive shafts are also available with rapid-change coupling.
* = Customized bores, key-ways and inner square dimensions possible
Md_{max} = Max. permissible torque
ß = Max. angle of deflection per joint
S_1
S_2 = preferred lengths, compressed
S_3
X_1 = Maximum extension for S_1
X_2 = Maximum extension for S_2
X_3 = Maximum extension for S_3
For application criteria and calculations refer to technical annex

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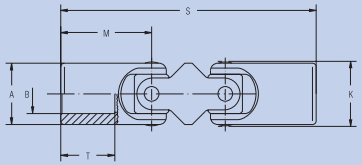
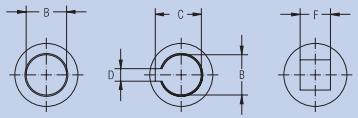
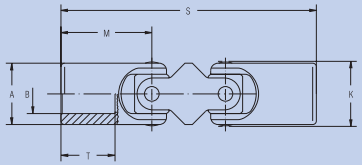
elso

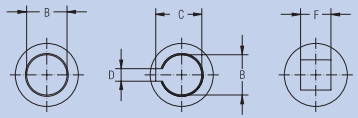
double, DIN 808





Standard bore | with key-way DIN 6885 sheet 1 | Inner square





Standard bore | with key-way DIN 6885 sheet 1 | Inner square

Cross Joints, double, Standard bore

Order number		0.713.300	0.716.300	0.720.300	0.725.300	0.732.300	0.740.300	0.750.300	0.763.300
Md_{max}	Nm	6	8	20	30	60	160	290	450
Angle of deflection ß	°	45	45	45	45	45	45	45	45
Weight	kg	0,04	0,08	0,14	0,24	0,50	0,95	1,71	3,51
A	mm	13	16	20	25	32	40	50	63
*B^{H7}	mm	8	10	12	16	20	25	32	40
*$C^{+0,2}$	mm	–	–	–	–	–	–	–	–
*D^{P9}	mm	–	–	–	–	–	–	–	–
*F^{H9}	mm	–	–	–	–	–	–	–	–
K	mm	14	17,5	21,5	26,5	33,5	42	52,5	65
M	mm	21	26	31	37	43	54	66	83
S	mm	60	74	88	104	124	156	188	238
T	mm	12	15	18	22	25	32	40	50

Cross Joints, double, Bore with key-way DIN 6885, Sheet 1

Order number		0.713.303	0.716.303	0.720.303	0.725.303	0.732.303	0.740.303	0.750.303	0.763.303
Md_{max}	Nm	6	8	20	30	60	160	290	450
Angle of deflection ß	°	45	45	45	45	45	45	45	45
Weight	kg	0,04	0,08	0,14	0,24	0,50	0,95	1,71	3,51
A	mm	13	16	20	25	32	40	50	63
*B^{H7}	mm	8	10	12	16	20	25	32	40
*$C^{+0,2}$	mm	9	11,4	13,8	18,3	22,8	28,3	35,3	43,3
*D^{P9}	mm	2	3	4	5	6	8	10	12
*F^{H9}	mm	–	–	–	–	–	–	–	–
K	mm	14	17,5	21,5	26,5	33,5	42	52,5	65
M	mm	21	26	31	37	43	54	66	83
S	mm	60	74	88	104	124	156	188	238
T	mm	12	15	18	22	25	32	40	50

Cross Joints, double, Inner square

Order number		0.713.304	0.716.304	0.720.304	0.725.304	0.732.304	0.740.304	0.750.304	0.763.304
Md_{max}	Nm	6	8	20	30	60	160	290	450
Angle of deflection ß	°	45	45	45	45	45	45	45	45
Weight	kg	0,04	0,08	0,14	0,24	0,50	0,95	1,71	3,51
A	mm	13	16	20	25	32	40	50	63
*B^{H7}	mm	–	–	–	–	–	–	–	–
*$C^{+0,2}$	mm	–	–	–	–	–	–	–	–
*D^{P9}	mm	–	–	–	–	–	–	–	–
*F^{H9}	mm	6	8	10	12	16	20	25	32
K	mm	14	17,5	21,5	26,5	33,5	42	52,5	65
M	mm	21	26	31	37	43	54	66	83
S	mm	60	74	88	104	124	156	188	238
T	mm	12	15	18	22	25	32	40	50

* = Customized bores, key-ways and inner square dimensions possible
Md_{max} = Max. permissible torque
ß = Max. angle of deflection per joint
For application criteria and calculations refer to technical annex

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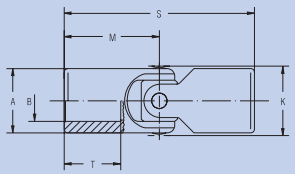
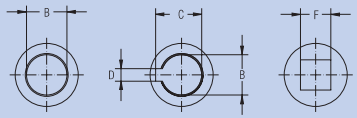
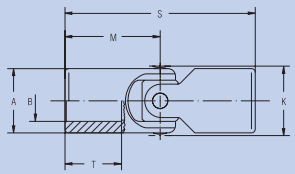
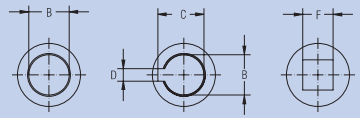
single, DIN 808





Standard bore | with key-way DIN 6885 sheet 1 | Inner square





Standard bore | with key-way DIN 6885 sheet 1 | Inner square

		Cross Joints, single, Standard bore								Cross Joints, single, Bore with key-way DIN 6885, Sheet 1		Cross Joints, single, Inner square							
Order number		**0.713.400**	**0.716.400**	**0.720.400**	**0.725.400**	**0.732.400**	**0.740.400**	**0.750.400**	**0.763.400**	**0.713.403**	**0.716.403**	**0.720.403**	**0.725.403**	**0.732.403**	**0.740.403**	**0.750.403**	**0.763.403**	**0.713.404**	**0.716.404**	**0.720.404**	**0.725.404**	**0.732.404**	**0.740.404**	**0.750.404**	**0.763.404**
Md_{max}	Nm	6	8	20	30	60	160	290	450	6	8	20	30	60	160	290	450	6	8	20	30	60	160	290	450
Angle of deflection ß	°	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45
Weight	kg	0,03	0,05	0,10	0,16	0,31	0,61	1,15	2,38	0,03	0,05	0,10	0,16	0,31	0,61	1,15	2,38	0,03	0,05	0,10	0,16	0,31	0,61	1,15	2,38
A	mm	13	16	20	25	32	40	50	63	13	16	20	25	32	40	50	63	13	16	20	25	32	40	50	63
$*B^{H7}$	mm	8	10	12	16	20	25	32	40	8	10	12	16	20	25	32	40	–	–	–	–	–	–	–	–
$*C^{+0,2}$	mm	–	–	–	–	–	–	–	–	9	11,4	13,8	18,3	22,8	28,3	35,3	43,3	–	–	–	–	–	–	–	–
$*D^{P9}$	mm	–	–	–	–	–	–	–	–	2	3	4	5	6	8	10	12	–	–	–	–	–	–	–	–
$*F^{H9}$	mm	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	6	8	10	12	16	20	25	32
K	mm	14	17,5	21,5	26,5	33,5	42	52,5	65	14	17,5	21,5	26,5	33,5	42	52,5	65	14	17,5	21,5	26,5	33,5	42	52,5	65
M	mm	21	26	31	37	43	54	66	83	21	26	31	37	43	54	66	83	21	26	31	37	43	54	66	83
S	mm	42	52	62	74	86	108	132	166	42	52	62	74	86	108	132	166	42	52	62	74	86	108	132	166
T	mm	12	15	18	22	25	32	40	50	12	15	18	22	25	32	40	50	12	15	18	22	25	32	40	50

* = Customized bores, key-ways and inner square dimensions possible
Md_{max} = Max. permissible torque
ß = Max. angle of deflection per joint
For application criteria and calculations refer to technical annex

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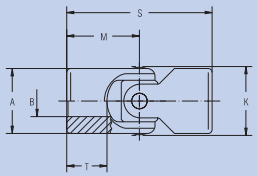
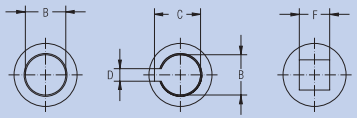
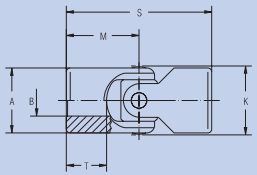
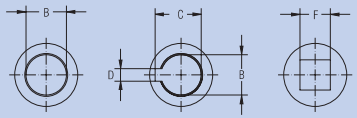
single, Short version, DIN 808





Standard bore | with key-way DIN 6885 sheet 1 | Inner square





Standard bore | with key-way DIN 6885 sheet 1 | Inner square

Cross Joints, single, Short version, Standard bore

Order number		0.716.410	0.716.411	0.720.410	0.725.410	0.732.410	0.740.410	0.750.410	0.763.410
Md_{max}	Nm	8	8	20	30	60	160	290	450
Angle of deflection ß	°	45	45	45	45	45	45	45	45
Weight	kg	0,02	0,03	0,07	0,10	0,22	0,42	0,80	2,12
A	mm	16	16	20	25	32	40	50	63
*B^{H7}	mm	6	8	10	12	16	20	25	32
*$C^{+0,2}$	mm	–	–	–	–	–	–	–	–
*D^{P9}	mm	–	–	–	–	–	–	–	–
*F^{H9}	mm	–	–	–	–	–	–	–	–
K	mm	17,5	17,5	21,5	26,5	33,5	42	52,5	65
M	mm	17	20	24	28	34	41	52,5	65
S	mm	34	40	48	56	68	82	105	130
T	mm	9	11	13	15	19	21**	28**	36

Cross Joints, single, Short vers., Bore with key-way DIN 6885, Sheet 1

Order number		0.716.413	0.720.413	0.725.413	0.732.413	0.740.413	0.750.413	0.763.413
Md_{max}	Nm	8	20	30	60	160	290	450
Angle of deflection ß	°	45	45	45	45	45	45	45
Weight	kg	0,03	0,07	0,10	0,22	0,42	0,80	2,12
A	mm	16	20	25	32	40	50	63
*B^{H7}	mm	8	10	12	16	20	25	32
*$C^{+0,2}$	mm	9	11,4	13,8	18,3	22,8	28,3	35,3
*D^{P9}	mm	2	3	4	5	6	8	10
*F^{H9}	mm	–	–	–	–	–	–	–
K	mm	17,5	21,5	26,5	33,5	42	52,5	65
M	mm	20	24	28	34	41	52,5	65
S	mm	40	48	56	68	82	105	130
T	mm	11	13	15	19	21**	28**	36

Cross Joints, single, Short version, Inner square

Order number		0.716.414	0.720.414	0.725.414	0.732.414	0.740.414	0.750.414	0.763.414
Md_{max}	Nm	8	20	30	60	160	290	450
Angle of deflection ß	°	45	45	45	45	45	45	45
Weight	kg	0,03	0,07	0,10	0,22	0,42	0,80	2,12
A	mm	16	20	25	32	40	50	63
*B^{H7}	mm	–	–	–	–	–	–	–
*$C^{+0,2}$	mm	–	–	–	–	–	–	–
*D^{P9}	mm	–	–	–	–	–	–	–
*F^{H9}	mm	6	8	10	14	19	24	30
K	mm	17,5	21,5	26,5	33,5	42	52,5	65
M	mm	20	24	28	34	41	52,5	65
S	mm	40	48	56	68	82	105	130
T	mm	11	13	15	19	21**	28**	36

* = Customized bores, key-ways and inner square dimensions possible
** = Bore depth smaller than DIN 808
Md_{max} = Max. permissible torque
ß = Max. angle of deflection per joint
For application criteria and calculations refer to technical annex

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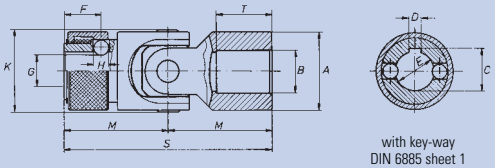
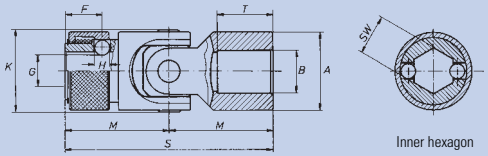
single, with rapid-change coupling, DIN 808



with key-way
DIN 6885 sheet 1



Inner hexagon

Cross Joints, with rapid-change coupling, Bore with key-way DIN 6885, Sheet 1

Order number		0.716.423	0.720.423	0.725.423	0.732.423	0.740.423	0.750.423	0.763.423
Md_{max}	Nm	8	20	30	60	160	290	450
Angle of deflectionl ß	°	45	45	45	45	45	45	45
Weight	kg	0,05	0,10	0,16	0,31	0,61	1,15	2,08
A	mm	16	20	25	32	40	50	63
*B^{H7}	mm	8	10	14	16	20	25	30
*$C^{+0,2}$	mm	9	11	15,3	17,3	21,7	26,7	31,7
*D^{H8}	mm	2	3	5	5	6	8	8
*E^{H7}	mm	8	10	14	16	20	25	30
F	mm	9,5	11,5	13,5	14	19	20,5	25
G	mm	7	8,7	13	14,8	18	23	28
H	mm	3,5	4	4	6,35	8	10	10
K	mm	17,5	21,5	26,5	33,5	42	52,5	65
M	mm	26	31	37	43	54	66	83
S	mm	52	62	74	86	108	132	166
*SW^{H7}	mm	–	–	–	–	–	–	–
T	mm	15	18	22	25	32	40	50

Cross Joints, with rapid-change coupling, Inner hexagon

0.716.426	0.720.426	0.725.426	0.725.427	0.732.426	0.740.426	0.750.426	0.763.426	0.763.426
8	20	30	30	60	160	290	450	450
45	45	45	45	45	45	45	45	45
0,05	0,10	0,16	0,16	0,31	0,61	1,15	2,08	2,08
16	20	25	25	32	40	50	63	63
–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–
9,5	11,5	13,5	13,5	14	19	20,5	25	25
6,3	8	13	10,5	14,8	18	23	28	33
3,5	4	4	4	6,35	8	10	10	10
17,5	21,5	26,5	26,5	33,5	42	52,5	65	65
26	31	37	37	43	54	66	83	83
52	62	74	74	86	108	132	166	166
7,2	9,06	14,04	11,15	16	20	25	30	35
15	18	22	22	25	32	40	50	50

* = Customized bores, key-ways and inner hexagon dimensions possible
Md_{max} = Max. permissible torque
ß = Max. angle of deflection per joint
For application criteria and calculations refer to technical annex

■ T I P ■

There are application examples in which frequent removal of the universal joint shaft or the joint from the drive or the output shaft is required.

In this case the use of a rapid-change coupling allows to change the shaft within very short time. This is done manually without any tools.

Torque transmission is ensured via a hexagonal profile or a feather key. Two steel balls which grip into a circular groove at the shaft connection provide axial locking of the shaft.

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Ball and socket joints and shafts of our production series 0.800 are supported by gliding bearings and therefore can only be used at low speeds.

The permissible maximum speeds depend on the deflection angle and the load, however, they should not exceed 500 min^{-1}.

We strongly recommend to consult our Technical Advice Service in cases of uncertainty.

Unlike cardan joints, ball and socket joints can not be exposed to axial stress.

To ensure trouble-free operation, the joints must always be sufficiently lubricated. This may also be done by means of bellows with grease or oil filling.

Further information on the use of ball and socket joints and shafts can be found under „Information on the use" in the Technical Annex, chapter 8.

Page 152 provides information on surface refinement processes.

General technical data of
the production series 0.800:
Max. angle of deflection: 35°
Torque range: 6 Nm up to 1370 Nm

For more detailed information please refer to the following datasheets.

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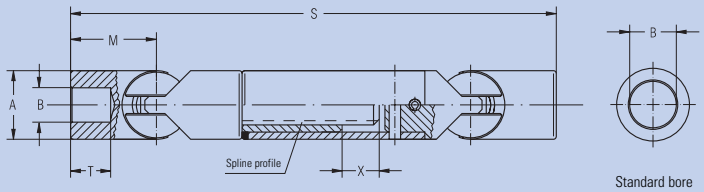
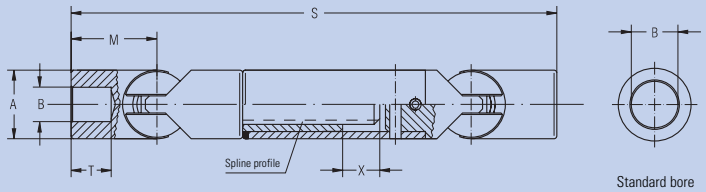
0.800

double, with length compensation, Standard bore





When ordering, please indicate compressed length and extension!

Ball and Socket Shafts, double, Standard bore

Order number		0.820.100	0.824.100	0.828.100	0.832.100	0.836.100	0.840.100	0.845.100
Md_{max}	Nm	20	30	50	60	120	160	200
Angle of deflection ß	°	35	35	35	35	35	35	35
Weight by S_1	kg	0,32	0,50	0,78	1,10	1,58	2,17	2,92
Weight by S_2	kg	0,36	0,58	0,85	1,22	1,72	2,28	3,38
Weight by S_3	kg	0,40	0,62	0,98	1,33	1,82	2,52	3,68
A	mm	20	24	28	32	36	40	45
$*B^{H7}$	mm	10	12	14	16	18	20	22
$*C^{+0,2}$	mm	–	–	–	–	–	–	–
$*D^{P9}$	mm	–	–	–	–	–	–	–
$*F^{H9}$	mm	–	–	–	–	–	–	–
M	mm	25	30	35	40	45	50	55
$S_1 + X_1$	mm	150 + 20	170 + 25	200 + 30	220 + 30	250 + 35	280 + 40	300 + 40
$S_2 + X_2$	mm	170 + 40	200 + 55	220 + 50	250 + 60	280 + 65	300 + 60	350 + 90
$S_3 + X_3$	mm	200 + 70	220 + 75	250 + 80	280 + 90	300 + 85	350 + 110	400 + 140
T	mm	13	14	17	19	22	24	26
Spline profile	mm	6x11x14	6x11x14	6x16x20	6x16x20	6x18x22	6x21x25	6x21x25

Order number	0.850.100	0.855.100	0.860.100	0.865.100	0.870.100	0.880.100	0.890.100	0.896.100
Md_{max}	290	440	520	700	820	930	1060	1250
Angle of deflection ß	35	35	35	35	35	35	35	35
Weight by S_1	4,27	5,50	7,78	10,4	13,6	20,1	27,7	35,8
Weight by S_2	4,58	5,98	8,45	10,8	14,7	21,9	30,6	38,7
Weight by S_3	5,18	6,62	9,58	11,8	16,2	24,5	33,5	41,7
A	50	55	60	65	70	80	90	100
$*B^{H7}$	25	30	35	40	45	50	60	70
$*C^{+0,2}$	–	–	–	–	–	–	–	–
$*D^{P9}$	–	–	–	–	–	–	–	–
$*F^{H9}$	–	–	–	–	–	–	–	–
M	62,5	67,5	82,5	95	105	115	130	145
$S_1 + X_1$	350 + 50	400 + 50	450 + 50	520 + 70	580 + 70	630 + 70	700 + 70	800 + 100
$S_2 + X_2$	400 + 100	450 + 100	500 + 100	550 + 100	630 + 120	700 + 140	800 + 170	900 + 200
$S_3 + X_3$	450 + 150	500 + 160	580 + 180	630 + 180	700 + 190	800 + 240	900 + 270	1000 + 300
T	30	35	42	46	52	58	70	80
Spline profile	6x28x32	6x28x32	6x36x42	6x36x42	52x44x18	58x50x18	62x54x20	62x54x20

* = Customized bores, key-ways and inner square dimensions possible
Md_{max} = Max. permissible torque
ß = Max. angle of deflection per joint
S_1
S_2 = preferred lengths, compressed
S_3
X_1 = Maximum extension for S_1
X_2 = Maximum extension for S_2
X_3 = Maximum extension for S_3
For application criteria and calculations refer to technical annex

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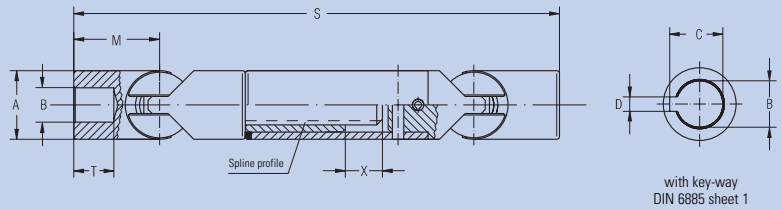
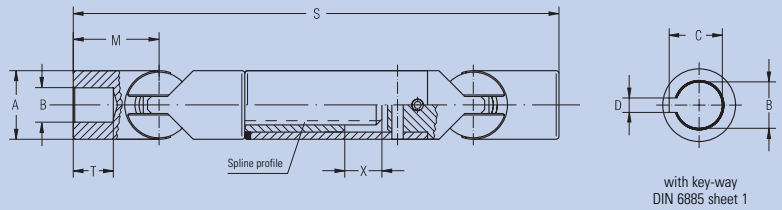
double, with length compensation, Bore with key-way DIN 6885, Sheet 1





When ordering, please indicate compressed length and extension!

Ball and Socket Shafts, double, Bore with key-way DIN 6885, Sheet 1

Order number		0.820.103	0.824.103	0.828.103	0.832.103	0.836.103	0.840.103	0.845.103
Md_{max}	Nm	20	30	50	60	120	160	200
Angle of deflection ß	°	35	35	35	35	35	35	35
Weight by S_1	kg	0,32	0,50	0,78	1,10	1,58	2,17	2,92
Weight by S_2	kg	0,36	0,58	0,85	1,22	1,72	2,28	3,38
Weight by S_3	kg	0,40	0,62	0,98	1,33	1,82	2,52	3,68
A	mm	20	24	28	32	36	40	45
$*B^{H7}$	mm	10	12	14	16	18	20	22
$*C^{+0,2}$	mm	11,4	13,8	16,3	18,3	20,8	22,8	24,8
$*D^{P9}$	mm	3	4	5	5	6	6	6
$*F^{H9}$	mm	–	–	–	–	–	–	–
M	mm	25	30	35	40	45	50	55
$S_1 + X_1$	mm	150 + 20	170 + 25	200 + 30	220 + 30	250 + 35	280 + 40	300 + 40
$S_2 + X_2$	mm	170 + 40	200 + 55	220 + 50	250 + 60	280 + 65	300 + 60	350 + 90
$S_3 + X_3$	mm	200 + 70	220 + 75	250 + 80	280 + 90	300 + 85	350 + 110	400 + 140
T	mm	13	14	17	19	22	24	26
Spline profile	mm	6x11x14	6x11x14	6x16x20	6x16x20	6x18x22	6x21x25	6x21x25

Order number	0.850.103	0.855.103	0.860.103	0.865.103	0.870.103	0.880.103	0.890.103	0.896.103
Md_{max}	290	440	520	700	820	930	1060	1250
Angle of deflection ß	35	35	35	35	35	35	35	35
Weight by S_1	4,27	5,50	7,78	10,4	13,6	20,1	27,7	35,8
Weight by S_2	4,58	5,98	8,45	10,8	14,7	21,9	30,6	38,7
Weight by S_3	5,18	6,62	9,58	11,8	16,2	24,5	33,5	41,7
A	50	55	60	65	70	80	90	100
$*B^{H7}$	25	30	35	40	45	50	60	70
$*C^{+0,2}$	28,3	33,3	38,3	43,3	48,8	53,8	64,4	74,9
$*D^{P9}$	8	8	10	12	14	14	18	20
$*F^{H9}$	–	–	–	–	–	–	–	–
M	62,5	67,5	82,5	95	105	115	130	145
$S_1 + X_1$	350 + 50	400 + 50	450 + 50	520 + 70	580 + 70	630 + 70	700 + 70	800 + 100
$S_2 + X_2$	400 + 100	450 + 100	500 + 100	550 + 100	630 + 120	700 + 140	800 + 170	900 + 200
$S_3 + X_3$	450 + 150	500 + 160	580 + 180	630 + 180	700 + 190	800 + 240	900 + 270	1000 + 300
T	30	35	42	46	52	58	70	80
Spline profile	6x28x32	6x28x32	6x36x42	6x36x42	52x44x18	58x50x18	62x54x20	62x54x20

* = Customized bores, key-ways and inner square dimensions possible
Md_{max} = Max. permissible torque
ß = Max. angle of deflection per joint
S_1
S_2 = preferred lengths, compressed
S_3
X_1 = Maximum extension for S_1
X_2 = Maximum extension for S_2
X_3 = Maximum extension for S_3
For application criteria and calculations refer to technical annex

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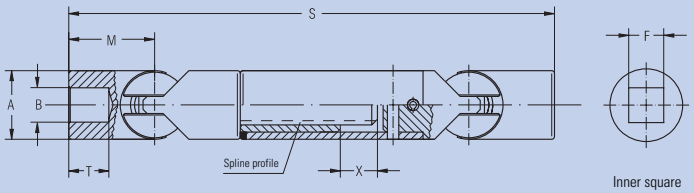
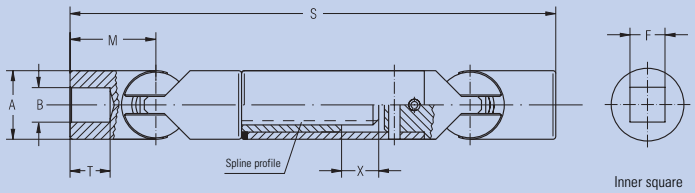
double, with length compensation, Inner square





When ordering, please indicate compressed length and extension!

Ball and Socket Shafts, double, Inner square

Order number		0.820.104	0.824.104	0.828.104	0.832.104	0.836.104	0.840.104	0.845.104
Md_{max}	Nm	20	30	50	60	120	160	200
Angle of deflection ß	°	35	35	35	35	35	35	35
Weight by S_1	kg	0,32	0,50	0,78	1,10	1,58	2,17	2,92
Weight by S_2	kg	0,36	0,58	0,85	1,22	1,72	2,28	3,38
Weight by S_3	kg	0,40	0,62	0,98	1,33	1,82	2,52	3,68
A	mm	20	24	28	32	36	40	45
$*B^{H7}$	mm	–	–	–	–	–	–	–
$*C^{+0,2}$	mm	–	–	–	–	–	–	–
$*D^{P9}$	mm	–	–	–	–	–	–	–
$*F^{H9}$	mm	10	12	14	16	18	20	22
M	mm	25	30	35	40	45	50	55
$S_1 + X_1$	mm	150 + 20	170 + 25	200 + 30	220 + 30	250 + 35	280 + 40	300 + 40
$S_2 + X_2$	mm	170 + 40	200 + 55	220 + 50	250 + 60	280 + 65	300 + 60	350 + 90
$S_3 + X_3$	mm	200 + 70	220 + 75	250 + 80	280 + 90	300 + 85	350 + 110	400 + 140
T	mm	13	14	17	19	22	24	26
Spline profile	mm	6x11x14	6x11x14	6x16x20	6x16x20	6x18x22	6x21x25	6x21x25

Order number	0.850.104	0.855.104	0.860.104	0.865.104	0.870.104	0.880.104	0.890.104	0.896.104
Md_{max}	290	440	520	700	820	930	1060	1250
Angle of deflection ß	35	35	35	35	35	35	35	35
Weight by S_1	4,27	5,50	7,78	10,4	13,6	20,1	27,7	35,8
Weight by S_2	4,58	5,98	8,45	10,8	14,7	21,9	30,6	38,7
Weight by S_3	5,18	6,62	9,58	11,8	16,2	24,5	33,5	41,7
A	50	55	60	65	70	80	90	100
$*B^{H7}$	–	–	–	–	–	–	–	–
$*C^{+0,2}$	–	–	–	–	–	–	–	–
$*D^{P9}$	–	–	–	–	–	–	–	–
$*F^{H9}$	25	30	32	36	40	42	50	54
M	62,5	67,5	82,5	95	105	115	130	145
$S_1 + X_1$	350 + 50	400 + 50	450 + 50	520 + 70	580 + 70	630 + 70	700 + 70	800 + 100
$S_2 + X_2$	400 + 100	450 + 100	500 + 100	550 + 100	630 + 120	700 + 140	800 + 170	900 + 200
$S_3 + X_3$	450 + 150	500 + 160	580 + 180	630 + 180	700 + 190	800 + 240	900 + 270	1000 + 300
T	30	35	42	46	52	58	70	80
Spline profile	6x28x32	6x28x32	6x36x42	6x36x42	52x44x18	58x50x18	62x54x20	62x54x20

* = Customized bores, key-ways and inner square dimensions possible
Md_{max} = Max. permissible torque
ß = Max. angle of deflection per joint
S_1
S_2 = preferred lengths, compressed
S_3
X_1 = Maximum extension for S_1
X_2 = Maximum extension for S_2
X_3 = Maximum extension for S_3
For application criteria and calculations refer to technical annex

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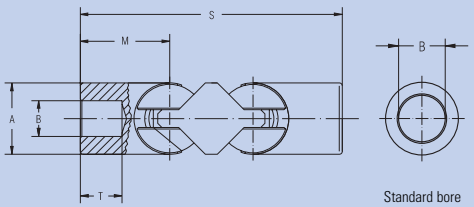
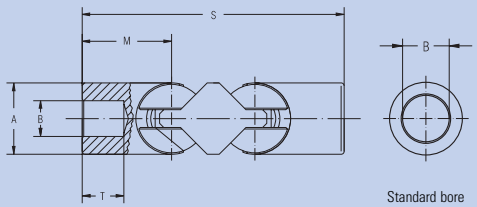
elso

double, Standard bore





Ball ans Socket Joints, double, Standard bore

Order number		0.820.300	0.824.300	0.828.300	0.832.300	0.836.300	0.840.300	0.845.300
Md_{max}	Nm	20	30	50	60	120	160	200
Angle of deflection ß	°	35	35	35	35	35	35	35
Weight	kg	0,14	0,22	0,38	0,55	0,78	1,08	1,48
A	mm	20	24	28	32	36	40	45
$*B^{H7}$	mm	10	12	14	16	18	20	22
$*C^{+0,2}$	mm	–	–	–	–	–	–	–
$*D^{P9}$	mm	–	–	–	–	–	–	–
$*E^{H9}$	mm	–	–	–	–	–	–	–
M	mm	25	30	35	40	45	50	55
S	mm	74	88	103	118	133	148	163
T	mm	13	14	17	19	22	24	26

Order number	0.850.300	0.855.300	0.860.300	0.865.300	0.870.300	0.880.300	0.890.300	0.896.300	0.897.300
Md_{max}	290	440	520	700	820	930	1060	1250	1370
Angle of deflection ß	35	35	35	35	35	35	35	35	35
Weight	2,08	2,62	3,65	4,78	5,88	8,52	11,7	15,5	21,8
A	50	55	60	65	70	80	90	100	110
$*B^{H7}$	25	30	35	40	45	50	60	70	75
$*C^{+0,2}$	–	–	–	–	–	–	–	–	–
$*D^{P9}$	–	–	–	–	–	–	–	–	–
$*E^{H9}$	–	–	–	–	–	–	–	–	–
M	62,5	67,5	82,5	95	105	115	130	145	160
S	185	200	237	267	292	322	362	404	444
T	30	35	42	46	52	58	70	80	85

* = Customized bores, key-ways and inner square dimensions possible
Md_{max} = Max. permissible torque
For application criteria and calculations refer to technical annex

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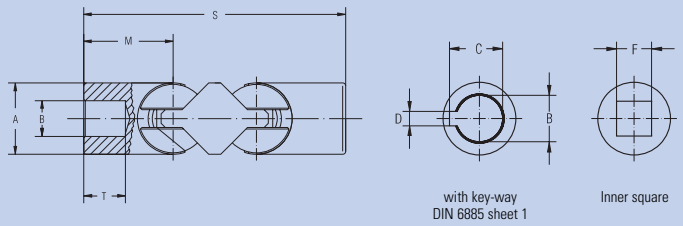
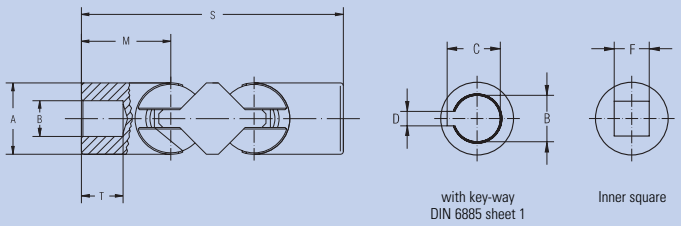
double, Bore with key-way DIN 6885, Sheet 1; Inner square





Ball and Socket Joints, double, Bore with key-way DIN 6885, Sheet 1

Order number		0.820.303	0.824.303	0.828.303	0.832.303	0.836.303	0.840.303	0.845.303	0.850.303	0.855.303	0.860.303	0.865.303	0.870.303	0.880.303	0.890.303	0.896.303	0.897.303
Md_{max}	Nm	20	30	50	60	120	160	200	290	440	520	700	820	930	1060	1250	1370
Angle of deflection ß	°	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35
Weight	kg	0,14	0,22	0,38	0,55	0,78	1,08	1,48	2,08	2,62	3,65	4,78	5,88	8,52	11,7	15,5	21,8
A	mm	20	24	28	32	36	40	45	50	55	60	65	70	80	90	100	110
*B^{H7}	mm	10	12	14	16	18	20	22	25	30	35	40	45	50	60	70	75
*$C^{+0,2}$	mm	11,4	13,8	16,3	18,3	20,8	22,8	24,8	28,3	33,3	38,3	43,3	48,8	53,8	64,4	74,9	79,9
*D^{P9}	mm	3	4	5	5	6	6	6	8	8	10	12	14	14	18	20	20
*F^{H9}	mm	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
M	mm	25	30	35	40	45	50	55	62,5	67,5	82,5	95	105	115	130	145	160
S	mm	74	88	103	118	133	148	163	185	200	237	267	292	322	362	404	444
T	mm	13	14	17	19	22	24	26	30	35	42	46	52	58	70	80	85

Ball and Socket Joints, double, Inner square

Order number		0.820.304	0.824.304	0.828.304	0.832.304	0.836.304	0.840.304	0.845.304	0.850.304	0.855.304	0.860.304	0.865.304	0.870.304	0.880.304	0.890.304	0.896.304	0.897.304
Md_{max}	Nm	20	30	50	60	120	160	200	290	440	520	700	820	930	1060	1250	1370
Angle of deflection ß	°	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35
Weight	kg	0,14	0,22	0,38	0,55	0,78	1,08	1,48	2,08	2,62	3,65	4,78	5,88	8,52	11,7	15,5	21,8
A	mm	20	24	28	32	36	40	45	50	55	60	65	70	80	90	100	110
*B^{H7}	mm	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
*$C^{+0,2}$	mm	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
*D^{P9}	mm	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
*F^{H9}	mm	10	12	14	16	18	20	22	25	30	32	36	40	42	50	54	58
M	mm	25	30	35	40	45	50	55	62,5	67,5	82,5	95	105	115	130	145	160
S	mm	74	88	103	118	133	148	163	185	200	237	267	292	322	362	404	444
T	mm	13	14	17	19	22	24	26	30	35	42	46	52	58	70	80	85

* = Customized bores, key-ways and inner square dimensions possible
Md_{max} = Max. permissible torque
For application criteria and calculations refer to technical annex

0.800

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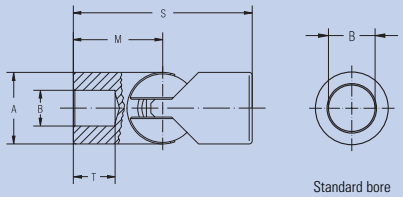
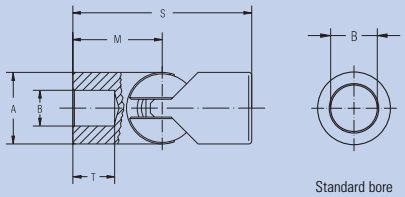
single, Standard bore





Ball and Socket Joints, single, Standard bore

Order number		0.813.400	0.816.400	0.820.400	0.824.400	0.828.400	0.832.400	0.836.400	0.840.400
Md_{max}	Nm	6	8	20	30	50	60	120	160
Angle of deflection ß	°	35	35	35	35	35	35	35	35
Weight	kg	0,03	0,05	0,09	0,15	0,24	0,36	0,53	0,72
A	mm	13	16	20	24	28	32	36	40
*B^{H7}	mm	6	8	10	12	14	16	18	20
*$C^{+0,2}$	mm	–	–	–	–	–	–	–	–
*D^{P9}	mm	–	–	–	–	–	–	–	–
*E^{H9}	mm	–	–	–	–	–	–	–	–
M	mm	17,5	20	25	30	35	40	45	50
S	mm	35	40	50	60	70	80	90	100
T	mm	10	10	13	14	17	19	22	24

Order number	0.845.400	0.850.400	0.855.400	0.860.400	0.865.400	0.870.400	0.880.400	0.890.400	0.896.400	0.897.400
Md_{max}	200	290	440	520	700	820	930	1060	1250	1370
Angle of deflection ß	35	35	35	35	35	35	35	35	35	35
Weight	1,02	1,40	1,75	2,52	3,32	4,15	6,02	8,04	10,6	15,3
A	45	50	55	60	65	70	80	90	100	110
*B^{H7}	22	25	30	35	40	45	50	60	70	75
*$C^{+0,2}$	–	–	–	–	–	–	–	–	–	–
*D^{P9}	–	–	–	–	–	–	–	–	–	–
*E^{H9}	–	–	–	–	–	–	–	–	–	–
M	55	62,5	67,5	82,5	95	105	115	130	145	160
S	110	125	135	165	190	210	230	260	290	320
T	26	30	35	42	46	52	58	70	80	85

* = Customized bores, key-ways an inner square dimensions possible
Md_{max} = Max. permissible torque
For application criteria and calculations refer to technical annex

0.800

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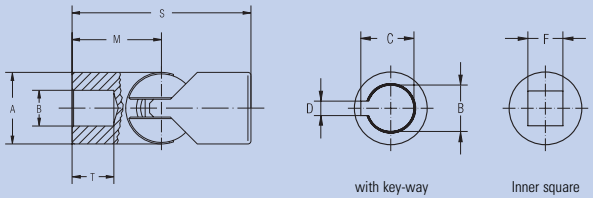
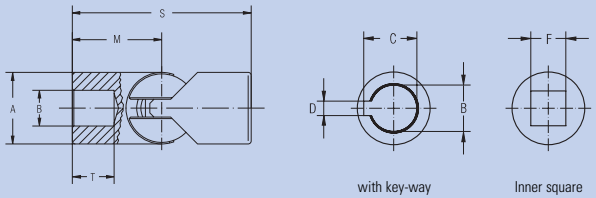
single, Bore with key-way DIN 6885, Sheet 1; Inner square



with key-way
DIN 6885 sheet 1

Inner square



with key-way
DIN 6885 sheet 1

Inner square

Ball and Socket Joints, single, Bore with Key-way DIN 6885, Sheet 1

Order number		0.820.403	0.824.403	0.828.403	0.832.403	0.836.403	0.840.403	0.845.403	0.850.403	0.855.403	0.860.403	0.865.403	0.870.403	0.880.403	0.890.403	0.896.403	0.897.403
Md_{max}	Nm	20	30	50	60	120	160	200	290	440	520	700	820	930	1060	1250	1370
Angle of deflection ß	°	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35
Weight	kg	0,09	0,15	0,24	0,36	0,53	0,72	1,02	1,40	1,75	2,52	3,32	4,15	6,02	8,04	10,6	15,3
A	mm	20	24	28	32	36	40	45	50	55	60	65	70	80	90	100	110
*B^{H7}	mm	10	12	14	16	18	20	22	25	30	35	40	45	50	60	70	75
*$C^{+0,2}$	mm	11,4	13,8	16,3	18,3	20,8	22,8	24,8	28,3	33,3	38,3	43,3	48,8	53,3	64,4	74,9	79,9
*D^{P9}	mm	3	4	5	5	6	6	6	8	8	10	12	14	14	18	20	20
*F^{H9}	mm	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
M	mm	25	30	35	40	45	50	55	62,5	67,5	82,5	95	105	115	130	145	160
S	mm	50	60	70	80	90	100	110	125	135	165	190	210	230	260	290	320
T	mm	13	14	17	19	22	24	26	30	35	42	46	52	58	70	80	85

Ball and Socket Joints, single, Inner square

Order number		0.820.404	0.824.404	0.828.404	0.832.404	0.836.404	0.840.404	0.845.404	0.850.404	0.855.404	0.860.404	0.865.404	0.870.404	0.880.404	0.890.404	0.896.404	0.897.404
Md_{max}	Nm	20	30	50	60	120	160	200	290	440	520	700	820	930	1060	1250	1370
Angle of deflection ß	°	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35
Weight	kg	0,09	0,15	0,24	0,36	0,53	0,72	1,02	1,40	1,75	2,52	3,32	4,15	6,02	8,04	10,6	15,3
A	mm	20	24	28	32	36	40	45	50	55	60	65	70	80	90	100	110
*B^{H7}	mm	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
*$C^{+0,2}$	mm	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
*D^{P9}	mm	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
*F^{H9}	mm	10	12	14	16	18	20	22	25	30	32	36	40	42	50	54	58
M	mm	25	30	35	40	45	50	55	62,5	67,5	82,5	95	105	115	130	145	160
S	mm	50	60	70	80	90	100	110	125	135	165	190	210	230	260	290	320
T	mm	13	14	17	19	22	24	26	30	35	42	46	52	58	70	80	85

* = Customized bores, key-ways an inner square dimensions possible
Md_{max} = Max. permissible torque
For application criteria and calculations refer to technical annex

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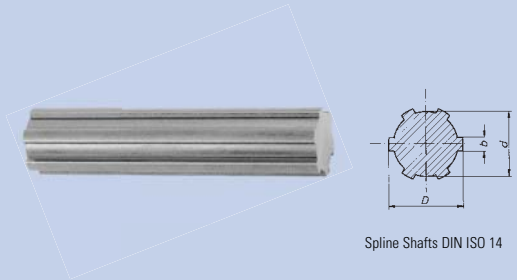
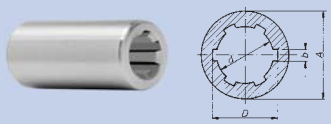


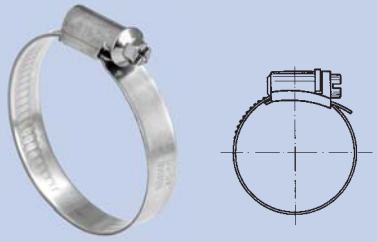
Spline Shafts DIN ISO 14

Material: C40 k, 1.0511 oder C45 k, 1.0503
Material: 35 S 20 k, 1.0726

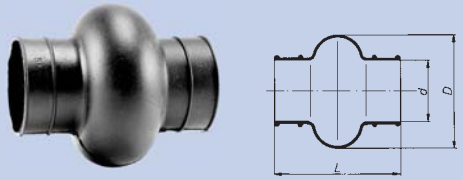


Spline Bore Hubs DIN ISO 14

Material: 9 SMn Pb 28 k, 1.0718



Material: steel, zinc-plated or stainless steel, corrosion- and acid-resistant



Material: neoprene; temperature-resistant up to 100 °C

Also available with Spigots

Spline Shafts DIN ISO 14

Order number		1.000.524.001	1.000.524.002	1.000.524.003	1.000.524.004	1.000.524.005	1.000.524.007	1.000.524.006
Designation		B 6 x 11 x 14	B 6 x 16 x 20	B 6 x 18 x 22	B 6 x 21 x 25	B 6 x 28 x 32	B 6 x 28 x 34	B 6 x 36 x 42
D	mm	14	20	22	25	32	34	42
d	mm	11	16	18	21	28	28	36
b	mm	3	4	5	5	7	7	8
Available in all lenghts up to	mm	3000	3000	3000	3000	500*	3000	500*

Material: C40 k, 1.0511 oder C45 k, 1.0503
*= Material: 35 S 20 k, 1.0726

Hose Clips, steel, zinc-plated

Order number		1.000.961.011	1.000.961.029	1.000.961.003	1.000.961.006	1.000.961.012	1.000.961.013	1.000.961.014	1.000.961.010
Joint-size		0.716/0.816/ 0.720/0.820	0.824/0.725/ 0.828	0.732/0.832/ 0.836	0.740/0.840/ 0.845	0.750/0.850/ 0.855	0.860/0.865	0.870	0.880
Clamping range	mm	12 – 20	20 – 32	25 – 40	32 – 50	40 – 60	50 – 70	60 – 80	70 – 90

Hose Clips, stainless steel, corrosion- and acid-resistant

Order number		1.000.961.020	1.000.961.022	1.000.961.023	1.000.961.024	1.000.961.025	1.000.961.026	1.000.961.027	1.000.961.028
Joint-size		0.716/0.816/ 0.720/0.820	0.824/0.725/ 0.828	0.732/0.832/ 0.836	0.740/0.840/ 0.845	0.750/0.850/ 0.855	0.860/0.865	0.870	0.880
Clamping range	mm	12 – 20	20 – 32	25 – 40	32 – 50	40 – 60	50 – 70	60 – 80	70 – 90

Spline Bore Hubs DIN ISO 14

Order number		1.000.511.001	1.000.511.002	1.000.511.003	1.000.511.004	1.000.511.005	1.000.511.007	1.000.511.006
Designation		A 6 x 11 x 14	A 6 x 16 x 20	A 6 x 18 x 22	A 6 x 21 x 25	A 6 x 28 x 32	A 6 x 28 x 34	A 6 x 36 x 42
D	mm	14	20	22	25	32	34	42
d	mm	11	16	18	21	28	28	36
b	mm	3	4	5	5	7	7	8
A	mm	20	28	36	40	50	50	60
Lenght*	mm	50	60	70	70	80	60	100

*= max. grip lenght even
Material: 9 SMn Pb 28 k, 1.0718

Bellows

Order number		1.000.830.009	1.000.830.010	1.000.830.013	1.000.830.014	1.000.830.002	1.000.830.003
Joint-size		0.716/0.816	0.720/0.820	0.725/0.824	0.828	0.732/0.832	0.836
L	mm	40	47	52	58	67	74
D	mm	31	33	46	50	54	65
d	mm	16	20	25	28	32	36

1.000.830.004	1.000.830.015	1.000.830.016	1.000.830.006	1.000.830.007	1.000.830.017
0.740/0.840	0.845	0.750/0.850	0.855/0.860	0.865/0.870	0.880
84	97	110	122	132	157
75	82	90	100	110	131
040	45	50	56	65	80

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Appearance and protection. The following methods help to avoid corrosion damage:

a) by influencing the properties of the coreactants and/or changing the reaction conditions;
b) by separating the metal material from the corrosive agent by applying protective coatings and
c) by electrochemical procedures.

Chroming
This surface refinement method allows to obtain excellent protection against corrosion. A chromed part exhibits outstanding visual appearance only through its shiny surface.

Chromating (olive)
Chromate coatings on zinc plating are used to enhance appearance and corrosion resistance.

Phosphating
To obtain efficient lasting protection, additional treatment processes that are matched with the intended use of the phosphated metal surface are required, e.g. application of anti-corrosion oil or wax or coating with paint materials.

Zinc-plating
This surface refinement method allows to achieve outstanding protection against corrosion.

Chromating (yellow)
Chromate coatings on zinc plating are used to enhance appearance and corrosion resistance.

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The complete manufacturing process with all its advantages is identical with the description of the series 0.100.

The bearings of this series feature roller bearing design with all advantages previously described.

The main advantage of this wing-style version is the positive-fit connection resulting from the key of the bearing housing and the key-way of the flange. Therefore the torque is transmitted in a more defined way in comparison to the friction connection.

The four screws used to mount the flange to the universal joint allow fast assembling and disassembling.

General technical data of series 0.900:
Maximum angle of defelction: up to 30°
Torque range: up to 13200 Nm

Detailed information can be obtained from the data sheets that follow.

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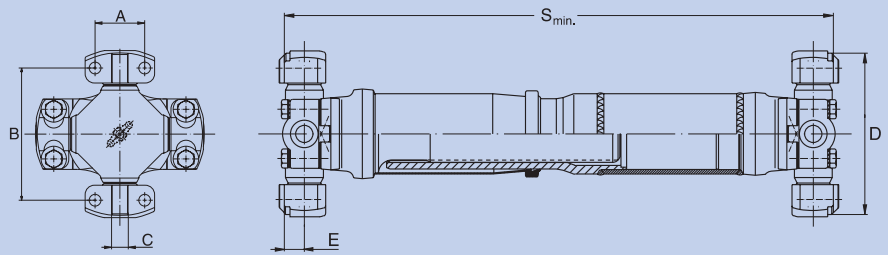
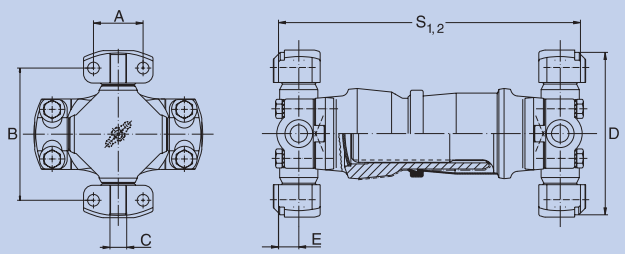
with extension, Roller bearing



Built 110, Tubular Type, larger extension
end number: 0.9XX.110



Built 130, Short Type
end number: 0.9XX.130

Additional lenght and types on request.

Wing-Style, Tubular Type, larger extension, Roller bearing version

Order number		**0.950.110**	**0.960.110**	**0.970.110**	**0.980.110**	**0.985.110**	**0.990.110**
Series		5C	6C	7C	8C	8.5C	9C
Md_{max}	Nm	2500	4000	5400	7600	9000	13200
Angle of deflection ß	°	25	25	25	30	25	25
S_{min}	mm	400	402	465	555	575	575
S_1	mm	–	–	–	–	–	–
S_2	mm	–	–	–	–	–	–
X	mm	105	105	110	110	110	110
X_1	mm	–	–	–	–	–	–
X_2	mm	–	–	–	–	–	–
P_1	mm	**60x4**	**70x4**	**80x4**	**90x4**	**100x5**	**110x6**
Spline dim. DIN 5480	mm	42x2,0x20	50x2,0x24	55x2,5x20	60x2,5x22	65x2,5x24	75x2,5x28
$A_{\pm 0,2}$	mm	42,9	42,9	49,2	49,2	71,4	71,4
$B_{\pm 0,2}$	mm	88,9	114,3	117,5	174,7	123,9	168,3
C_{h8}	mm	14,26	14,26	15,85	15,85	15,85	15,85
$D_{-0,4}$	mm	115,06	140,46	148,39	206,32	165,08	209,52
E (Subtraction measure)	mm	17,5	17,5	20,6	20,6	25,4	25,4

Md_{max} = Maximum permitted torque. See technical annex
ß = Maximum angle of deflection
S_{min} = Minimum length of tubular types
S_1, S_2 = Compressed lengths of short types
X_1 = Extension at S_{min} resp. S_1
X_2 = Extension at S_2
P_1 = Tube diameter. Dimensions in bold type for normal applications. Alternative dimensions are for long shafts at high speeds, see technical annex domain speed

Additional lenght and types on request.

Wing-Style, Short Type, Roller bearing version

Order number		**–**	**0.960.130**	**0.970.130**	**0.980.130**	**0.985.130**	**0.990.130**
Series		–	6C	7C	8C	8.5C	9C
Md_{max}	Nm	–	4000	5400	7600	9000	13200
Angle of deflection ß	°	–	25	25	30	25	25
S_{min}	mm	–	–	–	–	–	–
S_1	mm	–	260	292	315	330	370
S_2	mm	–	–	–	–	–	–
X	mm	–	–	–	–	–	–
X_1	mm	–	45	50	45	45	45
X_2	mm	–	–	–	–	–	–
P_1	mm	–	–	–	–	–	–
Spline dim. DIN 5480	mm	–	50x2,0x24	55x2,5x20	60x2,5x22	65x2,5x24	75x2,5x28
$A_{\pm 0,2}$	mm	–	42,9	49,2	49,2	71,4	71,4
$B_{\pm 0,2}$	mm	–	114,3	117,5	174,7	123,9	168,3
C_{h8}	mm	–	14,26	15,85	15,85	15,85	15,85
$D_{-0,4}$	mm	–	140,46	148,39	206,32	165,08	209,52
E (Subtraction measure)	mm	–	17,5	20,6	20,6	25,4	25,4

Md_{max} = Maximum permitted torque. See technical annex
ß = Maximum angle of deflection
S_{min} = Minimum length of tubular types
S_1, S_2 = Compressed lengths of short types
X_1 = Extension at S_{min} resp. S_1
X_2 = Extension at S_2
P_1 = Tube diameter. Dimensions in bold type for normal applications. Alternative dimensions are for long shafts at high speeds, see technical annex domain speed

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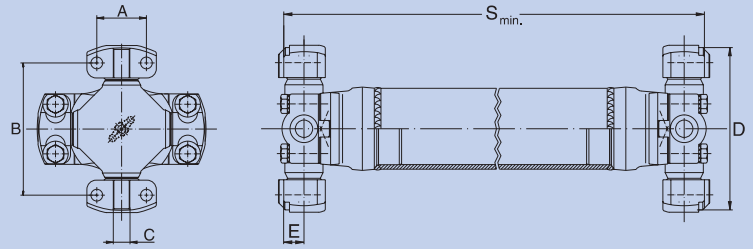
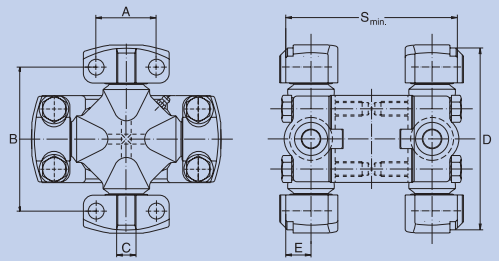
ORIGINAL elbe GELENKE

without extension, Roller bearing



Built 200, Tubular Type
end number: 0.9XX.200



Built 300 Universal Joint double
end number: 0.9XX.300

Additional lenght and types on request.

Wing-Style, Tubular Type, Roller bearing version

Order number		0.950.200	0.960.200	0.970.200	0.980.200	0.985.200	0.990.200
Series		5C	6C	7C	8C	8.5C	9C
Md_{max}	Nm	2500	4000	5400	7600	9000	13200
Angle of deflection ß	°	25	25	25	30	25	25
S_{min}	mm	205	206	245	275	315	295
S_1	mm	–	–	–	–	–	–
S_2	mm	–	–	–	–	–	–
X	mm	–	–	–	–	–	–
X_1	mm	–	–	–	–	–	–
X_2	mm	–	–	–	–	–	–
P_1	mm	**60x4**	**70x4**	**80x4**	**90x4**	**100x5**	**110x6**
Spline dim. DIN 5480	mm	–	–	–	–	–	–
$A_{\pm 0,2}$	mm	42,9	42,9	49,2	49,2	71,4	71,4
$B_{\pm 0,2}$	mm	88,9	114,3	117,5	174,7	123,9	168,3
C_{h8}	mm	14,26	14,26	15,85	15,85	15,85	15,85
$D_{-0,4}$	mm	115,06	140,46	148,39	206,32	165,08	209,52
E (Subtraction measure)	mm	17,5	17,5	20,6	20,6	25,4	25,4

Md_{max} = Maximum permitted torque. See technical annex
ß = Maximum angle of deflection
S_{min} = Minimum length of tubular types
S_1, S_2 = Compressed lengths of short types
X_1 = Extension at S_{min} resp. S_1
X_2 = Extension at S_2
P_1 = Tube diameter. Dimensions in bold type for normal applications. Alternative dimensions are for long shafts at high speeds, see technical annex domain speed

Additional lenght and types on request.

Wing-Style, Universal Joint Double, Roller bearing version

Order number		0.950.300	0.960.300	0.970.300	–	0.985.300	–
Series		5C	6C	7C	–	8.5C	–
Md_{max}	Nm	2500	4000	5400	–	9000	–
Angle of deflection ß	°	10	25	10	–	10	–
S_{min}	mm	141	188	140	–	169	–
S_1	mm	–	–	–	–	–	–
S_2	mm	–	–	–	–	–	–
X	mm	–	–	–	–		–
X_1	mm	–	–	–	–	–	–
X_2	mm	–	–	–	–	–	–
P_1	mm	–	–	–	–	–	–
Spline dim. DIN 5480	mm	–	–	–	–	–	–
$A_{\pm 0,2}$	mm	42,9	42,9	49,2	–	71,4	–
$B_{\pm 0,2}$	mm	88,9	114,3	117,5	–	123,9	–
C_{h8}	mm	14,26	14,26	15,85	–	15,85	–
$D_{-0,4}$	mm	115,06	140,46	148,39	–	165,08	–
E (Subtraction measure)	mm	17,5	17,5	20,6	–	25,4	–

Md_{max} = Maximum permitted torque. See technical annex
ß = Maximum angle of deflection
S_{min} = Minimum length of tubular types
S_1, S_2 = Compressed lengths of short types
X_1 = Extension at S_{min} resp. S_1
X_2 = Extension at S_2
P_1 = Tube diameter. Dimensions in bold type for normal applications. Alternative dimensions are for long shafts at high speeds, see technical annex domain speed

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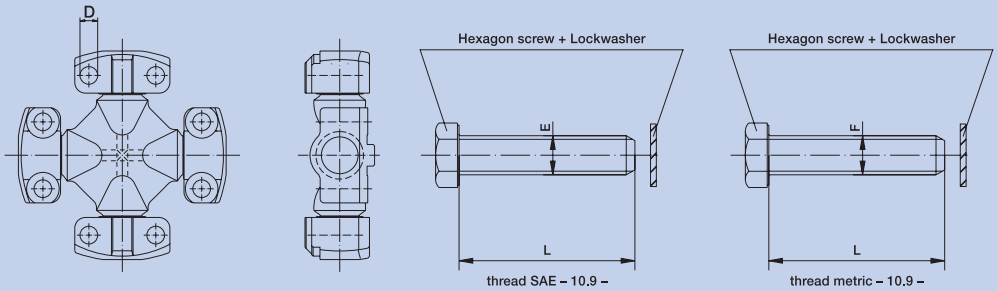
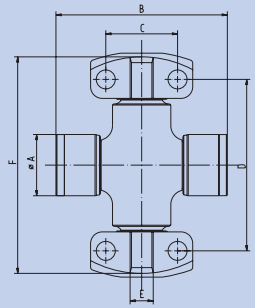
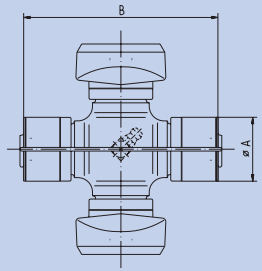




Combination cross kits



Cross kits for Half Round Yokes

Cross Units, Roller bearing version

Order number		0.950.023	0.960.023	0.970.023	0.980.023	0.985.023	0.990.023
Series		5C	6C	7C	8C	8.5C	9C
bore dimension Ø D	mm	$10{,}2^{+0{,}4}$	$10{,}2^{+0{,}4}$	$13{,}0^{+0{,}4}$	$13{,}0^{+0{,}4}$	$13{,}0^{+0{,}4}$	$13{,}0^{+0{,}4}$

Screw kit SAE – 10.9 –

Order number		0.950.192.001	0.970.192.001	0.985.192.001
thread Ø E x L	inch	3/8"-24-UNF x 1 3/4"	1/2"-20-UNF x 2"	1/2"-20-UNF x 63,5
Screw torque	Nm	62_{-4}	135_{-7}	135_{-7}
used for		0.950.023/0.960.023	0.970.023/0.980.023	0.985.023/0.990.023

Screw kit metric – 10.9 –

Order number		0.950.192.002	0.970.192.002	0.985.192.002
thread Ø F x L	mm	M10 x 1,25 x 45	M12 x 1,5 x 52	M12 x 1,5 x 60
Screw torque	Nm	70_{-4}	120_{-7}	120_{-7}
used for		0.950.023/0.960.023	0.970.023/0.980.023	0.985.023/0.990.023

Combination cross kits, Roller bearing version

Order number		0.950.023.015	0.950.023.011/012	0.960.023.016	0.960.023.019	0.960.023.017	0.970.023.012
Grease nipple		no	no	no	yes	no	no
Ø A	mm	35	38	38	38	48	42
B	mm	97	106	106	106	126	117,5
C	mm	42,9	42,9	42,9	42,9	42,9	49,2
D	mm	88,9	88,9	114,3	114,3	114,3	117,5
E	mm	14,26	14,26	14,26	14,26	14,26	15,85
F	mm	115,06	115,06	140,46	140,46	140,46	148,39
used for		5C/112	5C/113	6C/113	6C/113	6C/158	7C/148

Cross kits for Half Round Yokes, Roller bearing

Order number		0.100.015.011	0.112.015.013
Ø A	mm	$34{,}915^{\pm 0{,}015}$	$34{,}915^{\pm 0{,}015}$
B	mm	126,1	$106{,}26^{\pm 0{,}1}$
used for / description		0.100.259.011/ inter mediate shaft	0.100.300.220/ Universal Joint double

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Technical Description

In vehicle construction and mechanical engineering drive flanges form the connection between drive and cardan shaft.

Using modern machine equipment, we manufacture products on the basis of high-quality forgings according to customer drawings.

The drive flanges can be manufactured with internal and external splines as well as with hardened and lead-free ground seal bearing surface.

Please refer to the following pages for further information on our product range.

Design: end plate
– Induction-hardened and lead-free ground seal bearing surface
– Internal splines

Design according to DIN ISO 8667
– Induction-hardened and lead-free ground seal bearing surface
– Internal splines
– Cross-serration 70°

Design: triangular
– Induction-hardened and lead-free ground seal bearing surface
– Internal splines

Design according to DIN 7646
– Induction-hardened and lead-free ground seal bearing surface
– Case-hardened version
– Internal splines

Design: rectangular
– Induction-hardened and lead-free ground seal bearing surface
– Internal splines

Design: half round
– Induction-hardened and lead-free ground seal bearing surface
– Nitrided
– Internal splines

Special design: wing style
– Induction-hardened and lead-free ground seal bearing surface
– Internal splines

Design: wing style
– Induction-hardened and lead-free ground seal bearing surface
– Nitrided
– Internal splines

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Technical Description

The main application field of our spiders is the integration into cardan joints. The spider is the main component of the cardan joint. Spiders, however, are also used in numerous other applications.
Our product range includes e.g. also so-called „compensation spiders" for differential gears and spiders for tool technology.
Our spiders are made of high-quality pressed or forged blanks. Processing such as turning, case-hardening and grinding is carried out at our production facilities and strict quality control processes are adhered to.

General technical data for spiders:
Trunnion diameter: 4 mm to 48 mm
For torque range: 6 Nm to 35000 Nm

Complete spider kits with needle or roller bearing supported bushings are part of the delivery program of our cardan shaft service.

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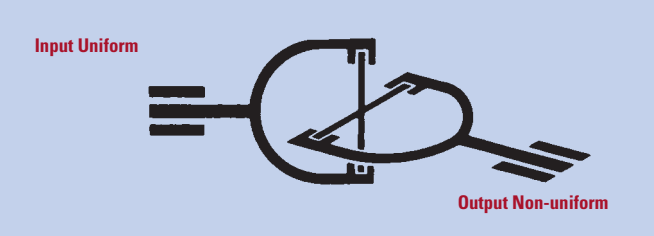
1. Installation and arrangement of universal drivelines

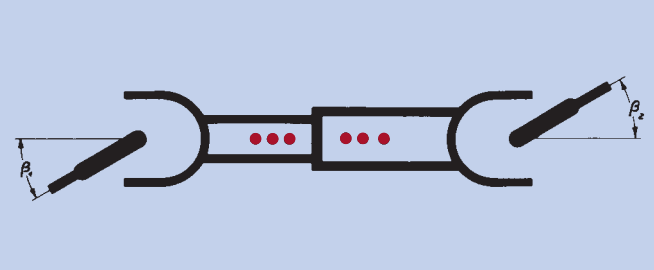
1.1 Basic installation rules

When a single universal-, cross- or ball joint is rotated uniformly in an angled position, a non-uniform motion occurs at the output side. (See motion characteristices and torques under 2).



This fluctuation is eliminated when two single joints are connected, forming a driveline. To obtain complete synchronous motion, the following conditions must be met:

a) Equal deflection angles at both joints ($ß_1 = ß_2$)
b) The two inner forks must be in one plane.
c) In- and output shaft must also lie in one plane.



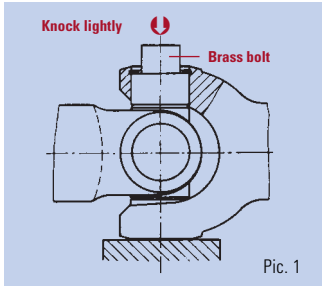
Exception:
If a driveline is angled three-dimensionally, in- and output shafts are not located in one plane. To obtain a uniform output motion, it is necessary in this case to offset the inner forks relative to each other so that they end up in the same plane of deflection created by their joints. Also, the three-dimensional deflection angles must also be equal. (Our Engineering Department will glady assist you in determining the correct angular offset).

Note:
Incorrectly assembled universal joints do not equalize fluctuating output motion. They amplify it. This can lead to early joint bearing and spline failure. Therefore, when assembling the two driveline halves, the marker points on the spline shaft and spline sleeve must face each other.

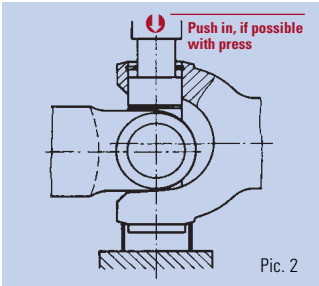
The cross Journals and the needle bearing cups wear simultaneously. It is therefore necessary to replace both the cross and the needle bearings, if they show signs of wear.

1.2 Disassembly

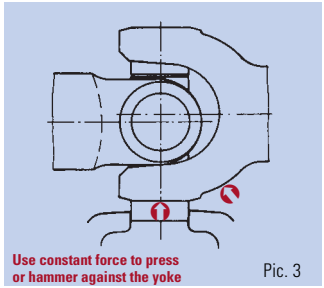
1. Eliminate the tension between circlips and cups (see picture 1).
2. Remove circlips (with special pliers).
3. Press out one cup at each yoke (see picture 2).
4. Grip cup extending out of the yoke and pull them out (see picture 3).Use aluminium or plastic hammer.
5. Press out and pull off the opposite cup.
6. Remove cross (see picture 4)..



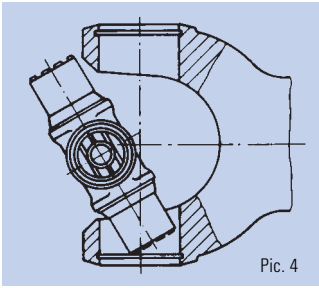
Pic. 1



Pic. 2

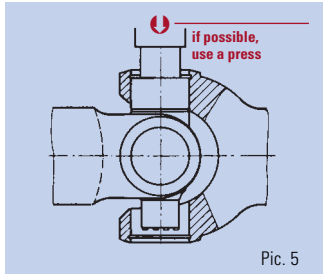


Pic. 3

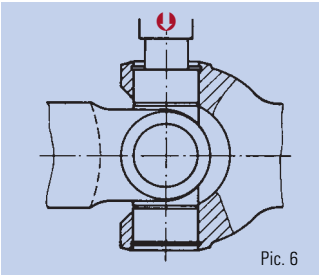

Pic. 4

1.3 Assembly.

1. Insert the cross (see picture 4).
2. Press in the bearing cup on one side and secure it with a circlip (see picture 5).
3. Press in and secure the opposite cup (see picture 6).
4. Insert the cross in the second yoke.Then press in the bearing cup and secure.
5. Tensions in the universal joint can be eliminated by lightly hammering against the yokes. The joint will then move more freely.



Pic. 5


Pic. 6

Instructions for Exchanging the Cross Assemblies in Double Joints for Steering Axles:
The bearing cups of the centre piece are fitted with a detaching thread. These cups can therefore be removed with a puller after removing the screw plugs.
All other steps for assembling and disassembling are the same as described above.

Attention:
Before pressing in the bearing cups, make sure that all needles are in contact with the inside diameter of the cup.
After replacing any worn parts, high-speed shafts must be rebalanced in accordance with rating Q16 of theVDI recommendations 2060. If the shaft is only subject to low speeds, rebalancing is not necessary. The speed limit lies between 500 and 800 rpm depending on size and design of the shaft.
If, for any special reason, high-speed shafts cannot be rebalanced, the individual components of the yoke should be carefully marked before disassembling so that they can be realigned exactiy after-wards. In this way the Unbalance can be limited to a minimum.

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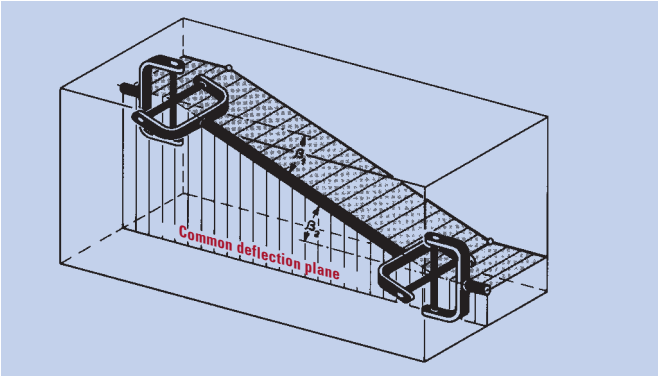
1.4 Arrangement configuration

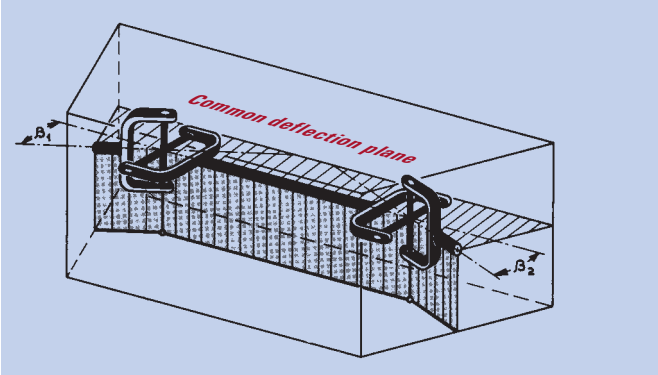
Z-Configuration:
In- and output shaft are parallel to each other in one plane.

Requirement: $ß_1 = ß_2$



W-Configuration:
In- and output shaft intersect in one plane.

Requirement: $ß_1 = ß_2$

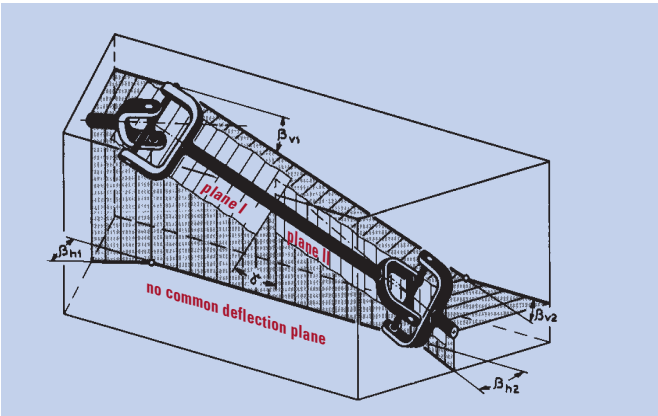


Three-dimensional configuration:
(Combined Z and W configuration)
In- and output shaft cross each other offset in space. No common plane exists. Therefore the inner forks must be offset by the angle γ (See 1.1 „Exception").

Requirement: $ß_{R1} = ß_{R2}$

The resultant three-dimensional deflection angle $ß_R$ derived from the vertical and horizontal angular deviation, is calculated as:

$$ß_R = \arctan \sqrt{\tan^2 ß_v + \tan^2 ß_h}$$



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Technical Annex

2. Motion relationships and torques

2.1 Rotation angle of a single joint

as a function of deflection angle ß

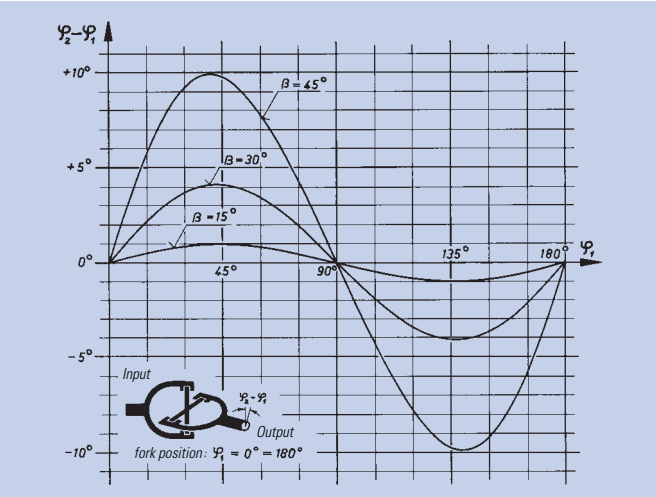
φ_1 = Input – rotation angle
φ_2 = Output – rotation angle

If a single joint is deflected by angle ß and rotated in this condition, rotation angle φ_2 of the output shaft differs from rotation angle φ_1 of the input shaft. The relationship between the two rotation angles is as follows:

$$\tan \varphi_2 = \frac{\tan\varphi_1}{\cos ß}$$

As can be seen from the adjacent diagram, maximum lead occurs at about 45 °, maximum lag at about 135°.

Fork position $\varphi_1 = 0°$ is then obtained, when the input fork is located in the deflection-plane of the joint.

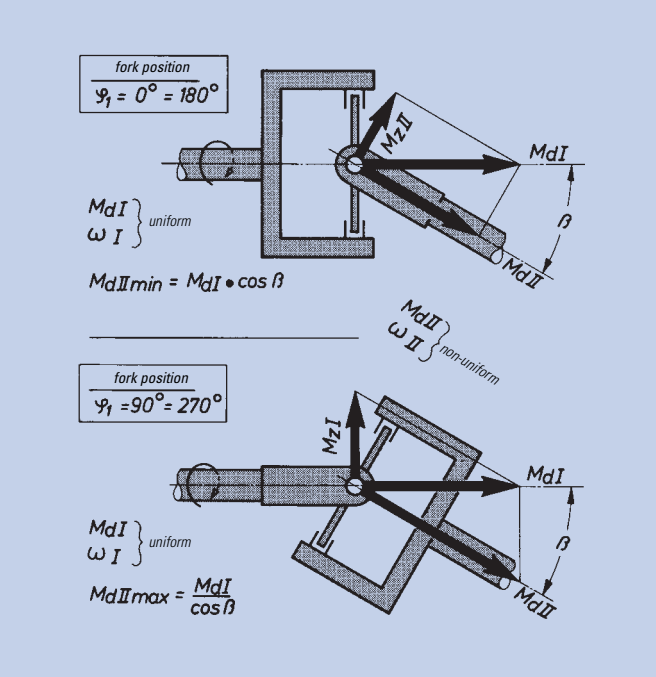


2.2 Motion and torque characteristics of a sigle joint

as a function of deflection angle ß

M_{dI} = Input torque
M_{dII} = Output torque
ω_I = Input – angular velocity
ω_{II} = Output – angular velocity

When analyzing the motion and torque characteristic of a singular joint, it is found that with a constant angular velocity- and torque input, a fluctuating motion and torque curve is obtained at the output. The reason for this fluctuation can easily be illustrated by following the torque characteristic at the fork position φ_1 = 0° and φ_1 = 90° as shown at left. Since the torque can only be transmitted in the spider plane, the spider however, depending on the fork position, is always at a right angle to the input or output axis, output torque fluctuates twice per revolution between $M_{dI} \cdot \cos ß$ and $M_{dI}/\cos ß$.



The transmitted power, however, is constant disregarding friction losses in the bearings.

Therefore, the following applies:

$$N_I = N_{II} = \text{Constant}$$

$$M_{dI} \cdot \omega I_1 = M_{dII} \cdot \omega_{II} = \text{Constant}$$

$$\frac{M_{dI}}{M_{dII}} = \frac{\omega_{II}}{\omega_I} = \frac{\cos ß}{1 - \cos^2 \varphi_1 \cdot \sin^2 ß}$$

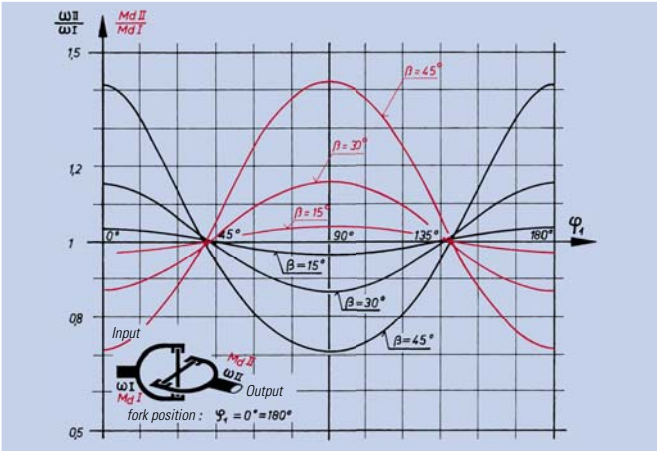
For fork position $\varphi_1 = 0°$ we obtain:

$$\frac{M_{dI}}{M_{dII\,min}} = \frac{1}{\cos ß} = \frac{\omega_{II\,max}}{\omega_I}$$

and for fork position $\varphi_1 = 90°$:

$$\frac{M_{dI}}{M_{dII\,max}} = \cos ß = \frac{\omega_{II\,min}}{\omega_I}$$

$$\frac{M_{dI}}{M_{dII}} = \frac{\omega_{II}}{\omega_I} \qquad \frac{\omega_I}{\omega_{II}} = \frac{M_{dII}}{M_{dI}}$$



2.3 Motion and torque characteristic of a universal driveline

as a function of deflection angles ß1 and ß2

Section 2.2 illustrates that angular velocity and torque at the output of a single joint follow a sinusoidal pattern with a 180° cycle. Maximum angular velocity $\omega_{II\,max}$ max coincides with minimum torque $M_{d\,II\,min}$ and vice versa. From this can be derived that a uniform output is then possible,when a sec-ond joint, having a 90° phase shift is connected to the first joint by means of a shaft. Then, the non-uniform motion of the first joint can be balanced by the non-uniform motion of the second joint. The required 90° phase shift is always then met, when the two inner forks happen to be in the deflection plane of their respective joints. Moreover, the two deflection angles $ß_1$ und $ß_2$ of both joints must be the same. (See also Section 1.1 and 1 .4).

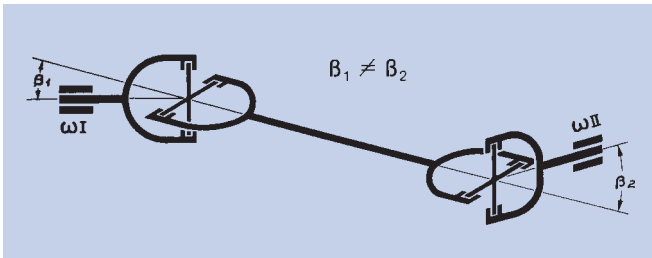
With unequal deflection angles, complete compensation is not possible.
For $ß_2 > ß_1$ the following applies:

$$\left(\frac{\omega_{II\,min}}{\omega_I}\right)_{max} = \frac{\cos ß_1}{\cos ß_2}$$

$$\left(\frac{\omega_{II\,min}}{\omega_I}\right)_{min} = \frac{\cos ß_2}{\cos ß_1}$$

$$\left(\frac{M_{dII}}{M_{dI}}\right)_{max} = \frac{\cos ß_1}{\cos ß_2}$$

$$\left(\frac{M_{dII}}{M_{dI}}\right)_{min} = \frac{\cos ß_2}{\cos ß_1}$$



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3. Fluctuation rate

3.1 Single joint

As explained under 2.1, on a single joint the output velocity deviates from the input velocity. This means, the speed ratio is not uniform. This non-uniformity (fluctuation) can be calculated as a dimensionless value:

Fluctation rate

$$U = \frac{\omega_{2\,max} - \omega_{2\,min}}{\omega_1} = \frac{1}{\cos ß} - \cos ß$$

3.2 Universal driveline (2 joints connected in series)

If the preconditions listed in Chapter 1 for obtaining a complete motion compensation cannot be met, it must be aimed for that: $U \leqq 0{,}0027$.

3.3 Universal driveline with more than two joints

Design requirements might dictate the use of a universal driveline that employs more than 2 joints. This universal driveline, however, must then incorporate an intermediate bearing.
Here, also, the condition applies:
$U_{Res} \leqq 0{,}0027$.
Here, U_{Res} expresses the total fluctuation of the driveline.
Observe, when determining U_{Res}:

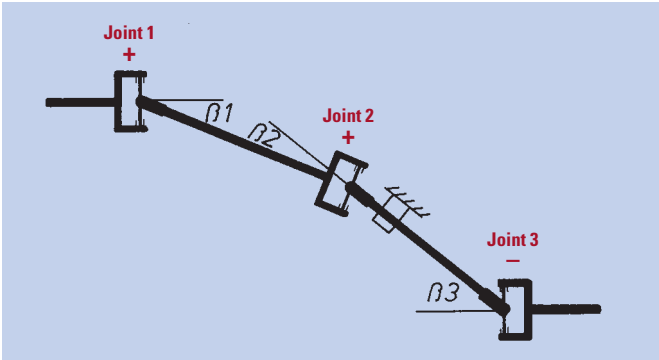
a) Joints with the same fork position get the same sign.
b) The fluctuation rate of each joint must be calculated individually U_1, U_2, U_3.
c) The signs must be observed when adding:

$$U_{Res} = \pm U_1 \pm U_2 \pm U_3$$

Since the rate of fluctuation is a function of deflection angle ß, a limiting condition can be set in regard to the resulting deflection angle $ß_{res}$

$$ß_{res} = \sqrt{\pm ß_1^2 \pm ß_2^2 \pm ß_3^2} \leqq 3°$$

$ß_{res}$ corresponds to the deflection angle of a single joint if it were to replace the entire driveline.



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4. Offset angle

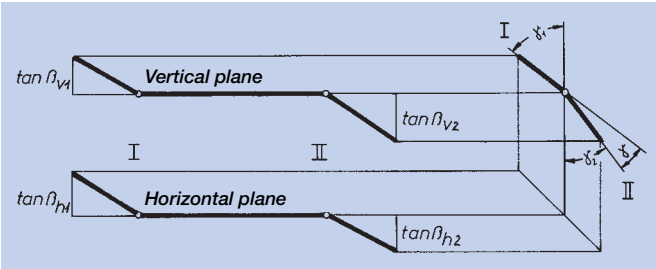
On drivelines with three-dimensional deflection angles, in- and output shaft are not located in one plane. This results, if no special measures are taken, in a non-uniform output motion. The constantly repeating acceleration and deceleration unleashes inertia forces which can greatly reduce the life of the joints.

However, not only the driveline, the driven equipment also is subjected to these forces and vibration caused by them. To avoid this, the inner forks must be offset relative to each other such that each fork ends up in the plane of deflection of its joint. The angle between both deflection planes is called offset angle γ and it can be obtained as follows.

Example 1

$$\tan \gamma_1 = \frac{\tan \beta_{h1}}{\tan \beta_{v1}} \; ; \; \tan \gamma_2 = \frac{\tan \beta_{h2}}{\tan \beta_{v2}}$$

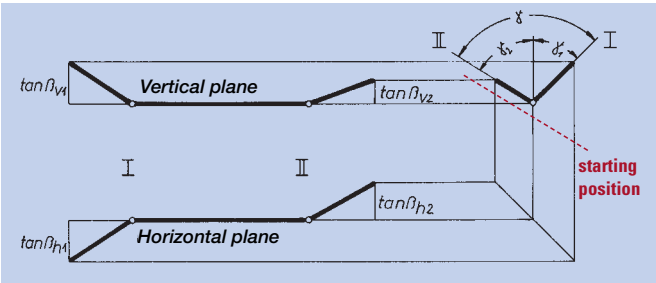
Offset angle $\gamma = \gamma_1 - \gamma_2$



Example 2

$$\tan \gamma_1 = \frac{\tan \beta_{h1}}{\tan \beta_{v1}} \; ; \; \tan \gamma_2 = \frac{\tan \beta_{h2}}{\tan \beta_{v2}}$$

Offset angle $\gamma = \gamma_1 + \gamma_2$



As shown by the graphic illustrations, on both examples two directions of rotation are possible:

Example 1:
a) Rotate joint 1 counter clockwise by the offset angle
b) Rotate joint 2 clockwise by the offset angle.
The direction for viewing is, in both cases, from joint 1 to joint 2.

Example 2:
a) Rotate joint 1 counter clockwise by the offset angle
b) Rotate joint 2 clockwise by the offset angle.
The direction for viewing is, in both case, from joint 1 to joint 2.

By researching the offset angle, you always have to take the graphic illustration.
Only in this way it is possible to find the right direction of rotation and to determine wether the offset angle γ_1 and γ_2 have to be summed or have to be subtracted

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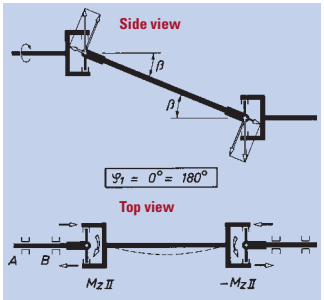
5. Additional moments on the drive line Bearing loads on the in- and output shaft

In Section 2.2 it was shown that the torque is being transmitted only in the spider plane and that depending on the fork position, the spider can be perpendicular either to the input axis or the output axis.
What additional forces and moments this causes on the driveline as well as on the bearings of the in- and output shaft, is explained briefly in the following chapter.

5.1 With Z-Arrangement

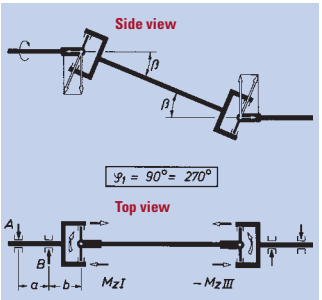
The adjacent illustration shows the location and direction of the additional forces and moments on drivelines having a Z-arrangement, in particular for yoke angles $\varphi_1 = 0°$ and $\varphi_1 = 90°$. This shows clearly, that the driveline center part is stressed by the torque which fluctuates between $M_{dl} \cdot \cos ß$ and $M_{dl} / \cos ß$ in torsion and by the additional moment M_{ZII} periodically alternating, in bending.
(See also Section 6.8).
Likewise, in- and output shaft are stressed by M_{ZI} and M_{ZIII} periodically alternating in bending. The resulting bearing load A and B vary twice per revolution between 0 and maximum value.

Bearing loads on in- and output shaft with Z-arrangement



Driveline-center part stressed in bending

$$A = B = 0$$



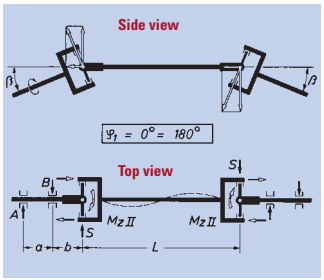
Driveline-center part stressed in bending

$$A_{max} = B_{max} = \frac{Mdl \cdot \tan ß}{a} \quad [N]$$

5.2 With W-Arrangement

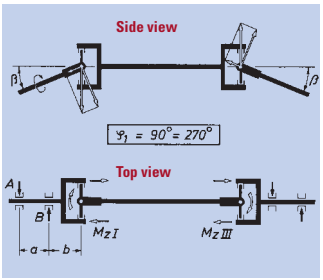
According to the adjacent illustration, with the W-arrangement, an additional force, "S" is introduced, caused by the additional moments M_{ZII} acting in the same direction. The maximum force value occurs at fork position $\varphi_1 = 0°$, and it is being transmitted to the input- and output shaft by the faces of the spider pins.

Bearing loads on in- and output shaft with W-arrangement



In- and output shaft stressed in bending

$$A = \frac{2 \cdot M_{dl} \cdot \sin ß \cdot b}{L \cdot a} \qquad B = \frac{2 \cdot M_{dl} \cdot \sin ß \cdot (a+b)}{L \cdot a}$$



In- and output shaft stressed in bending

$$A = B = \frac{M_{dl} \cdot \tan ß}{a} \quad [N]$$

5.3 Caused by axial displacement forces

If a driveline with an adjustable spline is being changed in length while under torque, in both cases, Z- or W configuration, addition bearing loads are introduced, resulting from the friction caused in the spline. The axial displacement force Pa responsible for these bearing loads is calculated as follows:

$$P_a = 2 \cdot M_{dl} \cdot \mu \left(\frac{1}{dm} + \frac{\sin ß}{Ü} \right) \quad [N]$$

d_m is the spline pitch diameter, Ü the spline overlap. Depending on configuration and lubrication, the coefficient of friction for steel on steel must be assumed to range from 0.11 to 0.15. Plastic coated splines have considerably better sliding characteristics. Here, the friction value is approximately 0.08. Rilsan coated splines are available from size 0.109 up.

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6. Fundamental data for sizing of universal drivelines

To size universal drivelines properly, various conditions and factors must be considered. In view of the multitude of possible applications, exact, generally valid rules cannot be provided. The following information is therefore used for the first rough determination of size. In case of doubt, we will gladly compute the required joint sizes for you and, in this context, we like to refer to the technical questionnaires starting on page 189.

6.1 Torques

The max. permitted torques Md_{max} stated for the individual drive-shaft sizes apply normally only for short-term peak loads.
Md_{nom}: Nominal torque for pre-selection on the basis of the operating moment.
Md_{lim}: Limit torque that may be transmitted temporarily from the universal-drive-joint at limited frequency without functional damage.

The respective permissible torque has to be calculated individually depending on the remaining operating data, such as shock loads, angle of deflection, rotation,etc. (See item 6.2 and 6.3)

6.2 Shock loads

Depending on the type of power input or installation, a driveline can be subjected to shock loads considerably above the rated torque. To take those into account, shock service factors must be implemented. Following are some shock-service factors for the most common drives

Prime mover	with flexible coupling	without flexible coupling
Turbine or electric motor	1	1 to 1,5
Gasoline engine, 4 and more cylinders	1,25	1,75
Gasoline engine, 1 to 3 cylinders	1,5	2
Diesel engine, 4 and more cylinders	1,5	2
Diesel engine, 1 to 3 cylinders	2	2,5

Of course, not only the drives, but, in many instances, also the driven equipment is responsible for shock loads. Because of the magnitude of different possibilities, general data valid for every use cannot be supplied.

6.3 Life expectancy – calculation

The decisive factor with regard to life expectancy of universal drivelines are usually the joint bearing. Therefore, in order to determine the individually required joint size, the life ex-pectancy diagram shown later on should beused. This diagram allows to:

a) determine the theoretical life expectancy of a selected driveline as a function of prevailing operating conditions, or
b) to determine the required joint size for a given life expectancy.

In this case, the rated input torque is multiplied by the appropriate service (shock) factor and the M_d such obtained entered in the following diagram. Other factors, such as correction - or deflection angle factor do not have to be considered since they are already incorporated in the diagram.

On machines or vehicles with changing operating conditions, at first, the individual life expectancy values (for each condition) must be determined from the diagram. Then the overall life expectancy L_{hR} can be calculated as follows:
q_1, q_2 … = time share in [%]
L_{h1}, L_{h2} … expressed in 10^3 [Hours]

$$L_{hR} = \frac{100000}{\frac{q_1}{L_{h1}} + \frac{q_3}{L_{h2}} + \ldots + \frac{qn}{L_{hn}}} \text{ [Hours]}$$

6.4 Life expectancy-Diagram

In view of the multitude of applications, it is not possible to determine the suitability of a driveline by tests. Therefore, the selection and analysis of the required joint size is done by calculations. These are based on the computation of the dynamic load carrying capacity of full rotation needle - and roller bearings according to ISO recommendation R 281. The life expectancy diagrams shown in the catalogue are based on this recommendation and also on an equation formula especially suited for ob-taining nominal life expectancy on universal joints. The thus obtained life expectancy lists the hours of operation that will be reached or exceeded by 90% of a larger number of equi-valent universal joint bearings.

There are also methods of obtaining the modified life expectancy. In this case varying survival probabilities, material quality and operating conditions are taken into account. The present technical know how does not allow statements to be made about variations in life expectancy-performance resulting from differences in steel quality (grain, hardness, impurities). For this reason, no guidelines have been set in the International Standards.

All pertinent operating conditions, such as operating temperature, lubrication intervals, the type of grease used and its viscosity in operation, must also be considered. Since these factors vary from case to case, it is not possible to determine the modified life expectancy and accordingly, a life expectancy diagram valid for universal use.

The two following life expectancy diagrams will allow you to roughly determine the nominal life expectancy.

If the deflection angle is smaller than ß = 3°, ß = 3 should be used. Otherwise, the obtained result will be less accurate.

If it is necessary to determine the life expectancy accurately, kindly consult the ELBE Engineering Department.

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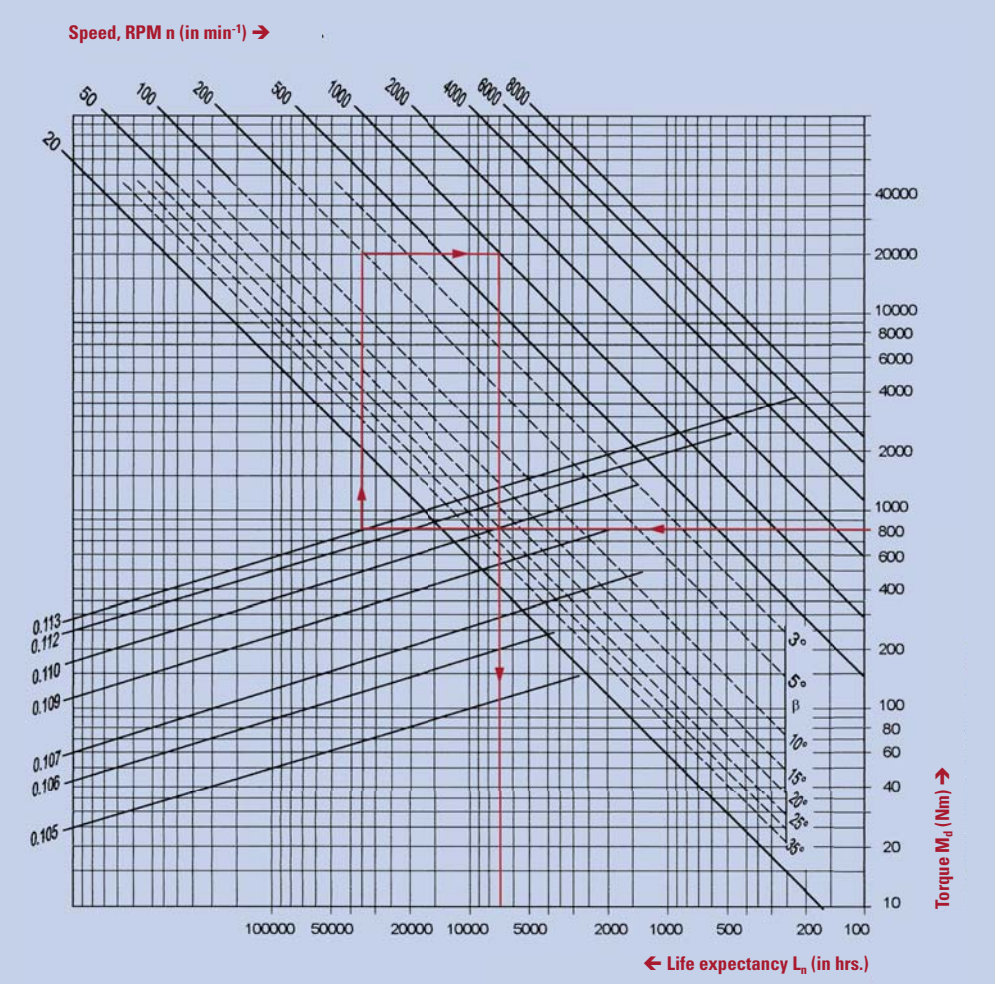
6.5 Life expectancy diagram, Needle bearing



Example

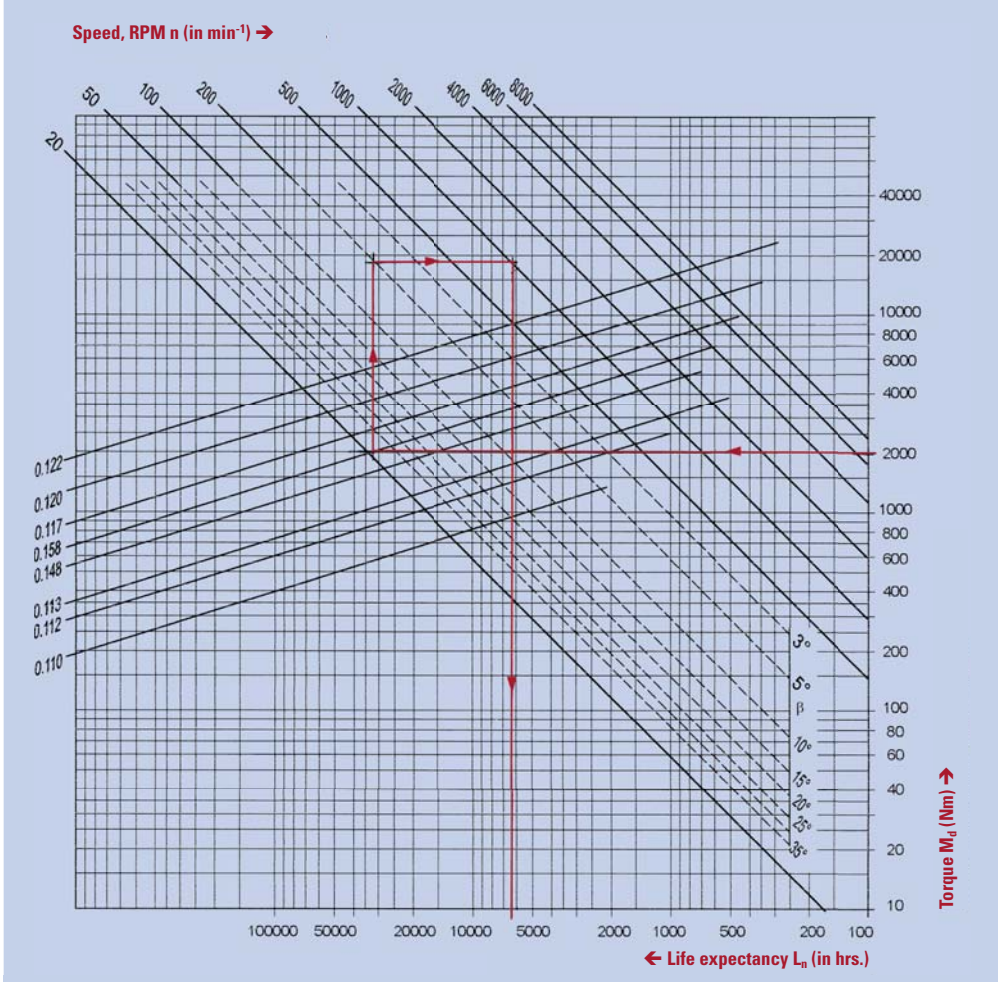
Universal driveline 0.113

Torque	M_d	=	800 Nm
Deflection angle	ß	=	5°
RPM	n	=	1000 min^{-1}

➔ **Life expectancy = 6900 hrs.**

Procedure:
Torque ➔ Joint size ➔ Defelction angle ➔ RPM ➔ Life expectancy

6.6 Life expectancy diagram, Roller bearing



Example

Universal driveline 0.158

Torque	M_d	=	2000 Nm
Deflection angle	ß	=	5°
RPM	n	=	1000 min^{-}

➔ **Life expectancy = 7000 hrs.**

Procedure:
Torque ➔ Joint size ➔ Defelction angle ➔ RPM ➔ Life expectancy

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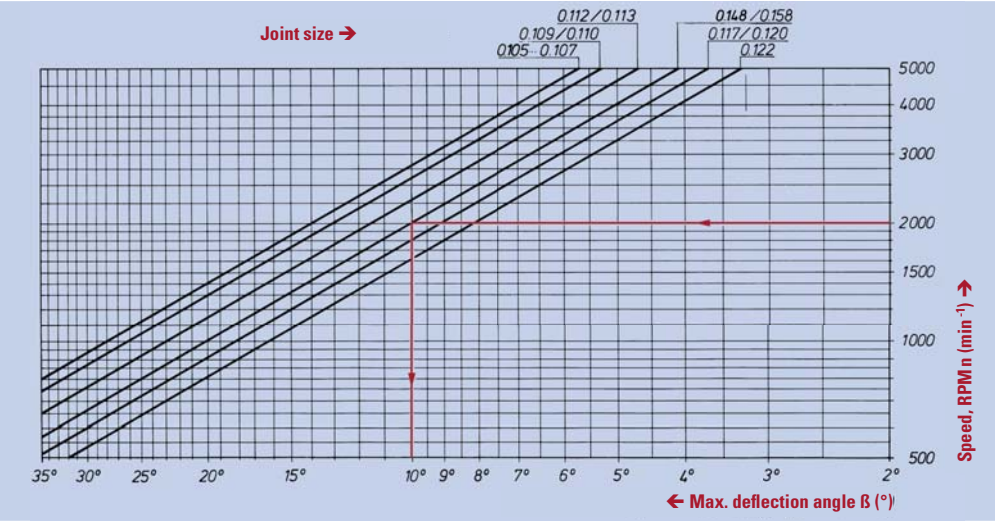
6.7 RPM and deflection angle

As shown in 2.3 by taking certain precautions, a constant output can be obtained on a universal driveline. The center part, however, still retains a non-uniform motion; it is subjected twice per revolution to an acceleration and deceleration. The resulting acceleration torque caused this way is a function of the mass moment of inertia of the driveline's center part as well as of rpm and deflection angle. When regarding smoothness of operation and wear, the product of rpm and deflection angle should not be too high. For use in general mechanical engineering, appropriate guide values can be taken from the diagram below, which is designed for universal drivelines having a standard tubing of up to 1500 mm length.
For vehicle drive trains, these guide values must often be exceeded. Here, at most, up to 1.5 times of the diagram value can be permitted.



6.8 Critical speeds

As shown in 5.1, the center part of the angled driveline, when transmitting torque, is being stressed periodically in bending by additional moment M_{ZII}. This incites the center part to vibrate. If the frequency of this bending vibration approaches the natural frequency of the driveline, maximum stress in all components, buckling of the shaft and development of noise will result.

To avoid this, long and fast running drivelines must be checked for critical bending vibration speeds. The critical, first order bending vibration speed of a driveline employing tubing can be roughly calculated as follows:

$$n_{kr} \approx 1{,}21 \cdot 10^8 \; \frac{\sqrt{D^2 + d^2}}{L^2} \quad [\text{min}^{-1}]$$

D = Tubing-outside diameter [mm]
d = Tubing-inside diameter [mm]
L = Center part length in [mm]

Drivelines are used in the subcritical zone only. For reasons of safety, it must be ensured that the maximum operating speed is far enough away from its system's resonance (critical) speed. Therefore, the following applies:

Max. Operating Speed $n_{max} \approx 0{,}65 \cdot n_{cr}$ [RPM]

6.9 Larger tubing diameters

The critical bending vibration speed of a driveline is, as can be seen from the critical rpm formula, a function of tubing diameters and length of center part. By going to larger tubing diameters, the critical speed of a driveline can be increased. However, the diameter increase must remain within defined limits since a certain relationship between tubing dimensions and joint size must be adhered to.

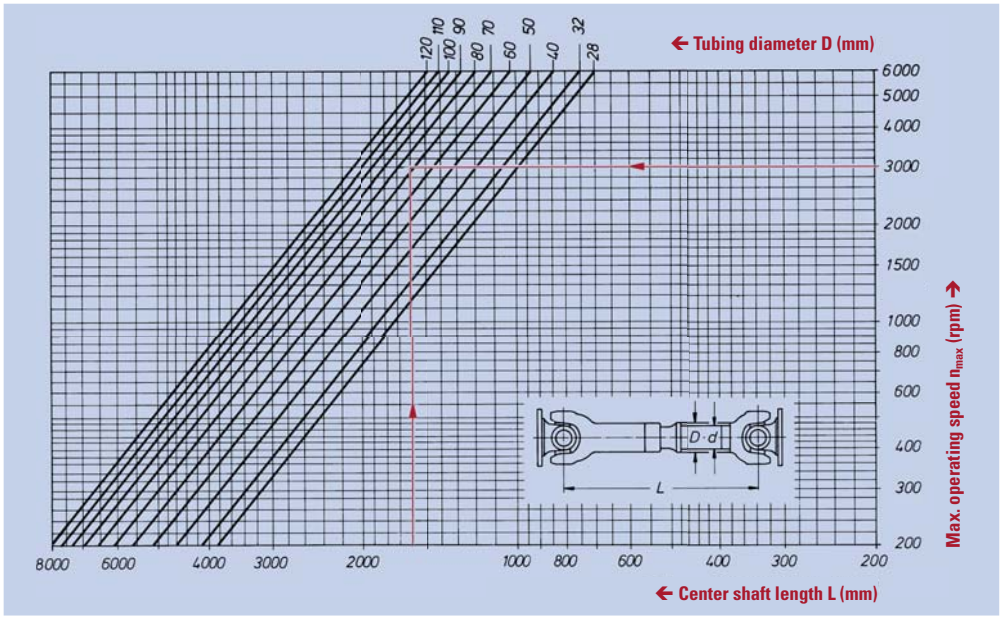
The dimension sheets of the different driveline models list the possible tubing dimensions for each size. In all the cases where a single driveline is insufficient, multiple arrangements with intermediate bearings must be used.

It must be noted that larger tubing diameters are feasible only above a certain shaft length. The following minimum lengths can be used as a angle line.

Flange diameter	[mm]	Up to 65	75 to 100	120 to 180
Min. length S	[mm]	650	950	1250

6.10 Tubing diagram

For determining the required tubing diameter when maximum operating speed n_{max} and center part length L are given.



Example:
Center shaft length L = 1600 mm
Max. operating speed n_{max} = 3000 RPM
} Obtained: Tubing diameter ≧ 70 mm

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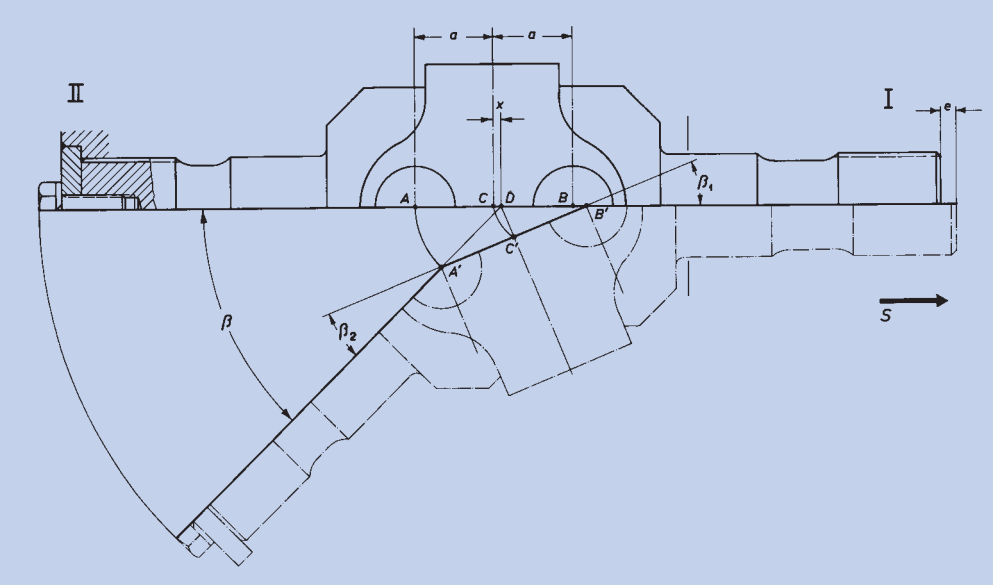
7. Application principles for double joint shafts in steering axles

The double joint shafts of series 0.400.5 and 0.500.3 are intended for use in powered steering axles only.

7.1 Kinematic conditions

As shown in the sketch below, when steering is activated, the axle system is rotated around pin center **D**. The double joint deflects at its two joint pivot points **A** and **B**. Since shaft II is fixed axially, shaft I must move in the direction **S**. This causes unequal joint deflection angles β_1 and β_2, and therefore, also a non-uniform (fluctuating) output motion. The fluctuation can be kept very small provided joint center **C** is offset toward the fixed side by the compensation value X. This way, at a certain deflection angle (= synchronous motion angle β_x) completely uniform motion is obtained, i.e., the two joint deflection angles β_1 and β_2 are equal.
ßx = 30° bis 35° would be an appropriate synchronous motion angle to select



A, B = Joint pivot point
C = center of the double joint
D = rotation pin center
a = distance of a joint point from the center ot the double joint
e = axial movement of floating shaft
X = center offset on installation
β_x = uniform motion angle (synchronous)
ß = total deflection angle
β_1, β_2 = deflection angle of each individual joint

7.2 Center offset value x and max. slide movement e

The center offset **X** required for smooth output can be derived from distance a and synchronous motion angle ß:

$$X = \frac{a}{\cos \frac{\beta_x}{2}} - a$$

Calculated center offset value **X** for individual joint sizes:
Series 0.400, synchronous motion angle β_x = 35°

Joint size	0.408	0.409	0.411	0.412
Deflection angle ß°	50	50	50	50
x [mm]	1,5	1,7	2,0	2,2

Series 0.500, synchronous motion angle β_x = 32°

Joint size	0.509	0.510	0.511	0.512	0.513	0.515	0.516	0.518
Deflection angle ß°	42 | 47	| 50	42 | 47	42 | 47	42 | 47	42 | 47	42 | 47	42 | 47
x [mm]	1,3 | 1,3	| 1,6	1,5 | 1,6	1,6 | 1,7	1,7 | 1,8	1,9 | 2,0	2,1 | 2,2	2,2 | 2,3

Sliding motion **e** at deflection angle ß, and also as a function of distance a and uniform motion angle β_x, can be calculated as follows:

$$e = 2a \left(\frac{\sin^2 \frac{\beta}{2} + \sqrt{\cos^2 \frac{\beta x}{2} - \sin^2 \frac{\beta}{2} \cdot \cos^2 \frac{\beta}{2}}}{\cos \frac{\beta x}{2}} - 1 \right)$$

Max. slide motion **e** for the individual joint sizes:
Series 0.400, synchronous motion angle β_x = 35°

Joint size	0.408	0.409	0.411	0.412
Deflection angle ß°	50	50	50	50
e [mm]	6,5	7,2	8,3	9,2

Series 0.500, uniform synchronous motion angle β_x = 32°

Joint size	0.509	0.510	0.511	0.512	0.513	0.515	0.516	0.518
Deflection angle ß°	42 | 47	| 50	42 | 47	42 | 47	42 | 47	42 | 47	42 | 47	42 | 47
e [mm]	4,5 | 6,0	| 7,9	5,2 | 6,9	5,8 | 7,8	6,1 | 8,1	6,7 | 9,0	7,3 | 9,7	7,8 | 10,5

7.3 Sizing of double joint shafts

Max. possible torque should be used for determining the required joint size. This could be the input torque, calculated from prime mover output, gear ratio and power distribution, or also the tire slippage torque, derived from al-lowable axle loading, static tire radius and coefficient of friction. The lower of the two values represents the maximum operating torque which should be used for determining the proper joint size. The double joint shaft selected this way will have adequate life expectancy, since the time percentage of maximum loading is usually low.

7.4 Loads on the shaft bearing

Double joint shafts, when not centered, must have a bearing support at both shaft halves right next to the joint with one shaft half fixed axially and the other floating axially. When torque is being transmitted, additi-onal forces occur which must be taken into account when sizing the bearings.

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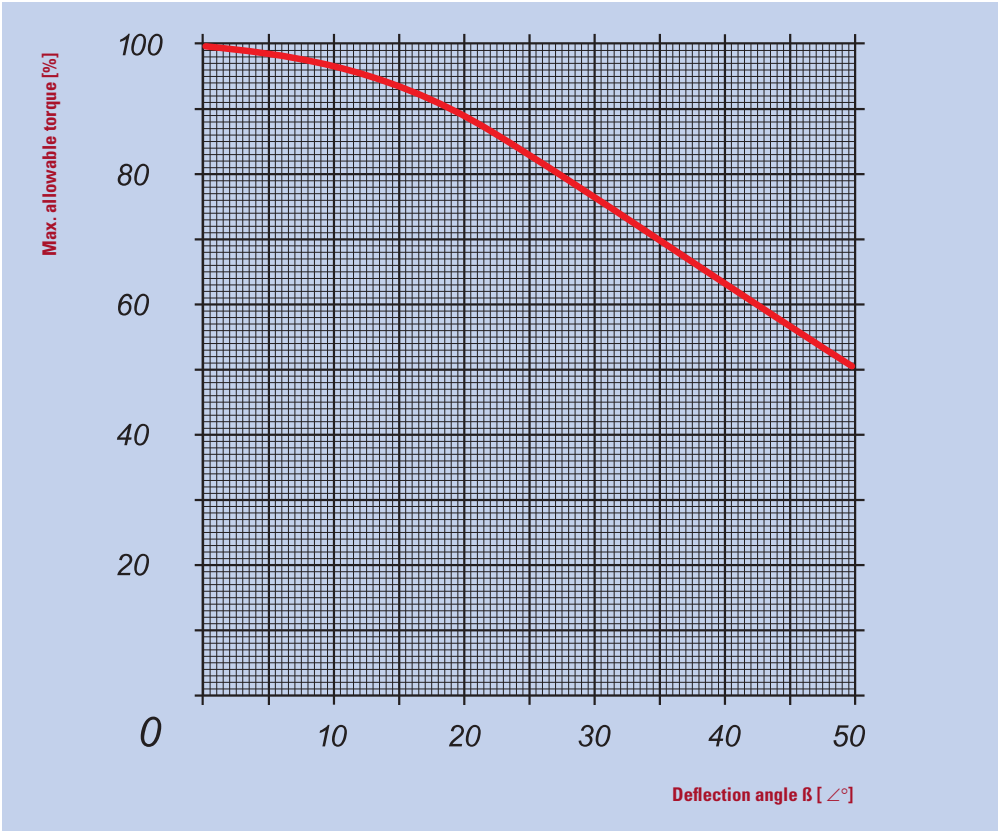
7.5 Torque capacity of double joints as a function of deflection angle

Under torque, different force conditions exist at the joint spider pins and center piece with the double joint in an angled position than in a straight position. The reason for this is that the torque to be transmitted is not distributed evenly over the joint spider pins any longer. Also, as mentioned in Chapter 5, an additional moment occurs. This additional moment must be combined with the torque to be transmitted.

This resulting moment leads to higher compres-sion loads and to a larger bending stress within the joint spider pins. The diagram below allows to take these factors into account. It shows the percentage the maximum allowable torque must be reduced in relation to the deflection angle.



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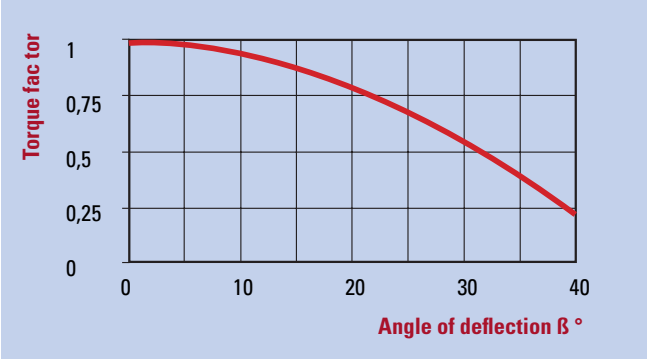
8. Hints for the application of pin and block cardan joints, ball and socket cardan joints

Torque calculation for needle bearing equipped precision cardan shafts, pin and block cardan joints, ball and socket cardan joints, single

The values Md_{max} listed in the diagram represent limit values that may not be exceeded. They are admissible in full altitude only at small rotation speed and minor angle of deflection respectively at intermittent duty.

The transmissible torque varies depending on the size of the angle of deflection.



Needle bearing equipped precision cardan joints

Permitted max. operation moments of the needle bearing equipped precision cardan joints (Torque in Nm)..

	Speed (r.p.m.)						
Joint type	**250**	**500**	**1000**	**2000**	**3000**	**4000**	**5000**
0.616	11	10	8	6	5,5	5,1	4,8
0.620	28	25	19	15	14	12,5	12
0.625	35	30	25	20	18,5	17	16
0.632	70	60	50	40	37	34	32
0.640	150	130	100	80	74	68	64
0.650	220	190	150	120	110	100	95
0.663	450	400	310	250	220	200	190

Pin and Block cardan joint, Ball and socket cardan joint, single

The empirical formula on the right can be used for the rolled calculation of the required joint size.

At	Md_{max}	Speed x bending angle ≤ 500
At 0,5 x	Md_{max}	Speed x bending angle ≤ 5000

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9. Transport and storage – installation information

Our universal drivelines are delivered ready for installation. If not otherwise specified by the customer, they are balanced dynamically at n = 2000 RPM according to classification Q 16 of the VDI recommendation 2060.

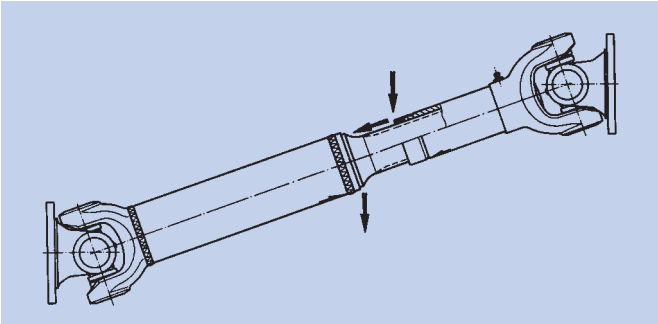
9.1 Transport and storage

To retain the high degree of balance, the drivelines must be protected during transportation or storage from blows or jolts. It is recommended to transport them in horizontal position. When transporting them vertically, appropriate measures must be taken to avoid separation of the driveline halves. A horizontal position is also preferred for storage of the driveline, since doing so eliminates tipping over and possible damage. Never store drivelines on the floor, but if possible, on wooden shelves. At prolonged storage, blank metal parts must be checked for corrosion, and if necessary, treated again with a corrosion inhibiting oil.

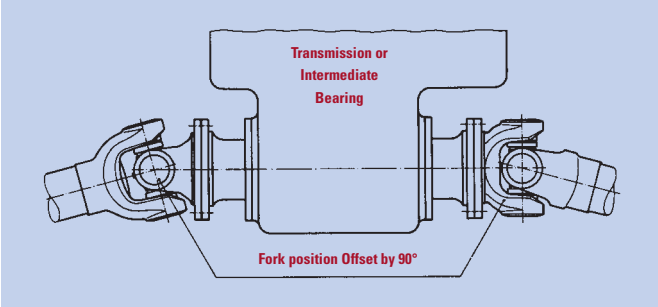
9.2 Installation

Before installing drivelines, all traces of rust inhibitor, dirt and grease must be removed from the flange surfaces to preserve the coefficient of friction vital for torque transmission.

Drivelines should not be separated at the splines and the halves interchanged, otherwise the quality of balance is greatly impaired. For the same reason, balance plates should not be removed.
Prior to installing drivelines, it must be checked that they are assembled correctly, which means that the marking arrows on the splined shaft and splined hub must face each other (See also notation on Page 170).



This drivelines should be arranged such that the spline, whenever possible, is protected from dirt and moisture. As a rule, this means installing the driveline according to the sketch above, where the spline seal points downwards so that spray water hitting it runs away from the spline.



If two or more drivelines are arranged in series be-hind each other, it is recommended that they be mounted offset to each other by 90°. Doing so will at least partially cancel to the outside the effect of the mass acceleration forces caused by the fluctuation motion of the driveline center parts.

The necessary, bolting hardware for flange mount-ing can also be supplied by us on request. For bolt grades and necessary bolt torques, see page 74. When torquing down the bolts, if possible, a torque wrench should be used and the torque should be applied evenly in a crosswise pattern.

Our drivelines are delivered grease-packed, ready for installation. However, after prolonged storage, it is advisable to reapply grease before putting them into service.

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10. Safety instructions and Maintenance

10.1 Safety instructions

The operator has to take corresponding safety precautions that will exclude dangers to persons and material by rotating drive shafts or their components.

- On working on the drive-shafts the **drive has to be in quiescent condition** – set down engine and secure, so that the drive can't be activated unauthorised by a third person.
- Installation, assembly and maintenance work may be performed only by **competent personnel**.
- When installing and disassembling and when transporting of the drive shafts don't reach into the joints to avoid contusions caused by **tilting flanges or components**. Take suitable measures to avoid that drive-shafts-shares **slide apart unintentionally** and cause injuries or damage.
- Fast mode or/and long shafts should be lined with protection devices like safety shackle and guard and protected against touching or point potential dangers explicitly out.
- Don't place weights onto shafts in standstill, don't place, hang or fasten tools or other objects on the shafts.

The user or operator hast to observe the legal safety regulations and has to make arrangements before beginning the maintenance-work.

To avoid damages or dangers observe the following **basic information**:

- The permitted **operating speed** may not be exceeded.
- Don't exceed the permitted **angle of deflection**.
- In case of shafts with **length extension** the maximum permitted X-value may not be exceeded. It is recommended to use 1/3 of the complete length extension.
- The drive shaft has to be checked regularly for modified **running noises** and **vibrations** and if necessary to check the changing of the **joint slackness** and of the length extension in standstill.
- The **balance status** of drive shafts may not be changed.
- Don't make modifications or unauthorized repairs without the **written approval** of the manufacturer, as dangers for humans and material result and any claim of warranty becomes void.
- Drive shafts may not be cleaned with **pressure water** or **steam jet** to avoid damage of the seals and to prevent the penetration of water and dirt.
- When cleaning don't use **aggressive cleanser**.
- **Protect plastics-coated profiles** and sliding surfaces against mechanical, thermal and chemical damages. Sliding surfaces for seals have to be covered before colouring.
- The drive shafts may only be installed in fluid or solid media with written approval of the manufacturer.
- **Local heating** of the drive shafts (e. g. flame cleaning of colour residues) must not be carried out to avoid significant changes of the true running characteristics.

10.2 General maintenance information

ELBE drive shafts will be delivered as fully finished power units, are ready for use greased and balanced. To guarantee the characteristics specified in the documentation the condition upon delivery may not be changed.

The maintenance-cycle of the drive shafts depends particularly on the application conditions.

Above-average load, variations in temperature and the effect of dirt and water render it necessary to observe shorter maintenance intervals to guarantee the safe and efficient application.

We recommend coordinating the inspection intervals of the drive shafts with the ones of other machine parts or with the service intervals of the machine or of the vehicle.

Inspection and maintenance are required at least once a year.

Application field	control and maintenance intervals Joint	length extension
Commercial vehicles in street application	50.000 km or 1 year	maintenance-free
Commercial vehicles in street- and territory application	25.000 km or 6 months	maintenance-free
Commercial vehicles in pure construction-site and territory application	10.000 km or 1 month	maintenance-free or 100 hours
Earth-moving and construction machines	250 operating hours or 1 month	maintenance-free or 100 hours
Stationary plant and machines construction	500 operating hours or 3 months	maintenance-free or 3 months

10.3 Lubrication guidelines

ELBE cardan-drive-shafts are normally equipped with 3 cone-grease-nipples DIN 71412. Thereby every joint will be greased over per grease nipple, the third nipple serves for relubrication of the spline profile.

This nipple is omitted for plastic-coated lenght extensions.

10.3.1 Lubricants

- Temperature range -30°C up to max. +100°C. For relubrication of the drive shafts use only **lithium-saponified greases** of consistency class 2 with penetration 265/295 and drop point approx. 180°C. The lubrications may not contain **MoS2**-additives.
- Temperature range up to approx. +160°C, temporary up to 180° C (**High-temperature-version**): use HT-greases of the consistency 1 or 2. Special versions up to +250°C are partly also available.
- Temperature range from approx. -60°C up to +110°C (low-temperature-version): use TT-greases of the consistency 1 or 2.
- **Low-maintenance or maintenance-free**: If longer lubrication-periods are required, low-maintenance versions of the drive shafts are available. In consideration of the application conditions if necessary maintenance-free versions are also available. Consult our technical service team.

10.4 Technical information

- Before lubricating **clean grease nipples!**
- The relubrication of the spline-length-extension should be carried out **at compressed length** S_{min} or in the shortest operation status (vehicle loaded). Non-observance may result in excess axial forces.
- Air vent may not be taken off or be replaced by standard grease nipples.
- The lubricant may not be pressed in with excessive pressure or with hard lubrication impact.
- Max. permitted **lubrication pressure: 20 bar**.
- The cross units have to relubricatd over the grease nipples in the centre of the cross or on the bottom of a bearing housing of the cross. It must be ensured that grease has to be pressed in until it **leaks from all four seals of each bearing**.
- This is the only way to ensure that all four bearings have received fresh grease.
- Some versions of double drive-shafts are equipped with a grease nipple on the centre piece of the joint, over which both cross joints can be relubricated at the same time through lubrication ducts (**central lubrication**).
- Drive shafts that are stored more than 6 months have to be lubricated before starting.

10.5 Control information

- Fittings and connection flanges have to be checked for firm connection.
- Drive shafts should be checked in operation for abnormal noises or vibrations, to determine the cause and initiate repair work.
- Before lubrication, check the driveshaft for loosness in the joints or splines.
- The connection side of the drive shaft flanges and companion flanges must be cleaned before installation. They must not be greased or oiled.
- Corrosion inhibitors and paint residues must be thouroughly removed. Possible light transportation damage should be corrected (knicks and scratches).
- Companion flanges have to be checked for face and OD rounout.

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Technical questionnaire for sizing universal joint drives
Vehicle application

Customer's adress: _____

_____

_____

Prepared by: _____

Department: _____

Date: _____

1. Prime Mover:

☐ Electric motor ☐ Internal combustion engine

Type or Model: _____

No. of Cylinders: _____

Tilt Factor: _____

Operating Time %: _____

Maximum Output: _____

at Speed (RPM): _____

Maximum Torque: _____

at Speed (RPM): _____

2. Vehicle:

Type of Vehicle: _____

Number of Axles: _____

Number of Powered Axles: _____

Rated Gross Weight: _____

Max. axle loaded: front _____ rear _____

Drive: ☐ front ☐ rear

Differential-distribution gear box: ☐ yes ☐ no

Lock-up differential-distribution gear box: ☐ ja ☐ nein

Lock-up differential, driving axle: ☐ ja ☐ nein

Tire size Dynamic radius: _____

Static radius: _____

Max. rated speed: _____

3. Coupling:

Type of couplings: _____

Fluid coupling: _____

Flexible coupling: _____

Efficiency %: _____

4. Transmission:

Type of transmission: _____

Gear ratios, forward: _____

Gear ratios, reverse: _____

Gear ratios, differential: _____

Gear ratios, planetary gears: _____

Max torque, front axle: _____

Max torque, rear axle: _____

Time share – each gear: _____

Torque converter: ☐ yes ☐ no _____

Start up torque: _____

5. Driveline:

Deflection angle: _____

Min. installation length: _____ Min. installation length: _____

Flange diameter and mounting holes: _____

Hub bore: _____

Installed position: ☐ horizontal ☐ vertical

Desired life expectancy approx.: _____ Hours

Estimated requirement approx.: _____ parts per month/year

Technical questionnaire for sizing universal joint drives
Industrial application

Customer's adress: _____

_____

_____

Prepared by: _____

Department: _____

Date: _____

1. Prime Mover:

☐ Electric motor ☐ Internal combustion engine

Type or Model: _____

No. of Cylinders: _____

Tilt Factor: _____

Operating Time %: _____

Maximum Output: _____

at Speed (RPM): _____

Maximum Torque: _____

at Speed (RPM): _____

Gear Ratio: _____

Time Share of individual Gears: _____

Clutch Type: _____

Elastomeric Coupling: _____

2. Driven Equipment:

f. i. Transmission, ventilation fan, pump:

_____

_____

3. Operating Conditions:

Shock load: _____

Intemittent Operation: ☐ no ☐ yes _____ Engagements per day

Reversing Operation: ☐ no ☐ yes _____ Times per hour/day

Ambient Temperature, continuous: _____ Maximum: _____

Dust, dirt, wather? _____

4. Driveline:

Max. occuring torque: _____

Continuous torque: _____

Max. Speed (RPM): _____

Average speed (RPM): _____

Deflection angle: _____

Min. installation length: _____

Max. installation length: _____

Flange diameter and mounting holes: _____

Hub bore: _____

Installed position: ☐ horizontal ☐ vertikal

Desired life expectancy, apporox.: _____ Hours

Estimated requirement apporox.: _____ parts per month/year

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