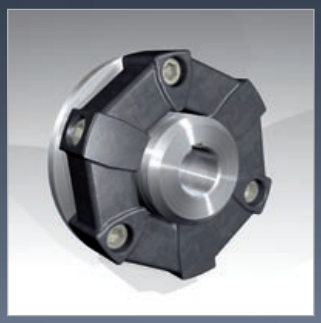
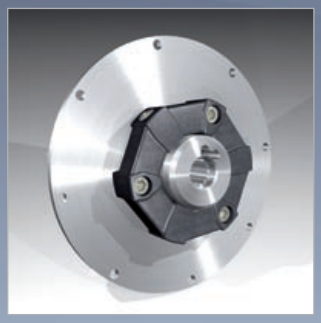
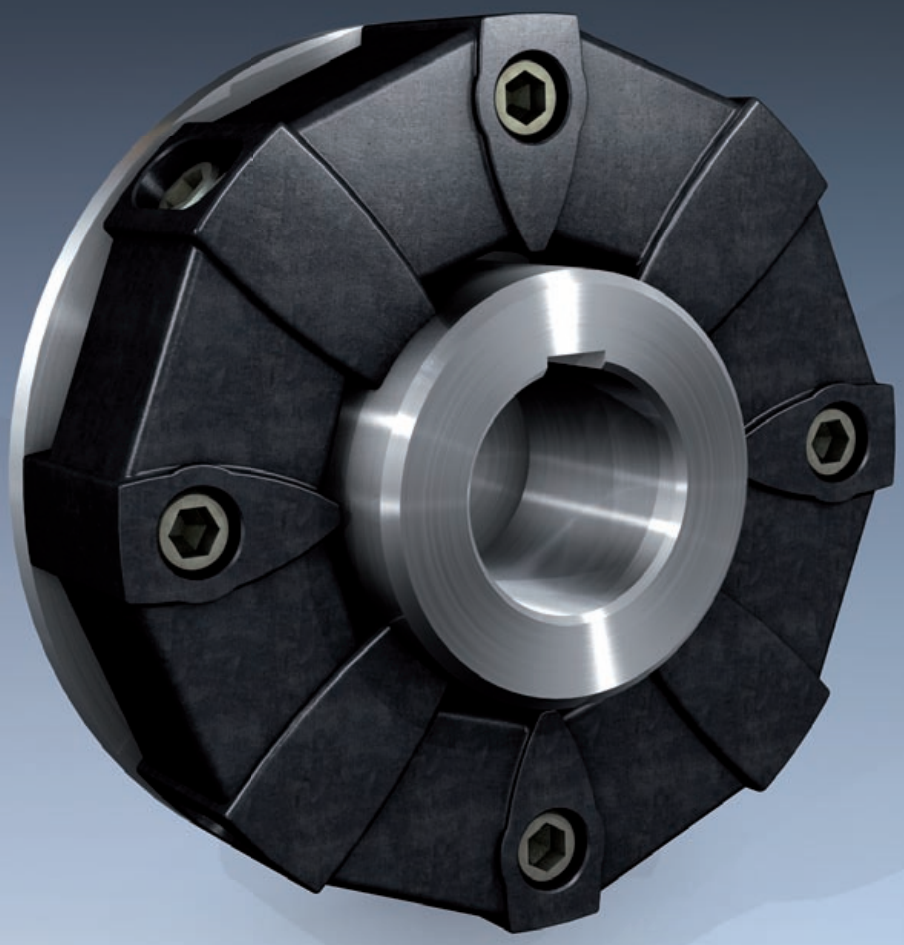
CENTAFLEX®-A

highly flexible couplings









CENTA

Power Transmission
Leading by innovation

Catalog CF-A-E-15-07

CENTAFLEX®
The success of a coupling system

CENTAFLEX, the original from the inventor!

This successfull coupling has been developed and internationally been patented by CENTA Transmissions and brought to the market in 1970. Since then a unique success story on the world market began. More than 100.000 couplings are produced every year, with still growing volume. Totally six million couplings have been installed and are performing reliably. Beside the original production in Germany, the couplings are produced under license by:
Miki Pulley Co. in Japan
CENTA Andino in Brazil.

Further ten CENTA subsidiaries and 30 agencies with broad know-how provide worldwide sales and service and make the CENTAFLEX the most successfull couplings of its kind on the world market.

The idea

A high quality coupling element which - with very little effort - enables a highly flexible coupling to be "custom built" for almost any purpose. The CENTAFLEX contains a highly elastic element which is extensively flexible in any direction, and upon which an entire coupling system is based. This coupling system embodies a combination of numerous positive characteristics, with a versatility of design from common components, not previously achieved.

The principle

A prestressed polygon shaped rubber element with metal parts vulcanised in. The important innovation is that the screws connecting the rubber element with the hubs are alternately arranged axially and radially. The radial screws fulfill 2 tasks:

- **connecting**
  the rubber element to the hub
- **producing a preload by radial compression**
  of the rubber column

Preload pressure stress in the rubber element considerably raises the capacity of the coupling, since it compensates for the tensile stress which otherwise occurs in operation. Under compressive stress the capacity of rubber is multiplied.
Transmission of the peripheral force from the bonded aluminium segments to the hubs is by friction. The stress in the screws is therefore purely tensile and in no way a flexional or shearing stress. For better frictional engagement, the cylindrical hubs for most sizes are knurled on the perimeter. During assembly, the knurl points press into the aluminium and result in a highly stressable combination giving a positive and friction locking connection.

The materials

Precision diecast aluminium parts, vulcanised into high quality rubber; high tensile selfsecuring screws and steel hubs machined all over.

The hubs

The hubs have very simple cylindrical or flat mating faces without cams or recesses.
This means that other existing elements (e.g. flywheels, brake discs, clutches, pulleys, gears etc.) can easily be used as hubs. All that is necessary in such cases is to drill and tap a few holes for fastening the rubber element. The simple, easily manufactured form of the hubs permits the manufacture of many special designs, such as elongated hubs.

The CENTAFLEX system

An entire system with the most varied designs and hubs was developed, based on the advantages described above. In addition there are hundreds of special designs. This catalog describes only the important highly flexible designs of the CENTAFLEX system. Apart from these, several varieties with higher torsional stiffness of the elastic element have been developed, which provide – with the same connecting dimensions and hubs – for further interesting designs in other areas of applications:

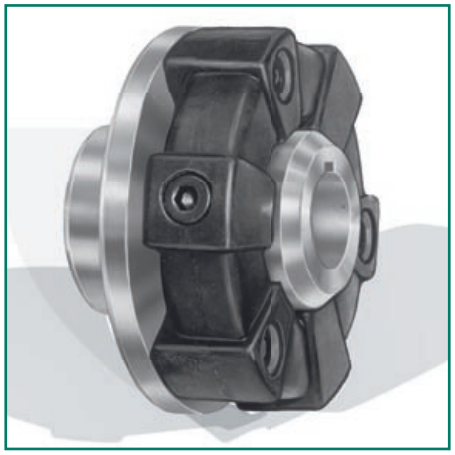
CENTAFLEX type H	torsionally stiff, for diesel hydraulic drives
CENTAFLEX type X	torsionally very stiff, angularly flexible free of play and backlash.

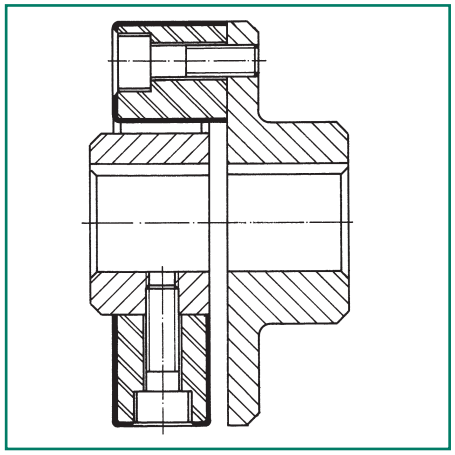
Every good elastic coupling has 4-way flexibility:

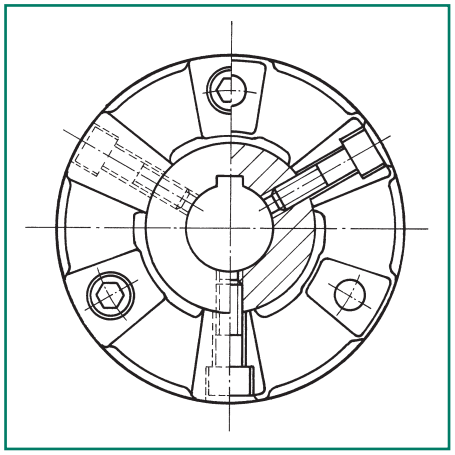
1. torsional elasticity
2. radial flexibility
3. axial flexibility
4. angular flexibilty

In addition, the CENTAFLEX-A is uniquely flexible in application, i.e. capable of modification and adaption; CENTAFLEX therefore has 5-way flexibility.

® CENTAFLEX is a registered trademark of CENTA Antriebe







Characteristics and advantages of the CENTAFLEX-couplings

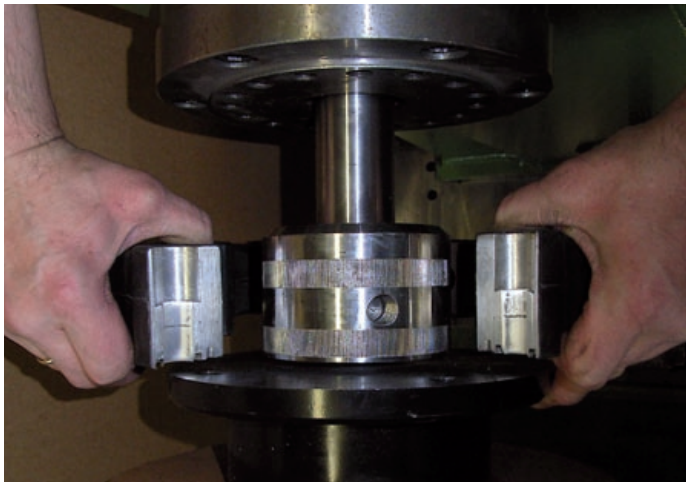
- Simple, compact, smoothface design
- Low weight, low moment of inertia
- High performance, high speed range, large bores permitted, ruptureproof
- Large angle of twist with progressive characteristic curve (approx. 6–8° at nominal torque)
- High elasticity and considerable flexibility in any direction (radial, axial, angular) with low counter forces on shafts and bearings. Therefore the shafts do not have to be aligned accurately
- The action of the CENTAFLEX coupling is shock and vibration absorbing
- The torque is transmitted absolutely free from play, uniformly, free from noise, and electrically insulating
- The coupling requires no maintenance, the rubber parts suffer no wear, providing long useful life with no dirt produced by rubber particles
- The rubber element is air flushed all around; the heat generated is easily conducted away and the rubber element remains cool
- The rubber element can easily be fitted and dismantled without the use of special tools or tension bands
- The coupling can be very easily aligned, relying on line of sight or with the aid of a straight edge, without any special templates or gauges
- The elements can be dismantled transversely without any axial displacement
- By slackening the radial screws, the drive can easily be seperated and rotated without dismantling
- No axial reaction forces are imposed on shafts and bearings due to the transmission of torque
- Rubber elements are available in various shorehardness grades. This permits variation of the torsional stiffness within wide limits and its adaption to the vibrational requirements of each drive system
- The rubber elements are available in various materials:

  Standard: natural rubber

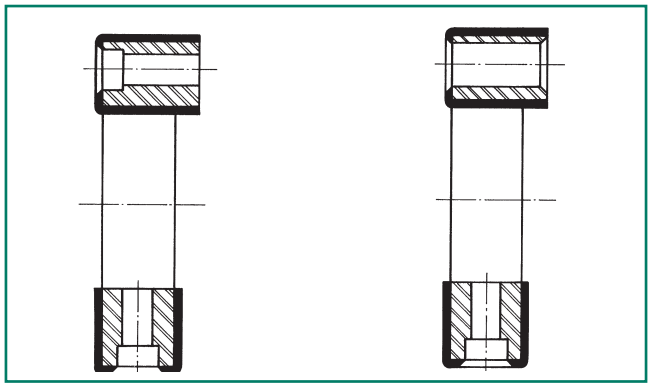
  Special materials: Perbunan, Neoprene and Silicone for high temperatures.

NEW !

Split CENTAFLEX-element Series AR. In case that the flexible element is damaged, then the split spare element can be wrapped around the cylindrical hub. Therefore no hub or components must be disturbed. Extremely simple exchange of the element within minutes.
The fasteners, overall dimensions and the rating of the element remain unchanged.
A further CENTA innovation, protected by patents.

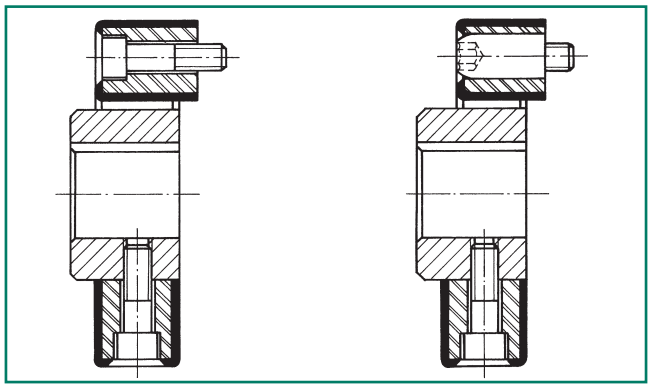


CENTAFLEX coupling design types



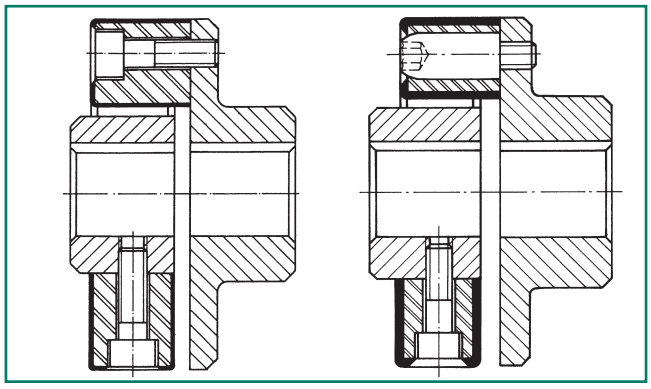
Type 0 and 0-S

The rubber element for customers' "own designed" special applications. Available in various shorehardness grades and materials.



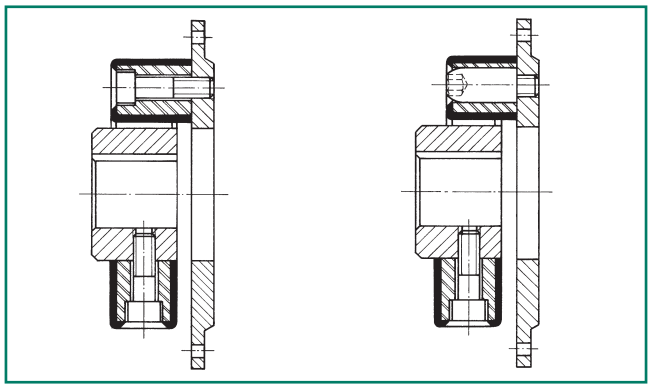
Type 1 and 1-S

Element with cylindrical hub for existing drive elements, e.g. flywheels, pulleys, brake discs, friction clutches, universal joints, freewheels, gears.



Type 2 and 2-S

Complete shaft couplings for all areas of mechanical engineering. After removing the axial screws, coupled machines can be removed radially, as with "three-part" couplings.



Type 3 and 3-S

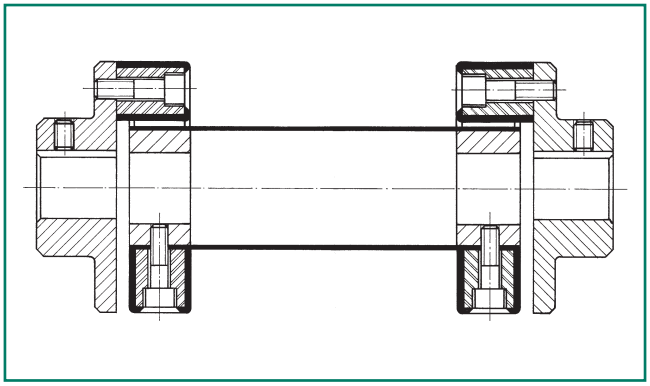
Flanged couplings for combustion engines and many other applications. The simple adaptor plate can be adapted to fit any standard or non-standard flywheel or other component.

Type S

Design "S" is a plug-in variation for applications where axial movement or "blind" assembly in a housing is required. Design "S" is available for all design types and sizes of CENTAFLEX. In addition, there are special designs available with extended socket bolts for applications requiring large axial movement or the provision of facilities to change V-belts.

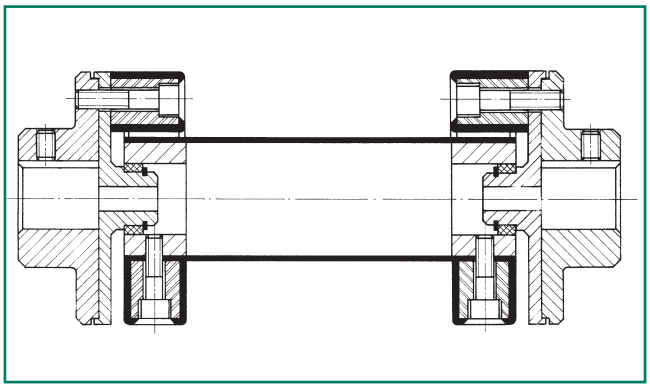
Universal joint shaft, type G

Highly elastic universal joint shafts for any assembly length and for a variety of applications. Connecting pieces can be varied as required, and are adaptable. With short assembly length they are suitable for speeds up to 3000 rpm.
Never surpassed for simplicity and economic pricing!



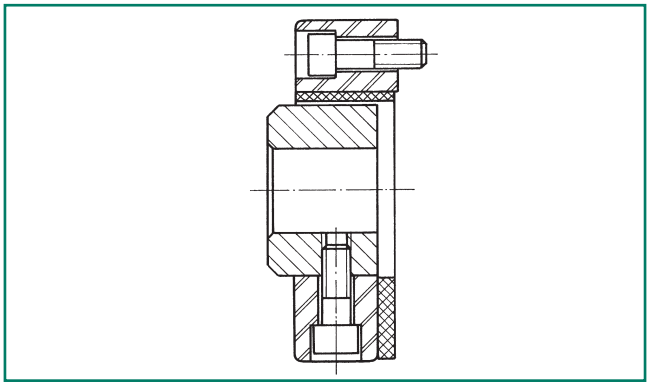
Universal joint shaft, type GZ

Highly elastic universal joint shafts with accurate, maintenance-free centering of the central part for applications with very high speeds and/or long shaft lengths.



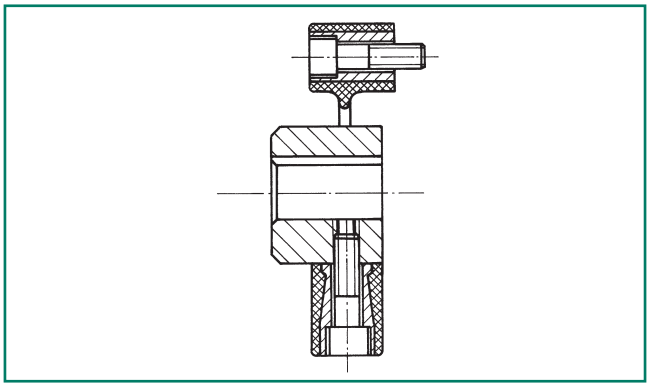
CENTAFLEX design H

Torsionally stiff, plug-in, high temperature and oil-resistant design series, specially designed for diesel hydraulic drives. Numerous design types identical to those previously described, and with further special designs.
Detailed description is given in catalog CF-H.



CENTAFLEX design X

Torsionally very stiff design series, free from play or backlash, but axially and angularly flexible. This series is temperature and oil resistant. Plug-in types suitable for blind fitting, or axially stiff types are available. This series is especially suitable for torsionally stiff universal joint shafts identical to the above design type G.
Detailed description is given in catalog CF-X.



A 1.0 Performance table

Centaflex size				1	2	4	8	12	16	22	25	28	30	50	80	90	140	200	250	400	Remarks*
Pos.	Description	Symbol	Unit																		
1	Nominal Torque	T_{KN}	Nm	10	20	50	100	140	200	275	315	420	500	700	900	1100	1700	2400	3000	5000	
2	Maximum Torque	T_{Kmax}	Nm	25	60	125	280	360	560	750	875	1200	1400	2100	2100	3150	4900	6000	8750	12500	
3	Angle of Twist	T_{KN}	degree	6°	6°	5°	5°	3°	5°	3°	5°	3°	5°	3°	3°	5°	3°	3°	3°	3°	
		T_{Kmax}	degree	17°	17°	12°	14°	7.5°	14°	7.5°	14°	7.5°	14°	7.5°	7.5°	14°	7.5°	7.5°	7.5°	7.5°	
4	Max speed	n_{max}	min-1	10000	8000	7000	6500	6500	6000	6000	5000	5000	4000	4000	4000	3600	3600	3000	3000	2500	
5	Angular Elasticity	ΔK_W	degree	3°	3°	3°	3°	2°	3°	2°	3°	2°	3°	2°	2°	3°	2°	2°	2°	2°	dependant upon speed
6	Axial Elasticity	ΔK_a	mm	2	3	3	4	4	5	5	5	5	5	5	3	5	5	5	5	5	
7	Radial Elasticity	ΔK_r	mm	1.5	1.5	1.5	2	2	2	2	2	2	2	2	1.5	2	2	2	2	2	depedant upon speed
8	Cont. Oscillating Torque	T_{KW}	Nm	5	10	20	40	50	80	100	125	150	200	300	320	450	700	960	1250	2000	
9	Allowable Energy Loss	P_{KV}	W	6	10	15	25	30	40	50	68	75	80	90	100	120	150	170	200	250	
10	Dyn. Torsional Stiffness	C_{Tdyn}	Nm/rad	90	180	550	900	2700	2000	6100	2800	7500	4800	12000	16000	10500	26500	38700	43000	75000	50 Shore
		C_{Tdyn}	Nm/rad	140	290	850	1500	4400	3400	9000	4500	12000	7800	19000	25000	16000	40000	60000	67000	120000	60 Shore
11	Axial Stiffness	c_a	N/mm	38	22	75	75	250	100	500	140	550	190	650	850	220	650	900	1150	1300	
12	Radial Stiffness	c_r	N/mm	150	150	500	500	1000	500	1300	600	1400	750	2200	2900	1000	2300	3100	4100	6000	
13	Angular Stiffness	c_w	Nm/degree	0.3	0.3	2.4	3.6	9.0	5.0	12.0	7.0	17.0	9.0	26.0	34.0	17.0	38.0	48.0	68.0	88.0	

Figures given for lines 3, 11, 12, 13 are values for a shore hardness of 60° measured statically ($c_{dyn} = C_{stat} \cdot 1,3$)

Nominal Torque T_{KN}: Torque which can be transmitted throughout the entire permitted speed range.
Max. Torque T_{Kmax}: Torque which may be applied for short periods 10^5 times, pulsating in the same direction of rotation, or 5 x 10^4 alternating.
Continuously Torque T_{KW}: Amplitude of continuously permissable torque fluctuation at max. frequency of 10 Hz and a basic load up to nominal Torque T_{KN}.
*** Larger sizes up to 1250 Nm are available, please consult us.**

A 1.1. Starting up Factor

Z	≤ 120	120 < Z≤ 240	> 240
S_Z	1,0	1,3	1,6

Z= start frequency per hour

A 1.2. Frequency Factor

f in Hz	≤ 10	> 10
S_f	1	$\sqrt{\frac{f}{10}}$

A 1.3. Shore Hardness

Conversion Factor U				
Shore	50	60	70	75
u	0,7	1	1,6	2,3

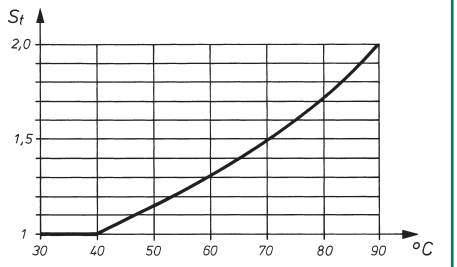
A 1.4. Surge or Pulse Factor

S_A/S_L	
1,6	Light starting load
1,9	Medium starting load
2,2	heavy starting load

A 1.5. Resonance Factor V_R Relative Damping Factor Ψ

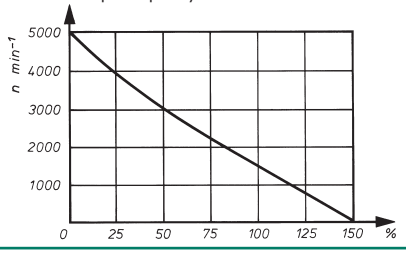
Natural Rubber (NR)		
Shore Hardn.	V_R	Ψ
50	10	0,6
60	8	0,78

A 1.6 Temperature factor



A 1.7 Permissible angular and radial misalignment

permissible angular and parallel offset misalignment is dependant upon the speed when utilising the nominal torque capacity. % of line 5 or 7



Coupling selection

The CENTAFLEX-coupling must be suitable dimensioned to prevent the stresses:
a) Nominal torque T_{KN}
b) Maximum torque T_{Kmax}
c) Continuously oscillating torque T_{KW}
from exeeding the permissible values in any operational state. The following formulae will be helpful.

Stress due to the torque

The permissible nominal torque at all operating temperatures must be at least as great as the nominal torque of the drive or load side.

$$T_{AN} \cdot S_t \leq T_{KN} \geq T_{LN} \cdot S_t$$

Factors of influence:

Nominal torque drive side T_{AN} Nm
load side T_{LN} Nm
Temperature factor S_t (diagram A 1.6)

Performance formula:

$$T_{AN} \mid T_{KN} \mid T_{LN} = 9555 \frac{P}{n} \cdot \frac{KW}{R.P.M.} \text{ Nm}$$

Stress due to torque pulses:

The permissible max. torque of the coupling must at all operating temperatures be at least as great as the torque pulses T_{AS} and T_{LS} (Nm) occuring in operation.

Factors of influence :

start-up factor S_z (Table A 1.1)
pulse factor
drive side S_A (Table A 1.4)
load side S_L
Mass factor
drive seite M_A $M_A = \frac{J_L}{J_A + J_L}$
load side M_L $M_L = \frac{J_A}{J + J_L}$

Drive side pulse

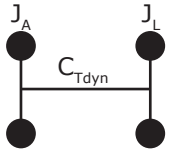
$$T_{Kmax} \geq M_A \cdot T_{AS} \cdot S_A \cdot S_Z \cdot S_t \text{ Nm}$$

Load side pulse

$$T_{Kmax} \geq M_L \cdot T_{LS} \cdot S_L \cdot S_Z \cdot S_t \text{ Nm}$$

Stress due to a periodic oscillating torque Position of resonance (resonance speed)

For easier calculation, the existing unit is best reduced to a 2-mass torsional oscillating system if possible.



Total mass moment of inertia
drive side J_A kgm²
load side J_L kgm²
Dyn. torsional stiffness of the coupling
CTdyn Nm/rad (Table A 1.0-9)

Determining the resonance speed of the i^{th} order

$$n_R = \frac{30}{\pi \cdot i} \sqrt{C_{Tdyn} \cdot \frac{JA + JL}{JA \cdot JL}} \text{ rpm}$$

i = number of oscillations generated per revolution

Distance from resonance

Where there is considerable oscillation generated, the resonance can be placed outside the operating speed range by the appropriate selection of the coupling torsional stiffness. The following applies for the required resonance distance:

$$\frac{nB}{nR} = 1{,}5 \ldots . 2$$

Passing through resonance

The permissible max. torque TKmax must not be exceeded while running through the resonance.
Factors of influence:
generating torque
drive side T_{Ai} Nm
load side T_{Li} Nm
Resonance factor V_R (Table A 1.5)

Drive side oscillation generation

$$T_{Kmax} \geq M_A \cdot T_{Ai} \cdot V_R \cdot S_Z \cdot S_t \text{ Nm}$$

Load side oscillation generation

$$T_{Kmax} \geq M_L \cdot T_{Li} \cdot V_R \cdot S_Z \cdot S_t \text{ Nm}$$

Continuously oscillating torque

For the operating frequency, the oscillating torque must be compared with the permissible continuously oscillating torque of the coupling. The continuously oscillating torque existing is dependant upon the amplifying factor outside the resonance.
Amplifying factor V outside the resonance.

approximation formula: $V \approx \frac{1}{|1 - (n/n_R)^2|}$

Drive side oscillation generation

$$T_{KW} \geq M_A \cdot T_{Ai} \cdot V \cdot S_t \cdot S_f \text{ Nm}$$

Load side oscillation generation

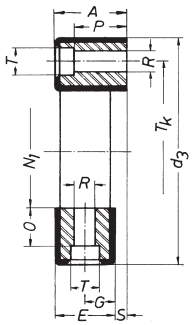
$$T_{KW} \geq M_L \cdot T_{Li} \cdot V \cdot S_t \cdot S_f \text{ Nm}$$

Frequency factor S_f (Table A 1.2)
We shall be pleased to carry out torsional vibration calculations for you in our offices.

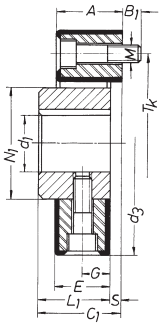
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Dimensions, Basic Design Types 0, 1, 2, 0-S, 1-S, 2-S.

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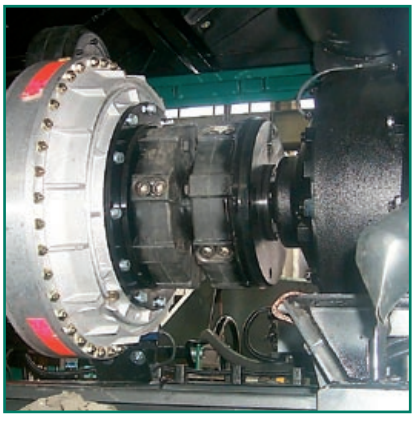
Centaflex	d_1 min.	d_1 max.	d_2 min.	d_2 max.	d_3	A	B	B_1	C_1	E	G	L_1	L_2	L_3	M	N_1	N_2	S	TS
1	8	19	8	25	56	24	7	7	26	22	11	24	24	50	M 6	30	36	2	10
2	10	26	12	38	85	24	8	8	32	20	10	28	28	60	M 8	40	55	4	14
4	12	30	15	45	100	28	8	8	34	24	12	30	30	64	M 8	45	65	4	14
8	12	38	18	55	120	32	10	10	46	28	14	42	42	88	M 10	60	80	4	17
12	12	38	18	55	122	32	10	10	46	28	14	42	42	88	M 10	60	80	4	17
16	15	48	20	70	150	42	12	12	56	36	18	50	50	106	M 12	70	100	6	19
22	15	48	20	70	150	42	12	12	56	36	18	50	50	106	M 12	70	100	6	19
25	15	55	20	85	170	46	14	14	61	40	20	55	55	116	M 14	85	115	6	22
28	15	55	20	85	170	46	14	14	61	40	20	55	55	116	M 14	85	115	6	22
30	20	65	25	100	200	58	16	16	74	50	25	66	66	140	M 16	100	140	8	25
50	20	65	25	100	200	58	16	16	74	50	25	66	66	140	M 16	100	140	8	25
80	20	65	25	100	205	65	16	16	75.5	61	30.5	66	66	141.5	M 16	100	140	4	25
90	30	85	30	110	260	70	19	20	88	62	31	80	80	168	M 20	125	160	8	32
140	30	85	30	110	260	70	11	20	88	62	31	80	80	168	M 20	125	160	8	32
200	35	105	35	110	300	80	11	20	102	72	36	94	90	192	M 20	145	160	8	32
250	40	115	40	130	340	85	11	20	108	77	22.5 54.5	100	100	208	M 20	160	195	8	32
400	40	120	40	140	370	105	25	28	135	95	28.5 66.5	125	125	260	M 24	170	200	10	45

Larger sizes up to 1250 Nm are available, please consult us.

Typical examples of application for CENTAFLEX-couplings

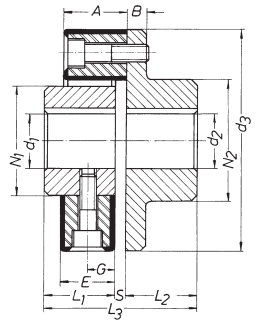




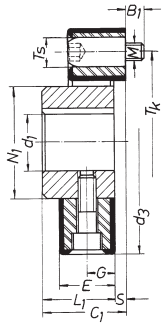


The CENTAFLEX couplings have been proven in many areas of mechanical engineering. The major area of application lies with diesel driven stationary and mobile equipment as well as a very wide range of industrial applications. The photographs illustrate some typical examples of application:

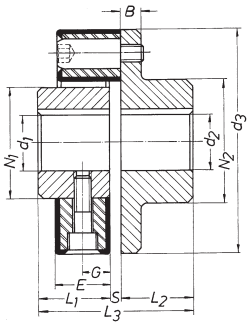
2



1-S

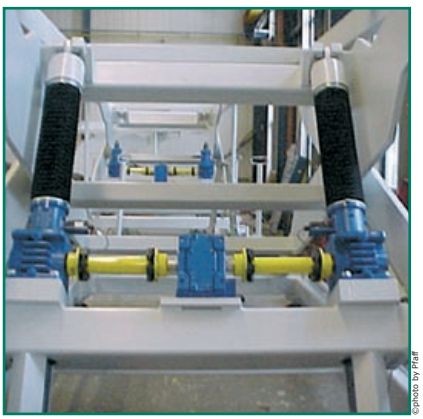


2-S

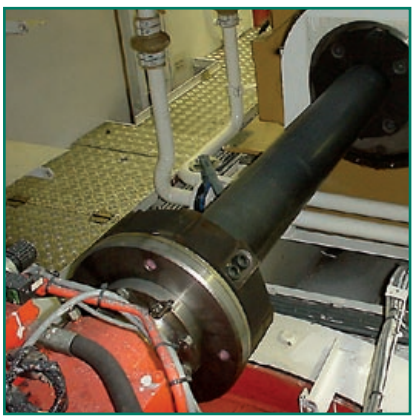


T	R	P	O	TK/Division	Weight [kg]					Mass moment of Inertia [kg·cm²]					Centaflex
					Type 0	Type 1	Type 2	Type 1/S	Type 2/S	Type 0	Type 1	Type 2	Type 1/S	Type 2/S	
10.5	6.5	18	5	44/2x180°	0.06	0.21	0.47	0.24	0.49	0.35	0.75	1.6	0.86	1.7	1
13.5	8.5	12	14.2	68/2x180°	0.15	0.46	1.06	0.49	1.09	1.25	2.5	7.3	3.3	8.1	2
13.5	8.5	17	18.5	80/3x120°	0.21	1.31	2.31	0.70	1.70	3.3	5.0	11.3	6.5	12.8	4
16.5	10.5	20.5	20.5	100/3x120°	0.32	1.35	3.45	1.44	3.54	7.0	15.0	41.0	18.6	44.6	8
16.5	10.5	20.5	20.5	100/4x90°	0.35	1.45	3.55	1.56	3.66	8.4	18.2	44.2	20.0	46.1	12
18.5	12.5	23.5	25.2	125/3x120°	0.65	2.28	6.16	2.33	6.21	23.4	42.5	118.8	49.1	125.4	16
18.5	12.5	23.5	25.2	125/4x90°	0.70	2.52	6.42	2.62	6.62	26.6	50.4	126.5	70.2	146.3	22
21.5	14.5	26.0	27.0	140/3x120°	0.84	3.59	9.31	3.77	9.49	50.2	90.7	215.0	102.7	227.0	25
21.5	14.5	26.0	27.0	140/4x90°	0.95	3.79	9.51	4.05	9.76	55.6	102.4	247.8	113.2	258.5	28
24.5	16.5	34.5	34.5	165/3x120°	1.43	5.66	15.21	6.02	15.57	102.0	200.0	545.5	220.4	565.9	30
24.5	16.5	34.5	34.5	165/4x90°	1.60	6.04	15.60	6.50	16.05	104.0	205.0	550.5	253.4	598.9	50
24.5	16.5	34.5	34.5	165/4x90°	2.10	6.85	16.60	7.25	17.00	131.8	240.3	585.5	263.9	609.1	80
30.5	20.5	45.5	47.0	215/3x120°	3.30	11.55	28.67	12.23	29.35	450.0	657.5	1630.1	759.2	1731.8	90
30.5	20.5	45.5	47.0	215/4x90°	3.65	12.33	29.45	13.22	30.36	572.0	770.0	1742.6	873.0	1845.6	140
30.5	20.5	44.5	45.5	250/4x90°	5.75	13.13	33.16	14.07	34.11	1356.0	1598.0	3050.0	1686.0	3129.0	200
30.5	20.5	60.0	59.0	280/4x90°	7.10	18.98	44.42	20.01	45.44	1754.0	2404.0	5264.0	2529.0	5389.0	250
42.5	24.5	72.0	77.0	300/4x90°	11.25	26.58	57.23	29.34	59.95	3380.0	4485.0	9130.0	4683.0	9328.0	400



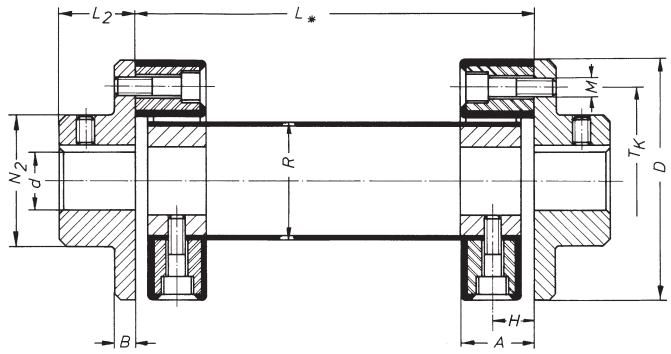


©photo by Pfaff

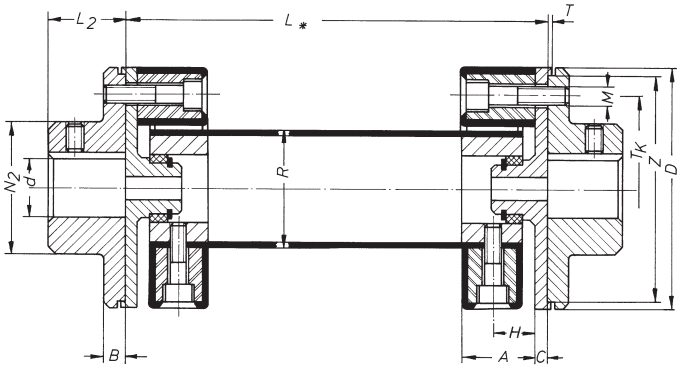


Boat drives, mechanical conveying and handling, agricultural machinery, front power take-off on diesel engines for the most varied applications, lifting elements or platforms.

CENTAFLEX
Universal Joint Shafts



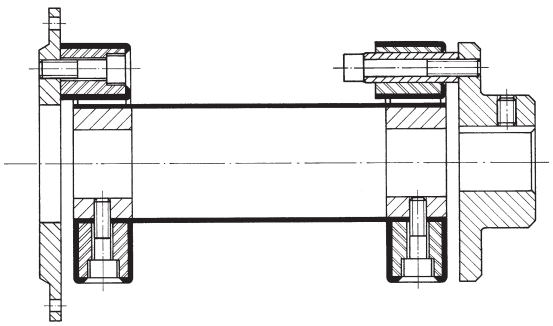
G



GZ

Size	TKN [Nm]	A	B	C	D	d Vorb.	d max.	H	L_2	N_2	R	T	T_K	M	Z^{H8}
1	10	24	7	5	56	8	25	13	24	36	30	1.5	44	2 x M6	52
2	20	24	8	5	85	12	38	14	28	55	40	1.5	68	2 x M8	80
4	50	28	8	5	100	15	45	16	30	65	45	1.5	80	3 x M8	95
8	100	32	10	5	120	18	55	18	42	80	60	1.5	100	3 x M10	115
12	140	32	10	5	122	18	55	18	42	80	60	1.5	100	4 x M10	115
16	200	42	12	5	150	20	70	24	50	100	70	1.5	125	3 x M12	145
22	275	42	12	5	150	20	70	24	50	100	70	1.5	125	4 x M12	145
25	315	46	14	5	170	20	85	26	55	115	85	1.5	140	3 x M14	165
28	420	46	14	5	170	20	85	26	55	115	85	1.5	140	4 x M14	165
30	500	58	16	5	200	25	100	33	66	140	100	1.5	165	3 x M16	195
50	700	58	16	5	200	25	100	33	66	140	100	1.5	165	4 x M16	195
80	900	65	16	5	205	25	100	34.5	66	140	100	1.5	165	4 x M16	195
90	1100	70	19	5	260	30	110	39	80	160	125	1.5	215	3 x M20	250
140	1700	70	19	5	260	30	110	39	80	160	125	1.5	215	4 x M20	250
200	2400	80	19	10	300	35	110	44	90	160	145	1.5	250	4 x M20	290
250	3000	85	19	10	340	40	130	46	100	195	160	1.5	280	4 x M20	330
400	5000	105	25	10	370	40	140	57	125	200	170	1.5	300	4 x M24	360

Please state dimension „L" upon order.



The CENTAFLEX universal joint shafts are proven, extremely simple, versatile and torsionally highly elastic.
They dampen noise, torsional oscillation and shock.
They compensate for considerable axial, radial and angular misalignment.
The lengths are not standardised, but made individually in accordance with customers' requirements; but they are, nonetheless very moderately priced. The connecting parts (hubs) can also be adapted to suit requirements.
CENTAFLEX universal joint shafts require no maintenance whatsoever; the centre part can be removed radially (transversely) without displacing the coupled machines.

Design G

This is the simplest design type; the centre part is centered only by the CENTAFLEX elements. Suit-able for short and medium lengths and for speeds up to approx. 1500 rpm. Please also see the diagram on page 11 for additional information.

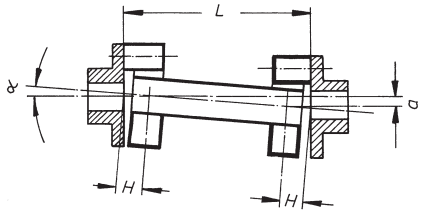
Design GZ

Here, the centre assembly is accurately located on the centering plate and maintenance free bearings. This design is suitable for long lengths and/or high speeds. The centre assembly can be withdrawn without disturbing the driving or driven hubs. In cases of doubt, the decision whether to chose design G or GZ should be left to us, since a clear demarcation is difficult.

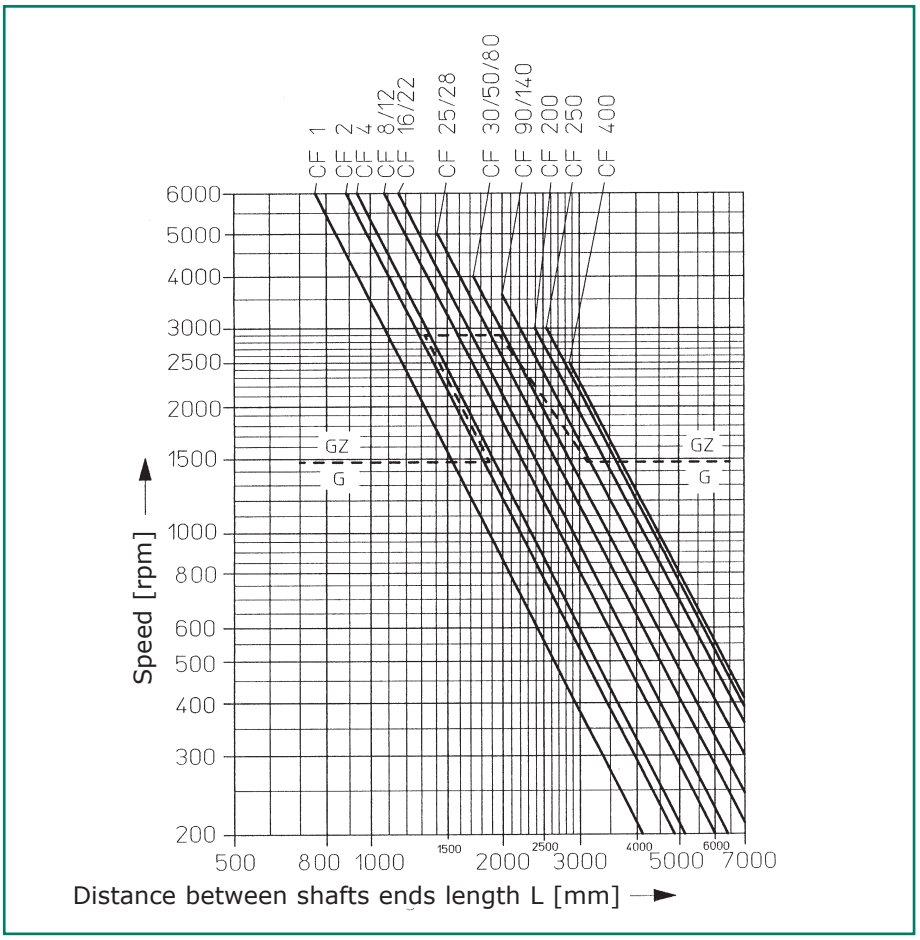
The sectional drawing on the left shows one of the many special designs, with an adaptor plate for a diesel engine and with extensive axial movement permitted by means of long socket bolts.

Selection of CENTAFLEX Universal Joint Shafts:

Torque capacity is in accordance with the table on page 6.
Due to the use of two CENTAFLEX elements, the values of axial elasticity and for the angle of twist are doubled, the values for torsional stiffness and the axial spring values are halved.
Permissible angular misalignment is shown in diagram A 1.7 and the following formula:
Design G:
$a = \tan \alpha \ (L - 2H)$
a = parallel offset (mm)
Design GZ:
$a = \tan \alpha \ [L - 2 \ (H+C)]$
L; H and C as in dimension table.



The maximum permissible length for the centre part is dependant on the speed and can be found in the diagram on the right.

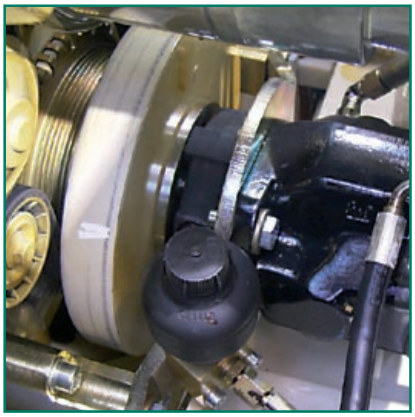


The dotted line gives an approximate indication as to whether type G or GZ should be used on short shafts, but only in respect of speed, not of length. We recommend that all shafts regardless of length are of the GZ type if they run at speeds above those indicated by the dotted line.

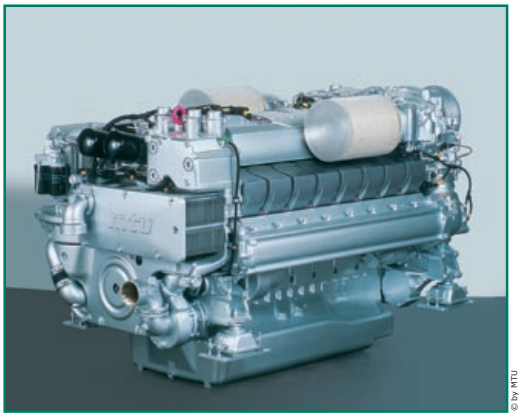
Examples of typical applications: Screw Jacks, compressors, engine test benches
(Size 16 GZ; n= 7200 rpm).
Other applications: Boat drives, diesel drives for centrifugal pumps, air conditioning, construction machinery, general mechanical engineering.



CF-A-400-G with carbon fibre tube on HMS Albion.



CF-A in marine application.



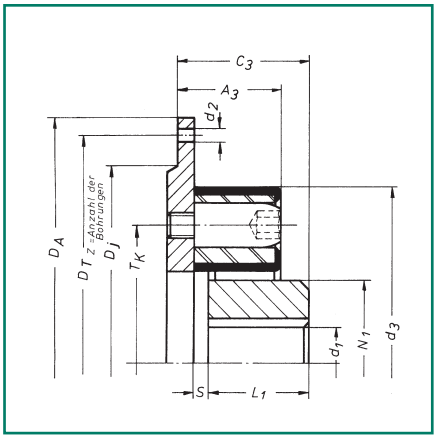
CF-A-16 double in the PTO for hydraulic pumps on MTU engine Series 2000 Common Rail.

© by MTU

CENTAFLEX-couplings for diesel engines

This is the central point of application for CENTAFLEX. We supply suitable CENTAFLEX couplings for practically any diesel or petrol engine, to suit the flywheel side as well as for the power take-off at the front end of the crankshaft, e.g. Caterpillar, Detroit, Deutz, Dorman, Ford, Gardner, Hatz, Leyland, Lister, MAN, Perkins, Petter, Rolls Royce, VW and many others.
The number of the existing assembly drawings is so great that it is not possible to include them in a brochure.
The type most extensively used for diesel engine flywheels is SAE standard J620. The dimensional sheet shows appropriate couplings for the plug-in (blind fitting) design (e.g. for generator drives).
For Deutz and Perkins engines, flywheels with tapped holes are available for CENTAFLEX couplings. This enables couplings to be fitted direct - without and adaptor plate- with types 1 and 1-S, and results in particularly compact and economically priced couplings.
Please ask for our detailed offer for your specific requirements.

Type 3-S-SAE



Size	d1 min.	d1 max.	d3	A3	C3	L1	N1	S	TK / Division	Appropriate SAE-Flange
8	12	38	120	38	52	42	60	4	100 / 3 x 120°	6½" 7½"
16	15	48	150	48	62	50	70	6	125 / 3 x 120°	6½" 7½" 8"
25	15	55	170	52	67	55	85	6	140 / 3 x 120°	8"
25	15	55	170	56	71	55	85	6	140 / 3 x 120°	10"
30	20	65	200	68	84	66	100	8	165 / 3 x 120°	10" 11½"
50	20	65	200	68	84	66	100	8	165 / 4 x 90°	10" 11½"
90	30	85	260	80	98	80	125	8	215 / 3 x 120°	(10") 11½" 14"
140	30	85	260	80	98	80	125	8	215 / 4 x 90°	(10") 11½" 14"
200	35	105	300	90	112	94	145	8	250 / 4 x 90°	11½" 14" 16"
250	40	115	340	95	118	100	160	8	280 / 4 x 90°	11½" 14" 16"
400	40	120	370	115	150	125	170	10	300 / 4 x 90°	14" 16" 18"

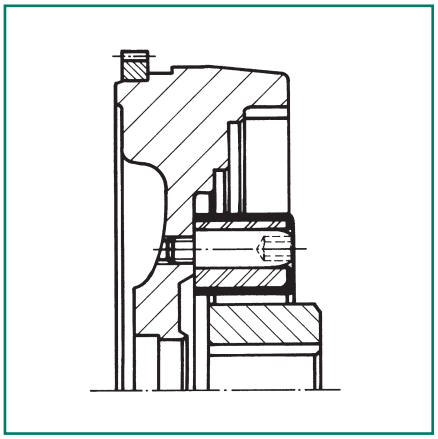
1 Deutz F3-6L912 available for engines 208, 210, 511, 912, 913 and 413

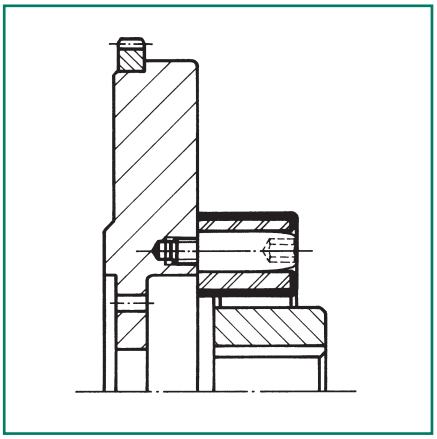
2 Perkins 3, 4, 6 and 8 cylinders Perkins part-no. 31221322

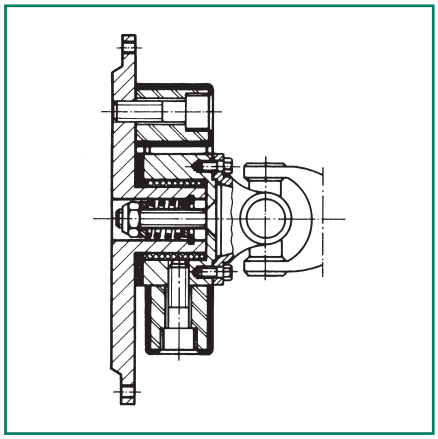
3 Intermediate couplings for universal joint shafts.

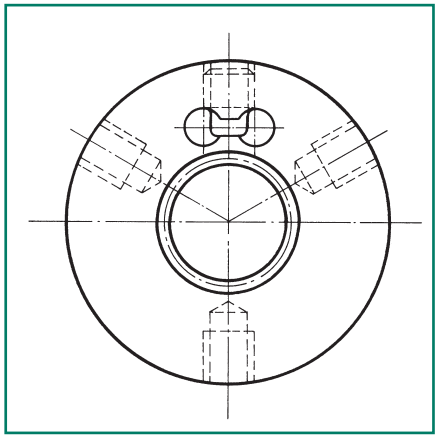
Nominal SAE Size	DA f7	DT	Dj	d2	Z*	weight [kg]	Mass moment of Inertia J [kgcm²]
6½"	215.9	200.02	180	9	6	2.60	147
7½"	241.3	222.25	200	9	8	3.25	228
8"	263.52	244.47	220	11	6	3.90	328
10"	314.32	295.27	270	11	8	7.20	966
11½"	352.42	333.37	310	11	8	9.60	1584
14"	466.72	438.15	405	13	8	19.40	5421
16"	517.5	489	450	13	8	24.60	8272

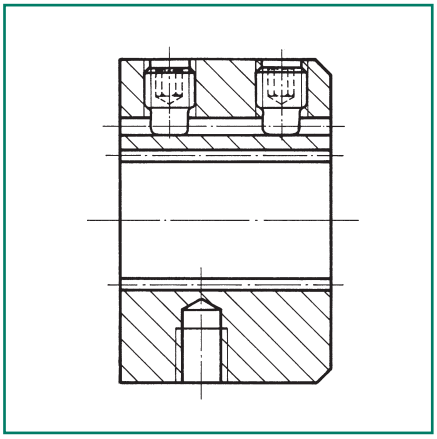
Example of coupling reference CF 30-3-S-SAE 10 * Z = No. of holes

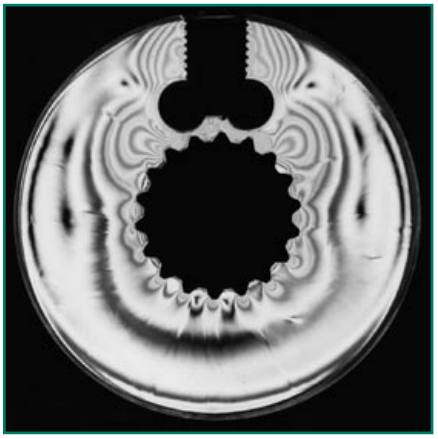












Path of clamping force

CENTALOC®
Clamping Hub

It is well known that all splined steel connections, which are not free from play tend to wear due to "hammering" and fretting corrosion.

The shaft of hydrostatic pumps for mobile equipment nearly always have spline or involute profiles. The unavoidable play, due to the manufacturing tolerances on the flanks of these profiles between shaft and hub, permits minor relative movements in operation leading to wear. Even hubs and shafts made from high quality and hardened steels cannot solve this problem in its essence, but can at best only reduce the wear. The problem can be solved effectively only when the connection between shaft and hubs is made **free from play.**
With this objective in mind, we developed the CENTALOC clamping hub. This new type of clamp hub has a slot arranged tangentially to the bore. On the inner part of this slot, strong forces are applied through one or more set screws. The hub is radially pressed inwards in this area, i.e. pressed firmly against the shaft profile. The opposing reaction forces of the clamping screw are diverted within the hub causing it to be pressed firmly against the shaft. The hub thus becomes firmly locked against the shaft around its diameter i.e. **absolutely free from play**. It is at the same time also locked axially. The incidental minor deformations of the hub occur within the elastic limit and there is no permanent deformation. After slackening the clamping screws, the hub can easily be dismantled or refitted. This procedure can be repeated as often as may be required.
Use of the CENTALOC clamping hub does not present any difficulty at the assembly stage with the blind fitting design type S, H or X. When assembling for example a motor and pump, the cylindrical coupling hub is simply mounted on the pump shaft and locked prior to motor and pump being assembled together. The coupling housing does not, therefore, require any access holes.

The CENTALOC clamp hub can be selected for all design types of CENTAFLEX. The clamping should preferably be arranged in the cylindrical inner hub; but it is also possible to manufacture flanged hubs with the clamping facility.

The connecting details and external dimensions of the CENTAFLEX coupling are not altered by the CENTALOC clamping facility.

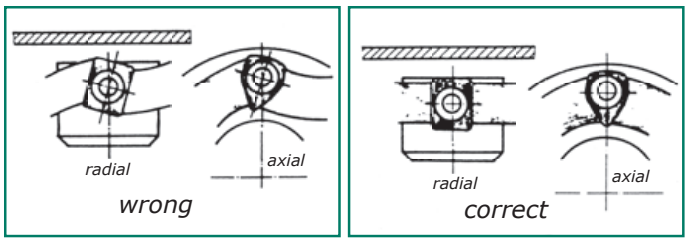
The patented CENTALOC clamp hub has already been proved in thousands of hard applications. It is recommended by major manufacturers of hydraulic pumps. This is evidence of the fact that you can expect real solutions to your problems for CENTA power transmission engineers.

® CENTALOC is a registered trademark of CENTA Antriebe

Fitting instructions for CENTAFLEX-A-couplings

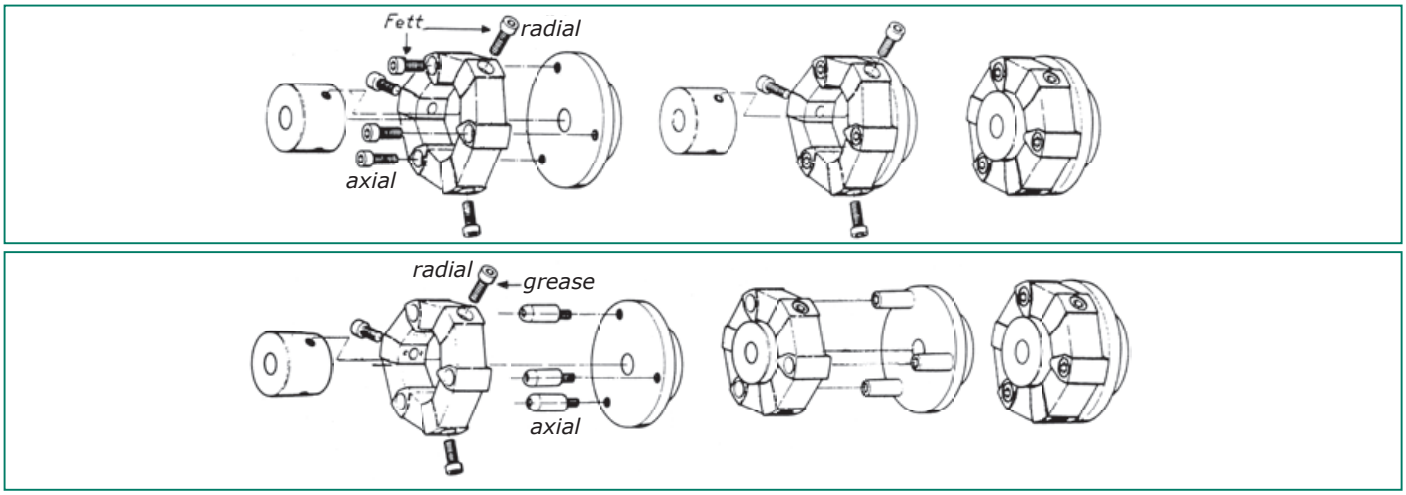
with highly elastic rubber elements. Important notes - observe strictly

The radial and axial screws connecting the rubber element to the hubs must all be tightened to the torque given in the table below, using a **torque wrench**.
Tightening with a torque wrench is par-ticularly important withthe larger sizes. Tightening "by feel" will not do, as experience has proved the tightening torques in such cases are far too low.
Tightening torques which are too low will inevitably lead to slackening of the screws in service and consequently to the destruction of the coupling.
Ensure that on tightening the screws, the aluminium bushes in the rubber part are not twisted at the same time, but sit straight.
In order to reduce friction between the screw head and the aluminium part, a small amount of **grease** should be applied under the head of the screw before fitting. If necessary, use a suitable tool for applying counter pressure on the element to **prevent twisting of the rubber part** during tightening of the screws. This is particularly important with the **radial screws**, otherwise the cylindrical faces between aluminium insert and hub will not engage on the full area, but only on two corners. This will inevitably lead to slackening of the screws and subsequent destruction of the coupling. If the coupling is supplied in a pre-assembled state, do not dismantle it, but fit in this condition.



CENTAFLEX size	Screw ISO 4762 (DIN912)	Anzugsdrehmoment [Nm]	[in/lbs]
1	M 6	10	90
2	M 8	25	220
4	M 8	25	220
8/12	M 10	50	440
16/22	M 12	85	750
25/28	M 14	140	1250
30	M 16	220	1950
50/80	M 16	220	1950
90/140	M 20	500	4450
200/250	M 20	500	4450
400	M20/24	610/1050	5400/9300
600	M24/27	1050/1550	9300/13800
800	M 22	820	7300

Sequency of Assembly



Standard Design

Fith the hubs onto the shafts or the adaptor plate onto the flywheel.
Fit the rubber element to the flanged hub or flywheel, by means of **axial screws. This must be carried out before engaging the radial screws in the cylindrical hub.**
Push the shaft-mounted cylindrical hub inside the rubber element and then fasten the rubber element on it with radial screws. During this process, the rubber element is compressed radially and is pre-loaded for increased capacity.

Design S (plug-in or blind fitting type)

Fit the hubs onto the shafts or the adaptor plate onto the flywheel.
Fit the axial socket bolts on ot the flange hub or adaptor plate on the flywheel.
Position the element with the side ha-ving the rubber free face of the axial aluminium inserts towards the flange hub and, using the radial screws, mount it on the cy-lindrical hub. During this process, the rubber element is pulled together radially and receives its preload. Then, push the coupled elements together and in doing so, carefully slide the coupling with light axial pressure onto the socket bolts. The rubber element is subjected to a little more radial compression by the socked bolts, and the pre-load is thus increased. The axial bores in the rubber element should be smeared lightly with grease beforehand to allow the socket bolts to slide easily in the inserts.

Use only the "Inbus Plus" screws pro-vided which are marked on the threads with a micro-encapsulated adhesive which locks the screw in the thread and secures them reliably against slackening. For adequate effect, the hardening period for this adhesive after bolting up is approxi-mately 4-5 hours at room temperature (20°C). The coupling should not be operated before this period has elapsed.
The adhesive will be fully hardened after 24 hours. Higher temperatures will speed up the hardening process, at 70°C (using a hot air blower), for instance, the hardening will take only 15 minutes. Inbus Plus is tem-perature proof between -80° and +90°C and the screws can be reused up to 3 times max. Any adhesive stripped off during bolting up will settle between the hub and the aluminium part, but this will have a beneficial effect in that it enhances the friction grip between these parts.
Note: Anaerobic adhesives (such as Loctite, Omnifitic etc.) will loosen the adhe-sion of the rubber and the insert and will consequently destroy the coupling.
Such adhesives should therefore be avoided if possible. Where the use of this adhesive is unavoidable apply it very sparingly so that no surplus adhesive will moisten the rubber.
We cannot accept any complaints concerning rubber parts which have become defective through the action of adhesives not supplied or recom-mended by us.
The coupling is completely maintenance-free and does not require any lubrica-tion. Splashing with oil and similar substan-ces should be avoided, since natural rubber is not oil-resistant.
However occasional minor contact with oil or grease is not harmful as this oil will be thrown off during rotation of the coupling.

CENTALOC clamping hub

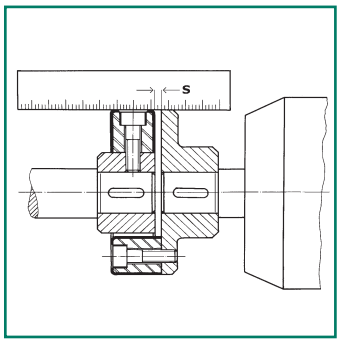
If the hubs are equipped with CENTALOC clamping (see page 13), the clamping screws must be tightened at least to the following tightening torques:

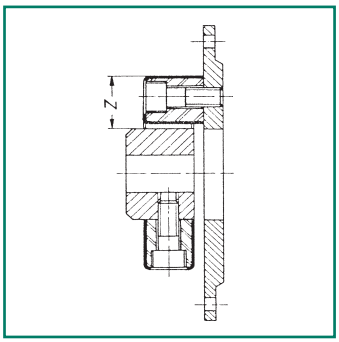
After assembly, the coupling should be carefully aligned if the coupled elements are not already in good alignment by virtue of being spigot located. In the interest of a long service life of the coupling, the higher the speed, the more meticulous should the alignment be. In design type 2, the alignment can very easily be checked with a straight edge. The outer diameter of the flange hub must be flush with the outer diameter of the rubber element in those areas where the radial screws sit: i.e. in different radial positions.
In design types 1 and 3 the distance "Z" must be measured at all axially bolted points of the rubber element (2, 3 or 4 points depending on the size) and must be set as accurately as possible to the value "Z" quoted in the table below.
For spigot located components there is no need to align the coupling.

Position of cylindrical hubs:

The long end of the cylindrical hub, usually identifiably by a chamfer, is normally as shown in the drawing below. However, in some special applications, the hub must be reversed. When in doubt, install as shown in the relevant installation drawing.

Clamp Screw	Tightening torque [Nm]
M 10	30
M 12	50
M 14	70
M 16	120
M 20	200





Installation table: Screw fastener details, dimension "S" between the hubs and dimension "Z".

CENTAFLEX-A size	Standard Design	Type „S"		Universal joint shaft G	Universal joint shaft GZ/GB		Dimension „S" [mm]	Dimension „Z" [mm]
		Special Bolt	Screws		radial	axial		
1	M6x10 M6x25	M6	M6x10	M6x10 M6x25	M6x10	M6x30	2	13
2	M8x20	M8	M8x20	M8x20	M8x20	M8x25	4	22,5
4	M8x25	M8	M8x25	M8x25	M8x25	M8x30	4	27,5
8/12	M10x30	M10	M10x30	M10x30	M10x30	M10x35	4	30/31
16/22	M12x35	M12	M12x35	M12x35	M12x35	M12x40	6	40
25/28	M14x40	M14	M14x40	M14x10	M14x10	M14x45	6	42,5
30	M16x50	M16	M16x50	M16x50	M16x50	M16x55	8	50
50/80	M16x50	M16	M16x50	M16x50	M16x50	M16x55	8/4	50/52,5
90	M20x65	M20	M20x65	M20x65	-	M20x70	8	67,5
140	M20x65	M20	M20x65	M20x65	-	M20x70	8	67,5
200	M20x65	M20	M20x65	M20x65	M20x65	M20x80	8	77,5
250	M20x80	M20	M20x80	M20x80	M20x80	M20x90	8	90
400	M24x100 M20x100	M24	M20x100	M20x100	M20x100	M24x100	10	100
600	M24x120 M27x120	-	-	M24x100 M27x120	M24x120	M27x130	15	135
800	M22x140 M22x140	-	-	M22x140	M22x140	M22x150	17	110


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