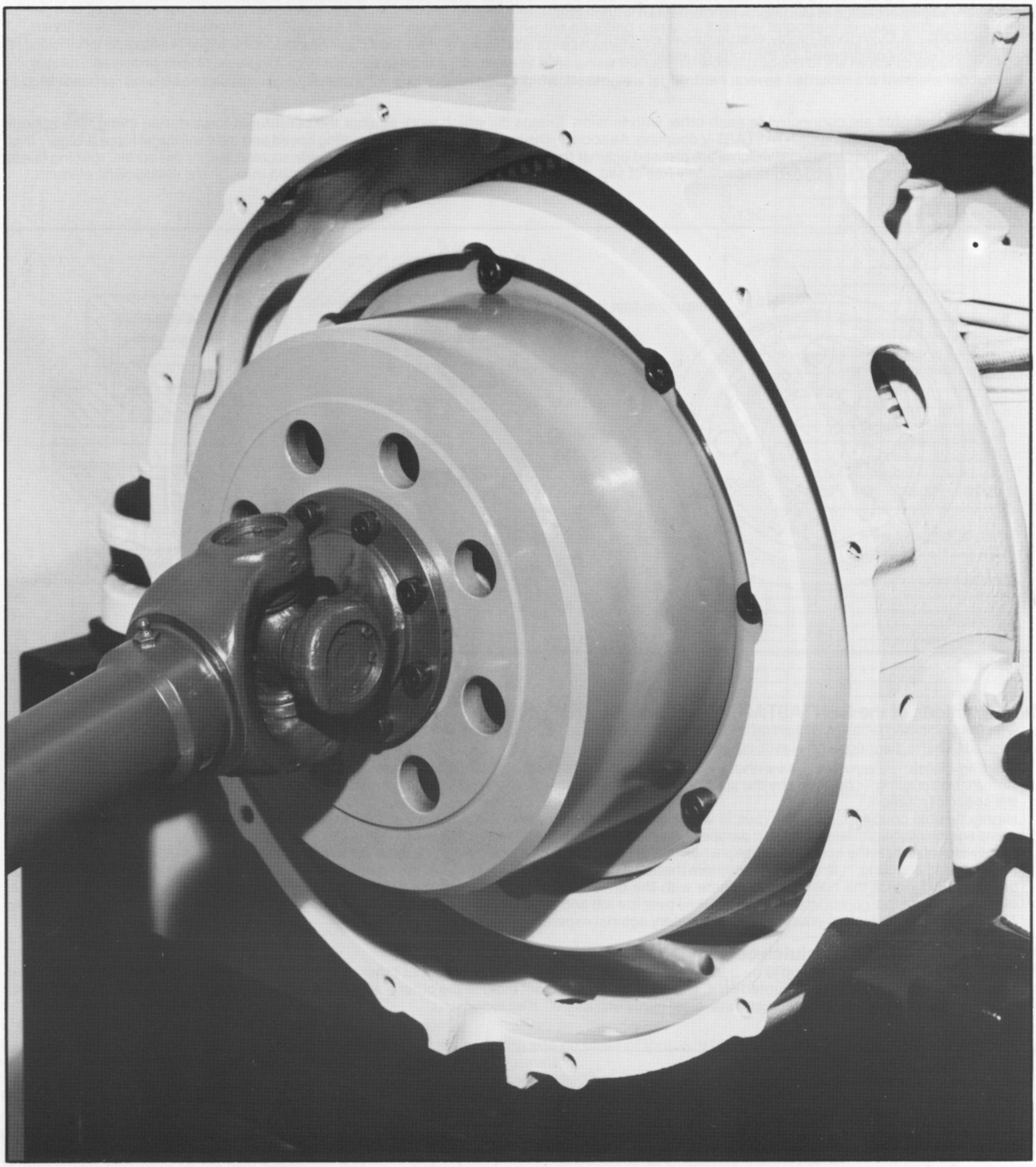


Centastart®-V

CENTA

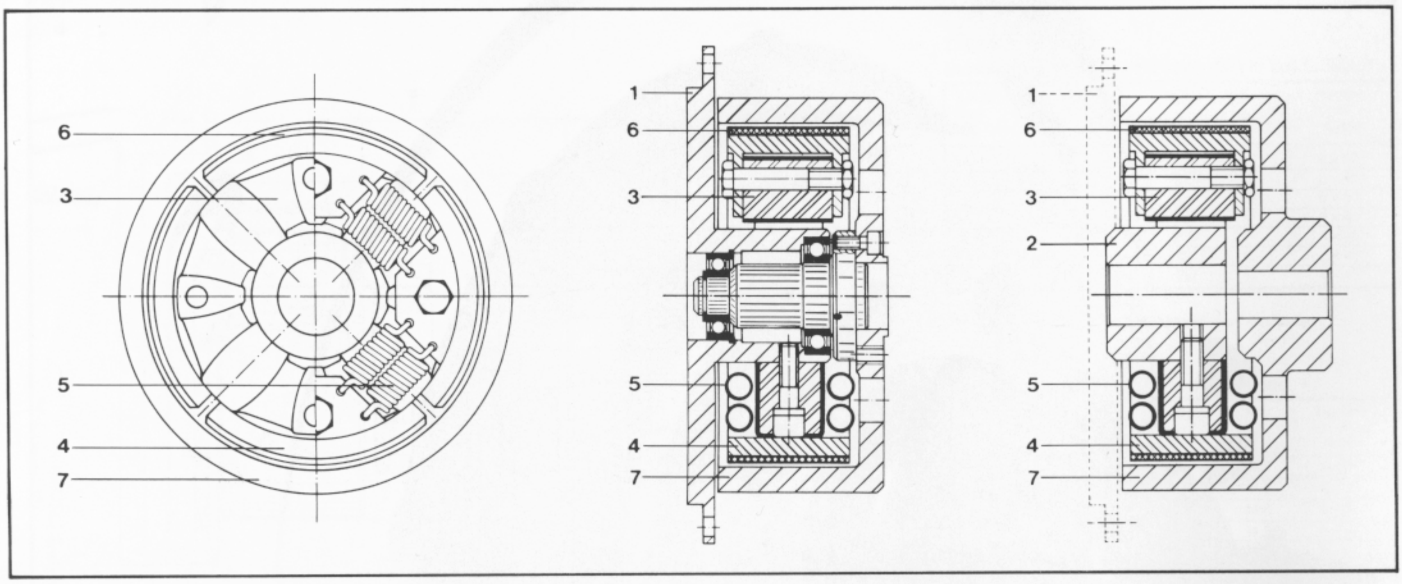
CENTASTART® series V clutch couplings

CENTASTART® -V is a combined clutch and coupling, operated by centrifugal force, combining excellent characteristics with compact and rigid construction, a special design of the improved 'Centastart' clutch coupling.

Construction: A Cylindrical highly elastic rubber element (3) is connected to the driving hub (2) of the driving flange (1) by a set of bolts. The rubber element is pre-compressed, by the bolts on assembly.

On this rubber element are mounted several centrifugal weights (4), which are provided with high quality wear resistant and heat resistant friction linings (6).

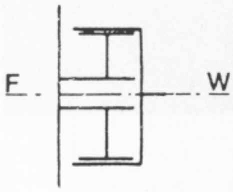
The centrifugal weights are connected to each other with tension springs (5), which work against the centrifugal force during idling. The springs determine the idling speed of the CENTASTART-V coupling. As soon as the speed is higher than the idling speed and the centrifugal force is bigger than the force of the springs, the centrifugal weights are pressed against the output housing (7), and this is slowly accelerated. At the normal running speed and the normal load the CENTASTART is absolutely free of slip, and the driving and driven side are connected through the elastomeric element.



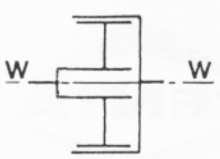
The 5 functions of the CENTASTART-V system: Depending on the type you will use in your machinery, the CENTASTART-V can provide you with the combined features of several couplings, and can replace other power transmission elements, (such as friction plate clutches, housings, intermediate shafts, bearings and elastic couplings).

1. Starting clutch: the motor runs without load until engaging speed is reached. At normal speed it runs absolutely slip free.
2. Automatic coupling: operated by the speed of rotation. It is possible to connect or disconnect the driving and driven machine by only changing the speed of rotation.
3. Highly flexible coupling: in the types in which no ball bearings are mounted you have all features of a highly flexible coupling, so you can compensate misalignments and also dampen vibration between the driven and driving machines.
4. Safety-slip-clutch: the coupling will slip when you have an overload since the torque to be transmitted depends on the speed of rotation.
5. Free running coupling: In some drives where there is a requirement to drive installations with 2 motors (stand-by sets) the CENTASTART-V can be used to connect the combustion engine with the driven machine. Normally the machine is driven by an electrical motor but in case of electrical failure the combustion engine takes over the job and will be connected automatically by the CENTASTART-V to the driven machine. These features can protect your valuable machinery against expensive breakdown.

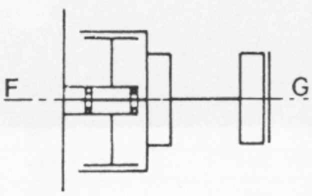
Types of CENTASTART-V clutch couplings.
The CENTASTART-V clutch coupling is built to provide several types of installation so that other power transmission components such as floating shafts and universal joints can be mounted on it. The different types do not include the other power transmission parts, but are ready to connect with them. We can provide the cardan shafts and universal joints etc. as well, if so requested.



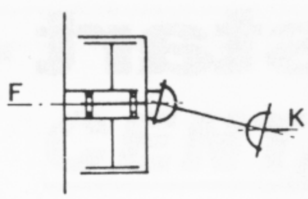
Type F·W
The input side of the clutch is in the form of an adaptor plate that can be directly bolted to the flywheel of an engine. This adaptor plate can be produced to fit many types of engines, (S.A.E.) standard J620 and others).
The output side of the coupling can be bored and keywayed or splined to suit the driven machine (pumps, fans, electric motors, speed reducers etc.). This type of clutch includes all the advantages of a highly flexible coupling and can compensate for misalignment as indicated in table 1.3



Type W·W
This type is similar to Type F·W with the exception of the input side which is in the form of a hub that can be mounted on free shaft extensions.



Type F·G
The input side is mounted as indicated for Type F:W. The output side is again mounted on substantial sealed bearings and is combined with a floating shaft incorporating two Centaflex elastomeric couplings. This type produces a silent, maintenance free, highly flexible floating shaft and can accept upto 2°-3° angular misalignment. The length of the floating shaft can be varied to suit requirements. This coupling provides excellent torsional damping characteristics.



Type F·K
The input side of the clutch is mounted as indicated for Type F·W. The output side is carried on substantial sealed bearings mounted on an internal stub shaft. Shafts with universal joints, etc. can be mounted direct to the output side of the clutch. The elastomeric element in the clutch dampens vibration and thus provides extended life for joints and floating shafts. It is necessary for us to know the size and type of driven component so that the output flange on the clutch can be machined to make a suitable connection. (see table 2)

How to select CENTASTART® series V clutch couplings.

The coupling selection must take account of two factors:

a. The centrifugal force. The torque capacity is a result of this force increasing as a square of the speed, minus an amount due to the power of the springs.

b. The torque capacity of the rubber element. The torque to be transmitted by the rubber element T_{EL} is not dependant on the speed.
The permissible torque T_{EL} according to table 3 should always be greater than the motor torque. The torque capacity produced by the centrifugal force is higher as the speed increases and can exceed torque T_{EL} (figure 1). To understand this situation take idling speed n_E, coupling speed n_K and the torque and make a diagram like figure 1. At the intersection of the diagram of the motor torque T_M and the coupling torque T_K, the coupling is slip free (at speed n_K). Between the two speeds n_E and n_K the coupling can slip. It is very important to pass through this area as quickly as possible to avoid unnecessary wear of the friction material and heat generation. The difference between n_E and n_K should be 200-400 revolutions per minute. The value of n_K should be at least a minimum of 20% under the normal working speed of the motor to avoid slip and heat generation. The relation between speed and torque is shown in figure 1.

Fig. 1

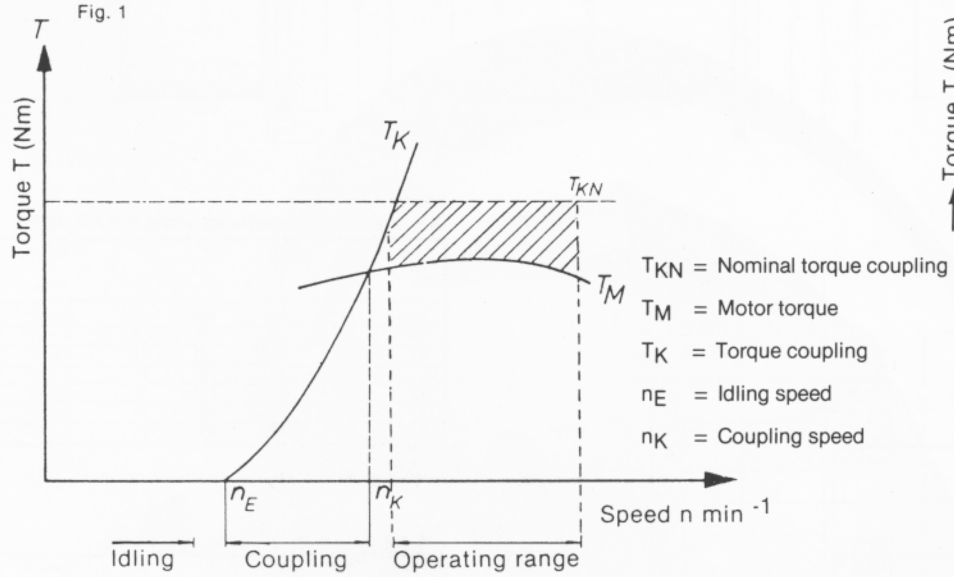


Fig. 2

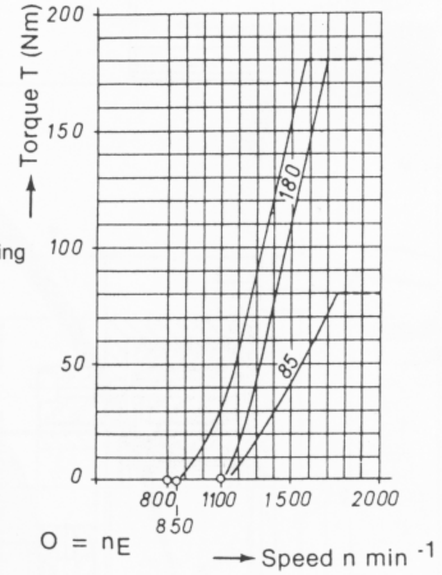


Fig. 3

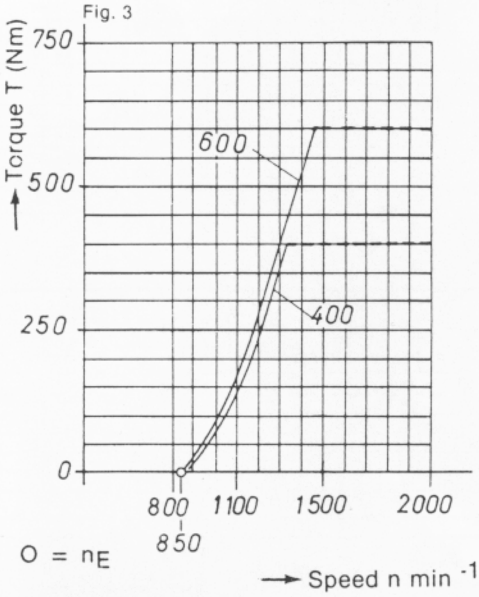
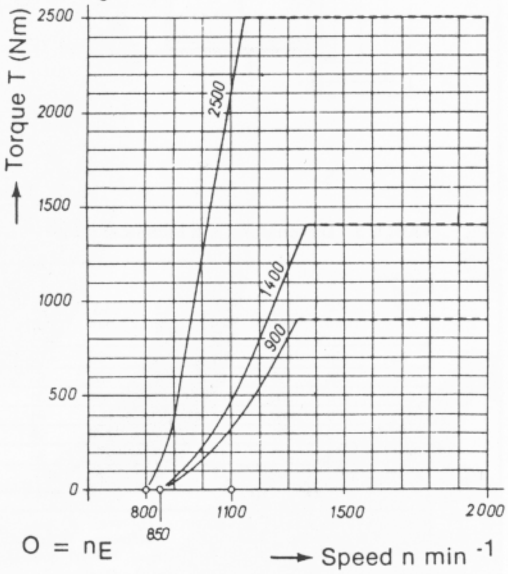


Fig. 4



Using data.

Using the data mentioned in figure 2-4 it is possible to select the coupling size on basis of torque. It is necessary to make a calculation of torsional vibration and we can make this for you. For this we need the following information:

a. motor type, number of cylinders and type (inline or V).
b. idling speed and working speed.
c. inertia of driven machine.
d. type of driven machine (hydraulic pump or generator etc.).

Idling Speeds.

The most usual idling speeds (n_E) are mentioned in table 3 and are chosen so that there is sufficient distance between idling and running speed of the combustion engine on which the various couplings could be mounted. Other idling speeds are possible but we advise you to try to make your first choice from table page 4.

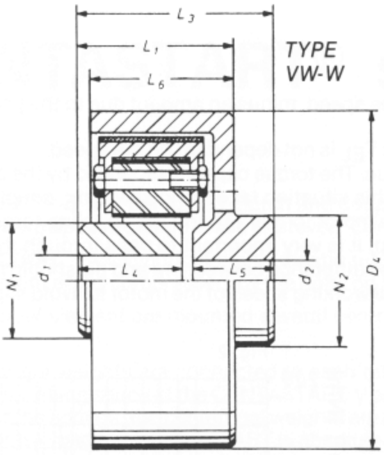
Sizes.

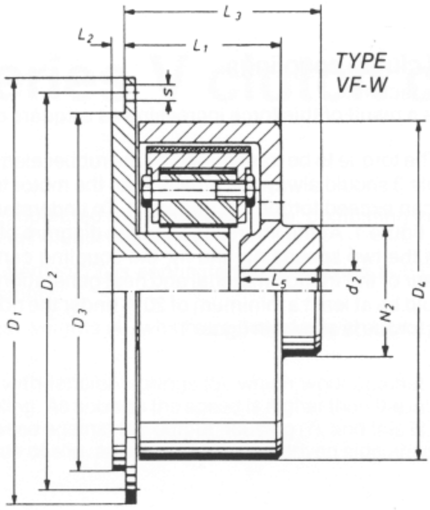
The range has 7 sizes, for torques from 85 Nm up to 2500 Nm. With these sizes it is possible to provide for combustion engines up to 750 kW (1000 hp). Larger and smaller types are possible and can be designed when quantities are required.

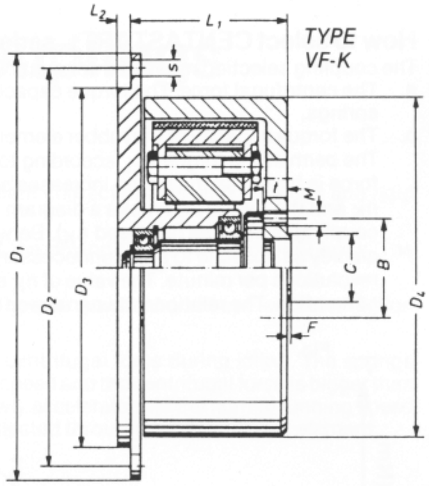
Maximum Speeds.

The maximum speed is determined by the material of the output housing. That is why you should always check your running speed with the maximum speed as mentioned in table 3, and order the correct material for the output housing.
(mat. GG × cast iron, mat. GGG = nodular cast iron)

Flywheel dimensions according to S.A.E. J620, see table 1, other flywheel mountings available.







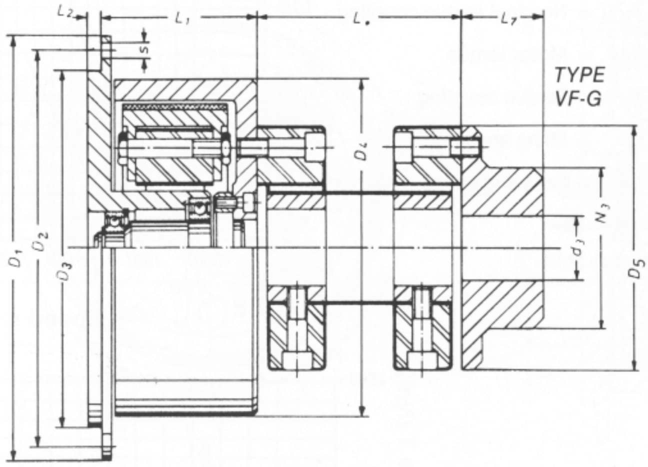


TABLE 1*
Dimensions for Flywheels according to S.A.E. J620.*

S.A.E. Size	D_1 f7	D_2 ± 0,2	D_3	S	Number of holes
6½	215,9	200	180	9	6 × 60°
7½	241,3	222,3	200	9	8 × 45°
8	263,5	244,5	220	11	6 × 60°
10	314,4	295,3	270	11	8 × 45°
11½	352,4	333,4	310	11	8 × 45°
14	466,7	438,2	400	13	8 × 45°
16	517,5	489	450	13	8 × 45°

*Mountings for other flywheel dimensions available.

TABLE 2 Universal Joints dimensions.

Flange size A	B ± 0,1	C f7	F	M	Number of holes
58	47	30	1,2	M 5	4 × 90°
65	52	35	1,5	M 6	4 × 90°
75	62	42	1,5	M 6	6 × 60°
90	74,5	47	2	M 8	4 × 90°
100	84	57	2	M 8	6 × 60°
120	101,5	75	2	M 10	8 × 45°
150	130	90	2,5	M 12	8 × 45°
180	155,5	110	2,5	M 14	8 × 45°
225	196	140	3	M 16	8 × 45°

TABLE 3 Dimensions and technical data.

Centa-start Size	D_4 mm	D_5 mm	L_1 mm	L_2 mm	L_3 mm	L_4 mm	L_5 mm	L_6 mm	L_7 mm	t mm	N_1 mm	N_2 mm	N_3 mm	d_1 max. mm	d_2 max. mm	d_3 max. mm	Universal Joints flange sizes	Floating shaft size
85	178	120	81	5	98	52	40	69	42	12	60	65	80	38	40	55	58/ 65/ 75	8
180	208	150	96	8	120	63	50	88	50	15	70	80	100	48	50	70	75/ 90/100	16
400	270	200	122	10	184	81	80	113	66	18	100	120	140	65	80	100	90/100/120	30
600	270	200	122	10	184	81	80	113	66	18	100	120	140	65	80	100	90/100/120	50
900	335	260	147	12	224	98	100	130	80	23	125	160	160	85	100	110	120/150/180	90
1400	335	260	147	12	224	98	100	130	80	23	125	160	160	85	100	110	120/150/180	140
2500	436	340	172	16	254	117	102	159	100	20	160	200	195	115	120	130	180/225	250

Centa-start size	Flange dimensions according to S.A.E. J620	Rubber size	Nominal Torque1) T_{KN} (T_{EL}) Nm	Dynamic Stiffness C_{Tdyn} 50 sh	Dynamic Stiffness Nm/rad 60 sh	Max. Torque2) T_K Max Nm	Vibratory Torque3) T_{KW} Nm	Standard Idling speed n_E r.p.m.	Max. GG Housing	Speed GGG Housing	Allowed Misalignment Axial K_A mm	Allowed Misalignment Offset4) k_R mm	Allowed Misalignment Angular K_W degree	Moment of inertia driven part. J Inner-part kgm²	Moment of inertia driven part. J Housing kgm²	Weights F-K kg	Weights F-G kg	Weights F-W driving part kg	Weights F-W driven part kg	Weights W-W driving part kg	Weights W-W driven part kg	L
85	6½"/7½"/8"	8	85	840	1200	280	40	1100	4000	5800	± 1	0,5	1	0,010	0,027	11,0	12,5	6,5	4,5	3,5	4,5	Maximum permissible length is dependant on coupling size and application. Please contact our engineering department.
180	7½"/8"/10"	16	180	1900	2800	560	80	850 1100	3300	5000	± 1	0,5	1	0,026	0,064	17,8	20,0	10,6	7,8	5,6	7,8	
400	10"/11½"	30	400	4200	6000	1400	200	850	2800	3800	± 1,5	0,5	1	0,095	0,185	41,0	46,0	24,0	21,0	13,0	21,0	
600	10"/11½"	50	600	11200	16000	2100	300	850	2800	3800	± 1,5	0,5	1	0,100	0,185	42,0	48,0	24,0	21,0	14,0	21,0	
900	11½/14"	90	900	10500	15000	3150	450	850	2100	3000	± 1,5	1	1	0,200	0,467	72,0	84,0	43,0	38,0	19,0	38,0	
1400	11½/14"	140	1400	25000	36000	4900	700	850	2100	3000	± 1,5	1	1	0,278	0,467	75,0	87,0	47,0	38,0	24,0	38,0	
2500	14"/16"	250	2500	45500	65000	8750	1250	800	1600	2650	± 2	1	1	0,949	1,865	152,0	184,0	90,0	72,0	58,0	72,0	

1) T_{KN} nominal continuous full load torque capacity without any service factor.
2) $T_{K\,MAX}$ is the maximum torque that can be transmitted for 100.000 cycles (non-reversing) or 50.000 cycles with torque reversals at a temperature not exceeding 30 °C.
3) T_{KW} is the amplitude of periodic changes of torque at a frequency of 10 Hz and a basic load up to nominal torque T_{KN}.
4) Dependant upon speed.

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