CROSS+MORSE

Power Transmission Solutions



Overload Protection Clutches

® OPC2009©

The Company

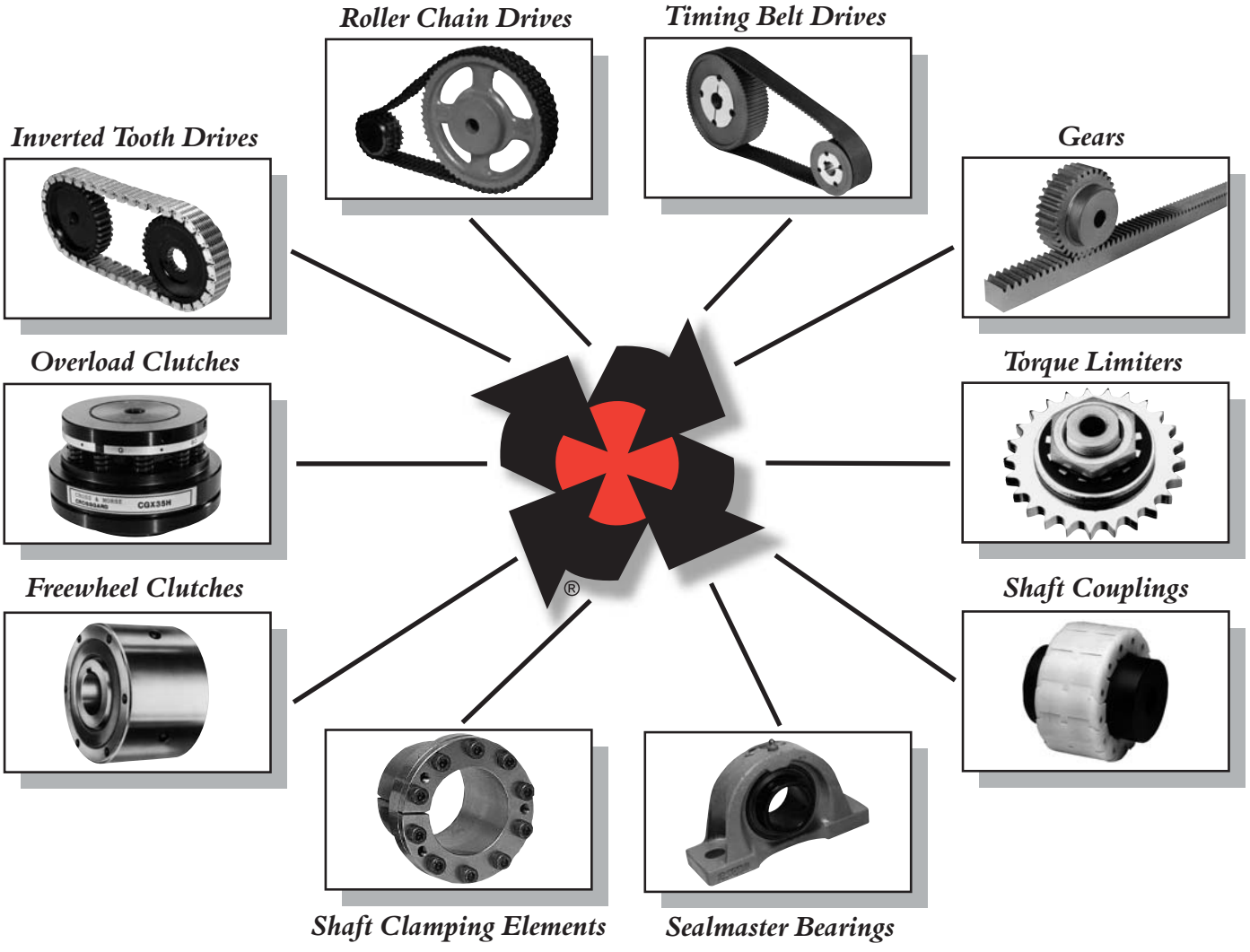
Cross & Morse was established in 1984 through the amalgamation of two long standing and well respected companies in the Power Transmission Industry, T.D. Cross and Morse Chain.

T.D. Cross & Sons was founded in 1870 in Birmingham, concentrating in the production of bicycle components under the direction of the Cross family. They moved to the current factory site in 1950 and developed into production of a popular range of roller chain sprockets and gearing. The competitive pricing and quality of product soon established the Company as a major supplier to both Agricultural and Industrial markets.

The Morse Chain Company was founded in 1894 also for the manufacture of bicycles in Pennsylvania, U.S.A. The company moved into production of inverted tooth chain drives and established a manufacturing plant in London in 1907, moving to the new Garden City of Letchworth, Herts. in 1918. The product range in the U.K. was developed to include Roller Chain and Sprockets, Couplings, Torque Limiters, Sprag Clutches and Timing Belt Drives, whilst in the U.S.A. by acquisition Morse also included the Denver Gearbox Range and the Sealmaster Bearing Products.

In 1987 Cross & Morse closed the Letchworth plant and centralised all production at the 10,000 sq. metre factory in Great Barr, Birmingham where current production of Roller Chains, Sprockets, Gears, Timing Belt Pulleys, Torque Limiters, Sprag Clutches and other specialised power transmission equipment is undertaken. In addition to manufactured products, Cross & Morse are main agents for Morse-Emerson, U.S.A.; and Stieber Formsprag, Germany; providing an extensive range of power transmission products.

The company operates a policy of continued assessment to develop and improve its products and customer service. In pursuance of these objectives Cross & Morse has been successfully assessed by Lloyds, and is registered, as an approved manufacturer of power transmission products to BS EN ISO 9001.



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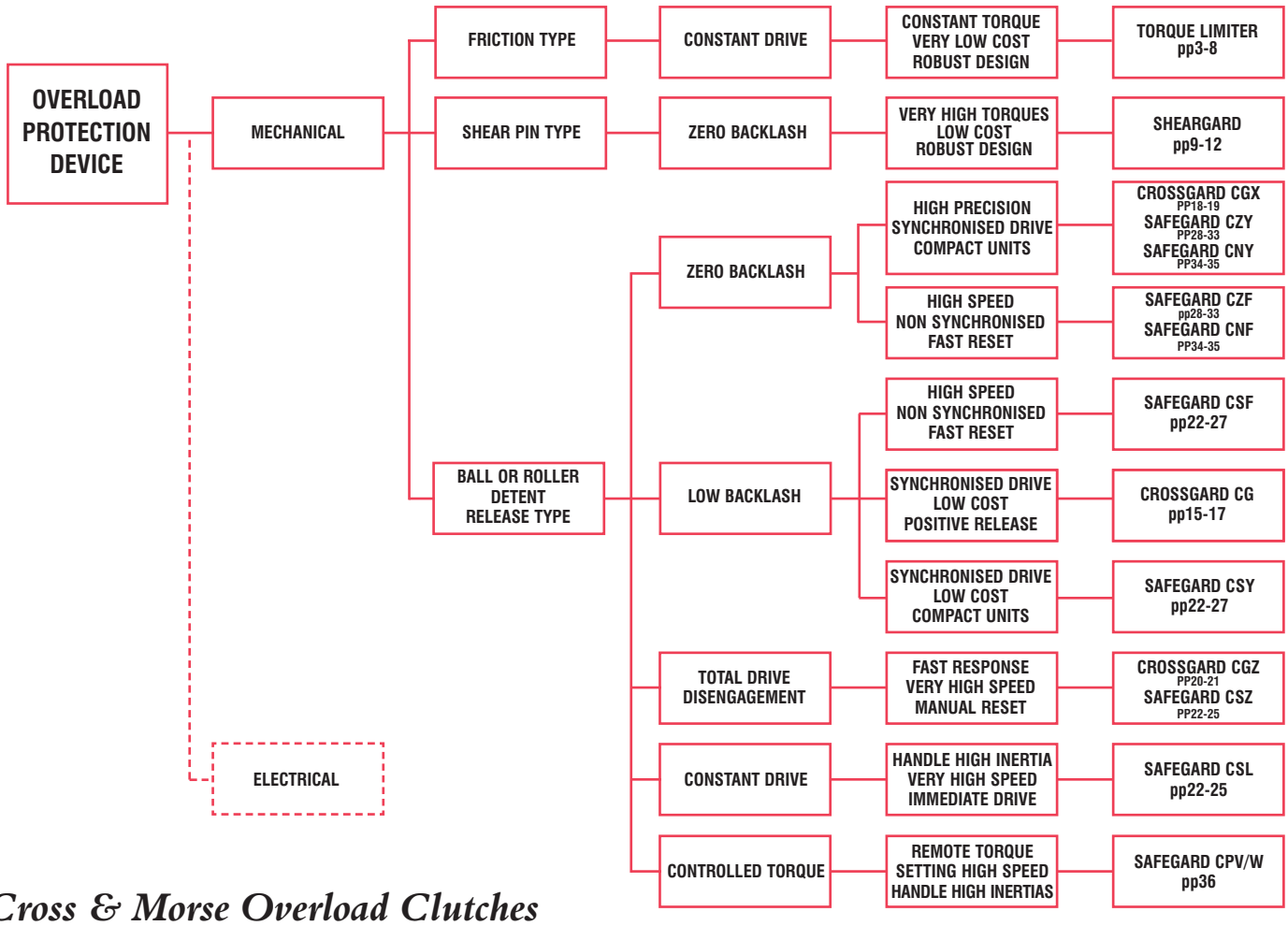
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Overload Protection Devices

Development of manufacturing methods and production techniques has led to machinery and equipment being more automated, and systematically combined to provide the best material flow and production efficiency. In these conditions any small accident which could damage either machinery or drive lines can result in extended downtime of the total plant. Cross & Morse range of overload protection devices are designed to prevent damage of machinery or drive line in the event of an overload, so avoiding the need of costly repairs and minimising production downtime.

Several methods of overload protection are available, these being as classified below, all of which provide various levels of protection. Cross & Morse units are all of mechanical operation for minimum maintenance and simplicity of operation.

Classification of Overload Protection Types



Cross & Morse Overload Clutches

All Cross & Morse protection devices are available as shaft mount units for mounting sprockets, pulleys or gears, or as couplings for shaft to shaft connection. The basic features of the units offered are as shown in the table below. For detailed design specification and selection of units refer to catalogue pages of the relevant series.

FEATURE	Torque Limiter	Sheargard	Crossgard CG	Crossgard CGX	Crossgard CGZ	Safegard CSF	Safegard CSL	Safegard CSY	Safegard CSZ	Safegard CZF/CNF	Safegard CZY/CNY	Safegard CPF/CPY
DRIVE SYNCHRONISATION	NO	YES	YES	YES	YES	NO	YES	YES	YES	NO	YES	YES
DRIVE DISENGAGEMENT	NO	YES	1 REV	1 REV	YES	RATCHET	NO	1 REV	YES	TEMP	1 REV	1 REV
RESETTING METHOD	AUTO	MANUAL	AUTO	AUTO	MANUAL	AUTO	AUTO	AUTO	MANUAL	AUTO	AUTO	PNEU
BACKLASH	NONE*	NONE	MINIMAL	NONE*	MINIMAL	MINIMAL	MINIMAL	MINIMAL	MINIMAL	NONE*	NONE*	NONE*
OVERLOAD INDICATOR	NONE	OPTIONAL	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
CAN PROVIDE SOFT START	YES	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
SET TORQUE ACCURACY %	15%	10%	10%	3%	10%	10%	10%	10%	10%	5%	5%	5%
SHAFT RANGE mm	5-120	10-215	8-130	7-70	8-50	7-110	7-110	7-110	7-110	6-60	6-60	8-55
MAX. TORQUE Nm	10000	125000	7154	785	450	8200	8200	8200	4400	740	740	550
MAX SHAFT SPEED rpm	3000	1500	700	1400	1800	3300	4000	1000	5000	4000	4000	5000

*Within Torque Range

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Cross & Morse Torque Limiters

Cross & Morse Torque Limiters are low cost protection devices that limit torque in a drive system by slipping when a preset value is exceeded, in order to:-

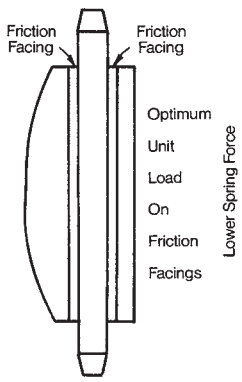
Prevent machine and drive damage.
Eliminate costly machine downtime.

The Torque Limiter is a protective device that limits torque transmitted in a drive system by slipping when a preset value is exceeded as a result of shock load, overload or machine jam. It automatically re-engages, when the overload is removed, no setting being required, Torque is transmitted by spring loaded friction faces, the value being preset by adjustment of the spring force by simple setting of the adjustment nuts and bolts. The Torque Limiter is suitable to use with sprockets, gears, pulleys or a flange plate as the centre member clamped between the friction facings. The Torque Limiter is not a new product with Cross & Morse. In 1949 Morse introduced the first spring loaded, friction type protective device which was developed to today's line of products consisting of 7 sizes, the models 200M to 700M being the most popular units. To further extend the capabilities of our products a new metric series of clutches, consisting of 6 sizes from M30 to M280 has been added, to cater for higher torque applications, and areas where space is limited. As originator of the Torque Limiter, Morse gained vast experience in the design and application of these units as trouble free and long lasting protective devices. Many thousand units have been fitted to conveyors, mechanical handling equipment and agricultural machines.

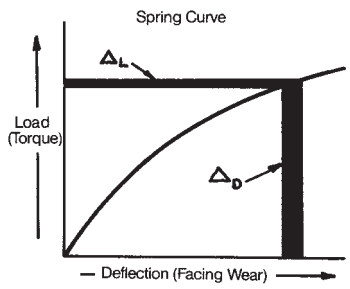


Morse Torque Limiters incorporate design features for long life and reliability.

Correct Spring Selection and Ratings



Torque Limiter capacities are directly proportional to the spring force applied to the friction surfaces and it is a simple matter to increase capacity by increasing spring force - but not without a sacrifice. The higher the unit load or pressure (psi) on the friction surfaces, the quicker the friction facings will deteriorate as they slip against the pressure plates and centre member. Morse ratings are realistic and are consistent with optimum spring loads and face pressures that permit longer slip time, maintain re-engagement at pre-set torque, and provide long-lasting protection.
The spring is designed so that its force varies little over a wide deflection range at the rated capacity of the torque limiter. This assures load re-engagement near the pre-set torque level as the friction facing wears. It is characteristic of a disc spring that it is more unstable and erratic in the lower end of its load vs. deflection curve; Morse therefore established minimum torque ratings consistent with spring characteristics.



Cross & Morse Torque Limiters offer you the following Benefits:

- *Simple Design*
- *Easy Adjustment*
- *Wide Torque Range*
- *Minimum Maintenance*
- *Corrosion Resistant*
- *Infinite Torque Adjustment Settings*
- *Economical*
- *Compact*
- *Dependable*
- *Durable*
- *Low Cost*

Conclusion

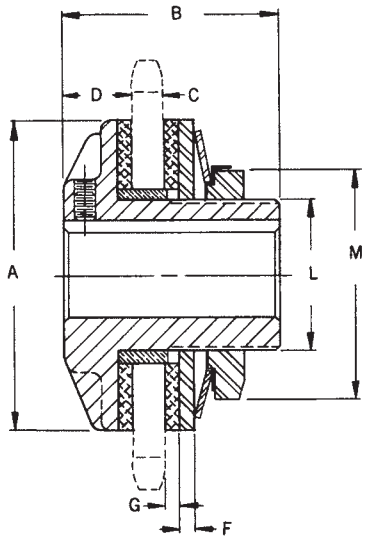
The incorporation of an inexpensive Cross & Morse Torque Limiter improves machine design, safeguards production, and minimises the downtime so ensuring increased productivity and profits.

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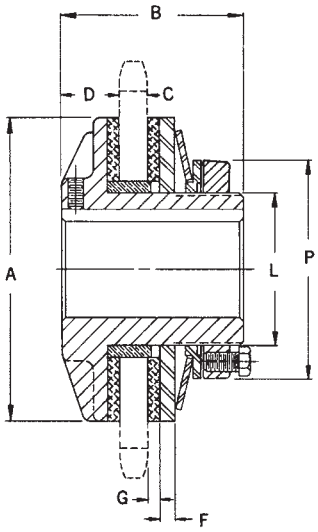
Standard Torque Limiters

Original Morse Series Torque Limiters

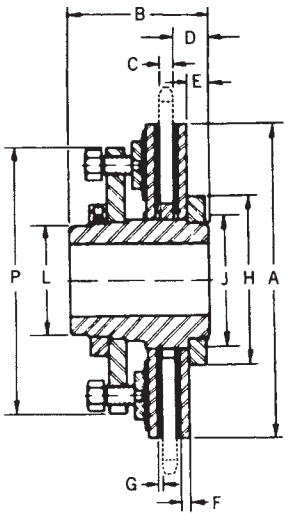
Developed from the original Torque Limiters produced in 1949, these well proven units are based on Imperial dimensions. Imitated by many over the years these units provide the ideal low cost solution to overload protection for torques between 3 & 1500 Nm. For Torque Limiter selection refer to page 6.



Models 200M, 250M & 350M



Models 500M & 700M



Models 13 & 20

Dimensions

*Model	Torque min	Torque max	Stock min plain bore	Stock Finish bores	Max Bore with Std Keyway	†Standard Bush Lengths (Ref.)	Set Screw	A	B	C (max)	D	F	G	L	M A/F	P	Weight
	Nm	Nm	mm	mm	mm	mm		mm	mm	mm	mm	mm	mm	mm	mm	mm	kg
200M1 200M2	3 6	13 25	9.5	19 20	22	(275, 365, 480, 551) 7.0, 9.5, 11.5, 13.4	M5	52	48	9	16	4.0	3.5	34.9	46		0.4
250M1 250M2	7 12	34 67	9.5	15 19 20	22	(275, 365, 480, 551) 7.0, 9.5, 11.5, 13.4	M5	64	48	9	16	4.0	3.5	34.9	46		0.5
350M1 350M2	20 34	100 200	18	20 24 25	25	(365, 480, 551, 628, 829) 9.5, 11.5, 13.4 16.0, 20.3	M6	89	62	16	19	4.0	3.5	42.9	60		1.1
500M1 500M2	48 88	283 566	22	25 28 30 35 38 40	41	(480, 551, 628, 829) 11.5, 13.4, 16.0, 20.3	M8	127	76	16	22	6.5	3.5	63.5	-	92	3.0
700M1 700M2	110 224	770 1540	24	40 45 48 50 60	64	(520, 580, 667, 868, 966, 1187, 1375) 13.2, 14.7, 16.9, 22.3, 24.6, 30.2, 34.9	M10	178	98	29	24	8.0	5.0	95.3	-	133	6.8
13-8 (1) 13-16 (1)	678 1356	1966 3120	38.1		82	(375, 500, 562) 9.5, 12.7, 14.3	-	330	146	22	36	9.5	4.8	114.3	-	279	38.6
20-5 (1) 20-10 (1)	2135 4270	4270 8540	50.8		124	(500, 625) 12.7, 15.9	-	508	184	24	46	12.5	4.8	165.1	-	413	115.0

*M1 Torque Limiters Fitted One Disc Spring.
M2 Torque Limiters Fitted Two Disc Springs.

†Torque Limiter supplied standard without Bush, which is supplied with Platewheel.
If Bush required, specify on order which length (size) required.

For procedure to select Torque Limiters refer to page 6.
For range of standard platewheels refer to page 7.

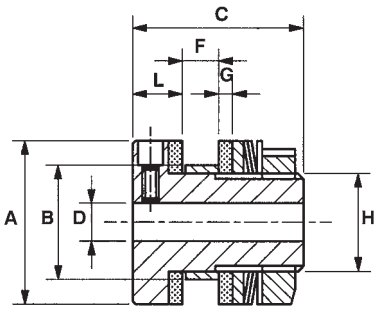
(1) Sizes 13 & 20 Torque Limiters for replacement purposes only
Refer Metric sizes M200 - M280 for new applications.

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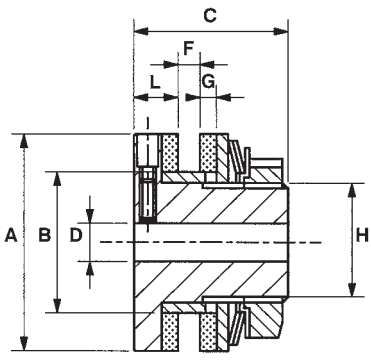
Standard Torque Limiters

Metric Series Torque Limiters

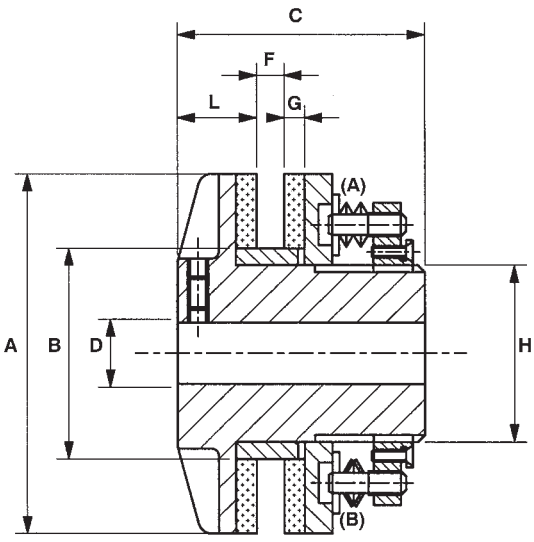
To extend the range of torque capability a new series of Torque Limiters is offered providing both smaller and larger sized units with a range of 1.5 to 10,000 Nm. These units are all to metric dimensions, and as with the original series are available with a roller chain coupling for shaft to shaft connection. For Torque Limiter selection refer to page 6.



Models M30



Models M40 & M45



Models M200/254/280

Dimensions

Model	Torque min	Torque max	Stock bore	Max Bore with Std Keyway	A	Bk7	C	Bush	F		G	L	H	Approx. Weight
								Length	min	max				
	Nm	Nm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	kg
M30-2	3*	10*	4.5	11	30	21	31	5.8	6.0[2]	7.2	2.5	9.0	18	0.10
M40-1 M40-2 M40-3	4 7 10	15 28 40	7.0	14	40	26	28	7.0	3.5	5.0[1]	2.8	8.0	22	0.16
M45-1 M45-2 M45-3	7 13 17	30 55 70	7.0	20	45	35	33	8.8	4.5	5.8[1]	3.0	8.5	32	0.19
M200-24(A)† M200-24(B)†	440 800	2200 4000	35.0	80	200	120	105	28.0	20.0[2]	22.0	5.0	27.0	110	16.50
M254-32(A)† M254-32(B)†	760 1350	3800 6800	48.0	90	254	140	120	31.8	23.8[2]	26.0	5.0	33.0	125	21.00
M280-32(A)† M280-32(B)†	1100 2000	5500 10000	48.0	120	280	170	120	31.8	23.8[2]	26.0	5.0	33.0	155	26.00

*Torque values can be halved by facing springs towards one another.

†Torque values determined by positioning of springs, refer to drawings.

[1]Torque Limiters with 1 & 2 springs can accommodate thicker platewheels, (up to 2mm max), but extra care must be exercised to ensure that bush supports both friction facings, and use second bush if required.

[2]Min. width can be reduced by reducing bush length.

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Torque Limiters Selection

Selection Procedure

1. Determine if the Torque Limiter is to be mounted on input (driver) or output (driven) shaft. Mounting on input shaft is normally lowest cost, and spreads load on Limiter body in overload slip, but if frequent slip occurs longer wear life of friction facings is obtained with the Torque Limiter on the output shaft.

2. Determine normal Drive Torque from input Power and Shaft Speed using formulae:-

$$\text{Torque Nm} = \frac{\text{H.P.} \times 7124}{\text{R.P.M.}} \qquad \text{Torque Nm} = \frac{\text{kW} \times 9550}{\text{R.P.M.}}$$

3. Decide on required Slip Torque, normally between 1.2 and 1.5 times Drive Torque dependant on frequency of machine stop-start cycles.

4. Refer to pages 4 and 5, select size of Torque Limiter where Rated Torque slightly exceeds Slip Torque. Confirm Selected Torque Limiter will accept drive shaft diameter.

5. Using capacity below, confirm selection of Torque Limiter. For machines under constant supervision or with motor overload sensors the 10 sec values should be used. For unmanned machines combination of torque and speed should always be within power ratings over 5 min to avoid deterioration of components parts due to temperature build-up. If necessary a larger Torque Limiter may have to be selected to provide sufficient heat dissipation.

6. Check Sprocket Tables below, to ensure that required size will fit selected Torque Limiter.

Dimensions

Torque Limiter Model	Maximum Operating RPM		kW Ratings according to max slip time					
	At Minimum Torque	50% Plus Torque Rating	Over 5 min	5 min	2 min	1 min	30 sec	10 sec
200M 250M	1800 1450	800 430	0.06 0.08	0.11 0.16	0.20 0.30	0.38 0.56	0.55 0.80	0.90 1.30
350M 500M 700M	1050 750 530	280 250 200	0.19 0.47 1.02	0.37 0.93 2.04	0.70 1.70 3.80	1.30 3.25 7.15	1.85 4.65 10.20	3.00 7.50 16.30
M30 M40 M45	3000 2300 2000	310 210 140	0.01 0.02 0.03	0.02 0.04 0.05	0.04 0.08 0.10	0.07 0.14 0.18	0.10 0.20 0.25	0.16 0.32 0.40
M200 M254 M280	475 375 340	100 90 80	1.29 2.40 2.95	2.50 4.80 5.85	4.80 8.90 10.80	9.00 16.80 20.50	12.90 24.00 29.25	20.60 38.50 47.00

Note: If your drive requirements do not permit selection of a Standard Torque Limiter by the above procedure contact Technical Department, Cross & Morse.

Minimum Sprocket Teeth and Bush Lengths for BS and ANSI Roller Chains

Chain Size		3/8" 06B/35		1/2" 08B/40		5/8" 10B/50		3/4" 12B/60		1" 16B/80		1 1/4" 20B/100		1 1/2" 24B/120		1 3/4" 28B/140		2" 32B/160	
Model No.	Bore Dia. mm	Sprocket Min. Teeth	Bush Length mm	Sprocket Min. Teeth	Bush Length mm	Sprocket Min. Teeth	Bush Length mm	Sprocket Min. Teeth	Bush Length mm	Sprocket Min. Teeth	Bush Length mm	Sprocket Min. Teeth	Bush Length mm	Sprocket Min. Teeth	Bush Length mm	Sprocket Min. Teeth	Bush Length mm	Sprocket Min. Teeth	Bush Length mm
200M	41.33 41.38	21	(365) 9.5	17	(480) 11.5	14	(551) 13.4												
250M	41.33 41.38	25	(365) 9.5	20	(480) 11.5	16	(551) 13.4												
350M	49.28 49.33	33	(365) 9.5	26	(480) 11.5	21	(551) 13.4	18	(628) 16.0	15	(829) 20.3								
500M	73.10 73.15			35	(480) 11.5	29	(551) 13.4	25	(628) 16.0	19	(829) 20.3								
700M	104.88 104.93			48	(520) 13.2	39	(580) 14.7	33	(667) 16.9	25	(868) 22.2	21	(966) 24.6	18	(1187) 30.2	16	(1187) 30.2	15	(1375) 34.9
13-	161.99 162.05									44	(375) 9.5	36	(500) 12.7	31	(562) 14.3	27	(562) 14.3	24	(562) 14.3
20-	222.33 222.40											54	(500) 12.7	46	(625) 15.9	40	(625) 15.9	35	(625) 15.9
M30	21.10 21.05	14	4.5[3]	12	6.0														
M40	26.10 26.05	17	8.0	14	8.0														
M45	35.12 35.07	19	9.0	15	9.0														
M200	120.18 120.10					43	15.5[3]	36	17.0[3]	28	22.5[3]	23	25.0[3]	20	29.0	17	29.0[1]	15	29.0[1]
M254	140.20 140.12							45	17.0[3]	35	22.5[3]	29	25.0[3]	24	31.8	21	31.8[2]	19	35.0[4]
M280	170.20 170.12							50	17.0[3]	38	22.5[3]	31	25.0[3]	26	31.8	23	31.8[2]	21	35.0[4]

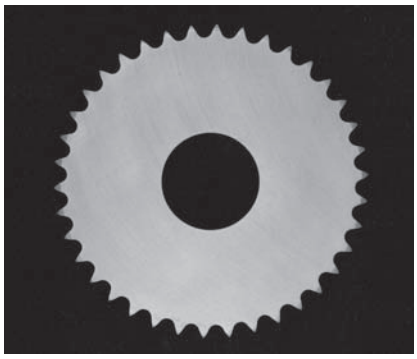
[1]Platewheels require recess to fit Torque Limiter.
[2]Platewheels for BS series chains requires recess to fit Torque Limiter.
[3]Bushes require shortening to length indicated.
[4]Two bushes required to total length indicated.
For standard stock platewheels refer to page 7.

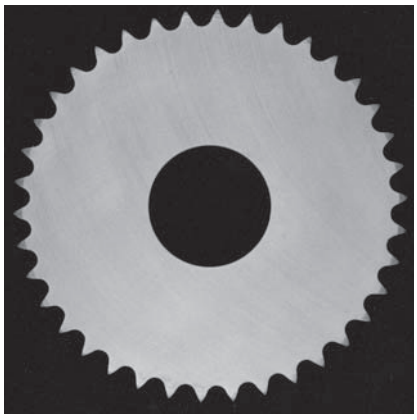
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Torque Limiters Platewheels

Stock Machined Platewheels for BS Roller Chain

Morse recommend and offer as stock items, specially machined platewheels for use with Torque Limiters. Both faces of Morse Torque Limiter Platewheels are machined to 1.6μm surface finish. Uniform surfaces and parallel faces ensure that Morse Torque Limiters will reliably maintain correct torque release and re-engagement. For the most economical drive design, select a platewheel from the increased range of standard stock platewheels.





For accurate torque setting and applications where slippage may be frequent, it is essential that a ground plate sprocket is used. Rated torque capacity can only be obtained with dry friction facings and a ground plate sprocket which has been run-in for 500 revolutions at 50% maximum torque rating for the single spring unit at a speed not exceeding 120 r.p.m.

Fits Torque Limiter Number	Catalogue Number	Chain Pitch inches	Number of Teeth	Outside Diameter mm	Bore Dia. over Bushing mm	Max. Width mm	Bush Size	Bush Length mm	Weight kg
M30	M30G06B1-16	0.375	16	52.3	21.1	5.33		5.0	0.06
	M30G06B1-19	0.375	19	61.3	-0.05	5.33		5.0	0.09
M40	M40G06B1-19	0.375	19	61.3	26.1	5.33		7.0	0.09
	M40G06B1-22	0.375	22	71.0	-0.05	5.33		7.0	0.12
M45	M45G06B1-22	0.375	22	71.0	35.12	5.33		8.8	0.12
	M45G08B1-19	0.500	19	82.3	-0.05	7.24		8.8	0.18
200M	200G06B1-21	0.375	21	67.8	41.38	5.33	365	9.5	0.11
	200G06B1-23	0.375	23	73.5	-0.05	5.33	365	9.5	0.13
	200G08B1-19	0.500	19	82.3		7.24	480	11.5	0.18
250M	250G06B1-25	0.375	25	80.0	41.38 -0.05	5.33	365	9.5	0.14
	250G06B1-38	0.375	38	119.4		5.33	365	9.5	0.36
	250G08B1-20	0.500	20	85.8		7.24	480	11.5	0.21
	250G08B1-21	0.500	21	90.4		7.24	480	11.5	0.23
	250G08B1-22	0.500	22	94.5		7.24	480	11.5	0.27
	250G08B1-23	0.500	23	98.5		7.24	480	11.5	0.32
	250G08B1-25	0.500	25	106.4		7.24	480	11.5	0.36
	250G08B1-30	0.500	30	127.5		7.24	480	11.5	0.54
	250G08B1-38	0.500	38	159.0		7.24	480	11.5	0.91
	250G08B1-57	0.500	57	236.1		7.24	480	11.5	2.15
	250G10B1-19	0.625	19	104.1		9.02	551	13.4	0.41
	250G10B1-21	0.625	21	114.1		9.02	551	13.4	0.50
	250G10B1-23	0.625	23	124.2		9.02	551	13.4	0.64
	250G10B1-25	0.625	25	134.4		9.02	551	13.4	0.75
	250G10B1-38	0.625	38	199.6		9.02	551	13.4	1.78
	250G10B1-57	0.625	57	296.0		9.02	551	13.4	4.29
350M	350G06B1-38	0.375	38	119.4	49.33 -0.05	5.33	365	9.5	0.38
	350G08B1-27	0.500	27	114.5		7.24	480	11.5	0.40
	350G08B1-30	0.500	30	127.5		7.24	480	11.5	0.53
	350G08B1-38	0.500	38	159.0		7.24	480	11.5	0.91
	350G08B1-57	0.500	57	236.1		7.24	480	11.5	2.14
	350G10B1-21	0.625	21	114.1		9.02	551	13.4	0.47
	350G10B1-23	0.625	23	124.2		9.02	551	13.4	0.62
	350G10B1-24	0.625	24	129.3		9.02	551	13.4	0.68
	350G10B1-25	0.625	25	134.4		9.02	551	13.4	0.73
	350G10B1-38	0.625	38	199.6		9.02	551	13.4	1.73
	350G10B1-57	0.625	57	296.0		9.02	551	13.4	4.27
	350G10B1-76	0.625	76	392.1		9.02	551	13.4	7.72
	350G12B1-19	0.750	19	125.2		10.97	628	16.0	0.73
	350G12B1-21	0.750	21	137.2		10.97	628	16.0	0.91
	350G12B1-23	0.750	23	150.2		10.97	628	16.0	1.15
	350G12B1-25	0.750	25	161.3		10.97	628	16.0	1.38
	350G12B1-38	0.750	38	239.8		10.97	628	16.0	3.04
	350G12B1-57	0.750	57	355.4		10.97	628	16.0	7.58
	350G12B1-76	0.750	76	469.9		10.97	628	16.0	13.65
500M	500G08B1-38	0.500	38	159.0	73.15 -0.05	7.24	480	11.5	0.82
	500G08B1-57	0.500	57	236.1		7.24	480	11.5	2.10
	500G08B1-76	0.500	76	312.4		7.24	480	11.5	3.70
	500G10B1-38	0.625	38	199.6		9.02	551	13.4	1.54
	500G10B1-57	0.625	57	296.0		9.02	551	13.4	4.24
	500G10B1-76	0.625	76	392.1		9.02	551	13.4	7.69
	500G12B1-25	0.750	25	161.3		10.97	628	16.0	1.13
	500G12B1-28	0.750	28	179.6		10.97	628	16.0	1.59
	500G12B1-38	0.750	38	239.8		10.97	628	16.0	2.81
	500G12B1-57	0.750	57	355.4		10.97	628	16.0	7.52
	500G12B1-76	0.750	76	469.9		10.97	628	16.0	13.59
	500G16B1-19	1.000	19	166.6		16.08	829	20.3	2.31
	500G16B1-21	1.000	21	184.9		16.08	829	20.3	2.81
	500G16B1-23	1.000	23	200.7		16.08	829	20.3	3.20
	500G16B1-25	1.000	25	216.7		16.08	829	20.3	3.81
	500G16B1-38	1.000	38	320.5		16.08	829	20.3	7.42
700M	700G10B1-39	0.625	39	205.0	104.93 -0.05	9.02	580	14.7	1.54
	700G10B1-57	0.625	57	295.7		9.02	580	14.7	3.85
	700G10B1-76	0.625	76	392.1		9.02	580	14.7	7.65
	700G12B1-38	0.750	38	239.8		10.97	667	16.9	2.72
	700G12B1-57	0.750	57	355.4		10.97	667	16.9	7.47
	700G12B1-76	0.750	76	469.9		10.97	667	16.9	13.55
	700G16B1-28	1.000	28	240.5		16.08	868	22.2	3.72
	700G16B1-38	1.000	38	320.5		16.08	868	22.2	7.39
	700G16B1-57	1.000	57	474.0		16.08	868	22.2	17.90
	700G20B1-21	1.250	21	230.9		18.57	966	24.6	3.76
M200	M200G16B1-30	1.000	30	254.0	120.18 -0.08	16.08		28.0	4.20
M254	M254G24B1-24	1.500	24	306.8	140.2 -0.08	24.10		31.8	9.30
M280	M280G24B1-30	1.500	30	379.5	170.2 -0.08	24.10		31.8	14.50

Torque Limiters are suitable for running in oil. As a general rule the torque capacity will be reduced to .25 of the stated torque when using SAE 30 oil. Torque Limiters to run in oil should have the friction facings soaked in oil before assembly.

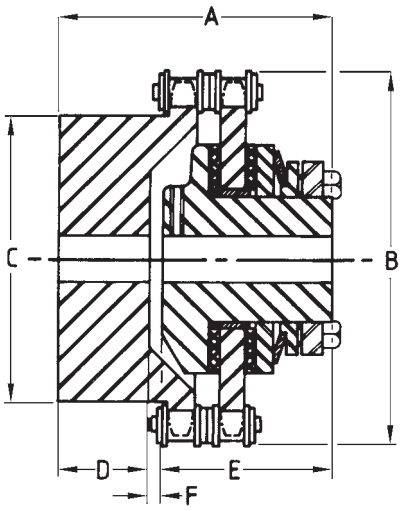
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Torque Limiter Couplings

Torque Limiter combined with Roller Chain Flexible Coupling

The Torque Limiter Coupling combines overload protection with ability to connect in-line shafts. The unit consists of a standard Torque Limiter and platewheel connected to a special coupling sprocket by duplex Roller Chain. Available in eleven standard sizes, they are easy assembly units providing protection and reliability. For selection refer to page 6.





Capacities and Dimensions

Catalogue Number	Misalignment		Torque Capacity Nm		Minimum Plain Bore		Maximum Bore		Sprocket Size	Dimensions mm						Weight* Kg
	Max. Pall. mm	Max. Angle	Min.	Max.	Limiter mm	Coupling mm	Limiter mm	Coupling mm		A	B	C	D	E	F	
M30-2C	0.20	30'	3	10	4.5	11	11	22	06B-16	55.0	57.1	37.0	22.5	31.0	1.5	0.5
M40-1C M40-2C M40-3C	0.20	30'	4 7 10	15 28 40	7	8	14	35	06B-22	55.0	75.2	55.0	25.0	28.0	2.0	0.8
M45-1C M45-2C M45-3C	0.20	30'	7 13 17	30 55 70	7	8	20	40	06B-22	59.5	75.2	55.0	25.0	33.0	1.5	0.9
200M-1C 200M-2C	0.25	30'	3 6	13 25	11	14	22	42	08B-20	73.3	93.0	66.0	22.0	47.6	3.7	1.8
250M-1C 250M-2C	0.25	30'	7 12	34 67	11	11	22	50	08B-22	76.7	101.0	75.4	25.4	47.6	3.7	2.0
350M-1C 350M-2C	0.31	30'	20 34	100 200	18	18	25	70	10B-24	103.7	136.5	104.4	38.1	61.9	3.7	5.2
500M-1C 500M-2C	0.38	30'	48 88	283 566	22	22	41	95	12B-28	121.2	186.8	149.3	41.3	76.2	3.7	12.2
700M-1C 700M-2C	0.51	30'	110 224	770 1540	24	24	64	135	16B-28	168.1	247.5	199.4	66.7	98.4	3.0	31.3
M200-24C	0.51	30'	440 800	2200 4000	35	35	80	100	16B-30	194.0	264.0	150.0	85.0	105.0	3.0	41.5
M254-32C	0.76	30'	760 1350	3800 6800	48	51	90	150	24B-24	214.0	326.0	232.0	90.0	120.0	4.0	74.6
M280-32C	0.76	30'	1100 2000	5500 10000	48	51	120	200	24B-30	214.0	398.0	302.0	90.0	120.0	4.0	98.2

*Weights are for Torque Limiter and Coupling unbored.

Good Reasons to fit a Morse Torque Limiter on your Equipment.

Design
Protection for expensive components within the drive system or structural framework, gives longer machine life with increased reliability in service, and reduction of expensive downtime.

Maintenance
Maintenance is reduced by the inherent protection offered by the torque limiter, which in itself is inexpensive, corrosion resistant, and extremely easy to maintain.

Product Improvement
Many existing machines can be fitted with a torque limiter, without modification to the design, by replacing a sprocket with a torque limiter fitted with a platewheel, or for in-line drives by replacing existing coupling with a torque limiter coupling.

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Sheargard Overload Clutches

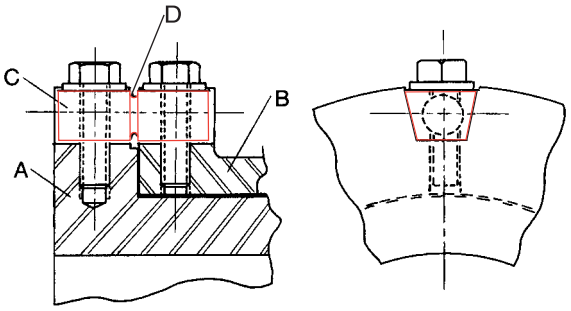
The Cross Sheargard clutch complements the range of Torque Limiters by providing machinery protection on applications where accurate torque control and shaft synchronisation are necessary; and when in the event of an overload, total disengagement of driving and driven members is required.

The design of the Sheargard Clutches provides for the transmission of high torques (up to 125,000 Nm) with a compact, low inertia unit. Standard stock products enables prompt delivery, at low cost of shearpin chain sprockets and flexible shaft couplings. The provision of an optional motor monitor plate enables disconnection of the power supply and / or operation of alarm signals in the event of an overload when used in conjunction with a limit switch or proximity switch.

The basic advantages of the well proven "Howdon" wedge shearpin, have been combined with a clutch designed for economic production, with component parts sized to enable the use of the existing range of torque limiter platewheel and chain flexible coupling to enable supply from stock of complete drive assemblies. For higher speed applications a rubber coupling is available.

In the diagram Hub "A" and Flange "B" have matching tapered slots cut axially in their periphery, into which the "Howdon" wedge-shaped shearpins "C" are inserted and firmly clamped by two self-locking screws. Torque is transmitted by the wedge which has a reduced diameter neck in mid-span "D"' designed to shear when the pre-determined torque is exceeded, so allowing the sleeve to rotate freely on the hub.





The Cross Sheargard by virtue of its design offers a number of advantages over alternate overload protection systems

1. Simple Design

In a Shearpin the full shear strength is directly available as a frictionless driving force. The use of up to three shearpins provides high torque capacity within a compact unit, keeping both inertias and costs to a minimum. Several ratings of pin for each clutch size provides over 200 stock torque ratings. The Sheargard can be used with chain sprockets, gears, belt drives or shaft couplings. In the event of an overload, the wedge shaped shearpins are easy to locate, and quickly replaced by removal of two self-locking screws and broken halves of shearpin, and replacement with a new wedge pin.

2. Accurate Torque Ratings

Inaccuracy of torque setting in conventional shearpin couplings is caused by non-uniform shear necks, and poor fit of the pin with its mating surfaces. The "Howdon Wedge" pins are precision turned to a constant form and can be expected to fracture within ±10% of catalogue rating. The wedge pins are rigidly located in the mating grooves so totally eliminating fretting fatigue failures, and ensuring zero backlash making it ideal for indexing and reversing drives. The clamping of the pin into the wedge angle ensures positive radial and axial location. The design also ensures load sharing is achieved when a number of pins are used for higher torque drives, enabling different rated pins to be used in one clutch.

3. Reliability

The "Howdon Wedge" pins are naturally "fail-safe" under all conditions. They are not affected by changes in temperature or humidity and are tolerant of most environment conditions. Sizes 350-900SG standard pins are manufactured from brass to avoid sparking in the event of overload, thus making them suitable in volatile atmospheres. The unconventional shape of the wedge pins prevents the fitment of alien pins ensuring safety and product liability requirements are met at all times. The peripheral location of the wedge pins enables easy inspection, and clear colour coding of the pins ensures simple checking of torque setting.

4. Availability

Cross Sheargard Clutches and Couplings are carried in stock with minimum pilot bore. Units can be finished bored and keyed to customer's specifications through a 48 hour rework service. A large stock of standard rated wedge pins, colour coded according to capacity ensures instant spares availability.

5. Low Cost Protection

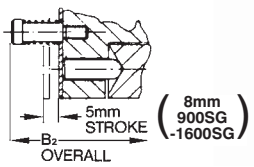
The cost of Sheargard Clutches is kept low by volume production techniques, so providing the customer with a low cost synchronised, reliable overload protection device.

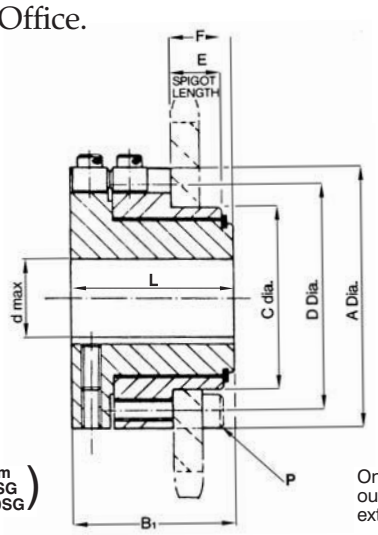
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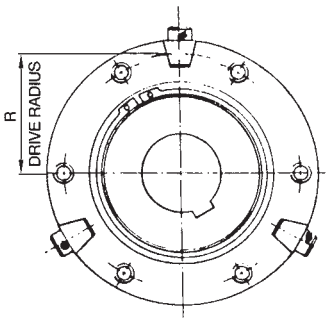
Sheargard Overload Clutches

Standard Stock Sheargard Clutches are available in five sizes providing a torque range from 27 to 13,700 Nm. Other units with torque ratings to 125,000 Nm are available to order, on short lead time. For further details contact Cross & Morse Sales Office.









On sizes 1000SG to 1600SG the outer hub is retained by an end plate which extends beyond bore length.

Dimensions

Clutch Size	Wedge[4]* Pins	Drive radius R	Torque Rating[1]*				Bore Dia d	
			Min		Max			
			Nm	lb ft	Nm	lb ft	Min	Max
250SG	2 x W25	26	27	20	336	248	10	25
350SG	3 x W37	34.5	33	24	1509	1113	19	28
500SG	3 x W37	47	45	33	2028	1496	24	45
700SG	3 x W50	66.5	251	185	5580	4115	28	65
800SG	3 x W50	81	306	225	6798	5013	30	80
950SG	3 x W75	97	830	612	16740	12345	45	100
1000SG	4 x W100	128	3468	2558	63920	47138	55	115
1200SG	4 x W100	147	3982	2937	73400	54140	60	150
1400SG	4 x W120	160	12240	9025	100000	73750	70	180
1600SG	4 x W120	200	15300	11285	125000	92200	100	215

Clutch Size	Outside Dia. A	Length Through Bore L	Overall Length B[1]	Overall Length B[2]	Spigot Dia. C	Bolt PCD D	Bolts P	Spigot Length E[2]*	Position Back Face F
250SG	63	36	36	-	38.90 / 38.85	50	6 x M5	11.5	15.5
350SG	85	57	57	78	49.25 / 49.20	65	6 x M6	16	21
500SG	105	72	72	93	73.08 / 73.03	92	6 x M8	25	31
700SG	148	92	92	113	104.85 / 104.80	128	6 x M10	35	40
800SG	175	112	112	133	119.86 / 119.80	146	6 x M12	40	50
950SG	215	130	130	156	149.85 / 149.80	185	6 x M14	54	64
1000SG	280	175	191	217	164.85 / 164.80	220	8 x M16	75*[3]	91*[3]
1200SG	320	200	220	246	224.85 / 224.80	260	8 x M20	100*[3]	120*[3]
1400SG	350	270	295	321	254.85 / 254.80	300	8 x M24	125*[3]	150*[3]
1600SG	425	300	325	351	304.85 / 304.80	360	12 x M24	148*[3]	173*[3]

*[1]For standard Torque Ratings see table page 12.
*[2]The drive sprocket/pulley can overhang spigot.
*[3]Dimensions E & F can be adjusted to suit sprocket widths.
*[4]W37, W50, & W75 Brass Std, others steel.

Minimum Number of Teeth on Sprockets for Standard Roller Chains

Chain Pitch / Clutch Size	1/2"	5/8"	3/4"	1"	1 1/4"	1 1/2"	2"
250SG	27	22	18				
350SG	25	27	24	18			
500SG	30	24	21	16	18		
700SG	40	33	28	22	18	19	
800SG		38	34	25	21	23	20
950SG			40	31	25	26	23
1000SG				35	29	28	26
1200SG					36	30	29
1400SG					40	34	25
1600SG						38	29

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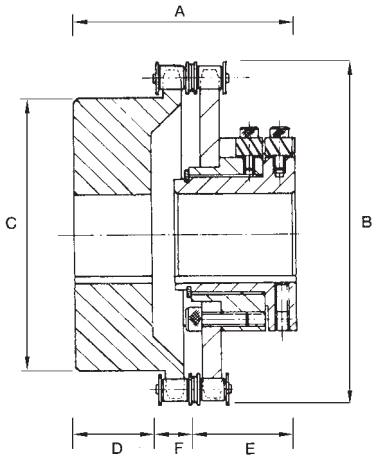
Sheargard Flexible Couplings

Sheargard Chain Couplings

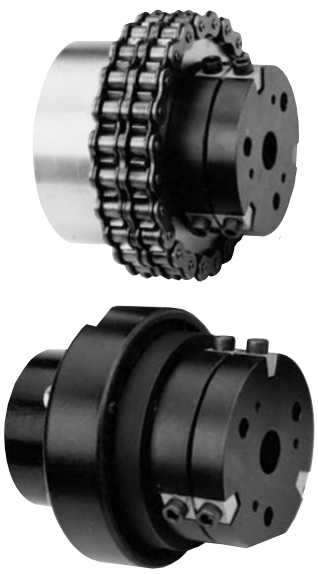
The standard Cross Sheargard unit combines with the Chain Coupling to provide stock overload couplings with minimum backlash and a high reliability. This construction provides a simple, reliable, easy to assemble flexible coupling capable of transmitting high loads and accommodating shaft misalignment with continuous overload protection. Motor monitor assemblies can also be used to switch off power in the event of an overload.

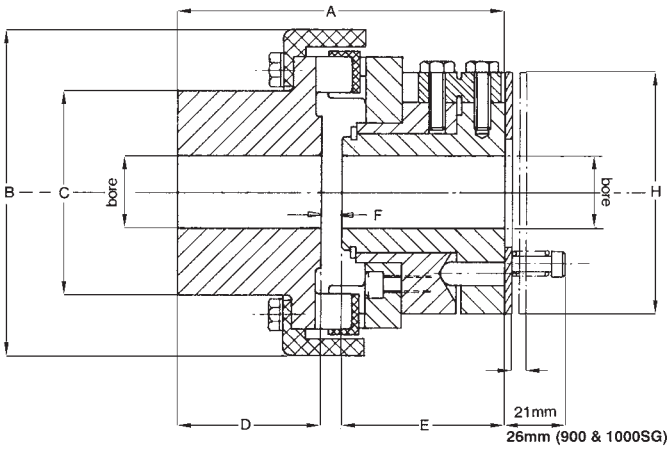
Sheargard ES & KE Couplings

For high speed drives (over 500 rpm) low inertia rubber elastic couplings are offered to enable quiet operation with torsional elasticity to damp vibration and absorb shock loads. The ES Couplings consists of two close grained cast iron jaws with hard rubber drive elements interposed between them, retained by a reinforced thermoplastic cap. The KE Coupling also has close grained cast iron jaws with a Pebax Polyester elastomeric gear ring interspaced to damp vibration and torsional loads. This series can be provided with taper-bore bushes on the coupling end. The KE Coupling provides a lower cost solution.



Chain Coupling





KE & ES Couplings

Chain Coupling Dimensions

Coupling Ref.	Misalignment		Torque Ratings		Sheargard Bore		Coupling Bore		A	B	C	D	E	F
	Parallel	Angular	Min Nm	Max Nm	Min	Max	Min	Max						
350SG-C	0.31	½°	33	1509	19	28	18	57	106	137	104	38	57	11
500SG-C	0.38	½°	45	2028	24	45	22	70	119	187	149	41	72	5
700SG-C	0.51	½°	251	5580	28	65	24	102	162	248	199	67	92	3
800SG-C	0.75	½°	306	6796	30	80	51	120	186	278	175	77	100	9
950SG-C	0.75	½°	830	16740	45	100	51	150	222	326	232	83	130	9
1000SG-C	1.00	½°	3468	37500	45	115	60	200	286	462	320	106	175	5

KE Sheargard Coupling Dimensions

Coupling Ref.	Misalignment		Torque Ratings		Sheargard Bore		Coupling Bore Max *(2)	Taper Bush Size *(3)	*(4) A	B	C	*(4) D	E	F
	Parallel	Angular	Min Nm	Max Nm*(1)	Min	Max								
350SGKE13	0.4	1.0°	33	725	19	28	55	1610	140	130	90	50	57	33
350SGKE15	0.4	1.0°	33	1490	19	28	65	2012	151	150	104	58	57	36
500SGKE15	0.4	1.0°	45	1490	24	45	65	2012	179	150	104	58	72	49
500SGKE18	0.4	1.0°	45	2026	24	45	75	2517	185	180	120	68	72	45
700SGKE23	0.5	1.0°	251	4800	28	65	95	3020	241	225	150	85	92	64
800SGKE28	0.5	1.0°	306	6796	30	80	130	3525	281	275	206	106	100	75

ES Sheargard Coupling Dimensions

Coupling Ref.	Misalignment		Torque Ratings		Sheargard Bore		Coupling Bore Max *(2)	A	B	C	D	E	F	H
	Parallel	Angular	Min Nm	Max Nm*(1)	Min	Max								
350SGES	0.6	0.7°	33	300	19	28	45	114	115	72	48	57	9	85
500SGES	0.7	0.7°	45	1200	24	45	60	143	158	96	61	72	10	105
700SGES	0.9	0.8°	251	3000	28	65	75	183	202	120	75	92	16	148
800SGES	1.0	0.8°	306	4800	30	80	80	208	202	130	82	100	26	175
950SGES	1.4	0.8°	830	12000	45	100	100	249	294	160	97	130	22	215

Except as indicated all dimensions in mm

*(1)Running Torque should not exceed 50% of this figure.

*(2)Coupling half manufactured with blind bore.

*(3)Coupling half can be supplied for taper-bush fitted either from hub end (type H) or from coupling end (type F).

*(4)Taper bore versions are shorter.

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Sheargard Torque Ratings

Selection of Wedges for Torque Rating

For each size of Sheargard clutch a selection of Standard wedge pins are available, which can be combined together to provide the desired torque setting. Standard Howdon wedges are coloured coded for identification. Sizes 350SG to 900SG use brass pins as standard (steel optional), other clutches use steel as standard pin material.

A representative selection of standard torque settings possible with standard wedges is shown in the table below, all torque ratings being accurate within ±10%. Additional torque settings can be provided with standard or special wedge pins. To avoid unnecessary tripping of the clutch the design torque should be at least 15% above max. starting torque of the drive. To minimise downtime and costs, use selections with minimum number of wedges, for simplicity of maintenance and stock control use selections with wedges one colour, as shown in the table. If torque setting is critical, intermediate ratings can be obtained by mixing colours. For drives with shaft speed above 120 rpm, or for improved protection of drive and machinery, use optional monitor plate with a limit switch or proximity sensor to switch off motor on overload.

Torque Ratings - Nm

Number of Wedges in Clutch													Torque Rating against each Clutch size and Pin Material (Standards in Bold)													
Orange	Orange/ White	Gold	White	White/ Yellow	Yellow	Yellow/ Blue	Blue	Blue/ Green	Green	Green/ Red	Red	Black	250 Steel	350 Brass	350 Steel	500 Brass	500 Steel	700 Brass	700 Steel	800 Brass	800 Steel	950 Brass	950 Steel	1000 Steel	1200 Steel	1400 Steel	1600 Steel
1														**33**	46	**45**	62	**115**	160	**140**	200						
	1													**46**	63	**62**	85										
		1												**62**	86	**84**	115										
2														**66**	92	**90**	124										
			1										**27**	**86**	119	**116**	169	**251**	345	**306**	420	**830**	1140	3468	3983		
	2													**92**	126	**124**	170										
3														**99**	138	**135**	186										
		2												**124**	172	**168**	230										
				1										**125**	171	**187**	230	**341**	469	**415**	571	**1165**	1600	5160	5926		
	3													**138**	189	**186**	255										
					1								**82**	**165**	226	**221**	303	**446**	645	**543**	786	**1476**	2027	6942	7972	12240	15300
			2										**54**	**172**	238	**232**	338	**502**	690	**612**	840	**1660**	2280	6936	7966		
		3												**186**	258	**252**	345										
						1								**199**	273	**267**	367	**652**	896	**794**	1091	**2012**	2763	8718	10012		
				2										**250**	342	**374**	460	**682**	938	**830**	1142	**2330**	3200	10320	11852		
							1						**107**	**257**	353	**345**	474	**896**	1230	**1091**	1498	**2409**	3309	9824	11282	17632	22040
			3										**81**	**258**	357	**348**	507	**753**	1035	**918**	1260	**2490**	3420	10404	11949		
								1						**300**	411	**402**	562	**1119**	1536	**1363**	1871	**2846**	3908	11607	13330		
					2								**164**	**330**	452	**442**	606	**892**	1290	**1086**	1572	**2952**	4054	13884	15944	24480	30600
									1				**136**	**370**	508	**497**	682	**1388**	1876	**1691**	2285	**3570**	4904	13875	15935	20240	25300
				3										**375**	513	**561**	690	**1023**	1407	**1245**	1713	**3495**	4800	15480	17778		
						2								**398**	546	**534**	734	**1304**	1792	**1588**	2182	**4024**	5526	17436	20024		
										1				**447**	815	**600**	825	**1727**	2371	**2104**	2888	**4190**	5723				
					3								**246**	**495**	678	**663**	909	**1338**	1935	**1629**	2358	**4428**	6081	20826	23916	36720	45900
											1		**168**	**503**	891	**676**	928	**1785**	2452	**2174**	2987	**4810**	6606	15980	18352	24992	31240
							2						**214**	**514**	706	**690**	948	**1792**	2460	**2182**	2996	**4818**	6618	19648	22564	35264	44080
												1						**1860**	2555	**2266**	3112	**5580**	7683	16922	19434	31344	39180
						3								**597**	819	**801**	1101	**1956**	2688	**2382**	3273	**6036**	8289	26154	30036		
								2						**600**	822	**804**	1124	**2238**	3072	**2726**	3742	**5692**	7816	23214	26660		
									2				**272**	**740**	1016	**994**	1364	**2776**	3752	**3382**	4570	**7140**	9808	27750	31870	40480	50600
																								27768	31888	48960	61200
							3						**321**	**771**	1059	**1035**	1422	**2688**	3690	**3273**	4494	**7227**	9927	29472	33846	52896	66120
										2				**994**	1630	**1200**	1650	**3454**	4742	**4208**	5776	**8380**	11446				
								3						**900**	1233	**1206**	1686	**3357**	4608	**4089**	5613	**8538**	11724	34821	39990		
											2		**336**	**1006**	1782	**1352**	1856	**3570**	4904	**4348**	5974	**9620**	13212	31960	36704	49984	62480
												2						**3720**	5110	**4532**	6224	**11160**	15366	33844	38868	62688	78360
						4																		34872	40048		
							4																	39296	45128	70528	88160
									3				**408**	**1110**	1524	**1491**	2046	**4164**	5628	**5073**	6855	**10710**	14712	41625	47805	60720	75900
										3				**1341**	2445	**1800**	2475	**5181**	7113	**6312**	8664	**12570**	17169				
								4																46428	53320		
											3		**504**	**1509**	2673	**2028**	2784	**5355**	7356	**6522**	8961	**14430**	19818	47940	55056	74976	93720
												3						**5580**	7665	**6798**	9336	**16740**	23049	50766	58302	94032	117540
									4															55500	63740	80960	101200
											4													63920	73408	99968	124960

Note:- Torque capacity of size 250SG controlled by unit size, and not wedge capacity. Sizes 1000SG and above are designed to accept up to four wedges, size 250SG only has two wedge slots.

Wedge Replacement following Overload:

To return Sheargard to service after overload, first remove all broken halves of wedges by removing their locking screws. Rotate hub on body until wedge grooves are in line (for drives where synchronisation is essential rotate until alignment marks on body and hub flanges are in line). Ensure wedge grooves are clean. Fit new wedges of same colour identification as parts removed and fix firmly into place by tightening locating screws.

Servicing Sheargard Clutches

Sheargard units require minimal servicing. Routine checks that wedge locating screws and monitor plate screws are securely locked down is generally all that is required. If the clutch has suffered a number of overloads, or at major maintenance shutdowns disassembly of the clutch, cleaning with paraffin and light greasing of bearing surfaces will ensure long service life.

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Crossgard Overload Couplings

The Crossgard series of overload protection clutches all use sprung loaded balls locked in detents to provide drive and overload control. The balls are random positioned in the clutch so drive can only be engaged in one relative angular position between driver and driven shafts, so ensuring full synchronisation of the drive at all times. In the event of an overload the balls are driven out of their detents to release the torque, and cause axial movement of the pressure plate which can be used to actuate a limit switch or proximity sensor to isolate the drive. All units are fitted with a torque indicator to enable simple setting of the desired torque rating. There are three basic types of Crossgard Clutches all of which are available as flexible shaft couplings, types CG, CGX and CGZ.

Crossgard Principles of Operation

During normal operation torque is transmitted between hub and driving flange by a number of balls located in the flange engaged in detents in the hub under load applied by disc springs. The balls are arranged in irregular angular positions to ensure re-engagement can only occur at one angular position between hub and flange. When an overload occurs the balls are driven out of their detents and then roll between the hub and pressure plate. The pressure plate moves axially a sensor plate which can be used to activate a proximity or limit switch. Torque is varied by adjusting the spring load on the pressure plate by tightening or loosening adjusting nuts.

Design Features

Crossgard clutches have been designed to provide the customer with a reliable, simple to operate clutch, all three types incorporating the following design features.

Drive Synchronisation
Non symmetrical arrangement of the drive balls and pockets allows only one angular position of engagement of drive, ensuring input and output are always synchronised.

Bi-directional drive
The clutches function equally in either direction of rotation, and are suitable for reversing drives.

Visual Torque Meter
All units have a scale on the adjusting nut to enable the set torque to be determined by reference to torque charts. Setting can also be verified at any time by visual check.

Simple Torque setting and adjustment
Required torque is set by turning the adjusting nut, and setting off torque scale.

Overload Monitoring
All units incorporate a sensor plate which moves axially when overload occurs to trigger a proximity or limit switch to isolate power to motor and activate failure indicators.

Stock availability
All standard Crossgard clutches are carried in stock with pilot bore. Units can be supplied with finished bore, keyseat and setscrews, fitted with platewheels; or complete with flexible coupling on 72 hours lead time.

Type CG Crossgard Clutch Pages 15-17

CG Crossgard Clutches are a low cost, simple design suitable for general purpose applications. The clutches provide full overload protection of drives which require synchronisation to be maintained at all times. Following overload the clutches are automatically reset by slow rotation of input drive once the overload cause is cleared. Seven sizes of clutch provide a torque range 10Nm to 7150Nm with operating speeds to 700rpm. Torque settings are accurate to ±10% even after repeated tripping. Also can be supplied with roller chain or elastomeric coupling.



Use CG Clutch:

- For general purpose applications.
- Where drives are inaccessible.
- For chain and low speed belt drives.
- In wrapping and packaging machines.
- On bakery and bottling machines.
- For conveyors and on sliding door drives.

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Crossgard Overload Clutches and Selection Procedure

Type CGX Crossgard Clutch Pages 18/19

High technology and precision is demanded in indexing and the position of equipment in modern machinery. The CCX Crossgard satisfies the demands for precision and performance and provides overload protection for modern machinery. CGX Clutches through their unique design provide backlash free, fail-safe, overload protection. High precision of trip torque is obtained with settings within ±3% accuracy, and very little motion is lost during tripping. An innovative ball and wedge mechanism is used to prevent backlash, and this is further employed in the coupling version to compensate for angular or parallel error or axial displacement with no loss in torsional rigidity. Five sizes of clutches and couplings have range 1.7 Nm to 785 Nm with maximum shaft speeds of 1400rpm. Units automatically reset after overload by slow shaft rotation.



Use CGX Clutch:

- For precision positioning indexing drives.
- For accurate mechanical overload protection.
- For zero backlash drives.
- On output shafts on cam boxes and Geneva mechanisms.
- On servo motor drives and robotics.
- In printing machinery.
- On N.C. machine tools and machining centres.

Type CGZ Crossgard Clutch Pages 20/21

The CGX Clutches incorporate a locking mechanism which restrains spring pressure being applied to the driving balls following an overload. Following an overload the input drive can continue to rotate freely enabling the clutch to be used for shaft speeds up to 1800 rpm. After the machine has been stopped following an overload the CGZ can only be reset by applying an axial load on the pressure plate. The clutch can also be used as an on-off clutch. Four sizes have torque range 2.4 Nm to 450 Nm, with accuracy ±10%. An elastomeric coupling is also available.



Use CGZ Clutch:

- For high speed drives - direct motor shaft.
- Where manual re-engagement preferred.
- As ON-OFF clutch.
- For machine tool drives.
- On textile and paper making machinery.

Crossgard Selection

Like other overload devices,it is best to position the Crossgard nearest the driven equipment where the overload is most likely to occur. Tripping torque should be at least 25% greater than the operating torque to compensate for motor starting torque and intermittent, shock and reversing loads.

Selection Method

1. Selecting the trip torque.
Trip torque should be set equal to the maximum amount of torque which can be applied based on such conditions as the strength of the machine and load. When it is not clear what the maximum amount of torque is, calculate the rated torque from the rated output and the rpm of the shaft onto which the Crossgard is to installed, and multiply this figure by the service factor. The result may be taken as the trip torque.

Tripping Torque = Operating x SF

$$\text{Torque Nm} = \frac{\text{Power kW} \times 9550}{\text{RPM}}$$

2. Select Clutch or Coupling where torque is mid range of rating to allow maximum on-site adjustment.

3. Check shaft diameters can be accommodated, if not a larger unit will be required.

4. Ensure shaft speeds are within limits of unit selected.

5. For coupling check alignment requirements.

6. Select proximity sensor switch, see page 29.

Determination of Service Factor

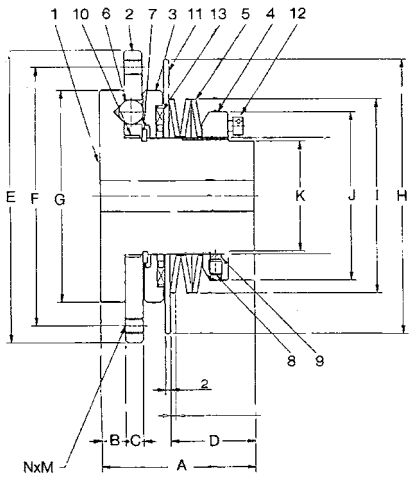
SF	Operating Conditions
1.25	Normal starting and stopping, intermittent motion
1.50	Load with light shocks, forward and reverse motion
1.70	Load with heavy shocks,frequent torque reversals

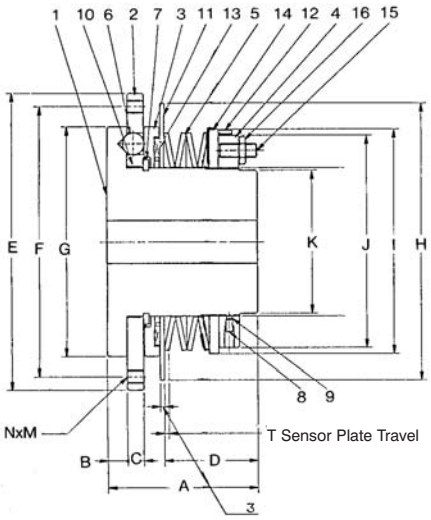
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Type CG Crossgard Clutch

Provides low cost overload protection with simple setting and operation, whilst maintaining synchronisation of driving elements



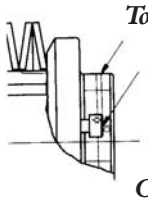




1 Hub
2 Centre Flange
3 Plate
4 Adjusting Nut
5 Disc Spring
6 Steel Ball
7 Snap Ring
8 Set Screw
9 Lock Plug
10 Skid Bearing
11 Sensor Plate
12 Indicator
13 Bearing
14 Pressure Plate
15 Adjusting Bolt
16 Adjusting Nut

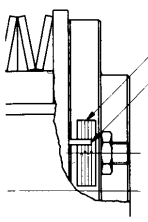
Model	Torque Nm		Max. Speed	Disc Spring	Bore Size		Weight	Inertia
	Min	Max	RPM	Colour	Min	Max	kg.	kgfm² x 10⁻²
CG20	10	44	700	Orange	8	20	0.9	0.23
CG30L CG30H	20 54	54 167	500	Yellow Orange	12	30	2.0	0.79
CG50L CG50M CG50H	69 137 196	147 412 539	300	Yellow Blue Orange	22	50	5.9	4.84
CG70	294	1080	160	Orange	32	70	17.0	25.2
CG90L CG90H	441 931	1323 3136	120	Yellow Orange	42	90	37.5	135
CG110L CG110H	686 1568	1960 5096	100	Yellow Orange	52	110	69.6	364
CG130L CG130H	1176 2646	3038 7154	80	Yellow Orange	60	130	102.0	688

Torque Meter



CG20-CG50

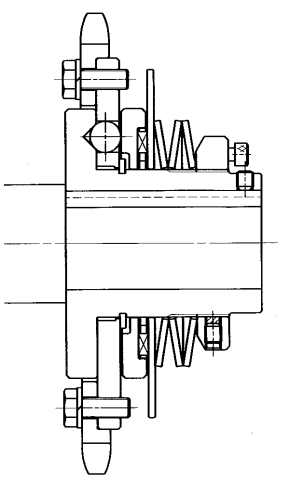
Torque Meter Indicator



CG70

Dimensions in mm

Model	A	B	C	D	Eh7	F	G	H	I	J	K	M	N (No.)	R	S	T
CG20	47	7.5	5.7	25	90	78	62	82	54	48	30	M5	4	5.5	65	1.8
CG30	60	9.5	7	33	113	100	82	106	75	65	42.5	M6	6	6.5	85	2.0
CG50	81	14.5	8.5	44.8	160	142	122	150	117	98	70	M8	6	9.0	125	2.7
CG70	110	14.5	12	68.5	220	200	170	205	166	157	106	M10	6	11.0	175	3.3
CG90	157	25.0	22	88.6	295	265	236	290	213	203	124	M12	8	13.0	242	5.4
CG110	195	30.0	25	105	355	325	287	345	278	266	155	M16	6	17.0	295	6.0
CG130	230	35.0	27	130	400	360	319	390	316	304	184	M16	8	17.0	330	6.6



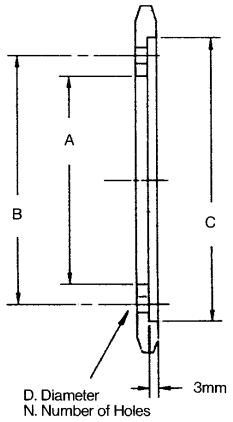
Typical Sprocket Assembly

Dimensions for Mounting Drive Sprockets

Model	A mm	B mm	C mm	D mm	N
CG20	65	78	90.06/ 90.02	5.5	4
CG30	85	100	113.08/113.02	6.5	6
CG50	125	142	160.10/160.02	9.0	6
CG70	175	200	220.10/220.02	11.0	6
CG90	241	265	295.10/295.02	13.0	8
CG110	292	325	355.12/355.02	17.0	6
CG130	324	360	400.12/400.02	17.0	8

Driving members can be Timing Belt Pulleys, Vee-Belt Pulleys, Spur Gears or most common, Roller Chain Sprockets. For roller chain the minimum number of teeth sprocket which can be used is shown in the table below:

Model	CHAIN PITCH (INCHES)								
	¼	8mm	⅜	½	⅝	¾	1	1 ½	2
CG20	48	40	34	26	22				
CG30	60	48	41	32	26	22			
CG50			57	43	35	30	24		
CG70				58	47	40	31		
CG90						47	36	25	
CG110							44	30	26
CG130								33	29



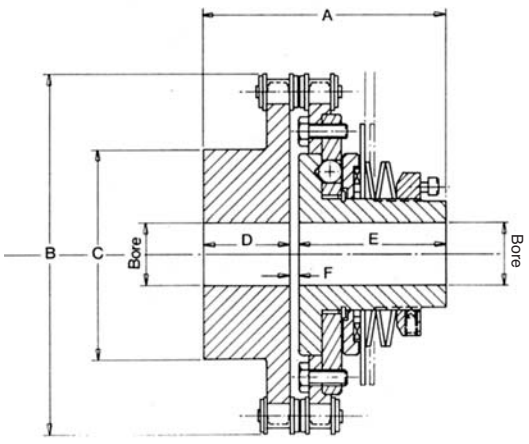
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Type CG Crossgard Flexible Couplings

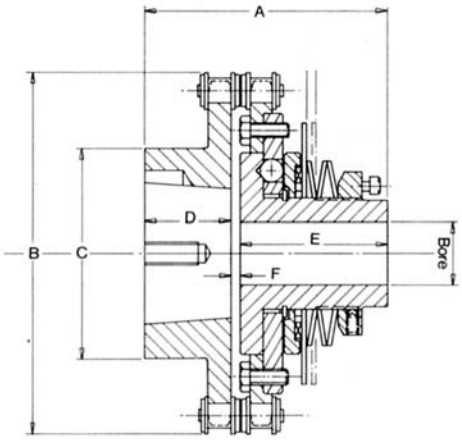
Two basic types of couplings are being offered, Type ES Rubber Elastic Coupling, and Type CC Roller Chain Coupling. Both combine the full overload protection capabilities of the CG Crossgard with facility of shaft to shaft connection.

Crossgard CG-CC Couplings

A standard roller chain sprocket is connected by a duplex roller chain to a platewheel mounted on the CG Clutch. This construction provides a simple, reliable, low cost means of transmitting drive with minimum backlash, and accommodating reasonable shaft misalignment. Both Taper-bored and pilot bore sprockets are available.







CG-CC Crossgard Chain Coupling

Model	Torque NM		Max. Speed	Misalignment		Clutch Bore Size		Coupling Bore Size		Dimensions						Weight	Inertia
	Min	Max	RPM	Parallel	Angular	Min	Max	Min	Max	A	B	C	D	E	F	kg.	kgfm² x10⁻²
CG20-CC	10	44	700	0.25	½°	8	20	16	53	81	118	70	30	47	3.5	2.6	1.43
CG30L-CC CG30H-CC	20 54	54 167	500	0.31	½°	12	30	20	60	99	147	85	35	60	4	4.8	3.7
CG50L-CC CG50M-CC CG50H-CC	69 137 196	147 412 539	300	0.38	½°	22	50	20	63	123.5	199	95	40	81	2.5	12.3	16.9
CG70-CC	294	1080	160	0.51	½°	32	70	25	80	174.5	265	120	50	110	14.5	29.2	81.7
CG90L-CC CG90H-CC	441 931	1323 3136	120	0.76	½°	42	90	30	107	257	374	160	80	157	20	79.5	491
CG110L-CC CG110H-CC	686 1568	1960 5096	100	0.76	½°	52	110	40	107	310	446	160	100	195	15	125.5	1063
CG130L-CC CG130H-CC	1176 2646	3038 7154	80	1.00	½°	60	130	60	150	368	495	225	120	230	18	188.5	2002

Dimensions in mm.

CG-CC Crossgard Taper Bored Chain Coupling

Model	Torque NM		Max. Speed	Misalignment		Clutch Bore Size		Coupling Bore Size		Dimensions						Weight	Inertia
	Min	Max	RPM	Parallel	Angular	Min	Max	Min	Max	A	B	C	D	E	F	kg.	kgfm² x10⁻²
CG20-CC	10	44	700	0.25	½°	8	20	16	53	76	118	76	25	47	3.5	2.4	1.43
CG30L-CCTB CG30H-CCTB	20 54	54 167	500	0.31	½°	12	30	20	60	95	147	90	31	60	4	4.2	3.7
CG50L-CCTB CG50M-CCTB CG50H-CCTB	69 137 196	147 412 539	300	0.38	½°	22	50	20	63	128	199	108	44	81	2.5	11.5	16.9
CG70-CCTB	294	1080	160	0.51	½°	32	70	25	80	175	265	159	51	110	14.5	29	85

For further dimensions of Crossgard Clutch refer to page 15.

Dimensions in mm.

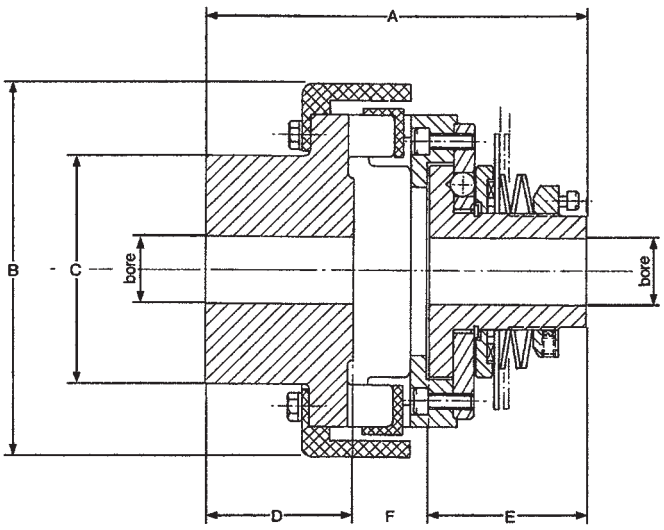
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Crossgard Overload Couplings

Crossgard CG-ES Couplings

The ES Couplings consist of two close grained cast iron jaws with hard rubber drive elements interposed. It is a low inertia coupling combining quiet operation with torsional elasticity to absorb shock loads and damp vibration.





CG-ES Crossgard Coupling

Model	Setting Torque Nm	Max Speed RPM	Misalignment		Clutch		Coupling		A	B	C	D	E	F	Weight kg	Inertia kg m² x10⁻²
			Parallel	Angular	Pilot Bore	Max Bore	Pilot Bore	Max Bore								
CG20-ES	9.6 - 45	700	0.5	0.7°	8	20	-	40	118	92	65	45	47	26	2.7	0.38
CG30L-ES CG30H-ES	19.8 - 54 53.6 - 167	500	0.7	0.7°	12	30	-	55	146	143	88	57	60	29	6.3	1.49
CG50L-ES CG50M-ES CG50H-ES	68 - 147 136 - 407 196 - 540	300	0.9	0.6°	22	50	-	75	199	202	120	75	81	43	16.6	9.2
CG70-ES	294 -1080	160	1.2	0.5°	32	70	-	90	261	257	145	89	110	62	37.6	30.3

Dimensions in mm.

For further dimensions of Crossgard Clutch refer to page 15.

Crossgard Couplings can be supplied with both clutch and coupling hub finish bored, keyseated, with setscrew to customers' requirements on 48-hour re-work service.

Installation of Crossgard CG Clutches

For optimum performance of CG Clutches and couplings it is necessary to have a good fit(transition) between shafts and hubs. Drives should be via a parallel key with interference fit with ideally two set screws to maintain axial position on shaft.

The chain/belt drive should be accurately aligned to avoid axial loading of the clutch; and coupling assemblies should be carefully aligned at installation to minimise operating loads.

All units should be installed with a limit switch or proximity switch to shut down the drive in the event of an overload, refer to page 29 for details standard units available.

Installation of Crossgard Couplings

Prior to installation it is necessary to separate the Crossgard and Coupling half by either removing the duplex chain, or for the ES Coupling removing the outer cover and the rubber element. Fit Crossgard and Coupling half to shafts, for ES Coupling ensure cover is fitted to hub prior to installation. Adjust distance between Crossgard and Coupling according to catalogue dimensions, and align shafts as accurately as possible. Refit duplex chain or rubber element and cover, ensure chain is free to move, and shafts rotate freely.

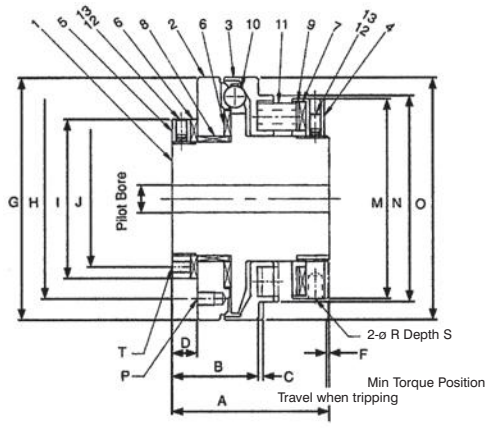
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Type CGX Crossgard Clutch

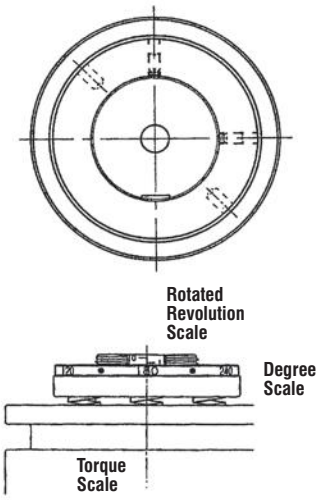
Provides complete overload protection of drives with accurate positioning and zero backlash. Suitable for gears, cams and index table drives.

These clutches can be supplied with pilot bore, finish bore and keyseat, or fitted with clamping elements to clamp directly to keyless shafts. The use of clamping elements ensures total elimination of backlash in the complete assembly within the operating torque range, but does require an increase to the overall length of clutch in order to accommodate. Clutch and clamping element assemblies are supplied from stock to suit specific metric shaft sizes as indicated in the table, using clamping elements types ACE81 & RCK80.





1 Hub
2 Driven Flange
3 Plate
4 Adjusting Nut
5 Fixed Nut
6 Bearing
7 Bearing
8 Bearing
9 Side Plate
10 Steel Ball
11 Coil Spring
12 Set Screw
13 Lock Plug



For Selection of Crossgard CGX Clutches refer to page 14, always use with proximity sensor switch, refer to page 29

Model	Setting Torque Range Nm	Max Running Speed RPM	Colour of Spring x Number	Pilot Bore mm	Max Bore mm	Shaft Clamping Element † Std. Bore Sizes (mm)	*Weight kg	Inertia kgfm² (x10⁻²)
CGX10 L	1.7 - 6.5	1400	Yellow x 3	7	15	8, 9, 10, 11, 12	0.75	0.177
CGX10 M	5.5 - 15		Red x 3					
CGX10 H	11 - 30		Red x 6					
CGX20 L	6.5 - 24	1100	Yellow x 6	8.5	25	11, 12,14, 15, 16, 18, 19, 20	1.67	0.535
CGX20 M	13 - 35		Red x 3					
CGX20 H	26 - 68		Red x 6					
CGX35 L	23 - 68	800	Red x 5	12	35	19, 20, 22, 24, 25, 28, 30	2.51	1.33
CGX35 M	44 - 100		Green x 5					
CGX35 H	89 - 200		Green x 10					
CGX50 L	46 - 120	600	Red x 5	18	55	24, 25, 28, 30, 32, 35, 38, 40, 42	7.03	7.32
CGX50 M	92 - 200		Green x 5					
CGX50 H	180 - 400		Green x 10					
CGX70 L	130 - 370	480	Red x 8	23	70	28, 30, 32, 35, 38, 40, 42, 45 48, 50, 55, 60	11.4	19.5
CGX70 M	270 - 520		Green x 8					
CGX70 H	400 - 785		Green x 12					

Dimensions in mm.
*Weight and inertia values for clutches with max. bore.
† Clamping elements protrude from end of clutch 17.5mm (CG X 10 & 20), 25.0mm (CGX 35 & 50), 31mm(CGX 70)

Models	A	B	C	D	F	G h7	H PCD	I	J PCD	M	N	O	P Screws No.	P Screws Size	R	S	P Screws No.	P Screws Size
CGX10	53	22	1.4	7.5	+0.3	62	54	42	34	56	56	61.8	4	M4x6	5	10	4	M4x7
CGX20	64	35	1.6	10	+0.7	86	74	60	50	70	73	86	6	M5x8	5	10	6	M4x7
CGX35	68	37.5	2.0	11	-0.5	107	88	70	60	88	91	107	6	M6x7	6	10	6	M5x8
CGX50	92	54.8	2.6	15	+0.3	148	130	105	-	123	129	148	6	M8x13	9	17	-	-
CGX70	98	61	3.5	15	+1.0	185	164	135	-	148	153	185	6	M10x13	10	18	-	-

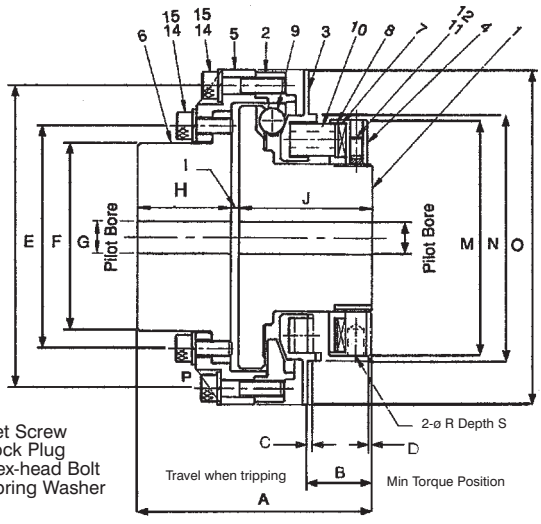
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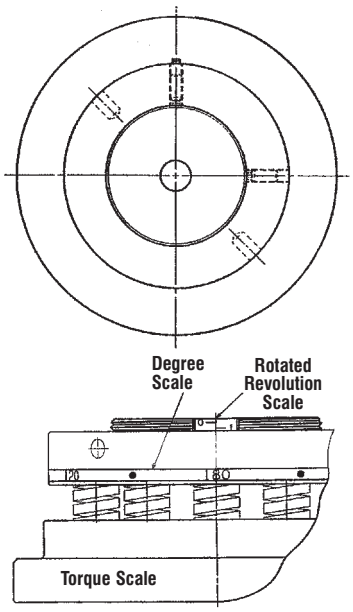
Type CGX-C Crossgard Couplings

Provides complete overload protection of drives with accurate positioning and zero backlash. For shaft to shaft connection.

These couplings can be supplied with pilot bore, finish bore and keyseat and setscrews, or fitted with clamping elements to clamp directly to keyless shafts. The use of clamping elements eliminates all backlash in the drive line within the operating torque range, but does require an increase to the overall length of coupling in order to accommodate. Coupling and clamping element assembly are supplied to suit specific metric shaft sizes as indicated in the table. Clutch and Coupling half can have different bush sizes.







1 Hub
2 Centre Flange
3 Plate
4 Adjusting Nut
5 Flange
6 Boss
7 Bearing
8 Side Plate
9 Steel Ball
10 Coil Spring
11 Set Screw
12 Lock Plug
14 Hex-head Bolt
15 Spring Washer

For Selection of Crossgard CGX-C Clutches refer to page 14, always use with proximity sensor switch, refer to page 29

Model	Setting Torque Range Nm	Max Running Speed RPM	Colour of Spring x Number	Clutch Half		Coupling Half		Shaft Clamping Element † Std. Bore Sizes (mm) () Sizes fit Cplg half only	*Weight kg	Inertia kg m² (x10⁻²)	Maximum Angular Error Deg.	Maximum Parallel Error Deg.	Maximum Axial Movement mm
				Pilot Bore mm	Max Bore mm	Pilot Bore mm	Max Bore mm						
CGX10 LC	1.5 - 5.4	700	Yellow x 3	7	15	7	19	8, 9, 10, 11, 12	1.07	0.222	0.6	0.1	±0.5
CGX10 MC	4.6 - 12.7		Red x 3										
CGX10 HC	9.3 - 25.5		Red x 6										
CGX20 LC	5.2 - 18.6	550	Yellow x 6	8.5	25	8.5	35	11, 12, 14, 15, 16, 18, 19, 20 (22, 24, 25, 28, 30)	2.38	0.924	0.6	0.1	±0.5
CGX20 MC	9.8 - 27.5		Red x 3										
CGX20 HC	20.6 - 55		Red x 6										
CGX35 LC	19 - 57	400	Red x 5	12	35	12	50	15, 16, 18, 19, 20, 22, 24, 25, 28, 30 (32, 35, 38, 40, 42)	3.92	2.65	0.6	0.1	±0.5
CGX35 MC	36 - 84		Green x 5										
CGX35 HC	74 - 166		Green x 10										
CGX50 LC	40 - 98	350	Red x 5	18	55	18	60	24, 25, 28, 30, 32, 35, 38, 40, 42 (45, 48, 50)	10.9	13.34	0.6	0.1	±0.5
CGX50MC	80 - 176		Green x 5										
CGX50HC	160 - 343		Green x 10										
CGX70 LC	120 - 325	240	Red x 8	23	70	23	80	28, 30, 32, 35, 38, 40, 42, 45, 48, 50, 55, 60 (65)	16.3	35.7	0.6	0.1	±0.5°
CGX70 MC	235 - 460		Green x 8										
CGX70 HC	353 - 696		Green x 12										

*Weight and inertia values for couplings with max. bore.
† Clamping elements protrude from end of clutch/coupling 17.5mm to 34.0mm dependant on size.

Models	A	B	C	D Min. Pointed Position	E PCD	F PCD	G	H	I	J	M	N	O	P Screws x Length	Q Screw x Length	R	S
CGX10-C	69	24	1.3	+0.3	62	42	33	25	2	42	56	–	74	M4x18	M4x10	5	10
CGX20-C	84	24	1.6	+0.3	89	66	55	35	3	46	70	–	98	M5x20	M5x12	5	10
CGX35-C	88	24	1.9	- 0.5	113	83	70	35	3	50	88	–	125	M6x25	M6x15	6	10
CGX50-C	114	34	2.4	+0.9	158	112	92	45	4	65	123	128	174	M8x32	M8x20	9	17
CGX70-C	124	36	3.3	+0.6	200	145	116	50	4	70	148	152	218	M10x22	M10x38	10	18

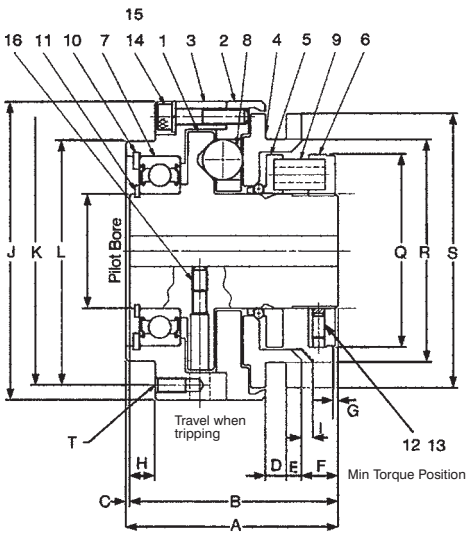
Dimensions in mm.

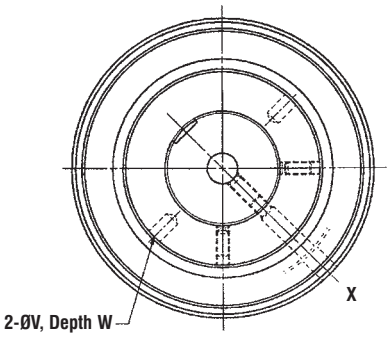
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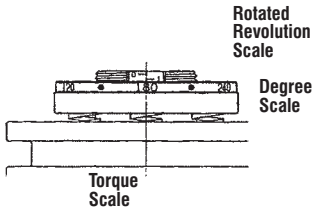
Type CGZ Crossgard Clutch

Provides total disengagement in event of overload.
Suitable for mounting gears, cams sprockets and timing belt pulleys









1 Hub
2 Centre Flange
3 Driven Flange Plate
4 Plate
5 Ball Cage
6 Adjustable Nut
7 Bearing (Z Type)
8 Steel Ball
9 Coil Spring
10 Snap Ring
11 Snap Ring
12 Set Screw
13 Lock Plug
14 Hex-Head Bolt
15 Spring Washer
16 Set Screw

For Selection of Crossgard CGZ Clutches refer to page 14.

Model	Setting Torque Range Nm	Max Running Speed RPM	Colour of Spring x Number	Pilot Bore mm	Max Bore mm	*Weight kg	Inertia kgfm² (x10⁻²)
CGZ20 L	2.4 - 8.3	1800	Yellow x 3	8	20	2.57	1.09
CGZ20 M	4.1 - 15.7		Blue x 3				
CGZ20 H	8.2 - 31.4		Blue x 6				
CGZ30 L	6 - 20	1800	Yellow x 4	12	30	4.17	2.78
CGZ30 M	20 - 52		Red x 4				
CGZ30 H	39 - 108		Red x 8				
CGZ40 L	26 - 93	1800	Blue x 5	17	40	8.71	9.60
CGZ40 M	44 - 127		Red x 5				
CGZ40 H	88 - 245		Red x 10				
CGZ50 L	63 - 157	1800	Red x 5	22	50	13.7	21.2
CGZ50 M	128 - 304		Red x 10				
CGZ50 H	245 - 450		Green x 10				

*Weight and inertia values for clutches with max. bore.

Dimensions in mm.

Model	A	B	C	D	E	F	G	H	I Travel when tripping	J	K PCD	L h7	N	Q	R	S	T Screw No.	T Screw Size x length	V	W	SIZE
CGZ20	74	73	1	8	6	13.5	0.8	11	4.1	96	86	72	24.5	58	70	88	4	M5x10	5	10	M5x10
CGZ30	83.5	82	1.5	8	6	14.5	1.1	11.5	4.7	118	106	87	27.5	76	88	108	4	M6x12	6	10	M6x10
CGZ40	101	100	1	9	8	20	1.1	14	5.9	152	139	114	32.5	104	119	141	6	M6x12	8	14	M8x10
CGZ50	114.5	112	2.5	10	9	20.2	1.2	16	7	178	162	133	37	114	138	166	6	M8x16	9	14	M8x10

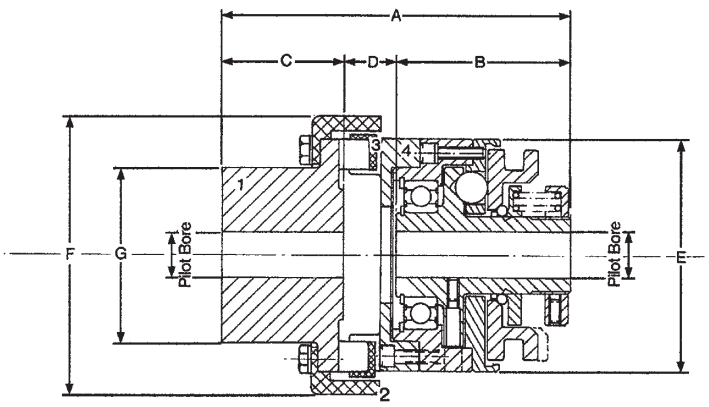
Type CGZ clutches totally disengage on overload, and will not re-engage drive without external axial force being applied to the pressure plate when the clutch is correctly aligned. The clutch must be stationary when re-engaged, otherwise the clutch may be damaged.
The CGZ clutch can be used as a mechanical engage/disengage clutch, but whilst the clutch can be dis-engaged at full speed by applying an axial force to the pressure plate, it can only be engaged whilst stationary. These clutches are designed for use on horizontal shafts, but may be applied to vertical shaft applications providing the driven flange plate is uppermost.

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Type CGZ Crossgard Flexible Couplings

For shaft to shaft connection the CGZ Couplings provides total disengagement in the event of overload. Suitable for mounting on high speed shafts. The coupling consists of two close grain cast iron jaws with hard rubber drive elements interposed. A low inertia coupling which combines quiet operation with torsional elasticity to absorb shock loads and damp vibrations.





1 Coupling Hub
2 Cover
3 Rubber Element
4 Connecting Flange

For Selection of Crossgard CGZ Clutch Couplings refer to page 14.

Model	Setting Torque Range Nm	Max Running Speed x RPM	Colours of Spring x Number	Coupling Model	Max Allowable Misalignment			Weight kg	Inertia kgfm² (x10⁻²)
					Parallel mm	Angular	Axial mm		
CGZ20 L-ES	2.4 - 8.3	1800	Yellow x 3	10SF	0.6	0.7°	±1.0	4.87	1.29
CGZ20 M-ES	4.1 - 15.7		Blue x 3						
CGZ20 H-ES	8.2 - 31.4		Blue x 6						
CGZ30 L-ES	6 - 20	1800	Yellow x 4	25SF	0.7	0.7°	±1.0	8.5	3.5
CGZ30 M-ES	20 - 52		Red x 4						
CGZ30 H-ES	39 - 108		Red x 8						
CGZ40 L-ES	26 - 93	1800	Blue x 5	63SF	0.8	0.6°	±1.2	17.5	11.5
CGZ40 M-ES	44 - 127		Red x 5						
CGZ40 H-ES	88 - 245		Red x 10						
CGZ50 L-ES	63 - 157	1800	Red x 5	100SF	0.9	0.6°	±1.2	25.7	26.6
CGZ50 M-ES	128 - 304		Red x 10						
CGZ50 H-ES	245 - 450		Green x 10						

*Weight and inertia values for couplings with max. bore.

Dimensions in mm

Model	Crossgard		*Coupling	A	B	C	D	E	F	G
	Pilot Bore	Max Bore	Max Bore							
CGZ20-ES	8	20	45	142	73	48	21	96	114	72
CGZ30-ES	12	30	55	167	82	57	28	118	143	88
CGZ40-ES	17	40	70	202	100	67	35	152	181	110
CGZ50-ES	22	50	75	229	112	75	42	178	202	120

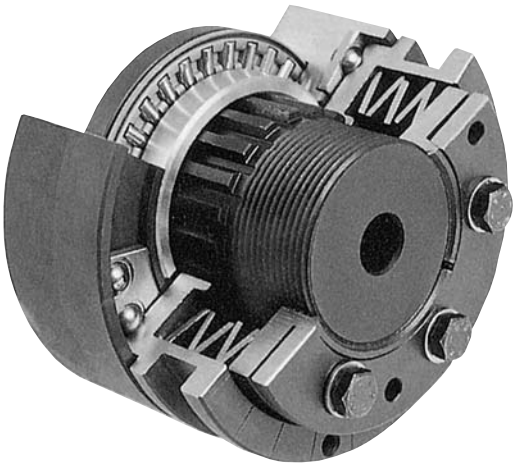
For detail dimensions of CGZ Clutch refer to page 20.
*Couplings halves are stocked unbored and centred.

Stock Couplings can be reworked to customers' bore and keyway requirements on short delivery lead time.

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Cross Safegard Overload Clutches

The Safegard CS series Overload Clutches were developed to provide overload protection for the transmission of high torques within a compact unit. Directly interchangeable with other units in the market, this series offers low cost protection with a minimum of maintenance and long reliable service life.
Safegard CS series are offered in two basic types, the standard type, available in 6 sizes for bores up to 65mm, with torque range of 2.5 to 1800Nm, see pages 24/25, provide optimum speed and torque capabilities; and the Mini type, available in 4 sizes for bores up to 45mm, with torque range 2.5 to400Nm, see pages 26/27, for a lower cost option for slower speed drives. Both types are available as basic clutch, and also as shaft couplings. The basic clutch is offered in three basic designs to enable alternate methods for connecting driven components.
Four modes of drive operation are available, to suit the requirements of different applications, as outlined below, the principles of operation of each being detailed opposite.



The Safegard CSF Clutch uses a large number of equally spaced balls to provide the drive, and the clutch ratchets from one drive position to the next in the event of an overload. The design allows for high operating speeds, and the possibility to recapture drive in the event of an inertia created overload during starting, but do not provide any synchronisation between input and output.

The Synchron CSY Clutch uses 7 rollers unequally spaced to provide the drive, ensuring that there is only one position of engagement of the drive, enabling full synchronisation between driver and driven shafts.

The Safe Lift CSL Clutch has a retaining ring to prevent disengagement of the drive, but allowing sufficient movement to actuate a limit switch. This clutch is ideal on applications where components cross one another's path, as synchronisation is maintained even when clutch has overloaded. The clutch also controls forward inertia drives.

The Contact-Free CSZ Clutch totally disengages in the event of an overload, and requires an outside force to be re-engaged. This enables the clutch to be operated at higher speeds, and also to be used on applications where it is undesirable to stop the motor quickly. The requirement of an external force to re-engage ensures the machine can be checked prior to a restart.

Safegard Series Clutches offer the following operating advantages:

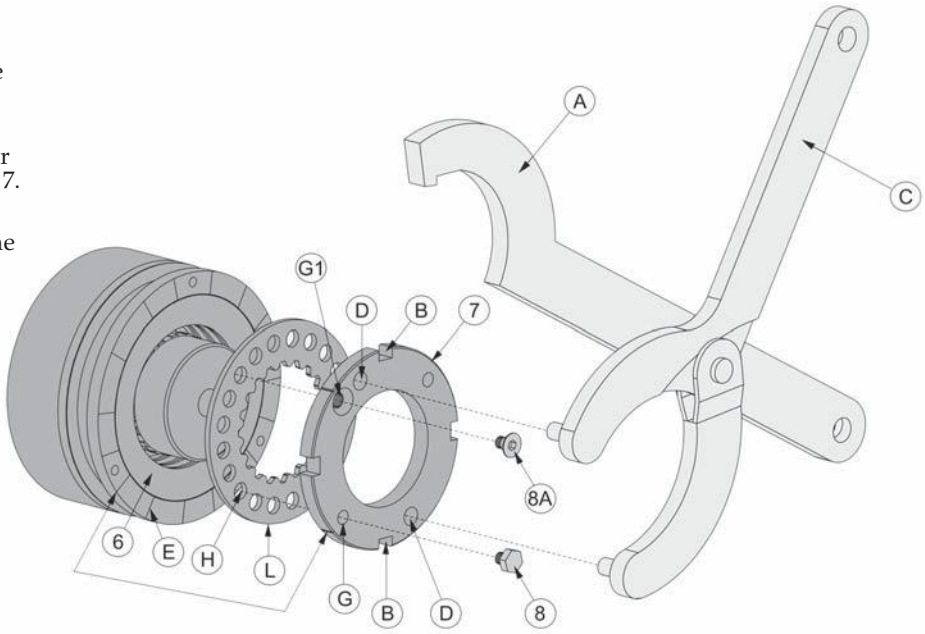
- Long Service Life
- Cater for Frequent Overloads
- No Maintenance required
- Standardised Sizes
- Continued Operating Reliability
- Maintained Torque Accuracy
- Rapid Drive Disengagement
- Very Fine Torque Adjustment

Method of Torque Adjustment

Torque Adjustment on Safegard series Clutches is relatively simple process by the following procedure.

Refer to diagram below, to adjust the Torque on a Clutch first remove screws 8 or 8A to permit free rotation of adjusting nut 7.

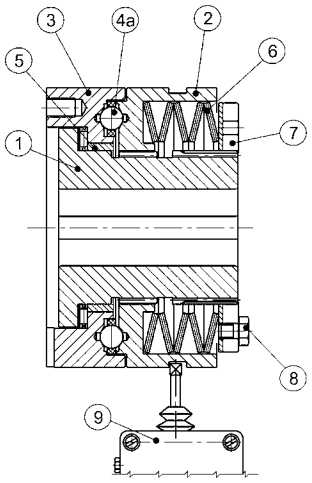
If first adjustment manually tighten the adjusting nut 7 until it is in contact with the springs. Insert a C spanner 'A' into slots D, or a face wrench 'C' into holes D and tighten the nut clockwise to achieve desired Torque as indicated by the number of indents E moved. Replace screw 8 or 8A in thread hole G or G1 with adjusting nut positioned so this lines up with one of the holes H in the locking washer L.



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Cross Safegard CS Clutch Types

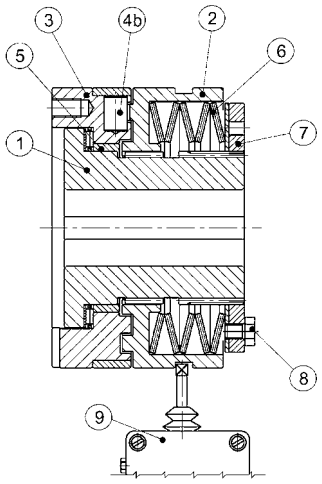
Safegard CSF



During normal operation the drive is transmitted by the sliding hub 2, which is connected by a spline to the main hub 1, and via a ring of balls 4a to the output flange 3. Drive is maintained by the springs 6 exerting pressure on flange 2, so keeping the balls in their respective indents in flange 2 & 3.

When an overload occurs the balls ride up the indents pushing flange 2 back which will actuate limit switch 9. During overload conditions plain bearing 5 maintains concentricity and ensures free running. The balls will re-engage in the nearest indents when the overload is removed. Torque adjustment is by rotation of nut 7.

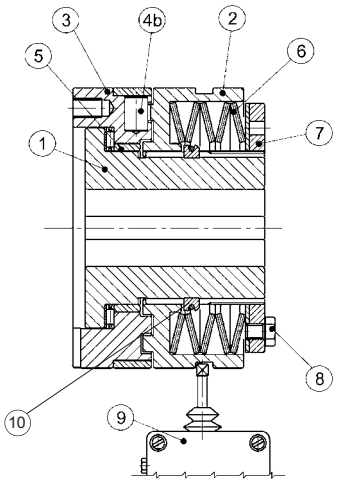
Synchron CSY



The Synchron clutch functions in much the same way as the Safegard, and has similar construction in except the balls 4a are replaced by seven rollers 4b. The rollers are unequally spaced so the clutch will only engage drive in one angular position, providing full synchronisation of the drive.

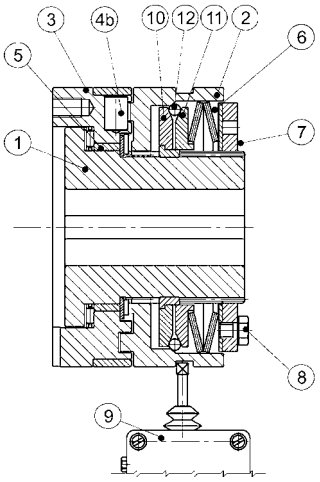
When an overload occurs the rollers ride up the indents pushing flange 2 back which will actuate limit switch 9. During overload conditions plain bearing 5 maintains concentricity and ensures free running. The rollers will re-engage in the nearest indents when the overload is removed. Torque adjustment is by rotation of nut 7.

Safe Lift CSL



The Safelift clutch is of identical design and operation to the Synchron clutch with the addition of a restricting ring 10 which prevents full dis-engagement of the clutch in the event of an overload; thus maintaining drive at all times. An overload still causes the rollers to ride up the detents sufficient to activate the limit switch 9, but they are prevented from totally disengaging. On these units it is essential that a limit switch is used to turn off the drive. These units are ideal when high inertia loads are involved to prevent on running of the driven equipment, also they can be electrically isolated during starting to ignore tripping at that time.
Torque adjustment is by rotation of nut 7.

Contact Free CSZ



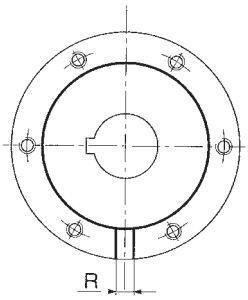
The Contact-free clutch is based on the Synchron clutch with modification to the outer flange 2, and the addition of locking assembly parts 10/11/12. In normal drive mode the pressure from the spring is conveyed to the flange 2 via the pressure plate 11and locking ball race 12. In the event of an overload the flange 2 is still pushed back, but this action also forces the locking balls inwards forcing the pressure plate 11 to move back from the locking ring 10. In the tripped condition the locking balls 12 apply no axial load to the outer flange 2 and thus the clutch will not re-engage, but instead runs totally free. To re-engage drive the outer flange 2 and output flange 3 must be correctly aligned,and then a light axial load applied to the outer flange to move it back into engagement.

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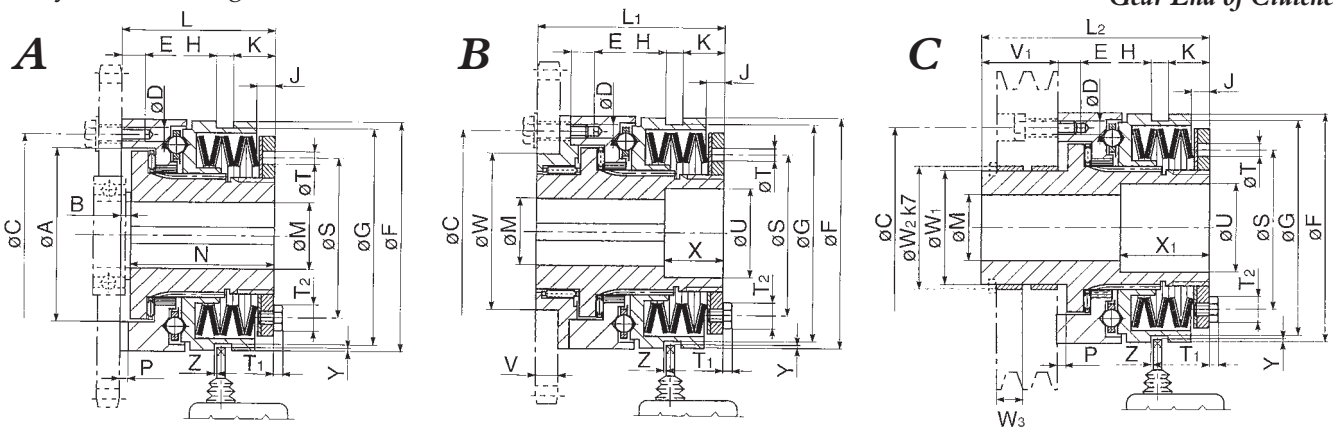
Cross Safegard Overload Clutches

CS Standard Series Clutches

The standard series of clutches are available in 8 sizes offering three modes of operation, simple overload, synchronous overload, and safelift, and in 7 sizes of the total dis-engagement design. All are available with three methods of supporting drive sprockets, pulleys, or gears, to provide flexibility in application design.
Type A - allows simple connection of a driven gear with its own bearing support.
Type B - has an integral needle roller bearing providing full support of driven gear.
Type C - has extended inner race to mount larger pulleys with plain bearings.
Up to Four torque ranges are available on each size of clutch, controlled by selection of the actuating spring set, providing a wide range of torque capacities to select from.
Inertias are provided for each half of the clutch in dis-engaged condition, the hub inertia incorporating all items that revolve free with the hub, and the flange inertia all those items that stay with the flange connection.



View from Driven Gear End of Clutches



CS Standard Series - Technical Capacities

Models* A, B & C	Torque Range according to Spring Selection					Max. Speed			Bore Size		Weight kg			Hub Inertia kgcm²			Flange Inertia kgcm²		
	S Nm	M Nm	L Nm	U Nm	R Nm	S/M rpm	L/U rpm	'R' rpm	min mm	max mm	Type A	Type B	Type C	Type A	Type B	Type C	Type A	Type B	Type C
CSF20	2.5-5.0	5-10	10-20	20-40		3300	1800		7	20	0.5	0.7	0.6	1.0	1.1	1.1	0.9	1.2	0.9
CSY20	5-10	10-20	20-40			1000	500												
CSL20	5-10	10-20	20-40			4000	3000												
CSF25	6-12	12.3	25-55	55-100		2900	1450		10	25	1.5	2.0	1.8	6.7	7.0	7.2	6.2	9.1	6.2
CSY25	12-25	25-50	50-100			950	450												
CSL25	12-25	25-50	50-100			3900	2900												
CSZ25	12-25	25-50	50-100			5000	5000												
CSF35	12-25	25-50	50-120	120-200		2400	1200		14	35	2.9	3.2	3.0	19.0	20.5	21.4	14.9	18.2	14.9
CSY35	25-50	50-100	100-200			800	400												
CSL35	25-50	50-100	100-200			3300	2400												
CSZ35	25-50	50-100	100-200			4000	4000												
CSF45	25-50	50-100	100-250	250-400		2000	1000		18	45	5.0	6.0	5.8	51.7	54.1	57.0	38.0	48.4	38.0
CSY45	50-100	100-200	200-400			650	300												
CSL45	50-100	100-200	200-400			2800	2000												
CSZ45	50-100	100-200	200-400			3500	3500												
CSF55(R)	50-100	100-200	200-500	500-800	800-2000	1600	850	90	24	55	9.8	11.8	11.5	163	171	177	100	143	100
CSY55(R)	100-200	200-400	400-800		800-2000	550	250	90											
CSL55(R)	100-200	200-400	400-800		800-2000	2300	1600	700											
CSZ55	100-200	200-400	400-800			3000	3000												
CSF65(R)	85-200	170-500	300-1000	700-1800	1200-3400	1400	700	70	30	70*	16.0	20.0	19.0	416	428	439	235	310	235
CSY65(R)	170-400	350-900	700-1800		1200-3400	400	150	70											
CSL65(R)	170-400	350-900	700-1800		1200-3400	1800	1400	600											
CSZ65	170-400	350-900	700-1800			2300	2300												
CSF80(R)	180-480	360-960	720-1950	1600-3300	2900-5800	1200	600	40	40	80	21.0	26.0	25.5	769	789	825	396	547	396
CSY80(R)	300-750	600-1500	1200-3000		2900-5800	150	80	40											
CSL80(R)	300-750	600-1500	1200-3000		2900-5800	1500	1000	400											
CSZ80	300-750	600-1500	1200-3000			1600	1600												
CSF100(R)	250-520	500-1050	1000-2100	2000-3600	3000-8200	950	480	30	50	110*	37.0	44.0	45.0	1968	2030	2109	969	1238	969
CSY100(R)	550-110	1100-2200	2200-4400		3000-8200	100	50	30											
CSL100(R)	550-110	1100-2200	2200-4400		3000-8200	1300	800	300											
CSZ100	550-110	1100-2200	2200-4400			1400	1400												

*For clutch Part No. for ordering refer to page 27.

CS Standard Series Dimensions

Models CSF/CSY and CSL/CSZ	Dimensions mm																							
	AG7	B	C	D	E	F	G	H	J	K	L	L1	L2	N	P	R	U	V	V1	Wh6	W1	X	X1	Y	Z
20	41.0	4.0	48	6xM5	6.5	55	50	9	3.0	7.5	38.5	51.5	66	35.0	3.1	6	21	8	27.5	38	28	15	25.5	2	0.1
25	60.0	4.0	70	6xM5	8.0	82	73	9	6.0	11.5	52.0	70.0	83	48.0	3.1	6	26	10	33.0	50	38	20	35.0	2	0.1
35	78.0	5.0	89	6xM6	10.0	100	91	9	6.0	12.0	61.0	78.0	100	56.0	3.6	8	36	12	39.0	60	52	25	45.0	2	0.1
45	90.5	5.0	105	6xM8	12.0	120	112	10	8.5	21.0	78.0	96.0	125	72.0	4.1	10	46	12	47.0	80	65	30	59.0	2	0.1
55	105.0	6.5	125	6xM10	15.0	146	140	9	11.0	27.0	100.0	124.5	153	93.5	4.1	12	56	16	52.5	100	78	30	60.0	2	0.1
65	120.5	6.5	155	6xM12	17.0	176	170	9	12.0	33.0	113.5	140.0	171	107.0	4.6	14	66	18	57.5	120	90	30	60.0	2	0.1
80(not CS-Z)	136.0	7.0	160	6xM12	20.0	200	190	9	14.0	39	119	150	183	112.0	5.3	16	82	20	64	130	108	25	55.0	2	0.1
CSZ 80	136.0	7.0	160	6xM12	20.0	200	190	9	29.0	53	134	165	198	127.0	5.3	16	82	20	64	130	108	40	70.0	2	0.1
100(not CS-Z)	168.0	8.0	200	6xM16	25.0	240	230	9	15.0	46	141	175	213	133.0	5.8	18	111	25	72	160	135	35	70.0	2	0.1
CSZ 100	168.0	8.0	200	6xM15	25.0	240	230	9	33.0	64	159	193	231	151.0	5.8	18	111	25	72	160	135	53	88.0	2	0.1

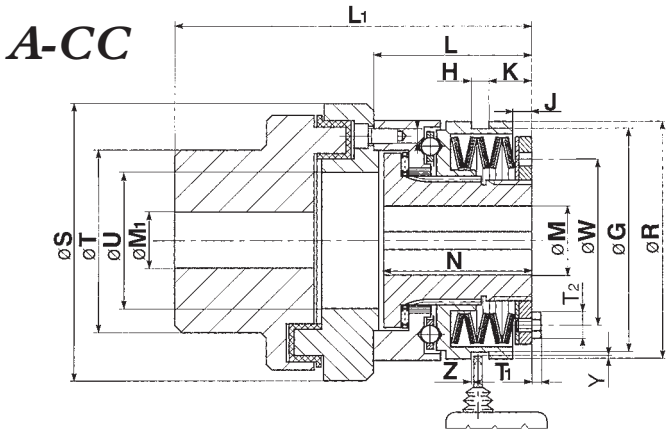
For Limit Switch location and operation refer to page 29. Always use limit switch for long service life.

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Cross CS Overload Shaft Couplings

CS Standard Series Couplings

For shaft to shaft connection CS Standard series clutches are available with an elastomeric coupling for all the sizes and modes of operation, simple overload, synchronous overload, or safe lift and total dis-engagement.
The elastomeric Coupling permits up to 1/2 degree angular misalignment, with 0.3mm radial and a maximum of 0.5mm axial. The rubber element absorbs peak shocks, providing greater accuracy in overload protection.
Up to five torque ranges are available on each size of clutch, controlled by selection of the actuating spring set, providing a wide range of torque capacities to select from.
Inertias are provided for each half of the clutch in dis-engaged condition, the hub inertia incorporating all items that revolve free with the hub, and the coupling inertia all those items that stay with the flexible coupling.



CS Standard Series Couplings - Technical Capacities

Models*	Torque Range according to Spring Selection					Max. Speed			Bore Size mm			Weight kg	Inertia kgcm²	
	S Nm	M Nm	L Nm	U Nm	R Nm	S/M rpm	L/U rpm	'R' rpm	Clutch M min	Clutch M max	Cplg. M1 max		Hub Side	Cplg Side
CSF20 CSY20 CSL20	2.5-5.0 5-10 5-10	5-10 10-20 10-20	10-20 20-40 20-40	20-40		3300 1000 4000	1800 500 3000		7	20	30	1.2	1.0	6.1
CSF25 CSY25 CSL25 CSZ25	6-12 12-25 12-25 12-25	12.3 25-30 25-50 25-50	25-55 50-100 50-100 50-100	55-100		2900 950 3900 5000	1450 450 2900 5000		10	25	50	5.0	6.7	71.8
CSF35 CSY35 CSL35 CSZ35	12-25 25-50 25-50 25-50	25-50 50-100 50-100 50-100	50-120 100-200 100-200 100-200	120-200		2400 800 3300 4000	1200 400 2400 4000		14	35	50	6.4	19.0	81.0
CSF45 CSY45 CSL45 CSZ45	25-50 50-100 50-100 50-100	50-100 100-200 100-200 100-200	100-250 200-400 200-400 200-400	250-400		2000 650 2800 3500	1000 300 2000 3500		18	45	60	10.6	51.7	148.5
CSF55(R) CSY55(R) CSL55(R) CSZ55	50-100 100-200 100-200 100-200	100-200 200-400 200-400 200-400	200-500 400-800 400-800 400-800	500-800	800-2000 800-2000 800-2000	1600 550 2300 3000	850 250 1600 3000	90 90 700	24	55	60 90 (R type)	15 26	163	279 500
CSF65(R) CSY65(R) CSL65(R) CSZ65	85-200 170-400 170-400 170-400	170-500 350-900 350-900 350-900	300-1000 700-1800 700-1800 700-1800	700-1800	1200-3400 1200-3400 1200-3400	1400 400 1800 2300	700 150 1400 2300	70 70 600	30	70*	70 90 (over 1000Nm) 115 (R type)	416	27 36 42	734 980 1350
CSF(80R) CSY80(R) CSL80(R) CSZ80	180-480 300-750 300-750 300-750	360-960 600-1500 600-1500 600-1500	720-1950 1200-3000 1200-3000 1200-3000	1600-3300	2900-5800 2900-5800 2900-5800	1200 150 1500 1600	600 80 1000 1600	40 40 400	40	80	115	48	769	1580
CSF100(R) CSY100(R) CSL100(R) CSZ100	250-520 550-1100 550-1100 550-1100	500-1050 1100-2200 1100-2200 1100-2200	1000-2100 2200-4400 2200-4400 2200-4400	2000-3600	3000-8200 3000-8200 3000-8200	950 100 1300 1400	480 50 800 1400	30 30 300	50	110*	125	70	1968	2500

*The maximum bore on these clutches is only possible with keyways to DIN 6885 sheet 3

CS Standard Series Couplings - Dimensions

Models CSF/CSY and CSL/CSZ	Dimensions															
	G	H	J	K	L	L1	N	R	S	T	T1	T2	U	W	Y	Z
20A-CC	50.0	9	3.0	7.50	38.5	86.0	34.5	55	67	46	3.0	7	33	38.5	2	0.1
25A-CC	72.5	9	6.0	11.50	52.0	137.5	48.0	82	112	79	3.5	8	50	54	2	0.1
35A-CC	90.5	9	5.0	12.00	61.0	147.0	56.0	100	112	79	4.0	10	60	70	2	0.1
45A-CC	112.0	10	8.5	21.00	78.0	176.5	73.0	120	128	90	4.0	10	70	84	2	0.1
55A-CC	140.0	9	11.0	27.00	100.0	211.5	93.5	146	148	90	5.5	13	70	108	2	0.1
55A(R)-CC	140.0	9	11.0	27.00	100.0	257.0	93.5	146	198	140	5.5	13	90	108	2	0.1
65A-CC	170.0	9	12.0	33.00	113.5	242.5	107.0	176	177	107	5.5	13	90	129	2	0.1
65A-CC(1000Nm+)	170.0	9	12.0	33.00	113.5	272.0	107.0	176	198	140	5.5	13	90	129	2	0.1
65A(R)-CC	170.0	9	12.0	33.00	113.5	312.0	107.0	176	225	180	5.5	13	113	129	2	0.1
80(not CSZ)A-CC	190.0	9	14.0	39.00	119.0	299.5	183.0	112	225	180	15.0	24	113	150	2	0.1
CSZ 80A-CC	190.0	9	29.0	53.00	134.0	314.5	198.0	127	225	180	15.0	24	113	150	2	0.1
100(not CSZ)A-CC	230.0	9	15.0	46.00	141.0	339.0	213.0	133	255	200	21.0	30	127	186	2	0.1
CSZ 100A-CC	230.0	9	33.0	64.00	159.0	357.0	231.0	151	255	200	21.0	30	127	186	2	0.1

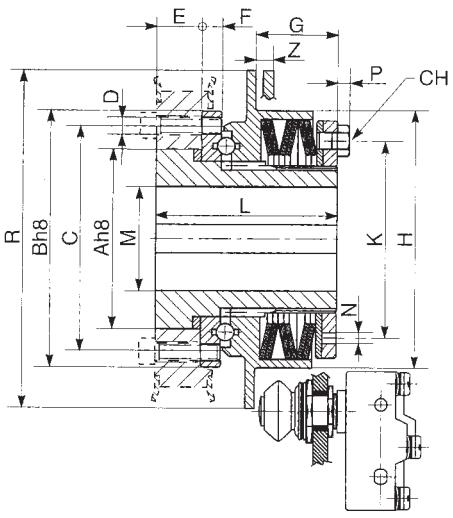
For details on Limit Switch location and operation refer to page 29. Always use limit switch for long service life.
*For clutch Part No. for ordering refer to page 27.

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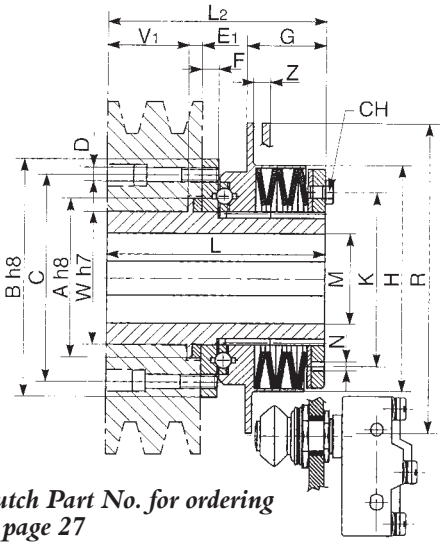
CS Mini Series Clutches

The CS Mini series of clutches is available in 4 basic sizes with simple overload, and synchronous overload facility
These lower cost units are offered with two methods to attach sprockets. gears, or pulleys.
Type E - allows connection of driven gear with its own external bearing support.
Type F - has extended inner race suitable to mount larger pulleys with a bronze or needle roller bearing.
Four torque ranges are available on standard units, and three on the synchronous version, providing a wide range of torque capacity to select from.
The series is suitable for moderate speed applications with low radial forces and infrequent tripping. The design is suited to inline stop switch, or proximity switch.

E



F



For Clutch Part No. for ordering refer to page 27

CS Mini Series - Technical Capacities

Models* E & F	Torque Range according to Spring Selection				Max. Speed		Bore size		Weight kg	Inertia kgcm²
	S Nm	M Nm	L Nm	U Nm	S/M rpm	L/U rpm	min mm	max mm		
CSF20	2.5-5.0	5-10	10-20	20-40	800	800	7	20	0.5	2.7
CSY20	5-10	10-20	20-40		700	500				
CSF25	6-12	12-25	25-55	55-100	800	700	10	25	1.5	7.6
CSY25	12-25	25-50	50-100		700	450				
CSF35	12-25	25-50	50-120	120-200	800	600	14	35	2.5	25.0
CSY35	25-50	50-100	100-200		700	400				
CSF45	25-50	50-100	100-250	250-400	800	500	18	45	5.0	81.0
CSY45	50-100	100-200	200-400		650	300				

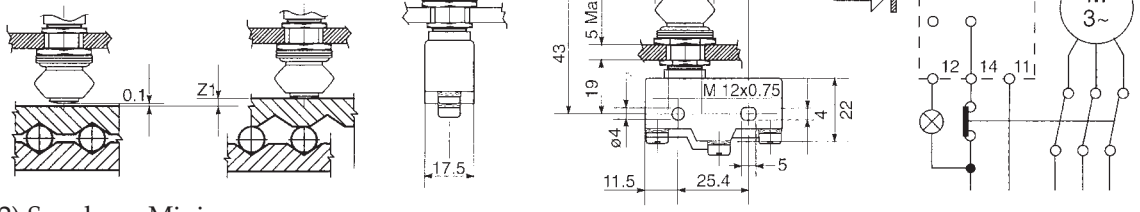
CS Mini Series Dimensions

Models CSF & CSY	Dimensions mm																		
	A_{h8}	B_{h8}	C	D	E	E_1	F	G	H	K	L	L_2	N	P	R	V	V_1	W_{h7}	CH
20	36	55	46	6xM5	11.5	4.5	5.5	21.7	53	38	50	83.5	3	2.8	80	47.5	40.5	30	7
25	46	70	59	6xM5	16.5	5.5	7.0	23.2	74	54	57	94.0	4	3.5	100	59.0	48.0	35	8
35	64	90	80	6xM6	16.5	6.5	7.0	29.0	88	70	65	108.0	4	4.0	120	85.5	53.0	50	10
45	78	115	100	6xM6	22.0	8.0	8.0	34.5	114	86	81	127.0	5	4.0	150	98.5	60.0	65	10

Emergency Stop Switch Location and Operation - Switch CSS2

The Stop Switch (available separately) should be used on all applications.

Clutch Size	Z¹ (1) mm	Z¹ (2) mm
20	1.4	1.2
25	1.4	1.2
35	2.4	1.8
45	2.4	2.0



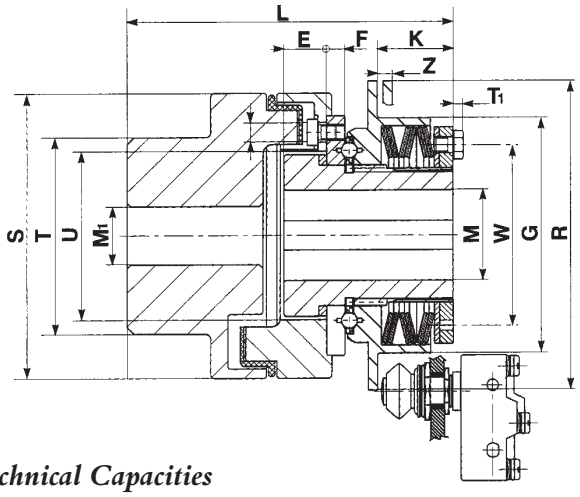
(1) Safegard Mini - (2) Synchron Mini

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CS Mini Series Couplings

For shaft to shaft connection CS Mini series clutches are available with an elastomeric coupling for all the sizes and modes of operation, simple overload, synchronous overload.
The elastomeric Coupling permits up to 1/2 degree of angular misalignment, with 0.3mm radial, and a maximum of 0.5mm axial. The rubber element absorbs peak shocks, providing greater accuracy in overload protection.
Up to four torque ranges are available on each size of clutch, controlled by selection of the actuating spring set, providing a wide range of torque capacities to select from.
The series is suitable for moderate speed applications with low radial forces and infrequent tripping. The design is suited to inline stop switch, or proximity switch, see page 26.

E-CC



CS Mini Series Couplings - Technical Capacities

Models*	Torque Range according to Spring Selection				Max. Speed		Bore Size mm			Weight	Inertia
	S Nm	M Nm	L Nm	U Nm	S/M rpm	L/U rpm	Clutch M min	Clutch M max	Cplg. M1 max	kg	kgcm²
CSF20E-CC	2.5-5.0	5-10	10-20	20-40	800	800	7	20	30	1.2	8
CSY20E-CC	5-10	10-20	20-40		700	500					
CSF25E-CC	6-12	12-25	25-55	55-100	800	700	10	25	35	2.5	21
CSY25E-CC	12-25	25-50	50-100		700	450					
CSF35E-CC	12-25	25-50	50-120	120-200	800	600	14	35	50	5.2	91
CSY35E-CC	25-50	50-100	100-200		700	400					
CSF45E-CC	25-50	50-100	100-250	250-400	800	500	18	45	60	10.0	205
CSY45E-CC	50-10	100-200	200-400		650	300					

*For clutch Part No. for ordering refer below

CS Mini Series Couplings - Dimensions

Models CSF/CSY	Dimensions												
	E	F	G	K	L1	N	R	S	T	T1	T2	U	W
20E-CC	11.5	5.5	53	21.7	84.5	50	80	67	46	2.8	7	37	38
25E-CC	16.5	7.0	74	23.2	98.0	57	100	82	53	3.5	8	48	54
35E-CC	16.5	7.0	88	29.0	132.0	65	120	112	79	4.0	10	66	70
45E-CC	22.0	8.0	114	34.5	155.0	81	150	128	90	4.0	10	81	86

Catalogue Part Numbers

To order Safegard series clutches it is essential to identify clutch type, size (refers to max bore capacity), connection flange design, and spring ratings for correct torque, (see rating for each clutch).

Examples Clutch Reference ***CSF 35A/M*** is a Safegard (type CSF) size 35, design A with M rated springs (25-50 Nm).
CSY 25E/L is a Synchron (type CSY) size 25, design E (Mini Series) with L rated springs (50-100 Nm).

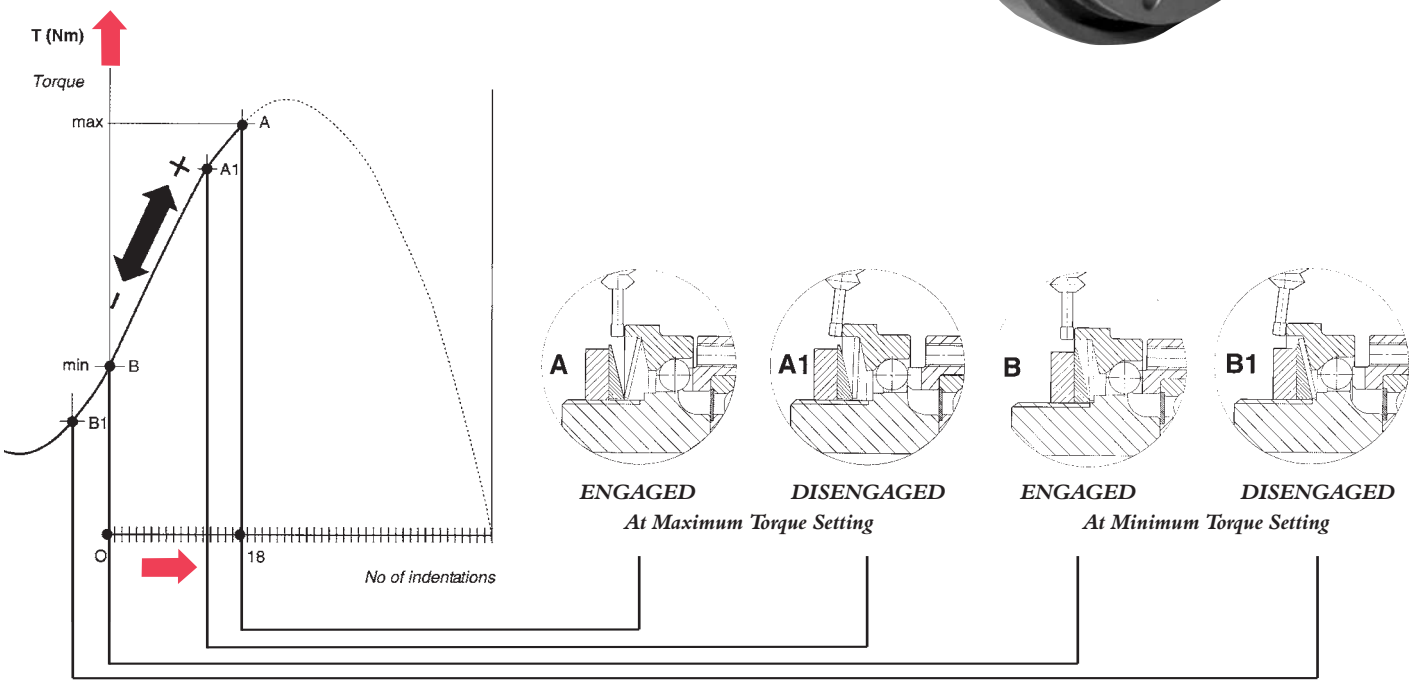
Couplings are identified by suffix - CC, e.g. ***CSY 25E/L - CC*** is coupling version of above clutch. Clutches come with pilot bores, but can be supplied finish bored if specified on order.

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Series CZ and CN Zero Backlash Safegard Overload Clutch

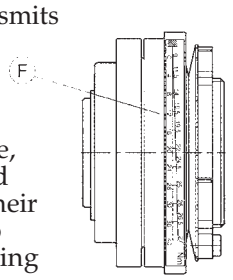
Zero backlash Overload Clutches and Couplings, series CZ and CN, available in 8 different basic types, and 12 basic sizes, for shaft diameters from 8mm to 60mm; providing Overload Protection for Torque values from 5Nm to 740Nm.
The CZ series Safegard overload clutches were developed to provide a totally backlash free transmission of power with a very responsive overload protection. These compact units are directly interchangeable with existing designs in the market providing a cost advantage with long reliable service life.
Two basic modes of operation are available, the basic CZF/CNF Safegard ratchetting design with the driving balls equally spaced so that clutch can re-engage after a small angle of rotation, and the Synchron CZY/CNY design with the balls unequally spaced so that clutch can only re-engage after a full revolution so providing full synchronisation between driver and driven. Responsive overload reaction is obtained by the use of negative functioning Disc Springs to apply drive load. In the event of an overload the spring load actually decreases, allowing faster dis-engaging of the drive, and minimal pressure on the driving surface in the dis-engaged mode, reference diagrams below.

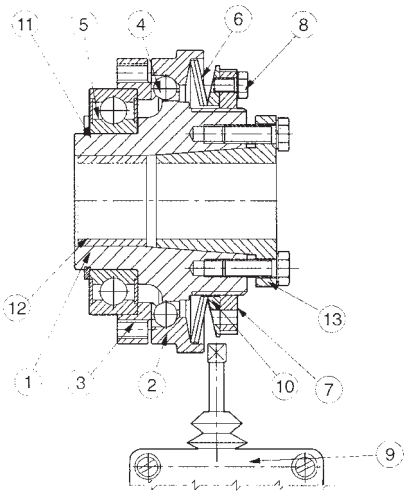




Method of Operation

During normal operation the CZ/CN Overload Clutches transmits the torque from the Hub (1) to the Flange (3) by a number of hardened steel balls (4) located in pockets in the Hub, and forced into matching seats in the Flange by the Disc Spring (6) applying load to the Pressure Flange (2).
In the event that the Driving Torque exceeds the pre-set value, the reaction forces on the Steel Balls exceeds the force applied by the Pressure Flange, and the Balls start to ride-up out of their seats in the Flange (3). This action reduces the spring load, so allowing the Balls to quickly come out of their seats, so releasing the drive. The action of the Balls dis-engaging moves the Pressure Flange to the right so activating the stop switch (9).
Re-engagement is automatic once the torque level drops below the pre-set value. The Synchron design re-engages only at one angular position to keep Hub and Flange accurately synchronised at all times.
The Disc Springs work only in the negative area of their characteristics so unscrewing the Adjusting Nut (7) increases the axial load of the Springs, so increasing dis-engaging torque. When desired Torque setting is achieved the Adjusting Nut is locked by the Bolt (8) being screwed into the locking Collar (10).



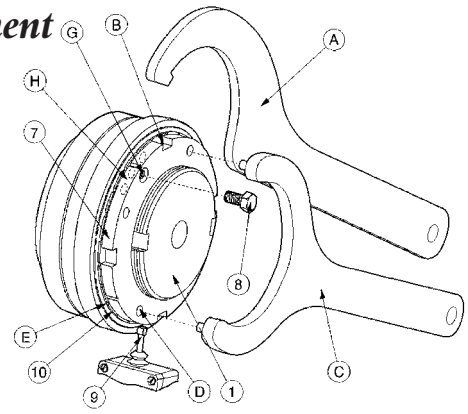


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Series CZ and CN Safegard Overload Clutch

CZ/CN Series Clutches and Couplings Torque Adjustment

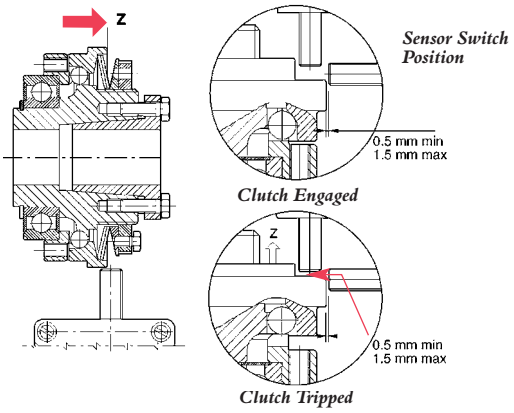
Referring to drawing alongside Torque setting of the Clutches can be made using either a suitable size 'C' Spanner (A), or a correct size Pin Wrench (C). First release Adjusting Nut (7) by removing the Locking Screw (8), then rotate the Nut clockwise until at end of stroke (do not apply excess force). Then rotate nut back anti-clockwise by one indent to reach the neutral position, corresponding to minimum torque. Then continue to turn Adjusting Nut anti-clockwise for the number of indents indicated on the label (F) on the outside of Clutch for required Torque. Put Threadlock on Locking Screw, and replace in one of the threaded holes (G) which aligns with a hole in the Locking Plate behind.

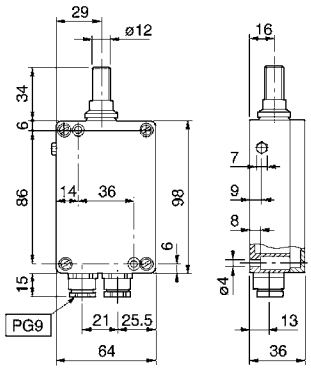


Overload Sensor Switches

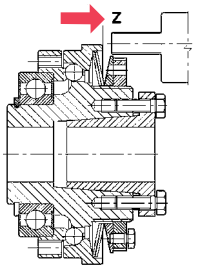
It is strongly recommended that all installations should include a Limit Switch or Sensor to switch off the power in event of an overload. The following are standard units available with mounting instructions.

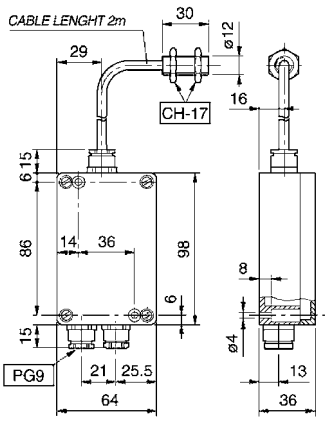
a) Proximity Sensor Switch for Radical mounting - CSS3



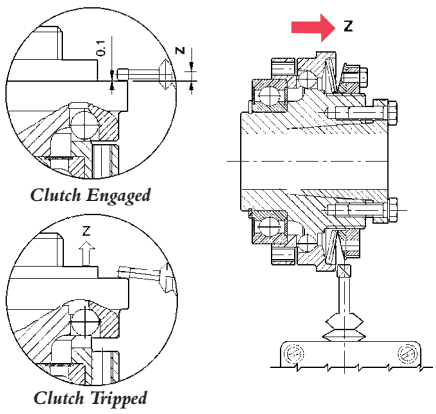


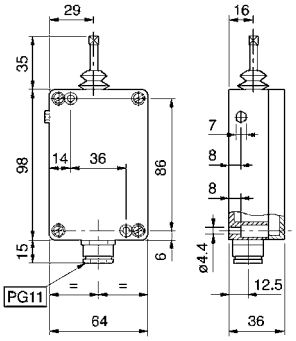
a) Proximity Sensor Switch for Axial movement - CSS4





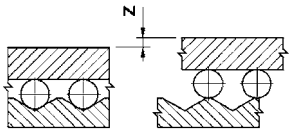
a) Mechanical Limit Switch for contact actuation - CSS1





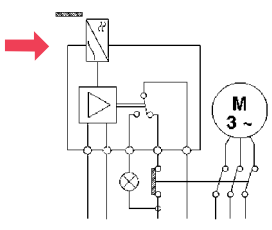
Outer Movement in Overload

CS CLUTCH	Z mm CFS	CSY	CSL	CSZ	R	CZ/ CN	z mm
20	1.4	1.2	0.6	1.6	-	11	0.8
25	2.3	1.8	0.8	2.3	-	16	1.0
35	2.4	2.0	1.1	3.0	-	20	1.2
45	2.7	2.2	1.2	3.5	-	25	1.2
55	3.7	2.5	1.2	3.8	2.5	30	1.5
65	4.6	3.0	1.6	4.5	3	40	1.8
80	5.0	3.5	2.5	-	3.5	50	2.0
100	5.5	4.0	2.7	-	4	60	2.2



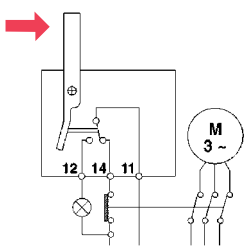
For other clutch types refer to respective dimension tables.

Wiring Connections for Proximity Sensor - Models CSS3 & CSS4



24VDC/6A
IP-54

Wiring for Limit Switch Model CSS1



220-250VAC/15A
24 VDC/6A

IP-54

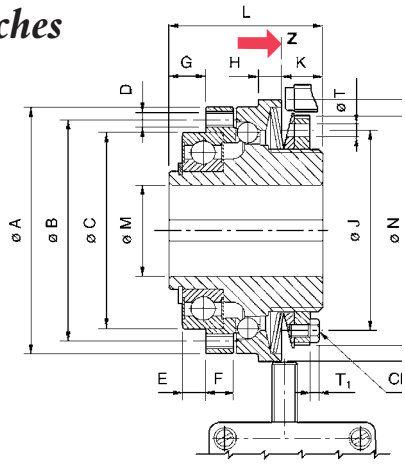
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Series CZ Safegard Overload Clutches Standard Plain Bore Units

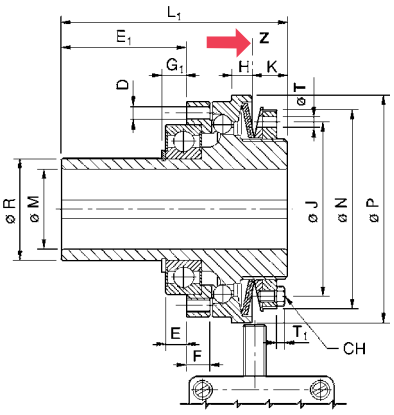
Standard Zero Backlash Clutches types H&K

These clutches are intended for keyway connection to shafts where pre-machined synchronisation is the preferred design. Type H is used to mount compact drive systems with minimal overhung load, the single deep groove ball bearing providing full radial support for the sprocket, pulley, or gear.
Type K has an extended inner race to support a second Bearing to allow fitment of wider transmission elements, and where high radial loads may be encountered.

Type H



Type K



CZ Series types H & K - Technical Capacities

Models H&K Clutch Size	Torque Range according to Spring selection			Max.Speed	Bore Size 'M'		Weight kg		Hub Inertia kgcm2		Flange
	S Nm	M Nm	U Nm	rpm	min mm	max mm	Type H	Type K	Type H	Type K	Inertia kg m2
25	3-14	6-28	13-56	4000	8	20	0.74	0.83	2.15	2.22	0.95
30	9-35	18-70	40-140	3000	10	30*	1.37	1.41	5.30	5.58	2.35
40	19-65	38-130	78-260	2500	14	35*	2.28	2.56	13.68	14.58	6.45
50	35-110	80-220	160-440	2000	18	45*	3.29	3.74	27.62	29.88	13.07
60	80-185	160-370	320-740	1200	24	50	5.12	5.73	66.45	72.01	26.52

*For clutch Part No. for ordering refer bottom of page
*max bore achievable only with keyway according to DIN 6885 Sheet 3

CZ Series types H & K - Dimensions

Clutch Size	A	B	C h5	D	E	E1	F	G	G1	H	J	K	L	L1	M min	M max	N	P	R h6	T	T1	Z	CH A/F
25	65	56	47	8x M4	5	33	7.5	8	6.5	7	54.5	12	40	65	8	20	63	70	30	5	2.8	1.2	7
30	80	71	62	8x M5	7	43	8.0	11	8.8	8	69.0	14	48	80	10	30*	77	85	40	5	2.8	1.5	7
40	95	85	75	8x M6	9	55	10.5	14	11.5	9	77.0	16	59	100	14	35*	88	100	45	5	3.5	1.8	8
50	110	100	90	8x M6	10	67	12.0	16	13.0	10	87.5	17	64	115	18	45*	100	115	55	6	4.0	2.0	10
60	130	116	100	8x M8	10	73	12.0	18	14.0	12	106.0	21	75	130	24	50	122	135	65	7	4.0	2.2	10

For Limit Switch location and operation refer to page 29. Always use limit switch for long service life.

Clutch Part Numbers for Ordering

To correctly order CZ series clutches it is essential to identify the clutch operating mode, size, type, spring ratings (torque range), and for clutches and couplings using Clamping Elements for shaft connection, the shaft diameters.
Operating Mode: CZ series clutches are available with two operating modes, ratchetting type CZF for applications where synchronisation of input to output is not required, and single position type CZY for full synchronisation.
Clutch Size: The clutch size generally indicates the max bore size, and is identified in the tables.
Clutch Type: A letter from H to T indicates the clutch/coupling design, as shown in the respective drawings.
For couplings type M and N it is required to indicate the coupling size also, e.g. for Coupling size 40-72 type M the reference is M72, for couplings P,R & T it is necessary to indicate rubber shore value ie. P92 is with rubber 92 shore.
Spring Rating: following a '/' the letter S, M, or U indicates the Spring sizes selected, which controls the torque range.
Bore Sizes: Except for pilot bored types H, K and M it is essential that the finish bore sizes of the Clutch/Coupling are provided to enable supply of the unit. Types H, K and M can be supplied with finish bores also if specified.

Examples

CZF40H/M	is a Ratchetting size 40 clutch type 'H' with spring selection M.
CZY50L/S-40	is a Synchronous size 50, type L, with spring set S, fitted with 40mm clamping bush.
CSY40N89/U-35/40	is a Synchronous Coupling size 40, type N, with spring set U, with the clutch half fitted with a 35mm clamping bush, and the coupling half with a 40mm clamping bush.
CSY50M89/S-38/48	is a Synchronous Coupling size 50, type M, with spring set S, with the clutch half bored and keyed for a 38mm shaft, and the coupling half bored and keyed for 48mm.

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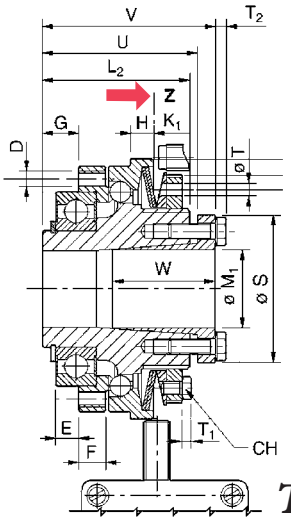
INDEX BACK NEXT

Series CZ Safegard Overload Clutches

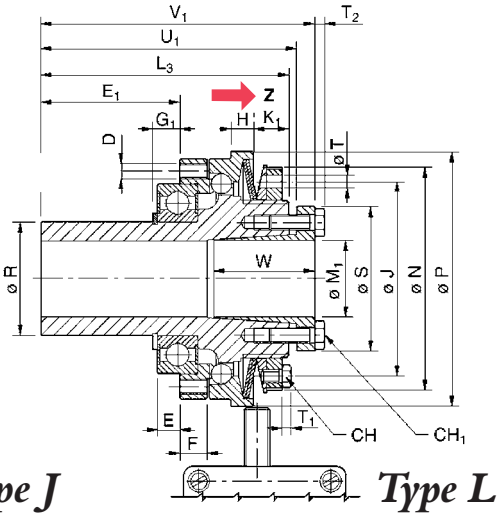
Standard Units With Expanding Bush Shaft Connection

Zero Backlash Clutch for keyless shaft connection types J & L. These clutches provide totally backlash free connection of drive gears and sprockets to shafts. A selection of clamping inserts provides a wide range of shaft diameters to be accommodated. Type J can be used to mount compact drive systems, with minimal overhung load, the single deep groove ball bearing providing full radial support.

Type L has extended inner race to support a second bearing to enable fitting of wider transmission elements.



Type J



Type L

CZ Series types J & L - Technical Capacities

Models* J & L Clutch Size	Torque Range according to Spring selection S Nm	M Nm	U Nm	Max.Speed rpm	Bore Size 'M1' min mm	max mm	Weight kg Type J	Type L	Hub Inertia kgcm2 Type J	Type L	Flange Inertia kgcm2
25	3-14	6-28	13-56	4000	10	25	0.72	0.81	2.29	2.36	0.95
30	9-35	18-70	40-140	3000	15	30	1.26	1.50	5.90	6.17	2.35
40	19-65	38-130	78-260	2500	19	40	2.11	2.39	14.75	15.66	6.45
50	35-110	80-220	160-440	2000	32	50	2.98	3.43	30.34	32.60	13.07
60	80-185	160-370	320-740	1200	32	60	4.75	5.36	71.94	77.18	26.52

*For clutch Part No. for ordering refer to page 30.

CZ Series types J & L - Dimensions

Clutch Size	A	B	C h5	D	E	E1	F	G	G1	K1	L2	L3	M1 min	M1 max	P	R h6	S	T2	U	U1	V	V1	W	Z	CH1 A/F
25	65	56	47	8x M4	5	33	7.5	8	6.5	12	40	65	10 19	20 25	70	30	40.5 42	2.8	42	67	47	72	26.5 26	1.2	7
30	80	71	62	8x M5	7	43	8.0	11	8.8	12	46	78	15	30	85	40	57	4	49	81	56	88	31	1.5	10
40	95	85	75	8x M6	9	55	10.5	14	11.5	14	57	98	19 32	30 40	100	45	57 64	4 3.5	60	101	67	108	40 31	1.8	10 8
50	110	100	90	8x M6	10	67	12.0	16	13.0	16	63	114	32	50	115	55	73.5	4	66.5	118	73	124	29	2	10
60	130	116	100	8x M8	10	73	12.0	18	14.0	21	75	130	32 55	50 60	135	65	73.5 89	4	78.5 78	134 133	85 86	140 141	29 45.5	2.2	10

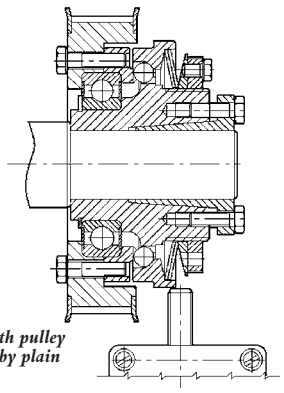
For Limit Switch location and operation refer to page 29. Always use limit switch for long service life.

Standard Bore sizes available on J & L type clamping hubs, with respective maximum transmittable Torques

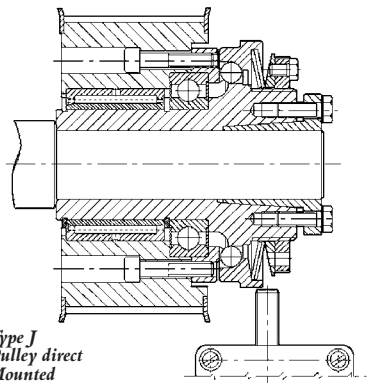
Clutch Size	Available Bore sizes in mm (Figures indicate max. transmittable Torque Nm) 10	11	12	14	15	16	18	19	20	22	24	25	28	30	32	35	38	40	42	45	48	50	55	60	Bolt Torque Nm
25	65	70	75	90	95	100	115	120	130	140	150	160													3
30					120	130	150	160	180	190	210	220	240	260											10
40								240	260	290	310	320	360	390											10
40															440	480	520	550							5.9
50															620	680	730	770	810	870	930	970			10
60															620	680	730	770	810	870	930	970	1070	1160	10

Shaft tolerance required for correct operation is h6 up to 40mm dia., h7 for over 40mm.

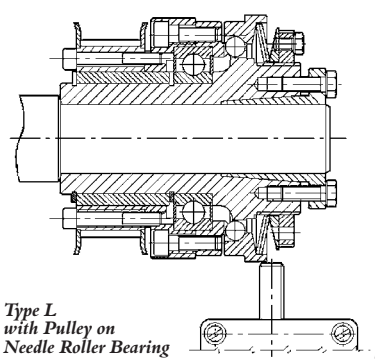
Typical Mounting Arrangements with Timing Pulleys



Type L with pulley supported by plain bearing



Type J Pulley direct Mounted

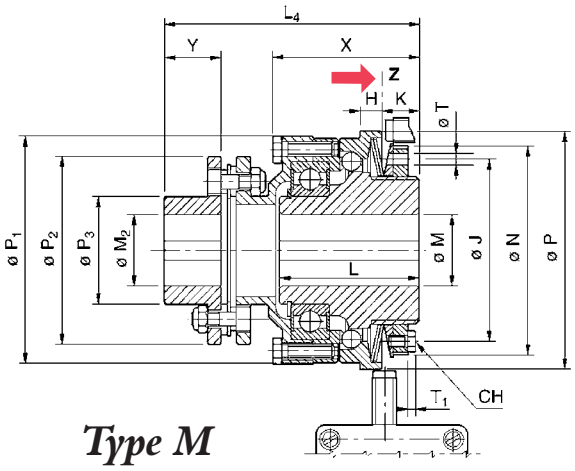


Type L with Pulley on Needle Roller Bearing

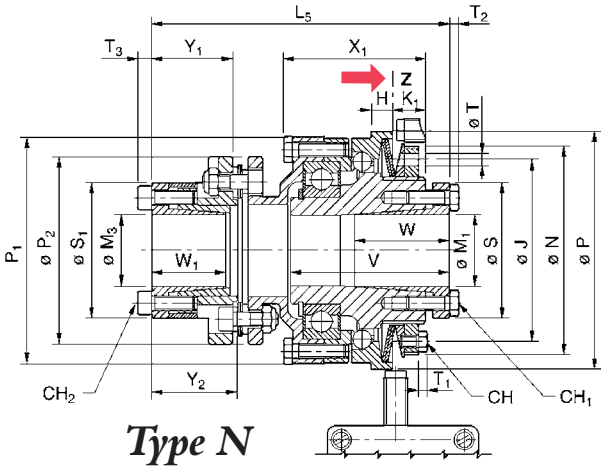
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Series CZ Safegard Overload Couplings

Standard CZ series Zero Backlash Overload Clutches combined with a Torsionally stiff. Steel Disc Coupling for ultimate shaft to shaft positional accuracy, with full overload protection. Available with keyed shaft connection, or totally keyless with shaft clamping elements.



Type M



Type N

CZ Series Couplings types M & N - Technical Capacities

Models M & N Coupling Size	Torque Range According to Spring Type			Speed Max.	Coupling Type M Bore Sizes				Coupling Type N Bore Sizes				Weight		Hub Inertia		Flange Inertia		Max. Misalignment Coupling	
					Clutch Hub		Coupling Hub		Clutch Hub		Coupling Hub									
	S Nm	M Nm	U Nm	rpm	M min mm	M max mm	M2 min mm	M2 max mm	M1 min mm	M1 max mm	M3 min mm	M3 max mm	Type M kg	Type N kg	Type M kgcm2	Type N kgcm2	Type M kgcm2	Type N kgcm2	Angular degrees	Axial mm
25-53	3-14	6-28	13-56	4000	8	20	6	25*	10	25	11	20	1.2	1.2	2.15	2.22	2.42	2.47	1	0.4
30-72	9-35	18-70	40-140	3000	10	28	10	35	15	30	19	30	2.4	2.0	5.30	5.58	6.92	7.06	1	0.5
40-72	19-65	38-130	78-260	2500	12	35*	10	35	19	40	19	30	3.5	3.4	13.68	14.58	16.55	16.88	1	0.5
40-89	19-65	38-130	78-260	2500	12	35*	14	50*	19	40	24	42	4.3	3.6	13.68	14.58	16.55	26.12	1	0.6
50-89	35-110	80-220	160-430	2000	16	45*	14	50*	32	50	24	42	5.5	4.8	27.62	29.88	34.03	34.71	1	0.6
60-118	80-185	160-370	320-740	1200	22	50	15	65	32	60	32	60	9.4	7.8	66.45	72.01	43.52	44.39	1	0.8

For clutch Part No. for ordering refer to page 30.
*max bore achievable only with keyway according to DIN 6885 Sheet 3

CZ Series Couplings types M & N - Dimensions

Models M & N Size	Dimensions																								
	K	K1	L	L4	L5	L8	N	P	P1	P2	P3	S MAX	S1 MAX	T1	T2	T3	V	W MIN	W1 MIN	X	Y MAX	Y1 MAX	Z	CH	CH1	CH2
25-53	12	12	40	87.5	95.5	28	63	70	65	53	32	42	42	2.8	2.8	4	47	26	26.5	41.5	24.5	25.5	1.2	7	7	3
30-72	14	12	48	113.0	114.5	34	77	85	80	72	47	57	58	2.8	4.0	6	56	31	31	50.0	39.5	33.0	1.5	7	10	5
40-72	16	14	59	126.5	128.0	43	88	100	97	72	47	57	58	3.5	4.0	6	67	40	31	62.0	39.5	33.0	1.8	8	10	5
40-89	16	14	59	142.5	150.0	43	88	100	97	89	62	64	72	3.5	3.5	6	67	31	45	62.0	45.0	44.5	1.8	8	8	5
50-89	17	16	64	145.0	153.5	47	100	115	111	89	62	74	72	4.0	4.0	6	73	29	45	66.5	45.0	44.5	2.0	10	10	5
60-118	21	21	75	172.5	162.5 172.5	54	122	135	131	118	82	89	92	4.0	4.0	6	86	29	29	76.5	55.0	35.0 44.0	2.2	10	10	5

Standard Bore sizes available on N type Clutch clamping hubs, with respective maximum transmittable Torques

Clutch Size	Available Bore sizes in mm (Figures indicate max. transmittable Torque Nm)																								Bolt Torque Nm
	10	11	12	14	15	16	18	19	20	22	24	25	28	30	32	35	38	40	42	45	48	50	55	60	
25	65	70	75	90	95	100	115	120	130	140	150	160													3
30					120	130	150	160	180	190	210	220	240	260											10
40								240	260	290	310	320	360	390											10
40															440	480	520	550							5.9
50															620	680	730	770	810	870	930	970			10
60															620	680	730	770	810	870	930	970	1070	1160	10

Standard Bore sizes available on N type Coupling half clamping hubs, with respective maximum transmittable Torques

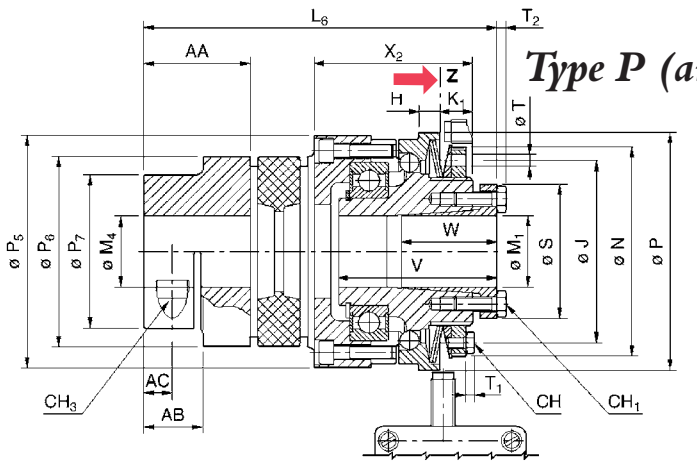
Clutch Size	Available Bore sizes in mm (Figures indicate max. transmittable Torque Nm)																					Element Bolt Torque Nm	Disc Bolt Torque Nm
	11	12	14	15	16	18	19	20	22	24	25	28	30	32	35	38	40	42	45	48	50		
25-53	80	87	102	108	116	130	138	145														5	6
30-72				146	155	175	210	220	242	265	276	309	331									17	8
40-72							210	220	242	265	276	309	331									17	8
40-89										529	552	618	662	706	772	839	883	926				17	15
50-89										529	552	618	662	706	772	839	883	926				17	15
60-118														730	798	866	912	958	1026	1094	1140	17	33

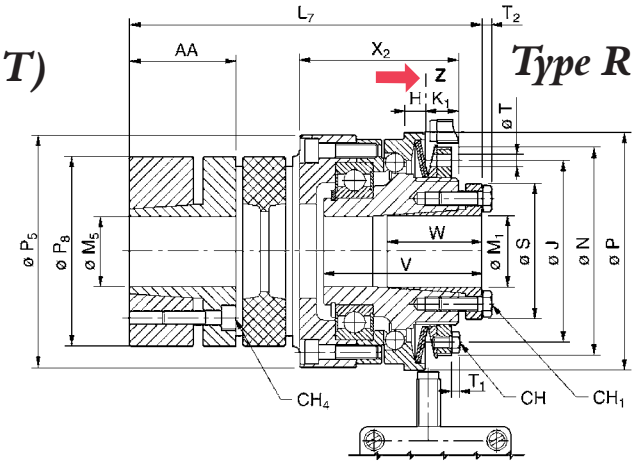
Shaft tolerances required for correct operation is h6 up to 40mm dia., h7 for over 40mm., for both Clutch and Coupling
Disc Bolt Torque is for the bolts on the Flexible Disc Plate

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Series CZ Safegard Overload Couplings

Standard Keyless Connection Overload Clutches with Elastomeric Couplings





Couplings type T is identical to type P except coupling hub is not split, and hub suitable for standard reworking
Couplings are supplied standard with 92 Shore rubber inserts, but 98 shore can be supplied to order

CZ Series Couplings types P, R & T - Technical Capacities

Models P, R&T Clutch Size	Torque Range According to Spring Type			Nominal Torque Flexible Coupling		Speed Max.	Clutch Hub Bore Sizes*		Coupling Hub Bore Sizes*					Weight		Hub Inertia	Flange Inertia	Max. Misalignment of Coupling				
									Cplg Types P & T			Cplg Type R		Type P & T	Type R			Axial	92 Shore A		98 Shore A	
	S Nm	M Nm	U Nm	92 Sh.A Nm	98 Sh.A Nm	rpm	M1 min mm	M1 max mm	M4 min mm	M4 (P) max mm	M4 (T) max mm	M5 min mm	M5 max mm	kg	kg	kgcm2	kgcm2	mm	Radial mm	Ang. deg.	Radial mm	Ang. deg.
25	3-14	6-28	13-56	70	120	4000	10	25	10	28	28	15	28	1.38	1.53	2.2	4.00	1.4	0.14	1	0.10	0.9
30	9-35	18-70	40-140	190	320	3000	15	30	14	38	38	19	38	3.47	3.67	5.6	10.00	1.5	0.15	1	0.11	0.9
40	19-65	38-130	78-260	380	650	2500	19	40	15	45	45	20	45	4.48	4.48	14.6	20.00	1.8	0.17	1	0.12	0.9
50	35-110	80-220	160-440	530	900	2000	32	50	20	48	55	28	50	6.59	6.59	29.9	50.00	2.0	0.19	1	0.14	0.9
60	80-185	160-370	320-740	620	1050	1200	32	60	25	55	60	30	55	10.71	10.71	72.0	114.00	2.1	0.23	1	0.16	0.9

For Clutch Part No. for ordering refer to page 30.
*max bore achievable only with keyway according to DIN 6885 Sheet 3

CZ Series Couplings types P, R & T - Dimensions

Models P & R Size	Dimensions																							
	AA	AB	AC	H	J	K1	L6 MAX	L7 MAX	N	P	P5	P6	P7	P8	S MAX	T	T1	T2	V MIN	W MAX	X2	Z	CH	CH1	CH3	CH4
25	30	-	10.5	7	54.5	12	102	102	63	70	70	55	-	55	42.0	5	2.8	2.8	47	26.5	47.0	1.2	7	7	5	4
30	35	-	11.5	8	69.0	12	120	120	77	85	85	65	-	65	57.0	5	2.8	4.0	56	31.0	54.5	1.5	7	10	6	4
40	45	-	15.5	9	77.0	14	146	146	88	100	100	80	-	80	64.0	5	3.5	4.0	67	40.0	67.0	1.8	8	8/10	6	5
50	50	28	18.0	10	87.5	16	159	159	100	115	115	95	85	95	73.5	6	4.0	4.0	73	29.0	73.0	2	10	10	8	6
60	56	32	21.0	12	106	21	213	213	122	135	135	105	95	105	89.0	7	4.0	4.0	85	45.5	87.0	2.2	10	10	10	8

Standard Bore sizes available on P, R & T type Clutch clamping hubs, with respective maximum transmittable Torques

Clutch Size	Available Bore sizes in mm (Figures indicate max. transmittable Torque Nm)																								Bolt Torque Nm
	10	11	12	14	15	16	18	19	20	22	24	25	28	30	32	35	38	40	42	45	48	50	55	60	
25	65	70	75	90	95	100	115	120	130	140	150	160													3
30					120	130	150	160	180	190	210	220	240	260											10
40								240	260	290	310	320	360	390											10
40															440	480	520	550							5.9
50															620	680	730	770	810	870	930	970			10
60															620	680	730	770	810	870	930	970	1070	1160	10

Standard Bore sizes available on P type Coupling clamping hubs, with respective maximum transmittable Torques

Clutch Size	Available Bore sizes in mm (Figures indicate max. transmittable Torque Nm)																								Bolt Torque Nm
	10	11	14	15	16	19	20	24	25	28	30	32	35	38	40	42	45	48	50	55					
25	34	35	36	38	39	39	41	43	45	46															10.5
30			80	81	81	85	87	91	92	97	99	102	105	109											25
40				92	94	98	99	104	105	109	112	113	118	122	123	126	130								25
50							232	244	246	255	260	266	274	283	288	294	301	309							69
60									393	405	413	421	434	445	454	462	473	486	494	514					120

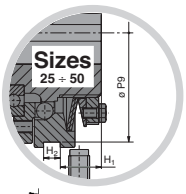
Standard Bore sizes available on R type Coupling clamping hubs, with respective maximum transmittable Torques

Clutch Size	Available Bore sizes in mm (Figures indicate max. transmittable Torque Nm)																								Bolt Torque Nm
	11	14	15	16	19	20	24	25	28	30	32	35	38	40	42	45	48	50	55						
25	48	67	74	72	90	97	112	120	143																6
30			142	154	188	189	237	250	280	307	310	353	389												6
40						269	337	356	398	436	442	501	533	572	585	644									10
50								399	445	470	506	566	581	630	647	728	836	858							35
60										775	819	955	999	1090	1091	1230	1334	1381	1540						69

Shaft tolerance required for correct operation is h6 up to 40mm dia., h7 for over 40mm.

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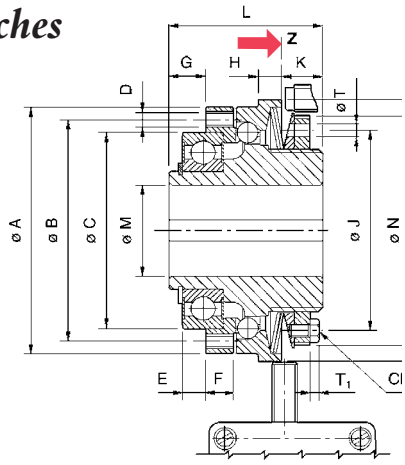
Series CN Safegard Overload Clutches Standard Plain Bore Units



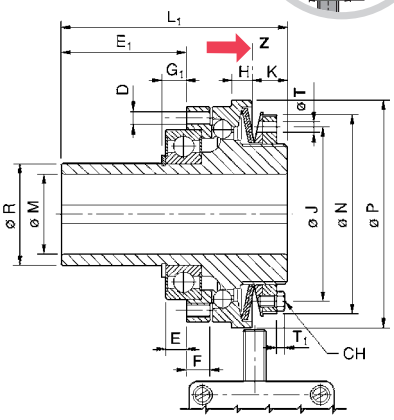
Standard Zero Backlash Clutches types H&K

These clutches are intended for keyway connection to shafts where pre-machined synchronisation is the preferred design. Type H is used to mount compact drive systems with minimal overhung load, the single deep groove ball bearing providing full radial support for the sprocket, pulley, or gear.
Type K has an extended inner race to support a second Bearing to allow fitment of wider transmission elements, and where high radial loads may be encountered.

Type H



Type K



CN Series types H & K - Technical Capacities

Models H&K Clutch Size	Torque Range according to Spring selection				Max. Speed	Bore Size 'M'		Weight kg		Hub Inertia kgcm²		Flange
	S Nm	M Nm	L Nm	U Nm	rpm	min mm	max mm	Type H	Type K	Type H	Type K	Inertia kg m²
11	0.65 - 3.0	1.3 - 6	2 - 9	2.6 - 12	4000	6	11	0.17	0.19	0.27	0.26	0.08
16	2 - 5	4 - 10	6 - 15	8 - 20	4000	8	16*	0.26	0.30	0.54	0.55	0.2
20	4 - 10	8 - 20	12 - 30	16 - 40	4000	9	20	0.51	0.59	1.8	1.8	0.6
25	4 - 14	8 - 28	12 - 42	16 - 56	4000	12	20	0.89	1.06	4.6	4.8	1.8
30	9 - 35	18 - 70	27 - 105	40 - 140	3000	15	25	1.62	1.77	11.8	12.1	3.9
40	19 - 65	38 - 130	57 - 195	78 - 260	2500	22	35*	2.86	3.28	27.0	27.6	7.7
50	35 - 110	80 - 220	120 - 330	160 - 440	2000	32	45	3.72	4.80	61.5	65.3	17.3

*For clutch Part No. for ordering refer bottom of page
*max bore achievable only with keyway according to DIN 6885 Sheet 3

CN Series types H & K - Dimensions

Clutch Size	A	B	C h5	D	E	E1	F	G	G1	H	J	K	L	L1	H1	H2	P9	N	P	R h6	T	T1	Z	CH A/F
11	40	35	30	6XM3	2	20.5	5	4.5	3.0	6	32	7.0	24	40	–	–	–	39.5	45	17	4	2.1	0.8	5.5
16	47	42	37	6xM3	2	25	6	5.0	5.0	8	36.5	9.5	29	49	–	–	–	43	50	25	4	2.1	1.0	5.5
20	60	53	47	6XM4	3	31	7	5.0	5.0	9	36.5	9.5	33	58	–	–	–	43	65	30	4	2.1	1.2	5.5
25	77	69	62	6XM5	4	35	7.5	5.5	5.5	–	54.5	10.2	41	68	14.9	7.5	75	63	80	35	5	2.8	1.2	7.0
30	90	80	68	6xM6	5	40	8	6.5	6.5	–	69	11.0	47	77	17.4	7.5	90	77	95	40	5	4.0	1.5	7.0
40	106	90	80	6XM6	5	48	9	7.0	7.0	–	77	12.6	52	90	20.0	8.0	105	88	110	50	5	4.0	1.8	8.0
50	125	112	100	6XM8	5	60	11	7.5	7.5	–	87.5	14.7	59	109	23.5	9.0	125	100	130	65	6	4.0	2.0	10

For Limit Switch location and operation refer to page 29. Always use limit switch for long service life.

Clutch Part Numbers for Ordering

To correctly order CN series clutches it is essential to identify the clutch operating mode, size, type, spring ratings (torque range), and for clutches and couplings using Clamping Elements for shaft connection, the shaft diameters.
Operating Mode: CN series clutches are available with two operating modes, ratchetting type CNF for applications where synchronisation of input to output is not required, and single position type CNY for full synchronisation.
Clutch Size: The clutch size generally indicates the max bore size, and is identified in the tables.
Clutch Type: A letter from H to L indicates the clutch design, as shown in the respective drawings.
Spring Rating: following a / the letter S, M, L or U indicates the Spring sizes selected, which controls the torque range.
Bore Sizes: Except for pilot bored types H and K it is essential that the finish bore sizes of the Clutch/Coupling are provided to enable supply of the unit. Types H, K and M can be supplied with finish bores also if specified.

Examples

CNF40H/M	is a Ratchetting size 40 clutch type 'H' with spring selection M.
CNY50L/S-40	is a Synchronous size 50, type L, with spring set S, fitted with 40mm clamping bush.

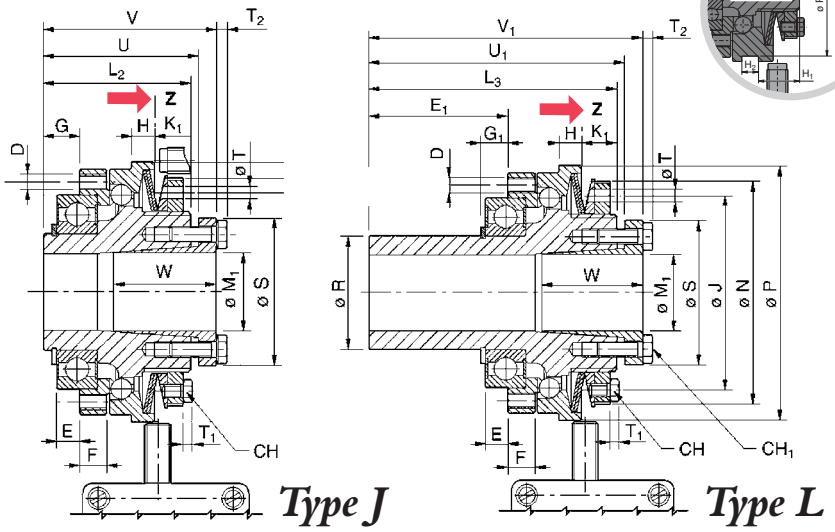
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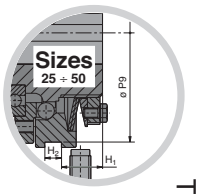
Series CN Safegard Overload Clutches

Standard Units With Expanding Bush Shaft Connection

Zero Backlash Clutch for keyless shaft connection types J & L. These clutches provide totally backlash free connection of drive gears and sprockets to shafts. A selection of clamping inserts provides a wide range of shaft diameters to be accommodated. Type J can be used to mount compact drive systems, with minimal overhung load, the single deep groove ball bearing providing full radial support.

Type L has extended inner race to support a second bearing to enable fitting of wider transmission elements.





CN Series types J & L - Technical Capacities

Models J&L Clutch Size	Torque Range according to Spring selection				Max. Speed	Bore Size 'M1'		Weight kg		Hub Inertia kgcm²		Flange
	S Nm	M Nm	L Nm	U Nm	rpm	min mm	max mm	Type J	Type L	Type J	Type L	Inertia kgcm²
11	0.65 - 3.0	1.3 - 6	2 - 9	2.6 - 12	4000	6	11	0.18	0.2	0.25	0.28	0.08
16	2 - 5	4 - 10	6 - 15	8 - 20	4000	8	16*	0.28	0.32	0.51	0.58	0.2
20	4 - 10	8 - 20	12 - 30	16 - 40	4000	9	20	0.55	0.63	1.7	1.8	0.6
25	4 - 14	8 - 28	12 - 42	16 - 56	4000	12	20	0.94	1.11	4.6	4.9	1.8
30	9 - 35	18 - 70	27 - 105	40 - 140	3000	15	25	1.63	1.78	11.5	12.5	3.9
40	19 - 65	38 - 130	57 - 195	78 - 260	2500	22	35*	3.03	3.45	26.3	28.4	7.7
50	35 - 110	80 - 220	120 - 330	160 - 440	2000	32	45	3.95	5.03	59.5	67.1	17.3

*For clutch Part No. for ordering refer bottom of page 34
*max bore achievable only with keyway according to DIN 6885 Sheet 3

CN Series types J & L - Dimensions

Clutch Size	A	B	C h5	D	E	E1	F	G	G1	K1	L2	L3	P	R h6	H1	H2	P9	M1 min	M1 max	S	T2	V	V1	W	Z	CH1 A/F
11	40	35	30	6xM3	2	21	5	4.5	3.0	7	24	40	45	17	–	–	–	6	12	25	2.1	29	45	13	0.8	5.5
16	47	42	37	6xM3	2	25	6	5.0	5.0	9.5	29	49	50	25	–	–	–	8	16	30	2.1	34	54	19	1.0	5.5
20	60	53	47	6xM4	3	31	7	5.0	5.0	9.5	33	58	65	30	–	–	–	9	16	30	2.1	38	63	19	1.2	5.5
25	77	69	62	6xM5	4	35	7.5	5.5	5.5	10	41	68	80	35	14.9	7.5	75	10 19	20 25	41 42	2.8	46	75	26	1.2	7.0
30	90	80	68	6xM6	5	40	8	6.5	6.5	11	47	77	95	40	17.4	7.5	90	15	30	57	4.0	57	87	31	1.5	10
40	106	90	80	6xM6	5	48	9	7.0	7.0	13	52	90	110	50	20.0	8.0	105	19 32	30 40	57 64	4.0 3.5	62	100	40 31	1.8	10
50	125	112	100	6xM8	5	60	11	7.5	7.5	15	59	109	130	65	23.5	9.0	125	32	50	74	4.0	69	119	29	2.0	10

For Limit Switch location and operation refer to page 29. Always use limit switch for long service life.

Standard Bore sizes available on J & L type clamping hubs, with respective maximum transmittable Torques

Clutch Size	Available Bore sizes in mm (Figures indicate max. transmittable Torque Nm)																									Bolt Torque Nm
	6	8	9	10	11	12	14	15	16	18	19	20	22	24	25	28	30	32	35	38	40	42	45	48	50	
11	13	18	20	23	25	28																				2.2
16		28	30	34	37	41	48	51	54																	1.7
20		28	30	34	37	41	48	51	54																	1.7
25				65	70	75	90	95	100	115	120	130	140	150	160											3
30								95	100	115	160	180	190	210	220	240	260									10
40											240	260	290	310	320	360	390									10
40																		440	480	520	550					5.9
50																		620	680	730	770	810	870	930	970	10

Shaft tolerance required for correct operation is h6 up to 40mm dia., h7 for over 40mm.

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Series CP Safegard Pneumatically operated Overload Clutch

CP Pneumatic Overload Clutches operating features

CP Clutches are zero backlash units which provide remote accurate adjustment of the overload torque by air pressure adjustment. The torque can be constantly adjusted throughout a production cycle providing optimum machine protection.
CP Overload Clutches can be integrated into complex control systems with substantial advantage in automatic machinery with continuous changes of operating conditions. A stop switch is integrated in the torque limiter detecting the axial movement of the unit in event of an overload, providing a signal to cut off the air feed, to disconnect the drive. When overloaded, the CP Clutch has no connection between drive and driven sides providing a long maintenance free service life. After the cause of the overload has been removed the clutch can be automatically re-engaged by resumming the air pressure. Standard finish on the clutches is black phosphate exterior, but can supply in Nickel plated.

Method of Operation

During normal operations, (fig. 1+2), the PC clutch transmits a backlash-free torque, proportional to the air pressure, from the input hub(1) to the output flange(18), through balls(16), forced by the air pressure on the moving flange(11) into the seats on the parts(1) and (18). A torque arm(5B) is required to avoid the rotation of the stator(5). When overload occurs(fig. 3), the input hub(1) and the output flange(18) disengage, and axial movement of the flange(11) against the air pressure activates the stop switch(14), which gives a signal to cut off the air; input and output of the clutch are then disconnected. CP units can be used as a clutch. The air pressure can be switched on or off, transmitting torque when on and remotely disconnecting the drive when not. CP clutches must be engaged under no load condition at slow speed or when stationary. Disengagement torque is proportional to air pressure, according to the torque/pressure diagram on the label on the clutch outer diameter. Filtered, oiled air kept at a constant pressure during normal operations will ensure the accuracy of the overload torque.

Fig.1

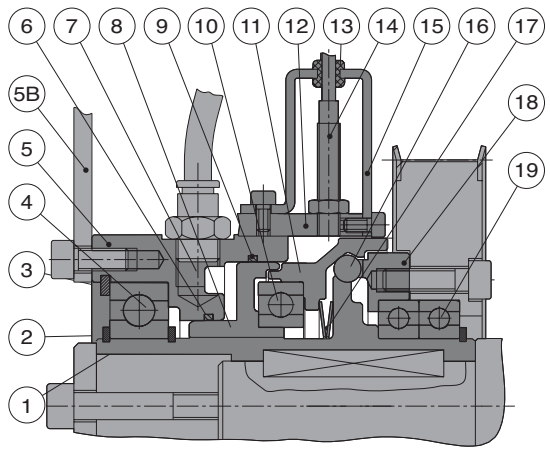
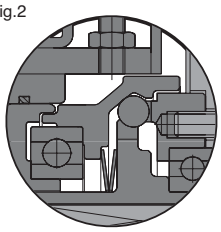
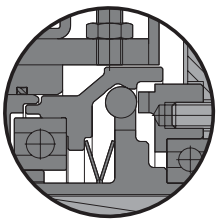


Fig.2



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Fig.3



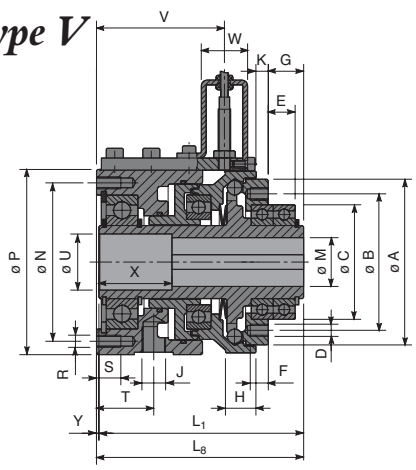
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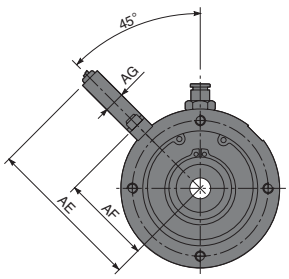
Series CP Pneumatic Clutches and Couplings Technical Features

Clutch Size	Clutch Torque		Coupling Torque		Max Speed	Misalignment			Clutch Bore M		Coupling Bore M[6]		Inertias kgcm²		
	Min Nm	Max Nm	Nominal Nm	Max Nm		Axial mm	Radial mm	Angular deg	Min mm	Max mm	Min mm	Max mm	Hub Side	Type V Flange	Type W Coupling
V/W 20	3.8	47	35	70	5000	1.4	0.14	1	10	22*	8	28	0.28	0.17	3.07
V/W 25	15	80	95	190	4000	1.5	0.15	1	12	25	10	38	0.56	0.34	7.68
V/W 35	25	180	265	530	2500	2.0	0.19	1	15	35	14	55	2.12	0.90	37.01
V/W 45	50	250	310	620	2000	2.1	0.23	1	20	45	15	60	4.88	2.11	87.68
V/W 50	90	550	310	620	2000	2.1	0.23	1	20	55*	15	60	10.37	5.02	87.97

*d max with keyway according to DIN6885/3

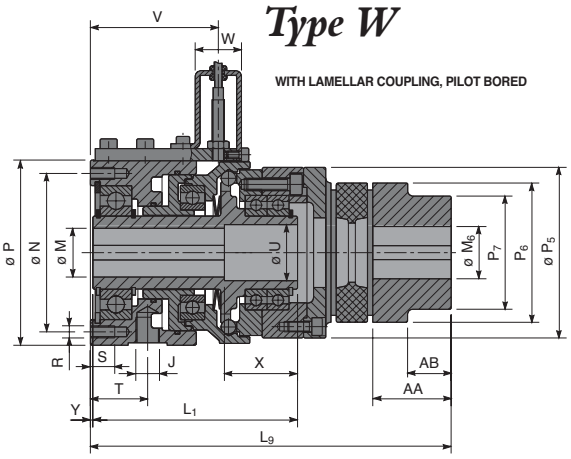
Type V





Type W

WITH LAMELLAR COUPLING, PILOT BORED



Clutch Size	A	B	C	D	E	F	G	H	J	K	L[1]	L[8]	L[9]	N	P	P[5]	P[6]	P[7]	R	S	T	U	V	W	X	Y	AA	AB	AE	AF	AG
20	68	56	47	6xM5	11	7	15	13	1/8"	5	85	85	148	65	76	70	55	-	4xM5	10	24	23	53	19	30	-	30	-	75	45	10
25	82	72	62	6xM5	24	6	28	13	1/8"	4	104	105	169	82	90	85	65	-	4xM4	8	29	26	60	22	40	1.0	35	-	85	51	15
35	102	92	80	6xM5	28	7	34	19	1/8"	4	125	126	194	102	115	115	95	85	4xM5	10	34	36	69	22	50	1.5	41	19	96	63	15
45	123	110	95	6xM6	30	8	36	23	1/8"	5	133	135	219	122	130	135	105	95	4xM5	10	37	46	71	22	55	2.0	53	29	104	71	15
50	151	139	110	6xM8	33	9	40	23	1/4"	6	151	153	247	140	160	157	105	95	4xM6	12	40	51	84	22	60	2.5	53	29	119	86	15

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