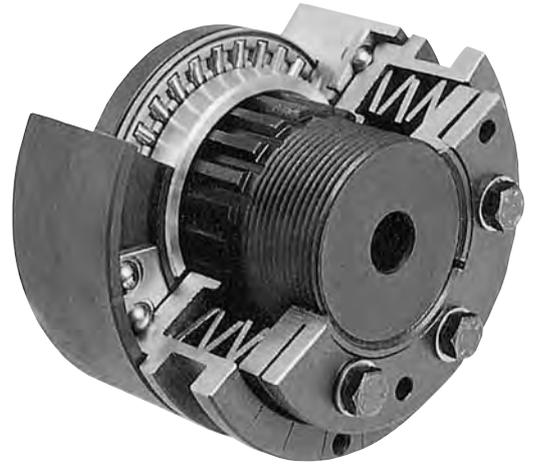


Cross Safeguard Overload Clutches



The Safeguard 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. Safeguard 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 to 400Nm, 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 Safeguard 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.

Safeguard Series Clutches offer the following operating advantages:

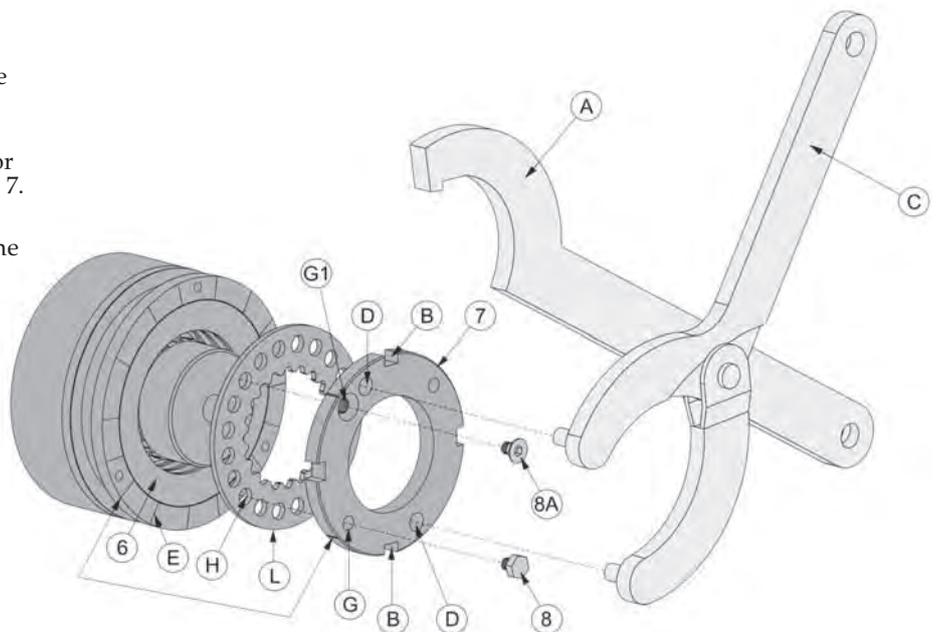
- Long Service Life
- Cater for Frequent Overloads
- No Maintenance required
- Standardised Sizes
- Continued Operating Reliability
- Maintained Torque Accuracy
- Rapid Drive Disengagement
- Very Fine Torque Adjustment

Method of Torque Adjustment

Torque Adjustment on Safeguard 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.

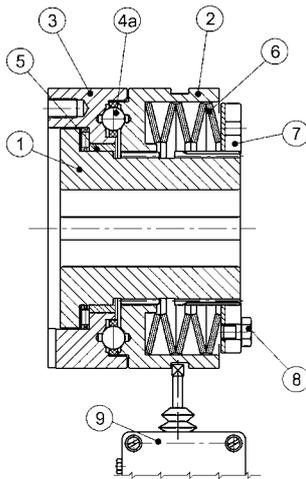
If first adjustment manually tighten the adjusting nut 7 until it is in contact with the springs. Insert a C spanner 'A' into slots D, or a face wrench 'C' into holes D and tighten the nut clockwise to achieve desired Torque as indicated by the number of indents E moved. Replace screw 8 or 8A in thread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



Cross Safegard CS Clutch Types



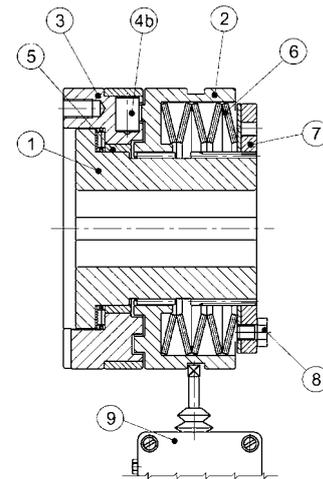
Safegard CSF



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.

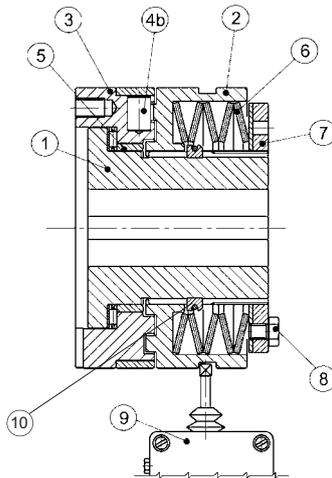
Synchron CSY



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.

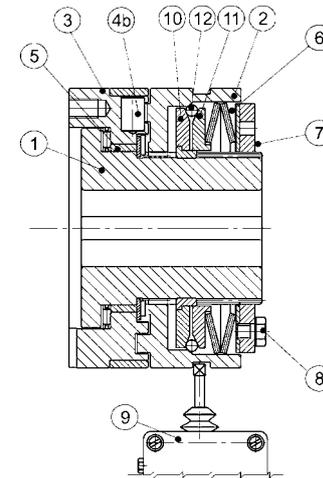
When an overload occurs the rollers ride up the indents pushing flange 2 back which will actuate limit switch 9. During overload conditions plain bearing 5 maintains concentricity and ensures free running. The rollers will re-engage in the nearest indents when the overload is removed. Torque adjustment 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 11 and 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 Safeguard 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.

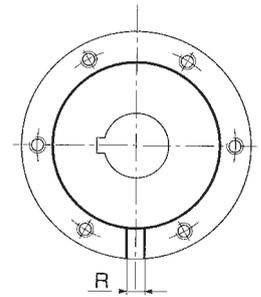
Type A - allows simple connection of a driven gear with its own bearing support.

Type B - has an integral needle roller bearing providing full support of driven gear.

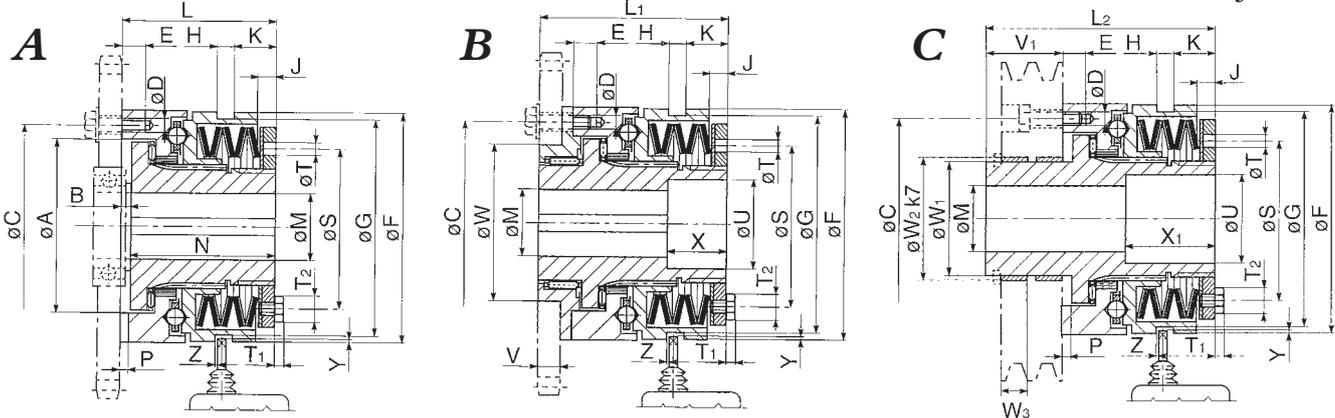
Type C - has extended inner race to mount larger pulleys with plain bearings.

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 kgcm ²			Flange Inertia kgcm ²		
	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												
CSY25	12-25	25-50	50-100			950	450		10	25	1.5	2.0	1.8	6.7	7.0	7.2	6.2	9.1	6.2
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												
CSY35	25-50	50-100	100-200			800	400		14	35	2.9	3.2	3.0	19.0	20.5	21.4	14.9	18.2	14.9
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												
CSY45	50-100	100-200	200-400			650	300		18	45	5.0	6.0	5.8	51.7	54.1	57.0	38.0	48.4	38.0
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											
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	24	55	9.8	11.8	11.5	163	171	177	100	143	100
CSZ55	100-200	200-400	400-800			3000	3000												
CSF65(R)	85-200	170-500	300-1000	700-1800	1200-3400	1400	700	70											
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	30	70*	16.0	20.0	19.0	416	428	439	235	310	235
CSZ65	170-400	350-900	700-1800			2300	2300												
CSF80(R)	180-480	360-960	720-1950	1600-3300	2900-5800	1200	600	40											
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	40	80	21.0	26.0	25.5	769	789	825	396	547	396
CSZ80	300-750	600-1500	1200-3000			1600	1600												
CSF100(R)	250-520	500-1050	1000-2100	2000-3600	3000-8200	950	480	30											
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	50	110*	37.0	44.0	45.0	1968	2030	2109	969	1238	969
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	L ₁	L ₂	N	P	R	U	V	V ₁	W _{h6}	W ₁	X	X ₁	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

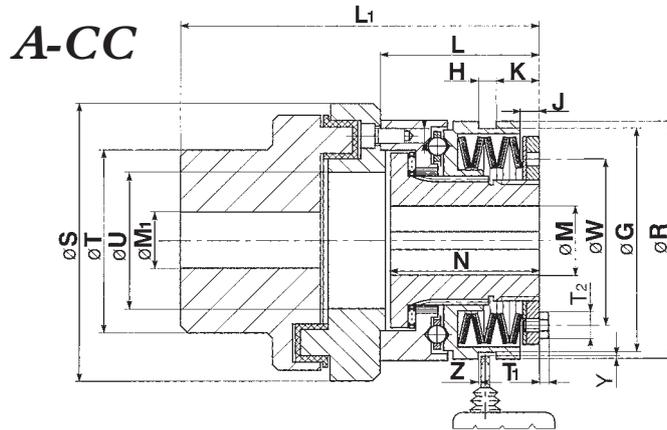
For Limit Switch location and operation refer to page 29. Always use limit switch for long service life.

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 kgcm ²	
	S Nm	M Nm	L Nm	U Nm	R Nm	S/M rpm	L/U rpm	'R' rpm	Clutch M		Cplg. M ₁ max		Hub Side	Cplg Side
									min	max				
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
CSF80(R) 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	L ₁	N	R	S	T	T ₁	T ₂	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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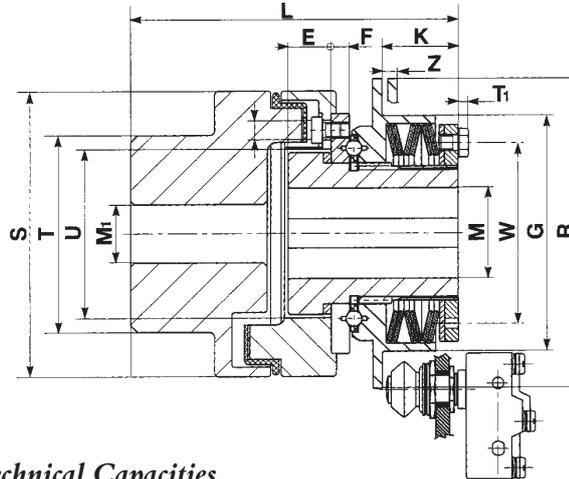
CS Mini Series Couplings



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 kg	Inertia kgcm ²
	S Nm	M Nm	L Nm	U Nm	S/M rpm	L/U rpm	Clutch M		Cplg. M1 max		
							min	max			
CSF20E-CC CSY20E-CC	2.5-5.0 5-10	5-10 10-20	10-20 20-40	20-40	800 700	800 500	7	20	30	1.2	8
CSF25E-CC CSY25E-CC	6-12 12-25	12-25 25-50	25-55 50-100	55-100	800 700	700 450	10	25	35	2.5	21
CSF35E-CC CSY35E-CC	12-25 25-50	25-50 50-100	50-120 100-200	120-200	800 700	600 400	14	35	50	5.2	91
CSF45E-CC CSY45E-CC	25-50 50-10	50-100 100-200	100-250 200-400	250-400	800 650	500 300	18	45	60	10.0	205

*For clutch Part No. for ordering refer below

CS Mini Series Couplings - Dimensions

Models CSF/CSY	Dimensions												
	E	F	G	K	L ₁	N	R	S	T	T ₁	T ₂	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 Safeguard 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 Safeguard (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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