

# Sheargard Overload Clutches

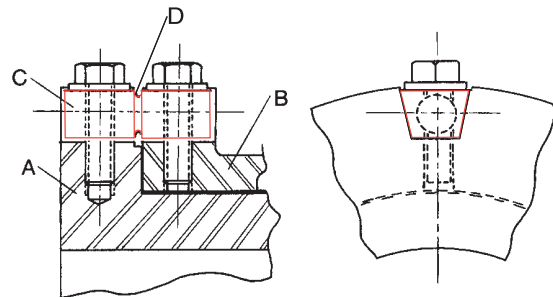


The Cross Sheargard clutch complements the range of Torque Limiters by providing machinery protection on applications where accurate torque control and shaft synchronisation are necessary; and when in the event of an overload, total disengagement of driving and driven members is required.

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  $\pm 10\%$  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.

Tel: +44 121 360 0155

Fax: +44 121 325 1079

Email: sales@crossmorse.com

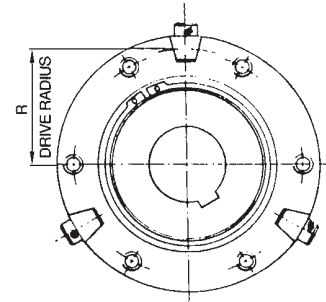
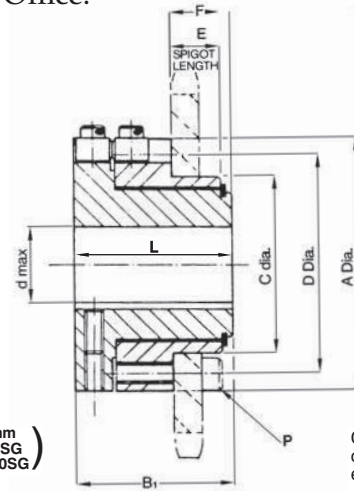
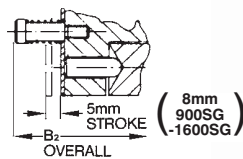
# Sheargard Overload Clutches



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.



OPTIONAL MONITOR PLATE PART SECTION



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

## Dimensions

Clutch Size	Wedge <sup>(1)</sup> Pins	Drive radius R	Torque Rating <sup>(1)*</sup>				Bore Dia d			
			Nm	Min	lb ft	Nm	Max	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 <sup>1</sup>	Overall Length B <sup>2</sup>	Spigot Dia. C	Bolt PCD D	Bolts P	Spigot Length E <sup>(2)*</sup>	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 <sup>(3)</sup>	91 <sup>(3)</sup>
1200SG	320	200	220	246	224.85 / 224.80	260	8 x M20	100 <sup>(3)</sup>	120 <sup>(3)</sup>
1400SG	350	270	295	321	254.85 / 254.80	300	8 x M24	125 <sup>(3)</sup>	150 <sup>(3)</sup>
1600SG	425	300	325	351	304.85 / 304.80	360	12 x M24	148 <sup>(3)</sup>	173 <sup>(3)</sup>

<sup>(1)</sup>For standard Torque Ratings see table page 12.

<sup>(2)</sup>Dimensions E & F can be adjusted to suit sprocket widths.

<sup>(2)</sup>The drive sprocket/pulley can overhang spigot.

<sup>(4)</sup>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

# Sheargard Flexible Couplings

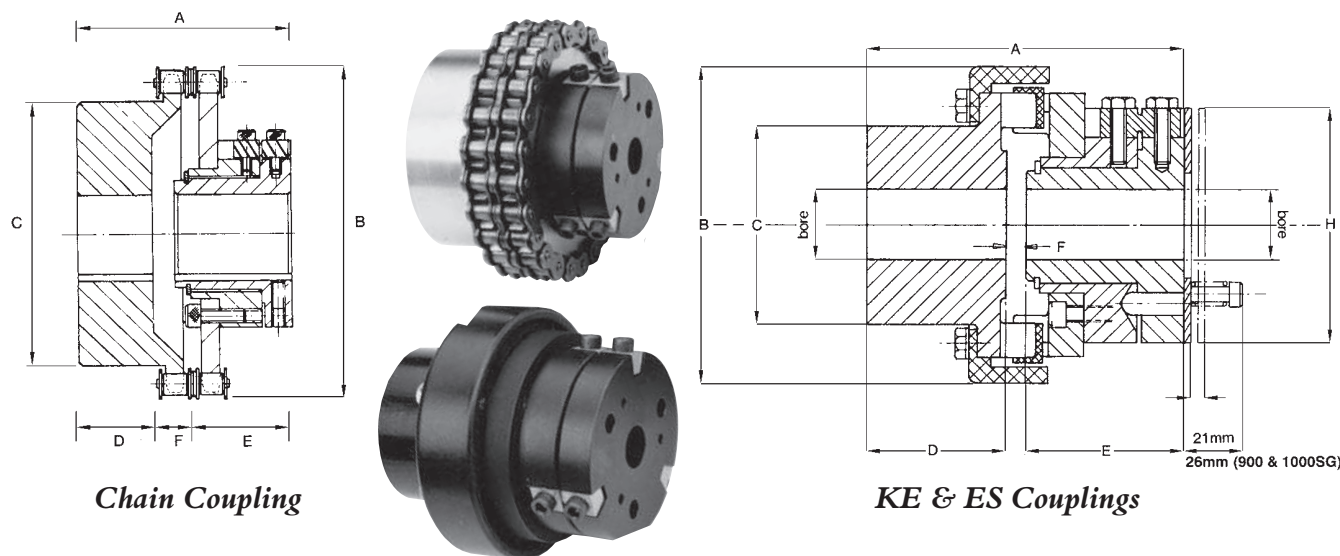


## Sheargard Chain Couplings

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	1/2°	33	1509	19	28	18	57	106	137	104	38	57	11
500SG-C	0.38	1/2°	45	2028	24	45	22	70	119	187	149	41	72	5
700SG-C	0.51	1/2°	251	5580	28	65	24	102	162	248	199	67	92	3
800SG-C	0.75	1/2°	306	6796	30	80	51	120	186	278	175	77	100	9
950SG-C	0.75	1/2°	830	16740	45	100	51	150	222	326	232	83	130	9
1000SG-C	1.00	1/2°	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 <sup>*(2)</sup>	Taper Bush Size <sup>*(3)</sup>	* <sup>(4)</sup>		* <sup>(4)</sup>		E	F
	Parallel	Angular	Min Nm	Max Nm <sup>*(1)</sup>	Min	Max			A	B	C	D		
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 <sup>*(2)</sup>	A	B	C	D	E	F	H
	Parallel	Angular	Min Nm	Max Nm <sup>*(1)</sup>	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

\*<sup>(1)</sup>Running Torque should not exceed 50% of this figure.

\*<sup>(2)</sup>Coupling half manufactured with blind bore.

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

\*<sup>(4)</sup>Taper bore versions are shorter.

Tel: +44 121 360 0155

Fax: +44 121 325 1079

Email: sales@crossmorse.com

# 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  $\pm 10\%$ . 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		
															33	46	45	62	115	160	140	200								
	1														46	63	62	85												
		1													62	86	84	115												
			1												66	92	90	124												
	2													27	86	119	116	169	251	345	306	420	830	1140	3468	3983				
		2													92	126	124	170												
			2												99	138	135	186												
	3														124	172	168	230												
		3													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		
							1							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				
									1					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		
											1				375	513	561	690	1023	1407	1245	1713	3495	4800	15480	17778				
												1			398	546	534	734	1304	1792	1588	2182	4024	5526	17436	20024				
													1		447	615	600	825	1727	2371	2104	2888	4190	5723						
														246	495	678	663	909	1338	1935	1629	2358	4428	6081	20826	23916	36720	45900		
													1	168	503	691	676	928	1785	2452	2174	2987	4810	6606	15980	18352	24992	31240		
														214	514	706	690	948	1792	2460	2182	2996	4818	6618	19648	22564	35264	44080		
													1		597	819	801	1101	1956	2688	2382	3273	6036	8289	26154	30036				
															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		
															2776	3188	48960	61200												
													3	321	771	1059	1035	1422	2688	3690	3273	4494	7227	9927	29472	33846	52896	66120		
														994	1630	1200	1650	3454	4742	4208	5776	8380	11446							
													2	900	1233	1206	1686	3357	4608	4089	5613	8538	11724	34821	39990					
														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		
																									34872	40048				
													4												39296	45128	70528	88160		
														408	1110	1524	1491	2046	4164	5628	5073	6855	10710	14712	41625	47805	60720	75900		
															1341	2445	1800	2475	5181	7113	6312	8664	12570	17169						
													3												46428	53320				
														504	1509	2673	2028	2784	5355	7356	6522	8961	14430	19818	47940	55056	74976	93720		
													3												50766	58302	94032	117540		
																									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.

# 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  $\pm 10\%$  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.



Tel: +44 121 360 0155

Fax: +44 121 325 1079

Email: [sales@crossmorse.com](mailto:sales@crossmorse.com)

# 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  $\pm 3\%$  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.

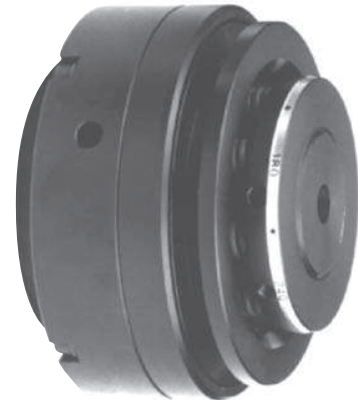


### Use CGX Clutch:

- 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  $\pm 10\%$ . 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 be installed, and multiply this figure by the service factor. The result may be taken as the trip torque.

$$\text{Tripping Torque} = \text{Operating} \times \text{SF}$$

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

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.

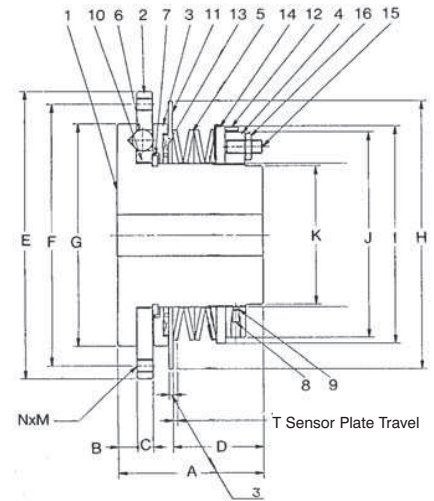
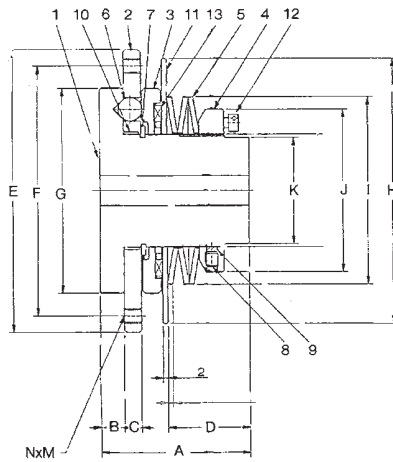
### Determination of Service Factor

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

# Type CG Crossgard Clutch

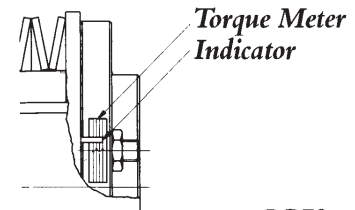
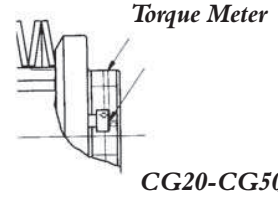


*Provides low cost overload protection with simple setting and operation, whilst maintaining synchronisation of driving elements*



- 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 RPM	Disc Spring Colour	Bore Size		Weight kg.	Inertia kgm <sup>2</sup> x 10 <sup>-2</sup>
	Min	Max			Min	Max		
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



### Dimensions in mm

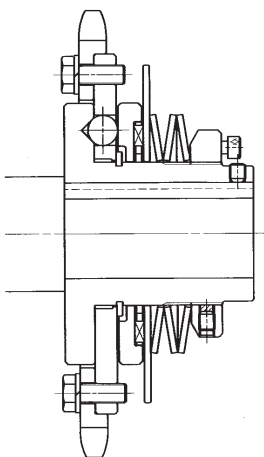
Model	A	B	C	D	Eh'	F	G	H	I	J	K	M	N (No.)	R	S	T
CG20	47	7.5	5.7	25	90	78	62	82	54	48	30	M5	4	5.5	65	1.8
CG30	60	9.5	7	33	113	100	82	106	75	65	42.5	M6	6	6.5	85	2.0
CG50	81	14.5	8.5	44.8	160	142	122	150	117	98	70	M8	6	9.0	125	2.7
CG70	110	14.5	12	68.5	220	200	170	205	166	157	106	M10	6	11.0	175	3.3
CG90	157	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

### Dimensions for Mounting Drive Sprockets

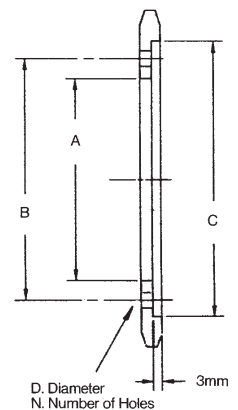
Model	A mm	B mm	C mm	D mm	N
CG20	65	78	90.06/ 90.02	5.5	4
CG30	85	100	113.08/113.02	6.5	6
CG50	125	142	160.10/160.02	9.0	6
CG70	175	200	220.10/220.02	11.0	6
CG90	241	265	295.10/295.02	13.0	8
CG110	292	325	355.12/355.02	17.0	6
CG130	324	360	400.12/400.02	17.0	8

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	¾	½	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



**Typical Sprocket Assembly**



Tel: +44 121 360 0155

Fax: +44 121 325 1079

Email: sales@crossmorse.com

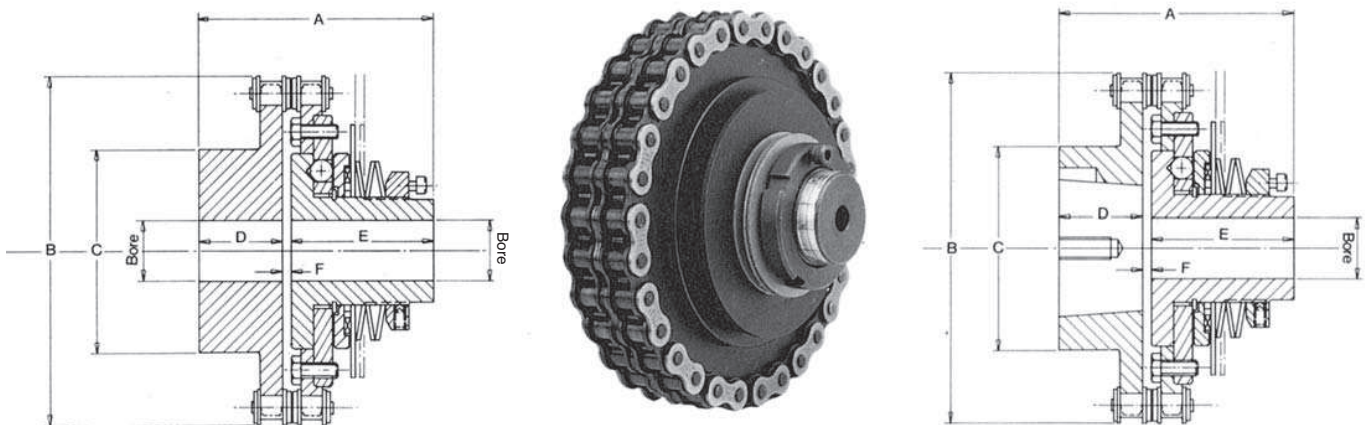
# Type CG Crossgard Flexible Couplings



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 RPM	Misalignment		Clutch Bore Size		Coupling Bore Size		Dimensions						Weight kg.	Inertia kgm <sup>2</sup> x10 <sup>-2</sup>
	Min	Max		Parallel	Angular	Min	Max	Min	Max	A	B	C	D	E	F		
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 RPM	Misalignment		Clutch Bore Size		Coupling Bore Size		Dimensions						Weight kg.	Inertia kgm <sup>2</sup> x10 <sup>-2</sup>
	Min	Max		Parallel	Angular	Min	Max	Min	Max	A	B	C	D	E	F		
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.

Tel: +44 121 360 0155

Fax: +44 121 325 1079

Email: sales@crossmorse.com

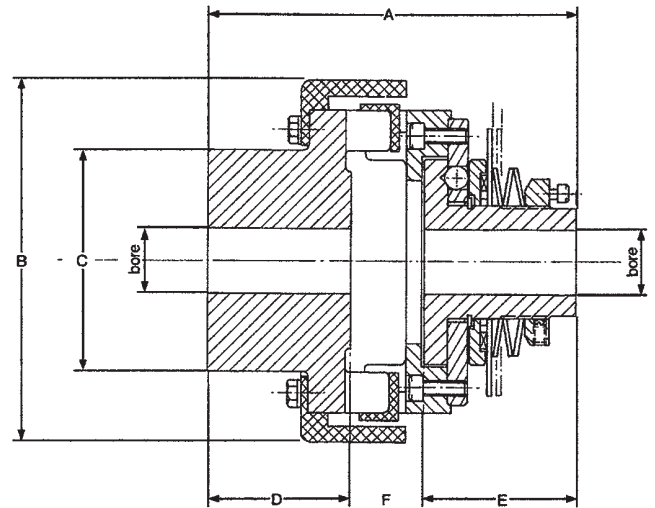


# Crossgard Overload Couplings



## 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 m <sup>2</sup> x10 <sup>-2</sup>
			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.

Tel: +44 121 360 0155

Fax: +44 121 325 1079

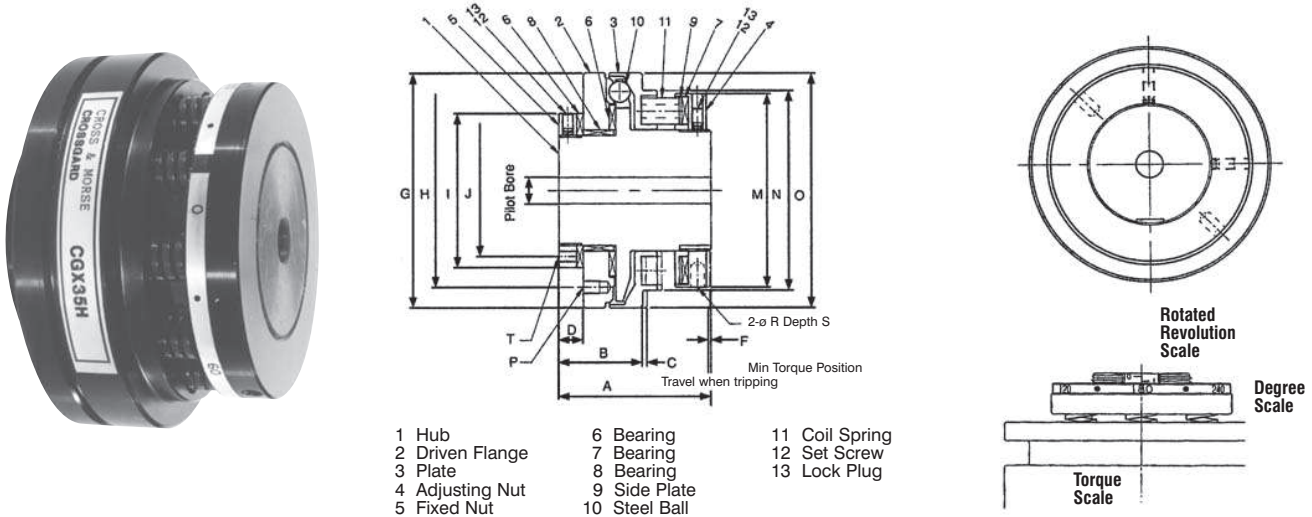
Email: sales@crossmorse.com

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

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 kgm <sup>2</sup> (x10 <sup>-3</sup> )
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		R	S	P Screws	
													No.	Size			No.	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	-	-

# Type CGX-C Crossgard Couplings

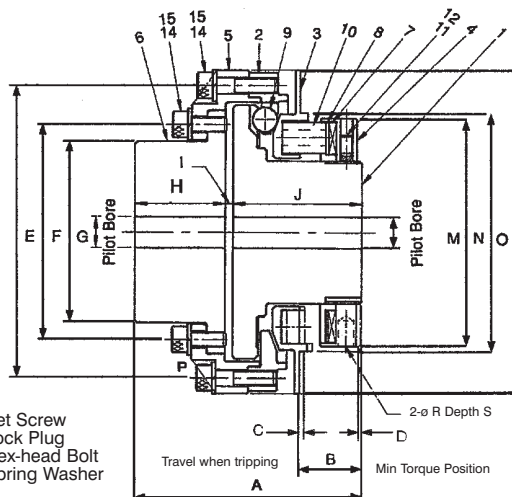


*Provides complete overload protection of drives with accurate positioning and zero backlash.  
For shaft to shaft connection.*

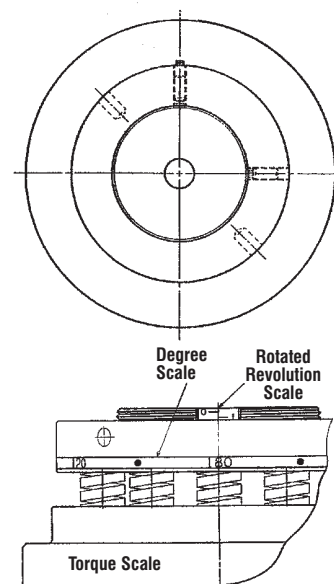
These couplings can be supplied with pilot bore, finish bore and keyseat and setscrews, or fitted with clamping elements to clamp directly to keyless shafts. The use of clamping elements eliminates all backlash in the drive line within the operating torque range, but does require an increase to the overall 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 m <sup>2</sup> (x10 <sup>-2</sup> )	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 <sup>o</sup>
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.

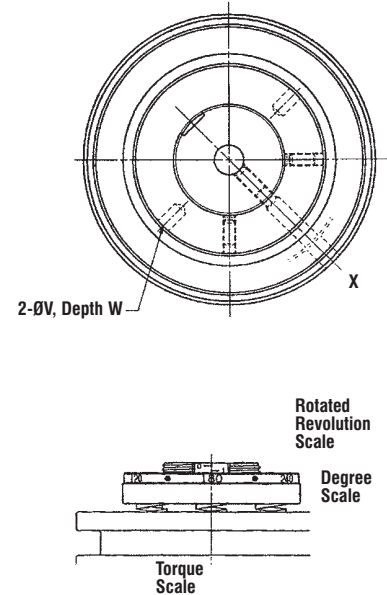
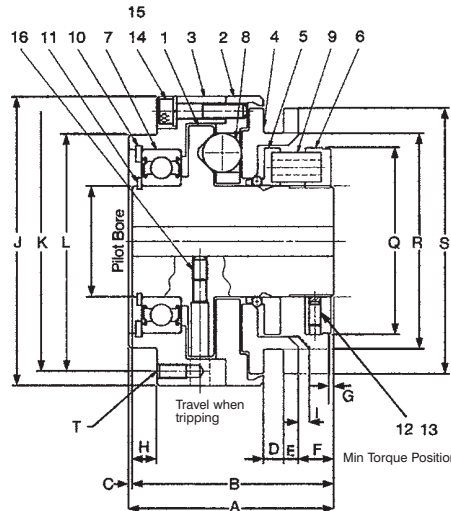
Models	A	B	C	D Min. Pointed Position	E PCD	F PCD	G	H	I	J	M	N	O	P Screws x Length	Q Screw x Length	R	S
CGX10-C	69	24	1.3	+0.3	62	42	33	25	2	42	56	-	74	M4x18	M4x10	5	10
CGX20-C	84	24	1.6	+0.3	89	66	55	35	3	46	70	-	98	M5x20	M5x12	5	10
CGX35-C	88	24	1.9	-0.5	113	83	70	35	3	50	88	-	125	M6x25	M6x15	6	10
CGX50-C	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.

# Type CGZ Crossgard Clutch



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



- |                       |                    |               |                  |
|-----------------------|--------------------|---------------|------------------|
| 1 Hub                 | 5 Ball Cage        | 9 Coil Spring | 13 Lock Plug     |
| 2 Centre Flange       | 6 Adjustable Nut   | 10 Snap Ring  | 14 Hex-Head Bolt |
| 3 Driven Flange Plate | 7 Bearing (Z Type) | 11 Snap Ring  | 15 Spring Washer |
| 4 Plate               | 8 Steel Ball       | 12 Set Screw  | 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 kgfm <sup>2</sup> (x10 <sup>-2</sup> )
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			SIZE	
																	No.	Size x length	V		W
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

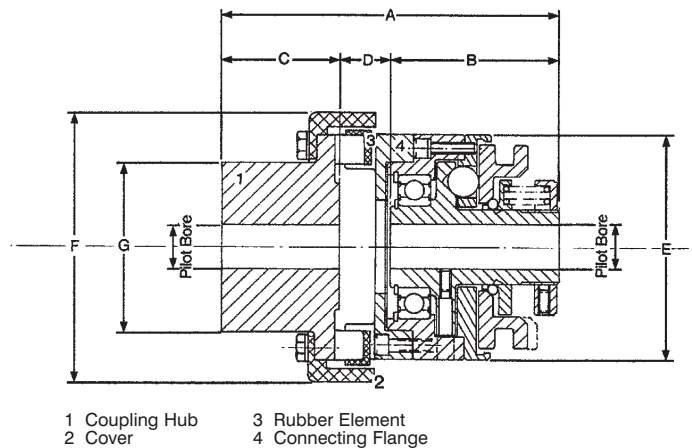
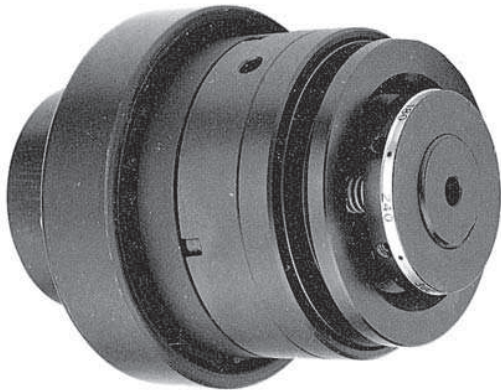
Type CGZ clutches totally disengage on overload, and will not re-engage drive without external axial force being applied to the pressure plate when the clutch is correctly aligned. The clutch must be stationary when re-engaged, otherwise the clutch may be damaged.

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.

# 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.



Tel: +44 121 360 0155

Fax: +44 121 325 1079

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 kgm <sup>2</sup> (x10 <sup>-2</sup> )
					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.

Email: sales@crossmorse.com