Option

● Torque guard (TGX)

■ Features

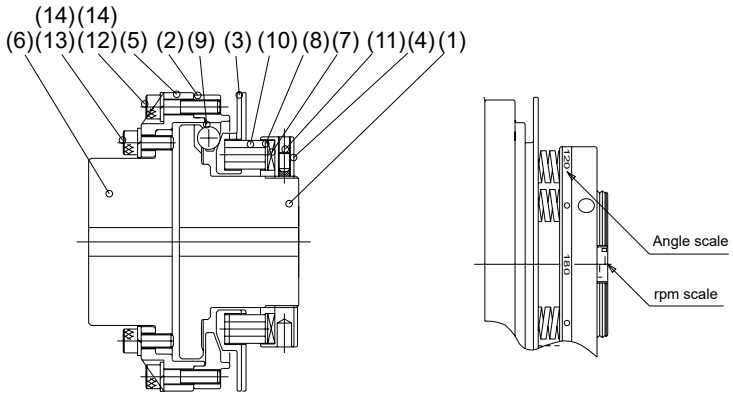
1. Coupling function
   The ball & wedge mechanism absorbs misalignment including angular error, parallel error and axial direction displacement.
2. High return accuracy of ±10 seconds.
   When returning after the trip, the phase difference between the drive side and load side is small.
3. High accuracy trip (release)
   The differences of adjacent trip torque values for repetitive trips (releases) are within 3%.
4. Easy torque adjustment
   Trip torque can be easily adjusted by turning the adjusting nut.
5. Checking the set torque
   The set torque can be easily checked with an easy-to-read rpm scale and angle scale.
6. Single position
   The unique layout of the ball & wedge mechanism allows matching array only at 1 position.
7. Overload detection is available
   (combined with a proximity switch)

■ Motion overview

Ball & wedge mechanism

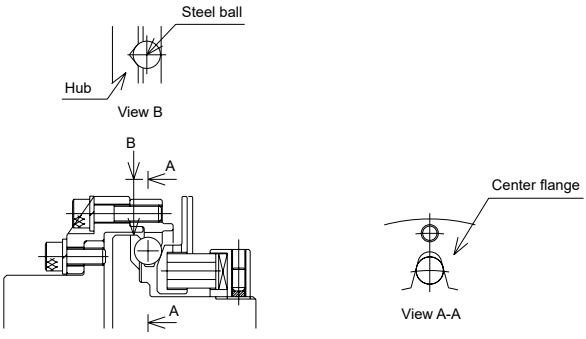
Torque is transmitted via the (1) hub (9) steel ball (2) center flange (5) flange and to the (6) boss. The (9) steel ball is pressed against the (1) hub and the (2) center flange with the force of (10) coil spring. The contact area of the (3) plate is tapered so that the (9) steel ball is always pressed against the (1) hub and the groove of the (2) center flange. This is the ball & wedge mechanism. (Figures 1 and 2) When overload is applied, the (9) ball moves out of the pocket and starts rolling. Since there is no sliding surface, the frictional torque is extremely small enhancing the durability. When this happens, the (3) plate is pushed down, which can be detected with a proximity switch.When the table is manually turned after removing the overload, it automatically returns to the original position.

Fig. 1



(1)	Hub	(6)	Boss	(11)	Lock screw
(2)	Center flange	(7)	Bearing	(12)	Hexagon socket head cap screw
(3)	Plate	(8)	Side plate	(13)	Hexagon socket head cap screw
(4)	Adjusting nut	(9)	Steel ball	(14)	Spring washer
(5)	Flange	(10)	Coil spring		

Fig. 2



Option

● Torque guard (TGX)

⚠ CAUTION When designing or making a selection

1. Confirm that the actual load torque of index drive Te x 1.3 is within the trip torque (release torque) adjusting range.
2. If an external load exists while index drive is stopped (in a dwell interval), confirm that this is less than the trip torque (release torque).
3. When index drive is stopped for emergency during output motion, take time to stop the system so that the torque guard does not trip.
4. If backlash exists in the driving system or if rigidity is not sufficient, a load exceeding the calculation may apply. Select the optimum index drive and adjust the trip torque of a torque guard, taking the load characteristics well into consideration.
5. When you select index drive, calculate the load conditions taking into consideration the moment of inertia of a torque guard itself as well as the table to be installed, the workpiece, etc.
6. When ordering only a set of index drive and a torque guard, they can be delivered assembled with special specifications for mounting the output shaft depending on the size.
   When you place an order only for the torque guard, note the output shaft specification of index drive to be mounted.
7. When you install a torque guard exceeding the specification of the index number n of 12 of index drive, you may not be able to make a proper trip torque adjustment. Contact CKD when you select a model.
8. Frictional torque from the bearings and seals and work torque caused by uneven mounting of the workpiece and jigs affect the accuracy of a torque guard. Take measures to minimize these when you design the system.

⚠ CAUTION Installation & adjustment

■ Adjusting trip torque

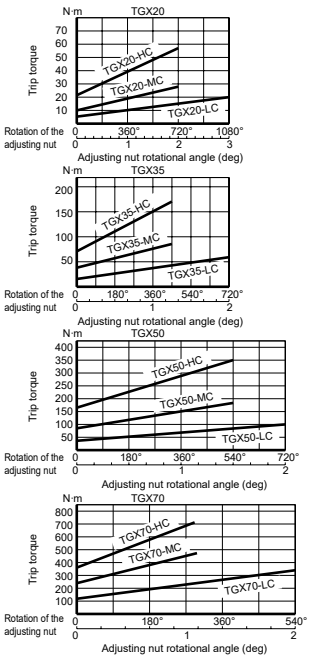
How to adjust trip torque

1. Calculate the actual load torque Te of index drive.
2. Calculate the trip torque Taj. (generally, Taj = Te × 1.3)
3. Torque for the torque guard is adjusted to be at min. point (min. torque) at shipment unless specified. Confirm the indicator points zero on a torque scale.
4. Take out one of the lock screws stopping the adjustment nut rotation. (When the index drive is shipped assembled)
5. Read the tightening angle from the diagram of the clamping and torque correlation chart (right table) for the preset trip torque, and tighten the adjusting nut based on this angle. One increment of the Adjusting nut rotational angle scale is 60 degrees.
   First, as factory settings is at the lowest increment (0°), perform a trip test at this setting. If necessary, tighten accordingly and test again. Repeat these steps until you reach the optimum trip torque.
   The trip torque of the product many not exactly match the value in the diagram of the relationship of the trip torque and adjusting nut rotation (on the right) as this is just a reference value.
6. Tighten 1 lock screw up to the following torque. [CAUTION 1]
   There are 2 locations for the lock screw to tighten. If the position is at the hub notch, use the other position. If you suspect the lock nut may become loose due to vibration while running, apply Loctite 242 or a similar product to prevent loosening.

[CAUTION] When you re-tighten the lock screw, check the following 2 points.
(1) Ensure that the plug of the tip is not displaced.
   If you use the lock screw whose plug is displaced, the thread of the hub may be damaged or the screw may bite into the notch of the hub.
(2) Ensure that the plug of the tip is not significantly deformed.
   If you use the lock screw whose plug is deformed, the thread of the hub may be damaged.
* In the above cases of (1) or (2), or if you suspect this may happen, use a new lock screw.

[CAUTION]
(1) The trip torque is set at min. within the adjusting range for delivery unless specified specified otherwise. Adjust the trip torque when installed on the unit.
(2) After adjustment of the trip torque, confirm that it is correctly adjusted using a torque gauge.
(3) Do not turn the adjusting nut exceeding the max. on the torque torque scale.

Clamping and torque correlation chart



Tightening torque

Lock screw	Tightening torque
M5	3.8 Nm
M8	16 Nm

⚠ CAUTION Installation & adjustment

Installation

1. Be sure to securely fix the torque guard and the table.
2. When the trip detection switch is installed
   The distance of detection of the proximity switch may vary depending on temperature and voltage. Confirm that the torque guard trip is correctly detected after installation.
3. When you install a torque guard onto the shaft, surface runout of the torque guard may increase if you forcibly pound it with a hammer.
4. When you install the torque guard to the shaft, be sure to check the alignment including concentricity.
   Installation should be within the allowable misalignment. (Tables 2 & 3, Figures 3 & 4)
5. Do not use the products in an environment where water or oil may be splashed over the unit. CKD products are not water-proof nor splash-proof. If water or oil is splashed, the torque saver may malfunction or become damaged.
   Provide countermeasures such as a cover if water or oil may be splashed.
6. Grease is applied to the torque saver. Oil may seep out while being used. Conduct periodic inspection and provide countermeasures such as an oil drip pan if this may cause a product defect.
7. Do not use this product in an environment where explosion or fire may occur.

Aligning method 1

a. Disassemble the flange from the boss and the center flange and slide it in the axial direction.
b. Fix the dial around the boss, and measure the runout at the side surface and circumference of the hub.

Aligning method 2

a. Disassemble the flange and the center flange.
b. Slide the boss with the flange in the axial direction.
c. Secure the dial on the shaft, and measure the runout at the side surface and circumference of the hub.

(Table 2)

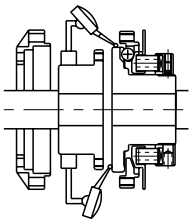
Model No.	Allowable angle deviation deg	Allowable parallel deviation mm	Axial tolerance displacement mm
TGX20-C	0.6	0.1	±0.5
TGX35-C	0.6	0.1	±0.5
TGX50-C	0.6	0.1	±0.6
TGX70-C	0.6	0.1	±0.7

(Table 3)
Reference: Hub side runout per angular error of $\theta = 0.1°$

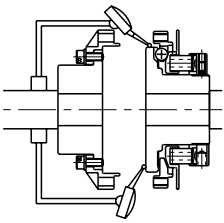
Model No.	O.D.	Runout of the hub mm
TGX20-C	ø 75	0.131
TGX35-C	ø 98	0.171
TGX50-C	ø 138	0.241
TGX70-C	ø 177	0.309

* Mount the unit so that the angular error can be minimized.

(Fig. 3)



(Fig.4)



⚠ CAUTION During use & maintenance

1. Lubrication with grease
   Apply a thin coat of grease to the ball and bearing section once every year or once every 1,000 trips.
2. Do not service or inspect the units while power is being supplied.
   It may suddenly run due to an error or control circuit failure resulting in injury.
3. Be sure to make index drive start and stop within the dwell interval.
   If the input shaft is started or stopped outside the dwell interval, load torque exceeding the design value may be applied causing the torque guard to release resulting in the table to overrun, which may cause serious injury to person(s) or damage to the unit or surrounding equipment.

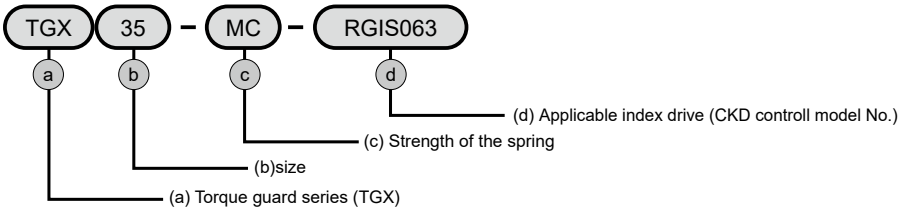
Option

● Torque guard (TGX)

CAD

How to display the model numbers (When you place an order without mounting a torque guard on the index drive)

(Example)



Note. When ordering only for a torque guard, check the output shaft specification of index drive on which it is to be mounted.
(d) For an applicable index drive, refer to the table below.

● Standard
(Roller gear cam)

Main model No.		Torque guard
RGIS	**040**	TGX20
	050	TGX20
	063	TGX35
	080	TGX50
	110	TGX70

● Standard
(Parallel cam)

Main model No.		Torque guard
PCIS	**050**	TGX20
	063	TGX20
	080	TGX35
	100	TGX50
	125	TGX70

● Wide angle
(Roller gear cam)

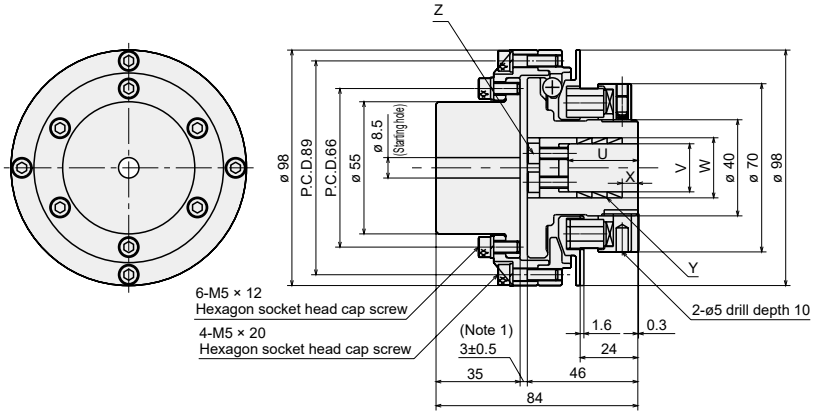
Main model No.		Torque guard
RGIL	**063**	TGX20
	080	TGX20
	110	TGX35
	140	TGX50
	180	TGX70

(CAUTION)
The applicable index drive is not indicated on the name plate. When ordering a torque guard, confirm the model number of index drive to be installed.

Dimensions

TGX20

Return accuracy	±10 sec
Variations of adjacent trip torque	±3%



Note 1: Mount onto the equipment within the dimensions specified.

Characteristics

Torque guard coupling Model No.	Set torque range (N·m)	Max. rotation speed (rpm)	Color of coil spring x quantity	Torque guard (boss)		Weight (kg)	Moment of inertia × 10^{-2} (kg·m^2)	Allowable angle deviation (deg)	Allowable parallel deviation (mm)	Axial tolerance displacement (mm)
				Tap hole diameter	Max. hole diameter					
TGX20-LC	5.2 to 19	550	Yellow × 6	8.5	35	2.38	0.231	0.6	0.1	±0.5
TGX20-MC	9.8 to 27		Red × 3							
TGX20-HC	21 to 55		Red × 6							

Applicable index drive	U	V	W	X	Y	Z	Shaft end installation hole
RG*S040	33	ø 17H7	ø 21H7	18	2-17 × 21 (S)	3-M5 special hexagon socket head cap screw	2-M6 depth 9 (P.C.D.9)
RG*S050	29	ø 20H7	ø 25H7	6.5	3-20 × 25 (S)	3-M5 hexagon socket head cap screw	3-M5 depth 10 (P.C.D.12)
RG*L063	33	ø 17H7	ø 21H7	18	2-17 × 21 (S)	3-M5 special hexagon socket head cap screw	2-M6 depth 9 (P.C.D.9)
RG*L080	29	ø 20H7	ø 25H7	6.5	3-20 × 25 (S)	3-M5 hexagon socket head cap screw	3-M5 depth 10 (P.C.D.12)
PC*S050	32	ø 16H7	ø 20H7	18	2-16 × 20 (S)	3-M5 special hexagon socket head cap screw	2-M6 depth 9 (P.C.D.9)
PC*S063	29	ø 20H7	ø 25H7	6.5	3-20 × 25 (S)	3-M5 hexagon socket head cap screw	3-M5 depth 10 (P.C.D.12)

Option

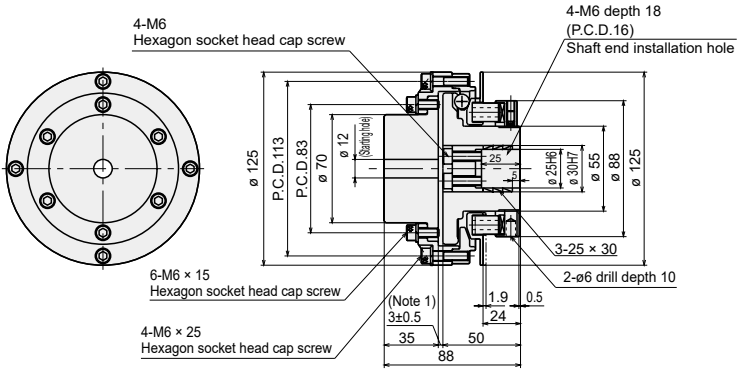
● Torque guard (TGX)

CAD

■ Dimensions

● TGX35

Return accuracy	±10 sec
Variations of adjacent trip torque	±3%



Note 1: Mount onto the equipment within the dimensions specified.

■ Characteristics

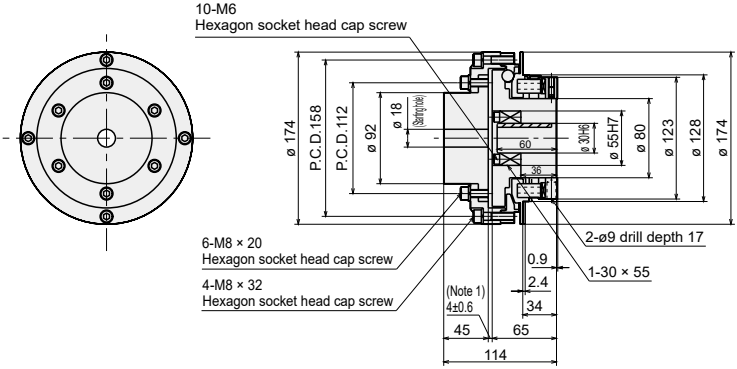
Torque guard coupling Model No.	Set torque range (N·m)	Max. rotation speed (rpm)	Color of coil spring x quantity	Torque guard (boss)		Weight (kg)	Moment of inertia ×10^{-2} (kg·m^2)	Allowable angle deviation (deg)	Allowable parallel deviation (mm)	Axial tolerance displacement (mm)
				Starting hole diameter	Max. hole diameter					
TGX35-LC	19 to 57	400	Red × 5	12	50	3.92	0.663	0.6	0.1	±0.5
TGX35-MC	36 to 84		Green × 5							
TGX35-HC	74 to 167		Green × 10							

Applicable index drive		
RG*S063	RG*L110	PC*S080

Dimensions

TGX50

Return accuracy	±10 sec
Variations of adjacent trip torque	±3%



Note 1: Mount onto the equipment within the dimensions specified.

Characteristics

Torque guard coupling Model No.	Set torque range (N·m)	Max. rotation speed (rpm)	Color of coil spring x quantity	Torque guard (boss)		Weight (kg)	Moment of inertia $\times 10^{-2}$ (kg·m^2)	Allowable angle deviation (deg)	Allowable parallel deviation (mm)	Axial tolerance displacement (mm)
				Starting hole diameter	Max. hole diameter					
TGX50-LC	40 to 98	300	Red × 5	18	60	10.9	3.35	0.6	0.1	±0.6
TGX50-MC	81 to 176		Green × 5							
TGX50-HC	167 to 343		Green × 10							

Applicable index drive		
RG*S080	RG*L140	PC*S100

Option

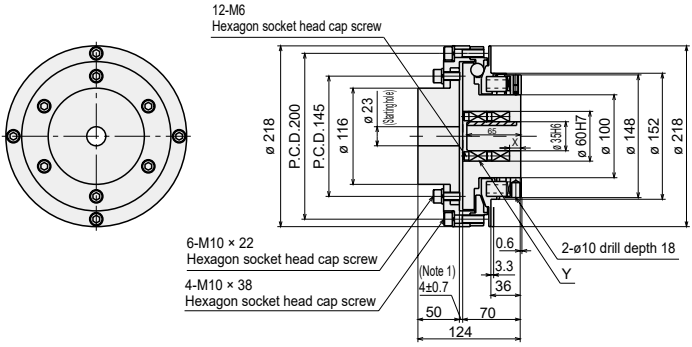
● Torque guard (TGX)

CAD

■ Dimensions

● TGX70

Return accuracy	±10 sec
Variations of adjacent trip torque	±3%



Note 1: Mount onto the equipment within the dimensions specified.

■ Characteristics

Torque guard coupling Model No.	Set torque range (N·m)	Max. rotation speed (rpm)	Color of coil spring x quantity	Torque guard (boss)		Weight (kg)	Moment of inertia ×10^{-2} (kg·m^2)	Allowable angle deviation (deg)	Allowable parallel deviation (mm)	Axial tolerance displacement (mm)
				Starting hole diameter	Max. hole diameter					
TGX70-LC	118 to 323	240	Red × 8	23	80	16.3	8.93	0.6	0.1	±0.7
TGX70-MC	235 to 461		Green × 8							
TGX70-HC	353 to 696		Green × 12							

Applicable index drive		X	Y
RG*S110	TGX70-LC/MC	41	1-35 × 60
	TGX70-HC	13.5	2-35 × 60
RG*L180	TGX70-LC/MC	41	1-35 × 60
	TGX70-HC	13.5	2-35 × 60
PC*S125	TGX70-LC/MC	41	1-35 × 60
	TGX70-HC	13.5	2-35 × 60