Koyo®

Patented

MINIATURE ONE-WAY CLUTCH



ISO9001/QS-9000
Certificate No. 927265

CAT.NO.113E-1

KOYO SEIKO CO.,LTD.

Koyo MINIATURE ONE-WAY CLUTCH

Koyo miniature one-way clutch

On the basis of highly advanced technology and extensive experience, Koyo has developed a full range of clutches, ranging from heavy load type to light load type, as well as various shaft diameters (4~12mm), for use under various operating conditions.

Koyo has won a high reputation as a manufacture of high quality clutches for application in various types of office automation equipment, including LBP, plain paper copiers(PPC), printers and facsimiles.

Please consult Koyo should you require any further information.



Characteristics

1 Free from creep

The protruding portions on the outside surface prevent creep, even when fitting surface of plastic housing is not strictly accurate.

2 Suitable for compact designs

Designed to achieve the utmost in size and weight reduction, including the use of thin steel sheet for the outer ring (drawn cup), this clutch contributes greatly to compact equipment design.

3 Diminishes heat generation and wear

Due to the low torque in idle mode, heat generation and wear can be prevented in case no radial and moment loads are imposed.

4 Excellent grease retention

The pre-packed grease suitable for clutch function enables product use at a wide range of temperatures.

It is unnecessary to replenish grease under normal operating conditions.

5 Ease of installation

Since clutches do not require special fixing device, they are quite easy to install; so, direct press fitting to plastic housing is possible.

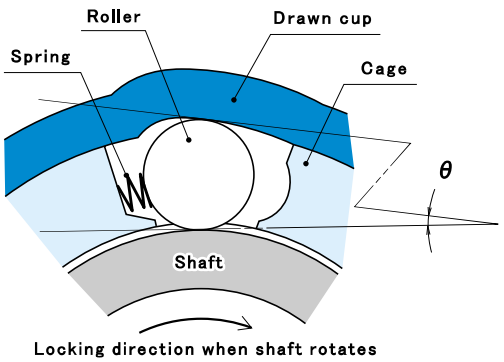
Structure and Principles

The Koyo miniature one-way clutch consists of drawn cup, rollers, cage, and springs.

The drawn cup, made of carburized steel sheet, has a unique structure: a protruding portion, which serves as a stopper of rotation on the outside surface at O.D. side, and a cam on the outer ring at bore side are provided.
(The drawn cup of light load type is not carburized.)

When the clutch system works

When shaft rotates clockwise as shown below, rollers are engaged with the cam on the drawn cup by the force of springs supported by the cage. At this time the roller acts as a wedge between cam surface and shaft, actuating the drawn cup.



Clutch in idle mode

When the clutch rotates counterclockwise, the roller disengages from the drawn cup cam, and the shaft rotates idly.

For Compact Design and Prevention of Housing Creep

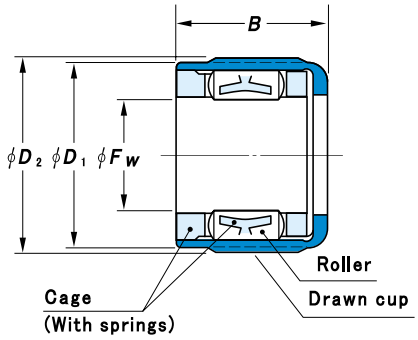
Types and Characteristics of Miniature One-Way Clutches

	EWC series (with synthetic resin spring)		1WC series (with metal springs)
	Heavy load type	Light load type	Heavy load type
	EWC...C	EWC...A	1WC...
Torque capacity	Heavy load	Light load	Heavy load
Range of operating temperature	−10 ~ 70 ℃		−10 ~ 90 ℃
Locking life	Locking system can function more than1 million times, (Provided that torque capacity remains below the figures shown in the specification tables)		
Insert molding	Impossible		Possible
Delivery of clutch only	Possible		
Unit delivery	Standard : Polyacetal resin Standard gear accuracy : Gear intermeshing accuracy JGMA class 6		
Remark	One−way clutch for rust prevention with nickel plating on drawn cup and stainless rollers is also available. (Characteristics can be similar to those of heavy load type)		

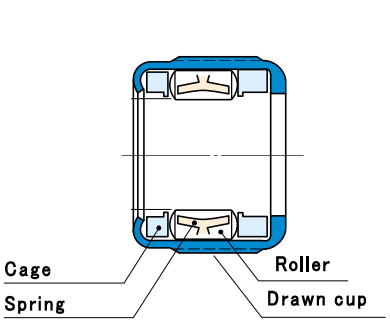
※Housing can be designed in accordance with shapes of gears, timing pulleys and cams.
Please contact Koyo for further information.

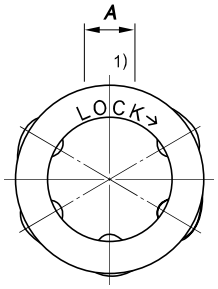
Parts and Dimensions

EWC series



1WC series





Shaft diameter (mm)	Boundary dimensions (mm) F_W	D_1	D_2	B	A	Torque capacity (N・m)	(kgf・cm)	Designation EWC series (with resin spring)	1WC series (with metal springs)	1) Number of protruding portions provided at equal intervals	(Refer.)Mass (g) EWC	1WC
4	4	8	8.4	6	2.6	0.08	0.8	EWC0406A	—	4	1.0	—
						0.15	1.5	EWC0406C	—			—
6	6	10	10.4	6	2.8	0.19	1.9	EWC0606XA	—	6	1.4	—
						0.33	3.4	EWC0606XC	—			—
				8		0.25	2.5	EWC0608A	—		1.7	—
						0.44	4.5	EWC0608C	1WC0608			2.0
				12		0.88	9	—	1WC0612		—	3.0
8	8	12	12.4	9	2.6	0.49	5	EWC0809A	—	6	2.4	—
						0.88	9	EWC0809C	—			—
	8	14.2	15	12	3.6	1.18	12	EWC0812A	—		5.8	—
						1.96	20	EWC0812C	1WC0812			7.0
				14.5		2.65	27	—	1WC0815		—	8.0
10	10	14	14.4	9	2.5	2.25	23	—	1WC100914	12	—	3.0
	10	16	17	10	5	1.18	12	EWC1010A	—	6	6.0	—
						1.96	20	EWC1010C	—			—
				12		1.37	14	EWC1012A	—		6.8	—
						2.35	24	EWC1012C	1WC1012			8.0
12	12	18	19	9	5.1	3.04	31	EWC1209C	—	8	6.2	—
				16		6.28	64	—	1WC1216		—	12

For Compact Design and Prevention of Housing Creep

Shaft Dimension Tolerance and Accuracy (Recommended)

Generally shaft is used as inner ring instead of using it. Therefore it is necessary to follow the shaft dimension tolerance and accuracy shown in the table, to help ensure optimal clutch performance.

	Heavy load type (EWC...C, 1WC...)	Light load type (EWC...A)
Class of shaft tolerance	h 8 - h 10 (Refer to remarks 1),2))	
Surface hardness※	50 HRC min.	30 HRC min.(Refer to remarks 3))
Surface roughness (Ra)	0.3a max.	0.8a max.
Roundness – Cylindricity	0.005 mm max.	

※One-way clutch with surface treatment such as plating may not work properly under the certain operating conditions. Please contact Koyo for further information.

(Remarks)

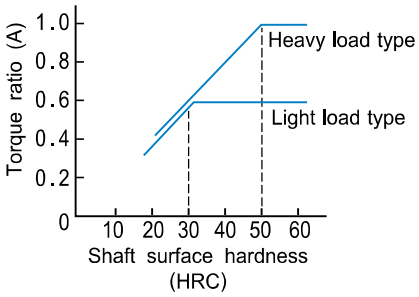
1) In some operating conditions, clutches need high precision engagement:
- Shaft diameter tolerance ····· h8

2) Shaft diameter tolerance when engaging accuracy of the clutch is not required, or when clutch is free from radial load and moment :
- Not more than shaft dia. 6 mm & EWC 0809 ····· 0 to –0.040mm
- Over shaft dia. 8 mm ····· h 10

3) Surface hardness when loading torque is lower than torque capacity :
- The recommended value of surface hardness to torque ratio (A) is shown in right diagram.

Where,

$$\text{Torque ratio (A)} = \frac{\text{Loading torque}}{\text{Torque capacity of heavy load type}}$$

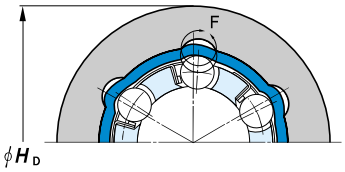


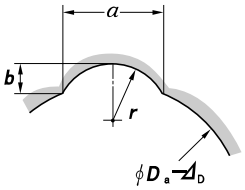
Housing Dimension and Accuracy (Recommended)

Since housing dimension tolerance and accuracy depend on materials and thickness, please ask Koyo for more information.

When Polyacetal resin is used for this shape of housing, the interference (Δ_D) is shown in below.

■Housing shape



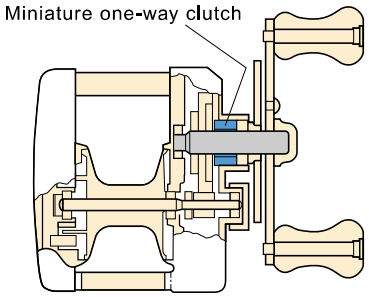


Detail of section F

Shaft diameter (mm)	Designation: EWC series (with resin spring)	Designation: 1WC series (with metal springs)	Recommended housing dimensions (mm): H_D	a	b	r	D_a	Δ_D
4	EWC0406A	—	12	2.65	0.50	2	8	0.06
	EWC0406C	—						
6	EWC0606XA	—	14	2.8	0.57	2	10	0.08
	EWC0606XC	—						
	EWC0608A	—						
	EWC0608C	1WC0608						
	—	1WC0612						
8	EWC0809A	—	16	2.6	0.48	2	12	0.10
	EWC0809C	—						
	EWC0812A	—	18.5	3.6	0.87	2.3	14.2	0.11
	EWC0812C	1WC0812						
	—	1WC0815						
10	EWC1010A	—	21	5.0	1.20	3.2	16	0.13
	EWC1010C	—						
	EWC1012A	—						
	EWC1012C	1WC1012						
12	EWC1209C	—	23	5.1	1.20	3.3	18	0.14
	—	1WC1216						

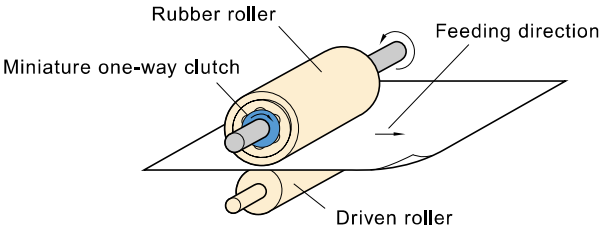
Applications

Instantaneous reel locking



Application to paper feed rollers

(When trouble occurs, paper can be easily removed without disassembly)

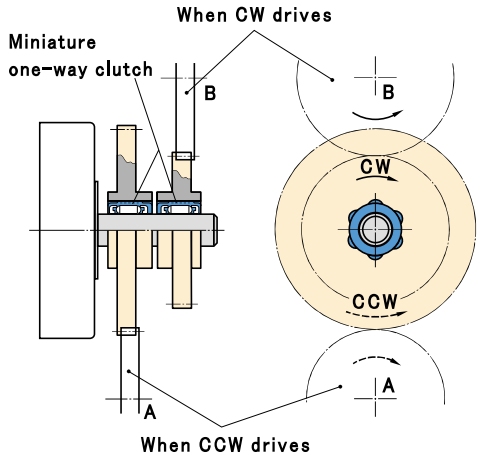


Drive line changing switch

Two one-way clutch gear units are installed for locking in opposite directions. By changing motor rotating direction, driven equipment (A or B) can be changed.

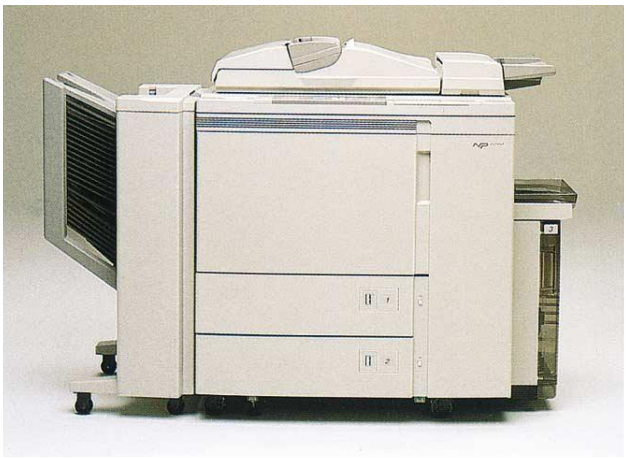
Application ↓

- For driving paper feed cassette of PPC
- For switching fax function from transmission to reception and vice versa.



Others

- Facsimiles
- Industrial sewing machines
- Typewriters
- Automatic vending machines, money exchanging machines



Plain Paper Copier

Caution

Miniature one-way clutch itself does not have capability to receive radial and moment loads. Therefore, it is rerecired to use other bearing to support radial load under heavy radial load condition. Insufficient locking action may be caused when the rate of idle mode rotation is rather high. Please contact Koyo for further information.