

Koyo®

Patented

MINIATURE ONE-WAY CLUTCH



KOYO SEIKO CO., LTD.

CAT.NO.113E-1

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 manufacturer 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

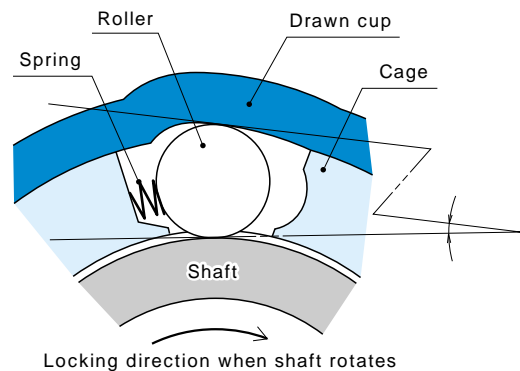
The Koyo miniature one-way clutch consists of drawn cup, rollers, cage, and springs.

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.

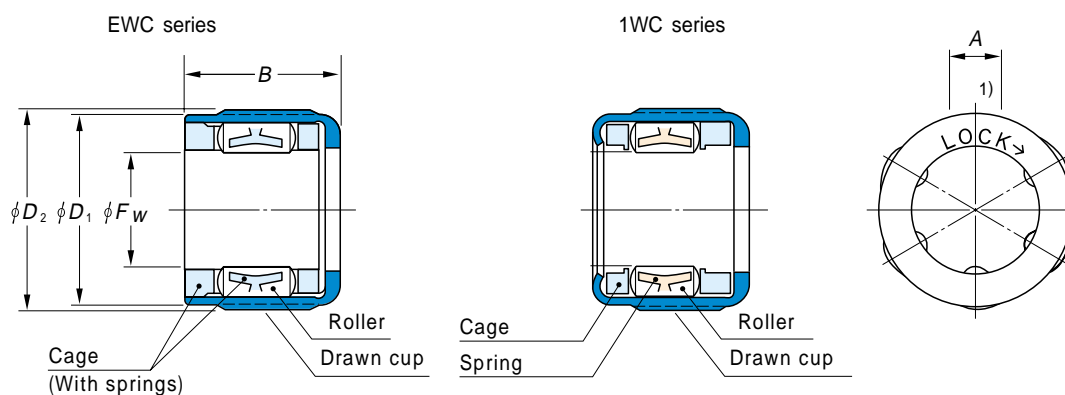
For Compact Design and Prevention of Housing Creep

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 °C		-10 ~ 90 °C
Locking life	Locking system can function more than 1 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



Shaft diameter (mm)	Boundary dimensions (mm)					Torque capacity		Designation		1) Number of protruding portions provided at equal intervals	(Refer.) Mass (g)	
	F_w	D_1	D_2	B	A	(N · m)	(kgf · cm)	EWC series (with resin spring)	1WC series (with metal springs)		EWC	1WC
4	4	8	8.4	6	2.6	0.08	0.8	EWC0406A	—	4	1.0	—
				6		0.15	1.5	EWC0406C	—		—	
6	6	10	10.4	8	2.8	0.19	1.9	EWC0606XA	—	6	1.4	—
				12		0.33	3.4	EWC0606XC	—		—	
				8	0.25	2.5	EWC0608A	—	—			
				12	0.44	4.5	EWC0608C	1WC0608	1.7		2.0	
				12	0.88	9	—	1WC0612	—		3.0	
8	8	12	12.4	9	2.6	0.49	5	EWC0809A	—	6	2.4	—
				12		0.88	9	EWC0809C	—		—	
				12	1.18	12	EWC0812A	—	5.8		—	
				14.5	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		1.18	12	EWC1010A	—		6.0	—
				10	1.96	20	EWC1010C	—	—			
				12	1.37	14	EWC1012A	—	6.8		—	
				12	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

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 :

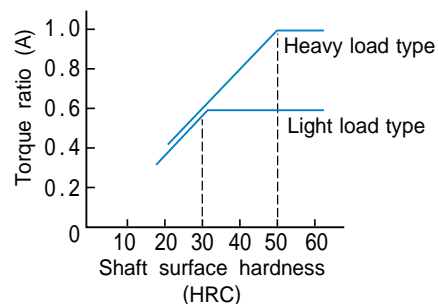
- Not more than shaft dia. 6 mm & EWC 0809 0 to -0.040mm
- Over shaft dia. 8 mm h 10

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,

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

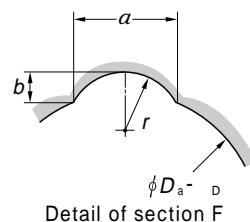
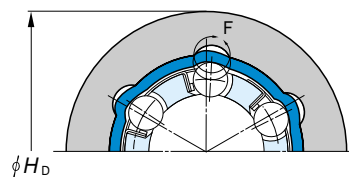


Housing Dimension and Accuracy (Recommended)

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 (ϕ) is shown in below.

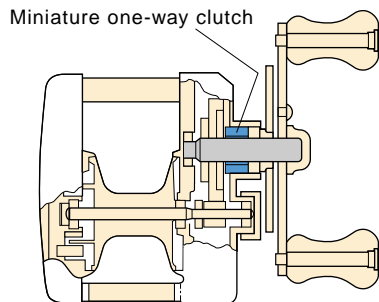
■ Housing shape



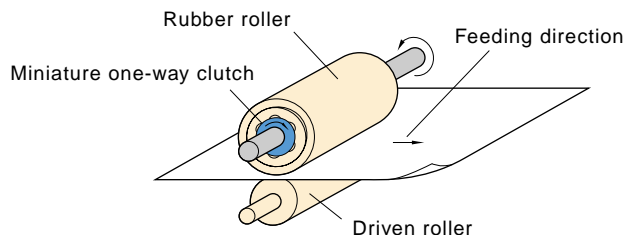
Shaft diameter (mm)	Designation		Recommended housing dimensions (mm)					
	EWC series (with resin spring)	1WC series (with metal springs)	H_D	a	b	r	D_a	ϕD
4	EWC0406A	—	12	2.65	0.50	2	8	0.06
	EWC0406C	—						
6	EWC0606XA	—	14	2.8	0.57	2	10	0.08
	EWC0606XC	—						
	EWC0608A	—						
	EWC0608C	1WC0608						
	—	1WC0612						
8	EWC0809A	—	16	2.6	0.48	2	12	0.10
	EWC0809C	—						
	EWC0812A	—						
	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)

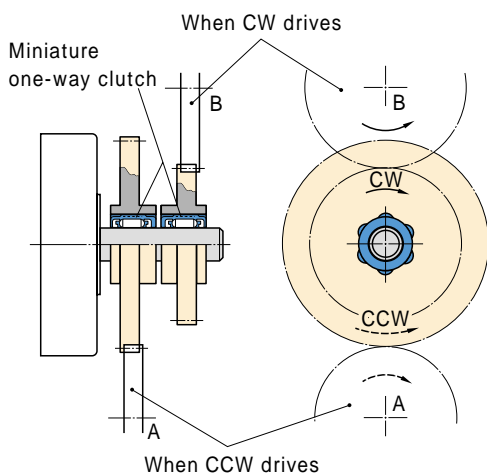


■ Drive line changing switch

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 required 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.

INTERNATIONAL NETWORK

KOYO SEIKO CO., LTD. HEAD OFFICE

No.5-8, Minamisemba 3-chome,Chuo-ku,Osaka 542-8502,JAPAN
 TEL : 81-6-6245-6087
 FAX : 81-6-6244-0814
 TLX : 63040(KOYO OSJ)

KOYO CANADA INC.

5324 South Service Road,Burlington,Ontario L7L 5H5,CANADA
 TEL : 1-905-681-1121
 FAX : 1-905-681-1392

* KOYO CORPORATION OF U.S.A.

29570 Clemens Road,P.O.Box 45028,Westlake,OH 44145,U.S.A.
 TEL : 1-440-835-1000
 FAX : 1-440-835-9347
 TLX : 0985461(AMKOY RKVR)

* KOYO CORPORATION OF U.S.A.

(AUTO SALES & TECHNICAL CENTER)

47771 Halyard Drive,Plymouth,MI 48170,U.S.A.
 TEL : 1-734-454-1500
 FAX : 1-734-454-4076

KOYO STEERING SYSTEMS OF U.S.A. INC.

(SALES & TECHNICAL CENTER)

47771 Halyard Drive,Plymouth,MI 48170,U.S.A.
 TEL : 1-734-454-7067
 FAX : 1-734-454-7059

KOYO DE MÉXICO, S.A.

Av.Primer de Mayo No.153,53500 Naucalpan Edo.de México,MÉXICO
 TEL : 52-5-358-0214,0077
 FAX : 52-5-576-8827,8871

KOYO LATIN AMERICA, S.A.

P.O.Box 6-1797,El Dorado,Panama,REPUBLICA DE PANAMA
 TEL : 507-264-0921,0977
 FAX : 507-264-2782,507-269-7578

KOYO ROLAMENTOS DO BRASIL LTDA.

Rua Desembargador Eliseu Ghilherme 304,7-Andar,Paraiso CEP 04004-30,BRASIL
 TEL : 55-11-3887-9173
 FAX : 55-11-3887-3039

THAI KOYO CO., LTD.

193/53 Lake Rajada Office Complex,14th Floor Unit B,Rachadapisek Road,
 Klongtoey,Bangkok 10110,THAILAND
 TEL : 66-2-264-0395,66-2-661-9603-5
 FAX : 66-2-661-9606

KOYO SINGAPORE BEARING (PTE.) LTD.

38 Tuas West Road,Singapore 638385,SINGAPORE
 TEL : 65-274-2200
 FAX : 65-862-1623

PHILIPPINE KOYO BEARING CORPORATION

Rm.504,Comfoods Bldg., Cor. Gil Puyat Ave.and Pasong Tamo,Makati City,
 PHILIPPINES
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 FAX : 63-2-867-3148

KOYO SEIKO CO., LTD. SEOUL BRANCH

Inwoo Building 6F,539-11,Shinsa-Dong,Kangnam-Ku,Seoul,KOREA
 TEL : 82-2-549-7922
 FAX : 82-2-549-7923

KOYO SEIKO CO., LTD. BEIJING LIAISON OFFICE

Peace Hotel Room No.2804,No.3 JinYu HuTong,Beijing,CHINA
 TEL : 86-10-6512-5673,9401
 FAX : 86-10-6512-5674

KOYO SEIKO CO., LTD. SHANGHAI LIAISON OFFICE

Rm.402,Aetna Tower,107 Zunyi Road,Shanghai 200051,CHINA
 TEL : 86-21-6237-5280
 FAX : 86-21-6237-5277

** KOYO AUSTRALIA PTY. LTD.

P.O.Box 442,Rydalmere,2116 N.S.W., AUSTRALIA
 TEL : 61-2-9638-2355
 FAX : 61-2-9638-3368

KOYO SEIKO CO., LTD. EUROPEAN CENTRAL OFFICE (SALES & TECHNICAL CENTER)

Markerkant 13-01,1314 AL,Almere,THE NETHERLANDS
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KOYO STEERING EUROPE S.A.S.

(SALES & TECHNICAL CENTER)

Zone Industrielle du Broteau,B.P.1,69540 Irigny,FRANCE
 TEL : 33-472-39-4444
 FAX : 33-478-51-2188

** KOYO KULLAGER SCANDINAVIA A.B.

Kanalvägen 1B,194 61 Upplands-Väsby,SWEDEN
 TEL : 46-8-590-212-00
 FAX : 46-3-590-212-29

* KOYO (U.K.) LTD.

Whitehall Avenue,Kingston,Milton Keynes MK10 OAX,UNITED KINGDOM
 TEL : 44-1908-289300
 FAX : 44-1908-289333

** EUROPA-KOYO B.V.

P.O.Box 1-2965 ZG,Nieuwpoort,THE NETHERLANDS
 TEL : 31-184-606800
 FAX : 31-184-602572,606857

KOYO ROMANIA REPRESENTATIVE OFFICE

Str. Frederic Jolliot-Curie,Nr.3,Etaj 1,Ap.2, Sector 5 Bucharest,RUMANIA
 TEL : 40-1-410-4170
 FAX : 40-1-410-1178

* KOYO DEUTSCHLAND GMBH.

P.O.Box 73 06 60,D-22126 Hamburg,GERMANY
 TEL : 49-40-67-9090-0
 FAX : 49-40-67-9203-0
 TLX : 213138(KOYO D)

KOYO FRANCE S.A.

8 Rue Guy Moquet,B.P.189 Z.I.,95105 Argenteuil Cedex,FRANCE
 TEL : 33-1-3998-4222
 FAX : 33-1-3998-4244,4249

KOYO IBERICA, S.A

Calle Belfast 15 Naves A y B, Polígono Ind. "Las Mercedes",
 28022 Madrid,SPAIN
 TEL : 34-91-329-0818
 FAX : 34-91-747-1194

KOYO ITALIA S.R.L.

Via Bronzino 9,20133 Milano,ITALY
 TEL : 39-02-2951-0844
 FAX : 39-02-2951-0954

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