Fig. 1 Structure of Precision Linear Pack Model ER

Labels: Inner block, Outer rail, Ball, Ball case

Structure and Features

Precision Linear Pack model ER is a slide unit using a stainless steel plate that is precision formed, heat-treated and then ground. It has a structure where balls rolls between the V-shaped grooves machined on the outer rail and the inner block to allow the system to slide. It is an ultra-thin, lightweight unit in which the balls circulate in a ball case incorporated in the inner block to perform infinite linear motion.

●Reduced design and assembly costs

It provides a highly accurate linear guide system with lower design cost and fewer man-hours than the conventional miniature ball bearings used in precision machines and other equipment.

●Maintains long-term stability

It is a ball-circulating type slide unit with an extremely small friction coefficient. This slide unit maintains stable performance over a long period of time.

●Light weight, compact design and high-speed response

The outer rail and the inner block are composed of very thin stainless steel plates.
Since the linear pack is light, it has a small inertial moment and demonstrates superbly high-speed response.

Applications

The Precision Linear Pack is used in extensive applications such as magnetic disc device, electronic equipment, semiconductor manufacturing machine, medical equipment, measuring equipment, plotting machine and photocopier.

Rated Loads in All Directions

Model ER is capable of receiving loads in all directions: radial, reverse radial and lateral directions.

The basic load rating in the dimensional table in the "THK General Catalog - Product Specifications," provided separately, indicates the rated load in the radial direction as shown in Fig. 2. The rated loads in the reverse-radial and lateral directions are obtained from table 1 below.
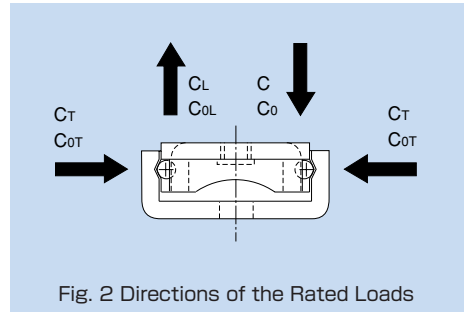
Fig. 2 Directions of the Rated Loads

Table 1 Rated Loads in All Directions

	Basic dynamic load rating	Basic static load rating
Radial direction	C	C_0
Reverse-radial direction	$C_L=C$	$C_{0L}=C_0$
Lateral direction	$C_T=1.47C$	$C_{0T}=1.73C_0$

Accuracy Standards

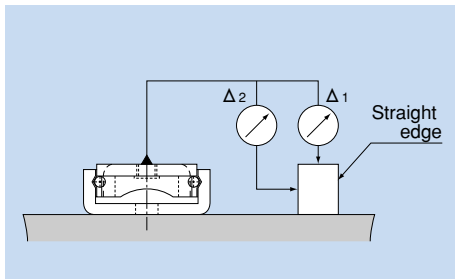The running straightness of Linear Pack model ER is indicated in table 2 (see Fig. 3).

Fig. 3 Method for Measuring Running Straightness

Table 2 Running Straightness

Unit: mm

| Stroke length		Running straightness of inner block in vertical directions $\Delta 1$	Running straightness of inner block in horizontal directions $\Delta 2$
Above	Or less		
−	20	0.002	0.004
20	40	0.003	0.006
40	60	0.004	0.008
60	80	0.005	0.010
80	100	0.006	0.012
100	120	0.008	0.016

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Radial Clearance

The radial clearance of model ER means the value for the motion of the central part of the inner block when the inner block is slightly moved with a vertically constant force in the middle of the outer rail in the longitudinal direction. The negative values in table 3 indicate that the respective models are provided with a preload when assembled and have no clearance between their inner blocks and the outer rails.

Table 3 Radial Clearance

Unit: μm

Model No.	Radial clearance	
	Normal	C1
ER　513	±2	–2 to 0
ER　616	±2	–3 to 0
ER　920	±2	–4 to 0
ER 1025	±3	–6 to 0

Note: When desiring normal clearance, add no symbol; when desiring C1 clearance, indicate "C1" in the model number (see "Model number coding" on page e-6).

Model ER
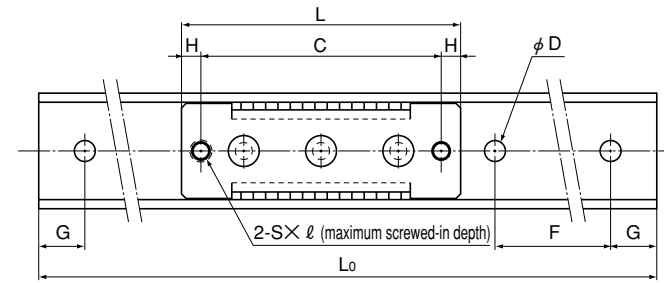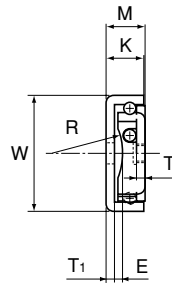
Unit: mm

Model No.	Inner block dimensions										Outer rail dimensions						Basic load rating		Mass	
	Width	Height M ±0.05	Length						Maximum screwed-in depth								C	C₀	Inner block	Outer rail
	W		L	C	H	E	R	S	ℓ	T	K	T₁	D	L₀	F	G	N	N	g	g/m
ER 513	13	4.5	22	7	7.5	1.1	4.2	M2	1.3	0.9	4	1.1	2.4	40, 60, 80	20	10	54.9	72.5	2.4	166
ER 616	15.6	6	36	29	3.5	1.7	9.2	M3	1.8	1.1	5.5	1.4	2.9	45, 70, 95	25	10	71.6	125	5.6	268
ER 920	20	8.5	46	40	3	2.3	7.3	M3	2.5	1.9	7.5	1.9	3.5	50, 80, 110	30	10	144	201	14.4	474
ER 1025	25	10	56	48	4	2.9	9.3	M4	2.8	2.2	9	2.2	4.5	60, 100, 140	40	10	215	315	27	677

Note To secure the outer rail of models ER513 and ER616, use cross-recessed screws for precision equipment (No. 0 screw).
Japan Camera Industry Association Standard JCIS 10-70
Cross-recessed screw for precision equipment (No. 0 screw)

Type		Nominal number of screw × pitch
No. 0 pan-head screw (class 1)	For model ER513	M2×0.4
	For model ER616	M2.6×0.45

Model number coding

2 ER616 C1 +95L

1 2 3 4

1 Number of inner blocks used on the same rail 2 Model number
3 Radial clearance symbol (see page e-5) 4 Outer rail length (in mm)

Precautions on Using the Precision Linear Pack

Handling

(1) Disassembling components may cause dust to enter the system or degrade mounting accuracy of parts. Do not disassemble the product.

(2) Dropping or hitting the Precision Linear Pack may damage it. Giving an impact to the Precision Linear Pack could also cause damage to its function even if the product looks intact.

(3) Removing the inner block of the Precision Linear Pack from the outer rail or letting it overrun will cause balls to fall off.

Lubrication

(1) Thoroughly remove anti-corrosion oil with a cleaning detergent and apply lubricant before using the product (note that grease is not fed when the product is shipped). As the most suitable grease, we recommend THK AFC Grease, which maintains lubricity over a long period of time. For lubrication in a clean room, low dust generation THK AFE Grease and THK AFF Grease are recommended.

(2) Do not mix lubricants of different physical properties.

(3) In locations exposed to constant vibrations or in special environments such as clean rooms, vacuum and low/high temperature, normal lubricants may not be used. Contact THK for details.

(4) When planning to use a special lubricant, contact THK before using it.

Installation

The mounting surface of Precision Linear Pack model ER must be finished to the maximum accuracy.

For securing the outer rail of models ER513 and ER613, also purchase and use No. 0 screws for precision equipment (see table 1) (if using ordinary screws, the inner block may hit the screw head).

Table 1 Outer Rail Securing Screws for Models ER513 and ER616

Model No.	Type	Nominal number of screw × pitch
ER513	No. 0 pan-head screw	M2×0.4
ER616	(class 1)	M2.6×0.45

Japan Camera Industry Association Standard JCIS 10-70
Cross-recessed screw for precision equipment (No. 0 screw)

Precautions on Use

(1) Entrance of foreign matter may cause damage to the ball circulating path or functional loss. Prevent foreign matter, such as dust or cutting chips, from entering the system.

(2) If foreign such as dust or cutting chips matter adheres to the product, replenish the lubricant after cleaning the product with pure white kerosene.

(3) When desiring to use the system at temperature of 80℃ or higher, contact THK in advance.

(4) When using the product in locations exposed to constant vibrations or in special environments such as clean rooms, vacuum and low/high temperature, contact THK in advance.

Storage

When storing the Precision Linear Pack, enclose it in a package designated by THK and store it while avoiding high temperature, low temperature and high humidity.

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