ETP BUSHINGS & POSI-LOCK

CONTENTS

ETP Bushing and POSI-LOCK Models

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Selection Guide

1 Select a type

Select an ETP or a PSL model as appropriate, referring to the list of machines, select by characteristics (p. 191) and applications (p. 192) sections for details to assist with the selection. Select an ETP model when wishing to increase workability or when needing a high level of concentricity. Select a PSL model when using in applications with low incidences of product attachment/detachment.

2 Select a size

Select an appropriate size from the required torque and thrust. Select so that the combined load is less than the rated torque in cases where torque and thrust apply simultaneously.

3 Check the minimum external hub diameter

(When using a hallow shaft, check the max. diameter.)

Make sure that the selected diameter dimensions are appropriate for the chosen application and model by checking the list of hub's minimum external diameters. If using a hallow shaft, measure the inner diameter of the hollow shaft, and check to make sure that the diameter of the selected shaft is smaller than this value.

4 Overview

Once the model has been selected, check the rated torque, dimensions, and other settings again to confirm that they satisfy the usage conditions.

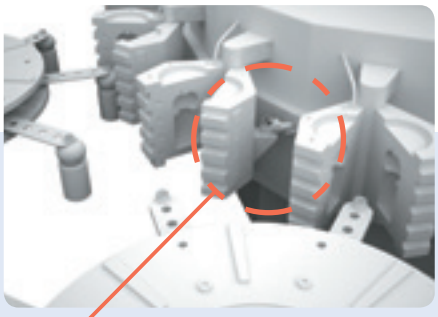
Select by Torque and Bore Diameter

Method and Type			Torque [N·m] (1 / 10 / 100 / 1000 / 10000 / 100000 / 1000000)	Bore diameter range [mm]
Hydraulic method	General-purpose single-bolt type	Steel	ETP-E N [45-17000 N·m]	φ15 ~ 60
		Simple antirust	ETP-E C [34-2475 N·m]	φ15 ~ 60
	High-performance single-bolt type	Steel	ETP-T [40-18000 N·m]	φ15 ~ 100
		Simple antirust	ETP-T C [30-3000 N·m]	φ15 ~ 60
	Multi-bolt -variation type	Steel and hexagon head bolt	ETP-A [55-15500 N·m]	φ15 ~ 100
		Steel and hexagon bolt	ETP-A B [55-15500 N·m]	φ15 ~ 100
		Simple antirust	ETP-A C [41-1426 N·m]	φ15 ~ 50
		Short length specifications	ETP-A S [53-1000 N·m]	φ19 ~ 50
		Stainless steel	ETP-A R [45-1550 N·m]	φ15 ~ 50
	High-torque and high-thrust type		ETP-H [2600-273000 N·m]	φ50 ~ 220
Mechanical method	Flange type	Steel and hexagon head bolt	PSL-K [5.9-750 N·m]	φ6 ~ 42
		Steel and hexagon bolt	PSL-K B [5.9-750 N·m]	φ6 ~ 42
		Simple antirust	PSL-K C [5.9-750 N·m]	φ6 ~ 42
		Stainless steel	PSL-K F [4.7-504 N·m]	φ6 ~ 35
	Type compatible with models from other companies	Steel	PSL-G [289-13500 N·m]	φ19 ~ 120
		Simple antirust	PSL-G C [289-2810 N·m]	φ19 ~ 60
	Medium-load type	Steel	PSL-D [6-1760 N·m]	φ6 ~ 50
		Simple antirust	PSL-D C [67-1760 N·m]	φ16 ~ 50

Select by Thrust and Bore Diameter

Method and Type			Thrust [N] (100 / 1000 / 10000 / 100000 / 1000000 / 100000000)	Bore diameter range [mm]
Hydraulic method	General-purpose single-bolt type	Steel	ETP-E N [5100-280000 N]	φ15 ~ 60
		Simple antirust	ETP-E C [3800-67000 N]	φ15 ~ 60
	High-performance single-bolt type	Steel	ETP-T [5000-360000 N]	φ15 ~ 100
		Simple antirust	ETP-T C [3750-99750 N]	φ15 ~ 60
	Multi-bolt -variation type	Steel and hexagon head bolt	ETP-A [7300-310000 N]	φ15 ~ 100
		Steel and hexagon bolt	ETP-A B [7300-310000 N]	φ15 ~ 100
		Simple antirust	ETP-A C [5000-53000 N]	φ15 ~ 50
		Short length specifications	ETP-A S [5000-40000 N]	φ19 ~ 50
		Stainless steel	ETP-A R [6000-62000 N]	φ15 ~ 50
	High-torque and high-thrust type		ETP-H [70000-2485000 N]	φ50 ~ 220
Mechanical method	Flange type	Steel and hexagon head bolt	PSL-K [1950-35700 N]	φ6 ~ 42
		Steel and hexagon bolt	PSL-K B [1950-35700 N]	φ6 ~ 42
		Simple antirust	PSL-K C [1950-35700 N]	φ6 ~ 42
		Stainless steel	PSL-K F [1560-28800 N]	φ6 ~ 35
	Type compatible with models from other companies	Steel	PSL-G [30500-225000 N·m]	φ19 ~ 120
		Simple antirust	PSL-G C [30500-93600 N]	φ19 ~ 60
	Medium-load type	Steel	PSL-D [2100-70300 N]	φ6 ~ 50
		Simple antirust	PSL-D C [8400-70300 N]	φ16 ~ 50

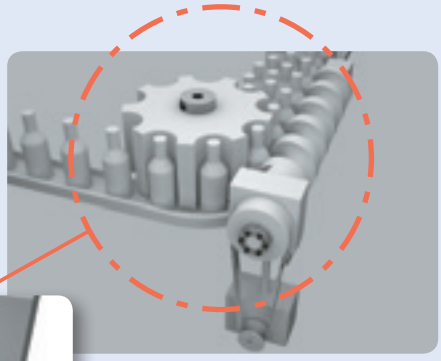
Applications



Product model ETP-E Plus

Employed device Plastic Bottle Molding Machine

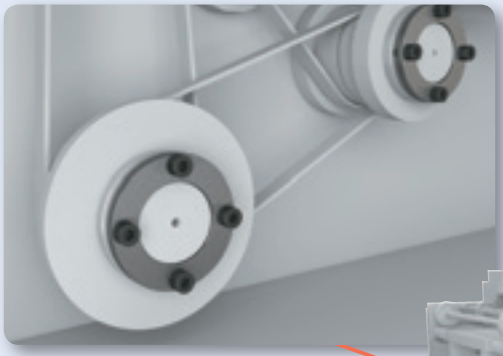
ETP bushing is used to connect the mold fixing shaft and the shaft of the index feeding unit.
Connection with one bolt substantially reduces the adjustment time.



Product model ETP-T+PSL

Employed device Filling Machine

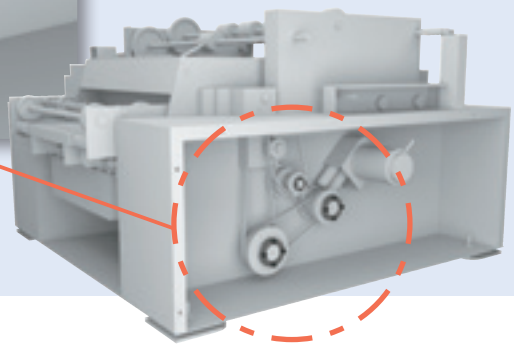
ETP bushing is used to match the phase of the alignment table with the phase of the alignment screw.

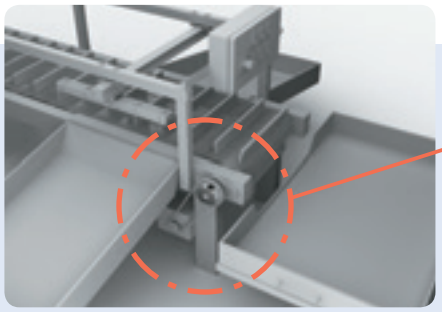


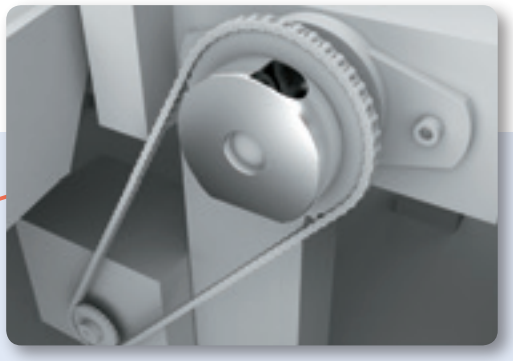
Product model ETP-A

Employed device Bookbinding Machine

ETP-A model is used to fix the timing pulley.

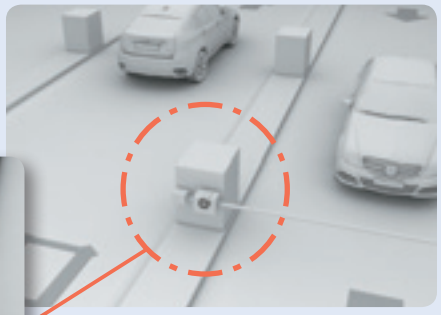


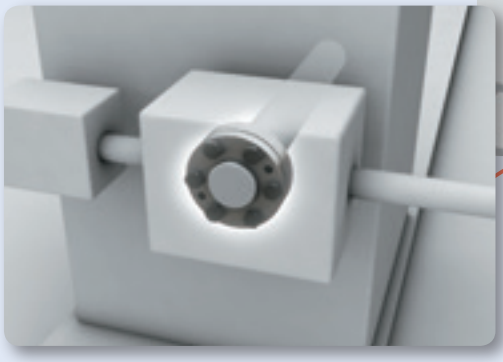




Product model ETP-E Plus
Employed device Food Processing Machine

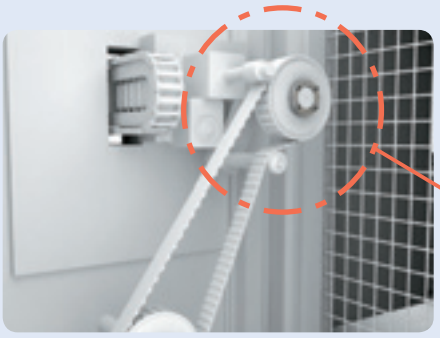
Stainless ETP bushing is used in a food processing machine.
It can be used in sections that need to be washed or are exposed to water.





Product model PSL-K
Employed device Parking Lot

POSI-LOCK PSL-K model is used to position and fix the crossbar.



Product model ETP-A C
Employed device Belt System

ETP-A model is used for complicated positioning of the timing belt.

Hydraulic Shaft Lock

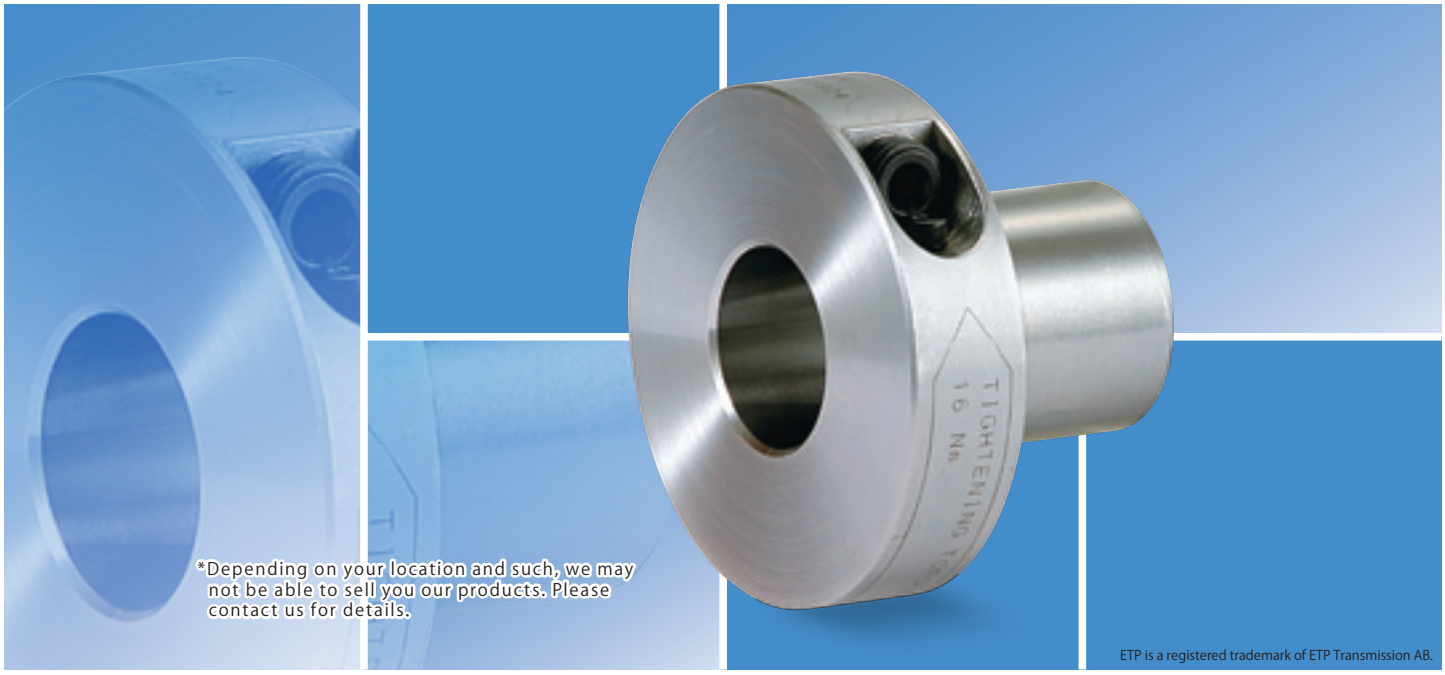
ETP BUSHINGS

Application	Machine tool, pump, molding machine, printing machine, palletizing robot, various jigs and tools

Easy and Precise Frictional Coupling Using the Pascal's Principle

A hydraulic method using the Pascal's principle is employed to connect the shaft and the hub to eliminate all the disadvantages and inconvenience of the key connection. The machining tolerance of the shaft and the hub is just the general fitting tolerance and no special specification is needed. Positioning can be performed freely both in the rotation and shaft directions. Furthermore, a 1-bolt tightening task unique to the hydraulic method significantly reduces man-hours.

RoHS

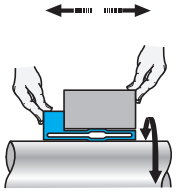


*Depending on your location and such, we may not be able to sell you our products. Please contact us for details.

Features

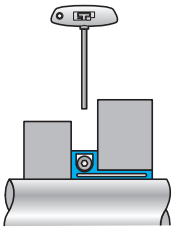
Easy and Precise Positioning

Positioning in the shaft and rotation directions can be performed arbitrarily, and it is easy to mount the device to equipment where accurate sync adjustment is required.



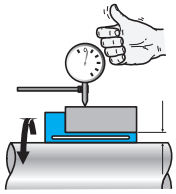
Saving Space

You can design so that the device is connected to the shaft from the radial direction to save space. The device contributes to a compact and lightweight low inertia design.



High Concentricity

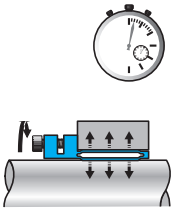
Since the contact pressure on the shaft and hub sides is uniform, high concentricity can be maintained even if the hub's external diameter is reduced. Accordingly, unbalance caused by a centrifugal force can be reduced in applications where the device is used at a high rotation speed.



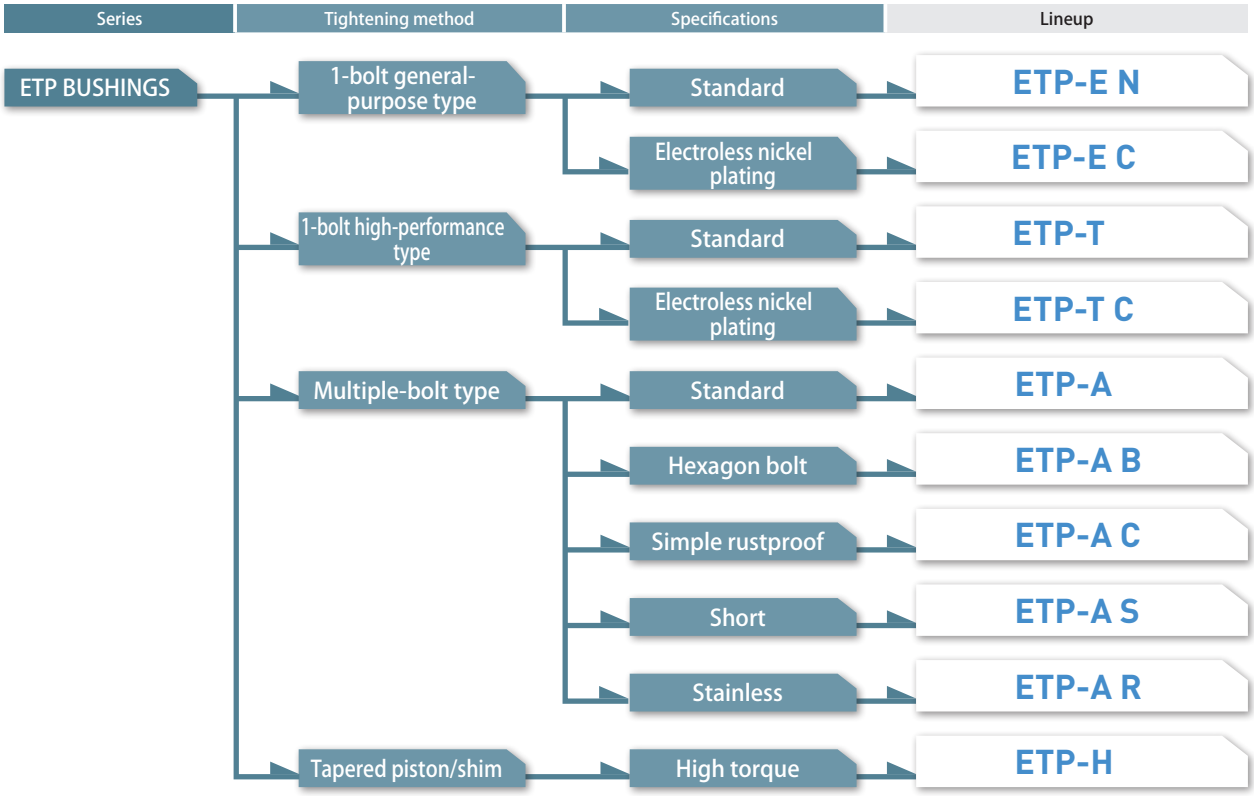
Secure and Quick Mounting

Secure mounting can be performed by just tightening a couple of bolts to the specified torque.

* To firmly secure the device with the appropriate contact pressure to the shaft and hub, mount the device so that the shaft and the hub completely contact each other.



Available Models



Model Selection

Model/Type	Main body material	Surface finishing	Applied shaft diameter [mm]	Max. rated torque [N・m]	Max. rated thrust [N]	Operating temperature [℃]	Concentricity [mm]
ETP-E N	SCM435 or an equivalent (A portion equivalent to SCM420)	—	15 ～ 100	17000	280000	−30 ～ 85	0.02
ETP-E C	SCM435 or an equivalent	Electroless nickel plating	15 ～ 60	2475	67000	−30 ～ 85	0.02
ETP-T	SCM415 or an equivalent (A portion equivalent to SCM420)	—	15 ～ 100	18000	360000	−30 ～ 110	0.006
ETP-T C	SCM415 or an equivalent (A portion equivalent to SCM420)	Electroless nickel plating	15 ～ 60	3000	99750	−30 ～ 110	0.006
ETP-A	SCM415 or an equivalent (A portion equivalent to SCM420)	—	15 ～ 100	15500	310000	−30 ～ 85	0.05
ETP-A B	SCM415 or an equivalent (A portion equivalent to SCM420)	—	15 ～ 100	15500	310000	−30 ～ 85	0.05
ETP-A C	SCM415 or an equivalent	Electroless nickel plating	15 ～ 50	1426	53000	−30 ～ 85	0.05
ETP-A S	SCM415 or an equivalent	—	19 ～ 50	1000	40000	−30 ～ 85	0.05
ETP-A R	SUS630 or an equivalent	—	15 ～ 50	1550	62000	−30 ～ 85	0.05
ETP-H	SMn420 or an equivalent	—	50 ～ 220	273000	2485000	−40 ～ 150	0.02

Product Lineup

ETP-E Plus

ETP EXPRESS

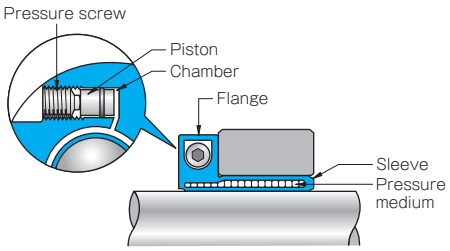
RoHS

The shaft and the hub can be connected easily and quickly with 1 bolt. Since the concentricity is as accurate as 0.02 mm, this model is most suitable for applications that require high accuracy and where the device is frequently attached and detached. It is structured to be tightened from the radial direction to save work space.

Max. rated torque	[N·m]	17000
Max. rated thrust	[N]	280000
Applied shaft diameter	[mm]	ϕ 15 ~ 60
Operating temperature	[℃]	− 30 ~ 85
Backlash		Zero
Concentricity	[mm]	0.02

Operating Principles

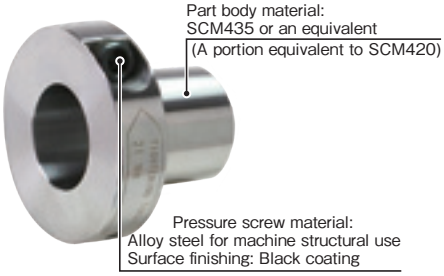
Tightening the pressure screw applies pressure to the pressure medium sealed in the chamber so the pressure medium moves into the sleeve. Applying pressure to the pressure medium applies pressure to the sleeve from the inside, so that the shaft side sleeve is shrunk and the hub side sleeve is expanded. Thus, the shaft and the hub are connected through the sleeve.



Variations and Materials

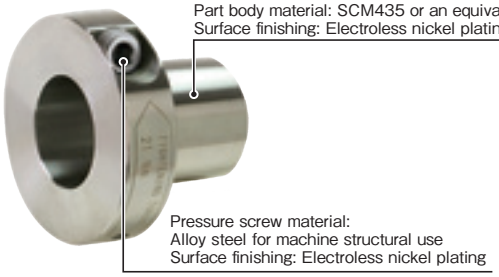
ETP-E N

Standard type of the ETP-E Plus model.



ETP-E C

Simple antirust specification with electroless nickel plating on parts such as main body and pressure screw.



ETP-T

ETP TECHNO

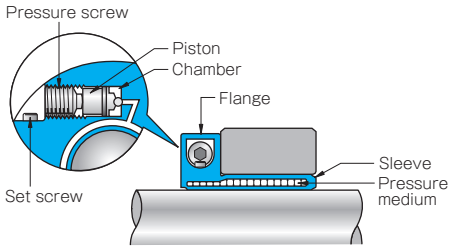
RoHS

The shaft and the hub can be connected easily and quickly with 1 bolt. Since the concentricity is as accurate as 0.006 mm, this model is most suitable for applications that require high accuracy and where the device is frequently attached and detached. It is structured to be tightened from the radial direction to save work space.

Max. rated torque	[N·m]	18000
Max. rated thrust	[N]	360000
Applied shaft diameter	[mm]	ϕ 15 ~ 100
Operating temperature	[℃]	− 30 ~ 110
Backlash		Zero
Concentricity	[mm]	0.006

Operating Principles

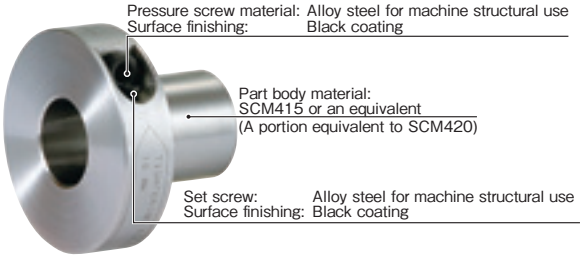
Tightening the pressure screw applies pressure to the pressure medium sealed in the chamber so the pressure medium moves into the sleeve. Applying pressure to the pressure medium applies pressure to the sleeve from the inside, so that the shaft side sleeve is shrunk and the hub side sleeve is expanded. Thus, the shaft and the hub are connected through the sleeve.



Variations and Materials

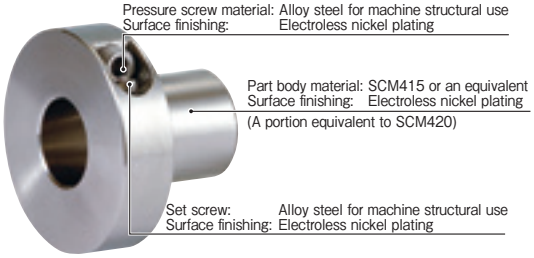
ETP-T

Standard type of the ETP-T model.



ETP-T C

The main body and pressure screw are electroless nickel coated (simple rustproof finishing).



ETP-A

ETP CLASSIC

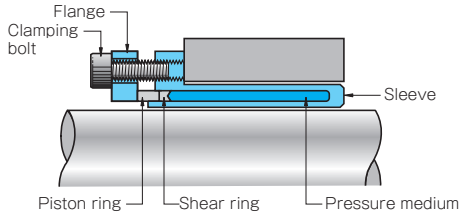
RoHS

Compared to the mechanical connecting element, the number of bolts can be reduced and attachment and detachment can be simplified. The concentricity is 0.05 mm so mounting can be performed with relatively high precision.

Max. rated torque	[N·m]	15500
Max. rated thrust	[N]	310000
Applied shaft diameter	[mm]	ϕ 15 ~ 100
Operating temperature	[℃]	−30 ~ 85
Backlash		Zero
Concentricity	[mm]	0.05

Operating Principle

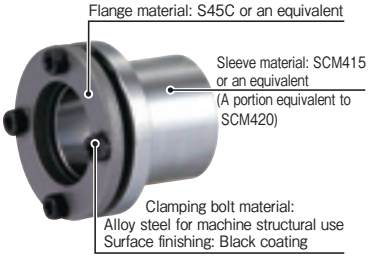
The pressure medium inserted in the sleeve is sealed by a sealing ring. Tightening the clamping bolt compresses the pressure medium mechanically through the flange, piston ring, and sealing ring. Applying pressure to the pressure medium applies pressure to the sleeve from the inside, so that the shaft side sleeve is shrunk and the hub side sleeve is expanded. Thus, the shaft and the hub are connected through the sleeve.



Variations and Materials

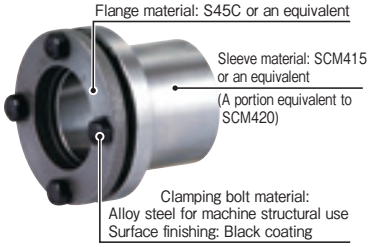
ETP-A

Standard type of the ETP-A model.



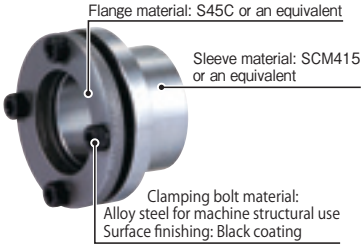
ETP-A B

A hexagon bolt is used for the clamping bolt so the device can be mounted even in tight space in the thrust direction.



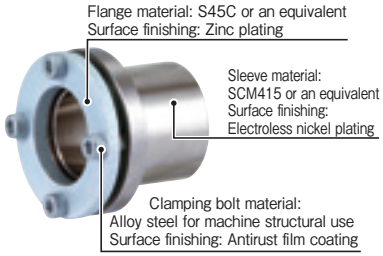
ETP-A S

A short-sleeve type, which can be mounted to the thin part of the hub.



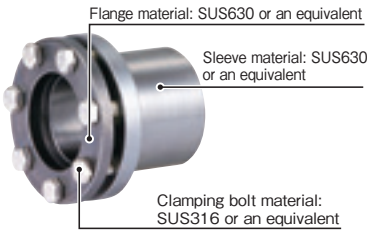
ETP-A C

The main body is electroless nickel coated (simple rustproof finishing).



ETP-A R

The main body is made of stainless material (rustproof coating).



ETP-H

ETP HYLOC

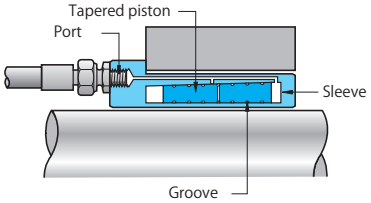
RoHS

The maximum rated torque is very large so this model is suitable for applications where a heavy radial load is applied.

Max. rated torque	[N·m]	273000
Max. rated thrust	[N]	2485000
Applied shaft diameter	[mm]	ϕ 50 ~ 220
Operating temperature	[℃]	−40 ~ 150
Backlash		Zero
Concentricity	[mm]	0.02

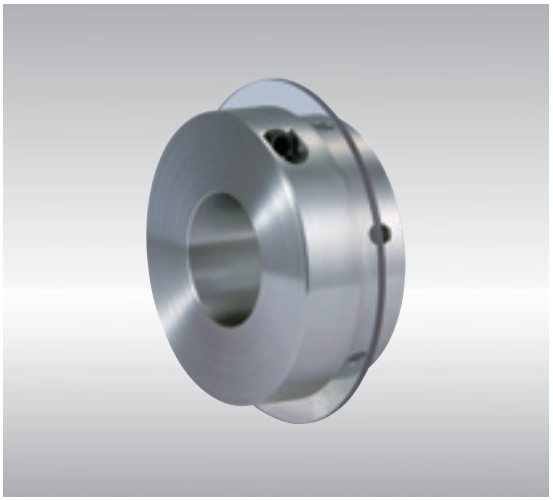
Operating Principle

A hydraulic pressure from the port moves the tapered piston inserted in the sleeve to the shaft direction. The movement of the tapered piston shrinks the shaft side sleeve and expands the hub side sleeve. Thus, the shaft and the hub are connected through the sleeve. The hydraulic pressure just moves the tapered piston and does not apply pressure after the connection. The connecting force is maintained by the wedge effect of the tapered piston.



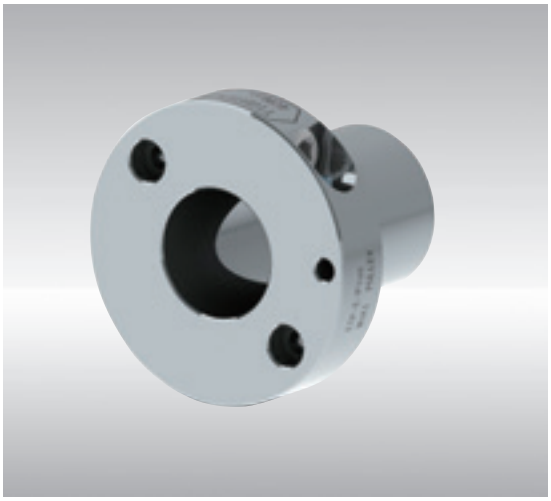
Customization Examples

Case of an Application to a Slitter Knife Holder



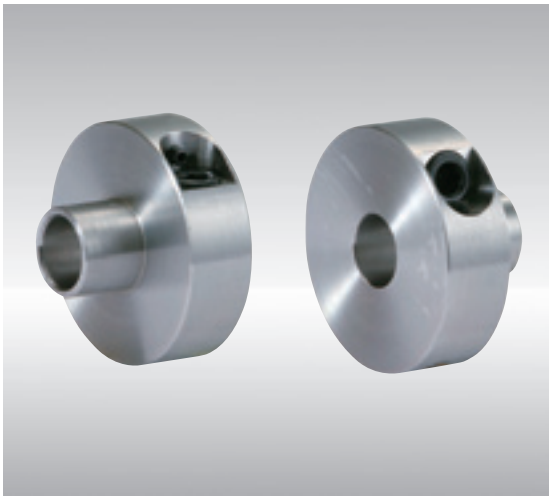
This is a hydraulic slitter knife holder. This holder is used to position the rotating knife to cut tin, iron, aluminum plates, or paper sheet in any position. Petitioning in the shaft direction can be performed arbitrarily with 1 bolt. For the angular deflection caused by detachment and attachment, a micron meter (μ m) level repeatable accuracy can be maintained.

Additional Countersink/Tap Processing



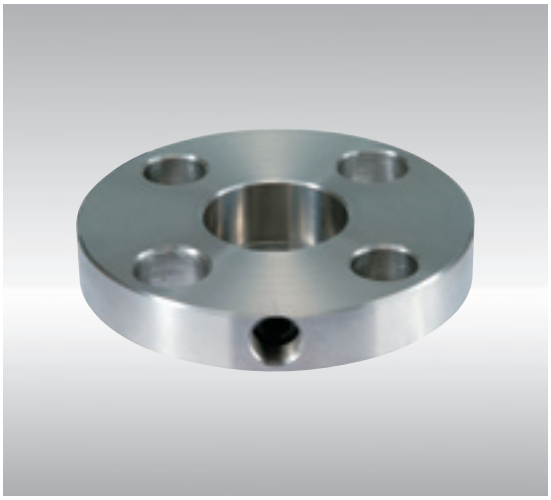
Additional processing is possible to make a counterbore or tap to allow ETP positioning when installing on equipment. (Limitations apply to processing locations; contact Miki Pulley.)

Customization of the Sleeve Length to Meet the Customer's Requirement



If the customer makes a request, the standard sleeve length can be customized (reduced) to enable it to be fitted to the thin part of the mating hub.

Case of an Application to a Holding Jig



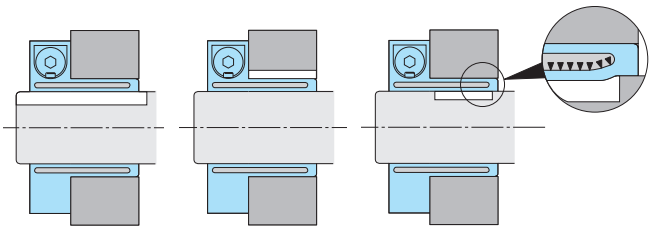
This can be mounted to a work bench as a holder for assembly and machining to ensure stable work. Furthermore, work pieces can be held with an extremely high repeatable hold position accuracy.

For details, please visit our website.

FAQ

Q1 Can I use the ETP bushings for the shaft and hub with keyways in them?

A You can use the ETP bushing by completely filling the keyway with epoxy putty for metals and then shaping it. If you use the device with keyways on the shaft and hub, the specified valued cannot be met, and the sleeve may be deformed and the device may become unable to be detached and attached again.



Q2 Can I use the ETP bushing when the shaft and hub do not overlap the entire sleeve length?

A Please select a short sleeve so that the shaft and the hub overlap the entire sleeve length, or please consult with us. If there is a part of the sleeve that does not contact the shaft and hub, the deformation of that part of the sleeve is not controlled and the amount of deformation increases, so the sleeve will be deformed and enough friction force will not be able to be obtained. As a result, the specified value cannot be met. For details on the allowable range of the edge, see “Allowable Range of Edge” in “Items Checked for Design Purposes” for each model.

Q3 Can the rated torque be transmitted even if thrust load is applied?

A The specified rated torque and rated thrust are the maximum rated values when they are applied independently. If the torque and thrust are applied at the same time, obtain the combined load and check that it is less than the rated torque.

Q4 If an ETP bushing slips once, can it be reused?

A Whether or not it can be reused depends on the degree of slip. If the degree of slip is small, it can be reused. However, if you reuse it, you need to check it to make sure there is no scratch on the surface of the ETP bushing, shaft, and hub, and there is no deformation on the ETP bushing main body. And, if you reuse it, you need to remove the cause of the slip.

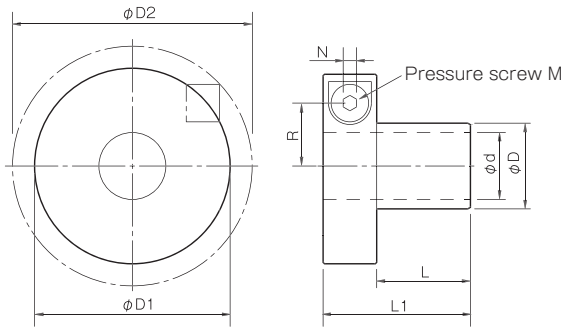
ETP-E N Types

Specifications

Model	Shaft tolerance		Rated torque [N·m]	Rated thrust [N]	Rated radial load [N]	Shaft contact pressure [N/mm²]	Hub contact pressure [N/mm²]	Tightening torque [N·m]	Moment of inertia [kg·m²]	Mass [kg]
	h 7	k6 (j6)								
ETP-E-015-N	●		46	5100	500	90	70	7	0.042 × 10⁻³	0.16
ETP-E-019-N	●	○	85	7300	1000	90	70	7	0.063 × 10⁻³	0.20
ETP-E-020-N	●		110	9100	1000	90	70	7	0.069 × 10⁻³	0.21
ETP-E-022-N	●	○	130	9600	1200	90	70	7	0.095 × 10⁻³	0.25
ETP-E-024-N	●	○	190	13000	1400	90	70	7	0.109 × 10⁻³	0.26
ETP-E-025-N	●		230	15000	1500	90	70	7	0.114 × 10⁻³	0.27
ETP-E-028-N	●	○	280	16000	1800	90	70	7	0.166 × 10⁻³	0.33
ETP-E-030-N	●		380	21000	2000	90	70	7	0.185 × 10⁻³	0.35
ETP-E-032-N	●	○	440	22000	2200	90	70	7	0.244 × 10⁻³	0.41
ETP-E-035-N	●		640	30000	2500	90	70	7	0.317 × 10⁻³	0.47
ETP-E-038-N	●	○	890	38000	2800	90	70	24	0.756 × 10⁻³	0.83
ETP-E-040-N	●		1100	45000	3000	90	70	24	0.836 × 10⁻³	0.88
ETP-E-042-N	●	○	1100	43000	3200	90	70	24	0.959 × 10⁻³	0.95
ETP-E-045-N	●		1400	51000	3500	90	70	24	1.152 × 10⁻³	1.03
ETP-E-048-N	●	○	1700	57000	4000	90	70	24	1.430 × 10⁻³	1.09
ETP-E-050-N	●		1900	63000	4500	90	70	24	1.497 × 10⁻³	1.18
ETP-E-055-N	●	○	2400	71000	5000	90	70	24	2.130 × 10⁻³	1.46
ETP-E-060-N	●		3300	90000	5300	90	70	24	3.089 × 10⁻³	1.79
ETP-E-070-N	●		5600	130000	6400	90	70	40	6.951 × 10⁻³	2.93
ETP-E-080-N	●		8700	180000	7500	90	70	40	10.02 × 10⁻³	3.58
ETP-E-090-N	●		12000	230000	8600	90	70	40	14.84 × 10⁻³	4.54
ETP-E-100-N	●		17000	280000	9700	90	70	40	21.00 × 10⁻³	5.51

* Sizes for shaft tolerance h7(g6, h6) are marked with ●. Also note that sizes for k6(j6) are optional and only for sizes marked with ○.
* The rated torque values are those when the thrust is zero and the rated thrust values are those when the torque is zero.
* The rated torque, rated thrust, shaft contact pressure, and hub contact pressure values given are measured values at a temperature of 20° C.
* ETP-E-070, 080, 090, and 100 are made to order.

Dimensions



CAD

How to Place an Order

ETP-E-□-N□

- Size
- Type N: Standard specifications
- Supported shaft tolerance
  - H: h7(g6, h6) shaft
  - K: k6(j6) shaft (option)

* Depending on your location and such, we may not be able to sell you our products. Please contact us for details.

Model	d [mm]	D [mm]	D1 [mm]	D2 [mm]	L [mm]	L1 [mm]	R [mm]	N [mm]	M Qty - Nominal dia.
ETP-E-015-N	15	18	46	50	23	37	15.1	5	1-M10
ETP-E-019-N	19	23	50.5	55	25	39	17.4	5	1-M10
ETP-E-020-N	20	24	51.5	56	27	41	18	5	1-M10
ETP-E-022-N	22	27	55.5	61	29	43	19.3	5	1-M10
ETP-E-024-N	24	29	57.5	63	30	44	20.3	5	1-M10
ETP-E-025-N	25	30	58	63	32	46	20.8	5	1-M10
ETP-E-028-N	28	34	63	70	34	48	22.6	5	1-M10
ETP-E-030-N	30	36	64.5	71	36	50	23.6	5	1-M10
ETP-E-032-N	32	39	68.5	78	38	52	24.8	5	1-M10
ETP-E-035-N	35	42	73	86	41	55	26.4	5	1-M10
ETP-E-038-N	38	46	84.5	92.5	47	67	31	8	1-M16
ETP-E-040-N	40	48	86.5	94	50	70	32	8	1-M16
ETP-E-042-N	42	51	89	96.5	50	70	33.2	8	1-M16
ETP-E-045-N	45	54	93	101	52	72	34.8	8	1-M16
ETP-E-048-N	48	59	97	104	53	73	36.8	8	1-M16
ETP-E-050-N	50	60	98.5	106	54	74	37.5	8	1-M16
ETP-E-055-N	55	67	106	116	59	79	40.5	8	1-M16
ETP-E-060-N	60	73	115.5	123.5	63	83	43.3	8	1-M16
ETP-E-070-N	70	85	135.5	150	77	101	50.8	10	1-M20
ETP-E-080-N	80	97	145.5	160	86	110	56.3	10	1-M20
ETP-E-090-N	90	109	155.5	169	95	119	61.8	10	1-M20
ETP-E-100-N	100	121	166	180	104	128	67.3	10	1-M20

* Dimension φ D2 is that before tightening the ETP-E Plus.
* The nominal diameter of the pressure screw M is equal to the quantity minus the nominal diameter of the screw threads.

ETP-E C Types Simple Antirust Specifications

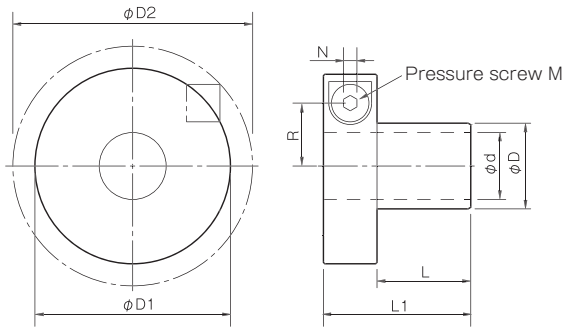
Made to order

Specifications

Model	Shaft tolerance		Rated torque [N·m]	Rated thrust [N]	Rated radial load [N]	Shaft contact pressure [N/mm²]	Hub contact pressure [N/mm²]	Tightening torque [N·m]	Moment of inertia [kg·m²]	Mass [kg]
	h 7	k6 (j6)								
ETP-E-015-C	●		34	3800	500	90	70	7	0.042×10^{-3}	0.16
ETP-E-019-C	●	○	63	5400	1000	90	70	7	0.063×10^{-3}	0.20
ETP-E-020-C	●		82	6800	1000	90	70	7	0.069×10^{-3}	0.21
ETP-E-022-C	●	○	97	7200	1200	90	70	7	0.095×10^{-3}	0.25
ETP-E-024-C	●	○	142	9700	1400	90	70	7	0.109×10^{-3}	0.26
ETP-E-025-C	●		172	11200	1500	90	70	7	0.114×10^{-3}	0.27
ETP-E-028-C	●	○	210	12000	1800	90	70	7	0.166×10^{-3}	0.33
ETP-E-030-C	●		285	15000	2000	90	70	7	0.185×10^{-3}	0.35
ETP-E-032-C	●	○	330	16000	2200	90	70	7	0.244×10^{-3}	0.41
ETP-E-035-C	●		480	22000	2500	90	70	7	0.317×10^{-3}	0.47
ETP-E-038-C	●	○	667	28000	2800	90	70	24	0.756×10^{-3}	0.83
ETP-E-040-C	●		825	33000	3000	90	70	24	0.836×10^{-3}	0.88
ETP-E-042-C	●	○	825	32000	3200	90	70	24	0.959×10^{-3}	0.95
ETP-E-045-C	●		1050	38000	3500	90	70	24	1.152×10^{-3}	1.03
ETP-E-048-C	●	○	1275	42000	4000	90	70	24	1.430×10^{-3}	1.09
ETP-E-050-C	●		1425	47000	4500	90	70	24	1.497×10^{-3}	1.18
ETP-E-055-C	●	○	1800	53000	5000	90	70	24	2.130×10^{-3}	1.46
ETP-E-060-C	●		2475	67000	5300	90	70	24	3.089×10^{-3}	1.79

* Sizes for shaft tolerance h7(g6, h6) are marked with ●. Also note that sizes for k6(j6) are optional and only for sizes marked with ○.
* The rated torque values are those when the thrust is zero and the rated thrust values are those when the torque is zero.
* The rated torque, rated thrust, shaft contact pressure, and hub contact pressure values given are measured values at a temperature of 20° C.

Dimensions



CAD

How to Place an Order

ETP-E-□-C□

- Size
- TYPE C: Simple antirust specifications (Electroless nickel plating)
- Supported shaft tolerance
  - H: h7(g6, h6) shaft
  - K: k6(j6) shaft (option)

* Depending on your location and such, we may not be able to sell you our products. Please contact us for details.

Model	d [mm]	D [mm]	D1 [mm]	D2 [mm]	L [mm]	L1 [mm]	R [mm]	N [mm]	M Qty - Nominal dia.
ETP-E-015-C	15	18	46	50	23	37	15.1	5	1-M10
ETP-E-019-C	19	23	50.5	55	25	39	17.4	5	1-M10
ETP-E-020-C	20	24	51.5	56	27	41	18	5	1-M10
ETP-E-022-C	22	27	55.5	61	29	43	19.3	5	1-M10
ETP-E-024-C	24	29	57.5	63	30	44	20.3	5	1-M10
ETP-E-025-C	25	30	58	63	32	46	20.8	5	1-M10
ETP-E-028-C	28	34	63	70	34	48	22.6	5	1-M10
ETP-E-030-C	30	36	64.5	71	36	50	23.6	5	1-M10
ETP-E-032-C	32	39	68.5	78	38	52	24.8	5	1-M10
ETP-E-035-C	35	42	73	86	41	55	26.4	5	1-M10
ETP-E-038-C	38	46	84.5	92.5	47	67	31	8	1-M16
ETP-E-040-C	40	48	86.5	94	50	70	32	8	1-M16
ETP-E-042-C	42	51	89	96.5	50	70	33.2	8	1-M16
ETP-E-045-C	45	54	93	101	52	72	34.8	8	1-M16
ETP-E-048-C	48	59	97	104	53	73	36.8	8	1-M16
ETP-E-050-C	50	60	98.5	106	54	74	37.5	8	1-M16
ETP-E-055-C	55	67	106	116	59	79	40.5	8	1-M16
ETP-E-060-C	60	73	115.5	123.5	63	83	43.3	8	1-M16

* Dimension ϕ D2 is that before tightening the ETP-E Plus.
* The nominal diameter of the pressure screw M is equal to the quantity minus the nominal diameter of the screw threads.

ETP-E Plus

Items Checked for Design Purposes

Selection Procedure

(1) Selection is determined by the used shaft diameter. In general, find the torque, Ta, applied to the connecting element using the output capacity, P, of the driver and usage rotation speed, n. Next, obtain the thrust, Fa, applied to the connecting element.

$$Ta\ [N\cdot m] = 9550 \times \frac{P\ [kW]}{n\ [min^{-1}]}$$

Ta: Torque applied to the connecting element [N·m] P: Driver's output [kW]
n: Connecting element's rotation speed [min⁻¹] Fa: Thrust applied to the connecting element [N]

(2) Determine the service factor, K1, based on the load property and obtain the corrected torque, Td, and corrected thrust, Fd, applied to the connecting element.

$$Td = Ta \times K1 \times K2$$
$$Fd = Fa \times K1 \times K2$$

Td: Corrected torque applied to the connecting element [N·m]
Fd: Corrected thrust applied to the connecting element [N]
K1: Service factor based on the load property
K2: Service factor based on repeated load

(3) Correct the values according to the load property.

1. For the torque alone

Compare the connecting element's rated torque, T, based on the used diameter with the calculated corrected torque, Td.

$$T \geqq Td$$

T: Connecting element's rated torque [N·m]

2. For the thrust alone

Compare the connecting element's rated thrust, F, based on the used diameter with the calculated corrected thrust, Fd.

$$F \geqq Fd$$

F: Connecting element's rated thrust [N]

3. If torque and thrust are applied at the same time

Calculate the combined load, Mr, and compare the result with the rated torque, T.

$$T \geqq Mr$$
$$Mr = \sqrt{Td^2 + \left(Fd \times \frac{d}{2}\right)^2}$$

Mr: Combined load applied to the connecting element [N·m]
d: Shaft diameter [m]

(4) Obtain the hub's minimum external diameter and the hollow shaft's maximum internal diameter.

1. How to obtain the hub's minimum external diameter

Obtain the hub's minimum external diameter based on the used hub material's strength.

$$DO \geqq D\sqrt{\frac{\delta_{0.2N} + P_2 \times C}{\delta_{0.2N} - P_2 \times C}}$$

DO: Hub's minimum external diameter [mm]
D: Hub's internal diameter [mm]
$\delta_{0.2N}$: Hub material's yield stress [N/mm²]
P_2: Hub contact pressure [N/mm²]
C: Coefficient
B: Hub length [mm]
L: Effective contact length [mm]

When B = L: C = 1
When L < B < 2L: C = 0.8
When B ≧ 2L: C = 0.6

If the hub material's yield stress value is large, make sure the ratio of the hub's minimum external diameter to the hub's internal diameter is more than about 1.3 times to prevent the hub's deformation.

2. How to obtain the hollow shaft's maximum internal diameter

Obtain the hollow shaft's maximum internal diameter based on the used hollow shaft material's strength.

$$di \leqq d\sqrt{\frac{\delta_{0.2N} - 2P_1 \times C}{\delta_{0.2N}}}$$

di: Hollow shaft's maximum internal diameter [mm]
d: Shaft diameter [mm]
$\delta_{0.2N}$: Hollow shaft material's yield stress [N/mm²]
P_1: Shaft contact pressure [N/mm²]
C: Coefficient

When using a single one: C = 0.6
When using multiple ones: C = 0.8

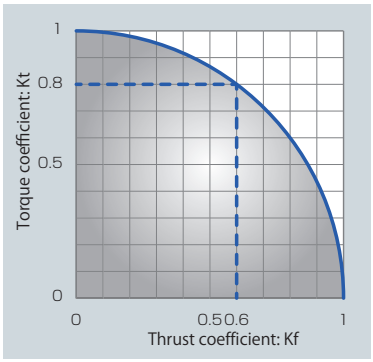
The shaft contact pressure and hub contact pressure vary depending on the operating temperature. You need to correct these values based on the operating temperature. Note that the contact pressure values were those measured at 20℃ . If the operating temperature exceeds 20℃ , obtain the hub's minimum external diameter and the hollow shaft's maximum internal diameter with the following formulas.

P1, P2 = contact pressure at 20° C × service factor based on the operating temperature (K3)

The operating temperature range is from -30℃ to 85℃ .

Torque and Thrust Coefficients

If torque and thrust are applied to the ETP-E Plus at the same time, the rated values of both decrease. These values can be obtained based on the coefficients in the figure below.



Calculation example: When using the ETP-E-35-NH at 20℃ .

Maximum rated torque (T) and thrust (F) at 20℃ , T = 640 [N·m] and F = 30000 [N]. The maximum rated torque, Tmax, when the maximum thrust (Fmax = 18000 [N]) is applied can be obtained as follows.

$$\text{Thrust coefficient (Kf)} = Fmax / F \times \text{service factor (K3)} = 18000/30000 \times 1.0 = 0.6$$

The torque coefficient, Kt, when Kf = 0.6 is about 0.8 based on the above figure. Accordingly, the maximum rated torque, Tmax, in this case is as follows.

$$Tmax = T \times K3 \times Kt = 640 \times 1.0 \times 0.8 = 512\ [N\cdot m]$$

The relationship between Kt and Kf can be obtained from the following formula.

$$\sqrt{(Kt)^2 + (Kf)^2} = 1$$

Service Factor

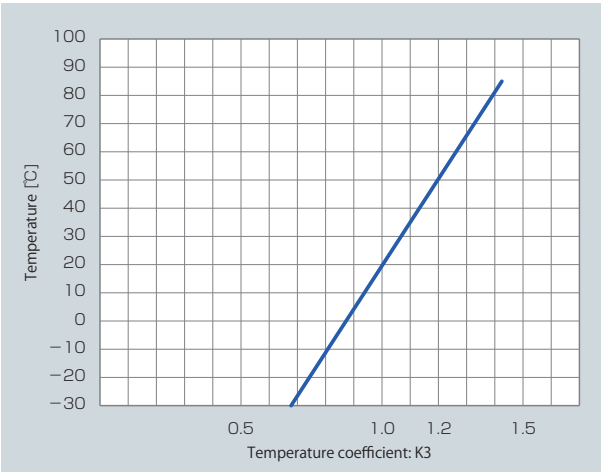
■ Service factor based on the load property: K1

Load property	Constant	Vibrations: Small	Vibrations: Medium	Vibrations: Large
K1	1.0	1.25	1.75	2.25

■ Service factor based on repeated load (K2)

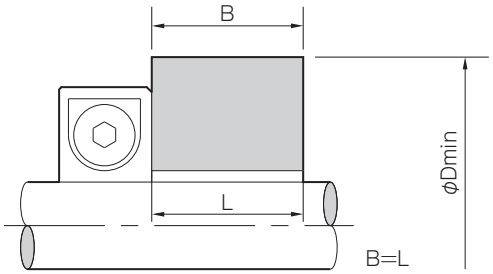
Load property	Constant	Repeated	Reversed
K2	1.0	1.35	2.0

■ Service factor based on the operating temperature: K3



Hub's Minimum External Diameters

If the stress applied to the hub is too large, the hub may be deformed. Select the appropriate external diameter size from the hub's minimum external diameters in the table below in the design phase.



φ Dmin unit [mm]

ETP-E Plus size	Hub contact pressure [N/mm²]	Material's yield stress δ 0.2 [N /mm²]									
		150	180	210	230	250	280	300	350	400	450
		FC250	FC300 SS330 SC360 FCMB310	FC350 SS400 SC410 FCMB360 SUS304	SC450 S10C SF440	FCD400 SS490 SC480 S20C SF490	S30C SF540 SUS201	FCD450 S35C SF590	FCD500 S45C SUS410	FCD600 S55C SUS403	FCD700 SUS420
015	70	30	28	26	25	24	24	24	24	24	24
019	70	39	35	33	32	31	30	30	30	30	30
020	70	40	37	34	33	32	32	32	32	32	32
022	70	45	41	39	37	36	36	36	36	36	36
024	70	49	44	42	40	39	38	38	38	38	38
025	70	50	46	43	42	40	39	39	39	39	39
028	70	57	52	49	47	46	45	45	45	45	45
030	70	60	55	51	50	48	47	47	47	47	47
032	70	65	59	56	54	52	51	51	51	51	51
035	70	70	64	60	58	56	55	55	55	55	55
038	70	77	70	66	63	62	60	60	60	60	60
040	70	80	73	68	66	64	63	63	63	63	63
042	70	85	77	73	70	68	67	67	67	67	67
045	70	90	82	77	74	72	71	71	71	71	71
048	70	98	89	84	81	79	77	77	77	77	77
050	70	100	91	85	83	80	78	78	78	78	78
055	70	112	102	95	92	90	88	88	88	88	88
060	70	122	111	104	100	98	95	95	95	95	95
070	70	141	129	121	117	114	111	111	111	111	111
080	70	161	147	138	133	130	127	127	127	127	127
090	70	181	165	155	150	146	142	142	142	142	142
100	70	201	183	172	166	162	158	158	158	158	158

* Hub contact pressure at an operating temperature of 20℃ . The contact pressure increases as the temperature rises.
* If the operating temperature exceeds 20℃ , you need to obtain the hub's minimum external diameter according to the selection procedure on P.202.
* The hub's minimum external diameter shows a value calculated based on C=1 in the selection procedure on P.202.
* The above SUS values are proof stress values (N/mm²) after quenching and tempering.

ETP-E Plus

Items Checked for Design Purposes

Mounting Shaft Tolerance, Mounting Hub Tolerance, and Surface Roughness

Model	Mounting shaft tolerance	Mounting hub tolerance	Surface roughness
ETP-E-□-NH・CH	h7 (g6, h6)	H7	25S (center line's average roughness 6.3a) or less
ETP-E-□-NK・CK	k6 (j6)		

Operating Temperature Range

Model	Operating temperature range [℃]
ETP-E-□-N	−30～85
ETP-E-□-C	

Concentricity and Balance

Model	Concentricity [mm]	Balance [g・mm/kg]
ETP-E-□-N	0.02	150
ETP-E-□-C		

Number of Attachments and Detachments

The number of attachments/detachments only applies if you prevent foreign particles from adhering to the pressure screw and make sure oil or grease containing molybdenum-, silicon-, or fluorine-based antifriction material always remains on the pressure screw's surface.
In addition, be sure to use a torque wrench and do not use an impact wrench that has large torque fluctuation.

■ ETP-E N

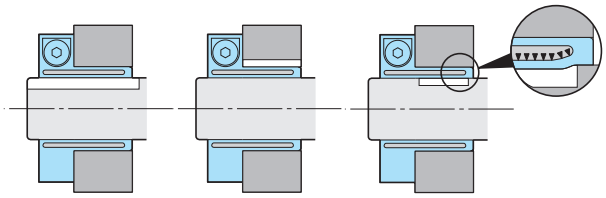
Model	Number of attachments/detachments
ETP-E-015-N～035-N	3000
ETP-E-038-N～060-N	2000
ETP-E-070-N～100-N	750

■ ETP-E C

Model	Number of attachments/detachments
ETP-E-015-C～035-C	1500
ETP-E-038-C～060-C	1000

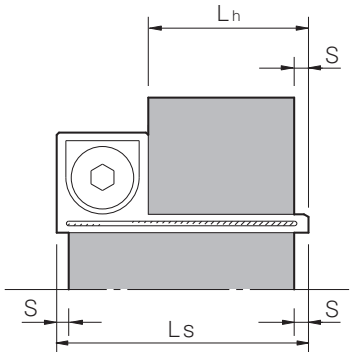
Keyway Shape where the ETP-E Plus Cannot Be Detached due to a Deformation of the Sleeve

The ETP-E Plus cannot be used if the shaft and hub have a keyway as shown in the figure below. Note that you can use the ETP-E Plus for the shaft and hub with a keyway if you completely fill the keyway with epoxy putty for metals and then shape it.



Allowable Range of Edge

The performance of the ETP-E Plus is based on the case where the shaft and the hub have the effect for the entire standard shaft length, Ls, and the entire standard hub length, Lh, respectively. Accordingly, make sure in the design phase that the shaft and the hub have the effect for the respective entire standard length. If the length of the shaft and hub is limited due to design reasons, make sure it is less than the dimension S in the figure below. If it exceeds the dimension S, stress concentrates on the sleeve edge and the sleeve is deformed, so there is the possibility that the ETP-E Plus cannot be detached.



ETP-E Plus size	S [mm]
015	2
019	2
020	2
022	3
024	3
025	3
028	4
030	4
032	4
035	4
038	5
040	5
042	5
045	5
048	5
050	5
055	5
060	5
070	8
080	8
090	8
100	8

Mounting

(1) Remove the rust, dust, oil, etc. off from the inner surface of the shaft and hub. Similarly, if any anti-rust oil, soiling, etc. remains on the surface of the ETP-E Plus, wipe it off with a cloth, etc.
In particular, never allow oil or grease containing antifriction or other agent (molybdenum-, silicon-, or fluorine-based), which would dramatically affect the friction coefficient, to contact the surface.

(2) Attach the ETP-E Plus to the hub and mount them to the shaft. If accurate positioning of the shaft and hub is needed, adjust the position of both before tightening the pressure screw.
Never tighten the pressure screw before mounting the ETP-E Plus to the shaft and hub.

(3) Tighten the pressure screw to the specified torque using a torque.

Removal

(1) Before starting work, ensure safety by making sure no torque and thrust are applied to the ETP-E Plus and there is no risk of a fall due to the self-weight of the shaft and hub.
The ETP-E Plus does not have a self-locking mechanism. The connecting force is instantaneously released by loosening the pressure screw.

(2) Loosen the pressure screw until the connecting force is released. The pressure screw should only be loosened. Do not remove it.

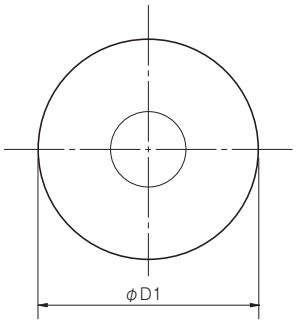
ETP-T Models

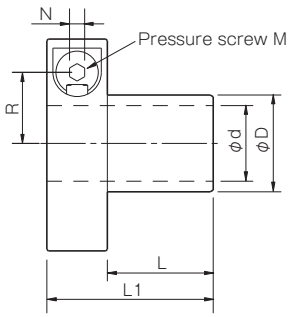
Specifications

Model	Rated torque [N·m]	Rated thrust [N]	Rated radial load [N]	Shaft contact pressure [N/mm²]	Hub contact pressure [N/mm²]	Tightening torque [N·m]	Moment of inertia [kg·m²]	Mass [kg]
ETP-T-15	40	5000	1000	90	70	12	0.09×10^{-3}	0.25
ETP-T-19	90	9000	1000	90	70	12	0.14×10^{-3}	0.31
ETP-T-20	120	12000	2000	90	70	12	0.15×10^{-3}	0.32
ETP-T-24	220	18000	2000	90	70	16	0.40×10^{-3}	0.57
ETP-T-25	290	23000	3000	90	70	16	0.44×10^{-3}	0.60
ETP-T-30	500	33000	4000	90	70	16	0.60×10^{-3}	0.70
ETP-T-35	800	45000	5000	90	70	16	1.00×10^{-3}	1.00
ETP-T-40	1200	60000	6000	90	70	24	1.70×10^{-3}	1.30
ETP-T-50	2000	94000	9000	90	70	24	2.70×10^{-3}	1.70
ETP-T-60	4000	133000	12000	90	70	40	5.00×10^{-3}	2.50
ETP-T-70	6500	186000	13000	90	70	40	8.80×10^{-3}	3.60
ETP-T-75	7800	208000	14000	90	70	40	11.60×10^{-3}	4.20
ETP-T-80	9000	225000	15000	90	70	40	14.37×10^{-3}	4.77
ETP-T-90	13000	288000	17000	90	70	60	24.07×10^{-3}	6.48
ETP-T-100	18000	360000	19000	90	70	80	37.02×10^{-3}	8.41

* The rated torque values are those when the thrust is zero and the rated thrust values are those when the torque is zero.
* The rated torque, rated thrust, shaft contact pressure, and hub contact pressure values given are measured values at a temperature of 20℃ .
* ETP-T-70, 75, 80, 90, and 100 are made to order.

Dimensions





CAD

How to Place an Order

ETP-T-□
Size

* Depending on your location and such, we may not be able to sell you our products. Please contact us for details.

Unit [mm]

Model	d	D	D1	L	L1	R	N	M
ETP-T-15	15	19	52	25	41	14.5	6	1-M12
ETP-T-19	19	24	58	28	44	18	6	1-M12
ETP-T-20	20	25	59	30	46	19	6	1-M12
ETP-T-24	24	30	71	33	53	23	6	1-M14
ETP-T-25	25	32	73	35	55	23.5	6	1-M14
ETP-T-30	30	38	78	40	60	26.5	6	1-M14
ETP-T-35	35	44	88	45	65	30	6	1-M14
ETP-T-40	40	52	100	55	75	34	8	1-M16
ETP-T-50	50	65	110	60	80	40	8	1-M16
ETP-T-60	60	75	122	70	95	46.5	10	1-M20
ETP-T-70	70	90	138	85	110	52	10	1-M20
ETP-T-75	75	95	146	90	115	56	10	1-M20
ETP-T-80	80	100	154	95	120	58	10	1-M20
ETP-T-90	90	112	170	105	133	64.5	10	1-M22
ETP-T-100	100	125	184	115	145	72	12	1-M24

* The nominal diameter of the pressure screw M is equal to the quantity minus the nominal diameter of the screw threads.

ETP-T C Types

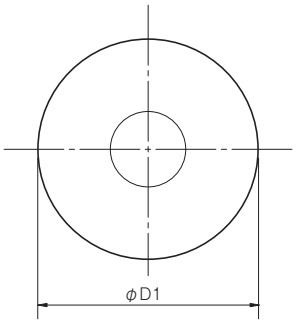
Made to order

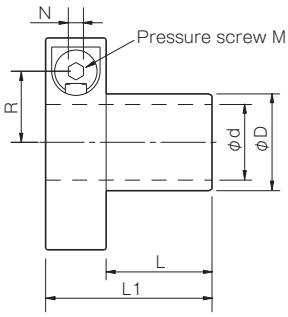
Specifications

Model	Rated torque [N·m]	Rated thrust [N]	Rated radial load [N]	Shaft contact pressure [N/mm²]	Hub contact pressure [N/mm²]	Tightening torque [N·m]	Moment of inertia [kg·m²]	Mass [kg]
ETP-T-15-C	30	3750	1000	90	70	12	0.09×10^{-3}	0.25
ETP-T-19-C	67	6750	1000	90	70	12	0.14×10^{-3}	0.31
ETP-T-20-C	90	9000	2000	90	70	12	0.15×10^{-3}	0.32
ETP-T-24-C	165	13500	2000	90	70	16	0.40×10^{-3}	0.57
ETP-T-25-C	217	17250	3000	90	70	16	0.44×10^{-3}	0.60
ETP-T-30-C	375	24750	4000	90	70	16	0.60×10^{-3}	0.70
ETP-T-35-C	600	33750	5000	90	70	16	1.00×10^{-3}	1.00
ETP-T-40-C	900	45000	6000	90	70	24	1.70×10^{-3}	1.30
ETP-T-50-C	1500	70500	9000	90	70	24	2.70×10^{-3}	1.70
ETP-T-60-C	3000	99750	12000	90	70	40	5.00×10^{-3}	2.50

* The rated torque values are those when the thrust is zero and the rated thrust values are those when the torque is zero.
* The rated torque, rated thrust, shaft contact pressure, and hub contact pressure values given are measured values at a temperature of 20° C.

Sizes





CAD

How to Place an Order

ETP-T-□-C

Size

Type (C: Simple antirust specifications)

* Depending on your location and such, we may not be able to sell you our products. Please contact us for details.

Unit [mm]

Model	d	D	D1	L	L1	R	N	M
ETP-T-15-C	15	19	52	25	41	14.5	6	1-M12
ETP-T-19-C	19	24	58	28	44	18	6	1-M12
ETP-T-20-C	20	25	59	30	46	19	6	1-M12
ETP-T-24-C	24	30	71	33	53	23	6	1-M14
ETP-T-25-C	25	32	73	35	55	23.5	6	1-M14
ETP-T-30-C	30	38	78	40	60	26.5	6	1-M14
ETP-T-35-C	35	44	88	45	65	30	6	1-M14
ETP-T-40-C	40	52	100	55	75	34	8	1-M16
ETP-T-50-C	50	65	110	60	80	40	8	1-M16
ETP-T-60-C	60	75	122	70	95	46.5	10	1-M20

* The nominal diameter of the pressure screw M is equal to the quantity minus the nominal diameter of the screw threads.

ETP-T Models

Items Checked for Design Purposes

Selection Procedure

(1) Selection is determined by the used shaft diameter. In general, find the torque, Ta, applied to the connecting element using the output capacity, P, of the driver and usage rotation speed, n. Next, obtain the thrust, Fa, applied to the connecting element.

$$Ta\ [N\cdot m] = 9550 \times \frac{P\ [kW]}{n\ [min^{-1}]}$$

Ta: Torque applied to the connecting element [N·m] P: Driver's output [kW]
n: Connecting element's rotation speed [min^{-1}] Fa: Thrust applied to the connecting element [N]

(2) Determine the service factor, K1, based on the load property and obtain the corrected torque, Td, and corrected thrust, Fd, applied to the connecting element.

$Td = Ta \times K1$ Td: Corrected torque applied to the connecting element [N・m]
$Fd = Fa \times K1$ Fd: Corrected thrust applied to the connecting element [N]
K1: Service factor based on the load property

(3) Correct the values according to the load property.

1. For the torque alone

Compare the connecting element's rated torque, T, based on the used diameter with the calculated corrected torque, Td.

$T \geqq Td$ T: Connecting element's rated torque [N·m]

2. For the thrust alone

Compare the connecting element's rated thrust, F, based on the used diameter with the calculated corrected thrust, Fd.

$F \geqq Fd$ F: Connecting element's rated thrust [N]

3. If torque and thrust are applied at the same time

Calculate the combined load, Mr, and compare the result with the rated torque, T.

$T \geqq Mr$ $Mr = \sqrt{Td^2 + (Fd \times \frac{d}{2})^2}$

Mr: Combined load applied to the connecting element [N·m] d: Shaft diameter [m]

(4) Obtain the hub's minimum external diameter and the hollow shaft's maximum internal diameter.

1. Determining hub minimum external diameter

$$DO \geqq D\sqrt{\frac{\delta_{0.2N} + CP_2}{\delta_{0.2N} - CP_2}}$$

$C = 1$ $B = L$
$C = 0.8$ $L < B < 2L$
$C = 0.6$ $B \geqq 2L$

DO: Hub's minimum external diameter [mm] B: Hub length [mm]
D: Hub's internal diameter [mm] L: Effective contact length [mm]
P_2: Hub contact pressure [N/mm^2] C: Coefficient
$\delta_{0.2N}$: Hub material's yield stress [N/mm^2]

If the hub material's yield stress value is large, make sure the ratio of the hub's minimum external diameter to the hub's internal diameter is more than about 1.3 times to prevent the hub's deformation.

2. Determining hollow shaft maximum internal diameter

$$di \leqq d\sqrt{\frac{\delta_{0.2N} - 2P_1C}{\delta_{0.2N}}}$$

$C = 0.6$ when using a single one
$C = 0.8$ when using multiple ones

di: Hollow shaft's maximum internal diameter [mm] d: Shaft diameter [mm]
$\delta_{0.2N}$: Hollow shaft material's yield stress [N/mm^2] C: Coefficient
P_1: Shaft contact pressure [N/mm^2]

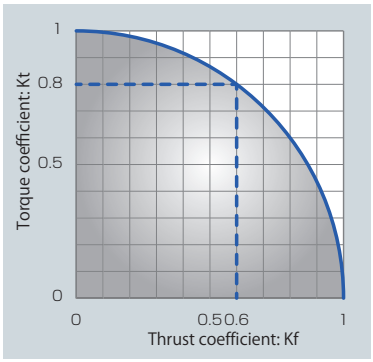
The shaft contact pressure and hub contact pressure vary depending on the operating temperature. You need to correct these values based on the operating temperature. Note that the contact pressure values were those measured at 20℃ . If the operating temperature exceeds 20℃ , obtain the hub's minimum external diameter and the hollow shaft's maximum internal diameter with the following formulas.

$P_1 \cdot P_2$ = contact pressure at 20℃ × temperature coefficient (K 2)

The operating temperature range is from -30℃ to 110℃ .

Torque and Thrust Coefficients

If torque and thrust are applied to ETP-TECHNO at the same time, the rated values of both decrease. These values can be obtained based on the coefficients in the figure on the right.



Calculation example:
When using the ETP-T-30 at 20℃ .

Maximum rated torque at 20℃ [T] and thrust (F): T = 500 [N·m]and F = 33000 [N]
The maximum rated torque, Tmax, when the maximum thrust (Fmax = 20000 [N]) is applied can be obtained as follows.

Thrust coefficient (Kf) = Fmax / F × temperature coefficient (K2)
= 20000/33000 × 1.0 = 0.61

The torque coefficient, Kt, when Kf = 0.61 is about 0.8 based on the figure above. Accordingly, the maximum rated torque, Tmax, in this case is as follows.

$Tmax = T \times K2 \times Kt = 500 \times 1.0 \times 0.8 = 400\ [N\cdot m]$

The relationship between Kt and Kf can be obtained from the following formula.

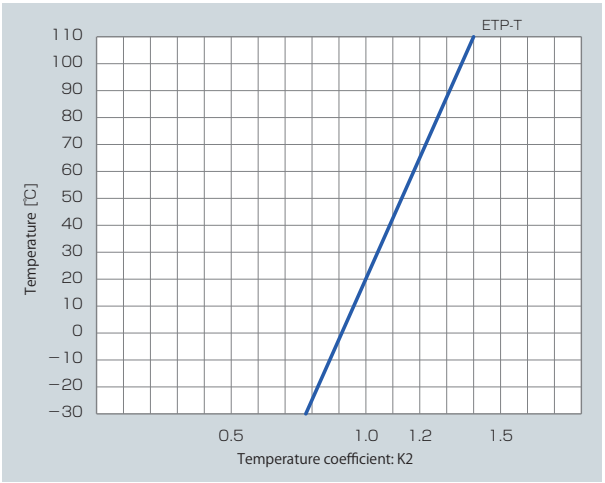
$$\sqrt{(Kt)^2 + (Kf)^2} = 1$$

Service Factor

■ Service factor based on the load property: K1

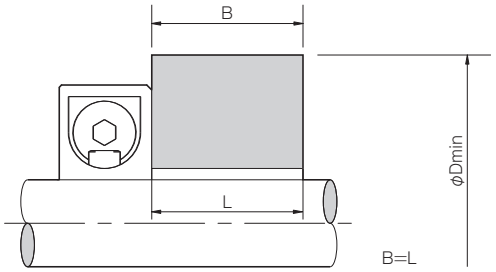
Load property	Constant	Vibrations: Small	Vibrations: Medium	Vibrations: Large
K1	1.0	1.25	1.75	2.25

■ Service factor based on the operating temperature: K2



Hub's Minimum External Diameters

If the stress applied to the hub is too large, the hub may be deformed. Select the appropriate external diameter size from the hub's minimum external diameters in the table below in the design phase.



ϕ Dmin unit [mm]

ETP-TECHNO size	Hub contact pressure [N/mm²]	Material's yield stress δ 0.2 [N /mm²]									
		150	180	210	230	250	280	300	350	400	450
		FC250	FC300 SS330 SC360 FCMB310	FC350 SS400 SC410 FCMB360 SUS304	SC450 S15C SF440	FCD400 SS490 SC480 S20C SF490	S30C SF540 SUS201	FCD450 S35C SF590	FCD500 S45C SUS410	FCD600 S55C SUS403	FCD700 SUS420
15	70	32	29	27	27	26	25	25	25	25	25
19	70	40	37	35	33	33	32	32	32	32	32
20	70	42	38	36	35	34	33	33	33	33	33
24	70	50	46	43	42	41	39	39	39	39	39
25	70	54	49	46	44	43	42	42	42	42	42
30	70	64	58	54	53	51	50	50	50	50	50
35	70	74	67	63	61	59	58	58	58	58	58
40	70	87	79	74	72	70	68	68	68	68	68
50	70	108	99	93	90	88	85	85	85	85	85
60	70	125	114	107	103	101	98	98	98	98	98
70	70	150	136	128	124	121	117	117	117	117	117
75	70	158	144	135	131	128	124	124	124	124	124
80	70	166	151	142	137	134	130	130	130	130	130
90	70	186	170	160	154	151	146	146	146	146	146
100	70	208	189	178	172	168	163	163	163	163	163

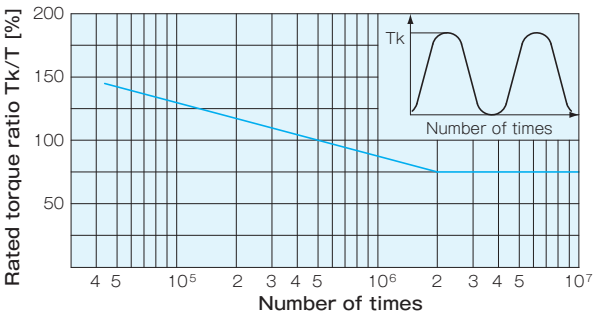
* Hub contact pressure at an operating temperature of 20℃ . The contact pressure increases as the temperature rises.
* If the operating temperature exceeds 20℃ , you need to obtain the hub's minimum external diameter according to the selection procedure on P.208.
* The hub's minimum external diameter shows a value calculated based on C=1 in the selection procedure on P.208.
* The above SUS values are proof stress values (N/mm²) after quenching and tempering.

ETP-T Models

Items Checked for Design Purposes

Fatigue Caused by Periodically Applied Varying Torque

The following figure shows the fatigue state when a varying static torque, Tk, is applied periodically to the ETP-TECHNO. The vertical axis shows the percentage of the rated torque, T, and the horizontal axis shows the number of periodically applied varying static torque events.
If the rated torque, T, is periodically applied to the ETP-TECHNO, it can withstand about 500,000 events in terms of fatigue life. If 75% of the rated torque, T, is applied, it can withstand an unlimited number of events in terms of fatigue life.



Mounting Shaft Tolerance, Mounting Hub Tolerance, and Surface Roughness

Model	Mounting shaft tolerance	Mounting hub tolerance	Surface roughness
ETP-T-□	h8	H7	25S (center line's average roughness 6.3a) or less
ETP-T-□-C			

Operating Temperature Range

Model	Operating temperature range [° C]
ETP-T-□	− 30 ~ 110
ETP-T-□-C	

Concentricity and Balance

Model	Concentricity [mm]	Balance [g·mm/kg]
ETP-T-□	0.006	50
ETP-T-□-C		

Number of Attachments and Detachments

The number of attachments/detachments only applies if you prevent foreign particles from adhering to the pressure screw and make sure oil or grease containing molybdenum-, silicon-, or fluorine-based antifriction material always remains on the pressure screw's surface.
In addition, be sure to use a torque wrench and do not use an impact wrench that has large torque fluctuation.

■ ETP-T

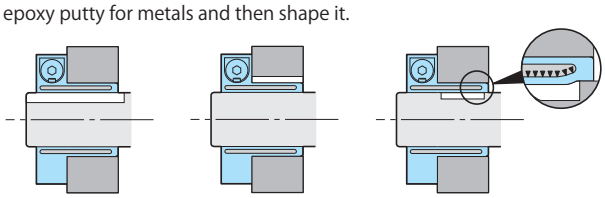
Model	No. of attachments/detachments
ETP-T-15 ~ 50	5000
ETP-T-60 ~ 80	3000
ETP-T-90 • 100	500

■ ETP-T C

Model	No. of attachments/detachments
ETP-T-15-C ~ 50-C	5000
ETP-T-60-C	3000

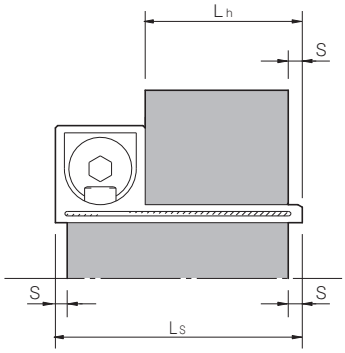
Keyway Shape where the ETP-TECHNO Cannot Be Detached due to a Deformation of the Sleeve

The ETP-TECHNO cannot be used if the shaft and hub have a keyway as shown in the figure below. Note that you can use the ETP-TECHNO for the shaft and hub with a keyway if you completely fill the keyway with epoxy putty for metals and then shape it.



Allowable Range of Edge

The performance of the ETP-TECHNO is based on the case where the shaft and the hub have the effect for the entire standard shaft length, Ls, and the entire standard hub length, Lh, respectively. Accordingly, make sure in the design phase that the shaft and the hub have the effect for the respective entire standard length. If the length of the shaft and hub is limited due to design reasons, make sure it is less than the dimension S in the figure below. If it exceeds the dimension S, stress concentrates on the sleeve edge and the sleeve is deformed, so there is the possibility that the ETP-TECHNO cannot be detached.



ETP-TECHNO size	S [mm]
15	5
19	5
20	5
24	5
25	6
30	6
35	6
40	7
50	8
60	9
70	10
75	10
80	10
90	10
100	10

Mounting

(1) Remove the rust, dust, oil, etc. off from the inner surface of the shaft and hub. Similarly, if any anti-rust oil, soiling, etc. remains on the surface of the ETP-TECHNO, wipe it off with a cloth, etc.
In particular, never allow oil or grease containing antifriction or other agent (molybdenum-, silicon-, or fluorine-based), which would dramatically affect the friction coefficient, to contact the surface.

(2) Attach the ETP-TECHNO to the hub and mount them to the shaft. If accurate positioning of the shaft and hub is needed, adjust the position of both before tightening the pressure screw.
Never tighten the pressure screw before mounting the ETP-TECHNO to the shaft and hub.

(3) Tighten the pressure screw to the specified torque using a torque wrench.

Removal

(1) Before starting work, ensure safety by making sure no torque and thrust are applied to the ETP-TECHNO and there is no risk of a fall due to the self-weight of the shaft and hub.
The ETP-TECHNO does not have a self-locking mechanism. The connecting force is instantaneously released by loosening the pressure screw.

(2) Loosen the pressure screw until it comes into contact with the set screw. Also, do not remove the pressure screw by removing the set screw.

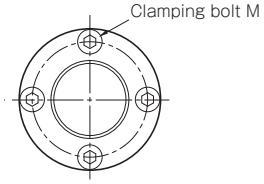
ETP-A Models

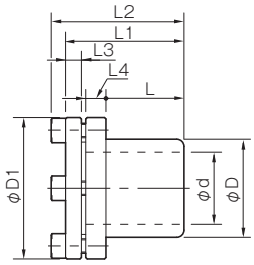
Specifications

Model	Rated torque [N·m]	Rated thrust [N]	Rated radial load [N]	Shaft contact pressure [N/mm²]	Hub contact pressure [N/mm²]	Tightening torque [N·m]	Moment of inertia [kg·m²]	Mass [kg]
ETP-A-15	55	7300	2500	90	80	6	0.018×10^{-3}	0.10
ETP-A-19	100	10600	5800	90	80	8	0.046×10^{-3}	0.17
ETP-A-20	125	12500	6600	90	80	8	0.046×10^{-3}	0.16
ETP-A-22	135	12300	8200	90	80	8	0.065×10^{-3}	0.19
ETP-A-24	200	16700	9800	90	80	8	0.067×10^{-3}	0.20
ETP-A-25	250	20000	10600	90	80	8	0.071×10^{-3}	0.19
ETP-A-28	300	21400	13100	90	80	8	0.12×10^{-3}	0.26
ETP-A-30	420	28000	14700	90	80	8	0.14×10^{-3}	0.29
ETP-A-32	420	26300	16300	90	80	8	0.20×10^{-3}	0.35
ETP-A-35	650	37100	18800	90	80	8	0.25×10^{-3}	0.40
ETP-A-38	750	39500	21200	90	80	8	0.31×10^{-3}	0.43
ETP-A-40	940	47000	22800	90	80	8	0.44×10^{-3}	0.55
ETP-A-42	940	44800	24400	90	80	8	0.47×10^{-3}	0.55
ETP-A-45	1290	57300	26900	90	80	13	0.69×10^{-3}	0.71
ETP-A-48	1570	65400	29300	90	80	13	0.83×10^{-3}	0.78
ETP-A-50	1900	76000	30900	90	80	13	1.05×10^{-3}	0.86
ETP-A-55	2500	90900	35000	90	80	13	1.43×10^{-3}	1.06
ETP-A-60	3400	113000	39100	90	80	13	2.15×10^{-3}	1.37
ETP-A-65	3500	108000	43100	90	80	13	3.10×10^{-3}	1.67
ETP-A-70	5200	149000	47200	90	80	32	4.08×10^{-3}	2.04
ETP-A-75	6300	168000	51300	90	80	32	5.50×10^{-3}	2.42
ETP-A-80	8800	220000	55000	90	80	32	8.10×10^{-3}	2.64
ETP-A-90	11000	244000	60000	90	80	32	12.2×10^{-3}	3.54
ETP-A-100	15500	310000	62000	90	80	32	19.9×10^{-3}	4.80

* The rated torque values are those when the thrust is zero and the rated thrust values are those when the torque is zero.
* The rated torque, rated thrust, shaft contact pressure, and hub contact pressure values given are measured values at a temperature of 20° C.
* ETP-A-75, 80, 90, and 100 are made to order.

Dimensions





CAD

How to Place an Order

ETP-A-□
Size

* Depending on your location and such, we may not be able to sell you our products. Please contact us for details.

Unit [mm]

Model	d	D	D1	L	L1	L2	L3	L4	M
ETP-A-15	15	23	37.5	17	28	33	5	5.4	3-M5 × 10
ETP-A-19	19	28	45	21	34	39	5.5	6.9	3-M5 × 12
ETP-A-20	20	28	45	22	35	40	5.5	6.4	3-M5 × 12
ETP-A-22	22	32	49	22	35	40	5.5	6.4	4-M5 × 12
ETP-A-24	24	34	49	25	38	43	5.5	6.4	4-M5 × 12
ETP-A-25	25	34	49	27	41	46	5.5	6.9	4-M5 × 12
ETP-A-28	28	39	55	29	43	48	5.5	6.9	4-M5 × 12
ETP-A-30	30	41	57	32	46	51	5.5	6.9	4-M5 × 12
ETP-A-32	32	43	60	34	50	55	7	7.4	4-M5 × 14
ETP-A-35	35	47	62.5	37	53	58	7	7.4	6-M5 × 14
ETP-A-38	38	50	65	41	57	62	7	7.4	6-M5 × 14
ETP-A-40	40	53	70	43	60	65	7.5	8.4	6-M5 × 16
ETP-A-42	42	55	70	45	62	67	7.5	8.4	6-M5 × 16
ETP-A-45	45	59	77	49	66	72	8	8.4	6-M6 × 16
ETP-A-48	48	62	80	52	70	76	8	8.4	6-M6 × 16
ETP-A-50	50	65	83	53	72	78	8.5	9.4	6-M6 × 18
ETP-A-55	55	71	88	58	77	83	9	9.4	8-M6 × 18
ETP-A-60	60	77	95	64	85	91	10	10.4	8-M6 × 20
ETP-A-65	65	84	102	68	90	96	9.5	10.9	8-M6 × 20
ETP-A-70	70	90	113	72	94	102	9.5	10.9	6-M8 × 20
ETP-A-75	75	95	118	85	108	116	11	11	6-M8 × 22
ETP-A-80	80	100	123	90	114	122	11	11	6-M8 × 22
ETP-A-90	90	112	135	100	127	135	12.5	12.5	8-M8 × 25
ETP-A-100	100	125	148	110	139	147	13.5	13	8-M8 × 25

* L1 and L2 are dimensions when the ETP-CLASSIC is mounted. These values may vary slightly depending on the fit tolerances of the shaft diameter and internal hub diameter.
* The nominal diameter of the clamping bolt M is equal to the quantity minus the nominal diameter of the screw threads times the nominal length.

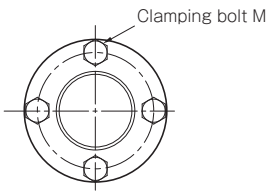
ETP-A B Types

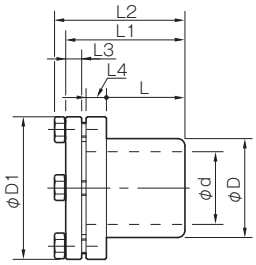
Specifications

Model	Rated torque [N·m]	Rated thrust [N]	Rated radial load [N]	Shaft contact pressure [N/mm²]	Hub contact pressure [N/mm²]	Tightening torque [N·m]	Moment of inertia [kg·m²]	Mass [kg]
ETP-A-15-B	55	7300	2500	90	80	6	0.018×10^{-3}	0.10
ETP-A-19-B	100	10600	5800	90	80	8	0.046×10^{-3}	0.17
ETP-A-20-B	125	12500	6600	90	80	8	0.046×10^{-3}	0.16
ETP-A-22-B	135	12300	8200	90	80	8	0.065×10^{-3}	0.19
ETP-A-24-B	200	16700	9800	90	80	8	0.067×10^{-3}	0.20
ETP-A-25-B	250	20000	10600	90	80	8	0.071×10^{-3}	0.19
ETP-A-28-B	300	21400	13100	90	80	8	0.12×10^{-3}	0.26
ETP-A-30-B	420	28000	14700	90	80	8	0.14×10^{-3}	0.29
ETP-A-32-B	420	26300	16300	90	80	8	0.20×10^{-3}	0.35
ETP-A-35-B	650	37100	18800	90	80	8	0.25×10^{-3}	0.40
ETP-A-38-B	750	39500	21200	90	80	8	0.31×10^{-3}	0.43
ETP-A-40-B	940	47000	22800	90	80	8	0.44×10^{-3}	0.55
ETP-A-42-B	940	44800	24400	90	80	8	0.47×10^{-3}	0.55
ETP-A-45-B	1290	57300	26900	90	80	13	0.69×10^{-3}	0.71
ETP-A-48-B	1570	65400	29300	90	80	13	0.83×10^{-3}	0.78
ETP-A-50-B	1900	76000	30900	90	80	13	1.05×10^{-3}	0.86
ETP-A-55-B	2500	90900	35000	90	80	13	1.43×10^{-3}	1.06
ETP-A-60-B	3400	113000	39100	90	80	13	2.15×10^{-3}	1.37
ETP-A-65-B	3500	108000	43100	90	80	13	3.10×10^{-3}	1.67
ETP-A-70-B	5200	149000	47200	90	80	32	4.08×10^{-3}	2.04
ETP-A-75-B	6300	168000	51300	90	80	32	5.50×10^{-3}	2.42
ETP-A-80-B	8800	220000	55000	90	80	32	8.10×10^{-3}	2.64
ETP-A-90-B	11000	244000	60000	90	80	32	12.2×10^{-3}	3.54
ETP-A-100-B	15500	310000	62000	90	80	32	19.9×10^{-3}	4.80

* The rated torque values are those when the thrust is zero and the rated thrust values are those when the torque is zero.
* The rated torque, rated thrust, shaft contact pressure, and hub contact pressure values given are measured values at a temperature of 20° C.
* ETP-A-75, 80, 90, and 100-B are made to order.

Dimensions





CAD

How to Place an Order

ETP-A-□-B

Size

Type (B: Hexagon head bolt specifications)

* Depending on your location and such, we may not be able to sell you our products. Please contact us for details.

Unit [mm]

Model	d	D	D1	L	L1	L2	L3	L4	M
ETP-A-15-B	15	23	37.5	17	28	32.5	5	5.4	3-M5 × 10
ETP-A-19-B	19	28	45	21	34	38.5	5.5	6.9	3-M5 × 12
ETP-A-20-B	20	28	45	22	35	39.5	5.5	6.4	3-M5 × 12
ETP-A-22-B	22	32	49	22	35	39.5	5.5	6.4	4-M5 × 12
ETP-A-24-B	24	34	49	25	38	42.5	5.5	6.4	4-M5 × 12
ETP-A-25-B	25	34	49	27	41	45.5	5.5	6.9	4-M5 × 12
ETP-A-28-B	28	39	55	29	43	47.5	5.5	6.9	4-M5 × 12
ETP-A-30-B	30	41	57	32	46	50.5	5.5	6.9	4-M5 × 12
ETP-A-32-B	32	43	60	34	50	54.5	7	7.4	4-M5 × 14
ETP-A-35-B	35	47	62.5	37	53	57.5	7	7.4	6-M5 × 14
ETP-A-38-B	38	50	65	41	57	61.5	7	7.4	6-M5 × 14
ETP-A-40-B	40	53	70	43	60	64.5	7.5	8.4	6-M5 × 16
ETP-A-42-B	42	55	70	45	62	66.5	7.5	8.4	6-M5 × 16
ETP-A-45-B	45	59	77	49	66	71	8	8.4	6-M6 × 16
ETP-A-48-B	48	62	80	52	70	75	8	8.4	6-M6 × 16
ETP-A-50-B	50	65	83	53	72	77	8.5	9.4	6-M6 × 18
ETP-A-55-B	55	71	88	58	77	82	9	9.4	8-M6 × 18
ETP-A-60-B	60	77	95	64	85	90	10	10.4	8-M6 × 20
ETP-A-65-B	65	84	102	68	90	95	9.5	10.9	8-M6 × 20
ETP-A-70-B	70	90	113	72	94	99.5	9.5	10.9	6-M8 × 20
ETP-A-75-B	75	95	118	85	108	113.5	11	11	6-M8 × 22
ETP-A-80-B	80	100	123	90	114	119.5	11	11	6-M8 × 22
ETP-A-90-B	90	112	135	100	127	132.5	12.5	12.5	8-M8 × 25
ETP-A-100-B	100	125	148	110	139	144.5	13.5	13	8-M8 × 25

* L1 and L2 are dimensions when the ETP-CLASSIC is mounted. These values may vary slightly depending on the fit tolerances of the shaft diameter and internal hub diameter.
* The nominal diameter of the clamping bolt M is equal to the quantity minus the nominal diameter of the screw threads times the nominal length.

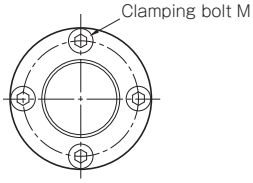
ETP-A C Types

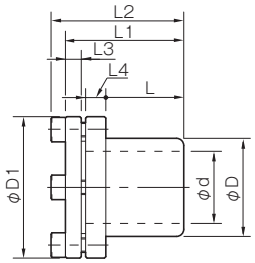
Specifications

Model	Rated torque [N·m]	Rated thrust [N]	Shaft contact pressure [N/mm²]	Hub contact pressure [N/mm²]	Tightening torque [N·m]	Momentof inertia [kg·m²]	Mass [kg]
ETP-A-15-C	41	5000	90	80	6	0.018×10^{-3}	0.10
ETP-A-19-C	75	7400	90	80	8	0.046×10^{-3}	0.17
ETP-A-20-C	94	8700	90	80	8	0.046×10^{-3}	0.16
ETP-A-25-C	188	14000	90	80	8	0.071×10^{-3}	0.19
ETP-A-30-C	315	19000	90	80	8	0.14×10^{-3}	0.29
ETP-A-35-C	488	26000	90	80	8	0.25×10^{-3}	0.40
ETP-A-40-C	705	33000	90	80	8	0.44×10^{-3}	0.55
ETP-A-45-C	968	40000	90	80	13	0.69×10^{-3}	0.71
ETP-A-50-C	1426	53000	90	80	13	1.05×10^{-3}	0.86

* The rated torque values are those when the thrust is zero and the rated thrust values are those when the torque is zero.
* The rated torque, rated thrust, shaft contact pressure, and hub contact pressure values given are measured values at a temperature of 20° C.

Dimensions





CAD

How to Place an Order

ETP-A-□-C

Size

Type (C: Simple antirust specifications)

* Depending on your location and such, we may not be able to sell you our products. Please contact us for details.

Unit [mm]

Model	d	D	D1	L	L1	L2	L3	L4	M
ETP-A-15-C	15	23	37.5	17	28	33	5	5.4	3-M5 × 10
ETP-A-19-C	19	28	45	21	34	39	5.5	6.9	3-M5 × 12
ETP-A-20-C	20	28	45	22	35	40	5.5	6.4	3-M5 × 12
ETP-A-25-C	25	34	49	27	41	46	5.5	6.9	4-M5 × 12
ETP-A-30-C	30	41	57	32	46	51	5.5	6.9	4-M5 × 12
ETP-A-35-C	35	47	62.5	37	53	58	7	7.4	6-M5 × 14
ETP-A-40-C	40	53	70	43	60	65	7.5	8.4	6-M5 × 16
ETP-A-45-C	45	59	77	49	66	72	8	8.4	6-M6 × 16
ETP-A-50-C	50	65	83	53	72	78	8.5	9.4	6-M6 × 18

* L1 and L2 are dimensions when the ETP-CLASSIC is mounted. These values may vary slightly depending on the fit tolerances of the shaft diameter and internal hub diameter.
* The nominal diameter of the clamping bolt M is equal to the quantity minus the nominal diameter of the screw threads times the nominal length.

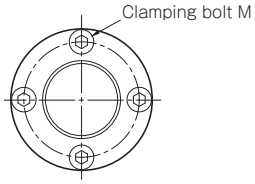
ETP-A S Types

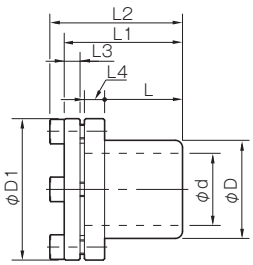
Specifications

Model	Rated torque [N·m]	Rated thrust [N]	Shaft contact pressure [N/mm²]	Hub contact pressure [N/mm²]	Tightening torque [N·m]	Momentof inertia [kg·m²]	Mass [kg]
ETP-A-19-S	53	5000	90	80	8	0.044×10^{-3}	0.15
ETP-A-20-S	75	6000	90	80	8	0.042×10^{-3}	0.14
ETP-A-25-S	120	10000	90	80	8	0.065×10^{-3}	0.17
ETP-A-30-S	210	14000	90	80	8	0.12×10^{-3}	0.24
ETP-A-35-S	330	19000	90	80	8	0.22×10^{-3}	0.32
ETP-A-40-S	500	26000	90	80	8	0.37×10^{-3}	0.46
ETP-A-45-S	700	31000	90	80	13	0.56×10^{-3}	0.57
ETP-A-50-S	1000	40000	90	80	13	0.85×10^{-3}	0.72

* The rated torque values are those when the thrust is zero and the rated thrust values are those when the torque is zero.
* The rated torque, rated thrust, shaft contact pressure, and hub contact pressure values given are measured values at a temperature of 20° C.

Dimensions





CAD

How to Place an Order

ETP-A-□-S

Size

Type (S: Short length specifications)

* Depending on your location and such, we may not be able to sell you our products. Please contact us for details.

Unit [mm]

Model	d	D	D1	L	L1	L2	L3	L4	M
ETP-A-19-S	19	28	45	13	26	31	5.5	6.9	3-M5 × 12
ETP-A-20-S	20	28	45	15	28	33	5.5	6.4	3-M5 × 12
ETP-A-25-S	25	34	49	15	29	34	5.5	6.9	4-M5 × 12
ETP-A-30-S	30	41	57	20	34	39	5.5	6.9	4-M5 × 12
ETP-A-35-S	35	47	62.5	22	38	43	7	7.4	6-M5 × 14
ETP-A-40-S	40	53	70	25	42	47	7.5	8.4	6-M5 × 16
ETP-A-45-S	45	59	77	28	45	51	8	8.4	6-M6 × 16
ETP-A-50-S	50	65	83	26	45	51	8.5	9.4	6-M6 × 18

* L1 and L2 are dimensions when the ETP-CLASSIC is mounted. These values may vary slightly depending on the fit tolerances of the shaft diameter and internal hub diameter.
* The nominal diameter of the clamping bolt M is equal to the quantity minus the nominal diameter of the screw threads times the nominal length.

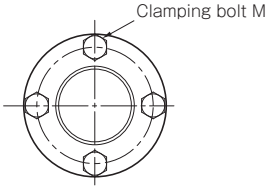
ETP-A R Types

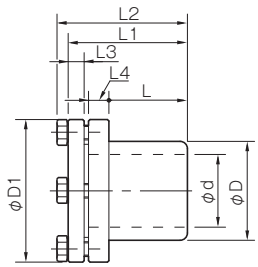
Specifications

Model	Rated torque [N·m]	Rated thrust [N]	Rated radial load [N]	Shaft contact pressure [N/mm²]	Hub contact pressure [N/mm²]	Tightening torque [N·m]	Moment of inertia [kg·m²]	Mass [kg]
ETP-A-15-R	45	6000	2500	90	70	4.5	0.018×10^{-3}	0.10
ETP-A-20-R	100	10000	6600	90	70	4.5	0.046×10^{-3}	0.16
ETP-A-25-R	210	16800	10600	90	70	4.5	0.071×10^{-3}	0.19
ETP-A-30-R	350	23300	14700	90	70	4.5	0.142×10^{-3}	0.29
ETP-A-35-R	500	28500	18800	90	70	4.5	0.250×10^{-3}	0.40
ETP-A-40-R	750	37500	22800	90	70	4.5	0.441×10^{-3}	0.55
ETP-A-45-R	1100	48800	26900	90	70	7.8	0.686×10^{-3}	0.71
ETP-A-50-R	1550	62000	30900	90	70	7.8	1.045×10^{-3}	0.86

* The rated torque values are those when the thrust is zero and the rated thrust values are those when the torque is zero.
* The rated torque, rated thrust, shaft contact pressure, and hub contact pressure values given are measured values at a temperature of 20° C.

Dimensions





CAD

How to Place an Order

ETP-A-□-R

Size

Type (R: Stainless steel specifications)

* Depending on your location and such, we may not be able to sell you our products. Please contact us for details.

Unit [mm]

Model	d	D	D1	L	L1	L2	L3	L4	M
ETP-A-15-R	15	23	37.5	17	28	32	5	5.4	4-M5 × 10
ETP-A-20-R	20	28	45	22	36	40	5.5	6.4	5-M5 × 12
ETP-A-25-R	25	34	49	27	41	45	5.5	6.9	7-M5 × 12
ETP-A-30-R	30	41	57	32	46	50	5.3	6.9	7-M5 × 12
ETP-A-35-R	35	47	62.5	37	53	57	7	7.4	9-M5 × 14
ETP-A-40-R	40	53	70	43	60	64	8	8.4	9-M5 × 16
ETP-A-45-R	45	59	77	49	66	70	8	8.4	9-M6 × 16
ETP-A-50-R	50	65	83	53	72	76	8.5	9.4	9-M6 × 18

* L1 and L2 are dimensions when the ETP-CLASSIC is mounted. These values may vary slightly depending on the fit tolerances of the shaft diameter and internal hub diameter.
* The nominal diameter of the clamping bolt M is equal to the quantity minus the nominal diameter of the screw threads times the nominal length.

Items Checked for Design Purposes

Selection Procedure

(1) Selection is determined by the used shaft diameter. In general, find the torque, Ta, applied to the connecting element using the output capacity, P, of the driver and usage rotation speed, n. Next, obtain the thrust, Fa, applied to the connecting element.

$$Ta\ [N{\cdot}m] = 9550 \times \frac{P\ [kW]}{n\ [min^{-1}]}$$

Ta: Torque applied to the connecting element [N·m]
P: Driver's output [kW]
n: Connecting element's rotation speed [min^{-1}]
Fa: Thrust applied to the connecting element [N]

(2) Determine the service factor, K1, based on the load property and obtain the corrected torque, Td, and corrected thrust, Fd, applied to the connecting element.

$Td = Ta \times K1$
$Fd = Fa \times K1$

Td: Corrected torque applied to the connecting element [N·m]
Fd: Corrected thrust applied to the connecting element [N]
K1: Service factor based on the load property

(3) Correct the values according to the load property.

1. For the torque alone

Compare the connecting element's rated torque, T, based on the used diameter with the calculated corrected torque, Td.

$T \geqq Td$ T: Connecting element's rated torque [N·m]

2. For the thrust alone

Compare the connecting element's rated thrust, F, based on the used diameter with the calculated corrected thrust, Fd.

$F \geqq Fd$ F: Connecting element's rated thrust [N]

3. If torque and thrust are applied at the same time

Calculate the combined load, Mr, and compare the result with the rated torque, T.

$T \geqq Mr$ $\quad Mr = \sqrt{Td^2 + (Fd \times \frac{d}{2})^2}$

Mr: Combined load applied to the connecting element [N·m] d: Shaft diameter [m]

(4) Obtain the hub's minimum external diameter and the hollow shaft's maximum internal diameter.

1. Determining hub minimum external diameter

$$DO \geqq D\sqrt{\frac{\delta_{0.2N} + CP_2}{\delta_{0.2N} - CP_2}}$$

$C = 1 \quad B = L$
$C = 0.8 \quad L < B < 2L$
$C = 0.6 \quad B \geqq 2L$

DO: Hub's minimum external diameter [mm]
D: Hub's internal diameter [mm]
P_2: Hub contact pressure [N/mm^2]
$\delta_{0.2N}$: Hub material's yield stress [N/mm^2]
B: Hub length [mm]
L: Effective contact length [mm]
C: Coefficient

If the hub material's yield stress value is large, make sure the ratio of the hub's minimum external diameter to the hub's internal diameter is more than about 1.3 times to prevent the hub's deformation.

2. Determining hollow shaft maximum internal diameter

$$di \leqq d\sqrt{\frac{\delta_{0.2N} - 2P_1C}{\delta_{0.2N}}}$$

$C = 0.6$ when using a single one
$C = 0.8$ when using multiple ones

di: Hollow shaft's maximum internal diameter [mm]
$\delta_{0.2N}$: Hollow shaft material's yield stress [N/mm^2]
P_1 : Shaft contact pressure [N/mm^2]
d: Shaft diameter [mm]
C: Coefficient

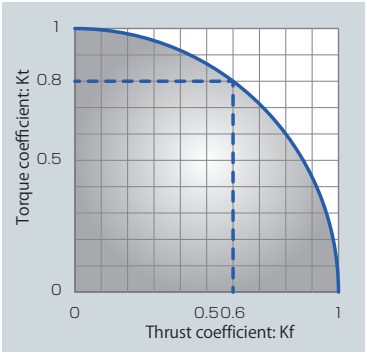
The shaft contact pressure and hub contact pressure vary depending on the operating temperature. You need to correct these values based on the operating temperature. Note that the contact pressure values were those measured at 20℃ . If the operating temperature exceeds 20℃ , obtain the hub's minimum external diameter and the hollow shaft's maximum internal diameter with the following formulas.

$P_1 \cdot P_2$ = contact pressure at 20℃ × temperature coefficient (K2)

The operating temperature range is from -30℃ to 85℃ .

Torque and Thrust Coefficients

If torque and thrust are applied to the ETP-CLASSIC at the same time, the rated values of both decrease. These values can be obtained based on the coefficients in the figure below.



Calculation example:
When using the ETP-A-30 at 20℃ .

Maximum rated torque (T) and thrust (F) at 20℃ , T = 340 [N·m] and F = 23100 [N]. The maximum rated torque, Tmax, when the maximum thrust (Fmax = 14000 [N]) is applied can be obtained as follows.

Thrust coefficient (Kf) = Fmax / F × temperature coefficient (K2)
= 14000/23100 × 1.0 = 0.61

The torque coefficient, Kt, when Kf = 0.61 is about 0.8 based on the above figure. Accordingly, the maximum rated torque, Tmax, in this case is as follows.

$Tmax = T \times K2 \times Kt = 340 \times 1.0 \times 0.8 = 272\ [N{\cdot}m]$

The relationship between Kt and Kf can be obtained from the following formula.

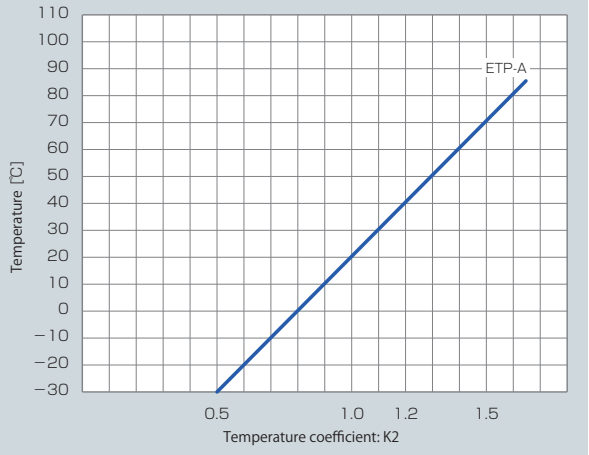
$$\sqrt{(Kt)^2 + (Kf)^2} = 1$$

Service Factor

■ Service factor based on the load property: K1

Load property	Constant	Vibrations: Small	Vibrations: Medium	Vibrations: Large
K1	1.0	1.25	1.75	2.25

■ Service factor based on the operating temperature: K2



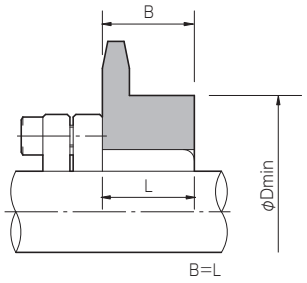
ETP-A Models

Items Checked for Design Purposes

Hub's Minimum External Diameters

If the stress applied to the hub is too large, the hub may be deformed. Select the appropriate external diameter size from the hub's minimum external diameters in the table below in the design phase.

■ ETP-A, ETP-A B, ETP-A C, ETP-A S



ø Dmin, unit [mm]

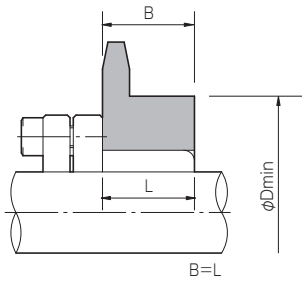
ETP-A ETP-A B ETP-A C ETP-A S size	Hub contact pressure [N/mm²]	Material's yield stress δ 0.2 [N /mm²]									
		150	180	210	230	250	280	300	350	400	450
		FC250	FC300 SS330 SC360 FCMB310	FC350 SS400 SC410 FCMB360 SUS304	SC450 S15C SF440	FCD400 SS490 SC480 S20C SF490	S30C SF540 SUS201	FCD450 S35C SF590	FCD500 S45C SUS410	FCD600 S55C SUS403	FCD700 SUS420
15	80	42	37	35	33	32	31	31	30	30	30
19	80	51	46	42	41	39	38	37	37	37	37
20	80	51	46	42	41	39	38	37	37	37	37
22	80	58	52	48	46	45	43	42	42	42	42
24	80	62	55	51	49	48	46	45	45	45	45
25	80	62	55	51	49	48	46	45	45	45	45
28	80	71	63	59	56	55	53	52	51	51	51
30	80	75	67	62	59	58	55	54	54	54	54
32	80	78	70	65	62	60	58	57	56	56	56
35	80	86	76	71	68	66	63	62	62	62	62
38	80	91	81	75	72	70	67	66	65	65	65
40	80	96	86	80	77	74	72	70	69	69	69
42	80	100	89	83	79	77	74	73	72	72	72
45	80	107	96	89	85	83	80	78	77	77	77
48	80	113	100	93	90	87	84	82	81	81	81
50	80	118	105	97	94	91	88	86	85	85	85
55	80	129	115	106	102	99	96	94	93	93	93
60	80	140	125	115	111	108	104	102	101	101	101
65	80	153	136	126	121	117	113	111	110	110	110
70	80	164	146	135	130	126	121	119	117	117	117
75	80	173	154	142	137	133	128	125	124	124	124
80	80	182	162	150	144	140	135	132	130	130	130
90	80	203	181	168	161	156	151	148	146	146	146
100	80	227	202	187	180	175	168	165	163	163	163

* Hub contact pressure at an operating temperature of 20℃ . The contact pressure increases as the temperature rises.
* If the operating temperature exceeds 20℃ , you need to obtain the hub's minimum external diameter according to the selection procedure on P.217.
* The hub's minimum external diameter shows a value calculated based on C=1 in the selection procedure on P.217.
* The above SUS values are proof stress values (N/mm²) after quenching and tempering.

Hub's Minimum External Diameters

If the stress applied to the hub is too large, the hub may be deformed. Select the appropriate external diameter size from the hub's minimum external diameters in the table below in the design phase.

■ ETP-A R



ø Dmin, unit [mm]

ETP-A R size	Hub contact pressure [N/mm²]	Material's yield stress δ 0.2 [N /mm²]									
		150	180	210	230	250	280	300	350	400	450
		FC250	FC300 SS330 SC360 FCMB310	FC350 SS400 SC410 FCMB360 SUS304	SC450 S15C SF440	FCD400 SS490 SC480 S20C SF490	S30C SF540 SUS201	FCD450 S35C SF590	FCD500 S45C SUS410	FCD600 S55C SUS403	FCD700 SUS420
15	70	39	35	33	32	31	30	30	30	30	30
20	70	47	43	40	39	38	37	37	37	37	37
25	70	57	52	49	47	46	45	45	45	45	45
30	70	68	62	58	57	55	54	54	54	54	54
35	70	78	71	67	65	63	62	62	62	62	62
40	70	88	80	75	73	71	69	69	69	69	69
45	70	98	89	84	81	79	77	77	77	77	77
50	70	108	98	92	90	87	85	85	85	85	85

* Hub contact pressure at an operating temperature of 20℃ . The contact pressure increases as the temperature rises.
* If the operating temperature exceeds 20℃ , you need to obtain the hub's minimum external diameter according to the selection procedure on P.217.
* The hub's minimum external diameter shows a value calculated based on C=1 in the selection procedure on P.217.
* The above SUS values are proof stress values (N/mm²) after quenching and tempering.

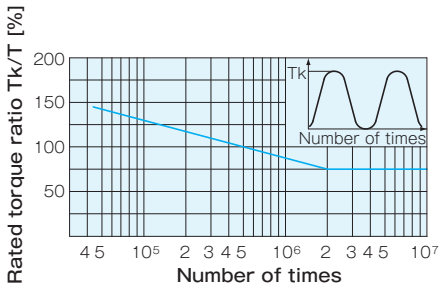
ETP-A Models

Items Checked for Design Purposes

Fatigue Caused by Periodically Applied Varying Torque

The following figure shows the fatigue state when a static varying torque, Tk, is applied periodically to the ETP-CLASSIC. The vertical axis shows the percentage of the rated torque, T, and the horizontal axis shows the number of periodically applied static varying torque events.

If the rated torque, T, is periodically applied to the ETP-CLASSIC, it can withstand about 500,000 events in terms of fatigue life. If 75% of the rated torque, T, is applied, it can withstand an unlimited number of events in terms of fatigue life.



Mounting Shaft Tolerance, Mounting Hub Tolerance, and Surface Roughness

■ ETP-A

Model	Mounting shaft tolerance	Mounting hub tolerance	Surface roughness
ETP-A-15	h7	H7	25S (center line's average roughness 6.3a) or less
ETP-A-19 ~ 100	h8 ~ k6		

■ ETP-A B, C

Model	Mounting shaft tolerance	Mounting hub tolerance	Surface roughness
ETP-A-15-B • C	h7	H7	25S (center line's average roughness 6.3a) or less
ETP-A-19-B • C ~ 100-B • C	h8 ~ k6		

■ ETP-A S

Model	Mounting shaft tolerance	Mounting hub tolerance	Surface roughness
ETP-A-19-S ~ 50-S	h8 ~ k6	H7	25S (center line's average roughness 6.3a) or less

■ ETP-A R

Model	Mounting shaft tolerance	Mounting hub tolerance	Surface roughness
ETP-A-15-R	h7	H7	25S (center line's average roughness 6.3a) or less
ETP-A-20-R ~ 50-R	h8		

Operating Temperature Range

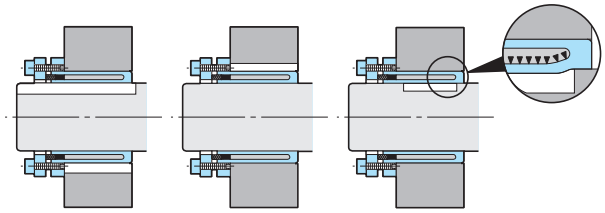
Model	Operating temperature range [° C]
ETP-A-□	− 30 ~ 85
ETP-A-□-B	
ETP-A-□-C	
ETP-A-□-S	
ETP-A-□-R	

Concentricity and Balance

Model	Concentricity [mm]	Balance [g·mm/kg]
ETP-A-□	0.05	100
ETP-A-□-B		
ETP-A-□-C		
ETP-A-□-S		
ETP-A-□-R		

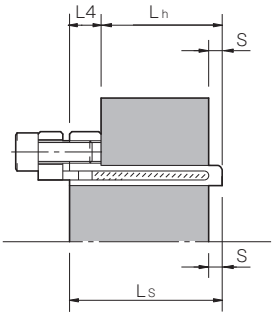
Keyway Shape where the ETP-CLASSIC Cannot Be Detached due to a Deformation of the Sleeve

The ETP-CLASSIC cannot be used if the shaft and hub have a keyway as shown in the figure below. Note that you can use the ETP-CLASSIC for the shaft and hub with a keyway if you completely fill the keyway with epoxy putty for metals and then shape it.



Allowable Range of Edge

The performance of the ETP-CLASSIC is based on the case where the shaft and the hub have the effect for the entire standard shaft length, Ls, and the entire standard hub length, Lh, respectively. Accordingly, make sure in the design phase that the shaft and the hub have the effect for the respective entire standard length. If the length of the shaft and hub is limited due to design reasons, make sure it is less than the dimension S in the figure below. If it exceeds the dimension S, stress concentrates on the sleeve edge and the sleeve is deformed, so there is the possibility that the ETP-CLASSIC cannot be detached.



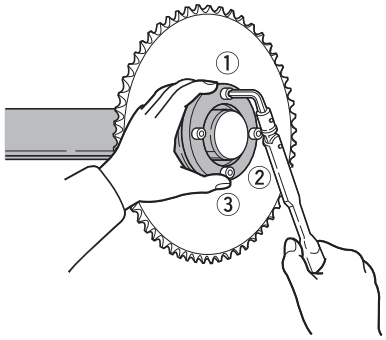
ETP-CLASSIC size	S [mm]
15	3
19	3.5
20	3.5
22	4
24	4
25	3.6
28	4.5
30	5
32	5
35	5.5
38	5.5
40	6
42	6
45	6.5
48	7
50	7
55	7.5
60	8
65	9
70	9.5
75	9.5
80	9.5
90	10.5
100	12.5

Mounting

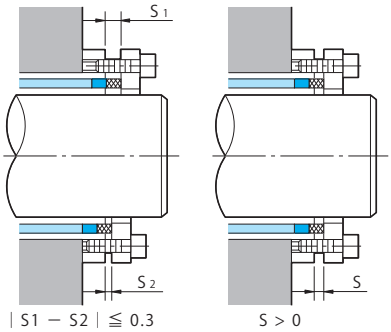
(1) Remove the rust, dust, oil, etc. off from the inner surface of the shaft and hub. Similarly, if any anti-rust oil, soiling, etc. remains on the surface of the ETP-CLASSIC, wipe it off with a cloth, etc.
In particular, never allow oil or grease containing antifriction or other agent (molybdenum-, silicon-, or fluorine-based), which would dramatically affect the friction coefficient, to contact the surface.

(2) Attach the ETP-CLASSIC to the hub and mount them to the shaft. If accurate positioning of the shaft and hub is needed, adjust the position of both before tightening the clamping bolts.
Never tighten the clamping bolts before mounting the ETP-CLASSIC to the shaft and hub.

(3) Gently put a hand on the ETP-CLASSIC and tighten the clamping bolts one by one by a half turn in order of (1), (2), and (3) as shown in the figure. Tighten the clamping bolts for the ETP-CLASSIC to the specified torque using a torque wrench. Do not tighten the clamping bolt to a torque greater than the specified torque and then loosen the clamping bolt to the specified tightening torque. The clamping bolts of the ETP-A-R are made of stainless steel. Stainless steel can gall easily. Slowly tighten the stainless steel bolts to prevent galling.



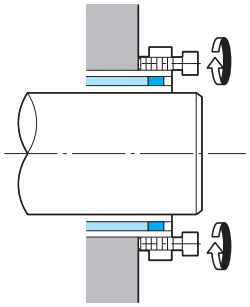
(4) When the mounting is finished, check to make sure the spacing between the flange and sleeve is uniform. If the flange and the sleeve are in close contact with each other, the ETP-CLASSIC may not be able to achieve its full performance. In this case, re-check the shaft and hub tolerances and the material.



Removal

(1) Before starting work, ensure safety by making sure no torque and thrust are applied to the ETP-CLASSIC and there is no risk of a fall due to the self-weight of the shaft and hub. The ETP-CLASSIC does not have a self-locking mechanism. The connecting force is instantaneously released by loosening the clamping bolts.

(2) The clamping bolts should only be loosened until the connecting force is released. Do not remove them. If for any reason the ETP-CLASSIC cannot be removed, remove all the clamping bolts, flange, and piston ring, and then remove the ETP-CLASSIC using the sleeve's tapped holes as removal screw holes.



ETP-H Models

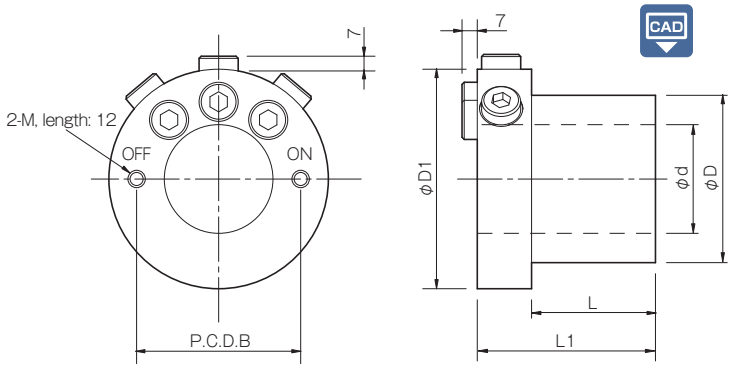
Made to order

Specifications

Model	Rated torque [N·m]						Rated thrust [N]						Moment of inertia [kg・m²]	Mass [kg]
	Oil pressure: 60 MPa		Oil pressure: 80 MPa		Oil pressure: 100 MPa		Oil pressure: 60 MPa		Oil pressure: 80 MPa		Oil pressure: 100 MPa			
	Shaft tol. h7	Shaft tol. h8	Shaft tol. h7	Shaft tol. h8	Shaft tol. h7	Shaft tol. h8	Shaft tol. h7	Shaft tol. h8	Shaft tol. h7	Shaft tol. h8	Shaft tol. h7	Shaft tol. h8		
ETP-H-50	800	800	1600	1400	2600	2400	30000	30000	55000	55000	70000	70000	3.2×10^{-3}	2.4
ETP-H-60	1100	1100	3300	3000	4600	4300	60000	60000	100000	100000	130000	130000	5.4×10^{-3}	3.1
ETP-H-70	2400	2400	5800	5300	7900	7400	100000	95000	150000	150000	210000	200000	8.7×10^{-3}	4.1
ETP-H-80	5600	5300	9000	8400	12100	11500	150000	135000	220000	210000	290000	280000	14×10^{-3}	5.4
ETP-H-90	8300	7400	12700	11800	17100	16200	185000	165000	285000	265000	380000	360000	23×10^{-3}	7
ETP-H-100	12100	11000	18200	17100	24200	23100	245000	220000	365000	340000	485000	460000	34×10^{-3}	8.6
ETP-H-110	16800	15400	24800	23500	32900	31500	305000	280000	450000	430000	595000	570000	51×10^{-3}	11
ETP-H-120	22300	20600	32700	31100	43200	41600	370000	345000	545000	520000	720000	690000	76×10^{-3}	14
ETP-H-130	27200	24900	40500	38100	53800	51400	420000	385000	620000	590000	825000	790000	110×10^{-3}	17
ETP-H-140	35600	32900	52300	49600	68900	66200	510000	470000	750000	710000	985000	945000	150×10^{-3}	21
ETP-H-150	44500	41400	65000	61900	85400	82300	595000	550000	870000	825000	1135000	1095000	210×10^{-3}	25
ETP-H-160	54800	51200	79500	76000	104000	100000	685000	640000	995000	950000	1305000	1260000	290×10^{-3}	30
ETP-H-180	80000	75000	115000	110000	150000	146000	890000	835000	1280000	1220000	1675000	1625000	500×10^{-3}	42
ETP-H-200	109000	103000	157000	151000	206000	200000	1090000	1030000	1570000	1510000	2060000	2000000	830×10^{-3}	56
ETP-H-220	144000	137000	209000	201000	273000	266000	1310000	1245000	1900000	1830000	2485000	2415000	1300×10^{-3}	73

* The maximum rated torque values are those when the thrust is zero and the maximum rated thrust values are those when the torque is zero.

Dimensions



CAD

How to Place an Order

ETP-H-□

Size

* Depending on your location and such, we may not be able to sell you our products. Please contact us for details.

Unit [mm]

Model	d	D	D1	L	L1	P.C.D.B	M
ETP-H-50	50	77	101	56	82	75	M8
ETP-H-60	60	89	113	64	90	86	M8
ETP-H-70	70	102	122	74	100	96	M8
ETP-H-80	80	115	135	84	110	107	M8
ETP-H-90	90	128	148	94	120	124	M12
ETP-H-100	100	140	160	104	130	140	M12
ETP-H-110	110	154	173	114	140	150	M12
ETP-H-120	120	168	186	124	150	160	M12
ETP-H-130	130	182	200	134	160	175	M16
ETP-H-140	140	196	213	144	170	185	M16
ETP-H-150	150	210	227	154	180	195	M16
ETP-H-160	160	224	240	164	190	205	M16
ETP-H-180	180	252	267	184	210	223	M16
ETP-H-200	200	280	293	204	230	247	M16
ETP-H-220	220	308	320	224	250	280	M16

* The port (for connecting the radial thrust hose) is G1/8.

Items Checked for Design Purposes

Torque and Thrust Coefficients

If torque and thrust are applied to the ETP-HYLOC at the same time, the rated values of both decrease. These values can be obtained based on the coefficients in the figure below.

Calculation example: When using the ETP-H-100.

Maximum rated torque, T, and thrust, F, at 20℃ ,
T = 24200 [N·m] and F = 485000 [N]
The maximum rated torque, Tmax, when the maximum thrust (Fmax = 290000 [N]) is applied can be obtained as follows.

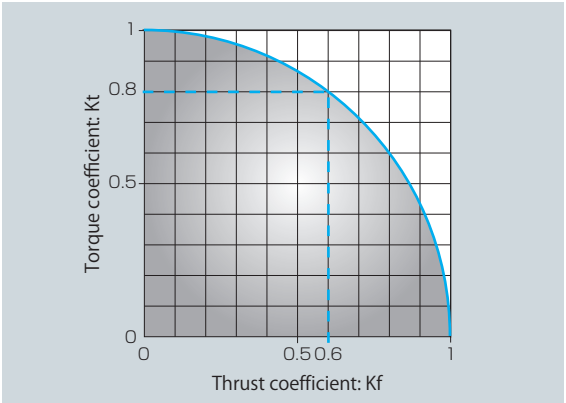
Thrust coefficient: Kf = Fmax / F
= 290000/485000 ≒ 0.6

The torque coefficient, Kt, when Kf ≒ 0.6 is about 0.8 based on the figure below. Accordingly, the maximum rated torque, Tmax, in this case is as follows.

Tmax = T × Kt = 24200 × 0.8 = 19360 [N·m]

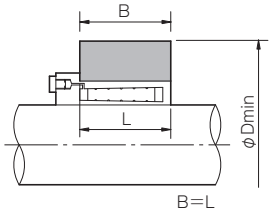
The relationship between Kt and Kf can be obtained with the following formula.

$$\sqrt{(Kt)^2 + (Kf)^2} = 1$$



Hub's Minimum External Diameters

If the stress applied to the hub is large, the hub may be deformed. Select the appropriate external diameter size from the hub's external diameters in the table below in the design phase.



ø Dmin, unit [mm]

Model	Material's yield stress [N/mm²]						
	Oil pressure: 60 MPa			Oil pressure: 80 MPa		Oil pressure: 100 MPa	
	> 200	> 300	> 400	> 300	> 400	> 300	> 400
ETP-H-50	90	90	90	95	90	110	105
ETP-H-60	115	105	95	120	110	140	125
ETP-H-70	135	120	110	140	125	170	145
ETP-H-80	155	140	130	165	140	200	160
ETP-H-90	180	160	145	185	160	235	180
ETP-H-100	200	170	160	210	180	270	200
ETP-H-110	220	195	180	235	195	295	220
ETP-H-120	240	215	195	255	215	320	240
ETP-H-130	260	230	210	275	230	350	260
ETP-H-140	285	250	225	295	250	375	280
ETP-H-150	300	265	240	315	265	400	300
ETP-H-160	320	285	260	335	285	425	320
ETP-H-180	360	320	290	375	320	480	360
ETP-H-200	400	355	320	420	355	535	400
ETP-H-220	440	390	355	460	390	585	435

ETP-H Model

Items Checked for Design Purposes

Mounting Shaft Tolerance, Mounting Hub Tolerance, and Surface Roughness

Model	Mounting shaft tolerance	Mounting hub tolerance	Surface roughness
ETP-H	h7 or h8	H7	25S (center line's average roughness 6.3a) or less

* Note that the maximum rated torque and the maximum rated thrust vary depending on the mounting shaft tolerance.

Operating Temperature Range

Model	Operating temperature range [° C]
ETP-H	− 40 ～ 150

Number of Attachments and Detachments

Model	No. of attachments/detachments
ETP-H	2000

Concentricity and Balance

Model	Concentricity [mm]	Balance [g·mm/kg]
ETP-H	0.02	75

* If a steel plug is attached in the radial direction, the unbalance amount increases for size 100 or more.

Recommended Hydraulic Pump

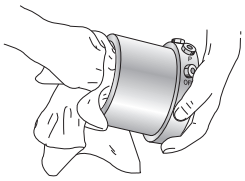
To attach and detach the ETP-HYLOC, you need a pump capable of applying pressure of up to about 150 MPa and a hose that can withstand that pressure. Hand Pump (H-11) that meets these requirements is available (made to order). The Hand Pump (H-11) includes a 3 m-long hose that can be mounted directly.
In addition, Quick Connection (Type 02) is also available for applications where the hose is attached and detached frequently.

■ Hand Pump (H-11)

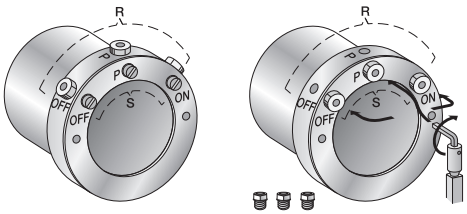
■ Quick Connection (Type 02)

Mounting

(1) Remove the rust, dust, oil, etc. off from the inner surface of the shaft and hub. Similarly, if any anti-rust oil, soiling, etc. remains on the surface of the ETP-HYLOC, wipe it off with a cloth, etc.
In particular, never allow oil or grease containing antifriction or other agent (molybdenum-, silicon-, or fluorine-based), which would dramatically affect the friction coefficient, to contact the surface.

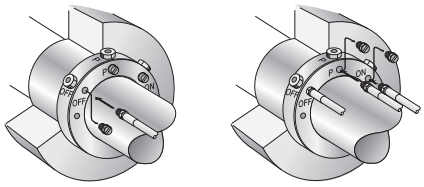


(2) The ETP-HYLOC is delivered with a plastic plug attached to it in the thrust direction (S). If you use it in the radial direction (R), remove 3 steel plugs and cover the thrust (S) port with a steel plug. (The width across the flat of the steel plug is 5 mm.)



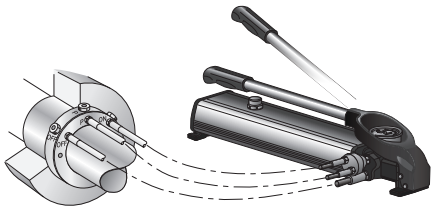
Then, mount the ETP-HYLOC to the shaft and hub.

(3) Remove the plastic plug from the OFF port and connect the pump's return hose ②.
Remove the plastic plug from the ON/P port and connect the pump's pressure hose ①.

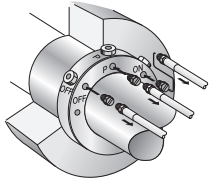


Never apply pressure before the ETP-HYLOC is mounted to the shaft and hub.

(4) Before applying pressure, check to make sure unused ports are covered by steel plugs. When the specified pressure is reached, keep the state for about 5 to 10 seconds. The specified pressure is 100 MPa.

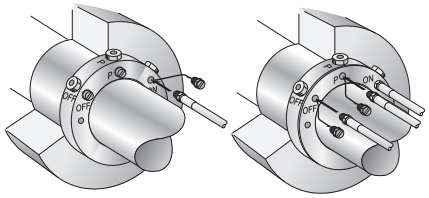


(5) Remove the hose from the ETP-HYLOC. Before removing it, open the pump's valve to relieve pressure from the pump.
After removing the hose, attach the plastic plug to prevent dust from entering inside the ETP-HYLOC.



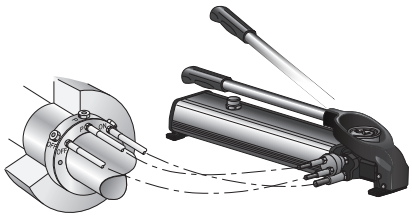
Removal

(1) Remove the plastic plug from the ON port and connect the pump's return hose ②.
Remove the plastic plug from the OFF/P port and connect the pump's pressure hose ①.

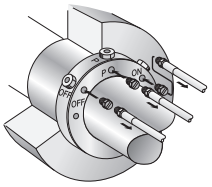


If the return hose is not connected to the ON port, the oil inside may spew out.

(2) Before applying pressure, check to make sure that unused ports are covered by steel plugs. When the specified pressure is reached, keep the state for about 10 seconds. (Check the pressure gage.) When the tapered piston moves, the pressure begins to decrease. Apply pressure slowly with the pump until the pressure begins to start to increase again. At this point, the ETP-HYLOC is completely released. The allowable pressure for removal is 120 MPa.

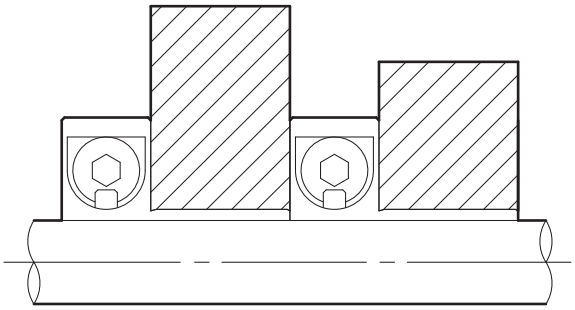


(3) Remove the hose from the ETP-HYLOC. Before removing it, open the pump's valve to relieve pressure from the pump.
After removing the hose, attach the plastic plug to prevent dust from entering inside the ETP-HYLOC.

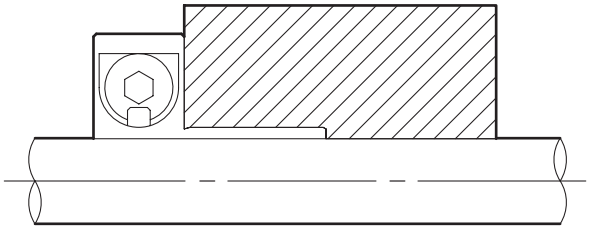


Mounting Example

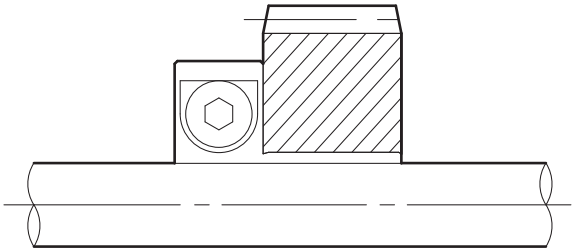
Connection with a Cam, Etc. (Phase Matching)
■ ETP-T



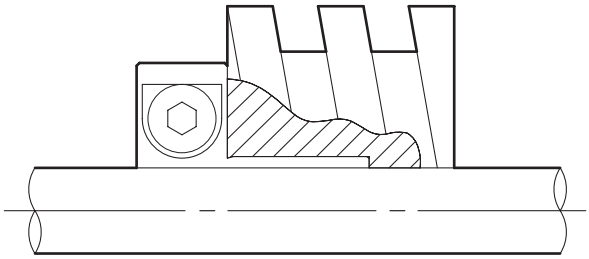
Connection with a Roller of a Printing Machinery
■ ETP-T



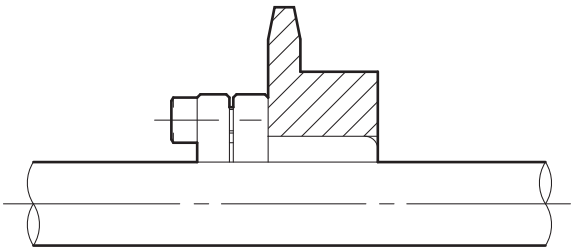
Connection with a Timing Gear
■ ETP-E



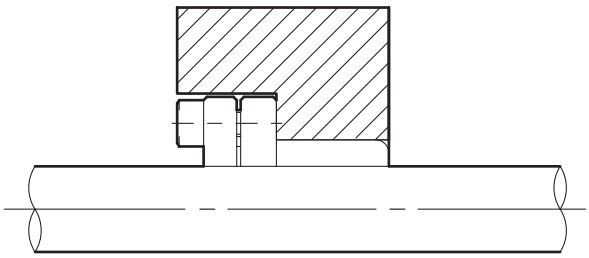
Connection with a Rotor
■ ETP-E



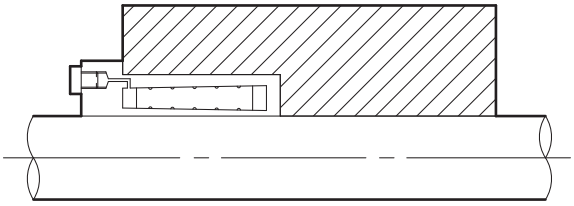
Connection with a Sprocket
■ ETP-A



Drilling a Stepped Hole in the Hub for Connection
■ ETP-A



Connection with a Rolling Roller
■ ETP-H



Torque Wrenches

ETP-E N, ETP-E C

Nominal diameter	Tightening torque [N・m]	Torque wrench (Single-function)	Hexagonal head	Applicable size
M10	7.0	N12SPCK × 7.0N・m	25HCK 5mm	015 ～ 035
M16	24.0	N25SPCK × 24.0N・m	25HCK 8mm	038 ～ 060
M20	40.0	N50SPCK × 40.0N・m	50HCK 10mm	070 ～ 100

ETP-T, ETP-T C

Nominal diameter	Tightening torque [N・m]	Torque wrench (Single-function)	Hexagonal head	Applicable size
M12	12.0	N25SPCK × 12.0N・m	25HCK 6mm	15 ～ 20
M14	16.0	N25SPCK × 16.0N・m	25HCK 6mm	24 ～ 35
M16	24.0	N50SPCK × 24.0N・m	50HCK 8mm	40 ～ 50
M20	40.0	N50SPCK × 40.0N・m	50HCK 10mm	60 ～ 80
M22	60.0	N100SPCK × 60.0N・m	100HCK 10mm	90
M24	80.0	N100SPCK × 80.0N・m	100HCK 12mm	100

ETP-A, ETP-A C, ETP-A S

Nominal diameter	Tightening torque [N・m]	Torque wrench (Single-function)	Hexagonal head	Applicable size
M5	6.0	N6SPCK × 6.0N・m	25HCK 4mm	15
M5	8.0	N12SPCK × 8.0N・m	25HCK 4mm	19 ～ 42
M6	13.0	N25SPCK × 13.0N・m	25HCK 5mm	45 ～ 65
M8	32.0	N50SPCK × 32.0N・m	50HCK 6mm	70 ～ 100

ETP-A B

Nominal diameter	Tightening torque [N・m]	Torque wrench (Single-function)	Wrench attachment	Applicable size
M5	6.0	N6SPCK × 6.0N・m	25SCK 8mm	15
M5	8.0	N12SPCK × 8.0N・m	25SCK 8mm	19 ～ 42
M6	13.0	N25SPCK × 13.0N・m	25SCK 10mm	45 ～ 65
M8	32.0	N50SPCK × 32.0N・m	50SCK 13mm	70 ～ 100

ETP-A R

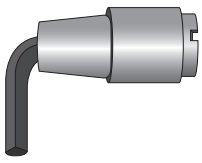
Nominal diameter	Tightening torque [N・m]	Torque wrench (Single-function)	Wrench attachment	Applicable size
M5	4.5	N6SPCK × 4.5N・m	25SCK 8mm	15 ～ 40
M6	7.8	N12SPCK × 7.8N・m	25SCK 10mm	45 ～ 50

Torque Wrench (Single-function)

■ N-SPCK

Hexagonal Head

■ HCK

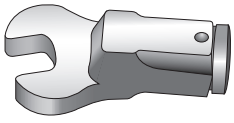


Torque Wrench (Preset Type)

■ N-LCK

Wrench Attachment

■ SCK



* The above torque wrench and wrench attachment models are those of Nakamura Mfg. Co., Ltd.

PSL-K, PSL-K C

Nominal diameter	Tightening torque [N ·m]	Torque wrench (Single-function)	Hexagonal head	Applicable size
M4	2.0	N6SPCK × 2.0N ·m	25HCK 3mm	6 ~ 7
M4	4.0	N6SPCK × 4.0N ·m	25HCK 3mm	8 ~ 14
M5	8.0	N12SPCK × 8.0N ·m	25HCK 4mm	15 ~ 25
M6	14.0	N25SPCK × 14.0N ·m	25HCK 5mm	28 ~ 42

PSL-K B

Nominal diameter	Tightening torque [N ·m]	Torque wrench (Single-function)	Wrench attachment	Applicable size
M4	2.0	N6SPCK × 2.0N ·m	25SCK 7mm	6 ~ 7
M4	4.0	N6SPCK × 4.0N ·m	25SCK 7mm	8 ~ 14
M5	8.0	N12SPCK × 8.0N ·m	25SCK 8mm	15 ~ 25
M6	14.0	N25SPCK × 14.0N ·m	25SCK 10mm	28 ~ 42

PSL-K F

Nominal diameter	Tightening torque [N ·m]	Torque wrench (Single-function)	Hexagonal head	Applicable size
M4	2.0	N6SPCK × 2.0N ·m	25HCK 3mm	6 ~ 7
M4	3.5	N6SPCK × 3.5N ·m	25HCK 3mm	8 ~ 14
M5	7.0	N12SPCK × 7.0N ·m	25HCK 4mm	15 ~ 25
M6	12.0	N25SPCK × 12.0N ·m	25HCK 5mm	28 ~ 35

PSL-G, PSL-G C

Nominal diameter	Tightening torque [N ·m]	Torque wrench (Preset type)	Hexagonal head	Applicable size
M6	17.0	N25LCK	25HCK 5mm	19 ~ 40
M8	41.0	N50LCK	50HCK 6mm	42 ~ 65
M10	82.0	N100LCK	100HCK 8mm	70 ~ 95
M12	142.0	N200LCK	200HCK 10mm	100 ~ 120

PSL-D, PSL-D C

Nominal diameter	Tightening torque [N ·m]	Torque wrench (Single-function)	Hexagonal head	Applicable size
M2.5	1.0	N6SPCK × 1.0N ·m	25HCK 2mm	6 ~ 12
M3	2.0	N6SPCK × 2.0N ·m	25HCK 2.5mm	14 ~ 15
M4	4.0	N6SPCK × 4.0N ·m	25HCK 3mm	16 ~ 19
M5	8.0	N12SPCK × 8.0N ·m	25HCK 4mm	20 ~ 22
M6	14.0	N25SPCK × 14.0N ·m	25HCK 5mm	24 ~ 40
M8	34.0	N50SPCK × 34.0N ·m	50HCK 6mm	42 ~ 50