

## TOOTH CLUTCHES

Our clutches and brakes used in various equipment including industrial equipment, information equipment and recreation facilities play an important part in automation or motion control systems.



For safe and reliable operation, it is essential to read the user's manual carefully before using this equipment.

We have a new slogan in Japan; "ECOing" a combination of "eco" and "ing". This is to promote eco-friendly technological development and manufacturing. Our ecological activities are of course not limited to Japan and practiced in many countries around the world.

SINFONIA TECHNOLOGY CO., LTD. continually upgrades and improves its products. Actual features and specifications may therefore differ slightly from those described in this catalog.

Formerly SHINKO ELECTRIC CO., LTD.

 **SINFONIA** SINFONIA TECHNOLOGY CO., LTD.

Shiba NBF Tower, 1-30, Shiba-daimon 1-chome, Minato-ku, Tokyo, 105-8564, Japan  
TEL +81-3-5473-1826 FAX +81-3-5473-1845

**SINFONIA TECHNOLOGY (SINGAPORE) PTE. LTD.**

96 Robinson Road, #13-02 SIF Building, Singapore 068899  
TEL +65-6223-6122 FAX +65-6225-2729

**PT. SINFONIA TECHNOLOGY INDONESIA**

Graha Paramita 8th Floor Suite E Jl. Denpasar Raya Block D2 KAV. 8 Kuningan, Jakarta 12940, Indonesia  
TEL: 021-252-3606 (hunting) FAX: 021-252-3608

**SINFONIA TECHNOLOGY (SHANGHAI) CO., LTD.**

Room3006, Building B Far East International Plaza, No 317, Xian Xia Road, Changning District, Shanghai, China  
Zip Code:200051  
TEL +86-21-6275-0606 FAX +86-21-3209-8975

CODE <http://www.sinfo-t.jp>

E74-120

# Tooth Clutches Tooth Series

A claw electromagnetic clutch which transmits torque by a direct linkage of the tooth plane. In addition to the characteristics usually found in a claw electromagnetic clutch (small, high torque and correct transmission), our unique tooth plane and tooth profile delivers incomparable transmission and disengagement characteristics. Additionally, with our unique tooth plane structure, we are able to create a "single position" clutch that mates only at one point on the circumference to enable correct, fixed position engagement and motion.

## Features

### 1. Large torque transmission with a small body

Small and high torque are both possible due to the claw tooth mating.



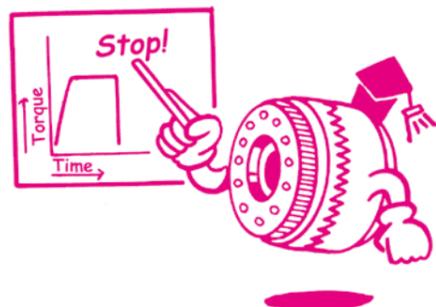
### 2. Torque transmission with no slippage

Correct operation which never slips during torque transmission.



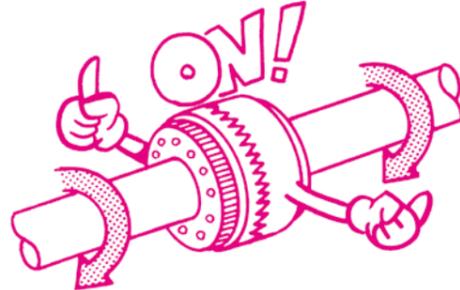
### 3. Zero drag torque

Driving and load are completely separated when the power is cut off with no dragging.



### 4. Can connect even during rotation

Depending on the usage condition, it is possible to engage even during (relative) rotation.



### 5. Fixed position connection and synchronous operation

This single position clutch does not change its relative position after repeated connections and disconnections, so it is always connected at the proper position.

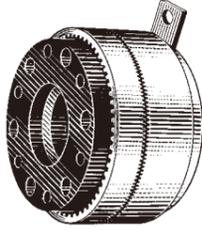
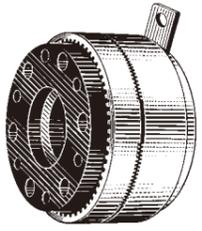


### 6. It can be used both wet and dry

Depending on the location and the purpose, it is possible to operate this clutch both wet and dry.



## List of Models

Type	Clutch		
	TZ Ball bearing attachment type	TO Coil static type	TR Coil rotation type
Appearance			
Type	Single-position clutch		
	STZ Ball bearing attachment type	SPO Coil static single-position type	
Appearance			

## Indication of Type

# TO-80

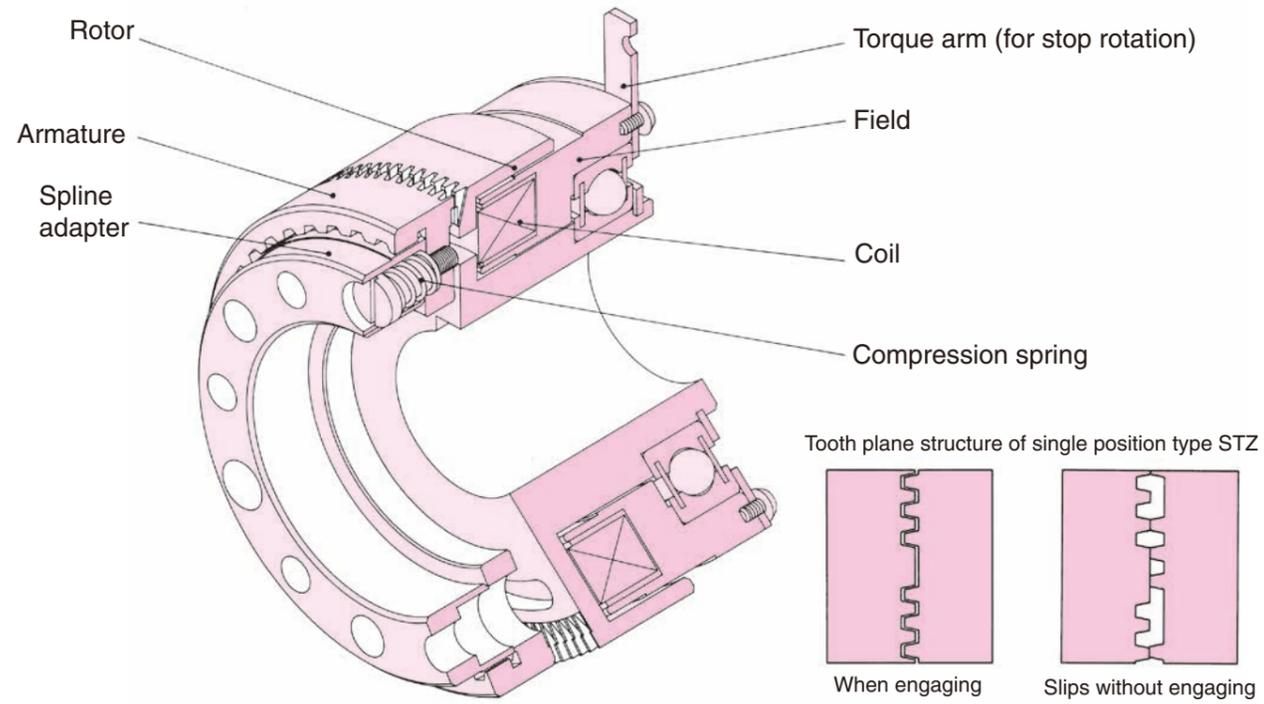
Nominal number

### Model symbol

- TZ : Ball bearing attachment type clutch
- TO : Coil static type clutch
- TR : Coil rotation type clutch
- STZ : Ball bearing attachment type clutch
- SPO : Coil static single-position type clutch

# Structure

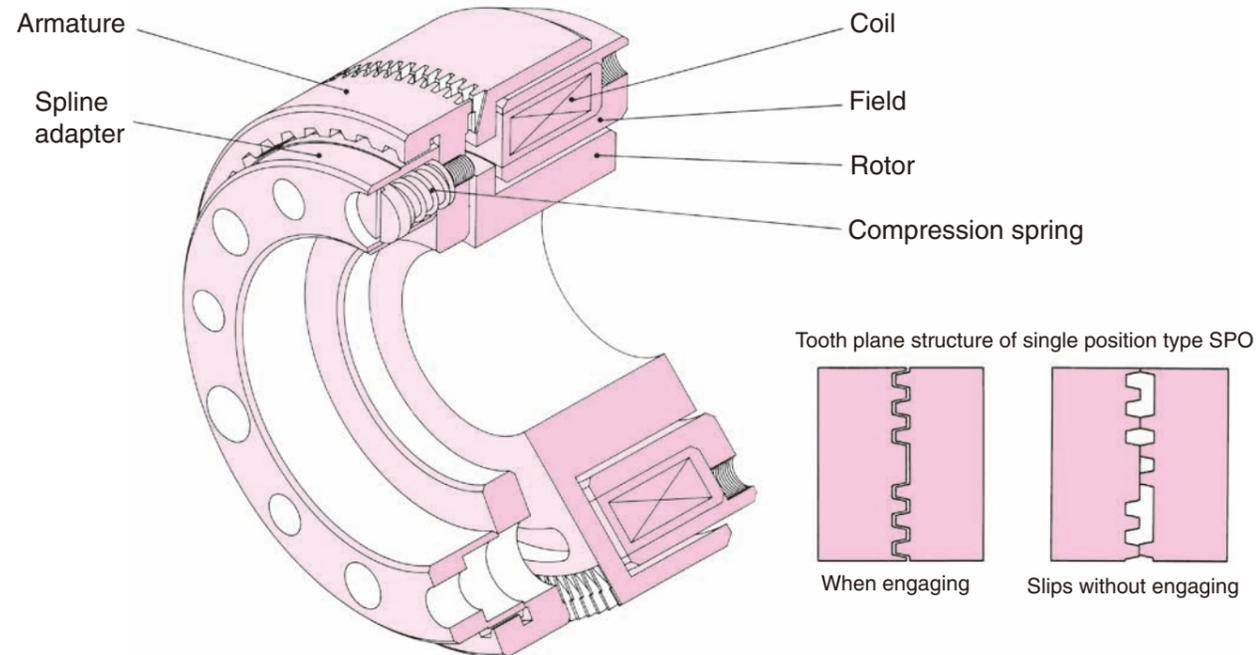
## Clutch



\* This figure is for TZ type (bearing attachment type).

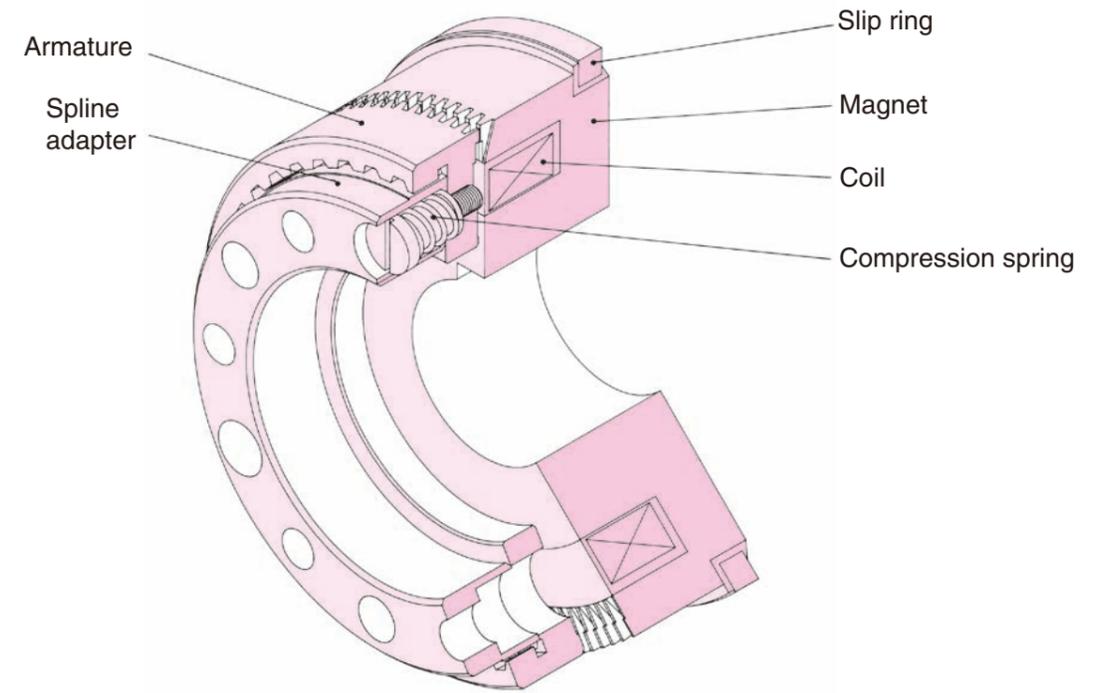
Some are made to order.

## Clutch



\*This figure is for TO type (coil static type).

## Clutch



\* This figure is for TP type (coil rotation type).

Some are made to order.

# Selection Guide

## 1. About selection of torque capacity

As the rotation speed increases, the transmission torque lowers by the influences such as vibration of the machine (refer to the torque reduction rate on page 6). Therefore, when selecting torque capacity, reduction is compensated to obtain the required transmission torque based on the rotation speed in use and the torque reduction curve.

The torque calculated here is to be the required torque capacity, and the final required torque capacity is determined by treating this with a safety factor (2 or higher).

For example, in a case where the required transmission torque is 100Nm, the rotation speed is 300r/min, 60% of the torque is transmitted from the torque reduction rate table, that is,  $100\text{Nm} \times 100/60 = 167\text{Nm}$ . This multiplied by the safety factor 2 equals 334Nm, which is required for the capacity, that is, TO-40 type is required.

## 2. Engagement limit when relative rotation

Tooth clutches can be engaged in a state with relative rotation, however, in such a case, the engagement limit of a tooth clutch is restrained by the relative rotation speed, load inertia moment J, and load torque, and will be as shown in Figure 1. If your usage condition is in the area with broken lines in the figure (2 – 80 type and at relative rotation speed of 30r/min or more), please clearly specify your usage condition and consult with us beforehand. Static engagement is basically used for the 280 type and higher. And a single position type (SPO type) may be used for a case exceeding the engagement limit in the above figure, so please contact us.

## 3. About engagement limit of static engagement use

At the time of static engagement use, there is a case where tooth planes completely engage and a case where tooth planes incompletely engage. In a case of incomplete engagement, the tooth may slip without engagement when the accelerating torque is large on the drive side during start-up. In such a case, the motor must be started by specific methods such as kuza start, star-delta starting, start compensation, and reactor starting to restrain the accelerating torque.

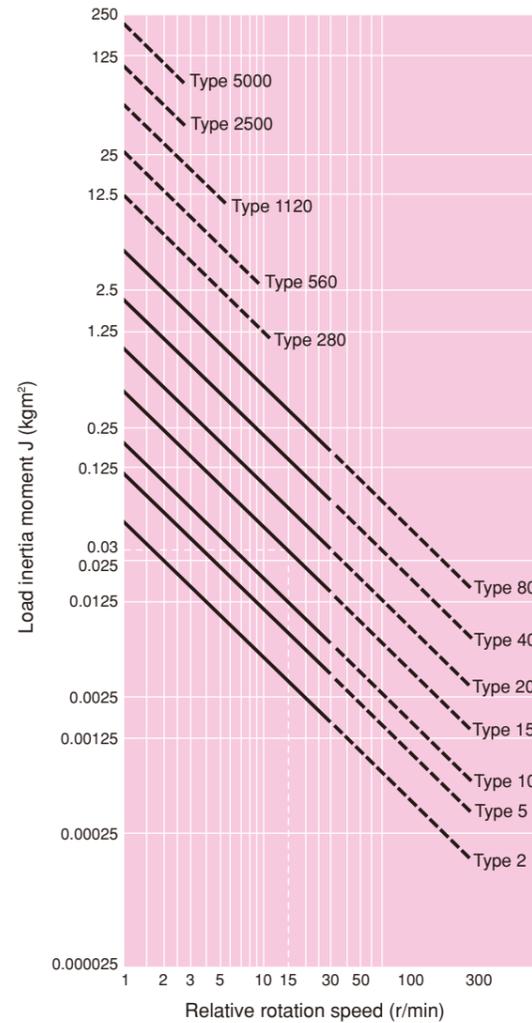
## 4. Cautions for tooth plane torque of single position type

A single position type slips until it comes to the engagement point owing to its tooth plane structure, and while slipping, slipping generates tooth plane torque and dragging may occur on the load side. In such a case, it is necessary to prevent dragging by using the brake. The size of the tooth plane torque is 15% or less of the rated torque.

## 5. About restriction of load torque when clutch release

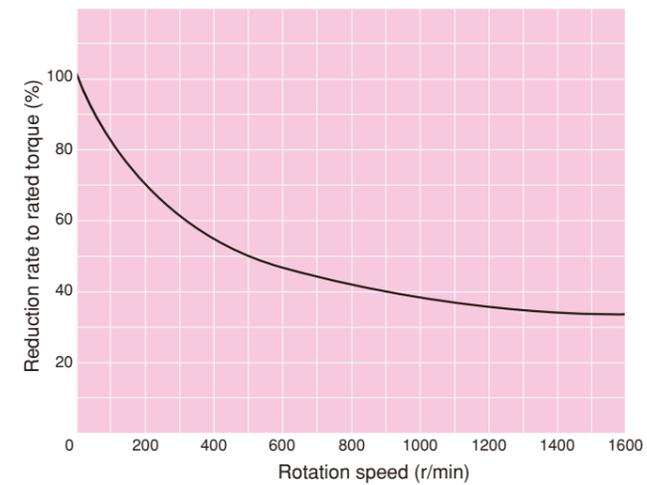
Because of the tooth characteristics, the tooth clutch cannot let out if a certain amount of load torque or more acts when releasing. The releasable torque is 20% or less of the rated torque.

Figure 1



# Characteristics

## 1. Torque reduction rate



## 2. Operating Characteristics

### TZ/STZ

Nominal Number	6.3	10	16	25	40	160
Coil time constant t (ms)	25	60	65	95	135	350
Armature pull-in time ta (ms)	70	120	130	140	150	320
Armature release time tar (ms)	30	50	60	70	80	340

### TO/SPO

Nominal Number	2	5	10	15	20	40	80
Coil time constant t (ms)	10	25	40	50	120	150	180
Armature pull-in time ta (ms)	50	60	60	100	120	140	250
Armature release time tar (ms)	40	60	80	100	120	140	250

### TR

Nominal Number	2	5	10	15	20	40	80
Coil time constant t (ms)	20	40	40	70	120	180	200
Armature pull-in time ta (ms)	50	60	60	100	120	140	250
Armature release time tar (ms)	40	60	80	100	120	140	250

Nominal Number	280	560	1120	2500	5000
Coil time constant t (ms)	330	340	500	1840	3370
Armature pull-in time ta (ms)	280	300	600	600	1300
Armature release time tar (ms)	300	350	700	2500	2700

## 3. Maximum rotation speed / Inertia moment J

### TZ/STZ

Type	Max speed (r/min)	J (kgm²)	
		Rotor	Armature
TZ/STZ-6.3	5200	$5.00 \times 10^{-4}$	$5.00 \times 10^{-4}$
TZ/STZ-10	4500	$7.50 \times 10^{-4}$	$7.50 \times 10^{-4}$
TZ/STZ-16	3800	$1.25 \times 10^{-3}$	$1.50 \times 10^{-3}$
TZ/STZ-25	3300	$2.60 \times 10^{-3}$	$3.25 \times 10^{-3}$
TZ/STZ-40	2800	$5.00 \times 10^{-3}$	$7.00 \times 10^{-3}$
TZ/STZ-160	2000	$6.30 \times 10^{-2}$	$5.00 \times 10^{-2}$

### TO/SPO

Type	Max speed (r/min)	J (kgm²)	
		Rotor	Armature
TO/SPO-2	7300	$5.00 \times 10^{-5}$	$5.00 \times 10^{-5}$
TO/SPO-5	5200	$2.50 \times 10^{-4}$	$5.00 \times 10^{-4}$
TO/SPO-10	4500	$5.00 \times 10^{-4}$	$7.50 \times 10^{-4}$
TO/SPO-15	3800	$1.00 \times 10^{-3}$	$1.50 \times 10^{-3}$
TO/SPO-20	3300	$2.25 \times 10^{-3}$	$3.25 \times 10^{-3}$
TO/SPO-40	2800	$4.75 \times 10^{-3}$	$7.00 \times 10^{-3}$
TO/SPO-80	2400	$1.10 \times 10^{-2}$	$1.70 \times 10^{-2}$

### TR

Type	Max speed (r/min)	J (kgm²)	
		Magnet body	Armature
TR-2	7300	$5.00 \times 10^{-5}$	$5.00 \times 10^{-5}$
TR-5	5200	$5.00 \times 10^{-4}$	$5.00 \times 10^{-4}$
TR-10	4500	$1.00 \times 10^{-3}$	$7.50 \times 10^{-4}$
TR-15	3800	$2.00 \times 10^{-3}$	$1.50 \times 10^{-3}$
TR-20	3300	$4.75 \times 10^{-3}$	$3.25 \times 10^{-3}$
TR-40	2800	$1.05 \times 10^{-2}$	$7.00 \times 10^{-3}$
TR-80	2400	$2.45 \times 10^{-2}$	$1.70 \times 10^{-2}$
TR-280	2000	$5.75 \times 10^{-2}$	$4.25 \times 10^{-2}$
TR-560	1750	$1.30 \times 10^{-1}$	$8.50 \times 10^{-2}$
TR-1120	1250	$4.45 \times 10^{-1}$	$2.85 \times 10^{-1}$
TR-2500	1000	3.400	1.250
TR-5000	700	11.65	4.325

# Cautions for handling

## Installation precautions

(1) Make sure to fix securely in the axial direction in order to keep the attachment clearance g the value specified in the following table in a non-excitation state.

### TO, TR, SPO

Bearing No.	2	5	10	15	20	40
Attachment clearance g	0.2 <sup>+0.1</sup> <sub>0</sub>	0.3 <sup>+0.2</sup> <sub>0</sub>	0.2 <sup>+0.2</sup> <sub>0</sub>	0.4 <sup>+0.3</sup> <sub>0</sub>	0.4 <sup>+0.3</sup> <sub>0</sub>	0.4 <sup>+0.3</sup> <sub>0</sub>
Bearing No.	80	280	560	1120	2500	5000
Attachment clearance g	0.5 <sup>+0.3</sup> <sub>0</sub>	0.8 <sup>+0.3</sup> <sub>0</sub>	0.8 <sup>+0.3</sup> <sub>0</sub>	0.9 <sup>+0.3</sup> <sub>0</sub>	1.5 <sup>+0.5</sup> <sub>0</sub>	2.0 <sup>+0.5</sup> <sub>0</sub>

Unit: mm

### TZ, STZ

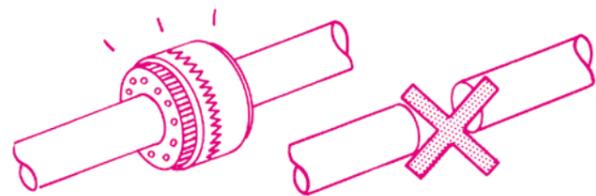
Bearing No.	6.3	10	16	25	40	160
Attachment clearance g	0.3 <sup>+0.1</sup> <sub>0</sub>	0.3 <sup>+0.1</sup> <sub>0</sub>	0.4 <sup>+0.1</sup> <sub>0</sub>	0.4 <sup>+0.1</sup> <sub>0</sub>	0.4 <sup>+0.1</sup> <sub>0</sub>	0.8 <sup>+0.3</sup> <sub>0</sub>

Unit: mm

(2) Position the rotor (or the magnet body) and the armature with a collar of nonmagnetic materials (such as brass and stainless steel).

(3) The recommended tolerance of the attachment shaft is H7 · j6 or H7 · k6.

(4) Use a through shaft type of clutch whenever possible. If a split shaft type is to be used, please consult with us beforehand.



(5) Attach the field within the concentricity 0.10 T.I.R to the rotor attachment shaft.

(6) Use bolts to be attached to the field at a length not exceeding the maximum screwing depth of the field.

(7) Apply LOCKTITE, etc., to the attachment bolt of the spline adapter, in order to prevent loosening.

(8) Holes are made beforehand on the spline adapter for pin attachment. Finish them with a reamer to match the actual pin and always use pins together. H7, m6 is recommended for fitting of the pins.

(9) When using a dry type, it is recommended to apply grease thinly to the spline when mounting to smoothen the sliding surfaces of the spline adapter and the armature.



(10) When using a large type clutch, it is recommended to use a coupling for impact absorption to avoid impact as much as possible.

(11) TZ-160 type and STZ-160 type are for wet operation, therefore use them with the shaft core lubrication method.



**Design so as to install a cover to the power supply part of the TR type.**

Since the power supply part (terminal block, slip ring, brush, etc.) are exposed to exterior, and if hands, fingers, etc., come into contact, an electric shock may occur. Do not directly touch not only during operation but also during maintenance and inspection, and also design so as to install a protective cover, etc.

## When using in an oil bath

### (1) Purification of lubrication oil

Pay sufficient attention to purification of the lubrication oil. Attach a magnet plug, etc., on the bottom of the oil bath or the gear box storing the clutch/brake so that fine iron powder such as gear friction powder in the oil does not float. It is necessary to use a suction strainer (about 70~150 mesh) and a magnet plug and a filter together. If contamination of the lubrication oil becomes heavier during operation, or if the amount of sediment becomes larger, filter the oil or replace the oil. Always use the same brand of oil as the currently used oil for replacement.

### (2) Temperature control of lubrication oil

Keep the oil temperature at 60°C or less in a normal operating state. If the temperature increases, thoroughly examine the heat dissipation structure of the gear box or the oil tank, and attach a fan, etc., for forcible air cooling or an oil cooler, etc., to secure a sufficient cooling effect. And in the case of an oil bath, the temperature rise may be excessive owing to oil agitation and loss, etc., so special attention must be paid. If the size of the storing part of the clutch or the brake is small, provide an air vent.

### (3) Replacement period of lubrication oil (reference)

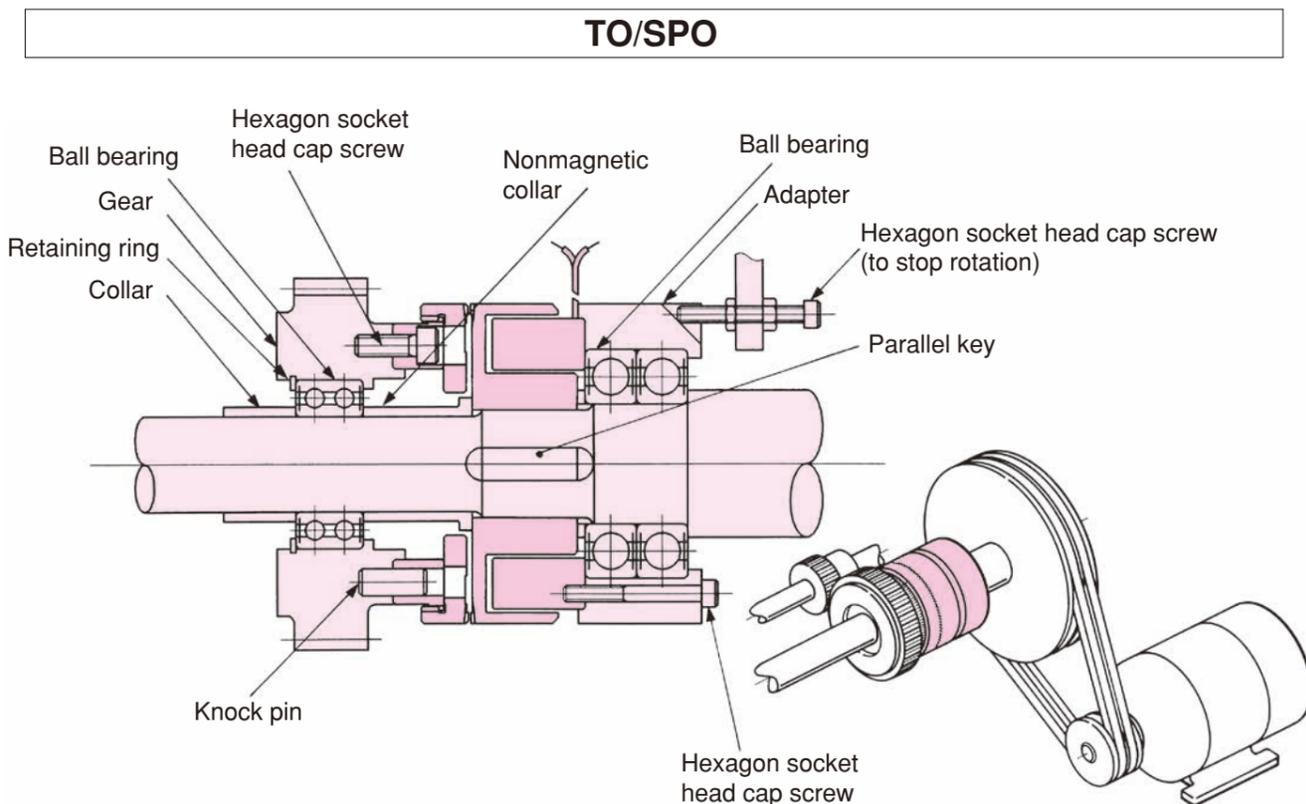
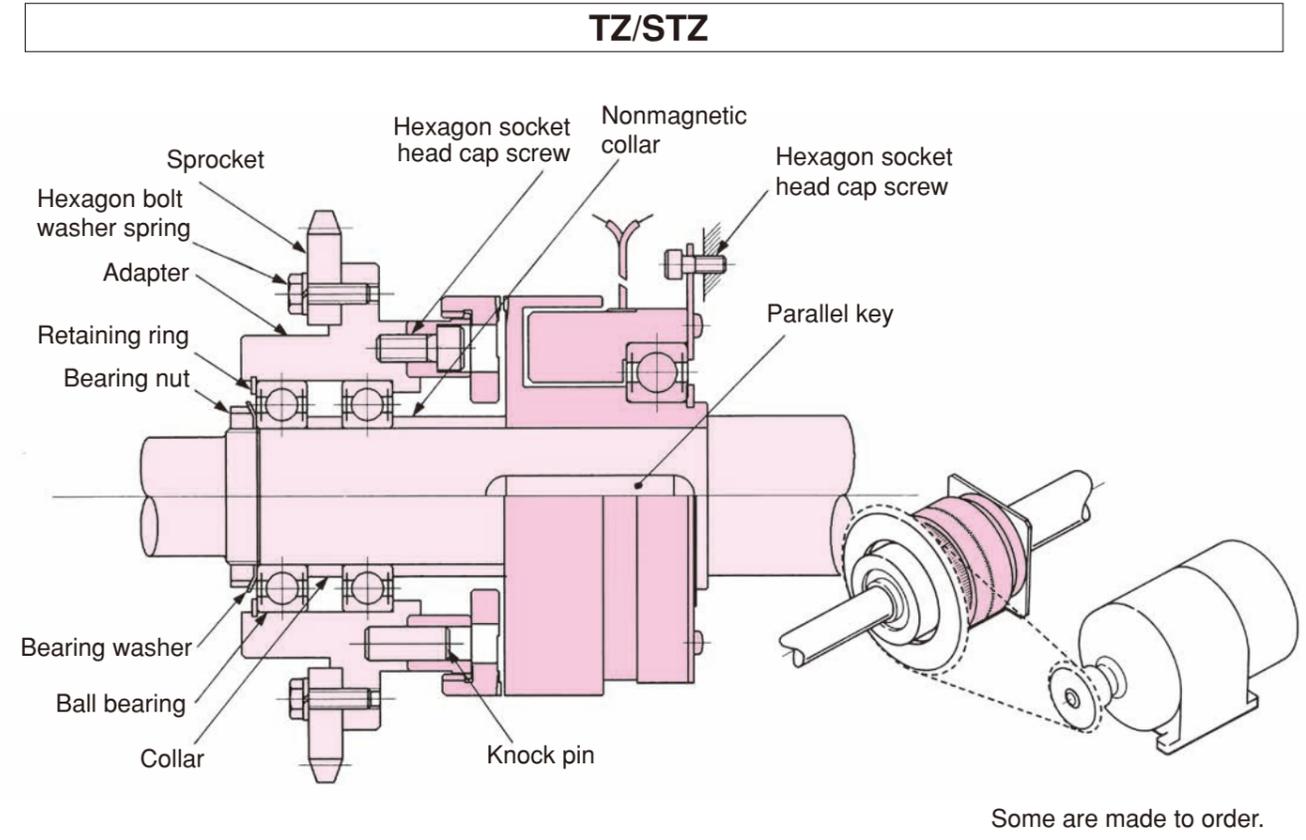
It is recommended to replace the lubrication oil at the replacement time shown in the table below. Also pay sufficient attention at inspection of the magnet plug and the filter used in order to purify the lubrication oil. Always use the same brand of oil for replacement.

Number of replacements	Replacement time
1st time	After 1 week or 70 hours of operation
2nd time	After 1 month or 250 hours of operation
3rd time and after	After 4 months or 1000 hours of operation

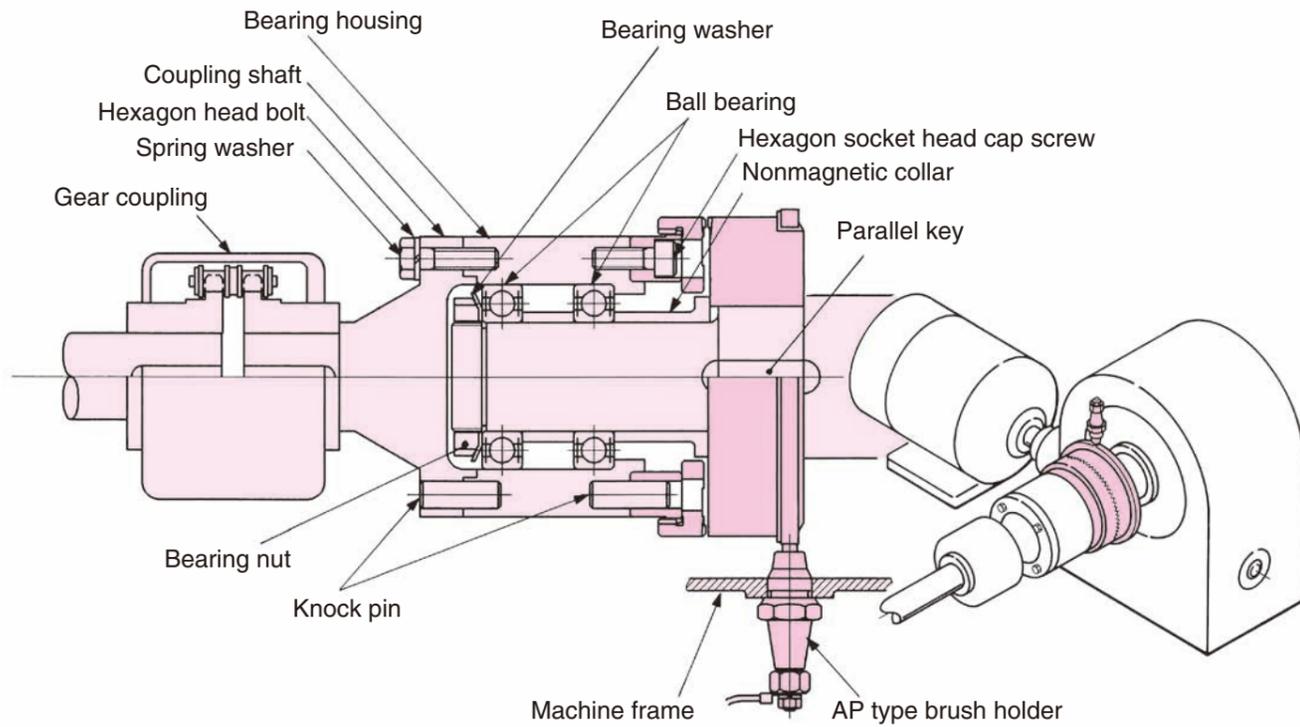
### (4) Limit of immersion in lubrication oil

Immerse the clutch at 1/2 of its diameter or less in the lubrication oil. Immersing more than 1/2 of the diameter in the oil is unfavorable because of temperature rise.

# Installation Example

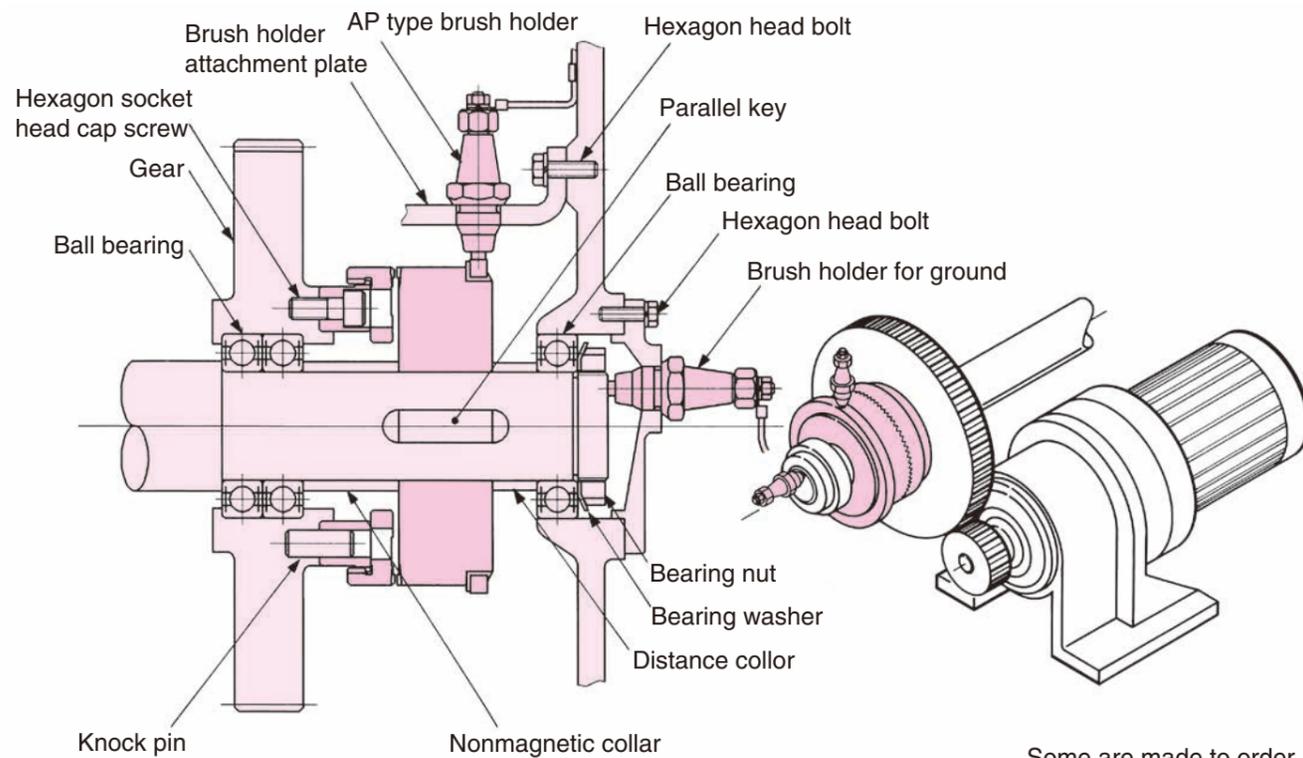


TR



Some are made to order.

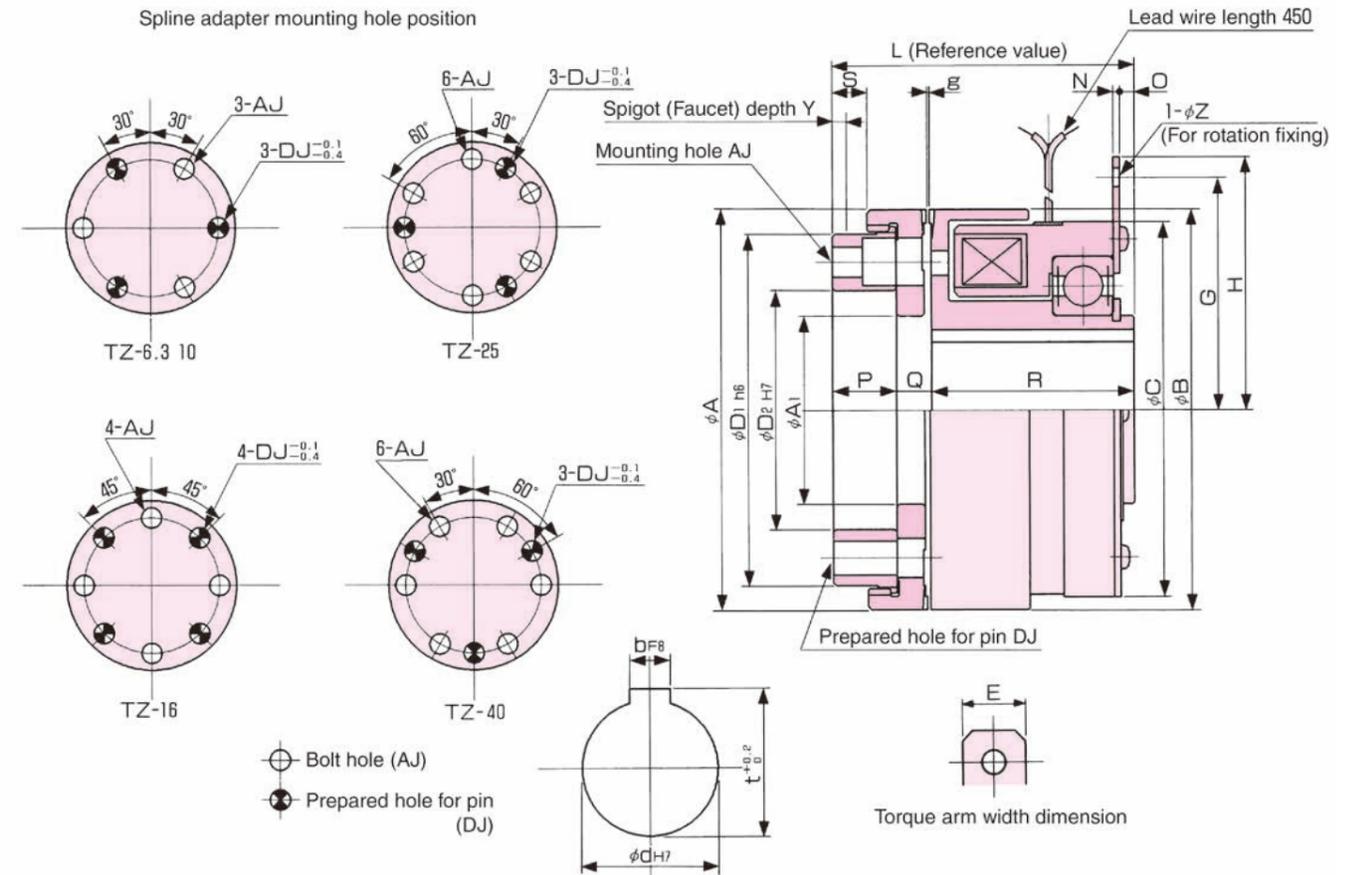
TR



Some are made to order.

### TZ-6.3, 10, 16, 25, 40 Ball bearing attachment clutch

Model	Rated torque(Nm)	Rated voltage(DC-V)	Power consumption at 75°C(W)	Mass(kg)
TZ-6.3	63	24	24	1.5
TZ-10	100	24	24	2.1
TZ-16	160	24	30	3.3
TZ-25	250	24	45	4.8
TZ-40	400	24	50	8.5



Unit: mm

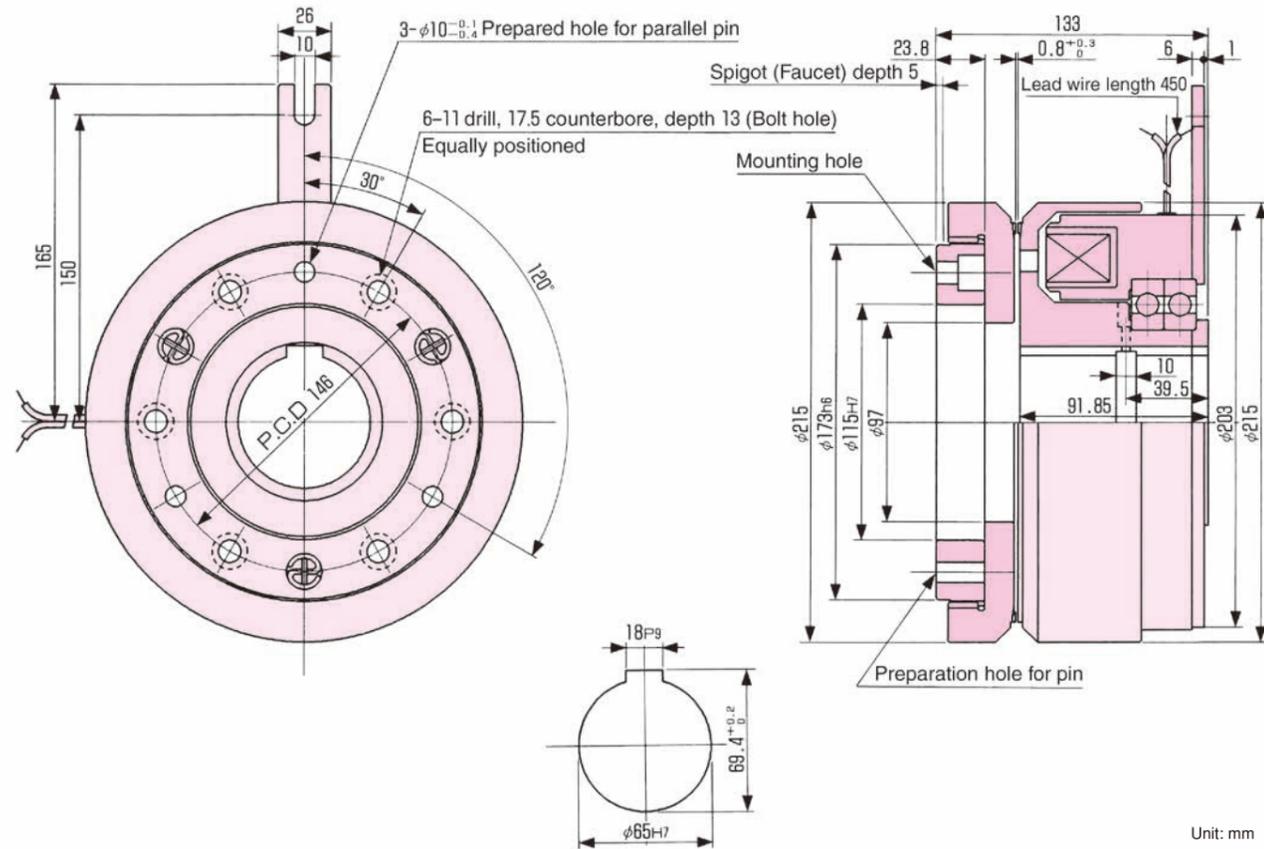
Model	Diameter direction							Shaft direction							Mounting			Shaft hole							
	A	A <sub>1</sub>	B	C	D <sub>1</sub>	D <sub>2</sub>	E	H	G	L	N	O	P	Q	R	S	Y	Z	g	P.C.D	AJ	DJ	d	b	t
TZ-6.3	76.2	38.1	76.2	76	64	42	16	60	54	66	1.8	2.2	11.2	7.8	47	5.3	2.5	5.5	0.3 <sup>+0.1</sup> <sub>-0.2</sub>	53.75	φ5.5hole, φ9 ℓ: 6.5	6	25	7	28
TZ-10	85.9	40	85.9	85.9	73	50	16	64	58	74	1.8	3.15	12.7	7.8	53.5	6.6	3	5.5	0.3 <sup>+0.1</sup> <sub>-0.2</sub>	62.48	φ5.5hole, φ9 ℓ: 6.5	6	30	7	33
TZ-16	98.6	45.2	98.6	98	86	58	16	69	63	82	1.8	2.7	15.7	9.3	57	9.4	4	5.5	0.4 <sup>+0.1</sup> <sub>-0.2</sub>	72.90	φ6.5hole, φ11 ℓ: 7.5	8	35	10	38.5
TZ-25	117.4	55	117.4	110	103	70	16	74	68	89.1	1.8	4.2	19.0	10.4	59.7	10.4	4	5.5	0.4 <sup>+0.1</sup> <sub>-0.2</sub>	86.87	φ9hole, φ14 ℓ: 10	10	40	12	43.5
TZ-40	137.7	64.3	137.7	133	118	84	16	79	73	109.9	1.8	6.2	22.4	12.5	75	13.9	4	5.5	0.4 <sup>+0.1</sup> <sub>-0.2</sub>	101.60	φ9hole, φ14 ℓ: 10	10	50	15	55

## TZ-160 Ball bearing attachment clutch

Build-to-order product

Model	Rated torque(Nm)	Rated voltage(DC-V)	Power consumption at75°C(W)	Mass(kg)
TZ-160	1600	24	80	18

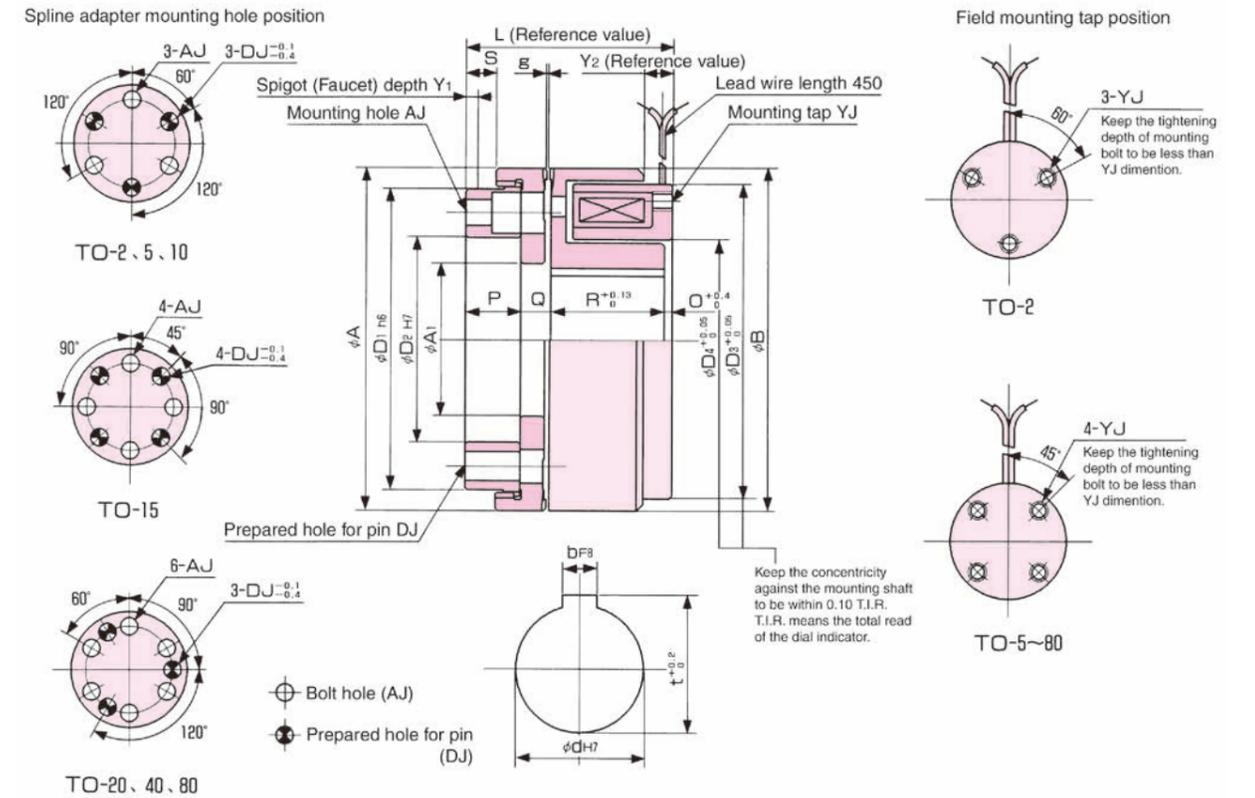
Note: TZ-160 is for wet usage. (Shaft core lubrication)  
Please contact us for dry usage.



Unit: mm

## TO-2, 5, 10, 15, 20, 40, 80 Static coil clutch

Model	Rated torque(Nm)	Rated voltage(DC-V)	Power consumption at75°C(W)	Mass(kg)
TO-2	20	24	13	0.60
TO-5	50	24	20	1.0
TO-10	100	24	34	1.8
TO-15	150	24	34	2.7
TO-20	200	24	50	4.2
TO-40	400	24	70	7.2
TO-80	800	24	79	12



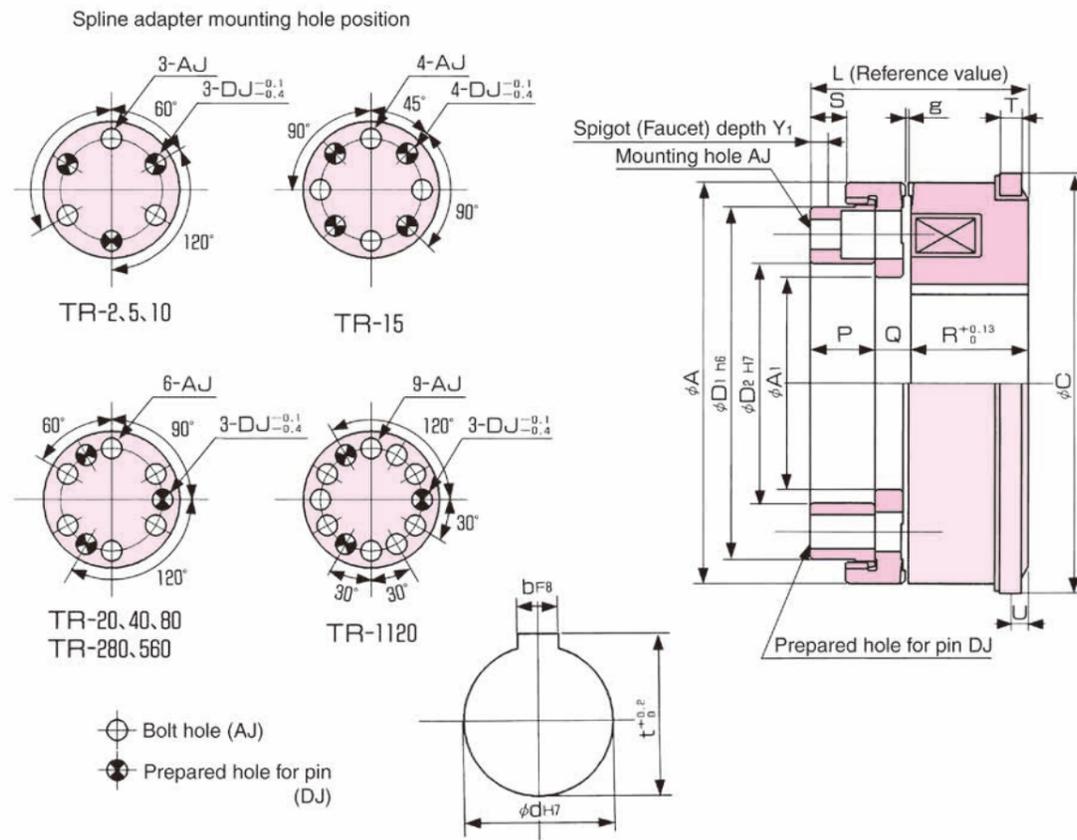
Unit: mm

Model	Diameter direction						Shaft direction						Mounting			Shaft hole									
	A	A1	B	D1	D2	D3	D4	L	O	P	Q	R	S	Y1	Y2	g	P.C.D	Bolt hole	P.C.D	Prepared hole for pin	P.C.D	Tap	d	b	t
TO-2	50.8	15.9	50.8	44	25	46.56	23.04	40.3	2	8.6	6.1	23.6	4.5	2	4.6	0.2 <sup>+0.1</sup>	35	φ3.4hole, φ6.5 ℓ: 4	35	4	38.1	M3X4.5	12	4	13.5
TO-5	76.2	38.1	76.2	64	42	71.37	42.82	49.3	2.5	11.2	7.99	27.61	5.3	3	6.1	0.3 <sup>+0.2</sup>	53.75	φ5.5hole, φ9 ℓ: 6.5	53.75	6	63.5	M4X5	24	7	27
TO-10	85.9	40	85.9	73	50	79.32	48.39	55.9	2.5	12.7	7.95	32.75	6.6	3	6.6	0.3 <sup>+0.2</sup>	62.48	φ5.5hole, φ9 ℓ: 6.5	62.48	6	71.42	M4X5	28	7	31
TO-15	98.6	45.2	98.6	86	58	91.24	55.52	63.0	2.5	15.7	9.75	35.05	9.4	4	6.6	0.4 <sup>+0.3</sup>	72.9	φ6.5hole, φ11 ℓ: 7.5	72.9	8	84.12	M5X6	37	10	40.5
TO-20	117.4	55	117.3	103	70	108.7	66.85	71.4	2.5	19	10.78	39.12	10.4	5	9.9	0.4 <sup>+0.3</sup>	86.87	φ8.8hole, φ14 ℓ: 10	86.87	10	95.25	M6X6	44	12	47.5
TO-40	137.7	64.3	137.3	118	84	128.5	79.35	86.9	2.5	22.4	12.85	49.15	13.8	6	9.9	0.4 <sup>+0.3</sup>	101.6	φ8.8hole, φ14 ℓ: 10	101.6	10	114.3	M6X8	57	15	62
TO-80	162.6	79.3	162.6	144	104	152.3	99.01	104.1	3.8	28.4	14.19	57.71	16.8	8	10.4	0.5 <sup>+0.3</sup>	124.4	φ11hole, φ17.5 ℓ: 13	124.4	13	133.3	M8X9	67	18	73

### TR-2, 5, 10, 15, 20, 40, 80, 280, 560, 1120 Rotation coil clutch

Model	Rated torque(Nm)	Rated voltage(DC-V)	Power consumption at75°C(W)	Mass(kg)
TR-2	20	24	13	0.40
TR-5	50	24	20	0.90
TR-10	100	24	26	1.5
TR-15	150	24	34	2.5
TR-20	200	24	42	4.1
TR-40	400	24	47	6.8
TR-80	800	24	47	12
TR-280	2800	24	71	17
TR-560	5600	24	78	27
TR-1120	11200	24	93	60

Note: TR-1120 is build-to-order product.



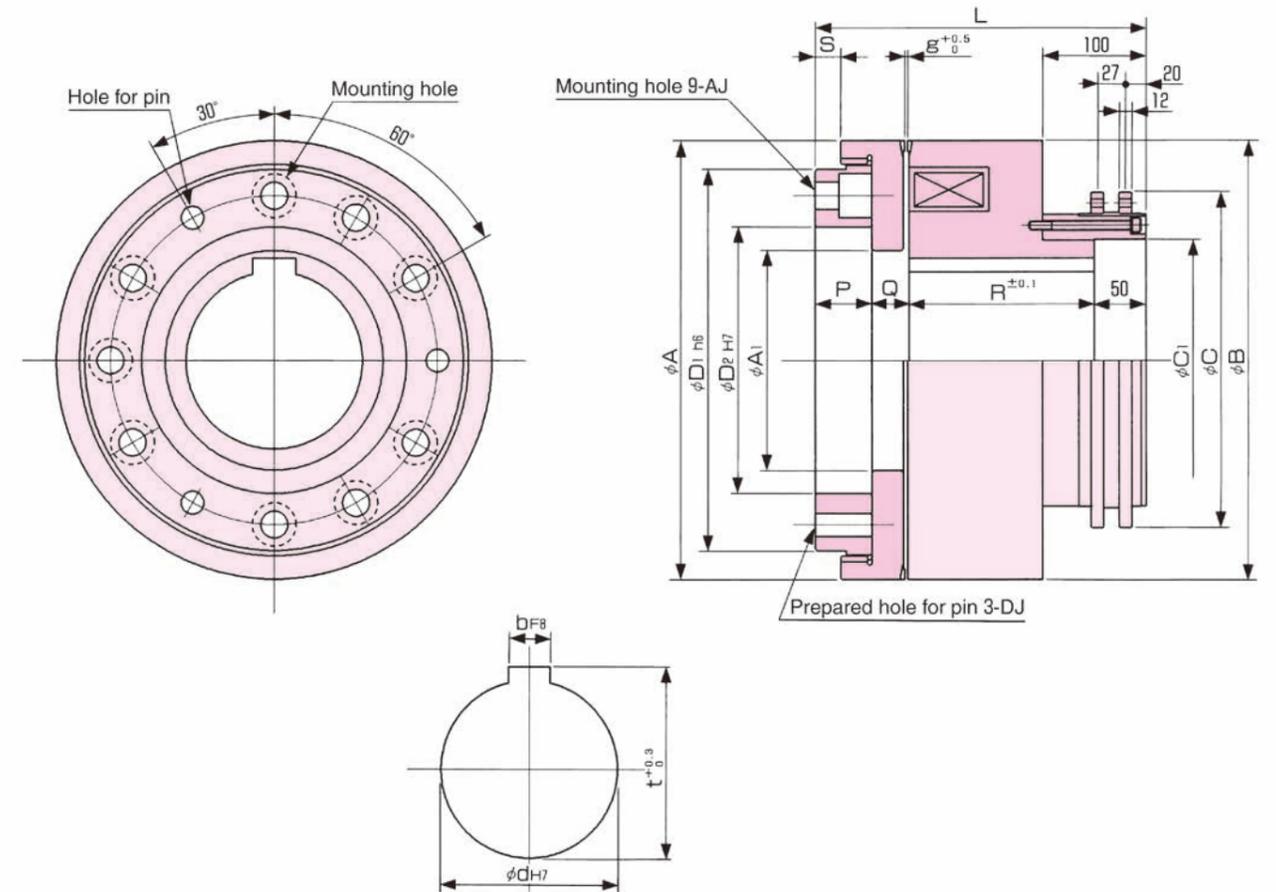
Unit: mm

Model	Diameter direction					Shaft direction										Mounting		Shaft hole			
	A	A1	C	D1	D2	L	P	Q	R	S	T	U	Y1	g	P.C.D	Bolt hole	P.C.D	Prepared hole for pin	d	b	t
TR-2	50.8	15.9	52.3	44	25	37.6	8.6	7.1	21.9	4.5	6.3	3.9	2	0.2 <sup>+0.1</sup> <sub>0</sub>	35	φ3.4hole, φ6.5 ℓ: 4	35	4	12	4	13.5
TR-5	76.2	38.1	77.7	64	42	39.9	11.2	7.8	20.9	5.3	6.3	5.1	3	0.3 <sup>+0.2</sup> <sub>0</sub>	53.75	φ5.5hole, φ9 ℓ: 6.5	53.75	6	32	10	35.5
TR-10	85.9	44.4	90.5	73	50	45.2	12.7	7.74	24.7	6.6	6.3	5.1	3	0.3 <sup>+0.2</sup> <sub>0</sub>	62.48	φ5.5hole, φ9 ℓ: 6.5	62.48	6	37	10	40.5
TR-15	98.6	52.3	104.8	86	58	54.6	15.7	9.56	29.3	9.4	6.3	5.1	4	0.4 <sup>+0.3</sup> <sub>0</sub>	72.9	φ6.5hole, φ11 ℓ: 7.5	72.9	8	42	12	45.5
TR-20	117.4	62	122.2	103	70	64.3	19	10.6	34.6	10.4	6.3	5.1	5	0.4 <sup>+0.3</sup> <sub>0</sub>	86.87	φ8.8hole, φ14 ℓ: 10	86.87	10	52	15	57
TR-40	137.7	71.4	142.9	118	84	76.2	22.4	12.5	41.2	13.8	8	5.6	6	0.4 <sup>+0.3</sup> <sub>0</sub>	101.6	φ8.8hole, φ14 ℓ: 10	101.6	10	62	18	68
TR-80	162.6	85.9	168.3	144	104	90.9	28.4	14.0	48.4	16.8	8	5.6	8	0.5 <sup>+0.3</sup> <sub>0</sub>	124.46	φ11hole, φ17.5 ℓ: 13	124.46	13	72	20	78
TR-280	195.1	98.6	200	173	118	104.9	28.4	17.3	59.1	8.6	8	6.2	7	0.8 <sup>+0.3</sup> <sub>0</sub>	146	φ14hole, φ20 ℓ: 13.5	146	13	82	24	90
TR-560	223.5	111.3	230	197	140	117.4	28.4	21.5	67.4	8.6	8	6.2	7	0.8 <sup>+0.3</sup> <sub>0</sub>	170	φ14hole, φ20 ℓ: 13.5	170	13	97	28	106
TR-1120	282.6	148	304.8	250	172	165.6	45	25.9	94.7	20.4	9.5	17.5	10	0.9 <sup>+0.3</sup> <sub>0</sub>	214	φ18hole, φ26 ℓ: 19	214	16	127	35	138

### TR-2500, 5000 Rotation coil clutch

Build-to-order product

Model	Rated torque(Nm)	Rated voltage(DC-V)	Power consumption at75°C(W)	Mass(kg)
TR-2500	25000	24	125	195
Tr-5000	50000	100	175	435

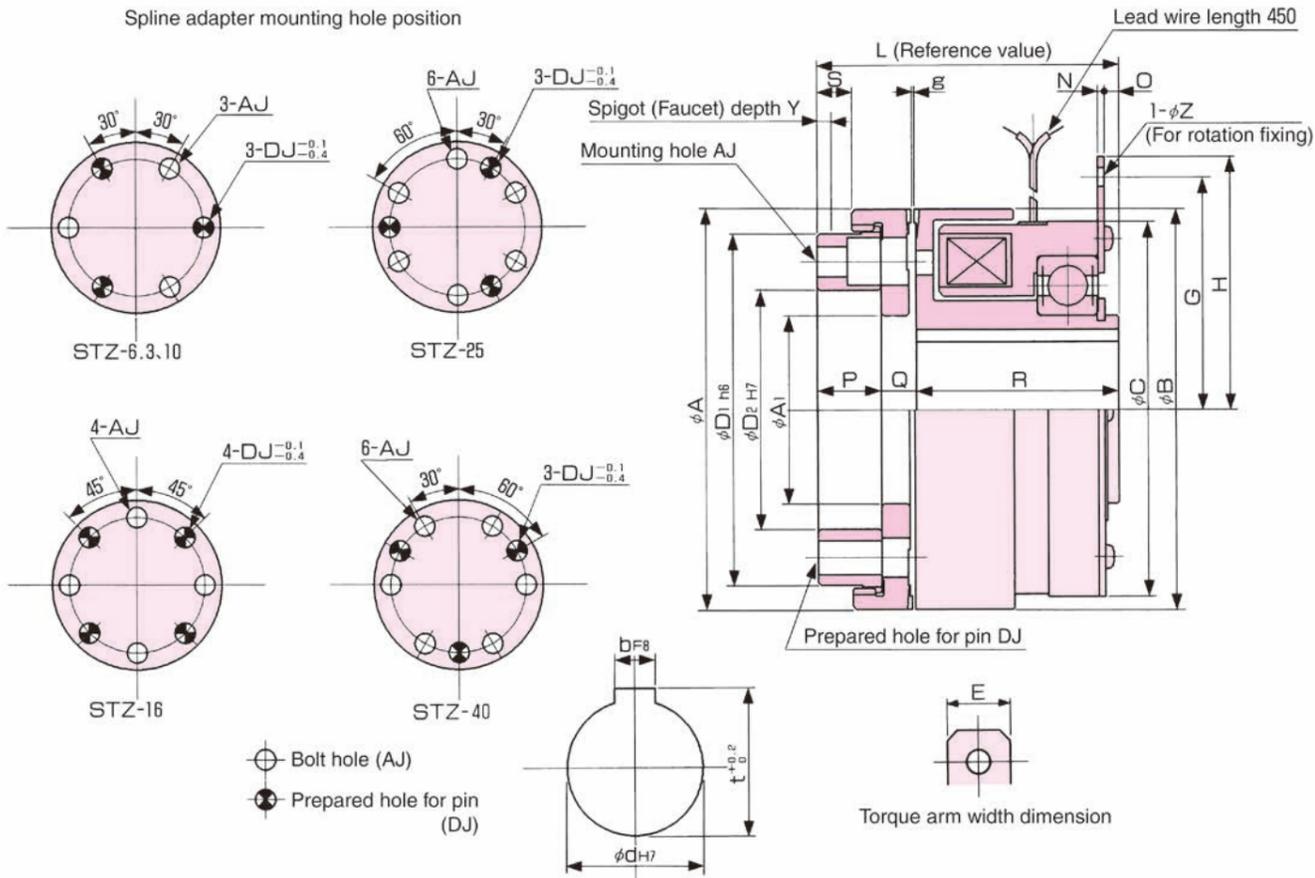


Unit: mm

Model	Diameter direction					Shaft direction					Mounting			Shaft hole					
	A	A1	B	C	C1	D1	D2	L	P	Q	R	S	g	P.C.D	AJ	DJ	d	b	t
TR-2500	420	210	420	320	230	365	255	319.3	55	34.3	180	25	1.5	315	φ26hole, φ39	φ20 <sup>-0.1</sup> <sub>-0.2</sub>	170	42	183
TR-5000	540	260	540	380	280	460	310	391	70	51	220	30	2	380	φ33hole, φ51	φ30 <sup>-0.1</sup> <sub>-0.4</sub>	200	45	214

### STZ-6.3, 10, 16, 25, 40 Ball bearing attachment single-position clutch

Model	Rated torque(Nm)	Rated voltage(DC-V)	Power consumption at75°C(W)	Mass(kg)
STZ-6.3	63	24	24	1.5
STZ-10	100	24	24	2.1
STZ-16	160	24	30	3.3
STZ-25	250	24	45	4.8
STZ-40	400	24	50	8.5

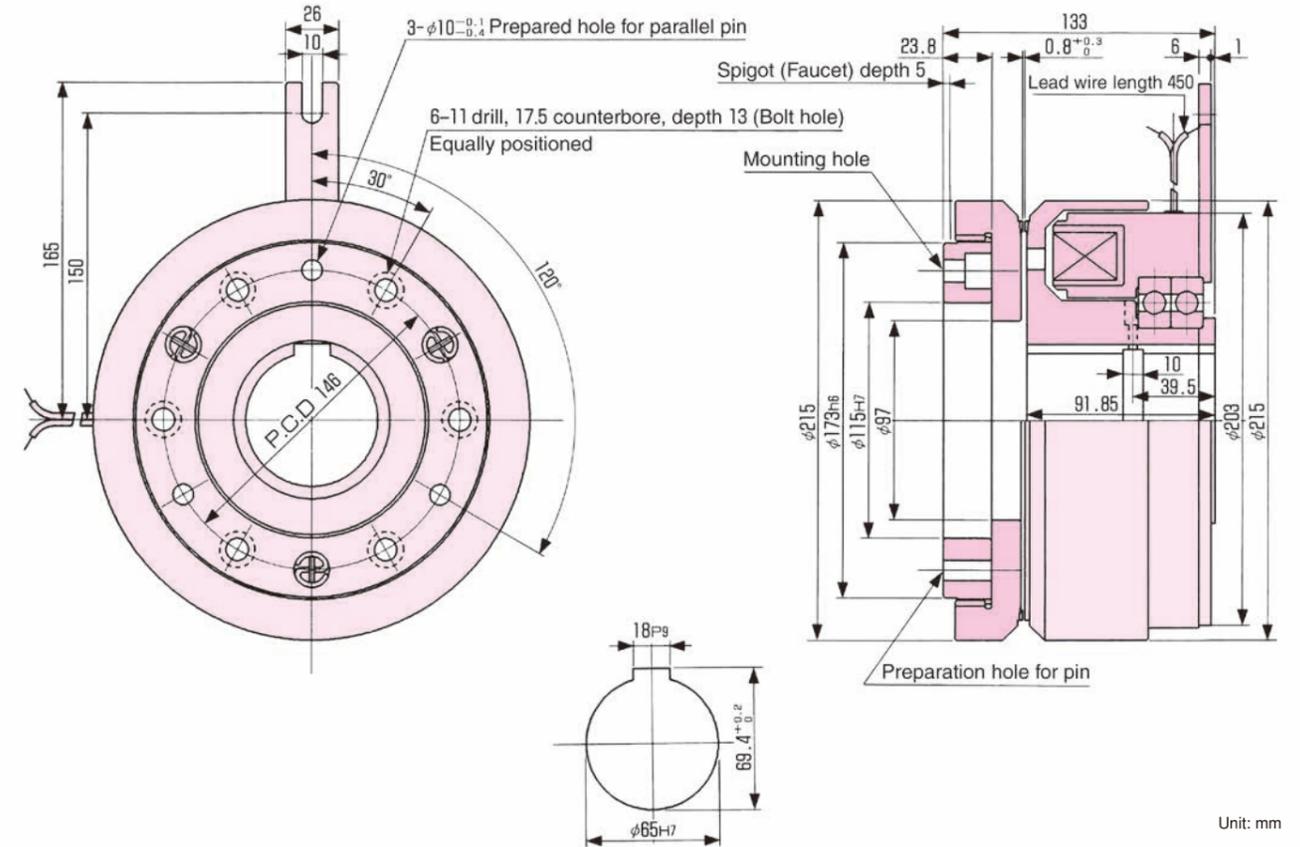


### STZ-160 Ball bearing attachment single-position clutch

Build-to-order product

Model	Rated torque(Nm)	Rated voltage(DC-V)	Power consumption at75°C(W)	Mass(kg)
STZ-160	1600	24	80	18

Note: STZ-160 is for wet usage. (Shaft core lubrication)  
Please contact us for dry usage.



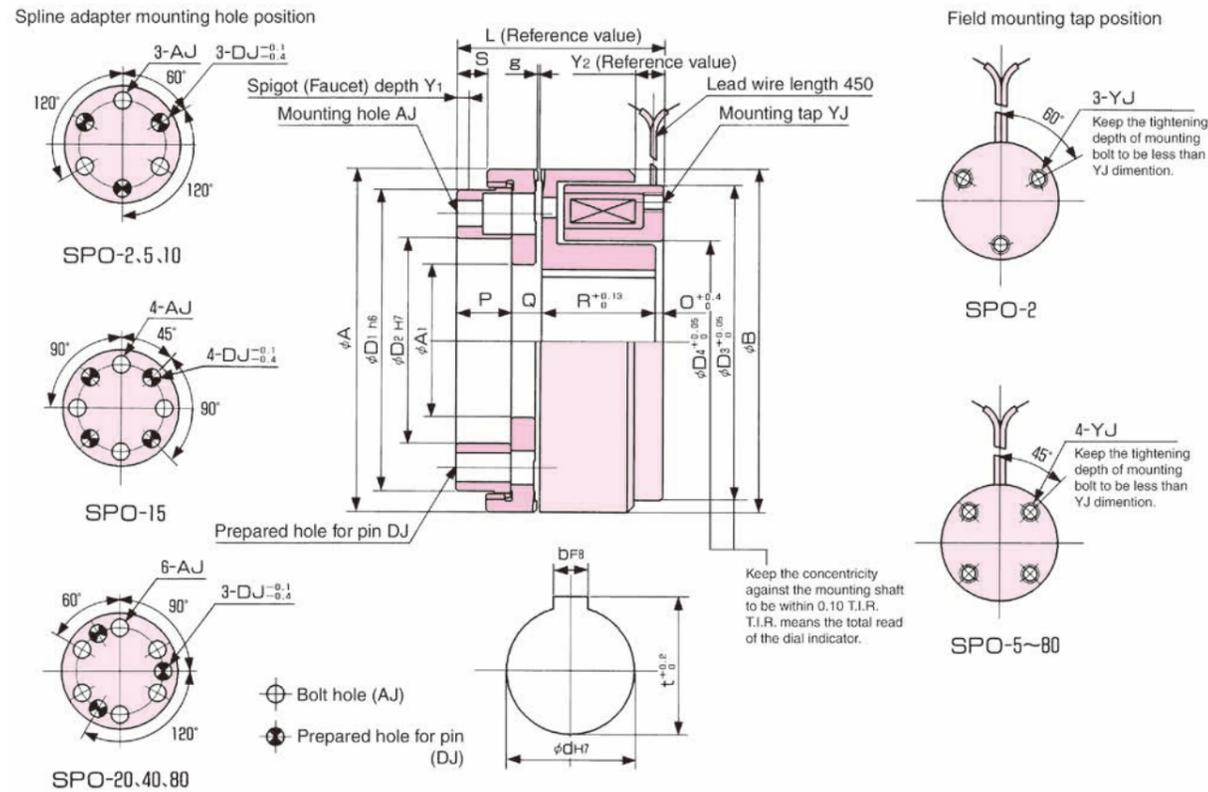
Unit: mm

Unit: mm

Model	Diameter direction					Shaft direction										Mounting			Shaft hole						
	A	A1	B	C	D1	D2	E	H	G	L	N	O	P	Q	R	S	Y	Z	g	P.C.D	AJ	DJ	d	b	t
STZ-6.3	76.2	38.1	76.2	76	64	42	16	60	54	66	1.8	2.2	11.2	7.8	47	5.3	2.5	5.5	0.3 <sup>+0.1</sup>	53.75	φ5.5hole, φ9 ℓ:6.5	6	25	7	28
STZ-10	85.9	40	85.9	85.9	73	50	16	64	58	74	1.8	3.15	12.7	7.8	53.5	6.6	3	5.5	0.3 <sup>+0.1</sup>	62.48	φ5.5hole, φ9 ℓ:6.5	6	30	7	33
STZ-16	98.6	45.2	98.6	98	86	58	16	69	63	82	1.8	2.7	15.7	9.3	57	9.4	4	5.5	0.4 <sup>+0.1</sup>	72.90	φ6.5hole, φ11 ℓ:7.5	8	35	10	38.5
STZ-25	117.4	55	117.4	110	103	70	16	74	68	89.1	1.8	4.2	19.0	10.4	59.7	10.4	4	5.5	0.4 <sup>+0.1</sup>	86.87	φ9hole, φ14 ℓ:10	10	40	12	43.5
STZ-40	137.7	64.3	137.7	133	118	84	16	79	73	109.9	1.8	6.2	22.4	12.5	75	13.9	4	5.5	0.4 <sup>+0.1</sup>	101.6	φ9hole, φ14 ℓ:10	10	50	15	55

## SPO-2, 5, 10, 15, 20, 40, 80 Static coil single-position clutch

Model	Rated torque(Nm)	Rated voltage(DC-V)	Power consumption at75°C(W)	Mass(kg)
SPO-2	20	24	13	0.60
SPO-5	50	24	20	1.0
SPO-10	100	24	34	1.8
SPO-15	150	24	34	2.7
SPO-20	200	24	50	4.2
SPO-40	400	24	70	7.2
SPO-80	800	24	79	12



Model	Diameter direction							Shaft direction							Mounting				Shaft hole					
	A	A1	B	D1	D2	D3	D4	L	O	P	Q	R	S	Y1	Y2	g	P.C.D	AJ	DJ	P.C.D	Tap	d	b	t
SPO-2	50.8	15.9	50.8	44	25	46.5	23.0	40.3	2	8.6	6.1	23.6	4.5	2	4.6	0.2 <sup>-0.1</sup>	35	φ3.4hole, φ6.5 ℓ:4	4	38.1	M3×4.5	12	4	13.5
SPO-5	76.2	38.1	76.2	64	42	71.3	42.8	49.3	2.5	11.2	7.99	27.6	5.3	3	6.1	0.3 <sup>-0.2</sup>	53.75	φ5.5hole, φ9 ℓ:6.5	6	63.5	M4×5	24	7	27
SPO-10	85.9	40	85.9	73	50	79.3	48.3	55.9	2.5	12.7	7.95	32.7	6.6	3	6.6	0.3 <sup>-0.2</sup>	62.48	φ5.5hole, φ9 ℓ:6.5	6	71.42	M4×5	28	7	31
SPO-15	98.6	45.2	98.6	86	58	91.2	55.5	63	2.5	15.7	9.75	35.0	9.4	4	6.6	0.4 <sup>-0.3</sup>	72.9	φ6.5hole, φ11 ℓ:7.5	8	84.12	M5×6	37	10	40.5
SPO-20	117.4	55	117.3	103	70	108.71	66.8	71.4	2.5	19	10.78	39.12	10.4	5	9.9	0.4 <sup>-0.3</sup>	86.87	φ8.8hole, φ14 ℓ:10	10	95.25	M6×6	44	12	47.5
SPO-40	137.7	64.3	137.3	118	84	128.55	79.3	86.9	2.5	22.4	12.85	49.15	13.8	6	9.9	0.4 <sup>-0.3</sup>	101.6	φ8.8hole, φ14 ℓ:10	10	114.	M6×8	57	15	62
SPO-80	162.6	79.3	162.6	144	104	152.35	99.0	104.1	3.8	28.4	14.19	57.71	16.8	8	10.4	0.5 <sup>-0.3</sup>	124.46	φ11hole, φ17.5 ℓ:13	13	133.35	M8×9	67	18	73

Unit: mm

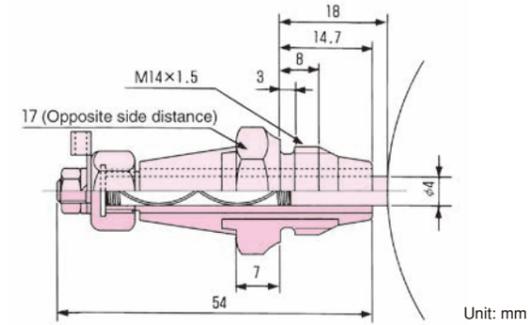
## Brush holder for TR type clutches

The brush and holder shown below are required to use the rotation coil tooth clutch (TR type). Please order this part separately as it is not included with the clutch.

### Tubler brush holder for small class TR type clutches

Brush for AP-223 type

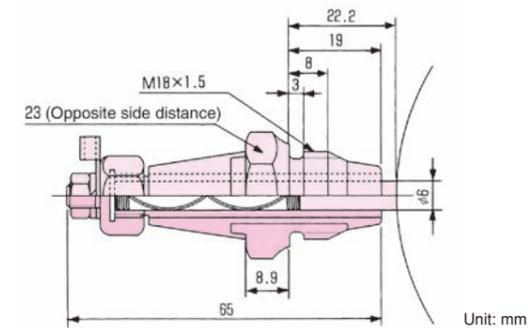
For wet usage:AP-223-1/For dry usage : AP-223-2



### Tubler type brush holder for middle class TR type clutches

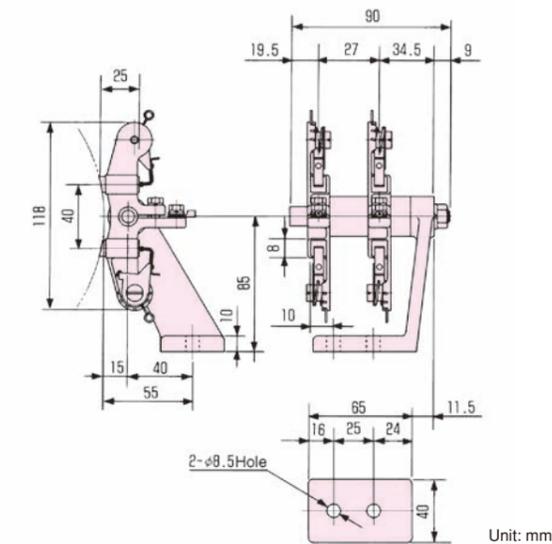
Brush for AP-45 type

For wet usage:AP-45-1/For dry : usageAP-45-2



### Multiple brush holder A for large TR type

This is the brush holder used for the TR-2500 and TR-5000 type.



### Brush holder and its application table

Brush holder type	Application	Brush type	Number of uses	Applicable clutch type
AP-223	For wet mode	AP-223-1	1	TR-2~15
	For dry mode	AP-223-2	1	TR-2~15
AP-45	For wet mode	AP-45-1	1	TR-20~80
			4	TR-280~5000
	For dry mode	AP-45-2	1	TR-20~80
			2	TR-280~1120
Multiple A type	For dry mode	8×10×25	1 set (4 pieces)	TR-2500~5000

(Note) When AP type brushes are used, please connect the plus side of the brush to the clutch spring and the minus side of the brush to the yoke side.

### Brush performance specification list

Brush type	Dimension (mm)	Maximum allowable current (A)	Maximum allowable peripheral speed (m/s)	Contact pressure (N)	Memo
AP-223-1	φ4×16	3	12.7	10	With pigtail and spring
AP-223-2	φ4×16	1.4	25	3.5	With pigtail and spring
AP-45-1	φ6×20	6	12.7	20	With pigtail and spring
AP-45-2	φ6×20	3	25	5	With pigtail and spring
Multiple A type	8×10×25	20	25	2~2.5	1 set (4 pieces) with pigtail

- (Note) 1. The tubler brush can be used for both wet and dry operation by changing the brush module. Wet operation uses a braided bronze brush and dry operation uses a copper carbon brush.
2. During wet operation, if the peripheral speed of the spring is more than 12.7m/s or if the current usually flows on the spring, attach 2 brushes with a 90-degree angle between them and apply the current across both brushes.
3. Connect the plus side to the brush holder and connect the minus side to the separate brush sliding on the shaft attached to the clutch body. Be careful not to connect the plus and minus terminals inversely.
4. When the clutch is used while submersed in oil, attach an idler brush in the forward direction of rotation without applying any additional current.
5. If you use a clutch larger than our type TR-280 for wet operation, use 4 AP45-1 type brushes, designating one as an idler, as is described in note 4.

- (Note) 1. The TO and SPO types are designed to be attached to a fixing adapter or a fixed part of the machine to maintain proper thermal dissipation. If there is insufficient space for ventilation or if the clutch is installed in a sealed box with direct sun exposure, the ambient temperature will increase. Please contact us for application advice.
2. If using the TR-280, 560, or 1120 types, attach the grounding brush to the shaft in order to protect the machine's shaft bearing.