CKD

SM-612457-A

INSTRUCTION MANUAL

ELECTRIC ACTUATOR

ETV Series

Food manufacturing processes

ETV FP Series

- Read this manual carefully and thoroughly before using this product.
- Pay extra attention to the instructions concerning safety.
- After reading this manual, keep it in a safe and convenient place.

8th Edition
CKD Corporation

For Safe Operation of This Product

(Be sure to read before using)

Make sure to read this instruction manual, catalog, technical data, and any attached documents thoroughly before installation, operation, maintenance, and inspection of the product to ensure its proper use.
This product is designed and manufactured as a general industrial machine device/part. It must be handled by individuals having sufficient knowledge about equipment and safety. CKD is not responsible for any accidents caused by individuals without such knowledge or arising from mishandling of the product. Since our customers use this product for a very wide range of applications, CKD cannot keep track of all of them. Depending on the conditions of use, the product may fail to provide the best performance or may lead to accidents. Therefore, before deciding how to use the product, examine the product specifications and usage to see whether they meet your application and usage.
This product incorporates many functions and mechanisms to ensure safety. However, mishandling of the product by a customer may lead to accidents. To avoid such accidents, **before using the product, read this instruction manual carefully for proper use.**
In addition to the handling precautions described in the text of this manual, cautions should also be exercised on the following precautions.

The precautions below are for safety and proper use of the product to prevent possible damage to human life or assets.

In this instruction manual, the safety precautions are ranked as “DANGER,” “WARNING,” and “CAUTION.”
Note that even some precautions described as “WARNING” or “CAUTION” may lead to serious results depending on a situation.
In any case, important information is described. Read them carefully and take good care when handling the product.
Keep this instruction manual in a safe and convenient place where it can be quickly accessed and read whenever necessary, and please be sure to deliver the manual to the end user.
To secure product safety, make sure to observe each precaution described under “DANGER,” “WARNING,” and “CAUTION.”

DANGER	If mishandled, dangerous situations leading to fatal or serious injuries may occur and there is a high degree of emergency (urgency) to a warning.
WARNING	If mishandled, dangerous situations leading to fatal or serious injuries may occur.
CAUTION	If mishandled, dangerous situations leading to minor injuries or damage to property may occur.

⚠ DANGER

Do not use this product for the following applications:

- Medical equipment related to sustainment and control of human life and body
- Mechanical devices and mechanisms designed for the purpose of moving or transporting people
- Critical security parts in mechanical devices

<Installation>

- Do not operate the product where there are hazardous materials such as combustibles, flammables, and explosives. The product may ignite, catch fire, or explode.
- Keep water drops, oil drops, and such away from the product. They may cause fire or product failure.
- Make sure to hold and lock the product (including workpieces) when installing the product. The operator could be injured due to falling, dropping, or abnormal operation of the product.

<Maintenance/Inspection/Repair>

- Wiring work and inspections must be performed by a specialized technician.
- Perform wiring work after installing the product. Failure to do so may result in an electric shock.
- Do not operate the product with wet hands. Doing so may result in an electric shock.

⚠ WARNING

- Use the product within its specifications.

<Design/Selection/Installation>

- Install a protection cover in case of possible danger to the operator. Do not enter the operating range of the product when it is ready to operate. The product may move suddenly and lead to injury.
  Take appropriate countermeasures that prevent damage to human body by the moving part of the product.
- Design the safety circuit/device so that the product's movement causes no damage to the operator or equipment if the machine stops due to emergency stop, power outage, or other system errors.
- Consider the operation status when the machine is reactivated after emergency stop or abnormal stop. The machine must be designed so that reactivation causes no damage to the operator or equipment.
- Install the product indoors and keep it away from humid places. Current leakage or fire may occur in places where the product is exposed to rainwater or humidity (85% or more, or dew condensation).
- Operate and store the product in conditions without dew condensation by observing operating and storage temperatures.
  (Storage temperature: -10°C to 50°C, storage humidity: 35% to 80%, operating temperature: 0°C to 40°C, operating humidity: 35% to 80%)
  Failure to do so may result in errors or shorter life of the product. Ventilate the place if the heat is trapped there.
- Install the product in a place where it is not exposed to direct sunlight, dust, heat generating element and where there are no corrosive gas, explosive gas, flammable gas, and flammables. This product is not designed to be resistant to chemical substances.
  Failure to do so may result in damage or malfunction of the product, or the cause of explosion or ignition.
- Attach the product to nonflammable items. Attachment of the product directly to or near flammable items could cause fire.
- Perform D-class grounding (with ground resistance of 100 ohms or less) with the product. In the event of current leakage, there is a possibility of an electric shock and product malfunction.
- Do not use the product under shock or vibration conditions.
- Consider the possibility of a failure in the installed motor. Take appropriate measures so that no damage will occur to the operator or equipment even if the power source fails.

- Do not damage, apply undue stress to, place heavy objects on, or tuck cables of the systems related to the product. Doing so may lead to poor conduction or an electric shock.
- In case of putting the product in a place temporarily, place the product horizontally.
- Do not get on or place objects on the packaging.

<Operation>

- Before supplying power to the installed motor, always confirm safety of its operating range. Carelessly supplying power to it may lead to an electric shock or injury.
- Do not touch or come into contact with the product body during operation and immediately after it stops operating. Doing so may result in burns.
- Do not get on or place objects on the product. Doing so may cause falling accidents, product turnover, injury due to drops, product breakdown, product malfunction due to damage, loss of control, and others.
- Take appropriate measures so that no damage will occur to human body or equipment even if the power source fails.
- Before setting the position of the installed motor, make sure that it is safe if the actuator runs.
- If any belt abnormality is found, such as wear or abrasion on the tooth/side surface, vertical cracks on the tooth part, cracks or softening on the back surface, or partial breaks, immediately stop the operation of the product. Your use environment or use conditions may be inappropriate.

<Maintenance/Inspection/Repair>

- If an abnormal condition develops in the product, such as generating heat, smoke, odor, noise, or vibration, immediately turn the power off. Failure to do so may cause product breakdown or fire due to continued flow of current.

⚠ CAUTION

<Design/Selection/Installation>

- Properly design and wire the product with attention to safety by referring to the instruction manuals of the motor/control to be installed on the product.
- When wiring the motor/control to be installed on the product, route the power cables so that they avoid any areas with a large electric current and strong magnetic field and do not share the same conduit with, as well as run along, the (multi-conductor) cables for a large motor not for this product; this is to prevent the influence of magnetic induction noise. Also be careful of the inverter power supply used in robots and of the wiring section (do not share the cables or conduit). Ground the frame for the inverter power supply and always provide the inverter output connectors with a filter.
- Select a motor power supply that can supply more power than required by the installed products. Insufficient capacity can cause product malfunction. (Refer to the instruction manuals of the motor/control installed by the customer.)
- When turning on the power of the motor/control installed on the product, the origin position may be detected. If there is an external stopper or a holding mechanism (such as a break), the product may detect an unintended position as the origin point. Take care on the location of an external stopper and such so that the origin position is definitely detected after the power is turned on.
- Do not move the slider part before installing the motor on the product. The internal belt of the product will bend, create a bend or flaw, and may cause product breakdown at an early stage.
- Do not use the product in a place where it is exposed to ultraviolet radiation and atmospheres containing corrosive gas or salt. Doing so may cause degradation in strength due to performance degradation, product malfunction, and rust formation.
- Do not use the product in a place where dew condensation can occur due to rapid change in ambient temperature.
- Do not install the product in places subject to strong vibration or impact. Doing so may result in malfunction.
- The flatness of the mounting surface where the product is installed should be 0.05 mm/200 mm or less, and do not give twist or bending force to the product.
- When installing the product on the mounting surface, tighten the screws with proper torque.
  M4: 1.5 N•m, M5: 3.0 N•m, M6: 5.2 N•m, M8: 12.5 N•m, M10: 24.5 N•m
- This product is manufactured in conformity with the related standards. Never attempt to disassemble or modify the product.
- Please note that the customer is responsible for checking the compatibility of our product with the system, machine, and device to be used by the customer.

<Operation>

- Use the product so that the slider does not hit the stroke end. During return-to-origin movement, do not let the product hit the mechanical stopper, etc. while it is performing any operation other than the pressing action. Ball screws will be damaged and may cause malfunction.
- During return-to-origin movement, do not apply an external force to the product. The origin point may be recognized incorrectly.
- The recommended servomotors have a gain adjustment function to control vibrations. Adjust the gain and operate the product under vibration-controlled conditions. If the product is operated under vibration/resonance conditions, the product life may be shortened.
- If the servomotor is turned off with gravity and inertial force applied, the work piece may continue to move or drop. Such operation must be performed in an equilibrium state with no gravity or inertial force, or after conforming safety.
- Do not operate the moving part of the product or decelerate rapidly by an external force. The regenerative current may cause product malfunction or breakdown.
- Durability varies depending on transport load or environment. Sufficient settings for the allowable load/moment are required. Do not apply load exceeding the allowance to the product.

<Maintenance/Inspection/Repair>

- Conduct a daily inspection to make sure that the product works properly.
- Grease in the grade for food (NSF H1) is used in FP series. Do not mix it with other grease.
- Control the belt tension appropriately. In particular in the beginning of use, attention should be given to stress relaxation (flaccidity).
  Inappropriate tension may increase violation and noise, shorten life, and cause tooth jump.
- Grease lubrication is at intervals of three months or approximately 100 km travel.
  However it varies depending on the use conditions, such as noise or vibration. Perform it as required.
  If the product has not been used for 1 month or more, conduct a trial run before starting work.
- When disposing of this product, follow the Law on Waste Disposal and Cleaning, and make sure to have it disposed of by a specialized waste disposer.
- Before performing maintenance, inspection, or repair, always stop the power supply to the product. Call attention to the others around you so that they do not turn the power on, or operate carelessly by a third party.
- Specify the maintenance conditions in the equipment instruction manual. Product functions may deteriorate significantly due to usage, use environment, or maintenance of the equipment. This may result in failure to ensure safety.

Warranty Clause

Term of Warranty and Scope of Warranty are as follows.

1) Term of Warranty

The period of warranty for the product specified herein is one year from the date of delivery. (However, the number of hours in operation per day shall be within eight hours. In addition, in the case where the device reaches the service life within one year, the term of warranty is only within that period.)

2) Scope of Warranty

If the product becomes defective for reasons attributable to CKD during the above period of warranty, CKD will promptly repair the product without any charge to customer.
However, following circumstances are excluded from this warranty:

(1) Operation under conditions and in environments deviating from that described in the product specifications
(2) Faulty maintenance and improper use such as negligence
(3) Damage caused by reasons attributable to anything other than the delivered product
(4) Operation of the product in any unintended manner
(5) Modifications in structure, performance, specifications, etc. without involvement of CKD, and repairs performed by an unauthorized party after delivery
(6) Damage that could have been avoided if the customer equipment, into which the product is incorporated, had functions, structure, etc. generally accepted in the industry
(7) Damage caused by reasons unforeseen at the level of technology available at the time of delivery
(8) Damage caused by external factors such as fire, earthquake, flood, lightning, other acts of nature, terrestrial disaster, pollution, salt, gas, and abnormal voltage.

Please note that this warranty covers only the delivered product itself. Any direct, indirect, or consequential damage that may arise from failure with the delivered product are not covered under this warranty.

3) Warranty for Product Exported Outside Japan

(1) CKD will repair any product returned to our factory or to a company or a factory designated by CKD.
Work and expense involved in returning the product are not covered under the warranty.
(2) The repaired product will be packed according to domestic packing specification and delivered to a location inside Japan designated by the customer.

4) Other

This Warranty Clause stipulates basic provisions.
If warranty information given on individual specification drawings or specification sheets differs from that given herein, priority will be given to the specification drawings and specification sheets.

Table of Contents

1. Introduction

Thank you for purchasing our「ETV Series」、「ETV-FP Series」Electric Actuator.

This instruction manual describes basic instructions on operation so that「ETV Series」、「ETV-FP Series」Electric Actuator can perform at its full potential.

Please read this instruction manual thoroughly before using the product to ensure its proper use.

Please keep this instruction manual in a safe place where it will not get lost.

Precautions:

This product has no motor.

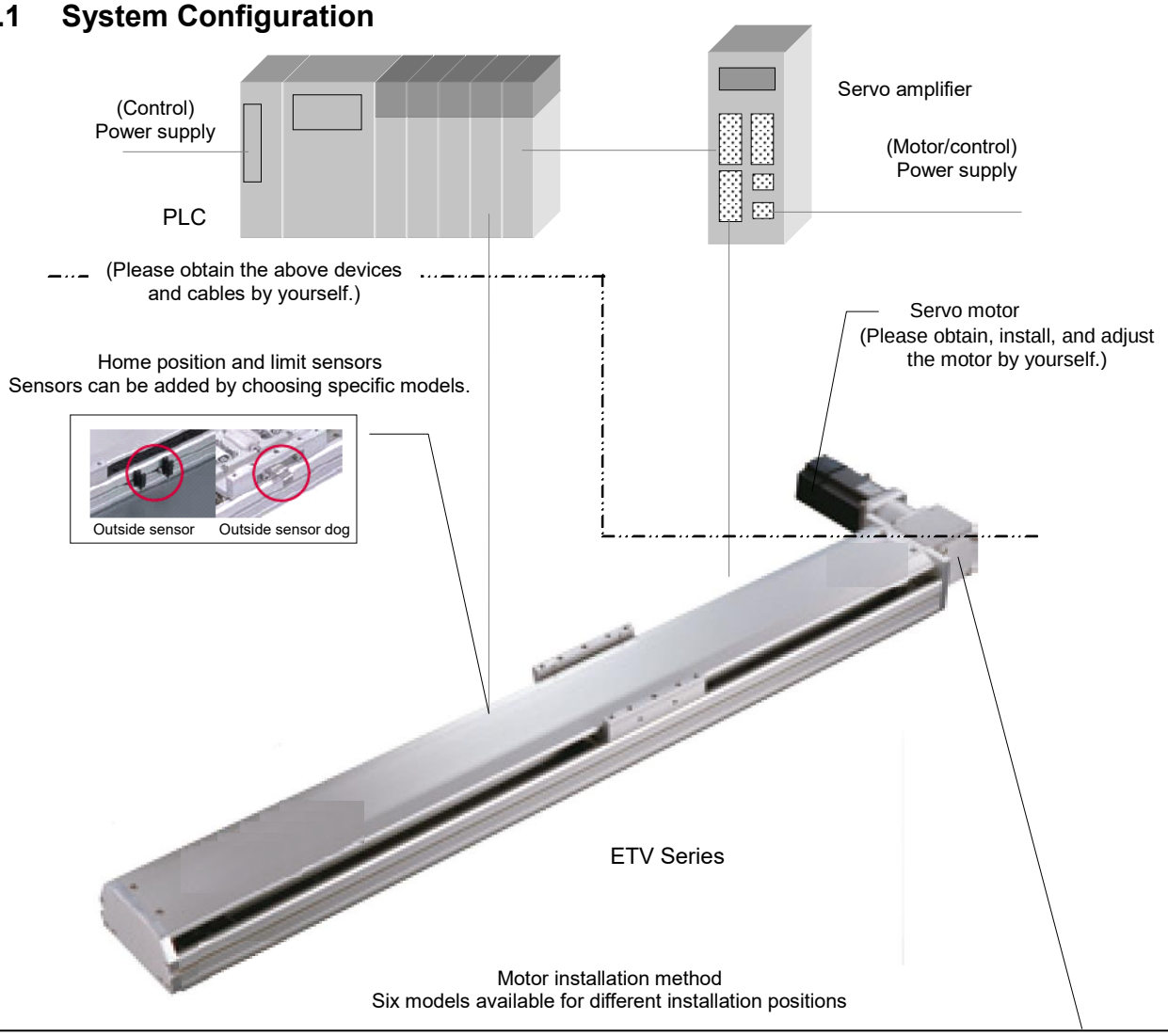
Please obtain, install, and adjust the motor and driver by yourself.

For details on how to install the motor properly, refer to this instruction manual.

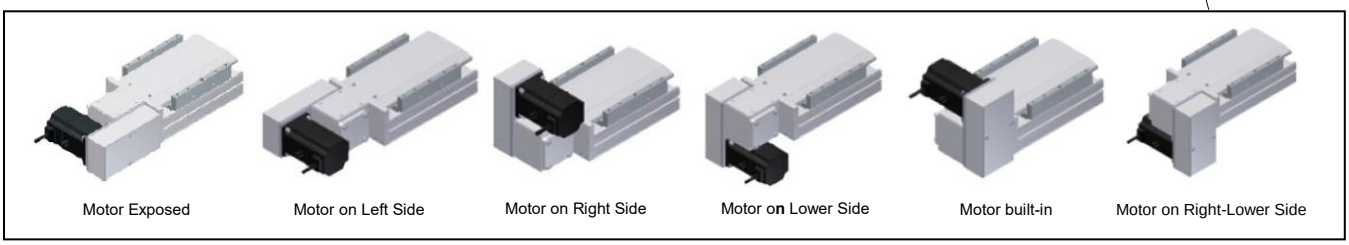
For details on how to adjust the motor, refer to the instruction manual of the motor you prepared.

2. Product Specifications

2.1 System Configuration



Motor installation method
Six models available for different installation positions



Network examples of recommended servo motors

	General-purpose	SSCNET	CC-Link	MECHATRO LINK-II	MECHATRO LINK-III	Device NET	Ether CAT	Ether Net/IP
MITSUBISHI ELECTRIC	○	○	○					
DELTA ELECTRONICS	○						○	
SANYO DENKI	○						○	
YASUKAWA ELECTRIC	○			○	○	○		
KEYENCE	○			○				
PANASONIC	○							
OMRON	○			○			○	
FANUC	○							○
Bosh Rexroth AG	○							○
Rockwell Automation	○							○
SIEMENS	○							○

This product has no motor. Please obtain, install, and adjust the motor and drive by yourself.

2.2 Specifications

[Applicable motor size: 100 W]

Item			Model		
			ETV-05	ETV-06	ETV-10
Belt width		(mm)	9	12	15
Lead		(mm)	40	40	32
Repeatability		(mm)	±0.08		±0.04
Max. load capacity *1	Horizontal	(kg)	3	3	10
	Vertical	(kg)	-	-	-
Max. speed *2		(mm/s)	2000	2000	1600
Stroke length *3		(mm)	100~800	100~800	100~2550
Thrust		(N)	42	42	61
Operating ambient temperature		(°C)	0 to 40 (Without condensation or freezing)		
Operating ambient humidity		(%)	35 to 85 (Without condensation or freezing)		
Storage ambient temperature		(°C)	-10 to 50 (Without condensation or freezing)		
Storage ambient humidity		(%)	35 to 85 (Without condensation or freezing)		

[Applicable motor size: 200 W]

Item			Model
			ETV-14
Belt width		(mm)	22
Lead		(mm)	40
Repeatability		(mm)	±0.04
Max. load capacity *1	Horizontal	(kg)	25
	Vertical	(kg)	-
Max. speed *2		(mm/s)	2000
Stroke length *3		(mm)	100~3050
Thrust		(N)	100
Operating ambient temperature		(°C)	0 to 40 (Without condensation or freezing)
Operating ambient humidity		(%)	35 to 85 (Without condensation or freezing)
Storage ambient temperature		(°C)	-10 to 50 (Without condensation or freezing)
Storage ambient humidity		(%)	35 to 85 (Without condensation or freezing)

*1: The maximum load capacity is a value when the acceleration and deceleration time is the recommended value (0.4 sec).
The thrust force and maximum load capacity are estimated values on the assumption that the installed motor outputs the rated torque.
When using the product hung from the ceiling, calculate the motor max. load capacity by dividing the horizontal load capacity by 3.

*2: The maximum speed is an estimated value on the assumption that the installed motor outputs the power at 3000 rpm.
The maximum speed varies depending on the stroke length.

*3: The stroke pitch is 50.

[Applicable motor size: 400 W]

Item			Model
			ETV-17
Belt width		(mm)	30
Lead		(mm)	40
Repeatability		(mm)	±0.04
Max. load capacity *1	Horizontal	(kg)	45
	Vertical	(kg)	-
Max. speed *2		(mm/s)	2000
Stroke length *3		(mm)	100~3500
Thrust		(N)	204
Operating ambient temperature		(°C)	0 to 40 (Without condensation or freezing)
Operating ambient humidity		(%)	35 to 85 (Without condensation or freezing)
Storage ambient temperature		(°C)	-10 to 50 (Without condensation or freezing)
Storage ambient humidity		(%)	35 to 85 (Without condensation or freezing)

[Applicable motor size: 750 W]

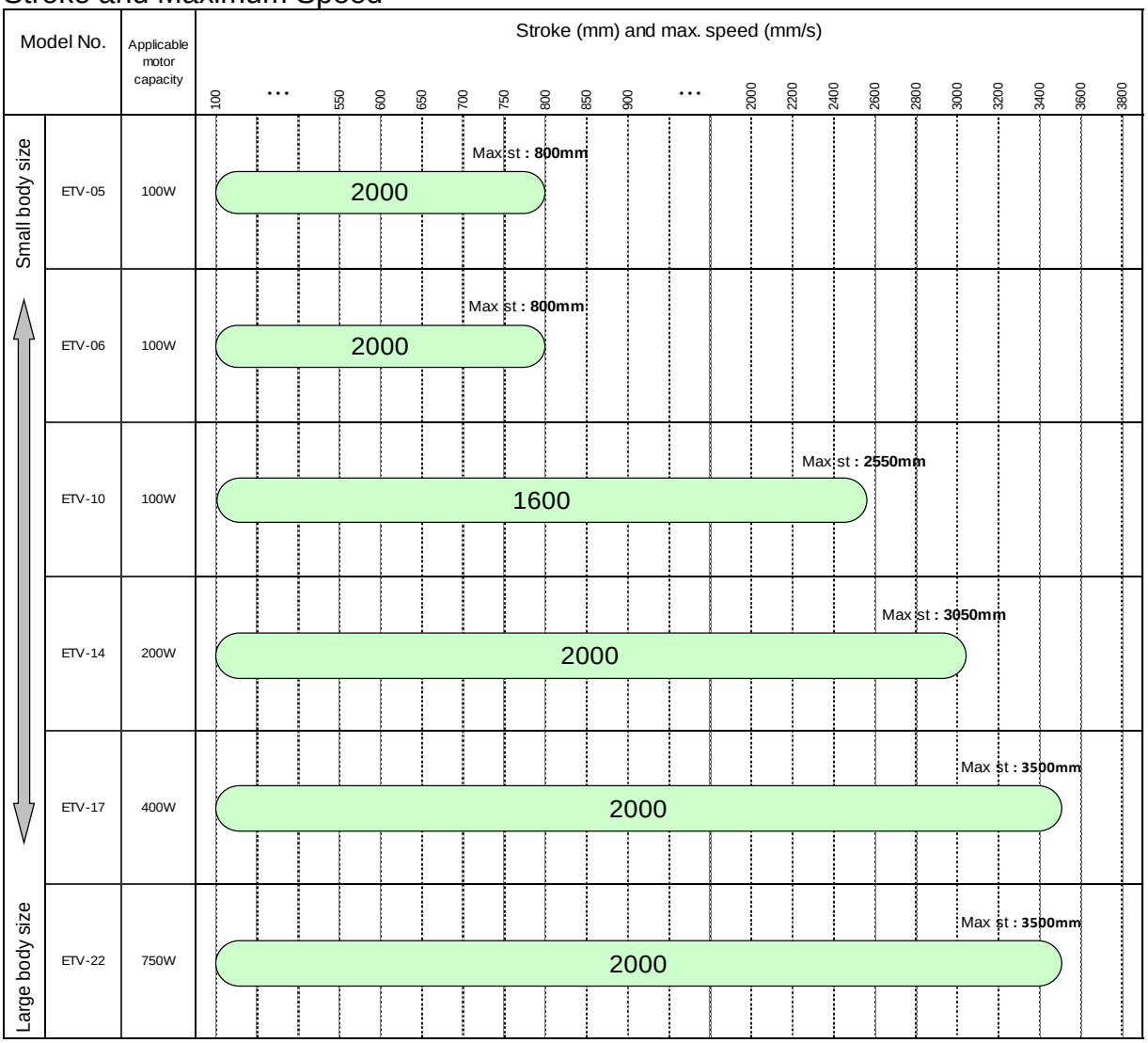
Item			Model
			ETV-22
Belt width		(mm)	50
Lead		(mm)	40
Repeatability		(mm)	±0.04
Max. load capacity *1	Horizontal	(kg)	85
	Vertical	(kg)	-
Max. speed *2		(mm/s)	2000
Stroke length *3		(mm)	100~3500
Thrust		(N)	367
Operating ambient temperature		(°C)	0 to 40 (Without condensation or freezing)
Operating ambient humidity		(%)	35 to 85 (Without condensation or freezing)
Storage ambient temperature		(°C)	-10 to 50 (Without condensation or freezing)
Storage ambient humidity		(%)	35 to 85 (Without condensation or freezing)

*1: The maximum load capacity is a value when the acceleration and deceleration time is the recommended value (0.4 sec).
The thrust force and maximum load capacity are estimated values on the assumption that the installed motor outputs the rated torque.
When using the product hung from the ceiling, calculate the motor max. load capacity by dividing the horizontal load capacity by 3.

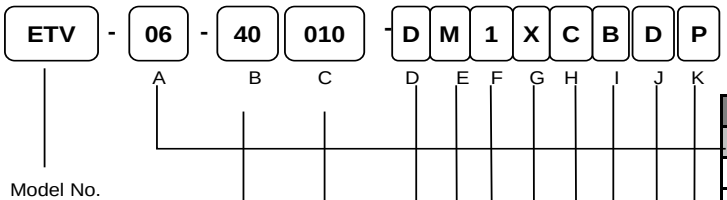
*2: The maximum speed is an estimated value on the assumption that the installed motor outputs the power at 3000 rpm.

*3: The stroke pitch is 50.

Stroke and Maximum Speed



2.3 Model Variation



<Example of model number>
ETV-06-40010－DM1XCBDP

A) Body size: Width 65 x height 56 mm
B) Thread lead: 40 mm
C) Stroke length: 100 mm
D) Motor installation method: Motor on Lower Side
E) Specifications of the installed motor: MITSUBISHI ELECTRIC
F) Motor size: 100 W
G) Belt type: rubber belt
H) Home position sensor: Outside - Motor side
I) Limit sensor: Outside
J) Grease nipple: None(body mounting direction: bottom side)
K) Positioning pin hole: YES

* When the body size is "05" or "06," "L (Low dust urethane)" cannot be selected for the belt type.

(E) Specifications of the installed motor

Manufacturer	100 W	200 W	400 W	750 W
MITSUBISHI ELECTRIC	M	M	M	M
DELTA ELECTRONICS	M	M	M	M
SANYO DENKI	M	M	M	M
YASUKAWA ELECTRIC	Y	Y	Y	Y
KEYENCE	Y	Y	Y	Y
PANASONIC	P	P	P	P
OMRON	M	P	P	P
HUJI ELECTRIC	M	M	M	M
DENSO WAVE	M	M	M	—
FANUC	F	F	F	F
Bosch Rexroth	P	P	P	P
Rockwell Automation	M	M	M	M
SIEMENS	M	M	M	M

Symbol	Description
A:	Body size (mm)
05	Width 51 × height 54
06	Width 65 × height 56
10	Width 102 × height 66
14	Width 135 × height 78
17	Width 170 × height 97
22	Width 220 × height 122
B:	Lead (See Table 1 in the next section)
32	32mm
40	40mm
C:	Stroke length (See Table 1 in the next section)
010 to 350	100 mm to 3500 mm (50-mm pitch) Indication is 1/10
D:	Motor installation method (See Table 2 in the next section)
U	Motor on Upper Side
D	Motor on Lower Side
R	Motor on Right Side
S	Motor on Right-Upper Side
T	Motor on Right-Lower Side
L	Motor on Left Side
V	Motor on Left-Upper Side
W	Motor on Left-Lower Side
E:	Specifications of the installed motor (See Table 3 in the next section)
M, Y, P, F	For details on specifications of the installed motor, see the table below
F:	Motor size (See Table 2 in the next section)
1	100W
2	200W
4	400W
8	750W
G:	Belt type
X	Standard (rubber)
L	Low dust (urethane) *
H:	Home position sensor (1 pc, see Table 4 in the next section)
N	Without
C	Outside: Motor side (Installed at shipment)
D	Outside: Opposite side to motor (Installed at shipment)
I:	Limit sensor (2 pcs, see Table 4 in the next section)
N	Without
B	Outside (Installed at shipment)
J:	Grease nipple (See Table 5 in the next section)
N	None (body mounting direction: standard)
D	None (body mounting direction: bottomside)
R	Clockwise
L	Counterclockwise
K:	Positioning pin hole (See Table 6 in the next section)
N	None
P	Yes

Food manufacturing processes

(AtoK : See the table above)

Table 1: (B) Thread lead and (C) stroke length

Model	(B) Thread lead (mm)		(C) Stroke length (mm)
	32	40	(50 mm pitch)
ETV - 05	-	○	100-800
ETV - 06	-	○	100-800
ETV - 10	○	-	100-2550
ETV - 14	-	○	100-3050
ETV - 17	-	○	100-3500
ETV - 22	-	○	100-3500

Table 2: (D) Motor installation method and (F) motor size

Model	(D) Motor installation method								(F) Motor size			
	Motor on Upper Side	Motor on Lower Side	Motor on Right Side	Motor on Right-Upper Side	Motor on Right-Lower Side	Motor on Left Side	Motor on Left-Upper Side	Motor on Left-Lower Side	100 W	200 W	400 W	750 W
ETV - 05	○	○	-	-	-	-	-	-	○	-	-	-
ETV - 06	○	○	-	-	-	-	-	-	○	-	-	-
ETV - 10	-	-	○	○	○	○	○	○	○	-	-	-
ETV - 14	-	-	○	○	○	○	○	○	-	○	-	-
ETV - 17	-	-	○	○	○	○	○	○	-	-	○	-
ETV - 22	-	-	○	○	○	○	○	○	-	-	-	○

Table 3: (E) Motor manufacturer and recommended motor model No./rated output

(E) Manufacturer	Motor (without brake)	Motor (with brake)	Rated output
MITSUBISHI ELECTRIC	HG-KR13	HG-KR13B	100 W
	HG-KR23	HG-KR23B	200 W
	HG-KR43	HG-KR43B	400 W
	HG-KR73	HG-KR73B	750 W
YASUKAWA ELECTRIC	SGMJV-01ADA21	SGMJV-01ADA2C	100 W
	SGMJV-02ADA21	SGMJV-02ADA2C	200 W
	SGMJV-04ADA21	SGMJV-04ADA2C	400 W
	SGMJV-08ADA21	SGMJV-08ADA2C	750 W
PANASONIC	MSMD012G1A	MSMD012G1B	100 W
	MSMD022G1A	MSMD022G1B	200 W
	MSMD042G1A	MSMD042G1B	400 W
	MSMD082G1A	MSMD082G1B	750 W
OMRON	R88M-K10030H	R88M-K10030H-B	100 W
	R88M-K20030□	R88M-K20030□-B	200 W
	R88M-K40030□	R88M-K40030□-B	400 W
	R88M-K75030H	R88M-K75030H-B	750 W
KEYENCE	SV-M010□□	SV-B010□□	100 W
	SV-M020□□	SV-B020□□	200 W
	SV-M040□V	SV-B040□□	400 W
	SV-M075□□	SV-B075□□	750 W

(E) Manufacturer	Motor (without brake)	Motor (with brake)	Rated output
DELTA ELECTRONICS	ECMA-C10401ES	ECMA-C10401FS	100 W
	ECMA-C10602ES	ECMA-C10602FS	200 W
	ECMA-C10604ES	ECMA-C10604FS	400 W
	ECMA-C10807ES	ECMA-C10807FS	750 W
SANYO DENKI	R2AA04010FX	R2AA04010FC	100 W
	R2AA06020FX	R2AA06020FC	200 W
	R2AA06040HX	R2AA06040HC	400 W
	-	-	750 W
FANUC	A06B-0112-B1	A06B-0112-B4	100 W
	A06B-2115-B1	A06B-2115-B4	200 W
	A06B-2116-B1	A06B-2116-B4	400 W
	A06B-2063-B1	A06B-2063-B4	750 W
Bosch Rexroth	MSM019B□□□□□0	MSM019B□□□□□1	100 W
	MSM031B□□□□□0	MSM031A□□□□□1	200 W
	MSM031C□□□□□0	MSM031A□□□□□1	400 W
	MSM041B□□□□□0	MSM041B□□□□□1	750 W
Rockwell Automation	TLP-A046-010-DKA□2	TLP-A046-010-DKA□4	100 W
	TLP-A070-020-DKA□2	TLP-A070-020-DKA□4	200 W
	TLP-A070-040-DKA□2	TLP-A070-040-DKA□4	400 W
	TLP-A090-075-DKA□2	TLP-A090-075-DKA□4	750 W
SIEMENS	1FK2102-1AG0	1FK2102-1AG1	100 W
	1FK2203-2AG0	1FK2203-2AG1	200 W
	1FK2203-4AG0	1FK2203-4AG1	400 W
	1FK2204-5AK0	1FK2204-5AK1	750 W

For other motor manufacturers, models, and details, contact us.

Table 4: (H) Home position sensor and (I) limit sensor

Model	(H) Home position sensor (1 pc)			(I) Limit sensor (2 pcs)	
	None *1	Inside		None *1	Outside
		Motor side	Opposite side to motor		
ETV - 05	○	○	○	○	○
ETV - 06	○	○	○	○	○
ETV - 10	○	○	○	○	○
ETV - 14	○	○	○	○	○
ETV - 17	○	○	○	○	○
ETV - 22	○	○	○	○	○

*1: The home position sensor and limit sensors are used together. If either is “without,” select “without” for the other.
Example: A combination of the home position sensor “without” and the limit sensor “with (inside/outside)” is not available.

Table 5: (J) Body installation direction and Grease nipple

Model	(J) Grease nipple							
	Motor on Upper Side (U) Motor on Lower Side (D)		Motor on Right Side (R) Motor on Right-Upper Side (S) Motor on Right-Lower Side (T)			Motor on Left Side (L) Motor on Left-Upper Side (V) Motor on Right-Lower Side (W)		
	N	D	N	R	L	N	R	L
ETV - 05 *1	For N only <Body installation direction: Standard>		-			-		
ETV - 06 *1	N: Body installation direction - Standard *2 D: Body installation direction - Lower side		-			-		
ETV - 10 *3	-	-	○	-	○	○	○	-
ETV - 14 *3	-	-	○	-	○	○	○	-
ETV - 17 *3	-	-	○	-	○	○	○	-
ETV - 22 *3	-	-	○	-	○	○	○	-

*1: For ETV-05 and 06, no grease nipples can be installed.
*2: For ETV-06, this is an instruction for the body installation direction.
"N": Installation direction - Standard (Upper Side φ 4.5 countersink), "D": Installation direction - Select Lower Side (M5).
*3: For ETV-10 to 22, these are instructions for grease nipple installation options.
"N": None, "R": Right Side, "L": Left Side

Table 6: (K) Positioning pin hole

Model	(K) Positioning pin hole
ETV - 05 to 22	N/P

Precautions:

This product has no motor.
Please obtain, install, and adjust the motor and driver by yourself.

3. How to Install Motor/Sensors

3.1 Accessories

<Basic type>

Motor-mounting screws (common to all motor installation directions)

Model No.	Installed motor	Motor size	Screw size	Quantity
ETV-05 ETV-06 ETV-10	M	100W	M4	2
	Y		M4	2
	P		M3	4
	F		M4	2
ETV-14	M	200W	M5	4
	Y		M5	4
	P		M4	4
	F		M5	4
ETV-17	M	400W	M5	4
	Y		M5	4
	P		M4	4
	F		M5	4
ETV-22	M	750W	M6	4
	Y		M6	4
	P		M5	4
	F		M6	4

<Variations in motor installation directions>

Accessory name	Quantity
Pulley	1
Belt	1

<When home position/limit sensors are selected *1>

Sensor installation direction	Shipment configuration	Quantity
Outside sensor	Attached at shipment *1	3 *2

*1: If "without" is selected for either of home position or limit sensor, the other will be "without."
The sensor dog and sensor (ECS-10 and ECS-12) are shipped when "without" is selected.

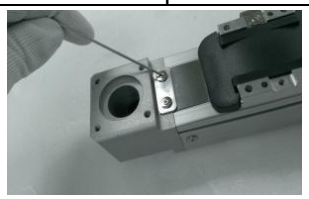
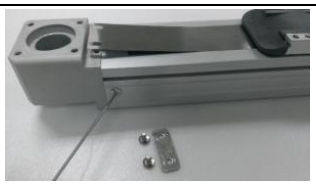
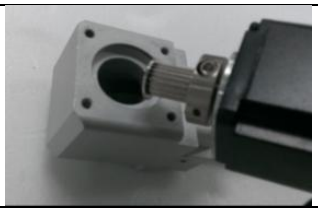
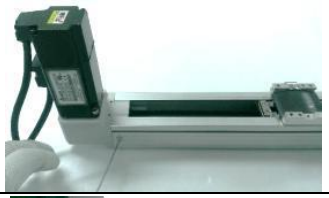
*2: The sensor-mounting screws are also attached.

3.2 How to Install Motor

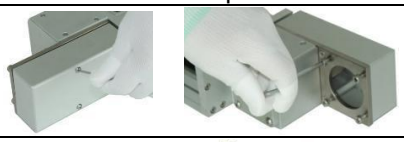
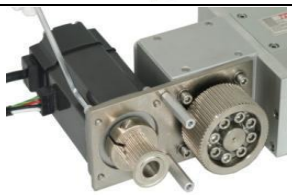
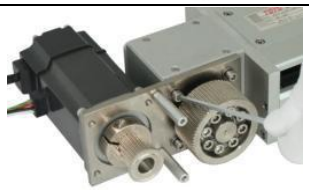
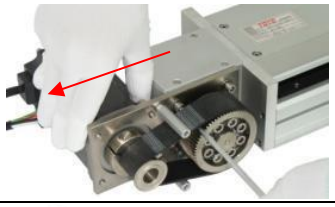
CAUTION:

Installing and adjusting a motor requires expertise and technical skills.
The work may be hazardous for individuals not having such expertise.
Before work, always power down the motor and sensors.

<Motor type: ETV-05, ETV-06, Motor installation direction: U (Motor on Upper Side), D (Motor on Lower Side)>

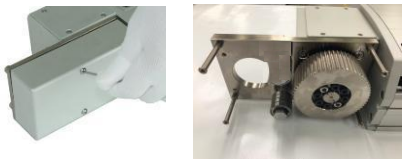
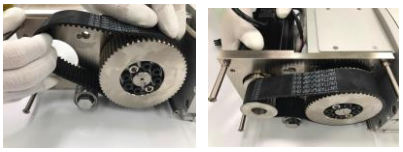
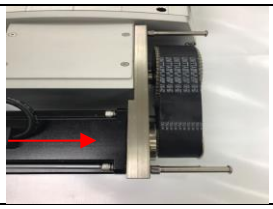
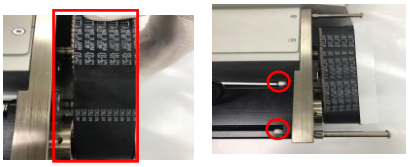
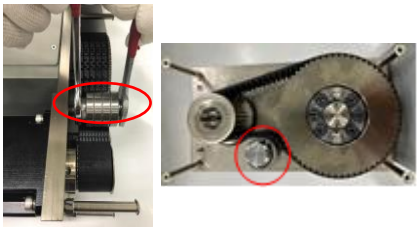
Order	Procedure	Description
(1)	Remove the four steel belt-fixing bolts to remove the steel belt and the bracket.	
(2)	Remove the four side cover-fixing bolts to remove the side cover.	
(3)	With the pulley installed on the motor, from the motor attachment, pass the pulley through the belt. (Be careful not to bend the belt.)	
(4)	Slightly tighten the four screws diagonally. Then, to keep the motor from tilting, gradually tighten the screws further to fix the motor.	
(5)	Loosen the bolt of the belt tension block to adjust the tension appropriately.	
(6)	Check the belt tension with the belt tension meter. For details on the belt tension, see page 20.	
(7)	Attach the side cover.	
(8)	Attach the steel belt and the bracket. The motor installation is completed.	

<Motor type: ETV-10-17, Motor installation direction: R (Motor on Right Side)/S (Motor on Right-Upper Side)/T (Motor on Right-Lower Side)/L (Motor on Left Side)/V (Motor on Left-Upper Side)/W (Motor on Left-Lower Side) >

Order	Procedure	Description
(1)	Remove the four mounting bolts fixing the belt cover and the motor plate.	
(2)	Mount the pulley on the motor shaft. Provide clearance between the pulley and the motor shaft.	
(3)	Check that there is no foreign object on the mounting surface, and then install the motor. Slightly tighten the four screws diagonally, and then gradually tighten the screws further to fix the motor.	
(4)	Tighten the four mounting bolts of the motor plate.	
(5)	Loop the belt over the smaller pulley, and then loop the belt over the larger pulley. Adjust the belt position at the center of the pulley.	
(6)	While adjusting the motor plate, adjust the belt tension appropriately, and then tighten the motor plate-mounting bolts.	
(7)	Check the belt tension with the belt tension meter. For details on the belt tension, see page 20.	
(8)	Attach the belt cover. The motor installation is completed.	

In the case of ETV-10, the belt has been assembled from the first.

<Motor type: ETV-22, Motor installation direction:
R (Motor on Right Side)/S (Motor on Right-Upper Side)/T (Motor on Right-Lower Side)/L (Motor on Left Side)/V (Motor on Left-Upper Side)/W (Motor on Left-Lower Side) >

Order	Procedure	Description
(1)	Remove the belt cover.	
(2)	Loosen the eccentric shaft (tension roller).	
(3)	Mount the pulley on the motor shaft. Provide clearance between the pulley and the motor shaft.	
(4)	Loop the belt over the larger pulley. Place the motor through the motor plate.	
(5)	Check that there is no foreign object on the mounting surface, and then install the motor. Insert spring washers into the four motor mounting screws and slightly tighten the screws diagonally.	
(6)	Check that the belt is installed at the center of the pulley. After the check, fix the motor with the four mounting screws.	
(7)	Fix the eccentric shaft (tension roller). The position will vary depending on the motor installation direction, but the belt tension is the same.	
(8)	Attach the belt cover. The motor installation is completed.	

Belt tension for belt-drive type motors

Model No.	Belt tension (N)
ETV-05	23～27
ETV-06	23～27
ETV-10	46～60
ETV-14	46～60
ETV-17	46～60
ETV-22	155～176

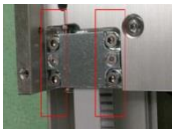
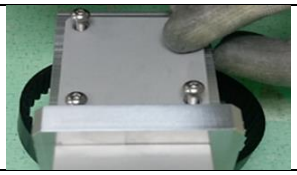
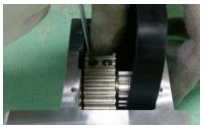
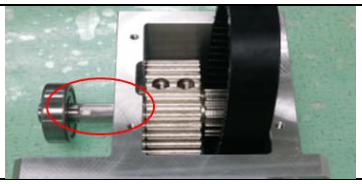
Tightening torque when engaging motor shaft with pulley

Screw Size	Tightening torque (N·m)
M3	1.7±10%
M4	3.7±10%
M5	6.7±10%
M6	9.7±10%

Tightening torque of motor-mounting screws

Model No.	Installed motor	Motor size	Screw size	Tightening torque (N•m)
ETV-05 ETV-06 ETV-10	M	100 W	M4	1.5
	Y		M4	1.5
	P		M3	0.7
	F		M4	1.5
ETV-14	M	200 W	M5	3.0
	Y		M5	3.0
	P		M4	1.5
	F		M5	3.0
ETV-17	M	400 W	M5	3.0
	Y		M5	3.0
	P		M4	1.5
	F		M5	3.0
ETV-22	M	750 W	M6	5.0
	Y		M6	5.0
	P		M5	3.0
	F		M6	5.0

<Motor type: ETV-10, Motor belt replacement method>

Order	Procedure	Description
(1)	Loosen the belt tension of the drive belt. M4 (four) and tension bolt M3 (one)	 
(2)	Remove the cover for the pulley part. Countersunk bolt M3 (eight)	 
(3)	Remove the bearing holder for the main shaft of the pulley part. M4 (four)	
(4)	Remove the main shaft of the pulley part. Loosen the screws (M5) for the pulley on the drive belt side and remove the C-shaped retaining ring for the main shaft.	 
(5)	Remove the main shaft of the pulley part, assemble the motor belt and restore it in the reverse procedure.	

3.3 How to Adjust Belt Tension

<Motor type: ETV-10 - 22>

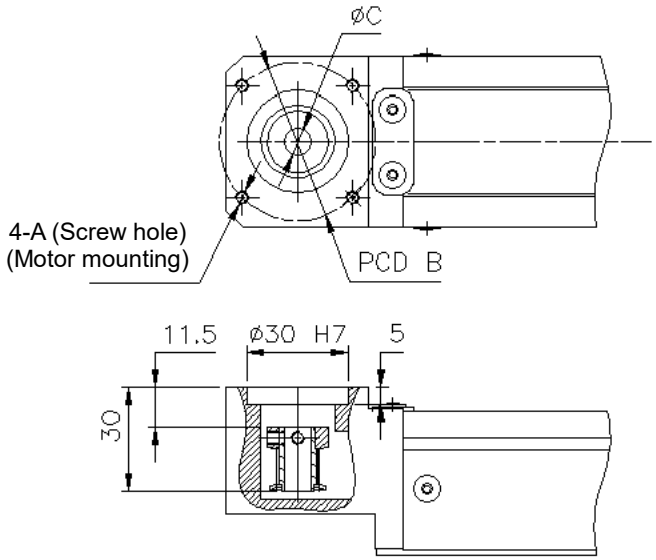
Order	Procedure	Photographic description
(1)	Loosen the four fixing bolts to remove the top cover.	
(2)	Move the slider part to the measurement reference point of the belt tension to check the tension.	
(3)	Loosen the four fixing belt-bolts to adjust the belt tension appropriately with the tension bolt.	 
(4)	Check the belt tension with the belt tension meter. For details on the belt tension, see the table below	
(5)	Attach the top cover. The belt tension adjustment is completed	

Table of belt tension at the actuator side

Model No.	Belt type	
	Standard (rubber)	Low dust (urethane)
	(N)	
ETV-05	25.2	-
ETV-06	34.5	-
ETV-10	96.0	96.0
ETV-14	157.0	157.0
ETV-17	220.0	220.0
ETV-22	373.0	373.0

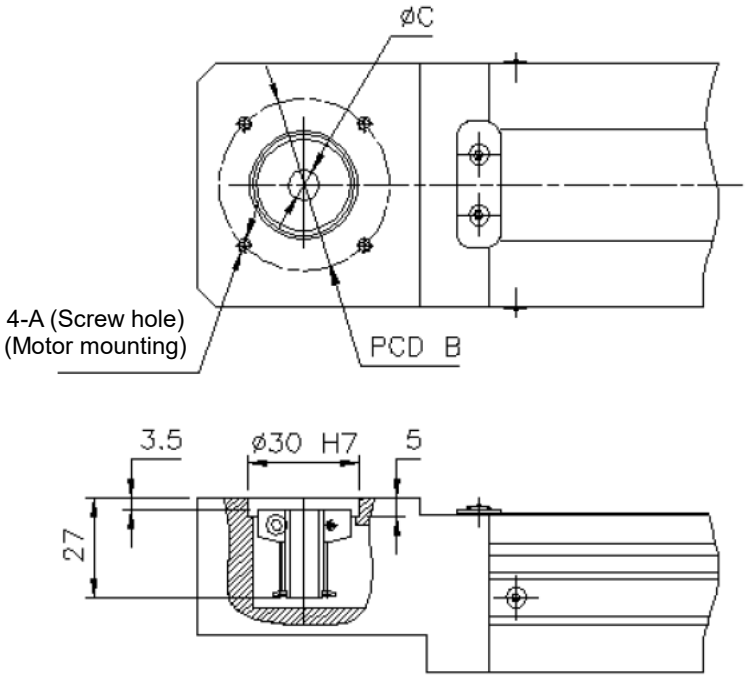
3.4 Dimensions of Motor Attachment

[ETV-05-U/D]



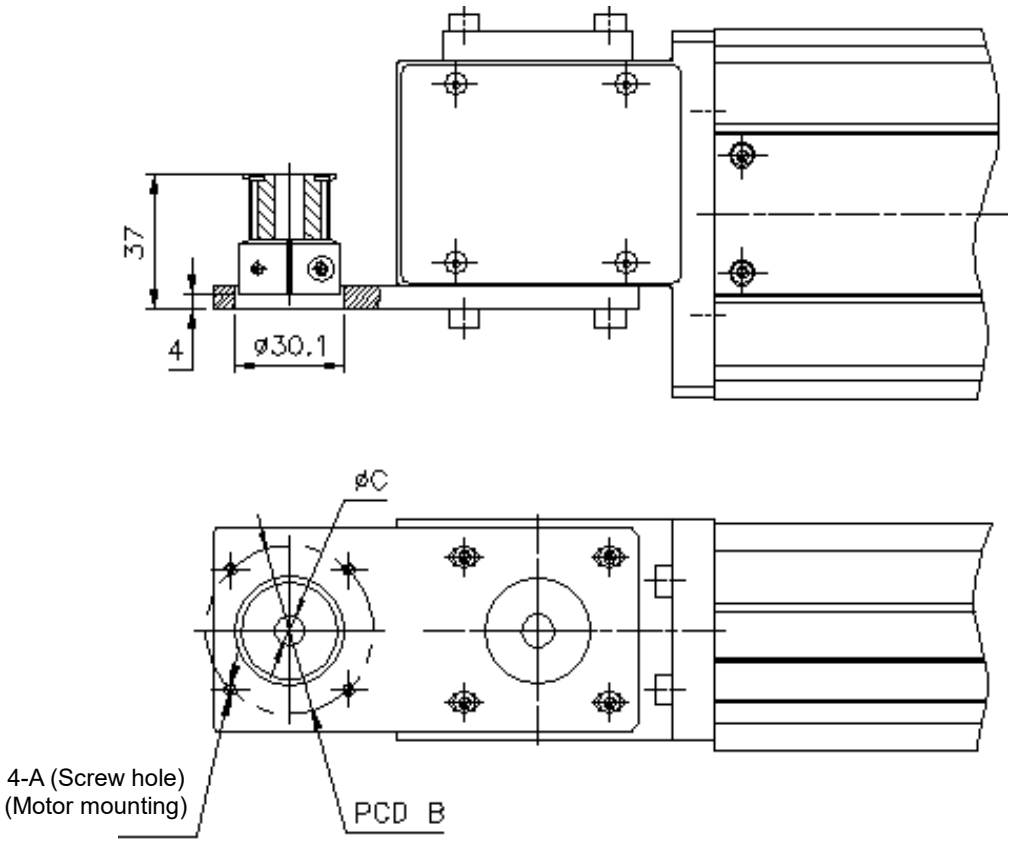
ETV-05-U/D					
Motor		A	B	C	Motor mounting screws
M	100W	M4	Φ46	Φ8	4-M4×L12
Y	100W	M4	Φ46	Φ8	4-M4×L12
P	100W	M3	Φ45	Φ8	4-M3×L12
F	100W	M4	Φ46	Φ8	4-M4×L12

[ETV-06-U/D]



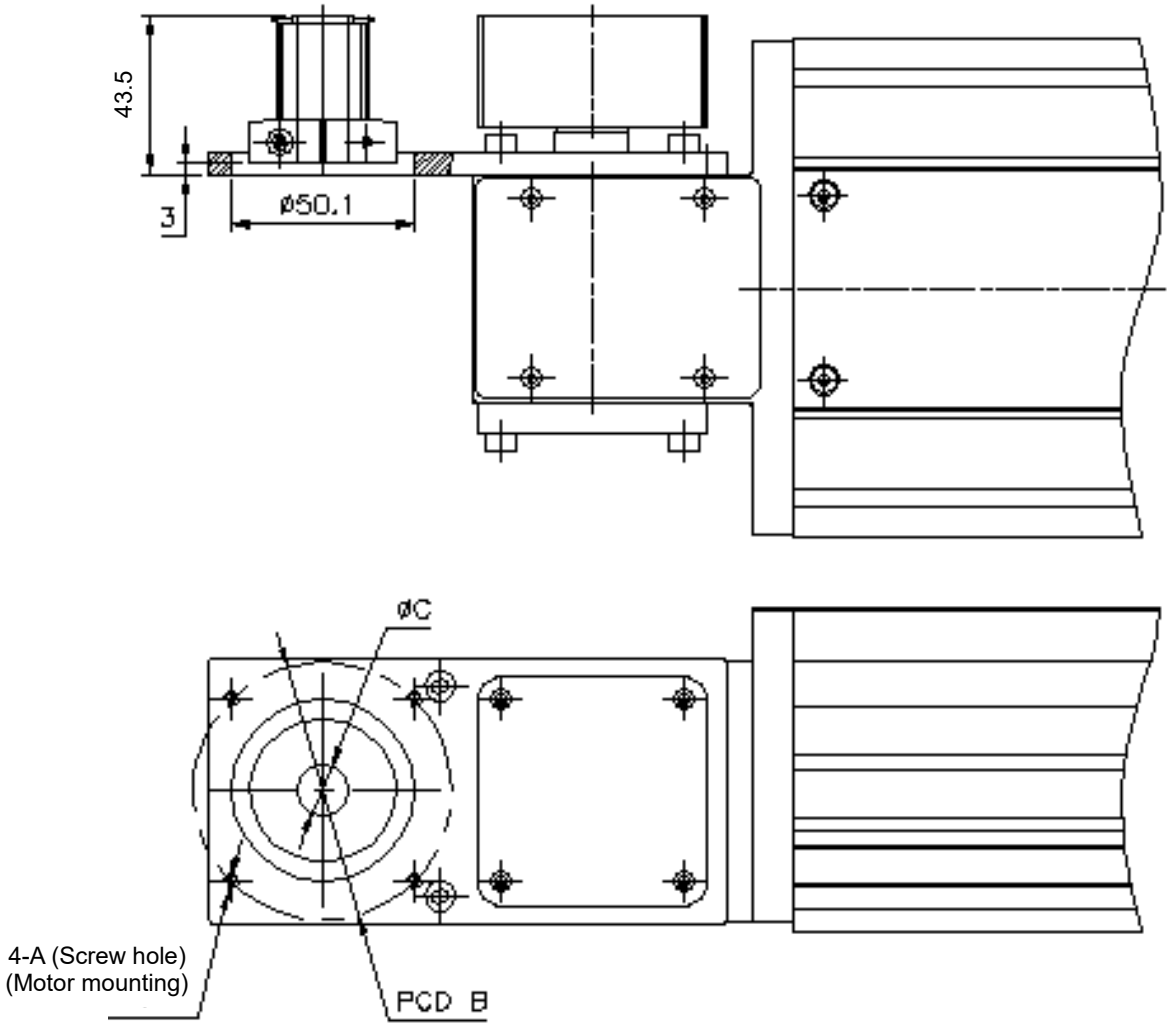
ETV-06-U/D					
Motor		A	B	C	Motor mounting screws
M	100W	M4	Φ46	Φ8	4-M4×L12
Y	100W	M4	Φ46	Φ8	4-M4×L12
P	100W	M3	Φ45	Φ8	4-M3×L12
F	100W	M4	Φ46	Φ8	4-M4×L12

[ETV-10-R/S/T/L/V/W]



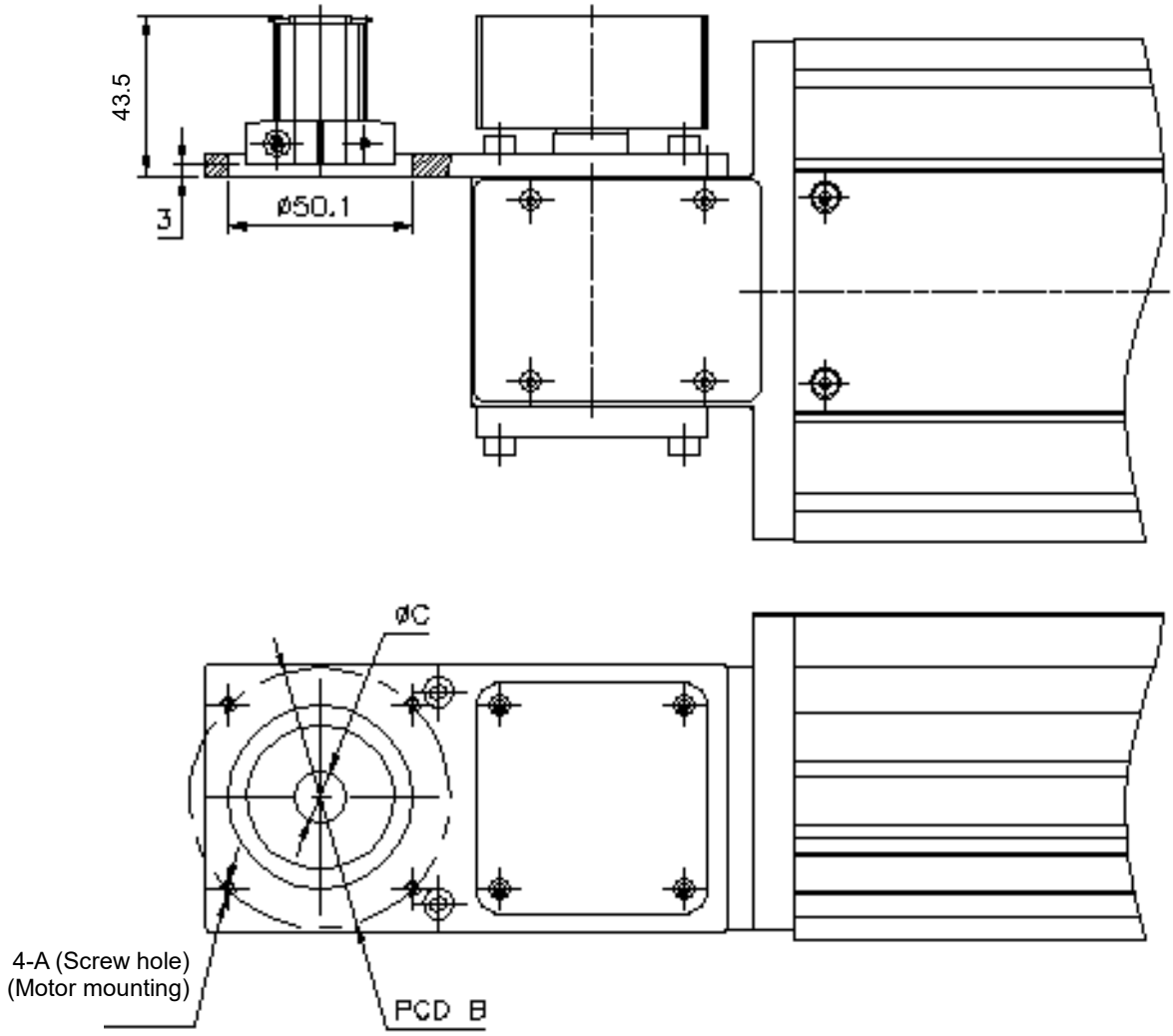
ETV-10-R/S/T/L/V/W					
Motor		A	B	C	Motor mounting screws
M	100W	M4	Φ46	Φ8	4-M4×L12
Y	100W	M4	Φ46	Φ8	4-M4×L12
P	100W	M3	Φ45	Φ8	4-M3×L12
F	100W	M4	Φ46	Φ8	4-M4×L12

[ETV-14-R/S/T/L/V/W]



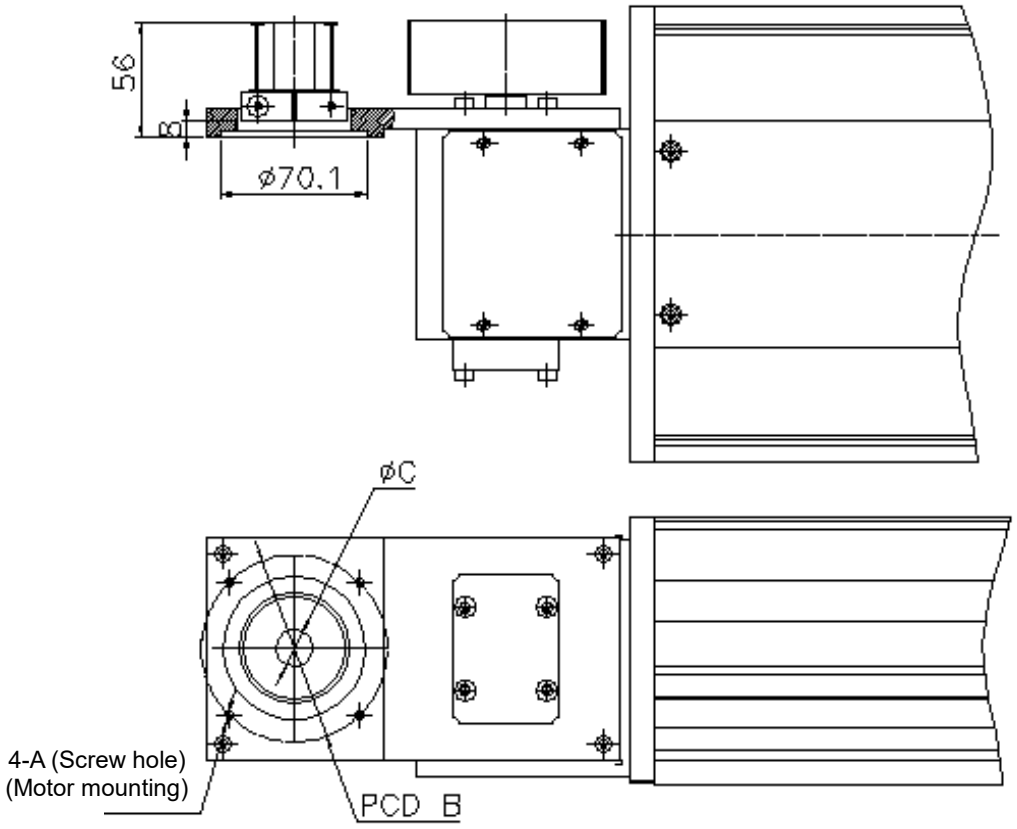
ETV-14-R/S/T/L/V/W					
Motor		A	B	C	Motor mounting screws
M	200W	M5	Φ70	Φ14	4-M5×L12
Y	200W	M5	Φ70	Φ14	4-M5×L12
P	200W	M4	Φ70	Φ11	4-M4×L12
F	200W	M5	Φ70	Φ9	4-M5×L12

[ETV-17-R/S/T/L/V/W]

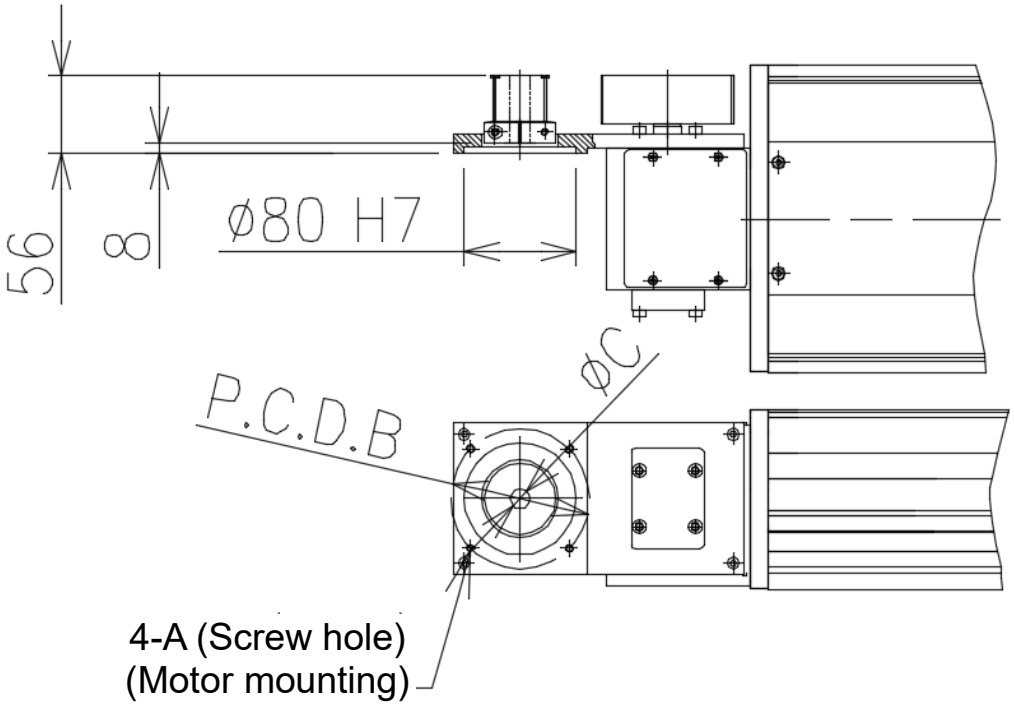


ETV-17-R/S/T/L/V/W					
Motor		A	B	C	Motor mounting screws
M	400W	M5	Φ70	Φ14	4-M5×L12
Y	400W	M5	Φ70	Φ14	4-M5×L12
P	400W	M4	Φ70	Φ14	4-M4×L12
F	400W	M5	Φ70	Φ14	4-M5×L12

[ETV-22-R/S/T/L/V/W]
(M･Y･P specifications)



(F specifications)



ETV-22-R/S/T/L/V/W					
Motor		A	B	C	Motor mounting screws
M	750W	M6	Φ90	Φ19	4-M6×L20
Y	750W	M6	Φ90	Φ19	4-M6×L20
P	750W	M5	Φ90	Φ19	4-M5×L20
F	750W	M6	Φ90	Φ14	4-M6×L20

3.5 How to Install Sensors

To install the outside sensor, insert the attached nut into the sensor rail on the product body. The inside sensor, which has been fixed at the factory before shipment, cannot be adjusted.

4. Installation

4.1 Confirmation of Delivered Product

Please confirm that the delivered product is the product (model) as per order.
Also inspect the product for any transport damage and deformation.

* If you have any questions as to the descriptions on the product, do not use it. Please contact the dealer or the distributor from you purchased it immediately.

4.2 Instructions on Handling Delivered Product

4.2.1 Handling of Packed Product

- Handle the product carefully so as not to drop it and apply impact on the package.
- Do not carry a heavy package by one person alone.
- When placing the product in a static position, place it horizontally.
- Never get on the package.
- Do not place heavy objects that deform the package or objects that concentrate the load on the package.

4.2.2 Handling of Unpacked Product

- When unpacking the actuator from the package, hold the body part and pick it up.
- Be very careful not to be injured by a sensor dog, etc.
- When carrying the actuator, be careful not to apply impact on it due to dropping, etc.
- Do not apply an external force to every part of the actuator.

4.3 Installation Environment

- Check the ambient temperature and atmosphere of the product specifications for product storage and operation.
- Do not install or use the product in a place where the product can be exposed to water or oil.
  * Doing so may result in current leakage or fire failure. Exposure to oil droplets and oil mist is also strictly prohibited.
- Use the product in a place where the operating ambient temperature is 0 to 50°C. Ventilate the place if the heat is trapped there.
- Install the product in a place where it is not exposed to direct sunlight, dust, heat generating element and where there are no corrosive gas, explosive gas, flammable gas, and flammables. This product is not designed to be resistant to chemical substances.
- Do not install the actuator in places subject to strong vibration or impact. Doing so may result in malfunction.

4.4 Installation of Product Body

- The flatness of the mounting surface where the actuator is installed should be 0.05 mm/200 mm or less, and do not give twist or bending force to the product.
  * Installing the actuator on an uneven surface may result in damage or malfunction of the product.
- When installing the product on the mounting surface, tighten the screws with the following proper torque:

M4	1.5 N•m
M5	3.0 N•m
M6	5.2 N•m
M8	12.5 N•m
M10	24.5 N•m

4.5 Installation of Transfers

- The flatness of the mounting surface where the transfer to be attached to the product should be 0.05 mm/200 mm or less, and do not give twist or bending force to the product.
- Use the product within the specified transport load, allowable moment, and overhang amount.

5. Operation

Please read “Introduction” of this instruction manual thoroughly, and use the product within its specifications.
This product has no motor.
Please obtain, install, and adjust the motor and driver by yourself.
For details on how to install the motor properly, refer to this instruction manual.
For details on how to adjust the motor, refer to the instruction manual of the motor you prepared.

The recommended servomotors have a gain adjustment function to control vibration.
Adjust the gain and operate the product under vibration-controlled conditions (during operation/halts).
If the product is operated under vibration/resonance conditions, the product life may be shortened.
Set the acceleration and deceleration time during operation to 0.4 sec or greater.

6. Maintenance & Inspection

To ensure longer service life of the product, carry out the following inspections and perform maintenance as necessary.
Always turn the power off before inspection, except for items 1, 2, and 3.

Inspection Items

Inspection Items	Inspection Methods	Inspection Frequency	Corrective Actions
1. Check the product and transfers are mounted securely.	Looseness inspection	Daily	Additionally tighten them.
2. Check the cables for breaks or damages.	Visual inspection	Daily	Repair is required.
3. Check the moving parts (such as the linear guide and dust-proof plate) for trapped foreign objects and for poor lubrication condition.	Visual inspection	Daily	Clean the product if necessary. *1 After cleaning, put grease at 3-month intervals or at a travel distance of approx. 100 km.*2
4. Check that the belt tension is appropriate.	Tension control	Every time	Adjust the belt tension.
5. Check for any belt abnormality	Visual inspection	Daily	Check for any wear or abrasion on the tooth/side surface, partial breaks, vertical cracks on the tooth part, or cracks on the back surface. Repair (replacement) is required.
6. Check for any vibration or noise during halts as if the product is in operation.	Sound inspection		Adjust the gain. Repair is required.

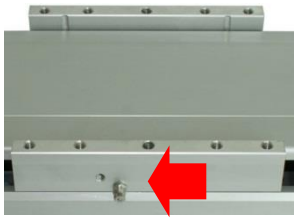
*1: Use a soft cloth for cleaning and make sure that no foreign object remains in the moving parts.
*2: For details on how to put grease, see the following page.

Grease Lubrication

Before greasing, turn the power off.

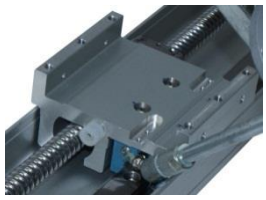
	Recommended grease
Standard series	AFEP2(YAMABARA)
ETV FP series	Super Lube (Synco Chemical) (multipurpose grease)

a) Model equipped with grease nipple:
Pump grease through the grease nipple on the slider part.
(The linear guide and ball screw part are greased.)



b) Model equipped with no grease nipple:
Grease the following parts (linear guide rail, and linear guide block).

Linear guide rail



Linear guide block

Replacement and Adjustment of Dust-Proof Plate

Before replacing or adjusting the dust-proof plate, turn the power off.

(1) Remove the screws on the slider part.

(2) Remove the screws on both sides of the dust-proof plate.

(3) Remove the plastic holding springs of the slider carefully not to lose them.

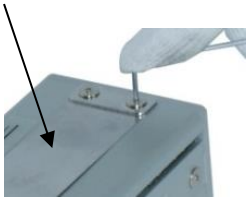
(4) Clean and replace the plate.

(5) When mounting the dust-proof plate, stretch the plate toward both ends so that there is no warp on it, and then tighten the screws.

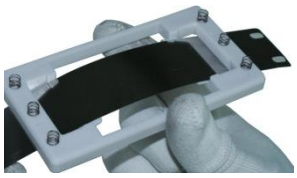
* Note that the dust-proof plate is easily deformed.
Handle it carefully.

Dust-proof plate

(1)

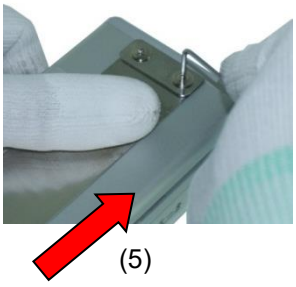


(2)



(3)

(4)



(5)

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