KOGANEI
http://www.koganei.co.jp

Catalog No.BK-C0049

NEW Products

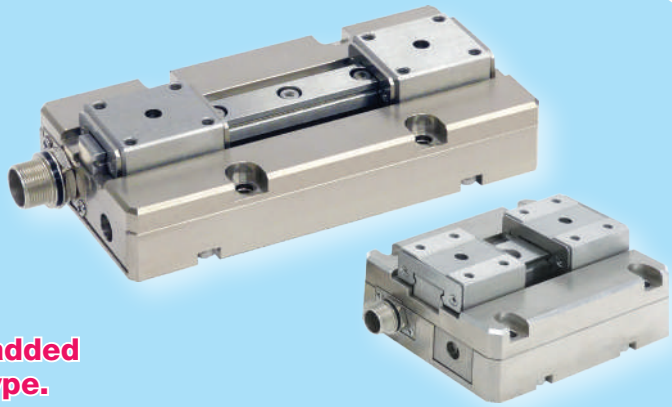
Electric actuators

Elewave Series

- Electric Hand Flat Type (Standard stroke type/Long stroke type)
- Electric Hand (Standard type/High-speed type)
- Electric Rotary Actuator
- NS Slider

NEW

CC-Link



The CC-Link remote device type has been added to the controller for the electric hand flat type.

NS slider
EWM5

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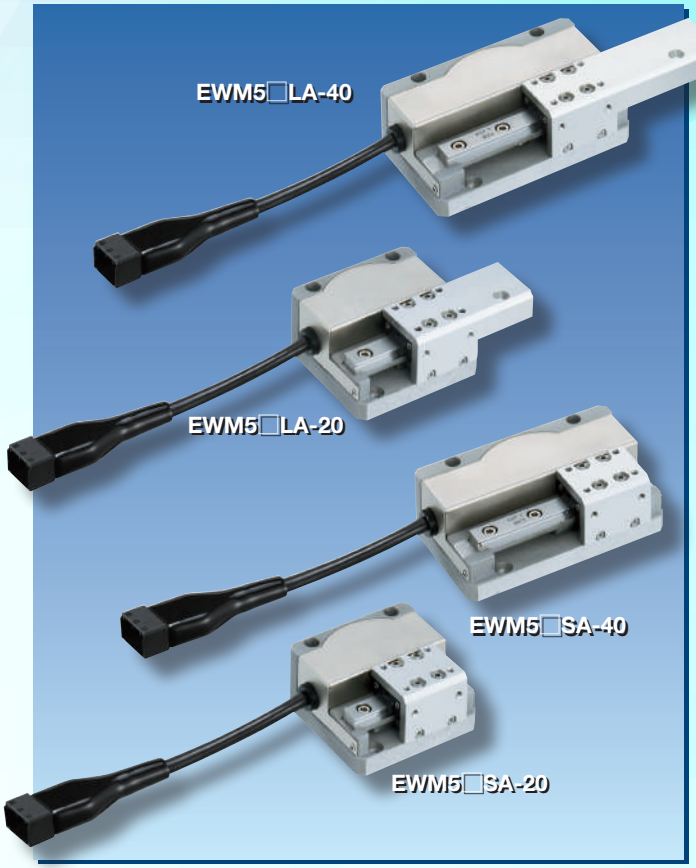
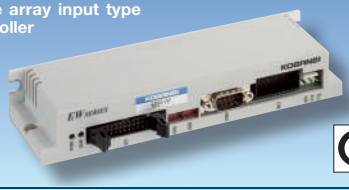
Compact and thin square form actuator to stir creativity



- High-speed type (120 mm/s) [4.724 in/sec] and high thrust type (50 N)
- Short stroke actuator that minimizes dead space in the stroke direction (st 20, 40)
- Long table type suitable for push control selectable
- Multi-point positioning operation available (64 points)
- Desired acceleration and deceleration (smooth, shockless operation even at low speed)
- Soft touch with desired speed control
- High precision and high rigidity with linear guide
- Mode selection for positioning and thrust control
- Force control and missed step detection with stepping motor + encoder
- Sense pushing position with communication function (length measurement function included)
- Size detection enables workpiece selection

● Point input type controller

● Pulse array input type controller



Support Software

(supports Windows 95, 98, 2000, Me, NT4.0, XP, VISTA, 7, 8, 8.1, and 10)*

*Windows is a registered trademark of Microsoft Corporation.
*The electric hand flat type supports Windows XP (SP3), VISTA, 7, 8, 8.1, and 10

Free-of-charge

- Elewave Series dedicated support software
- Can be downloaded free-of-charge from the KOGANEI website
- Parameters and point data can be edited from the support software
- Movement to a specified point can be performed from the support software

Teaching Box

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- Settings such as parameters and point data can be configured
- Point movement and teaching movement can be performed
- Simple programming function included

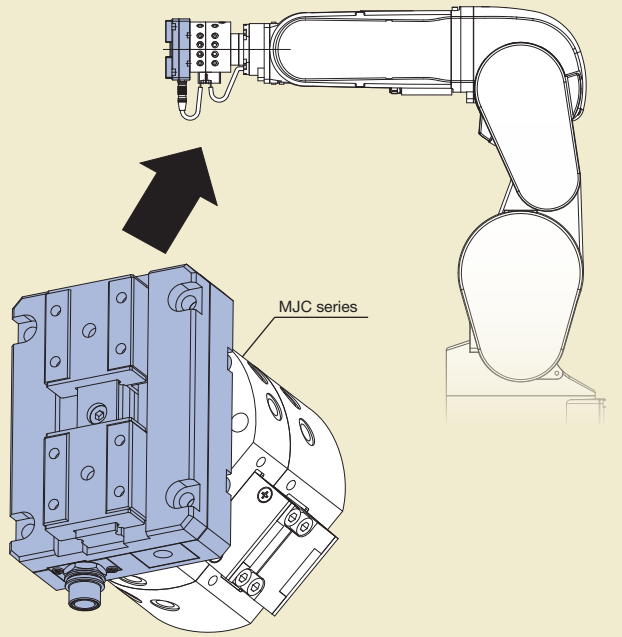
⚠ CAUTION Make sure to read the safety precautions on page ⑧ before use.

Expand the possibilities of manufacturing with user ideas!

Application example

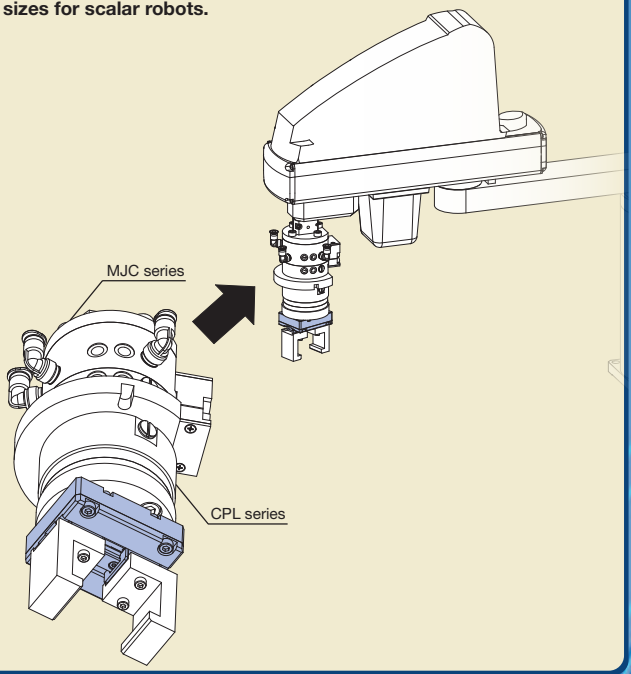
Electric hand flat type unit (1)

Can be directly mounted to an auto hand changer (MJC Series).
The low-profile, lightweight design promotes increased takt or more compact sizes for vertical multi-joint robots.



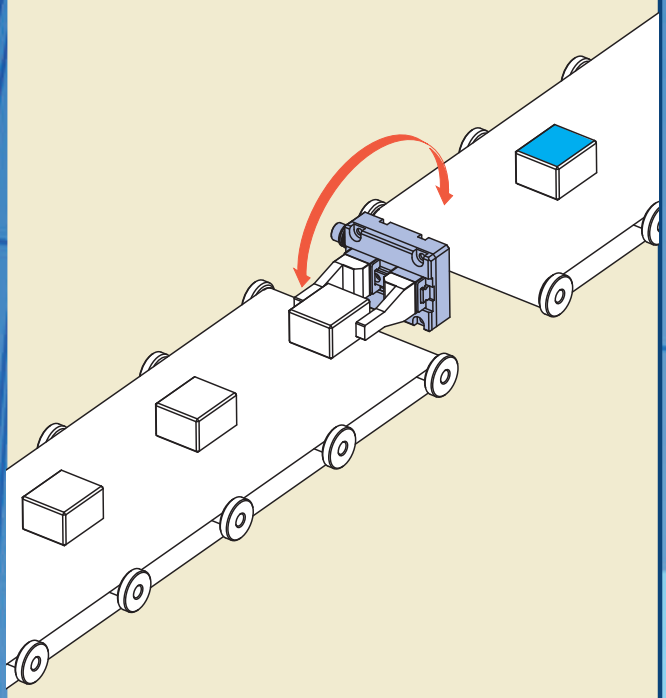
Electric hand flat type unit (2)

Can be mounted to a compliance light (CPL Series) with a dedicated adapter.
Can be directly mounted to the CPL Series or an auto hand changer (MJC Series).
The lightweight design promotes increased takt or more compact sizes for scalar robots.



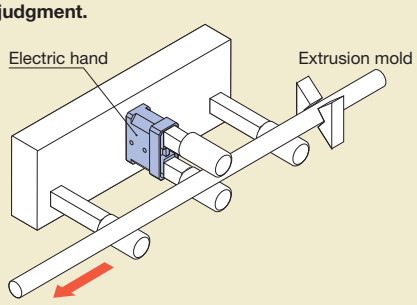
Workpiece Reversal

An electric hand flat type can be used to perform reversal in narrow areas.



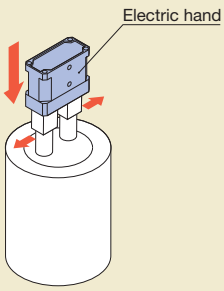
Measurement of Outer Diameter

Example of preventing the inclusion of faulty tube mold items (with a different diameter)
Use the gripping mode and communication function to read external diameter data of the gripped tube to a PC to perform tolerance judgment.



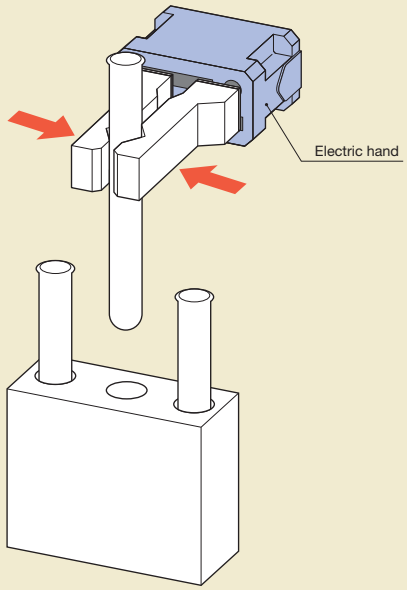
Measurement of Inner Diameter

Example of performing inner diameter judgment on containers and inner diameter judgment after making holes
Attach the jig to the hand tip, and perform tolerance judgment by touching the inner surface of the workpiece with the hand in the gripping mode.



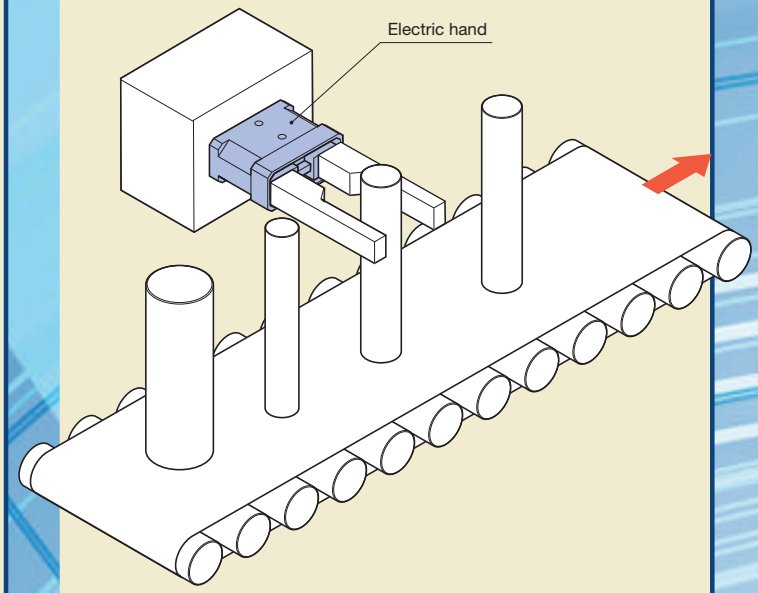
Gripping a Test Tube

Example of gripping delicate workpieces like a test tube



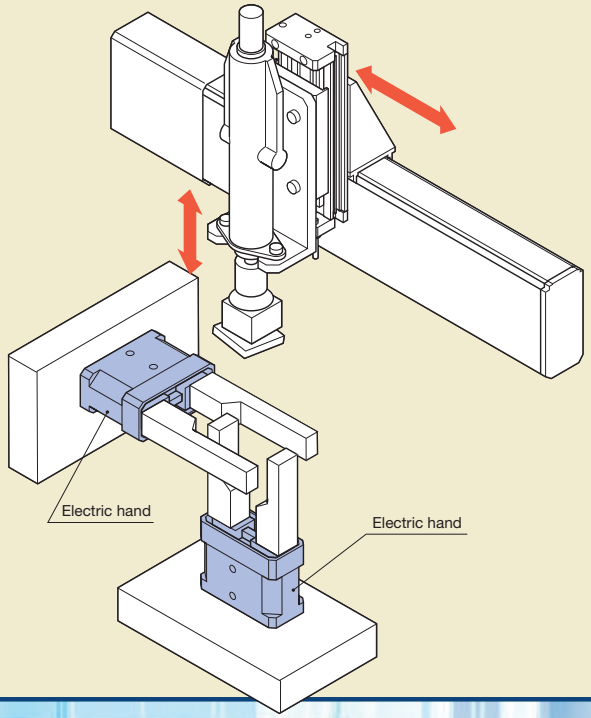
Workpiece Tolerance Determination

Example of preventing the inclusion of workpieces with a different diameter and preventing the leak of faulty items Grip the workpiece with the gripping mode and perform tolerance judgment.

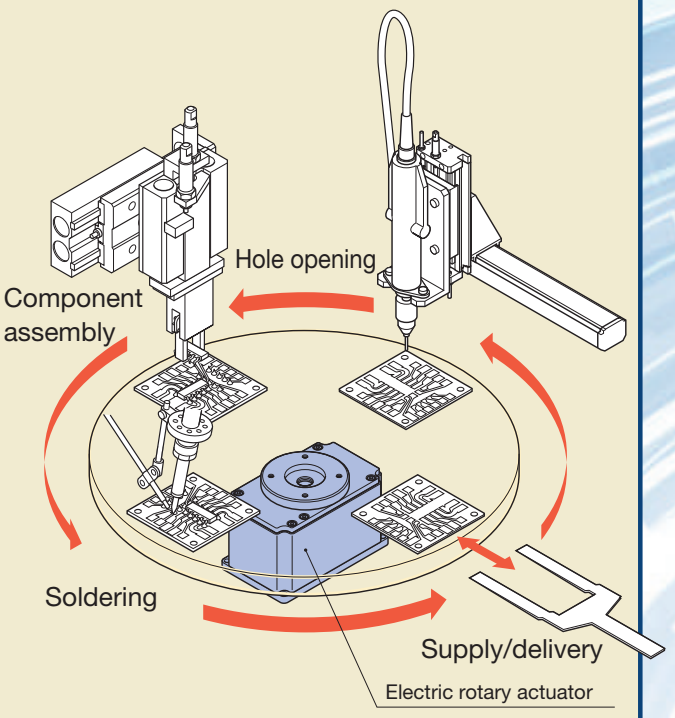


Correction of Parts Position

Example of gripping the workpiece with the positioning mode to perform position control
Perform part positioning correction between pick and place in the IC mounting process. Perform correction in the vertical and horizontal directions simultaneously with two electric hands.



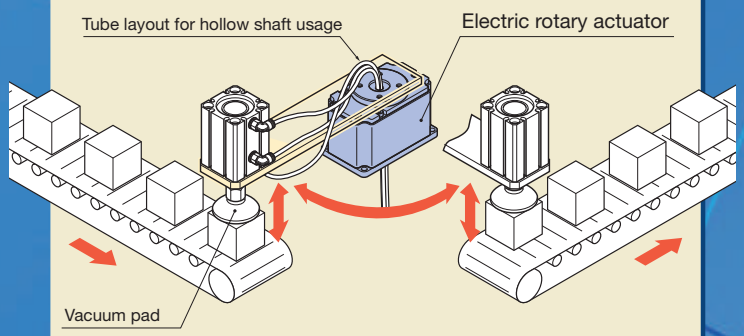
Indexing Table for Automatic Assembly



Application example

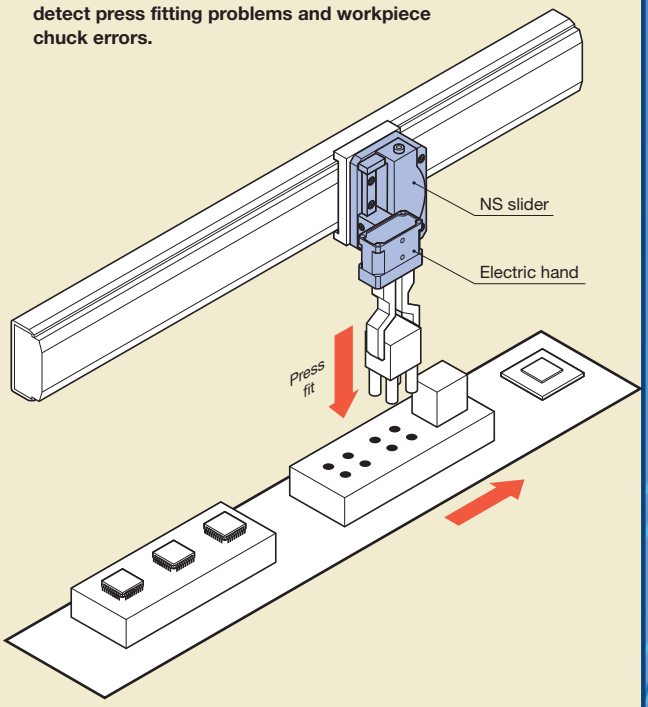
Swing Loading the Workpiece

Example of tube layout for hollow shaft usage



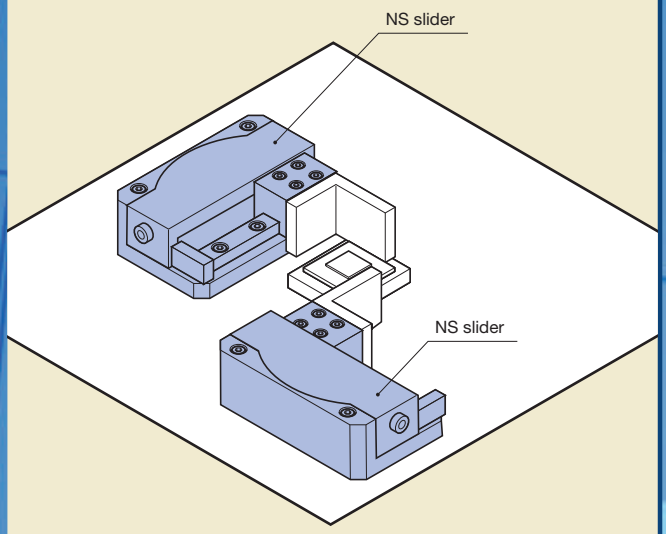
Workpiece Press Fitting

Example of press fitting terminals of compact parts and case caulking, etc.
Perform climb motion with positioning mode and workpiece press fitting with pushing mode. Add judgment function to detect press fitting problems and workpiece chuck errors.



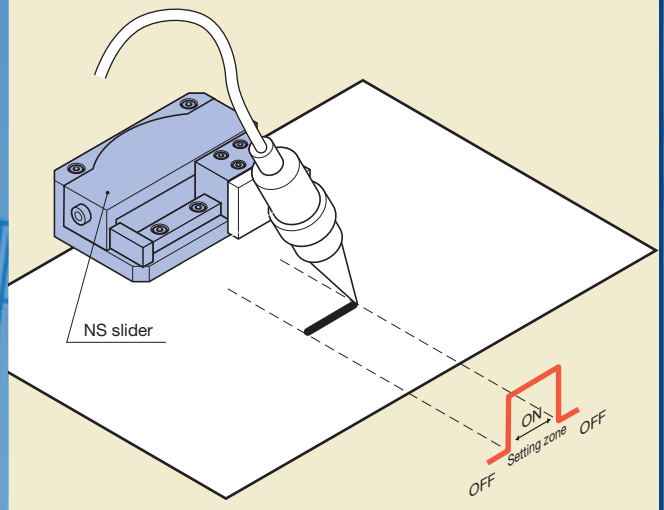
Correction of Parts Position

Example of gripping the workpiece with the positioning mode to perform position control
Perform device positioning correction in the SMT process. Perform correction in the vertical and horizontal directions simultaneously with two NS sliders.



Zone Output (Pulse array input type controller only)

Example of using zone output
Perform dispensing by performing external output at regular intervals via zone output during point movement. This can be used for simple straight line application of solvents and applying a fixed amount of coating, etc.



Safety Precautions (Elewave)

Make sure to read the safety precautions before use.

Before selecting and using the products, please read all the Safety Precautions carefully to ensure proper product use.
The Safety Precautions described below are to help you use the product safely and correctly, and to prevent injury or damage to you, other people, and assets.
Make sure to also follow the safety regulations in JIS B 8433 (safety requirements for industrial robots).

The directions are ranked according to degree of potential danger or damage: "DANGER", "WARNING", "CAUTION" and "ATTENTION."

⚠ **DANGER**	Indicates situations that can be clearly predicted as dangerous. Failure to avoid the indicated danger creates the risk of death or serious injury. It could also result in damage or destruction of assets.
⚠ **WARNING**	Indicates situations that, while not immediately dangerous, could become dangerous. Failure to avoid the indicated danger creates the risk of death or serious injury. It could also result in damage or destruction of assets.
⚠ **CAUTION**	Indicates situations that, while not immediately dangerous, could become dangerous. Failure to avoid the indicated danger creates the risk of minor or semi-serious injury. It could also result in damage or destruction of assets.
⚠ **ATTENTION**	While there is little chance of injury, this content refers to points that should be observed for appropriate use of the product.

■ This product was designed and manufactured for use in general industrial machinery.

- ■ When selecting and handling equipment, the system designer or another person with sufficient knowledge and experience should always read the Safety Precautions, catalog, instruction manual and other documentation before commencing operation. Improper handling is dangerous.
- ■ The customer is responsible for verifying and judging the compatibility of these products with your systems.
- ■ After reading the Instruction Manual, catalog, and other documentation, always store them in a location that allows easy availability for reference to users of this product.
- ■ Whenever transferring or lending the product to another person, always attach the catalog, instruction manual, and other documentation to the product where they are easily visible in order to ensure that the new user can learn how to use the product safely and properly.
- ■ The danger, warning and caution items listed under these Safety Precautions do not cover all possible contingencies. Read the catalog and instruction manual carefully, and always keep safety first.

⚠ DANGER

- ● Do not use the product for the purposes listed below:
  1. Medical equipment related to maintenance or management of human lives or bodies.
  2. Mechanisms, machines, or equipment designed for the purpose of moving or transporting people.
  3. Critical safety components in machines or equipment. This product has not been planned or designed for purposes that require high levels of safety. Using the product in any of the ways described above creates the risk of loss of human life.
- ● Do not use in locations with or near dangerous substances such as flammable or ignitable substances. The product could ignite or burst into flames.
- ● While the product is in operation or in the state where it can be operated, avoid entering the operation range of the machine. In addition, do not make any adjustments to the interior or to the attached mechanisms while in operation. The actuator can move suddenly, possibly resulting in injury.
- ● Persons who use a pacemaker, etc., should keep a distance of at least 1 meter [3.28 ft.] away from the product. There is a possibility that the pacemaker will malfunction due to the magnetism of the strong magnet built into the product.
- ● When attaching the product, always firmly support and secure them (including workpieces) in place. Dropping or falling of the product or abnormal operation could result in injury.
- ● Never attempt to modify the product. It could result in abnormal operation leading to injury, electrocution, or fire, etc.
- ● Never attempt inappropriate disassembly or assembly of the product's basic construction, or of its performance or functions. This could result in injury, electrocution, fire, etc.
- ● Do not splash water on the product. Splashing it with water, washing it, or using it underwater could result in abnormal operation of the product, leading to injury, electrocution, fire, etc.

⚠ WARNING

- ● Do not use an actuator as a device for absorbing the shocks and vibrations of machines or equipment. Doing so could possibly result in injury or damage to the machines or equipment.
- ● Do not use the product in excess of its specification range. Doing so creates the risk of product breakdown, loss of function, or damage. It could also drastically reduce operating life.
- ● Design safety circuits or equipment to ensure that damage to the product or injury does not occur if the device stops in the event of a system error such as an emergency stop or power failure.
- ● When using the product in the following locations, make sure to implement adequate shielding measures.
  Failure to do so may lead to a malfunction, which can cause damage to the product or injury.
  1. Locations where large currents and strong magnetic fields are emitted
  2. Locations where noise is emitted due to electrostatic, etc.
  3. Locations that may be exposed to radiation
- ● Make sure to implement type D grounding (grounding resistance 100 Ω or less).
  There is a possibility of electrocution and malfunction due to electric leakage.
- ● Before installing the product to equipment, etc., confirm that the installation, wiring, and operating commands are appropriate. Using the product without checking could possibly result in injury caused by contact with moving parts or damage to the machines or equipment.
- ● Before supplying electricity to the device and before starting operation, always conduct a safety check of the area of machine operation. Unintentional supply of electricity could possibly result in electrocution, or in injury caused by contact with moving parts.
- ● Do not touch the terminal and the miscellaneous switches, etc., while the device is powered on. There is a possibility of electrocution and abnormal operatio.
- ● Do not damage the cords such as the cables.
  Damaging, forcibly bending, pulling, winding, or placing heavy objects on, or pinching cords could result in fire or electrocution due to electric leakage or conduction failure, or cause abnormal operation, etc.
- ● If abnormal noise is emitted or vibrations become abnormally high, immediately stop operation. Continuing to use the product could result in damage or break it, resulting in abnormal operation, or runaway, etc.
- ● Do not throw the product into fire.
  The product could explode and/or release toxic gases.
- ● Do not sit on the product, place your foot on it, or place other objects on it.
  Doing so could result in a fall, injury due to the product falling down or falling over, damage to the product, or malfunction or runaway, etc. due to damage.
- ● When conducting any kind of operation for the product, such as maintenance, inspection, repair, or connection/disconnection or replacement of piping, always turn off the electricity supply completely.
- ● Use the product within the recommended load and speed.

Make sure to read the safety precautions before use.

⚠ CAUTION

- Do not use the product in locations that are subject to direct sunlight (ultraviolet rays); locations with high humidity, dust, salt, or iron powder, or atmospheres including organic solvents, phosphate ester type hydraulic oil, sulfur dioxide, chlorine gas, acids, etc. It could lead to early shutdown of some functions, a sudden degradation of performance, and a reduced operating life.
- Do not use the product in atmospheres including corrosive gas, combustible gas, or flammable liquid, etc. It could lead to degraded strength due to rusting or cause the motor to ignite or explode.
- Make sure to use the specified controller for the product. Using another controller may cause product failure or runaway, etc.
- Install the main unit and controller in a location with low levels of dust. Installing them in a location with high levels of dust may cause malfunction.
- Do not install the product in a location subject to strong vibrations (4.9 m/s^2 [0.500 G] or higher). Strong vibrations may cause malfunction.
- When mounting the product, leave room for adequate working space around it. Failure to do so will make it more difficult to conduct routine maintenance, which could eventually lead to system shutdown or damage to the product.
- Do not bring magnetic media, within 1 meter [3.28 ft.] of the product. There is the possibility that the data on the magnetic media will be destroyed due to the magnetism of the magnet.
- Sitting on the product, placing your foot on it, or placing other objects on it may damage, dent, or deform the moving parts. It could damage or break it, resulting in operation shutdown or reduced performance.
- When performing installation or adjustment work, indicate that work is being performed to ensure that the power is not unintentionally turned ON, etc. It could cause electrocution or injury due to sudden actuator operation.
- Never conduct an insulation resistance test or withstand voltage test on the controller.
- Do not apply excessive force to the base of the main unit cable.
- Do not secure the connector of the main unit cable with bending moment applied.

⚠ ATTENTION

- When considering the possibility of using this product in situations or environments not specifically noted in the Catalog or Instruction Manual, or in applications where safety is an important requirement such as in an aircraft facility, combustion equipment, leisure equipment, safety equipment, and other places where human life or assets may be greatly affected, take adequate safety precautions such as the application with enough margins for ratings and performance or failsafe measures. Be sure to consult us with such applications.
- Isolate the operating parts of the machines or equipment, etc. with a protective cover, etc. to ensure that they do not come into contact with the human body.
- Configure the control so that the workpiece does not fall down in the event of a power failure.
  Implement fall prevention control for workpieces, etc. in the event of a power failure or emergency stop of the machines or equipment.
- Check the instruction manual for information on product installation and wiring.
- When handling the product, wear protective gloves, protective goggles, safety shoes etc. as required to maintain safety.
- Perform routine maintenance to confirm that the system requirements are met in order to prevent accidents.
- When the product becomes unusable or unnecessary, dispose of it properly as industrial waste.
- For inquiries about the product, contact your nearest KOGANEI sales office or the KOGANEI overseas group. The addresses and telephone numbers are shown on the back cover of this catalog.

⚠ Others

- Make sure to follow the items below.
  1. When using this product in systems, always use genuine KOGANEI parts or compatible parts (recommended parts). When conducting maintenance and repairs, always use genuine KOGANEI parts or compatible parts (recommended parts).
     Always observe the prescribed methods and procedures.
  2. Never attempt inappropriate disassembly or assembly of the product's basic construction, or of its performance or functions.

KOGANEI shall not be held responsible for any problems that occur as a result of these items not being properly observed.

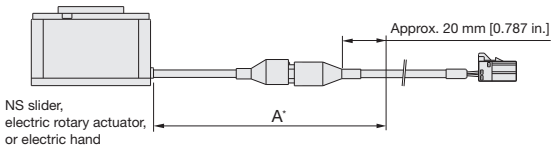
General Precautions

Environment

1. Avoid using the main unit, controller, or teaching box in locations subject to water droplets or oil droplets, or dusty locations.
2. Avoid using the product in locations where corrosive gases such as sulfuric acid or hydrochloric acid are emitted.
3. Avoid using the product in locations subject to strong vibrations or shocks.

Wiring

1. The method for connecting the I/O wire for connecting to external devices such as a controller or programmable controller differs between the previous **EWC-R** and **EWC-H** controllers and the current **EWHC-RA**, **EWHC-RS**, **EWHCP-RA**, **EWHCP-RS**, **EWHC-NH**, **EWHCP-NH**, **EW2C-H-NP**, and **EW2C-H-PN** controllers. When replacing an existing controller, make sure to check the connection method in the instruction manual.
2. Do not use the cable between the main unit and connector (indicated by A in the figure below) in a manner where it will be repeatedly bent.



* Approximately 50 mm [1.969 in.] from the main unit connector for the EWHRT40A and EWHRT60A electric rotary actuators.

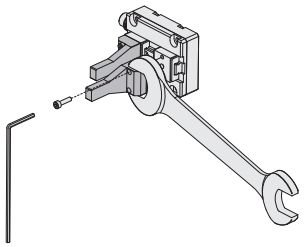
3. Do not apply excessive force to the base of the cable on the main unit side. Secure the cable so that a load such as twisting or pulling is not applied to the connector. Do not secure the resin connector with bending moment applied.
4. Secure the cable so that a load such as twisting, pulling, or bending is not applied to the connector of the controller.

Others

1. Do not apply external force to the claw or workpiece attached to the main unit. Excessive force or external shocks may cause parts to become damaged or displaced. Make sure to check the operation and the settings, as this can cause faulty operation or displacement of the workpiece or claw.

   In particular, the table does not move by external force with the electric hand flat type. Do not apply excessive shocks to the table. To manually move the table, use the straight groove for table operation.

   *The straight groove for table operation on the side of the main unit, which is used for manually operating the table, cannot be used if "-1" is selected as the cable direction. (EW2H8, EW2H18, EW2HL8, EW2HL18)
2. Make sure to read the instruction manual before use.
3. When mounting the claw to a table, perform screw tightening after securing the claw so that excessive force or shocks are not applied to the table or guide.

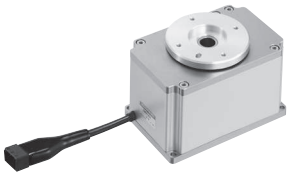


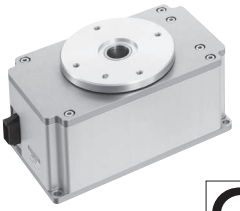
*See the table below for the torque for tightening to a table.

Type	Thread size	Thread depth (mm [in.])	Maximum tightening torque (N·m [in·lbf])
EW2H8	M2.5	3 [0.118]	0.36 [3.2]
EW2H18	M3	3 [0.118]	0.63 [5.6]
EW2H28	M3	3.5 [0.138]	0.63 [5.6]
EW2HL8	M2.5	3 [0.118]	0.36 [3.2]
EW2HL18	M3	3 [0.118]	0.63 [5.6]
EW2HL28	M3	3.5 [0.138]	0.63 [5.6]
EWHA12A	M2.5	3 [0.118]	0.36 [3.2]
EWHA24A	M3	3 [0.118]	0.63 [5.6]
EWHA36A			
EWHA6H	M2	3 [0.118]	0.18 [1.6]
EWHA12H	M2.5	2.5 [0.098]	0.36 [3.2]
EWHA24H	M3	3.5 [0.138]	0.63 [5.6]
EWHA36H			
NS slider	M3	4 [0.157]	0.63 [5.6]

4. Use a combination of electric actuator and controller indicated in the chart on page ⑥⑨ .
5. Provide sufficient space around the controller (20 mm [0.787 in.] or more) to ensure ventilation.
6. Use the F.G wire of the power cable for the ground terminal of the controller.
   When using the EW2C-H-CC or EW2C-H-CCD (CC-Link type), it is recommended that the F.G wire of the power cable is grounded at a distance of 250 mm [9.843 in.] or less. If the distance is longer than 250 mm [9.843 in.], external noise may affect communication.
   The following measures, including connections with peripherals, are required to conform with CE standards.
   1. Attach a clamp filter to the power cable (2 turns).
   2. Attach a clamp filter to the controller side of the relay cable.
      - EW2C-H-NP, EW2C-H-PN: 1 (2 turns)
      - EW2C-H-CC: 3 (2 turns each)
      - EW2C-H-CCD: 4 (2 turns each)
   3. Do not use the relay cable bundled together with other cables or coiled.
   4. Use the CC-Link cable with a maximum length of 30 m [98.425 ft.].
   5. When operating the product with a teaching box (EW2TB) connected, attach a clamp filter (2 turns) to the cable of the teaching box.
7. The grease film may be lost if reciprocations are performed within a short distance.
   It is recommended that you perform about five reciprocations at full stroke every 5,000 to 10,000 reciprocations to restore the grease film.
8. Set the mass of the workpiece to actually grip to about 1/10 to 1/20 of the gripping force.
9. When moving the electric hand with the workpiece gripped, set the mass of the workpiece to about 1/30 to 1/50 of the gripping force.
10. Use the figures in the specifications charts and graphs as rough estimates, as the mass of the workpiece that can be gripped differs greatly according to factors such as the claw material and shape, state of the gripping surface, and workpiece transfer speed.
11. When pressing (gripping) a workpiece, be sure to use the Pressing mode (gripping mode). Pressing (gripping) in Positioning mode will result as error and will damage the actuator.

Electric rotary actuator





Specifications

● Main unit basic specifications

Item \ Type			EWHRT1A	EWHRT3A	EWHRT5A	EWHRT10A	EWHRT20A	EWHRT40A	EWHRT60A
Motor			Two phase stepping motor						
Maximum torque		N·m [in·lbf]	0.1 [0.9]	0.25 [2.2]	0.5 [4.4]	1.0 [8.9]	2.0 [17.7]	4.0 [35.4]	6.0 [53.1]
Repeated positioning precision*2		°	±0.02						
Angle detection			Optical encoder (with origin point)						
Maximum load inertia*3		kg·m² [lb·ft²]	3.0 x 10^{-4} [2.21×10^{-4}]	1.0 x 10^{-3} [0.74×10^{-3}]	3.0 x 10^{-3} [2.21×10^{-3}]	2.0 x 10^{-3} [1.48×10^{-3}]	2.0 x 10^{-2} [1.48×10^{-2}]	5.0 x 10^{-2} [3.69×10^{-2}]	1.0 x 10^{-1} [0.74×10^{-1}]
Minimum operation time*4	(90° load free)	s	0.2	0.1	0.2	0.12	0.2	0.3	
	(90° maximum load)	s	0.35	0.25	0.4	0.25	0.5		0.65
Minimum speed		rps	0.5	0.01					
Operating temperature range		°C [°F]	0 to 40 [32 to 104]						
Allowable thrust load		N	100			200		400	
Allowable radial load		N	100			200		400	
Allowable moment		N·m [in·lbf]	2.5 [22.1]			5.5 [48.7]		10.0 [88.5]	
Mass*5		kg [lb]	0.3 [0.661]	0.34 (0.4) [0.750 (0.882)]		0.8 (0.9) [1.764 (1.984)]		2.0 (2.3) [4.409 (5.071)]	2.2 (2.5) [4.850 (5.512)]
Applicable controllers			EWHC-RS,EWHCP-RS	EWHC-RA,EWHCP-RA					

*1 **EWHRT40A** and **EWHRT60A** are the type where the cable does not protrude from the main unit (the connector is built into the side of the main unit).
*2 The repeated positioning precision for pulsation.
*3 The workpiece mass moment of inertia must be at or below the maximum load inertia.
*4 The value when there is no load torque.
*5 Values in parentheses are the mass with brake.

● See pages ㊺ and ㊻ for the controller specifications.

Order Codes

EWHRT □ **A** - □ - □ - □ - □

Elewave electric rotary actuator

Size
1 : Torque 0.1 N·m [0.9 in·lbf]
3 : Torque 0.25 N·m [2.2 in·lbf]
5 : Torque 0.5 N·m [4.4 in·lbf]
10 : Torque 1.0 N·m [8.9 in·lbf]
20 : Torque 2.0 N·m [17.7 in·lbf]
40 : Torque 4.0 N·m [35.4 in·lbf]
60 : Torque 6.0 N·m [53.1 in·lbf]

Brake
Not specified: Without brake
B: With brake*1

Controller type
Not specified: Without controller
C: With **EWHC-RA** or **EWHC-RS** (point input type)
CP: With **EWHCP-RA** or **EWHCP-RS** (pulse array input type)

DIN rail mounting plate
Not specified: Without mounting plate
DP: With mounting plate (cannot be selected without controller)

Cable length (relay cable)
Not specified: Without cable
3L: 3 m [9.843 ft.]
5L: 5 m [16.404 ft.]

*1 There is no EWHRT1A with brake.

● Additional parts

Point input type controller
[Accessories]
・Power cable
・I/O cable

EWHC - RA - □

DIN rail mounting plate
Not specified: Without mounting plate
DP: With mounting plate

EWHC - RS - □ **(for EWHRT1A)**

DIN rail mounting plate
Not specified: Without mounting plate
DP: With mounting plate

Pulse array input type controller
[Accessories]
・Power cable
・I/O cable
・Pulse array input cable
・Conversion cable for pulse array input connector

EWHCP - RA - □

DIN rail mounting plate
Not specified: Without mounting plate
DP: With mounting plate

EWHCP - RS - □ **(for EWHRT1A)**

DIN rail mounting plate
Not specified: Without mounting plate
DP: With mounting plate

DIN rail mounting plate **EW2DP**

Cable (relay cable)*2
*2 Robot cable

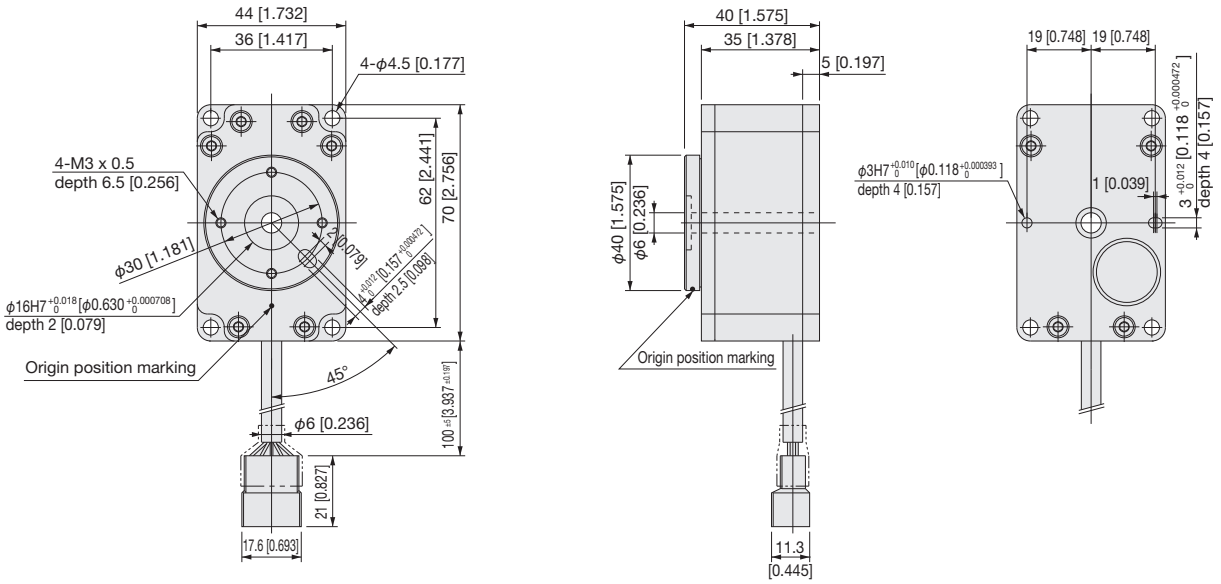
EWHKA - □

Cable length
3L: 3 m [9.843 ft.]
5L: 5 m [16.404 ft.]

Teaching*3 box **EWHTB**

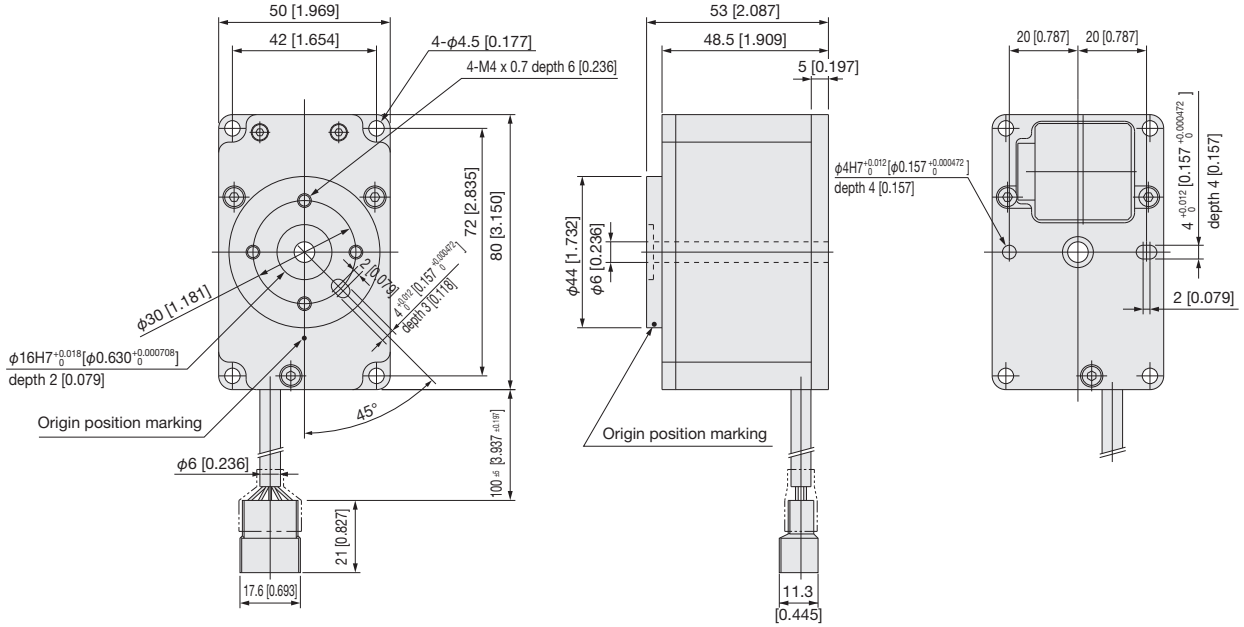
*3 See page ㊾ for the specifications and dimensions.

EWHRT1A



*The origin position of the table is when the slot of the locating dowel pin is in the position indicated in the figure above.

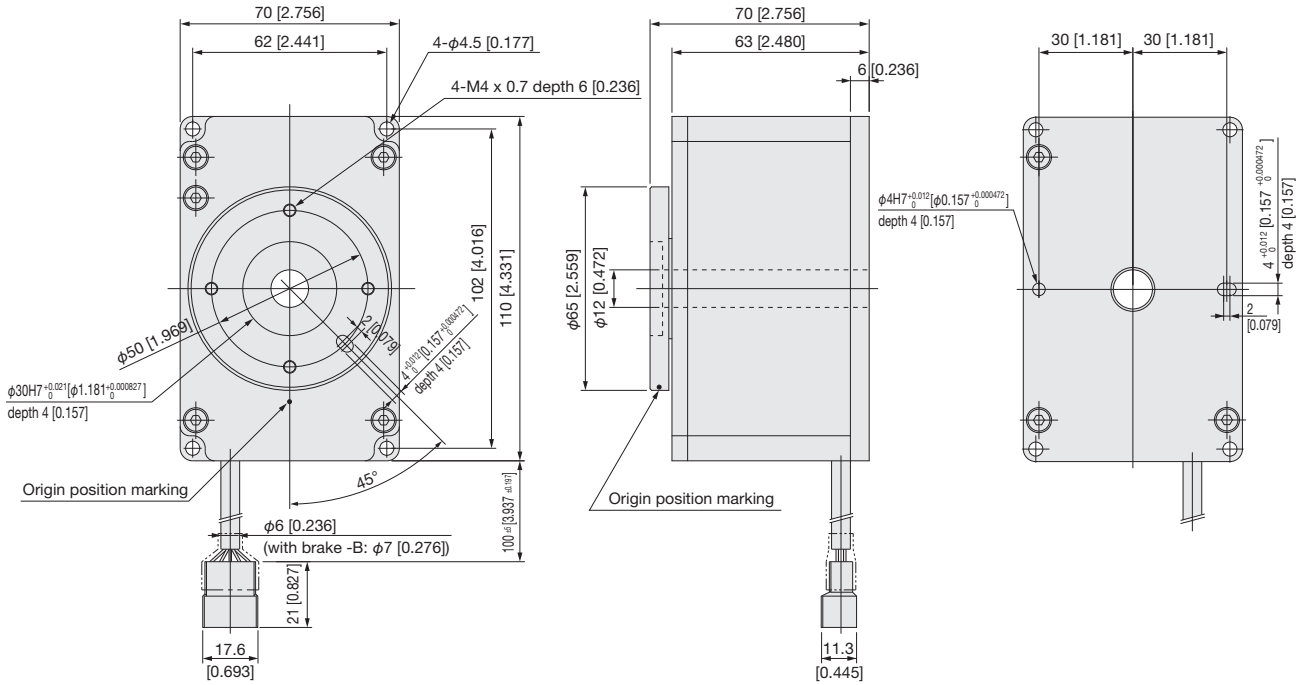
EWHRT3A
EWHRT5A



*The origin position of the table is when the slot of the locating dowel pin is in the position indicated in the figure above.

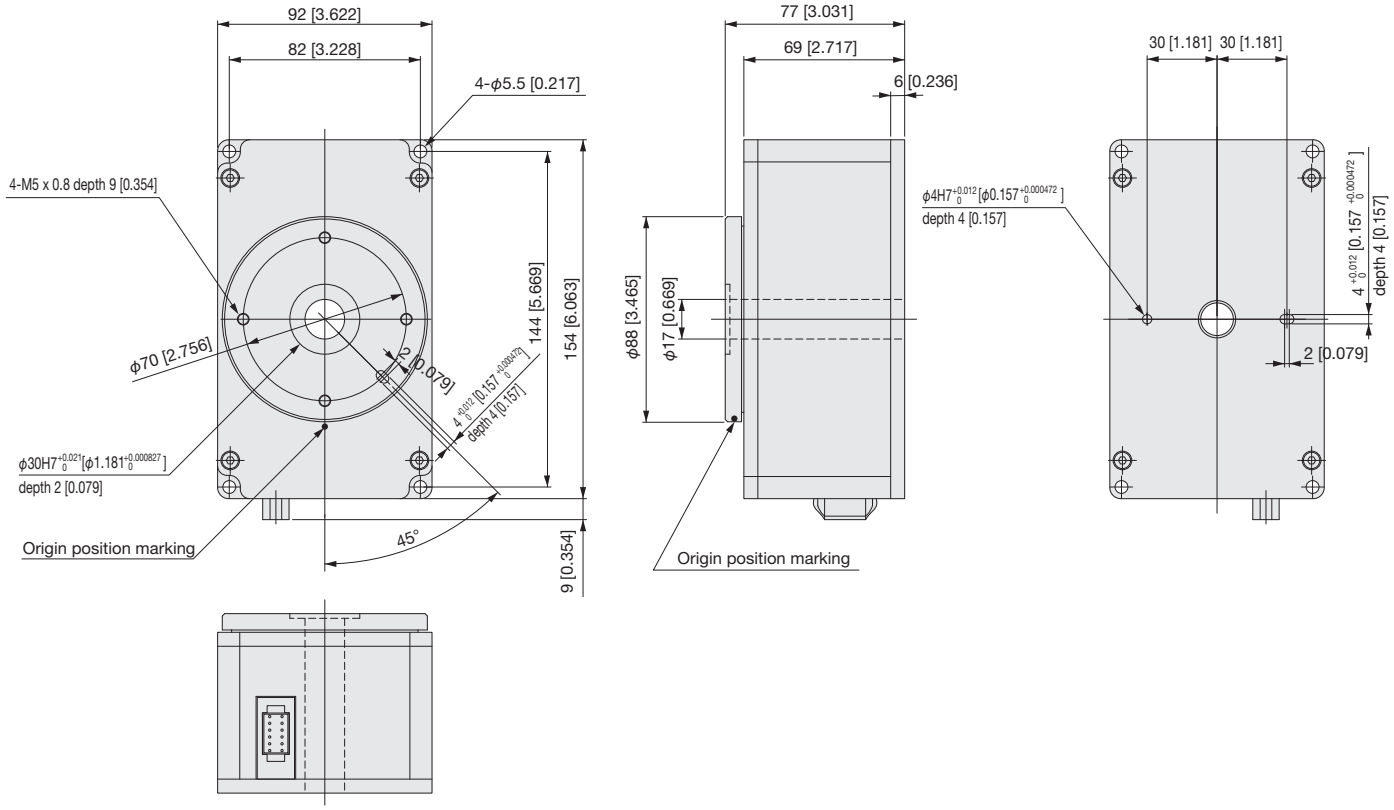
Electric rotary actuator dimensions mm [in.]

EWHRT10A
EWHRT20A



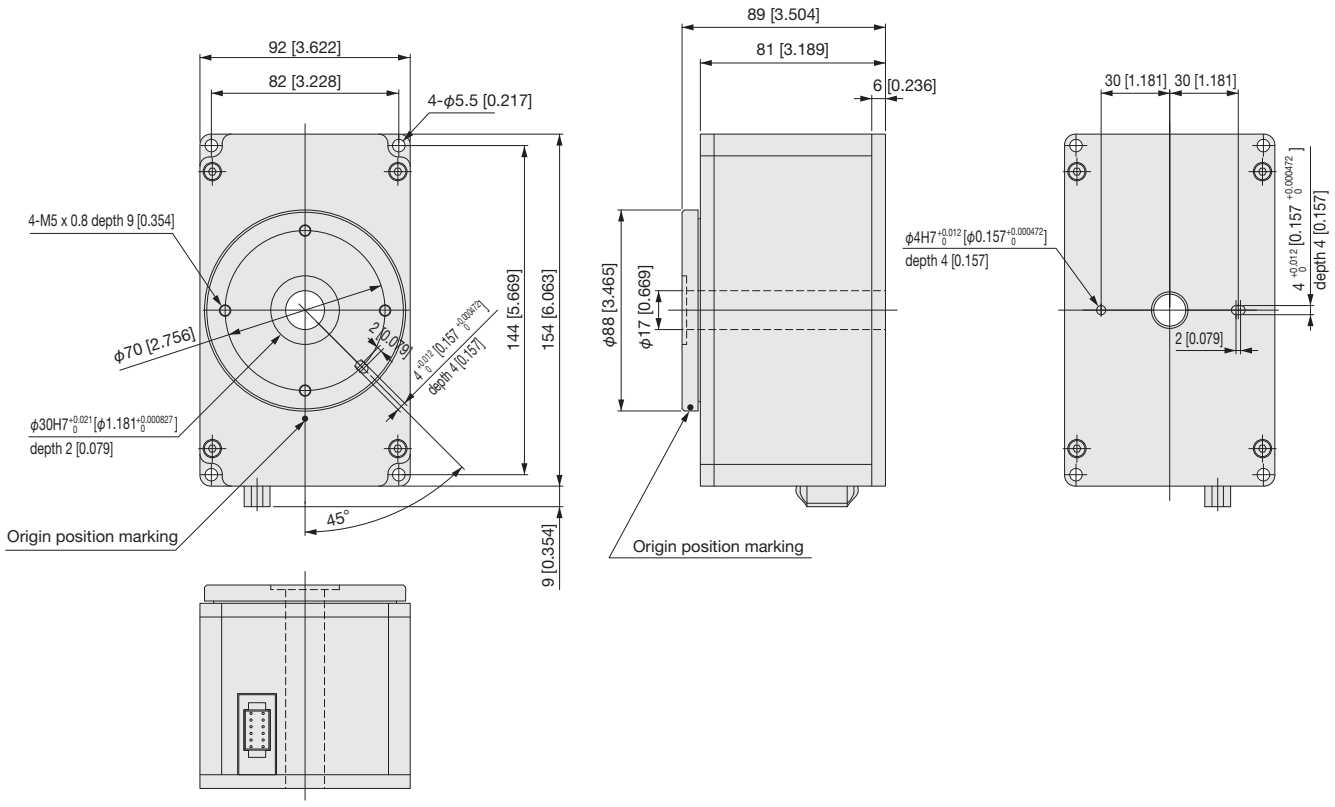
*The origin position of the table is when the slot of the locating dowel pin is in the position indicated in the figure above.

EWHRT40A



*The origin position of the table is when the slot of the locating dowel pin is in the position indicated in the figure above.

EWHRT60A



*The origin position of the table is when the slot of the locating dowel pin is in the position indicated in the figure above.

Controller

Point input type

Specifications

Item	Type	EWHC-RA,EWHC-RS
Axis control	Motor drive system	Microstep drive
	Control method	Closed loop control*1
	Operating method	PTP
	Origin detection method	Encoder Z phase
	Position detection method	Encoder A/B phase output
	Minimum setting distance (angle)	0.01°
	Acceleration setting	1 to 100 % (automatically set by load inertia)
	Point setting	64 points
	Point input method	Numeric input, teaching input, direct teaching
External input/output	Point setting input	6 point (POS0～POS5) photocoupler receptor 5 mA TYP/point
	Control input	3 point (ORG, START, STOP) photocoupler receptor 5 mA TYP/point
	Control output	3 point (READY, BUSY, INPOS) 30 mA Max./point
	Error detection output	Overload, wiring disconnection, data error, system error
	External communication	RS232C 1 ch (computer, TB communication)
	Motor drive output	Dedicated cable (with F.G.)
	Encoder input	Dedicated cable (shielded)
General specifications	Mass	0.2 kg [0.441 lb]
	Power supply	DC 24 V±10 % 1.6 A Max. (motor, I/O power supply shared)*2
	Operating temperature	0 to 40 °C [32 to 104°F]
	Operating humidity	35 to 85 % RH (without condensation)
	Storage temperature	-10 to 65 °C [14 to 149°F]
	Backup	Setting conditions retained in EEPROM
	Noise resistance	IEC61000-4-4 level 3
	Accessories	I/O cable, power cable

*1 Missed step detection is performed via a rotary encoder.
*2 The maximum consumption current value differs according to the actuator. See the table below.

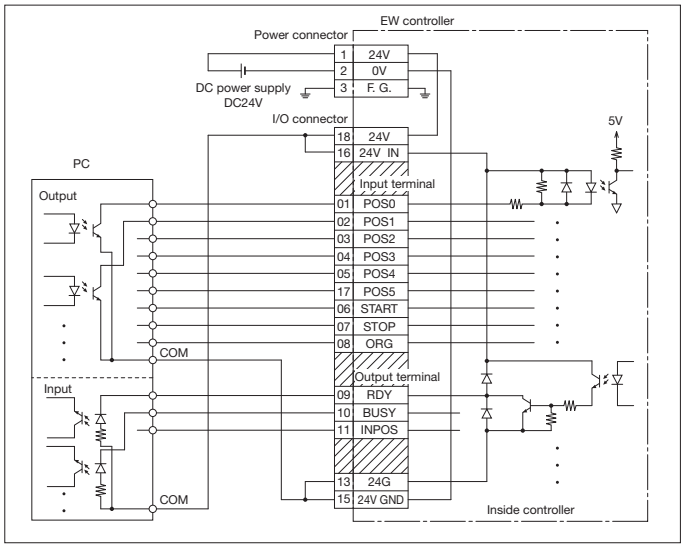
Maximum consumption current (electric rotary actuator)

(A)

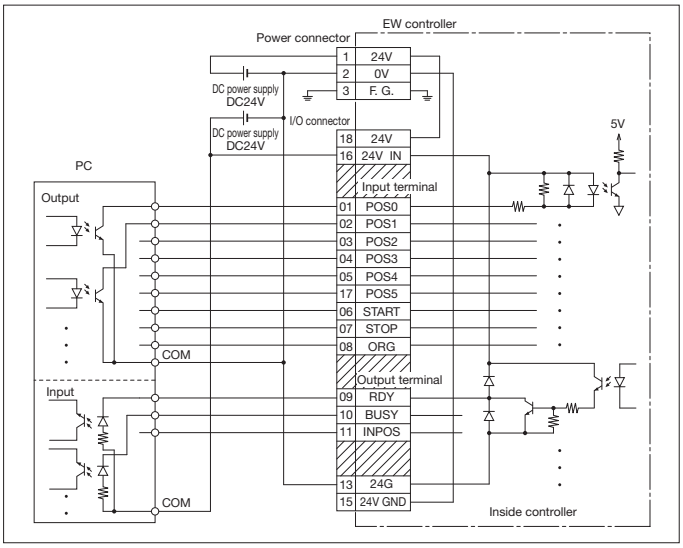
Model	EWHRT1A	EWHRT3A	EWHRT5A	EWHRT10A	EWHRT20A	EWHRT40A	EWHRT60A
Standard	0.6	1.0				1.3	
With brake	-	1.0				1.6	

Controller Wiring Method

1. When using the internal power supply of the controller (electric rotary actuator)



2. When not using the internal power supply of the controller (electric rotary actuator)



Controller

Pulse array input type

Specifications

Item	Type	EWHCP-RA,EWHCP-RS
Axis control	Motor drive system	Microstep drive
	Control method	Closed loop control*1
	Operating method	Position control via pulse array input
	Origin detection method	Encoder Z phase
	Position detection method	Encoder A/B phase output
	Pulse array input method	Differential line driver/open collector
	Maximum input pulse frequency*2	Max. 200 kpps (differential line driver)/Max 60 kpps (open collector)
	Pulse array input instruction format	CW/CCW, pulse/code (positive/negative logic available)
External input/output	Control input	6 points (alarm reset, clear counter, brake release, servo ON, pulse input prohibited/origin return stopped, origin return) 5 mA TYP/point
	Control output	4 points (preparations complete, pulse input reception available, positioning complete, zone output) 30 mA Max./point
	Error detection output	Overload, data error, system error
	External communication	RS232C 1 ch (computer, TB communication)
	Motor drive output	Dedicated cable (with F.G.)
	Encoder input	Dedicated cable (shielded)
	Pulse array input	Dedicated cable (twisted pair cable)
General specifications	Mass	0.2 kg [0.441 lb]
	Power supply	DC 24 V±10 % 1.6A Max. (motor, I/O power supply shared)*3
	Operating temperature	0 to 40 °C [32 to 104°F]
	Operating humidity	35 to 85 % RH (without condensation)
	Storage temperature	-10 to 65 °C [14 to 149°F]
	Backup	Setting conditions retained in EEPROM
	Noise resistance	IEC61000-4-4 level 3
	Accessories	I/O cable, power cable, pulse array input cable*4, conversion cable for pulse array input connector x 2*5

*1 Missed step detection and force control when gripping are performed via a rotary encoder.
*2 The actual maximum input pulse count is regulated by the maximum speed of each actuator.
*3 The maximum consumption current value differs according to the actuator. See the table below.
*4 The length of the pulse array input cable is 1 m [3.281 ft.].
*5 Note that the method for connecting the pulse array input cable differs for the differential line driver input and open collector input (see the instruction manual for details).

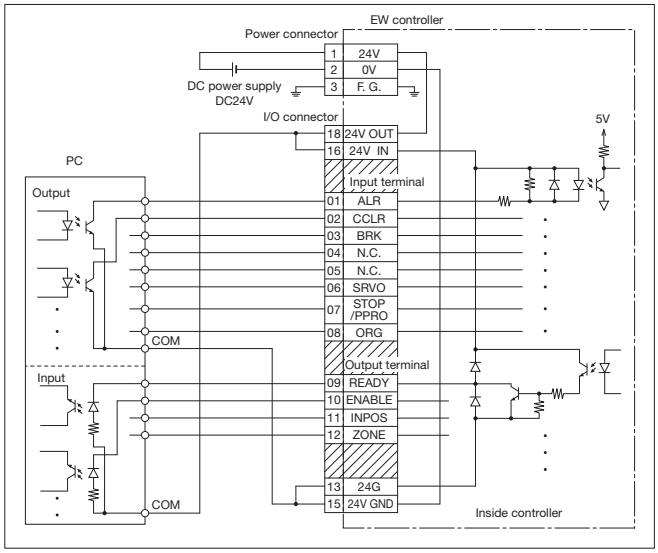
Maximum consumption current (electric rotary actuator)

(A)

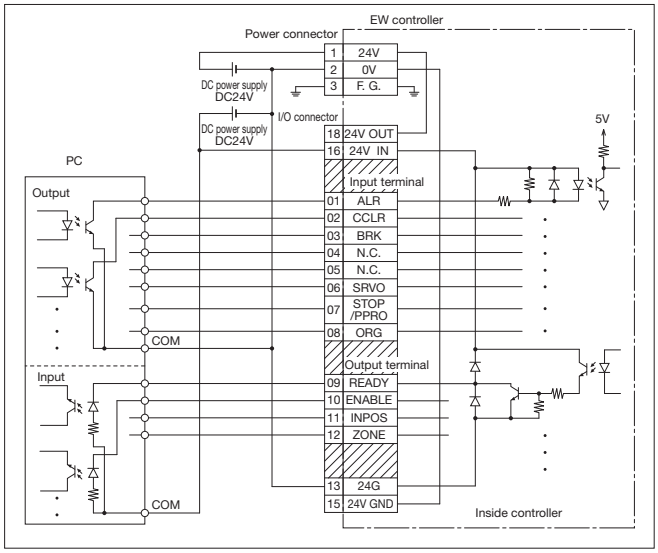
Model	EWHRT1A	EWHRT3A	EWHRT5A	EWHRT10A	EWHRT20A	EWHRT40A	EWHRT60A
Standard	0.6	1.0				1.3	
With brake	—	1.0				1.6	

Controller Wiring Method

1. When using the internal power supply of the controller (electric rotary actuator)



2. When not using the internal power supply of the controller (electric rotary actuator)



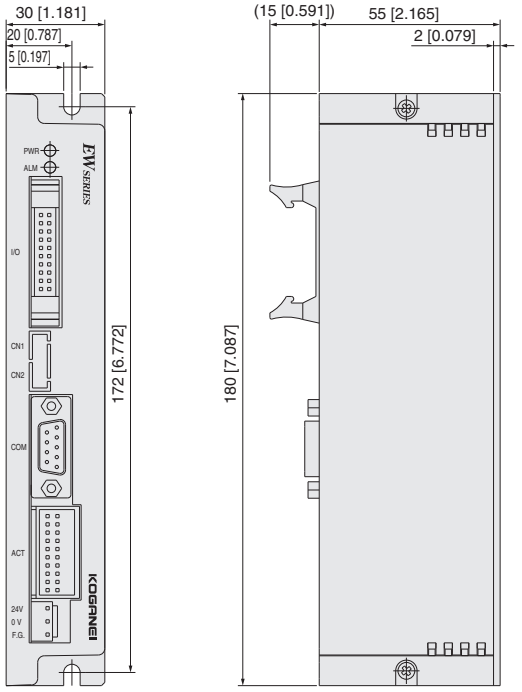
Controller dimensions mm [in.]

(point input type)

EWHC-□-□

DIN rail mounting plate
Not specified: Without
DP: With (cannot be selected without controller)

Applicable main units
RA : For EWHRT3A, 5A, 10A, 20A, 40A, 60A
RS : For EWHRT1A

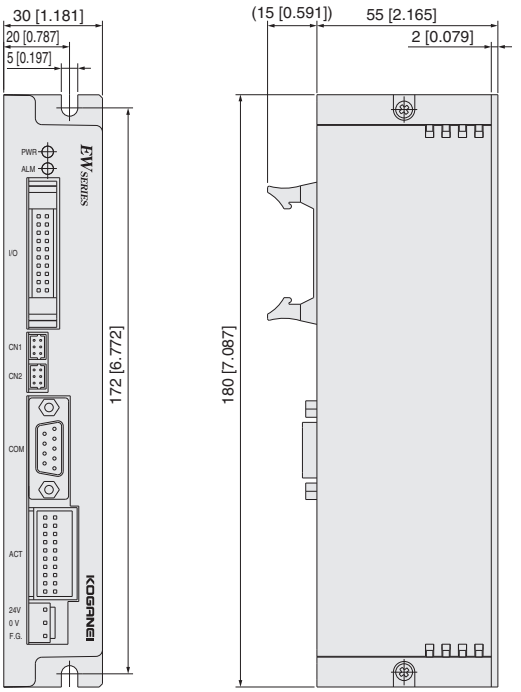


(pulse array input type)

EWHCP-□-□

DIN rail mounting plate
Not specified: Without
DP: With (cannot be selected without controller)

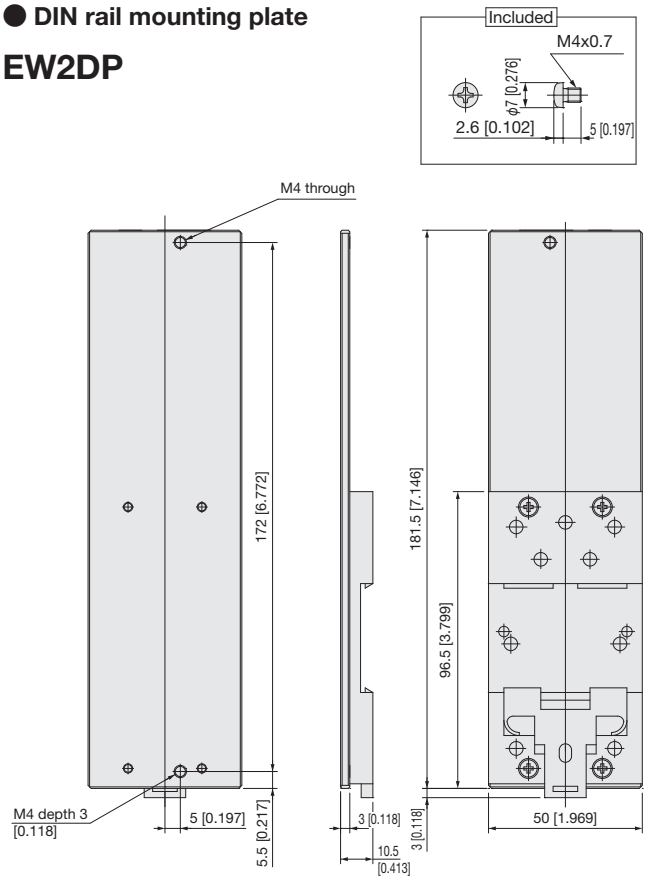
Applicable main units
RA : For EWHRT3A, 5A, 10A, 20A, 40A, 60A
RS : For EWHRT1A



Controller dimensions mm [in.]

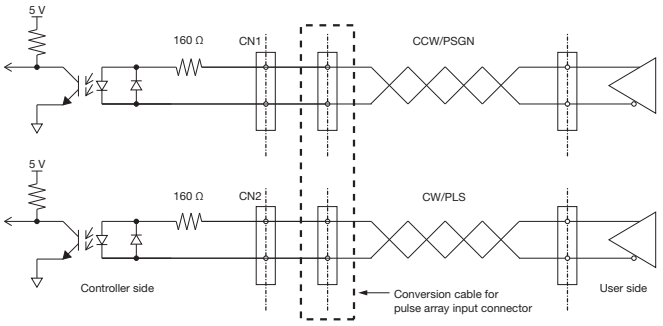
● DIN rail mounting plate

EW2DP

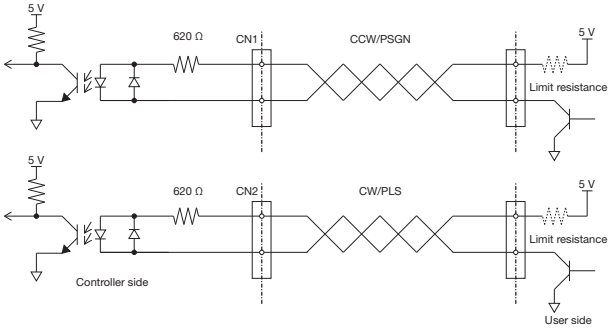


Controller wiring method (pulse array input type)

● Differential line driver input circuit



● Open collector input circuit



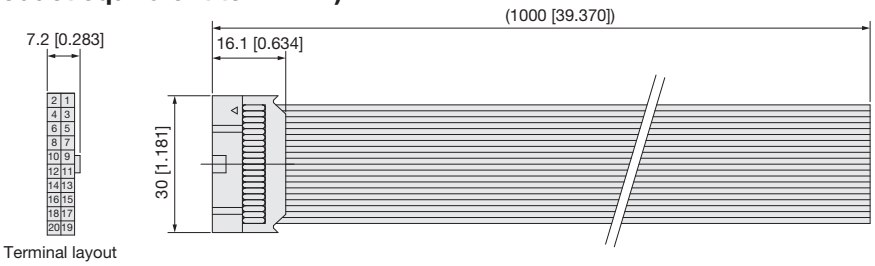
[Caution] When applying voltage of 5.5 V or higher, add current limit resistance (10 mA or less).

Controller dimensions mm [in.]

● Controller included

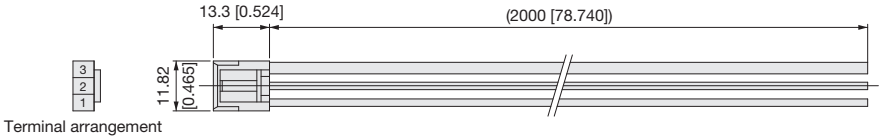
• I/O cable (type: product equivalent to EW2KI)

EW2KI



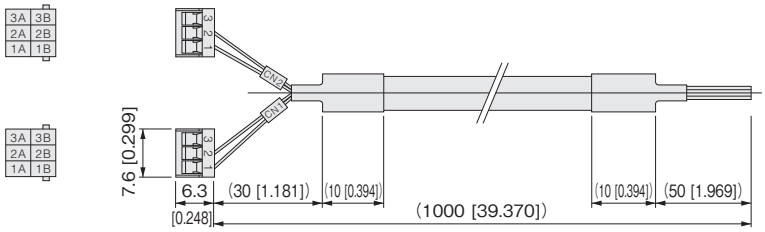
• Power cable (type: product equivalent to EW2KP)

EW2KP



• Pulse array input cable (pulse array input type controller only)

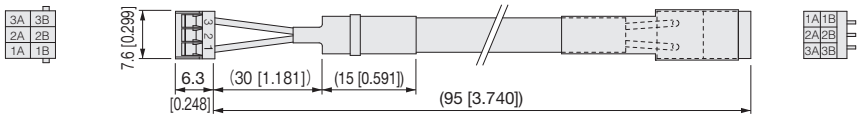
EWHKY



● Conversion cable for pulse array input connector (pulse array input type controller only)

*Make sure to use this conversion cable when the pulse array input signal is a differential line driver.

EWHKC

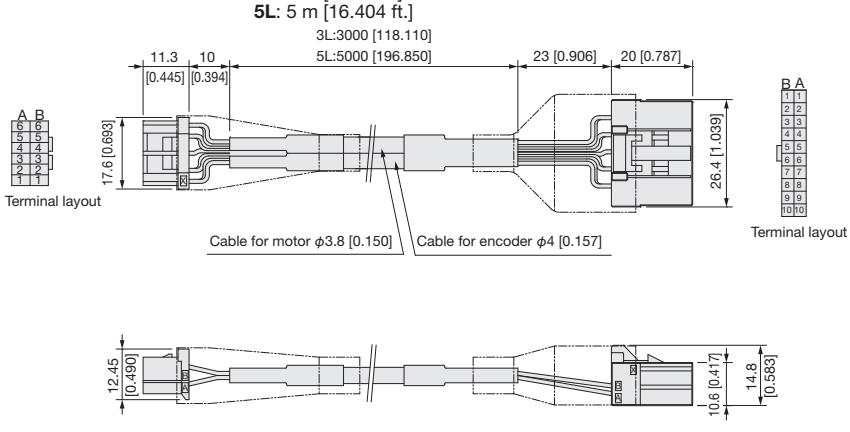


● Cable

• Relay cable (robot cable)

EWHKA-□

3L: 3 m [9.843 ft.]
5L: 5 m [16.404 ft.]



Main unit side connector

No.	Parts	Color
A1	F.G.	Brown
A2	A+	Red
A3	A-	Yellow
A4	B+	Green
A5	B-	White
A6	BRK	Black
B1	Shield	
B2	GND	Red
B3	5V	Yellow
B4	EA	Green
B5	EB	White
B6	EC	Black

Controller side connector

No.	Parts	Color
A1	A+	Red
B1	B+	Green
A2	A-	Yellow
B2	B-	White
A3	F.G.	Brown
B3	BRK	Black
A4	COM1	—
B4	COM2	—
A5		—
B5		—
A6	F.G.	—
B6	GND 5V	—
A7	DV+	Yellow
B7	DV-	Red
A8	EA+	—
B8	EA-	Green
A9	EB+	—
B9	EB-	White
A10	EC+	—
B10	EC-	Black

● Electric rotary actuator

● When securing a workpiece to the table of the electric rotary actuator using a bolt, etc., do so with the table or workpiece retained.

● Duty limitation

Use the electric rotary actuator at a duty of 50 % or less.

$$\text{Duty} = \frac{\text{Operation time}}{\text{Operation time + rest time}} \times 100\ (\%)$$

● Load torque and speed limitation

When using the table installed in the vertical direction, design the workpiece so that load torque will not be applied where possible. When load torque is applied, ensure that it is at or below 60 % of the maximum torque of the actuator.

When load torque is applied, use the speed setting within the following limits.

Load ratio (%)	20	40	60
Speed setting (%)	50 or below	33 or below	25 or below

$$\text{Load ratio} = \frac{\text{Load torque}}{\text{Maximxum torque}} \times 100\ (\%)$$

● Example of calculating mass moment of inertia

The workpiece mass moment of inertia must be at or below the maximum load inertia.

1. When there is disk shaped load on the rotation axis

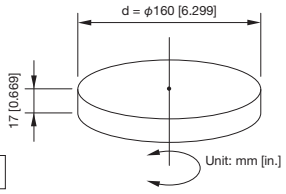
Load material: Aluminum alloy (density 2.7 x 10^3 kg·m^3)

$$I = \frac{md^2}{8}$$

I : Mass moment of inertia about the rotation axis (kg·m^2)
d : Disk outer diameter (m)
m : Mass (kg)
d = 0.16 (m)

$$m = \frac{\pi \times 0.16^2}{4} \times 0.017 \times 2.7 \times 10^3$$
$$= 0.92\ (\text{kg})$$

$$I = \frac{0.92 \times 0.16^2}{8}$$
$$= \boxed{3.0 \times 10^{-3}\ (\text{kg·m}^2)\ [2.213 \times 10^{-3}\ (\text{bf·ft·sec}^2)]}$$



The maximum load inertia of the EWHRT5A.

2. For cuboid load offset from the rotation axis

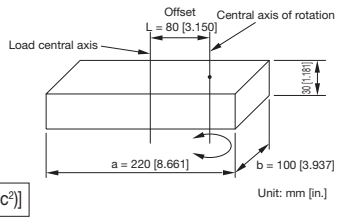
Load material: Aluminum alloy (density 2.7 x 10^3 kg·m^3)

$$I = \frac{m}{12}(a^2 + b^2) + mL^2$$

I : Mass moment of inertia about the rotation axis (kg·m^2)
a, b : Side length (m)
L : Offset from rotation axis and load center (m)
m : Mass (kg)

$$m = 0.22 \times 0.1 \times 0.03 \times 2.7 \times 10^3$$
$$= 1.78\ (\text{kg})$$

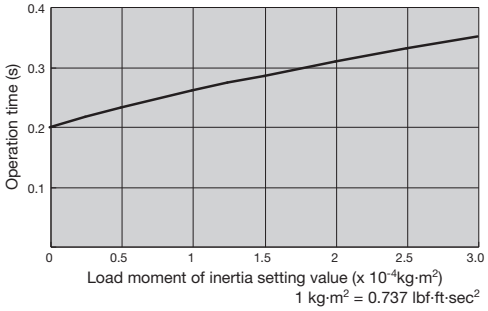
$$I = \frac{m}{12}(a^2 + b^2) + mL^2$$
$$= \frac{1.78}{12}(0.22^2 + 0.1^2) + (1.78 \times 0.08^2)$$
$$= \boxed{2.0 \times 10^{-2}\ (\text{kg·m}^2)\ [1.475 \times 10^{-2}\ (\text{bf·ft·sec}^2)]}$$



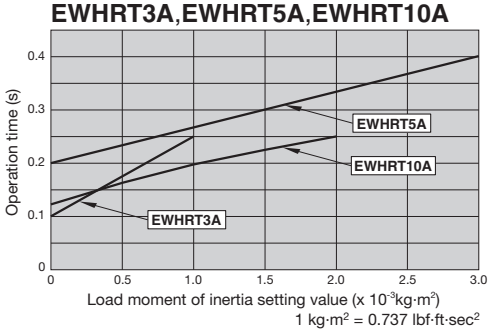
The maximum load inertia of the EWHRT20A.

● Operation time (operation angle 90°)

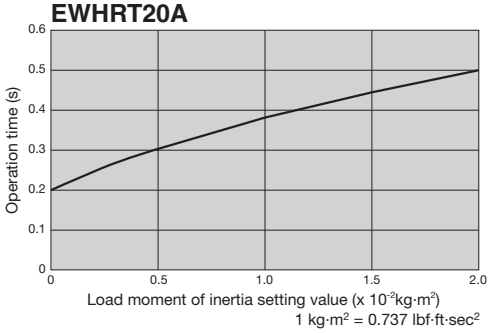
EWHRT1A



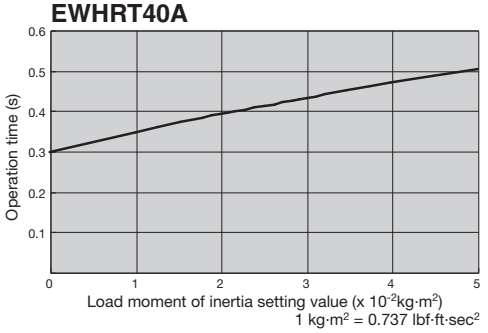
EWHRT3A,EWHRT5A,EWHRT10A



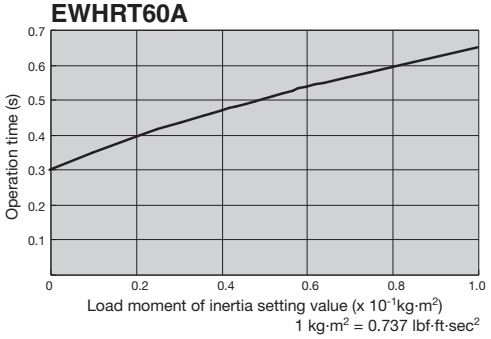
EWHRT20A



EWHRT40A



EWHRT60A



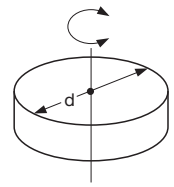
Remarks: At maximum speed and maximum acceleration (when there is no load torque)

● Electric rotary actuator

● Mass moment of inertia calculation diagrams

[When the rotation axis passes the workpiece]

Disk

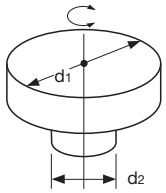


● Diameter d (m)
● Mass m (kg)

■ Mass moment of inertia I (kg·m²)

$$I = \frac{md^2}{8}$$

Stepped disk

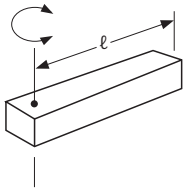


● Diameter d_1 (m)
d_2 (m)
● Mass d_1 part m_1 (kg)
d_2 part m_2 (kg)

■ Mass moment of inertia I (kg·m²)

$$I = \frac{1}{8}(m_1 d_1^{\,2} + m_2 d_2^{\,2})$$

Bar (center of rotation at edge)

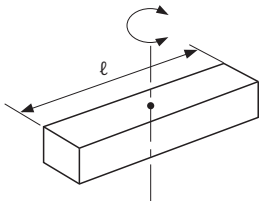


● Bar length ℓ (m)
● Mass m (kg)

■ Mass moment of inertia I (kg·m²)

$$I = \frac{m\ell^2}{3}$$

Bar (center of rotation at center of gravity)

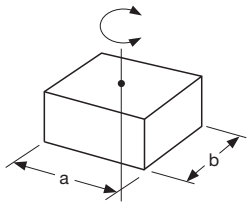


● Bar length ℓ (m)
● Mass m (kg)

■ Mass moment of inertia I (kg·m²)

$$I = \frac{m\ell^2}{12}$$

Rectangular parallelepiped



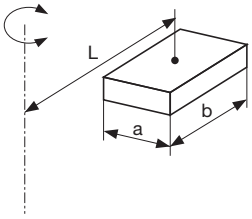
● Side length a (m)
b (m)
● Mass m (kg)

■ Mass moment of inertia I (kg·m²)

$$I = \frac{m}{12}(a^2 + b^2)$$

[When the rotation axis is offset from the workpiece]

Rectangular parallelepiped

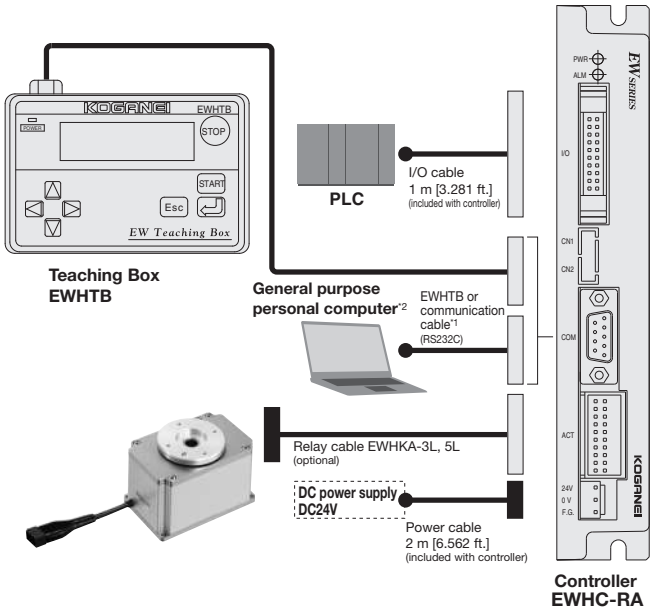


● Side length a (m)
b (m)
● Distance from the rotation axis to the load center L (m)
● Mass m (kg)

■ Mass moment of inertia I (kg·m²)

$$I = \frac{m}{12}(a^2 + b^2) + mL^2$$

● System configuration (example)



*1 RS232C cable (for reference)
Specifications: D-sub 9 pin (female) ⟷ D-sub 9 pin (female)/cross cable
Type: C232R-ECO915 (1.5 m [4.921 ft.])/C232R-ECO930 (3.0 m [9.842 ft.])
Manufacturer: Elecom Co., Ltd.
The communication cable must be provided by the customer.

*2 The support software for setting the controller can be downloaded from the KOGANEI website free of charge.