

Instruction Manual

Original instructions

ELCT1-100-20-CRX

Electric parallel gripper for FANUC CRX

Be sure to read this instruction manual before using the product.




New-Era[®]


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Safety Precautions – Electric actuator –

The safety precautions stated below are to be followed to use the product safely and correctly and to prevent the harm or damage to other persons and property. The precautions are classified into three categories, DANGER, WARNING and CAUTION, to indicate the degree of hazard, damage and imminence. Strictly observe these important safety precautions in addition to the safety requirements specified in applicable international or industry standards.

 DANGER	Expresses situations that can be clearly predicted as dangerous. If the noted danger is not avoided, it could result in death or serious injury. It could also result in damage or destruction of assets.
 WARNING	Expresses situations that, while not immediately dangerous, could become dangerous. If the noted danger is not avoided, it could result in death or serious injury. It could also result in damage or destruction of assets.
 CAUTION	Expresses situations that, while not immediately dangerous, could become dangerous. If the noted danger is not avoided, it could result in light or semi-serious injury. It could also result in damage or destruction of assets.

 DANGER	
<ul style="list-style-type: none"> ● Do not use the product in locations with or near dangerous substances such as flammable or ignitable substances. It could ignite or burst into flames. ● Do not use it in a place where the main body and controller may be splashed with water or oil. Doing so can cause malfunction, resulting in personal injury, electric shock or fire. ● When mounting the product and workpiece, always firmly support and secure them in place. Dropping or falling the product or improper operation could result in injury. ● Do not enter the machine's operating area while the product is in operation. ● Do not use the product for the purposes listed below: <ol style="list-style-type: none"> 1. Medical equipment related to maintenance or management of human lives or bodies. 2. Mechanical devices or equipment designed for moving or transporting people. 3. Critical safety components in mechanical devices. <p>This product has not been planned or designed for purposes that require advanced stages of safety. It could cause injury to human life.</p>	


DANGER

- 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 strong magnet built in the product.
- Never attempt inappropriate disassembly, or assembly of the product relating to basic construction, its performance, or functions. It could result in injury, electric shock, fire, etc.
- Do not use the product in excess of its specification range. Such use could result in product breakdowns, function stop, or damage.
- Design safety circuits and equipment systems so as to avoid equipment damage or personal injury when the machine is shut down due to an emergency stop, power outages, or other system abnormalities.
- When wiring the product, see the wiring procedures stated in the instruction manual, and be careful not to wire it incorrectly. Connect the cables and connectors securely so that they will not be disconnected or loosened. Failure to do so may cause product malfunction or fire.
- When operating or adjusting the system after installing the actuator, strictly observe the safety precautions for the system. Failure to do so can cause serious personal injury.
- Before supplying power to the product and starting it, ensure the safety in the product operating range. If power is supplied to it carelessly, personal injury may be caused by electric shock or contact with moving parts.
- Do not touch any connector while the power is on the actuator. Doing so can cause electric shock and malfunction.
- When the actuator is installed in a system (machinery, equipment or robot), maintain the actuator in a safe and correct manner in accordance with the laws and standards relating to the system safety measures.


WARNING

- Use the compatibility of the product with your system based on the verification and judgement at your own risk.
- After reading the catalog and instruction manuals, keep them in a place accessible to the operators.
- The product was designed and manufactured as parts for use in General Industrial Machinery.
- In the selection and handling of the equipment, a system designer or other person with fully adequate knowledge and experience should always read the Safety Precautions, Catalog, Owner's Manual and other literature before commencing operation. Making mistakes in handling is dangerous.



WARNING

- Do not service or attempt to remove product and machinery equipment until safety is confirmed.
 1. The inspection and maintenance of machinery/equipment should only be performed after measures to prevent falling or runaway of the driven objects have been confirmed.
 2. When the product is to be removed, confirm that the safety measures as mentioned above are implemented and the power from any appropriate source is cut, and read and understand the specific product precautions of all relevant products carefully.
- Be sure to perform a safety check of the device's operating range before supplying power to the product. Inadvertently supplying power can cause electric shock or injury.
- Contact us beforehand and take special consideration of safety measures if the product is to be used in any of the following conditions.
 1. Conditions and environments outside of the given specifications, or use outdoors or in a place exposed to direct sunlight.
 2. Installation on equipment in conjunction with atomic energy, railways, air navigation, space, shipping, vehicles, military, medical treatment, combustion and recreation, or equipment in contact with food and beverages, emergency stop circuits, clutch and brake circuits in press applications, safety equipment or other applications unsuitable for the standard specifications described in the product catalog.
 3. An application which could have negative effects on people, property, or animals requiring special safety analysis.
 4. Use in an interlock circuit, such as providing a mechanical protective function, and periodical checks to confirm proper operation.
- For inspection, maintenance, replacement, or other kinds of operations related to the product, always completely cut off the power supply before proceeding. Otherwise, it may cause damage, malfunction, or electric shock.
- Do not use the product in excess of its specification range. Such use could result in product breakdowns, function stop, and damage.
- There is a possibility of dangerous sudden action by the product if the sliding parts of the machinery are twisted due to external forces, etc.
In such cases, human injury may occur, such as by hands or feet getting caught in the machinery, or damage to the machinery itself may occur. Design the machinery so as to avoid such dangers.
- Use a protective cover, etc. to ensure that the operating portions of mechanical devices, etc., are isolated and do not come into direct contact with human bodies.
- Consider the possibility of power source failure. Take measures to prevent bodily injury or machine damage even in the event of a power failure.


WARNING

- Design safety circuits and equipment systems so as to avoid equipment damage or personal injury when the machine is shut down due to an emergency stop, power outages, or other system abnormalities.
- Do not configure such a control that the work will drop upon occurrence of power interruption. Configure a control to prevent drop of work upon power interruption or emergency stop of the equipment.
- Consider the operation status when restarting after emergency or abnormal stops. Design the system so that bodily injury or machine damage even in the event of a power failure.
- Never disassemble the product or make any modifications, including additional machining. Doing so may cause human injury and/or an accident. It may also cause the deterioration of the product's performance.
- When an external guide is used, connect the moving parts of the actuator and the load in such a way that there is no interference at any point within the stroke.
- Do not scratch or dent the sliding parts of the product tube, piston-rod, etc., by striking or grasping them with other objects. The components are manufactured to precise tolerances. Even a slight deformation may cause a malfunction or seizure.
- Do not use the product until you confirm that the equipment can operate properly. After mounting or repair, connect the power supply to the product and perform appropriate functional inspections to check it is mounted properly.
- Do not apply strong impact or an excessive moment while mounting the product or a workpiece. If an external force over the allowable moment is applied, it may cause play in the guide or an increase in the sliding resistance.
- When mounting the product, secure adequate working space. Failure to ensure the enough working space will make it more difficult to conduct daily inspections or maintenance, which could eventually lead to system shutdown or damage to the product.
- Do not touch the motor during operation. The temperature may also increase due to energization. It may cause burns.
- If the product generates abnormal heat, smoke or odor, turn OFF the power immediately. Otherwise, product damage or fire may result.
- If abnormal noise occurs or vibrations are excessive, immediately cease operation. Continued use in this condition may result in abnormal operation or runaway that could lead to product damage or destruction.
- Always implement D-class grounding work (ground resistance 100 Ω or less). Grounding should be performed near the actuator to shorten the grounding distance. The cross-sectional area of this wire shall be a minimum of 2mm². Avoid common grounding with other devices.


WARNING

- Avoid use in the following environments.
 - Areas with large amounts of dust or cutting chips that could enter the product.
 - Areas where the ambient temperature exceeds the specified range (Refer to the specifications).
 - Areas where the ambient humidity exceeds the specified range (RH: less than 85% and no condensation).
 - Areas with corrosive gas, flammable gas, sea water, water, or steam that could adhere to the product
 - Areas where strong magnetic or electric fields are generated
 - Areas where direct vibration or impact shock is applied to the product
 - Areas where there are large amounts of dust or there is exposure to water/oil droplets
 - Areas that are exposed to direct sunlight (ultraviolet rays)
- Do not use in an environment where the product is directly exposed to liquid, such as cutting oils. If cutting oil, coolant, or oil mist adheres to the product, failure or increase of sliding resistance can be caused.
- Install a protective cover when the product is used in an environment directly exposed to foreign matters, such as dust, cutting chips, and spatter.
- Shade the product from direct sunlight.
- In locations near heat sources, block them off. When there is a heat source surrounding the product, the radiated heat from the heat source can increase the temperature of the product beyond the operating temperature range. Protect it with a cover, etc.
- Levels of the base oil of grease may decrease due to the external environment and operating conditions, causing a decline in lubrication performance and a shortened lifetime of the product.
- Do not store the product in a place in direct contact with rain or water drops or where it is exposed to harmful gas or liquid.
- Store in an area that is shaded from direct sunlight and has a temperature and humidity within the specified range (5°C to 50°C and RH 35% to 85% no condensation or freezing).
- Do not apply vibration or impact to the product during storage.
- Do not disassemble or repair the product. Fire or electric shock can be caused. Contact New-Era if the disassembly of the product is required for maintenance.
- If power interruption occurs during operation, turn off the power. Otherwise, when the power is restored, the product may suddenly start moving, thereby damaging the equipment or causing personal injury.
- Before modifying or checking the wiring, the voltage should be checked with a tester 5 minutes after the power supply is turned off. Failure to do so may result in electrical shock.


WARNING

- Do not step onto the packing box of the product or do not place object on the box. Accidents such as falling and tripping over could result in injury. Dropping the product may result in injury, or also may damage or break the product resulting in abnormal or erratic operation, or runaway, etc.
- Wire the product securely while confirming with this catalog and the instruction manual and ensuring that there is no miswiring or loose connectors.
- Be sure to insulate unused wires. Failure to do so may cause malfunction, failure, or electric shock.
- Avoid scratching the cords of cables, etc. Letting the cords be subject to scratching, excessive bending, pulling, rolling up, or being placed under heavy objects or squeezed between two objects, may result in current leaks or defective continuity that lead to fire, electric shock, or abnormal operation.
- Mount the product before wiring. It may lead to electric shock.
- Do not throw the product into fire. It may rupture or generate toxic gas.
- Do not hold the moving parts or cable parts of the product during transportation. It may cause injury or disconnection.
- When the protective device (alarm) of the product works, immediately turn off the power. The product may malfunction, resulting in personal injury and property damage. After turning off the power, reveal the causes. Do not reapply the power until the causes are removed.


CAUTION

- Our products are offered for the manufacturing industry. It is provided mainly for peaceful use for the manufacturing industry. If you are considering using it in non-manufacturing industry, please consult with us and exchange specifications and make a contract as necessary.
- For export or provision of products or related technologies subject to EAR regulations, we request that the US Export Administration Regulations (EAR) be observed appropriately.
- Wiring should be done correctly. For each terminal, voltages other than those stipulated in the operation manual should not be applied.
- Connect the connector securely. Check for correct connector wiring and polarity.
- Do not connect power or high-voltage cables in the same wiring path as the unit. The product can malfunction due to noise and surge voltage interference in the signal line from power and high-voltage cables. Separate the wiring of the controller and its peripheral device from that of power and high-voltage cables.
- Be careful that cables are not caught by actuator movement.

 CAUTION

- Fix the cable so as not to be moved easily. Avoid bending cables at sharp angles where they enter the product.
- Avoid twisting, folding, rotating, or applying external force to the cable. Electric shock, wire breakage, contact failure, or a loss of product control may occur.
- To fix the cable from actuator, make it larger than minimum fixing radius of 29.5mm. When moving it, make it larger than the minimum movable bending radius of 59mm. If it is smaller than the specified radius, there is a risk of electric shock, and problem such as cable disconnection, poor contact, and runaway may occur.
- Confirm wiring insulation. Insulation failure (interference with other circuits, poor insulation between terminals, etc.) could introduce excessive voltage or current to the controller or its peripheral devices, which may cause damage to them.
- When checking the conductivity of the cable, be careful not to deform the connector's mating hole and terminals. Inserting a non-compatible connector, tool, cylinder-shaped object, etc., into the connector's mating hole can cause the hole or terminals to become deformed, which may cause contact failure or disconnection.
- Operate within the limits of the maximum usable stroke. The product will be damaged if it is used with a stroke which exceeds the maximum stroke. Refer to the specifications of the product.
- When the product repeatedly cycles with partial strokes, operate it at a full stroke at least once a day or every 1000 strokes. Otherwise, lubrication may run out.
- Do not use the product in applications where excessive external force or impact force is applied to it, or the product can be damaged. The components, including the motor, are manufactured to precise tolerances. Even a slight deformation may cause a malfunction or seizure.
- Always use the robot designated for the product. Use of a non-designated robot could lead to product breakdown or runaway operation.
- Conduct the following inspection before operation.
 1. Confirm that the power supply line and each signal line is not damaged.
 2. Confirm that the power supply line and each signal line is not loosened.
 3. Confirm that the electric actuator/cylinder/controller/driver is not mounted loosely.
 4. Confirm that the electric actuator/cylinder/controller/driver is operating correctly.
 5. Confirm the function of the emergency stop of the whole system.
- If several persons are to be working conjointly, determine the procedure, signs, measures against abnormality, and restarting measures in advance. Then, have someone else to supervise the work.
- Do not remove the name plate.
- Operation tests should be done at a low speed. Start operation by predefined speed after confirming there are no problems.

 CAUTION

- Do not apply forces of impact, collision, or resistance to the moving parts of an actuator in operation. Doing so will cause a decrease in product lifetime, damage to the product, etc.
- Check that the received product is as ordered. Installation of different product can result in injury or damage.
- Perform maintenance and inspection according to the procedures indicated in the operation manual. Improper handling can cause an injury, damage, or the malfunction of equipment and machinery.
- Do not manually move the actuator slider (lever, finger, attachment, etc.). The product may be damaged.
- The product has been lubricated for the lifespan by the manufacturer and does not require any further lubrication. Special grease must be used for lubrication. Please contact us when you apply it.
- Durability varies with transported load and environment. The transport load, etc., should be at a setting well within the margin.
- When disposing of the product, comply with laws pertaining to waste treatment and cleaning. Consign it to a specialized waste disposal company for processing.
- Frequently turning the power ON/OFF can cause damage to the elements inside the controller.
- The relationships between pressing force (gripping power) and pressing rate described in this catalog are merely guidelines. Fluctuation in motor torque, etc., may cause errors even at the same set values.
- Do not bring floppy disks or magnetic media, etc., within one meter [3.28ft.] of the product. There is the possibility that the data on the floppy disks will be destroyed due to the magnetism of the magnet.
- When handling the product, wear protective gloves, safety glasses, safety boots, etc. to keep safety.
- Perform daily inspections to make sure that the system meets the required functions to prevent accidents.

Warranty and Disclaimer

1) Warranty Period

A warranty period of our products are 12 months after our shipment.

2) Range of Warranty and Disclaimer

- If any malfunction or damage due to our responsibility becomes clear during the warranty period, we will repair or replace without charge. Although it is still within the warranty period, we set the lifespan of the product according to the number of operation. Please contact us to check that.
- Warranty of our products are applied only to our product itself. We will not bear responsibility at all against the damage caused by functional deterioration or malfunction of our products, or the damage of other equipment caused by those.
We will not bear responsibility at all against the cost to repair or replace our products at customer's side.
- We will not bear responsibility at all against the damage caused by remodeling, modifying or repairing by a customer.
- We will not bear responsibility at all against the usage, storage or mounting which is exceeding the limit of product specification indicated on a catalog and an instruction manual.
- We will not bear responsibility at all against the damage or malfunction occurred by fires, earthquakes, thunderbolts or other natural disasters.
- We will not bear responsibility at all against malfunction of product occurred by handling negligence.

1. Product Overview

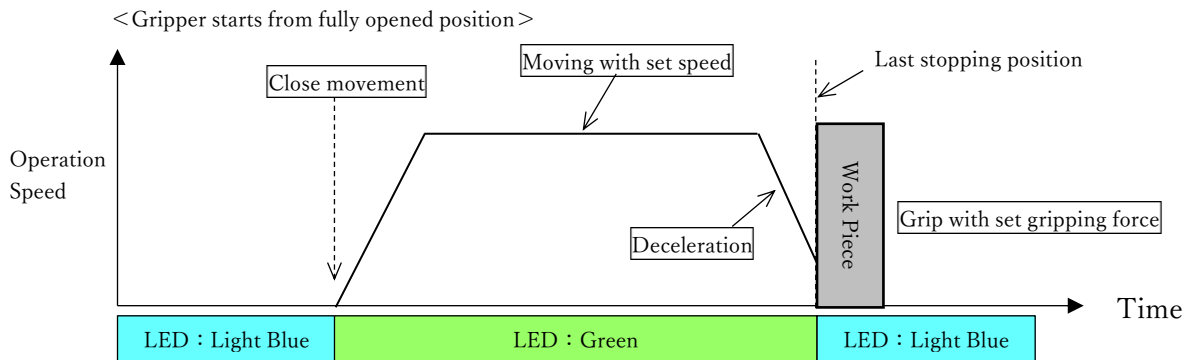
1.1. Feature

- This product is electric gripper installed with controller.
- It memorizes operation stroke every open/close, and decelerates right before the last stopping position.
- You can set the gripping force and open/close speed in 3 levels for each by plug-in software or the front panel of body.

1.2. Operation Example

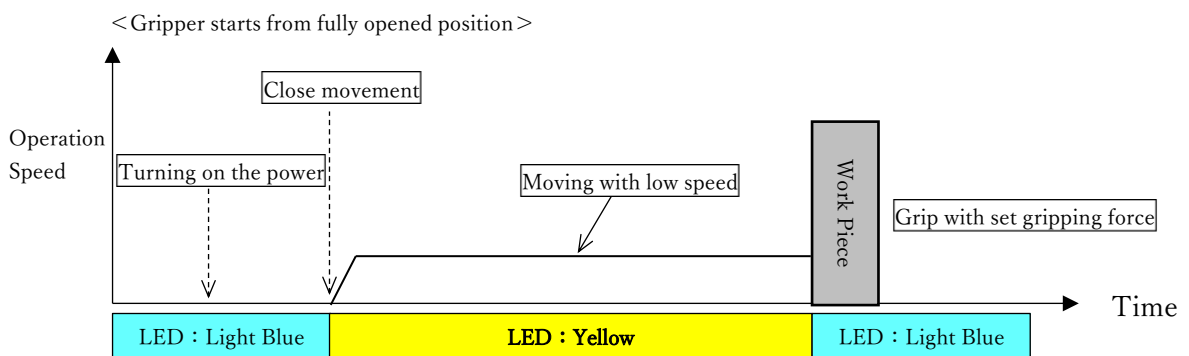
◆ Gripping and releasing operation of identical work piece.

It operates with set gripping force and operation speed. During operation, an LED lights up green, and it moves in set operation speed. It grips work piece with set gripping force and decelerates right before touching work piece.



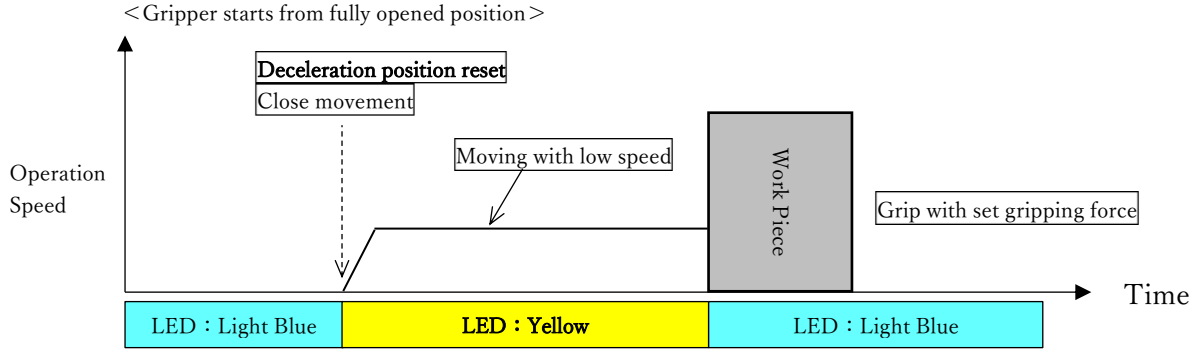
◆ Movement after turning on the power

It runs the memorizing operation of work piece position as first action after turning on the power. During operation, an LED lights up yellow and moving at low speed. After this, in case of gripping identical work piece, it decelerates right before touching work piece after moving at set operating speed.



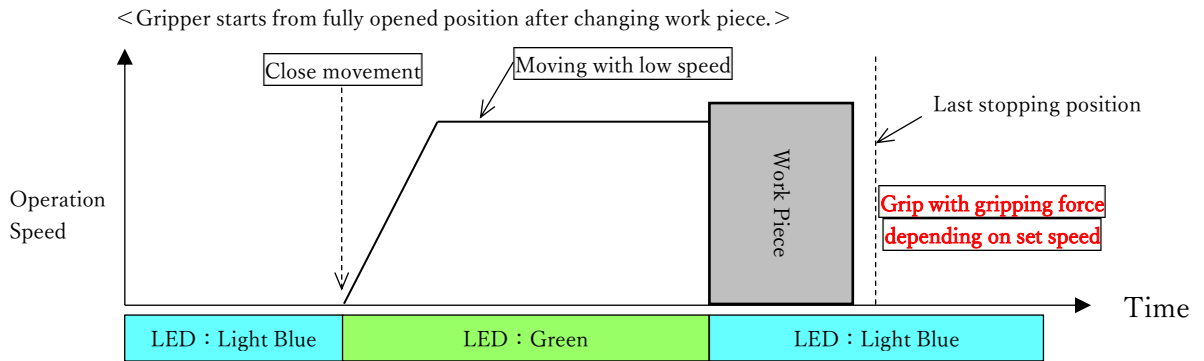
◆ The procedure at the time of work piece change.

In case operation stroke need to be changed due to work piece change, reset deceleration position when making gripping order of work piece.



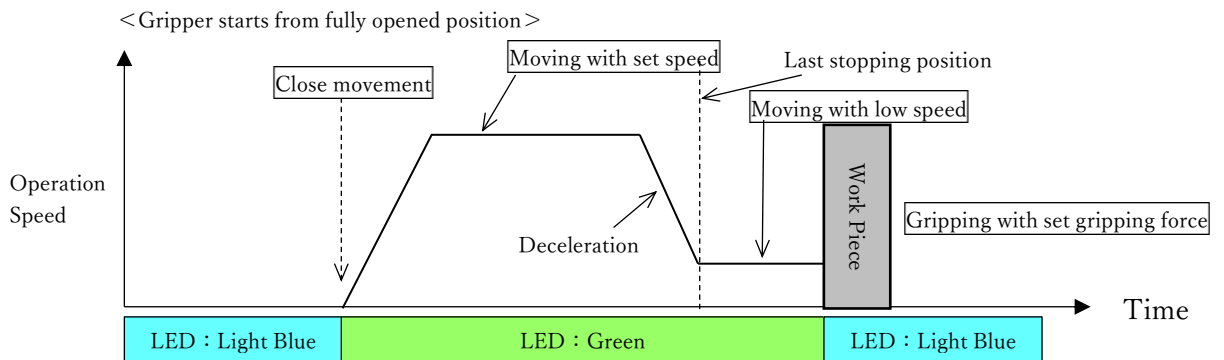
⚠ Caution

Please be careful if gripping bigger work piece than the last operation stroke without deceleration position reset, there will be possibility about damaging the work piece due to excessive gripping force created by the last operation speed.



⚠ Caution

If gripping smaller work piece than the last operation stroke without deceleration position reset, the operation time at low speed will be longer because it starts deceleration right before the last stopped position.



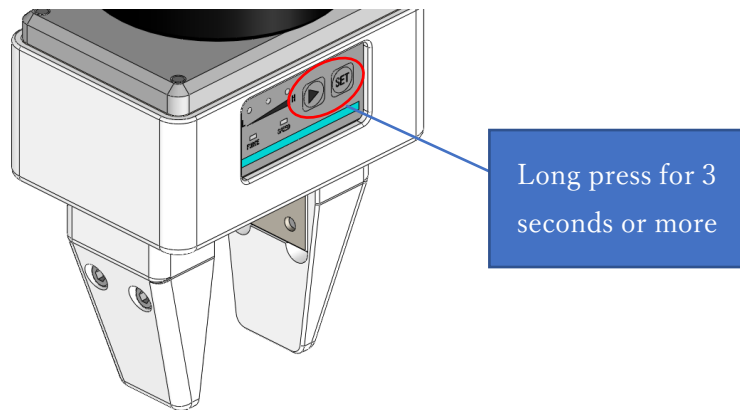
1.3. Release operation in case of emergency

If you need to release the fingers due to some trouble, please follow the steps below.

◆ When energized (when the LED band is lit in light blue)

Press and hold any button on the control panel for 3 seconds to move the fingers in the opposite direction of the previous action.

After operation, the LED band lights up in red and cannot accept commands from the robot. This state is canceled by restarting the gripper.



◆ When not energized (when the LED band is off)

Perform this operation after removing the main body cover.

- Loosen the two screws and remove the plate. (Figure 1)
- Fingers can be opened and closed manually by using a flathead screwdriver. (Figure 2)

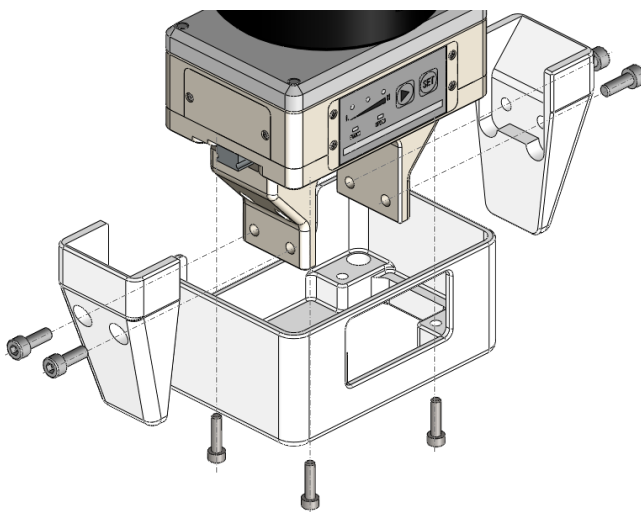


Figure 1 plate removal

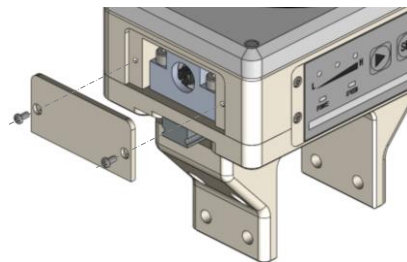
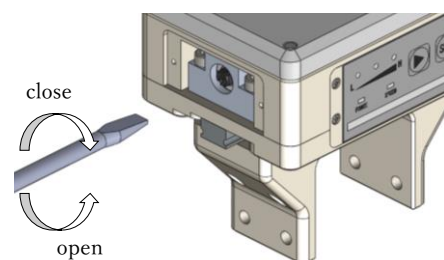
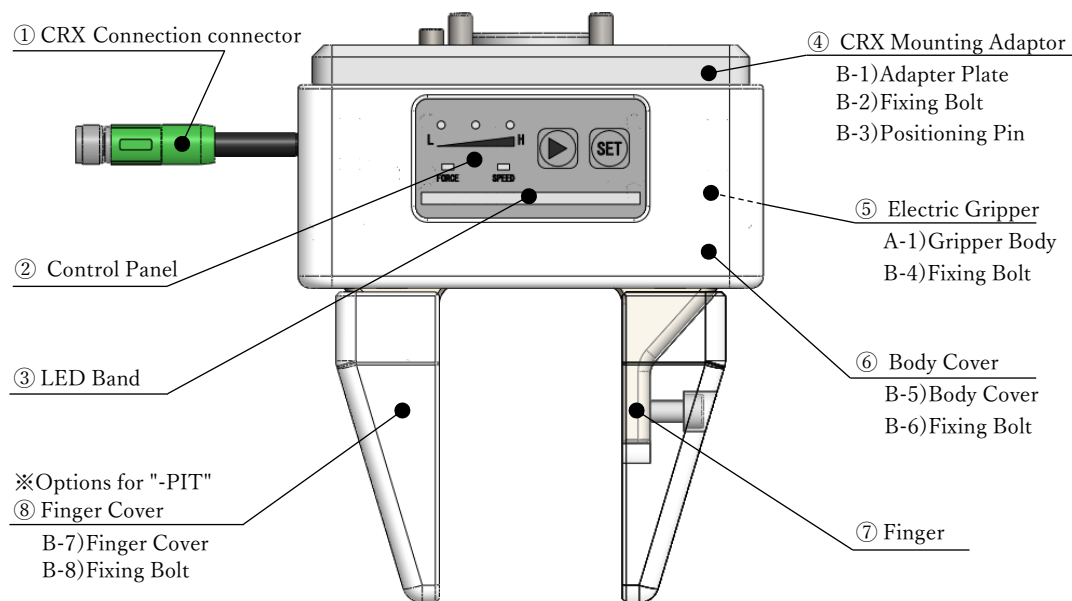


Figure 2 emergency release action



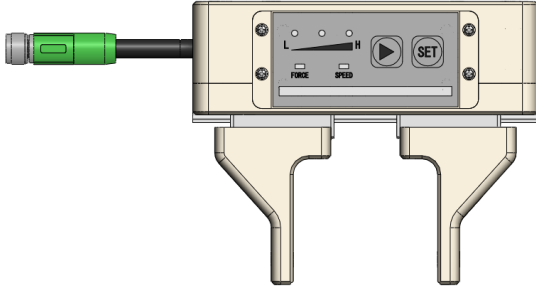
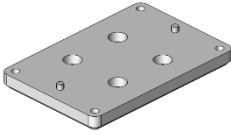


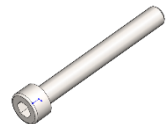
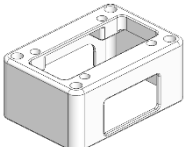

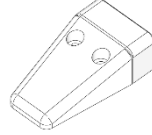

2. Product Structure



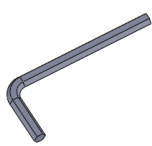
◆ The name of each part

① CRX Connection Connector	To connect CRX Series EE Connector Reference ⇨P.27 "Installing Connectors"
② Control Panel	Gripping force and operation time of electric gripper can be set. (Setting from plug-in software is given priority.) Reference ⇨P.32 "How to Operate the Setting Panel"
③ LED Band	The state of the electric gripper is indicated with the color of the LED band. Reference ⇨P.34 "Instruction of LED Band"
④ CRX Mounting Adapter	An adaptor for installing to a CRX series. Reference ⇨P.24 "Installation of an adapter plate"
⑤ Electric Gripper	ELCT1 Electric Gripper
⑥ Body Cover	Body cover made of resin Reference ⇨P.25 "Installation of a body cover"
⑦ Finger	An aluminum open/close finger. Please use it for gripping work piece and installing an attachment. Reference ⇨P.28 "Mounting Finger and Lever Attachments"
⑧ Finger Cover	A plastic finger cover. Reference ⇨P.26 "Installation of a finger cover"

3. List of Bundled Items

<p>A-1)</p>  <p style="text-align: right;">× 1</p> <p style="text-align: center;">Gripper Body</p>			
<p>B-1)</p>  <p style="text-align: right;">× 1</p> <p>Adapter plate</p>	<p>B-2)</p>  <p style="text-align: right;">× 4</p> <p>Mounting bolt for adapter plate (M6×12L)</p>	<p>B-3)</p>  <p style="text-align: right;">× 1</p> <p>Bearing pin for adapter plate (φ 6×10L)</p>	<p>B-4)</p>  <p style="text-align: right;">× 4</p> <p>Mounting bolt for gripper body (M5×40L)</p>
<p>B-5)</p>  <p style="text-align: right;">× 1</p> <p>Body cover</p>	<p>B-6)</p>  <p style="text-align: right;">× 4</p> <p>Mounting bolt for body cover (M4×16L)</p>	<p>B-7)</p> <p>※Options for "-PIT"</p>  <p style="text-align: right;">× 2</p> <p>Finger cover</p>	<p>B-8)</p> <p>※Options for "-PIT"</p>  <p style="text-align: right;">× 4</p> <p>Mounting bolt for finger cover (M5×14L)</p>

◆ Please prepare a necessary tool for installation.

<p>C-1)</p>  <p>Hexagonal wrench Opposite side 2 mm (For M4) , Opposite side 2.5 mm (For M5), Opposite side 3 mm (For M6)</p>
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4. Product Specifications

4.1. Specifications

Model	ELCT1-100-20-CRX ELCT1-100-20-CRX-PIT(with finger cover)			
Connection cable/connector	300mm shield wire / M8 connector (CRX series for EE connector joint)			
Communication interface	RS-485 *Note 1、 Digital I/O (2 points for each)			
Supply voltage	DC 24V $\pm 10\%$			
Consumption current (at stand-by)	Max 35mA			
Instantaneous maximum current / motor	Max 1.8A			
Stroke *Note 2	20mm (one side 10mm)			
Gripping force *Note 3	3 stage setting	1 : 60N	2 : 80N	3 : 100N
Operating time *Note 4	3 stage setting	1 : 1.8s	2 : 1.2s	3 : 0.9s
Deceleration stroke (time)	1mm (About 0.2s)			
Repeated Gripping Accuracy *Note 5	± 0.01 mm			
Lever backlash amount *Note 6	One side 0.2mm			
Operating temperature range	5~50°C (No dew condensation)			
Sound noise	70dB(A) or less			
Maximum load mass	One side 150 g			
Static allowable moment	Mp : 4.0N · m	My : 5.0N · m	Mr : 8.0N · m	
Product mass	1.35kg (-PIT:1.49kg)			
	Breakdown (-PIT)	Gripper body (without finger)		: 0.86 kg
		Finger (Including mounting part)		: 0.14 kg (2 pcs)
		Body cover		: 0.11 kg
		Adapter plate (Including mounting part)		: 0.24 kg
		Finger cover (Including mounting part)		: 0.14 kg (2 pcs)

Note1) Control by special plug-in software is needed.

Note2) Please use a stroke by more than 3 mm. The usage for extremely short stroke leads to operation malfunction due to grease shortage.

Note3) Gripping force at the time of shipment: L=30mm. It fluctuates about $\pm 20\%$ due to the change of sliding friction etc by repeated swinging.

Note4) No load, rough indication of maximum stroke at the time of shipment. It fluctuates about $\pm 20\%$ due to the change of sliding friction etc by repeated swinging.

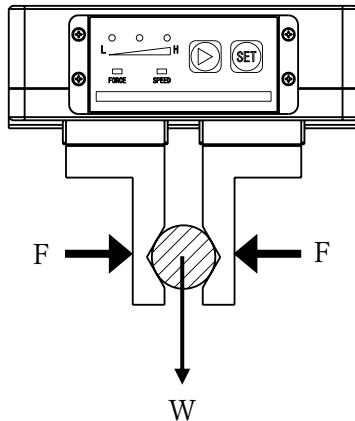
Note5) Variation of repeated 10 times operation at an identical operation condition with an identical work piece.

Note6) The backlash amount of opening/closing direction at the lever intermediate position.

4.2. About selection of gripping force and the work mass.

Force F acting while gripping a work piece is called gripping force as shown in the figure below. It's necessary to select proper gripping force to grip a work piece, to transport, and to assemble.

The standard of the selection is indicated on below, so please refer.



F : Gripping force [N]
 W : Work mass [kg]
 g : Gravitational acceleration [m/s²]

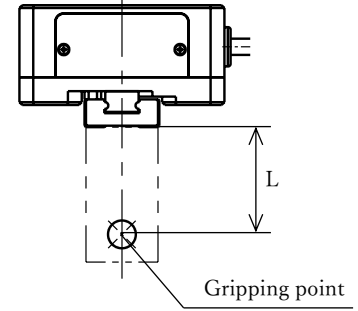
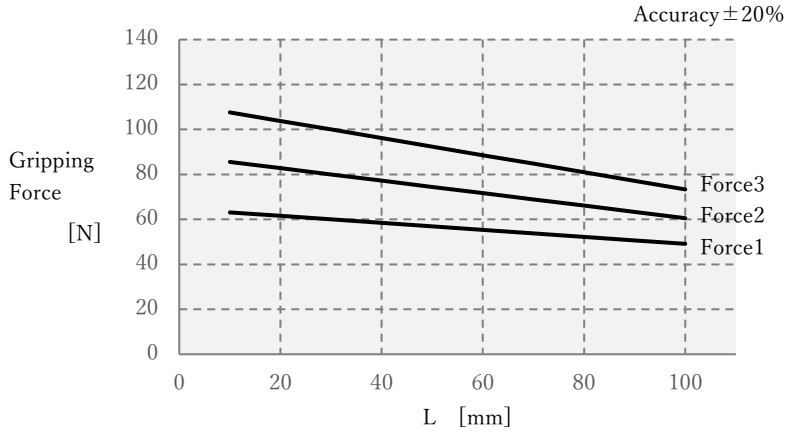
◆ Standard of selection

When a gripper just gripping	$F > 10 \times W \times g \sim 20 \times W \times g$
When a gripper involves usual movement	$F > 20 \times W \times g \sim 30 \times W \times g$
When a gripper involves urgent acceleration and deceleration movement	$F > 30 \times W \times g \sim 50 \times W \times g$

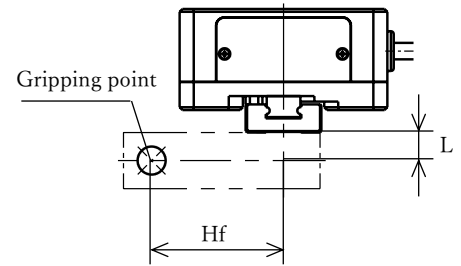
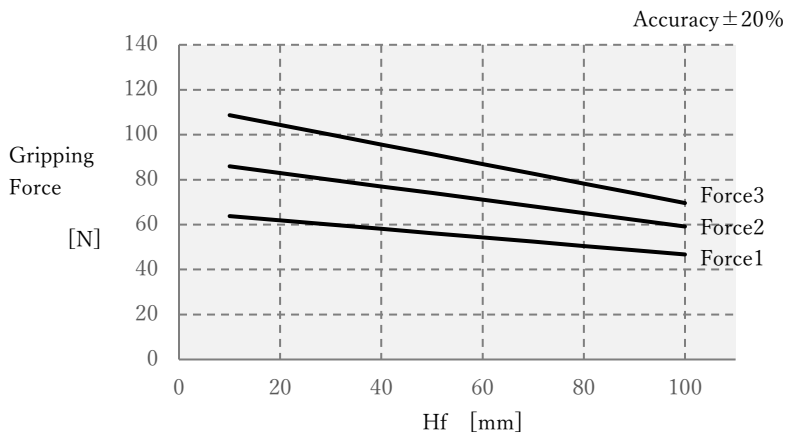
※When the friction coefficient of finger and the work piece is 0.1-0.2.

4.3. Effective Gripping Force

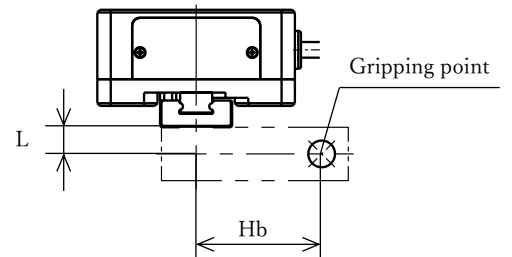
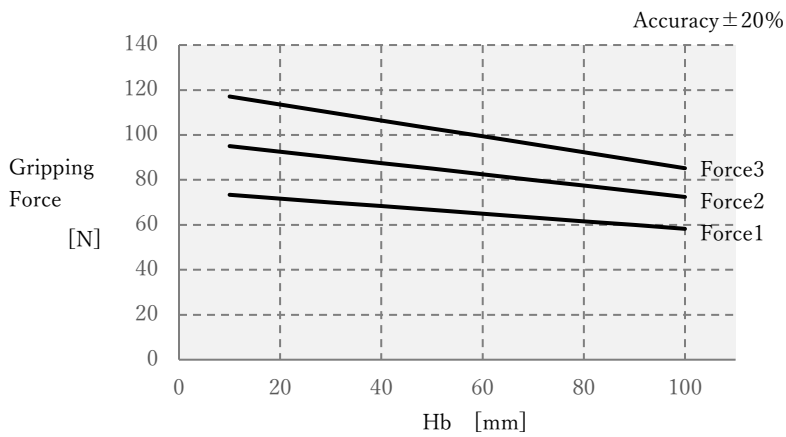
- ◆ Effective gripping force in the grip point L direction.



- ◆ Effective gripping force in the overhang Hf direction. (L=10)



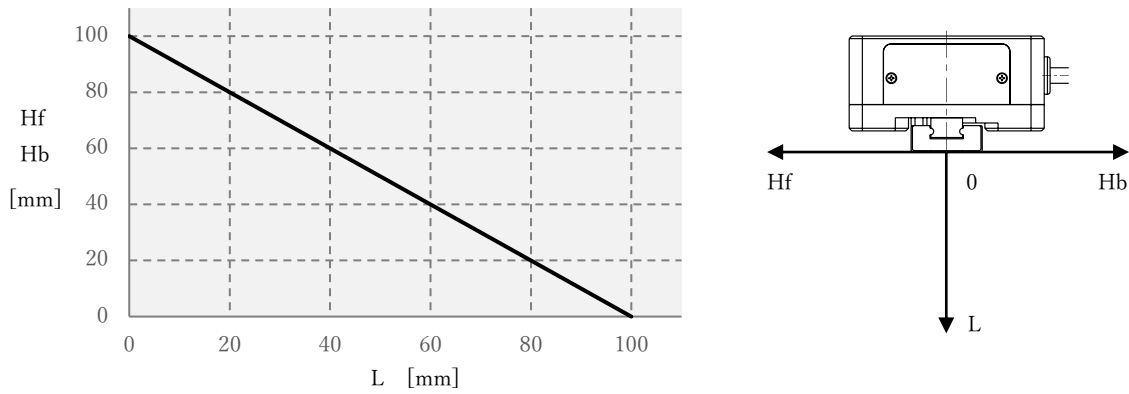
- ◆ Effective gripping force in the overhang Hb direction. (L=10)



4.4. Grip Limit Range

Please use within the grip limit range. There is a possibility of damage because a moment which applies to a lever becomes bigger when a grip point (L direction) and an overhang (H direction) become bigger.

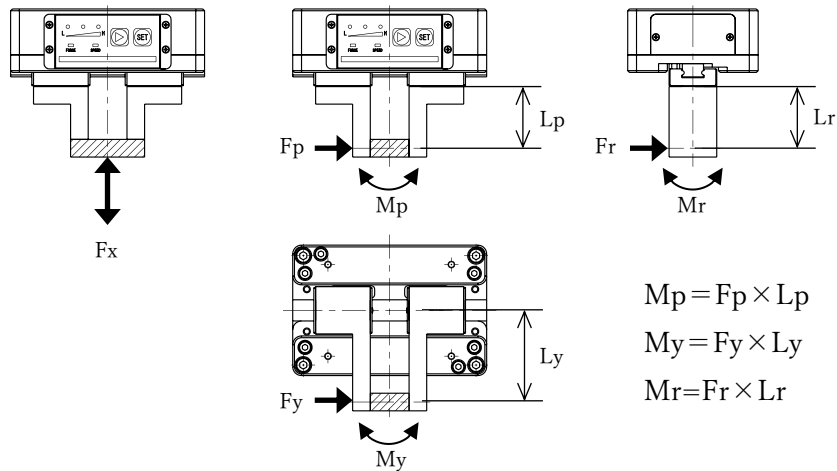
◆ Grip Limit Range



4.5. Allowable load and allowable moment

When adding external force to a lever, please make sure that it'll be within the range of allowable load and allowable moment.

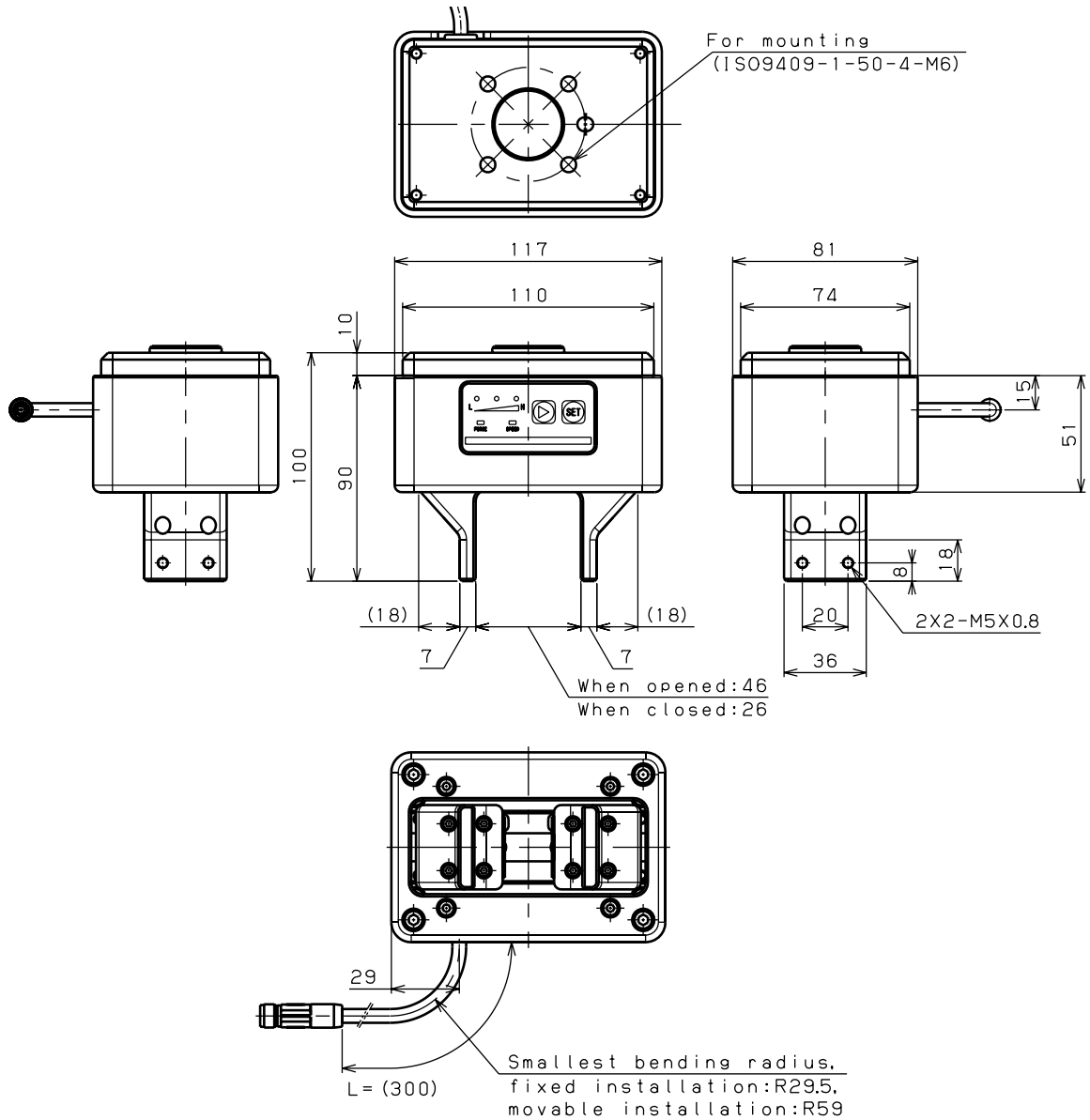
Static allowable load				Static allowable moment		
F _x	F _p	F _y	F _r	M _p	M _y	M _r
210 N	50 N	50 N	100N	4.0 N · m	5.0 N · m	8.0 N · m



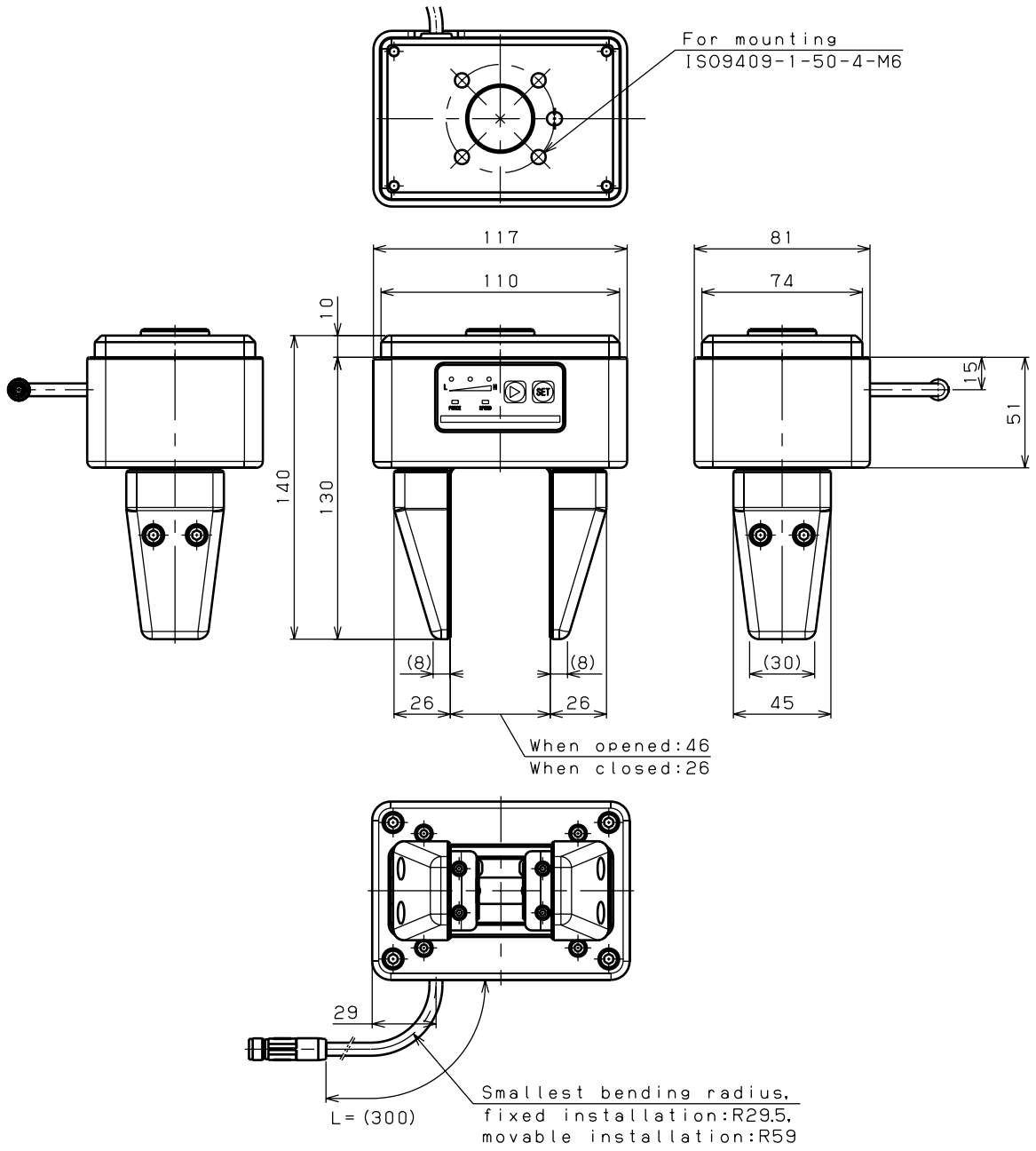
5. Outside dimension

5.1. Outside drawing

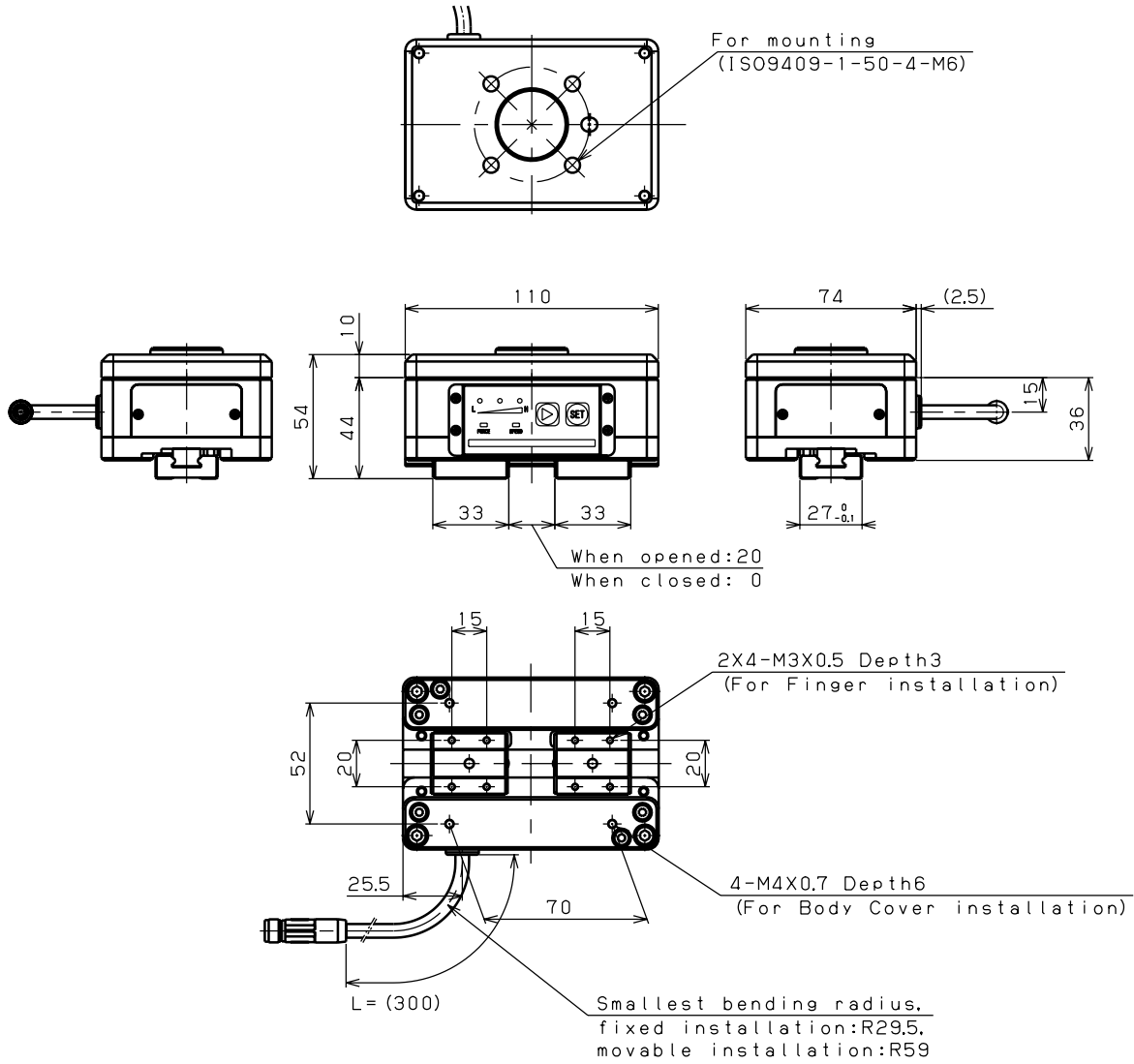
◆ Finger and body cover assembled (outside drawing)



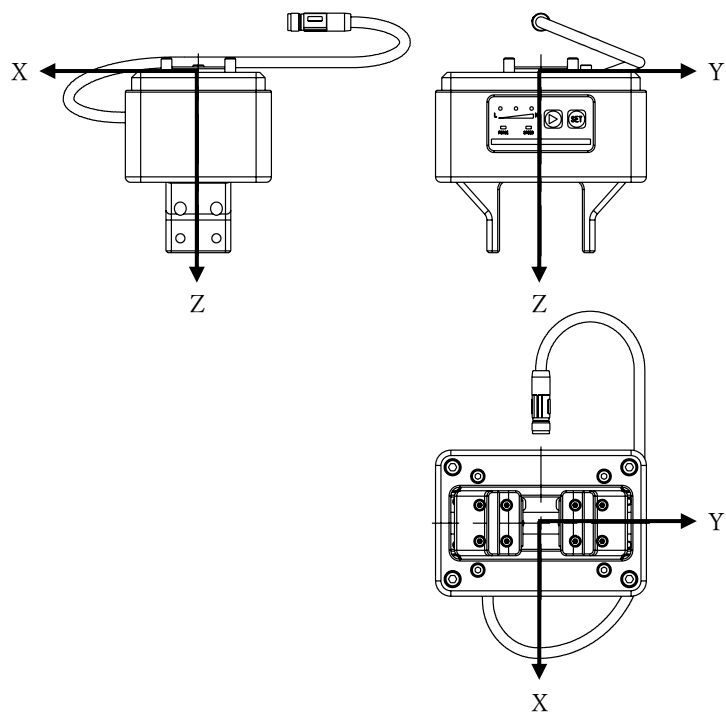
◆ Finger cover assembled (outside drawing)



◆ Accessories not assembled (outside drawing)



5.2. The position of center of gravity



Assembled condition of accessories	position of center of gravity [mm]			Product mass [kg]
	X	Y	Z	
Finger and body cover assembled	-1.0	1.0	31.0	1.35
Finger cover assembled	-1.0	1.0	36.5	1.49
Accessories not assembled	-1.0	1.0	25.0	1.10

6. Installation

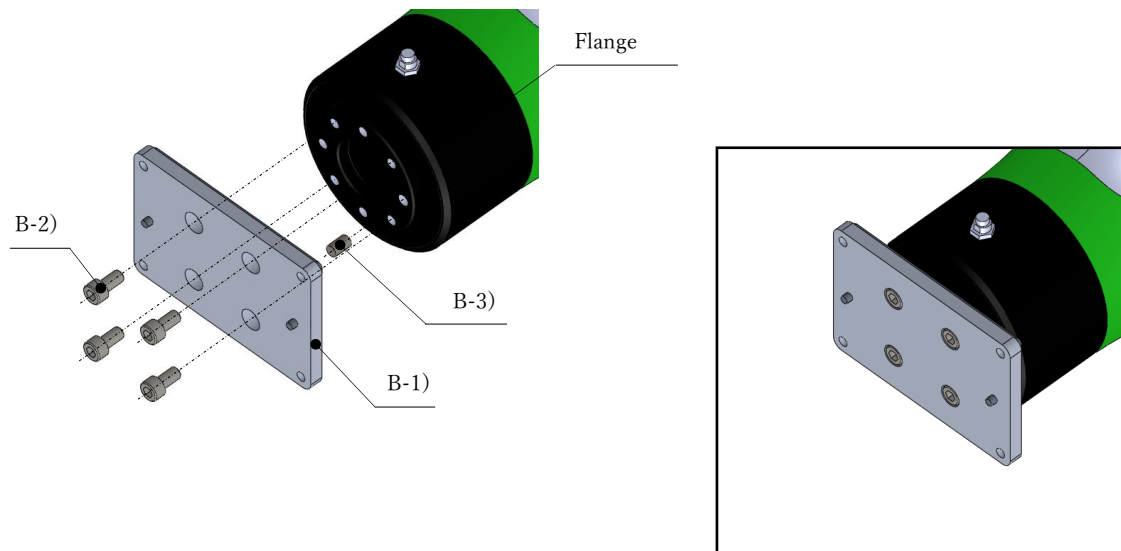
6.1. Installing electric gripper on a robot

As to installation to a robot, make a robot arm move to the location where an electric gripper is easily installed, and install it after confirming the safety.

1) Installation of an adapter plate

- 1-1) **B-3. positioning pin** is inserted flange pin hole at the tip of robot.
- 1-2) **B-1. adapter plate** is installed according to the location of the long hole.
- 1-3) Adapter plate is fixed by attached **B-2. fixing bolts** 4 pcs.

※Tightening torque : 9.6 N · m

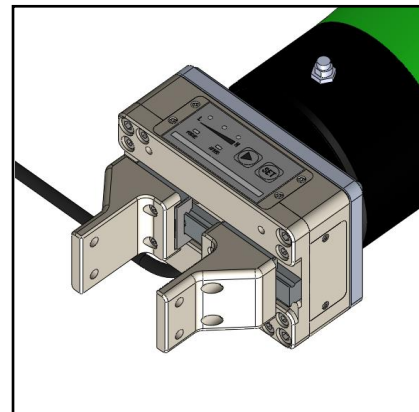
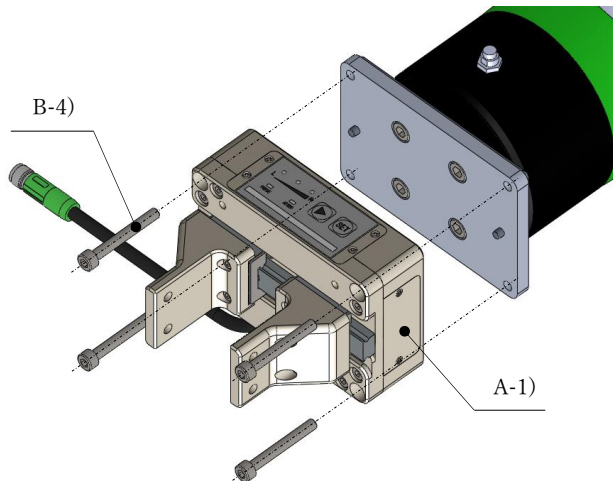


2) Installation of an electric gripper

2-1) **A-1. gripper body** is installed according to 2 positioning pin of an adapter plate.

2-2) Gripper body is fixed by attached **B-4. fixing bolts** 4pcs.

※Tightening torque : 2.9 N · m

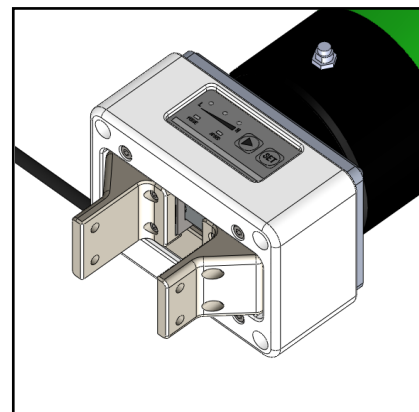
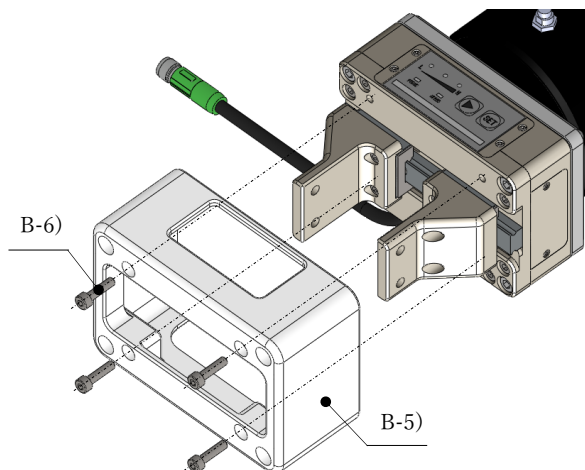


3) Installation of a body cover

3-1) **B-5. body cover** is installed on the gripper body.

3-2) Body cover is fixed by attached **B-6. fixing bolts** 4pcs.

※Tightening torque : 1.4 N · m

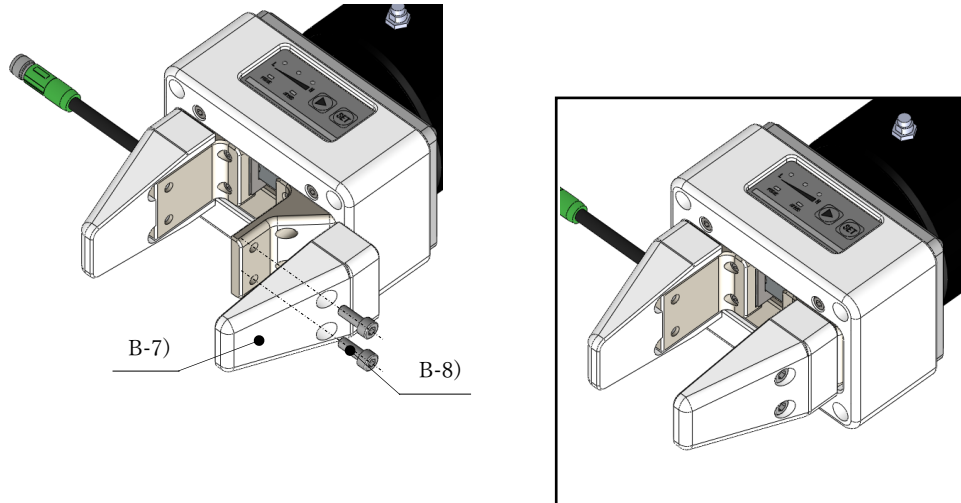


4) Installation of a finger cover (Options for "-PIT")

4-1) B-7. finger cover is installed on the finger.

4-2) Finger cover is fixed by attached B-8. fixing bolts 2pcs.

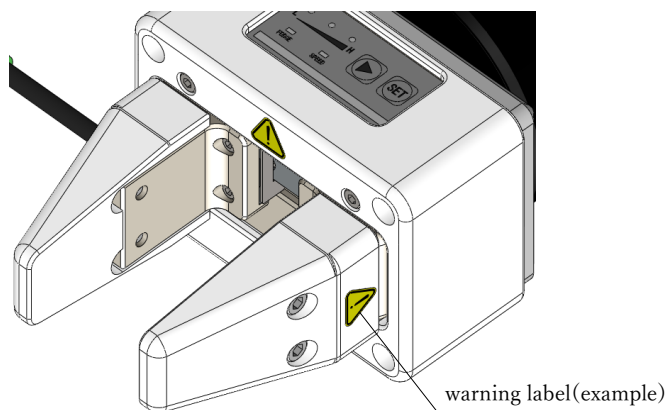
※Tightening torque : 2.9 N · m



5) Attaching warning labels

Attach warning labels to locations where opening and closing operations of the gripper pose a danger. (Please prepare the warning label by yourself.)

- attaching example



6.2. Installing Connectors

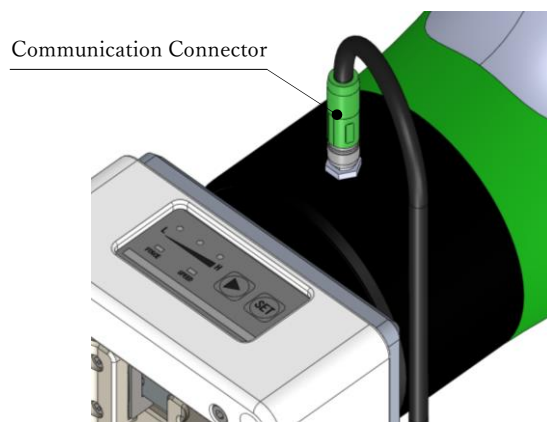
Connect the communication connector on the gripper body to the EE connector on the tip of the robot. Tighten tightly so that there is no loosening.

Attach the cable not to be an acute angle more than the minimum bending radius (29.5mm when fixed).

※ Please connect the connector when not energized.

※ Please install the plug-in software before installing the connector.

See [P.35 "Installation of Plug-in Software"](#)



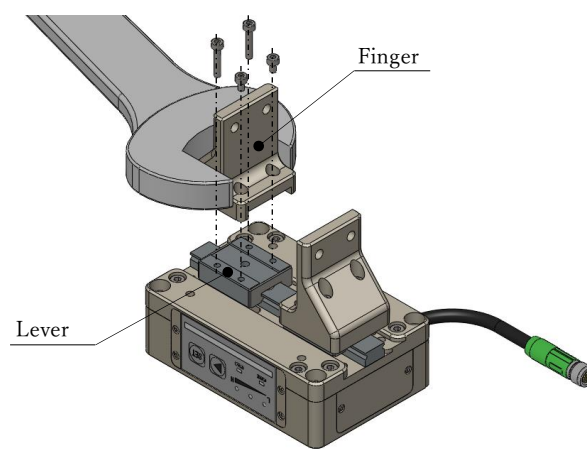
6.3. Mounting Finger and Lever Attachments

The assembled fingers are general-purpose products. Please use them depending on the application.

When mounting and removing finger and lever attachments, support with a spanner so that the lever will not be twisted.

When design lever attachment at your side, be careful not to exceed maximum load mass and make small and light-weight as much as possible.

Please refer to the table below for the tightening torque of mounting bolt.



◆ Tightening torque table

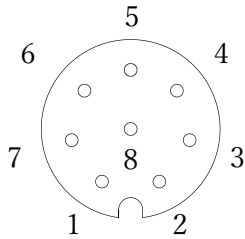
Mounting part	Bolt used	Tightening Torque
Lever	M3	1.14 N · m
Finger	M5	2.84 N · m

◆ Maximum load (attachment) mass

Maximum load mass
150 g (per lever)

7. Input / Output Interface

7.1. Connector Pin Arrangement



M8 8 pin connector (socket)

Pin No.	Type	CRX EE connector Signal Name	Function
1	RS485 comm.(+)	RS485+	RS485 comm. (plug-in software required)
2	RS485 comm.(-)	RS485-	RS485 comm. (plug-in software required)
3	Output Signal 2	DI2	Close End
4	Output Signal 1	DI1	Open End
5	Power +24V	Power1	DC24V Power Supply
6	Input Signal 2	DO2	Close Operation
7	Input Signal 1	DO1	Open Operation
8	Power GND	Ground1	DC0V Power Supply

7.2. Input / Output Circuit Specifications

1) Power

Input Voltage : 24V ± 10%

Input current : 1.8A (Maximum instantaneous motor current 1sec or less)

Select Power1 when using the tool interface output power supply. (When you install the plug-in software, the setting will be Power1.)

CAUTION

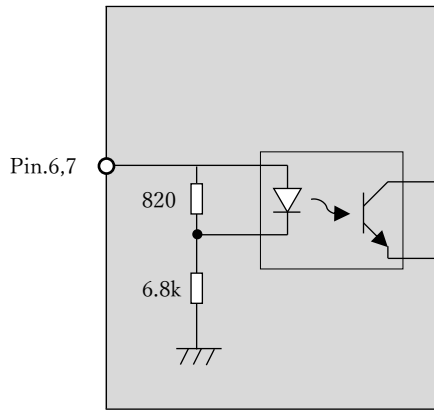
For safe use, install an overcurrent protection such as a fuse or circuit protector on the power supply. (Recommended rated current: 2A)

2) Input / Output Specification

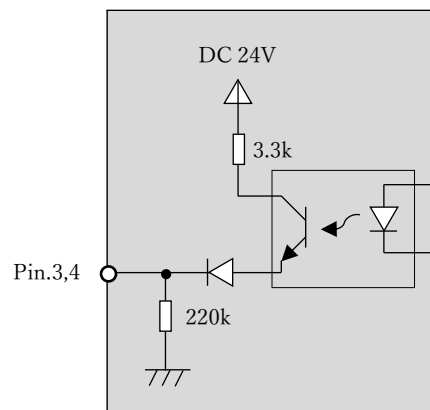
Input Signal		Output Signal	
Spec.	Photo Coupler Input (sink type input)	Spec.	Photo Coupler Output (source type output)
Input Voltage	H : 24V (19.6V~26.4V) L : OPEN or 2V MAX	Output Voltage	H : 26.4V MAX L : 0.6V MAX (pull-down resistance 220kΩ)
Input Current	6mA MAX (input resistance : 6.8kΩ)	Output Current	3mA MIN (output resistance : 3.3kΩ)

3) Input / Output Equivalent Circuit

• Input Circuit



• Output Circuit

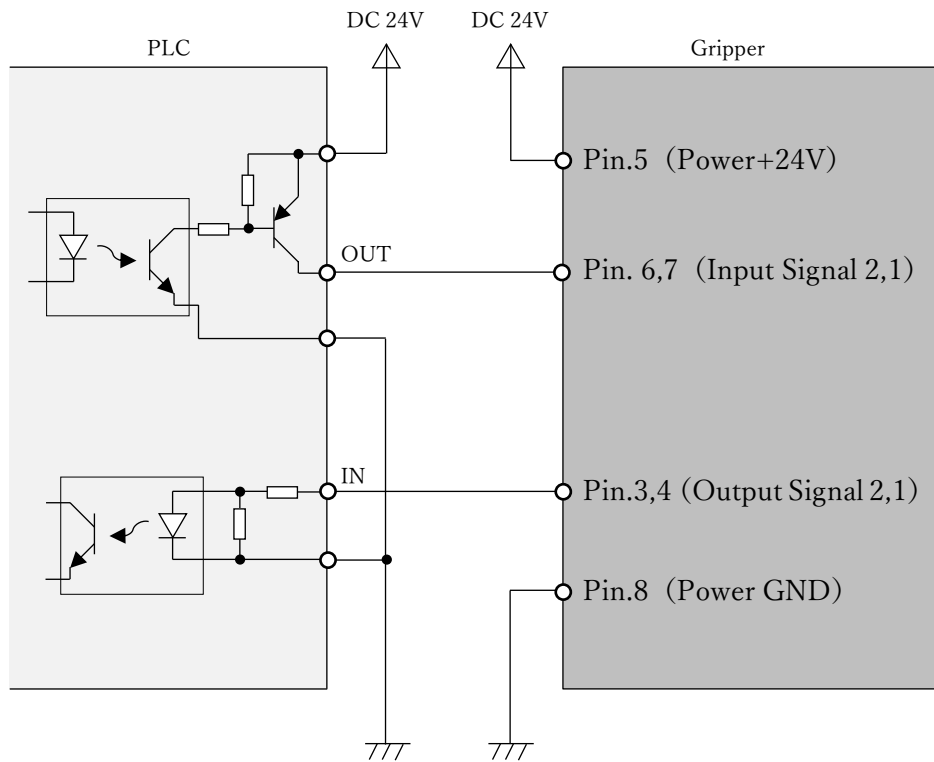


7.3. Connection Example

1) Connecting to the CRX Series EE connector

Refer to CRX Series Tool Interface Specifications.

2) Without connecting to CRX Series EE connector(digital input/output only)



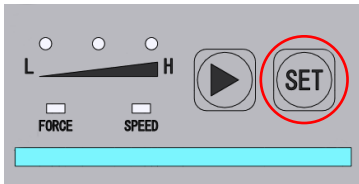
8. Setting Panel

8.1. How to Operate the Setting Panel

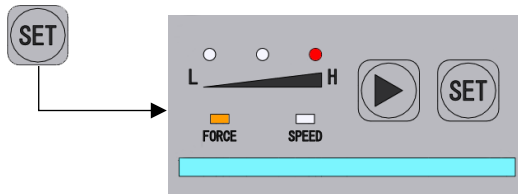
Press **SET** button to switch to the setting mode, you can set the gripping force and operating speed.

※Be sure to check the safety before operating the setting panel with the robot and gripper stopped.

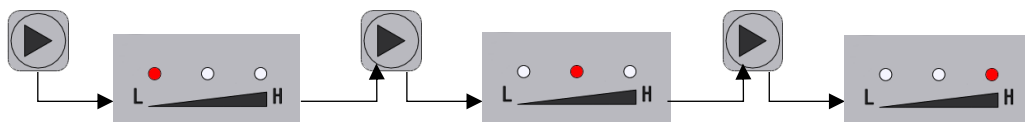
※The setting value by the plug-in software is prioritized.



- 1) Press **SET** button to switch to the gripping force setting mode, and the LED above FORCE and the LED above the L to H bars will light up. At the time of shipment, the L to H bar LED is set to the far right (H).

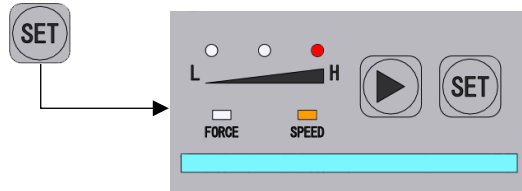


- 2) Press **▶** button to move the L to H bar LED by one to the right.
Press **◀** button to move the LED from the far right to the far left.

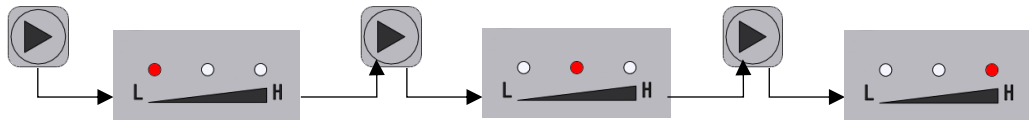


LED Position			
Gripping Force	60 N	80 N	100 N

- 3) Press **SET** button to determine the gripping force level and switch to the operating speed setting mode. The LED above SPEED and the LED above the L to H bar will light up. At the time of shipment, the L to H bar LED is set to the far right (H).

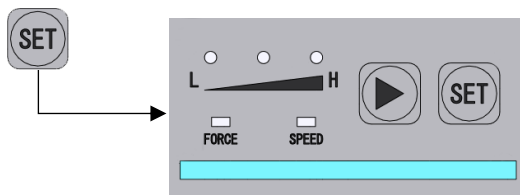


- 4) Press **▶** button to move the L to H bar LED by one to the right.
 Press **◀** button to move the LED from the far right to the far left.








LED Position			
Operating Time	1.8 sec	1.2 sec	0.9 sec

- 5) Press **SET** button to determine the operating speed level, and all LEDs will turn off.
 ※ You can confirm the set value by pressing **SET** button. After checking, press **SET** button until the LED turns off.



8.2. Instruction of LED Band

You can check the status of the gripper with the LED band on the setting panel.

	State	Color	Function
1)	Standby	Light Blue (on) 	Waiting for operation. Able to receive operation commands from the robot.
2)	Operating	Green (on) 	Opening or closing. Unable to receive operation commands from the robot until the operation is completed.
3)	Memorizing Workpiece	Yellow (on) 	Opening or closing at the minimum speed. This operation is performed when the power is turned on or when the gripper receives the command to open or close after resetting the deceleration position. Unable to receive operation commands from the robot until the operation is completed.
4)	Error	Red (blinking) 	There is an error. Refer to P.43 “Error Code and Remedy” for the details of the error and how to deal with and resolve.
5)	Emergency operation	Red (lighting) 	Emergency operation in progress. It is not possible to receive motion commands from the robot until it is released. It is necessary to turn on the power again to cancel.

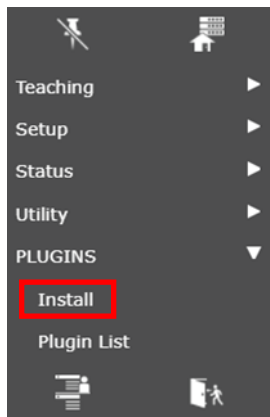
9. Installation of Plug-in Software

9.1. Preparation for Plug-in Software Installation

- 1) If the robot controller software is V9.40P/08 version or earlier, update to V9.40P/09 version or the latest version before installing the plug-in software.
- 2) Download the plug-in software from our website (<http://www.newera.co.jp/en/>) and save the unzipped file to a USB memory that can be used with the CRX series.

9.2. Installation of Plug-in Software

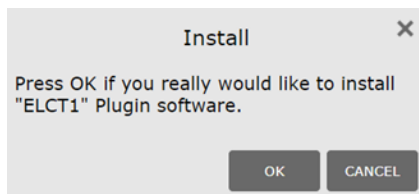
- 1) Connect the USB memory storing the plug-in software “NEWERA_ELCT1.IPL” to the USB port of the robot control device.
- 2) Select [PLUGINS] > [Install] from the menu on the upper left of the tablet TP screen.



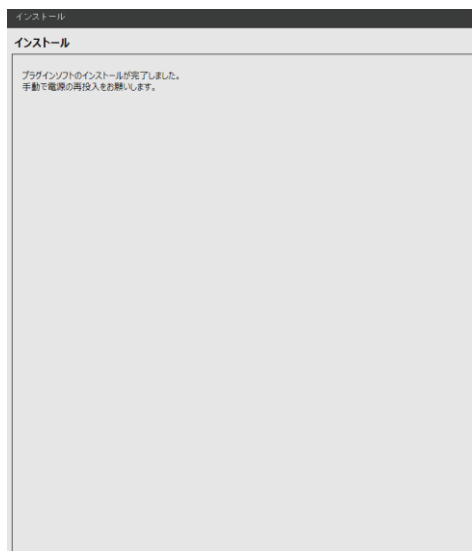
- 3) Select the plug-in software “NEWERA_ELCT1.IPL” displayed on the screen and press the install button.



- 4) Click OK on the pop-up to install the plug-in software.

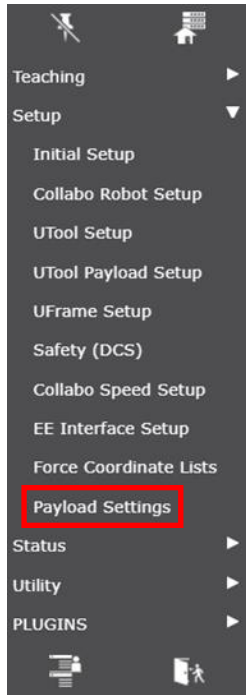


- 5) After the installation finished, restart the robot controller.



9.3. Robot Setting

- 1) Select [Setup]>[Payload Settings] from the menu on the upper left of the tablet TP screen.

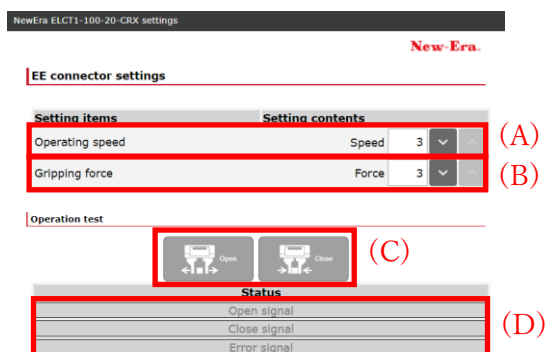


- 2) For the payload setting parameters of the gripper, refer to “Barycentric Position of Load” in this instruction manual. If you install an attachment matching the workpiece, set the barycentric position of load and the mass by adding the setting values of the attachment to that of the gripper. Refer to P.23 “The position of center of gravity”

Payload Settings									
Payload Cent		Apply DCS		Active Payload number = 1					
Group1									
1 / 1 page									
No	Payload(Kg)	Comment	BarycentricPositionOfLoad[m]			LoadInertia[kgm ²]			
			X	Y	Z	X	Y	Z	
1	0.00		0.00	0.00	0.00	0.00	0.00	0.00	
2	10.00		0.00	0.00	0.00	0.00	0.00	0.00	
3	10.00		0.00	0.00	0.00	0.00	0.00	0.00	
4	10.00		0.00	0.00	0.00	0.00	0.00	0.00	
5	10.00		0.00	0.00	0.00	0.00	0.00	0.00	
6	10.00		0.00	0.00	0.00	0.00	0.00	0.00	
7	10.00		0.00	0.00	0.00	0.00	0.00	0.00	
8	10.00		0.00	0.00	0.00	0.00	0.00	0.00	
9	10.00		0.00	0.00	0.00	0.00	0.00	0.00	
10	10.00		0.00	0.00	0.00	0.00	0.00	0.00	

9.4. Hand Setting (Plug-in Setting Screen)

- 1) Select [PLUGINS] > [NEWERA ELCT1] from the menu to display the setting screen.



A) Operating Speed

※changeable for each process on the program details screen.

Set Value	1	2	3
Operating Time (Full Stroke)	1.8 s	1.2 s	0.9 s

B) Gripping force

※changeable for each process on the program details screen.

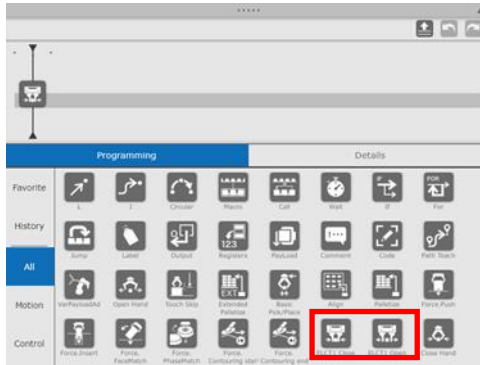
Set Value	1	2	3
Gripping Force	60 N	80 N	100 N

- C) Able to test the operation. When you press the [Open] button or [Close] button, the gripper will move according to the button. The first operation after turning on the power is to memorize workpiece (initial operation). From the next operation, it will decelerate before the previous stop position.

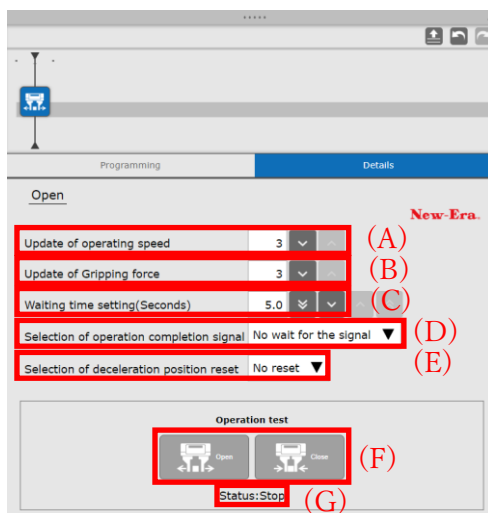
- D) Check the status of the gripper. [Open signal] = open operation end, [Close signal] = close operation end, [Error signal] = error. For the details of the error, refer to P.39 “Error Code and Remedy” in this manual.

9.5. Gripper Setting (Programming-Details Screen)

- 1) [ELCT1 Open] and [ELCT1Close] icons of the NEW ERA gripper are displayed in the programming area.



- 2) Drag and drop the icon on the time chart, and select it to display the details screen.



- A) Update of Operating Speed
Change the operating speed value.
- B) Update of Gripping Force
Change the gripping force value.
- C) Waiting Time Setting
Set the time to move to the next operation after that of the gripper is completed.
- D) Selection of Operation Completion Signal

Select to move to the next operation without waiting for the completion signal of the gripper when releasing the workpiece. If you select “No wait for the signal,” you need to set the waiting time.

E) Selection of Deceleration Position Reset

Select it when you change the workpiece. If you select “Reset,” the operating speed becomes low speed to memorize the workpiece (with LED band yellow).

Note) If the deceleration position is not reset when the workpiece is changed, unintended gripping force may be applied to the workpiece. Be sure to select “Reset” when you change the workpiece.

F) Able to test the operation. When you press [ELCT1 open] button or [ELCT1 close] button, the gripper will move according to the button. The first operation after turning on the power is to memorize workpiece at low speed. From the next operation, it will decelerate before the previous stop position.

G) The status of the gripper (“Stop” and “Operating”) is displayed below each button.

10. Failure Diagnosis and Troubleshooting

10.1. Phenomenon, Possible Cause, and the Remedy

If the product does not work as intended, or if the operation is unstable, refer to this section and take appropriate measures. If it still does not work properly, or if you have any other questions, please contact our distributor or New-Era office.

Phenomenon	Possible Cause	Remedy
LED band does not light when the power is turned on.	Unconnected connector	Check if the comm. connector on the gripper is properly attached to the EE connector on the robot.
	Disconnected cable	Check the cable for cracks, damage, or breaks
	Incorrect wiring	Check if the connected robot is CRX series EE connector or an equivalent signal interface wiring.
	Broken/damaged product	Needs repairing. Contact our distributor or New-Era office.
When the power is turned on, LED band flashes red and the gripper does not work.	Low voltage protection is working error code: E101	Check if the power supply voltage is appropriate.
	Overvoltage protection is working error code :E102	Check if the power supply voltage is appropriate.
LED band flashes after the gripper moves, and then the gripper doesn't work.	Product is broken/damaged error code: E201	Needs repairing. Contact our distributor or New-Era office.
Not working even if the gripper is in standby (LED light blue) and the command is sent.	Communication error	Check if the comm. connector on the gripper is properly attached to the EE connector on the robot.

Phenomenon	Possible Cause	Remedy
Not working even if the gripper is in standby (LED light blue) and the command is sent.	Disconnected cable	Check the cable for cracks, damage, or breaks
	Incorrect wiring	Check if the connected robot is CRX series EE connector or an equivalent signal interface wiring.
	Broken/damaged product	Needs repairing. Contact our distributor or New-Era office.
Operating speed of the gripper is very slow.	The first operation after turning on the power.	For the first operation after turning on the power, the LED band lights yellow and the gripper operates at the minimum speed. This is not a malfunction
	A deceleration position reset signal has been input.	Operating at the minimum speed when the power is turned on or after the deceleration position reset signal is input. Check if the signal input is performed at the appropriate timing.
Operating speed of the gripper becomes very slow in the middle of the operation.	Trying to grip the smaller workpiece than that is gripped just before.	Memorizing the workpiece for each movement and decelerating just before gripping. This is not a malfunction. If the workpiece is changed, the gripper needs to grip the workpiece in advance at the minimum speed with the deceleration position reset signal input.
Sometimes the gripping force of the gripper is stronger than the setting.	Trying to grip the bigger workpiece than that is gripped just before.	Unable to grip the workpiece with the setting force without the deceleration operation just before its gripping. If the workpiece is changed, the gripper needs to grip the workpiece in advance at the minimum speed with the deceleration position reset signal input.
The gripper does not open and close when using the plug-in software.	RS-485 is not valid in robot settings.	Check if the robot setting is appropriate.

10.2. Error Code and Remedy

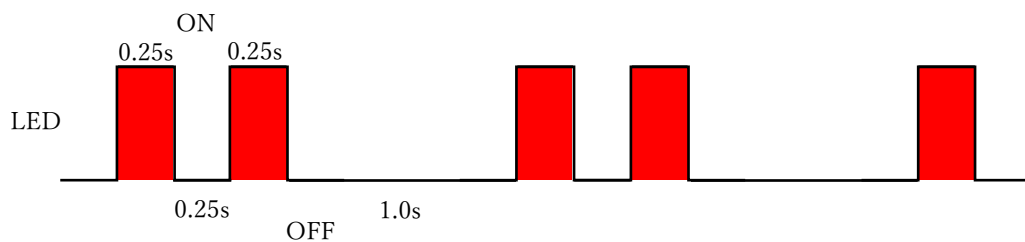
If the LED band is blinking red, there is an error. You can check the error code on the plug-in software.

You need to turn off the power and then on again to cancel the error. After removing the causes of the problem, turn off the power of the robot, and then turn it on again.

Error Code	Error Details	Remedy
E101 <LED band> Blinking red twice	[Low Voltage Error] The input voltage is below the rated voltage	Check if the power supply voltage is appropriate.
E102 <LED band> Blinking red three times	[Overvoltage Error] The input voltage exceeds the rated voltage.	Check if the power supply voltage is appropriate.
E201 <LED band> Blinking red four times	[Operation Error] The operation completion signal is not returned for 5 seconds or more after the operation command.	Motor or opening-closing mechanism may be broken or damaged, and needs repairing. Contact our distributor or New-Era office.
E301 Can only be confirmed with plug-in software	[Communication Error] The communication between robot and gripper fails.	Check if the comm. connector on the gripper is properly attached to the EE connector on the robot.
E401 <LED band> Red lighting	[Emergency operation error] Displayed when an emergency operation is performed.	Turn on the power again.

◆ Blinking LED when an error occurs

You can check the details of the error by counting the number of times the LED band blinks in red. It lights on for 0.25 seconds, blinks specific number times in 0.25 seconds, and repeats them at intervals of about 1 second.



11. Declarations and Certificates

11.1. Declaration of Incorporation

In terms of the EU Machinery Directive 2006/42/EC Annex II 1 B.

The manufacturer : New-Era Co., Ltd.
 1-7-21 Nakagawa-higashi, Ikuno-ku,
 Osaka, 544-0006 Japan

Product designation : Electric parallel gripper

Type designation : ELCT1-100-20-CRX

Serial number: 1000000-1999999

The product is partly completed machinery according to 2006/42/EC.

Do not use the product until the entire machine fully complies with all essential requirements of 2006/42/EC.

11.2. Declaration of Conformity

In terms of the EU Directive 2014/30/EU(EMC) , 2011/65/EU(RoHS).

The manufacturer New-Era Co., Ltd.
 1-7-21 Nakagawa-higashi, Ikuno-ku,
 Osaka, 544-0006 Japan

Product designation Electric parallel gripper

Type designation ELCT1-100-20-CRX

Serial number: 1000000-1999999

The product is in conformity with, and CE marked according to, the following directives:

2014/30/EU Electromagnetic Compatibility Directive (EMC)

2011/65/EU Restriction of the use of certain hazardous substances (RoHS)

Signature: see original declaration

New-Era®

New-Era Co., Ltd.

1-7-21 Nakagawa-higashi, Ikuno-ku, Osaka, 544-0006 Japan

URL <http://www.newera.co.jp>

E-mail eigy2@newera.co.jp

TEL +81-6-6754-8585 FAX +81-6-6754-3030

★The specifications shall be changed without prior notice due to continuous technical research and development.

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