Touch Panel Teaching Pendant

TB-03

ELECYLINDER Wireless Link

Instruction Manual　Fifth Edition

ME0376

ME0377

This instruction manual describes the contents for ELECYLINDER Wireless Link.

For how to use the position (CON/SEP/MEC system) controllers and ELECYLINDER wired link, refer to the following instruction manual.
"Touch Panel Teaching Pendant TB-03 Position Controller and ELECYLINDER Wired Link Instruction Manual" (ME0376)

For how to use the Program (SEL system) controllers wired link, refer to the following instruction manual.
"Touch Panel Teaching Pendant TB-03 Program Controller and Wired Link Instruction Manual" (ME0377)

For details of applicable controllers, refer in the section for the supported models.

IAI Corporation

ELECYLINDER

Please Read Before Use

Thank you for purchasing our product.

This instruction manual explains the handling methods, structure and maintenance of this product, providing the information you need in order to use the product safely.

Before using the product, be sure to read this manual and fully understand the contents explained herein to ensure safe use of the product.

Please downloaded the user's manual from our website.
You can download it free of charge. User registration is required for the first time downloading.
URL : www.iai-robot.co.jp/data_dl/CAD_MANUAL/

When using the product, print out of the necessary portions of the relevant manual, or please display it on your computer, tablet terminal, etc. so that you can check it immediately.

After reading the instruction manual, keep it in a convenient place so that whoever is handling the product can refer to it quickly when necessary.

[Important]

- This instruction manual is an original document dedicated for this product.
- This product cannot be used in ways not shown in this instruction manual. IAI shall not be liable for any result whatsoever arising from the use of the product in any other way than what is noted in the manual.
- The information contained in this instruction manual is subject to change without notice for the purpose of product improvement.
- If any issues arise regarding the information contained in this instruction manual, contact our customer center or the nearest sales office.
- Use or reproduction of this instruction manual in full or in part without permission is prohibited.
- The company names, names of products and trademarks of each company shown in the text are registered trademarks.

Supported Models

This Instruction Manual is for the ELECYLINDER Wireless Link.

For details on handling the position controller (ERC3, ERC2, ACON, PCON, SCON, DCON, RACON, RPCON, MSCON, MCON, RCON, ASEP, PSEP, DSEP, MSEP, AMEC, PMEC, RCP6S, RCM-P6PC, RCM-P6AC, RCM-P6DC), and ELECYLINDER wired link, refer to the separate “Touch Panel Teaching Pendant TB-03 Applicable for Position Controller wired link Instruction Manual (ME0376)”.

For details on handling the program controller (XSEL-K/KX/KT/KET/P/Q/PX/QX/PCT/QCT/R/S/RX/SX/RXD/SXD/RA/SA/RAX/SAX/RAXD/SAXD, MSEL-PC/PG/PCX/PGX, SSEL, ASEL, PSEL, RSEL and TT/TTA) wired link, refer to the separate “Touch Panel Teaching Pendant TB-03 Applicable for Program Controller wired link Instruction Manual (ME0377)”.

Supported Model List

<table>
<tr><th rowspan="2">ELECYLINDER Type (Note 1)</th><th colspan="2">Supported from version</th></tr>
<tr><th>Standard type</th><th>Digital speed controller type</th></tr>
<tr><td>EC-S6, EC-S7, EC-R6, EC-R7, EC-S6□CR, EC-S7□SR</td><td>V1.80</td><td rowspan="6">V2.60</td></tr>
<tr><td>EC-S6□H, EC-S7□H, EC-RR6, EC-RR7, EC-R6□W,
EC-R7□W, EC-RP4, EC-GS4, EC-GD4, EC-TC4, EC-TW4</td><td>V2.00</td></tr>
<tr><td>EC-RR6□H, EC-RR7□H</td><td>V2.10</td></tr>
<tr><td>EC-S6□AH, EC-S7□AH, EC-RR6□AH, EC-RR7□AH</td><td>V2.30</td></tr>
<tr><td>EC-S3, EC-S4, EC-RR3, EC-RR4, EC-S6□R, EC-S7□R,
EC-S6□AHR, EC-S7□AHR, EC-RR6□R, EC-RR7□R,
EC-RR6□AHR, EC-RR7□AHR, EC-S3□CR, EC-S4□CR</td><td>V2.40</td></tr>
<tr><td>EC-RR6□W, EC-RR7□W</td><td>V2.50</td></tr>
<tr><td>EC-B6, EC-B7</td><td>V2.60</td><td>—</td></tr>
<tr><td>EC-S3□R, EC-S4□R, EC-RR3□R, EC-RR4□R,
EC-RTC9, EC-RTC12, EC-ST15, EC-ST15ME</td><td colspan="2">V2.70</td></tr>
<tr><td>EC-S13, EC-S13X, EC-S15, EC-S15X</td><td>V2.80</td><td>—</td></tr>
<tr><td>EC-RR6X□AH, EC-RR7X□AH, EC-WS10, EC-WS12,
EC-S6□AHCR, EC-S7□AHCR</td><td rowspan="2">V3.30</td><td>V3.30</td></tr>
<tr><td>EC-GD5, EC-RP5, EC-TC5, EC-TW5</td><td>—</td></tr>
<tr><td>EC-GRB8M, EC-GRB10M, EC-GRB13M, EC-GRB13L
EC-S10, EC-S10X</td><td>V3.50</td><td>—</td></tr>
<tr><td>EC-S3□A, EC-S4□A, EC-S6□A, EC-S7□A
EC-S6X□AH, EC-S7X□AH, EC-WS10□R, EC-WS12□R
EC-WS10□CR, EC-WS12□CR</td><td colspan="2">V3.70</td></tr>
<tr><td>EC-ST11□, EC-SRG11□, EC-SRG15□
EC-SL3□, EC-GDS3□, EC-GDB3□, EC-T3□</td><td>V3.70</td><td>—</td></tr>
<tr><td>EC-S6□D, EC-S7□D, EC-S6□W, EC-S7□W, EC-RTC18</td><td>V3.80</td><td>—</td></tr>
<tr><td>EC-S18, EC-S18X</td><td>V3.90</td><td>—</td></tr>
</table>

Make sure to use a version started to support or later.
(There should be some features not available to use in versions before supporting.)

Note 1 For the digital speed controller type, the model code includes “D” in the type.
e.g.) EC-S3 → EC-DS3, EC-RR6 → EC-DRR6
There are some models that have no digital speed controller type in the lineup.

Variation Applied to Axis Operation with Wireless Connection

ELECYLINDER Type	Supported from version
ELECYLINDER with Option Code -WL2	V2.30

Version upgrade

How to version upgrade, refer to [6.2 Teaching Update].

ELECYLINDER

Table of Contents

ELECYLINDER

Safety Guide

“Safety Guide” has been written to use the machine safely and so prevent personal injury or property damage beforehand. Make sure to read it before the operation of this product.

Safety Precautions for Our Products

The common safety precautions for the use of any of our robots in each operation.

No.	Operation Description	Description
1	Model Selection	● This product has not been planned and designed for the application where high level of safety is required, so the guarantee of the protection of human life is impossible. Accordingly, do not use it in any of the following applications. 1) Medical equipment used to maintain, control or otherwise affect human life or physical health. 2) Mechanisms and machinery designed for the purpose of moving or transporting people (For vehicle, railway facility or air navigation facility) 3) Important safety parts of machinery (Safety device, etc.) ● Do not use the product outside the specifications. Failure to do so may considerably shorten the life of the product. ● Do not use it in any of the following environments. 1) Location where there is any inflammable gas, inflammable object or explosive 2) Place with potential exposure to radiation 3) Location with the ambient temperature or relative humidity exceeding the specification range 4) Location where radiant heat is added from direct sunlight or other large heat source 5) Location where condensation occurs due to abrupt temperature changes 6) Location where there is any corrosive gas (sulfuric acid or hydrochloric acid) 7) Location exposed to significant amount of dust, salt or iron powder 8) Location subject to direct vibration or impact ● For an actuator used in vertical orientation, select a model which is equipped with a brake. If selecting a model with no brake, the moving part may drop when the power is turned OFF and may cause an accident such as an injury or damage on the work piece.

No.	Operation Description	Description
2	Transportation	● When carrying a heavy object, do the work with two or more persons or utilize equipment such as crane. ● When the work is carried out with 2 or more persons, make it clear who is to be the “leader” and who to be the “follower(s)” and communicate well with each other to ensure the safety of the workers. ● When in transportation, consider well about the positions to hold, weight and weight balance and pay special attention to the carried object so it would not get hit or dropped. ● Transport it using an appropriate transportation measure. The actuators available for transportation with a crane have eyebolts attached or there are tapped holes to attach bolts. Follow the instructions in the instruction manual for each model. ● Do not step or sit on the package. ● Do not put any heavy thing that can deform the package, on it. ● When using a crane capable of 1t or more of weight, have an operator who has qualifications for crane operation and sling work. ● When using a crane or equivalent equipments, make sure not to hang a load that weighs more than the equipment’s capability limit. ● Use a hook that is suitable for the load. Consider the safety factor of the hook in such factors as shear strength. ● Do not get on the load that is hung on a crane. ● Do not leave a load hung up with a crane. ● Do not stand under the load that is hung up with a crane.
3	Storage and Preservation	● The storage and preservation environment conforms to the installation environment. However, especially give consideration to the prevention of condensation. ● Store the products with a consideration not to fall them over or drop due to an act of God such as earthquake.
4	Installation and Start	(1) Installation of Robot Main Body and Controller, etc. ● Make sure to securely hold and fix the product (including the work part). A fall, drop or abnormal motion of the product may cause a damage or injury. Also, be equipped for a fall-over or drop due to an act of God such as earthquake. ● Do not get on or put anything on the product. Failure to do so may cause an accidental fall, injury or damage to the product due to a drop of anything, malfunction of the product, performance degradation, or shortening of its life. ● When using the product in any of the places specified below, provide a sufficient shield. 1) Location where electric noise is generated 2) Location where high electrical or magnetic field is present 3) Location with the mains or power lines passing nearby 4) Location where the product may come in contact with water, oil or chemical droplets

No.	Operation Description	Description
4	Installation and Start	(2) Cable Wiring ● Use our company's genuine cables for connecting between the actuator and controller, and for the teaching tool. ● Do not scratch on the cable. Do not bend it forcibly. Do not pull it. Do not coil it around. Do not insert it. Do not put any heavy thing on it. Failure to do so may cause a fire, electric shock or malfunction due to leakage or continuity error. ● Perform the wiring for the product, after turning OFF the power to the unit, so that there is no wiring error. ● When the direct current power (+24V) is connected, take the great care of the directions of positive and negative poles. If the connection direction is not correct, it might cause a fire, product breakdown or malfunction. ● Connect the cable connector securely so that there is no disconnection or looseness. Failure to do so may cause a fire, electric shock or malfunction of the product. ● Never cut and/or reconnect the cables supplied with the product for the purpose of extending or shortening the cable length. Failure to do so may cause the product to malfunction or cause fire.
		(3) Grounding ● The grounding operation should be performed to prevent an electric shock or electrostatic charge, enhance the noise-resistance ability and control the unnecessary electromagnetic radiation. ● For the ground terminal on the AC power cable of the controller and the grounding plate in the control panel, make sure for grounding work. For security grounding, it is necessary to select an appropriate wire thickness suitable for the load. Perform wiring that satisfies the specifications (electrical equipment technical standards). For detail, follow the description in an instruction manual of each controller. ● Perform Class D Grounding (former Class 3 Grounding with ground resistance 100Ω or below).

No.	Operation Description	Description
4	Installation and Start	(4) Safety Measures ● When the work is carried out with 2 or more persons, make it clear who is to be the “leader” and who to be the “follower(s)” and communicate well with each other to ensure the safety of the workers. ● When the product is under operation or in the ready mode, take the safety measures (such as the installation of safety and protection fence) so that nobody can enter the area within the robot’s movable range. When the robot under operation is touched, it may result in death or serious injury. ● Make sure to install the emergency stop circuit so that the unit can be stopped immediately in an emergency during the unit operation. ● Take the safety measure not to start up the unit only with the power turning ON. Failure to do so may start up the machine suddenly and cause an injury or damage to the product. ● Take the safety measure not to start up the machine only with the emergency stop cancellation or recovery after the power failure. Failure to do so may result in an electric shock or injury due to unexpected power input. ● When the installation or adjustment operation is to be performed, give clear warnings such as “Under Operation; Do not turn ON the power!” etc. Sudden power input may cause an electric shock or injury. ● Take the measure so that the work part is not dropped in power failure or emergency stop. ● Wear protection gloves, goggle or safety shoes, as necessary, to secure safety. ● Do not insert a finger or object in the openings in the product. Failure to do so may cause an injury, electric shock, damage to the product or fire. ● When releasing the brake on a vertically oriented actuator, exercise precaution not to pinch your hand or damage the work parts with the actuator dropped by gravity.
5	Teaching	● When the work is carried out with 2 or more persons, make it clear who is to be the “leader” and who to be the “follower(s)” and communicate well with each other to ensure the safety of the workers. ● Perform the teaching operation from outside the safety protection fence, if possible. In the case that the operation is to be performed unavoidably inside the safety protection fence, prepare the “Stipulations for the Operation” and make sure that all the workers acknowledge and understand them well. ● When the operation is to be performed inside the safety protection fence, the worker should have an emergency stop switch at hand with him so that the unit can be stopped any time in an emergency. ● When the operation is to be performed inside the safety protection fence, in addition to the workers, arrange a watchman so that the machine can be stopped any time in an emergency. Also, keep watch on the operation so that any third person can not operate the switches carelessly. ● Place a sign “Under Operation” at the position easy to see. ● When releasing the brake on a vertically oriented actuator, exercise precaution not to pinch your hand or damage the work parts with the actuator dropped by gravity. * Safety protection Fence : In the case that there is no safety protection fence, the movable range should be indicated.

No.	Operation Description	Description
6	Trial Operation	● When the work is carried out with 2 or more persons, make it clear who is to be the “leader” and who to be the “follower(s)” and communicate well with each other to ensure the safety of the workers. ● After the teaching or programming operation, perform the check operation one step by one step and then shift to the automatic operation. ● When the check operation is to be performed inside the safety protection fence, perform the check operation using the previously specified work procedure like the teaching operation. ● Make sure to perform the programmed operation check at the safety speed. Failure to do so may result in an accident due to unexpected motion caused by a program error, etc. ● Do not touch the terminal block or any of the various setting switches in the power ON mode. Failure to do so may result in an electric shock or malfunction.
7	Automatic Operation	● Check before starting the automatic operation or rebooting after operation stop that there is nobody in the safety protection fence. ● Before starting automatic operation, make sure that all peripheral equipment is in an automatic-operation-ready state and there is no alarm indication. ● Make sure to operate automatic operation start from outside of the safety protection fence. ● In the case that there is any abnormal heating, smoke, offensive smell, or abnormal noise in the product, immediately stop the machine and turn OFF the power switch. Failure to do so may result in a fire or damage to the product. ● When a power failure occurs, turn OFF the power switch. Failure to do so may cause an injury or damage to the product, due to a sudden motion of the product in the recovery operation from the power failure.

No.	Operation Description	Description
8	Maintenance and Inspection	● When the work is carried out with 2 or more persons, make it clear who is to be the “leader” and who to be the “follower(s)” and communicate well with each other to ensure the safety of the workers. ● Perform the work out of the safety protection fence, if possible. In the case that the operation is to be performed unavoidably inside the safety protection fence, prepare the “Stipulations for the Operation” and make sure that all the workers acknowledge and understand them well. ● When the work is to be performed inside the safety protection fence, basically turn OFF the power switch. ● When the operation is to be performed inside the safety protection fence, the worker should have an emergency stop switch at hand with him so that the unit can be stopped any time in an emergency. ● When the operation is to be performed inside the safety protection fence, in addition to the workers, arrange a watchman so that the machine can be stopped any time in an emergency. Also, keep watch on the operation so that any third person can not operate the switches carelessly. ● Place a sign “Under Operation” at the position easy to see. ● For the grease for the guide or ball screw, use appropriate grease according to the instruction manual for each model. ● Do not perform the dielectric strength test. Failure to do so may result in a damage to the product. ● When releasing the brake on a vertically oriented actuator, exercise precaution not to pinch your hand or damage the work parts with the actuator dropped by gravity. ● The slider or rod may get misaligned OFF the stop position if the servo is turned OFF. Be careful not to get injured or damaged due to an unnecessary operation. ● Pay attention not to lose the removed cover or screws, and make sure to put the product back to the original condition after maintenance and inspection works. Use in incomplete condition may cause damage to the product or an injury. * Safety protection Fence : In the case that there is no safety protection fence, the movable range should be indicated.
9	Modification and Dismantle	● Do not modify, disassemble, assemble or use of maintenance parts not specified based at your own discretion.
10	Disposal	● When the product becomes no longer usable or necessary, dispose of it properly as an industrial waste. ● When removing the actuator for disposal, pay attention to drop of components when detaching screws. ● Do not put the product in a fire when disposing of it. The product may burst or generate toxic gases.
11	Other	● Do not come close to the product or the harnesses if you are a person who requires a support of medical devices such as a pacemaker. Doing so may affect the performance of your medical device. ● See Overseas Specifications Compliance Manual to check whether complies if necessary. ● For the handling of actuators and controllers, follow the dedicated instruction manual of each unit to ensure the safety.

Alert Indication

The safety precautions are divided into “Danger”, “Warning”, “Caution” and “Notice” according to the warning level, as follows, and described in the instruction manual for each model.

Level	Degree of Danger and Damage	Symbol
Danger	This indicates an imminently hazardous situation which, if the product is not handled correctly, will result in death or serious injury.	 Danger
Warning	This indicates a potentially hazardous situation which, if the product is not handled correctly, could result in death or serious injury.	 Warning
Caution	This indicates a potentially hazardous situation which, if the product is not handled correctly, may result in minor injury or property damage.	 Caution
Notice	This indicates lower possibility for the injury, but should be kept to use this product properly.	 Notice

Handling Precautions

- In touch panel teaching pendant TB-03, the language to be displayed can be changed.
  Refer to the following for how to change it.
  - ELECYLINDER 3.1 Displayed Language Change

- Do not apply mechanical shocks on TB-03, because they may cause failure.

- If using the LCD screen for a long time, the brightness decreases. In order to extend the life of LCD, set the time setting to turn off in the environment setting to turn it off automatically, turn it off in case not used.

- Do not touch more than one point at the same time, because the touch panel is an analog resistive film system. If you touch more than one point, the center position of more than one point may react and operate.

- Operate the touch panel by 0.5 N force or less.
  There is a risk that the panel will be broken if it is operated by stronger force than that.

- The life of the touch panel is around one million times under the condition of depression at the same point. (Based on the usage environment of 25°C)

- It is recommended to have distance between TB-03 and ELECYLINDER of 5m or less with no interruption.
  The connection may get unstable even in distance of 5m or less depending on the peripheral environment of use.
  Also, be aware that, even if an axis is displayed in the wireless axis select window with distance over 5m, the connection could get unstable as the distance goes far.

- For a SD memory card, choose a SD/SDHC memory card with 1G to 32G. (Toshiba-made recommended) Also, use FAT32 Format for the file system.

International Standards Compliances

This TB-03 comply with the following international standards:
Refer to Overseas Standard Compliance Manual (ME0287) for more detailed information.

CE Marking			UL
RoHS3 Directive	EMC Directive	Radio Equipment Directive	
○	○	○	-

If it is necessary to announce EU Declaration of Conformity with this product built in your facility, as this product itself declares the conformity to EU Directives in some specific conditions as stated below, you would be able to utilize this declaration.

EU Directives Applicable for Declaration of Conformity

EMC Directive (2014/30/EU) • • • • • • • • • • • • • • • • • • To be checked in CE marking described in product nameplate.

RoHS3 Directive (2011/65/EU + (EU)2015/863) • • • • Same as above.

RE Directive (2014/53/EU) • • • • • • • • • • • • • • • • • • To be checked in EU Declaration of Conformity.

There is EU Declaration of Conformity attached to clarify that it complies with RE Directive in [8.1 EU Declaration of Conformity].
This EU Declaration of Conformity may change without notice in case of addition of complying models and change in specifications. Consult with our sales person in charge if necessary.

Precautions for Handling Wireless Operation

- This product uses the 2.4 GHz radio band known as an ISM band. This frequency range is used by various devices such as microwave ovens and wireless LAN, so that communication may be disrupted by radio disturbance.
  Use of this device is permitted within the following countries (regions) only. Use in other countries (regions) requires certification to be obtained based on the laws and regulations of the relevant country (region).

Wireless frequency	2,400 to 2,483.5MHz
Wireless output	+5dBm

[U.S.]

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference and
2. This device must accept any interference received, including interference that may cause undesired operation of the device.

FCC RF Radiation Exposure Statement:

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. End users must follow the specific operating instructions for satisfying RF exposure limits. This transmitter must not be colocated or operating with any other antenna or transmitter.

[CANADA]

This device complies with Industry Canada licence-exempt RSS standards.

Operation is subject to the following two conditions:

1. This device may not cause interference, and
2. This device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence

L'exploitation est autorisée aux deux conditions suivantes:

1. l'appareil ne doit pas produire de brouillage, et
2. l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

IC RF Radiation Exposure Statement:

To comply with IC RF exposure requirements, this device and its antenna must not be co-located or operating in conjunction with any other antenna or transmitter.

Pour se conformer aux exigences de conformité RF canadienne l'exposition, cet appareil et son antenne ne doivent pas étre co-localisés ou fonctionnant en conjonction avec une autre antenne ou transmetteur.

[日 本]

本製品で使用している無線モジュールは、工事設計認証を受けていますので、以下の事項を行うと法律で罰せられることがあります。

・ 無線モジュールを分解/改造すること

[EU Member States]

- For details of the applicable standards, please refer to above mentioned international standards compliances.
- Import Corporation Name : IAI Industrieroboter GmbH

* The product can be used in any country which is a member of EU.

【中国 / CHINA】

- 许可编号 : CMIIT ID = 2017DJ6592
- 申请公司名 : IAI 株式会社
- 机型名 : TB-03（主机部分“TB-03”正在接受认证。）
- 制造国 : 日本（Made in Japan）
- 进口企业名 : IAI（Shanghai）Co., Ltd.

【한국 / KOREA】

- 식별 부호 : MSIP - CRM - IAI - TB-03
- 제조사명 : 주식회사 IAI
- 모델명 : TB-03 (본체부분 "TB-03"로 인증 받고 있습니다)
- 제조국 : 일본(Made in Japan)
- 수입업자명 : IAI KOREA Corp.

해당 무선설비는 전파혼신 가능성이 있으므로 인명안전과 관련된 서비스는 할 수 없습니다

【ประเทศไทย / Thailand】

- ผู้ผลิต : IAI CORPORATION.
- ชื่อโมเดล : TB-03 (ได้รับใบรับรองภายใต้ชื่อ "TB-03")
- ประเทศผู้ผลิต : ญี่ปุ่น (Made in Japan)
- ผู้นำเข้า : IAI Robot (Thailand) Co., Ltd.

【México / Mexico】

- Número de Certificación : IFETEL：RCPIATB19-1957
- Nombre de la Empresa Solicitante : IAI Corporation
- Nombre del Modelo : TB-03
- País de Fabricación : Japón (Hecho en Japón)
- Nombre de la Empresa Importadora : IAI America, Inc.

Precautions for Axis Operation with Wireless Connection

This device (V2.30 or later) can operate the option model code -WL2 ELECYLINDER with wireless connection. For operation with wireless connection, secure safety by following the precautions below before use.

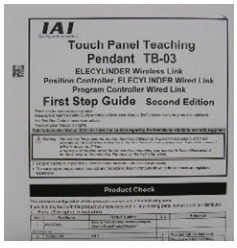
- The stop switch on this device will not function during wireless connection. Prepare a device / circuit to stop the operation when emergency stop is required.
- For axis operation with wireless connection, operation testing (movement to forward and backward ends, jog operation, inching operation) is possible, but the control device is not designed for purposes of automatic operation. Construct a mechanical system based on the risks of the operating environment.
- Carry out risk assessment based on the standard/spec requirements of the machinery for installation. Dangerous operation, such as that requiring an automatic stop when control signals cannot be received (including disabled communication) is not acceptable.
- Stopping axis operation by wireless network cannot be used as a safety feature as defined in EN ISO 13849-1: 2015. It is also not compliant with Safety Category B or Categories 1 to 4 stated in EN ISO 13849-1: 2015.

1. Confirming the Specifications

1.1 Product Check

This product, if adopting a standard configuration, consists of the parts listed below.

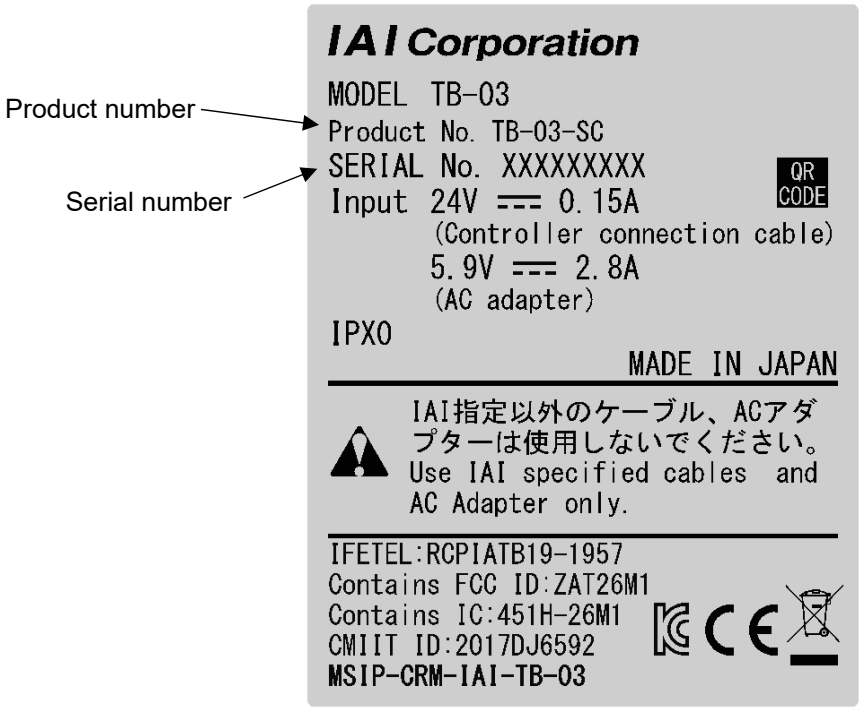
1.1.1 Component (excluding options)

No.	Product name	Product number • Photo	Number	Remarks
1	Main Body	Refer to "How to Read Model Nameplate" and "How to Read Model Number."	1	
Accessories				
2	Battery unit	AB-7 	1	
3	Touch pen	TCH-TB03	1	Provided with the teaching pendant ϕ4.5 × 100.5mm
4	AC adapter	UN318-5928 (For use in Japan, North America, Mexico and Thailand) UNZ318-5928 (For use in China) UNE318-5928 (For use in Europe) UNR318-5928 (For use in Korea)	1	Depends on model code (enclosed AC adapter type)
5	Safety guide	M0194 	1	The picture shows an image.
6	First step guide	ME0378 	1	The picture shows an image.

1.1.2 Instruction manual related to this product

No.	Name	Control number
1	Teaching Pendant Wireless Link Instruction Manual (This guide)	ME0375
2	ELECYLINDER Rod Type / Table Type Instruction Manual	ME3778
3	ELECYLINDER Rod Type Dust and Drip Proof Instruction Manual	ME3779
4	ELECYLINDER Slider Type Instruction Manual	ME3793
5	ELECYLINDER Rod Type / Radial Cylinder Type Instruction Manual	ME3794
6	ELECYLINDER Belt Driven Type Instruction Manual	ME3798
7	ELECYLINDER Stopper Cylinder Instruction Manual	ME3799
8	ELECYLINDER Rotary Instruction Manual	ME3800
9	ELECYLINDER Large Slider Type Instruction Manual	ME3801
10	ELECYLINDER Creanroom Specification Instruction Manual	ME3804
11	ELECYLINDER Gripper Instruction Manual	ME3806
12	ELECYLINDER Slider Type Dust and Drip Proof Instruction Manual	ME3814
13	Ultra Mini ELECYLINDER Instruction Manual	ME3815

1.1.3 How to Read Model Nameplate



1.1.4 How to Read Model Number

TB – 03 – SCN – E– ENG

<Language option>
Not specified : Screens are displayed in Japanese.
(Display can be changed to other languages)
ENG : Screens are displayed in English.
(Display can be changed to other languages)
CHI : Screens are displayed in Chinese.
(Display can be changed to other languages)

<Model code for enclosed AC adapter>
No Indication : For use in Japan, North America, Mexico and Thailand
C : For use in China
E : For use in Europe
K : For use in Korea
N : No AC adapter enclosed

<Model number>
TB-03 : Standard type
TB-03E : Equipped with power supply unit dedicated for ELECYLINDER

<Cable Type>
SCN : With No Cable (Main body only)

* Refer to [1.11 Actuator Drive Unit for Teaching Pendant] regarding TB-03E.

TB-03 -SCN -E -ENG
Model name Enclosed items and language select

Radio Certificate certified under the model name of “TB-03”.

Set model code for main unit + AC adapter		Model code for enclosed AC adapter
For use in Japan, North America, Mexico and Thailand Type	TB-03-SCN-<Language Options>	For use in Japan, North America, Mexico and Thailand : UN318-5928
For use in China Type	TB-03-SCN-C-<Language Options>	For use in China : UNZ318-5928
For use in Europe Type	TB-03-SCN-E-<Language Options>	For use in Europe : UNE318-5928
For use in Korea	TB-03-SCN-K-<Language Options>	For use in Korea : UNR318-5928
No AC adapter enclosed type	TB-03-SCN-N-<Language Options>	No AC adapter enclosed

Option model code		Remarks
Strap	STR-1	
Spiral Cord	SIC-1	Connect the touch pen on the main unit in order to avoid loosing or dropping it
Grip Belt	GRP-2	Prepare your own and attach. Refer to [1.10.1 Grip Belt (GRP-2)]
Battery Unit for Main Unit	AB-7	

Maintenance part code		Remark
Touch Pen	TCH-TB03	ϕ4.5 × 100.5mm

1.2 Specifications

1.2.1 Basic Specification

Item	Specifications
Rated voltage	5.9V DC (Supplied from adapter)
Operating voltage range	5.7 to 6.3V DC
Power consumption	16.52W or less (2.8A or less)
Insulation resistance	Between GND and FG, 500V DC, 10MΩ or more
Wireless link / Features	Bluetooth 4.2　Class 2
Battery charge system	Dedicated AC Adapter：Quick charging system with additional charging when fully charged (Wired link to EC：Slow charging with additional charging)
Duration for wireless operation	4 Hours Max.
Duration of charging	Approx. 3 Hours (AC Adapter)
Wireless operation battery	300 times of Cycle Durability
Display colors	65536 colors (16-bit colors)
Backlight method	White LED backlight
Backlight life	15,000 hours
Touch panel screen	7 inch TFT color WVGA (800 × 480)
Touch detection method	4-wire resistive type
Touch panel life	1 million times
External memory	SD/SDHC memory card interface installed (1G to 32G) (Toshiba-made recommended)
Touch pen (Accessory)	ϕ4.5 × 100.5mm
Language selection	Japanese/English/Chinese
Touch sound	ON/OFF　Volume Settable in 3 steps, S, M, and L
Data save	Applicable to have data saved to and read from external SD memory card (FAT32 Format) (Position data, parameter and alarm list)
Display adjustment	Brightness adjustable for contrast and backlight
Time setting	Clock setting available with real time clock (Backup held with CR2032 button battery)
Duration from the power being off to turned on	More than 2 seconds
Cooling method	Natural air-cooling
Size	TB-03 : 155 mm (H) × 200 mm (W) × 34 [54] mm (D) Stop switch included in [ ]
Mass	TB-03 : 670g approx. (Main Body)

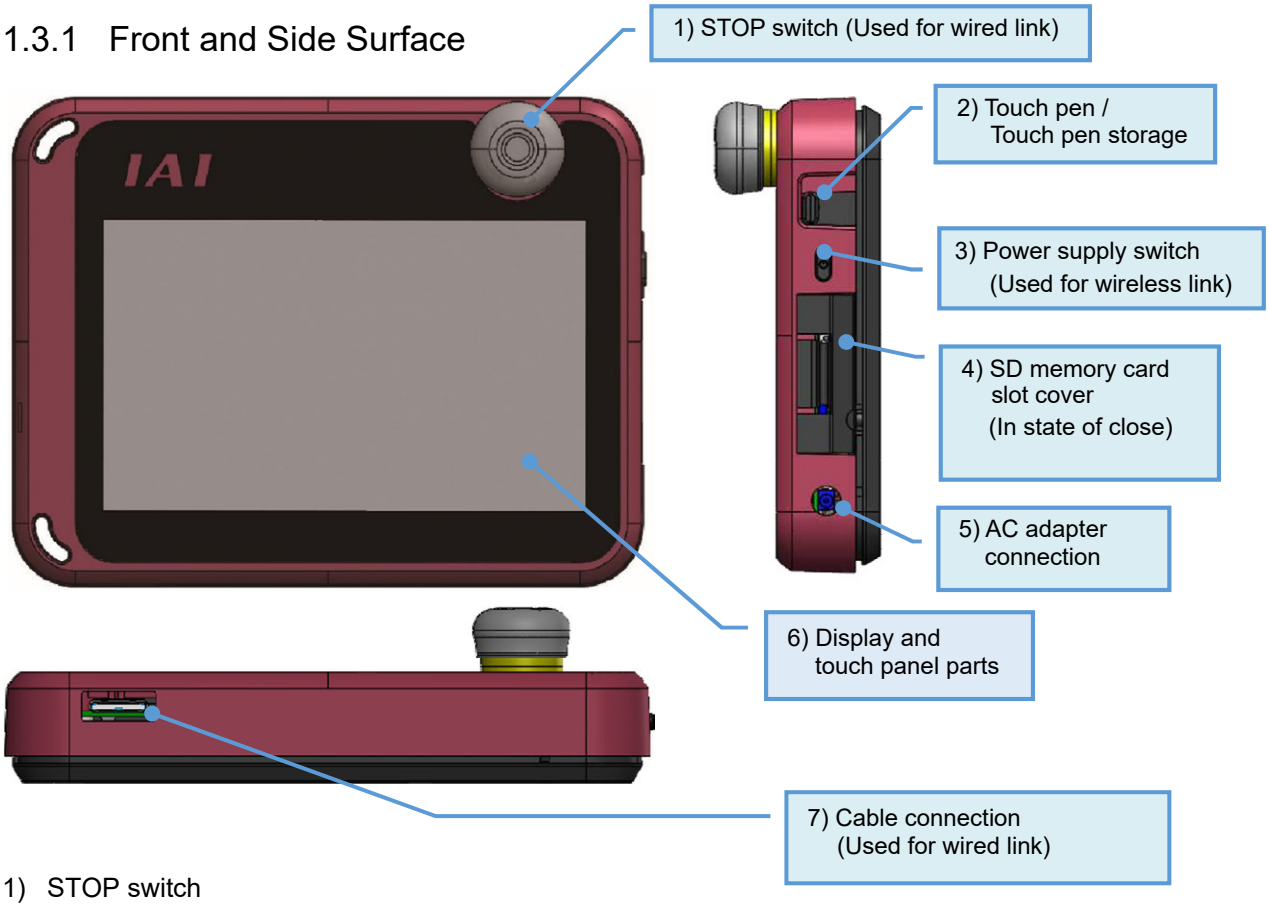
SD memory card is a trademark of SD-3C, LLC and SDA.

1.2.2 Environmental Specifications

Item	Specifications
Working ambient temperature	0 to 40°C
Working ambient humidity	5%RH to 85%RH (There should be no water condensation or freeze)
Storage ambient temperature	-20 to 40°C
Storage ambient humidity	5%RH to 85%RH (There should be no water condensation or freeze)
Altitude	1000 meters or less above the sea level
Environment	Environment with no corrosive or flammable gas. Avoid use in places with dust or in places where oil mist or cutting fluid splashes.
Vibration resistance	Frequency 10 to 57Hz / Swing width: 0.035mm (Continued), 0.075mm (Continual) Frequency 57 to 150Hz / Acceleration: 4.9m/s^2 (Continued), 9.8m/s^2 (Continued) XYZ Each direction Sweep time: 10 min. Number of sweep: 10 times
Dropped in package	From height 800mm, dropped on 1 corner + 3 edges + 6 surfaces
Pollution degree	II
Protection class	IPX0
Heat generation volume	3.6W
Protection function against electric shock	III

1.3 Explanation of Each Part

1.3.1 Front and Side Surface



1) STOP switch
It should be not used in wireless link.

> ⚠ *Caution : When the wireless link, operation can not be stopped with the stop switch.*

2) Touch pen/Touch pen storage
The pen to touch on the touchscreen should be stored here.

3) Power supply switch
Press this button in order to turn the power on and off for TB-03 main unit.
Press it and hold for 2 seconds or more to turn it off.

4) SD memory card slot cover
There is an inlet for SD memory card inside the cover.
Refer to [1.4 How to Set in/out SD Memory Card] to set in or out a SD memory card.

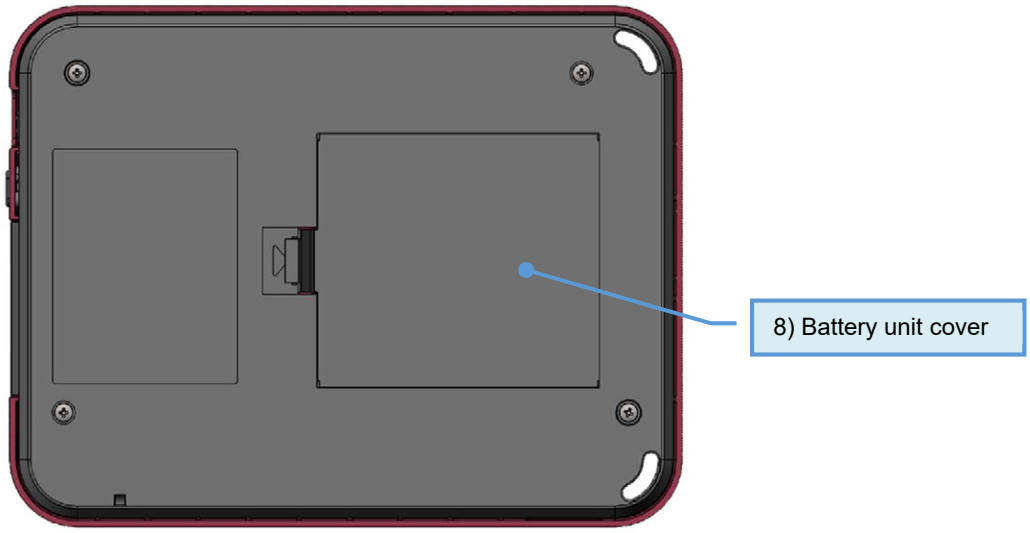
5) AC adapter connection
It is a connector to have the AC adapter joined in.

6) Display and touch panel parts
This screen is configured of a TFT color LCD and touch panel.
Use this screen to edit the various setting values and to display the current value display, etc.
Touch the touch panel with a finger or touch pen (or fingers) to perform operations.

*1 In a use of the LCD display for a long term, the brightness may drop.
Set the turn-off time in the environment setting so it automatically turns off.
*2 This touch panel is of analog resistance membrane type, so do not touch two or more locations on the screen at the same time.
If two or more locations are touched at the same time, the centers of all touched locations may respond and trigger multiple operations.
*3 When operating the touch panel, do not apply a force exceeding 0.5 N.
If any greater force is applied, the touch panel may be damaged.
*4 The life of touch panel is approx. 1 million touches at the same location. (Assuming a use environment of 25°C)

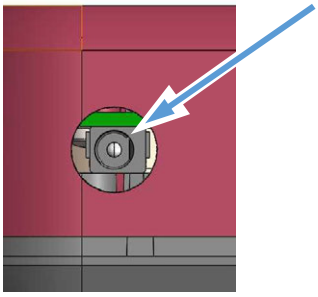
7) Cable connection
It should be not used in wireless link.

1.3.2 Back



8) Battery Unit cover
There is the battery unit AB-7 inside the cover.
For how to attach or detach the battery unit, refer to [1.5 How to Set in/out Battery Unit].

1.3.3 AC Adapter Joint

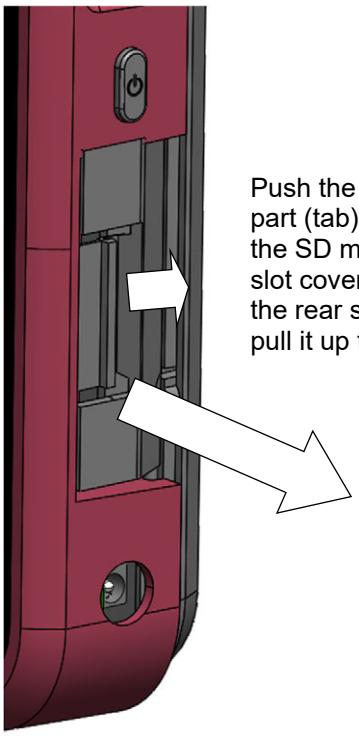


Connector name : LGP2631-0101F (SMK) : (JEITA RC-5320A Voltage Classification 2)		
Pin number	Signal name	Explanation
2	5.9V	Power supply input 5.9V
3	GND	Signal ground
4	GND	Signal ground

1.4 How to Set in/out SD Memory Card

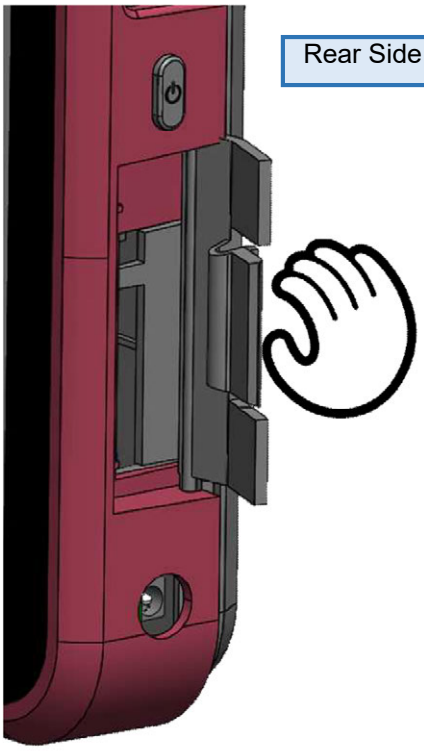
1.4.1 How to Insert SD Memory Card

1

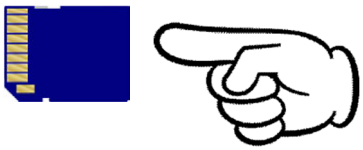


Push the extruded part (tab) slightly on the SD memory card slot cover towards the rear side and pull it up to open.

2



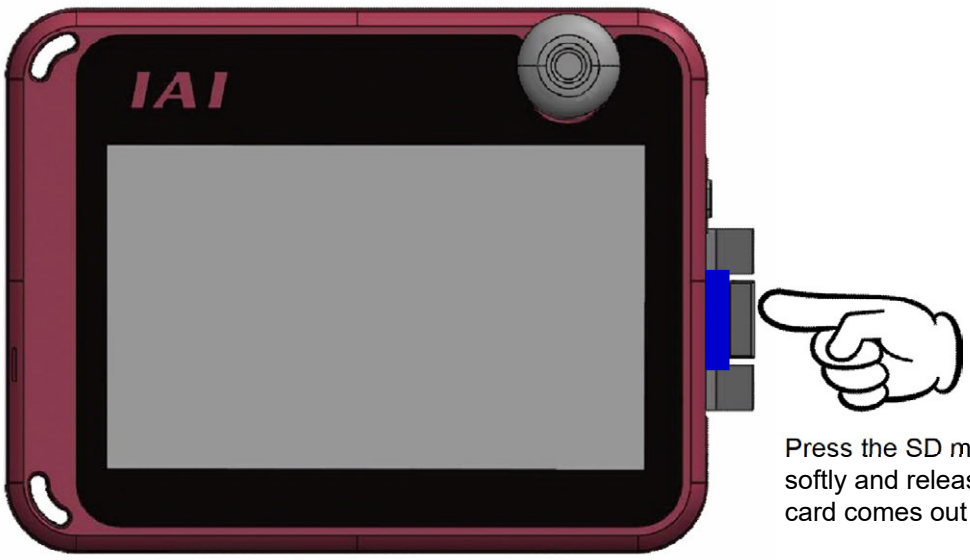
3



Face the electrode side of a SD memory card to the front and insert it till it makes a clicking noise.

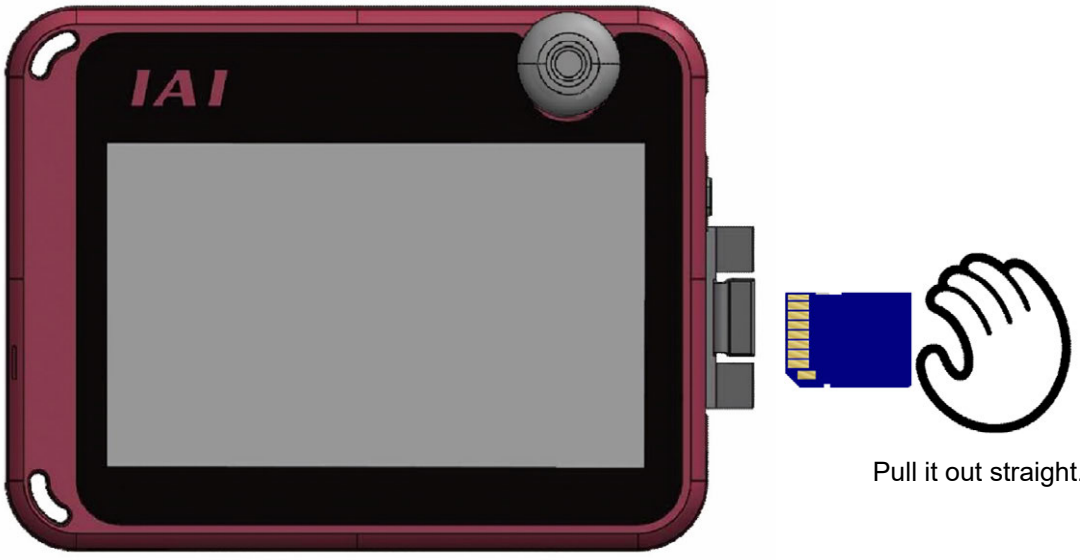
1.4.2 How to Take out SD Memory Card

1



Press the SD memory card softly and release, and the card comes out slightly.

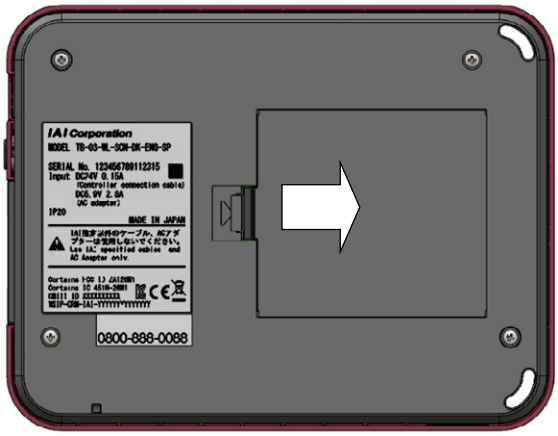
2

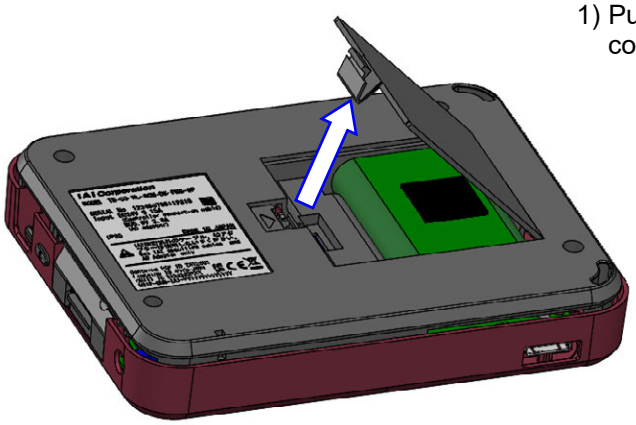


Pull it out straight.

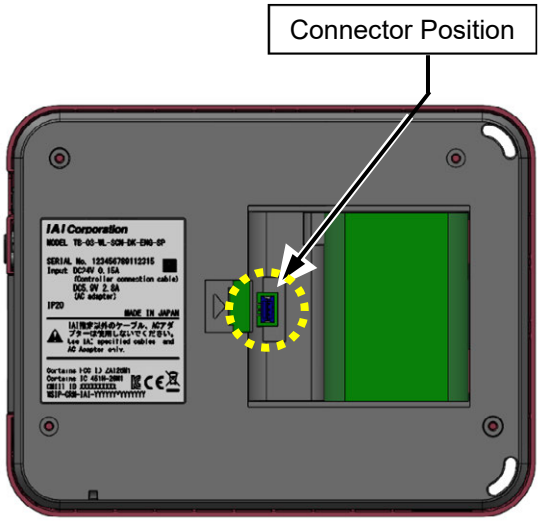
1.5 How to Set in/out Battery Unit

1.5.1 How to Take Out Battery Unit

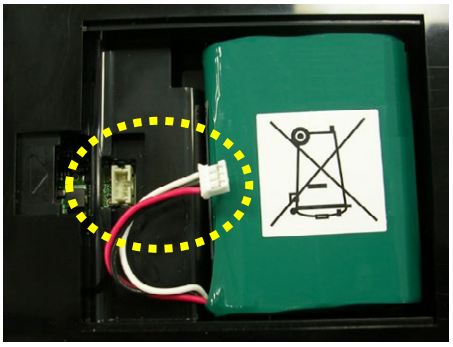




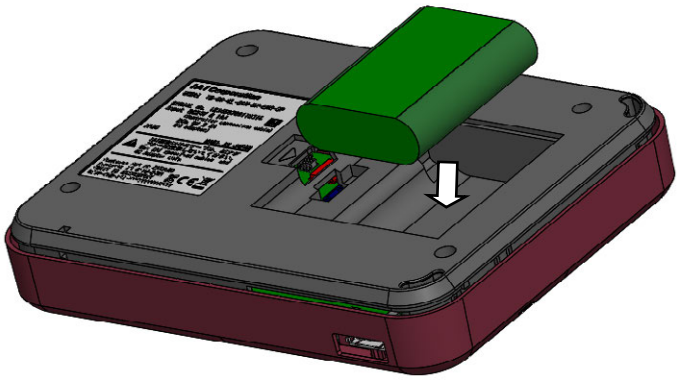
1) Push the tab towards the battery cover and the pull up batter cover.



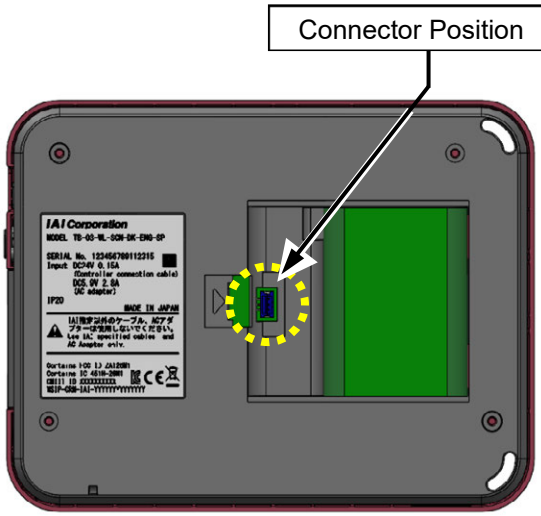
2) Pull out the connector and take out the battery unit.



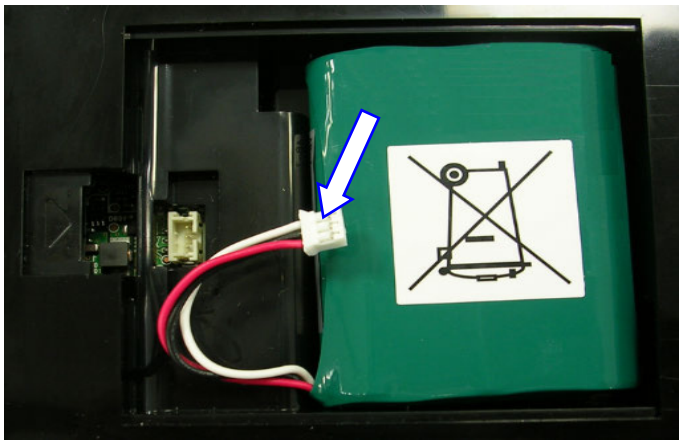
1.5.2 How to Attach Battery Unit



1) Set the battery unit in.



2) Join the connector.



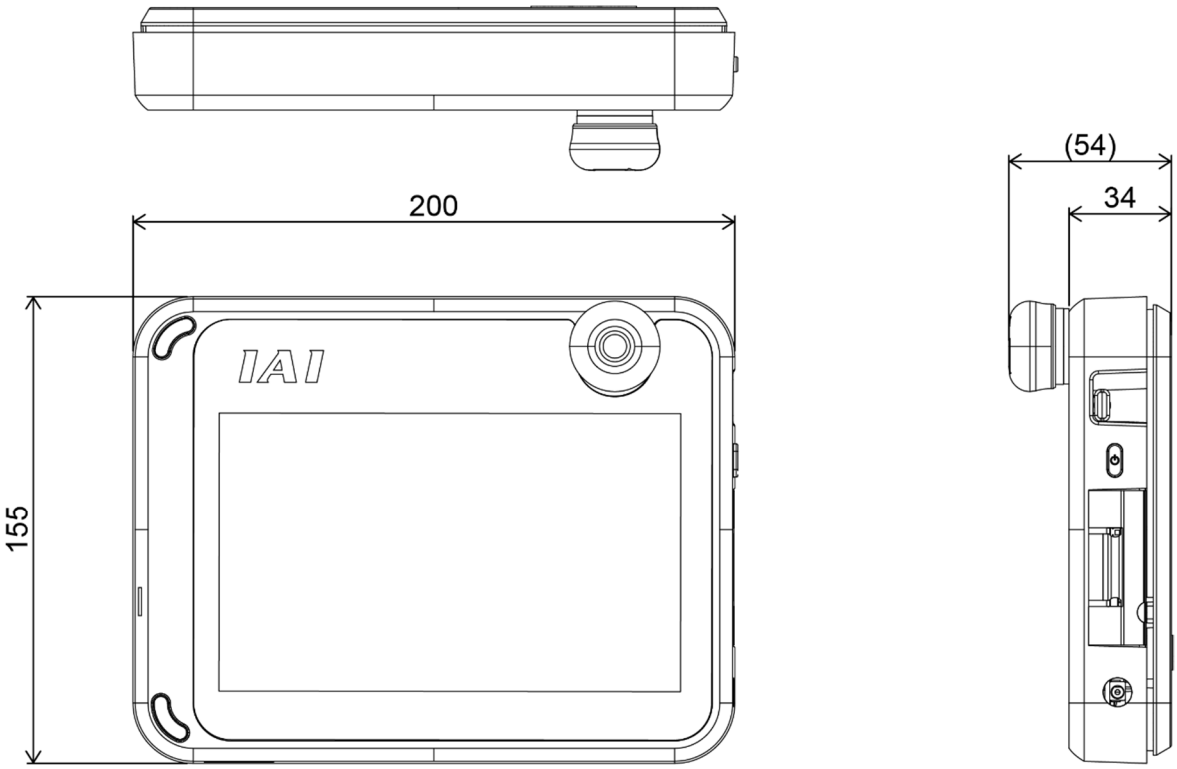
3) Attach the battery cover.

Pay attention not to get the cable pinched.

1.5.3 Caution When Battery Taken Off

When a battery is taken off and then put back on, the power would not turn on even with the power supply switch being pressed. Establish a connection with an AC adapter or a controller and supply power to TB-03 before turning it on.

1.6 External Dimensions



1.7 Life of Touch Panel LCD

The product life of the touch panel is 1,000,000 times of touches and that of the LCD backlight is 15,000 hours. (Ambient temperature at 25°C)

1.8 Built-in Battery (Life of Battery and Replacement of Battery)

With a button battery built-in the main body, the data set in the environment setting window, such as time and language settings and touch sound setting, is retained. The data should get reset to the default setting once the battery gets flat.

The nominal life of the button battery CR2032 that the manufacturer states is approximately five years (Ambient temperature at 25°C).
You will get notified with a message "187 RTC Backup Battery Voltage Drop" once the voltage of the battery gets low. As the battery cannot be replaced at a customer's site, make a request to IAI.

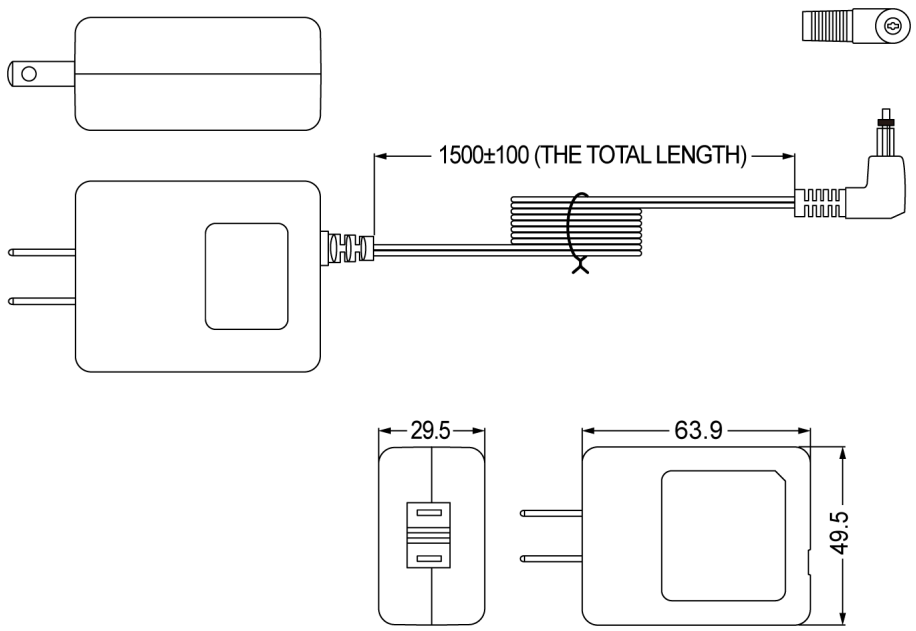
1.9 AC Adapter

1.9.1 Common Specifications for Adapter

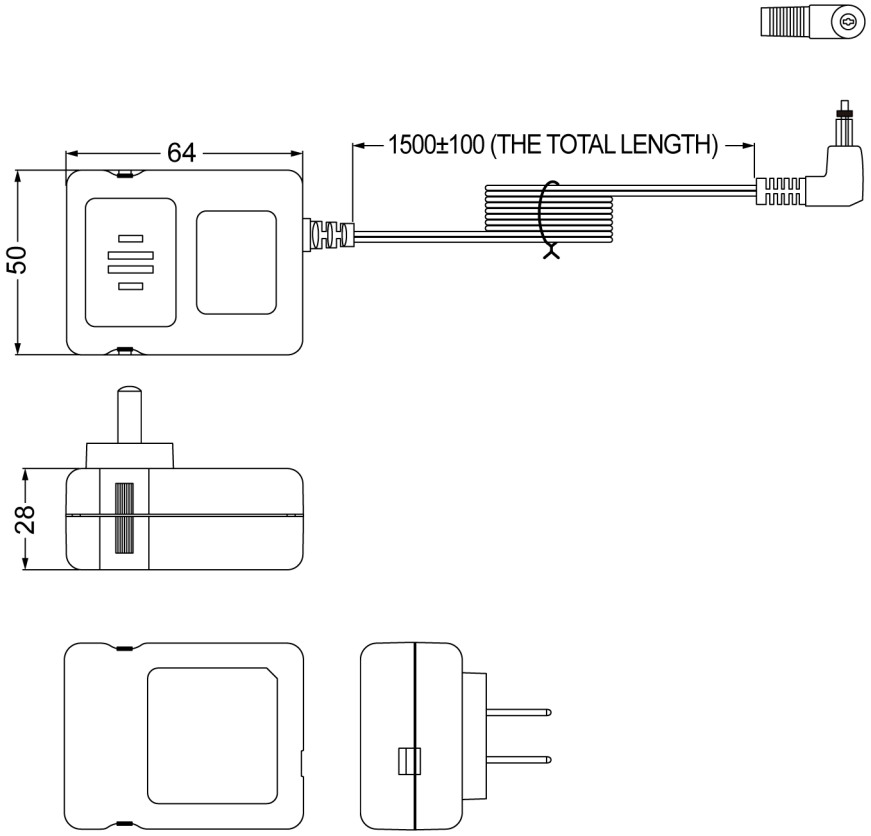
Iitem	Specifications
Power Input Voltage Range	Single-Phase 100 to 240V±10%
Power Current	0.4Amax.
Power Frequency Range	50 / 60Hz±5%
In-Rush Current	50A (at 25°C)
Output Voltage	5.9V DC (5.7 to 6.3V)
Output Current	2.8Amax.
Cable Length	1500±100mm

1.9.2 AC adapter appearance

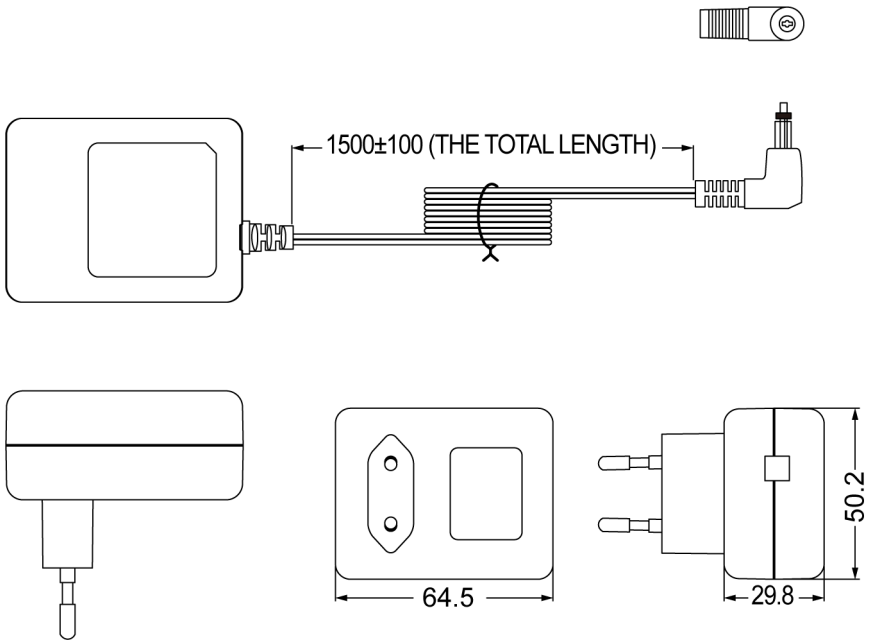
[For use in Japan, North America, Mexico and Thailand : UN318-5928]



[For use in China : UNZ318-5928]



[For use in Europe : UNE318-5928] [For use in Korea : UNR318-5928]



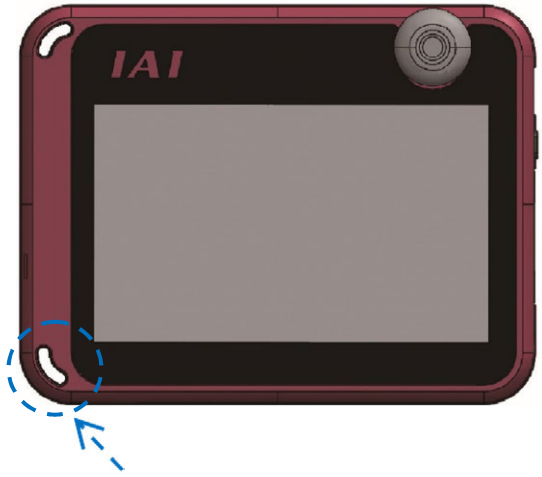
1.10 Optional Items

1.10.1 Grip Belt (GRP-2)

1) Put the belt through the slit on the left of the main body, and fix it on the fabric hook-and-loop fastener on the open grip.

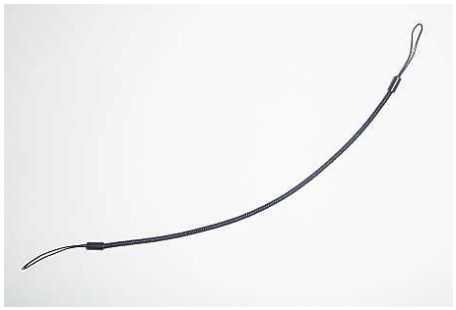
2) Close the grip.

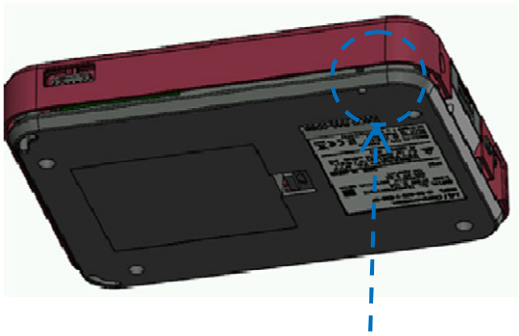
1.10.2 Strap (STR-1)



Put it through the slit on the left bottom of the main body.

1.10.3 Spiral Cord (SIC-1)





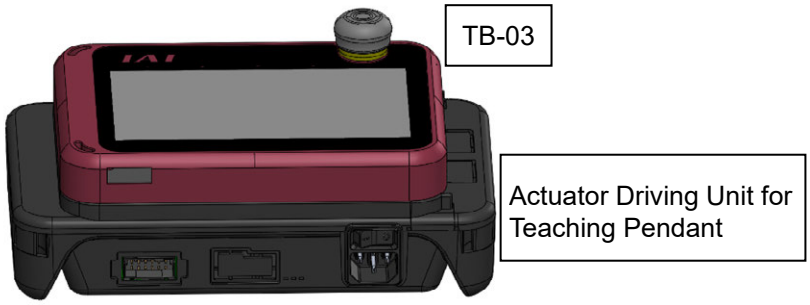
Putting it through the hole on the touch pen, and then put it through the hole allocated on the bottom the main body. (In case the spiral code would not go through the hole well, pull the cord using a tool such as tweezers.)

1.11 Actuator Driving Unit for Teaching Pendant

1.11.1 Feature

As an option for a teaching pendant, it is an "actuator driving unit" that is capable of supplying power to an actuator not completed with wiring for power supply in such cases as in installation of equipment.
It saves time to currently build up the power supply line and enables to have a quick trial run.
It is detachable to a teaching pendant, and enables to have a trial run in such cases as slider position tuning and AVD setup.

1) Unit configuration



2) Compatible actuator

The connectable actuator is ELECYLINDER (24V pulse motor type).

1.11.2 How to Read Model Number

1) Model Code for Driver Unit Individually

ADTB-EC-EC-5-1

<Power Supply Cable for Driving Unit>
0: Without cable
1: 100V AC Power Supply Cable (2m)
2: 200V AC Power Supply Cable (2m)

<Cable length>
0 : Without cable
5 : 5m (Standard)
10: 10m

<Model>
EC: ELECYLINDER

<Enclosed Cable Type>
0 : Without cable
EC (Note 1) : EC Power Supply Connectivity Cable
ECT (Note 2) : EC Power Supply + TB-03 Integrated Connectivity Cable

(Note 1) EC power supply connectivity cable (CB-ADTB-PW□□□-RB) should be enclosed.
(Note 2) EC power supply + TB-03 integrated connectivity cable (CB-ADTB-PWTB□□□) should be enclosed.

2) Model Code for TB-03 / Driving Unit in Set

TB-03E-SCN-C-1

<Power Supply Cable for Driving Unit>
0: Without cable
1: 100V AC Power Supply Cable (2m)
Equipped with Plug on Tip
2: 200V AC Power Supply Cable (2m)
Equipped with Ring Tongue Terminal on Tip

<Model>
03E: Actuator Driving Unit for ELECYLINDER

<AC Adapter for Touch Panel>
Blank : For use in Japan, North America, Mexico and Thailand
C : For use in China
E : For use in Europe
K : For use in Korea
N : No AC adapter enclosed

* An integrated connectivity cable (5m) should be enclosed in the set. Contact IAI when it is required to change the length.

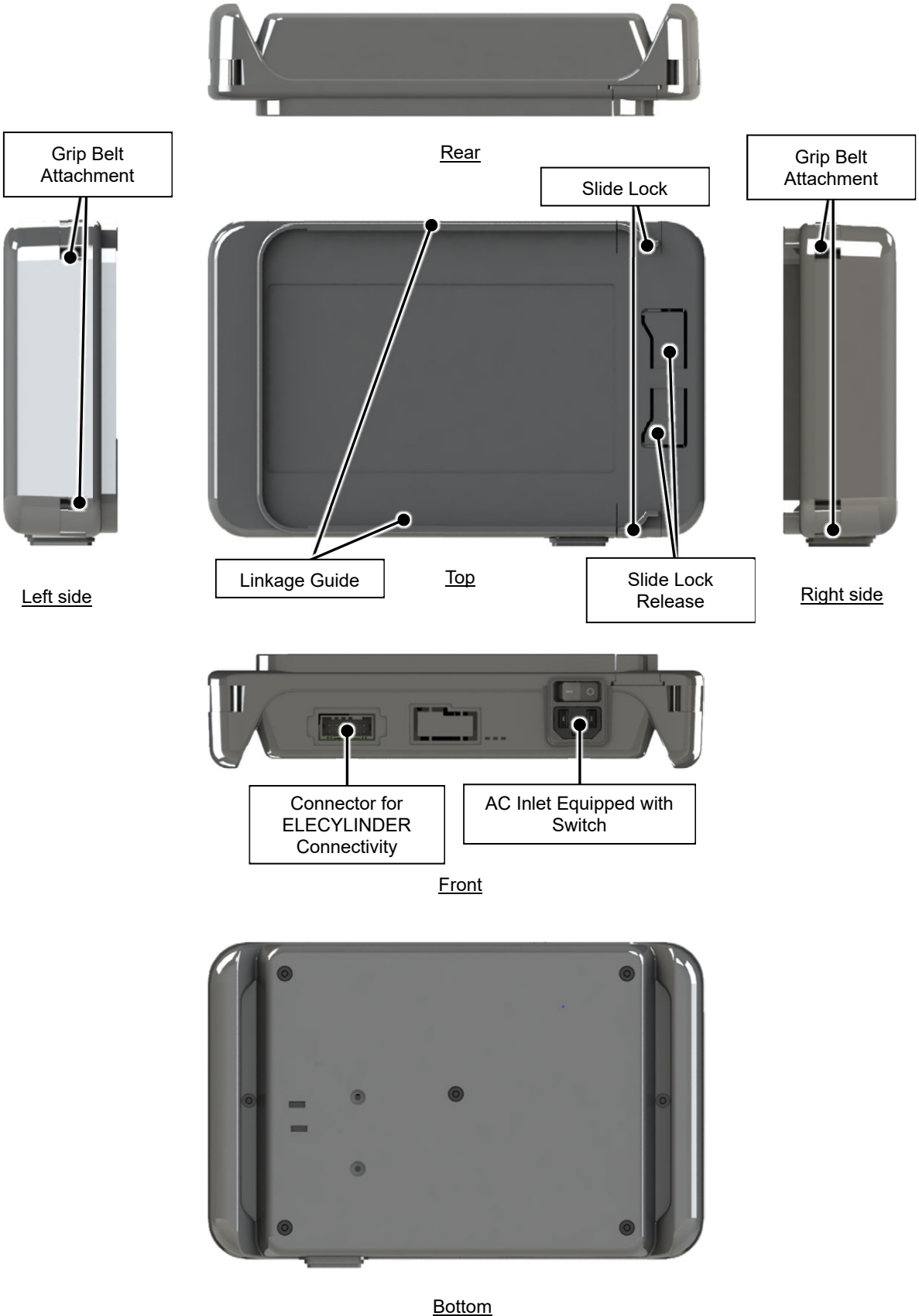
3) Model Code for Enclosed Cables Individually

- EC Power Supply Connectivity Cable : CB-ADTB-PW□□□-RB (Set the length in □□□)
- EC Power Supply + TB-03 Integrated Connectivity Cable : CB-ADTB-PWTB□□□ (Set the length in □□□)
- 100V AC Power Supply Cable : KWD-UJ-2MBS (Cable length should be 2m)
- 200V AC Power Supply Cable : CB-APMEC-PW-020-TM (Cable length should be 2m)

1.11.3 Basic Specification

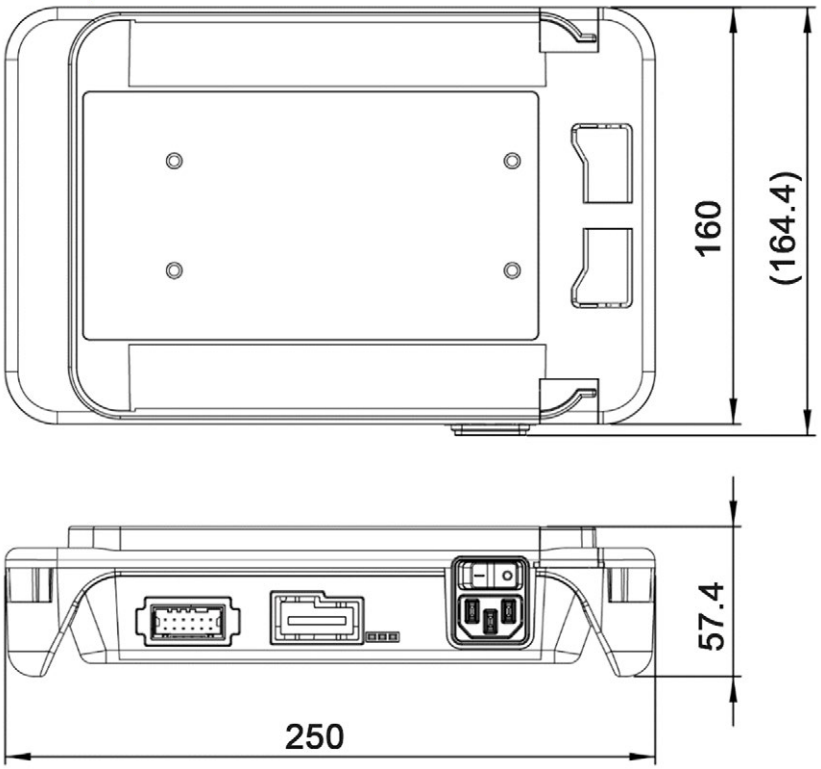
Item		Specifications
Rated Input Voltage		Single-Phase 100 to 230V AC ±10%
Input Current		1.4Atyp. (100V AC) 0.6Atyp. (230V AC)
Frequency Range		50/60Hz ±5%
Current Amperage		141VA (100V AC)
Output Current		24V DC ±10%
Load Current	Standard Dustproof and splashproof High-Stiffness	When Power Saving Setting Invalid: Rating 3.5A, Max. 4.2A When Power Saving Setting Valid: Rating 2.2A
	Slim and Small	Max. 2.0A
Output Capacity		When Power Saving Setting Invalid: Rating 84W, Max. 98.4W When Power Saving Setting Valid: Rating 52.8W
Ambient operating temperature		0 to 40°C (There should be no water condensation or freeze)
Ambient operating humidity		5%RH to 85%RH (There should be no water condensation or freeze)
Ambient storage temperature		-20 to 70°C
Ambient storage humidity		5%RH to 85%RH (There should be no water condensation or freeze)
Environment		Avoid corrosive gas and in particular avoid excessive dust
Altitude		1000 meters or less above the sea level
Vibration resistance		Frequency 10 to 57Hz / Swing width: 0.075mm Frequency 57 to 150Hz / Acceleration: 9.8m/s^2 XYZ Each direction Sweep time: 10 min. Number of sweep: 10 times
Dropped in package		From height 800mm, dropped on 1 corner + 3 edges + 6 surfaces
Overvoltage category		II
Pollution degree		2
Protection function against electric shock		II
Degree of protection		IP30
Mass		Approx. 740g
Cooling method		Natural cooling

1.11.4 Explanation of Each Part

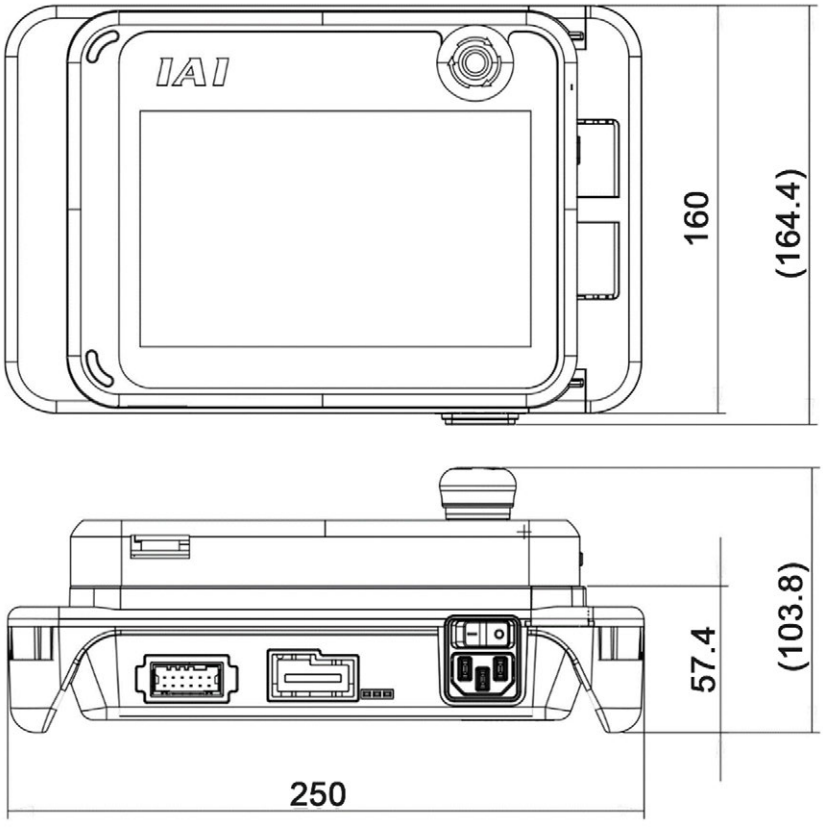


1.11.5 External Dimensions

Driving Unit Individually



Driving Unit Joined



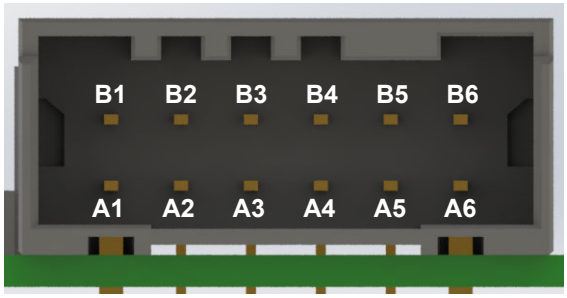
1.11.6 Feature of Each Part and Pin Assignment on Connector

1) AC Inlet Equipped with Switch

Model	DC11.0001.403	
Manufacturer	SCHURTER	
Pin No.	Signal name	Explanation
1	L	AC Input Live Terminal (Non-Grounding Side)
2	N	AC Input Neutral Terminal (Grounding Side)
3	PE	Protective Grounding Terminal (Class D Grounding)
Rated Voltage	Single-Phase 100 to 230V AC ±10%	
Input Current	1.4Atyp. (100V AC), 0.6Atyp. (230V AC)	

Connectivity Cable Specifications	
Item	Model
100V AC Power Supply Cable	KWD-UJ-2MBS
200V AC Power Supply Cable	CB-APMEC-PW-020-TM

2) Connector for ELECYLINDER Connectivity

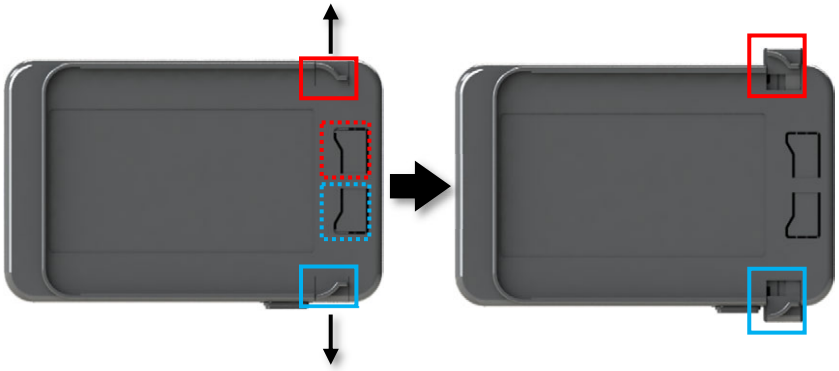


Model	1-1871935-6	
Manufacturer	TE	
Pin No.	Signal name	Explanation
A1	0V	GND
A2	24V (CP)	24V output (CP)
A3	NC	Not connected
A4	NC	Not connected
A5	NC	Not connected
A6	NC	Not connected
B1	24V (MP)	24V output (24V output (MP))
B2	NC	Not connected
B3	NC	Not connected
B4	NC	Not connected
B5	NC	Not connected
B6	NC	Not connected
Output Voltage	24V DC±10%	
Load Current	Rated 3.5A, Max. 4.2A	
Connectivity Cable Specifications		
Item	Model	
Connection Cable	EC Power Supply Connectivity Cable CB-ADTB-PW□□□-RB	
	EC Power Supply + TB-03 Integrated Connectivity Cable CB-ADTB-PWTB□□□	

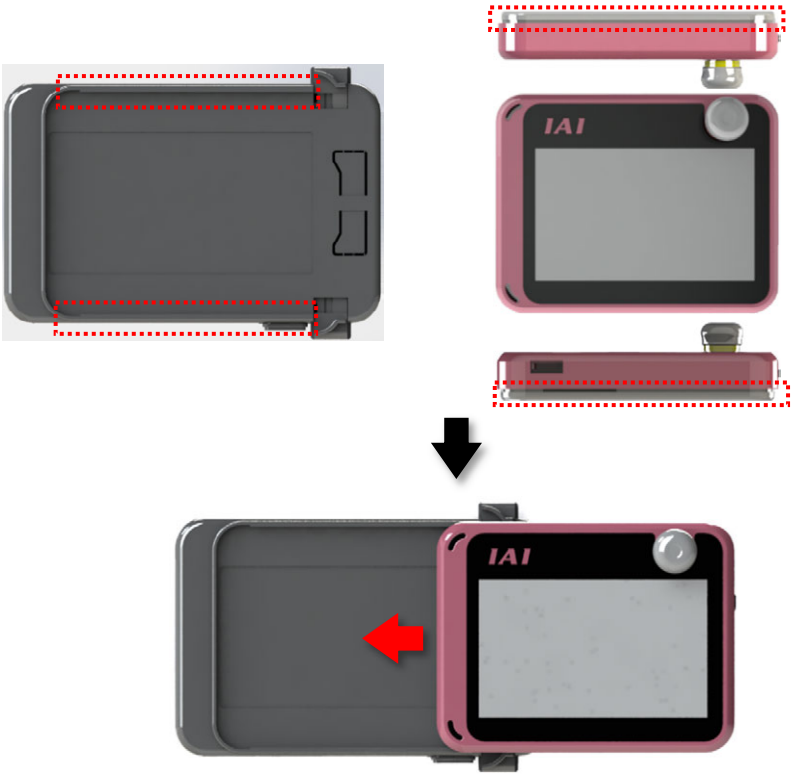
1.11.7 Joining Unit

Here explains how to join an actuator driving unit to a teaching pendant.

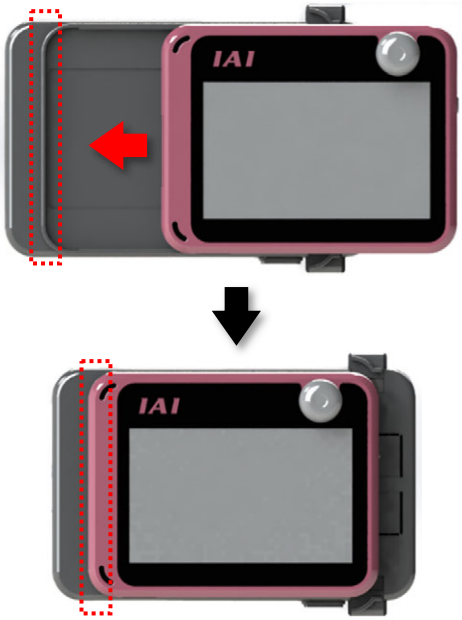
1 While pressing the slide lock release (broken line areas) on the driving unit, slide the slide locks to make them open.



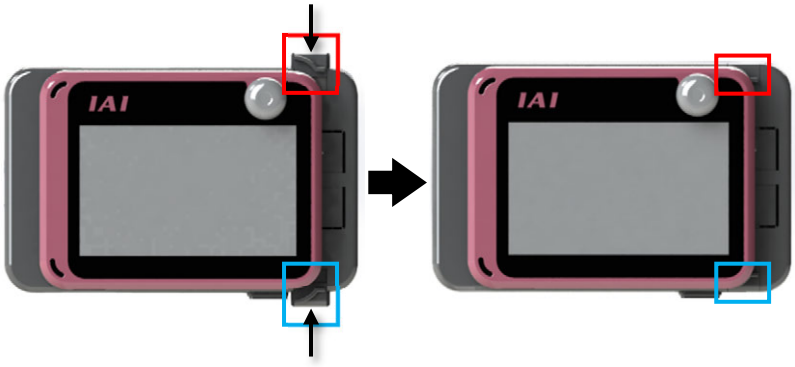
2 Insert the slots (broken line areas in the figure) on a teaching pendant to the linkage guides on the actuator driving unit from the right side.



3 Insert the teaching pendant along the linkage guides on the actuator driving unit till the teaching pendant reaches the area marked with the broken line.



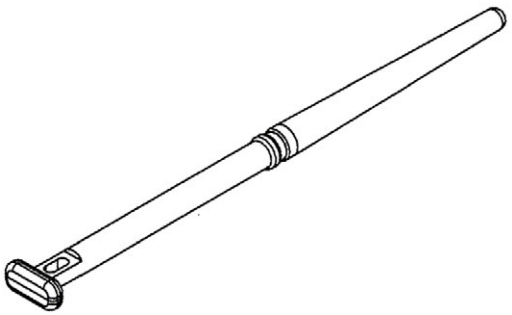
4 Slide it till the slide locks get locked to lock the teaching pendant.



1.12 Maintenance Parts

1.12.1 Battery Unit (AB-7) (Enclosed to Main Unit)

1.12.2 Touch Pen (TCH-TB03) (Enclosed to Main Unit, For purpose of lost and damaged)



1.13 Specifications Related to Wireless

1.13.1 Specifications (Version, Class)

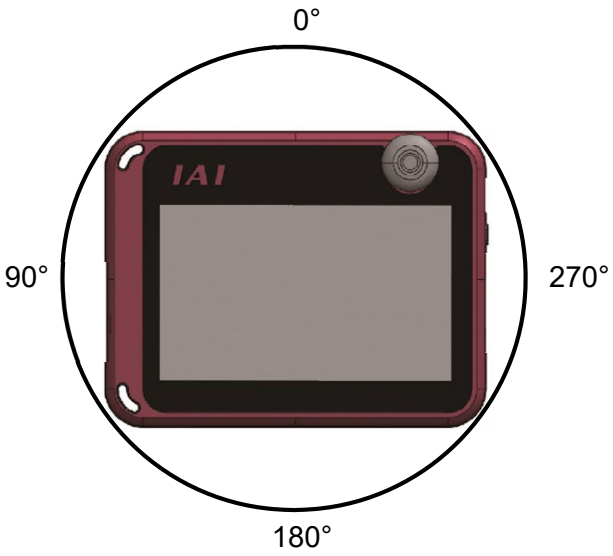
Bluetooth 4.2 Class 2

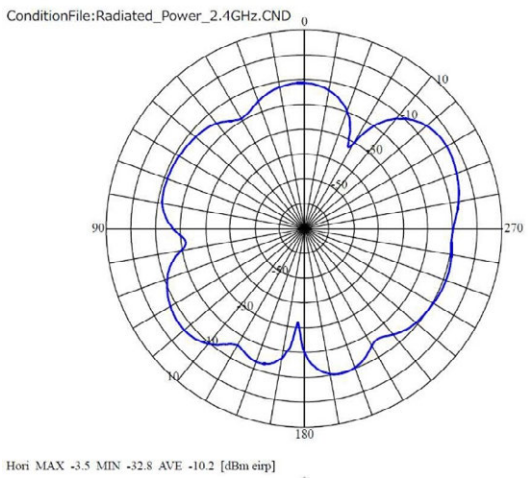
1.13.2 Reference for Wireless Link Reachable Distance

It is recommended to have distance between TB-03 and ELECYLINDER of 5m or less with no interruption.
The connection may get unstable even in distance of 5m or less depending on the peripheral environment of use.
Also, be aware that, even if an axis is displayed in the wireless axis select window with distance over 5m, the connection could get unstable as the distance goes far.

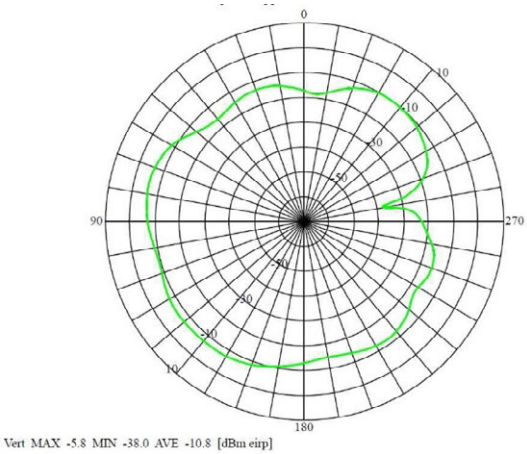
1.13.3 Directivity

Shown below is the result of directivity measurement in the measurement distance of 3m.





Horizontally Polarized Wave



Vertically Polarized Wave

1.14 Specifications Related to Battery Charge

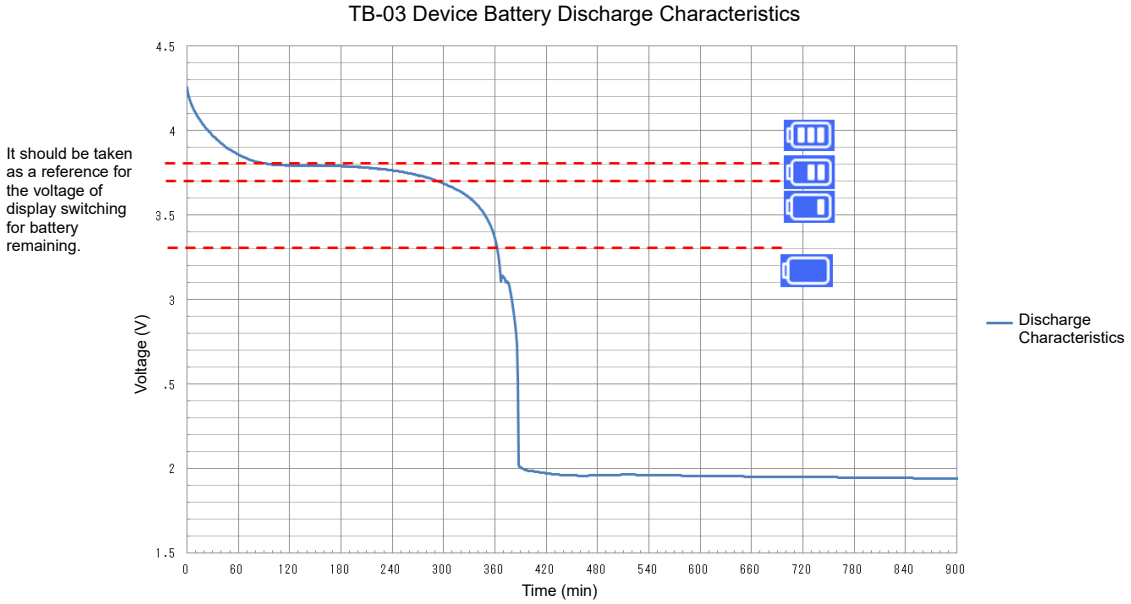
1.14.1 Types of Charger Mode

Charger Mode	Condition of Operation	Contents
Quick Charging of AC Adapter	• AC adapter connected • Battery not fully charged	• Battery should be fully charged from empty in approximately three hours.
AC Adapter Additional Charging	• AC adapter connected • Battery fully charged	• Battery should be remained almost fully charged.

1.14.2 Caution Related to Battery Charging

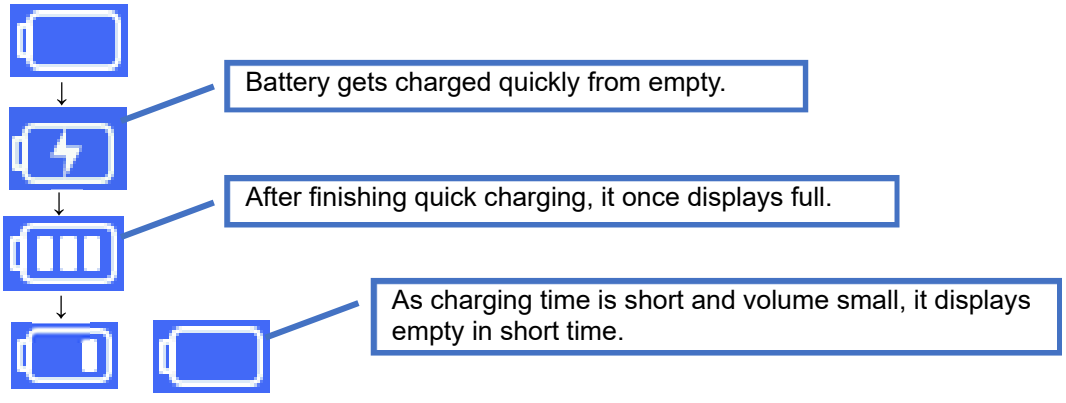
1.14.2.1 Display of Battery Remained

Due to the voltage characteristics of NiMH battery electrical discharge, the duration of the battery remained display should not be constant. (Duration of battery full or remained small should be short)



In case when the battery remained at start and the duration for charging is short, the display may show the battery condition full but show empty in short period.

(Example)



2. Connection

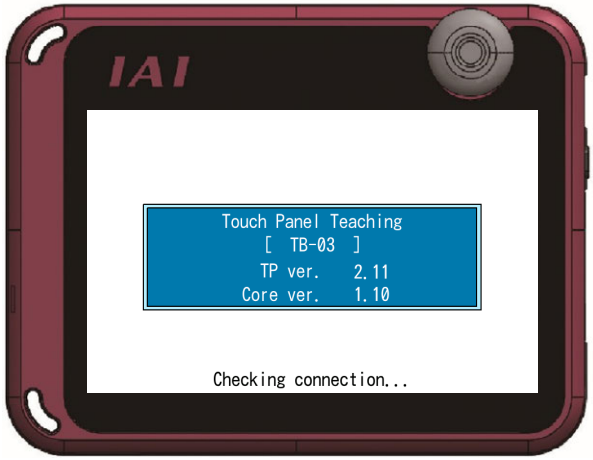
2.1 Wireless Link to ELECYLINDER

Turn the ELECYLINDER power on, and then turn on the power of the TB-03.
It is recommended to have distance between TB-03 and ELECYLINDER of 5m or less with no interruption.
[Refer to 1.12.2 Reference for Wireless Link Reachable Distance]

1

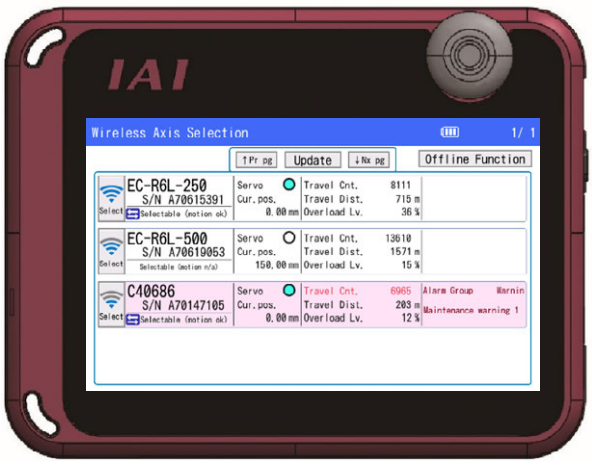
Press the power switch to turn the power on.

2



Initial display window starts up.

3

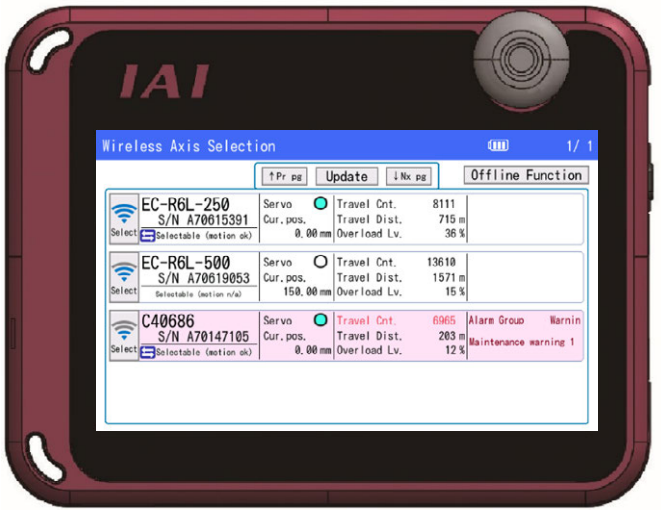


Wireless axis selection window appears.
It may take time to show the display depending on the reception of the signal.

Displays on actuators turn on from those with reception stronger to weaker when there are several units linked.

2.2 To Turn Power OFF

1

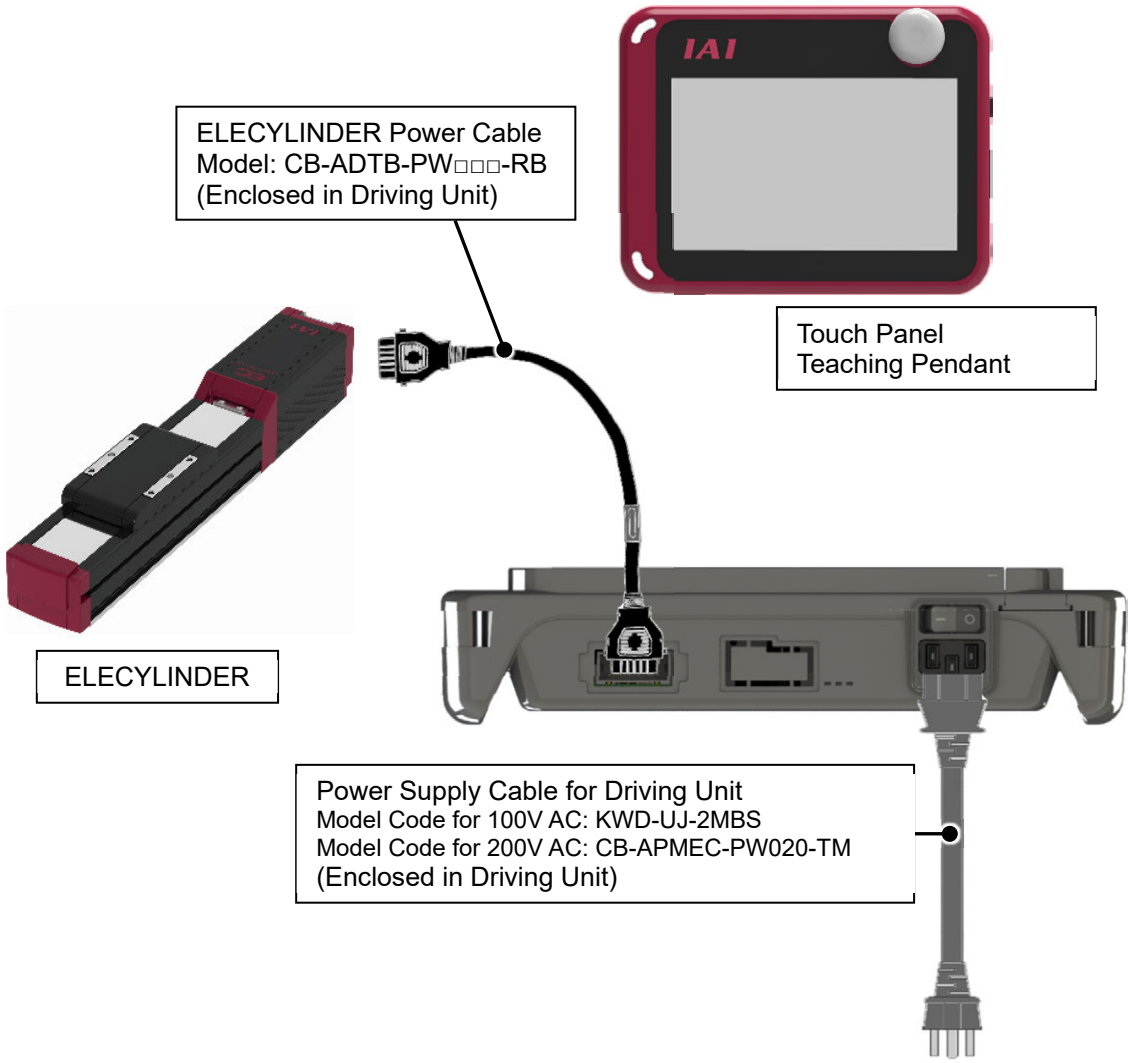


Press and hold the power switch for two seconds or longer to turn the power on.

2

2.3 Connection of Actuator Driving Unit and ELECYLINDER

Turn the controller power OFF before connecting or disconnecting the teaching pendan.

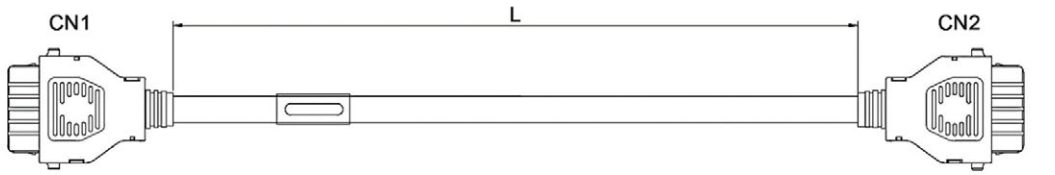


⚠ *Caution*:
- *Connecting or disconnecting the unit while the controller power is ON could result in faults.*
- *Confirm the connector engagement section and connect/disconnect while taking care not to apply excessive force. If the connector does not fit in smoothly, do not push it in with force. Failure to observe this could result in faults.*

* When purchasing a driving unit individually, selection can be made from EC power supply + TB-03 combination cable (CB-ADTB-PWTB□□□) and EC power supply connection cable (CB-ADTP-PW050-RB) for an ELECYLINDER connection cable.

2.4 Appearance of Connectivity Cables Enclosed to Actuator Driving Unit and Connectivity Specification Diagrams

2.4.1 EC Power Supply Connectivity Cable: CB-ADTB-PW□□□-RB



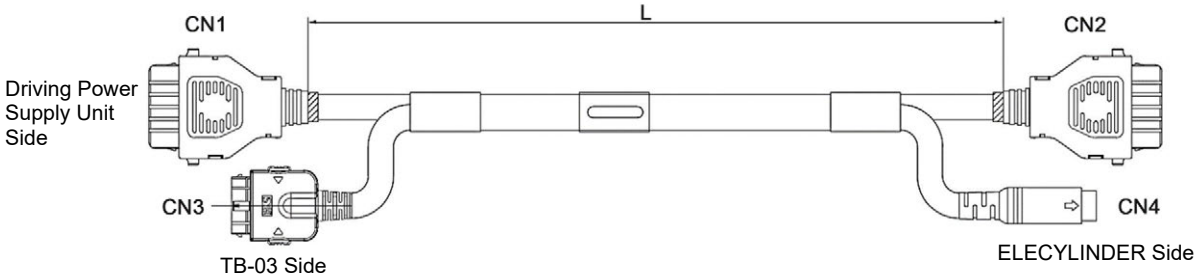
CN1

Color	Signal Name	Pin No.
BK (AWG18)	0V	A1
RD (AWG18)	24V (MP)	B1
LB (AWG22)	24V (CP)	A2
	IN0	B3
	IN1	B4
	IN2	B5
	(Reservation)	B6
	OUT0	A3
	OUT1	A4
	OUT2	A5
	(Reservation)	A6
	BKRLS	B2

CN2

Pin No.	Signal Name	Color
A1	0V	BK (AWG18)
B1	24V (MP)	RD (AWG18)
A2	24V (CP)	LB (AWG22)
B3	IN0	
B4	IN1	
B5	IN2	
B6	(Reservation)	
A3	OUT0	
A4	OUT1	
A5	OUT2	
A6	(Reservation)	
B2	BKRLS	

2.4.2 EC Power Supply + TB-03 Integrated Connectivity Cable: CB-ADTB-PWTB□□□ (For wired)



CN1

Color	Signal Name	Pin No.
BK (AWG18)	0V	A1
RD (AWG18)	24V (MP)	B1
LB (AWG22)	24V (CP)	A2
	IN0	B3
	IN2	B5

CN2

Pin No.	Signal Name	Color
A1	0V	BK (AWG18)
B1	24V (MP)	RD (AWG18)
A2	24V (CP)	LB (AWG22)
B3	IN0	
B5	IN2	

CN3

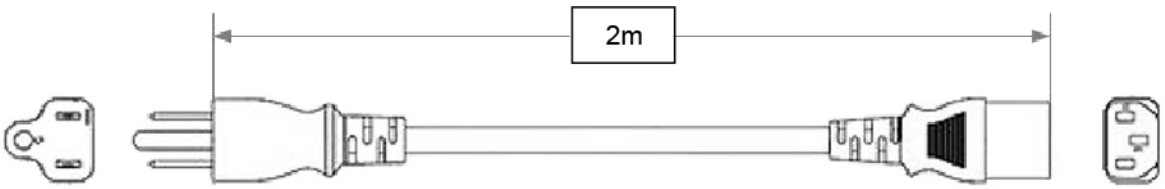
Color	Dot mark/Color		Signal Name	No.
YW	■	BK	EMG1+	1
YW	■	RD	EMG1-	2
-	-	-	EMG2+	3
-	-	-	EMG2-	4
LGY	■	BK	ENB1+	5
LGY	■	RD	ENB1-	6
-	-	-	ENB2+	7
-	-	-	ENB2-	8
-	-	-	N.C	9
-	-	-	N.C	10
WT	■	BK	GND	11
-	-	-	TXD	12
-	-	-	RXD	13
-	-	-	6.5V	14
OR	■	RD	SRD+	15
OR	■	BK	SRD-	16
PK	■	RD	T5V	17
WT	■	RD	T24V	18
-	-	-	GND	19
UL1571 Applicable Wire			GND	20
-	-	-	N.C	21
-	-	-	N.C	22
-	-	-	N.C	23
-	-	-	FG	24
Shield to be clamped to hood on ST connector				

CN4

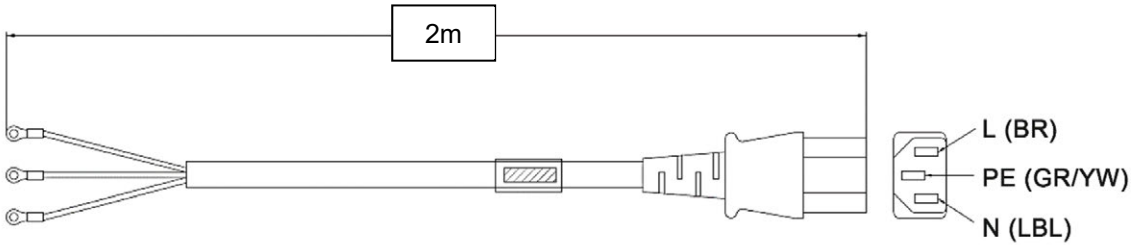
No.	Signal Name	Color	Dot mark/Color	
1	SGA	OR	■	RD
2	SGB	OR	■	BK
3	T5V	UL1571 Applicable Wire		
4	ENB	LGY	■	BK
6	T24V	WT	■	RD
8	EMGB	YW	■	RD
5	EMGA	YW	■	BK
7	GND	WT	■	BK
Shell	GND	-	-	-

2.5 Appearance of Actuator Driving Unit Power Supply Cables and Connectivity Specification Diagrams

2.5.1 100V AC Power Supply Cable (Model: KWD-UJ-2MBS)



2.5.2 200V AC Power Supply Cable (Model: CB-APMEC-PW020-TM)



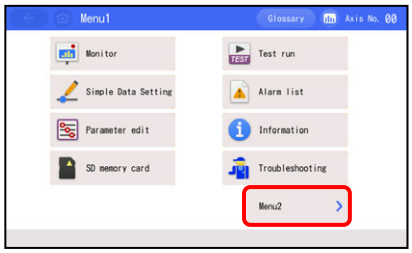
3. Operation of ELECYLINDER

3.1 Displayed Language Change

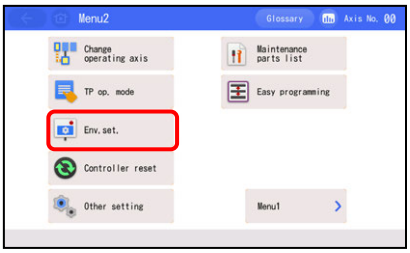
The language can be changed by following the steps below.
For the operations after the language change, please refer to the instruction manual written in each language.

● Display change from English to Japanese

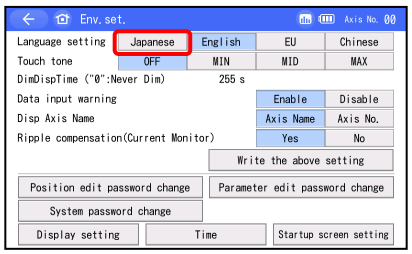
(1) Touch [Menu2] in Menu1.



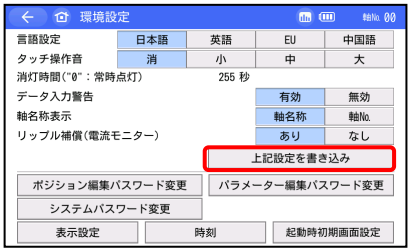
(2) Touch [Env. set.] in Menu2.



(3) Touch [Japanese].



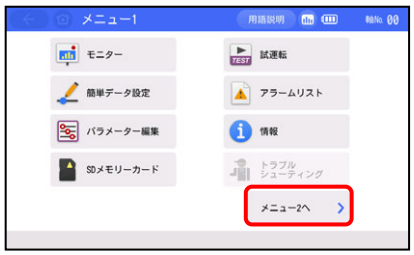
(4) Touch [上記設定を書き込み].



(Note) Skipping to another window without touching [上記設定を書き込み] will allow language to go back to that before changed.

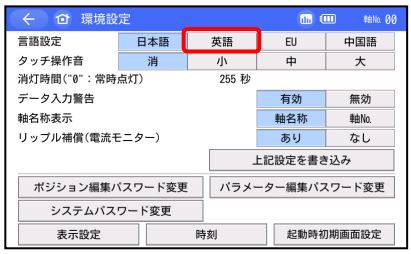
● Display change from Japanese to English

(1) Touch [メニュー2 へ] in メニュー1.

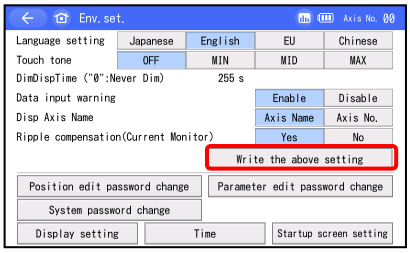


(2) Touch [環境設定] in メニュー2.

(3) Touch [英語].



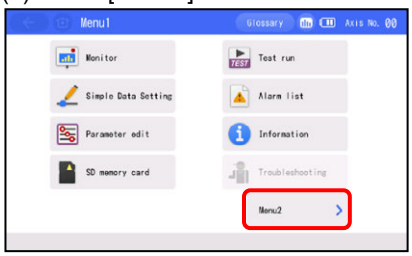
(4) Touch [Write the above setting].



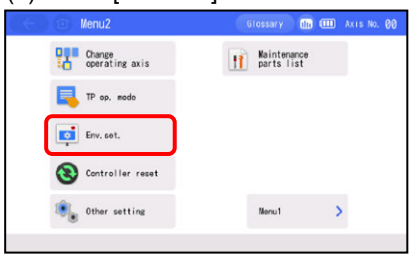
(Note) Skipping to another window without touching [Write the above setting] will allow language to go back to that before changed.

● Display change from English to Chinese

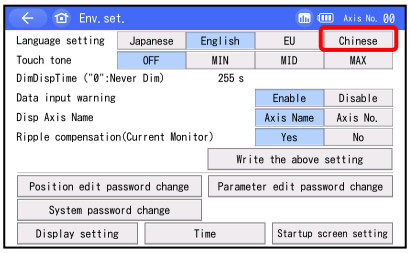
(1) Touch [Menu2] in Menu1.



(2) Touch [Env. set.] in Menu2.



(3) Touch [Chinese].



(4) Touch [写入上述设定].

(Note) Skipping to another window without touching [写入上述设定] will allow language to go back to that before changed.

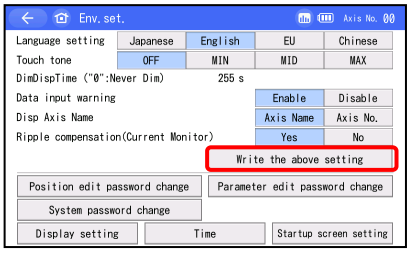
● Display change from Chinese to English

(1) Touch [菜单 2] in 菜单 1.

(2) Touch [环境设定] in 菜单 2.

(3) Touch [英语].

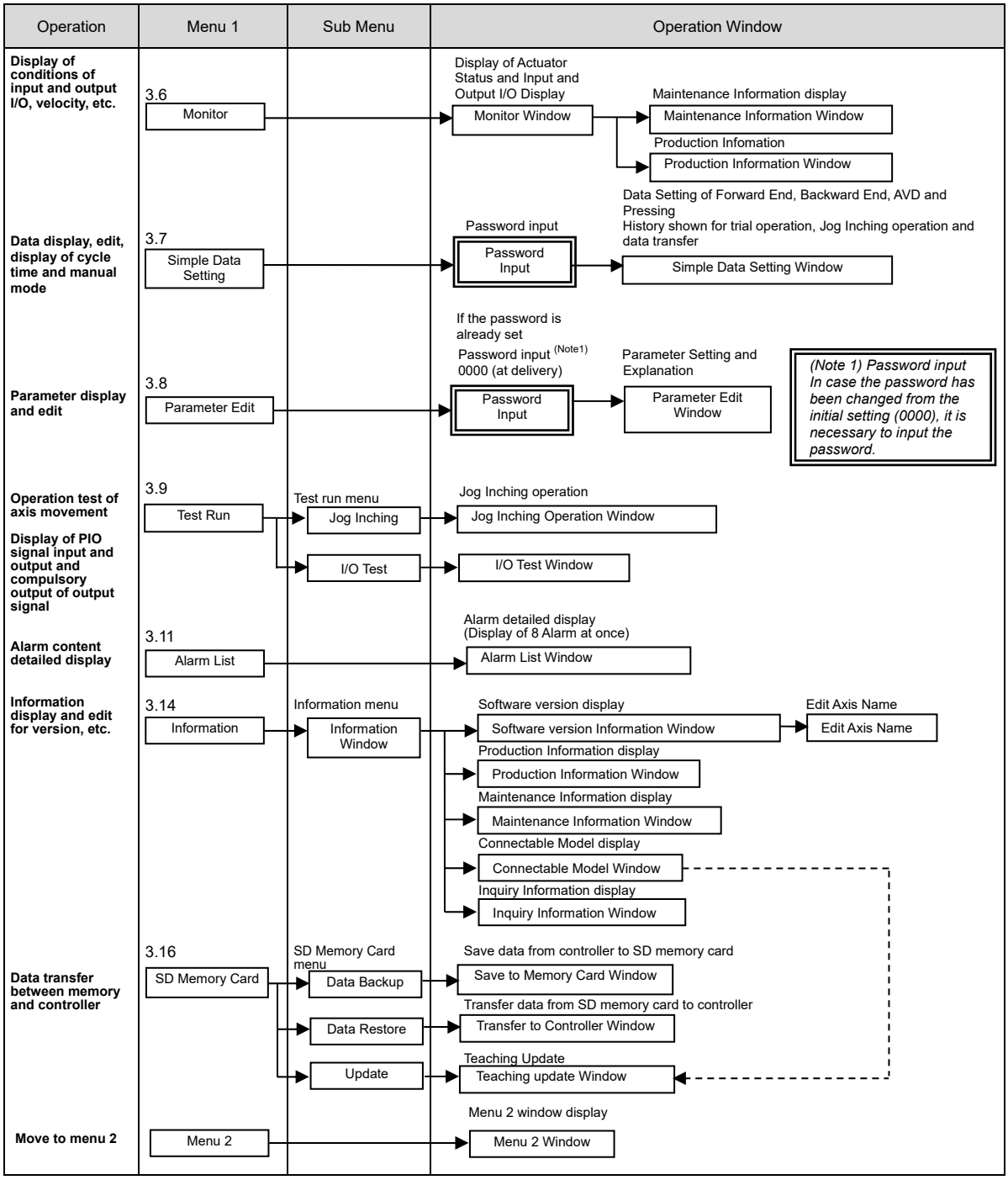
(4) Touch [Write the above setting].

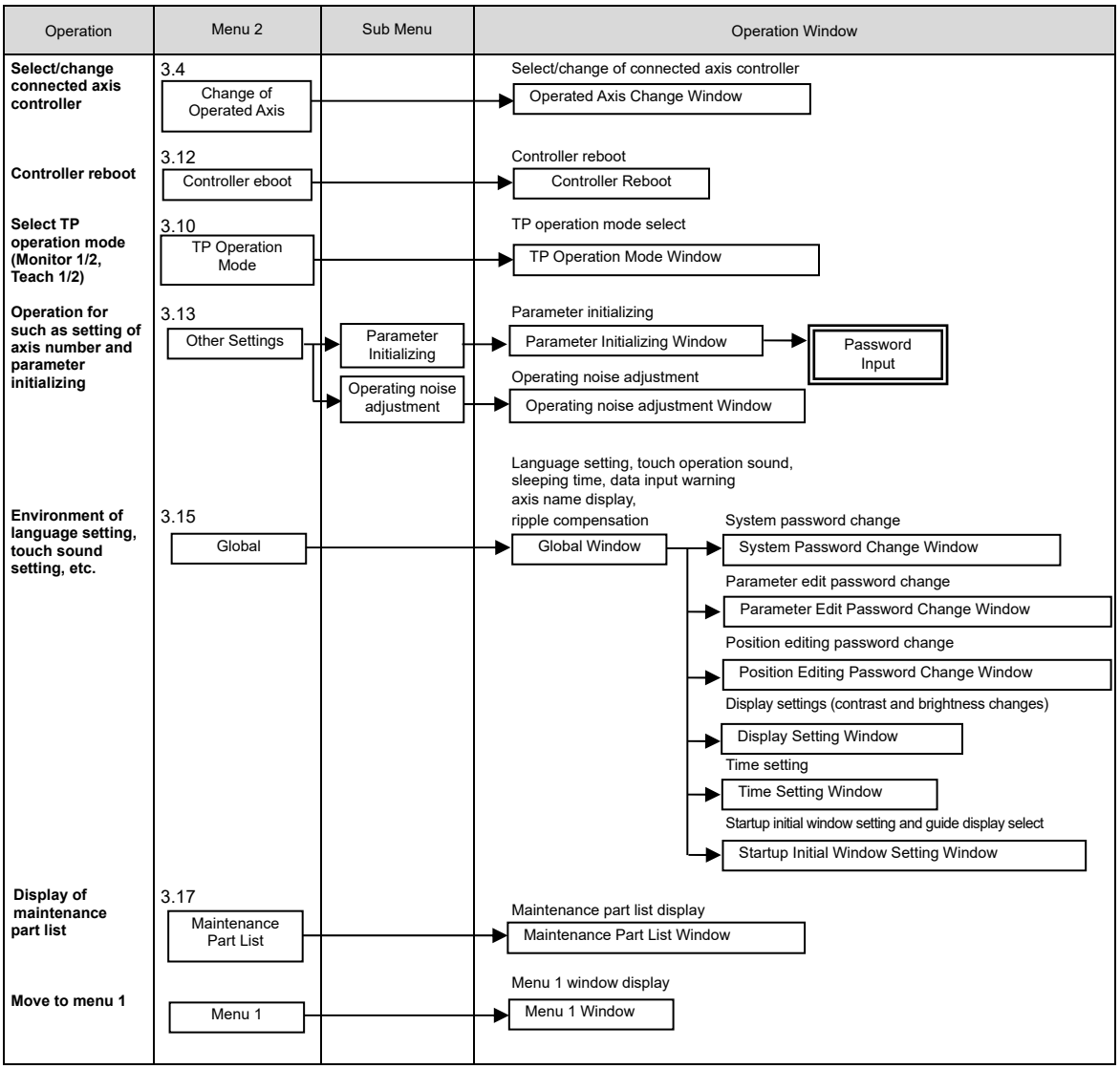


(Note) Skipping to another window without touching [Write the above setting] will allow language to go back to that before changed.

3.2 Operating Menu

Operating menu when the TB-03 is connected to ELECYLINDER is shown.



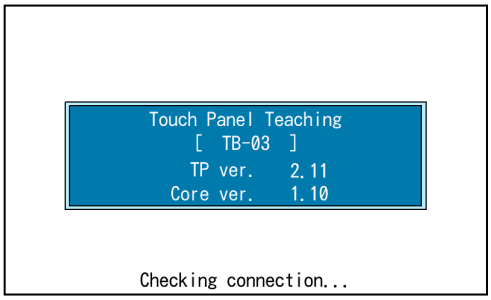

Operation
Menu 2
Sub Menu
Operation Window
Select/change connected axis controller
3.4
Change of Operated Axis
Select/change of connected axis controller
Operated Axis Change Window
Controller reboot
3.12
Controller eboot
Controller reboot
Controller Reboot
Select TP operation mode (Monitor 1/2, Teach 1/2)
3.10
TP Operation Mode
TP operation mode select
TP Operation Mode Window
Operation for such as setting of axis number and parameter initializing
3.13
Other Settings
Parameter Initializing
Parameter initializing
Parameter Initializing Window
Password Input
Operating noise adjustment
Operating noise adjustment
Operating noise adjustment Window
Environment of language setting, touch sound setting, etc.
3.15
Global
Language setting, touch operation sound, sleeping time, data input warning axis name display, ripple compensation
Global Window
System password change
System Password Change Window
Parameter edit password change
Parameter Edit Password Change Window
Position editing password change
Position Editing Password Change Window
Display settings (contrast and brightness changes)
Display Setting Window
Time setting
Time Setting Window
Startup initial window setting and guide display select
Startup Initial Window Setting Window
Display of maintenance part list
3.17
Maintenance Part List
Maintenance part list display
Maintenance Part List Window
Move to menu 1
Menu 1
Menu 1 window display
Menu 1 Window

3.3 Initial Screen

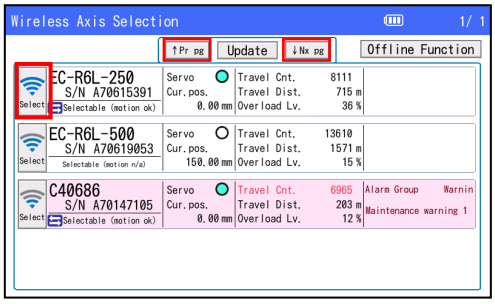
Turn the power on, select wireless axis to operate and start the operation.

IAI logo will be displayed in the screen for a few seconds.

Versions of the teaching and core will be displayed.



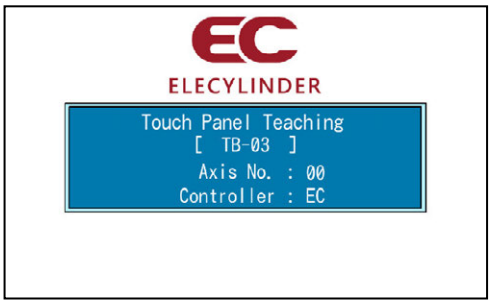
Wireless Axis Select window will show up.



Select the axes to operate in this teaching pendant.

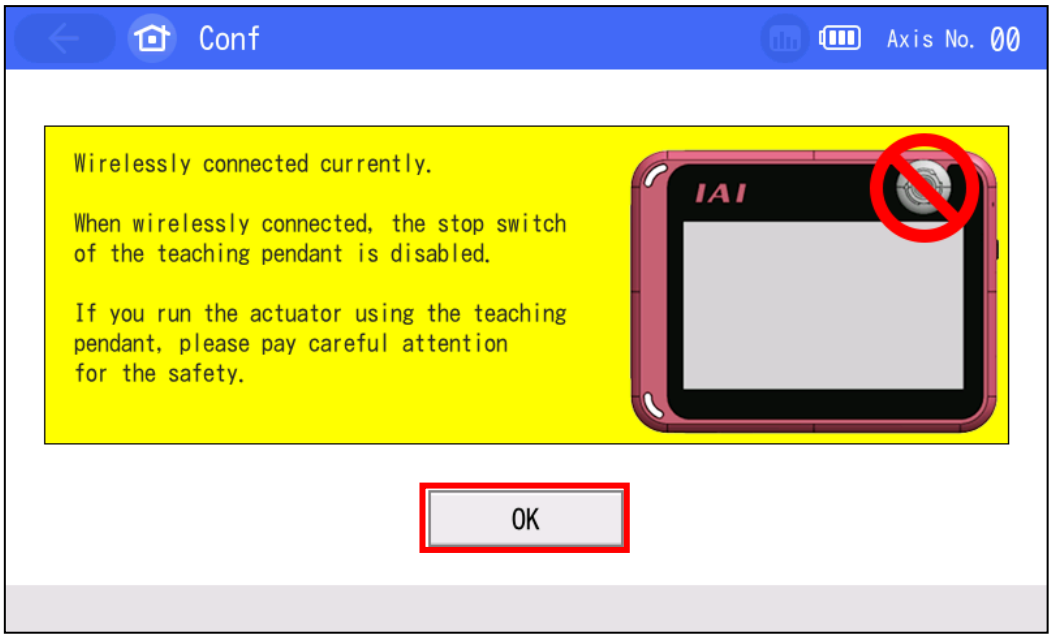
Four units at maximum can be shown in one screen. (Up to 4 screens 16 units)
In case more than four units are connected and the axis you would like to operate is not displayed, touch [↑ Pr pg] / [↓ Nx pg] to show the axis you would like to operate.
[Refer to 3.4 Wireless Axis Select Screen (Change Operation Axis)]

The number of axis to be operated and the type of controller will be displayed.



(EC: ELECYLINDER)

This confirmation window should appear when you selected an axis available for wireless operation.
Confirm what is written and touch [OK].



> ⚠ *Caution*: *Before starting axis operation, make sure that you check the contents described in the 11 page "Precautions for Axis Operation with Wireless Connection" and follow it to secure the safety.*

The Menu 1 screen appears.

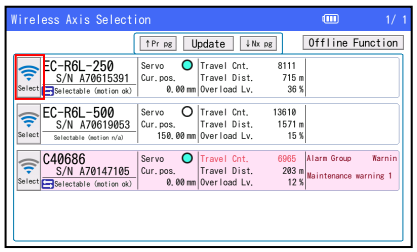
It is available to show a screen other than Menu 1 Screen.
[Refer to 3.15 Environment Setting]

3.4 Wireless Axis Selection Window (Change Operation Axis)

It is a window to select wireless axis to operate.
It is also available to monitor the status of the connected axes. [Refer to 3.4.2 Display Wireless Axis Status]

This window should appear after the power gets turned on or if you touch [Change Operating Axis] in Menu 2 window or touch the Change Axes to Operate button [Refer to 3.5 Menu Selection] on the right top of the window.

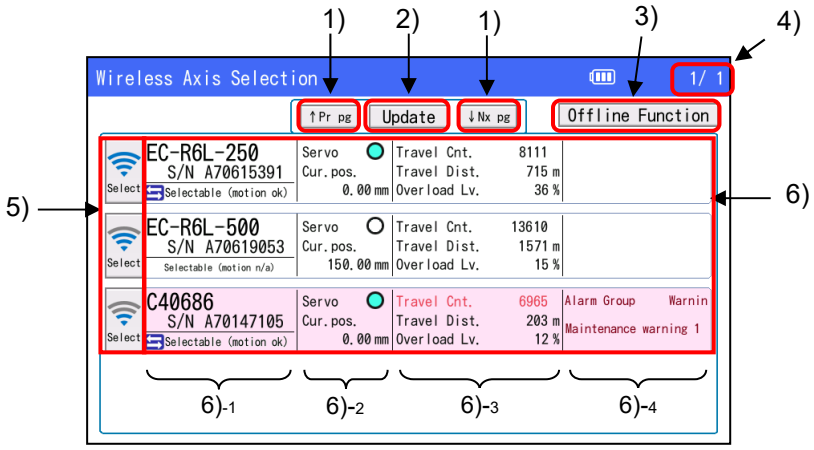
3.4.1 Change Axes to Operate



Display the axis to operate in the teaching pendant, and touch the wireless icon on the left to select it.

Four units at maximum can be shown in one screen. (Up to 4 screens 16 units)
In case more than four units are connected and the axis you would like to operate is not displayed, touch [↑ Pr pg] / [↓ Nx pg] to show the axis you would like to operate.

3.4.2 Display Wireless Axis Status



1) [↑ Pr pg] and [↓ Nt pg] Buttons

You can change pages with these buttons. Four pages (16 units) should be able to show at maximum.

2) [Update] Button

Display in the window gets erased once and wireless axis data get gathered and displayed again.

3) [Offline Function] Button

The display goes to the screen to edit positions (only for EC), to set up environment for main unit and to update the teaching tools which are available offline (with no wireless operation).

4) Page Number
Current page number and total number of pages should be shown.

5) Wireless Icon (Wireless Link Button)

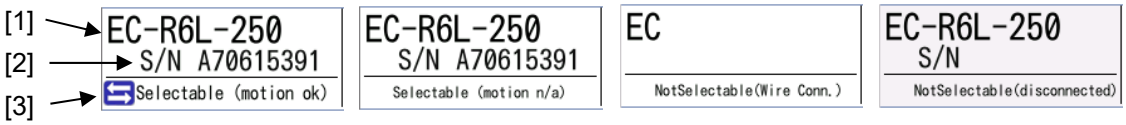
It is an icon to show the status of signal reception.
Status of signal reception should be expressed in five patterns, which are 4 levels + no reception of signal.

Press and hold this icon to move to a process to establish connection to the applicable axis.
This should not be available for an axis linked with wire or an axis with no link established.

6) Data Display Area

Data for wireless axis should be displayed. Order of display should follow the strength of signal reception.

6)-1 Display Area 1



[1] Axis Name

Here, displays the “axis name” registered to ELECYLINDER.
The model code of ELECYLINDER (Series name - Type / Lead Length - Stroke: eg. EC-R6L-250) is registered in the initial setting.
“Axis name” is available to change. [Refer to 3.14.1 Axis Name Edit]

[2] S/N (serial number)

Here, displays the “serial number” of ELECYLINDER.

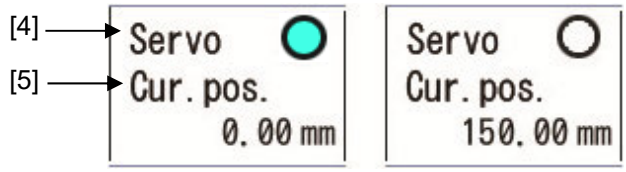
[3] Link Status

Here, displays the status of ELECYLINDER connection. The status of link should be shown in either of four types below.
Wireless axis operation icon should be displayed when operation with wireless connection is available.

Display	Status
Selectable (motion ok)	It is a condition wireless link is available to select (Axis available for operation with wireless connection: WL2)
Selectable (motion n/a)	It is a condition wireless link is available to select (Axis not available for operation with wireless connection: WL)
Not Selectable (Wire Conn.)	It is a condition that wired link is established with another teaching tool
Not Selectable (disconnected)	It is a condition that data was received once, but it is lost

(Note) An axis in condition of “Not Selectable (disconnected)” is not linked wirelessly for such reasons as the power to ELECYLINDER gets shut off on the way and likes, but it remains displayed until [Update] button gets pressed.

6)-2 Display Area 2

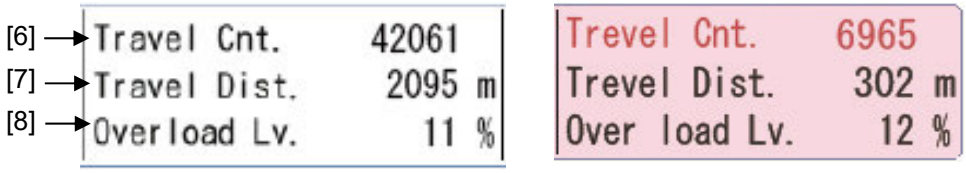


[4] Servo-on Display
The status of the servo should be displayed in two patterns.
Servo is on when this is on ●, and it is off when off ○ .

[5] Current Position Display
Here, displays the current position.

6)-3 Display Area 3

The items in this display area should be displayed only in wireless link.

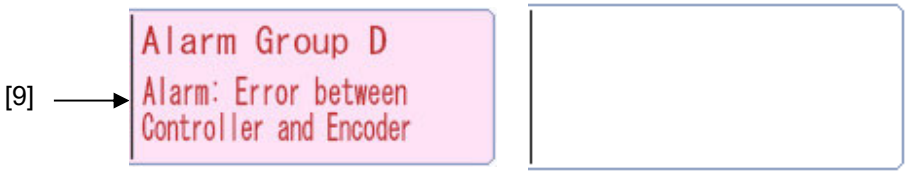


[6] Travel Cnt.
Here, displays “total number of drive” in the maintenance information. [Refer to 3.6.2 Maintenance Information Window]
of any item exceeded the threshold for warning, it should be shown here in red.

[7] Travel Dist.
Here, displays “total distance of drive” in the maintenance information. [Refer to 3.6.2 Maintenance Information Window]
In case of any item exceeded the threshold for warning, it should be shown here in red.

[8] Over load Lv.
Here, displays “overload level” in the driver monitor information. [Refer to 3.6.1 Monitor Window]
In case of any item exceeded the threshold for warning, it should be shown here in red. [Refer to 3.6.2 Maintenance Information Window]

6)-4 Display Area 4



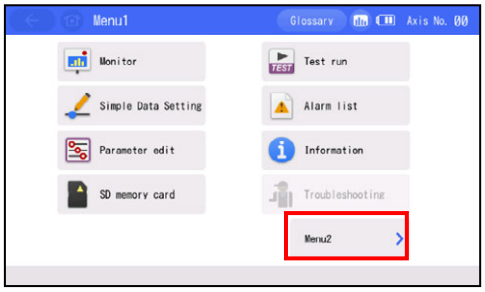
[9] Alarm Display
There should be nothing to be displayed here if there is no alarm or warning being occurred at the moment.
“Alarm Group” and “Alarm Group Name” should be displayed when an alarm or warning is being occurred.
The data display of an axis with an alarm or warning being occurred should be displayed with red at the background.

Data Availability ○ : Data Available × : Data Unavailable

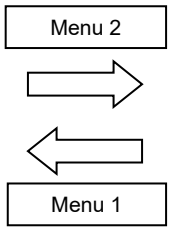
No.	Display Content	Normal Condition		Wireless Link Unavailable (Wire-Linked) Condition	Disconnected Condition
		Alarm Not Generated	Alarm Generated		
1	Axis Name	○	○	Displayed as “EC”	×
2	S/N (serial number)	○	○	×	×
3	Link Status	○	○	○	×
4	Servo-on Display	○	○	○	×
5	Current Position Display	○	○	○	×
6	Travel Cnt.	○	○	×	×
7	Travel Dist.	○	○	×	×
8	Over load Lv.	○	○	×	×
9	Alarm Display	-	○	○	×

3.5 Menu Selection

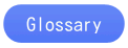
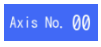
Menu 1



Menu 2



Two menu selection screens, Menu 1 and Menu 2, are available.
Touching [Menu2] on the Menu 1 screen changes the display to the Menu 2 screen.
Touching [Menu1] on the Menu 2 screen changes the display to the Menu 1 screen.

1)		Return Button	: Display goes back to a screen one step previous to a touch.
2)		Home Button	: Returns to Menu 1 Screen
3)		Glossary Button	: Shows the explanation screen for special terms
4)		Monitor Button	: Opens the monitor screen
5)		Battery Display	: It displays the condition and remaining of battery. [1.13.2.1 Refer to Display of Battery Remained]
6)		Change operation axis Button	: Opens the Change operation axis Screen

There are eight types of menu button in Menu 1 and six types menu button in Menu 2. Select one of them and touch it. The screen goes to the touched menu.

In this manual, some figures may not show the battery display. Although, the battery condition and remaining should be displayed in all the windows in the TB-03 in the actual use.

[Menu 1 list]

- Monitor — Displays the actuator status, I/O signal status, maintenance information and manufacturing information. [Refer to 3.6 Monitor]
- Simple Data Setting — Conduct settings of position, velocity acceleration/deceleration to operate the actuator. Axes available for operation with wireless connection should be also available for trial operation. [Refer to 3.7 Simple Data Setting (Position Editing)]
- Parameter edit — Conduct settings such as to adjust operation range or home position, or to change the direction of home-return operation. [Refer to 3.8 Parameter Edit]
- SD memory card — Perform readout of position data and parameters, file saving and storage of the alarm list. Teaching update also can be conducted in this menu. [Refer to 3.16 Data Backup]
- Test run — Conduct a test run for Jog operation, inching operation and I/O. [Refer to 3.9 Test Run]
- Alarm list — Shows a list of alarms and the time when they occurred. [Refer to 3.11 Alarm List]
- Information — Shows the software version, manufacturing information, maintenance information and models available for connection. [Refer to 3.14 Information Display]
- Troubleshooting — Shows the contents of an alarm and the countermeasure when an alarm has been generated.

[Menu 2 list]

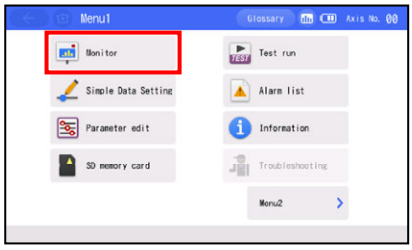
- Change operation axis — Select an axis to operate. [Refer to 3.4 Wireless Axis Selection Window (Change Operation Axis)]
- TP op. mode — Switch over between forbidden and permitted for PIO operation and between invalid and valid for the safety velocity. [Refer to 3.10 TP Operation Mode]
- Env. set. — Conduct settings for display language, touch sound, turn-off time, data input warning, axis name display, ripple compensation, password, display, clock and initial window setting at startup. [Refer to 3.15 Environment Setting]
- Controller reset — Restart the controller. [Refer to 3.12 Controller Reset]
- Other setting — Conduct parameter initialization and Operating noise adjustment. [Refer to 3.13 Other Setting]
- Maintenance parts list — Displays information of maintenance parts. [Refer to 3.17 Maintenance Parts List]

When an alarm generates, the corresponding alarm code and alarm name will appear at the bottom of the screen and the background color will change to orange.

Touch the gray area which shows the alarm information, and the display changes to the contents of the alarm.

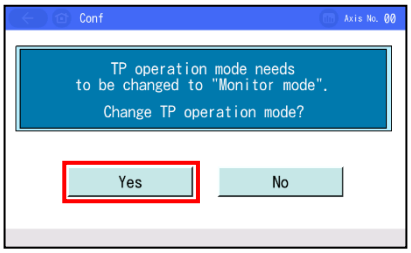
3.6 Monitor

The I/O statuses, current position and other information of the controller connected are displayed.



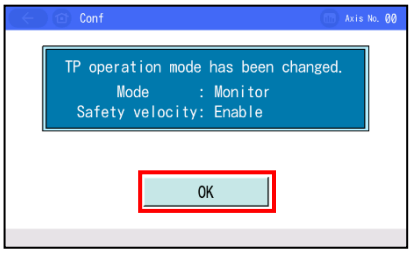
Touch [Monitor] on the Menu 1 screen.

If the TP operation mode is not Monitor Mode 1 or 2, the following message screen appears.



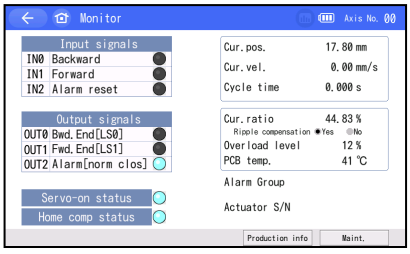
Touch [Yes] to change to Monitor Mode 1 or 2.
If not, touch [No].

(Note) The safety speed does not change.
If the current mode is Teaching Mode 1, it changes to Monitor Mode 1.
If the current mode is Teaching Mode 2, it changes to Monitor Mode 2.



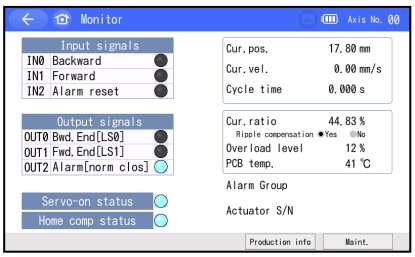
Touch [OK].

The monitor screen appears.

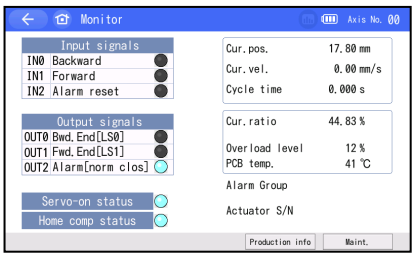


3.6.1 Monitor Window

(Applicable for Ripple Compensation)



(Not Applicable for Ripple Compensation)



Touch [Production info] and the production information screen will be displayed. [Refer to 3.14 Information Display]
Touch [Maint.] and the maintenance information screen will be displayed. [Refer to 3.6.2 Maintenance Information Window]

[Displayed Items]

- Input signals — The status of each input signal is shown. ON is lit. OFF is unlit.
- Output signals — The status of each output signal is shown. ON is lit. OFF is unlit.
- Cur. pos. — The current position is shown.
- Cur. vel. — The current speed is shown.
- Cycle time — The cycle time calculated from the velocity and acceleration / deceleration set for the way forth and the way back is shown.
- Cur. ratio — The value of electrical current is shown as a percentage of the rated current.

  Ripple compensation (Note 1) — It can be chosen with the radio button whether to display the current/current ratio with ripple compensation or without ripple compensation.
  • Yes : Shown in command current (Note 2)
  • No : Shown in output current (Note 3)
- Overload level — The overload level is shown in the rate that the motor raising temperature assumed to generate the overload alarm set as 100%.
- PCB temp. — Temperature of the control PC board in the actuator is shown.
- Alarm Group — The applicable alarm group is shown.
- Actuator S/N — Shows the manufacturing number of the actuator.

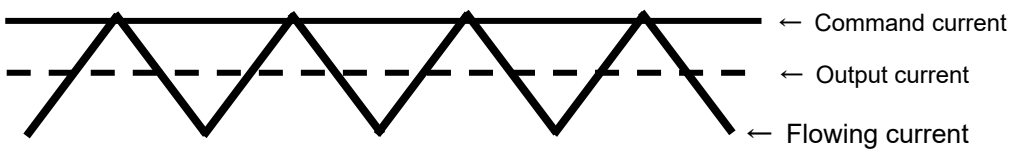
Note 1 Versions Applicable for Ripple Compensation

Tool/Actuator	Applicable Versions
Teaching Pendant TB-03	V2.40 and later
ELECYLINDER	V0006 and later

- In versions other than those listed above, the selections of ripple compensation should not be displayed.
- For those models with no selections, calculations should be performed in command current (Note 2).

Note 2 The command current should compensate for the amount of current ripple considering transistor switching.

Note 3 In ELECYLINDER, output current close to the effective value should be figured out by calculation as it will not acquire the output current.



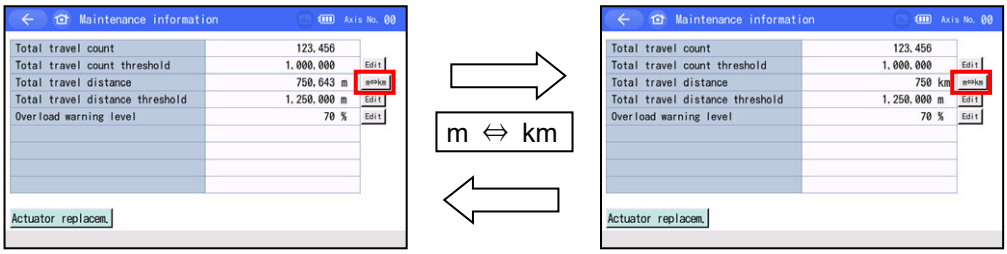
3.6.2 Maintenance Information Window

(1) Total travel count and total travel distance

A warning should get output when the total travel count or total travel distance has exceeded each setting. (Rotary type excluded)

Touch [m ⇔ km] and the display of unit for the total travel distance (current value) can be switched between m and km.

(Display in m for distance) (Display in km for distance)

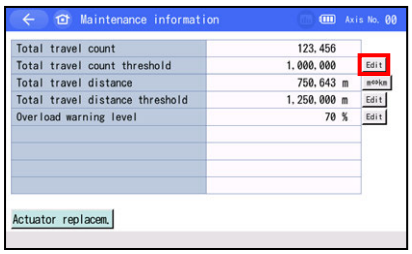


[Contents of Display]

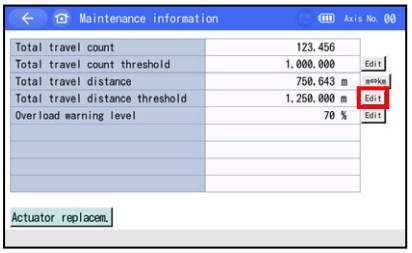
- Total travel count The cumulative total number of actuator movements is shown.
- Total travel distance The cumulative total distance travelled by the actuator is shown. (Rotary type: travel count for round trip between 0 and 180deg (To be figured out from total drive distance))

[Items of Setting]

- Total travel count threshold Set the total travel count to output a warning.
- Total travel distance threshold Set the total travel distance to output a warning. (Rotary type: setting of travel count for round trip between 0 and 180deg)

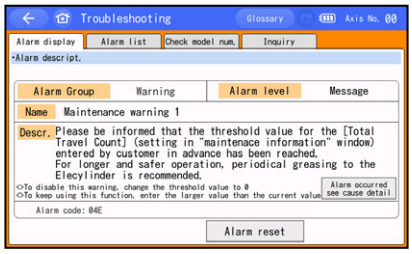


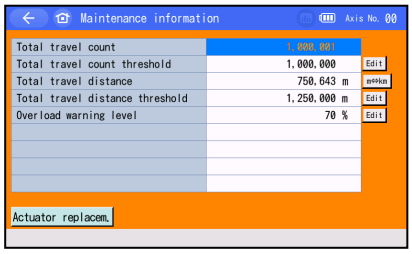
Touch [Edit] on the right of Total travel count threshold to change the setting for the total travel count threshold.



Touch [Edit] on the right of Total travel distance threshold to change the setting for the total travel distance threshold.

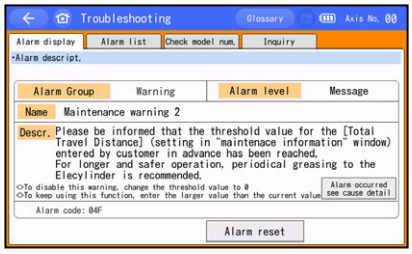
When Total Travel Count has Exceeded Total Travel Count Threshold

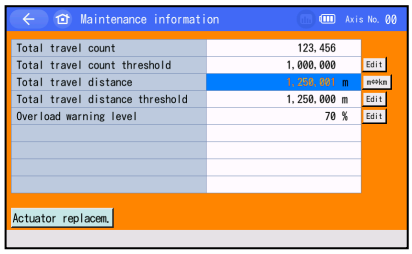




You will be notified in Maintenance warning 1 window.
The number in total travel count blinks in maintenance information window.

When Total Travel Distance has Exceeded Total Travel Distance Threshold



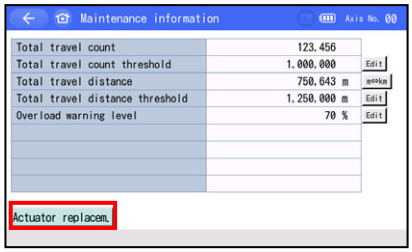


You will be notified in Maintenance warning 2 window.
The number in total travel distance blinks in maintenance information window.

● / ● flash in turn

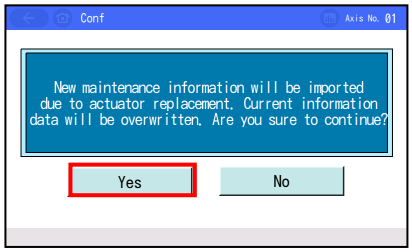
LED lamps on ELECYLINDER flash red and green in turn in all of Maintenance Warning 1, 2 and 3.

[Resetting Total travel count and Total travel distance]



Touch [Actuator replacem.] to display the password entry screen.

Input “5119” and touch [ENT].



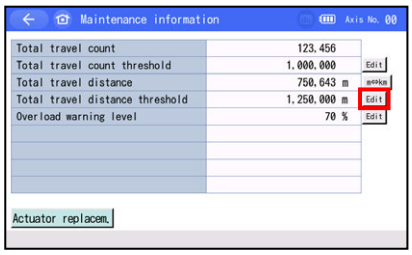
The actuator replacement confirmation screen appears.

Touch [Yes].

The Total travel count and Total travel distance are reset to 0.

(2) Over Load Warning

With the motor rising temperature estimated to generate an overload alarm set as 100%, an overload warning can get output when the temperature has exceeded the rate of the motor temperature set in this window.

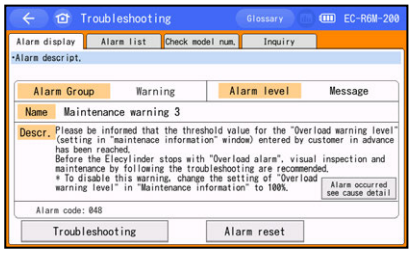


Touch [Edit] on the right of Over load warning level to change the setting for the over load warning level.

[Items of Setting]

- Over load warning level Set the level to generate the over load warning alarm. Set to 100, and a warning should be generated.

When Over load Level has Exceeded Setting Rate

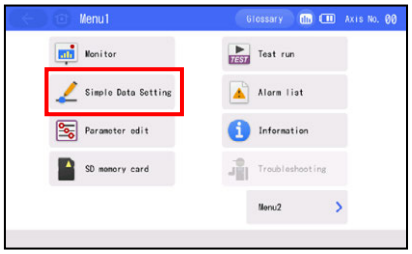


You will be notified as an overload warning in Maintenance warning 3 screen.

LED lamps on ELECYLINDER flash red and green in turn.

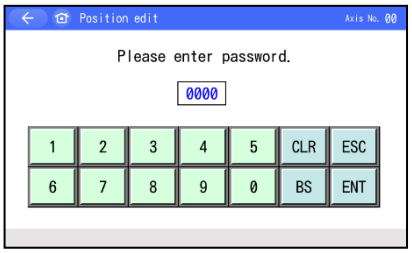
3.7 Simple Data Setting (Position Editing)

Setting and editing of data related to operation such as forward end, backward end, velocity (V), acceleration (A), deceleration (D) and pressing setting can be performed.
Axes available for operation with wireless connection should be available for JOG and inching operations. [Refer to 3.7.3 Manual Mode]



Touch [Simple Data Setting] on the Menu 1 screen.

If a position edit password is other than “0000,” the password entry screen appears.

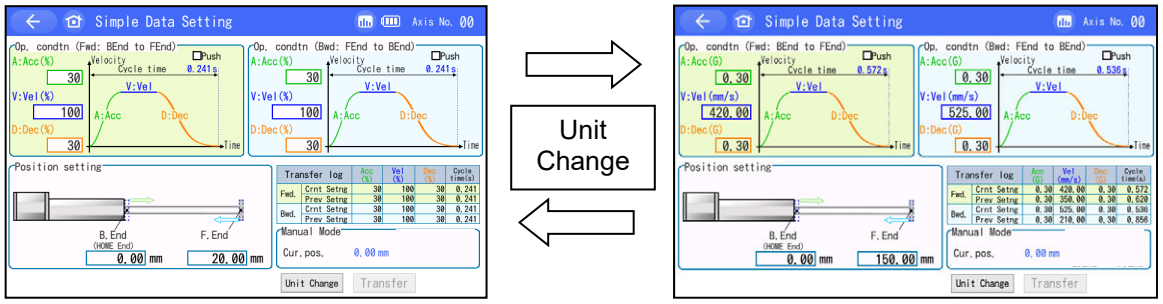


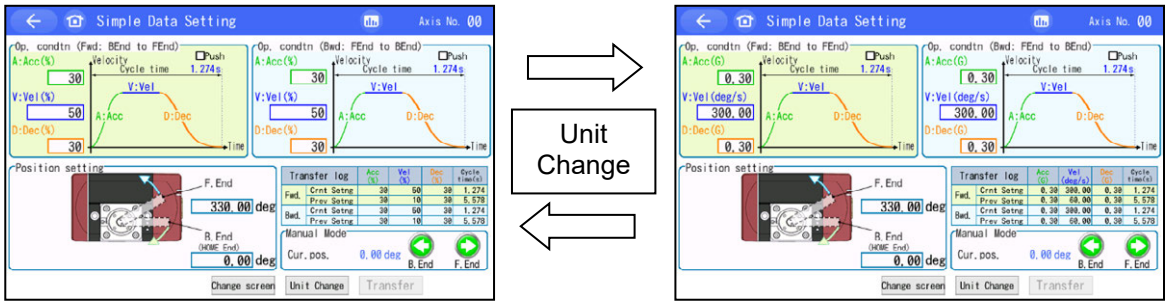
Enter the position edit password.
Touch [ENT].

> The default position edit password is “0000”.
> For how to change the position edit password, refer to 3.15, “Environment Setting [Position edit password change]”.

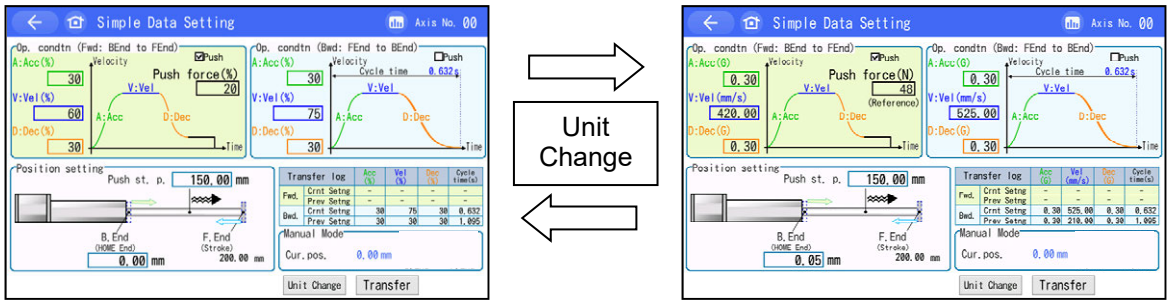
The simple data setting screen appears.
[Unit Change] switches the unit between % and mm/s (deg/s) for velocity, % and G for acceleration / deceleration and % and N (N•m) for pressing force.

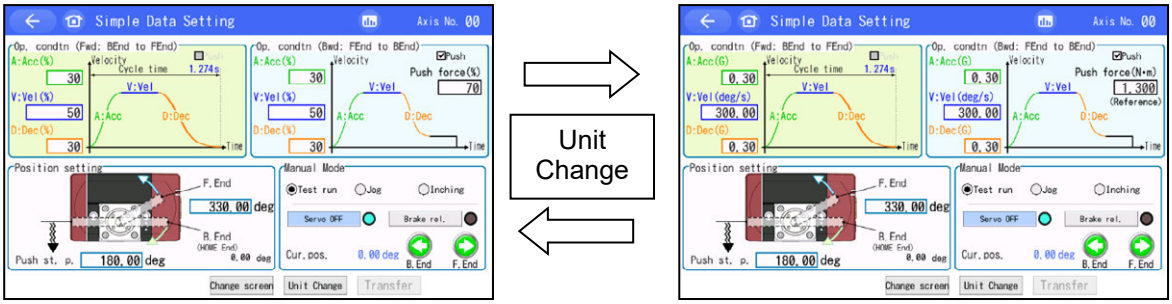
Simple Data Setting screen (Positioning Operation) [Refer to 3.7.1 Positioning Operation Setting]





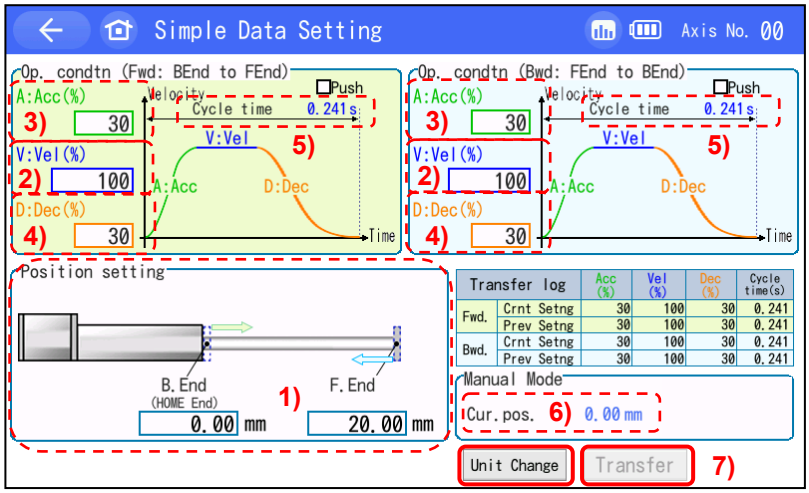
Simple Data Setting screen (Pressing Operation) [Refer to 3.7.2 Pressing Operation Setting]





3.7.1 Positioning Operation Setting

Shown below is the content of setting for the position data for the positioning operation. (Rotary excluded)



1) Position setting [mm] -------- Input the positions of the backward end and forward end. Positioning coordinate value. Enter is as the distance from the home position.
The unit is mm and input can be made down to two decimal places.

2) Vel [% or mm/s] ---------- Set the velocity of operation.
Set a number from 1% to 100%.
Also, the unit can be switched to mm/s by pressing [Unit Change].
Input can be made down to the two decimal places for mm/s.

Note 1 Figure out the minimum velocity by using the formula below.
Min. Velocity [mm/s] = Lead Length [mm] / 800 / 0.001 [s]
(Number of 200V servo motor type encoder pulse: 16384)

3) Acc [% or G] ---------- Set the acceleration at start.
Set a number from 1% to 100%.
Also, the unit can be switched to G by pressing [Unit Change].
Input can be made down to the two decimal places for G.

4) Dec [% or G] ---------- Set the deceleration at stop.
Set a number from 1% to 100%.
Also, the unit can be switched to G by pressing [Unit Change].
Input can be made down to the two decimal places for G.

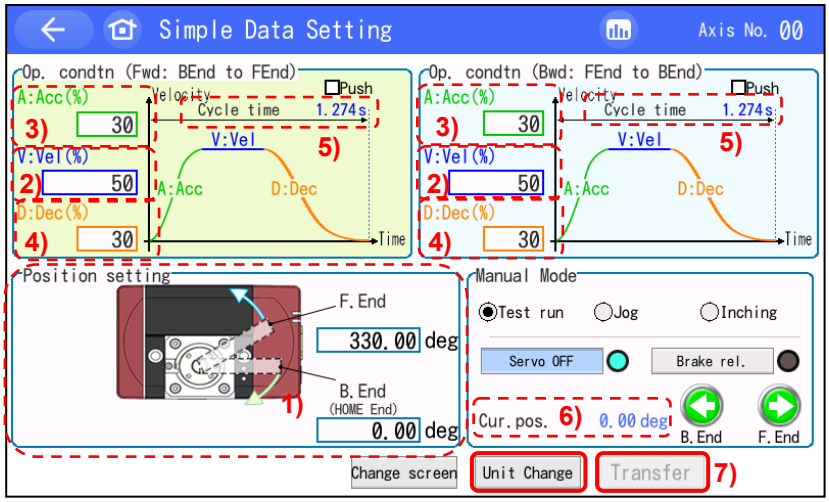
5) Cycle time [s] ---------- The cycle time calculated from the velocity and acceleration / deceleration set is shown.

6) Cur. pos. [mm] ---------- Displays the current position.

7) [Transfer] button ---------- Once the data setting is complete, press [Transfer] to transfer the data to the controller.

> ⚠ *Caution: If moving to another window without transferring data, all the data settings will go back to those before.*

Shown below is the content of setting for the position data for the positioning operation. (Rotary)



1) Position setting [deg] -------- Input the positions of the backward end and forward end.
Positioning coordinate value. Enter is as the distance from the home position.
The unit is deg and input can be made down to two decimal places.

2) Vel [% or deg/s] ---------- Set the velocity of operation.
Set a number from 0% to 100%.
Also, the unit can be switched to deg/s by pressing [Unit Change].
Input can be made down to the two decimal places for deg/s.
Note 1 Figure out the minimum velocity by using the formula below.
Min. Velocity: 20deg/s

3) Acc [% or G] ---------- Set the acceleration at start.
Set a number from 0% to 100%.
Also, the unit can be switched to G by pressing [Unit Change].
Input can be made down to the two decimal places for G.

4) Dec [% or G] ---------- Set the deceleration at stop.
Set a number from 0% to 100%.
Also, the unit can be switched to G by pressing [Unit Change].
Input can be made down to the two decimal places for G.

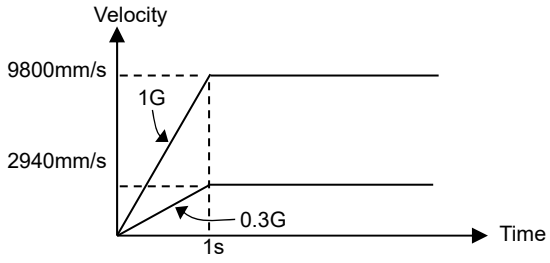
5) Cycle time [s] ---------- The cycle time calculated from the velocity and acceleration / deceleration set is shown.

6) Cur. pos. [mm] ---------- Displays the current position.

7) [Transfer] button ---------- Once the data setting is complete, press [Transfer] to transfer the data to the controller.

⚠ *Caution: If moving to another window without transferring data, all the data settings will go back to those before.*

(Reference) Acceleration is explained. The same concept applies to deceleration.
1G = 9800mm/s^2: Acceleration at which the actuator can increase its speed up to 9800mm/s per second.
0.3G : Acceleration at which the actuator can increase its speed up to 2940mm/s (9800mm/s × 0.3) per second.



⚠ *Caution: If the actuator or work part receives impact or generates vibration, lower the acceleration/deceleration. If the system is used continuously with the actuator or work part receiving impact or generating vibration, the life of the actuator may be significantly reduced.*

8)

Transfer log		Acc (%)	Vel (%)	Dec (%)	Cycle time(s)
Fwd.	Crnt Setng	30	65	30	0.535
	Prev Setng	30	60	30	0.572
Bwd.	Crnt Setng	30	85	30	0.510
	Prev Setng	30	75	30	0.536

Manual Mode

Cur.pos. 0.00 mm

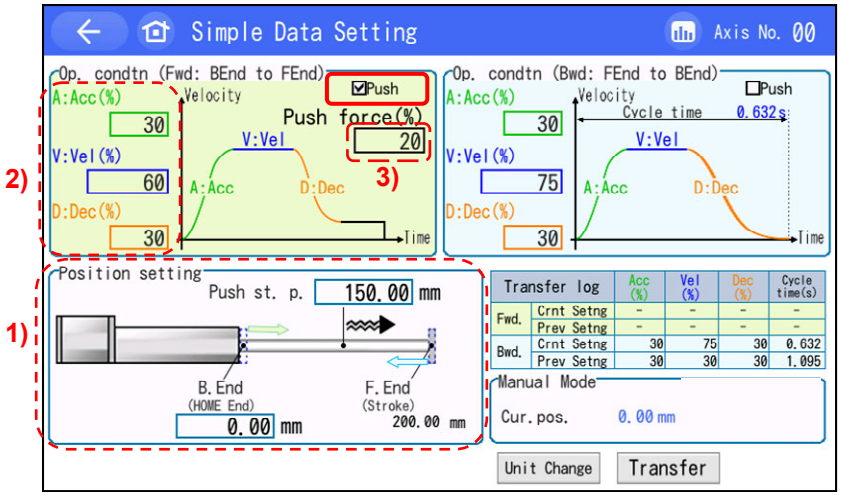
Unit Change | Transfer 7)

8) Transfer log

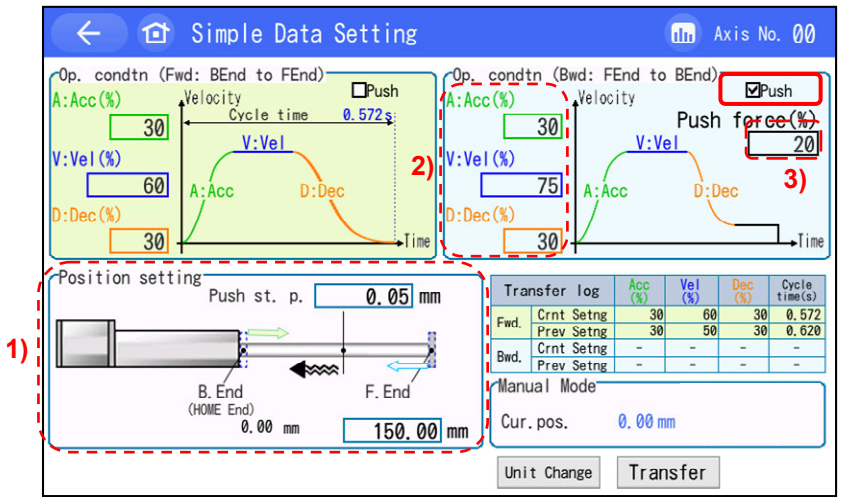
Once the data of the velocity and acceleration/deceleration for the way forth and the way back is transferred by pressing [Transfer], the old setting parameters will be shown in the previous setting area and the new parameters in the current setting area, and the cycle time calculated from these parameters will be displayed.

3.7.2 Pressing Operation Setting

Shown below is the content of setting for the position data for the pressing operation.
Put a check mark ✓ in the check box □. Push and the screen goes to the setting window for the pressing operation. (The belt driven types (EC-B6 and B7) are not available for pressing operation.)



Pressing operation of Fwd (BEnd to FEnd)



Pressing operation of Bwd (FEnd to BEnd)

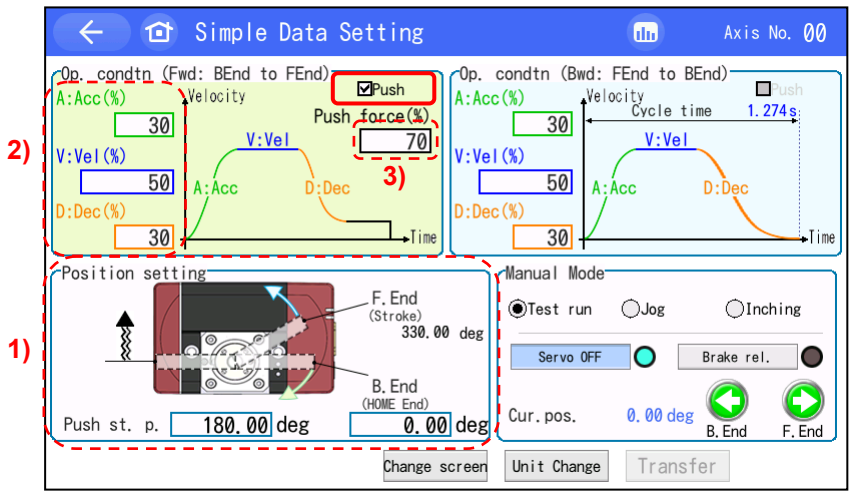
1) Position setting [mm] -- Setting can be made for the start position of movement (backward end or forward end) and the start position of pressing operation.
Positioning coordinate value. Enter is as the distance from the home position.
The unit is mm and input can be made down to two decimal places.

2) Vel and Acc/Dec -------- Setting can be made for the velocity, acceleration and deceleration for movement from the start position of the movement (backward end or forward end) to the start position of pressing operation.
The way to conduct settings is the same as that for positioning operation.

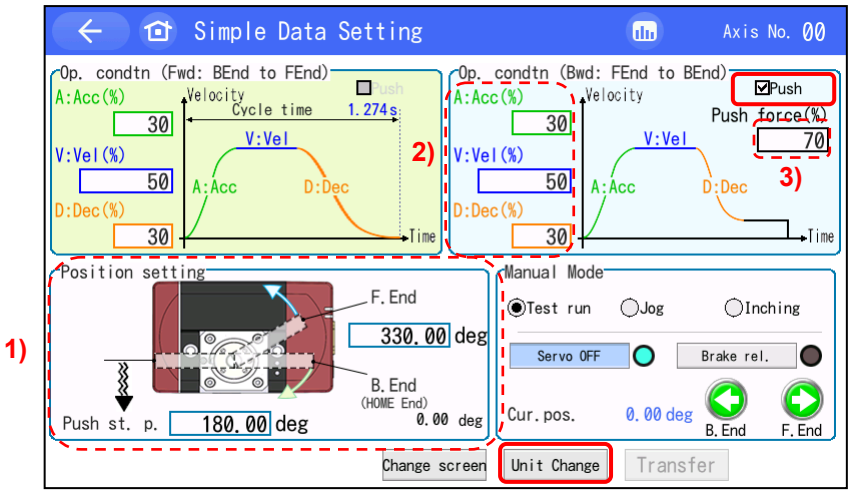
3) Push force [%] ---------- Set a pressing torque (limit current value) in %.
The unit can be switched to N by pressing [Unit Change].
The pressing velocity should be 20mm/s.
If the velocity is set to 20mm/s or less, pressing operation will be performed in the setting velocity.

Transfer log ---------- The transfer log will not be displayed in pressing operation.The transfer operation is the same as the positioning operation. [Refer to 3.7.1 Positioning Operation]

Shown below is the content of setting for the position data for the pressing operation. (Rotary)
Put a check mark ✓ in the check box □Push and the screen goes to the setting window for the pressing operation.



Pressing operation of Fwd (B.End to F.End)



Pressing operation of Bwd (F.End to B.End)

1) Position setting [mm] -- Setting can be made for the start position of movement (backward end or forward end) and the start position of pressing operation.
Positioning coordinate value. Enter is as the distance from the home position.
The unit is mm and input can be made down to two decimal places.

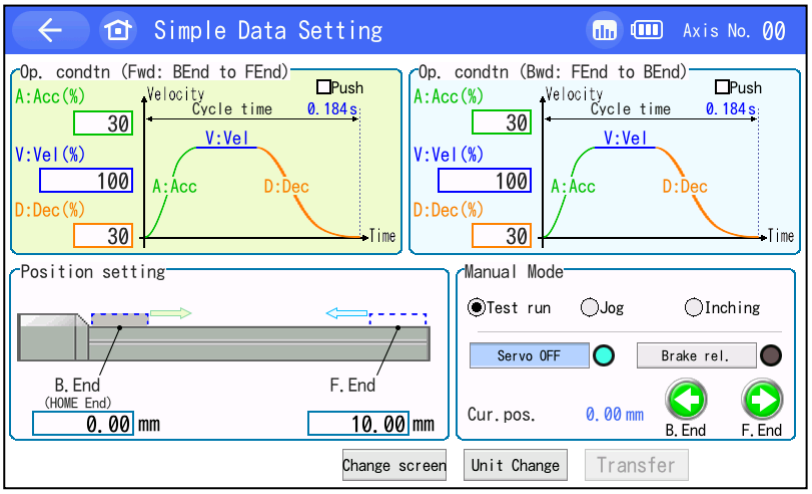
2) Vel and Acc/Dec -------- Setting can be made for the velocity, acceleration and deceleration for movement from the start position of the movement (backward end or forward end) to the start position of pressing operation.
The way to conduct settings is the same as that for positioning operation.

3) Push force [%] ---------- Set a pressing torque (limit current value) in %.
The unit can be switched to N•m by pressing [Unit Change].
The pressing velocity should be 20deg/s.
If the velocity is set to 20deg/s or less, pressing operation will be performed in the setting velocity.

Transfer log ---------- The transfer log will not be displayed in pressing operation.
The transfer operation and manual operation is the same as the positioning operation. [Refer to 3.7.1 Positioning Operation Setting]

3.7.3 Manual Mode

In the combination of TB-03 (V2.30 and later) and option code -WL2, trial operation (moving to forward end and backward end and JOG and inching operations) of axis is available in wireless condition.

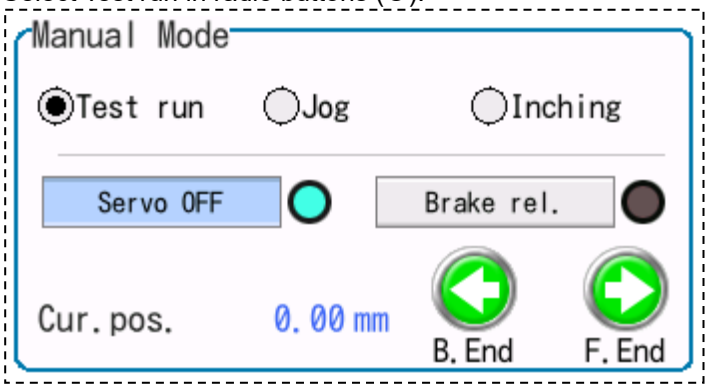


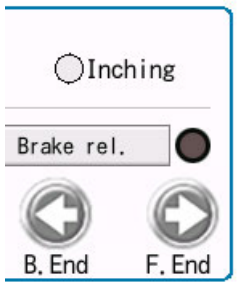
> ⚠ *Caution: Before starting axis operation, make sure that you check the contents described in the 11 page "Precautions for Axis Operation with Wireless Connection" and follow it to secure the safety.*

Once the simple data setup window is shown, the manual operation box should show up in the right bottom of the screen.
Selection can be made with ○ (radio buttons) from Trial Run, Jog and Inching.

(1) Test Run

Select Test run in radio buttons (○).





Set values not transferred

It should be switched over between power on and off by touching [Servo OFF].
It should be switched over between brake compulsory release on and off by touching [Brake rel.].

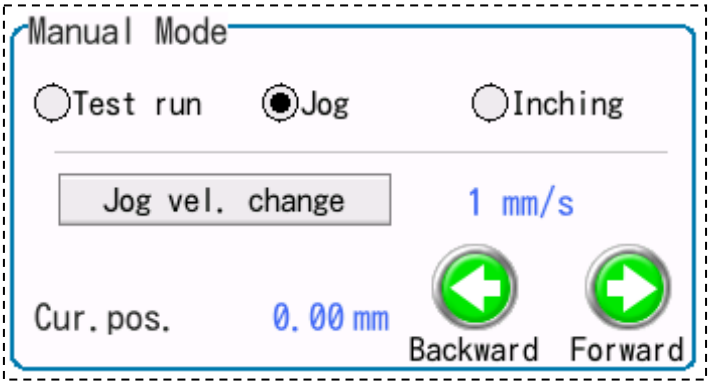
An actuator should move to the backward end if you touch [B. End].
Make operation using velocity and acceleration/deceleration in the operation conditions (Way back: from F. End to B. End).

An actuator should move to the forward end if you touch [F. End].
Make operation using velocity and acceleration/deceleration in the operation conditions (Way forward: from B. End to F. End).

Both forward and backward operations should activate while the button is touched and held. Release the button and the operation should stop.
[B. End] and [F. End] are ready for operation when they are shown in green. If they are not green, the set values are not transferred. Transfer the set value data to a controller in advance by pressing [Transfer] button.

(2) JOG

Select JOG in radio buttons (○).



An actuator keeps moving backward while touching [Backward].
Regardless of the backward end setting, the actuator should move backwards till the home position.

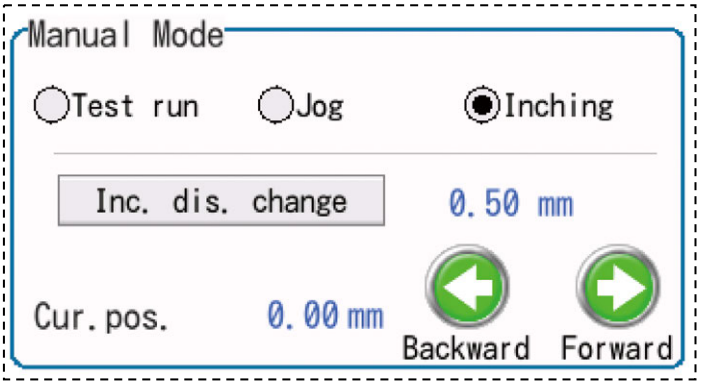
An actuator keeps moving forward while touching [Forward].
Regardless of the forward end setting, the actuator should move forwards till the stroke end.

Touch [Jog vel. change] and the velocity to move backward/forward should change in the order below.

1 mm/s (deg/s) → 10 mm/s (deg/s) → 30 mm/s (deg/s) → 50 mm/s (deg/s) → 100 mm/s (deg/s)

(3) Inching

Select Inching in radio buttons (○).



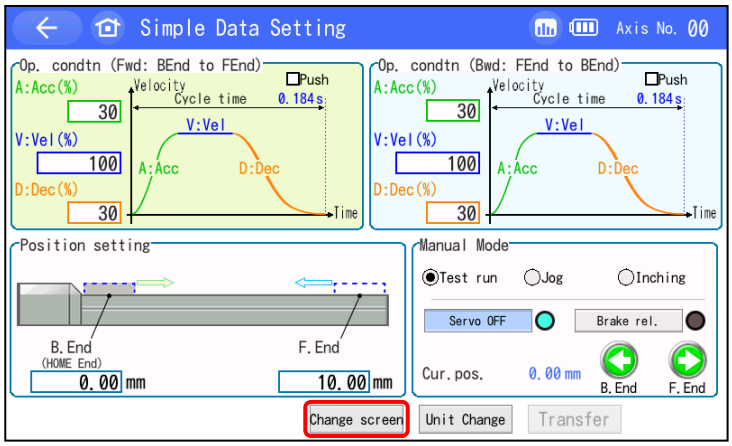
Touch [Backward] and an actuator should move backward in a certain distance.
Regardless of the backward end setting, the actuator should move backwards till the home position.

Touch [Forward] and an actuator should move forward in a certain distance.
Regardless of the forward end setting, the actuator should move forwards till the stroke end.

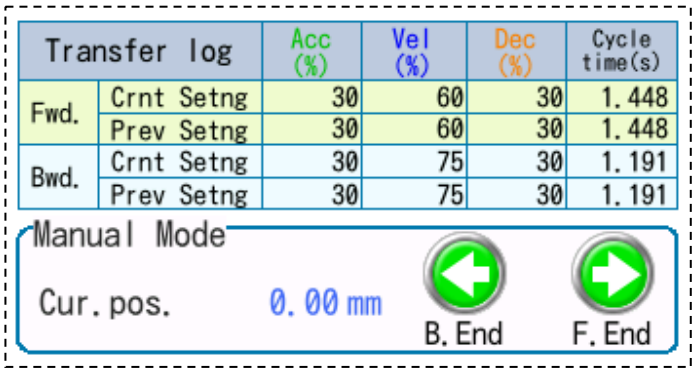
Touch [Inc. dis. change] and the distance to move in one touch should change in the order below.

0.01 mm (deg) → 0.10 mm (deg) → 0.50 mm (deg) → 1.00 mm (deg) → 5.00 mm (deg)

(4) Transfer log display



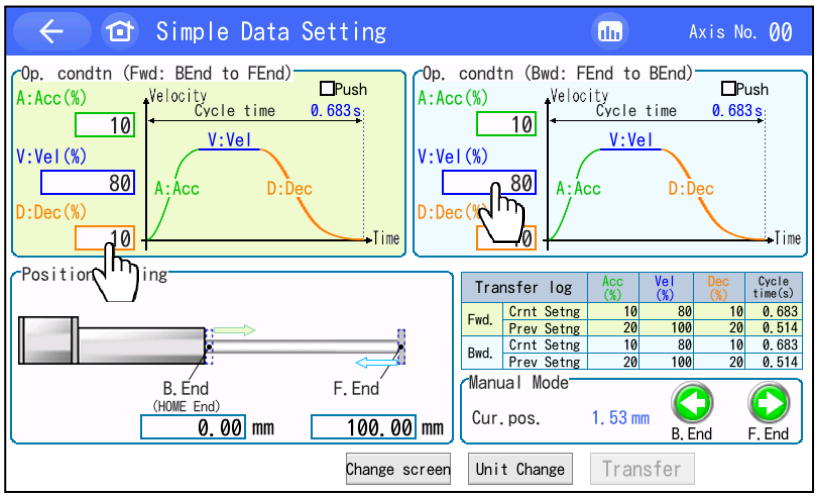
Touch [Change screen] and the screen should be switched over between the manual operation display and data transfer history display.
Switchover is available in any condition of Test run, Jog and Inching.



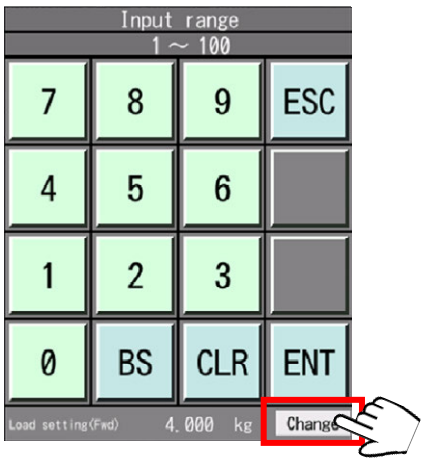
In the data transfer history display, the manual operation buttons work as [B. End] and [F. End] buttons for Test Run.
Once you switch the screen back to the manual operation display, the setting should go back to the test run.

3.7.4 Mounting Orientation Setting / Payload Setting

By setting “Payload (kg/kg•m^2)” and “Mounting orientation” on the way back and forth in advance, the acceleration and deceleration you can choose can be determined.



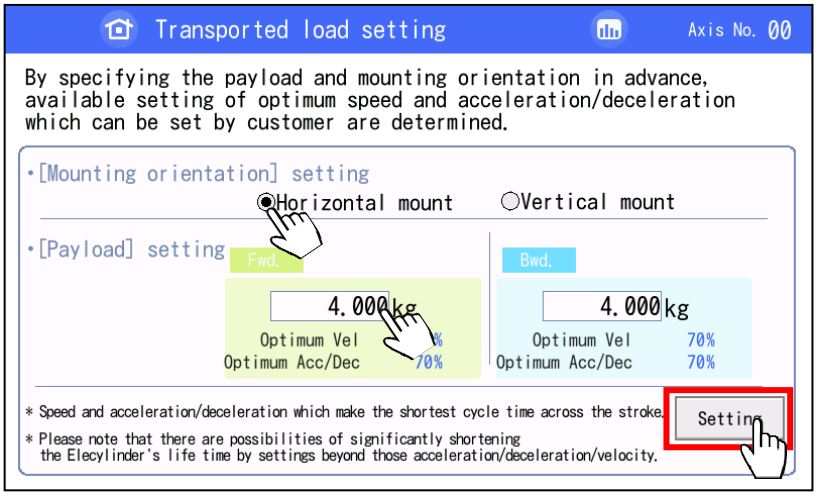
Touch either acceleration, velocity or deceleration.



The numeric key pad should open.

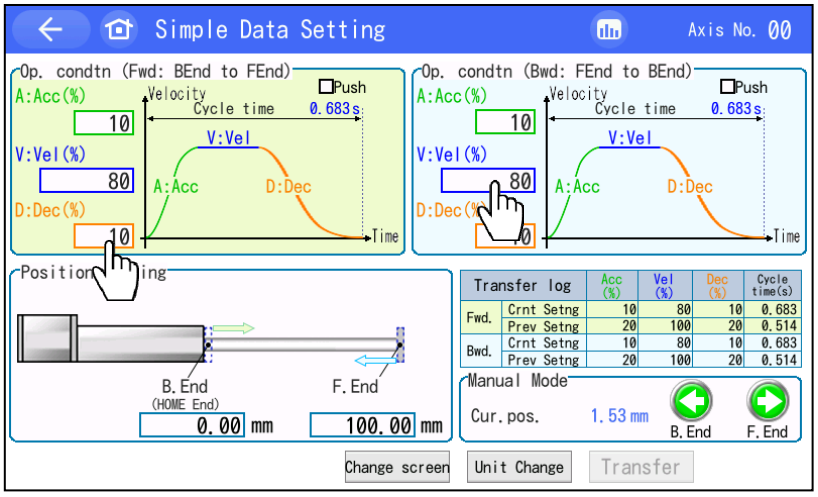
Touch [Change] on the right bottom.

The models not applicable for the payload setting (refer to next page) should not have [Change] displayed.

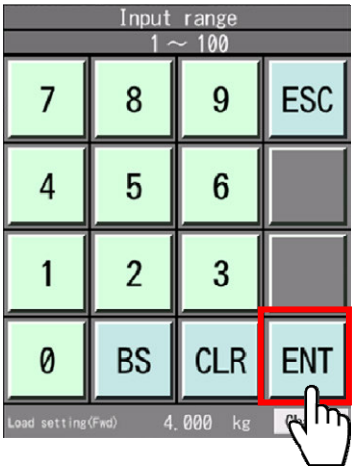


Select "Mounting orientation", input "Payload" and then touch [Setting].

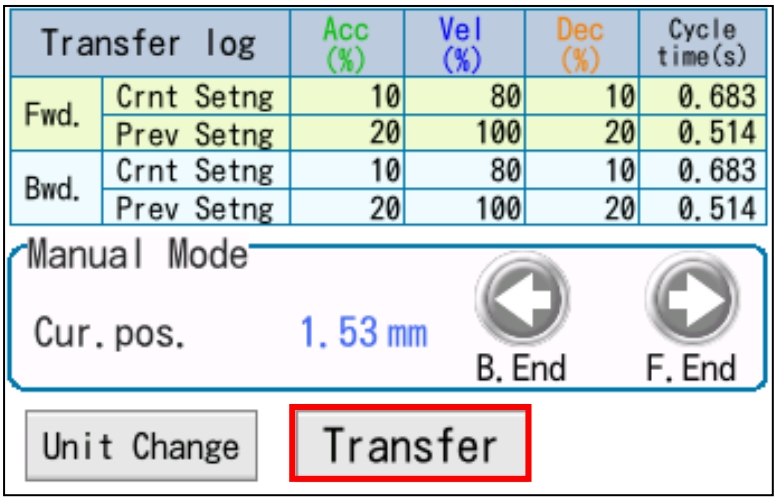
The unit is "kg•m^2" for rotary type



Touch an operational condition to be set or adjusted.



Input a value in the numeric keys and touch [ENT].



Touch [Transfer].

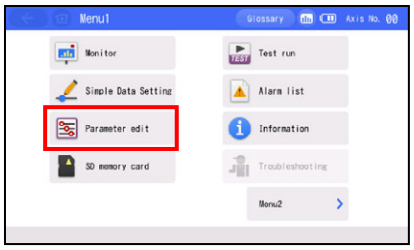
The values should get written to the controller, [B. End] and [F. End] should turn into green and "Transfer liog" should be updated.

Payload Setting Not Applicable Model

- Ultra Mini ELECYLINDER (EC-SL3□, GDS3L, GDB3□, T3□)
- Gripper Type (EC-GRB8M, GRB10M, GRB13M, GRB13L)
- Stopper Cylinder ECO Type (EC-ST15ME)

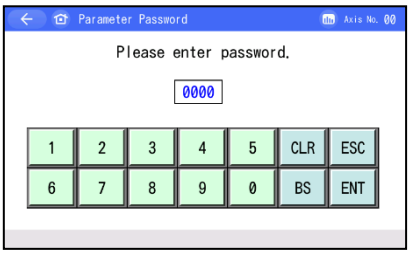
3.8 Parameter Edit

Parameters are displayed and edited.



Touch [Parameter edit] on the Menu 1 screen.

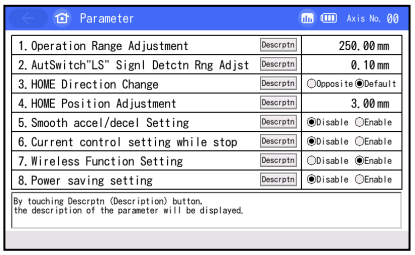
If a system password is not “0000,” the password entry screen appears.



Input the parameter edit password.
Touch [ENT].

> The parameter edit password at delivery is set to “0000”. For how to change the parameter edit password, refer to 3.15 Environment Setting [Parameter edit password change].

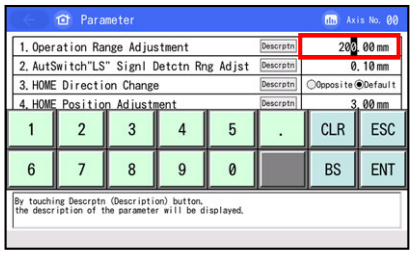
A parameter table is displayed.



(1) Basic operation

There are two types of input, one is to input a setting value and the other is to touch ○ (radio button) to select.

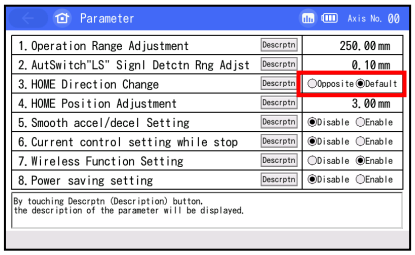
Item to input a setting value



Touch the item that you would like to make a setting, and the setting parameter starts flashing and numeric keys will show up.
Touch numbers on the numeric keys to input and touch [ENT].

When the process needs to be cancelled after the numeric keys appear, touch [ESC].

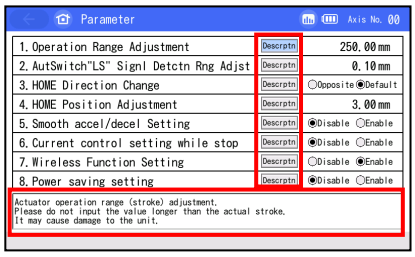
Item to touch ○ (radio button) to select



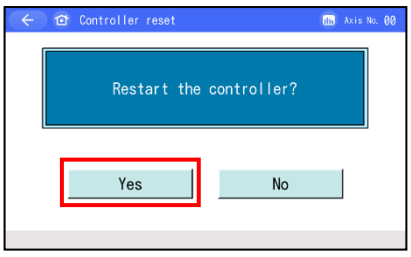
Touch ○ (radio button) of the item or the text itself that you would like to select.

A black dot will be marked in ○ (radio button) that you selected.

Descriptions



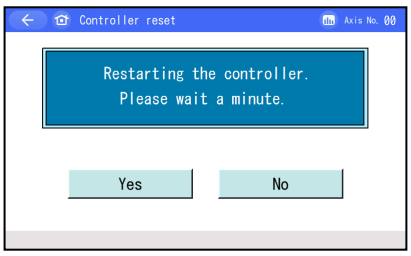
Touch [Descrptn] button and the descriptions of the setting items will be shown in the bottom of the screen.



Touch Home Button once all the settings are completed. A confirmation screen asking “Restart the controller?” will come up. Touch [Yes] if you have made a change.

Touch [No] to return to the parameter screen without restarting the controller or reflecting the parameter you have set. To reflect the parameter you have set, you must restart the controller.

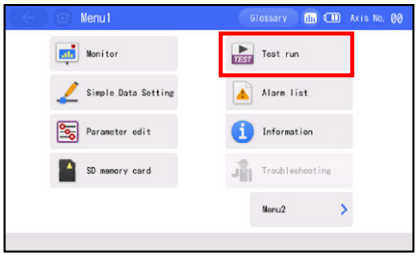
⚠ *Caution: If the controller is not restarted, the parameter that has been rewritten does not translate to the intended action.*
The parameter will become effective once the controller is restarted or power is reconnected.



The controller is restarted, after which the parameter you have set will be reflected.

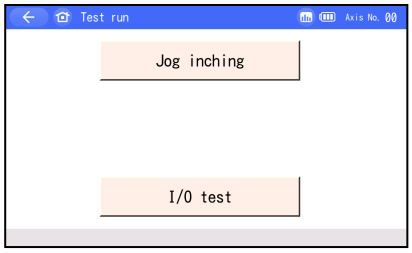
3.9 Test Run

It is available to monitor jog/inching operation, input and output signals and perform compulsory output of the output signal.
Also, it is available to have the output signals switched on/off compulsorily if touching OUT00 to OUT02.



Touch [Test run] on the Menu 1 screen.

Test run menu screen is displayed.



* [Jog inching] button should appear only when an axis available for operation with wireless connection is connected.

Touch either one of [Jog inching] or [I/O test].

(1) Jog inching

Touch [Jog inching] button.

Perform jog/inching operation.
Refer to [3.9.1 Jog Inching Operation] for details about how to operate.

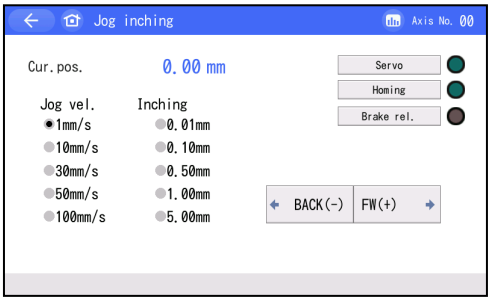
(2) I/O test

Touch [I/O test] button.

Monitoring of the input and output signals and compulsory output of the output signal can be conducted.
Refer to [3.9.2 I/O Test] for details about how to operate.

3.9.1 Jog Inching Operation

JOG and inching operations should be available only when an axis available for operation with wireless connection is connected.



Operation on the Jog inching screen

- Jog vel. / Inching : Select either of 1, 10, 30, 50 or 100mm/s of JOG speed or 0.01, 0.10, 0.50, 1.00, 5.00mm of inching distance, and JOG operation with the selected speed or inching operation with the selected distance can be conducted. The circle (radio button) on the selected one will be marked with a black dot.

- [Servo] : It shows the status of the servo whether it is ON or OFF for the axis. When the servo is ON, display of ○ is activated and it is inactivated when the servo is OFF.

- [Homing] : It shows the status of completion of the home-return operation. When the home-return operation is incomplete, the display of ○ is inactivated. Touch [Homing] and the axis starts home-return operation and the display of ○ gets activated.

- [Brake rel.] : For an actuator equipped with a brake, touch [Brake rel.] and the brake gets compulsorily released and the circle turns on. Touch [Brake rel.] again and the brake works and the circle turns off.

- [BACK (-)], [FW (+)] : When JOG operation is selected, while touching them, the axis moves in the set speed. When inching operation is selected, every time touching them, the axis moves for the set distance. [BACK (-)] performs JOG operation in negative direction. [FW (+)] performs JOG operation in positive direction.

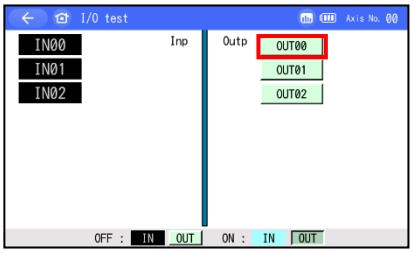
  In inching operation, touch and hold them for two seconds, and JOG operation will be performed in 1mm/sec. The speed increases in every 1 second afterwards.

> ⚠ *Caution: An axis could drop if the brake compulsory release is performed while the servo is off when the axis is installed in the vertical orientation.*

3.9.2 I/O Test

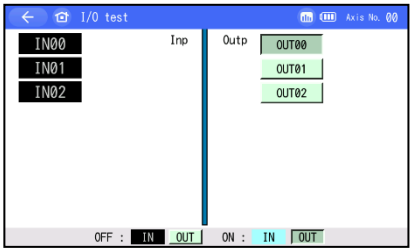
The input signal and the output signal can be monitored.
You can also touch OUT00 to OUT02 to forcibly turn ON/OFF the corresponding output signals.

Touch [I/O Test] in the trial operation menu window to open the I/O test window.



If it is necessary to turn on OUT00 which is currently off, touch [OUT00].

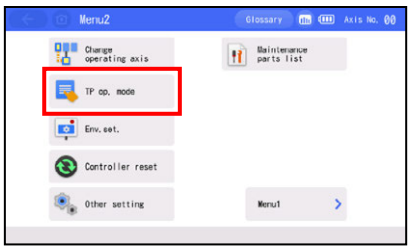
OUT00 turns on.



Touch [OUT00] again and it turns off.

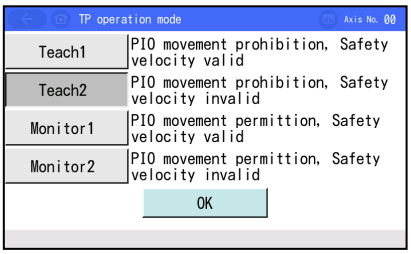
3.10 TP Operation Mode

An operation mode is set if the manual (MANU) mode is selected.



Touch [TP op. mode] on the Menu 2 screen.

The TP operation mode screen appears.



Select and touch [Teach1] or other desired mode.

Select a manual operation mode from the menu containing the following four items:

- Teach1 (PIO movement prohibition / Safety velocity valid)
  PIO movement prohibition : Items and parameters in Simple Data Setting Window should be written in the controller.
  Safety velocity valid : It is not for use in wireless link.

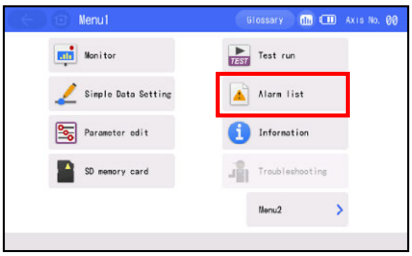
- Teach2 (PIO movement prohibition / Safety velocity invalid)
  PIO movement prohibition : Items and parameters in Simple Data Setting Window should be written in the controller.
  Safety velocity invalid : It is not for use in wireless link.

- Monitor1 (PIO movement permittion / Safety velocity valid)
  PIO movement permittion : Monitoring is only available. It is not available that the items and parameters in Simple Data Setting Window get written in the controller.
  Safety velocity valid : The maximum velocity should be the safety velocity (100m/s) regardless of the velocity command from the PLC.

- Monitor2 (PIO movement permittion / Safety velocity invalid)
  PIO movement permittion : Monitoring is only available. It is not available that the items and parameters in Simple Data Setting Window get written in the controller.
  Safety velocity invalid : You can move the actuator at the velocity (higher than the safety velocity) according to the command from the PLC.

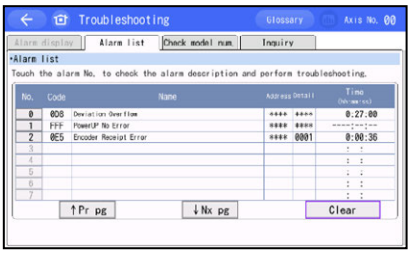
3.11 Alarm List

A list of alarms that may generate after the controller power is turned on is shown.

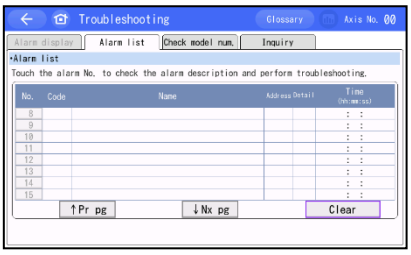


Touch [Alarm list] on the Menu 1 screen.

The controller's alarm list appears.



Touching [↓ Nx pg] displays the list of the next screen.



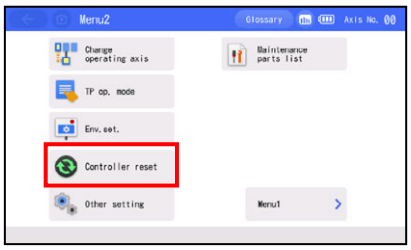
Touching [↑ Pr pg] displays the list of the previous screen.

Touching [Clear] clears all alarm details.

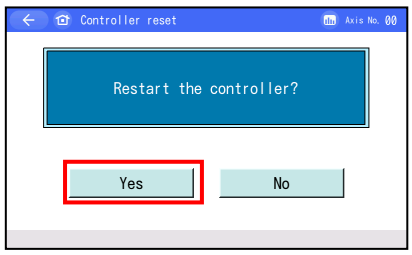
The time of occurrence of each alarm is indicated by an elapsed time from this "FFF PowerUP No Error".

3.12 Controller Reset

The controller is restarted.

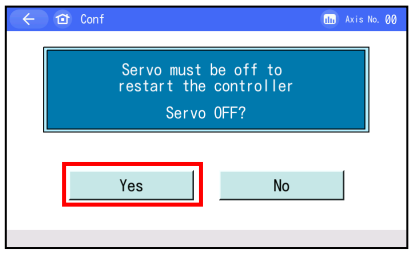


Touch [Controller reset] on the Menu 2 screen.



Touch [Yes].

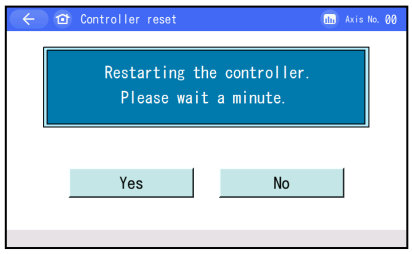
Touch [No] to return to the Menu 2 screen without restarting the controller.



This screen appears if the servo is on.

Touch [Yes].

Touch [No] to return to the Menu 2 screen without restarting the controller.

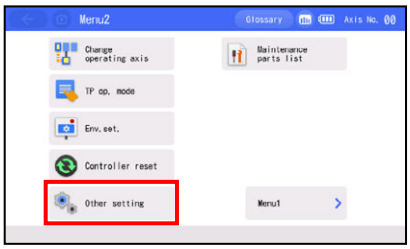


The controller is restarted.

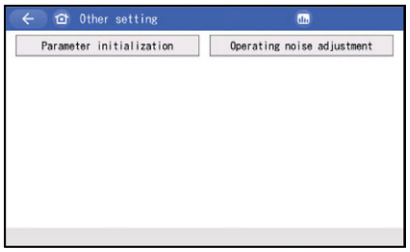
Returns to Menu 1 screen.

3.13 Other Setting

Parameter initialization and operating noise adjustment should be conducted.



Touch [Other setting] in Menu 2 screen.



Other setting screen opens.

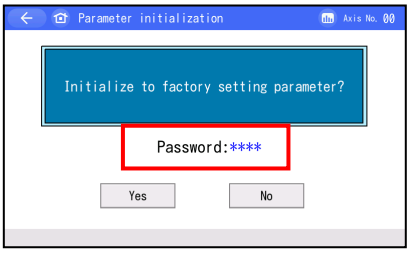
Select one from [Parameter initialization] and [Operating noise adjustment] that you would like to carry on and touch the button.

3.13.1 Parameter Initialization

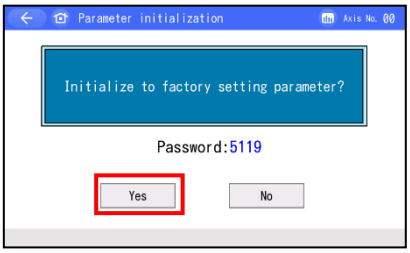
The parameters are reset to their factory default settings (initialized).

> ⚠ *Caution: Once the parameters are initialized (to their factory default settings), all parameters the user has set will return to the values set at the factory. Exercise caution.*

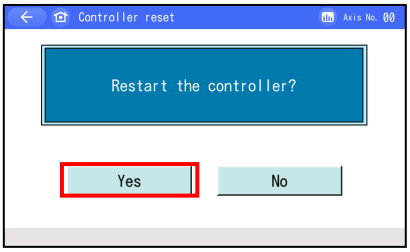
Touch [Parameter initialization] in Other setting screen to display Parameter initialization screen.



Touching [Password] displays the numerical keypad.
Input "5119" and touch [ENT].



Touch [Yes], and the confirmation screen for controller restart appears.



Touch [Yes].

Touch [No], and the controller will not be restarted and the screen returns to the previous.

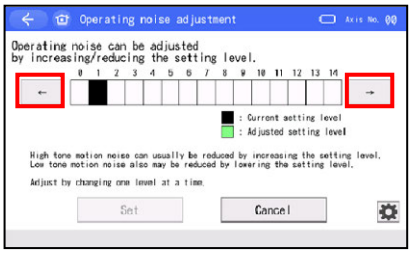
> ⚠ *Caution: If the controller is not restarted, the parameters that have been rewritten to their factory settings do not translate to the factory-set operations.*
> *The factory settings will become effective once the controller is restarted or power is reconnected.*

3.13.2 Operating Noise Adjustment

The operation noise can be tuned.
By having it tuned, possibility of an operation noise error could be reduced.

Touch the [Operating noise adjustment] in the Other Setting window to display the Operating noise adjustment screen.

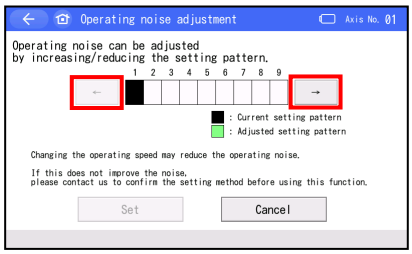
● For models that support level setting



Touch [←] and [→] on the right and left of the levels to adjust the level one by one to perform tuning.

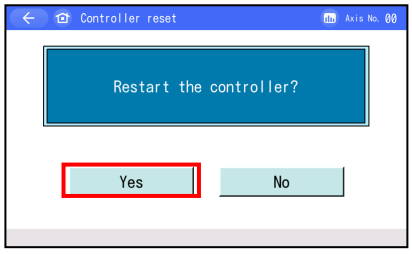
Once the tuning is finished, touch [Set].

● For models that support pattern setting



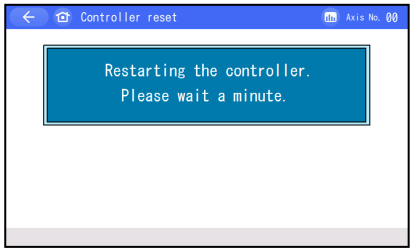
Touch [←] and [→] on the right and left of the pattern to adjust the pattern one by one to perform tuning.

Once the tuning is finished, touch [Set].



Touch [Yes].

Touch [No] and a restart of the controller would not be performed and the screen goes back to the previous screen.

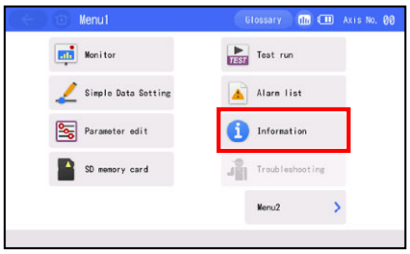


The controller is restarted.

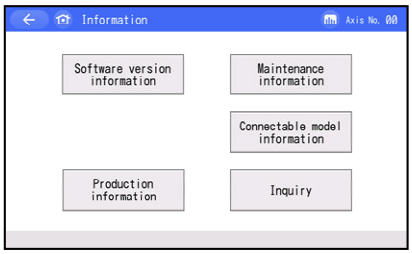
Returns to Menu 1 screen.

3.14 Information Display

Information such as the controller version, prodaction information and maintenance information is displayed.



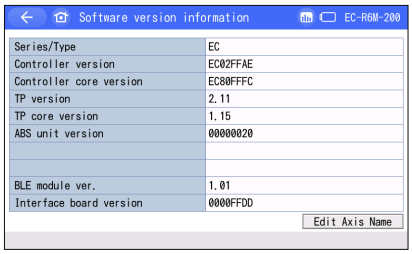
Touch [Information] on the Menu 1 screen.



The information screen appears.

Touch a button of the feature that you would like to display such as [Software version information].

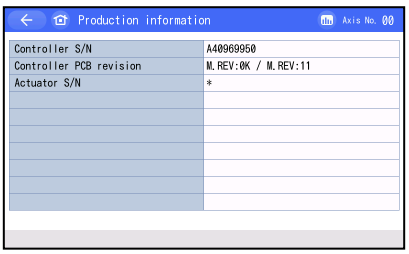
[Software version information]
Touch [Software version information] in Information screen.



Software version information screen opens.

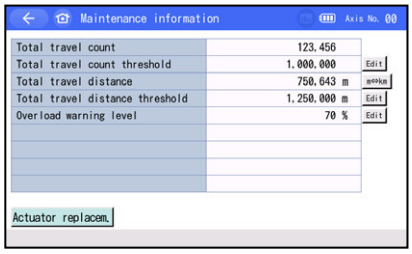
Touch [Edit Axis Name] and the name of axes can be edited. Refer to [3.14.1 Edit Axis Name] for how to edit an axis name.

[Production information]
Touch [Production information] button in Information screen.



Production information screen opens.

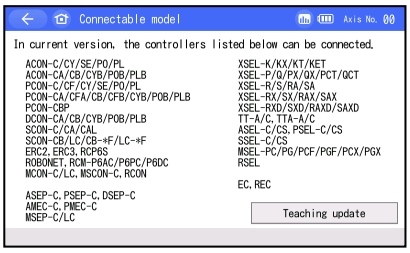
[Maintenance information]
Touch [Maintenance information] in Information screen.



Maintenance information screen opens.

Refer to [3.6.2 Maintenance Information Screen] for how to operate displayed button.

[Connectable model]
Touch [Connectable model information] in Information screen.



Connectable model screen opens.

(Note) In this display, controllers applicable for wired link should also be shown.

Refer to [4.3 Teaching Update] for how to update teaching.

[Inquiry]
Touch [Inquiry] in Information screen.

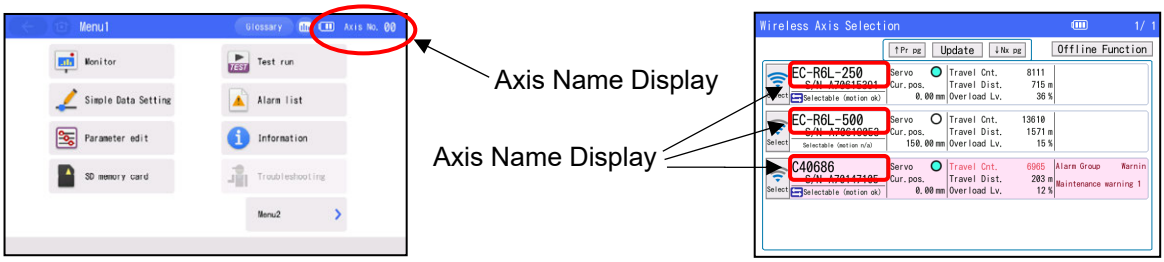
Inquiry screen opens.

3.14.1 Edit Axis Name

A name can be set on an axis. To show the axis name, select Axis Name at the axis name display section in the environment setting screen. [Refer to 3.15 Environment Setting [Axis Name Display]]

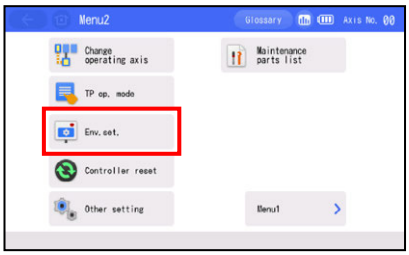
Axis name is shown in the right top of each screen or select wireless axis select.

Display on the right top corner in each window should show the “Axis No. 00” even if Axis Name Display is selected if an axis name has not been set.

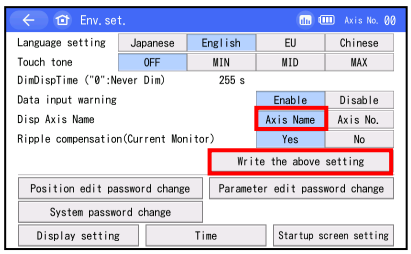


(Note) The available characters for setting in TB-03 are capitalized font English characters (from A to Z) and numbers (from 0 to 9).
For full-size font characters character input, please use PC software.

[Axis Name Edit Operation]

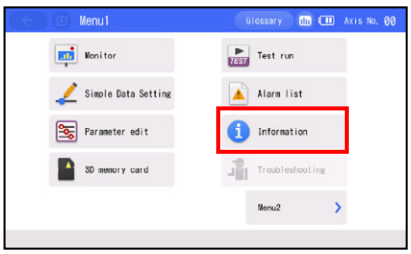


Touch [Env. set.] on the Menu 2 screen.

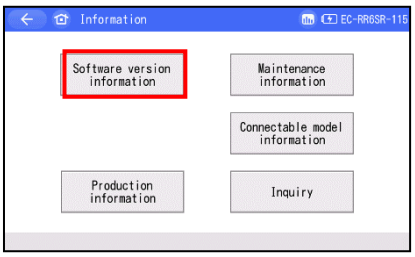


Set to “Axis Name” for the axis name display.

Touch [Write the above setting]. The setting will not be changed when you move to another screen without touching it.

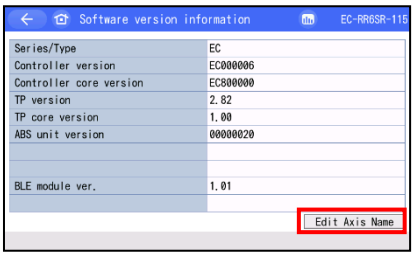


Touch [Information] on the Menu 1 screen.

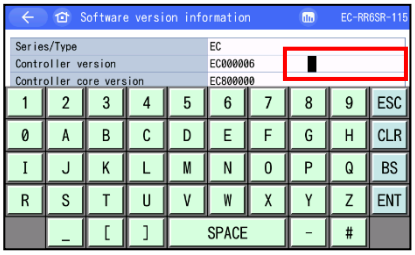


Information screen opens.

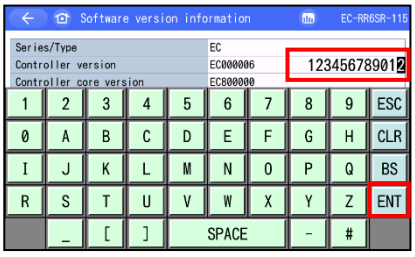
Touch [Software version information].



Touch [Edit Axis Name] in Software version information screen.

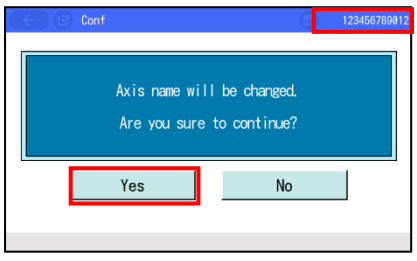


On the right of the Controller version display is the input area. Character select buttons are shown in the half bottom of the screen.



Input a name and touch [ENT].
The number of characters available for input is 12 in half-size font characters.

Touch [ENT] with nothing input, and it is defined as no setting. With no setting, an axis number will be shown.



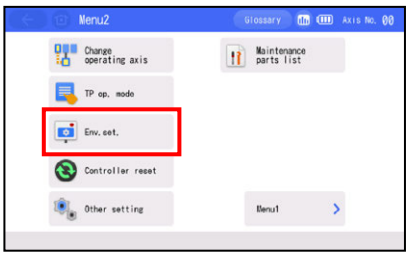
Displayed in the top right is the name of the axis. (Tentative setting condition)

Touch [Yes] to confirm the setting.

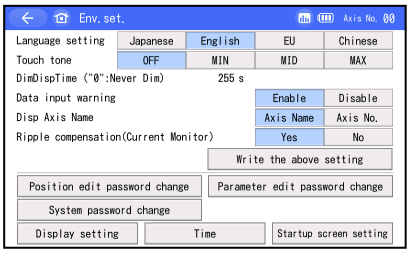
Touch [No] and the condition goes back to before setting.

3.15 Environment Setting

You can change the language setting, touch tone setting, dim display time setting, data input warning setting, axis name display setting, ripple compensation, position editing password change / Prs Program edit password change, parameter edit password change, system password change, display setting, time setting and Startup screen setting.

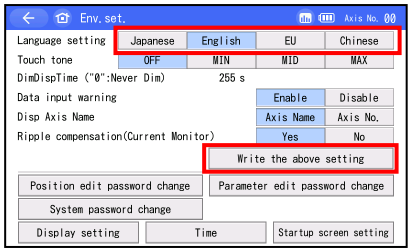


Touch [Env. set.] on the Menu 2 screen.



The environment setting screen appears.

[Language setting]
Select a language to show from Japanese/English/EU/Chinese.

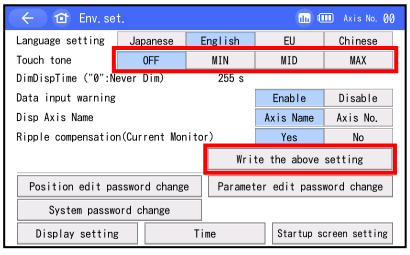


Touch a language (such as [Japanese]) to show.

Touch [Write the above setting]. The setting will not be changed when you move to another screen without touching it.

For the operation procedures in detail to change the language, refer to 3.1 [Display Language Change].

[Touch tone]
You can select whether or not to output a touch tone.

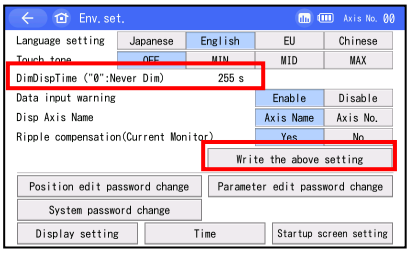


Touch [OFF]. A touch tone is not output.

Touch [MAX], [MID] or [MIN]. A touch tone is output.

Touch [Write the above setting]. The setting will not be changed when you move to another screen without touching it.

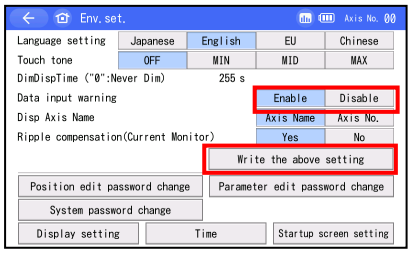
[DimDispTime]
Set the dim display time when not being operated.
Zero seconds mean the display is on all the time.



Touching [DimDispTime ("0": Never Dim) 0 sec] displays the numerical keypad.
Enter a desired time and touch [ENT].
You can set a value between 0 to 255 seconds.

Touch [Write the above setting]. The setting will not be changed when you move to another screen without touching it.

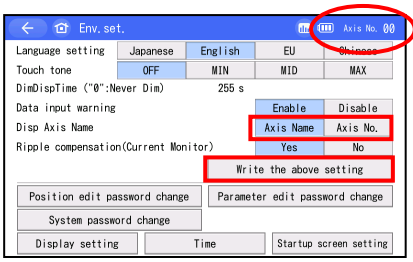
[Data input warning]
The warning can be output when a value less than the minimum speed and a value exceeding the rated acceleration/deceleration speed are entered in the position data. Note that the value is entered even if the warning occurs. Always use within the specification of the actuator.



Touch [Enable] to give the warning.
Touch [Disable] not to give the warning.

Select either Enable or Disable,
and then touch [Write the above setting]. The setting will not be changed when you move to another screen without touching it.

[Axis Name Display]
Make a selection whether to show the name or number for axis display.



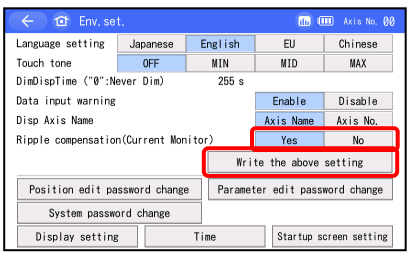
Axis Name Display

Touch [Axis Name] and the name will be shown.
Touch [Axis No.] and the number will be shown.

Select either Axis Name or Axis No, and touch [Write the above setting]. The setting will not be changed when you move to another screen without touching it.

The axis name can be set in Software version information screen.
[Refer to 3.14.1 Axis Name Edit]

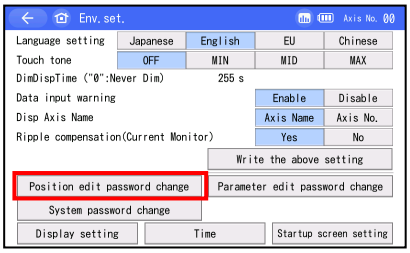
[Ripple Compensation]
Setting should be established to select whether to have ripple compensation or not to have it in the monitor screen as the initial setting.



Touch [Yes] and the setting should be established with ripple compensation.
Touch [No] and the setting should be established without ripple compensation.

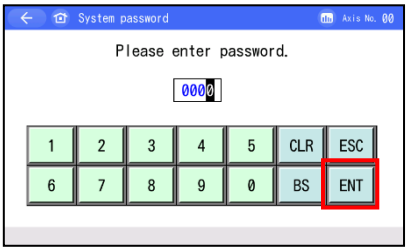
Select either yes or no and touch [Write the above setting]. The setting will not be changed when you move to another screen without touching it.

[Position Edit Password Chenge]
Change the position edit password.



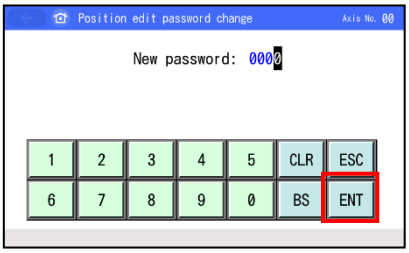
Touch [Position edit password change].

If the system password is not “0000”, the password entry screen appears.



Input a system password.
Touch [ENT].

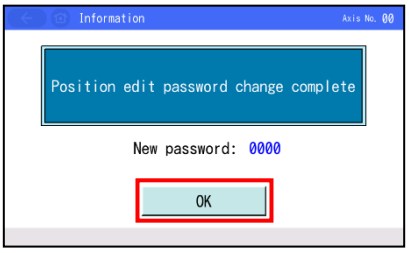
> The default system password is “5119”.
> For how to change the system password, refer to [System Password Change] as described later.



Enter the new position edit password to change to.
If the position edit password is not set, enter “0000”.

Touch [ENT].

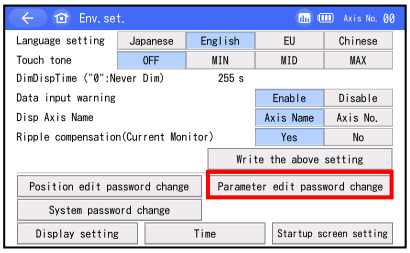
Touch [Change].



The new password after change will be displayed. Make sure it shows the same as the password you have set.

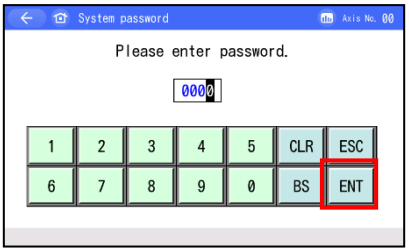
Touch [OK].

[Parameter Edit Password Change]
Change the parameter edit password.



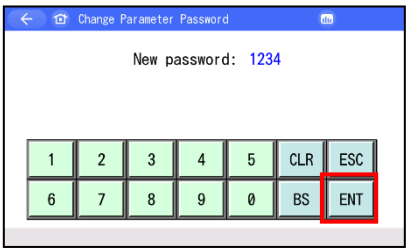
Touch [Parameter edit password change].

If the system password is not “0000”, the password entry screen appears.



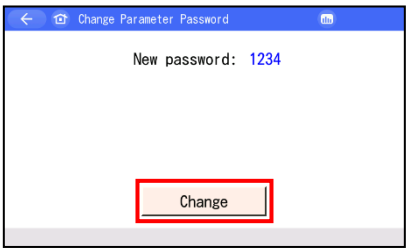
Input a system password.
Touch [ENT].

> The default system password is “5119”.
> For how to change the system password, refer to [System Password Change] in the next page.

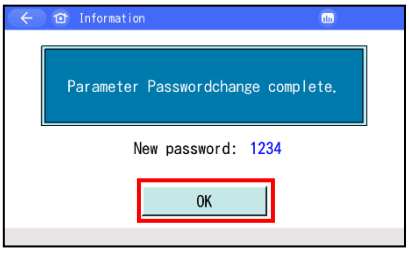


Enter the new parameter edit password to change to.
If the parameter edit password is not set, enter “0000”.

Touch [ENT].



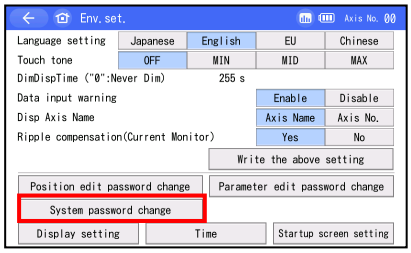
Touch [Change].



The new password after change will be displayed. Make sure it shows the same as the password you have set.

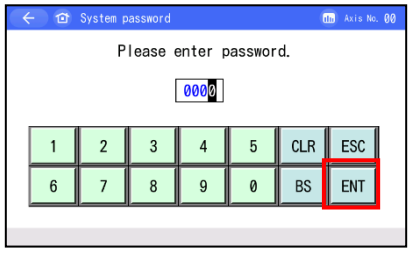
Touch [OK].

[System Password Change]
Change the system password.



Touch [System password change].

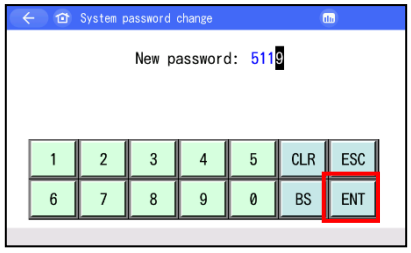
If the system password is not “0000”, the password entry screen appears.



Input the system password that is currently set.

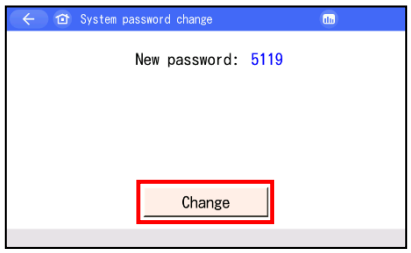
Touch [ENT].

The default system password is “5119”.

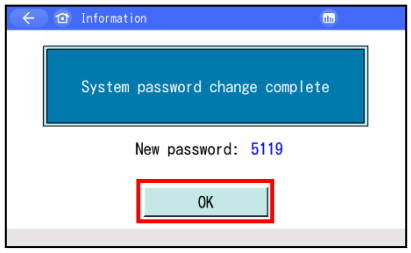


Enter the new system password to change to.
If you do not set the system password, enter “0000”.

Touch [ENT].



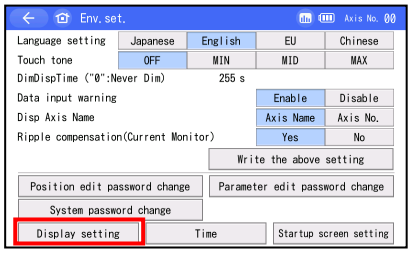
Touch [Change].



The new password after change will be displayed. Make sure it shows the same as the password you have set.

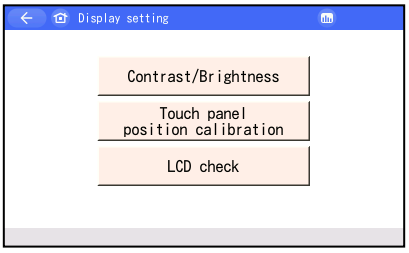
Touch [OK].

[Display setting]
Adjustment of contrast and brightness of the screen, position tuning for touch panel and LCD screen check can be performed.



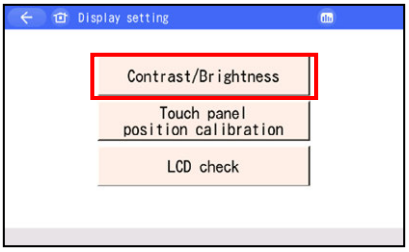
Touch [Display setting].

Display setting menu screen is displayed.

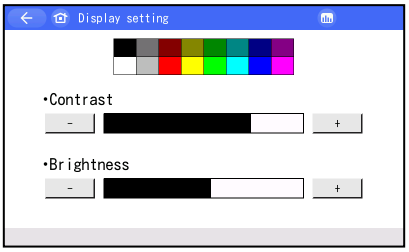


Select Display setting menu.

● Change the Contrast / Brightness
You can adjust contrast (shading of liquid crystal) and brightness (of liquid crystal).



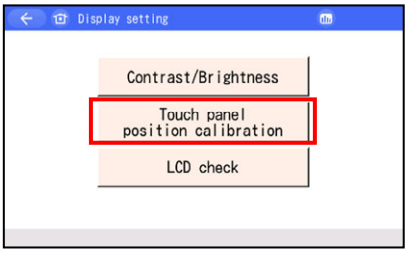
Touch [Contrast/Brightness].



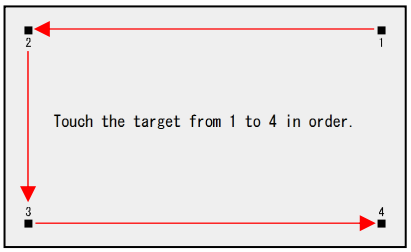
Contrast adjustment
Touch [–] and [+] under Contrast to adjust the contrast of the screen.

Brightness adjustment
Touch [–] and [+] under Brightness to adjust the brightness of the screen.

● Touch panel position calibration
A calibration for the position detection of the touch panel is performed.



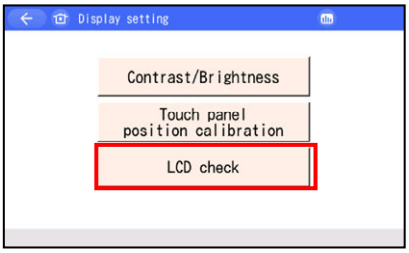
Touch [Touch panel position calibration].



Touch [■] in the order of 1, 2, 3 and 4.

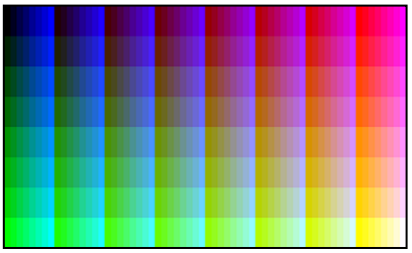
The display returns to Display setting menu screen.

● LCD Check
LCD display can be checked in the order of color pattern, white only and black only.



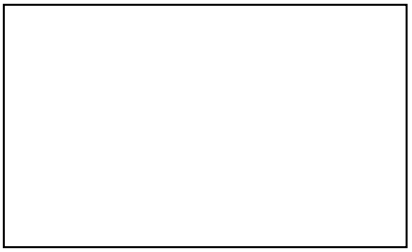
Touch [LCD check].

Color Pattern is displayed.



Touch any point on the screen.

White Only is displayed.



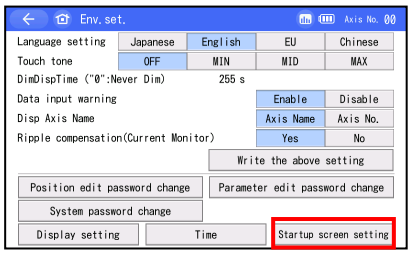
Touch any point on the screen.

Black Only is displayed.

Touch any point on the screen.

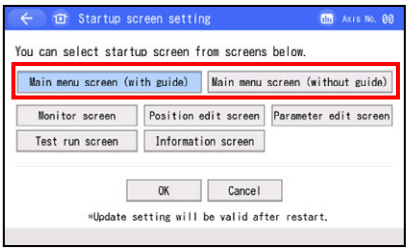
The display returns to Display setting menu screen.

[Startup screen setting]
Setting can be established for the window shown in the screen first after the power is turned on.

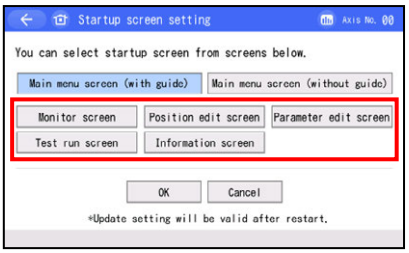


Touch [Startup screen setting].

1) Guide Icon Display Select
This button is not to be used for ELECYLINDER.



2) Initial Screen Select at Startup



Select a screen from those below for the screen shown first after the power is turned on.
[Monitor screen]
[Position edit screen] (Note 1)
[Parameter edit screen]
[Test run screen]
[Information screen]

Touch either one to select and touch [OK].

Note 1 Select [Position edit screen], and Simple Data Setting Screen should be displayed at the startup.

3.16 Data Backup

Data is transferred between the SD card in the teaching pendant and the controller (ELECYLINDER).

(Note) Type of Stored Data
This includes the position data, parameters and alarm list.
It is not applicable to the backup data storable in the RC PC software.

(Note) Extensions of the Stored Data
- *The file extensions of the data stored to the SD card are the same as those dealt in RC PC software, and are compatible. The position data is ptec and the parameters are prec.*
  [Refer to the details of the file extensions in the RC PC Software Instruction Manual]
- *The alarm list can only have the backup. It cannot be restored. Data is in a CSV file.*

(Note) Directories of the Stored Data
The folders to store the backup data of the controller and the folder to read the data from when restoring the data to the controller are as listed below. The directories to store the files cannot be changed. The files existing in other directories other than the specified folders cannot be listed up in the file name list in the file select at the initial setting or restore.
If the folder does not exist, it is automatically created.
- *Position Data: \TB_CON\Position\File Name*
- *Parameter : \TB_CON\Parameter\File Name*
- *Alarm List : \TB_CON\Alarmlist\File Name*

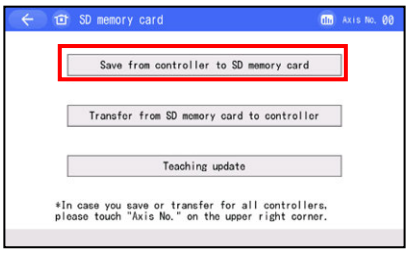
(Note) Files with Chinese names are not supported.

> ⚠ *Caution: For a SD memory card, choose a SD/SDHC memory card with 1G to 32G. (Toshiba-made recommended) Also, use FAT32 Format for the file system.*

3.16.1 Data Backup of the Controller

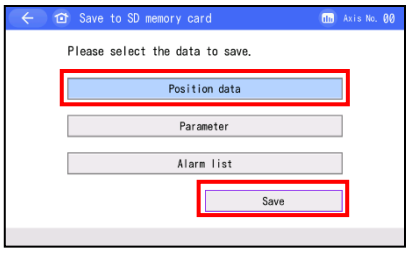
The data in the controller is transferred to the SD memory card for backup.

Touch [SD memory card] in Menu 1 screen.



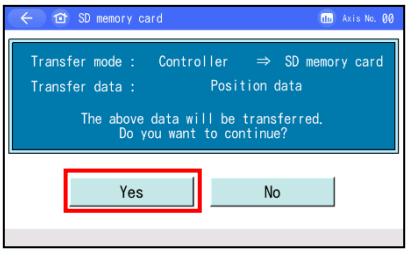
SD memory card screen opens.

Touch [Save from controller to SD memory card].



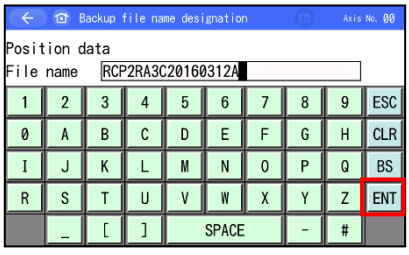
Select the data type for the backup such as [Position data] and touch it.
The data type been selected will be shown in light blue.

Touch [Save].



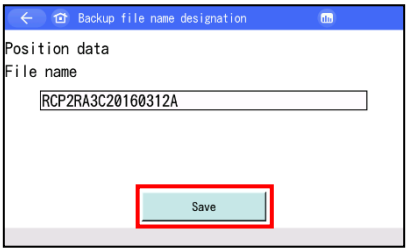
Touch [Yes].

Touch [No], and the screen returns to the previous screen.

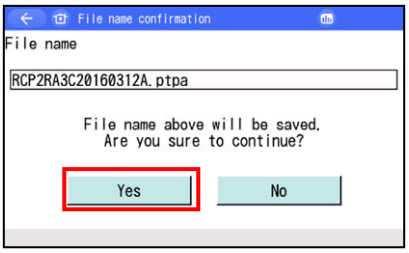


Numeric keys are displayed. Input a file name and touch [ENT].

The file name is to be typed with 32 characters at maximum in letters and numbers.



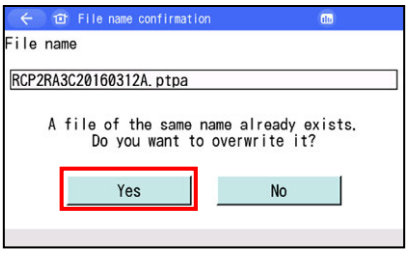
Touch [Save].



The screen below appears if the same name is not found.

Touch [Yes].

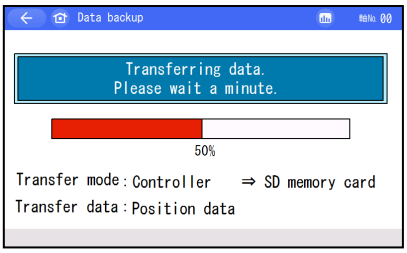
If [No] is touched, the screen goes back to the previous one to indicate the backup file name in which the numeric keys were shown.



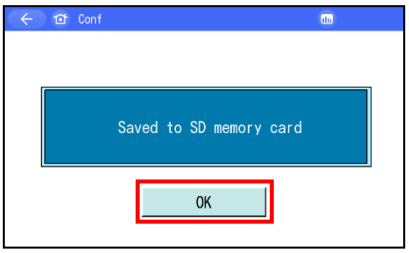
The screen below appears if the same name is found.

Touch [Yes].

If [No] is touched, the screen goes back to the previous one to indicate the backup file name in which the numeric keys were shown.



Transferring data screen will be shown.

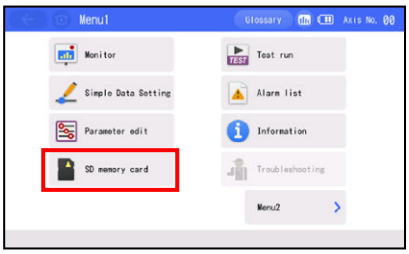


A message to tell the data transfer is complete pops up and the backup process is finished.

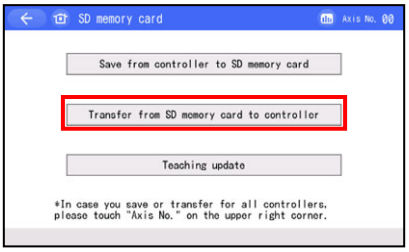
Touch [OK], and the screen returns to SD memory card screen.

3.16.2 Restore to Controller

Data in the SD memory card is transferred to the controller.

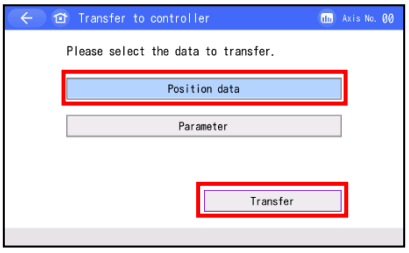


Touch [SD memory card] in Menu 1 screen.



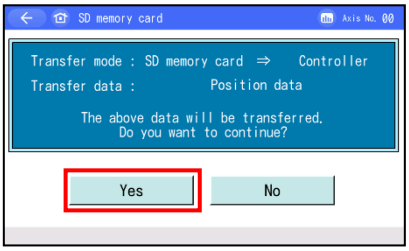
SD memory card screen opens.

Touch [Transfer from SD memory card to controller].



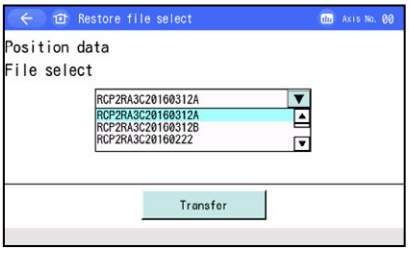
Select the data type to transfer to the controller, such as [Position data], and touch it.
The data type been selected will be shown in light blue.

Touch [Transfer].

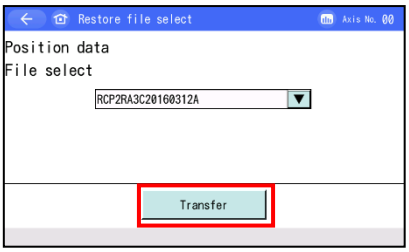


Touch [Yes].

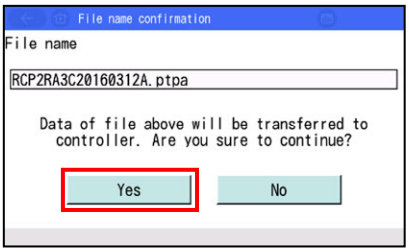
If [No] is touched, the screen goes back to the data backup screen.



Touch ▲ and ▼ to select a file to transfer to the controller from the list of the backed up file names.

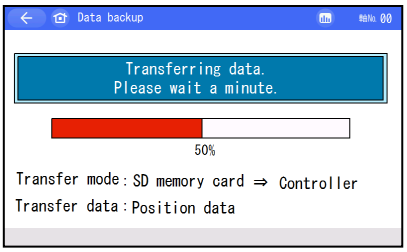


Touch [Transfer].



Touch [Yes].

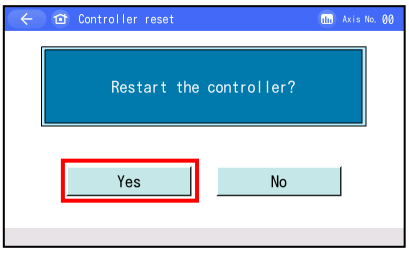
If [No] is touched, the screen goes back to the previous one for the restore file select.



Transferring data screen will be shown.

A message to tell the data transfer is complete pops up and the data transfer process to the controller is finished.

Touch [OK].



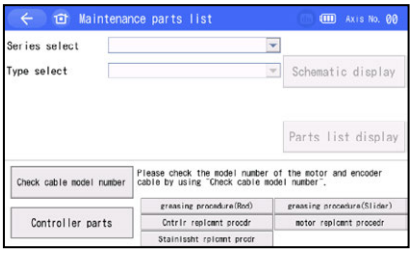
Touch [Yes] to execute restart.

(Note) The controller reboot screen will not appear if there is no difference between the data in the controller and the data that was read out.

3.17 Maintenance Parts List

Information of maintenance components is displayed.

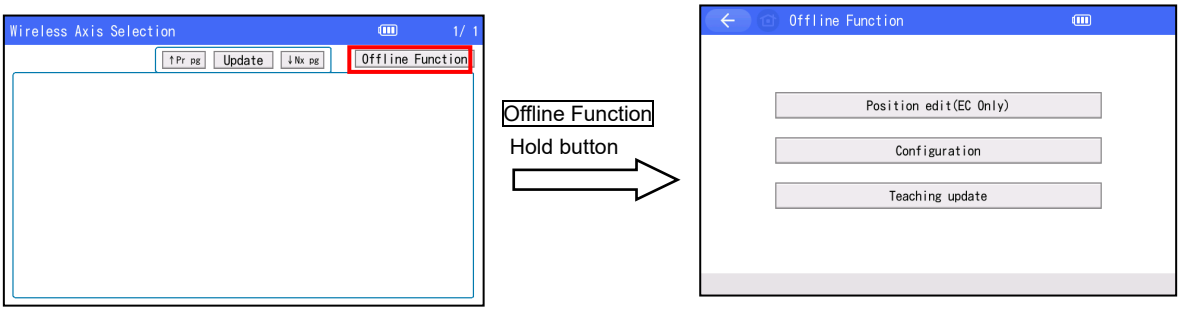
Touch [Maintenance parts list] in Menu 2 screen.



Maintenance parts list screen opens.

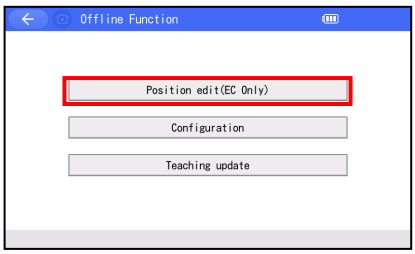
4. Offline Function

In case there is no actuator connected (offline), position edit, Cofiguration and teaching update should be available for the existing data in ELECYLINDER.



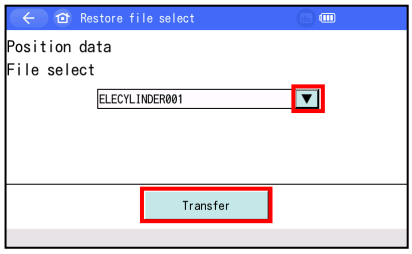
4.1 Position Edit (EC Only)

After reading out the existing data in ELECYLINDER and edit positions, data can be saved in a Secure Digital memory card. Creating new data is not available.



Touch [Position edit (EC only)].

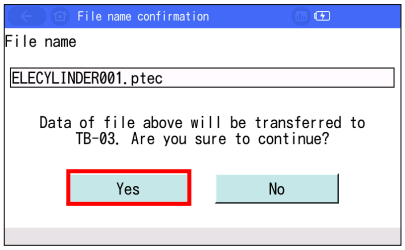
Restore file select window appears.



Touch the pulldown button and select a file to read out.

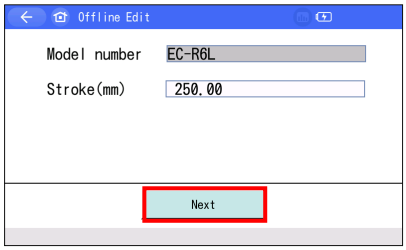
Touch [Transfer].

File name confirmation window appears.



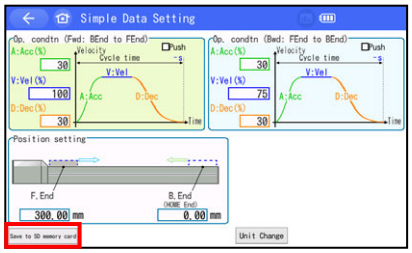
The selected file name should be displayed.

Confirm this file is the right one, and touch [Yes].



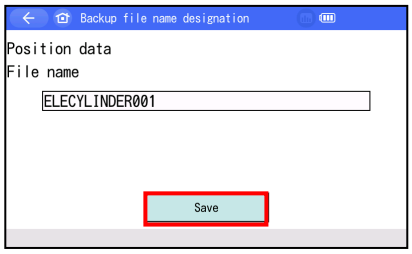
Confirm the Model number and input Stroke, and touch [Next].

Simple Data Setting window shows up.



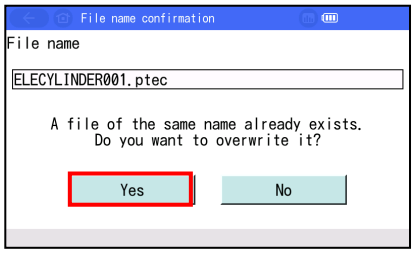
Edit the data, and touch [Save to SD memory card].

Backup File Name Indication Screen appears.



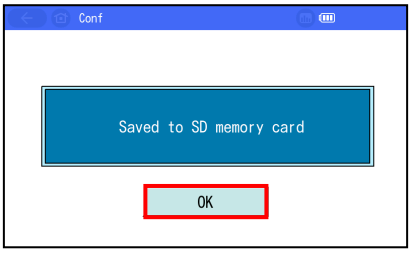
Input a file name that you would like to save.

Touch [Save].

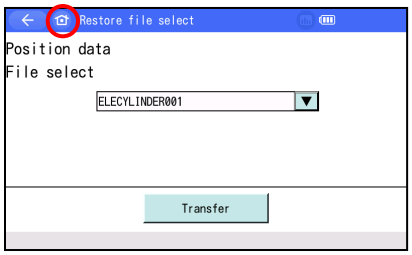


If there is the same name already existed, the overwriting confirmation screen should pop up.

Touch [Yes] if you accept to overwrite.



A screen stating saving complete should show up. Touch [OK].



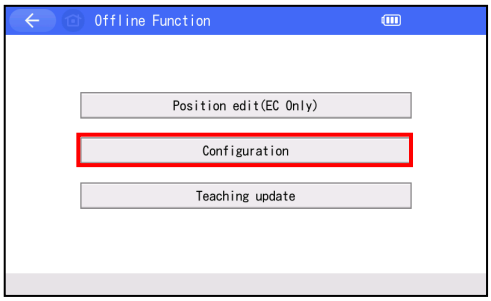
The display goes back to Restore file select screen.

Touch the home button on the top of the screen if you require to go back to Wireless Axes Select Screen.

4.2 Configuration

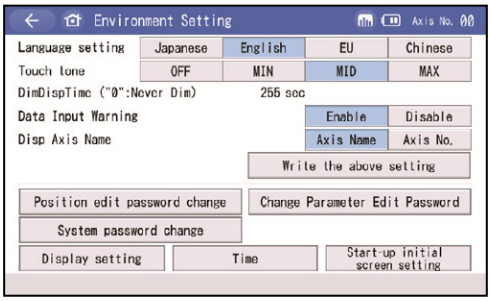
Environment setting should be conducted here for the teaching pendant.
How to operate the window should follow [3.15 Environment Setting].

[3.15 Refer to Environment Setting]



Touch [Configuration].

Environment Setting window shows up.

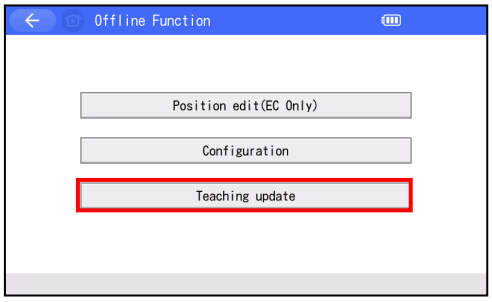


Refer to [3.15 Environment Setting] to establish settings for each item.

4.3 Teaching Update

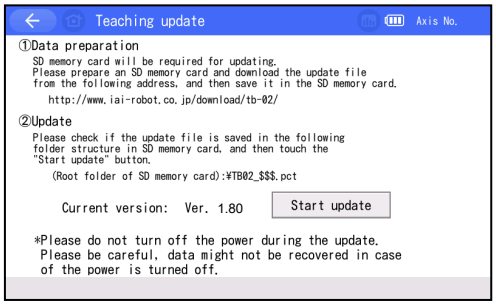
Software update should be conducted here for the teaching pendant.
How to operate the window should follow [6.2 Teaching Update].

[6.2.2 Refer to How to Update when Offline]



Touch [Teaching update].

Teaching update Window shows up.

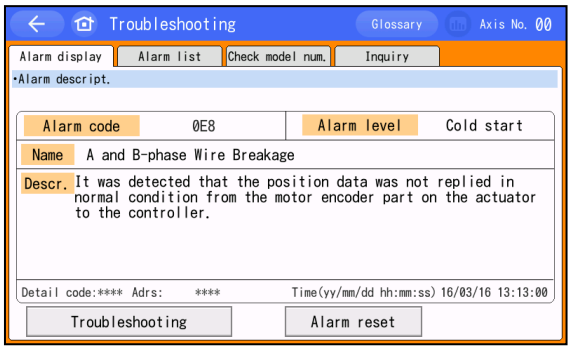


Refer to [6.2.2 How to Update when Offline] to perform updating.

5. Error Display

5.1 Occurrence of Alarm

If an alarm occurs, the alarm screen appears.



5.1.1 Alarms Detected by Controller

Alarms of codes 000 to 0FF are those detected by the controller.
These alarms include major alarms relating to the servo control system, power system, etc. For details on these alarms, refer to the instruction manual for your controller.

If an alarm occurs, remove the cause of each alarm and then perform the following operation.

- To reset operation -cancellation level alarms, touch [Alarm reset] on the alarm screen.
- To reset cold-start level alarms, reconnect the control power.

5.1.2 Messages Which Occur when Operating the Teaching Pendant

Codes from 100 to 3FF are messages which occur when operating the teaching pendant.

- 100 to 1FF: Message level (input errors, guide messages)
- 200 to 2FF: Operation cancellation level (errors having a disadvantage for operation)
- 300 to 3FF: Cold-start level (which requires re-power-on or reconnection)

The following table shows the list and countermeasures.

Code	Message	Contents, occurring cases, and countermeasures
112	Input data error	An inadequate value was entered in the parameter setting. Retype a proper value with reference to the actuator specification and the parameter list.
113	Data too small	The input value is smaller than the setting range. Retype a proper value with reference to the actuator specification and the parameter list.
114	Data too large	The input value is bigger than the setting range. Retype a proper value with reference to the actuator specification and the parameter list.
117	No position data	The target position is not set to the selected position number. In first, enter a target position.
123	Password error	The input value of the system password, position editing password, or position data edit password does not match the setting value. Retype the correct password.

Code	Message	Contents, occurring cases, and countermeasures
132	Detect Undefined Controller	An unsupported controller was recognized. Follow the process in [6.2 Teaching Update] to have you controller updated to the applicable version or later. Refer to [Supported Models] for the applicable version.
160	SDcard open error	File cannot open. Example: Backup was performed without SD card inserted.
161	SDcard write error	SD card cannot be written. Example: Backup was performed under the following conditions. ・Free space of the SD card is insufficient. ・SD card write-protect switch is engaged. ・File is set to the write prohibit property in overwriting. ・An unsupported SD card is inserted.
162	SDcard read error	SD card cannot be read. Example: If a SD card is not inserted or files cannot be read, at the time of restoring.
164	SDcard file format error	File format is not matched. Example: If the content of the file which will be restored are different from the file format defined by data types.
181	Controller init complete	Messages to confirm the operation (It is not to say any operation mistake or abnormal occurrence)
184	Data transfer completed	
186	Time setting completed	
187	Brownout of RTC backup battery	Voltage of the battery inside the teaching pendant is reduced. *(Note)* *Settings for time, languages, and touch operation sound are initialized.* *Consult us about replacing the battery.*
188	Input warning of below Min. Vel	The velocity, which is less than the "minimum velocity" that depends on the lead and encoder pulses, was entered in the "velocity" of position data. The message is displayed, but entering data is possible. Retype a proper value after the confirmation of the specification, because the movement in less than the minimum velocity may cause abnormal noise and vibration.

Code	Message	Contents, occurring cases, and countermeasures
189	Input warning of over ratings ACC/DCL	An acceleration/deceleration speed, which exceeds the "rated acceleration/deceleration speed" of the actuator connected, was entered in the "acceleration/deceleration speed" of the position data. The message is displayed, but entering data is possible. Retype a proper value after the confirmation of the specification, because the movement in the excess high acceleration/deceleration speed may lead to actuator failures.
18B	Battery not connected	• It is a condition that a battery cannot be detected or no battery connected. • Battery drive is not available. Operation should be available if connected to an AC adapter.
18C	Battery Error	• The battery cannot be charged in quick charging (connected to an AC adapter). • It can be concerned the malfunction of the battery. • Battery drive is not available. Operation should be available if connected to an AC adapter or CTL.
18D	Battery Power Drop Warning	• It occurs when the battery voltage gets below the warning output threshold voltage (3.27V). * Operation can be continued till the voltage reaches 3.1V. The power should be turned off when it goes below 3.1V. • It is necessary to connect an AC adapter and charge the battery.
20A	Servo OFF while moving	1) Movement operation was performed with the servo OFF. 2) Since the servo ON signal (SON) from PLC was turned OFF during the movement operation, the servo was turned OFF and the movement operation became impossible. Turn the servo ON before the operation.

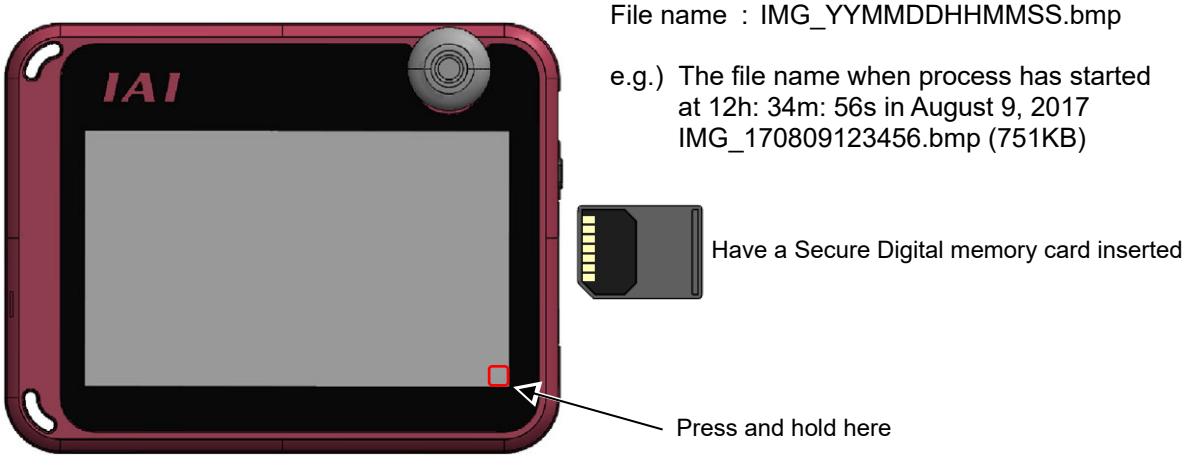
Code	Message	Contents, occurring cases, and countermeasures
301	Overrun error	Abnormality occurred on the serial communication with the controller 1) The controller connection cable may be open. Check the connection cable for wrong wiring or wire breakage. 2) The controller connection cable connector may be inserted improperly. Securely insert the connection cable connector. 3) Garbled data could occur due to the influence of noise. Review the wiring run, installation, etc. so that the noise does not influence them. 4) In the control of multiple units with the serial communication, the slave station number could be duplicated. Change the number so that the slave station number is not duplicated. If still having trouble, consult us.
302	Framing error	
303	Parity error	
304	SCI Recieve-Que overflow	
305	SCI Send-Que overflow	
306	Recieve-Buffer overflow	
308	Response time out	
30A	Packet Recieve-Que overflow	
30B	Packet Send-Que overflow	
30C	Not connected	The axis number of the controller cannot be recognized. 1) The controller may not be functioning properly. Check that the RDY lamp of the controller is lighted. If the lamp is not lighted, the controller is broken down. 2) The communication lines (SGA/SGB) of the provided cable could break. Replace to a spare teaching pendant or replace with a PC to see if the problem solves. 3) If a SIO converter is used, the link cable could not be connected, though the power, 24 V, is supplied to the converter. Supply the power after connecting the link cable between the converter and the controller. If still having trouble, consult us.
30D	Recieve exept responce	The abnormal response was returned from the controller. (This may be a temporary abnormality caused by noise, etc.) If the condition occurs frequently, check the cables, noise elimination measures taken on the power supply, etc.

Code	Message	Contents, occurring cases, and countermeasures
330	Wire-Linked in Wireless Communication	• It occurs on the teaching pendant in wireless communication when an ELECYLINDER in wireless communication gets connected with wire to another tool. (It is because wired communication should be prioritized.) • The display switches from Troubleshooting Window to Wireless Axes Select Window.
331	Wireless Communication Response Timeout Error	• It occurs when an error occurred in communication between a teaching pendant and an ELECYLINDER while in wireless communication. • The display switches from Troubleshooting Window to Wireless Axes Select Window.

6. Appendix

6.1 Screenshot

The capture of the displayed screen (screenshot) can be saved in the Secure Digital memory card.
When capturing a screenshot, press and hold on the right bottom of the screen for approximately two seconds while a Secure Digital memory card is inserted.
After making a “pip” sound, screenshot saving process starts. (The sound will not be made if the touch operation sound is set off.) The saved file name will be displayed on the screen for three seconds when the saving is complete.



Domain to Save Data (cannot be changed)
The domain that the screenshot data is saved is the folder stated below in a Secure Digital memory card.
\TB_CON\ScreenShot\

[Caution]
1. *The saving process takes approximately 10 seconds at the maximum.*
2. *During the saving process, the monitor display (such as the current position) on the screen does not get updated.*
3. *There are some windows that you cannot get screenshots.*

> ⚠ *Warning: As keys do not work on the screen during saving process, **emergency stop will not work by keys**. Do not attempt to use this feature when an actuator is operated (continuous movement, simple program, etc.) from the teaching.*

6.2 Teaching Update

The software in TB-03 can be updated using a Secure Digital memory card.
(Note) In this update, not only the software applicable for the connected controller, but also the software for CON/SEP/MEC/SEL and ELECYLINDER gets updated.
Update takes approximately 20 minutes.

◆ Preparation

The same updating file as TB-02 should be used for TB-03.

Preparation 1 Prepare a SD memory card or a SD High-Capacity memory card with 1GB to 32GB formatted in FAT32 (hereafter described as a SD memory card).

Preparation 2 Access homepage http://www.iai-robot.co.jp/download/tb-02/ and download the TB-02/03 update file TB-02_$$$.zip and unzip it. ($$$ should be replaced by the version number in three digits.)

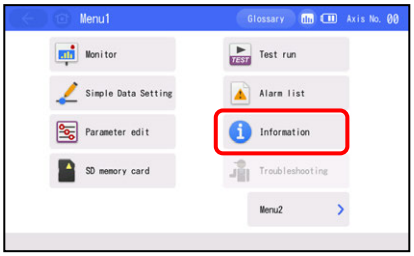
Preparation 3 Copy the unzipped update file TB-02_$$$.pct to the root folder of the SD memory card. ($$$ should be replaced by the version number in three digits.)
(Note) Update cannot be conducted if there are two or more update files in the root folder.

Preparation 4 Take the SD memory card cover off, and insert a SD memory card while the power to TB-03 is off. [Refer to 1.4, “How to Set in/out SD Memory Card”]

Preparation 5 Press the power switch on the right side of TB-03 to turn on TB-03.

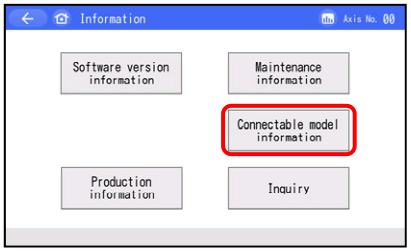
6.2.1 How to Update when ELECYLINDER Wireless Link

[Step 1] Perform from Preparation 1 to Preparation 5.



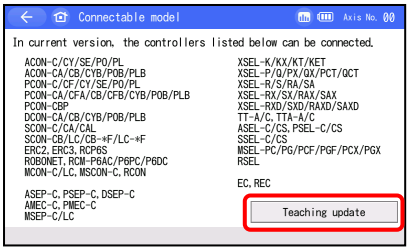
[Step 2]

Touch [Information] in Menu 1 screen.



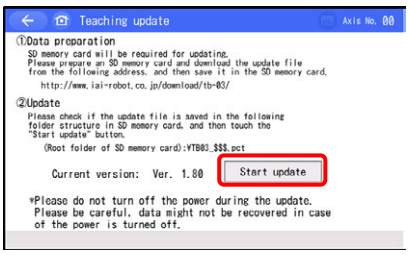
[Step 3]

Touch [Connectable model information].



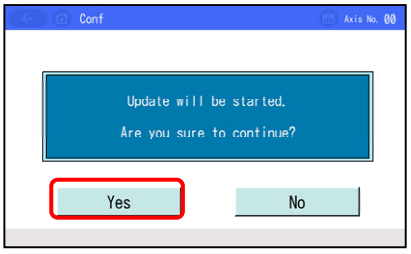
[Step 4]

Touch [Teaching update].



[Step 5]

Touch [Start update].



[Step 6]

The updating confirmation screen shows up.

Touch [Yes].

[Step 7]

Start updating.

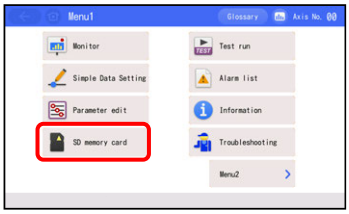
Touch the screen after you confirm the following messages;
“Program Update is All Done !!!”
“Touch the screen and this will be rebooted automatically.”

* There may be a case with the screen window reversed in white and black depending on the version of the software.

TB-03 will start up in the new version.

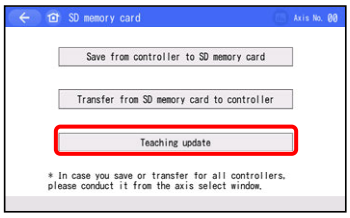
⚠ *Caution: Do not attempt to turn off the power to TB-03 while in updating.*

It is also available to perform by touching [SD memory card] → [Teaching update] in Menu 1 window.



[Step 1] Perform from Preparation 1 to Preparation 5.

[Step 2] Touch [SD memory card] in Menu 1 screen.

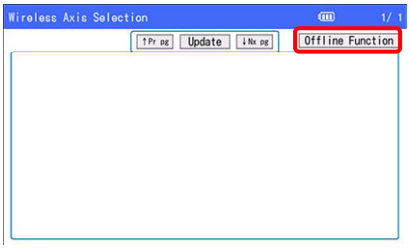


[Step 3] Touch [Teaching update].

[Step 4] Perform “Step 5” and after shown above.

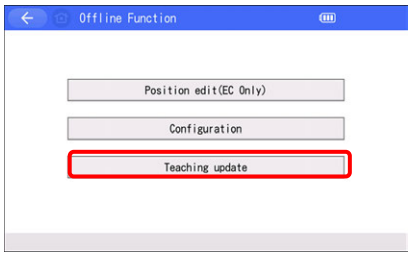
6.2.2 How to Update when Offline

[Step 1] Perform from Preparation 1 to Preparation 5.



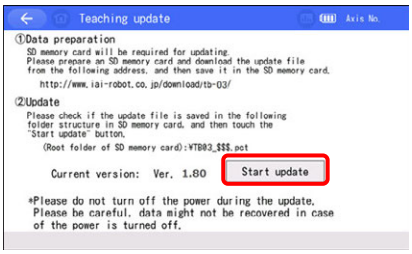
[Step 2]

Touch [Offline Function] in Wireless Axis Selecion screen.



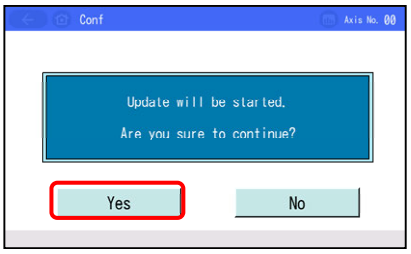
[Step 3]

Touch [Teaching update].



[Step 4]

Touch [Start update].



[Step 5]

The updating confirmation screen shows up.

Touch [Yes].

[Step 6]

Start updating.

Touch the screen after you confirm the following messages;
“Program Update is All Done !!!”
“Touch the screen and this will be rebooted automatically.”

TB-03 will start up in the new version.

⚠ *Caution: Do not attempt to turn off the power to TB-03 while in updating.*

7. Warranty

7.1 Warranty Period

One of the following periods, whichever is shorter:
- 18 months after shipment from our company
- 12 months after delivery to the specified location

7.2 Scope of Warranty

Our products are covered by warranty when all of the following conditions are met. Faulty products covered by warranty will be replaced or repaired free of charge:

(1) The breakdown or problem in question pertains to our product as delivered by us or our authorized dealer.

(2) The breakdown or problem in question occurred during the warranty period.

(3) The breakdown or problem in question occurred while the product was in use for an appropriate purpose under the conditions and environment of use specified in the Instruction Manual and catalog.

(4) The breakdown or problem in question was caused by a specification defect or problem, or by a quality issue with our product.

Note that breakdowns due to any of the following reasons are excluded from the scope of warranty:
- Anything other than our product
- Modification or repair performed by a party other than us (unless we have approved such modification or repair)
- Anything that could not be easily predicted with the level of science and technology available at the time of shipment from our company
- A natural disaster, man-made disaster, incident or accident for which we are not liable
- Natural fading of paint or other symptoms of aging
- Wear, depletion or other expected result of use
- Operation noise, vibration or other subjective sensation not affecting function or maintenance

Note that the warranty only covers our product as delivered and that any secondary loss arising from a breakdown of our product is excluded from the scope of warranty.

7.3 Honoring the Warranty

As a rule, the product must be brought to us for repair under warranty.

7.4 Limited Liability

(1) We shall assume no liability for any special damage, consequential loss or passive loss such as a loss of expected profit arising from or in connection with our product.
(2) We shall not be liable for any program or control method created by the customer to operate our product or for the result of such program or control method.

7.5 Conditions of Conformance with Applicable Standards/Regulations, Etc., and Applications

(1) If our product is combined with another product or any system, device, etc., used by the customer, the customer must first check the applicable standards, regulations and/or rules. The customer is also responsible for confirming that such combination with our product conforms to the applicable standards, etc. In such a case we will not be liable for the conformance of our product with the applicable standards, etc.

(2) Our product is for general industrial use. It is not intended or designed for the applications specified below, which require a high level of safety. Accordingly, as a rule our product cannot be used in these applications. Contact us if you must use our product for any of these applications:

- Medical equipment pertaining to maintenance or management of human life or health
- A mechanism or mechanical equipment intended to move or transport people (such as a vehicle, railway facility or aviation facility)
- Important safety parts of mechanical equipment (such as safety devices)
- Equipment used to handle cultural assets, art or other irreplaceable items

(3) Contact us at the earliest opportunity if our product is to be used in any condition or environment that differs from what is specified in the catalog or Instruction Manual.

7.6 Other Items Excluded from Warranty

The price of the product delivered to you does not include expenses associated with programming, the dispatch of engineers, etc. Accordingly, a separate fee will be charged in the following cases even during the warranty period:

- Guidance for installation/adjustment and witnessing of test operation
- Maintenance and inspection
- Technical guidance and education on operating/wiring methods, etc.
- Technical guidance and education on programming and other items related to programs

8. EU Declaration of Conformity

8.1 EU Declaration of Conformity

As this product is complied with the Wireless Directive, here attaches a document for EU Declaration of Conformity.

IAI Quality and Innovation

IAI CORPORATION
577-1 Obane, Shimizu-Ku, Shizuoka City, Shizuoka 424-0103 Japan

EU DECLARATION OF CONFORMITY

Manufacturer:

IAI CORPORATION
577-1 Obane, Shimizu-Ku, Shizuoka City, Shizuoka 424-0103 Japan

Authorized representative within the Community:

IAI Industrieroboter GmbH
Ober der Röth 4, D-65824 Schwalbach am Taunus, Germany

We make this declaration under the responsibility of the manufacturer.
Hereby declares that the equipment described below:

Equipment:

RADIO EQUIPMENT SYSTEM

TB-03 series
IABL series

Complies with the provisions of the RED 2014/53/EU, European Directives and the following harmonized standards:

EN 55032: 2015
ETSI EN 300 328 V2.2.2

And also complies with the provisions of the RoHS Directive 2011/65/EU+(EU)2015/863, based on the following specifications applied:

EN IEC 63000: 2018

Done at Shizuoka, Japan,

On July 30 , 2021

President Toru Ishida

CE

ORIGINAL

Change History

Revision Date	Description of Revision
September 2017	First Edition
August 2018	Edition 1B • Applicable models added to supported models • Information added for EU/China/Korea in caution for handling regarding wireless connection • Correction made to description in 6.2 Teaching Update • Feature replaced, Correction made
October 2018	Second Edition • Applied to axis operation in wireless connection • 3.6.2 and 3.14 Figures swapped for Maintenance Information Screen, descriptions revised • 3.8 Figure swapped for Parameter Edit Screen • Correction made
November 2018	Edition 2B • Data Setter changed to (Touch Panel) Teaching Pendant
February 2019	Edition 2C • Models added for ELECYLINDER supported
May 2019	Third Edition • Models added for ELECYLINDER supported • 3.6.1 and 3.15 Selection of with or without ripple compensation added to display of current/current ratio • 3.7.3 [Servo OFF] and [Brake rel.] buttons added in ELECYLINDER Simple Data Setting Screen
March 2020	Fourth Edition • Models that support ELECYLINDER added • Complied with certifications in Mexico • 1.5.3 Caution When Battery Taken Off added
July 2020	Fifth Edition • 3.2 Operation Menu - "Other Settings" → "Operating noise adjustment" added • 3.5 Menu Select [Menu 2 List] - Other Settings "Operating noise adjustment" added • 3.6.2 Maintenance Information Window statement added regarding rotary types • 3.7 Rotary type added • 3.7.2 Note added stating Pressing Operation (Belt driven types (EC-B6 and B7) are not available for performing pressing operation) Rotary type added • 3.7.4 Loading Posture Setting / Payload Setting added

Revision Date	Description of Revision
July 2020	• 3.13 Pressing Operation (The belt driven types (EC-B6 and B7) are not available for pressing operation.) added • 3.13.2 Operating noise adjustment added • 3.14.1 Axis Name Edit Change made to teaching figures • 3.16.1 Change made to teaching numeric key pad figures
April 2021	Edition 5B • The supported models added • Terms integrated
May 2021	Edition 5C • The supported models added • Change made connectable model figures • Correction made
April 2022	Edition 5D • The supported models added • 1.11.2 Correction made in how to read model code • 3.13.2 Comment added in Operation Noise Tuning
June 2022	Edition 5E • Image of window swapped • Supported models added, Correction made • 1.8 Description revised regarding built-in battery • 3.7.4 Descriptions added for Payload Setting Not Applicable Model • 3.13 Description revised regarding Other Setting • Chapter 8 EU Declaration of Conformity added
September 2022	Edition 5F • Supported models added

Manual No.: ME0375-5F (September 2022)

IAI
Quality and Innovation

IAI Corporation

Head Office: 577-1 Obane Shimizu-KU Shizuoka City Shizuoka 424-0103, Japan
TEL +81-54-364-5105 FAX +81-54-364-2589
website: www.iai-robot.co.jp/

IAI America, Inc.

Head Office: 2690 W. 237th Street, Torrance, CA 90505
TEL (310) 891-6015 FAX (310) 891-0815
Chicago Office: 110 East State Parkway, Schaumburg, IL 60173
TEL(847) 908-1400 FAX (847) 908-1399
Atlanta Office: 1220 Kennestone Circle, Suite 108, Marietta, GA 30066
TEL (678) 354-9470 FAX (678) 354-9471
website: www.intelligentactuator.com

Technical Support available in Europe

IAI Industrieroboter GmbH

Ober der Röth 4, D-65824 Schwalbach am Taunus, Germany
TEL 06196-88950 FAX 06196-889524
website:www.iai-automation.com

Technical Support available in Great Britain

LC Automation
control & safety

Duttons Way, Shadsworth Business Park, Blackburn, Lancashire, BB1 2QR, United Kingdom
TEL 01254-685900
website: www.lcautomation.com

IAI (Shanghai) Co., Ltd.

SHANGHAI JIAHUA BUSINESS CENTER A8-303, 808, Hongqiao Rd. Shanghai 200030, China
TEL 021-6448-4753 FAX 021-6448-3992
website: www.iai-robot.com

IAI Robot (Thailand) Co., Ltd.

825 PhairojKijja Tower 7th Floor, Debaratana RD., Bangna-Nuea, Bangna, Bangkok 10260, Thailand
TEL +66-2-361-4458 FAX +66-2-361-4456
website:www.iai-robot.co.th

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