YAMATAKE

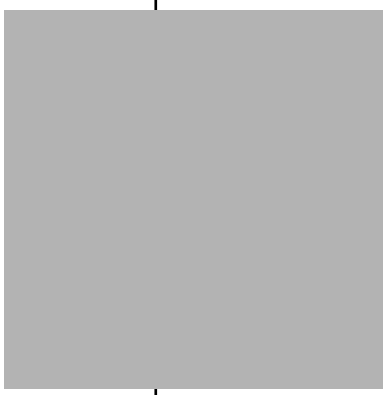
No. CP-UM-1670E

SMART TERMINAL EST SERIES

User's Manual

Large-size Model EST

Installation Manual



Thank you for purchasing the Smart Terminal EST.
This manual contains information for ensuring correct use of the Smart Terminal EST. It also provides necessary information for installation, maintenance, and troubleshooting.
This manual should be read by those who design and maintain devices that use the Smart Terminal EST.
Be sure to keep this manual nearby for handy reference.

Yamatake Corporation

RESTRICTIONS ON USE

When using this product in applications that require particular safety or when using this product in important facilities, pay attention to the safety of the overall system and equipment. For example, install fail-safe mechanisms, carry out redundancy checks and periodic inspections, and adopt other appropriate safety measures as required.

REQUEST

Ensure sure that this User's Manual is handed over to the user before the product is used.

Copying or duplicating this User's Manual in part or in whole is forbidden. The information and specifications in this User's Manual are subject to change without notice.

Considerable effort has been made to ensure that this User's Manual is free from inaccuracies and omissions.
If you should find any inaccuracies or omissions, please contact Yamatake Corporation.

In no event is Yamatake Corporation liable to anyone for any indirect, special or consequential damages as a result of using this product.

SAFETY PRECAUTIONS

■ About Icons

Safety precautions are for ensuring safe and correct use of this product, and for preventing injury to the operator and other people or damage to property. You must observe these safety precautions. The safety precautions described in this manual are indicated by various icons.
As the following describes the icons and their meanings, be sure to read and understand the descriptions before reading this manual:

⚠**WARNING**	Warnings are indicated when mishandling this product might result in death or serious injury to the user.
⚠**CAUTION**	Cautions are indicated when mishandling this product might result in minor injury to the user, or only physical damage to this product.

■ Examples

	Triangles warn the user of a possible danger that may be caused by wrongful operation or misuse of this product. These icons graphically represent the actual danger. (The example on the left warns the user of the danger of electrical shock.)
	White circles with a diagonal bar notify the user that specific actions are prohibited to prevent possible danger. These icons graphically represent the actual prohibited action. (The example on the left notifies the user that disassembly is prohibited.)
	Black filled-in circles instruct the user to carry out a specific obligatory action to prevent possible danger. These icons graphically represent the actual action to be carried out. (The example on the left instructs the user to remove the plug from the outlet.)

⚠WARNING

	**Be sure to turn off the power when you wire, assemble or disassemble the EST.** **Otherwise, electric shock hazard can be caused.**
	**Ground the FG terminal to an Earth of less than 100Ω.** **Otherwise, electric shock hazard could occur.**
	**The display unit is very heavy. Make sure not to drop it when you replace it. Doing so can harm your body or the unit.**

⚠CAUTION

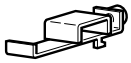
	**Do not operate an EST with a broken touch switch. It may result in bodily harm.**
	**Should the instrument become abnormally hot or produce smoke, immediately turn off the power to the EST and the equipment it is connected to, and disconnect the power cable.**
	**Prevent debris of wiring from entering the EST. It may cause short circuit and trouble or burning the EST.**
	**Do not make outdoor wiring, or lightening can damage the internal mechanism of the product.**
	**Be sure to turn off the power before maintenance of the EST.**
	**Do not touch the IC leads with bare hand. Electronic devices of IC can be damaged by static electricity. The use of antistatic work benches are highly recommended.**
	**Touch switch should be pressed only with a finger. Do not press it with a hard or sharp-pointed thing like a ball-point pen. Doing so can cause damage on the surface of the switch or its function.**
	**The protective sheet on the touch switch panel is shipped with a thin plastic film to protect it from damage during shipping. Remove this film before use.**
	**When disposing of used batteries at the user site, observe local bylaws.**
	**Do not short-circuit the batteries as they may be hot or start burning, and do not expose them to water.**

Unpacking

Check the following when removing the **EST** from its package.

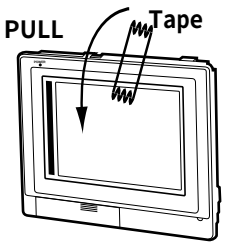
1. Check the model No. to make sure that you have received the product that you ordered.
2. Check the **EST** for any apparent physical damage.
3. Check the contents of the package against the Package List to make sure that all accessories are included in the package.

After unpacking, handle the **EST** and its accessories taking care to prevent damage or loss of parts.
If an inconsistency is found or the package contents are not in order, immediately contact your dealer.

Name	Model No.	Qt'y	Remarks
EST 		1	See 1-1 Model Numbers Configuration, page 1-1.
Metal fittings 	ESTX939FB00	4	
User's Manual 	CP-UM-1670E	1	This manual

Request

The protective sheet on the panel front has a thin plastic film protecting the panel surface . After mounting and wiring works are completed, a cellophane adhesive tape should be taped on the corner to pull off the thin plastic film in the arrow direction as shown.

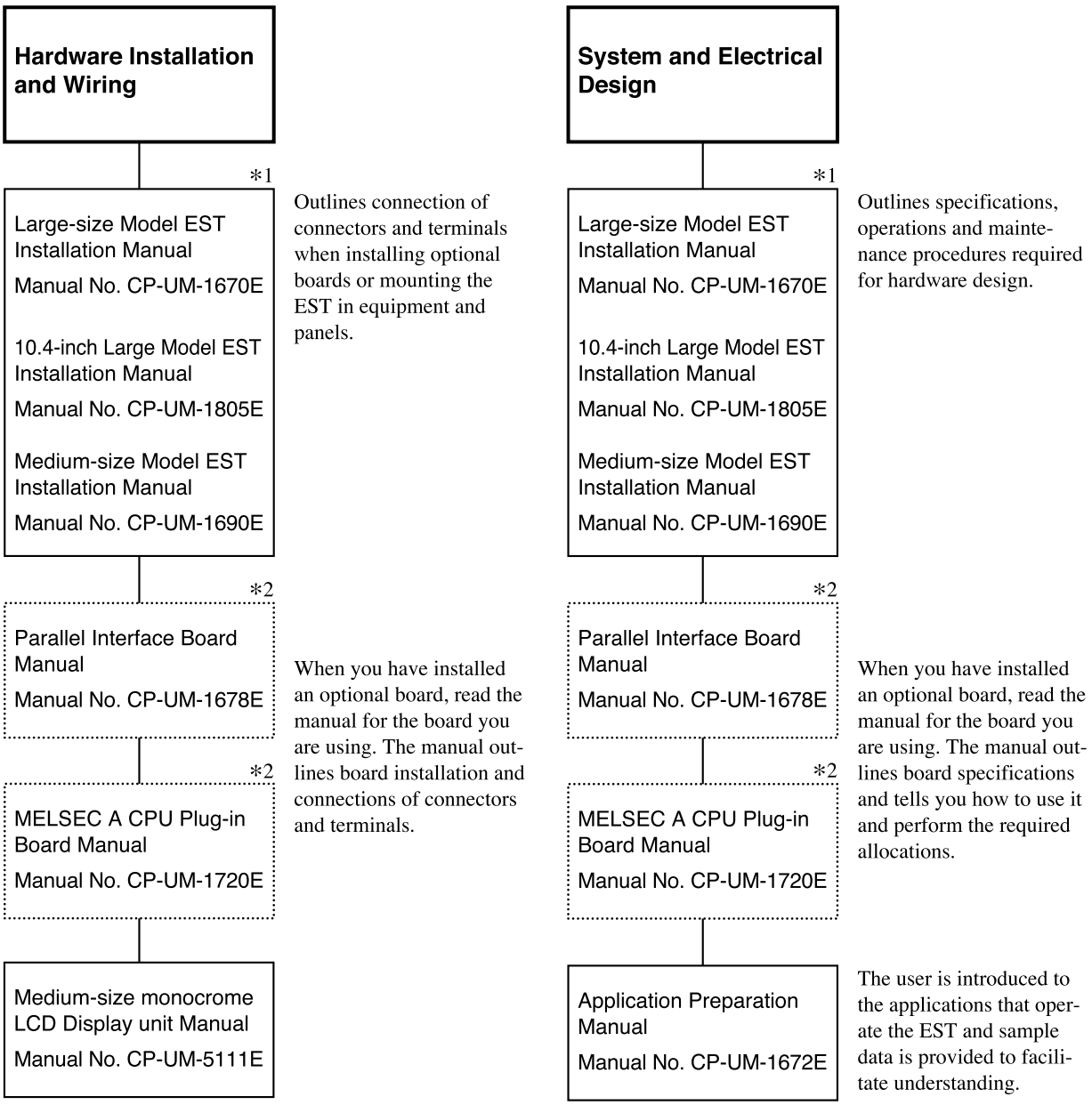


Caution on Installation

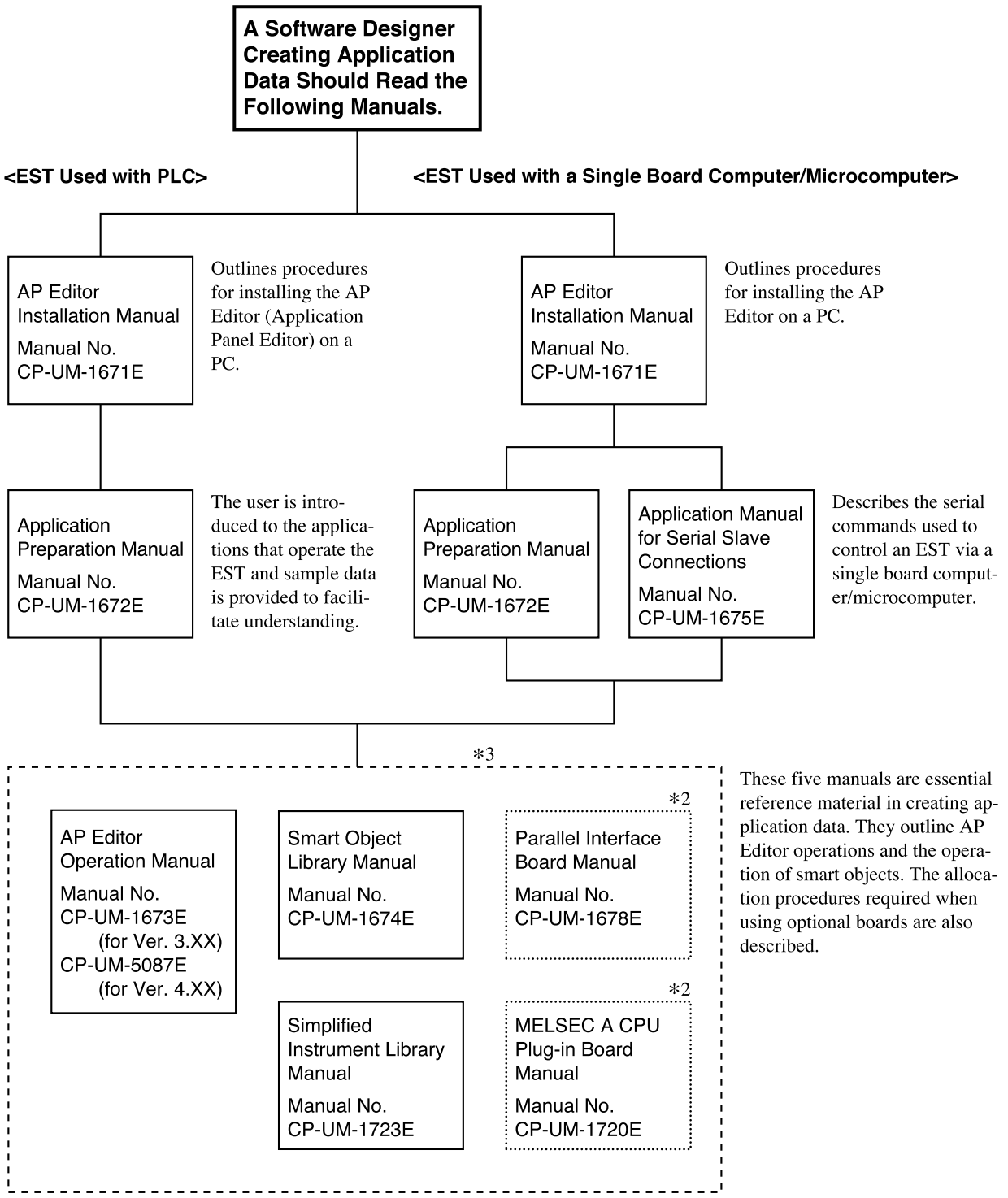
Peeling off the protective film with your fingernail might scratch the surface of the EST.

Outline of EST Manuals

The Smart Terminal EST series is referred to as the EST in the manual.
There are a total of 13 manuals for the EST. Users are recommended to read the manuals that concern the fields they are engaged in and that relate to the specific models and systems they are using. The contents of each User's manual are listed on pages vi and vii.



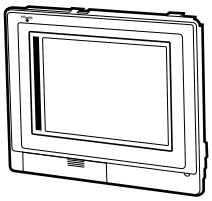
∗1 The installation manual is included only with the large model ESTs.
∗2 ⋯⋯: Read the user's manual accompanying the optional board.
∗3 - - -: Also read the manuals that are enclosed in dotted boxes.

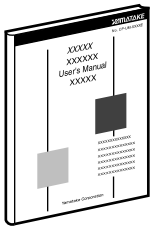

A Software Designer Creating Application Data Should Read the Following Manuals.
<EST Used with PLC>
<EST Used with a Single Board Computer/Microcomputer>
AP Editor Installation Manual
Manual No. CP-UM-1671E
Outlines procedures for installing the AP Editor (Application Panel Editor) on a PC.
AP Editor Installation Manual
Manual No. CP-UM-1671E
Outlines procedures for installing the AP Editor on a PC.
Application Preparation Manual
Manual No. CP-UM-1672E
The user is introduced to the applications that operate the EST and sample data is provided to facilitate understanding.
Application Preparation Manual
Manual No. CP-UM-1672E
Application Manual for Serial Slave Connections
Manual No. CP-UM-1675E
Describes the serial commands used to control an EST via a single board computer/microcomputer.
*3
AP Editor Operation Manual
Manual No. CP-UM-1673E (for Ver. 3.XX)
CP-UM-5087E (for Ver. 4.XX)
Smart Object Library Manual
Manual No. CP-UM-1674E
*2
Parallel Interface Board Manual
Manual No. CP-UM-1678E
Simplified Instrument Library Manual
Manual No. CP-UM-1723E
*2
MELSEC A CPU Plug-in Board Manual
Manual No. CP-UM-1720E
These five manuals are essential reference material in creating application data. They outline AP Editor operations and the operation of smart objects. The allocation procedures required when using optional boards are also described.

Configuration of This User's Manual

The following 13 manuals are currently provided to cover the EST-related topics. Use the manual that fits your applications. In the event such a manual is not available, contact us or your local Smart Terminal EST dealer.

Large-size model EST

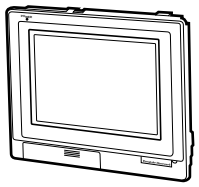


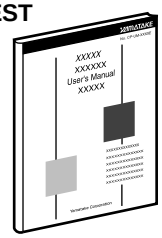


Large-size Model EST Installation Manual
Manual No. CP-UM-1670E

This manual, which is included with the EST, is written for first-time users, hardware designers and maintenance personnel. It walks the user through installation and wiring procedures and offers descriptions of maintenance, inspection and troubleshooting procedures as well as listing the hardware specifications.

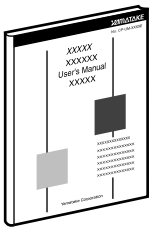
10.4-inch Large model EST





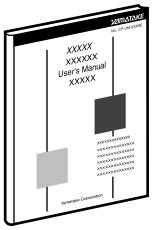
10.4-inch Large Model EST Installation Manual
Manual No. CP-UM-1805E

This manual, which is included with the EST, is written for first-time users, hardware designers and maintenance personnel. It walks the user through installation and wiring procedures and offers descriptions of maintenance, inspection and troubleshooting procedures as well as listing the hardware specifications.



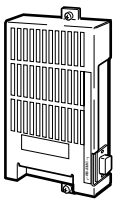
Medium-size Model EST Installation Manual
Manual No. CP-UM-1690E

This manual is written for first-time users, hardware designers and maintenance personnel. It walks the user through installation and wiring procedures and offers descriptions of maintenance, inspection and troubleshooting procedures as well as listing the hardware specifications.



Parallel Interface Board Manual **Manual No. CP-UM-1678E**

A parallel interface board is used to connect the EST to a PLC (Programmable Logic Controller) and DI/O to perform handshake operations and add a serial port.
The manual should be read by those who plan to install and wire parallel interface boards and those who design and operate applications.
It provides procedures for installing, wiring and operating boards, and lists system specifications for a parallel board installed in an EST.



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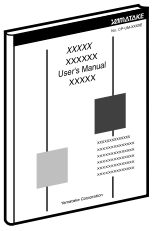
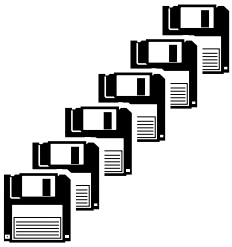


MELSEC A CPU Plug-in Board Manual
Manual No. CP-UM-1720E

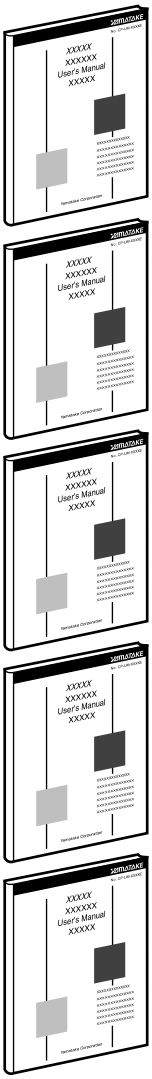
This manual is provided with the optional Mitsubishi Electric "**MELSEC A CPU Plug-in Board**". It describes procedures for connecting an EST to a MELSEC A series CPU. It should be read by those who install and wire MELSEC A CPU plug-in boards.
It describes installation, wiring, use and specifications of this optional board.

∗ The optional boards for the large and medium-size models differ in size.

These five manuals come with the AP Editor software.



AP Editor
(6 floppy disks)



AP Editor Installation Manual **Manual No. CP-UM-1671E**

This manual is an introduction to the "**AP Editor (Application Panel Editor)**", the application editing tool, and describes how to install the editor on a PC.

Application Manual for PLC Connections
Manual No. CP-UM-1672E

This manual should be read by designers and operators of EST panels and functions (referred to as application data on the EST). It offers detailed description of how to design and create applications from sample data. Sample data is included on the "**AP Editor floppy disks**".

AP Editor Operation Manual **Manual No. CP-UM-1673E**
Manual No. CP-UM-5087E

This manual should be read by those who plan to use the "**AP Editor**" to create EST application data on a PC. Detailed descriptions of AP Editor operations are given.

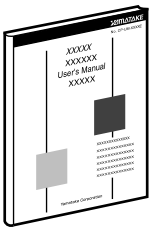
Smart Object Library Manual **Manual No. CP-UM-1674E**

The Graphic elements that can be displayed by an EST are called smart objects. The manual explains the smart object concept and describes the function of each smart object. This manual assumes that you have read the "**Application Manual for PLC Connections**" and the "**AP Editor Operation Manual**".

Application Manual for Serial Slave Connections
Manual No. CP-UM-1675E

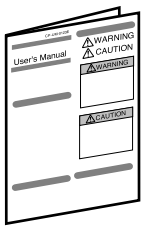
This manual describes procedures for controlling an EST as a slave station via board computers/microcomputers in user designed control systems. Serial slave station commands and registers in the EST are also outlined.

(1 floppy disk)



Simplified Instrument Library Manual
Manual No. CP-UM-1723E

This manual is provided with the optional "**Simplified Instrument Library**" and describes how to use the EST in simplified instrument applications. The manual should be read by those who plan to design and operate applications and panels on the EST.
It describes the smart objects in the simplified instrument library and their functions.



Medium-size monocrome LCD Display unit Manual
Manual No. CP-UM-5111E

This manual is included in the package with the "Medium-size monochrome LCD display unit".

Configuration of This User's Manual

The user's manual has the following configuration.

Chapter 1. PRODUCT OUTLINE

This chapter gives the EST model numbers and describes EST system configurations and related equipment.

Chapter 2. NOMENCLATURE AND FUNCTIONS

This chapter gives the nomenclature of EST parts and describes their functions.

Chapter 3. INSTALLATION AND WIRING

This chapter describes the installation procedures and precautions required for installing the EST.

Chapter 4. CONNECTIONS AND INSTALLATION

This chapter describes how to connect the EST to other equipment and how to use the EST setting menu.

Chapter 5. OPERATION PROCEDURES

This chapter describes procedures for downloading application data to the EST and how to use the self-diagnostic menu and tests.

Chapter 6. MAINTENANCE AND INSPECTION

This chapter describes inspection procedures and how to replace maintenance parts to ensure maximum service life of the EST.

Chapter 7. TROUBLESHOOTING

This chapter describes checkpoints and countermeasures when the EST is not operating normally.

Chapter 8. SPECIFICATIONS

This chapter gives the general specifications, performance specifications and the external dimensions of the EST.

Conventions Used in This Manual

The following conventions are used in this manual.

! Caution on Installation

: Text preceded by **"! Caution on Installation"** alerts the reader to point of note when installing and wiring the unit.

📖 NOTE : Text preceded by **"📖NOTE"** alerts the reader to supplementary explanations, reference materials, or reference of Yamatake Corporation.

(1), (2), (3) : The numbers with the parenthesis indicate steps in a sequence or indicate corresponding parts in an explanation.

ABC ····· : Indicate commands and messages displayed on a PC screen.

Contents

Chapter 4. CONNECTIONS AND INSTALLATION

Chapter 5. OPERATION PROCEDURES

Chapter 6. MAINTENANCE AND INSPECTION

Chapter 7. TROUBLESHOOTING

Chapter 8. SPECIFICATIONS

Index

Chapter 1. PRODUCT OUTLINE

1-1 Model Numbers

■ Model numbers

The table below lists the EST series models.

Type	Power supply voltage	Proximity memory card interface	Memory	Model No.
EL display EST0330 for large model	110V AC	Not included	512Kbytes	EST0330C01WBX∗0
		Included	512Kbytes	EST0330C01WBS∗0
Monochrome LCD display EST0300 for large model	110V AC	Not included	512Kbytes	EST0300C01WBX∗0
		Included	512Kbytes	EST0300C01WBS∗0
	24V DC	Not included	512Kbytes	EST0300C05WBX∗0
		Included	512Kbytes	EST0300C05WBS∗0

Example:

The EST0330C01WBS00 model comes with the following accessories and options: EL display for large EST model, touch switch panel, function switches, 110V AC power supply, 512Kbytes expanded memory and proximity memory card (optional).

NOTE ∗ represents as follows
E: English, B: Hangul, C: Mandarin(GB code), D: Taiwanese(BIG5 code)
For further information, contact your Yamatake Corporation sales/service office or the dealer from whom you purchased the equipment.

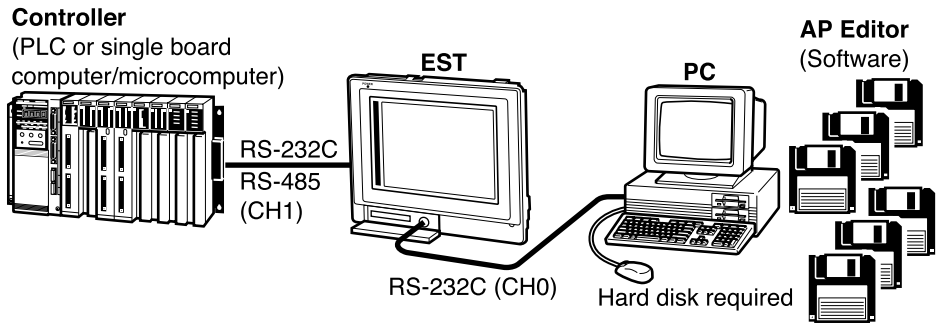
■ Display devices

The EST comes with one of three display devices which are listed in the following table with their model numbers.

Model No.	Display device	Touch switches	Function keys
EST0300	Monochrome LCD display with 640 × 480 pixels	32 × 20	10
EST0330	EL display with 640 × 400 pixels	32 × 20	10

1-2 Connections and Configuration

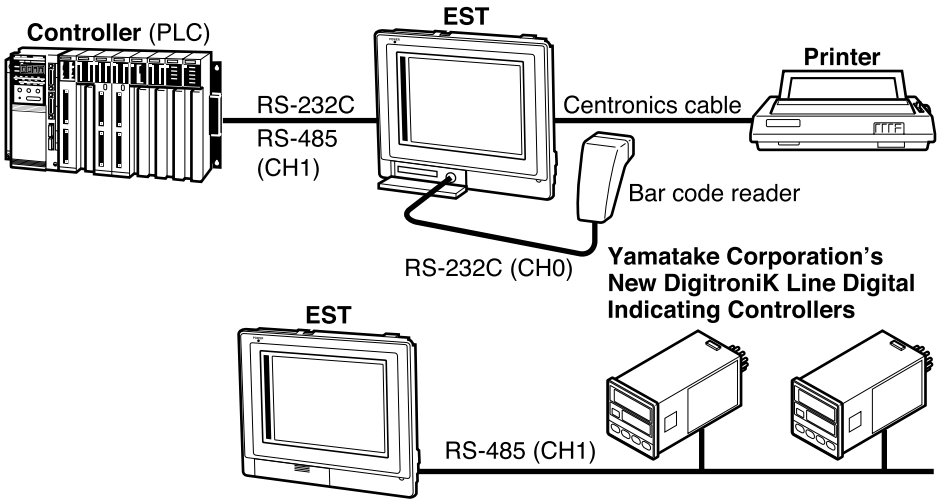
■ Basic configuration



Application data (panels, registered graphics and characters) is generated on a PC (Personal Computer: PC-AT or compatible) using the AP Editor (Application Panel Editor) and the created data is downloaded to the EST.
Communications and other settings are made using the AP Editor or EST system setting screen.

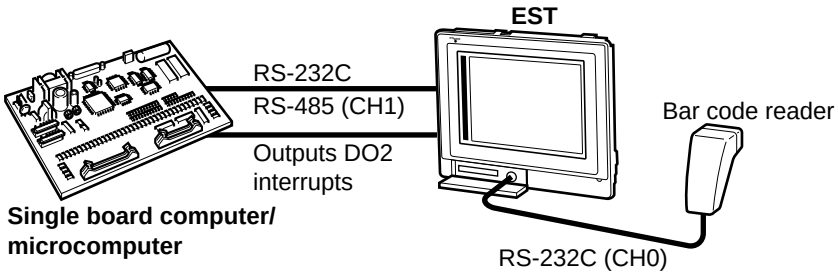
■ Configuration examples

●Connecting to a host



The EST communicates using the controller protocol so no communications program is required. A bar code reader can be connected to the CH0 port on the EST.

●Connecting to a serial slave station



A single board computer/microcomputer supports EST serial station communications. One single board computer/microcomputer can control several ESTs.
A bar code reader can be connected to the CH0 port on the EST.

1-3 Related Parts and Products

■ Optional boards

Optional board	Model No.	Applicable EST model
Parallel interface board DI 24 points, DO 16 points	ESTX130PR00	EST0300/0330
MELSEC A CPU Plug-in board	ESTX130MD00	

■ Software for creating application data

Software name	Software parts No.	Applicable EST model
AP Editor for DOS/V DOS Ver. 5.0 or later Type 3.5, 1.44Mbytes floppy disks	ESTX200SWDE3003	EST0300/0330
Simplified Instrument Library Type 3.5, 1.2Mbytes floppy disks	ESTX220LKAE1001	

■ Replacement parts

Parts name	Parts No.	Applicable EST model
EL display unit	ESTX933DP00	EST0330
Monochrome LCD display unit	ESTX930P01	EST0300
Touch switch panel	ESTX939TS00	EST0300/0330
EL protective sheet	ESTX933SS00	EST0330
Monochrome LCD protective sheet	ESTX930SS00	EST0300

■ Accessories

Parts name	Parts No.	Remarks
Metal fittings	ESTX939FB00	Common to models EST0300/0330
RS-232C cable (2m) 25-9 pin	CBL232AFT02	For channel 1 connection
RS-232C cable (2m) 9-9 pin	CBL232FFT02	
RS-232C cable (2m) 25 pin-DIN	CBL232AGT02	For channel 0 connection and downloading
RS-232C cable (2m) 9 pin-DIN	CBL232FGT02	
Battery	MX100BT01	Common to models EST0300/0330
Proximity memory card∗	SKM128C	For saving internal data
	SKM512C	For saving internal data/for saving application data

∗ Can be used on the EST with the optional proximity memory card.

■ Memory board for memory expansion

Parts name	Parts No.	Remarks
Memory board, 512Kbytes	ESTX939EMB0	• Replace the current memory board with this one. • Only one memory board can be inserted.
Memory board, 1Mbytes	ESTX939EMC0	

■ Recommended equipment

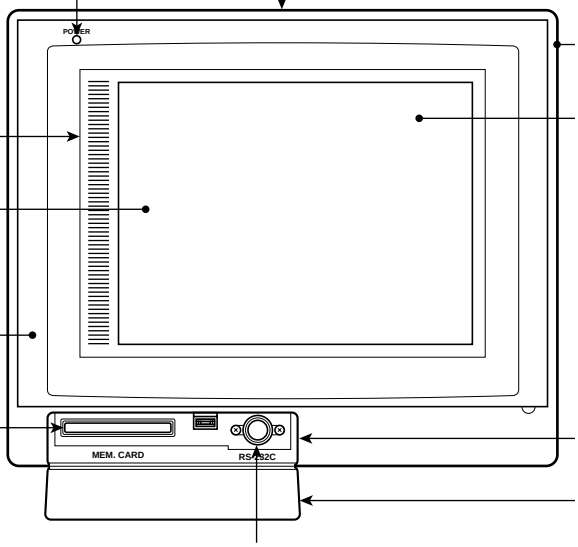
Equipment name	Model No.	Manufacturer	Remarks
Printer*			
Bar code reader	NBS-651R-1 (or equivalent)	Nitsuukou Corp.	Handy type round DIN 8-pin connector
	HC61 series (or equivalent)	Nippondenso Co., Ltd.	Handy type round DIN 8-pin connector
	BCH5532 (or equivalent)	Nippon denki seiki Co., Ltd.	Handy type round DIN 8-pin connector

✻ Available printer: Supports Epson ESC/P (ESC/PJ84) and prints 80 or more characters per line.

Chapter 2. NOMENCLATURE AND FUNCTIONS

2-1 Nomenclature and Functions

■ Front view



Mode indicator lamp
In RUN mode : Green
In STOP mode : Orange
Error condition : Red
LED flashes green when the system menu is called up.

Body

Case

Display unit

Display devices
There are three types of displays according to the model No.:
EST0300: 640 × 480 pixels
Monochrome LCD display
EST0330: 640 × 400 pixels
EL display
EST0550: 640 × 480 pixels
Color TFT LCD display

Touch switch panel
A conductive matrix is mounted on the display surface.

Panel protective sheet
This replaceable sheet protects the display.

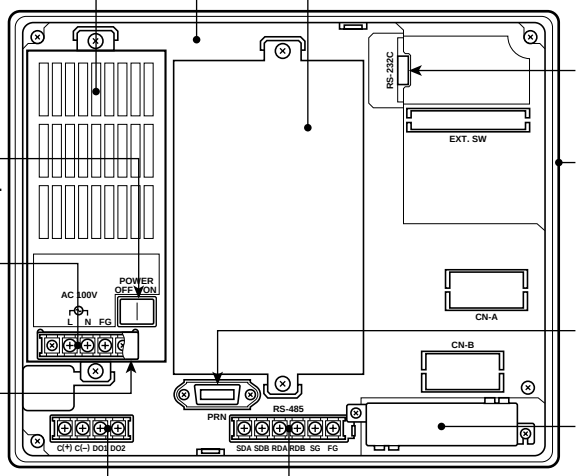
Door packing
Protects the door from liquid spills.

Door
Open to use RS-232C CH0 and the memory card reader/writer.

Memory card slot (Optional)
Insert a memory card here.
Some models are initially provided with this option:
This card comes with an EST when you selected an model No. which has an optional proximity memory card.
The memory card reader/writer and RS-232C CH0 connector compartment are provided with a door which is opened by pressing the knurled portion "═══"on the door.

RS-232C CH0 connector
Connects a PC or bar code reader.

■ Rear view



Back plate

Optional cover (For optional board)
Remove this cover to install an optional CBL board or a parallel interface board in the optional slots inside.

Power supply unit
Supplies the EST with power. It can be removed from the EST body and installed in a separate location.

RS-232C CH1 connector

Power switch
Turns on/off the power to the EST.

Case packing
Prevents water and other liquids from entering the EST.

Power supply terminals
(M4 screws)
Can be connected to a power supply.

Printer connector
Connect a printer cable here.

Terminal cover
Protective cover that insulates the power supply terminals

Memory card cover (Optional)

Parallel output terminal (M4 screws)
This is a 2-point transistor
Factory setting
DO1: RUN mode
DO2: Switch ready

CH1 RS-485 terminal
Interface (M4 screws)
For RS-485 communication line connections

2-2 Materials Used

The table below shows the materials that the EST is made with and their environmental durability.

Part name	Material	Resistance to chemicals and oil
• **Case** • **Back plate** • **Door** • **Display unit chassis** • **Memory card cover**	PC/ABS (polycarbonate/ acrylonitrile/ butadiene/ styreneplastic)	These materials are resistant to water, alcohol, oil, salts and weak acids. However, alkali, aromatic hydrocarbons, halogenated hydrocarbons and other substances may cause them to swell or dissolve.
• **Touch switch panel** • **Panel protective sheet**	PET (polyethylene terephthalate)	PET is used in the panels. Although it is permeable to strong acid, alkali, boiling water and steam, it is highly resistant to organic solvents and oils. It is a thermoplastic material and a crystalline resin.
• **Door packing**	EPDM (ethylene propylene rubber)	The material is EPDM combined with a heat-resistant foam open cell type flexible foam. It is however, susceptible to mineral oils. It is highly resistant to oz one and has a high degree of resistance to heat and heat aging and is also resistant to hot water and steam.
• **Case packing**	CR (chloroprene rubber)	A foam material with a flexible, independent cell structure derived from chlorine. It is almost as resistant to oz one as EPDM, has excellent heat and oil resistance qualities and is autolytic.
• **Option cover**	Fire and heatresistant vinyl chloride panel	This material is very rigid, has good insulation resistance and excellent weatherproof, waterproof and chemical resistance characteristics. It has poor resistance to hydrocarbons, esters, ketone, aldehyde, carbamide, chlorinated solvents and colophonium.

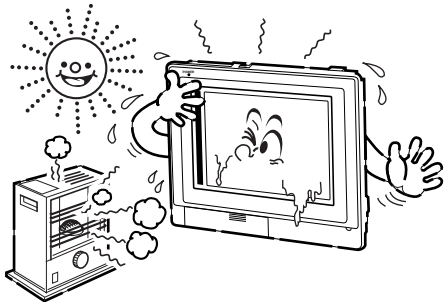
Chapter 3. INSTALLATION AND WIRING

3-1 Installation

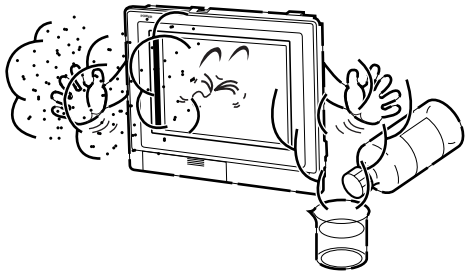
■ Installation environment

⚠CAUTION

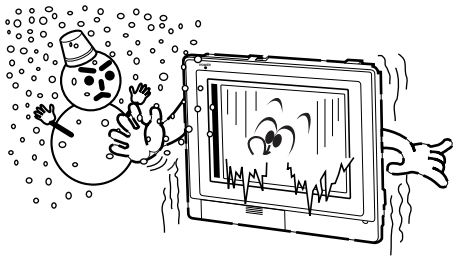
In order to ensure the reliability of the system and to take full advantage of the EST' s functions, the user should heed the instructions given below.
Do not install the EST outside or in the following locations where:



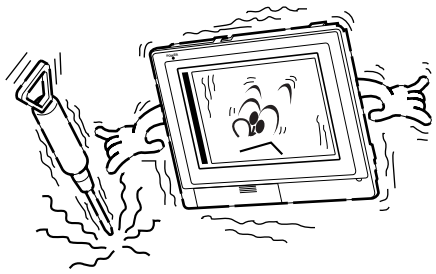
- Ambient temperature exceeds 50 °C.
- Equipment is exposed to direct sunlight.



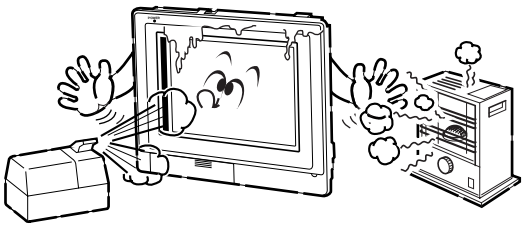
- Equipment is exposed to corrosive or inflammable gas.
- Equipment is exposed to large amounts of dust, salt, iron powder and other conductive substances or organic solvents.



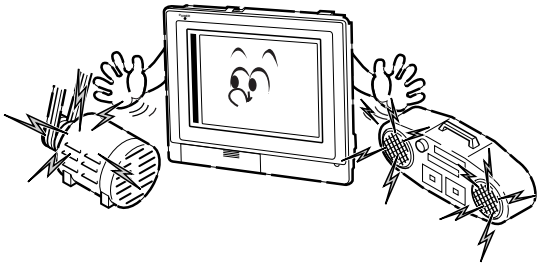
- Ambient temperature becomes under 0 °C.



- Equipment would be directly exposed to vibrations or shocks.



- Ambient humidity exceeds 85%
- Equipment is exposed to sudden temperature fluctuations and dew condensation.
- Equipment would be exposed to water, oil or chemical spills (panel surfaces satisfy the IP64 standard).



- Equipment would be exposed to strong electric or magnetic fields.

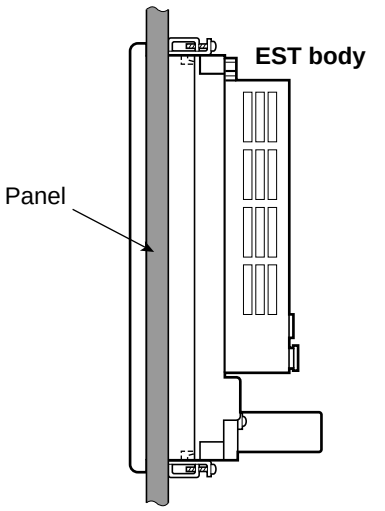
■ Precautions to be taken in installation and wiring

⚠WARNING

Be sure to turn off the power when you wire, assemble or disassemble the EST or the power supply unit. Otherwise, electric shock hazard can be caused.

The following section describes cautions to be taken when the EST is mounted in an operation panel. Observe the instructions listed below to ensure optimum resistance to environmental conditions and guarantee ease of use and maintenance.

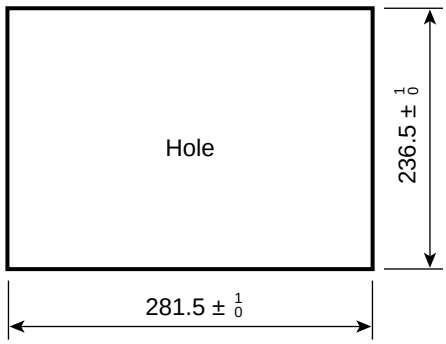
1. Provide sufficient free space around the EST to ensure good ventilation.
2. Do not mount the EST directly above transformers or high capacity resistors that dissipate large amounts of heat.
3. Do not install the EST together with high voltage devices or motors. Preferably, install the EST in a different panel.
4. Make sure the EST is properly grounded to improve noise resistance. Use a grounding cable with a diameter of at least 2mm^2. When a long grounding cable is required, use a thick insulated cable and route it through a conduit.
5. Do not bundle the EST communications cables or data lines with a noise source such as the power cable of a motor. If routing these cables in the same duct cannot be avoided, use a shielded cable and connect the shield to the FG terminal.
6. Mount the EST on a flat, even surface as performance may otherwise not meet the IP64 standard.
7. Packings are subject to aging and all packings that have lost their elasticity through long use should be replaced with new ones.
8. Note that if the screws of the metal fittings are overtightened, the panel protective sheet on the display surface may crease. Should this happen, loosen the screws. If this fails to return the protective sheet to its original shape, remove it and reattach it.
9. Install the EST in a vertical attitude to ensure natural convection. Horizontal and oblique installation will affect operating temperature range and should be avoided. Consult Yamatake Corporation for technical advice when normal installation is not possible.



3-2 Installation

■ Panel cut dimensions

The figure below shows the dimensions of a panel. An SPC (cold-rolled steel) panel should be at least 1.6mm thick.



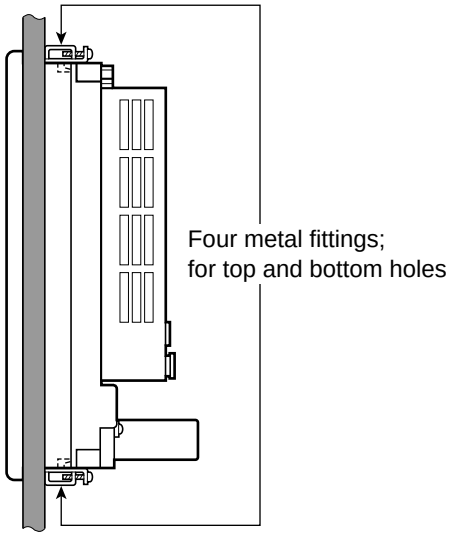
Unit: mm

■ Installation

Insert the body in the holes in the panel.

Use the provided four metal fittings screws to secure the top and bottom of the EST to the panel.

When the heads of the screws of the four metal fittings are flush with the panel and there is no looseness, turn the screws an extra half to one full turn to ensure that the EST is firmly secured.



! Caution on Installation

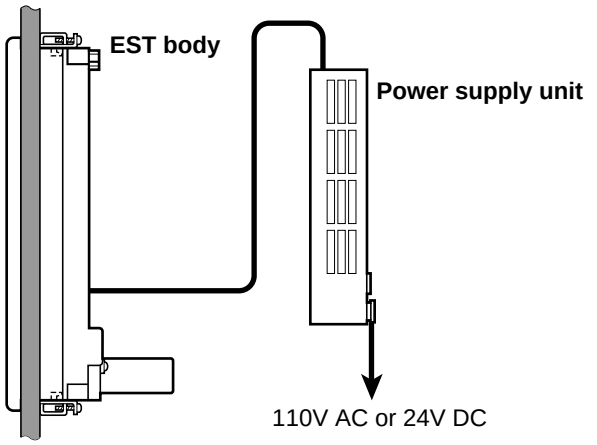
Overtightening the screws of the four metal fittings can deform or damage the case.

■ Installing the power supply unit in a separate location

⚠WARNING

Be sure to turn off the power when you wire, assemble or disassemble the EST or the power supply unit. Otherwise, electric shock hazard can be caused.

The power supply unit can be detached from the EST and placed in a separate location. This reduces the depth of the EST and makes for a more compact panel.



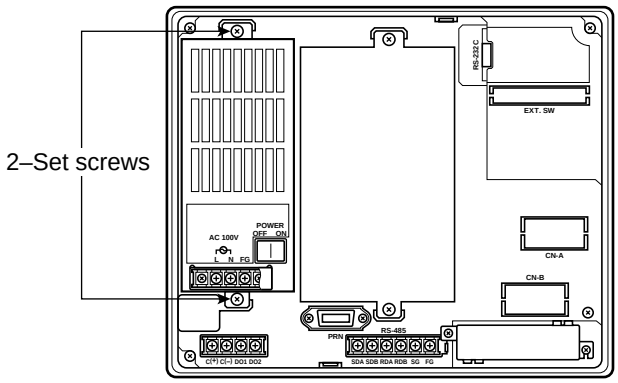
Connect the power supply unit and the EST with the provided power cable (Approx.15 cm).

Caution on Installation

- Install the power supply unit near the EST.
- Install the power supply unit vertically to ensure proper ventilation.

●Removing the power supply unit

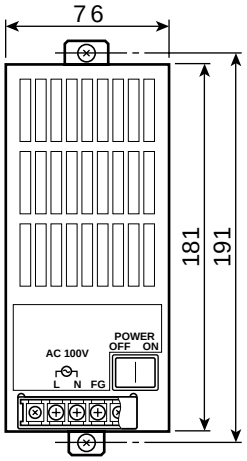
(1) Remove the two set screws on the rear panel of the EST.
(2) Gently lift the power supply unit out of the EST.
(3) Disconnect the power supply unit connectors.



●Installing the power supply unit

Install the removed power supply unit in a separate location according to the following instructions.

Unit: mm

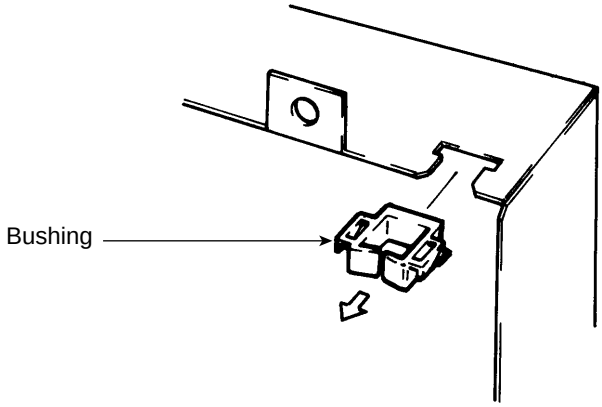


Power supply unit

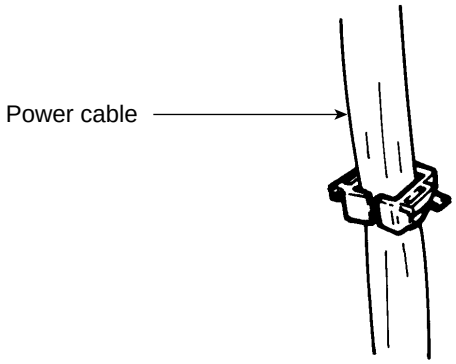
(1) Determine the location of the power supply.

(2) Drill holes for the set screws.
Use M4 screws.

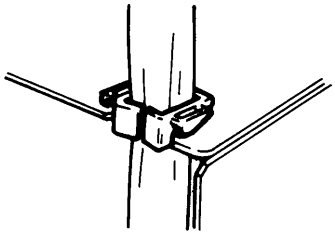
(3) Remove the bushing in the top part of the power supply unit.



(4) Pull out the power cable and thread it through the bushing.



(5) Fit the bushing with the power cable into the power cable outlet.



Chapter 4. CONNECTIONS AND INSTALLATION

4-1 Preparations

⚠WARNING

Be sure to turn off the power when you wire, assemble or disassemble the EST or the power supply unit. Otherwise, electric shock hazard can be caused.

⚠CAUTION

Prevent debris of wiring from entering the EST.
It may cause short circuit and trouble or burning the EST.

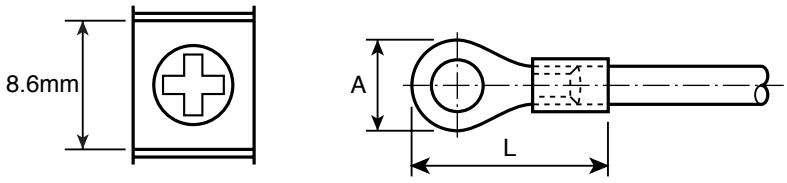
Do not make outdoor wiring.
It can be damaged if struck by lightening.

The EST uses signals to connect terminals and connectors.
Use crimp-style solderless wire connector to make terminal connections and M4 screws to secure them.

Signal	Means of connection	Components connected
Power supply	Terminal connection	Crimp-style solderless wire connector
Parallel output		
RS-485		
RS-232C (CH0)	Connector connection	DIN 8-pin connector
RS-232C (CH1)		D-sub 9-pin
Printer		Amphenol microribbon connector 14-pin or the equivalent

■ Recommended crimp-style solderless wire connector

Example showing recommended crimp-style solderless wire connectors



Terminl screws	Diameter (mm^2)	JIS Standard	(Reference) Parts No. of Nippon Atchaku Tanshi Co.,
M4	0.25 to 1.65mm^2	RAV1.25-4	V1.25-4

Caution on Installation

- The crimp-style solderless wire connector in the above example is a round insulated terminal.
- Use of crimp-style solderless wire connectors with insulated cables is recommended.
- The crimp-style solderless wire connector used depends on the maximum diameter of cable that it can accommodate.
- Crimp-style solderless wire connectors other than the one given above can be used, but dimension A must not exceed 8.5mm.

4-2 EST Connections

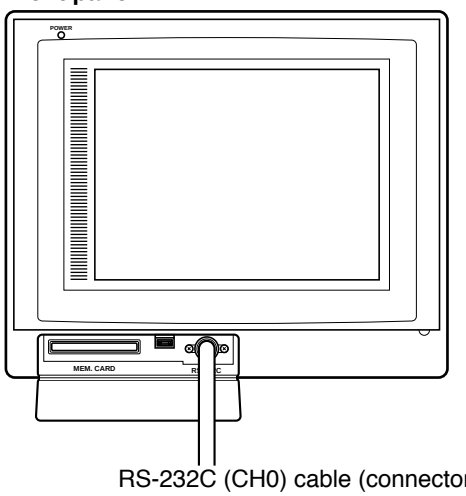
⚠WARNING

Ground the FG terminal to an Earth of less than 100Ω.
Otherwise, electric shock hazard could occur.

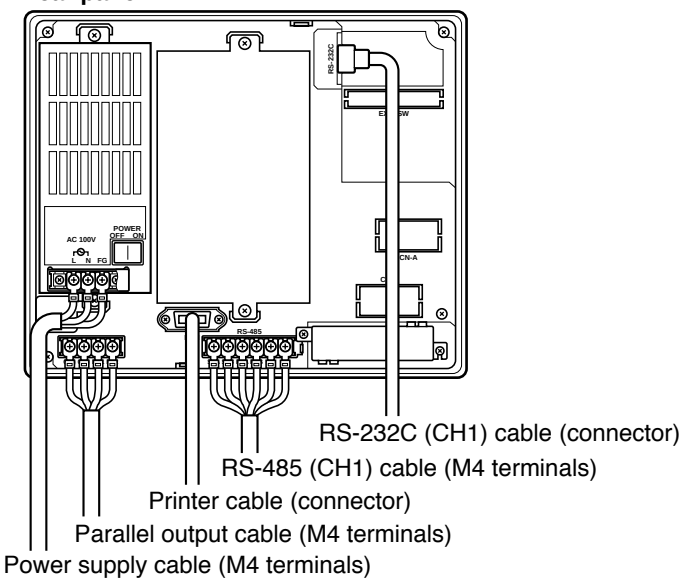
Be sure to attach the terminal covers when all connectors have been made.
Otherwise, electric shock hazard can be caused.

This section describes EST connections.

Front panel

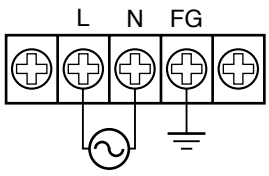


Rear panel



■ Power supply connection

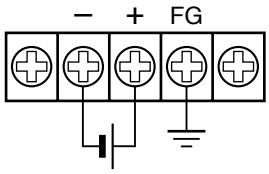
●AC power supply connections



Terminal signal configuration

Signal	Description
L	110V AC input
N	110V AC input
FG	Frame ground

●DC power supply connections



Terminal signal configuration

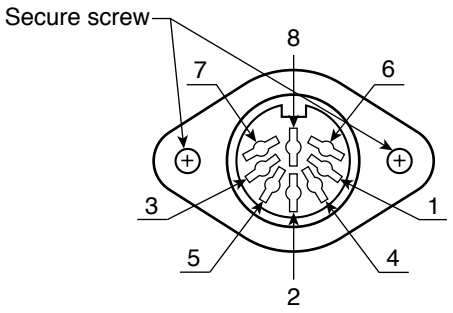
Signal	Description
–	GND
+	+24V
FG	Frame ground

Caution on Installation

- Make sure that the polarity of DC power supply connections is correct.
- Use M4 crimp-style solderless wire connectors for power cable connections.
- The terminal screws should be tightened to no more than 1.2N·m torque.
- The power terminals are provided with plastic insulation covers. The covers are easily removed by pulling them towards you.

■ RS-232C (CH0) connection

The RS-232C (CH0) connector is on the front panel.

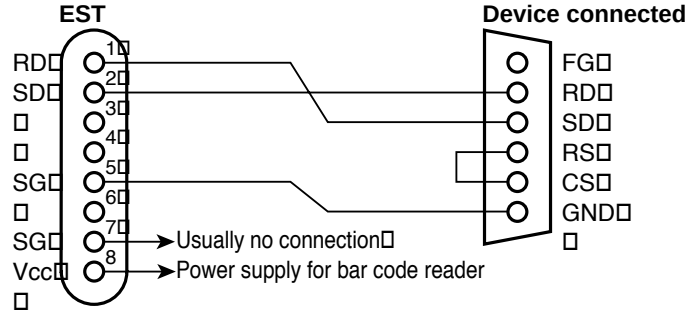


Connector signal configuration

Pin No.	Signal	Description
1	RD	Reception data
2	SD	Transmission data
3	CS	4-pin and internal connection
4	RS	3-pin and internal connection
5	SG	Ground
6	□	Not used
7	SG	Ground
8	VCC	5V output

Recommended connector: TCP0587-71-5201 Hoshiden Co., Ltd. or the equivalent

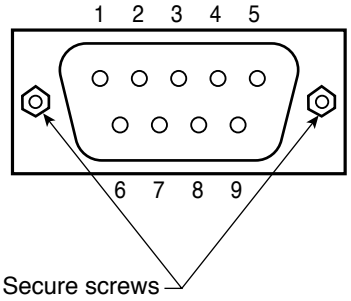
Dedicated cable: Use a CBL232FGT02 (for DOS/V 9-pin) to connect the EST to a PC.



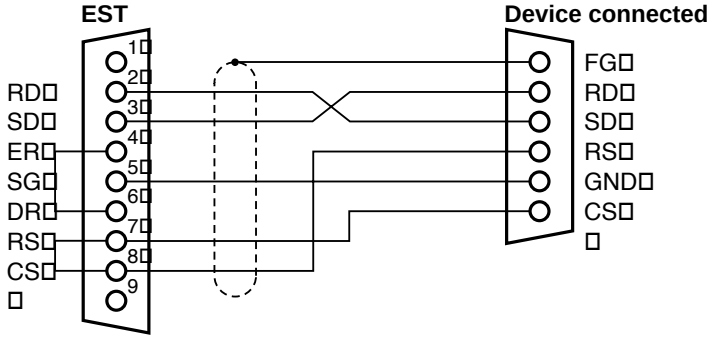
■ RS-232C (CH1) connection

Connector signal configuration

Pin No.	Signal	Description
1	□	Not used
2	RD	Reception data
3	SD	Transmission data
4	ER	6-pin and internal connection
5	SG	Ground
6	DR	4-pin and internal connection
7	RS	8-pin and internal connection
8	CS	7-pin and internal connection
9		Not used

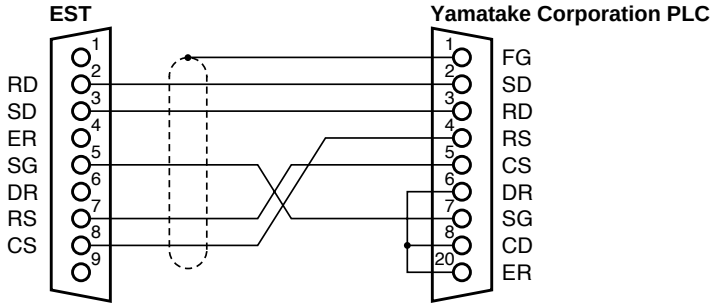


Recommended connector: 17JE-13090-02 (D8C2) Daiichi denshi kogyo Co., Ltd. or the equivalent

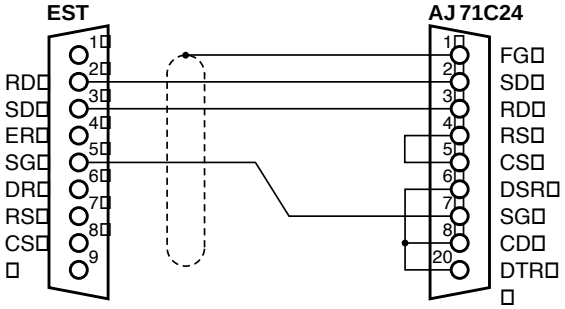


●**Connection examples for RS-232C**

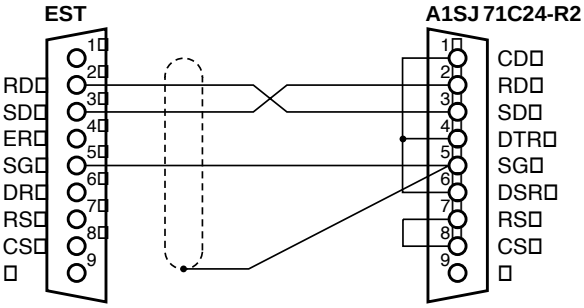
Yamatake Corporation (supports host communications) (1:1)



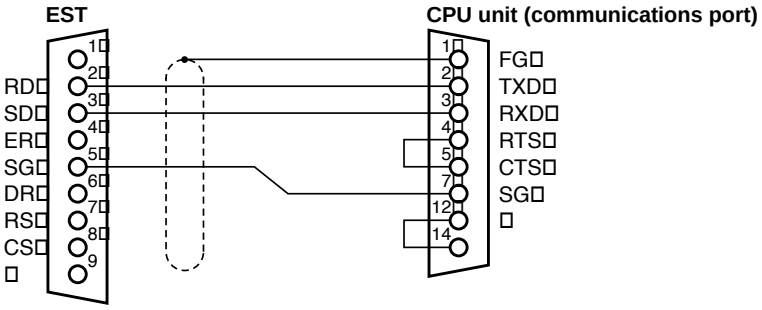
Mitsubishi (MELSEC-A series) (1:1)



Mitsubishi (MELSEC-A1S series) (1:1)



Sharp (JW series CPU) (1:1)



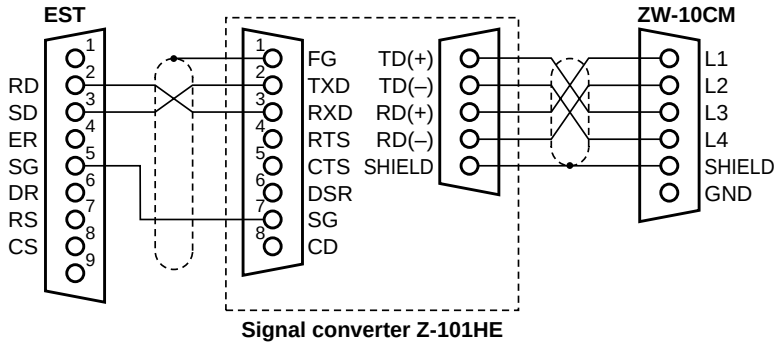
Pins (12) and (14) must be short-circuited when the communications port is used as an RS-232C connection.

Caution on Installation

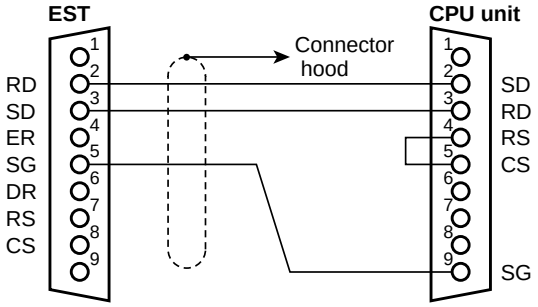
The communications port is located on the control unit of the JW-70CU/100CU and JW-70CUH/100CUH.

Sharp (ZW-10CM series) (1:1)

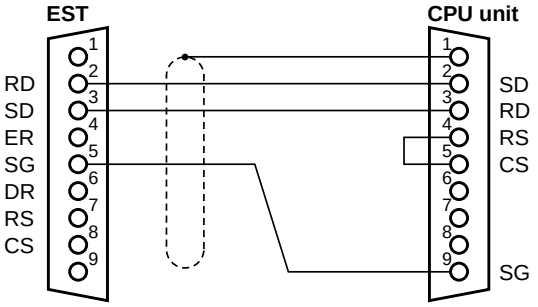
This connection requires a Z-101HE (Sharp), an RS-232C/RS-485 converter sold separately.



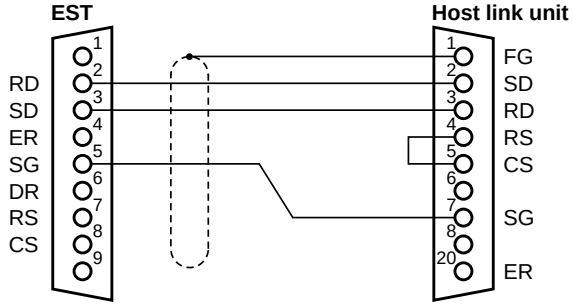
Omron (CV series) (1:1)



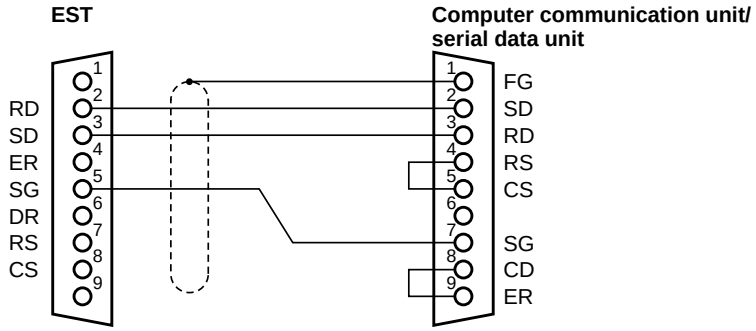
Omron (CQM1 series) (1:1)



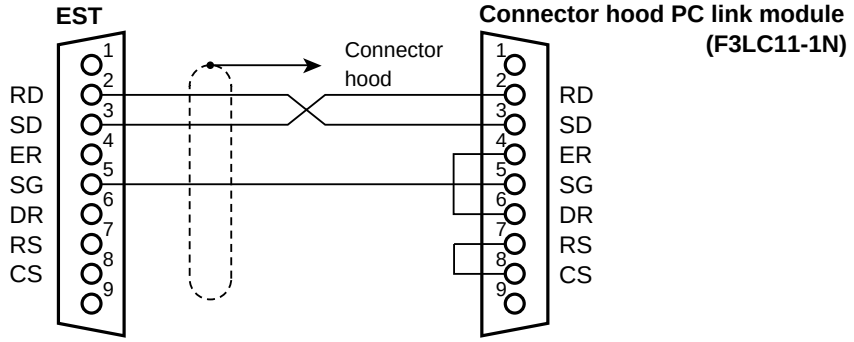
Omron (C series) (1:1)



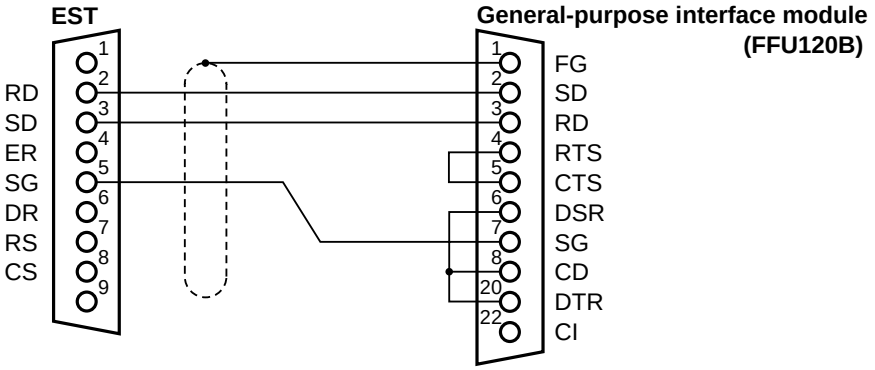
Matsushita Electric Works (FP3/FP5 series) (1:1)



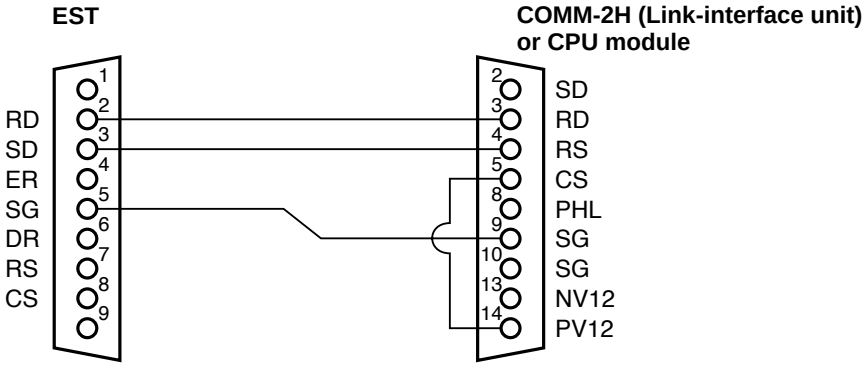
Yokogawa Electric (FA-M3 series) (1:1)



Fuji Electric (MICREX-F series) (1:1)



Hitachi (HIDIC/HIZAC H series COMM-2H, CPU module connections) (1:1)

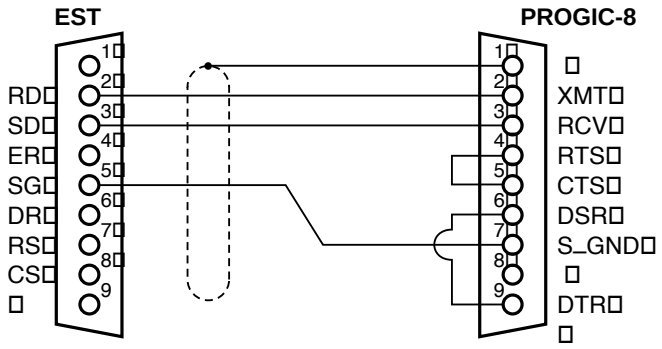


Caution on Installation

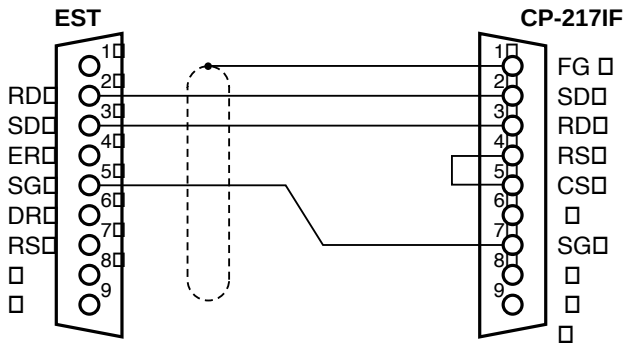
Take the following precautions when making connections to the CPU module.

- EST communication setting should be data 7 bit, even parity, 2 stop bit.
- COMM-2H communication speed can be set by following connection.
  - 4800bps: NV12 (pins (13)) connect to PHL (pins (8))
  - 19200bps: PV12 (pins (14)) connect to PHL (pins (8))

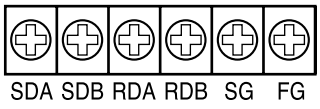
Yasukawa MEMOBUS (PROGIC-8 series) (1:1)



Yasukawa (CP-9200SH CP-217 IF module) (1:1)

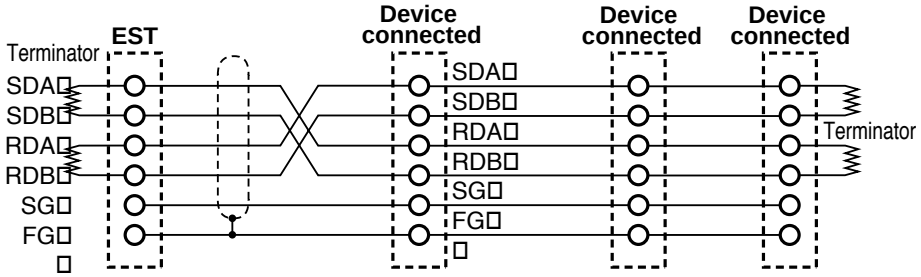


■ RS-485 (CH1) connection



Configuration of output terminal signals

Signal	Description
SDA	Transmission data(+)
SDB	Transmission data(-)
RDA	Reception data(+)
RDB	Reception data(-)
SG	Ground
FG	Frame ground relay terminal

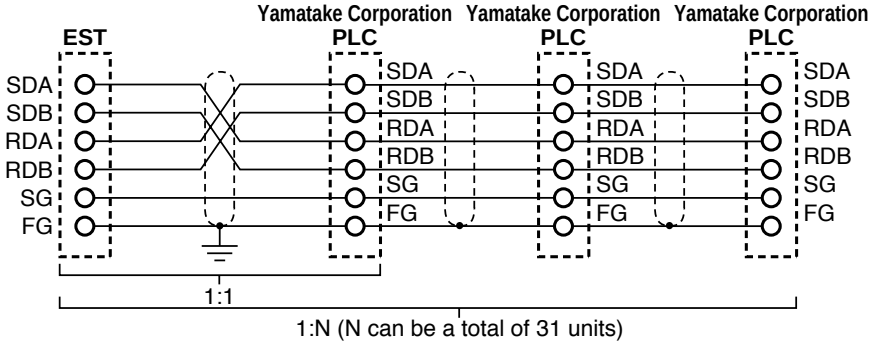


Caution on Installation

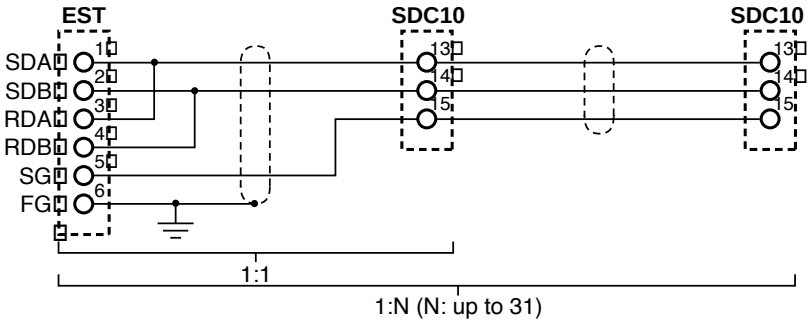
- Other device manufacturers may use different signal names.
  RS-485 supports both 1:1 and 1:N connections. N is a maximum of 31 units.
- Use twisted pair-cable shield wire with a diameter of 0.3 to 0.5mm².
- Connect the shield to the FG terminal.
- The FG terminal is used as a dedicated communications relay terminal.
  It must not be connected to the FG terminal of the power supply.
- Connect a terminator with a resistance of 150Ω ±5% 1/2W at both ends of the communications path.
- Terminal screws should be tightened to no more than 1.2N·m torque.

●Connection examples for RS-485

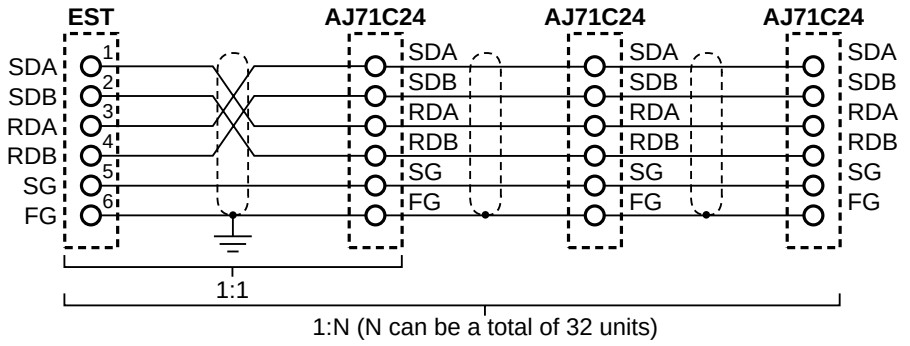
Yamatake Corporation (host supported module) (1:1, 1:N)



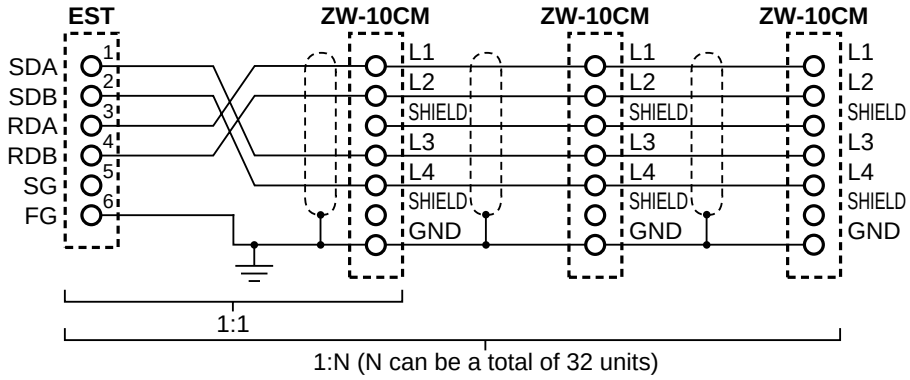
Yamatake Corporation (SDC10) (1:1, 1:N)



Mitsubishi (MELSEC-A series) (1:1, 1:N)



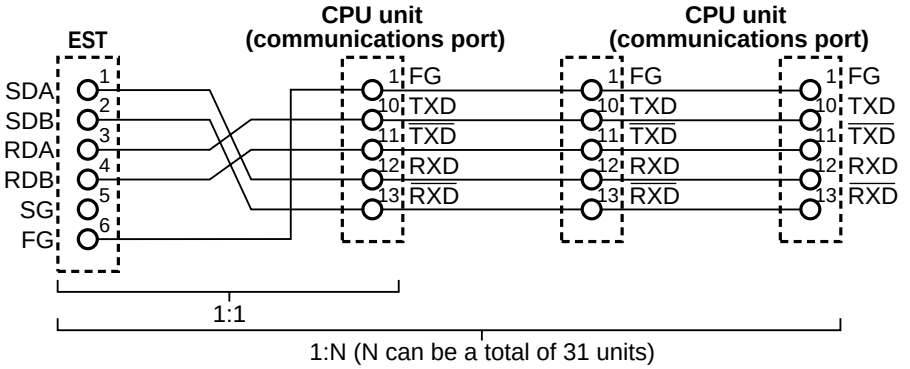
Sharp (ZW/JW series) (1:1, 1:N)



Caution on Installation

There are two shield terminals, one of which is connected to GND and the other is to an internal connection. Leave the SG terminal on the EST open.

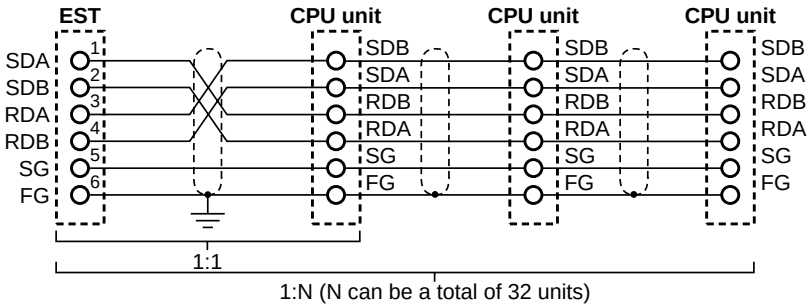
Sharp (JW series CPU) (1:N)



Caution on Installation

The communications port is located on the control unit of the JW-70CU/100CU and JW-70CUH/100CUH.

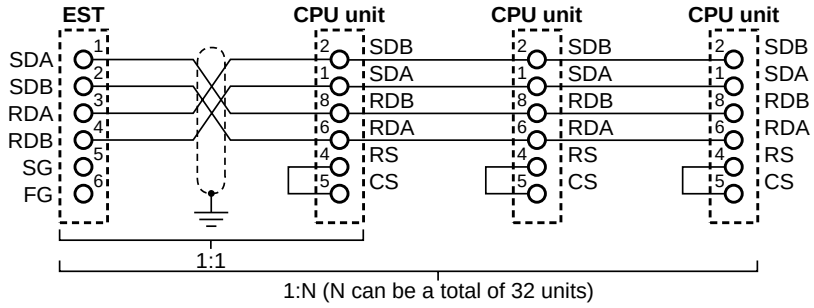
Omron (C series) (1:1, 1:N)



Caution on Installation

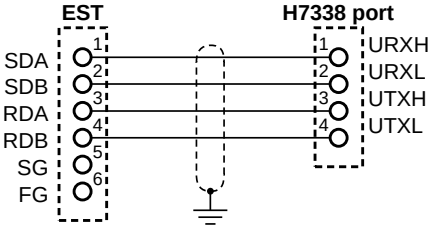
Leave the SG terminal on the EST open on models without an SG.

Omron (CV series) (1:N)



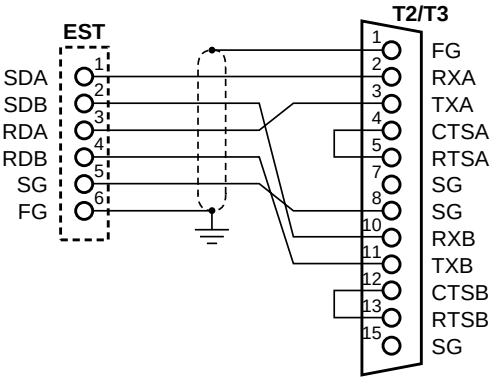
NOTE A link adapter B500AL001 is required.

Hitachi (S10α series) (1:1)

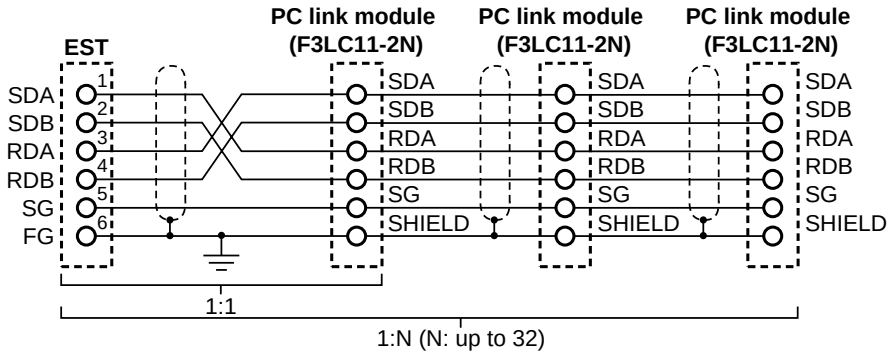


NOTE For an applicable model number, consult the Yamatake Corporation sales/service office or the dealer from whom you purchased the equipment.

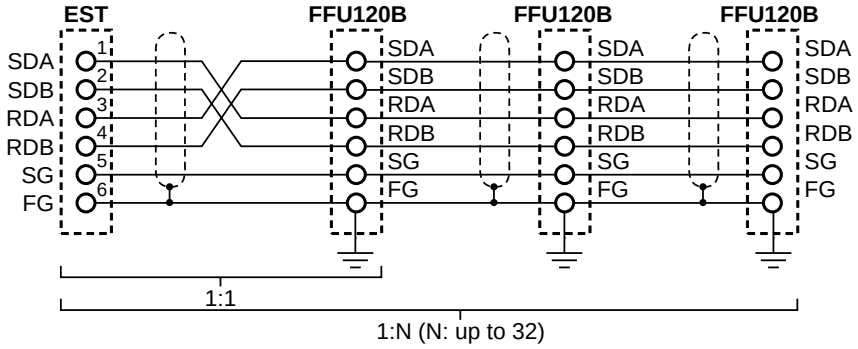
Toshiba (PROSEC T series) (1:1)



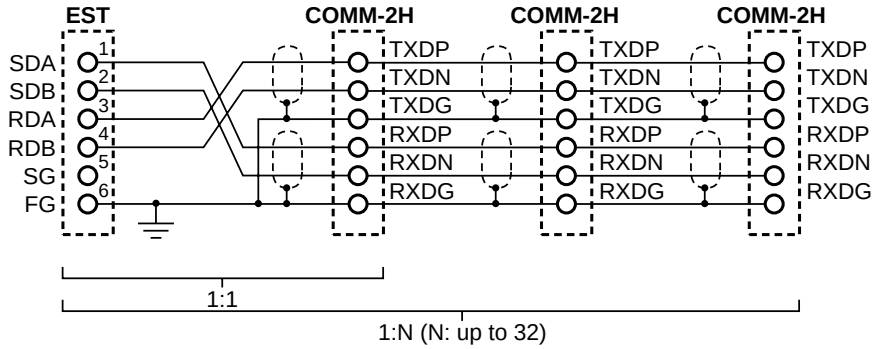
Yokogawa Electric (FA-M3 series) (1:1, 1:N)



Fuji Electric (MICREX-F series)



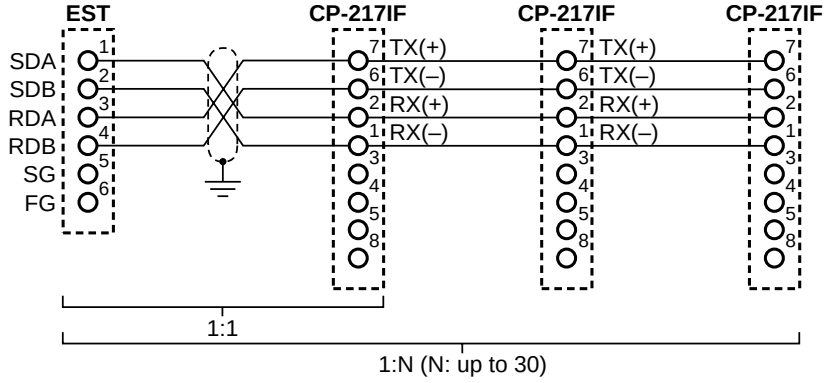
Hitachi (HIDIC/HIZAC H series COMM-2H) (1:1, 1:N)



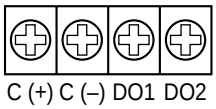
Caution on Installation

Leave the SG terminal on the EST open.

Yasukawa (CP-9200SH CP-217 IF module) (1:1, 1:N)



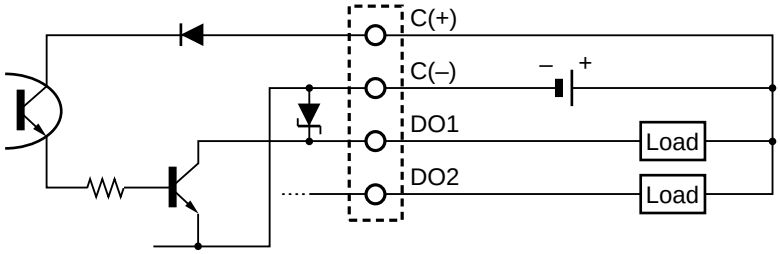
■ Parallel output connection



Configuration of output terminal signals

Signal	Description
C (+)	4.5 to 26.4V DC
C (–)	Ground
DO1	Output 1*
DO2	Output 2*

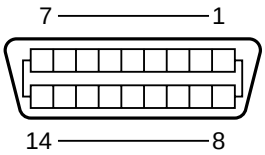
✻ In initial setting: • DO1 is the RUN mode output.
• DO2 is the alarm event output.



Output circuit diagram

■ Printer connection

Standard centronics connector



PRN connector signal table

Pin No.	Signal	Description
1	PSTB	Strobe
2	PDB0	Data 0
3	PDB1	Data 1
4	PDB2	Data 2
5	PDB3	Data 3
6	PDB4	Data 4
7	PDB5	Data 5
8	PDB6	Data 6
9	PDB7	Data 7
10	Not used	——
11	BUSY	Busy
12	Not used	——
13	Not used	——
14	GND	Ground

Applicable plugs:

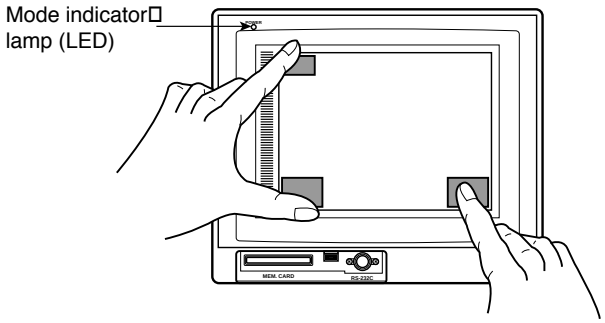
- MFP-14K-0111 (contact manufactured by Yamaichi Electronics Co., Ltd.)
- PC30-14P (insulation displacement contact manufactured by Hirose Electric Co.,Ltd.)

4-3 EST Setup

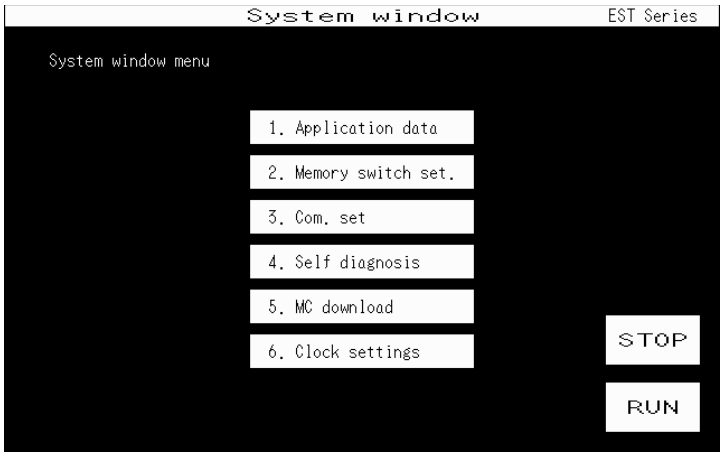
The EST is set up by calling up the system menu on the EST and selecting the desired items.
The following section describes EST setting procedures.

■ System window

Touch the function switches in the upper left, the lower left and lower right corners on the display at the same time.



The following system window menu is displayed.
The Mode indicator lamp (LED) flashes when the system window is displayed.



The system window menu has the following fields:

1. **Application data**
2. **Memory switch set.**
3. **Com. set**
4. **Self diagnosis**
5. **MC download** (**Memory card download**)
6. **Clock settings** (**Clock setting**)

This section describes **2. Memory switch set**, **3. Com. set** and **6. Clock settings**.

NOTE See "**Chapter 5. OPERATION PROCEDURES**" for descriptions of **1. Application data**, **4. Self diagnosis** and **5. MC download**.

Select the desired setting in the system menu.
STOP : Touch to go to STOP mode.
RUN : Touch to go to RUN mode.

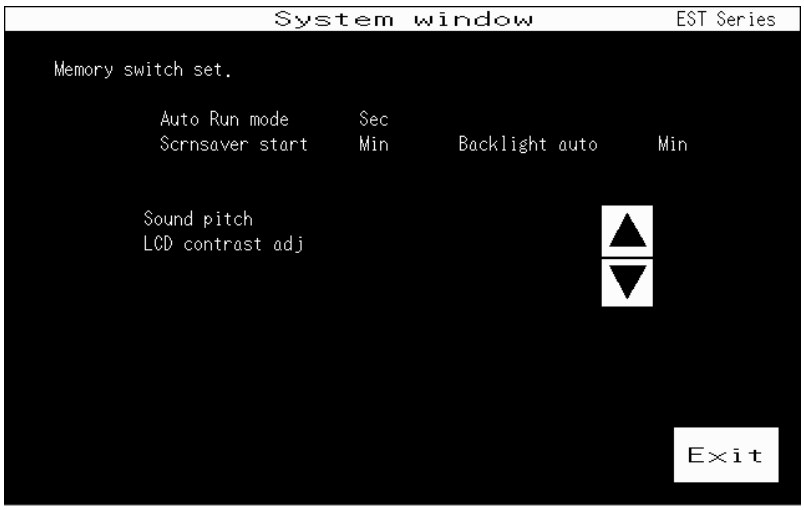
Caution on Installation

Do not turn off the power in the system window menu mode.
If you turn off the power in this mode, the internal device data can be change.

■ Memory switch set.

All EST settings are made in this menu.
The settings described below can also be made in the application data created on a PC. If such settings are entered, determine whether settings made in the switching menu are to be retained through a power down or whether they should be initialized by the application data the next time the EST is powered up.

Touch **2. Memory switch set.** in the system menu.
The following memory switch menu is displayed.



To activate **Auto Run mode**, **Scrnsaver start**, or **Backlight auto**, touch ☐ to the left. Touch the same again to deactivate the item.

Touching the time, tone and the contrast adjustment settings causes the area to be displayed in reverse video. Then enter the desired value with the up ▼ and down ▲ keys.
When all settings have been completed, touch **Exit** to return to the system menu.

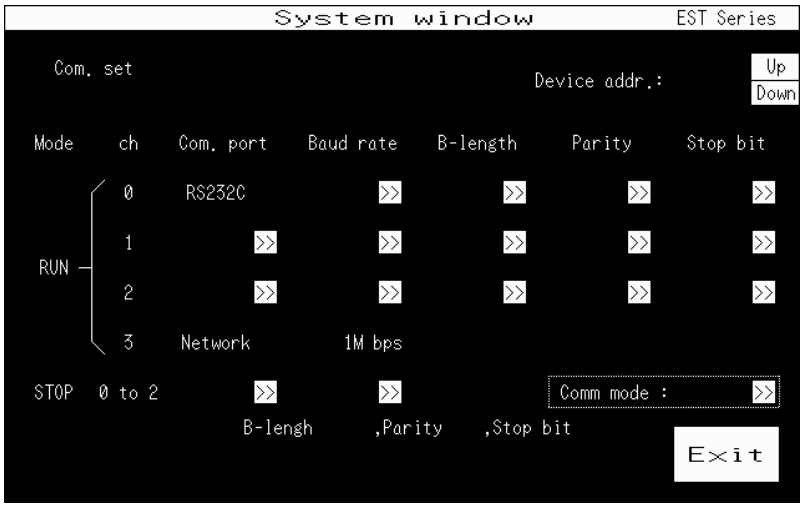
The message areas display the following messages.

Selected item	Message 1
Auto Run mode	Use the Up/Down keys to set the time of RUN mode activation after power up.
Scrnsaver start	Use the Up/Down keys to set the time of automatic screen saver startup.
Backlight auto	Use the Up/Down keys to set the time of automatic backlight shutdown.
Sound picth	Use the Up/Down keys to select one of three sound pitches.
LCD contrast adj	Use the Up/Down keys to adjust LCD contrast.

■ Com. set

Procedure for communications channel settings

Touch **3. Com. set** in the system menu.
The following communications settings menu is displayed.

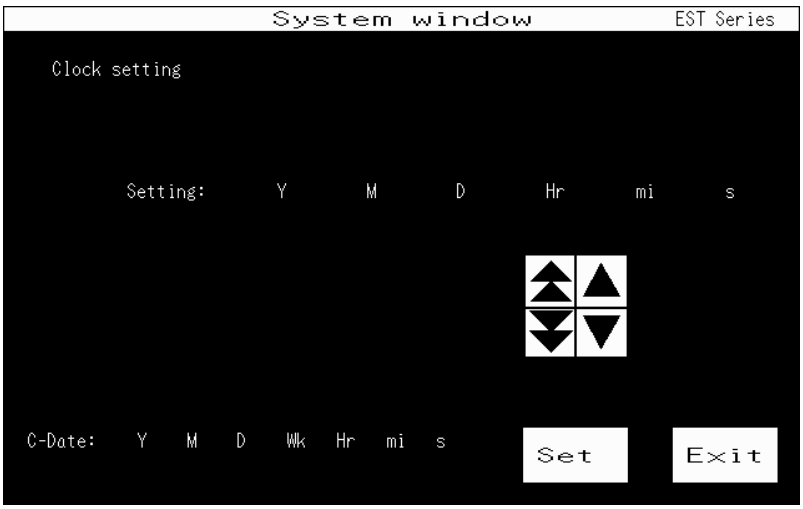


Each time you touch the switch marked ▼, the indication changes.
For example, when you touch the port switch, the indication changes from RS-232C to RS-485 and back to RS-232C.
Touch **Exit** to enter all made settings and return to the system menu.

■ Clock settings

The internal EST clock is set as described below.

Touch **6. Clock settings** in the system menu.
The following clock setting menu is displayed.



Touch any number that is to be changed, to highlight it. It can now be changed with the following keys.
Touch the ▲ or ▼ key to select the next higher or lower number.
Keep touching the ⏬ or ⏫ key to continuously change the numbers.
Any year between 1950 and 2035 can be set. The days of the week are automatically set.
Set : Touch to change currently selected value.
Exit : Touch to return to the system menu.

❗ Caution on Installation

If **Exit** is touched before the **Set** key, the clock setting is not changed.

Chapter 5. OPERATION PROCEDURES

5-1 Downloading

The data used to operate the EST is referred to as application data. The application data is downloaded from a PC to start up an EST.

●Download procedure

(1) Turn off the PC and the EST and connect them with an RS-232C cable.

(2) Turn on the EST.

(3) Turn on the PC and start up the AP Editor. Select Download in the Select menu. Following two downloading methods are available.

- Select **Application data edit** on the Select menu  and **Download**.
- Select Download  in the Quick icons on the Select menu.

(4) Select the name of the created application data file and click **Execute**.

(5) When the download process starts, the following parameters are displayed on the PC screen to indicate the progress of the download process:

The name of the file to be transferred
Number of bytes transferred
Type of data downloaded

On the EST screen, the following three messages indicate the progress of a download:

>>"**Application data is now being initialized**"
>>"**Initialization of application data has now been completed**"
>>"**Download in progress**"

(6) When the download is completed, the download menu on the PC screen is exited. While the EST screen displays the following message:

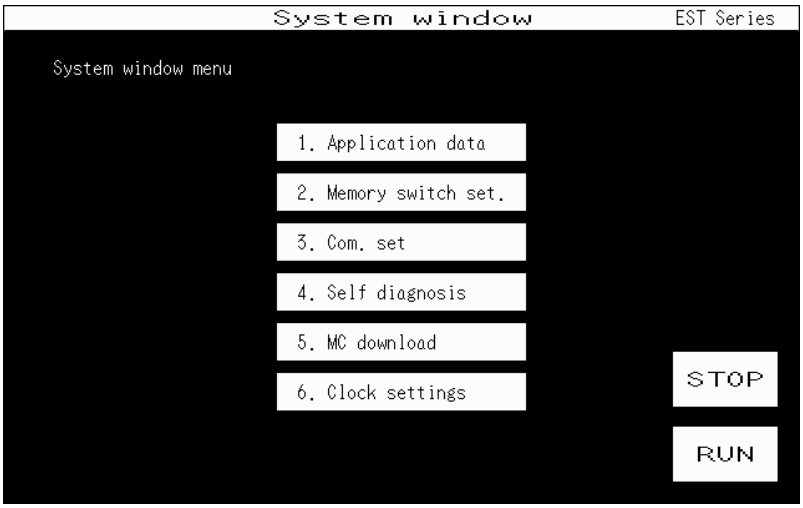
>>"**Download process has been completed**"

(7) To run the EST, touch the function switches in the lower right corner, lower left corner and upper left corner simultaneously to display the system menu.
When the system menu appears, touch the **RUN** button.
When the EST has been set to auto run mode with the memory switch settings, turn off the EST and turn it back on again to set it to run mode.

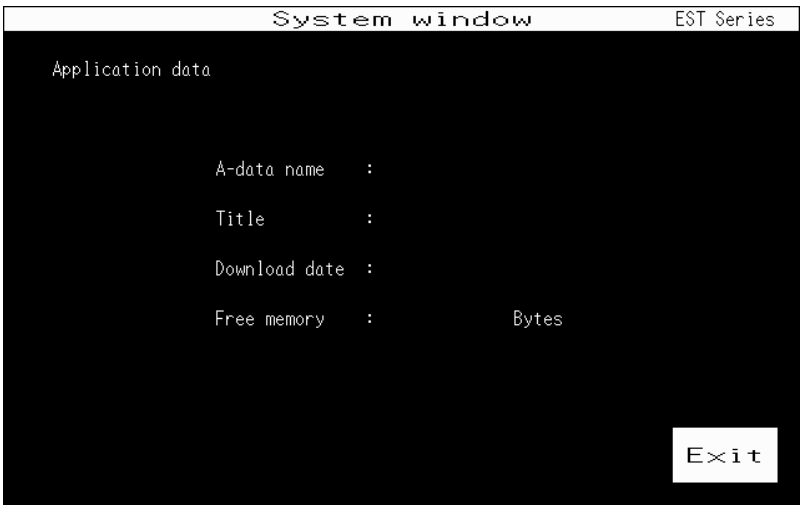
NOTE Refer to the **Smart Terminal EST Series User's Manual "AP Editor Operation Manual" (Manual No. CP-UM-1673E)** for further information on how to download data.

5-2 Application Data

Touch the function switches in the lower right corner, lower left corner and upper left corner simultaneously to display the system menu.
The following system window menu is displayed.



Select **1. Application data** in the system window menu.
Application data screen is displayed.



The following application data is displayed.

Item	Description
A-data name	Downloaded file names
Title	File comment
Download date	Date of download operation
Free memory	Unused memory in bytes

Exit: Touch to return to the system menu.

Caution on Installation

If the Application data file name is modified outside of the AP Editor (ex. file copy and rename), then the Application data name displayed will not match the file name.
Always use the AP Editor to change the name of the Application data.

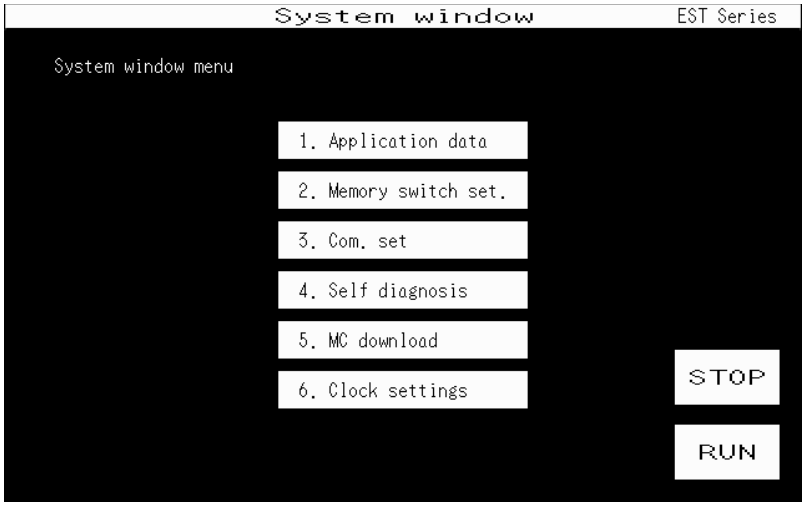
5-3 Self-Diagnostic Function

The self-diagnostic function of the EST can diagnose the following conditions.

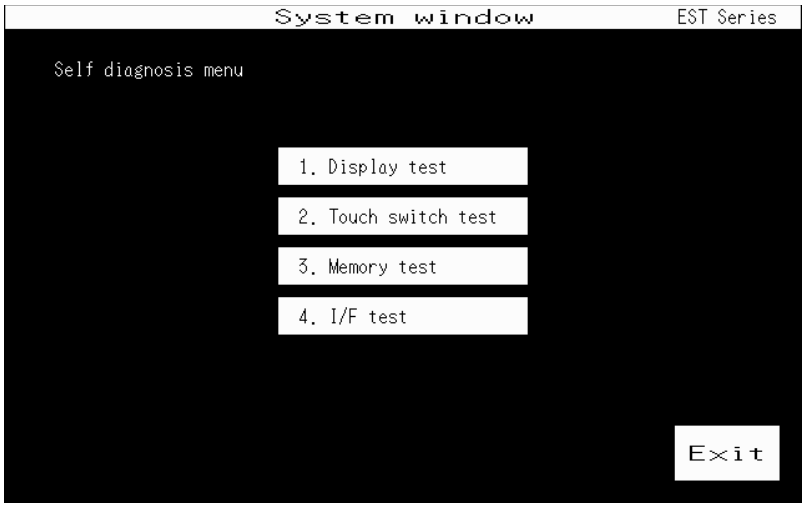
1. The screen or part of it is not displayed.
2. The touch switches do not respond.
3. Erratic operation after downloading application data
4. A serial communications error has occurred or the parallel interface does not operate normally.

Touch the function switches in the lower right corner, lower left corner and upper left corner simultaneously to display the system menu.

The following system window menu is displayed.

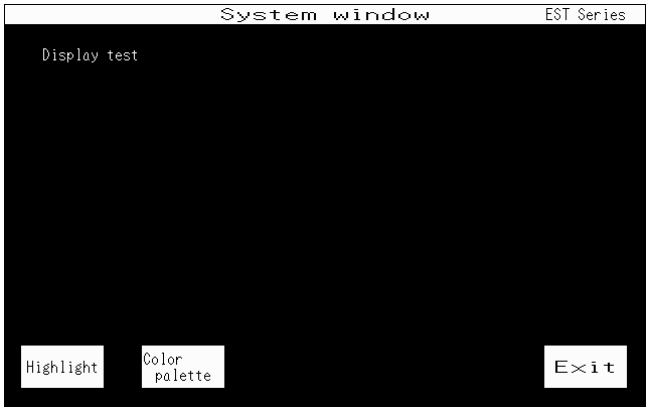


Touch **4. Self diagnosis** in the system window menu.
The following self diagnosis menu is displayed.



■ Display test

Touch **1. Display test** in the self diagnosis menu.
The following screen is displayed.



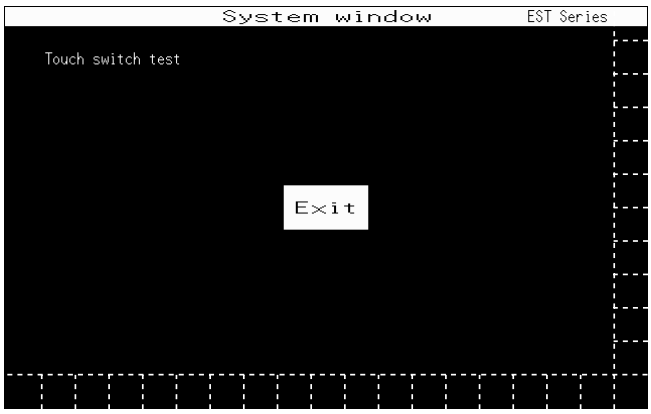
Highlight: Touch to cause all screen pixels to go on and off alternately.
Exit: Touch to return to the self diagnosis menu.

! Caution on Installation

- On the EST0300, the 80 pixels that constitute the function keys go on and off in the same manner.
- The EST0300 and the EST0330 display shades of gray when the color palette key is touched.

■ Touch switch test

This is a test of the 32 × 20 touch panel switch matrix.
Touch **2. Touch switch test** in the self diagnosis menu.
The following screen is displayed.



When a cell ☐ is touched, there is a beep and an OK sign is displayed. When the same cell is touched again, the OK sign is undisplayed.
The function switches operate in the same way.
Exit: Touch to return to the self diagnosis menu.

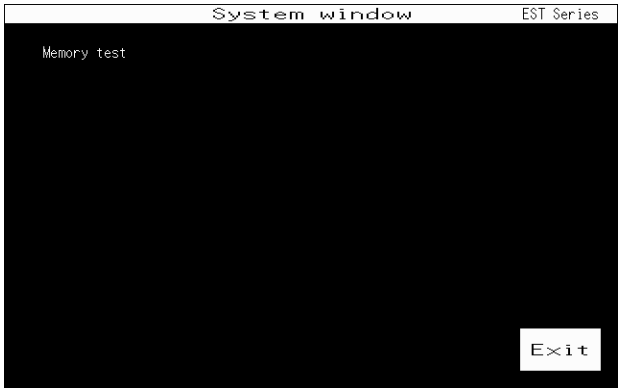
! Caution on Installation

Since the function switches on the EST0330 (EL) have no display area, only the buz z er can be heard.

■ Memory test

Memory test can be performed as follows:

Touch **3. Memory test** in the Self diagnosis menu.
The following screen is displayed, memory test is performed, and a message is displayed.

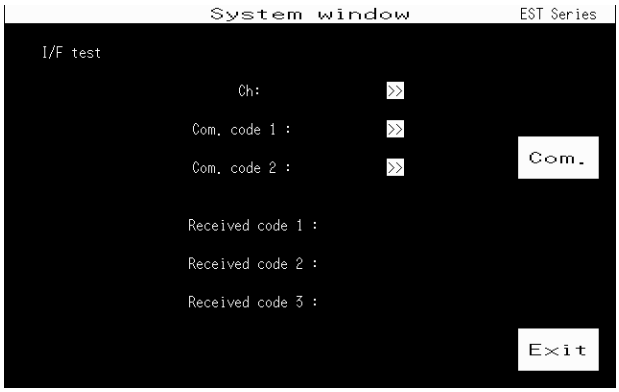


Step	Message
End of memory test	"**Memory test completed. No error found**" or "**An error was detected in the memory test**"

Exit: Touch to return to the self diagnosis menu.
If "**An error was detected in the memory test**" is displayed, contact the Yamatake Corporation sales/service office or the dealer from whom you purchased the equipment.

■ Interface test

Touch **4. I/F test** in the self diagnosis menu.
The following menu is displayed.
The Mode indicator lamp (LED) changes from red to green and to orange.



Touch the channel (ch) that is to undergo the interface channel test.
Each time the ▼ key is touched, the indication changes from ch0, ch1, ch2 and ch3, to DI/DO, to printer (PRN) and back. Enter the one-byte transmission code to be transmitted by the EST. The following settings can be made: 01, 02, 04, 08, 10, 20, 40 and 80.
Touch the ▼ key to change codes.
In a DO test the high-order byte of a 16-bit output is set in transmission code 2. Reception codes always display communications channels 0 to 3 and the most recent data received from the DI. DI has a 24 point input so three bytes are displayed in reception code 1 and 3.
Com. : Touch to output the selected transmission code for the selected channel.
Exit : Touch to return to the self diagnosis menu.

5-4 Memory Card Download

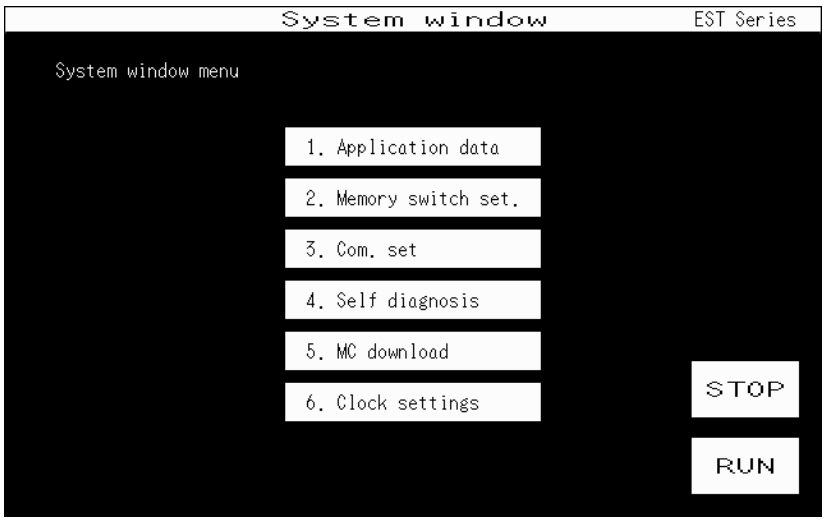
Memory card transfer has the following functions.

1. **Downloading the application data**
   The application data for the EST saved in the SKM (Yamatake Corporation SKM series interface proximity memory card) is read to the EST.
2. **Uploading the application data**
   The application data in the EST is saved to SKM (SKM512C).
3. **Initializing the memory card**
   The SKM is initiated so that the memory card (SKM) can be used on the EST.
   If you use memory card (SKM) on the EST, it should be initialized beforehand.

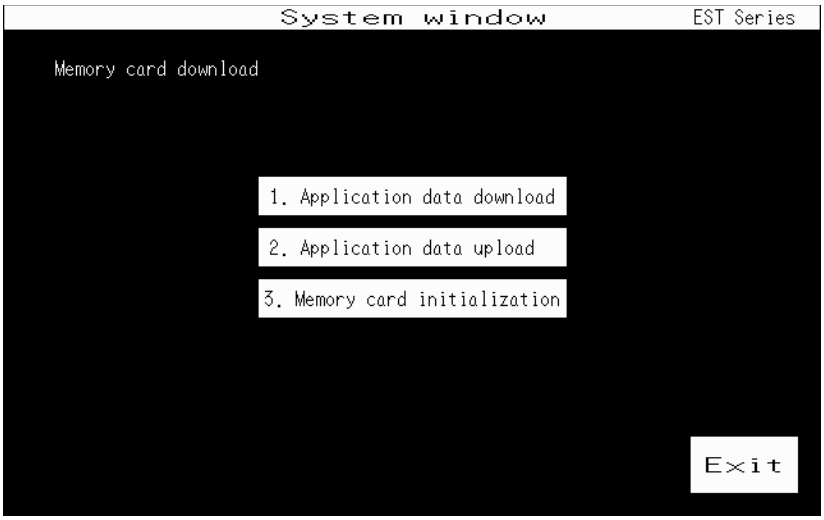
Caution on Installation

Memory card transfer is available only on the EST with optional memory card.

Touch function switches in the lower right corner, lower left corner, and upper left corner simultaneously.
The following system menu is displayed.



Touch **5. MC download** in the system window menu.
The following memory transfer menu is displayed.



■ Downloading the application data

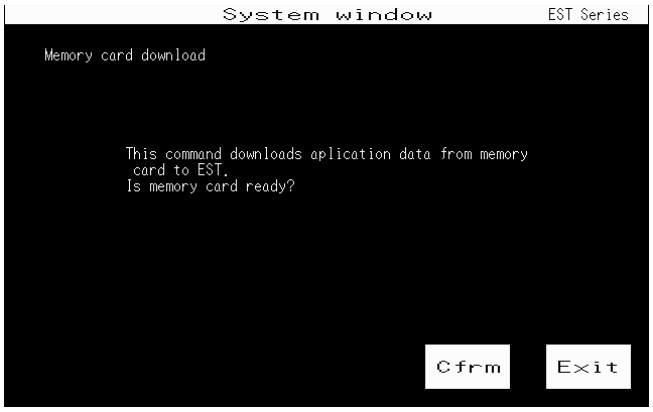
The application data of the SKM is read to the EST.

Caution on Installation

- Use the memory card SKM512C.
- Be sure to initializ e the SKM before use.

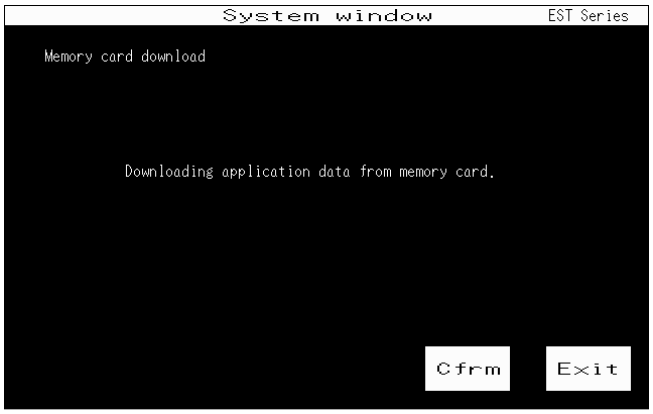
●Download procedure

(1) Touch **1. Application data download** in the memory card download menu.
The following screen is displayed.

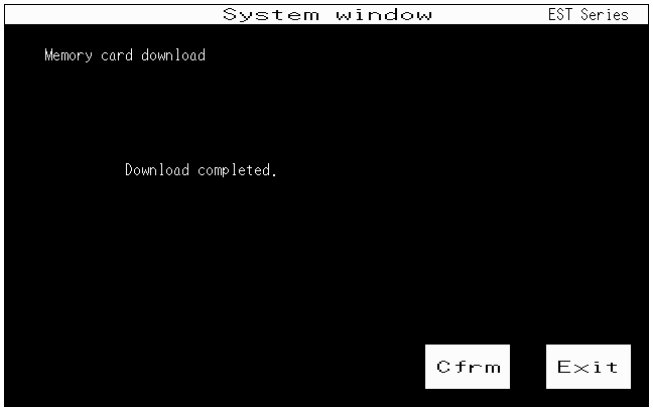


(2) Insert the memory card (SKM512C) in which the EST application data is uploaded to the memory card slot.

(3) Touch **Cfrm** to start downloading.



(4) When downloading is completed, touch **Exit**.
The screen returns to the memory card download menu.



■ Uploading the application data

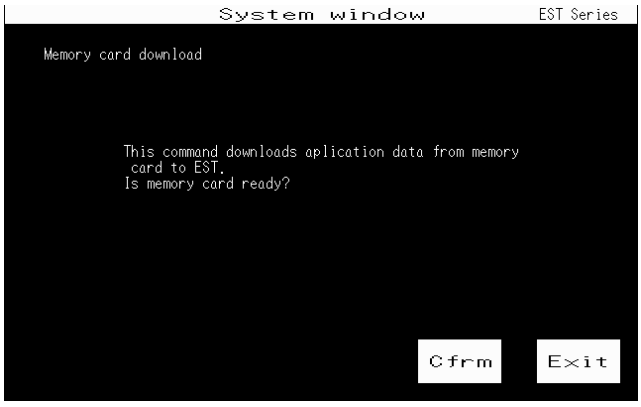
The application data of the EST is saved to SKM.

Caution on Installation

- Use the memory card SKM512C.
- Be sure to initializ e theSKM before use.
- When the application data of the EST exceeds 5237 7 5bytes, it cannot be uploaded to the SKM.

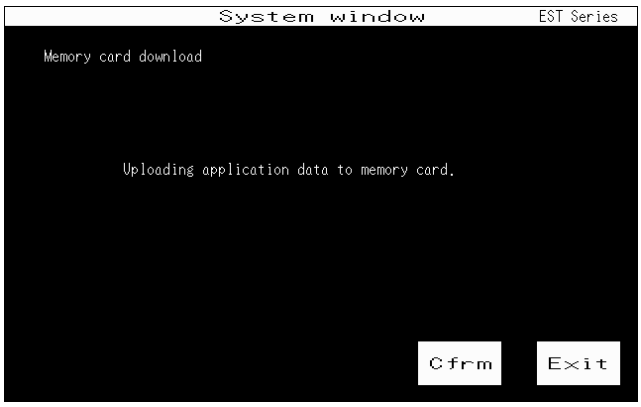
●Upload procedure

(1) Touch **2. Aapplication data upload** in the memory card download menu. The following screen is displayed.

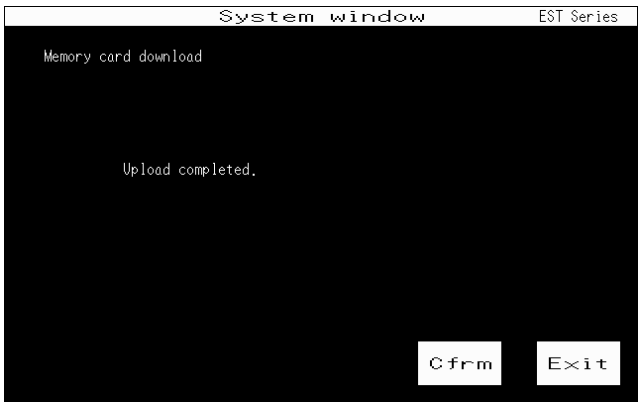


(2) Insert the memory card (SKM512C) in which the EST application data is initialized to the memory card slot.

(3) Touch **Cfrm** to start uploading.



(4) When uploading is completed, touch **Exit**. The screen returns to the memory card download menu.



■ Initializing the memory card

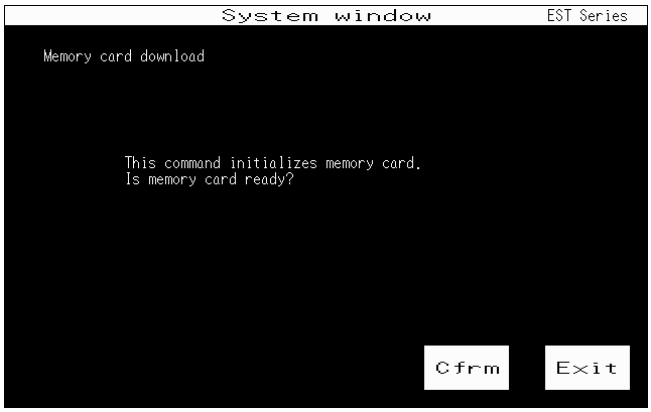
The SKM is initialized to be used in the EST.

! Caution on Installation

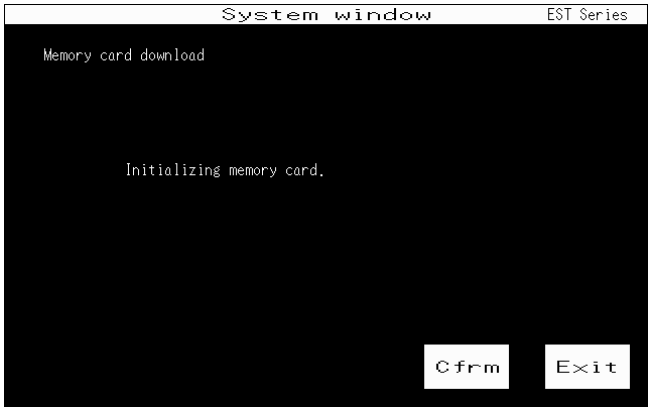
A new SKM which is not initializ ed is unavailable.

●Initializing

(1) Touch **3. Memory card Initialization** in the memory card download menu.
The following screen is displayed.



(2) Insert the memory card (SKM512C/SKM128C) to the memory card slot.
(3) Touch **Cfrm** to start initializing.



(4) When initializing is completed, touch **Exit**.
The screen returns to the memory card download menu.

Chapter 6. MAINTENANCE AND INSPECTION

6-1 Maintenance

Regular or daily inspection will ensure a long service life for your Smart Terminal.

⚠CAUTION	
	Be sure to turn off the power before maintenance of the EST.
	Do not touch the IC leads with bare hand. Electronic devices of IC can be damaged by static electricity. The use of antistatic work benches are highly recommended.

Caution on Installation

- Maintenance should not be done by a person who does not have experience of handling or assembling electronic equipment.
- Replacement of parts requires close attention.
  Be careful not to lose or damage disassembled parts like screws.

■ Battery replacement

⚠CAUTION	
	When disposing of used batteries at the user site, observe local bylaws.
	Do not short-circuit the batteries as they may be hot or start burning, and do not expose them to water.

●Battery replacement timing

- 5 years after date of manufacture or 5 years after latest replacement (at room temperature).
- When the diagnostic command has output a battery alarm.

●Required items

- New battery·····Parts No. MX100BT01
- Phillips-head screwdriver
- Small flat-head screwdriver

●Note on battery replacement

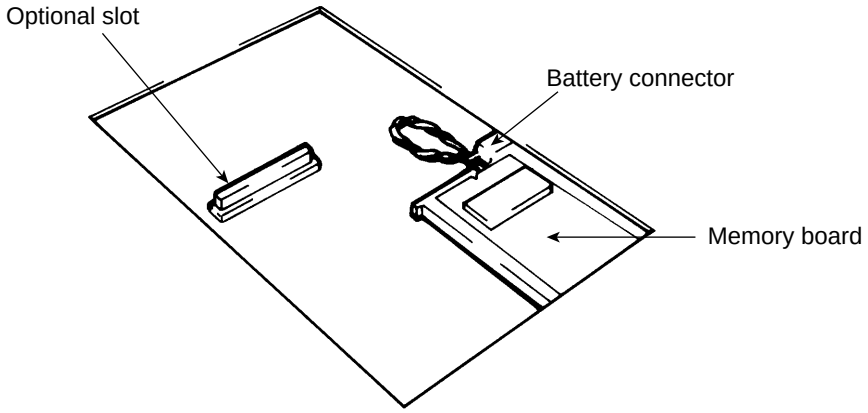
- Replace the old battery with the designated Yamatake Corporation battery.
- Turn on the EST 10 minutes before replacing the battery and perform the replacement within 10 minutes to prevent data loss.

●**Replacement procedure**

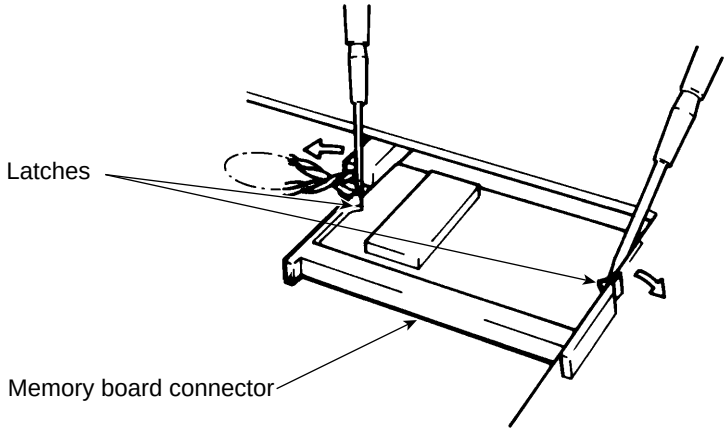
(1) Turn on and leave on the EST for 10 minutes before the replacement and turn off the power.

(2) • When an optional board is installed (Refer to EST "■ **Rear view**" on page 2-1):
Remove the two securing screws in the optional board.
Pull the board gently toward you to remove it from the optional slot.

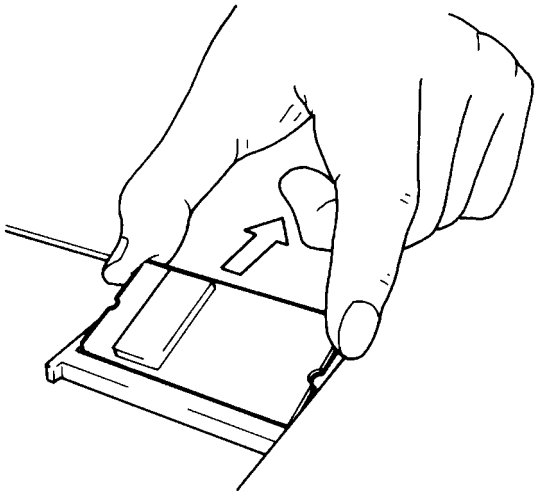
• When no optional board is installed (Refer to EST "■ **Rear view**" on page 2-1):
Remove the two securing screws in the optional cover.



(3) Open the latches in the memory board connector using the small flat-head screwdriver.



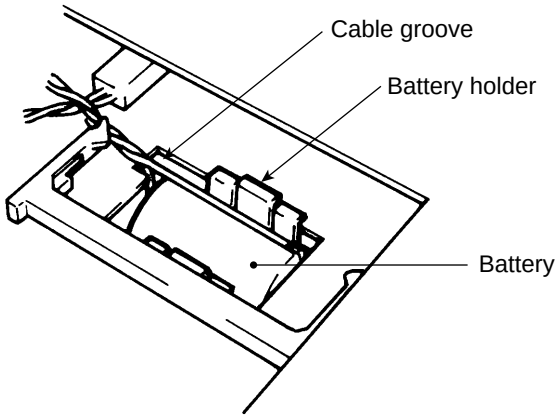
(4) The memory board now flips back.
Hold the memory board between the forefinger and the thumb and gently remove it from the connectors.



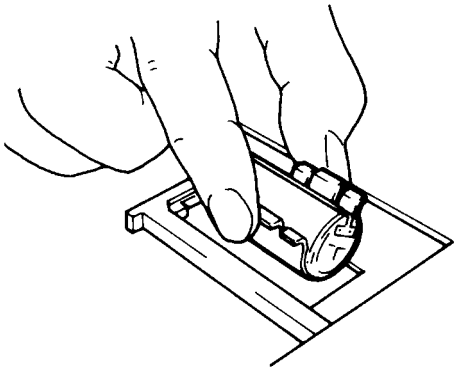
Caution on Installation

Do not touch the memory board connectors.

The battery is located underneath the memory board.

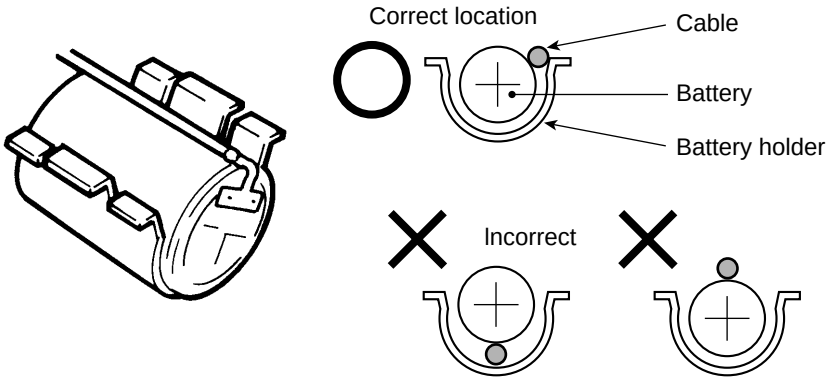


(5) Remove the battery connectors.
(6) Press the latches of the battery holder together between the thumb and the forefinger and pull it towards you.



(7) Remove the battery from the battery holder.
(8) Place the new battery in the battery holder.
Place the battery cable between the battery holder and the battery.

Location of battery cable



Caution on Installation

The PCB (Print Circuit Board) cannot be installed if the cable is not correctly routed.

(9) Install the battery connectors. Make sure that the poles of the battery are correctly oriented.
(10) Place the battery holder in the recess above the PCB.

Caution on Installation

The battery cable must be placed in the groove of the PCB when the battery holder is installed.

(11) Replace the memory board and attach the memory board connectors.
(12) Replace the optional board and optional cover.

Caution on Installation

- Do not touch the memory board connectors as this may damage them or prevent normal operation.
- When the connectors become dirty, clean them with a cloth moistened in alcohol.

■ Replacing the panel protective sheet

Replace the panel protective sheet when it becomes dirty or scratched.
This replacement can be performed when the EST is mounted in a control panel or other equipment.

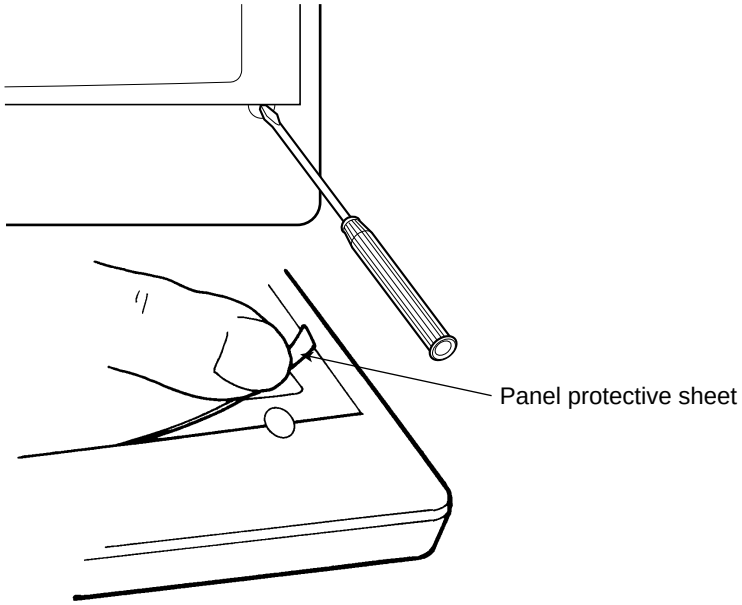
●Required items

- Panel protective sheet: for EL ·····Parts No. ESTX933SS00
  for monochrome LCD·····Parts No. ESTX930SS00
- Small flat-head screwdriver

●Replacement procedure

The sheet is attached to the display with an adhesive.

(1) There is a semi-circular recess at the lower right part of the screen.
Insert a small flat-head screwdriver into this recess and gently pull off the sheet.



(2) Remove dirt and remaining adhesive from the display screen.
(3) Remove the exfoliate paper on the backside of the new panel protective sheet. Make sure that no dirt gets stuck in the adhesive.
(4) Attach the sheet aligning the long side of the sheet with the lower and upper side of the screen.
(5) sure that the sheet is properly attached to the screen.
(6) Remove the film on the panel protective sheet when the sheet has been attached.

! Caution on Installation

The panel protective sheet can be reattached 2 to 3 times if creases appear. Make sure that it is properly attached as dirt on the side of the adhesive will lower the power of the adhesive and make it impossible to meet its specified drip-proof specifications.

■ Replacing the display unit

Replace the display unit when it is damaged. This replacement can be performed when the EST is mounted in a control panel or other equipment.

⚠WARNING

The display unit is very heavy.
Make sure not to drop it when you replace it. Doing so can harm your body or the unit.

●Required items

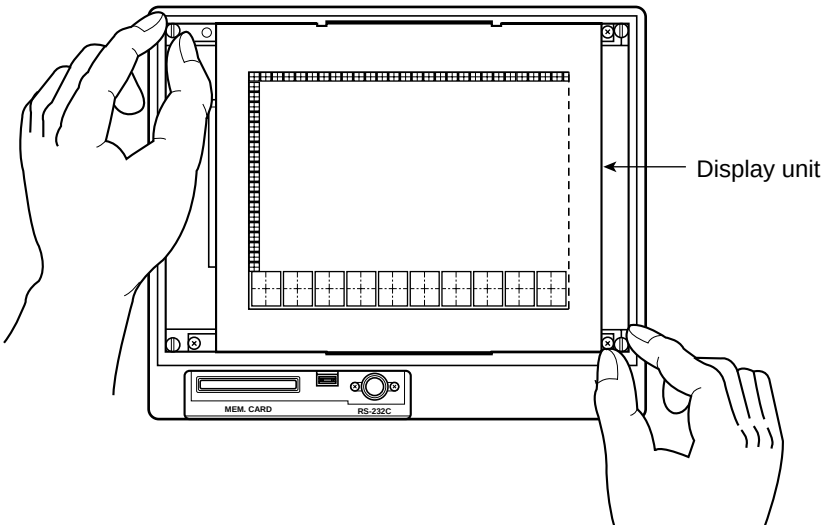
- Display unit: for EL ·····Parts No. ESTX933DP00
  for monochrome LCD ·····Parts No. ESTX930P01
- Flat-head screwdriver
- Small flat-head screwdriver

●Replacement procedure

(1) Turn off the power.
(2) Remove the panel protective sheet.

📖 **NOTE** Follow the instructions on page 6-5, "**■ Replacing the panel protective sheet**".

(3) Remove the display unit from the body.
The display unit consists of the touch switch panel, the display and PCBs.



(4) The display unit is secured with 4 thumb screws. Loosen the screws with a flat-head screwdriver.
Remove the diagonally opposite screws and lift the display out of the body.
(5) Install the new display unit and secure it with the thumb screws.
(6) Attach the panel protective sheet.

📖 **NOTE** Follow the instructions on page 6-5, "**■ Replacing the panel protective sheet**".

■ Touch switch panel replacement

Damaged and defective touch switch panel can be replaced.

●Required items

- Touch switch panel for large model·····Parts No. ESTX939TS00
- Panel protective sheet
- Flat-head screwdriver
- Phillips-head screwdriver

●Replacement procedure

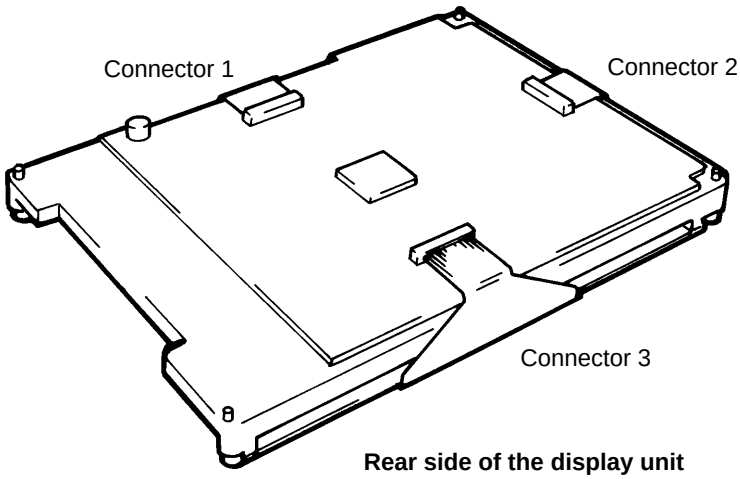
(1) Remove the panel protective sheet.

📖 **NOTE** Follow the instructions on page 6-5, "■ **Replacing the panel protective sheet**".

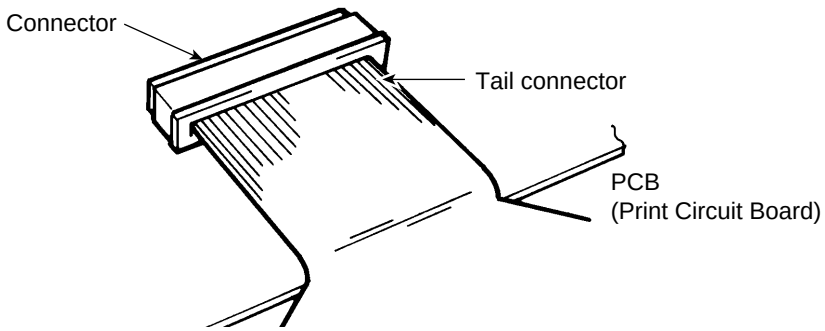
(2) Remove the display unit from the body.

📖 **NOTE** Follow the instructions on page 6-6, "■ **Replacing the display unit**".

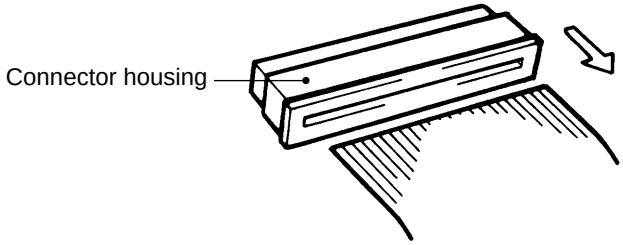
(3) Place the display unit on a flat surface with the rear side up.
Remove the three tail connectors (ribbon cable connectors) from the PCB connector.



Rear side of the display unit



(4) Slide the connector housing towards the tail connector.

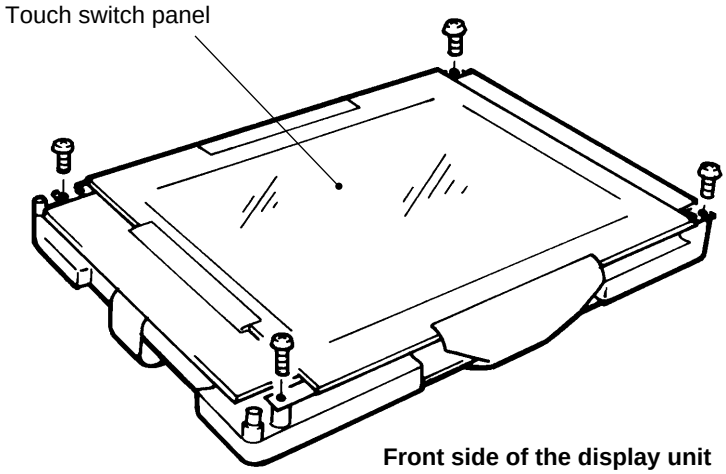


(5) Slide and disconnect the tail connector.

Caution on Installation

Do not touch the conductor on the front end of the tail connector to prevent poor contact.

(6) Remove the other connectors in the same way.
(7) Place the display unit on a flat surface with the front side up.



Front side of the display unit

(8) Remove the four touch switch panel securing screws using a phillips-head screwdriver. Remove the touch switch panel.

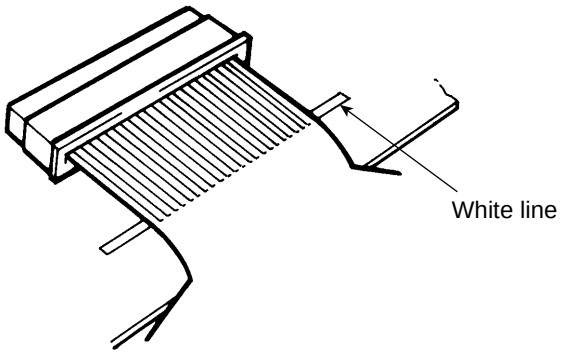
Caution on Installation

Do not lose the removed screws.

(9) Install the new touch switch panel and secure it with the four screws.
(10) Place the display unit with the rear panel up.

(11) Connect the three tail connectors.

Slide the tail connectors into the connector housings.



Caution on Installation

Insert the tail connectors so far into the housing that the black portion of the tail connectors is aligned with the white line on the board.

Slide the connector housings in the direction of the tail connectors to secure them.

(12) Mount the display unit.

NOTE Follow the instructions on page 6-6, "■ **Replacing the display unit**".

(13) Attach the panel protective sheet.

NOTE Follow the instructions on page 6-5, "■ **Replacing the panel protective sheet**".

6-2 Inspections

This section describes inspections that should be performed regularly.

■ Notes on inspections

- Do not use organic solvents or alkali for cleaning.
- Turn off the power before cleaning.
- Tighten terminals and screws to specified torque.

■ Inspection procedures

●Condition of installation

Check points	Check	Correction
Metal fittings, power supply terminals, connector connections and connector securing screws	All screws must be properly tightened and all connectors and terminals properly connected.	Tighten or correct as necessary.
Ambient temperature and humidity Environmental conditions	Temperature and humidity must be within the prescribed range. There must be no corrosive gas, dust or condensation.	If the temperature is too high, install a fan to lower the temperature. Adjust environment to ensure proper ventilation.
Panel protective sheet	The display should be easy to view. The panel protective sheet must be properly attached. There must not be any dust on the panel protective sheet.	Wipe the panel protective sheet with a soft damp cloth or use a soft brush. If required, replace the panel protective sheet.
Power supply voltage	The power supply voltage must be within the following ranges: AC power supply: 85 to 132V AC DC power supply: 21.6 to 26.4V DC	Check the power supply, power voltage and wiring.
Battery life Battery alarm	The battery must be less than 5 years old. No battery alarms should have been generated.	Replace if 5 years has elapsed since installation or battery replacement.

Chapter 7. TROUBLESHOOTING

7-1 Error Messages and Countermeasures

The following table gives the error messages of the EST and corrective measures.

Message	Countermeasure
System error!!! ROM check error	Make a hard reset. If the message appears again, the EST is defective. Contact the Yamatake Corporation sales/service office or the dealer from whom you purchased the equipment.
System error!!! RAM check error	Make a hard reset. If the message appears again, the EST is defective. Contact the Yamatake Corporation sales/service office or the dealer from whom you purchased the equipment.
System error!!! Watchdog error	Make a hard reset. If the message appears again, the EST is defective. Contact the Yamatake Corporation sales/service office or the dealer from whom you purchased the equipment.
System error!!! Not enough memory	There is not enough memory. Install more memory or trim application data specifications.
Abnormal CHx communications Reboot	An error has occurred in CHx communications. 1. Check for incorrect application communication settings (addresses, station numbers, etc.) 2. Check for incorrect connections and broken cables. 3. Check settings on connected equipment (parity, transfer rate, etc.) 4. Check EST settings (parity, transfer rate, etc.) and reboot.
The EST was set to the STOP mode	If the EST was not set to STOP with the AP Editor, an error has occurred in the execution of the application data. Check for incorrect settings in the application data. If no incorrect settings can be found, download the data again.
System error!!! Initialization of application data failed	The application data has been corrupted and startup cannot be performed. Download the data again. If the error occurs a second time, contact the Yamatake Corporation sales/service office or the dealer from whom you purchased the equipment.
System error!!! Sorting of application data failed	The application data has been corrupted and startup cannot be performed. Download the data again. If the error occurs a second time, contact the Yamatake Corporation sales/service office or the dealer from whom you purchased the equipment.
Caution! Download failed	1. A communications error occurred during the download. 2. There is an error in the downloaded data. Download the data again. If the error occurs a second time, contact the Yamatake Corporation dealer.

7-2 Checks to be Performed in the Event of a Problem

Symptoms	Check points	Checks
The backlight does not go on.	Power supply Power switch Temperature Application data	Is the correct voltage being supplied? Is the power switch set to ON? Is the ambient temperature too low? Is the backlight set to OFF?
No data is displayed.	Download Power supply	Was the correct application data file downloaded? Is the correct voltage being supplied?
Display is faded.	Protective sheet	Is the thin protective film on the protective sheet taken off completely?
Download cannot be performed.	Cables Settings	Is the PC correctly connected to the EST? Do PC and EST settings match each other?
EST and PLC communications not possible.	PLC EST Application data	Is the station no., transfer rate and checksum of the communications module correctly set? Are the communications settings correct? Has the communications program been downloaded? Are the device settings of the component, communications port and station no. settings correct?
Switches do not respond.	Damage Replace Application data	Are the touch switches damaged? Was the touch switch panel correctly connected when replaced? Are the device settings of the component, communications port and station no. settings correct?

Caution on Installation

When the instrument is powered up after having been left in a cold location, the display will remain dark for about 10 minutes. This is only normal and not a cause for concern.

Chapter 8. SPECIFICATIONS

8-1 General Specifications

■ Electrical specifications

Items / Model No.	Specifications	
	EST0300	EST0330
Power supply voltage	85 to 132V AC 50/60Hz or 24V DC -10%	85 to 132V AC 50/60Hz
Current	AC power supply: 50VA or less DC power supply: 2A or less	
Allowable transient power loss	20ms or less (AC power supply)	
Withstand voltage	AC power supply: 1500V AC for 1 minute (input–FG, Input–output) DC power supply: 1000V AC for 1 minute (input–FG, Input–output)	
Insulation resistance	500V DC, 10MΩ or more (between charged terminal and other terminal)	
Grounding	Less than 100 Ω Annealed copper wire more than 2mm^2 (AWG14) or equivalent or thicker wire	

■ Environmental specifications

Items	Specifications
Operating temperature range	Display unit contrast : 0 to 45˚C Operation guaranteed: 0 to 50˚C
Storage temperature range	-20 to +60˚C
Operating humidity	30 to 85% RH (non-condensing)
Storage humidity	30 to 85% RH (non-condensing)
Operating atmosphere	No presence of corrosive gas
Vibration resistance	Conforms to JIS C 0911, the equipment is exposed to 10 to 55Hz vibrations , 9.8m/s^2 in X, Y and Z directions, single sweep: 6 minute., 2 hours in each direction
Impact resistance	Conforms to JIS C0912: 98m/s^2 for 20sec. or less
Noise resistance	AC power supply: 1200V DC power supply: 1000V (100ns to 1μs)
Protective structure	IP64 (dust and drip-proof)

■ Mechanical specifications

Items	Specifications
External dimensions	295(W) × 250(H) × 99(D)mm When power supply is removed: 295(W) × 250(H) × 65(D)mm
Weight (Mass)	EST0330: 2.9kg / EST0300: 2.7kg
Structure	When the EST is mounted in a panel, the display unit can be removed and installed.
Cooling	Natural convection
Torque of set screws in power supply	Recommended torque: 1.2N·m Maximum torque : 1.4N·m
Torque of terminal block screws	Recommended torque: 1.2N·m Maximum torque : 1.4N·m
Torque of EST body metal fittings	Turn screws an extra half to 1 turn when the EST is seated.
Torque of optional cover and optional set screws	Recommended torque: 1.2N·m Maximum torque : 1.4N·m

8-2 Performance Specifications

■ Display functions

Items / Model No.	Specifications	
	EST0300	EST0330
Display devices	Monochrome LCD	EL display
Display color	Monochrome (no gray scale)	Orange
Resolution	640 × 400 pixels	
Function switch	640 × 80 pixels	Fixed
Dot pitch	0.3mm	0.3mm
Service life of display* (at room temperature)	87 ,500 hours	50,000 hours
Service life of backlight* (at room temperature)	10,000 hours	———
Screen saver	Goes on after set time	
Goes on after set time	Goes off after set time	
Attribute	Inversion, blinking (flashing)	
Display characters	158 ANK, 6349 kanji characters (including 453 symbols; JIS level 1 and 2 kanji sets)	
External character bitmap	32 × 32 pixel font, 500 characters	
Display characters 8 × 8 pixels 8 × 16 pixels 16 × 16 pixels	 80 characters × 50 lines 80 characters × 25 lines 40 characters × 25 lines	
Display character size	1 to 8 integers in vertical and horiz ontal directions	
Graphic devices	Straight lines, rectangles, circles, circular arcs, ellipses, elliptic arcs, paint out and bit-mapped patterns	
Graph trends	Bar graph, line graph and analog meter	
Display functions	Numerics, time values, character strings and registered graphical elements	

* Service life is estimated with the brightness turned down by 50% and is not a guaranteed value

■ Screen memory

Items	Specifications
Memory capacity	EST0✻✻✻C✻✻WB✻✻✻ : 512Kbytes
Number of screens	999 panels (depends on installed memory)
Number of panels	Up to 8 simultaneously

■ Switches

Items	Specifications
Touch switches	32 × 20
Function switches	10
Switch system	Transparent resistor membrane
Surface material	Polyethylene terephthalate (PET)
Service life	1 million times (finger input)

■ Clocks

Items	Specifications
Selectable items	Years, months, days, hours, minutes, seconds (days of the week are automatically set)
Precision	±50ppm (deviation: ±120 sec. per month)
Calibration method	System menu, serial communication

8-3 Interface Specifications

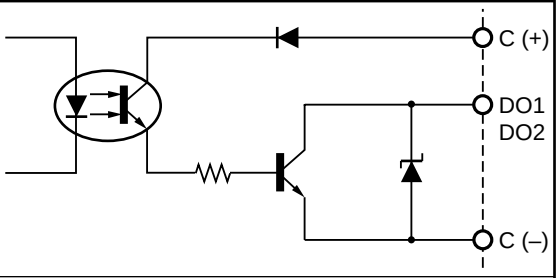
■ Serial interface CH0

Items	Specifications
Interface	RS-232C
Transmission distance	Max. 15 meters
Synchronization	Start-stop synchronization
XON/XOFF	No
RS/CS control	No
Transfer rate	600 to 19200bps
Data length	8, 7 bits
Parity	Even, Odd, None
Stop bit	1, 2 bits
Connector	8-pin DIN connector

■ Serial interface CH1

Items	Specifications	
Interface	RS-232C	RS-485
Transmission distance	Max. 15 meters	Max. 500 meters
No. of connected units	1	32
Synchronization	Start-stop synchronization	
XON/XOFF	No	
RS/CS control	No	
Transfer rate	4800 to 38400bps	
Data length	8, 7 bits	
Parity	Even, Odd, None	
Stop bit	1, 2 bits	
Connector	9-pin D-sub connector Male contact	Terminal block M4 screws

■ Parallel interface

Items	Specifications
Circuit configuration	
Number of points	2 points (EST RUN output and alarm event output in initial setting)
Output system	Photocoupler insulation and NPN transistor
Dielectric strength	30V DC
Load voltage range	4.5 to 26.4V DC
Output current	Max. 50mA
Output saturation voltage	2.2V or less
Leakage current	0.5mA or less
Connector	M4 screw connector

■ Printer

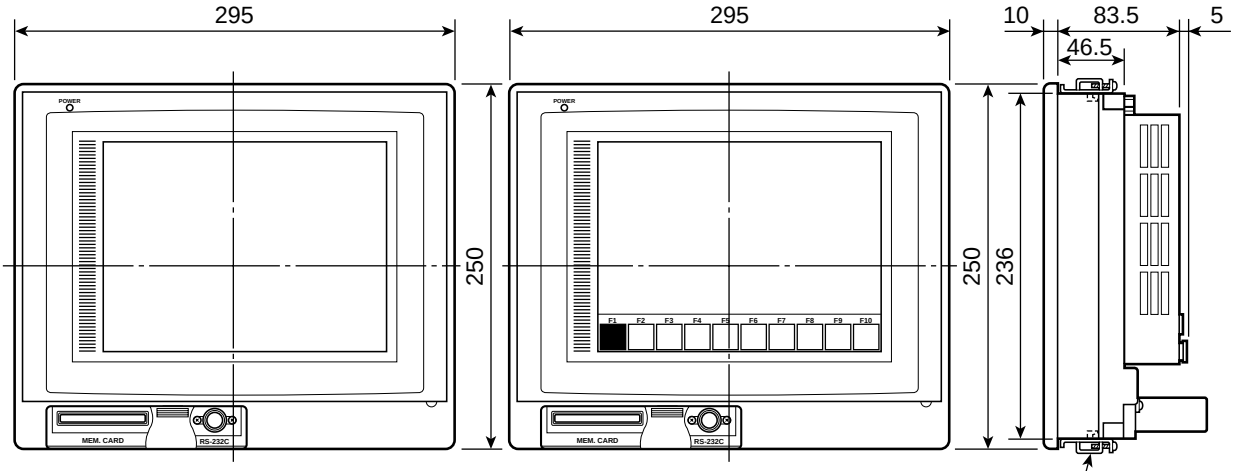
Use a Centronics standard printer with a 14-pin parallel interface.

■ Memory card (optional)

Yamatake Corporation’s SKM series interface proximity memory card

8-4 External Dimensions

Unit: mm



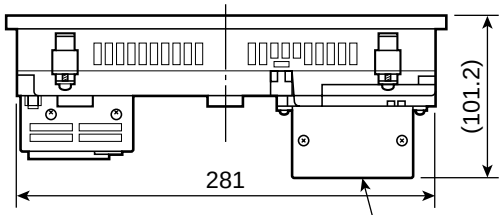
Color TFT LCD display model
Monochrome LCD display model

Front view

EL display model

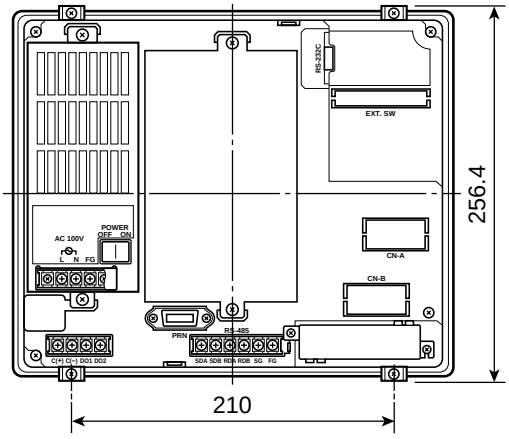
Four metal fittings
(two for each top and bottom)

Right side view



Top view

For
EST0550C01WNS00
or
EST0550C05WNS00



Rear view

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【T】

【U】

Revision History

Printed Date	Manual Number	Edition	Revised pages	Description
95-07	**CP-UM-1670E**	**1st Edition**		
96-03		**2nd Edition**		
96-12		**3rd Edition**	Entire manual	
97-06		**4th Edition**	<3>	Manual No.CP-UM-1805E → CP-UM-1670E
98-02		**5th Edition**	1-1 4-2 4-7	Model numbers revised NOTE revised Display devices revised DC power supply connections revised Yamatake SDC10 connection examples added
98-11		**6th Edition**	 <4>, <6> 1-3, 5-4 1-4 4-6 4-9 4-11 4-13 6-5, 6-6 6-10, 6-11 8-1 8-2 8-3	Yamatake-Honeywell Co., Ltd. changed to Yamatake Corporation Related User's Manual CP-UM-1677E deleted EST0550 deleted Printer (ESC/PJ84) added Connection example added Sharp (JW series CPU) wrong description corrected Connection example added Caution on Installation added for color TFT LCD deleted Pages deleted EST0550 deleted. SI units revised EST0550 deleted. Specifications partially modified Specifications partially modified
99-07		**7th Edition**	<4>, <6> 1-3	10.4-inch Large Model EST → Type 10.4 ESTX200SWDE3001 → 3003
00-03		**8th Edition**	ii, 4-2 iii v vii 1-3 6-11, 6-12 7-2 8-1	"Grounding" notation changed "Request" added Revised description on AP Edition Operation Manual Addition of CP-UM-5111E User's Manual "CBL board" is deleted. Pages deleted. Added an item in Checkpoint"Display is faded." Revised specification on noise resistance "Grounding" of Mechanical specifications is deleted.
00-05		**9th Edition**	vi 8-5	Attaching the CP-UM-1690E to the product was stopped. Dimension addition
00-07		**10th Edition**	5-2 5-4	"Caution on Installation" added EST0550 deleted
01-01		**11th Edition**	iv	*1 Attaching the CP-UM-1690E to the product was stopped.
02-03		**12th Edition**	ii, 6-1 iv to vii 1-3, 6-6 8-1	CAUTION of used batteries changed Related User's Manual changed Monochrome LCD display unit parts No. changed :ESTX930DP01 → ESTX930P01 Specifications of Externl dimensions changed :247(H) → 250(H), 94(D) → 99(D) (mm)

Printed Date	Manual Number	Edition	Revised pages	Description
02-07	**CP-UM-1670E**	**13th Edition**	5-2, 5-4	Display changed

Specifications are subject to change without notice.

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