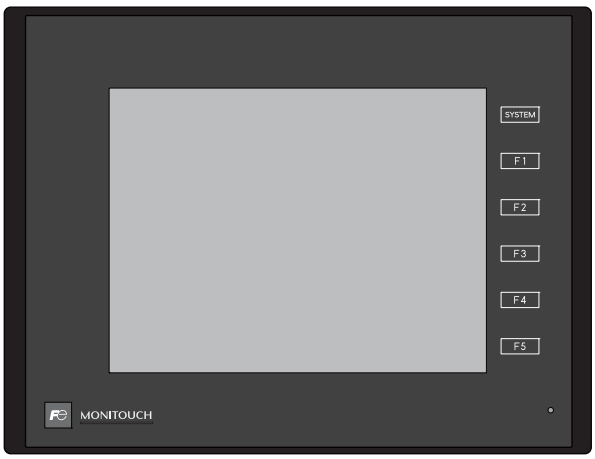
Fuji Electric

MONITOUCH

Hardware Specifications



TECHNOSHOT
TS2060

Hakko Electronics Co., Ltd.

Record of Revisions

Reference numbers are shown at the bottom left corner on the back cover of each manual.

Printing Date	Reference No.	Revised Contents
July 2016	2207NE0	First edition
August 2016	2207NE1	Second edition

Preface

Thank you for selecting the MONITOUCH TS2060.
This manual describes operation procedures and errors of the TS2060 in detail.
For correct use of the TS2060, you are requested to read through this manual to understand more about the product.
The manuals shown below are related manuals for the TS2060. Refer to them as necessary.

Manual Name	Contents	Reference No.
TS2060 Reference Manual [1]	Explains the functions and operation of the TS2060.	1204NE
TS2060 Reference Manual [2]		1205NE
TS2060 Connection Manual [1]	Explains the connection and communication parameters for the TS2060 and controllers in detail. Included Makers ALLEN BRADLEY, Automationdirect, Azbil, Baumuller, BECKHOFF, CHINO, CIMON, DELTA, DELTA TAU DATA SYSTEMS, EATON Cutler-Hammer, EMERSON, FANUC, FATEK AUTOMATION, FUFENG, Fuji Electric, Gammaflux, GE Fanuc, Hitachi, Hitachi Industrial Equipment Systems, HYUNDAI	2204NE
TS2060 Connection Manual [2]	Explains the connection and communication parameters for the TS2060 and controllers in detail. Included Makers IAI, IDEC, JTEKT, KEYENCE, KOGANEI, KOYO ELECTRONICS, LS, MITSUBISHI ELECTRIC, MODICON, MOELLER, M-SYSTEM, OMRON, Oriental Motor, Panasonic, RKC, RS Automation	2205NE
TS2060 Connection Manual [3]	Explains the connection and communication parameters for the TS2060 and controllers in detail. Included Makers SAIA, SAMSUNG, SanRex, SANMEI, SHARP, SHIMADEN, SHINKO TECHNOS, Siemens, SINFONIA TECHNOLOGY, SUS, TECO, Telemecanique, TOHO, Tokyo Chokoku Marking Products, TOSHIBA, TOSHIBA MACHINE, TURCK, UNIPULSE, UNITRONICS, ULVAC, VIGOR, WAGO, XINJE, YAMAHA, Yaskawa Electric, Yokogawa Electric, MODBUS, Barcode Reader, Slave Communication Function, Universal Serial Communication	2206NE

For further details about controllers (PLCs, temperature controllers, etc.), refer to the manual issued by each controller manufacturer.

Notes:

1. This manual may not, in whole or in part, be printed or reproduced without the prior written consent of Hakko Electronics Co., Ltd.
2. The information in this manual is subject to change without prior notice.
3. Windows and Excel are registered trademarks of Microsoft Corporation in the United States and other countries.
4. All other company names or product names are trademarks or registered trademarks of their respective holders.
5. This manual is intended to give accurate information about MONITOUCH hardware. If you have any questions, please contact your local distributor.

Notes on Safe Usage of MONITOUCH

In this manual, you will find various notes categorized under the following levels with the signal words “DANGER” and “CAUTION”.

⚠DANGER	Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.
⚠CAUTION	Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury and could cause property damage.

Note that there is a possibility that items listed with **⚠CAUTION** may have serious ramifications.

⚠DANGER

- Never use the output signal of the TS2060 for operations that may threaten human life or damage the system, such as signals used in case of emergency. Please design the system so that it can cope with a touch switch malfunction. A touch switch malfunction may result in machine accidents or damage.
- Turn off the power supply when you set up the unit, connect new cables, or perform maintenance or inspections. Otherwise, electrical shock or damage may occur.
- Never touch any terminals while the power is on. Otherwise, electrical shock may occur.
- The liquid crystal in the LCD panel is a hazardous substance. If the LCD panel is damaged, do not ingest the leaked liquid crystal. If leaked liquid crystal makes contact with skin or clothing, wash it away with soap and water.
- Never disassemble, recharge, deform by pressure, short-circuit, reverse the polarity of the lithium battery, nor dispose of the lithium battery in fire. Failure to follow these conditions will lead to explosion or ignition.
- Never use a lithium battery that is deformed, leaking, or shows any other signs of abnormality. Failure to follow these conditions will lead to explosion or ignition.
- Switches on the screen are operable even when the screen has become dark due to a faulty backlight or when the backlight has reached the end of its service life. If the screen is dark and hard to see, do not touch the screen. Otherwise, a malfunction may occur resulting in machine accidents or damage.

⚠CAUTION

- Check the appearance of the unit when it is unpacked. Do not use the unit if any damage or deformation is found. Failure to do so may lead to fire, damage, or malfunction.
- For use in a facility or as part of a system related to nuclear energy, aerospace, medical, traffic equipment, or mobile installations, please consult your local distributor.
- Operate (or store) the TS2060 under the conditions indicated in this manual and related manuals. Failure to do so could cause fire, malfunction, physical damage, or deterioration.
- Observe the following environmental restrictions on use and storage of the unit. Otherwise, fire or damage to the unit may result.
  - Avoid locations where there is a possibility that water, corrosive gas, flammable gas, solvents, grinding fluids, or cutting oil can come into contact with the unit.
  - Avoid high temperatures, high humidity, and outside weather conditions, such as wind, rain, or direct sunlight.
  - Avoid locations where excessive dust, salt, and metallic particles are present.
  - Avoid installing the unit in a location where vibrations or physical shocks may be transmitted.

⚠CAUTION

- Equipment must be correctly mounted so that the main terminal of the TS2060 will not be touched inadvertently. Otherwise, an accident or electric shock may occur.
- Tighten the mounting screw on the fixtures of the TS2060 to an equal torque of 4.43 lbf-in (0.5 N·m). Excessive tightening may distort the panel surface. Loose mounting screws may cause the unit to fall down, malfunction, or short-circuit.
- Check periodically that terminal screws on the power supply terminal block and fixtures are firmly tightened. Loosened screws or nuts may result in fire or malfunction.
- Tighten the terminal screws on the power supply terminal block of the TS2060 to an equal torque of 5 to 6 lbf-in (0.56 to 0.68 N·m). Improper tightening of screws may result in fire, malfunction, or other serious trouble.
- The TS2060 has a glass screen. Do not drop the unit or impart physical shocks to the unit. Otherwise, the screen may be damaged.
- Correctly connect cables to the terminals of the TS2060 in accordance with the specified voltage and wattage. Overvoltage, overwattage, or incorrect cable connection could cause fire, malfunction, or damage to the unit.
- Always ground the TS2060. The FG terminal must be used exclusively for the TS2060 with the level of grounding resistance less than 100 Ω. Otherwise, you may sustain an electric shock, a fire may occur, MONITOUCH may not recognize touch operations, and malfunctions may occur.
- Prevent any conductive particles from entering the TS2060. Failure to do so may lead to fire, damage, or malfunction.
- Do not attempt to repair the TS2060 yourself. Contact Hakko Electronics or the designated contractor for repairs.
- Do not repair, disassemble, or modify the TS2060. Hakko Electronics Co., Ltd. is not responsible for any damages resulting from repair, disassembly, or modification of the unit that was performed by an unauthorized person.
- Do not use sharp-pointed tools to press touch switches. Doing so may damage the display unit.
- Only experts are authorized to set up the unit, connect cables, and perform maintenance and inspection.
- Lithium batteries contain combustible material such as lithium and organic solvents. Mishandling may cause heat, explosion, or ignition resulting in fire or injury. Read the related manuals carefully and correctly handle the lithium battery as instructed.
- Take safety precautions during operations such as changing settings when the unit is running, forced output, and starting and stopping the unit. Any misoperations may cause unexpected machine movement, resulting in machine accidents or damage.
- In facilities where the failure of the TS2060 could lead to accidents that threaten human life or other serious damage, be sure that such facilities are equipped with adequate safeguards.
- When disposing of the TS2060, it must be treated as industrial waste.
- Before touching the TS2060, discharge static electricity from your body by touching grounded metal. Excessive static electricity may cause malfunction or trouble.
- Insert an SD card into the unit in the same orientation as pictured on the unit. If an SD card is accidentally inserted in the wrong orientation, the SD card or the slot on the unit may be damaged.
- Never remove a storage device (SD card or USB flash drive) when the storage device is being accessed. Doing so may destroy the data on the storage device. Only remove a storage device when the Main Menu screen is displayed or after pressing the [Storage Removal] switch.
- Do not press two or more positions on the screen at the same time. If two or more positions are pressed at the same time, a switch located between the pressed positions may be activated.
- Be sure to remove the protective sheet that is attached to the touch panel surface at delivery before use. Using MONITOUCH with the protective sheet attached may result in incorrect touch switch activation.

[General Notes]

- Never bundle control cables or input/output cables with high-voltage and large-current carrying cables such as power supply cables. Keep control cables and input/output cables at least 200 mm away from high-voltage and large-current carrying cables. Otherwise, malfunction may occur due to noise.
- When using the TS2060 in an environment where a source of high-frequency noise is present, it is recommended that the FG shielded cable (communication cable) be grounded at each end. However, when communication is unstable, select between grounding one or both ends, as permitted by the usage environment.
- Be sure to plug connectors and sockets of the TS2060 in the correct orientation. Failure to do so may lead to damage or malfunction.
- If a LAN cable is inserted into the MJ1 or MJ2 connector, the device on the other end may be damaged. Check the connector names on the unit and insert cables into the correct connectors.
- Do not use thinners for cleaning because it may discolor the TS2060 surface. Use commercially available alcohol.
- If a data receive error occurs when the TS2060 unit and a counterpart unit (PLC, temperature controller, etc.) are started at the same time, read the manual of the counterpart unit to correctly resolve the error.
- Clean the display area using a soft cloth to avoid scratching the surface.
- Avoid discharging static electricity on the mounting panel of the TS2060. Static charge can damage the unit and cause malfunctions. Discharging static electricity on the mounting panel may cause malfunction to occur due to noise.
- Avoid prolonged display of any fixed pattern. Due to the characteristic of liquid crystal displays, an afterimage may occur. If prolonged display of a fixed pattern is expected, use the backlight's auto OFF function.
- The TS2060 is identified as a class-A product in industrial environments. In the case of use in a domestic environment, the unit is likely to cause electromagnetic interference. Preventive measures should thereby be taken appropriately.

[Notes on the LCD]

Note that the following conditions may occur under normal circumstances.

- The response time, brightness, and colors of the TS2060 may be affected by the ambient temperature.
- Tiny spots (dark or luminescent) may appear on the display due to the characteristics of liquid crystal.
- There are variations in brightness and color between units.

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Chapter 4 Installation

Chapter 5 MONITOUCH Operations

1 Product Outline

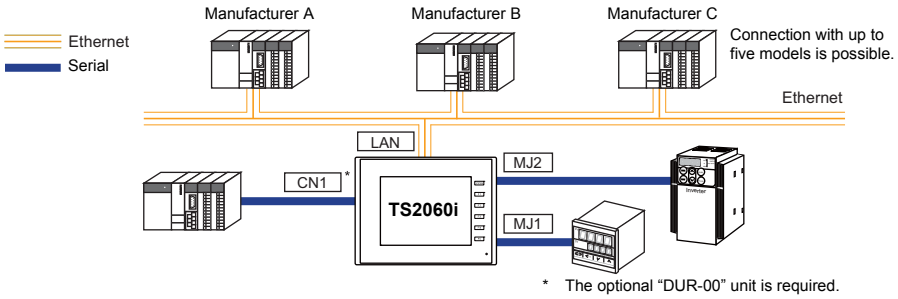
1. Features
2. Models and Peripheral Equipment
3. System Configuration

1. Features

The TS2060 unit has the following features.

1. A programmable display unit equipped with an LED-backlit LCD capable of displaying up to 65,536 colors.
2. SD card slot equipped as standard (TS2060i only)
   The TS2060i unit is equipped with an SD/SDHC card slot as standard.
   These cards can be used as storage for saving screen programs and sampling data, and transferring recipe data.
3. LAN connectors equipped as standard (TS2060i only)
   The TS2060i unit is equipped with a LAN connector (10BASE-T/100BASE-TX) as standard. This connector supports Auto-MDIX (straight/crossover cable automatic detection function).
4. Portrait orientation for TS2060 units
   Mounting in a portrait orientation (90° left or 90° right) is possible to suit the installation environment of the TS2060 unit. Since screen editing in the screen configuration software also supports portrait orientations (left rotation/right rotation), screens can be edited for display in the target orientation.
5. 8-way communication (TS2060i only)
   A single TS2060i unit is capable of connecting to a maximum of eight types of different models, PLCs from other manufacturers, and other peripheral devices through a combination of Ethernet connections (up to eight protocols) and serial connections (up to three protocols). 8-way communication enables simultaneous communication and data transfer between eight types of devices.
   * The TS2060 unit (model without the “i”) only supports serial connections (up to two protocols).

   Connection example: Mixed connections of Ethernet and 3-port serial connection



6. Operation log function (TS2060i only)
   Screen operation history records (operation logs) can be output to a storage device (SD card or USB flash drive). In the event of an error, these stored logs allow previous operations to be examined in order to determine the cause of the error.
   Operation history records (operation logs) can be checked on the TS2060i unit.
7. Security function
   Setting a security level to screens and items enables displaying and operating screens in accordance with the security level of the logged-in user.

2. Models and Peripheral Equipment

MONITOUCH Models

This model is available in the following two versions.

TS2060i
TS2060

Specification Comparison

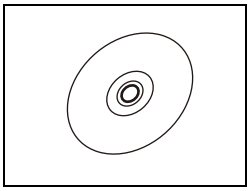
		TS2060i	TS2060
Unit Specifications	Screen Size	5.7-inch	
	Display Device	TFT color	
	Resolution	320 × 240 dots	
	Touch Switch	Analog resistive film type	
	Power Supply	DC power supply	
	Conformance Standards	CE/KC/UL/c-UL approved	
Function	Screen Program Capacity (FROM)	10.5 MB	2.5 MB
	Backup Memory (SRAM)	512 KB	128 KB
	Stroke Font	○	×
External I/F	MJ1, MJ2	○	○ *
	LAN	○	×
	Optional Unit (DUR-00)	○	×
	Communication I/F Units (CUR-xx)	○	×
	USB-A	○	×
	USB mini-B	○	○
	SD Card Slot	○	×

* An external power supply of +5 V is not available.

Peripheral Equipment

The following software and equipment are available as options for the TS2060 unit.

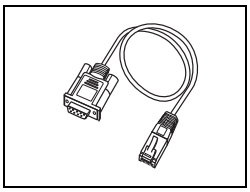
Configuration Tool



V-SFT-6 (configuration software)

Application software for editing screen programs.

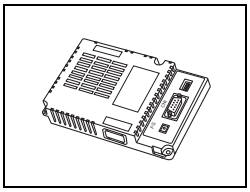
Supported operating systems:
Windows XP, XP 64 Edition, Vista (32-bit, 64-bit), 7 (32-bit, 64-bit), 8 (32-bit, 64-bit), 8.1 (32-bit, 64-bit), 10 (32-bit, 64-bit)



V-CP (screen program transfer cable) 3 m

A cable used for connecting the TS2060 unit to a PC.

Optional Units



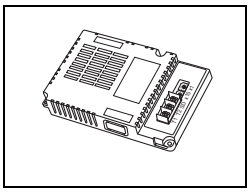
DUR-00

An optional unit for adding a D-sub 9-pin connector to the TS2060 unit.

* This unit cannot be used together with a “CUR-xx” communication interface unit.

* The optional “DUR-00” unit is only available for the TS2060i unit.

Communication Interface Units



CUR-xx

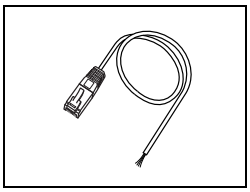
Communication units used for connecting to networks.

* These units cannot be used together with the optional “DUR-00” unit.

* “CUR-xx” communication interface units are only available for the TS2060i unit.

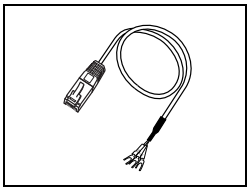
CUR-00 → OPCN-1
CUR-01 → T-Link
CUR-02 → CC-Link
CUR-03 → Ethernet
CUR-04 → PROFIBUS-DP
CUR-06 → SX-BUS
CUR-07 → DeviceNet
CUR-08 → FL-net

Cables



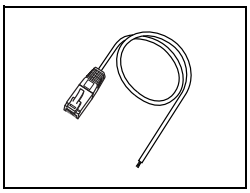
V6-BCD (barcode reader connection cable) 3 m

A cable used for connecting a barcode reader unit to the TS2060 unit.



V6-MLT (multi-link2 master cable) 3 m

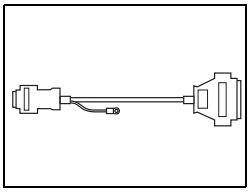
A cable used for multi-link2 connection between a TS2060 master station and TS2060 slave station.



V6-TMP (connection cable for controllers)

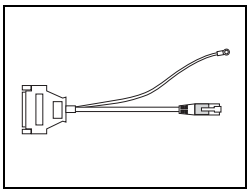
A cable used for connecting the TS2060 unit to each controller.

V6-TMP: 3 m
V6-TMP-5M: 5 m
V6-TMP-10M: 10 m



D9-D25 (D-sub 9-pin-to-25-pin conversion cable) 0.3 m

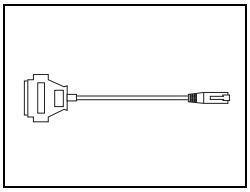
A conversion cable used for connecting the communication cable for CN1 (D-sub 25-pin) of the V6/V7 series to CN1 (D-sub 9-pin) of the TS2060 unit.
This cable is used together with the optional “DUR-00” unit.



MJ2-PLC (MJ2-to-D-sub conversion cable) 0.3 m

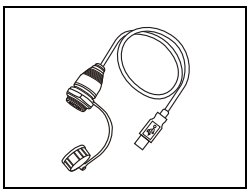
This cable is used for connection to MJ1/2 on the TS2060 unit via RS-232C, or MJ2 on the TS2060 unit via RS-422 (4-wire connection).
This cable is used together with the communication cable used for CN1 (D-sub 25-pin) of the V6/V7 series.

* Use the MJ-D25 cable (see below) when connecting to a PLC via RS-485 (2-wire connection).



MJ-D25 (MJ-to-D-sub conversion cable) 0.3 m

This cable is used for connecting to MJ1/2 on the TS2060 unit via RS-232C or RS-485 (2-wire connection).
This cable is used together with the communication cable used for CN1 (D-sub 25-pin) of the V6/V7 series.

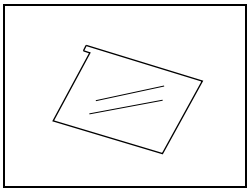


UA-FR (for USB-A port) 1 m

A cable for USB-A (master) that allows connection from the front of the control cabinet.

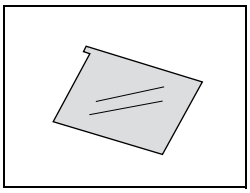
* The “UA-FR” unit is only available for the TS2060i unit.

Protective Sheets



V906T-GS

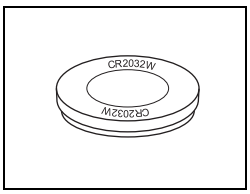
A sheet used for protecting the operation panel surface (5 pcs./set).



V906T-GSN10

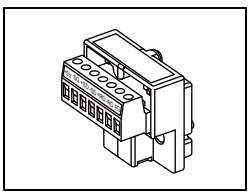
A sheet used for protecting the operation panel surface (5 pcs./set, anti-glare treatment). This sheet is colored light gray and the graininess of its surface prevents light reflection.

Other Options



TS-BT (replacement battery)

A replacement lithium battery for the TS2060 unit.
(CR2032W manufactured by Sony Energy Devices)



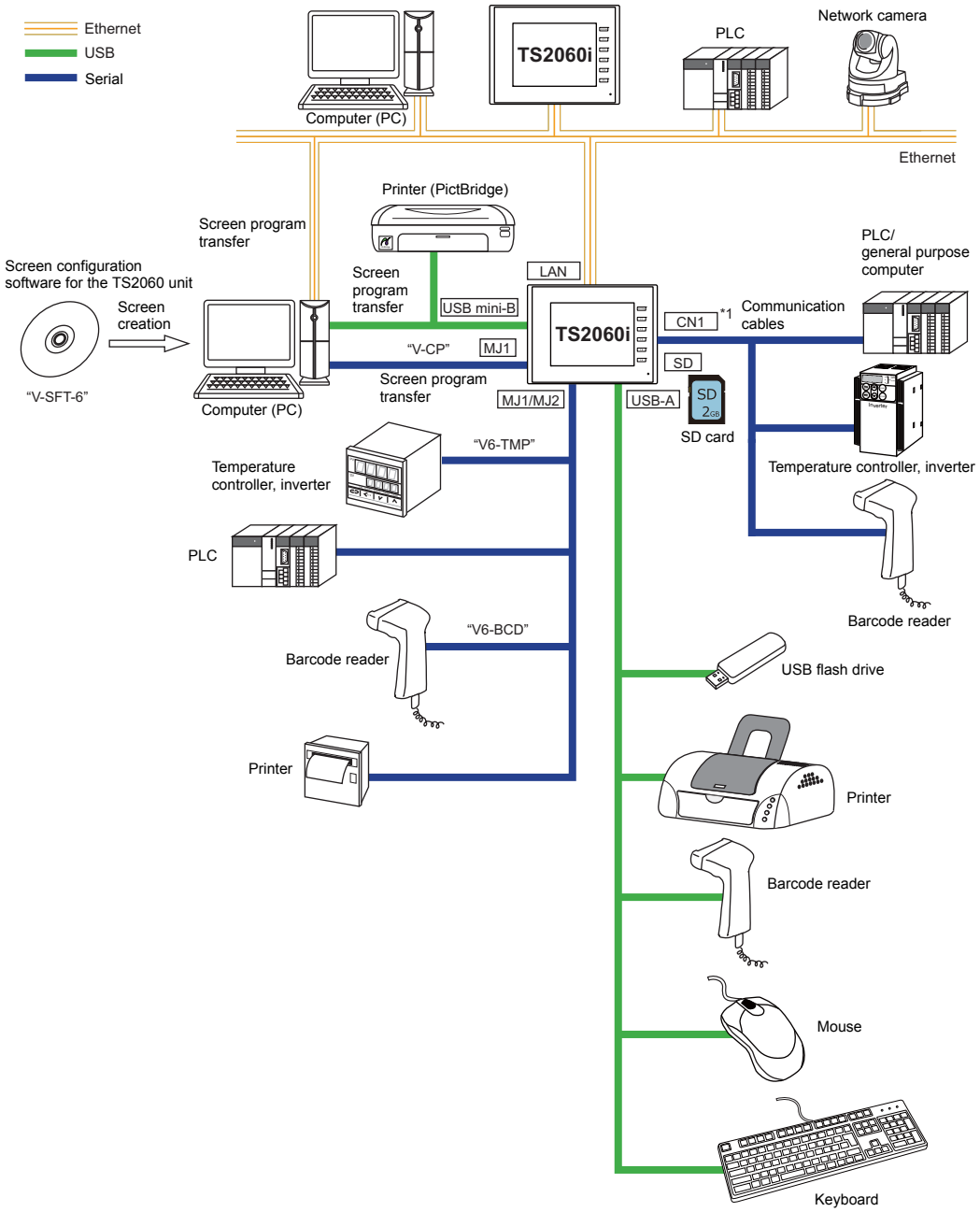
TC-D9 (terminal converter)

This converter is used for connecting the TS2060i unit to a controller at the RS-422/485 terminal block via CN1 (D-sub 9-pin) of the optional “DUR-00” unit.

3. System Configuration

TS2060i Unit System Configuration

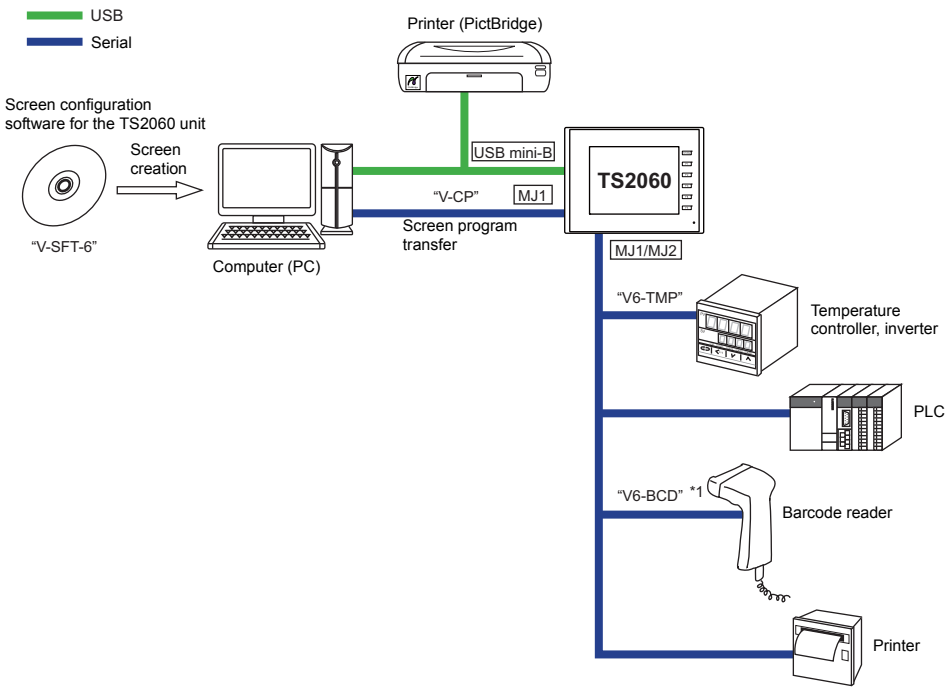
The following figure shows the possible system configurations when using the TS2060i unit.



*1 The optional "DUR-00" unit is required.

TS2060 Unit System Configuration

The following figure shows the possible system configurations when using the TS2060 unit.



*1 An external power supply of +5 V is not available.

MEMO

Please use this page freely.

2 Specifications

1. Specification

1. Specification

General Specifications

Item		Specification
Conformance Standards		• CE (EN61000-6-2, EN61000-6-4) • KC • UL61010-1, UL61010-2-201 (File No. E313548)
Power Supply	Permissible Voltage Range	24 VDC ±10 %
	Permissible Momentary Power Failure	Within 1 ms
	Power Consumption (Maximum Rating)	13 W or less
	Rush Current	7 A or less, 9 ms (ambient temperature at 25 °C)
	Withstand Voltage	DC external terminals to FG: 500 VAC for 1 minute
Insulation Resistance		DC external terminals to FG: 500 VDC, 10 MΩ or higher
Physical Environment	Operational Ambient Temperature	0 °C to +50 °C *1
	Storage Ambient Temperature	−10 °C to +60 °C *1
	Operational Ambient Humidity	85 % RH or less (without dew condensation) *1
	Storage Ambient Humidity	85 % RH or less (without dew condensation) *1
	Altitude	2000 m or less
	Atmosphere	No corrosive gas, no excessive dust, and no conductive dust
	Overvoltage Category *2	Category II
	Contamination Level *3	Contamination level 2
Mechanical Working Conditions	Vibration Resistance	JIS B 3502 (IEC61131-2) compliant Vibration frequency: 5 to 9 Hz, Half-amplitude: 3.5 mm, Vibration frequency: 9 to 150 Hz, Constant acceleration: 9.8 m/s^2 (1 G), 3 directions of X, Y, and Z: 10 times each
	Shock Resistance	JIS B 3502 (IEC61131-2) compliant Peak acceleration: 147 m/s^2 (15 G), X, Y, and Z: 3 directions, 3 times each (18 times in total)
Electrical Working Conditions	Noise Resistance	Noise voltage: 1000 Vp-p, Pulse width: 1 μs, Rising time: 1 ns (Measured using a noise simulator)
	Static Electricity Discharge Resistance	Compliant with IEC61000-4-2, contact: 6 kV, air: 8 kV
Mounting Conditions	Weight	Approx. 580 g
	Dimensions W × H × D	182.5 × 138.8 × 45.8 mm
	Panel Cut-out Dimensions	$174.0^{+0.5}_{-0}$ × $131.0^{+0.5}_{-0}$ mm
Case Color		Black
Material		PC resin

*1 Use the unit in an environment where the wet-bulb temperature is 39 °C or less, otherwise the unit may be damaged.

*2 This indicates the distribution section to which the unit is intended to be connected to within the path between the distribution of the public power network and machinery in the facility.
"Category II" applies to devices supplied with power from mains sockets or similar points. The withstand surge voltage is 2,500 V for devices rated up to 300 V.

*3 This is an index that expresses the degree of conductive contamination in the environment where the unit is used.
"Contamination level 2" indicates conditions where only non-conductive contamination occurs. However, due to condensation, temporary conductive contamination may occur.

Installation Specifications

Item		Specification
Grounding		Less than 100 Ω, FG/SG separated
Protection Structure	Panel Front Surface *1	Complies with IP65 (when gasket is installed)
	Rear Case	Complies with IP20
Cooling System		Natural cooling
Structure		Inserted in a mounting panel
Appropriate Mounting Panel Thickness		1.5 to 4 mm *2

*1 Protective structure for the front when the TS2060 unit is mounted on a mounting panel.
While the protective structure has passed compliance testing, it is not guaranteed in all environments.
*2 Even when the mounting panel thickness is within the specified range, the panel itself may warp depending on the material and size of the mounting panel.
Use a panel that can withstand the forces of mounting.

Display Specifications

Item	Specification
Display Device	TFT color
Display Size	5.7-inch
Colors	65,536 colors *1
Resolution (W × H)	320 × 240 dots
Dot Pitch (W × H)	0.36 × 0.36 mm
Actual Display Dimensions (W × H)	115.2 × 86.4 mm
Backlight	LED
Backlight Brightness Halftime *1	Approx. 50,000 hours
Backlight Auto OFF Function	Always ON, custom setting
Brightness Adjustment	Function switch: 3 levels Macro: 128 levels
Surface Sheet	PET, 0.188 mm
POWER Lamp	On: Normal (green) Flashing: Circuit board or power supply failure

*1 Time until the surface brightness becomes 50 % of the initial value at an ambient temperature of 25 °C.

Touch Switch Specifications

Item	Specification
Type	Analog resistive film type
Switch Resolution	1024 × 1024
Mechanical Life	One million activations or more
Surface Treatment	Anti-glare treatment

Function Switch Specifications

Item	Specification
Number of Switches	6 pcs.
Type	Matrix resistive film type
Mechanical Life	One million activations or more

Interface Specifications

Item			Specification
Modular Jack, 8-pin (MJ1)	Applicable Standards		RS-232C, RS-485 (2-wire connection)
	Synchronization		Asynchronous type
	Data Length		7 or 8 bits
	Parity		None, even, odd
	Stop Bit		1 or 2 bits
	Baud Rate		4800, 9600, 19200, 38400, 57600, 76800, 115 kbps
	Application		Screen program transfer (MJ1), PLC, temperature controller, barcode reader, printer, multi-link2, V-Link connection, etc.
Modular Jack, 8-pin (MJ2)	Applicable Standards		RS-232C, RS-485 (2-wire connection), RS-422 (4-wire connection)
	Synchronization		Asynchronous type
	Data Length		7 or 8 bits
	Parity		None, even, odd
	Stop Bit		1 or 2 bits
	Baud Rate		4800, 9600, 19200, 38400, 57600, 76800, 115 kbps (For PPI/MPI connection with a Siemens PLC: 187.5 kbps *2)
	Application		PLC, temperature controller, barcode reader, printer, multi-link2, V-Link connection, etc.
USB Ports (U-A *1, U-B)	USB-A	Applicable Standards	Compliant with USB version 2.0
		Baud Rate	High speed 480 Mbps
		Application	Printer (STYLUS PHOTO series), USB flash drive, keyboard, mouse connection, etc.
	USB mini-B	Applicable Standards	Compliant with USB version 2.0
		Baud Rate	High speed 480 Mbps
		Application	Screen program transfer, PictBridge-compatible printer connection
Ethernet Port 100BASE-TX / 10BASE-T (LAN) *1	Applicable Standards		IEEE802.3u compliant (100BASE-TX), IEEE802.3 compliant (10BASE-T)
	Baud Rate		100 Mbps, 10 Mbps
	Protocol		TCP/IP, UDP/IP
	Function		Auto-MDIX, Auto-Negotiation
	Recommended Cable *3		100 Ω UTP (unshielded twist-pair) cable, category 5, max. 100 m long
	Application		Screen program transfer, PLC connection, etc.
D-sub 9-pin (CN1) *1 *4	Applicable Standards		RS-232C, RS-485 (2-wire connection), RS-422 (4-wire connection)
	Synchronization		Asynchronous type
	Data Length		7 or 8 bits
	Parity		None, even, odd
	Stop Bit		1 or 2 bits
	Baud Rate		4800, 9600, 19200, 38400, 57600, 76800, 115 kbps
	Application		PLC, temperature controller, barcode reader connection, etc.
SD Card Interface *1			SD/SDHC card compliant
Communication Interface Unit Connector (EXT1) *1			Connection to the optional “DUR-00” unit and “CUR-xx” communication interface units (for SX-BUS, OPCN-1, T-Link, Ethernet, CC-Link, PROFIBUS-DP, DeviceNet, and FL-net) * “DUR-00” and “CUR-xx” cannot be used at the same time.

*1 Only for TS2060i
*2 For details, refer to TS2060 Connection Manual 1.
*3 Both straight and cross cables are usable, irrespective of the presence or absence of a hub.
*4 The optional “DUR-00” unit must be installed.

Clock and Backup Memory Specifications

Item	TS2060i	TS2060
Battery	Coin-type lithium primary cell (TS-BT manufactured by Hakko Electronics or CR2032W manufactured by Sony Energy Devices)	
Backup Memory	SRAM 512 KB	SRAM 128 KB
Backup Retention Period	Approx. 5 years (ambient temperature at 25 °C)	
Battery Voltage Drop Detection	Provided (allocated to internal device memory address $s167)	
Calendar Accuracy *	When powered: Monthly deviation of ±210 sec. (ambient temperature at 25 °C) When unpowered: Monthly deviation of ±90 sec. (ambient temperature at 25 °C, with battery backup)	

* When using the unit at an ambient temperature other than 25 °C, clock deviation may increase. Check and correct the clock periodically.

Screen Configuration Environment

Item	Specification
Configuration Method	Dedicated configuration software
Configuration Tool	Name of dedicated configuration software: V-SFT-6 Computer: Pentium 4 2.0 GHz or above recommended OS *1: Windows XP, XP64 Edition, Vista (32-bit, 64-bit), 7 (32-bit, 64-bit), 8 (32-bit, 64-bit), 8.1 (32-bit, 64-bit), 10 (32-bit, 64-bit) Memory: 1.0 GB or above (2.0 GB or above recommended) Hard disk capacity: Free space of approx. 2.0 GB or more Optical disc drive: DVD-ROM drive Display: Resolution of 1024 × 768 or above Color depth of 16-bit or above Other: Microsoft .NET Framework 4.0 or 4.5 (If a PC does not have .NET Framework 4.0 or 4.5 installed, Framework 4.0 will be automatically installed on the PC.)

*1 Administrator privileges are required for installation.

Display Function Specifications

Item		Specification
Interface Language *1		Japanese, English/Western Europe, Chinese (Traditional), Chinese (Simplified), Korean, Central Europe, Cyrillic, Greek, Turkish, and Baltic
Font Types		Bitmap fonts, gothic fonts, stroke fonts *2, Windows fonts
Character Size	1/4-size	8 × 8 dots
	1-byte	8 × 16 dots
	2-byte	16 × 16 dots or 32 × 32 dots
	Character Magnification	X: 1 to 8 times, Y: 1 to 8 times Point size *3: 8, 9, 10, 11, 12, 14, 16, 18, 20, 22, 24, 26, 28, 36, 48, 72
Number of Displayable Characters	Display Resolution	320 × 240 dots
	1/4-size	40 characters × 30 lines
	1-byte	40 characters × 15 lines
	2-byte	20 characters × 15 lines
Character Properties	Display Properties	Normal, blink, bold, shadow, transparent
	Color	65,536 colors (without blinking), 32,768 colors (with blinking), 256 colors (without blinking), 128 colors, 16-tone monochrome, monochrome
Graphics	Lines	Line, continuous line, box, parallelogram, polygon
	Circles	Circle, arc, sector, ellipse, elliptical arc
	Other	Pattern, data display (graphics library, data sheets)
Graphic Properties	Line Type	6 types (thin, thick, dotted, chain, dashed, two-dot chain) Line thickness can be selected from 1 to 8 points (excluding thick lines).
	Tile Patterns	16 types (including 8 user-definable patterns)
	Display Properties	Normal, blinking
	Colors	65,536 colors (without blinking), 32,768 colors (with blinking), 256 colors (without blinking), 128 colors, 16-tone monochrome, monochrome
	Color Selection	Foreground, background, boundary (line)

*1 For more information, refer to TS2060 Reference Manual 1.
*2 Only for TS2060i
*3 Applicable when using gothic fonts and stroke fonts.
When using Windows fonts, the range of point size specification is 6 to 999.

Function Performance Specifications

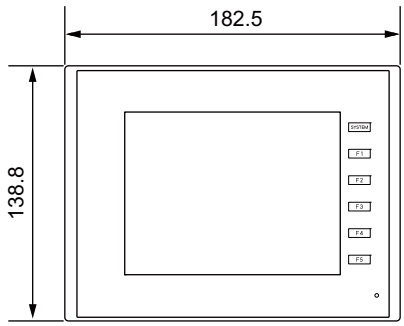
Item		TS2060i	TS2060
Screens		Max. 4,000	
Screen Memory (Flash Memory)		10.5 MB	2.5 MB
switch		192 switches per screen (including slider switches and scroll bars)	
Switch Actions		Set, reset, momentary, alternate, illuminated It is possible to press a function switch and a switch on the display at the same time.	
Lamp		Reverse, blinking, exchange of graphics Max. 192 per screen	
Graph		Pie, bar, panel meter and closed area graph: No limit *1 Statistics and trend graphs: Max. 256 per layer *2	
Data Setting	Numerical Data Display	No limitation *1	
	Character Display	No limitation *1	
	Message Display	No limitation *1 Maximum number of characters per line: 40 one-byte characters	
Message		Max. 32,768 lines	
Macro Block		Max. 1,024	
Graphic Library		Max. 2,560	
Overlap Library		Max. 4,000	
Screen Library		Max. 4,000	
Data Block		Max. 1,024	
Pattern		Max. 1,024	
Data Sheet		Max. 1,024	
Tags		Max. 65,536 lines	
Page Block		Max. 2,048	
Direct Block		Max. 1,024	
Screen Block		Max. 1,024	
Comment		Max. 32,767	
Trend		Bit synchronization, constant sampling	
Alarm		Alarm logging, time order alarming, alarm tracking	
Attribute Setting		Max. 256	
MES Setting		Max. 256	
Device Memory Map		Max. 32 × 8 (PLC1 to PLC8)	
Time Display		Provided	
Hard Copy		Provided	
Buzzer		Provided, 3 sounds (short beep, long beep, continuous beep)	
Auto OFF Function		Always ON, custom setting	
Self-diagnostic Function		Switch self-test function Configuration status confirmation function for communication conditions Communication check function	

*1 The number of memory settings is limited to 256 per screen.
*2 Layer: 5 layers per screen (base + 4 overlap displays including global overlap)

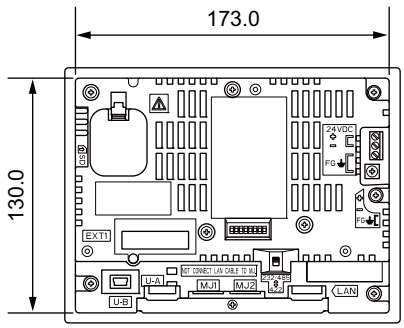
TS2060 Unit External Dimensions and Panel Cut-out Dimensions

(Unit: mm)

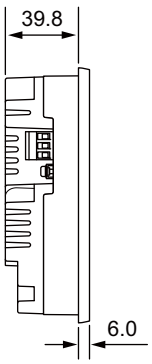
- Front view



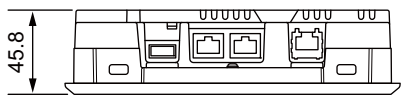
- Rear view



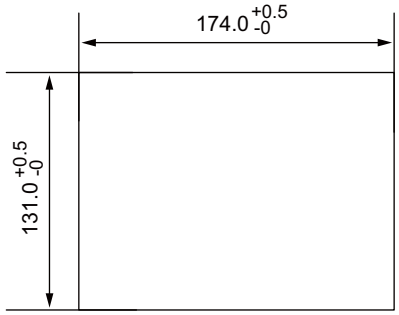
- Side view



- Bottom view



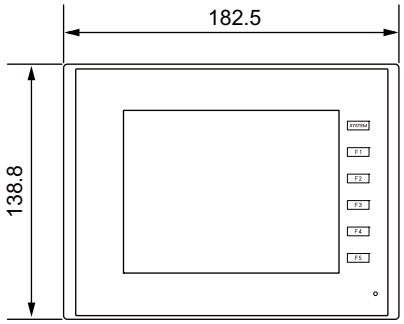
- Panel cut-out dimensions



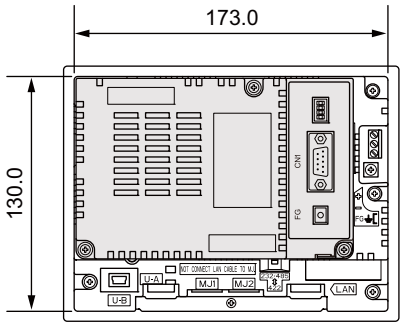
TS2060i Unit with DUR-00 External Dimensions and Panel Cut-out Dimensions

(Unit: mm)

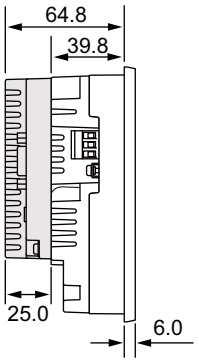
- Front view



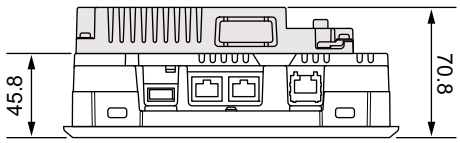
- Rear view



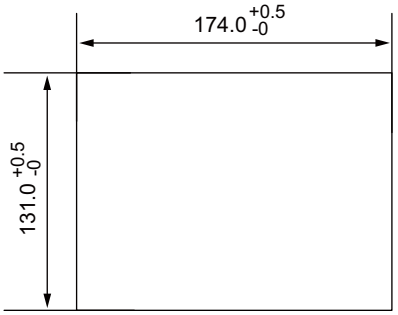
- Side view



- Bottom view



- Panel cut-out dimensions

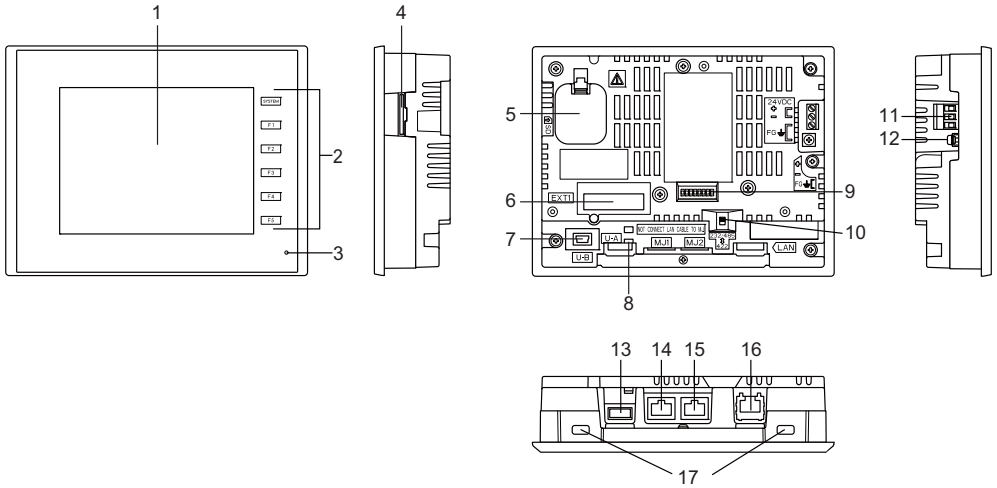


3 Names and Specifications of Components

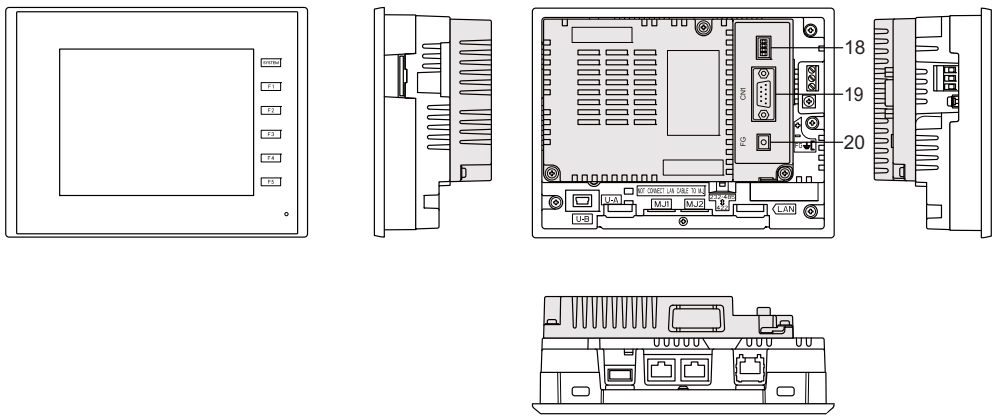
1. Names and Functions of Components
2. Specifications of Components

1. Names and Functions of Components

TS2060i/TS2060



TS2060i+DUR-00



1. Display
   This is the display area.
2. Function switches
   There are 6 function switches comprising the [SYSTEM] switch and [F1] to [F5] switches. These function switches are used to switch between the RUN/STOP modes, adjust brightness, and turn the backlight on and off (requires configuration in V-SFT-6). Switches [F1] to [F5] can be used as user switches in RUN mode.
3. POWER lamp
   This lamp illuminates green when the TS2060 unit is powered on and operating normally. The lamp flashes when there is a failure (circuit board failure, power supply failure).
4. SD card slot (SD) (TS2060i only)
   This slot is where an SD card can be inserted.

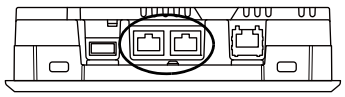
5. Battery holder
   This part contains the backup battery for the SRAM and clock.
   When the battery voltage drops, replace the battery with a new one.
6. Connector (EXT1) for optional units/communication I/F unit (TS2060i only)
   This connector is used to connect to the optional “DUR-00” unit and “CUR-xx” communication interface units (for SX-BUS, OPCN-1, T-Link, CC-Link, Ethernet, PROFIBUS-DP, DeviceNet, and FL-net).
   * “DUR-00” and “CUR-xx” cannot be used at the same time.
7. USB mini-B (U-B)
   This port is used for transferring screen programs or connecting a PictBridge-compatible printer.
8. USB cable clamp hole
   This clamp hole is used to attach a USB cable tie.
9. DIP switches
   This 8-bit DIP switch is used for setting the terminating resistance of the MJ1/MJ2 RS-485 signal line.
10. Sliding switch for MJ2
    This switch is for selecting the RS-232C/RS-485 signal (2-wire connection) or the RS-422 signal (4-wire connection) for MJ2. The upper side is for the RS-232C/RS-485 signal (2-wire connection) and the lower side is for the RS-422 signal (4-wire connection).
11. Power supply terminal block
    This terminal block is for supplying power (24 VDC) to the TS2060 unit.
12. FG terminal for communication
    This terminal is for connecting the FG wire of a communication cable and FG wire for the communication interface unit.
13. USB-A (U-A) (TS2060i only)
    This port is used to connect a printer, USB flash drive, keyboard, or mouse.
14. Modular jack 1 (MJ1)
    This connector is used for screen program transfer and connection with PLCs or other peripheral devices.
15. Modular jack 2 (MJ2)
    This connector is used for connection with PLCs or other peripheral devices.
16. 100BASE-TX/10BASE-T connector (LAN) (TS2060i only)
    This connector is used for Ethernet communication.
17. Mounting holes
    The mounting holes are used for inserting fixtures when securing the TS2060 unit to a mounting panel.
18. DIP switches (optional “DUR-00” unit)
    These switches are used for setting the terminating resistance of the CN1 signal line.
19. PLC communication connector (CN1) (optional “DUR-00” unit)
    This connector is used for connection to a controller (PLC, temperature controller, inverter, etc.).
20. FG terminal (FG) (optional “DUR-00” unit)
    This terminal is for connecting the FG wire of a communication cable.

2. Specifications of Components

Modular Jacks (MJ1/MJ2)

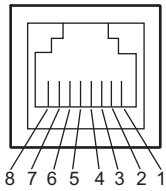
The modular jacks are used for connection to a screen program transfer cable (MJ1 only), temperature controller, barcode reader, and other devices.

Bottom view



The pins of MJ1 and MJ2 correspond to the signals as shown below.

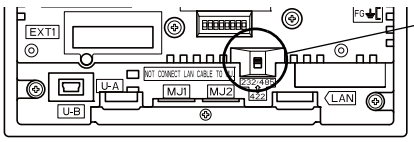
MJ1/2



Pin No.	MJ1		MJ2		
	Signal Name	Description	Sliding Switch *1	Signal Name	Description
1	+SD/RD	RS-485 + data	Up	+SD/RD	RS-485 + data
			Down	+SD	RS-422 + send data
2	–SD/RD	RS-485 - data	Up	–SD/RD	RS-485 - data
			Down	–SD	RS-422 - send data
3	+5V	Externally supplied +5 V *2	–	+5V	Externally supplied +5 V *2
4	+5V			+5V	
5	SG	Signal ground		SG	Signal ground
6	SG			SG	
7	RD	RS-232C receive data	Up	RD	RS-232C receive data
			Down	+RD	RS-422 + receive data
8	SD	RS-232C send data	Up	SD	RS-232C send data
			Down	–RD	RS-422 - receive data

*1 The MJ2 sliding switch is on the rear side of the TS2060 unit.

Rear view



Sliding switch (upon delivery: up)
Up: RS-232C, RS-485 (2-wire connection)
Down: RS-422 (4-wire connection)

*2 TS2060i only.
The total maximum allowable current for MJ1 and MJ2 is 150 mA.

Application

Application	V-SFT-6 Setting	Refer to
PLC/temperature controller connection	Required	TS2060 Connection Manual
Barcode reader connection	Required	
Multi-link/Multi-link2 communication	Required	
Ladder transfer function *1	Required	TS2060 Reference Manual 2
Screen program transfer	Not required	See page 5-2.
Printer connection	Required	TS2060 Reference Manual 1

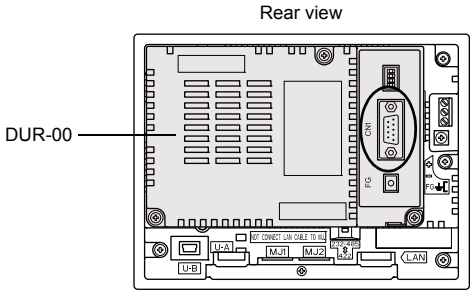
*1 The ladder transfer function cannot be used simultaneously with 1:n communication (multi-drop) or multi-link communication.

Serial Connector (CN1) (TS2060i + DUR-00 Only)

This connector is used for connecting a controller or barcode reader via RS-232C, or connecting a controller via RS-422/485.
This connector is provided when the optional “DUR-00” unit is installed.

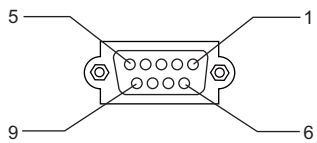
* The optional “DUR-00” unit is only available for the TS2060i unit.

Rear view



The serial connector pins correspond to the signals as shown below.

CN1 (D-sub 9-pin, female)



Pin No.	RS-232C *1		RS-422 / RS-485 *1	
	Signal	Description	Signal	Description
1	NC	Not used	+ RD	Receive data (+)
2	RD	Receive data	– RD	Receive data (–)
3	SD	Send data	– SD	Send data (–)
4	NC	Not used	+ SD	Send data (+)
5	SG	Signal ground	SG	Signal ground
6	NC	Not used	+ RTS	Request to send (+)
7	RTS	Request to send	– RTS	Request to send (–)
8	CTS	Clear to send	NC	Not used
9	NC	Not used	+ 5 V	Use prohibited *2

*1 The signal level can be changed between RS-232C and RS-422/485 in the configuration software.
When RS-232C is selected, set DIP switches 1 and 2 to the OFF position.
(For details on DIP switches, refer to page 3-17.)

*2 When RS-422/485 is selected, +5 V is output from pin No. 9.
This +5 V is used as the power supply for the external terminating resistance when performing RS-422/485 communication. It cannot be used as an external power supply.

Recommended Connector

The following connector is recommended for custom-made cables.

Recommended Connector	17JE-23090-02(D8C)-CG manufactured by DDK	D-sub 9-pin / male / inch screw thread (#4-40UNC) type / with hood / lead and cadmium free

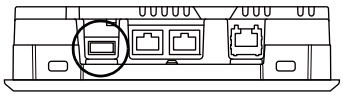
Applications

Application	V-SFT-6 Setting	Refer to
PLC/temperature controller connection	Required	TS2060 Connection Manual
Barcode reader connection	Required	
Multi-link/Multi-link2 communication	Required	

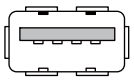
USB-A (U-A) (TS2060i Only)

This connector is used to connect a printer, USB flash drive, barcode reader, keyboard, mouse, or USB hub. The USB-A port of the TS2060i unit complies with USB version 2.0.

Bottom view



Enlarged view



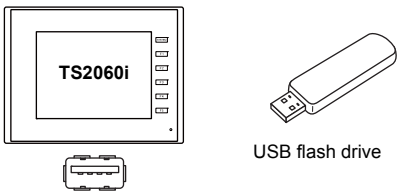
Applications

Application	V-SFT-6 Setting	Refer to
Printer connection	Required	TS2060 Reference Manual 1
USB flash drive connection	Required	See page 3-6.
Barcode reader connection	Required	TS2060 Connection Manual 3
Keyboard/numeric keypad connection	Required	See page 3-7.
Mouse connection	Not required	See page 3-8.
USB hub connection	Not required	See page 3-9.

USB Flash Drives

A USB flash drive can be connected to the TS2060i unit to perform operations including screen program transfers or saving of log data.

Connection Example



USB Flash Drive Specifications

The type of USB flash drives that can be used with the TS2060i are shown below.

Storage	Capacity	File System
USB flash drive	32 GB max.	FAT, FAT32

V-SFT-6 Setting

Required settings vary according to the application.
For more information, refer to TS2060 Reference Manual 2.

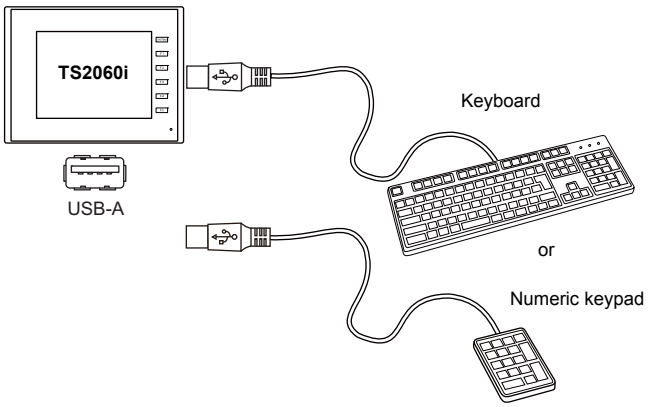
Notes on Handling a USB Flash Drive

1. Only remove a USB flash drive when the Main Menu screen is displayed or after pressing the [Storage Removal] switch.
2. Do not turn off power to the unit when the USB flash drive is being accessed.
3. Make a backup copy of the USB flash drive at regular intervals.
4. If a disk error occurs and data read/write operations are disabled, execute ScanDisk on Windows and try to restore the disk.
   If the disk cannot be restored, format the device. Note that formatting will completely erase all stored data. (For information on executing ScanDisk on Windows, refer to the relevant Windows manual.)
5. USB flash drives have a limited number of write cycles. Consequently, frequent writing at short intervals may shorten the service life of USB flash drives. When using a USB flash drive to save sampling data, take the acquisition interval and monitoring interval settings into consideration. Be sure to avoid constantly writing to a USB flash drive with the CYCLE macro command.

Keyboard and Numeric Keypad

Numeric values and characters can be entered by connecting a keyboard or numeric keypad to the TS2060i unit.

Connection Example



Compatible Keyboards

Type	Description
Japanese keyboard	106 keyboard, 109 keyboard, etc.
US standard keyboard	101 keyboard, 104 keyboard, etc.
Numeric keypad	

V-SFT-6 Setting

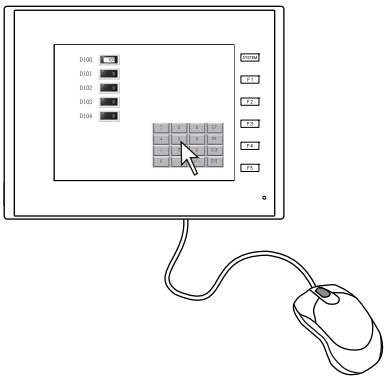
An [Entry] icon must be registered on the screen where the keyboard is to be used.
In addition, setting of the numerical data or character display parts of [Entry Target] selected under [Function] is required.
For details, refer to TS2060 Reference Manual 1.

TS2060i Unit Settings

On the Main Menu screen, select the type of keyboard to be connected.
For details, refer to “10. Expanded Function Settings” (page 5-56).

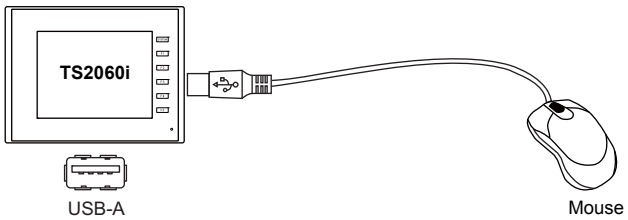
Mouse

A mouse can be used to operate screens displayed on the TS2060i unit by connecting a mouse to the unit.



The mouse pointer displayed on the unit is shown below.

Connection Example



Mouse Operation

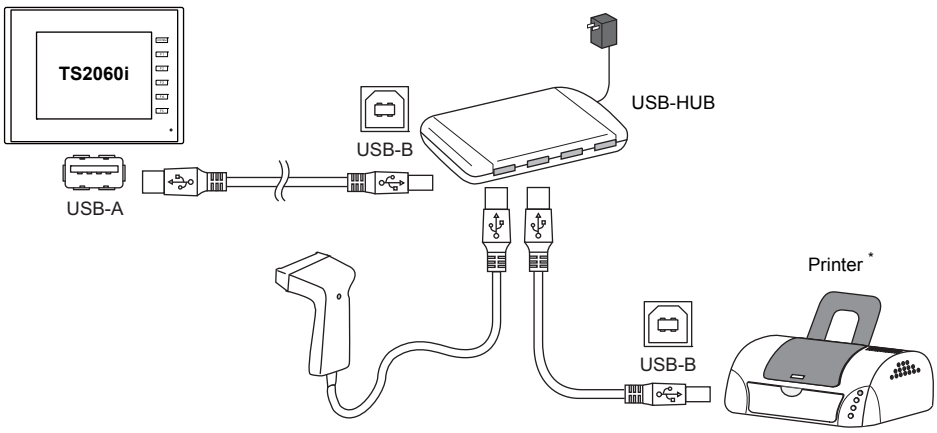
The mouse operations available on the unit are shown below.

Mouse Operation	Action
Movement	Moving the mouse pointer
Left-click	Pressing a switch

USB Hub

Devices like printers can be used at the same time by connecting a USB hub to the TS2060i unit.

Connection Example



* A parallel printer can also be connected. (In this case, a parallel printer that is compatible with the TS2060i and a commercially available parallel-to-USB cable must be used (recommended cable: UC-PGT manufactured by ELECOM).) For more information on compatible printer models, visit our website (http://www.monitouch.com/)).

Combinations of Connected Devices

Combination of devices usable at the same time: ○
Combination of devices not usable at the same time: ×

	Printer	USB Flash Drive	USB Barcode Reader	Keyboard/ Numeric Keypad	USB Mouse
Printer	-	○	○	○	○
USB Flash Drive	○	-	○	○	○
USB Barcode Reader	○	○	-	× *	○
Keyboard/ Numeric Keypad	○	○	× *	-	○
USB Mouse	○	○	○	○	-

* If these devices are connected at the same time, only the USB barcode reader will be recognized.

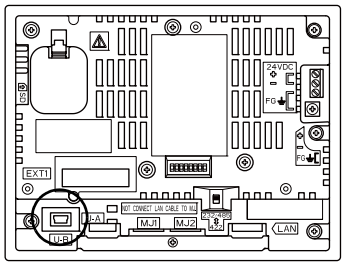
Notes

- A maximum of two USB hubs can be connected (cascaded) to the TS2060i unit.
  Note that performance will decrease when two USB hubs are connected.
- Do not turn off the power adaptor or disconnect the connector between the power adaptor and the USB hub when the USB hub is connected to the TS2060i unit and powered by the adaptor. Doing so may prevent sufficient power supply to the TS2060i unit resulting in faulty operation such as repeated restarting.
- When connecting two USB hubs to the TS2060i unit, supply power to each USB hub using the adaptor provided with each hub.
  Even when connecting only one USB hub, use the provided power supply adaptor (if provided).

USB mini-B (U-B)

This connector is used for screen program transfer or connection with a PictBridge-compatible printer. The USB mini-B port of the TS2060 unit complies with USB version 2.0.

Bottom view



Enlarged view 

Applications

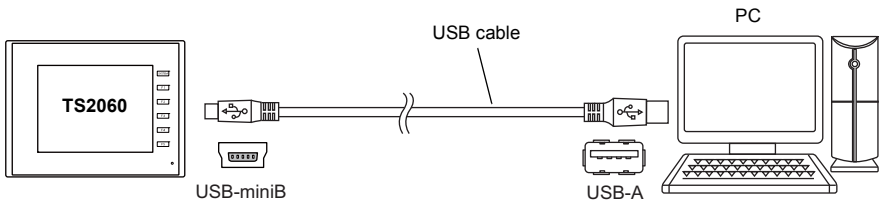
Application	V-SFT-6 Setting	Refer to
Ladder transfer function *1	Required	TS2060 Reference Manual 2
PictBridge-compatible printer connection	Required	TS2060 Reference Manual 1
Screen program transfer	Required	See page 3-10.

*1 The ladder transfer function cannot be used simultaneously with 1:n communication (multi-drop) or multi-link communication.

Screen Program Transfer

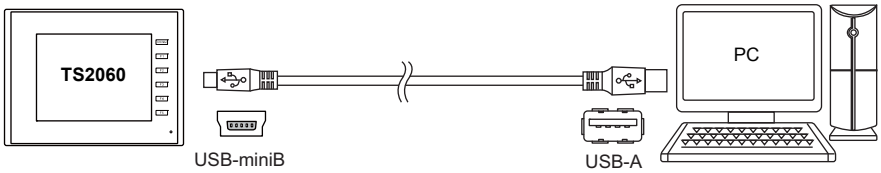
Screen programs can be transferred using the U-B port (USB mini-B).
A USB driver must be installed on the PC in advance to perform transfer.
Refer to “Installing the USB Driver” (page 3-11) below for the driver installation procedure.

Connection Example

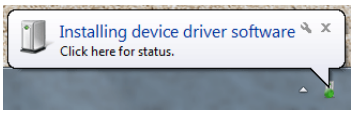


Installing the USB Driver

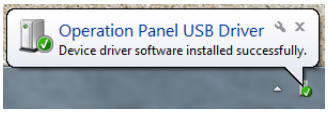
- For Windows Vista, 7, 8, 8.1, 10
  1) Use a USB cable to connect the USB-mini-B port of the powered TS2060 unit to the USB-A port of the PC.



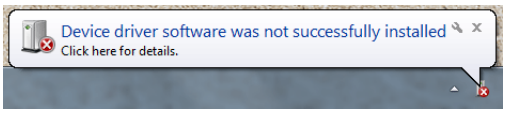
  2) The USB driver is automatically installed. During installation, the following message is displayed on the PC's taskbar.



  3) The following message is displayed on the PC's taskbar when installation is finished.
  When successfully completed, transfer the screen program.
  If installation has terminated due to an error, reinstall the USB driver. → Refer to page 3-12.
    - When successfully completed

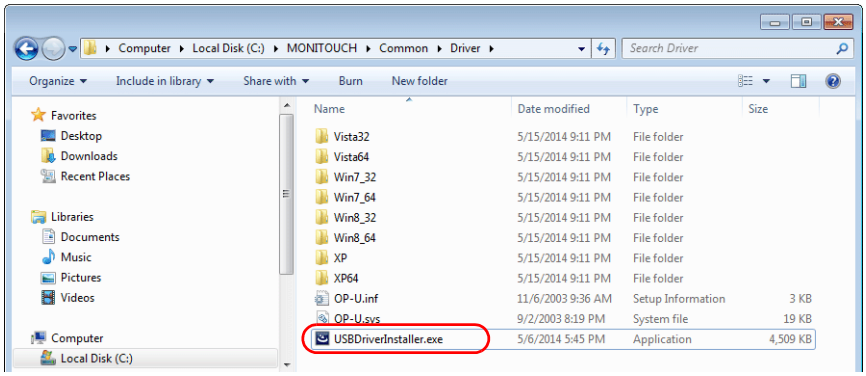


    - When terminated due to an error

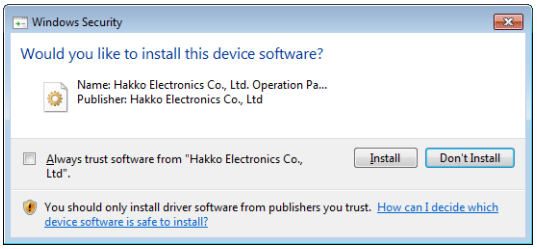


- When USB driver installation fails
  If automatic installation of the USB driver fails, perform installation according to the following procedure.

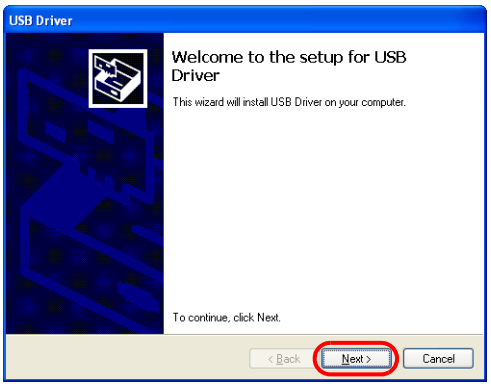
  1) Open the following folder using [My Computer] or [Windows Explorer].
     C:\MONITOUCH\Common\Driver
  2) Double-click “USBDriverInstaller.exe”.



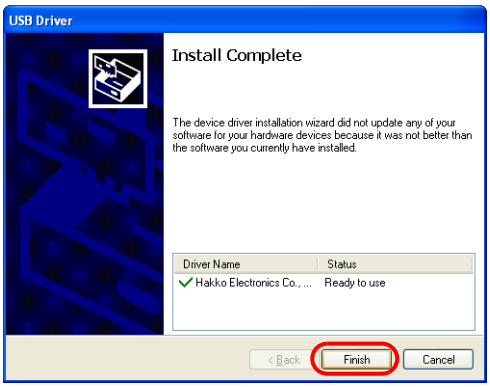
Depending on your OS, the following window may be displayed.
Click [Install].



  3) Click the [Next] button in the window below. Installation of the USB driver starts.

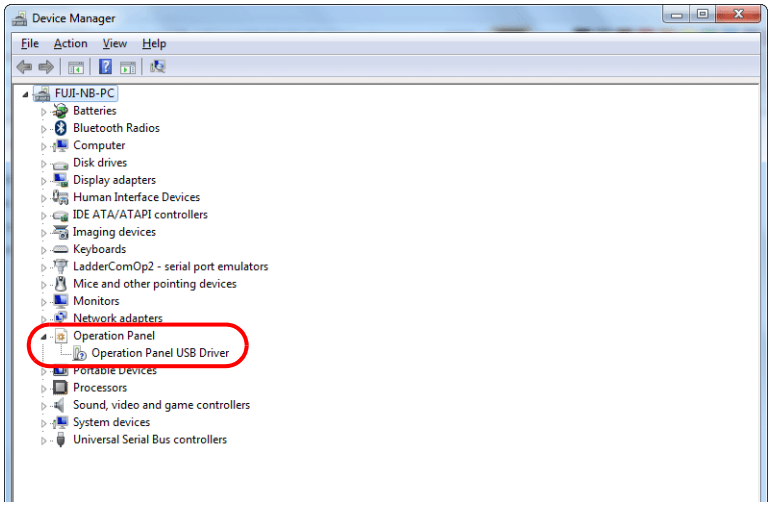


4) Click the [Finish] button in the window below.



USB driver installation is complete. Transfer the screen program.

- Confirming installation of the USB driver
  When the driver has been installed successfully, “Operation Panel - Operation Panel USB Driver” appears in the [Device Manager] window.

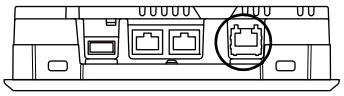


This item disappears when the USB cable is removed from a powered TS2060 unit.
If [Other Device] or a mark other than shown above is displayed even during USB connection, the USB driver is not recognized. If this happens, uninstall the USB driver and reinstall it.

LAN Connector (LAN) (TS2060i Only)

This connector is used for Ethernet communication with controllers and supports 100BASE-TX and 10BASE-T.

Bottom view

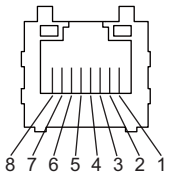


CAUTION

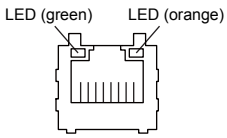
The MJ1 (or MJ2) and LAN connectors are both 8-pin modular jacks.
Check the connector names on the unit and insert cables into the correct connectors.
Do not connect any peripheral device that will carry excess voltage to the LAN connector.

The LAN connector pins correspond to the signals as shown below.

Specification: IEEE802.3 (u)-compliant, UDP/IP and TCP/IP support, Auto-MDIX and Auto-Negotiation function support

LAN	Pin No.	Signal	Description
	1	TX+	Ethernet send signal (+)
	2	TX–	Ethernet send signal (–)
	3	RX+	Ethernet receive signal (+)
	4	NC	Not used
	5	NC	Not used
	6	RX–	Ethernet receive signal (–)
	7	NC	Not used
	8	NC	Not used

The LEDs on the LAN connector operate as shown below.

LAN	LED Status		Description
	Green	Orange	
	On	On	Connected via 100BASE-TX
	On	Off	Connected via 10BASE-T
	Flashes	On/off	Data transfer in progress

Applications

Application	V-SFT-6 Setting	Refer to
PLC/temperature controller connection	Required	TS2060 Connection Manual
Multi-link2 (Ethernet)/ 1:n Multi-link2 (Ethernet) communication	Required	
Ladder transfer function *1	Required	TS2060 Reference Manual 2
Screen program transfer	Required	See page 5-2.
Ethernet communication function	Required	TS2060 Reference Manual 2

*1 The ladder transfer function cannot be used simultaneously with 1:n communication (multi-drop) or multi-link communication.

Wiring

CAUTION	When using the LAN port, keep the LAN cable away from the power supply cable as much as possible.

Use a commercially available cable. Using a custom-made cable may prevent normal connection to the network.

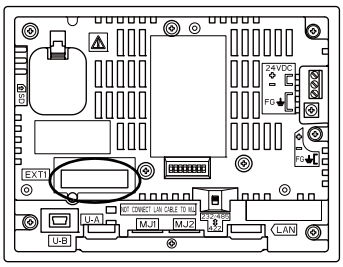
Recommended cable: 100 Ω UTP (unshielded twist-pair) cable, category 5, max. 100 m long
* Both straight and cross cables are usable, irrespective of the presence or absence of a hub.

Connector (EXT1) for Optional Unit/Communication I/F Unit (TS2060i Only)

This connector is used to connect to the optional “DUR-00” unit or “CUR-xx” communication interface unit.

* “DUR-00” and “CUR-xx” cannot be used at the same time.

Rear view



The types of communication interface units are shown below.

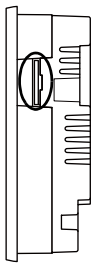
Type	Communication Specification
CUR-00	OPCN-1
CUR-01	T-Link
CUR-02	CC-Link
CUR-03	Ethernet
CUR-04	PROFIBUS-DP
CUR-06	SX BUS
CUR-07	DeviceNet
CUR-08	FL-net

* For details on specifications and how to attach a communication interface unit, refer to the respective Communication Unit Specifications.

SD Card Interface (SD) (TS2060i Only)

This is the interface used for inserting an SD card.
An SD card can be used to transfer screen programs and save log data and image data.

Side view



SD Card Specifications

SD cards that are compatible with the TS2060i are shown below.

* This manual collectively refers to the following cards as “SD cards”.

Card Type	Capacity	File System
SD card	2 GB max.	FAT, FAT32
SDHC card	4 GB to 32 GB	FAT32

Applications

- For details on functions that use an SD card, refer to the separate TS2060 Reference Manual 2.
- For details on reading and writing between an SD card and TS2060i unit as well as the SD card removal method, refer to “7. Storage Transfer” (page 5-16).

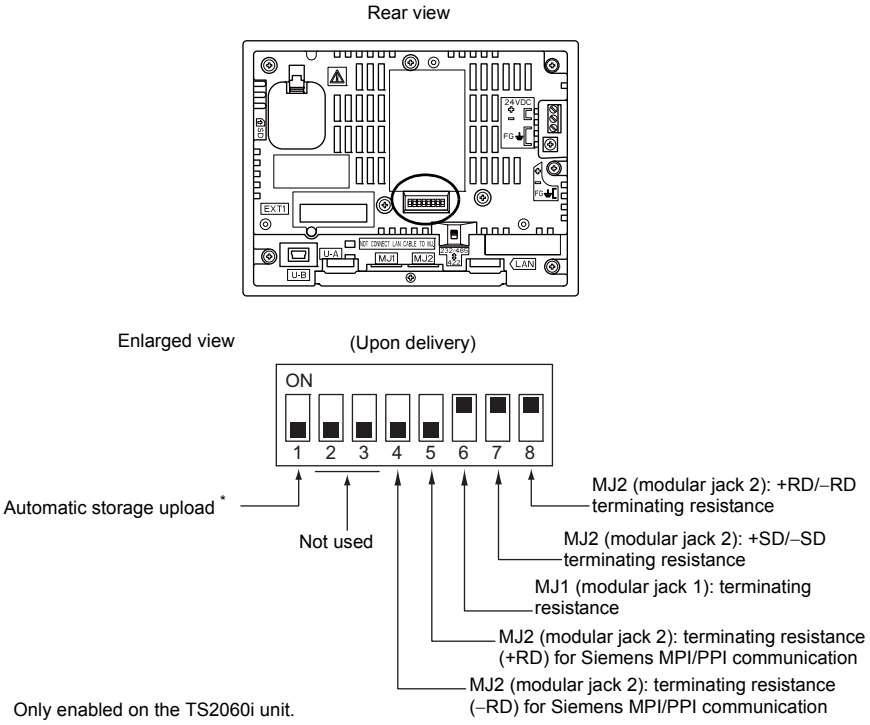
Notes on SD Card Handling

1. Only remove an SD card when the Main Menu screen is displayed or after pressing the [Storage Removal] switch.
2. Do not turn off power to the unit when the SD card is being accessed.
3. Make a backup copy of the SD card at regular intervals.
4. If a disk error occurs and data read/write operations are disabled, execute ScanDisk on Windows and try to restore the disk.
   If the disk cannot be restored, format the device. Note that formatting will completely erase all stored data. (For information on executing ScanDisk on Windows, refer to the relevant Windows manual.)
5. The number of write cycles for SD cards is limited. Consequently, frequent writing at short intervals may shorten the service life of SD cards. When using an SD card to save sampling data, take the acquisition interval and monitoring interval settings into consideration. Be sure to avoid constantly writing to an SD card with the CYCLE macro command.

DIP Switches (DIPSW)

The TS2060 unit is equipped with DIP switches 1 to 8 and the optional “DUR-00” unit is equipped with DIP switches 1 to 4. Turn off power to the unit before changing any DIP switches.

TS2060 Unit



DIPSW1 (Automatic Storage Upload) * Only Enabled on the TS2060i Unit.

Set DIPSW1 to ON to automatically upload screen programs from a storage device (SD card or USB flash drive).

Procedure

1. Preparation of storage
   Use the V-SFT-6 editor to load a screen program onto a storage device.
   (For the loading procedure, refer to the TS2060 Reference Manual 2.)
2. Connection of storage
   Turn OFF power to the TS2060i unit and connect the storage device (insert an SD card or connect a USB flash drive to the USB-A port).
3. DIP switch settings
   Slide DIPSW1 upward to the ON position.
4. Automatic upload start
   Turn ON power to the TS2060i unit. The screen program is automatically loaded into the flash memory of the TS2060i unit.

* When not using automatic upload, always set DIPSW1 to OFF.

DIPSW2, 3 (Not Used)

Set these DIP switches to OFF.

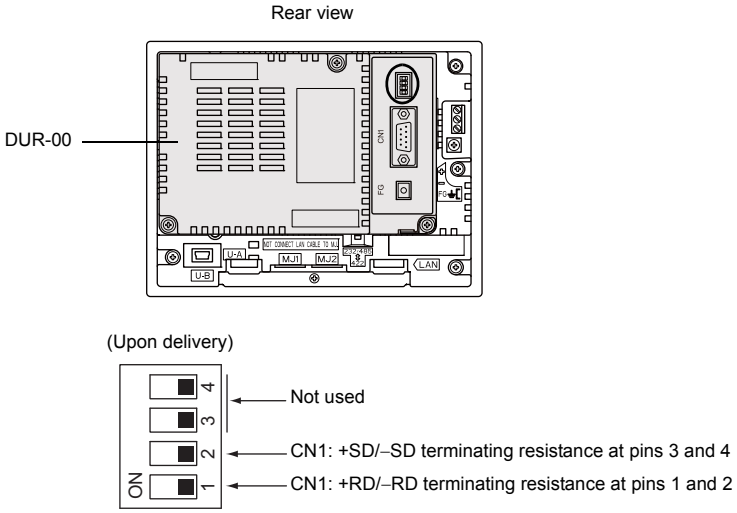
DIPSW4, 5 (Terminating Resistance for Siemens MPI/PPI Communication)

Set DIPSW4 and DIPSW5 to ON when using a Siemens PLC or performing MPI/PPI communication using MJ2.

DIPSW6, 7, 8 (Terminating Resistance Setting)

- Connection to MJ1 via RS-232C and RS-485 (2-wire connection) is possible. Turn DIPSW6 to ON in the following situations.
  - Master station for multi-link2 connection
  - Connection to a controller (PLC, temperature controller, etc.) via RS-485
  - TS2060 unit at the termination of V-link connection via RS-485
- Connection to MJ2 via RS-232C, RS-422 (4-wire connection), or RS-485 (2-wire connection) is possible.
  When connecting via RS-485 (2-wire connection), set DIPSW8 to ON. When connecting via RS-422 (4-wire connection), set DIPSW7 and DIPSW8 to ON.

DUR-00



DIPSW1, 2 (Terminating Resistance Setting)

⚠CAUTION	When connecting a controller to CN1 via RS-232C, set DIPSW1 and 2 to the OFF position.

- When connecting a controller to CN1 via RS-422/485 (2-wire connection), set DIPSW1 to the ON position.
- When connecting a controller to CN1 via RS-422/485 (4-wire connection), set DIPSW1 and 2 to the ON position.

4 Installation

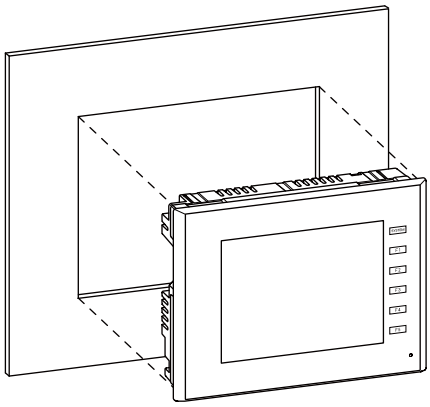
1. Installation Procedure
2. Power Supply Cable and Grounding Connections
3. Securing USB Cables
4. Inserting and Removing SD Cards (TS2060i Only)
5. Installing the Battery

1. Installation Procedure

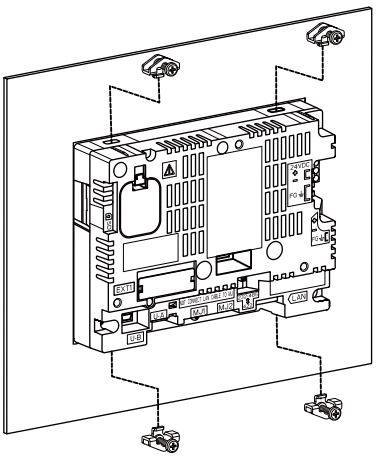
Installation Procedure

1. Mount the TS2060 unit into the mounting panel (maximum thickness of 4.0 mm).

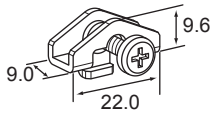
   * Make sure that the provided gasket is firmly squeezed between the mounting panel and the TS2060 unit.



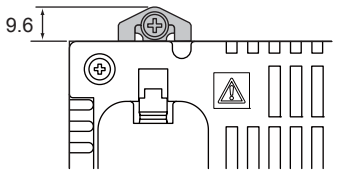
2. Insert the four fixtures provided with the TS2060 unit into the mounting holes and tighten them with the tightening screws (tightening torque: 4.43 lbf-in (0.5 N·m)).



- Fixture dimensions (unit: mm)



- Dimensions of a tightened fixture that protrudes from the edge of the TS2060 unit (unit: mm)



   * If the screws are tightened to a torque higher than stated above or the torque at each location is not equal, the surface sheet may warp due to deformation in the mounting panel and unit.

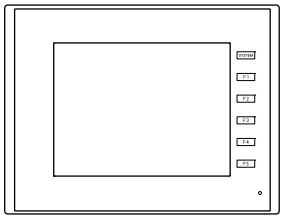
   * Ground the mounting panel to prevent any buildup of static electricity.

Installation Conditions

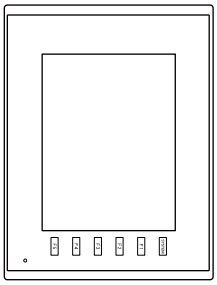
Mounting Orientation

The TS2060 unit can be mounted in the following orientations.

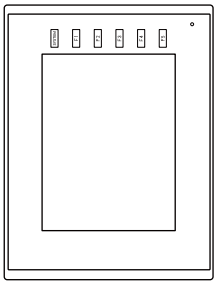
Upright



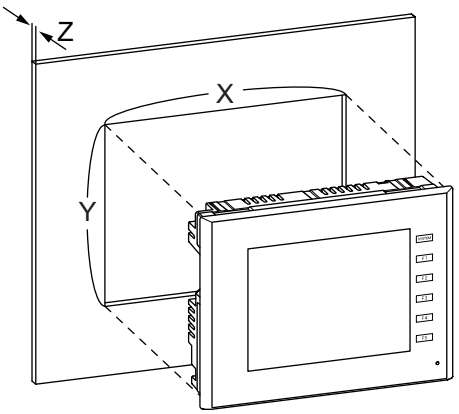
90° right

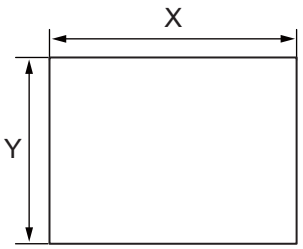


90° left



Panel Cut-out Dimensions



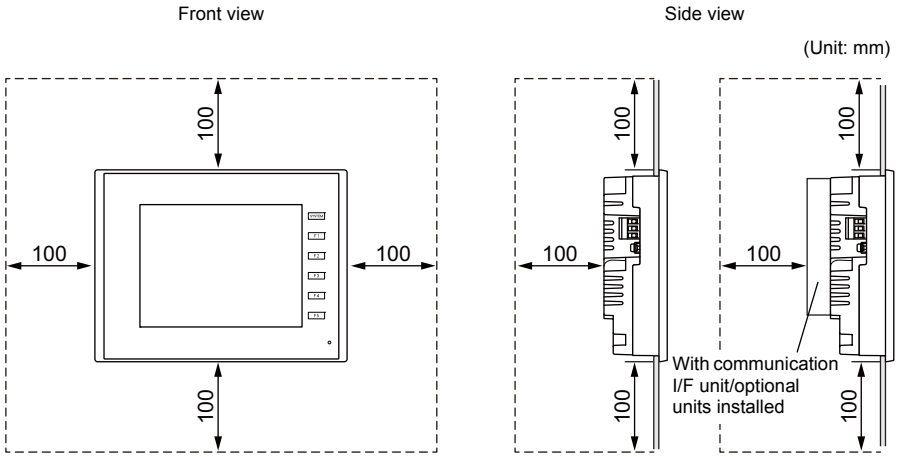


(Unit: mm)

X	Y	Z (panel thickness)
174.0 $^{+0.5}_{-0}$	131.0 $^{+0.5}_{-0}$	1.5 to 4.0

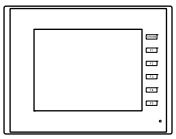
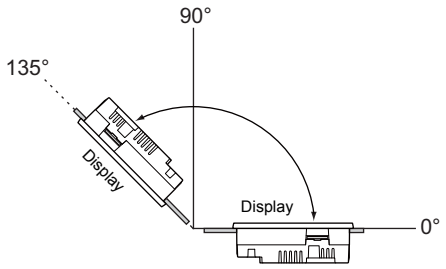
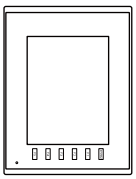
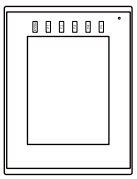
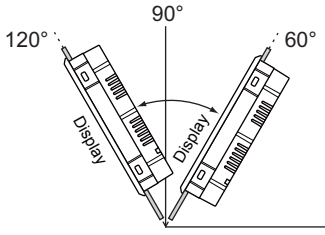
Mounting Spatial Restrictions

Mount the TS2060 unit with approximately 100 mm of space around the periphery of the unit.



Mounting Angle

The mounting angle differs depending on the mounting orientation. Mount the unit within the angle ranges shown in the table below.

Mounting Orientation	Mounting Angle
Upright 	
90° right  or 90° left 	

Ambient Temperature

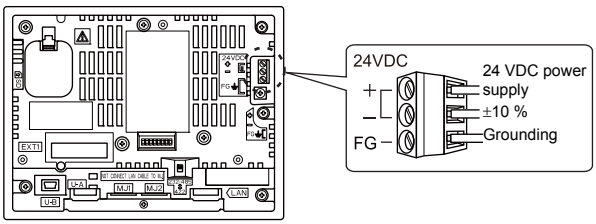
Use the TS2060 unit in an ambient temperature range of 0 °C to +50 °C (wet-bulb temperature of 39 °C or less).

2. Power Supply Cable and Grounding Connections

DANGER There is a risk of electrical shock.
Shut the power off before connecting the power supply cable.

Power Supply Cable Connection

Connect the power supply cable to the terminal on the backside of the unit.



Cable Specifications

Tighten the terminal screws on the terminal to within the ranges shown in the table below.

Tightening torque	5 to 6 lbf-in (0.56 to 0.68 N·m)
Recommended flat-head screwdriver	SZS 0.6 × 3.5 manufactured by PHOENIX CONTACT

When Using Bare Cables

CAUTION
- Do not solder the ends of wires. Doing so may lead to poor contact.
- When using stranded wire for cabling, make sure that the core is sufficiently twisted. Otherwise, stray wires may cause a short-circuit with neighboring electrodes.

Cable size	Power supply cable: AWG18 to AWG14, stranded wire/solid wire (diameter: 1.0 to 1.6 mm) FG wire: AWG20 to AWG14, stranded wire/solid wire (diameter: 0.8 to 1.6 mm)
Core length	

When Using Ferrule Terminals

Recommended ferrule terminal (pin type) *	Manufactured by PHOENIX CONTACT	AI 0.75-6 GY
		AI 1-6 RD
		AI 1.5-6 BK
Recommended crimping tool	Manufactured by PHOENIX CONTACT	CRIMPFOX 6

* Select a ferrule terminal appropriate to the cross-section area (diameter) of the electric wire.

Power Supply Cable Connection

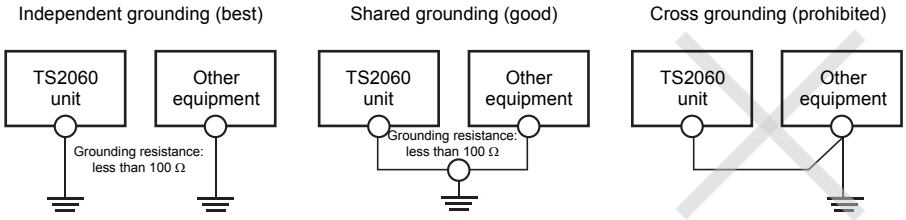
DANGER Avoid applying excessive force to the power supply cable.
A serious accident may result if the cable unintentionally separates from the power supply terminal.

- The power supply must be used within allowable range of voltage fluctuation.
- Use a power supply with low noise between cables and between the ground and cables.
- Do not insert two wires into a single terminal on the terminal block.
- Use the thickest power supply cable possible to minimize voltage drops, and twist the wire prior to insertion.
- Keep power supply cables away from high-voltage, large-current carrying cables.

Grounding

CAUTION Be sure to establish a ground for the TS2060 unit.
(The level of grounding resistance should be less than 100 Ω.)

- Independent grounding must be used for the unit.
- Use AWG20 to AWG14 wire for the grounding cable.
- Set the grounding point near the unit to reduce the length of grounding cables.



3. Securing USB Cables

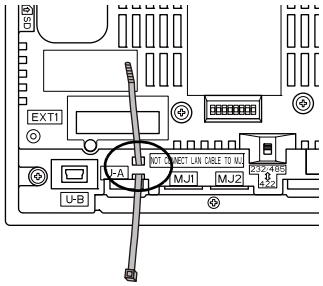
USB cables may disconnect from the TS2060 unit depending on the mounting conditions.
Use a cable tie about 3 mm in width on the unit to prevent disconnection.

Securing USB Cables

1. Preparing a cable tie
   Pass a cable tie through the hole as shown in the figure below.

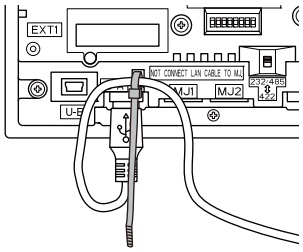
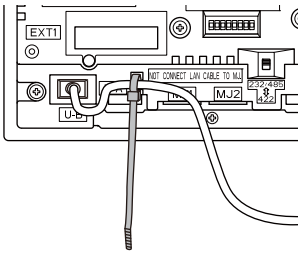
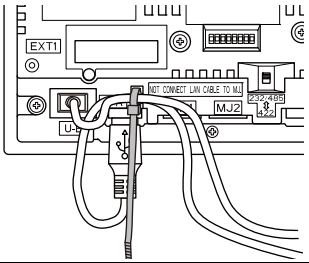
   * Pass the cable tie through the lower side upward.

Rear view



2. Inserting and securing a USB cable
   Insert a USB cable and secure it using the cable tie.

   Example:

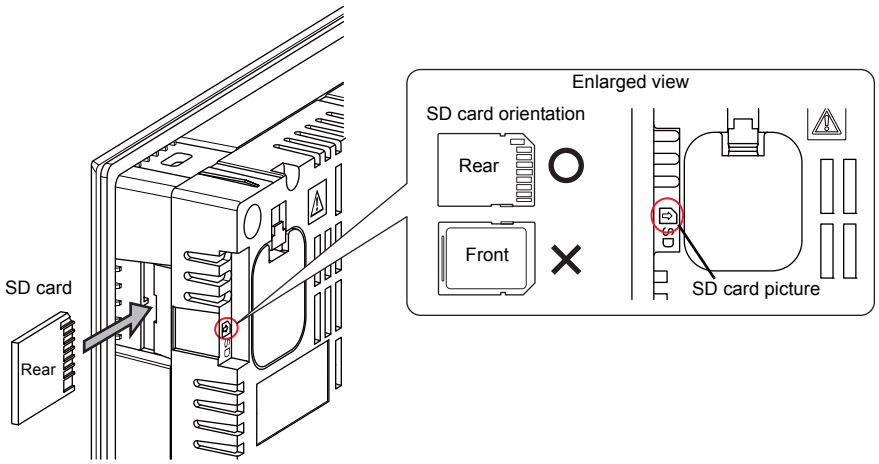
When only USB-A is used	When only USB mini-B is used	When both USB-A and USB mini-B (two cables) are used
		

4. Inserting and Removing SD Cards (TS2060i Only)

SD Card Insertion/Removal Procedure

1. Insert an SD card into the SD card slot on the right side of the TS2060i unit.
   Hold the SD card in the same orientation (SD card rear) as shown by the SD card pictured on the unit and then insert the SD card into the slot until it clicks.

⚠CAUTION	Insert the SD card into the TS2060i unit in the correct orientation. Failure to do so may damage the SD card or the slot on the unit.



2. Push the SD card until it clicks and then the SD card will come out. Pinch the SD card with your fingers and remove it from the slot.
   * Only remove an SD card when the Main Menu screen is displayed or after pressing the [Storage Removal] switch.

5. Installing the Battery

CAUTION A battery is already installed upon delivery.

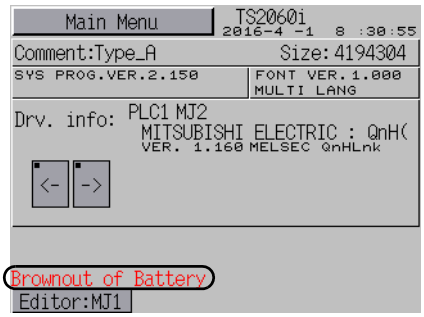
Role of the Battery

The battery provides backup power to the user memory area in SRAM (for non-volatile device memory $L and $LD, sampling data storage, etc.) as well as the built-in clock.

Battery Replacement Period

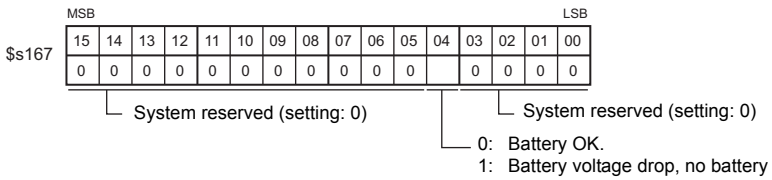
The service life of the battery is about 5 years from the date of manufacture.
When the battery voltage has dropped, the message “Brownout of Battery” appears at the lower left of the Main Menu screen on the TS2060 unit.

* For details on the Main Menu screen, refer to “3. Main Menu Screen” (page 5-5).



Battery Voltage Drop Detection

The battery status is output to the internal device memory address $s167 of the TS2060 unit.
When the battery voltage drops, the 4th bit of $s167 turns ON.
If the battery voltage drops (4th bit turns ON) within the expiration date (five years), replace the battery immediately.



Battery Replacement

Replacement batteries are available from Hakko Electronics.

Name	Model	Description
Battery for replacement	TS-BT	• Coin-type lithium primary cell (CR2032W manufactured by Sony Energy Devices) 1 pce. • Caution sticker 1 pce.

* When using a commercially available battery, use “CR2032W” manufactured by Sony Energy Devices.

Safety Instructions on Handling Batteries

Lithium batteries contain combustible material such as lithium and organic solvents. Mishandling may cause heat, explosion, or ignition resulting in fire or injury. To prevent accidents, pay attention to the following cautions when handling lithium batteries.

⚠DANGER

- The battery indicates polarity with a "+" symbol so be sure to insert the battery in the correct direction. Inserting the battery in the wrong direction may cause the battery to burst or ignite.
- The electrodes are exposed on the TS-BT and CR2032W batteries. Do not carry or store replacement batteries together with metal products. Short-circuiting of the electrodes may reduce battery capacity or cause batteries to burst or ignite.
- Do not disassemble, incinerate, or heat batteries.
- Never attempt to recharge batteries.

⚠CAUTION

- Only experts are authorized to perform battery replacement.
- Be sure to discharge static electricity from your body before performing battery replacement.
- Use the recommended battery for replacement.
- Rough handling of the battery may cause fire or chemical burns.
- Do not disassemble, incinerate, or heat the battery.
- Observe local and governmental regulations when disposing of waste batteries.
- Keep batteries out of reach of children. (If swallowed, immediately consult a doctor.)
- If a battery leaks or smells, note that the leaking battery electrolyte is flammable. Keep away from heat or flame.

SRAM Area Backup Procedure

Replace the battery within three minutes after the unit is turned off.
If it is not possible to replace the battery within three minutes, use the V-SFT-6 editor or a storage device to make a backup copy of the data in SRAM.

When Using the V-SFT-6 Editor

1) Connecting a cable
   Connect the TS2060 unit and the computer using the transfer cable ("V-CP", USB cable, or Ethernet cable).
2) Starting the V-SFT-6 editor
   Start the V-SFT-6 editor on the computer.
3) Displaying the [Transfer] dialog
   Click [Transfer] → [Upload]. The [Transfer] dialog is displayed.
4) Selecting data to be transferred
   Select [SRAM Data] for [Transfer Data].
5) Starting SRAM data transfer
   Click the [PC <–] button. Data transfer from the SRAM is started.
6) Saving the SRAM data
   When the SRAM data has been transferred, the [Save As] dialog is displayed on the computer. Save the data as a backup copy. The file extension is "∗.RAM".

* To transfer the "∗.RAM" data, which was saved as a backup copy, back to the TS2060 unit, click [Transfer] → [Download] in step 3, and click the [PC –>] button in step 5.

When Using a Storage Device (TS2060i Only)

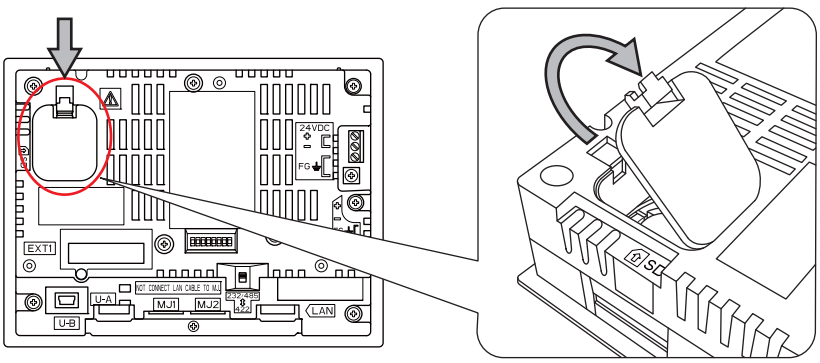
For details on the procedure for making backups using a storage device (SD card or USB flash drive), refer to “7-3. Saving Backup Copies of SRAM (TS2060i Only)” (page 5-25).

Battery Replacement Procedure

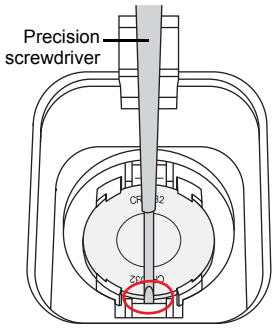
⚠DANGER	There is a risk of electric shock. Turn off power to the TS2060 unit before performing steps 2. through 7. below.

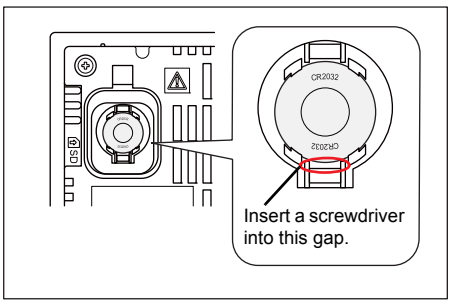
1. Turn off power to the TS2060 unit.
2. Slide the battery holder cover in the direction of the arrow to open it, and then remove the cover.

Rear view



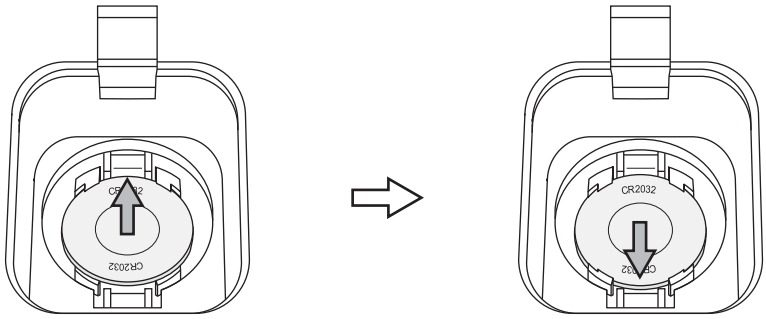
3. Insert a non-conducting precision screwdriver (flat-head screwdriver) into the gap under the battery and lift the battery out.



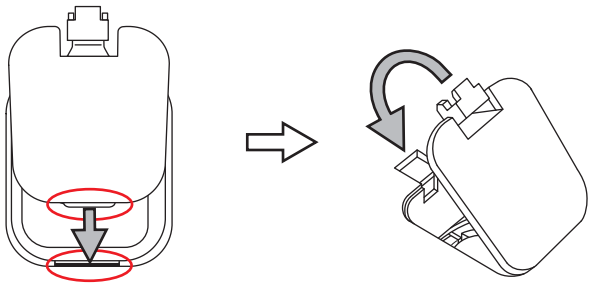


4. Remove the battery.

5. Slide a new battery up into the battery holder with the “+” side facing upward and then press the lower side of the battery until it clicks.



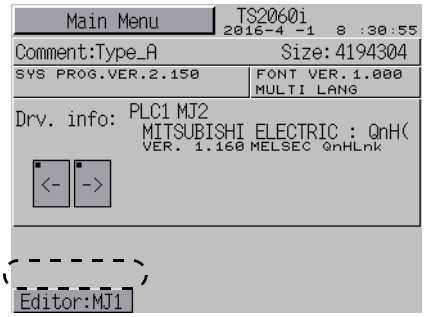
6. Close the battery holder cover by inserting the tab on the bottom of the cover into the TS2060 unit and pressing the top of the cover until it clicks.



7. Write a date five years from the present date for battery replacement on the new caution sticker and attach the sticker to an empty area on the TS2060 unit.

   * Do not attach the sticker over any air holes on the TS2060 unit or optional units.

8. Turn on the TS2060 unit and check that the “Brownout of Battery” message has disappeared from the lower left of the Main Menu screen.



9. If a “*.RAM” backup file was saved, transfer it back to the TS2060 unit.

Notes on the Battery: EU Directive 2006/66/EC

According to EU directive 2006/66/EC effective in EU countries, the package box of the TS2060 unit and the packaging of the replacement battery have the marking shown below.

⚠CAUTION

- The marking shown above is effective only in EU countries.
- The details on the marking are designated in Article 20 “Information for end-users” and ANNEX II in EU directive 2006/66/EC.
- The marking indicates that the battery should be disposed of separately from general household waste.
- If element symbols are indicated below the marking, it means that the battery contains the specified heavy metal at a concentration exceeding the control value. The concentration control values are given below.
  Hg: mercury (0.0005 %), Cd: cadmium (0.002 %), Pb: lead (0.004 %)
- The EU has determined the separating program for used batteries.
  Dispose of used batteries properly at your local waste-disposal/recycling center.

“Perchlorate Best Management Practices” Regulations in California State Law, U.S.

The TS2060 unit is an applicable product under the “Perchlorate Best Management Practices” regulations of California state law in the U.S. The package box of the TS2060 unit and the packaging of the replacement battery have the explanation shown below.

Perchlorate Material - special handling may apply.
See www.dtsc.ca.gov/hazardouswaste/perchlorate

If exporting a product with an embedded TS2060 unit that contains a lithium primary battery to California, the above explanation must be printed on the product’s package box.

5 MONITOUCH Operations

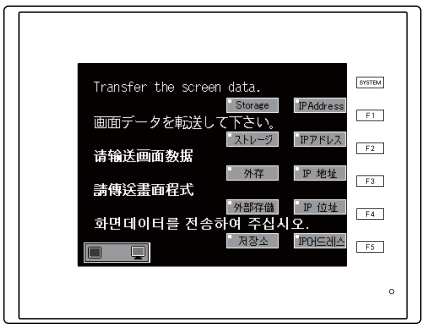
1. Before Operation
2. Function Switches
3. Main Menu Screen

1. Before Operation

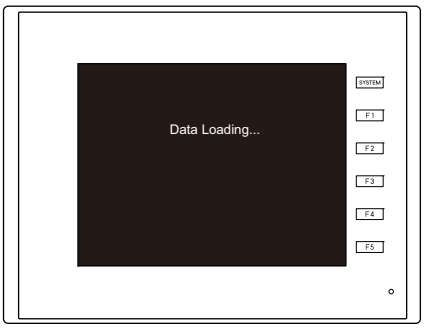
Procedure before Operation

1. Mount and install the TS2060 unit on the mounting panel and perform wiring.
   For details, refer to Chapter 4.
2. Install peripheral equipment, such as PLCs and temperature controllers, and perform wiring.
   For details on precautions, refer to the separate TS2060 Connection Manual.
3. Turn on power to the TS2060 unit.

Turning on power for the first time



Other cases

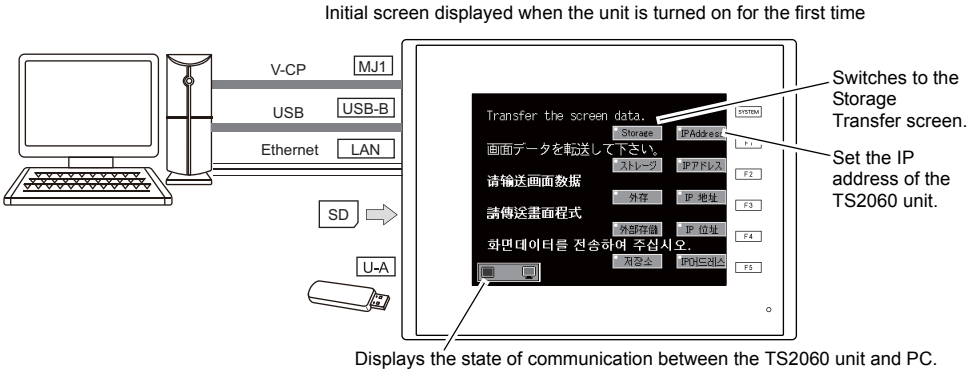


4. Transfer the screen program created using the V-SFT editor.
   For details on screen program transfer, refer to “Screen Program Transfer” page 5-2.
5. Start operation. To switch to RUN mode, refer to “Main Menu Screen” page 5-5.
   When a connection with controllers has been established, the TS2060 unit enters RUN mode.

   * If the TS2060 unit does not operate normally and shows an error message, refer to Chapter 6 and eliminate the cause of the error.

Screen Program Transfer

There are five methods for transferring a screen program as described below.



1) Serial transfer
   Connect the “V-CP” screen program transfer cable to the MJ1 port on the TS2060 unit and transfer the screen program from a PC.
2) Transfer via USB
   Connect a USB mini-B cable to the U-B port on the TS2060 unit and transfer the screen program from a PC.
3) Transfer from storage device (TS2060i only)
   Use a storage device (SD card or USB flash drive).
   Write a screen program from the PC to the storage device in advance. When turning on power to the TS2060 unit for the first time, the [Storage] switch appears on the initial screen.

   Pressing this switch displays the Storage Transfer screen where you can transfer the screen program.
4) Transfer from a storage device (automatic upload) (TS2060i only)
   Write a screen program from the PC to the storage device (SD card or USB flash drive) in advance. Screen program transfer starts automatically when power to the TS2060 unit is turned on.
5) Transfer via Ethernet (TS2060i only)
   Connect an Ethernet cable to the LAN port on the TS2060i unit and transfer the screen program from a PC.
   When turning on power to the TS2060i unit for the first time, the [IP Address] switch appears on the initial screen. Pressing this switch displays the Ethernet screen where you can set the IP address.

* For more information on 4) and 5), refer to TS2060 Reference Manual 2.

2. Function Switches

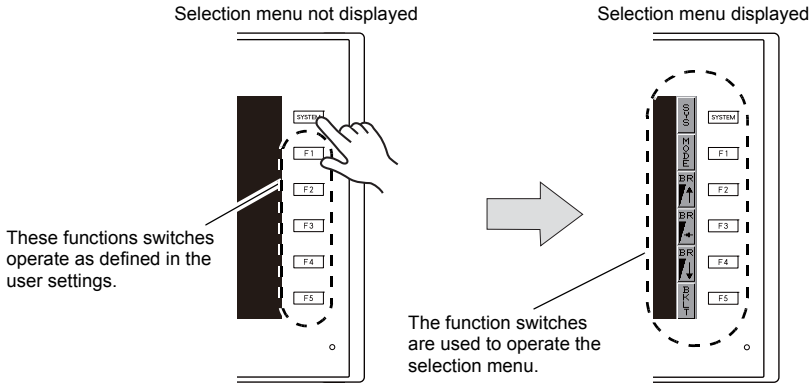
Types

The following six types of function switches are provided.
[SYSTEM], [F1], [F2], [F3], [F4], [F5]

Function of Each Switch

[SYSTEM] Switch

The [SYSTEM] switch is an alternate action switch.
Pressing this switch once displays the selection menu on the left of the function switches as shown in the figure *. [F1] to [F5] are used to operate the selection menu.



* If the selection menu does not appear even if the [SYSTEM] switch is pressed, use of the [SYSTEM] switch has been prohibited. To enable the [SYSTEM] switch, hold down the [F5] switch and [SYSTEM] switch together for the time specified for [Mode Change Delay Time] (max. 30 seconds). [Mode Change Delay Time] is set in the screen program.

[F1] to [F5] Switch Functions with Menu Displayed

	Function	Specification	
F1	Mode changeover	Switch the operation mode between STOP and RUN. *3	
F2	Brightness	Bright	
F3*1		Medium	
F4*1		Dark	
F5	Backlight control *4	Always ON	–
		Auto 1 Auto 2 Auto 3	• The [F5] switch turns the backlight off. • These settings are available when the backlight control bit (11th bit) of read area “n + 1” in the system device memory is set to “0”.
		Manual Manual 2	• Manual The [F5] switch turns the backlight off. To turn the backlight back on, touch the screen or any function switch. • Manual 2 The [F5] switch turns the backlight on/off. • The [Control during Backlight Power ON] item that specifies the state of the backlight when the power is turned on is enabled. At power-on ON → backlight on OFF → backlight off

*1 Reducing the brightness may slightly extend the service life of the backlight.
*2 If the operation mode does not switch between STOP and RUN even if the [MODE] switch is pressed, use of the [F1] (MODE) switch has been prohibited. To enable the [F1] (MODE) switch, hold down the [F5] switch and [F1] switch together for the time specified for [Change-over Time] (max. 30 seconds). [Change-over Time] is set in the screen program.
*3 Backlight control settings are configured in the [System Setting] → [Unit Setting] → [Backlight] tab window.

Setting Procedure for User Setting Function Switches [F1] to [F5]

The function switches can be operated by the user when the TS2060 unit is in RUN mode (in operation) and the selection menu is not displayed by pressing the [SYSTEM] switch *1.
The function switches should be defined in V-SFT-6.

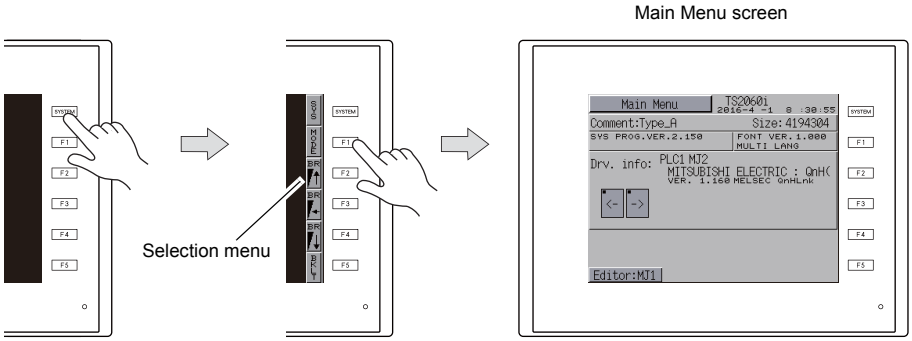
- Settings for each screen
  [Screen Setting] → [Local Function Switch Setting]
- Making settings common to all screens *2
  [System Setting] → [Global Setting] → [Global Function Switch Setting]

*1 If the TS2060 unit displays the Main Menu screen and the selection menu displayed using the [SYSTEM] switch is not shown, the function switches are disabled.
*2 When a screen with [Local Function Switch Setting] set is displayed, settings configured in the [Local Function Switch Setting] window override those configured in the [Global Function Switch Setting] window.

3. Main Menu Screen

Procedure for Switching to the Main Menu Screen

To switch to the Main Menu screen from RUN mode, press the [SYSTEM] switch and then press the [F1] switch *2 for the displayed selection menu *1.

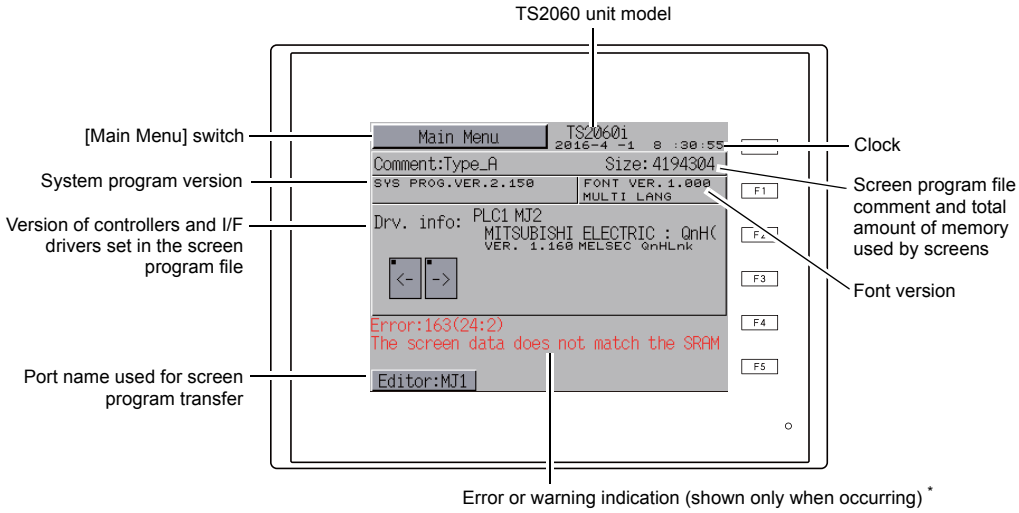


*1 If the selection menu does not appear even if the [SYSTEM] switch is pressed, use of the [SYSTEM] switch has been prohibited. To enable the [SYSTEM] switch, hold down the [F5] switch and [SYSTEM] switch together for the time specified for [Change-over Time] (max. 30 seconds). [Change-over Time] is set in the screen program.

*2 If the Main Menu screen does not appear even if the [F1] switch is pressed, use of the [F1] (MODE) switch has been prohibited. To enable the [F1] (MODE) switch, hold down the [F5] switch and [F1] switch together for the time specified for [Change-over Time] (max. 30 seconds). [Change-over Time] is set in the screen program.

Main Menu Screen

The Main Menu screen shows information about the TS2060 unit, including the unit model, system information, and screen program information.
It also functions as a system screen for transferring screen programs between a PC and TS2060 unit. To transfer a screen program from a PC to the TS2060 unit through serial communication, be sure to display the Main Menu screen. (However, this is not necessary if [MJ1] shows [No connection].)

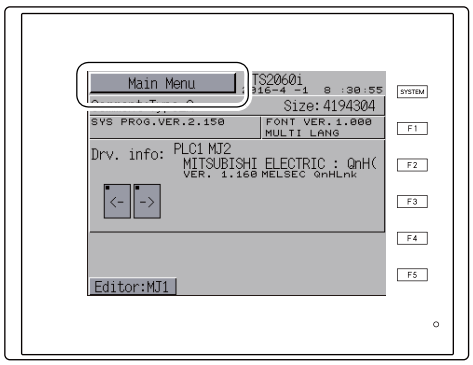


* Pressing the error/warning will display the entire message.

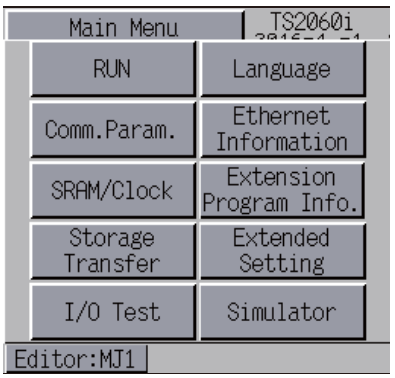
[Main Menu] Switch

Press the [Main Menu] switch to display the following menu.

Main Menu screen



[Main Menu]



Composition of Main Menu Screen

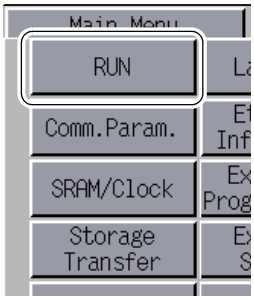
The Main Menu screen is configured as shown below.

- Main Menu screen
  - [Main Menu] switch
    - [RUN] (refer to page 5-7.)
    - [Language] (refer to page 5-7.)
    - [Comm. Param.] (refer to page 5-8.)
    - [Ethernet Information] (refer to page 5-9.)
    - [SRAM/Clock] (refer to page 5-13.)
    - [Extension Program Info.] (refer to page 5-15.)
    - [Storage Transfer] (refer to page 5-16.)
      - [Card Recorder Menu] (refer to page 5-29.)
    - [Extended Setting] (refer to page 5-30.)
      - [Remote Desktop Key Code] (refer to page 5-31.)
      - [Bright Adjustment] (refer to page 5-33.)
      - [Trial period Setting] (refer to page 5-34.)
    - [I/O Test] (refer to page 5-38.)
      - [Keyboard] (refer to page 5-40.)
      - [Print Test] (refer to page 5-41.)
      - [USB Test] (refer to page 5-42.)
      - [Serial Test] (refer to page 5-43.)
      - [Switch Check] (refer to page 5-53.)
    - [Simulator]
      Configure settings when using the simulator.
  - Expanded function settings
    Press the [Editor: MJ1] switch at the lower left of the Main Menu screen and the [F5] function switch at the same time. For details, refer to “Expanded Function Settings” page 5-56.

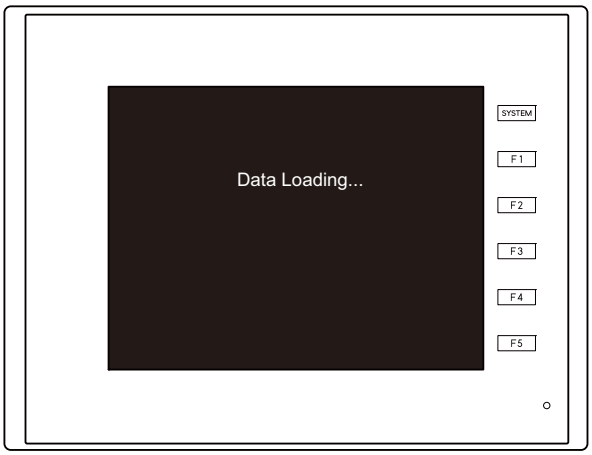
1. RUN

Pressing the [RUN] switch in the Main Menu drop-down window switches to RUN mode.

[Main Menu]



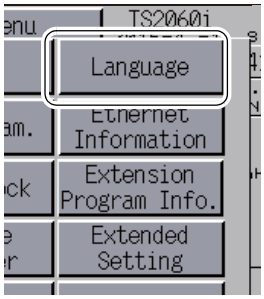
RUN screen



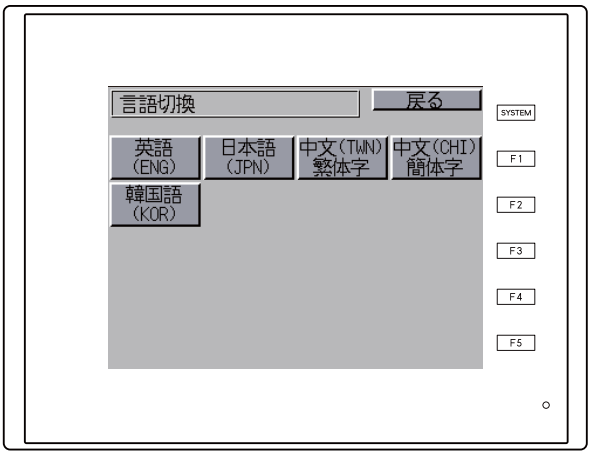
2. Language Selection

Pressing the [Language] switch in the Main Menu drop-down window displays the Language Selection screen.
This screen displays the language switches (*) selected in the [Font Setting] window of V-SFT-6 and allows the display language of the Main Menu screen to be changed.

[Main Menu]



Language Selection screen

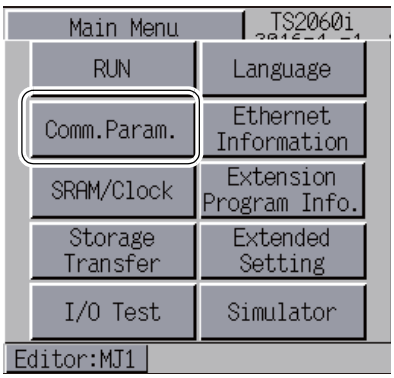


* The languages available for displaying the Main Menu screen are English, Japanese, Chinese (Traditional), Chinese (Simplified), and Korean. It is possible to always display English.

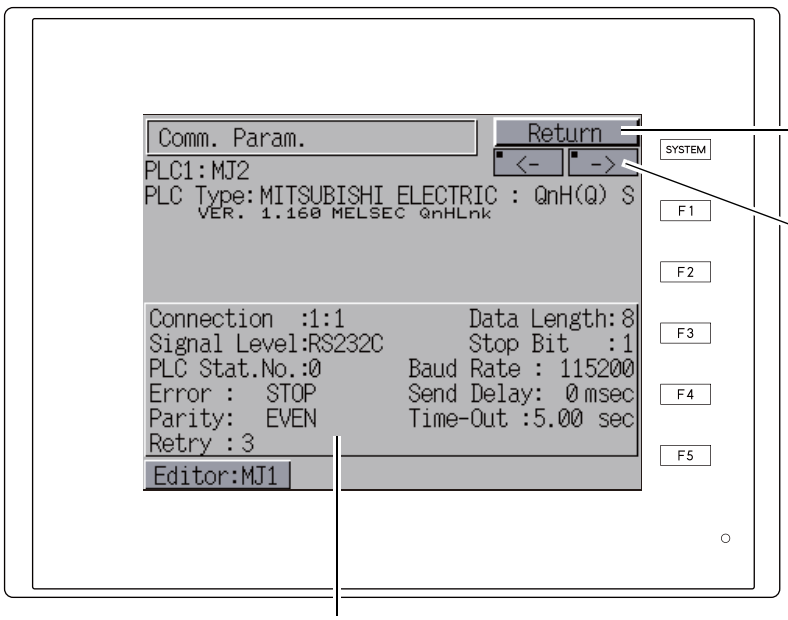
3. Communication Parameters

Pressing the [Comm. Param.] switch in the Main Menu drop-down window displays the Comm. Param. screen.
This screen allows users to check the communication parameters of PLC1 to PLC8 configured using V-SFT-6.

[Main Menu]



Comm. Param. screen



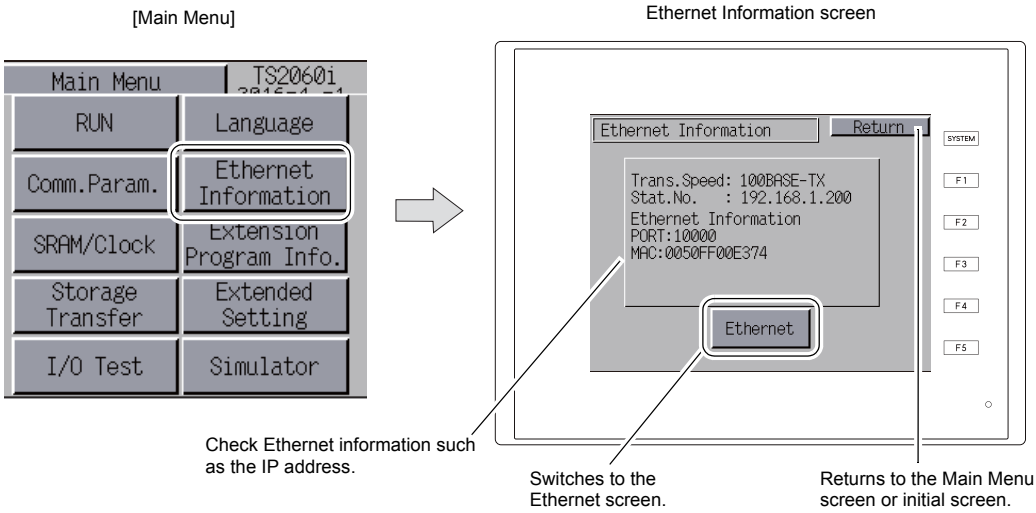
Returns to the Main Menu screen.

The [←] and [→] switches change between PLC1 to PLC8.

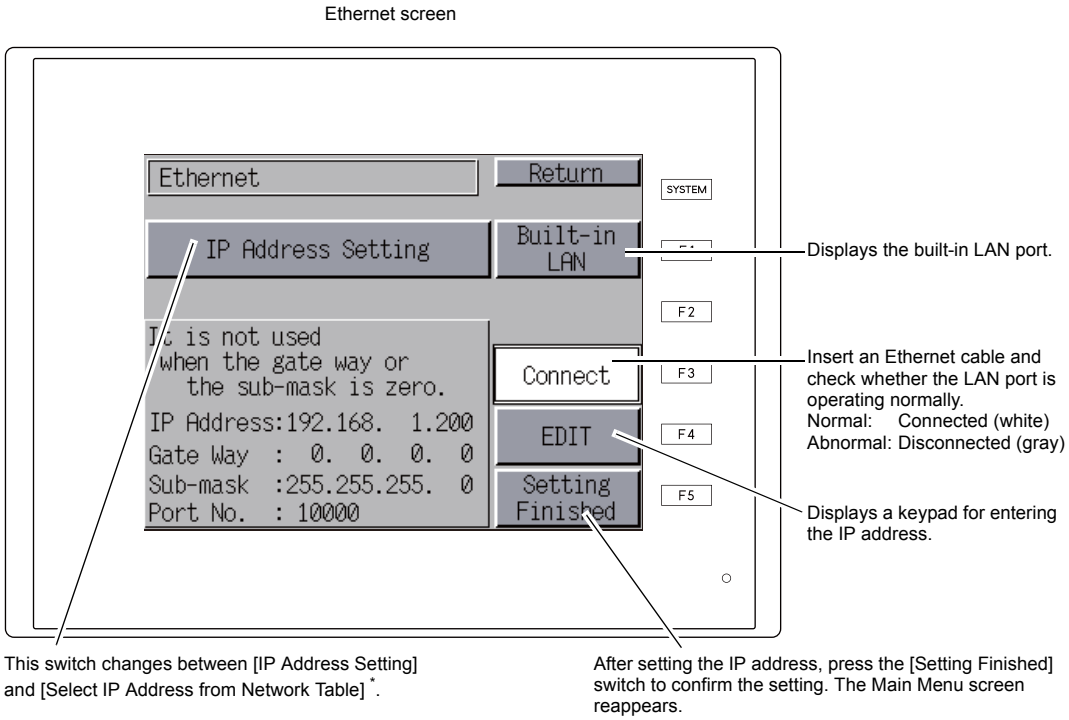
Displays the configured communication parameters.

4. Ethernet (TS2060i Only)

Pressing the [Ethernet Information] switch in the Main Menu drop-down window displays the Ethernet Information screen.
This screen is used to check the Ethernet information of the TS2060i unit and set the IP address.



Pressing the [Ethernet] switch on the Ethernet Information screen displays the following screen. The IP address of the TS2060i unit can be set on this screen.



* Refer to the TS2060 Connection Manual.

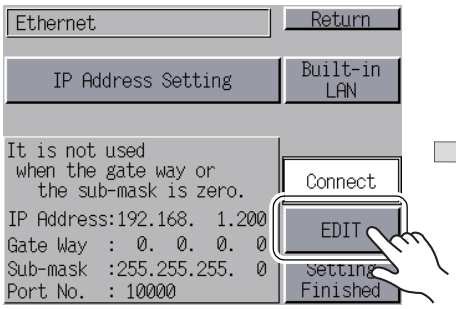
4-1. IP Address Setting for the TS2060i Unit

When using the Ethernet function, set the IP address of the TS2060i unit. An IP address can be set either on the unit itself or in the screen program.

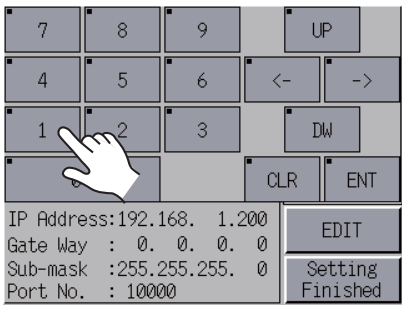
Setting on the TS2060i Unit

1. Press the [Ethernet Information] switch in the Main Menu drop-down window to display the Ethernet Information screen and then press the [Ethernet] switch. The Ethernet screen is displayed.
2. Press the [EDIT] switch and configure each setting.

Before change



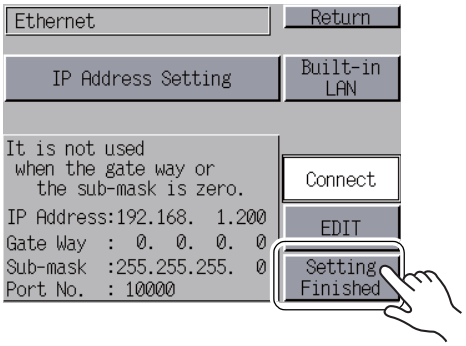
Changing the IP address using the keypad



Not used when the gateway or the subnet mask is zero.

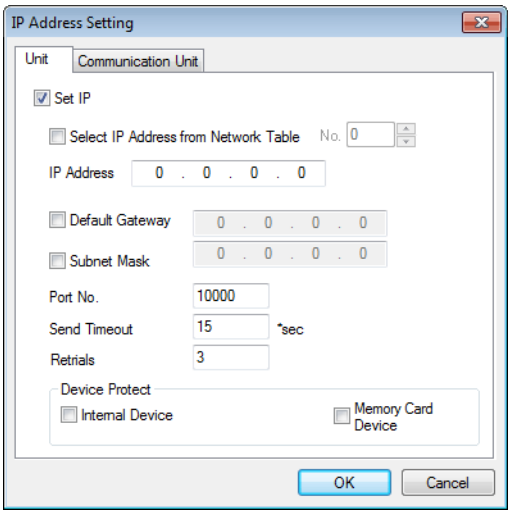
3. Press the [Setting Finished] switch to confirm the IP address. Check that the set IP address is displayed on the Ethernet Information screen.

Confirming the IP address



Setting Using the V-SFT Editor

1. Select [System Setting] → [Ethernet Communication] → [Local Port Address] on V-SFT. The [IP Address Setting] window is displayed.
2. Select the [Set IP] checkbox and configure each setting.



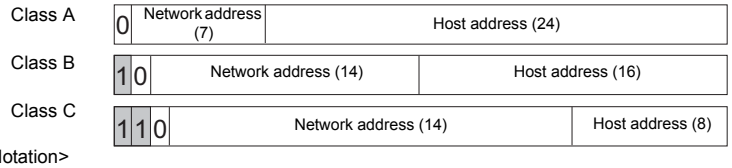
☐ Select IP Address from Network Table	This is valid when the IP address of the TS2060i unit has been registered in the network table. Select a network table number from 0 to 255 to set the IP address.
IP Address *	Set the IP address for the TS2060i unit.
☐ Default Gateway *	Set the default gateway.
☐ Subnet Mask *	Set the subnet mask. When this box is not checked, the subnet mask is automatically assigned based on the byte at the extreme left of the IP address. Example: IP address 172.16.200.185: “255.255.0.0” is set. IP address 192.168.1.185: “255.255.255.0” is set.
Port No. *	Set a port number from 1024 to 65535. (“8001” is not available.)
Send Timeout	Set a timeout period for transmitting macro commands EREAD, EWRITE, SEND, MES or Ethernet DLL functions.
Retrials	0 to 255 Set the number of retrials to be performed when a time-out occurs.
Device Protect ☐ Internal Device ☐ Memory Card Device	Select either checkbox to write-protect the device memory from PCs or other stations.

* For details on the setting items, refer to page 5-12.

3. Click [OK].
4. Transfer the screen program to the TS2060i unit. Press the [Ethernet Information] switch in the Main Menu drop-down window and check the IP address on the Ethernet Information screen.

IP Address

This is an address that is used for recognizing each node on the Ethernet and should be unique.
The IP address is 32-bit data which consists of the network address and the host address and can be classified into classes A to C depending on the network size.



<Notation>
Data consisting of 32 bits is divided into four segments in decimal notation and each segment is delimited with a period.
Example: The IP address in class C shown below is represented as “192.128.1.50”.
11000000 10000000 00000001 00110010

<Unavailable IP addresses>
- “0” is specified for one byte at the extreme left.
  Example: 0.x.x.x
- “127” is specified for one byte at the extreme left (loop back address).
  Example: 127.x.x.x
- “224” or more is specified for one byte at the extreme left (for multi-cast or experiment).
  Example: 224.x.x.x
- The host address consists of only “0” or “255” (broadcast address).
  Example: 128.0.255.255, 192.168.1.0

Port Number

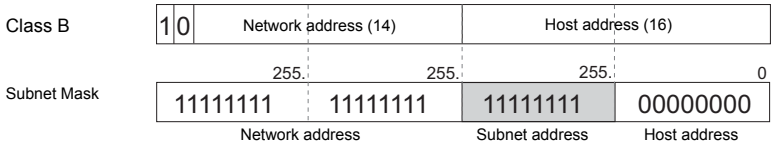
Multiple applications are running on each node, and communications are carried out for each application between the nodes. Consequently, it is necessary to have a means to identify the application that data should be transferred to. The port number works as this identifier. Each port number is 16-bit data (from 0 to 65535).
The TS2060i uses ports for screen program transfer (8001), PLC communication (as desired), and the simulator (8020). Set a unique number in the range of 1024 to 65535. For a PLC or a PC, set the port number in the range of 256 to 65535. It is recommended to set a greater number.

Default Gateway

A gateway and a router are used for communication between different networks.
The IP address of the gateway (router) should be set to communicate with the node(s) on other networks.

Subnet Mask

A subnet mask is used for dividing one network address into multiple networks (subnet).
The subnet is assigned by specifying a part of the host address in the IP address as a subnet address.

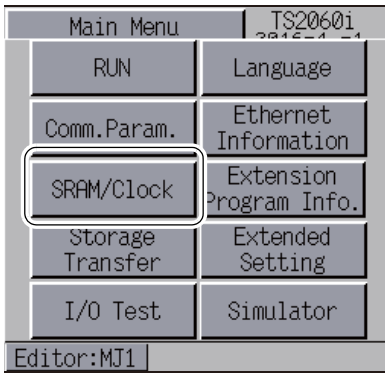


<Unavailable subnet masks>
- All bits are set to “0”..... 0.0.0.0
- All bits are set to “1”..... 255.255.255.255

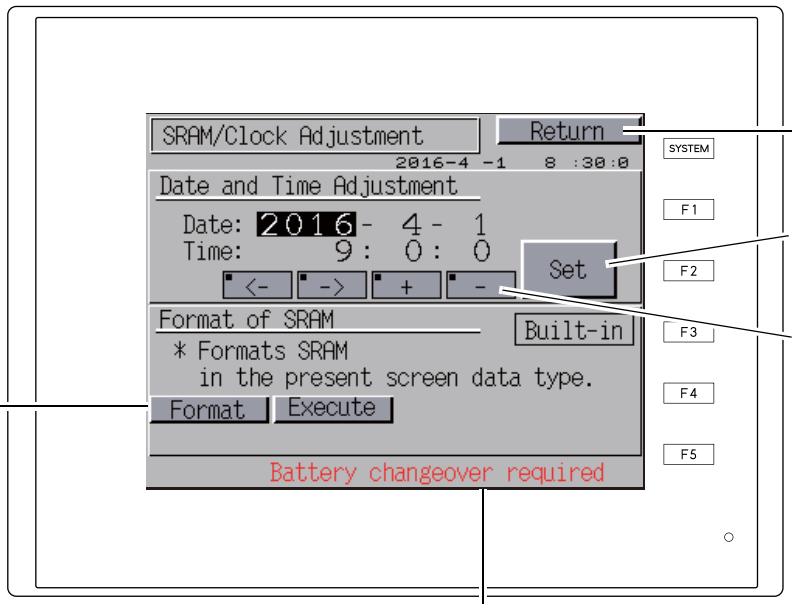
5. SRAM/Clock Adjustment

Pressing the [SRAM/Clock] switch in the Main Menu drop-down window displays the SRAM/Clock Adjustment screen.
This screen allows users to adjust the date and time and format the SRAM area.

[Main Menu]



SRAM/Clock Adjustment screen



Returns to the Main Menu screen.

Confirms the adjusted date and time.

Use the [←] and [→] switches to move the cursor and [+] and [–] switches to adjust the date and time.

Formats the SRAM area.

A “Battery changeover required” alert message is displayed here *1.

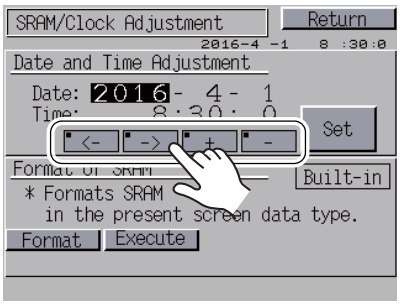
*1 Always replace the battery when required. The clock setting and contents of the SRAM area cannot be retained without a power supply.

5-1. Date and Time Adjustment

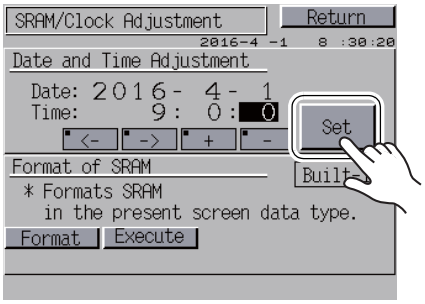
This screen can be used to adjust the built-in clock of the TS2060 unit.
Set whether to use the built-in clock in the TS2060 unit or the clock in a PLC by selecting [System Setting] → [Unit Setting] → [SRAM/Clock] → [SRAM/Clock Setting] → [Use Built-in Clock] on V-SFT-6.

1. Use the [←] and [→] switches to move the cursor and [+] and [–] switches to adjust the date and time.
2. After adjustment, press the [Set] switch to confirm the setting. The clock displayed at the top right is updated.

Before adjustment



Adjustment complete



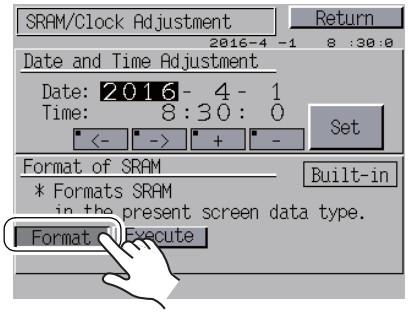
3. Press the [Return] switch to return to the Main Menu screen.

5-2. Formatting SRAM

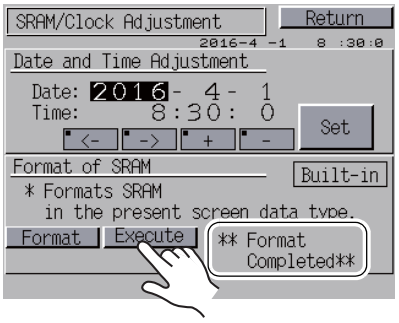
An SRAM area can be formatted.
When the SRAM area is formatted, any saved data (history data saved in SRAM, internal device memory $L, etc.) is completely cleared. Exercise caution when formatting the SRAM area.

1. Press the [Format] switch and then the [Execute] switch.
   The SRAM area is formatted in the format specified in the current screen program. When formatting is complete, the message "**Format Completed**" is displayed.

Before formatting of SRAM area



Formatting of SRAM area complete

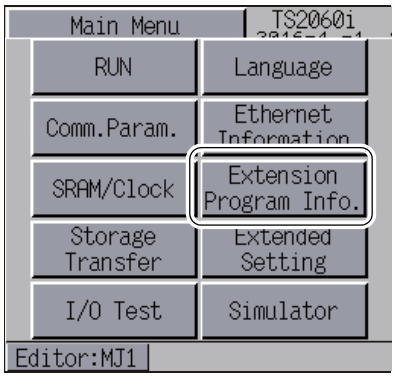


2. Press the [Return] switch to return to the Main Menu screen.

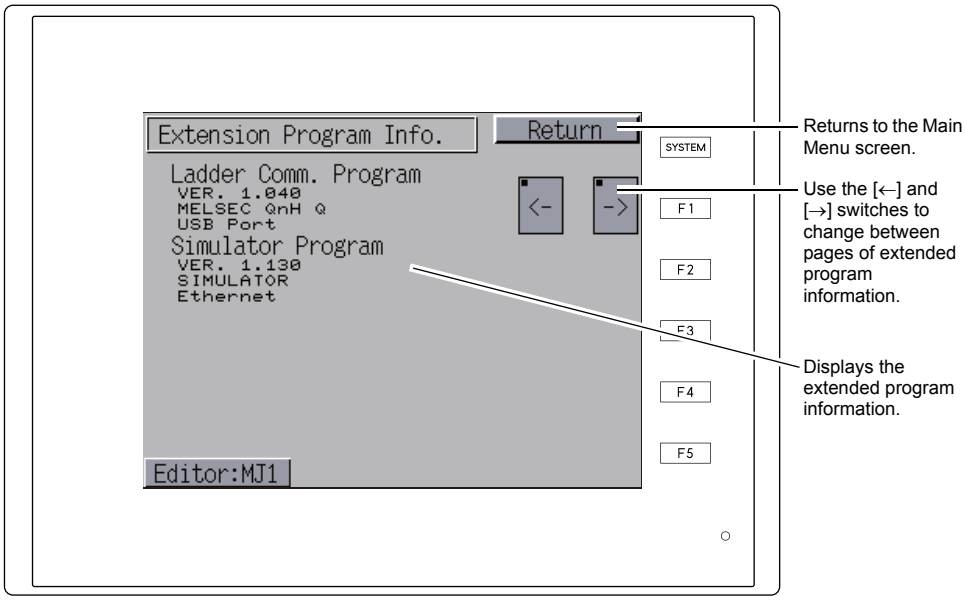
6. Extension Program Information

Pressing the [Extension Program Information] switch in the Main Menu drop-down window displays the Extension Program Info. screen. This screen allows users to check the program version of the ladder transfer function, printer, simulator, etc.

[Main Menu]



Extension Program Info. screen

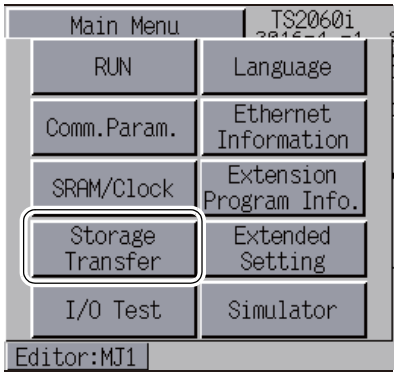


7. Storage Transfer

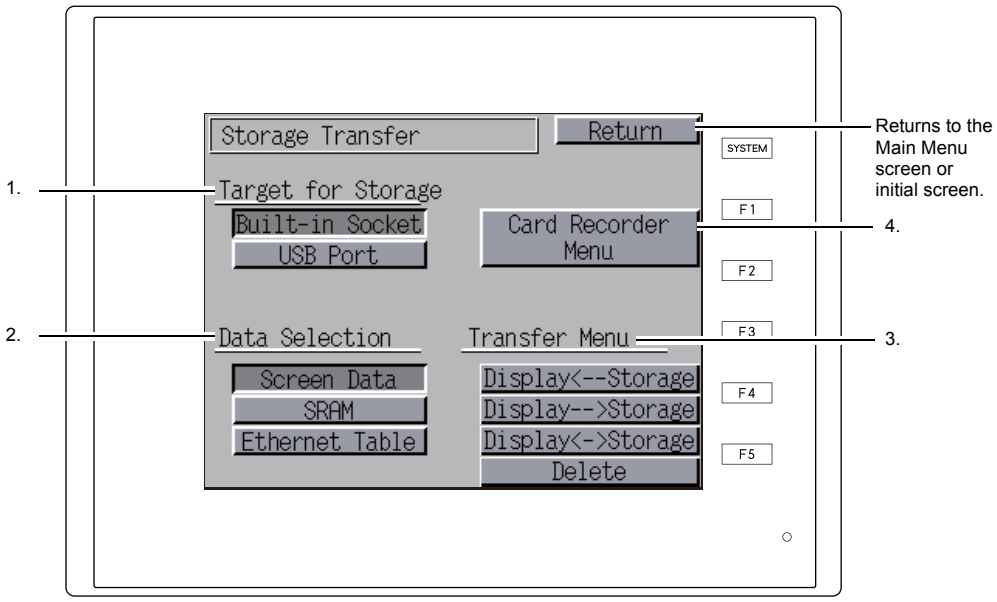
Pressing the [Storage Transfer] switch in the Main Menu drop-down window displays the Storage Transfer screen.
This screen is used to transfer screen programs between a TS2060i unit and storage device (SD card or USB flash drive) * or between a TS2060 unit and memory card.

* Transfer using a storage device is only supported on the TS2060i unit.

[Main Menu]



Storage Transfer screen



1. [Target for Storage] (only displayed on the TS2060i)
   - [Built-in Socket]
     Press this switch to transfer via the built-in SD card slot.
   - [USB Port]
     Press this switch when transferring by connecting a USB flash drive to the USB-A (master) port.
2. [Data Selection] (only displayed on the TS2060i)
   - [Screen Data]
     Press this switch when transferring the screen program to/from a storage device.
   - [SRAM]
     Press this switch when backing up data from the SRAM area to a storage device before battery replacement or when uploading data from a storage device to SRAM.
3. [Transfer Menu] (only displayed on the TS2060i)
   - [Display ← Storage]
     Transfers data from a storage device to the TS2060i unit.
   - [Display → Storage]
     Transfers data from the TS2060i unit to an SD card.
   - [Display ↔ Storage]
     Compares stored data between the TS2060i unit and a storage device.
   - [Delete]
     Deletes data from a storage device.
4. [Card Recorder Menu] switch
   Press this switch when transferring a screen program between the TS2060 unit and a memory card by connecting an existing “CREC” unit (option) to an MJ port on the TS2060 unit.
   For details, refer to “Card Recorder Transfer” page 5-29.

7-1. Storage Folder Configuration (TS2060i Only)

The following table shows folder names, a description of the folder, and the files in each folder. For details, refer to the TS2060 Reference Manual.

Storage device

DAT0000 (access folder name: user-definable within 32 one-byte characters)

Folder Name (fixed)	Description	File Name	Transfer Direction
BITMAP	Pattern data	BMPxxxx.BIN	TS2060i ← storage device
CARD	Recipe data using the V6 compatible memory manager function	MCMHEAD.BIN MCMxxxx.BIN	TS2060i ↔ storage device
DSP	Screen program	DSP0000.BIN	TS2060i ↔ storage device
FONT	Gothic fonts and multi-language	xxxxxx.FTD	TS2060i ← storage device
HDCOPY	Hard copy images *1	HDxxxx.JPG HDxxxx~yy.JPG xxxxxx.JPG *2	TS2060i → storage device *3
JPEG	JPEG files	xxxxx.JPG *2 JPxxxxx.JPG	TS2060i ← storage device
MEMO	Memo pad data	MEMxxxx.BIN	TS2060i ↔ storage device
MSG	Message files	MSGxxyyy.BIN MSGxxyyy.TXT	TS2060i ← storage device
OPELOG	Operation log file	OPELOG_hhmmss.BIN	TS2060i ↔ storage device
RECIPE	Recipe data *1	RECxxxx.CSV xxxxxxxx.CSV *2	TS2060i ↔ storage device
SAMPLE	Trend sampling, data sampling Alarm tracking, alarm logging	SMPxxxx.BIN SMPxxxx.CSV xxxxxxxx.CSV *2	TS2060i → storage device *4
	Title file	SMHxxxx.CSV	TS2060i ← storage device
SCRN	Header file	SCHEADER.BIN	TS2060i ← storage device
	Screen file Component parts (macro blocks, sampling messages)	SCxxxx.BIN MCRxxxx.BIN MSGxxxx.BIN	
	3D part file	3Dxxxx.BIN	
	Windows font files (graphics/messages)	WFSxxxx.BIN WFMxxxx.BIN	
SNAP	Network camera (Banner) snapshot images	VDxxxxx.JPG	TS2060i → storage device *3
SRAM	SRAM backup data	SRM0000.BIN	TS2060i ↔ storage device
WEBSERV	Files accessible from a Web browser	*.SHT, *.HTML, *.TXT etc.	TS2060i ← storage device

*1 File type (JPEG/BIN) can be selected using [Storage Setting] for 128 colors, 16-tone monochrome, and monochrome display
*2 File name: 64 or less one-byte uppercase alphanumeric characters
*3 When using a web server: TS2060i ← storage device
*4 TS2060i ↔ storage device for the BIN file directly under the SAMPLE folder

Storage device

DSPDEF (Folder for automatically uploading screen programs: fixed folder name)

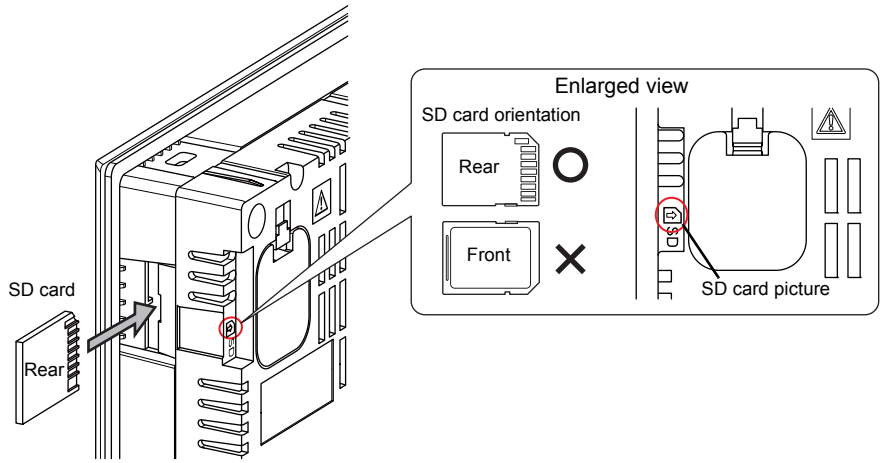
Folder Name (fixed)	Description	File Name	Transfer Direction
DSP	When a storage device is inserted into the TS2060i unit after setting the DIP switches appropriately on the unit, the screen program will automatically be uploaded into the storage device.	DSPDEF.BIN	TS2060i ← storage device

(Other folders are the same as the “access folder”.)

7-2. Transferring a Screen Program (TS2060i Only)

This section explains how to transfer data with an SD card inserted into the SD card slot on the TS2060i unit.

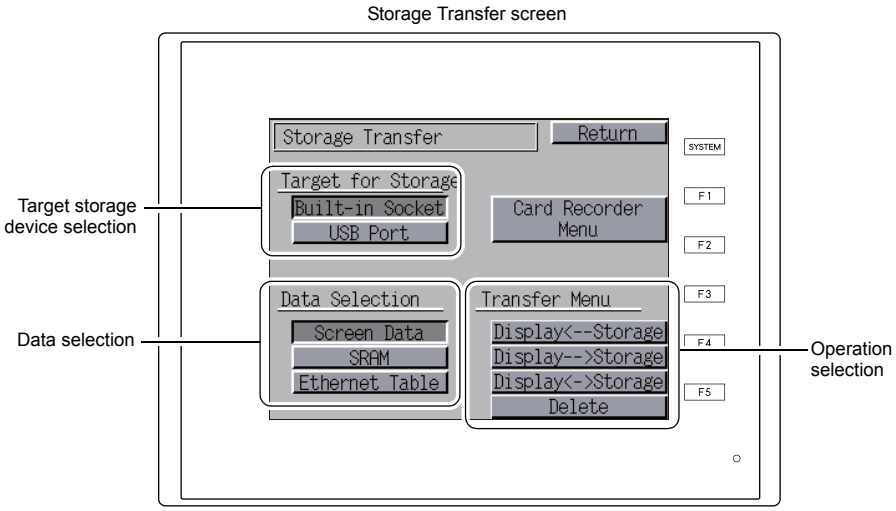
1. SD card insertion
   Insert an SD card into the SD card slot on the right side of the TS2060i unit.



2. Storage Transfer screen display
   Press the [Storage Transfer] switch in the Main Menu drop-down window accessible from the Main Menu screen. The Storage Transfer screen is displayed.

   * Do not remove and reinsert the SD card from this point on.

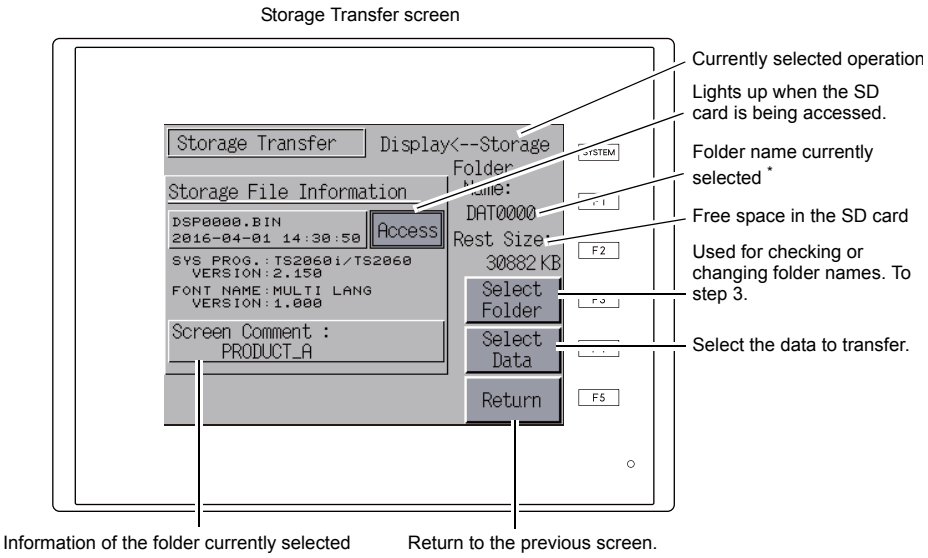
3. Target storage device and data selection
   Select [Built-in Socket] under [Target for Storage] and [Screen Data] under [Data Selection].



4. Operation selection
   - Refer to “When [Display ← Storage] Is Selected” page 5-20.
   - Refer to “When [Display → Storage] Is Selected” page 5-23.
   - Refer to “When [Display ↔ Storage] Is Selected” page 5-24.

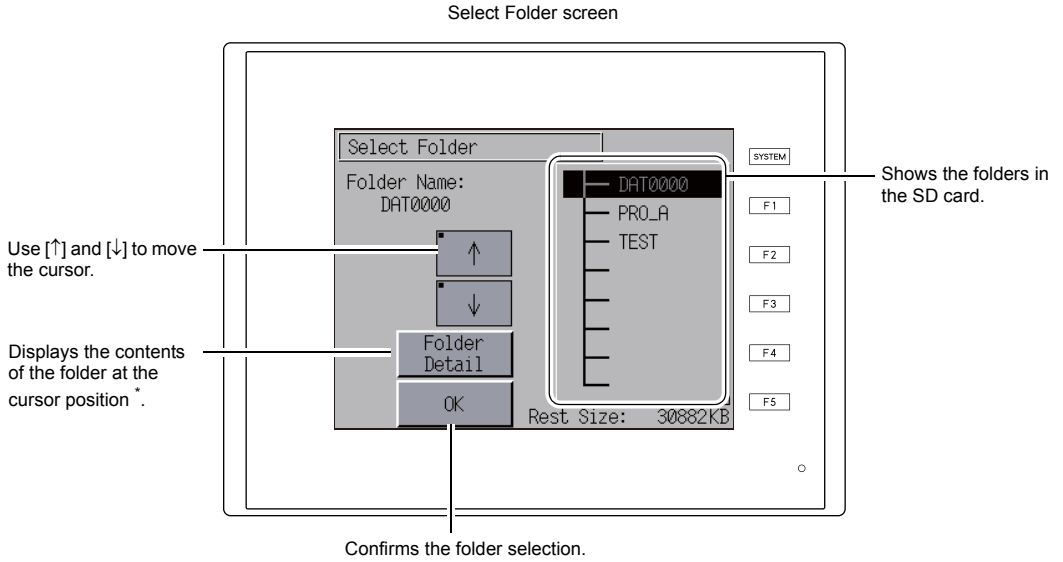
When [Display ← Storage] Is Selected

1. When [Display ← Storage] is selected, the Storage Transfer screen appears.



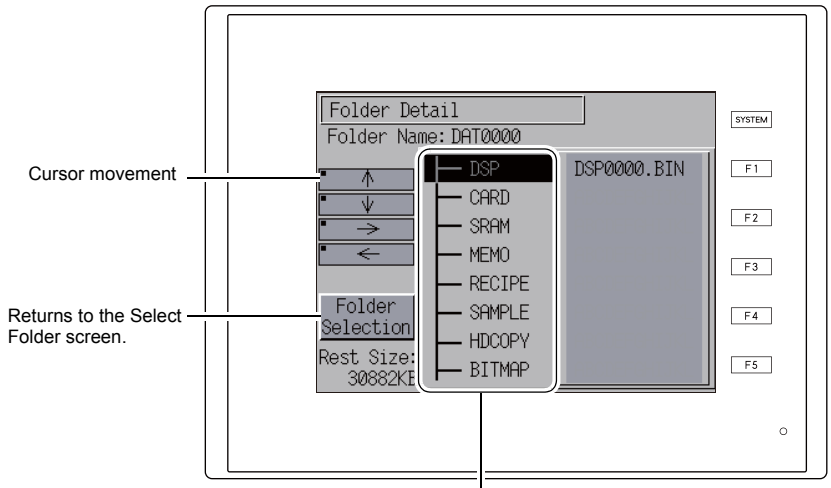
* The access folder name set in the screen program is displayed by default. If there is no screen program on the TS2060i unit, “DAT0000” is displayed.

2. Check the storage file information, free space on the storage device, and the folder name. After confirming the selected folder, proceed to step 4. To change the folder, proceed to step 3.
3. To change the access folder to another folder, press the [Select Folder] switch.
   The Select Folder screen is displayed. Select the desired folder and press the [OK] switch.



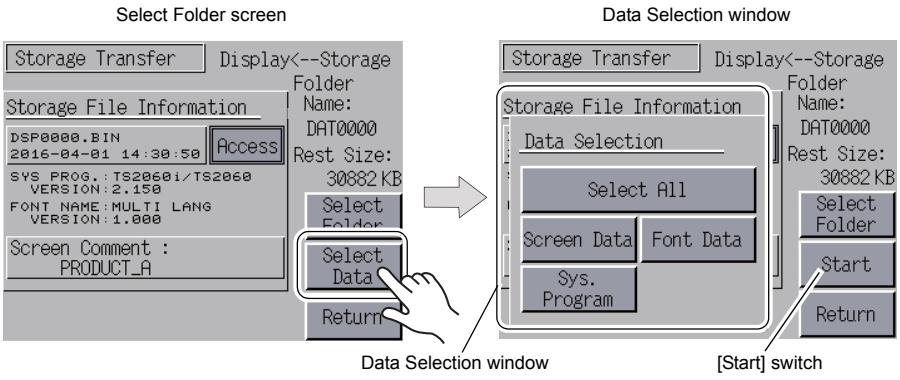
* Pressing the [Folder Detail] switch shows the contents of the folder selected with the cursor.

Folder Detail screen



Pressing the [↑] and [↓] switches scrolls the screen and shows the other folders listed below.
[JPEG], [SNAP], [WAV], [FONT], [WEBSERV], [MSG], [SCRN], [OPELOG]

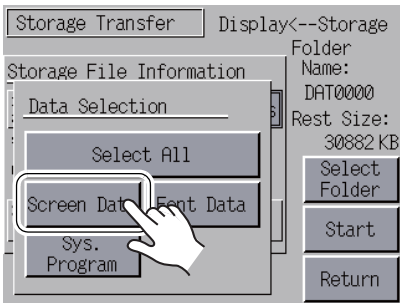
4. After selecting a folder, press the [Select Data] switch.
   The Data Selection window appears and the [Select Data] switch changes to read [Start] at the same time.



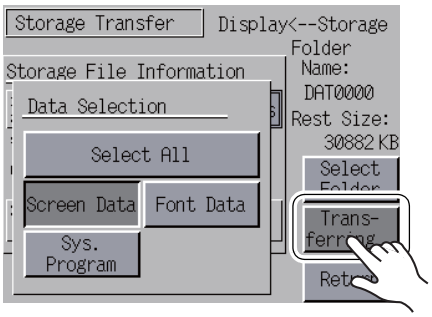
* Press the [Return] switch to cancel the data transfer and dismiss the Data Selection window.

5. Select the data to transfer and then press the [Start] switch. The [Start] switch changes to read [Transferring].

Before data transfer

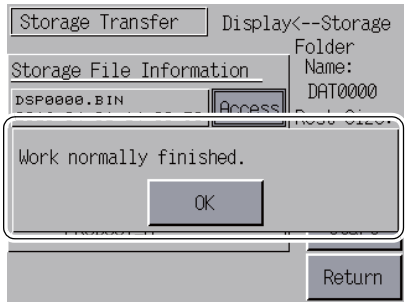


Transferring



6. When the data has been transferred successfully, the following window is displayed. Press the [OK] switch.
   If the [Sys. Program] switch or [Select All] switch was selected in the Data Selection window, the Main Menu screen is automatically displayed when the data transfer is complete.

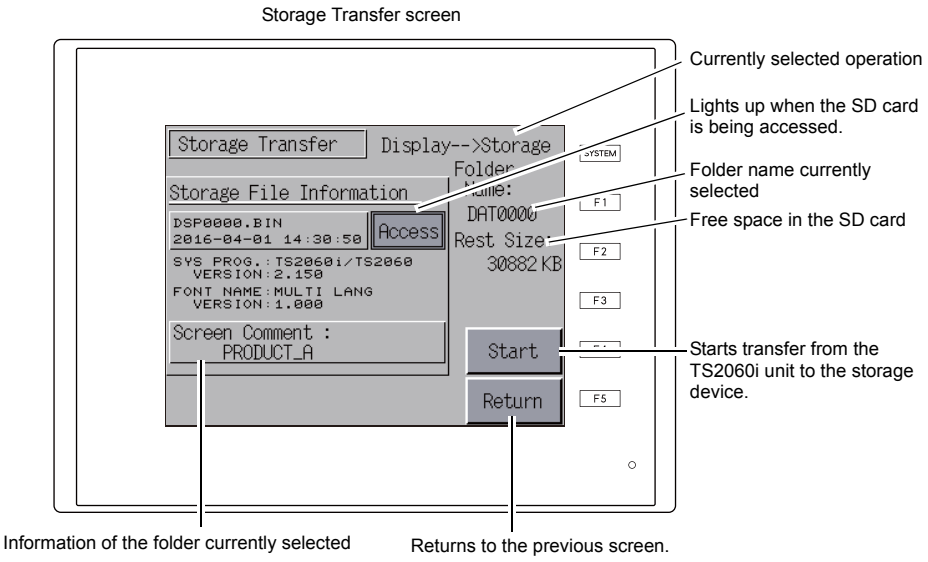
Data transfer completed



* If any other error message window is displayed, refer to “Errors Displayed during Data Transfer (between a TS2060i Unit and Storage Device)” page 5-29.

When [Display → Storage] Is Selected

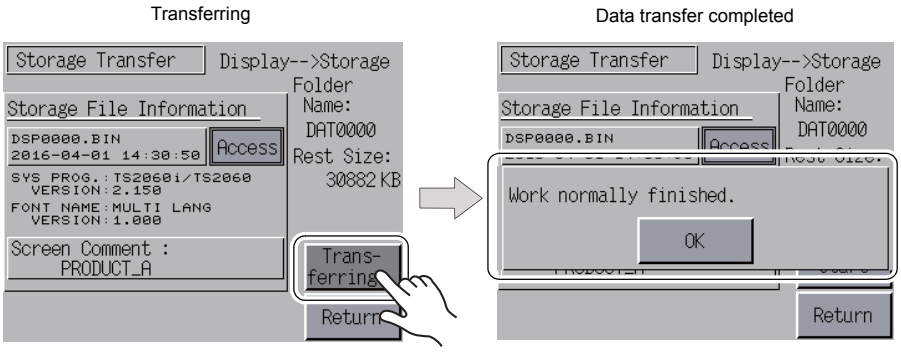
1. When [Display → Storage] is selected, the Storage Transfer screen appears.



2. Check the storage file information and folder name and then press the [Start] switch.

   * If the access folder of the screen program and that on the SD card are named the same, the data on the SD card will be overwritten.
     If the [Storage File Information] field is blank, a new file called “DSP0000.BIN” will be created in the DSP folder under the access folder.

3. During the transfer, the [Start] switch changes to read [Transferring]. On successful completion, the following window is displayed. Press the [OK] switch.

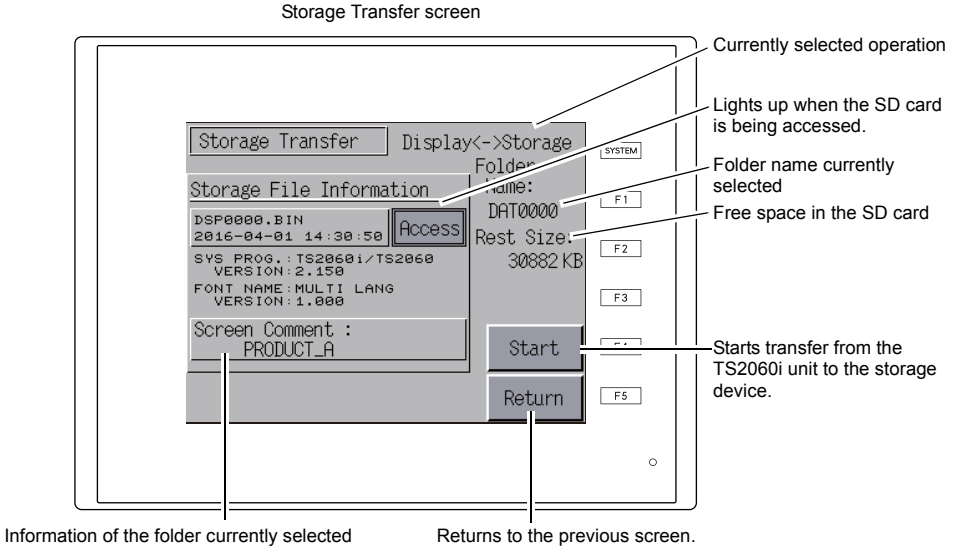


The storage file information changes to information on the transferred data.

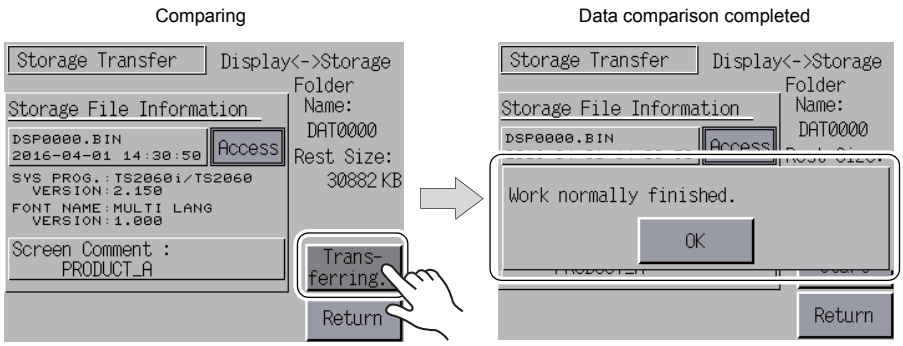
   * If any other error message is displayed, refer to “Errors Displayed during Data Transfer (between a TS2060i Unit and Storage Device)” page 5-29.

When [Display ↔ Storage] Is Selected

1. When [Display ↔ Storage] is selected, the Storage Transfer screen appears.
   The screen program on the TS2060i unit is compared with the screen program (in the DSP folder) in the access folder.



2. Press the [Start] switch.
3. During the comparison, the [Start] switch changes to read [Transferring]. On successful completion, the following window is displayed. Press the [OK] switch.



* If any other message is displayed, refer to “Errors Displayed during Data Transfer (between a TS2060i Unit and Storage Device)” page 5-29.

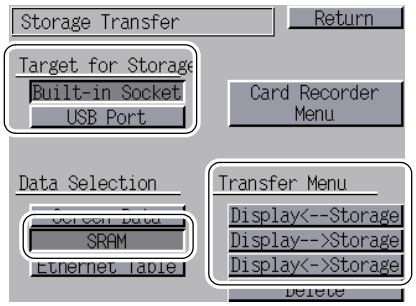
7-3. Saving Backup Copies of SRAM (TS2060i Only)

This section explains how to transfer data with an SD card inserted into the SD card slot on the TS2060i unit.

1. SD card insertion
   Insert an SD card into the SD card slot on the back of the TS2060i unit.
   For details, refer to page 5-19.
2. Storage Transfer screen display
   Press the [Storage Transfer] switch in the Main Menu drop-down window accessible from the Main Menu screen. The Storage Transfer screen is displayed.

   * Do not remove and reinsert the SD card from this point on.
3. Target storage device and data selection
   Select [Built-in Socket] under [Target for Storage] and [SRAM] under [Data Selection].

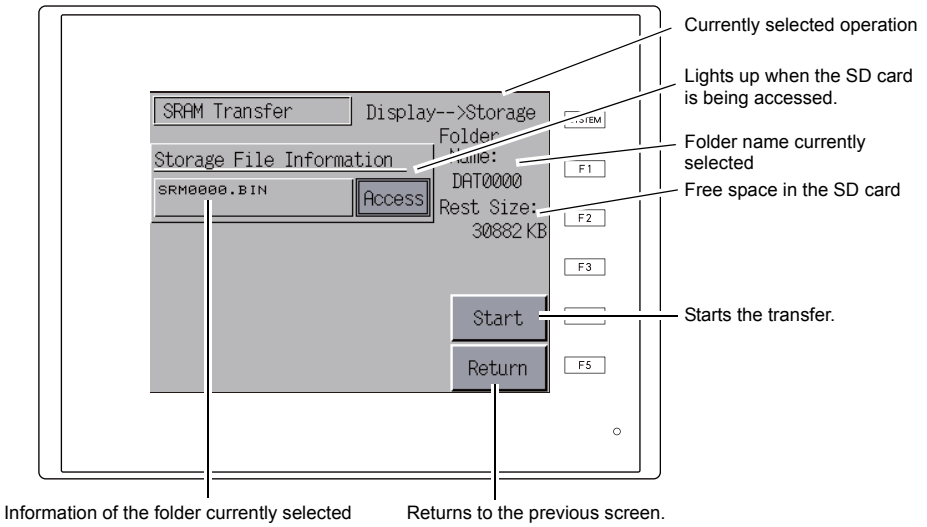
Target storage device, data selection, and operation selection



4. Operation selection
   Select [Display ← Storage], [Display → Storage], or [Display ↔ Storage].
5. Access folder confirmation and selection
   The SRAM Transfer screen is displayed.

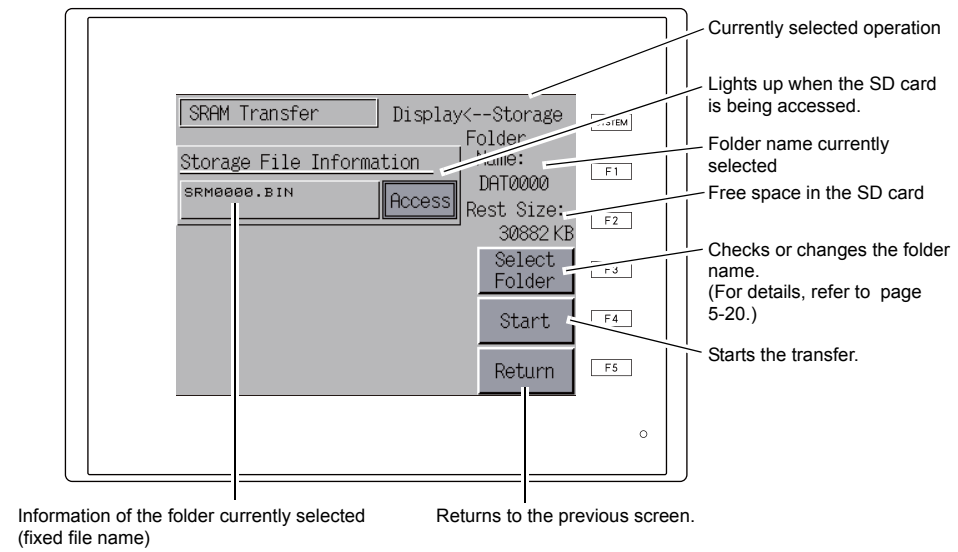
- When [Display → Storage] or [Display ↔ Storage] is selected
  The access folder with the same name as the screen program on the TS2060i unit is selected from the SD card and displayed on the screen.

SRAM Transfer screen

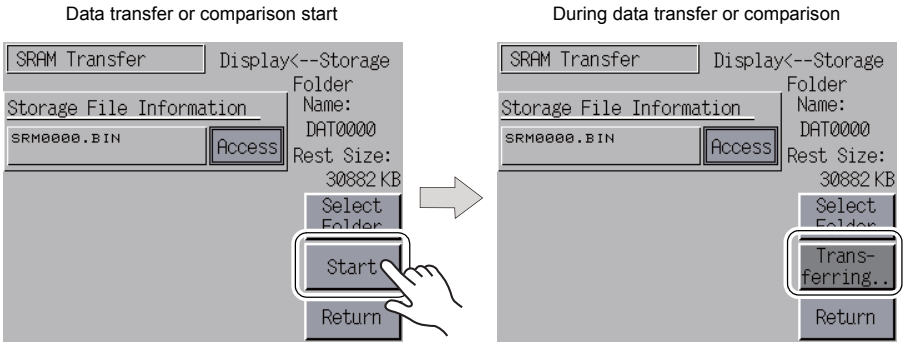


- When [Display ← Storage] is selected
  To change the access folder to another folder, press the [Select Folder] switch to display the Select Folder screen. For details on the Select Folder screen, refer to step 3 in “When [Display ← Storage] Is Selected” (page 5-20).

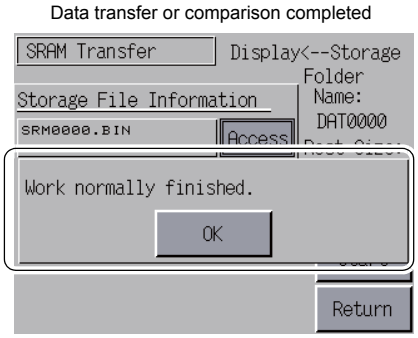
SRAM Transfer screen



6. Data transfer or comparison start
   Check the folder name, free space on the SD card, and transfer operation and then press the [Start] switch.
   During the transfer or comparison, the [Start] switch changes to read [Transferring].



7. On successful completion, the following window is displayed. Press the [OK] switch.



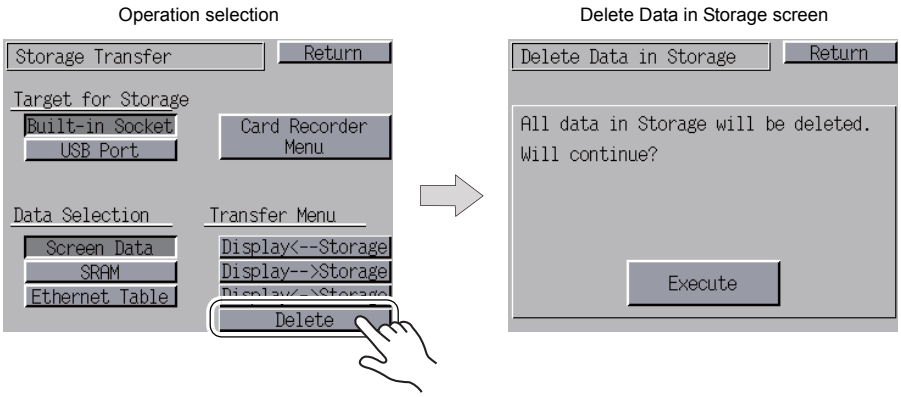
* If any other message is displayed, refer to “Errors Displayed during Data Transfer (between a TS2060i Unit and Storage Device)” page 5-29.

7-4. Deleting Data from an SD Card (TS2060i Only)

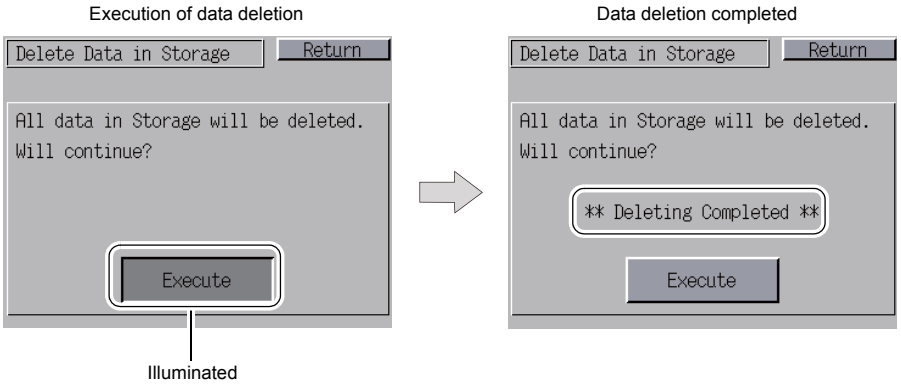
This section explains how to transfer data with an SD card inserted into the SD card slot on the TS2060i unit.

1. SD card insertion
   Insert an SD card into the SD card slot on the back of the TS2060i unit.
   For details, refer to page 5-19.
2. Storage Transfer screen display
   Press the [Storage Transfer] switch in the Main Menu drop-down window accessible from the Main Menu screen. The Storage Transfer screen is displayed.

   * Do not remove and reinsert the SD card from this point on.
3. Target storage device and data selection
   Select [Built-in Socket] under [Target for Storage] and [Screen Data] under [Data Selection].
4. Operation selection
   Selecting the [Delete] switch under [Transfer Menu] changes to the Delete Data in Storage screen.
   Press the [Return] switch to return to the previous screen.



5. Execution of data deletion to data deletion completion
   Press the [Execute] switch to delete all data on the SD card. The switch is illuminated for a while.
   When the data has been completely deleted, the message “**Deleting Completed**” is displayed.



* While the data on the SD card is completely erased, redisplaying the Main Menu screen with the [Return] switch will automatically create the access folder of the screen program transferred to the TS2060i unit.

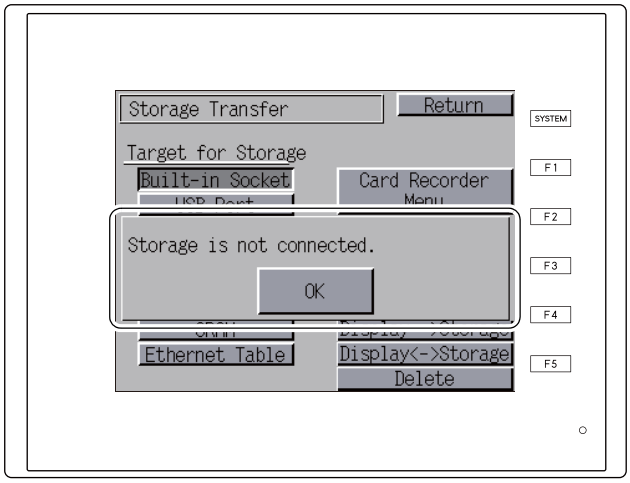
7-5. Card Recorder Transfer

Pressing the [Card Recorder Menu] switch on the Storage Transfer screen displays the Card Recorder Menu screen. This screen is used to transfer data between the TS2060 unit and a memory card using a CREC.
For details, contact your local distributor.

7-6. Errors Displayed during Data Transfer (between a TS2060i Unit and Storage Device)

If an error occurs when transferring data from a storage device, an error message window appears on the TS2060i unit.

Error message window



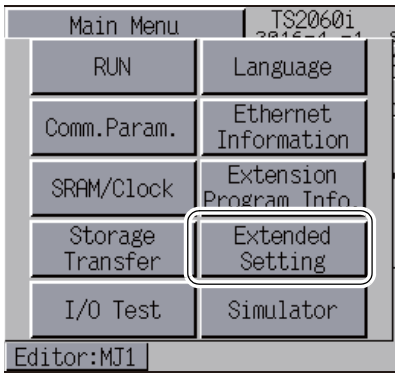
Messages and their contents are shown below.

Messages	Description
Work normally finished.	The specified operation has been concluded normally.
Storage is not connected	Storage is not connected
Storage Capacity over	Cannot write data to a storage device because the data size in the TS2060i unit is larger than the capacity of the storage device.
Writing Error occurred.	An error occurred during writing to a storage device.
Selected data does not exist.	The data does not exist in the reading target.
Data type is different.	When writing to the TS2060i unit, the type of data in the storage device does not match the model of the TS2060i unit.
Selected data cannot be read.	Data in the storage device cannot be read.
Reading Error occurred.	An error occurred during writing to the flash ROM in the TS2060i unit.
Data discrepant	Data comparison found a discrepancy between the storage device and the TS2060i unit.
The screen data on TS will be broken.	Warning about data corruption on the TS2060 unit that may occur when transferring font data larger than the present data from the storage device to the TS2060 unit. (If pressing the [OK] switch to continue, transfer the screen program again.)
Undefined Error occurred.	An error occurred due to a cause other than those mentioned above.
Invalid format.	The format of the file system in the storage device cannot be identified. Reformat it to FAT or FAT32 on the PC.
Uploading is prohibited.	Uploading of screen programs is prohibited.

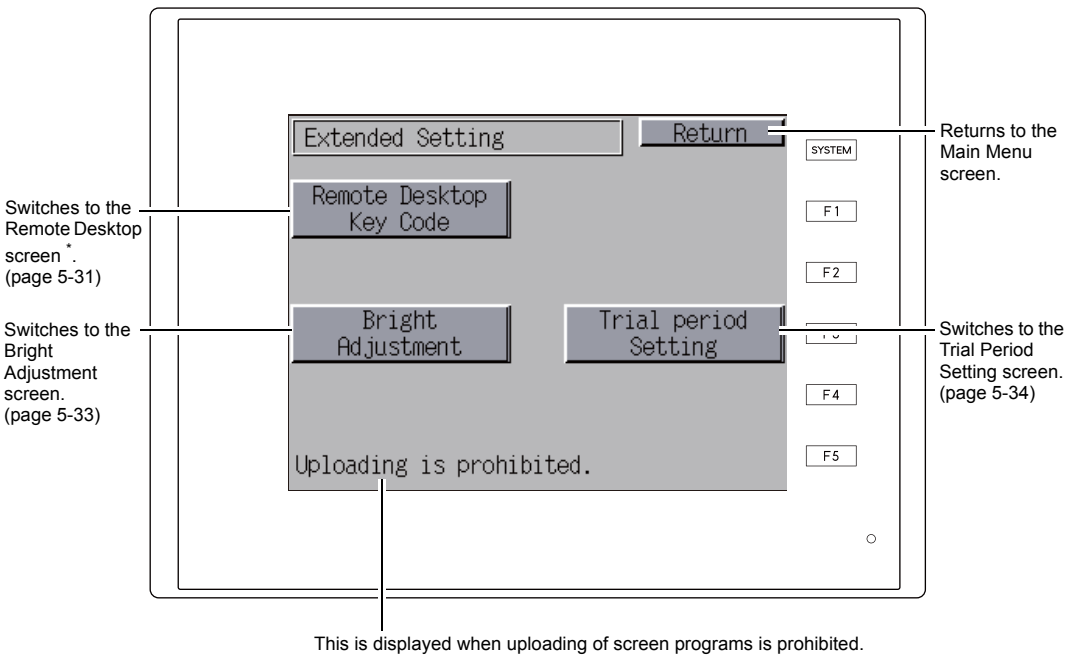
8. Extended Setting

Pressing the [Extended Setting] switch in the Main Menu drop-down window displays the Extended Setting screen.
This screen is used to register or deregister a remote desktop license, adjust brightness, and configure the trial period settings.

[Main Menu]



Extended Setting screen



* Only displayed on the TS2060i unit.

8-1. Registering and Deregistering a Remote Desktop License (TS2060i Only)

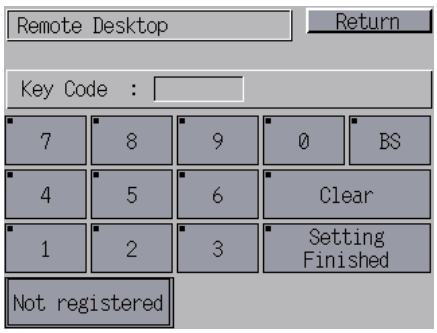
Pressing the [Remote Desktop Key Code] switch on the Extended Setting screen displays the Remote Desktop screen. This screen is used to register or deregister a remote desktop license.
A license must be registered in order to use the remote desktop function.
A single license is provided with each TS2060i unit.

* For details on purchasing a “V-RemoteDT” license, contact your local distributor.

Registering a License

1. Enter the key code (8-digit value) using the keypad and then press the [Setting Finished] switch.

Remote Desktop screen



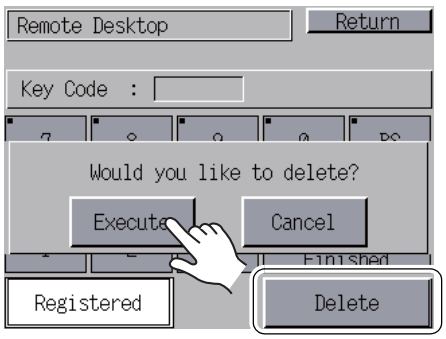
2. The Main Menu screen reappears when registration is complete.

Deregistering a License

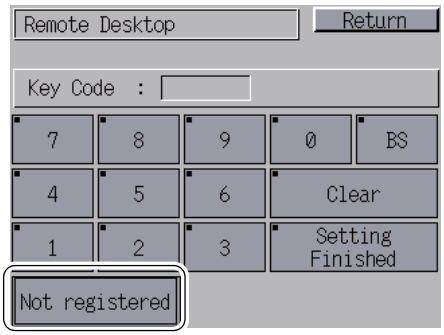
A license can be deregistered from the TS2060i unit.

* The key code must be reregistered in order to use the remote desktop function again at a later time.
Take care when managing key codes as they cannot be reissued.

1. Press the [Delete] switch and then press the [Execute] switch in the window that appears.



2. The [Delete] switch disappears and [Not registered] appears in its place.

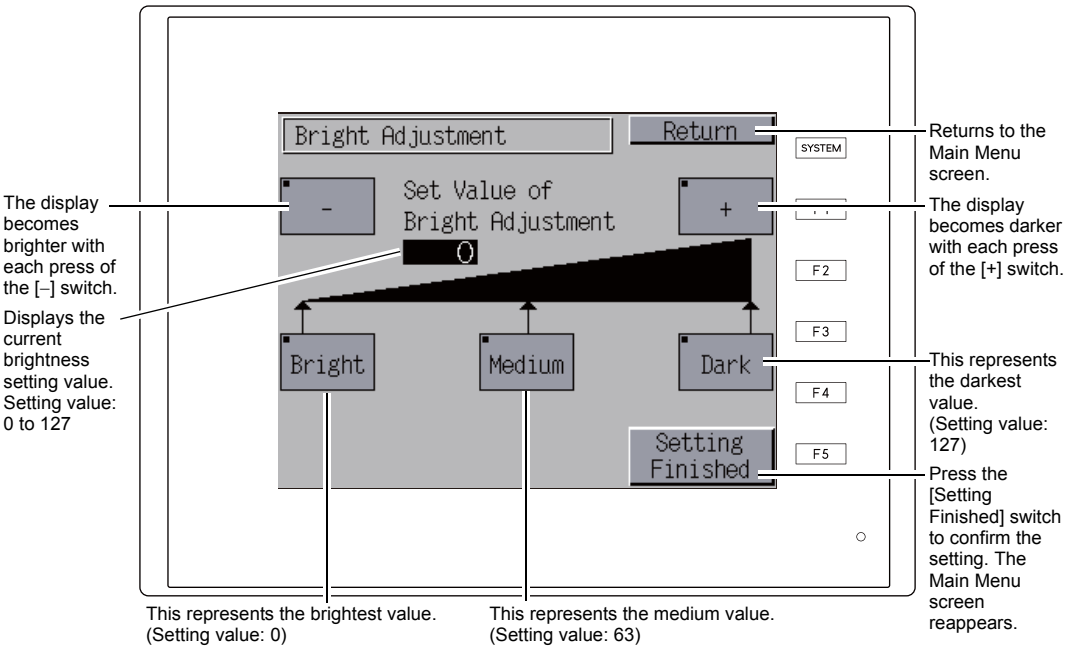


3. The license is no longer registered.

8-2. Brightness Adjustment

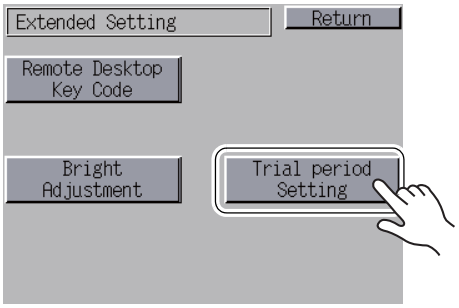
Pressing the [Bright Adjustment] switch on the Extended Setting screen displays the Bright Adjustment screen.
This screen is used to adjust the brightness of the TS2060 unit display.

Bright Adjustment screen

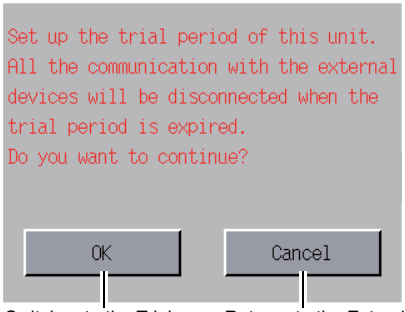


8-3. Trial Period Setting

Pressing the [Trial period Setting] switch on the Extended Setting screen displays the following screen. These screens allow a trial period to be applied to the TS2060 unit and access with a password required upon TS2060 unit start-up after a specified date and time.



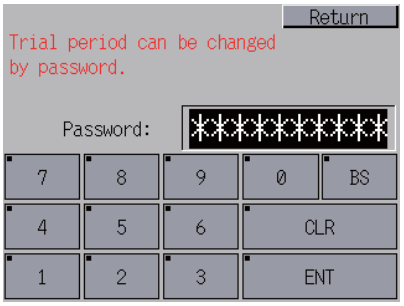
When password protection is disabled



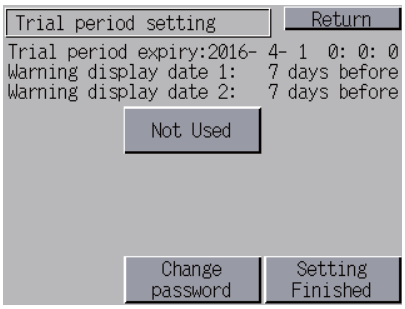
Switches to the Trial Period Setting screen.

Returns to the Extended Setting screen.

When password protection is enabled



Trial Period Setting screen



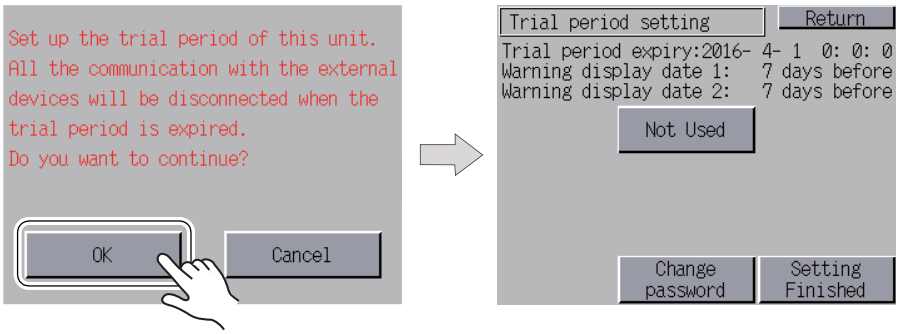
Trial Period Settings

It is possible to unconditionally stop operation of the TS2060 unit after a specified date and time.
By configuring a trial period, use of the TS2060 unit can be restricted unless a password is entered.

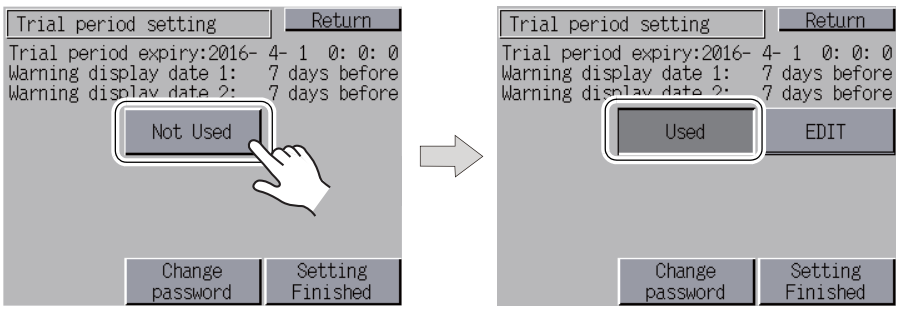
Enabling Password Protection

1) Select the [Extended Setting] switch in the Main Menu drop-down window and then press the [Trial period Setting] switch.

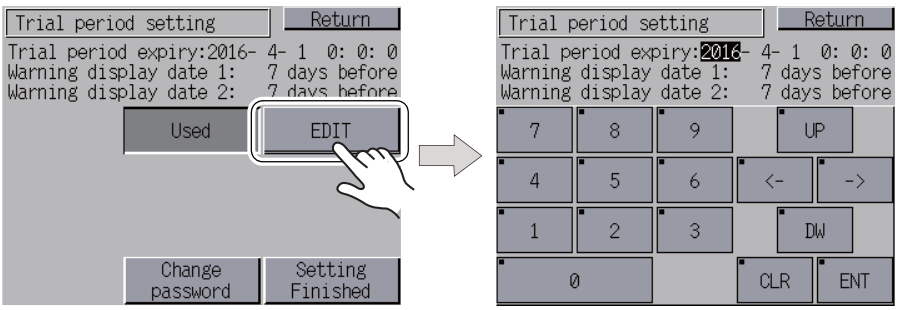
2) The following screen appears. Press the [OK] switch.
The Trial Period Setting screen is displayed.



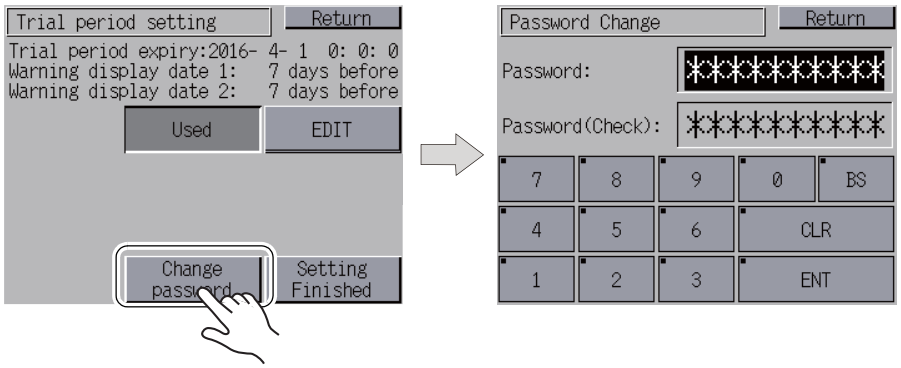
3) Pressing the [Not Used] switch on the Trial Period Setting screen changes the switch to read [Used].



4) Press the [EDIT] switch and set the trial period expiry date and time and the warning display dates.



5) Press the [Change password] switch to enter the password (4 to 10 digits) for disabling password protection.

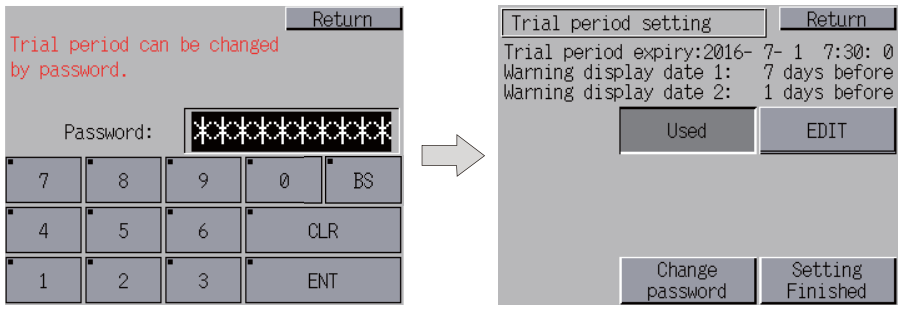


6) Press the [Setting Finished] switch to confirm the setting. The Extended Setting screen reappears.

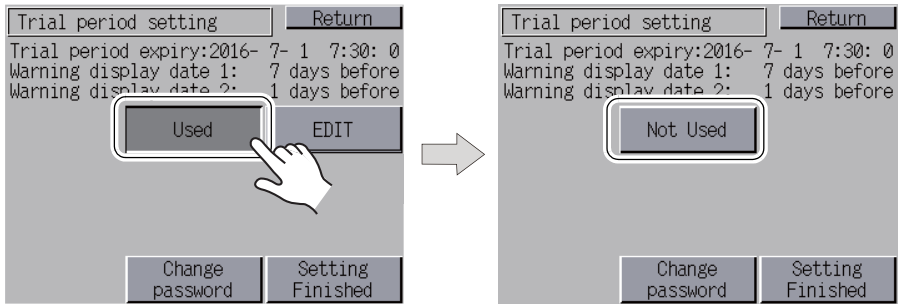
Disabling Password Protection

1) Select the [Extended Setting] switch in the Main Menu drop-down window and then press the [Trial period Setting] switch.

2) The following screen is displayed. Enter the password for disabling password protection and then press the [ENT] switch. If the password matches, the Trial Period Setting screen appears.



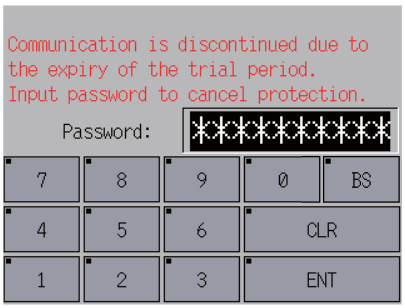
3) Pressing the [Used] switch on the Trial Period Setting screen changes the switch to read [Not Used].



4) Press the [Setting Finished] switch to confirm the setting. The Extended Setting screen reappears.

When the Specified Date and Time Is Reached

1) The following screen is displayed immediately after the power is turned on.



2) Enter the password for disabling password protection and then press the [ENT] switch. If the password matches, the Main Menu screen appears.

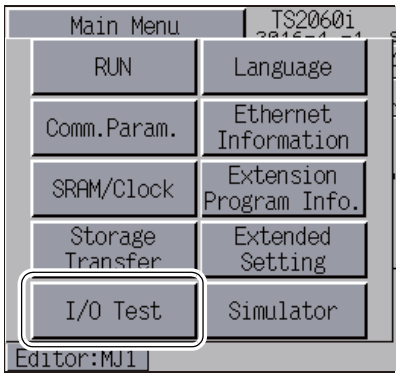
3) Press the [RUN] switch in the Main Menu drop-down window.

* Although the Main Menu screen appears even if the password does not match, attempting to transition to the RUN screen will display the screen shown in step 1).

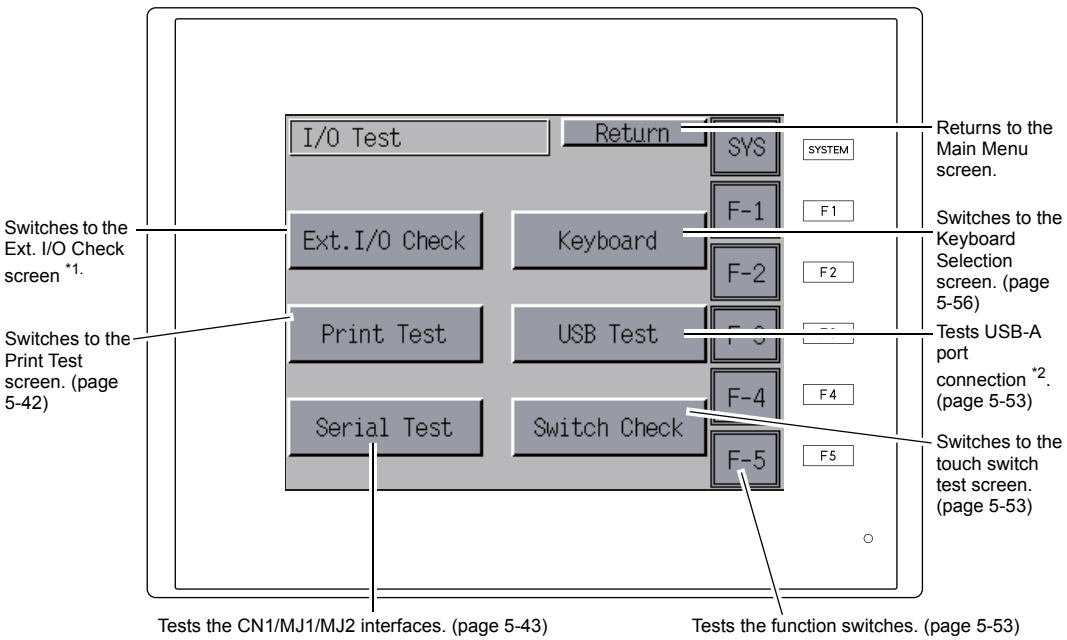
9. I/O Test

Pressing the [I/O Test] switch in the Main Menu drop-down window displays the I/O Test screen. This screen is used to check whether the interfaces of the TS2060 unit are operating correctly and whether the touch switch function of the display is operating correctly.

[Main Menu]



I/O Test screen

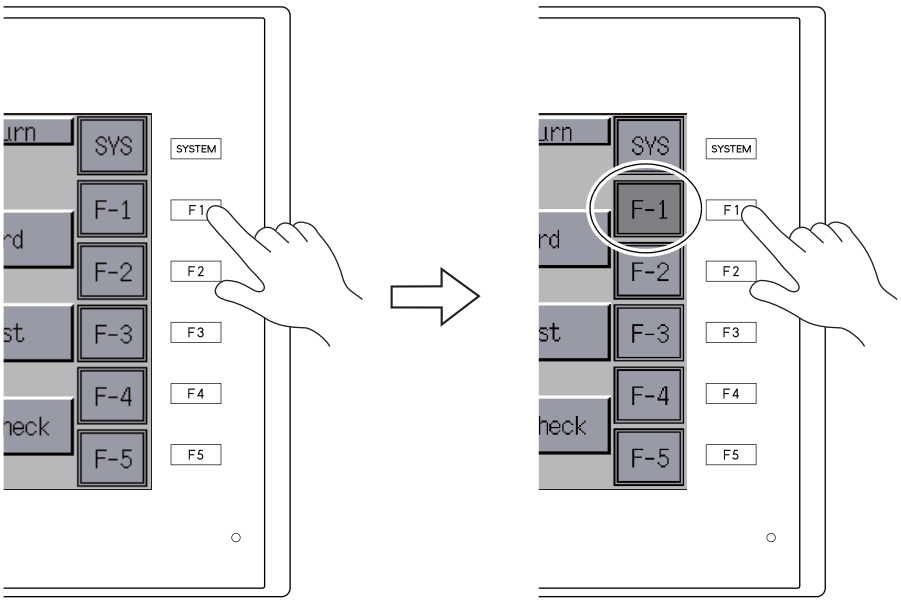


*1 If using the TS2060 unit connected to an existing serial extended I/O unit (V-I/O), whether the V-I/O is operating correctly can be checked. Note that the [Ext. I/O Check] switch is only displayed when the modular jack (MJ1/MJ2) setting is specified as [V-I/O] in V-SFT-6.

*2 Only displayed on the TS2060i unit.

9-1. [SYSTEM] Switch & Function Switch Test

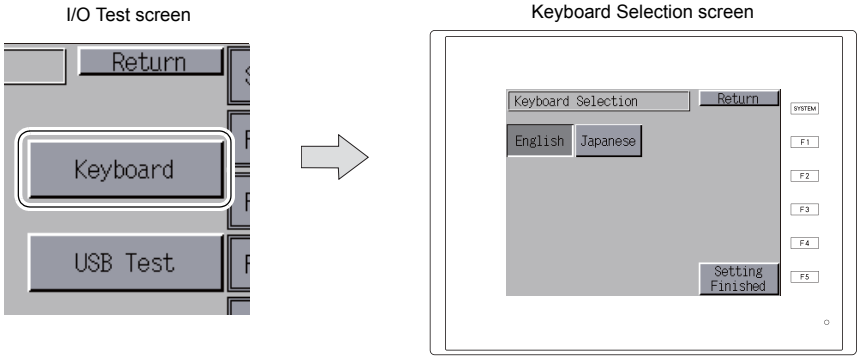
Check the operation of the six function switches located vertically on the right side of the TS2060 unit. These switches are operating correctly if the lamp on the screen corresponding to each switch illuminates when each switch is held down.



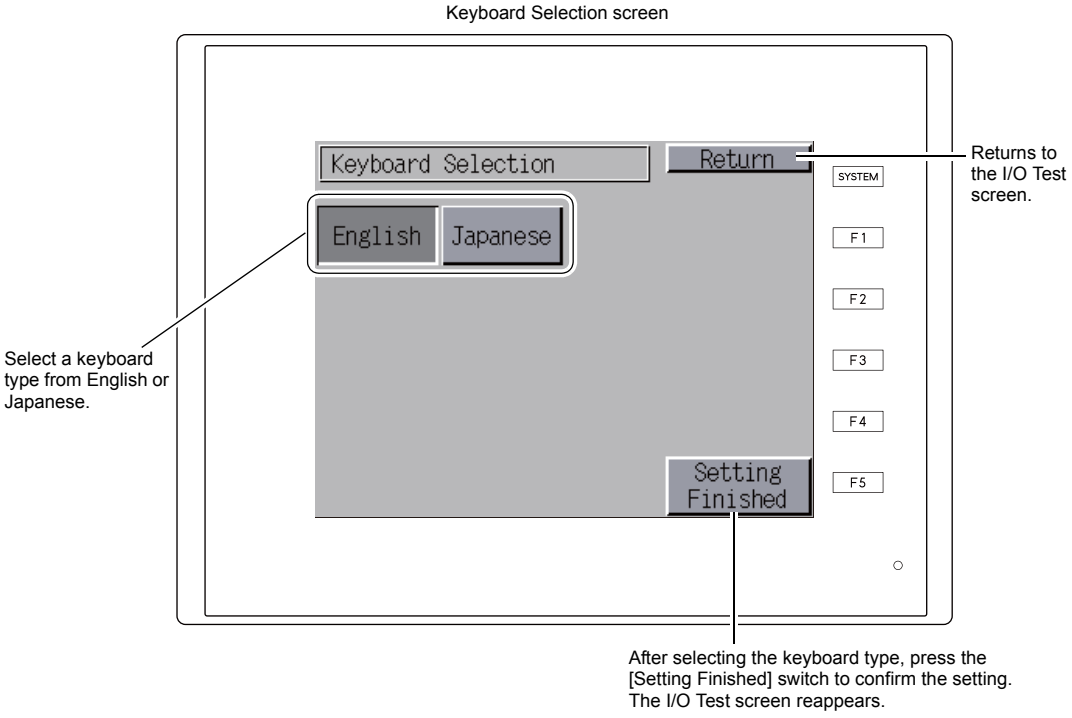
9-2. Keyboard Selection (TS2060i Only)

Set the type of the keyboard to connect to the USB-A (master) port.

1. Keyboard Selection screen
   Pressing the [Keyboard] switch displays the Keyboard Selection screen.



2. Keyboard type setting
   Select a keyboard type from English or Japanese.

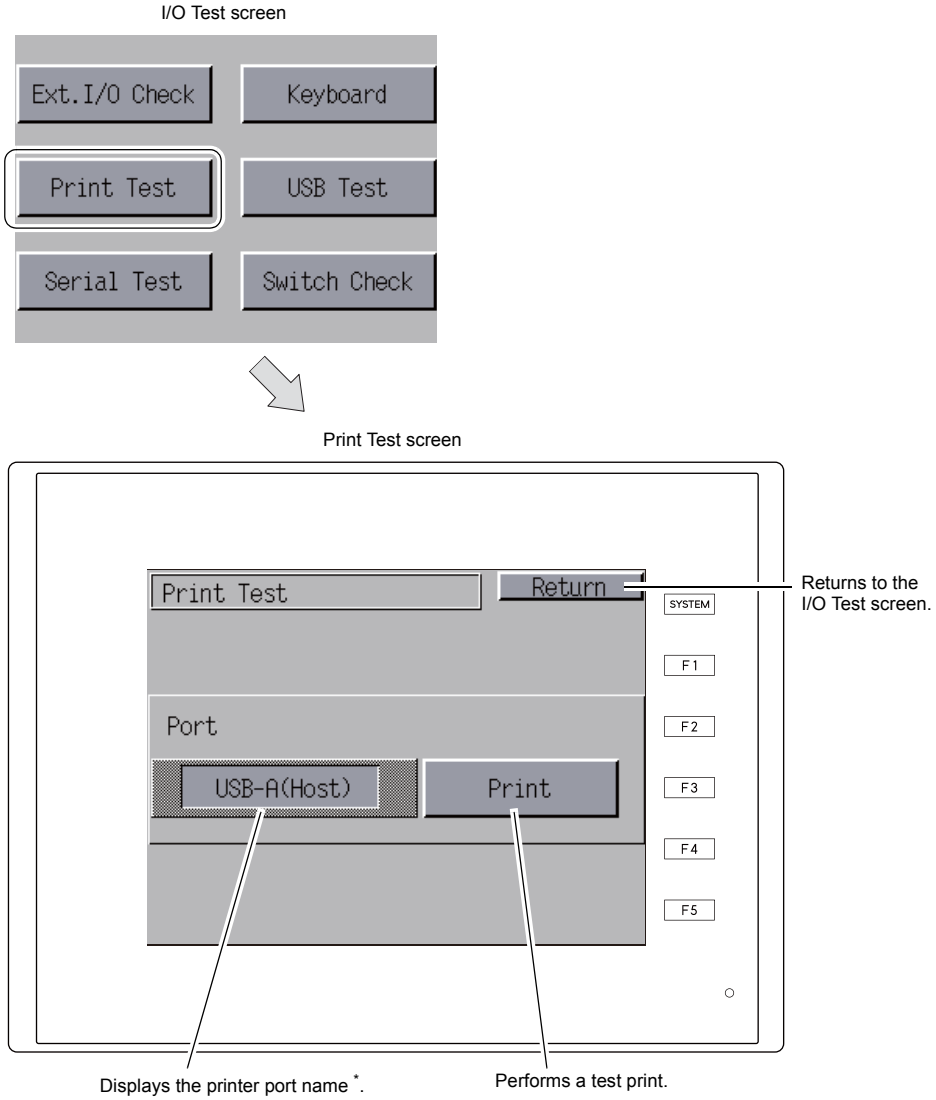


* [English] is selected by default.
After changing the keyboard type on the Keyboard Selection screen and pressing the [Setting Finished] switch, the selected type is retained even if the power is turned off and back on again.

3. Press the [Setting Finished] switch to confirm the keyboard type. The I/O Test screen reappears.

9-3. Printer Test

Pressing the [Print Test] switch on the I/O Test screen displays the Print Test screen. This screen is used to connect to a printer and perform a test print.



* The printer port name set in V-SFT-6 is displayed here. The port names that can be displayed are [MJ1], [MJ2], [USB-A (Host)], and [USB-B (Device)].

Print Test Example

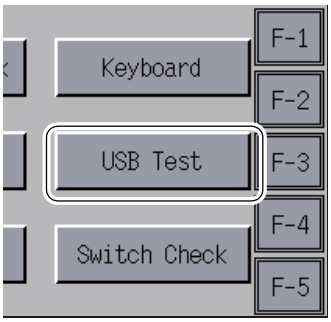
Press the [Print] switch to perform a test print. If printing is successful, the printer will output the following.

```
!"#$%&@   0123456789   ABCDEFGHIJKLMNO
!"#$%&@   0123456789   ABCDEFGHIJKLMNO
!"#$%&@   0123456789   ABCDEFGHIJKLMNO
!"#$%&@   0123456789   ABCDEFGHIJKLMNO
!"#$%&@   0123456789   ABCDEFGHIJKLMNO
!"#$%&@   0123456789   ABCDEFGHIJKLMNO
!"#$%&@   0123456789   ABCDEFGHIJKLMNO
```

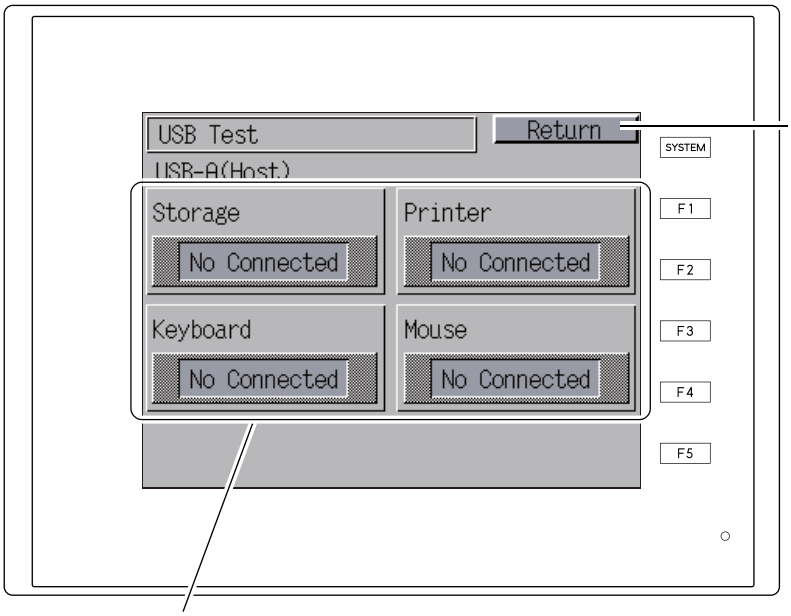
9-4. USB Test (TS2060i Only)

Pressing the [USB Test] switch on the I/O Test screen displays the USB Test screen.
Check the connection status of the USB-A (master) port.

I/O Test screen



USB Test screen

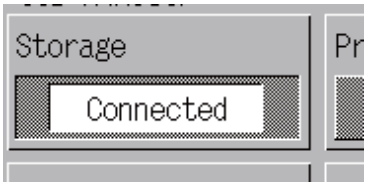


Returns to the I/O Test screen.

Insert a USB cable and check the connection status.

Checking the Connection Status

The USB device is correctly recognized if the lamp displays [Connected].

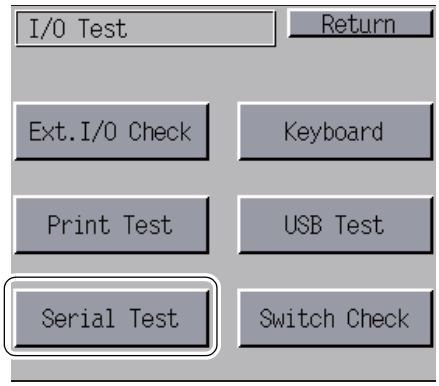


* If the lamp displays [No Connected] on the screen, the USB device is not correctly recognized.

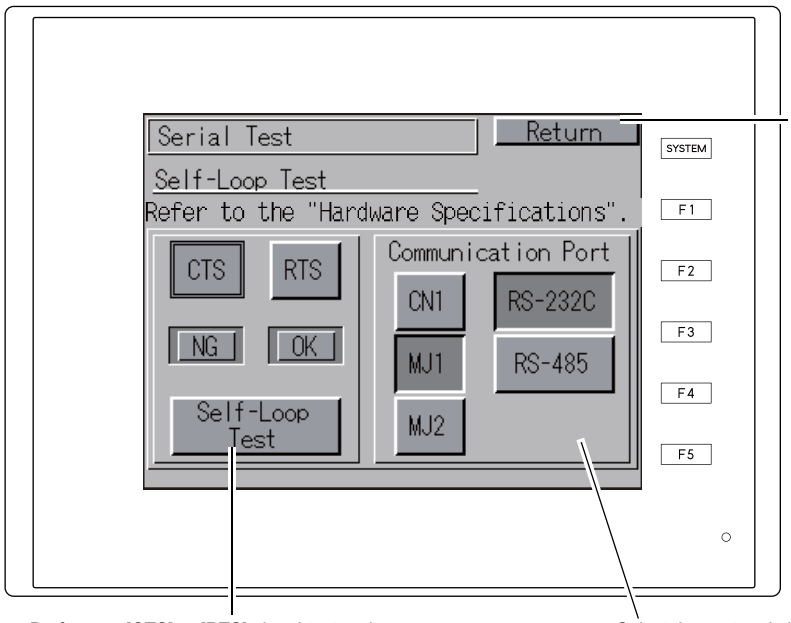
9-5. Self-Loop Test

Pressing the [Serial Test] switch on the I/O Test screen displays the Serial Test screen.
This screen is used to perform a signal test for communication using the MJ1, MJ2, and CN1 connectors.

I/O Test screen



Serial Test screen



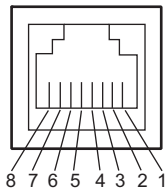
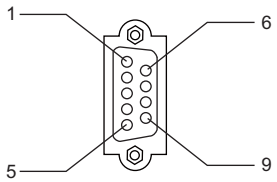
Returns to the Main Menu screen.

Performs a [CTS] or [RTS] signal test and loopback test.

Select the port and signal to use for the signal test.

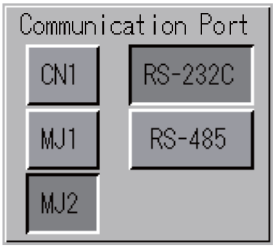
MJ1/2 and CN1 (D-sub 9-pin) Pin Numbers

The signal test procedure may differ depending on whether or not the optional “DUR-00” unit is installed. For details on the procedure, refer to each signal test.

MJ1/2	CN1 (D-sub 9-pin, female)
	

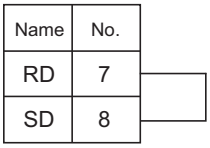
MJ2: RS-232C Signal Test

Check the [SD] and [RD] signals.
Turn on the [MJ2] and [RS232C] switches under [Communication Port].



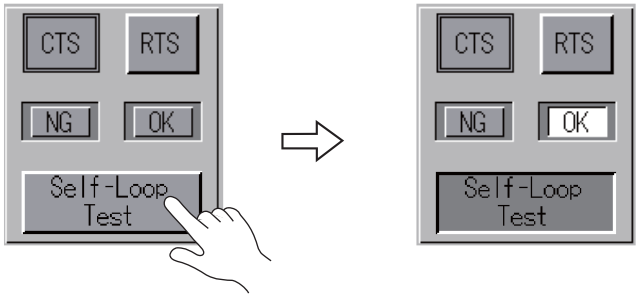
When “DUR-00” Is Installed / Not Installed

1. Set the sliding switch on the TS2060 unit to “RS-232C/RS-485” (upper side).
2. Place a jumper between pin 7 and pin 8 on the MJ2 connector.



Name	No.
RD	7
SD	8

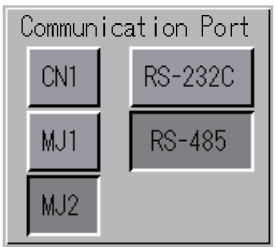
3. Press the [Self-Loop Test] switch. The test is successful if the [OK] lamp illuminates.



* If the [NG] lamp illuminates, pin 7, pin 8, or both pins may be broken. In this case, contact your local distributor.

MJ2: RS-422/RS-485 Signal Test

Check the [+SD], [–SD], [+RD], and [–RD] signals.
Turn on the [MJ2] and [RS485] switches under [Communication Port].



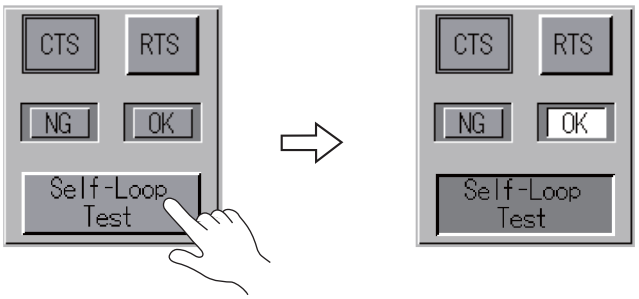
When "DUR-00" Is Not Installed

1. Set the sliding switch on the TS2060 unit to "RS-422" (lower side).
2. Place a jumper between pin 1 and pin 7, and between pin 2 and pin 8 on the MJ2 connector.

MJ2

Name	No.
+SD	1
-SD	2
+RD	7
-RD	8

3. Press the [Self-Loop Test] switch. The test is successful if the [OK] lamp illuminates.

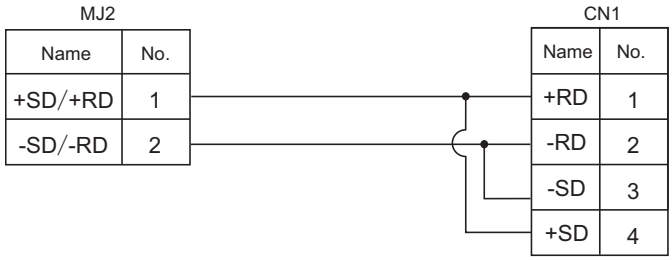


* If the [NG] lamp illuminates, one or more pins may be broken. In this case, contact your local distributor.

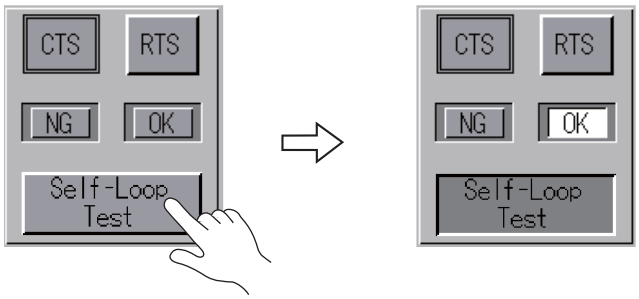
When “DUR-00” Is Installed

Perform a RS-485 (2-wire connection) signal test. Because the signal test is performed with MJ2 and CN1 connected, perform the loopback test of MJ2 after confirming that the RS-422 signal of CN1 is correct. For details on the signal test procedure for CN1, refer to “CN1: RS-485 Signal Test” (page 5-51).
When performing a RS-422 (4-wire connection) signal test, remove the “DUR-00” unit.
For details on the signal test procedure, refer to “MJ2: RS-422/RS-485 Signal Test” (page 5-45).

1. Set the sliding switch on the TS2060 unit to “RS-232C/RS-485” (upper side).
2. Wire MJ2 and CN1 together as shown below.



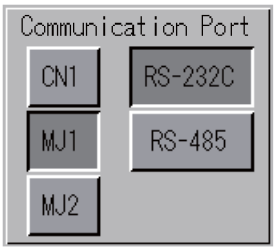
3. Press the [Self-Loop Test] switch. The test is successful if the [OK] lamp illuminates.



* If the [NG] lamp illuminates, one or more pins may be broken. In this case, contact your local distributor.

MJ1: RS-232C Signal Test

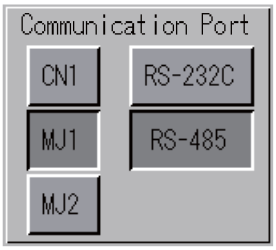
Check the [SD] and [RD] signals.
Turn on the [MJ1] and [RS232C] switches under [Communication Port].



For details on the signal test procedure, refer to steps 2 and 3 in “MJ2: RS-232C Signal Test” (page 5-44).

MJ1: RS-485 Signal Test

Check the [+SD], [–SD], [+RD], and [–RD] signals.
Turn on the [MJ1] and [RS485] switches under [Communication Port].



When “DUR-00” Is Not Installed

Because the signal test is performed with MJ1 and MJ2 connected, perform the loopback test of MJ1 after confirming that the RS-485 signal of MJ2 is correct.
For details on the signal test procedure for MJ2, refer to “MJ2: RS-422/RS-485 Signal Test” (page 5-45).

1. Set the sliding switch on the TS2060 unit to “RS-232C/RS-485” (upper side).
2. Wire MJ1 and MJ2 together as shown below.

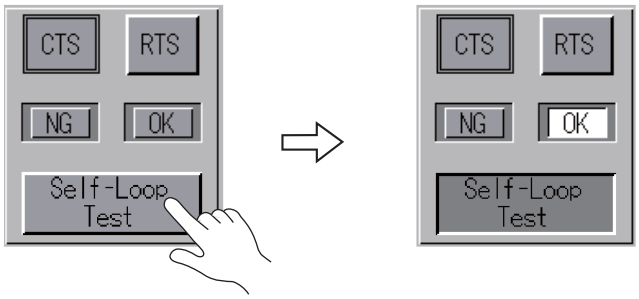
MJ1

Name	No.
+SD/+RD	1
-SD/-RD	2

MJ2

Name	No.
+SD/+RD	1
-SD/-RD	2

3. Press the [Self-Loop Test] switch. The test is successful if the [OK] lamp illuminates.

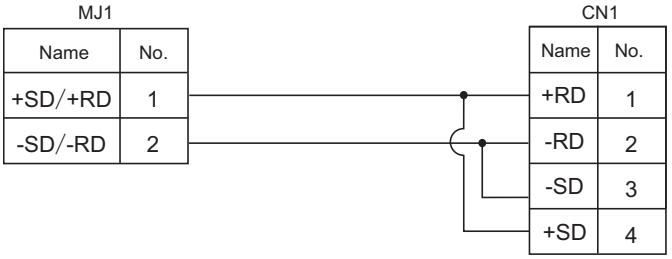


* If the [NG] lamp illuminates, one or more pins may be broken. In this case, contact your local distributor.

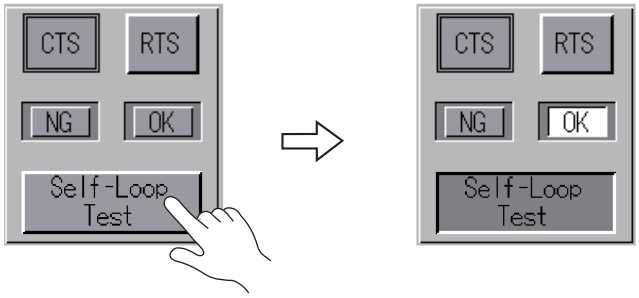
When "DUR-00" Is Installed

Because the signal test is performed with MJ1 and CN1 connected, perform the loopback test of MJ1 after confirming that the RS-422 signal of CN1 is correct.
For details on the signal test procedure for CN1, refer to "CN1: RS-485 Signal Test" (page 5-51).

1. Wire MJ1 and CN1 together as shown below.



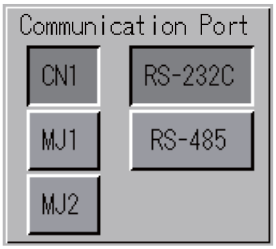
2. Press the [Self-Loop Test] switch. The test is successful if the [OK] lamp illuminates.



* If the [NG] lamp illuminates, one or more pins may be broken. In this case, contact your local distributor.

CN1: (D-sub 9-pin) RS-232C Single Test

Turn on the [CN1] and [RS232C] switches under [Communication Port].



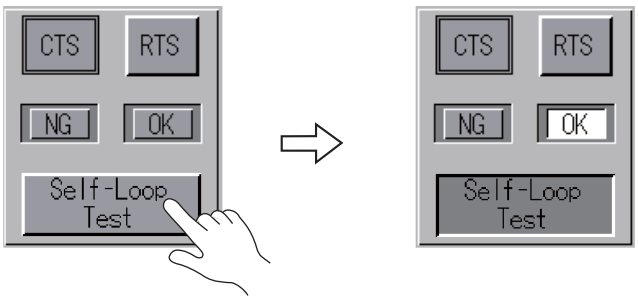
[SD] and [RD] Signal Test

Check the [SD] and [RD] signals.

1. Place a jumper between pin 2 and pin 3 on the CN1 (D-sub 9-pin) connector.

Name	No.
RD	2
SD	3

2. Press the [Self-Loop Test] switch. The test is successful if the [OK] lamp illuminates.



* If the [NG] lamp illuminates, pin 2, pin 3, or both pins may be broken. In this case, contact your local distributor.

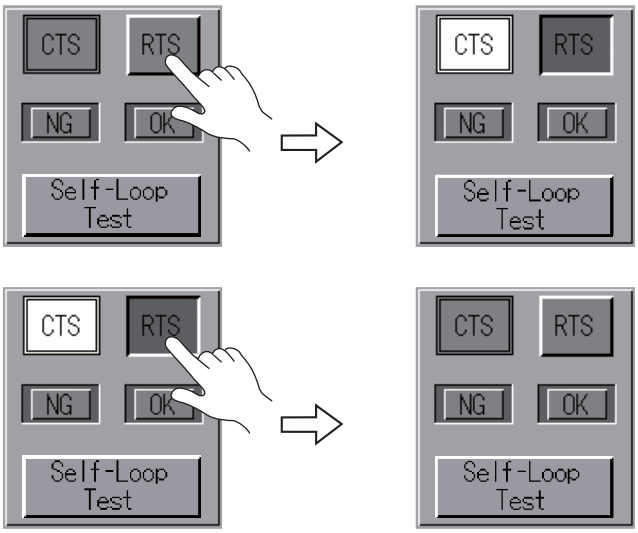
[RTS] and [CTS] Signal Test

Check the [RTS] and [CTS] signals.

1. Place a jumper between pin 7 (RTS) and pin 8 (CTS) on the CN1 (D-sub 9-pin) connector.

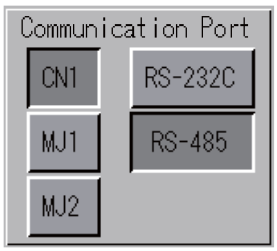
Name	No.
RTS	7
CTS	8

2. The signal test is successful if the [RTS] lamp and [CTS] lamp illuminate when the [RTS] switch is pressed and the [CTS] lamp turns off when the [RTS] lamp turns off.



CN1: RS-485 Signal Test

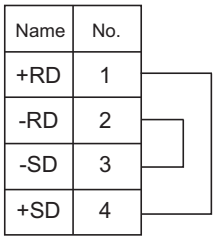
Turn on the [CN1] and [RS485] switches under [Communication Port].



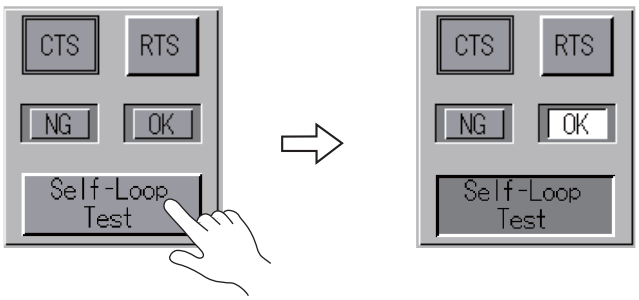
[SD] and [RD] Signal Test

Check the [+SD], [–SD], [+RD], and [–RD] signals.

1. Place a jumper between pin 1 and pin 4, and between pin 2 and pin 3 on the CN1 (D-sub 9-pin) connector.



2. Press the [Self-Loop Test] switch. The test is successful if the [OK] lamp illuminates.

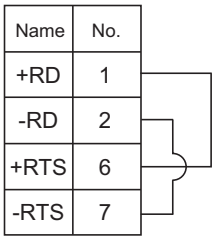


* If the [NG] lamp illuminates, one or more pins may be broken. In this case, contact your local distributor.

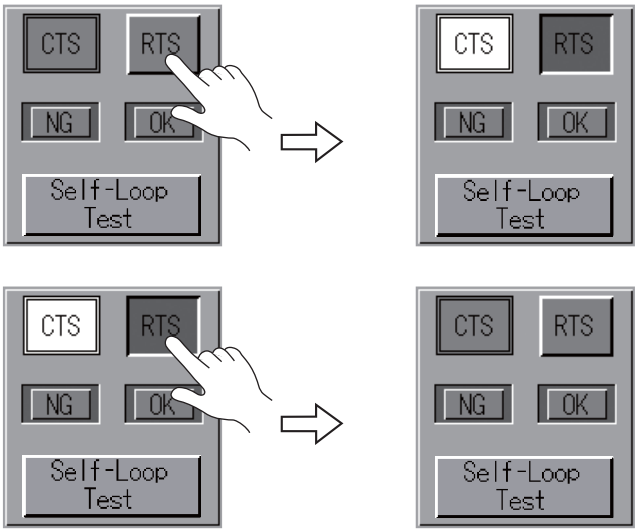
[RTS] Signal Test

Check the [+RTS] and [–RTS] signals.

1. Place a jumper between pin 1 (+RD) and pin 6 (+RTS), and between pin 2 (–RD) and pin 7 (–RTS) on the CN1 (D-sub 9-pin) connector.



2. The signal test is successful if the [RTS] lamp and [CTS] lamp illuminate when the [RTS] switch is pressed and the [CTS] lamp turns off when the [RTS] lamp turns off.

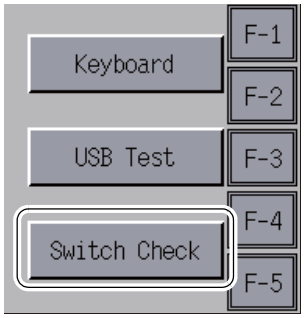


* The loopback test is performed using [+RD] (pin 1) and [–RD] (pin 2) because the CN1 (D-sub 9-pin) connector does not have [+CTS] and [–CTS].

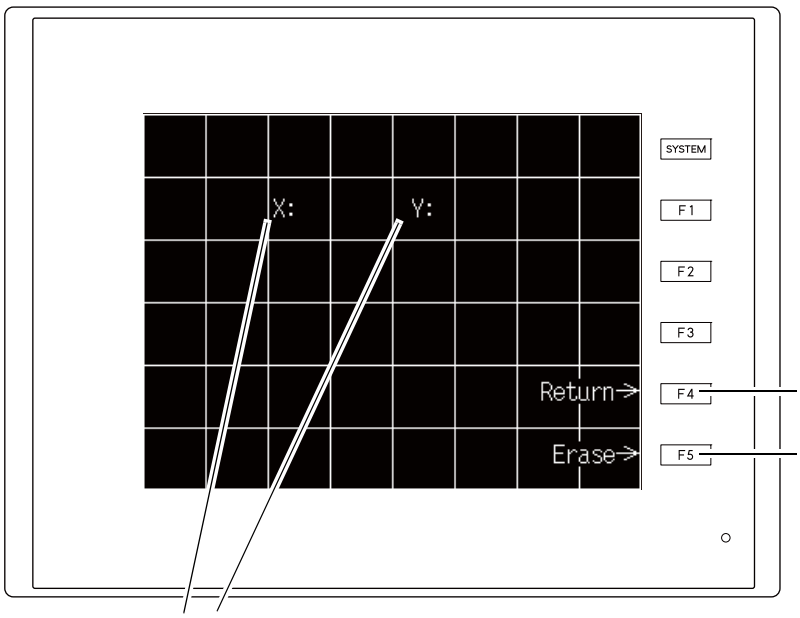
9-6. Touch Switch Test

Pressing the [Switch Check] switch on the I/O Test screen displays the touch switch test screen. This screen is used to check that the touch switch function is not suffering from issues such as switch unresponsiveness and false triggering of switches.

I/O Test screen

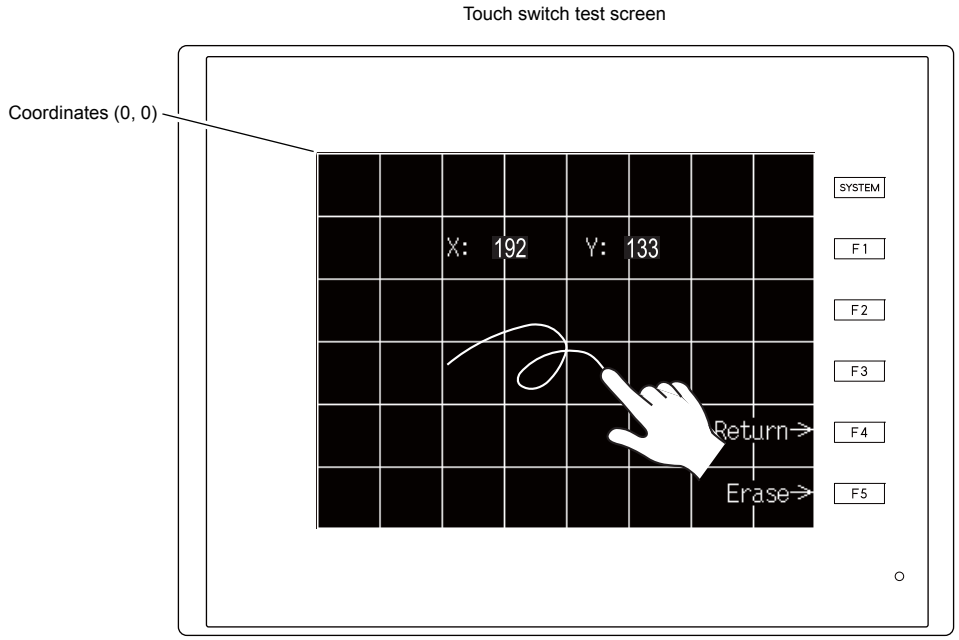


Touch switch test screen

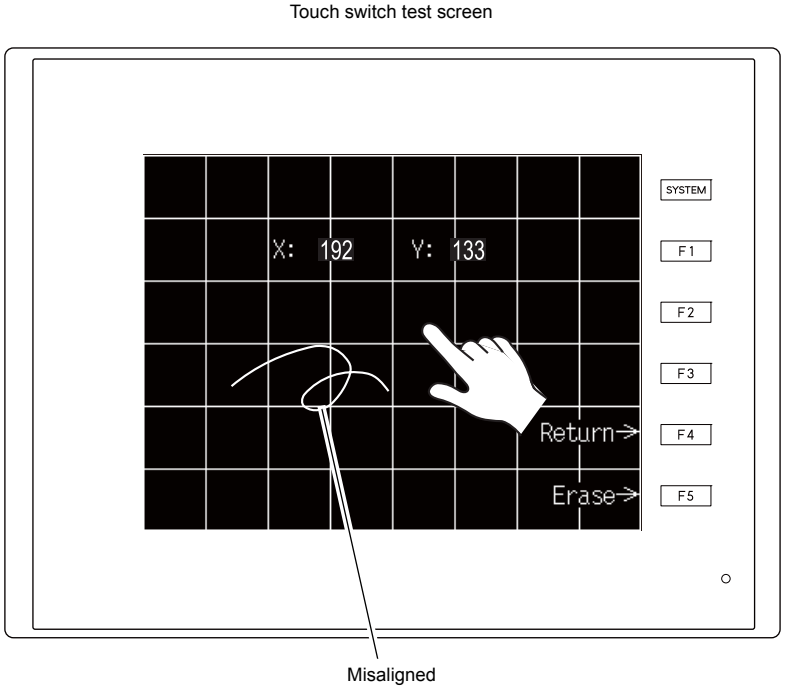


Checking Switch Output

Check that the pressed position on the display changes to white on the touch switch test screen. If the pressed position changes to white, the touch switch is operating correctly.



* Adjust the touch switch position if a position different from the pressed position turns white. Refer to “Touch Switch Adjustment” (page 5-55).

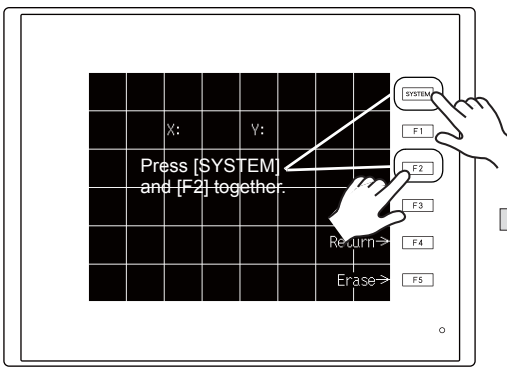


Touch Switch Adjustment

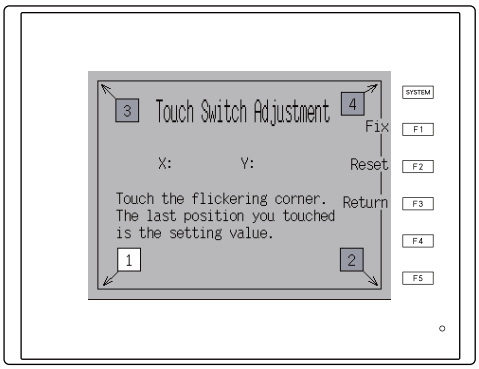
If a position different from the pressed position changed to white on the touch switch test screen, adjust the touch switch position according to the following procedure.

1. Press the [F2] function switch while holding down the [SYSTEM] switch on the touch switch test screen to display the Touch Switch Adjustment screen.

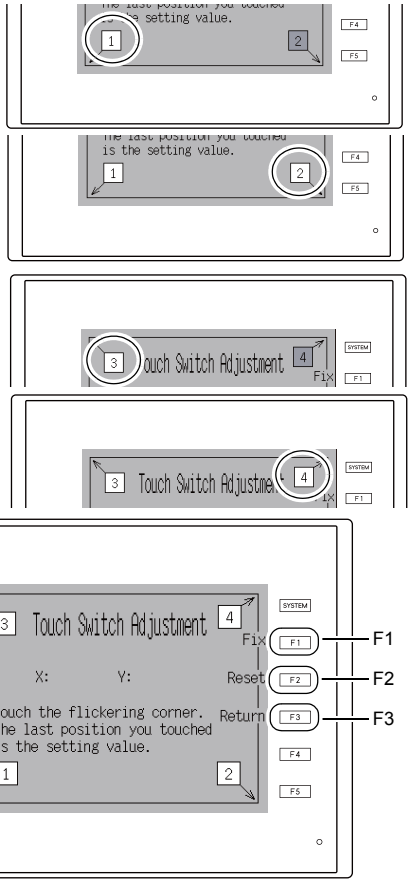
Touch switch test screen



Touch Switch Adjustment screen

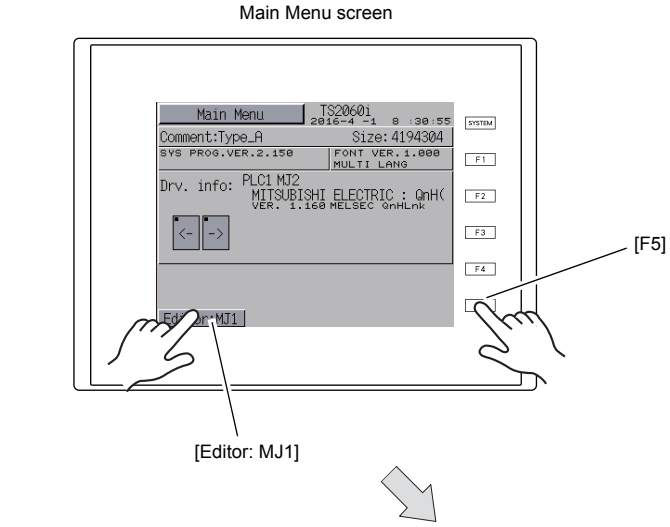


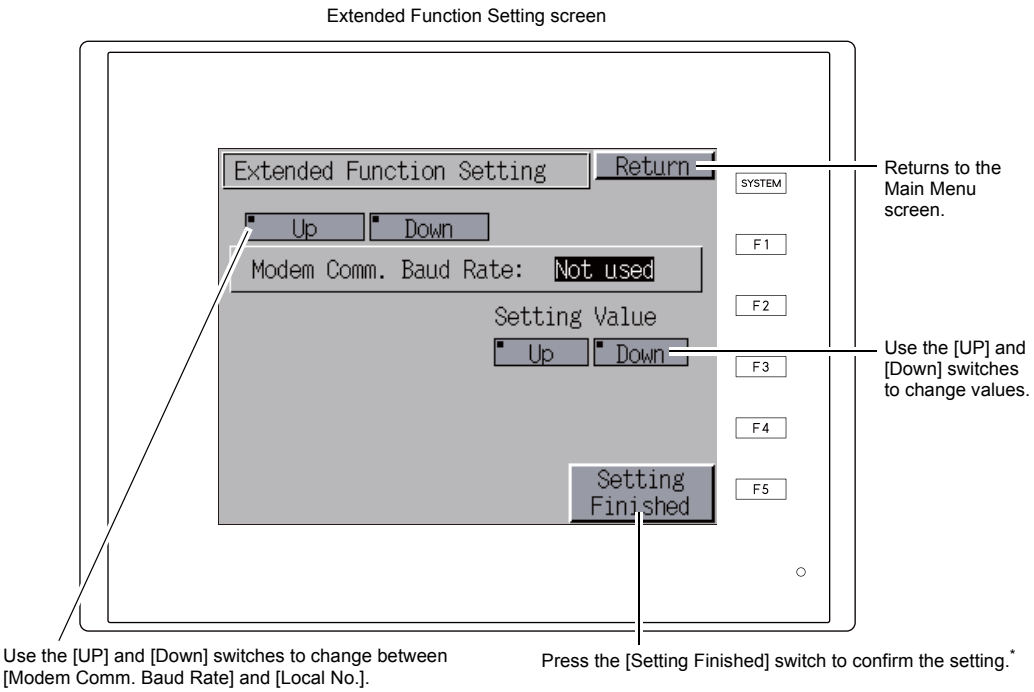
2. Touch the corner corresponding to the blinking [1]. A beep sound is emitted when you release your finger and the released position becomes the setting value. [2] starts blinking.
3. Touch the corner corresponding to the blinking [2]. A beep sound is emitted when you release your finger and the released position becomes the setting value. [3] starts blinking.
4. Touch the corner corresponding to the blinking [3]. A beep sound is emitted when you release your finger and the released position becomes the setting value. [4] starts blinking.
5. Touch the corner corresponding to the blinking [4]. A beep sound is emitted when you release your finger and the released position becomes the setting value.
6. To perform adjustment again, press the [F2] switch to return to the state in step 2.
7. Pressing the [F1] switch will emit a long buzzer sound to confirm the touch switch position. Then the touch switch test screen reappears.
8. To cancel adjustment, press the [F3] switch to return to the touch switch test screen.



10. Expanded Function Settings

Pressing the [Editor: MJ1] switch on the Main Menu screen and the [F5] switch at the same time displays the Extended Function Setting screen. This screen is used to set the modem communication baud rate and the local port number for V-Link or Modbus slave communication.





* Note that the switches on the Main Menu screen and function switches are unavailable for 15 seconds after the [Setting Finished] switch is pressed.

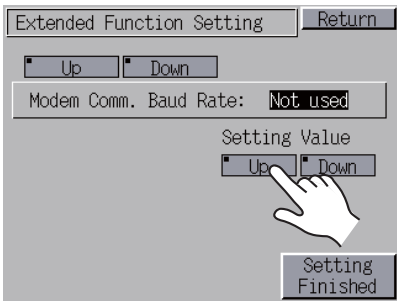
10-1. Setting the Baud Rate between the TS2060 Unit and Modem

Set the baud rate to use between the TS2060 unit and modem when transferring screen programs using the modem.

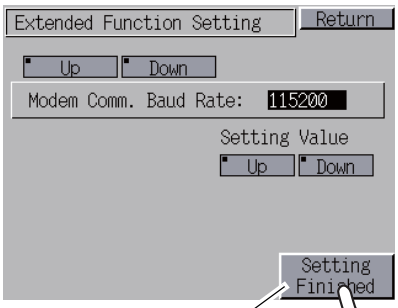
1. Use the [UP] and [Down] switches under [Setting Value] to select the modem communication baud rate, and press the [Setting Finished] switch to confirm the setting.

   * [Modem Comm. Baud Rate] can be set to 4800, 9600, 19200, 38400, 57600, or 115200 bps.

Changing the baud rate



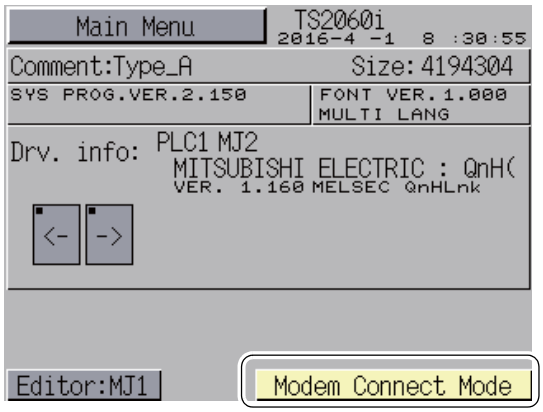
Change complete



Pressing the [Setting Finished] switch automatically sends an AT command to the modem and sets the baud rate between the TS2060 unit and modem.

2. The Main Menu screen reappears automatically and [Modem Connect Mode] appears to the right of [Editor: MJ1].

In the modem connection mode



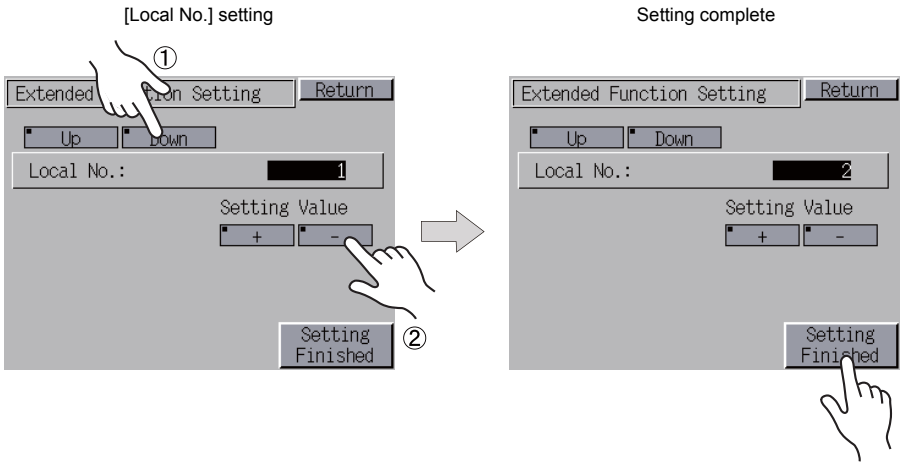
* When transferring screen programs without using the modem, always set the modem communication baud rate to “Not used”. When transferring screen programs by connecting a PC using a “V-CP” cable, set the modem communication baud rate to “Not used”.

10-2. Setting the Local Port Number

In the case of the V-Link, Modbus slave or Multi-link communication, set the local port number on the Main Menu screen.

(The local port number can be configured when [PLCn: V-Link] or [PLCn: Modbus Slave (RTU)] is selected as a device to connect or when [Connection Mode] is set to “Multi-link” under [Communication Setting], which are accessible via [System Setting] → [Hardware Setting] in V-SFT-6.)

1. Press the [Down] switch to change to the [Local No.] setting.
2. [Local No.] setting
   Use the [+] and [–] switches under [Setting Value] to specify the local port number. [Local No.] can be set from 1 to 254. Press the [Setting Finished] switch to confirm the setting.



3. The Main Menu screen reappears automatically.

6 Error Handling

1. Error Messages
2. Troubleshooting

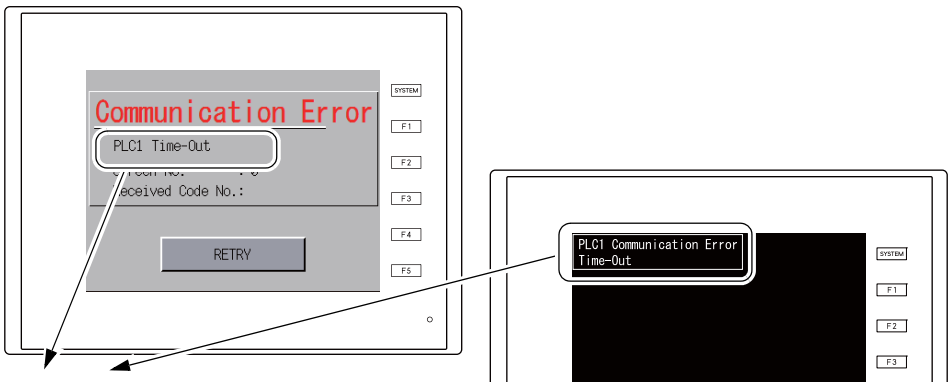
1. Error Messages

There are five kinds of error messages displayed on the TS2060:

1. Communication error
2. Data Loading
3. Warning
4. SYSTEM ERROR
5. Touch switch is active

1. Communication Error

When communication is not established between a TS2060 unit and a controller, or an abnormality (noise etc.) is detected, the following screen is displayed on the TS2060 unit.



Error Messages	Contents	Solution	Remarks
Time-Out	Although a request to send is given to a controller, no answer is returned within the specified time.	1. Check the settings in the [System Setting] → [Hardware Setting] → [PLC Properties] window. 2. Check that the cable is correctly connected.	1
		3. Data may be corrupted due to noise. Take measures to prevent noise from affecting data.	2
Parity	An error occurred in parity check.	1. Check that the cable is correctly connected.	1
		2. Data may be corrupted due to noise. Take measures to prevent noise from affecting data.	2
Framing	Although the stop bit must be “1”, it was detected as “0”.	1. Check the settings in the [System Setting] → [Hardware Setting] → [PLC Properties] window. 2. Check the cables and wiring.	1
		3. Data may be corrupted due to noise. Take measures to prevent noise from affecting data.	2
Over-Run	After receiving one character, the next character was received before internal processing was completed.	1. Check the settings in the [System Setting] → [Hardware Setting] → [PLC Properties] window.	1
		2. Data may be corrupted due to noise. Take measures to prevent noise from affecting data.	2
Check Code	The check code in the controller response was not correct.	1. Check the settings in the [System Setting] → [Hardware Setting] → [PLC Properties] window.	1
		2. Data may be corrupted due to noise. Take measures to prevent noise from affecting data.	2

* If the above error messages are displayed on the TS2060 unit without establishing communication between the unit and PLC, test the solution of remark “1”. If the error occurs suddenly during communication, test the solution of remark “2”.

Error Messages	Contents	Solution
Error Code received	An error code was sent by a controller. (NAK)	Examine the controller error code and solve the problem.
Break	The controller's SD remains at the low level.	Examine the connection between the controller's SD and the TS2060's RD.
Invalid memory (Mitsubishi CPU, or other equipment)	An address outside the permissible range of the connected PLC was specified.	Check the type and range of the specified device memory.
Invalid CPU Model (Mitsubishi ACPU)	There is no CPU that corresponds to the PLC currently supported.	Check whether or not the CPU currently in use can be used with the TS2060.
Format	The code of the received data was different from the specified code.	1. Check the link unit settings. (After changing any settings, turn the power of each controller off and on again.) 2. In V-SFT-6, select [System Setting] → [Hardware Setting] and check the settings in the [PLC Properties] window. 3. If errors only occur from time to time, a communication error due to noise may be present.
Compare (Hitachi HIDIC S10)	Transmitted data and received data were inconsistent.	
NAK	The TS2060 unit judged that communication is impossible.	
Transaction Error (Allen-Bradley PLC)	Transmitted transaction data and received transaction data were inconsistent.	
Communication Error	An unknown communication error was detected.	
Count error (Mitsubishi CPU/Sharp CPU)	The expected data amount was different from the count value.	
Command error (Mitsubishi CPU)	The response code was different from the expected code.	
Invalid cassette (Mitsubishi ACPU)	There is no memory cassette that corresponds to the cassettes currently supported.	Contact your local distributor.
Password error (Mitsubishi QCPU)	The password is incorrect.	
Unsupported CPU (Siemens S5)	Unsupported CPU type	Check whether or not the TS unit supports this CPU.
Invalid DB (Siemens S5)	The corresponding DB cannot be found in the CPU.	Check if the corresponding DB exists using the ladder tool. If the DB does not exist, create it using the ladder tool.

1-1. Network Error Messages (TS2060i Only)

Ethernet

Error Message	Description	Solution
Ethernet Error: XXXX	The status of Ethernet communication is stored in system device memory $s518 and an error occurs for any status other than “0” (normal). XXXX: Error number	For details and measures for handling each error number, refer to “$s518 (Ethernet Status Confirmation)” under “1. Overview” in the separate TS2060 Connection Manual.

OPCN-1

Error Message	Description	Solution
I/F Board Err	An error occurred on the OPCN-1 communication I/F unit.	Contact your local distributor.
Stat. No. out of range	The port number set by a switch is not within the setting range (1 to 127).	Specify the port number within the setting range.
Network Link Error	Cannot connect to the master station on the network.	Check the status of the master station (PLC). Check the status of the network link.
Network I/O Access Err	The TS2060 unit attempted to access an area outside the set number of input/output words.	Check the memory for network I/O in the screen data file.
Waiting for Reply	1. Response time was less than the “Max_int” time setting (communication monitoring time for the slave station) for OPCN-1 communication on the PLC side. 2. Response time exceeded the timeout setting of the TS2060i unit. (The timeout setting is set at [System Setting] → [Hardware Setting] → [PLC Properties] window in V-SFT-6.) This error is displayed when both conditions 1 and 2 above are met.	When the “Max_int” time is too long (infinite, for example) on the PLC, it is impossible to know whether the response from the PLC is correct or not. This error message disappears when a response from the PLC is received within the “Max_int” time.
Word Writing to Sp. Relay (Mitsubishi A series)	Word writing to a special relay (M9000 and later) was attempted. (Caution: Only bit writing is possible for special relays when connecting with OPCN-1.)	Do not attempt to perform word writing to special relays.

T-Link

Error Message	Description	Solution
Communication Error Time-Out (F8) *	Although a send request is issued to a PLC, no answer is returned within the specified time. (T-Link communication is not established.)	Check that the PLC is supplied with power and that cables are connected properly.
Communication Error Time-Out (F9) *	Although a send request is issued to a PLC, no answer is returned within the specified time. (T-Link communication is established.)	Check that the unit is operating correctly and that cables are connected correctly.
T-LINK I/F Board Err	An error occurred on the T-Link communication I/F unit.	Contact your local distributor.
Network I/O Access Err	The TS2060 unit attempted to access an area outside the set number of input/output words.	Check the memory for network I/O in the screen data file.
Access Denied by Loader or Communication Error Error code received Received code: 22	The TS2060i unit cannot perform processing because the PLC loader is being accessed. (This generally means that a program is being transferred from the PLC loader.)	Wait for PLC loader processing to finish and then try communicating again.
Communication Error Error code received Received code: 32 (MICREX-F)	An attempt was made to access an area not present in the PLC. Example: A file (W) area etc. not defined in the PLC program	Check the PLC device memory set in the screen program.

Error Message	Description	Solution
Communication Error Error code received Received code: 36 (MICREX-F)	The number of monitor registration points is too small.	Correct the number of monitor registration points. For details on the monitor registration function, refer to the user's manual of the PLC in use.
Communication Error Error code received Received code: A0 (MICREX-SX)	The specified PLC CPU number does not exist.	Check the PLC device memory (CPU number) set in the screen program. Moreover, if using X/Y (input/output memory), import the INI file output from the SX project file.

* Be aware that these errors are not displayed even if a communication error occurs for screens that only contain the I/O device memory (TI/TO).

CC-Link

Error Message	Description	Solution
I/F Board Error	An error occurred on the CC-Link communication I/F unit.	If the port number setting is correct, contact your local distributor.
Station Number Err	The port number setting configured using the DIP switches is outside the settable range (1 to 64).	Specify the port number within the setting range.
Word Writing to Sp. Relay (Mitsubishi A series)	Word writing to a special relay (M9000 and later) was attempted. (Caution: Only bit writing is possible for special relays when connecting with CC-Link.)	Do not attempt to perform word writing to special relays.
Watch dock timer error	A watchdog timer error was detected on the CC-Link communication I/F unit.	Contact your local distributor.
Error Code received	If the received code is "0000": In V-SFT-6, the port number is set to a value other than "0" at [System Setting] → [Hardware Setting] → [PLC Properties] → [Communication Setting].	In V-SFT-6, select [System Setting] → [Hardware Setting] to display the [PLC Properties] window and then set the port number to "0" under [Communication Setting].
	If the received code is not "0000": The error code originates from a PLC.	Check the PLC error code and take measures accordingly.

PROFIBUS-DP

Error Message	Description	Solution
Time-Out	When switching to RUN mode on the TS2060i unit and PROFIBUS-DP, "Data Loading..." appears for two or three seconds and then "Time-Out" is displayed.	The [Local Port No.] set on the TS2060i unit and the [Address] set for [CUR-04] in SIMATIC Manager may be different. Check the settings and modify them as necessary.
	When switching to RUN mode on the TS2060i unit and PROFIBUS-DP, a screen appears briefly (i.e., communication is established) but "Time-Out" is immediately displayed instead.	The [DB] address set on the TS2060i unit screen program may not exist on the PLC (insufficient memory). Check the setting.

SX BUS

Error Message	Description	Solution
Error SX-BUS I/F. Board	An error occurred on the SX BUS communication I/F unit.	Contact your local distributor.
Communication Error Error code received Received code: 22	The communication data is corrupted.	The data may be corrupted due to noise. Take measures to prevent noise from affecting data.
Access Denied by Loader or Communication Error Error code received Received code: 28	The TS2060i unit cannot perform processing because the PLC loader is being accessed. (This generally means that a program is being transferred from the PLC loader.)	Wait for PLC loader processing to finish and then try communicating again.
Communication Error Error code received Received code: 44 or 45	An attempt was made to access device memory unavailable in the PLC.	Check the PLC device memory set in the screen program.
Communication Error Error code received Received code: 36 (MICREX-F)	The number of monitor registration points is too small.	Correct the number of monitor registration points. For details on the monitor registration function, refer to the user's manual of the PLC in use.
Communication Error Error code received Received code: A0	The specified PLC CPU number does not exist.	Check the PLC device memory (CPU number) set in the screen program.

DeviceNet

○: Off ●: On ◎: Flashing

Error Message	LED		Description	Solution
	MS	NS		
Initialization error	● Red	○	Reading or writing to RAM was not performed correctly during the initialization check.	• Turn power off and back on again. If recovery is not possible, the unit may be faulty.
			Start-up information check error: The baud rate is outside the specified range.	• Set the same baud rate on CUR-07 as the master station (using DIP switches 7 and 8) and then turn the power on again. If recovery is not possible, the unit may be faulty.
			Start-up information check error: Excessive size for input	• In V-SFT-6, select [System Setting] → [Hardware Setting]. In the [PLC1 Properties] window, enter the desired value of up to 128 words for [Input Range] under [Input/Output Word Counts Setting]. Then turn the power on again.
			Start-up information check error: Excessive size for output	• In V-SFT-6, select [System Setting] → [Hardware Setting]. In the [PLC1 Properties] window, enter the desired value of up to 128 words for [Output Range] under [Input/Output Word Counts Setting]. Then turn the power on again.
BUS OFF Error	● Green	● Red	• The communication cable is short-circuiting at startup. • The baud rate setting is not the same as the master station.	• Check the wiring and then turn the power on again. • Set the same baud rate on CUR-07 as the master station (using DIP switches 7 and 8) and then turn the power on again.
Node address Duplication error	● Green	● Red	The same node address is already used for the master station or a different slave station.	• Check the node address on the CUR-07 and change it to an unused address (using DIP switches 1 to 6). Then turn the power on again.

Error Message	LED		Description	Solution
	MS	NS		
Network Error	● Green	○	The network power is off.	• Turn on the network power supply.
			There are no other devices on the network.	• Check the wiring and turn the power on again. • Set the same baud rate on CUR-07 as the master station (using DIP switches 7 and 8) and then turn the power on again.
		◎ Red	I/O time-out: Communication with the master station cannot be established.	• Check the power supply status of the master station. • Check the wiring.
		◎ Green	No connection exists.	• Check the wiring.
Definition Error	–	–	The returned error code is not supported by DeviceNet.	Review the following settings: • Master station settings • CUR-07 settings • V-SFT settings • Wiring

* Depending on the error detected, the master station may also have to be turned off and on again in addition to the TS2060i unit.

FL-net

Error Message	Description	Solution
FL-net Error:400	FL-net stoppage error Communication has stopped.	Check that the counterpart station is operating correctly.
FL-net Error:401	FL-net message error No response to message.	• In V-SFT-6, select [System Setting] → [Hardware Setting] to display the [PLC Properties] window and then set the timeout setting to 100 ms or more under [Communication Setting]. • Check that the address of the VW or PLC device memory is set correctly.
FL-net Error:410	Message identification error The counterpart station did not correctly receive a message.	Check that the counterpart station supports message-based communication.
FL-net Error:421	Undefined message error A message unsupported by the counterpart station was sent.	Check that the counterpart station supports message communications for reading/writing word-block data.
FL-net Error:1201.	Buffer size exceeded. Access occurred outside the set range during access with MB and MW.	Check the area size of the target node and configure the device memory setting accordingly.

2. Data Loading...

If an error is detected in the screen program when switching to RUN mode, the following messages are displayed on the TS2060 unit.

Screen No. Error screen

Error: XX (XX:XXX) screen

Error Message	Description	Solution
Screen No. Error	The screen of the received number is not set.	When communication starts, the TS2060 unit determines the screen number set as the value stored at read area “n + 2”. Since the value of read area “n + 2” does not correspond to an existing screen number, check each controller.
Error: XX (XX:XXX)	An error exists in the created screen program.	Check the screen causing the error as determined from the item number and sub-item number displayed on the TS2060 unit, check the error details (error number), and remove the cause of the error accordingly. Error : XX (XX : XXX) Sub-item number Item number Error number For details on item numbers and sub-item numbers, refer to the next page.

2-1. Error Numbers

Error Number

*** Error numbers with "*" do not occur under ordinary circumstances. If any of these errors are displayed, contact your local distributor.**

Error No.	Contents	Solution
3	Data version does not match the MONITOUCH system program version.	Transfer the MONITOUCH system program from the V-SFT editor. If the problem persists, check the editor version and the system program (SYSTEM PROG.) version of the TS2060, and contact your local distributor.
10	The communication I/F unit is not installed, or it does not match the I/F driver.	Install the communication I/F unit. Transfer the I/F driver again.
11	The PLC model set in the screen program does not match the I/F driver.	Check the PLC model and transfer the I/F driver again.
12	The I/F driver version does not match the screen program version.	Check the editor version and the I/F driver version, and contact your local distributor.
13	The I/F driver version does not match the version of the MONITOUCH system program.	Check the I/F driver version and the system program (SYSTEM PROG.) version of the TS2060, and contact your local distributor.
15	The interface language on MONITOUCH does not match the language set in the screen program.	Check the MONITOUCH model and the language set in the created program.
17	The network I/O number exceeds the usable number range.	Set a number within the usable range.
19	An I/F driver that is unsupported on MONITOUCH is transferred.	Transfer the correct I/F driver.
20	The maximum capacity of the buffering area has been exceeded.	The data capacity to be saved in DRAM at the primary storage target (buffering area setting) has exceeded the maximum available capacity. Reduce the number set for [Number of Data to Save].
22	The buffer number specified for the trend or alarm item has not been set.	In V-SFT-6, select [System Setting] → [Buffering Area Setting] and set the relevant buffering area correctly.
23*	Memory card file number error	Contact your local distributor.
24	The output file number set in the buffering area setting is not unique or [Buffering File] is not set for the memory card setting.	When [Secondary storage target: Memory Card] is selected in the [Buffering Area Setting] window, the output file number can be set. However, the set output file number already exists. As another possibility, [Type: Buffering File] is not set in the [Memory Card Setting] window although [Secondary storage target: Memory Card] is selected. Check the output file number in the [Buffering Area Setting] window, and set correctly. If unsuccessful, check the setting in the [Memory Card Setting] window.
25	The amount of obtained data/number of monitoring alarms has exceeded the buffering area setting.	Check [Number of data to acquire] or [Number of Monitoring Alarms] in the [Buffering Area Setting] window. Bit synchronization, constant sampling, alarm tracking, alarm logging, time order alarming: 256 words maximum Device memory map: 128 words maximum
26	There are too many trend and alarm items that refer to the buffering area.	There are too many items that refer to the logging server or alarm server (max. 16 items). Reduce the number of trend/alarm items placed on the screen.
27*	There is an error in the buffering area setting.	Contact your local distributor.

Error No.	Contents	Solution
28	The same function is set for both MJ1 and MJ2 ports.	Check the settings in the [System Setting] → [Hardware Setting] window and specify the settings correctly.
29	The memory capacity is insufficient.	Reduce the number set for [Number of Data to Save] for [DRAM] under [Primary storage target] in the [Buffering Area Setting] → [Data Output Setting] tab window. Reduce the number set for [Number of Monitoring Alarms] for the alarm item. Delete the following settings if not necessary. • Multi-link/Multi-link2 • Connected devices not in use If the problem is not resolved by taking the above measures, contact your local distributor.
30	There are too many registered items.	Reduce the number of items.
31	The memory capacity for the registered items is insufficient.	Take the following action for the relevant screen. Reduce the number set for [Number of Monitoring Alarms] for the time order alarming. Reduce the number set for [Number of Monitoring Alarms] for alarm tracking. Reduce the number set for [Number of Monitoring Alarms] for the bit order alarming. Reduce the number of items placed on the screen.
32	The number of items that uses the memory exceeds the available number.	Reduce the number of items.
33	The maximum number of switches and lamps that can be set has been exceeded.	The number of switches and lamps placed on the screen has exceeded 192. Switches and lamps on overlap displays are included in this number. Reduce the number of switches and lamps.
34	The items that occupy the memory area exceed the available work memory capacity.	Reduce the amount of data.
35*	Variable length data error	Contact your local distributor.
36*	ITEM error	
37*	Component ITEM error	
38*	Component error	
40*	Group byte count error	
41*	Recognition flag error	
42*	Function ITEM error	
43*	Function ITEM end error	
44*	Group ITEM end error	
46	An unavailable device memory address is set or the available device memory range is exceeded.	Check the device memory setting.
47	IDs of the items having setting limitations in the screen library are duplicated on a screen.	Check the IDs and keep them unique.
48	The network table number set for Ethernet local port IP address is the same as the network table number of the PLC.	Check and set the network table number again.
49*	Group ITEM error	Contact your local distributor.
50*	Link ITEM error	
51*	Editor ITEM error	
52	The overlap ID is incorrect and must be a value from “0” to “3”.	Check the overlap ID and set correctly.
53	In the call-overlap setting, an overlap library number with no data registration is specified.	Specify an overlap library number registered on the multi-overlap edit window.

Error No.	Contents	Solution
54	Overlap displays occupy too much memory capacity.	Reset the overlap display data size.
55*	Multi-overlap header error	Contact your local distributor.
56*	Graphic undefined command error	
57*	Graphic ITEM error	
58*	Graphic execution error	
59*	Switch function error	
60	Switch operating area error	Reset the switch operating area.
61*	Statistic graph % display No. exceeding	Contact your local distributor.
62*	Multi data exceeding	
63	The ordinal number for data block selection (a maximum of four) is duplicated.	Check the ordinal number for data block selection, and set correctly.
64*	Data display element No. error	Contact your local distributor.
65	The scale or graph is not set correctly in the settings for trend graph or trend sampling.	Correct the settings for [Max. Scale Value] and [Min. Scale Value] or [Max.] and [Min.] in the [trend graph settings] window.
66*	Internal circle radius is “0”.	Contact your local distributor.
67*	The number of points to display is equal to or smaller than zero.	
68	The display area is insufficient for the area (lines) that is displayed by one bit (bit order alarming).	Check the [Message Lines] item set in the [Alarm] window ([Display Mode: Bit Order Alarming]) and enlarge the display area if necessary.
69	A pattern or frame larger than the screen size has been specified.	Re-set the pattern or frame.
70	Too many columns or lines on the data sheet	Check the data sheet columns/lines, and set correctly.
71	The maximum part size in the closed area graph has been exceeded.	The part size in the closed area graph has exceeded 64 kbytes. Reduce the data size of the parts.
72	The setting for real time printing of alarm logging has exceeded the upper limit, or the specified buffer number is not unique.	There are more than four alarm logging parts with [Use the real-time printing function] selected. Or, there are more than two alarm logging parts for which the same buffering area number is set with [Use the real-time printing function] selected. Select the [Use the real-time printing function] setting within the limitations. If the problem persists, check the editor version and the system program (SYSTEM PROG.) version of the TS2060 unit and then contact your local distributor.
75	The model selected in the screen program is not consistent.	Transfer the system program of the TS2060 from the editor.
76	Too many monitoring alarms.	Check the [Number of Monitoring Alarms] setting. 4096 maximum
77*	Expanded graphic ITEM error	Contact your local distributor.
78*	Expanded function ITEM error	
79	Component parts occupy too much memory capacity.	Reduce the number of component parts.
80*	Macro: Undefined command error	Contact your local distributor.
81	Macro: The numbers of FOR and NEXT commands are not the same. FOR-NEXT commands are nested beyond 8 levels.	Correct the FOR-NEXT commands.
82	Macro: There are two different commands for the same label number.	Macro: Re-set the label.
83	Macro: There is no destination label for the jump.	Macro: Change or set the destination label.

Error No.	Contents	Solution
84*	Macro: Incorrect use of device memory	Change the macro command.
85*	Macro: Undefined system call	Contact your local distributor.
90	Unregistered screen library is used.	Check the screen library number.
91	Bitmap data for a switch or lamp is not registered.	Check the following points: No bitmap name is designated. The total count of 3D parts exceeds 1023 (maximum). The part size is too large. There is no bitmap file in the “Parts” folder located under “MONITOUCH” → “User”.
92*	Multi-language initial display string No. error	Contact your local distributor.
94	Multi-language selection string number error	
95	MR400 format table setting: String code error	There is an invalid code after “\” in the string.
96	MR400 format table setting: String size error	The total size of the string is too large.
97	Multi-language font setting error	Transfer the first language font or screen program again.
99	Registration items occupy too much memory capacity.	Reduce the number of registration items.
100	Universal serial: GD-80 compatible entry mode is set.	Deselect [GD-80 Compatible] from the entry mode part.
101	Universal serial: System device memory setting error	Check whether or not access to the outside of the specified device memory address is attempted, such as by macro indirect designation.
102*	Connection mode setting error	Contact your local distributor.
103*	Network I/O size setting error	
104*	Network table setting error	
120	Multi-link2 is not selected for modular jack 1 or 2.	Check the connection port setting in the [Multi-link2] window.
121	Multi-link2 station number error. The value for [Local Port No.] or [Total] is out of the range of 1 to 4.	The value for [Local Port No.] or [Total] in the [Multi-link2] window is out of the range of 1 to 4. Set [Local Port No.] or [Total] within the range of 1 to 4.
122	Multi-link program is not registered.	Transfer the multi-link program.
123	Multi-link2 program is not registered.	
127	MONITOUCH does not support the remote desktop window display.	Check whether MONITOUCH is a model that supports the remote desktop window display. If not, remove the setting.
129	No remote desktop window display program is registered on the TS2060 unit.	Update the V-SFT version and resend the screen program to the TS2060 unit. When transferring the screen program to a storage device, use the storage manager to resend the program.
130*	Ethernet: Network byte error	Contact your local distributor.
131	Ethernet: The local port is not set in the table.	Check the port number on the Main Menu screen of the TS2060 unit, and check that the local port is set in the network table edit window.
132	Ethernet: The network table is not found or is not the right one.	Configure the settings located at [System Setting] → [Hardware Setting] → [PLC Properties] → [Target Setting] → [PLC Table].
133	Ethernet: IP address No. error	Check the IP address in the network table edit window or in the PLC table.
134	Ethernet: Port No. error	Check the port number in the network table edit window or in the PLC table.
135	FL-net: FL-net data error	Check the [FL-Net] settings located at [System Setting] → [Hardware Setting] → [PLC1 Properties].

Error No.	Contents	Solution
136	IP address setting error: The network table number selected for the local station IP address is not registered.	Check the network table number.
137	The Ethernet port number of the I/F driver is not unique.	Set a unique port number for the I/F driver.
138	The remote desktop table is not registered.	Register the remote desktop table with the specified number.
139	The remote desktop table is not set correctly.	Check the remote desktop table settings again. (Check, for example, whether an unregistered remote desktop table number is specified.)
140	The I/F driver version of MONITOUCH does not match the version of the MONITOUCH system program.	Check that the MONITOUCH system program (SYSTEM PROG.) version is compatible with the device connected, and if necessary, update the system program.
141*	Multi-link2 connection is set.	Contact your local distributor.
142	I/F driver not registered	Transfer the I/F driver. Or check the device memory of the item.
143	Device memory maps in the buffering area setting are not set.	Check the device memory map setting, and set correctly.
145	The setting number of a device memory map in the buffering area setting is not unique.	Check that each device memory map number is unique in the buffering area setting, and set correctly.
146*	Device memory map memory setting error	Contact your local distributor.
155	FROM data unregistered	The “default.dtm” file has not been transferred although the [Use Internal Flash ROM as Back-up Area] checkbox is selected in the [System Setting] → [Unit Setting] → [General Settings] tab window of the editor. As another possibility, no port number table is found although [Use Port Number Table] is selected under [Communication Setting] located at [System Setting] → [Hardware Setting] → [PLC Properties]. If selected, the amount of screen program capacity used for the Main Menu screen is 128 kbytes less than when it is not selected. Check that this is the case. If the capacity is not reduced, contact your local distributor.
156	“Backup area” and “port number table” cannot be used at the same time.	[Use Internal Flash ROM as Back-up Area] is selected in the [System Setting] → [Unit Setting] → [General Settings] tab window and [Use Port Number Table] is selected under [Communication Setting] located at [System Setting] → [Hardware Setting] → [PLC Properties]. It is not possible to use both functions at the same time. Deselect either function, and transfer the screen program again.
157	Some port numbers in the port number table are duplicate.	Be sure to set unique port numbers when the port number table is changed using the FROM_WR macro command.
160	The SRAM area size exceeds the available range.	Check the SRAM/clock setting.
161	The SRAM area is not formatted.	Format the SRAM area on the SRAM/Clock screen that can be displayed from the Main Menu drop-down window. Check that the battery voltage does not drop.
162	Data in the SRAM area does not match the TS2060 unit system program version.	Check the TS2060 unit system program version, and contact your local distributor.
163	The SRAM/clock setting does not match the SRAM area format.	Format the SRAM area on the SRAM/Clock screen that can be displayed from the Main Menu drop-down window.

Error No.	Contents	Solution
164	The simulator program version does not match the MONITOUCH system program version.	Check the MONITOUCH system program version and the compatible simulator program version.
165	Device memory map data is registered for a model that does not support device memory maps.	Delete the device memory map.
166	The function set for the serial port is duplicated.	Error : 166 (Header : x) └ Sub-item number The sub-item number denotes the ports as shown below: 0: CN1 1: MJ1 2: MJ2 Specify a unique function (simulator, etc.) for each port.
170	The ladder communication program does not exist on the TS2060 unit.	The ladder communication program is not stored on the TS2060 unit although [Use Ladder Transfer] is selected in the [System Setting] → [Hardware Setting] → [Ladder Transfer Setting] window. If not performing ladder transfer, deselect the relevant [Use Ladder Transfer] checkbox located in the [System Setting] → [Hardware Setting] → [Ladder Transfer Setting] window. When executing ladder transfer, transfer the ladder communication program to the TS2060 unit.
171	The PLC model set in the screen program does not match the model set in the ladder communication program.	Transfer the ladder communication program for the PLC model.
172	The ladder communication program is stored in the TS2060 unit.	The ladder communication program is stored on the TS2060 unit although [Use Ladder Transfer] is not selected in the [System Setting] → [Hardware Setting] → [Ladder Transfer Setting] window. Set the ladder transfer settings.
173	[Use Ladder Transfer] is selected in the [Device Connection Setting] window; however, a connection mode other than “1:1” is selected for [Connection Mode].	Ladder transfer supports “1:1” connections only. If not performing ladder transfer, deselect the relevant [Use Ladder Transfer] checkbox located in the [System Setting] → [Hardware Setting] → [Ladder Transfer Setting] window. When executing ladder transfer, select “1:1” for [Connection Mode] under [Communication Setting].
174	The I/F driver that does not support ladder communication is set.	Check that the I/F driver supports ladder communication.
183	The printer model is not correctly set.	Transfer the printer driver suitable for the model set in the screen program.
184	Printer driver is not found.	Transfer the printer driver.
185	No option unit is installed.	Check the optional unit settings at [System Setting] → [Edit Model Selection] in the editor and install the optional “DUR-00” unit.
186	No option unit is installed.	Remove the optional “DUR-00” unit and install it again.
187	Check that the device memory map number specified in the buffering area setting is used for periodical writing or synchronized writing.	Check the data in the device memory map.
188	The same device memory address is specified for writing in the device memory map number set with periodical writing or synchronized writing.	Check the data in the device memory map.
189	The Japanese conversion program is not registered in MONITOUCH.	Transfer the Japanese conversion program.

Error No.	Contents	Solution
192*	I/F driver setting error	Contact your local distributor.
193*	The common data sheet setting is not registered.	
194*	The memory card setting is not registered.	
195*	V-I/O input/output device memory is not registered.	
196	Data stored in the storage device is different.	This error may be relevant to the operation for storing data (screen, 3D parts, etc.) in a storage device. Connect a storage device in which data has been stored correctly using the storage manager.
199	Multiple functions are assigned to the USB port.	Multiple functions are assigned to the USB-B port. Use the USB-B port only for any of the following functions: USB simulator, PictBridge printer, or USB ladder communication function.
201*	Total byte count error	Contact your local distributor.
204	Manual setting type font data is not transferred.	Manual setting type font data is not transferred. While text that corresponds to an automatic setting type font is displayed correctly, any text that does not correspond to an automatic setting type font is tentatively displayed using a 12-point font. Check the setting in the [Manual Font Setting] dialog, and transfer the screen data again.
208	There is no gateway setting.	To use the e-mail function, be sure to set gateway on the network table (Ethernet).
214	No key code for the remote desktop window display is registered on the TS2060 unit.	Register the license key code for remote desktop window display via the Main Menu screen.
215	The SRAM area is in use. Install a battery.	No battery is connected even though the use of SRAM is set in the [System Setting] → [Unit Setting] → [SRAM/Clock Setting] window. Install an optional battery (TS-BT) into the rear of the unit.
216	A data sheet includes an item that cannot be printed.	Recheck the data sheet screen. Remove any unusable items.
217	The source voltage of the touch panel does not conform to the specifications.	Check the voltage of the power supply. For details on the power supply, refer to Chapter 2.

Item Number

The item number shows the editing screen or other place where the error is detected.

0: Header
1: Network table
2: Buffering area
3: Barcode
4: Memory card
5: External character 16
6: External character 32
7: Message group
8: Dot pattern
9: Graphic library
10: Page block
11: Direct block
12: Screen block
13: Macro block
14: Data block
15: Data sheet
16: Multi-overlap
17: Screen
18: Function switch
19: Screen library
20: Extended data
21: Device memory map
22: Extended font
23: Alarm mask data
24: SRAM
25: Bitmap area
26: Storage attributes
27: Print format
28: Tag table
29: Slave communication memory table
31: JPEG table
33: Comment table
34: Windows font table
35: Windows font table (messages)
36: Windows font table (text)
37: Extended message, comment table
50: I/F driver
52: Remote desktop table
70: No option driver
90: Error detected in RUN mode

Sub-item Number

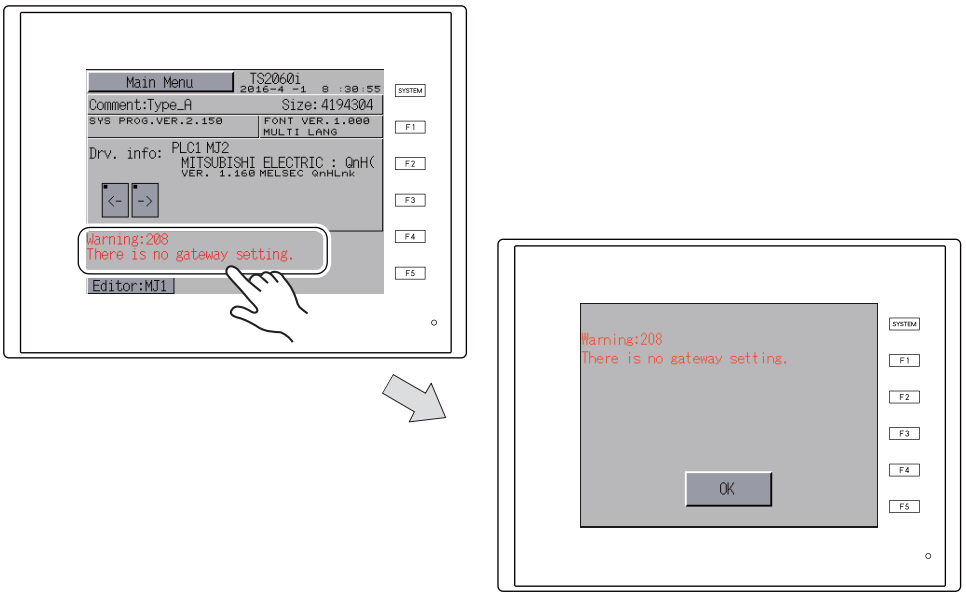
The sub-item number indicates the number of the screen where the error was detected.

- Buffering area: −1 = common item, 0 to 11 = buffer No.
- Message: Message group No.
- For graphic library, the library linear number is shown.
  Graphic group No. × 256 + No. in the group
- Device memory map: xyy (x = PLC1 to 8, yy = table No.)
- I/F driver: 1 to 8 = PLC1 to 8, 9 = simulator

3. Warning

"Warning" may be displayed on the Main Menu screen. This is a message displayed to give a warning. Select [Tool] → [Error Check] in V-SFT-6, and correct the screen program by checking the details of the error as well as the solution.

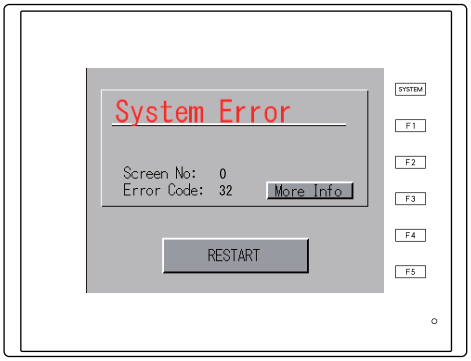
* Pressing the warning will display the entire message.



4. SYSTEM ERROR

If an error (that occurs when the system crashes) on the TS2060 unit is detected, the error is displayed on the TS2060 unit as shown below.

System Error screen



Error Code: XX

- 1: Watchdog timer error
- 11: Switch table error
- 30: Too many display requests error
- 31: Memory allocation system error
- 32: General exception/MMU address system error
- 33: RTOS system error
- 34: Memory error
- 35: Invalid memory error
- 37: Invalid memory write error

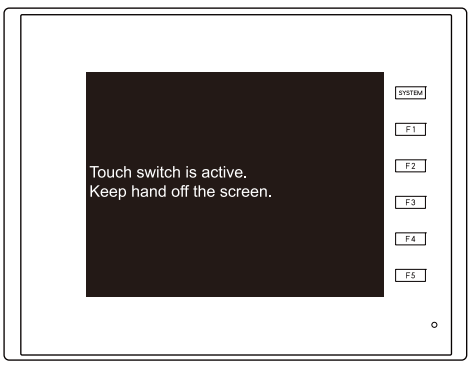
The source of the error could be one of the following three problems.

1) Program crash due to noise
2) Hardware problem
3) Bad program

If this type of error occurs, contact your local distributor.

5. Touch Switch Is Active

If the power is turned on while a touch switch is activated, the following error screen is displayed.
If you are touching the screen, take your hand off the screen.
If the error persists even though nothing is touching the screen, contact your local distributor.



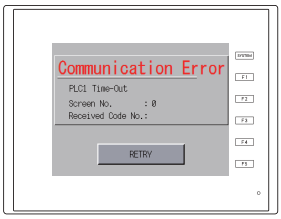
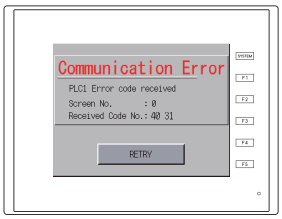
2. Troubleshooting

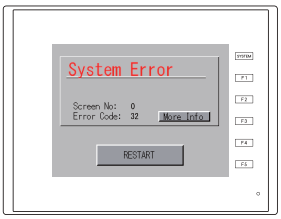
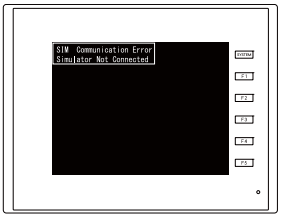
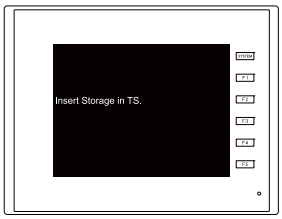
In the Event of an Error

Perform the steps below:

1. If the current error matches a symptom in the following table, correct it by following the instructions provided.
2. If the error does not match the symptoms in the table, contact your local distributor (specified on the back cover).
   Please provide the distributor with the detailed information, such as a MONITOUCH model, serial number, symptom of the error and error message displayed on MONITOUCH.

Probable Symptoms

Symptoms	Causes	Solutions
The TS2060 unit is connected to controllers; however, communication fails. "Communication Error: Time-Out" appears on the screen. 	Probable causes are: 1) Cables are not connected correctly or a cable is disconnected. 2) Parameter settings on the controller are not correct or do not match the settings on the TS2060 unit. 3) The TS2060 unit is faulty.	Solutions are: 1) Check the cable connection. 2) Recheck the parameter settings on the controller. 3) Perform a loopback test (refer to page 5-43) on the I/O Test screen of the TS2060 unit. If the loopback test fails, return the TS2060 unit to your local distributor as soon as possible.
Communications have been successful. However, opening a certain screen always causes a "Communication Error: Error code received" error. 	The error code denotes a controller error (NAK) displayed in hex. 1) When the error code only appears on a certain screen, a device memory address that does not exist on the controller may be set on the TS2060 unit. 2) If the error code appears at power-on, a device memory address that does not exist on any controller may be specified in the read/write area located at [System Setting] → [Hardware Setting], buffering area settings, and initial macro in V-SFT-6.	1) Check if any address outside the permissible range of any controller device memory is specified on the screen. 2) Check that there is no address outside the permissible range of any controller set in the read/write area located at [System Setting] → [Hardware Setting], buffering area settings, and initial macro.

Symptoms	Causes	Solutions
Communications have been successful. However, “Communication Error: Parity” or “Communication Error: Framing” suddenly occurs. 	Noise may cause the error.	Check if appropriate measures are taken against noise. Example: • Check if communication cables are bundled together with power cables. • Try to attach a ferrite core to the communication cable. • Try to attach a noise filter to the power supply, etc.
“SYSTEM ERROR: xx” was displayed. 	The cause depends on the symptoms. 1) Turning the power off and on again restores MONITOUCH. ↓ Communication failed due to incorrect timing. 2) Turning the power off and on again does not restore MONITOUCH. ↓ The error always occurs under certain conditions or MONITOUCH is faulty. If the error does not correspond to the above symptoms, contact your local distributor.	1) If communication seems stable after turning power off and on again, wait and see if the error has been resolved. 2) Write down all details displayed on the TS2060 unit, such as the error number etc., and contact your local distributor.
“Communication Error: Simulator Not Connected ” appears on the screen. 	Simulator communications between TS2060 unit and PC are not successful.	1) When communicating with a PLC: Select [Not use] on the Simulator Setting screen via the Main Menu screen. Or deselect the [Use Simulator] checkbox in the [Transfer] window of V-SFT-6, and transfer the screen program again. 2) When communicating with the simulator: Select [Use Simulator] on the Simulator Setting screen via the Main Menu screen. Or select [Transfer] → [Simulate] in V-SFT-6 to start the simulator.
“Insert Storage in TS” is displayed on the screen. 	No storage device is inserted in the TS2060i unit although a setting is made to automatically upload a screen program from the storage device when the power to the TS2060i unit is turned on.	1) When enabling auto-upload Check that the storage device is correctly inserted. Check that data files to be uploaded automatically are stored in the storage device. * For details on auto-uploading using a storage device, refer to the TS2060 Reference Manual 2. 2) When disabling auto-upload Turn the power to the TS2060i unit off and set the DIP switch 1 (on the back of the unit) to the off position.

Symptoms	Causes	Solutions
The screen becomes dark or black.	1) Touching the screen restores it to the previous illuminated state. ↓ The backlight is operating automatically and normally.	1) To change the timing that the backlight turns off, change the relevant setting in V-SFT-6.
	2) Touching the screen does not restore it. The POWER lamp is illuminated. ↓ The backlight may have exceeded its service life or an error has occurred on MONITOUCH.	2) Return the unit to your local distributor.
The POWER LED does not light up, or flashes.	1) The power is not correctly supplied to the TS2060 unit.	1) Check that the correct voltage and current are supplied.
	2) The POWER LED is faulty. (The screen functions normally.)	2) Return MONITOUCH to your local distributor.
	3) MONITOUCH is faulty. (The screen is black.)	3) Return MONITOUCH to your local distributor.
Switches do not work.	1) Switches do not work in RUN mode. Several beep sounds are emitted. ↓ The switches may be disabled by an interlock.	1) Check the settings of switch functions, etc. in V-SFT-6.
	2) The switch activation position is wrong. The activation position is wrong when displaying the I/O Test screen from the Main Menu screen, pressing [Switch Check], and touching the screen. ↓ The switch activation position may be misaligned.	2) Perform a touch switch adjustment (refer to page 5-55).
	3) Switching to STOP mode does not restore switch operation. No part of the touch switch test screen is activated when displaying the I/O Test screen from the Main Menu screen, pressing [Switch Check], and touching the screen. ↓ The touch switch of the unit may be faulty.	3) Return the unit to your local distributor.
The storage device is not recognized on the TS2060i unit.	1) The format type of the storage device is different.	1) The format type of the storage device available with the TS2060i is FAT or FAT32. Check the format type of the storage device on the PC. If it is different, format the storage device again to either format type.
	2) An error code is stored in $s497. ($s1035 when the USB-A port is used)	2) Check the value stored in system device memory $s497 or $s1035. (Assigning these addresses to the numerical data display part enables monitoring.) A value other than “0” indicates an error. For details on error codes, refer to the TS2060 Reference Manual 1.
	3) The storage device is faulty.	3) Check whether or not the storage device can be accessed from the PC. If not, use other storage device.

Symptoms	Causes	Solutions
The screen program cannot be transferred.	1) All attempts at serial transfer have not succeeded. ↓ The settings on the PC may be incorrect. 2) Serial transfer worked in the past but has suddenly stopped working. ↓ There may be a problem on MONITOUCH or settings between MONITOUCH and PC do not match. 3) Means other than serial transfer ↓ There may be some errors in the Ethernet or USB settings.	1) In the [Transfer] window in V-SFT-6, decrease the baud rate by one level. Also check that the correct COM port is selected. 2) Check that [Modem Connect Mode] (page 5-57) is not displayed on MONITOUCH. (Shown at the lower right corner of the Main Menu screen.) Also try a loopback test on MONITOUCH using RS-232C (refer to page 5-43). 3) For Ethernet transfer: Check that the IP address set in V-SFT-6 matches the one set on MONITOUCH. Also check if any error due to Ethernet connection occurs on MONITOUCH. For USB transfer: Is the USB driver identified? Is the driver installation successfully finished? (Refer to page 3-11.) If the problem persists, contact your local distributor.
The selection menu does not appear even after pressing [SYSTEM] switch on the RUN screen.	The [SYSTEM] switch is prohibited.	To enable the [SYSTEM] switch, hold down the [F5] switch with the [SYSTEM] switch for the time specified for [Mode Change Delay Time] (max. 30 seconds). ([Mode Change Delay Time] is set in the screen program.)
After displaying the selection menu by pressing the [SYSTEM] switch in RUN mode, the Main Menu screen does not appear even after pressing the [F1] ([MODE]) switch.	1) The [MODE] switch is prohibited. 2) The changeover time is specified in the screen program.	1) With the selection menu displayed, hold down the [F1] switch with the [F5] switch for the time specified for [Mode Change Delay Time] (max. 30 seconds). ([Mode Change Delay Time] is set in the screen program.) 2) With the selection menu displayed, hold down the [F1] ([MODE]) switch for the specified changeover time (max. 30 seconds).
The “Brownout of Battery” message is displayed on the Main Menu screen.	1) The time to replace the battery is approaching. 2) No battery is installed.	1) Refer to “Battery Replacement (page 4-8)” and replace the battery. 2) Data in the SRAM area or built-in clock data cannot be retained unless power is supplied. Refer to “Battery Replacement (page 4-8)” and install a battery.

MEMO

Please use this page freely.

7 Inspection and Maintenance

1. Inspection and Maintenance
2. Warranty Policy

1. Inspection and Maintenance

⚠DANGER	Always turn OFF the power before conducting inspection or maintenance. Failure to do so could cause an electric shock or damage to the unit.

Daily Inspection

- Check that the screws on the TS2060 unit are tightened firmly.
- Check that the connectors and terminal screws used for connection with other devices are tightened firmly.
- If the display surface or frame is dirty, wipe it with a soft cloth soaked in commercially available alcohol.
- Conduct periodical inspection once or twice a year. The number of inspections may be increased as necessary if facilities are relocated or modified, or the environment is hot, humid, or dusty.

Periodical Inspection

Inspect the following points periodically.

- Are the ambient temperature and humidity appropriate?
  0 to +50 °C, 85 % RH or less
- Are the environmental conditions appropriate?
  No excessive dust and no conductive dust
- Is there corrosive gas in the atmosphere?
- Is the source voltage in the allowable range?
  24 VDC ± 10 %
- Are the TS2060 mounting screws tightened firmly?
- Are the connectors and terminal screws used for connection with other devices tightened firmly?
- Has the coin-type lithium battery passed its replacement date?
  Within about 5 years from the date of manufacture

2. Warranty Policy

Inquiries about Failure

Please direct inquiries about failure or repair to your local distributor.
Please provide information including the MONITOUCH model, serial number, symptoms of the failure, error messages (if shown), etc.

* An inquiry form is provided on the final page (page 7-3) of this chapter. This form may be used for inquiries.

Warranty Period

The product is under warranty for one year after the date of purchase or delivery to the specified place. On the assumption that the maximum stock period of the product after manufacture is 6 months, the warranty period is limited to 18 months (checked by the serial number) after manufacture. When a warranty period is specified in the contract, however, the period in the contract takes precedence.

Free-of-charge Repair

If the product fails before the expiry of the warranty, it will be repaired free of charge.
However, repair of any failure resulting from the causes below will be chargeable even within the warranty period.

- Breakage of or damage to the appearance (case or surface sheet), touch switches, LCD, or other components due to dropping, impact, or mishandling
- End of service life of the LCD or backlight
- Fusion of a printed circuit board pattern associated with connection to external devices, or fusion of a pattern in the terminal block or connector section of a printed circuit board caused by short-circuiting of an external load circuit.
- Overvoltage or different voltage applied due to wiring mistakes (power supply terminal, external communication terminal, or other terminal blocks)
- Failure caused by a lightning surge
- Failure due to the entry of conductive substances, water, solvent, particles, etc. under inappropriate environmental conditions
- Failure due to inappropriate environmental conditions (e.g. corrosive gas or high humidity)
- Failure due to vibration or impact exceeding the specified level
- Disassembly and modification by the customer or failure obviously resulting from improper handling by the customer

Chargeable Repair

Any failure that occurs after the expiry of the warranty or that does not satisfy the requirements for free-of-charge repair will be repaired on a chargeable basis.

Inquiry Form

Your name				
Company name				
Contact	TEL		FAX	
	Email			
Model code *1			Ser. No. *1	
MONITOUCH version *2	SYSTEM PRG. Ver:			
Driver information *2	Maker, model name:		Version:	
Purchased from: (Distributor)				
Person in charge			Date of purchase	
Symptoms				
(Please describe the symptoms of the failure and also include any displayed error messages.)				

*1 See the label on the back of the unit for the model code and serial number (nine digits plus one letter of the alphabet).
*2 Enter the version if it can be verified.
The version is displayed on [Main Menu Screen] (refer to page 5-5) of the TS2060 unit.

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