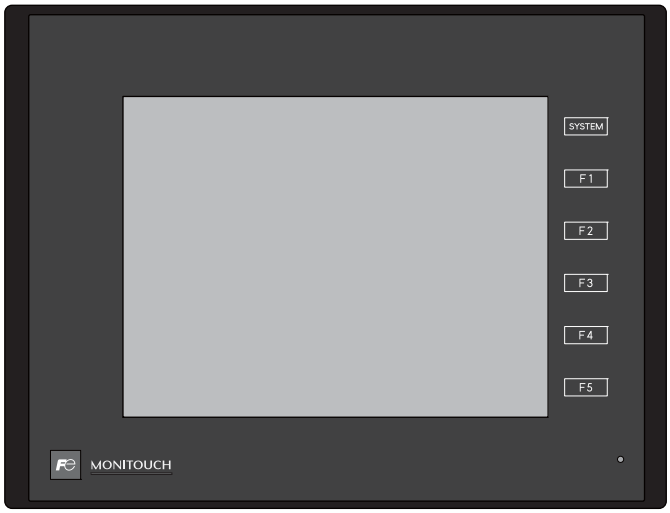
Fuji Electric

MONITOUCH

Reference Manual [2]



TECHNOSHOT

TS2060 / TS1000 Smart

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	1205NE0	First edition
September, 2016	1205NE0a	Correction of errors
August, 2018	1205NE1	Second edition Added TS1000 Smart and VNC Server Partial modifications

Preface

Thank you for selecting MONITOUCH TECHNOSHOT (hereafter referred to as "TS").
For correct setup of the TS, you are requested to read through this manual to understand more about the product.
For details on other operating procedures for the TS, refer to the following related manuals.

Manual Name	Contents	Reference No.
TS Reference Manual [1]	Explains the functions and operation of the TS.	1204NE
TS Reference Manual [2]		1205NE
TS2060 Connection Manual [1]	Explains the connection and communication parameters for the TS2060 and controllers in detail.	2204NE
TS2060 Connection Manual [2]		2205NE
TS2060 Connection Manual [3]		2206NE
TS2060 Hardware Specifications	Explains hardware specifications and precautions when handling the TS2060.	2207NE
TS1000 Smart Connection Manual [1]	Explains the connection and communication parameters for TS1000 Smart and controllers in detail.	2213NE
TS1000 Smart Connection Manual [2]		2214NE
TS1000 Smart Connection Manual [3]		2215NE
TS1000 Smart Hardware Specifications	Explains hardware specifications and precautions when handling TS1000 Smart.	2216NE

For details on devices including PLCs, inverters, and temperature controllers, refer to the manual for each device.

TS Types and Model Names

The notations used in this manual and the corresponding models are as shown below.

Notation	Model
TS	TS2060i, TS2060, TS1100Si, TS1070Si, TS1070S
TSi	TS2060i, TS1100Si, TS1070Si
TS2060i	TS2060i
TS2060	TS2060
TS1000 Smart	TS1100Si, TS1070Si, TS1070S
TS1000S	

Available Functions

Note that functions available differ depending on the TS model. For details, refer to the related chapters.

Functions Described in TS Reference Manual 1

○: Available △: Conditionally available ×: Not available

TS Reference Manual 1		TS2060i	TS2060	TS1100Si TS1070Si	TS1070S	Remarks
Chapter	Description					
2 Overlap	Normal overlap	○	○	○	○	Superimposing not possible
	Call-overlap	○	○	○	○	
	Multi-overlap	○	○	○	○	
	Global overlap	○	○	○	○	
3 Switch	Switch	○	○	○	○	
	Scroll bar	○	○	○	○	
	Slider switch	○	○	○	○	
4 Lamp	Lamp	○	○	○	○	
5 Data Display	Numerical data display	○	○	○	○	
	Character display	○	○	○	○	
	Message display	○	○	○	○	
	Table data display	○	○	○	○	
6 Entry	Numerical data entry	○	○	○	○	
	Character input (including Japanese conversion function)	○	○	○	○	
7 Trends	Historical display	○	△	○	○	△: Storage device not usable
	Real time display	○	○	○	○	
8 Alarm	Historical display	○	△	○	○	△: Storage device not usable
	Real time display	○	○	○	○	
9 Graph	Bar graph	○	○	○	○	
	Pie graph	○	○	○	○	
	Closed area graph	○	○	○	○	
	Panel meter Numerical data display Alarm (Area color) Scale setting extended	○ △ △ △	○ △ △ △	○ △ △ △	○ △ △ △	△: Landscape orientation only △: Landscape orientation only △: 128 colors, landscape orientation only
	Statistic bar graph	○	○	○	○	
	Statistic pie graph	○	○	○	○	
10 Time Display	Time display	○	○	○	○	
	Calendar	○	○	○	○	
11 Graphics	Graphics	○	○	○	○	
12 Message	Message mode	○	○	○	○	
	Displaying comments	○	○	○	○	
13 Others	Data block area	○	○	○	○	
	Memory card mode	○	△	○	○	△: Storage device not usable
	Memo pad	○	○	○	○	
14 Item Show/Hide Function	Item show/hide function	○	○	○	○	
15 Recipes	Recipe	○	×	○	○	
16 Print	Hard copy	○	△	○	○	△: Serial connection only
	Printing data sheets	○	△	○	○	
	Connecting to a Sato MR-400 barcode printer	○	△	○	○	
17 Barcode	Barcode (one-dimensional, two-dimensional)	○	△	○	○	△: Serial connection only

Functions Described in TS Reference Manual 2 (this manual)

○: Available △: Conditionally available ×: Not available

TS Reference Manual 2		TS2060i	TS2060	TS1100Si TS1070Si	TS1070S	Remarks
Chapter	Description					
1 Image Display	JPEG	△	×	△	△	△: 32k/64k colors only
	Network camera	△	×	△	×	
2 Operation Log	Operation log	○	×	○	○	
3 Security	Security	○	○	○	○	
4 Ethernet Communication Function	Screen data transfer	○	×	○	×	
	PLC communication	○	×	○	×	
	Transferring data between TS units (macro)	○	×	○	×	
	DLL communication	○	×	○	×	
	MES interface function	○	×	○	×	
	E-mail notification	○	×	○	×	
	FTP server	○	×	○	×	
	Remote desktop window display	△	×	△	×	△: 32k/64k colors, landscape orientation only
	Web server	○	×	○	×	
	VNC server	△	×	△	×	△: 32k/64k colors, landscape orientation only
5 Storage device	Storage device	○	×	○	○	
6 Language Changeover	Language selection	○	△	○	○	△: Storage device not usable
7 Tag	Tags	○	○	○	○	
8 Device Memory Map	Device Memory Map	○	○	○	○	
9 Ladder Transfer	Ladder transfer via USB	○	○	○	○	
	Ladder transfer via Ethernet	○	×	○	×	
	Serial ladder transfer	○	○	×	×	

System Setting

○: Available △: Conditionally available ×: Not available

Item		TS2060i	TS2060	TS1100Si TS1070Si	TS1070S	Remarks
Color	64K-Color w/o blinking 32K-Color 128-Color	○	○	○	○	
	256 colors w/o blinking Monochrome 16-grayscale Monochrome	○	○	×	×	
Font Type	Bitmap font	○	○	○	○	
	Stroke font	○	×	×	×	
	Gothic font	○	○	○	○	
	Windows font	○	○	○	○	
Hardware Settings	Ladder monitor	×	×	○	○	
Function Switches	Global function switches	○	○	△	△	△: When using soft function switches
	Local function switches	○	○	△	△	
TechnoShot Settings	VGA center display	×	×	○	○	

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.
	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 TS 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 TS 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.
- Equipment must be correctly mounted so that the main terminal of the TS will not be touched inadvertently. Otherwise, an accident or electric shock may occur.
- Tighten the mounting screws on the fixtures of the TS uniformly to the specified torque. Excessive tightening may deform 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 may result in fire or malfunction.
- Tighten the terminal screws on the power supply terminal block of the TS uniformly to the specified torque. Improper tightening of screws may result in fire, malfunction, or other serious trouble.
- The TS 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 TS 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, electric shock or a fire may occur.
- Do not use a positive ground for the 24-V power supply to the TS1000 Smart. If a positive ground is used and an external communication device such as a computer is connected, the 24-V power supply may short circuit and cause damage. If a positive ground is unavoidable, refer to "Positive Grounding" in the TS1000 Smart Hardware Specifications.
- Prevent any conductive particles from entering the TS. Failure to do so may lead to fire, damage, or malfunction.
- Do not attempt to repair the TS yourself. Contact Hakko Electronics or the designated contractor for repairs.

⚠ CAUTION

- Do not repair, disassemble, or modify the TS. 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 TS 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 TS, it must be treated as industrial waste.
- Before touching the TS, 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 of the TS2060 before use. Use with the protective sheet attached may result in incorrect recognition of touch operations.

[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 TS 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 TS 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 TS surface. Use commercially available alcohol.
- If a data receive error occurs when the TS 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 TS. 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 TS 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 TS 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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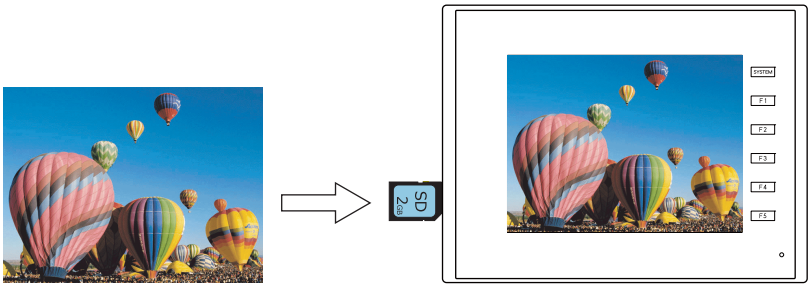
1 Image Display

1.1 JPEG Display

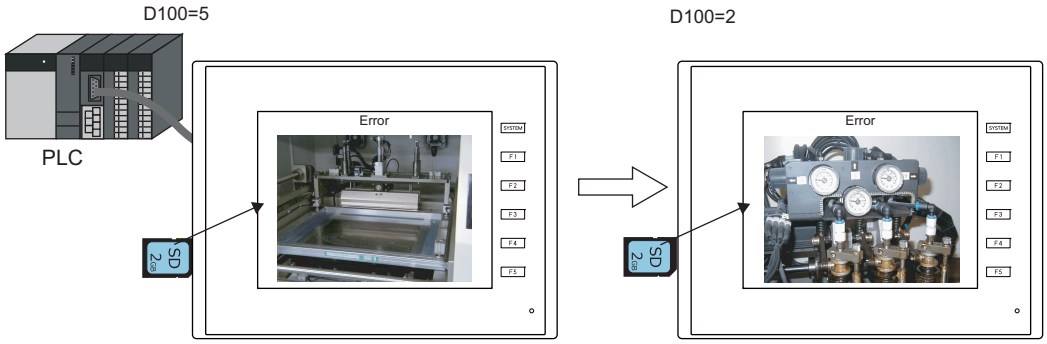
1.1.1 Overview

JPEG File Display

- Display JPEG files saved to a storage device.
- JPEG files with a resolution up to 1024 × 768 can be displayed.
  Note that when changing [Screen Size] for the display size setting using the [Scroll] function, the set resolution can also be displayed.

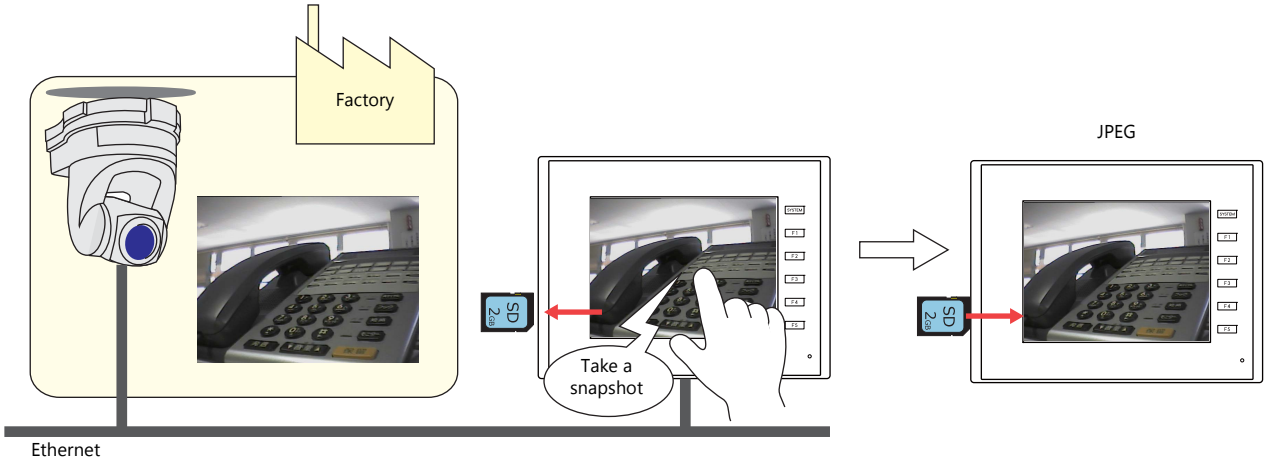


- There are three ways to load JPEG files.
  - Filename specification
  - File number specification (fixed)
  - File number specification (PLC device memory)



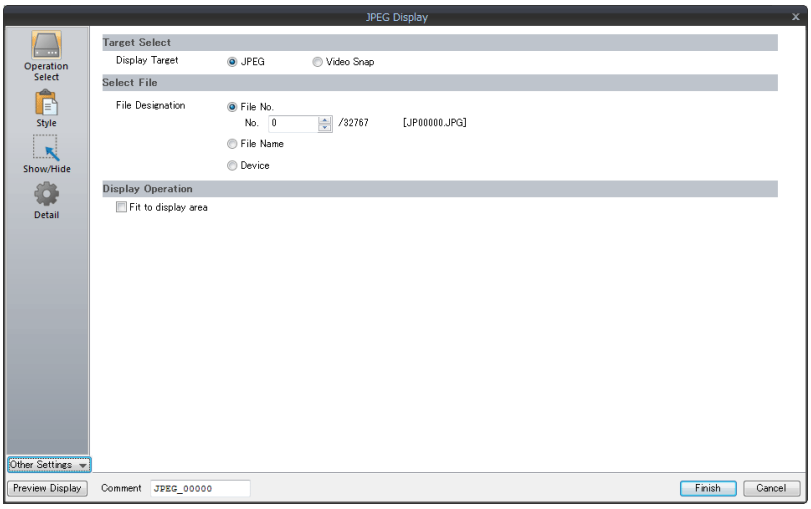
Network Camera Image Display

- Display network camera snapshot images saved to a storage device.
- Two methods of specifying a file number and designating a file number from the PLC are available.



1.1.2 Detailed Settings

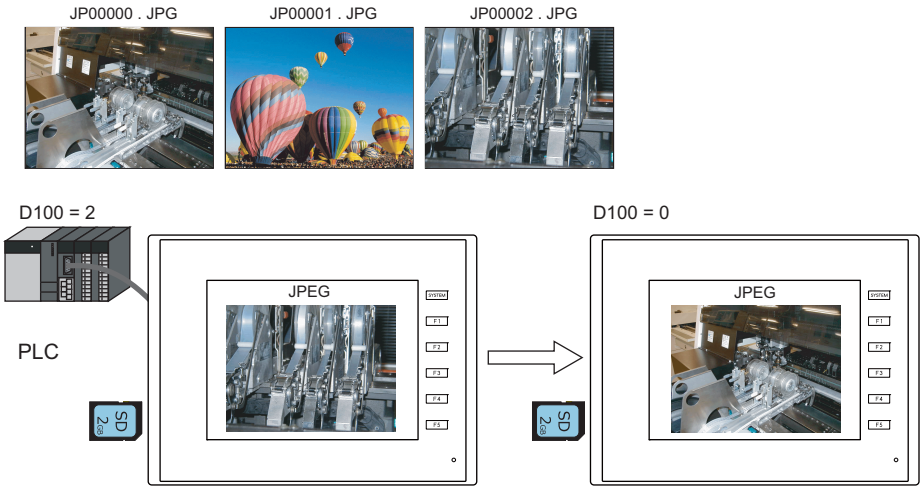
Operation Select



Item		Description
Target Select		Select a display target.
	JPEG	Display a JPEG file prepared in advance. Filename: JPxxxxx.jpg (xxxxx: 00000 to 32767) Any filename (maximum of 64 one-byte numerals or uppercase alphabetic characters)
	Video Snap	Display a video snapshot image. Filename: VDxxxxx.jpg (xxxxx: 00000 to 32767)
Select File		Select the file specification method.
	File No.	Specify the "xxxxx" part of "JPxxxxx.jpg" or "VDxxxxx.jpg" with a file number from 0 to 32767.
	File Name	Specify a filename. Maximum of 64 one-byte numerals or uppercase alphabetic characters
	Device *1	Set the device memory address that specifies the "xxxxx" part of "JPxxxxx.jpg" or "VDxxxxx.jpg" with a file number from 0 to 32767. This allows the JPEG file to be changed in RUN mode.
Display Operation	Fit to display area *2	Unselected: Actual size Selected: Automatically enlarge or reduce the display according to the size of the display area. The level of display detail can be specified at $s1008 when enlarging or reducing the display.

$s1008	Detail	Speed
0	Coarse	Fast
1	Fine	Slow

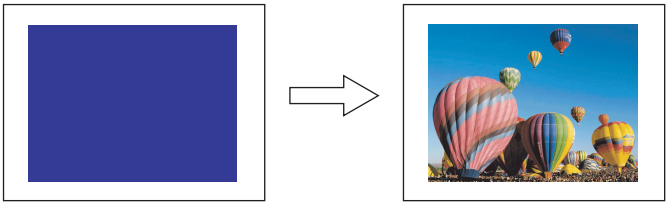
*1 Display example



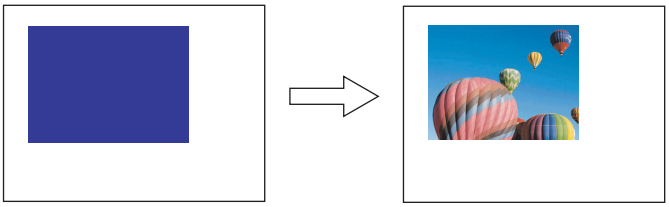
*2 Display example

- Checkbox: unselected
  The image is displayed at its original size with respect to the top left corner of the display area. If the JPEG image is larger than the display area, the part of the image outside the display area is not shown. Note that the color of the display area is visible when the JPEG image is smaller than the display area. It is recommended that users match the display area color with the background color of the image.

Same size

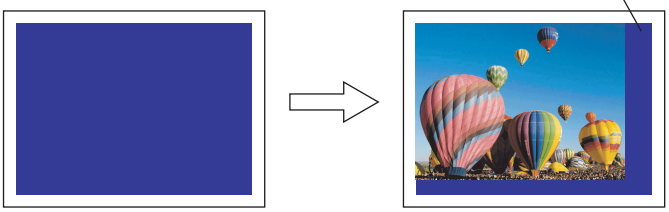


Size is smaller than the displayed image



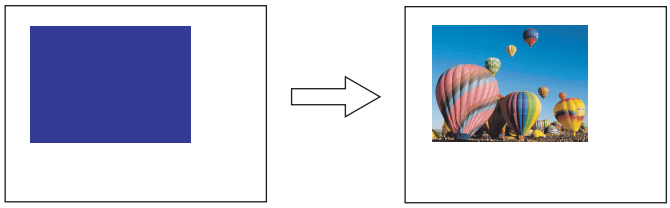
Size is larger than the displayed image

Use a color that matches the background color.

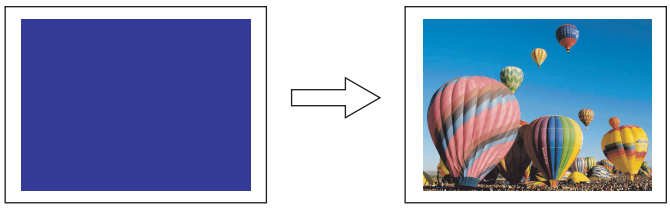


- Checkbox: selected
  The image is enlarged or reduced with respect to the top left corner of the display area. The image is enlarged or reduced using the same factor for width and length.

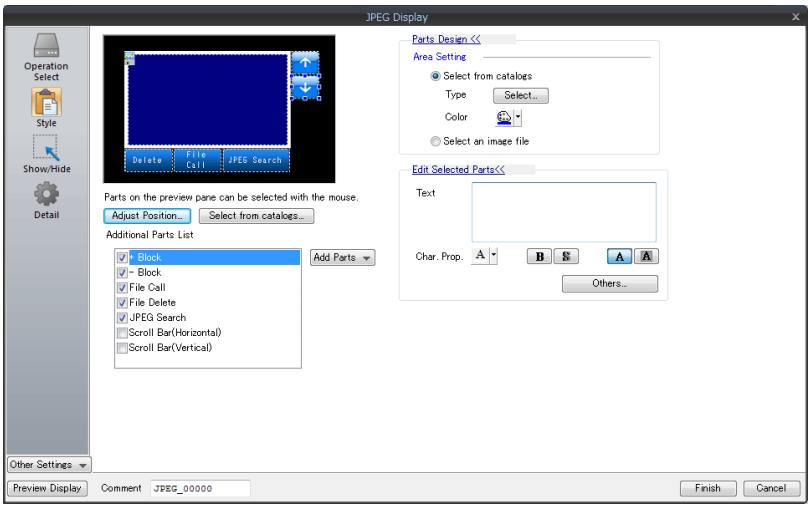
Reduction



Enlargement



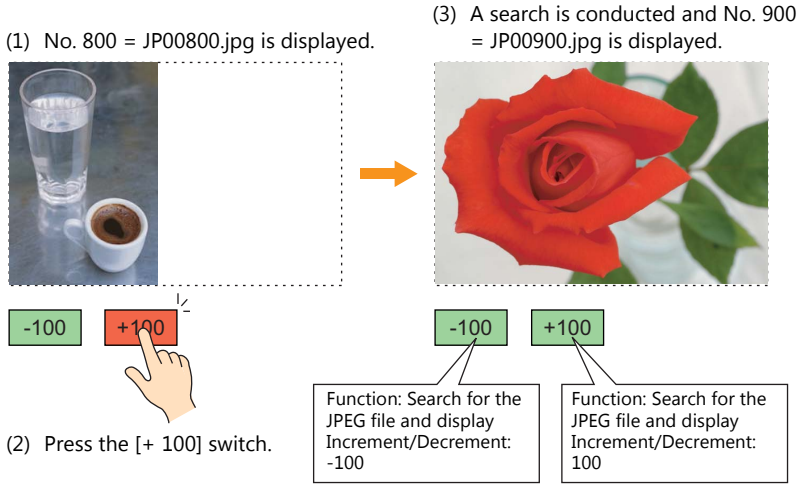
Style



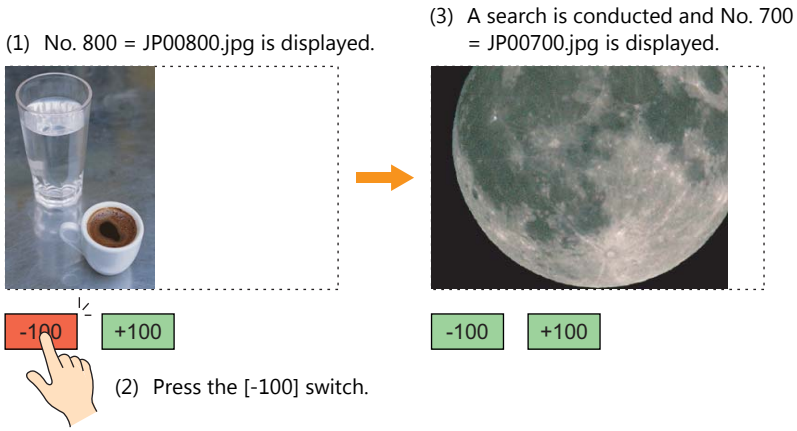
Item		Description	
Additional Parts List		Displays a list of JPEG display switches. Parts can be added to the list using the [Add Parts] button.	Target file
	+ Block	Display the JPEG file corresponding to the next file number.	JPxxxxx.jpg VDxxxxx.jpg
	– Block	Display the JPEG file corresponding to the previous file number.	
	File Call	Load the JPEG file corresponding to the specified file number.	
	File Delete	Delete the JPEG file that is currently displayed.	VDxxxxx.jpg
	JPEG Search	Set an increment or decrement value to use to search for and display a JPEG file *1.	JPxxxxx.jpg VDxxxxx.jpg
	Scroll Bar (Horizontal)	Scroll the displayed JPEG horizontally.	
	Scroll Bar (Vertical)	Scroll the displayed JPEG vertically.	
Adjust Position		Displays the window for adjusting the placement position of each part. The size of parts can also be changed.	
Select from catalogs		Set the part design from the catalog.	
Parts Design		Set the design and color of parts.	
Edit Selected Parts		Configure the part selected in the [Additional Parts List] or preview pane.	

*1 Display example

- When the [+100] switch is pressed while file No. 800 is displayed, a search is conducted for file No. 900 or later and the file is displayed. When a search has been conducted to No. 32767, it is continued moving back to No. 0.



- When the [–100] switch is pressed while file No. 800 is displayed, a search is conducted for file No. 700 or prior and the file is displayed. When a search has been conducted to No. 0, it is continued moving back to No. 32767.

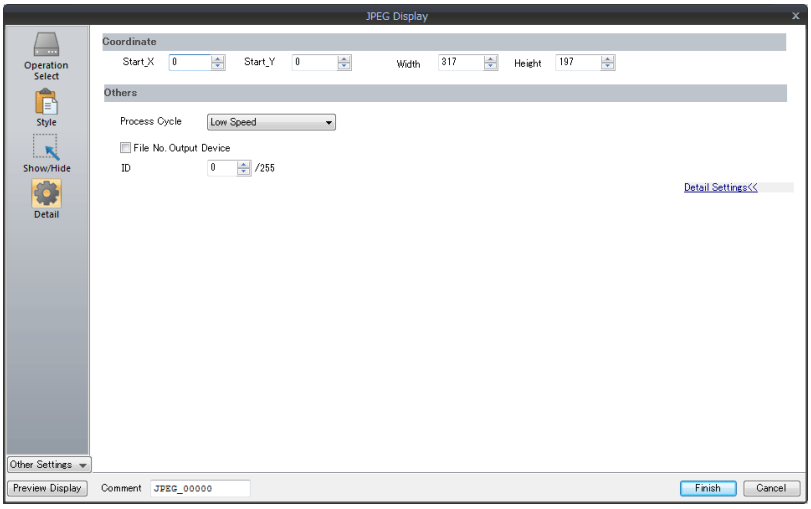


Show/Hide

Set the show and hide settings of graphic items.

☞ For details, refer to “14 Item Shown/Hide Function” in the TS Reference Manual 1.

Detail



Item		Description
Coordinate	Start X/Start Y	Set the placement position and size of the display area.
	Width/Height	
Others	Process Cycle	Set the cycle for the TS to read PLC data.
	File No. Output Device	Output the file number of the currently displayed image.
	ID	Set an ID number.

1.1.3 JPEG File Location

The JPEG display function loads and displays the files in the following location.

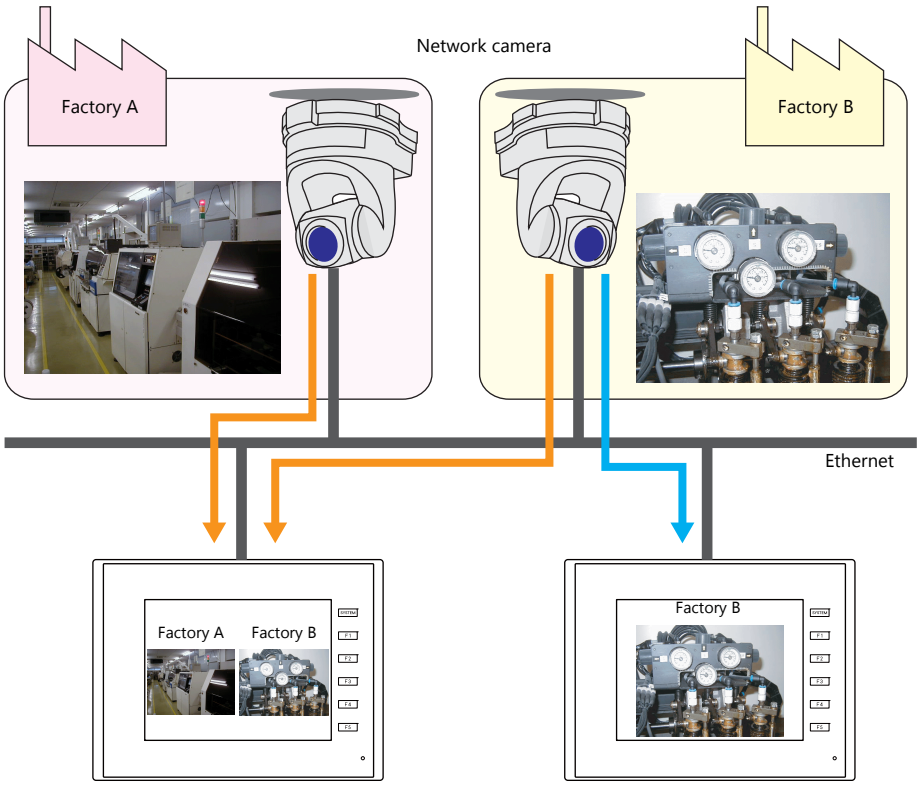
Display Target	Filenames	File Location
JPEG	JPxxxxx.jpg (xxxxx: 00000 - 32767) xxxxxxx.jpg (maximum of 64 one-byte numerals or uppercase alphabetic characters)	(access folder)\JPEG folder
Video Snap	VDxxxxx.jpg (xxxxx: 00000 - 32767)	(access folder)\SNAP folder

1.2 Network Camera

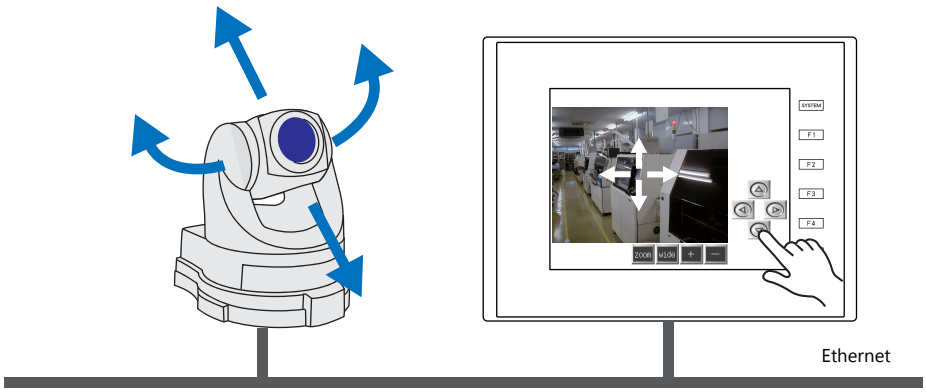
1.2.1 Overview

- Images from network cameras can be displayed on the TSi unit. Only the TSi unit supports this function because cameras are connected using an Ethernet connection.

Example: Monitoring the conditions in the factory

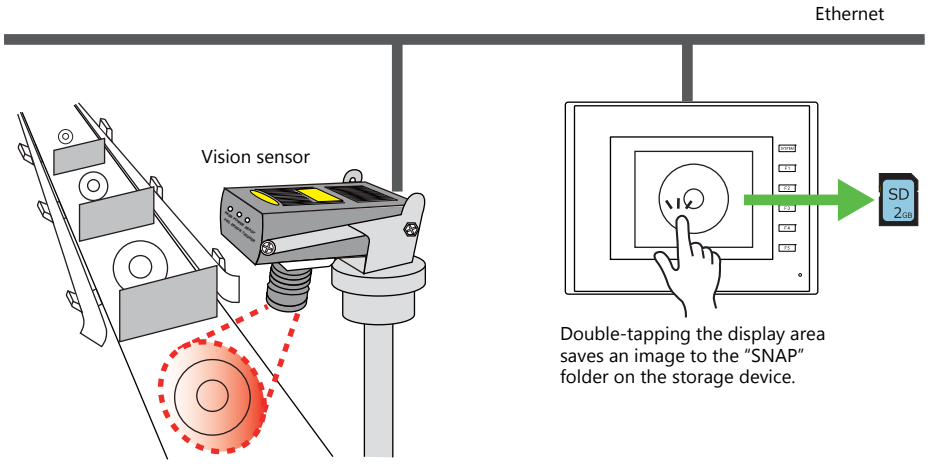


- Camera operation
  Using a command device memory or an operation switch on the screen allows network cameras to be easily controlled from a remote location.



Note that some network cameras cannot be controlled remotely. See the specifications of your network camera.

- Snapshot function
  The currently displayed image can be saved to a storage device as a JPEG file when the bit of a command device memory changes to ON or by double-tapping the display area.



1.2.2 System Requirements

Applicable Models

MONITOUCH Models	Connection Port	Remarks
TS2060i TS1100Si TS1070Si	LAN (built-in)	Not available with CUR-03

Available Network Cameras or Sensors

Manufacturer		Type	Protocol
Axis		MOTION-JPEG (video)	HTTP protocol communication (TCP/IP)
Panasonic	BB series BL series		
BANNER	PresencePLUS P4 OMNI	Bitmap (still image) *1	Dedicated protocol

*1 No image is displayed upon initial connection.
To display an image, sensor memory PI10000-00 (Trigger) must be change from "0" to "1" (leading edge). When accessing sensor memory from the TSi unit, select [System Setting] → [Hardware Setting] → [Maker: BANNER].

1.2.3 Required Settings

V-SFT Settings

- Settings in network camera display items → "1.2.4 Detailed Settings" page 1-9

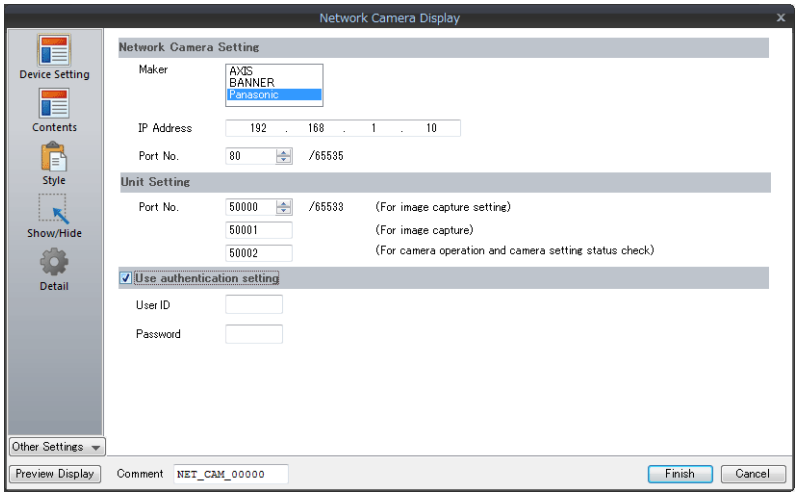
Network Camera Settings

- AXIS models → "1.2.5 AXIS Settings (Example: AXIS 214PTZ)" page 1-13
- Panasonic models → "1.2.6 Panasonic (Example: BB-HCM580)" page 1-18
- BANNER models → "1.2.7 BANNER (Example: PresencePLUS P4 OMNI)" page 1-28

1.2.4 Detailed Settings

Device Setting

Manufacturer: AXIS and Panasonic

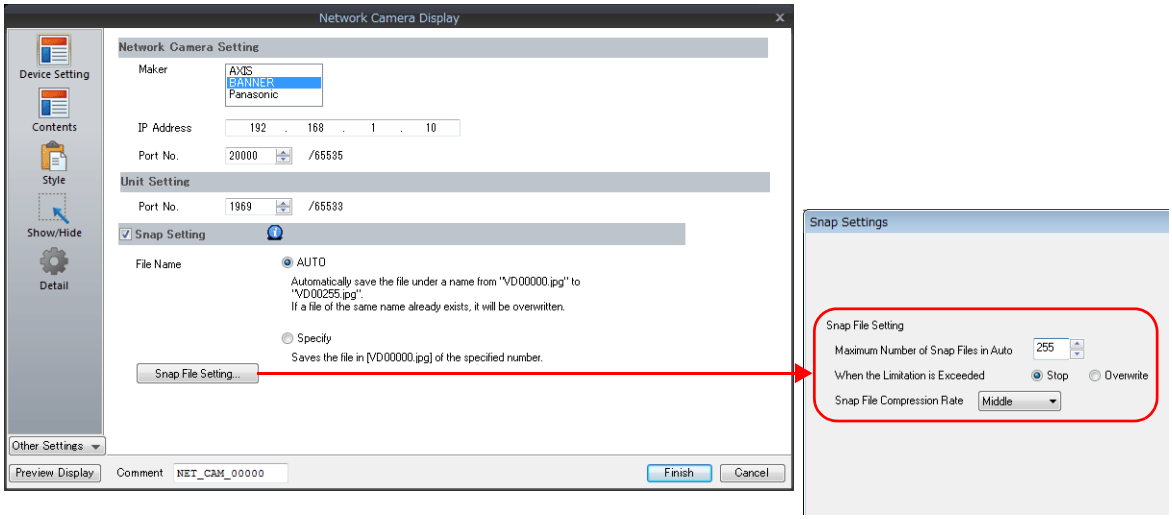


Item		Description
Network Camera Setting		Configure the settings of a network camera.
	Maker	Select the manufacturer of the network camera. AXIS, Panasonic
	IP Address *1	Specify the IP address of the network camera.
	Port No. (Panasonic only)	Specify the port number of the network camera. 1 to 65535 (default: 80)
Unit Setting		Configure the settings of the TSi unit.
	Port No.	Specify the port number of the TSi unit. The three consecutive port numbers from the specified port number are used. 1024 to 65535 (default: 50000 to 50002)
Use authentication setting		Select this checkbox to use basic authentication for the network camera. This enables user ID and password settings. For details, refer to your network camera settings.
	User ID Password	Enter the user name and password registered in the network camera settings. For details, refer to your network camera settings.

*1 For details on setting IP addresses, refer to the user's manual of the network camera.

Manufacturer	Model	Remarks
Axis	214PTZ	Use AXIS's dedicated tool when changing the default IP address. Default: 192.168.0.90
Panasonic	BB-HCM580	Use the CD-ROM provided with the network camera when changing the default IP address. Default: Automatic setup

BANNER



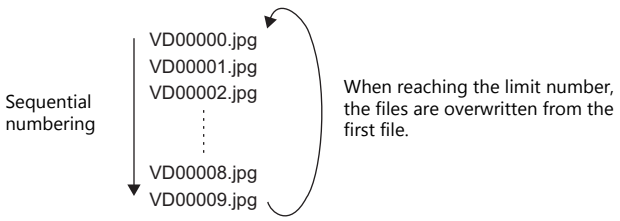
Item		Description
Network Camera Setting		Configure the settings of a network camera.
	Maker	Select the manufacturer of the network camera. BANNER
	IP Address *1	Specify the IP address of the network camera.
	Port No.	Specify the port number of the network camera. 20000 to 20009 (default: 20000)
Unit Setting		Configure the settings of the TSi unit.
	Port No.	Specify the port number of the TSi unit. Fixed to "1969"
Snap Setting *2 *3		Save the displayed image as a JPEG file by double-tapping on the display area. Save location: (storage device)\DAT0000\SNAP
	File Name	Set the filename to use when saving a snapshot. AUTO (1 to 255): Save using sequential numbers from "VD00000.jpg". Set the action to perform when the maximum number of snapshots is reached using [Snap File Setting]. Specify (0 to 32767): Save using the specified file number. If the specified file already exists, it is overwritten.
	Snap File Setting	Configure snapshot file settings.

*1 For details on setting IP addresses, refer to the user's manual of the network camera.

Manufacturer	Model	Remarks
BANNER	PresencePLUS P4 OMNI	Use the CD-ROM provided with the network camera when changing the default IP address. Default: Automatic setup

*2 Setting Examples

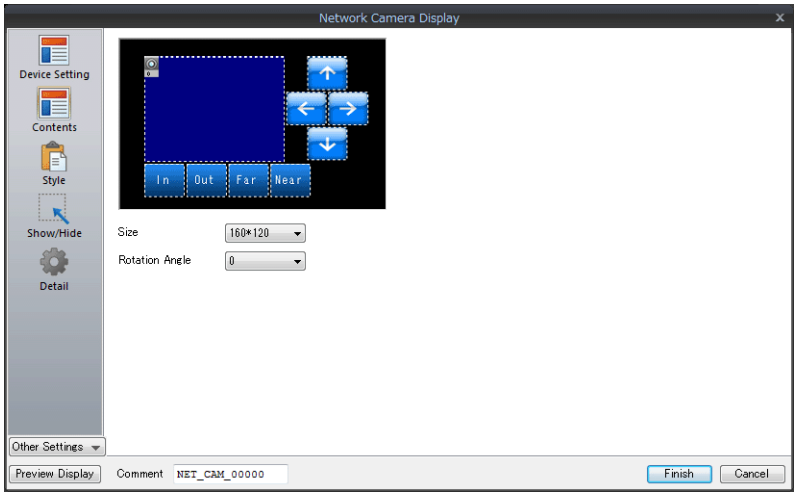
- When [Snap file naming] is "AUTO", [Maximum Number of Saves] is "10", and [Action when Limitation is Exceeded] is "Overwrite" Snapshot files ranging from "VD00000.jpg" to "VD00009.jpg" are created in sequence. When the file "VD00009.jpg" is created, the previous files will be overwritten from "VD00000.jpg".



- When [File Name] is "Specify" and [File No.] is "30"
  The file "VD00030.jpg" is created and always overwritten.

*3 When screen data contains both [AUTO] and [Specify] selected for [Snap file naming], enter a value for [Specify] in the 255 to 32767 range so that files created according to [AUTO] do not overwrite the file created according to [Specify]. When [AUTO] is selected, the file number saved last is stored in system memory address $s932.

Contents

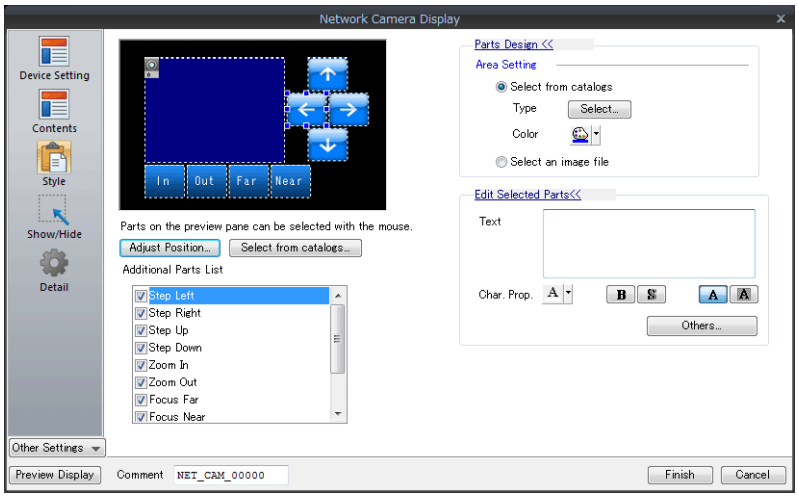


Item	Description
Size *1	Set the size of the display area. 160 * 120, 192 * 144, 320 * 240, 640 * 480
Rotation Angle *2	Set the rotation angle of the image output from the network camera. Select an angle appropriate for the mounting orientation of the network camera. 0, 90, 180, 270

*1 AXIS, BANNER: Cannot set to 192 * 144

*2 Panasonic, BANNER: Cannot set to 90, 270

Style



Item		Description
Additional Parts List		Select an operation switch. *1 *2
	Step Left	Pan the camera left.
	Step Right	Pan the camera right.
	Step Up	Tilt the camera up.
	Step Down	Tilt the camera down.
	Zoom In	Zoom in on the camera image.
	Zoom Out	Zoom out of the camera image.
	Focus Far	Focus the camera on a distant point.
	Focus Near	Focus the camera on a nearby point.
	Pause	Pause video display.
	Restart	Resume video display.
Parts Design		Set the design and color of parts.
Edit Selected Parts		Configure the part selected in the [Additional Parts List] or preview pane.
Adjust Position		Displays the window for adjusting the placement position of each part. The size of parts can also be changed.

*1 Note that some network cameras cannot be controlled remotely. See your network camera specifications. (No BANNER products support these functions.)

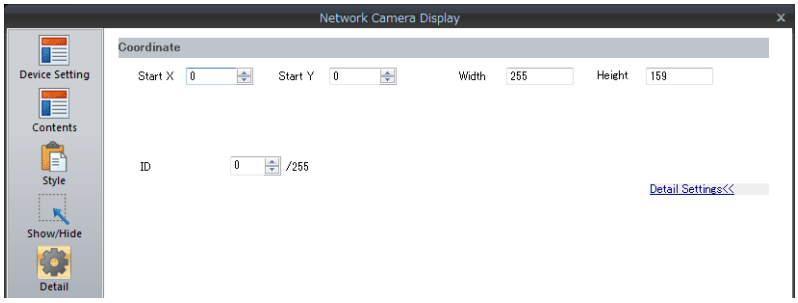
*2 If the [Delay] → [ON repeat] setting is configured in the switch settings window, the function performed by the switch is repeated while the switch is held down.

Show/Hide

Set the show and hide settings of JPEG display items.

☞ Refer to "14 Item Shown/Hide Function" in the TS Reference Manual 1.

Detail



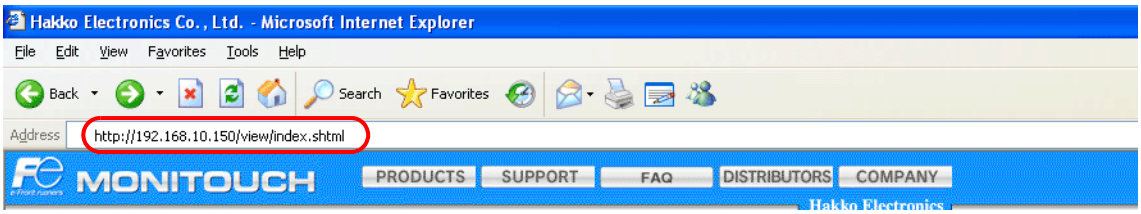
Item		Description
Coordinate	Start X/Start Y	Specify the coordinates of the display area.
ID		Set an ID number.

1.2.5 AXIS Settings (Example: AXIS 214PTZ)

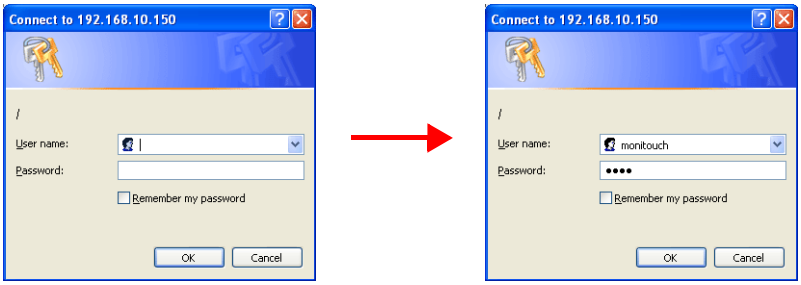
Access from the Computer

1. Start up Microsoft Internet Explorer on your computer.
2. Enter the IP address of the network camera in the address field.

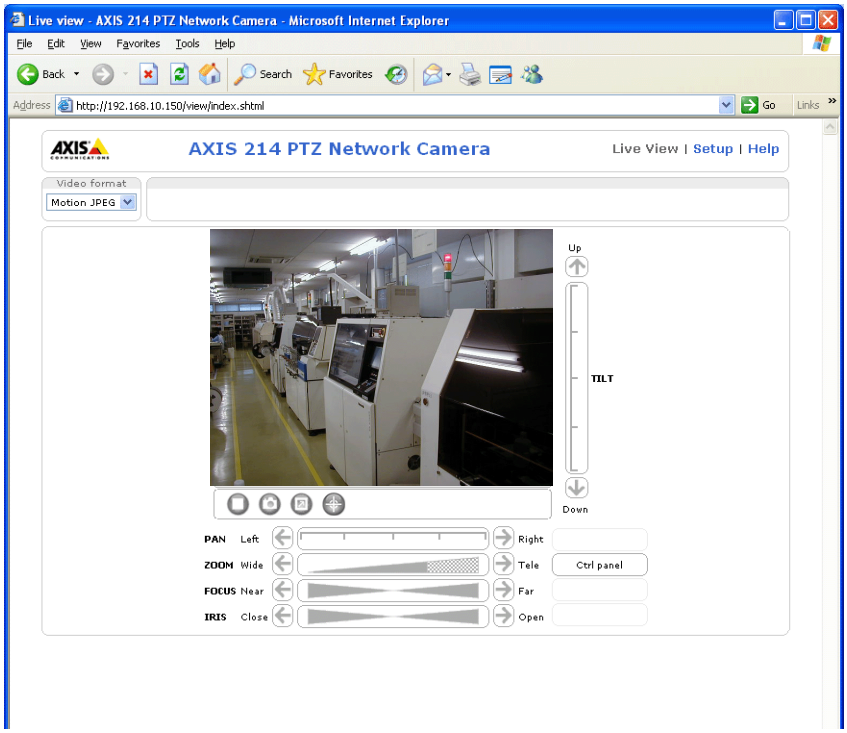
http://xxx.xxx.xxx.xxx
Network camera IP address



3. The following dialog is displayed when using basic authentication. Enter a registered user name and password, and click the [OK] button.
   If basic authentication is not used, proceed to step 4.
   For details on basic authentication, refer to page 1-15.



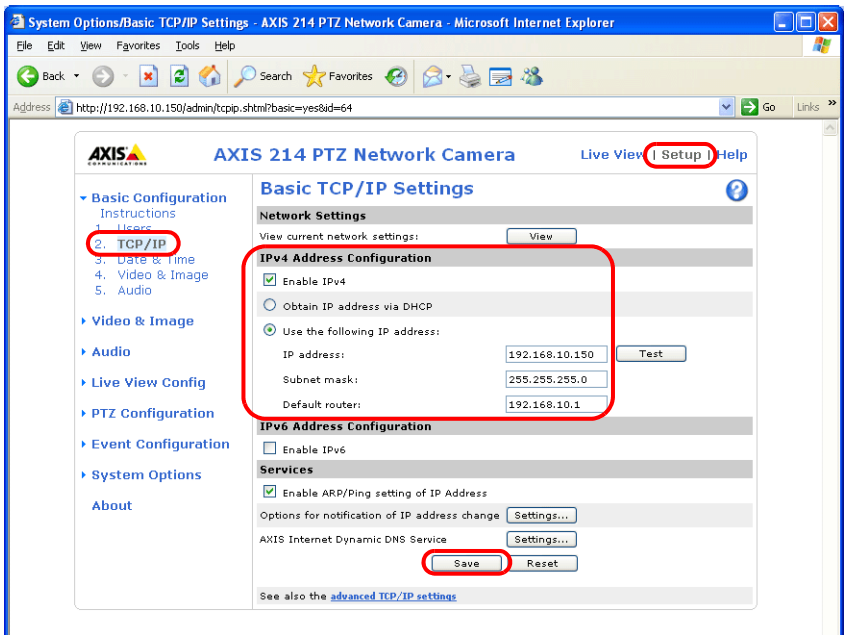
4. The [Live view] window is displayed.



Network Camera Settings

Checking and changing the IP address

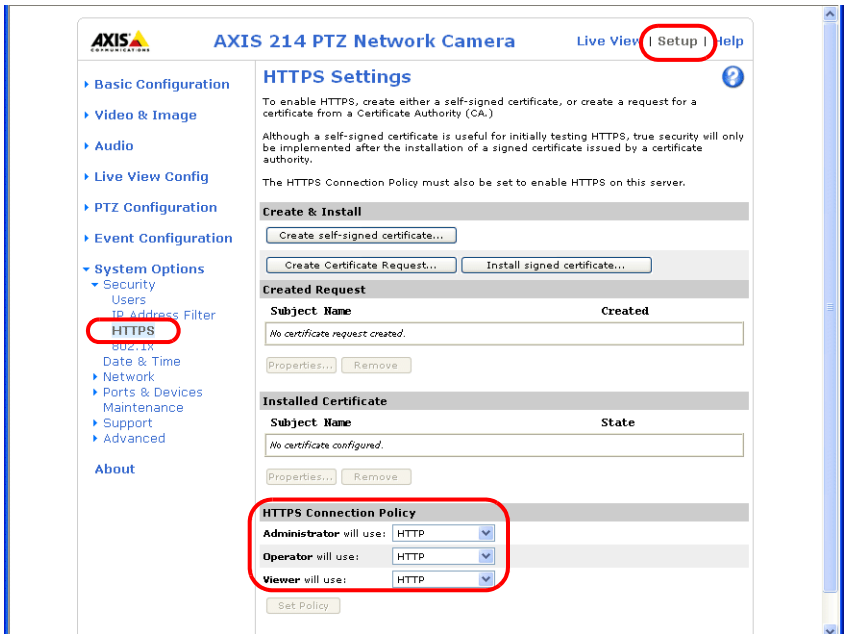
1. Display the [Setup] window.
   * If basic authentication is not used, pressing the [Setup] button displays the dialog box shown in step 3 of "Access from the Computer" page 1-13. Enter a user name and password.
2. On the menu on the left of the screen, click [Basic Configuration Instructions] → [2. TCP/IP].
3. Check and change the network camera IP address, subnet mask, and gateway settings as required.



4. Click the [Save] button to save any changes.

HTTP settings

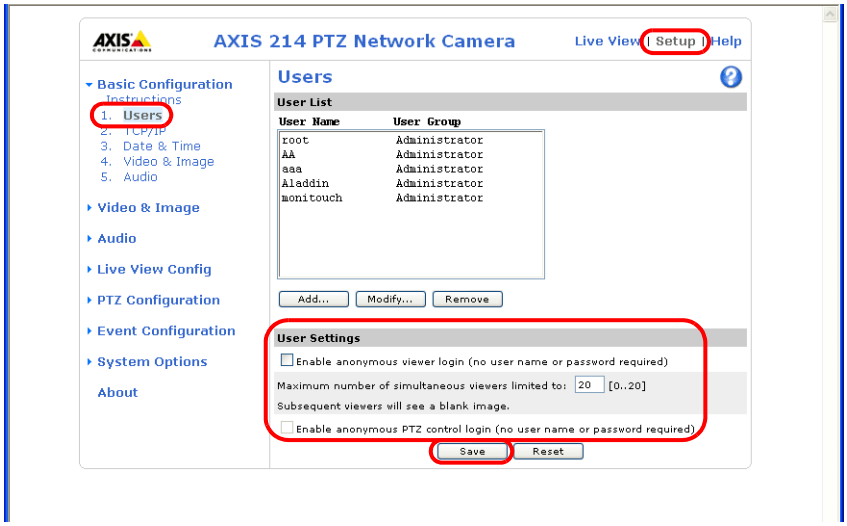
1. Display the [Setup] window.
   * If basic authentication is not used, pressing the [Setup] button displays the dialog box shown in step 3 of "Access from the Computer" page 1-13. Enter a user name and password.
2. On the menu on the left of the screen, click [System Options] → [Security] → [HTTPS].
3. Select "HTTP" for the options under [HTTPS Connection Policy]. ("HTTP" is selected as default.)



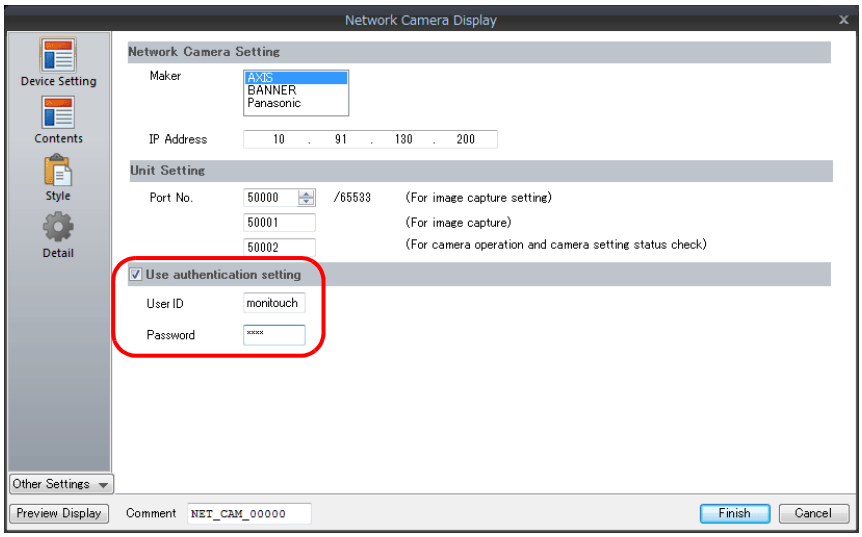
Basic authentication settings

Basic authentication is provided to permit or prohibit access from guest users.
Use basic authentication to prohibit access from guest users.

1. Display the [Setup] window.
   * If basic authentication is not used, pressing the [Setup] button displays the dialog box shown in step 3 of "Access from the Computer" page 1-13. Enter a user name and password.
2. On the menu on the left of the screen, click [Basic Configuration Instructions] → [Users].
3. If the checkmarks are not selected for the options under [User Settings], basic authentication is required for the network camera.



   * When using basic authentication, make the following settings in the V-SFT software. As shown below, select the [Use authentication setting] checkbox and enter a registered user ID and password in the [Network Camera Display] window. For details on registered user names and passwords, refer to "Checking and registering user names and passwords" page 1-16.

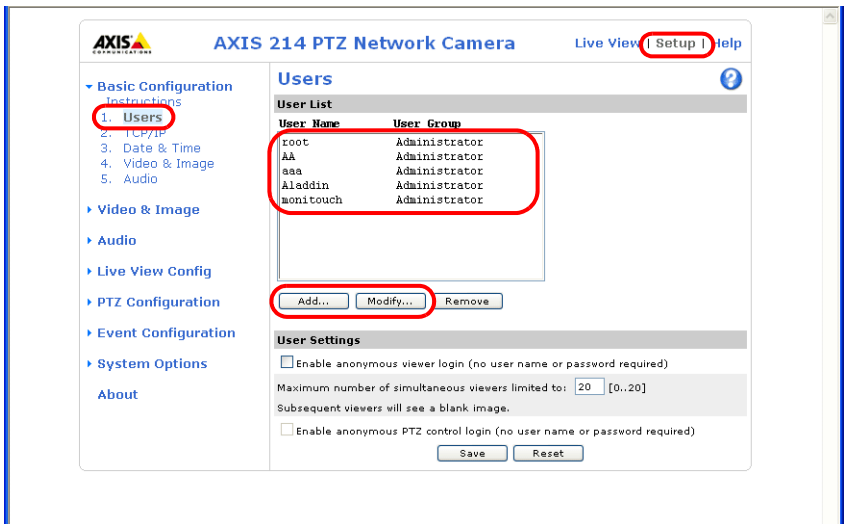


4. If basic authentication is not necessary, select the [Enable anonymous viewer login (no user name or password required)] checkbox under [User Settings] and click the [Save] button.
   * When performing camera lens operations from the TSi unit or PLC, select the [Enable anonymous PTZ control login (no user name or password required)] checkbox and click the [Save] button. For details, refer to "Operating the Camera Lens from the TSi Unit" page 1-17.

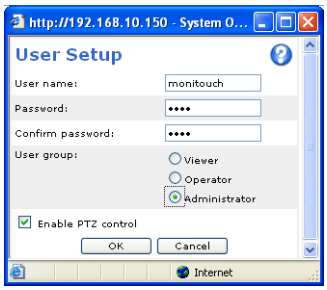
Checking and registering user names and passwords

1. Display the [Setup] window.
   * If basic authentication is not used, pressing the [Setup] button displays the dialog box shown in step 3 of "Access from the Computer" page 1-18. Enter a user name and password.

2. On the menu on the left of the screen, click [Basic Configuration Instructions] → [Users].
3. If users have been registered, they are displayed under [User List].
4. To add a new user, click the [Add...] button. To modify an existing user, click the [Modify...] button.



5. The [User Setup] window is displayed.
   Enter the desired name for [User name] and enter the same password for [Password] and [Confirm password].



Check [Administrator] for [User group].

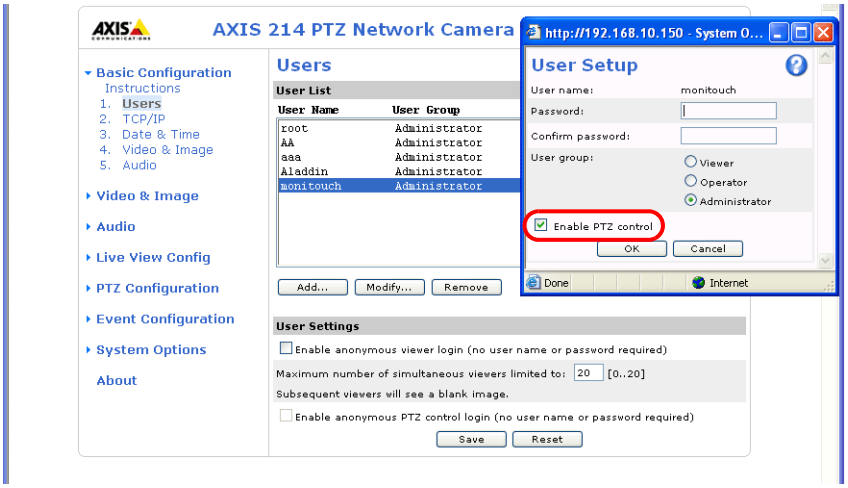
6. Click [OK] to accept the settings.

Operating the Camera Lens from the TSi Unit

The camera lens can be operated using switches and command device memory addresses on the TSi unit.

With basic authentication

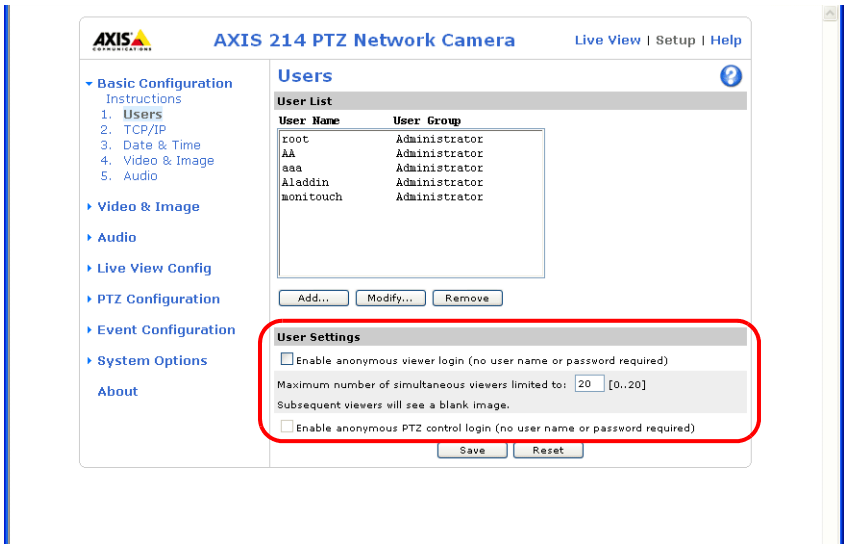
Display the [User Setup] window* and select the [Enable PTZ control] checkbox.



* For details on how to display the [User Setup] window, refer to "Checking and registering user names and passwords" page 1-16.

Without basic authentication

Display the [Users] window*. Select both checkboxes under [User Settings] and click the [Save] button.



* For details on how to display the [Users] window, refer to "Basic authentication settings" page 1-15.

1.2.6 Panasonic (Example: BB-HCM580)

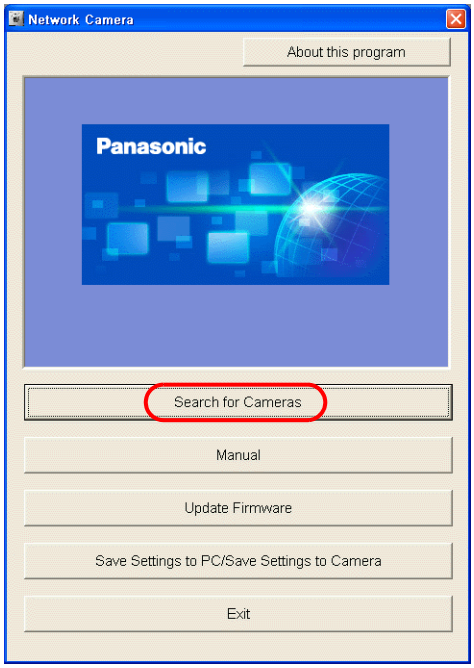
Access from the Computer

This network camera can be accessed from a computer using the CD-ROM included with the network camera or via a web browser.

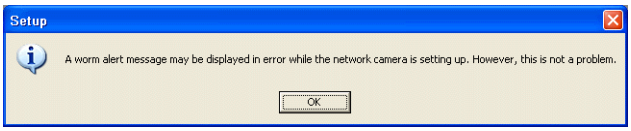
* Select the method using the CD-ROM when setting up the network camera for the first time.

CD-ROM

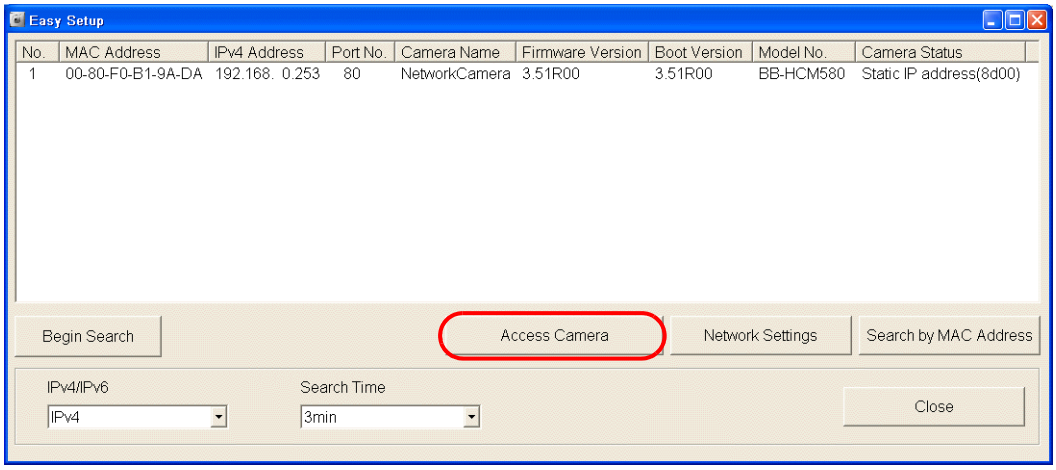
1. Load the CD-ROM included with the network camera into your computer.
2. The [Network Camera] window is displayed. Click [Search for Cameras] to search for the network camera connected to the computer.



3. If the following message appears, click [OK].



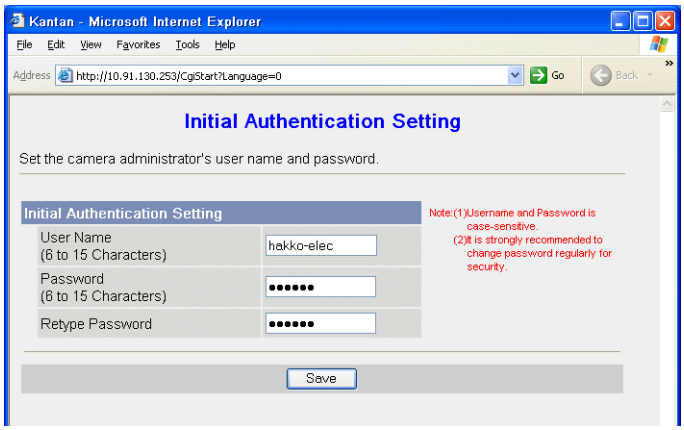
4. When the target network camera is found, information regarding the network camera, such as MAC address and IP address, is displayed in the [Easy Setup] window. Click [Access Camera] *.



* If the IP address of the network camera does not exist in the network group of the computer, click the [Network Settings] button. In the window to be displayed, change the IP address of the network camera so that it belongs to the network group of the computer.

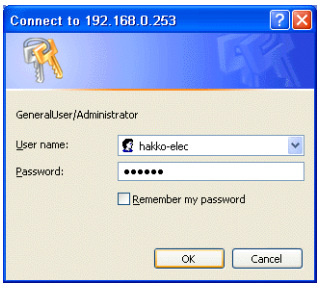
5. When connecting a factory-default network camera to your computer, the [Initial Authentication Setting] screen appears. Register a user name and password for the administrator. (If a user is already registered, proceed to step 6.)
For details, refer to the user's manual of the network camera.

The password registered in this step is required for access to the network camera.
Take appropriate measures to avoid forgetting the password.

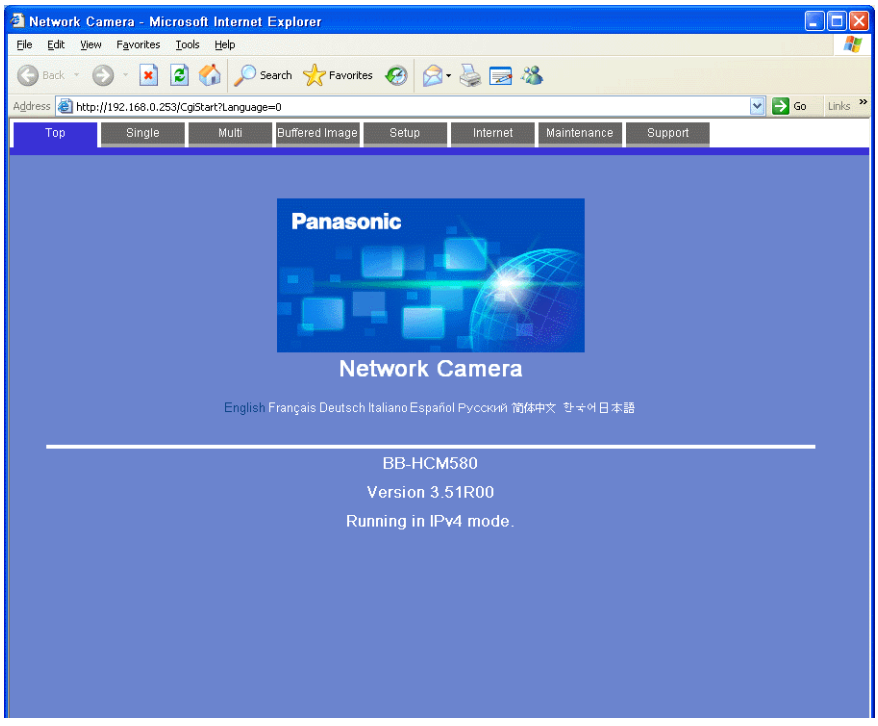


6. The authentication dialog box is displayed. Enter an administrator-level user name and password and click [OK].

* When [Permit access from guest users] is checked on the [Administrator] page, the [Top] tab window is displayed. Click the [Login] tab. For details, refer to "Authentication settings" page 1-22.



7. The [Top] tab window is displayed.
(This tab window is displayed when login authentication is performed with an administrator-level user name and password. When a general or guest user logs in, the menus in the displayed tab window vary slightly.)

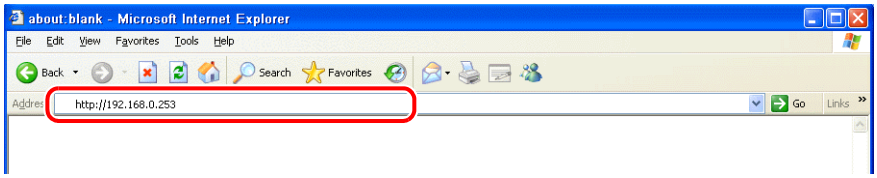


Web browser (Microsoft Internet Explorer)

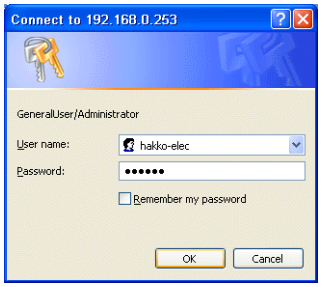
1. Start up Microsoft Internet Explorer on your computer.
2. Enter the IP address and port number of the network camera in the address field.
   * When using the factory-default port number of 80, the entry of the port number may be omitted.

http://**xxx.xxx.xxx.xxx**:Port number/

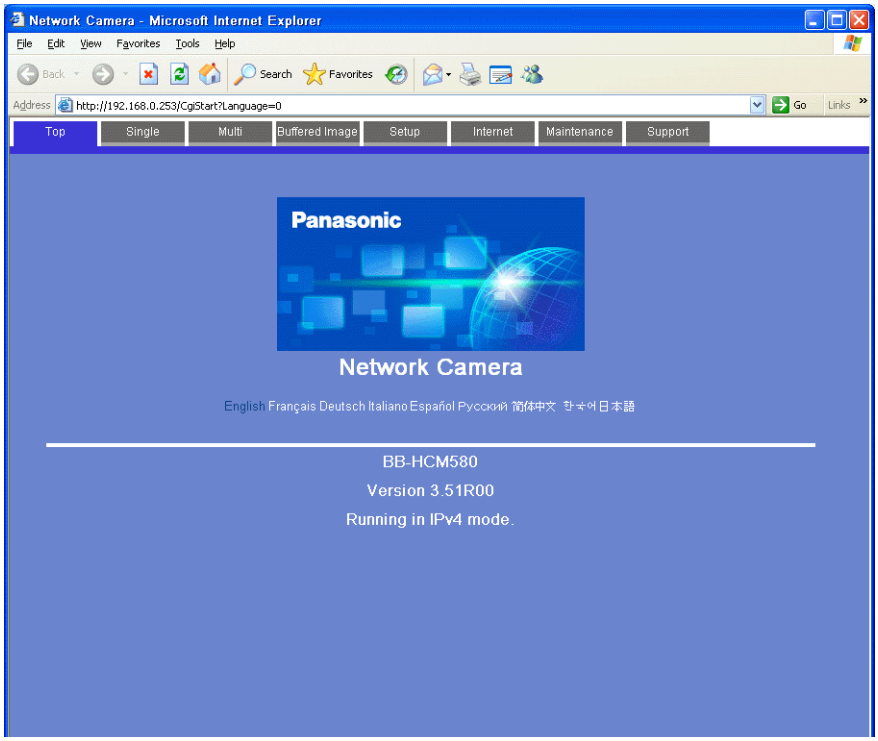
Network camera IP address



3. The authentication dialog box is displayed. Enter an administrator-level user name and password and click [OK].
   * When [Permit access from guest users] is checked on the [Administrator] page, the [Top] tab window is displayed. Click the [Login] tab. For details, refer to "Authentication settings" page 1-22.



4. The [Top] tab window is displayed.
   (This tab window is displayed when login authentication is performed with an administrator-level user name and password. When a general or guest user logs in, the menus in the displayed tab window vary slightly.)

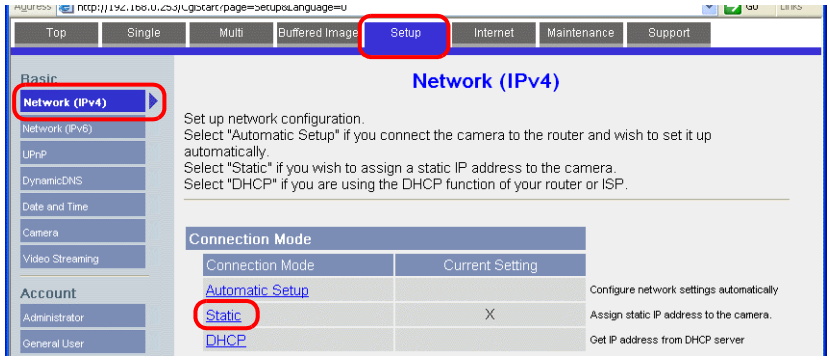


Network Camera Settings

Checking and changing the IP address

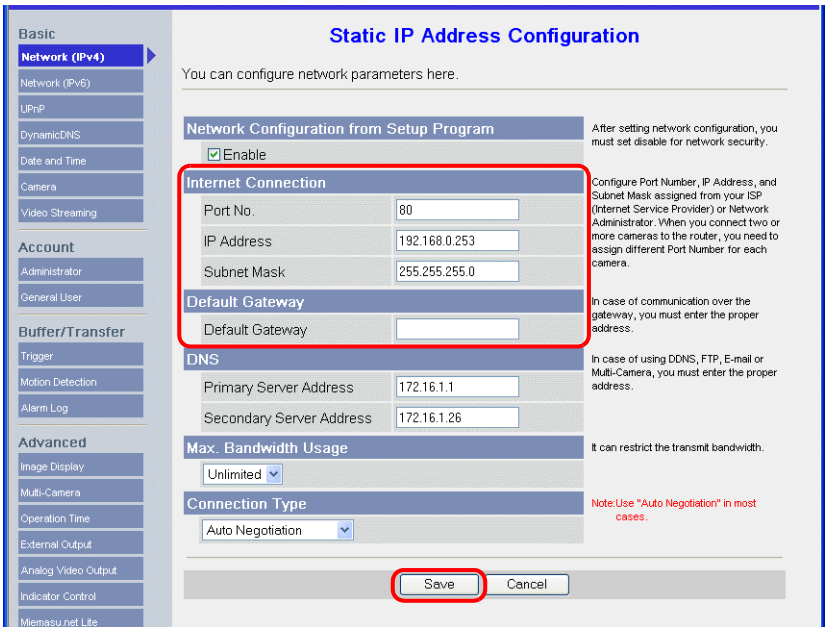
*** Login with an administrator-level user name and password is required to proceed to the following tab window settings.**

1. Click the [Setup] tab.
2. Check that [Network (IPv4)] is selected in the [Basic] menu at the left of the window. Next, go to the [Connection Mode] area and click [Static].

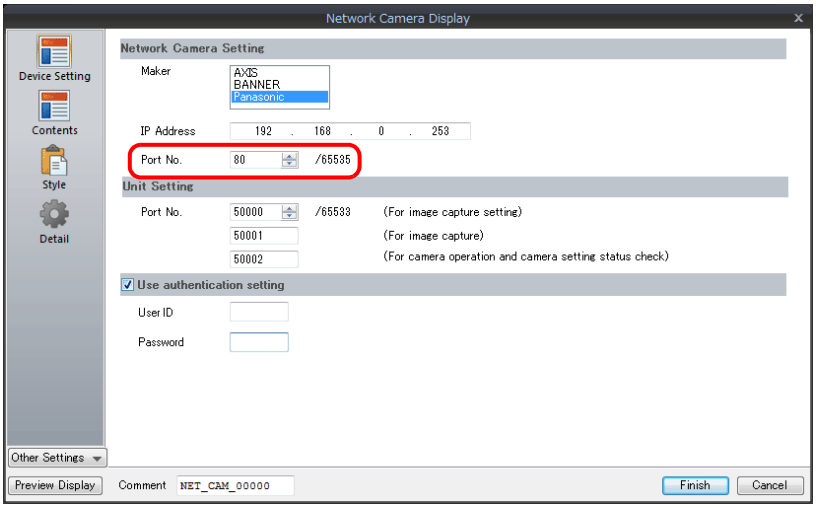


3. Configure the network camera port number*, IP address, subnet mask, and gateway settings.

*** The default port number is 80. Enter a port number between 1 and 65535.**

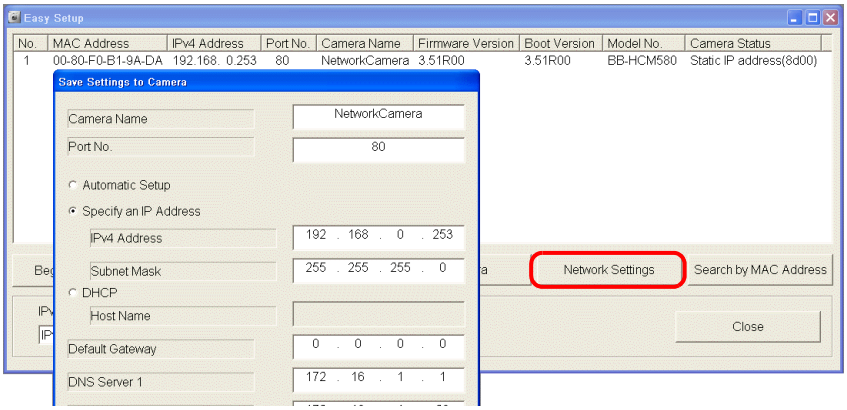


* Also enter the port number for [Port No.] in the [Network Camera Display] window in V-SFT. Refer to page 1-9.



4. Click [Save] to save the settings made in the previous steps.

The IP address can be checked or changed using the CD-ROM included with network camera or via the [Network Settings] button in the [Easy Setup] window.

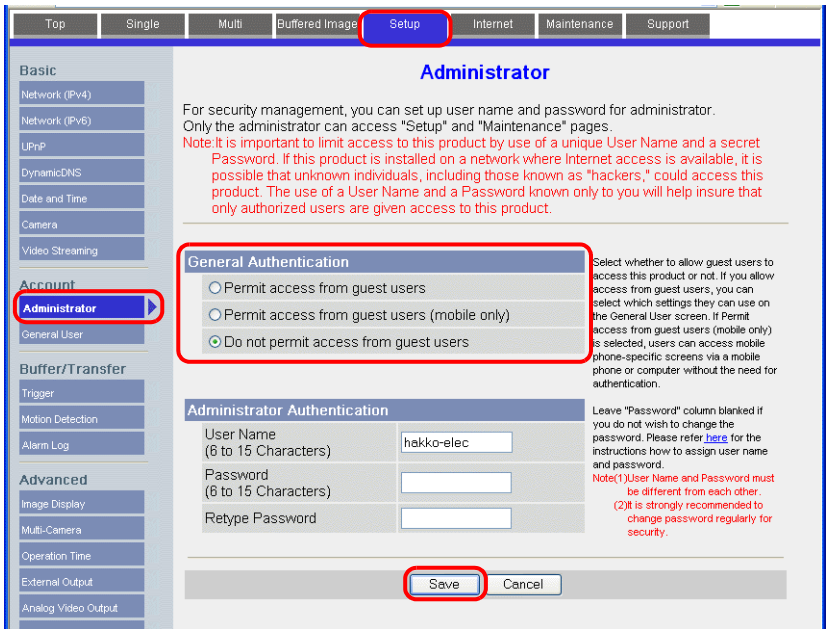


Authentication settings

Authentication settings are provided to permit or prohibit access from guest users.
These settings disallow access to guest users.

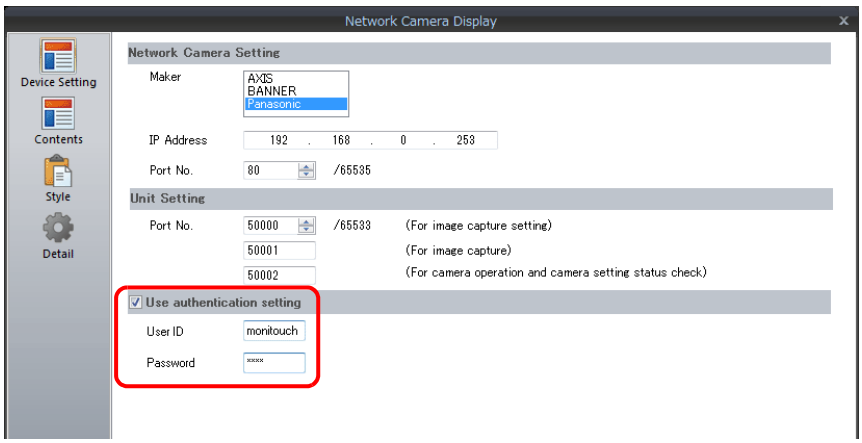
*** Login with an administrator-level user name and password is required to proceed to the following tab window settings.**

1. Click the [Setup] tab.
2. Click [Administrator] at the left of the screen.
3. In the [General Authentication] area, select either [Permit access from guest users] or [Do not permit access from guest users].



Permit access from guest users	This option allows anyone to access the network camera without a registered user name and password.
Do not permit access from guest users	Whenever access to the network camera is attempted, the authentication dialog box appears. Access is granted to the network camera by entering a registered user name and password.

* When the [Do not permit access from guest users] checkbox is selected, configure the following settings in the V-SFT software. As shown below, select the [Use authentication setting] checkbox and enter a registered user ID and password in the [Network Camera Display] window. For details on registered user names and passwords, refer to "Checking and Registering User Names and Passwords" page 1-26".



4. Click [Save] to save the settings made in the previous steps.

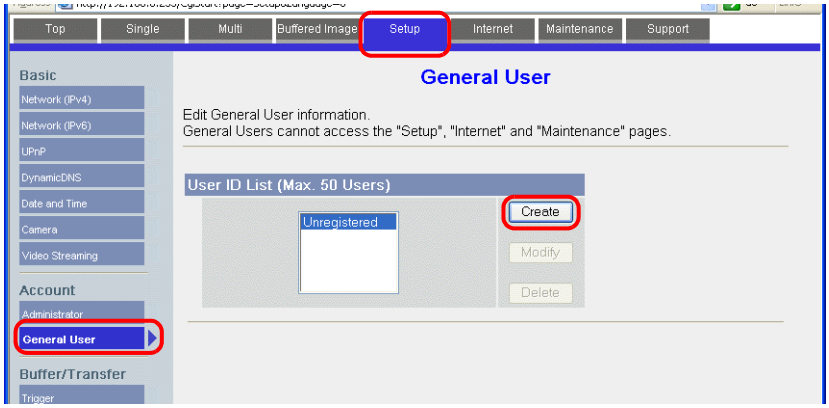
Registering and changing the settings of general users

When users other than the administrator need access to the network camera, general user registration is required.

*** Login with an administrator-level user name and password is required to proceed to the following tab window settings.**

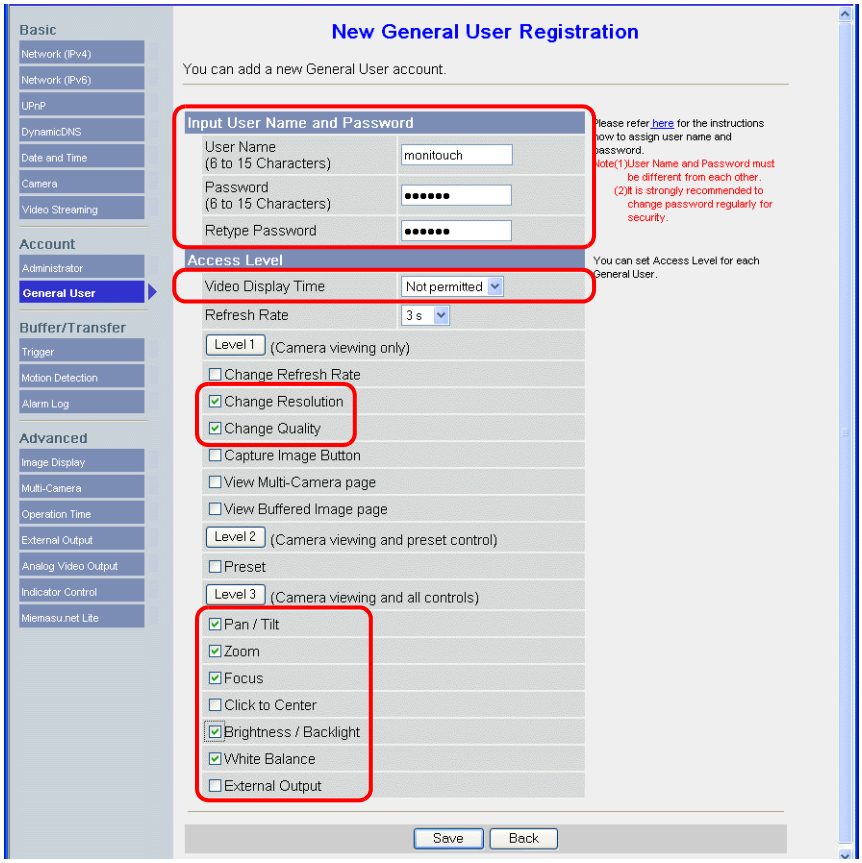
New general user registration

1. Click the [Setup] tab.
2. Click [General User] on the left of the screen.
3. Click [Create].



4. The [New General User Registration] page is displayed. Configure the settings as specified below.

The password registered in this step is required for access to the network camera.
Take appropriate measures to avoid forgetting the password.

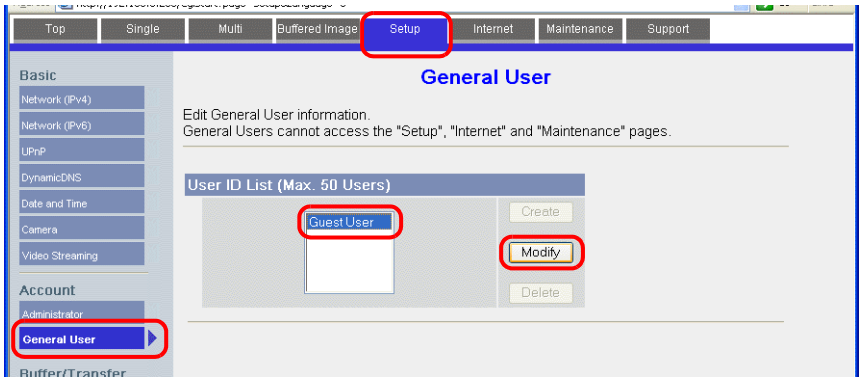


5. Click [Save] to save the settings made in the previous steps.

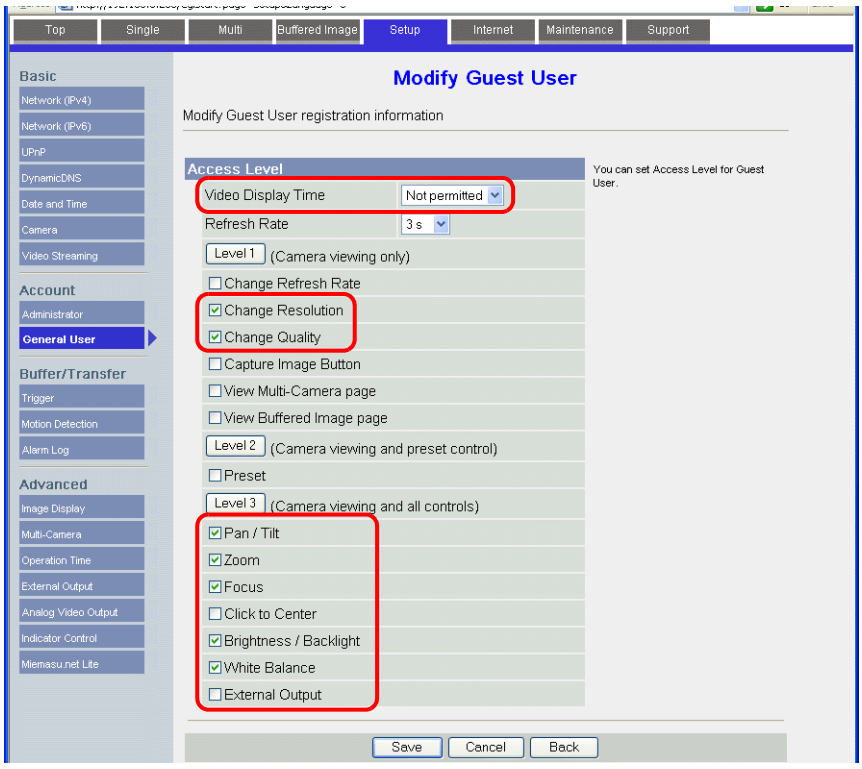
Changing guest user settings

The following settings can be configured when the [Permit access from guest users] checkbox is selected.
Configure the functions available when the network camera is accessed without authentication with a user name and password in the following tab window.

1. Click the [Setup] tab.
2. Click [General User] on the left of the screen.
3. Check that [Guest User] is selected and then click [Modify].



4. The [Modify Guest User] page is displayed. Configure the settings as specified below.



5. Click [Save] to save the settings made in the previous steps.

Checking and Registering User Names and Passwords

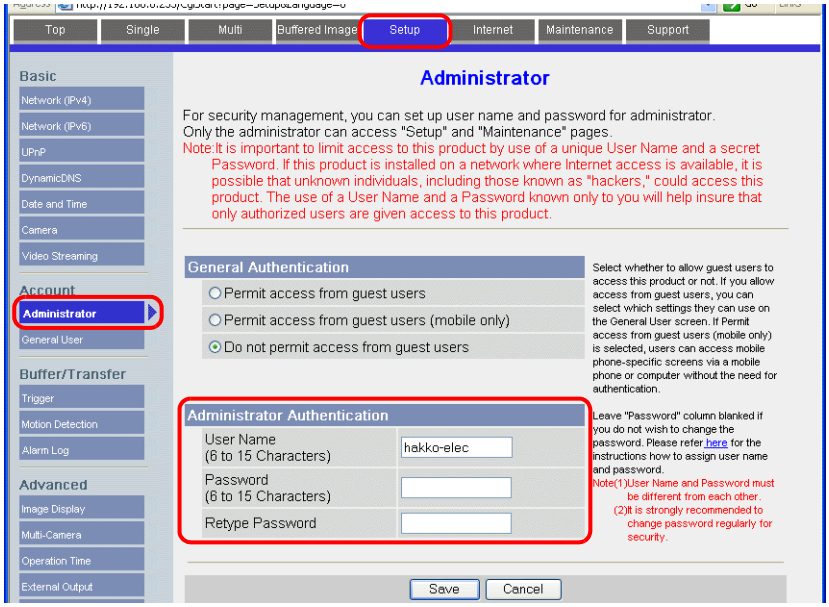
When a password has already been registered, the [Password] field is blanked out.
Take sufficient care when managing passwords. If you forget the password, a password newly registered is usable for authentication.

In a case when the [Do not permit access from guest users] checkbox is selected in the [General Authentication] area, the user name and password registered for the administrator or a general user in the network camera setting tab window must be set in the V-SFT software.
For details on the authentication settings, refer to "Authentication settings" page 1-22.

* **Login with an administrator-level user name and password is required to proceed to the following tab window settings.**

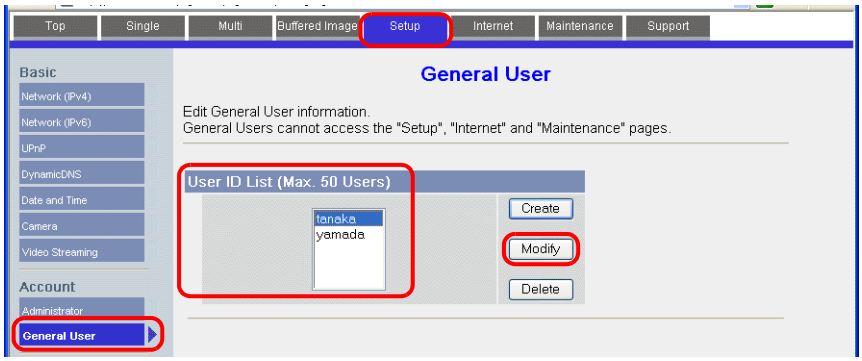
Administrator

1. Click the [Setup] tab.
2. Click [Administrator] at the left of the screen.
3. Check the settings in the [Input User Name and Password] area.
4. If any changes are made to these fields, click [Save] to save the changes.

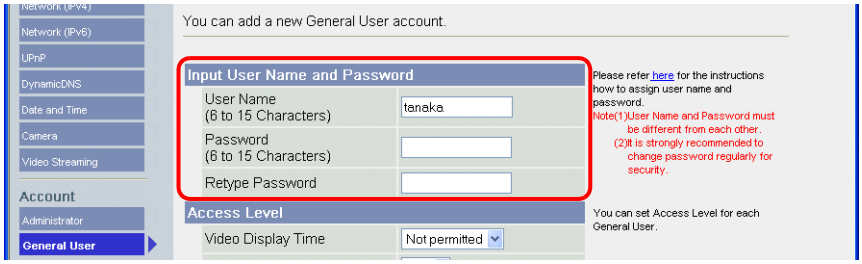


General users

1. Click the [Setup] tab.
2. Click [General User] on the left of the screen.
3. Select the target user name from the [User ID List].
4. Click [Modify].



5. Check the settings in the [Input User Name and Password] area.



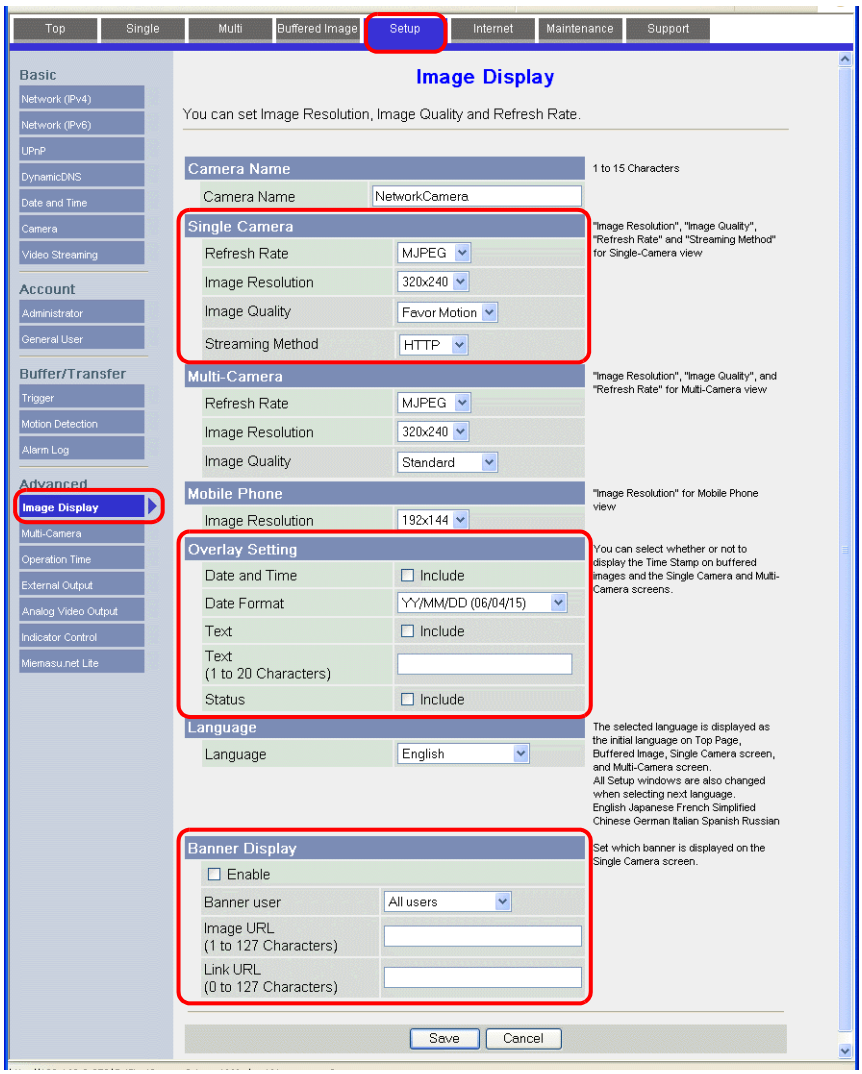
6. If any changes are made to these fields, click [Save] to save the changes.

Image Display Settings

*** Login with an administrator-level user name and password is required to proceed to the following tab window settings.**

1. Click the [Setup] tab.
2. Click [Image Display] at the left of the screen.
3. Configure the settings as specified below.

* Note that these settings will be overwritten while the TSi unit is communicating with the network camera. Because overwriting is likely to be time-consuming, it is recommended to configure these settings in advance.

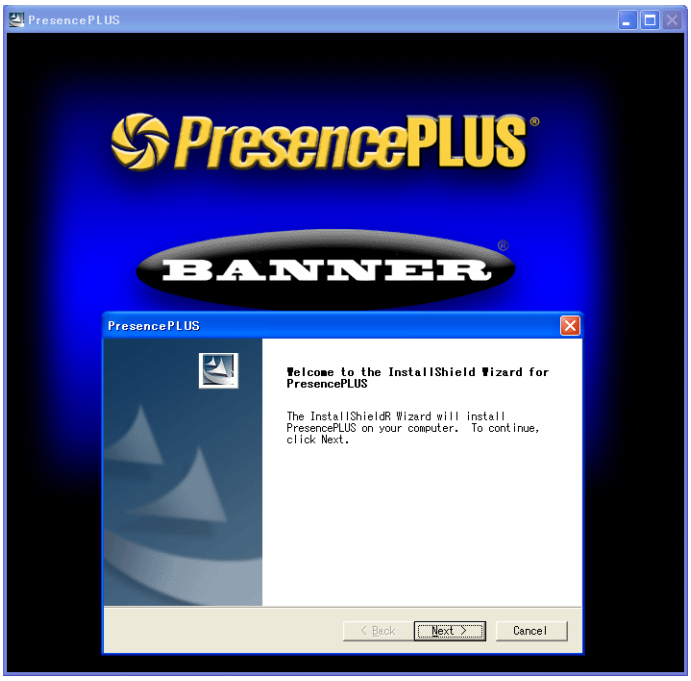


4. Click [Save] to save the settings made in the previous steps.

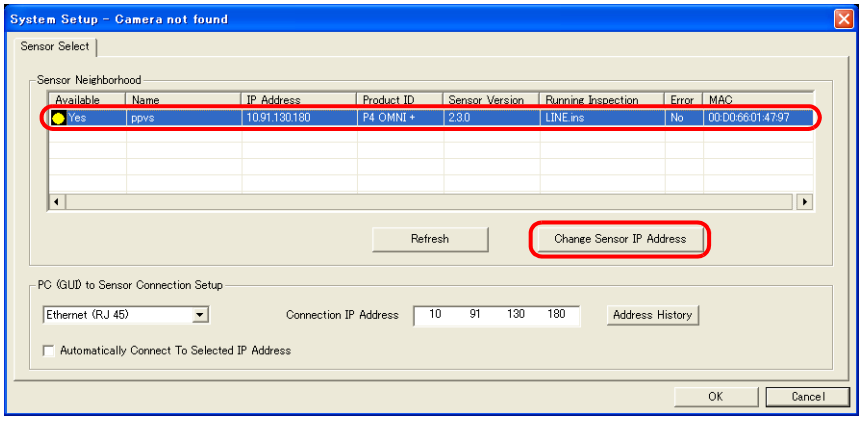
1.2.7 BANNER (Example: PresencePLUS P4 OMNI)

Access from the Computer

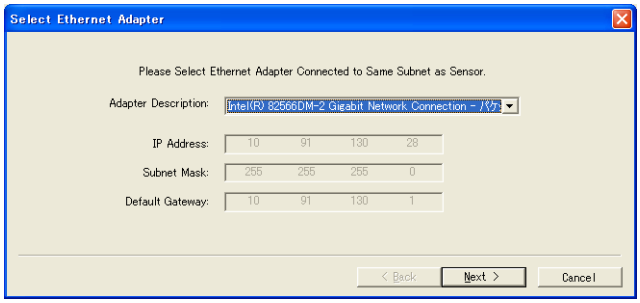
When accessing a sensor from a computer, use the “PresencePLUS” dedicated sensor software.
The CD-ROM provided with the sensor includes this software. Load the CD-ROM into the computer and install the software.
For details on the installation procedure, refer to the manual issued by BANNER.



1. Start the “PresencePLUS” software.
2. The [System Setup] window is displayed. When a connected sensor is found, the information on the sensor, including IP address and MAC address, appears in the window. Select the desired sensor listed under [Sensor Neighborhood] with the cursor and click [Change Sensor IP Address].

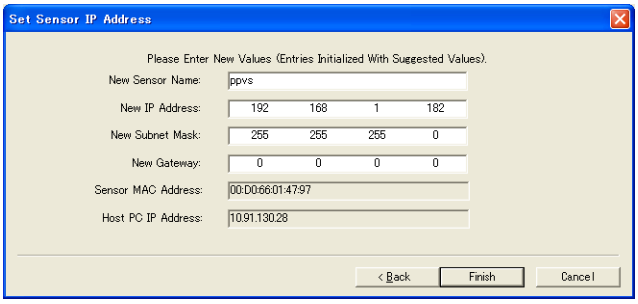


3. The [Select Ethernet Adapter] window is displayed. Select the Ethernet adapter of the computer and click [Next].



4. The [Set Sensor IP Address] window is displayed. Change the sensor's IP address and subnet mask settings as necessary and click [Finish].

The sensor is reset in this step.



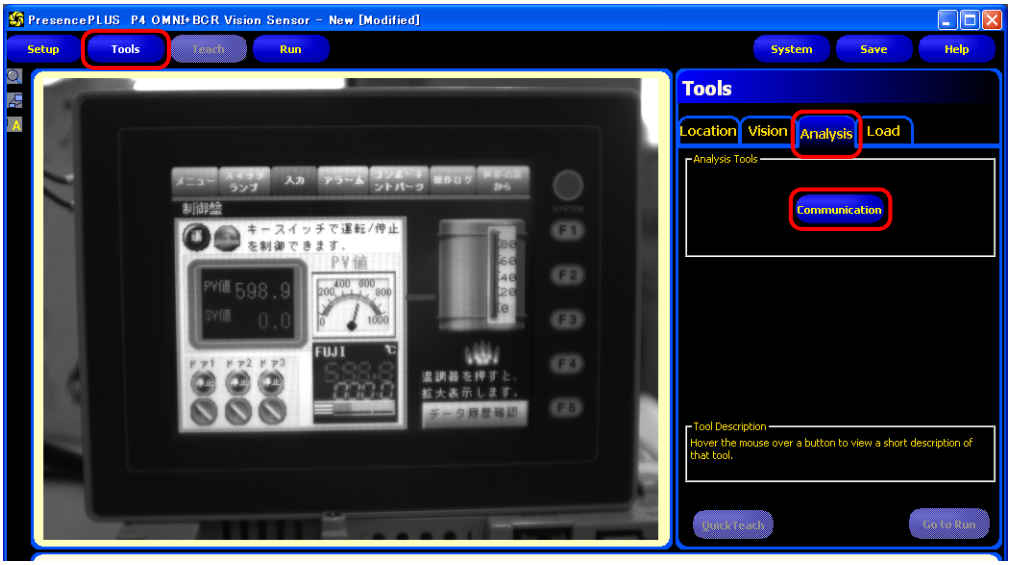
* Make sure that the computer network group and the sensor IP address are on the same network.

5. Click [OK] in the [System Setup] window to close the window.
6. When a connection between the computer and the sensor is established, the monitor screen is displayed on the computer.

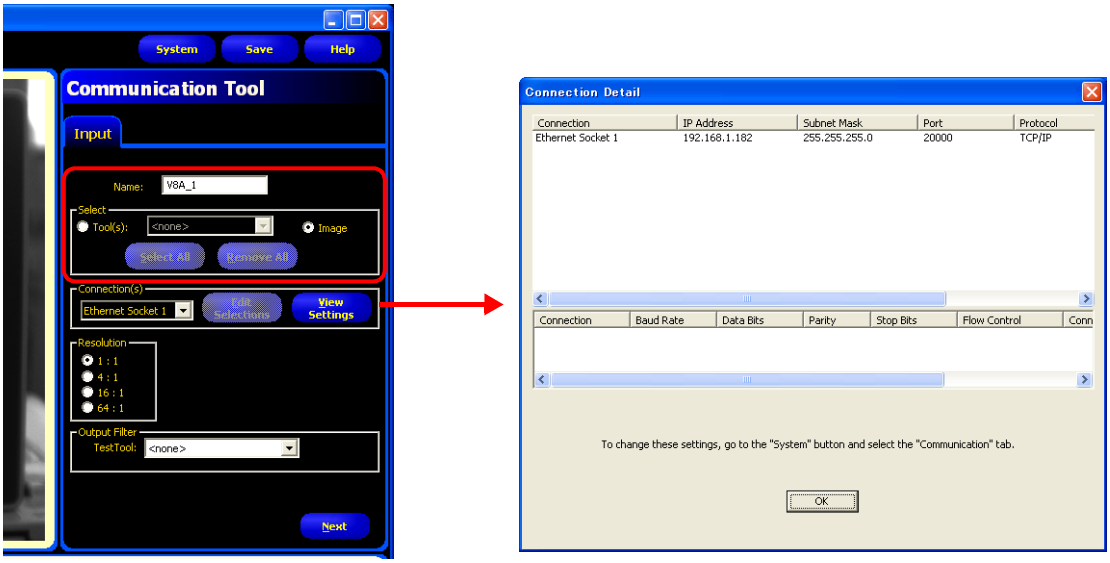
Sensor Settings

Port number setting

1. Click the [Tools] menu button.
2. Click the [Analysis] tab → [Communication].



3. The [Communication Tool] menu opens. Enter an arbitrary name for [Name] and select [Image] under [Select].



4. In the [Connection(s)] section, select an Ethernet socket number. The sensor port number corresponding to the selected socket number is used for connection with TSi unit.

   To see more information on each Ethernet socket number, display the [Connection Detail] window by clicking [View Settings].

Socket No.	Port No. (Fixed)
Ethernet socket 1	20000
Ethernet socket 2	20001
Ethernet socket 3	20002
Ethernet socket 4	20003
Ethernet socket 5	20004
Ethernet socket 6	20005
Ethernet socket 7	20006
Ethernet socket 8	20007
Ethernet socket 9	20008
Ethernet socket 10	20009

* The sensor port number corresponding to each Ethernet socket number is fixed.

5. In the [Resolution] section, select the size of the image to be displayed on the TSi unit.

Resolution	Description *
1:1	Display at actual size (640 × 480 pixels)
4:1	Display at a half of the size (320 × 240 pixels) of the width and height of 1:1 resolution
16:1	Display at a quarter of the size (160 × 120 pixels) of the width and height of 1:1 resolution
64:1	Display at an eighth of the size (80 × 60 pixels) of the width and height of 1:1 resolution

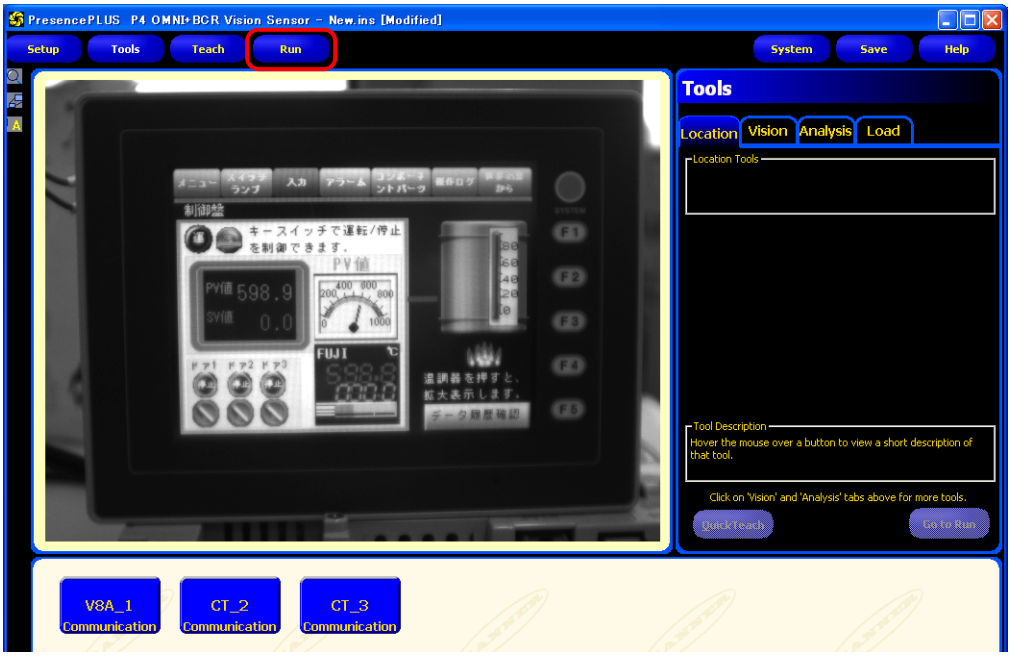
* The size of images captured with the sensor is based on 640 x 480 pixels (default). When changing the size, refer to the manual issued by BANNER.

6. Click [Next] to exit the menu.

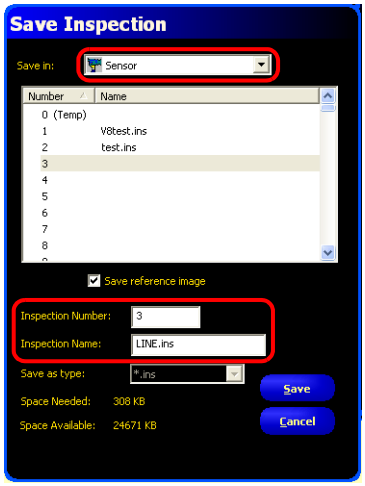
* Repeat steps 2 to 5 when connecting multiple TSi units. (Maximum of 10 sensors.) Only one TSi unit can be connected per sensor port number.

RUN

1. Click the [Run] menu button.

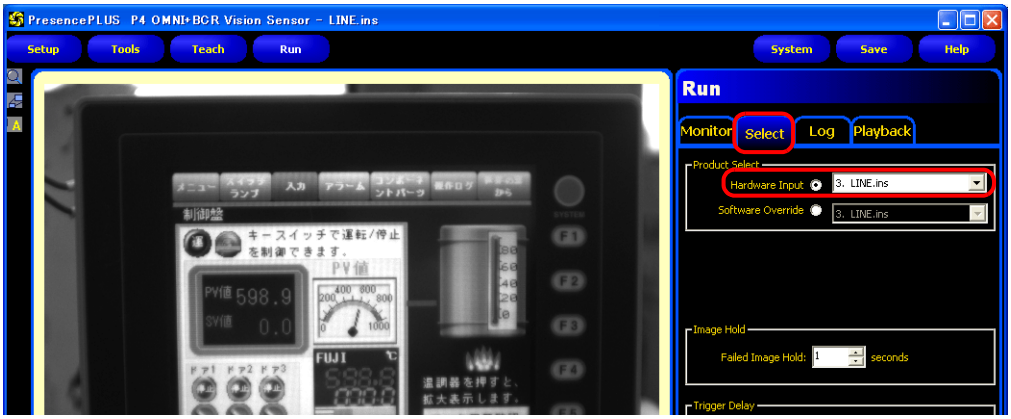


2. The [Save Inspection] window is displayed. Select “Sensor” for [Save in].
Enter an [Inspection Number] and [Inspection Name] for registration and click [Save].



Example
Inspection Number: 3
Inspection Name: LINE.ins

3. Click the [Select] tab in the [Run] menu, go to [Hardware Input], and select the name that was entered for [Inspection Name] in step 2.



4. Click the [Monitor] tab → [Start].

The settings in the [Run] menu are complete.

1.2.8 Restrictions

All Manufacturers

- The display size depends on the resolution of the network camera or sensor. If a display area placed on the screen is smaller than the resolution of the network camera or sensor, captured images displayed in the area are partially cut off.
- Captured images from multiple network cameras cannot be simultaneously displayed on the same layer (screen, overlap etc.). If multiple camera images are placed, only the first area displayed will be active. Displaying camera images from multiple network cameras or sensors is possible by switching between screens.
- In the case where an overlap containing a network camera/sensor display is called up while a network camera/screen display is shown on the screen, only the display on the overlap will be active.

AXIS and Panasonic

- The focus and brightness of images captured by a network camera are automatically adjusted.
- With no basic authentication, size and rotation settings configured for a network camera on the screen are invalid. The previously configured size and rotation settings take effect for the display of images captured with the network camera.

BANNER

- Focus and brightness of sensor images are not automatically adjusted. Sensors do not support these automatic adjustments.
- The resolution of snapshot files saved on the TSi unit depends on the [Snap Setting] set for the network camera or sensor.

MEMO

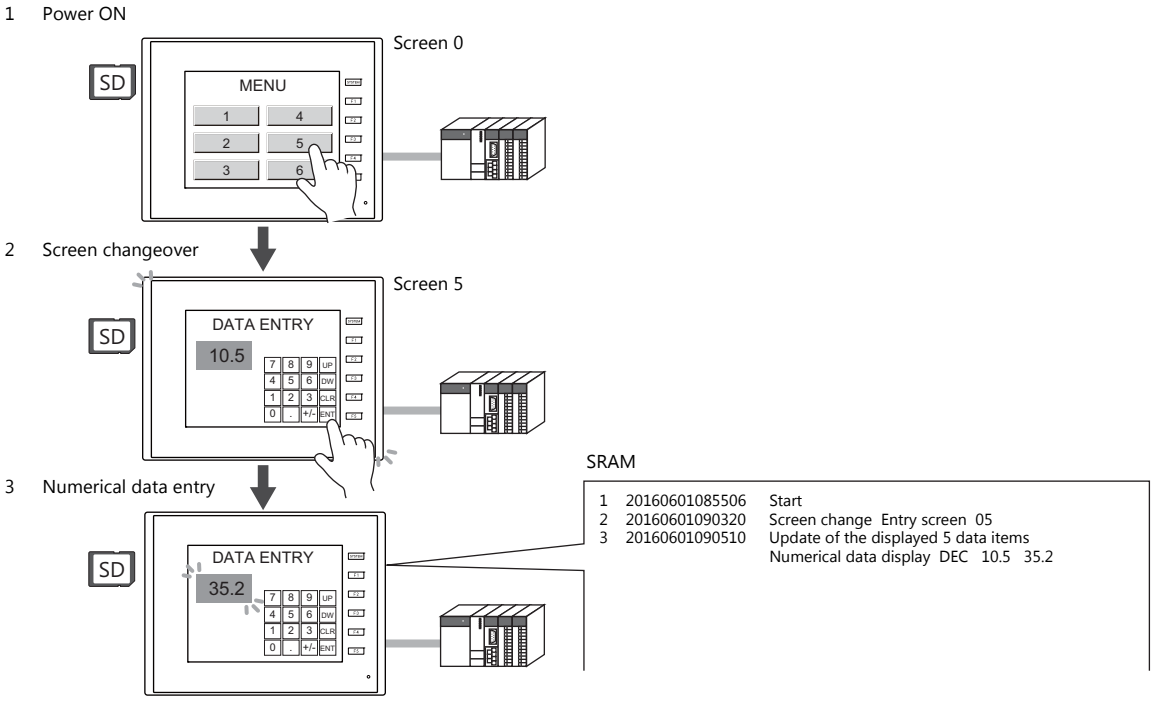
2 Operation Log

2.1 Overview

2.1.1 Operation Log

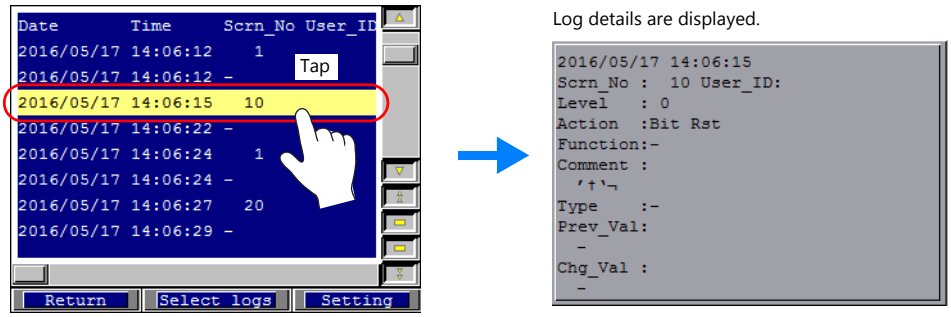
Operation Overview

The operation log function stores screen operation history records (operation logs) in the SRAM area. When the SRAM area becomes full, logs can be output to a storage device such as an SD card or a 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. Also, when used in conjunction with the security function, operator names can also be recorded.



Operation Log Viewer

Operation history records (operation logs) stored in the SRAM area can be displayed on MONITOUCH using the operation log viewer.
The details of operations that were performed when an error occurred can be easily examined in order to determine the cause of the error.

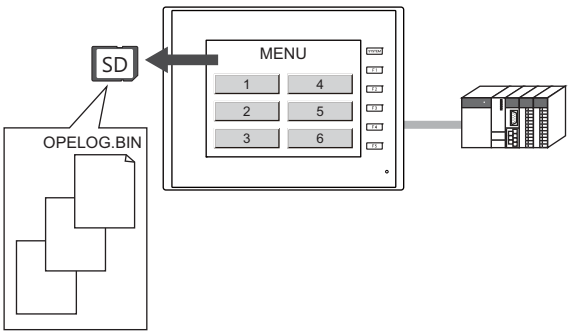


☞ For details on the log viewer, refer to "2.5 Operation Log Viewer"page 2-9.

Log Storage

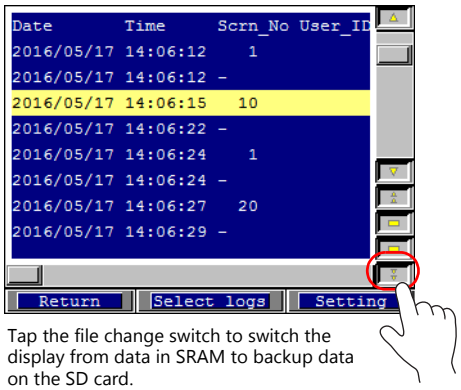
When the SRAM area becomes full, logs are written to a storage device. In addition to the logs stored in the SRAM area, the log files output to a storage device can also be displayed in the log viewer.
Log files written to a storage device are in binary format. The dedicated "LogToCsv" tool can be used to convert such log files to CSV files so their contents can be viewed.

Binary format files in SRAM are output to the SD card.



Binary files are backed up to the SD card according to the time they were output and saved.

Operation log viewer

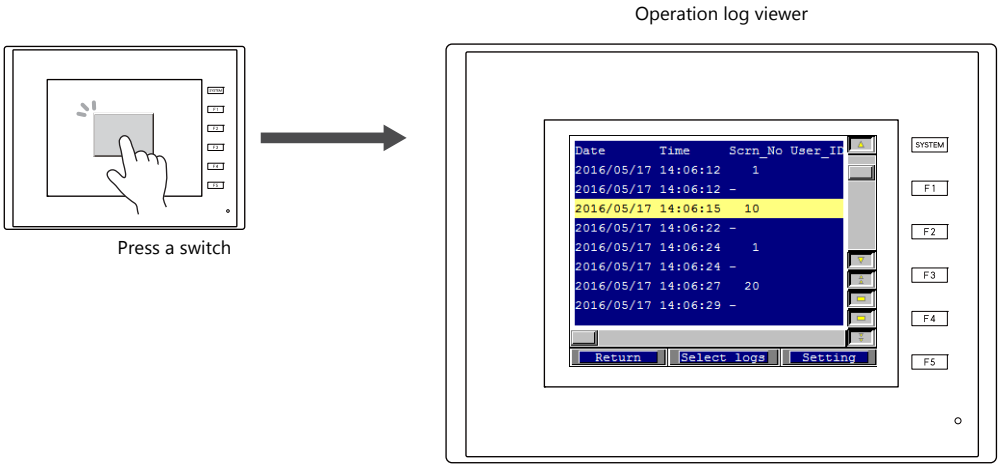


Tap the file change switch to switch the display from data in SRAM to backup data on the SD card.

A dedicated "LogToCsv" tool can be used to convert log files to CSV files.
For details, refer to "2.6.3 Importing Log Data to Computer (Conversion to CSV Files)" page 2-13.

2.2 Using the Operation Log Viewer

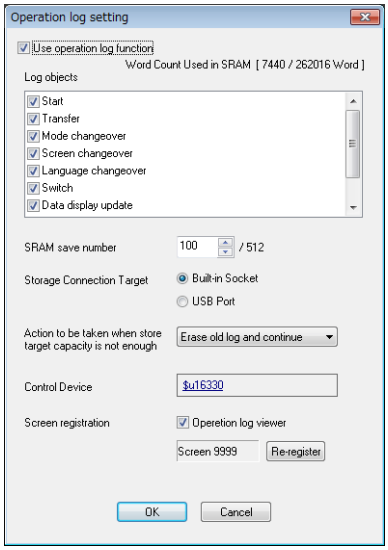
2.2.1 Conceptual Operation



The operation log viewer is displayed.

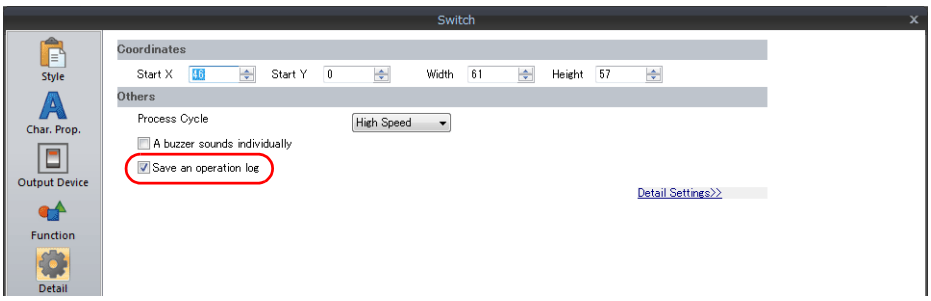
2.2.2 Setting Procedure

1. Click [System Setting] → [Other] → [Operation log Setting]. The [Operation log setting] window is displayed.
2. Select the [Use operation log function] checkbox and select the checkboxes of the relevant items under [Log objects].
3. Set any other relevant settings and select the [Operation log viewer] checkbox.
   Specify a screen number (default: 9999) to which the operation log viewer is to be registered.



4. Click [OK].
5. Place the switch used to read the operation log viewer screen ([Function: Screen]).

* When [Switch] is selected under [Log objects], the [Save operation log] checkbox must be selected in the settings window of any switches targeted for logging. (Default: selected)



This completes the necessary settings. The screen program can be transferred to MONITOUCH.

2.3 Applicable Items

2.3.1 Applicable Items and Saving

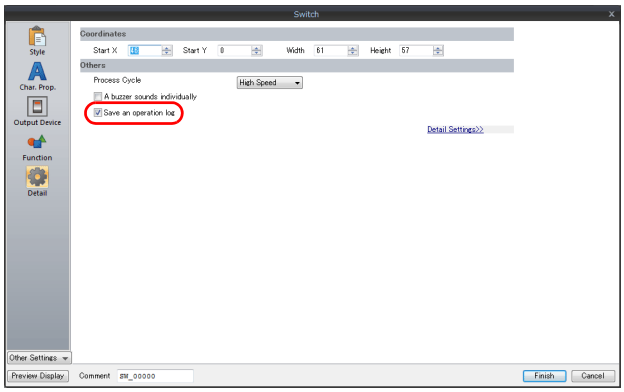
Applicable Items and Timing of Saving

The table below shows the items that can be saved to operation logs and when saving to SRAM takes place.

<table>
<tr><th>Items</th><th>Timing of Saving</th></tr>
<tr><td>Start</td><td>When power is turned ON</td></tr>
<tr><td>Transfer</td><td>When transferring a screen program or the I/F driver *1</td></tr>
<tr><td>Mode changeover</td><td>When changing between RUN mode and local mode</td></tr>
<tr><td>Screen changeover</td><td>When changing between screens</td></tr>
<tr><td>Language changeover</td><td>When changing between languages</td></tr>
<tr><td>Switch</td><td>When a switch with any of the following functions is pressed. *2
<table>
<tr><td colspan="2">With output device memory</td><td>Momentary, Set, Reset, Alternate, Momentary W, Word Operation</td></tr>
<tr><td rowspan="6">Function</td><td>Standard</td><td>Screen, overlap display, multi-overlap display, reset, storage device formatting (buffer), storage device removal, language changeover</td></tr>
<tr><td>Entry</td><td>Delete (alarms only)</td></tr>
<tr><td>Memory Card</td><td>Card format, transfer card → PLC, transfer PLC → card</td></tr>
<tr><td>Digital switch</td><td>Digital switch +, digital switch –</td></tr>
<tr><td>JPEG</td><td>File deletion</td></tr>
<tr><td>Security</td><td>Login/Logout</td></tr>
</table></td></tr>
<tr><td>Data display update *3</td><td>When updating numerical data/character displays in entry mode (Write/↓/↑ keys)</td></tr>
<tr><td>Storage Writing Error</td><td>When an error occurs during writing to a storage device
* 1024 words are used in SRAM. The words in use are added and displayed at [Unit Setting] → [SRAM/Clock Setting] → [Operation log storage point].</td></tr>
<tr><td>Log destruction</td><td>When newly storing log data after clearing the SRAM area due to the reasons below:
• SRAM data corruption
• Failure to output to storage device</td></tr>
</table>

*1 Logging does not take place when transferring system programs of MONITOUCH.

*2 Logs can be saved for switches when the [Save an operation log] checkbox is selected in the [Detail] settings of the item's settings window. (Default: selected)



*3 Table data display is not supported.

Saved Items (Titles)

The following item types are saved.

Saved Item (Title)	Description	Max. No. of Characters (Bytes)
No.	Log No.	-
Date	Log acquisition date	-
Time	Log acquisition time	-
Scrn_No	Screen number (0 to 9999)	-
User_ID	User ID registered in security settings	8
Level	Security level (0 to 15)	-
Action	(Differs depending on the log item. For details on the saved content for each item, refer to the sections below.)	-
Function	(Differs depending on the log item. For details on the saved content for each item, refer to the sections below.)	-
Comment	Comments on screens and parts	32
Type	Display format of numerical data displays	-
Prev_Val	Value before change	-
Chg_Val	Value after change	-

Start

No.	Date	Time	Scrn_No	User_ID	Level	Action	Function	Comment	Type	Prev_Val	Chg_Val
○	○	○	-	-	-	○	-	-	-	-	-

Details of items are as follows:

Action	Start

Transfer

No.	Date	Time	Scrn_No	User_ID	Level	Action	Function	Comment	Type	Prev_Val	Chg_Val
○	○	○	-	-	-	○	○	-	-	-	-

Details of items are as follows:

Action	Transfer
Function	Screen program
	Driver, expansion program

Mode Changeover

No.	Date	Time	Scrn_No	User_ID	Level	Action	Function	Comment	Type	Prev_Val	Chg_Val
○	○	○	-	-	-	○	○	-	-	-	-

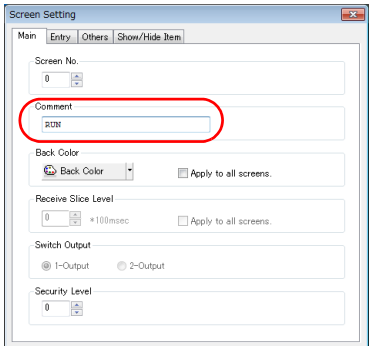
Details of items are as follows:

Action	Mode changeover
Function	Change to RUN mode
	Change to Local mode

Screen Changeover

No.	Date	Time	Scrn_No	User_ID	Level	Action	Function	Comment	Type	Prev_Val	Chg_Val
○	○	○	-	○	○	○	-	○	-	○	○

Details of items are as follows:

Action	Screen changeover
Comment	The comment entered in the [Screen Setting] → [Screen Setting] window is stored. When no comment is entered, the [Comment] field is blank. 
Prev_Val	Stores the screen number before changeover.
Chg_Val	Stores the screen number after changeover.

Language Changeover

No.	Date	Time	Scrn_No	User_ID	Level	Action	Function	Comment	Type	Prev_Val	Chg_Val
○	○	○	-	○	○	○	-	-	-	○	○

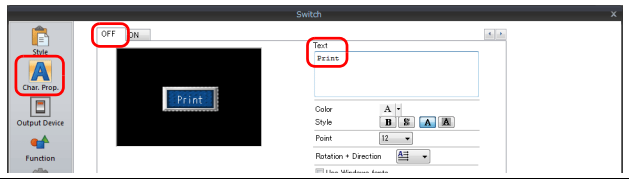
Details of items are as follows:

Action	Language changeover
Prev_Val	Stores the language number before changeover.
Chg_Val	Stores the language number after changeover.

Switch

No.	Date	Time	Scrn_No	User_ID	Level	Action	Function	Comment	Type	Prev_Val	Chg_Val
○	○	○	○	○	○	○	○	○	-	-	-

Details of items are as follows:

Action		Switch operations (Mom)/(Set)/(Rst)/(Alt)/(Word)/(Sample)/(Alm)
Function	Standard	Screen
		Overlap display, multi-overlap display
		Word operation
		Reset
		Storage device formatting (buffer), storage device removal
		Language selection
	Entry	Delete (alarms only)
	Memory Card	Transfer card → PLC, transfer PLC → card
		Card format
	Digital switch	Digital switch +, digital switch -
	JPEG	File delete
	Security	Login, logout
Comment		The text entered in the [Char. Prop.] window → [OFF] tab in the switch settings window is stored. 

Data Display Update (Numerical Display, Character Display)

No.	Date	Time	Scrn_No	User_ID	Level	Action	Function	Comment	Type	Prev_Val	Chg_Val
○	○	○	○	○	○	○	○	○	○	○	○

Details of items are as follows: (Log output is not supported for table data displays.)

Action	Data Display Update
Function	Numerical display
	Character display
Comment	Outputs the comment in the numerical data display's and character display's settings window. 

Storage Writing Error

No.	Date	Time	Scrn_No	User_ID	Level	Action	Function	Comment	Type	Prev_Val	Chg_Val
○	○	○	-	-	-	○	○	○	-	-	-

Details of items are as follows:

Action	Writing error detection
Function	Power OFF
	Card removal
Comment	The directory path of the drive or file where an error has occurred is output. • Error when accessing SD card: "Drive name:\Directory Information" Example: For built-in socket: "C:\Directory Information" • Error when accessing files: "Drive name:\Full path"* Example: When an error occurred during writing of "REC0000.CSV" in recipe mode C:\DAT0000\RECIPE\REC0000.CSV * When the number of characters exceeds 32 one-byte characters (16 two-byte characters), the top of the pathname is omitted and displayed as "..". Example: C:\..\RECIPE\REC0000.CSV

Log Destruction

A log is saved when the SRAM area is cleared and newly saving logs because of SRAM data corruption or failure to output to the SD card. The log contains the data items below.

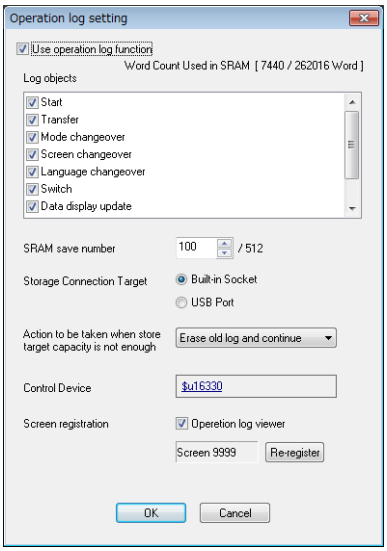
No.	Date	Time	Scrn_No	User_ID	Level	Action	Function	Comment	Type	Prev_Val	Chg_Val
○	○	○	-	-	-	○	-	-	-	-	-

Details of items are as follows:

Action	Log destruction

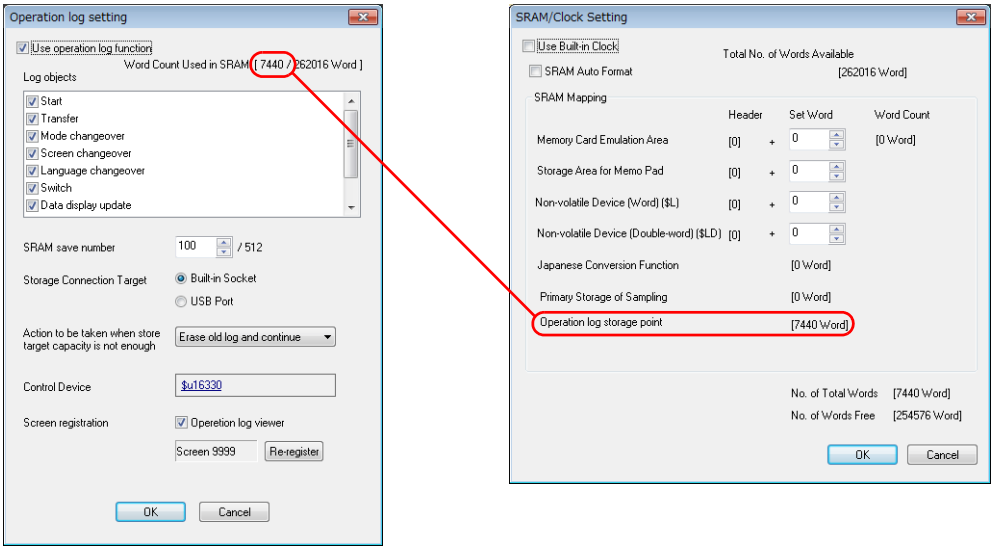
2.4 Detailed Settings

Configure the detailed settings at [System Setting] → [Other] → [Operation log Setting].



Item	Description
Use operation log function	Select this checkbox to use the operation log function.
Log objects	Select the checkboxes of the items to save to operation logs. For details, refer to "2.3 Applicable Items" page 2-4.
SRAM save number *1	Set the number of logs to be stored in the SRAM area. (100 - 512)
Storage Connection Target	Select how to connect the storage device to which operation logs will be output.
Action to be taken when store target capacity is not enough	Select the action to take when the storage device is full.
Control Device *2	Set the device memory for outputting log data to the storage device.
Screen registration	Select this checkbox to use the operation log viewer. Select a screen number to which an operation log viewer (= component part) is to be registered.

*1 The required amount of SRAM is automatically secured based on the [SRAM save number] setting.



*2 Control Device

Control device memory

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

Reserved for system

Storage output bit
0 → 1 (edge): Output SRAM log data to storage device

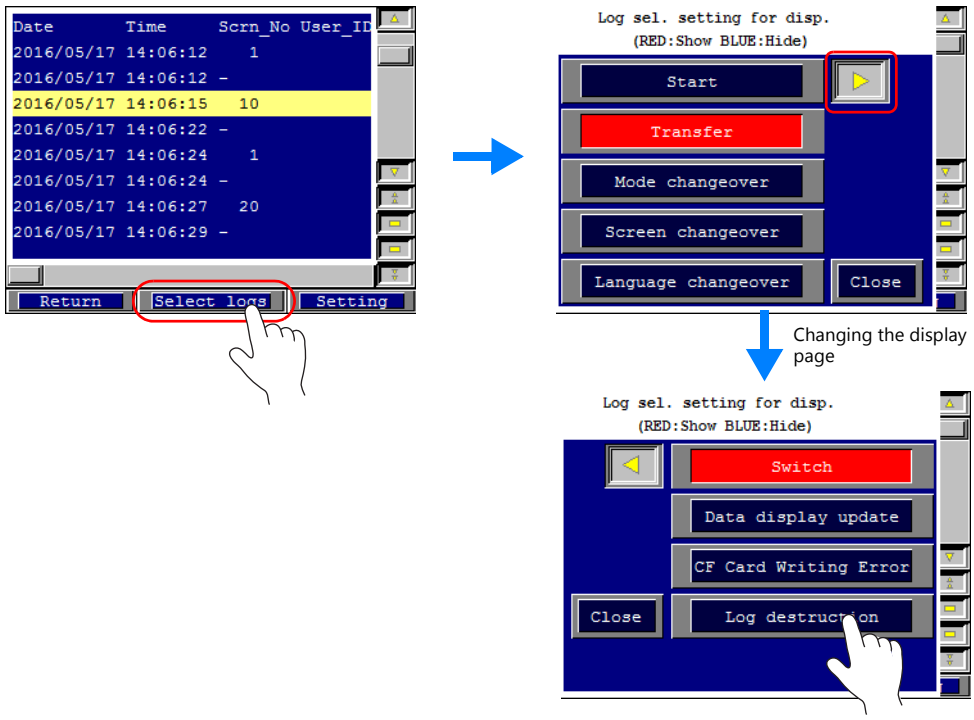
2.5 Operation Log Viewer

This section explains the log viewer screen.

Showing/Hiding Logs

Tap the [Select logs] switch in the operation log viewer. The following window is displayed.
Logs not to be displayed can be hidden by turning off the corresponding switches.

Example: Hiding logs other than [Transfer] and [Switch]

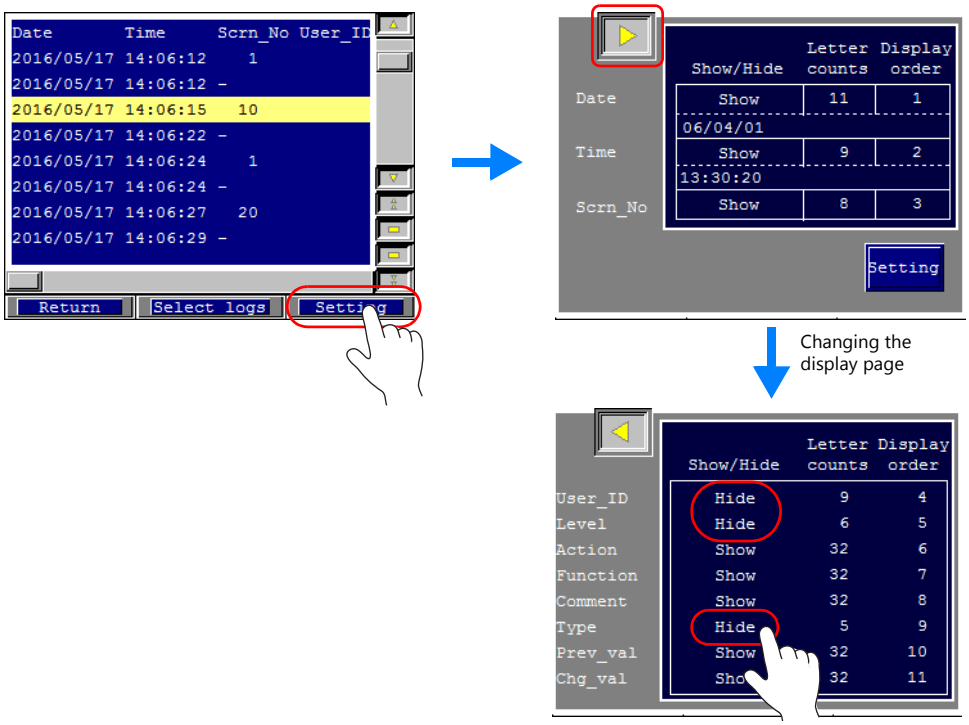


Showing/Hiding Items and Changing Width (No. of Characters) and Date/Time Format

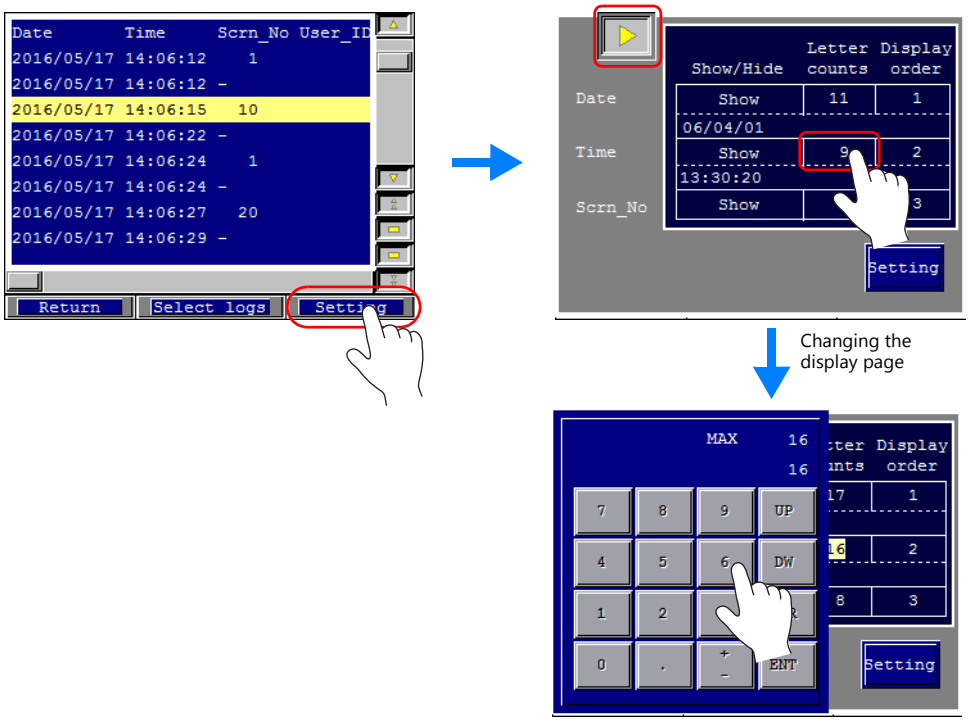
Tap the [Setting] switch in the operation log viewer. The following window is displayed.

- Unnecessary items can be set to “Hide”.

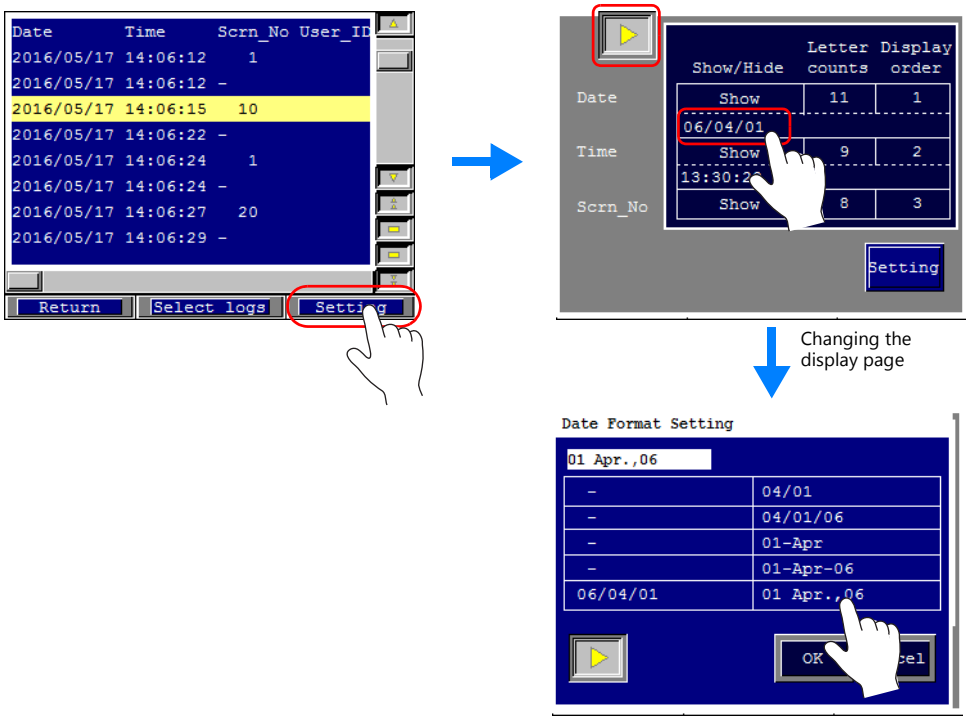
Example: Hiding the [User_ID], [Level], and [Type] items



- The width ([Letter counts]) can be changed as needed.



- The display format of the date and time ([Date] and [Time]) can be changed.



2.6 Log Data

2.6.1 Output Timing

Log data is first output to SRAM. Subsequent log data in SRAM may be output to a storage device depending on the condition of SRAM. This section explains the timing of output.

SRAM

For information on the output timing of each item, refer to "Applicable Items and Timing of Saving" page 2-4.

Storage Device

Log data in SRAM is output to the storage device at the following timings.

- When the area defined by [SRAM save number] in the [Operation log setting] window is full
- When the "card output bit" defined for [Control Device] in the [Operation log setting] window turns ON
- When a switch with [Storage Removal] set for [Function] is pressed

2.6.2 Details of Output (File Type)

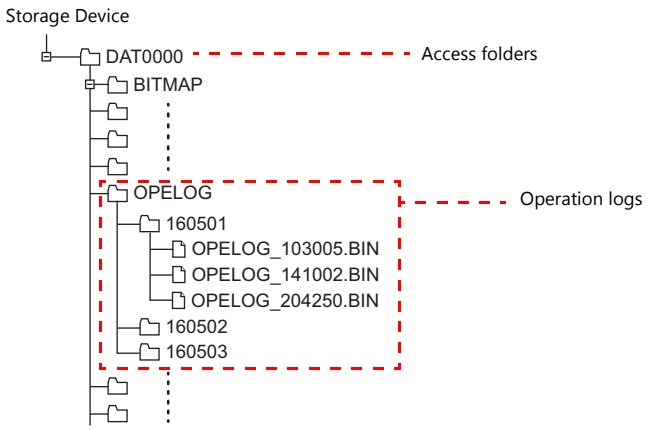
SRAM

Log data is stored in the SRAM area in binary format. A maximum of 64 KB of the SRAM area is used for log data and up to 512 logs can be stored. The SRAM data is cleared after output to a storage device.

Storage Device

The directory and file type when outputting to a storage device is as follows.

Directory	Filename
Access folder\OPELOG\YYMMDD Year, month, and day	OPELOG_hhmmss.BIN Hour, minutes, and seconds

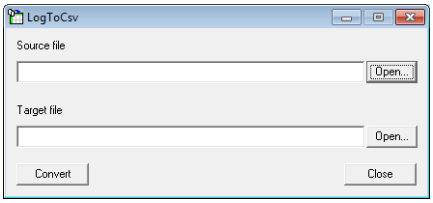


2.6.3 Importing Log Data to Computer (Conversion to CSV Files)

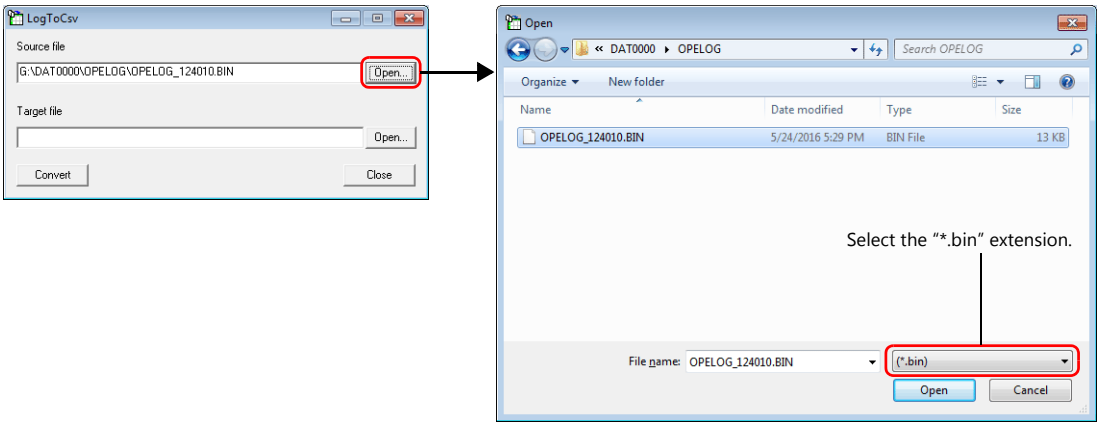
A log file output to a storage device can be converted to a CSV file for viewing using the dedicated "LogToCsv" tool.
"LogToCsv.exe" is installed when V-SFT version 6 (Ver. 6.0.8.0 or later) is installed.
If the version of your V-SFT version 6 is an earlier one, download "LogToCsv.exe" from Hakko Electronics' website and install.

File Conversion Procedure

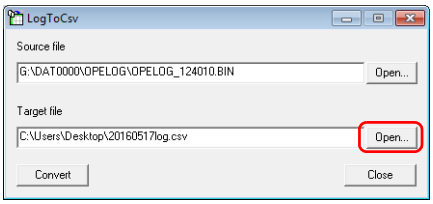
1. Click the start button and start "LogToCsv" from [All Programs] → [V-SFTV6].



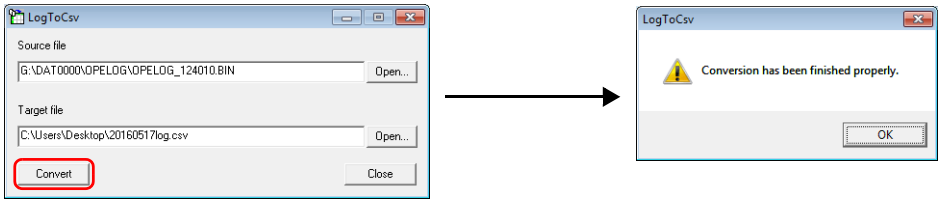
2. Click the [Open] button for [Source file] and select the log file to convert. (Extension: *.bin)



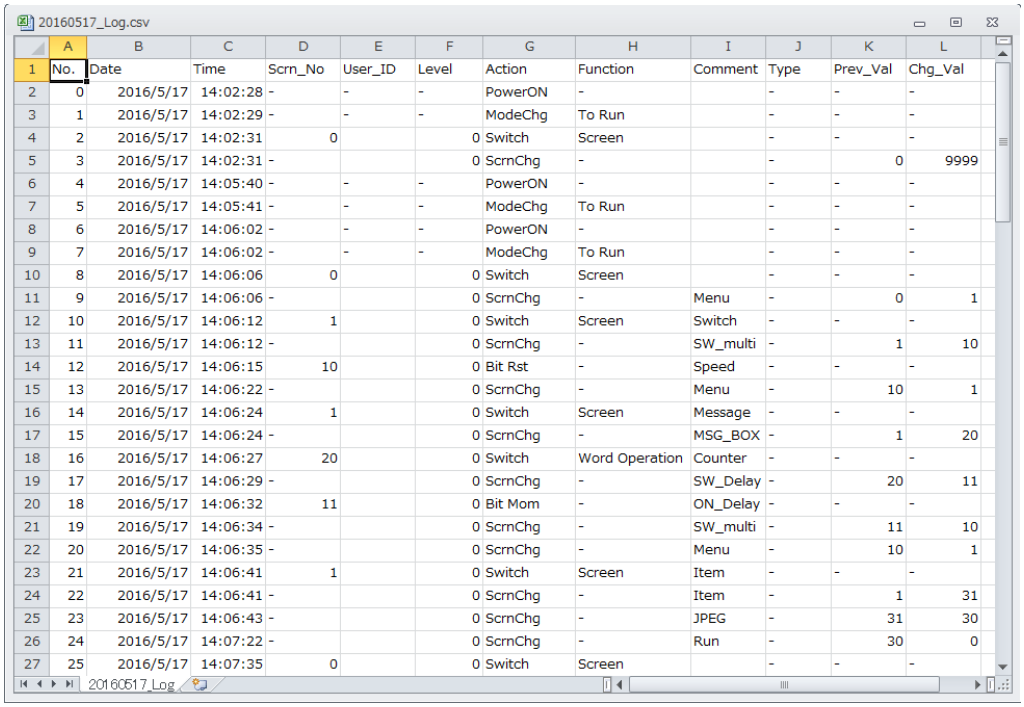
3. Click the [Open] button for [Target file] and specify the location for storing the CSV file and the filename.



4. Click the [Convert] button. A conversion complete message is displayed and the CSV file is output to the specified location.



5. Open the CSV file.



20160517_Log.csv

	A	B	C	D	E	F	G	H	I	J	K	L
1	No.	Date	Time	Scrn_No	User_ID	Level	Action	Function	Comment	Type	Prev_Val	Chg_Val
2	0	2016/5/17	14:02:28	-	-	-	PowerON	-		-	-	-
3	1	2016/5/17	14:02:29	-	-	-	ModeChg	To Run		-	-	-
4	2	2016/5/17	14:02:31	0		0	Switch	Screen		-	-	-
5	3	2016/5/17	14:02:31	-		0	ScrnChg	-		-	0	9999
6	4	2016/5/17	14:05:40	-	-	-	PowerON	-		-	-	-
7	5	2016/5/17	14:05:41	-	-	-	ModeChg	To Run		-	-	-
8	6	2016/5/17	14:06:02	-	-	-	PowerON	-		-	-	-
9	7	2016/5/17	14:06:02	-	-	-	ModeChg	To Run		-	-	-
10	8	2016/5/17	14:06:06	0		0	Switch	Screen		-	-	-
11	9	2016/5/17	14:06:06	-		0	ScrnChg	-	Menu	-	0	1
12	10	2016/5/17	14:06:12	1		0	Switch	Screen	Switch	-	-	-
13	11	2016/5/17	14:06:12	-		0	ScrnChg	-	SW_multi	-	1	10
14	12	2016/5/17	14:06:15	10		0	Bit Rst	-	Speed	-	-	-
15	13	2016/5/17	14:06:22	-		0	ScrnChg	-	Menu	-	10	1
16	14	2016/5/17	14:06:24	1		0	Switch	Screen	Message	-	-	-
17	15	2016/5/17	14:06:24	-		0	ScrnChg	-	MSG_BOX	-	1	20
18	16	2016/5/17	14:06:27	20		0	Switch	Word Operation	Counter	-	-	-
19	17	2016/5/17	14:06:29	-		0	ScrnChg	-	SW_Delay	-	20	11
20	18	2016/5/17	14:06:32	11		0	Bit Mom	-	ON_Delay	-	-	-
21	19	2016/5/17	14:06:34	-		0	ScrnChg	-	SW_multi	-	11	10
22	20	2016/5/17	14:06:35	-		0	ScrnChg	-	Menu	-	10	1
23	21	2016/5/17	14:06:41	1		0	Switch	Screen	Item	-	-	-
24	22	2016/5/17	14:06:41	-		0	ScrnChg	-	Item	-	1	31
25	23	2016/5/17	14:06:43	-		0	ScrnChg	-	JPEG	-	31	30
26	24	2016/5/17	14:07:22	-		0	ScrnChg	-	Run	-	30	0
27	25	2016/5/17	14:07:35	0		0	Switch	Screen		-	-	-

20160517_Log

2.7 System Device Memory

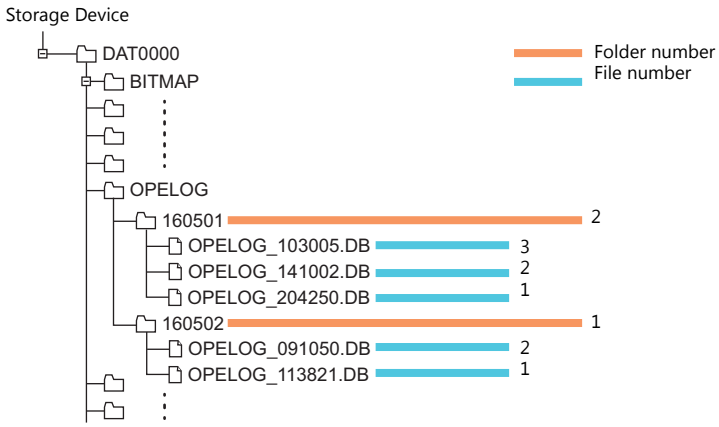
- The following describes the system device memory associated with operation logs.

Device Memory	Description	Remarks
$s1050	Storage device processing flag MSB LSB 15 14 13 12 11 10 09 08 07 06 05 04 03 02 01 00 0 0 0 0 0 0 0 0 0 0 0 0 0 Reserved for system (setting: 0) Operation logs 0: Not processed 1: Processing Sampling 0: Not processed 1: Processing Hard copy 0: Not processed 1: Processing	← TS
$s1051	Storage device processing completion flag MSB LSB 15 14 13 12 11 10 09 08 07 06 05 04 03 02 01 00 0 0 0 0 0 0 0 0 0 0 0 0 0 Reserved for system (setting: 0) Operation logs 0: Not completed 1: Completed Sampling 0: Not completed 1: Completed Hard copy 0: Not completed 1: Completed	← TS
$s1052	Storage device processing error flag MSB LSB 15 14 13 12 11 10 09 08 07 06 05 04 03 02 01 00 0 0 0 0 0 0 0 0 0 0 0 0 0 Reserved for system (setting: 0) Operation logs 0: Normal 1: Error Sampling 0: Normal 1: Error Hard copy 0: Normal 1: Error * Errors that occur related to operation logs are “write errors”. For details on the inserted state of storage devices, refer to $s1030/1035.	← TS

- The following describes the system device memory associated with the operation log viewer.

Addresses	Description	Remarks
$s1365	File number of currently displayed log data	← TS
$s1366	Log folder number being displayed	

* When the log data in SRAM is displayed, 0 is stored at both addresses $s1365 and $s1366.
When a log file on a storage device is displayed, the files and folders stored on the storage device are numbered sequentially, starting at 1, from the file with the most recent date stamp.
The following illustrates the numbering of files and folders.



3 Security

3.1 Overview

Security

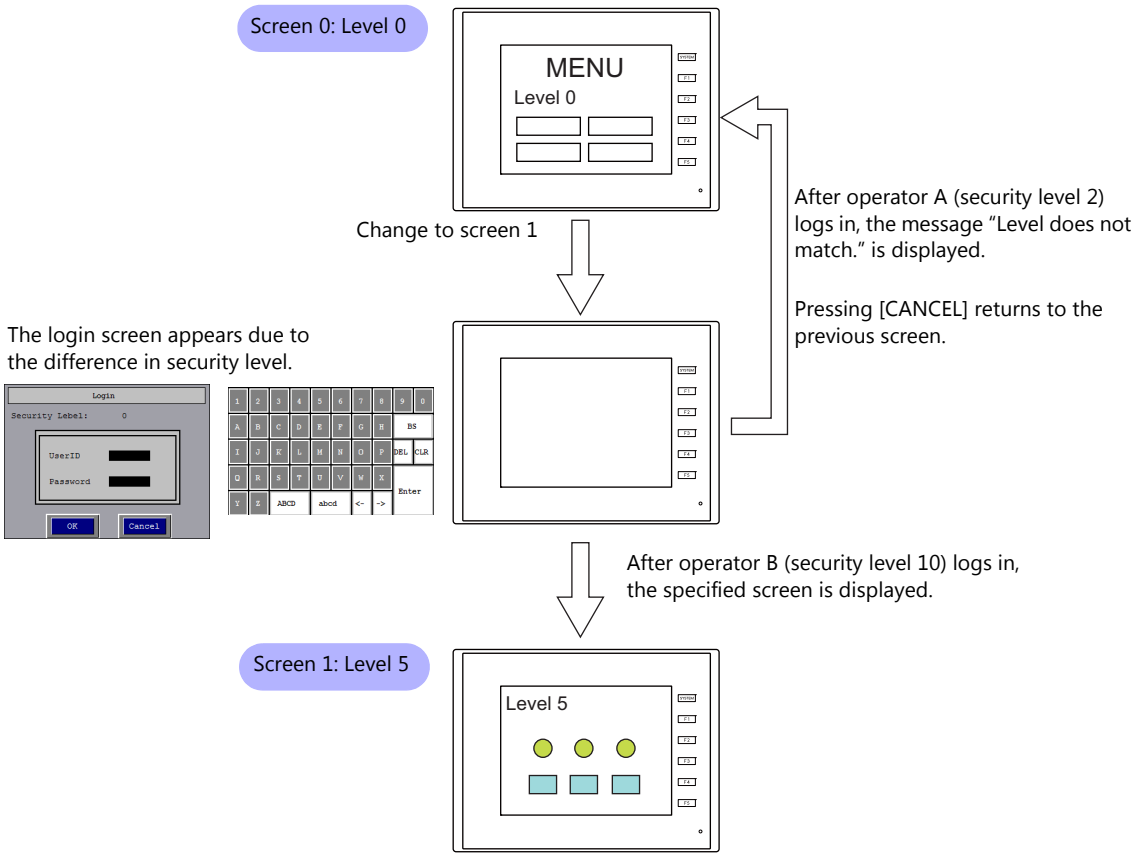
Registering user IDs and passwords at the required security levels in advance enables operators to control the display and operation of screens in accordance with their corresponding security level.

* Security levels are set on a scale from 0 to 15.

Security Level	Priority	Description
0	Low	Screen display and operation permitted at level 0 (no security)
1	↓	Screen display and operation permitted at levels 0 and 1
:		:
15	High	Screen display and operation permitted at all levels from 0 through 15

Screen Security Levels

A security level can be set for each screen. An attempt to switch to a higher-security screen will automatically display the login screen. The target screen can be displayed by entering a user ID and password at a level equivalent to or higher than the level required for the target screen.

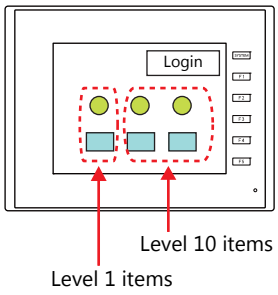


☞ For details on the location of settings, refer to "Screen Settings" page 3-6.

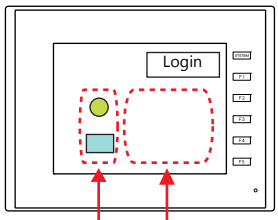
Item Security Levels

Security levels can be set for each item on the screen, such as switches and data displays.
Once security levels are specified for screen items, these items can be shown or hidden based on the security level selected when an operator logs into the system. Also, switches can be configured with an interlock setting.

Showing/Hiding Items



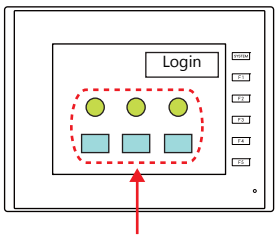
Operator A
Security level 2



Items at level 2 or lower are shown.

Items at level 3 or higher are hidden.

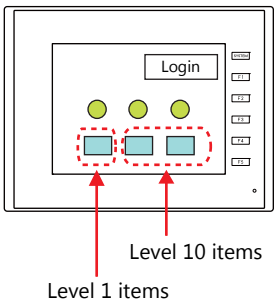
Operator B
Security level 10



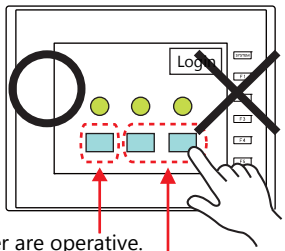
Items at level 10 or lower are shown.

☞ For details on the location of settings, refer to "[Show/Hide] Settings in the Settings Window of Each Part" page 3-7.

Prohibiting Switch Operations



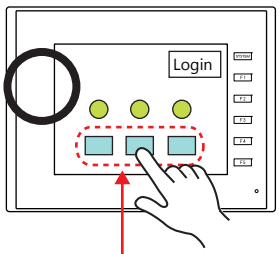
Operator A
Security level 2



Items at level 2 or lower are operative.

Items at level 3 or higher are inoperative.

Operator B
Security level 10



Items at level 10 or lower are operative.

☞ For details on the location of settings, refer to "[Interlock] Settings in the [Switch] Settings Window" page 3-8.

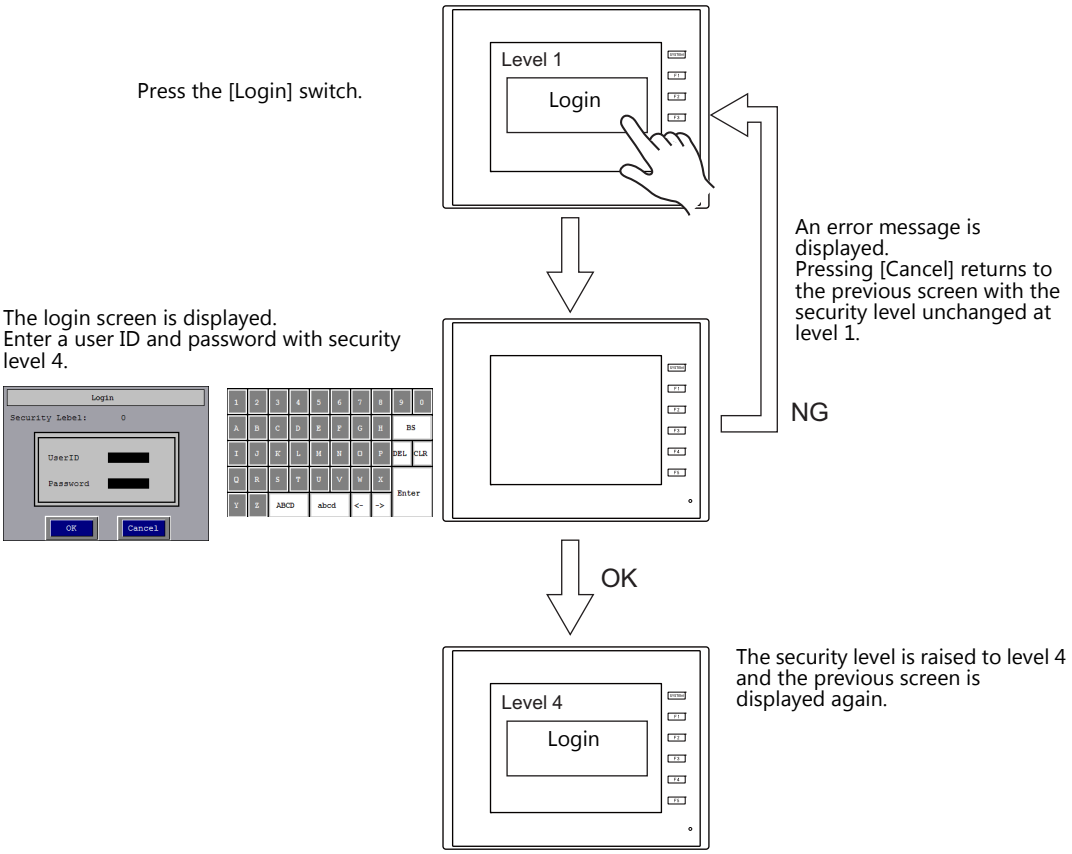
Login, logout

The security level can be changed by logging in or out with the screen that is automatically displayed when a screen change occurs as well as by a switch operation.

☞ For details on settings, refer to "3.4 Login/Logout" page 3-9.

Login

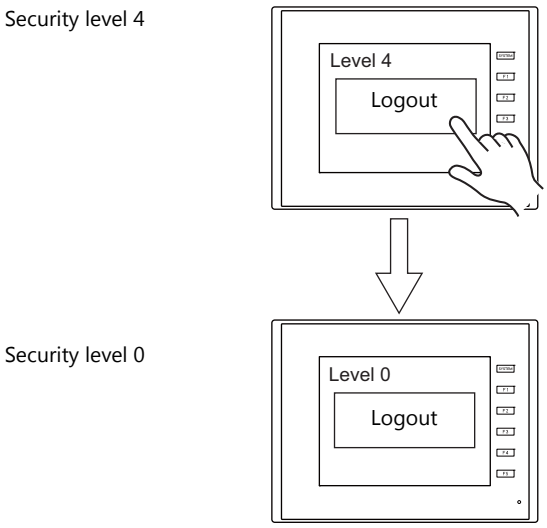
The security level can be changed using a switch with [Log In] set for [Function].



* Login is prohibited for users with a security level lower than that of the currently displayed screen. If such an attempt is made, the message "Level does not match." appears.

Logout

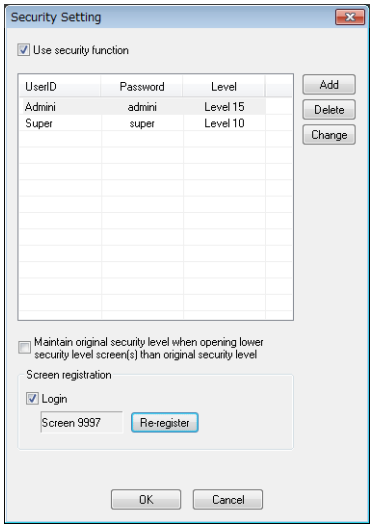
The security level is set to zero (0) when a switch with [Log Out] set for [Function] is pressed.

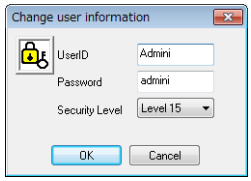


* When logout is executed, the security level is set to zero (0); however, the same screen remains displayed even after logging out.
  To change over the screen at the time of a logout, log out on a lower-security screen or use the SET_SCRN macro command (for screen number change) together with a logout.

3.2 Security Settings

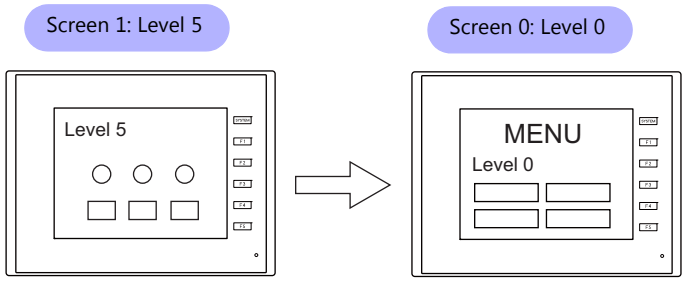
Location of settings: [System Setting] → [Other] → [Security Setting].





Item	Description
Use security function	Select this checkbox to use the security function.
UserID Password Level	Register user IDs, passwords, and security levels using the [Add], [Delete], and [Change] buttons. A maximum of 64 users can be registered. Use eight or less one-byte alphanumeric characters. Input is case-sensitive. * The same user ID cannot be registered more than once. However, the same password can be registered for different user IDs.
Maintain original security level when opening lower security level screen(s) than original security level *1	Select the operation to perform when a screen change occurs. Unselected When switching to a screen with a lower security level, the currently valid security level is also lowered to the level of the target screen. When switching to a higher-security screen next, the operator is prompted to enter a password. Selected The same security level is maintained until the level is changed when another user logs in with a different security level or when the user logs out.
Screen registration Login	Register a login screen. Default: Unregistered, maximum screen number

*1 When the currently displayed screen is switched to a lower-security screen, the security level may be maintained or automatically lowered, depending on the selected option.



- Level lowered — Security level 5 → Security level 0
  * The operator must log in again in order to switch to a higher-security screen.
- Level maintained — Security level 5 → Security level 5
  * The security level is maintained until a login or logout is performed.

3.3 Security Level Settings

The security level can be set at the following three locations. The setting procedure at each location is different.

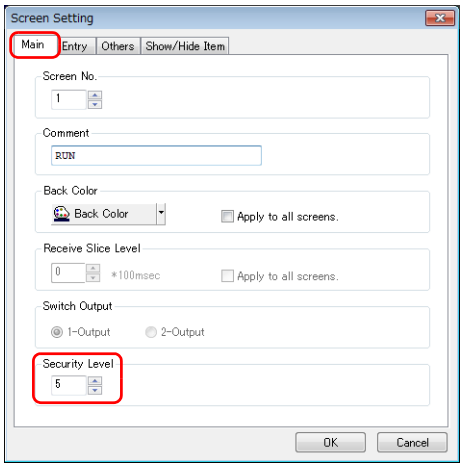
- Screen settings (page 3-6)
- [Show/Hide] settings in the settings window of each part (page 3-7)
- [Interlock] settings in the [Switch] settings window (page 3-8)

Screen Settings

Screen switching can be prohibited according to security level.

Location of settings

[Screen Setting] → [Screen Setting] → [Main] tab window → [Security Level] setting
Security level: 0 to 15



[Show/Hide] Settings in the Settings Window of Each Part

Screen items can be shown or hidden according to their security level.

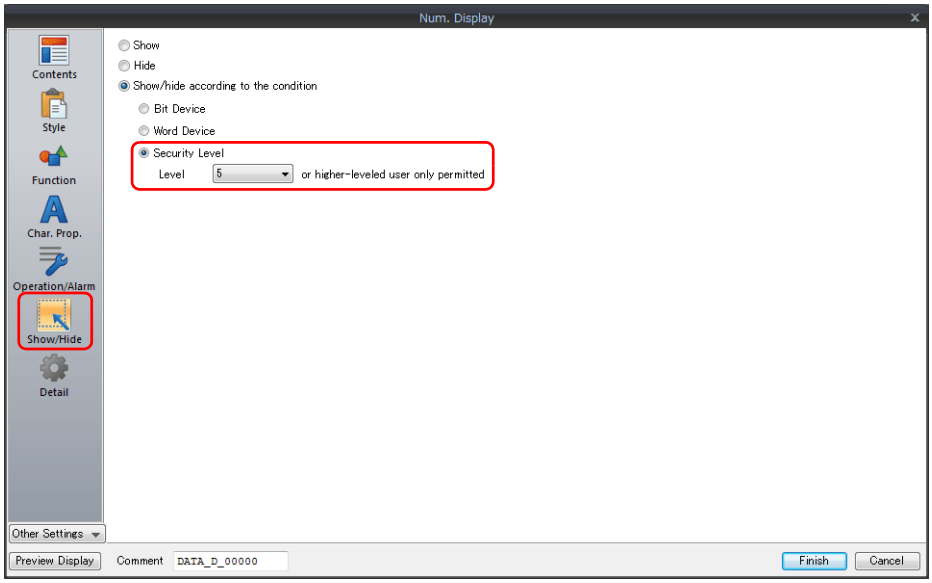
Applicable items

The following items can be configured with security level settings.

- Switches, lamps
- Numerical data displays, character displays, message displays (excluding table data displays)
- Graphs, statistical graphs, closed area graphs
- Linked parts
- Grouped items (including graphic items)

Location of settings

In the setting window of each part, set the security level at [Show/Hide] → [Show/hide according to the condition] → [Security Level].
Security level: 0 to 15

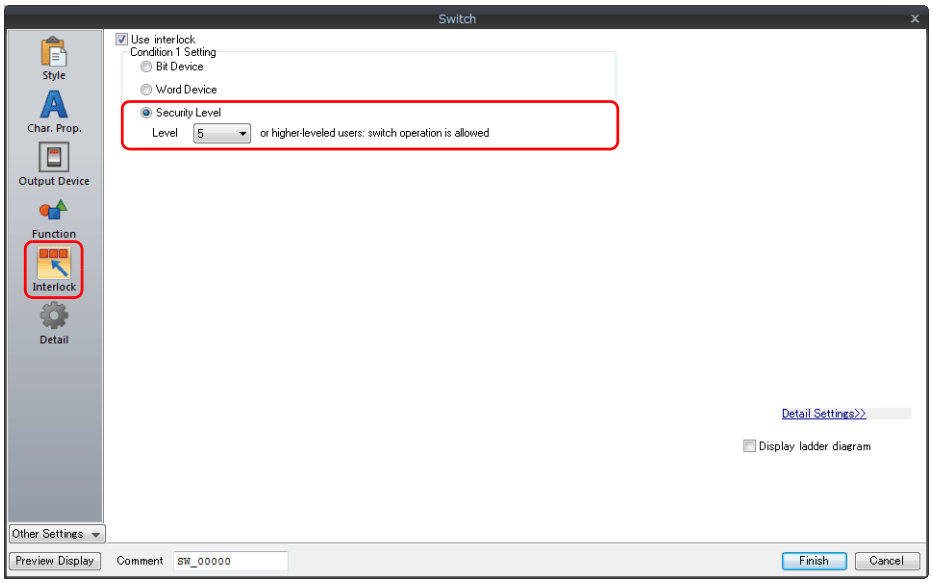


[Interlock] Settings in the [Switch] Settings Window

The operation of switches can be prohibited according to their security level.

Location of settings

In the switch settings window, set the security level at [Interlock] → [Security Level].
Security level: 0 to 15

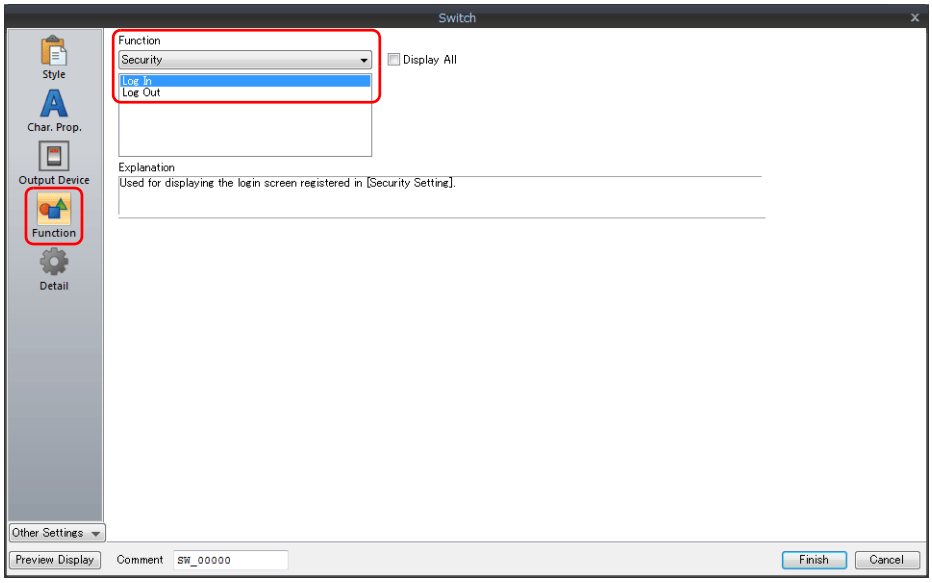


3.4 Login/Logout

The security level can be changed by logging in or out with the screen that is automatically displayed when a screen change occurs as well as by a switch operation.

Location of Settings

Configure the following settings at [Parts] → [Switch] → [Function].



Item	Description
Function	Log In Display the login screen registered at [System Setting] → [Other] → [Security Setting]. Log Out Change the security level to zero (0).

The screen does not change after logging out. When logging out on a low security level screen or using a switch, use in conjunction with the SET_SCRN macro (for screen number change) to change the screen when a user logs out.

3.5 System Device Memory ($s)

The following system device memory are associated with the security function.

Device Memory	Description
$s1360	Stores the current security level (0 to 15) specified when an operator logs into the system.
$s1361	Stores the user ID of the operator who is currently logged into the system.
$s1362	
$s1363	
$s1364	

4 Ethernet Communication Function

4.1 Preface

4.1.1 List of Functions

The TSi features the following Ethernet functions.
An IP address for the TSi unit must be configured in order to use the Ethernet functions. Refer to "4.2 TSi Unit IP Address Settings" page 4-2.
Other settings differ depending on the function to be used.

Function		TS2060i		TS1100Si/TS1070Si		TS2060/TS1070		Refer to
		LAN	CUR-03	LAN	CUR-03	LAN	CUR-03	
Screen program transfer		○	○	○	×	×	×	page 4-6
Simulator		○	○					
PLC communication *1	TCP/IP	○	×					TS2060 Connection Manual TS1000 Smart Connection Manual
	UDP/IP	○	○					
Ladder transfer		○	×					"9 Ladder Transfer"
Macro *2	EREAD/EWRITE	○	○					V8 Series Macro Reference Manual
	MES/SEND	○	○					
DLL communication	HKEtn20.dll *3	○	○					DLL Function Specifications
	VCFAcs.dll	○	○					
FTP server		○	×					page 4-45
E-Mail		○	×					page 4-40
Network camera		○	×					1.2 Network Camera
Remote desktop		○	×					page 4-54
Web server		○	×					page 4-69
VNC server		○	×					page 4-80

*1 For details on selecting TCP/IP and UDP/IP for PLC communication, refer to the TS2060 Connection Manual or the TS1000 Smart Connection Manual.
*2 The network table settings must be configured in the screen program settings.
*3 When using the SEND command, the network table settings must be configured in the screen program settings.

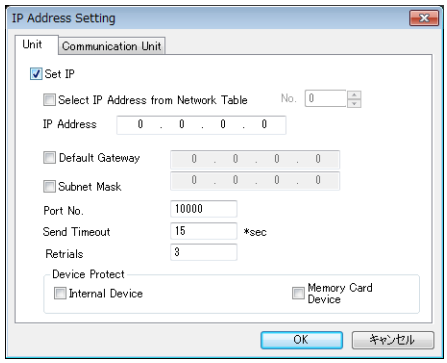
4.2 TSi Unit IP Address Settings

An IP address for the TSi unit must be configured in order to use the Ethernet functions. There are two ways to configure the IP address of the TSi unit: setting using the V-SFT editor or setting using Local mode on the unit.

4.2.1 Setting Using the V-SFT Editor

Set the IP address in the screen program.

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



Item	Description
Select IP Address from Network Table	This setting is available when the IP address of the TSi unit has been registered in the network table. Select a network table number from 0 to 99 to set the IP address.
IP Address *	Set the IP address for the TSi unit.
Default Gateway *	Set the default gateway.
Subnet Mask *	Set the subnet mask. When this checkbox is not selected, the subnet mask is automatically assigned based on the first byte of the IP address. When the IP address is “172.16.200.185”, “255.255.0.0” is set. When IP address is “192.168.1.185”, “255.255.255.0” is set.
Port No. *	Set a port number (1024 to 65535). (except for “8001”)
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 retries to be performed when a timeout occurs.
Device Protect Internal Device Memory Card Device	Select these checkboxes to write-protect the corresponding device memory from PCs or other stations.

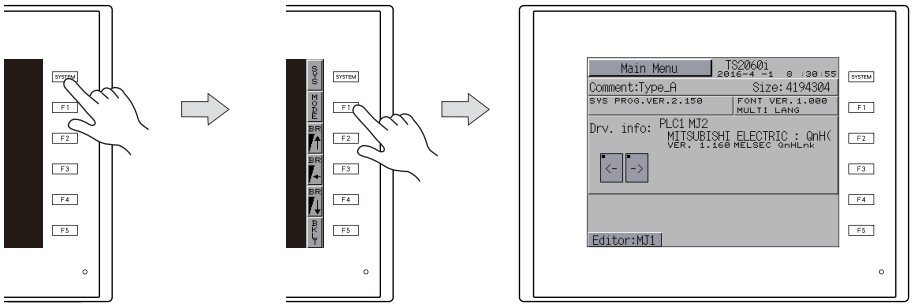
* For details on these settings, refer to page 4-4.

3. Click [OK].
4. Transfer the screen program to the TSi unit.
5. Check the IP address via the [Main Menu] on the unit.

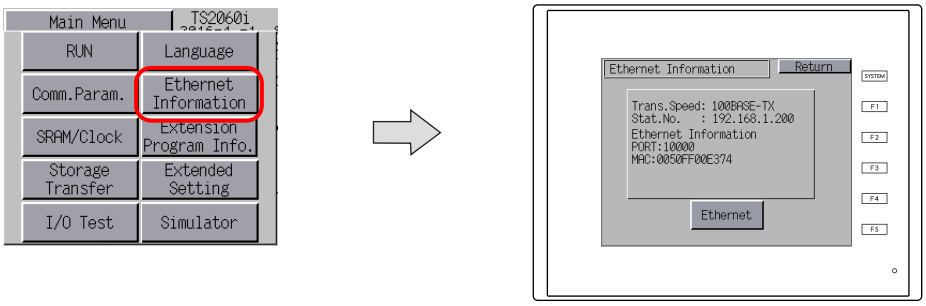
4.2.2 Setting the IP Address via the Main Menu

Set the IP address via the Main Menu.

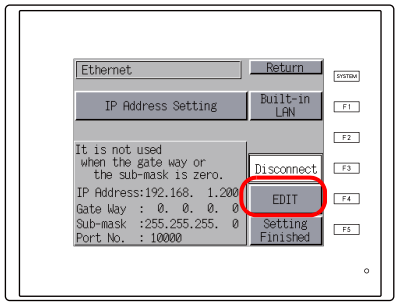
1. Press the [SYSTEM] function switch on the unit to display the MODE menu.
2. With the MODE menu displayed, press the [F1] switch. The Main Menu screen is displayed on the unit.



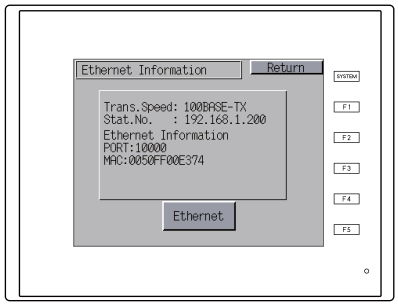
3. Press the [Main Menu] switch at the upper left corner of the screen to display the menu.
4. Press the [Ethernet] switch to display the [Ethernet] screen.



5. Press the [Ethernet] switch, press the [EDIT] switch, and then configure each setting.



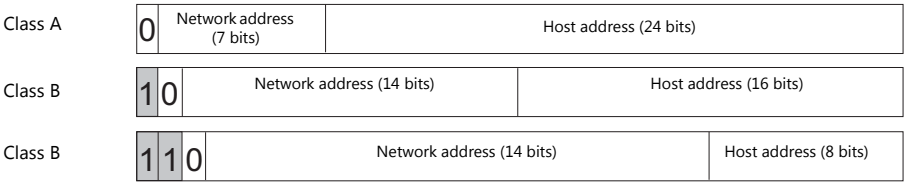
6. Press the [Setting Finished] switch to confirm the setting. Check the IP address on the [Ethernet Information] screen.



4.2.3 Ethernet Terminology

IP Address

This address is used for recognizing each node on the Ethernet network and must be unique.
An IP address is 32-bit data that consists of a network address and a host address, and is classified as 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 following class C IP address is represented as "192.128.1.50".
11000000 10000000 00000001 00110010

Unusable IP addresses

- "0" is specified for the first byte, e.g. 0.x.x.x
- "127" is specified for the first byte (which is reserved as the loop back address), e.g. 127.x.x.x
- "224" or more is specified for the first byte (which is reserved for multi-casting or experiments), e.g. 224.x.x.x
- The host address consists of only "0" or "255" (broadcast address), e.g. 128.0.255.255, 192.168.1.0

Port No.

Multiple applications run 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. While the range of port numbers is 0 to 65535, the lower port numbers of 0 to 1024 are generally reserved for other uses. When assigning port numbers, use numbers higher than 1024.

TSi port numbers

The following port numbers are used on the TSi unit. When changing any port number, select an unused number from the range of 1024 to 65535.

Port No.	Setting Range	Function	Location of Settings
20	Fixed	FTP server	-
21			
25	Fixed	E-mail notification	-
80	Fixed	Web server	-
502	Fixed	Modbus slave (TCP/IP)	-
1024 - 1025	1024 - 65534	Ladder transfer via Ethernet	[System Setting] → [Hardware Setting] → [Ladder Transfer]
1969	1024 - 65535	Network camera (BANNER)	-
5900	Fixed	VNC server	-
8001	Fixed	Screen program transfer *1	Screen program transfer *1
8020	Fixed	Simulator (Ethernet)	-
8050	1024 - 65535	Remote desktop window display	[System Setting] → [Other] → [Remote Desktop Table Setting] → [Local Port No.]
10000	1024 - 65535	Ethernet macros EREAD, EWRITE, SEND, MES	Set in the editor "Setting Using the V-SFT Editor" page 4-2 Set on the unit "Setting the IP Address via the Main Menu" page 4-3
		Ethernet DLL functions HKEtn20.DLL VCFAcs.DLL	
10001 - 10008	1024 - 65535	8-way communication	[System Setting] → [Hardware Setting]→ [Communication Setting] → [Port No.]
10021 - 10028	1024 - 65535	8-way communication	MITSUBISHI ELECTRIC L series (built-in Ethernet) connections only A port number that is 20 higher than the port number set at [System Setting] → [Hardware Setting] → [PLC Properties] → [Communication Setting] → [Port No.] is secured automatically.

Port No.	Setting Range	Function	Location of Settings
50000 - 50002	1024 - 65535	Network camera (AXIS/Panasonic)	-
64000	1024 - 65535	Multi-link2 (Ethernet), 1:n multi-link2 (Ethernet)	[System Setting] → [Hardware Setting] → [Multi-link2 (Ethernet)]

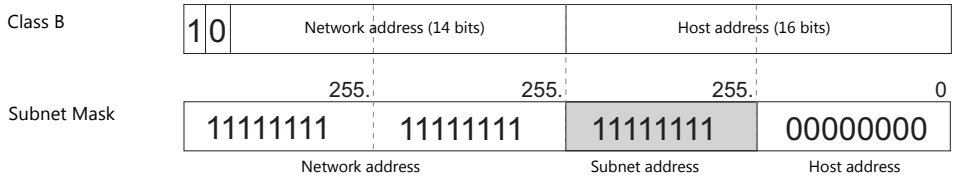
*1 When transferring screen programs over the Internet, specify the router port number in the [Transfer] window of the V-SFT software.

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 (subnets).
A subnet is assigned by specifying a part of the host address in the IP address as the subnet address.

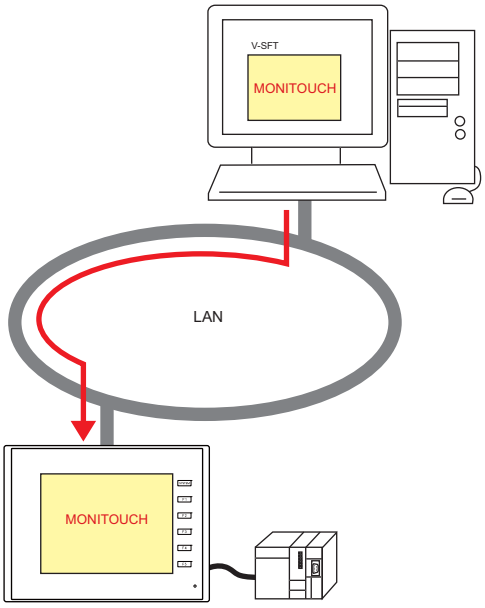


Unusable subnet masks

- When all bits are set to “0”, e.g. 0.0.0.0
- When all bits are set to “1”, e.g. 255.255.255.255

4.3 Screen Program Transfer

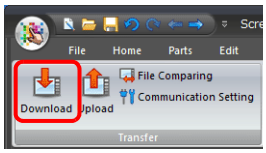
Screen programs can be uploaded and downloaded using Ethernet communication.



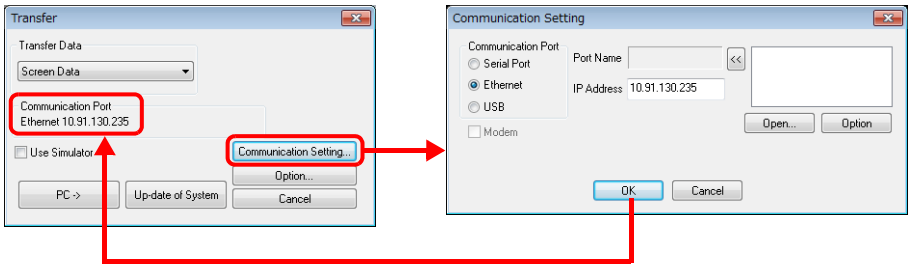
4.3.1 Transfer Procedure

Downloading (PC → TSi)

1. Click [Transfer] → [Download]. The [Transfer] menu is displayed.



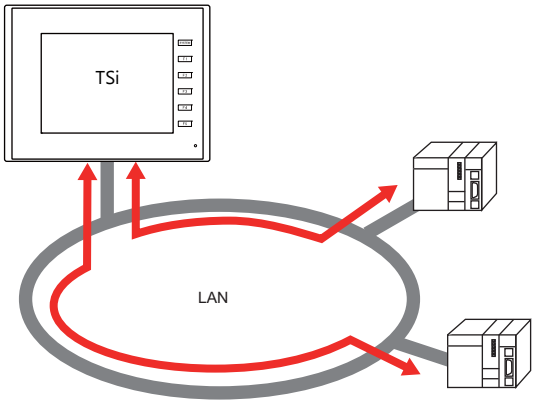
2. Select [Screen Data] for [Transfer Data].
3. Check the [Communication Port] setting.
   - If Ethernet is set and the IP address is correct, proceed to the next step.
   - If [Serial Port] or [USB] is set, click the [Communication Setting] button and select [Ethernet] under [Communication Port].



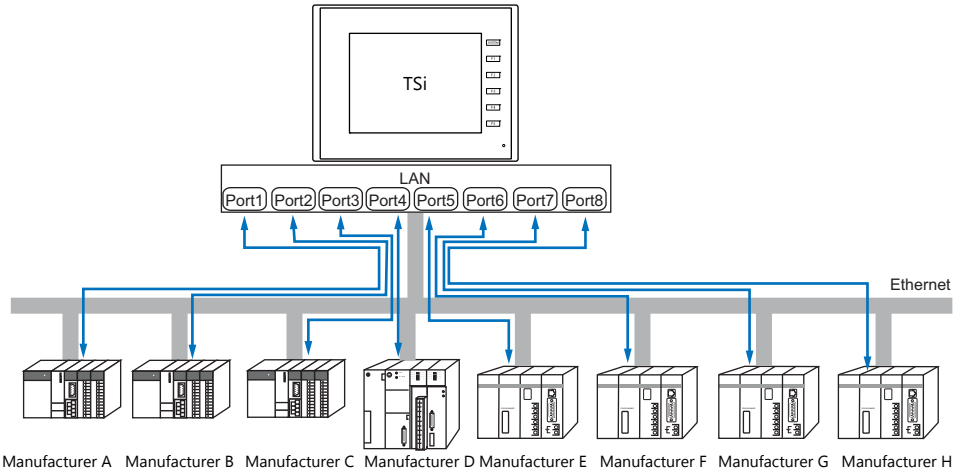
4. Click [PC →] to start the transfer.

4.4 PLC Communication

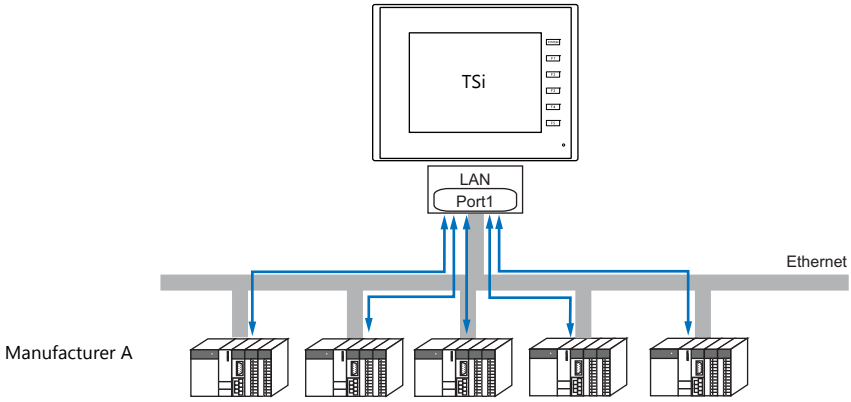
- High-speed communication with the Ethernet port of the PLC can be performed at 100 Mbps or 10 Mbps.



- The TSi unit can open up to eight ports for communication, which means that the unit can simultaneously communicate with up to eight types of PLCs.



- When multiple PLCs of the same model are connected, a single port on the TSi unit can be used to perform 1:n communication with these PLCs.

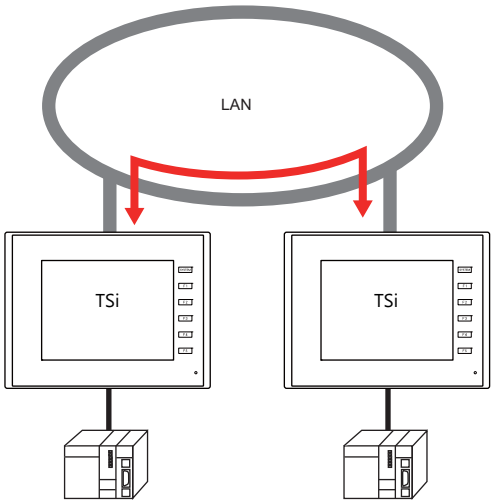


☞ For details on PLC communication, refer to the TS2060 Connection Manual or the TS1000 Smart Connection Manual.

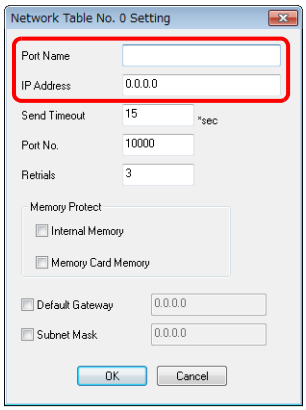
☞ For details on LAN ports available with the TSi unit, refer to "4.1.1 List of Functions" page 4-1.

4.5 Transferring Data Between TSi Units (Macro)

- Communication can be performed and data shared between TSi units on the same LAN using the “EREAD” and “EWRITE” macro commands.



- Network table editing
  Register the IP address of the counterpart unit.



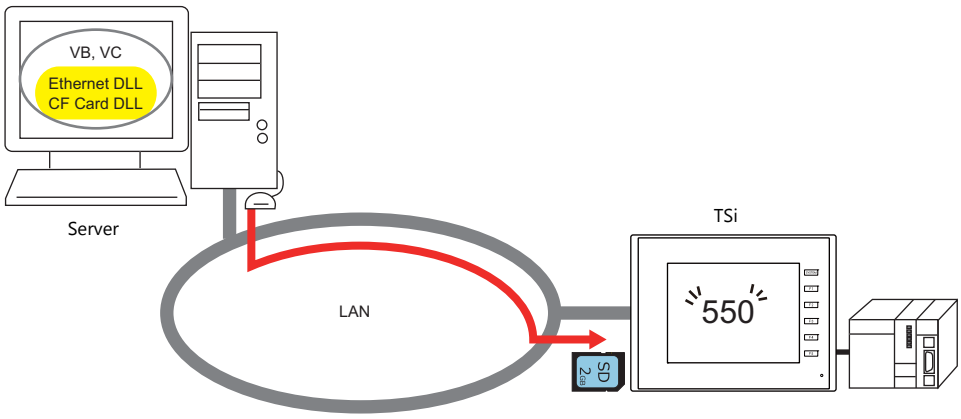
☞ For details on macros, refer to the Macro Reference Manual.

- Network table
  Register the IP address of the counterpart unit in the [Network Table Edit] window in order to specify the destination using a macro.
  Click [System Setting] → [Ethernet Communication] → [Network Table].

☞ For details on LAN ports available with the TSi unit, refer to “4.1.1 List of Functions” page 4-1.

4.6 DLL Communication

- Ethernet access functions (that support UDP/IP) for executing device memory read and write operations with respect to TSi units from a server and CF card access functions for executing read and write file operations on a storage device are provided.
  By creating an application on a server using an environment such as Visual C++ 6.0 and Visual Basic, data can be collected from TSi units and transferred to the server.



☞ For details on DLL functions, refer to the V Series DLL Function Specifications.

☞ For details on LAN ports available with the TSi unit, refer to “4.1.1 List of Functions” page 4-1.

4.7 MES Interface Function

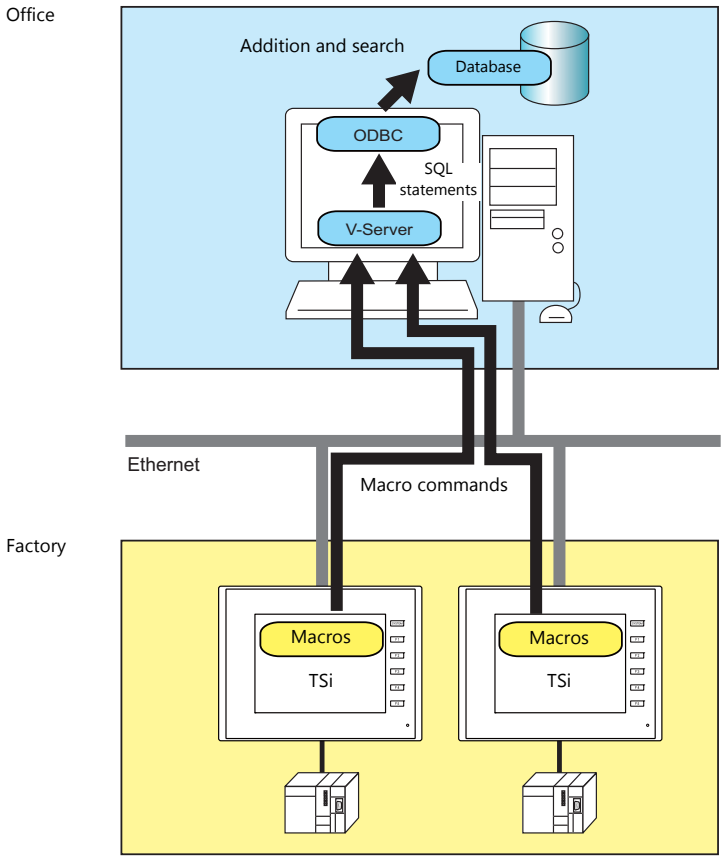
4.7.1 Overview

- The TSi supports the MES interface function.

MES: Manufacturing Execution System

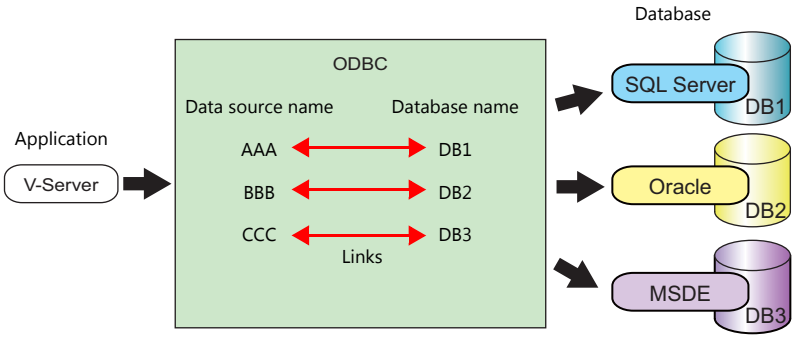
MES provides information necessary to optimize production activities (such as quality, yield, time of delivery, and cost) throughout processes from order receipt until product completion. Based on real-time information obtained from the manufacturing floor, MES serves as a bridge linking management and production, for the purpose of improving management in manufacturing.

- The MES interface function enables the TSi to add, search, and delete data on databases.
  Production control from a PC in the office is made simple by using real-time production information transmitted from the factory to the database.
- The TSi sends commands to V-Server on the PC connected via Ethernet. V-Server sends the commands as SQL statements to ODBC, and ODBC accesses the database.

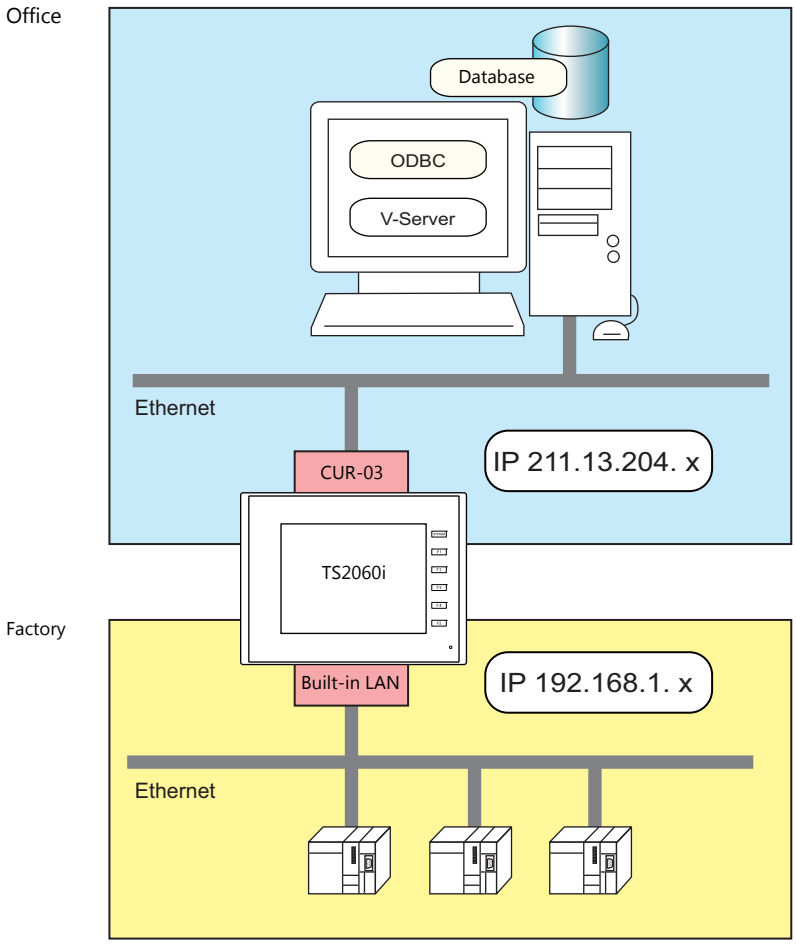


ODBC: Open DataBase Connectivity

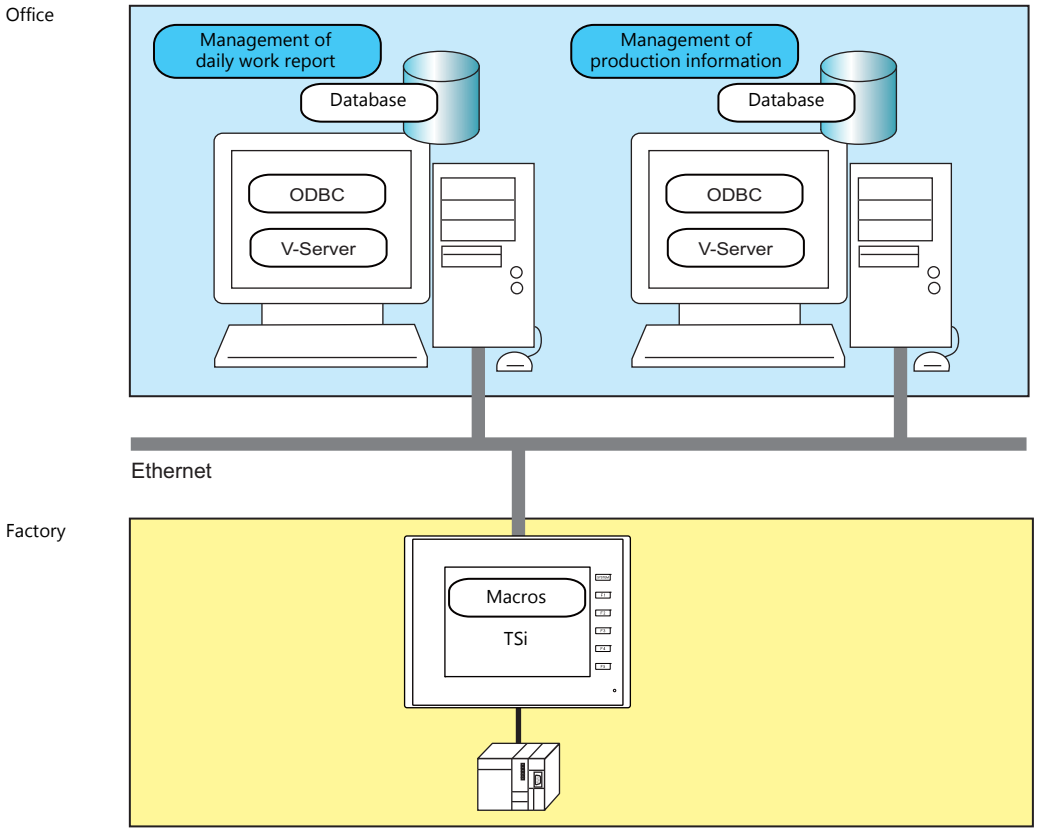
ODBC is the interface between an application (V-Server) and the database.
Because ODBC accommodates the differences in specifications between databases, users only need to create programs based on the ODBC-specified procedure in order to access those databases.



- The TS2060i can be set two IP addresses by using the CUR-03 communication unit so that different networks can be established respectively in the factory and the office. System configuration is therefore made simple in the existing facilities.

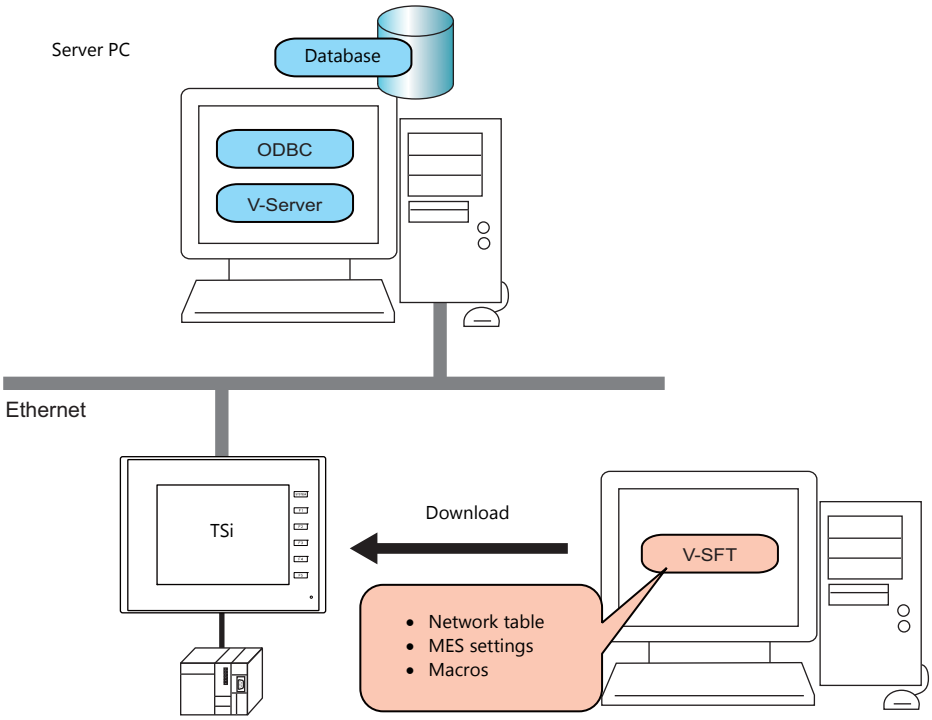


- Separate management through multiple V-Servers is enabled.



4.7.2 System Configuration

System configuration that includes the MES interface function is shown below. This section describes the settings required on the TSi unit and PC.



Required Settings

TSi

Configure the required settings for the TSi in the screen program.

1. Network table editing (page 4-12)
2. IP address settings for the TSi unit (page 4-2)
3. MES setting (page 4-13)
4. Macro programming (page 4-16)

Server PC

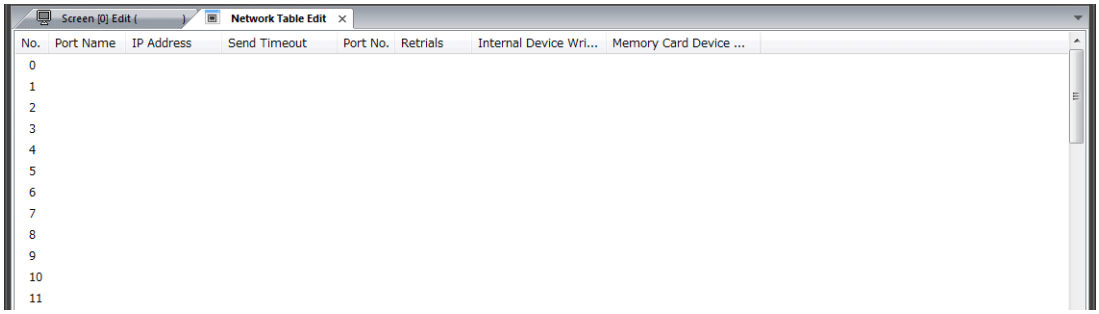
1. V-Server installation (page 4-22)
2. Database installation and table creation (page 4-23)
3. ODBC settings (page 4-35)

4.7.3 TSi Unit Settings

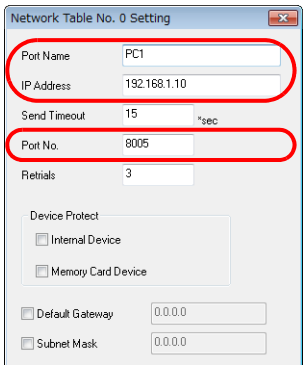
Network Table Editing

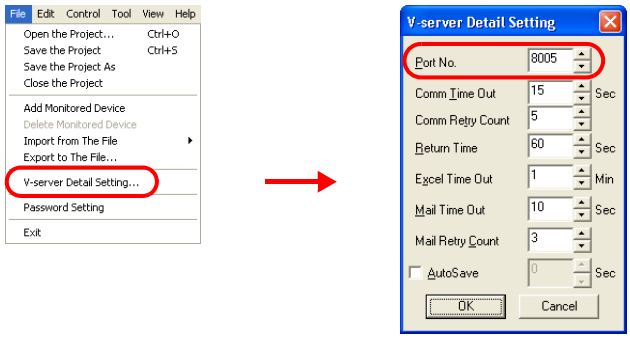
Register the IP address and port number of the PC installed with V-Server in the network table.

1. Click [System Setting] → [Ethernet Communication] → [Network Table]. The [Network Table Edit] window is displayed.



2. Double-click a number in the [No.] column to display the [Network Table No. Setting] window and configure the following settings.

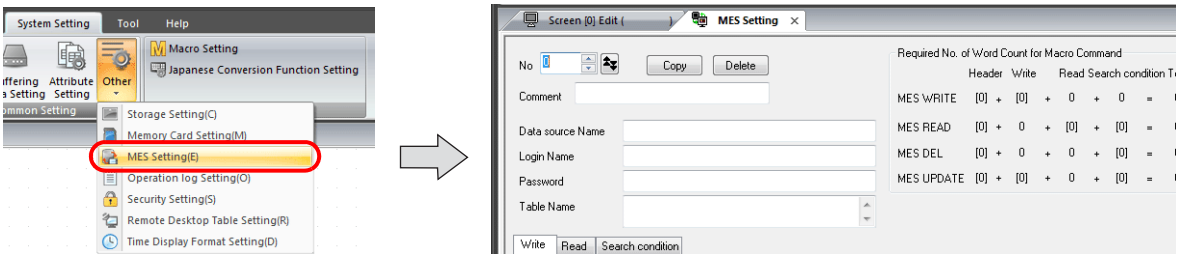


Item	Description
Port Name	Set the name of the PC.
IP Address	Set the IP address of the PC.
Port No.	Specify the port number of V-Server. (Default: 8005) * The port number can be checked in V-Server software via [File] → [V-server Detail Setting] → [Port No.]. 
Send Timeout Retrials Device Protect Default Gateway Subnet Mask	Setting these items is not required when registering the IP address of the PC.

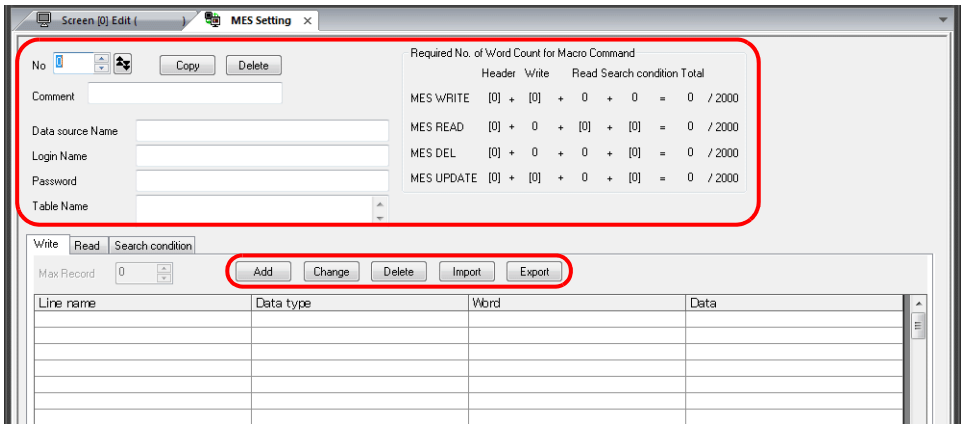
3. Click [OK]. The settings are registered to the network table.
4. If multiple PCs are connected, perform the above registration steps for each PC.

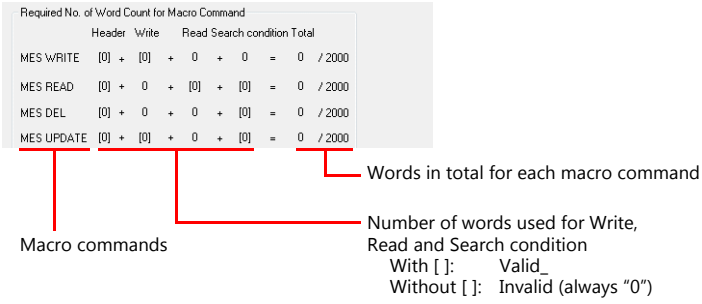
MES Settings

Click [System Setting] → [Other] → [MES Setting]. The [MES Setting] window is displayed.



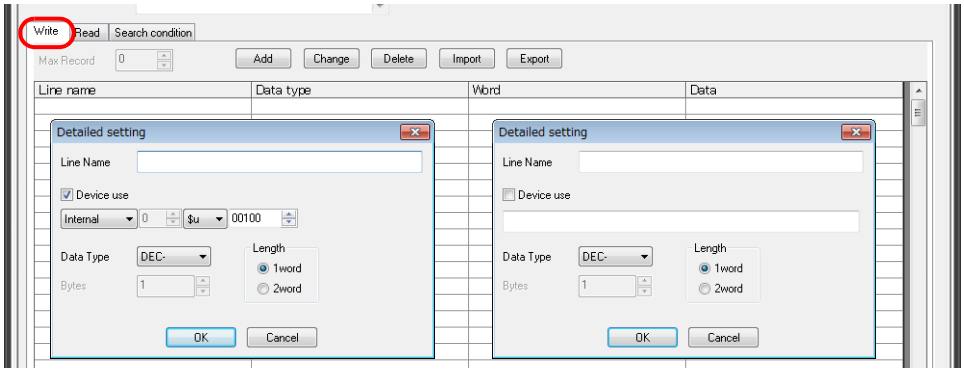
Common settings



Item		Description
No.		Switch between MES setting numbers (0 to 255).
Skip Unregistered No.		Click this button to skip unregistered numbers when switching between MES setting numbers.
Copy		Copy data associated with the current MES settings to the specified destination.
Delete		Delete the current MES settings.
Comment		Enter a comment describing the MES settings. Maximum of 16 one-byte characters (8 two-byte characters.)
Data source Name		Specify the data source name of the database. 32 bytes maximum
Login Name		Specify a login name used for accessing the database. 32 bytes maximum
Password		Specify a password used for accessing the database. 32 bytes maximum
Table Name		Specify the name of the table in the database. 128 bytes maximum
Required No. of Word Count for Macro Command		This area shows the number of words used for each macro command based on the current settings. A number of words more than the maximum of 2,000 is highlighted in red. Adjust the number of registrations, length of line names, and number of words so that 2,000 words are not exceeded. 
Write Read Search condition	Add	Display the [Detailed setting] window. Enter a line name as targeted for writing and the data type in this window. 256 maximum
	Change	Display the [Detailed setting] window. Change the registered settings.
	Delete	Delete the registered settings.
	Import	Import a CSV file into the current MES settings.
	Export	Export the current MES settings into an CSV file.

[Write] tab window

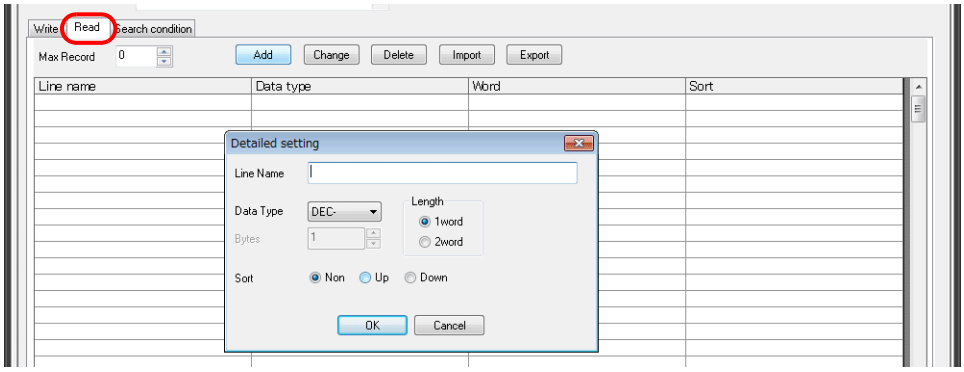
The [Write] tab window is used for adding data to the database.



Item	Description
Line Name	Specify the name of the line to which you will add data. 128 bytes maximum * The line name must not begin with a one-byte numeral. * The following characters cannot be used: ~ - ! , { % } ^ ' & . (/) ` space
Device use	Specify the data for writing. 256 bytes maximum • With device memory specification: Set the device memory address to store the data for writing. Device Memory / Input Type / Text Processing: PLC1 - PLC8 / Depends on the input type of each PLC. Internal / DEC / LSB → MSB • Without device memory specification: Set a constant or fixed string of text.
Data Type Length Bytes	Set the data type of the data for writing, data length, and number of bytes. Data type / Length / Bytes: DEC- / 1 words/2 words / - CHAR / 128 word / 256 bytes maximum BCD / 1 words/2 words / - FLOAT / 2 word / -

[Read] tab window

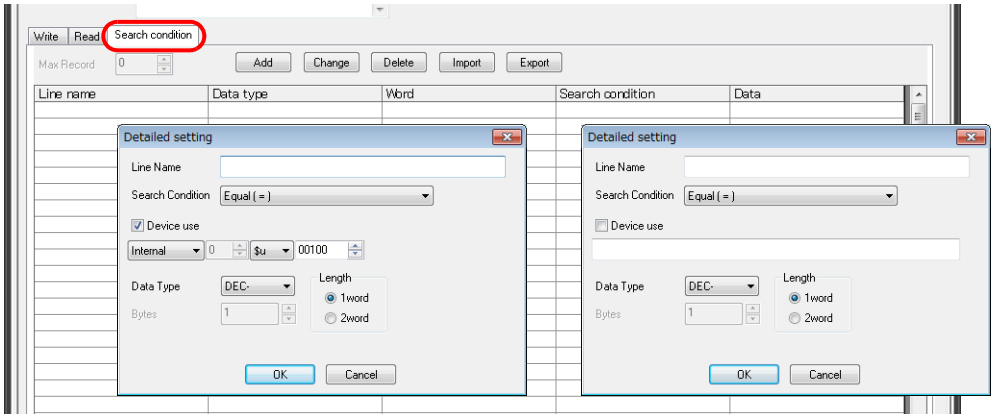
Configure settings for searching the database.



Item	Description
Max Record	Specify the maximum number of records to display in the search results. 65536 maximum
Line Name	Specify the line name targeted in searching. 128 bytes maximum * The line name must not begin with a one-byte numeral. * The following characters cannot be used: ~ - ! , { % } ^ ' & . (/) ` space
Data Type Length Bytes	Specify the data type, data length, and number of bytes of the data targeted in searching. Data type / Length / Bytes: DEC- / 1 words/2 words / - CHAR / 128 word / 256 bytes maximum BCD / 1 words/2 words / - FLOAT / 2 word / -
Sort	Set an option for sorting the search results. Non / Up / Down

[Search condition] tab window

Configure settings for searching the database. This tab is also used to delete data from the database.



Item	Description
Line Name	Specify the line name targeted in searching. 128 bytes maximum * The line name must not begin with a one-byte numeral. * The following characters cannot be used: ~ - ! , { % } ^ ' & . (/) ` space
Search Condition	Set the search conditions. When searching based on multiple conditions, use AND.

Search condition	Remarks
Equal (=)	
Not equal (!=)	
Big (> value)	
Small (< value)	
Upper (>= value)	
Under (<= value)	
Include character string	Wildcard (%) usable Example: AA%: Text beginning with AA to be searched
Update	Extract records that do not match the data for searching from the specified line name. These records are then replaced as the data for searching.

Device use

Specify the data targeted for searching. 256 bytes maximum

- With device memory specification: Set the device memory address to store the data for searching.

Device Memory	Input Type	Text Processing
PLC1 - PLC8	Depends on the input type of each PLC.	
Internal	DEC	LSB → MSB

- Without device memory specification: Set a constant or fixed string of text.

Data Type
Length
Bytes

Specify the data type, data length, and number of bytes of the data targeted in searching.

Data type	Length	Bytes
DEC-	1 words/2 words	-
CHAR	128 word	256 bytes maximum
BCD	1 words/2 words	-
FLOAT	2 word	-

Macros

The MES interface function uses the following five types of macros.

MES macro command list

Category	Command Name	Mnemonic	Description	Refer to
MES	MES	MES CHECK (F1, F2, F3)	V-server start check	page 4-16
		MES WRITE (F1, F2, F3)	Adding data to the database	page 4-17
		MES READ (F1, F2, F3)	Searching the database	page 4-18
		MES DEL (F1, F2, F3)	Deleting data from the database	page 4-19
		MES UPDATE (F1, F2, F3)	Updating the database	page 4-20

MES CHECK (F1, F2, F3)

Function: V-server start check

This macro is used to check whether V-Server at the location specified in table No. [F2] is running. The returned value specified in [F3] is stored in the memory at the return address of [F1].

Device Memory Used

	Internal	PLC1 - 8	Constant
F1	◎		
F2	○		○
F3	○		○

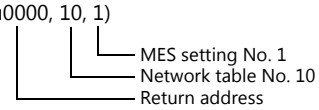
○: Setting enabled (indirect designation disabled) ◎: Setting enabled (indirect designation enabled)

Range

	Value
F0	MES CHECK
F1	Return address
F2	0 to 99: Network table number
F3	0 to 65535 (-32768 to 32767): Return value

Operation Example

MES CHECK ($u0000, 10, 1)



The above macro checks whether V-Server is running on the PC registered to network table number 10. If V-Server is running, a return value of "1" is stored at the return address of $u0000.

Supplementary information

- Execute the macro after setting a value other than the returned value at the return address.
- The execution type of the macro can be set using $s514. For details, refer to page 4-21.
  When a macro command is executed, if "1" (other than "0") is set for $s514 while V-Server is not running, no response is given from V-Server and the TSi unit will enter the standby state. It is recommended to execute this command when "0" is set for $s514.
- The result of the macro execution is stored in the device memory address $s515. For details, refer to page 4-21.
- The returned value will not be placed at the [F1] return address immediately. Monitor the [F1] return address using an event timer macro, etc.
- If an error occurs when writing the result (return value, data retrieved by a search) of accessing database, the result and log data is not output to the TSi unit.

MES WRITE (F1, F2, F3)

Function: Adding data to the database

This macro is used to add the data set on the [Write] tab window under MES setting No. [F3] to the database. The data is added using V-Server at the location specified in table No. [F2]. The result is stored at the [F1] return address.

Device Memory Used

	Internal	PLC1 - 8	Constant
F1	◎		
F2	○		○
F3	○		○

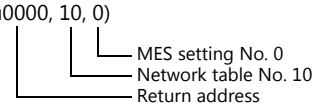
○: Setting enabled (indirect designation disabled) ◎: Setting enabled (indirect designation enabled)

Range

	Value	
F0	MES WRITE	
F1	Return address	Return value 0: Normal termination -1: Ended in error
F2	0 to 99: Network table number	
F3	0 to 255: MES setting No.	

Operation Example

MES WRITE ($u0000, 10, 0)



The above macro adds data to the database of the PC specified in network table No. 10. The data to be added depends on the settings made for MES setting No. 0. When the data update is completed normally, a return value of "0" is stored at the return address of $u0000.

Supplementary information

- The execution type of the macro can be set using $s514. For details, refer to page 4-21.
- The result of the macro execution is stored in the device memory address $s515.
  -40: The [Write] tab window setting is not made in the specified MES setting number, or any setting error is found.
  For details on other error numbers, refer to page 4-21.
- The returned value will not be placed at the [F1] return address immediately. Monitor the [F1] return address using an event timer macro, etc.
- The primary key for V-Server must be set to the database table. (page 4-32)
- If an error occurs when writing the result (return value, data retrieved by a search) of accessing database, the result and log data is not output to the TSi unit.

MES READ (F1, F2, F3)

Function: Searching the database

This macro is used to search the line set on the [Read] tab window for MES setting No. [F3]. The search is performed based on the specified search conditions via V-Server at the location specified in table No. [F2]. The result is stored at the [F1] return address.

Device Memory Used

	Internal	PLC1 - 8	Constant
F1	◎		
F2	○		○
F3	○		○

○: Setting enabled (indirect designation disabled) ◎: Setting enabled (indirect designation enabled)

Range

	Value
F0	MES READ
F1	Return address
F2	0 to 99: Network table number
F3	0 to 255: MES setting No.

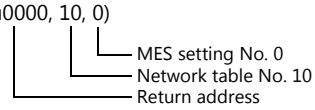
Return address

The following data is stored at the addresses starting from the [F1] return address.

Return address	Value
n	Execution result Normally finished: 0 Error: Other than 0
n+1	Number of retrieved records The number of records that match the search conditions is stored. If no records are found, 0 is stored. The maximum number of records is set on the [Read] tab window in the MES settings.
n+2 -	Obtained data 1 The retrieved data is stored in the format specified on the [Read] tab window in the MES settings.
:	Obtained data 2
:	Obtained data 3
:	:
:	Obtained data m (maximum number of records)

Operation Example

MES READ ($u0000, 10, 0)



The above macro searches the database on the PC specified in network table No. 10.

The search is performed according to the settings on the [Read] and [Search condition] tab windows for MES setting No. 0. When the search is completed normally, a return value of "0" and the obtained data are stored at the addresses starting from the return address of $u0000.

Supplementary information

- The execution type of the macro can be set using $s514. For details, refer to page 4-21.
- The result of the macro execution is stored in the device memory address $s515.
  -40: The [Read] tab window setting is not made in the specified MES setting number, or any setting error is found.
  For details on other error numbers, refer to page 4-21.
- The returned value will not be placed at the [F1] return address immediately. Monitor the [F1] return address using an event timer macro, etc.
- If settings are not configured on the [Search condition] tab window for the specified MES setting number, all records are extracted as the results of the search.
- If an error occurs when writing the result (return value, data retrieved by a search) of accessing database, the result and log data is not output to the TSi unit.

MES DEL (F1, F2, F3)

Function: Deleting records from the database

This macro is used to search the database according to the settings on the [Search condition] tab window for MES setting No. [F3]. The search is performed via V-Server at the location specified in table No. [F2]. The records that match the conditions are deleted. The result is stored at the [F1] return address.

Device Memory Used

	Internal	PLC1 - 8	Constant
F1	◎		
F2	○		○
F3	○		○

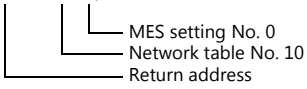
○: Setting enabled (indirect designation disabled) ◎: Setting enabled (indirect designation enabled)

Range

	Value	
F0	MES DEL	
F1	Return address	Return value 0: Normal termination -1: Ended in error
F2	0 to 99: Network table number	
F3	0 to 255: MES setting No.	

Operation Example

MES DEL ($u0000, 10, 0)



The above macro searches the database of the PC specified in network table No. 10 and deletes the retrieved data. The search is performed according to the settings on the [Search condition] tab window for MES setting No. 0.

When the data deletion is completed normally, a return value of "0" is stored at the return address of $u0000.

Supplementary information

- The execution type of the macro can be set using $s514. For details, refer to page 4-21.
- The result of the macro execution is stored in the device memory address $s515.
  -40: The [Search condition] tab window setting is not made in the specified MES setting number, or any setting error is found.
- For details on other error numbers, refer to page 4-21.
- If an error occurs when writing the result (return value, data retrieved by a search) of accessing database, the result and log data is not output to the TSi unit.

MES UPDATE (F1, F2, F3)

Function: Updating the database

This macro is used to search the line set on the [Write] tab window for MES setting No. [F3]. The search is performed based on the specified search conditions via V-Server at the location specified in table No. [F2], and then the database is updated. The result is stored at the [F1] return address.

Device Memory Used

	Internal	PLC1 - 8	Constant
F1	◎		
F2	○		○
F3	○		○

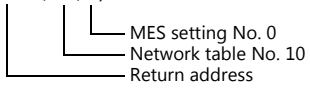
○: Setting enabled (indirect designation disabled) ◎: Setting enabled (indirect designation enabled)

Range

	Value	
F0	MES UPDATE	
F1	Return address	Return value 0: Normal termination -1: Ended in error
F2	0 to 99: Network table number	
F3	0 to 255: MES setting No.	

Operation Example

MES UPDATE ($u0000, 10, 0)



The above macro searches the database on the PC specified in network table No. 10 and updates the database. The search is performed according to the settings on the [Write] and [Search condition] tab windows for MES setting No. 0.
When the data update is completed normally, a return value of "0" is stored at the return address of $u0000.

Supplementary information

- The execution type of the macro can be set using $s514. For details, refer to page 4-21.
- The result of the macro execution is stored in the device memory address $s515.
  -40: Settings are not configured on the [Write] or [Search condition] tab window for the specified MES setting number, or any setting error is found.
  For details on other error numbers, refer to page 4-21.
- The returned value will not be placed at the [F1] return address immediately. Monitor the [F1] return address using an event timer macro, etc.
- This macro command cannot be executed when "Update" is set on the [Search condition] tab window.
- If an error occurs when writing the result (return value, data retrieved by a search) of accessing database, the result and log data is not output to the TSi unit.

System Device Memory ($s)

The system device memory related to MES macros are shown below.

Addresses	Description	Remarks
$s512	Selection from two Ethernet ports 0: LAN 1: CUR-03	→ TSi
$s514	Macro Wait request MSB LSB 15 14 13 12 11 10 09 08 07 06 05 04 03 02 01 00 0 0 0 0 0 0 0 0 0 0 0 0 0 0 System reserved (setting 0) Wait request 0: No 1: Yes	→ TSi
$s515	Macro Wait request execution result	TSi →

$s514, 515

Device memory related to MES macros and Ethernet macros (SEND/EREAD/EWRITE).
Executed with respect to the port specified with $s512.

- $s514: Set whether a macro wait request is on or off.
  - [0]: No wait
    During the execution of a macro command, the execution of the next macro command takes place before the completion of the current one.
  - Other than [0]: With wait
    During the execution of a macro command, the next macro command is put on hold and is executed after the completion of the current command.

* In the case of successive accesses to the same port on one single macro sheet, specify a value other than “0” (with wait). If “0” (no wait) is specified, a macro command issued afterward will not be accepted.

- $s515: Store the macro execution result.
  When $s514 is set to “0”, the issue of a macro command is stored. When $s514 is set to “1”, the response returned for the command is stored.

Code	Description	Solution
0	Normal	-
200 - 2000	Communication error	Refer to the TS2060 Hardware Specifications or the TS1000 Smart Hardware Specifications.
-30	Timeout	Check whether an error has occurred on the destination TSi unit.
-31	Number of words for sending exceeded	Use the macro editor to check the number of words for sending.
-32	The specified table is not used.	Check the network table settings.
-33	The send command cannot be used.	Use the macro editor to check the macro command.
-34	The specified table is in use.	Check whether system device memory address $s514 is set. If it is not to be set, reduce the number of communications.
-35	Processing impossible due to insufficient memory	Check the memory availability of the counterpart device.
-40	Setting data error	Check that [Write], [Read], and [Search condition] settings are configured for the specified MES setting number. Check that the set data is correct.

4.7.4 V-Server

V-Server

Hakko Electronics V-Server is the software that enables accesses to databases.
Once V-Server is installed on a PC, no additional configuration is needed. The system requirements for V-Server are listed in the table below.

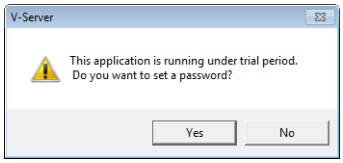
System requirements

Item	Description
PC	Pentium 4, 1 GHz equivalent or higher
OS	Windows 98 / Me / NT Ver.4.0 / 2000 / 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) / Server 2008 R2 / Server 2012
Memory	Min. 256 MB
Hard disk	Min. 1 GB of free disk space
Database	SQL Server (Microsoft) MSDE (Microsoft) Oracle (Oracle Corporation)

Installation

1. Download the V-Server software to your PC from the Hakko Electronics website at the following URL.
   http://monitouch.fujielectric.com/site/support-e/download-index-01.html
2. Install V-Server on the PC.
3. Start V-Server.

* The message that appears at start-up indicates that V-Server is usable for one hour.
To use V-Server without this limitation, please apply for a software license and obtain a password. For details, refer to the TELLUS and V-Server Manual.



4.7.5 Database

Types of Databases

The following databases can be used.

- SQL Server: Microsoft
- MSDE: Microsoft
- Oracle: Oracle Corporation

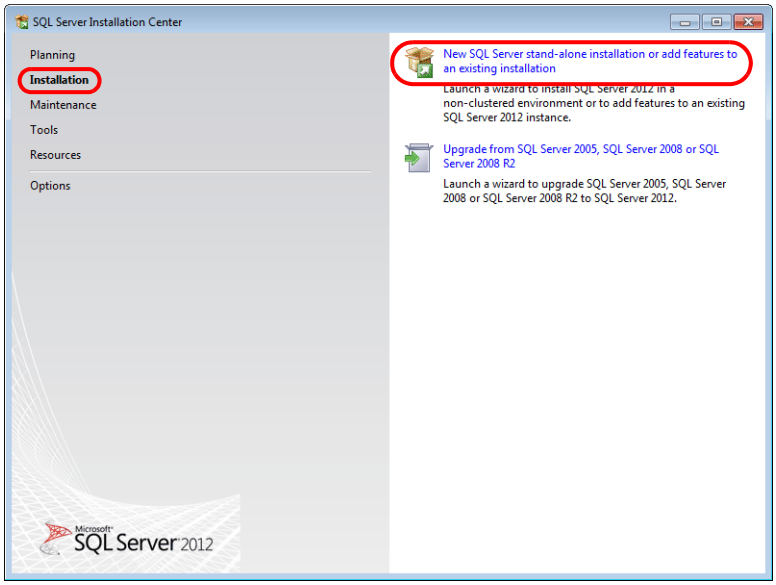
This manual describes an example of configuration using Microsoft SQL Server 2012 Express Edition.

SQL Server 2012 Express Edition
This is a simplified version of SQL Server 2012. This software can be downloaded free of charge from Microsoft's website.

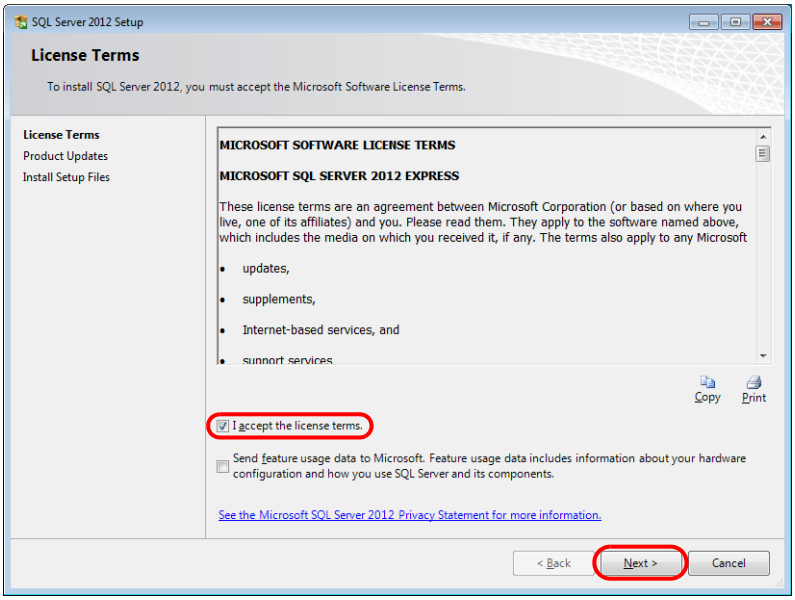
SQL Server 2012 Express Edition

Installation

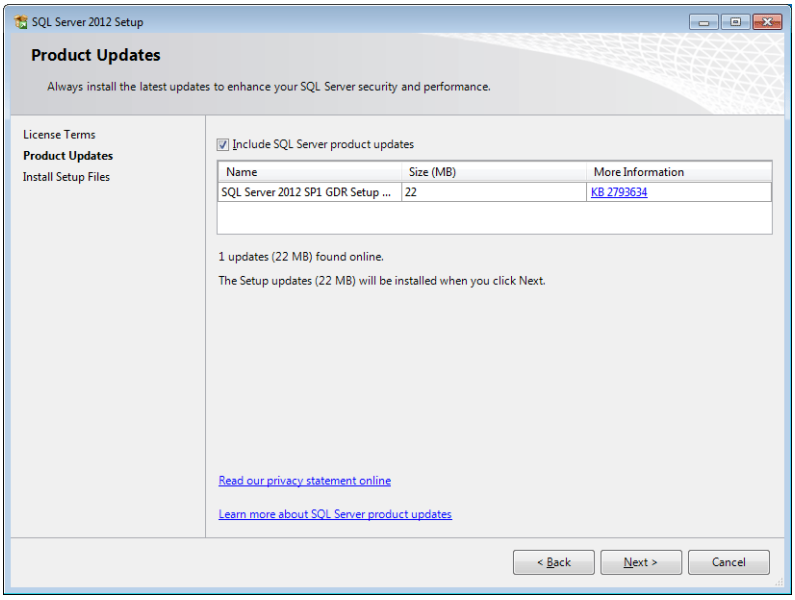
1. Download SQL Server 2012 Express Edition from Microsoft's website.
2. Double-click the downloaded executable file.
3. The [SQL Server Installation Center] window is displayed. Select [New SQL Server stand-alone installation or add features to an existing installation].



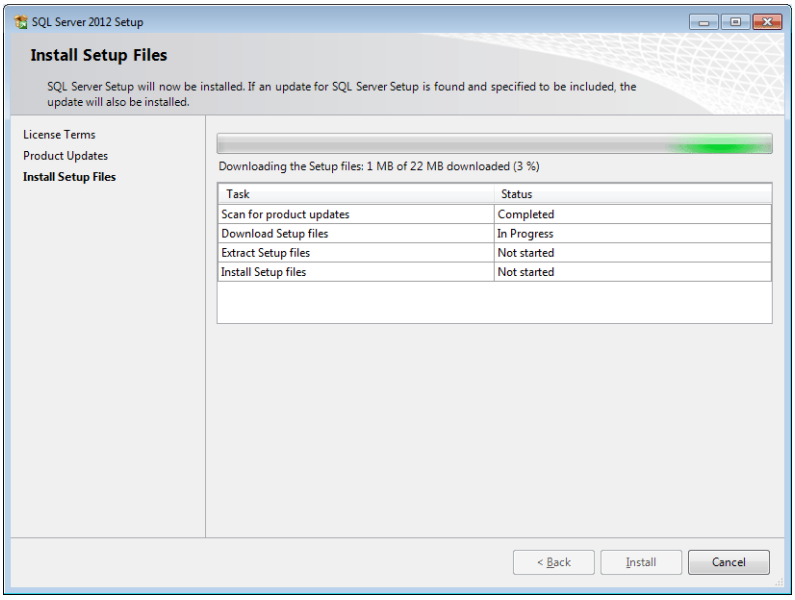
4. The license terms are displayed. Select the [I accept the license terms.] checkbox and click the [Next] button.



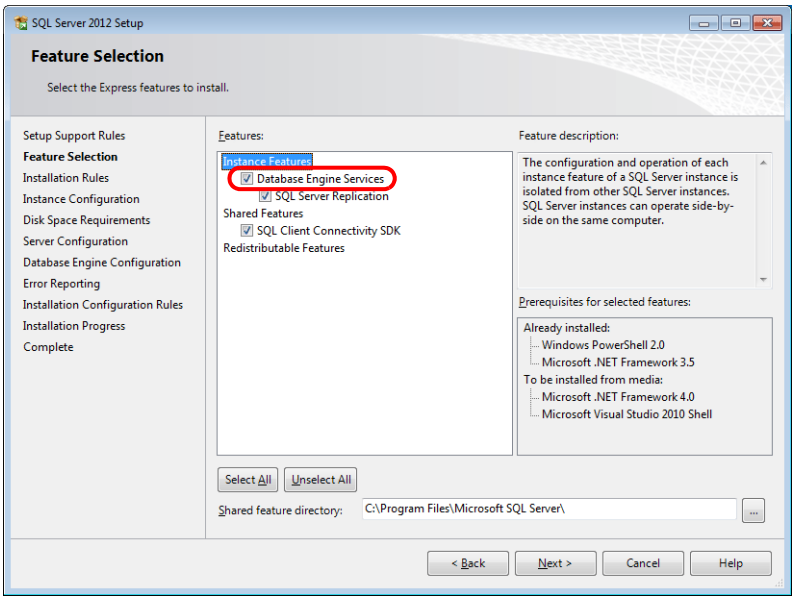
5. The [Product Updates] window is displayed. Proceed by following the instructions.



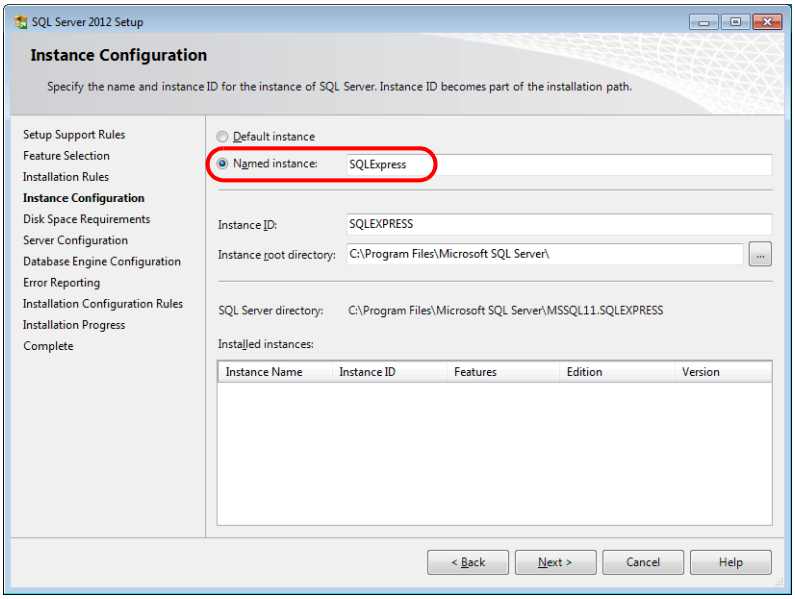
6. The [Install Setup Files] window is displayed and installation of setup files starts.



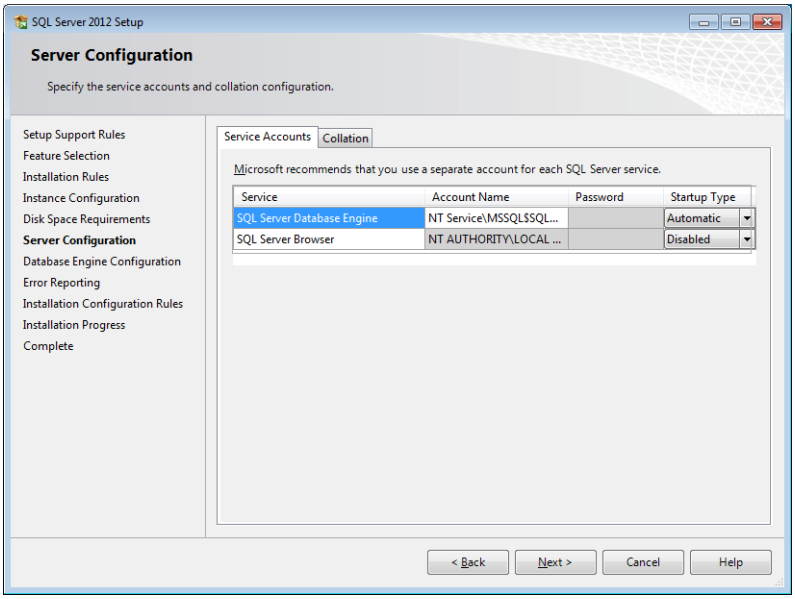
7. The [Feature Selection] window is displayed. Select [Database Engine Services].



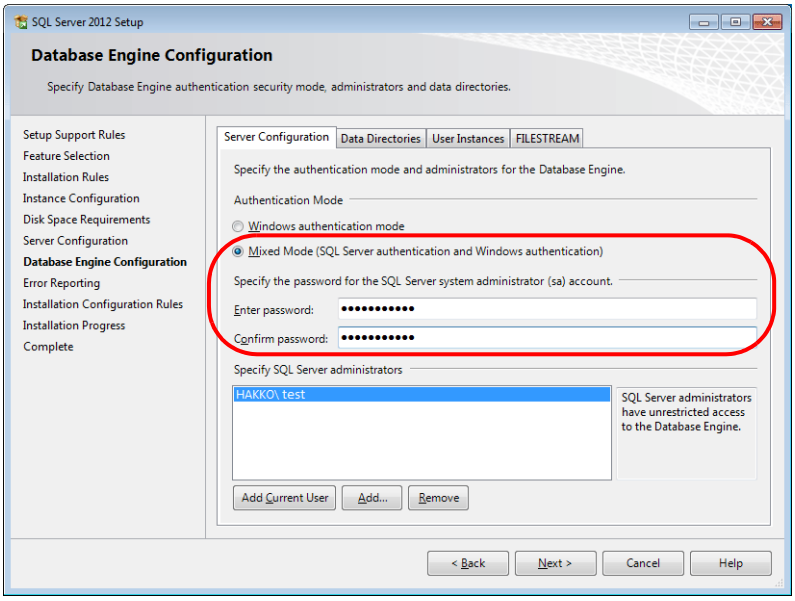
8. The [Instance Configuration] window is displayed. Select the [Named instance] radio button and proceed to the next screen.



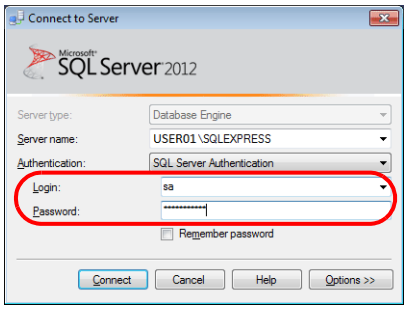
9. The [Server Configuration] window is displayed. Click the [Next] button.

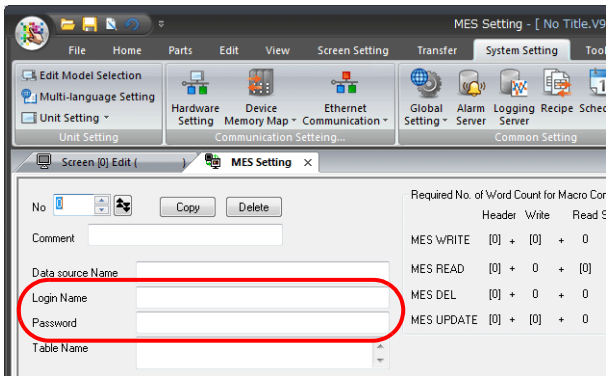


10. The [Database Engine Configuration] window is displayed. Select [Mixed Mode] and enter a password.

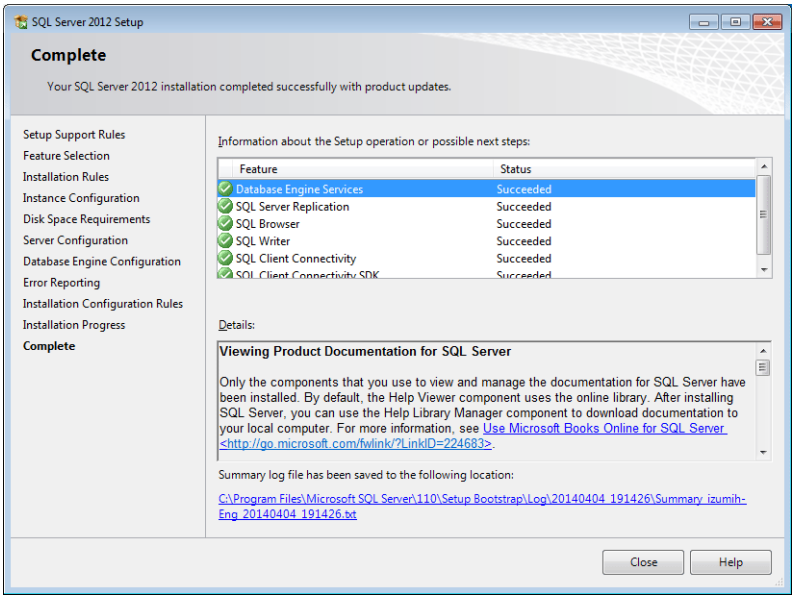


The password is required when connecting to the database and configuring MES settings in V-SFT. Take care managing your password and do not lose it.

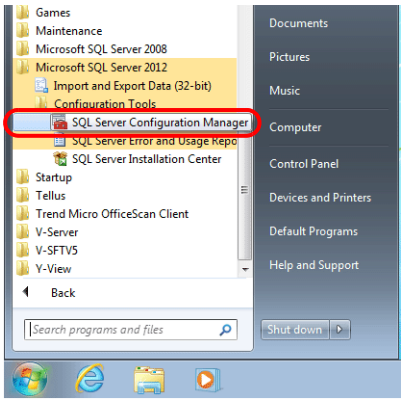




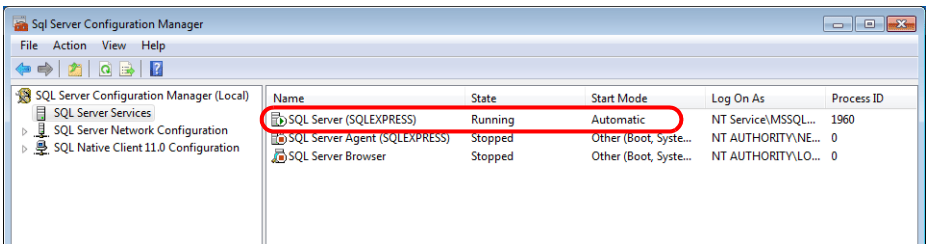
11. The [Error Reporting] window is displayed. Click [Next] to start installation.
12. The [Complete] window is displayed when installation is finished. Click the [Close] button to exit.



13. Restart the PC.
14. From the Windows [Start] menu, click [All Programs] → [Microsoft SQL Server 2012] → [Configuration Tools] → [SQL Server Configuration Manager].



15. SQL Server Configuration Manager starts. Check that SQL Server (SQL Express) is running.



This completes the installation procedure.

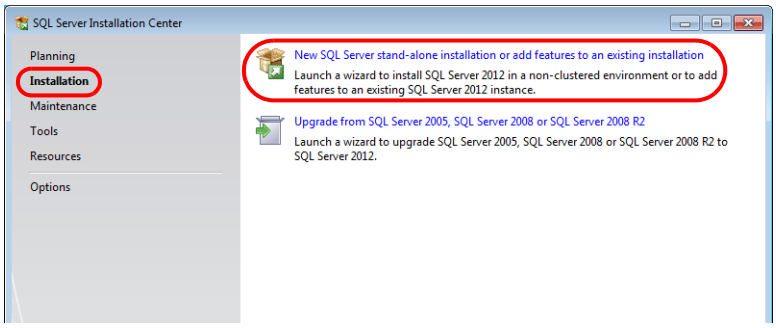
Creating an SQL Server Database

An SQL Server database can be created using SQL Server Management Studio Express.

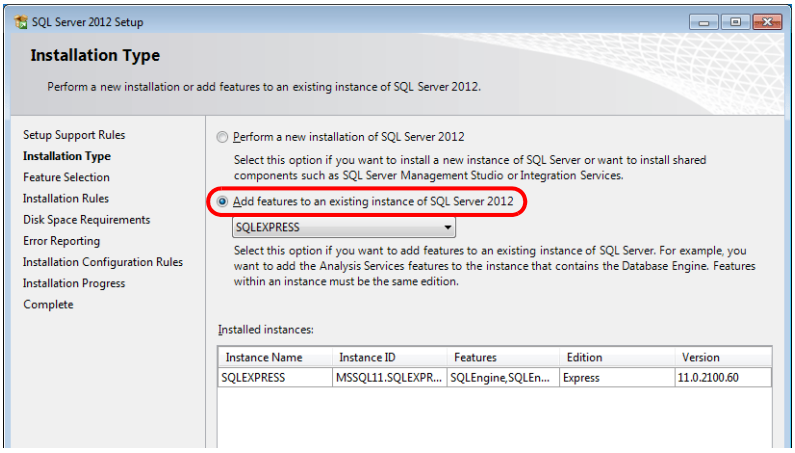
Microsoft SQL Server Management Studio Express: SSMSE
An easy-to-use, graphical management tool intended for management of SQL Server 2012 Express Edition.

Installation

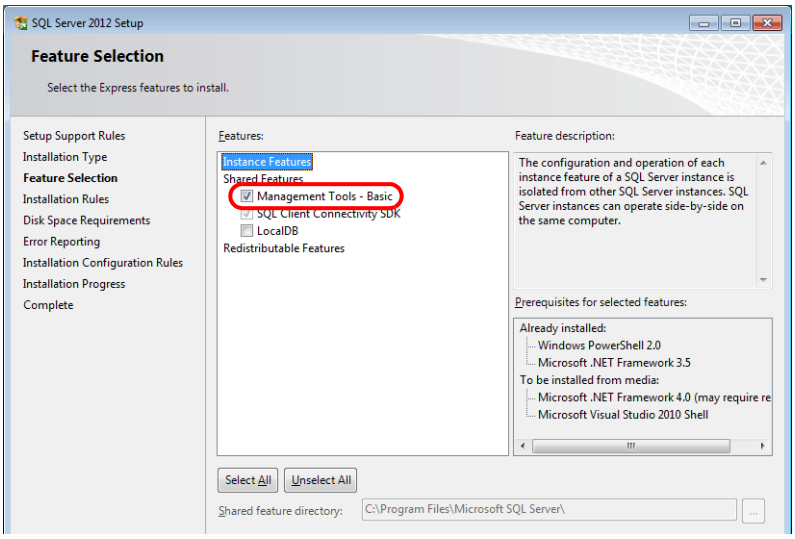
1. Download SQL Server Management Studio Express from Microsoft's website.
2. Double-click the downloaded file.
3. The [SQL Server Installation Center] window is displayed. Select [New SQL Server stand-alone installation or add features to an existing installation].



4. The [Product Updates] window is displayed. Proceed by following the instructions.
5. The [Installation Type] window is displayed. Select the [Add features to an existing instance of SQL Server 2012] radio button.

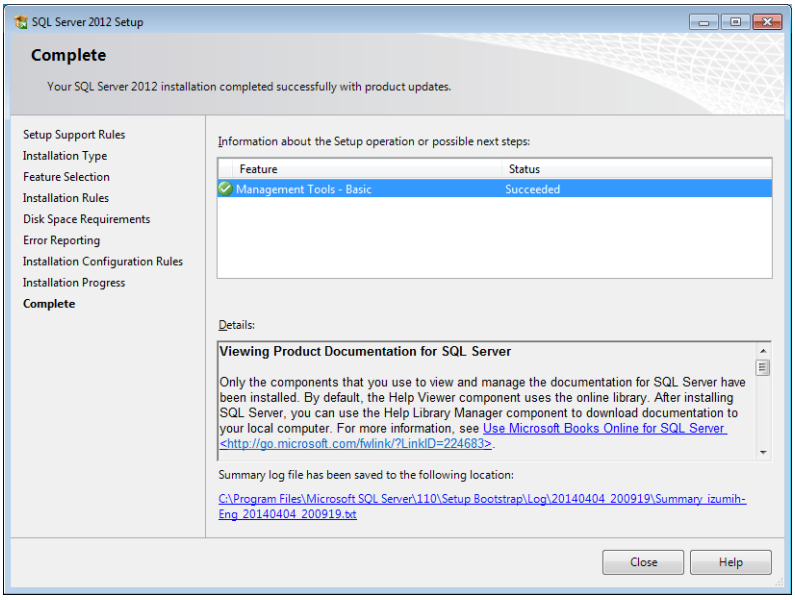


6. The [Feature Selection] window is displayed. Select the [Management Tools - Basic] checkbox.



7. Click [Next] to start installation.

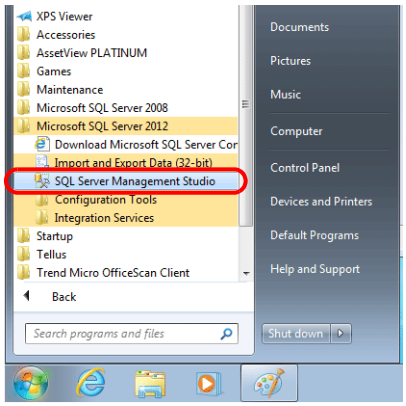
8. The [Complete] window is displayed when installation is finished. Click the [Close] button to exit.



9. Restart the PC.
   This completes the installation procedure.

Starting SQL server management studio express

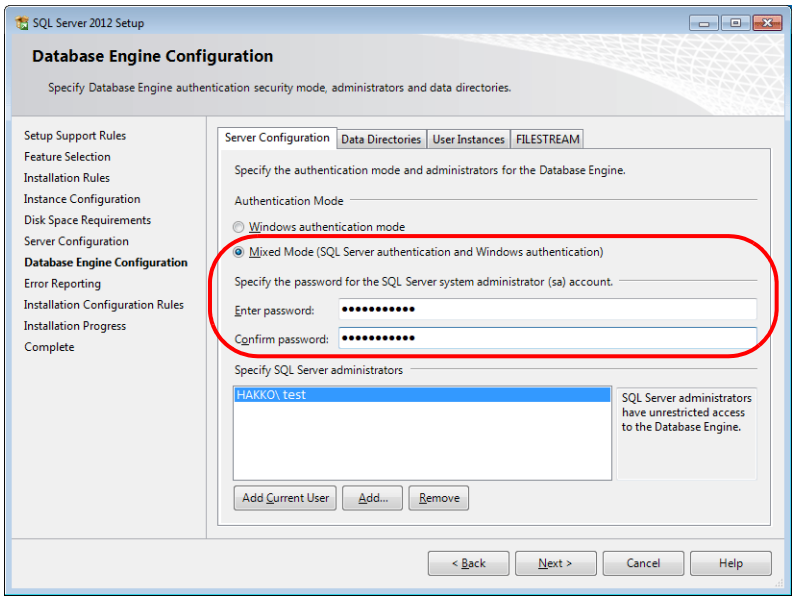
1. From the Windows [Start] menu, click [All Programs] → [Microsoft SQL Server 2012] → [SQL Server Management Studio].



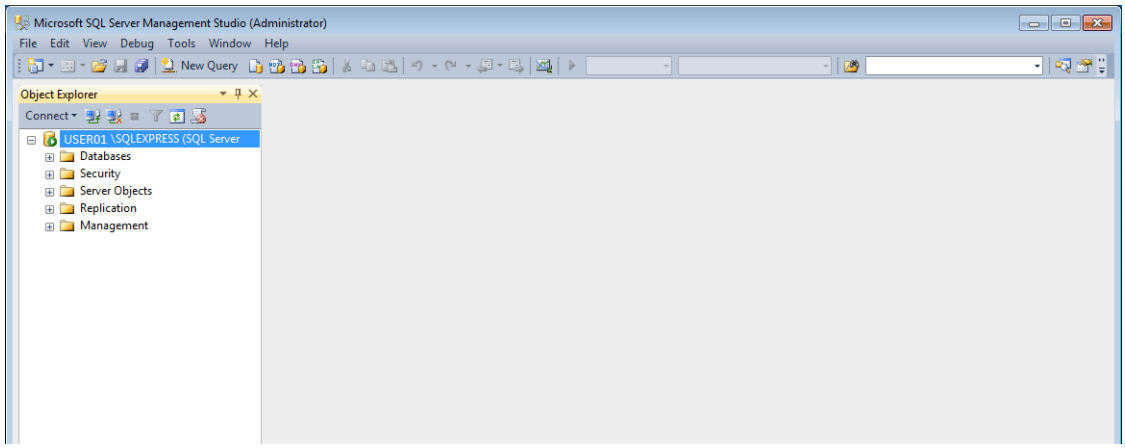
2. The [Connect to Server] window is displayed. Enter the required information and click the [Connect] button.

Item	Description
Server name	Select the server name of the SQL Server.
Authentication	Select “SQL Server Authentication”.
Login	Enter a user name. The user name “sa” is entered in this example.
Password	Enter the password.

The password for "sa" was specified on the [Authentication Mode] window displayed during installation of SQL Server 2012 Express Edition (see page 4-26).

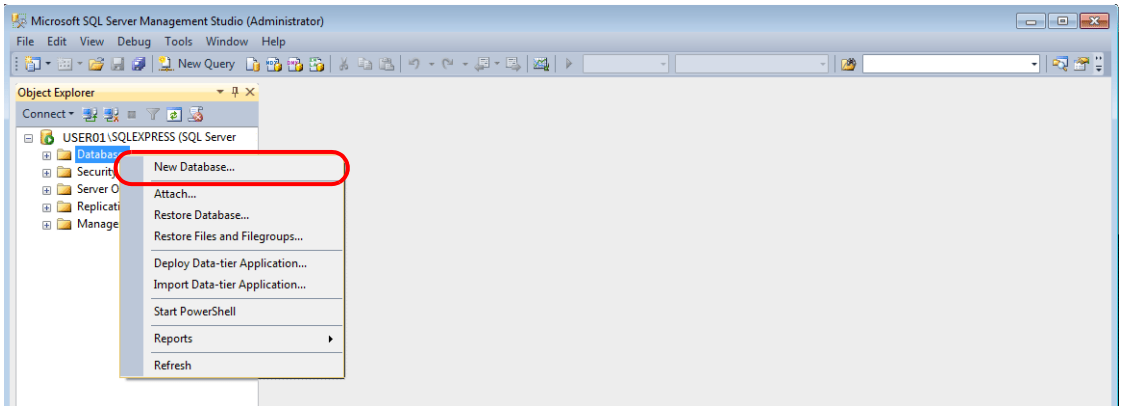


3. SQL Server Management Studio Express starts up.

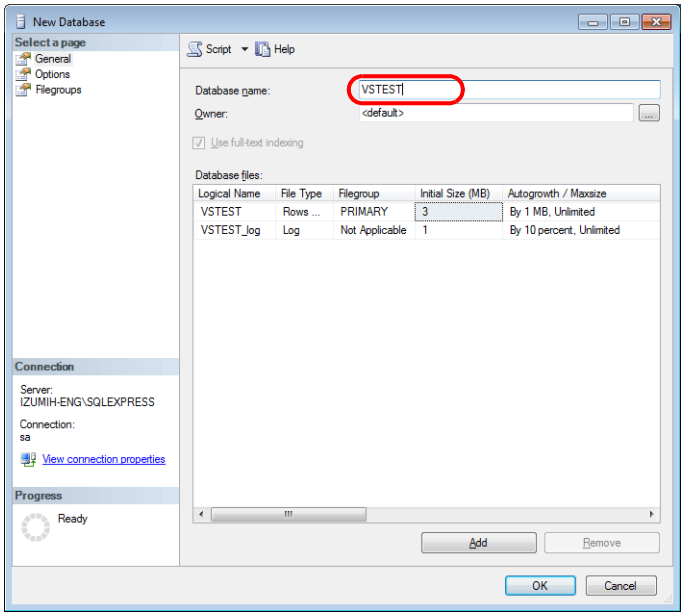


Creating a new database

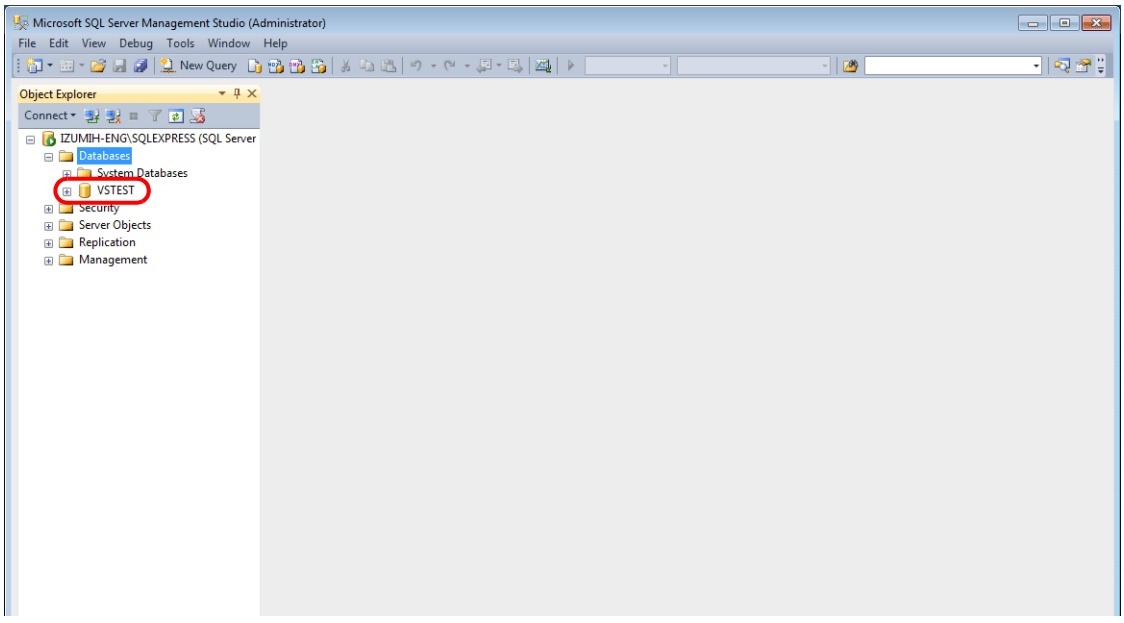
1. Select [Databases] and click [New Database] on the right-click menu.



2. The [New Database] window is displayed. Specify a database name and click the [OK] button.

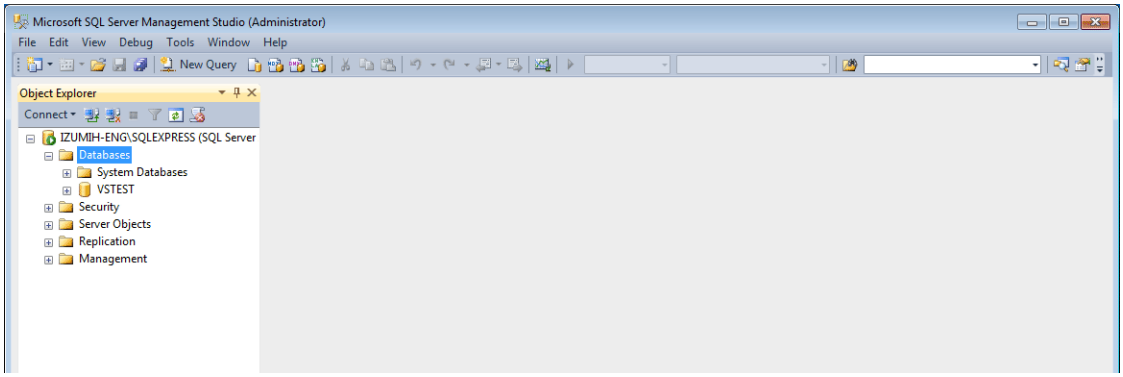


3. A new database is created.

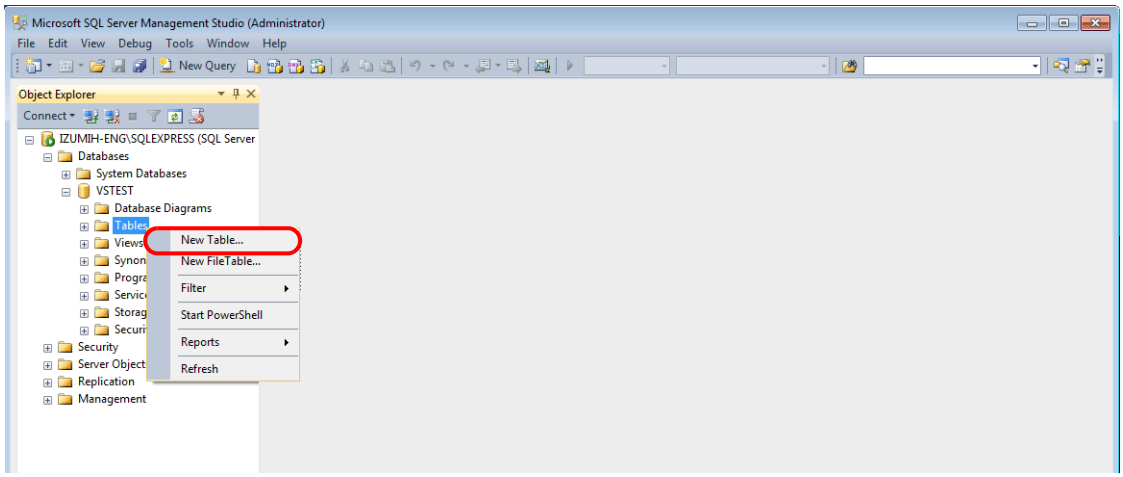


Creating a new table

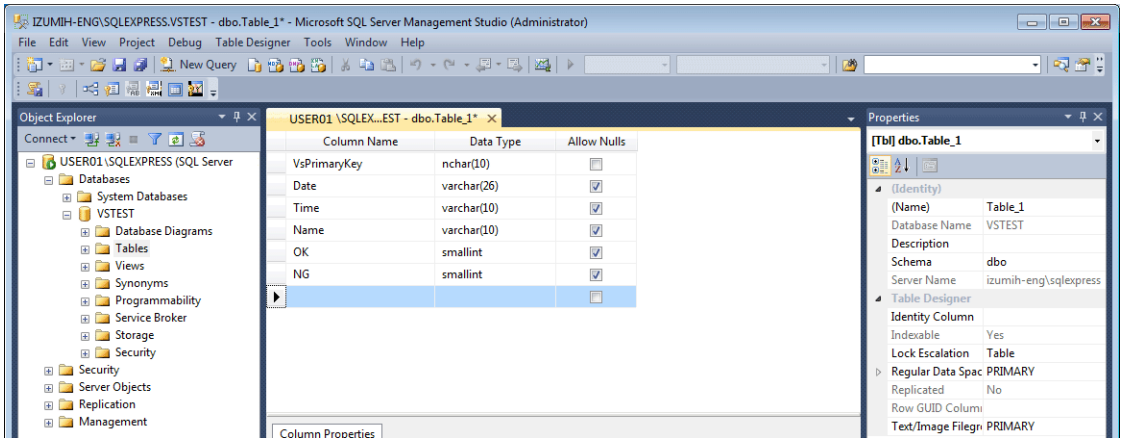
1. Start SQL Server Management Studio Express.



2. Select the database created in the previous section and click [New Table] on the right-click menu.



3. The table creation screen is displayed. Create a table by registering a line name and data type.



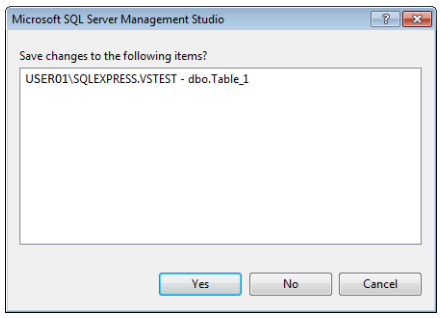
- Always set the primary key for V-Server for a database table to which data will be added.

Line Name	Data Type	Length	Allow Nulls	Primary Key
VsPrimaryKey	varchar	26 bytes or more	No	○

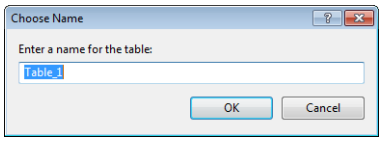
- The following data types can be used with the MES interface function. These correspond to the data types in the MES settings in V-SFT.

Database: Table				V-SFT: MES settings	
Line Name	Data Type	Length	Allow Nulls	Data type	Length
(Arbitrary)	smallint	1 word	Permitted	DEC-BCD	1 word
(Arbitrary)	int	2 word	Permitted		2 word
(Arbitrary)	Float	2 word	Permitted	FLOAT	2 word
(Arbitrary)	varchar	Arbitrary	Permitted	CHAR	256 bytes maximum

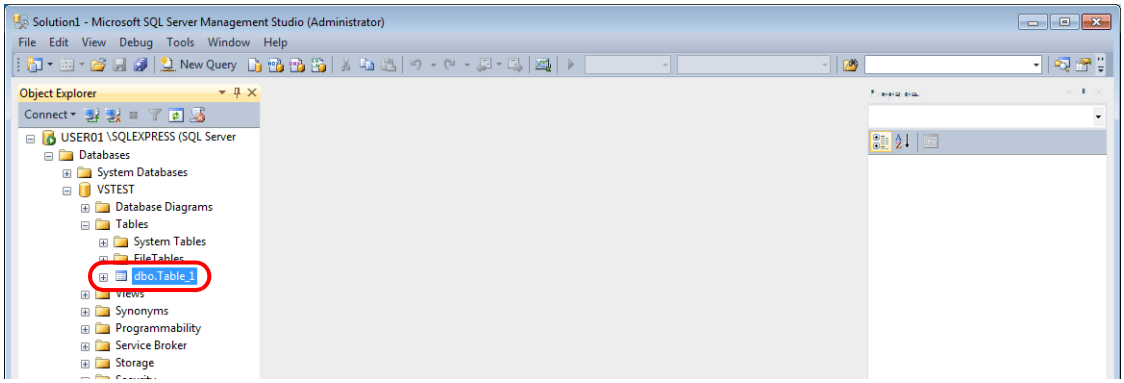
4. When the table settings are complete, close the table. The confirmation dialog box is displayed. Click the [Yes] button.



5. Enter a name and click the [OK] button.



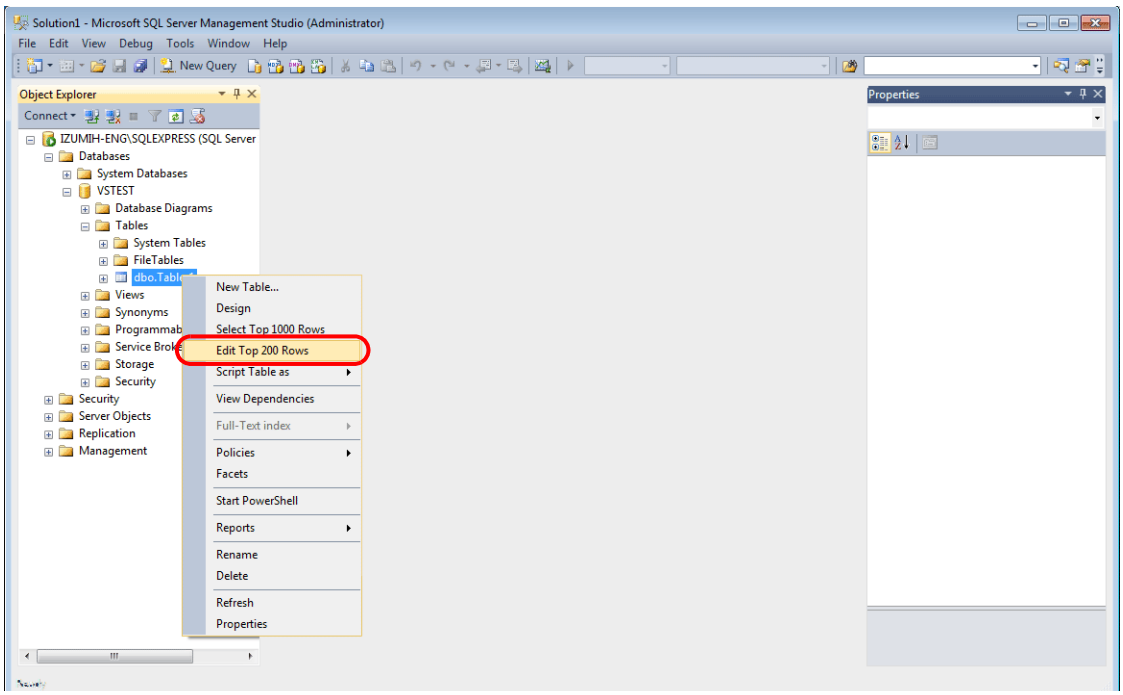
6. The table is created.



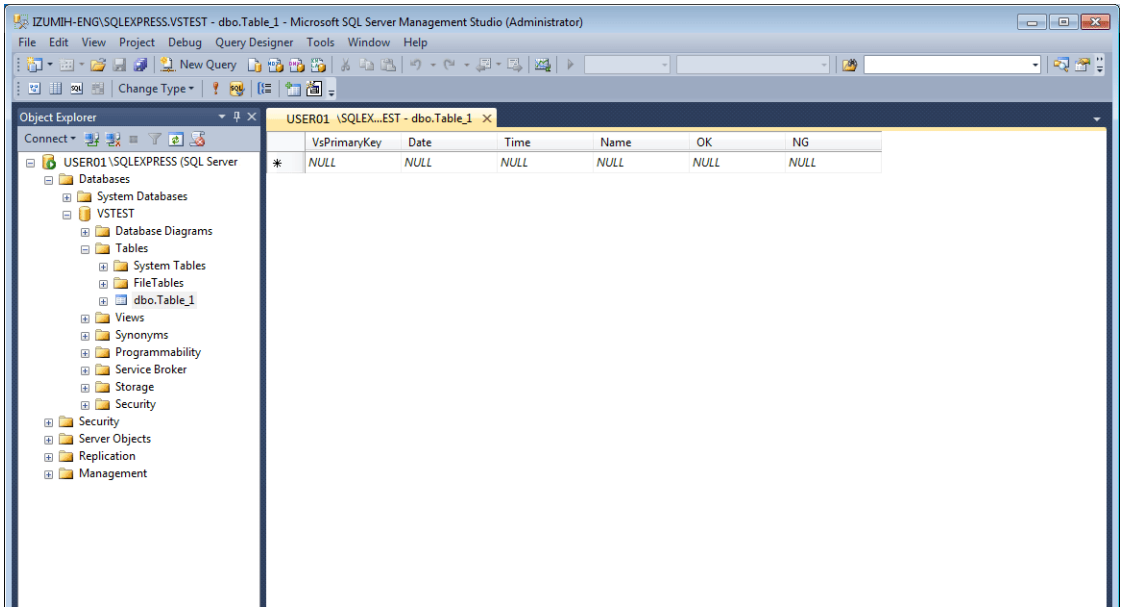
Opening a table

The data saved in the database can be checked according to the following procedure.

1. Select a table and click [Edit Top 200 Rows] on the right-click menu.



2. The table is opened. The line name registered when the table was created is displayed. Data is saved in each “NULL” field.

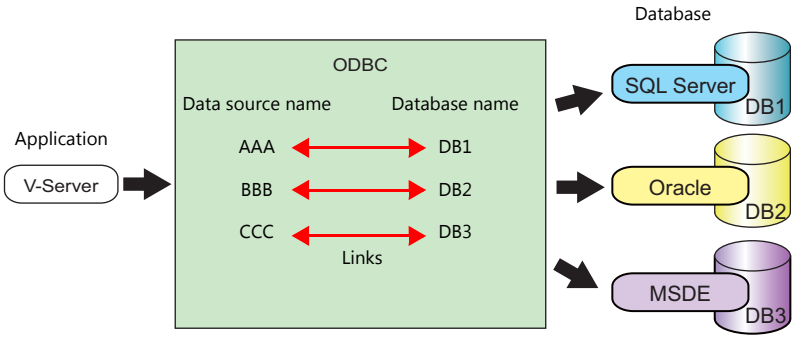


4.7.6 Data Source (ODBC) Settings

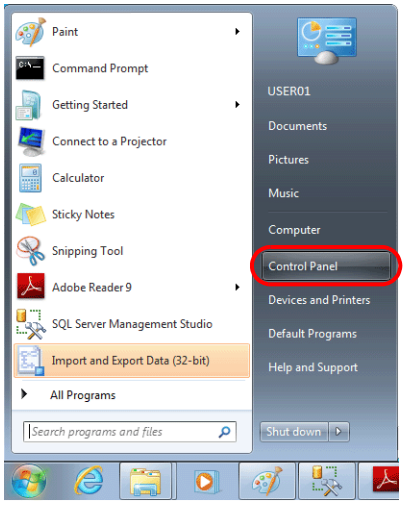
V-Server accesses the database via a data source (ODBC). Data source settings need to be configured to allow V-Server access to the database. This manual describes an example of configuration using Microsoft SQL Server 2012 Express Edition.

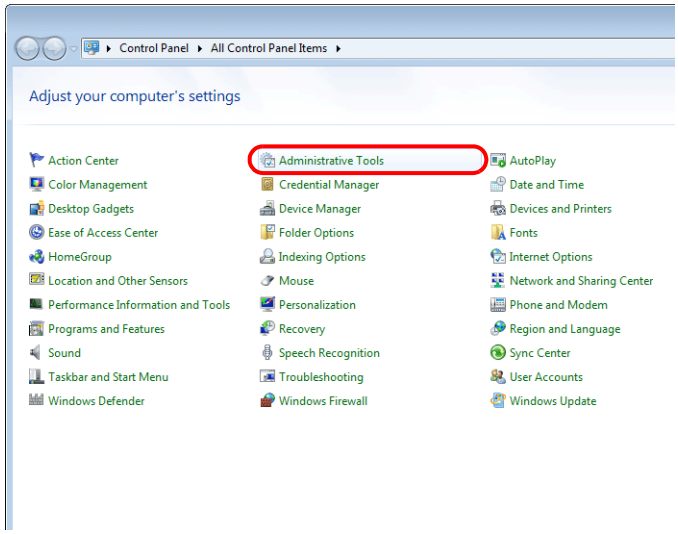
ODBC: Open DataBase Connectivity

ODBC is the interface between an application (V-Server) and the database.
Because ODBC accommodates the differences in specifications between databases, users only need to create programs based on the ODBC-specified procedure in order to access those databases.

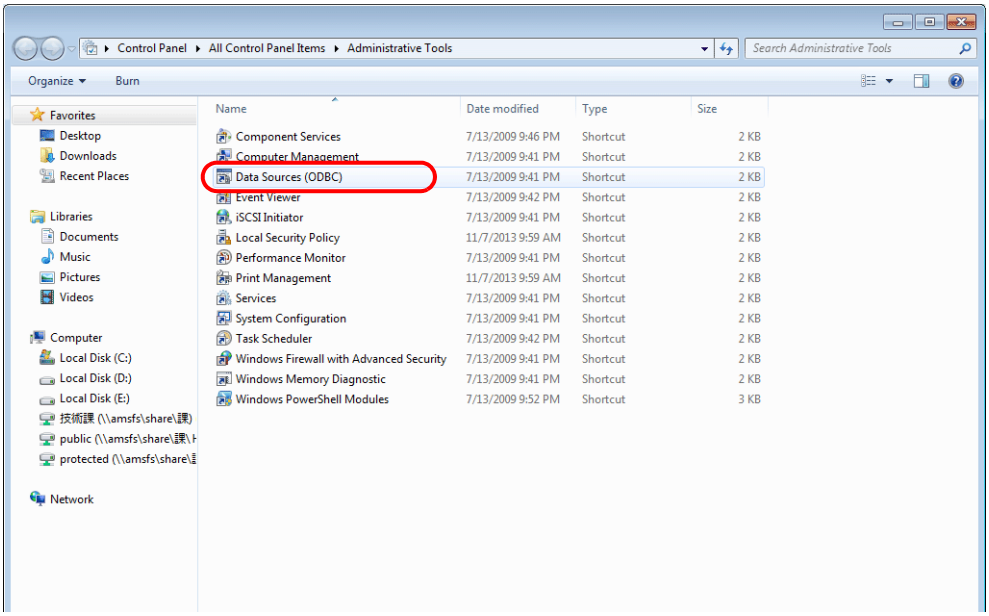


1. From the Windows [Start] menu, click [Control Panel] to display the Control Panel.
2. Click [Administrative Tools].





3. The [Administrative Tools] window is displayed. Double-click [Data Sources (ODBC)].



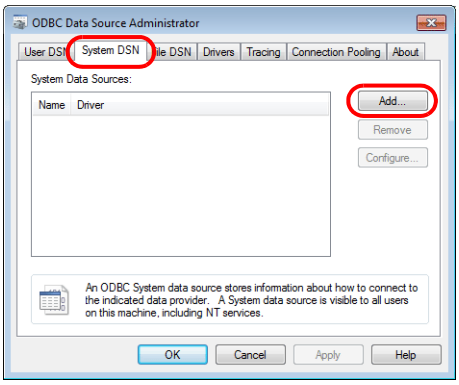
For 64-bit versions of Windows XP/Vista/7/8/8.1/10

The 32-bit version of ODBC must be used because V-Server is a 32-bit application.

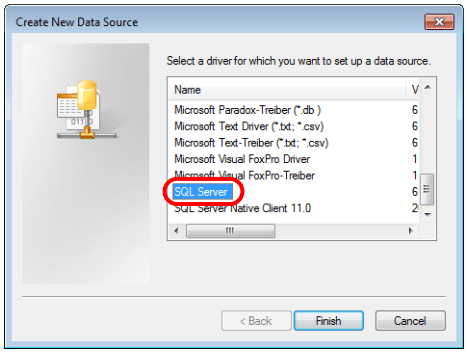
1. From the Windows [Start] menu, click [Computer], double-click [Local Disk (C:)] → [Windows] → [SysWOW64].
2. Double-click the “odbcad32” application. The 32-bit version of ODBC starts up.
3. Press the [Ctrl] + [Shift] + [Esc] keys together to start Windows Task Manager and check which version of ODBC is running.

   On the [Processes] tab, the 32-bit version is running if “odbcad32.exe *32” is shown in the list.

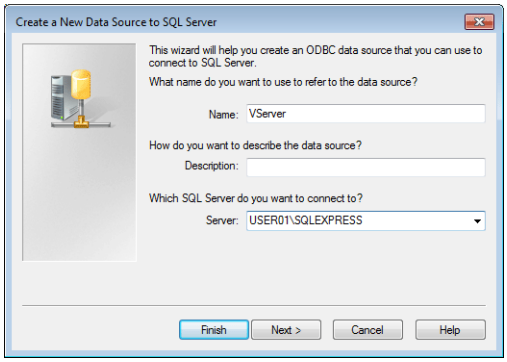
4. The [ODBC Data Source Administrator] window is displayed. Select the [System DSN] tab and click the [Add] button.



5. The [Create New Data Source] window is displayed. Select [SQL Server] and click the [Finish] button.

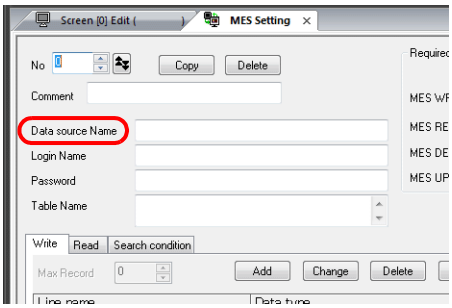


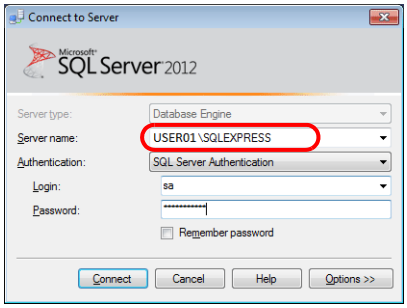
6. The following window is displayed. Configure the required settings and click the [Next] button.



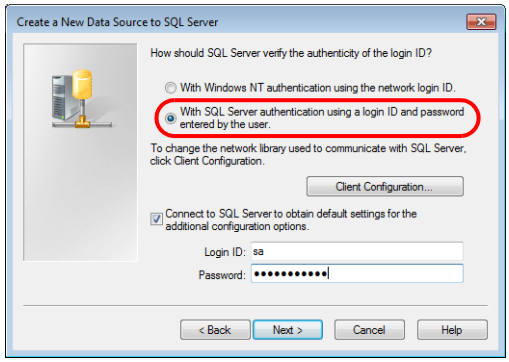
Item	Description
Name	Specify a data source name.
Server	Specify a SQL Server name.

- The data source name is used in the MES settings in V-SFT.
- The SQL Server name can be checked in SQL Server Management Studio Express.





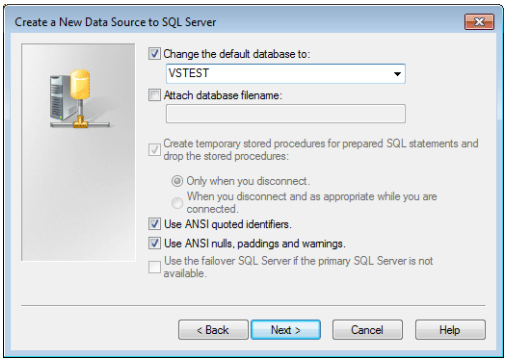
7. The following window is displayed.
   Select the [With SQL Server authentication using a login ID and password entered by the user] radio button and specify a login ID and password.



Item	Description
Login ID	Enter a login ID (“sa” in this example).
Password	Enter the password.

The login ID (“sa”) and password were specified on the [Authentication Mode] window displayed during installation of SQL Server 2012 Express Edition (see page 4-26).

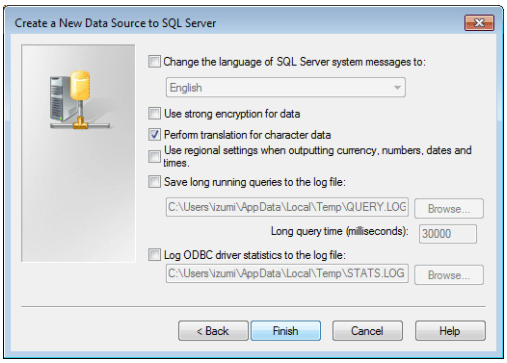
8. Click the [Next] button. The following window is displayed.



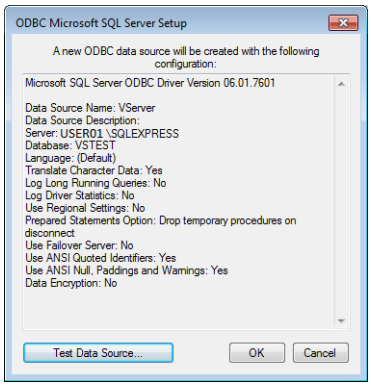
9. Select the [Change the default database to] checkbox and select a database.

Select the database created using Microsoft SQL Server Management Studio Express (see page 4-31).

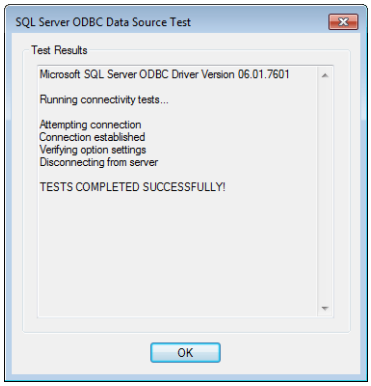
10. Click the [Next] button. The following window is displayed.



11. Click the [Finish] button. The following window is displayed.

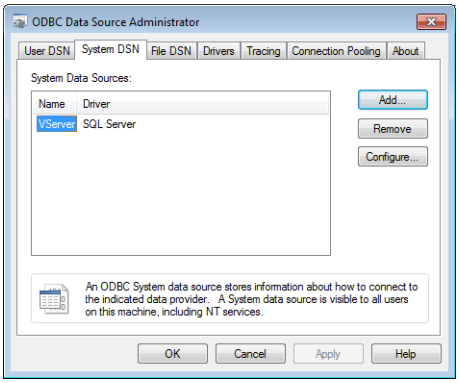


12. Click the [Test Data Source] button. When a connection has been successfully established, the following window is displayed.



13. Click [OK]. The previous screen reappears.

14. Click [OK]. The data source is registered.

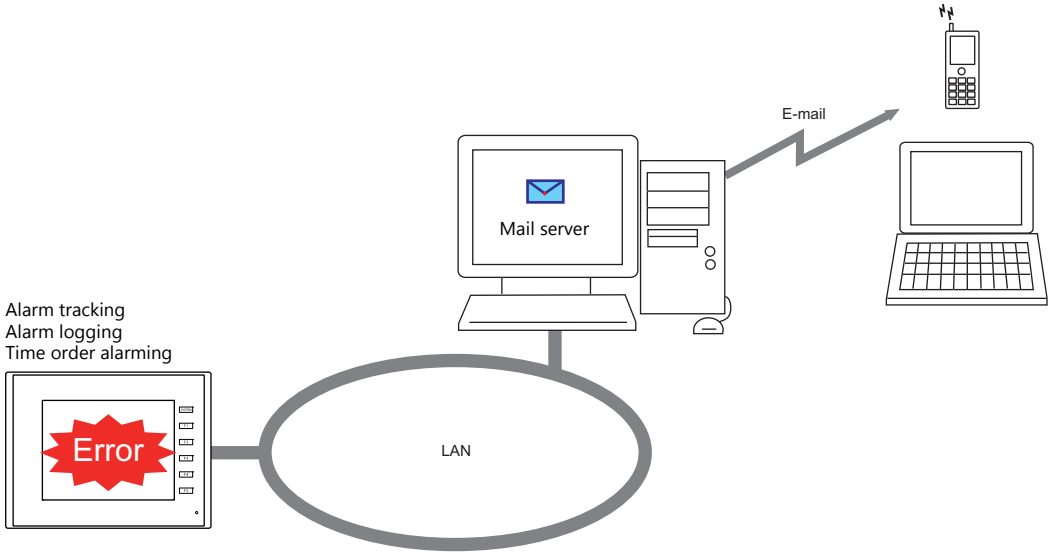


This completes the configuration of settings.

4.8 E-mail Notification

4.8.1 Overview

- E-mail notifications can be sent according to the ON/OFF status of alarm bits. If a problem occurs, you can be notified of the fault even at a remote location.



- SSL/TLS communication is also supported.
- Supported items and ports used

Port	Item	Other
LAN	Alarm tracking Alarm logging Time order alarming	The mail server must reside on the LAN. Not available with CUR-03.

4.8.2 Detailed Settings

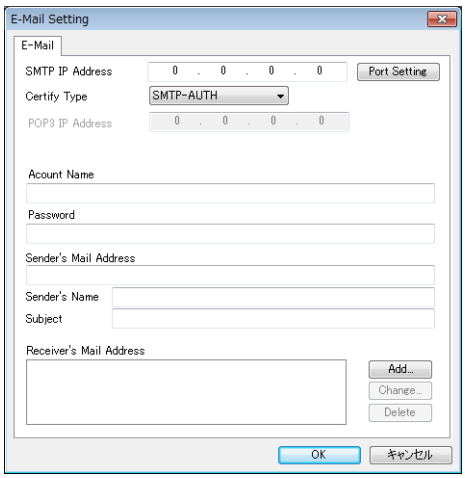
To send e-mail notifications, IP address settings on the TSi unit and e-mail settings for registering the mail server and recipients of notification must be configured.

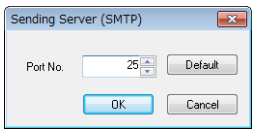
IP Address Settings

For information on IP address settings, refer to "TSi Unit IP Address Settings" page 4-2.

E-mail Settings

[System Setting] → [Ethernet Communication] → [E-Mail]



Item		Description
SMTP IP Address		Set the network IP address of the mail server.
Port Setting		Set the SMTP port number of the mail server. 0 to 65535 (default: 25)  Example: Yahoo Corporation's Yahoo e-mail: Port No. 587 SSL/TLS communication: Port No. 465
Certify Type		Set the authentication method in accordance with the specifications of the mail server.
	No authorization	No authentication is performed.
	POP before SMTP*1	Authentication is performed with the POP3 server. Configure the following settings. • POP3 IP Address • Account Name (63 one-byte characters or less) • Password (63 one-byte characters or less)
	SMTP-AUTH*2 LOGIN PLAIN CRAM-MD5 DIGEST-MD5 *3	Authentication is performed with the SMTP server. Configure the following settings. • Use SSL/TLS Communication • Account Name (63 one-byte characters or less) • Password (63 one-byte characters or less)
Sender's Mail Address		Set the sender's mail address. It is recommended to create a dedicated account for the TSi on the mail server and to set its address here.
Sender's Name		Set the sender's name. A name consisting of both one- and two-byte characters is not valid. It is displayed in the "Sender" field in an incoming e-mail.
Subject		Set the subject. It is displayed in the "Subject" field in an incoming e-mail.

Item		Description
Receiver's Mail Address		8 maximum Register the recipient mail addresses. Register all mail addresses to receive notifications from the TSi unit.
	Add	Register a new recipient address.
	Change	Change a registered address.
	Delete	Delete a registered address.

*1 POP before SMTP

POP before SMTP uses POP3 authentication that is performed when e-mail is received. SMTP permits the sending of e-mail from the authenticated IP address for a limited time.

Since authentication is disabled after a specific time has elapsed, authentication with POP3 will be required again.

In the case of authentication with POP3, a password is sent in plain text. POP before SMTP using APOP is also available. APOP allows a password to be sent in encrypted form. Note that the TSi only supports POP3.

*2 SMTP Authentication

Authentication is performed with the SMTP server. SMTP Authentication is classified into several authentication methods. The TSi supports LOGIN, PLAIN, CRAM-MD5, and DIGEST-MD5 methods.

Since the SMTP server automatically performs authentication according to the available method, users are not requested to make configurations.

<Automatic authentication steps>

1. Compliant with PLAIN?
2. Compliant with LOGIN?
3. Compliant with CRAM-MD5?
4. Compliant with DIGEST-MD5?
5. Authentication failure

About the authentication methods

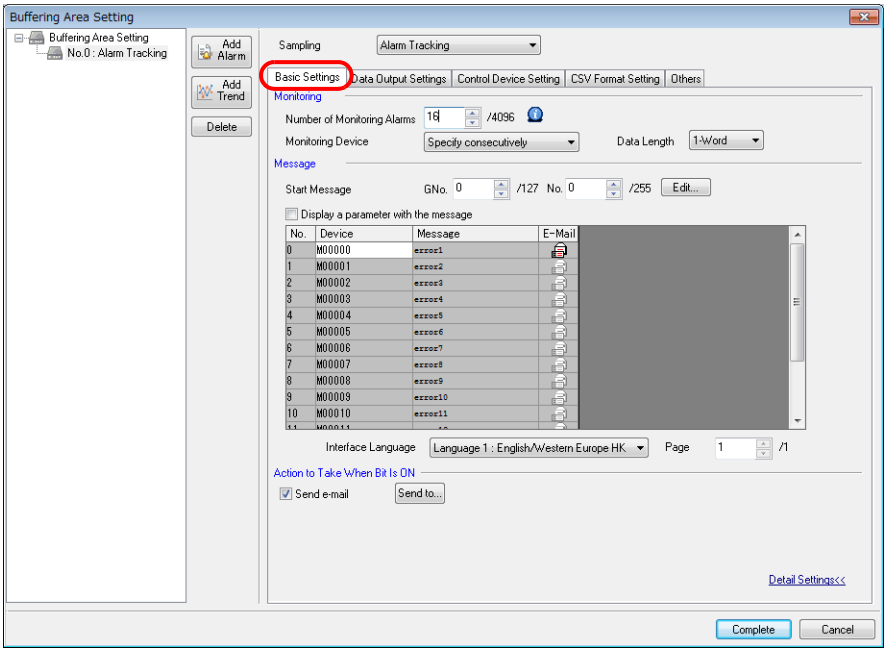
- PLAIN
  The PLAIN method sends user names and passwords in plain text (not in encrypted form).
- LOGIN
  LOGIN is similar to PLAIN but it often sends information, such as USER xxxxx or PASS xxxxxx, separately (as performed with POP3). Because the standard specifications of LOGIN are not established, there are e-mail servers that use LOGIN in their own way.
- CRAM-MD5
  With CRAM-MD5, the server sends an arbitrary character string (a challenge string) to the client. The client then performs a specific computing process called Message Digest 5 (MD5) by using the challenge string and password, and returns the result to the server. The server that receives the result also performs the same process. When both results match each other, the server judges that the client knows the correct password and grants authorization.
- DIGEST-MD5
  DIGEST-MD5, an expanded version of CRAM-MD5, has an enhanced resistance to dictionary attacks and brute force attacks.

*3 Only "auth" mode is supported for "quality protection". It does not support "auth-int" and "auth-conf" modes.

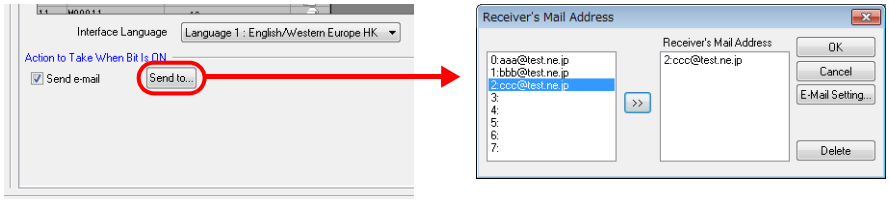
Buffering Area Settings

Set the recipients of e-mail notifications in the buffering area settings window. Recipients of e-mail notifications can be set for each sampling.
This section describes the settings required for sending e-mail notifications. For details on other settings, refer to "8. Alarm" in the TS Reference Manual 1.

1. Display [System Setting] → [Buffering Area Setting] → [Alarm Tracking] → [Basic Settings].

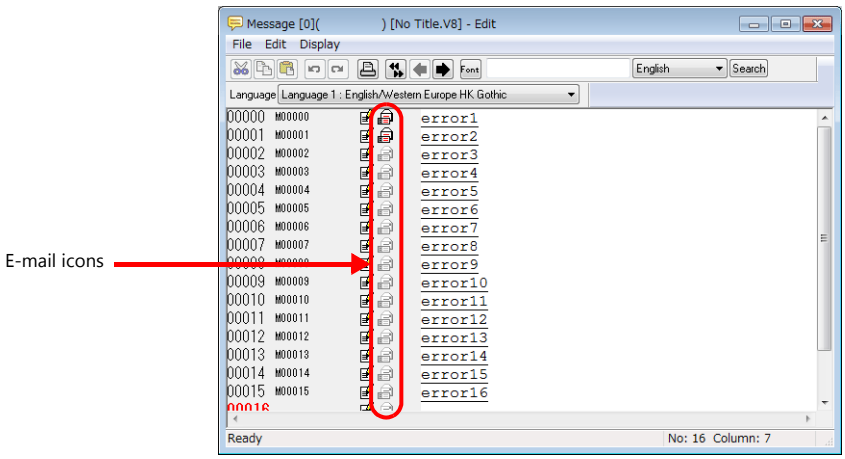


2. Select [Detail Settings], select the [Send e-mail] checkbox under [Action to Take When Bit Is ON], and then select the [Send to.] button to register recipients in the [Receiver's Mail Address] window.



Message Editor

In the [Message Edit] window, register messages corresponding to error bits and select whether or not to send e-mail notifications.
Select the [E-Mail] icons of the messages with which you want to send e-mail notifications.



* If the display in the [Message Edit] window differs from the above screenshot, click [Display] → [Mark] → [E-Mail].

4.8.3 System Device Memory ($s)

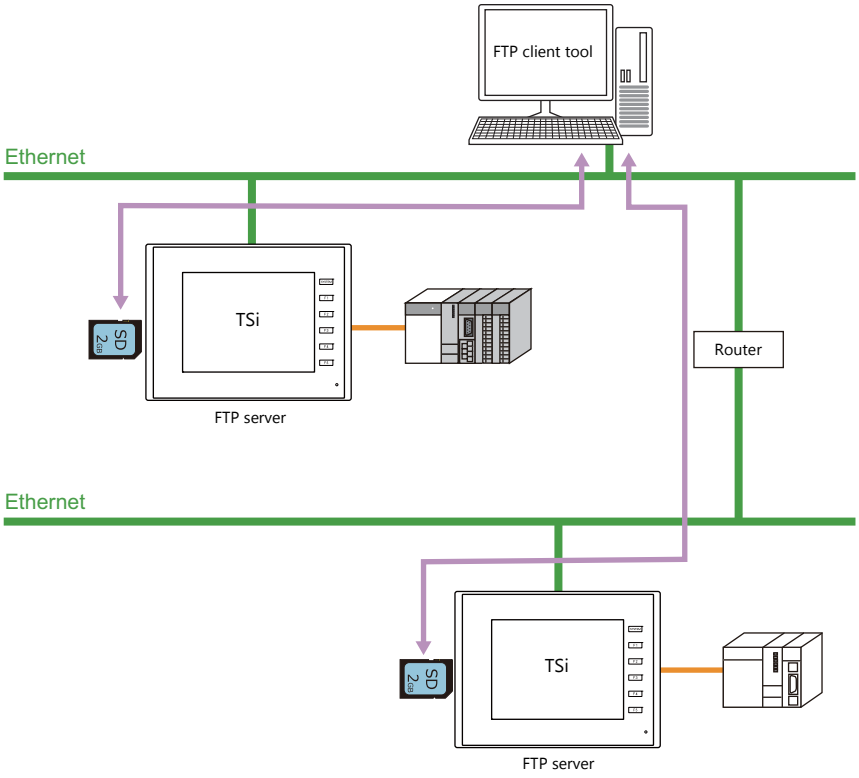
Information on sent e-mail messages is output to system device memory ($s).

<table>
<tr><th>$s</th><th>Description</th></tr>
<tr><td>$s1005</td><td>If the TSi unit receives send requests continually, the number (0 to 16) of e-mail messages waiting to be sent is stored.
The TSi unit can keep up to 16 e-mail messages. Any more than 16 messages are discarded.</td></tr>
<tr><td>$s1006</td><td>Stores error information on e-mail messages.
<table>
<tr><th>Error No.</th><th colspan="2">Cause</th></tr>
<tr><td>0</td><td>Normal</td><td>-</td></tr>
<tr><td>1</td><td>E-mail address error</td><td>Incorrect recipient mail address</td></tr>
<tr><td>6</td><td>Network not connected</td><td>Incorrect SMTP/POP3 server IP address
SMTP server refusal
Incorrect port number
Incorrect SSL/TLS settings
Incorrect account name/password</td></tr>
<tr><td>50</td><td>SMTP transmission error</td><td>Authentication method error
Incorrect sender's mail address
Connection lost</td></tr>
</table></td></tr>
</table>

4.9 FTP Server

4.9.1 Overview

The TSi can serve as an FTP server.
An FTP client tool installed on the PC can be used to access a TSi unit over Ethernet and perform reading and writing data on a storage device inserted into the TSi.
A standard FTP tool included with Windows is available for reading, writing, and editing files on a storage device without the need for installing any special tool.



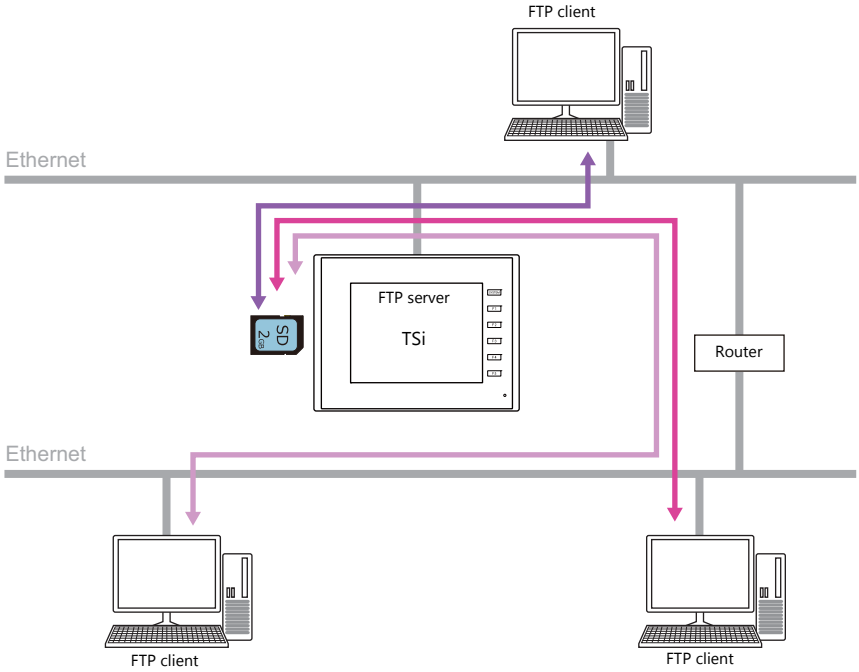
Applicable Models	Port	Other
TS2060i TS1100Si TS1070Si	LAN	Storage Device

4.9.2 Specifications

Functional Capabilities

Item	Specifications	Location of Settings
Protocol	TCP/IP (Not available with CUR-03)	-
User Name	1 to 12 one-byte alphanumeric characters (case-sensitive)	Editor
Password	1 to 8 one-byte alphanumeric characters (case-sensitive)	Editor
Port number	20, 21	(Fixed)
No. of clients *1	Maximum of 3 clients	-
Input supervisory time	1 to 60 minutes (default: 15 minutes) *2	Editor
File readout size	Unlimited (within the storage capacity)	-
File name	One-byte alphanumeric characters only	-
Requirement	Only operable in RUN mode (not operable in local mode)	-

*1 Clients (FTP clients)
This manual defines a client or FTP client as a PC that transmits commands for reading/writing data to an FTP server. A maximum of three client PCs can access a TSi unit.



*2 If no command is received from the FTP client within the time period specified for [Input Supervisory Period], the TSi unit automatically disconnects the client.

Compatible FTP Client Tools

Tools and Functions	Computer OS/Monitouch Series
Command Prompt (included with Windows as standard)	Windows XP SP3 Windows 7 Windows 8
ftp.exe (included with Windows as standard)	
Windows Explorer (included with Windows as standard)	
FFFTP version 1.96b (freeware)	
Data transfer service	V9 Series

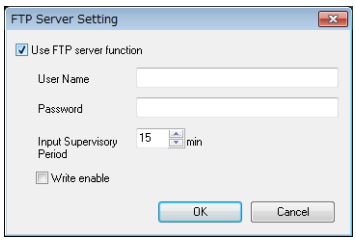
Supported FTP Commands

The following commands can be used with the FTP server on the TSi unit.

Command Name	Function
cd	Changing the current directory
close	Closing the connection
dir	Displaying the file information
ls	Displaying folder and file names
put	Sending a file
get	Retrieving a file
delete	Deleting a file
rename	Renaming a file
pwd	Displaying the current folder name
mkdir	Creating a folder
rmdir	Deleting a folder
quit	Exit the FTP client tool after disconnecting the client.

4.9.3 Detailed Settings

Click [System Setting] → [Ethernet Communication] → [FTP Server]. The [FTP Server Setting] window is displayed.

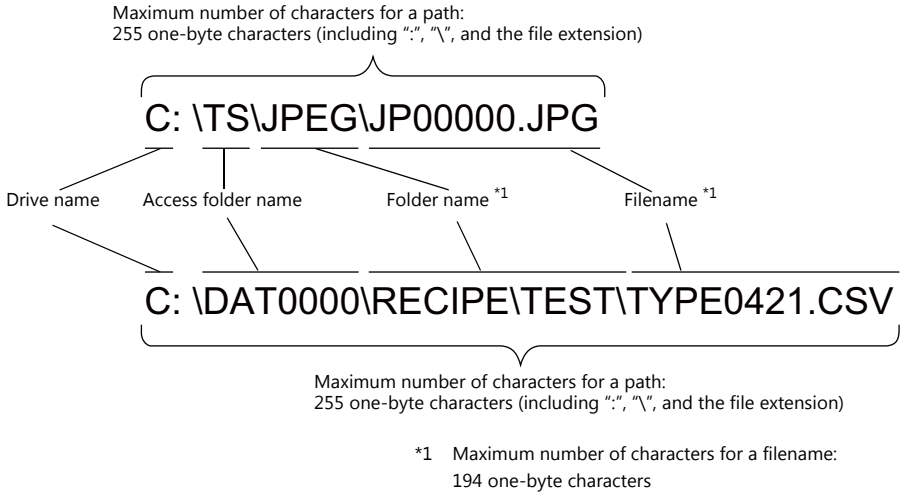


Item	Description
Use FTP server function	Select this checkbox to use the FTP server function. The FTP server function is not available unless this checkbox is selected.
User Name	1 to 12 one-byte alphanumeric characters (case-sensitive)
Password	1 to 8 one-byte alphanumeric characters (case-sensitive)
Input Supervisory Period	1 to 60 minutes (default: 15 minutes) *
Write enable	Select this checkbox to allow the FTP client to write, delete, and edit files. When this checkbox is not selected, only file reading is possible. (Default: unselected)

* If no command is received from the FTP client within the time period specified for [Input Supervisory Period], the TSi unit automatically disconnects the client.

4.9.4 Specifying File Paths

How to specify file paths



*1 Maximum number of characters for a filename:
194 one-byte characters

- Drive name
  C: Inserted SD card
  D: USB-A port (USB flash drive, etc.)

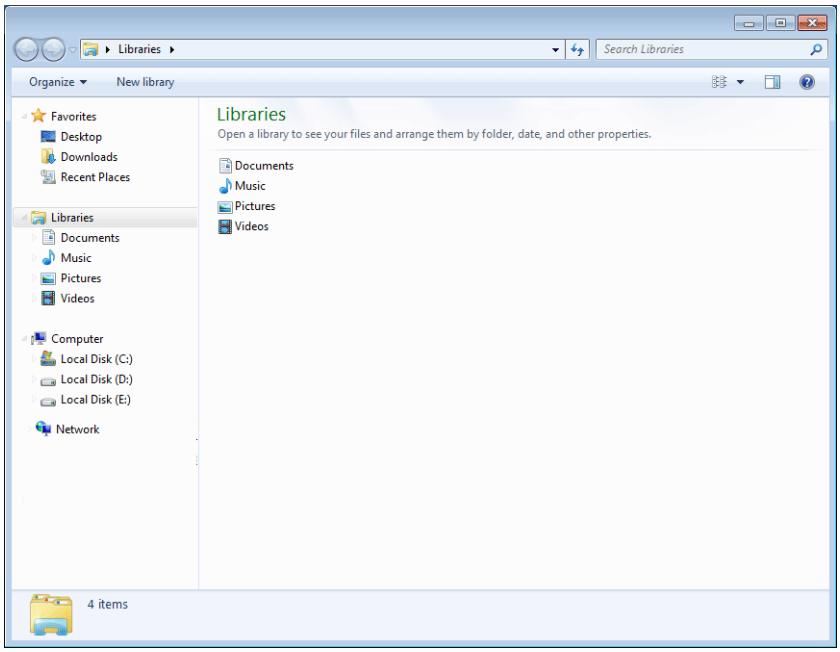
4.9.5 Login

This section explains the login procedure and how to operate the FTP tools.
Prepare the TSi unit as instructed below before starting.

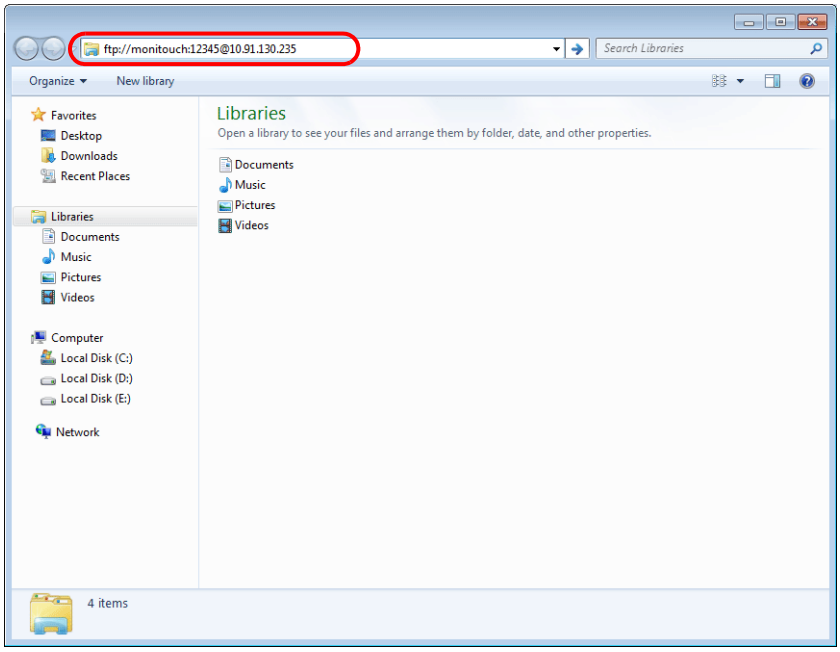
1. Transfer the screen program with configured FTP server settings to the TSi unit.
2. Connect your computer to the TSi unit via Ethernet.
3. Insert a storage device into the TSi unit and set the unit to RUN mode.

Explorer (or Internet Explorer)

1. Start [Explorer].

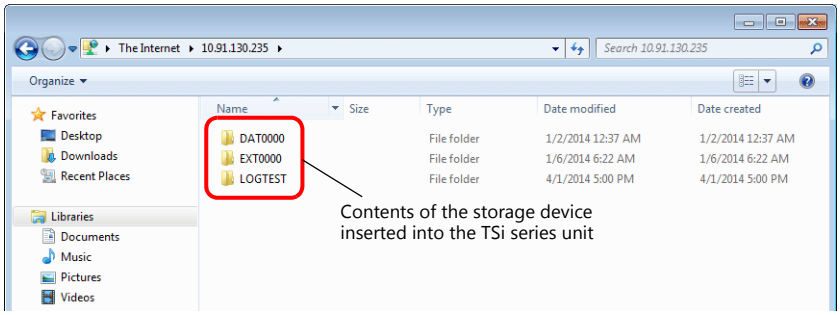


2. Enter the FTP command in the [Address] field.
   Enter "ftp://user name:password@TSi IP address" and then press the [Enter] key.

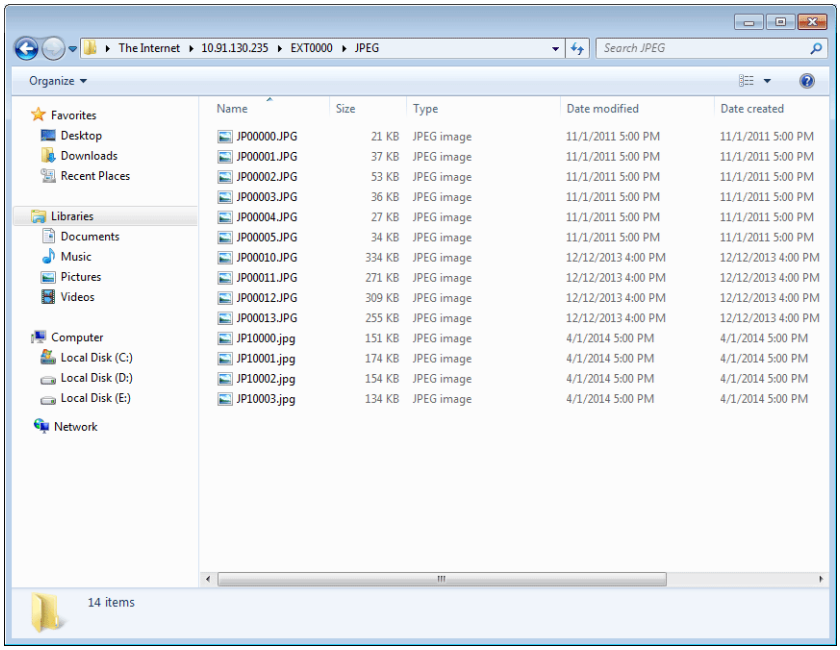


* When using Explorer or Internet Explorer,
specify "ftp://user name:password@TSi IP address".
User authentication may not be successful if only "ftp://TSi IP address" is entered.

3. The Explorer window is displayed as follows. Login is complete.



4. Explorer allows the contents of the storage device inserted into the TSi unit to be displayed.

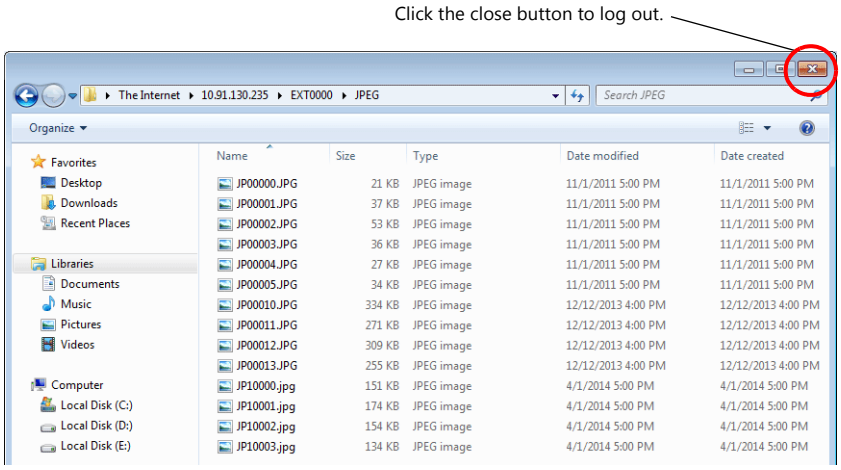


4.9.6 Log Out

This section explains the log out procedure and how to operate the FTP tools.

Explorer (or Internet Explorer)

To log out when using Explorer, close the Explorer window.



4.9.7 Checking the Connection

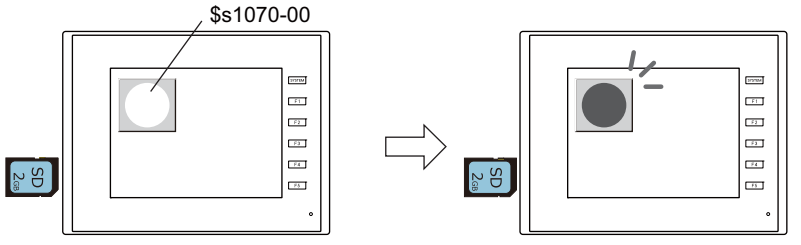
System Device Memory ($s)

The following describes the system device memory associated with the FTP server.

Addresses	Description	Remarks
$s1070	Storage of FTP information MSB … LSB 15 14 13 12 11 10 09 08 07 06 05 04 03 02 01 00 0 0 0 0 0 0 0 0 0 0 0 0 0 0 System reserved (setting: 0) FTP client 0: Command not being executed 1: Command being executed FTP client 0: Logged off 1: Logged in * If two or more FTP clients log in to the FTP server, the data stored in the system memory is based on the status of all these FTP clients. (Even if only one FTP client is executing a command, bit 1 is set to ON.)	← TSi
$s1071	Number of FTP clients that are logged into the server (maximum of 3 clients)	← TSi
$s1072	Forced disconnection of FTP connection MSB … LSB 15 14 13 12 11 10 09 08 07 06 05 04 03 02 01 00 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 System reserved (setting: 0) Connection to FTP client 0 → 1: Forcibly disconnected	← TSi

Checking the Connection State

Create a lamp to which the internal device memory $s1070-00 is assigned, and place it on the screen.
A lit lamp indicates that a client is logged in, i.e. a connection is established.



Indicates that a client is logged in.

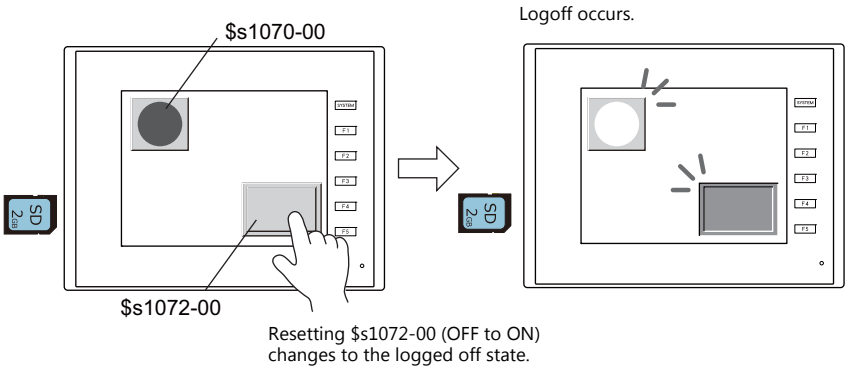
Closing the Connection

Automatic disconnection

If no command is received from the FTP client within the time period specified for [Input Supervisory Period] in the [FTP Server Setting] window (click [System Setting] → [Ethernet Communication] → [FTP Server]), the TSi unit automatically disconnects the client.

Manual disconnection from the TSi unit

The connection with the FTP client can be forcibly disconnected by resetting (OFF to ON) bit 0 of $s1072 on the TSi unit.



Disconnection from FTP client

The FTP client is disconnected from the TSi unit when the FTP client logs out.
For details, refer to "4.9.6 Log Out" page 4-50.

4.9.8 Restrictions

Number of Simultaneous FTP Client Connections

A maximum of three FTP clients can be connected to one TSi unit at the same time.
Note that requests from multiple FTP clients cannot be processed at the same time. They are processed one by one. Therefore, while an FTP client is transferring a large-size file, another client cannot transfer a file and must wait until the current file transfer is completed.

File Property Changes

Changing file properties (such as changing write permissions) is prohibited.

4.9.9 Notes

Notes on FTP Server System Design

1. In the case when an FTP client writes a recipe file to the storage device inserted into the TSi unit, the recipe file from the FTP client and the recipe in operation on the TSi unit must be in the same format. In the case when a recipe file is written from a remote location, make sure that the same format is used at the target location in advance.
2. Before using an FTP client tool, read the provided documentation to understand the functions and operational procedures, and also conduct a trial operation. The TSi (FTP server) may not support some functions depending on the type of the FTP client tool used.

Notes on File Transfer

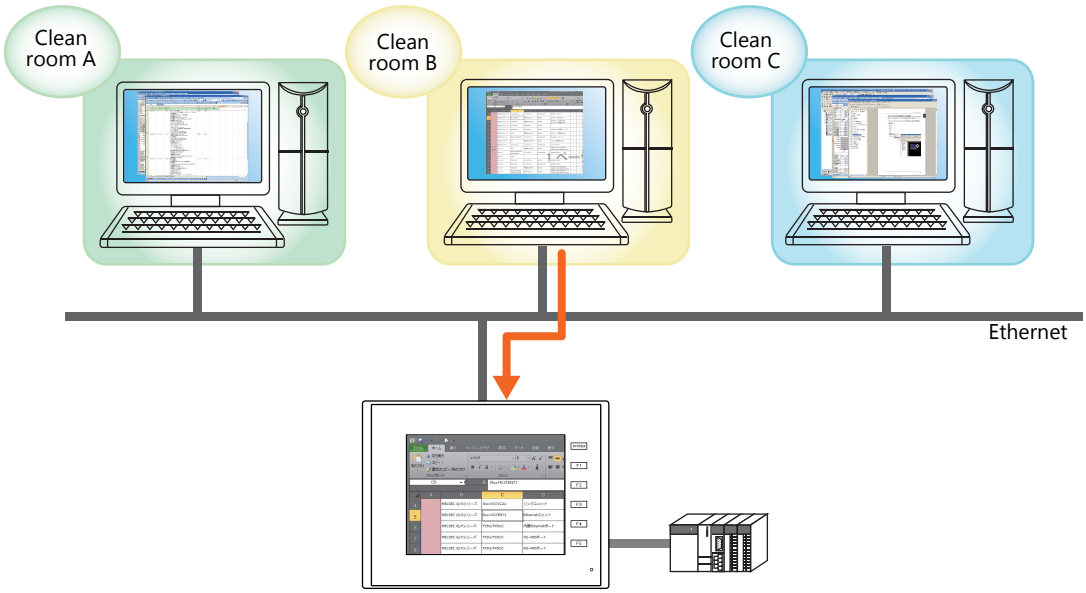
1. If no command is sent from the FTP client within the time period specified for [Input Supervisory Period] in the [FTP Server Setting] window, the connection between the FTP server and FTP client will be disconnected automatically.
2. While the TSi unit is communicating with the FTP client, changing the TSi unit to local mode will disconnect them.
3. While the TSi unit is accessing a file, do not allow the FTP client to write to or delete the same file.
   If the same file accessed by the TSi unit is written to or deleted, a malfunction will occur. Deleting a file from the storage device, even when the file is not being accessed by the TSi unit, will cause a file reading error the next time the TSi unit attempts to access the file.
   Basically, do not execute the writing and deleting commands with respect to any files relevant to TSi unit operation.
4. When a file on the storage device has been overwritten via the FTP server, check that the data in the file is correct.
   If writing to the file ends in an error, the file will be deleted from the storage device. In the event of such a deletion, repeat writing from the FTP client.
5. If the FTP client is down, wait until the time for [Input Supervisory Period] elapses and then retry login.
6. While the FTP client is accessing a file on the storage device inserted into the TSi unit, do not turn off power to the TSi unit. Doing so may corrupt data on the storage device.
7. If the TSi unit is reset or turned off while connected to an FTP client, the next action that the FTP client takes depends on the specifications of the FTP client tool.
   With this in mind, select an FTP client tool that can detect when an FTP server goes down and can terminate safely in such a case.
8. Depending on the type of FTP client tool, there may be a time stamp mismatches between files on the storage device and the PC. If such a mismatch is found, check the configuration of the FTP client tool.

4.10 Remote Desktop

4.10.1 Overview

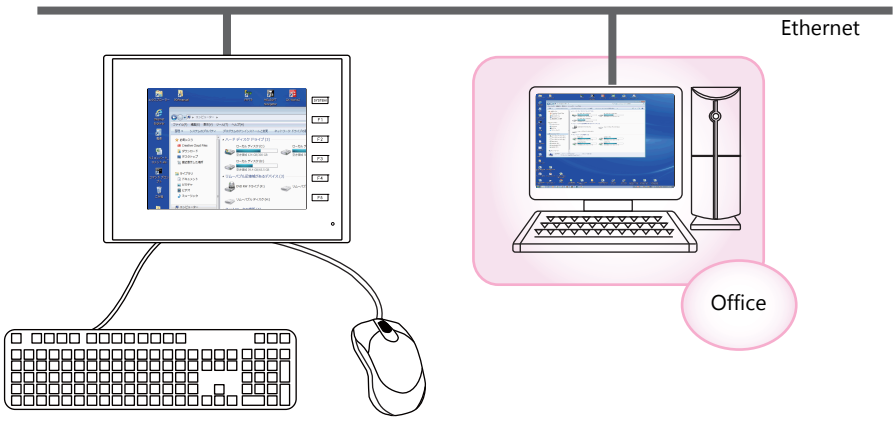
- The screen of a computer at a remote location can be displayed on the TSi unit.
  This function serves the purpose of remote monitoring through the TSi unit connected to, for instance, a server (computer) that controls an entire production line or computers that are installed in a clean room where access is limited.

  Example: Monitoring a server (computer) in clean room B



- The screen of remote computers can be operated using a mouse and keyboard connected to the TSi unit. This facilitates data entry or referencing of manuals through the TSi unit at worksites where it is difficult to bring a computer with you.

  Example: Searching for documents on a computer in the office



☞ Refer to "4.10.5 Window Configuration and Operation" page 4-66

Operating Environment

- Applicable Models

Model	Port	Other Notes
TS2060i TS1100Si TS1070Si	LAN	Not available with CUR-03

- Server (Computer)

Item	Description
OS	Windows 7/8
Protocol	TCP/IP

Required Settings

Server (Computer) Settings

- Installing and Configuring UltraVNC page 4-56

About VNC (Virtual Network Computing)

This software is developed by AT&T Laboratories Cambridge (U.K.) and designed to operate remote computer screens across a network.

TSi Unit Settings

- Registering/Deregistering the License page 4-58

V-SFT Settings

- Remote Desktop Table Settings page 4-59
- Remote Desktop Window Display Procedure
  Placement of a Display Area to Show Remote Desktop Window page 4-60
  Switch to Show/Hide Remote Desktop Window page 4-63
  Showing/Hiding Using a Macro Command page 4-64

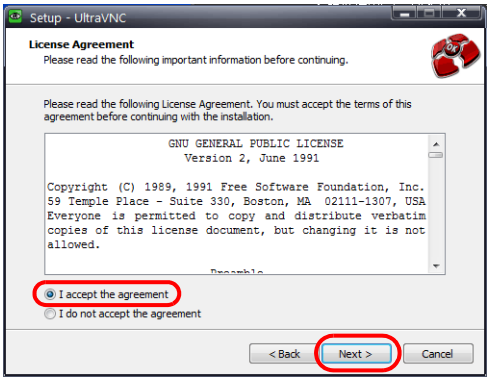
4.10.2 Server (Computer) Settings

Installing and Configuring UltraVNC

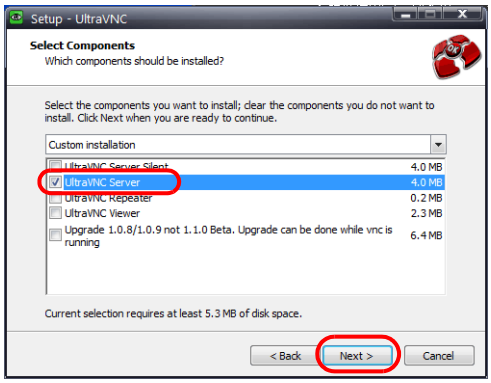
This section describes the settings necessary for remote desktop window display using UltraVNC as an example.

1. Access the following URL and download UltraVNC.
   http://www.uvnc.com/download/index.html
2. Execute the downloaded file to start the installation process.

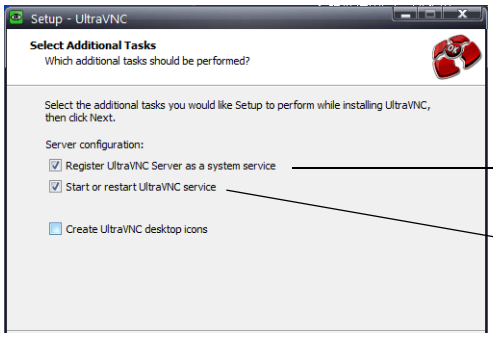
3. Read the license agreement and if you agree to the terms and conditions, select [I accept the agreement] option and click the [Next] button.



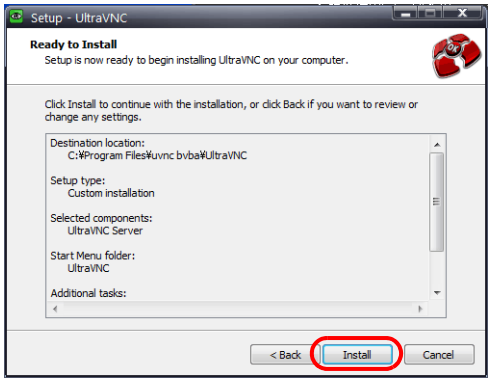
4. Check the information displayed in the window and then click the [Next] button.
5. Select the location to install UltraVNC using [Select Destination Location] and then click the [Next] button.
6. Select [UltraVNC Server] and then click the [Next] button.



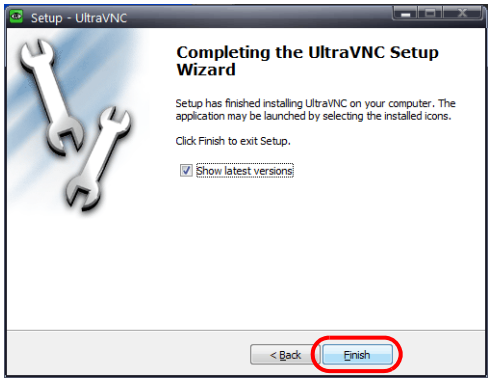
7. To register UltraVNC to the start menu, specify its location and the name of the program, and then click the [Next] button.
8. Select the following checkboxes and then click the [Next] button.



9. Check the information displayed in the [Ready to Install] window and then click the [Install] button.



10. Check the information displayed in the window and then click the [Next] button.
11. Click the [Finish] button to complete the installation process. The UltraVNC icon is added to the taskbar of your computer.

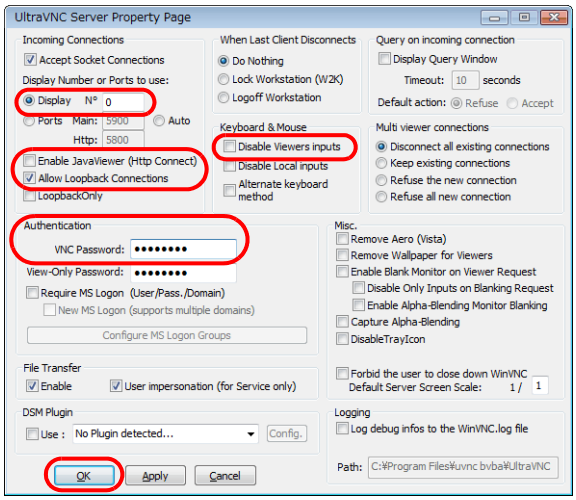


About the UltraVNC icon

UltraVNC must be running on the connected computer in order to display the remote desktop window. (Nothing is displayed if UltraVNC is not running.) The UltraVNC icon illuminates orange when a connection with the TSi unit is established.

UltraVNC running (green)	Connected to the TSi unit (orange)
	

12. Right-click on the UltraVNC icon on the taskbar to display the right-click menu and select [Admin Properties]. Configure the following settings and click [OK].



*** When connecting from multiple TSi units, select the [Keep existing connections] under [Multi viewer connections].**

About [VNC Password]

The password set here must be entered in V-SFT when configuring the remote desktop table (refer to Remote Desktop Table Settings page 4-59).

Take care managing your password and do not lose it.

4.10.3 TSi Unit Settings

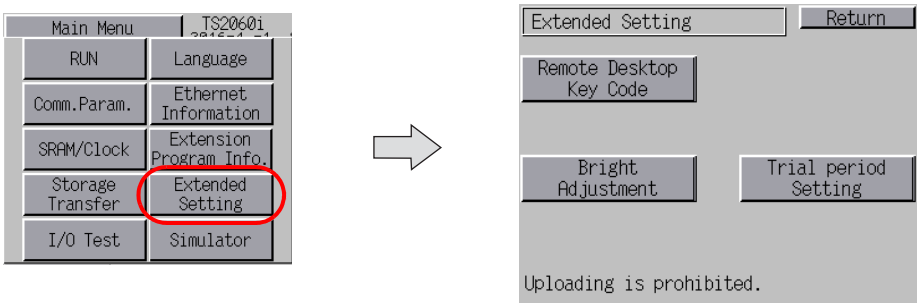
Registering/Deregistering the License

A license must be registered in order to use the remote desktop function. A single license is provided with each TSi unit.

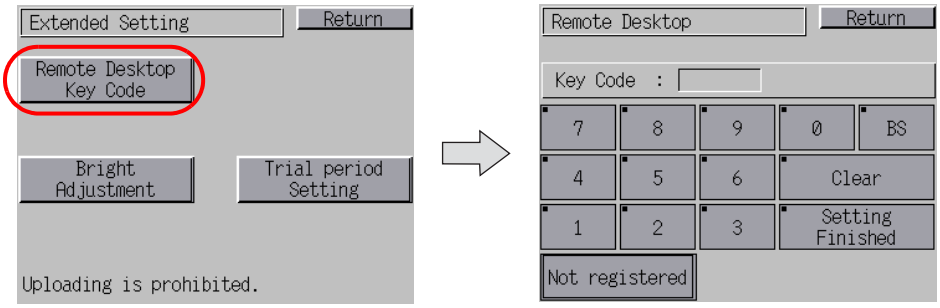
For details on purchasing a “V-RemoteDT” license, contact your local distributor.

Registering a License

1. Switch to the Main Menu screen on the TSi unit.
2. Press the [Extended Setting] switch on the Main Menu screen. The Extended Setting screen appears.



3. Press the [Remote Desktop Key Code] switch. The Remote Desktop screen appears.

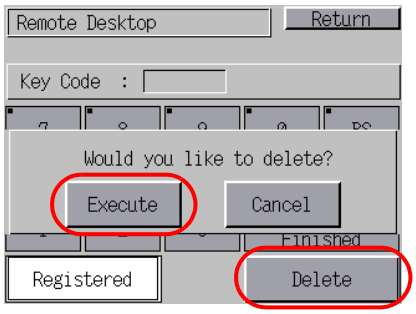


4. Enter the key code (8-digit value) using the keypad and then press the [Setting Finished] switch.
5. The Main Menu screen reappears when registration is complete.

Deregistering a License

A license can be deregistered from the TSi unit.

1. Switch to the Remote Desktop screen. For details on switching to this screen, refer to “Registering a License”.
2. Press the [Delete] switch and then press the [Execute] switch in the dialog box that appears.



3. The [Delete] switch disappears and [Not registered] appears in its place. The license is no longer registered.

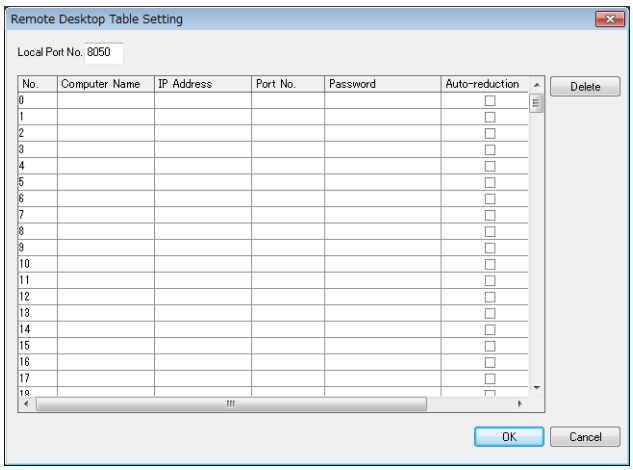
4.10.4 V-SFT Settings

Attempting to transfer a screen program with configured remote desktop settings without registering a license on the TSi unit will display "Warning: 214" on the TSi unit.

☞ Refer to "Registering/Deregistering the License" page 4-58.

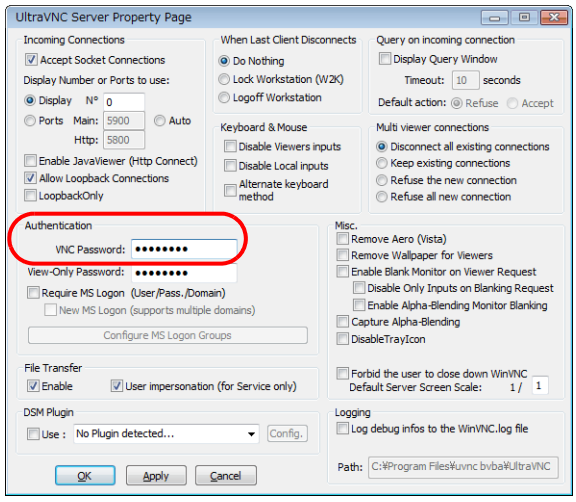
Remote Desktop Table Settings

Register the computer (server) for connection.
Click [System Setting] → [Other] → [Remote Desktop Table Setting] to display the [Remote Desktop Table Setting] window.



Item	Description
Local Port No.	Specify the local port number of the TSi unit. This port is used as a sending/receiving port for remote desktop window display. (default: 8050, range: 1024 to 65533)
Computer Name	Specify the name of the server (computer).
IP Address	Specify the IP address of the server (computer).
Port No.	Specify the port number of the server (computer). (UltraVNC default: 5900)
Password	Specify the password. Typing the password shows eight asterisks. (one-byte 254 alphanumerics maximum)
Auto-reduction	Select this checkbox to use the function that zooms out to show the entire computer screen.
PC resolution	When the [Auto-reduction] checkbox is selected, specify the resolution of the computer. (800*600, 1024*768, 1152*864, 1280*1024, 1600*1200, specification (width: 800 to 1600, height: 600 to 1200))

Enter the password set in the [UltraVNC Server Property Page] window on the computer. (Refer to step 12 in "Installing and Configuring UltraVNC" page 4-56.)



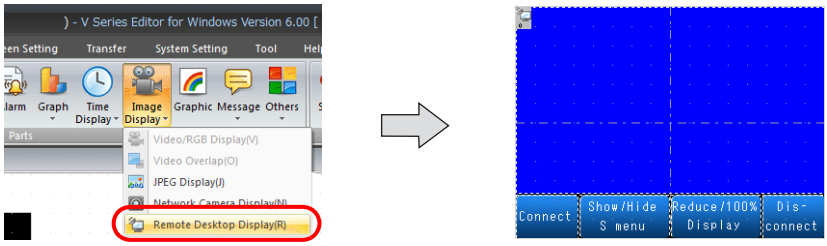
Remote Desktop Window Display Procedure

There are three ways to display a remote desktop window.

- Placement of a Display Area to Show Remote Desktop Window → page 4-60
- Switch to Show/Hide Remote Desktop Window → page 4-63
- Showing/Hiding Using a Macro Command → page 4-64

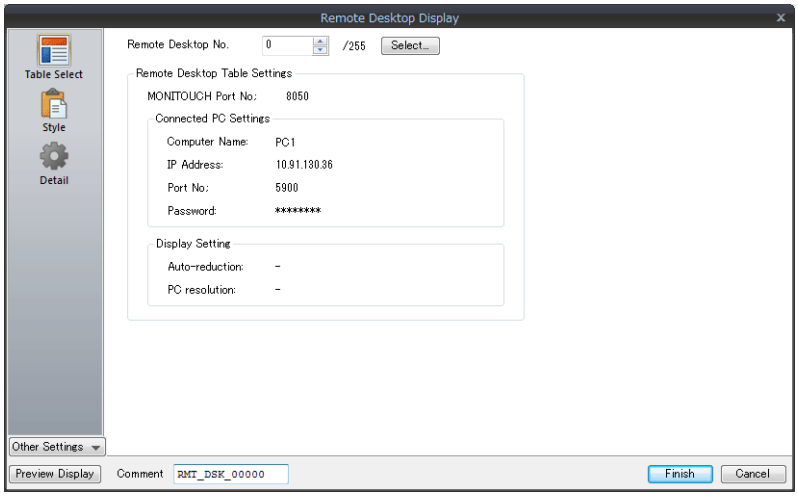
Placement of a Display Area to Show Remote Desktop Window

A display area can be placed on a screen to display the remote desktop window of a connected server (computer).
Click [Parts] → [Image Display] → [Remote Desktop Display] and place the part.



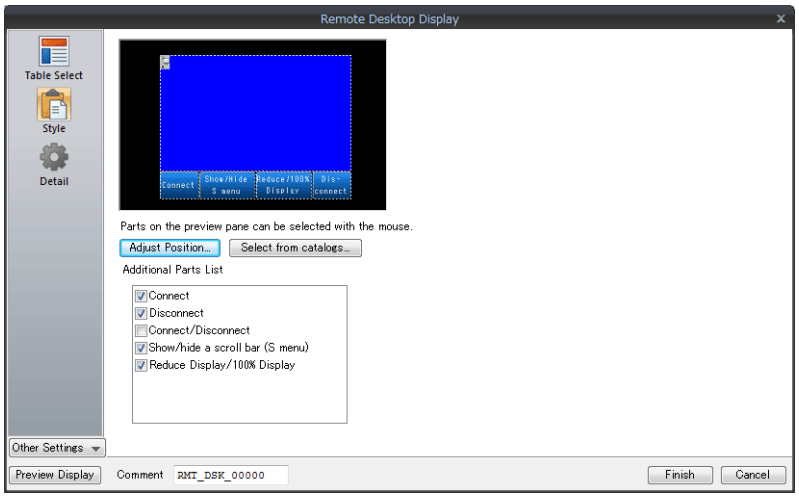
Remote Desktop Display

- Table selection



Item	Description
Remote Desktop No.	Click the [Select] button to display the [Remote Desktop Table Setting] window. Specify the table number of the server (computer) that has been registered in the [Remote Desktop Table Setting] window.
Remote Desktop Table Settings	This area summarizes the remote desktop table settings.

- Style

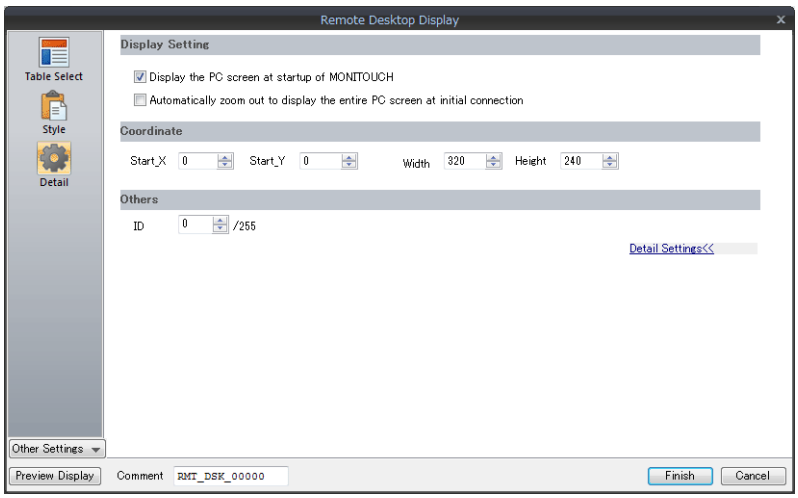


Item		Description
Additional Parts List		Displays a list of remote desktop-related parts. Selected: Displayed on the unit. Unselected: Not displayed on the unit.
	Connect	Connect to the server (computer) and enable display of the remote desktop window.
	Disconnect	Disconnect from the server (computer) and disable display of the remote desktop window.
	Connect/Disconnect	Each press of this switch toggles between connecting to the server (computer) and enabling display of the remote desktop window and disconnecting from the server (computer) and disabling display of the remote desktop window.
	Show/hide the scroll bars (S menu)	Each press of this switch toggles between showing and hiding the scroll bars (S menu). However, this function is disabled when displaying the remote desktop window with auto-reduction.
	Reduce Display/100% Display	Each press of this switch toggles between automatic size reduction and actual size display of the remote desktop window.
Adjust Position		Display the window for adjusting the placement position of each part. The size of parts can also be changed.
Select from catalogs		Set the part design from the catalog.
Parts Design		Set the design and color of the part selected in the [Additional Parts List] or preview pane.
Edit Selected Parts		Set the part selected in the [Additional Parts List] or preview pane.

- Show/Hide
  Configure the show/hide settings of the remote desktop display.

  ☞ For details, refer to the Reference Manual 1.

- Detail



Item		Description
Display Setting		
	Display the PC screen at startup of MONITOUCH	Display the screen of the connected server (computer) when the TSi unit starts up. *1
	Automatic zoom out to display the entire computer screen at initial connection.	Automatically zoom out to display the entire computer screen. *2 This option is only effective for the initial connection. From the second and subsequent connections, the computer screen is displayed at the actual size.
Coordinate	Start_X/Start_Y	
Others	ID (0 - 255)	Set the ID.

*1 When this checkbox is deselected, use a switch to display the remote desktop window.

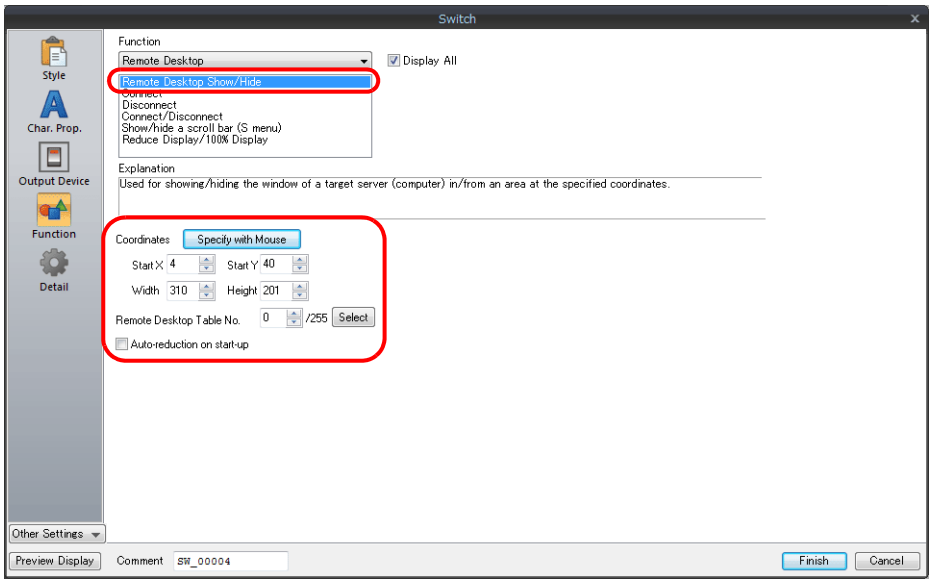
*2 The corresponding [Auto-reduction] checkbox in the [Remote Desktop Table Setting] window must be selected. For details, refer to “Remote Desktop Table Settings” page 4-59.

Switch to Show/Hide Remote Desktop Window

A switch can be placed on a screen to show or hide the remote desktop window of a connected server (computer) at the specified coordinates.

Set the switch function to [Remote Desktop Show/Hide].

*** Function switch setting is disabled.**



Switch Function/Auxiliary Setting Item		Description
Remote Desktop: Remote Desktop Show/Hide		Each press of this switch toggles between showing and hiding the remote desktop window. *1
	Specify with Mouse	The mouse is used to specify the position where the remote desktop window is displayed.
	Start X	Specify an X coordinate as the start point where the remote desktop window is displayed.
	Start Y	Specify a Y coordinate as the start point where the remote desktop window is displayed.
	Width	Specify the width of the area where the remote desktop window is displayed.
	Height	Specify the height of the area where the remote desktop window is displayed.
	Remote Desktop Table No.	Click [Select] to specify the table number of the server (computer) that has been registered in the [Remote Desktop Table Setting] window.
	Auto-reduction on start-up	Automatically zoom out to display the entire computer screen. *2

*1 Use the REMOTEDT_CTL macro command to show/hide the scroll bars (S menu). For details, refer to "Showing/Hiding Using a Macro Command" page 4-64.

*2 The corresponding [Auto-reduction] checkbox in the [Remote Desktop Table Setting] window must be selected. For details, refer to "Remote Desktop Table Settings" page 4-59.

Showing/Hiding Using a Macro Command

Command list

Category	Mnemonic	Description	Refer to
Remote Desktop	SET_REMOTEDT F0 F1	Show/Hide	page 4-64
	REMOTEDT_CTL F0 F1 F2	Change the display	page 4-65

- SET_REMOTEDT F0 F1
  Function: Showing/hiding the remote desktop window
  This macro command is used to show/hide the remote desktop window of the computer (server) set to remote desktop table number [F1], which specified in the [Remote Desktop Table Setting] window, according to the value specified for [F0].

  Device memory used

	Internal	PLC 1 to 8	Constant
F0	○		
F1	○		○

○: Setting enabled (indirect designation disabled) ◎: Setting enabled (indirect designation enabled)

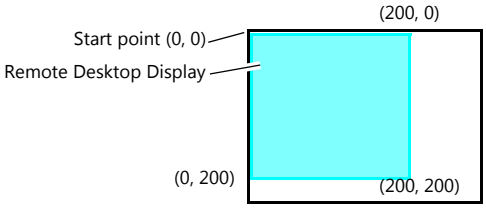
Range

	Value	Remarks
F0	0 : Hide 1 : Actual size 2 : Actual size (based on specified coordinates) 3 : Automatically reduced display 4 : Automatically reduced display (based on specified coordinates)	
F0 + 1	X coordinate as the start point	Valid when F0 = 2 or 4
F0 + 2	Y coordinate as the start point	
F0 + 3	Width	
F0 + 4	Height	
F1	0 - 255: Remote desktop table number	

Operation example

Display in an area based on the specified coordinates (remote desktop table number 10)

```
$u00100 =  2 (W) for actual size display based on the
           specified coordinates
$u00101 =  0 (W) for X coordinate as the start point
$u00102 =  0 (W) for Y coordinate as the start point
$u00103 =  200 (W) for width
$u00104 =  200 (W) for height
SET_REMOTEDT  $u00100 10
                      |
                      Remote desktop table number 10
```



Supplementary information

- The SET_REMOTEDT macro command cannot be used unless the relevant settings are configured in the [Remote Desktop Table Setting] window. For details on configuration, refer to page 4-59.
- This macro command is not usable as an initial macro.
- The result of macro execution is stored in $s1063.

Code (DEC)	Description
0	Normal
–1	Execution error

- REMOTEDT_CTL F0 F1 F2

  Function: Switching the display in the remote desktop window

  This macro command is used to switch the display of the remote desktop window of the computer (server) set to remote desktop table number [F1], which specified in the [Remote Desktop Table Setting] window, according to the value specified for [F0].

  Device memory used

	Internal	PLC 1 to 8	Constant
F0	○		
F1	○		○
F2	○		○

○: Setting enabled (indirect designation disabled) ◎: Setting enabled (indirect designation enabled)

  Range

	Value		
F0	0 : Computer screen reduction 1 : Computer screen rotation 2 : Show/hide scroll bars (S menu)		
F1	0 - 255: Remote desktop table number		
F2	(F0 = 0)	(F0 = 1)	(F0 = 2)
	0 : Actual size 1 : 1/4 2 : 1/9 3 : 1/16 4 : Auto-reduction	0 : 0° 1 : 90° 2 : 270°	0 : Hide 1 : Always displayed 2 : Automatic *

  * About the automatic setting

Resolution	Scroll bars (S menu)
Computer resolution > TSi unit resolution	Show
Computer resolution = TSi unit resolution	Hide
Computer resolution < TSi unit resolution	Hide

  Operation example

  Hiding the scroll bars (S menu) (remote desktop table number 10)

```
REMOTEDT_CTL  2  10  0
                     |
                     Remote desktop table number 10
```

  Supplementary information

  - The REMOTEDT_CTL macro command cannot be used unless the relevant settings are configured in the [Remote Desktop Table Setting] window. For details on configuration, refer to page 4-59.
  - The scroll bars (S menu) cannot be displayed when the auto-reduction function is used to display the computer screen.
  - The result of macro execution is stored in $s1063.

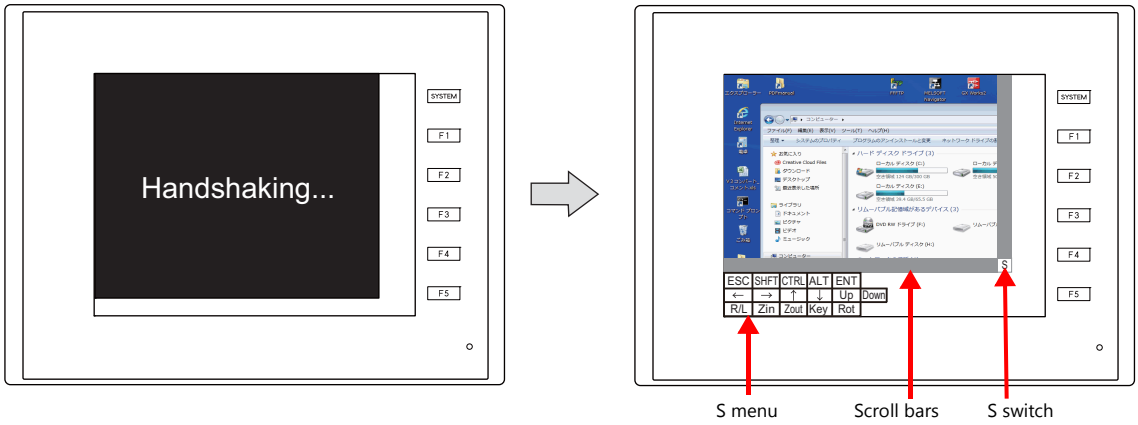
Code (DEC)	Description
0	Normal
–1	Execution error

4.10.5 Window Configuration and Operation

Window Configuration

When a connection is normally established between the TSi unit and the server (computer), the remote desktop window of the server is displayed on the TSi unit. When disconnecting, a [Disconnected] screen is displayed briefly and then disappears.

Example: When the [Auto-reduction] checkbox is not selected



*** The scroll bars (S menu) cannot be displayed while the auto-reduction function is used.**

Scroll bars

If the resolution of the server (computer) is higher than that of the remote desktop window display area, hidden parts in the area can be displayed by scrolling either horizontally or vertically with the relevant scroll bar.

[S] switch

Pressing this switch shows or hides the [S] menu.

[S] menu

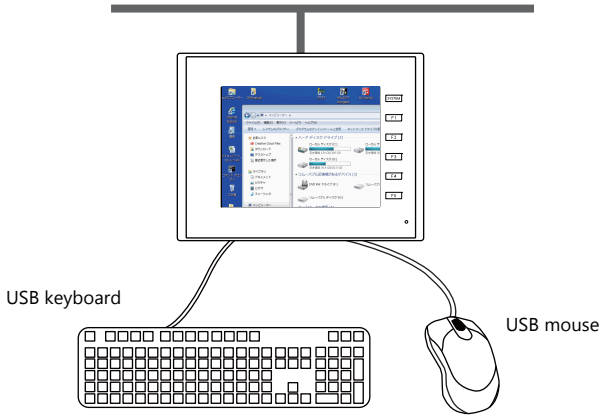
These are special switches for operating the remote desktop window used to perform operations including rotating and reducing the size of the display.

Item	Description
ESC	Esc key entry
SHFT	Shift key entry
CTRL	Ctrl key entry
ALT	Alt key entry
ENT	Enter key entry
←	← key entry
→	→ key entry
↑	↑ key entry

Item	Description
↓	↓ key entry
Up	Page-up key entry
Down	Page-down key entry
R/L	OFF: Equivalent to left-clicking the mouse ON: Equivalent to right-clicking the mouse
Zin	Window enlargement: 1/16 → 1/9 → 1/4 → 100% (maximum)
Zout	Window reduction: 100% (maximum) → 1/4 → 1/9 → 1/16
Key	Not used
Rot	Window rotation: 90°, 180°, 270°

Operation Method

The remote desktop window can be operated from the TSi unit by directly tapping on the screen and using a USB mouse and USB keyboard.



USB mouse

The left-click button, right-click button, and wheel of a USB mouse are usable.

USB keyboard

The language must be set for the USB keyboard on the Main Menu screen of the TSi unit.

When no USB keyboard is used, the on-screen keyboard can be used instead.
To use the standard Windows on-screen keyboard, click the Start menu → [All Programs] → [Accessories] → [Ease of Access] → [On-Screen Keyboard] to launch the on-screen keyboard.

4.10.6 System Memory

The following addresses in the system memory are used to store the data regarding the table number (set in the [Remote Desktop Display Setting] window) of the remote desktop window currently displayed and whether connection with the remote desktop is established.

$s	Description	Value
1380	Remote desktop window display Start-up status	0 : Hidden (disconnected) 1 : Shown (connected)
1381	Remote desktop window display Connection status	0 or greater: Remote desktop table number –1 : Disconnected –2 : Connection failure

4.10.7 Error

[Disconnected.] Screen

If connection between the TSi unit and a server (computer) fails or is disconnected due to a cable disconnection or an error, the [Disconnected.] screen appears in place of the remote desktop window. Check the cable and server (computer) and attempt reconnection.

Error No.

For details on error numbers that occur during data transfer, refer to the TS2060 Hardware Specifications or the TS1000 Smart Hardware Specifications.

4.10.8 Limitations

License Limitations

- A single license is provided with each TSi unit.
- Take care when managing key codes as they cannot be reissued.

Display Limitations

- Remote desktop window display is only available on screens (screen library) and is unavailable for overlap libraries.
- Multiple remote desktop windows cannot be displayed at the same time. If multiple display areas are concurrently placed and the [Display the PC screen at startup of MONITOUCH] checkbox is selected, the display area placed first takes effect.
- While a remote desktop window is displayed, attempting to bring up another window on the same screen will turn off the initial window and switch to the next window.
- While a remote desktop window is displayed, any change to the server (computer) resolution will forcibly turn off the window.
- When a remote desktop window is hidden, disconnection occurs if the specified remote desktop table number is the same even for a different display method.
  However, the [Disconnect] switch explained in "Placement of a Display Area to Show Remote Desktop Window" page 4-60 does not work to turn off the remote desktop window that was displayed by a switch or the macro command.
- If any part placed behind a remote desktop window is updated, the part will be displayed over the window.
- While a remote desktop window is displayed, any switches placed behind the window do not work. (However, they will work when the remote desktop window is hidden.)
- The display of a remote desktop window is always based on the upper left corner of the server (computer) screen as the start point.
- If a remote desktop window display area shows an image smaller than the area, the margin of the area turns black.
- While a remote desktop window is displayed in a display area, turning it off leaves the area in the color set in the V-SFT.
- When a remote desktop window is displayed by a switch or macro command, tuning it off will clear the window as well as its display area.
- When a remote desktop window is initially displayed, the image is scaled to 100%.
- Once a remote desktop window is turned off, the settings for the [S] menu will return to the defaults.
- If disconnection is performed using a switch or macro, the screen is redrawn. Any displayed overlaps also disappear. (However, overlaps do not disappear if the [Display Overlap during bit ON] checkbox located at [System Setting] → [Unit Setting] → [General Setting] is selected.)
- While a remote desktop window is displayed, switching to the Main Menu screen turns the window off.
- The scroll bars (S menu) cannot be displayed while the screen of a connected server (computer) is displayed using the auto-reduction function.
- The auto-reduction function of the TSi unit can display a range of 800*600 (SVGA) to 1024*768 (XGA).
- During auto-reduction display, if the H/V aspect ratio of the remote desktop display area on the TSi unit is 4:3, the display can be matched to the size of the remote desktop window. (In all other cases, blank parts of the display area appear filled black.)

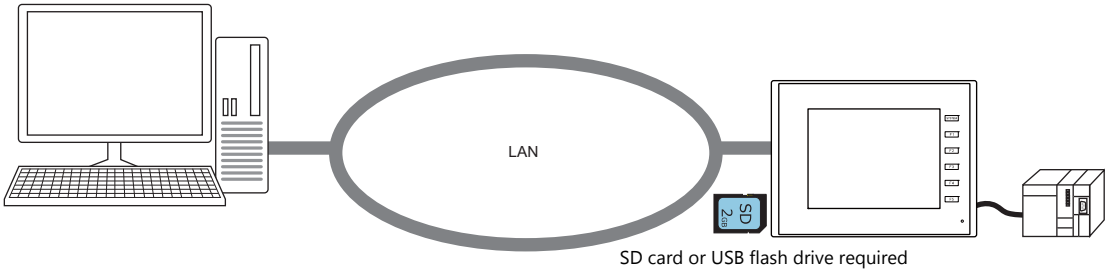
Other Limitations

- The SET_REMOTEDT macro command for displaying the remote desktop window is not usable as an initial macro.
- When the remote desktop window display function and the touch switch emulation of the RGB display function are used at the same time, a USB mouse cannot be used for the remote desktop window.

4.11 Web Server

4.11.1 Overview

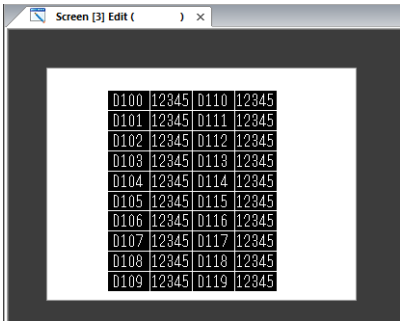
The internal device memory of the TSi unit, device memory of connected equipment (PLC1 to PLC8), and contents of memory cards can be monitored using a web browser on a computer connected on the LAN.



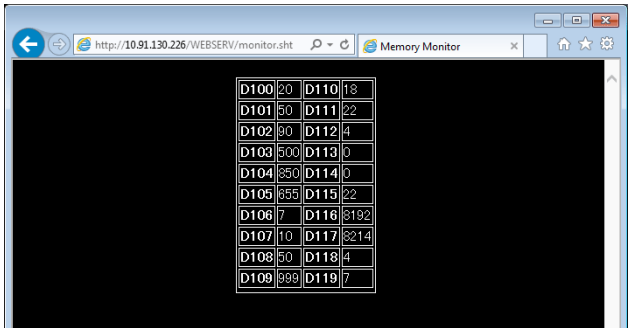
SD card or USB flash drive required

- An SHT file can be created in V-SFT by using a table data display. Users are not required to create a file for monitoring purposes.

V-SFT



Web browser

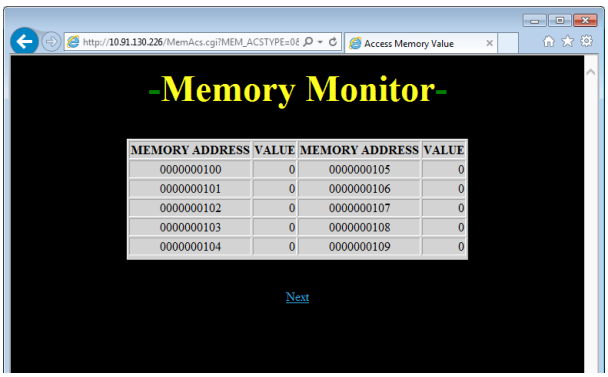


However, this SHT file is a simple file that only shows a table data display. To display titles or allow automatic updates to monitoring, users must make additions to the SHT file.

☞ "Monitoring Table Data Displays" page 4-71

- It is possible to write data to the TSi unit and perform monitoring from a web browser. A CGI function (MemAcs.cgi) embedded in the TSi unit is used for this purpose. In this case however, users must create an HTM file.

☞ Refer to"Memory Device Access" page 4-73



- Screenshots of screens on the TSi unit can be saved in JPEG format to an SD card. In addition, JPEG data on a storage device can also be viewed in a web browser.
  The operational status of machines on a production line can be checked from a separate monitoring room via a TSi unit on the production floor.

☞ "JPEG File Display" page 4-77

Applicable Models

Model	Port	Color	Other Notes
TS2060i TS1100Si TS1070Si	LAN	32K/64K	Not available with CUR-03

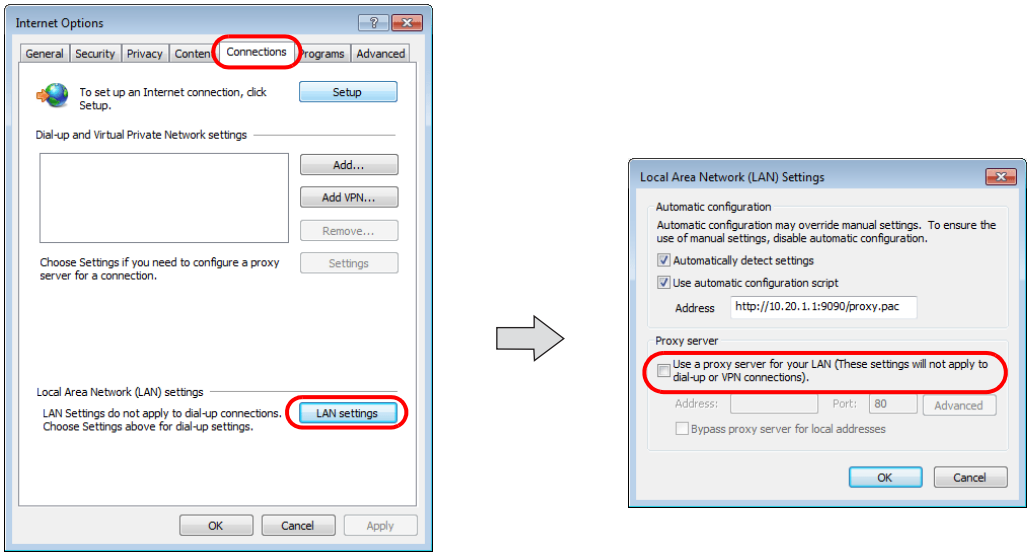
4.11.2 Notes

Browser Settings

Be sure to deselect the [Automatically detect settings] and [Use a proxy server for your LAN] checkboxes in the LAN settings of your web browser.

Example: Windows 7

1) Start Internet Explorer.
2) Click the [Tools] menu and select [Internet Options].
3) Click the [Connections] tab.
4) Click the [LAN settings] button under [Local Area Network (LAN) settings].
5) Deselect the [Use a proxy server for your LAN] checkbox.



Files Types Available for Use on Web Servers

When using the web server function, the SD card in the TSi unit can be accessed from a web browser on your computer. The files you can access from the web browser are as follows:

Extension	MIME Type	Description
htm	text/html	HTML document
sht	text/html	SHT file (with SSI)
txt	plain	Text file
gif	image/gif	GIF image
jpg, jpe	image/jpeg	JPEG image

* The filenames of the above file types must be specified within 64 one-byte characters (0 to 9, A to Z) and with extensions three characters in length. Filenames and extensions that do not comply with this convention cannot be accessed from a web browser.

* SSI (Server Side Include)
This is one method of embedding dynamic information, such as the current date and time, into HTML documents.
Such embedding is described as <!--#exec cgi="xxx.cgi"-->, <!--#echo var="DATE_LOCAL"-->. Files with SSI are referred to as SHT/SHTM files.

4.11.3 Monitoring Table Data Displays

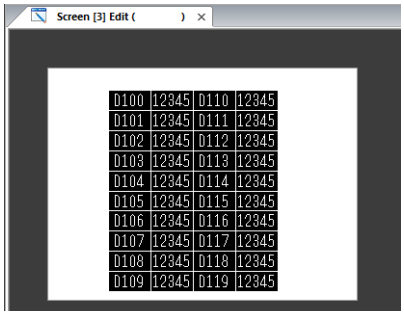
The internal device memory of the TSi unit and device memory of PLCs etc. can be monitored using a web browser.
An SHT file, which is required for monitoring in a web browser, can be created by using a table data display in V-SFT.

Creating SHT Files

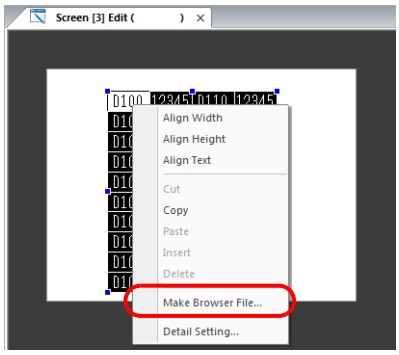
Create an SHT file using the V-SFT.

Procedure

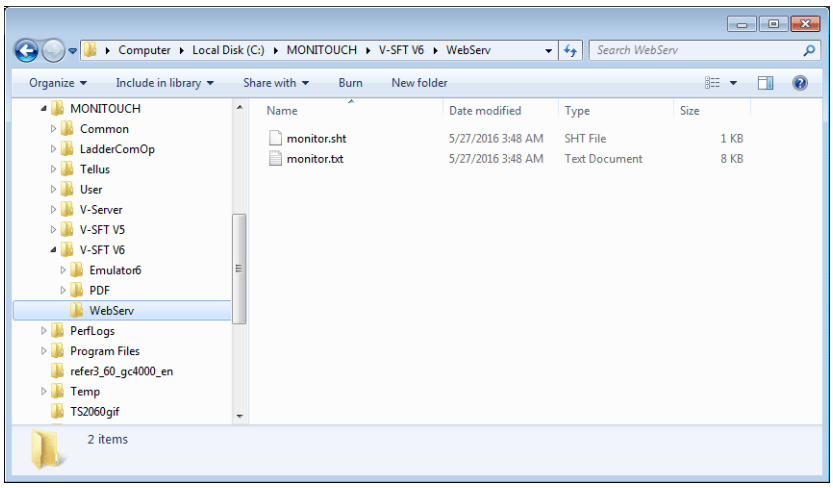
1. Place the table data display on the screen in V-SFT.



2. Click on the table data to show the handles. If multiple table data displays are required, create them one by one.
3. Right-click and select [Make Browser File].



4. The [Make Browser File] window is displayed. Enter a filename.
   * The filename must be within 64 one-byte characters (0 to 9, A to Z). The file cannot be accessed if any other characters are used.
5. Two files are created in the "C:\MONITOUCH\V-SFTV6\WebServ" folder where V-SFT is installed.
   - (Filename).sht: File for display in the web browser
   - (Filename).txt: Table data file for table data display



6. Save the screen program.
   * An SHT file needs to be used because the table data display monitoring function uses SSI. An HTM file cannot be used.

Saving to a Storage Device

Save the SHT file, which is created in the "C:\MONITOUCH\V-SFTV6\WebServ" folder, to a storage device (SD card or USB flash drive) and then perform monitoring using web browser on a computer.
Files can be saved using either Windows Explorer or the storage manager.

When Using the Storage Manager

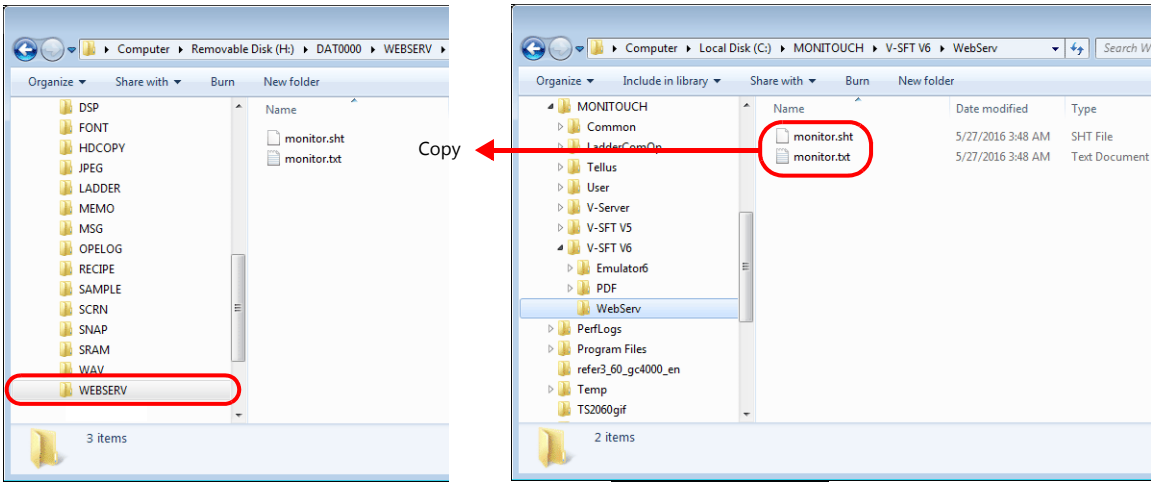
1. Click [File] → [Storage Manager] in V-SFT.
2. The [Storage Drive Select] dialog is displayed. Select the drive of the storage device.
   The [Storage Manager] tab window is displayed.
3. Click [Write to Storage]. The [Write to storage] window is displayed. Select the screen program.
4. Clicking [OK] creates an access folder on the storage device.
   At this point, the SHT file (.sht) and text file (.txt) created in the "C:\MONITOUCH\V-SFTV6\WebServ" folder are stored in the "\access folder\WEBSERV" folder on the storage device.

* In this case, all files stored in the "C:\MONITOUCH\V-SFTV6\WebServ" folder are saved to the storage device. Delete any unnecessary files.

☞ For details on the storage manager, refer to "5 Storage Device".

When Using Explorer

1. Open an Explorer window in Windows.
2. Specify the storage device drive.
3. Copy the SHT file (.sht) and text file (.txt) created in the "C:\MONITOUCH\V-SFTV6\WebServ" folder to the "\access folder\WEBSERV" folder on the storage device.

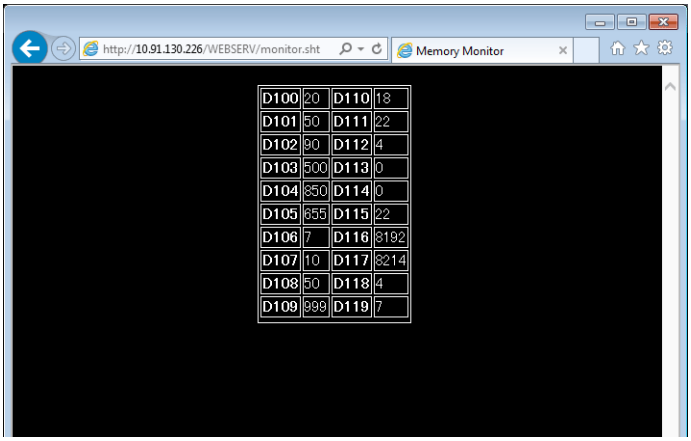


Accessing with a Web Browser

Access the TSi unit, in which the storage device is inserted, from a web browser.

1. Start a web browser on the computer connected via Ethernet.
2. Specify the IP address of the TSi unit and the SHT file as follows. The table data display will appear in the web browser.

   http://(IP address)/WEBSERV/(filename).sht



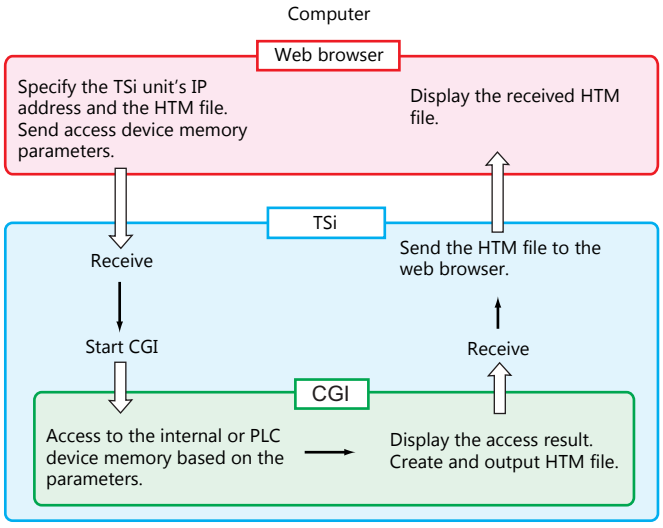
- In the web server function, the access folder is the root folder.
- This section assumes that the HTM file is stored in the WEBSERV folder.

4.11.4 Memory Device Access

A web browser can be used to access (read/write) to any device memory, such as the internal device memory of the TSi unit, PLC device memory, and temperature controller device memory. To achieve this, users must create an HTM (SHT) file with parameters set as shown in the table (page 4-74) to be sent to the TSi unit. Access to the desired device memory from this HTM (SHT) file is made possible by specifying the CGI function (MemAcs.cgi) prepared on the TSi unit.

Device Memory Access Flowchart

The procedure of device memory access is shown below.



CGI Function (MemAcs.cgi)

"MemAcs.cgi" is a CGI function prepared for reading/writing from/to the device memory of a device connected to the TSi unit.
The CGI function is executed according to the parameters specified in an SHT file etc.
The CGI function recognizes whether to read or write according to the received parameter values. For reading, it sends a monitor table to the web browser. For writing, it sends its writing result to the web browser.

Device Memory Access Parameter List

The following parameters are required in order to start the CGI function (MemAcs.cgi). Always specify the parameter name and parameter value correctly. MemAcs.cgi cannot recognize incorrect specifications and will not work correctly.

Parameter Name	Description		W	R
MEM_ACSTYPE	Device memory access type	0: Device memory read 1: Device memory write	○	○
MEM_MODEL	Device memory model	The approach to device memory is defined the same as the "indirect memory" approach of macros. For details, refer to the Macro Reference Manual.	○	○
MEM_TYPE	Device memory type		○	○
MEM_ADDR	Device memory address Top device memory address to be accessed (32-bit address supported)		○	○
MEM_EXP	Expansion code Only set for required models. Otherwise, set to "0".		○	○
MEM_TRMNO	PLC station number in case of the multi-drop connection		○	○
MEM_WCNT	Number of words to be accessed	Data length: 1 word = 1 to 128 Data length: 2 words = 1 to 64	○	○
MEM_TBL_LINE	Number of lines in a table		×	○
MEM_TBL_COLMN	Number of columns in a table		×	○
MEM_UPDT_TIME	Update cycle (unit: second) * No updates when "0" is set.		×	○
MEM_WR_DATA	Writing data Set the number of words specified for [MEM-WCNT] with delimiter "," (comma).		○	×
MEM_WRTYPE	Writing data type	0: DEC 1: HEX 2: OCT 3: BIN	○	×
MEM_DSPTYPE	Device memory display type	0: DEC 1: DEC (w/ -sign) 2: DEC (with sign +-) 3: HEX 4: OCT 5: BIN	×	○
MEM_KETA	Digits for displaying the value in device memory	1 to 32	×	○
MEM_DCPT	Decimal point for the value in device memory	0 to 10	×	○
MEM_DLEN	Device memory data length	0: 1 word 1: 2 words	○	○
MEM_INPUT	Input type	0: DEC 1: BCD	×	○

Example of Device Memory Access

Creating HTM Files

Create an HTM file with which the read/write parameters are set using the radio button menu or combo box, and save the file to the "C:\MONITOUCH\User\WebServ" folder.

Example:

```
<HTML>
<BODY>

<FORM METHOD="GET" ACTION="../MemAcs.cgi">   <- Starting the entry form. Use this as is.

<DT>Way to Access Memory
<DD>
<INPUT TYPE="radio" NAME="MEM_ACSTYPE" VALUE=0 CHECKED>read<BR>
<INPUT TYPE="radio" NAME="MEM_ACSTYPE" VALUE=1>write
                                            Radio button menu
<DT>Access Memory<DD>
<SELECT SIZE=1 NAME="MEM_MODEL">
<OPTION VALUE=0 SELCTED>Internal Memory
<OPTION VALUE=1>PLC Memory
<OPTION VALUE=2>Memory Card Memory          Combo box
<OPTION VALUE=3>Temp. Control Memory
</SELECT>

<DT>Memory Address
<DD>
<INPUT TYPE="text" SIZE=6 MAXLENGTH=20 NAME="MEM_ADDR" VALUE=100><BR>
                                            Key board entry
<INPUT TYPE="submit" NAME="submitname" VALUE="Execute">
<INPUT TYPE="reset" VALUE="Clear">
                                            Sending the entered data
</FORM>

<BR>

<FONT SIZE=4>|<A HREF="./index.htm">Back</A>|</FONT>

</BODY>
</HTML>
```

Device memory cannot be accessed with just the above example. A file must be created to set all necessary parameters for reading (or writing) by referring to the parameter list on "Device Memory Access Parameter List" page 4-74.

Saving to a Storage Device

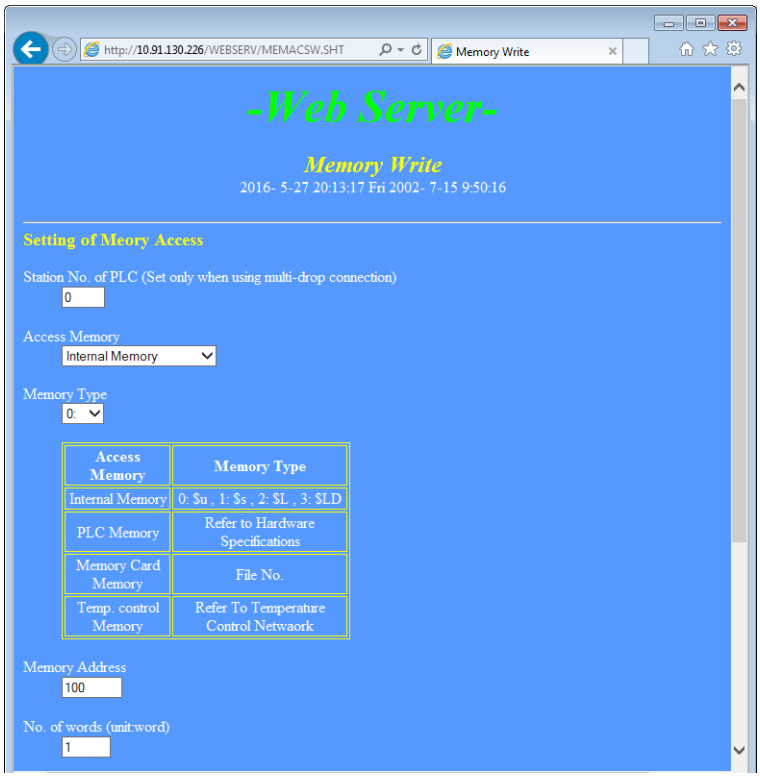
Save the created HTM file to a storage device. For details on saving, refer to page 4-72.

Accessing with a Web Browser

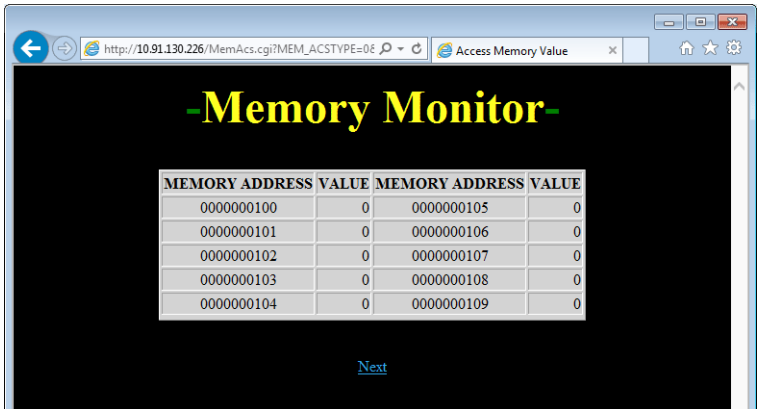
1. Start a web browser on your computer and access the storage device inserted into the TSi unit.

   ☞ For details on the access method, refer to page 4-73.

2. The created HTM file is displayed.



3. Set the access device memory parameters in each entry field and press the [Write] button. The TSi unit creates the following HTM file and sends it to the web browser.
   - Device memory access type is "0: Device memory read"



   - Device memory access type is "1: Device memory write"

4.11.5 JPEG File Display

Screenshots of screens displayed on the TSi unit can be saved in JPEG format to the "\access folder\HDCOPY" folder on a storage device. Using the web server function, these JPEG files can be displayed in a web browser.

These files can be displayed with or without using an HTM file. When using an HTM file, users must create the HTM file.

Without Using an HTM File

If not using an HTM file, specify the "folder name/filename" directly from the web browser to display a JPEG file.

Enter text in the following format into the address field of the web browser.

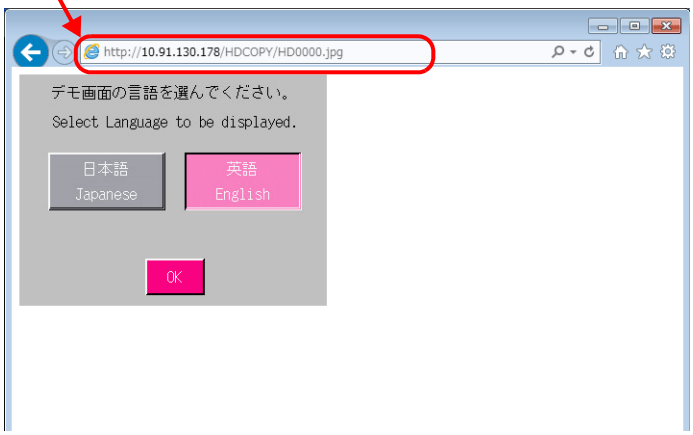
http://(IP address)/(folder name)/(filename).jpg

HDCOPY
JPEG

* In the web server function, the access folder is the root folder.

Example:

IP address: 10.91.130.178
When displaying HD0000.jpg in the "HDCOPY" folder:
http://10.91.130.178/HDCOPY/HD0000.jpg



Using an HTM File

If using an HTM file, a title can be displayed in addition to the JPEG file. By using the HTM refresh command, periodic updates can also be performed.

Creating HTM Files

Example: Display a screenshot image in the web browser and create an HTM file to be displayed while updating periodically.

・CCC.htm

```
<HTML>
<META HTTP-EQUIV="refresh" CONTENT="5;URL=DDD.htm">
      Auto update command      Update cycle   File name to be
                                              displayed next
<HEAD><TITLE>JPEG Monitor</TITLE></HEAD>
                  Page title
<BODY>
<CENTER>
<H1>Screen0</H1>   <-- Title to be displayed on the top
<P>                    of the screen
<IMAGE SRC="../HDCOPY/HD0000.jpg">
  Image display   JPEG file directory / filename

</P>
</CENTER>
</BODY>
</HTML>
```

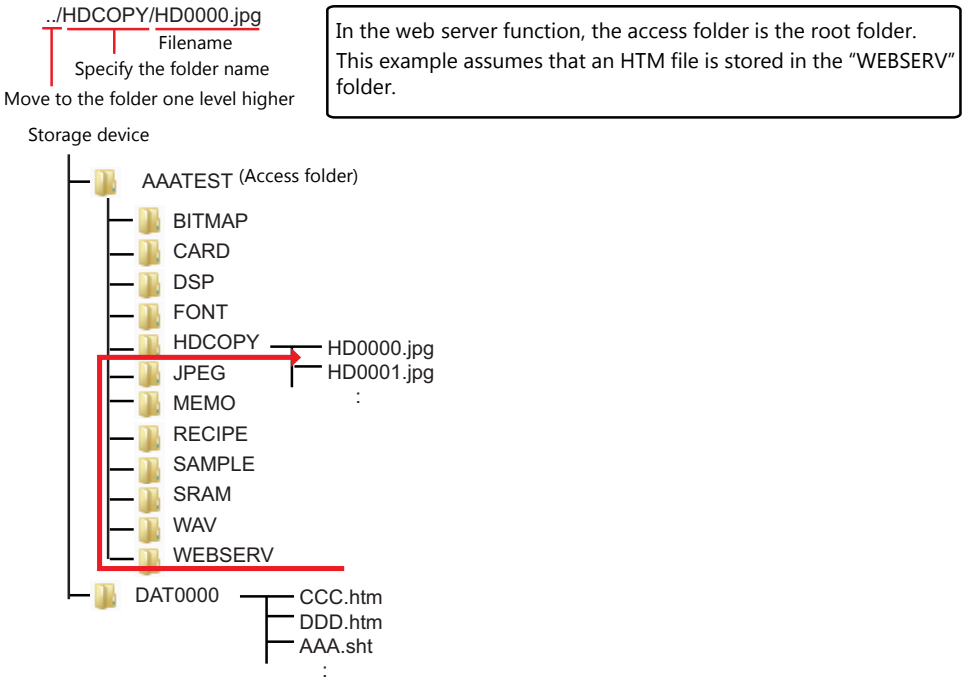
・DDD.htm

```
<HTML>
<META HTTP-EQUIV="refresh" CONTENT="5;URL=CCC.htm">
      Auto update command      Update cycle   File name to be
                                              displayed next
<HEAD><TITLE>JPEG Monitor</TITLE></HEAD>

<BODY>
<CENTER>
<H1>Screen1</H1>   <-- Title to be displayed on the top
<P>                    of the screen
<IMAGE SRC="../HDCOPY/HD0001.jpg">
  Image display   JPEG file directory / filename

</P>
</CENTER>
</BODY>
</HTML>
```

In the HTM file example shown on the previous page, the JPEG file directory is specified as "../HDCOPY/HD0000.jpg". This file specification method uses a relative path. Another file specification method that can be used is the absolute path.



Saving to a Storage Device

Save the created HTM file to a storage device.

☞ For details on saving, refer to page 4-72.

Accessing with a Web Browser

Start a web browser on your computer and access the storage device inserted into the TSi unit.

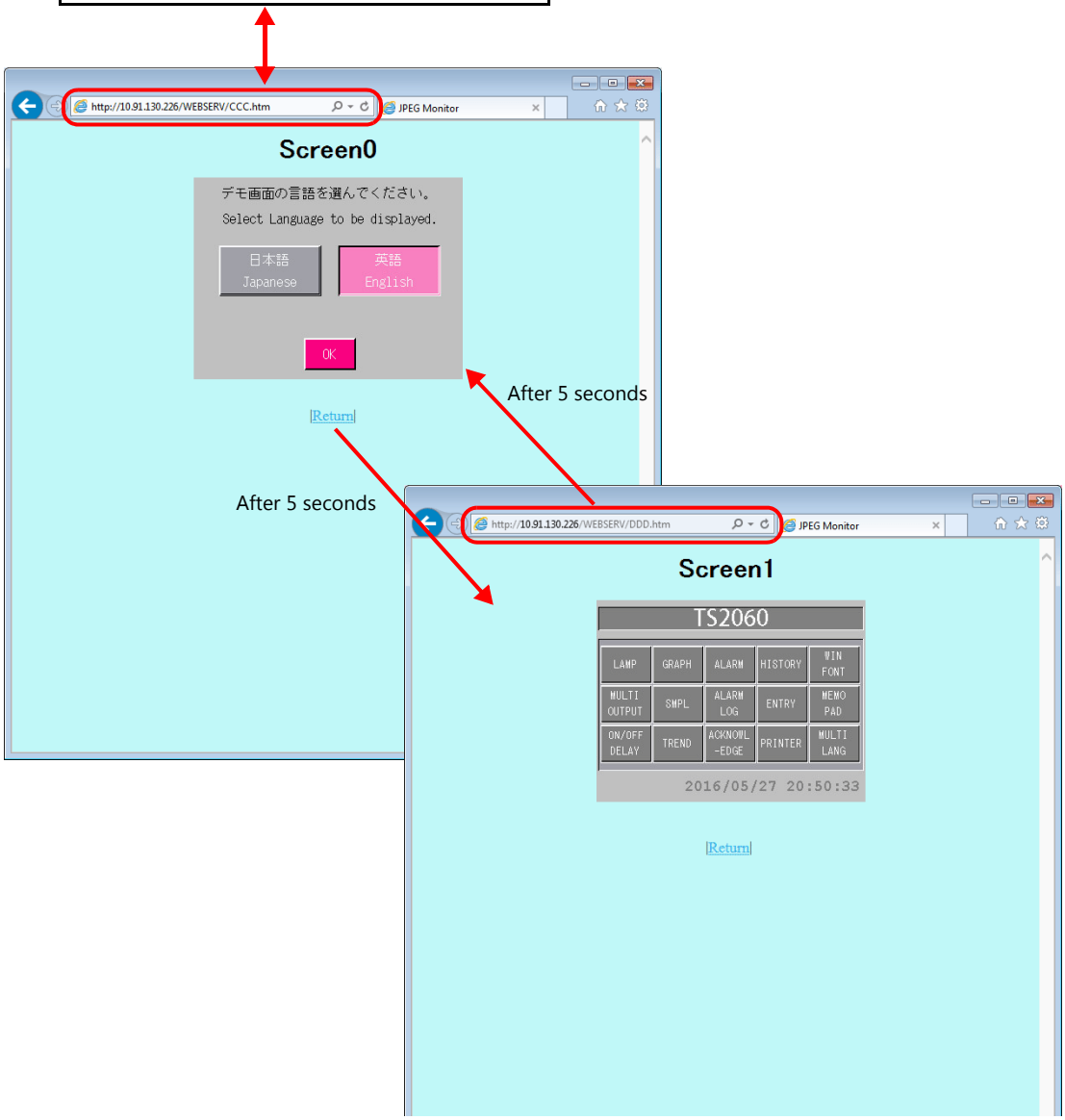
Enter text in the following format into the address field of the web browser.

http://(IP address)/WEBSERV/(filename).htm

Example:

IP address: 172.16.200.108
When displaying CCC.htm in the "WEBSERV" folder:

http://172.16.200.108/WEBSERV/CCC.htm



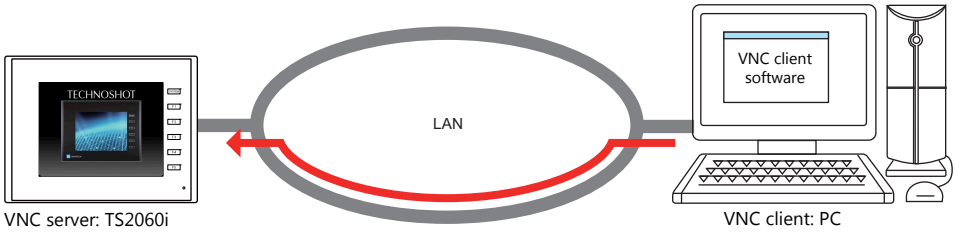
HD0000.jpg is displayed initially. HD0001.jpg and HD0000.jpg are then repeatedly displayed in turn for five seconds each.

4.12 VNC Server

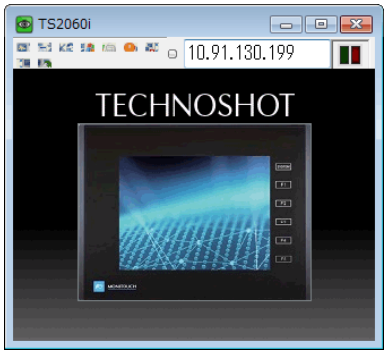
4.12.1 Overview

- The TSi supports the VNC server function. This means that the screen of the TSi unit can be monitored and remotely operated with ease from a PC on the network. Settings can also be configured to allow monitoring only.
- The TSi unit to be remotely operated is referred to as the "server" and the PC that performs remote operations is referred to as the "client".
- Simultaneous access from multiple clients is prohibited. All connections are 1:1.

VNC: Virtual Network Computing



VNC client software



- VNC client software (VNC viewer) must be installed on the VNC client.
- The TSi employs password authentication. When a client accesses a TSi unit, a password must be entered.
  The password is to be registered in the screen program using V-SFT.
- Remote operations on the display of the TSi unit can be performed on all RUN mode, Main Menu, and error screens.
- If a network camera is connected to the TSi unit, the network camera image can also be displayed on the VNC client.

4.12.2 Specifications

TSi Unit (Server)

Item	Description	Remarks
Port used	LAN	Not available with CUR-03.
Port number	5900	Fixed
Number of client connections	1	If the server receives connection requests from multiple clients, the currently connected client takes priority.
Authentication method	Password authentication	
Number of registered users	A maximum of 2 users	Remote operation permitted: 1 user Remote monitoring only: 1 user

Restrictions

- The function is available only when the TSi color setting is 64k or 32k colors.
- The connection between the TSi and VNC client is 1:1.
  If the TSi receives connection requests from multiple VNC clients, the currently connected client takes priority.
- When the screen program is in portrait orientation, the display on the VNC client remains in the landscape orientation without being rotated.
- The following operation cannot be performed on the TSi unit when a VNC client is connected:
  - Main Menu screen → [I/O Test] → [Switch Check] → [Adjust]
- When the Main Menu screen is displayed while a VNC client is connected, a light blue rectangle blinks at the bottom right of the screen.

4.12.3 Setting Procedure

1. Connect the TSi unit and the VNC client device to the network.
   For details on VNC client device settings, refer to the relevant device manual.

   ☞ "4.2 TSi Unit IP Address Settings" page 4-2

2. Register VNC server settings to the screen program using V-SFT and transfer the screen program to the TSi unit.
   Register the [User Name] and [Password] from [System Settings] → [Ethernet Communication] → [VNC Server].

   ☞ "4.12.4 V-SFT Settings" page 4-81

3. VNC client settings
   - Install the VNC viewer software.

   ☞ "4.12.5 VNC Client Settings/Operations" page 4-82

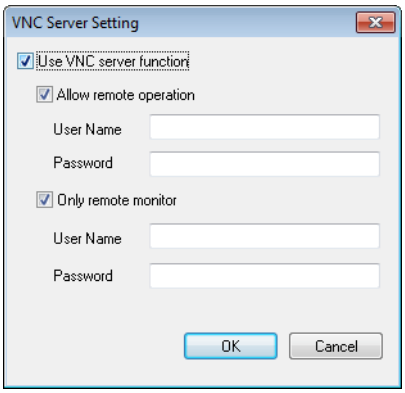
4. Start the VNC viewer and perform remote monitoring and operation.

   ☞ "Connecting to the VNC Server" page 4-82

4.12.4 V-SFT Settings

VNC Server Settings

Register the [User Name] and [Password] from [System Setting] → [Ethernet Communication] → [VNC Server Setting].



Item		Description
Use VNC server function		Select this checkbox to use the VNC server function.
Allow remote operation		Select this checkbox to register a user who is allowed remote operations.
	User Name	Register a user name. Up to 16 one-byte alphanumeric characters
	Password	Register a password. Up to 8 one-byte alphanumeric characters and symbols
Only remote monitor		Select this checkbox to register a user who is allowed only remote monitoring.
	User Name	Register a user name. Up to 16 one-byte alphanumeric characters
	Password	Register a password. Up to 8 one-byte alphanumeric characters and symbols

4.12.5 VNC Client Settings/Operations

VNC Viewer Software

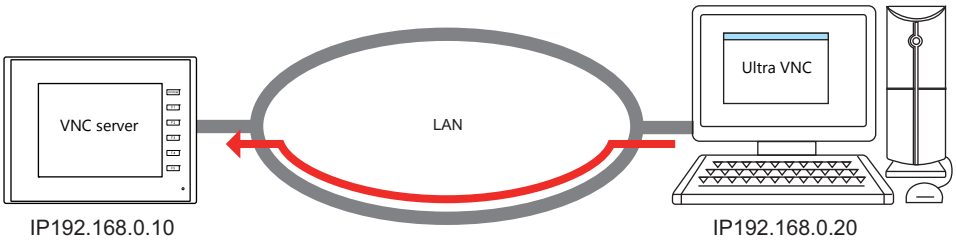
VNC viewer software must be installed on the VNC client in order to perform remote monitoring and operation of the TSi unit from the VNC client. Install the software in advance.

Software	OS	Remarks
Ultra VNC	Windows 2000 / XP / Server 2003 / Vista / 7 / 8	Free software
Tight VNC	Windows XP (32 bit)	

* For details on the system requirements of each software, visit the software's website. The method for obtaining the software differs depending on the client device. Obtain the software by referencing the specifications of the relevant device.
* Communication may be unstable depending on the OS version of the client, VNC viewer version, and operating environment. Always perform tests in the usage environment.

Connecting to the VNC Server

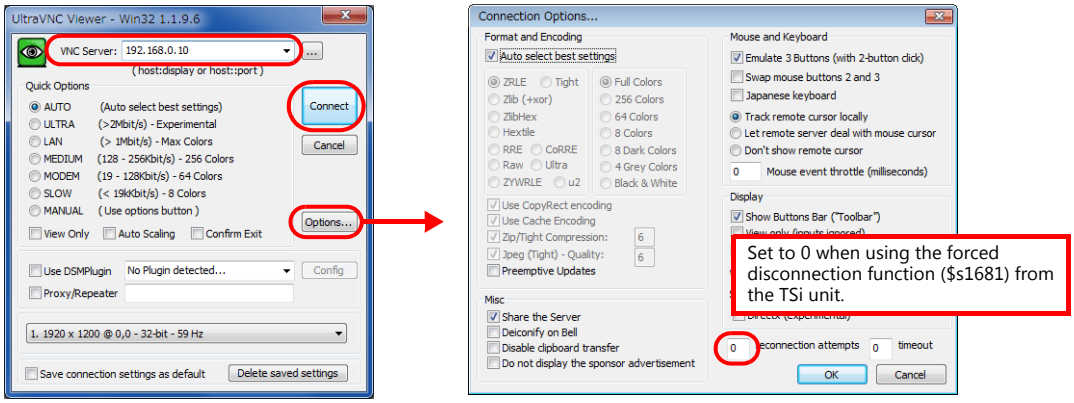
This section explains connecting to the VNC server from a PC on the network using Ultra VNC as an example.



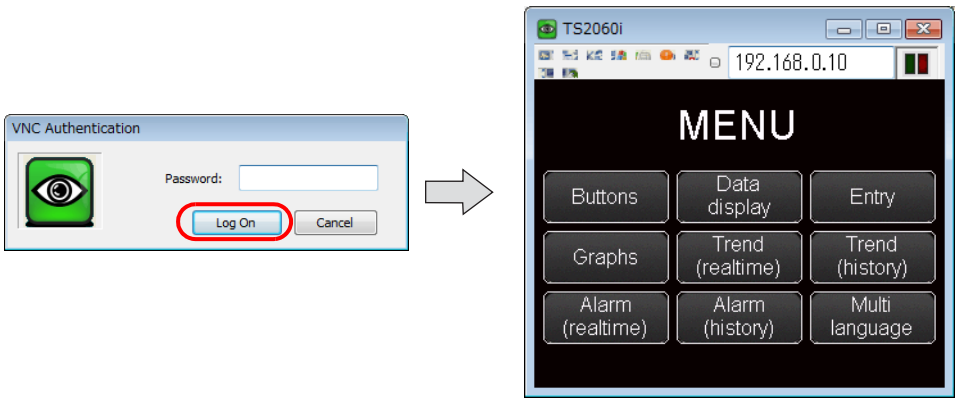
Ultra VNC

Install Ultra VNC on the PC and connect the TSi unit and PC to the network in advance.

1. Start the Ultra VNC application via Windows Start menu → [UltraVNC] → [UltraVNC Viewer].
2. Enter the IP address of the TSi unit into the [VNC Server] field and click [Connect].

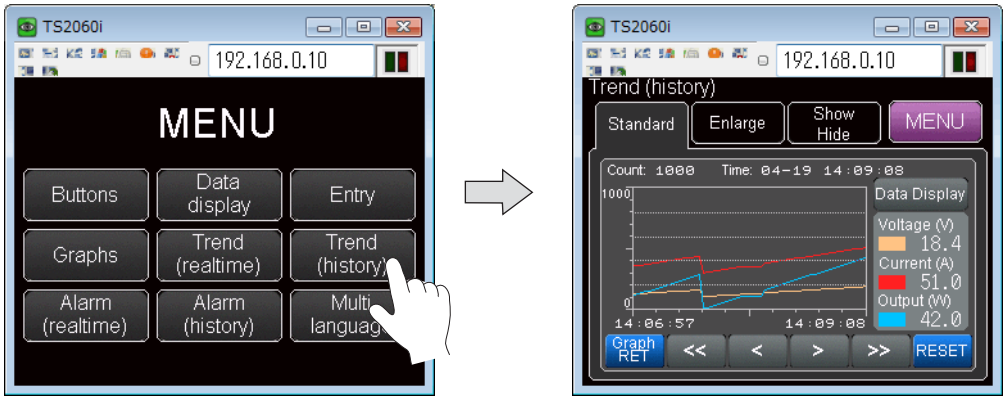


3. Enter a password on the user authentication screen and click [Log On]. The VNC viewer screen is displayed.



4. Operating the VNC viewer screen will change the display on the TSi unit as well.

* If logged on with the password for [Only remote monitor], remote operations are not allowed. The viewer screen changes to reflect operations performed on the TSi unit.



Keyboard Entry

If remote operations are permitted from the VNC client, the following keyboard entry can be performed in addition to operations on the viewer screen.

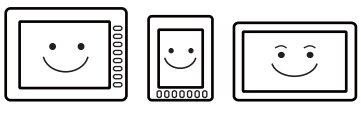
- Entry screens: numerical and text entry

4.12.6 System Device Memory ($s)

The following describes the system device memory associated with the VNC server function.

Address	Description	Remarks
$s1674	VNC client status 0: Disconnected 1: Connected	← TSi
$s1681	VNC access 0: Permitted Other than 0: Prohibited (forcible disconnection if client is connected)	→ TSi

MEMO

MONITOUCH 

5 Storage Device

5.1 Overview

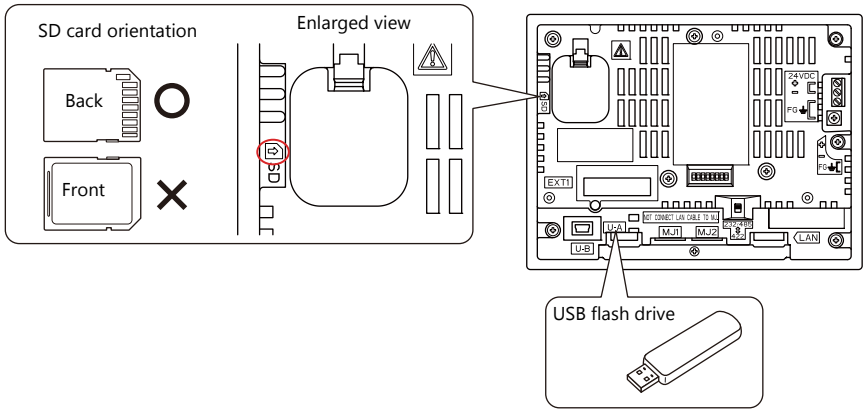
5.1.1 Connections

The SD card interface and USB-A port are provided on the TS unit as standard features. Connecting commercially available SD cards and USB flash drives (referred to hereafter as storage devices) enables them to be used for a variety of functions including screen program transfer, saving of logging data, and saving of screenshot images.

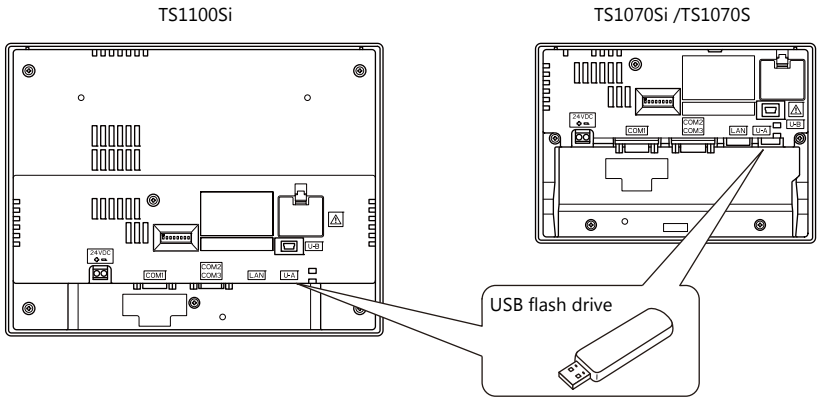
Applicable Models

Model	Storage Device	Connection Port
TS2060i	SD card / SDHC card	Built-in SD card socket
	USB flash drive	USB-A
TS2060	Not available	-
TS1100Si TS1070Si TS1070S	USB flash drive	USB-A

- TS2060i (use of storage devices is not available with TS2060)



- TS1100Si / TS1070Si / TS1070



5.1.2 Storage Device Specifications

Supported Storage Devices

The following storage devices can be used.

Type	Capacity	File System
SD card	Max. 2 GB	FAT, FAT32
SDHC card	4 - 32GB	FAT32
USB flash drive	Max. 32GB	FAT, FAT32

Notes on Handling Storage Devices

- When inserting an SD card into the unit, make sure to insert it in the correct orientation. Failure to do so may damage the SD card or the slot on the unit.
- Only remove a storage device when the Main Menu screen is displayed or after pressing the [Storage Removal] switch.
- Do not turn off power to the unit when a storage device is being accessed. Doing so may destroy data on the SD card.
- Make a backup copy of storage devices at regular intervals.
- If a disk error occurs and data read/write operation is disabled, execute ScanDisk on Windows and try to restore the disk. If the disk cannot be restored, format the storage device. If you format the device, data on the device is completely lost. (For details on scanning the disk or Windows operations, refer to the Windows help information.)
- The number of write cycles for a storage device is limited. Consequently, frequent writing at short intervals may shorten the service life of storage devices. When using a storage device to save trend/alarm data, take the monitoring interval into consideration. Be sure to avoid constantly writing to a storage device with the CYCLE macro command.
- Note that the amount of the data to be written should not exceed the capacity of the storage device. In particular, when using functions to write data from the TS unit to a storage device, such as backing up trend/alarm data, saving screen programs, saving screenshot images, or transferring recipe data, always consider the capacity limit of the storage device. Note that the amount of free space on a storage device can be checked with system device memory.
- If a screen program that uses storage device functions loaded onto the TS unit, be sure to insert the relevant storage device before running the screen program.

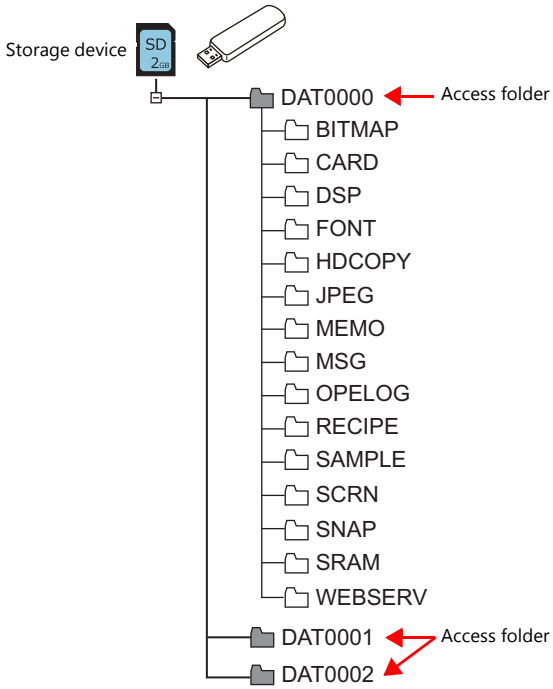
5.2 Access Folders

5.2.1 Access Folders

- Access folders are folders which are accessed regularly in RUN mode.
  An access folder is created when a screen program is written using storage manager.
  Access folders are also created automatically when a formatted storage device is connected to the TS unit.
- The access folder name is specified in the screen program.
  Location of setting: [System Setting] → [Other] → [Storage Setting] → [Access Folder Name]

☞ "Storage Device Settings" page 5-4

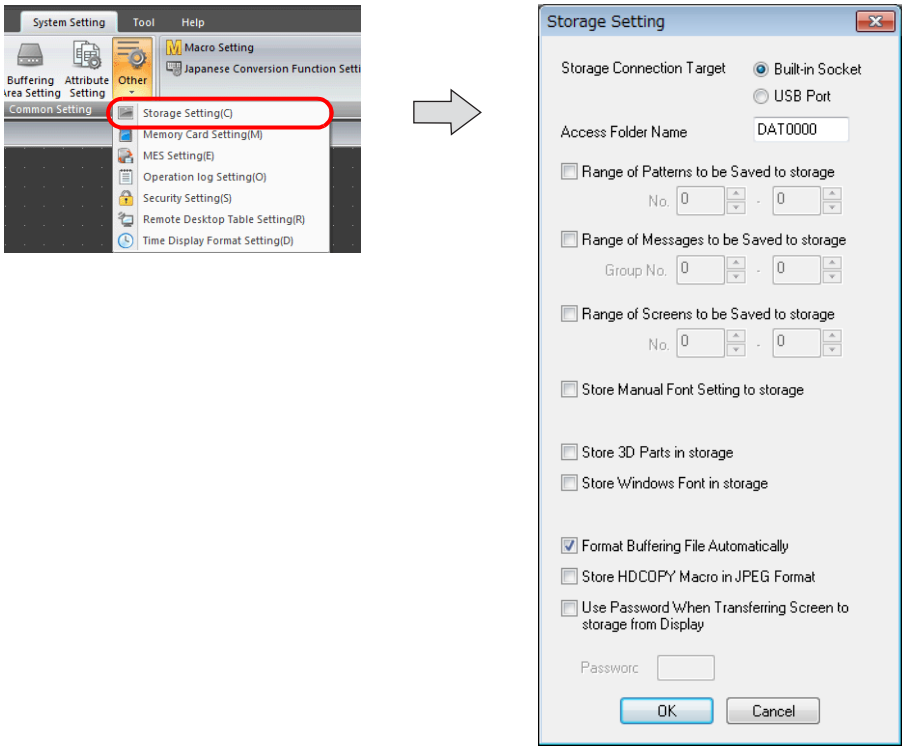
- If creating access folders with names differing by each screen program, multiple screen programs can be saved in respective folders as long as there is sufficient capacity on the storage device.



5.2.2 Storage Device Settings

Settings including the storage connection target, access folder name, and other storage-related items are configured in the [Storage Setting] window.

[System Setting] → [Other] → [Storage Setting]



Item	Description
Storage Connection Target	Select the location of the storage device for access in RUN mode. Built-in Socket USB Port
Access Folder Name	Set a different folder name for each screen program. (default: DAT0000) 32 one-byte characters or less (not case-sensitive) *1 If the same folder name already exists, data will be overwritten.
Range of Patterns to be Saved to storage	Store pattern data on the storage device.
Range of Messages to be Saved to storage	Store messages on the storage device.
Range of Screens to be Saved to storage	Store screens on the storage device.
Store Manual Font Setting to storage	Store manual font settings for gothic fonts on the storage device.
Store 3D Parts in storage	Store images for 3D parts on the storage device.
Store Windows Font in storage	Store Windows fonts on the storage device.
Format Buffering Area Automatically	Select this checkbox when storing trend and alarm history data on a storage device. For details, see "7 Trend" and "8 Alarm" in TS Reference Manual 1.
Store HDCOPY Macro in JPEG Format *2	Enabled when [Edit Model Selection] → [Color] is set to 128 colors, 16-tone monochrome, or monochrome. Store screenshot images as JPEG files.
Use Password When Transferring Screen to storage from Display	Password: Maximum of 6 one-byte numeric characters A password can be set for when transferring data from the TS unit to a storage device on the Main Menu → Storage Transfer screen. This setting is valid even if no password is set.

*1 These are recognized as uppercase characters. If inputting lowercase characters on the editor screen, they are converted into uppercase characters when [OK] is clicked, and are recognized as uppercase characters on MONITOUCH.

*2 Screenshot images are saved in BIN format if this checkbox is not selected. These files can be converted to BMP files using the storage manager in V-SFT-6.

5.2.3 Folder Configuration

The following table lists the folder names and names of files in each folder.

Access folder (DAT0000)

Folder Name	Description	Filename	Transfer Direction	Refer to
BITMAP	Pattern data	BMP0000.BIN to BMP1023.BIN	TS ← storage device	page 5-12
CARD	Recipe data using the memory manager function	MCMHEAD.BIN MCMxxxx.BIN	TS ⇔ storage device	*5
DSP	Screen program	DSP0000.BIN	TS ⇔ storage device	page 5-7
FONT	Gothic fonts and multi-language fonts	xxxxxx.FTD	TS ← storage device	page 5-12
HDCOPY	Screenshot images *1	HD0000.JPG to HD9999.JPG HD000~yy.JPG to HD999~yy.JPG (arbitrary filename).JPG *2	TS → storage device *3	page 5-17
JPEG	JPEG files	JP00000.JPG to JP32767.JPG (arbitrary filename).JPG *2	TS ← storage device	page 5-15
MEMO	Memo pad data	MEM0000.BIN to MEM0007.BIN	TS ⇔ storage device	page 5-18
MSG	Message files	MSGxxyyy.BIN MSGxxyyy.TXT	TS ← storage device	page 5-12 page 5-14
OPELOG	Operation log files	OPELOG_hhmmss.BIN	TS ⇔ storage device	page 5-16
RECIPE	Recipe data	REC0000.CSV to REC9999.CSV (arbitrary filename).CSV *2	TS ⇔ storage device	page 5-16
SAMPLE	Trend sampling Data sampling Alarm tracking Alarm logging	SMPxxxx.BIN SMPxxxx.CSV (arbitrary filename).CSV *2	TS → storage device *4	page 5-16
	Title file	SMHxxxx.CSV	TS ← storage device	
SCRN	Header file	SCHEADER.BIN	TS ← storage device	page 5-12
	Screen file	SC0000.BIN to SC9999.BIN		
	Component parts (Macro blocks)	MCR0000.BIN to MCR1023.BIN		
	Component parts (messages)	MSG0000.BIN to MSG0011.BIN		
	3D part file	3D0001.BIN to 3D1023.BIN		
	Windows font file (for screen creation)	WFS0000.BIN to WFS4095.BIN		
	Windows font file (messages)	WFM0000.BIN to WFM4095.BIN		
SNAP	Network camera BANNER snapshot images	VD00000.JPG - VD32767.JPG	TS → storage device *3	page 5-17
SRAM	SRAM backup data	SRM0000.BIN	TS ⇔ storage device	page 5-18
WEBSERV	Files accessible from a web browser	*.SHT, *.HTML, *.TXT etc.	TS ← storage device	page 4-69

*1 File type (JPEG/BIN) can be selected using [Storage Setting] for 128 colors, 16-tone monochrome, and monochrome display
*2 Filename: 64 or less one-byte numerals or uppercase alphabetic characters
*3 When using the web server: TS ← storage device
*4 TS ⇔ storage device for the BIN file directly under the SAMPLE folder
*5 Refer to "13.2 Memory Card Function" in TS Reference Manual 1.

Automatic upload (DSPDEF)

DSPDEF	Description	Filename	Transfer Direction	Refer to
DSP	File for automatic uploading	DSPDEF.bin	TS ← storage device	page 5-9
Other folders	Same as the access folder			

5.3 Function Descriptions

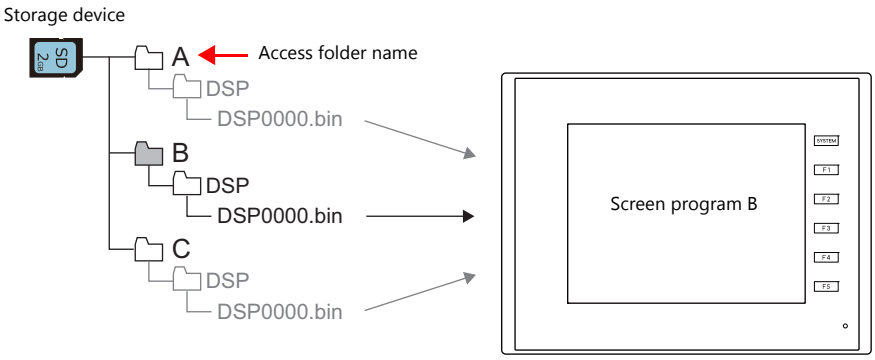
5.3.1 List of Functions

The following table lists the functions used by storage devices. For details, refer to the corresponding reference.

Function		Refer to
Saving and transferring screen programs		page 5-7
Automatically uploading screen programs		page 5-9
Reduction of screen program data size	Storing pattern (bitmap) data	page 5-12
	Storing screen data	
	Storing 3D parts	
	Storing Windows fonts	
	Storing gothic fonts	
	Storing message data	page 5-12, page 5-14
Storing JPEG files		page 5-15
Recipe data		page 5-16, "15 Recipes" in TS Reference Manual 1
Storing trend sampling/data sampling data		page 5-16, "7 Trend" in TS Reference Manual 1
Storing alarm tracking/alarm logging data		page 5-16, "8 Alarm" in TS Reference Manual 1
Memory manager function		"13.3 Memory Card Function" in TS Reference Manual 1
Operation logs		page 5-16, "2 Operation Log"
Saving screenshot images		page 5-17, Macro Reference Manual
Saving network camera images (BANNER)		page 5-17, "1.2 Network Camera"
Memo pad data backup		page 5-18, "13.1 Memo Pad" in TS Reference Manual 1
SRAM data backup		page 5-18, TS2060 Hardware Specifications or TS1000 Smart Hardware Specifications

5.3.2 Screen Program Transfer

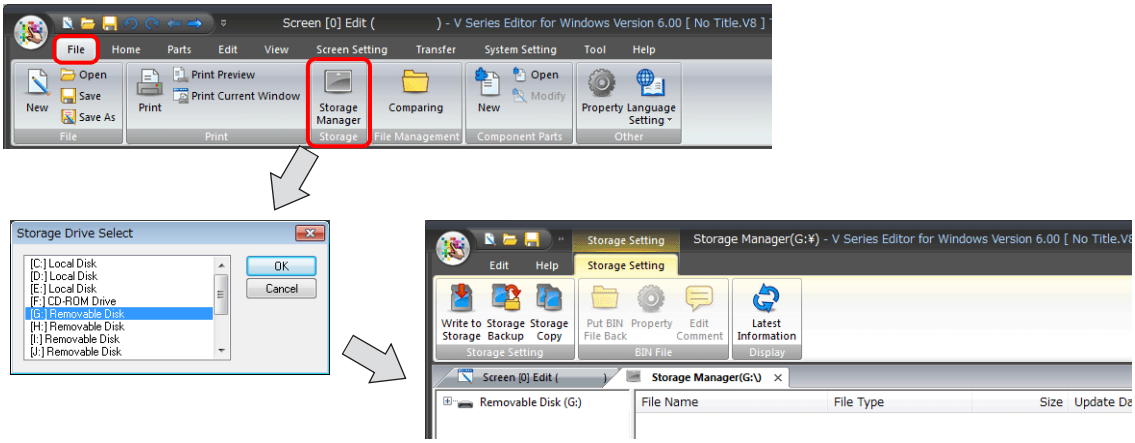
Screen programs can be transferred between the TS unit and a storage device.
Because multiple screen programs can be saved on a storage device, the screen program for display can be switched as required.
This section describes how to read and write data between a PC and a storage device. For details on reading and writing between a storage device and the TS unit, refer to the TS2060 Hardware Specifications or the TS1000 Smart Hardware Specifications.



Multiple screen programs can be stored using different access folder names.

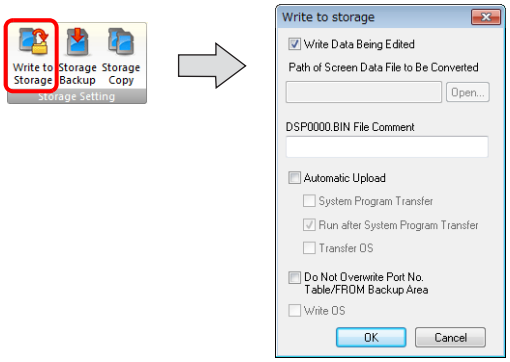
PC → Storage Device Writing

1. Start V-SFT.
2. Click [File] → [Storage Manager]. The window for specifying a drive is displayed.
3. Specify the drive where the storage device is inserted and click [OK]. The [Storage Manager] window *1 is displayed.



*1 Storage manager
The storage manager is an application that facilitates writing of TS screen programs to a storage device, and importing of data from a storage device for conversion into other file formats. For details, refer to "5.4 Storage Manager" page 5-19.

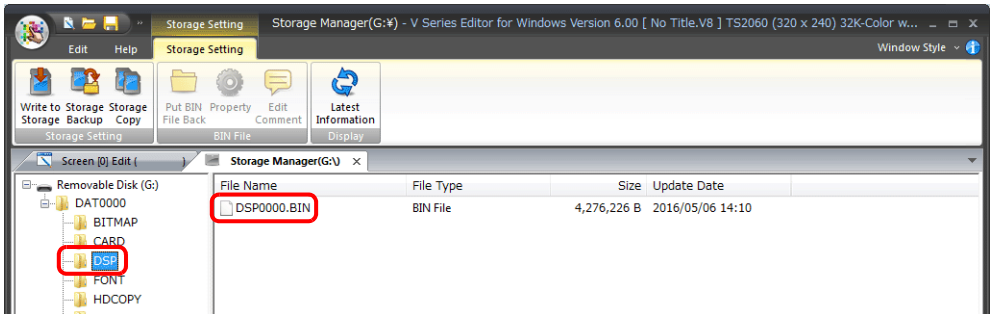
4. Click [Storage Setting] → [Write to Storage]. The [Write to storage] window is displayed.
Configure the following settings.



Item	Description
Write Data Being Edited	Write the screen program that is open (being edited) in V-SFT.

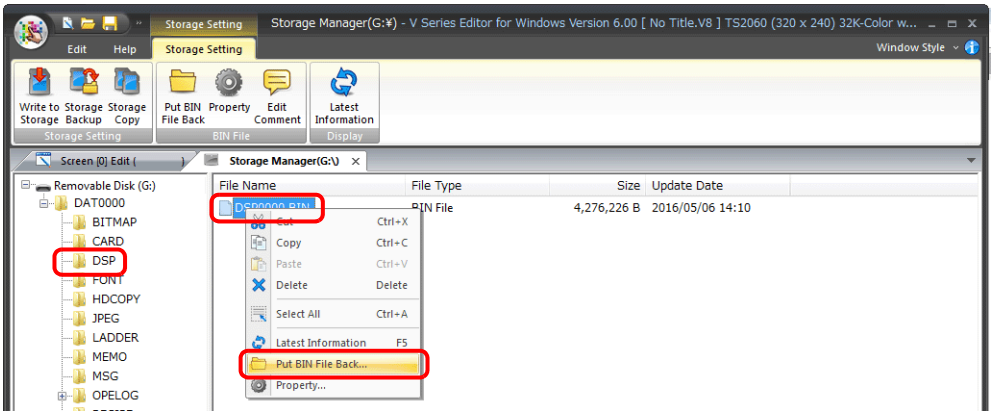
Item	Description
Path of Screen Data File to Be Converted	Select the screen program for writing to the storage device from the [Open] button. [Screen Data File (*.V8)]
DSP0000.BIN File Comment	Add a comment to the screen program file (DSP0000.BIN) written to the storage device. This comment can be checked via the file's [Property] window.
Automatic Upload	(This is not for screen program transfer.)_
Do Not Overwrite Port No. Table/FROM Backup Area	Select this checkbox to prevent existing values in the station number table or existing values in the FROM area from being changed when transferring a screen program from a storage device.

5. When the settings are complete, click [OK]. A "DSP0000.BIN" file is saved to "(access folder)\DSP" on the storage device. The "DSP0000.BIN" file contains the screen program, system program, fonts, I/F driver etc.

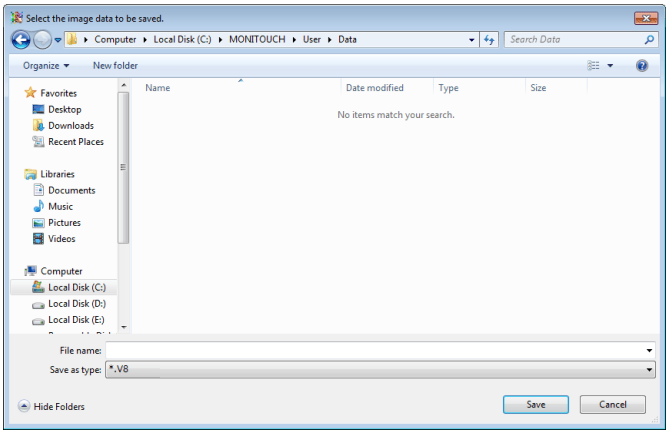


Storage Device → PC Reading

1. Start V-SFT.
2. Click [File] → [Storage Manager]. The window for specifying a drive is displayed.
3. Specify the drive where the storage device is inserted and click [OK]. The [Storage Manager] window is displayed.
4. Check that "DSP0000.BIN" exists in the "DSP" folder in the access folder, and select the file.
5. Right-click on the file and select [Put BIN File Back].



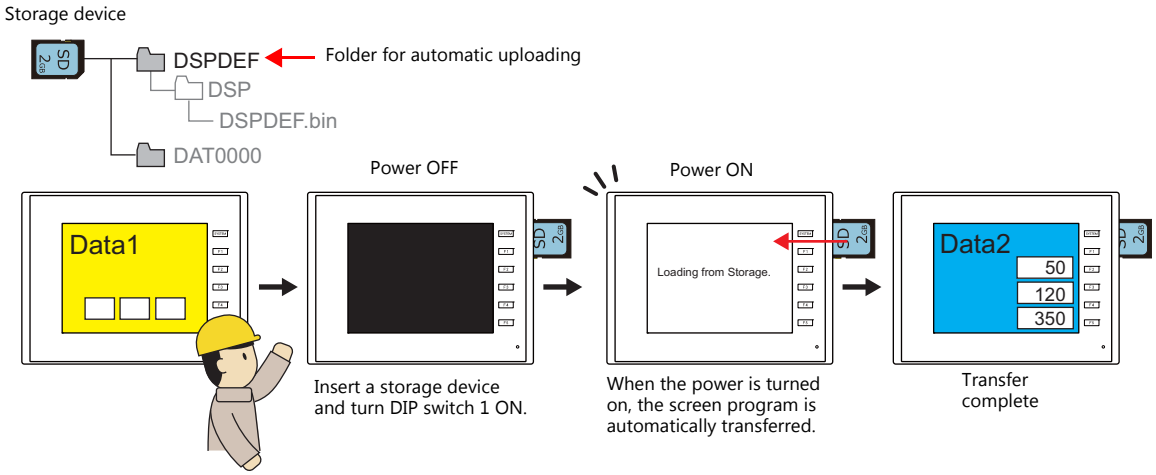
6. The window shown below is displayed. Specify the folder to save in and the filename and click [Save].



5.3.3 Automatically Uploading Screen Programs

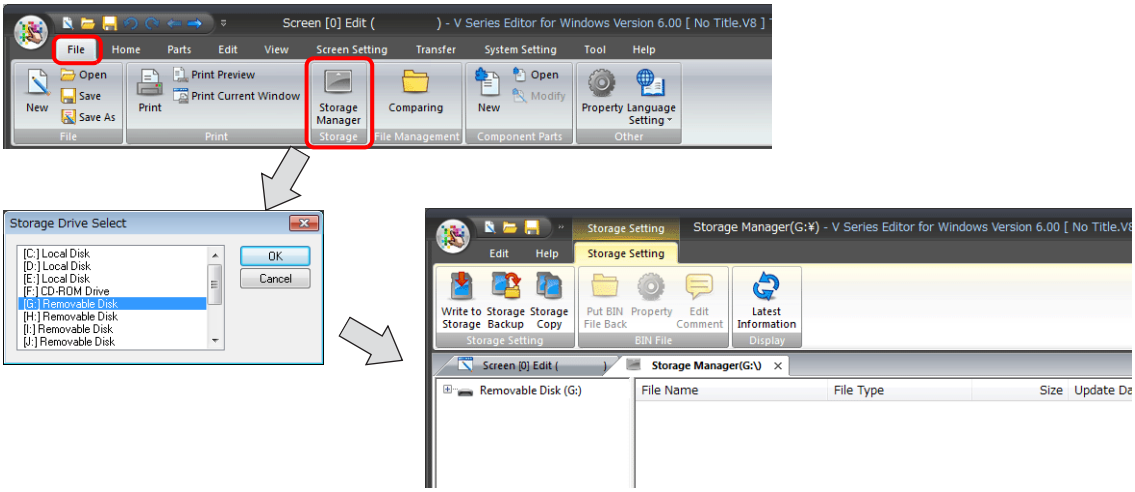
When a storage device is inserted and the power is turned on, the screen program is automatically uploaded.
This allows the screen program to be easily updated without bothering the operator.

☞ For the recommended capacity of a storage device, refer to "5.1.2 Storage Device Specifications" page 5-2.



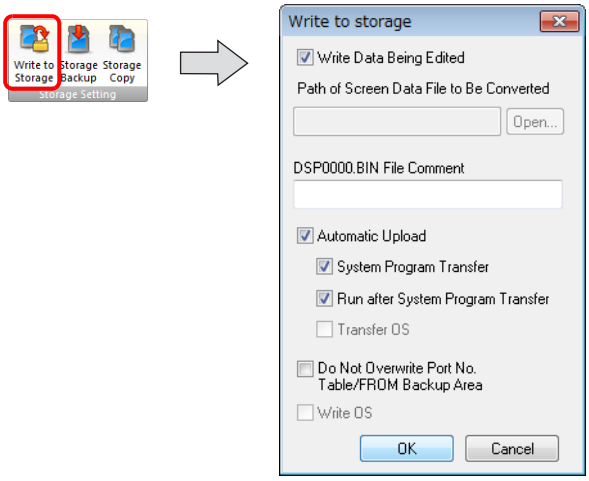
PC → Storage Device Writing

1. Start V-SFT.
2. Click [File] → [Storage Manager]. The window for specifying a drive is displayed.
3. Specify the drive where the storage device is inserted and click [OK]. The [Storage Manager] window *1 is displayed.



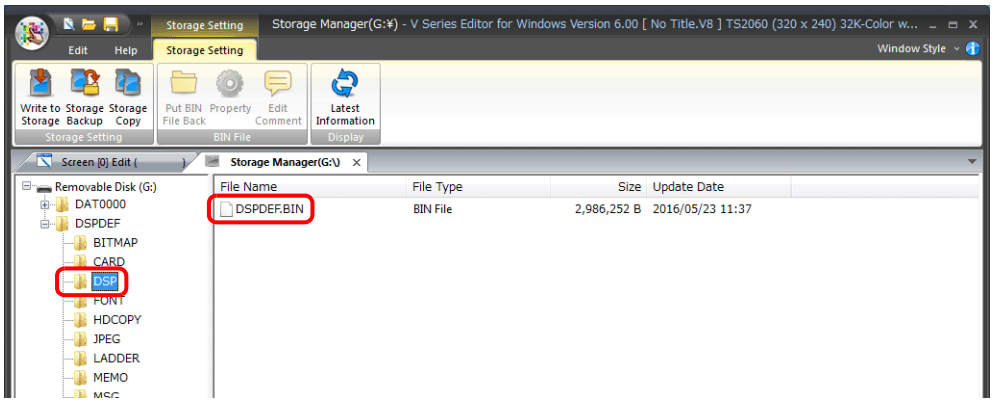
*1 Storage manager
The storage manager is an application that facilitates writing of TS screen programs to a storage device, and importing of data from a storage device for conversion into other file formats. For details, refer to "5.4 Storage Manager" page 5-19.

4. Click [Storage Setting] → [Write to Storage]. The [Write to storage] window is displayed.
   Configure the following settings.



Item		Description
Write Data Being Edited		Write the screen program that is open (being edited) in V-SFT.
Path of Screen Data File to Be Converted		Select the screen program for writing to the storage device from the [Open] button. [Screen Data File (*.V8)]
DSP0000.BIN File Comment		Add a comment to the screen program file (DSP0000.BIN) written to the storage device. This comment can be checked via the file's [Property] window.
Automatic Upload		Create an automatic upload file.
	System Program Transfer	Select this checkbox when uploading system program files together with the screen program.
	Run after System Program Transfer	Automatically switch MONITOUCH to RUN mode after automatic upload is complete.
Do Not Overwrite Port No. Table/FROM Backup Area		Select this checkbox to prevent existing values in the station number table or existing values in the FROM area from being changed when transferring a screen program from a storage device.

5. When the settings are complete, click [OK]. A "DSPDEF.BIN" file is saved to "DSPDEF\DSP". The "DSPDEF.BIN" file contains the screen program, system program, fonts, I/F driver etc.



Operation on the TS Unit

After storing data on the storage device, import the data into the TS unit according to the following procedure.

1. Turn off the TS unit.
2. Set DIPSW1 on the TS unit to ON.
3. Insert the storage device into the TS unit.
4. Turn on power to the TS unit. After a "Data Loading" message, a "Loading from Storage. Do not power off the unit." message is displayed, and then the screen program saved to the storage device is written.
   When transfer is complete, the RUN screen (or Main Menu screen) is displayed automatically.

* When both an SD card and a USB flash drive have a DSPDEF folder, the USB flash drive takes priority.

Notes on Write Operations

- When using the "DSPDEF" screen program for automatic uploading, only one type of data can be stored per storage device.
- If the storage device is removed after automatic uploading and the power is turned off and on again, the message "Insert Storage in TS." is displayed and the TS unit does not start correctly. Insert the storage device or set DIPSW1 to OFF, and then turn the power off and back on.
- Once automatic uploading has been performed, the screen program that was written to the TS unit (including I/F drivers, fonts, etc.) is overwritten by the screen program that was automatically uploaded. Note that even if the storage device is removed and DIPSW1 is set to OFF again, it is not possible to restore the state before to the upload.

5.3.4 Reducing Screen Program Data Size

Part of the screen program data, such as patterns and messages, can be stored to a storage device. This can reduce the size of the actual screen program data.

- Screen
- Pattern files (bitmap)
- Messages (BIN files, TXT files *1)
- 3D parts
- Windows fonts
- Gothic fonts (manual setting fonts)

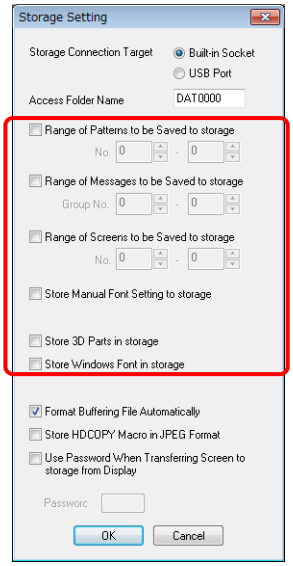
*1 Messages can be saved to a storage device as a BIN file or TXT file. For details on saving a TXT file, refer to "5.3.5 Storing Messages (TXT Files)" page 5-14.

File Location and Filename

Item		Filename	Directory
Patterns		BMPxxxx.BIN (xxxx: 0000 to 1023)	(Access folder)\BITMAP
Messages (BIN)		MSGxxyyy.BIN (xx: Language number 00 to 16) (yyy: Message group number 000 to 127)	(Access folder)\MSG
Header		SCHEADER.BIN	(Access folder)\SCRN
Screen	Screen	SCxxxx.BIN (xxxx: 0000 to 9999)	
	Component parts (macro blocks)	MCRxxxx.BIN (xxxx: 0000 to 1023)	
	Component parts (sampling messages)	MSGxxxx.BIN (xxxx: 00 to 11)	
3D parts		3Dxxxx.BIN (xxxx: 0 to 1023)	
Windows fonts	Graphics	WFSxxxx.BIN (xxxx: 0 to 4095)	
	Message	WFMxxxx.BIN (xxxx: 0 to 4095)	
Gothic fonts and multi-language fonts		xxxxxx.FTD	(Access folder)\FONT

PC → Storage Device Writing

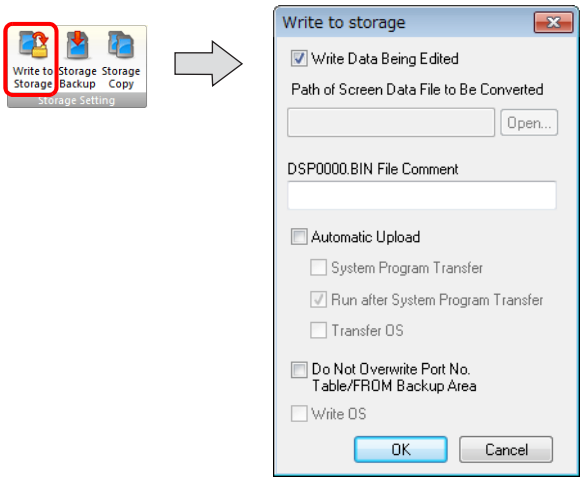
1. Click [System Setting] → [Storage Setting].
   The [Storage Setting] window is displayed.
2. Select the items to save to the storage device. When the settings are complete, click [OK] and save the screen program file.



Select items to save.

3. Click [File] → [Storage Manager]. The window for specifying a drive is displayed.
4. Specify the drive where the storage device is inserted and click [OK]. The [Storage Manager] window is displayed.

5. Click [Storage Setting] → [Write to Storage]. The [Write to storage] window is displayed.



6. If the screen program is currently being edited, select the [Write Data Being Edited] checkbox.
   If the screen program is not the one currently opened with V-SFT, deselect the [Write Data Being Edited] checkbox and select the relevant screen program from the [Open] button.
7. When the settings are complete, click [OK]. The file is saved to the access folder.

Operation on the TS Unit

Connect a storage device to the TS unit. When opening a screen program on the TS unit, the storage device will automatically be referred to for showing the screen.

- If screen data is not stored correctly on the storage device or a storage device is not connected to the TS unit, the TS unit will operate as if there is no screen.
  If calling a screen using a switch with [Screen Change-over] selected for [Function], a short intermittent beep will sound and the request will not be processed. If using a [Read Area] from the PLC to specify a screen, the screen will not changeover. (If immediately after power-on, the "Screen No. Error" screen will be displayed.)
- Screen data stored in a storage device takes longer to display than data stored in the MONITOUCH flash memory.
- If 3D parts are not stored correctly on the storage device or the storage device is not connected to the TS unit, 3D parts will not be displayed.
- If Windows fonts are not stored correctly on the storage device or the storage device is not connected to the TS unit, Windows fonts will not be displayed.
- If patterns are not stored correctly on the storage device or the storage device is not connected to the TS unit, patterns will not be displayed.
- When both BIN files (MSGxxyyy.BIN) and TXT files (MSGxxyyy.TXT) coexist in the "MSG" folder on the storage device, reference to TXT files takes priority.

Notes on File Storage

- Up to 512 KB of screen data can be saved to a storage device per screen. The per screen data size can be viewed at [Tool] → [List of Memory Use]. However, the size of the screen data that was selected for storage at [System Setting] → [Other] → [Storage Setting] cannot be viewed on the [List of Memory Use] tab window. We recommend checking the data size before configuring [Storage Setting].
- For the restoration of the screen data in the "SCRN" folder to the original data file (.V8), the "DSP0000.BIN" file in the "DSP" folder is required. However, if data information of "DSP0000.BIN" in the "DSP" folder and "SCHEADER.BIN" in the "SCRN" folder do not match, the compilation of files from these folders does not take place, and thus the screen program is created with screen data in the "SCRN" folder omitted. For details on the conversion procedure, refer to "BIN File Conversion" page 5-21.
- Gothic fonts can be stored on a storage device only when manual font settings are made. The maximum font size that can be stored is 2 MB.

5.3.5 Storing Messages (TXT Files)

Messages (in TXT file format) can be stored on a storage device to reduce the size of the screen program.
Since the messages are in TXT file format, they can be edited even without V-SFT.

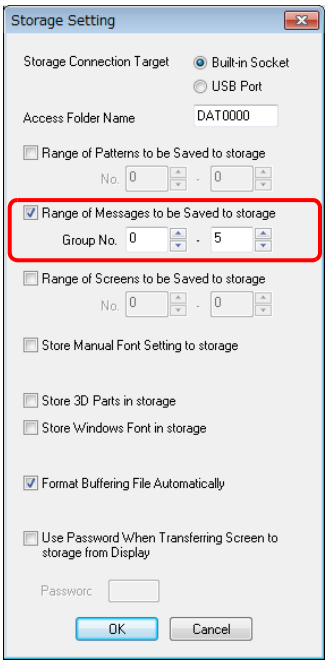
* Message files can be stored in BIN and TXT file formats. For details on storing BIN files, refer to "5.3.4 Reducing Screen Program Data Size" page 5-12.

File Location and Filename

Item	Filename	Directory
Messages (TXT format)	MSGxxyyy.TXT (xx: Language number 00 to 16) (yyy: Message group number 000 to 127)	(Access folder)\MSG

PC → Storage Device Writing (For TXT Files)

1. Click [System Setting] → [Storage Setting].
   The [Storage Setting] window is displayed.
2. Select the [Range of Messages to be Saved to storage] checkbox and specify the range of messages to be stored.
   When the settings are complete, click [OK] and save the screen program file.



3. Create files in TXT file format.
   Filename: MSGxxyyy.txt (xx: Language number 00 to 16, yyy: Message group number 000 to 127 *1)

*1 TXT files must be created in accordance with the message group numbers specified in the [System Setting] → [Storage Setting] window.
Any TXT file with a number not within the specified range will not be recognized.

4. Save "MSGxxyyy.TXT" files to the "MSG" folder under the access folder.

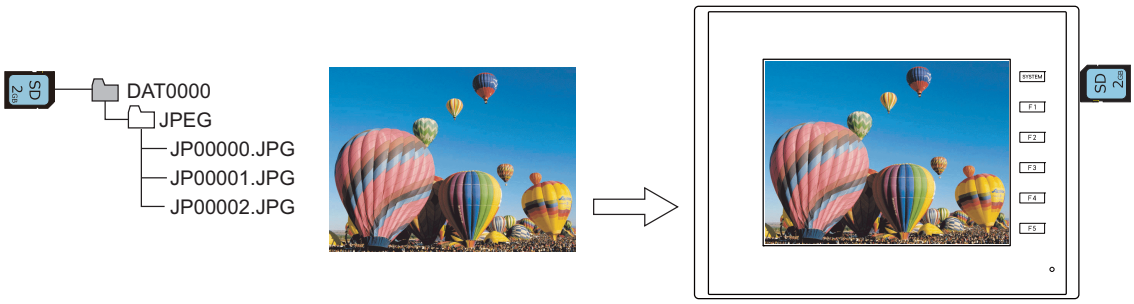
Operation on the TS Unit

Connect the storage device to the TS unit. When the screen program is displayed, the stored messages are displayed accordingly.

* When both BIN files (MSGxxyyy.BIN) and TXT files (MSGxxyyy.TXT) coexist in the "MSG" folder on the storage device, reference to TXT files takes priority.

5.3.6 Storing JPEG Files

JPEG files can be displayed on the TS unit. Always store JPEG files on a storage device.



Displaying a JPEG file stored on the storage device on the screen.

JPEG File Location and Filename

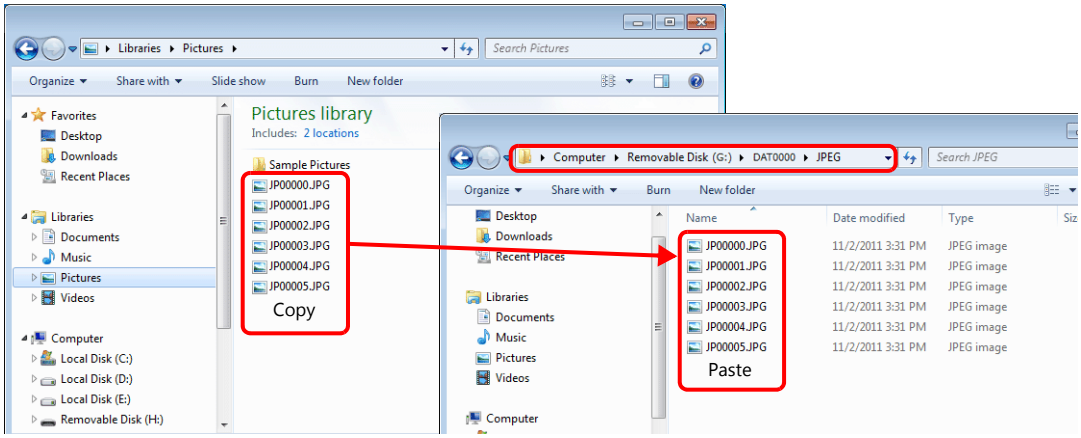
Filename	Directory
JPxxxxx.jpg (xxxxx: 00000 to 32767) xxxxxxx.jpg (64 or less one-byte characters or 32 or less two-byte characters)	(Access folder)\JPEG

Storing Files on a Storage Device

Either Windows Explorer or the storage manager can be used to store files.

Windows explorer

1. Select the JPEG file in Windows Explorer.
2. Execute [Copy] from the right-click menu.
3. Open the storage device drive using Windows Explorer and paste the file.



Storage manager

1. Store the JPEG file to be used in "\MONITOUCH\User\Jpeg" on the PC in advance.
2. Click [File] → [Storage Manager] and write to storage using [Write to Storage].

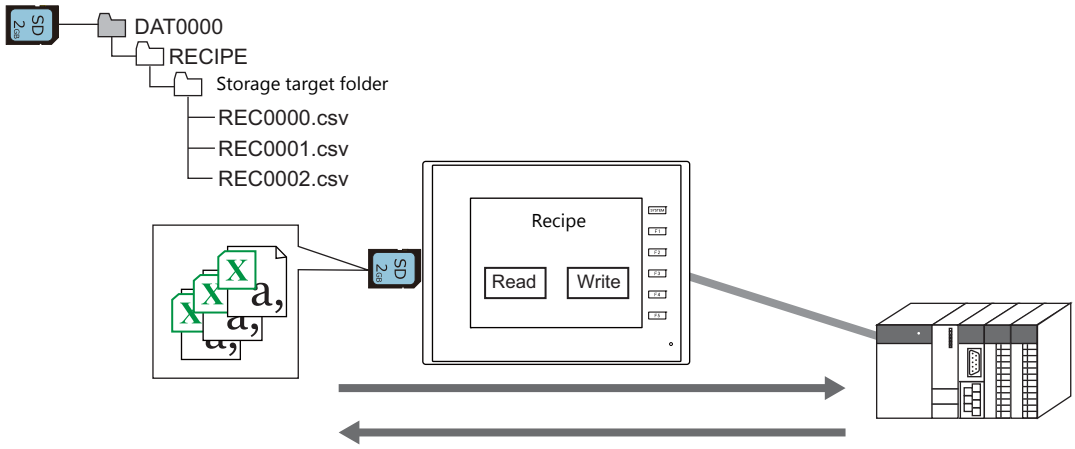
☞ "5.4 Storage Manager" page 5-19

Operation on the TS Unit

Insert the storage device into the TS unit. The JPEG file on the storage device is displayed in RUN mode.

5.3.7 Transferring Recipe Data

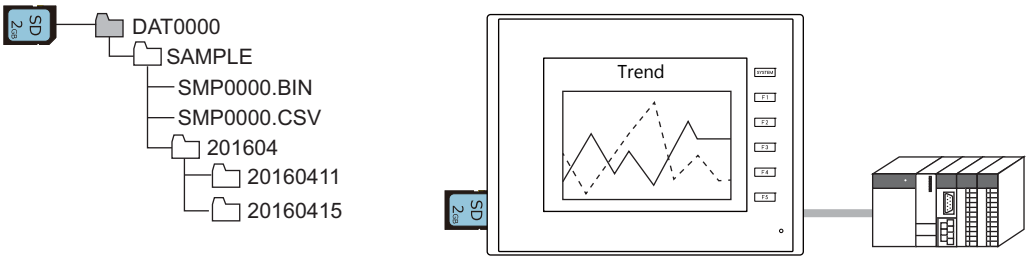
Recipe files (CSV) created on a computer can be stored on a storage device and read or written using a macro or a switch with [Recipe] set for [Function].



☞ Refer to “15 Recipes” in the TS Reference Manual 1.

5.3.8 Storing History Data

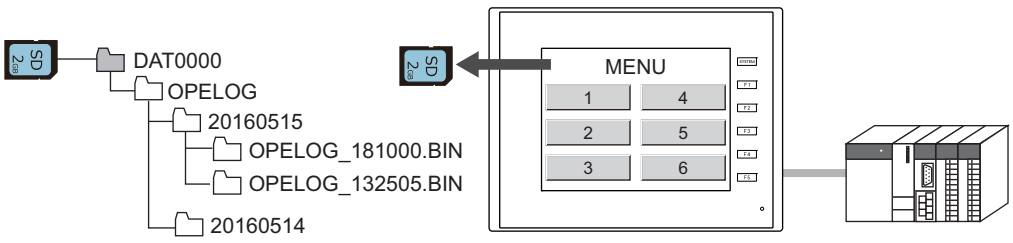
History data of trend sampling and alarm tracking can be saved.
If the stored sampling data is converted to a CSV file by using the macro command, you can edit the data easily using application software such as Excel.



☞ “7 Trend” and “8 Alarm” in the TS Reference Manual 1

5.3.9 Operation Logs

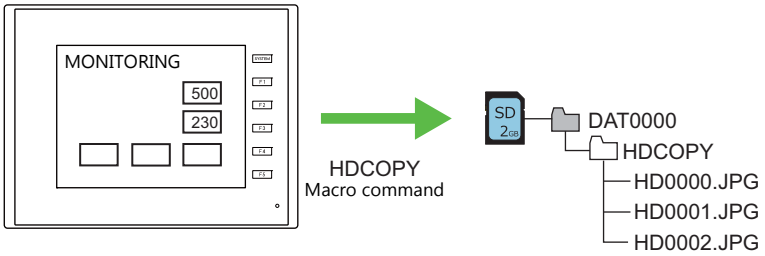
Screen operation history records (operation logs) can be output to a storage device. In the event of an error, these stored logs allow previous operations to be examined in order to determine the cause of the error.



☞ Refer to “2 Operation Log”.

5.3.10 Saving Screenshot Images

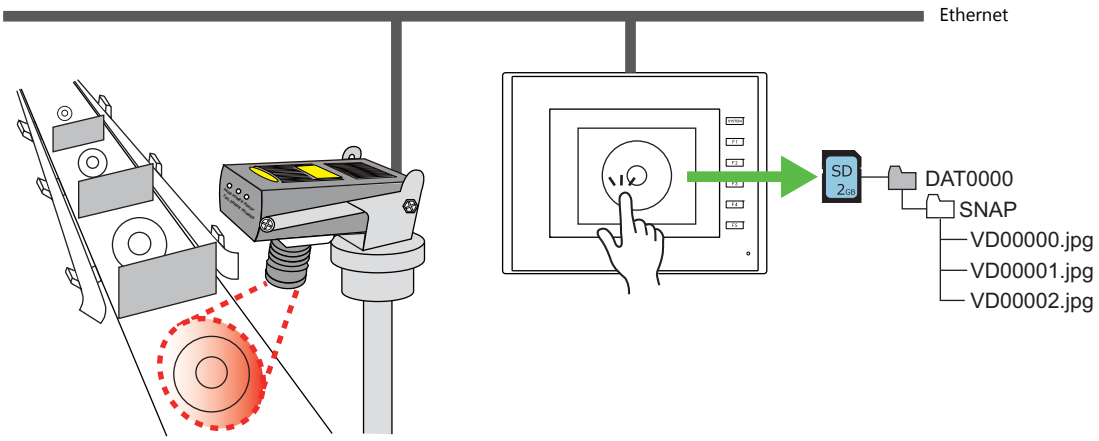
Screenshot images can be saved to a storage device as JPG files using a macro command.
When it is difficult to connect a printer on the factory floor, screenshot images can be saved to a storage device and printed later from a PC.



☞ Refer to the Macro Reference Manual.

5.3.11 Saving Network Camera Images

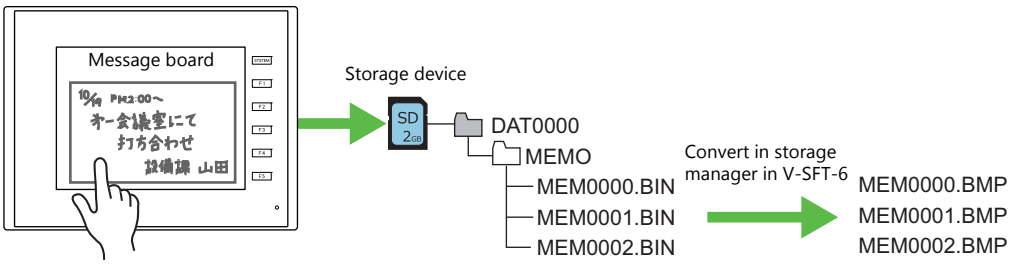
When using a sensor manufactured by BANNER, the currently displayed image can be saved to a storage device as a JPEG file by double-tapping the display area. (Snapshot function)



☞ Refer to "1.2 Network Camera".

5.3.12 Saving Memo Pad Data

Data from the memo pad function can be saved to a storage device as BIN files. These files can be converted to BMP files using the storage manager in V-SFT.



☞ Refer to “13.1 Memo Pad” in the TS Reference Manual 1.

Memo Pad Data Location and Filename

Filename	Directory
MEMxxxx.BIN (xxxx: 0000 to 0007)	(Access folder)\MEMO

Operation on the TS Unit

Insert the storage device into the TS unit. When using the memo pad in RUN mode, the memo pad data is automatically stored on the storage device.

* When the [Store Area for Memo Pad] at [System Setting] → [Unit Setting] → [SRAM/Clock] is configured, memo pad data is stored in SRAM even when a storage device is inserted into the unit.

Timing of Saving

The timing of writing memo pad data to a storage device is as follows.

- When switching the memo pad display using a switch with [+ Block], [– Block], or [Block Call] set for [Function]
- When the screen is changed
- When switching between RUN and STOP (on the Main Menu screen)

5.3.13 SRAM Data Backup

A backup copy of SRAM data can be saved to a storage device to guard against a case in which data may be lost when replacing the SRAM battery.

☞ Refer to the TS2060 Hardware Specifications or the TS1000 Smart Hardware Specifications.

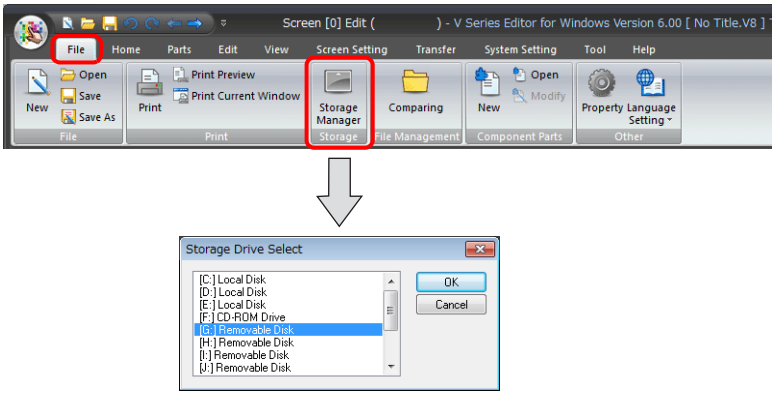
5.4 Storage Manager

The storage manager is an application that facilitates writing of data used by the TS unit to a storage device, and importing of data from a storage device for conversion into other file formats.

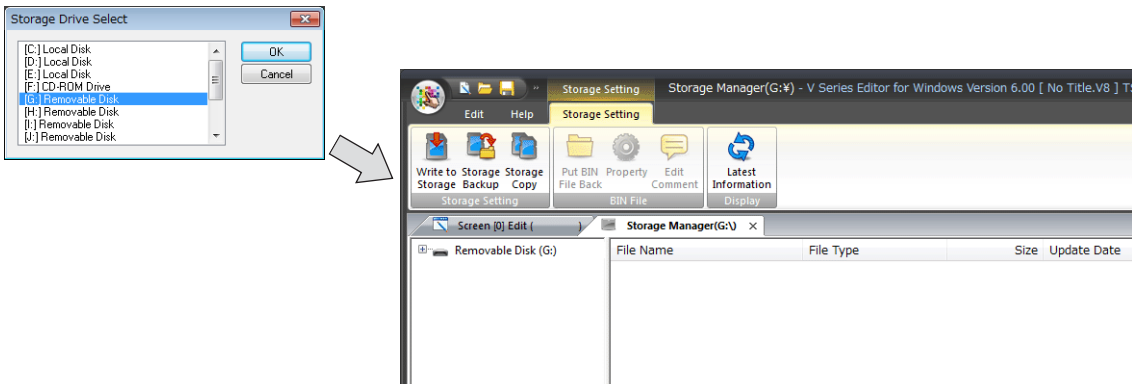
5.4.1 Starting and Ending

Starting

1. Start V-SFT.
2. Click [File] → [Storage Manager]. The window shown below is displayed.

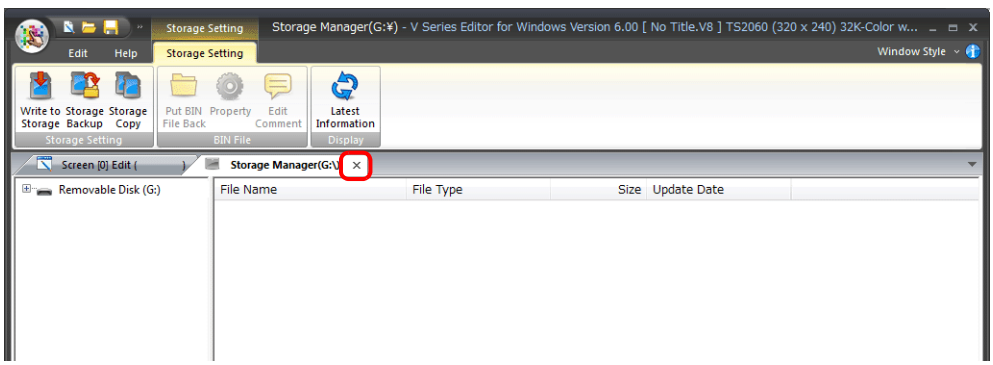


3. Specify the drive where the storage device is inserted and click [OK]. The [Storage Manager] window is displayed.



Ending

1. Click the [X] button on the corner of the [Storage Manager] tab.



2. The screen editing window reappears.

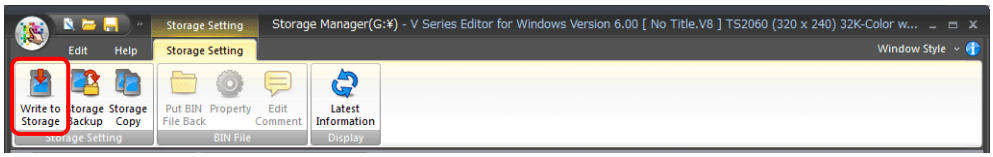
5.4.2 Writing

The procedure for writing data to a storage device is explained below.
Always use the storage manager to write the data in the following table to a storage device. Other files can be copied using Windows Explorer.

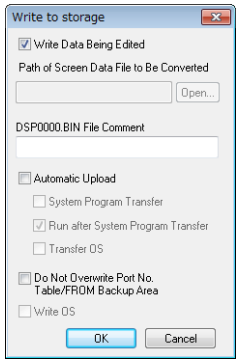
Data	Extension	Remarks
Screen program	.V8	Including screens/component parts/3D parts/Windows fonts/gothic fonts/pattern data
SRAM backup data	.RAM	
Text file	.BIN	

Writing Procedure

1. Click [Storage Setting] → [Write to Storage].



2. The [Write to storage] window is displayed.



Item		Description
Write Data Being Edited		Write the screen program that is open (being edited) in V-SFT.
Path of Screen Data File to Be Converted		Select the data for writing to the storage device from the [Open] button. File extensions: [*.V8], [*.RAM], [*.TXT]
DSP0000.BIN File Comment		Add a comment to the screen program file (DSP0000.BIN). This comment can be checked via the file's [Property] window.
Automatic Upload		Create an automatic upload file.
	System Program Transfer	Select this checkbox when uploading system program files together with the screen program.
	Run after System Program Transfer	Automatically switch MONITOUCH to RUN mode after automatic upload is complete.
Do Not Overwrite Port No. Table/FROM Backup Area *1 *2		Select this checkbox to prevent existing values in the station number table or existing values in the FROM area from being changed when transferring a screen program from a storage device.

*1 Station number table
The station number of a counterpart device can be changed in RUN mode when connecting to the following models.

- PLC: Mitsubishi QnH (Q) series (Ethernet) (1 : n connection only)
- PLC: Mitsubishi QnA series (Ethernet) (1 : n connection only)
- PLC: OMRON SYSMAC CS1/CJ1 (Ethernet Auto) (1 : n connection only)
- PLC: OMRON SYSMAC CS1/CJ1 DNA (Ethernet) (1 : n connection only)
- Temperature controller: Fuji Electric F-MPC04P (loader)
- Temperature controller: Fuji Electric F-MPC04S (UM03)

*2 FROM backup area
The FROM backup area is where a backup copy of the data in the PLC or internal device memory can be stored. To retain the data, use the macro commands "FROM_RD" and "FROM_WR". For details on macros, refer to the Macro Reference Manual.

3. When the settings are complete, click [OK]. A BIN file is written to each of the folders under the access folder.

5.4.3 BIN Files

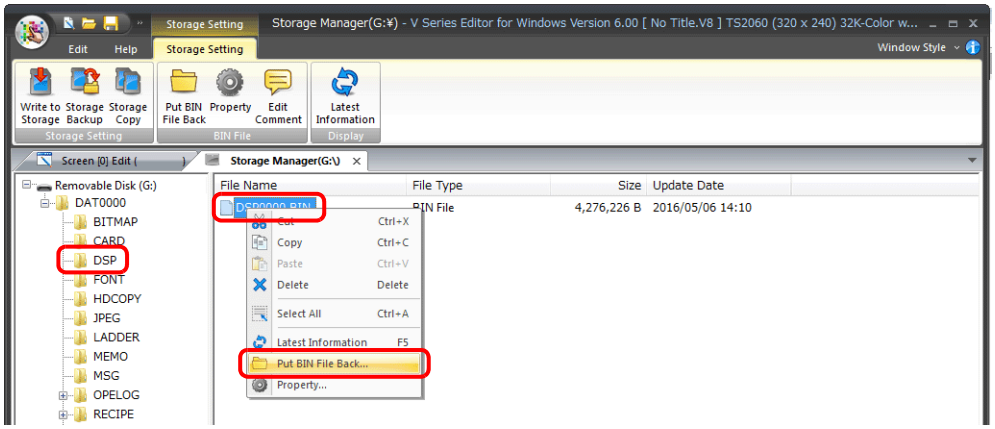
Files with the extension ".BIN" are stored under access folders. The storage manager can be used to convert BIN files and check file information.

File	Folder	Extension After Conversion	File Type
DSP0000.BIN	DSP	.V8	Screen program
BMPxxxx.BIN	BITMAP	.BMP	Pattern file
MSGxxyyy.BIN	MSG	.TXT	Message
HDxxxx.BIN	HDCOPY	.BMP	Screenshots (128 colors, 16-tone monochrome, and monochrome)
MEMxxxx.BIN	MEMO	.BMP	Memo pad
MCMHEAD.BIN	CARD	.MCD	Memory card mode

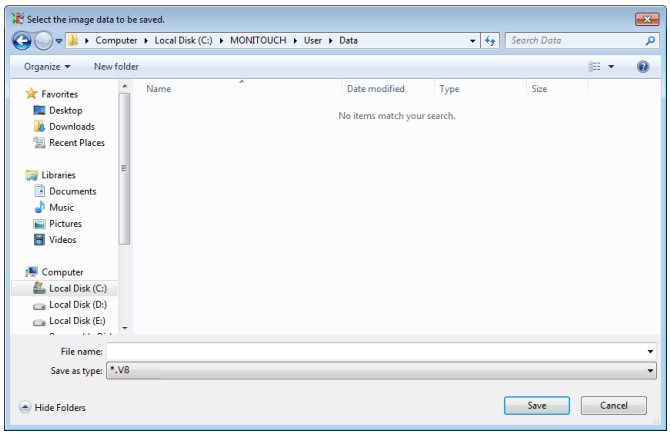
BIN File Conversion

All BIN files can be restored to their original state.

1. Select a file from an access folder.
2. Right-click on the file and select [Put BIN File Back].



3. The window shown below is displayed. Specify the folder to save in and the filename and click [Save].



4. A converted file is created.

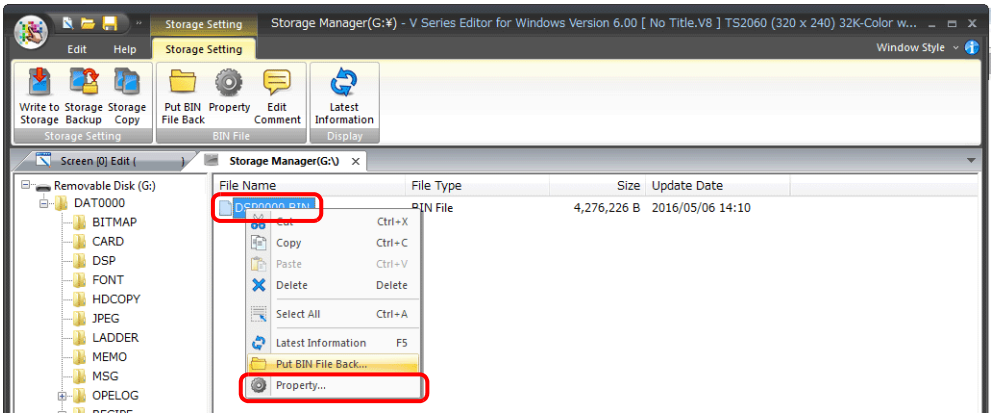
Notes

- Note that BIN files in the "BITMAP", "MSG", and "SCRN" folders are required to convert "DSP0000.BIN" into a V8 file. If these files are missing, the V8 file will be created without pattern data and 3D parts.

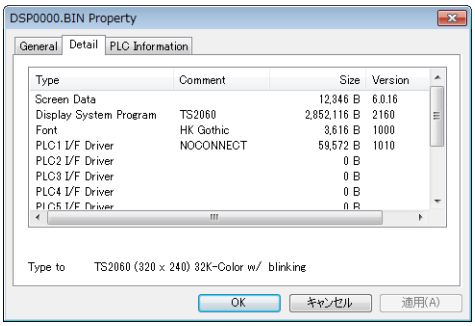
BIN File Properties

Information on each BIN file can be checked before conversion.

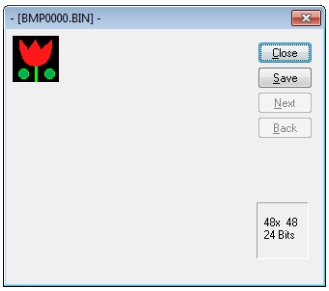
1. Select a file from an access folder.
2. Right-click on the file and select [Property]. Information on the file is displayed.



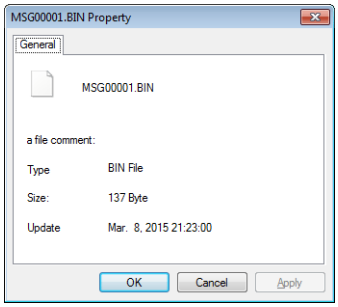
- DSP0000.BIN
  The file type or system program version of the file can be checked on the [Detail] tab window.



- BMPxxxx.BIN
  A bitmap image is displayed.



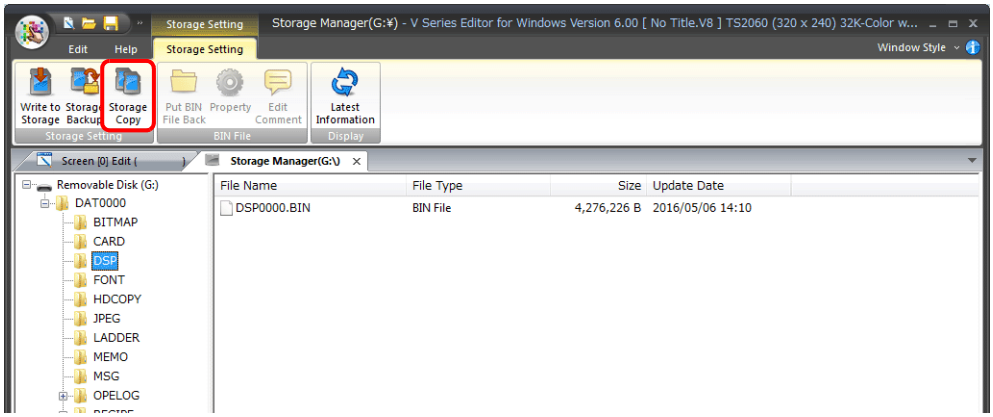
- MSGxxyyy.BIN
  Information on the file is displayed.



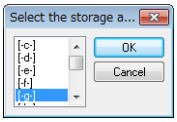
5.4.4 Storage Copy

Copy the data on the storage device.

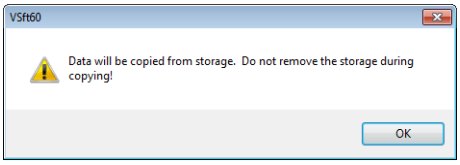
1. Click [Storage Setting] → [Storage Copy].



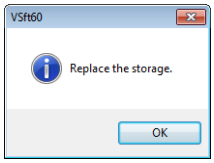
2. Specify the storage device drive and click [OK].



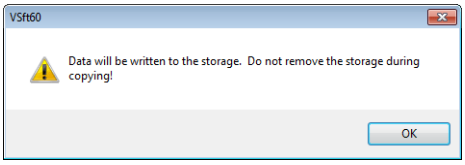
3. The following dialog box is displayed. Click [OK].



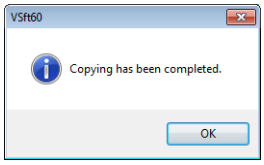
4. The following dialog box is displayed.
   Remove the storage device from the PC and insert another device for saving the copied data. Click [OK].



5. The following dialog box is displayed. Click [OK].



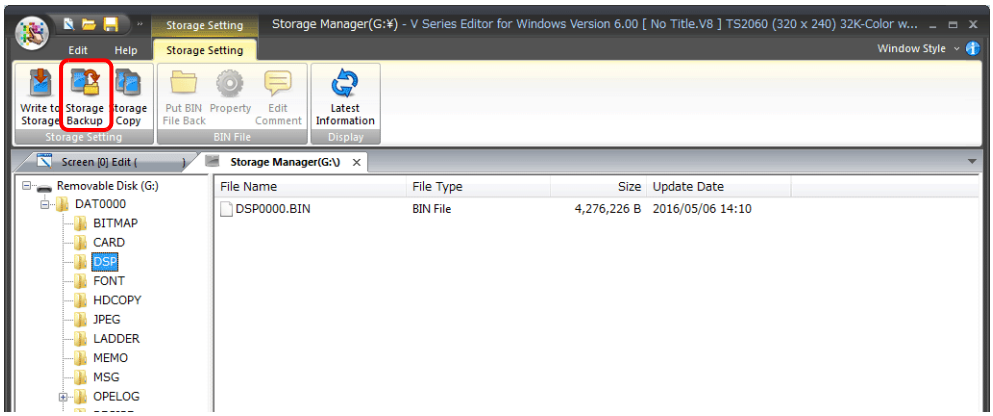
6. When copying is complete, the following dialog box is displayed.



5.4.5 Storage Device Backup

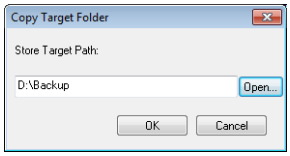
A backup of data on a storage device can be created.
Any folder can be selected for saving the data.

1. Click [Storage Setting] → [Storage Backup].

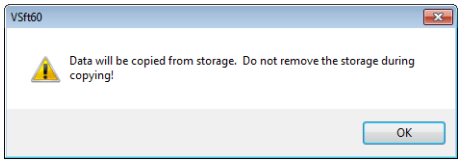


2. When the [Copy Target Folder] window is displayed, click [Open] and specify the copy target folder.

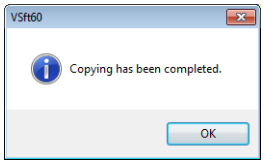
   Example: When saving in the “Backup” folder in the D drive:



3. Click [OK]. The following dialog box is displayed.



4. Click [OK]. The data on the storage device is copied to the copy target. When copying is complete, the following dialog is displayed.



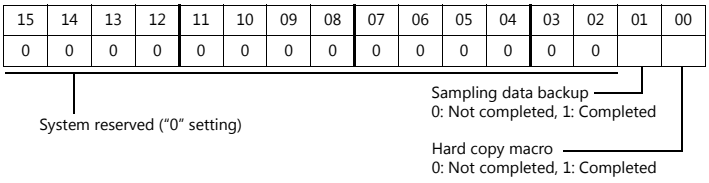
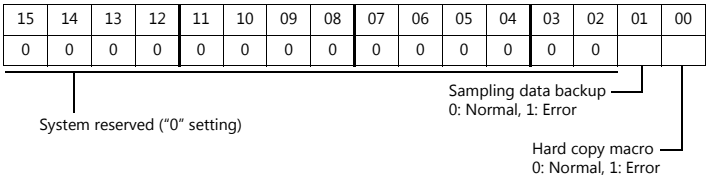
5. Use Windows Explorer to check that the data was copied correctly.

* When copying data from a storage device to the hard disk drive, it can also be copied and pasted using Windows Explorer.

5.5 System Device Memory ($s)

Information about the status and the free space of the storage device inserted into the TS unit is stored in system device memory ($s).

<table>
<tr><th>Addresses</th><th>Description</th><th>SD</th><th>USB-A</th><th>Device Type</th></tr>
<tr><td>$s497</td><td>Storage device error state
<table><tr><th>Value</th><th>JPEG</th></tr><tr><td>4</td><td>Card not mounted</td></tr><tr><td>5</td><td>Format error</td></tr><tr><td>6</td><td>Card size too small</td></tr><tr><td>7</td><td>Different card type</td></tr><tr><td>12</td><td>Card write error</td></tr><tr><td>15</td><td>Disk error (open failure)</td></tr><tr><td>16</td><td>Card read error</td></tr></table></td><td>○
*1</td><td>○
*1</td><td rowspan="14">← TS</td></tr>
<tr><td>$s498
$s499</td><td>Free space on storage device (kB)</td><td>○
*1</td><td>○
*1</td></tr>
<tr><td>$s500</td><td>[Storage Removal] switch status
MSB LSB
<table><tr><td>15</td><td>14</td><td>13</td><td>12</td><td>11</td><td>10</td><td>09</td><td>08</td><td>07</td><td>06</td><td>05</td><td>04</td><td>03</td><td>02</td><td>01</td><td>00</td></tr><tr><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td></td></tr></table>System reserved (“0” setting)
0: Switch OFF (storage removal prohibited)
1: Switch ON (storage removal permitted)</td><td>○
*1</td><td>○
*1</td></tr>
<tr><td>$s780</td><td>Bitmap file status
MSB LSB
<table><tr><td>15</td><td>14</td><td>13</td><td>12</td><td>11</td><td>10</td><td>09</td><td>08</td><td>07</td><td>06</td><td>05</td><td>04</td><td>03</td><td>02</td><td>01</td><td>00</td></tr><tr><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td></td><td></td></tr></table>Reserved for system (set to “0”)
0: File format matches
1: File format does not match
0: File present
1: No file present</td><td>○
*1</td><td>○
*1</td></tr>
<tr><td>$s1030</td><td>Storage device error state $s497 reference</td><td>○</td><td>-</td></tr>
<tr><td>$s1031
$s1032</td><td>Free space on storage device (kB)</td><td>○</td><td>-</td></tr>
<tr><td>$s1033</td><td>[Storage Removal] switch status $s500 reference</td><td>○</td><td>-</td></tr>
<tr><td>$s1035</td><td>Storage device error state $s497 reference</td><td>-</td><td>○</td></tr>
<tr><td>$s1036
$s1037</td><td>Free space on storage device (kB)</td><td>-</td><td>○</td></tr>
<tr><td>$s1038</td><td>[Storage Removal] switch status $s500 reference</td><td>-</td><td>○</td></tr>
<tr><td>$s1050</td><td>Background processing flag
MSB LSB
<table><tr><td>15</td><td>14</td><td>13</td><td>12</td><td>11</td><td>10</td><td>09</td><td>08</td><td>07</td><td>06</td><td>05</td><td>04</td><td>03</td><td>02</td><td>01</td><td>00</td></tr><tr><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td></td><td></td></tr></table>Sampling data backup
0: Not processed, 1: Being processed
System reserved (“0” setting)
Hard copy macro
0: Not processed, 1: Being processed</td><td>○</td><td>○</td></tr>
</table>

<table>
<tr><th>Addresses</th><th>Description</th><th>SD</th><th>USB-A</th><th>Device Type</th></tr>
<tr><td>$s1051</td><td>Background processing completion flag
When processing has been completed (when $s1050 turns OFF), this turns ON.
When the operation has been verified, the user must clear it to zero.
MSB LSB
 
</td><td>○</td><td>○</td><td rowspan="2">← TS</td></tr>
<tr><td>$s1052</td><td>Background processing error flag
If an error occurs at the time when processing has been completed (when $s1050 turns OFF), this turns ON.
When the operation has been verified, the user must clear it to zero.
MSB LSB
 
</td><td>○</td><td>○</td></tr>
</table>

*1 Information on the specified drive is stored at [System Setting] → [Other] → [Storage Setting] → [Storage Connection Target].

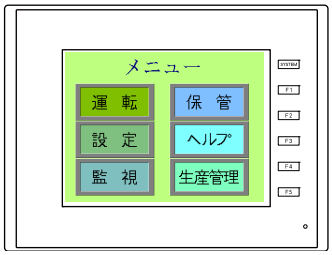
6 Language Changeover

6.1 Overview

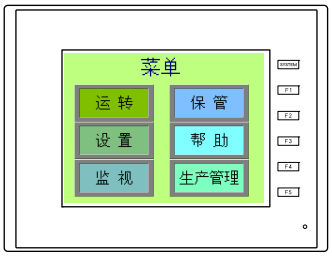
6.1.1 Fonts

- Select a base language (font) first and then edit the screen using text that can be displayed in the selected font.

Japanese (Gothic) TTF



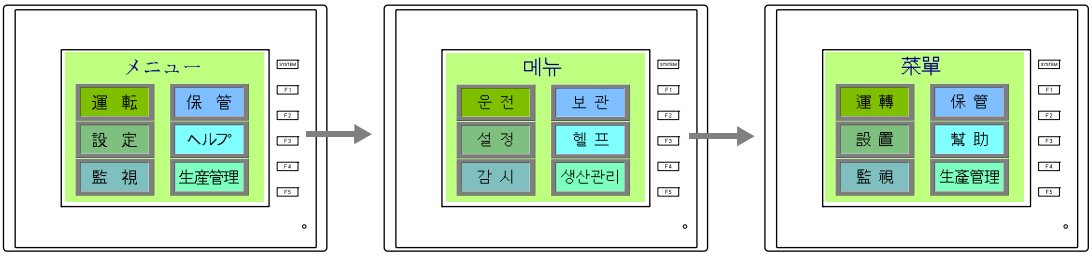
Chinese (Simplified) TTF



☞ For details on font types and supported languages, refer to "6.1.2 Font Types" page 6-2.

- A maximum of 16 languages can be used on the same screen just by switching the text for display.

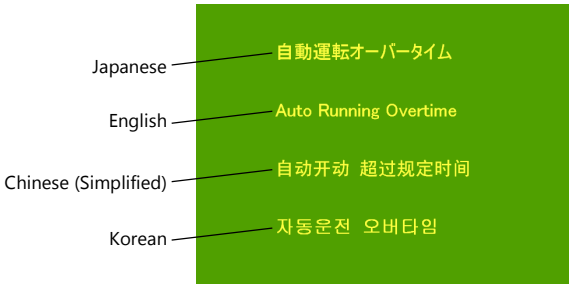
Example: Registration of screen program "ABC.V8" in three languages



Japanese　Korean　Chinese (Simplified)

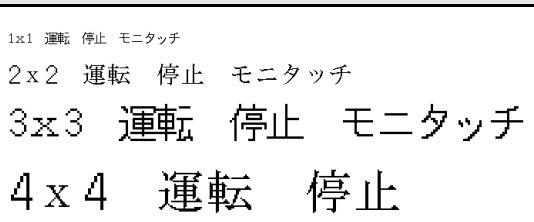
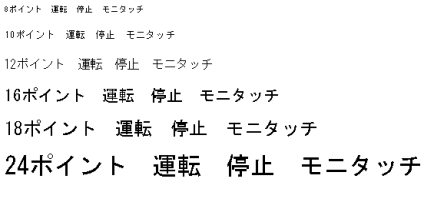
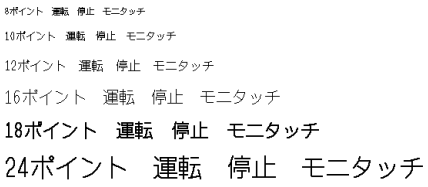
☞ For details, refer to "6.1.3 Language Selection" page 6-5.

- Use "Windows fonts" to display two or more languages on a single screen or display Windows-type characters on the screen.



6.1.2 Font Types

Fonts are generally divided into three types: bitmap fonts, Gothic fonts and stroke fonts.
Because the mixed use of fonts is not permitted on the TS unit, select one font type in the [System Setting] → [Multi-language Setting] → [Font Setting] window.

Type	Size Specification Method	Features	Image
Bitmap font	XY magnification factor specification	Font data designed in sizes of 16 × 16 dots and 32 × 32 dots (two-byte characters). This font type occupies less memory but is not suitable if a smoother-line typeface is required.	
Gothic font and stroke font *1	Point specification	Since the font data of each point size is transferred to the unit, the required capacity is larger than that of bitmap fonts while the displayed typeface has smoother lines. In the case of gothic fonts, depending on the function assigned to the part or item, some limitations, such as automatic or manual setting for fonts, may apply.	- Gothic font  - Stroke font 

*1 Only supported on the TS2060i.

Supported Language List

The following table lists the fonts and corresponding languages supported by the TS.

Font Setting [*1]		Supported Language	Supported Character Code
Bitmap font	Japanese	Japanese, English	JIS level-1 and level-2 + ANK code
	Japanese 32		JIS level-1 + ANK code
	English/Western Europe	English, Icelandic, Irish, Italian, Dutch, Swedish, Spanish, Danish, German, Norwegian, Portuguese, Finnish, Faroese, French	ISO-8859-1: Latin1 (Extended ASCII code)
	Chinese (Traditional)	Chinese (traditional), English	BIG5 code (A141 to C67E) + ASCII code
	Chinese (Simplified)	Chinese (simplified), English	GB2312 code (A1A1 to FEFE) + ASCII code
	Korean	Hangul, English	KS code (A1A2 to C8FE) + ASCII code
	Central Europe	Croatian, Czech, Hungarian, Polish, Hrvatska (Croatian), Romanian, Slovakian, Slovene	CP1250 code
			ISO code [*2] (ISO-8859-2: Latin2)
	Cyrillic	Russian, Ukrainian, Kazakh, Bulgarian, Uzbek, Azerbaijani	CP1251 code
			ISO code [*2] (ISO-8859-5: Latin5)
	Greek	Greek	CP1253 code
			ISO code [*2] (ISO-8859-7: Latin7)
	Turkish	Turkish	CP1254 code
			ISO code [*2] (ISO-8859-9: Latin9)
	Baltic	Estonian, Latvian, Lithuanian	CP1257 code
Gothic font	Gothic	Japanese, English	JIS level 1 + level 2 + ANK code
	Gothic (IBM Extended Character)	Japanese, English	JIS level 1 + level 2 + IBM extended code (FA40 to FC4B) + ANK code
	English/Western Europe HK Gothic	English, Icelandic, Irish, Italian, Dutch, Swedish, Spanish, Danish, German, Norwegian, Portuguese, Finnish, Faeroese, French	ISO-8859-1: Latin1 (Expanded ASCII code)
	English/Western Europe HK Times		
Stroke Font [*3]	Japanese stroke	Japanese, English	JIS X 0201 JIS X 0208 NEC special characters IBM extensions NEC selection of IBM extensions
	English/Western Europe stroke	English, Icelandic, Irish, Italian, Dutch, Swedish, Spanish, Danish, German, Norwegian, Portuguese, Finnish, Faeroese, French	CP1252 code
	Chinese (Traditional) stroke	Chinese (traditional), English	BIG5 code (A141 to F9FE) + ASCII code
	Chinese (Simplified) stroke	Chinese (simplified), English	GB2312 code (A1A1 to F7FE) + ASCII code
	Korean stroke	Hangul, English	KS code (A1A1 to FDFE) + ASCII code
	Central Europe stroke	Croatian, Czech, Hrvatska (Croatian), Hungarian, Polish, Romanian, Slovakian, Slovene	CP1250 code
	Cyrillic stroke	Russian, Ukrainian, Kazakh, Bulgarian, Uzbek, Azerbaijani	CP1251 code
	Greek stroke	Greek	CP1253 code
	Turkish stroke	Turkish	CP1254 code
	Baltic stroke	Estonian, Latvian, Lithuanian	CP1257 code

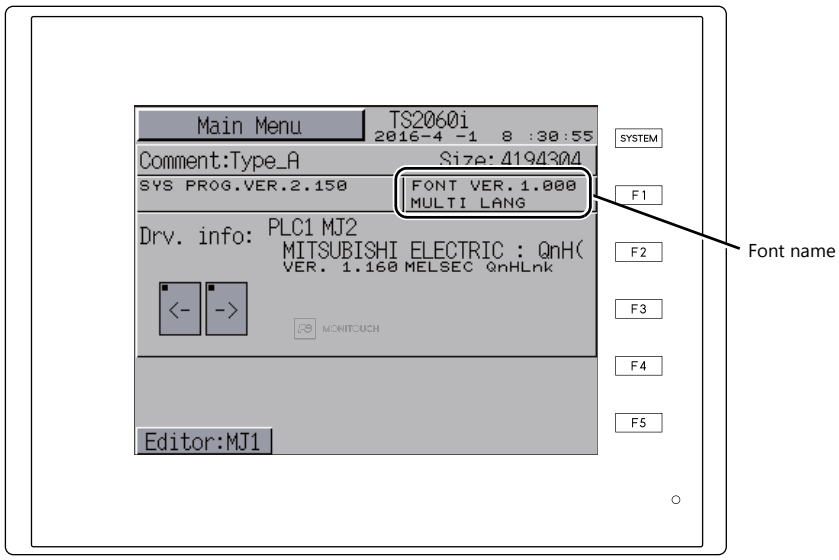
*1 Bitmap fonts, gothic fonts and stroke fonts cannot be used together.

*2 For ISO code support, select [System Setting] → [Multi-language Setting] → [Font Setting], and select the [ISO Code] checkbox when selecting the respective font.

*3 Only supported on the TS2060i.

Checking Fonts on Main Menu Screen

The font name is displayed in the position shown below on the Main Menu screen.



Font Names

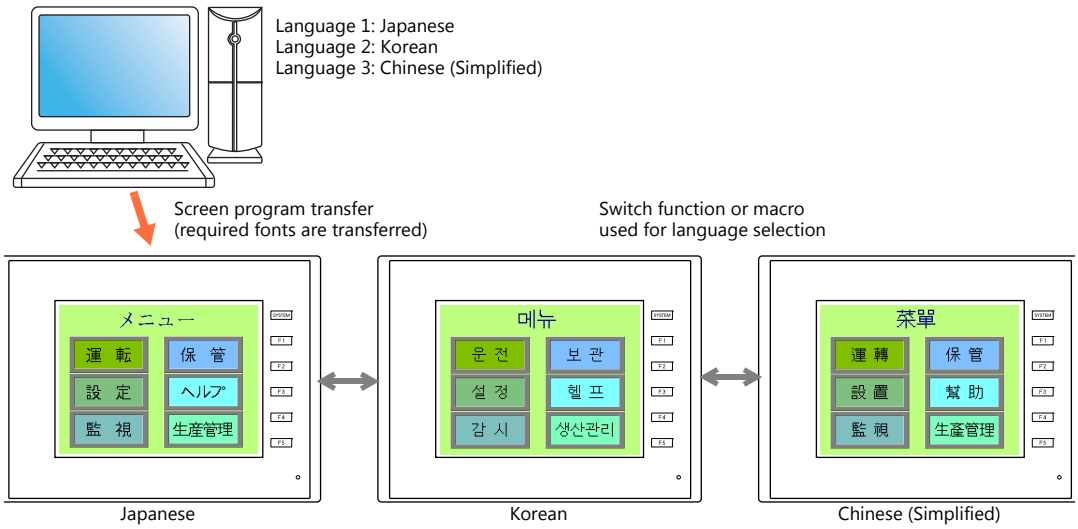
Font names are displayed in the [Font Setting] window and on the Main Menu screen as listed below:

Font Setting Window		Main Menu Screen
Bitmap font	Japanese	JAPANESE
	Japanese 32	JAPANESE 32
	English/Western Europe	ENGLISH
	Chinese (Traditional)	CHINESE(TRAD.)
	Chinese (Simplified)	CHINESE(SIMP.)
	Korean	KOREAN
	Central Europe	Central Euro. CP *
	Cyrillic	Cyrillic CP *
	Greek	Greek CP *
	Turkish	Turkish CP *
	Baltic	Baltic CP
Gothic font	Gothic	HA Gothic
	Gothic (IBM Extended Character)	HA Gothic(IBM)
	English/Western Europe HK Gothic	HK Gothic
	English/Western Europe HK Times	HK Times
Stroke Font	Japanese stroke	JAPANESE STROKE
	English/Western Europe stroke	ENGLISH STROKE
	Chinese (Traditional) stroke	CHINESE(TRD) ST
	Chinese (Simplified) stroke	CHINESE(SIM) ST
	Korean stroke	KOREAN STROKE
	Central Europe stroke	Cent.Eur. STROKE
	Cyrillic stroke	Cyrillic STROKE
	Greek stroke	Greek STROKE
	Turkish stroke	Turkish STROKE
	Baltic stroke	Baltic STROKE
Multi-language screen (with multiple fonts selected)		MULTI LANG

*1 When the [ISO Code] checkbox is selected in the [Font Setting] window, "CP" disappears from the Main Menu screen.

6.1.3 Language Selection

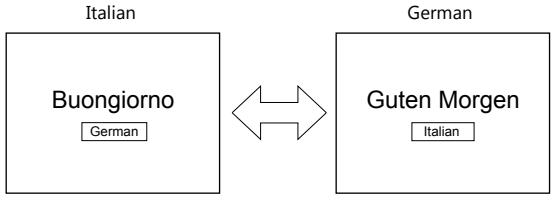
- The language for display can be selected. There are two methods for selecting the language: storing all required fonts on the unit and then selecting the language, or storing fonts on a storage device and then selecting the language. (The TS2060 does not support use of storage devices.)



☞ For details on settings, refer to "6.2 Setting Procedure" page 6-6.

- The text for display can be changed even when using a single font, such as German ↔ Italian or Japanese ↔ English. Using only one font reduces the space required by the screen program.

Language 1: English/Western Europe
Language 2: English/Western Europe



☞ For details on languages that are supported by each font, refer to "Supported Language List" page 6-3.

☞ For details on settings, refer to "6.2 Setting Procedure" page 6-6.

- When using a Windows font, it is possible to change only the text. The text for display can be changed using a single font.

- To change the language in the RUN mode, use a switch with [Function] set to "Language changeover" or use the "CHG_LANG" macro command.

☞ For details, refer to "6.2.4 Language Selection" page 6-18.

- The following methods are available for language editing.

☞ For details, refer to "6.2.3 Language Editing" page 6-12.

☞ For details, refer to "6.4 Convenient Editing Procedures" page 6-24.

6.2 Setting Procedure

This section describes the procedure for configuring settings that allow changing languages that use different fonts when in RUN mode.
(The procedure is explained assuming that the setting for Language 1 has been completed.)

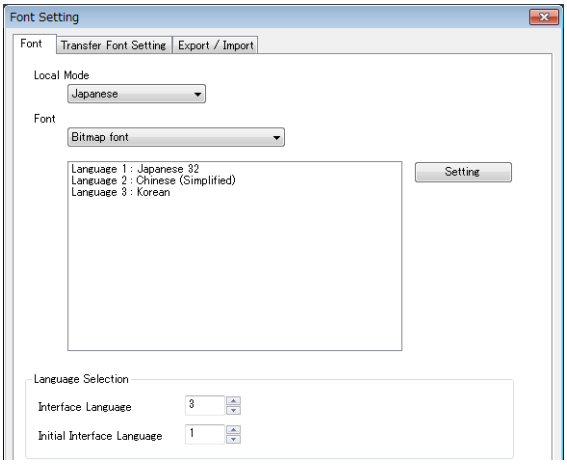
1. Font Setting Window
   Refer to "6.2.1 Method of Storing Fonts on the Unit" page 6-6
   Refer to "6.2.2 Method of Storing Fonts on a Storage Device (Not Available with TS2060)" page 6-8
2. Editing of each language → Refer to page 6-12.
3. Language selection using the switch function or "CHG_LANG" macro command → Refer to page 6-18.

6.2.1 Method of Storing Fonts on the Unit

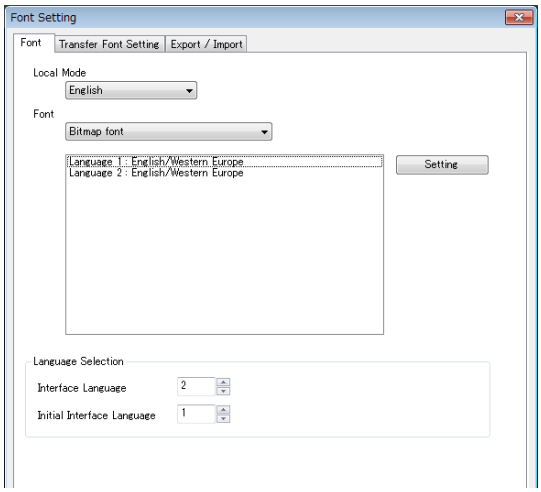
Font Setting Window

1. Click [System Setting] → [Multi-language Setting] to display the [Font Setting] window.
2. Set a value for [Interface Language]. (Example: set "3" to allow changing between three languages.)
3. Select the desired font type on the [Font] tab window. Under the [Font], select languages to be displayed.

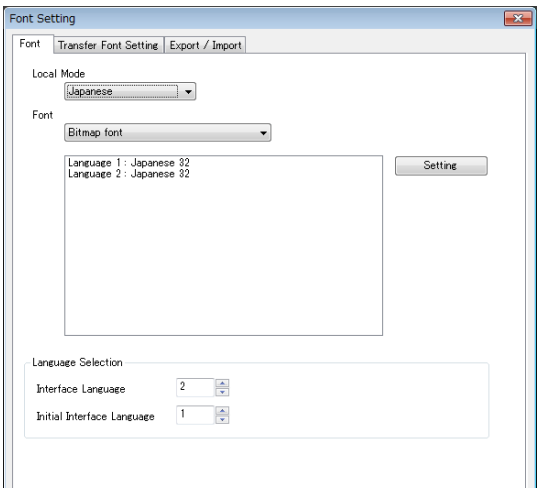
- Example 1: Changing between Japanese, Chinese (Simplified), and Korean
  Language 1: Japanese 32
  Language 2: Chinese (Simplified)
  Language 3: Korean TTF



- Example 2: Changing the displayed text using a single font
  - Changing between German and Italian
    Language 1: English/Western Europe
    Language 2: English/Western Europe

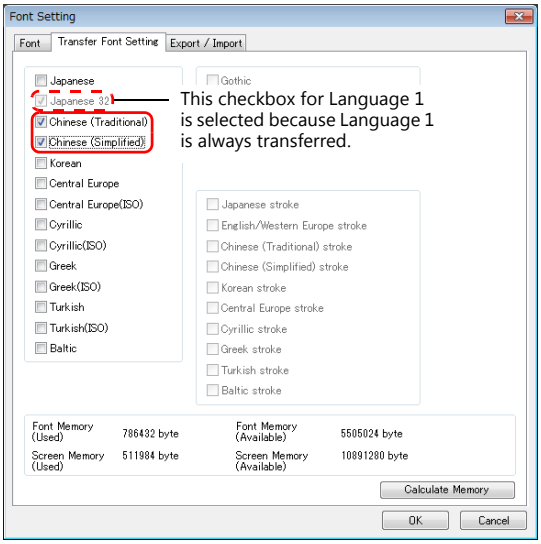


  - Changing between Japanese and English
    Language 1: Japanese 32
    Language 2: Japanese 32

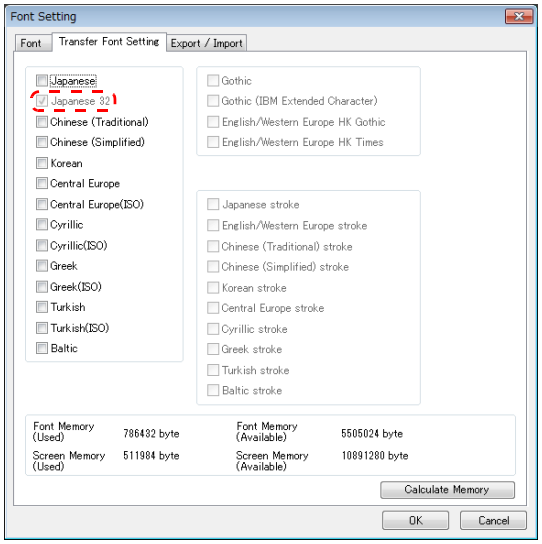


4. Select a language number for [Initial Interface Language] so that the corresponding language is displayed when a screen program is transferred.
5. Select the checkboxes of the required fonts on the [Transfer Font Setting] tab window. More fonts selected for transfer results in less capacity available for the screen program. Deselect the checkboxes of any unused fonts.

- Example 1



- Example 2

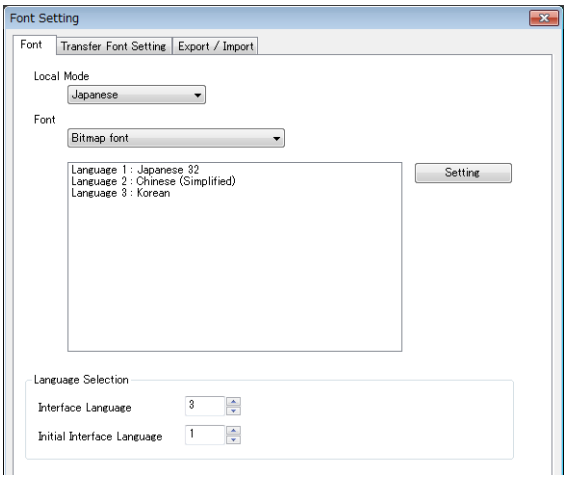


This completes the necessary settings.

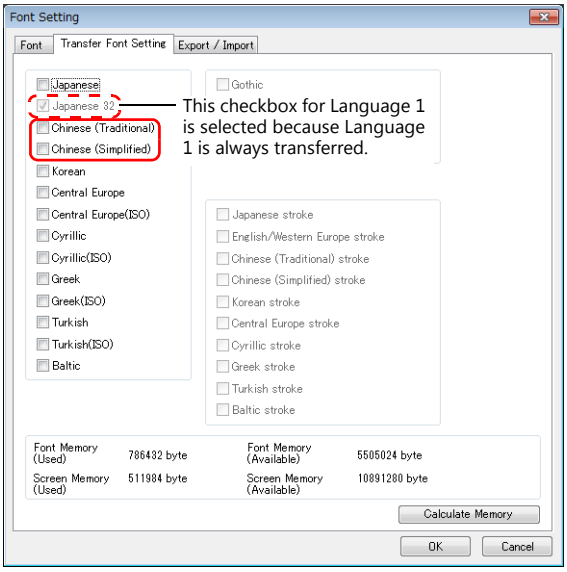
6.2.2 Method of Storing Fonts on a Storage Device (Not Available with TS2060)

Font Setting Window

1. Click [System Setting] → [Multi-language Setting] to display the [Font Setting] window.
2. Set a value for [Interface Language].
   Example: Set "3" to allow changing between three languages.
3. Select the desired font type on the [Font] tab window. Under the [Font], select languages to be displayed.
   - Example: Changing between Japanese, Chinese (Simplified), and Korean
     Language 1: Japanese 32
     Language 2: Chinese (Simplified)
     Language 3: Korean TTF



4. Select a language number for [Initial Interface Language] so that the corresponding language is displayed when the unit is changed to RUN mode.
5. Deselect the checkboxes of fonts on the [Transfer Font Setting] tab.



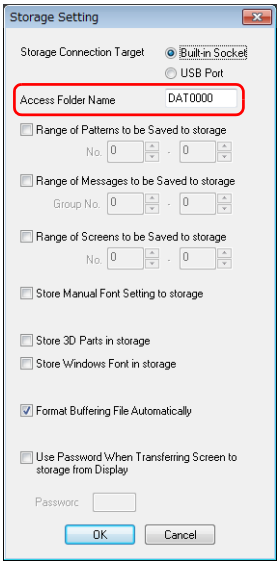
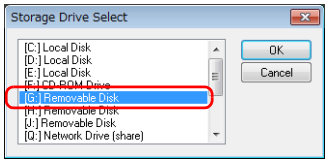
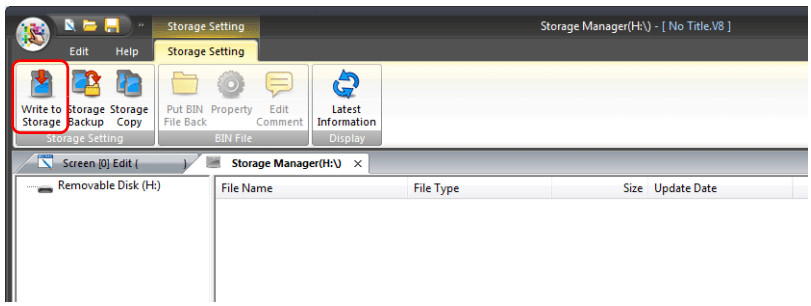
This completes the necessary settings.

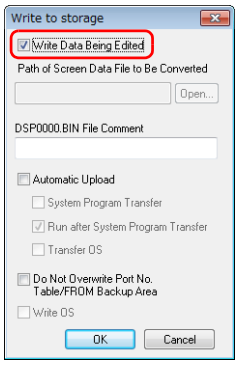
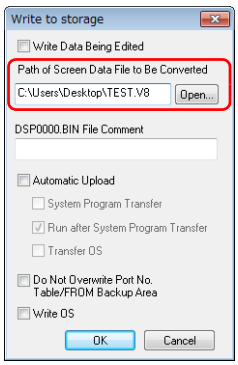
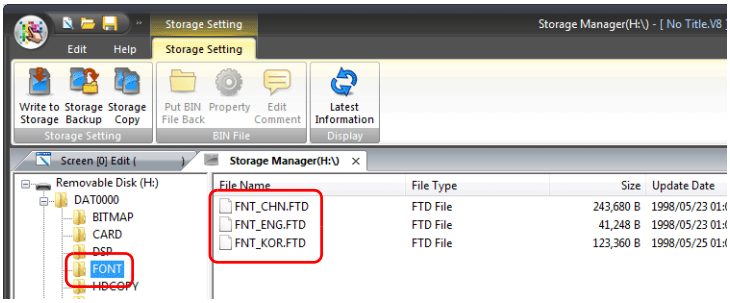
Writing Font Files to a Storage Device

To perform a multi-language selection using a storage device, you need to store the font file for Language 2 and later on a storage device, and then insert the storage device into the TS unit.

Storing Procedure

The procedure for storing font data for Language 2 and later are described below.

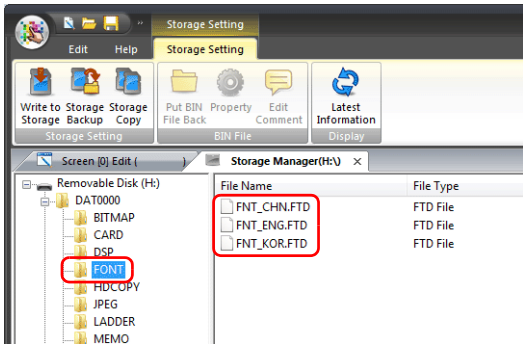
Step 1	With the screen program open, click [System Setting] → [Other] → [Storage Setting]. The [Storage Setting] window is displayed.
Step 2	Decide a folder name and enter it into the [Access Folder Name] field. (Maximum of 32 one-byte numerals or uppercase alphabetic characters) This folder name serves to identify which fonts stored on the storage device belong to what screen programs on the TS unit.  Default: DAT0000
Step 3	Save the screen program.
Step 4	Insert the storage device into the computer.
Step 5	Click [File] → [Storage Manager]. The following window is displayed. Specify the drive where the storage device is inserted and click [OK]. 
Step 6	The storage manager is displayed. Click [Storage Setting] → [Write to Storage].  About the storage manager The storage manager is an application that facilitates writing of data used on the TS unit to a storage device, and importing of data from a storage device for conversion into other file formats. For details, refer to "5.4 Storage Manager".

Step 7	The [Write to storage] window is displayed. If the screen program is currently being edited, select the [Write Data Being Edited] checkbox. If the screen program is not the one currently opened in V-SFT, deselect the [Write Data Being Edited] checkbox and select the [*.V8] file to write to the storage device by clicking the [Open] button under [Path of Screen Data File to Be Converted].  or 
Step 8	Click [OK]. The font files are saved to the “FONT” folder in the access folder (default: DAT0000) on the storage device. 

Font Filenames

The following font files are stored in the "FONT" folder in the access folder (default: DAT0000) on the storage device.

Font	Filename
Japanese	Fnt_jpn.ftd
Japanese 32	Fnt_jpn2.ftd
English/Western Europe	Fnt_eng.ftd
Chinese (Traditional)	Fnt_twn.ftd
Chinese (Simplified)	Fnt_chn.ftd
Korean	Fnt_kor.ftd
Central Europe	Fnt105.ftd
Cyrillic	Fnt106.ftd
Greek	Fnt107.ftd
Turkish	Fnt109.ftd
Baltic	Fnt110.ftd
Gothic	Fnt006.ftd, Fnt0062.ftd
Gothic (IBM Extended Character)	Fnt012.ftd, Fnt0122.ftd
English/Western Europe HK Gothic	Fnt008.ftd, Fnt0082.ftd
English/Western Europe HK Times	Fnt009.ftd, Fnt0092.ftd
Japanese stroke	FNT020.FTD
English/Western Europe stroke	FNT021.FTD
Chinese (Traditional) stroke	FNT022.FTD
Chinese (Simplified) stroke	FNT023.FTD
Korean stroke	FNT024.FTD
Central Europe stroke	FNT025.FTD
Cyrillic stroke	FNT026.FTD
Greek stroke	FNT027.FTD
Turkish stroke	FNT028.FTD
Baltic stroke	FNT029.FTD



*** Fonts other than the language 1 font are stored on the storage device.**

Inserting this storage device into the TS unit, to which a multi-language screen program has been transferred, enables the multi-language selection function.

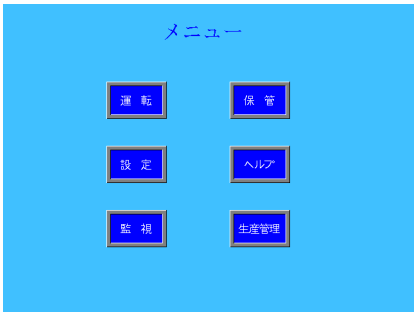
6.2.3 Language Editing

This section explains the multi-language editing procedure assuming that the version of Microsoft Windows on the PC used is capable of editing the required foreign languages. There are three methods for editing languages.

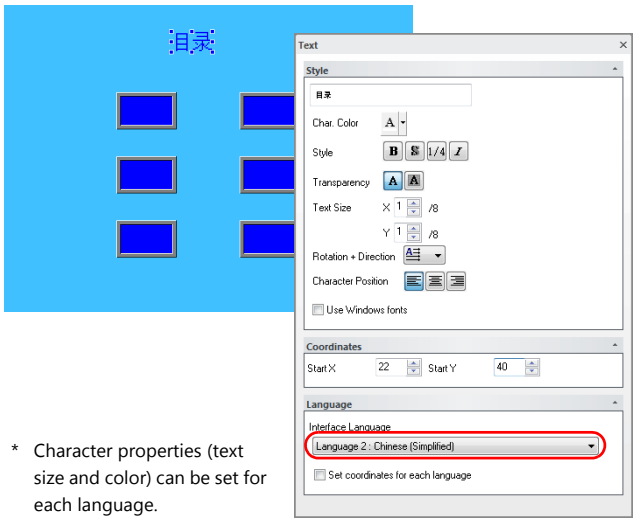
Directly Edit Items

By specifying the interface language number on the [Language] changing menu, text for Language 2 and later can be edited on the screen in the same way as Language 1.

Language 1

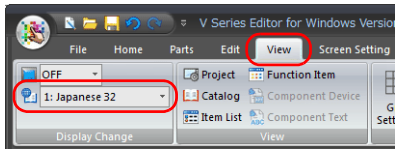


Language 2

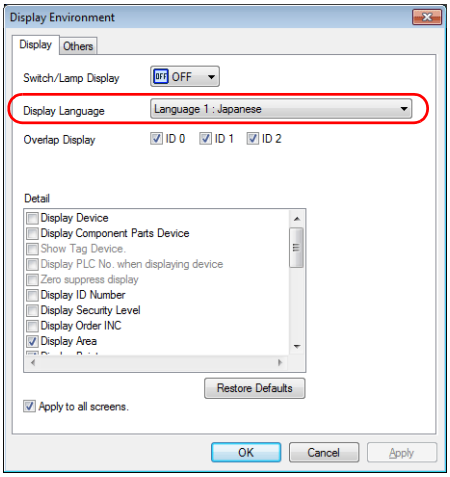


* Character properties (text size and color) can be set for each language.

- The interface language number can also be changed using the [Display Language] drop-down menu.
  - [View] → [Display Change]



  - [View] → [Display Environment]



Checking the layout

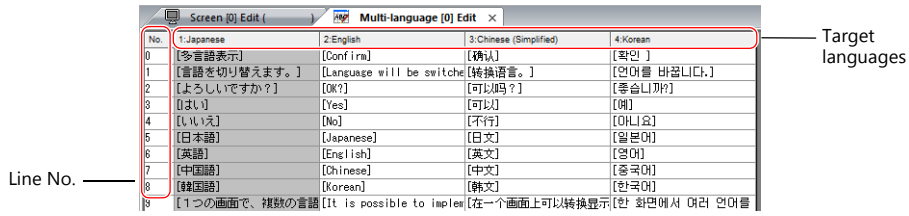
After editing, always check the layout of each language for problems using the [Language] changing menu.
Character properties can be set for each language.
The point size and color settings can be changed for specific languages.

Editing in the [Multi-language Edit] Window

Display the text in the screen program edited using Language 1 in the [Multi-language Edit] window and directly enter the desired text in another language.
Text can be copied and pasted between the [Multi-language Edit] window and Excel (pasted as “Unicode text” in Excel).

Editing location: [Home] → [Registration Item ▼] → [Multi-language]

[Multi-language Edit] window

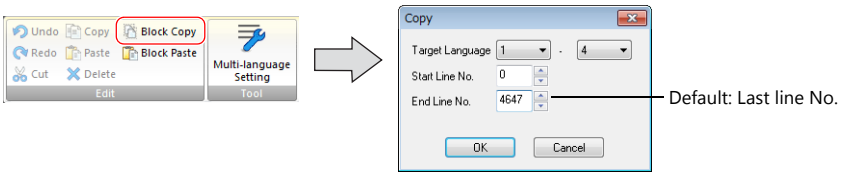


Language 1 cannot be edited in the [Multi-language Edit] window. To edit Language 1, edit it directly in the item settings.

* The [Multi-language Edit] window can be used to register up to 1000 lines (No. 0 to 999) per sheet.
When batch copying over 1000 lines (from the second sheet onwards) for editing in Excel, use the following procedure.

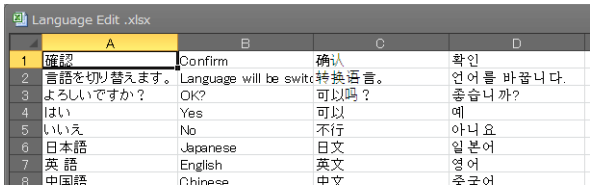
Example: Example: Batch copy of languages 1 to 4, numbers 0 to 4647 (4648 rows) in the [Multi-language Edit] window

1) Click [Edit] → [Block Copy]. The [Copy] window is displayed.
Specify target languages and start/end line numbers to copy, and click the [OK] button.



2) Select a cell in Excel and paste.

Excel

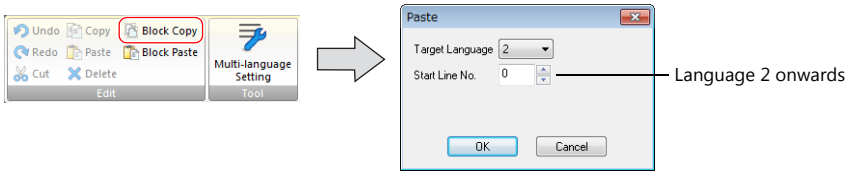


* If text cannot be pasted correctly, click [Paste Special] and select [Paste As: Unicode Text] to paste. Default: Unicode text

3) After editing in Excel, select the multi-language columns for Language 2 through 4 by dragging and copy them.

Language 1 cannot be pasted (edited) to the [Multi-language Edit] window. To edit Language 1, edit it directly in the item settings.

4) Click [Edit] → [Block Paste] in the [Multi-language Edit] window in V-SFT to display the [Paste] dialog. Select the languages for pasting and the starting row number, and click [OK].



This completes the editing.
After editing, always check the layout of each language for problems using the [Language] changing menu.
For details, refer to page 6-12.

Export / Import

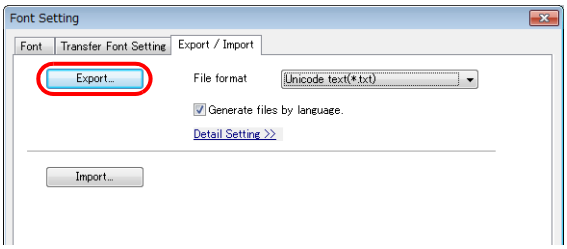
Export and import can be performed by compiling all languages in a text file per language.
Using this function allows text to be imported after undergoing translation and editing by viewing multiple languages side by side on an Excel spreadsheet.

Outputting a File for Each of the Languages for Switching

Export procedure

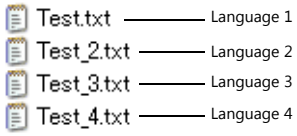
1. Select [System Setting] → [Multi-language Setting] to display the [Font Setting] window and click the [Import/Export] tab.

2. Configure the settings as shown below and click [Export].



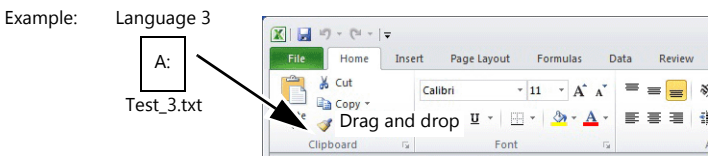
To export to CSV files instead of Unicode text files, select "*.csv" for [File format].

3. The [Save As] window is displayed.
   Enter a filename and click [Save] to output text files.



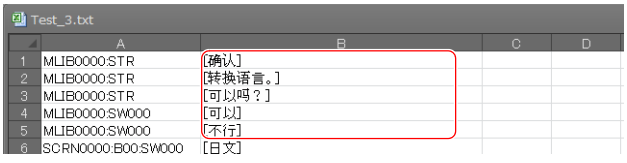
The same number of files are created as there are languages.

4. Start Excel and drag and drop the exported text into the Excel window to open it.



Language 1 cannot be pasted (edited) to the [Multi-language Edit] window. To edit Language 1, edit it directly in the item settings.

5. Register the text in square brackets in column B.



Do not edit column A. Also, do not delete any square brackets in column B. If these are edited or deleted, file import will end in failure.

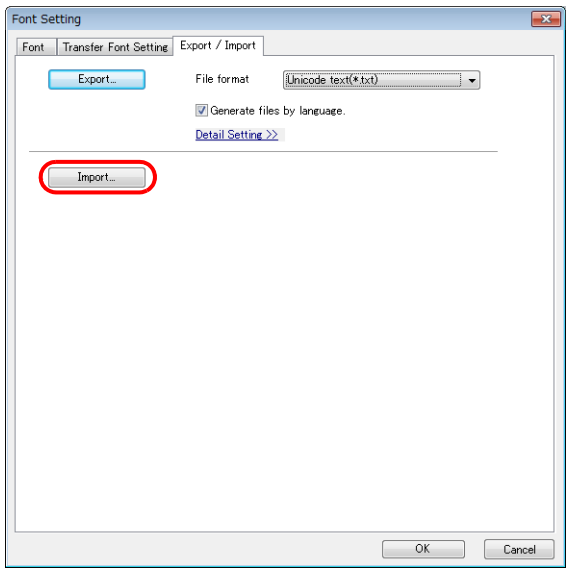
6. After editing, click [File] → [Save As].
   Select "Unicode Text (*.txt)" for [Save as type] and save the file using the same filename.

This completes the necessary settings.

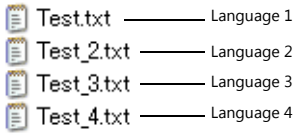
Import procedure

1. Click [System Setting] → [Multi-language Setting] to display the [Font Setting] window.

2. Display the [Export/Import] tab and click the [Import] button.



3. The [Open] window is displayed.
   Select "Unicode text (*.txt)" for [Save as type] and open each file one at a time.



Import languages 2 to 4 in order.

Be sure to save the files for languages 1 to 4 in the same place and using the original filenames. If any file is renamed or the Language 1 file is edited or deleted, file import will end in failure.
The Language 1 file cannot be imported.

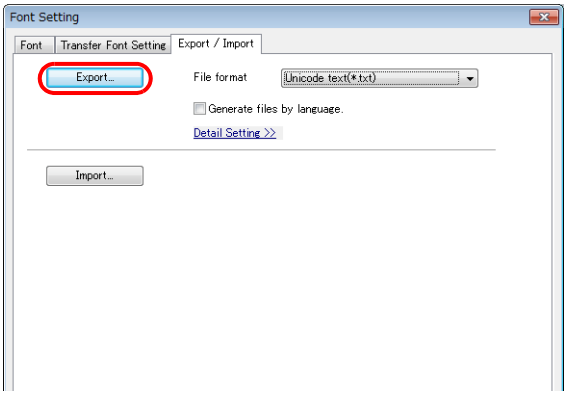
This completes the file importing process.
After editing, always check the layout of each language for problems using the [Language] changing menu.
For details, refer to page 6-12.

Outputting All Languages to a Single File

Export procedure

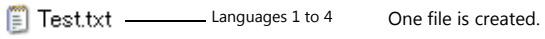
1. Select [System Setting] → [Multi-language Setting] to display the [Font Setting] window and click the [Import/Export] tab.

2. Configure the settings as shown below and click [Export].



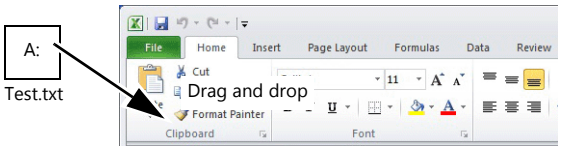
To export to CSV files instead of Unicode text files, select "*.csv" for [File format].

3. The [Save As] window is displayed.
   Enter a filename and click [Save] to output text files.



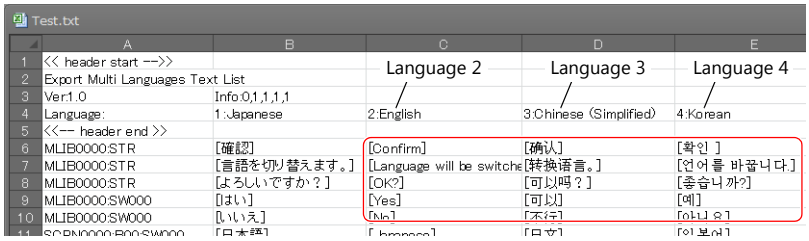
4. Start Excel and drag and drop the exported text into the Excel window to open it.

Example: Languages 1 to 4



Language 1 cannot be pasted (edited) to the [Multi-language Edit] window. To edit Language 1, edit it directly in the item settings.

5. Register the text in square brackets in column C, D, and E (red frame).



Do not edit the first to fifth rows (header) and columns A/B (language 1). Also, do not delete any square brackets from column C, D, or E. If these are edited or deleted, file import will end in failure.

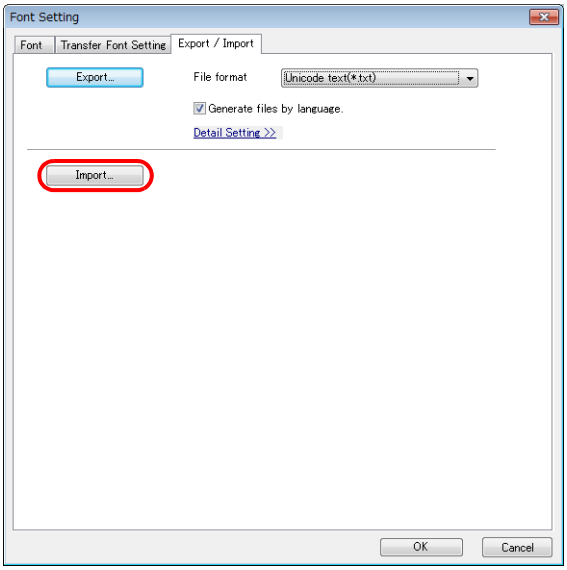
6. After editing, click [File] → [Save As].
   Select "Unicode Text (*.txt)" for [Save as type] and save the file using the same filename.

This completes the necessary settings.

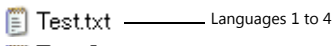
Import procedure

1. Click [System Setting] → [Multi-language Setting] to display the [Font Setting] window.

2. Display the [Export/Import] tab and click the [Import] button.



3. The [Open] window is displayed.
   Select "Unicode text (*.txt)" for [Save as type] and open the file.



   This completes the file importing process.
   After editing, always check the layout of each language for problems using the [Language] changing menu.
   For details, refer to page 6-12.

6.2.4 Language Selection

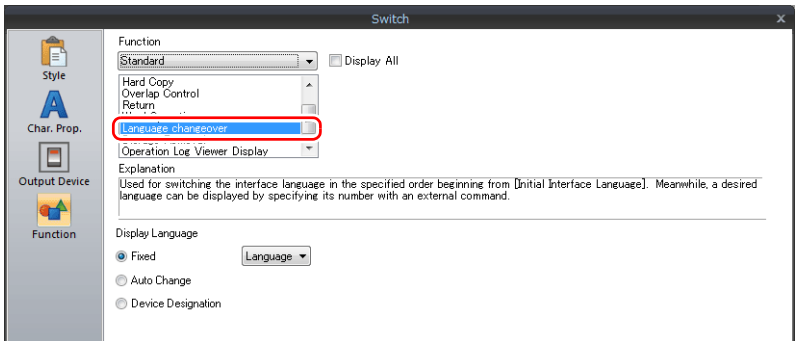
There are two ways to change the language.
Use either a switch function or macro command.

Switch Function

The interface language can be changed using a switch with the function [Language changeover].
Each time a [Language changeover] switch is pressed, the interface language switches in the specified order beginning from the [Initial Interface Language]. A desired language can also be displayed by specifying its number with an external command.

Location of Settings

Switch settings window → [Function] → [Function] → [Language changeover]



Item	Description
Fixed	Display the interface language of the specified language number. Language 1 to 16
Auto Change	Change the interface language in the specified order beginning from the [Initial Interface Language] set in the [Font Setting] window. Languages that are not selected in the window will not be displayed.
Device Designation	Display the interface language of the number stored at the specified device memory. 0: Language 1 1: Language 2 2: Language 3 : 15: Language 16

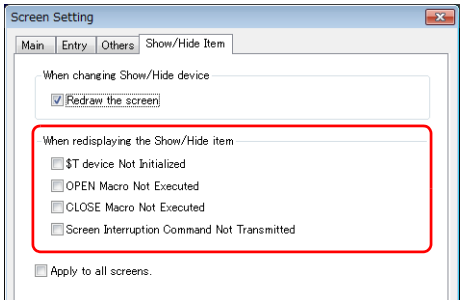
If a nonexistent language number is specified for display, an error beep sounds and no action takes place. The number of interface languages can be checked at [System Setting] → [Multi-language Setting] → [Font Setting] window.

Redraw Timing

When the interface language is switched, the screen is redrawn. The following actions also take place at the same time.

- Open macro, close macro (screen, multi-overlap library)
- Cycle macro (screen)
- $T device memory zero clear (screen)
- Screen interrupt command transfer (PLC type: universal serial) (screen)

Prevent execution of these operations when redraw occurs by selecting the checkboxes as required.
Location of settings: [Screen Setting] → [Screen Setting] → [Show/Hide Item] → [Redraw the screen]



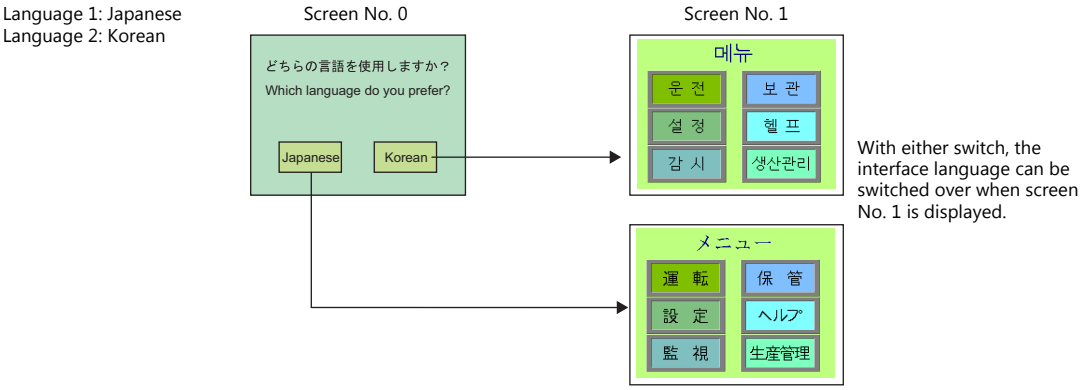
SYS (CHG_LANG) Macro Command

The “SYS (CHG_LANG)” macro command can be used to change the interface language.
This command is useful when changing the language using the ON macro of a switch or an external command.

> The language is switched over when the screen is changed after the macro command has been executed.
> For switching the language on the same screen, use the “RESET_SCRN” macro command.
> For details on macro commands, refer to the Macro Reference Manual.

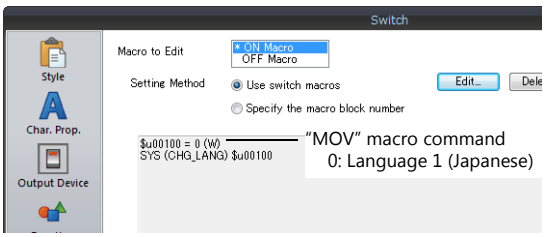
Setting Example

Example: Changing the language by switching the screen

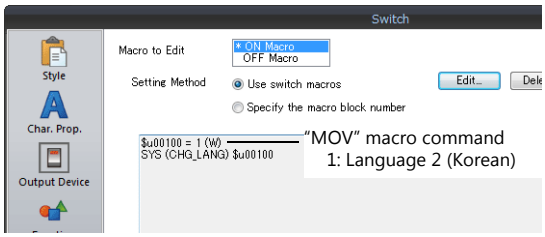


1. Configure the switch ON macro as shown below.

- “Japanese” switch ON macro



- “Korean” switch ON macro



2. Set the function of each switch to “Language changeover: 1”.

This completes the necessary settings.

Detail

Device used

	Internal Device	PLC1 to PLC8 Devices	Memory card	Constant
F1	◎			

○: Setting enabled (indirect designation disabled) ◎: Setting enabled (indirect designation enabled)

Range

	Value	Remarks
F1	0: Language 1 1: Language 2 : 15: Language 16	Although the setting range for [Interface Language] in the [System Setting] → [Multi-language Setting] → [Font Setting] window and [Display Language] in the [Display Environment] window is “1” to “16”, the range for “CHG_LANG” is “0” to “15”.

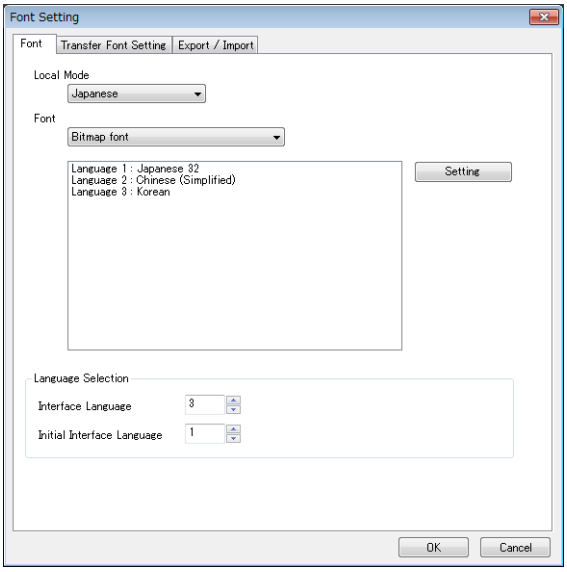
Editing procedure

For details on macro editing, refer to the Macro Reference Manual.

6.3 Detailed Settings

6.3.1 Font Setting

Set the number of languages and fonts for display on the TS unit. Display the following window by clicking [System Setting] → [Multi-language setting].

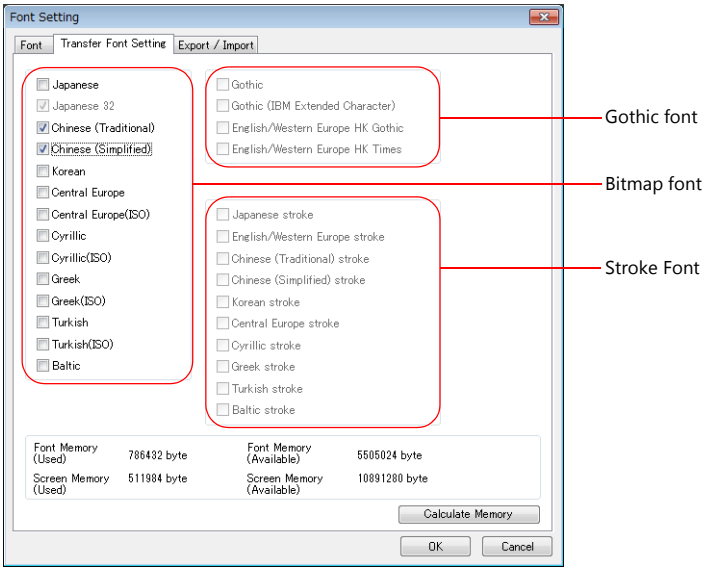


Item	Description
Local Mode *1	Select the interface language for the Main Menu screen of MONITOUCH. Selectable languages vary with the [Font] setting. The interface language can also be selected on the Main Menu screen of MONITOUCH. Japanese, English, Chinese (Traditional), Chinese (Simplified), Korean
Font	Select a font type from [Bitmap font], [Stroke font] and [Gothic font].
Setting	Set the languages to use.
Interface Language	Set the number of interface languages (1 to 16). Example: Specifying "5" means Languages 1 to 5 can be set.
Initial Interface Language	Select the language to be displayed after changing to RUN mode (1 to 16).

*1 The available combinations of language selections for the Main Menu screen and [Font] are shown below.
(Only the fonts selected on the [Transfer Font Setting] tab window can be set as the font that can be set on the Main Menu screen.)

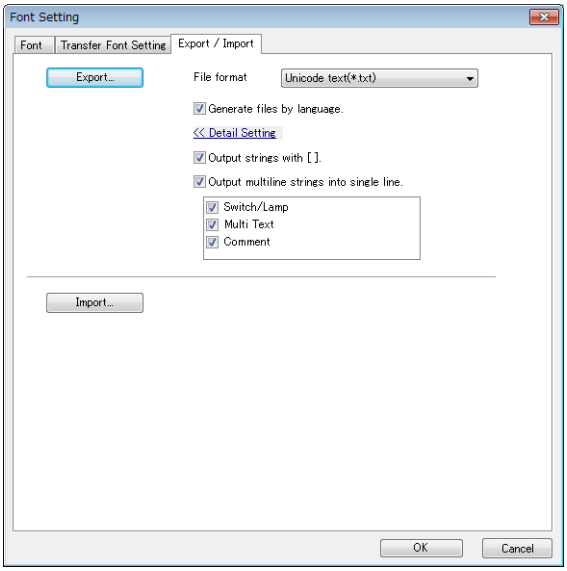
Main Menu screen	Font
Japanese, English	Japanese
	Japanese 32
	Gothic
	Gothic (IBM Extended Character)
Chinese (Traditional), English	Chinese (Traditional)
Chinese (Simplified), English	Chinese (Simplified)
Korean, English	Korean
English	English/Western Europe
	English/Western Europe HK Gothic
	English/Western Europe HK Times
	Central Europe
	Cyrillic
	Greek
	Turkish
	Baltic

6.3.2 Transfer Font Setting



Item	Description
Transfer Font Setting	Select the checkboxes of the fonts required on the TS unit. * More fonts selected for transfer results in less capacity available for the screen program. If capacity is insufficient, do not select unnecessary fonts.
Font Memory (Used)	Displays the total memory size used for the currently selected fonts for transfer.
Font Memory (Available)	Displays the memory space still available for fonts.
Screen Memory (Used)	Displays the size of the screen program currently being created.
Screen Memory (Available)	Displays the space available for the screen program.
Calculate Memory	Recalculate the volume of data from the current settings.

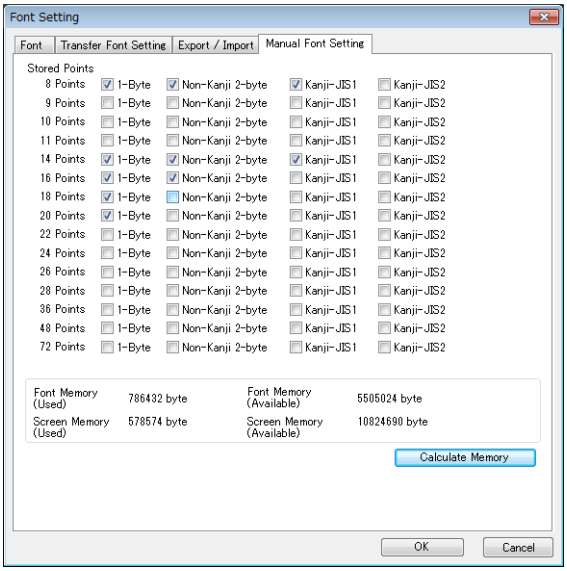
6.3.3 Import and Export



Item	Description
Export	Use this button when editing text for a language other than Language 1 in another application. For details, refer to page 6-14.
File format	Select the type of the file to be exported.
Generate files by language.	Set the file creation method used in exporting. • Selected The same number of files are created as there are languages. Test.txt — Language 1 Test_2.txt — Language 2 Test_3.txt — Language 3 Test_4.txt — Language 4 • Unselected One file is created. Test.txt — Languages 1 to 4
Output strings with [ ].	Selected Add square brackets to text in output files. Unselected Delimit output with commas. When a file is opened in Excel, some text like the following will not be imported correctly. Characters on V-SFT: 0123 → Output File (Standard cell format): 123 ← Leading zeros dropped Characters on V-SFT: +BK → Output File (Standard cell format): #NAME? ← Not recognized as a character string
Output multiline strings into single line.	Set how multiple lines of text located on a switch or lamp are output. Selected Lines of text are output in one cell with the line feed code "\n". Unselected Text is output line by line in separate cells. Switch: Error Screen — Checkbox: Selected → Output Result: [Error \n Screen] Checkbox: Unselected → Output Result: [Error] [Screen]
Import	Use this button to import an exported file. For details, refer to page 6-14.

6.3.4 Manual Font Settings (When a Gothic Font is Selected)

There are two types of Gothic fonts: one is an automatic setting type and the other is a manual setting type, for which you need to set the size manually.
While text and text on switches is displayed using the size specified for the particular item, items that use fonts of the manual setting type, which are mainly character and message displays, the font sizes must be specified in their respective setting windows, [Char. Display] and [Message Display].



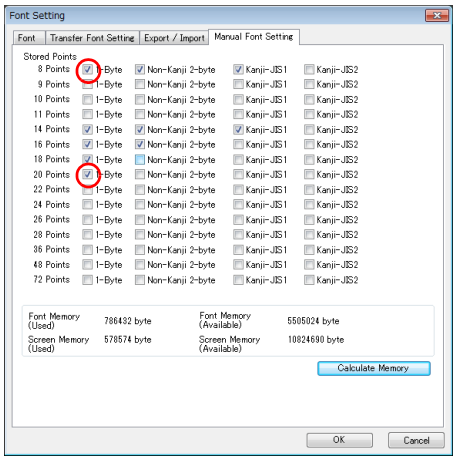
12 point fonts do not require setting.
They are transferred automatically.

Multi-language selection

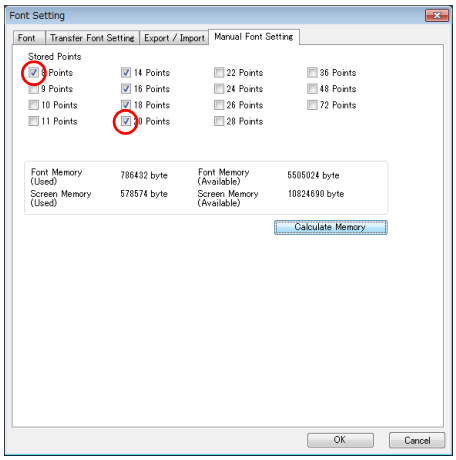
- Note that the setting for [☐1-Byte] of each point size of Language 1 (e.g. Gothic) affects the setting of Language 2 (e.g. English/Western Europe HK Gothic). Be aware that change one setting also changes the other setting.

  All settings made for Language 1 also apply to Language 2.
  Any changes to the settings for Language 1 affect that for Language 2.

  Language 1

  Language 2

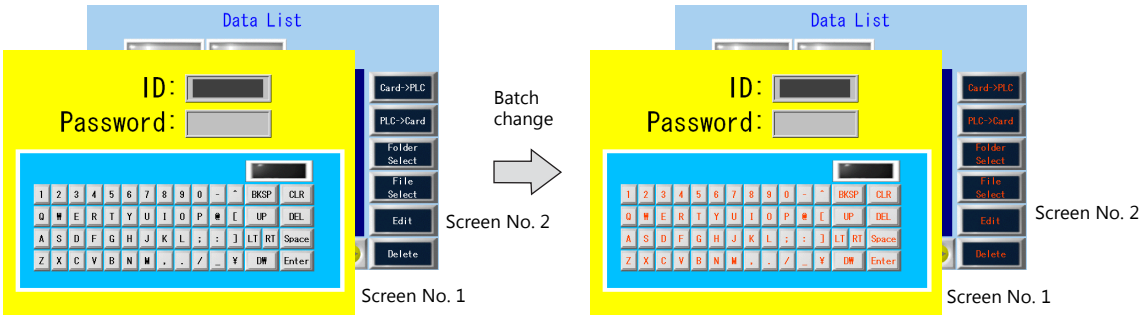
- About automatic fonts
  When multi-language selection is used, the font of the automatic setting type selected for Language 1 will automatically be transferred to the TS unit together with the screen program. However, the automatic setting type font is not recognized in Language 2 and later.
  For Language 2 and later, regard their fonts as those of the manual setting type and set the [Manual Font Setting] tab window as necessary.

6.4 Convenient Editing Procedures

6.4.1 Multi-language Batch Change

Overview

Item properties (text color etc.) for multiple languages from language 1 to 16 can easily be changed at once.



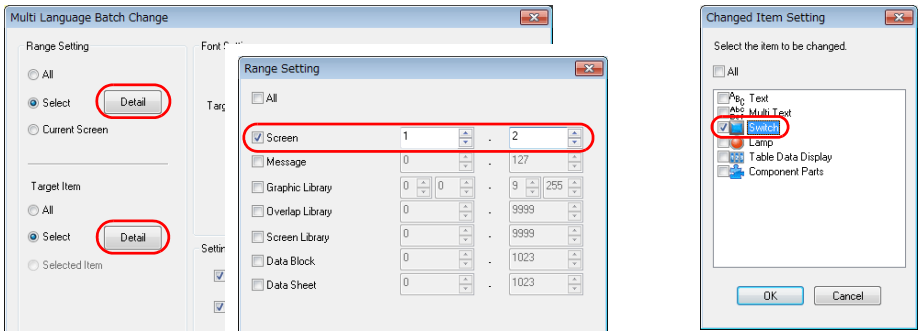
Setting Example

The procedure is explained with an example shown below.

Example: Changing the switch properties on screen numbers 1 and 2
Text color: black to orange, text property: standard to boldface

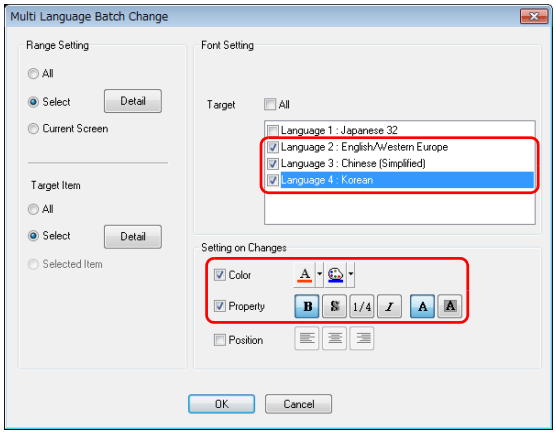
1. Select [Tool] → [Multi Language] → [Multi Language Batch Change] to display the [Multi Language Batch Change] window.

2. Click the [Select] → [Detail] button under [Range Setting] and specify a screen range of 1 to 2. Click the [Select] → [Detail] button under [Target Item] and select the [Switch] checkbox.



3. Select the [Target] checkbox under [Font Setting].

4. In the [Setting on Changes] area, select the [Color] checkbox and select orange. Also select the [Property] checkbox and select boldface.



5. Review the settings made in the previous steps, and click [OK].

The settings are updated.

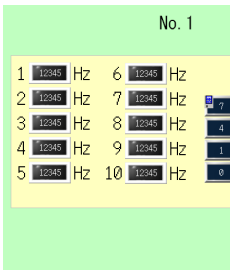
6.4.2 Multi-language Batch Copy

Overview

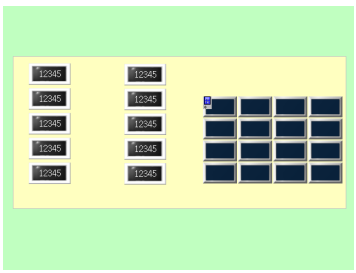
If exactly the same text, such as text on switches and item numbers, as language 1 is to be used, it can be easily copied at once.

- Before copying

Language 1



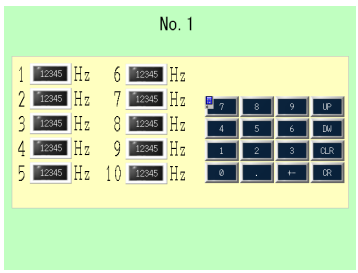
Language 2



Batch copy

- After copying

Language 2



Setting Example

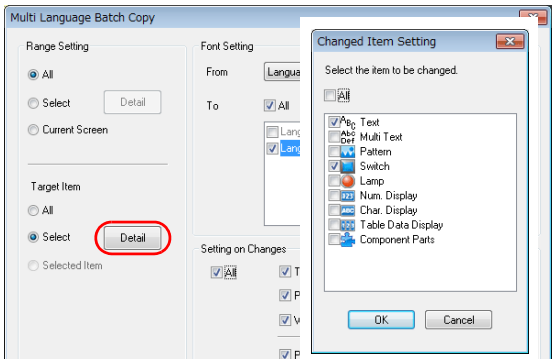
The procedure is explained with an example shown below.

In this example, the text and characters on the switches placed on all screens in language 1 are copied to screens in language 2.

Language 1: Japanese 32
Language 2: English/Western Europe

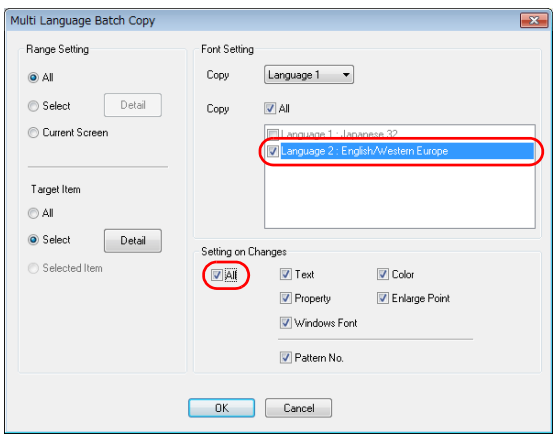
1. Select [Tool] → [Multi Language] → [Multi Language Batch Copy] to display the [Multi Language Batch Copy] window.

2. Select [All] under [Range Setting] and set the target items to [Select] → [Detail] → [Text] and [Switch].



3. In the [Font Setting] area in the [Multi Language Batch Copy] window, select [Language 1] for [From] and [Language 2] for [To].

4. Batch copy in this example targets all properties. In the [Setting on Changes] area, select the [All] checkbox.



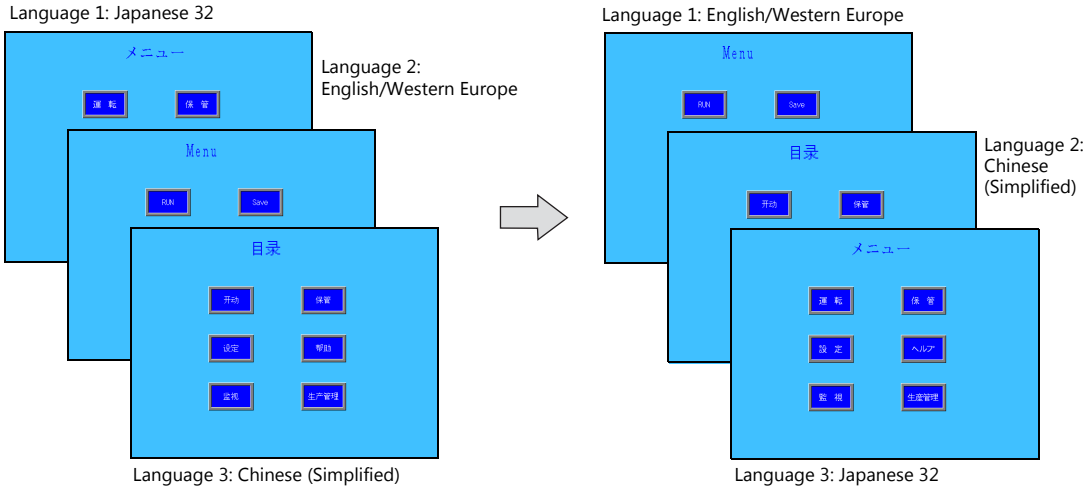
5. Review the settings made in the previous steps, and click [OK].

The settings are updated.

6.4.3 Multi-language Reordering

Overview

Interface languages from language 1 to language 16 can be reordered easily.



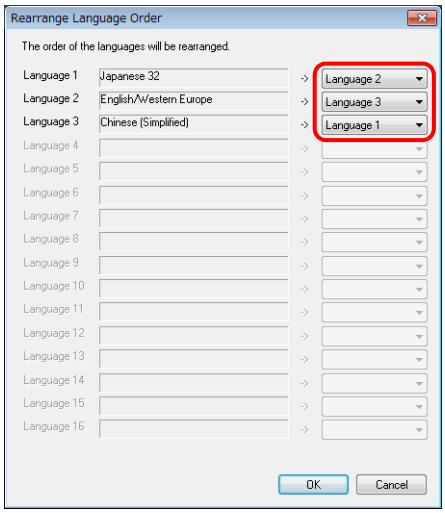
Setting Example

The procedure is explained with the settings shown below as an example.

Language 1: Japanese 32	→	Language 1: English/Western Europe
Language 2: English/Western Europe	→	Language 2: Chinese (Simplified)
Language 3: Chinese (Simplified)	→	Language 3: Japanese 32

1. Select [Tool] → [Multi Language] → [Rearrange Language Order] to display the [Rearrange Language Order] window.

2. Select the language number using the pull-down menus next to [Language 1], [Language 2], and [Language 3].



3. Review the settings made in the previous steps, and click [OK].

The settings are updated.

7 Tag

7.1 Overview

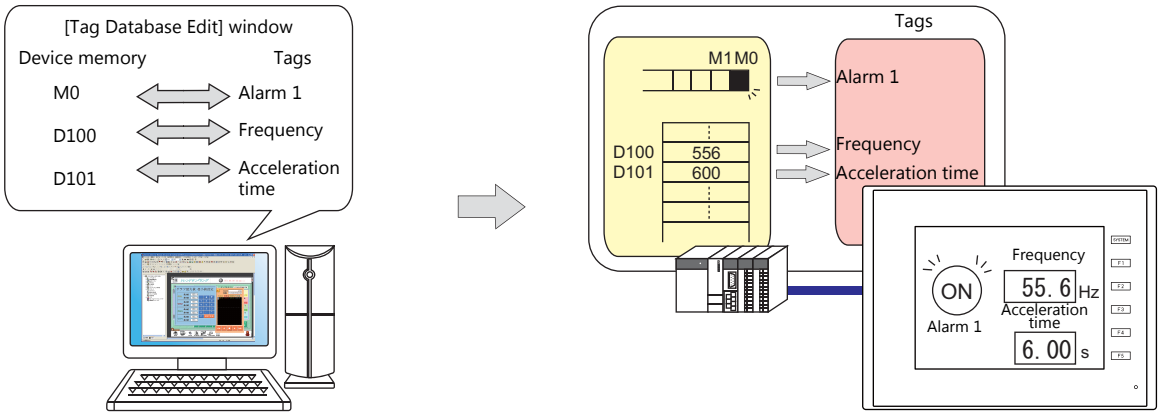
"Tag editing" is a function used to assign names (tags) to PLC or internal device memory ($u, $L, etc.) used on the TS unit and use these names for screen program creation. Tags can be divided into three general types: device memory designated tags, variable designated tags, and array designated tags.

7.1.1 Tag Types

Device Designation

Assign a tag name to a PLC device memory or internal device memory, and set the device memory for the part or item using the assigned name.

Example: In the [Tag Database Edit] window, register PLC device memory addresses "M0", "D100" and "D101" with names "Alarm 1", "Frequency" and "Acceleration Time", respectively.



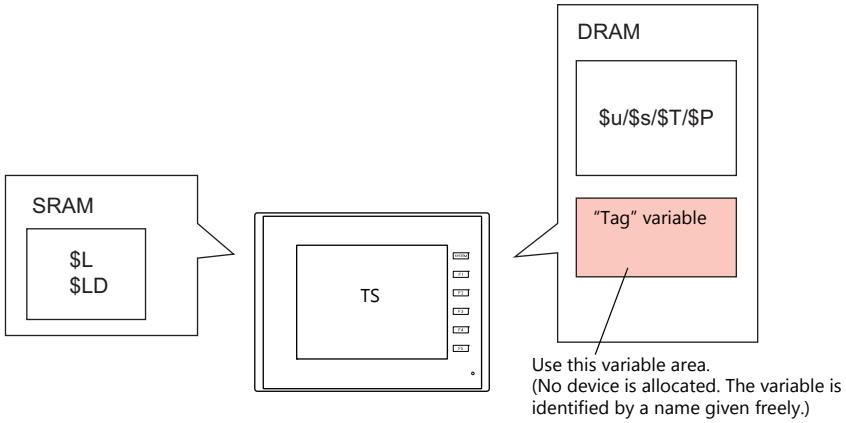
Set device memory addresses for parts using tags.
Lamp device memory: "Alarm 1" (M0)
Numerical data display device memory: "Frequency" (D100), "Acceleration time" (D101)

☞ For details on the procedure for editing tags, refer to "7.2 Editing Tags" page 7-3.

Variable Designation

Assign a tag name to a variable in the variable area of the TS unit, and set the device memory variable for parts and items using the assigned names. This is useful for specifying a working area for TS internal processing, such as for macro and password functions etc.

Example: Variable area in the TS unit

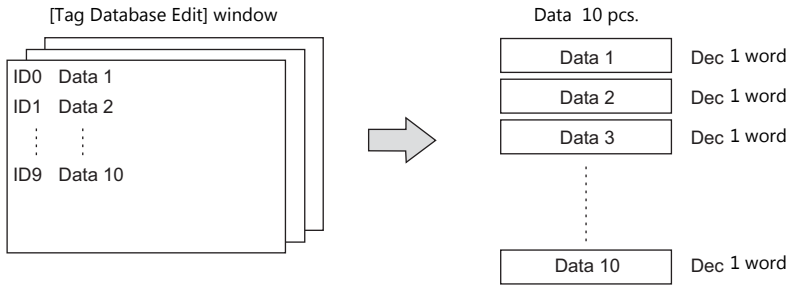


☞ For details on the editing procedure, refer to "7.2 Editing Tags" page 7-3.

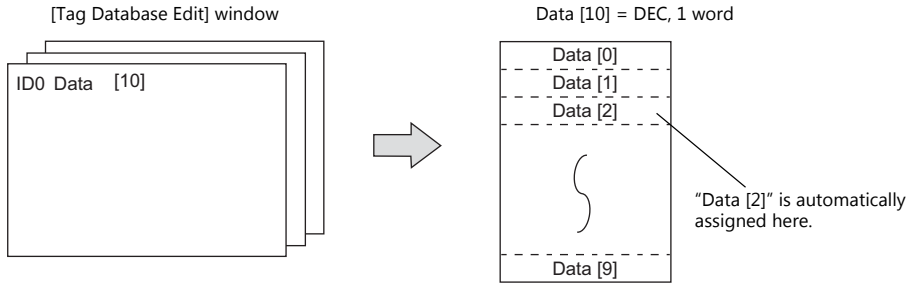
Variables
A "variable" is an area that stores data temporarily. This area is used for temporarily storing data, such as a default value or calculated value. The capacity of the variable area is 4096 words for both single words and double words, respectively.
For details, refer to ""Tag" Variable Capacity" page 7-18.

Array Designation

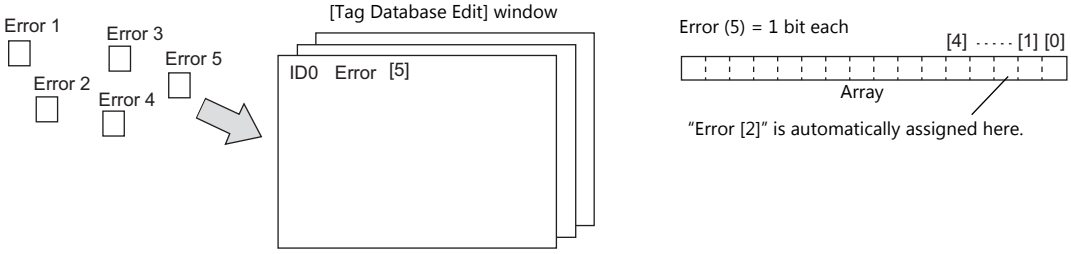
The array format can be specified for the tag. If there is multiple data of the same type, they can be registered at one time. This makes data management and maintenance easier.
For example, when allocating 10 variables that have the same properties (DEC, 1 word) without using the array format, 10 variables must be registered individually as shown below.



When registering one tag with 10 elements in the array format, 10 variables can be secured in the same way as shown above. If there is multiple data of the same type, the array format can be used to make configuration easier.



In the case of the bit variable:



☞ For details on the editing procedure, refer to "7.2.3 Configuring Arrays" page 7-6.

7.1.2 Importing Tags

Tags or system labels registered in PLC software can be imported using V-SFT and used as tags.

☞ For details, refer to the following.

- "MITSUBISHI ELECTRIC" page 7-9
- Siemens
  - "Model S7" page 7-13
  - "Model S7-200" page 7-16

7.2 Editing Tags

Click [Home] → [Registration Item ▼] → [Tag Database], specify a group number, and register tags in the [Tag Database Edit] window.
There are three ways to edit tags.
Refer to the following.

☞ "7.2.1 Direct Registration in the [Tag Database Edit] Window" page 7-3

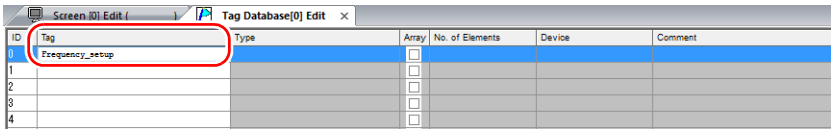
☞ "7.2.2 Editing in a CSV File" page 7-4

☞ "7.5 Importing Tags" page 7-9

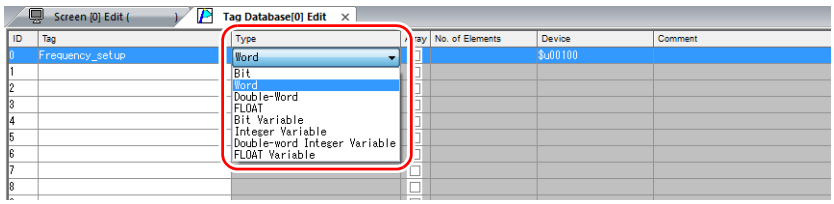
7.2.1 Direct Registration in the [Tag Database Edit] Window

This section describes the procedure for registering "D100" and "D101" (word device memory) and "M0" (bit device memory) of the PLC1 device memory using tags.

1. Click the [Tag] field and register a tag name.



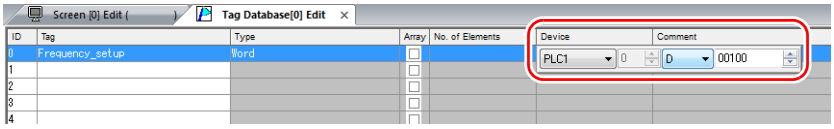
2. Click the [Type] field and select a data type from the list.



* To register the same type of data at once with consecutive device memory addresses, use the array format.

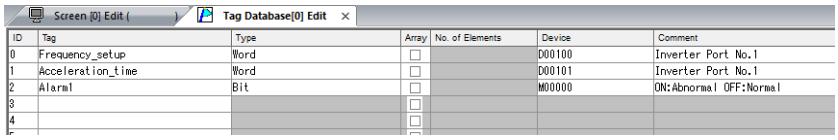
☞ For details, refer to "7.2.3 Configuring Arrays".

3. Click the [Device] field and set a device memory address.



4. Click the [Comment] field and enter a comment describing the tag.

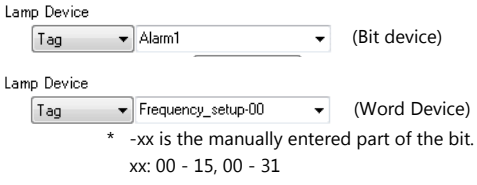
5. To register a new device memory address using a tag, select another ID number and repeat steps 1 to 5.



This completes the necessary settings.
Tags can be specified in the settings window of each part.

- Word designation:

- Bit designation:

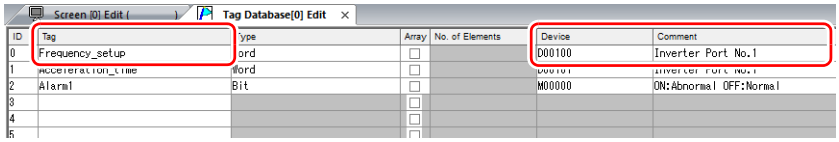


* -xx is the manually entered part of the bit.
xx: 00 - 15, 00 - 31

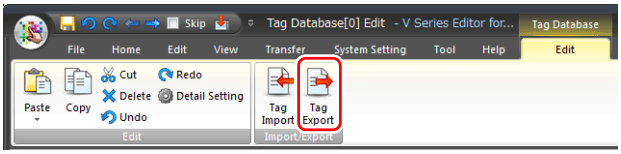
7.2.2 Editing in a CSV File

The data registered in the [Tag Database Edit] window for a screen program can be exported to a CSV file. The CSV file can be edited on a PC and then imported back into the screen program. In the example below, changes are made to the data registered with ID No. 0 in the [Tag Database Edit] window using Excel.

- Tag: Frequency_setup → Run_status
- Device: D100 → D105
- Comment: Inverter Port No. 1 → ON: RUN, OFF: STOP

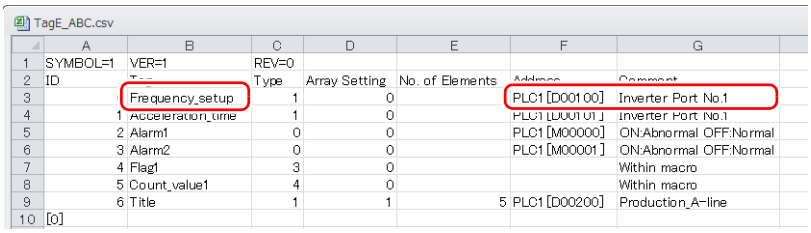


1. Click [Edit] → [Tag Export].



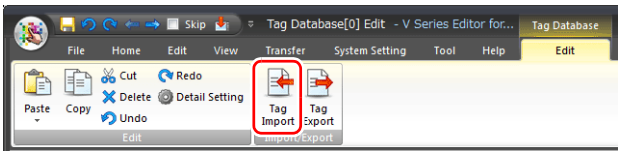
2. Enter an arbitrary filename in the window, select “Csv File (*.csv)” for the [Save as type] field, and click [Save].

3. Open the CSV file in Excel, edit each field for ID number 0, and save the file.



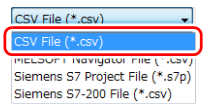
☞ For details on the data in CSV files, refer to “CSV File Configuration” page 7-5.

4. Open the [Tag Database Edit] window and click [Edit] → [Tag Import].

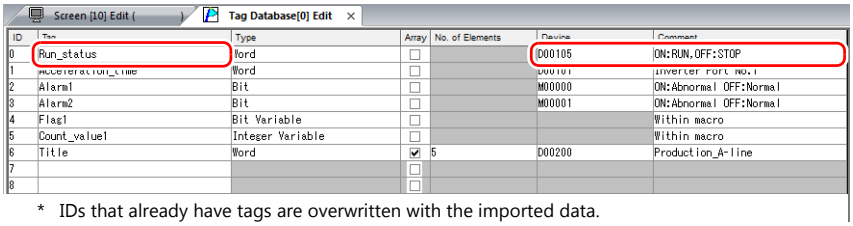


5. Select the CSV file saved in step 3, select “Csv File (*csv)” for the [Files of type] field, and click [Open].

File types



This completes the necessary settings.

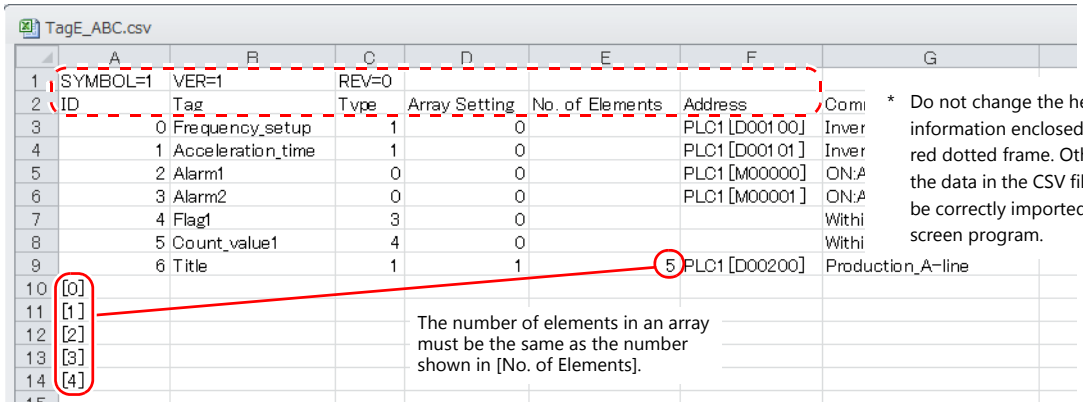


* IDs that already have tags are overwritten with the imported data.

CSV File Configuration

A CSV file opened in Excel is formatted as shown below.

[Tag Database Edit] data exported to a CSV file



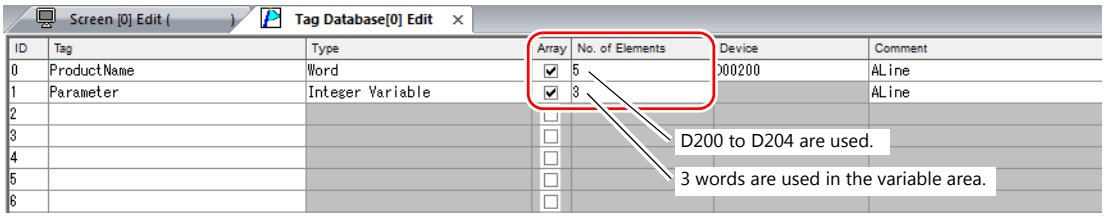
Column	Item	Description	Remarks
A	ID	0 - 65535 Numbers within square brackets [ ]: Element No. 0 to 4095 with the use of arrays	1-byte
B	Tag *1	Within 70 one-byte characters	1-byte / 2-byte
C	Type	0: Bit device memory 1: Word Device memory 2: Double-word device memory 3: Bit variable 4: Integer variable 5: Double-word integer variable 6: Real number variable 7: Real number device memory	1-byte
D	Array Setting	0: Not used, 1: Used	1-byte
E	No. of Elements	1 - 4096	1-byte, only when "1" is specified for [D. Array Setting]
F	Address	PLC device memory: PLCx [xxxxx] (PLCx: PLCNo.1 - 8; xxxxx: Device memory + address) Example: Specifying PLC1 Mitsubishi D100 • 1:1 connection Word designation: PLC1 [D00100] Bit designation: PLC1 [D00100-00] • 1:n connection (port No. 0) Word designation: PLC1 [0:D00100] Bit designation: PLC1 [0:D00100-00]	1-byte
		Internal device memory: $u/$T/$s/$L/$LD (xxxxx: Device memory + address) Example: Specifying internal device memory $u100 Word designation: $u00100, bit designation: $u00100-00	
		Memory card device: [xx:xxxx] #xxxx (xx: File No. 0 to 15; xxxx: Record No. 0 to 4095; #xxxx: Data No. 0 to 4096) Example: Specifying File No. 0, Record No. 0, and Data No. 100 Word designation: [0:0] #0100, bit designation: [0:0] #0100-00	
		I/O device memory: PLCx [xxxxx] (PLCx: PLCNo.1 - 8; xxxxx: Device memory + address) Example: Specifying PLC1 Fuji Electric T-link TI00 Word designation: PLC1 [TI00], bit designation: PLC1 [TI00-00]	
		Common device memory: CW/CB/MW/MB/VW: PLCx [xxxxx] (PLCx: PLCNo.1 - 8; xxxxx: Device memory + address) Example: • Specifying CW100 Word designation: PLC1 [CW0100], bit designation: PLC1 [CW0100-00] • Specifying MW100 (port No. 1) Word designation: PLC1 [1:MW0100], bit designation: PLC1 [1:MW0100-00]	1-byte, only when the general-purpose FL-Net is designated as PLC1
G	Comment	Within 130 one-byte characters	1-byte / 2-byte

*1 Data that includes unusable characters cannot be imported. Refer to "Detailed Settings" (page 7-7).

7.2.3 Configuring Arrays

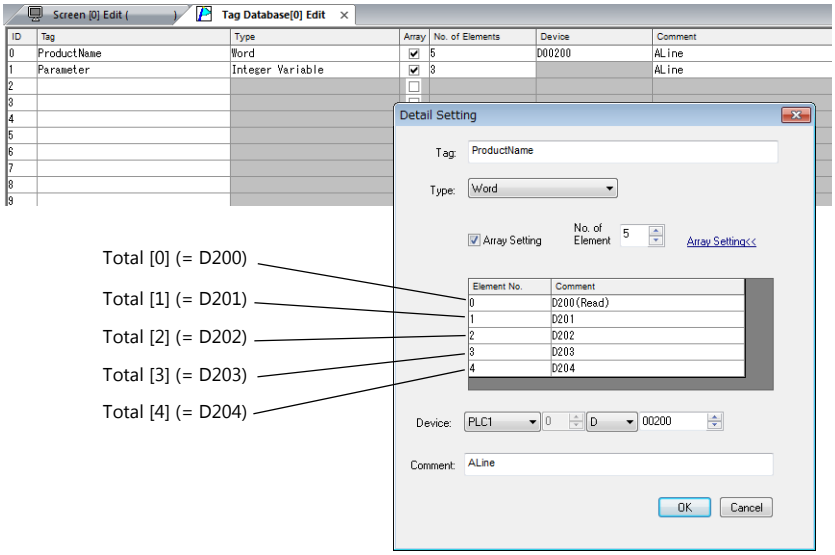
This section describes the procedure when "5" is specified for [No. of Elements] for the PLC1 device memory "D200", and "3" for the integer variable in the array format.

1. Select the [Array] checkbox and specify the number for the [No. of Elements] field.



- A maximum of 4096 elements can be set.
- If the bit variable is specified in the array format, 1 word is occupied in the variable area even if "16" or a smaller number is specified for the number of elements.
  For details, refer to "Tag Settings" page 7-18.

2. Double-click on the ID number and enter a description in the [Comment] field of the [Detail Setting] window.



* The [Detail Setting] window can also be displayed from the [Tag Database Edit] tab or by right-clicking and selecting [Detail Setting].

This completes the necessary settings.
Tag arrays can be specified in the settings window of each part.

- Tag [n] (n: number of elements in the array)

* Manually enter a value for [n].

7.2.4 Importing Tags

Tags or system labels registered in PLC software can be imported using V-SFT and used as tags.

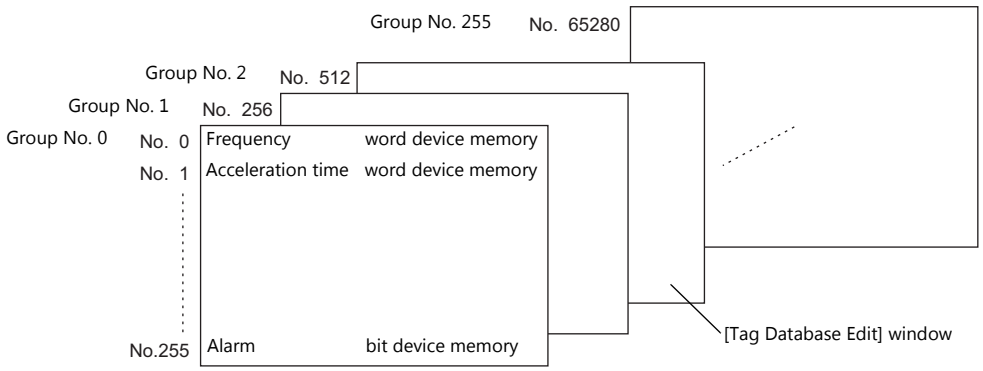
For details, refer to "7.5 Importing Tags" page 7-9.

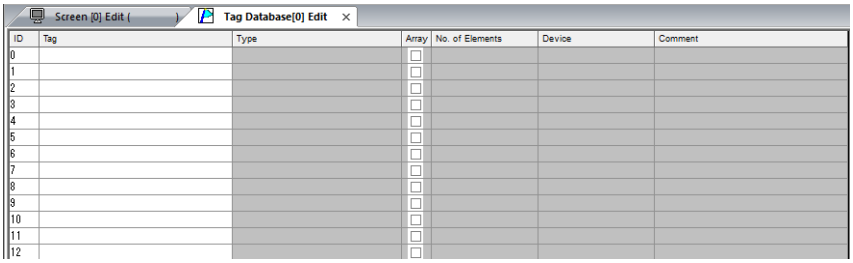
7.3 Detailed Settings

[Tag Database Edit] Window

The [Tag Database Edit] window consists of 256 groups, and 256 lines can be registered per group. Accordingly, a maximum of 65536 lines can be registered in total.

Location of settings: [Home] → [Registration Item ▼] → [Tag Database]



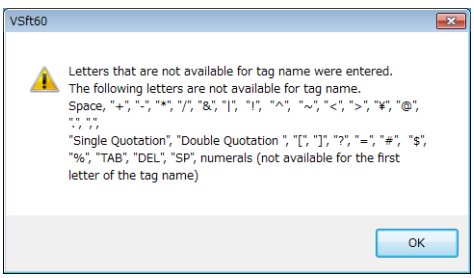


Item	Description
ID	Line No. 0 to 65535
Tag	Specify a tag name. Max. 70 one-byte characters (two-byte characters allowed, one-byte/two-byte/uppercase/lowercase are treated as different characters.)
Type, Device	Specify the data type for the tag.

Device memory	Type	Data Type
PLC device memory Internal device memory Memory card I/O device memory Common device memory	Bit	1-bit data
	Word	1-word data
	Double-word	Double-word data
	Real number	32-bit single precision real number format
Variable	Bit variable	1-bit data
	Integer variable	1-word data
	Double-word integer variable	Double-word data
	Real number variable	32-bit single precision real number format

Array	Use an array. For details on setting arrays, refer to "7.2.3 Configuring Arrays" page 7-6.
No. of Elements	When [Array] is checked, specify the number of elements to be used in the array. Max. 4096
Comment	Enter a description for the tag. Max. 130 one-byte characters (two-byte characters allowed, one-byte/two-byte/uppercase/lowercase are treated as different characters.)

If an unavailable character is used, the following message box will appear. In this case, perform registration again.



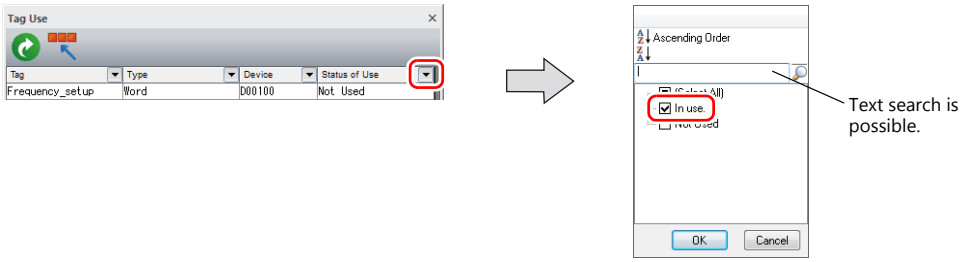
7.4 Tag Status List

The tag status list of the entire screen program can be searched and the total word count of tag variables can be checked.

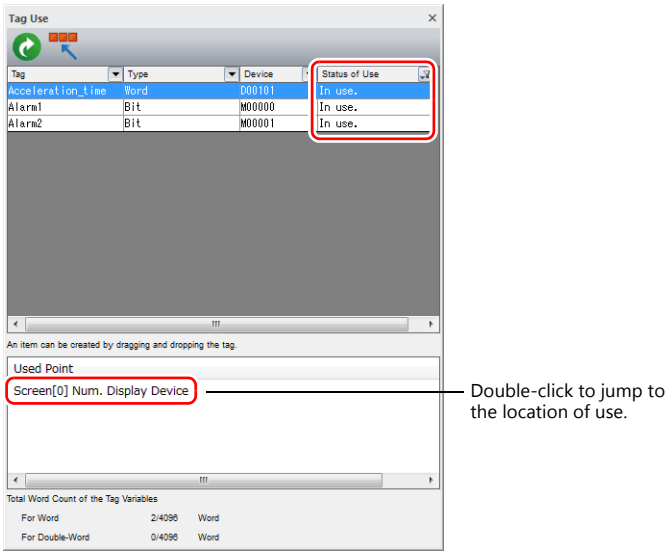
☞ For details, refer to "Checking the Capacity of "Tag" Variable" page 7-18.

The procedure of searching only for tags currently in use is explained as an example.

1. Click [Tool] → [Search] → [Tag Use] to display the [Tag Use] window.
2. Click the [▼] filter button next to [Status of Use].
   Only select the [In use] checkbox and click [OK].



The necessary settings have been completed.
The search results are displayed. Selecting a tag displays the location of use.



7.5 Importing Tags

Tags or system labels registered in PLC software can be imported using V-SFT and used as tags.

Manufacturers of supported PLCs

MITSUBISHI ELECTRIC

Global labels registered in Simple Project (with labels) or Structured Project in MITSUBISHI ELECTRIC's software GX Works2 can be registered as system labels in the software MELSOFT Navigator. These system labels can be exported in CSV file format. When such CSV files are imported using V-SFT, system labels in the files can be used as tags in V-SFT.

*** For details on using PLC software, refer to the relevant PLC manual.**

When whole program compiling is executed in GX Works2, device memory addresses registered with global labels will be reassigned to global labels. If there are global labels with no PLC device memory addresses assigned, addresses of such labels will be assigned according to the automatic assignment setting made in GX Works2.
Therefore, assigning PLC device memory addresses to global labels is recommended.

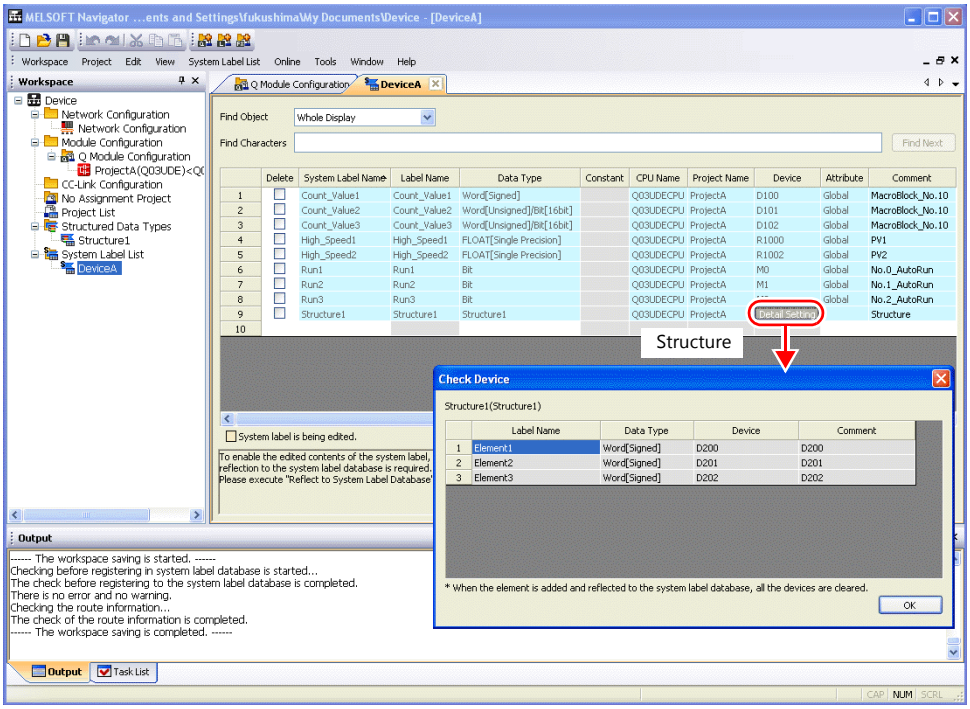
Supported PLC Models

Manufacturer	PLC Model
MITSUBISHI ELECTRIC	QnH (Q) series link
	QnH (Q) series CPU
	QnU series CPU
	Q00J/00/01 CPU
	QnH (Q) series (Ethernet)
	QnH (Q) series (Ethernet ASCII)
	QnU series (built-in Ethernet)
	QnH (Q) series (CC-LINK)
	L series link
	L series (built-in Ethernet)
	FX3U/3UC/3G series CPU
	FX3U/3UC/3G series link (A protocol)

*** Importing using V-SFT is allowed provided that [PLC1] and a 1:1 connection mode are set in the [System Setting] → [Hardware Setting] window. Importing is not possible for PLC2 and subsequent PLCs.**

Procedure

This section describes the steps to import “Device A” data registered in the system label list into a screen program.

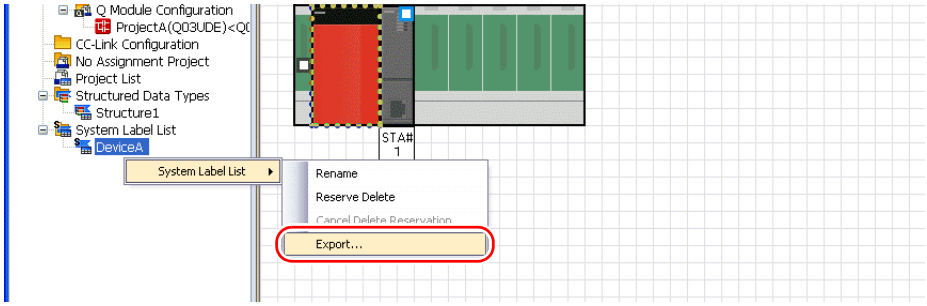


*** The following table lists the types of data that can be imported using V-SFT and the data types after importing.**

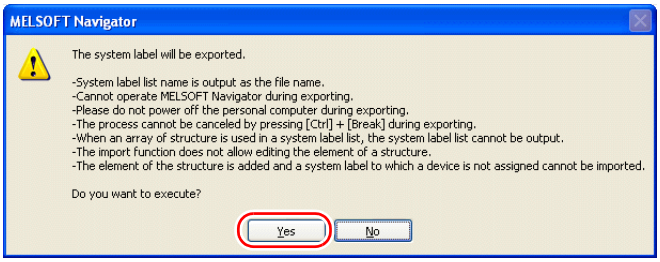
MITSUBISHI ELECTRIC “System Label”		Data Type for Tags in V-SFT
Data Type *1	Length	
Bit	1 bit	Bit
Word [Signed]	1 word	Word
Word [Unsigned]	1 word	
Timer	1 word	
Counter	1 word	
Retentive Timer *2	1 word	
Double Word [Signed]	2 words	Double-word
Double Word [Unsigned]	2 words	
Time	2 words	
FLOAT [Single Precision]	2 words	Real number

*1 No other types of data can be imported using V-SFT.
*2 With the PLC model QnH (Q) series (CC-LINK), data of the type “Retentive Timer” cannot be imported.

1. Start MELSOFT Navigator.
2. Right-click [DeviceA] under [System Label List], and then click [System Label List] → [Export].

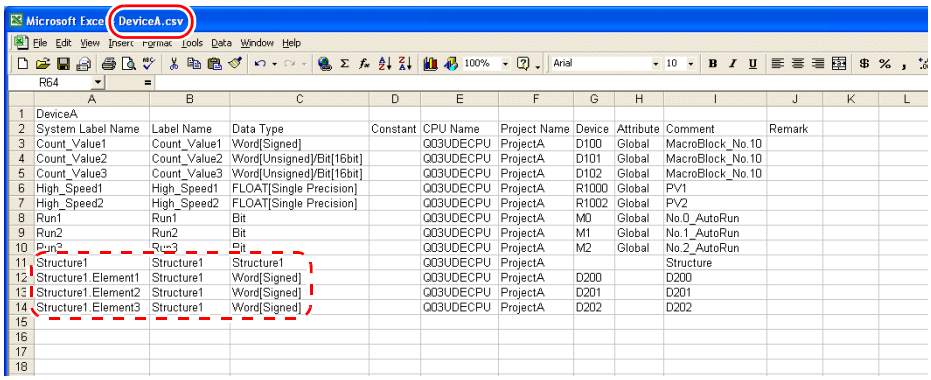


3. A message dialog box is displayed. Click the [Yes] button.



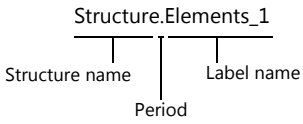
4. The [Select Export Destination Folder] window is displayed.
Select "CSV" for [Save as type] and click [Save].

5. Open the destination folder. Check that the CSV file with the same name in the system label list is created.
(Example: DeviceA.csv)



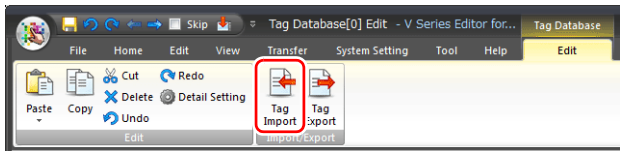
	A	B	C	D	E	F	G	H	I	J	K	L
1	DeviceA											
2	System Label Name	Label Name	Data Type	Constant	CPU Name	Project Name	Device	Attribute	Comment	Remark		
3	Count_Value1	Count_Value1	Word[Signed]		Q03UDECPU	ProjectA	D100	Global	MacroBlock_No.10			
4	Count_Value2	Count_Value2	Word[Unsigned]/Bit[16bit]		Q03UDECPU	ProjectA	D101	Global	MacroBlock_No.10			
5	Count_Value3	Count_Value3	Word[Unsigned]/Bit[16bit]		Q03UDECPU	ProjectA	D102	Global	MacroBlock_No.10			
6	High_Speed1	High_Speed1	FLOAT[Single Precision]		Q03UDECPU	ProjectA	R1000	Global	PV1			
7	High_Speed2	High_Speed2	FLOAT[Single Precision]		Q03UDECPU	ProjectA	R1002	Global	PV2			
8	Run1	Run1	Bit		Q03UDECPU	ProjectA	M0	Global	No.0_AutoRun			
9	Run2	Run2	Bit		Q03UDECPU	ProjectA	M1	Global	No.1_AutoRun			
10	Run3	Run3	Bit		Q03UDECPU	ProjectA	M2	Global	No.2_AutoRun			
11	Structure1	Structure1	Structure1		Q03UDECPU	ProjectA			Structure			
12	Structure1.Element1	Structure1	Word[Signed]		Q03UDECPU	ProjectA	D200		D200			
13	Structure1.Element2	Structure1	Word[Signed]		Q03UDECPU	ProjectA	D201		D201			
14	Structure1.Element3	Structure1	Word[Signed]		Q03UDECPU	ProjectA	D202		D202			
15												
16												
17												
18												

* The dotted line frame indicates the structure. A structure name with a period is added to the top of each label name.

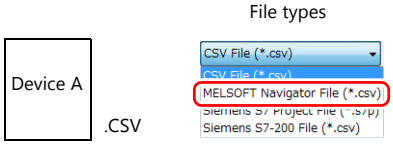


6. Open the screen program in V-SFT. Click [Home] → [Registration Item] → [Tag Database] to display the [Tag Database Edit] window.

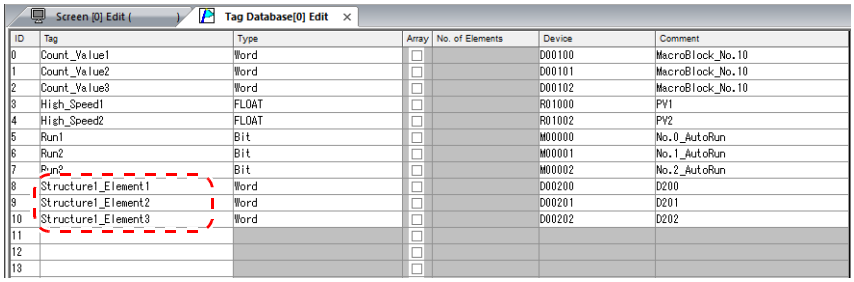
7. Click [Edit] → [Tag Import].



8. The [Open] window is displayed. Select "MELSOFT Navigator File (*.csv)" for [Files of type]. Select the desired CSV filename (e.g. "DeviceA.csv") and click [Open].



The contents of the file are registered as tags in the “tag database edit” window. Types ([Type]) are specified for individual device memory addresses.
This completes the import procedure.



ID	Tag	Type	Array	No. of Elements	Device	Comment
0	Count_Value1	Word			D00100	MacroBlock_No.10
1	Count_Value2	Word			D00101	MacroBlock_No.10
2	Count_Value3	Word			D00102	MacroBlock_No.10
3	High_Speed1	FLOAT			R01000	PV1
4	High_Speed2	FLOAT			R01002	PV2
5	Run1	Bit			M00000	No.0_AutoRun
6	Run2	Bit			M00001	No.1_AutoRun
7	Run3	Bit			M00002	No.2_AutoRun
8	Structure1_Element1	Word			D00200	D200
9	Structure1_Element2	Word			D00201	D201
10	Structure1_Element3	Word			D00202	D202
11						
12						
13						

*** Periods “.” cannot be used with tags. If any system label exported from MELSOFT Navigator includes a period, the period is converted to an underscore “_”.**

Notes

Note the following for importing CSV files.

- If a file to be imported includes a tag that is already registered, the existing tag is overwritten. Unregistered tags are registered to blank ID numbers (in the [Tag Database Edit] window).
- Only device memory addresses available on the TS can be imported. For details, refer to the TS2060 Connection Manual or the TS1000 Smart Connection Manual.

Siemens

Supported PLC Models

Manufacturer	PLC Model	Refer to
Siemens	S7	page 7-13
	S7-300/400 MPI	
	S7-300/400 (Ethernet ISOTCP)	
	S7-300/400 (Ethernet TCP/IP PG protocol)	
	S7 PROFIBUS-DP	
	S7-200 PPI	page 7-16

*** Importing using V-SFT is allowed provided that [PLC1] and a 1:1 connection mode are set in the [System Setting] → [Hardware Setting] window. Importing is not possible for PLC2 and subsequent PLCs.**

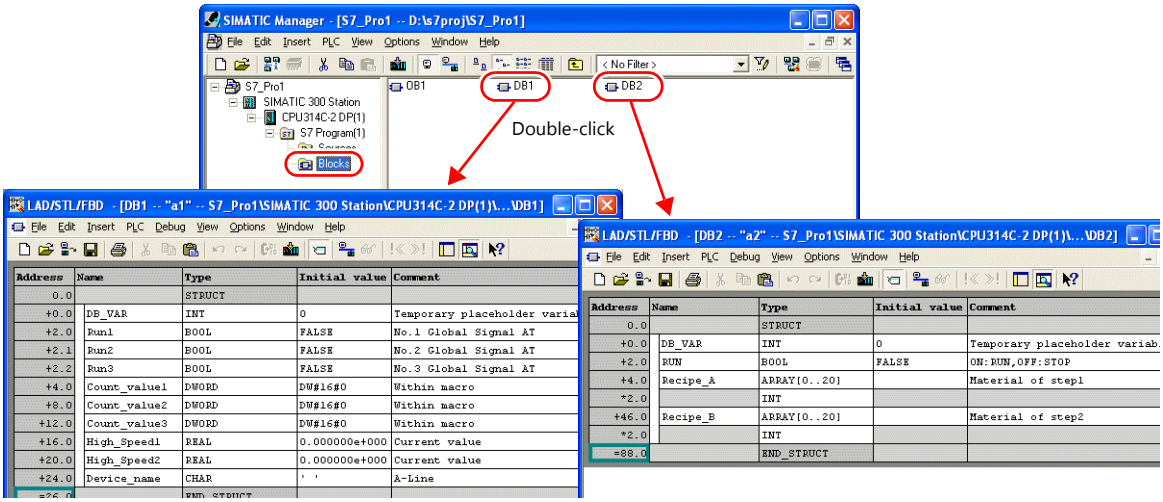
Model S7

When a project file (*.s7p) created in Siemens software "SIMATIC Manager (version 5.5 or 5.4)" is imported using V-SFT, names registered in data blocks "DBx" can be used as tags in V-SFT.

☞ For details on using PLC software, refer to the relevant PLC manual.

Procedure

This section describes the steps to import a project file (e.g. "test.s7p"), in which data blocks DB1 and DB2 are registered, to a screen program.

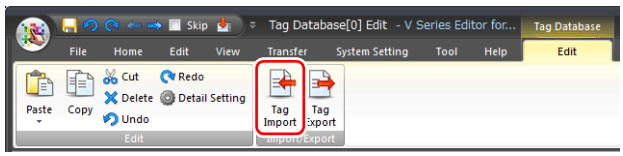


*** The following table lists the types of data that can be imported using V-SFT and the data types after importing.**

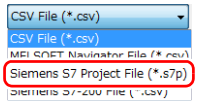
Siemens "DBxx"		Data Type for Tags in V-SFT
Data Type *	Length	
BOOL	1 bit	Bit
BYTE *	1 byte	Word
CHAR *	1 byte	
WORD	1 word	
S5TIME	1 word	
DATE	1 word	
INT	2 words	
DWORD	2 words	Double-word
DINT	2 words	
TIME	2 words	
TIME_OF_DAY	2 words	
REAL	2 words	Real number

* No other types of data can be imported with V-SFT. Data types BYTE and CHAR (bytes) are imported as word device memory. If any odd bytes are registered in the PLC software, the data cannot be imported.

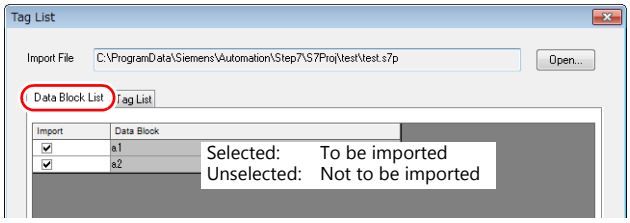
1. Start V-SFT and open the screen program.
   Click [Home] → [Registration Item] → [Tag Database] to display the [Tag Database Edit] window.
2. Click [Edit] → [Tag Import].



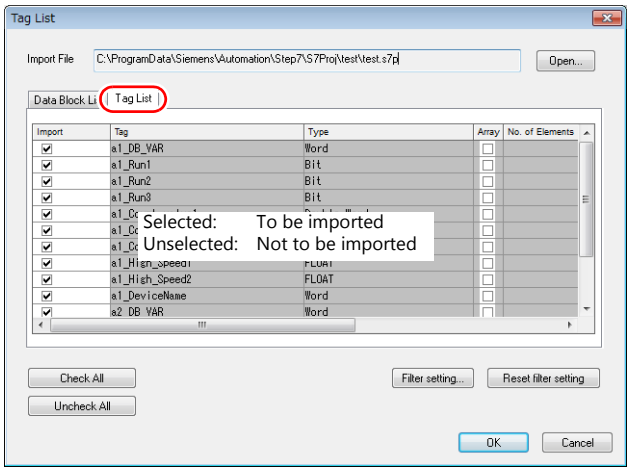
3. The [Open] window is displayed.
   Specify “Siemens S7 Project File (*.s7p)” for [Files of type].
   Select the desired project file (e.g. “test.s7p”) and click [Open].



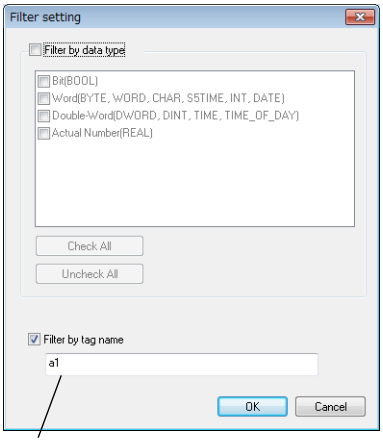
4. The [Tag List] window is displayed. Select the tags to import.
   - [Data Block List]: Displayed block by block (data block “DBx”)



   - [Tag List]: All tags displayed_

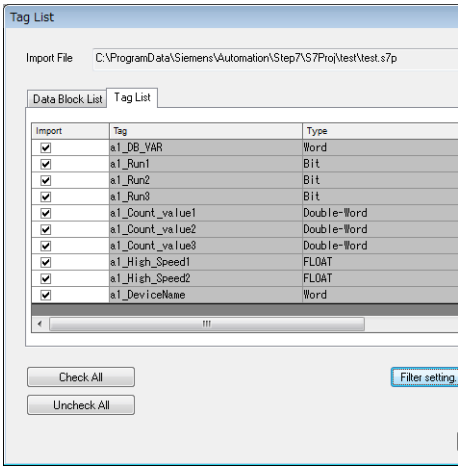


* When specifying further search criteria, go to [Filter setting]. Only tags that match the specified data type, data block name, or tag name will be displayed in the [Tag List] window.



A one-byte space is treated as an OR condition.
(Case-sensitive)

Filtering out “a1”

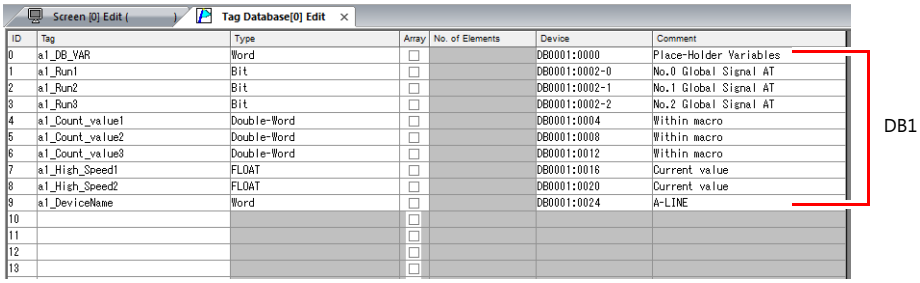


5. Click [OK].

The contents of the file are registered as tags in the “tag database edit” window. Types ([Type]) are specified for individual device memory addresses.

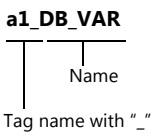
This completes the import procedure.

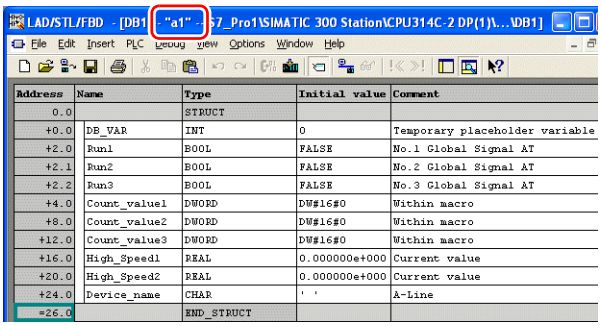
Example: Only DB1 imported



ID	Tag	Type	Array	No. of Elements	Device	Comment
0	a1_DB_VAR	Word	☐		DB0001:0000	Place-Holder Variables
1	a1_Run1	Bit	☐		DB0001:0002-0	No.0 Global Signal AT
2	a1_Run2	Bit	☐		DB0001:0002-1	No.1 Global Signal AT
3	a1_Run3	Bit	☐		DB0001:0002-2	No.2 Global Signal AT
4	a1_Count_value1	Double-Word	☐		DB0001:0004	Within macro
5	a1_Count_value2	Double-Word	☐		DB0001:0008	Within macro
6	a1_Count_value3	Double-Word	☐		DB0001:0012	Within macro
7	a1_High_Speed1	FLOAT	☐		DB0001:0016	Current value
8	a1_High_Speed2	FLOAT	☐		DB0001:0020	Current value
9	a1_DeviceName	Word	☐		DB0001:0024	A-LINE
10			☐			
11			☐			
12			☐			
13			☐			

*** Periods “.” cannot be used with tags. If any tag includes a period, the period is converted to an underscore “_”.**
A tag name with an underscore “_” registered in a SIMATIC Manager data block (DBxx) is added to the top of each tag.





Address	Name	Type	Initial value	Comment
0.0		STRUCT		
+0.0	DB_VAR	INT	0	Temporary placeholder variable
+2.0	Run1	BOOL	FALSE	No.1 Global Signal AT
+2.1	Run2	BOOL	FALSE	No.2 Global Signal AT
+2.2	Run3	BOOL	FALSE	No.3 Global Signal AT
+4.0	Count_value1	DWORD	DW#16#0	Within macro
+8.0	Count_value2	DWORD	DW#16#0	Within macro
+12.0	Count_value3	DWORD	DW#16#0	Within macro
+16.0	High_Speed1	REAL	0.000000e+000	Current value
+20.0	High_Speed2	REAL	0.000000e+000	Current value
+24.0	Device_name	CHAR	' '	A-Line
=26.0		END_STRUCT		

Notes

Note the following for importing CSV files.

- If a file to be imported includes a tag that is already registered, the existing tag is overwritten. Unregistered tags are registered to blank ID numbers (in the [Tag Database Edit] window).
- Device memory addresses unavailable on the TS cannot be imported.
  For details on device memory addresses available on the TS, refer to the TS2060 Connection Manual or the TS1000 Smart Connection Manual. Data types BYTE and CHAR (bytes) are imported as word device memory. Device memory registered to odd bytes in the PLC software cannot be imported.

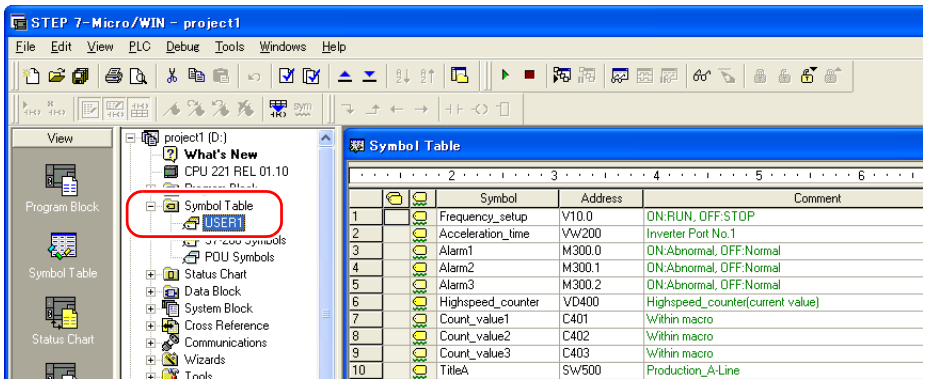
Model S7-200

When a CSV file copied from the Symbol Table in the software "SIMATIC STEP 7-Micro/WIN" for Siemens S7-200 is imported using V-SFT, the contents in the file can be used as tags.

*** For details on using PLC software, refer to the relevant PLC manual.**

Procedure

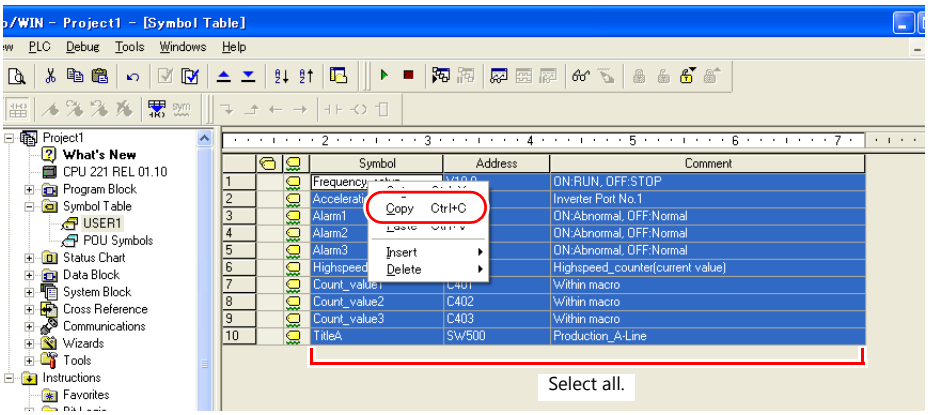
1. Start the software "SIMATIC STEP 7-Micro/WIN" for Siemens S7-200.
2. Open [Symbol Table].



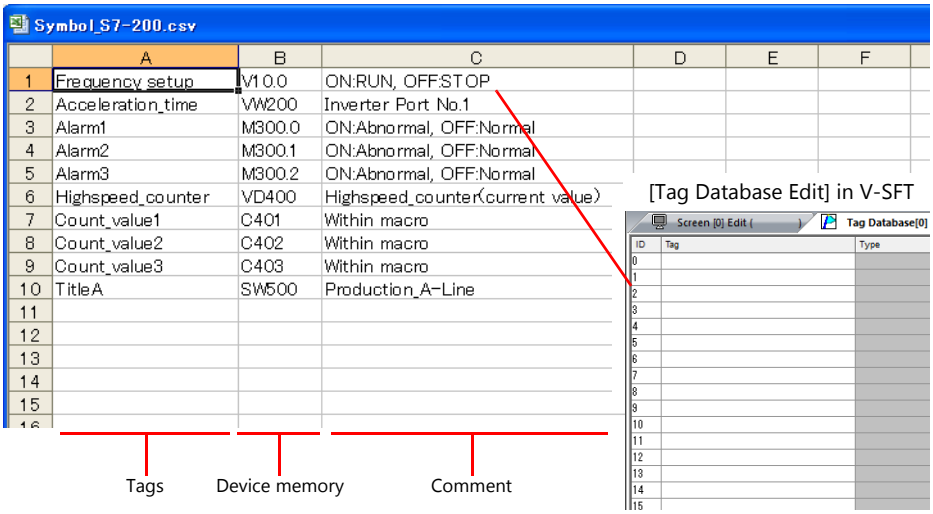
Only device memory addresses available on the TS can be imported. For details, refer to the TS2060 Connection Manual or the TS1000 Smart Connection Manual. Double-word device memory are imported as word device memory.

Device memory: VD → VW, ID → IW, QD → QW, MD → MW, SMD → SMW, SD → SW

3. Select all columns under [Symbol], [Address], and [Comment]. Right-click and select [Copy] from the right-click menu.

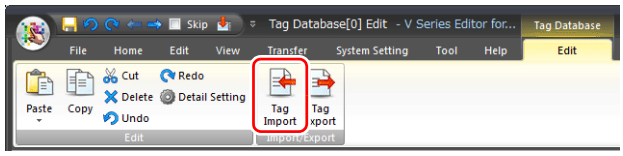


4. Start Excel. Paste the copied data to the worksheet from cell A1.

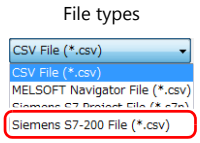


*** The first row on the Excel sheet corresponds to tag ID No. 0. The copied data on the worksheet is imported from its first row to the [Tag Database Edit] window. (65536 maximum)**

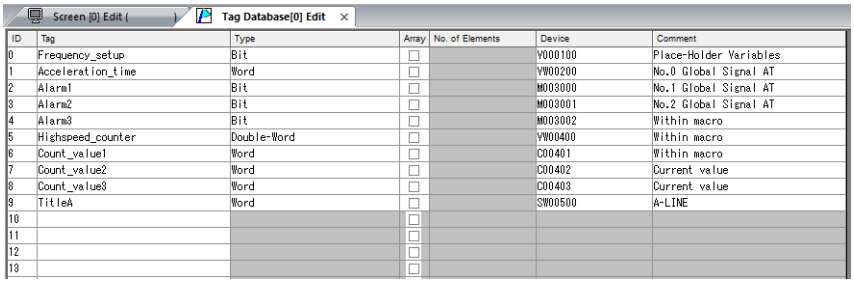
5. Click [File] → [Save As]. The [Save As] window is displayed.
6. Enter a filename. Select "CSV" for [Save as type] and click [Save].
7. Open the screen program. Click [Home] → [Registration Item] → [Tag Database] to display the [Tag Database Edit] window.
8. Click [Edit] → [Tag Import].



9. The [Open] window is displayed. Select the CSV file saved in step 6. Specify "Siemens S7-200 File (*.csv)" for [Files of type] and click [Open].



The contents of the file are registered as tags in the "tag database edit" window. Types ([Type]) are specified for individual device memory addresses.
This completes the import procedure.



ID	Tag	Type	Array	No. of Elements	Device	Comment
0	Frequency_setup	Bit			V000100	Place-Holder Variables
1	Acceleration_time	Word			VW00200	No.0 Global Signal AT
2	Alarm1	Bit			M003000	No.1 Global Signal AT
3	Alarm2	Bit			M003001	No.2 Global Signal AT
4	Alarm3	Bit			M003002	Within macro
5	Highspeed_counter	Double-Word			VW00400	Within macro
6	Count_value1	Word			C00401	Within macro
7	Count_value2	Word			C00402	Current value
8	Count_value3	Word			C00403	Current value
9	TitleA	Word			SW00500	A-LINE
10						
11						
12						
13						

Notes

Note the following for importing CSV files.

- IDs that already have tags are overwritten with the imported data.
- Device memory addresses unavailable on the TS cannot be imported. If an unavailable device memory address is included, the row is left blank.
  For details on device memory addresses available on the TS, refer to the TS2060 Connection Manual or the TS1000 Smart Connection Manual. Note that double-word device memory are imported as word device memory.
  Device memory: VD → VW, ID → IW, QD → QW, MD → MW, SMD → SMW, SD → SW

7.6 Notes

Tag Settings

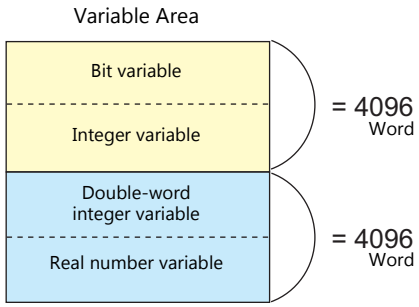
Tags cannot be specified for the following items.

- [Screen Setting] → [PLC Device Transfer]
- Device memory map (transfer source device memory, transfer destination device memory 1, transfer destination device memory 2, control device memory)
- Modbus device memory table

"Tag" Variable Capacity

When "tag" variables are registered in the [Tag Database Edit] window, the variable area in the MONITOUCH is used. Since the capacity of the variable area is limited, check the word count currently used, and be careful not to exceed the capacity.

Capacity of Variable Area

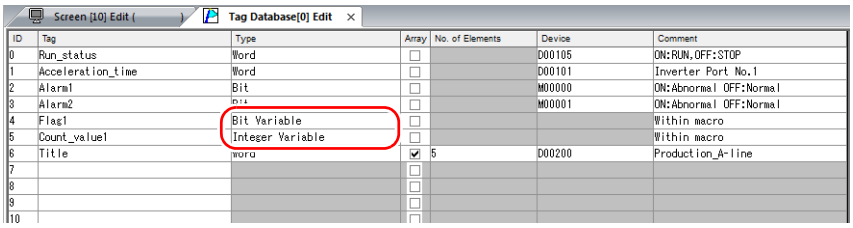


Variable Type	Data Type	Capacity
Bit variable *	1-bit data	4096 word
Integer variable	1-word data	
Double-word integer variable	Double-word data	4096 word
Real number variable	32-bit single precision real number format	

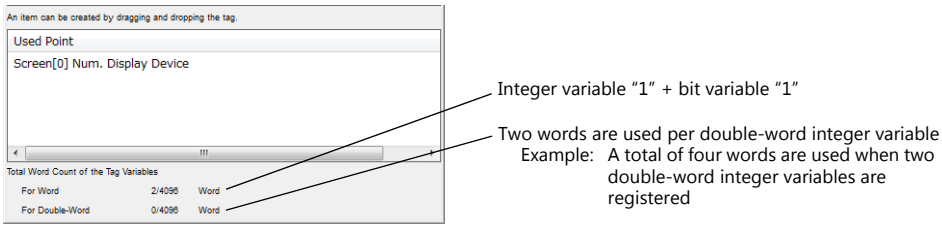
* If the bit variable is specified in array format, 1 word is occupied in the variable area even if "16" or a smaller number is specified for the number of elements.

Checking the Capacity of "Tag" Variable

Check the capacity when the "tag" variables are registered as shown below.



2 words are occupied in the variable area.



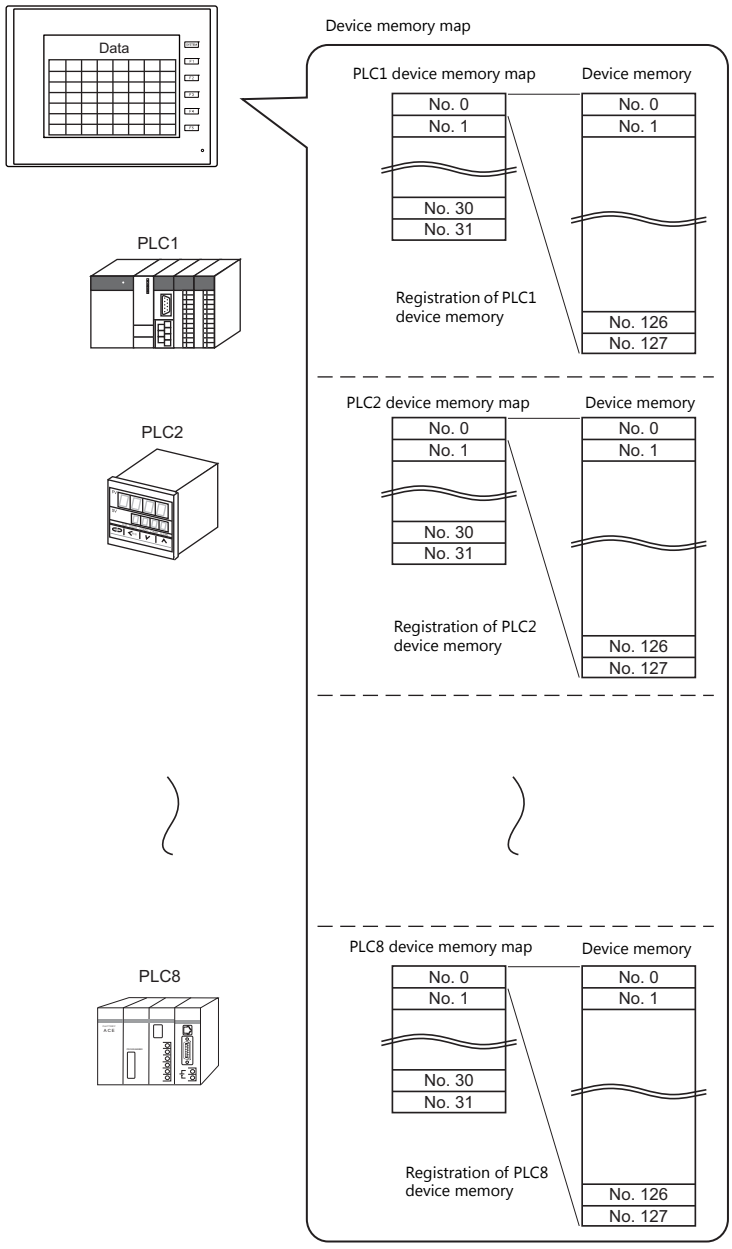
☞ For details on status list operations, refer to "7.4 Tag Status List".

The value is indicated in red when it exceeds the maximum value. If the tag indicated in red is used on the screen, the message "Error: 46" appears and the unit will not run. Set a value smaller than the maximum.

8 Device Memory Map

8.1 Overview

- The TS unit contains device memory map numbers 0 to 31 (32 total) with respect to a single logical port. 128 addresses can be registered to a single device memory map and batch transfer of addresses can be performed between each equipment.



- Functions that use device memory maps
  - Periodical reading

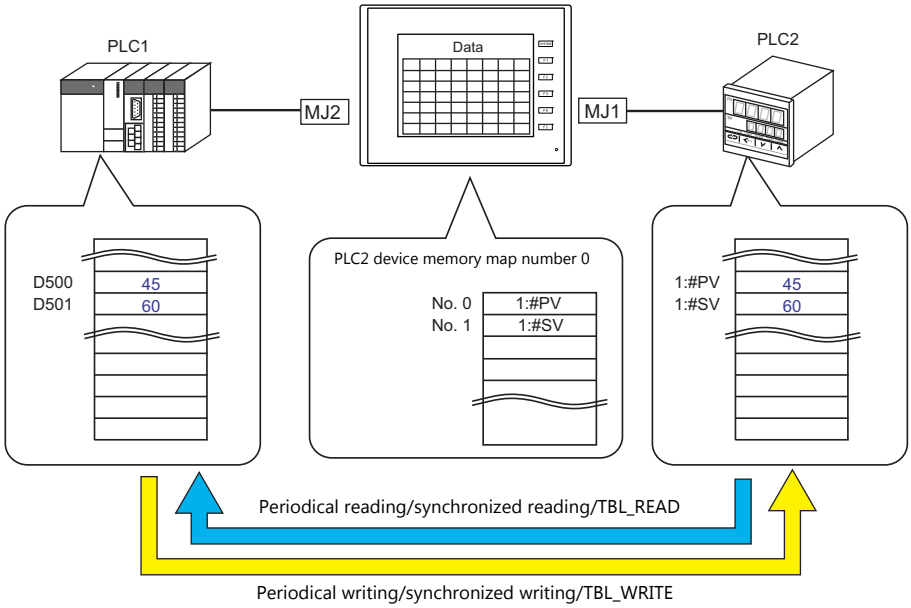
    Data in device memory addresses registered on a device memory map is periodically transferred to other equipment. ("8.3 Periodical Reading" page 8-7)
  - Periodical writing

    Data in other equipment is periodically transferred to device memory addresses registered on a device memory map. ("8.7 Control Device" page 8-12)
  - Synchronized reading

    Data in device memory addresses registered on a device memory map is transferred to other equipment when the relevant bit turns ON. ("8.4 Synchronized Reading" page 8-8)
  - Synchronized writing

    Data in other equipment is transferred to device memory addresses registered on a device memory map when the relevant bit turns ON. ("8.6 Synchronized Writing" page 8-11)
  - Macros (TBL_READ, TBL_WRITE)

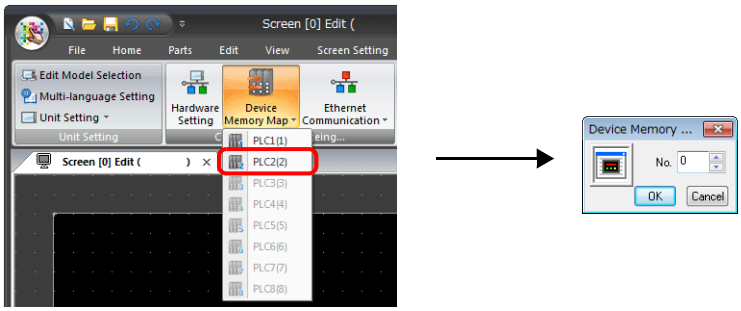
    Data in device memory addresses registered on a device memory map is transferred using the "TBL_READ" and "TBL_WRITE" macro commands. ("8.8 TBL_READ/TBL_WRITE" page 8-13)"8.9 System Device Memory" page 8-14



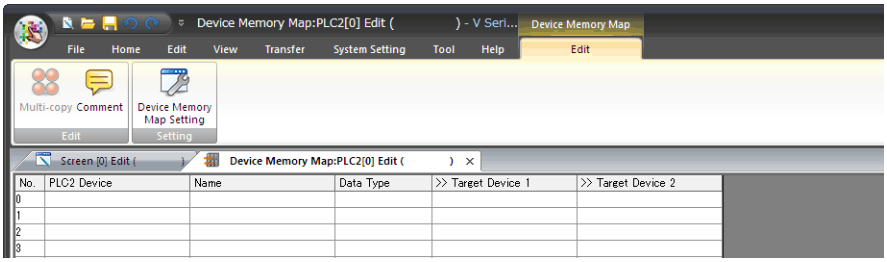
8.2 Editing Device Memory Maps

8.2.1 Starting

1. Click [System Setting] → [Device Memory Map] → [PLCn].
   The [Device Memory Map: PLCn] window is displayed.



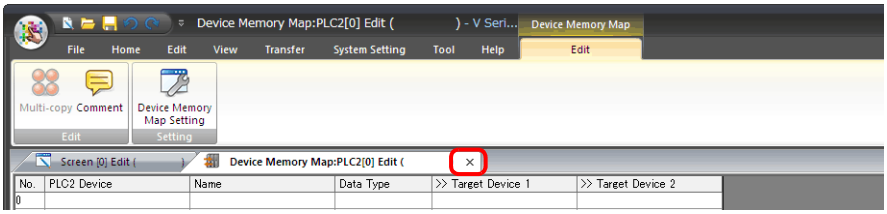
2. Select a device memory map number and click [OK].
   The [Device Memory Map Edit] window is displayed.



A device memory map has numbers 0 to 31 (32 total) with respect to a single logical port and 128 addresses can be registered to each device memory map.

8.2.2 Quitting

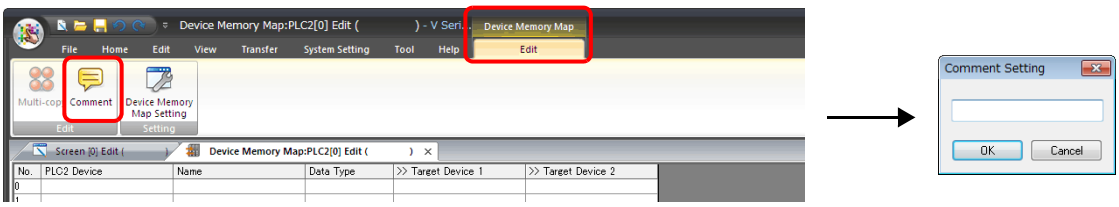
Click the close button.



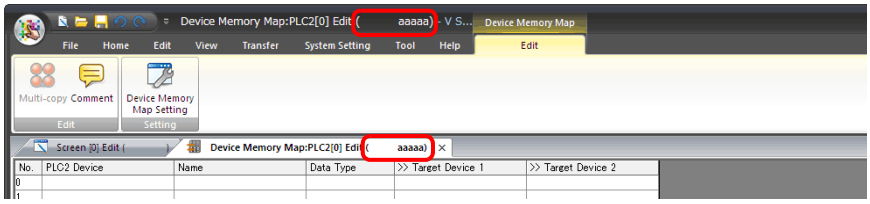
8.2.3 Comment Settings

A comment can be set to each device memory map.

1. With the device memory map displayed, click [Edit] → [Comment]. The [Comment Setting] window is displayed.

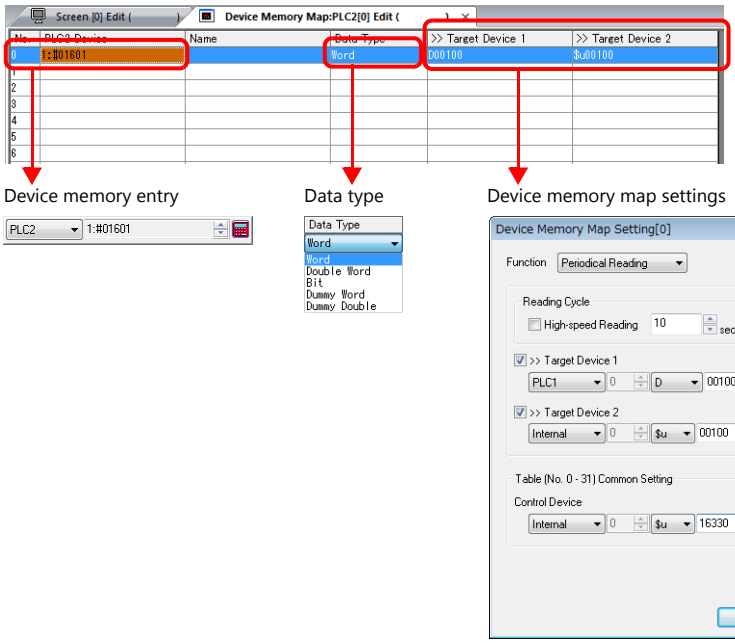


2. Enter a comment and click the [OK] button. The comment is displayed.



8.2.4 Editing the Device Memory Map

Double-click a cell to display the settings window.

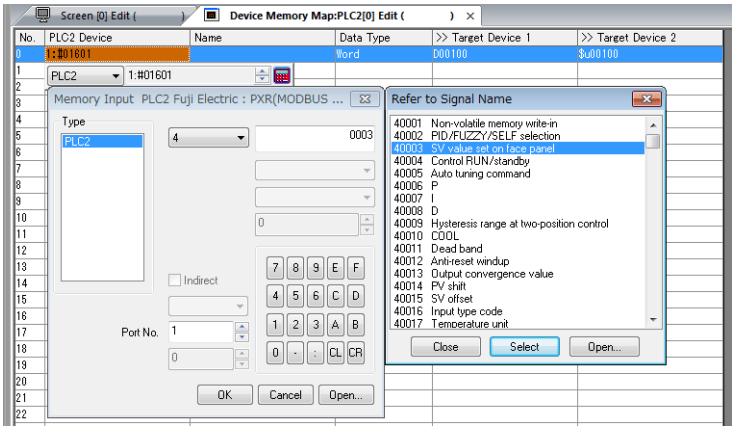


* The [Device Memory Map Setting] window can also be displayed by clicking [Edit] → [Device Memory Map Setting] with the device memory map displayed.

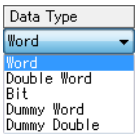
1. Device memory entry

   Set the device memory for transfer. If the [Device Memory Map Edit] window for PLC2 is open, register PLC2 device memory.

   The following figure shows the list view.



2. Data type



Item	Description
Word	Data is handled as single-word numerical data. Data is transferred based on the [Communication Setting] → [Code] setting of each logical port. *1
Double Word	Data is handled as two-word numerical data. Data is transferred based on the [Communication Setting] → [Code] setting of each logical port. *1
Bit	Data is handled as single-word bit information. Data is transferred as is without conversion. *2
Dummy Word Dummy Double	The transfer source/target device memory addresses are automatically registered with consecutive numbers. If there is an address to be skipped, leaving it not configured (blank) will result in either a dummy word or double word being assigned. When reading: "0" is always stored in the transfer target device memory. Cannot be used for any other purpose. When writing: The transfer source device memory can be used for other purposes.

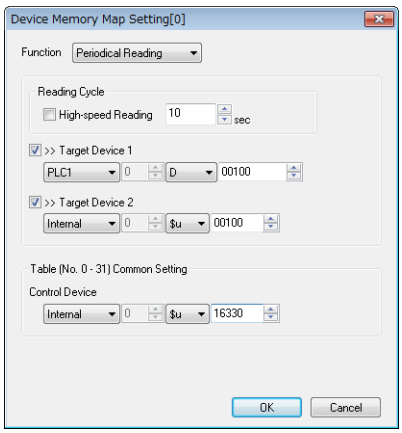
*1 When Word or Double Word is selected:
The internal device memory of the TS unit are always handled as "DEC (with sign)".

		Code	Bit status
Reading	Transfer source PLC	Communication setting BCD	MSB 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0 LSB 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0
	TS internal device memory	DEC	MSB 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0 LSB 0 0 0 0 0 0 0 0 0 0 0 0 1 0 1 0
	Transfer target PLCm	Communication setting DEC	MSB 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0 LSB 0 0 0 0 0 0 0 0 0 0 0 0 1 0 1 0
		Communication setting BCD	MSB 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0 LSB 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0

*2 When Bit is selected:

		Code	Bit status
Reading	Transfer source PLC	Communication setting BCD	MSB 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0 LSB 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0
	TS internal device memory	DEC	
	Transfer target PLCm	Communication setting DEC BCD	

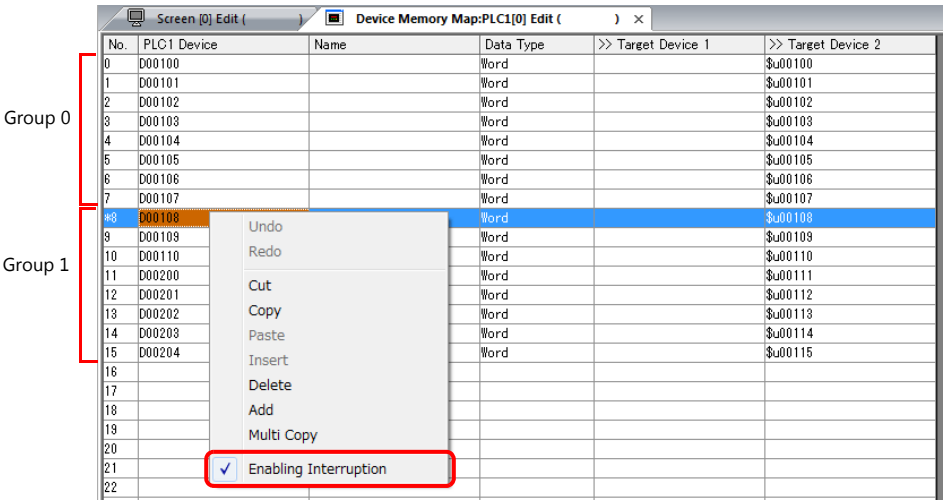
3. Device memory map settings
Set the purpose of each device memory map.
- TBL_READ/TBL_WRITE → page 8-13
- Periodical reading → page 8-7
- Synchronized reading → page 8-8
- Periodical writing → page 8-10
- Synchronized writing → page 8-11



8.2.5 Permitting Interruption

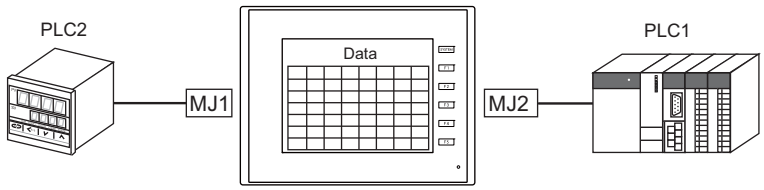
Interruption can be permitted by right-clicking on the relevant device memory map number and selecting [Enabling Interruption] on the menu.
When interruption is permitted, an asterisk mark (*) is shown next to the device memory map number. Switch output, cycle reading, trend/alarm reading operations can be performed during device memory map processing.

Operation for the following settings
Reading group 0 (numbers 0 to 7)
↓
Switch output, cycle reading, trend/alarm reading
↓
Reading group 1 (numbers 8 to 15)

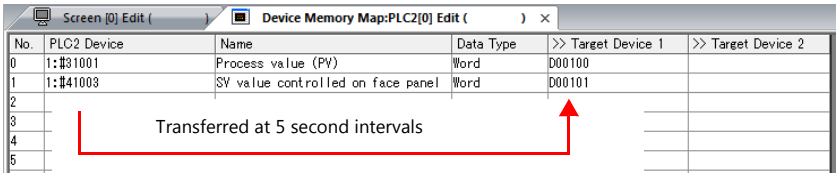


8.3 Periodical Reading

Data in a device memory address registered on a device memory map is transferred to the targeted address at the timing set for [Reading Cycle].



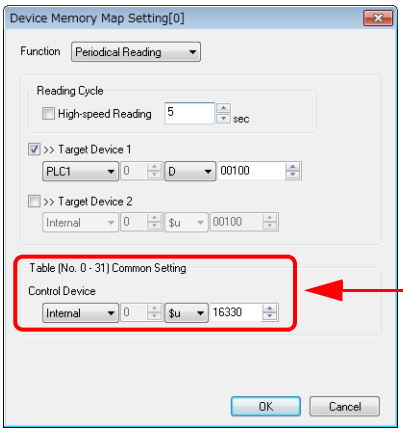
PLC2 device memory map number 0



Settings

Settings required for periodical reading

- "Editing Device Memory Maps" (page 8-3)
- "Device Memory Map Settings"



Disabled when [Periodical Reading] is selected

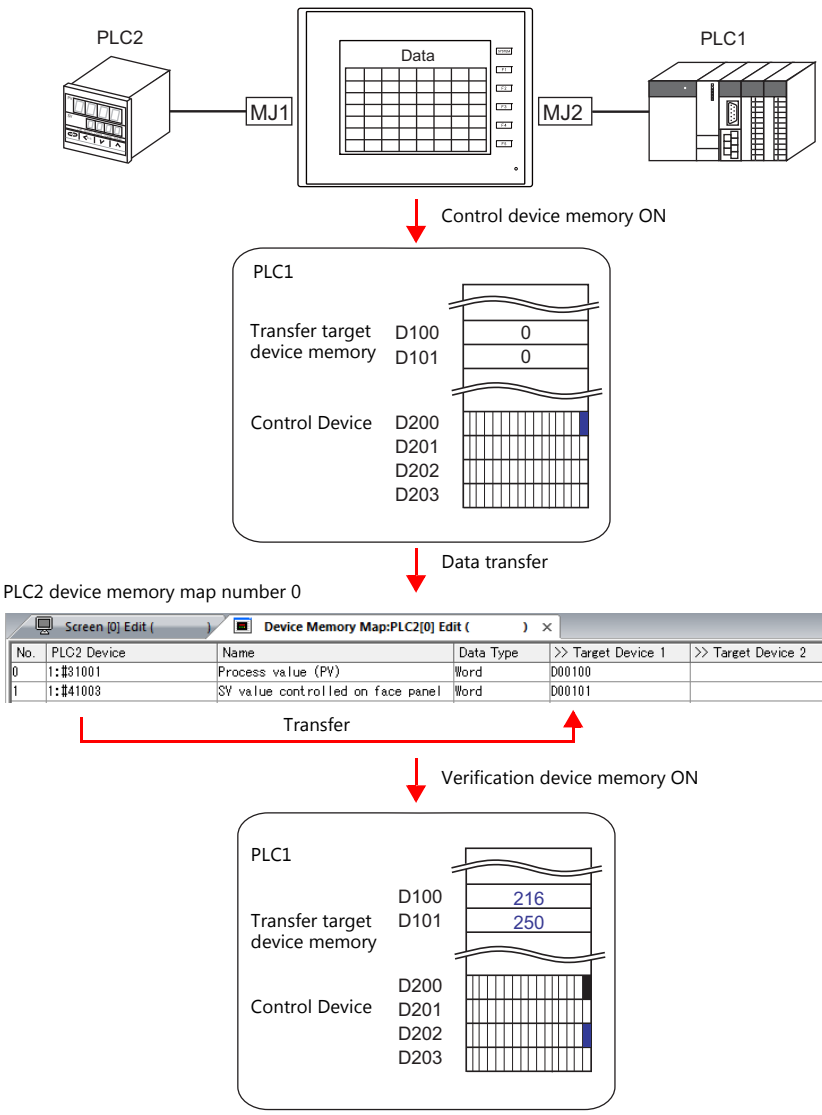
Item	Description
Function	Periodical reading
Reading Cycle	Set the cycle for periodical data reading.

[High-speed Reading] checkbox	Reading Cycle	
	Setting Range	Unit
Unselected	1 - 3600	1s
Selected	1 - 3600	100ms

Target Device 1 Target Device 2	Set the device memory address for storing the read data.
Control Device	Disabled when [Periodical Reading] is selected.

8.4 Synchronized Reading

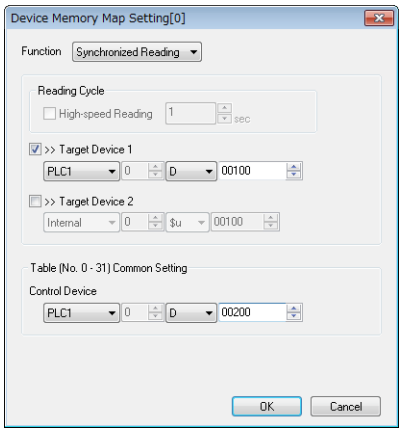
Data in a device memory address registered on a device memory map is transferred to the targeted address when the relevant bit changes from 0 to 1.



Settings

Settings required for synchronized reading

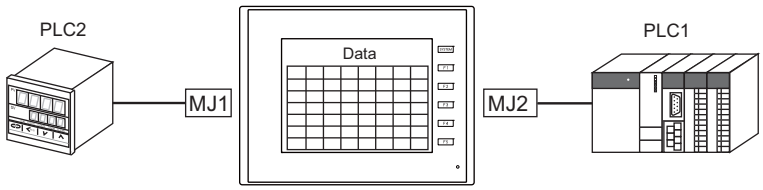
- "Editing Device Memory Maps" (page 8-3)
- "Device Memory Map Settings"



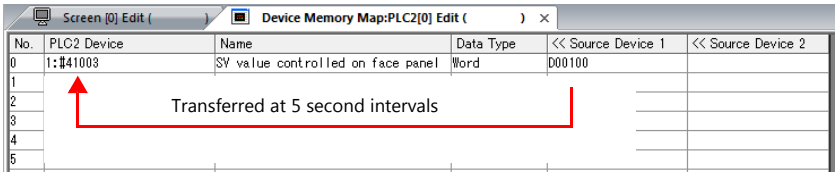
Item	Description
Function	Synchronized reading
Target Device 1 Target Device 2	Set the device memory address for storing the read data.
Control Device	Set the device memory address that serves as the trigger for synchronized reading. Four words are used for an address common to device memory map numbers 0 to 31. For details, refer to "Control Device" page 8-12.

8.5 Periodical Writing

Data in a source device memory address is transferred to the address registered on the device memory map at the timing set for [Writing Cycle].



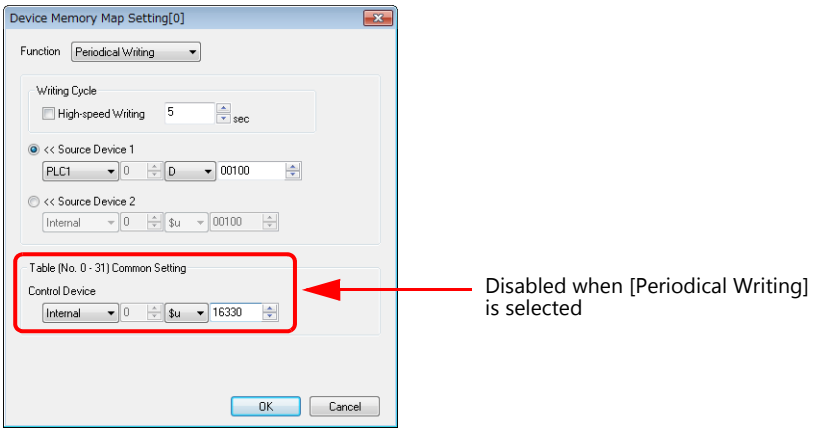
PLC2 device memory map number 0



Settings

Settings required for periodical writing

- "Editing Device Memory Maps" (page 8-3)
- "Device Memory Map Settings"



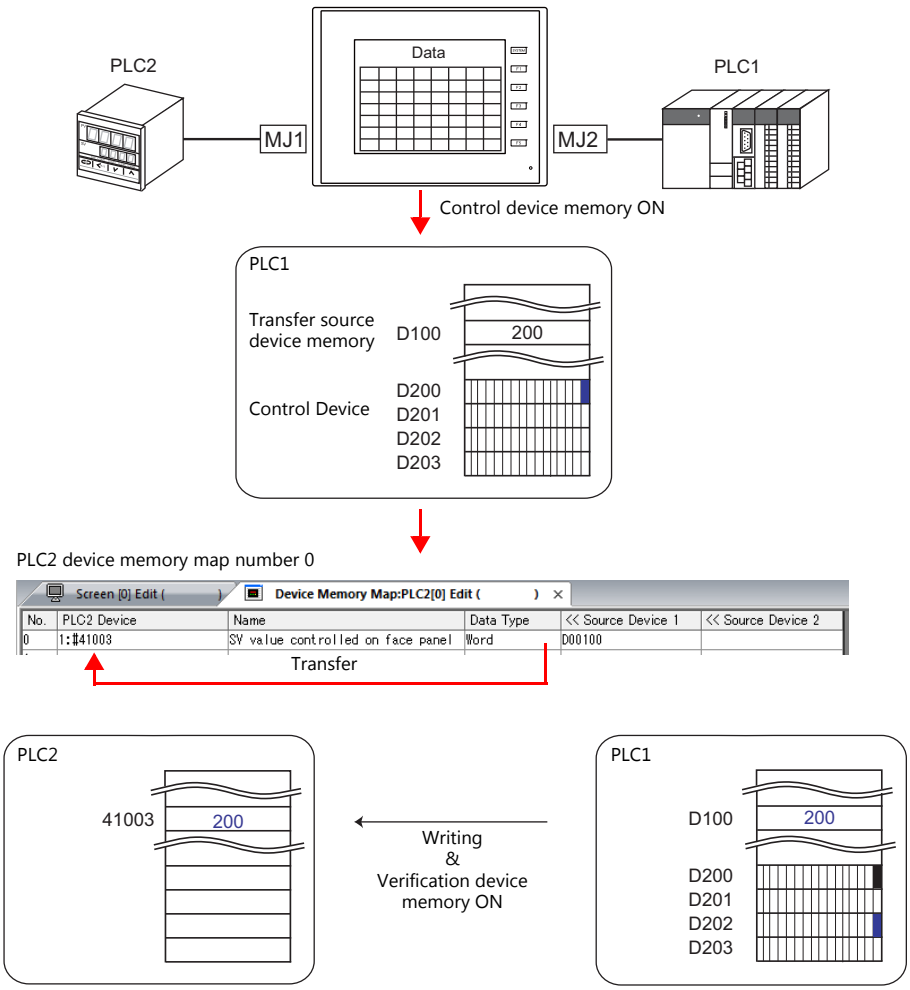
Item	Description
Function	Periodical writing
Periodical Writing	Set whether to perform periodical data writing.

[High-speed Reading] checkbox	Reading Cycle	
	Setting Range	Unit
Unselected	1 - 3600	1s
Selected	1 - 3600	100ms

Source Device 1 Source Device 2	Set the device memory address of the source data to transfer.
Control Device	Disabled when [Periodical Writing] is selected.

8.6 Synchronized Writing

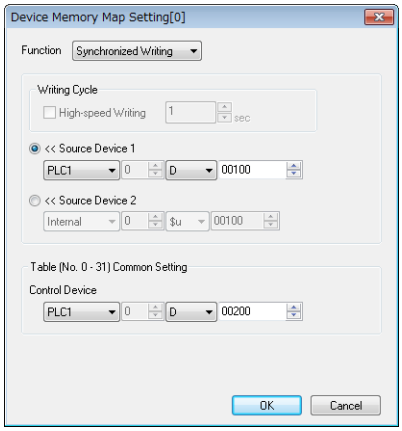
Data in a source device memory address is transferred to the address registered on the device memory map when the control device memory changes from 0 to 1.



Settings

Settings required for synchronized writing

- "Editing Device Memory Maps" (page 8-3)
- "Device Memory Map Settings"



Item	Description
Function	Synchronized writing
Source Device 1 Source Device 2	Set the device memory address for storing data from the transfer source.
Control Device	Set the device memory address that serves as the trigger for synchronized writing. Four words are used for an address common to device memory map numbers 0 to 31. For details, refer to "Control Device" page 8-12.

8.7 Control Device

This type of device memory is used when synchronized reading or synchronized writing is performed.
Four consecutive words are used from control device memory n.
The control device memory can be changed via [System Setting] → [Device Memory Map] → [PLCn] → [Device Memory Map: PLCn] → [Edit] → [Device Memory Map Setting].

Control Device	Description	Device Memory Type
n	Command device memory for reading/writing	→ TS
n+1		
n+2	Verification device memory for reading/writing	← TS
n+3		

Reading/Writing Command Device Memory (Control device memory n, n + 1)

One bit is assigned to each device memory map.
Reading and writing for the specified device memory map is executed according to the change in bit status from 0 to 1.

n

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0

← Bit number

Device memory map numbers 0 to 15

n + 1

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16

← Bit number

Device memory map numbers 16 to 31

Reading/Writing Verification Device Memory (Control device memory n + 2, n + 3)

One bit is assigned to each device memory map.
The turning ON (0 → 1) of the command device memory is recognized, and when the reading/writing finishes, the corresponding bit of the verification device memory turns ON (0 → 1).
Also, when the turning OFF (1 → 0) of the command device memory is recognized, the verification bit of the corresponding device memory map number turns OFF (1 → 0).

n + 2

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0

← Bit number

Device memory map numbers 0 to 15

n + 3

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16

← Bit number

Device memory map numbers 16 to 31

- Synchronized reading
  Only one address needs to be successfully read among the addresses registered on the device memory map for the verification device memory to turn ON.
  If no addresses were successfully read, the verification bit does not turn ON.
- Synchronized writing
  Regardless of whether writing succeeds or fails, the verification bit turns ON after writing is finished.

8.8 TBL_READ/TBL_WRITE

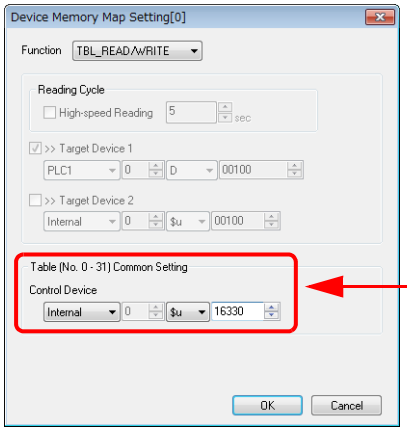
Data in device memory addresses registered on a device memory map is transferred at once using the "TBL_READ" and "TBL_WRITE" macro commands.

Settings

Settings required for device memory map transfer

- "Editing Device Memory Maps" (page 8-3)
- Device memory map settings
- Macros (TBL_READ/TBL_WRITE)

Device Memory Map Settings



Disabled when TBL_READ/TBL_WRITE is selected

Item	Description
Function	TBL_READ/TBL_WRITE * Transfer is possible using a macro even for device memory maps selected for other functions.
Control Device	Disabled when TBL_READ/TBL_WRITE is selected.

Macros

Register a switch ON macro, interval timer etc. For details on macro commands, refer to the Macro Reference Manual.

- TBL_READ
  Transfers data in device memory addresses registered on a device memory map to device memory of other equipment.
- TBL_WRITE
  Transfers data from other equipment to a device memory address registered on a device memory map.

8.9 System Device Memory

This section explains the system device memory addresses of the TS that are related to device memory maps.

$Pn (n=1 - 8)	$s*1	Description	Device Type
493	762 (PLC2)	Device memory map reading prohibition flag 0: Periodical reading/synchronized reading executable Other than 0: Periodical reading/synchronized reading stopped	→ TS
494	763 (PLC2)	Device memory map TBL_READ/TBL_WRITE macro forced execution Macro operation setting when a port is not communicating 0: Do not execute the macro with respect to all ports Other than 0: Execute the macro with respect to connected ports	
495	764 (PLC2)	Device memory map writing prohibition flag 0: Periodical writing/synchronized writing executable Other than 0: Periodical writing /synchronized writing stopped	

*1 When controlling a device memory map using $s762, $s763, or $s764, set [PLC Properties] → [Detail] → [System memory ($s) V7 Compatibility] to [Yes] for PLC2. In this case, $P2:493/494/495 cannot be used.

$Pn:493, 495

These system device memory addresses can be used to temporarily stop periodical reading/synchronized reading or periodical writing/synchronized writing set in the device memory map.

$Pn:493

- 0: Periodical reading/synchronized reading is always executed.
- Other than 0: Periodical reading/synchronized reading is stopped.

$Pn:495

- 0: Periodical writing/synchronized writing is always executed.
- Other than 0: Periodical writing/synchronized writing is stopped.

- Example: Periodical reading
  When PLC2 device memory is accessed by a macro, macro completion is delayed when periodical reading of the device memory map is executed (as shown in figure A). To avoid this, periodical reading can be stopped temporarily using $P2:493 (as shown in Figure B).

Figure A

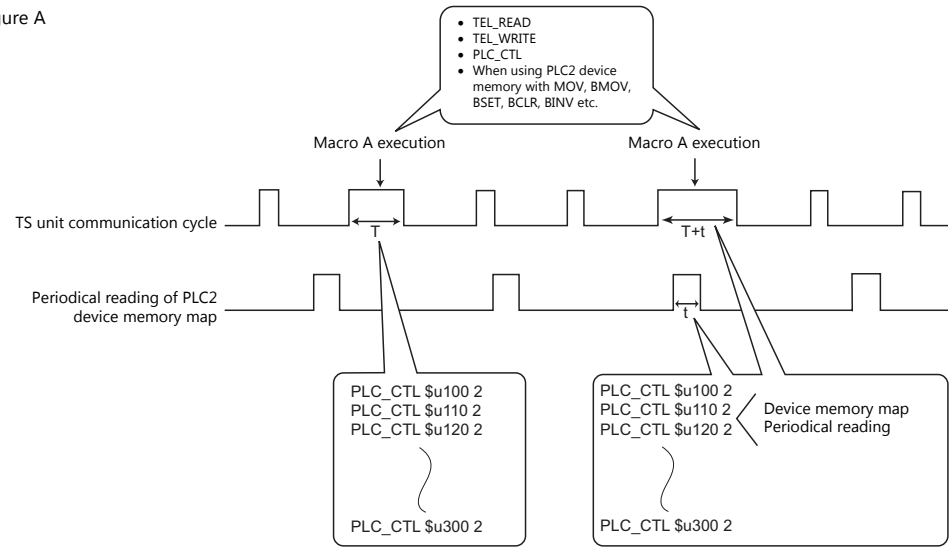
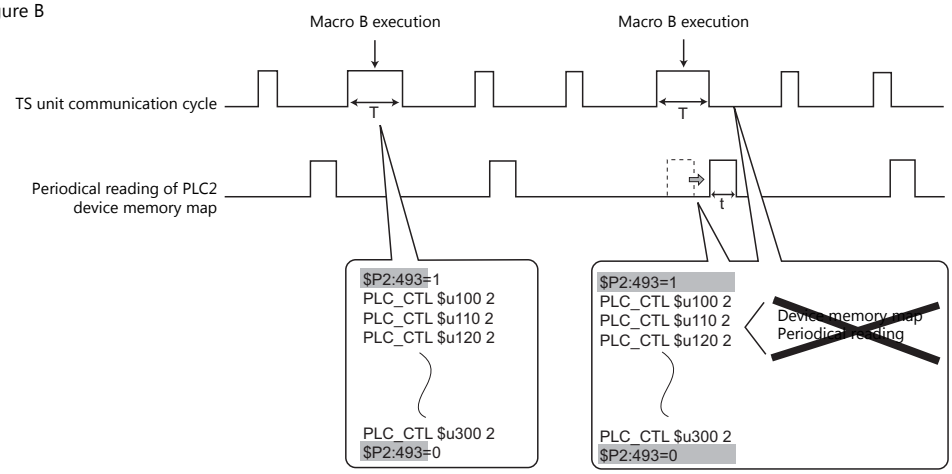


Figure B

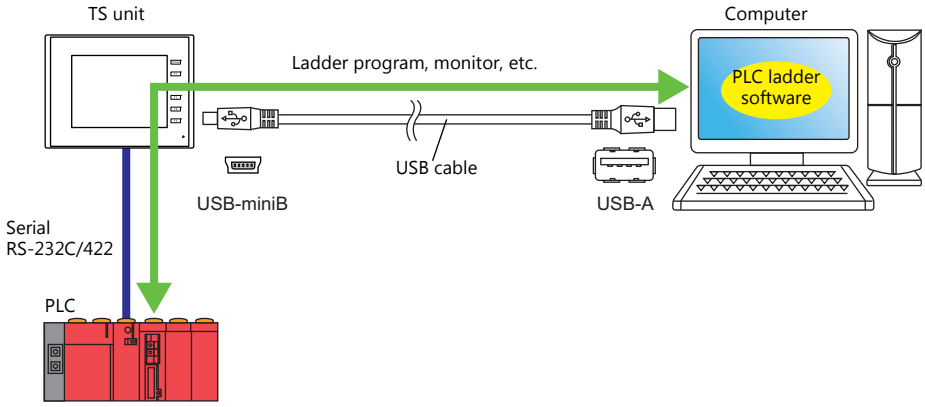


9 Ladder Transfer

9.1 Overview

- PLC ladder programs can be written and monitored via the TS unit.

  Example: USB connection



☞ For details on the configuration procedure, refer to .

- USB connection: "9.3 Ladder Transfer via USB" page 9-9
- Ethernet connection: "9.4 Ladder Transfer via Ethernet (TSi Only)" page 9-14
- Serial connection: "9.5 Serial Ladder Transfer (TS2060i/TS2060 Only)" page 9-19

- The ladder transfer function is only available when the PLC targeted for connection is registered as [PLC1]. In addition, [Hardware Setting] → [PLC Properties] → [Communication Mode] must be set to [1:1]. This function cannot be used for 1:n connections (multi-drop), multi-link communication, or multi-link2 communication.
- Simultaneous ladder communication with multiple PLCs by one computer is not possible. Be sure to specify the ladder transfer port of the PLC to communicate with using the "LadderComOp" ladder transfer tool.

9.1.1 Operating Environment

Ladder Transfer Ports

Model	Applicable Ports
TS2060i	USB-B / LAN / MJ1 / MJ2
TS2060	USB-B / MJ1 / MJ2
TS1100Si / TS1070Si	USB-B / LAN
TS1070S	USB-B

Supported PC Operating Systems

Windows 2000 / XP / Vista / 7 / 8 / 8.1 / 10

Required Applications

Connection Method	Application
USB connection	V-SFT Ver. 6 / LadderComOp Ver. 2
Ethernet connection	
Serial connection	V-SFT Ver. 6

Supported PLC Models

- The ladder transfer function is only available when the PLC targeted for connection is registered as [PLC1]. In addition, [Hardware Setting] → [PLC Properties] → [Communication Mode] must be set to [1:1]. This function cannot be used for 1:n connections (multi-drop), multi-link communication, or multi-link2 communication.
- For details on compatible PLC models, refer to the TS2060 Connection Manual or the TS1000 Smart Connection Manual.

PLC models that support the ladder transfer function are listed below.

Manufacturer	PLC Name Shown in Editor	Connection CPU/Port	TS Port		
			MJ1, MJ2	USB B *1	Built-in LAN *2
MITSUBISHI ELECTRIC	A series CPU *3	A2A, A3A A2U, A3U, A4U A2US(H) A1N, A2N, A3N A3V, A73 A3H, A3M A0J2H A1S(H), A1SJ(H) A2S(H) A2CCPUC24 A1FX	○ *4	○	○
	QnH (Q) series CPU	Q02(H), Q06H	○	○	○
	QnU series CPU	Q00UJ, Q00U, Q01U Q02U, Q03UD, Q04UDH Q06UDH, Q10UDH, Q13UDH Q20UDH, Q26UDH	○	○	○
	Q00J/00/01 CPU	Q00J, Q00, Q01	○	○	○
	QnH (Q) series CPU (Multi CPU)	Q02(H), Q06H	○	○	○
	Q170MCPU (Multi CPU)	Q170M	○	○	○
	FX series CPU	FX1/2 *3	×	×	×
		FX0N	○	○	○
	FX2N/1N series CPU	FX2N, FX1N, FX2NC	○	○	○
	FX1S series CPU	FX1S	○	○	○
	FX-3U/3UC/3G series CPU	FX-3U, FX-3UC, FX-3G	○	○	○

Manufacturer	PLC Name Shown in Editor	Connection CPU/Port	TS Port		
			MJ1, MJ2	USB B *1	Built-in LAN *2
OMRON	SYSMAC C	All ports	○	×	×
	SYSMAC CS1/CJ1		○	○	○
Panasonic	FP Series (RS232C/422)	FP0 tool port	○	○	○
		FP2 tool port FP2SH tool port	○	○	○
		FPΣ tool port	○	○	○
		FP-e tool port	○	○	○
		FP-X tool port	○	○	○
	FP7 Series (RS232C/422)	All ports	○	○	○
Yokogawa Electric	FA-M3	Tool port on CPU	○	○	○
	FA-M3R				
	FA-M3V				
Fuji Electric	SPB (N mode) & FLEX-PC CPU	FLEX-PC CPU port	○	×	×
		NJ-B16 RS-232C port			
		NW0Pxx CPU port			
	MICREX-SX SPH/SPB CPU	NP1Px-xx (SPH)	○	○	○
		NW0Pxx (SPB)			
Allen-Bradley	SLC500	SLC5/03 or later, Channel 0	○	×	×
Siemens *1 *5	S7-200PPI	S7-200 PPI port	○*1 *5	○*1 *5	○*1 *5
	S7-300/400MPI	S7-300/400 MPI port	○*1 *5	×	○*1 *5
SAMSUNG	SECNET	N70 COM port (RS-422)	○	×	×
		N70 α COM port			
		N700 COM port (RS-422)			
		N700 α TOOL port			
		N7000 COM port (RS-422)			
		N7000 α COM1			
		NX70 TOOL port			
		NX700 TOOL port			
RS Automation	N7/NX Series (70/700/750/CCU)	N70 COM port (RS-422)	○	×	×
		N70 α COM port			
		N700 COM port (RS-422)			
		N700 α TOOL port			
		N7000 COM port (RS-422)			
		N7000 α COM1			
		NX70 TOOL port			
		NX700 TOOL port			

*1 Ladder communication is only available in RUN mode. Ladder communication cannot be performed on the Main Menu screen.
*2 Only supported on theTSi.
*3 Connection with the TS1000 Smart not possible.
*4 Only supported for the TS2060i unit with DUR-00 installed. This also uses both MJ1 and MJ2 so the dedicated "V6-CP-A" cable is required.
*5 The following messages may be displayed at the top left of the screen on the TS unit during access (mainly when transferring a large amount of data, such as programs) to the Siemens S7-200 PPI and S7-300/400 MPI. The TS unit automatically returns to normal operation after access is complete.
- PLC1 Access denied by Loader
- PLC1 In Reset Service

9.2 LadderComOp Ver. 2

The “LadderComOp” ladder transfer tool is required when connecting the TS unit and PC via USB or Ethernet in order to monitor or write PLC ladder programs.

9.2.1 LadderComOp Installation

Acquiring the LadderComOp Software

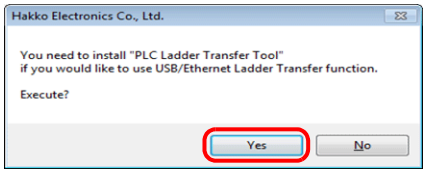
- On the V-SFT Ver. 6 CD-ROM, or download the latest update from our website.
- Download “LadderComOp.exe” from our website.

☞ Our website URL: http://www.monitouch.com

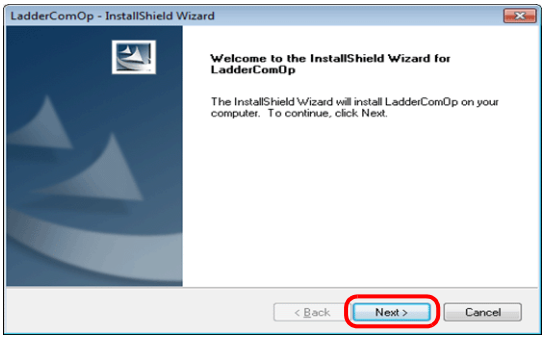
Installation

If installing LadderComOp during V-SFT Ver. 6 installation, perform the procedure below from step 1.
If installing LadderComOp after downloading “LadderComOP.exe” from our website, perform the procedure below from step 2.

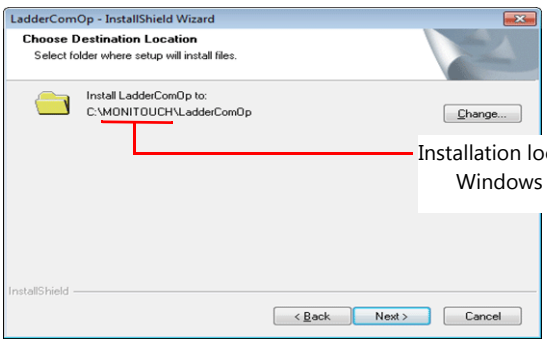
1. After V-SFT Ver. 6 has been installed or updated, the following dialog box is displayed.
   Click the [Yes] button.



2. Click the [Next] button.

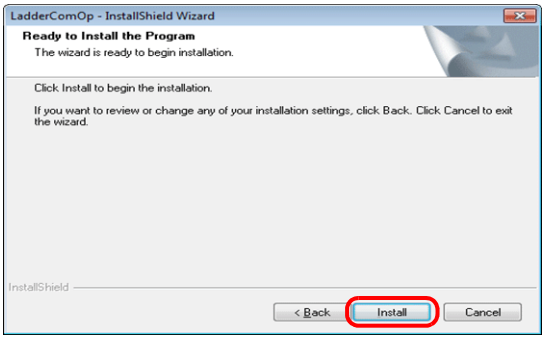


3. Select the location to install the tool and click the [Next] button.

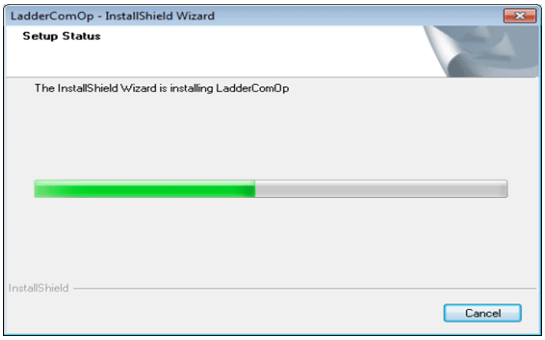


Installation location (default)
Windows Vista/7/8/8.1/10: MONITOUCH

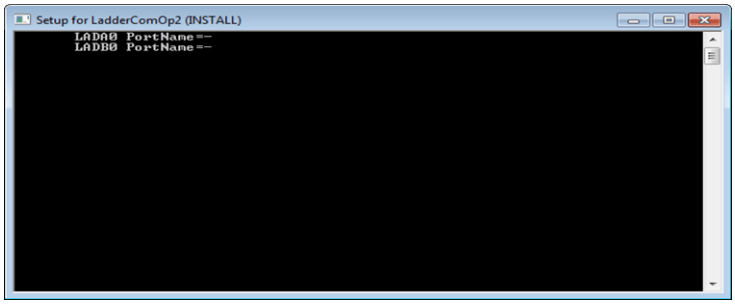
4. Click the [Install] button.



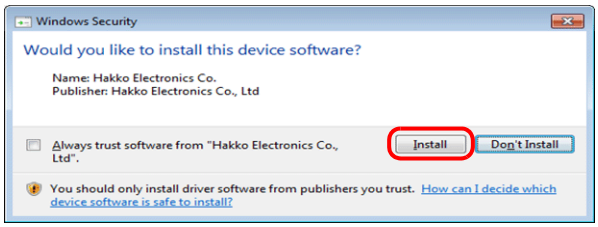
5. Installation of LadderComOp starts.



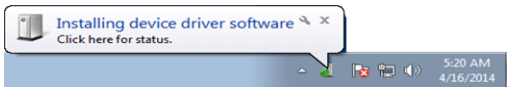
The following window is displayed during installation.



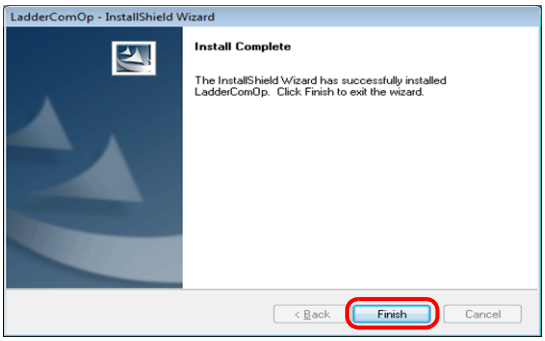
6. The following window is displayed. Install the LadderComOp driver.
   This window is display three times so click the [Install] button each time.



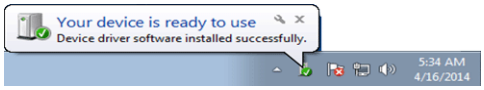
7. Installation of the driver starts.



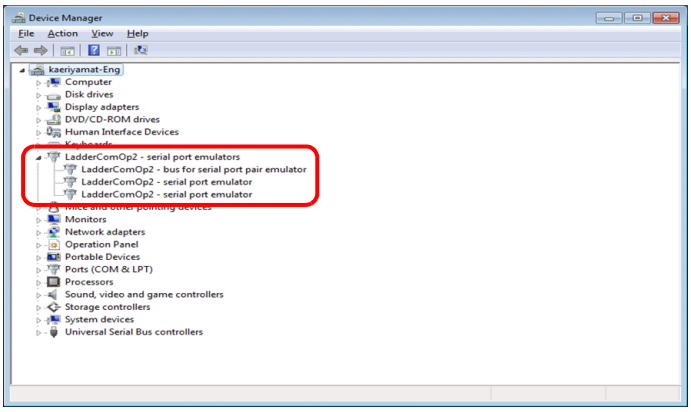
8. The following window is displayed when LadderComOp installation is complete. Click the [Finish] button.



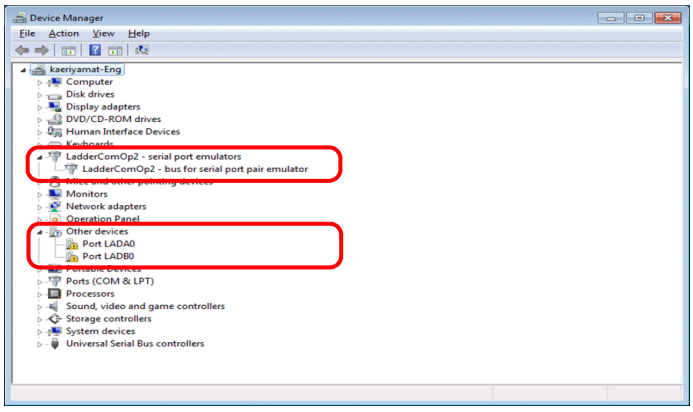
9. The following message is displayed on the PC's task bar when installation is complete.



10. Open the Device Manager on the PC.
    If installation was successful, "LadderComOp2" is displayed in the Device Manager.

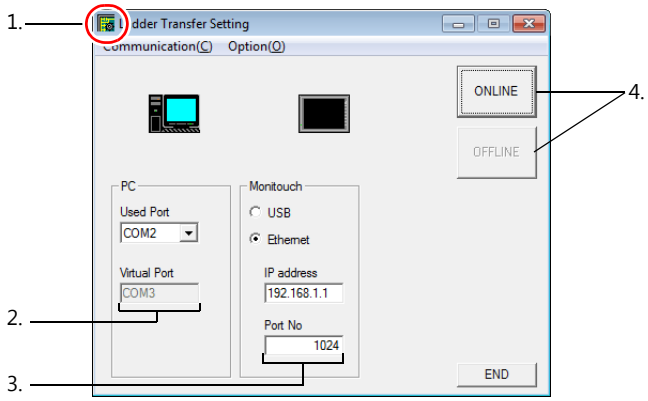


If installation was not successful, a yellow exclamation mark (!) is displayed under [Other devices] in the Device Manager.
If this happens, uninstall LadderComOp and then reinstall it.

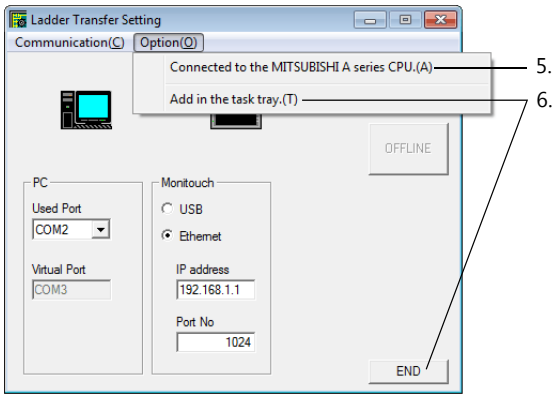


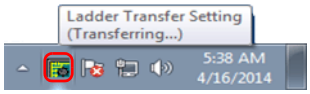
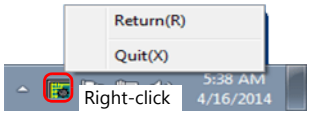
This completes the installation procedure.

9.2.2 LadderComOp Ver. 2 Detailed Settings



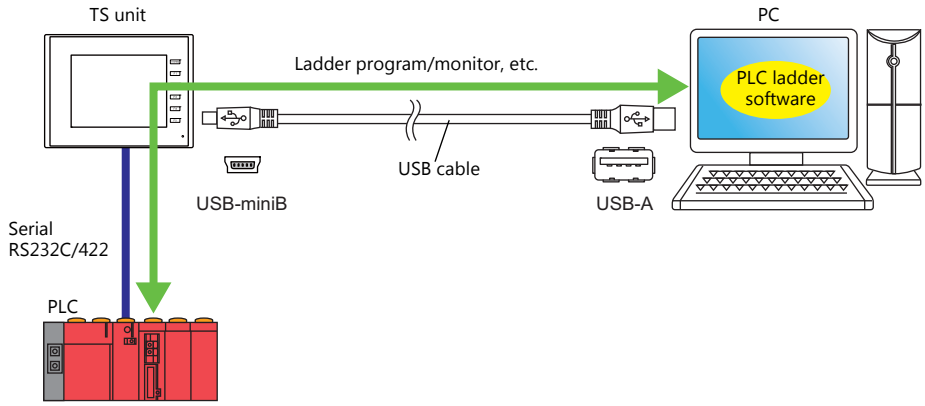
	Item	Description
1.	Icon	Clicking this icon and selecting [About LadderComOp] opens a window that displays the version of LadderComOp.
2.	PC	A total of two COM ports on the PC are used. • Used Port Select the COM port to use for ladder transfer from the list. Range: COM1 to COM256 (COM port numbers that are already assigned on the PC are not shown in the list.) The COM port number set here needs to be set in each relevant PLC programming software.* * The range of usable COM port numbers depends on the PLC programming software. For details, refer to the relevant PLC manual. Example: Panasonic FPWIN GR, COM1 to 15 (COM1 to 5 for Ver. 2.2 or earlier) • Virtual Port An unassigned COM port number is selected automatically.
3.	MONITOUCH	Select the connection method to use between the PC and TS unit. • USB No settings are required. • Ethernet IP address: Set the local IP address of the TSi unit (built-in LAN port). Port No: Set the port number of the TSi unit. Set the same port number as set under [Hardware Setting] → [Ladder Transfer]. Range: 1024 to 65533 (default: 1024)
4.	ONLINE/OFFLINE	Turn ladder transfer ON or OFF between the PC and TS unit. • ONLINE Establish a connection between the PC and TS unit and enable ladder transfer mode. • OFFLINE Disconnect the PC and TS unit.



	Item	Description
5.	Connected to the MITUBISHI A series CPU. (A)	Always select this checkbox when using a MITSUBISHI ELECTRIC A series CPU.
6.	Hide/END	• Hide Display an icon in the task tray when a connection is established. LadderComOp is added to the task tray. * The [Add in the task tray] checkbox is automatically selected. - The task tray tool tip indicates "Transferring...".  - Right-click on the icon in the task tray to display a menu.  Return Display the [Ladder Transfer Setting] window. • END Display an icon in the task tray when a connection is not established. Disconnect the PC and TS unit and close the [Ladder Transfer Setting] window.

9.3 Ladder Transfer via USB

The TS unit and PC can be connected via USB to monitor or write PLC ladder programs through the TS unit.



☞ For details on supported PLC models, refer to "Supported PLC Models" page 9-2.

⚠ The ladder transfer function is only available when the PLC targeted for connection is registered as [PLC1]. In addition, [Hardware Setting] → [PLC Properties] → [Communication Mode] must be set to [1:1].
This function cannot be used for 1:n connections (multi-drop), multi-link communication, or multi-link2 communication.

9.3.1 Setting Procedure

V-SFT and LadderComOp configuration is required. Refer to the following for the setting procedure.

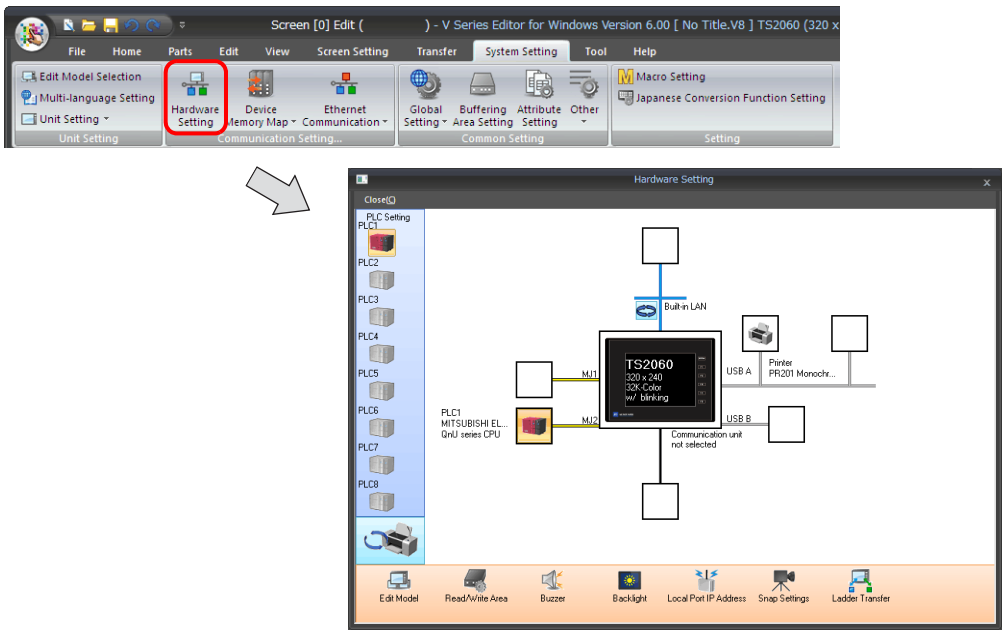
- V-SFT Ver. 6 settings → "V-SFT Ver. 6 Settings" page 9-9
- LadderComOp settings → "LadderComOp Settings" page 9-11
- PLC programming software settings → "PLC Programming Software Settings" page 9-12

V-SFT Ver. 6 Settings

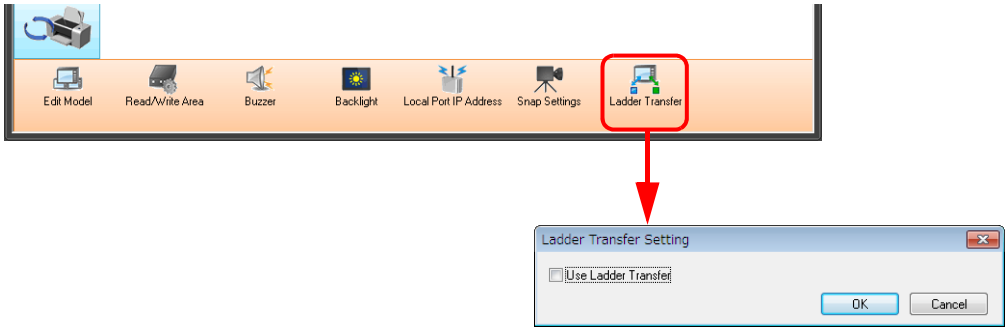
This section describes the settings for ladder transfer using the MITSUBISHI QnU series CPU as an example.

[Ladder Transfer Setting] window

1. Click [Communication Setting] → [Hardware Setting] to display the [Hardware Setting] window.

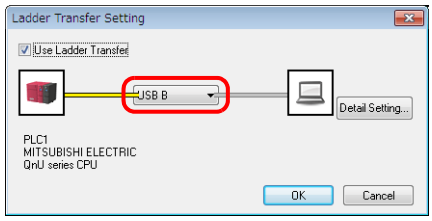


2. Click [Ladder Transfer] to display the [Ladder Transfer Setting] window.



3. Select the [Use Ladder Transfer] checkbox and set the port to which the computer is connected (the ladder transfer port) to [USB B].

*** Be sure to use a different ladder transfer port for each PLC.**



4. Click the [OK] button to complete the necessary settings. Transfer the screen program to the TS unit.

Notes on ladder transfer via USB
Observe the following when transferring screen programs over a USB cable.

- Switch to the Main Menu screen on the TS.
  (Ladder communication is enabled only in RUN mode.)
- Set LadderComOp Ver. 2 to [OFFLINE] mode.
  (For details on this setting, refer to "9.2.2 LadderComOp Ver. 2 Detailed Settings" page 9-7.)

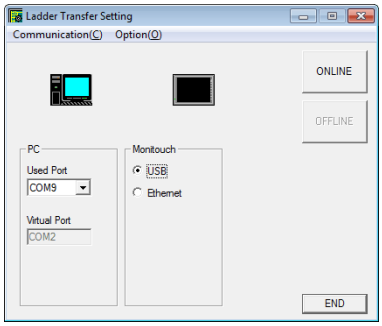
LadderComOp Settings

When using the ladder transfer function via USB/Ethernet, the dedicated "LadderComOp" tool must be installed on the PC. For details on the LadderComOp installation procedure, refer to "9.2.1 LadderComOp Installation" page 9-4.

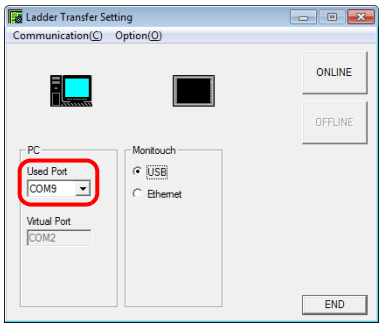
[Ladder Transfer Setting] window

1. From the Windows [Start] menu, click [Programs] → [V-SFT V6] → [LadderComOp] → [Ladder Transfer Setting].

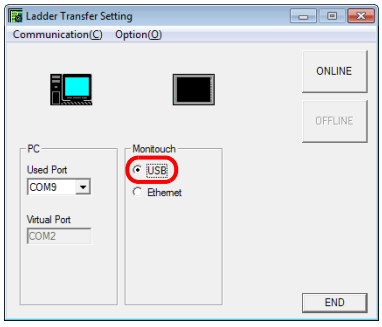
2. The [Ladder Transfer Setting] window is displayed.



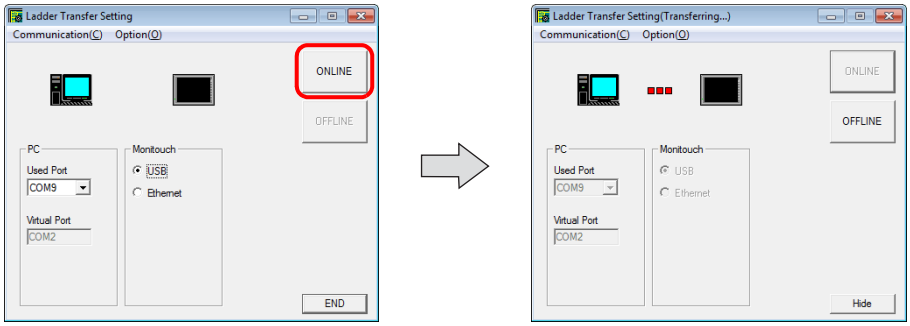
3. Select the COM port to use for ladder transfer from the [Used Port] list under [PC].
   * **This port must match the COM port used in the PLC programming software.**



4. Select [USB] under [MONITOUCH].



5. Click the [ONLINE] button.
   The display above the ladder transfer settings changes to the connected state.

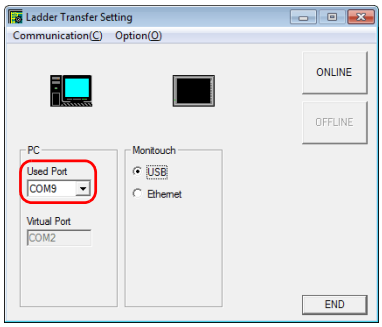


This completes the LadderComOp settings.

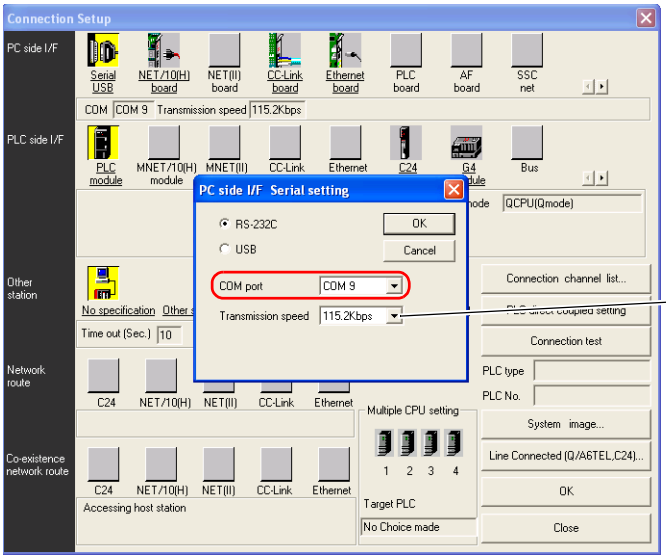
PLC Programming Software Settings

Set the COM port number configured in the [Ladder Transfer Setting] window of LadderComOp to the following window of the relevant PLC programming software to enable access to the PLC.

Example: [Ladder Transfer Setting] window, COM port number 9



MITSUBISHI ELECTRIC GX Developer/GX Works2



For [Transmission speed], specify the same value as the baud rate between the TS unit and the PLC.

OMRON CX-Programmer

Be sure to select “SYSMAC WAY” for [Network Type].
[Network Settings] dialog → [Driver] → [Port Name]
For [Baud Rate], specify the same value between the TS unit and the PLC.

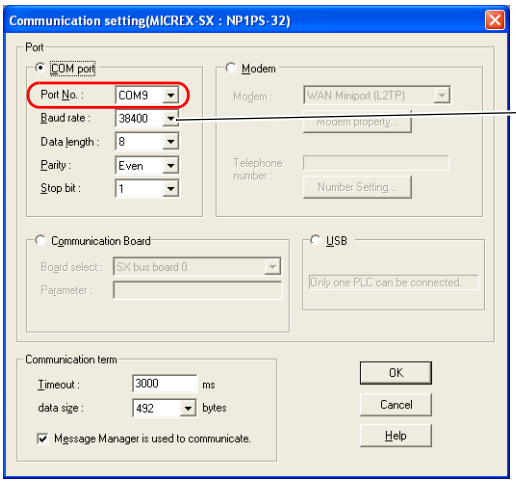
Panasonic “FPWIN GR”

[Communication Settings] dialog → [Port No.]
For [Baud Rate], specify the same value between the TS unit and the PLC.

Yokogawa Electric “Wide Field2”

[Environmental Settings] dialog → [Communication Settings] → [COM Port No.]

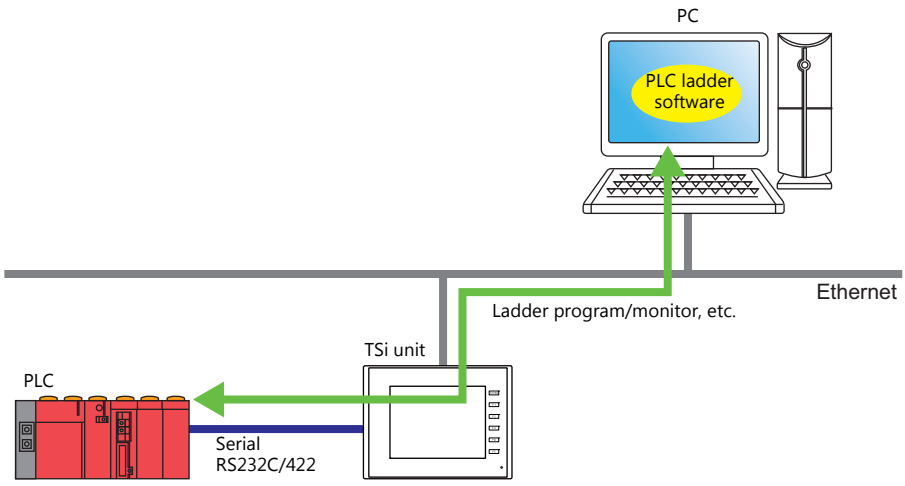
Fuji Electric SX-Programmer Expert (D300win)



For [Baud rate], specify the same value as the baud rate between the TS unit and the PLC.

9.4 Ladder Transfer via Ethernet (TSi Only)

The TSi unit and PC can be connected via Ethernet to monitor or write PLC ladder programs through the TSi unit.



☞ For details on supported PLC models, refer to "Supported PLC Models" page 9-2.

⚠ The ladder transfer function is only available when the PLC targeted for connection is registered as [PLC1]. In addition, [Hardware Setting] → [PLC Properties] → [Communication Mode] must be set to [1:1].
This function cannot be used for 1:n connections (multi-drop), multi-link communication, or multi-link2 communication.

9.4.1 Setting Procedure

V-SFT and LadderComOp configuration is required. Refer to the following for the setting procedure.

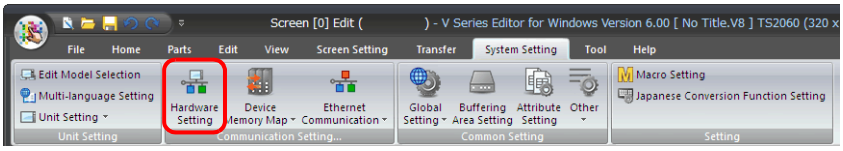
- V-SFT Ver. 6 settings → "V-SFT Ver. 6 Settings" page 9-14
- LadderComOp settings → "LadderComOp Settings" page 9-16
- PLC programming software settings → "PLC Programming Software Settings" page 9-17

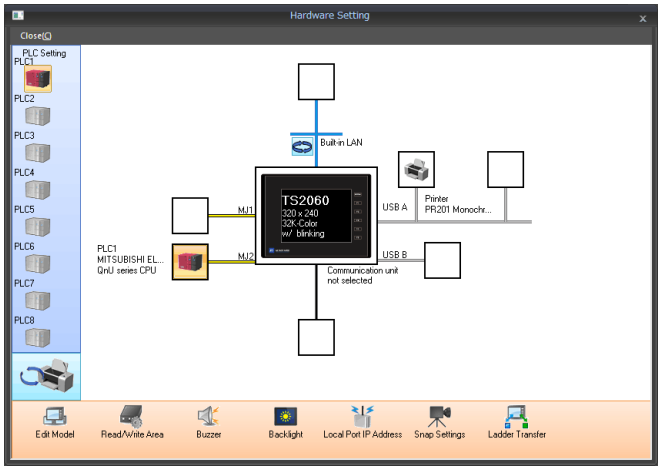
V-SFT Ver. 6 Settings

This section describes the settings for ladder transfer using the MITSUBISHI QnU series CPU as an example.

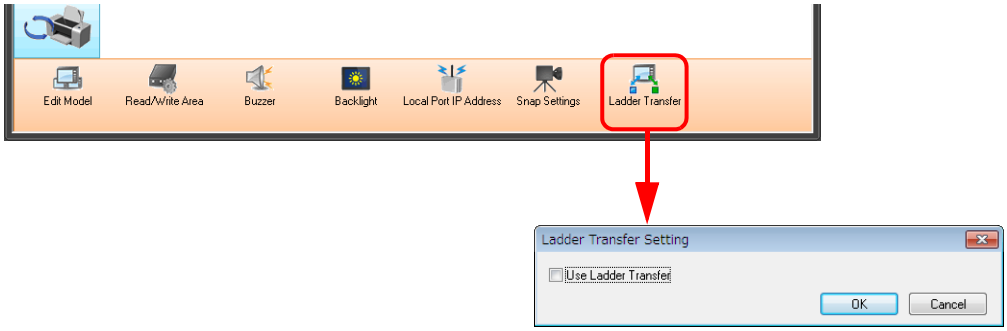
[Ladder Transfer Setting] window

1. Click [System Setting] → [Hardware Setting] to display the [Hardware Setting] window.



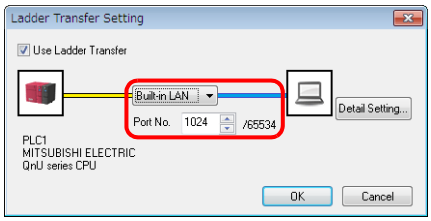


2. Click [Ladder Transfer] to display the [Ladder Transfer Setting] window.



3. Select the [Use Ladder Transfer] checkbox and set the port to which the computer is connected (the ladder transfer port) to [Built-in LAN].

*** This port is also used in the LadderComOp settings.**
Be sure to use a different ladder transfer port for each PLC.



This completes the necessary settings. Transfer the screen program to the TS unit.

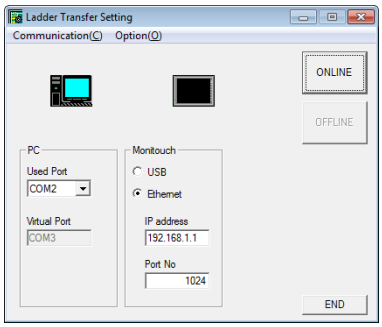
LadderComOp Settings

When using the ladder transfer function via USB/Ethernet, the dedicated "LadderComOp" tool must be installed on the PC. For details on the LadderComOp installation procedure, refer to "9.2.1 LadderComOp Installation" page 9-4.

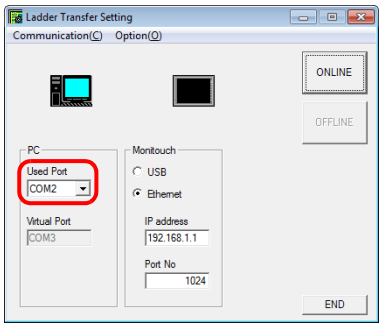
[Ladder Transfer Setting] window

1. From the Windows [Start] menu, click [Programs] → [V-SFT V6] → [LadderComOp] → [Ladder Transfer Setting].

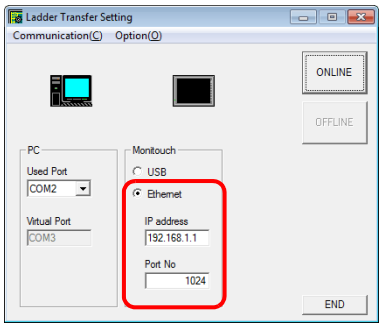
2. The [Ladder Transfer Setting] window is displayed.



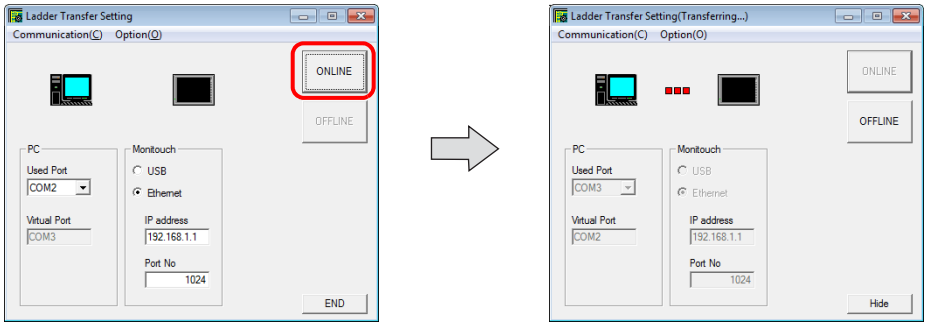
3. Select the COM port to use for ladder transfer from the [Used Port] list under [PC].
   * **This port must match the COM port used in the PLC programming software.**



4. Select [Ethernet] under [MONITOUCH] and set the IP address of the TSi unit and the port number to use in ladder transfer.
   * **The port number must match the ladder transfer port number specified in the [Hardware Setting] window of V-SFT Ver. 6.**



5. Click the [ONLINE] button.
   The display above the ladder transfer settings changes to the connected state.

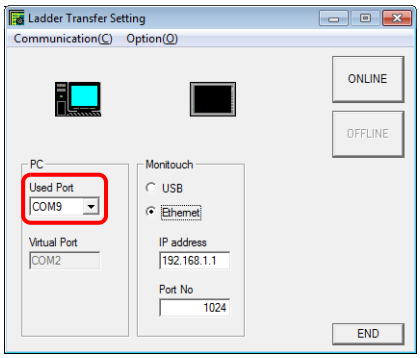


This completes the LadderComOp settings.

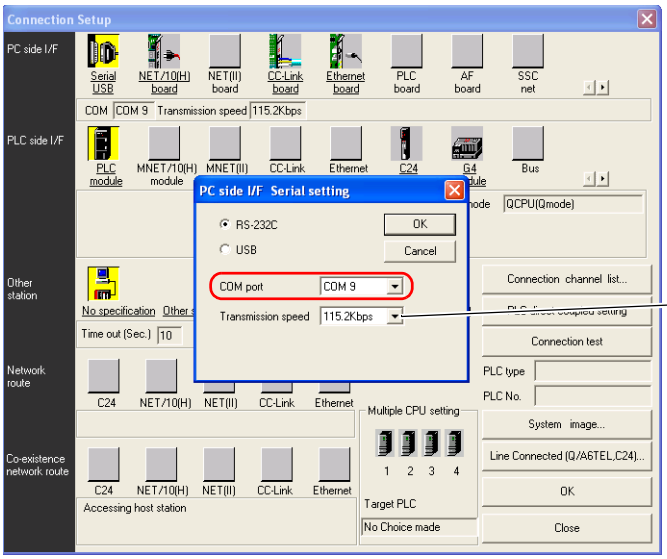
PLC Programming Software Settings

Set the COM port number configured in the [Ladder Transfer Setting] window of LadderComOp to the following window of the relevant PLC programming software to enable communication with the PLC.

Example: [Ladder Transfer Setting] window, COM port number 9



MITSUBISHI ELECTRIC GX Developer/GX Works2



For [Transmission speed], specify the same value as the baud rate between the TSi unit and the PLC.

OMRON CX-Programmer

Be sure to select "SYSMAC WAY" for [Network Type].
[Network Settings] dialog → [Driver] → [Port Name]
For [Baud Rate], specify the same value between the TSi unit and the PLC.

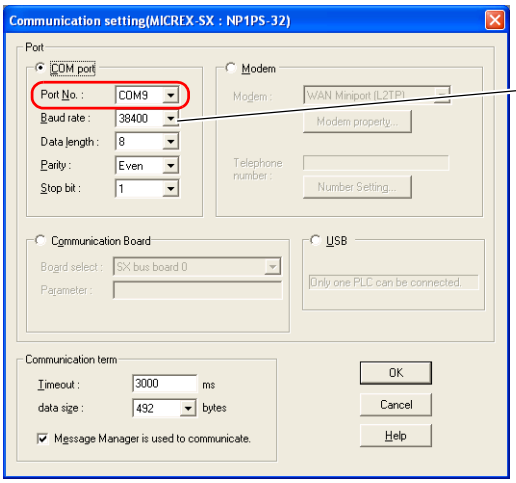
Panasonic "FPWIN GR"

[Communication Settings] dialog → [Port No.]
For [Baud Rate], specify the same value between the TSi unit and the PLC.

Yokogawa Electric "Wide Field2"

[Environmental Settings] dialog → [Communication Settings] → [COM Port No.]

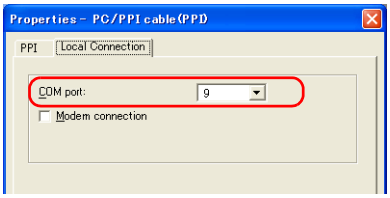
Fuji Electric SX-Programmer Expert (D300win)



For [Baud rate], specify the same value as the baud rate between the TSi unit and the PLC.

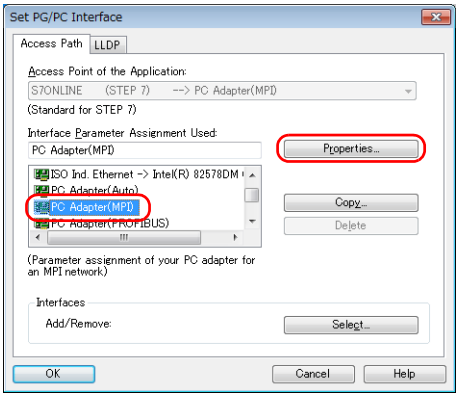
Siemens "STEP 7-Micro/WIN"

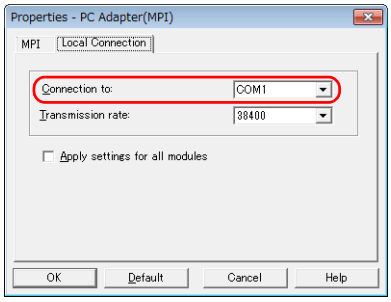
[Set PG/PC Interface] dialog → [PC/PPI cable (PPI)] → [Properties].



The baud rate between the TSi unit and the PC is fixed to 115 Kbps.

Siemens SIMATIC Manager



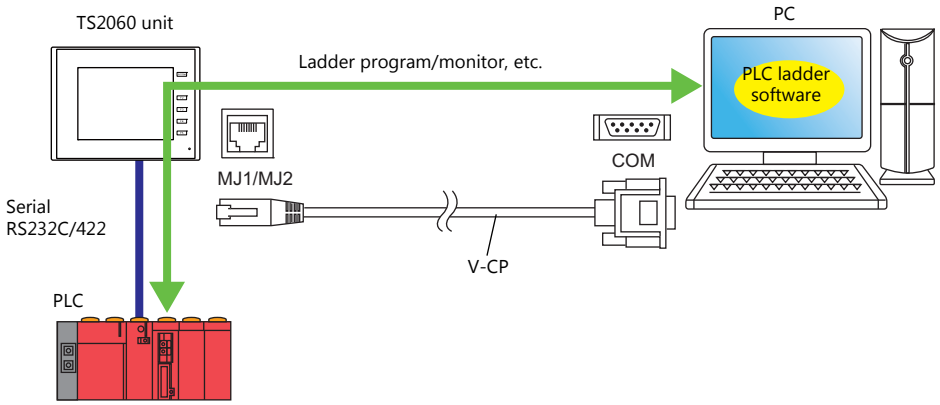


Set [Connection to:] in the range of COM1 to 8.
[Transmission rate:] does not need to be changed.

9.5 Serial Ladder Transfer (TS2060i/TS2060 Only)

The TS2060 unit and PC can be connected using a "V-CP" screen program transfer cable to monitor or write PLC ladder programs through the TS2060 unit.

* **The TS2060i unit with DUR-00 installed must be used when using the MITSUBISHI A series CPU. Use Hakko Electronics' "V6-CP-A" cable to connect the TS2060i unit and a computer.**

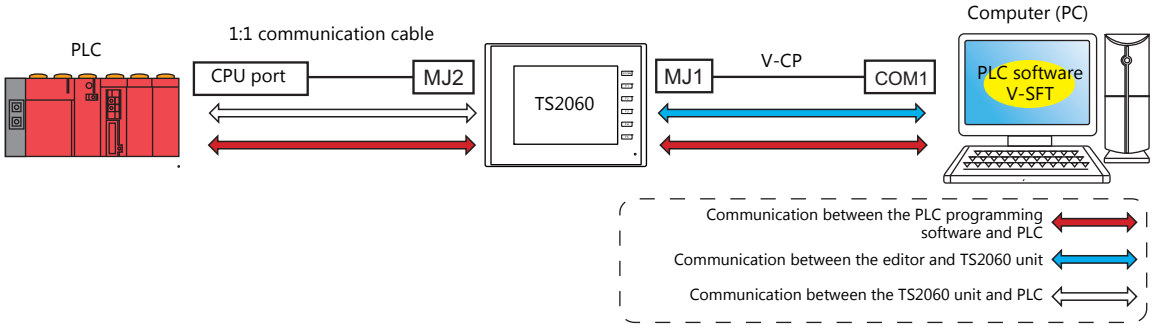


☞ For details on supported PLC models, refer to "Supported PLC Models" page 9-2.

The ladder transfer function is only available when the PLC targeted for connection is registered as [PLC1]. In addition, [Hardware Setting] → [PLC Properties] → [Communication Mode] must be set to [1:1].
This function cannot be used for 1:n connections (multi-drop), multi-link communication, or multi-link2 communication.

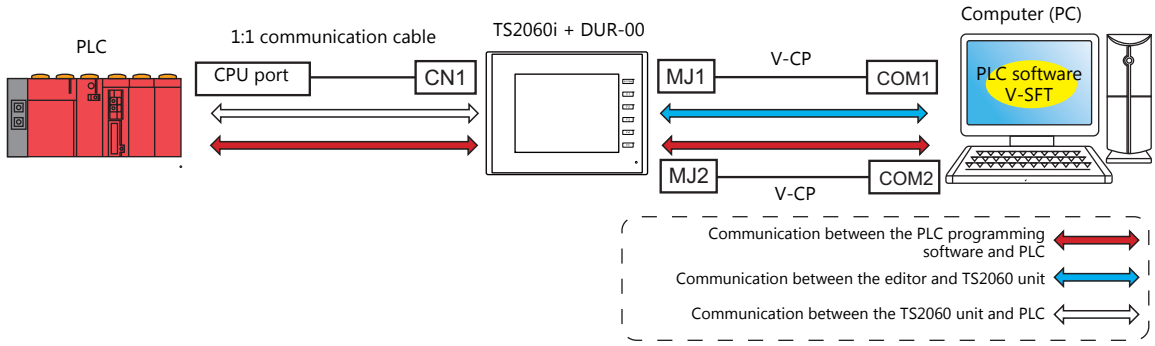
Executing Screen Program Transfer and Ladder Transfer Using the MJ1 Port

Use the MJ1 port when using the ladder transfer function and performing screen program transfer over a single cable.
Screen program transfer and PLC programming software transfers cannot be performed at the same time. Communication of either software is cut off in order to perform transfers.
Screen program transfer is only possible on the Main Menu screen. For details, refer to [Ladder Communication is not Used in Local Mode] settings page 9-21 .



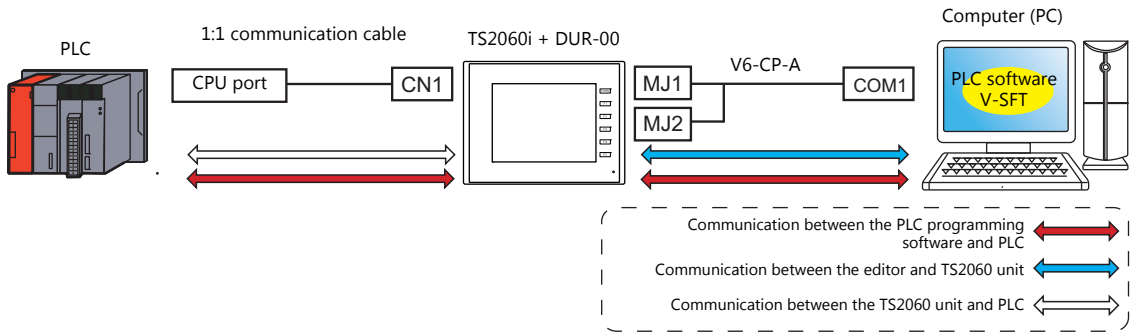
Executing Screen Program Transfer Using the MJ1 Port and Ladder Transfer Using the MJ2 Port (TS2060i + DUR-00)

Screen program transfer and PLC programming software transfers can be performed using separate COM ports and cables.
Screen program transfer and PLC programming software transfers cannot be performed at the same time.



Communication with the MITSUBISHI ELECTRIC A Series CPU (TS2060i with DUR-00 Installed Only)

Use Hakko Electronics "V6-CP-A" cable to connect the TS2060 unit and PC.



9.5.1 Setting Procedure

V-SFT configuration is required. Refer to the following for the setting procedure.

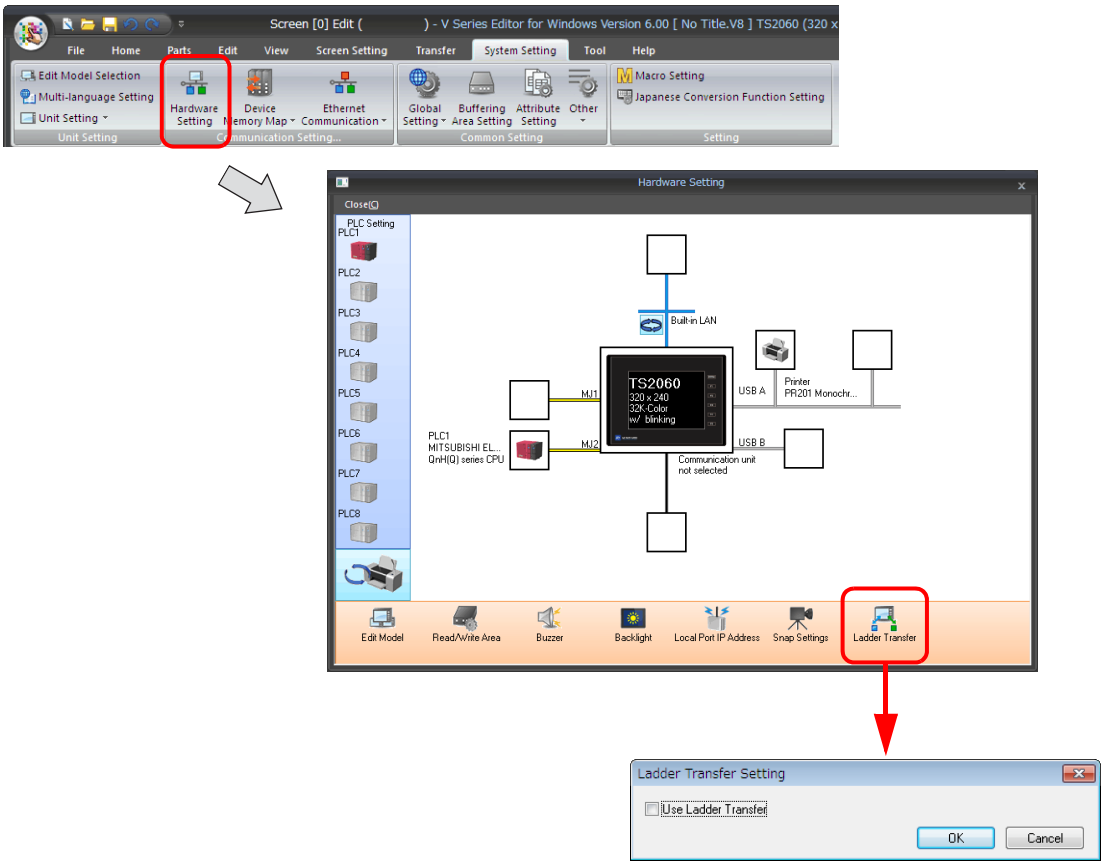
- V-SFT Ver. 6 settings → "V-SFT Ver. 6 Settings" page 9-20
- PLC programming software settings → "PLC Programming Software Settings" page 9-23

V-SFT Ver. 6 Settings

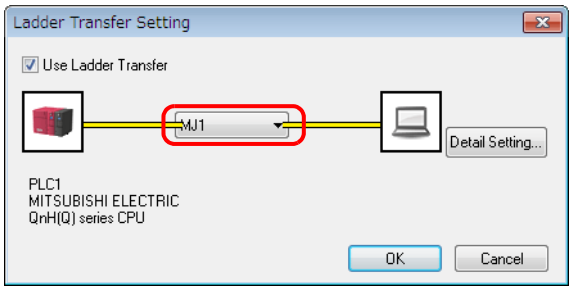
This section describes the settings for ladder transfer using the MITSUBISHI QnH (Q) series CPU as an example.

[Ladder Transfer Setting] window

1. Click [System Setting] → [Hardware Setting] → [Ladder Transfer]. The [Ladder Transfer Setting] window is displayed.



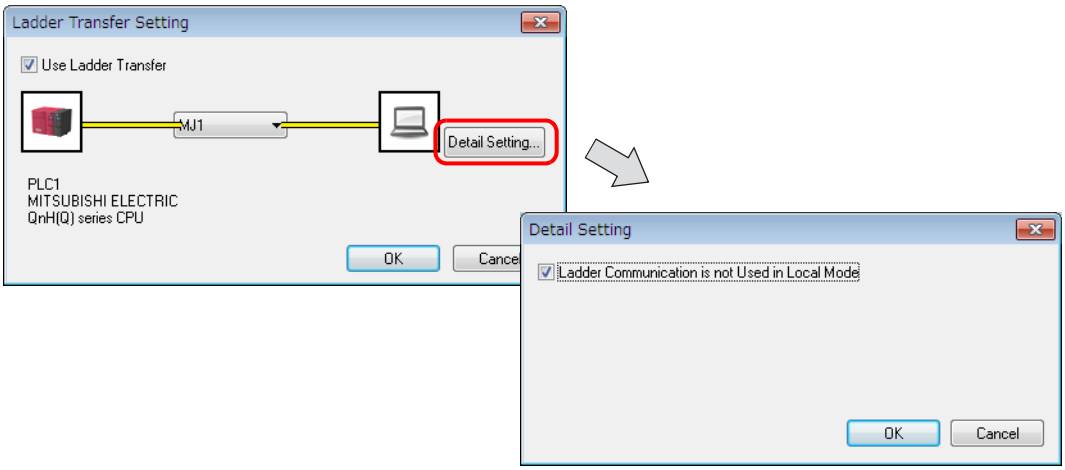
2. Select the [Use Ladder Transfer] checkbox and set the port to which the computer is connected to [MJ1] or [MJ2].



3. Click the [OK] button to complete the necessary settings. Transfer the screen program to the TS2060 unit.

[Ladder Communication is not Used in Local Mode] settings

Selecting the [MJ1] or [MJ2] connection port allows the [Ladder Communication is not Used in Local Mode] checkbox setting to be selected in the [Detail Setting] window.



Whether screen program transfer and ladder transfer can be performed in a particular state of the TS2060 unit differs depending on the combination of this setting and the modular jack function.

- MJ1: Ladder transfer

[Ladder Communication is not Used in Local Mode]	TS2060 Unit State	Screen Program Transfer	Ladder Transfer
Selected	RUN	×	○
	Local mode	○	×
Unselected	RUN	×	○
	Local mode	△*	△*

- MJ1: Not connected, MJ2: Ladder transfer

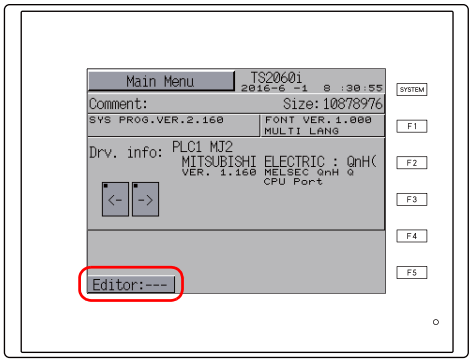
[Ladder Communication is not Used in Local Mode]	TS2060 Unit State	Screen Program Transfer	Ladder Transfer
Selected	RUN	○	○
	Local mode	○	×
Unselected	RUN	○	○
	Local mode	○	○

- MJ1: Not connected/other than ladder transfer, MJ2: Ladder transfer

[Ladder Communication is not Used in Local Mode]	TS2060 Unit State	Screen Program Transfer	Ladder Transfer
Selected	RUN	×	○
	Local mode	○	×
Unselected	RUN	×	○
	Local mode	○	○

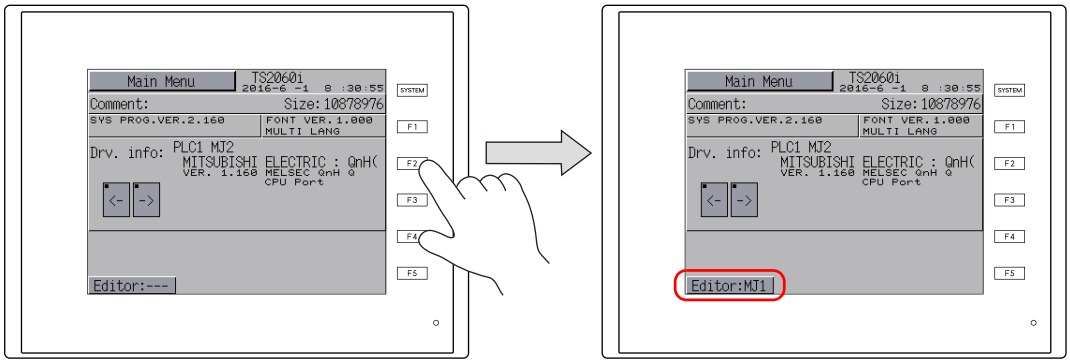
*** Switching to Local mode**

Press the [SYSTEM] → [F1] switch to display the Main Menu screen.
[Editor:---] (ladder transfer mode) is displayed at the lower left of the screen. In this case, screen program transfer using the MJ1 port cannot be performed.
(Refer to the table below.)



Indication	Screen Program Transfer	Ladder Transfer
Editor:---	×	○
Editor:MJ1	○	×

Switching between [Editor:---] and [Editor:MJ1] is performed using a function switch.
Press and hold the [F2] switch for three seconds.

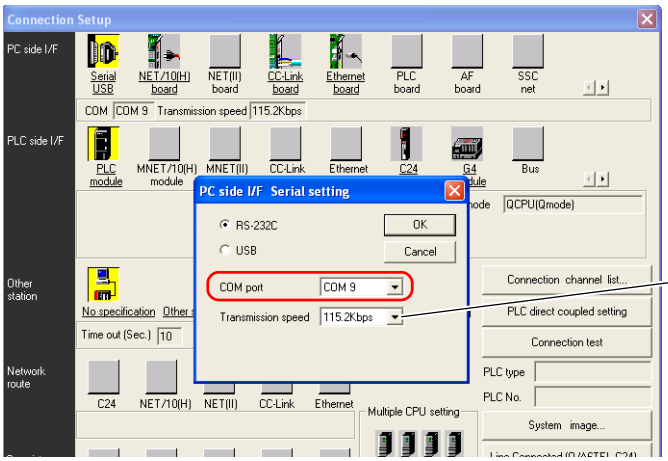


Press for three seconds.

PLC Programming Software Settings

Set the COM port number to enable communication with the PLC.

MITSUBISHI ELECTRIC GX Developer/GX Works2



For [Transmission speed], specify the same value as the baud rate between the TS2060 unit and the PLC.

OMRON CX-Programmer

Be sure to select "SYSMAC WAY" for [Network Type].
[Network Settings] dialog → [Driver] → [Port Name]
For [Baud Rate], specify the same value between the TS2060 unit and the PLC.

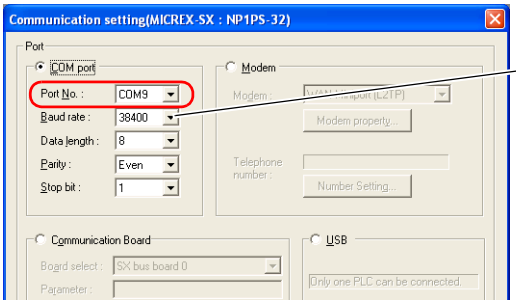
Panasonic "FPWIN GR"

[Communication Settings] dialog → [Port No.]
For [Baud Rate], specify the same value between the TS2060 unit and the PLC.

Yokogawa Electric "Wide Field2"

[Environmental Settings] dialog → [Communication Settings] → [COM Port No.]

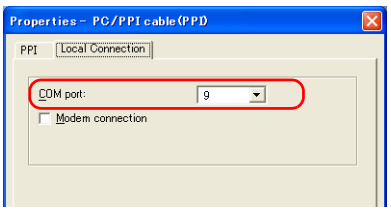
Fuji Electric SX-Programmer Expert (D300win)



For [Baud rate], specify the same value as the baud rate between the TS2060 unit and the PLC.

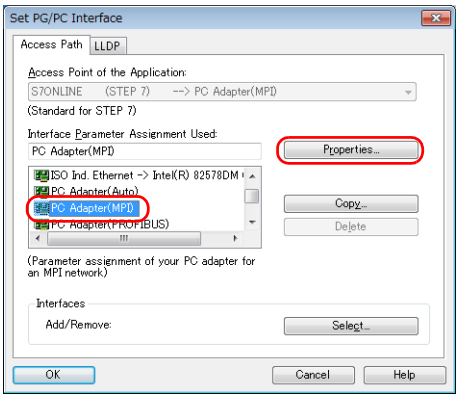
Siemens "STEP 7-Micro/WIN"

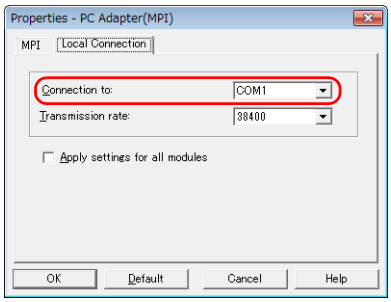
[Set PG/PC Interface] dialog → [PC/PPI cable (PPI)] → [Properties].



The baud rate between the TS2060 unit and the PC is fixed to 115 Kbps.

Siemens SIMATIC Manager





Set [Connection to:] in the range of COM1 to 8.
[Transmission rate:] does not need to be changed.

9.6 Notes

Screen Program Transfer

- When transferring a screen program via USB cable while executing the ladder transfer function via USB, always perform the following.
  - Switch to the Main Menu screen on the TS.
    (Ladder communication is enabled only in RUN mode.)
  - Set LadderComOp Ver. 2 to [OFFLINE] mode.
    (For details on this setting, refer to "9.2.2 LadderComOp Ver. 2 Detailed Settings" page 9-7.)
- When using Siemens S7-200 PPI or S7-300/400 MPI, always switch to the Main Menu screen before transferring the screen program. (Ladder communication is enabled only in RUN mode.)

Other Notes

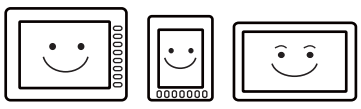
- The ladder transfer function can be used for up to three ports with PLC 1 to 8.
- When using a PC with user privileges enabled, perform the following in advance.

  1) Log in with administrator privileges.
  2) Start the LadderComOp program and set a COM port for [Used Port].
     * When settings are configured initially, LadderComOp may take a few moments to exit.
       Also, if a user logs in without administrator privileges, the following message is displayed and the LadderComOP software cannot be used.
- The following messages are displayed at the top left of the screen on the TS unit during access (mainly when transferring a large amount of data, such as programs) to the Siemens S7-200 PPI and S7-300/400 MPI. The TS unit automatically returns to normal operation after access is complete.
  - PLC1 Access denied by Loader
  - PLC1 In Reset Service
- The communication states of the PLC programming software and PLC when communication is performed between the editor and the TS unit are shown below.

Editor	PLC Programming Software
Writing to TS unit	Communication stops (normal communication after writing finishes)
Reading from TS unit	Normal communication
Checking with TS unit	Normal communication

- Baud rate
  The baud rate used between the TS unit and the PLC is the value set in the editor for [Hardware Setting] → [PLC Properties] → [Baud Rate].
  However, when communication (monitoring etc.) with the PLC programming software occurs with the ladder transfer function, the baud rate value changes to that of the PLC programming software. This baud rate is retained until power to the TS unit is turned off and on again.
  For this reason, set the same baud rate setting for [Hardware Setting] → [PLC Properties] → [Baud Rate] as the PLC programming software.
- When [Use Ladder Tool] is set to [Yes], monitor registration of the TS unit and PLC communication is prohibited even if the PLC programming software is not running. This means that the screen display speed is slightly slower than usual.
- When transferring ladder programs when the TS unit is in RUN mode, the performance of both the TS unit and the PLC programming software decreases because communication between the two is performed in synchronization.

MEMO

MONITOUCH 

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