FP7 CPU Unit
Ver 4.30
Additional Functions Manual

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Introduction of Ver.4.30

1.1 Introduction of FP7 CPU Unit Ver.4.30

The following functions have been added to FP7 CPU Unit Ver.4.30.

■ Additional functions

1.   Addition of PB expansion function during RUN

The size of program blocks can be changed while editing a program during RUN from tool software "FPWIN GR7S V2.13.0".

Even when exceeding the PB size during editing a program, it will be written after the PB size is automatically expanded at the time of conversion.

Details: Refer to "2 PB Expansion Function During RUN"

2.   Forced output using Y in PROG mode

The forced output using Y contact can be performed in PROG mode from tool software "FPWIN GR7S V2.13.0".

Details: Refer to "3 Forced Output Using Y in PROG Mode"

3.   Adiition of new instructions

Added high-level instructions CRMDIRFL, LENGTH and NTPcSV.

Details: Refer to "4 Additional Instructions".

2

PB Expansion Function During RUN

2.1 Overview

■ Overview of functions

- This function enables the size of program blocks to be changed when editing a program during RUN.

- When exceeding the PB size while editing a program during RUN, the PB size will be automatically expanded at the time of conversion of PB or project, and it will be written after the expansion of PB size.

- Also, the PB size can be changed after displaying the property by right-clicking the PB in the project tree.

■ Overview of usage

- By default, this function is disabled. Make the setting to use this function in CPU configuration.

- The setting can be changed in PROG mode only.

### ■ Precautions when using this function

- When this function is enabled, a compile full error may rarely occur in the last PB and the mode may not be switched to RUN mode.

- In such case, expand the size of the last PB or use the numbers of subroutine instructions filled in numerical order as much as possible from the smallest number.

2.2 **CPU Configuration**

♦ **PROCEDURE**

1. **Select "Options" > "FP7 Configuration" > "CPU configuration" from the menu of tool software "FPWIN GR7S". The CPU configuration setting screen opens.**
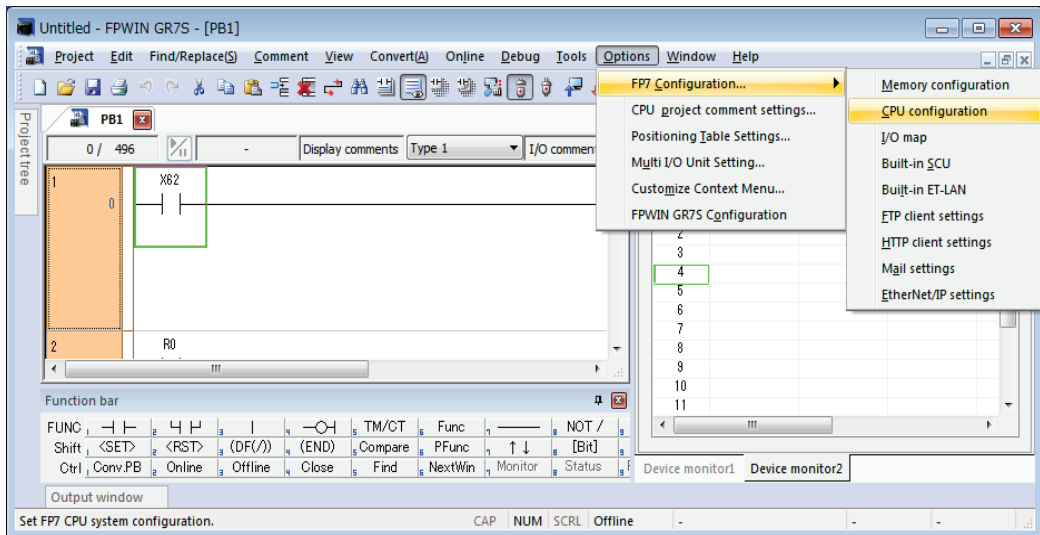
2. **Open the "Select operation" tab, and set "PB expansion function during RUN" to "Use.".**
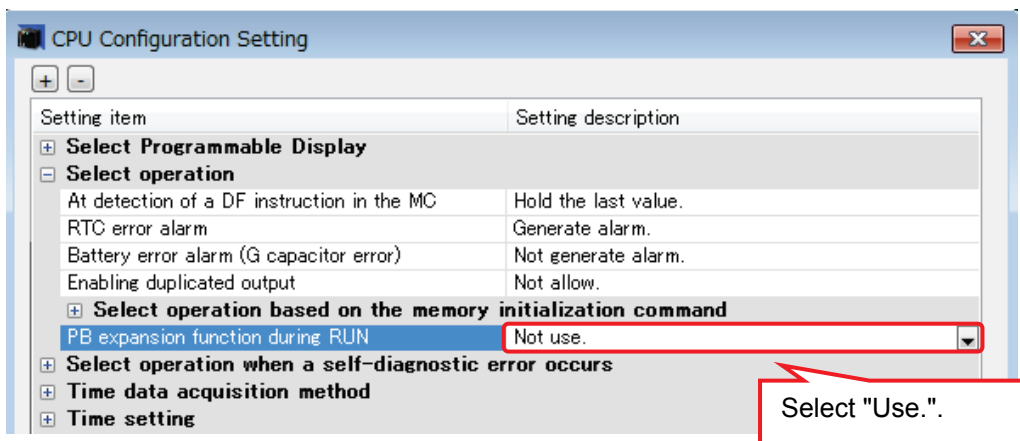
3. Press the OK button to finish the setting.

In offline mode, the setting is written at the time of next download.

In online mode, a transfer confirmation message is displayed. Press "Yes" to transfer the setting.
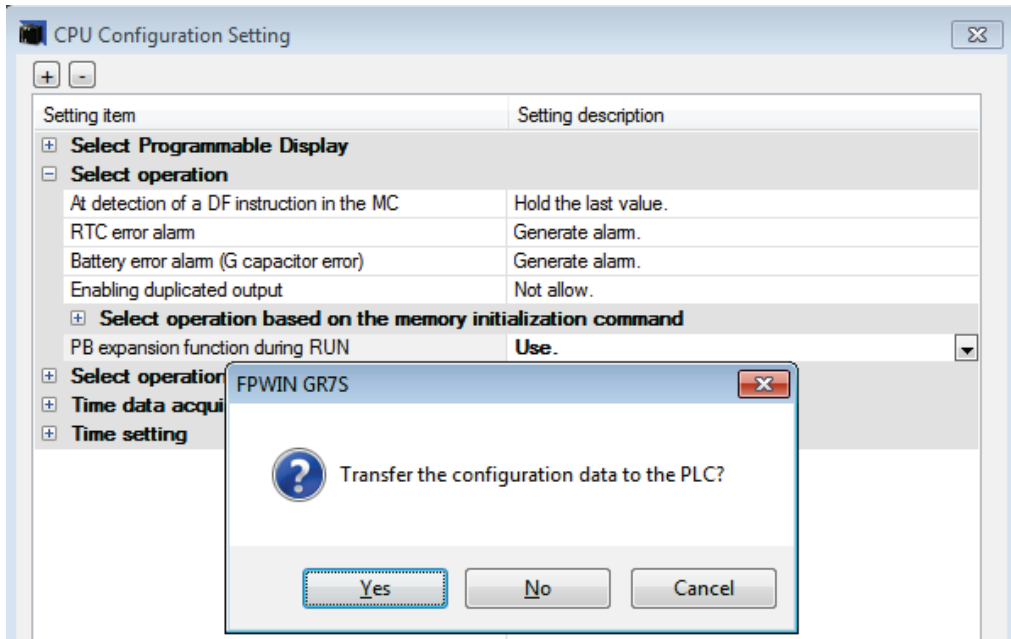
2.3 How to Use Expansion Function

When exceeding the PB size while editing a program during RUN, the PB size will be automatically expanded at the time of conversion of PB or project.
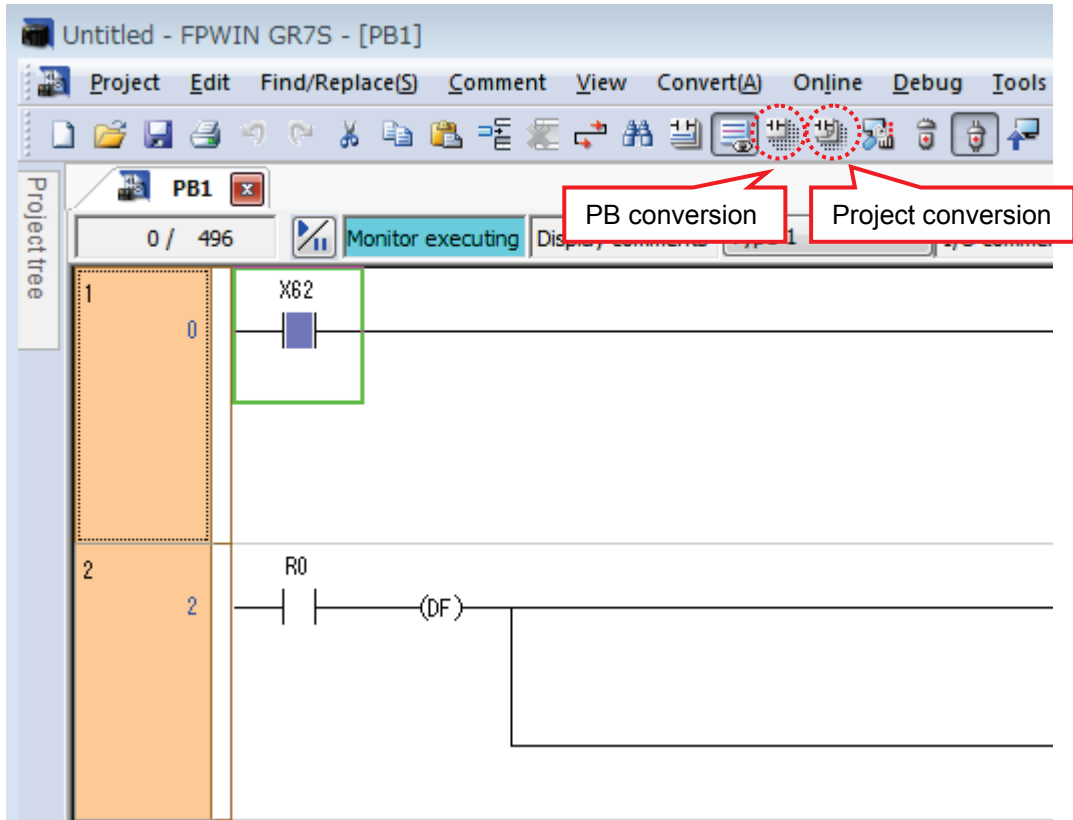
2.4 Operating From Project Tree

Only the PB size can be changed by the following procedure. In this case, however, one PB can be changed simultaneously.

1. **Right-click a PB in the project tree, and select "Property" to open the Property screen of the PB.**
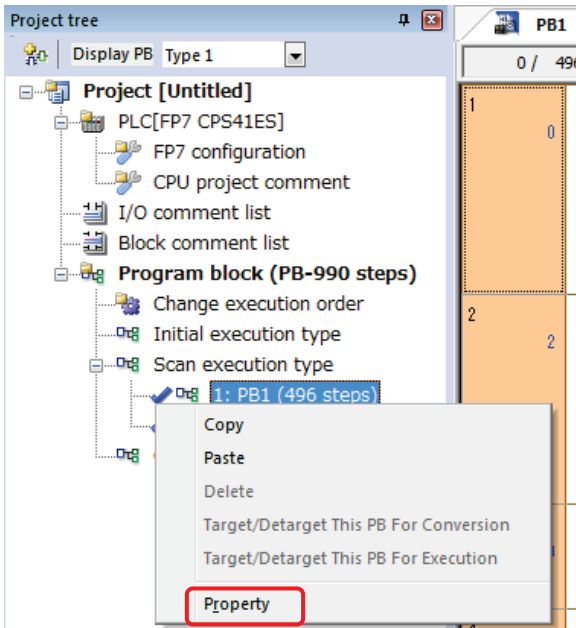
2. **The PB size can be confirmed and changed on the Property screen.**

Change the size by 500 steps.

3
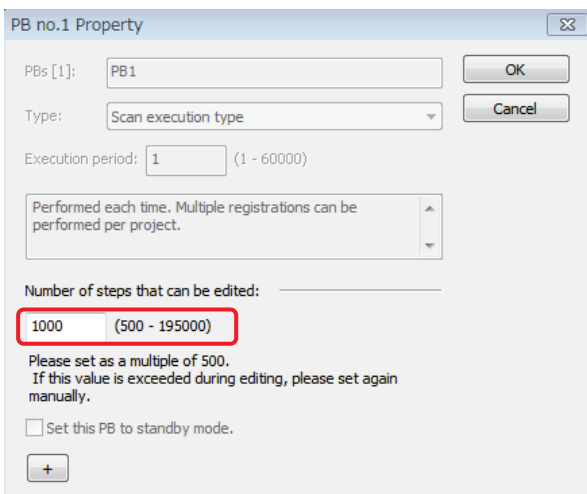
Forced Output Using Y in PROG Mode

3.1 Overview of Function

A new feature has been added to the forced output function (wiring check function) in PROG mode.

The forced output specifying Y is available in addition to the existing forced output specifying OT.

The forced output specifying Y or OT is available.

As I/O refresh is activated during the forced output specifying Y, input can also be monitored.

However, when performing the forced output specifying Y, it is recommended to perform it with an I/O map registered.

3.2 Procedure

◆ PROCEDURE

1. Select "Debug" > "Force I/O" from the menu of tool software "FPWIN GR7S".

The Force I/O screen opens.
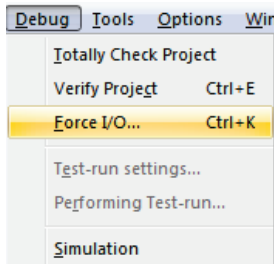
2. Set "Forced output device" in the lower part of the screen to "Y (external output)".

Then, press the "Input Device" button.

This can be set only in PROG. mode.
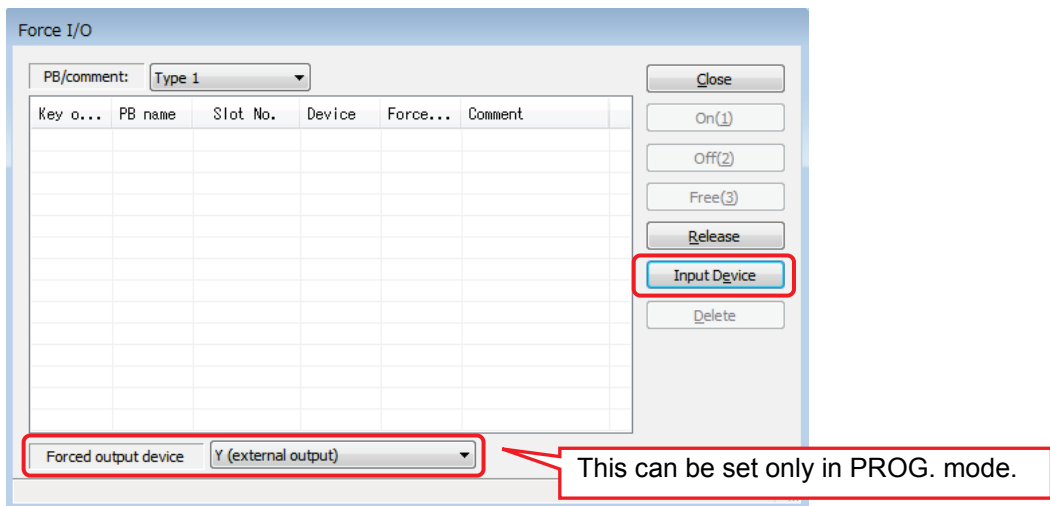
3. Register devices to be forcibly output in the Force I/O device screen.

In the following example, Y100 and Y101 are registered.
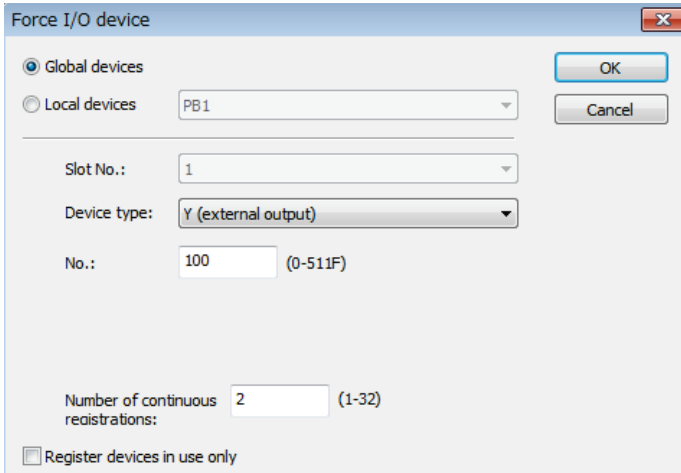
4. After registering devices, select a device in the Force I/O screen and press the On/Off button. The device output changes.

The output turns on.

4
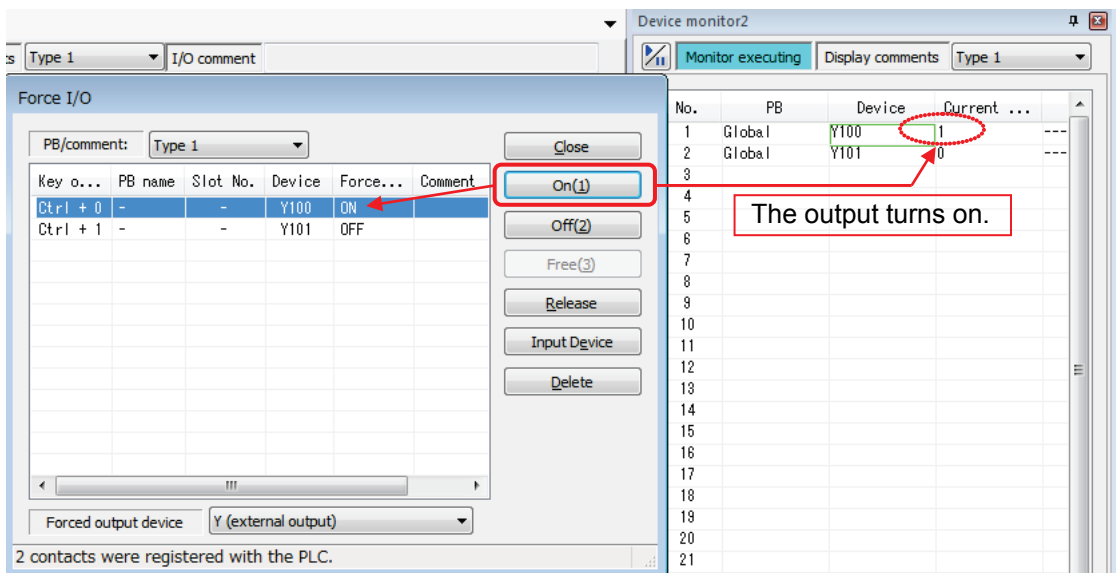
Additional Instructions

4.1 List of New Instructions

Instruction	Overview
CRMDIRFL	Deletes a specified directory in an SD card.
LENGTH	Detects a termination character (null) from a string and acquires the number of characters.
NTPcSV	Sets a destination NTP server and time zone to send a time adjustment request.

4.2 CRMDIRFL (Delete Directory (Also Valid for Diretory with Files))

Deletes a specified directory in an SD card.

Unlike CRMDIR instruction, this instruction can also delete directory in which a file exist.

* However, a directory in which a subdirectory exists cannot be deleted.

■ Instruction format

```
  R0
  | |                                    CRMDIRFL   "¥abc"
--| |----------------------------------|                  |--
                                                     S
```

For details, refer to the description of CRMDIR instruction.

4.3 LENGTH (Search String Length (Terminating NULL))

Detects a termination character (null) from a string and acquires the number of characters.

Null characters are not included in the number of characters.

■ Instruction format
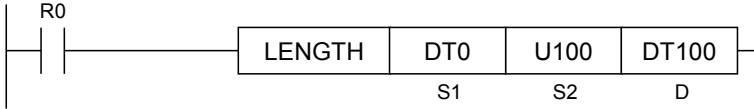
```
   R0
  ─┤├─────────┤ LENGTH │ DT0 │ U100 │ DT100 ├─
                         S1     S2      D
```

■ Operation unit

There is no operation unit.

■ List of operands

Operand	Description
S1	The starting address of the string to be searched is specified.
S2	The starting address storing the maximum search string length or a constant is specified. (Settable range: 1 to 4096)
D	The starting address storing string length is specified.

■ Available devices

(A: Available)

Operand	16-bit device											32-bit device		Integer			Real no.		String	Index modifier
	WX	WY	WR	WL	WS	SD	DT	LD	UM	WI	WO	TS CS	TE CE	IX	K	U	H	SF	DF	" "	
S1	A	A	A	A			A	A												A	
S2	A	A	A	A	A	A	A	A								A	A				A
D	A	A	A	A			A	A													A

■ Processing

- Searches the length of the string specified by [S1].
  Searches NULL characters for the number of characters specified by [S2] (maximum string length) from [S1], and stores the string length excluding NULL characters in [D] (result) when NULL characters exist.

- When there is no NULL character within the maximum string length [S2], sets CY (SR9) flag and returns the maximum string length to the result [D].

- When a NULL character exists, CY (SR9) flag is not cleared.

The following examples show the processing results for a string "with a NULL character" and a string "without NULL character".

- Instruction

LENGTH DT0 U10 DT100

- Specification of operand

  [S1] : DT0
  [S2] : U10
  [D] : DT100

Example) 1. With NULL

[S1] Content of device

"0123456"+ NULL

	Value
DT0	3130h
DT1	3332h
DT2	3534h
DT3	0036h
DT4	****h

Processing result

String length: 7

	Value
DT100	0007h

SR9: Not change

Example) 2. Without NULL

[S1]Content of device

"0123456789"

	Value
DT0	3130h
DT1	3332h
DT2	3534h
DT3	3736h
DT4	3938h

Processing result

String length: 10

	Value
DT100	000Ah

SR9: ON
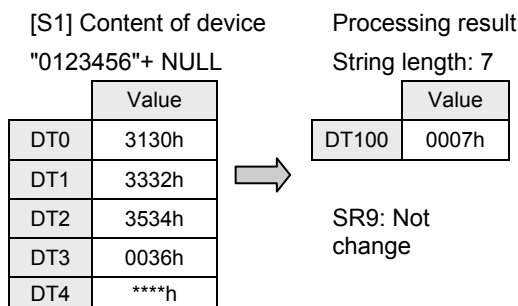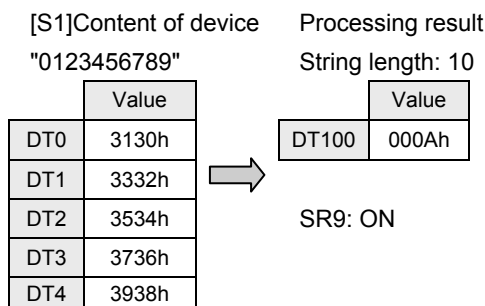
■ Precautions on programming

Error flags are not cleared even when normal operation is performed.

Use ERR instruction for clearing error flags.

■ Flag operation

Name	Description
Latest error (SR7) Hold error (SR8)	To be set in case of out-of-range values in indirect access (index modification).
	To be set when the maximum string length specified by [S2] is out of the range.
	To be set when the maximum string length specified by [S2] exceeds the area.
CY(SR9)	To be set when a NULL character is not included in the string of [S1].

4.4 NTPcSV (NTP Destination Server Setting Instruction)

Sets a destination NTP server and time zone to send a time adjustment request.

∎ Instruction format

```
   R0    X61
 ──┤↑├──┤/├──────────────────────────────┤ UNITSEL │ U100 │ U1 ├──
                                          └─────────┴──────┴────┘
        └─────┤ NPTcSV │ "IPv4=192.168.1.1,TIMEZONE=+0000" │ "DAY0900" ├──
              └────────┴─────────────────────────────────┴──────────┘
                                       S1                      S2
```
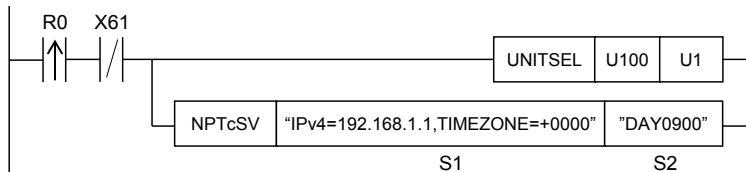
* A target unit for this instruction is specified with UNITSEL beforehand.

∎ Operation unit

There is no operation unit.

∎ List of operands

Operand	Description
S1	The starting address storing the server specification parameter or a character constant is specified.
S2	The starting address storing the time acquisition timing setting parameter or a character constant is specified.

∎ Available devices

(A: Available)

Operand	16-bit device											32-bit device			Integer			Real no.		String	Index modifier
	WX	WY	WR	WL	WS	SD	DT	LD	UM	WI	WO	TS CS	TE CE	IX	K	U	H	SF	DF	" "	
S1	A	A	A	A			A	A												A	
S2	A	A	A	A			A	A												A	

∎ Processing

- Set NTP server address and time zone in Ethernet unit according to S1.
  * The unit configuration data of Ethernet never be rewritten.

- Set time acquisition request timing according to S2.
  When it has already been set in CPU configuration, that data will be invalid and the NTP time acquisition request will be executed at the timing specifyinng by this instruction.

  The setting will be valid until the power turns off.
  Also, it will be valid until PROG mode changes to RUN mode after copying a project using an SD card and executing a communication command (download of project, backup/restoration of project, writing of configuration fixed area, forced cancel of security, initialization of system (factory default setting)).
  However, the time acquisition timing (CPU configuration) setting follows the project setting simultaneously when the project is changed regardless of the mode change from PROG to RUN.

- The setting content will not be lost even if IPv4SET instruction is executed.

• It is executable when the Ethernet initialization active (X61) is OFF. If it is ON when executing the instruction, an error is set to CY flag and it becomes no operation.

■ Details of operand [S1]

The starting address storing the server specification parameter or a character constant is specified.

Setting item		Settings
S1	IP address or host name of NTP server (can be omitted)	Specify IP address or host name. For IP address, specify the keyword "IPv4=" or "IPv6=" at the beginning. For host name, specify "HOST=". * The number of characters should be within 68 characters including keywords ("IPv4=", "IPv6=", "HOST="). - For IPv4 address "IPv4=111.122.133.144" - For IPv6 address "IPv6=1111:1222::1555:0:0:1888" - For host name "HOST=ntp.pidsx.com"
	Time zone setting (can be omitted)	Specify the time zone setting in "dHHMM" format (d:"+" or "-", HH: hour"00-24", MM: minute"00-59"). Specify the keyword "TIMEZONE=" at the beginning. - For GMT+09:00 (Osaka, Sapporo, Tokyo) "TIMEZONE=+0900" - For GMT-10:00 (Hawaii) "TIMEZONE=-1000" - For GMT 00:00 (Greenwich Mean Time) "TIMEZONE=+0000"

• Input "IP address or host name of NTP server" and "Time zone setting" separated by a comma ",".

• The keywords should be specified in the order shown in the above table. Upper and lower case characters can be used for specifying keywords.

• A part of parameters can be omitted. Omitted parameters are not changed.

• When omitting the part before a specified keyword, omit only "keyword" without omitting ",".

• When omitting the part after a specified keyword, omit both "," and "keyword".

• It is prohibited to specify the same keyword redundantly. If specified, an error occurs.

Setting example

Example 1	S1	"IPv4=111.122.133.144,TIMEZONE=+0900"
	Settings	NTP server (IPv4): 111.122.133.144, Time zone: GMT+09:00

Setting example when omitting a part of a keyword

Example 1	S1	"HOST=ntp.pidsx.com"
	Settings	NTP server (Host name): ntp.pidsx.com, Time zone: Unchanged
Example 2	S1	",TIMEZONE=+0900"
	Settings	NTP server (IPv4): Unchanged, Time zone: GMT+09:00

■ **Details of operand [S2]**

The starting address storing the time acquisition timing setting parameter or a character constant is specified.

Setting item		Settings
S2	Once daily/specified time (can be omitted)	Time data acquisition timing: Once a day at a specified time. DAY= DISABLE: Not set HHMM: Set, HH: hour"00-23", MM: minute"00-59\rdblquote
	Once weekly/specified day of the week and time (can be omitted)	Time data acquisition timing: Once a week at a specified day of the week and time. WEEK= DISABLE: Not set WHHMM: Set, W: 0(Sunday)-6(Saturday), HH: hour"00-23", MM: minute"00-59\rdblquote
	Once monthly/specified date and time (can be omitted)	Time data acquisition timing: Once a month at a specified date and time. MONTH= DISABLE: Not set DDHHMM: Set, DD: "01-28", HH: hour"00-23", MM: minute"00-59\rdblquote

- Input "Once daily/specified time", "Once weekly/specified day of the seek and time" or "Once monthly/specified date and time" separated by a comman ",".

- The keywords should be specified in the order shown in the above table. Upper and lower case characters can be used for specifying keywords.

- A part of parameters can be omitted. Omitted parameters are not changed.

- When omitting the part before a specified keyword, omit only "keyword" without omitting ",".

- When omitting the part after a specified keyword, omit both "," and "keyword".

- It is prohibited to specify the same keyword redundantly. If specified, an error occurs.

Setting example

Example 1	S2	"DAY=DISABLE,WEEK=11200,MONTH=010000"
	Settings	Time acquisition (Day): Not set, Time acquisition (Week): Monday, 12:00, Time acquisition (Month): 1, 0:00

Setting example when omitting a part of a keyword

Example 1	S2	"DAY=0900"
	Settings	Time acquisition (Day): 9:00, Time acquisition (Week): Not change, Time acquisition (Month): Not change
Example 2	S2	",WEEK=11200,MONTH=010000"
	Settings	Time acquisition (Day): Not change, Time acquisition (Week): Monday, 12:00, Time acquisition (Month): 1, 0:00
Example 3	S2	",,MONTH=010000"
	Settings	Time acquisition (Day): Not change, Time acquisition (Week): Not change, Time acquisition (Month): 1, 0:00

■ **Precautions on programming**

• This instruction is dedicated to ET-LAN.
A target unit for this instruction is specified with UNITSEL beforehand.

• When specifying a device for an operand that this character constant can be specified, set string data using SSET instruction in advance. (ESSET instruction cannot be used as the format is different.)

• "When power supply is on" cannot be set for the acquisition timing.

• After executing this instruction;

When any of the settings "Once daily/specified time", "Once weekly/specified day of the week and time and "Once monthly/specified date and time" is set to "Set", the time data acquisition method "Acquire automatically from SNTP server" should be set to "Yes".

When all the settings "Once daily/specified time", "Once weekly/specified day of the week and time and "Once monthly/specified date and time" are set to "Not set", the time data acquisition method "Acquire automatically from SNTP server" should be set to "No".

• This instruction is not available in interrupt programs.

• This instruction cannot be used while acquiring the time of NTP. It is recommended to use this instruction only once.

• CY (SR9) and SD29 are cleared to 0 when this instruction is completed successfully. It is set when the operation ends abnormally. (Refer to the flag operation.)

■ **Flag operation**

Name	Description
Latest error (SR7) Hold error (SR8)	To be set when an out-of-range value is specified for parameters.
	To be set when the unit specified by UNITSEL is not an Ethernet unit.
	To be set when executed in an interrupt program.
	To be set while acquiring the time of NTP.
CY(SR9)	To be set when executed during the initialization of Ethernet.
	The detail code set in SD29 is "11: Ethernet initialization active".