Panasonic

Control Unit

ELC500

User's Manual

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Cautions for Your Safety

Read the manual carefully before installing, running and maintenance for proper operation. Before using, master the knowledge of the equipment, safety information and all of other notes.

This manual uses two safety flags to indicate different levels of danger.

⚠ **WARNING**	A handling error could cause serious physical injury to an operator and in the worst case could even be fatal.

- Always take precautions to ensure the overall safety of your system, so that the whole system remains safe in the event of failure of this product or other external factor.
- Do not use this product in areas with inflammable gas. It could lead to an explosion.
- Exposing this product to excessive heat or open flames could cause damage to the lithium battery or other electronic parts.

⚠ **CAUTION**	A handling error could cause serious physical injury to an operator or damage to the equipment.

- To prevent abnormal exothermic heat or smoke generation, use this product at the values less than the maximum of the characteristics and performance that are assured in these specifications.
- Do not dismantle or remodel the product. It could lead to abnormal exothermic heat or smoke generation.
- Do not touch the terminal while turning on electricity. It could lead to an electric shock.
- Use the external devices to function the emergency stop and interlock circuit.
- Connect the wires or connectors securely. The loose connection might cause abnormal exothermic heat or smoke generation.
- Do not allow foreign matters such as liquid, flammable materials, metals to go into the inside of the product. It might cause exothermic heat or smoke generation.
- Do not undertake construction (such as connection and disconnection) while the power supply is on.

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Introduction

Thank you very much indeed for purchasing
'Control Unit ELC500'.
In this manual, we explain the usage of Control Unit ELC500. Please use it correctly after understanding the content enough.

Table of Contents

Outline for Control Unit ELC500 1
Features of ELC500 Control unit 1
Data collection, File creating, Saving files 1
Demand monitoring, Alarm link control 1
Special control (Start control, Cyclic control) 1
Write data 1
Send mail 1
Programming' 2
Chapter 1 Web server 2
1.1 Name and Model Numbers 3
1.1.1 Main Unit 3
1.1.2 Option 3
1.1.3 Software 3
1.1.4 Additional features of each version 3
1.1.5 Combination Devices 4
1.1.6 ECOnect Series 4
1.1.7 FP7 Series 4
1.2 Combination Devices List 7
1.2.1 Restrictions of Combination Devices 8
1.2.2 Common Restrictions for each Unit 8
1.2.3 Restrictions for Mounting Number 8
1.2.4 Restrictions for Communication Function 8
1.3 Restrictions of Power Supply Selection and Combination 9
1.3.1 Power Supply for Internal Circuit 9
1.3.2 Parts Name and Functions 11
1.3.3 Parts Names 11
1.4 Installation and Cabling 16
1.4.1 Installation 16
1.4.2 Install Space 16
1.4.3 How to Connect Unit 17
1.5 How to Install Unit 19
1.5.1 Cabling 20
Chapter 2 Cabling of Power Supply Unit 20
2.1 Cabling of Power Supply for ELC500 22
Chapter 3 Grounding 23
3.1 Wiring of COM Port Terminal Block 24
3.1.1 Install and Setup of Backup Battery 26
3.1.2 Functions of Backup Battery 26
3.1.3 How to Install 26
3.2 Lifetime and Replacement Interval of Backup Battery 27
3.2.1 For your Safety 28
3.2.2 Safety Circuit 28
3.2.3 Momentary Power Failures 28
3.2.4 Alarm Output 29
3.3 Example of Connection to ELC500 30
3.3.1 Demand Control System 30
3.3.2 Connect to Eco-POWER METER or Remote I/O unit 32
3.3.3 Check Before Power On 34
3.4 Check Items Befotr Power On 34
3.4.1 Flow to Start Operation 35
3.4.2 Setup Procedure of Configurator EL500 36
3.4.3 Configurator EL500 36
3.5 How to Install 36
3.5.1 How to Uninstall 39
3.5.2 Start and Exit Configurator EL500 40
Chapter 4 Functions of Configurator EL500 41
4.1 Menu 43
4.2 File 43
Chapter 5 Setup 44
5.1
5.1.1
5.1.2
5.1.3
5.2
5.3
5.3.1
5.3.2

Online ... 44
Option ... 45
Help ... 45
Tool Bar ... 46
Navigator ... 47
Setup and Functions ... 48
Basic Configuration ... 48
Connection Device Setup ... 70
5.3.3 Trigger Setup ... 75
5.3.4 Remote I/O Output Setup ... 84
5.3.5 Logging File Setup ... 86
5.4 Demand Setup ... 100
5.5 Special Control ... 132
5.6 Write data ... 138
Send mail ... 142
5.6.1 Maintenace ... 147
5.6.2 Communication ... 147
5.6.3 Mode change ... 149
5.6.4 Status View ... 150
5.6.5 Current Value Monitor ... 152
5.6.6 Logging File Download ... 155
5.6.7 Read Out System History ... 157
5.6.8 Remote I/O Setup ... 160
5.6.9 Password Setup / Password Delete ... 161
5.7 Initialize ... 163
5.7.1 Firmware Update ... 164
5.7.2 Overlap of each Control ... 166
5.7.3 System ladder program update ... 169
5.7.4 I/O Number Allocation ... 172
5.7.5 Base of I/O Allocation ... 172
5.7.6 How to Count I/O Numbers ... 172
5.7.7 Concept of I/O Number Allocation ... 172
5.7.8 List of Occupied I/O Points for each Unit ... 173
5.7.9 Optional Allocation Using FPWIN Pro7 ... 174
5.7.10 Registration of Unit to be Used and Starting Word Number ... 174
5.8 SD Memory Card Operation ... 177
5.9 Preparing SD Memory Card ... 177
Chapter 6 How to Insert SD Memory Card ... 178
6.1 Save Execution File for SD Memoru Card Operation ... 178
6.1.1 Operation by SD Memory Card ... 179
6.1.2 Transmission from SD Memory Card to Execution Memory ... 180
6.1.3 Cautions for SD Memory Card Operation ... 180
6.2 Communication ... 181
6.2.1 MEWTOCOL communication ... 181
Chapter 7 MODBUS(RTU) Communication ... 182
7.1 Data collection behavior ... 184
7.2 Registers ... 185
7.3 Operation Memory Area ... 185
7.4 Data Registers Map ... 187
7.5 Data Registerd for Data Collection ... 188
7.6 Data Registers for Demand ... 189
Chapter 8 Special Internal Relay(R) ... 197
8.1 System Relays (SR) ... 198
8.2 System Data Registers (SD) ... 201
8.3 Self-diagnostic and Trouble shooting ... 203
Chapter 9 Self-diagnostic ... 203
9.1 Status indicator of LED ... 203
9.2 Procedures at Error ... 203
9.3 If ERROR LED is flashed. ... 203
9.4 Not change to RUN mode ... 204
9.5
9.6
9.7
Chapter 10
10.1
10.1.1
10.2
10.2.1
10.2.2

ALARM LED turns ON 204
POWER LED does not turn ON 205
Protect error message appears 205
Troubleshooting 206
Error Code 210
Specifications 214
ELC500 Control unit Specifications 214
Power supply for GT specifications 214
10.2.3 Data Logging / Damand Specifications 215
10.2.4 Data Logging 215
10.2.5 Demand Function 215
10.3 Program (PLC) Specifications 217
10.4 Communication Specifications 218
Chapter 11 USB Communication (Configurator software) 218
11.1 COM0 port (RS232C) Communication 218
11.2 COM1 / 2 port (RS-485 / RS-422) Communication 219
11.3 LAN port (Ethernet) Communication 220
11.3.1 External Memory Specifications 220
11.3.2 Dimensions and Others 221
11.4 Dimensions 221
11.5
11.5.1
11.5.2
11.5.3
11.5.4
11.6
Chapter 12
12.1

Cautions before using

■Installation environment

・Inside the control panel
・Surrounding air temperature: 0 to +55℃
・Surrounding air humidity: 10 to 95%RH (at 25℃) no-condensing
・Attitude under 2000m
・Pollution degree 2
・Do not use in the following environments.
-Where the unit will be exposed to direct sunlight
-Where condensation might occur by sudden temperature changes
-Where inflammable or corrosive gas might be produced
-Where the unit will be exposed to excessive airborne dust or metal particles
-Where organic solvents such as benzene, paint thinner, alcohol, or strong alkaline solutions such as ammonia or caustic soda might adhere to the unit
- Where the place near high-voltage cable, high-voltage device, power line, power device
- Where the place near a machinery with transmission function such as amateur radio
- Where the place near a machinery which occurs the big switching serge (at least 100mm)

■Installation

・Installation and wiring must be performed by expert personnel for electrical work or electric piping.

■Static electricity

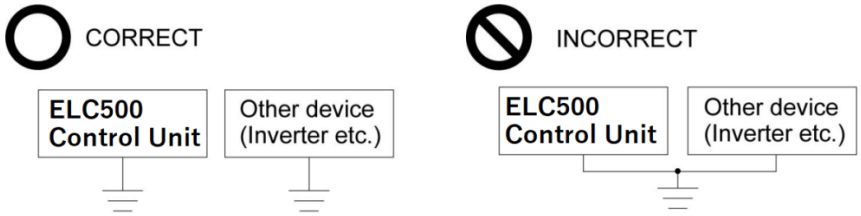
・Do not touch pins of connector directly in order to avoid electrostatic discharge failure.
・Discharge static electricity touching the grounded metal etc. before you touch the unit.

■Power supplies

・Use twisted (twisted) wires for power supply.
・Although it has enough noise immunity against noise to the power supply line, it is recommended to take measures such as using an isolation transformer in order to decrease the noise.
・Use the separate wiring for power supply line and input / output equipment line.
・If using a power supply without a protective circuit, power should be through a protective element such as fuse. If an incorrect voltage is directly applied, the internal circuit may be damaged or destroyed.

■Grounding

・Ground to ensure sufficient noise immunity. (In case of using 24V DC, ground the function earth line of the attached power supply cable.)
・Make the ground point as close as possible to ELC500 and shorten the distance of the ground wire.
・Sharing the ground with other equipment may have the opposite effect, so be sure to use a dedicated ground.
・The earth terminal of the AC power supply unit should be grounded to Class D (Type 3) ground resistance of 100 Ω or less.



■Before power on

Please note the following points when turning on power at the first time.

・Confirm there are neither wiring rubbish nor especially an electrical conduction when installed.
・Confirm neither the power supply wiring and the power-supply voltage are wrong.
・Tighten the installation screw and the terminal screw surely.
・Set RUN/STOP mode change switch to STOP.
・Use an electric wire applicable to the rated current.

■Request concerning setting parameters storage

To prevent the accidental loss of setting parameters, the user should consider the following measures.

・To avoid accidentally losing setting parameters, destroying files, or overwriting the contents of files, created setting files should be backed up or the contents should be printed out and then saved.
・The password setting is designed to avoid settings being accidentally changed. If the password is forgotten, however, it will be impossible to change the settings. When specifying the password, note it in the specifications or in another safe location in case it is forgotten at some point.

■Precautions on using network

This product supports various network connections therefore it is likely to be subject to the following security risks.

1. Leakage and outflow of information via this product
2. Illegal operation by third party with malicious acts
3. Interference and shut down by third party with malicious acts

It is recommended to take network security measures such as below for protecting against these risks under your responsibility.

・Use this product on the network that has been ensuring safety by using firewall
・Check and extermination against the infection of computer viruses and unauthorized program are you make sure that you have performed regularly
・To protect against unauthorized attacks, set the user name and password, and to limit the users who can log in.
・Restrict access by user authentication so that authentication information (user name, password) and network configuration information and equipment inside information is not leak on the network.
・Before you access this product via browser, close other windows.
・After you access this product via browser, close all browsers.
・Change password regularly.
・Do not install the place where it can be disassembled or remodeled easily.

Outline for Control Unit ELC500

ELC500 allows you to collect data and control FA devices or I/O devices by easy-setup.
It can communicate to upper device and monitor the collected data with PC.
In addition, it has functions that demand control, control to decrease power consumption, therefore, you can use ELC500 for demand control system or energy-saving system.

Chapter 1 Features of ELC500 Control unit

1.1 ELC500 Control unit has 7 features.

1.1.1 Data collection, File creating, Saving files

ELC500 has communication interface, Ethernet, RS-232C, RS-485/RS-422 and collect data of FA devices or I/O devices by communication protocol of MODBUS-RTU or MEWTOCOL. It can collect data up to 512-point
ELC500 save data in SD memory card as .csv format and transmit files by FTP or mail.
Refer to 5.6.5.Logging file setup.

1.1.2 Demand monitoring, Alarm link control

ELC500 monitor demand with 2 types of demand system, fixed demand or IEC demand.
You can select one method for demand prediction method. ELC500 control Remote I/O unit according to alarm level calculated by ELC500. It is possible to predict demand only with fixed demand.
Refer to 5.6.6 Demand setup.

■Fixed-time demand
It is a demand system that is calculates average usage power in 15-minute, 30-minute, 60-minute, based on the hour.

■IEC demand
It is a demand system according to IEC61557-12.
ELC500 supports sliding block interval demand, fixed block interval demand.

1.1.3 Special control (Start control, Cyclic control)

ELC500 realizes the following control with simple setup.

■Start control
This is the control that shifts start time for each group in order to reduce peak power.
Refer to 5.6.7.1. Start control.

■Cyclic control
1.1.4 This is control that stops each group at the setting cycle to reduce peak power.
Refer to 5.6.7.2. Cyclic control.

1.1.5 Write data

ELC 500 can write data such as relay status, registers by setting trigger.
For example, when the collected data is changed to over 100, trigger is established and make I/O devive contact to ON. When the collected data is changed to under 90, trigger is reset and make I/O device contact to OFF.
Refer to 5.6.8. Write data

Send mail

ELC500 can send mail to designated address by setting trigger.
For example, you can receive mail when it detects an abnormal value by setting.
Refer to 5.6.9 Send mail.

Programming'

Using 'FPWIN Pro7', you can create program and debug the created program.
You can write the program to the unit via USB cable or LAN cable.
Save the setup for your backup.

Note

- 'FPWIN Pro' can convert other PLC's program to ELC500's, by changing PLC model to ELC500.
  But the converted program cannot be used for ELC500.
  If you transfer it to ELC500, error will occur.
- Before programming, download the project file (ELC500SystemLadder_vxxx.pce) from our website and use the project to program. ('xxx' : version information)
- For programming, refer to 'FP7 CPU Unit Command Reference Manual' or 'FPWIN Pro7 Introduction Guidance' manual on our website.

1.1.6

Web server

ELC500 has Web server function. You can monitor the collected data with web browser when you create web contents by using 'Web Creator' and update it.
Refer to FP7 Web server manual in detail.

1.1.7

Name and Model Numbers

Main Unit

Product name	Model No.
Control unit ELC500	UELC500

Option

Product name	Description	Model No.
Power supply cable	Cable length 1m	AFPG805
Backup battery (attached)	Required for holding the calendar timer function	AFPX-BATT
FP7 end unit	For connecting the end	AFP7END

Software

Product name	Description	Model No.	Remarks
Configurator EL500 *1	Setup software	-	Free of charge
Control FPWIN Pro7	Programming tool	AFPSPR7	
Configurator WD *1	Tool for searching IP address	-	Free of charge
Control Web Creator *1	Web page creating tool	AFPSWC	Key unit is necessary.
Key unit	License key of Control Web Creator for USB port	AFPSWCKEY	
SD Formatter *2	Tool for format SD memory card	-	Free of charge

*1 You can download from our website. (Member registration is necessary, free of charge.)
*2 You can download from Panasonic HP. (Member registration is not necessary, free of charge.)

Note
It doesn't support to upgrade the firmware by using Configurator WD.

Additional features of each version

The features added in each version are as follows.

Function	Firmware	System Ladder	Configurator EL500
- Create current demand graph with WebCreator. - Ability to change the demand setting value from communication.	Ver 1.10	Ver 1.10	-
- Added a communication status confirmation screen to the current value monitor. - Added system ladder version to status display. - Addition of demand trigger to system trigger.	-	-	Ver 1.10

Combination Devices

ECOnect Series

Using with the below product, you can use the functions that demand control, start control and I/O output control of cyclic control.

Product name	Description	Model No.
Remote I/O unit	Common to ELC series ・Rated operating voltage: 100-240V AC ・Input 2-point ・Relay output 4-point ・RS-485 (MODBUS(RTU),MEWTOCOL)	UENU2D4R12

1.3
1.3.1

FP7 Series

You can use the below FP7 series unit for ELC500.
*Refer to the each manual for FP7 series.
<Power supply units>

Input Specifications	Output specifications	Model No.
100-240V AC	24V DC 1.0A	AFP7PSA1
100-240V AC	24V DC 1.8A	AFP7PSA2

1.3.2

<Input and output units>
FP7 input units

Type	Number of points	Connection method	Specifications	Model No.
DC input	16 points	Terminal block	12 to 24 V DC, common polarity: +/- common, input time constant setting	AFP7X16DW
	32 points	MIL connector	24 V DC, common polarity: +/- common, input time constant setting	AFP7X32D2
	64 points	MIL connector	24 V DC, common polarity: +/- common, input time constant setting	AFP7X64D2

FP7 output units

Type	Number of points	Connection method	Specifications	Model No.
Relay output	16 points	Terminal block	2 A/point, 5 A/common, 16 points/common (without relay socket)	AFP7Y16R
Transistor output, sink (NPN)	16 points	Terminal block	Load current: 1.0 A, 5A/common, 16 points/common	AFP7Y16T
	32 points	MIL connector	Load current: 0.3 A, 3.2A/common, 32 points/common	AFP7Y32T
	64 points	MIL connector	Load current: 0.3 A / 0.1 A mixed 3.2 A /common, 32 points/common	AFP7Y64T
Transistor output, source (PNP)	16 points	Terminal block	Load current: 1.0 A, 5A/common, 16 points/common	AFP7Y16P
	32 points	MIL connector	Load current: 0.3 A, 3.2 A/common, 32 points/common	AFP7Y32P
	64 points	MIL connector	Load current: 0.3 A / 0.1 A, mixed 3.2A /common, 32 points/common	AFP7Y64P

<Analog input and output units>

Product name	Specifications	Number of channels	Model No.
FP7 analog input unit (high-speed and multi-channel type)	Voltage / current, conversion rate: 25 μs/channel, resolution: max. 16 bits, accuracy: ±0.1 % F.S. or less (at 25℃) *1	8 channels	AFP7AD8
FP7 analog input unit (High-speed and high-accuracy type)	Voltage / current, conversion rate: 25 μs/channel, resolution: max. 16 bits, accuracy: ±0.05 % F.S. or less (at 25℃) / insulation between channels	4 channels	AFP7AD4H
FP7 analog output unit (High-speed and high-accuracy type)	Voltage / current, conversion rate: 25 μs/channel, resolution: max. 16 bits, accuracy: ±0.05 % F.S. or less (at 25℃) / insulation between channels	4 channels	AFP7DA4H

*1 The digital conversion value corresponding to the analog input of about 2 V is stored in the input relay area (WX) to the channel that is not connected when voltage range setup.

<Temperature input units>

Product name	Specifications	Model No.
Thermocouple multiple analog input unit	8ch ・[Thermocouple(resolution: 0.1℃)] K/J/T/N/R/S/B/E/PLⅡ/WRe5-26 ・[Voltage/Current] Resolution: max. 16 bits	AFP7TC8
Resistance temperature detector input unit	8ch ・[Resistance temperature detector(resolution: 0.1℃)] Pt100/JPt100/Pt1000	AFP7RTD8

<Multi input/output units>

Number of points	Connection method	Specifications	Model No.
Input: 16 points Output: 16 points	MIL connector	Input: Total 16 points •DC input: Max. 16 points •High-speed counter: Max. 4 channels (1 channel: 4 points) •Interrupt input: Max. 8 points Output: Total 16 points •Transistor output: Max. 16 points •Pulse output: Max. 4 channels (1 channel: 2 points) *1 •PWM output: Max. 4 channels (1 channel: 1 points) •Comparison output: Max. 8 points	AFP7MXY32DWD

*1 Trapezoidal control with acceleration / deceleration not yet supported.
Note) FP7 multi input/output unit positioning type (Model No. AFP7MXY32DWDH) is not supported.

<High-speed counter units>

Specifications				Model No.
Input time constant	Number of counters	Counter type	Input type	
Selection type	2 channels	Liner counter /ring counter	Individual input: 1 multiple, 2-multiple Direction discrimination input: 1 multiple, 2-multiple 2-phase input: 1 multiple, 2-multiple, 4-multiple	AFP7HSC2T
	4 channels			AFP7HSC4T

<Pulse output units>

Specifications			Model No.
Output type	Number of axes controlled	Operation speed	
Transistor	2 axes	1 pps to 500 kpps	AFP7PG02T
	4 axes		AFP7PG04T
Line driver	2 axes	1 pps to 4 Mpps	AFP7PG02L
	4 axes		AFP7PG04L

<FP7 Programmable input/output units>

Output type	I/O points	Model No.
Transistor	Input: 16 points Output: 16 points	AFP7PXY001

<PHLS (Remote I/O) unit>

Master unit

Max. points	Communication speed	Total distance	Max. number of connections	Model No.
1,008 points	6 Mbps / 12 Mbps	200 m (at 6 Mbps) / 100 m(at 12 Mbps)	63 slaves	AFP7PHLSM

Slave unit

Shape	Connection method	Type	Number of points	Specifications	Model No.
Standard type	Screw-type terminal block	DC input	8 points	24 V DC, common polarity: +, 8 points/common	AFPRP1X08D2
			16 points	24 V DC, common polarity: + 16 points/common	AFPRP1X16D2
		Transistor output (sink)	16 points	Load current: 0.1 A, common polarity: -, 0.4 A/ common, 16 points/common	AFPRP1Y16T
		DC input transistor output (sink)	Input: 8 points Output: 8 points	Input: 24 V DC, common polarity: +, 8 points/common Output: load current: 0.1 A, common polarity: -, 0.4 A/common, 8 points/common * Input / output common is shared.	AFPRP1XY16D2T
Compact type	e-CON	DC input	8 points	24 V DC, common polarity: +, 8 points/common	AFPRP2X08D2E
	Connector-type terminal block	DC input	16 points	24 V DC, common polarity: +, 16 points/common	AFPRP2X16D2
		Transistor output (sink)	16 points	Load current: 0.1 A, common polarity: -, 0.8 A/common, 16 points/common	AFPRP2Y16T
			Input: 8 points Output: 8 points	Input: 24 V DC, common polarity: +, 8 points/common Output: load current: 0.1 A, common polarity: -, 0.8 A/common, 8 points/common * Input / output common is shared.	AFPRP2XY16D2T
		Relay output	4 points	1 A/point 2 A/common 2 points/common	AFPRP2Y04R

Combination Devices List

<FP7 Series>

Product name	Model No.	ELC500
Power supply unit	AFP7PSA1	Available
Power supply unit	AFP7PSA2	Available
FP7 input unit	AFP7X16DX	Available
	AFP7X32D2	Available
	AFP7X64D2	Available
FP7 output unit	AFP7Y16R	Available
	AFP7Y16T	Available
	AFP7Y32T	Available
	AFP7Y64T	Available
	AFP7Y16P	Available
	AFP7Y32P	Available
	AFP7Y64P	Available
FP7 input and output unit	AFP7XY64D2T	Available
	AFP7XY64D2P	Available
FP7 analog input and output unit	AFP7AD8	Available
	AFP7AD4H	Available
FP7 analog output unit	AFP7DA4H	Available
FP7 Thermocouple multiple analog input unit	AFP7TC8	Available
FP7 Resistance temperature detector input unit	AFP7RTD8	Available
FP7 Multi input/output unit	AFP7MXY32DWD	Available
FP7 Multi input/output unit Positioning type	AFP7MXY32DWDH	Not available
FP7 High-speed counter unit	AFP7HSC2T	Available
	AFP7HSC4T	Available
FP7 Pulse output unit	AFP7PG02T	Available
	AFP7PG04T	Available
	AFP7PG02L	Available
	AFP7PG04L	Available
FP7 Multi input/output unit	AFP7PXY001	Available
FP7 PHLS Master unit	AFP7PHLSM	Available
FP7 PHLS Slave unit	AFPRP1X08D2	Available
	AFPRP1X16D2	Available
	AFPRP1Y16T	Available
	AFPRP1XY16D2T	Available
	AFPRP2X08D2E	Available
	AFPRP2X16D2	Available
	AFPRP2Y16T	Available
	AFPRP2XY16D2T	Available
	AFPRP2Y04R	Available

1.3.3

Note

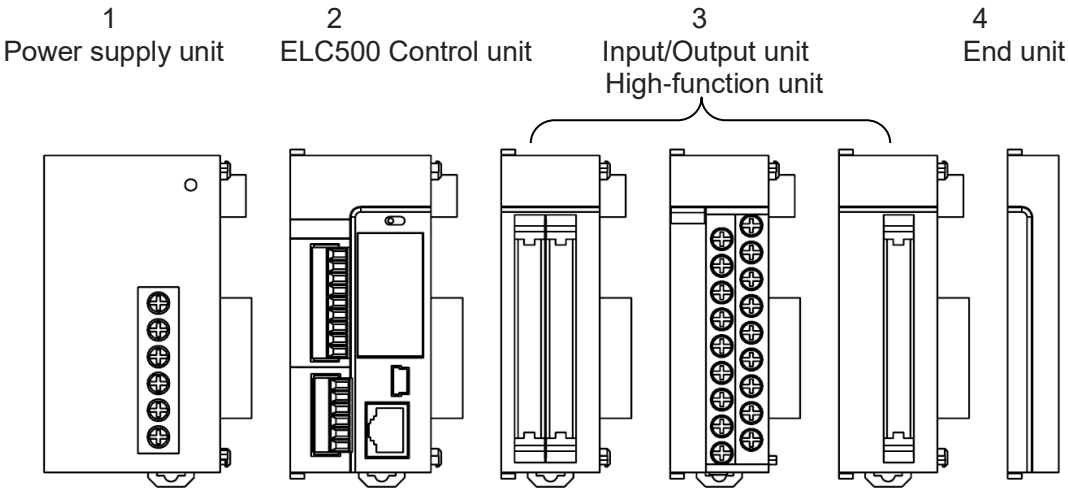
It doesn't use the units without 'Available'.

Restrictions of Combination Devices

Common Restrictions for each Unit

ELC500 can be used by combining any input / output unit and high function unit.
Up to 8 units can be connected.
Be sure to connect the end unit at the end of system.
Both power supply unit and the external power supply 24V DC is used for the system power supply.
Refer to the next for the restrictions of power supply selection and combination.

1.4
1.4.1



Restrictions for Mounting Number

1.4.2

Unit type	Mounitng number	Remarks
Power supply unit ELC500 Control unit	Max. 1 unit	---

1.4.3

Restrictions for Communication Function

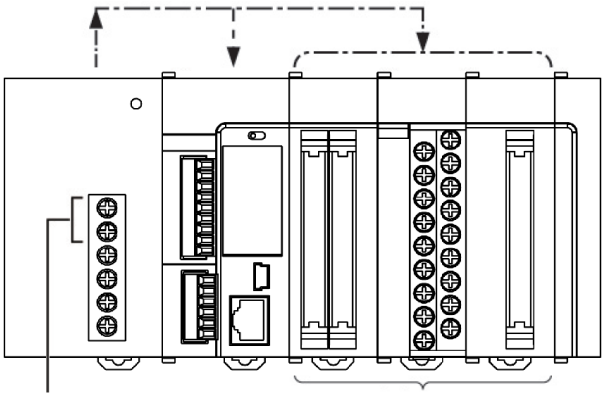
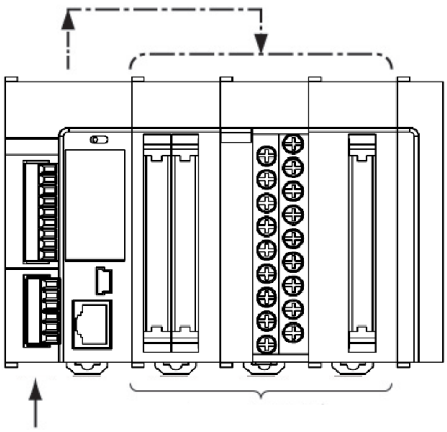
Using function	Restrictions
PLC link	Available communicatino port: Max. 1-port -Serial communication (COM1)
MEWTOCOL-COM master MODBUS-RTU master	Available commmunication port and connection: Max.16 in total -Serial communication (COM0, COM1, COM2) -Ethernet communication (User connection 1 to 16)
MEWTOCOL-COM slave MEWTOCOL7-COM slave MODBUS-RTU slave	Available commmunication port and connection: Max.16 in total -Serial communication (COM0, COM1, COM2) -Ethernet communication (System connection 1 to 4 /User connection 1 to 16)
General-purpose communication	No restrictions

Restrictions of Power Supply Selection and Combination

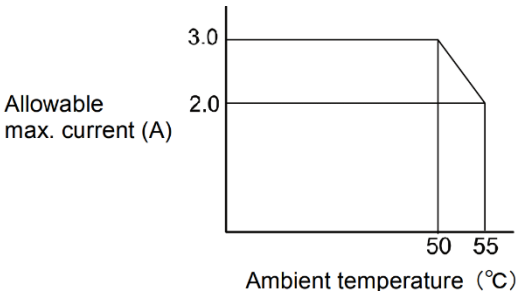
Power Supply for Internal Circuit

■Restrictions of power supply for interenal circuit and unit combination

Power supply for internal circuit is supplied by power supply unit or power supply terminal of ELC500.
Select unit according to the below explaination.

With power supply unit	Without power supply unit
1.5 1.5.1 Via internal bus to each unit  External power supply 100 to 240V AC I/O unit High-function unit	Via internal bus to each unit  External power supply 24V DC I/O unit High-function unit
The total value of the internal current consumption of units to be connected does not exceed the capacity of the power supply unit.	The total value of the internal current consumption of units to be connected does not exceed 3A. *1

*1 In case of using in the ambient temperature 50 degreeC, the current consumption of unit shoudl be in the below range.



■Selection of 24V DC power supply

Select a power supply with the capacity of equal to or larger than the capacity of the unit.
In addition, select a power supply of 24 W or more even in the minimum configuration.
To protect against abnormal voltage from the power supply line, Use an isolated type power supply with built-in protection circuit.
When using the power supply without built-in protection circuit, be sure to use a protection element such as fuse.

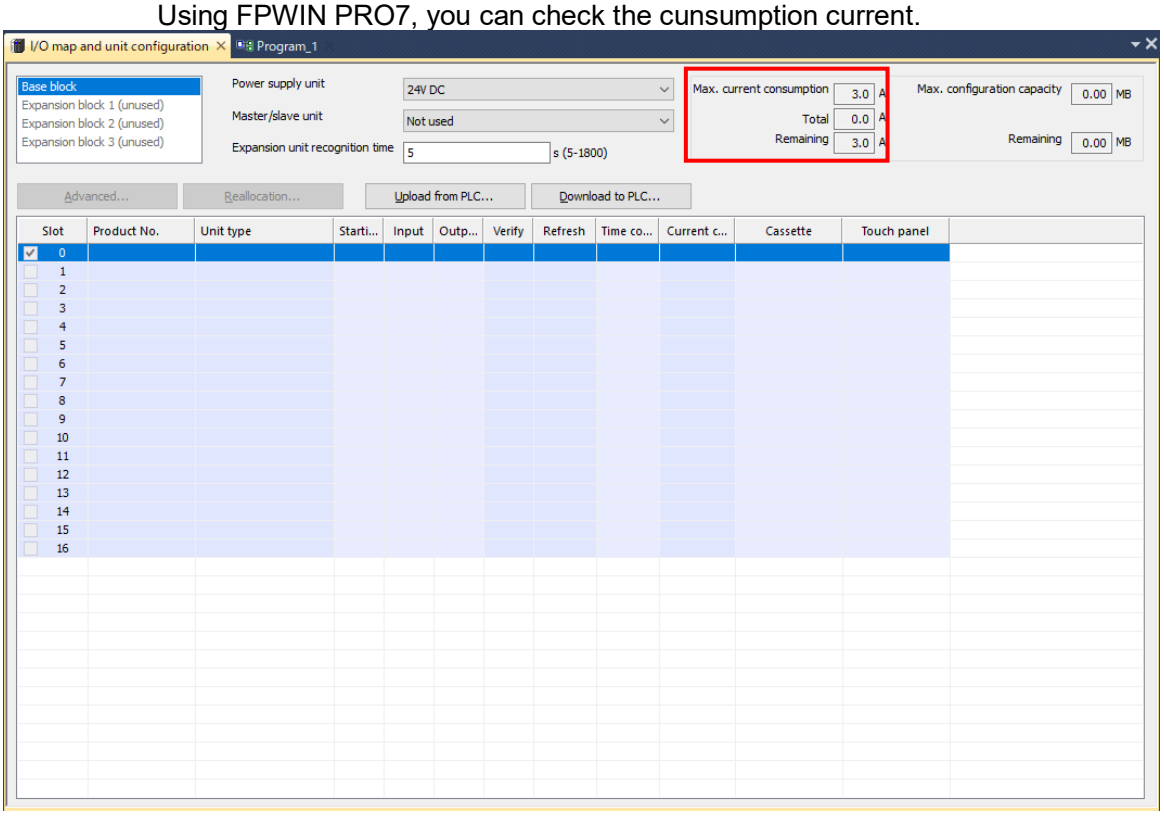
■Output current of power supply unit (24V)

Product name		Model No.	Rated output current
Power suppluy unit	100 to 240V AC, 24W	AFP7PSA1	1A
	100 to 240V AC, 43W	AFP7PSA2	1.8A

Note
When using the power supply unit, do not connect DC power supply to ELC500.

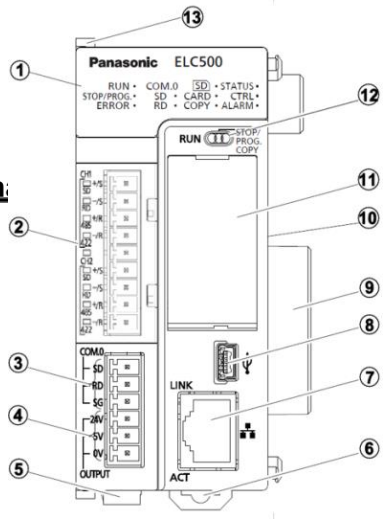
Point

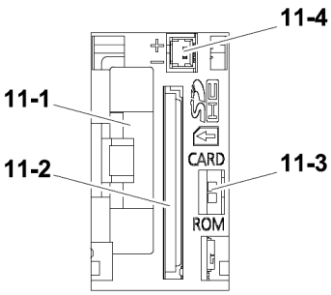
Using FPWIN PRO7, you can check the cunsumption current.



Parts Name and Functions

Parts Names

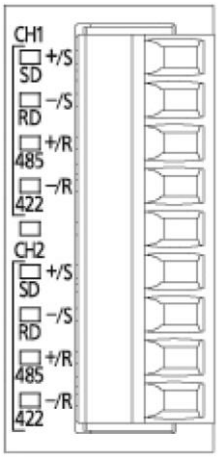




(1) Status indication LED

Indication		LED color	Descriptions
-		Blue	Light when it power on ELC500
RUN		Green	Light when RUN mode.(Collecting data, Logging data, Demand measuring, Under control)
STOP/PROG.		Green	Light when STOP/PROG. Mode. (Stop or programming)
COM.0	SD	Green	Light when transferring data from COM.0 port (RS-232C).
	RD	Green	Light when receiving data by COM.0 port (RS-232C).
SD		Flash green	Flash when accessing to SD memory card. Flash when logging to the internal memory using logging function
CARD		Green	Light when selecting the working by SD memory card.
COPY		Green	Light when copying.
STATUS			Change color according to working of ELC500.
		Light green	When normal working
		Flash red	When lower communication error
		Light red	When operating error (SD memory card writing error, RTC error)
CTRL			Change color according to demand alarm output of ELC500.
		Off	Not available for alarm link control
		Flash green	Under Start control or Cyclic control
		Light green	Demand alarm level 0
		Flash red	Demand alarm level 1 or level 2
		Light red	Demand alarm level 3
ERROR		Red	Light when it detects error with self-diagnostic.
ALARM		Red	Light when it works watchdog timer by occurring hardware error or operation stagnation.
CH1 (RS-485) (RS-422)	SD	Flash green	COM1 port (RS-485/422 1CH) transmitting data
	RD	Flash green	COM1 port (RS-485/422 1CH) receiving data
	485	Green	Light when selecting RS-485 for COM1 port
	422	Green	Light when selecting RS-422 for COM1 port
CH2 (RS-485) (RS-422)	SD	Flash green	COM2 port (RS-485/422 1CH) transmitting data
	RD	Flash green	COM2 port (RS-485/422 1CH) receiving data
	485	Green	Light when selecting RS-485 for COM2 port
	422	Green	Light when selecting RS-422 for COM2 port
LAN (Ethernet)	LINK	Green	Light when establish the connection via Ethernet.
	ACT	Flash green	Transmitting and receiving some data to or from the connected devices

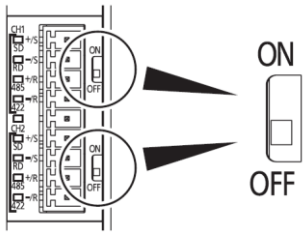
(2) COM1/COM2 port terminal (RS-422/RS-485)
2-channes for 2-wire RS-485, or 4-wire RS-422 port



No.	Signal		RS-485		RS-422	
			Function	Direction	Function	Direction
1	CH1	+/S	(+)	Bidirection	Transmitting data (+)	Output
2		-/S	(-)	Bidirection	Transmitting data (-)	Output
3		+/R	(+)	Bidirection	Receiving data (+)	Input
4		-/R	(-)	Bidirection	Receiving data (-)	Input
5	NC (vacant)					
6	CH2	+/S	(+)	Bidirection	Transmitting data (+)	Output
7		-/S	(-)	Bidirection	Transmitting data (-)	Output
8		+/R	(+)	Bidirection	Receiving data (+)	Input
9		-/R	(-)	Bidirection	Receiving data (-)	Input

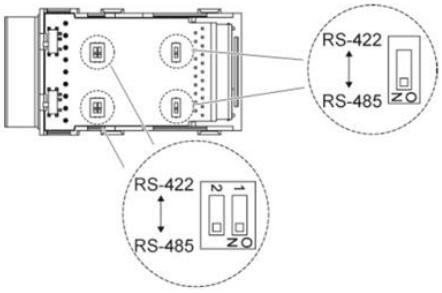
*CH1 and CH2 are insulated.

●Terminal resistance selector switch (under the terminal block)
Use to change terminal resisitance.at COM1 port and COM2 port.
Remove terminal block, it shows the switches. Be sure to set the switch to ON when it is used as a terminal station.

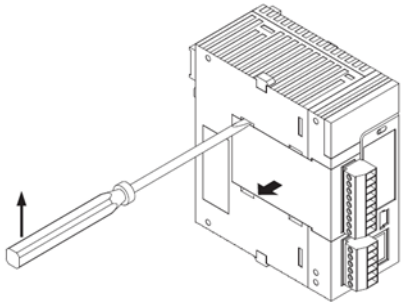


Position	Function
ON	Terminal resistance ON
OFF <default setting>	Terminal resistance OFF

●Serial Mode switch
Use to change serial mode at COM1 port and COM2 port. Remove cover on the side of ELC500, it shows the switches on the PC board. At default setting, it set to RS-485 for both COM1 and COM2.
You can check the settings by status LED.



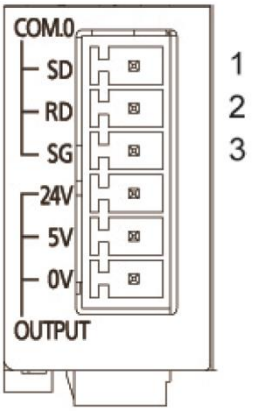
●How to remove serial communication cover



There are 4 hooks.

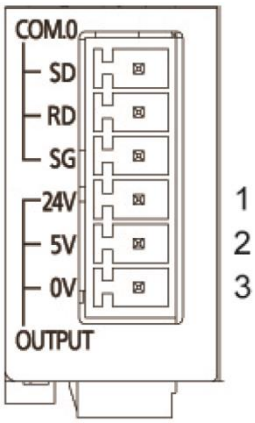
1. Remove cover using some tools.
2. Close cover after setting.

(3) COM0 port (RS-232C)
1-channe for 3-wire RS-232C port



	No.	Signal		Function	Direction
RS-232C	1	COM. 0	SD	Transmitting data	Output
	2		RD	Receiving data	Input
	3		SG	Ground for signal	---

(4) GT power supply output port
It can be used for power supply to our GT series.
Use one, 5V DC or 24V DC according to the using model.



	No.	Signal		Function	Direction
Power supply for GT	1	OUTPUT	24V	24V	---
	2		5V	5V	---
	3		0V	0V	---

* Connect 24V or 5V terminal to + terminal of GT series and
0V terminal to - terminal of GT series.

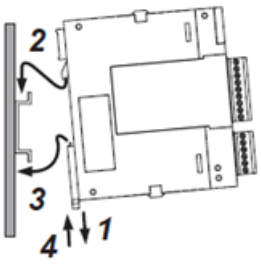
Note
GT power supply output port is designed to use for our GT series. Do not use for another usage. GT power supply output terminal and COM 0 port (RS-232C) is insulated internal.

(5) Power supply connector
Connect to external power supply (24V DC).
Do not connect it when using power supply unit.

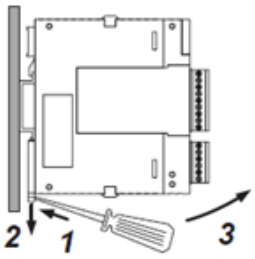
(6) DIN hook

Use to install it on DIN rail.

Installation



Removal

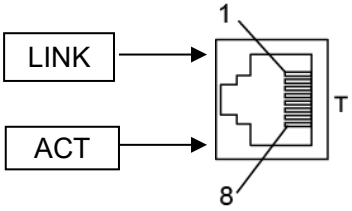


(7) LAN port

Use for connecting to Ethernet LAN. It can be connected programming tool.

MAC address is printed on the side of ELC500.

It supports the Ethernet interface of 100BASE-TX and 10BASE-T and switches automatic by auto negotiation function.



Pin No.	Signal	Direction	Remarks
1	TX+	Output	Transmitting data (+)
2	TX-	Output	Transmitting data (-)
3	RX+	Input	Receiving data (+)
4	N.C.	---	No connection
5	N.C.	---	No connection
6	RX-	Input	Receiving data (-)
7	N.C.	---	No connection
8	N.C.	---	No connection

・Status of LED and working

LED	Working
LINK	Lights when connecting the devices via Ethernet
ACT	Flashes when transmitting or receiving command or response between the connecting devices

(8) USB port

Connect USB cable

Use it to connect PC when using ‘Configurator EL500’ and ‘FPWIN Pro7’.

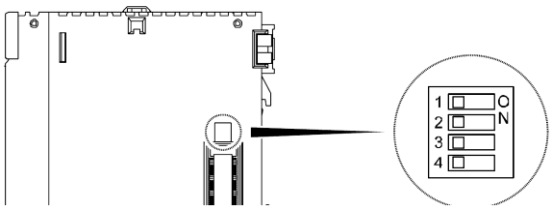
Use MiniB type for ELC500.

(9) Unit connector

Connect I/O unit or high-function unit. End unit is connected when shipped.

(10) Dip switch

Do not change the setting. It default set to OFF all.



(11) SD memory card slot

Open SD memory card cover to insert or remove SD memory card.

After inserting SD memory card, close the cover. If the cover is not closed correctly, it can't access SD memory card and can't read nor write.

No.	Name	Function
11-1	Battery holder	Use to install the battery. With mounting backup battery, it backup calendar timer and logging data when power off.
11-2	SD memory card slot	Use to insert SD memory card.
11-3	Card operation switch	Select ROM operation or SD operation. By selecting SD operation, it starts operating by SD memory card.
11-4	Battery connector	Connect battery. *Note the polarity.

Note

After stop blinking access LED, eject SD memory card.

Be careful to the direction when inserting. If it is wrong, it might break unit and SD memory card.

(12) Mode switch

It switches the operation of ELC500.

Switch	Operation mode
RUN (Left)	Start operation. Execute data collecting and logging, demand monitoring and control, and programs.
STOP/PROG. (Center)	Stop operation. Stop data collecting and logging, demand monitoring and control, and programs.
COPY (Right: momentary)	Transmit the project saved in the internal RAM ROM1 to ROM2 as a backup project. It uses only when transmitting the project.

* You can change RUN mode or STOP/PROG. mode by 'Configurator EL500'. It starts operation with the mode of switch position when power on again.

(13) Fixing hook

Use to fix the power supply unit (sold separately) to the main unit.

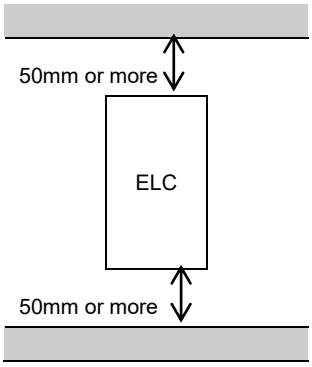
Installation and Cabling

Installation

Install Space

■Panel installing space

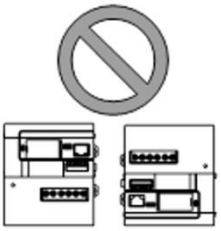
・Leave at least 50 mm of space between the wiring ducts of the unit and other devices to allow heat radiation and the unit replacement.



Chapter 3
3.1
3.1.1

■For heat discharge

・Do not install the unit as shown below.
It is not enough to heat dissipation and it will cause internal abnormal heat generation.



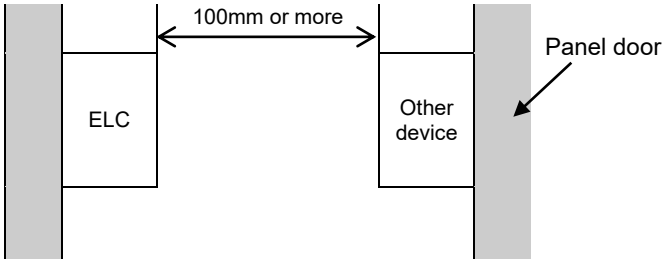
Direct installing

Horizontal installing

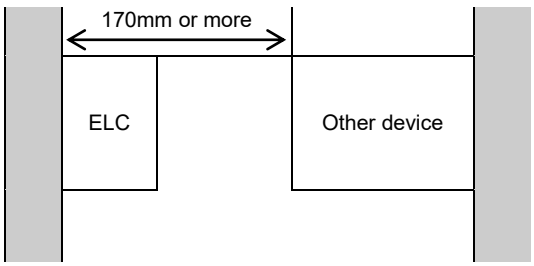
Upside down installing

・Do not install on the top of the devices with high heat generation such as heater, transformer, high-capacity register and so on.

・Keep at least 100mm of space between devices to avoid adverse effects from noise or heat when installing a device or panel door to the front of the unit.



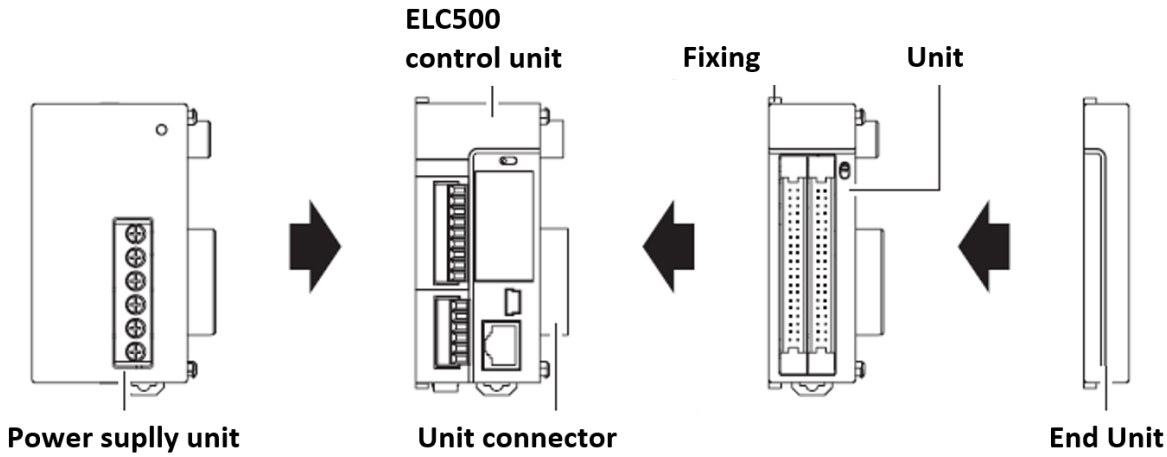
・Leave at least 170mm of space from the front surface of the unit in order to allow room for wiring.



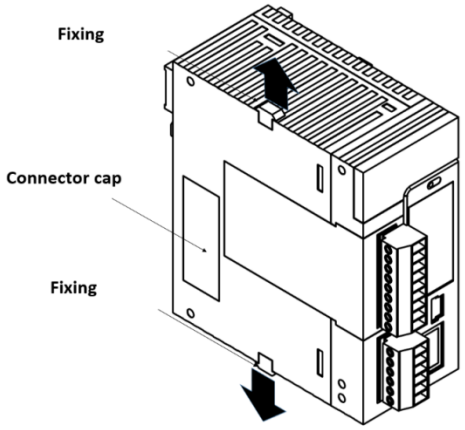
How to Connect Unit

You can connect the unit of FP7 series.
Connect the power supply unit on the left and the other unit on the right.
Connect the unit connectors on the side of the unit with each other.
The end unit is connected when shipped. Remove the end unit to connect the other units.
Attach the end unit to the right side of the last unit.
After connecting the units, install them on DIN rail.

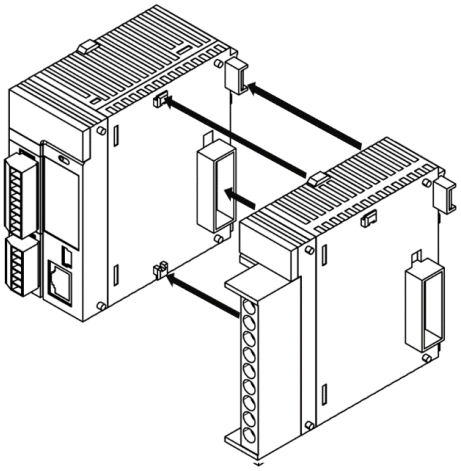
3.1.2 ■How to connect unit



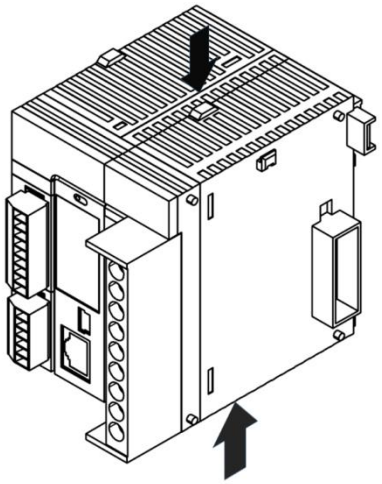
1. Release the fixing hook (2 places).
   Remove the connector cap when connecting power supply unit.



2. Connect the unit connectors with each other.



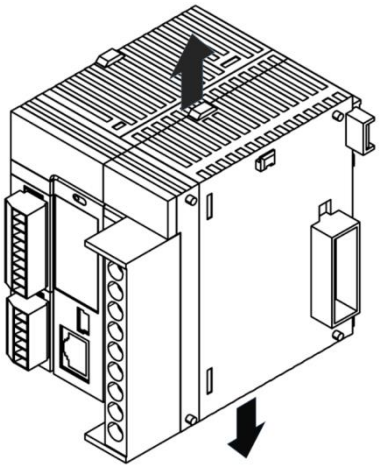
3. Lock them with the fixing hook (2 places).



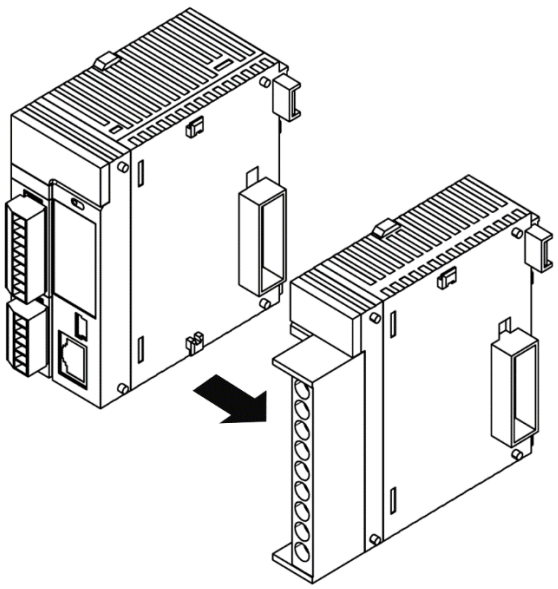
Note
- Up to 8 units can be connected for ELC500.
- It is impossible to use both of power supply unit and power supply cable (24V DC).
  Use one of these.

■How to remove unit

1. Remove the fixing hook (2 places) on the side of the unit.



2. Remove the unit by sliding to horizontal.

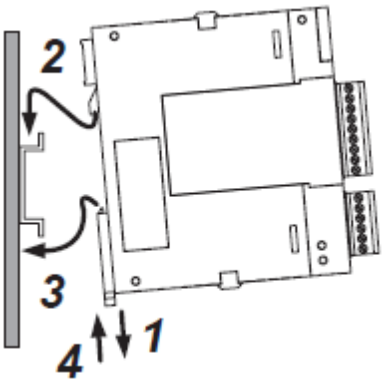


Note
Be sure to turn off the power before connecting units.
Do not touch the connector.
Do not stress the connector.

How to Install Unit

■Installing on DIN rail

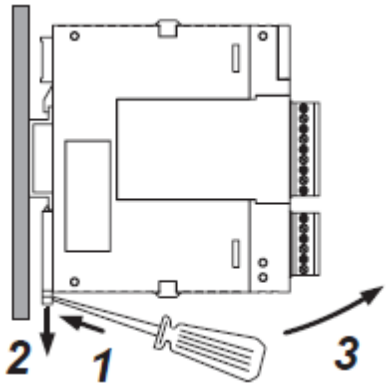
3.1.



1. Pull all DIN hooks on the back of the unit.
2. Mount the mounting part on DIN rail
3. Making the mounting part as a support fit the bottom side of the unit to DIN rail.
4. Lock with hooks with a ‘click’ sound.

Note
Be sure to fix by 2 places of DIN hooks.

■Removing from DIN rail



1 Insert a flathead screwdriver to DIN hook.
2 Pull down the DIN hook.
3 Lift up the unit and remove from the rail.

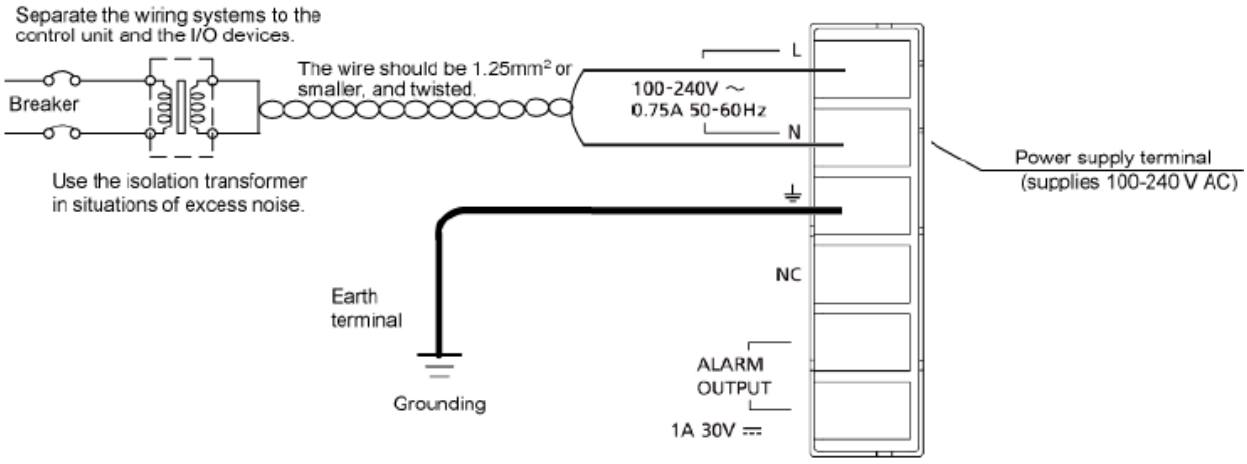
Cabling

Cabling of Power Supply Unit

■Wiring of power supply unit

Be sure to wire correctly according to the terminal arrangement and wiring diagrams.
After completing wiring, be sure to attach the terminal cover for safety reasons.

3.2
3.2.1



■Power supply voltage

Check that the connected power supply voltage is in the range of the allowable power supply.

Model No.	Rated input voltage	Allowable voltage	Rated frequency	Rated output capacity	Rated output current
AFP7PSA1	100 to 240VAC	85 to 264VAC	50/60Hz	24W	1A
AFP7PSA2				43W	1.8A

Note

- To add voltage or frequency out of specification range or to use wire that is not allowable cause damage to power supply.
- Do not connect AC power supply 100-240V to alarm output terminals.

■Power supply cable

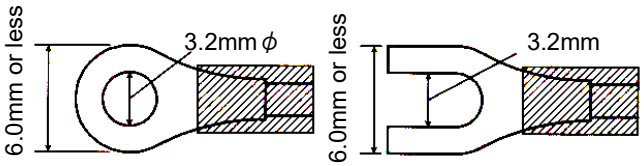
In order to reduce the voltage drop, use electric wire of 2 mm² (AWG 14).

■Applicable wire and fastening torque

Terminal	Applicable wire	Fastening torque
Power supply terminals Grounding terminals	AWG14 (2.0mm²)	0.5 to 0.6N・m
Alarm output terminals	AWG22 to 14 (0.3 to 2.0mm²)	

■Applicable crimping terminals

M3 terminal screws are used for terminals. Use the below crimping terminal for wiring.

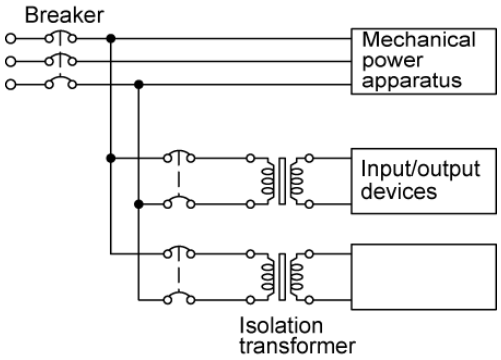


■To avoid the effect from noise

Use power supply that has little noise. The inherent noise resistance is sufficient for power supply superimposed noise. However, we recommend decreasing noise by using insulated transformer.
In order to decrease influence from noise, use twist cable for power supply.

■Isolate power supply system

Isolate the wiring system to ELC500, input/output devices, and mechanical power apparatus.



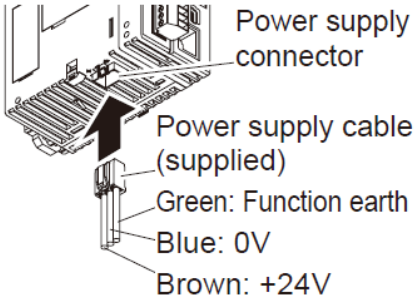
■Power supply sequences

Power supply sequence of the ELC500 should be the sequence that it turns OFF before power supply for I/O. If I/O power supply turns off before the power supply of the ELC500, ELC500 detects a change in input level and may cause unexpected operation.

Cabling of Power Supply for ELC500

For using by supplying 24V DC to ELC500, wire the power supply cable according to the below.
Use power supply cable (attached unit: Model No. AFPG805)
Insert the power supply cable to power supply connector.

3.2.



Note
Do not use the power supply cable when using the power supply unit.

■Power supply voltage

Check that the connected power supply voltage is in the range of the allowable power supply.

Rated input voltage	Allowable voltage	Rated output capacity
24V DC	20.4 to 28.8V DC	24W or more

Note
When connecting GT series to GT power supply terminal (24V),
use within the range of 21.6 to 26.4V.

■Power supply selection (Refer to 1.5)

Select a power supply with the capacity of equal to or larger than the capacity of the unit.
In addition, select a power supply of 24 W or more even in the minimum configuration.
To protect against abnormal voltage from the power supply line, Use an isolated type power supply with built-in protection circuit. The regurator on the unit is no-insulation type.
When using the power supply without built-in protection circuit, be sure to use a protection element such as fuse.

Grounding

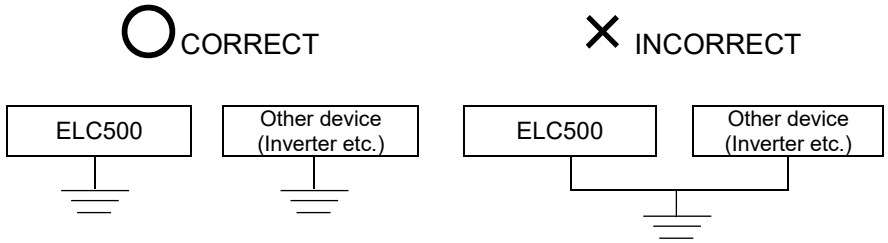
■In case of excess noise

Under normal conditions, the inherent noise resistance is sufficient. However, in case of that it is used under the excess noise, ground the unit to increase noise suppression.

■Exclusive grounding

3.2.3

- When supplying 24V DC directly to ELC500, ground the function earth (green).
- For grounding purposes, use wire with the cross section of 1.25mm^2 or more and the resistance of less than 100Ω.
- The grounding point should be as close to ELC1 as possible. And the grounding wire should be as short as possible.
- If the ground point shares with the other device, it may occur an adverse effect. Always use an exclusive ground for each device.



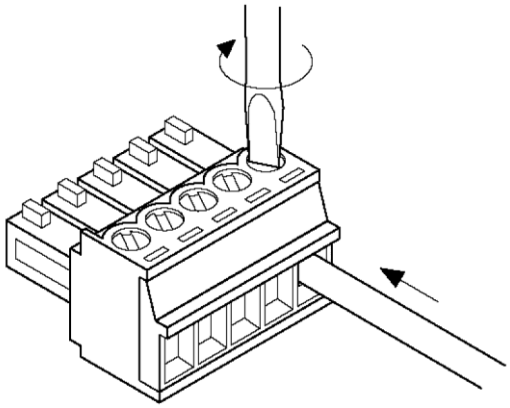
Wiring of COM Port Terminal Block

■How to wire

1) Remove wire's insulation.

7 mm

3.2.4 2) Insert wire into the terminal block until it reaches the back of the block and fasten the screw in a clockwise. (Fastening torque: 0.22 to 0.25N･m (2.3 to 2.5 kgf･cm))



■Notes for wiring

Take care not to break wire.

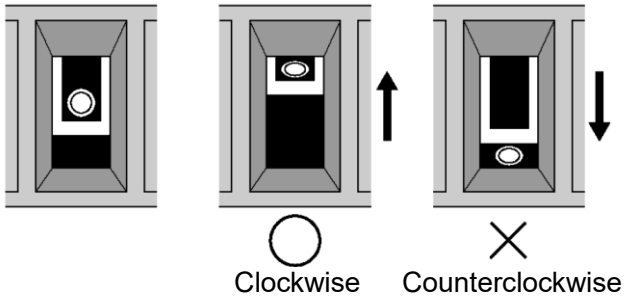
･When removing wire's insulation, take care not to scratch core wire.

･Do not twist the wires to connection.

･Do not solder wire to connect them. Soldering may break due to vibration.

･After wiring, do not make stress to the cable.

･On the structure of the terminal, if the wire tightens counterclockwise, it has connection problem. Once remove the wire and check the terminal and fasten again.



■Applicable cable (strand wire)

Size	Cross-sectional area
AWG28 to 16	0.08 to 1.25mm^2

■Applicable rod terminal

Manufacture	Cross-sectional area	Size	Model No.	
			With insulation sleeve	Without insulation sleeve
Phoenix Contact Co.	0.25mm^2	AWG #24	AI 0,25-6 BU	A 0,25-7
	0.34mm^2	AWG #22	AI 0,34-6 TQ	A 0,34-7
	0.50mm^2	AWG #20	AI 0,5-6WH	A 0,5-6
	0.75mm^2	AWG #18	AI 0,75-6GY	A 0,75-6
	1.00mm^2	AWG #18	-	A 1-6

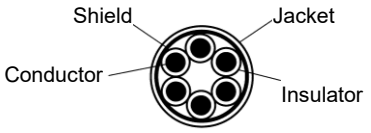
■Exclusive tool for rod terminal

Manufacture	Model No.
Phoenix Contact Co.	CRIMPFOX6(1212034)

■Recommended cable for RS-232C transmission line

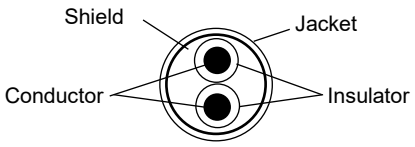
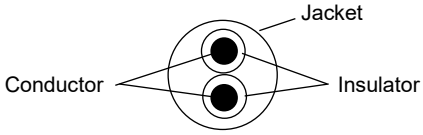
Type: Multi-conductor cable with shield

Conductor		Insulator	
Size	Resistance (at 20℃)	Material	Thickness
0.3 mm^2 (AWG22) or more	Max.58.8Ω/km	chloroethylene	Max. 0.3 mm

Cable diameter	Applicable cable	Section
Approx. 6.6 mm	Onamba ONB-D6x0.3mm^2	

■Recommended cable for RS-422 transmission line

Cable	Conductor		Insulator		Cable diameter	Applicable cable
	Size	Resistance (at 20℃)	Material	Thickness		
Twisted-pair with shield	1.25 mm^2 (AWG16) or more	Max.16.8Ω/km	Polyethylene	Max. 0.5 mm	Approx. 8.5 mm	HITACHI KPEV-S 1.25 mm^2 × 1P Belden Inc. 9860
	0.5 mm^2 (AWG20) or more	Max.33.4Ω/km	Polyethylene	Max. 0.5 mm	Approx. 7.8 mm	HITACHI KPEV-S 0.5 mm^2 × 1P Belden Inc. 9207
VCTF	0.75 mm^2 (AWG18) or more	Max.25.1Ω/km	PVC	Max. 0.6 mm	Approx. 6.6 mm	VCTF 0.75 mm^2 × 2C (JIS)

Cable	Section
Twisted-pair with shield	
VCTF	

Note

- Use shielded type twist cables.
- Use only one type of the transmission cable. Do not mix the different type of cable.
- Use twist pair cables under a bad noise environment.
- Be sure to connect with daisy chain the RS-485 transmission line between each unit. Do not use a splitter.

Install and Setup of Backup Battery

Functions of Backup Battery

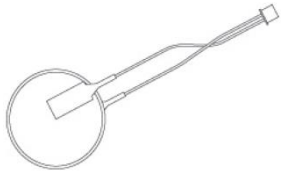
Installing an optional backup battery (AFPX-BATT) enables to back up calendar timer, logging data and so on.

⚠ Warning	Never use batteries other than AFPX-BATT. It may lead to ignition and rupture of batteries.

3.3

3.3.1

■Type of backup battery

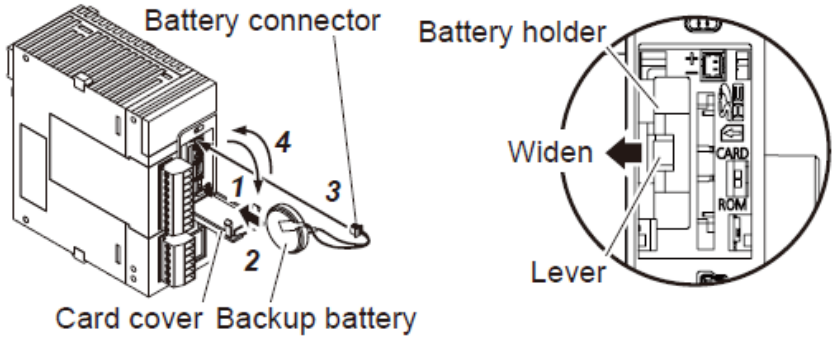
Appearance	Product name	Description	Model No.
	Backup battery (common to FP-X)	With connector	AFPX-BATT

Point

Calendar timer can be holded about 1 week by built-in capacitor without backup battery. In order to fully charge built-in capacitor, supply power to ELC500 for at least 30-min.

How to Install

3.3.2



1. Open the card cover.
2. Set the backup battery in battery holder.
3. Connect the battery connector.
4. Close the card cover.

Point

The battery can be replaced while power is on. If the battery is to be replaced while power is off, undertake replacement within 10 minutes from powering off, after supplying power for at least 5 minutes, in order to charge the built-in capacitor. If the built-in capacitor has not been sufficiently charged, calendar timer data may become indefinite.
Make sure that the battery connector cable is not pinched by the card cover.

Lifetime and Replacement Interval of Backup Battery

■Lifetime of backup battery

Lifetime	Suggested replacement interval
3.3 years or more	5 years

Lifetime indicated above is the value when no power at all is supplied.
Note that the lifetime in actual use may be shorter than the indicated value depending on the use conditions.

3.3.3 Backup battery is consumed for the backup battery detection circuit, even while power is being supplied. Lifetime while power is being supplied is approx. two times longer than the value when no power is supplied.

■Detection of errors and replacement interval of backup battery

When voltage of the backup battery declines, the system relays (SR24 and SR25) are turned on. As necessary, create a program for reporting the error to outside.
Promptly replace the battery, though data are retained for about one week from the detection of a backup battery error, even if no power at all is supplied.

Note

The retained memory data may become indefinite after one week has passed with no power supplied, from the time when the system relays (SR24 and SR25) turned on or when ERROR LED on ELC500 flashed.

Regardless of time passed from detection of a backup battery error, supply power to ELC500 for at least 5 minutes before replacing the backup battery.

For your Safety

Safety Circuit

■Precautions regarding system design

In certain applications, malfunction may occur for the following reasons:
- Power on timing differences between ELC500 and input/output or mechanical power apparatus.
- Response time lag when a momentary power drop occurs.
- Abnormality in ELC500, external power supply, or other devices.

3.4
3.4.1 In order to prevent a malfunction resulting in system shutdown take the following measures as adequate:

● Install the interlock circuit outside PLC
- When a motor clockwise/counter-clockwise operation is controlled, provide an interlock circuit externally.

● Install the emergency stop circuit outside ELC500
- Install an emergency stop circuit outside ELC500 to turn off power supply to the output device.

● Startup other devices before ELC500
- ELC500 should be started after booting the I/O device and mechanical power apparatus.
- When stopping the operation of ELC500, have the input/output devices turned off after ELC500 has stopped operating.

● Install safety measures in case of alarm outside the PLC body
- When an alarm is released, PLC output is turned off and its operation is stopped. In order to prevent a malfunction resulting in system shutdown under the above conditions, install safety measures outside ELC500.

● Perform secure grounding
- When installing PLC next to devices that generate high voltages from switching, such as inverters, do not ground them together. Use an exclusive ground for each device which should be grounded at a grounding resistance of 100 Ω or less.

3.4.2

Momentary Power Failures

■Working when momentary power failure

The working when momentary power failure is differed depending on the combination of units, power supply voltage and other conditions. It may work in the same way as power reset.
If the period of power failure is less than 10ms, ELC500 continues to the working.
When using by suppling 24V DC
The working at momentary power failure time less than 4 ms when 24 V DC is supplied to the ELC500 will continue. In case of that ELC500 restart due to power failure, demand calculation will be reset and control for devices will be cancelled.

■When connecting ECOnect Remote I/O unit

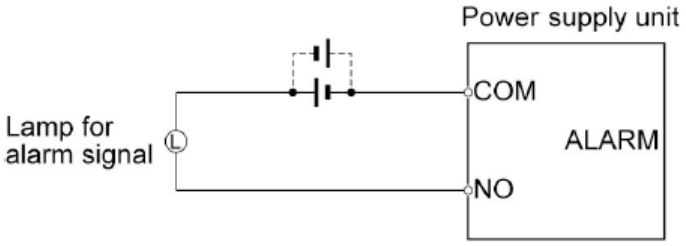
When ELC500 restart after power failure for 10ms or more, ELC500 send setup data for ECOnect Remote I/O unit and initialize the output status.

Note
We recommend using UPS.

3.4.3

Alarm Output

Power supply unit has alarm output contact. It can output alarm signal to outside when an error occurs. Relay contact of alarm output is closed when power is turned on, and it is opened when the system watchdog timer of the ELC500 is activated due to a hardware error or program malfunction.



System watchdog timer is the timer to detect a hardware error or program malfunction.

When the system watchdog timer is activated, ‘ALARM’ LED on the front turns on. If the power supply unit is connected, ‘ALARM’ contact of the power supply unit is activated at the same time.
At this time, all output signals of output unit turn off and stop. In addition, it becomes completely inoperative state, and communication with the tool software also stops.

Example of Connection to ELC500

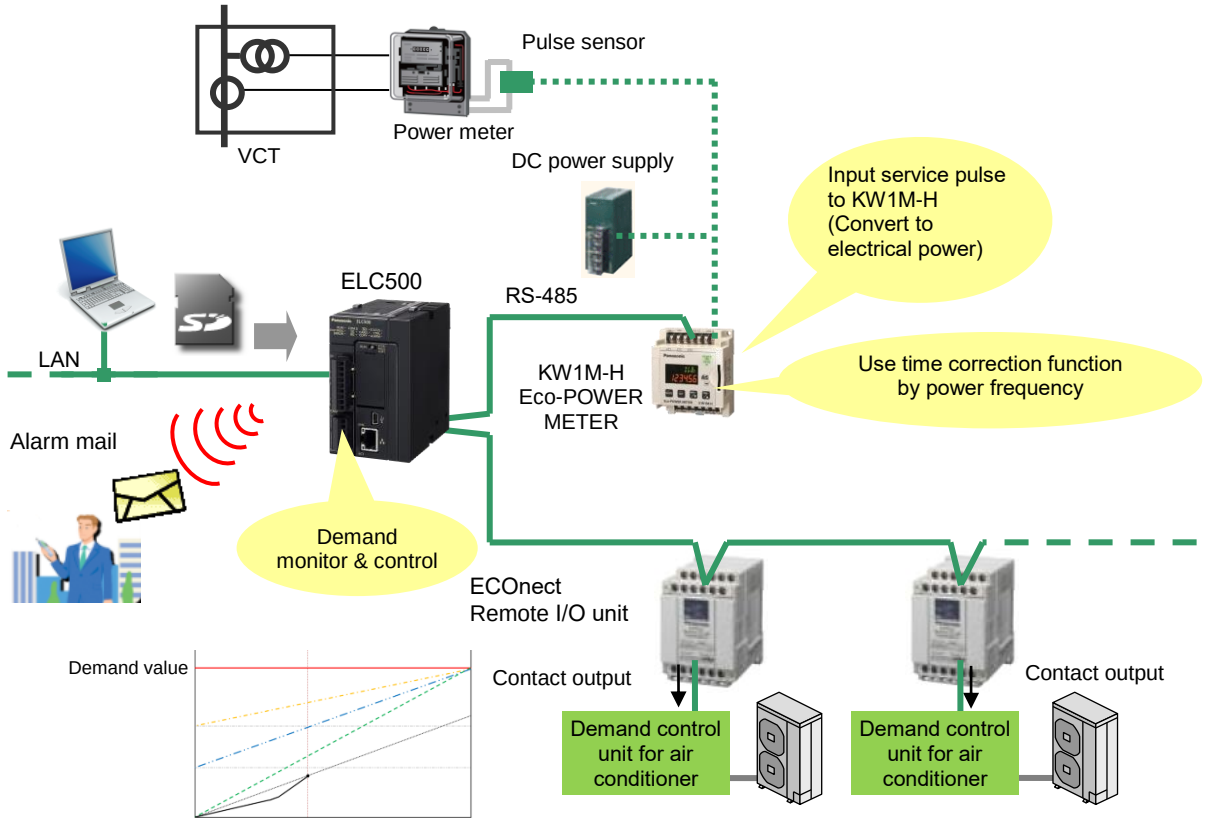
There are some representative examples of connecting to ELC500.

Demand Control System

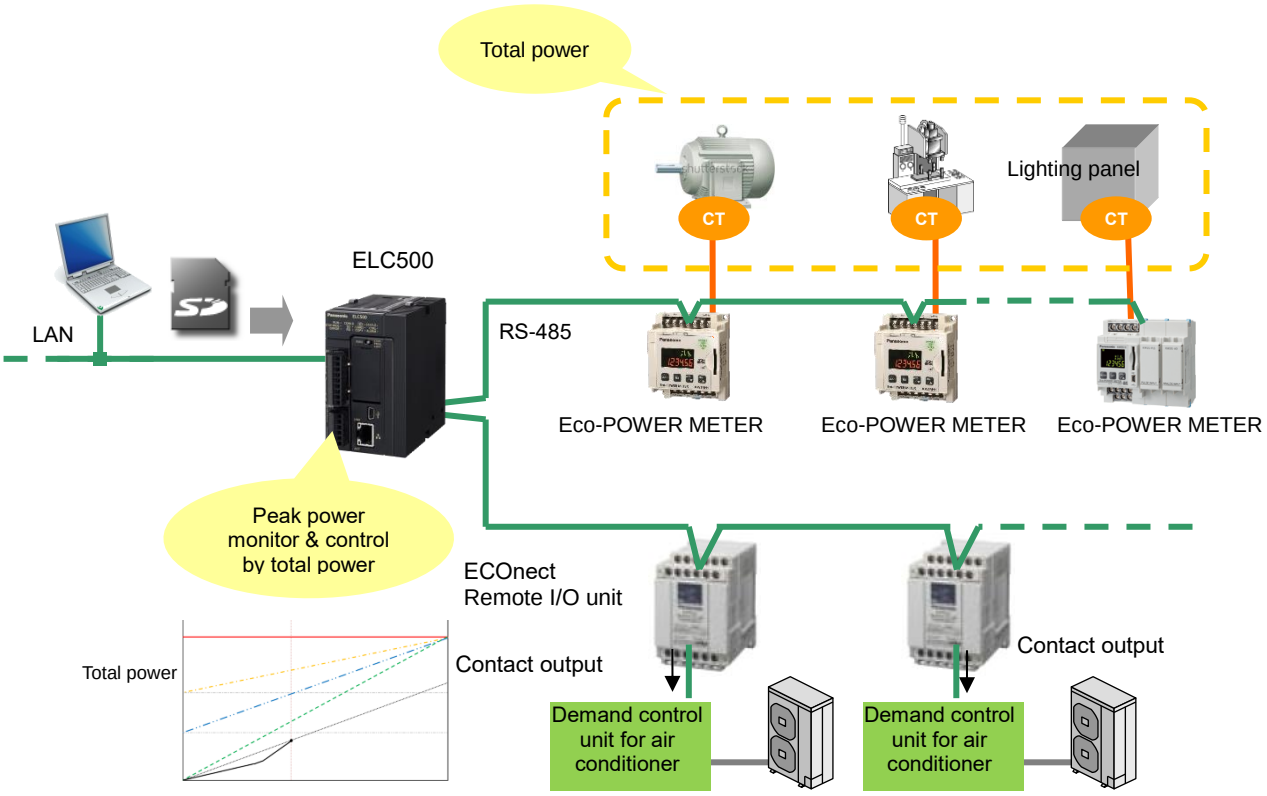
Example to use ELC500 as a demand controller
Collecting data from Eco-POWER METER via COM1 or COM2 and it output alarm to Remote I/O unit according to the settings.

3.5 ■Demand monitor control by local operation

3.5.1



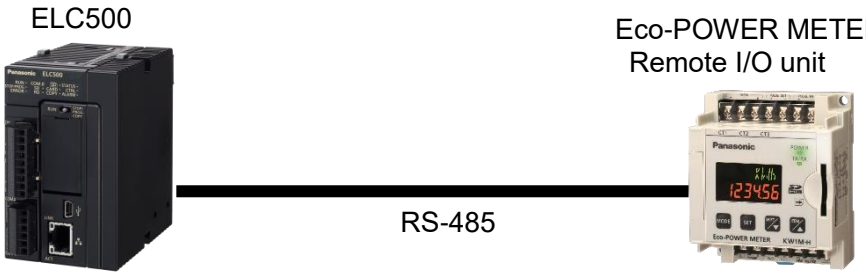
■Peak power monitor and control by total measured power



3.5.2

Connect to Eco-POWER METER or Remote I/O unit

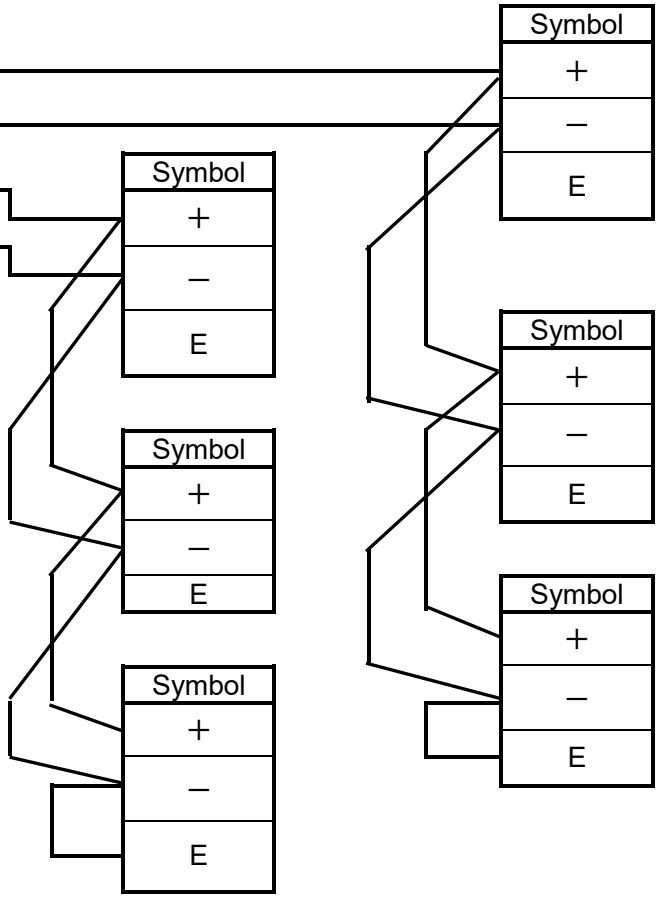
Example of 1:n communication between ELC500 and Eco-POWER METER or Remote I/O unit



ELC500

Symbol	Pin No.
SD＋	1
SD－	2
RD＋	3
RD－	4
NC	5
SD＋	6
SD－	7
RD＋	8
RD－	9

Eco-POWER METER/ Remote I/O unit



With a terminal unit, RS-485(－) and RS-485(＋) should be shorted.

■Setting

ELC500

COM1(RS-485)	
Protocol	MEWTOCOL
Usage	Data collection
Timeout (sec.)	1
Baud Rate	38400bps
Data length	8-bit
Parity	Odd
Stop bit	1-bit

Eco-POWER METER / Remote I/O unit

RS-485	
Protocol	MEWTOCOL
Unit No.	1
Baud Rate	38400bps
Data length	8-bit
Parity	Odd
Stop bit	1-bit
Response time	10ms

Point

Refer to User's manual in details of Eco-POWER METER.

■How to transfer setup data to Remote I/O unit

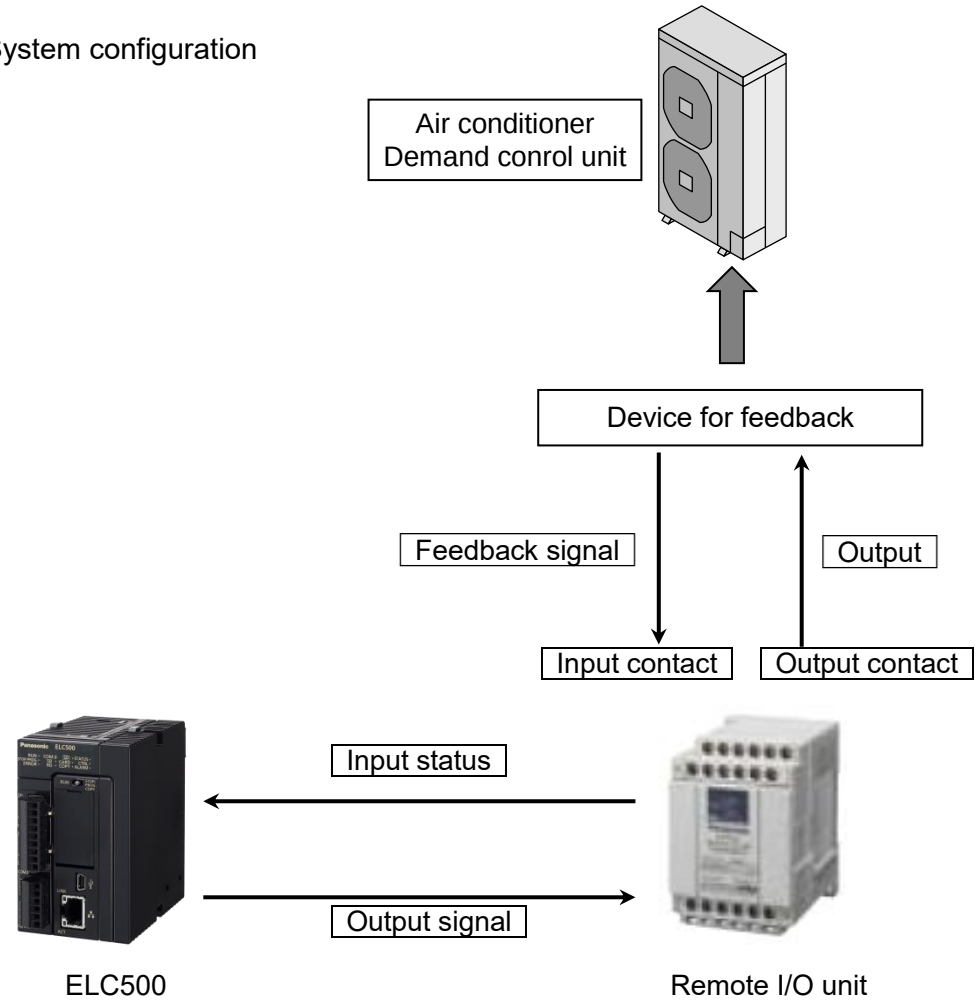
At the below case, ELC500 transfers setup data to Remote I/O unit.
1) When it changes ELC500 operation mode from STOP to RUN
2) When power on ELC500 during the operation mode switch set to RUN.

Note
- When it transfers setup data to Remote I/O unit, check that it turns on Remote I/O unit.
- When you replace or add Remote I/O unit, change ELC500 to STOP mode. After completing it, change ELC500 to RUN mode and transfer setup data. If you replace or add Remote I/O unit during RUN mode, it doesn't transfer setup data and it causes malfunction.

■Feedback of output status

In order to acquire output status feedback from Remote I/O unit, connect device that works synchronize with output contact of Remote I/O unit, to input contact of Remote I/O unit. ELC500 can acquire output status feedback.

・System configuration



・How to monitor

When you register DT102 (IN1) and DT103 (IN2) of Remote I/O unit to logging device by Configurator EL500, you can monitor with current value monitor.

Reference
<5.6.5.2 Logging Device Registration> <5.7.3 Current Value Monitor>
User's manual of ECOnect Remote I/O unit

Check Before Power On

Check Items Befotr Power On

Once you complete the installation and wiring, check the below items before power on.

■Check items

	Item	Descriptions
1	Unit connection	- Does each unit match the device list of system design? - Are unit mounting screws properly tightened? - Has the dust-proof sheet been removed from the unit?
2	Installation	- Does each unit installed so that it doesn't fall down? - Does each unit installed so that there is no water or dust?
3	Wiring	- Are terminal screws properly tightened? - Does wiring of terminal match the signal name? - Does wiring have sufficient thickness for expected current?
4	Connection cable	- Is cable securely connected? - Are connection cables properly connected?
5	Setup of ELC500	- Does Mode switch set to STOP/PROG.? - Does Card operation switch set correct?
6	Others	Carefully check if there is any potential for an accident.

Flow to Start Operation

1. Power on

(1) Before power on, check the installation and wiring refer to 4.1. Check Items.
(2) After power on, check power LED (blue) and STOP/PROG.LED (green) of ELC500 are light on.
In case of using the power supply unit, check POWER LED of the power supply unit is light on.

4.2

2. Install the configuration software

Install Configurator ELC500 and FPWIN Pro7.
Refer to FP7 user's manual for install FPWIN Pro7.

3. Setup

(1) Using Configurator EL500 to setup.

When you need programming, set the below.
(2) Create program using Control FPWIN Pro7.
(3) Check that there is no error by using Control FPWIN Pro7 'Compile all'

4. Check input/output wiring

(1) Check the wiring using forcely input/output function.
(2) Check the input wiring using input indication LED or monitor function of configuration software.

5. Test working

(1) Change to RUN mode with mode switch and check RUN LED is light on.
(2) Confirm the sequence working and the status of the surrounding devices.
(3) When the working is not correct, refer to monitoring or system history of the configuration software and investigate errors of setup or project.
(4) Correct the setup or the programming,

6. Save setup file and project

Save setup file and project.

7. Start operation

Setup Procedure of Configurator EL500

Configurator EL500

'Configurator EL500' is the application software in order to use for setup of ELC500.

How to Install

It is necessary to install 'Configurator EL500' to your PC.

Chapter 5
5.1

Point

You can download 'Configurator EL500' from our website.
Member registration is necessary. Free of charge.

5.1.1

■Operating environment

Item	Specification
OS (32-bit/64-bit)	Microsoft® Windows® 7 Professional Microsoft® Windows® 8 Pro Microsoft® Windows® 8.1 Pro Microsoft® Windows® 10 Pro
Required hard disc capacity	500MB (not include the capacity of saving setup data)
CPU	1GHz or more
Loaded memory	1GB or more
Image resolution	WXGA (1280x768) or more
Communication form	USB, Ethernet

*When NET Framework4.0 is installed, it is necessary 4.5GB or more. Refer to the website of Microsoft.

Note

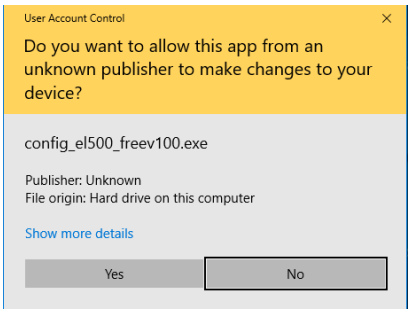
Even if a customer stores a file created by the customer in ¥Program files, the file will be automatically stored in /userID/AppData/Local/VirtualStore.
When User Account Control (UAC) is on.

■How to install (This is image of Windows 10.)
It will install automatically in the order NET Framework, Configurator EL500 and USB driver.

1) Execute setup file (configel_freev***.msi).

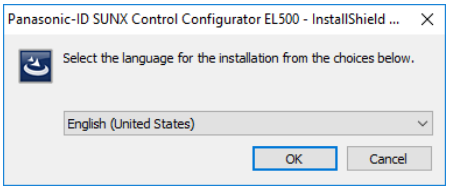
Note
'***' in file name means version of the file. Confirm version before downloading from our website. (ex. Ver.100 -> config_el500_freev100.exe)

2) Start installer and 'User Account Control' will be appeared.
Click [Yes].

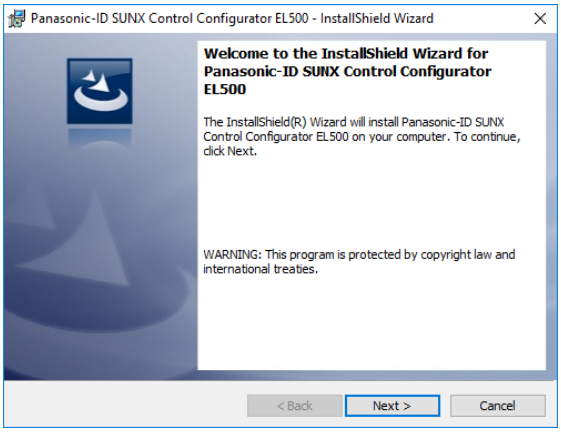


3) The massage to install 'Microsoft® .NET Framework 4.0' will be appeared.
Install according to the procedure. If this message is not appeared, it has already installed. This is not necessary.

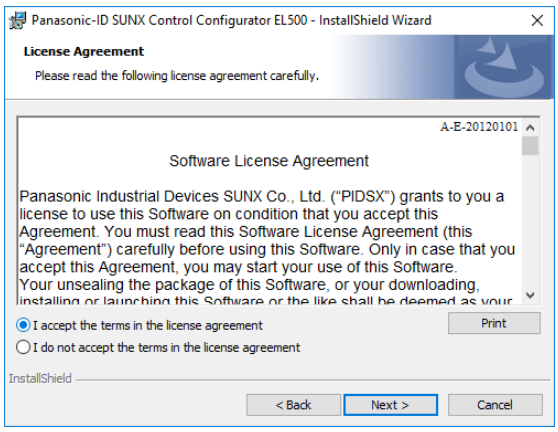
4) Select language to install.



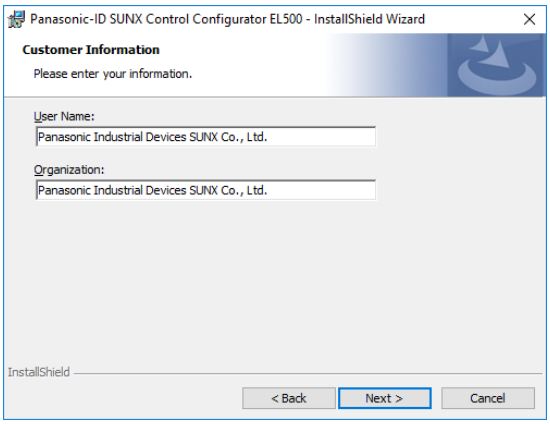
5) It starts installing automatically.
Install according to the procedure. Click [Next].



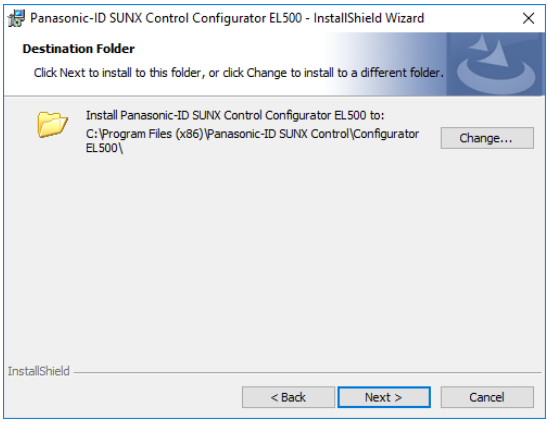
6) Read ‘License Agreement’ and you agree it, check ‘I accept the terms in the license agreement’ and click [Next].



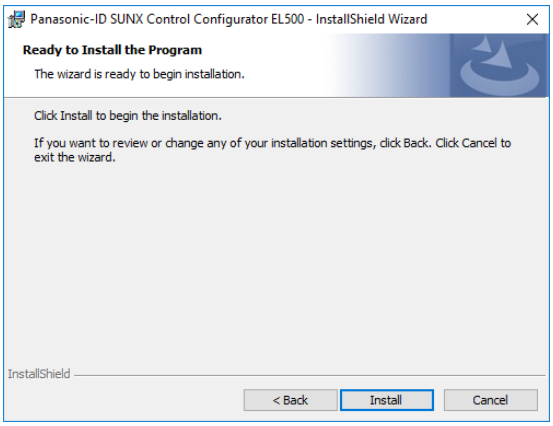
7) Input ‘User Name’ and ‘Organization’ and click [Next].



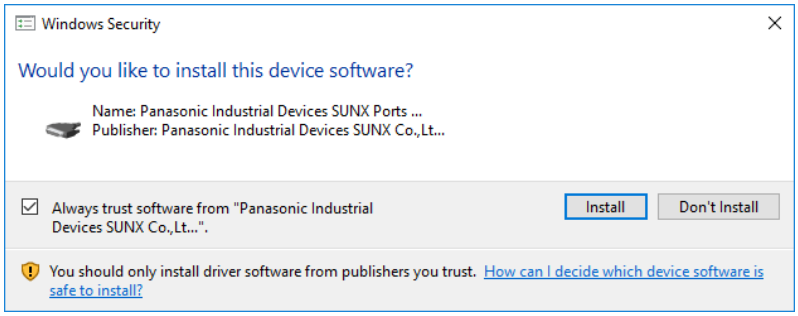
8) Destination Folder message is appeared.
If you change the destination folder, change it and click [Next].



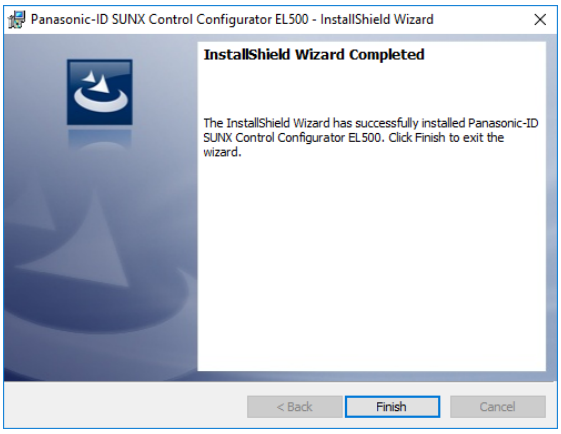
9) Click [Install] to start installing.



10) After installing the software, it will start an installer of USB driver.
Click [Install].



11) When it completes all installation, click [Finish].



There are the below files and folders in the installed folder. Do not delete them.

Configurator EL500.exe	: Configuration software
System.Windows.Forms.DataVisualization.dll	: Dynamic link library
Ja-JP folder	: Japanese resource folder

5.1.2

How to Uninstall

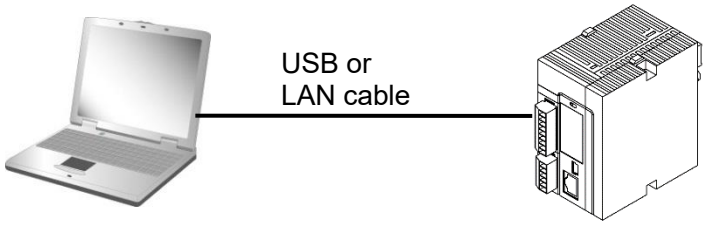
When uninstalling, select ‘Control Panel -> Add or Remove programs
-> Panasonic Industrial Devices SUNX Control Configurator EL500 and remove.

5.1.3

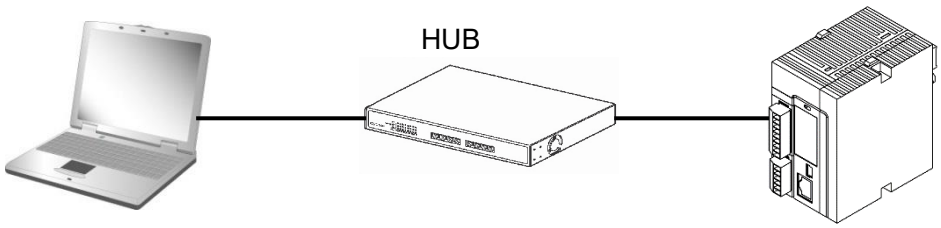
Start and Exit Configurator EL500

1) Connect PC to be used for setup with ELC500. There are 2 ways to connect.

[1] Directly connect via USB cable to LAN cable.



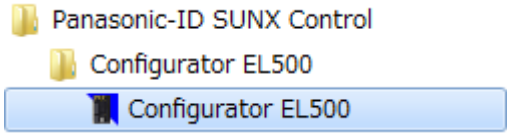
[2] Connect via LAN cable using HUB.



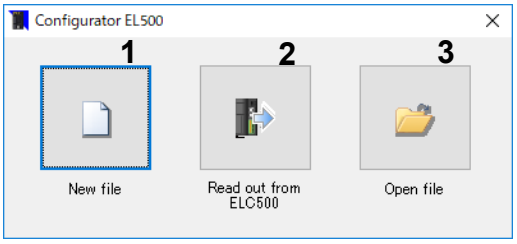
Point
Both of cross cable and straight cable can be used for ELC500 to connect to PC.

2) Power on after it set to STOP/PROG. mode.

3) Start Configurator EL500.
Select from start menu.
'Panasonic-ID SUNX Control' → 'Configurator EL500' → 'Configurator EL500'



Start Configurator EL and the below window will be appeared. There are 3 functions.



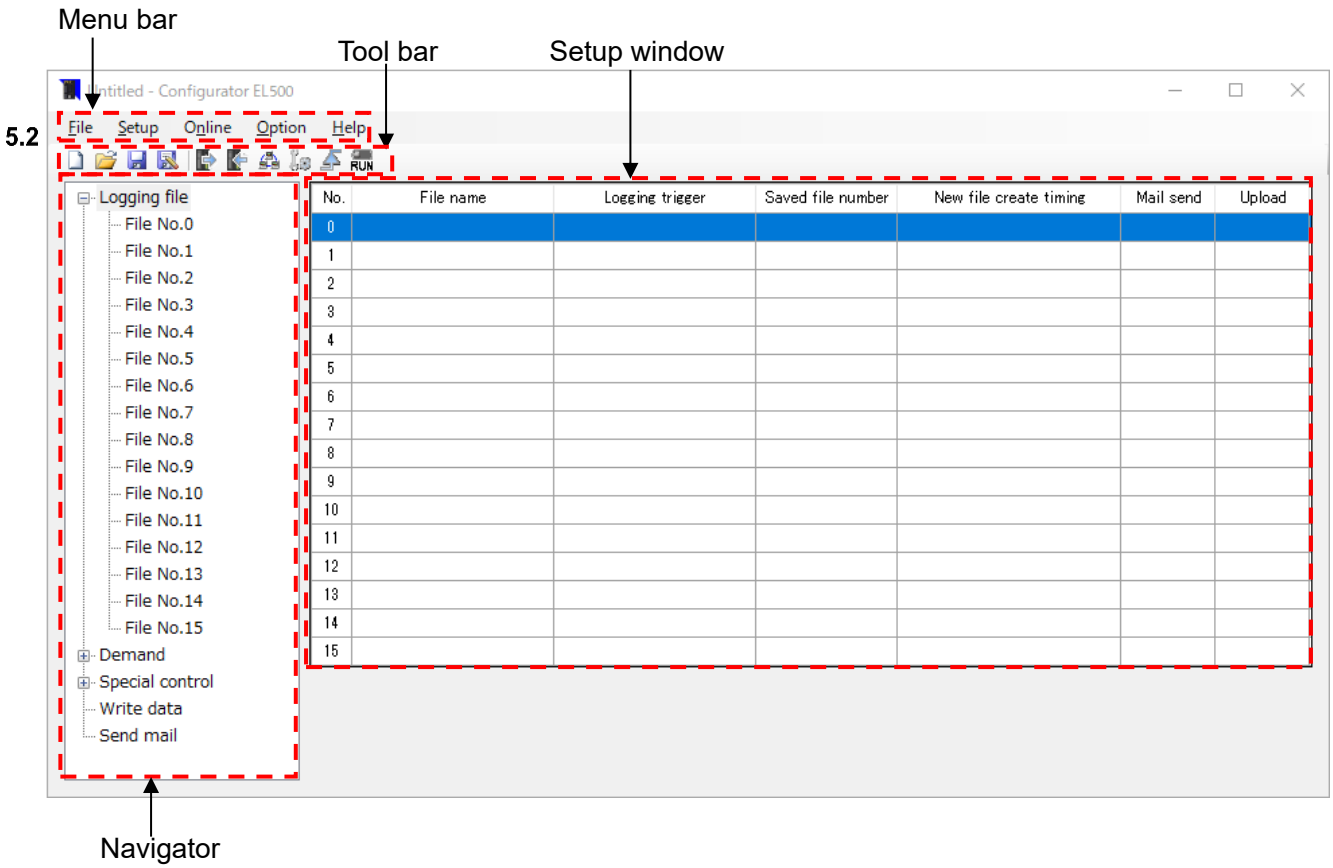
1. New file
You can create new setup for ELC500.

2. Read out from ELC500
You can read out setup data from ELC500.

3. Open file
You can read out setup data from saved file.

Functions of Configurator EL500

Starting the software and select at the initial window, it will appear the next window.
[Main window] (In case of selecting ‘New file’)



[Menu bar]

Function	Descriptions		Explanations
File	- Create new setup file - Read out and save setup file	- Exit software	5.3.1
Setup	- Setup ELC500 - Setup connected devices	- Trigger setup - Remote I/O unit output setup	5.3.2
Online	- Communication setup - Mode change - Current value monitor	- Status view of system error - Read out system history - Setup Remote I/O unit	5.3.3
Option	- Password setup - Password delete - Initialize ELC500	- Update firmware - Change language	5.3.4
Help	- Confirm version		—

[Tool bar]

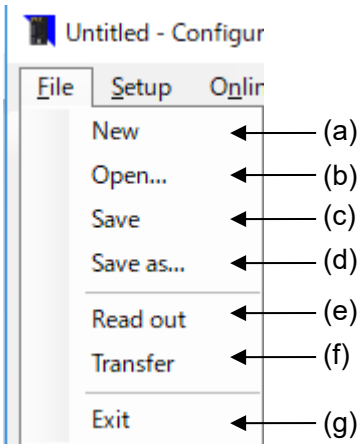
Function	Descriptions
New	Create new setup for ELC500.
Open	Open saved setup file and read out the file.
Save	Save editing setup file with overwrite.
Save As	Save editing setup file as a new file.
Read out	Read out setting data from ELC500.
Transfer setup data	Transmit setting data to ELC500.
Connection device	Register device to log or control.
Setup ELC500	Set name, Ethernet setup, clock, logging file setup etc.
Trigger setup	Set conditions of trigger for data collecting, creating file, sending mail, writing data etc.
Mode change	Change mode of ELC500.

[Navigator]

Function	Descriptions	Explanations
Logging file	Setup items related to create logging files	5.6.5
File No.0 to 15	Register devices for logging	5.6.5.2
Demand	Setup items related to demand Register devices to monitor demand value	5.6.6
Special control	Setup items related to start control and cyclic control	5.6.7
Write date	Setup items related to data writing	5.6.8
Send mail	Setup items related to sending mail	5.6.9

Menu

File



5.3
5.3.

(a) New
Create new setup for ELC500.

(b) Open
Open saved setup file.

(c) Save
Save editing setup file with overwrite.

(d) Save As
Save editing setup file as a new file.

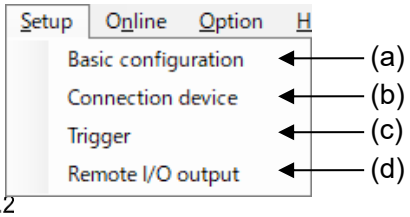
(e) Read out
Read out setting data from ELC500.

(f) Transfer
Transfer setting data to ELC500.
Do not disconnect the connected cable or turn off the power of ELC during transferring.

(g) Exit
Exit Configurator EL500.

Setup

5.3.2



(a) Basic configuration
Open ELC500 configuration window. (Refer to 5.6.1)

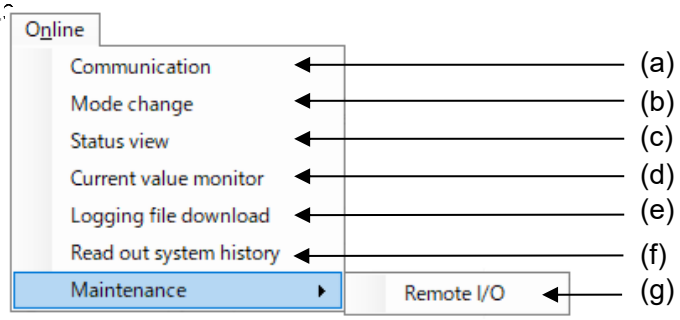
(b) Connection device
Open connection device setup window. (Refer to 5.6.2)

(c) Trigger
Open trigger setup window. (Refer to 5.6.3)

(d) Remote I/O output
Open Remote I/O setup window. (Refer to 5.6.4)

Online

5.3.3



(a) Communication
Open communication setup window. (Refer to 5.7.1)

(b) Mode change
Change mode of ELC500. (Refer to 5.7.2)

(c) Status view
Open status view window. (Refer to 5.7.3)

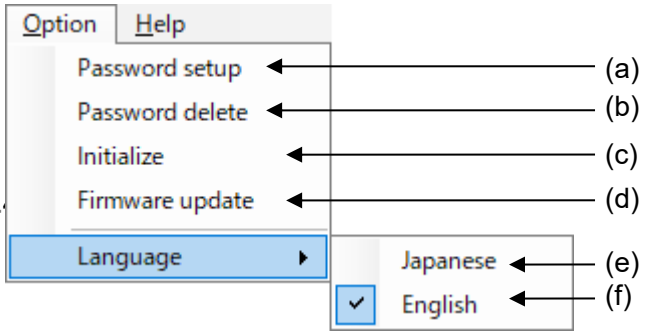
(d) Current value monitor
Open current value monitor window. (Refer to 5.7.4)

(e) Logging file download
Open logging file download window. (Refer to 5.7.5)

(f) Read out system history
Open system history reading window. (Refer to 5.7.6)

(g) Remote I/O
Open Remote I/O setup window. (Refer to 5.7.7)

Option



5.3.4

(a) Password setup
Open password setting window. (Refer to (5.7.8)

(b) Password delete
Open password deleting window. (Refer to 5.7.8)

(c) Initialize
Initialize settings of ELC500. (Refer to 5.7.9)

(d) Firmware update
You can upgrade the firmware of ELC500. (Refer to 5.7.10)

Point
- You can download the latest firmware from our website.
- Change to STOP/PROG mode to update the firmware.
  It can't update it during RUN mode.

Note
- Do not turn off ELC500 during updating the firmware. It may break data or unit.
- After it completes updating, it will restart. It takes time to recognize USB/LAN.

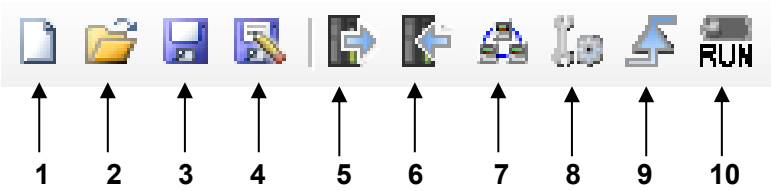
(e) Japanese
Change the language to be displayed to Japanese.

5.3.5 (f) English
Change the language to be displayed to English.

Help

(a) About…
Display version information.

Tool Bar



5.4

1) New

Create new setup.

2) Open

Open saved setup file in PC.

3) Save

Save editing setup file with overwrite.

4) Save as

Save editing setup file as a new file.

5) Read out

Read out the setup data of ELC500.

6) Transfer setup data

It transfers setup data to ELC500.
Do not disconnect the connected cable or turn off the power of ELC during transferring.

7) Connection device

Open window to setup connected devices. (Refer to 5.6.2)

8) Setup ELC500

Open window to setup ELC500. (Refer to 5.6.1)

9) Triger setup

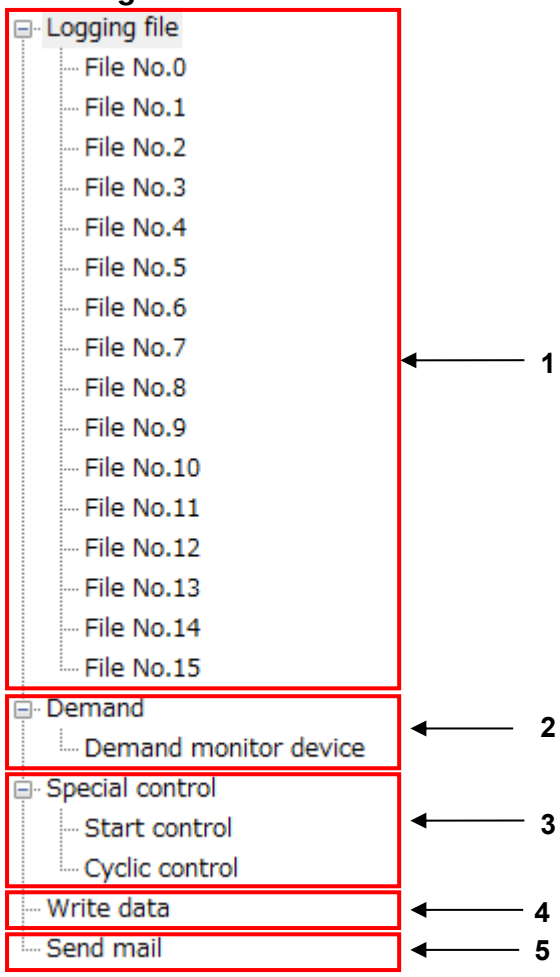
Open window to setup trigger. (Refer to 5.6.3)

10) Mode change

Change mode of ELC500. (Refer to 5.7.2)

5.5

Navigator



1) Logging file
It setup items related to create logging files and registers logging devices.

(Refer to 5.6.5)

2) Demand
It setup items related to create demand monitoring files and resisters devices to use for demand alarm or demand monitoring.

(Refer to 5.6.6)

3) Special control
It setup items related to special control (start control, cyclic control).

(Refer to 5.6.7)

4) Write date
It setup items related to data writing.

(Refer to 5.6.8)

5) Send mail
It setup items related to sending mail.

(Refer to 5.6.9)

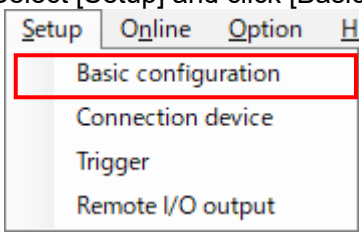
Setup and Functions

Basic Configuration

Setup ELC500 name, network, time etc.
You can open the window by 2-way the below.

(1) Select [Setup] and click [Basic configuration].

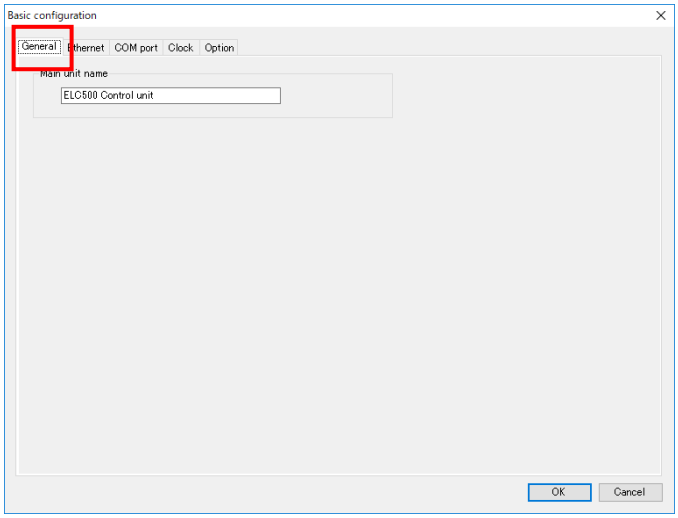
5.6
5.6.1



(2) Click icon on tool bar

5.6.1.1 General Setup

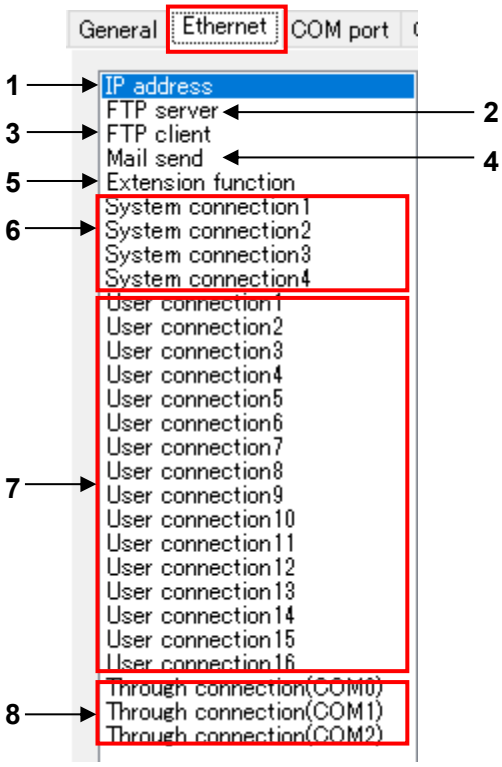
Set name of ELC500.



Item	Description
Main unit name	Set name for main unit <Set range> 32-letter or less

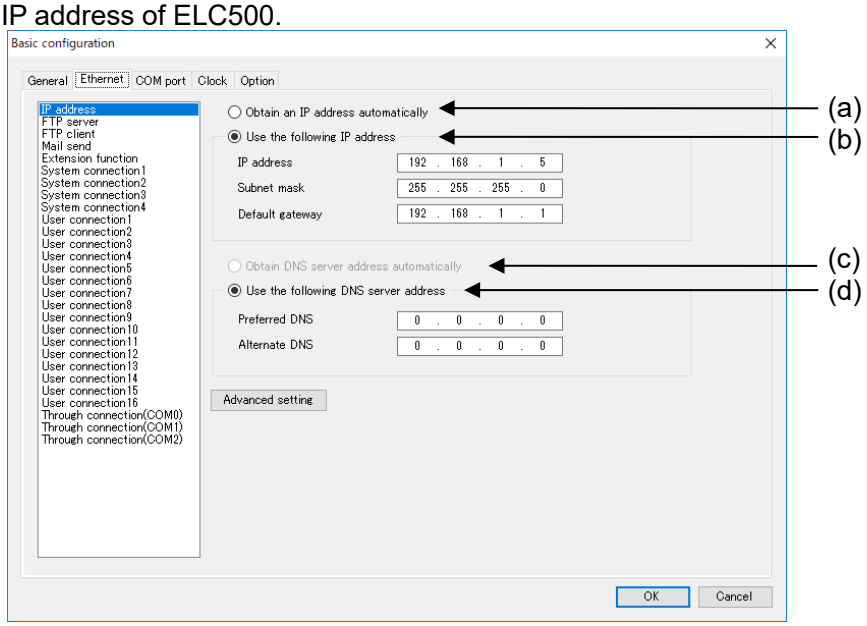
5.6.1.2 Ethernet Setup

Set IP address of ELC500, FTP server, Ethernet connection



[1] IP address

Set IP address of ELC500.

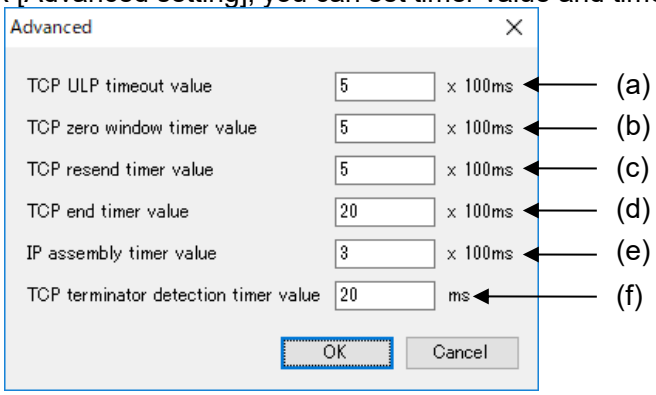


Item		Description
(a)	Obtain IP address automatically	It obtains IP address automatically.
(b)	Use the following IP address	It set IP address, subnet mask and default gateway.
(c)	Obtain DNS server address automatically	It obtains DNS server address automatically.
(d)	Use the following DNS address	It set preferred DNS, alternate DNS.

[Initial setting value]

IP Address	192.168.1.5
Subnet mask	255.255.255.0
Default gateway	192.168.1.1

Click [Advanced setting], you can set timer value and timeout value for each item.



Item		Description
(a)	TCP ULP timeout value	Set packet alive time for data transmission. TCP ULT time out value should be multiple of TCP resend time value. If it is not multiple value, set rounded up value. <Initial> 5 <Set range> 1 to 65535 (every 100 ms)
(b)	TCP zero window timer value	Set time until resending the reception window size confirmation packet, when the reception window size of the connected node reached 0. <Initial> 5 <Set range> 1 to 65535 (every 100 ms)
(c)	TCP resend timer value	Set time until resending data, when the connected node doesn't send ACK. <Initial> 5 <Set range> 1 to 65535 (every 100 ms)
(d)	TCP end timer value	Set waiting time until processing to open on the same port again when own node executed closing process to TCP. <Initial> 20 <Set range> 1 to 65535 (every 100 ms)
(e)	IP assembly timer value	Set waiting time to receive the divided data when IP received divided data. <Initial> 3 <Set range> 1 to 65535 (every 100 ms)
(f)	TCP terminator detection timer value	Set time to monitor an arrival of next segment when receiving divided TCP segment. When it doesn't receive the next during this time, it is assumed that TCP reception is completed. <Initial> 20 <Set range> 1 to 65535 (every 1 ms)

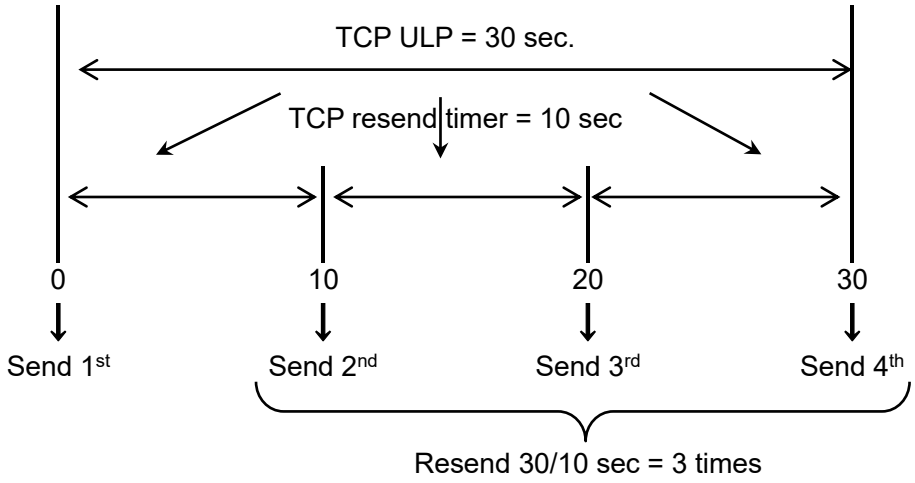
For the values for timer and timeout, refer to the followings.
<Setting conditions>
- TCP end timer value ≧ TCP ULP timeout value ≧ TCP resend timer value
- TCP zero window timer value ≧ IP assembly timer value

■Settings of TCP ULP timeout and TCP resend timer

With TCP/IP communication, it resends command at setting times automatically as below.

Number of resend = TCP ULP timeout / TCP resend timer

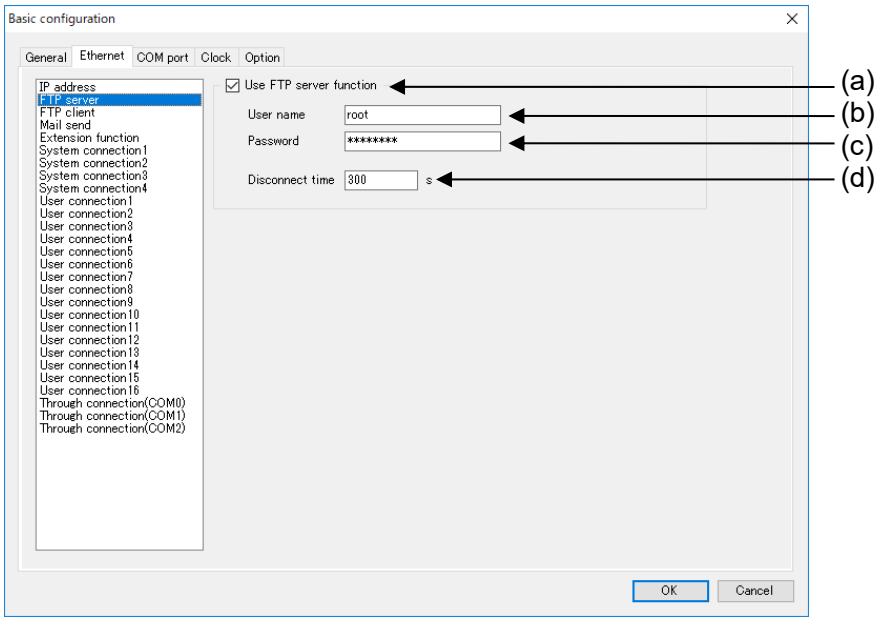
Ex.) TCP ULP timeout: 30-sec TCP resend timer: 10-sec



Point

If you increase the number of resend, it will reduce a communication error.
Take measures by PC side too.
Up to 12 times can be set. It doesn't resend it in case of using UDP/IP.

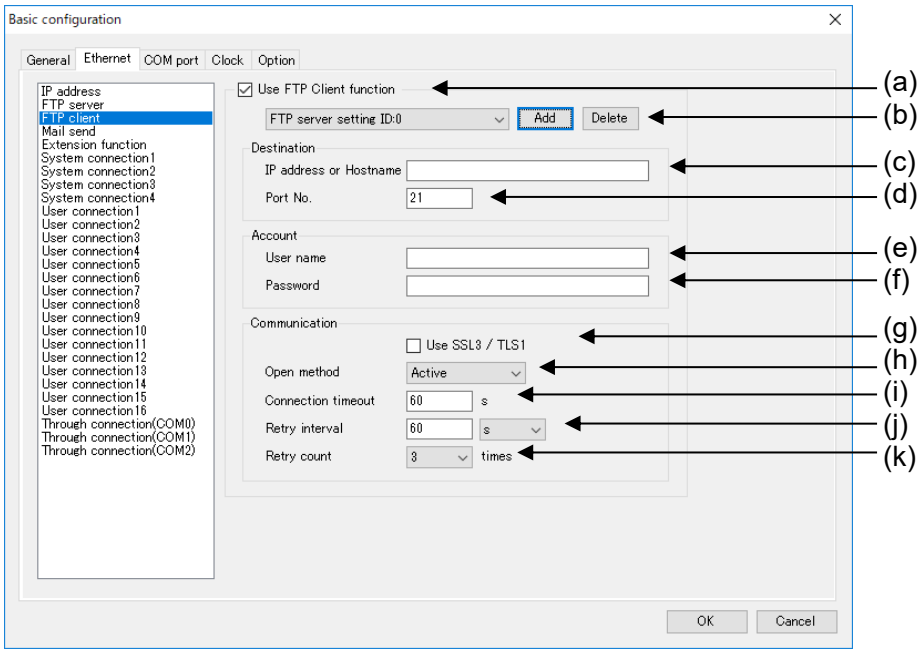
[2] FTP server
Set to use FTP server function.



Item		Description
(a)	Use FTP server function	Select use the function or not. <Initial> with check = available
(b)	User name	Set user name for login FTP server. <Initial> root <Set range> 4 to 15-letter
(c)	Password *1	Set password for login FTP server. <Initial> Root1234 <Set range> 8 to 15-letter
(d)	Disconnect time	Set disconnect time during using FTP. Disconnection time exceeds the set time, it will disconnect automatically. <Initial> 300 sec. <Set range> 300 to 600

*1 It is necessary to use at least one large-letter, one small-letter, one number for password.

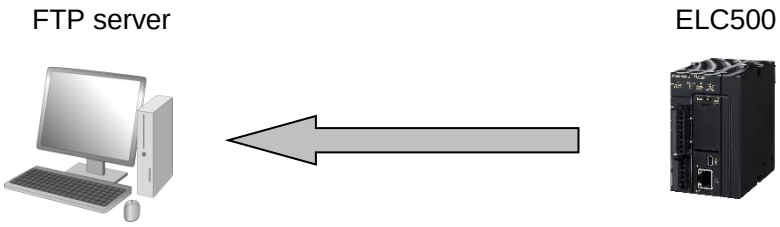
[3] FTP client
Set to use FTP client function



Item		Description
(a)	Use FTP Client function	Select use the function or not. <Initial> without check = not available
(b)	Add or Delete	Add FTP server setup. Up to 4 setups can be added. Click [Add] to add setup.
(c)	IP address or Hostname	Set IP address or name of the connected server. <Set range> 256-letter or less
(d)	Port No.	Set port number of the connected server. <Initial> 21 <Set range> 1 to 65535
(e)	User name	Set user name of the connected server. <Set range> 32-letter or less
(f)	Password	Set password for the connected server. <Set range> 32-letter or less
(g)	Use SSL3/TLS3	Select use SSL3/TLS1 authentication or not. <Initial> without check = not available
(h)	Open method	Set open method. <Initial> Active <Set range> Active / Passive
(i)	Connection timeout	Set timeout time to disconnect the connection. <Initial> 60 sec. <Set range> 30 to 300
(j)	Retry interval	Set retry interval to send mail. <Initial> 60 sec. <Set range> 10 to 86400
(k)	Retry count	Set retry number to send mail. <Initial> 3 times <Set range> 0 to 3

■FTP client function

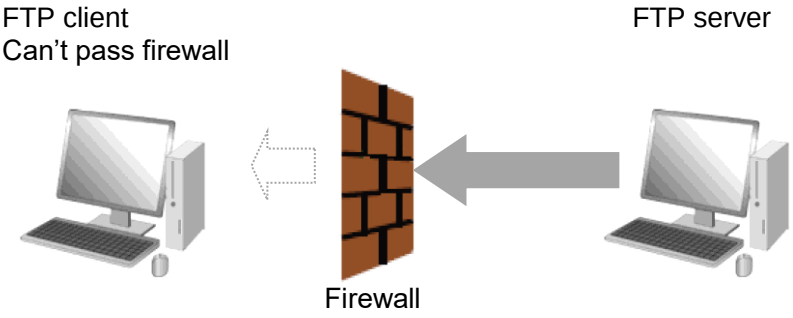
Created files can be transmitted to FTP server when logging file or demand monitor file is created.



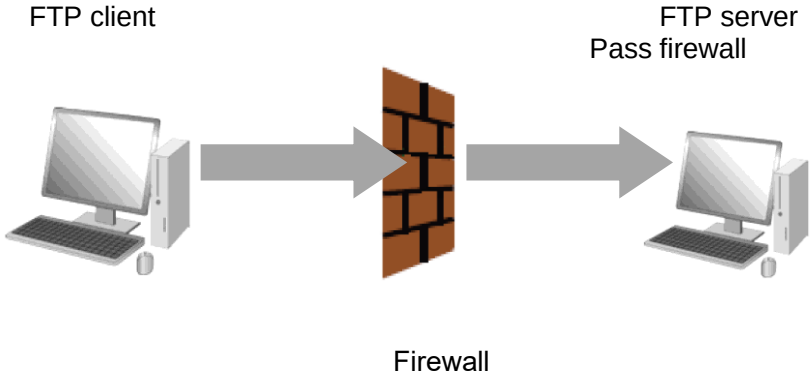
*Confirm your server manager about each setting.

■Connection mode

In active mode FTP connection, server sends a connection request to client in order to establish data transmission connection. Therefore, it may deny connection from server to client by firewall of client side.



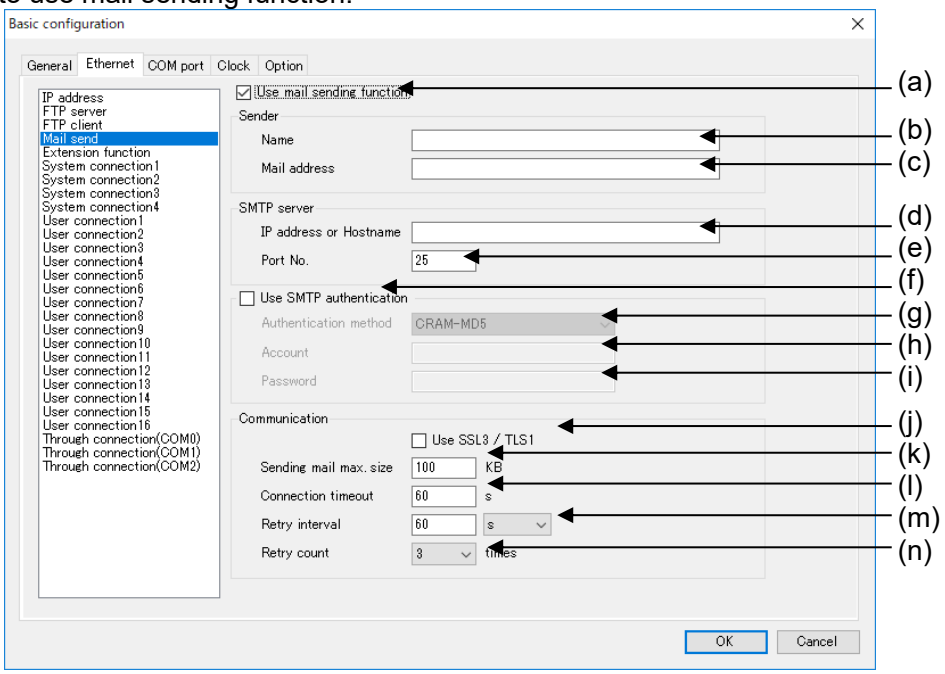
In passive mode FTP connection, client sends a connection request to server in order to establish data transmission connection. However, it can connect even if the client is inside the firewall.



Note

- If there is no setting folder, it creates folders up to 8 layers automatically.
When it can't create folders, it will be error and complete the process.
- When there is a file with the same name in the specified folder to upload, it works according to FTP server specification.
- When it failed to upload files by FTP, you can retry by setting.
It will retry to upload the file that is failed. It doesn't have new recorded files during retry period.

[4] Mail send
Set to use mail sending function.



	Item	Description
(a)	Use mail sending function	Select use the function or not. <Initial> without check = not available
(b)	Name	Set mail sender name. <Set range> 32-letter or less
(c)	Mail address	Set mail address of ELC500 <Set range> 256-letter or less
(d)	IP address or Hostname	Set IP address or name of SMTP server. <Set range> 256-letter or less
(e)	Port No.	Set port number of SMTP server. <Initial> 25 <Set range> 1 to 65535
(f)	Use SMTP authentication	Select use SMTP authentication or not. <Initial> without check = not available
(g)	Authentication method	Select SMTP authentication method. <Initial> CRAM-MD5 <Set range> CRAM-MD5 /PLAIN(ID/PASS) /PLAIN(ID/ID/PASS) /LOGIN
(h)	Account	Set account to use for SMTP authentication.
(i)	Password	Set password to use for SMTP authentication.
(j)	Use SSL3/TLS1	Select use SSL3/TLS1 authentication or not <Initial> without check = not available
(k)	Sending mail max. size	Set max. size for sending mail. <Initial> 100 KB <Set range> 1 to 1024KB
(l)	Connection timeout	Set timeout time to disconnect the connection. <Initial> 60 sec. <Set range> 30 to 300
(m)	Retry interval	Set retry interval to send mail. <Initial> 60 sec. <Set range> 10 to 86400
(n)	Retry count	Set retry number to send mail. <Initial> 3 times <Set range> 0 to 3

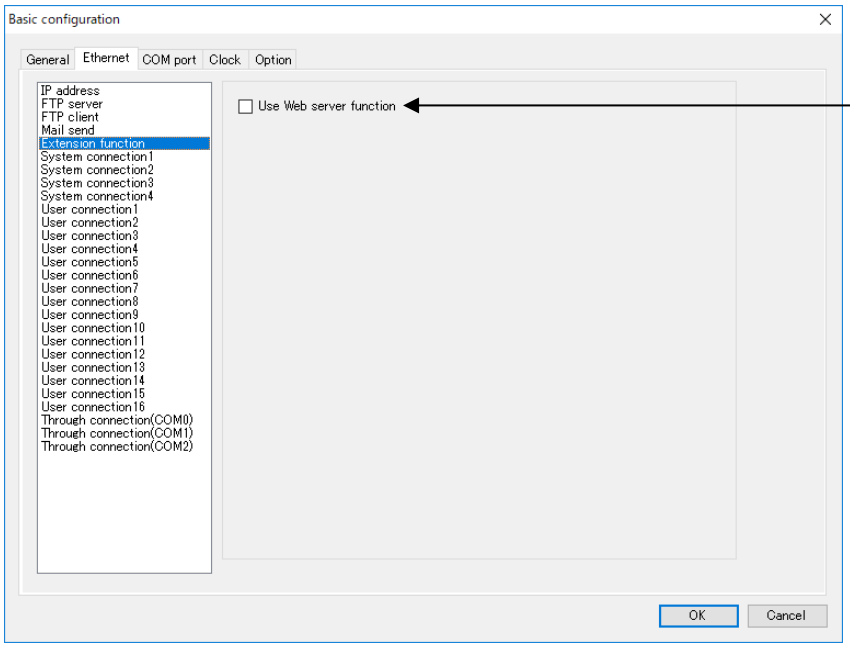
■Mail send function

It sends mail from ELC500 by using the mail transferring protocol.
There are 2 types of sending mail. At an event is occurred. At creating logging file or demand file.

Note

- When it can't send mail, it will send mail again according to the setting retry interval and retry count. However mail sending process during retry to send mail is deleted and it may not send file created during the retry.

[5] Extension function
Set to use Web server function.
Only customer Web can be used for ELC500.



Item		Description
(a)	Use Web server function	Select use the function or not. <Initial> without check = not available

■Web server function

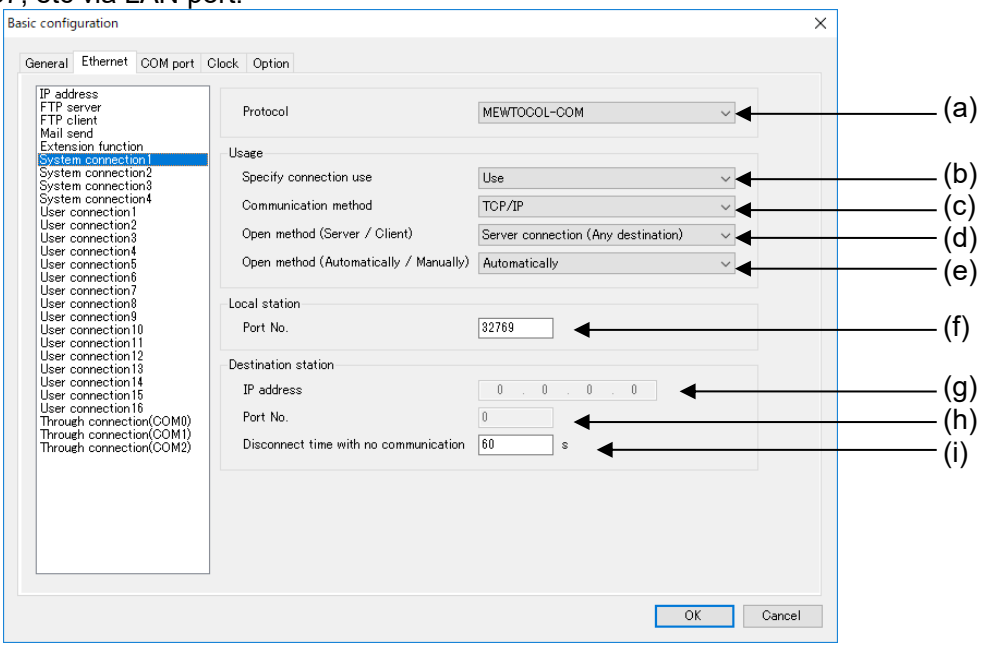
You can upload your contents created by using Web Creator (Customer Web) and monitor the contents with your browser.

Note

In order to use Web server function, the followings are necessary.
- Control Web Creator (Model No. AFPSWC)
- Key unit (Model No. AFPSWCKEY)

[6] System connection

[System Connection] is used to communicate with tool software such as Configurator EL500, FPWIN Pro7, etc via LAN port.



Item		Description
(a)	Protocol	Set communication protocol. <Initial> MEWTOCOL-COM <Set range> MEWTOCOL-COM / MEWTOCOL7-COM / MODBUS TCP / MEWTOCOL-DAT
(b)	Specify connection use	Select use the connection or not. <Initial> with check = available
(c)	Communication method	Set communication method. <Initial> TCP/IP <Set range> TCP/IP / UDP/IP
(d)	Open method (Server / Client)	Set connection open method. <Initial> Server connection (Any destination) <Set range> Server connection (Any destination) / Server connection (specified)
(e)	Open method (Automatically / Manually)	Set connection open method. <Initial> Automatically <Set range> Automatically / Manually
(f)	Port No.	Set port number to use by ELC500. <Initial> connection 1: 32769 connection 2: 32770 connection 3: 32771 connection 4: 32772 <Set range> UDP/IP: 0 to 65535 *1 TCP/IP: 1 to 65535
(g)	IP address *2	Set IP address of the connected device.
(h)	Port No. *2	Set port number to use by the connected device. < Set range> 0 to 65535
(i)	Disconnect time with no communication	Set disconnect time during the communication. Disconnection time exceeds the set time, it will disconnect automatically. <Initial> connection 1: 60 sec connection2, 3, 4: 3600 sec <Set range> 1 to 3600

*1 When it set to 0, it allocate automatically.

*2 Only when ‘Server connection (specified)’ is selected for open method.

■**Open method (Server / Client)**

Item	Description
Server connection (Any destination)	Wait for connections from unspecified clients.
Server connection (specified)	Wait for connections from specified clients.

■**Open method (Automatically / Manually)**

Item	Description
Automatically	When power on, it opens the communication line with each device according to system connection settings automatically. Open the connection and wait for a connection from client.
Manually	Do not select this. It can't open connection.

■**In case of selecting 'Server connection (specified)' for 'Open method (Server / Client)'**

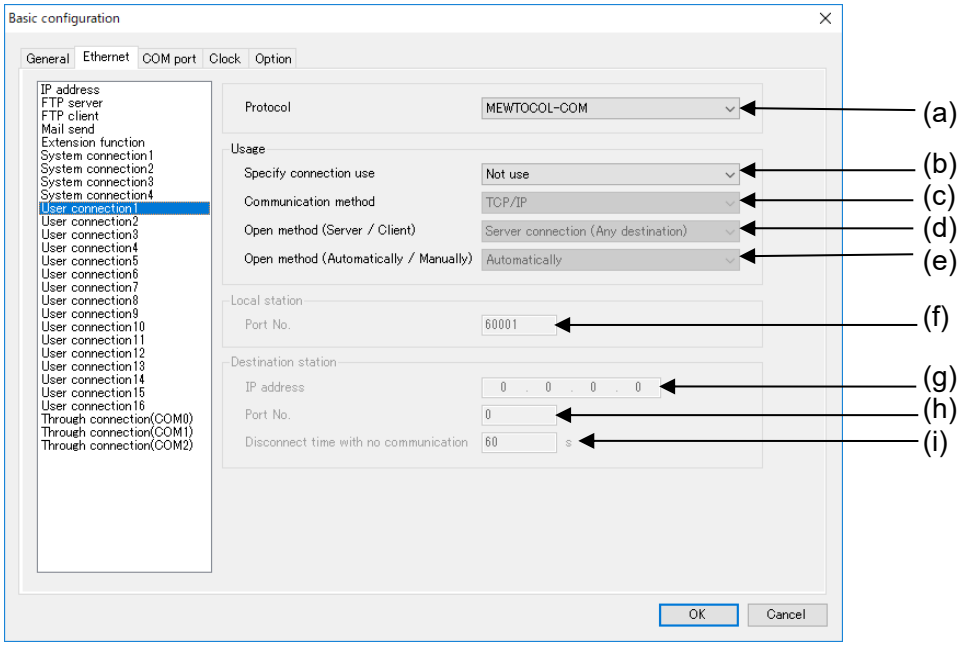
Item	Description
IP address	When IP address set to 0.0.0.0, it receives data from any destination. When it set to except 0.0.0.0, it receives data from the specified destination.
Port No.	When port number set to 0, it receives data from any destination. When it to except 0, it receives data from the specified destination.

Note

Either IP address or port number must be specified with except 0 (0,0,0,0).

[7] User connection
[User Connection] is used as following.
- Communicating to lower devices as a master. (Programming is needed. Refer to '1.1.6 Programming')
- Communicating from upper device as a slave.

Note
To communicate with the lower equipment ELC500 as a client you need to create a program in FPWIN Pro7.



Item		Description
(a)	Protocol	Set communication protocol. <Initial> MEWTOCOL-COM <Set range> MEWTOCOL-COM / MEWTOCOL7-COM / MODBUS TCP / MEWTOCOL-DAT / General communication *1
(b)	Specify connection use	Select use the connection or not. <Initial> without check = not available
(c)	Communication method	Set communication method. <Initial> TCP/IP <Set range> TCP/IP / UDP/IP
(d)	Open method (Server / Client)	Set connection open method. <Initial> Server connection (Any destination) <Set range> Server connection (Any destination) / Server connection (Specified) / Client connection
(e)	Open method (Automatically / Manually)	Set connection open method. <Initial> Automatically <Set range> Automatically / Manually
(f)	Port No.	Set port number to use by ELC500. <Initial> connection 1: 60001 connection 2: 60002 connection 3: 60003 connection 4: 60004 connection 5: 60005 connection 6: 60006 connection 7: 60007 connection 8: 60008 connection 9: 60009 connection 10: 60010 connection 11: 60011 connection 12: 60012 connection 13: 60013 connection 14: 60014 connection 15: 60015 connection 16: 60016 <Set range> Open method (Client): 0 to 65535 Open method (Server): 1 to 65535

Item		Description
(g)	IP address *2	Set IP address of the connected device.
(h)	Port No. *2	Set port number to use by the connected device. <Initial> 0 <Set range> 0 to 65535 or 1 to 65535
(i)	Disconnect time with no communication	Set disconnect time during the communication. Disconnection time exceeds the set time, it will disconnect automatically. <Initial> 60 sec <Set range> Open method (Client): 1 to 3600 Open method (Server): 0 to 3600

*1 When creating communication program by using FPWIN Pro7

*2 Only when Server connection (Specified) or Client connection is selected for open method.

■Open method (Server / Client)

Item	Description
Server connection (Any destination)	Wait for connections from unspecified clients.
Server connection (specified)	Wait for connections from specified clients.
Client connection	Connect to the destination port of server connection. When it can't connect, it will be communication error.

■Open method (Automatically / Manually)

Item	Description
Automatically	When power on, it opens the communication line with each device according to system connection settings automatically. <Client connection> If it can't establish connection, it connects repeatedly at regularly. <Serve connection> Open the connection and wait for a connection from client.
Manually	In order to open connection manually, FPWIN Pro7 programming is necessary.

■In case of selecting 'Server connection (specified)' for 'Open method (Server / Client)'

Item	Description
IP address	When IP address set to 0.0.0.0, it receives data from any destination. When it set to except 0.0.0.0, it receives data from the specified destination.
Port No.	When port number set to 0, it receives data from any destination. When it to except 0, it receives data from the specified destination.

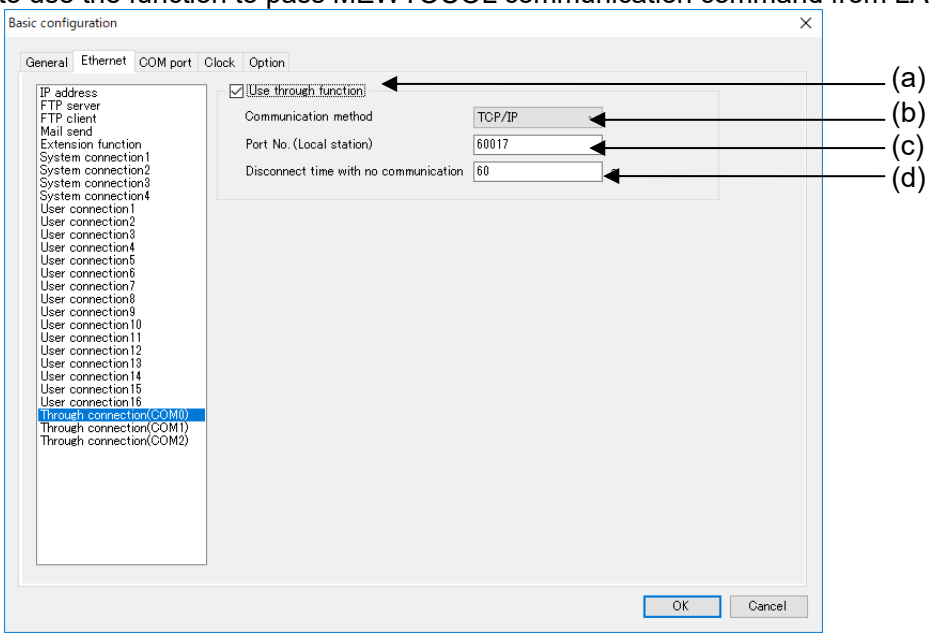
Note

Either IP address or port number must be specified with except 0 (0,0,0,0).

■In case of selecting 'Client connection' for 'Open method (Server / Client)'

Item	Description
IP address	Set IP address of destination. Except 0.0.0.0
Port No.	Set port number of destination. Except 0

[8] Through connection
Set to use the function to pass MEWTOCOL communication command from LAN port to serial port.



Item		Description
(a)	Use through function	Select use the function or not. <Initial> without check = not available
(b)	Communication method	Set communication method. <Initial> TCP/IP <Set range> TCP/IP / UDP/IP
(c)	Port No. (Local station)	Set port number of LAN port to use for output a command to serial port. <Initial> Through connection(COM0): 60017 Through connection(COM1): 60018 Through connection(COM2): 60019 <Set range> 1 to 65535
(d)	Disconnect time with no Communication *1	Set disconnect time during the communication. Disconnection time exceeds the set time, it will disconnect automatically. <Initial> 60 sec <Set range> 1 to 3600

*1 Only when 'TCP/IP' is selected for communication method.

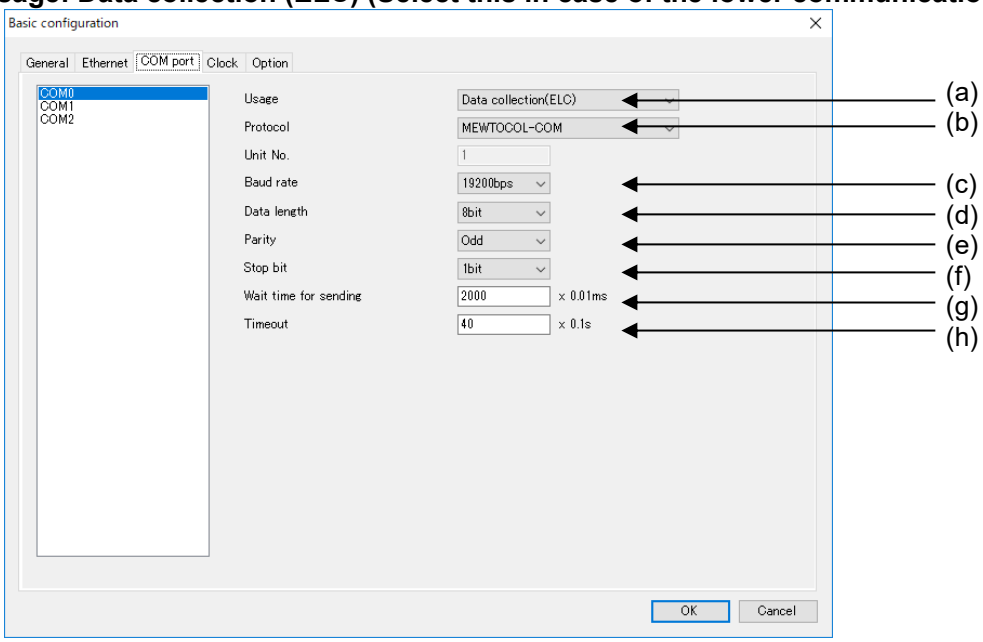
Point
When 'Use through function' of Through connection (COM0) is available, a command to LAN port is passed to COM0.

Note
- Through function supports only MEWTOCOL communication.
- When the station number is EE, it doesn't through. It responses as ELC500.

5.6.1.3 COM port setup

Set COM port to use for serial communication.
Required items are different according to the selected usage.
Set them according to the communication conditions of connected device.

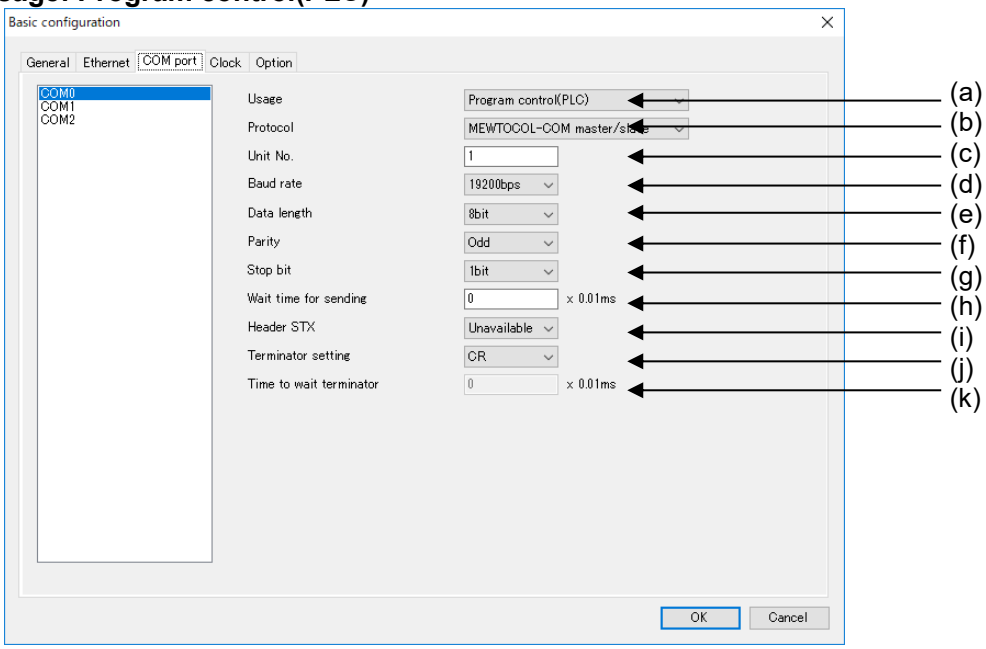
■Usage: Data collection (ELC) (Select this in case of the lower communication)



Item		Description
(a)	Usage	Set usage for serial communication. <Initial> Data collection(ELC) <Set range> Data collection(ELC) / Program control(PLC)
(b)	Protocol	Set communication protocol. <Initial> MEWTOCOL-COM <Set range> MEWTOCOL-COM / MODBUS RTU
(c)	Baud rate	Set baud rate. <Initial> 19200 bps <Set range> 300 / 600 / 1200 / 2400 / 4800 / 9600 / 19200 / 38400 / 57600 / 115200 / 230400 bps
(d)	Data length *1	Set data length. <Initial> 8bit <Set range> 7 bit / 8 bit
(e)	Parity	Set parity. <Initial> Odd <Set range> None / Odd / Even
(f)	Stop bit	Set stop bit. <Initial> 1 bit <Set range> 1 bit / 2 bit
(g)	Wait time for sending *2	Set wait time for sending next command after receiving a response. <Initial> 2000 x 0.01 ms <Set range> 0 to 20000
(h)	Timeout *2	Set waiting time for a response. When it doesn't response within the set time, it will send next command. It will not send the command again. <Initial> 40 x 0.1 sec <Set range> 1 to 100

*1 In case of select MODBUS RTU, data length is fixed to 8 bit.
*2 It is recommended that set timeout to long when connecting a wireless device.

■Usage: Program control(PLC)

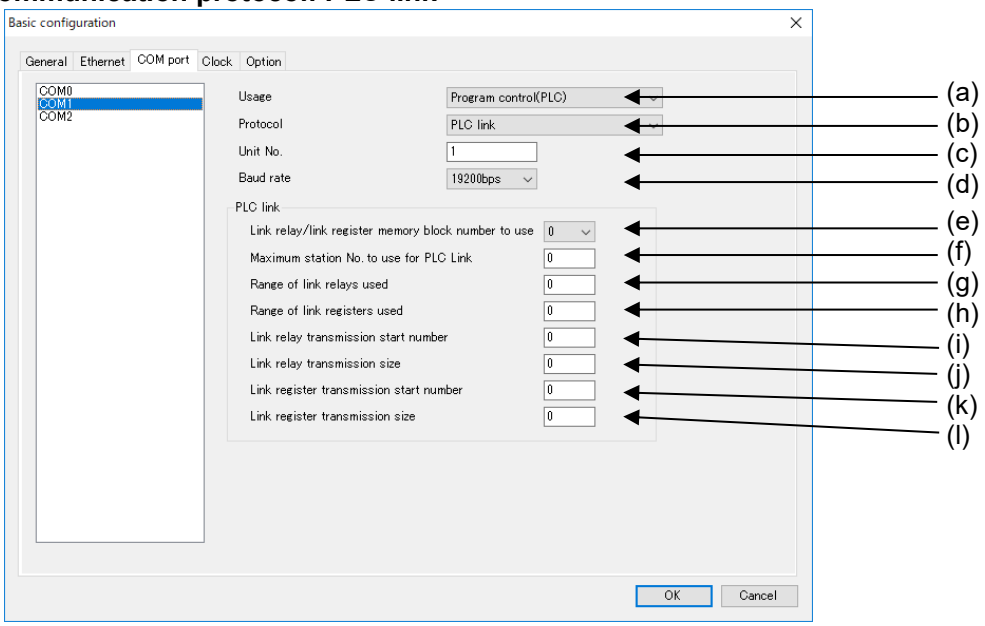


Item		Description
(a)	Usage	Set usage for serial communication. <Initial> Data collection(ELC) <Set range> Data collection(ELC) / Program control(PLC)
(b)	Protocol *3	Set communication protocol. <Initial> MEWTOCOL-COM master/slave <Set range> MEWTOCOL-COM master/slave MEWTOCOL7-COM slave MODBUS RTU master/slave General communication *1 PLC link *2
(c)	Unit No. *4	Set unit number of ELC500. <Initial> 1 <Set range> MEWTOCOL-COM master/slave: 1 to 99 MEWTOCOL7-COM slave: 1 to 999 MODBUS RTU master/slave: 1 to 247 General communication: 1 to 999
(d)	Baud rate	Set baud rate. <Initial> 19200 bps <Set range> 300 / 600 / 1200 / 2400 / 4800 / 9600 / 19200 / 38400 / 57600 / 115200 / 230400 bps
(e)	Data length *5	Set data length. <Initial> 8bit <Set range> 7 bit / 8 bit
(f)	Parity	Set parity. <Initial> Odd <Set range> None / Odd / Even
(g)	Stop bit	Set stop bit. <Initial> 1 bit <Set range> 1 bit / 2 bit

Item		Description
(h)	Wait time to sending	Set wait time for sending next command after receiving a response. <Initial> 2000 x 0.01 ms <Set range> 0 to 20000
(i)	Header STX	Set Header code <Initial> Unavailable <Set range> Available / Unavailable
(j)	Terminator setting	Set terminator conditions <Initial> CR <Set range> CR / CR+LF / Time / ETX
(k)	Time to wait terminator *6	Set time to judge a terminator. <Initial> 0 x 0.01 ms <Set range> 0 to 10000

*1 In case of using FPWIN Pro7 to make communication program.
*2 Only when selecting COM1.
*3 In case of using as a master, it is necessary to make communication program by FPWIN Pro7.
*4 Set range differs according to communication protocol.
*5 In case of select MODBUS RTU master/slave, data length is fixed to 8bit.
*6 Only when selecting time for terminator setting.

■Communication protocol: PLC link



Item		Description
(a)	Usage	Set usage for serial communication. <Initial> Data collection(ELC) <Set range> Data collection(ELC) / Program control(PLC)
(b)	Protocol	Set communication protocol. <Initial> MEWTOCOL-COM master/slave <Set range> MEWTOCOL-COM master/slave MEWTOCOL7-COM slave MODBUS RTU master/slave General communication PLC link
(c)	Unit No.	Set unit number of ELC500 to connect PLC link. <Initial> 1 <Set range> 1 to 16

Item		Description
(d)	Baud rate	Set baud rate. <Initial> 19200 bps <Set range> 300 / 600 / 1200 / 2400 / 4800 / 9600 / 19200 / 38400 / 57600 / 115200 / 230400 bps
(e)	Link relay / link register memory block number to use	Set range by block for device number of used link relay, link register. <Initial> 0 <Set range> 0 / 1
(f)	Maximum station No. to use for PLC link	Set maximum station number to connect PLC link. <Initial> 0 <Set range> 0 to 16
(g)	Range of link relays used	Set range of link relay to use for communication. <Initial> 0 <Set range> 0 to 64
(h)	Range of link registers used	Set range of link register to use for communication. <Initial> 0 <Set range> 0 to 128
(i)	Link relay transmission start number	Set transmission start number (header word number) of link relay to use for communication. <Initial> 0 <Set range> 0 to 63
(j)	Link relay transmission size	Set transmission size of link relay to use for communication. <Initial> 0 <Set range> 0 to 64
(k)	Link register transmission start number	Set transmission start number (header word number) of link register to use for communication. <Initial> 0 <Set range> 0 to 127
(l)	Link register transmission size	Set transmission size of link register to use for communication. <Initial> 0 <Set range> 0 to 127

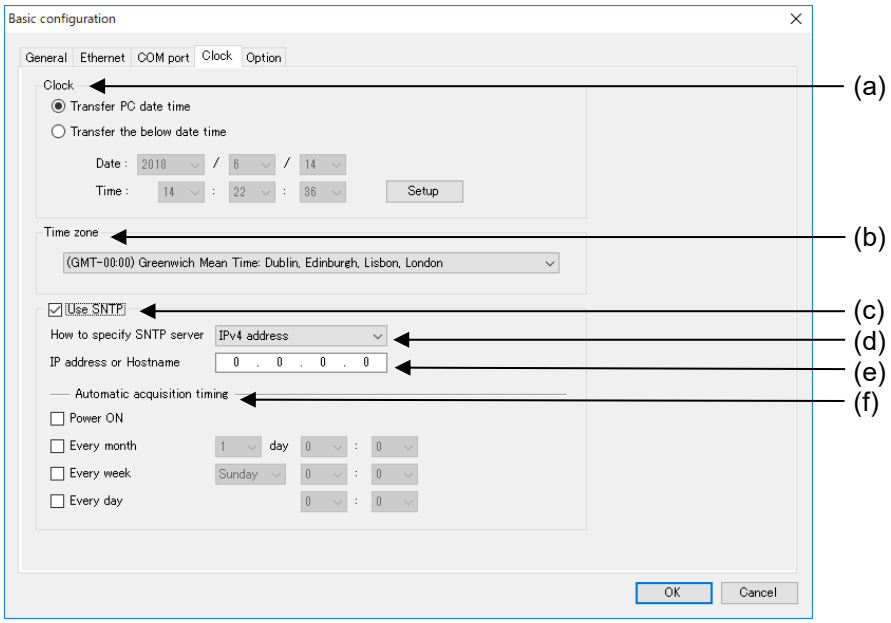
Reference

FP7 User's manual (SCU communication)

5.6.1.4 Clock setup

Set time of ELC500.

Unstable data is set at initial. Be sure to set the correct date and time before use.



■Manual setup

Set time manually.

Item		Description
(a)	Clock	Select the way to transfer time. Select one and click [Setup], it will update time of ELC500. *1
(b)	Time zone	Select time zone. It is used for mail function and SNTP function. <Initial> The time zone of the PC using Configurator EL500. <Set range>GMT-12:00/GMT-11:00/GMT-10:00/GMT-09:00/ GMT-08:00/GMT-07:00/GMT-06:00/GMT-05:00/ GMT-04:00/GMT-03:00/GMT-02:00/GMT-01:00/ GMT+00:00/GMT+01:00/GMT+02:00/GMT+03:00/ GMT+04:00/GMT+05:00/GMT+06:00/GMT+07:00/ GMT+08:00/GMT+09:00/GMT+10:00/GMT+11:00/ GMT+12:00

■Auto time setup

Set time by synchronizing to SNTP server.

Item		Description
(c)	Use SNTP	Select to use the function or not. <Initial> without check = not available
(d)	How to specify SNTP server	Set the way to specify SNTP server. <Initial> IPv4 address <Set range> IPv4 address / Hostname
(e)	IP address or Hostname *2	Set SNTP server address <Set range> 64-letter or less *3
(f)	Automatic acquisition timing	Set timing to synchronize clock to SNTP server Check the box to set. <Initial> without check <Set range> Power ON / Every month / Every week / Everyday

*1 In case of select 'Transfer PC date time', it transfer the time (including time zone) of PC directly.
In case of select 'Transfer the below date time', it transfer the time you input directly.

*2 Confirm your system administrator about SNTP server address.

*3 In case of select 'Hostname'

What is ‘SNTP server’?

It is protocol that is used for synchronizing time of computer or network device using network.

SNTP server sends clock value for inquiring time adjustment from a client.

It is not necessary to adjust clock manually by using this function.

What is ‘Time zone’?

A time zone is a region on Earth where uses same standard time, usually referred to as the local time. By convention, the 24 main time zones on Earth compute their local time as an offset from UTC (see also Greenwich Mean Time).

In Japan, it is +0900.

■Automatic acquisition timing

It accesses to SNTP server at selected timing and synchronize the time.

-Power ON	When ELC500 turn on
-Every month	Once in a month at setting date
-Every week	Once in a week at setting day of week
-Everyday	Once in a day at setting time

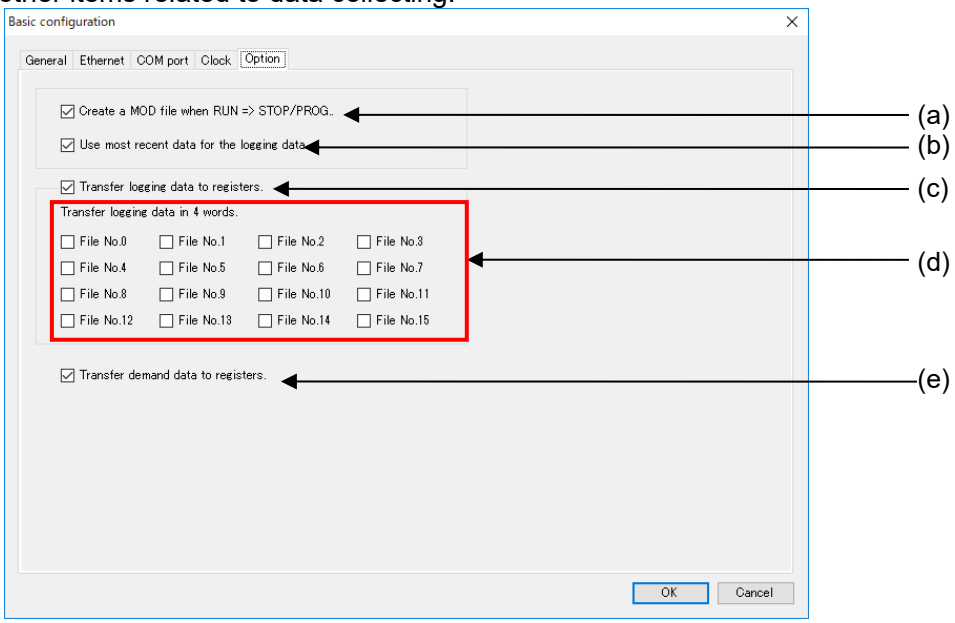
Note

Be sure to confirm the followings for time adjustment by SNTP.

- It adjusted at the timing of 30-sec. This is a measure to reduce the case of recording in 1 minute or the same record duplication.
- If demand period shifts by time adjustment, it can’t calculate demand value in the period correctly. Even if it adjusts in the same demand period, it effects to demand value.
- When synchronizing the time, set the time zone according to the area of use.

5.6.1.5 Option setup

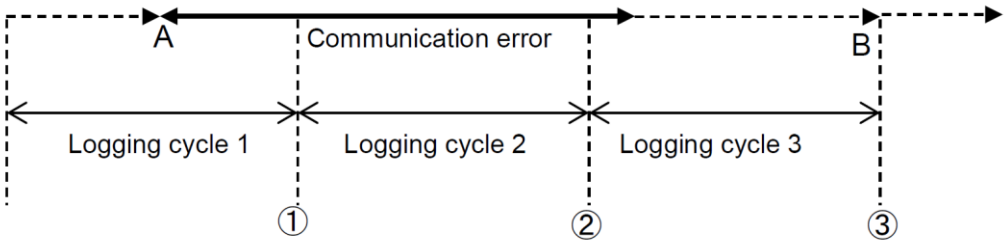
Set other items related to data collecting.



Item		Description
(a)	Create a MOD file when RUN => STOP/PROG.	Select to use the function or not. <Initial> with check = available
(b)	Use most recent data for logging data.	Select to use the function, if a communication error is happened at logging trigger timing, it uses the reading data after the last trigger timing, or not. <Initial> with check = available
(c)	Transfer logging data to registers.	Select to use the function, it transfers logging data to DT registers, or not. <Initial> with check = available
(d)	Transfer logging data in 4 words.	Set saved word unit of the logging data. With check = save with 4 words. Without check = save with 2 words <Initial> without check = 2 words *This setting is used for all DT registers.
(e)	Transfer demand data to registers.	Select to use the function or not. <Initial> with check = available

Point

This is the working of ‘Use most recent data for logging data’ function.



---------►:Sampling

<In case of ‘Not available’>

At (1) Communication error, No logging data (-)
At (2) Communication error, No logging data (-)
At (3) Take data B

<In case of ‘Available’>

At (1) Communication error, Take data A (most recent data)
At (2) Communication error during cycle 2, No logging data (-)
At (3) Take data B

Note

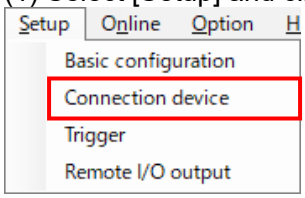
When ‘Create a MOD file when RUN => STOP/PROG.’ set to not available, it might miss data.

Connection Device Setup

Setup and register devices that ELC500 collect or control.
You can open the window by 2-way the below.
* It select [Program control (PLC)] as a usage with COM port setup, connected devices can't be registered.

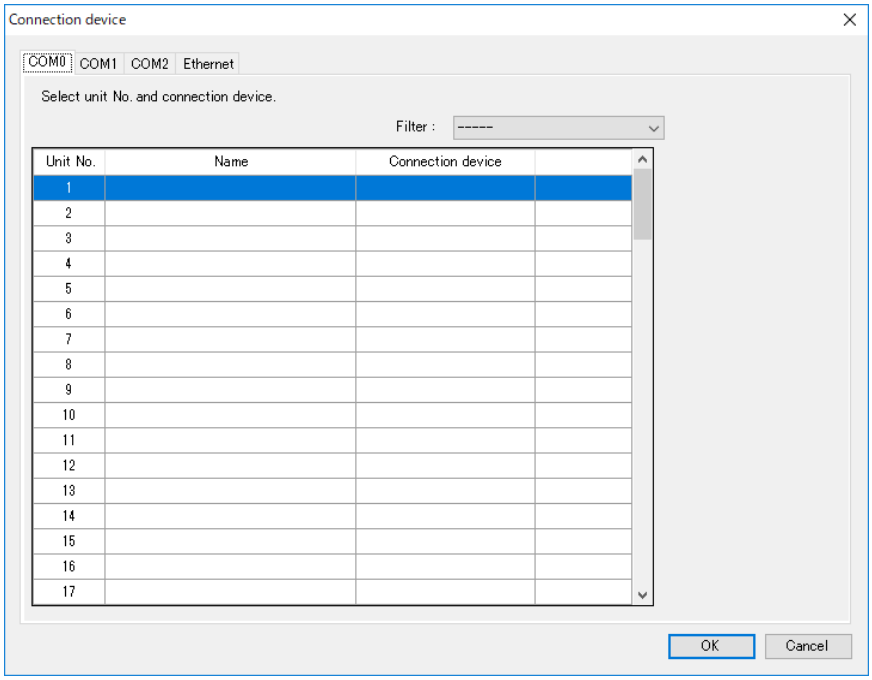
5.6.2

(1) Select [Setup] and click [Connection device].

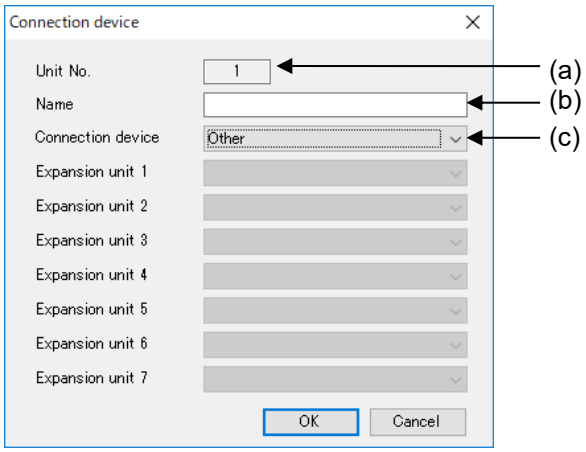


(2) Click icon on tool bar

■COM0

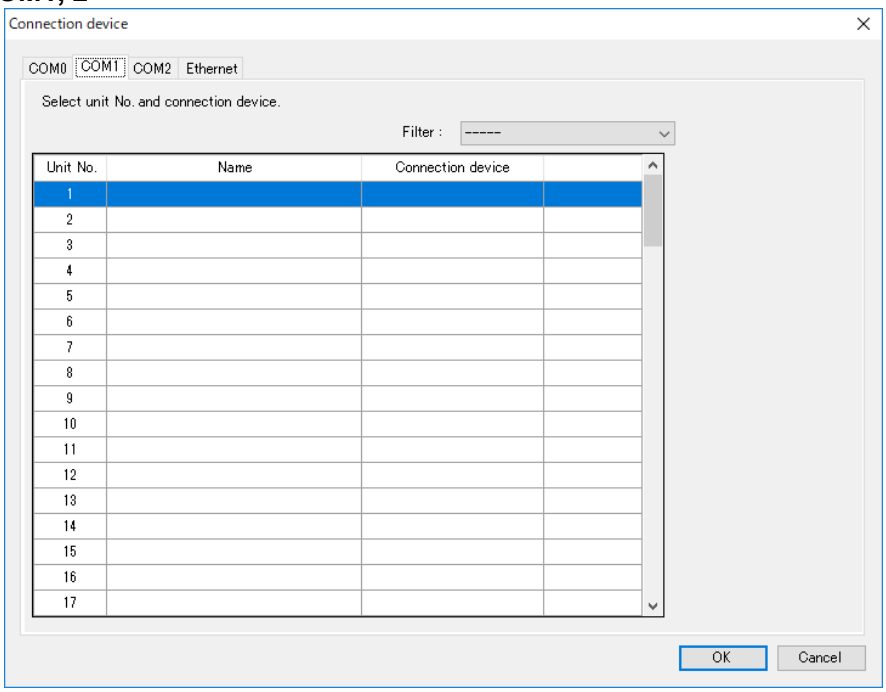


Register a device that is connected to COM0.
Double-click the line with the same unit No. as the device to be registered, and setup window will be displayed.
Up to 99 units can be registered and you can use filtering function to display the registered units.

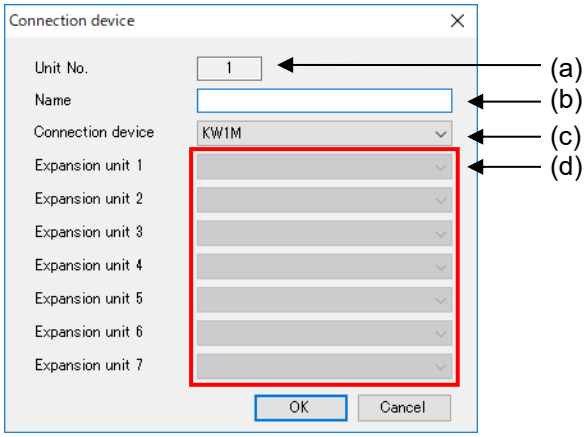


Item		Description
(a)	Unit No.	Registered unit number is displayed.
(b)	Name	Set name for the connected device. <Set range> 32-letter or less
(c)	Connection device	Set type for the connected device. <Initial> Other <Set range> Other

■COM1, 2



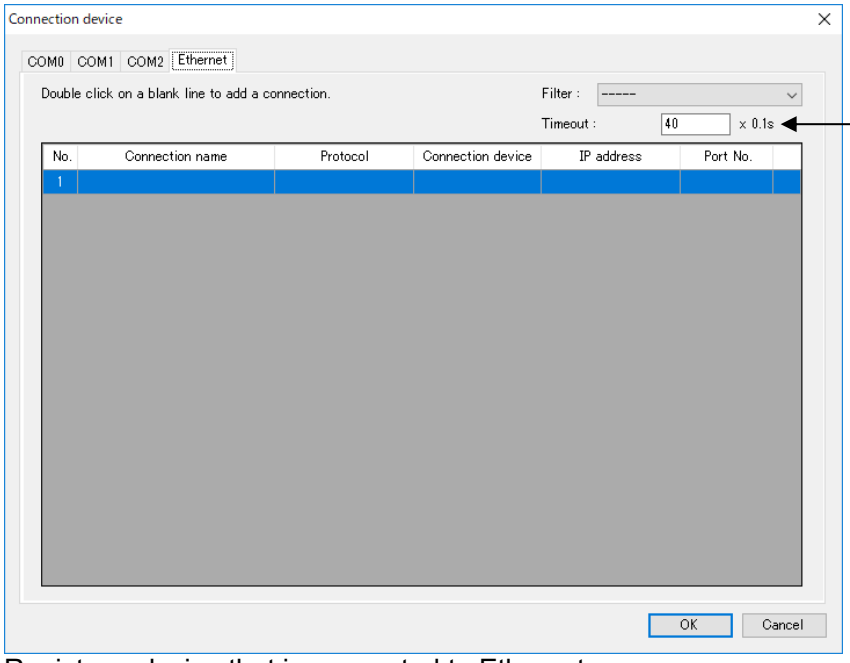
Register devices that are connected to COM1 and COM2.
Double-click the line with the same unit No. as the device to be registered, and setup window will be displayed.
Up to 99 units can be registered and you can use filtering function to display the registered units.



Item		Description
(a)	Unit No.	Registered unit number is displayed.
(b)	Name	Set name for the connected device. <Set range> 32-letter or less
(c)	Connection device	Set type for the connected device. <Initial> KW1M <Set range> KW1M / KW2G / KW2M / KW4M / KW7M / KW8M / KW9M / Remote I/O unit /Other
(d)	Expansion unit *1	Set when the connection device has expansion unit(s).

*1 Only when the connection device is KW2G or KW2M. Do not set unless otherwise specified.

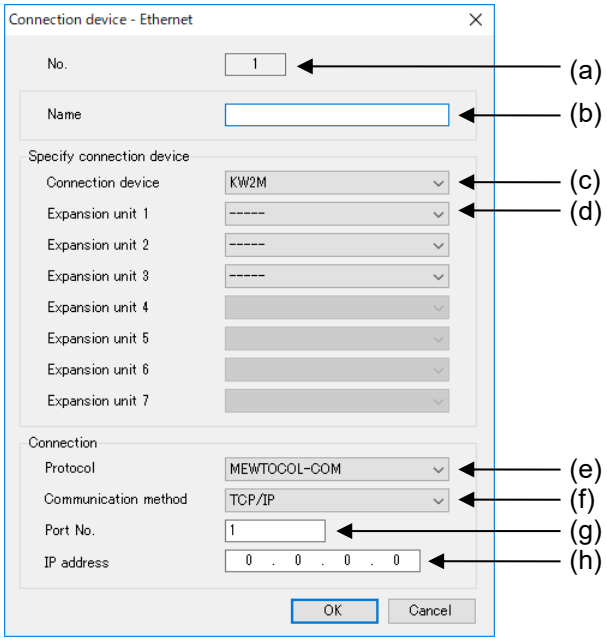
■Ethernet



Register a device that is connected to Ethernet.
Double-click any vacant line, and setup window will be displayed.
Up to 197 units can be registered and you can use filtering function to display the registered units.

Item		Description
(a)	Timeout *1	Set receiving timeout time with connection devices. <Initial> 40 x 0.1 ms <Set range> 1 to 100 x 0.1 ms

*1 Time from arriving data to the lower device
When data can't arrive to the lower device, it will resend 12 times.



Item		Description
(a)	No.	Registered unit number is displayed.
(b)	Name	Set name for the connected device. <Set range> 32-letter or less
(c)	Specify connection device	Set type for the connected device. <Initial> KW2M <Set range> KW2M / Other
(d)	Expansion unit *1	Set when the connection device has expansion unit(s).
(e)	Protocol	Set protocol of the connected device. <Initial> MEWTOCOL-COM <Set range> MEWTOCOL-COM / MODBUS TCP
(f)	Communication method	Set communication method od the connected device. <Initial> TCP/IP <Set range> TCP/IP / UDP/IP
(g)	Port No.	Set port number of LAN port of the connected device. <Initial> 1 <Set range> 1 to 65535
(h)	IP address *2	Set IP address of the connected device.

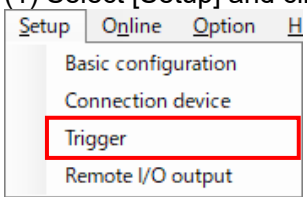
*1 Only when the connection device is KW2M. Do not set unless otherwise specified.
*2 Set IP address with no duplication.

Trigger Setup

In order to perform a data collection, logging file update, write data, send mail, special control, etc., it is necessary to setup the timing to execute them in advance. The timing is called ‘Trigger’.
You can open the window by 2-way the below.

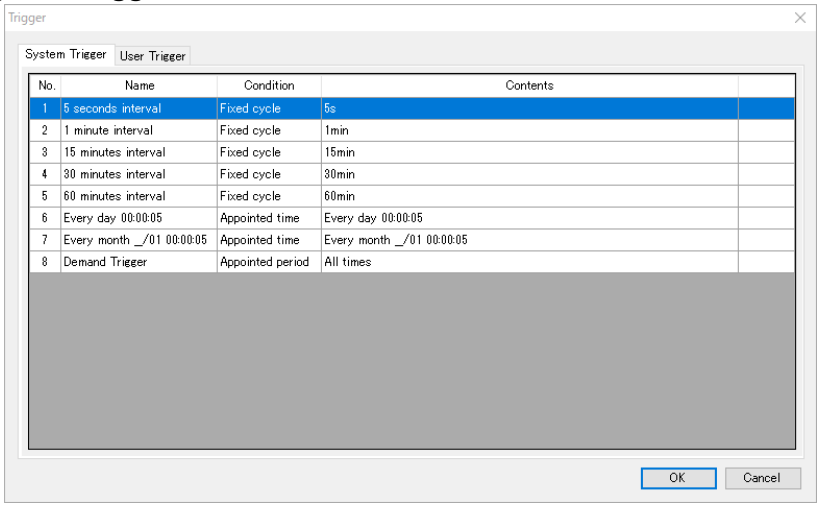
5.6.3

(1) Select [Setup] and click [Trigger].



(2) Click icon on tool bar.

■System trigger



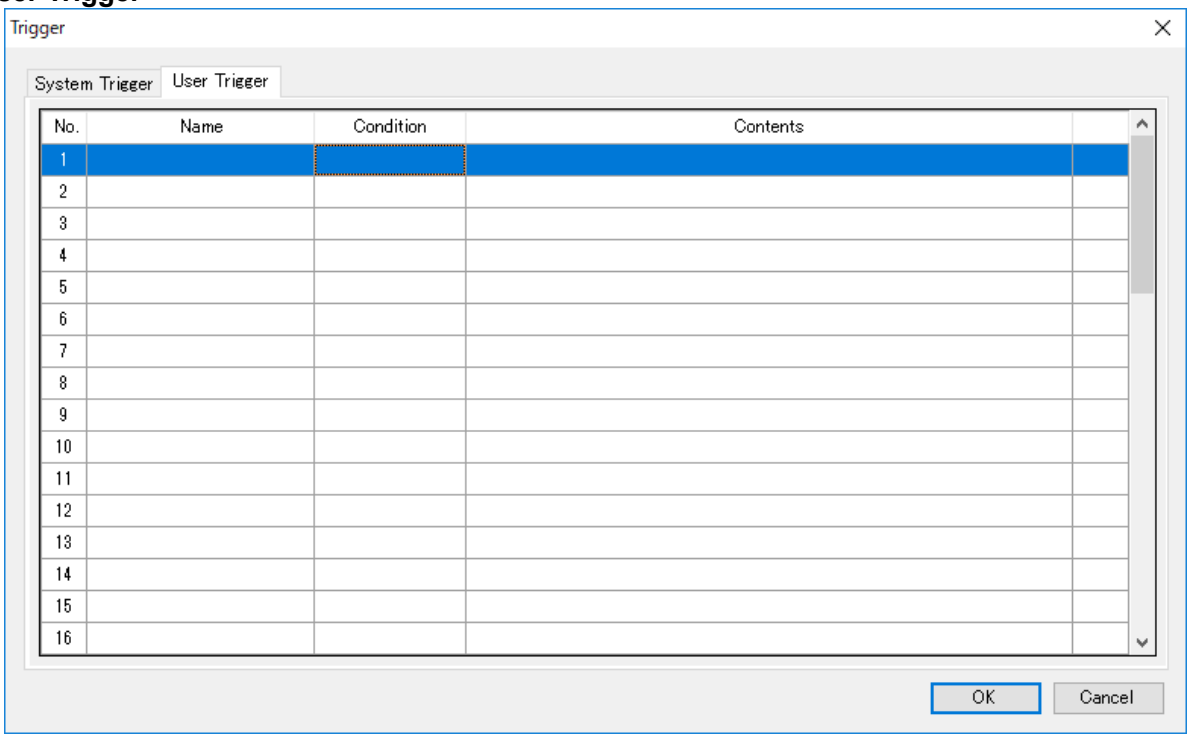
There are ‘System trigger’ and ‘User trigger’.
7 types of trigger setting are set to system trigger.
System trigger is not possible to neither edit nor delete.
In order to change and add trigger, use ‘User trigger’.

<Setting system triggers>

Trigger name	Condition	Description
5 seconds interval	Fixed cycle	Trigger occurs at 5-sec interval.
1 minute interval	Fixed cycle	Trigger occurs at 1-min interval.
15 minutes interval	Fixed cycle	Trigger occurs at 15-min interval.
30 minutes interval	Fixed cycle	Trigger occurs at 30-min interval.
60 minutes interval	Fixed cycle	Trigger occurs at 60-min interval.
Every day 00:00:05	Appointed time	Trigger occurs at every day 00:00:05.
Every month _/01 00:00:05	Appointed time	Trigger occurs at 00:00:00 on the 1st of every month.
Demand Trriger	Appointed time	Trigger occurs all times.

A trigger occurs on the basis of the hour.
Ex.) In case of 5 seconds interval
Trigger occur time: 0-sec, 5-sec, 10-sec, ….. 50-sec, 55-sec.

■User Trigger

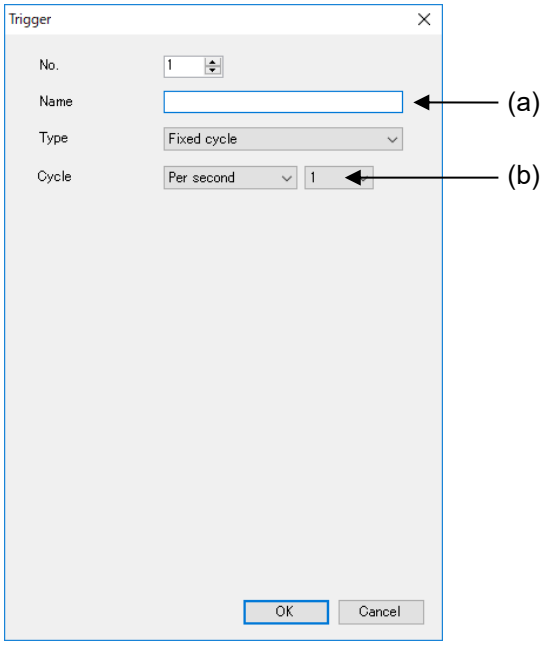


It set triggers you need by yourself.
Double-click any vacant line, and setup window will be displayed.
You can setup trigger with 6 types.

Condition	Description
Fixed cycle	Trigger occurs at setting cycle.
Appointed time	Trigger occurs at setting time.
Appointed period	Trigger occurs from the setting start time to the finish time.
Monitor data (relay)	When compare the setting contact and input condition value and it meets the conditions, a trigger occurs.
Monitor data (register)	When compare the setting register value and input condition value and it meets the conditions, a trigger occurs.
Combination	When it meets selected triggers, a trigger occurs.

* Up to 50 triggers can be registered for user trigger.

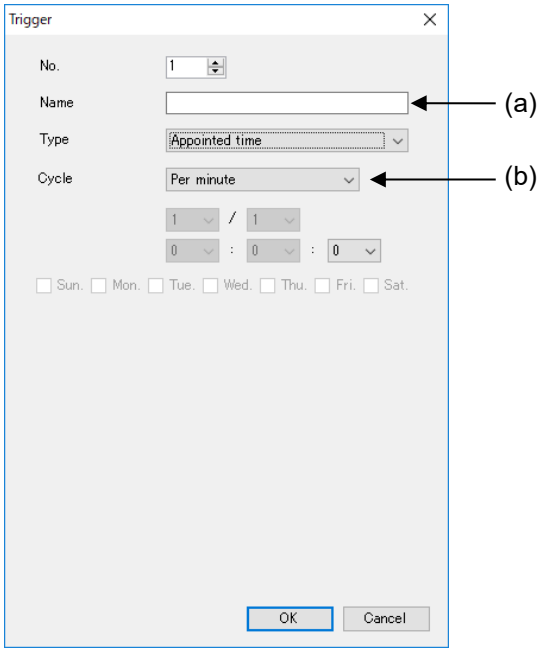
<Fixed cycle>
Select ‘Fixed cycle’ for type. Trigger occurs at setting cycle.



Item		Description
(a)	Name	Set trigger name. <Set range> 32-letter or less
(b)	Cycle	Set trigger occurred condition. <Initial> Per second 1 <Set range> Per second 1, 2, 3, 4, 5, 6, 10, 15, 30 Per minute 1, 2, 3, 4, 5, 6, 10, 15, 30 Per hour 1, 2, 3, 4, 6, 12, 24

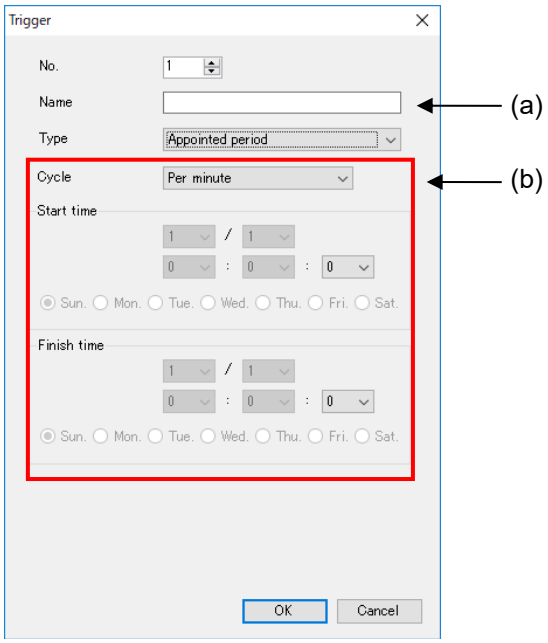
A trigger occurs on the basis of the hour.
Ex.) In case of 5 seconds
Trigger occur time: 0-sec, 5-sec, 10-sec, ….. 50-sec, 55-sec.

<Appointed time>
Select ‘Appointed time’ for type. Trigger occurs at setting time.



Item		Description
(a)	Name	Set trigger name. <Set range> 32-letter or less
(b)	Cycle	Set trigger occurred condition. <Initial> Per minute 1 <Set range> Per minute MM/dd hh:mm:0 to MM/dd hh:mm:59 Per hour MM/dd hh:0:0 to MM/dd hh:59:59 Every day MM/dd 0:0:0 to MM/dd 23:59:59 Every week MM/dd(Sun) 0:0:0 to MM/dd(Sat) 23:59:59 Every month MM/1 0:0:0 to MM/31 23:59:59 Every year 1/1 0:0:0 to 12/31 23:59:59

<Appointed period>
Select ‘Appointed period’ for type. Trigger occurs during the setting period.
When it changes to RUN mode during the period, or at the setting start time during RUN mode, trigger occurs.



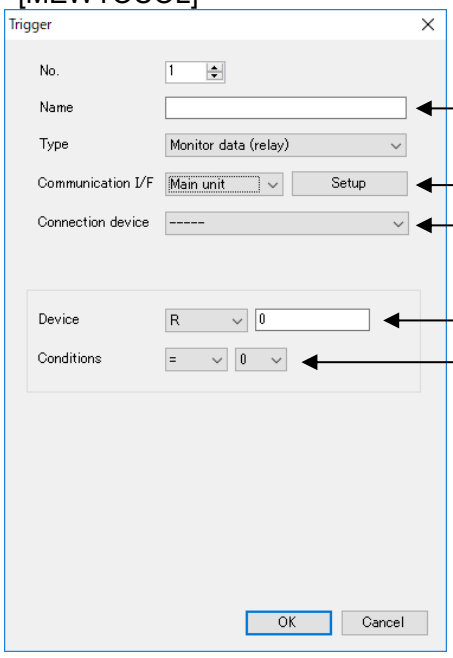
Item		Description
(a)	Name	Set trigger name. <Set range> 32-letter or less
(b)	Cycle	Set trigger occurred condition and period. <Initial> Per minute 1 <Set range> Per minute MM/dd hh:mm:0 to MM/dd hh:mm:59 Per hour MM/dd hh:0:0 to MM/dd hh:59:59 Every day MM/dd 0:0:0 to MM/dd 23:59:59 Every week MM/dd(Sun) 0:0:0 to MM/dd(Sat) 9:59 Every month MM/1 0:0:0 to MM/31 23:59:59 Every year 1/1 0:0:0 to 12/31 23:59:59 Always

・Working of ’Every day’ trigger
Ex.) <Set condition> Start time: 22:00:00 Finish time: 2:00:00
Trigger will occur when it shift to RUN mode during 22:00:00 to 2:00:00 on the next day.
Trigger will occur when it becomes 22:00:00 during RUN mode. Trigger will stop at 2:00:00.

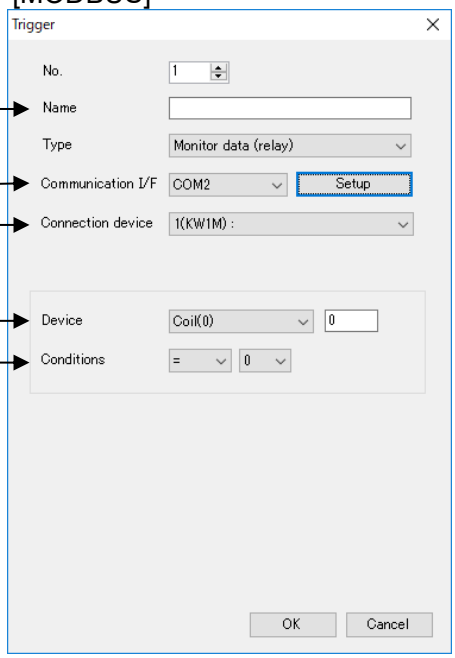
・Working of ’Every week’ trigger
Ex.) <Set conditions> Start time: 22:00:00 Sunday Finish time: 2:00:00 Tuesday
Trigger will occur when it shift to RUN mode during 22:00:00 on Sunday to 2:00:00 on Tuesday.
Trigger will occur when it becomes 22:00:00 on Sunday during RUN mode.
Trigger is kept during 22:00:00 on Sunday to 2:00:00 on Tuesday. Trigger will stop at 2:00:00 on Tuesday.

<Monitor data (relay)>
Select ‘Monitor data (relay)’ for type. When compare the setting contact and input condition value and it meets the conditions, a trigger occurs.

[MEWTOCOL]



[MODBUS]



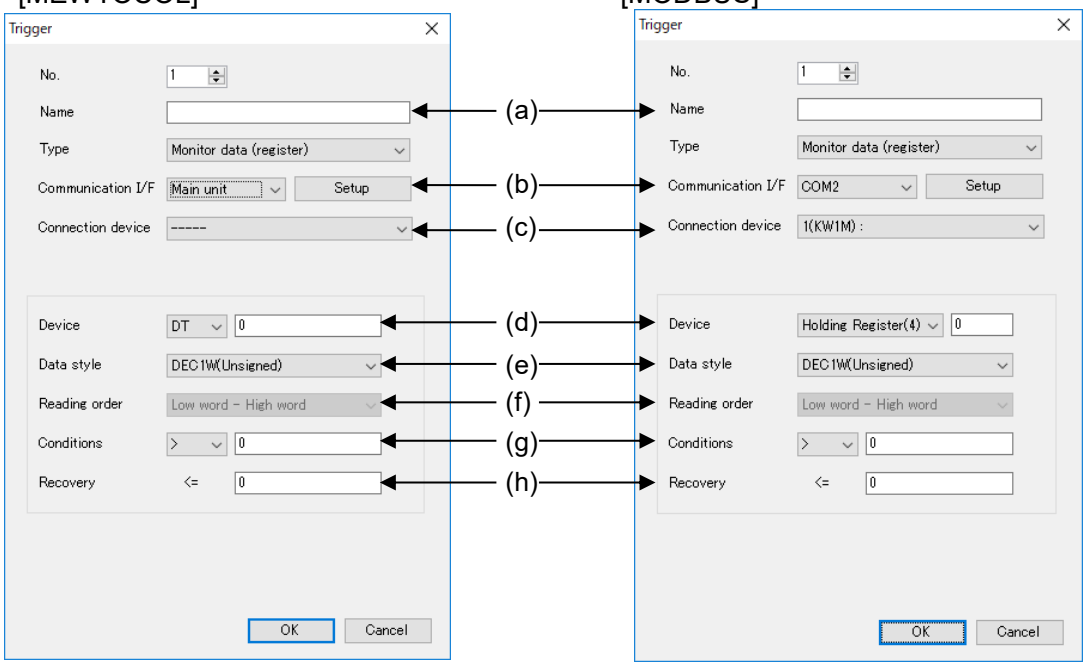
(a) (b) (c) (d) (e)

Item			Description
(a)	Name		Set trigger name. <Set range> 32-letter or less
(b)	Communication I/F		Set communication I/F that is connected the communication device used to collect relay data. <Initial> Main unit <Set range> Main unit/COM0 /COM1 /COM2 /Ethernet *1
(c)	Connection device *2		Set device to collect relay data.
(d)	Device *3	Main unit MEWTOCOL-COM	Set relay data to collect. <Initial> Device: R Number: 0 <Set range> Device R / X / Y / L / T / C *4 Number: 0 to 99999F
		MODBUS RTU MODBUS TCP	Set relay data to collect. <Initial> Device: coil (0) Number: 0 <Set range> Device: coil (0) / Input relay(1) Number: 0 to FFFF *5
(e)	Conditions		Set conditions to occur trigger <Initial> formula: = value: 0 <Set range> formula = / ≠ Value: 0 / 1

*1 It displays communication I/F that device is registered.
*2 It displays registered devices.
*3 It differs according to communication protocol of connected device.
*4 It can select T and C only when MEWTOCOL-COM is selected.
*5 Set with hexadecimal.

<Monitor data (register)>
Select ‘Monitor data (register)’ for type. When compare the setting register value and input condition value and it meets the conditions, a trigger occurs.

[MEWTOCOL] [MODBUS]



Item			Description
(a)	Name		Set trigger name. <Set range> 32-letter or less
(b)	Communication I/F		Set communication I/F that is connected the communication device used to collect relay data. <Initial> Main unit <Set range> Main unit/COM0 /COM1 /COM2 /Ethernet *1
(c)	Connection device *2		Set device to collect relay data.
(d)	Device *3	Main unit MEWTOCOL-COM MEWTOCOL7-COM General communication	Set device to collect. <Initial> Device: DT number: 0 <Set range> Device: DT / LD / FL / WX / WY / WR / WL / SV / EV *4 Number: 0 to 99999
		MODBUS RTU MODBUS TCP	Set device to collect. <Initial> Device: Holding register (4) Number: 0 <Set range> Device: Holding register(4)/Input register(3) Number: 0 to FFFF *5
(e)	Data style		Set data style of device to collect. <Initial> DEC1W(Unsigned) <Set range> DEC1W, DEC1W(Unsigned), DEC2W, DEC2W(Unsigned), DEC4W, DEC4W(Unsigned), single precision real number, double-precision real number
(f)	Reading order *6		Set reading order when it saves collecting data by MODBUS RTU or MODBUS TCP. <Initial> Low word – High word <Set range> Low word – High word / High word - Low word

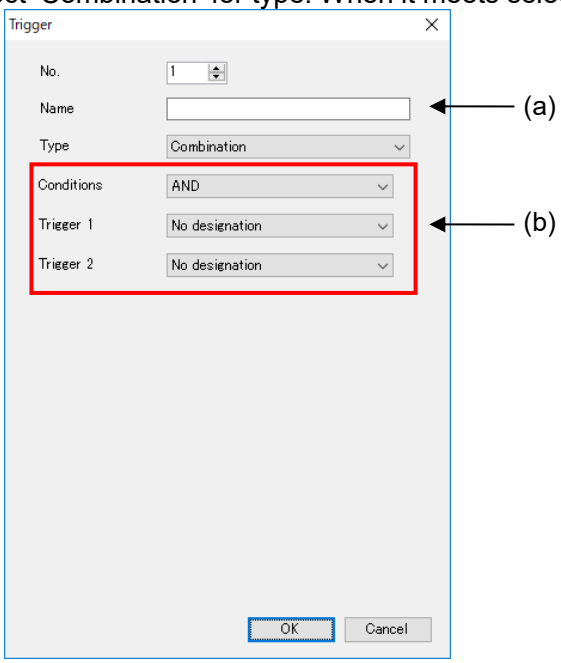
Item		Description
(g)	Conditions *7	Set conditions to occur trigger. <Initial> formula: > value: 0 <Set range> formula: > / < / ≧ / ≦ / = / ≠
(h)	Recovery *7*8	Set conditions to recover trigger. Set as condition value ≧ recovery value <Initial> 0

*1 It displays communication I/F that device is registered.
*2 It displays registered devices.
*3 It differs according to communication protocol of connected device.
*4 It can select LD, SV, and EV only when COM0, COM1, COM2 or Ethernet is selected.
*5 Set with hexadecimal.
*6 Only when device with MODBUS RTU or MODBUS TCP is selected.
Only when one of the following data styles is selected.
DEC2W, DEC2W (Unsigned),
DEC4W, DEC4W (Unsigned),
single precision real number
double-precision real number
*7 Set range differs according to data style.

DEC1W(Unsigned)	0 to 65535
DEC2W (Unsigned)	0 to 4294967295
DEC4W (Unsigned)	0 to 18446744073709551615
single precision real number	significant figure 7 digits or less, decimal point 4 or less
double-precision real number	significant figure 15 digits or less, decimal point 4 or less
DEC1W (signed)	-32768 to 32767
DEC2W (signed)	-2147483648 to 2147483647
DEC4W (signed)	-9223372036854775808 to 9223372036854775807

*8 Only when > / < / ≧ / ≦ is selected for conditions.

<Combination>
Select ‘Combination’ for type. When it meets selected triggers, a trigger occurs.



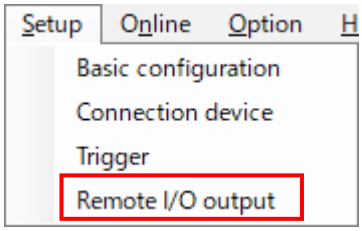
Item		Description
(a)	Name	Set trigger name. <Set range> 32-letter or less
(b)	Conditions	Select 2 type of trigger to combine conditions. AND: Trigger occurs when it meets both triggers. OR: Trigger occurs when it meets one of the triggers. <Initial> AND <Set range> AND / OR

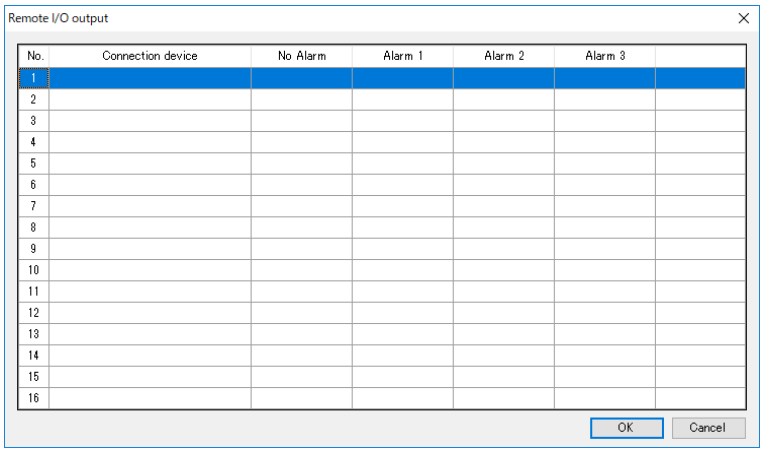
Note
- It is impossible to select triggers created by trigger combination for trigger No.1 nor No.2
- Be sure to set both trigger No.1 and No.2. If it set only one, it doesn’t work correctly.

Remote I/O Output Setup

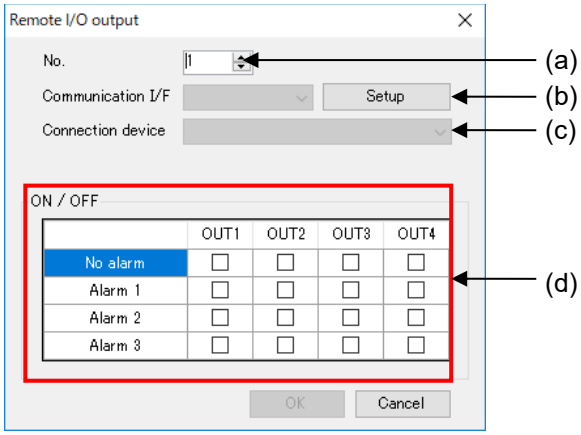
Setup output status of connected Remote I/O unit according to alarm level.
Select [Setup] and click [Remote I/O output].

5.6.4





Up to 16 units output status can be set.
Double-click the line, and setup window will be displayed.



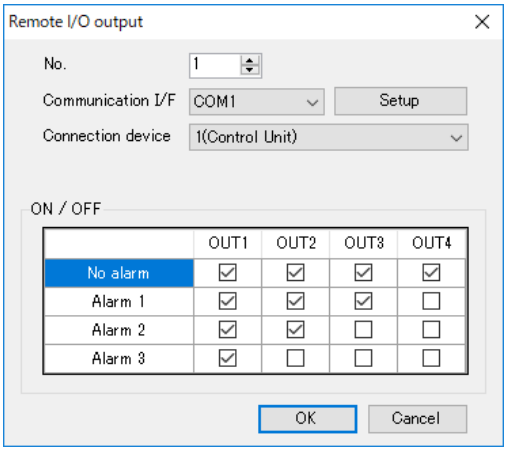
Item		Description
(a)	No.	Registered unit number is displayed.
(b)	Communication I/F	Set communication I/F that is connected Remote I/O unit to set output status. <Set range> COM1 / COM2 *1
(c)	Connection device *2	Set device to set output status.
(d)	ON/OFF	Set output status according to alarm level. With check boxes, output status will be ON.

*1 It displays communication I/F that device is registered.
*2 Registered Remote I/O unit are listed.

■Setup example

Remote I/O unit: Connected to COM1　No.1

Alarm status	OUT1 Contact status	OUT2 Contact status	OUT3 Contact status	OUT4 Contact status
No alarm	ON	ON	ON	ON
Alarm 1	ON	ON	ON	OFF
Alarm 2	ON	ON	OFF	OFF
Alarm 3	ON	OFF	OFF	OFF



Note

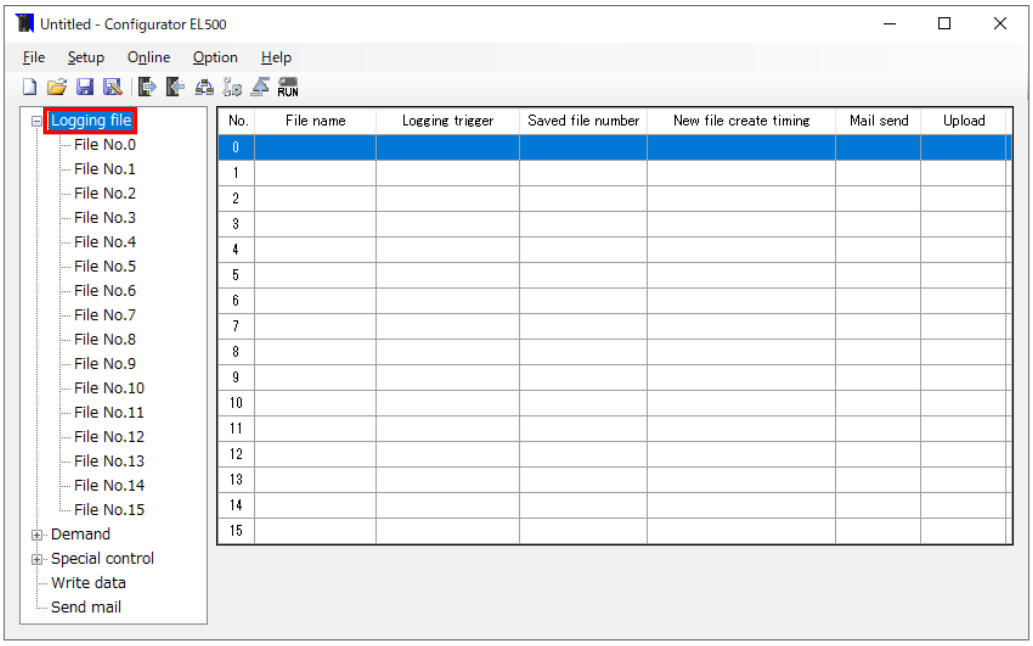
In case of setting Remote I/O unit to Remote I/O unit output, when it shifts RUN mode to STOP/PROG mode, ELC500 writes output status with no alarm to the registered Remote I/O unit.

Logging File Setup

5.6.5.1 Logging File

Setup items related to logging data file.
You can mail or upload by FTP the logging data file according to the settings.
It collects data from the connected device at logging trigger and creates file as csv format at new file creating timing. This files are called logging file.
Logging files are saved in SD memory card, therefore it doesn't save logging file when SD memory card is not inserted.

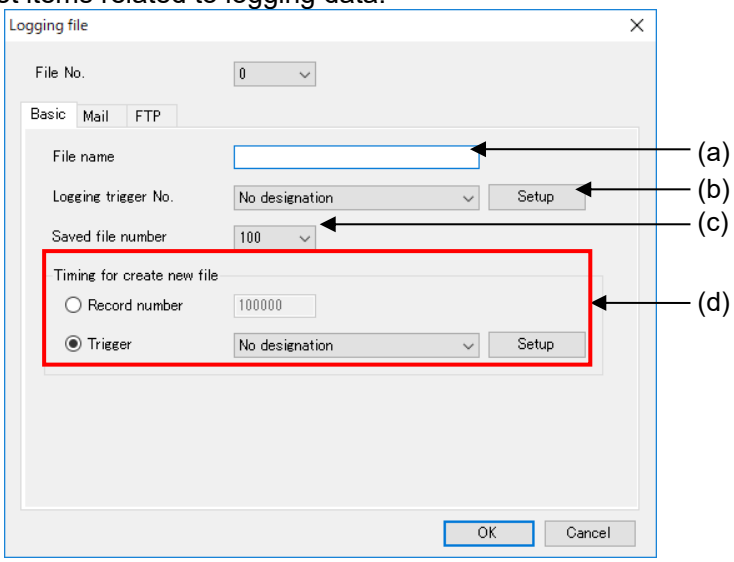
5.6.5



Click [Logging file] and it displays list of logging file setup window.
Double-click the line to setup.

■Basic setup

Set items related to logging data.



Item		Description
(a)	File name *1	Set name for logging file (csv). <Set range>:32-letter or less
(b)	Logging trigger No.	Set trigger to use for data logging. It logs data to file at setting trigger.
(c)	Saved file number	Set number of saved logging file in the folder. <Initial> 100 <Set range> 1 to 100
(d)	Timing for create new file	Set timing for creating a logging file. ・Record number At reach the setting record, it creates new logging file. <Set range> 1 to 100000 ・Trigger At setting trigger is occurs, it creates new logging file.

*1 It can't use the below letters.

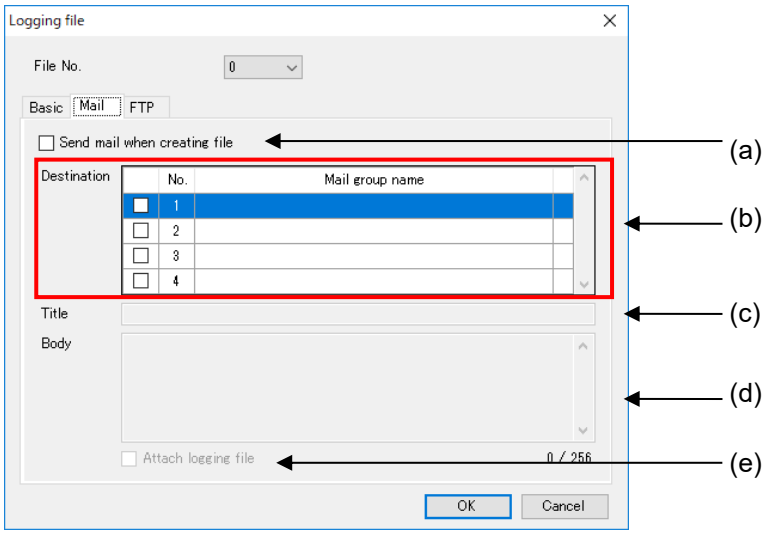
letter	name	letter	Name
¥	Yen	*	Asterisk
/	Slash	?	Question mark
\	Backslash	‘	Double quotation
:	Colon	<	Inequality sign
;	Semi-colon	>	Inequality sign
.	dot	|	pipe
	Half-width space (only the beginning)		

Note

- If the number of registered devices to log is increased or if there is a wireless device in the system, it is difficult to collect in short cycle and it may cause missing data.
- Be sure to set a cycle to record collected data longer than a cycle to collect data. If not, it may cause missing data.
- When the number of record exceeds 65536 (including header), it can't open the file by Excel 2003 or earlier version.
- Be sure to set logging trigger doesn't overlap new file creating timing. Of not, it may not record correct data nor send mail nor upload files.
- If saved file number is changed to a number smaller than the previous, it deletes files from the older file at the next time when it creates logging file.

■Mail setup

Set items related to send mail.

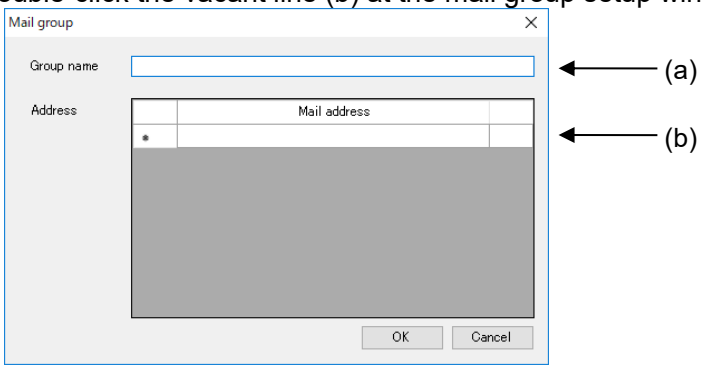


Item		Description
(a)	Send mail when creating file	Select to use the function or not. <Initial> without check = not available
(b)	Destination *1	Check boxes to send mail. You can send mail to several destinations by checking boxes. (Max. 8-group)
(c)	Title	Set title of mail <Set range> 64-letter or less
(d)	Body	Set body of mail <Set range> 256-letter or less
(e)	Attach logging file	Select to use the function or not. <Initial> without check = not available

*1 Up to 256-letter for mail address of all addresses in the group.
In case of setting several addresses, 1-letter is used for one mail address.

■How to add destinations

Register destination groups to send mail.
Up to 8 groups can be registered.
Double-click the vacant line (b) at the mail group setup window.



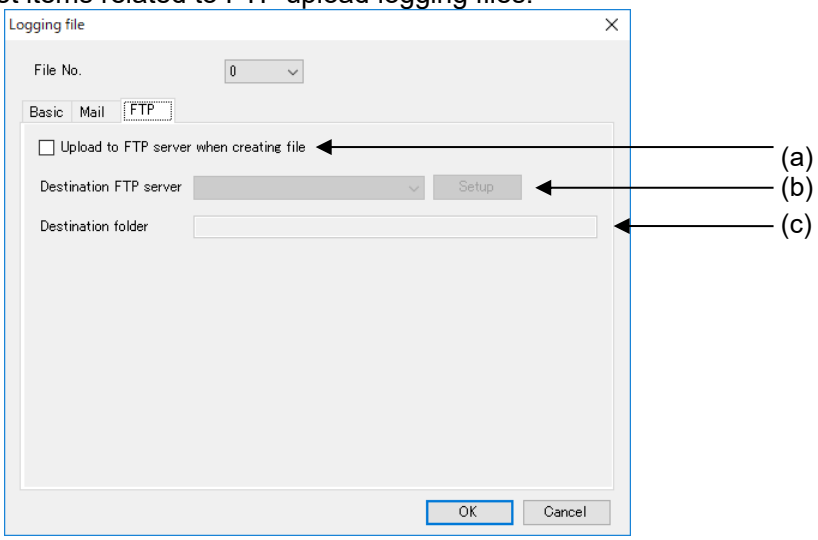
Item		Description
(a)	Group name	Set destination group name. <Set range> 64-letter or less
(b)	Address *1	Set destination address. <Set range> 256-letter of less (total of all registered address)

*1 Enter 1 address for 1 line. After that, new line is added.
Every time you add new address, it uses area for 1-letter.
Ex.) Register 1 address: up to 256-letter can be used
Register 2 addresses: up to 255-letter can be used
Register 3 addresses: up to 254-letter can be used

Note
- In order to send mail, it is necessary to setup Ethernet of ELC500. Refer to 5.6.1.2.
- For using this function, set mail sending cycle 5-min or more.
- When attached file name has space, it can't send mail. If there is no attachment, confirm your network administrator.
- When it failed to send file, you can retry by setting. It will retry send mail only attached the first failed file. It can't send files created during the retry period.

■FTP upload

Set items related to FTP upload logging files.



	Item	Description
(a)	Update to FTP server when creating file	Select to use the function or not. <Initial> without check = not available
(b)	Destination FTP server *1	Set FTP server to upload files.
(c)	Destination folder *2	Set FTP server folder to upload files. <Set range> 255-letter or less *3

*1 Registered FTP servers are displayed. Select one to use for transmit file.

*2 If there is no setting folder, it creates folders up to 8 layers automatically.
When it can't create folders, it will be error and complete the process.

*3 It can't use the below letters.

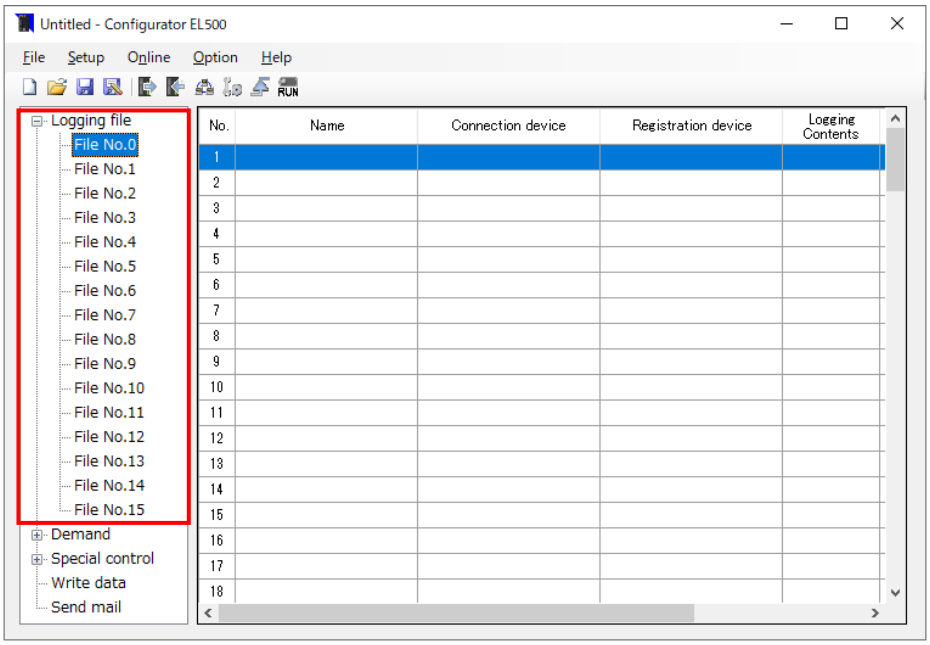
letter	name	letter	Name
¥	Yen	*	Asterisk
/	Slash	?	Question mark
\	Backslash	‘	Double quotation
:	Colon	<	Inequality sign
;	Semi-colon	>	Inequality sign
.	dot	|	pipe
	Half-width space (only the beginning)		

Note

- For using this function, set upload cycle to 5-min. or more.
- When attached file name has space, it can't upload by FTP.
- When there is a file with the same name in the specified folder to upload, it works according to FTP server specification.
- When it failed to upload files by FTP, you can retry by setting.
  It will retry to upload the file that is failed. It doesn't have new recorded files during retry period.
- According to FTP server, there is a restriction for using letter for file name and folder name. Set name according to FTP server specifications.
- For using thig function, it is necessary to setup FTP client of ELC500.

5.6.5.2 Logging Device Registration

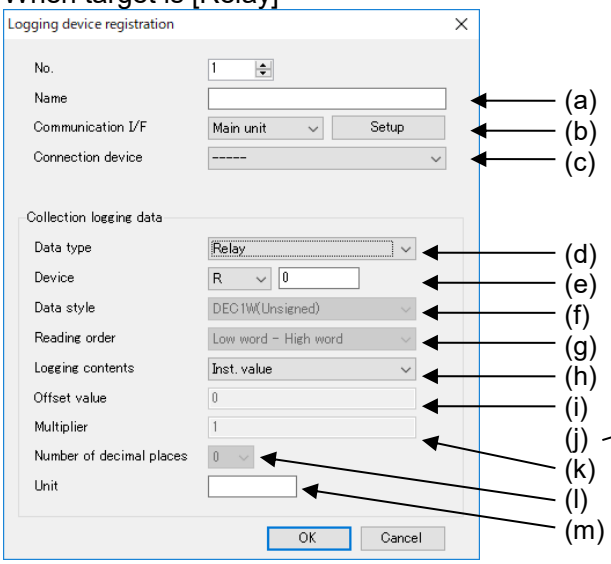
Set logging data type from the connected devices.



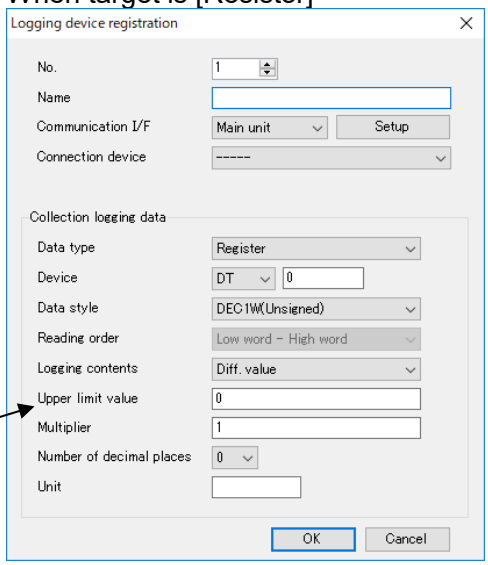
Select one from [File No.0] to [File No.15] on navigator and it displays list of logging device setup window. Double-click the line to setup.

[MEWTOCOL]

When target is [Relay]



When target is [Resister]



Item			Description
(a)	Name		Set name for logging device. <Set range> 32-letter or less
(b)	Communication I/F *1		Set communication I/F that is connected the devices used to collect relay data. <Initial> Main unit <Set range> Main unit/COM0 /COM1 /COM2 /Ethernet
(c)	Connection device *2		Set device to collect logging data. When [Communication I / F] is [Ethernet] and the connected device is [Other], set [Unit No.]. <Set range> EE or 1 to 99(MEWTOCOL-COM) 1 to 247(MODBUS TCP)
(d)	Data type		Set data type to collect data. <Initial> register <Set range> register/ relay
(e)	Device *3	Data type: Register *4	Set register data to collect. <Initial> Device: DT 0 <Set range> DT /LD /FL /WX /WY /WR /WL /SV / EV Number: 0 to 99999
		Data type: Relay *4	Set relay data to collect. <Initial> Device R 0 <Set range> R /X /Y /L /T /C Number: 0 to 99999F
(f)	Data style *5		Set data style of device to collect. <Initial> DEC1W(Unsigned) <Set range> DEC1W, DEC1W(Unsigned) DEC2W, DEC2W(Unsigned) DEC4W, DEC4W(Unsigned) HEX (4-digits / 8-digits / 16-digits), single precision real number, double-precision real number
(g)	Reading order *5 *6 *7		Set reading order when it saves collecting data to register by MODBUS RTU or MODBUS TCP. <Initial> Low word – High word <Set range> Low word – High word / High word - Low word
(h)	Logging contents *8		Set logging data contents. Inst. value: Collecting value is saved without change. Diff. value: Differential value from the previous collected value is saved. <Initial> Inst. value <Set range> Inst. value / Diff. value
(i)	Offset value *5 *9 *10		Set offset value. (add value to collected value) <Initial> 0 <Set range> -32768 to 32767
(j)	Upper limit value *11		Set upper limit value (max value of collected value) <Initial> 0 <Set range> 1 to 65535 / 1 to 4294967295 / 1 to 18446744073709551615
(k)	Multiplier *5*10		Set conversion value of collecting data. <Initial> 1 <Set range> 0.0001 to 9999.9999

Item		Description
(l)	Number of decimal places	It shows decimal point number for current value monitor, and csv file. <Initial> 0 <Set range> 0 to 4
(m)	Unit *12	Set unit. It doesn't have to be used. <Set range> 8-letter or less

*1 It displays communication I/F that device is registered.
*2 It displays registered devices.
*3 It differs according to communication protocol of connected device.
*4 It can select FL, SV, EV, T, C only when COM0, COM1, COM2, Ethernet is selected.
*5 Only when register is selected.
When DEC4W is selected, the number of significant digits of data is 15-digit.
*6 Only when the following is selected.
DEC2W, DEC2W (Unsigned), DEC4W, DEC4W (Unsigned), HEX (8-digit / 16-digit), single precision real number, double-precision real number
*7 It can't set when MEWTOCOL is selected.
*8 It fixed [Inst.value] when relay is selected.
*9 Only when [Inst. value] is selected.
*10 Only when the following is selected.
DEC1W, DEC1W (Unsigned), DEC2W, DEC2W (Unsigned), DEC4W, DEC4W (Unsigned), single precision real number, double-precision real number
*11 Only when [Diff.value] is selected.
Set range differs according to data style.

DEC1W(Unsigned)	1 to 65535
DEC2W (Unsigned)	1 to 4294967295
DEC4W (Unsigned)	1 to 18446744073709551615

When reading a value smaller than the previous value, it calculates a differential value as it assumes that the value was over the upper limit value and it changed value.
*12 Do not use double-quotation ["] .

Reference

Refer to the manual for each device about upper limit.

Note

- Up to 512 points total for 16 files including demand monitoring device are registered. Max. registered number is 128 points for 1 file.
- .Register logging devices without vacant line. If there is a vacant line, it counts as registration point, e.g. when you register in No.10 next to No.1, it counts total 10-point not 2-point.
- If the read out value is smaller than the previous value, it calculates demand value by assumed that it exceeds the upper limit value. Set the upper limit value correctly.
- It reads out as the below.

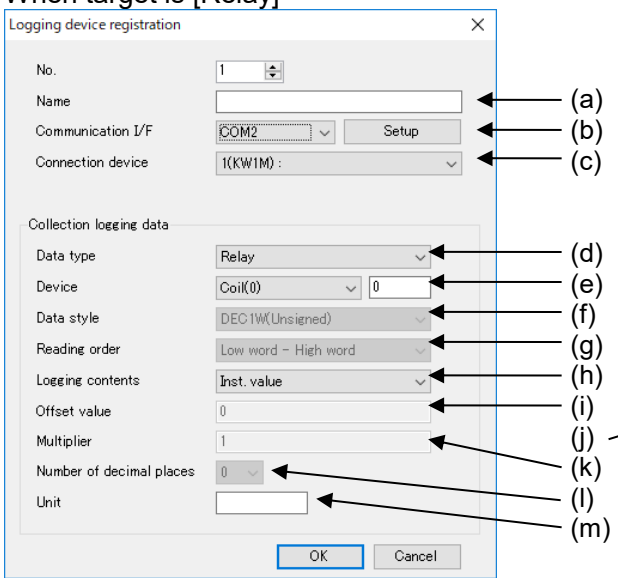
Saved value in outside device (N: integer)

Address	Value
N	0xCDEF(H)
N+1	0x89AB(H)
N+2	0x4567(H)
N+3	0x0123(H)

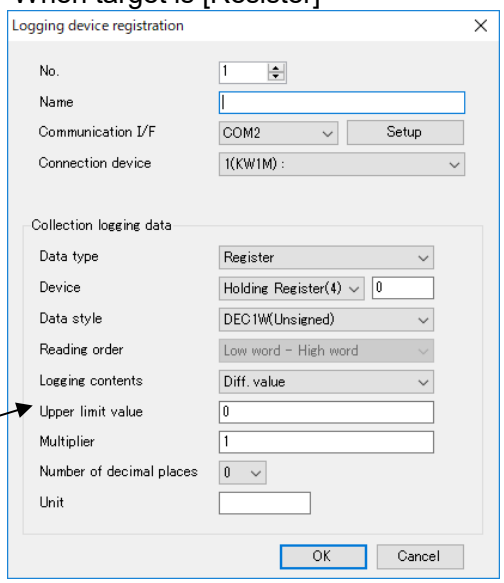
		High word - Low word	Low word – High word
Device N	DEC2W	0xCDEF89AB(H)	0x 89ABCEDF (H)
Device N	DEC4W	0xCDEF89AB45670123 (H)	0x12345678CDEF89AB (H)

[MODBUS]

When target is [Relay]



When target is [Resister]



Item			Description
(a)	Name		Set name for logging device. <Set range> 32-letter or less
(b)	Communication I/F		Set communication I/F that is connected devices used to collect data. <Initial> Main unit <Set range> Main unit/COM0 /COM1 /COM2 /Ethernet *1
(c)	Connection device *2		Set device to collect logging data. When [Communication I / F] is [Ethernet] and the connected device is [Other], set [Unit No.]. <Set range> EE or 1 to 99(MEWTOCOL-COM) 1 to 247(MODBUS TCP)
(d)	Data type		Set data type to collect data. <Initial> register <Set range> register/ relay
(e)	Device *3	Data type: Register *4	Set register data to collect. <Initial> Device Holding Register(4), 0 <Set range> Holding Register(4) / Input register(3) 0 to FFFF
		Data type: Relay *4	Set relay data to collect. <Initial> Coil(0), 0 <Set range> Coil(0) / Input relay(1), 0 to FFFF
(f)	Data style *5		Set data style of device to collect. <Initial> DEC1W(Unsigned) <Set range> DEC1W, DEC1W(Unsigned), DEC2W, DEC2W(Unsigned), DEC4W, DEC4W(Unsigned), single precision real number, double-precision real number
(g)	Reading order *5 *6 *7		Set reading order when it saves collecting data by MODBUS RTU or MODBUS TCP. <Initial> Low word – High word <Set range> Low word – High word / High word - Low word

Item		Description
(h)	Logging contents *8	Set logging data contents. Inst. value: Collecting value is saved without change. Diff. value: Differential value from the previous collected value is saved. <Initial> Inst. value <Set range> Inst. value / Diff. value
(i)	Offset value *5 *9 *10	Set offset value. (add value to collected value) <Initial> 0 <Set range> -32768 to 32767
(j)	Upper limit value *11	Set upper limit value (max value of collected value) <Initial> 0 <Set range> 1 to 65535 / 1 to 4294967295 / 1 to 18446744073709551615
(k)	Multiplier *5*10	Set conversion value of collecting data. <Initial> 1 <Set range> 0.0001 to 9999.9999
(l)	Number of decimal places	It shows decimal point number for current value monitor, and csv file. <Initial> 0 <Set range> 0 to 4
(m)	Unit	Set unit. It doesn't have to be used. <Set range> 8-letter or less

*1 It displays communication I/F that device is registered.
*2 It displays registered devices.
*3 It differs according to data type.
*4 Set with hex decimal.
*5 Only when register is selected.
When DEC4W is selected, the number of significant digits of data is 15-digit.
*6 Only when the following is selected.
DEC2W, DEC2W (Unsigned), DEC4W, DEC4W (Unsigned), HEX (8-digit / 16-digit), single precision real number, double-precision real number
*7 It can't set when MEWTOCOL is selected.
*8 It fixed [Inst.value] when relay is selected.
*9 Only when [Inst. value] is selected.
*10 Only when the following is selected.
DEC1W, DEC1W (Unsigned), DEC2W, DEC2W (Unsigned), DEC4W, DEC4W (Unsigned), single precision real number, double-precision real number
*11 Only when [Diff.value] is selected. Set range differs according to data style.

DEC1W(Unsigned)	1 to 65535
DEC2W (Unsigned)	1 to 4294967295
DEC4W (Unsigned)	1 to 18446744073709551615

When reading a value smaller than the previous value, it calculates a differential value as it assumes that the value was over the upper limit value and it changed value.
*12 Do not use comma [,] and double-quotation ["] .

Reference

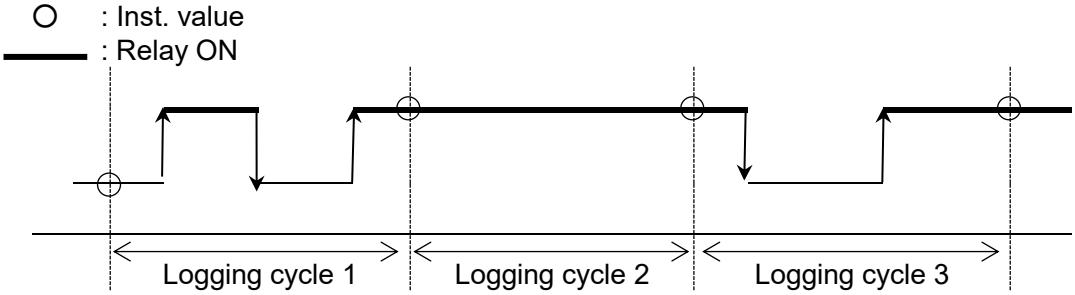
Refer to the manual for each device about upper limit.

Note

- Up to 512 points total for 16 files including demand monitoring device are registered. Max. registered number is 128 points for 1 file.
- .Register logging devices without vacant line. If there is a vacant line, it counts as registration point, e.g. when you register in No.10 next to No.1, it counts total 10-point not 2-point.
- If the read out value is smaller than the previous value, it calculates demand value by assumed that it exceeds the upper limit value. Set the upper limit value correctly.

■Details of Logging Data

[Relay]
Logging way is fixed to inst. Value.



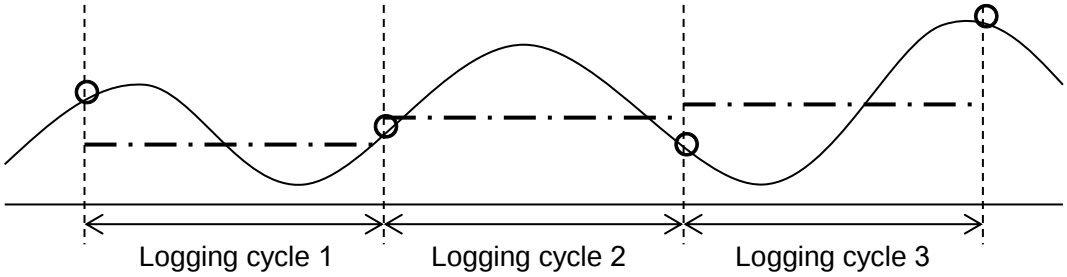
It records ON/OFF status of relay for each logging cycle.
Recorded data ON → 1
OFF → 0

[Register]

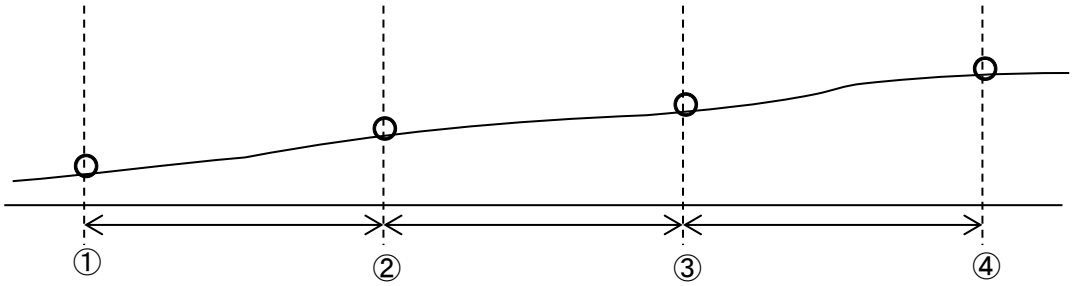
Logging ways are selected from the below.

1) Inst.value 2)Diff.value

○ : Inst.value



1) Inst.value: Latest value for every logging cycle is recorded.



2) Diff.value: Values subtract previous values are recorded for every logging cycle.
It can be used for application that collects an integrated electrical power and record using electrical power at a fixed time interval.

Ex.)

No.	Inst.value	Diff. value
①	100	(Value that subtract the previous value from 100)
②	150	50 (②－①)
③	180	30 (③－②)
④	190	10 (④－③)

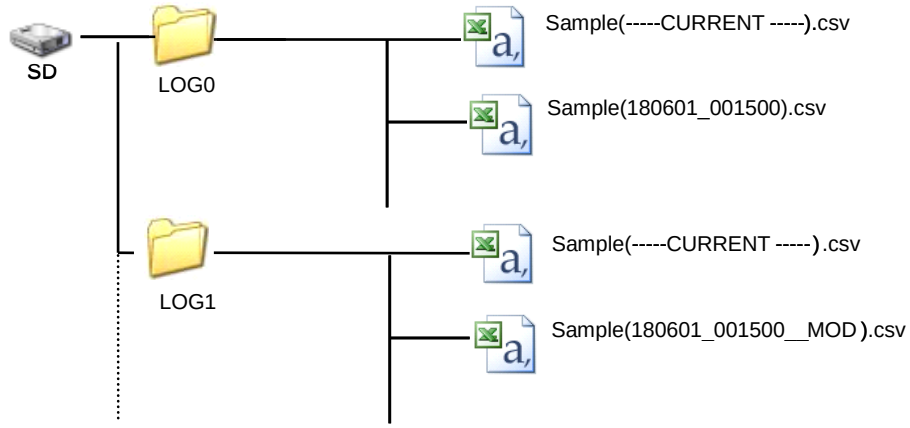
Note

When it is used with difference value, specify upper limit value.
If it is not set, it can't calculate correctly when it reaches max. value.

5.6.5.3 Folder Composition of Logging Files

Logging files are saved with the composition below in SD memory card.

Ex.) When it creates the files in SD memory card.



Point

When it set file creating at file No.0, it creates filed under LOG0 folder.

Accumulated files directly under the LOG * folder are recorded in the following format.

Example of data

(a) Date	(b) Time	1	2		128 (c)
		Air conditioning	Air conditioner		Air conditioning (d)
		COM0[001]	MAIN		ET[001] (e)
		DT170	DT170		DT170 (f)
		MOMENT	DIFFERENCE	～	MOMENT (g)
		US	SS		ULL (h)
		kW	kW		kW (i)
2018/7/1	16:27:00	100	200		500 (j)

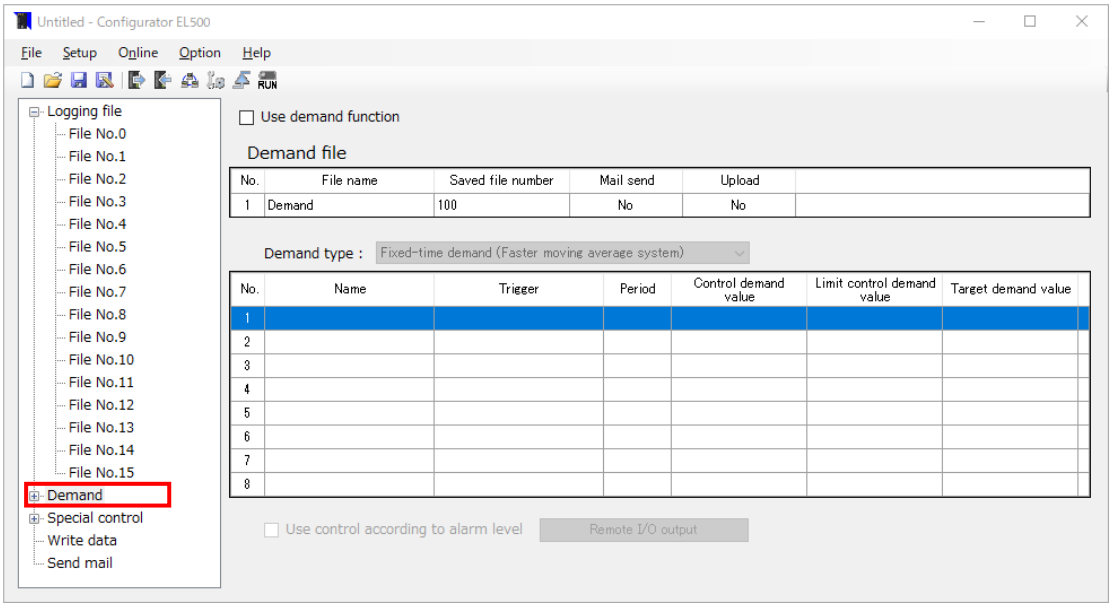
Details of each item

Item		Description
(a)	Date	-
(b)	Time	-
(c)	No.	Record the logging device registration number.
(d)	Name	Record the name of the seted logging device.
(e)	Communication I/F	Record communication I/F that is connected the devices used to collected relay data. MAIN: Main unit COM0[001]: Unit number 001 of COM0 ET[001]: Unit number 001 of Ethernet
(f)	Device	Record the collected device.
(g)	Logging contents	Record the collected logging content. MOMENT: Inst. value、DIFFERENCE: Diff. value Inst. value: Collecting value is saved without change. Diff. value: Differential value from the previous collected value is saved.
(h)	Data Style	Record the data format of the collected logging data. US：Unsigned 16bit integer UL：Unsigned 32bit integer ULL：Unsigned 64bit integer SF：Single precision real number DF：Double-precision real number SS：Signed 16bit integer SL：Signed 32bit integer SLL：Signed 64bit integer HEX1w：HEX4 digits HEX2w：HEX8 digits HEX4w：HEX16 digits
(i)	Unit	The set unit is recorded.
(j)	Logging data	The logging data is recorded.

Demand Setup

5.6.6

Setup items related to demand control and register devices to monitor demand value.



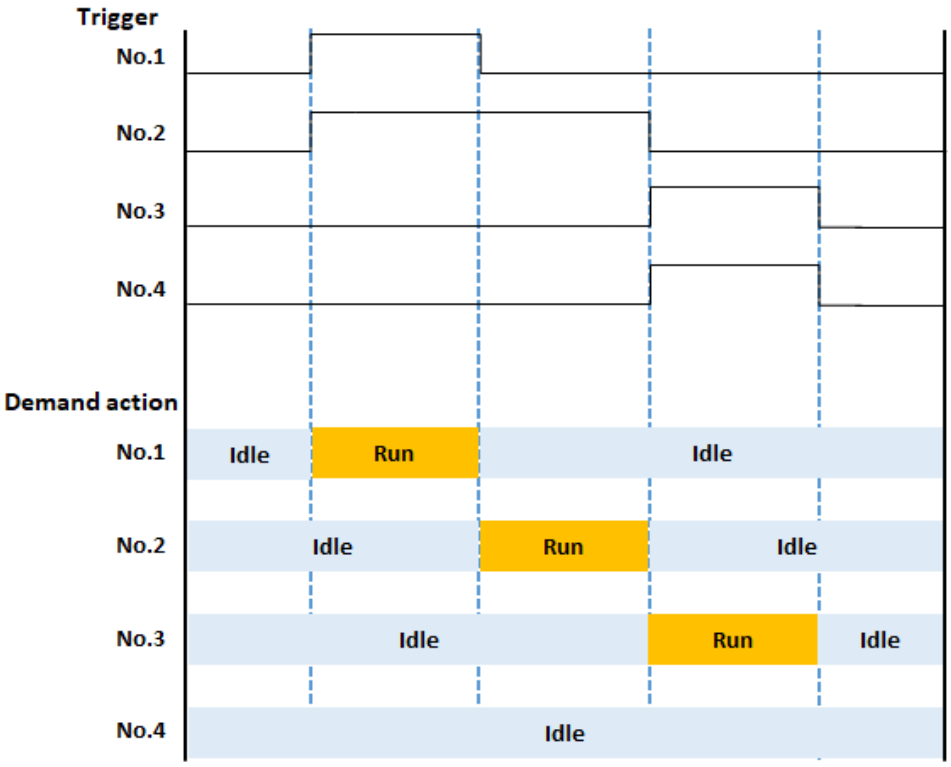
Click [Demand] on navigation view.

Demand setting produre

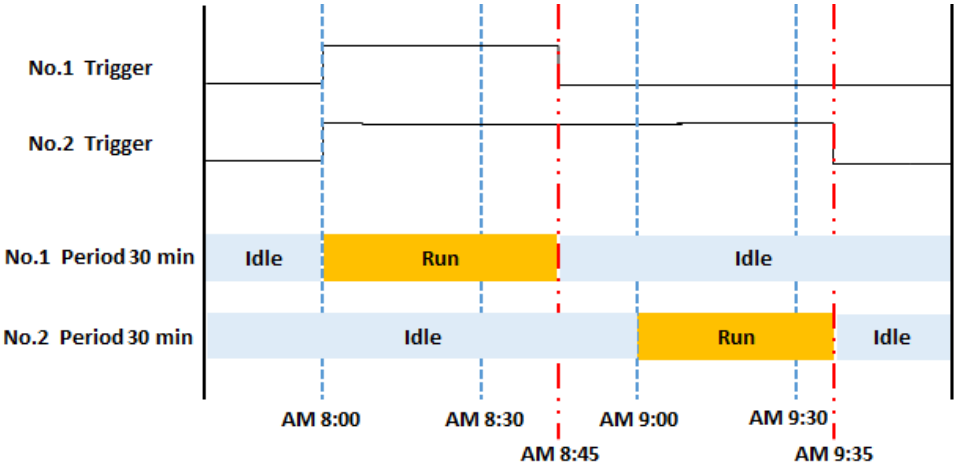
1) Check [Use demand function].
2) Click No.1 line of [Demand file] and set the demand file properties.
3) Select the demand method from [Demand type].
4) Click the line of No.1~8 and set the demand action properties of the demand value for time limit, alarm judgement, etc.
   Demand operation can be switched if you register multiple demand actions.
5) Since the demand operation runs only when [Trigger] activates, set [Type] to [Appointed period].
6) If you would like to make demand alarm output Remote I/O unit,
   check [Use control according to alarm level] and set the alarm level output for the Remote I/O unit.

Note

- While one [Trigger] activates, another [Trigger] is ignored in demand operation.
- No.1 has the highest priority for demand operations and higher value of No has the lower priority.
- Thus as shown the figure below, when No.1 and No.2 [Trigger] activated at the same time, No.1 runs.
  After No.1 demand operation ends, then if No.2 triger is already active the No.2 runs.

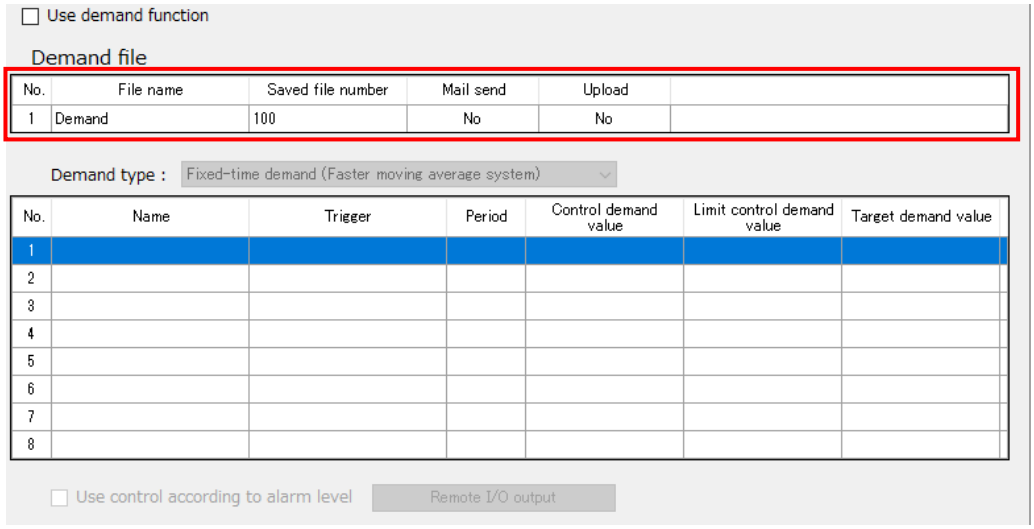


-When No.1 demand action ends and No.2 is swiched, if the time is middle of [Period], the actial No.2 demand operation starts from the next [Period].
If Remote I/O unit are linked to demand alarm with [Use control according to alarm level], these Remote I/O unit will be enable to be controled after next [Period].



5.6.6.1 Demand File

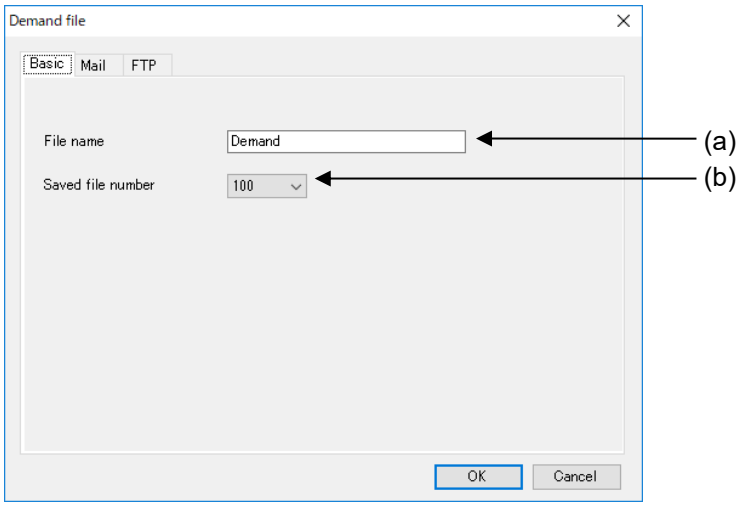
Setup items related to demand file.
In order to use demand function, check box of ‘Use demand function’.



Select and double-click line No.1. Demand setup window is displayed.

■Basic setup

Set items related to demand file.



Item		Description
(a)	File name *1	Set file name (csv format). <Set range> 32-letter or less
(b)	Saved file number	Set number of saved file in folder. <Initial> 100 <Set range> 1 to 100

*1 It can't use the below letters.

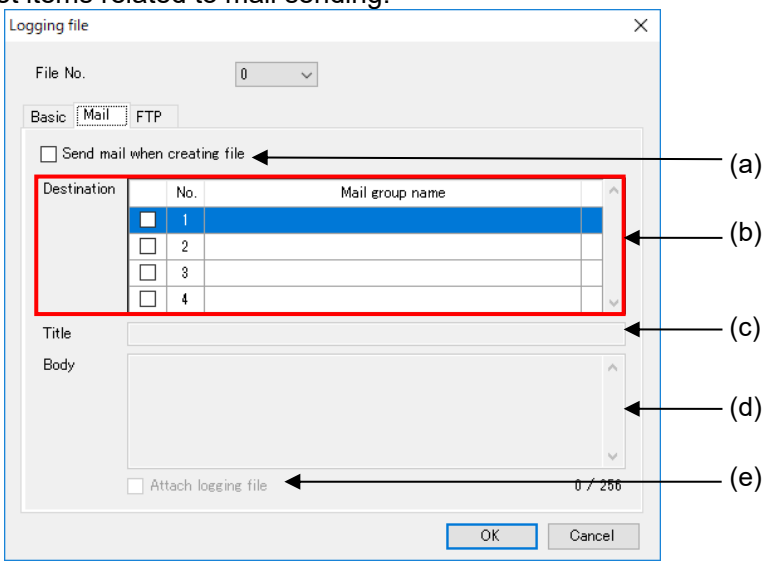
letter	name	letter	Name
¥	Yen	*	Asterisk
/	Slash	?	Question mark
\	Backslash	‘	Double quotation
:	Colon	<	Inequality sign
;	Semi-colon	>	Inequality sign
.	dot	|	pipe
	Half-width space (only the beginning)		

Note

If saved file number is changed to a number smaller than the previous, it deletes files from the older file at the next time when it creates logging file.

■Mail setup

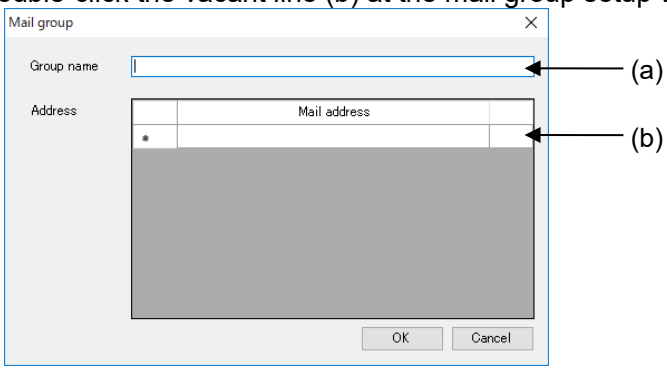
Set items related to mail sending.



Item		Description
(a)	Send mail when creating file	Select to use the function or not. <Initial> without check = not available
(b)	Destination	Check boxes to send mail. You can send mail to several destinations by checking boxes. (Max. 8-group)
(c)	Title	Set title of mail <Set range> 64-letter or less
(d)	Body	Set body of mail <Set range> 256-letter or less
(e)	Attach logging file	Select to use the function or not. <Initial> without check = not available

■How to add destinations

Register destination groups to send mail.
Up to 8 groups can be registered.
Double-click the vacant line (b) at the mail group setup window.



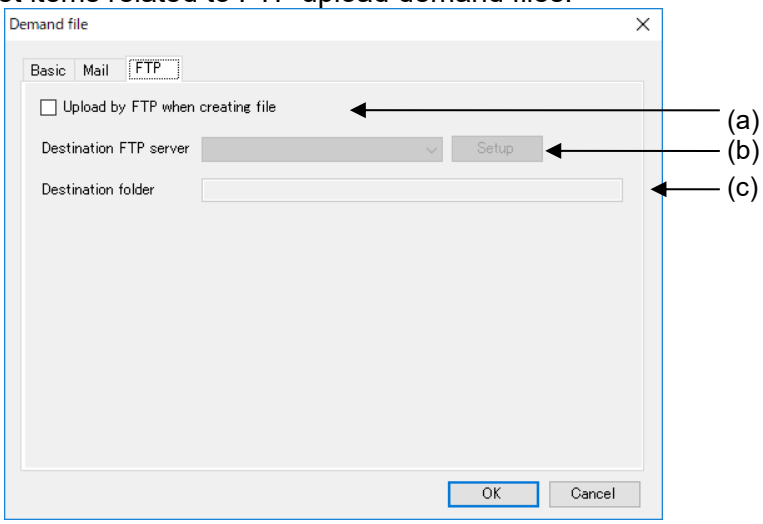
Item		Description
(a)	Group name	Set destination group name. <Set range> 64-letter or less
(b)	Address *1	Set destination address. <Set range> 256-letter of less (total of all registered address)

*1 Enter 1 address for 1 line. After that, new line is added.
Every time you add new address, it uses area for 1-letter.
Ex.) Register 1 address: up to 256-letter can be used
Register 2 addresses: up to 255-letter can be used
Register 3 addresses: up to 254-letter can be used

Note
- In order to send mail, it is necessary to setup Ethernet of ELC500. Refer to 5.6.1.2.
- For using this function, set mail sending cycle 5-min or more.
- When attached file name has space, it can't send mail. If there is no attachment, confirm your network administrator.
- When it failed to send file, you can retry by setting. It will retry send mail only attached the first failed file. It can't send files created during the retry period.

■FTP upload

Set items related to FTP upload demand files.



Item		Description
(a)	Update to FTP server when creating file	Select to use the function or not. <Initial> without check = not available
(b)	Destination FTP server *1	Set FTP server to upload files.
(c)	Destination folder *2 *3	Set FTP server folder to upload files. <Set range> 255-letter or less

*1 Registered FTP servers are displayed. Select one to use for transmit file.

*2 If there is no setting folder, it creates folders up to 8 layers automatically.
When it can't create folders, it will be error and complete the process.

*3 It can't use the below letters.

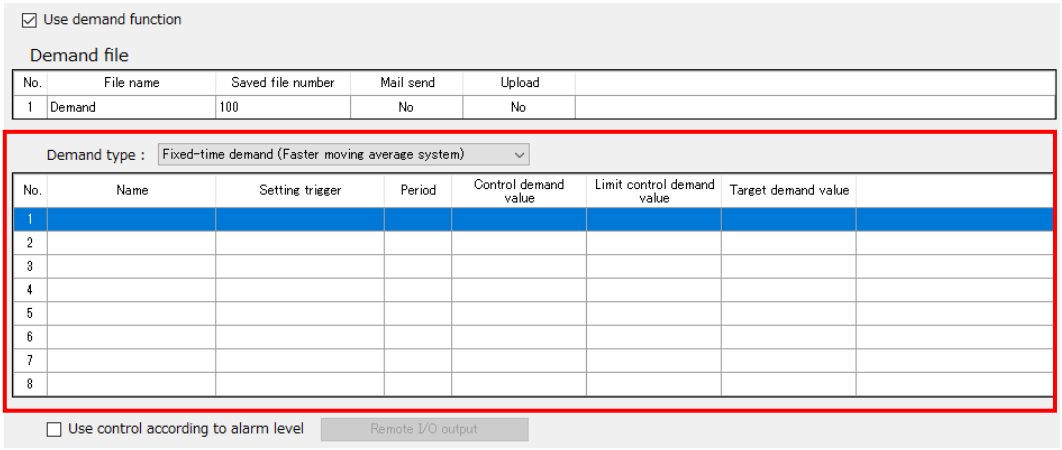
letter	name	letter	Name
¥	Yen	<	Inequality sign
	Half-width space	>	Inequality sign
"	Double quotation	=	Equal
:	Colon	+	Pulse
;	Semi-colon	|	pipe

Note

- For using this function, set mail sending cycle to 5-min. or more.
- When attached file name has space, it can't upload by FTP.
- When there is a file with the same name in the specified folder to upload, it works according to FTP server specification.
- When it failed to upload files by FTP, you can retry by setting.
  It will retry to send the file that is failed. It doesn't have new recorded files during retry period.
- According to FTP server, there is a restriction for using letter for file name and folder name. Set name according to FTP server specifications.
- For using thig function, it is necessary to setup FTP client of ELC500.

5.6.6.2 Demand Alarm Setup

Set items related to demand alarm.



Select demand type and double-click a line from No.1 to No.8.
Set items related to demand alarm.

[Terms for Demand Function]

Item	Description
Present demand	Integrated value from start the period to the elapsed time
Target demand	Target value to monitor demand value so as not to exceed.
Control demand	Integrated value that can be suppressed under an unnoticeable.
Limit control demand	Integrated value that can be suppressed but it effects work.
Reference demand	Integrated value that increases in proportion to elapsed time within the period. Target demand is the max. value.
Estimated demand	Integrated value at the end of the period that is estimated by power usage from the start of the period to the elapsed time.
Adjustment demand	Integrated value that needs to be cut off in order to make the estimated demand to same as the target demand at the end of the period.
Alarm mask time	Time to avoid false alarm due to error at starting the period

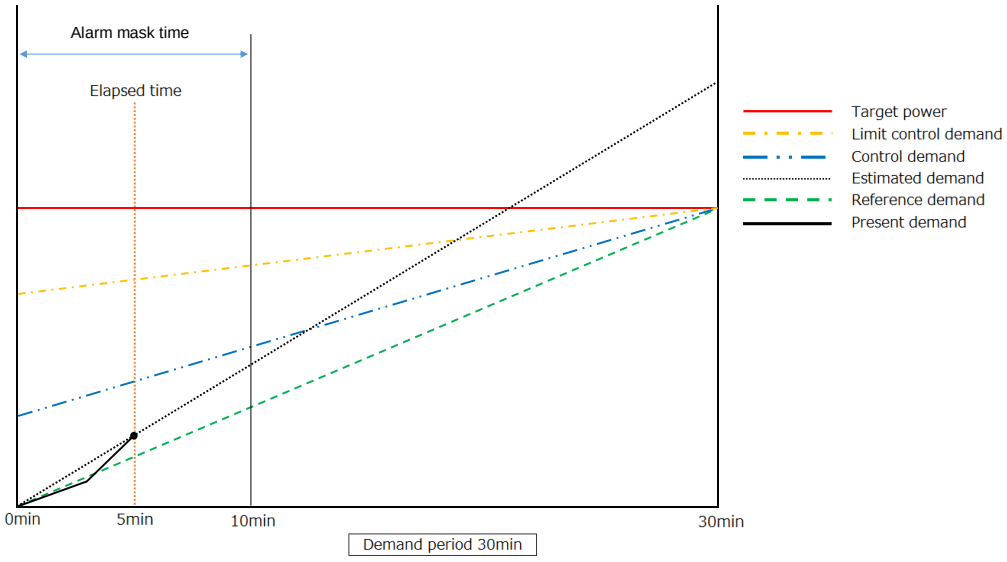
[Alarm generation conditions]

Alarm type	Generation conditions
Alarm 1	When present demand exceeds the target demand.
Alarm 2	Under the alarm 1 generation conditions, when the adjustment demand exceeds the control demand.
Alarm 3	Under the alarm 2 generation conditions, when the adjustment demand exceeds the limit control demand.

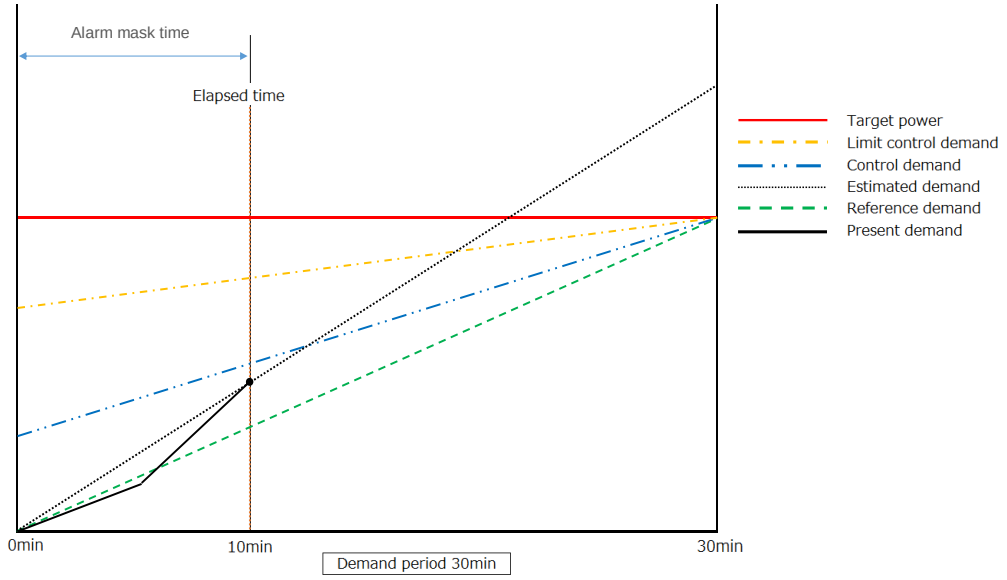
Note

It reset alarm every time when change the period.
It doesn't hold the alarm generation to the next period.
It doesn't generate alarm even if it satisfies the alarm generation conditions during alarm mask time.

Ex.) Alarm mask time: 10 min.
Present demand exceeds Reference demand from 10:00 (period start) to 10:05.
→ No alarm



Present demand exceeds Reference demand at 10:10.
→ Alarm 1



■Fixed-time demand (Average power method)

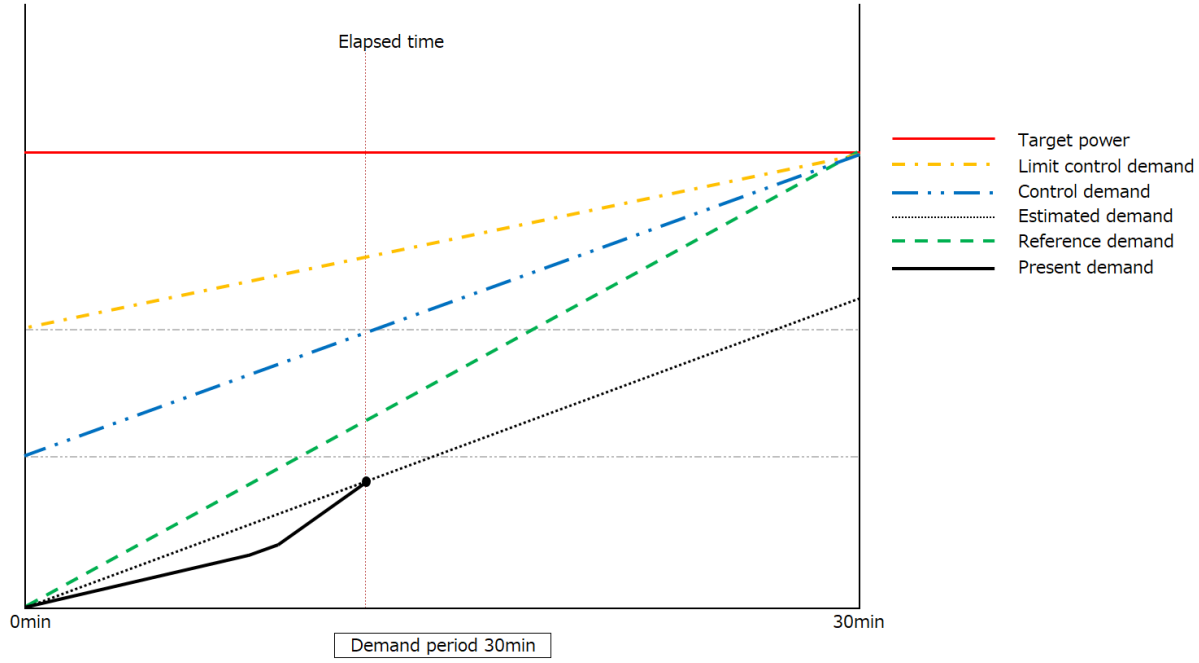
This is the method of monitor and control by estimation demand value from the ratio of the demand value increased from the start time to elapsed time.
It monitors every 1-min. When the estimated demand, calculated from average power for the elapsed time, exceeds the target value, it output alarm in 3 stages.
According to the alarm level, you can control equipment power consumption such as air conditioner, and depress peak power.

<Calculation formula> N (min): period

Present demand = Integral power from the start to elapsed time x (60/ N (min))
Estimated demand = Present demand / Elapsed time x N (min)
Adjustment demand = Estimated demand – Target demand

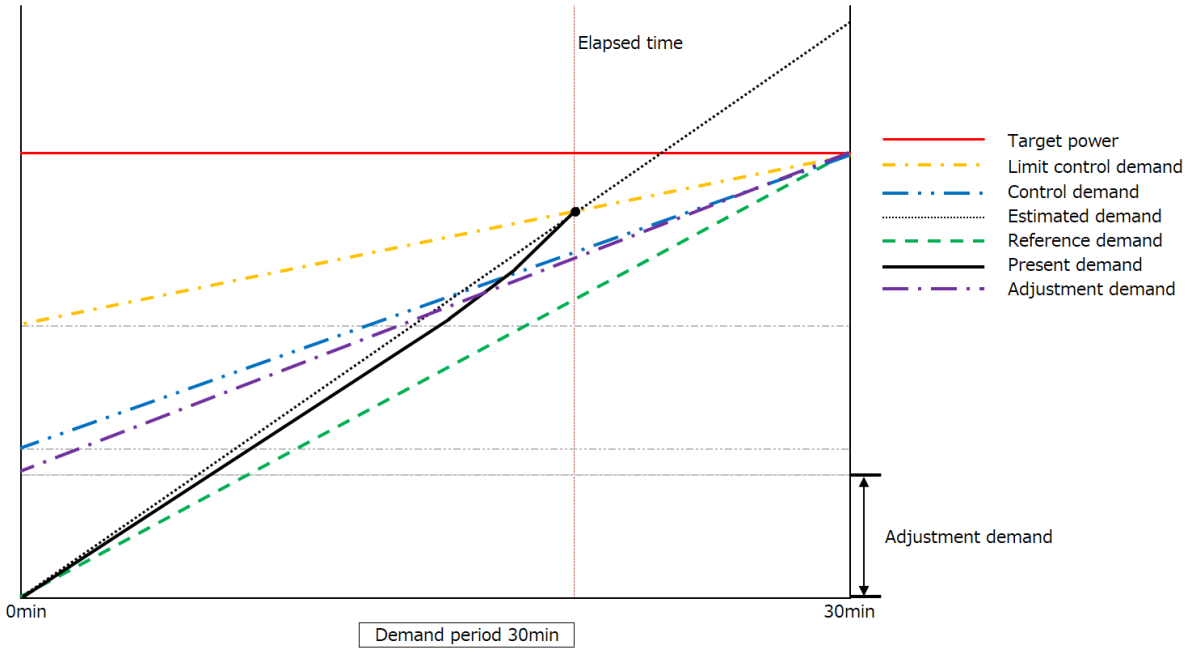
<Alarm example 1>

Present demand is under Reference demand. → No alarm



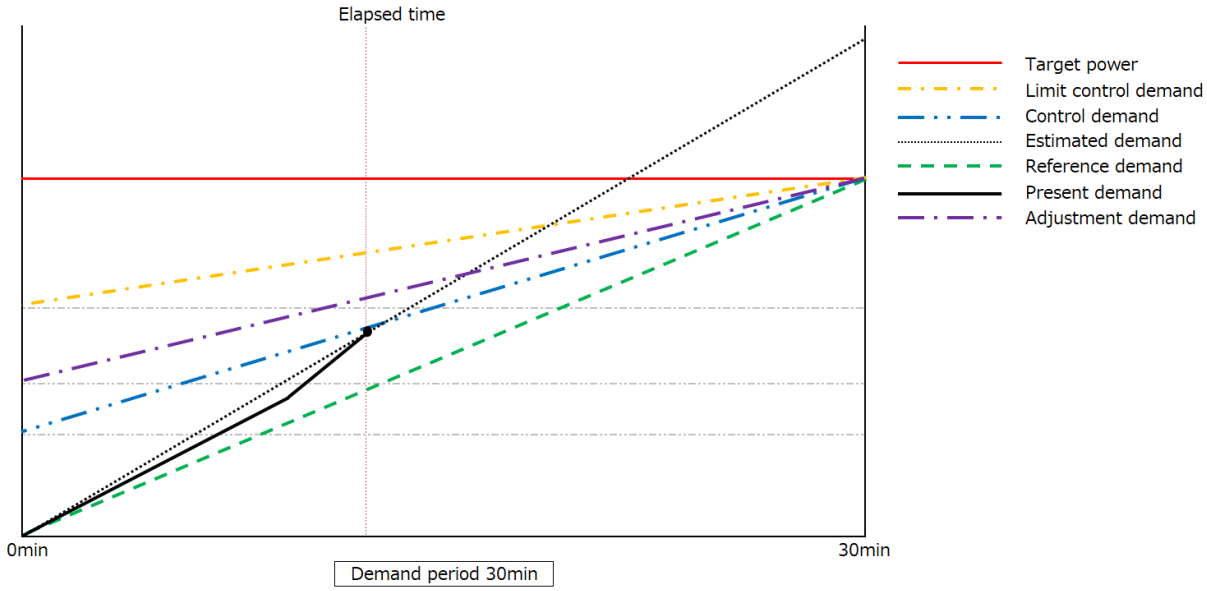
<Alarm example 2>

Present demand is over Reference demand → Alarm 1



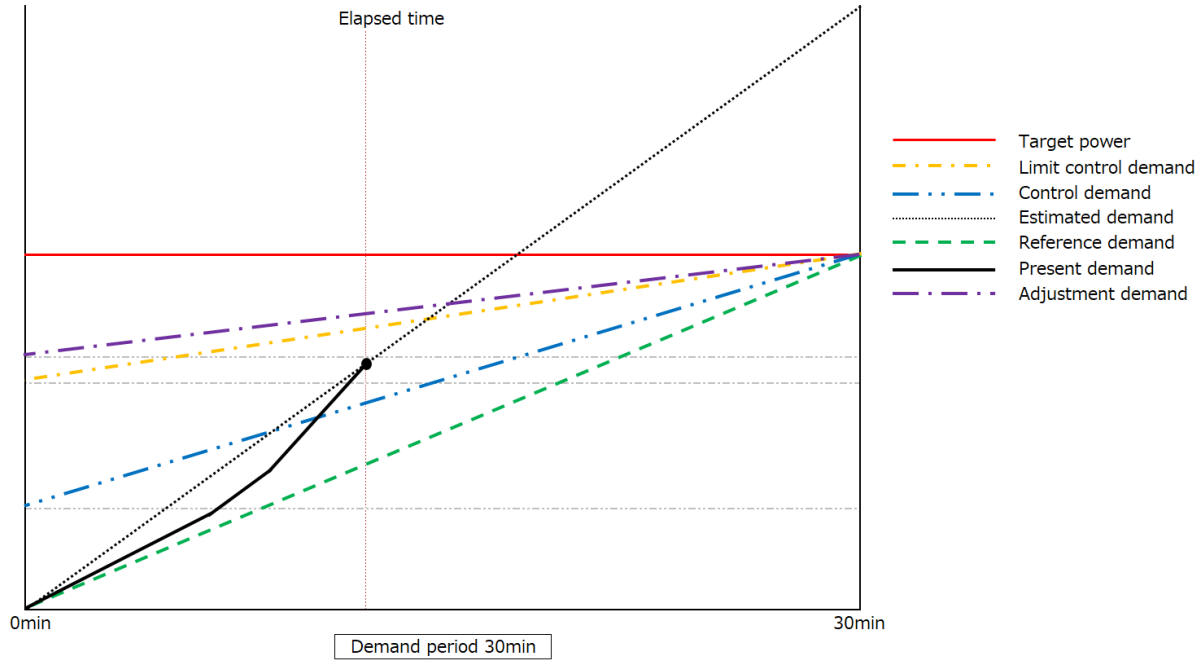
<Alarm example 3>

Present demand is over Reference demand.
Adjustment demand is over Control demand. → Alarm 2

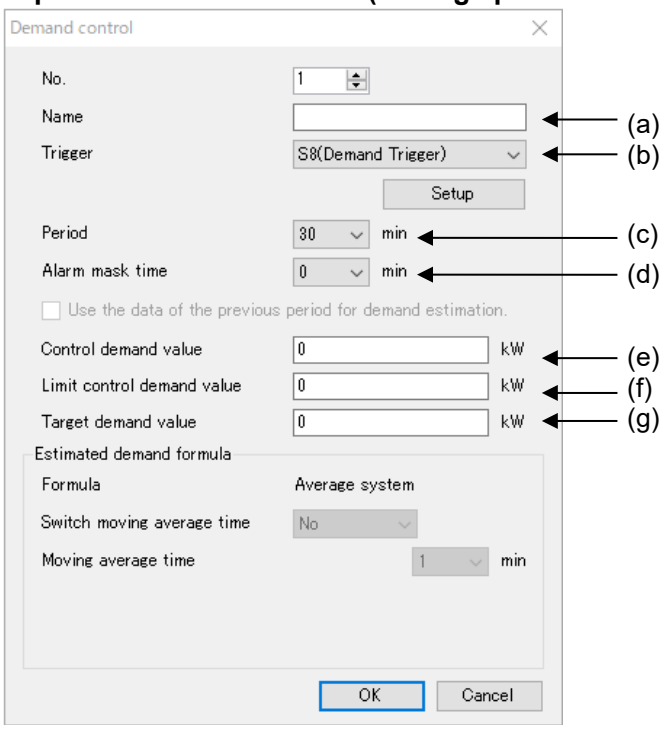


<Alarm example 4>

Present demand is over Reference demand.
Adjustment demand is over Limit control demand. → Alarm 3



■Setup for Fixed-time demand (Average power method)



Item		Description
(a)	Name	Set name for demand control pattern <Set range> 32-letter or less
(b)	Trigger	Set trigger from the registered trigger. It works alarm function at this trigger, it works alarm function. <Initial> Demand Trigger (No.1 only) No designation (No.2 to No.8)
(c)	Period	Set demand period. <Initial> 30 min <Set range> 15 / 30 / 60 min
(d)	Alarm mask time	Set alarm mask time. <Initial> 0 min <Set range> 0 to 10 min
(e)	Control demand value	Set control demand value <Initial> 0 kW <Set range> 0 to 999999999999999 kW
(f)	Limit control demand value	Set limit control demand value <Initial> 0 kW <Set range> 0 to 999999999999999 kW
(g)	Target demand value	Set target demand value <Initial> 0 kW <Set range> 0 to 999999999999999 kW

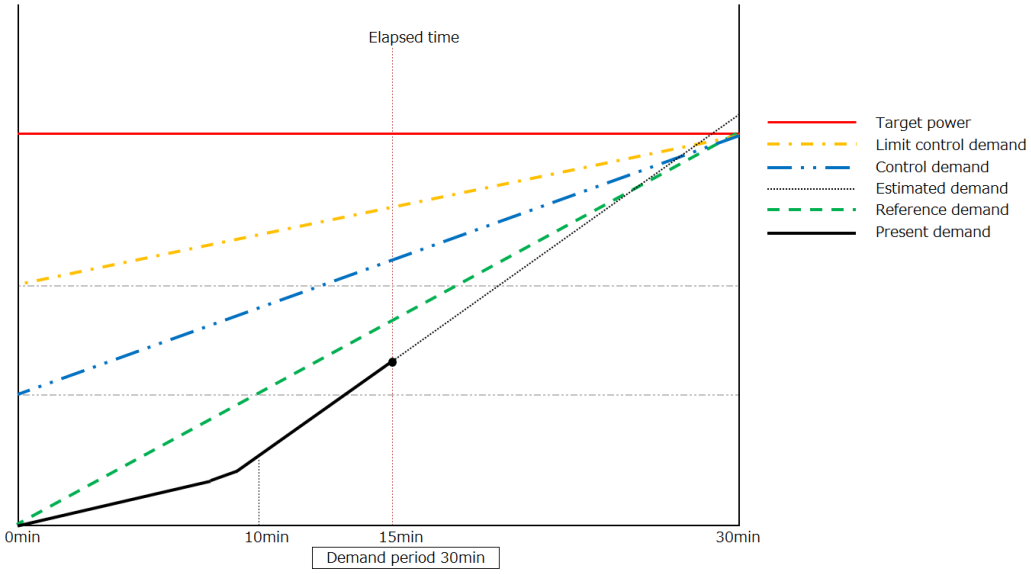
* Set each value as the followings.
Target demand value ≧ Limit control demand value ≧ Control demand value
If it doesn't meet this condition, error message will be appeared.

■Fixed-time demand (Moving average power method)

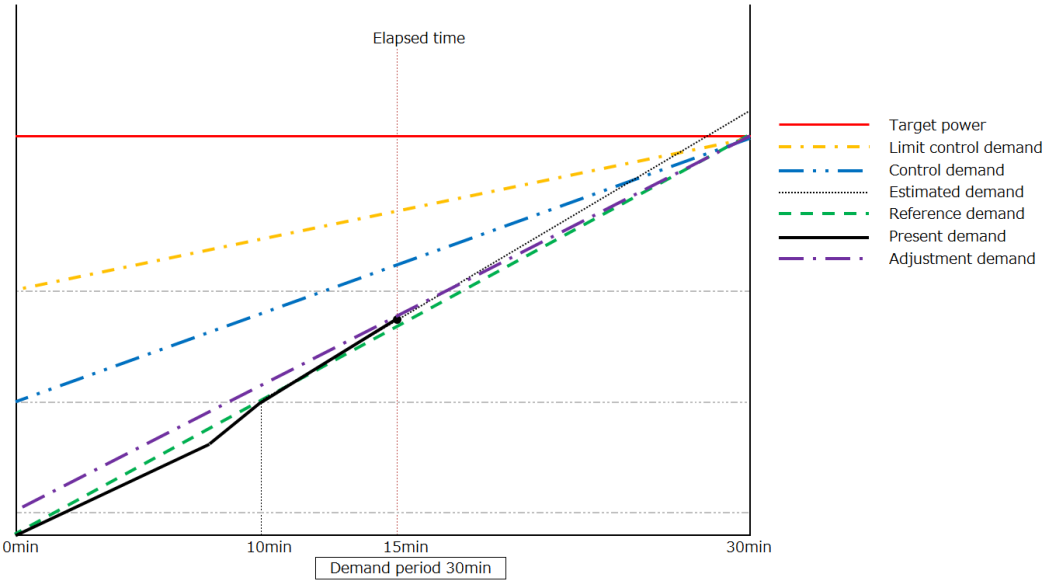
This is the method of monitor and control by estimation demand value from the ratio of the demand value increased from the start time to elapsed time.
It monitors every 1-min. When the estimated demand, calculated from average power for the elapsed time, exceeds the target value, it output alarm in 3 stages.
According to the alarm level, you can control equipment power consumption such as air conditioner, and depress peak power.

<Calculation formula> N (min): period n (min): moving average time
Present demand = Integral power from the start to elapsed time x (60/ N (min))
Estimated demand = Present demand + Incline from n-min to elapsed time x remaining time (min)
Incline from n-min to elapsed time = (Present demand – Present demand at n-min ago) / n (min)
Adjustment demand = Estimated demand – Target demand

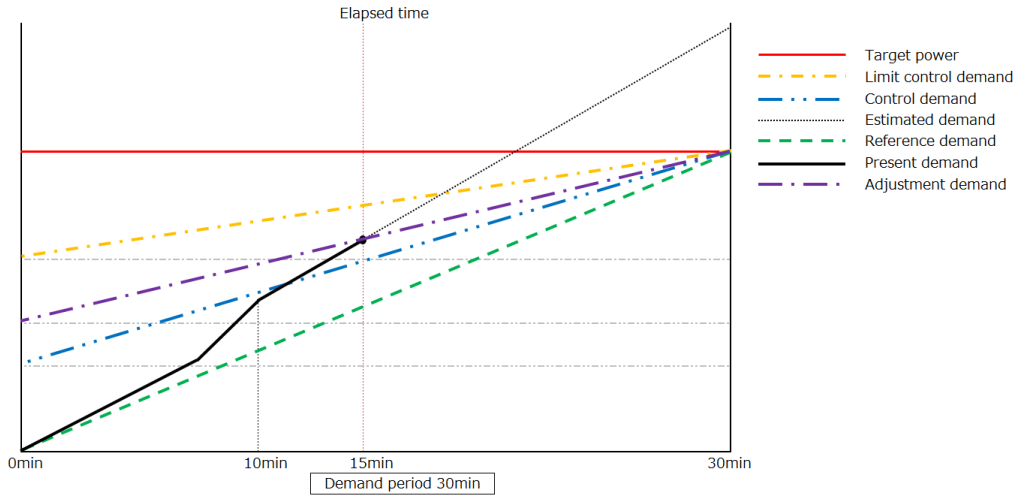
<Alarm example1> Moving average time: 5 min.
Present demand is under Reference demand. → No alarm



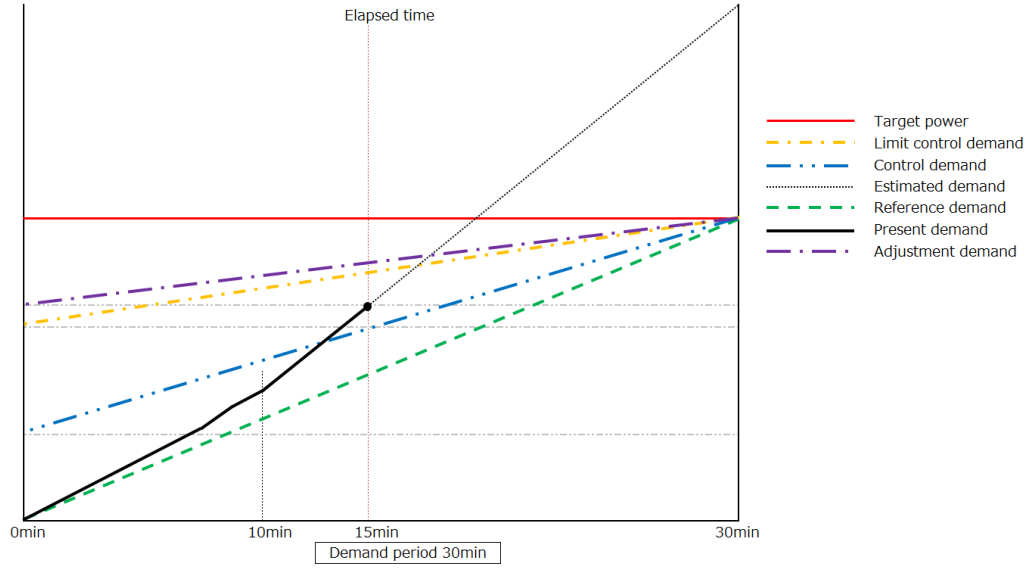
<Alarm example 2> Moving average time: 5 min.
Present demand is over Reference demand → Alarm 1



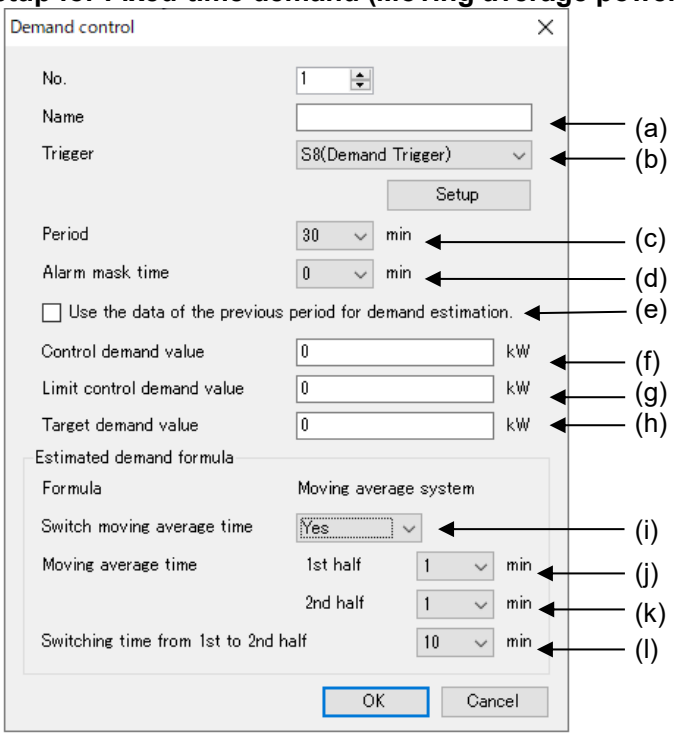
<Alarm example 3> Moving average time: 5 min.
Present demand is over Reference demand.
Adjustment demand is over Control demand. → Alarm 2



<Alarm example 4> Moving average time: 5 min.
Present demand is over Reference demand.
Adjustment demand is over Limit control demand. → Alarm 3



■Setup for Fixed-time demand (Moving average power method)



Item		Description
(a)	Name	Set name for demand control pattern <Set range> 32-letter or less
(b)	Trigger	Set trigger from the registered trigger. It works alarm function at this trigger, it works alarm function. <Initial> Demand Trigger (No.1 only) No designation (No.2 to No.8)
(c)	Period	Set demand period. <Initial> 30 min <Set range> 15 / 30 / 60 min
(d)	Alarm mask time	Set alarm mask time. <Initial> 0 min <Set range> 0 to 10 min
(e)	Use the data of the previous period for demand estimation.	Select use the function, it calculates estimated demand using the incline of power in the previous period, or not. <Initial> without check = not available
(f)	Control demand value	Set control demand value <Initial> 0 kW <Set range> 0 to 999999999999999 kW
(g)	Limit control demand value	Set limit control demand value <Initial> 0 kW <Set range> 0 to 999999999999999 kW
(h)	Target demand value	Set target demand value <Initial> 0 kW <Set range> 0 to 999999999999999 kW
(i)	Switch moving average time	Select use the function, that it switches period 1st half and 2nd half for calculate demand value increasing rate to estimate dimmed, or not <Initial> Yes

(j)	Moving average time 1st half	Set moving average time for 1st half. <Initial> 1 min. <Set range> 1 to 10 min
(k)	Moving average time 2nd half	Set moving average time for 2nd half. <Initial> 1 min. <Set range> 1 to 10 min
(l)	Switching time from 1st to 2nd half	Set time to switch moving average time. <Initial> 10 min. <Set range> 10 to 20 min

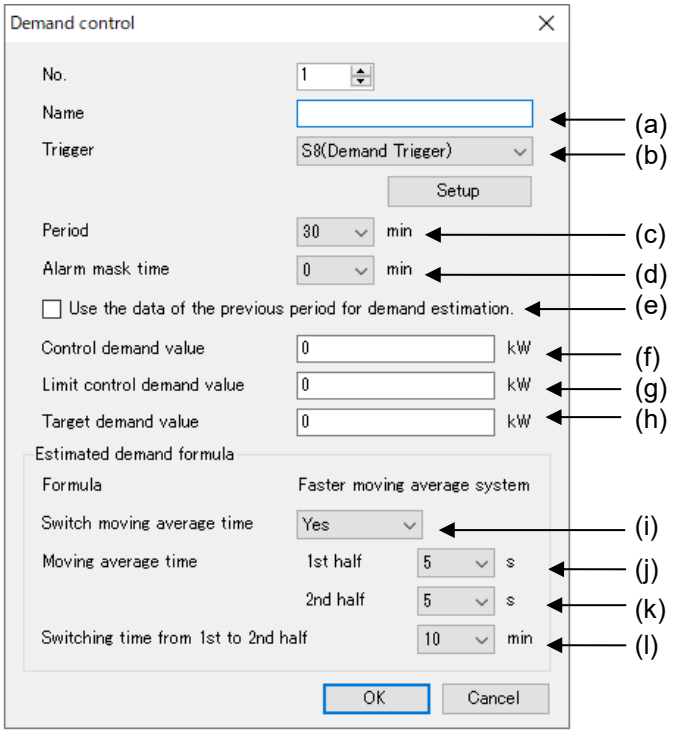
* Set each value as the followings.
Target demand value ≧ Limit control demand value ≧ Control demand value
If it doesn't meet this condition, error message will be appeared.

■Fixed-time demand (Faster moving average system)

This is the method of monitor and control by estimation demand value from the ratio of the demand value increased from the start time to elapsed time.
It monitors every 1-min. When the estimated demand, calculated from average power for the elapsed time, exceeds the target value, it output alarm in 3 stages.
According to the alarm level, you can control equipment power consumption such as air conditioner, and depress peak power.
Calculation formula and alarm system are the same as [Fixed-time demand (Moving average power method]

<Calculation formula> N (min): period n (min): moving average time
Present demand = Integral power from the start to elapsed time x (60/ N (min)
Estimated demand = Present demand + Incline from n-min to elapsed time x remaining time (min)
Incline from n-min to elapsed time = (Present demand – Present demand at n-min ago) / n (min)
Adjustment demand = Estimated demand – Target demand

■Setup for Fixed-time demand (Faster moving average power method)



Item		Description
(a)	Name	Set name for demand control pattern <Set range> 32-letter or less
(b)	Trigger	Set trigger from the registered trigger. It works alarm function at this trigger, it works alarm function. <Initial> Demand Trigger (No.1 only) No designation (No.2 to No.8)
(c)	Period	Set demand period. <Initial> 30 min <Set range> 15 / 30 / 60 min

(d)	Alarm mask time	Set alarm mask time. <Initial> 0 min <Set range> 0 to 10 min
(e)	Use the data of the previous period for demand estimation.	Select use the function, it calculates estimated demand using the incline of power in the previous period, or not. <Initial> without check = not available
(f)	Control demand value	Set control demand value <Initial> 0 kW <Set range> 0 to 999999999999999 kW
(g)	Limit control demand value	Set limit control demand value <Initial> 0 kW <Set range> 0 to 999999999999999 kW
(h)	Target demand value	Set target demand value <Initial> 0 kW <Set range> 0 to 999999999999999 kW
(i)	Switch moving average time	Select use the function, that it switches period 1st half and 2nd half for calculate demand value increasing rate to estimate dimmed, or not <Initial> Yes
(j)	Moving average time 1st half	Set moving average time for 1st half. <Initial> 5 sec. <Set range> 5 / 10 / 15 / 20 / 25 / 30 / 35 / 40 / 45 / 50 sec
(k)	Moving average time 2nd half	Set moving average time for 2nd half. <Initial> 5 sec. <Set range> 5 / 10 / 15 / 20 / 25 / 30 / 35 / 40 / 45 / 50 sec
(l)	Switching time from 1st to 2nd half	Set time to switch moving average time. <Initial> 10 min. <Set range> 10 to 20 min

* Set each value as the followings.
Target demand value ≧ Limit control demand value ≧ Control demand value
If it doesn't meet this condition, error message will be appeared.

■IEC demand

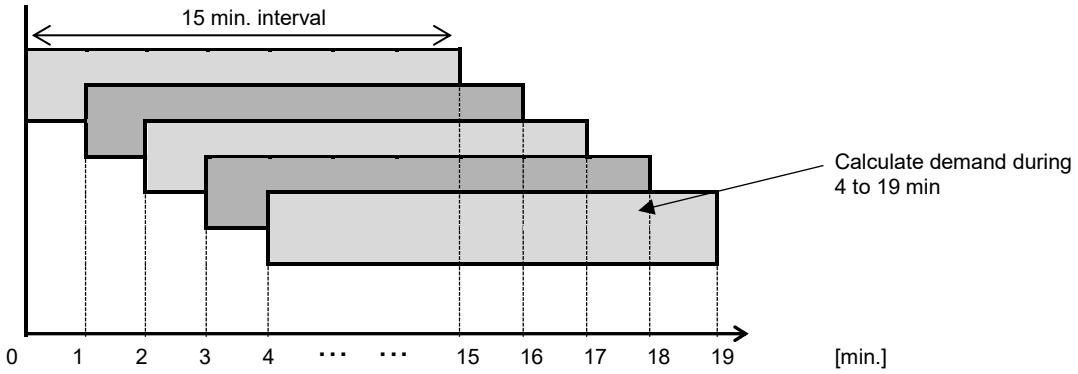
It monitors demand at the setting interval. IEC demand is supported only demand calculation.

<Calculation formula> N (min): period
Present demand = Integral power from the start to elapsed time x (60/ N (min))

Sliding block interval demand

It calculates demand by setting interval.
Set interval 1 to 60(min.)(every 1- min). It calculates demand during latest finished interval.
One interval is started every time that set for interval.

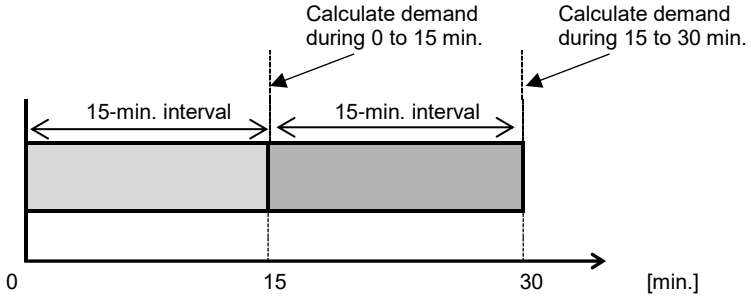
Ex.) Period: 15-min. Interval: 1-min

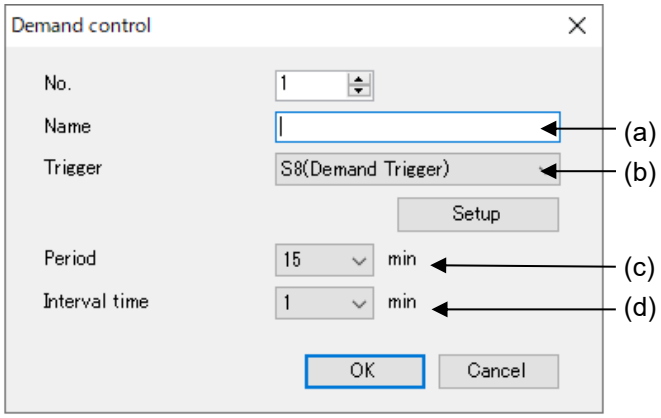


Fixed block interval demand

It calculates demand by setting interval.
Set interval 1 to 60(min.)(every 1- min). It calculates demand during latest finished interval.
After one interval finishes, the next interval starts.

Ex.) Period: 15-min. Interval: 15-min.





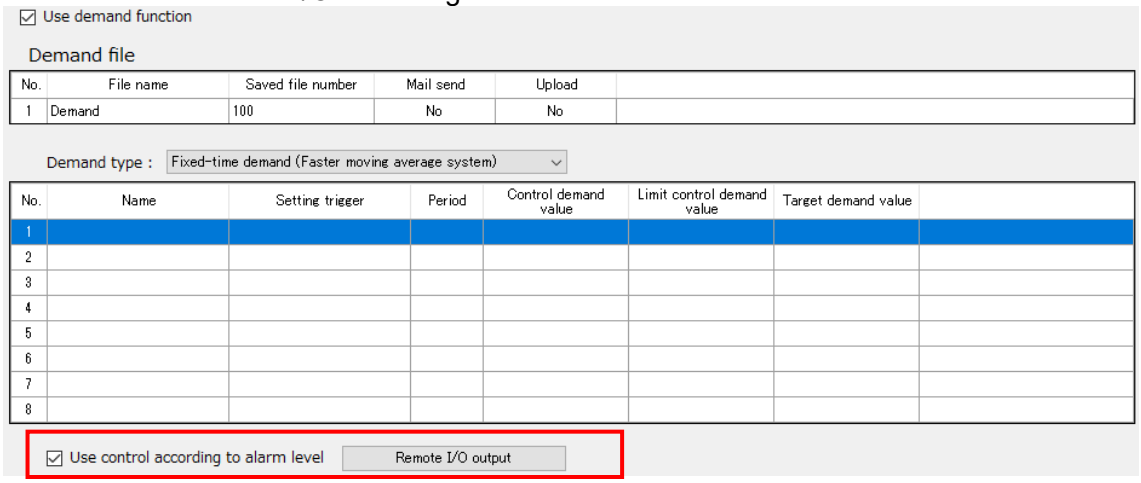
Item		Description
(a)	Name	Set name for demand control pattern. <Set range> 32-letter or less
(b)	Trigger	Set trigger from the registered trigger. It works alarm function at this trigger, it works alarm function. <Initial> Demand Trigger (No.1 only) No designation (No.2 to No.8)
(c)	Period	Set demand period. <Initial> 15 min <Set range> 1 to 60 min
(d)	Interval time	Set interval time to monitor demand Normally set to 1 min. <Initial> 1 min <Set range> 1 to 60 min

Note

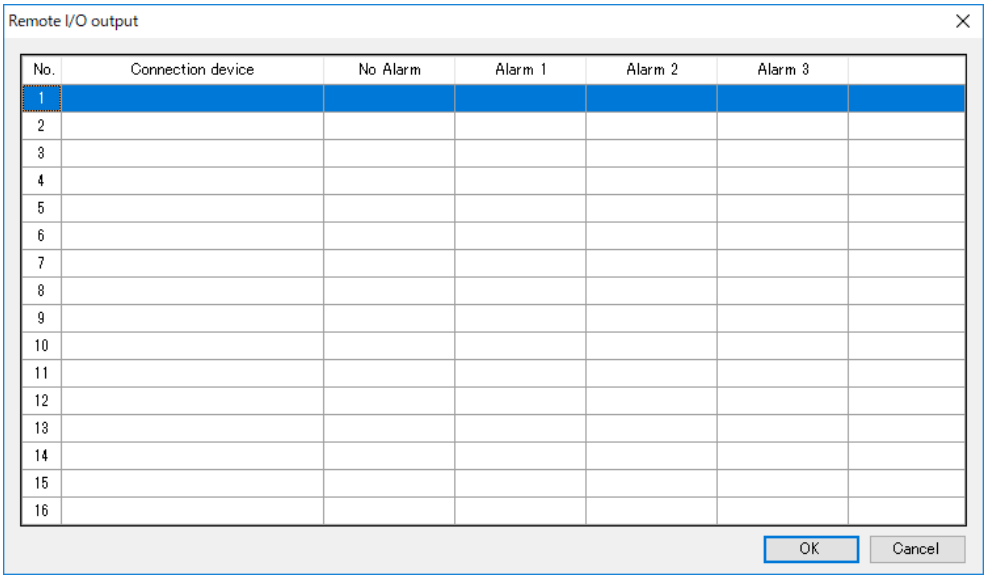
- When the same trigger is selected, a trigger with smaller registered number has a priority.
- If it power off in the same period, demand value will be reset.

5.6.6.3 Alarm Link Control

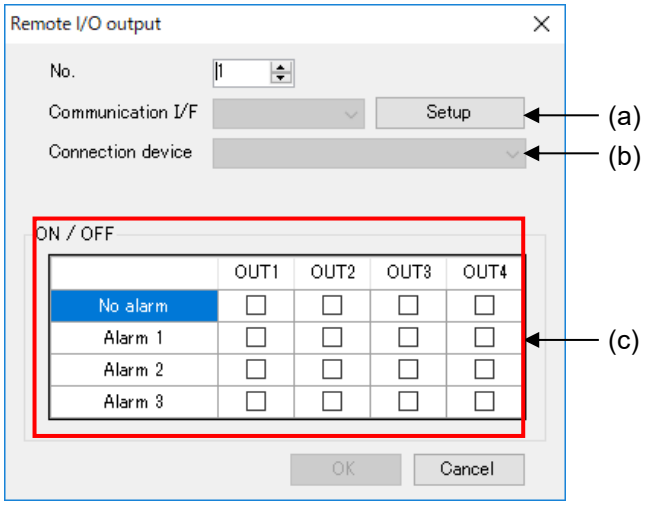
In order to control Remote I/O according to the demand alarm.



When using the alarm link control function, check box [Use control according to alarm level].
Click [Remote I/O output].
It can't check when IEC demand is selected.

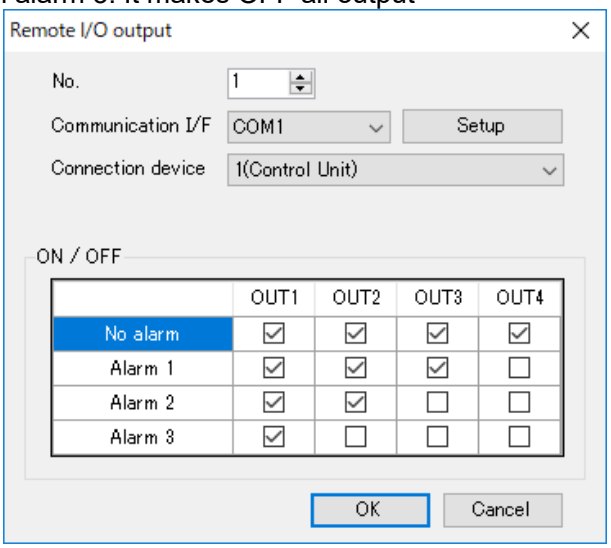


Set Remote I/O unit output working for each alarm level.
Up to 16 units can be set.
Double-click the line to setup.



Item		Description
(a)	Communication I/F	Set communication I/F that is connected Remote I/O unit. <Set range> COM1 / COM2
(b)	Connection device	Set registered Remote I/O.
(c)	ON/OFF	Set Remote I/O unit output working for each alarm level. With check: ON Without check: OFF

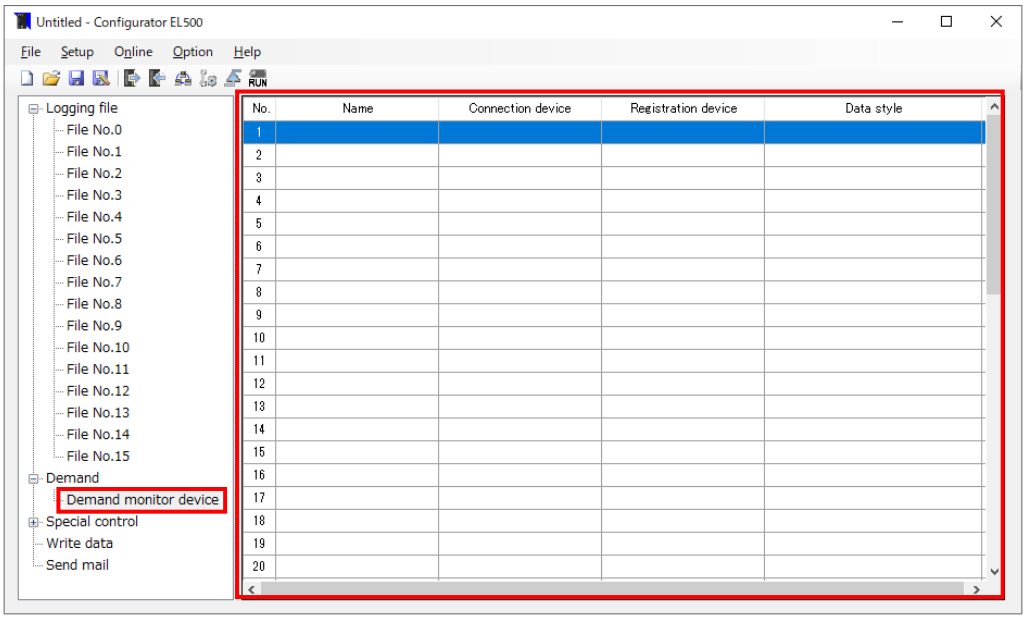
Ex.)
No alarm: It makes ON all output
When alarm 1: It makes ON OUT1 and OUT2
When alarm 2: It makes ON OUT1.
When alarm 3: It makes OFF all output



Note
- It can't set COM0 for communication I/F of Remote I/O unit.
- In case of setting Remote I/O unit to Remote I/O output, when it shifts RUN mode to STOP/PROG mode, ELC500 writes output status with no alarm to the registered Remote I/O unit.

5.6.6.4 Demand Monitor Device

Setup items related to demand monitor device.

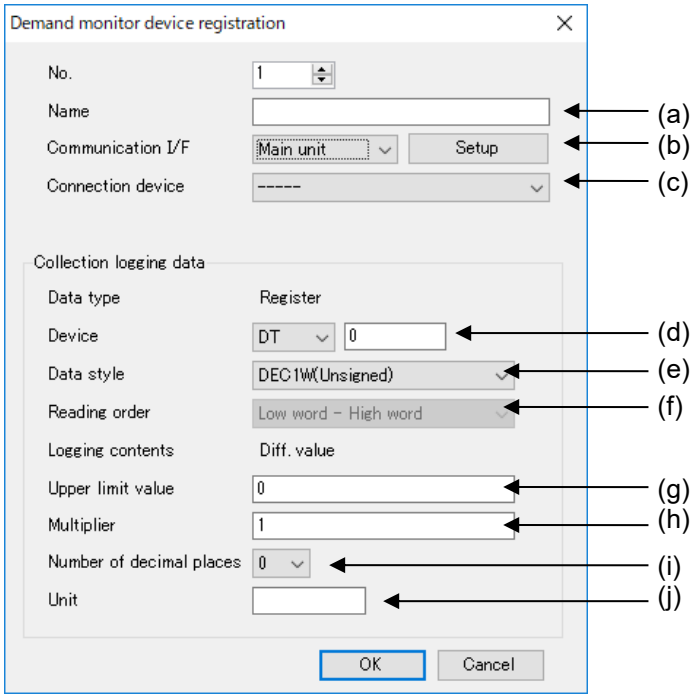


Select [Demand monitor device] on navigator and it displays list for demand monitoring device setup window. Double-click the line to setup.

Note

- Up to 50 devices are registered.
  Up to 512 points total including logging device are registered.
- .Register logging devices without vacant line. If there is a vacant line, it counts as registration point, e.g. when you register in No.10 next to No.1, it counts total 10-point not 2-point.
- Max. value of demand value is 32-bit (unsigned). It stops the value of 32-bit (unsigned).

■MEWTOCOL



Item		Description
(a)	Name	Set name for demand monitoring device. <Set range> 32-letter or less
(b)	Communication I/F	Set communication I/F that is connected devices used to collect data. <Initial> Main unit <Set range> Main unit/COM0 /COM1 /COM2 /Ethernet *1
(c)	Connection device *2	Set device to collect logging data.
(d)	Device	Set device to collect. <Initial> Device DT 0 <Set range> DT, 0 to 99999
(e)	Data style	Set data style of device to collect. <Initial> DEC1W(Unsigned) <Set range> DEC1W(Unsigned), DEC2W (Unsigned), DEC4W (Unsigned), single precision real number, double-precision real number
(f)	Reading order	Not set for MEWTOCOL
(g)	Upper limit value *3*4	Set upper limit value to collect. <Initial> 0 <Set range> 1 to 65535 / 1 to 4294967295 / 1 to 18446744073709551615

Item		Description
(h)	Multiplier	Set conversion value of collecting data. <Initial> 1 <Set range> 0.0001 to 9999.9999
(i)	Number of decimal places	It shows decimal point number for current value monitor, and csv file. <Initial> 0 <Set range> 0 to 4
(j)	Unit *5	Set unit. It doesn't have to be used. <Set range> 8-letter or less

*1 It displays communication I/F that device is registered.
*2 It displays registered devices.
*3 Only when DEC1W (Unsigned), DEC2W (Unsigned), DEC4W (Unsigned) is selected. When DEC4W is selected, the number of significant digits of data is 15-digit.
*4 Only when [Diff.value] is selected. Set range differs according to data style.

DEC1W(Unsigned)	1 to 65535
DEC2W (Unsigned)	1 to 4294967295
DEC4W (Unsigned)	1 to 18446744073709551615

When reading a value smaller than the previous value, it calculates a differential value as it assumes that the value was over the upper limit value and it changed value.
*5 Do not use double-quotation ["] .

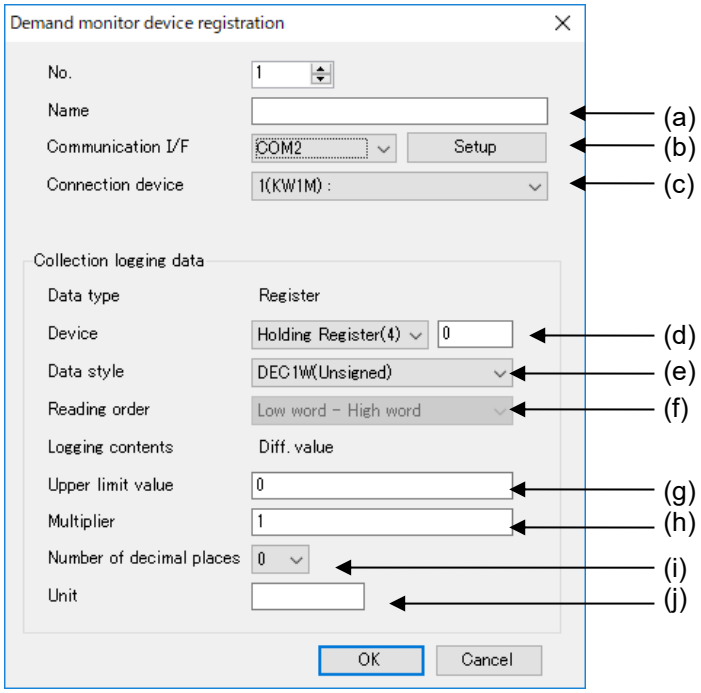
Reference

Refer to the manual for each device about upper limit.

Note

- It the read out value is smaller than the previous value, it calculates demand value by assumed that it exceeds the upper limit value. Set the upper limit correctly.

■MODBUS



Item		Description
(a)	Name	Set name for demand monitoring device. <Set range> 32-letter or less
(b)	Communication I/F *1	Set communication I/F that is connected the devices. <Initial> Main unit <Set range> Main unit /COM0 /COM1 /COM2 /Ethernet
(c)	Connection device *2	Set device to collect logging data.
(d)	Device *3	Set resister data to collect. <Initial> Holding register(4) 0 <Set range> Holding register(4)/ Input register(3) Number: 0 to FFFF
(e)	Data style	Set data style to collect. <Initial> DEC1W(Unsigned) <Set range> DEC1W(Unsigned), DEC2W (Unsigned), DEC4W (Unsigned), single precision real number, double-precision real number
(f)	Reading order *4 *5	Set reading order when it saves collecting data to registers by MODBUS RTU or MODBUS TCP. <Initial> Low word – High word <Set range> Low word – High word / High word - Low word
(g)	Upper limit value *6 *7	Set upper limit value of collecting data. <Initial> 0 <Set range> 1 to 65535 /1 to4294967295 / 1 to18446744073709551615
(h)	Multiplier	Set conversion value of collecting data. <Initial> 1 <Set range> 0.0001 to 9999.9999

Item		Description
(i)	Number of decimal places	It shows decimal point number for current value monitor, and csv file. <Initial> 0 <Set range> 0 to 4
(j)	Unit *8	Set unit. It doesn't have to be used. <Set range> 8-letter or less

*1 It displays communication I/F that device is registered.
*2 It displays registered devices.
*3 Set with hex decimal.
*4 Only when DEC2W (Unsigned), DEC4W (Unsigned), single precision real number, double-precision real number is selected.
*5 It can't set when MEWTOCOL is selected.
*6 Only when DEC1W (Unsigned), DEC2W (Unsigned), DEC4W (Unsigned) is selected. When DEC4W is selected, the number of significant digits of data is 15-digit.
*7 Only when [Diff.value] is selected. Set range differs according to data style.

DEC1W(Unsigned)	1 to 65535
DEC2W (Unsigned)	1 to 4294967295
DEC4W (Unsigned)	1 to 18446744073709551615

When reading a value smaller than the previous value, it calculates a differential value as it assumes that the value was over the upper limit value and it changed value.
*8 Do not use comma [,] and double-quotation ["].

Reference

Refer to the manual for each device about upper limit.

Note

- If the read out value is smaller than the previous value, it calculates demand value by assumed that it exceeds the upper limit value. Set the upper limit correctly.
- It reads out as the below according to the setting.

Saved value in outside device (N: integer)

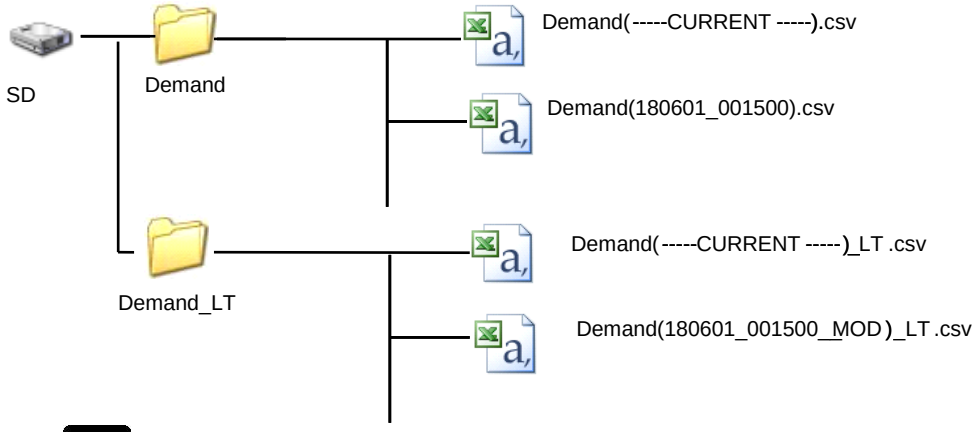
Address	Value
N	0xCDEF(H)
N+1	0x89AB(H)
N+2	0x4567(H)
N+3	0x0123(H)

		High word - Low word	Low word – High word
Device N	DEC2W	0xCDEF89AB(H)	0x 89ABCEDF (H)
Device N	DEC4W	0xCDEF89AB45670123 (H)	0x12345678CDEF89AB (H)

5.6.6.5 Folder Composition of Demand Files

Demand files are saved with the composition below in SD memory card.

Ex.) When it creates the files in SD memory card.



Note

KW Watcher doesn't support demand monitoring file.

■Format of demand files under [DEMAND] folder

<When 'Fixed demand' is selected>

Demand file under [DEMAND] folder is recorded with the format below.

Date	Time	Reference	Control	Limit	Adjust	Target	Present	Estimated	Alarm

Power	Device[*]	I/O[*] level

Example of data

Data	Time	1	2	3	4	5	6
		Reference	Control	Limit	Adjust	Target	Present
		-	-	-	-	-	-
		-	-	-	-	-	-
		DEMAND	DEMAND	DEMAND	DEMAND	DEMAND	DEMAND
		DF	DF	DF	DF	DF	DF
		kW	kW	kW	kW	kW	kW
2018/6/30	18:05	2	3	3	0	10	0.5

7	8	9	10	11
Estimated	Alarm	Power	Air conditioner	Control 1
-	-	-	COM2[001]	COM2[002]
-	-	-	DT120	DT200
DEMAND	LEVEL	POWER	DIFFERENCE	LEVEL
DF	US	DF	UL	US
kW		kWh	kWh	
6	0	0.3	0.3	0

Details of each item

Item	Description
Date	-
Time	-
Reference	Reference demand
Control	Control demand
Limit	Limit control demand
Adjust	Adjustment demand
Target	Target demand
Present	Present demand
Estimated	Estimated demand
Alarm	Current alarm level
Power	Differential value of total integral power
Device[*]	Differential value of integral power of one device
I/O[*] level	Current control level of individual I/O device

<When 'IEC demand' is selected>
Demand file under [DEMAND] folder is recorded with the format below.

Date	Time	Present	Power	Device[*]

Example of data

Data	Time	1	2	3
		Present	Power	Air conditioner
		-	-	COM2[001]
		-	-	DT120
		DEMAND	POWER	DIFFERENCE
		DF	DF	UL
		kW	kWh	kWh
2018/6/30	18:05	40	10	10

Details of each item

Item	Description
Date	-
Time	-
Present	Present demand
Power	Differential value of total integral power
Device[1]	Differential value of integral power of one device

■Format of demand files under [DEMAND_LT] folder

Demand file under [DEMAND_LT] folder is recorded with the format below.
It doesn't create file when 'IEC demand' is selected.

Date	Time	Reference	Control	Limit	Adjust	Target	Present	Estimated

Alarm	Power	Device[*]

Example of data

Data	Time	1	2	3	4	5	6
		Reference	Control	Limit	Adjust	Target	Present
		-	-	-	-	-	-
		-	-	-	-	-	-
		DEMAND	DEMAND	DEMAND	DEMAND	DEMAND	DEMAND
		DF	DF	DF	DF	DF	DF
		kW	kW	kW	kW	kW	kW
2018/6/30	18:00	10	8	9	6.2	10	3.8

7	8	9	10
Estimated	Alarm	Power	Air conditioner
-	-	-	COM2[002]
-	-	-	DT120
DEMAND	LEVEL	POWER	DIFFERENCE
DF	US	DF	UL
kW		kWh	kWh
3.8	0	1.9	1.9

Details of each item

Item	Description
Date	-
Time	-
Reference	Reference demand
Control	Control demand
Limit	Limit control demand
Adjust	Adjustment demand
Target	Target demand
Present	Present demand
Alarm	Current alarm level
Power	Differential value of total integral power
Device[*]	Differential value of integral power of one device

Note

Be sure to confirm the followings for time adjustment by SNTP.

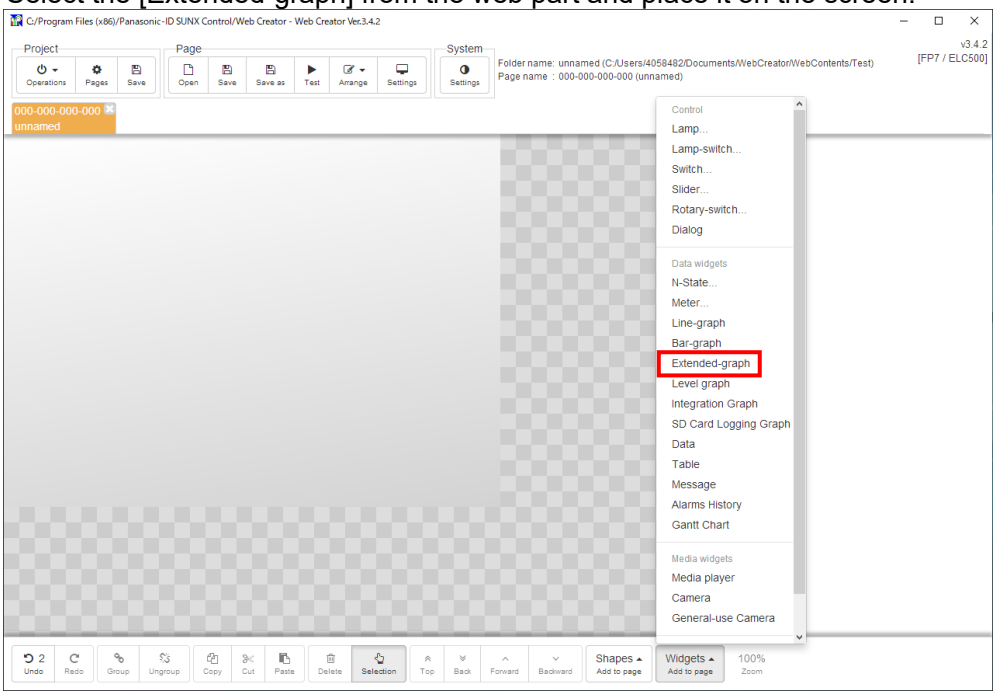
- It adjusted at the timing of 30-sec. This is a measure to reduce the case of recording in 1 minute or the same record duplication.
- If demand period shifts by time adjustment, it can't calculate demand value in the period correctly. Even if it adjusts in the same demand period, it effects to demand value.

5.6.6.6 Present demand graph

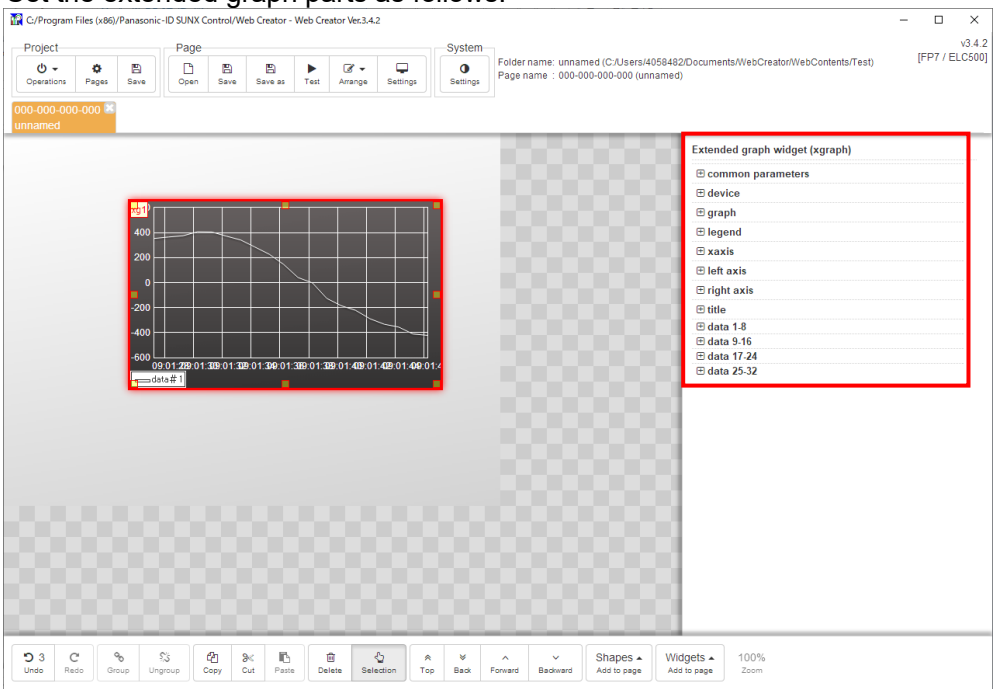
You can create demand graphs using Control Web Creator's extended graphs.
The types of demand that correspond to the [Present Demand Graph] are as follows.
- Average system
- Moving average system
- Faster moving average system

Please refer to the Web server function manual for how to use Control Web Creator.

[How to create a Present Demand Graph]
1. Select the [Extended-graph] from the web part and place it on the screen.



2. Set the extended graph parts as follows.



Settings for extended graph parts.

Setting items			Setting value
Device	Read trigger	Type	Global
		Device type	DT.n
		Number	330000
Graph	Action mode		Batch
	Scatter plot		true
	Number of display data		The setting value varies depending on the [Period] setting. The settings for each [Period] are as follows. Period 15 min : 16 Period 30 min : 30 Period 60 min : 61
Xaxis	Horizontal axis minimum value.		0
	Maximum value on the horizontal axis.		Period 15 min : 15 Period 30 min : 30 Period 60 min : 60
Left axis	Left axis data magnification		0.01
Data source #1	Monitor device	Type	Global
		Device type	DT
		Number	33002
		Data type	UL
	Label		Target demand
Data source #2	Monitor device	Type	Global
		Device type	DT
		Number	33246
		Data type	UL
	Label		Reference demand
Data source #3	Monitor device	Type	Global
		Device type	DT
		Number	33490
		Data type	UL
	Label		Control demand
Data source #4	Monitor device	Type	Global
		Device type	DT
		Number	33734
		Data type	UL
	Label		Limit control demand
Data source #5	Monitor device	Type	Global
		Device type	DT
		Number	33978
		Data type	UL
	Label		Estimated demand
Data source #6	Monitor device	Type	Global
		Device type	DT
		Number	34222
		Data type	UL
	Label		Present demand

Note

- The value of DT register used with extended graph part is updated every minute regardless of demand type.
- When demand type is "IEC demand", the value of DT register used with extended graph part is always 0.

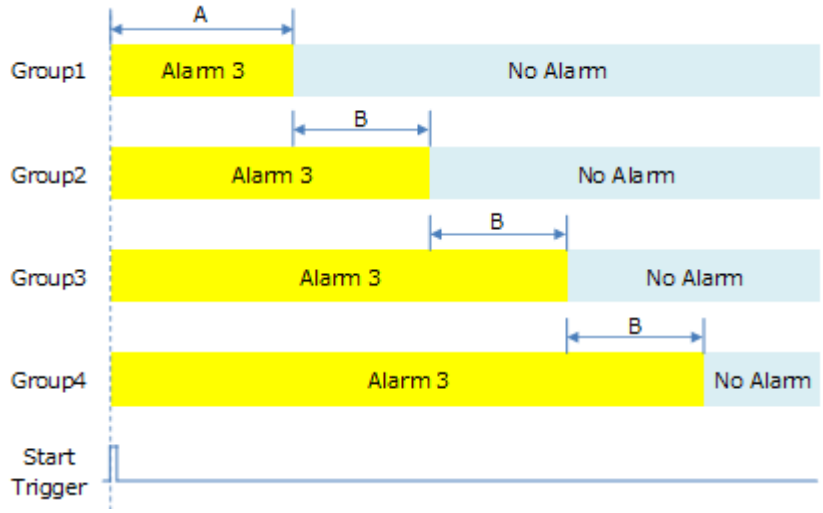
5.6.7 Special Control

Setup items related to start control and cyclic control.

5.6.7.1 Start Control

This is the control that shifts start time for each group in order to reduce peak power.

Remote I/O units are divided to 4-group and it controls them to make status at alarm 3 at start.
After it passes the set time, it will cancel the control one by one.
(Output status of Remote I/O unit will be 'No alarm'.)

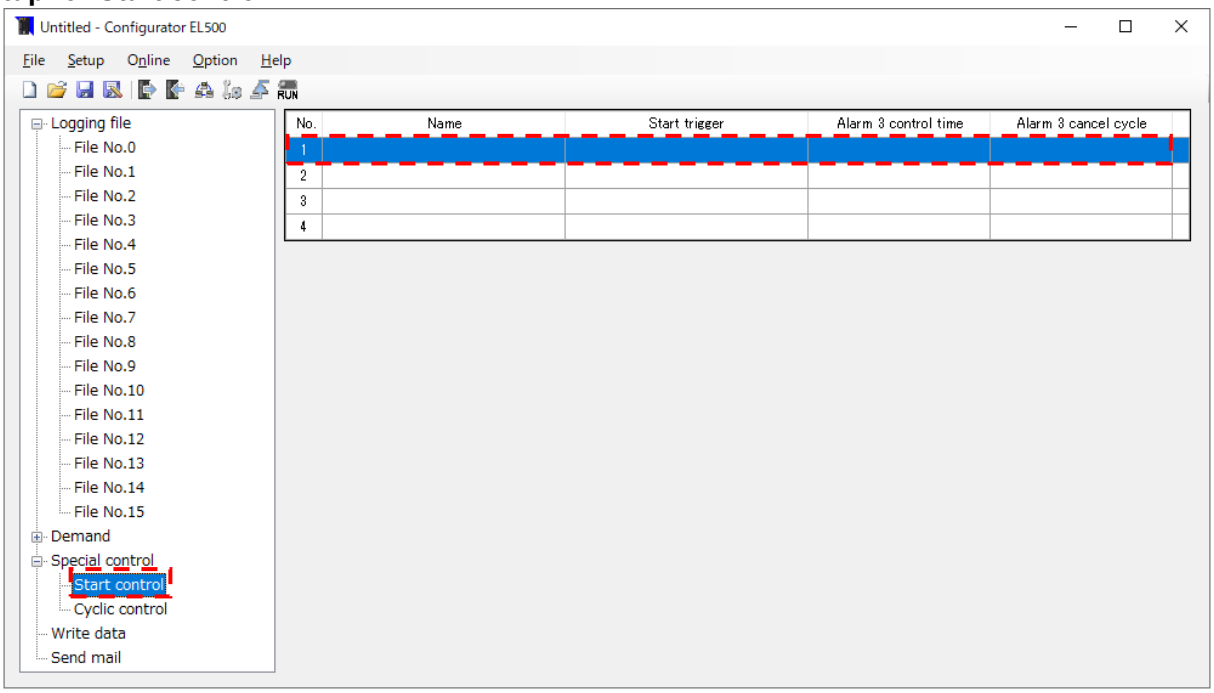


A: time to start at first B: time to start next group

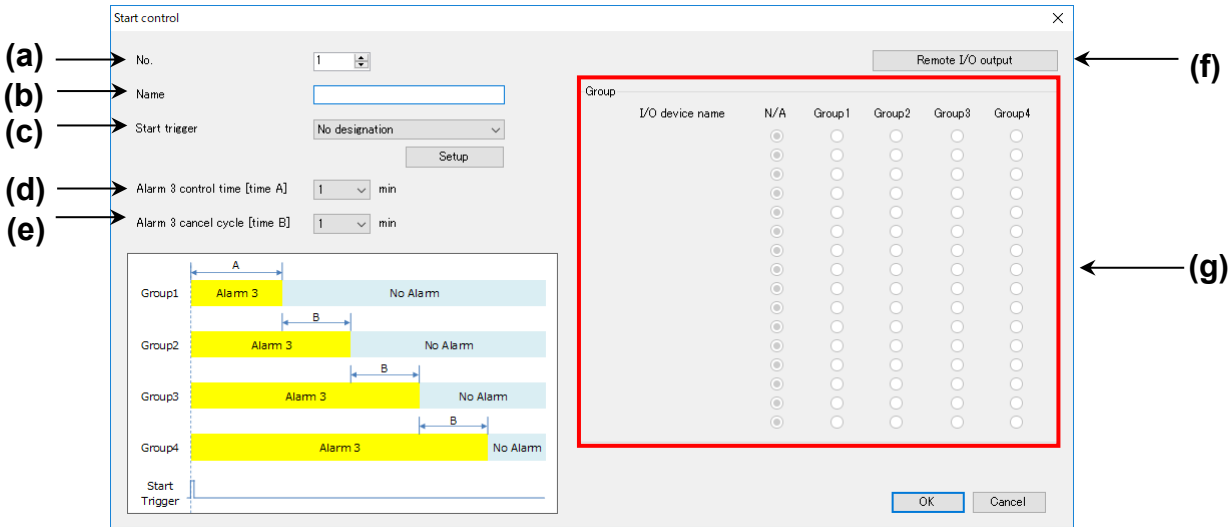
Ex.)

1. When it start 'Start control' (trigger is established.), Remote I/O unit that set to start control will be output state that alarm 3 occurs.
2. After it passes [Time A], it cancels the control of group 1. (No alarm output status)
3. After it passes [Time B], it cancels the control of group 2. (No alarm output status)
4. After that, it will cancel the control of group 3, group 4

■Setup for Start control



Select [Start control] on navigator and it changes to the window.
Double-click the line and setup window will be displayed.



Item		Description
(a)	No.	Set from 1 to 4.
(b)	Name	Set Name <Set range> 32-letter or less
(c)	Start trigger *1	Set trigger to start 'Start control'. Except trigger of appointed period
(d)	Alarm 3 control time [time A]	Set time to start (control time). <Set range> 1 to 60 min
(e)	Alarm 3 cancel time [time B]	Set time to start next group. (cancel time). <Set range> 1 to 60 min
(f)	Remote I/O output	Shift to Remote I/O unit setup window. Register I/O device before this.
(g)	Group	Register control group for I/O devioces. Register control group for Remote I/O units. Set order to control when it start 'Start control'. N/A Remove the target of start control. Output status = No alarm Group 1 Register Remote I/O unit in group 1 Group 2 Register Remote I/O unit in group 2 Group 3 Register Remote I/O unit in group 3 Group 4 Register Remote I/O unit in group 4

*1 It doesn't start 'Start control' without the trigger.

Point

- Start control is controlled by output pattern of Remoter I/O unit for alarm 3 and no alarm. In order to use start control, set Remote I/O unit so that it power off at alarm 3 and it power on at no alarm.

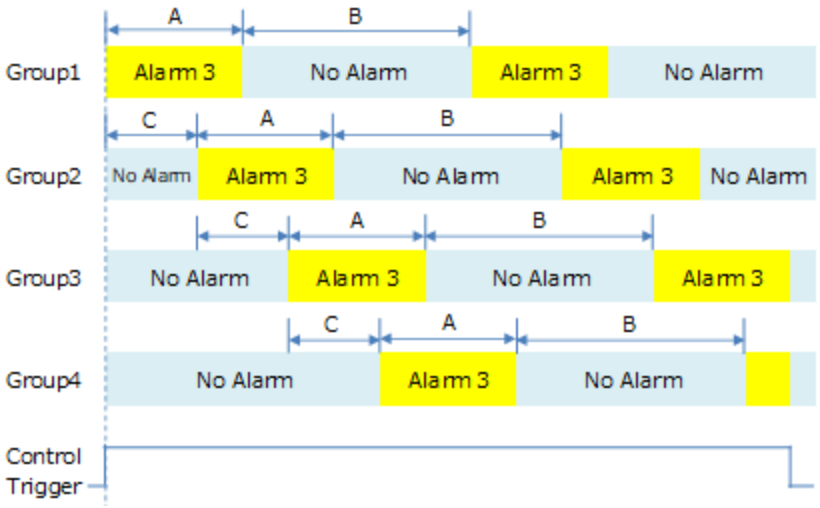
Note

- When the same trigger is selected, a trigger with smaller registered number has a priority.
- In case of setting Remote I/O unit to Remote I/O output, when it shifts RUN mode to STOP/PROG mode, ELC500 writes output status with no alarm to the registered Remote I/O unit.

5.6.7.2 Cyclic Control

This is control that stops each group at the setting cycle to reduce peak power.

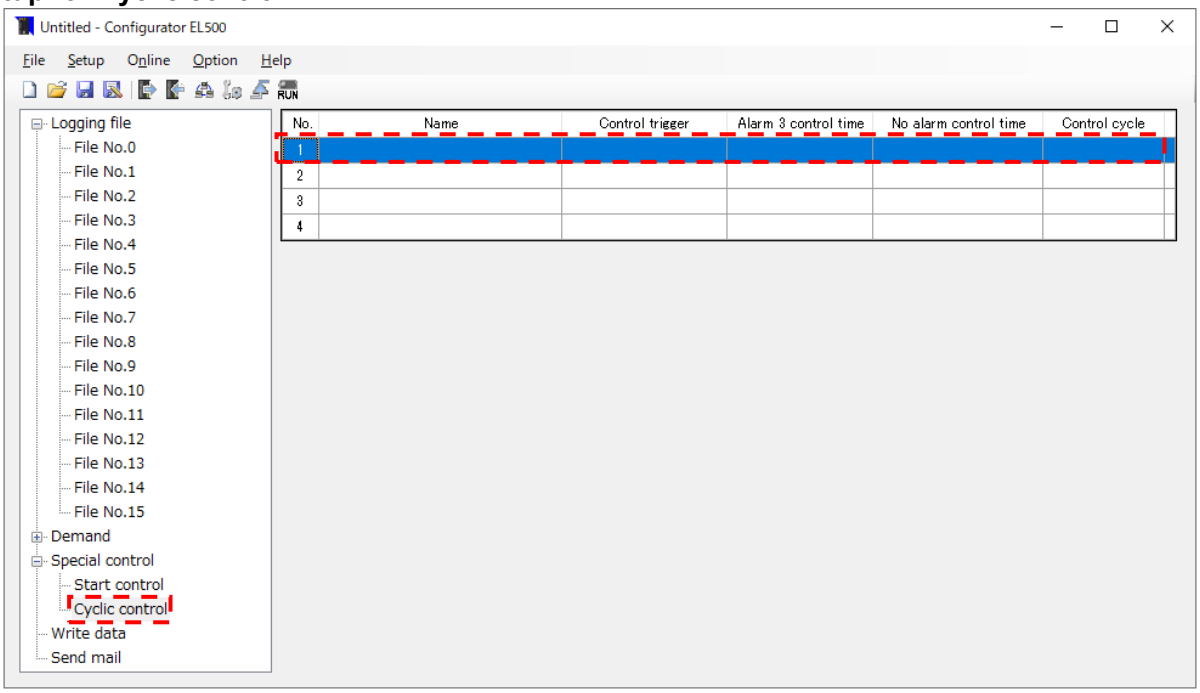
Remote I/O units are divided to 4-group and it controls them to make status at alarm 3 for during establishment the trigger, one by one sequentially.
After it passes the set time, it will cancel the control group 1 and control to make status at alarm 3 for next group.
When the trigger is not established, it will cancel control at alarm 3 immediately.
(Output status of Remote I/O unit will be 'No alarm'.)



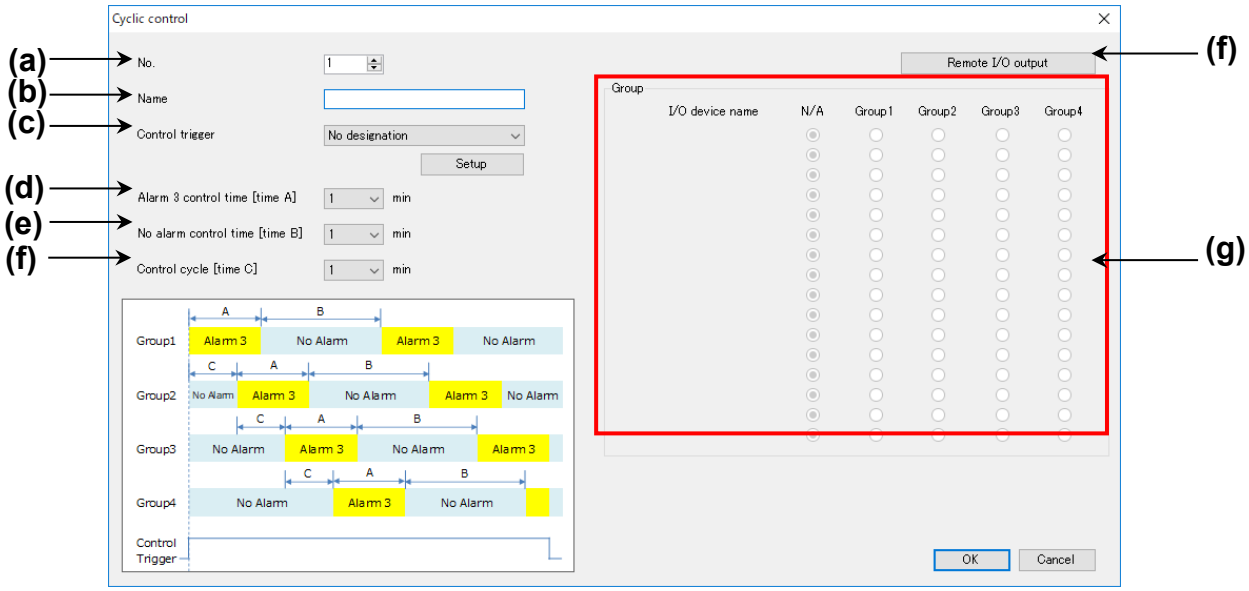
A: Alarm 3 control time B: No alarm control time C: Control cycle

Ex.)
1. When it start 'Cyclic control' (trigger is established), group 1 will be output status that alarm 3 occurs.
2, After it passes [Time A], it cancels the control of group 1. (No alarm output status)
   After it passes [Time C], group 2 will be output status that alarm 3 occurs.
3. After that, it will control group 3 and group 4 in order.
4. After it passes [Time B] at cancel control to group 1, group 1 will be output status that alarm 3 occurs again. (Same as the other group)
   It will repeat this operation during trigger is established.

■Setup for Cyclic control



Select [Cyclic control] on navigator and it changes to the window.
Double-click the line and setup window will be displayed.



Item		Description
(a)	No.	Set from 1 to 4.
(b)	Name	Set Name <Set range> 32-letter or less
(c)	Control trigger *1	Set trigger to start 'Cyclic control'. Select from triggers of appointed period, monitor data (relay), monitor data (register).
(d)	Alarm 3 control time [time A]	Set time to output control for alarm level 3. <Set range> 1 to 60 min
(e)	No alarm control time [time B]	Set time to cancel alarm. <Set range> 1 to 60 min
(f)	Control cycle [time C]	Set time to start next group. <Set range> 1 to 60 min
(g)	Remote I/O output	Shift to Remote I/O unit setup window. Register I/O device before this.
(h)	Group	Register control group for I/O devioces. Set order to control when it start 'Cyclic control'. N/A Remove the target of cyclic control. Output status = No alarm Group 1 Register Remote I/O unit in group 1 Group 2 Register Remote I/O unit in group 2 Group 3 Register Remote I/O unit in group 3 Group 4 Register Remote I/O unit in group 4

*1 It doesn't start 'Cyclic control' without the trigger.

Point

- Cyclic control is controlled by output pattern of Remoter I/O unit for alarm 3 and no alarm. In order to use start control, set Remote I/O unit so that it power off at alarm 3 and it power on at no alarm.

Note

- When the same trigger is selected, a trigger with smaller registered number has a priority.
- In case of setting Remote I/O unit to Remote I/O output, when it shifts RUN mode to STOP/PROG mode, ELC500 writes output status with no alarm to the registered Remote I/O unit.

Write data

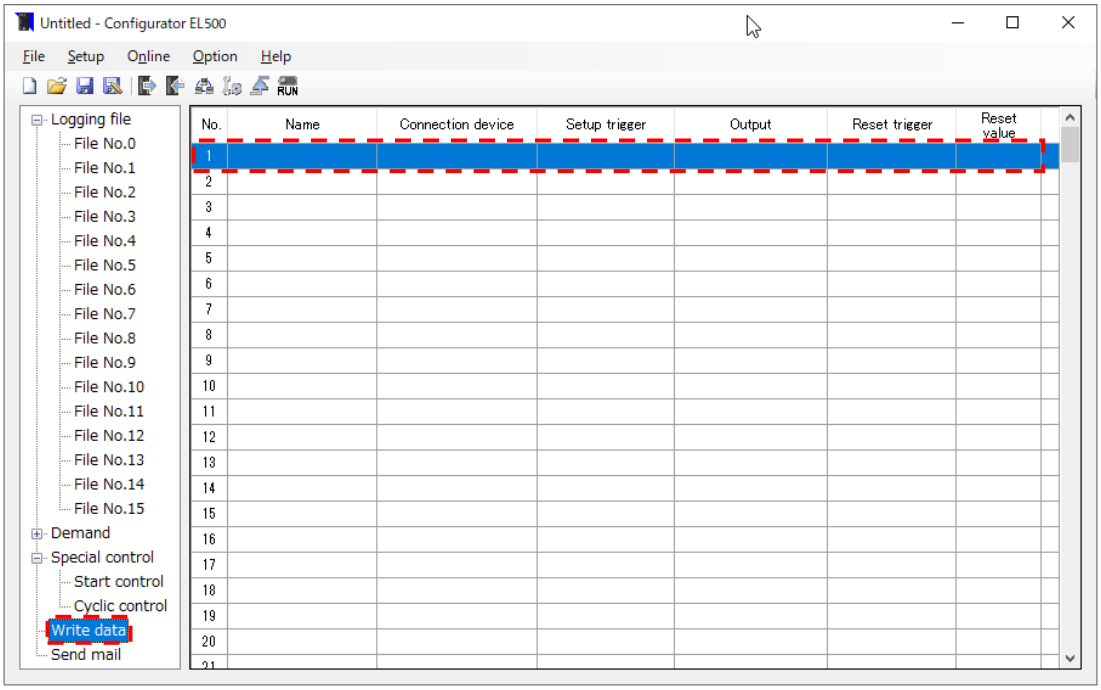
ELC 500 can write data such as relay status, registers by setting trigger.
For example, when trigger condition is established, it can initialize some registers.

Select and double-click line of No to setup, setup window is displayed.
Set items to required and click [OK] to register.
After registration, it displays the lists with registration information.

5.6.8

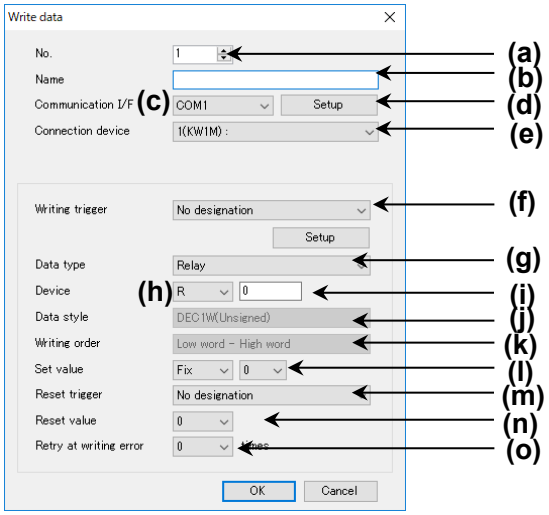
Point

- Set to [Data collection (ELC)] for usage of COM port setup
  When it set to [Program control (PLC)], it is impossible to use this function.

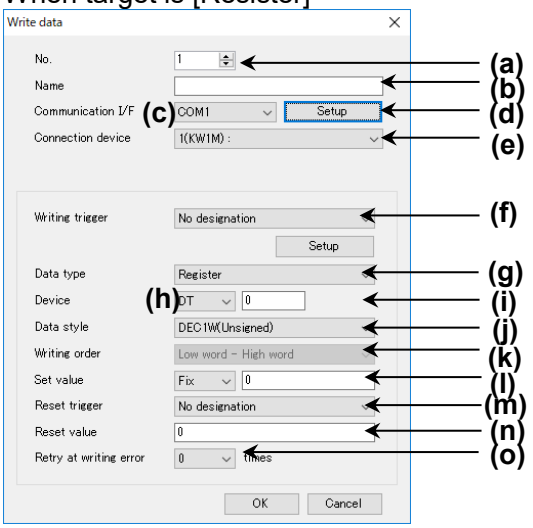


[MEWTOCOL-COM]

When target is [Relay]



When target is [Resister]



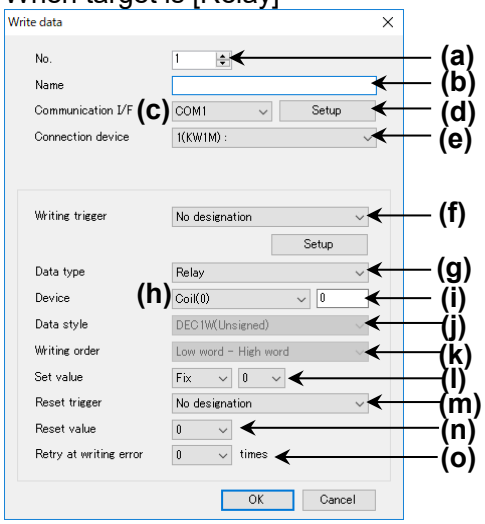
[MEWTOCOL]

Item		Description
(a)	No.	Selected registered number is displayed.
(b)	Name	Set name.
(c)	Communication I/F	Set communication I/F that is connected the devices to write data.
(d)	Connection device	Register device to write data if it doesn't yet.
(e)	Connection device	Set device to write data.
(f)	Write trigger	Set trigger to write data.
(g)	Data type	Set data type to write data. <Initial> register <Set range> register/ relay
(h)	Device *1	Set from the followings. <Set range> DT,LD,FL,WY,WR,WL,SV,EV
(i)		Set number of register or relay.
(j)	Data style	Set data style of data. <Set range> DEC1W, DEC1W(Unsigned), DEC2W, DEC2W(Unsigned), DEC4W, DEC4W(Unsigned), HEX (4-digits / 8-digits / 16-digits), single precision real number, double-precision real number
(k)	Writing order	Not set for MEWTOCOL
(l)	Set value *2	Set value format to write. Write fixed value: set value Write variable value: Set number of register or relay
(m)	Reset trigger	Set timing to reset (cancel) trigger.
(n)	Reset value	Set reset value.
(o)	Retry at writing error	Set retry number when it failed to write. <Initial> 0 [times] <Set range> 0 to 10

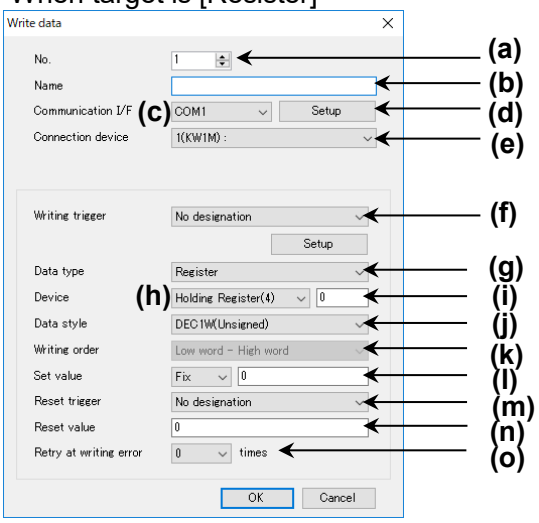
*1 It can select R, Y and L only when relay is selected.
*2 It can select R, X, Y and L only when relay is selected.

[MODBUS RTU]

When target is [Relay]



When target is [Resister]



Item		Description
(a)	No.	Selected registered number is displayed.
(b)	Name	Set name.
(c)	Communication I/F	Set communication I/F that is connected the devices to write data.
(d)	Connection device	Register device to write data if it doesn't yet.
(e)	Connection device	Set device to write data.
(f)	Writing trigger	Set trigger to write data.
(g)	Data type	Set data type to write data. <Initial> register <Set range> register/ relay
(h)	Device *1*2	Select Holding Register(4)
(i)		Set number of register or relay.
(j)	Data style	Set data style when data type is register. <Initial> DEC1W(Unsigned) <Set range> DEC1W, DEC1W(Unsigned), DEC2W, DEC2W(Unsigned), DEC4W, DEC4W(Unsigned), HEX (4-digits / 8-digits / 16-digits), single precision real number, double-precision real number
(k)	Writing order	Set writing order to transmit value. <Set range> Low word – High word / High word - Low word
(l)	Set value *3*4	Set value format to write. Write fixed value: set value Write variable value: Set number of register or relay
(m)	Reset trigger	Set timing to reset (cancel) trigger.
(n)	Reset value *3	Set reset value.
(o)	Retry at writing error	Set retry number when it failed to write. <Initial> 0 [times] <Set range> 0 to 10

*1 Set with hex decimal.
*2 It can select Coil (0) only when relay is selected.
*3 Set with decimal.
*4 It can select R, X, Y and L only when relay is selected.

Note

- It write as the below according to setting.
  [Device N DEC2W 0x01234567(H), DEC4W 0x0123456789ABCDEF(H)

Writing order in outside device (N: integer)

Low word – High word (DEC2W)		High word - Low word (DEC2W)	
Address	Value	Address	Value
N	0x4567(H)	N	0x0123(H)
N+1	0x0123(H)	N+1	0x4567(H)

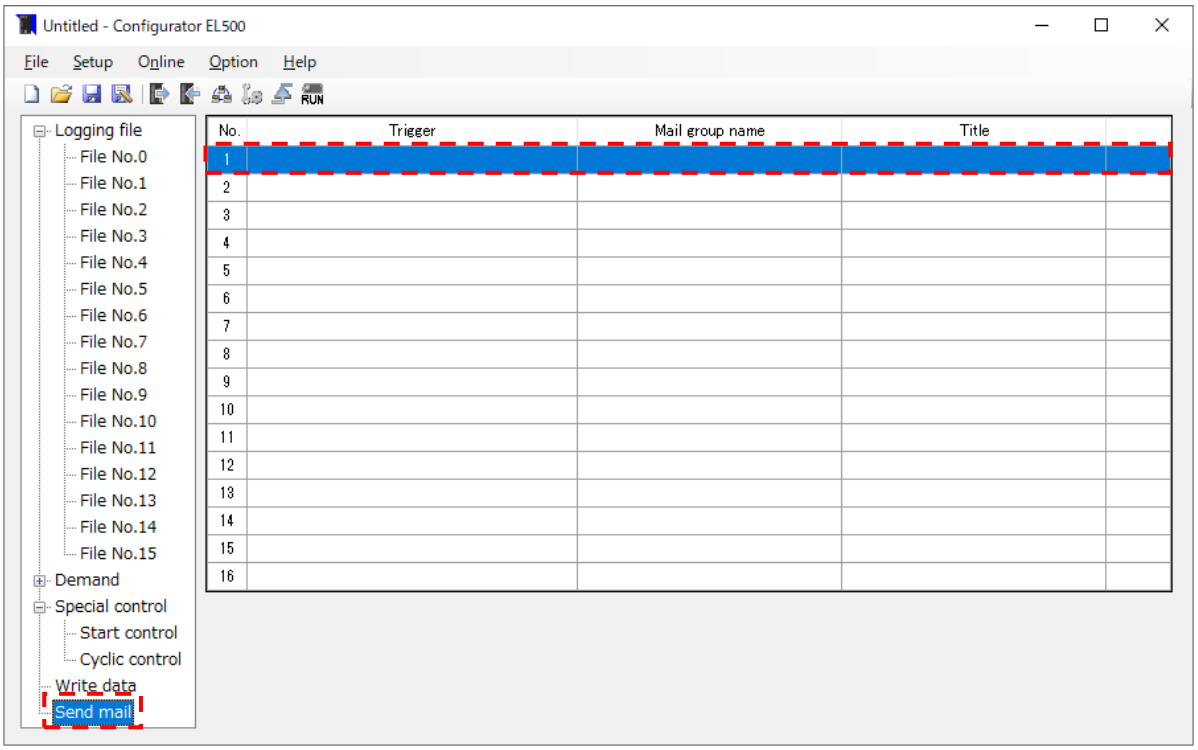
Low word – High word (DEC4W)		High word - Low word (DEC4W)	
Address	Value	Address	Value
N	0xCDEF(H)	N	0x0123(H)
N+1	0x89AB(H)	N+1	0x4567(H)
N+2	0x4567(H)	N+2	0x89AB(H)
N+3	0x0123(H)	N+3	0xCDEF(H)

Send mail

ELC500 can send mail to designated address (mail address) by setting trigger.
For example, you can receive mail when it detects an abnormal value by setting.

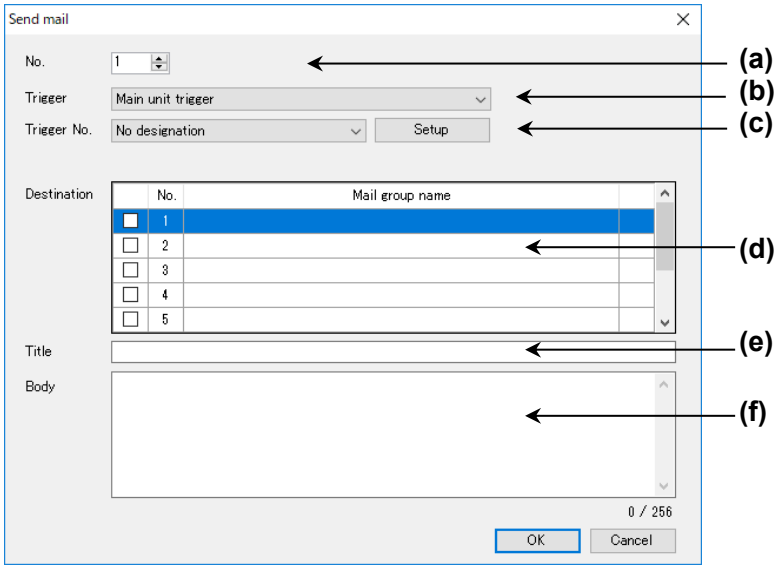
Select and double-click line of No to setup.
Set items to required and click [OK] to register.
After registration, it displays the lists with registration information.

5.6.9



Note

- If Time zone in Basic Configuration is not set correctly, mail will be sent at the wrong time.



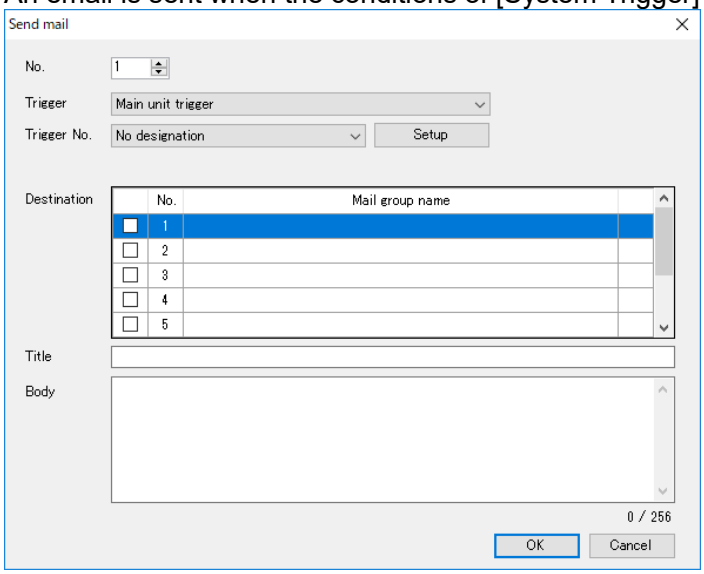
Item		Description
(a)	No.	Selected registered number is displayed. (Max. 16)
(b)	Trigger	Setlect trigger type from below list. Main unit trigger: Select trigger No, from registered triggers. Status change: Designate ELC500 status change. Ladder command: Designate program command by FPWIN Pro7.
(c)	Trigger No./ Condition	Select trigger number or condition from item list.
(d)	Destination	Select destination group.
(e)	Title	Set title of sending mail. If not set, it can't register. <Set range> 64-letter or less
(f)	Body	Set body to send. <Set range> 256-letter or less

Note

- Up to 256-letter can be used for mail address in group.
  Every time you add new address, it uses area for 1-letter.
  Ex.) Register 1 address: up to 256-letter can be used
  Register 2 addresses: up to 255-letter can be used
  Register 3 addresses: up to 254-letter can be used
- In order to send mail, it is necessary to setup items related to send mail.

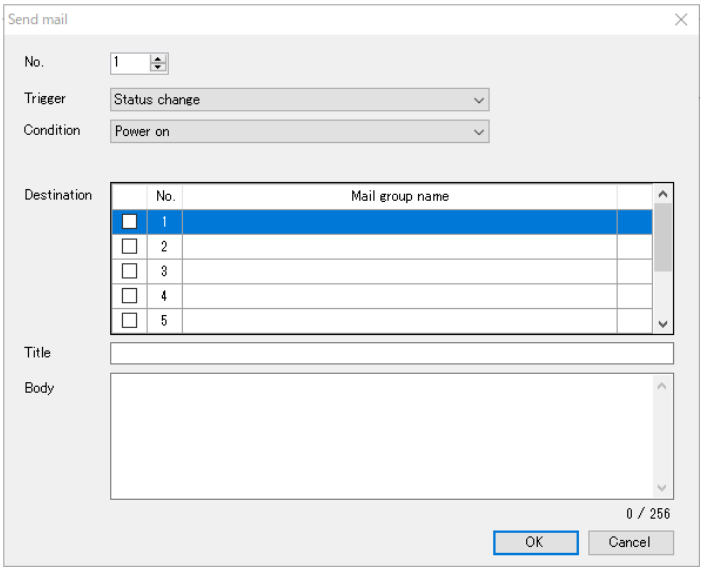
<Main unit trigger>
Send an email using [System Trigger] and [User Trigger] in [Trigger].
For details on [Trigger], refer to '5.6.3 Trigger Setup'.

An email is sent when the conditions of [System Trigger] and [User Trigger] set in [Trigger No.] are met.



Note
When Trigger type is [Fixed cycle] or [Appointed time], [Trigger No.] can't be set.

<Status change>
An email is sent when the status of the machine changes.

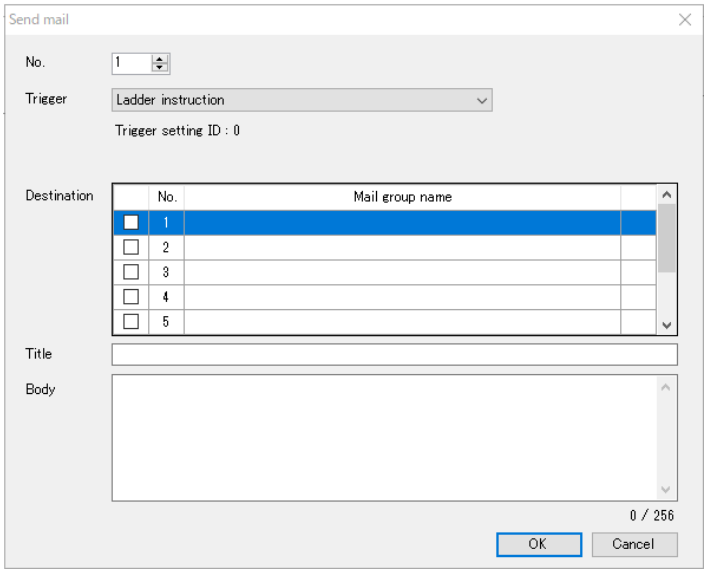


The operating conditions at the time of status change are as follows.

Item	Description
Power on	When ELC500 starts by power-on
Change from STOP/PROG. to RUN	When change STOP/PROG. mode to RUN mode
Change from RUN to STOP/PROG.	When change RON mode to STOP/PROG. mode
Operation stop self-diagnostic error detected	When operation stop by some self-diagnostic error.
Operation continue self-diagnostic error detected	When some Self-diagnostic error is detected.
Error clear	Reset errors with status view or ERR command - Self-diagnostic error - Unit error - Unit verification error - Calculation error - RTC data error - Power supply unit lifetime warning - RTC backup battery error - SNTP time updating error

<Ladder instruction>

[Ladder instruction] sends mail using SMTP transfer request (FP_SMTP_TRANSFER_REQUEST).
For details, refer to the help in the tool software 'Control FPWIN Pro7'.



Ex.) Notify mail setting of [Trigger setting ID: 0]
If [bTransferRequest] changes from FALSE to [TRUE] while [sys_bIsEthernetSMTPClientReady] is TRUE, an e-mail is issued.

```
if DF(bTransferRequest) AND sys_bIsEthernetSMTPClientReady then
    FP_SMTP_TRANSFER_REQUEST(nTransferID := 0,
                             bError => bTransferRequestError);
End_if;
```

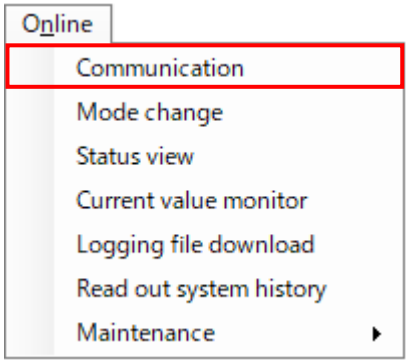
Note
Confirm that the system variable [sys_bIsEthernetSMTPClientReady] is TRUE before executing the instruction.

Maintenace

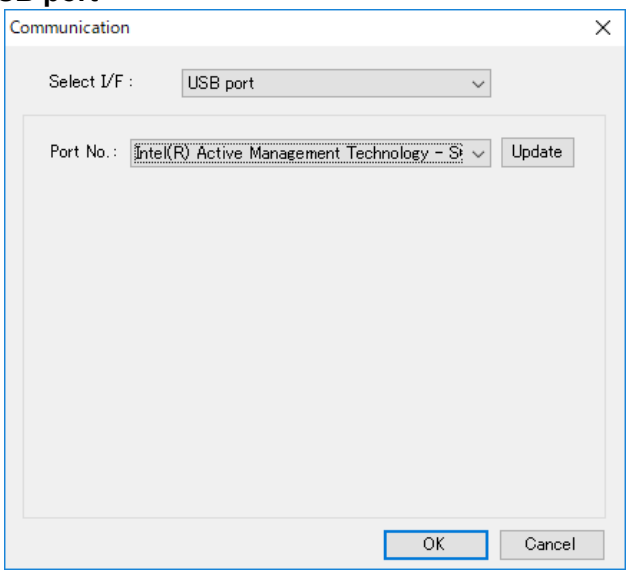
Communication

Setup communication I/F of PC to connect ELC500.
It differs setup items according to the communication I/F.
Select [Online] and click [Communication] to open the window.

5.7
5.7.1



■USB port

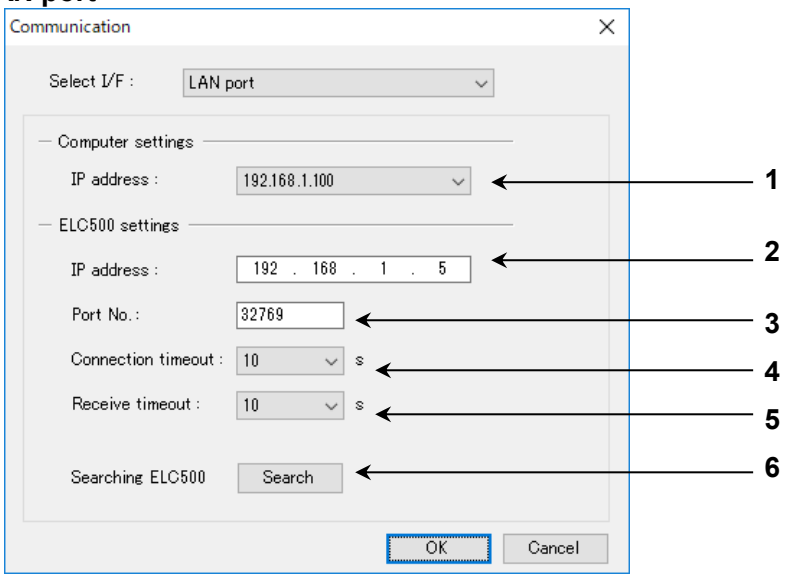


Item	Description
Port No.	Set connected port of USB. Devices that are recognized as COM port by PC can be selected. If it doesn't show it, check the connection and power supply of USB driver and USB port. It shows all COM port including for ELC500. Select COM port of ELC500.

Point
- You can confirm the COM port by Device Manager in Control panel.
- It automatically installs USB driver when Configurator EL500 is installed.

Note
- Be sure to install the specified driver to correct working, even though it is recognized as a USB driver without installing for Windows10.

■LAN port



Item		Description
1	Computer settings IP address	IP address of PC is displayed. When 2 or more addresses are set, select one.
2	ELC500 settings IP address	Set IP address of connected ELC500.
3	Port No.	Set port number of connected ELC500.
4	Connection timeout	Set timeout to use for cut the connection when no connection. <Initial> 10 sec. <Set range> 10 / 15 / 20 / 25 / 30 / 35 / 40 / 45 / 50 / 55 / 60
5	Receive timeout	Set timeout to use for cut the connection from sending command to receiving a response <Initial> 10 sec. <Set range> 10 / 15 / 20 / 25 / 30 / 35 / 40 / 45 / 50 / 55 / 60
6	Searching ELC500	Search ELC500 on network. After searching ELC500, select unit to readout or write data.

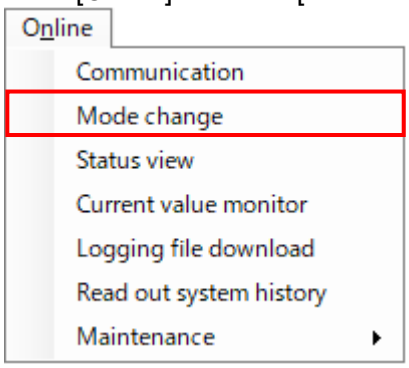
Note

- Set ELC500 to STP/PROG mode when it transmits data.
- When ELC500 and PC are on a different network group, it can be searched but it can't be set. It is necessary to change IP address of ELC500 or PC.
- Set port No. to the same as setting port No. at Ethernet system connection. Refer to 5.6.1 Basic Configuration.

5.7.2 Mode change

It changes operation mode of ELC500.

Select [Online] and click [Mode change] to open the window.



Click the [Mode change] icon on the toolbar.

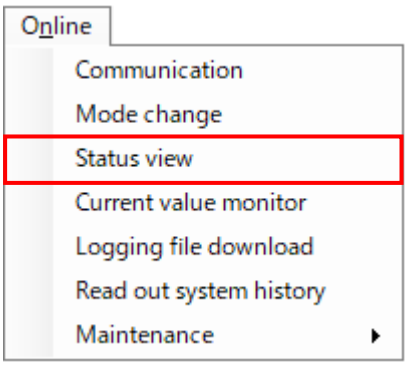
Note

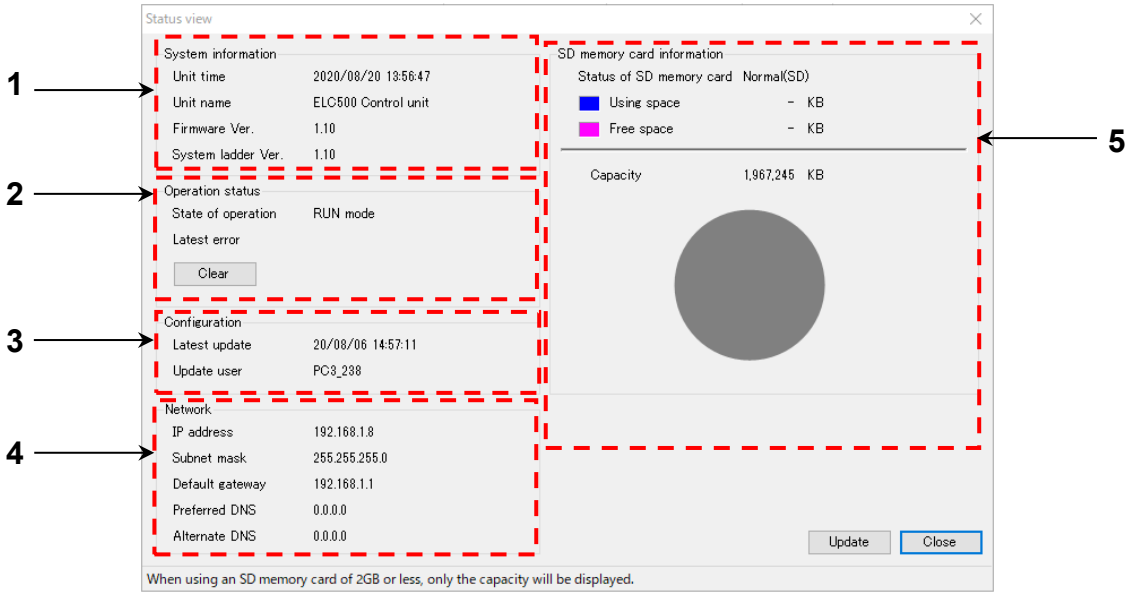
During stop operation for ELC500, it doesn't shift to RUN mode.

Status View

5.7.3

It displays the information of ELC500.
Select [Online] and click [Status view] to open the window..
Click [Update] to update the information.





1. System information
   You can confirm the time, name and firmware version, system ladder version of ELC500.
   The system ladder version will be displayed when the operating status is switched to RUN mode after startup.

2. Operation status
   You can confirm the current operation status.
   Click ‘Clear’ and clear errors displayed at the moment and ERROR LED turns off.

   Note
   ‘Clear’ is used only for clear error display and ERROR LED.
   It cannot used to solve an error source.

3. Configuration
   You can confirm the updated time to set to ELC500.

4. Network
   You can confirm the setup conditions for Ethernet.

5. SD memory card information (byte)
   You can confirm the capacity of inserted SD memory card.

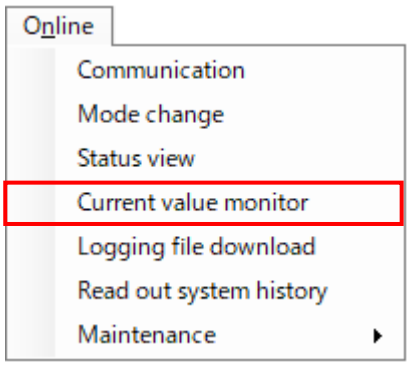
Note

- It can show a remaining capacity of SD memory card only when it is using Panasonic industrial SD memory card 4GB or more. It doesn't show it of SD memory card with 4GB or less.
- Logging files and demand files are saved in SD memory card.

Current Value Monitor

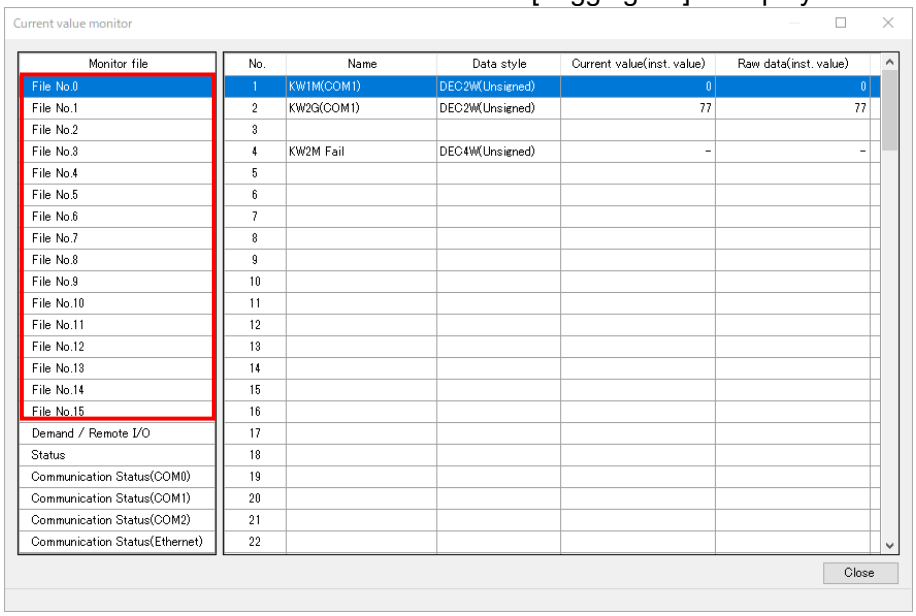
It displays the values of logging devices, demand monitoring devices that are registered and communication information.
Select [Online] and click [Current value monitor] to open the window.

5.7.4



●File No.0 to 15

The instantaneous value of the data set in [Logging file] is displayed.

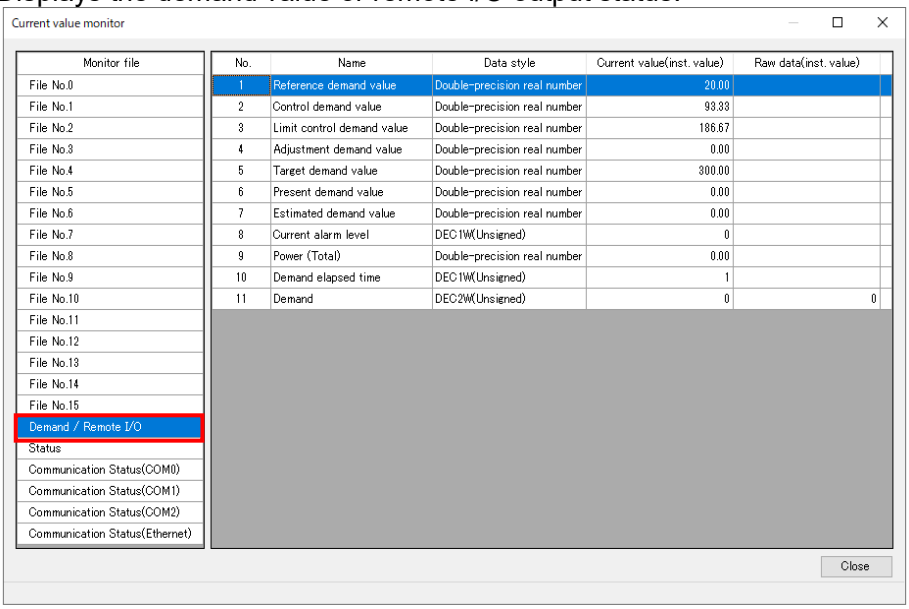


Point

- For device in which communication error occurs, '-' is displayed in Current value.
- Display of current value monitor is updated by 1 sec cycle.
- During STOP/PROG. mode, data are displayed by '0'.

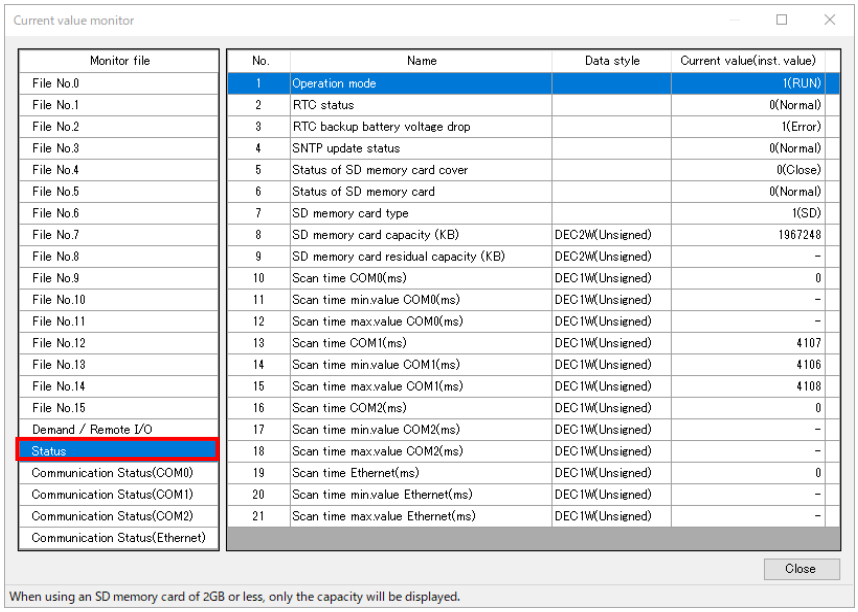
●Demand / Remote I/O

Displays the demand value or remote I/O output status.



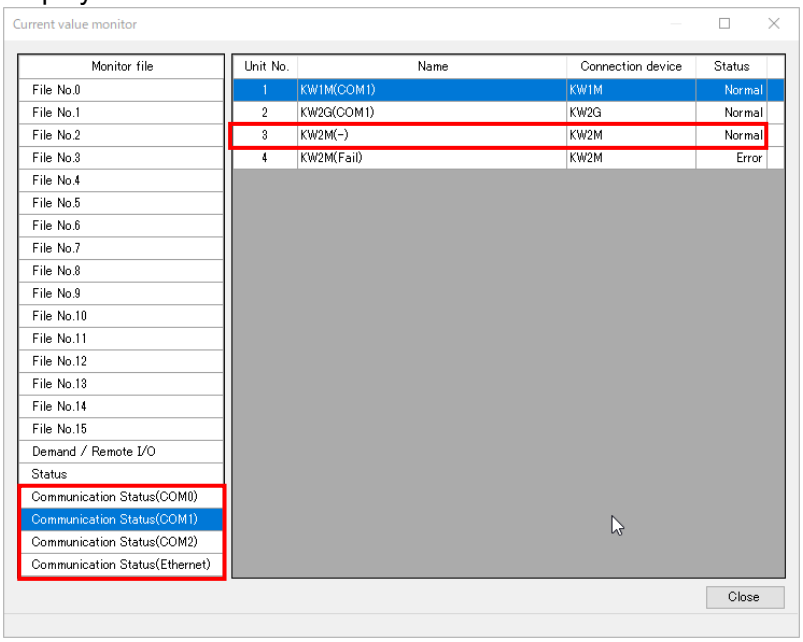
●Status

Displays the operation mode of ELC500, clock status, SD memory card information, and scan time of communication.



●Communication status (COM0 to 2, Ethernet)

Display the communication status of each device connected to each communication port.

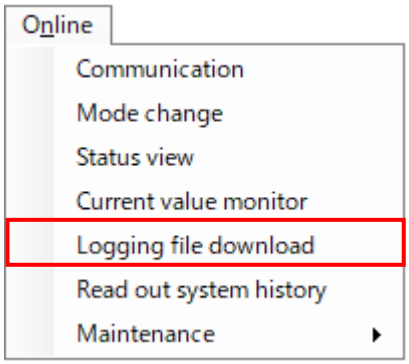


Point

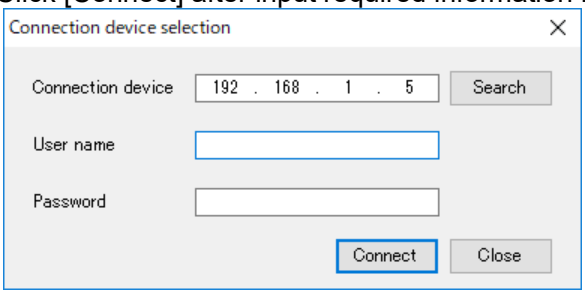
Devices that have never communicated with will be displayed as "Normal" in the status item.

5.7.5 Logging File Download

It displays the logging file list in SD memory card and downloads them.
Select [Online] and click [Logging file download] to open the window.

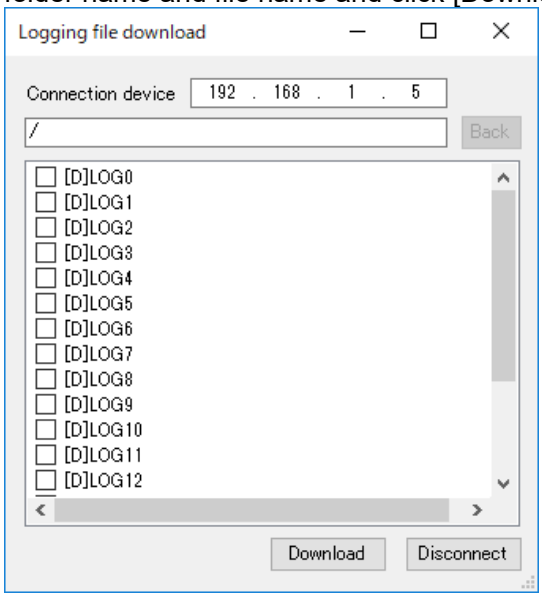


Click [Connect] after input required information for connection.



Item	Description
Connection device	Input IP address of ELC500 that has logging file and demand file to download.
User name	Input user name.
Password	Input password.

It displays a list of files saved in SD memory card. Double-click folders to move. Check boxes of folder name and file name and click [Download], it downloads data of the folder or the file.



Point

- Click [Back] to move the upper folder.
- It uses FTP command to display list and download data.
  It works with PASV mode, it passes firewall.

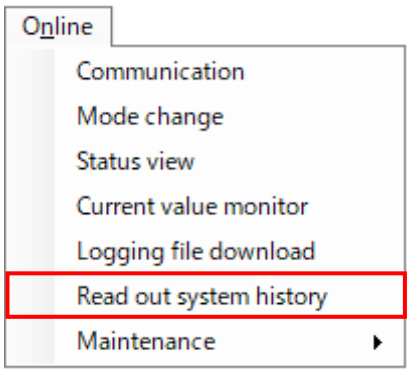
Note

- Max. connection number is 4. It can’t access when the connection number is 5 or more.
- By using this function, it can’t delete folders.

5.7.6

Read Out System History

ELC500 records history such as power on time, error time and so on.
Read out the system history and output files.
Select [Online] and click [Read out system history] to open the window.



■System history file is recorded with the format below.

Timestamp	Event	Characteristic-1	Characteristic-2	Characteristic-3	Characteristic-4

Details of each item

Item	Characteristic				Remarks
	1	2	3	4	
Operation event					
ELC 500 startup complete	WS2:	WS3:	Version No.	-	Record at power on
Power OFF	WS2:	WS3:	-	-	When power off
Open cover	-	-	-	-	When open SD memory card cover
Close cover	-	-	-	-	When close SD Memory card cover.
Insert SD memory card	-	-	-	-	When insert SD memory card
Remove SD Memory card	-	-	-	-	When remove SD memory card
Change operation mode switch (STOP/PROG.)	-	-	-	-	When change Mode SW to STOP/PROG.
Change operation mode switch (RUN)	-	-	-	-	When change Mode SW to RUN
Change card operation select switch (SD operation)	-	-	-	-	When change Card operation SW to CARD
Change card operation select switch (ROM operation)	-	-	-	-	When change Card operation SW to ROM
Copy project in SD Card	-	-	-	-	When change Mode SW to COPY for 5-sec.
Firmware update mode	-	-	-	-	When update firmware
Power off while accessing SD memory card	-	-	-	-	When power off during access to SD memory card
Operation mode status	Operation mode (STOP/PROG. or RUN)	-	-	-	When change mode

Item	Characteristic				Remarks
	1	2	3	4	
Event related to Ethernet					
Ethernet cable connection status	Connection status (Disconnect / Connect)	Speed	-	-	When change connection status of Ethernet cable
Login FTP server	Login status (Login / Logout)	-	-	-	When change login status to FTP server

Item	Characteristic				Remarks
	1	2	3	4	
Event related to command					
Read out system history	Port No.	-	-	-	When read out system history by tool
Reset system history	Port No.	-	-	-	When reset system history by tool.
Setup operation mode	Port No.	Operation mode (STOP/PROG. or RUN)	-	-	When change mode by tool
Error clear	Port No.	-	-	-	When clear error from ELC500
Setup calendar	Port No.	-	-	-	When setup calendar
Setup ELC500 password	Port No.	-	-	-	When setup password
Delete ELC500 password	Port No.	-	-	-	When delete password
Transfer ELC500 setup	Port No.	-	-	-	When transmit setup
Initialize ELC500	Port No.	-	-	-	When initialize ELC500

Item	Characteristic				Remarks
	1	2	3	4	
Event related to self-diagnosis error					
Battery voltage drop	Voltage value				When reduce backup battery voltage
Failed to update time with SNTP	DNS error / Communication timeout				When fail to update time with SNTP
FTP client error	DNS error / Authentication error / Passive mode change error / Directory change error / File transfer error				When fail to upload log files to FTP server
Mail sending error	DNS error / Authentication error / Attached file error				When fail to send mail
Communication error	COM0 / COM1/ COM2 /	Communication error / Return	Station No.	-	When fail to collect data nor write data
	Ethernet	Communication error / Return	Connection No.	Station No.	
Log file write error	SD not installed / SD capacity full / SD protect error				When fail to write log files

Ex.) Communication error when it read DT100 of No.1 at June 1st, 2018 12:00

Timestamp	Event	Characteristic			
		1	2	3	4
2018/6/1 12:00	Communication error	COM1	Communication error	-	-

Ex.) Return communication error when it read DT100 of No.1 at June 1st, 2018 12:05

Timestamp	Event	Characteristic			
		1	2	3	4
2018/6/1 12:05	Communication error	COM1	Return	-	-

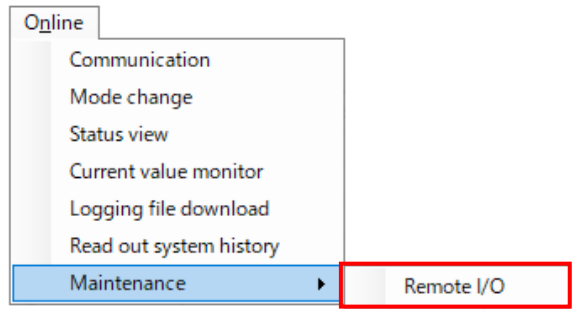
Note

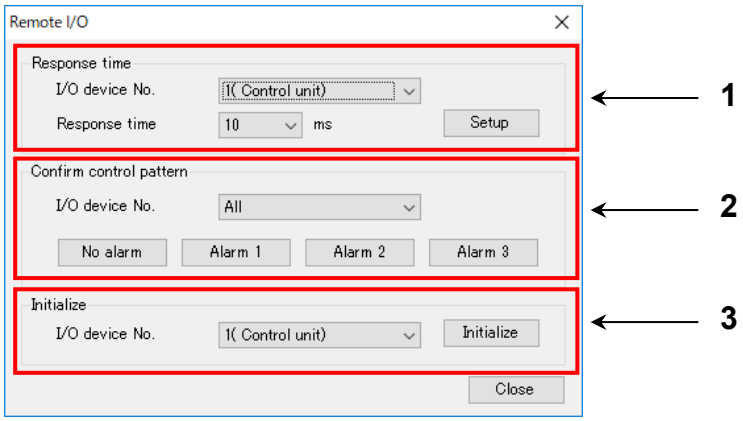
- It doesn't record that when ELC500 transmit setup data to Remote I/O unit.
- Up to 200 records for system history can be saved.
  When it reaches 200 records, it deletes record from the older record and save new record.

Remote I/O Setup

5.7.7

Setup items related to connected Remote I/O unit
You can output control pattern of alarm or set to initial settings.
Select [Online] and [Maintenance], [Remote I/O] to open the window.





Item		Description
1	Response time	Set time from receipt ELC500 command to response by Remote I/O unit Set for each device. <Initial> 10 ms <Set range> 1 to 99
2	Confirm control pattern	Set about output to Remote I/O unit registered to Remote I/O output setting. <I/O device No.> All: Send command to all registered units. Individual numbers: Designate device number to send command. No alarm : output at no alarm Alarm 1 : output at alarm level 1 Alarm 2 : output at alarm level 2 Alarm 3 : output at alarm level 3
3	Initialize	Select device number and initializer it.

Note
- This function can't be used with Remote I/O unit version 1.10 or earlier.
- It is necessary to read out the settings of ELC500 via Configurator 500 before using this function.

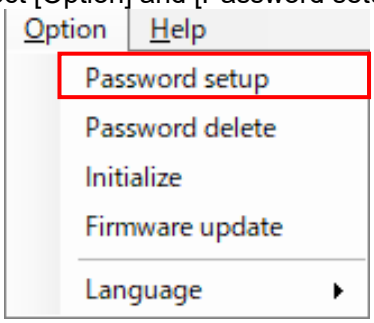
5.7.8

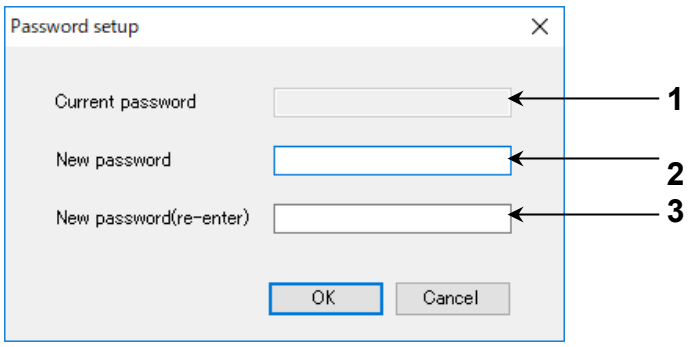
Password Setup / Password Delete

Set items related to password to be used for transfer and read out setup data.
It will be possible to prevent changing setup.

■Password setup

Select [Option] and [Password setup] to open the window.





Item		Description
1	Current password	Input the current password. <Set range> 8 to 16-letter
2	New password *1	Input the new password. <Set range> 8 to 16-letter
3	New password (re-enter)*1	Input the new password again to confirm. <Set range> 8 to 16-letter

*1 It is necessary to use at least one large-letter, one small-letter, one number for password.

■When you set password first

When you set password first, doesn't enter in [Current password] and enter password in [New password] and [Password (re-enter)].

Point

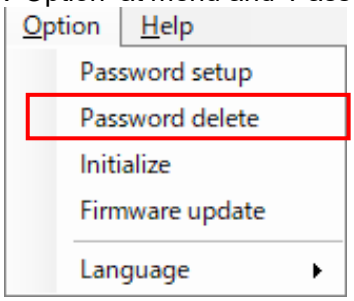
・Password setup in this point is different from the password to access FTP server.
This password is used when it updates setup data.
・After password is set, it will request the password at the time when the menus below are executed.
Read out
Transfer
Status view
Current value monitor
・When you forget the password, it can be cancelled by initializing ELC500.
In this case, setup data are initialized.
Take care for the operation and handling password.

Note

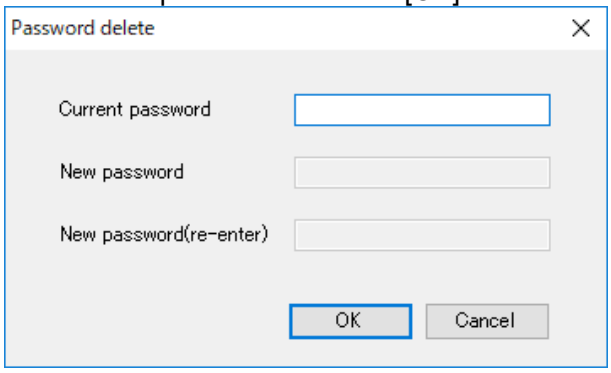
・Password setting is designed to avoid setups being accidentally changed. If the password is forgotten, however, it will be impossible to change the setup data even if you want to. When specifying password, note it in the safe place in case that it is forgotten at some point.
It is impossible to crack the password by our company.
・ELC500 should be set to STOP/PROG mode in order to set password. You can't set password during RUN mode.
・Once you enter wrong password 3 times, you can't access until it power on again.

■Password delete

Click 'Option' at menu and 'Password delete' to open 'Password delete' window.



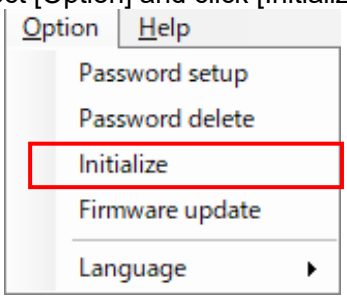
Input the current password and click [OK] to delete the password.



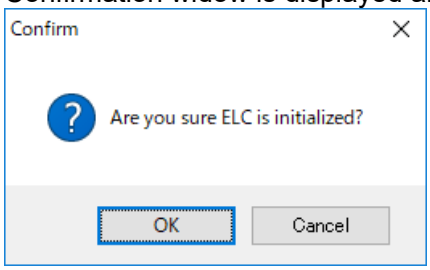
5.7.9 Initialize

It setup ELC500 to the initial settings.

Select [Option] and click [Initialize] to initialize ELC500.



Confirmation widow is displayed and click [OK].



Complete window will be displayed and it completes initialization.

Note

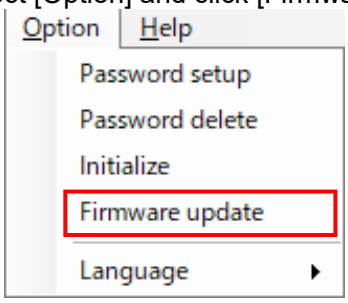
Setup the password during STOP/PROG mode.

- Do not turn off ELC500 during updating the firmware. It may break data or unit.

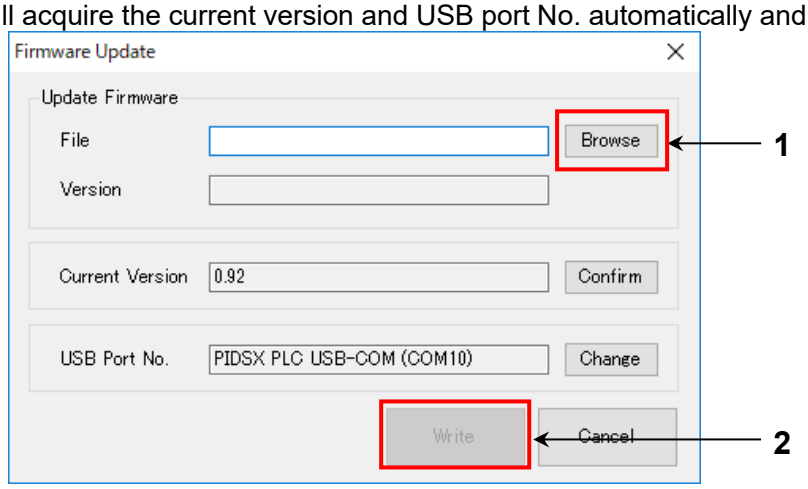
Firmware Update

5.7.10

Update the firmware of ELC500.
When updating the firmware, change to STOP/PROG. mode.
Select [Option] and click [Firmware update] to open the window.

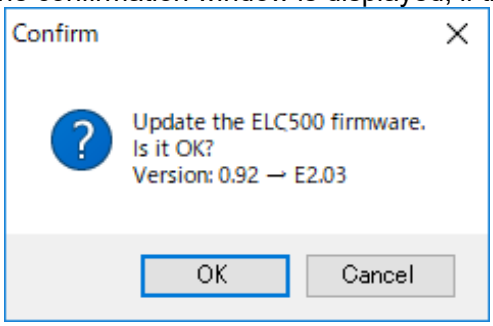


It will acquire the current version and USB port No. automatically and display them.

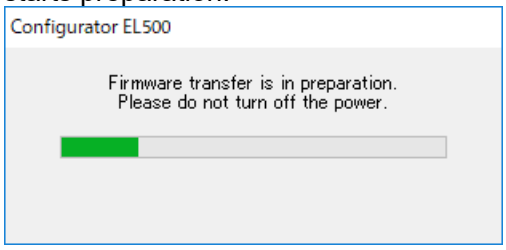


1) Click [Browse] to select files to update.
2) Confirm USB port number and click [Write].

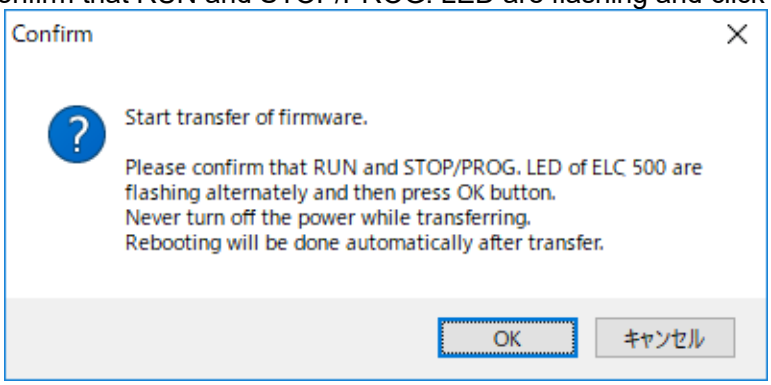
3) The confirmation window is displayed, if there is no problem, click [OK].



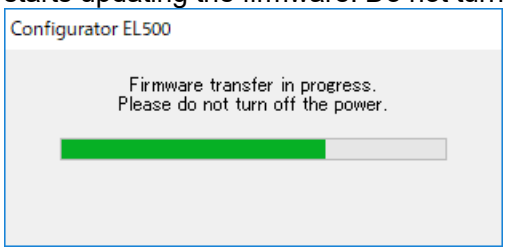
4) It starts preparation.



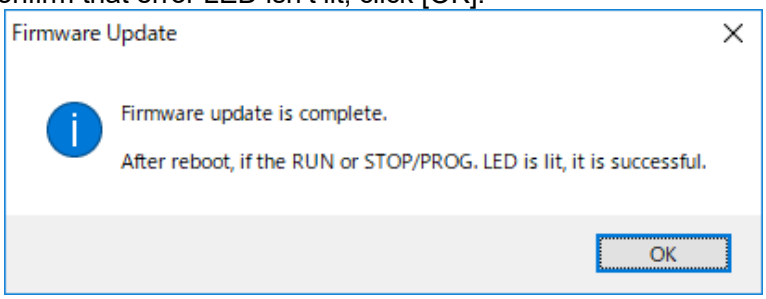
5) The confirmation window is displayed.
Confirm that RUN and STOP/PROG. LED are flashing and click [OK].



6) It starts updating the firmware. Do not turn off the power.



7) When it completes updating, ELC500 will be restarted automatically.
Confirm that error LED isn't lit, click [OK].



Note
-Do not turn off ELC500 during updating the firmware.
-Do not rename the firmware that is downloaded from our website.

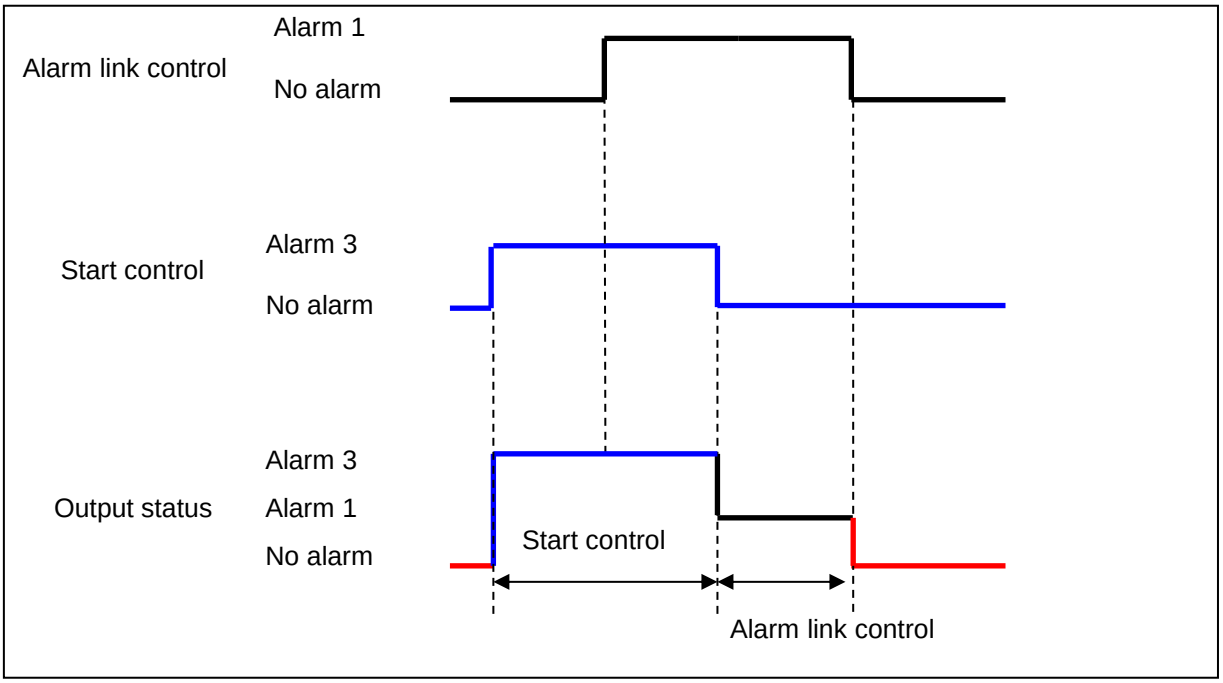
Overlap of each Control

ELC500 performs alarm link control, start control, cyclic control simultaneously.
This is the explanation about working when several controls are overlapped

■When start control overlaps with alarm link control

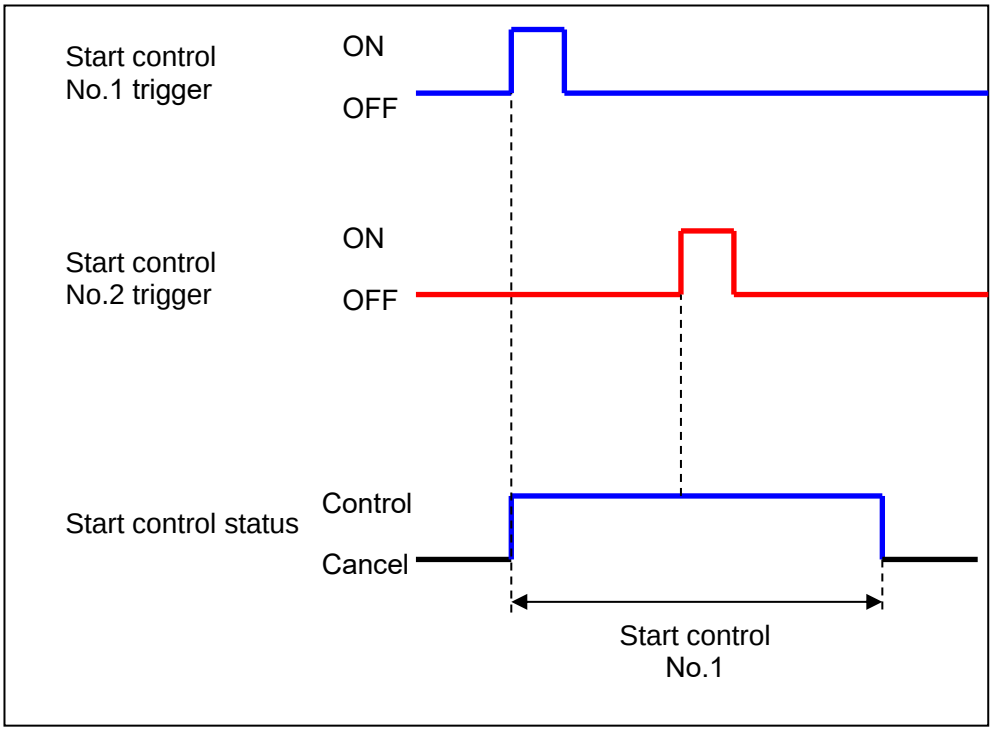
During executing start control (under control alarm 3), start control has a priority.
During start control is canceled (cancel alarm 3), alarm link control has a priority.

5.8



■When 2 or more start control overlap

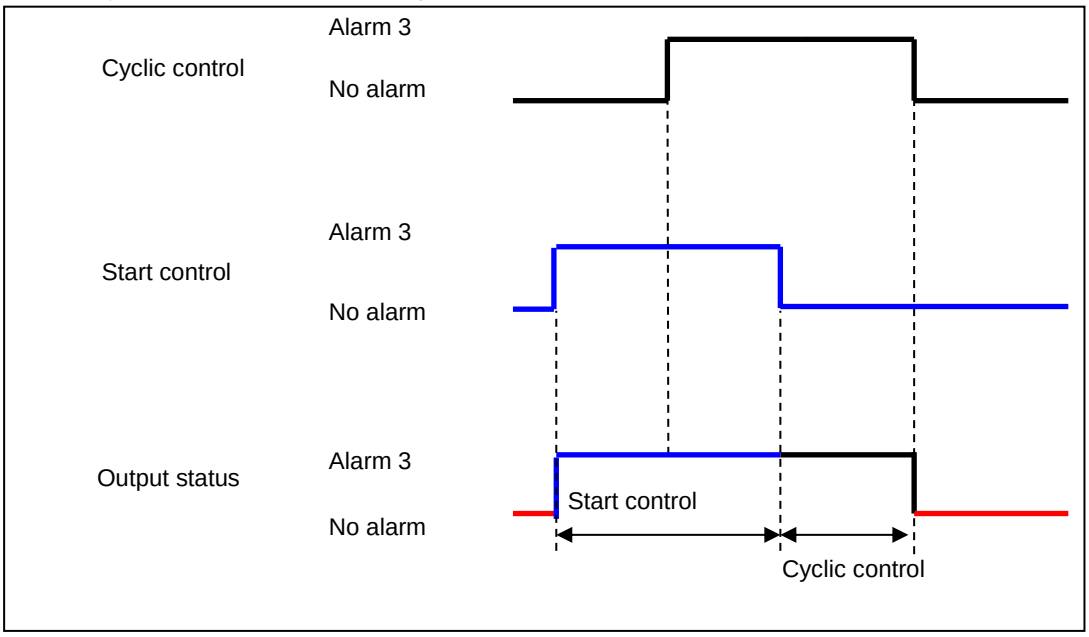
You can set 4 pattern of No.1 to No.4 for start control. When the controls overlap, start control that occurs first has a priority.
(The below shows that during it executes start control No.1, No.2 trigger occurs.)



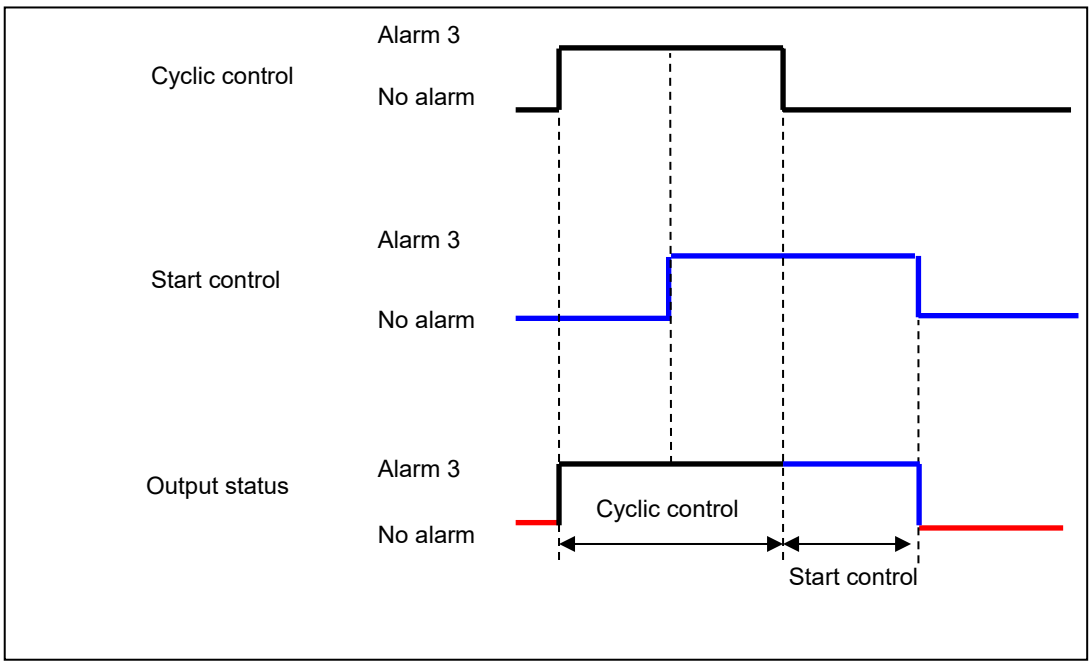
■When start control overlaps with cyclic control

Higher alarm level control has a priority.

・When cyclic control occurs during start control is executed

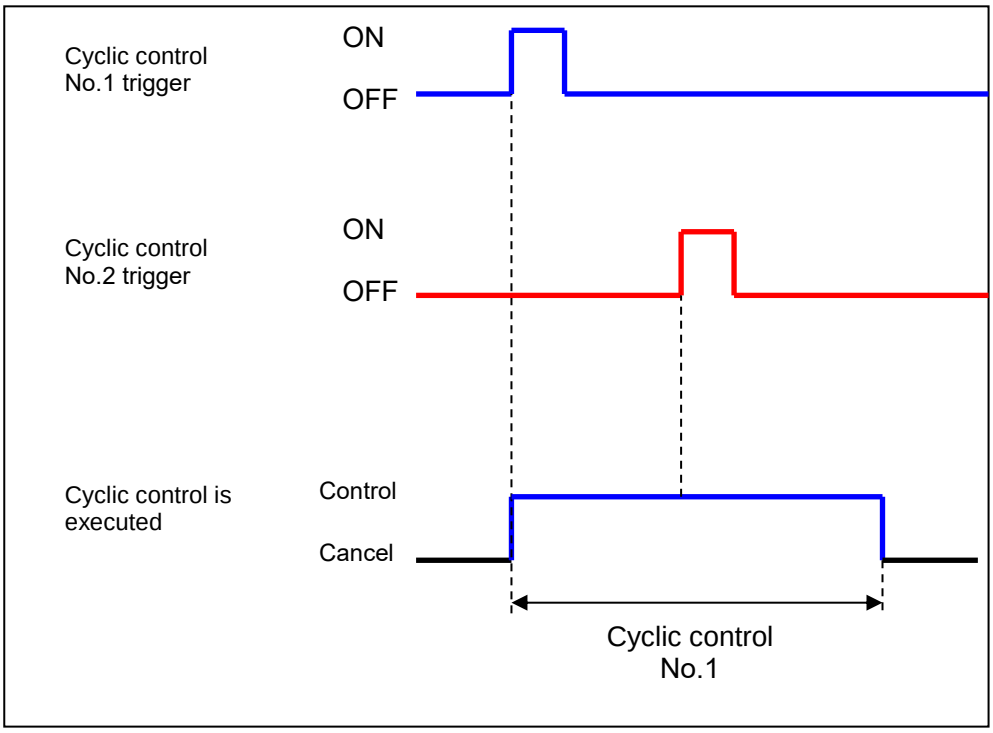


・When start control occurs during cyclic control is executed



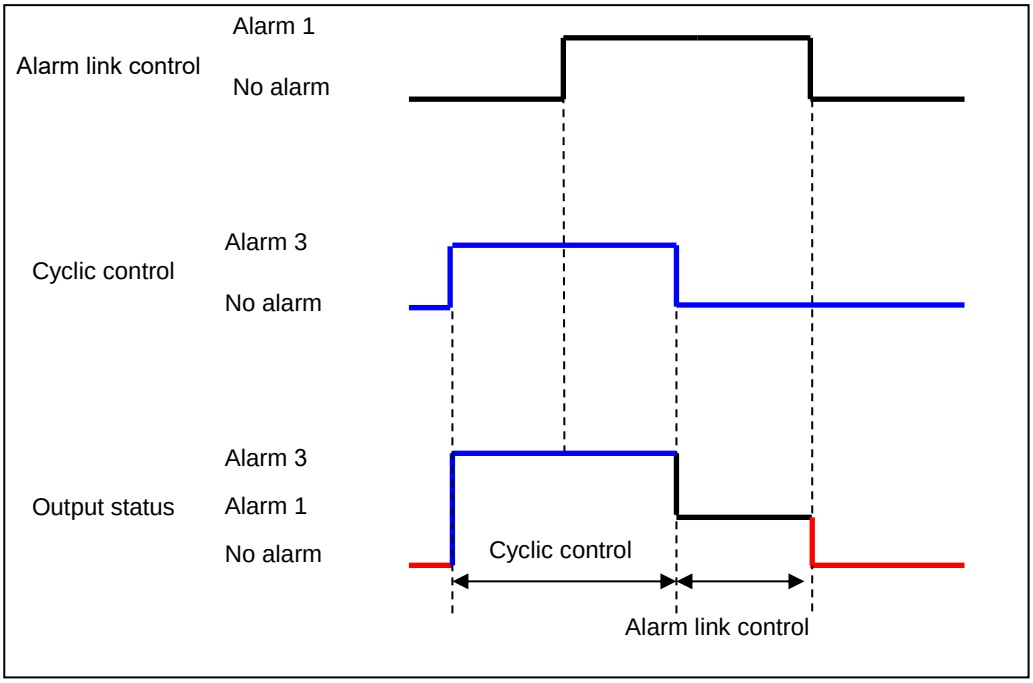
■**When 2 or more cyclic control overlap**

You can set 4 patterns of No.1 to No.4 for cyclic control. When the controls overlap, cyclic control that occurs first has a priority.
(The below shows that during it executes cyclic control No.1, No.2 trigger occurs.)



■**When cyclic control overlaps alarm link control**

During it executes cyclic control (Alarm 3 control), cyclic control has a priority. During it cancels cyclic control (No alarm control), alarm link control has a priority.



Note

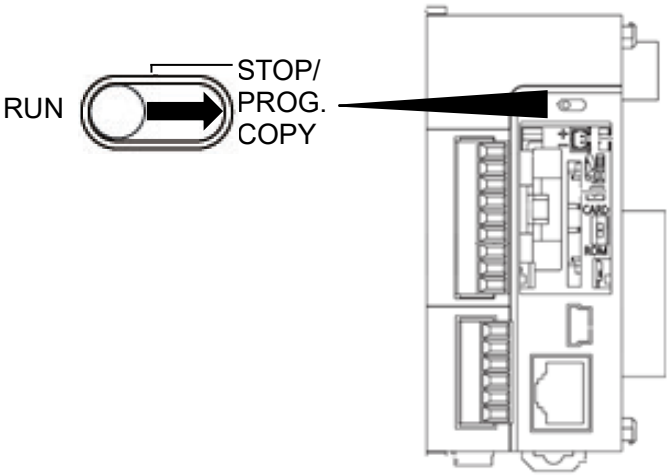
Setting relay is the target for start control and cyclic control.

System ladder program update

In this machine, some functions are realized by the system ladder program written at the time of shipment.
The system ladder program can be updated by the following two procedures.

Update using SD memory card

1. Please download the SD version upgrade system ladder (elc500_sd_verup_system_ladder_v***.zip) from our website.
2. If you unzip elc500_sd_verup_system_ladder_v***.zip, AUTO folder will be created. ([AUTOEXEC.FP7] and [COMMENT.FP7] are stored in the AUTO folder) Save the AUTO folder directly under the SD memory card.
3. Set the mode selector switch of this unit to STOP/PROG.
4. Insert the SD memory card into this unit and close the SD memory card cover.
5. Push the mode switch to the COPY side until the COPY LED lights up.



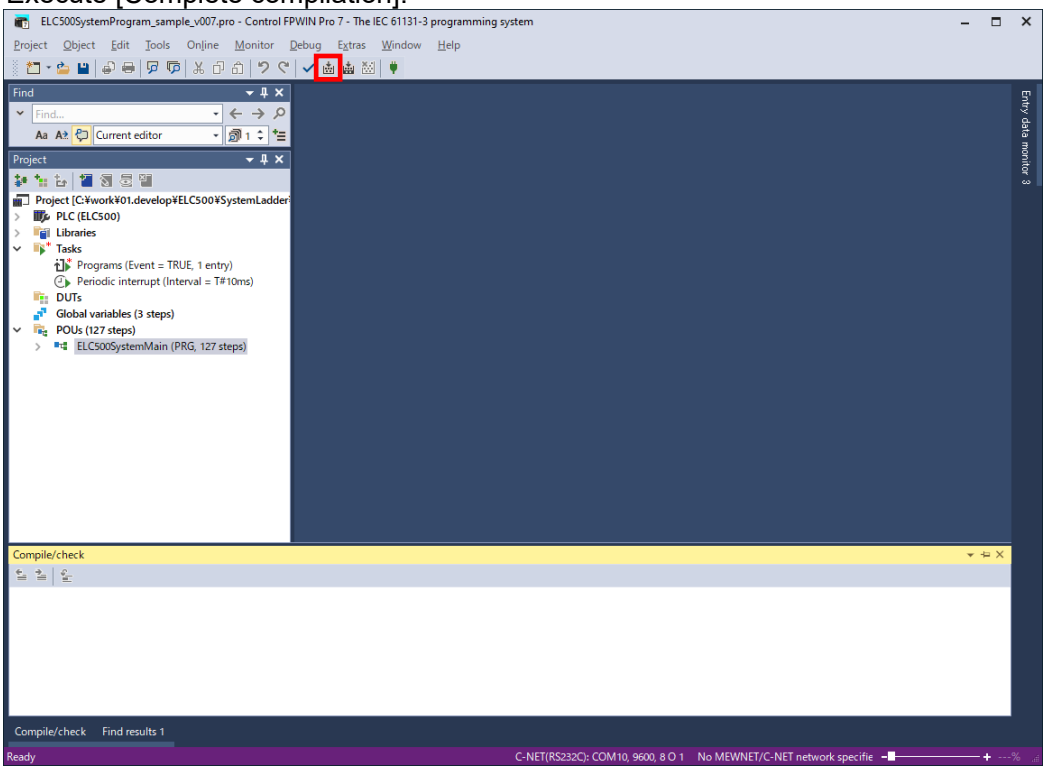
6. When the COPY LED goes off, the system ladder program update is complete.

Note

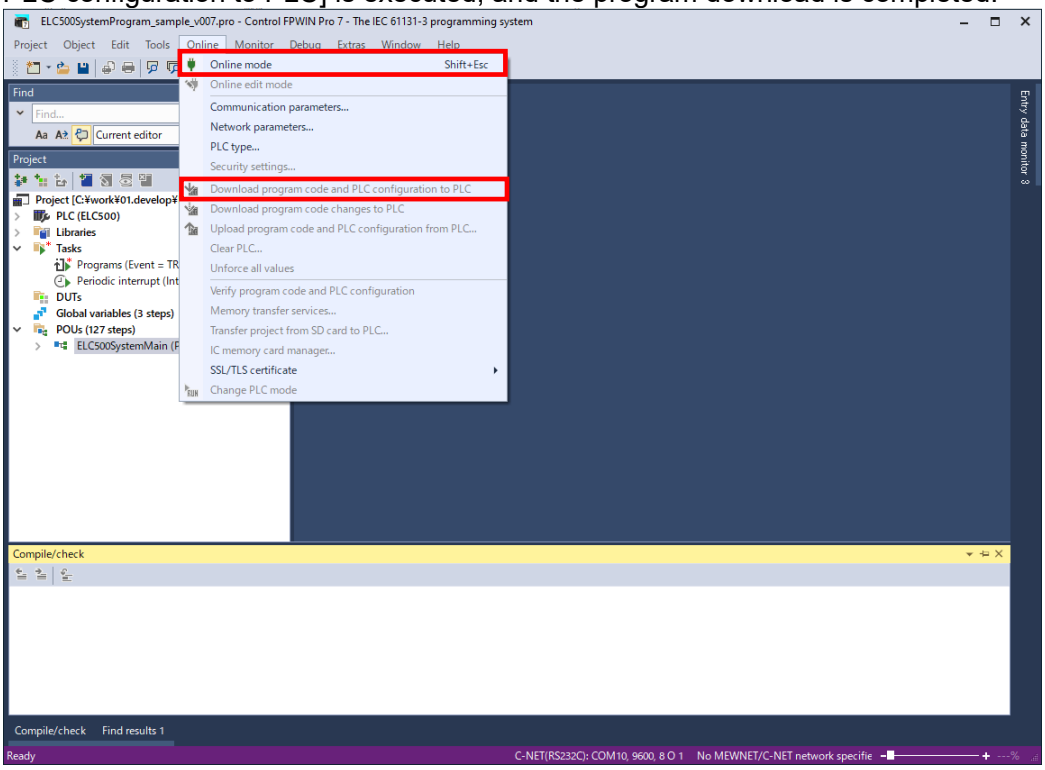
- When creating a user program with FPWIN Pro7, do not update using an SD memory card. The user program will be erased if you update using the SD memory card.
- The system ladder version of the status display will be updated when the operating status is changed to RUN mode after updating the system ladder program.

Update using FPWIN Pro 7

1. Download the Control FPWIN Pro7 project file (elc500_system_ladder_v***.zip) from our website and unzip.
2. Double-click ELC500SystemLadder_V***.pce to open the project file.
3. Execute [Complete compilation].

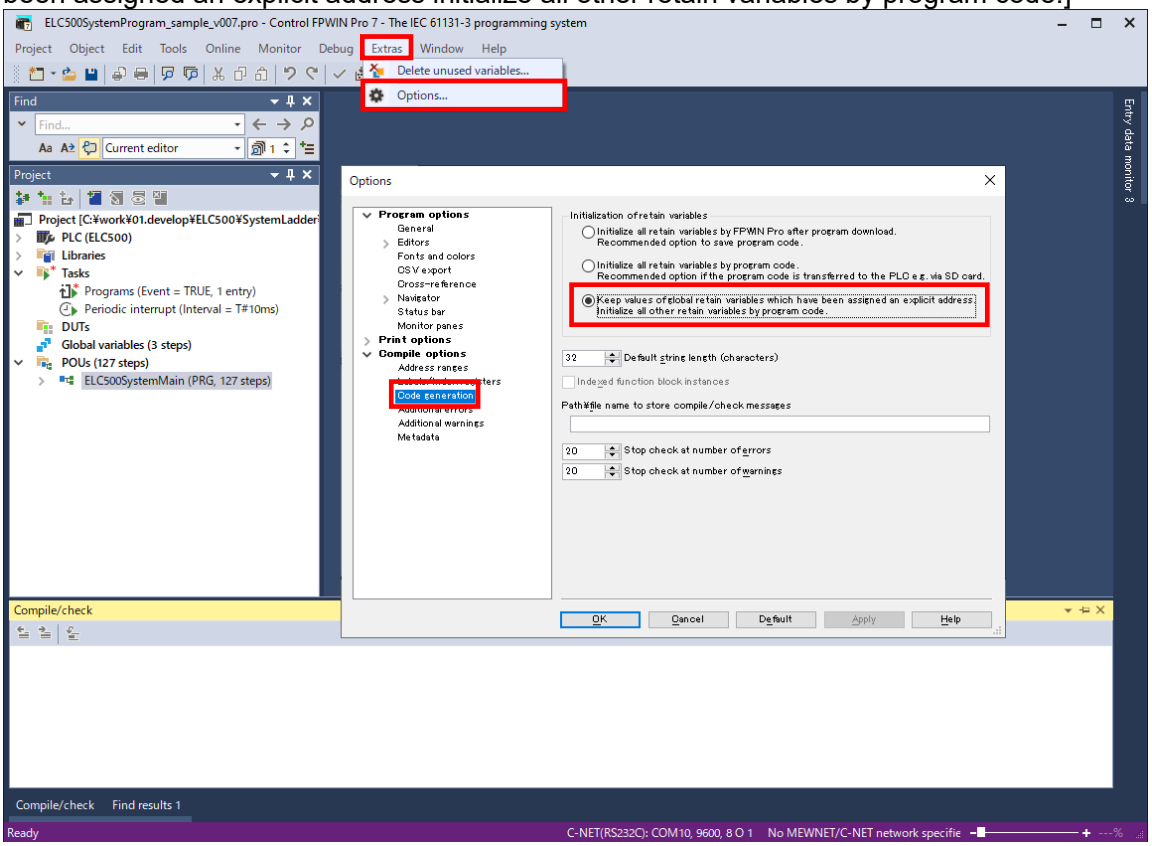


4. The update is completed when the mode is changed to [Online mode], [Download program code and PLC configuration to PLC] is executed, and the program download is completed.



Note

- If you have created a user program with FPWIN Pro7, copy the user program before compiling.
- The system ladder version of the status display will be updated when the operating status is changed to RUN mode after updating the system ladder program.
- Updating the system ladder program with FPWIN Pro7 initializes the hold type variable and the Monthly max. demand value by default.
  If you do not initialize the hold type variable and the monthly maximum demand value, perform the following.
  [Extras] -> [Options] -> [Code generation] -> [Keep values of global retain variables which have been assigned an explicit address initialize all other retain variables by program code.]



I/O Number Allocation

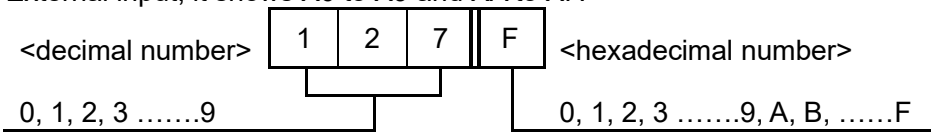
When FP7 expansion units are connected, you can set each unit by using FPWIN Pro7.

Base of I/O Allocation

How to Count I/O Numbers

I/O number is counted in units of 16-point, and it is shown by a combination of device type code, decimal number and the last digit of hexadecimal number.

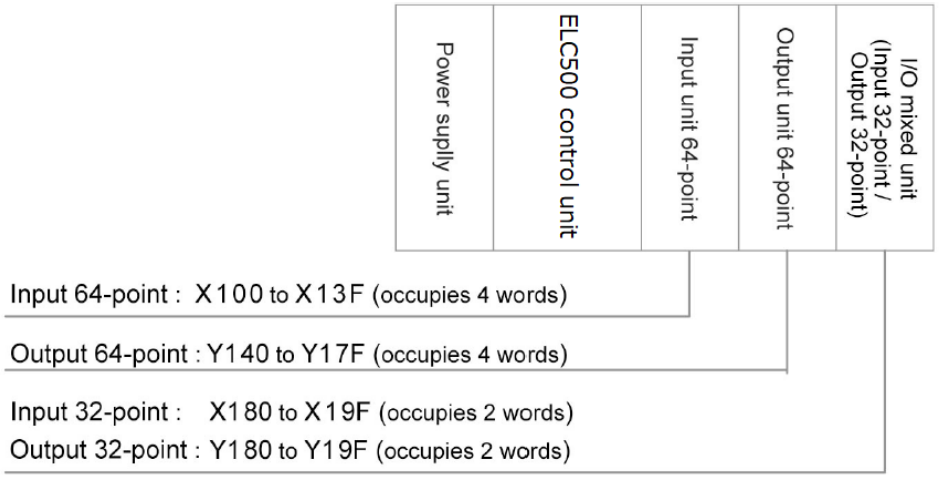
Ex.) External input, it shows X0 to X9 and XA to XF.



Concept of I/O Number Allocation

■Example of I/O number allocation

I/O numbers are determined by status of unit connection and occupied I/O points allocated to each unit.



■Starting word number of input/output unit, high-function unit

By default setting, the starting word number for the unit connected next to ELC500 is set to ‘10’.
And the I/O numbers start with X100 or Y100.
The starting word number for each unit can be changed by using FPWIN Pro7.

■How to count I/O numbers for units that have both of input and output

For a unit that has both input and output (e.g. I/O unit, high-function unit), input numbers and output numbers start with the same value.
Ex.) If input numbers for I/O unit are X100 to X11F, the unit's output numbers are set at Y100 to Y11F.

■I/O numbers allocated to ELC500

Fixed area is allocated to COM port ant LAN port.

Point

- When number of occupied input words is different from number of occupied output words, the larger number is allocated to the unit.
- You can change the starting word numbers for each unit by using FPWIN Pro7.

List of Occupied I/O Points for each Unit

6.1.3

■ELC500 Control unit

Functions	Occupied words (Occupied points)	
	Input	Output
COM0	2-word (32-point) WX0 to WX1	2-word (32-point) WY0 to WY1
System reserved area	WX4 to WX5	WY4 to WY5
Common to Ethernet area	WX6	-
User connection 1 to 16	3-word (48-point) WX7 to WX9	3-word (48-point) WY7 to WY9

Input/output contacts of ELC500 are allocated for using the functions of each unit.
Regardless of use of the functions, it occupies 10 words (160 points, WX0 to WX9) for input and 10 words (160 words, WY0 to WY9) for output.
You can change the starting word number for each unit by using FPWIN Pro7.

Reference

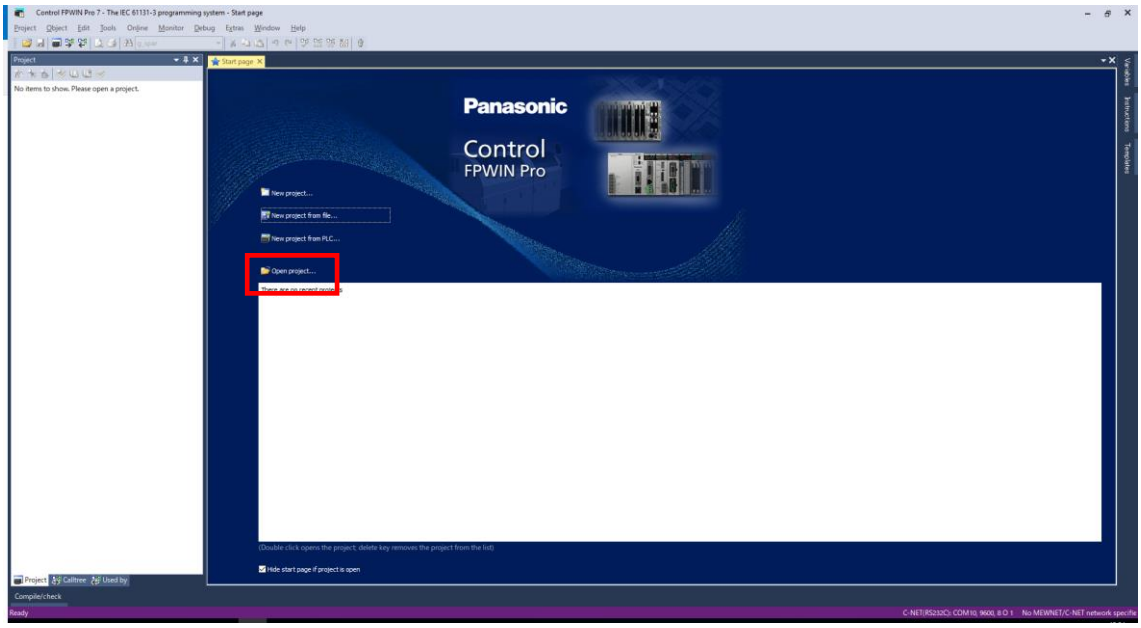
For occupied points for each unit, refer to User's manual of FP7 CUP unit.

Optional Allocation Using FPWIN Pro7

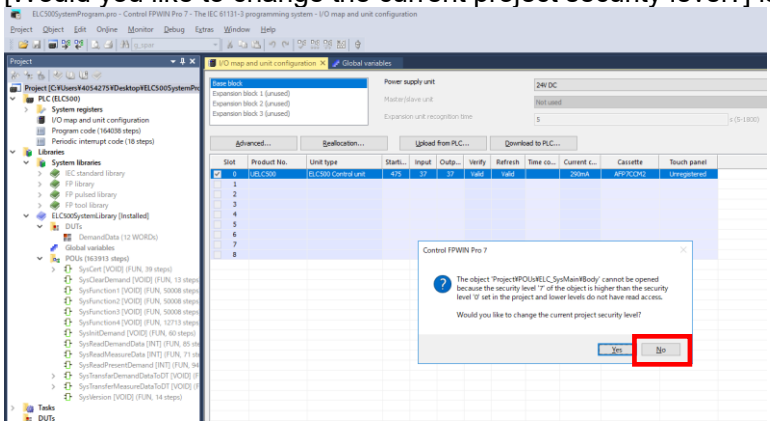
Registration of Unit to be Used and Starting Word Number

Setup I/O allocation for ELC500 and the connected unis by using FPWIN Pro7.
Select [Open project……]
Download the project from our website and use it to programming.

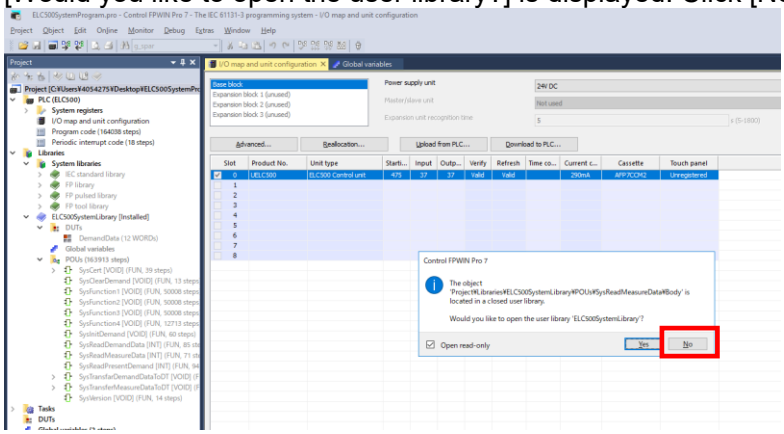
6.2
6.2.



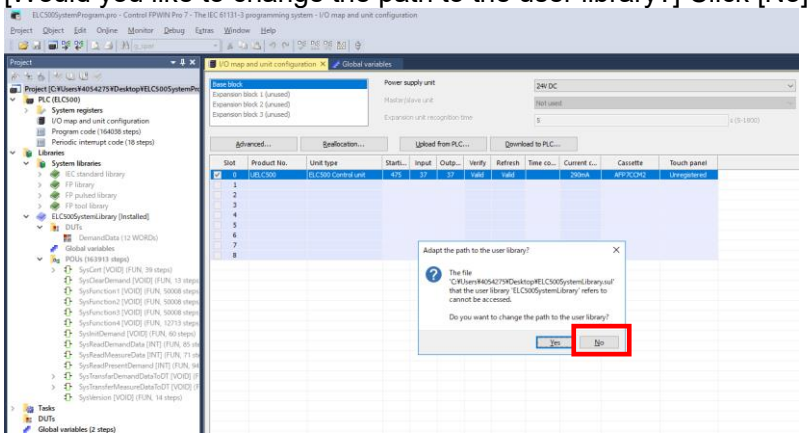
[Would you like to change the current project security level?] is displayed. Click [No].



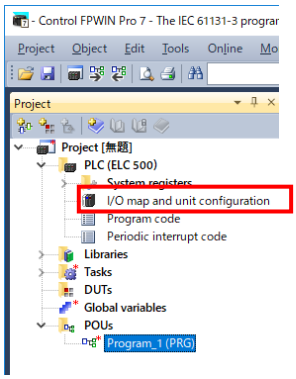
[Would you like to open the user library?] is displayed. Click [No].



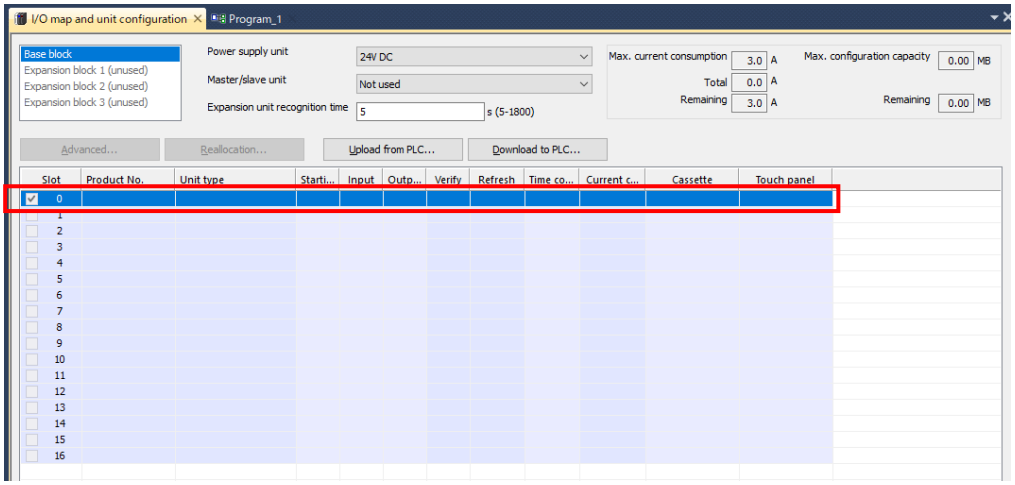
[Would you like to change the path to the user library?] Click [No].



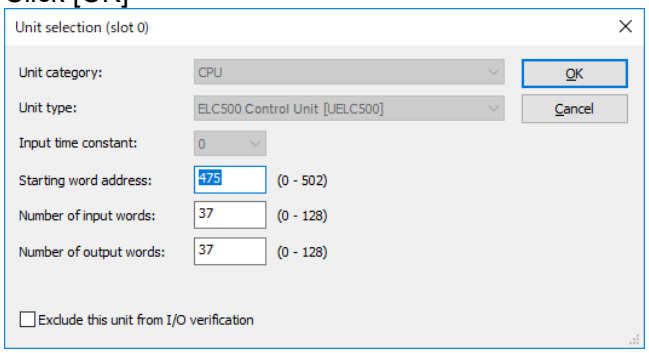
From the tree view, select [PLC (ELC500)] and [I/O map and unit configuration].



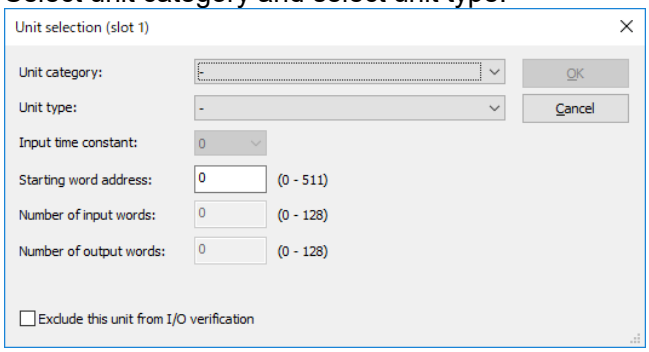
I/O Allocation setup window is displayed at the main window.
Select and double-click slot No.0.



Unit selection window is displayed.
Confirm Starting word address, Number of input words and Number of output words.
Click [OK]



Select and double-click slot No.1.
Unit selection window is displayed.
Select unit category and select unit type.



Number of input words and number of output words are input automatically.
Set starting word address, if you need, and click [OK].
After completing the setup, transmit setting by Online mode.

Point
- If there are some differences about connected units during power on or operating, self-diagnosis error is occurred.
- When a starting word address is not input, system input it automatically.
- Based on the starting word address allocated to each unit, I/O numbers are allocated.
- Starting word address of I/O number allocated to the internal functions of ELC500 can be changed to another number.

■Input time constant

Input time constant for input unit or I/O unit can be changed if necessary.
Select from the followings and set to each unit.
0 / 0.1 / 0.5 / 1.0 / 5.0 / 10.0 / 20.0 / 70.0 [ms]
Setting time constant is added to the hardware response time of each unit.

■Exclude this unit from I/O verification

In general, this check box should be unchecked.
If you want to exclude this unit from the scope of verification error temporarily for unit replacement or adjustment, check this box.

SD Memory Card Operation

In this chapter, it explains about writing project files.
It is useful when you write the same project for several times.
If you saved project files in SD memory card, you can copy the files to ELC500.

Preparing SD Memory Card

■Usable SD memory cards

Panasonic SD memory card for industrial use is recommended.
https://panasonic.net/cns/sdcard/industrial_sd_j/lineup.html
* We don't guarantee the operation with another company's SD memory card.

Logo on ELC500	Card type	Capacity
	SD memory card	2GB
	SDHC memory card	4GB to 32GB

■Cautions on handling SD memory card

The data saved in SD memory card may be lost in the following cases.
We assume no responsibility whatsoever for the loss of saved data.
- The user or a third party has misused SD memory card.
- SD memory card has been affected by static electricity or electric noise.
- SD memory card was removed, or ELC500 was power off, while the card was being accessed.
  (e.g. saving data into the card, deleting data from the card).

■Format of SD memory card

Initially SD memory card has been formatted, and it is not necessary to format by the user.
If you need to format, download the format software for SD memory cards on the following website.

Note
-File system of SD memory card formatted by PC's software is not supported SD memory card standard generally.
-We recommend that you always save an important data in other media to backup.
-Do not remove nor power off during accessing to SD memory card. It may be damaged the data.
-Do not use SD memory card that capacity is more the specified capacity. It may be damaged the data.

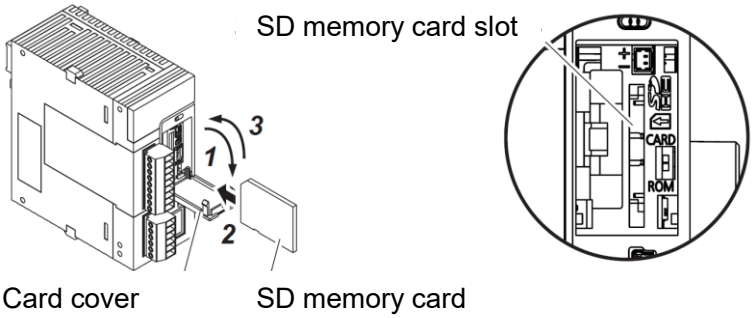
How to Insert SD Memory Card

Insert SD memory card according to the following procedure.

■Procedure

1. Open card cover.
2. Insert SD (SDHC) memory card to SD (SDHC) memory card slot.
3. Close card cover.

7.2



Point

-If card cover is opened during access to SD memory card while ELC500 is operating, a self-diagnosis error is detected and operation is stopped. Access to SD memory card is also stopped.

-Before removing an SD memory card, confirm that LED [SD] on ELC500 has been turned off.

7.3 Save Execution File for SD Memoru Card Operation

In order to enable operation by SD memory card, it is necessary to convert the created project into an auto execution file. Take the following procedure.

■Procedure

1. Create an ‘AUTO’ folder in SD memory card.
2. With FPWIN Pro7, select ‘Project’ → ‘Save As’ → Save Project in SD memory card’
3. Select ‘AUTO’ folder created in step1 and click [OK].
   Auto execution file ‘autoexec.fp7’ and comment file ‘comment.fp7’ are created.

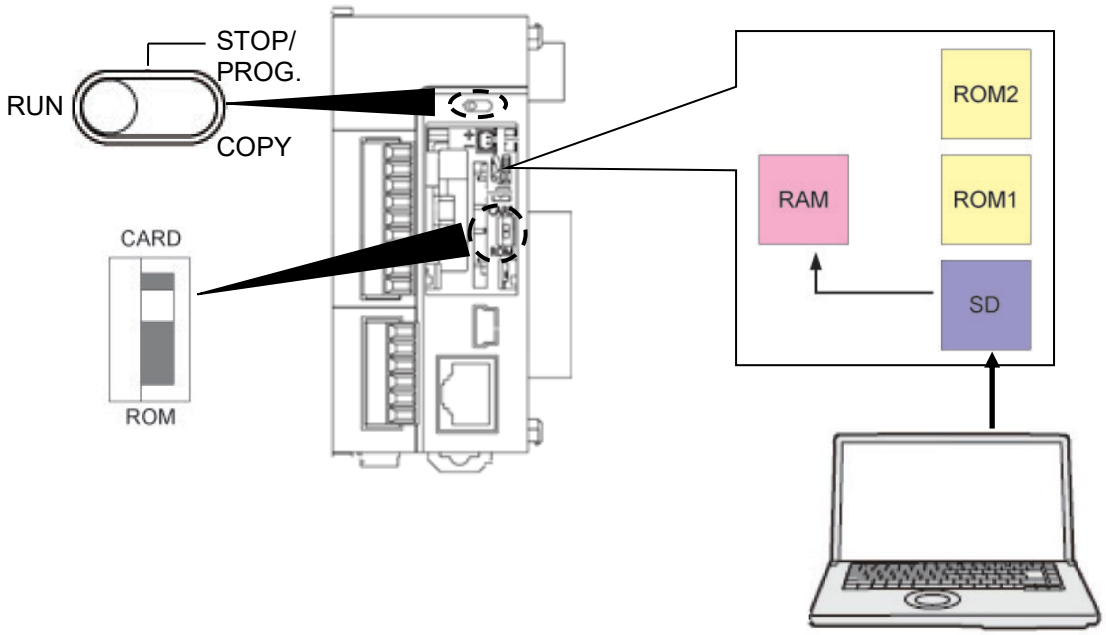
Operation by SD Memory Card

■Operation of a project saved in SD memory card

Insert SD memory card, set Mode switch to ‘RUN’, set Card operation switch to ‘CARD’ to enable the operation of a project saved in SD memory card.

■Switch setup

Mode switch	RUN
Card operation switch	CARD



■Procedure

1. Power off ELC500.
2. Insert SD memory card that it saves auto execution file ‘autoexec.fp7’ and comment file ‘comment.fp7’ of a project to be used for operation.
3. Set Card operation switch to ‘CARD’.
4. Close Cover and power on ELC500.
   Auto execution file ‘autoexec.fp7’ and comment file ‘comment.fp7’ of a project saved in SD memory card, are transmitted to the execution memory RAM.
   It transmits the project when ELC500 powered on or it change mode to ‘RUN’.

Note

During it operates by SD memory card, it is impossible to RAM/ROM operation until power off ELC500.

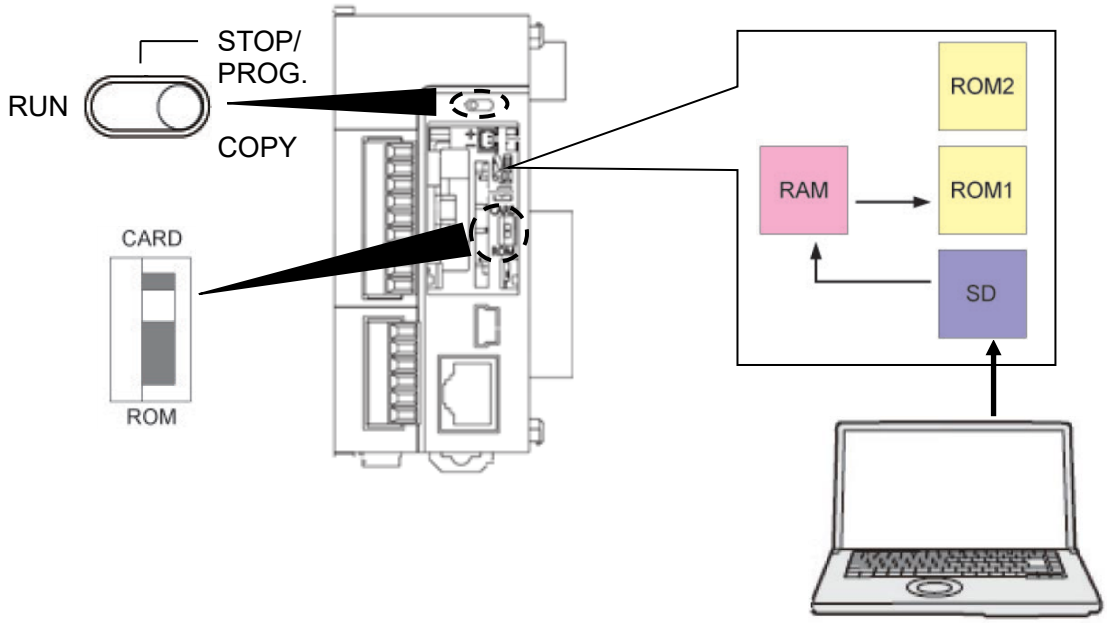
Transmission from SD Memory Card to Execution Memory

Insert SD memory card and set Mode switch to ‘COPY’, it transmit project in SD memory card to ROM1 and write it in as an execution project.

■Switch setup

Mode switch	STOP/PROG. → COPY (momentary)
Card operation switch	CARD

7.5



■When power off

1. Insert SD memory card that it saves auto execution file ‘autoexec.fp7’ and comment file ‘comment.fp7’ of a project.
2. Close Cover and power on.
3. Set Mode switch to ‘COPY’ for 5-sec until COPY LED flashes, it starts to transmit the project data. Once it starts flashing COPY LED, it continues the transmission even if Mode switch return. When it completes the transmission, COPY LED turns off.

■When power on

1. Set Mode switch to ‘STOP/PROG’.
2. Insert SD memory card that it saves auto execution file ‘autoexec.fp7’ and comment file ‘comment.fp7’ of a project.
3. Close Cover.
4. Set Mode switch to ‘COPY’ for 5-sec until COPY LED flashes, it starts to transmit the project data. Once it starts flashing COPY LED, it continues the transmission even if Mode switch return. When it completes the transmission, COPY LED turns off.

7.6

Point

-It transmits a project by using COPY switch regardless Card operation switch setting.

Cautions for SD Memory Card Operation

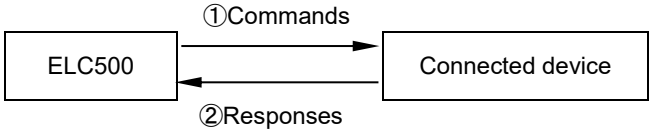
- In SD memory card, create AUTO folder and save auto execution file ‘autoexec.fp7’ and comment file ‘comment.fp7’.
- During transmitting, do not remove SD memory card. It may cause damages to the project.
- If Card operation switch set to CARD when SD memory card is not inserted, self-diagnosis error is occurred.
- If it can’t access to a project in SD memory card after Card operation switch set to CARD, self-diagnosis error is occurred.

Communication

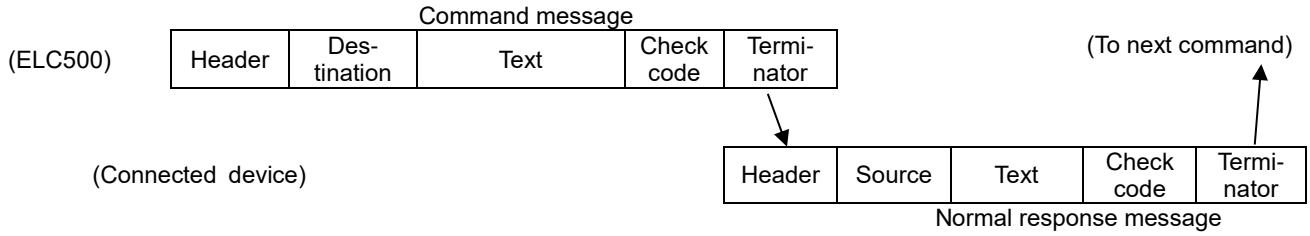
MEWTOCOL communication

◆Command and response functions

ELC500 sends commands (instructions) to the connected devices, and receives responses in return. This enables ELC500 and the connected devices to converse with each other, so that various kinds of information can be obtained and provided.



◆Command and response formats



◇Control codes

Name	Character	ASCII code	Explanation
Header	% or <	25H or 3CH	Indicates the beginning of a message.
Command	#	23H	Indicates that the data comprises a command message.
Normal response	$	24H	Indicates that the data comprises a normal response message.
Error response	!	21H	Indicates that the data comprises a response message when an error occurs.
Terminator	CR	0DH	Indicates the end of a message.

◇According to header character, max message length is limited.

% (header): 118-letter < (expansion header): 2048-letter

◇Destination and source AD (H), (L)

Two-digit decimal 01 to 99 (ASCII codes)

Command messages contain a station number for connected device that receives the message.

When FF (ASCII code table) is used, however, the transmission is a global transmission (sent to all stations at once).

Note) When a global transmission is sent, no response to the command message is returned.

◇Block check code Bcc (H), (L)

Two- digit hexadecimal 00 to FF (ASCII codes)

These are codes (horizontal parity) that are used to detect errors in the transmitted data.

If '**' is entered instead of 'Bcc', however, messages can be transmitted without the Bcc. In this case, the Bcc is included with the response

◇Error code Err (H), (L)

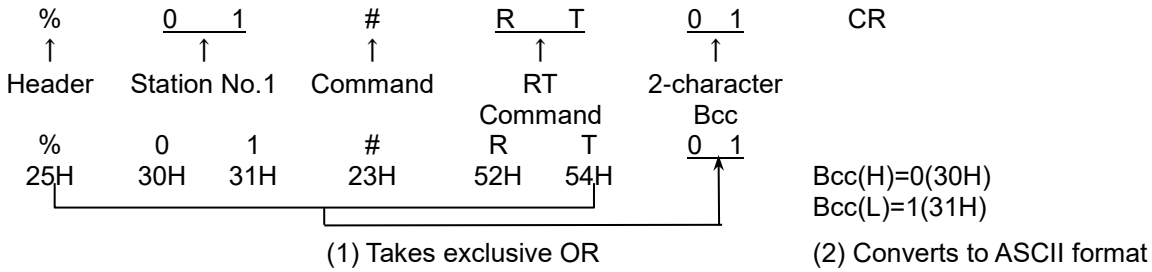
Two- digit hexadecimal 00 to FF (ASCII codes). These indicate the content if an error occurs.

◆Bcc (Block Check Code)

-The Bcc is a code that carries out an error check using horizontal parity, to improve the reliability of the data being sent.

-The Bcc uses an exclusive OR from the header (%) to the final character of the text, and converts the 8-bit data into a 2-character ASCII code.

Example)



MODBUS(RTU) Communication

MODBUS(RTU) is serial communication protocol designed for programmable logic controller (PLC) by Modicon in 1979.

8.2

●Sends 8-bit binary data in command as is.

Data structure	Start bit	: 1 bit
	Data length	: 8 bits * 7-bit data length is not available.
	Parity bit	: Selectable from None, Odd, Even.
	Stop bit	: 1 bit (Fixed)
	Error detection	: CRC-16 (cyclic redundancy check) method
	Data communication interval	: 3.5 character transmission time or more

●Message construction

Message in RTU mode is constructed to be started from silent interval of at least 3.5 characters and finished after silent interval of at least 3.5 characters.

Silent interval 3.5 characters	Slave address	Function code	Data	Error check CRC-16	Idle 3.5 characters
	8 bits	8 bits	** bits	16 bits	

Data reception will be considered complete when no more data is received for the time of 4 characters, and command processing will be performed.

* Baud rate and Reception done judgment time

Baud rate (bps)	Reception done judgment time (ms.)
230400	Approx.0.20
115200	Approx.0.35
57600	Approx.0.70
38400	Approx.1.00
19200	Approx.2.00
9600	Approx.4.00
4800	Approx.8.00
2400	Approx.16.00
1200	Approx.32.00
600	Approx.64.00
300	Approx.128.00

●Slave address

Slave addresses are device numbers for each slave unit. The setting range is 1 to 247 (01H to F7H).

Master unit specifies slave units using each slave address of request messages.

●Function code: Function code is code to instruct the type of operation for slave unit.

Function code	Name	Contents
01(01H)	Read Coil Status	Reads the status of coil
02(02H)	Read Input Status	Reads the input relay status.
03(03H)	Read Holding Registers	Reads holding registers.
04(04H)	Read Input Registers	Reads input registers.
05(05H)	Force Single Coil	Writes the status of single coil.
06(06H)	Preset Single Registers	Writes to holding register.
16(10H)	Preset Multiple Registers	Writes to multiple holding registers

Master unit sends an instruction (function code) to slave unit, and the slave unit responds according to the instruction.

In case of acknowledgment, the original function code is set and returned.

In case of negative acknowledgment, 1 is set in the most significant bit of the original function code and returned.

In case of negative acknowledgment, error codes as below are set in response message data to inform master unit which type of error occurred.

Error code	Meaning
01	Function code error (Non-existent function code)
02	Number error of coil, input relays or registers (out of range)
03	Quantity error of coil, input relays or registers (out of range)

●Error check: 16-bit data for detecting communication error (Refer to the next section.)

●Response in normal status:
The same message as a command is returned for single write command.

●Correspondence table between MODBUS command reference numbers and device numbers

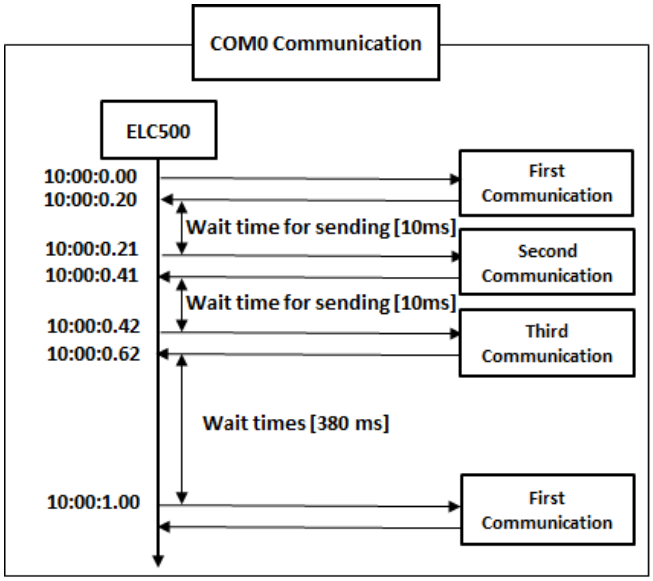
MODBUS reference number		Data on BUS (hexadecimal number)	PLC device number
Coil	000001 to 002048	0000 to 07FF	Y 0 to 127F
	002049 to 034916	0800 to 87FF	R 0 to 2047
Input	100001 to 108192	0000 to 1FFF	X 0 to 511F
Holding register	400001 to 465536	0000 to FFFF	DT 0 to 65535
Input register	300001 to 301024	0000 to 03FF	WL 0 to 1024
	302001 to 318384	07D0 to 47CF	LD 0 to 16383

Data collection behavior

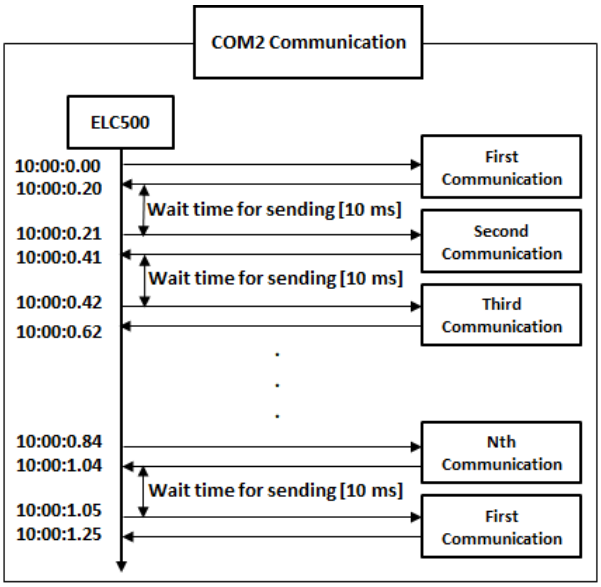
Data collection is performed independently for each communication port (COM0, COM1, COM2, Ethernet).
If data collection for all devices complete within 1 second, the collection is repeated every 1 second.
If data collection for all devices takes over 1 second, the collection is repeated continuously.
See the example below.

8.3

When data collection is completed within 1 second with 3 points.



When data collection is not completed within 1 second with N points.



[Wait time for sending] shows the time from reciving to next command sending the next command can be set in Basic configuration.

Registers

Operation Memory Area

	Name		Usable devices and ranges	Functions
1-bit device	External input	X	8,192 points (X0 to X511F) *1	Turns on or off based on external input.
	External output	Y	8,192 points (Y0 to Y511F) *1	Externally outputs on or off state.
	Internal relay	R	32,768 points (R0 to R2047F) *2 *3	Relay which turns on or off only within program.
	Link relay	L	16,384 points (L0 to L1023F) *2	This relay is a shared relay used for PLC link.
	Timer	T	4,096 points (T0 to T4095) *2	This goes on when the timer reaches the specified time.
	Counter	C	1,024 points (C0 to C1023) *2	This goes on when the timer increments.
	System relay	SR	Approx. 1,120points (approx. 70 words)	Relay which turns on or off based on specific conditions and is used as a flag.
	Pulse relay	P	4,096 points (P0 to P255F)	This relay only turns on during one scan at the start of the execution condition.
	Error alarm relay	E	4,096 points (E0 to E4095)	This relay ensures that error conditions that are freely allocated by the user are memorized in the memory.
	Direct input	IN	Can allocate input numbers to each slot (IN0 to IN62F) *4	This relay is for input/output processing during operation, without depending on usual I/O refresh.
	Direct output	OT	Can allocate output numbers to each slot (OT0 to OT62F) *4	
16-bit device	External input	WX	WX0 to WX511 *1	Code for specifying 16 external input points as one word (16 bits) of data.
	External output	WY	WY0 to WY511 *1	Code for specifying 16 external output points as one word (16 bits) of data.
	Internal relay	WR	WR0 to WR2047 *2*3	Code for specifying 16 internal relay points as one word (16 bits) of data.
	Link relay	WL	WL0 to WL1023	Code for specifying 16 link relay points as one word (16 bits) of data.
	Data register	DT	Max. DT 262,144 words (DT0 to DT262143) *2*5	Data memory used in program. Data is handled in 16-bit units (one word).
	Link register	LD	16,384 words (LD0 to LD16383) *2	This is a shared data memory which is used within the PLC link. Data is handled in 16-bit units (one word).
	Unit memory	UM	Max. 512K words per unit *4	This device is for accessing the unit memory of intelligent units. Its size varies by unit, and is allocated by default.
	System data register	SD	Approx. 110 words	Data memory for storing specific data. Various settings and error codes are stored.

Name			Usable devices and ranges	Functions
32-bit device	Index register	I	15 double words (I0 to IE) (with a switching function)	Register can be used as an address of memory area and constants modifier.
	Timer set value area	TS	4,096 double words (TS0 to TS4095) *2	Data memory for storing timer target data. It corresponds to the timer number.
	Timer elapsed value area	TE	4,096 double words (TE0 to TE4095) *2	Data memory for storing timer elapsed value. It corresponds to the timer number.
	Counter set value area	CS	4,096 double words (CS0 to CS4095) *2	Data memory for storing counter set value. It corresponds to the counter number.
	Counter elapsed value area	CE	4,096 double words (CE0 to CE4095) *2	Data memory for storing the elapsed value during operation of a counter. It corresponds to the timer number.
Constant	Signed decimal constants	K	K-32768 to K32767 (for 16-bit operation) K-2147483648 to K2147483647(for 32-bit operation)	
	Unsigned decimal constants	U	U0 to U65535 (for 16-bit operation) U0 to U4294967295 (for 32-bit operation)	
	Hexadecimal Constants	H	H0 to HFFFF (for 16-bit operation) H0 to HFFFFFFFF (for 32-bit operation)	
	Single precision floating point number (real number)	SF	SF-1.175494 × 10^{-38} to SF-3.402823 × 10^{38} SF1.175494 × 10^{-38} to SF3.402823 × 10^{38}	
	Double precision floating point number (real number)	DF	DF-2.2250738585072014 × 10^{-308} to DF-1.7976931348623158 × 10^{308} DF2.2250738585072014 × 10^{-308} to DF1.7976931348623158 × 10^{308}	

*1 Figures in the table indicate the number of devices that can be used in the program. The actual inputs and outputs that can be used vary by configuration.

*2 Operation memory area are categorized into [hold type], which memorizes the status immediately before power failure or switch to the STOP/PROG. mode, and [non-hold type], which resets such status. Non-hold area is cleared to zero when the unit is powered on or the mode is switched between STOP/PROG. mode and RUN mode.

*3 Some internal relay is used. When using internal relays, use unused area.
Refer to 9.5 Special Internal Relay(R).

*4 Direct inputs (IN), direct outputs (OT), and unit memories (UM) are used by specifying unit slot numbers and memory addresses to be controlled by instructions.

*5 Some DT register is used. When using DT registers, use unused area.
Refer to 9.3 Data Registers for Data Collection, 9.4 Data Registers for Demand.

9.2

Data Registers Map

ELC500 uses the following data registers (DT).
The area that can be used arbitrarily is the [user area].
Values cannot be written to other areas.

DT register No.	ELC500 usage area	FPWIN Pro7 setup
DT0	ELC500 system area	user area non-hold type
. .		
DT39999		
DT40000	user area	
. .		
DT99999		
DT100000	FPWIN Pro7 system area	system area non-hold type
. .		
DT196607		
DT196608	user area	user area hold type
. .		
DT203199		
DT203200	ELC500 system area	
. .		
DT213199		
DT213200	FPWIN Pro7 system area	system area hold type
. .		
DT262144		

You can adjust memory area by FPWIN Pro7.
[Extras] → [Options] → [Compile options] → [Address ranges]

Note

- When you adjust memory area or ELC500 system area, it doesn't work correctly.

9.3

Data Registerd for Data Collection

The below data registers are used for data collection.
Using DT0 to 15999, it display current value monitor of ELC500 logging data.

File No.	Registration No.	Register starting No. (2 words)	Register starting No. (4 words)	DT range	R/W
0	1	DT0	DT0	DT0 to DT999	R
	2	DT2	DT4		
	:	:	:		
	127	DT252	DT504		
	128	DT254	DT508		
1	1	DT1000	DT1000	DT1000 to DT1999	R
	2	DT1002	DT1004		
	:	:	:		
	127	DT1252	DT1504		
	128	DT1254	DT1508		
:	:	:	:	:	:
15	1	DT15000	DT15000	DT15000 to DT15999	R
	2	DT15002	DT15004		
	:	:	:		
	127	DT15252	DT15504		
	128	DT15254	DT15508		

Note

-The data register occupies 2 words or 4 words regardless of the data format of the device to be stored.
Set the number of words to be used from the following.
[Setup] -> [Basic configuration] -> [Option] -> [Transfer logging data to registers]
For two words, enable [Transfer logging data to registers.].
For four words, enable [Transfer logging data to registers.] and file No. checkboxes.
-The data register for data collection is read-only.
-When ELC500 is in STOP / PROG. Mode, 0 is stored.

Data Registers for Demand

ELC500 uses data for demand information on DT3xxxx, these registeres support only MEWTOCOL.

Note

-To use the following demand information, the following functions must be enabled.
[Setup] -> [Basic configuration] -> [Option] -> [Transfer demand data to registers]

-MODBUS RTU is not supported.

9.4

Register No.	Name	Unit	Dara Style	Range	R/W
DT30000 DT30001	Target demand [Only montor]	0.01kW	DEC 2W (Unsigned)	0 to 4,294,967,295	R
DT30002 DT30003	Control demand [Only montor]	0.01kW	DEC 2W (Unsigned)	0 to 4,294,967,295	R
DT30004 DT30005	Limit control demand [Only montor]	0.01kW	DEC 2W (Unsigned)	0 to 4,294,967,295	R
DT30006	Alarm mask time [Only montor]	Minute	DEC 1W (Unsigned)	0 to 10	R
DT30014 DT30015	Present demand value	0.01 kW	DEC 2W (Unsigned)	0 to 4,294,967,295	R
DT30016 DT30017	Estimated demand	0.01 kW	DEC 2W (Unsigned)	0 to 4,294,967,295 IEC demand is fixed at 0.	R
DT30018	Demand alarm level	—	DEC 1W (Unsigned)	0 : No Alarm 1 : Alarm 1 2 : Alarm 2 3 : Alarm3	R
DT30019	Demand alarm level (Show bit)	—	DEC 1W (Unsigned)	0 : No Alarm 1 : Alarm 1 2 : Alarm 2 3 : Alarm3	R
DT30020 DT30021	Adjustment demand	0.01kW	DEC 2W (Unsigned)	0 to 4,294,967,295	R
DT30099	Demand elapsed time	Minute	DEC 1W (Unsigned)	IEC demand is fixed at 0. 0 to 14(Period:15 min) 0 to 29(Period:30 min) 0 to 59(Period:60 min)	R
DT30100 DT30101	Target demand [Only setting change]	0.01kW	DEC 2W (Unsigned)	0 to 4,294,967,295	R
DT30102 DT30103	Control demand [Only setting change]	0.01kW	DEC 2W (Unsigned)	0 to 4,294,967,295	R
DT30104 DT30105	Limit control demand [Only setting change]	0.01kW	DEC 2W (Unsigned)	0 to 4,294,967,295	R
DT30106	Alarm mask time [Only setting change]	Minute	DEC 1W (Unsigned)	0 to 10	R

Register No.	Name	Unit	Dara Style	Range	R/W
DT30162 DT30163	Present demand 1-minute	0.01 kW	DEC 2W (Unsigned)	0 to 4,294,967,295	R
DT30164 DT30165	Present demand 2-minute	0.01 kW	DEC 2W (Unsigned)	0 to 4,294,967,295	R
DT30166 DT30167	Present demand 3-minute	0.01 kW	DEC 2W (Unsigned)	0 to 4,294,967,295	R
DT30168 DT30169	Present demand 4-minute	0.01 kW	DEC 2W (Unsigned)	0 to 4,294,967,295	R
DT30170 DT30171	Present demand 5-minute	0.01 kW	DEC 2W (Unsigned)	0 to 4,294,967,295	R
DT30172 DT30173	Present demand 6-minute	0.01 kW	DEC 2W (Unsigned)	0 to 4,294,967,295	R
DT30174 DT30175	Present demand 7-minute	0.01 kW	DEC 2W (Unsigned)	0 to 4,294,967,295	R
DT30176 DT30177	Present demand 8-minute	0.01 kW	DEC 2W (Unsigned)	0 to 4,294,967,295	R
DT30178 DT30179	Present demand 9-minute	0.01 kW	DEC 2W (Unsigned)	0 to 4,294,967,295	R
DT30180 DT30181	Present demand 10-minute	0.01 kW	DEC 2W (Unsigned)	0 to 4,294,967,295	R
DT30182 DT30183	Present demand 11-minute	0.01 kW	DEC 2W (Unsigned)	0 to 4,294,967,295	R
DT30184 DT30185	Present demand 12-minute	0.01 kW	DEC 2W (Unsigned)	0 to 4,294,967,295	R
DT30186 DT30187	Present demand 13-minute	0.01 kW	DEC 2W (Unsigned)	0 to 4,294,967,295	R
DT30188 DT30189	Present demand 14-minute	0.01 kW	DEC 2W (Unsigned)	0 to 4,294,967,295	R
DT30190 DT30191	Present demand 15-minute	0.01 kW	DEC 2W (Unsigned)	0 to 4,294,967,295	R
DT30192 DT30193	Present demand 16-minute	0.01 kW	DEC 2W (Unsigned)	0 to 4,294,967,295	R
DT30194 DT30195	Present demand 17-minute	0.01 kW	DEC 2W (Unsigned)	0 to 4,294,967,295	R
DT30196 DT30197	Present demand 18-minute	0.01 kW	DEC 2W (Unsigned)	0 to 4,294,967,295	R
DT30198 DT30199	Present demand 19-minute	0.01 kW	DEC 2W (Unsigned)	0 to 4,294,967,295	R
DT30200 DT30201	Present demand 20-minute	0.01 kW	DEC 2W (Unsigned)	0 to 4,294,967,295	R
DT30202 DT30203	Present demand 21-minute	0.01 kW	DEC 2W (Unsigned)	0 to 4,294,967,295	R
DT30204 DT30205	Present demand 22-minute	0.01 kW	DEC 2W (Unsigned)	0 to 4,294,967,295	R
DT30206 DT30207	Present demand 23-minute	0.01 kW	DEC 2W (Unsigned)	0 to 4,294,967,295	R
DT30208 DT30209	Present demand 24-minute	0.01 kW	DEC 2W (Unsigned)	0 to 4,294,967,295	R
DT30210 DT30211	Present demand 25-minute	0.01 kW	DEC 2W (Unsigned)	0 to 4,294,967,295	R
DT30212 DT30213	Present demand 26-minute	0.01 kW	DEC 2W (Unsigned)	0 to 4,294,967,295	R
DT30214 DT30215	Present demand 27-minute	0.01 kW	DEC 2W (Unsigned)	0 to 4,294,967,295	R
DT30216 DT30217	Present demand 28-minute	0.01 kW	DEC 2W (Unsigned)	0 to 4,294,967,295	R
DT30218 DT30219	Present demand 29-minute	0.01 kW	DEC 2W (Unsigned)	0 to 4,294,967,295	R
DT30220 DT30221	Present demand 30-minute	0.01 kW	DEC 2W (Unsigned)	0 to 4,294,967,295	R
DT30222 DT30223	Present demand 31-minute	0.01 kW	DEC 2W (Unsigned)	0 to 4,294,967,295	R
DT30224 DT30225	Present demand 32-minute	0.01 kW	DEC 2W (Unsigned)	0 to 4,294,967,295	R

Register No.	Name	Unit	Data Style	Range	R/W
DT30226 DT30227	Present demand 33-minute	0.01 kW	DEC 2W (Unsigned)	0 to 4,294,967,295	R
DT30228 DT30229	Present demand 34-minute	0.01 kW	DEC 2W (Unsigned)	0 to 4,294,967,295	R
DT30230 DT30231	Present demand 35-minute	0.01 kW	DEC 2W (Unsigned)	0 to 4,294,967,295	R
DT30232 DT30233	Present demand 36-minute	0.01 kW	DEC 2W (Unsigned)	0 to 4,294,967,295	R
DT30234 DT30235	Present demand 37-minute	0.01 kW	DEC 2W (Unsigned)	0 to 4,294,967,295	R
DT30236 DT30237	Present demand 38-minute	0.01 kW	DEC 2W (Unsigned)	0 to 4,294,967,295	R
DT30238 DT30239	Present demand 39-minute	0.01 kW	DEC 2W (Unsigned)	0 to 4,294,967,295	R
DT30240 DT30241	Present demand 40-minute	0.01 kW	DEC 2W (Unsigned)	0 to 4,294,967,295	R
DT30242 DT30243	Present demand 41-minute	0.01 kW	DEC 2W (Unsigned)	0 to 4,294,967,295	R
DT30244 DT30245	Present demand 42-minute	0.01 kW	DEC 2W (Unsigned)	0 to 4,294,967,295	R
DT30246 DT30247	Present demand 43-minute	0.01 kW	DEC 2W (Unsigned)	0 to 4,294,967,295	R
DT30248 DT30249	Present demand 44-minute	0.01 kW	DEC 2W (Unsigned)	0 to 4,294,967,295	R
DT30250 DT30251	Present demand 45-minute	0.01 kW	DEC 2W (Unsigned)	0 to 4,294,967,295	R
DT30252 DT30253	Present demand 46-minute	0.01 kW	DEC 2W (Unsigned)	0 to 4,294,967,295	R
DT30254 DT30255	Present demand 47-minute	0.01 kW	DEC 2W (Unsigned)	0 to 4,294,967,295	R
DT30256 DT30257	Present demand 48-minute	0.01 kW	DEC 2W (Unsigned)	0 to 4,294,967,295	R
DT30258 DT30259	Present demand 49-minute	0.01 kW	DEC 2W (Unsigned)	0 to 4,294,967,295	R
DT30260 DT30261	Present demand 50-minute	0.01 kW	DEC 2W (Unsigned)	0 to 4,294,967,295	R
DT30262 DT30263	Present demand 51-minute	0.01 kW	DEC 2W (Unsigned)	0 to 4,294,967,295	R
DT30264 DT30265	Present demand 52-minute	0.01 kW	DEC 2W (Unsigned)	0 to 4,294,967,295	R
DT30266 DT30267	Present demand 53-minute	0.01 kW	DEC 2W (Unsigned)	0 to 4,294,967,295	R
DT30268 DT30269	Present demand 54-minute	0.01 kW	DEC 2W (Unsigned)	0 to 4,294,967,295	R
DT30270 DT30271	Present demand 55-minute	0.01 kW	DEC 2W (Unsigned)	0 to 4,294,967,295	R
DT30272 DT30273	Present demand 56-minute	0.01 kW	DEC 2W (Unsigned)	0 to 4,294,967,295	R
DT30274 DT30275	Present demand 57-minute	0.01 kW	DEC 2W (Unsigned)	0 to 4,294,967,295	R
DT30276 DT30277	Present demand 58-minute	0.01 kW	DEC 2W (Unsigned)	0 to 4,294,967,295	R
DT30278 DT30279	Present demand 59-minute	0.01 kW	DEC 2W (Unsigned)	0 to 4,294,967,295	R
DT30280 DT30281	Present demand 60-minute	0.01 kW	DEC 2W (Unsigned)	0 to 4,294,967,295	R

Register No.	Name	Unit	Data Style	Range	R/W
DT32000	Monthly max. demand occurrence year (this month)	Year	HEX4 digits	00 to 99	R
DT32001	Monthly max. demand occurrence month (this month)	Month	HEX4 digits	1 to 12	R
DT32002	Monthly max. demand occurrence date (this month)	Day	HEX4 digits	1 to 31	R
DT32003	Monthly max. demand occurrence time (hour) (this month)	Hour	Hex4 digits	0 to 23	R
DT32004	Monthly max. demand occurrence time (min.) (this month)	Minute	HEX4 digits	0 to 59	R
DT32005	Monthly max. demand occurrence time (sec.) (this month)	Second	HEX4 digits	0 to 59	R
DT32006 DT32007	Monthly max. demand value (this month)	0.01 kW	DEC 2W (Unsigned)	0 to 4,294,967,295	R
DT32008	Monthly max. demand occurrence year (1-month ago)	Year	HEX4 digits	00 to 99	R
DT32009	Monthly max. demand occurrence month (1-month ago)	Month	HEX4 digits	1 to 12	R
DT32010	Monthly max. demand occurrence date (1-month ago)	Day	HEX4 digits	1 to 31	R
DT32011	Monthly max. demand occurrence time (hour) (1-month ago)	Hour	Hex4 digits	0 to 23	R
DT32012	Monthly max. demand occurrence time (min.) (1-month ago)	Minute	HEX4 digits	0 to 59	R
DT32013	Monthly max. demand occurrence time (sec.) (1-month ago)	Second	HEX4 digits	0 to 59	R
DT32014 DT32015	Monthly max. demand value (1-month ago)	0.01 kW	DEC 2W (Unsigned)	0 to 4,294,967,295	R
DT32016	Monthly max. demand occurrence year (2-month ago)	Year	HEX4 digits	00 to 99	R
DT32017	Monthly max. demand occurrence month (2-month ago)	Month	HEX4 digits	1 to 12	R
DT32018	Monthly max. demand occurrence date (2-month ago)	Day	HEX4 digits	1 to 31	R
DT32019	Monthly max. demand occurrence time (hour) (2-month ago)	Hour	Hex4 digits	0 to 23	R
DT32020	Monthly max. demand occurrence time (min.) (2-month ago)	Minute	HEX4 digits	0 to 59	R
DT32021	Monthly max. demand occurrence time (sec.) (2-month ago)	Second	HEX4 digits	0 to 59	R
DT32022 DT32023	Monthly max. demand value (2-month ago)	0.01 kW	DEC 2W (Unsigned)	0 to 4,294,967,295	R
DT32024	Monthly max. demand occurrence year (3-month ago)	Year	HEX4 digits	00 to 99	R
DT32025	Monthly max. demand occurrence month (3-month ago)	Month	HEX4 digits	1 to 12	R
DT32026	Monthly max. demand occurrence date (3-month ago)	Day	HEX4 digits	1 to 31	R
DT32027	Monthly max. demand occurrence time (hour) (3-month ago)	Hour	Hex4 digits	0 to 23	R
DT32028	Monthly max. demand occurrence time (min.) (3-month ago)	Minute	HEX4 digits	0 to 59	R
DT32029	Monthly max. demand occurrence time (sec.) (3-month ago)	Second	HEX4 digits	0 to59	R
DT32030 DT32031	Monthly max. demand value (3-month ago)	0.01 kW	DEC 2W (Unsigned)	0 to 4,294,967,295	R

Note

The occurrence date and time of the maximum monthly demand value is saved as BCD.
Example) When the value of 10 (decimal number) is stored in DT32000, it is stored as 0010.

Register No.	Name	Unit	Data Style	Range	R/W
DT32032	Monthly max. demand occurrence year (4-month ago)	Year	HEX4 digits	00 to 99	R
DT32033	Monthly max. demand occurrence month (4-month ago)	Month	HEX4 digits	1 to 12	R
DT32034	Monthly max. demand occurrence date (4-month ago)	Day	HEX4 digits	1 to 31	R
DT32035	Monthly max. demand occurrence time (hour) (4-month ago)	Hour	Hex4 digits	0 to 23	R
DT32036	Monthly max. demand occurrence time (min.) (4-month ago)	Minute	HEX4 digits	0 to 59	R
DT32037	Monthly max. demand occurrence time (sec.) (4-month ago)	Second	HEX4 digits	0 to 59	R
DT32038 DT32039	Monthly max. demand value (4-month ago)	0.01 kW	DEC 2W (Unsigned)	0 to 4,294,967,295	R
DT32040	Monthly max. demand occurrence year (5-month ago)	Year	HEX4 digits	00 to 99	R
DT32041	Monthly max. demand occurrence month (5-month ago)	Month	HEX4 digits	1 to 12	R
DT32042	Monthly max. demand occurrence date (5-month ago)	Day	HEX4 digits	1 to 31	R
DT32043	Monthly max. demand occurrence time (hour) (5-month ago)	Hour	Hex4 digits	0 to 23	R
DT32044	Monthly max. demand occurrence time (min.) (5-month ago)	Minute	HEX4 digits	0 to59	R
DT32045	Monthly max. demand occurrence time (sec.) (5-month ago)	Second	HEX4 digits	0 to 59	R
DT32046 DT32047	Monthly max. demand value (5-month ago)	0.01 kW	DEC 2W (Unsigned)	0 to 4,294,967,295	R
DT32048	Monthly max. demand occurrence year (6-month ago)	Year	HEX4 digits	00 to 99	R
DT32049	Monthly max. demand occurrence month (6-month ago)	Month	HEX4 digits	1 to 12	R
DT32050	Monthly max. demand occurrence date (6-month ago)	Day	HEX4 digits	1 to 31	R
DT32051	Monthly max. demand occurrence time (hour) (6-month ago)	Hour	Hex4 digits	0 to 23	R
DT32052	Monthly max. demand occurrence time (min.) (6-month ago)	Minute	HEX4 digits	0 to 59	R
DT32053	Monthly max. demand occurrence time (sec.) (6-month ago)	Second	HEX4 digits	0 to 59	R
DT32054 DT32055	Monthly max. demand value (6-month ago)	0.01 kW	DEC 2W (Unsigned)	0 to 4,294,967,295	R
DT32056	Monthly max. demand occurrence year (7-month ago)	Year	HEX4 digits	00 to 99	R
DT32057	Monthly max. demand occurrence month (7-month ago)	Month	HEX4 digits	1 to 12	R
DT32058	Monthly max. demand occurrence date (7-month ago)	Day	HEX4 digits	1 to 31	R
DT32059	Monthly max. demand occurrence time (hour) (7-month ago)	Hour	Hex4 digits	0 to 23	R
DT32060	Monthly max. demand occurrence time (min.) (7-month ago)	Minute	HEX4 digits	0 to 59	R
DT32061	Monthly max. demand occurrence time (sec.) (7-month ago)	Second	HEX4 digits	0 to 59	R
DT32062 DT32063	Monthly max. demand value (7-month ago)	0.01 kW	DEC 2W (Unsigned)	0 to 4,294,967,295	R

Register No.	Name	Unit	Data Style	Range	R/W
DT32064	Monthly max. demand occurrence year (8-month ago)	Year	HEX4 digits	00 to 99	R
DT32065	Monthly max. demand occurrence month (8-month ago)	Month	HEX4 digits	1 to 12	R
DT32066	Monthly max. demand occurrence date (8-month ago)	Day	HEX4 digits	1 to 31	R
DT32067	Monthly max. demand occurrence time (hour) (8-month ago)	Hour	Hex4 digits	0 to 23	R
DT32068	Monthly max. demand occurrence time (min.) (8-month ago)	Minute	HEX4 digits	0 to 59	R
DT32069	Monthly max. demand occurrence time (sec.) (8-month ago)	Second	HEX4 digits	0 to 59	R
DT32070 DT32071	Monthly max. demand value (8-month ago)	0.01 kW	DEC 2W (Unsigned)	0 to 4,294,967,295	R
DT32072	Monthly max. demand occurrence year (9-month ago)	Year	HEX4 digits	00 to 99	R
DT32073	Monthly max. demand occurrence month (9-month ago)	Month	HEX4 digits	1 to 12	R
DT32074	Monthly max. demand occurrence date (9-month ago)	Day	HEX4 digits	1 to 31	R
DT32075	Monthly max. demand occurrence time (hour) (9-month ago)	Hour	Hex4 digits	0 to 23	R
DT32076	Monthly max. demand occurrence time (min.) (9-month ago)	Minute	HEX4 digits	0 to 59	R
DT32077	Monthly max. demand occurrence time (sec.) (9-month ago)	Second	HEX4 digits	0 to 59	R
DT32078 DT32079	Monthly max. demand value (9-month ago)	0.01 kW	DEC 2W (Unsigned)	0 to 4,294,967,295	R
DT32080	Monthly max. demand occurrence year (10-month ago)	Year	HEX4 digits	00 to 99	R
DT32081	Monthly max. demand occurrence month (10-month ago)	Month	HEX4 digits	1 to 12	R
DT32082	Monthly max. demand occurrence date (10-month ago)	Day	HEX4 digits	1 to 31	R
DT32083	Monthly max. demand occurrence time (hour) (10-month ago)	Hour	Hex4 digits	0 to 23	R
DT32084	Monthly max. demand occurrence time (min.) (10-month ago)	Minute	HEX4 digits	0 to 59	R
DT32085	Monthly max. demand occurrence time (sec.) (10-month ago)	Second	HEX4 digits	0 to 59	R
DT32086 DT32087	Monthly max. demand value (10-month ago)	0.01 kW	DEC 2W (Unsigned)	0 to 4,294,967,295	R
DT32088	Monthly max. demand occurrence year (11-month ago)	Year	HEX4 digits	00 to 99	R
DT32089	Monthly max. demand occurrence month (11-month ago)	Month	HEX4 digits	1 to 12	R
DT32090	Monthly max. demand occurrence date (11-month ago)	Day	HEX4 digits	1 to 31	R
DT32091	Monthly max. demand occurrence time (hour) (11-month ago)	Hour	Hex4 digits	0 to 23	R
DT32092	Monthly max. demand occurrence time (min.) (11-month ago)	Minute	HEX4 digits	0 to 59	R
DT32093	Monthly max. demand occurrence time (sec.) (11-month ago)	Second	HEX4 digits	0 to 59	R
DT32094 DT32095	Monthly max. demand value (11-month ago)	0.01 kW	DEC 2W (Unsigned)	0 to 4,294,967,295	R

Register No.	Name	Unit	Data Style	Range	R/W
DT32096	Monthly max. demand occurrence year (12-month ago)	Year	HEX4 digits	00 to 99	R
DT32097	Monthly max. demand occurrence month (12-month ago)	Month	HEX4 digits	1 to 12	R
DT32098	Monthly max. demand occurrence date (12-month ago)	Day	HEX4 digits	1 to 31	R
DT32099	Monthly max. demand occurrence time (hour) (12-month ago)	Hour	Hex4 digits	0 to 23	R
DT32100	Monthly max. demand occurrence time (min.) (12-month ago)	Minute	HEX4 digits	0 to 59	R
DT32101	Monthly max. demand occurrence time (sec.) (12-month ago)	Second	HEX4 digits	0 to 59	R
DT32102 DT32103	Monthly max. demand value (12-month ago)	0.01 kW	DEC 2W (Unsigned)	0 to 4,294,967,295	R
DT32104	Monthly max. demand occurrence year (13-month ago)	Year	HEX4 digits	00 to 99	R
DT32105	Monthly max. demand occurrence month (13-month ago)	Month	HEX4 digits	1 to 12	R
DT32106	Monthly max. demand occurrence date (13-month ago)	Day	HEX4 digits	1 to 31	R
DT32107	Monthly max. demand occurrence time (hour) (13-month ago)	Hour	Hex4 digits	0 to 23	R
DT32108	Monthly max. demand occurrence time (min.) (13-month ago)	Minute	HEX4 digits	0 to 59	R
DT32109	Monthly max. demand occurrence time (sec.) (13-month ago)	Second	HEX4 digits	0 to 59	R
DT32110 DT32111	Monthly max. demand value (13-month ago)	0.01 kW	DEC 2W (Unsigned)	0 to 4,294,967,295	R
DT32112	Max. demand occurrence year	Year	HEX4 digits	00 to 99	R
DT32113	Max. demand occurrence month	Month	HEX4 digits	1 to 12	R
DT32114	Max. demand occurrence date	Day	HEX4 digits	1 to 31	R
DT32115	Max. demand occurrence time (hour)	Hour	Hex4 digits	0 to 23	R
DT32116	Max. demand occurrence time (min.)	Minute	HEX4 digits	0 to59	R
DT32117	Max. demand occurrence time (sec.)	Second	HEX4 digits	0 to 59	R
DT32118 DT32119	Max. demand value	0.01 kW	DEC 2W (Unsigned)	0 to 4,294,967,295	R

Register No.	Name	Unit	Data Style	Range	R/W
DT32200 DT32201	Monthly max. demand value (this month)	0.01 kW	DEC 2W (Unsigned)	0 to 4,294,967,295	R
DT32202 DT32203	Monthly max. demand value (1-month ago)	0.01 kW	DEC 2W (Unsigned)	0 to 4,294,967,295	R
DT32204 DT32205	Monthly max. demand value (2-month ago)	0.01 kW	DEC 2W (Unsigned)	0 to 4,294,967,295	R
DT32206 DT32207	Monthly max. demand value (3-month ago)	0.01 kW	DEC 2W (Unsigned)	0 to 4,294,967,295	R
DT32208 DT32209	Monthly max. demand value (4-month ago)	0.01 kW	DEC 2W (Unsigned)	0 to 4,294,967,295	R
DT32210 DT32211	Monthly max. demand value (5-month ago)	0.01 kW	DEC 2W (Unsigned)	0 to 4,294,967,295	R
DT32212 DT32213	Monthly max. demand value (6-month ago)	0.01 kW	DEC 2W (Unsigned)	0 to 4,294,967,295	R
DT32214 DT32215	Monthly max. demand value (7-month ago)	0.01 kW	DEC 2W (Unsigned)	0 to 4,294,967,295	R
DT32216 DT32217	Monthly max. demand value (8-month ago)	0.01 kW	DEC 2W (Unsigned)	0 to 4,294,967,295	R
DT32218 DT32219	Monthly max. demand value (9-month ago)	0.01 kW	DEC 2W (Unsigned)	0 to 4,294,967,295	R
DT32220 DT32221	Monthly max. demand value (10-month ago)	0.01 kW	DEC 2W (Unsigned)	0 to 4,294,967,295	R
DT32222 DT32223	Monthly max. demand value (11-month ago)	0.01 kW	DEC 2W (Unsigned)	0 to 4,294,967,295	R
DT32224 DT32225	Monthly max. demand value (12-month ago)	0.01 kW	DEC 2W (Unsigned)	0 to 4,294,967,295	R
DT32226 DT32227	Monthly max. demand value (13-month ago)	0.01 kW	DEC 2W (Unsigned)	0 to 4,294,967,295	R
DT32228 DT32229	Max. demand value	0.01 kW	DEC 2W (Unsigned)	0 to 4,294,967,295	R

Special Internal Relay(R)

ELC500 uses the following special interenal relays. Do not use them and do not write to the relay number not listed.

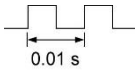
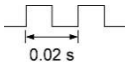
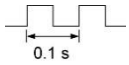
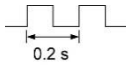
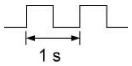
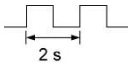
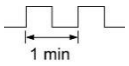
These relays can be referred by MEWTOCOL. (It doesn't support MODBUS.)

Relay No.	Name	Description
R11030	LOG0 data transfer words	Number of data transfer words of logging device registered in LOG0 (<Initial> 0 0: 2 words, 1: 4 words)
R11031	LOG1 data transfer words	Number of data transfer words of logging device registered in LOG1 (<Initial> 0 0: 2 words, 1: 4 words)
R11032	LOG2 data transfer words	Number of data transfer words of logging device registered in LOG2 (<Initial> 0 0: 2 words, 1: 4 words)
R11033	LOG3 data transfer words	Number of data transfer words of logging device registered in LOG3 (<Initial> 0 0: 2 words, 1: 4 words)
R11034	LOG4 data transfer words	Number of data transfer words of logging device registered in LOG4 (<Initial> 0 0: 2 words, 1: 4 words)
R11035	LOG5 data transfer words	Number of data transfer words of logging device registered in LOG5 (<Initial> 0 0: 2 words, 1: 4 words)
R11036	LOG6 data transfer words	Number of data transfer words of logging device registered in LOG6 (<Initial> 0 0: 2 words, 1: 4 words)
R11037	LOG7 data transfer words	Number of data transfer words of logging device registered in LOG7 (<Initial> 0 0: 2 words, 1: 4 words)
R11038	LOG8 data transfer words	Number of data transfer words of logging device registered in LOG8 (<Initial> 0 0: 2 words, 1: 4 words)
R11039	LOG9 data transfer words	Number of data transfer words of logging device registered in LOG9 (<Initial> 0 0: 2 words, 1: 4 words)
R1103A	LOG10 data transfer words	Number of data transfer words of logging device registered in LOG10 (<Initial> 0 0: 2 words, 1: 4 words)
R1103B	LOG11 data transfer words	Number of data transfer words of logging device registered in LOG11 (<Initial> 0 0: 2 words, 1: 4 words)
R1103C	LOG12 data transfer words	Number of data transfer words of logging device registered in LOG12 (<Initial> 0 0: 2 words, 1: 4 words)
R1103D	LOG13 data transfer words	Number of data transfer words of logging device registered in LOG13 (<Initial> 0 0: 2 words, 1: 4 words)
R1103E	LOG14 data transfer words	Number of data transfer words of logging device registered in LOG14 (<Initial> 0 0: 2 words, 1: 4 words)
R1103F	LOG15 data transfer words	Number of data transfer words of logging device registered in LOG15 (<Initial> 0 0: 2 words, 1: 4 words)
R11040	DT registers transfer 1	Transfer collected logging data to DT register or not (<Initial> 1 0: not transfer, 1: transfer)
R11041	DT registers transfer 2	Transfer collected logging data to DT register or not (<Initial> 1 0: not transfer, 1: transfer)
R11042	Demand data clear	Clear demand data or not (<Initial> 1 0: not clear, 1: clear)

System Relays (SR)

ELC500 uses the following system relays (SR).
These system relays can be used in programs.

Device No.	Name	Description
SR0	Self-diagnostic error flag	Turns on when a self-diagnosis error occurs. Self-diagnosis error codes are saved in the system data register SD0.
SR1	Unit alarm occurrence	Turns on when a unit alarm is detected. The slot number of the unit where an alarm has occurred is saved in the system data register SD1.
SR2	Unit error occurrence	Turns on when a unit error is detected. The slot number of the unit where an error has occurred is saved in the system data register SD2.
SR3	Unit warning occurrence	Turns on when a unit warning is detected. The slot number of the unit where a warning has occurred is saved in the system data register SD3.
SR4	Unit verification error occurrence	Turns on when an I/O verification error is detected. The slot number of the unit where an I/O verification error has occurred is saved in the system data register SD4.
SR5	Unit installation error detection	Turns on when a unit installation error is detected. The slot number of the unit where an I/O verification error has occurred is saved in the system data register SD5.
SR7	Operation error flag (hold type)	Turns on when an operation error occurs after the unit has started operating, and remains on while the unit operation continues. The PB number where an error has occurred is saved in the system data SD7, and the address is saved in system data registers SD8 to SD9. It indicates the first operation error that has occurred.
SR8	Operation error flag (latest type)	Turns on every time an operation error occurs. The PB number where an operation error has occurred is saved in the system data register SD10, and the address is saved in system data registers SD11 to SD12. Every time a new error occurs, the data are updated. It does not turn off even if the instruction is normally completed after the occurrence of the error(s). In order to check if any error has occurred in a specific instruction, either see address data saved in the SD, or clear error flags using ERR instruction immediately before the specific instruction, and check flags immediately after executing the instruction.
SR9	Carry flag (CY flag)	Used in shift instruction and rotate instruction with a carry flag. The flag can also be operated in carry set instruction and carry reset instruction. It is not set in overflow or underflow of operation results. Turns on when an error occurs during the execution of Ethernet communication instruction. The error code is stored in the system data register SD29.
SRA	> flag	Executes comparison instruction, and turns on if the result is larger.
SRB	= flag	Executes comparison instruction, and turns on if the result is equal. Executes operation instruction, and turns on if the result is '0'.
SRC	< flag	Executes comparison instruction, and turns on if the result is smaller.
SRD	Support timer instruction flag	Turns on after support timer instruction (SPTM) is executed and subsequently specified time has passed. Turns off when execution conditions go off.
SRE	All error alarms relay	Turns on when any of the error alarm relays E0 to E4095 turns on. Turns off once all of the error alarm relays go off.
SRF	Constant scan error flag	Turns on if scan time exceeds the setting during constant scan. It also turns on if '0' is set in FP7 configuration.

Device No.	Name	Description
SR10	Normally-on relay	Is normally on.
SR11	Normally-off relay	Is normally off.
SR12	Scan relay	Turns on or off in each scan.
SR13	Initial pulse relay (ON)	Goes on for only the first scan after operation (RUN) has been started, and goes off for the second and subsequent scans.
SR14	Initial pulse relay (OFF)	Goes off for only the first scan after operation (RUN) has been started, and goes on for the second and subsequent scans.
SR15	Stepladder Initial pulse relay (ON)	Turns on in the first scan only, following startup of any single process, during stepladder control.
SR16	PB initial relay (ON)	Turns on at the start of execution of a program block. Turns off in the next scan.
SR17	PB initial relay (OFF)	Turns off at the start of execution of a program block. Turns on in the next scan.
SR18	0.01-second clock pulse relay	Clock pulse with a 0.01-second cycle 
SR19	0.02-second clock pulse relay	Clock pulse with a 0.02-second cycle 
SR1A	0.1-second clock pulse relay	Clock pulse with a 0.1-second cycle 
SR1B	0.2-second clock pulse relay	Clock pulse with a 0.2-second cycle 
SR1C	1-second clock pulse relay	Clock pulse with a 1-second cycle 
SR1D	2-second clock pulse relay	Clock pulse with a 2-second cycle 
SR1E	1-minute clock pulse relay	Clock pulse with a 1-minute cycle 

Device No.	Name	Description
SR20	CPU operation modes	ON: RUN mode OFF: PROG. mode
SR21	Operation program memory	ON: SD memory card OFF: ROM
SR22	RTC data error	Turns on if an error is detected in calendar timer data when the unit is powered on.
SR23	Power supply unit lifetime warning	Turns on when it is detected that a power supply unit is close to its lifetime.
SR24	RTC backup battery error flag (hold type)	Turns on when an RTC backup battery error is detected. The flag turns on if the battery is out, even if battery error alarm is disabled in the configuration menu. Once a battery error has been detected, this is held even after recovery has been made. The flag is turned off when power supply is cut off.
SR25	RTC backup battery error flag (current type)	Turns on when an RTC backup battery error is detected. Is off in the normal status. The flag turns on if the battery is out, even if battery error alarm is disabled in the configuration system register.
SR26	SNTP time updating failure	Turns on if acquisition of time data has failed during time synch via LAN port. Turns off in normal conditions.
SR27	SNTP time update completed	Turns off when time is being updated with SNTP, and turns on when the update is completed.
SR29	Forcing flag	Turns on while forced input/output operations are in progress.
SR2A	Interrupt enable	Turns on when interrupt is enabled.
SR2B	Interrupt error flag	Turns on when an interrupt error occurs.
SR2C	Interrupting flag	Turns on when an interrupt program is being executed. Only valid within a PB for execution at a specified interval or within an INT program.
SR2D	PB for execution at a specified interval in progress	Turns on when a PB (program block) for execution at a specified interval is being executed.
SR2F	Rewriting during RUN completed	Turns on in the first scan only following completion of rewriting during RUN.

Device No.	Name	Description
SR30	SD slot cover status flag	ON: Cover open OFF: Cover closed
SR31	SD memory card attachment flag	ON: With an SD memory card OFF: Without an SD memory card
SR32	SD memory card recognition completed flag	ON: Completed recognition of an SD memory card OFF: Other than the above
SR33	SD memory card recognition result flag	ON: Error OFF: Normal
SR34	SD memory card write protection flag	ON: Protected OFF: Not protected
SR35	SD memory card type	ON: SD OFF: SDHC
SR36	SD memory card file system	ON: FAT16 OFF: FAT32
SR37	Logging into FTP server	Turns on while logging in.
SR38	Logging trace execution	ON: Being executed OFF: Stops
SR39	Logging trace start	ON: Starts OFF: Stops
SR3A	SD card access instruction execution	This relay is used to check whether other SD card access instructions are executed or not. ON: Being executed OFF: Stops
SR3B	SD card access instruction completed	This relay is used to check the completion of SD card access instruction with the change of this flag (ON to OFF), and used to turn off the trigger of the instruction. ON: Completed OFF: Being executed
SR3C	SD card access instruction execution result	The execution result of SD card access instruction is stored. Error codes are stored in system data register SD30. ON: Error OFF: Normal
SR3F	Powered off while accessing SD memory card	Turns on if the CPU unit is powered off while accessing an SD memory card.

Device No.	Name	Description
SR1000 to SR1499	Program block PB starting up relay	Can monitor program blocks that are being started up. SR1000 to SR1499 are allocated to 500 PBs. Device No. / PB No. SR1000 / PB 000 SR1001 / PB 001 SR1002 / PB 002 ----- / ----- SR1009 / PB 009 SR1010 / PB 010 SR1011 / PB 011 ----- / ----- ----- / ----- SR1498 / PB498 SR1499 / PB499

Reference

FP7 User's manual (command)

System Data Registers (SD)

ELC500 uses the following system data registers (SD).
These system data registers can be used in programs.

Device No.	name	Description	
SD0 *1	Self-diagnostic error code	Stores the error code when a self-diagnosis error occurred.	
SD1 *1	Alarm Occurrence Unit Slot No.	Saves the slot number of the unit where an alarm has occurred.	
SD2 *1	Error Occurrence Unit Slot No.	Saves the slot number of the unit where an error has occurred.	
SD3 *1	Warning Occurrence Unit Slot No.	Saves the slot number of the unit where a warning has occurred.	
SD4 *1	Verification Error Occurrence Unit Slot No.	Saves the slot number of the unit where a verification error has occurred.	
SD5 *1	Installation error detection slot No.	Saves the slot number of the unit where an installation error was detected.	
SD7	Operation error occurrence PB number (hold type)	Saves the PB number where the first operation error occurred after the unit has started operating.	
SD8	Operation error occurrence address (hold type) (32-bit lower-level address)	Saves the address where the first operation error occurred after the unit has started operating. Perform monitoring using 32-bit data.	
SD9	Operation error occurrence address (hold type) (32-bit higher-level address)		
SD10	Operation error occurrence PB number (latest type)	Saves the PB number where an operation error occurred. Every time a new error occurs, the data are updated. The value '0' is recorded at the start of the scan.	
SD11	Operation error occurrence address (latest type) (32-bit lower-level address)	Saves the address where an operation error occurred. Every time a new error occurs, the data are updated. The value '0' is recorded at the start of the scan. Perform monitoring using 32-bit data.	
SD12	Operation error occurrence address (latest type) (32-bit higher-level address)		
SD19	RING counter 2.5 ms	The saved value is increased by one every time the respective time unit has passed. (H0 to HFFFF) Current values of SD19 to SD21 can only be read when SD19 to SD21 are directly specified and read by MV instruction. The scan start value is read by other instructions.	
SD20	RING counter 10 μs		
SD21	RING counter 100 μs		
SD22	Scan time (current value)	Saves the current value.	[Saved value (decimal)] x 10 μs scan time indication: Indicates operation cycle time in the RUN mode only. Max. and Min. values are cleared at switching between the RUN mode and the STOP/PROG. mode.
SD23	Scan time (minimum value)	Stores the minimum value.	
SD24	Scan time (maximum value)	Saves the maximum value.	
SD27	Interval for PB for execution at a specified interval	Saves interval for PB for execution at a specified interval.	
SD29	Ethernet communication error code	Saves the error code when the Ethernet communication instruction is executed.	

*1 SD0 to SD5 are available only when the corresponding system relays SR0 to SR5 are on.

<table>
<tr><th>Device No.</th><th colspan="2">name</th><th>Description</th></tr>
<tr><td>SD30</td><td colspan="2">SD card access instruction execution result</td><td>Error codes while the SD card access instruction is executed are stored.</td></tr>
<tr><td>SD50</td><td colspan="2">Calendar timer (year)</td><td rowspan="7">Saves year, month, day, hour, minute, second and day-of-the-week data of the calendar timer as 16-bit binary data. The built-in calendar timer will operate correctly through the year 2099 and support leap years. The calendar timer can be set (time synch) by writing desired values using the programming tool or a program based on calendar setting instruction (TIMEWT).</td></tr>
<tr><td>SD51</td><td colspan="2">Calendar timer (month)</td></tr>
<tr><td>SD52</td><td colspan="2">Calendar timer (day)</td></tr>
<tr><td>SD53</td><td colspan="2">Calendar timer (hour)</td></tr>
<tr><td>SD54</td><td colspan="2">Calendar timer (minute)</td></tr>
<tr><td>SD55</td><td colspan="2">Calendar timer (second)</td></tr>
<tr><td>SD56</td><td colspan="2">Calendar timer
(day-of-the-week)</td></tr>
<tr><td>SD60</td><td colspan="2">Total ON number of error alarm relays</td><td>Saves the total number of error alarm relays that are on. (Max. 4096 relays) By specifying SD60 in RST instruction, all data in the error alarm buffer can be cleared.</td></tr>
<tr><td>SD61</td><td colspan="2">No.1 error alarm relay
that turned on</td><td>Saves the number of the error alarm relay that turned on in the first place (No.1).
By specifying SD61 in RST instruction, all data in the error alarm buffer can be cleared.</td></tr>
<tr><td>SD62
to SD79</td><td colspan="2">No.2 to No.19 error alarm relays
that turned on</td><td>Saves the numbers of the error alarm relays that turned on. By specifying the device number in RST instruction, all data of the relevant relay(s) in the error alarm buffer can be cleared. Device numbers of system data registers SDs and error alarm relays correspond as follows.
<table>
<tr><th>Device No.</th><th>Error alarm relay</th></tr>
<tr><td>SD62</td><td>No.2</td></tr>
<tr><td>SD63</td><td>No.3</td></tr>
<tr><td>SD64</td><td>No.4</td></tr>
<tr><td>SD65</td><td>No.5</td></tr>
<tr><td>SD66</td><td>No.6</td></tr>
<tr><td>SD67</td><td>No.7</td></tr>
<tr><td>SD68</td><td>No.8</td></tr>
<tr><td>SD69</td><td>No.9</td></tr>
<tr><td>SD70</td><td>No.10</td></tr>
<tr><td>SD71</td><td>No.11</td></tr>
<tr><td>SD72</td><td>No.12</td></tr>
<tr><td>SD73</td><td>No.13</td></tr>
<tr><td>SD74</td><td>No.14</td></tr>
<tr><td>SD75</td><td>No.15</td></tr>
<tr><td>SD76</td><td>No.16</td></tr>
<tr><td>SD77</td><td>No.17</td></tr>
<tr><td>SD78</td><td>No.18</td></tr>
<tr><td>SD79</td><td>No.19</td></tr>
</table></td></tr>
<tr><td>SD80</td><td rowspan="6">For error alarm relay</td><td>Calendar timer (year)</td><td rowspan="6">Saves time when the error alarm relay saved in SD61 turned on.</td></tr>
<tr><td>SD81</td><td>Calendar timer (month)</td></tr>
<tr><td>SD82</td><td>Calendar timer (day)</td></tr>
<tr><td>SD83</td><td>Calendar timer (hour)</td></tr>
<tr><td>SD84</td><td>Calendar timer (minute)</td></tr>
<tr><td>SD85</td><td>Calendar timer (second)</td></tr>
</table>

Chapter 10 Self-diagnostic and Trouble shooting

10.1 Self-diagnostic

10.1.1 Status indicator of LED

ELC500 has the self-diagnostic function that identifies errors and stops operation if necessary. When an error occurs, the status indicator LED shows as below.

	LED				Description	Status
	RUN Green	STOP/ PROG. Green	ERROR Red	ALARM Red		
Normal	●	×	×	×	Normal operation	RUN
	×	●	×	×	Program mode	STOP
	▲	×	×	×	Forcing input/output in RUN mode	RUN
Error	●	×	▲	×	When a self-diagnostic error occurs (RUN mode)	RUN
	×	●	▲	×	When a self-diagnostic error occurs (STOP)	STOP
	×	●	—	●	System watchdog timer has been activated.	STOP
	×	▲	—	×	Waiting for connection of PHLS slave	STOP

●: ON ▲: Flash ×: OFF —: ON or OFF

10.2 Procedures at Error

10.2.1 If ERROR LED is flashed.

■**Condition** Self-diagnostic error occurs.

■**Solution** Confirm the status in the following procedure.

<Procedure>

1. Select [Online] and click [Status View] in Configurator EL500, and check the contents of error.
2. Change to STOP/PROG. mode.
3. If the error is not syntax error, cancel the situation in accordance with error code.
4. It the error is syntax error, use FPWIN Pro7, select [Object] → [Check] to identify the syntax error and correct it if necessary.

Point

- In case of an operation error, check the address where the error occurred before performing error clearance.
- In case of that the error code is 80 or higher, the error can be cleared by click [Clear] with [Status view].
- In STOP/PROG mode, turn off power supply can clear error but all of the operation memory except hold type data is cleared.
- Self-diagnostic error set command (ERR) can clear error.

Not change to RUN mode

■**Condition** A syntax error or a self-diagnosis error that caused operation to stop has occurred.

■**Solution** Confirm the status in the following procedure.

<Procedure>

1. Confirm that ERROR or ALARM LED doesn't turn on.
2. Use FPWIN Pro7, select [Object] → [Check] to identify the syntax error and correct it if necessary.

10.2.2

ALARM LED turns ON

■**Condition** System watchdog timer has been activated and the operation of controller has been stopped.

■**Solution** Confirm the status in the following procedure.

<Procedure>

10.2.3

1. Change to STP/PROG. mode and power off ELC500 and then turn on again.
   If ALARM LED is ON again, it may be a problem with ELC500.
   If ALARM LED is OFF, it may have been caused by noise or another temporary phenomenon.
2. Change to RUN mode.If ALARM LED in ON, the program is taking excessive time. Review and modify the program.
3. Check ambient environment for influence of noise.
   If there is no problem with the program, there may be a problem in the ambient environment. Check the wiring including the grounding. Especially check if RS-232C wiring is not close to power cables, and if it uses shielded wire.

Point

- When the program is to be reviewed, check the following points.

Ex.1) Is there any infinite loop in the program, by JP command, LOOP command or other command that controls program flow?

Ex. 2) Are there multiple interrupt commands that are being consecutively executed?

POWER LED does not turn ON

■**Condition** There is not sufficient power supply..

■**Solution** Confirm the status in the following procedure.

<Procedure>

1. Power off ELC500 and double-check the wiring status (e.g. loose terminal?)
2. Check if output of the power supply unit exceeds the rating.
   If the internal power supply capacity is not sufficient, examine the combination of the units.
3. Disconnect the power supply to the other devices if the power supply is shared with other device.
   If LED on power supply unit turns on, it is assumed that the power supply is not sufficient. Review the power supply design.

10.2.4

Protect error message appears

■**Condition** It is locked by password.

■**Solution** Confirm the status in the following procedure.

<Procedure>

1. Power off ELC500 and power on again.

10.2.5

Point

- If you forget the password, initialize the setting.

Troubleshooting

■SD memory card

Condition	Cause	Action to take
When inserting SD memory card, the access LED does not light on.	SD memory card is not installed correctly. Or SD memory card cover is not closed correctly.	Remove SD memory card and insert it securely again and close cover. Then, check whether access LED lights on or not.
	SD memory card is not formatted. Or the format is not correct.	Use the format software that is downloaded from Panasonic HP. ∗ Data in SD memory card is deleted all when it is formatted.
	SD memory card is damaged.	Check the SD memory card is recognized (mounted) by connecting PC etc. If it is not recognized, contact the manufacturer of the SD memory card.
Data cannot be saved in SD memory card.	SD memory card is not recognized.	Check that the access LED is ON or OFF. If it is OFF, refer to the description of 'When inserting SD memory card, the access LED does not light on.'
	Available capacity of SD memory card is low.	Remove SD memory card and delete the unnecessary data or use the other SD memory card with enough capacity.
	SD memory card is locked.	Check whether the SD memory card is locked or not.
	Setting for the number of saved file is over.	Check setting for operation when the number of saved file is over at logging file setup.
	Using format is not supported.	Check data format. Other than FAT16 and FAT32 are not saved in SD memory card. Format to FAT16 or FAT32 again.

■Time adjustment

Condition	Cause	Action to take
Time cannot be updated.	Ethernet cable or USB cable is disconnected.	Connect Ethernet cable correctly.
	IP address to be connected is not correct.	Check IP address of SNTP server.
	Response time from SNTP server is long and it timeout.	Make TCP end timer longer.
Updated time is wrong.	Time zone is not correct,	Set time zone correctly.

■Mail

Condition	Cause	Action to take
Cannot send a mail	Ethernet cable is disconnected.	Connect Ethernet cable correctly.
	Setting for SMTP server is not correct.	Set IP address of SMTP server correctly. When SMTP server is specified with a name, check if IP address setting for DNS server is correct.
	Destination mail address is not set correctly.	Set the destination mail address correctly at user registration window.
	Source mail address is incorrect.	Depending on mail servers, the source mail address may be checked. Set the source mail address correctly at 'Mail setup'.
	Destination is not selected.	Check if the destination is selected or not.
Cannot send a mail by creating a file	Sending setting is not correct.	Set 'Mail sending' and 'Destination' correctly at setup window.

■Low-level communication

Condition	Cause	Action to take
Although a command has been transmitted, no response is received.	Your machine is not wired with the other machine correctly.	In case of RS232C Connect SD/RD lines of your machine to RD/SD lines of the other machine respectively. In case of RS-485 Connect the transmission cable between the (+) transmission terminals and between the (−) transmission terminals of each device. Also connect the terminal station correctly. Check the transmission cable specs is within the specifications. *Use one type of transmission cable in the same link. Do not mix more than one type.
	Communication conditions of your machine and the other machine are not matched.	Check the communication conditions of 'COM' at Basic configuration.
	The same unit number may be used for destination devices.	Check the unit number settings of destination devices.
	Wait time for sending or timeout is too short.	Make wait time for sending or timeout longer.
	Connect our Temperature Controller and the terminal register.	Not necessary to connect the terminal register.
Cannot collect data of KW2G.	The unit number setting of ELC may be wrong.	One unit number is allocated to one base unit even if an expansion unit is connected.
	Designate DT00500 for collecting with using our wireless unit.	When using the wireless unit, DT00500 is used for abnormal flag. Set DT00520.
Remote I/O unit doesn't work according to setup conditions	Setup data is not transmitted to Remote I/O unit.	Set ELC500 to RUN mode.
	Remote I/O unit is set to forced output mode.	Check that dip switch No.9 of Remote I/O unit is set to OFF

■Demand control by using wireless device

Condition	Cause	Action to take
Demand value is not correct.	Registered points are too much and it can't communicate correctly.	Reduce the registered points of each device.
	Multiplier or digit is not matched.	Check multiplier or digit for each device.
Command can't be sent by wireless communication	It doesn't support protocol of wireless device.	Check the protocol of wireless device is matched to using communication protocol.
Command can be sent, but no response is received.	Wait time for sending or timeout is too short.	Set transmission interval 100ms or more.
Data has a gap.	Time-out time is short.	Set time-out time 3-sec or more for 1 master or repeater. Ex.) Master 1 unit + Repeater 2 units Time-out time should be 10-sec or more.

■FTP

Condition	Cause	Action to take
Cannot connect via FTP	Ethernet cable is disconnected.	Connect Ethernet cable correctly.
	Connected IP address is not correct.	Check IP address at Basic configuration.
	Security function is enabled.	Cancel security function or use PASV mode.
	Setting port for FTP is used by another function.	Check the setting port can be used or not.
Cannot login	User name or password is not correct.	Check the user name and password. If you forget the password, set password again at the user registration.
	Another user logs in.	After a while, access again.
Although a connection is established, it fails in the file operation. (such as that a list is not displayed.)	FTP tool software used is not supported.	Use another FTP tool software or FTP pre-installed in Windows (operate by command prompt) for file operation.

■USB cable

Condition	Cause	Action to take
Cannot read or write setting data via USB	USB driver may not be properly installed.	Check if PC used recognizes USB driver, or uninstall the driver and then install it again. Be sure to install the specified driver to correct working, even though it is recognized as a USB driver without installing for Windows10.

■Others

Condition	Cause	Action to take
Cannot install Configurator EL500	File is broken.	Download Configurator EL500 from our website again.
	UAC security level is high or it doesn't approve it.	Please confirm your system administrator.
[Clock IC error] is shown at status view.	The value of clock IC is uncertain.	Reset ELC500 and set time.
Fail to update firmware	It may be power off during rebooting after complete the updating.	Update it again. In case of that it fails again, ELC500 may be broken. Please contact us.
[Unit verification error occurrence] or [Unit error occurrence] Is shown at status view.	It may be an error in a connected unit or in project.	Check the project and write it again. After that power off once and power on again. Remove the connected unit and connect it again.
Cannot register logging device or demand monitoring device	Number of registered device is exceeds 512.	Up to 512 devices can be registered total of logging device and demand monitoring device. Register logging devices without vacant line. If there is a vacant line, it counts as registration point, e.g. when you register in No.10 next to No.1, it counts total 10 not 2. Use within 512 devices.
Operation error has occuured and cannot collect data with RUN mode.	COM communication for configurator and Ethernet communication for programming tool is competing.	Set communication conditions so that communication is not conflict.

Error Code

Code	Name	Operation	Error contents and steps to take
0	Unit warning	Stop	Unexpected setting error. Please contact us.
1	CPU hardware error 1	Stop	There may be a hardware problem. Please contact your dealer.
2	CPU hardware error 2	Stop	
3	I/O bus power supply error (including "no end cover")	Stop	Error in the I/O bus part is probable, such that the end unit has not been attached. Double-check the attachment status of units. This error also occurs when an expansion cable is removed during operation.
4	Unit attachment limit exceeded	Stop	It is probable that the unit attachment limit has been exceeded. Double-check the configuration.
5	Project data error	Stop	Turns on when there is an error in project data.
6	Expansion unit power supply synchronization error	Stop	Turns on when there is an error in the expansion block side such that the power to the expansion unit is not on or the expansion cable is not connected correctly when the power turns on. The wait time until the power turns on can be set in the I/O map configuration dialog box.
18	ELC configuration data error	Stop	Setup data for ELC500 may be broken. Start Configurator EL500 and create new setup.
19	ELC ladder authentication error	Stop	It may be deleted ELC dedicated ladder. Download the project file from our website and transmit it to ELC500. (ELC500SystemLadder_v***.pce)

Code	Name	Operation	Error contents and steps to take
20	Syntax error	Stop Auto clear	A program with a syntax error has been written. Switch to the STOP/PROG. mode and correct the error.
21	Duplicated use	Stop Auto clear	The same relay is used multiple times in OT instruction, etc. Switch to the STOP/PROG. mode and correct the error. Or, set the duplicated output to [enable] in the CPU configuration.
			Applicable devices and instructions are as follows. • Operation device (X, Y, R, L), timer/counter instruction, SSTP instruction
22	Not paired	Stop Auto clear	For instructions which must be used in a pair, one instruction is either missing or in an incorrect position. Switch to the STOP/PROG. mode and enter the two instructions which must be used in a pair in the correct positions.
			Applicable instructions and cases are as follows. • MC and MCE are not paired. • LBLs corresponding to LOOP and JP are not located in the same area (normal program area / same sub-routine area / same interrupt program area). • There are no sub-routines corresponding to CALL and FCALL. • There is no STPE corresponding to SSTP.
24	Program area error	Stop Auto clear	An instruction that can only executed in a specified area is written in another location. Switch to the STOP/PROG. mode and correct the error.
			Applicable instructions and cases are as follows. • LBL, LOOP, JP, MC and MCE are in the stepladder area. • MC is nested in more than 16 layers. • CNDE is outside the normal program area. • EDPB is outside the blank area. • ED is inside the sub-routine area or the interrupt area. • SBL is outside the blank area or the sub-routine area. • An interrupt program is outside the blank area or the interrupt program area. • RET is outside the sub-routine area. • IRET is outside the interrupt program area. • STPE is outside the stepladder area.
25	High-level instruction execution combination error	Stop Auto clear	In the program, high-level instructions, which execute in every scan and at the leading edge of the trigger, are programmed to be triggered by one contact. Correct the program so that the high-level instructions executed in every scan and only at the leading edge are triggered separately.
27	Compile memory full error	Stop Auto clear	The program is too large to compile in the program memory. Switch to the STOP/PROG. mode and reduce the total number of steps for the program.

(Note) For errors where [Auto clear] is indicated in the 'Operation' column, error clearance is executed when power supply is cut off, or when the unit is set to the RUN mode again after the status has been corrected.

Code	Name	Operation	Error contents and steps to take
40	Copy failure: Cover open	Stop Auto clear	The card cover is open and the copy process cannot be executed. Close the cover.
41	Copy failure: No SD memory card	Stop Auto clear	Copying cannot be executed because there is no SD memory card. Insert an SD memory card.
42	Copy failure: SD memory card reading error (FAT / file error)	Stop Auto clear	Copying cannot be executed because the SD memory card is damaged. Insert a normal SD memory card.
43	Copy failure: No file	Stop Auto clear	Copying cannot be executed because there is no file in the SD memory card. Check if a project file is saved in the card.
44	Copy failure: Password mismatch (limited distribution function)	Stop Auto clear	Copying cannot be executed because the password for the project file saved in the SD memory card is not consistent with the password for the execution project saved in the built-in ROM. Check the password settings.
45	Copy failure: Invalid project data	Stop Auto clear	Copying cannot be executed because an error has been identified in project data saved in the SD memory card. Check the project data.
50	SD operation impossible Cover open	Stop Auto clear	SD memory card operation cannot be executed because the card cover is open. Close the cover.
51	SD operation impossible No SD memory card	Stop Auto clear	SD memory card operation cannot be executed because there is no SD memory card. Insert an SD memory card.
52	SD operation impossible SD memory card reading error (FAT / file error)	Stop Auto clear	SD memory card operation cannot be executed because the SD memory card is damaged. Insert a normal SD memory card.
53	SD operation impossible No file	Stop Auto clear	SD memory card operation cannot be executed because there is no file in the SD memory card. Check if a project file is saved in the card.
54	SD operation impossible Password mismatch (limited distribution function)	Stop Auto clear	SD memory card operation cannot be executed because the password for the project file saved in the SD memory card is not consistent with the password for the execution project saved in the built-in ROM. Check the password settings.
55	SD operation impossible Invalid project data	Stop Auto clear	SD memory card operation cannot be executed because an error has been identified in project data saved in the SD memory card. Check the project data.
60	Duplicated or exceeded collected I/O maps	Stop Auto clear	There is an error with I/O maps that have been collected in the CPU unit. Verify the registered data.
61	Duplicated or Exceeded registered I/O maps	Stop Auto clear	There is an error with I/O maps that have been registered in the CPU unit. Verify the registered data.
62	Interrupt error 1	Stop Auto clear	There may be a hardware problem. Please contact your dealer.
63	Interrupt error 2	Stop Auto clear	The interrupt program definition by INTPG instruction may be disappeared by rewriting during RUN. Check the program.

(Note) For errors where [Auto clear] is indicated in the 'Operation' column, error clearance is executed when power supply is cut off, or when the same operation is executed again after the status has been corrected.

Code	Name	Operation	Error contents and steps to take
80	Unit alarm occurred	Select (Default stop)	An alarm has occurred in an attached unit. Check the status of the unit in the slot number saved in the system data register SD1.
81	Unit error occurred	Select (Default stop)	An error has occurred in an attached unit. Check the status of the unit in the slot number saved in the system data register SD2. Verify the configuration settings.
82	Unit verification error occurred	Select (Default stop)	Unit wiring condition has changed compared to that at the time of power-up. Check the status of the unit in the slot number saved in the system data register SD4.
83	Unmatch number of registered units	Select (Default stop)	The number of units differs from that registered in the I/O map. Check the I/O map and the attachment status.
84	Unit initialization timeout	Select (Default stop)	An error has occurred during the unit initial operation. Check the unit status.
85	Unmatch unit with unit configuration data	Select (Default stop)	The unit's configuration data is not consistent with the applicable unit. Check the I/O map and the configuration data.
86	Operation error	Select (Default stop)	An operation error has occurred. Reasons for an operation error vary by instruction. Refer to the Instruction Manual, etc. and correct the appropriate reasons. PB and address where an operation error has occurred are saved in the system data registers SD7 to SD12.
100	Bus current error	Select (Default continue)	A bus error is probable. Please contact your dealer.
104	Service power supply Current error	Select (Default continue)	An error has been detected in the GT power supply terminal part. Check if it is correctly connected.
105	CPU temperature error 1	Select (Default continue)	A temperature rise has been detected in hardware. In general, select [Continue].
106	CPU temperature error 2	Select (Default continue)	

(Note) For errors where [Select] is indicated in the 'Operation' column, either [Stop] or [Continue] can be selected in the configuration menu.

Code	Name	Operation	Error contents and steps to take
120	RTC data error	Continue	An error has been detected in clock data of the calendar timer.
121	Power supply unit lifetime warning	Continue	It is alarmed that the power supply unit is close to its lifetime. Replace the power supply unit.
122	Battery voltage drop	Continue	Voltage of the optional battery has declined. Replace the battery. If no battery is used, disable battery error alarm in the CPU configuration.
123	Gold capacitor voltage drop	Continue	It is alarmed that voltage of the built-in gold capacitor of the CPU unit has declined. Charge the CPU unit.
124	SNTP time acquisition failure	Continue	Acquisition of time data has failed during time synch via LAN port.
125	Logging setting mismatch	Continue	An error has been detected in logging data settings.
126	Logging data error	Continue	An error has been detected in logging data.
127	Comment data error	Continue	An error has been detected in comment data.
1000 -1999	Error by ERR instruction	Stop	An error as specified by ERR instruction in the user program has occurred. Handle the error in accordance with the specified detection conditions.
2000 -2999	Error by ERR instruction	Continue	

(Note) If an RTC data error is detected, the date is set to "April 1, 2012".

Specifications

ELC500 Control unit Specifications

Rated operating voltage	24V DC
Allowable operating voltage range	20.4 to 28.8V DC *1
Current consumption	Max. 300mA *3
Allowable momentary power off time	4ms (at 20.4V), 7ms (at 24V), 10ms (at 28.8V) *2
Ambient temperature	0 to +55℃
Storage temperature	-40 to +70℃
Ambient humidity	10 to 95%RH (at 25℃ non-condensing)
Storage humidity	10 to 95%RH (at 25℃ non-condensing)
Vibration resistance	Comply to JISB3502, IEC61131-2 5 to 8.4Hz single amplitude: 3.5mm 8.4 to 150Hz constant acceleration 9.8m/s^2 10 times on 3 axes (1 octave/mm)
Shock resistance	Comply to JISB3502, IEC61131-2 147m/s^2 3 times on 3 axes
Noise immunity	1,000V [P-P] with pulse width 50ns, 1μs (by noise simulator method)(Power supply terminal)
Operating condition	Free from corrosive gassed and excessive dust.
EU Directives	EMC directive: EN61131-2 LVD: EN61010-2-201
Overvoltage category	Category Ⅱ
Pollution degree	2
Weight	Approx. 255g (with terminal block, end unit, battery)

*1 When GT series display is connected to GT power supply terminal (24V), use in the range of 21.6 to 26.4V DC.
*2 10ms when AC power supply unit (Model No. AFP7PSA1, AFP7PAS2) is used.
*3 For details of current consumption of a system refer to FP7 user's manual.
*4 Select a power supply with the capacity of equal to or larger than the capacity of the unit.
In addition, select a power supply of 24 W or more even in the minimum configuration.
However, ELC500 supplies current max 3A (2A for 50 to 55℃), select the connected unit not exceed the rating.
*Max. allowable current = ELC500 (300mA) + current consumption of connected unit
+ use for GT power supply output port

Power supply for GT specifications

Output *1	Connected device
5V	For GT series programmable display DC5V type
24V *2	For GT series programmable display 24V DC type

*1 It can't use both 5V and 24V at the same time.
*2 Use in the range of 21.6 to 26.4V DC.
*3 Refer to GT series manual in details.
*4 Do not short output terminals.

Data Logging / Damand Specifications

11.3

Data Logging

11.3.1

Logging data	Items	Instantaneous value, Differential value
	Data format (Available in register system)	DEC1W, DEC1W(Unsigned), DEC2W, DEC2W(Unsigned), DEC4W, DEC4W(Unsigned), HEX (4-digit / 8-digit / 16-digit), single precision real number, double-precision real number
	Number of registerable files	16
	Registerable device	128 points for 1-file (total 512 points for 16 files)
Data storage	Storage destination	SD/SDHC memory card
	File system	FAT16, FAT32
	Storage format	CSV
	Number of file storage	100
Trigger	Trigger type	・Fixed cycle (select with setting) *1 ・Relay status (ON status, OFF status) ・Specified time (every minute, every hour, every week, every day, every month, every year) ・Specified period (every minute, every hour, every week, every day, every month, every year, always) ・Register (＝, ＞, ＜, ≠) ・Register comparison (＝, ＞, ＜, ≠) ・Combination of trigger (AND, OR)
	Number of registerable trigger	50

Demand Function

11.3.2

Demand monitoring

Demand type		Fixed demand, IEC demand
Total measure/monitor device number		50 units
Fixed demand	Demand span	15-min, 30-min, 60-min
	Estimated demand calculation method	Average power system, Shift average system, Faster moving average system
	Alarm level setting	3 levels
	Alarm mask time	0 to 10 min. (selectable)
	Alarm update cycle	1-min cycle (fixed) (Average power system, Shift average system) 5-sec cycle (fixed) (Faster moving average system)
IEC demand	Demand span	1 to 60 min. (selectable)
	Interval time	1 to 60 min. (selectable)

Data storage (csv file)

Destination		SD/SDHC memory card
File system		FAT16, FAT32
Storage format		.csv format
Number of file storage		100
Items	Fixed demand	Reference demand, Control demand, Limit control demand, Adjustment demand, Target demand, Present demand、Estimated demand, Present alarm level, Total power, Integral power for each demand monitor device, Control level of each I/O device
	IEC demand	Present demand, Total power, Integral power for each demand monitor device,
Backup		None

Data storage (Internal memory)

Items	Max. Demand, Monthly max. demand (for 13-month)
Backup *2	None

Control

I/O device control *3	ON/OFF
I/O device connectable number	16 unit
Control pattern	Alarm link control, Start control, Cyclic control

Others

Sending mail	Sending network	Ethernet
	Mail contents	Title : Max.64 letters Body text: Max. 256 letters
	Registerable number	16 (No attached file)
Setting software	Configurator EL500 (Main unit setup software) *4	
Network functions	Communication protocol	TCP/IP, UDP/IP
	Application protocol	SMTP (SMTP AUTH authentication) FTP (Client / Server), SNTP, DHCP, DNS, HTTP(server)
Calendar timer		Time accuracy: less than 15-sec per month at 25℃ (Automatic correction by using SNTP is available.)
Backup		Calendar timer (for 1-week without battery) *5
Battery discharge life (No power is supplied.)		3.3 years or more (Ambient temperature 25℃)
Self-diagnostic function		Watchdog timer, Program grammar check

*1 <Set range> 1, 2, 3, 4, 5, 6, 10, 15, 30 (sec) 1, 2, 3, 4, 5, 6, 10, 15, 30 (min), 1, 2, 3, 4, 6, 12, 24 (hour)
*2 Present demand, Estimated demand are reset when power outage.
*3 Use Remote I/O unit (model No. UENU2D4R12) as I/O device.
*4 You can download Configurator EL500 from our website.
*5 It backup by built-in capacitor without backup battery. In order to fully charge built-in capacitor, supply power to ELC500 for at least 30-min.
*6 For FAT6, only saving data is supported. It can’t check capacity of SD memory card.

11.4 Program (PLC) Specifications

Item		Description
Memory capacity	Program	32,000 steps
	Data register	262,144 words
Program method		Relay symbol method
Control method		Cyclic operation method
Program memory		Built-in flash ROM (unnecessary backup battery)
Operation speed		Basic command 11ns/step
External input (X)		8,192 points
External output (Y)		8,192 points
Internal relay (R)		32,768 points
System relay (SR)		Use to show internal operation status
Link relay (L)		16,384 points
Timer (T)		4,096 points (unit 1μs, 1ms, 10ms, 100ms, 1s)
Counter (C)		1,024 points
Link data register (LD)		16,384 words
Index register (I0 to IE)		15 double words
Label (LOOP)		Max. 65,535
Differential point		No restriction
Number of step ladder		No restriction
Number of subroutine		Max. 65,535
Interrupt program		1 (Fixed cycle program)
Constant scan		0 to 125ms
Comment memory		3Mbite (unnecessary backup battery)
PLC link		Max. 16 Link relay 1,024 points Link register 128 words (Data transmission and remote programming are not supported.) (Available to switch link area allocation)
Overwrite in RUN mode		Available
Number of connected unit		Max. 8

Communication Specifications

USB Communication (Configurator software)

Interface	USB2.0
Connector shape	USB Mini B type
Transmission speed	12Mbps(Full-speed)
Protocol	MEWTOCOL-COM(slave)

Note1) USB port is insulated with the internal circuit.

11.5 2) In order to connect PC, it is necessary to install the USB driver.

11.5.1 USB driver is included in 'Configurator EL500'.

COM0 port (RS232C) Communication

Item		Specification	Initial setting
Interface		3-wire system RS-232C	—
Port number		1CH	—
Transmission type		1:1	—
Communication method		Half-duplex	—
Synchronous method		Asynchronous communication method	—
Transmission distance		15m	—
Transmission speed		300 / 600 / 1,200 / 2,400 / 4,800 / 9,600 / 19,200 / 38,400 / 57,600 / 115,200 / 230,400 [bps]	19,200
Transmission format	Stop bit	1bit / 2bit	1bit
	Parity	Odd / Even / None	Odd
	Start code	With STX / No STX	No STX
	End code	CR / CR+LF / None / ETX	CR
	Data length	7bit / 8bit	8bit
Data transferring order		From bit 0 to character unit	—
Protocol		MEWTOCOL-COM(master / slave) MODBUS RTU(master / slave) MEWTOCOL7-COM(slave) General-purpose * *Control FPWIN Pro7 is necessary.	MEWTOCOL

11.5.2

Note1) Transmission speed, transmission format is set with configuration software.

2) In order to use with 38,400 bit/s or more, cable length should be 3m or less.
Use shielded wire for RS-232C wiring in order to improve noise immunity.

3) In case of connecting with the commercial devices, please check with the actual environment.

4) Each terminal SD, RD, SG of RS-232C is insulated with the internal circuit.

11.5.3

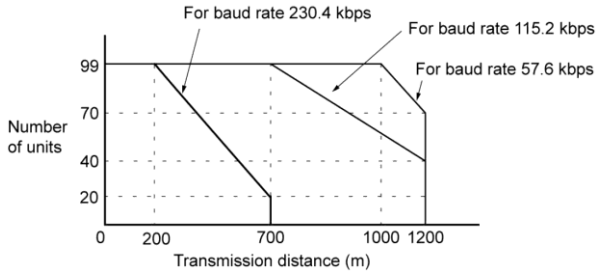
COM1 / 2 port (RS-485 / RS-422) Communication

Item		Specification	Initial setting
Interface		2-wire system RS-485/ 4-wire system RS-422 *2	RS-485
Port number		2CH	—
Transmission type		1:N	—
Communication method		Half-duplex	—
Synchronous method		Asynchronous communication method	—
Transmission distance	RS-485	Max. 1,200m *3	—
	RS-422	Max. 400m	—
Transmission speed		300 / 600 / 1,200 / 2,400 / 4,800 / 9,600 / 19,200 / 38,400 / 57,600 / 115,200 / 230,400 [bps]	19,200
Transmission format	Stop bit	1bit / 2bit	1bit
	Parity	Odd / Even / None	Odd
	Start code	With STX / No STX	No STX
	End code	CR / CR+LF / None / ETX	CR
	Data length	7bit / 8bit *6	8bit
Protocol : Connected number *4 *5		MEWTOCOL (master / slave): max. 99 MODBUS RTU (master / slave): max. 99 General-purpose: max.99 *8 PLC link: max. 16 *8, *9	MEWTOCOL

*1 Please check with the actual devices when some commercial devices with RS-485/RS-422 interface are connected. The number of connected devices, transmission distance, and transmission speed may be different according to using transmission line.

*2 RS-485/RS-422 can be changed with serial mode switch.

*3 Transmission distance is limited as below according to transmission speed and number of connected unit. With under 38400bps, max. distance is 1200m and max. number is 99 units.



*4 When using SI-35, SI-35USB or Eco-POWERMETER, PLC from our company (which can be connected up to 99 units), up to 99 units can be connected.
When other devices are mixed, the maximum number of connections is limited to 31.

*5 For RS-422 1:1

*6 8 bit fixed for MODBUS RTU

*7 Each terminal of RS-485/RS-422 port is insulated to internal circuit.

*8 Programming tool (Control FPWIN Pro7) is necessary.

*9 Only COM1 port is supported for PLC link.

LAN port (Ethernet) Communication

Interface	100BASE-TX / 10BASE-T
Transmission speed *1	100 Mbps / 10 Mbps Auto-negotiation
Cable length *4	100m
Node number	Max. 197
Number of simultaneous connections	Max. 20 (User connection: 16, System connection: 4) *2
Protocol	TCP/IP, UDP/IP
DNS	Name server
DHCP /DHCPV6	IP address auto-acquisition
FTP server (SSL)	Transfer file, user number: 3
FTP client (SSL)	Transfer file
HTTP server (SSL)	System WEB, Customer WEB (8MB), Simultaneous session: 16
HTTP client (SSL)	Transfer data
SMTP client (SSL)	Send mail, Transfer file
SNTP	Time setting function
Protocol	MEWTOCOL-COM(master / slave) MODBUS-TCP(master / slave) MEWTOCOL7-COM(slave) MEWTOCOL-DAT(master / slave) General-purpose *5

11.5.4

* Ethernet is the trademarks of Xerox in USA.
*1 Switching between different speeds is done automatically by auto negotiation function.
*2 System connection is used when connecting tool software via LAN.
*3 LAN port is insulated from the internal circuit.
*4 Depending on the using environment, a ferrite-core to avoid noise may be required. It is recommended to install hub near control panel and use it under 10m.
*5 Control FPWIN Pro7 is necessary.

11.6 External Memory Specifications

SD memory card slot

Support media	SD memory card
Format	SD and SDHC (only FAT16, FAT32)
Capacity	Max. 32GB
Speed class	Class2 to Class10

* If it breaks down during writing, there is a possibility that the data is damaged.
We recommend using UPS (uninterruptible power system).
* For FAT6, only saving data is supported. It can't check capacity of SD memory card.

<Care for handling SD memory card>

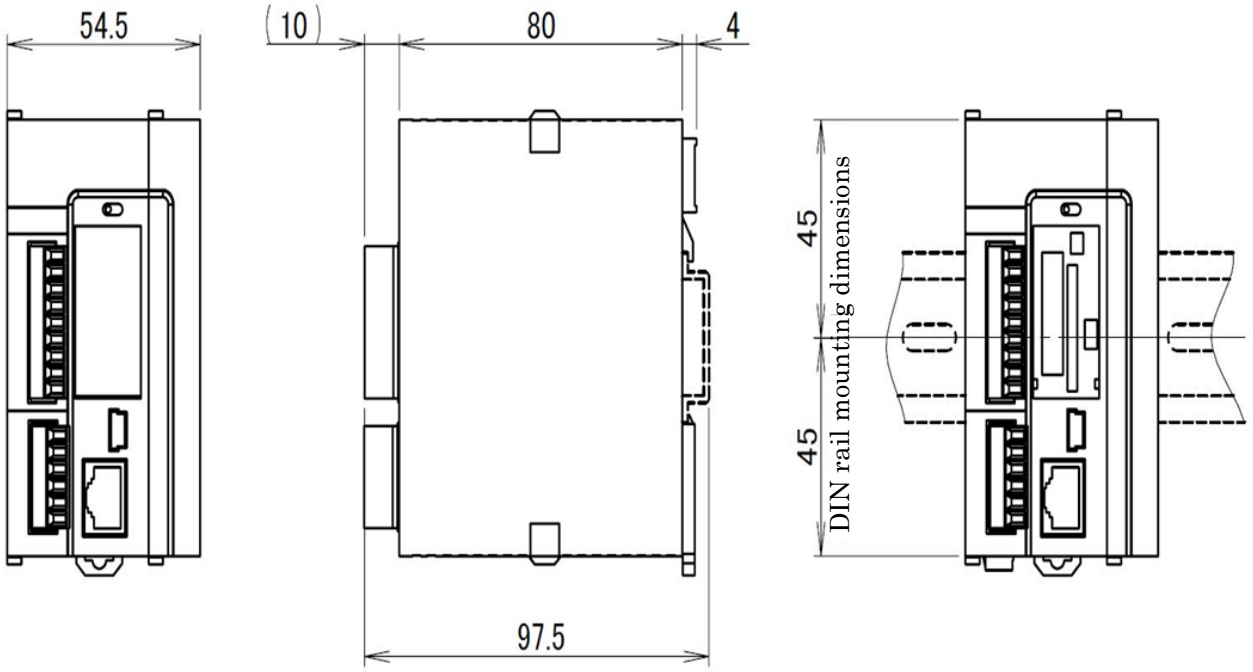
Be sure to format before using. In order to format SD memory card, use Panasonic format software. You can download from Panasonic website.
File system of SD memory card formatted by PC's software is not supported SD memory card standard generally.

In the following cases, there is a possibility to lose the saved data in SD memory card. Please understand us beforehand; we don't have any responsibility for loosing data or the other directly or indirectly failures.
1) When user or someone else do mistake to handle with SD memory card
2) When static electricity and the electrical noise influence the SD memory card
3) When SD memory card is removed or power supply of main unit turns off during the access LED is blinking on the main unit
*We recommend that you always save an important data in other media to backup.

Dimensions and Others

Dimensions

Unit: mm



Revision History

Issue Date	Manual no.	Content of revision
September, 2018	WUME-ELC5-01	First edition
February, 2020	WUME-ELC5-02	Second edition Misprint correction [Added description] - Note - Section 5.6.6 how to use the demand function - Section 5.6.9 email sending trigger - Section 8.3 data Registers for Demand - Section 9.4 data collection behavior
September, 2020	WUME-ELC5-03	Third edition [Added description] - Section 1.2.4 Additional features of each version - Section 5.4 Mode change - Section 5.6.2 Image of alarm mask time - Section 5.6.3 System trigger items - Section 5.6.6.6 How to create Present demand graph - Section 5.7.3 System ladder version - Section 5.7.4 Current value monitor - Section 5.9 How to update system ladder program - Section 8.2 MODBUS command reference number and device number comparison table - Section 9.4 Demand register items

Please contact .....

Panasonic Industrial Devices SUNX Co., Ltd.

■ Overseas Sales Division (Head Office): 2431-1 Ushiyama-cho, Kasugai-shi, Aichi, 486-0901, Japan

■ Telephone: +81-568-33-7861 ■ Facsimile: +81-568-33-8591

panasonic.net/id/pidsx/global

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WUME-ELC5-03