Panasonic

KS1
Signal Converter
User's Manual

ARCT1F437E-3

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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.

Copyright and trademark

- Panasonic Electric Works, Ltd. owns the copyright of this manual.
- We stiffly refuse the reproduction of without permission from this manual.
- Modbus Protocol is a communication protocol that the Modicon Inc.developed for PLC.
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- Ethernet is the trademark of Xerox Corporation.
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Introduction

Thank you very much indeed for purchasing
“KS1 Signal Converter”.
In this manual, we explain the usage of “KS1 Signal Converter” in detail.
Please use it correctly after understanding the content enough.

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Cautions before using

■ Installation environment

◇Do not use the Unit in the following environments.

- ・Where the unit will be exposed to direct sunlight and where the ambient temperature is outside the range of 0 to 55 °C.
- ・Where the ambient humidity is outside the range of 30 to 85 % RH (at 20℃ non-condensing) and 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 the unit will be exposed to water, oil or chemicals
- ・Where organic solvents such as benzene, paint thinner, alcohol, or strong alkaline solutions such as ammonia or caustic soda might adhere to the product
- ・Where direct vibration or shock might be transmitted to the product, and where water might wet the product
- ・Places unaffected by power transmission lines, high voltage equipment, power cables, power equipment, radio transmitters and any other equipment that would generate high switching surge.

◇Please use the Unit according to the specifications described in this manual. Otherwise, it may malfunction or cause fire and an electric shock.

- ・Connect to the power supply in compliance with the rating.
- ・Refer to the wiring diagram to ensure proper wiring for the power supply, input and output.
- ・Do not perform wiring or installation with a live line. It may also lead to circuit burnout or fire.
- ・Do not add voltage and current to an output terminal from outside.

■ Static electricity

- ・Discharge static electricity touching the grounded metal etc. when you touch the unit.
- ・Excessive static electricity might be generated especially in a dry place.

■ Cleaning

- ・Wipe dirt of the main unit with soft cloth etc. When thinner is used, the unit might deform or be discolored.

■ Power supply

- ・Connect a breaker to the voltage input part for safety reasons and to protect the device.
- ・Do not turn on the power supply or input until all wiring is completed.
- ・Do not add abnormal voltage directly, otherwise it might damage internal circuit.

■ 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, the I/O wiring nor the power-supply voltage are wrong.
- ・Tighten the installation screw and the terminal screw surely.
- ・Use an electric wire applicable to the rated current.

■ Others

- ・Please note that it might take time to approve the communication again after power on and breaking the communication.

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Chapter 1 Unit's Features and Structure

1-1 Features

KS1 signal converter is a signal converter of the DIN rail installation type that converts serial-communication data (RS232C, RS485) into Ethernet data (Ethernet).
Data exchange by personal computers or PLC etc. is achieved by converting serial-communication data to Ethernet data and connecting directly with LAN cable.

Ethernet ⇔ RS232C/RS485

1-2 Unit's Name and Part Numbers

1-2-1 Main unit

Convert signal	Rating	Model No.
Ethernet ⇔ RS232C/RS485	24V DC	AKS1202

1-2-2 Accessories

Product name	Model No.
Power supply cable	AFPG805

1-2-3 Options

Product name	Contents	Model No.
Mounting rail	DIN rail	AT8-DLA1
Fastening plate	Use to fix to DIN rail	ATA4806
Terminal screw driver	Using when wiring Phoenix terminal	AFP0806
FP0 Slim type mounting plate Type 30 (10pieces)	Mounting plate that is used to install a unit vertically against the panel.	AFP0811
FP0 Slim type mounting plate (10 piece)	Mounting plate that is used to install each unit vertically against the panel.	AFP0803
FP0 Flat type mounting plate	Mounting plate that is used to install each unit horizontally against the panel.	AFP0804

1-2-4 Tool software

Product name	File name
IP Address searching tool	ConfiguratorWD.exe

You can download IP address search tool：ConfiguratorWD.exe from our website.

Please refer to the help in Configurator WD for the way to set.
Note) In case of setting by "Configurator WD",
MODE 4 of ④switch 1 should be set to OFF (software).

NOTICE!

Ethernet communication port of PC is required to transmit the settings to Signal converter.

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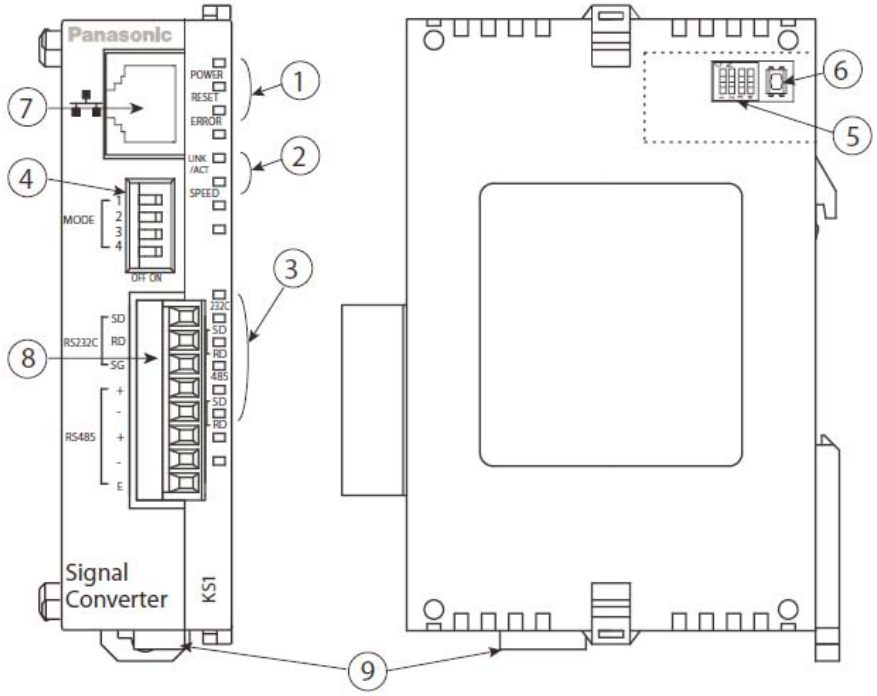
Chapter 2 Parts Name and Working

2-1 Parts Names



①Status indicator LED	Lighting or blinking according to the unit status ・ POWER: Lighting when power on ・ RESET: Lighting while pressing ⑥ reset switch ・ ERROR: Blinking when error occurs with this unit
②Input / Output indicator LED (LAN)	Lighting or blinking according to LAN communication status ・ LINK/ACT: Lighting when the link is approved Blinking during packet corresponding ・ SPEED: Turn off when 10BASE-communication Lighting when 100BASE-communication
③Input / Output indicator LED (RS232C/RS485)	Blinking according to serial communication status ・ SD: Blinking when this unit send data to the connected device. ・ RD: Blinking when this unit is received data from the connected device.
④Communication set switch 1 ⑤Communication set switch 2	Use to set communication conditions Only when MODE 4 switch of ④communication set switch 1 set to ON(hard), ④⑤ switches are available. Refer to 5-3-1 in detail. *All switches set to ON at initial.
⑥Reset switch	Pressing for 2 or more seconds makes system reset ・It can be cleared by power off and on again. ・However it can not be cleared when the serial-communication or wiring are wrong. ・In order to initialize all settings by Configurator WD, turn the power on with pressing this switch.)
⑦LAN connector	Use to connect Signal converter and PC etc. by Ethernet cable Connector: RJ45 Cable：UTP(Category 5) or more
⑧RS232C/RS485 terminal stand	Use to wire RS485 and RS232C lines
⑨Power supply connector	Use to connect the power supply ・Please use the attached power supply cable (AFPG805).

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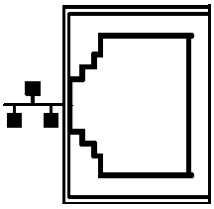
Chapter 3　Wiring and Installing Space

3-1 Main unit terminal arrangement

Be sure to wire correctly according to the terminal arrangement and wiring diagrams.

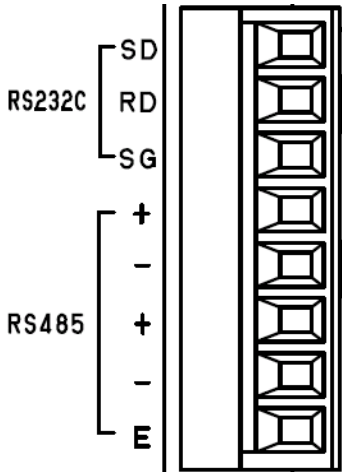
⑦LAN Connector



Connector: RJ45
Cable: UTP (Category 5 or more)

This unit recognizes automatically the cable, cross or straight.
Select cable according to the connected devices.

⑧RS232C/RS485 terminal stand



Terminal shape

Terminal No.
1
2
3
4
5
6
7
8

No.	Functions	
1	RS232C	SD
2	RS232C	RD
3	RS232C	SG
4	RS485	＋
5	RS485	－
6	RS485	＋
7	RS485	－
8	RS485	E

Terminal name

⑨Power supply connector

Use the attached power supply cable (AFPG805) to connect power supply.

Mark	Cable	
＋	Brown	24V DC
－	Blue	0V
⏚	Green	Function earth

Wiring of attached power supply cable

Note)

1. Please use twisted lines for power supply line (brown and blue) in order to reduce the noise effect from outside.
2. Please use a power supply of the insulation type with built-in protection circuit in order to protect against an abnormal voltage from power supply line.
3. Regulator on the unit is non-insulation type.
4. Use power supply voltage within the range of allowable voltage.

Rated voltage	24V DC
Operating voltage range	21.6~26.4V DC

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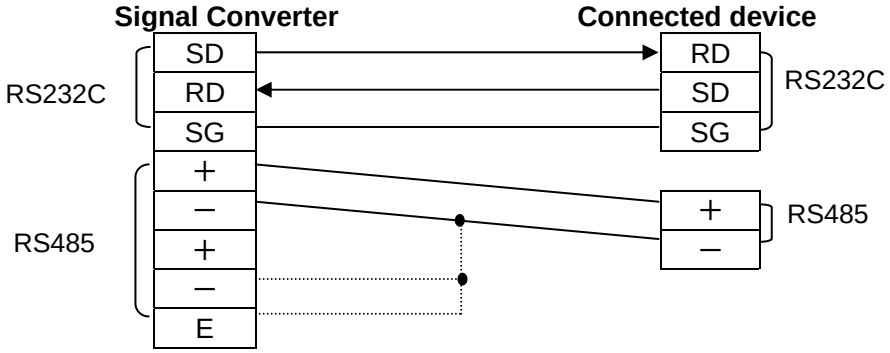
3-2 Wiring Diagrams



Cautions for wiring

(1)Terminal fastening torque should be **0.22 to 0.25 N·m**. (Use terminal driver AFP0806.)

(2) Use wire with its cross section of 0.3~1.0mm^2(AWG#22~16) for the terminal.

(3) When using this unit as terminal station of RS485, - (No.5 or No.7) and E (No.8) terminal should be shorted externally.

(4) Two + terminals (No.4 and No.6) of RS485 are shorted internally.

Two - terminals (No.5 and No.7) of RS485 are shorted internally.

3-3 Communication

Recommended Cable

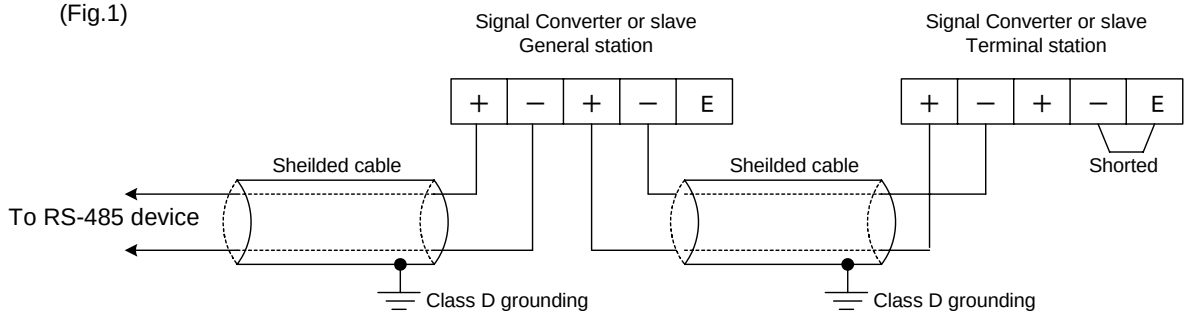
Use the transmission cables shown below for RS-485 communication system.

1) Use shielded type twist cables.
2) Use only one type of the transmission cables. Do not mix different types of the cables.
3) Use twist pair cables under a bad noise environment.
4) Be sure to connect with daisy chain the RS-485 transmission line between each unit. Connect one end of the shielded wire to an earth ground.
5) Use 2 recommended cables with the same cross section of 0.3 to 0.34mm^2 to connect to the RS-485 (+) and RS-485 (-) terminals.

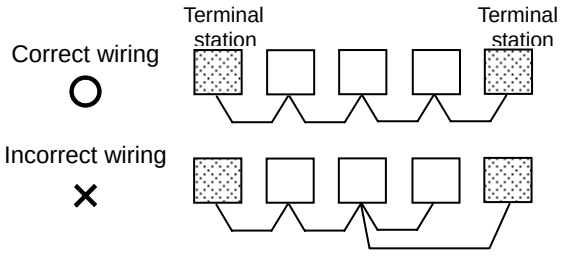
RS-485 Wiring and setting of terminal station

1) When using shielded cable for the RS-485 transmission line, ground one end.
Use a class D dedicated earth for grounding. Do not share a ground with other earth lines. (Fig.1)
2) Be sure to connect with daisy chain the RS-485 transmission line between each unit.
Do not use a splitter. (Fig.2)
3) With a terminal station, RS-485 (E) (No.8) and RS-485 (-) (No.5 or No.7) should be shorted. (Fig.1)

(Fig.1)



(Fig.2)



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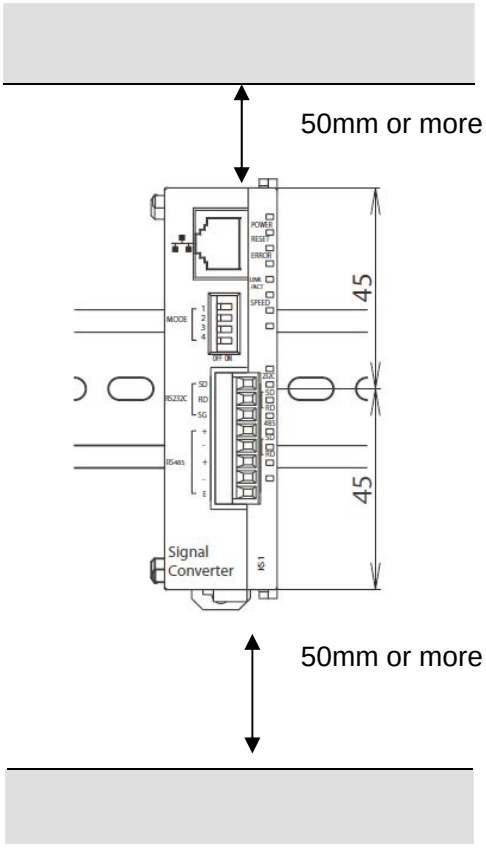
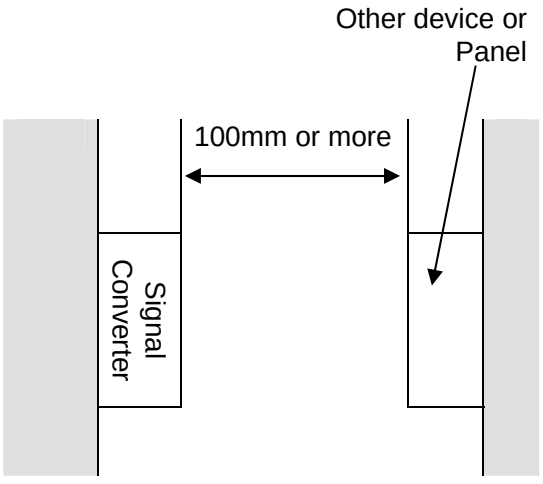
3-4 Installing space

・Leave the unit at least 50mm from both the wiring duct and the other device to allow heat radiation and unit replacement as shown below.



・Leave the unit at least 100mm from both a device that generate noise radiation, and the power line in order to avoid adverse affects of noise radiation and heat.



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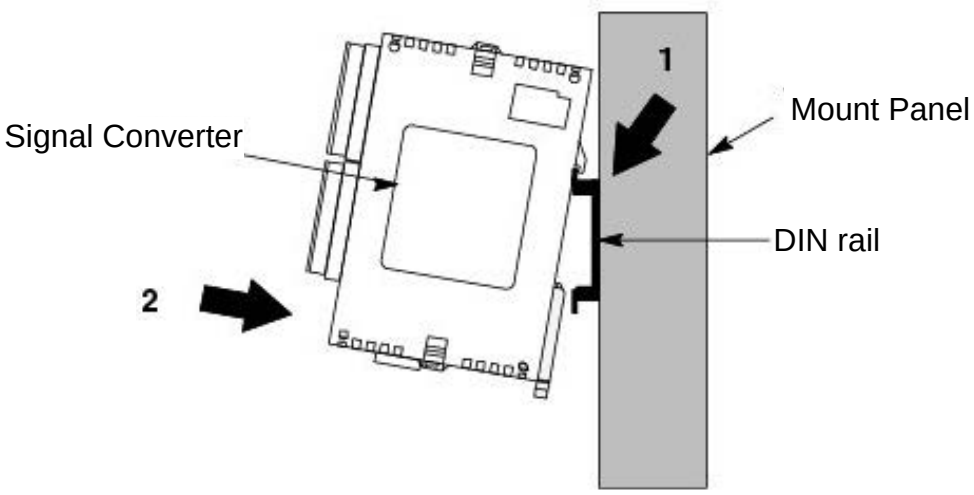
Chapter 4 How to Install

4-1. Install to DIN rail

You can install Signal Converter to DIN rail easily.

Procedure:

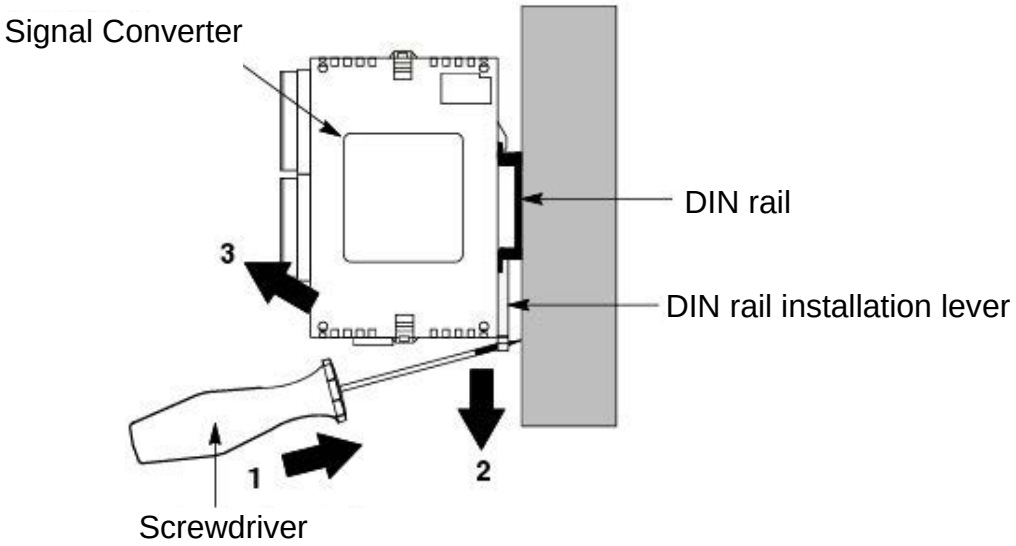
1. Hook the upper hook of main unit on DIN rail like 1
2. With supporting the upper hook, push main unit to DIN rail like 2 and fix the lower hook.



4-2. Remove from DIN rail

Procedure:

1. Insert a screwdriver in the DIN rail installation lever.
2. Pull the lever below.
3. Lift main unit and remove from the DIN rail.



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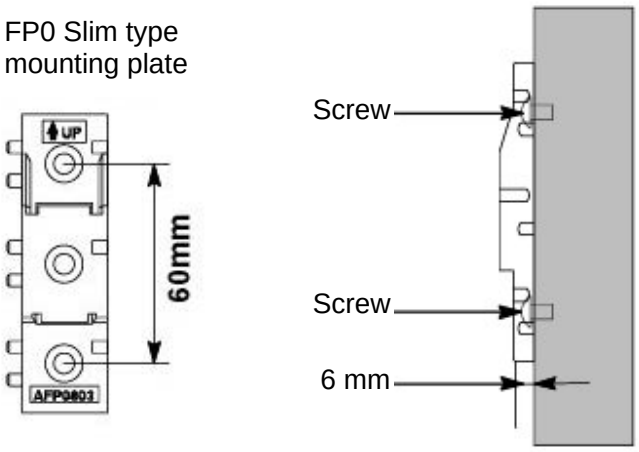
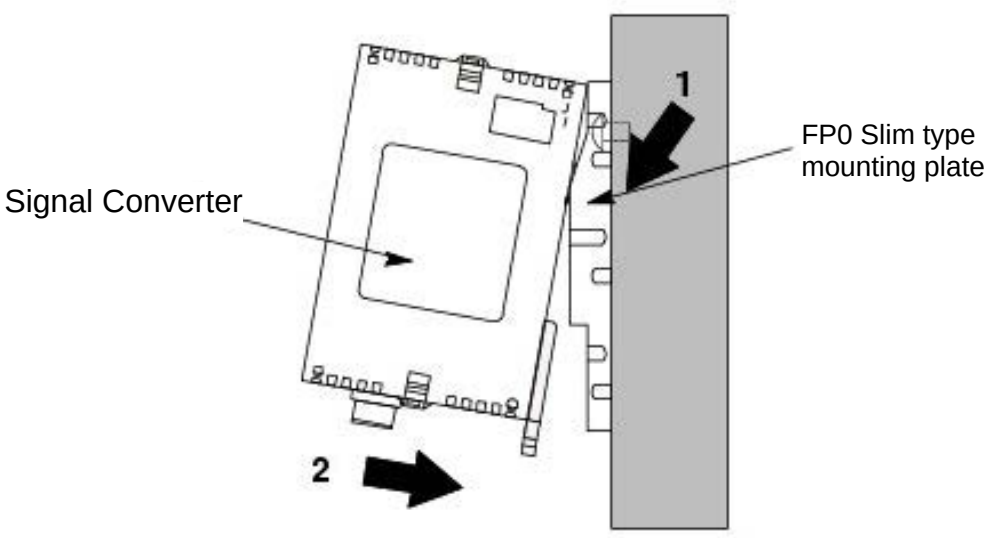
4-3. Install by using FP0 Slim type mounitng plate

Please use M4 screws to install FP0 slim type mounting plate (AFP0803) in the mounting plate.



Procedure:

1. Hook the upper hook of main unit on FP0 Slim type mounting plate like 1.
2. With supporting the upper hook, push main unit to the mounting plate like 2, and fix the lower hook.



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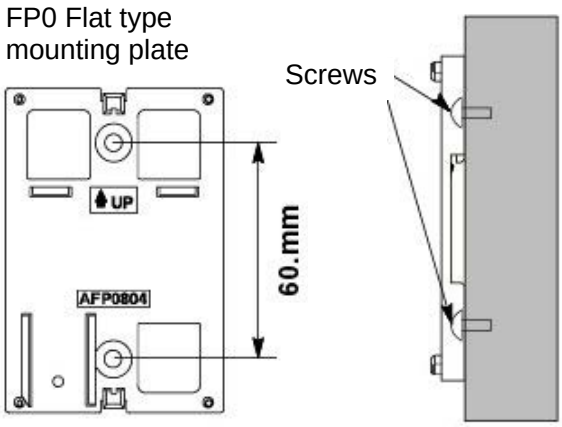
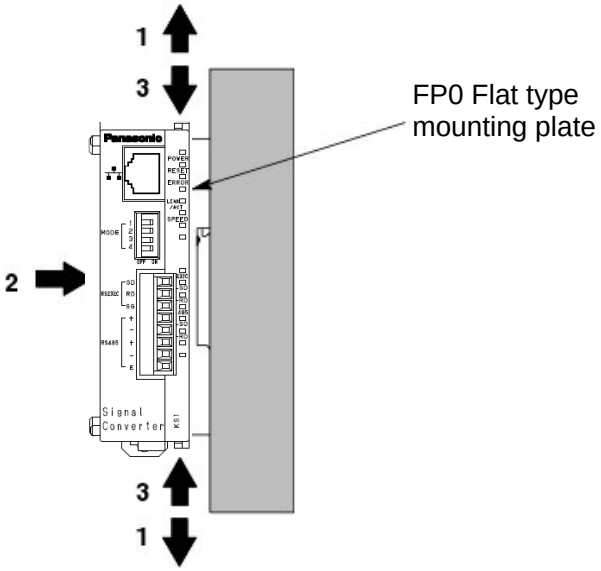
4-4. Install by using FP0 Flat type mounitng plate

Please use M4 screws to install FP0 flat type mounting plate (AFP0804) in the mounting plate.



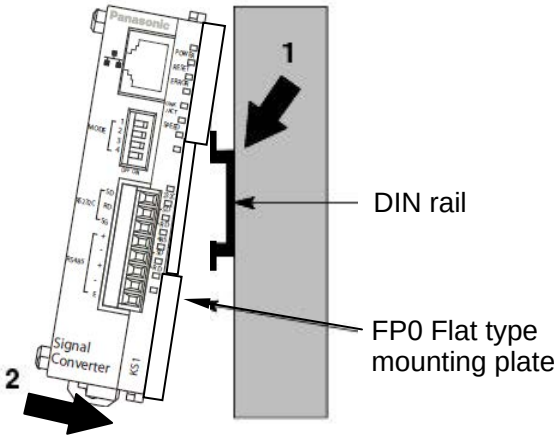
Procedure:

1. Please lift the expanding hooks of the upper surface and the bottom.
2. Please set up main unit in FP0 flat type mounting plate.
3. Please match the plate and the expanding hook, and push in the opposite direction.



NOTICE!

Signal converter with FP0 Flat type mounting plate is installed to DIN rail even if it is set from the side.



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Chapter 5 Setting

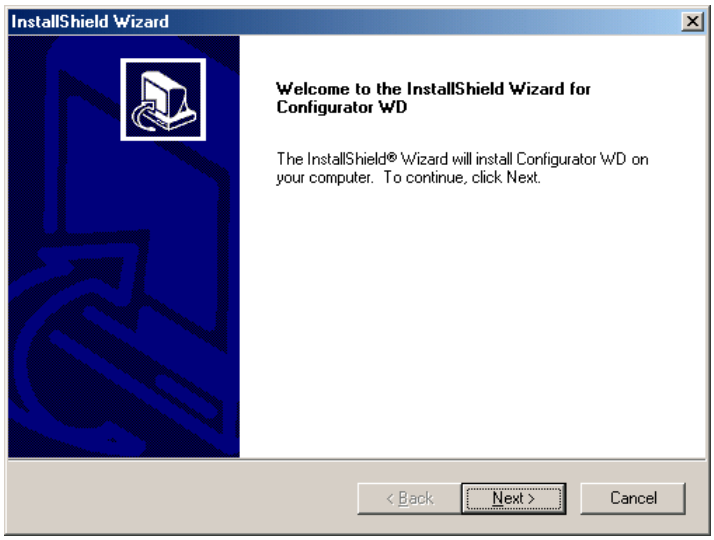
5-1 Install IP address search tool

A personal computer with Windows and Ethernet interface is required in order to set Signal converter.

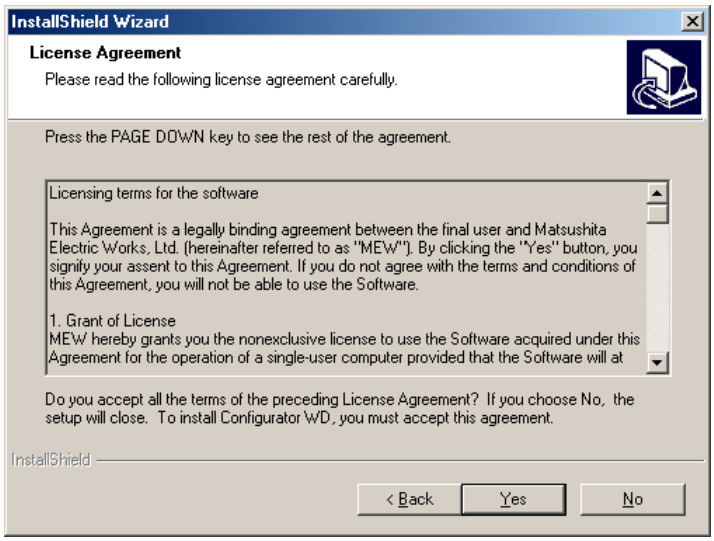
You can download the software from the homepage of Panasonic Electric Works, Ltd.

http://panasonic-denko.co.jp/ac/e/dl/software-info/common/tol_configwd.jsp

Download “Configurator WD” (IP Address search tool) V1.21 or more and install in a PC according to the below procedure.

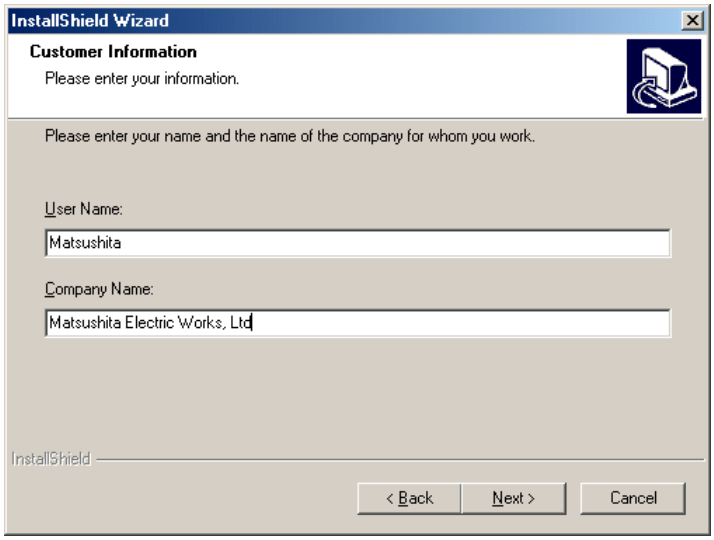


When the setup program is booted, a confirmation dialog box is displayed. Confirm the contents and click [Next].



License agreement confirmation box is displayed.

If you agree to all of the items in the displayed license agreement, click [Yes].



Fill in the [User Name] and [Company Name] and click [Next].

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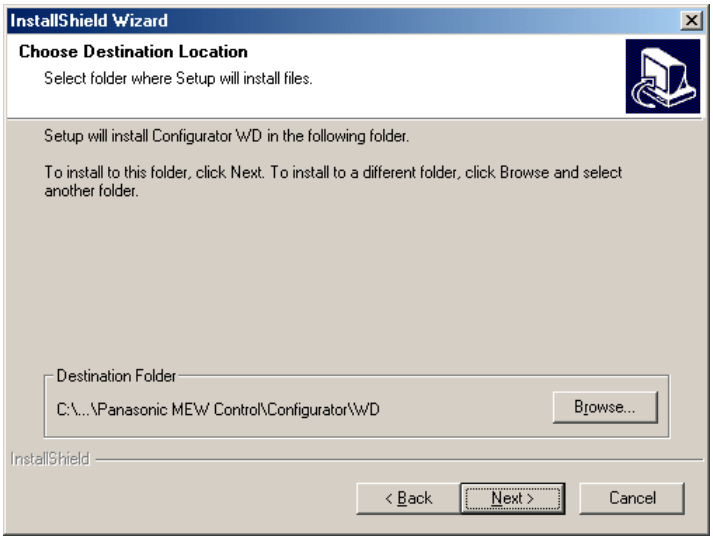
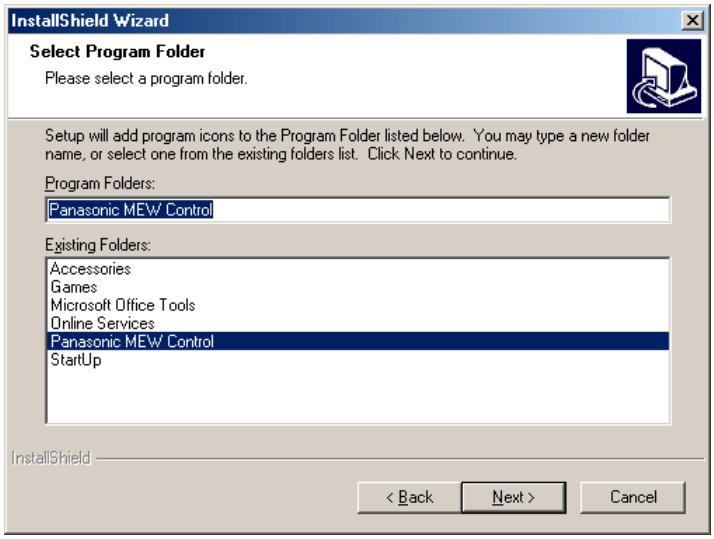
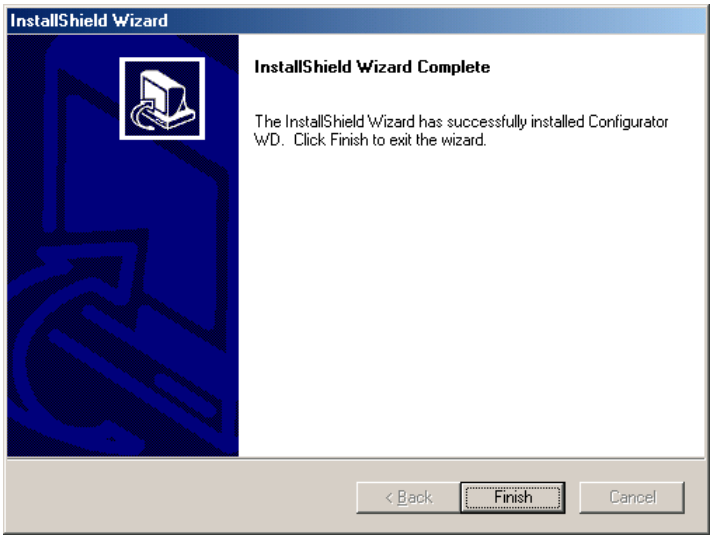


Select the installation destination and click [Next].



Select the program folder to install Configurator WD and click [Next].



Confirm the completion of the installation.

After complete the installation, click [start]-[program]-[Panasonic EW Control]-[Configurator WD] to start “Configurator WD”.

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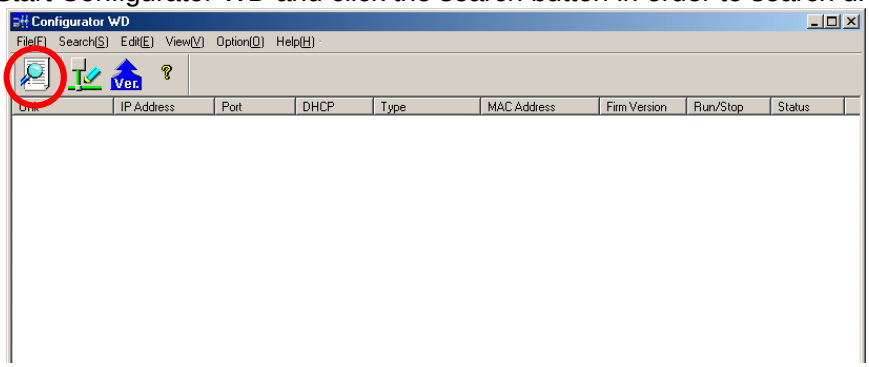
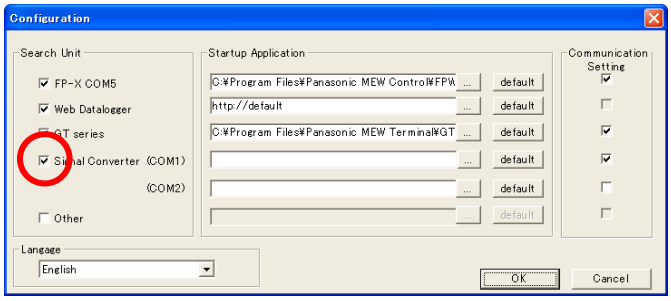
5-2 Set and Change IP Address

All devices connected with Ethernet network are required their own IP address.
192.168.1.5 is initially allocated to Signal converter as IP address.
If you want to change IP address, change here according to the procedure.

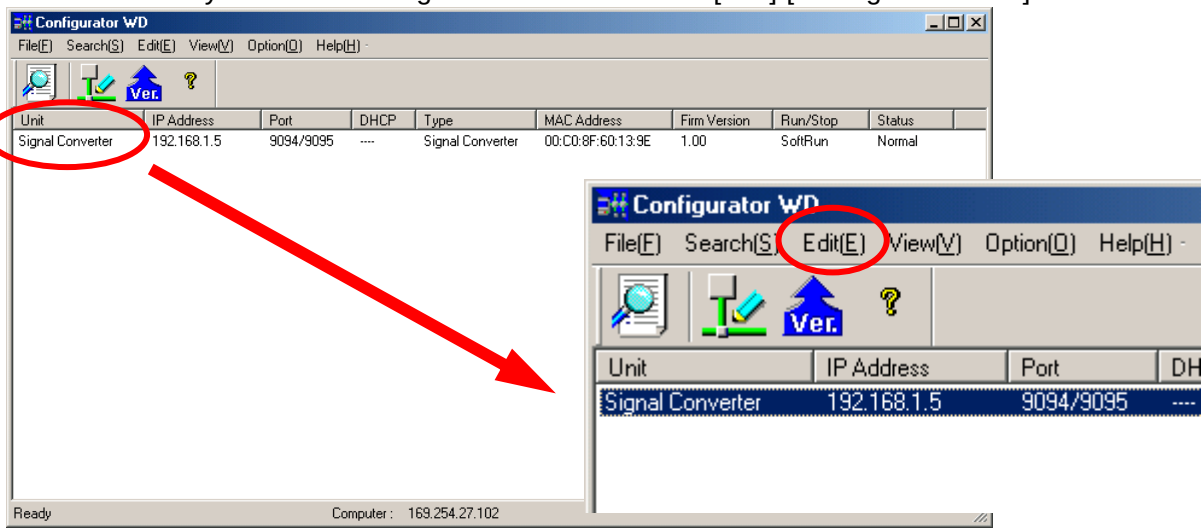
Start Configurator WD and click the search button in order to search units.



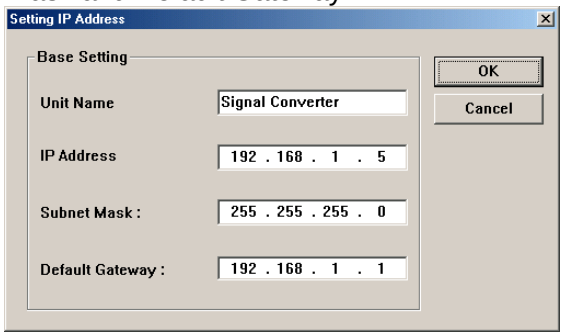
Before start searching, click [Option]-[Option] and confirm “Signal Converter” in “Search Unit” is checked.



The search result is displayed with respect to each unit.
Select a unit that you want to change IP address and click [Edit]-[Setting IP address].



Setting IP address window is displayed.
Specify the unit name and input IP address, Subnet Mask and Default Gateway.
Click [OK] to set new settings.



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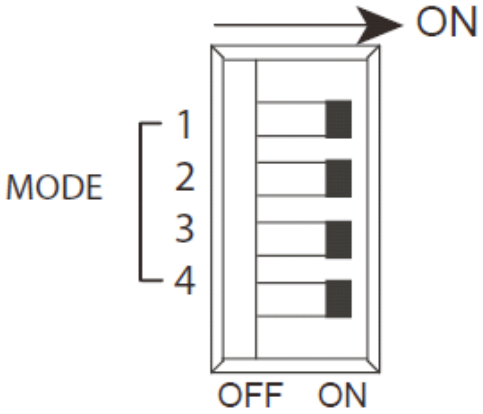
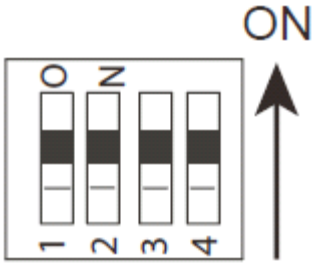
5-3 Communication Setting

You can set communication conditions by 2 methods, using the communication set switches on the front of main unit and using the setting software (Configurator WD).

5-3-1 Set by the communication set switches on the unit

Use ④Communication set switch 1 and ⑤Communication set switch 2 to set communication setting.





④Communication set switch 1

MODE	Item	OFF	ON
1	Transmission speed	Below table	
2			
3			
4	Setting method	Software	Hardware

⑤Communication set switch 2

No.	Item	OFF	ON
1	Parity	Not available	Available
2	Parity	Even number	Odd number
3	Stop bit	2	1
4	vacant		

note1)

<Table>

MODE 1	MODE 2	MODE 3	Transmission speed
OFF	OFF	OFF	115200bps
ON	OFF	OFF	2400bps
OFF	ON	OFF	4800bps
ON	ON	OFF	9600bps
OFF	OFF	ON	19200bps
ON	OFF	ON	38400bps
OFF	ON	ON	57600bps
ON	ON	ON	115200bps

Note 1）Only when MODE 4 of ④switch 1 is set to ON(Hardware),

④ and ⑤ switches' setting is available.

2）When MODE 4 of ④switch 1 is set to OFF (Software),

④ and ⑤ switches' setting is not available.

3）Data length is fixed with 8 bit.

4）Setting conditions are read when power turns on. You should set them before power turns on. If you change the settings while power turns on, some malfunctions might be occurred.

5）When setting by hardware (communication set switches), RS232C and RS485 communication settings are set as same. (If individual setting for RS232C and RS485 is required, use the setting software.)

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5-3-2 Set by setting tool Configurator WD

You can download the setting tool software “Configurator WD” from our web site.

http://panasonic-denko.co.jp/ac/e/

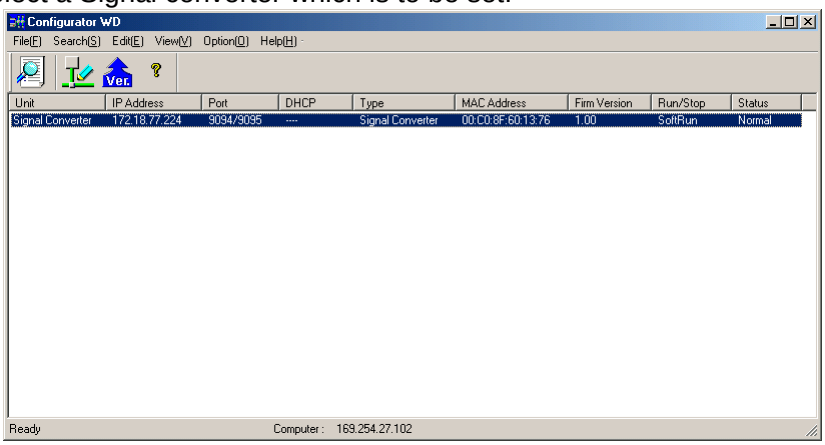
Use “Configurator WD” ver. 1.42 or more for KS1 signal converter ver. 1.03 or more, that supports Modbus TCP.

Please refer to the help in Configurator WD for the way to set.

Note) In case of setting by “Configurator WD”,

MODE 4 of ④switch 1 should be set to OFF (software).

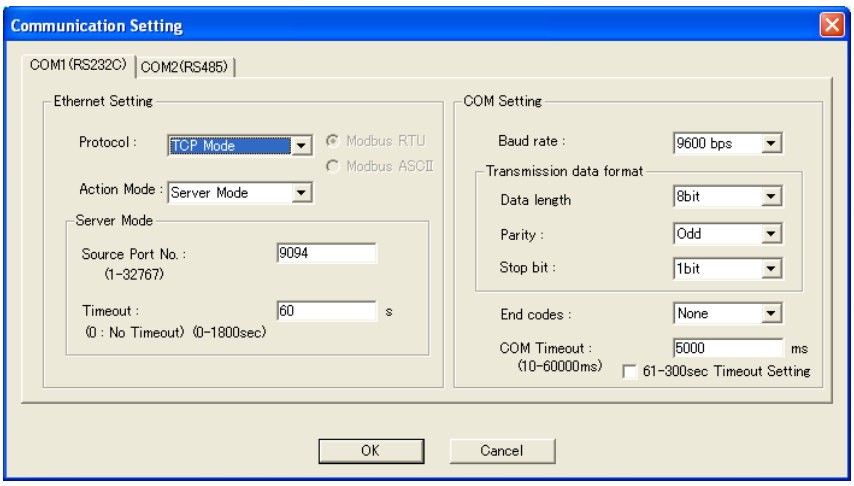
Select a Signal converter which is to be set.



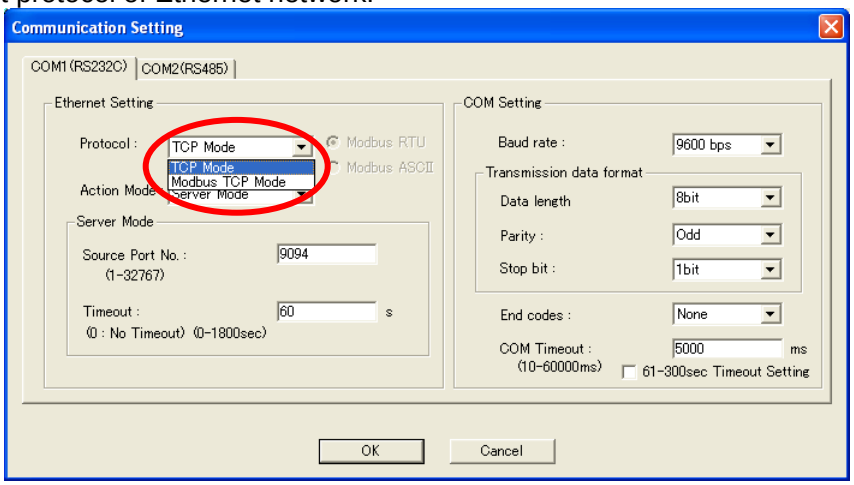
Click [Edit]-[Communication setting], and Communication setting window is displayed.

You can set the communication conditions for COM1 (RS232C) and COM2 (RS485) individually.

Note) Be sure to confirm COM No.



Set protocol of Ethernet network.



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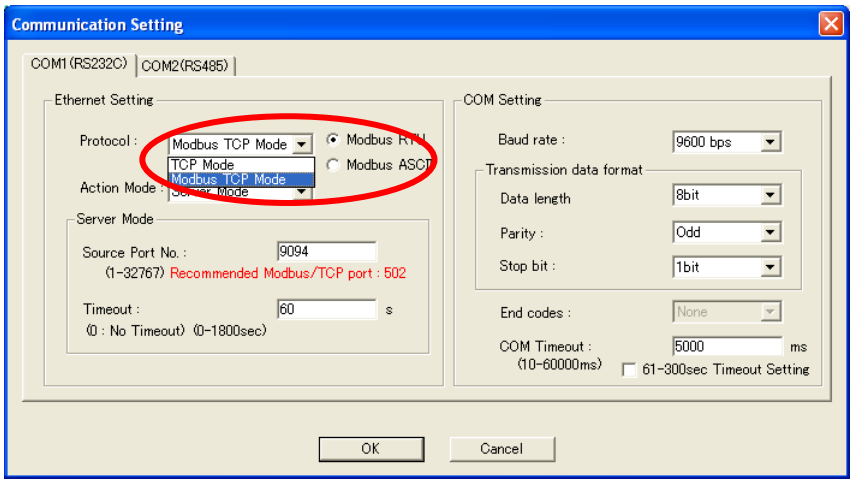
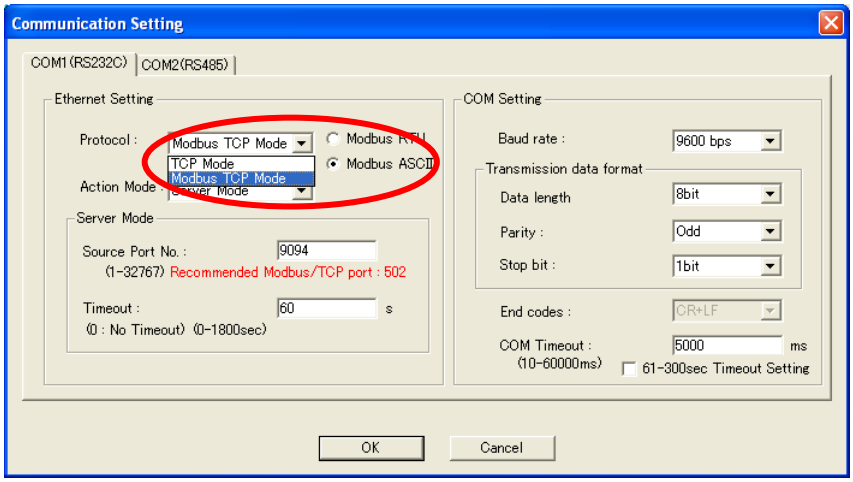
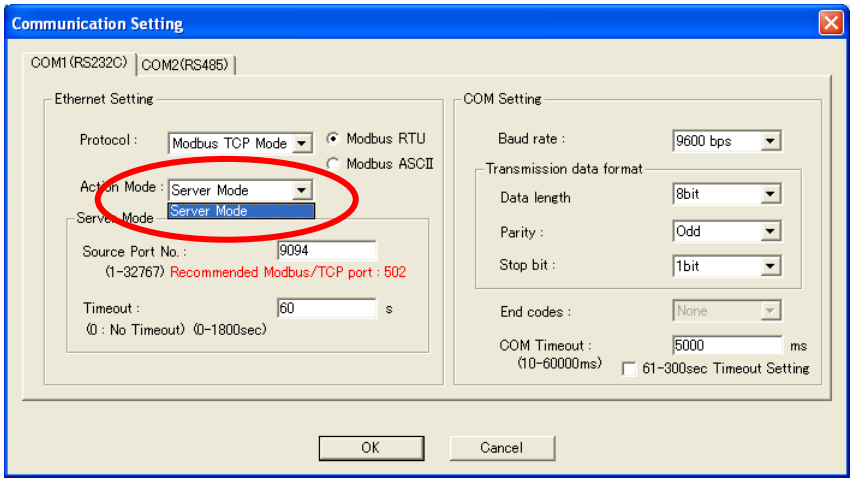
This is the display when you select MODBUS TCP (RTU).



This it the display when you select MODBUS TCP (ASCII).



Set action mode of PLC/PC for Ethernet network. At present, you can select only Server mode.



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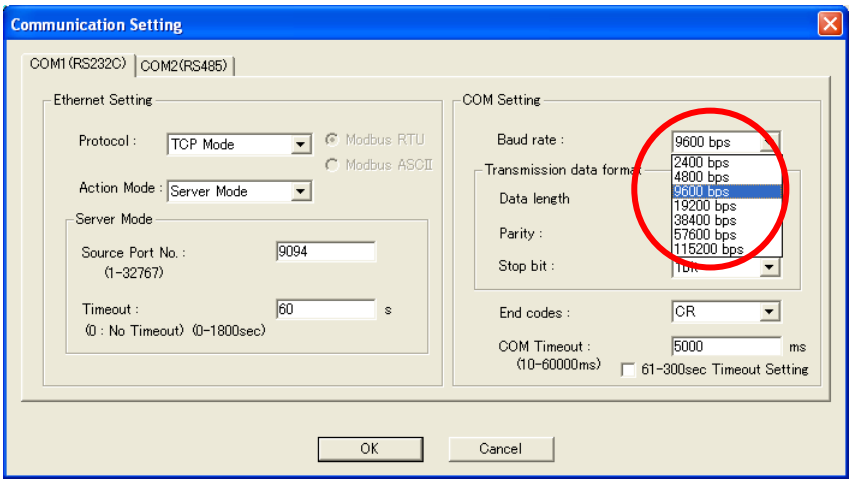
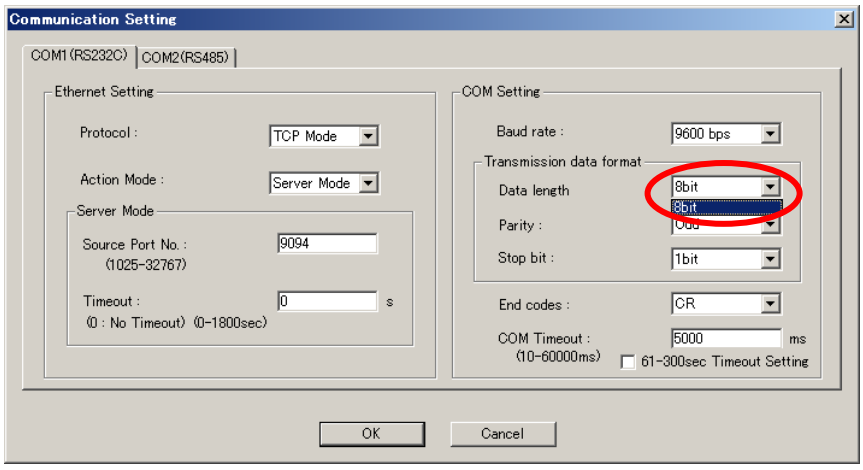
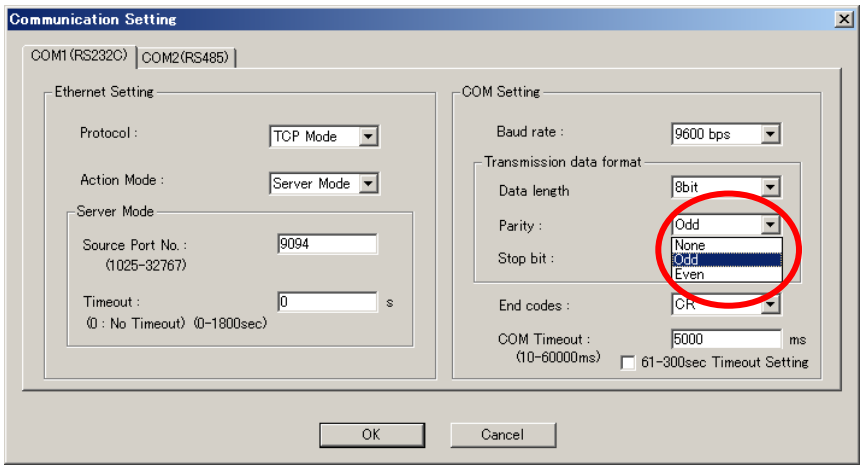
Set Baud rate of serial communication.
Default setting is 9600bps.
You can set it for COM1 (RS232C) and COM2 (RS485) individually.
When setting by hardware (communication set switches), the settings of COM1 and COM2 are common.



Set Data length of serial communication. At present, it fixes 8bit.



Set Parity of serial communication. Default setting is “Odd”.



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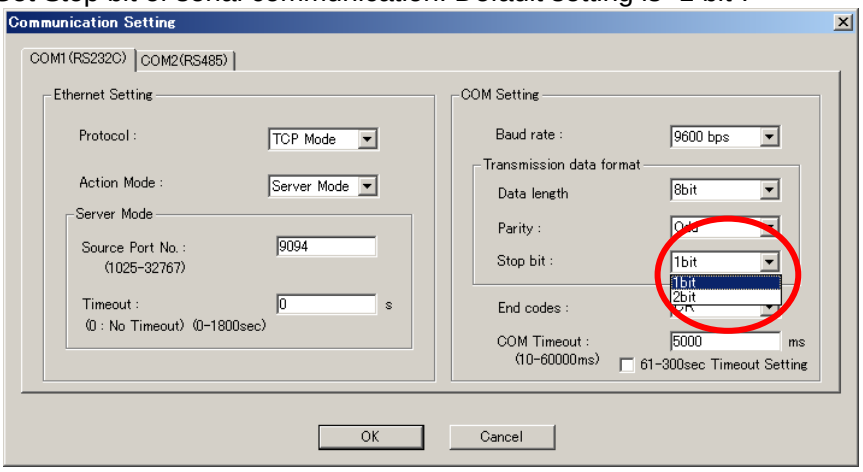
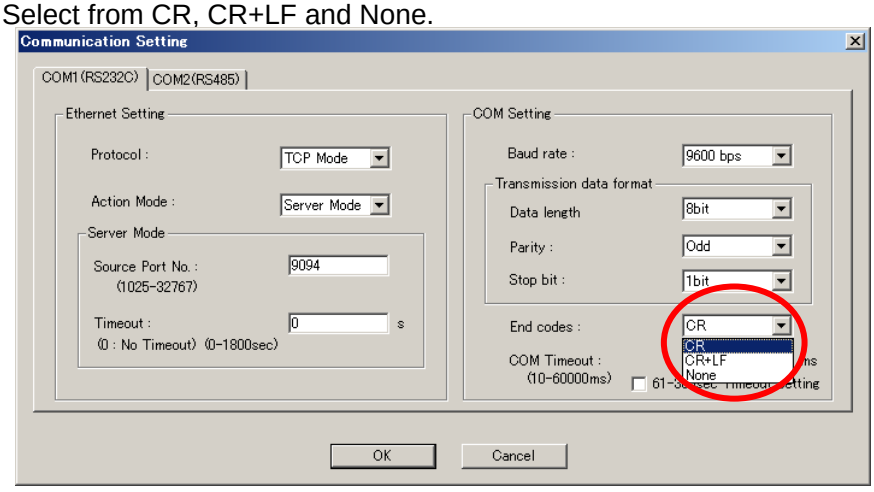
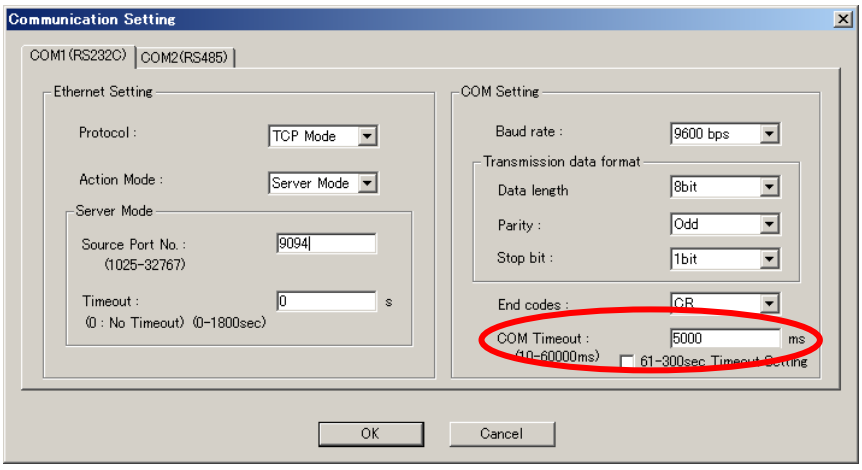
Set Stop bit of serial communication. Default setting is “1 bit”.



Set End codes of serial communication. Default setting is CR.
Select from CR, CR+LF and None.



Set COM Timeout of serial communication. Default setting is 5000ms (5s).
It means the time to wait responses from the devices connected by RS232C and RS485.
After passing the set time, it finishes the communication via the serial port.



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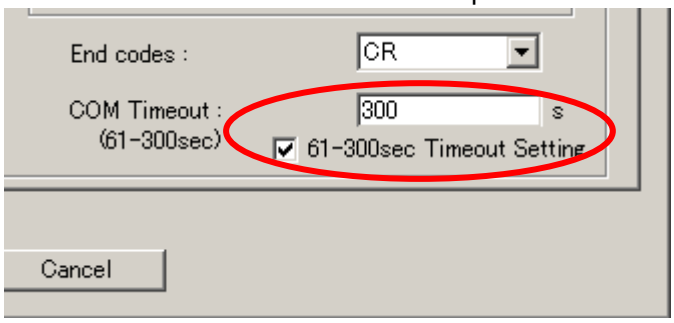
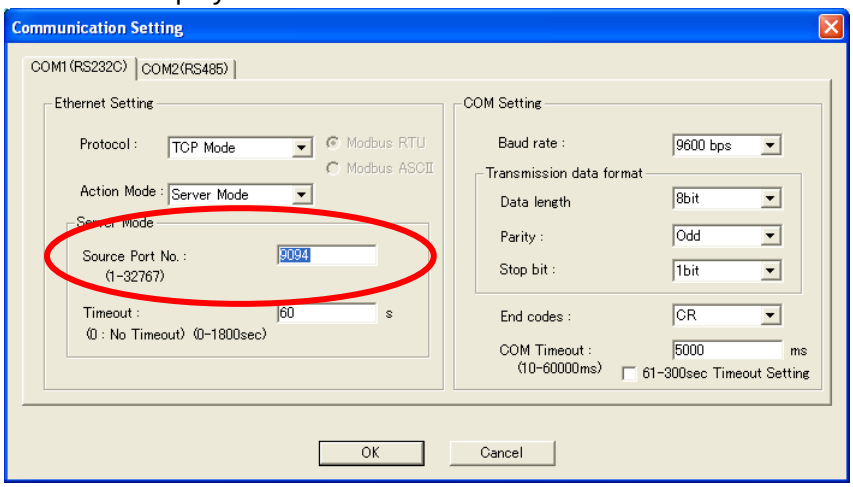
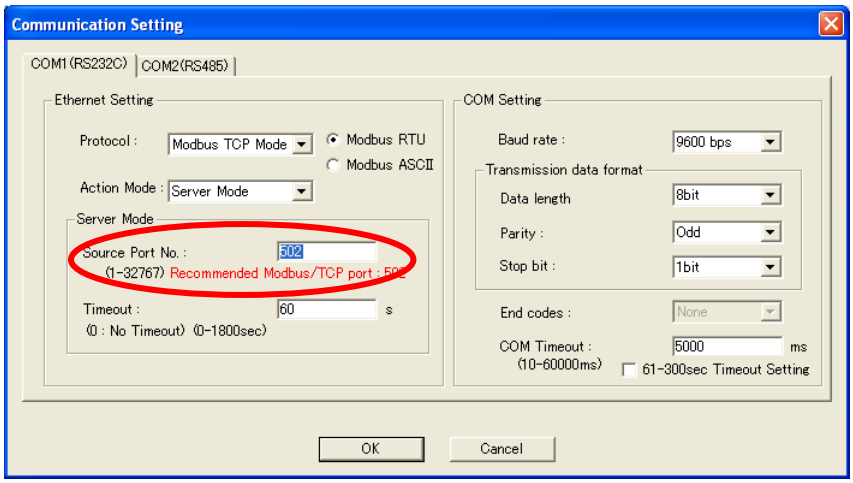
COM Timeout can be set 300 seconds or less by checking the box.
Uncheck the box : 10-60000msec possible to set every millisecond
Check the box : 61-300sec possible to set every second



Set Source Port No. of serial communication devices at server mode.
Default setting is 9094 for RS232C and 9095 for RS485.
This is the display when TCP mode is selected.



This is the display when Modbus TCP mode is selected for COM1 (RS232C).
It shows that the source port number of serial communication device to server.
“502”, the standard of Modbus TCP (RTU), is recommended.



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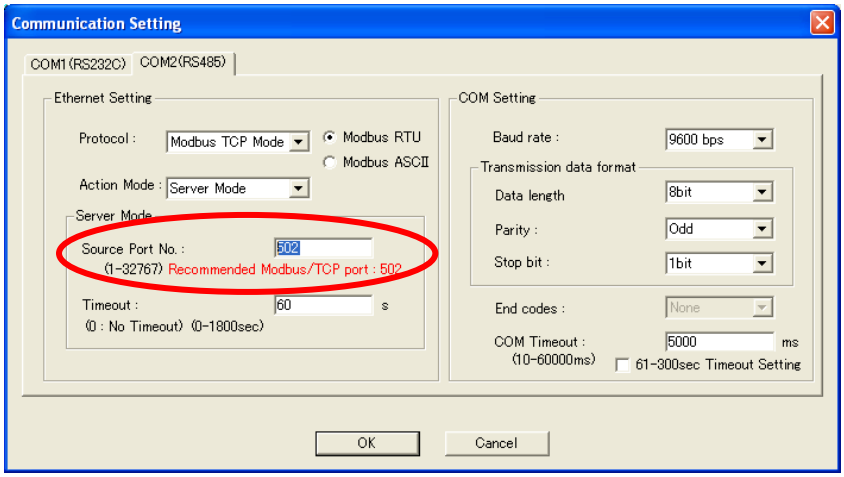
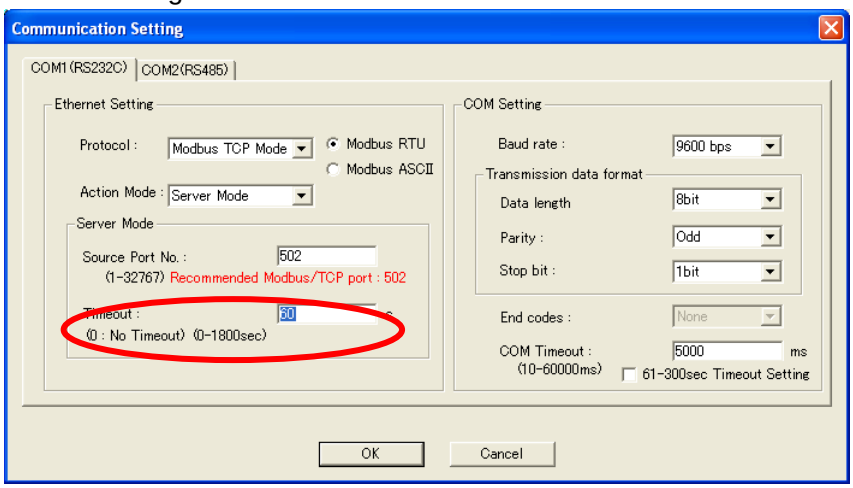
This is the display when Modbus TCP mode is selected for COM2 (RS485).
It shows that the source port number of serial communication device to server.
”502”, the standard of Modbus TCP (RTU), is recommended.



Note) The same port number can not be set for COM1 and COM2. Set the main serial port for Modbus TCP connection to “502” and set the other port to another number.
When “502” is set to COM1, set “9095” to COM2 and when “502” is set to COM2, set “9094” to COM1. And confirm that there is not the port number repetition from a client.

KS1 Signal Converter can connect 3 devices as RS232C server and 3 devices as RS485 server. Max connected devices as server side is 6 connections.
When some devices are connected as server, set Timeout time. When no signal from one server after setting timeout time, signal converter cut the connection with the server and wait for the next connection.
Default setting is 60sec.



Note1) In case of setting “60”,it cut TCP connection when there are no communication for 60 seconds, after establishing TCP connection.

2) KS1 Signal converter keeps the connection until time out setting time after establishing TCP connection if the client cut TCP connection correctly.
Set the timeout with considering break of Ethernet cable, cut out TCP connection due to power discontinuously of the unit and the case when it can’t establish connection.
When the client connects a new connection during KS1 Signal converter connection, it connects max 3 connections for one port.

3) In case of setting “0”, it keeps TCP connection until passing two hours with no communication (After passing two hours, the connection will be opened.)

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Chapter 6 Specifications

6-1 Main unit

Rated operating voltage	24V DC	
Rated power consumption	2.4VA	
Allowable operating voltage range	21.6～26.4V DC (90%～110% of rated operating voltage)	
Allowable momentary power-off time	10ms	
Ambient temperature	0 ～ +55℃	
Ambient humidity	30～85%RH (at 20℃ non-condensing)	
Breakdown voltage(initial)	Between the isolated circuits: 500V/1min note) Cut-off current: 10mA However protective varistor excluded.	RS485⇔ Power supply, Earth
Insulation resistance(initial)	Between the isolated circuits: 100MΩ以上 (measured with 500V DC)	
Vibration resistance	10 to 55Hz (1cycle/min) double amplitude:0.75mm (1h on 3 axes)	
Shock resistance	Min. 294m/s^2 (5 times on 3 axes)	
Dimensions (mm)	25 x 60 x 90	
Weight	Approx. 80g	

6-2 Communication Specifications Interface: RS232C, RS485

Interface		RS232C (non-insulated)	RS485 (insulated)
TCP port number note1)		9094 (initial)	9095 (initial)
Convert COM port note2)		COM1	COM2
Communication mode		1 : 1	1 : N
Number of connected units		1	99
Communication method		Full-duplex	Half-duplex
Synchronous system		Synchronous communication method	
Connected number note 5)		3	3
Transmission distance		15m	Max.1200m note2,3)
Transmission speed		2400,4800,9600,19200,38400,57600,115200bps	
COM receive time-out note 6)		Setting range 10ms to 60s	Setting range 10ms to 60s
Transmission Format	Data length	8bit (fixed)	
	Parity	Not available / Odd number / Even number	
	Stop bit	1, 2	
	End code	CR, CR＋LF, None	
Serial ⇔ Ethernet Conversion method		Command response method	

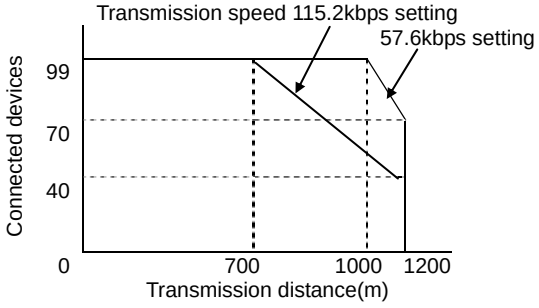
Note1)TCP port number is set from the range of 1 to 32767 by using the tool, Configurator WD and it compares to COM port. When connecting MODBUS TCP, “502” is recommended. In case of setting 502 to main COM port, set another number to the other port.

2) COM1 and COM2 can be used together.

3) Please check with the actual devices when some commercial devices are connected. The number of other connected devices, transmission distance, and transmission speed may be different according to using connected devices.

4）Transmission distance, speed and number of connected device should be decided by the right graph.

5) This is the maximum numbers of TCP connection that can connect to COM1 and COM1 as Ethernet sides.



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6) This shows the time to finish processing serial port when there is no response after command from COM port.
7) When the end code is CE or CR+LF, CR and CR+LF in the command are ignored.
8) In case of that the end code is none, it processes the data max 1460 byte per a IP packet.

6-3 Communication Specifications Interface: Ethernet

Interface		IEEE802.3u, 10BASE-T / 100BASE-TX
Connector		RJ45
Transmission specs.	Transmission speed	100Mbps / 10Mbps
	Communication method	Baseband
	Max. segment length	100m
Transmission cable		UTP(Category 5 or more)
Transmission method		Server connection
Source port number		1 to 32767 note2)
No transmission connection timeout		0 to 1800sec (initial: 60sec) note3,4,5)
Protocol		TCP / IP
Function		Auto-negotiation MDI / MDI-X Auto-cross over

Note1) You can select MODBUS TCP (RTU, ASCII) added to TCP for transport layer protocol of Ethernet. (Firmware V1.03 or more)
2) “502” is recommended when connecting MODBUS TCP. When MODBUS TCP is set to main COM port, set the other port to another port.
3) The time from when it comes no connection after establish TCP connection to cut TCP connection when connect by MODBUS TCP. If set to “0”, KS1 Signal converter keeps TCP connection until when MODBUS TCP client cut correctly. However, without transmission for 2 hours, it cut TCP connection.
4) When it doesn’t cut correctly during TCP connection, KS1 Signal converter keeps the TCP connection until the setting time. Considering read out cycle of using application, set the timeout.
5) With serial communication conditions, when the end code is set to CR or CR+LF, it cut the connection by receiving data 4k byte ore more.
When the end code is none, it proceeds by 1460 byte (max of one IP packet) or it doesn’t cut TCP connection without proceeding to store the several packets.

6-4 Factory setting

Setting method	Transmission speed	Data length	Parity	Stop bit
Hardware	115200 bps	8 bit (Fixed)	Odd number	1 bit
Software	9600 bps			

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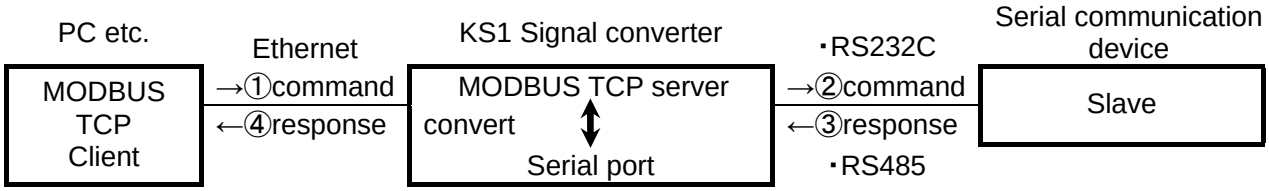
6-5 Outline of MODBUS TCP and Transmission format

6-5-1 Connections (When set to MODBUS TCP)



・MODBUS TCP server (KS1 Signal converter) is connected from MODBUS TCP client.

・MODBUS TCP server is designated by specific IP address and port number.

・MODBUS TCP server (KS1 Signal converter) converts data from MODBUS TCP client (command) to MODBUS RTU or MODBUS ASCII and send from the serial port. After that, it converts data from the serial port (response) and send to MODBUS TCP client.

6-5-2 Compare Packet of MODBUS TCP and MODBUS (RTU and ASCII)

①Example of Command data from MODBUS TCP client to MODBUS TCP server

Item	Transmit ID	Protocol ID	Transmit byte	Transmit data
Ex. of setting value	0001	0000	0006	0103238D0001
Meaning	ID of Transmit unit	Fixed value	Number of byte of transmit data	Slave unit No.01 Function code 03 Data address 238D Data 1 byte
Setting range	00 to FF	Fix to 0000	Any value	Any value

This shows the command to read out 1 byte data designated by 238D send from MODBUS TCP client to serial communication device number 01.

②Example of MODBUS RTU Command from MODBUS TCP server (KS1 Signal converter) to Serial slave unit

Item	Data	CRC
Ex. of setting value	0103238D0001	1FA5
Meaning	Slave unit No. 01 Function code 03 Data address 238D Data 1 byte	CRC value of data
Setting range	Any value	Calculated value 2 bytes

・This shows the command to read out data designated by 238D send from MODBUS TCP server (KS1 Signal converter) to serial communication device number 01.

・Pick up transmit data from MODBUS TCP client, and when it is MODBUS RTU, it send command with additional CRC, and when it is MODBUS ASCII, it send command with additional LRC.

③Example of MODBUS RTU response from serial communication device to MODBUS TCP server (KS1 Signal converter)

Item	Data	CRC
Ex. of setting value	0103020128	B9CA
Meaning	Slave unit No. 01 Function code 03 Data 2 byte Data value 0128 (Hex)	CRC value of data
Setting range		Calculated value 2 bytes

・This shows the response to send 2 bytes data 0128(Hex) designated 238D send from serial communication device number 01 to MODBUS TCP server (KS1 Signal converter).

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④Example of response from MODBUS TCP server to MODBUS TCP client
(Normal)

Item	Transmit ID	Protocol ID	Transmit byte	Transmit data
Ex. of setting value	0001	0000	0006	0103238D0001
Meaning	ID of Transmit unit	Fixed value	Number of byte of transmit data	Slave unit No.01 Function code 03 Data bytes 2 Data 0128(Hex)
Setting range	00 to FF	Fix to 0000		

・This shows the response to send from MODBUS TCP server (KS1 Signal converter) to MOSBUS TCP client after conversion 2 bytes data 0128(Hex) designated 238D send from serial communication device number 01 to transmit data.
・When it is MODBUS RTU, it converts to transmit data delete CRC, and when it is MODBUS ASCII, it converts to transmit data delete LRC.
Transmit data is total 5 bytes and the number of byte of transmit data is 0005.

⑤Example of response from MODBUS TCP server to MODBUS TCP client
(Error) Data error 1

Item	Transmit ID	Protocol ID	Transmit byte	Transmit data
Ex. of setting value	0001	0000	0003	00800A
Meaning	ID of Transmit unit	Fixed value	Number of byte of transmit data	Error code 0A

・This shows the example of error response when it send command without transmit ID, protocol ID and transmit byte.
・It response ”0A” in case of the below.
Transmit byte is under 6 bytes.
MOSBUS TCP command format error
MODBUS address in MODBUS TCP command error
Receive 4kbyte or more response from MODBUS slave unit.

(Error) Data error 2

Item	Transmit ID	Protocol ID	Transmit byte	Transmit data
Ex. of setting value	0001	0000	0003	01830B
Meaning	ID of Transmit unit	Fixed value	Number of byte of transmit data	Error code 0B

・It response "0B" when it doesn’t receive response such as there is no slave or serial line is opened etc.

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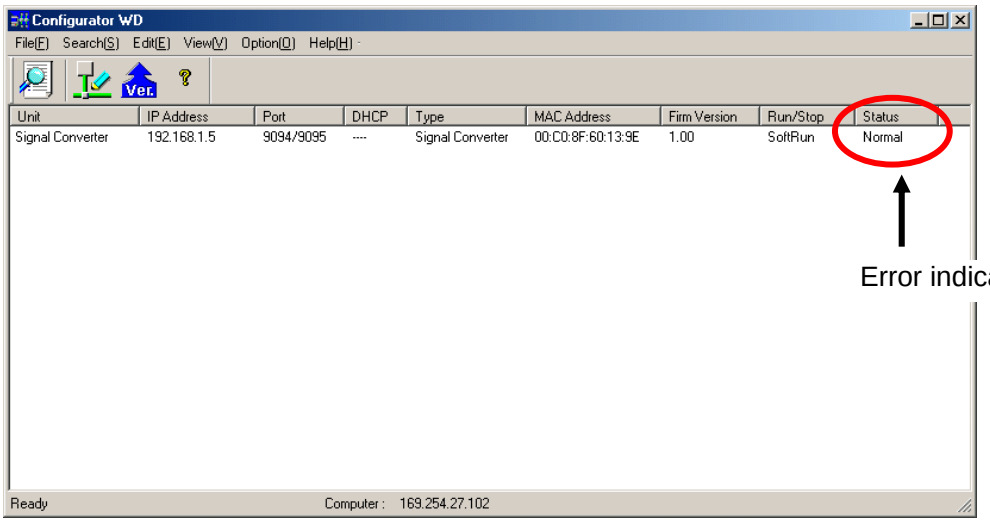
Chapter 7 Error indication and Clear Error

7-1 Error indication

You can see some errors' contents by Configurator WD status error code.

Error code	Item	Contents
0x26	ROM error	Flash ROM setting read failure
0x21	RAM error	RAM read failure
0x60	System error 1	Task formation failure
0x61	System error 2	RS485, RS232C initialize failure
0x62	System error 3	TCP initialize failure



7-2 How to clear the error

You can clear signal converter's error when error LED is blinking by the below 2 methods.

・Power off and on again or pressing for 2 or more seconds make system reset.

・Turn the power on with pressing reset switch in order to initialize the settings.
(It initializes all settings by software.)

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Revision History

Issue Date	Manual no.	Content of revision
June, 2007	ARCT1F437E	First edition
August, 2007	ARCT1F437E-1	Second edition Added the explanation of the new features of the setting Timeout along with the upgrade of KS1 Signal Converter and Configurator WD.
October, 2007	ARCT1F437E-2	Third edition Added the explanation of the new features of the setting Ethernet Timeout along with the upgrade of KS1 Signal Converter.
March, 2010	ARCT1F437E-3	Fourth edition Added the explanation about MODBUS TCP along with the upgrade of KS1 Signal Converter.

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