Quick Reference

PAPERLESS RECORDER

Type : GR200

GR21E2 2010.01

SHINKO TECHNOS CO., LTD.
OVERSEAS DIVISION

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Thank you for your purchasing our Paperless Recorder (Type: GR200)

- Read this instruction manual carefully to ensure correct installation, operation and preparation. Incorrect handling may lead to accident or injury.
- Specifications of this unit is subject to change without prior notice for improvement.
- Modification of this unit without permission is strictly prohibited.
  We will not be bear any responsibility for a trouble caused by such a modification.
- This instruction manual should be kept by the person who is actually using the unit.
- After reading the manual, be sure to keep it at a place easy to access.
- This instruction manual should be delivered to the end user without fail.

Manufacturer : Shinko Technos Co., Ltd.
Type : Shown on nameplate of Recorder
Date of manufacture : Shown on nameplate of Recorder
Product nationality : Japan

Note: Windows is a registered trademark of Microsoft Corporation.
Modbus is a registered trademark of AEG Schneider Automation International.
Other product names are registered trademarks or trademarks of each manufacturer.

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Confirming Specifications and Accessories

Before using the product, confirm that it matches the type ordered.
(For model code, please refer to page 12.)
Confirm that all of the following accessories are included.

Product name			Quantity	
			Panel-mounted	Portable
(1)	Panel-mounting bracket		2	–
(2)	CD-ROM	PC support software instruction manual (both in Japanese and English)	1	1
(3)	Panel packing for front face		1	–
(4)	AC power cord (2m)		–	1
(5)	Power supply noise filter		1	1
(6)	Quick reference (this manual)		1	1

Related Information

Refer to the following reference materials for details about the items described in this manual.

Content	Document	Reference Number
Specifications	Catalogue	78-201-GR2(E)
Operation Method	Instruction Manual for Paperless Recorder (type: GR200)	GR22E2 2010.01
Communication Function	Communication Functions Instruction Manual (RS485 Modbus/Ethernet) for Paperless Recorder	GR2CE1 2008.07
Parameter Loader (software)	Parameter Loader Instruction Manual for Paperless Recorder	GR2LE1 2008.07
Data Viewer (software)	Data Viewer Instruction Manual for Paperless Recorder	GR2VE1 2008.07

Please Read First

Caution on Safety

Read this "Caution on Safety" carefully before using the instrument.

- Be sure to observe the instructions shown below, because they describe important information on safety. The degree of danger is classified into the following two levels: "WARNING" and "CAUTION."

The signs and their meanings are as follows:

⚠ **WARNING**	Improper handling may cause dangerous situations that may result in death or severe injury.
⚠ **CAUTION**	Improper handling may cause dangerous situations that may result in moderate or light injuries or property damage.

1. ⚠ WARNING

1.1 Installation

- This equipment is intended to be used under the following conditions.

Ambient temperature	0 to 50°C (panel mounted type) 0 to 40°C (portable type or with Ethernet function)	
Ambient humidity	20 to 80% RH (with no condensation)	
Installation category	II	by IEC1010-1
Pollution degree	2	

- IP : 50 (Front) / 20 (Terminal)
- When there is a possibility that the abnormality of this instrument may cause a major accident or damage to other instruments, externally install an adequate emergency stop circuit or a protection circuit to prevent accidents.
- This product is provided with a built-in fuse that cannot be replaced by the customer. Therefore, we recommend you to separately provide adequate fuses externally. (Rating: 250V, 1A)
  The details of the built-in fuse are as follows.
  Type : TR-5 19372, 3.15A (Manufactured by Wickmann-Werke GmbH)
  Rating : 250V, 3.15A, Type: T (Slow-blow type)
- Feed the power-supply voltage to specifications to prevent damages to and breakdown of the instrument.
- Never turn on the power before all the mounting and wiring work are finished to prevent electric shock, malfunction or failure of the instrument.
- Never use this instrument in an environment where flammable or explosive gases exist, since this is not of intrinsically safe construction.
- Never disassemble, remodel, modify, or repair this instrument. Otherwise malfunction, electric shock, or failure may result.
- Never touch the terminal while the instrument is being energized. Otherwise electric shock or malfunction may result.

1.2 Maintenance

- Turn off the power before attaching/detaching the module/unit. Otherwise electric shock, malfunction or failure may result.
- We recommend you to perform periodic maintenance for the safe and continuous use of this instrument, because consumable parts or those which deteriorate with time are mounted in this instrument.
- Do not block the ventilation holes at the top and the bottom of this instrument. Otherwise a failure, malfunction, shortened service life, or fire may result.

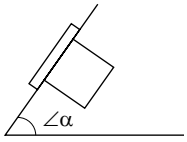
2. ⚠ Caution

2.1 Cautions when installing

- Never use the instrument if it is found damaged or deformed when unpacked. Otherwise a fire, malfunction, or failure may result.
- Check that the instrument is to the proper specifications. Otherwise damage or failure may result.
- Do not give a shock to the instrument by falling or toppling it. Otherwise damage or failure may result.
- Avoid installing the instrument in the following places.
  - A place where the ambient temperature goes beyond the range from 0 to 50°C (0 to 40°C when the instrument is mounted with its side face closely contacted, or in the case of portable type, or provided with Ethernet function)
  - A place where the ambient humidity goes beyond the range from 20 to 80% RH
  - A place where condensation occurs
  - A place where corrosive gases (sulfuric gases or ammonia, etc., in particular) or flammable gases exist
  - A place where vibration or impact may be applied to the instrument (permissible continuous vibration condition: 4.9 m/s^2 or lower)
  - A place subjected to water, oil, chemicals, vapor, or steam
  - A place subjected to dust and high in salt or iron content
  - A place where inductive interference may have a great effect, thus causing static electricity, magnetism, or noises
  - A place subjected to heat accumulation by radiant heat or the like
  - A place that is affected by electromagnetic wave from wireless machine or portable telephones.
- If the instrument is installed near other electronics instruments, such as TV in particular, noises may be caused. Take the following measures in these cases.
  - Place the instrument as far from the TV or the radio as possible (1m or more)
  - Change the orientation of the antenna of the TV or the radio.
  - Use separate receptacles.

2.2 Cautions when installing to the panel

- When mounting this instrument against the panel, pay attention not to apply stress to the case. Otherwise the case may be damaged.
- Fix the instrument by fastening the screws at the top and the bottom of the supplied mounting bracket.
- The panel to be used should be more than 2 mm thick.
- Excessive torque will cause damage to front panel frame or result in case deformation.
  Tightening torque: 0.2 N·m
- If the panel front is subject to water splashes, use panel packing between the unit and panel.
- Mount the unit horizontally, with no tilt to the left or right (The forward tilt should be 0° but the unit may be inclined 0 to 30° rearwards).



∠α = 60 to 90°

2.3 Cautions for wiring connection

- Only authorized workers should perform wiring. Improper wiring may cause fire, failure, or electric shock.
- Be sure to ground the instrument. Otherwise electric shock or malfunction may result.
- When cables are connected to terminals of the recorder unit, don't apply pulling force to them excessively. Excessive force to the terminal may result in damage to the terminal or cable.
- Use the power cable that has the performance equivalent to or higher than 600-V vinyl insulated power cable (JIS C3307). Install the attached noise filter within approximately 20cm from the power terminal of this instrument. (Wind the power cable 1 to 2 turns. The internal diameter of the ferrite core is 8mm.) Do not connect two or more instruments in parallel.
- Up to 2 solderless terminals should be used when connecting cables to terminals. Be sure to use an insulation cap.
  (Note)
  1) At the completion of wiring of the input terminals, be sure to close the rear cover to ensure the compensation of reference contact when thermocouple input is used.
     In case of thermocouple input, follow the steps to stabilize temperature at the terminal.
     - Be sure to attach input terminal cover.
     - Don't use a thick cable to prevent the effect of radiation. The cable with a diameter of 0.5 mm or less is recommended.
     - Don't mount other instruments near a fan to keep temperature stable.
  2) For connection of lead wires to terminals, use of sleeve-insulated clamping terminals (for M3 screw) is recommended.
  3) This unit has no power fuse which is removable. Mount a power fuse outside the unit as needed.
     Recommended fuse rating: 250V AC, 1A
  4) Don't loosen screws that are secured to the terminal case and power terminal.
- Input signal cables should be wired separately as far as possible (30 cm or more) from power lines and high-voltage lines to minimize the effect of inductive noise. Shielded cables should preferably be used. In this case, the shield braids should be earthed at one point.
- If a large noise is generated from the power supply, provide an isolating transformer and use a noise filter.
- Install the instrument paying attention to prevent foreign matters such as scraps, electric wire chips, and iron powder from entering in the instrument.

- Do not use the wires other than the specified compensation conducting wires for the thermocouple input connection. Otherwise improper indication or malfunction may result.
- Use a wiring cable with low resistance and with small resistance difference among the three wires for the resistance bulb input connection. Otherwise improper indication or malfunction may result.

2.4 Cautions in Operation

- Check every six months that the terminal screws and mounting screws are securely fastened. Loose screws may cause fire or malfunction.
- When changing the setting during the operation or forcibly outputting, starting or stopping the instrument, be sure to check that safety is ensured. Improper operation may result in damage or failure of the instrument.
- Be sure to keep the attached terminal cover mounted on the terminal block during the operation. Otherwise electric shock or fire may result.
- Stop using the instrument if it is immersed in water. Otherwise electric leak, electric shock, or fire may result.
- Never use organic solvents such as alcohol or benzene when cleaning this instrument. Do not directly water the main unit. Otherwise deterioration, failure, electric leak, electric shock, or fire may result. When cleaning the main unit, wipe with a dry cloth.
- Dispose the instrument as an industrial waste.

2.5 Handling memory card (Compact Flash)

- For the memory card, use Sandisk's compact flash memory (URL: http://www.sandisk.com). A compact flash manufactured by other companies may not be used or cause other problems.
  1) Be sure to format the memory card with the PC you use.
     Format it as FAT16 or FAT. If it is formatted as NTFS, for example, it cannot be used because this instrument does not recognize it.
  2) The memory card should be inserted in the proper direction and fixed securely to the slot.
  3) Don't turn OFF the power or remove the card from the slot while data is being written in or read from the card, or recorded data may be damaged or lost.
  4) We recommend you to back up the data contained in the card once a month. If the CF card is broken, the important log data contained in CF card will be lost. Be sure to back up the data.
     Before using a compact flash card adaptor, check the capacity of the adaptor. If the capacity of the memory card to be formatted is larger than that of the adaptor, do not format the card. If the card is formatted, a display may appear on Windows indicating that formatting is completed, but this instrument does not recognize the completion of formatting.
  5) Compact flash in the capacity range from 8MB to 1GB can be used.
  6) The data recorded in the compact flash can be regenerated on the PC by using the data viewer (contained in the attached CD-ROM).
     If the data is recorded in ASCII format, it can be directly opened in a spreadsheet such as EXCEL. However, large-amount data cannot be opened (about 10MB or larger in the case of 9-point input, and about 5MB or larger in the case of 18-point input).
     In those cases, read in data with the data viewer (contained in the attached CD-ROM), and perform CSV conversion to divide the file, which allows the data to be read in.
     The data recorded in binary format cannot be directly opened in a spreadsheet such as EXCEL.
     Be careful not to make the size of a file too large even if a large-capacity CF card is used. (Keep it to 10MB or less.)

For Proper Usage

<Reference Item> <Details>

- Model Designation Confirmation
  - Please confirm that the model delivered matches your order.
- 1 Installation
  - Dimensions
  - Panel cutout
  - How to install on the panel
- 2 Wiring
  - Terminal connection diagram
- Turn Power On
- 3 Usage (Read before using)
  - How to handle the memory card
- 4 Display and Operation Methods
  - How to change the data display screen
  - How to change the parameter setting screen
  - Setting of parameters
- 5 List of parameters
- Operation
  - Stopping and starting the recording
- 6 When the display does not make sense.
  - Displays during abnormalities.

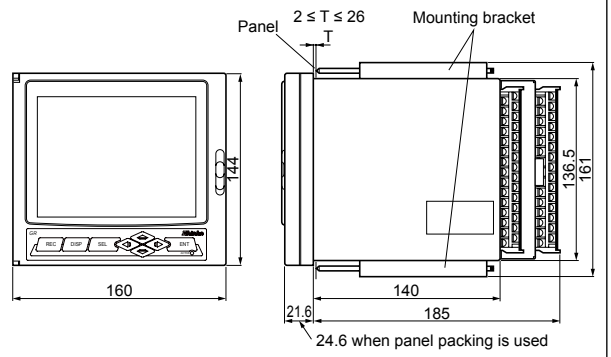
※Since about 60 minutes is needed until the unit becomes thermally stable, wait for 60 minutes or more after turning the power on before making measurements, etc.

1 Installation

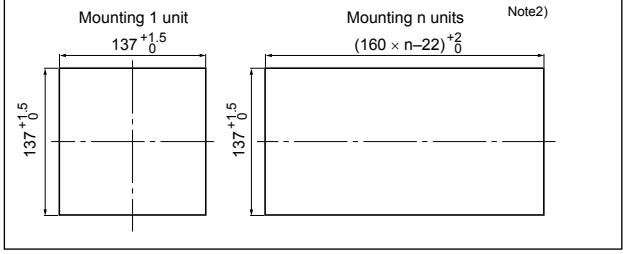
Dimensions/Panel Cutout

(unit : mm)

Dimensions



Panel cutout



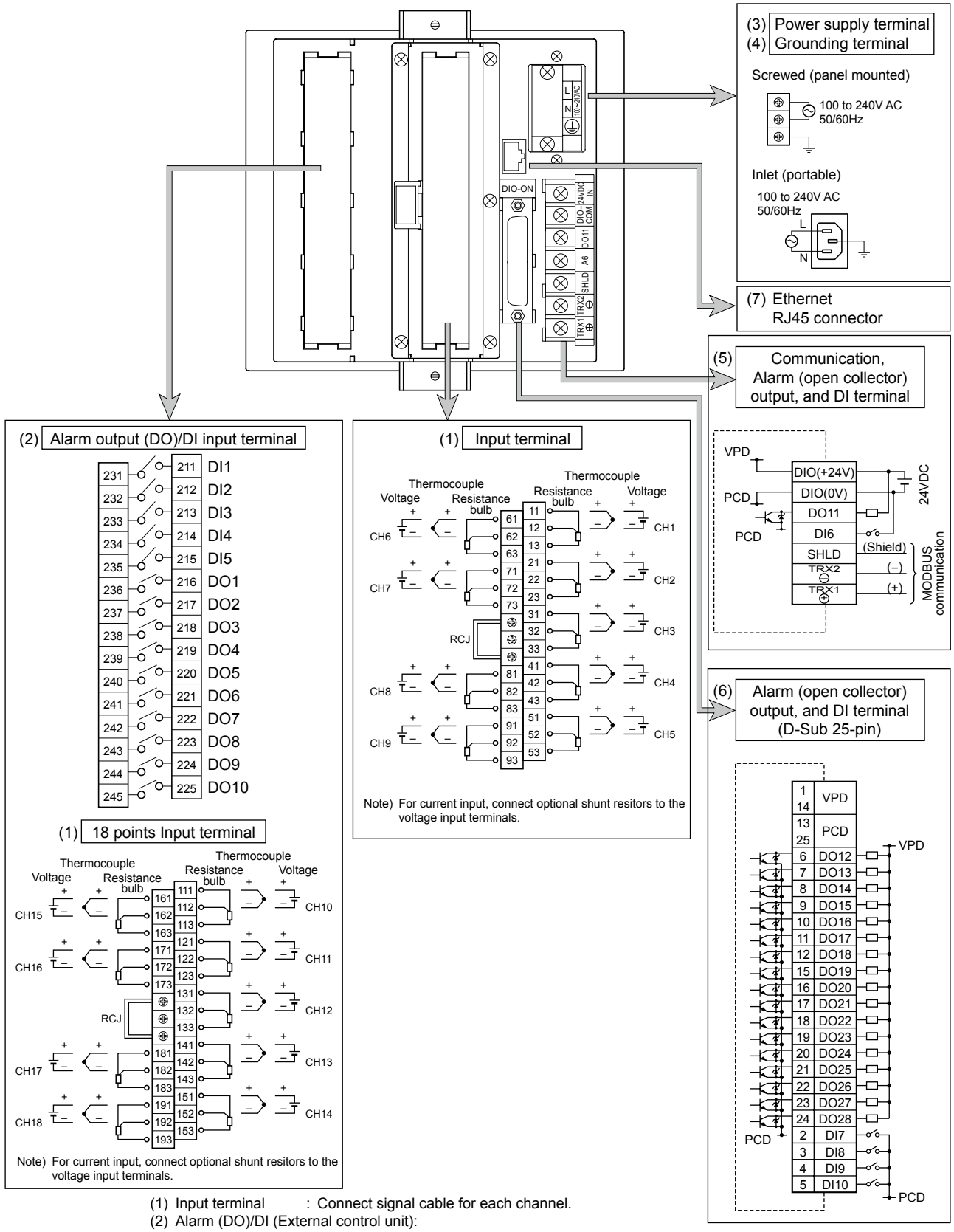
Note1) If other instruments are placed under the recorder unit, provide a space of 100 mm or more from the instrument or floor.
Note2) When unit is mounted with its side face closely contacted, don't use the packing.

Cautions on wiring

- Use crimped terminals matched to the screw size. Tightening torque should be about 0.2 N·m.
- Do not connect anything to terminals not used.

~	AC power source
⏚	Protective grounding
|	Power ON
○	Power OFF
▢	Double insulation
⚠	Electric shock hazard

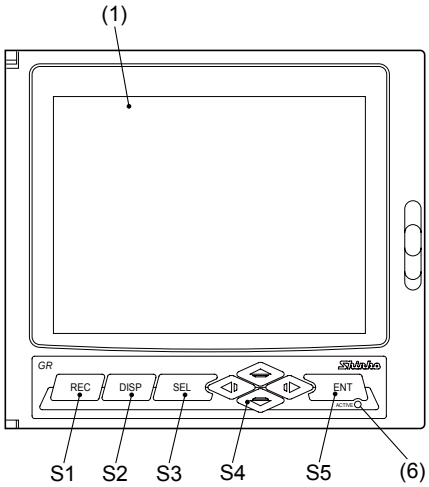
2 Wiring

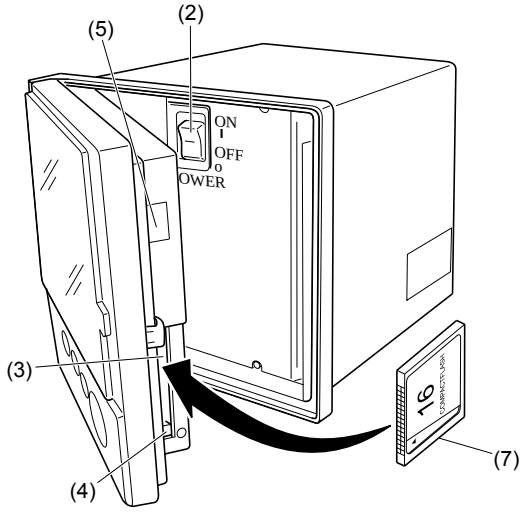


(1) Input terminal : Connect signal cable for each channel.
(2) Alarm (DO)/DI (External control unit):
Connect the output of alarm signals and the input of DI (external control) signals.
(for alarm [DO] 1 to 10 and DI [external control] 1 to 5)
(3) Power terminal : Connect power cable to L/N terminals. Power source to be connected should be free from noise.
(4) Grounding terminal : Connect to "G" terminal (Class-D, 100Ω or less).
(5) Communication, alarm (open collector) output and DI terminal:
Connect the input of alarm output (DO11) and DI (external control: D16) signals.
Connect communication signal cable to TRX (+) and TRX (–).
(6) Alarm (open collector) output and DI input:
Connect the input of alarm output (DO12 to 28) and DI (external control: DI7 to 10) signals.
(7) Ethernet terminal

3 Usage (Read before using)

Operation parts and their functions





	Name	Function
(1)	Display unit	Allows the Real time trend screen, Bar Graph Display screen, Analog Meter Display screen, Digital Display screen, Totalized Value Display screen, Historical trend screen and other various Parameter Set screens to be displayed.
(2)	Power switch	Used to turn the power ON or OFF.
(3)	Memory card slot	Used for inserting the memory card. Insert the card straight into the slot as shown in upper right figure. Be careful not to forcibly press the card if it is inserted obliquely. Otherwise the pin on the GR200 may be damaged.
(4)	Memory card ejection button	To remove the memory card from the slot, Caution press this button.
(5)	Connector to parameter loader	When changing parameters by using a loader, connect the exclusive cable (optional cable: Type; CGL or USB cable [USB (A) plug – USB (mini B) plug] to the connector.
(6)	Status indicator lamp	Displays power ON/OFF, LCD (screen) ON/OFF , and recording status. Lamp ON (lighting) : Power: ON, LCD: ON (recording in progress or suspended) Lamp blinking (ON for 2 seconds / OFF for 2 seconds) : Power: ON, LCD: OFF (recording in progress) Lamp blinking (ON for 1 second / OFF for 1 second) : Power: ON, LCD: OFF (recording suspended) Lamp OFF (extinction) : Power: OFF
(7)	Memory card	For the memory card, use Sandisk's compact flash memory (URL: http://www.sandisk.com). Other memory cards may cause trouble to the recorder.

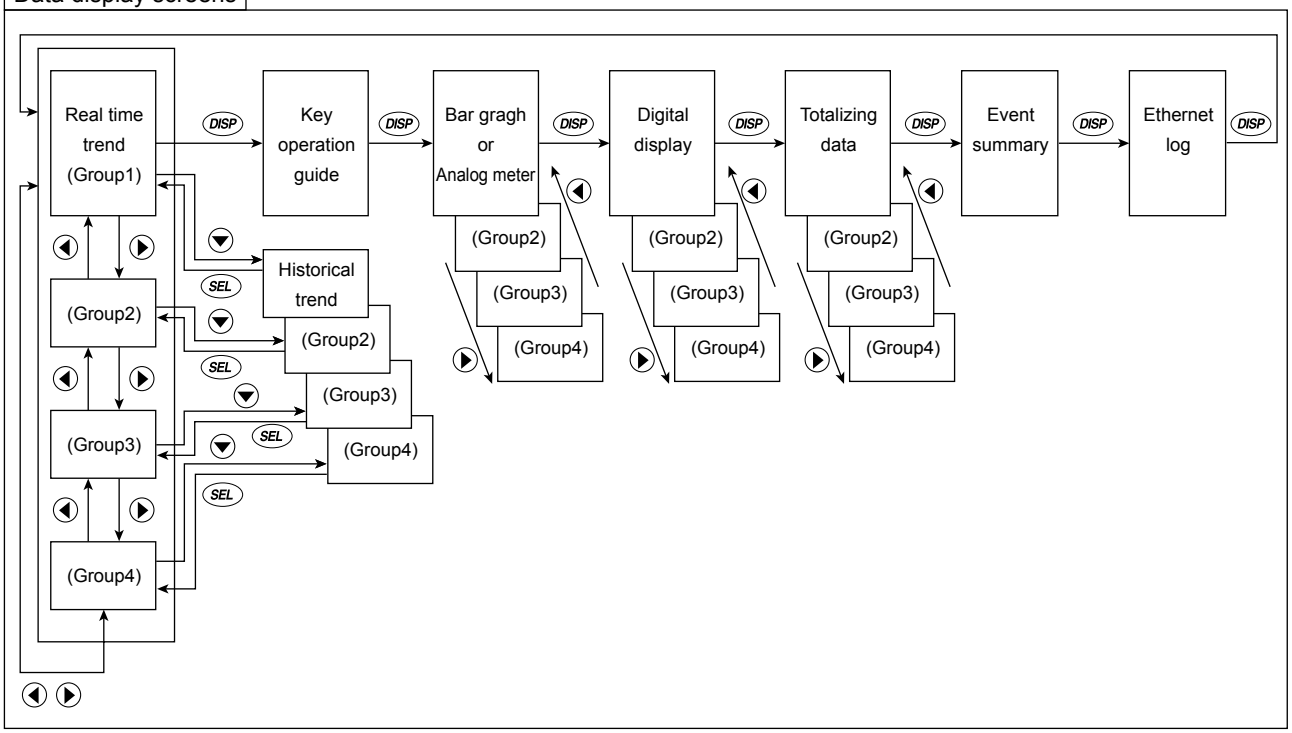
Caution

1. Do not remove the memory card during recording. Refer to another Manual in the CD-ROM "Removing memory card (compact flash)" for the removal of the memory card while recording is in progress.
2. After inserting the memory card into the slot, don't remove the card until the recorder can acknowledge it.
3. Be careful with static electricity when removing the memory card.

	Name	Function
S1	REC key	• Used to start or stop recording. Pressing once starts recording, and pressing once again stops recording.
S2	DISP key	• Used to switch displayed contents. Every time it is pressed, the display is switched in the following order: (1)→(2)→(3)→(4)→(5)→(6)→(7) and back to (1). (1) Real time trend display (2) Key guidance display (3) Bar graph/analog meter display (4) Digital display. (5) Totalizing data display (6) Event summary display (7) Ethernet log display • Used to switch the parameter setting screen to the data display screen.
S3	SEL key	• Used to switch from the data display screen to the parameter setting screen. • Pressing the key on the parameter setting screen switches to the screen one step up. Note, however, that pressing the key on the menu screen does not change screens.
S4	Cursor key	(1) Used to select setting items. (2) Used to increase or decrease numerical values. (3) Pressing the ▼ key on the real time trend displays the historical trend screen (*1). At this time, the window can be scrolled using the cursor key. (4) Pressing the ◄ or the ► key on the real time trend display, bar graph/analog meter display, digital display, or totalized value display screen switches group screens as follows. ► key: Group 1 → 2 → 3 → 4 → 1 → ... ◄ key: Group ... ← 1 ← 4 ← 3 ← 2 ← 1 *1: The screen in the past of the data currently recorded
S5	ENT key	(1) Used for selection on the setting screen or registration of the set data. (2) If the key is pressed while the scales are displayed on the real time trend display screen, historical trend display screen (*1), or recorded data display screen, the channels for which scales are to be displayed can be switched. (Scale of ch1 → scale of ch2 → ..... → scale of ch9 → scale of ch1 → scale of ch2.....) *1: The screen in the past of the data currently recorded

4 Displays and Operation Methods

Data display screens



Go to Real time trend, group1.

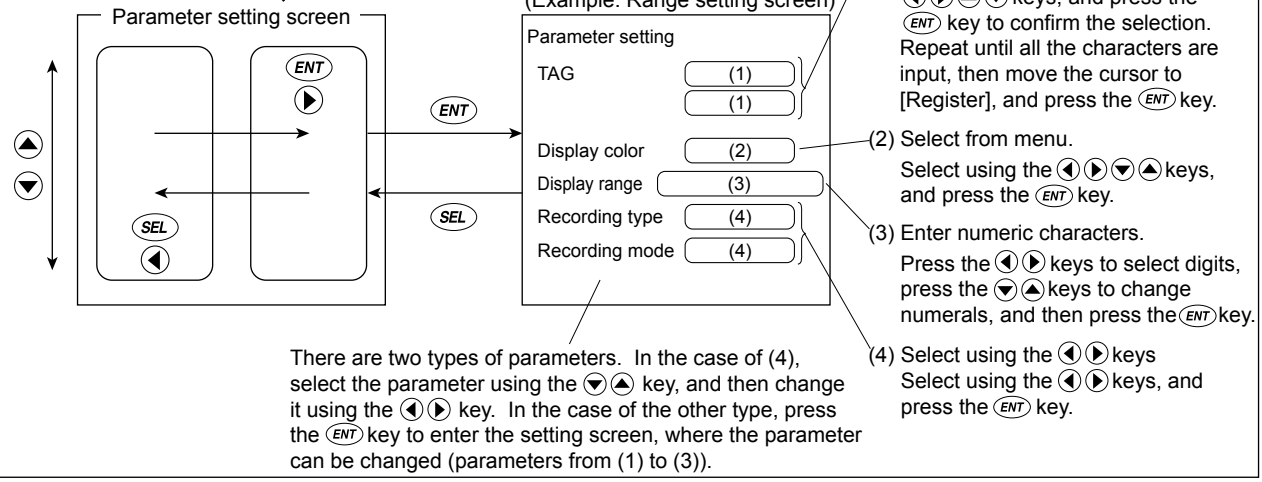
Go to Parameter setting screen.

DISP

(To real time trend group1)

SEL

Parameter setting



5 List of Parameters

	Parameter names	Factory setting contents (initial value)	Setting range	Copy setting ∗	Remarks
Channel settings	Input setting	Input type : K thermocouple	Skip, K, E, J, T, R, S, B, N, W, L, U, PN thermocouple, Pt100, JPt100, 50mV, 500mV, 1 to 5V, 0 to 5V range, Other channels	○	Set the same input types for every 2 channels.
		Unit : °C	°C, °F, and engineering unit for voltage input	○	
	Calculation setting	Input filter : 3 s	0 to 900 sec (1 sec step)	○	
		Subtraction channel : 0	0 to 30 (0: No subtraction)	○	
		PV shift : 0	Engineering unit	△	
		PV Gain : 100%	0.00 to 327.67%	△	
		F value calculation function : OFF	OFF, ON	○	
	F value calculation setting	Reference temperature : 0.0°C	−230.0 to 3276.7°C		Setting is common to all channels.
		Z value : 0.0°C	−230.0 to 3276.7°C		
		Decimal point : 1	0 to 4		
		Reset temperature : 0.0°C	−230.0 to 3276.7°C		
	Alarm setting	Alarm No : 1	1 to 4	○	
		Alarm type : OFF	OFF, H, L	○	
		DO relay No. : None	None, 1 to 28	○	
		Alarm set value : 0.0°C	Engineering unit	○	
Display record settings	Display recording mode setting	Display refresh cycle : 1 sec	1 sec to 12 hours		
		File division cycle : No division	No division, 1 hour, 1 day, 1 week, 1 month		
		File overwrite function : OFF	OFF, ON		
		Trend display compression : 1/1	1/1, 1/10, 1/30, 1/60		
	Range setting	Tag (upper) : TAG01 to TAG36	Up to 8 characters	○	
		Tag (lower) : Blank	Up to 8 characters	○	
		Display color : depends on channel No.	14 colors		
		Display range : 0.0 to 1200.0°C	Varies depending on input type.	○	
		Recording type : Max/Min recording	Max/Min recording, Instantaneous value recording, Average value recording	○	
		Recording mode : With Record	With Record/ Display Only	○	
	Message setting	Message : Blank	Up to 32 characters		Message data is only recorded in event file.
		Timing : None	No, DI ON, DI OFF, Alarm ON, Alarm OFF		
	Display setting	Display Name : Display group 1 to 4	Up to 16 characters		
		Screen structure : No.1-9=ch1-9	From ch1 to 30 for each of No.1 to 10		
		Trend direction : Vertical	Horizontal, Vertical		
		Display divided to : 10	1 to 20		
		Trend scale display : OFF	OFF, ON		
		Bar graph/Analog meter selection : Bar graph	Bar graph, Analog meter		
		Color bar display selection : Channel No. display	Channel No., Tag No., Unit		
	Background color setting	Trend screen background color : white	White, black		
		Historical screen background color : black	White, black		
Main Unit settings	Clock adjustment	Current time			
	LCD OFF time	LCD OFF time : 0 min (Kept lit at all times.)	0 to 60 min (0 : Kept lit at all times.)		
	Unit define	Blank	Up to 7 characters × 12		
	DI setting	Function Invalid	Function Invalid, Recording Start/Stop, F value calculation reset, Totalize start/stop, Totalize reset, LCD ON		
	Alarm Setting	Alarm hysteresis : 0.20%	0.00 to 100.00%		
		Alarm latch : OFF	OFF, ON		
		Memory FULL alarm : None	None, 1 to 28		
		Battery alarm : None	None, 1 to 28		
	Record data format	Recorded data format : ASCII	ASCII, Binary		
	RS-485 communication setting	MODBUS station No. : 1	0 to 255 (0 : No communication)		
		MODBUS communication speed : 19200bps	19200bps, 9600bps		
		MODBUS parity : Odd	None, Odd, Even		
		Front communication function : ON	OFF, ON		Be sure to set it to ON.

∗) When parameter copy is selected, the items marked with ○ are copied.
Initial value is restored with the items marked with △ .

	Parameter names		Factory setting contents (initial value)	Setting range	Copy setting *	Remarks
Main Unit settings	Ethernet setting	Ethernet setting 1	IP address : 192.168.1.1	0 to 255 (each digit)		
			Subnet mask : 255.255.255.0	0 to 255 (each digit)		
			Default gateway : 0.0.0.0	0 to 255 (each digit)		
		Ethernet setting 2	FTP server function : OFF	OFF, ON		
			FTP access control : OFF	OFF, ON		
			Web server function : OFF	OFF, ON		
			E-mail function : OFF	OFF, ON		
			MODBUS TCP/IP function : OFF	OFF, ON		
		E-mail setting 1	SMTP IP address : 0.0.0.0	0 to 255 (each digit)		
			Sender's mail address : Blank	Up to 64 characters		
			Sender's name : Blank	Up to 32 characters		
		E-mail setting 2	Receiver's mail address 1 to 8 : 0.0.0.0	Up to 64 characters		
		E-mail trigger setting	Title : Blank	Up to 32 characters		
			Trigger timing : None	None, DI ON, DI OFF, Alarm ON, Alarm OFF, Warning, Timer cycle		
			Text 1 : Blank	Up to 32 characters		
			Text 2 : Blank	Up to 32 characters		
			PV value affixation : OFF	OFF, ON		
			Receiver's address No. : None	1 to 8 (selectable)		
			Mail send test :			
		User account setting	User name : Blank	Up to 16 characters		
			Password : Blank	Up to 8 characters		
			User Level : Guest	Guest, Administrator		
	Password setting		Record start/stop : 0000	0000 to 9999 (no password at 0000)		
			Parameter setting : 0000	0000 to 9999 (no password at 0000)		
			CF manager : 0000	0000 to 9999 (no password at 0000)		
Totalized setting	Daily report		Totalize cycle : 1 hour	10, 20, and 30 min., 1, 2, 3, 4, 6, 12, and 24 hours		
	Annual report		Base date : 1	1 to 31		
	External input		External input : DI1	DI1 to 10, Channel 1 to 30, Alarm No. 1 to 4		
	Channel setting 1		Totalize calculation : Input value totalizer	Input value totalizer, Counter, Time measurement		
			External input : DI1	DI1 to 10, Channel 1 to 30, Alarm No. 1 to 4		
			Totalize base time : /h	/s., /min, /h., /day		
			Totalize reset operation : ON	OFF, ON		
			Totalize reset input : None	None, DI 1 to 10, Channel 1 to 30, Alarm No. 1 to 4		
	Channel setting 2		Totalize TAG : STAG01 to STAG72	Up to 8 characters		
			Totalize unit : Blank	Can be selected arbitrarily.		
			Totalize lower limit cut value : 0.0°C	Engineering unit		
			Totalize scaling value : 1	1 to 32767		
Math Channel setting	Arithmetic operation setting		Arithmetic operation : No setting		○	
	Input setting		Unit : °C	Engineering unit	○	
			Measurement range : 0.0 to 500.0	−3276.7 to 3276.7	○	
			Engineering value : 0.0 to 500.0	−3276.7 to 3276.7	○	
			Square rooter : OFF	OFF, ON	○	
			Logarithmic calculation : OFF	OFF, ON	○	
	Math setting		Input filter : 3 sec	0 to 900 sec (1 sec step)	○	
			Subtraction channel : 0	0 to 30 (0: no subtraction)	○	
			PV shift : 0	Engineering value	△	
			PV gain : 100%	0.00 to 327.67	△	
			F value calculation function : OFF	OFF, ON	○	
	Alarm setting		Alarm No. : 1	1 to 4	○	
			Alarm operation : OFF	OFF, H, L	○	
			DO relay No. : None	None, 1 to 28	○	
			Alarm set value : 0	Engineering value	○	
	Range setting		Tag (upper) : TAG37 to TAG72	Up to 8 characters	○	
			Tag (lower) : Blank	Up to 8 characters	○	
			Display color	14 colors		
			Display range : 0.0 to 1200.0°C	Engineering value	○	
			Recording type : Max/Min recording	Max/Min recording, Instantaneous value recording, Average value recording	○	
			Recording mode : yes	With record/ display only	○	
	Math timer setting		H-P, L-P timer cycle setting : 1	1 to 32767 min		
			Average value timer cycle setting : 1	1 to 32767 min		
			Total value timer cycle setting : 1	1 to 32767 min		
	Constant setting		Constant : 0	−32767 to 32767		

*) When parameter copy is selected, the items marked with ○ are copied.
Initial value is restored with the items marked with △ .

6 Troubleshooting

Error indications

This recorder is provided with an error display function. Modify the abnormal conditions as soon as an error display appears. Make sure to turn off the power before checking the wire connection to modify the abnormal conditions. Otherwise electric shock or a serious accident may result.

Display	Cause
OVER	Displayed when the measurement signal inputs exceeding the settable recording range (Table 1).
UNDER	Displayed when the measurement signal inputs lower than the settable recording range.
ERROR	Displayed in the following cases with 50mV, 500mV, and 5V input. 1) When the measurement signal inputs exceeding OVER. 2) When the measurement signal inputs lower than UNDER.
BURNOUT	Displayed in the following cases with TC and PT input. 1) When a break or disconnection of a cable occurs within the sensor 2) When the measurement signal inputs exceeding OVER. 3) When the measurement signal inputs lower than UNDER.

7 Specifications

Specification	
Power voltage	: 100 to 240 V AC (10%), 50/60 Hz
Power consumption (VA)	: 47 VA max. (240 V AC)
Input measurement range	: Range where input reading accuracy is assured.
Record range	: Settable recording range. (See Table 1.)
Input circuit	: Insulated between all channels (functional insulation).
Measurement cycle	: 100 msec
Record cycle	: 1 sec to 12 hours/one time
Record type	: Select from max.-min. value, instantaneous value, or average value.
Data storage cycle	: 1 min. (when record cycle is less than 1 min.) or synchronized with record cycle (when record cycle is more than 2 min.).
Record media	: Compact Flash (by Sandisk), 1GB max. Only FAT16 or FAT is supported.
Data format	: Select from ASCII or binary. Refer to *1 for usage size of measured data.
Alarm type	: Upper limit alarm, lower limit alarm
Alarm Output (relay)	: (DO1) 150Vac/3A, 30Vdc/3A
	: (DO2 to10) 240Vac/3A, 30Vdc/3A
Alarm output (transistor)	: 30Vdc/0.1A
Digital input	: No-voltage contact input.
Communication function	: RS-485 Interface (*2) Communication method / 2-wire, half-duplex communication Synchronous system / Start-stop synchronization Baud rate / 9,600bps, 19,200bps Protocol / compliant to Modbus RTU Communication distance / 500 m max. (total extension of communication) Number of connectable units / 31 (Master excluded)
Operating environment	: Indoor
Operating temperature	: 0 to 50ºC (panel mounted)
	: 0 to 40ºC (portable or with Ethernet function)
Operating humidity	: 20 to 80% RH (No condensation allowed.)
Storage temperature	: −10 to 60ºC
Storage humidity	: 5 to 90% RH (No condensation allowed.)
Installation category	: II
Pollution degree	: 2
Operating altitude	: 2000m max.
Calibration	: Calibrate at least once a year in order to maintain high measurement accuracy. For calibration, refer to the instruction manual in the CD-ROM, or contact us.
Ethernet	: 10 Base-T
- protocol	: Web (server) FTP (server) SMTP (client) MODBUS-TCP (slave)

*1 Usage size of measurement data

Usage size for each sampling is as follows:

ASCII (max.-min. record)
Time : 21 bytes
Measurement data: 16 bytes × number of input points
From the above, if the number of input point is 9ch,
21 + 16 × 9 = 165 bytes

ASCII (instantaneous or average value)
Time : 21 bytes
Measurement data: 8 bytes × number of input points
From the above, if the number of input point is 9ch,
21 + 8 × 9 = 93 bytes

Binary (max.-min. record)
Time : 4 bytes
Measurement data: 4 bytes × number of input points
From the above, if the number of input point is 9ch,
4 + 4 × 9 = 40 bytes

Binary (instantaneous or average value)
Time : 4 bytes
Measurement data: 2 bytes × number of input points
From the above, if the number of input point is 9ch,
4 + 2 × 9 = 22 bytes

*2 Communication converter is necessary for the connection with a computer.

Recommendation: Model IF-400 (manufactured by Shinko Technos)

8 Confirming the Code Symbols

Digit		4 5	6	7	8 9	10 11	12 13	14	15	16	17
Type	GR2	□□-	0	□	M0	00	00	□	0-	2	0
Specifications											
Input point	9 points	09									
	18 points	18									
Power supply voltage	100 to 240V AC		0								
Model name 1 (Mounting instruction/Language for display)	Panel mounting / Japanese			A							
	Panel mounting / English			B							
	Portable / Japanese			C							
	Portable / English			D							
Model name 2	Multi-range				M0						
Model name 3	None					00					
Model name 4	None						00				
Option (*)	None							0			
	DI/DO(10)							1			
	DI/DO(18), C5							2			
	DI/DO(10), DI/DO(18), C5							3			
	E-net							4			
	DI/DO(10), E-net							5			
	DI/DO(18), C5, E-net							6			
	DI/DO(10), DI/DO(18), C5, E-net							7			
Special order Number	None (Providing the No. for a special order product)								0		
Instruction manual	Japanese/English (CD-ROM)									2	
Shinko ID											0

(*) Description of option codes

Option codes	Description
DI	5 points (No-voltage contact input)
DO(10)	10 points (1a contact output)
DO(18)	18 points (Open collector output)
C5	Communication RS-485
E-net	Ethernet

9 Maintenance

Recommended parts replacement cycle

Front panel : 5 years (degradation of brightness of LCD back light. Pickup repair: including packing and battery)
Panel packing : 5 years (pickup repair)
Lithium battery : 5 years (pickup repair)
Fuse (external) : 2 years (for preventive maintenance)
: rating: 250V AC 1A
Memory card : 6 months
: Back up the data more frequently than 6 months.

Table 1 Display Range Set Range

Type		Input range	Record range set range
Thermocouple	B	400 to 1760°C	370.0 to 1790.0°C
	R	0 to 1760°C	– 30.0 to 1790.0°C
	S	0 to 1760°C	– 30.0 to 1790.0°C
	K	–200 to 1370°C	–230.0 to 1400.0°C
	E	–200 to 800°C	–230.0 to 830.0°C
	J	–200 to 1100°C	–230.0 to 1130.0°C
	T	–200 to 400°C	–230.0 to 430.0°C
	N	0 to 1300°C	– 30.0 to 1330.0°C
	W	0 to 1760°C	– 30.0 to 1790.0°C
	L	–200 to 900°C	–230.0 to 930.0°C
	U	–200 to 400°C	–230.0 to 430.0°C
	PN	0 to 1300°C	– 30.0 to 1330.0°C
Resistance bulb	JPt100	–200 to 600°C	–230.0 to 630.0°C
	Pt100	–200 to 600°C	–230.0 to 630.0°C
DC voltage		0 to + 50mV	– 10.00 to + 55.00mV
		0 to +500mV	– 10.0 to + 550.0mV
		+ 1 to + 5V	+ 0.500 to + 5.500V
		0 to + 5V	– 0.100 to + 5.500V