Fuji Electric

Innovating Energy Technology

Paperless Recorder

Type: PHL

Long Term Record Data Saving
3years in Compact Flash (In case of using 512MB Compact Flash)

Saved Data playback
Saved data in Memory card can be easily called out and played back on display

Math and totalization
These functions are available as standard.

Communication
RS485, MODBUS RTU protocol is available. (option)
Ethernet (10Base-T) is available. (option)

Screen saver
Period of non-operation exceeds the setting value of parameter, recorder turns off the backlight of LCD.

PC support softwares (Data Viewer/Parameter Loader)
Supplied in a CD-ROM as a part of standard accessory

Compact size
160 (W) X 144 (H) X 185 (D) mm (Panel mount)1.5 kg compact size

9-point recording and 18-point max. recording
12 types of thermocouples, 5 types of resistance bulbs and voltage/current input are available

21B1-E-0056

Memory Card Data Saving

Provides flexibility and variety in the handling of record data.

Status Display
Allows you to display screen name, calendar, alarm information, recording status, writing status of measured data in Compact Flash, and fitting status of the card into the recorder slot.

Time display
Indicates the time and time scale of recorded data.

Trend Display
Allows you to view measured result in waveforms.

Digital Display
Allows you to view measured values in a digital form.

Key panel
Allows you to perform the recording start/stop, selection of display, setting, data display/change.

Power indicator
During power on, LED turns on.
While screen saver is working, it flickers.

Mathematics function (programming formula) as standard

You can program formula using below operand.
Addition, Subtraction, Multiplication, Division Absolute value, X to the power of Y, Logarithm, Natural logarithm, Exponential function, Humidity, Average value, Maximum value, Minimum value.

Communication

- RS485, MODBUS RTU protocol is available. Communication rate is 9600 or 19200 bps and multi-drop/ up to 32 recorders connectable including master station. Total extension is 500m or less.
- Ethernet (10Base-T) is available. It has FTP, HTTP (Web server), SMTP and MODBUS-TCP protocols.

Calculation function offered as standard

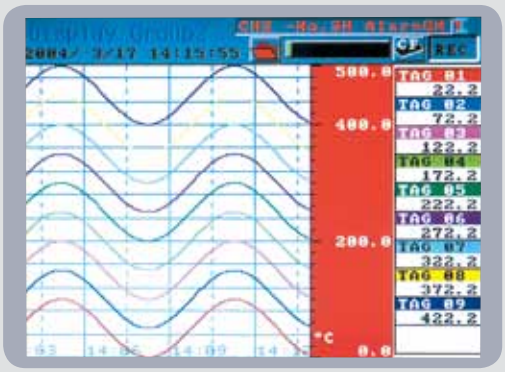
Subtraction
Difference between the values of each channel can be calculated.

F value calculation
Extinction rate of bacteria by heat sterilization can be calculated per channel according to the measured temperature.

Totalization
Measured value of each channel can be totalized.
Reference time can be selected from day, hour, minute and second.

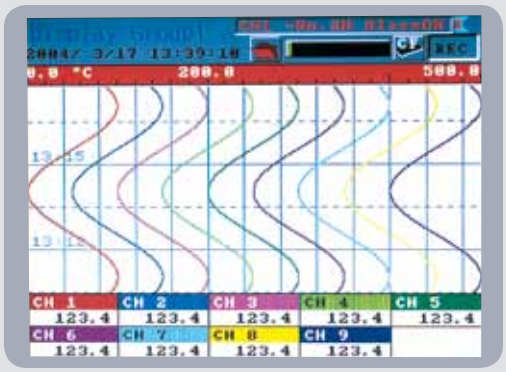
Square root extraction
Square root extraction of the input value of each channel can be performed.

Wide variety of display mode



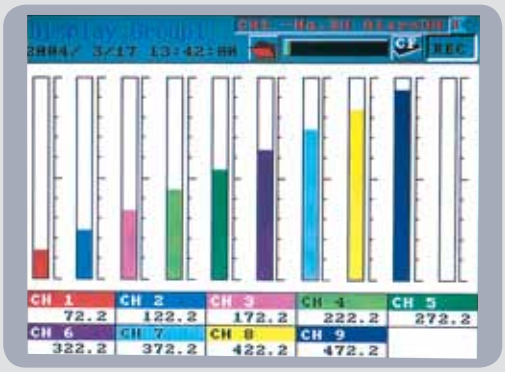
Trend recording (horizontal)

Measured result is horizontally displayed in real time.



Trend recording (vertical)

Measured result is vertically displayed in real time.



Bar graph

Measured values are displayed in bar graph.

Analog meter

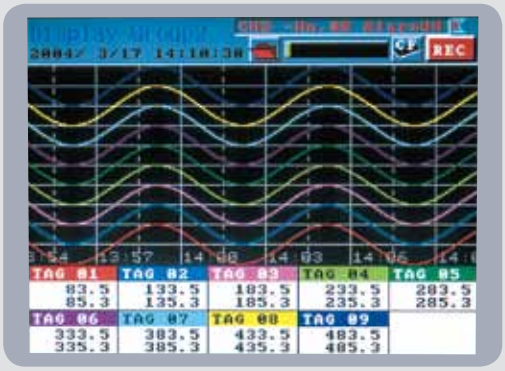
Measured values are displayed in analog meters.

Digital display

Channel No., Tag No. engineering unit, and alarm information are displayed in digital form, in addition to measured values.

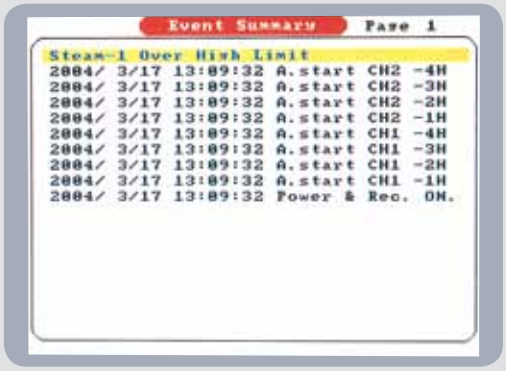
Totalized data display

Totalized data of each channel is digitally displayed.
(If power failure occurs while in totalizing operation and the power is restored later, the data being totalized is cleared.)



Historical trend display

Past data saved to Compact Flash can be viewed.
Scroll function is usable.



Event summary display

Alarm status and external control input status for each channel are displayed.

Specifications

General specifications

Mounting method	Panel flush mounted
Material	Molding resin (case, bezel)
External dimensions and mass	<Panel mount> 160 x 144 x 185 mm, about 1.5 kg (9-point input)
Power supply voltage	100V to 240V AC, 50/60 Hz
Power consumption	About 47VA (at 200VAC)
External terminals	Screw terminals (M3 thread)
Operate temperature	0 to 50˚C (in case the 12th digits of code symbols is “Y” or “R”.) 0 to 40˚C (in case the 12th digits of code symbol is “E” or “W”.)

Input unit

No. of inputs	9 or 18 points
Measuring cycles	100ms/9, 18 points
Recording cycle	1sec to 12hours
Input signal	Thermocouple: 12 types (B, R, S, K, E, J, T, N, W, L, U, PN) Resistance bulb: 5 types (Pt100, JPt100, Ni100, Pt50, Cu50) DC voltage: (0 to 50mV, 0 to 500mV, 0 to 5V or 1 to 5V) DC current: (connecting optional shunt resistor to input terminal)
Input types	Selected from the key panel (the same type should be set for every 2 channels)
Burn-out function	Equipped with thermocouple and resistance bulb inputs as standard.
Calculation function	Primary delay filter, scaling, calculation of difference between channels, F value calculation, totalization, and square root extraction

Mathematics function

Formula	It can be set 1 main formula and 3 temporary one. Addition, Subtraction, Multiplication, Division Absolute value, X to the power of Y, Logarithm, Natural logarithm, Exponential function, Humidity, Average value, Maximum value, Minimum value.
Input signal	DI (DI1 to DI10), Totalize (ch1 to ch30), Analog input (ch1 to ch30), Constant (No.1 to No.20), Communication input (No.1 to No.12)

Display unit

Display	5.7" TFT color LCD (320 X 240 dots) (The LCD may have some pixels that do not stay on or off. Due to the characteristics of liquid crystal, the brightness may not be uniform, which is not a failure.)
Life of backlight	50,000 hours
Display contents	•Trend display (in vertical and horizontal direction) selected in the refreshment cycles of 1 sec to 12 hours. Scale display/non-display selectable •Bar graph or analog meter display (refresh cycle: 1 second) •Digital display (in refreshment cycle of 1 sec) •Event summary display (alarm and message summary) •Historical trend display (Compact Flash memory data.) •Totalized data display •Group setting (4 groups at the maximum)

Recording function

Recording medium	Compact Flash card (Format as FAT16 or FAT, or recorder can’t read and write.)
Memory capacity	2GB, max.
Recording method	Writing starts in fixed cycles by turning ON the REC key on the front panel. Data is recorded in a new file every time the recording starts.
Data save cycles	Links to refreshment cycle of the trend display
Data format	•ASCII About 166 bytes per sampling (at 9 channel inputs) •Binary (Data cannot be read directly into Excel, etc.) About 40 bytes per 1 sampling (9-channel input)
Trend data	Maximum value and minimum value are saved from the data that are sampled in measuring cycles.
Event data	Alarm data and message data are saved.
Totalized data	Stores data totalized during specified period of time.
Storage capacity	•About 1.5 years at display refresh cycle of 30 seconds (ASCII) •About 6 years (Binary) (9-channel recording, 256MB compact flash used)
Amount of memory used	The display unit displays how much the memory card has been used via bar graphs. The recording will stop if the amount of recorded data exceeds the capacity.

Alarm function

No. of settings	Up to 4 alarms are settable for each channel.
Type of alarm	High/Low limits
Indication	Alarm status is displayed on digital display unit when an alarm occurs. Histories are displayed in the alarm summary.
Output	10 points as relay output (option) 18 points as open-collector transister output (option)

Reference performance

Indication accuracy	±(0.15%+1 digit) of input range Accuracy of the next range is ±(0.3%+1 digit). Thermocouple B: 400˚C to 600C, thermocouples R and S: 0˚C to 300˚C, thermocouples K, E, J, T, L, and U: -200˚C to -100˚C
Indication resolution	0.1C
Reference junction	±0.5C
Compensation accuracy	Thermocouples R, S, B and W: ±1.0˚C
Input resistance	About 1MΩ

Others

Clock	With calendar function
Memory backup	Parameter settings are saved to the internal non-volatile memory. The clock is backed up by a built-in lithium battery. Trend data is back up only 400 samplings.
Memory full alarm	When the amount of recorded data exceeds the capacity of memory card, recorder can energize the alarm output.
Low battery alarm	When the battery for backup of clock and SRAM becomes low, recorder can energize the alarm output.
CE mark	Safety standard: IEC61010-1 EMC standard: EN61326

Optional specifications

Alarm (relay) output/DI (Cannot be mounted to 18-point input type.)	10 relay outputs and 5 DI are added. Alarm output: SPST Output for each channel or common channel is possible. DI input: 5 no-voltage contact input points, Recording start/stop, message setting, F value caliculation resetting, Totalizing start/stop, Totalizing reset or LCD turning on functions can be performed.

Specifications

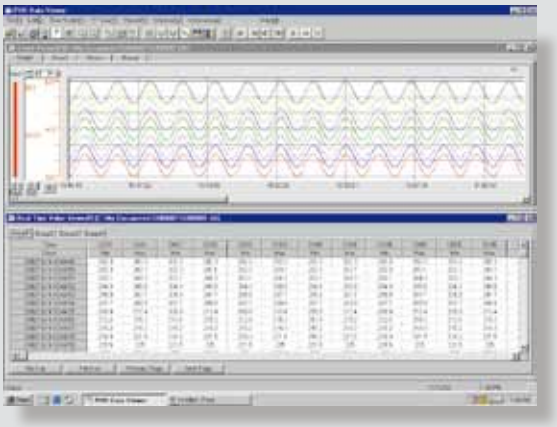
Alarm (open-collector) output/DI	18 open-collector outputs and 5 DI are added as option. Alarm output: Open-collector transister output for each channel or common channel is possible. DI input: 5 no-voltage contact input points, Recording start/stop, message setting, F value caliculation resetting, Totalizing start/stop, Totalizing reset or LCD turning on functions can be performed.
Communication (RS485, MODBUS)	Baudrate/parity: 9600, 19200bps/none, odd or even Length/Unit: 500m (total) /32units max (include master) Recommanded converter: K3SC-10/Omron Corp.
Communication (Ethernet)	10Base-T FTP server * (Internet Explorer 6. FFFTP or Comand Prompt are available) HTTP server * (Web server. Internet Explorer 6 is available) SMTP (e-mail client) MODBUS-TCP * Netscape and Mozilla Firefox are not available

PC support software (standard-supplied CD-ROM)

O/S	Windows XP/2000/7
PC/AT-compatible machine	Operation on PC98-series machines by NEC is not guaranteed. Operation on self-made or shop-brand PCs is not guaranteed.
Required memory capacity	64 MB or more
Contents	The following types are included as standard. 1) Data viewer software It allows you to view the past trend recorded data from the data saved to the Compact Flash on PC. Historical trend and event display functions are provided. 2) Parameter loader software It allows you to perform setting/change of various parameters on PC.

A convenient PC support software package is included as standard

Past data saved to Compact Flash can be viewed on personal computer.



Historical trend data screen

Parameters for the recorder can be easily set and changed from personal computer.

Parameter setting screen

Before use, install PC support software supplied as standard.
- O/S: Windows XP/2000/7
- Required storage capacity: 64 MB

PC/AT-compatible machine
- Operation on PC98-series machines by NEC is not guaranteed.
- Operation on self-made or shop-brand PCs is not guaranteed.

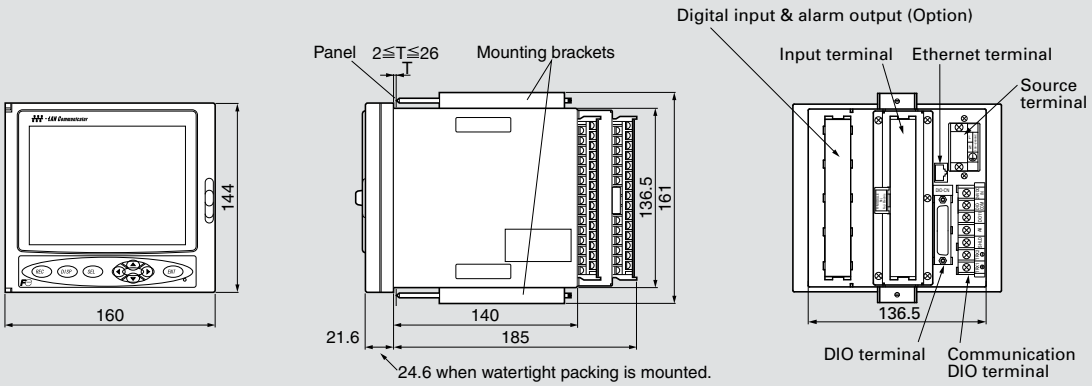
Before use, install PC support software supplied as standard.
- O/S: Windows XP/2000/7
- Required capacity of memory: 64 MB
- A communication cable between recorder and pc is optional.
Type: PHZP1801

PC/AT-compatible machine
- Operation on PC98-series machines by NEC is not guaranteed.
- Operation on self-made or shop-brand PCs is not guaranteed.

Outline Diagram and Panel Cut (Unit: mm)

Panel mount type

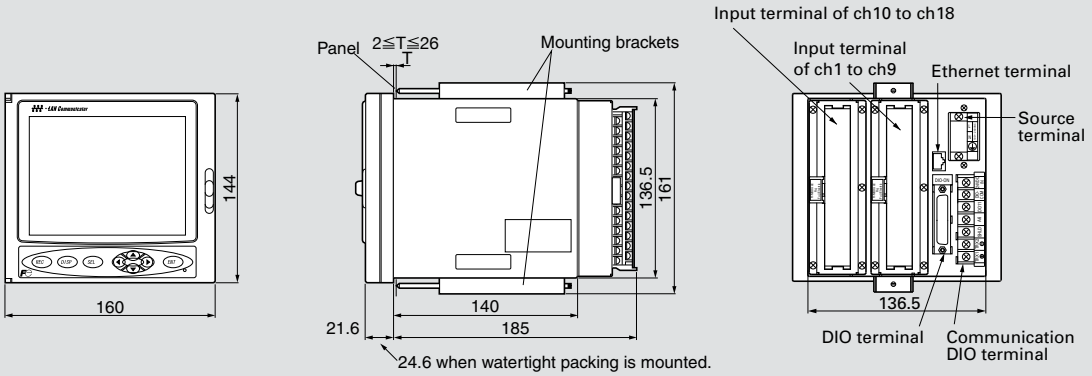
9 input points



In the case of 9-point input

Note: When another instrument or a floor surface is under the bottom of this unit, allow a space of 100mm or larger between them and the bottom of this unit.

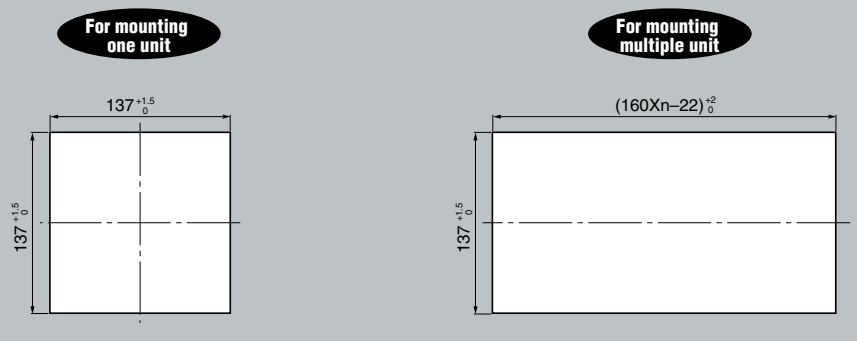
18 input points



In the case of 18-point input

Note: When another instrument or a floor surface is under the bottom of this unit, allow a space of 100mm or larger between them and the bottom of this unit.

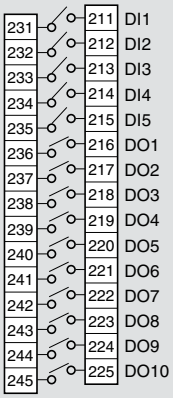
Panel cutout



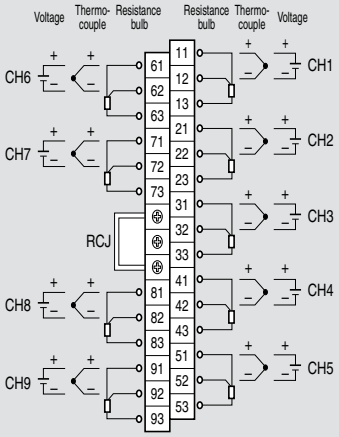
External connection diagram

9-point input

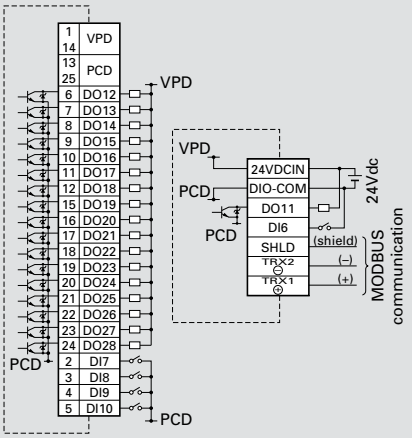
Alarm output/ DI input terminal



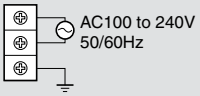
Input terminal



Communication, digital input and alarm output terminal.

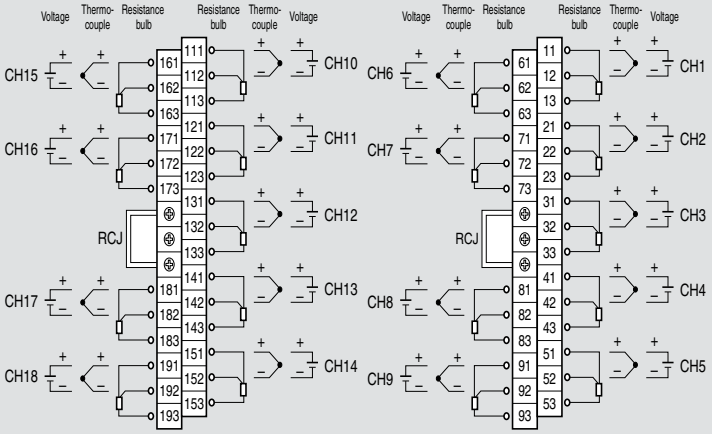


Power terminal

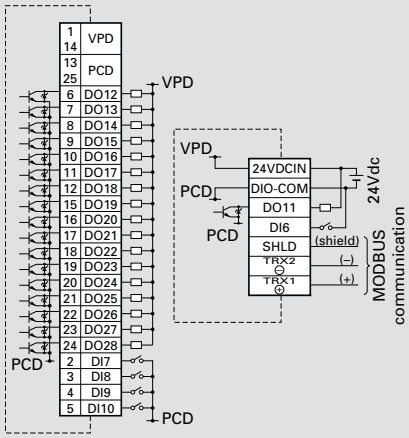


18-point input

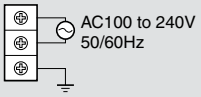
Input terminal



Communication, digital input and alarm output terminal.



Power terminal



Note: In the case of current input, connect the optional shunt resistor to the voltage input terminal.

Code Symbols

	4	5	6	7	8		9	10	11	12	13
PHL		1	B	1	2	-	E	1			V

Digit	Specifications	Note	
4	<Number of input points>		
	9		1
	18	Note 2	2
11	<Alarm (relay) output/DI input>		
	Without		0
	With	Note 1	1
12	<Communication>		
	Without		Y
	With RS485, Alarm and Di input	Note 3	R
	With Ethernet		E
	With Ethernet, RS485, Alarm and Di input	Note 3	W

Note 1: Cannot be selected if 2 is selected for the forth digit .(the number of input points is 18)
Note 2: Cannot be selected if 1 is selected for the 11th digit.
Note 3: Alarm outputs are open-collector transister output.
Note 4: Input signals are classified into the following 4 groups. Make the setting so that the consecutive 2 channels (1ch and 2ch for example) are assigned the input signal categorized in the same group.
Group 1: Thermocouple (12 kinds), 50mV
Group 2: Pt100. JPt100, Ni100, Cu50, Pt50
Group 3: 500mV
Group 4: 1-5V, 0-5V
Input signals can be arbitrarily selected for channels 9 and 18.

Scope of supply

Item	Quantity
Main unit	1
Panel mounting bracket	1
CD-ROM (PC software, Instruction manual)	1
Watertight panel packing for the front panel	1
Noise filter for power cable	1

Option

Item	Type	Specifications
Shunt resistor for DC current input	PHZP0101	10Ω±0.1%
PC loader communication cable	PHZP1801	With USB A and USB miniB Connector
CD-ROM (Instruction manual and softwares)	PHZP0601	
Terminating resister	PHZP0701	100ohm
D-subliht 25pins connector with male terminal	PHZP0801	
Transmission cable	PHZP0901	For PHL to PC
Transmission cable	PHZP1001	For PHL to PHL
Compact flash (512MB)	PHZP2801-512	
Compact flash (1GB)	PHZP2801-01G	

Note 1: Windows, Excel and Internet Explorer are registered trademarks of Microsoft Corporation.
Note 2: SanDisk compact flash is a trademark of SanDisk.
Note 3: PC98 series are registered trademarks of NEC Corp.
Note 4: MODBUS® is the registered trademark of AEG Schneider Autmation International.
Note 5: Netscape is the registered trademark of Netscape Communication Corp.
Note 6: Mozilla Firefox is the registered trademark of Mozilla Foundation.

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