e-Front runners

Fuji Instrumentation & Control

FC.R

Color Printer
Microjet Recorder Series

Fuji Electric Co., Ltd.

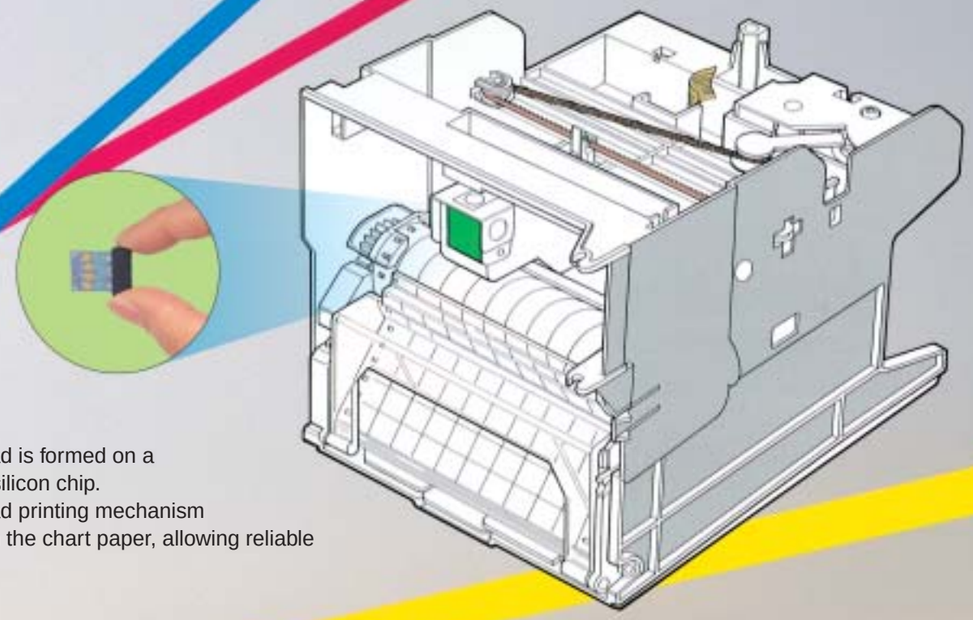
ECNO:1005I

A Revolution in Recorder Technology

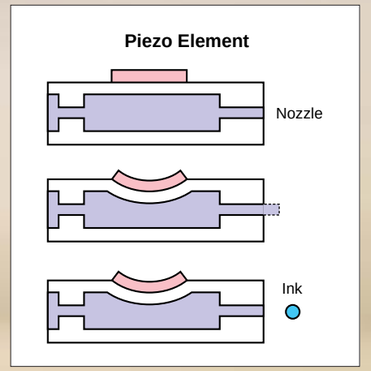
(Model :PHC)

The microjet recorder is a revolutionary recorder, its ink jet color printer technology is adopted in industrial type recorders for the first time in the world.
Fuji established ink jet technology based on the unique silicon chip manufacturing process for FCX transmitters.
The ink jet printing mechanism provides twelve continuous traces with a 180mm width recorder and six continuous trace with a 100mm width recorder without pen offset. The mechanism also provides six sharply defined colors.
Microjet recorder was designed with a reduced number of complicated mechanical parts to make it as trouble-free as possible.

Ink Jet Technology

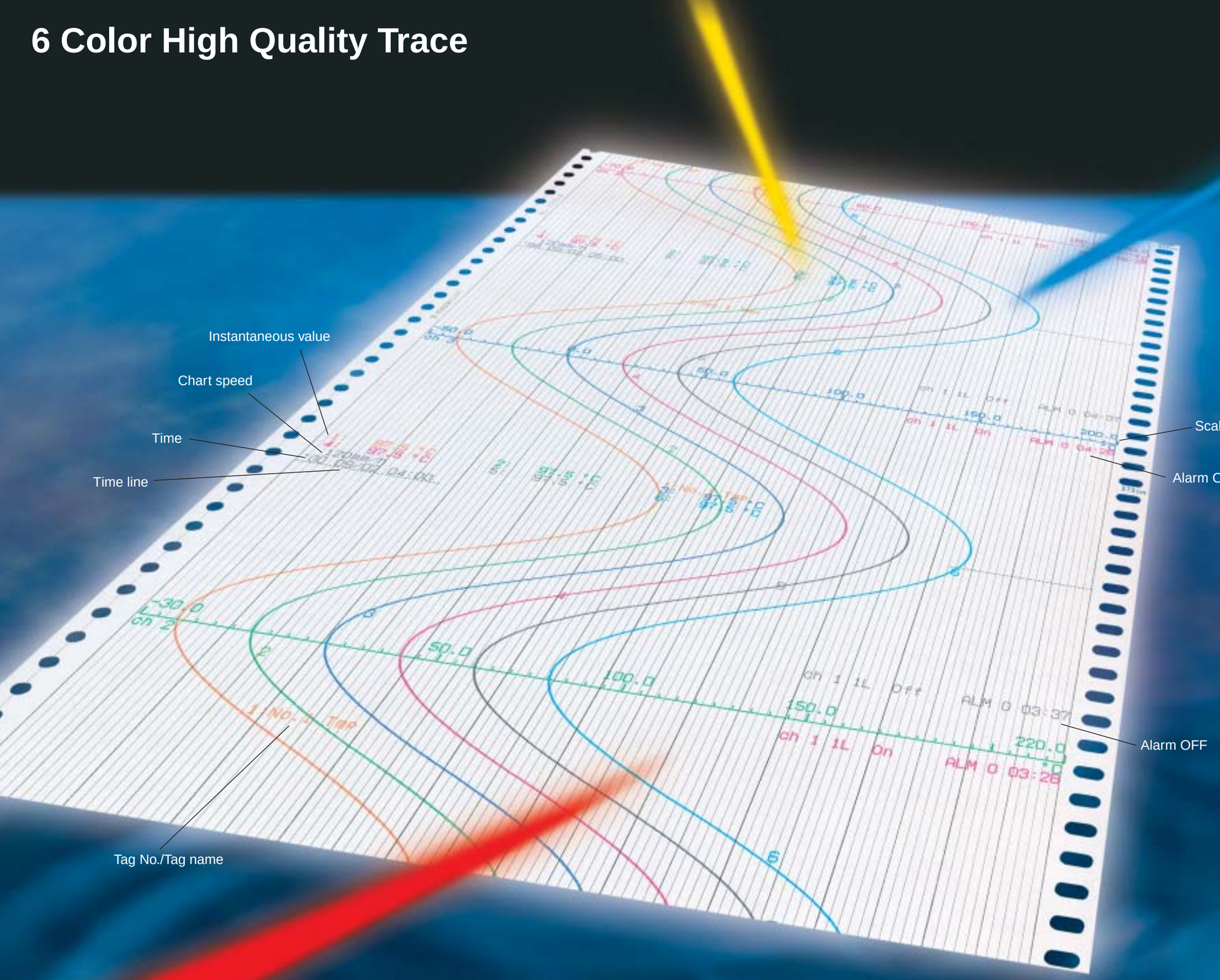


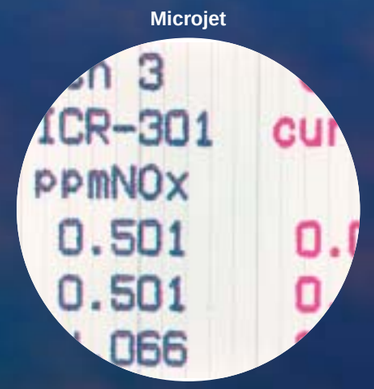
The ink jet head is formed on a stable quality silicon chip.
The ink jet head printing mechanism does not touch the chart paper, allowing reliable recording.



The ink jet mechanism is formed on a thin silicon chip (17.6 x 16mm) using silicon micro machining technology.
It is provided with piezo elements.
With voltage applied to the piezo elements, the shape of the elements changes as shown in the diagram, and ink particles are ejected from the tip of the nozzle.
These particles are very small and fast, and draw a series of very small dots of about 0.3mm diameter on the chart paper.
These small dots are combined together to form characters and trace lines for clear visible recording.

6 Color High Quality Trace





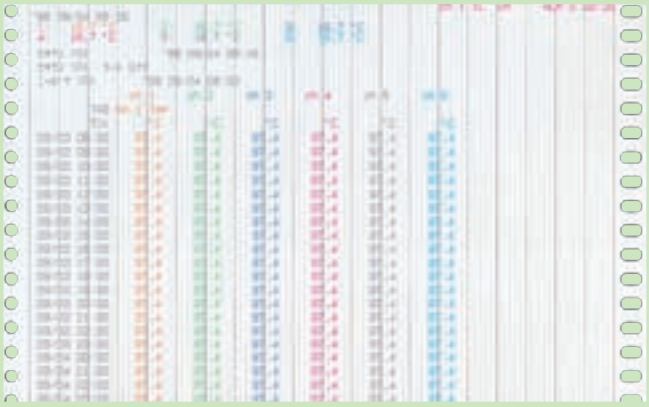
The ink jet printing mechanism allows continuous recording for a maximum of 12 channels (6 channels with 100mm width recorder) in 6 different colors. An A/D converter is used for each input signal for high speed data sampling to obtain a trace similar to that obtained by conventional pen mechanism recorders.
Digital printing is also possible in the same color as the channel color, so clear and visible recording can be obtained. (for model PHA, PHC)

Microjet Recorder PHC/PHA

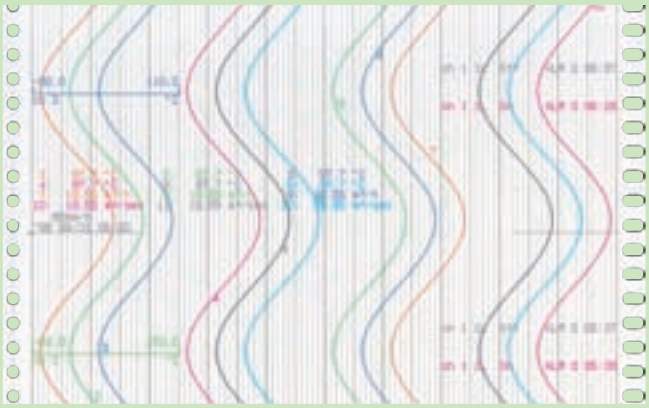

(PHC)


(PHA)

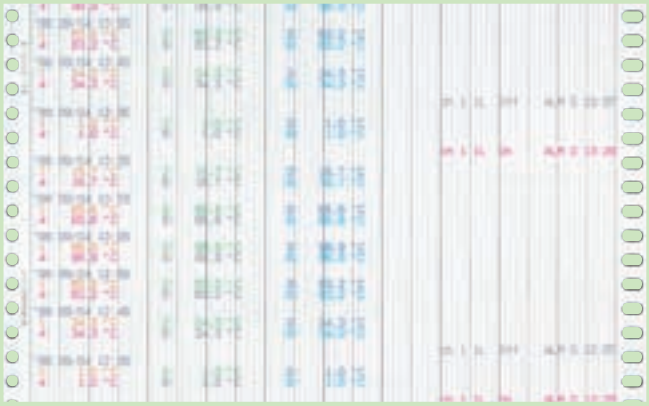
Report Generation



Daily report/totalization
On a daily report, measured values for every hour are printed along with maximum, minimum and average values.
On a totalization, integrated values at intervals of 1 hour and the total value for one day are printed.



Zoom, zone, auto-range trace
Special traces that match the operating conditions of the plant are available.



Logging print
Printing of measured values at intervals of 10-60 minutes.
Note: Analog trace is not available for logging printing.

Parameter list, test pattern
Configuration data can be checked with parameter list.
A test pattern of all colors and all combinations of colors is available.

■ **Continuous recording**
- 6 colors
- 180mm width, 12 channels
  100mm width, 6 channels

■ **Digital data printing in channel color**

■ **Self-printing scale in channel color**

■ **Tag No./Name printing in channel color, 8 digits (Max)**

■ **Message printing in 6 color**

■ **Long life recording**
6 months continuous operation with one cartridge.

■ **Color on each channel is selectable**
The following status printing is available for analyzing recording results.
- Alarm
  Red at alarm ON, black at alarm OFF, Channel No. and time are printed
- Burnout
- Ink shortage
- Recording start mark
- Chart speed change mark

■ **High reliability recording**
- 6 colors continuous trace
- Ink is not soluble in water, excellent water/sunlight resisting characteristics.

■ **Compact and light-weight design**
- Mass (weight): 2.1kg/100mm width
  6.0kg/180mm width
- Depth: 199mm

■ **Simple choice**
- The 100 and 180mm width recorders are configurable on each channel and accept most industrial inputs.
- The recorder operates on AC power 100 to 240V.

■ **RS-485 Communications**

Simple Operation

4-key operation (with door closed)

German and French languages can be displayed.

(PHC)

A. Record start/stop key
B. Display select key
C. Measured value print key
D. Chart feed key

(PHA)

4-key configuration (with door open)

Configuration can be done according to operation guide

(PHC)

E. Select key
F. Up key
G. Down key
H. Data entry key

(PHA)

Simple Design

Simple Design

The ink jet mechanism is simple in design.
Electronic parts are increasingly used in the recorder.
Mechanical parts have been reduced to about 1/3 that of conventional recorders and it comprises about 2/3 of the total number of parts.
The small size (199mm deep) contributes to panel cost saving.

Fully Configurable input

This recorder accepts multiple inputs.
With a process input, it can record and print the results of filter, square-root extraction, subtraction calculation and scaling for each channel.

Reduced Maintenance

Complicated servo mechanism is not used.
Each input has its own input circuit.
Unlike conventional recorders, input scanning relays are not used and hence trouble-free operation is ensured.

Specification Summary

Model		PHC	PHA
Chart width/length		100mm/15m	180mm/20m
No. of input channel		3/6	6/12
Input Signal type		TC (J, K, E, R, B, S, T, L, U, W, PN, N), RTD, DC V (±50mV,±500mV, ±5V, ±50V DC), DC mA	
Measuring cycle		160/320ms.	320ms.
Accuracy	Display Accuracy	±0.15% of measuring range, ±1 digit without cold junction compensation error	
	Analog Trace Accuracy	Display accuracy ±0.25% of measuring range	
Display		Fluorescent (20 characters x 2 lines)	
Chart speed		5-400mm/h continuous trace 401-1500mm/h intermittent trace	5-300mm/h continuous trace 301-1500mm/h intermittent trace
Recording cycle		Recording cycle (sec.) = 400 / Chart speed (mm/h) Recording cycle is more than 2 seconds.	Recording cycle (sec.) = 450 / Chart speed (mm/h) Recording cycle is more than 3 seconds.
Calculation *		Square root extraction, Subtraction, Scaling, Input filter, Logarithm	
Report Generation		Daily report, Totalize list, Parameter list, Test pattern, Measured value list, Logging print, Message print	
Alarm		H, L, RH, RL for each input, Burnout, Ink-out, Chart end, Battery alarm	
Option	Alarm output	6 Relay output	6/12 Relay output
	Remote control	Record start/stop, Chart speed change, Measured value print, Message print	
	Communication	RS-485	RS485, T-Link
	Chart Illumination	Cold cathode fluorescent	
Power supply		100-120V AC or 200-240V AC (Usable Range 85-150VAC or 150-300VAC)	100-240V AC (Usable Range 85-300VAC)
Environmental		Temperature: 0 to 50°C IEC IP50 Humidity: 20 to 80%RH (Temp. (°C) x Humi. (%RH) < 3200)	
Mass {weight} Approx.		2.1kg (without options)	6kg (without options)

* Consult Fuji Electric Instruments for additional features not listed such as flow integration record and calculation of input signal, etc.

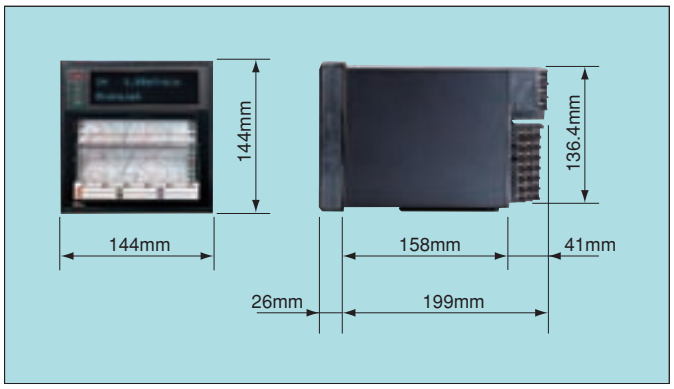
Code Symbols

1 2 3 4 5 6 7 8 - 9 10 11 12 13	Description
P H C 0 0 3 - V	
	Recording points
3 3	3 continuous recording
6 6	6 continuous recording
7 6	6 intermittent recording
	Power Supply
A	100 to 120V AC 50/60Hz
E	200 to 240V AC 50/60Hz
	Chart paper illumination
A	Without
B	With
	Alarm output/external control
0	Without
1	6-point alarm output (N.O.)/ 3-point external control
2	6-point alarm output (N.C.)/ 3-point external control
	Transmission function
Y	Without
R	With RS-485

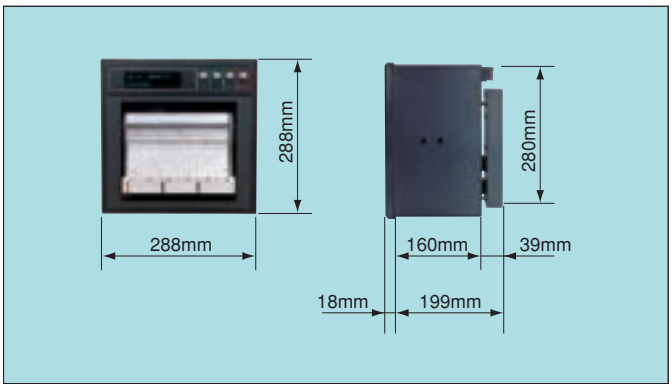
1 2 3 4 5 6 7 8 - 9 10 11 12 13	Description
P H A 0 0 4 - E V	
	Recording points
6 6	6 continuous recording
7 6	6 intermittent recording
8 8	12 intermittent recording
9 8	12 continuous recording
	Chart paper illumination
A	Without
B	With
	Alarm output/external control
0	Without
1	6-point alarm output/3-point external control
2	12-point alarm output/3-point external control
	Transmission function
Y	Without
R	With RS-485
T	With T-Link

Note) 1. Input signal
Setting prior to delivery is as follows;
• Thermocouple K: 0 to 1200˚C
2. Shunt resistor (10 Ω ± 0.1%) should be ordered separately for current input.
Shunt resistor : Ordering code PHZT8101 for PHA, PHZT1101 for PHC
3. T-Link transmission function is Fuji's original PLC Link transmission function

Dimension of PHC (100mm width)



Dimension of PHA (180mm width)



Microjet Recorder-E PHE

Inkjet technology, previously available only on expensive printers, is now available on a strip chart recorder at an affordable price, a price that falls below the cost of some dot matrix type printers. If you note the comparison between the dot matrix and inkjet typeface, there simply is no reason to use a dot matrix type recorder anymore.

- This recorder has basically 2 models, user programmable model and factory configuration model.
- Factory can pre-configure recorder parameters with customer supplied information prior to shipment, reducing the users' total installation cost and time.
- In case of 1 or 2 continuous recording, 2-color type Ink cartridge (PHZH2002) is also available. Since its life-span became longer than before, you can cut the running-cost in 1/4-1/2.
- Real time clock (calendar) function is available with standard specification.

Specification Summary

Model		PHE1	PHE2	PHE7, 8, 9
Chart width/length		100mm/15m		
No. of input channel		1	2	6
Signal type		TC (J, K, E, R, B, S, T, L, U, W, PN, N), RTD, DC V (±50mV,±500mV, ±5V, ±50V DC), DC mA		
Input/Recording range		User programmable or factory configuration		
Measuring cycle		200ms/point		30s/all point with input scanning relay
Accuracy	Display Accuracy	(±0.3% +1 digit) of measuring range (DC voltage, DC current input)		
	Analog trace Accuracy	Display accuracy ±0.2% of measuring range		
Display		LED (7 segments x 6 digits)		
Chart speed		10/20/24/30/50/120/200/300/400 mm/h		10/20/24/30/50/120/200/300/400/1000/1200/1500 mm/h
Recording cycle		Recording cycle (sec.) = 400 / Chart speed (mm/h) Recording cycle is more than 2 seconds.		30s/all point
Printing function	During analog recording	Channel No., Periodic data, Scale, Alarm, Burnout, Date and Time		
	Independent of analog recording	Instantaneous value list, Parameter list, Scale list, Test Pattern		
	Other	Recording start mark, Chart speed change mark		
Alarm		L/LL, H/L, H/HH		
Option	Alarm output	2 relay output	4 relay output	6 relay output
	Remote control	Chart speed change		
Power supply		100-120V AC or 200-240V AC		
Environmental		Temperature: 0 to 50°C IEC IP50 Humidity: 20 to 80%RH (Temp. (°C) x Humi. (%RH) < 3200)		
Mass {weight} Approx.		1.2kg (without option)	1.2kg (without option)	1.5kg (without option)

Code Symbols

User programmable model

1	2	3	4	5	6	7	8	-	9	10	11	12	13
P	H	E		0	0		2	-	V	V		E	V

	Description
	Recording points
1	1 continuous recording
2	2 continuous recording
9	6 intermittent recording
	Power Supply・Temperature Unit
1	100 to 120V AC 50/60Hz ˚C
2	200 to 240V AC 50/60Hz ˚C
3	100 to 120V AC 50/60Hz ˚F
4	200 to 240V AC 50/60Hz ˚F
	Alarm output/external control input (1 point)
0	Without
1	2 points alarm output (1 continuous only)
2	4 points alarm output (2 continuous only)
3	6 points alarm output (6 intermittent only)
A	2 points alarm output/External control (1 continuous only)
B	4 points alarm output/External control (2 continuous only)
C	6 points alarm output/External control (6 intermittent only)

Input : Universal (Programmable)
Range : Field settable (Programmable)

Note) 1. Input signal
Setting prior to delivery is as follows;
• Thermocouple K: 0 to 1200˚C
2. Shunt resistor (10Ω ± 0.1%) should be ordered separately for current input.
Shunt resistor : Ordering code PHZT 1101

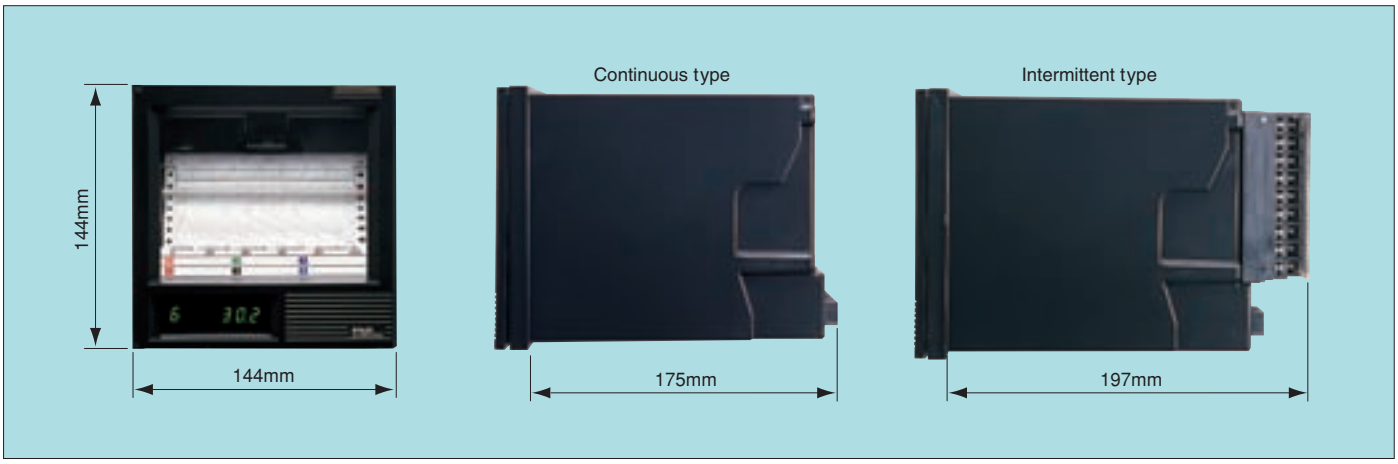
Factory configuration model

1	2	3	4	5	6	7	8	-	9	10	11	12	13
P	H	E					2	-					Y

	Description
	Recording points
1	1 continuous recording
2	2 continuous recording
7	6 intermittent recording (single scale)
8	6 intermittent recording (double scale)
	Input signal
	1 continuous * Y
	2 continuous * *
	6 intermittent (single range) * Y
	6 intermittent (double range) * *
	Symbols of input signals
	X..... B thermocouple R..... R thermocouple
	S..... S thermocouple K..... K thermocouple
	E..... E thermocouple J..... J thermocouple
	T..... T thermocouple N..... N thermocouple
	W.....W thermocouple L..... L thermocouple
	U..... U thermocouple P.....PN thermocouple
	H..... Pt100
	A..... 1 to 5V DC B..... 4 to 20mA DC *1
	C..... 10 to 50mA DC *1 M.....± 50mV DC
	O.....± 500mV DC V.....± 5V DC
	F..... ± 50V DC
	Power supply・Temperature Unit
1	100 to 120VAC 50/60Hz ˚C
2	200 to 240VAC 50/60Hz ˚C
3	100 to 120VAC 50/60Hz ˚F
4	200 to 240VAC 50/60Hz ˚F
	measuring range
	1 continuous * Y
	2 continuous * *
	6 intermittent (single scale) * Y
	6 intermittent (double scale) * *
	measuring range code are specified for each input signal.
	Alarm output/external control input (1 point)
0	Without
1	2 points alarm output (1 continuous only)
2	4 points alarm output (2 continuous only)
3	6 points alarm output (6-intermittent only)
A	2 points alarm output/External control (1 continuous only)
B	4 points alarm output/External control (2 continuous only)
C	6 points alarm output/External control (6 intermittent only)
	Instruction manual
Y	Not attached
E	English

Note) Recorder will be shipped with 10Ω shunt resistor attached to terminal for current input. For intermittent double scale type, 2 kind of recording range and unit should be specified. One is for channel 1 to channel 3, the other is for channel 4 to channel 6.

Outline diagrams



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