FC R
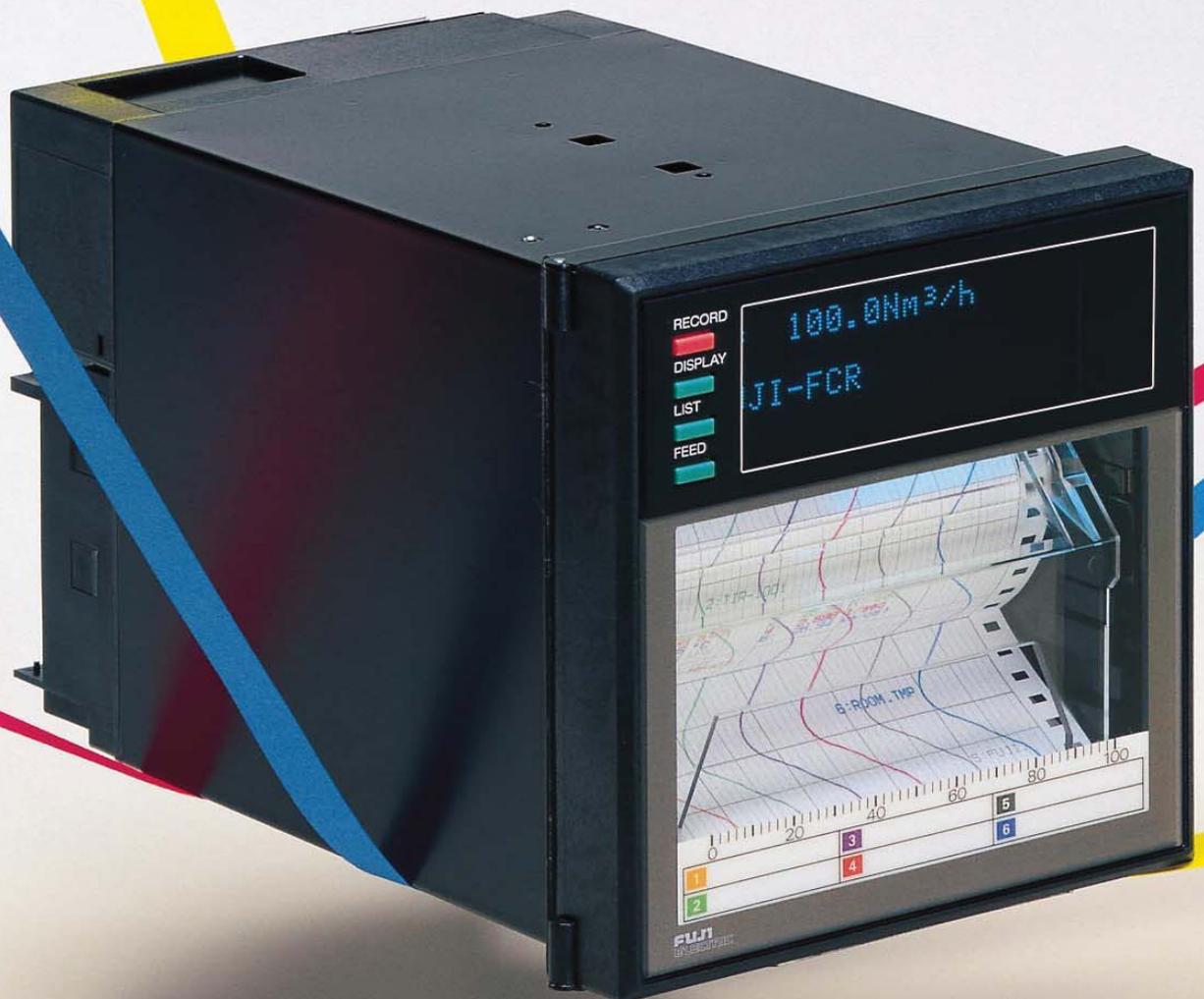
Color Printer
Microjet Recorder Series

# A Revolution in Recorder Technology

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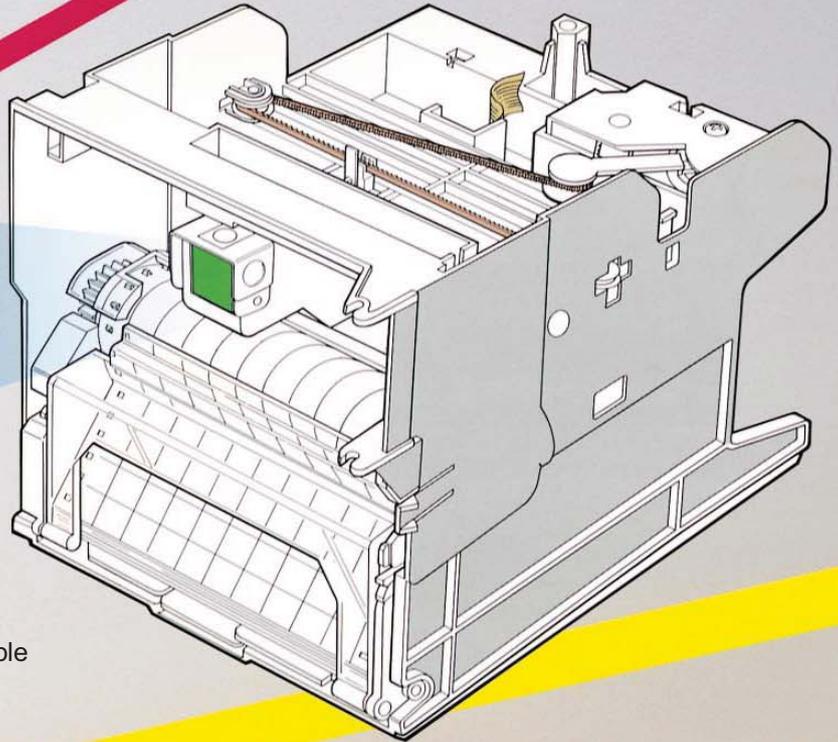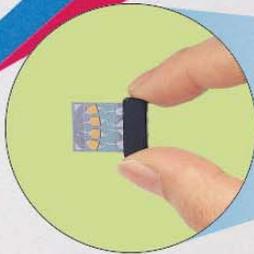
The ink jet head is formed on a stable quality silicon chip.
The ink jet head printing mechanism does not touch the chart paper, allowing reliable recording.

Piezo Element

Nozzle

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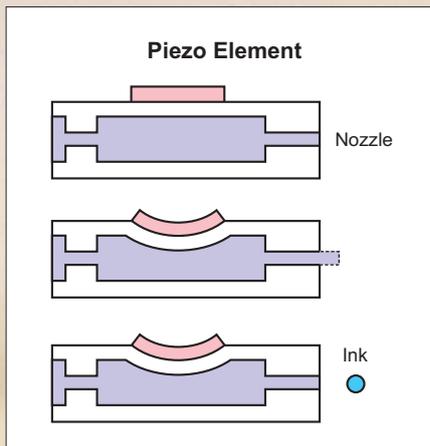
The ink jet mechanism is formed on a thin silicon chip (17.6 x 16mm) using silicon micro machining technology.
It is provided with piezo elements.
With voltage applied to the piezo elements, the shape of the elements changes as shown in the diagram, and ink particles are ejected from the tip of the nozzle.
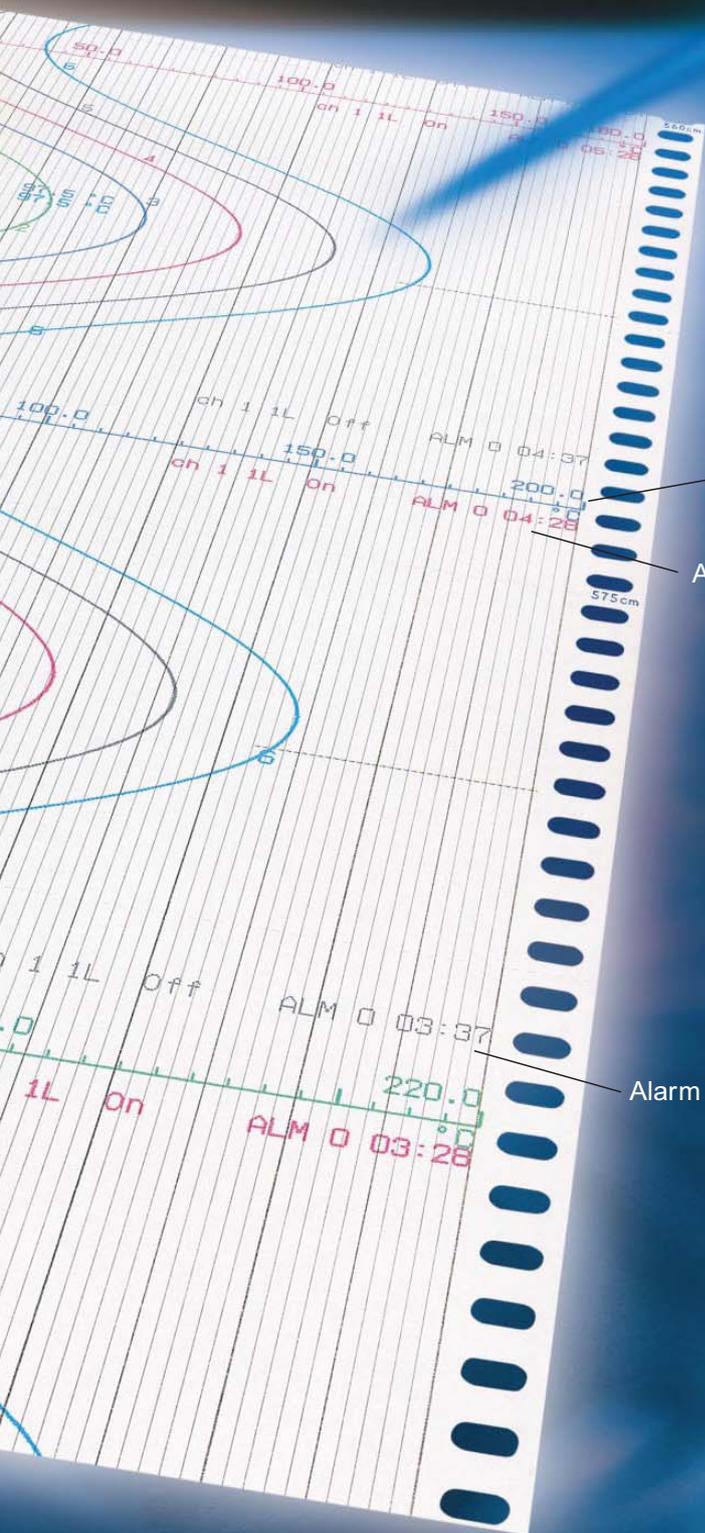These particles are very small and fast, and draw a series of very small dots of about 0.3mm diameter on the chart paper.
These small dots are combined together to form characters and trace lines for clear visible recording.

6 Color High Quality Trace

Instantaneous value

Chart speed

Time

Time line

Tag No./Tag name

Scale

Alarm ON

Alarm OFF

Microjet

n 3
ICR-301   cur
ppmNOx
0.501   0.0
0.501   0.
.066

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.
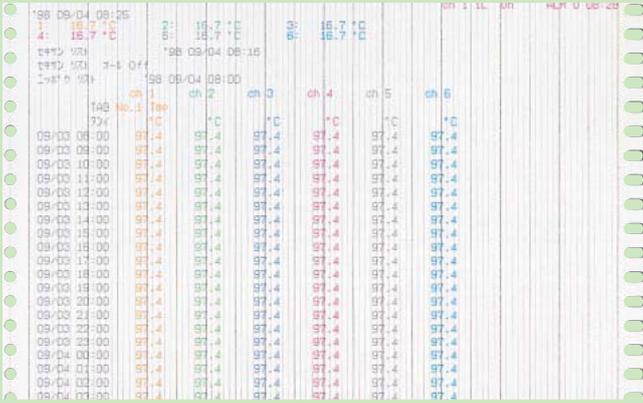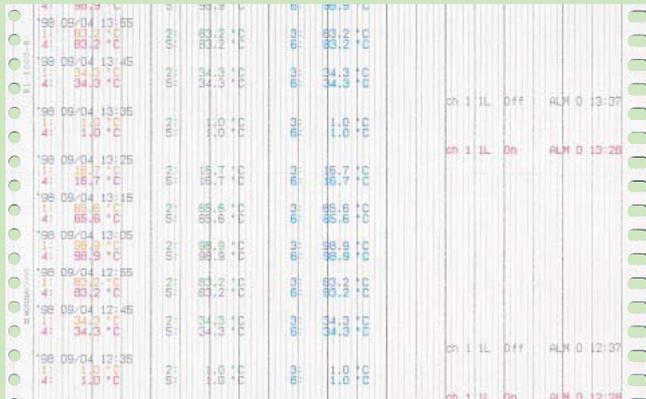
Microjet Recorder PHC/PHA

Report Generation

(PHC)

(PHA)

Daily report/totalization

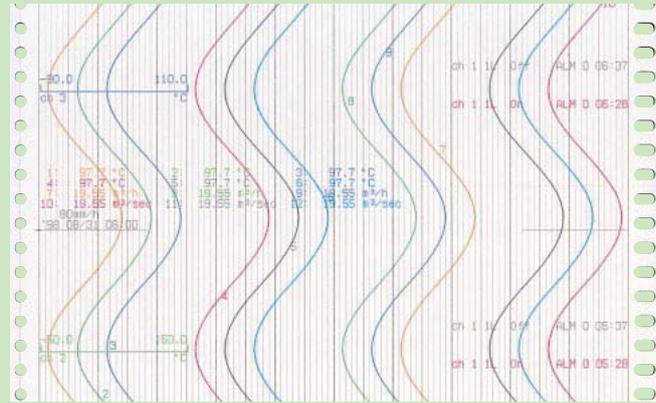On a daily report, measured values for every hour are printed along with maximum, minimum and average values.
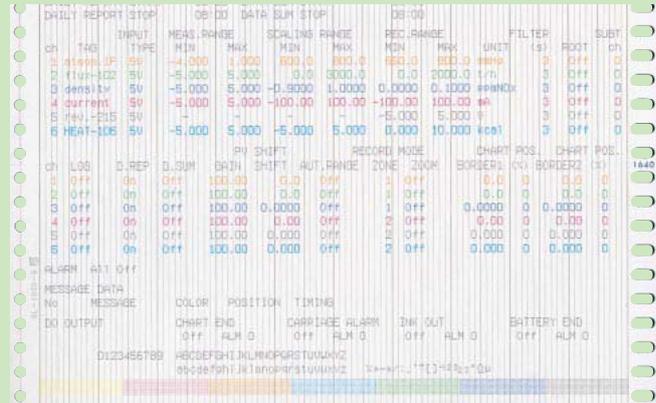On a totalization, integrated values at intervals of 1 hour and the total value for one day are printed.

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
■ **Self-printing scale in channel color**
■ **Tag No./Name printing in channel color, 8 digits (Max)**
■ **Digital data printing in channel color**
■ **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)

1*   1.00m³/min

MicroJet

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

ch 1* 150.0 °C
MicroJet

(PHA)

4-key configuration (with door open)

Configuration can be done according to operation guide

ch1RANGE m³/min

0.00 ~ 150.00

(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 ($\pm$50mV,$\pm$500mV, $\pm$5V, $\pm$50V DC), DC mA	
Measuring cycle	160/320ms.	320ms.
Accuracy — Display Accuracy	$\pm$0.15% of measuring range, $\pm$1 digit without cold junction compensation error	
Accuracy — Analog Trace Accuracy	Display accuracy $\pm$0.25% of recording 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.) $= \dfrac{400}{\text{Chart speed (mm/h)}}$ Recording cycle is more than 2 seconds.	Recording cycle (sec.) $= \dfrac{450}{\text{Chart speed (mm/h)}}$ 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
Option — Remote control	Record start/stop, Chart speed change, Measured value print, Message print	
Option — Communication	RS-485	
Option — 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

PHC

Code: `P H C [ ][ ] 0 0 3 - [ ][ ][ ][ ] V` (positions 1 2 3 4 5 6 7 8 - 9 10 11 12 13)

Code	Description
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

PHA

Code: `P H A [ ][ ] 0 0 3 - E [ ][ ][ ] V` (positions 1 2 3 4 5 6 7 8 - 9 10 11 12 13)

| Code	Description
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
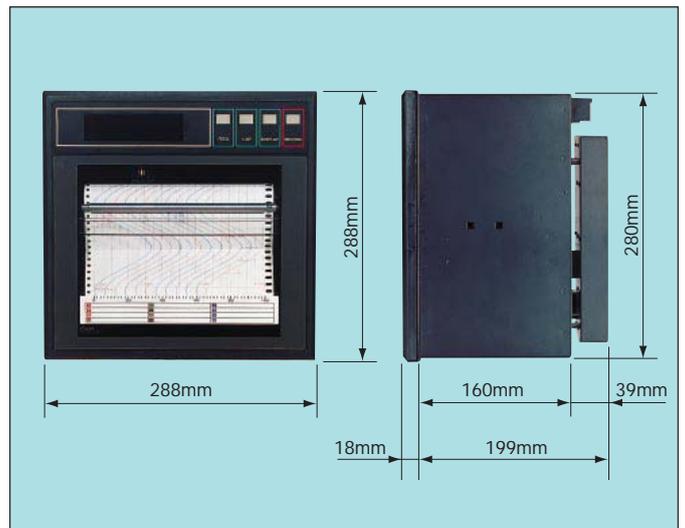2. Shunt resistor (10 Ω ± 0.1%) should be ordered separately for current input.
Shunt resistor : Ordering code PHZT8101 for PHA, PHZT1101 for PHC

Dimension of PHC (100mm width)
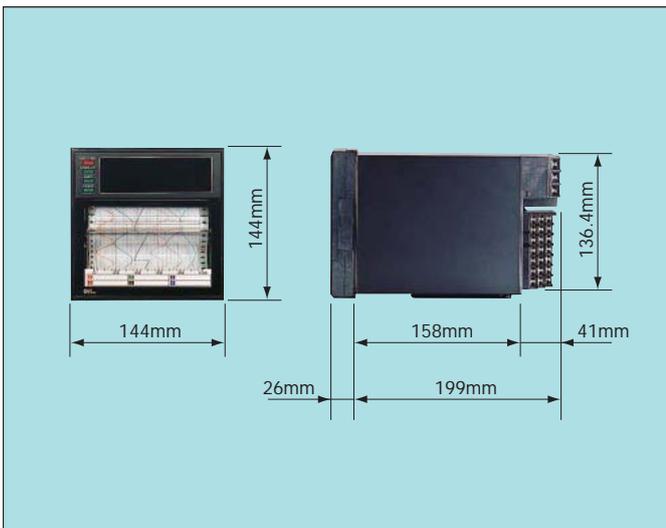
Dimension of PHA (180mm width)

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 various digital printing capabilities such as; periodic data, scale line, alarm burnout and parameter printing.
- Factry 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.

Specification Summary

Model		PHE1	PHE2	PHE9
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 ($\pm$ 50mV, $\pm$ 500mV, $\pm$ 5V, $\pm$ 50V DC), DC mA		
Input/Recording range		Programmable		
Measuring cycle		200ms/point		30s/all point with input scanning relay
Accuracy	Display Accuracy	($\pm$ 0.3% $+$ 1 digit) of input range, without cold junction compensation error		
	Analog trace Accuracy	Display accuracy $\pm$ 0.2%		
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.) $= \dfrac{400}{\text{Chart speed (mm/h)}}$ Recording cycle is more than 2 seconds.		30s/all point
Printing function	During analog recording	Channel No., Periodic data, Scale, Alarm, Burnout		
	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

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

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 (10 Ω± 0.1%) should be ordered separately
for current input.
Shunt resistor : Ordering code PHZT1101

Note) Items to specify when ordering except model : PHE□00
1. Code symbols (according to above table)
2. Recording range (scale) and unit in case of DC voltage and
DC current input.
For 2 continuous type, recording range and unit should be
specified for each channel 1 and channel 2.
3. Recording range should be specified with 3 or more effective
figures.
esp. 0 to 100, 0.0 to 10.0, 0.00 to 1.00

Outline diagrams

144mm

144mm

Continuous type

175mm

Intermittent type

197mm

Fuji Electric

Information in this catalog is subject to change without notice.