KH4000 SERIES
180mm chart DOT-PRINTING TYPE HYBRID RECORDER

PERFORMANCE SPECIFICATION
CHINO

KH4000 Series hybrid recorders realize simple and easy operation as analog recorders.
Not only can each measured value be read from the custom made analog scale plate which incorporates input type and measurement value input, but a comprehensive LED display also enables precise digital measurements to be taken by the user.

■FEATURES

●Dual displays for accuracy and simplicity
Measured value can be read at a glance, directory from sextupled analog scale display plate while a digital display clearly indicates measured values.

●Ready to run immediately after Power ON
As the recorders are pre-set to meet individual customer specifications and precise application requirements, the unit starts indicating and recording as soon as they are Power ON.

●Front section USB port provided
Connect with PC by mini-USB cable.* By attached setting software, you can set or change the parameter by PC. *Purchase commercialized product separately.

●Corresponds to custom-made
In addition to easy to use features, we will correspond to adding various devices and special features according to user's requirement.

●Packaged Software attached
・By Data acquisition software, the use of application is expands from recording/management to information processing.
*Optional communication interface is required.
・Parameter setting software can manage the setting information on PC.

■MODELS

KH4□□□–□□□

Input signal
1 : Thermocouple/DC voltage single range
2 : Resistance thermometer single range
5 : Thermocouple/DC voltage individual range
6 : Resistance thermometer/ thermocouple/DC voltage individual range

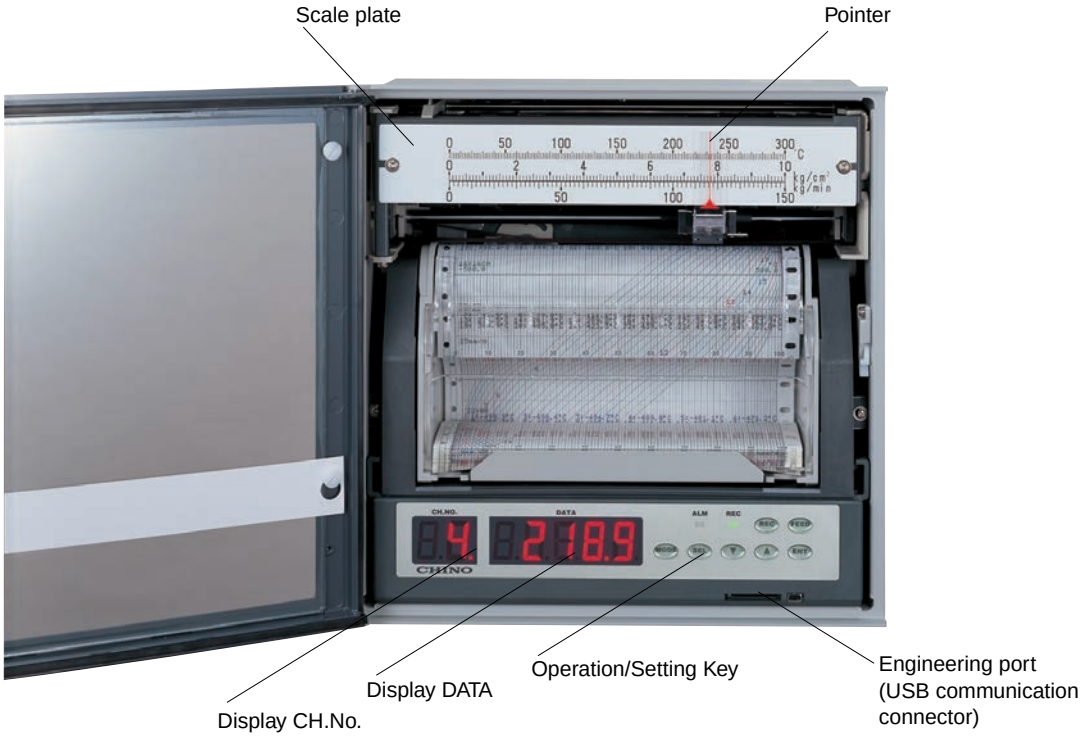
Input point
06: 6points
12: 12points
24: 24points

Communication Interface (option)
N : None
R : RS232C
A : RS422A/RS485

Alarm output + remote contacts (option)
0 : None
2 : 2 mechanical relay 'a' contact alarm outputs
4 : 4 mechanical relay 'c' contact alarm outputs + 5 remote contacts
A : 6 mechanical relay 'a' contact alarm outputs + 5 remote contacts
8 : 8 mechanical relay 'c' contact alarm outputs + 10 remote contacts
B : 12 mechanical relay 'a' contact alarm outputs + 10 remote contacts
F : 16 mechanical relay 'c' contact alarm outputs + 20 remote contacts
D : 24 mechanical relay 'a' contact alarm outputs + 20 remote contacts

Power supply
A : 100-240V AC

■NAME



●Display and operation keys

[Display]

CH.No.	Channel number of analog indication and data display (data display only for one-point continuous display) *
DATA	Data or time display*

*Set contents are displayed while in [Setting mode].

[Status LED]

REC	Green light lights during recording. Operation of recording ON/OFF is done by REC key. Flashes when chart end.
ALM	ALM Red light blinks during alarm activation.

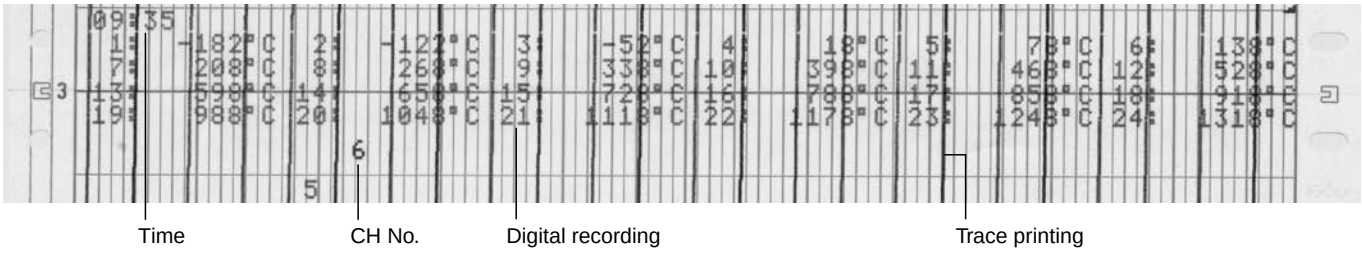
[Operation/set key]

Key names		Function
FEED	Feed key	Feeds chart at a speed of 600mm/min while this key is pressed.
MODE	Mode key	Switches mode.
SEL	Select key	Selects item to be set.
▼	Down key	Moves the cursor up/down.
▲	Up key	Selects setting items or values.
ENT	Enter key	Registers various settings.

RECORDING EXAMPLE

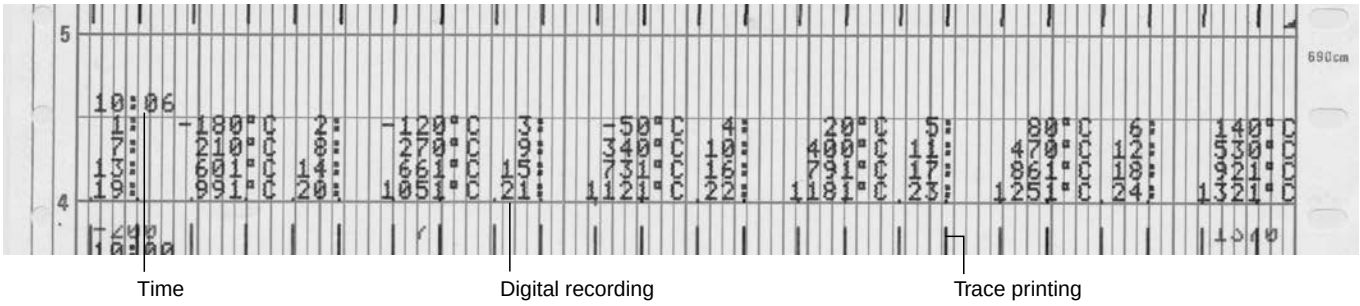
Periodic data printing and fixed time printing

Prints data(time, scale, chart speed periodic, setting change mark and printing of time line) on trace printing at arbitrary set intervals.



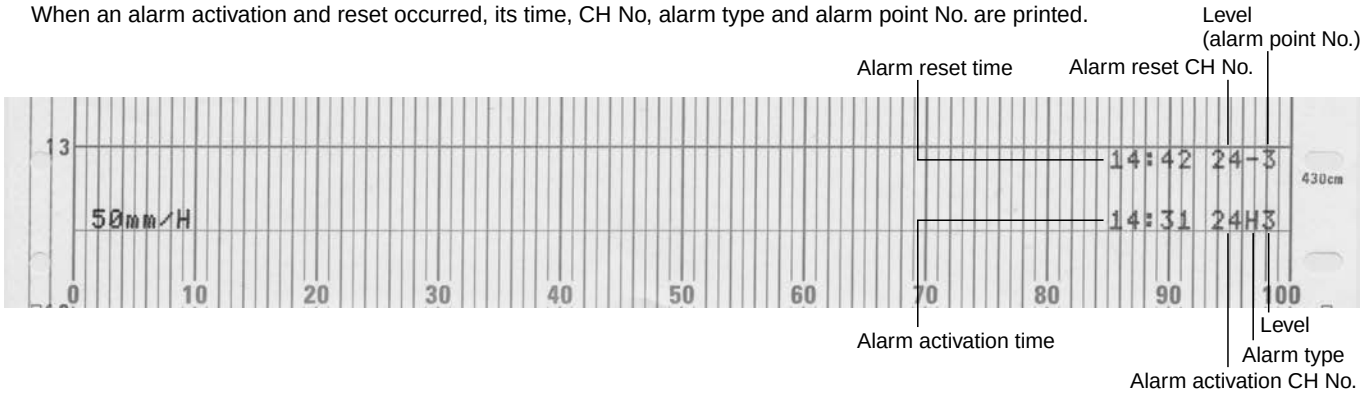
Data print

When the latest data is required, trace printing will stop and record.



Alarm activation and reset printing

When an alarm activation and reset occurred, its time, CH No, alarm type and alarm point No. are printed.



INPUT SPECIFICATIONS

Measuring points: 6, 12, 24
Input types: DC voltage --- ±6.9mV, ±13.8mV, ±27.6mV, ±69.0mV, ±5V
DC current --- Max 50mA by external shunt resistor (100Ω, 250Ω) (sold separately)
Thermocouple --- K, E, J, T, R, S, B, N, U, L, W-WRe26, WRe5-WRe26, PtRh40-PtRh20, NiMo-Ni, CR-AuFe, Platinel Ⅱ
Resistance thermometer --- Pt100, old Pt100, JPt100, Pt50, Pt-Co
Accuracy ratings: Refer to the tables of measurement range, accuracy ratings and display resolution
Measuring interval: 5 sec./ 6 points, 10 sec./12 points, 10 sec./ 24 points
RJ compensation accuracy:
At ambient temperature:23℃±10℃
K, E, J, T, N Platinel Ⅱ --- ±0.5℃ or equivalent of 20μV, whichever is greater
Other than above --- ±1.0℃ or equivalent of 40μV thermal electromotive force, whichever is greater
Burnout: For thermocouple input and resistance thermometer input, this function detects input signal disconnection. For thermocouple, resistance thermometer, this function enables selection of NON/UP/DOWN for each input CH.
Terminal board: Removable when wiring.

RECORDING SPECIFICATIONS

Dotting interval: About 5sec./1point
Recording system: Wire-dot type 6-color ribbon
Record/Printed color:
Trace printing

Channel no.	1, 7 13,19	2, 8 14,21	3, 9 15,21
Color	Red	Black	Blue
Channel no.	4,10 16,22	5,11 17,23	6,12 18,24
Color	Green	Brown	Purple

Digital recording

Periodic data printing	Repetition of six colors; red, black, blue, green, brown and purple
Alarm printing	Activate: Red, Reset: Green
List printing	Black (individual channel items use same colors as trace printing)

Chart paper: Fan-fold type
Total width 200mm, total length 20m, effective chart width 180mm
Chart speed: From 1 to 1500mm/h, in 1mm/h increments. (12.5mm can be set exceptionally.)
Periodic data printing:
Digital printing is added to trace printing as time, channel no., data, and unit. Interval (hour, minute) arbitrary setting.
Data printing: When required, interrupt trace printing and digital print time and measuring value.
Alarm printing: Alarm activated --- Time, CH No, alarm type and level are printed
Alarm reset --- Time, CH No. and alarm level are printed
Memory capacity --- Max. of 48 data
List printing: When required, interrupt trace printing and print date, chart speed and setting information of each channel.
*Optional remote contacts is required.
Subtract printing: Record difference between reference channel and measuring value or between reference value (set value) and measuring value.
Fixed time printing: Time and time line, scale, CH No. tag and unit are printed in conjunction with the chart speed.
Skip function: No display or printing of channels that are not inputted.

DISPLAY AND INDICATION SPECIFICATIONS

Analog display: 180mm scale plate
Digital display: 7-segment type red LED, CH No, 2 digits and data display, 5 digits
Status display: REC, ALM

ALARM SPECIFICATIONS

Alarm display: Status LED “ALM” flashes, measurement value flashes on operation screen
Alarm types: Absolute upper/lower alarm, differential upper/lower alarm, rate-of-change upper/lower alarm
Alarm settings: Each points individual settings, Max 2 levels/1 CH
Alarm output: Mechanical relay ‘a’ contact 2, 6, 12 or 24points output
Mechanical relay ‘c’ contact 4, 8 or 16points output

GENERAL SPECIFICATIONS

Rated power voltage: 100 to 240V AC, 50/60Hz
Power consumption: Max 60VA
100VAC balanced 20VA, 240VAC balanced 28VA
Normal operation condition:
Ambient temperature range : 0 to 50°C (20 to 80%RH no dew condensation)
Ambient humidity range: 20 to 80%RH (5 to 45°C) no dew condensation
Power voltage : 90 to 264V AC
Power frequency : 50/60Hz ±2%
Mounting orientation : forward tilting 0°, backward tilting 0 to 30°, left/right 0 to 10°
Case material: Door---Aluminum die casting (ADC12)
Front plate---Soda glass
Case---Steel (SPCC)
Case color: Door frame---Black (equivalent to Munsell N3.0)
Front plate---Clear and colorless
Case---Gray (equivalent to Munsell N7.0)
Mounting method: Panel flush-mount
Weight: About 8.0kg (full option)

STANDARDS

CE marking: EN61326-1
EN61010-1
*Under EMC test condition, variation in indication value is ±20% or ±2mV at maximum, whichever is larger.
UL: UL61010-1
CSA (C-UL): CAN/CSA C22.2 No.61010-1

OPTIONS

Other manufacture's chart paper corresponding type
Handle and feet

ACCESSORIES

Shunt resistor for DC current	100Ω Model : EZ-RX100 (Max.50mA)
	250Ω Model : EZ-RX250 (Max.20mA)

●MEASURING RANGES/ACCURACY RATING/DISPLAY RESOLUTION

Input type		Measuring range	Accuracy ratings	Display resolution
DC voltage	mV	-6.9 to 6.9mV	±0.2% ±1digit	5μV
		-13.8 to 13.8mV	±0.1% ±1digit	10μV
		-27.6 to 27.6mV		10μV
		-69.0 to 69.0mV		10μV
	V	-5 to 5 V		10mV
Thermocouple	K	-150 to 150ºC	±0.2% ±1digit	0.1ºC
		-200 to 300ºC	±0.1% ±1digit	0.1ºC
		-200 to 600ºC		0.1ºC
		-200 to 1370ºC		1 ºC
	E	-200 to 350ºC		0.1ºC
		-200 to 900ºC		1 ºC
	J	-200 to 500ºC		0.1ºC
		-200 to 1200ºC		1 ºC
	T	-150 to 150ºC	±0.2% ±1digit	0.1ºC
		-200 to 250ºC	±0.1% ±1digit	0.1ºC
		-200 to 400ºC		0.1ºC
	R	0 to 1760ºC		1 ºC
	S	0 to 1760ºC		1 ºC
	B	0 to 1820ºC		1 ºC
	N	-200 to 200ºC	±0.2% ±1digit	0.1ºC
		-200 to 400ºC	±0.1% ±1digit	0.1ºC
		-200 to 750ºC		0.1ºC
		-200 to 1300ºC		1 ºC
	U	-150 to 150ºC	±0.2% ±1digit	0.1ºC
		-200 to 250ºC	±0.1% ±1digit	0.1ºC
		-200 to 500ºC		0.1ºC
		-200 to 600ºC		0.1ºC
	L	-200 to 500ºC		0.1ºC
		-200 to 900ºC		1 ºC
	W-WRe26	0 to 2315ºC		1 ºC
	WRe5-WRe26	0 to 2315ºC		1 ºC
	NiMo-Ni	0 to 1310ºC		1 ºC
	Platinel Ⅱ	0 to 150ºC	±0.2% ±1digit	0.1ºC
		0 to 350ºC	±0.1% ±1digit	0.1ºC
		0 to 650ºC		0.1ºC
		0 to 1390ºC		1 ºC
	PtRh40-PtRh20	0 to 1880ºC	±0.2% ±1digit	1 ºC
	CR-AuFe	0 to 280 K		0.1K
RTD	Pt100	-50 to 50ºC	±0.1% ±1digit	0.1ºC
		-100 to 100ºC		0.1ºC
		-140 to 150ºC		0.1ºC
		-200 to 300ºC		0.1ºC
		-200 to 649ºC		0.1ºC
	Old Pt100	-50 to 50ºC	±0.1% ±1digit	0.1ºC
		-100 to 100ºC		0.1ºC
		-140 to 150ºC		0.1ºC
		-200 to 300ºC		0.1ºC
		-200 to 649ºC		0.1ºC
	JPt100	-50 to 50ºC	±0.1% ±1digit	0.1ºC
		-100 to 100ºC		0.1ºC
		-140 to 150ºC		0.1ºC
		-200 to 300ºC		0.1ºC
		-200 to 649ºC		0.1ºC
	Pt50	-200 to 649ºC		0.1ºC
	Pt-Co	4 to 374 K	±0.15% ±1digit	0.1K

Note: The accuracy ratings are converted into the measuring range under reference condition. Thermocouple input does not contain reference junction compensation accuracy.
K, E, J, T, R, S, B, N : IEC584(1977, 1982), JIS C 1602-1995, JIS C 1605-1995
W-WRe26, NiMo-Ni, PlatinelⅡ, PtRh40-PtRh20, CR-AuFe, Au/Pt : ASTM E1751
WRe5-WRe26 : ASTM E988 U, L : DIN43710-1985
Pt100 : IEC751(1995), JIS C 1604-1997
Old Pt100 : IEC751(1983), JIS C 1604-1989, JIS C 1606-1989
JPt100 : JIS C 1604-1981, JIS C 1606-1986, Pt50 : JIS C 1604-1981 Pt-Co : CHINO

●STANDARD SCALE LIST

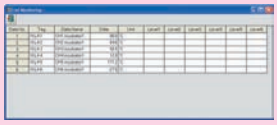
Input type		Standard scale
DC voltage & DC current		-5 to 5mV, 0 to 5mV -10 to 10mV, 0 to 10mV 0 to 20mV 0 to 50mV 1 to 5V, 4 to 20mA, 10 to 50mA
Thermocouple	K	0 to 100ºC, 0 to 150ºC, -50 to 100ºC 0 to 200ºC, 0 to 250ºC, 0 to 300ºC 0 to 400ºC, 0 to 500ºC, 0 to 600ºC 0 to 800ºC, 0 to 1000ºC, 0 to 1200ºC
	E	0 to 200ºC, 0 to 300ºC, -50 to 150ºC 0 to 500ºC, 0 to 600ºC, 0 to 800ºC
	J	0 to 300ºC, 0 to 400ºC, 0 to 600ºC, 0 to 800ºC, 0 to 1000ºC
	T	0 to 100ºC, 0 to 150ºC, -50 to 100ºC 0 to 200ºC, 0 to 250ºC, -50 to 200ºC 0 to 300ºC, 0 to 400ºC
	R	0 to 1200ºC, 0 to 1400ºC, 0 to 1600ºC
	S	0 to 1400ºC, 0 to 1600ºC, 400 to 1600ºC
	B	0 to 1200ºC, 0 to 1400ºC, 0 to 1600ºC
	N	0 to 150ºC、0 to 200ºC 0 to 300ºC 0 to 400ºC, 0 to 500ºC, 0 to 600ºC 0 to 1000ºC, 0 to 1200ºC
	PR20-40	0 to 1600ºC
	PR5-20	0 to 1200ºC、0 to 1400ºC, 0 to 1600C
	Ni-NiMo	0 to 800ºC, 0 to 1000ºC, 0 to 1200ºC
	Platinel Ⅱ	0 to 100ºC, 0 to 150ºC, -50 to 100ºC 0 to 200ºC, 0 to 250ºC, 0 to 300ºC 0 to 400ºC, 0 to 500ºC, 0 to 600ºC 0 to 800ºC, 0 to 1000ºC, 0 to 1200ºC
	U	0 to 100ºC, 0 to 150ºC, -50 to 100ºC 0 to 200ºC, 0 to 250ºC、-50 to 200ºC 0 to 300ºC, 0 to 400ºC 0 to 600ºC
	L	0 to 300ºC, 0 to 400ºC 0 to 600ºC, 0 to 800ºC
RTD	Pt100	-50 to 50ºC、0 to 50ºC 0 to 100ºC, -20 to 80ºC、-100 to 50ºC 0 to 150ºC, -50 to 150ºC 0 to 200ºC, 0 to 250ºC、0 to 300ºC 0 to 400ºC, 0 to 500ºC、0 to 600ºC
	JPt100	-50 to 50ºC、0 to 50ºC 0 to 100ºC, -20 to 80ºC、-100 to 50ºC 0 to 150ºC, -50 to 150ºC 0 to 200ºC, 0 to 250ºC, 0 to 300ºC 0 to 400ºC, 0 to 500ºC, 0 to 600ºC
	Pt50	0 to 300ºC, 0 to 400ºC, 0 to 500ºC

APPLICATION SOFTWARE (standard attached)

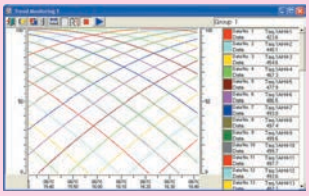
Data Acquisition Software

You can acquire data easily to your PC.

*Optional communication interface required



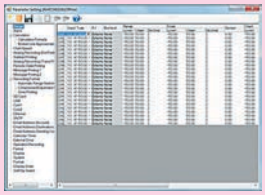
List Data Screen

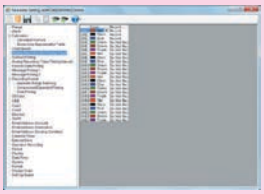


Trend Data Screen

Parameter Setting Software

Control the setting information at PC by using communication interface or USB port (standard equipped)





TERMINAL ARRANGEMENT

Alarm relay output(24 points 'a' contact) + remote contacts(20 points) and communication interface

Communication terminal

* RS232C and RS422A/485 are specified on purchase.

		1	2	3	4	5	6	7	8
COM1	RS232C				SG	SD		RD	
	RS422A				SG	SDA	SDB	RDA	RDB
	RS485				SG	SA	SB	SA	SB

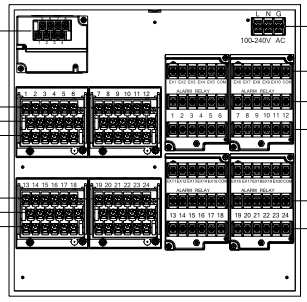
Short between 5-7, 6-8

Measurement input terminals

TC.mV(+), RTD(A) terminals
TC.mV(–), RTD(B) terminals
RTD(B) terminals

TC.mV(+), RTD(A) terminals
TC.mV(–), RTD(B) terminals
RTD(B) terminals

Remote contact terminals (option)
Power/protective conductive terminals



Alarm output terminals (option)
N.O terminal
COM terminal
N.O terminal
COM terminal

Alarm relay output(16 points 'c' contact) + remote contacts(20 points) and communication interface

Communication terminal

* RS232C and RS422A/485 are specified on purchase.

		1	2	3	4	5	6	7	8
COM1	RS232C				SG	SD		RD	
	RS422A				SG	SDA	SDB	RDA	RDB
	RS485				SG	SA	SB	SA	SB

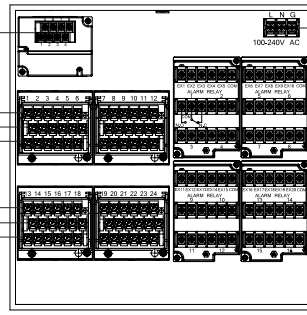
Short between 5-7, 6-8

Measurement input terminals

TC.mV(+), RTD(A) terminals
TC.mV(–), RTD(B) terminals
RTD(B) terminals

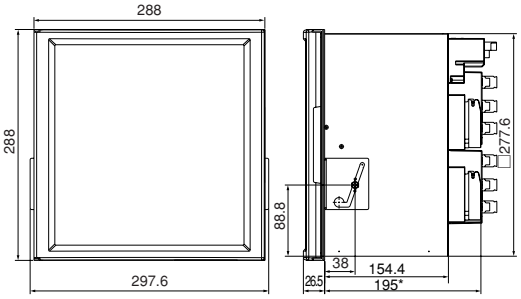
TC.mV(+), RTD(A) terminals
TC.mV(–), RTD(B) terminals
RTD(B) terminals

Remote contact terminals (option)
Power/protective conductive terminals



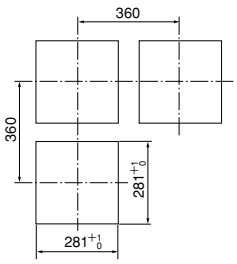
Alarm output terminals (option)
Alarm output terminals (option)

DIMENSIONS



*Maximum 216 when an alarm unit and a communication unit are added

Panel cutout



Unit :mm

Specifications subject to change without notice. Printed in Japan (I) 2015. 6

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