AL3000 AH3000 SERIES

100mm Chart 180mm Chart

HYBRID RECORDERS

NEW

Easy-to-read digital display, simple operation, abundant functions and much more!!!

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CHINO

SIMULTANEOUS DISPLAY OF 12-POINT DATA (Multi-point type AH3000 SERIES)

AL3000/AH3000 series conforming to CE-marking, UL and CSA are 100mm and 180mm multi-point type hybrid recorders with a simultaneous display of multi-channel data, alarm display/printings and other unique features. A software package "KIDS" for data acquisition of measured values is available.

Pen type

Multi-point type

AH3000

180mm Chart

Pen type

AL3000

100mm Chart

Multi-point type

FEATURES

Simultaneous digital displays of multi-point data

Simultaneous digital displays of every points (except 24points) allows measured data to be viewed at a glance.

AL3000 series
4-pen simultaneous display

AH3000 series, 12-channel simultaneous display

Universal input

The recorders accept total 56 ranges of 10 DC voltage ranges, 35 thermocouple ranges and 11 resistance themometer ranges and these ranges can be programmed for each channel.

Alarm display/printings

Alarm display (status and channels) and printings (channels, alarm types and alarm numbers) are executed.

Up to 4 levels of alarm are programmable for each channel. Optional alarm outputs are available.

CE, UL and CSA standards

The recorders manufactured in our ISO9001 certified facilities conform to the rules of safety standards of CE, UL (approval pending) and CSA (approval pending).

Software package "KIDS" for data acquisition

The data acquisition software package "KIDS" is available for data acquisition with real-time data/trend displays and historical data/trend displays.

Other features:

Universal power supply---100V to 240VAC, 50/60Hz
Communications interface---RS232C, RS422A or RS485 (options)

MULTI-POINT TYPE SEPCIFICATIONS

INPUT SPECIFICATIONS

Number of measuring points:
AL3000 ... 6 points
AH3000 ... 6 points, 12 points, 24 points
Input signals: Universal input
DC voltage, thermocouple, resistance thermometer
DC current (by adding shunt resistors)
Range setup: Programming of input types and ranges by keys
Scale setup: Programming of maximum values, minimum values, and engineering units by keys
Accuracy rating: Refer to the table of inputs.
Measuring interval: About 5 seconds/6 points
About 10 seconds/12 points
About 20 seconds/24 points
Reference junction compensation accuracy:
K, E, J, T, N, Platinel II ... +/-0.5'C or less
R, S, NiMo-Ni, CR-AuFe, WRe5-WRe26, W-WRe26, U, L ... +/-1.0'C or less
(At the measurement higher than 0'C, the above errors are added to the accuracy ratings for internal reference junction compensation.)
Burnout: With a function to detect input signal disconnection for thermocouple inputs and resistance thermometer inputs
Up-scale burnout, down-scale burnout or burnout disabled is selectable for each input.
Terminal board: Detachable type, removable on wirings

PRINTING SPECIFICATIONS

Printing interval: About 5 seconds/point
Printing system: Wire-dot type 6-color ribbon
Printing color: Trace printing

Channel No. Colors	1,7,13,19 Red	2,8,14,20 Black	3,9,15,21 Blue
Channel No. Colors	4,10,16,22 Green	5,11,17,23 Brown	6,12,18,24 Purple

Digital printing
Periodic data printing, digital data printing:
Repetition of red, black, blue, green, brown and purple
Channel number printing: ...Same color as trace printing
Fixed-time printing:
Range (scale), tag, engineering unit ...Same color as trace printing
Month/day or year/month/day, time, time line, chart speed ... black
List printing:
Programmed parameters ... Same color as trace printing
Others ... black
Programming change mark: Black
Alarm printing: Red
Chart: Fan-fold type

	effective width	total width	total length
AL3000	100mm	114mm	10mm
AH3000	180mm	200mm	20mm

Chart speed: 1 to 1500mm/hr
(Default AL3000 20mm/hr, AH3000 25mm/hr)
Periodic data printing:
Digital printing of time, channel numbers and measured values on trace printing Interval time (hour, minute) optional programming (limited by chart speeds)
Digital data printing: Digital printing of time and measured values by interrupting trace printing on demand.
Alarm printing: Alarm-activated ...Time, channel number, alarm type and level (alarm point number)
Alarm-reset ...Time, channel number and level (alarm point number)
Subtract printing: Printing of difference between two channels or between a channel and a reference value (programmed value)
Fixed-time printing:
Printing of month/day, time, time line, ranges (scales), tags and engineering units every fixed-time (interlocking to chart speed)

DISPLAY SPECIFICATIONS

Digital display: -9999 to 99999
Display items: Multi-point sequential display (fluorescent vacuum display tube) ... Channel number, measured value (multi-point sequential display or 1-point continuous display), time, and chart speed
Multi-point simultaneous display (LCD) ...
Simultaneous display of 6 or 12—channel measured values, or time (year/month/day/hour/minute), alarm-activated channel, and chart speed
Status display: Multi-point sequential display ...
Printing status, key lock, digital print condition, alarm-activation condition, and programming error information
Multi-point simultaneous display ...
Printing status, key lock, and alarm-activation condition

ALARM SPECIFICATIONS

Alarm display: Multi-point sequential display ...
"ALARM" illumination and flashing of alarm-activated channel number display
Multi-point simultaneous display ...
"ALARM" illumination and flushing of measured value at an alarm-activated channel
Alarm types: Absolute value alarm, differential alarm, rate-of-change alarm
Alarm programming: Individual programming for each channel, maximum 4 levels (alarm points)/channel
Alarm output: Option (refer to list of options)

GENERAL SPECIFICATIONS

Rated power supply:
100 to 240VAC, 50/60Hz
Power consumption: Maximum 45VA
Normal operating condition:
Ambient temperature/humidity range
0 to 40'C, 20 to 80%RH
Power voltage ... 90 to 264VAC
Power frequency ... 50/60Hz **+/-**2%
Attitude ... Left/right 0 to 10', Forward tilting 0', Backward tilting 0 to 30'
Power failure protection:
Programmed parameters stored into EEPROM memory
Clock circuit sustained for minimum 10 years by a lithium battery (at the operation more than 8 hours/day)
Case assembly material:
Door ... ABS resin (frame) with glass
Enclosure ... Steel
Mounting: Panel mounting
Weight: AL3000 ... About 3.0kg (full options)
AH3000 ... About 8.5kg (full options)

STANDARDS

CE: EN55011 Group 1 Class A, EN5008-2, EN61010-1 + A2
UL: UL3111-1
CSA (C-UL): C22.2, No.1010
IIP: IEC529 IP54 (Front part)

OPTIONS

Options		Explanations
Measuring interval		1 second/6 points, 2 seonds/12 points, 4 seconds/24 points, Alarm judgment interval: Same as measuring interval, Multi-point simultaneous display only, Printing interval: About 5 seconds/point, Conforming to CE, UL (approval pending), CSA (approval pending), The indication equivalent to maximum 25'C or 2mV may vary under the test environment requested by EMC directive.
Remote contacts		By signals of 4-point contacts and 2-point common contacts, the following operations are executed. Selection of 3-chart-speed/stop, digital data printing and list printing
Alarm output		Output: 6-point, 12-points or 24-point individual output OR output possible Maximum contact rating: MOS relay output 240V (AC, DC), 50mA (AC, DC), resistive load Mechanical relay output (common to "a" and "c" contacts) 100V AC 0.5A, 240V AC 0.2A, 100VDC 0.3A, resistive load ("a" contact: conforming to CE, "c" contact: not conforming to CE, UL and CSA.)
Pringing format*	Zone printing	Printing area is divided into 4 zones (AH3000) or 2zones (AL3000)
	Compressed/ expanded printing	A part of printing area of each channel is printing compressed or expanded.
	Automatic range-shirt	Printing range is automatically changed into a new printing area in the event of over-range or under-range.
Communications		3 kinds of RS-232C, RS-422A, RS-485 (to be specified) Parameter programming, operation and data logging (MODBUS protocol)
High-speed trace printing		Printing interval about 2.5 seconds (standard: 5 seconds) Note: Printing interval is longer for chart speeds of less than 12mm/hr.
Mathematics		The following math-function can be executed to the measured data. The math-function can be also executed to the calculated data. Arithmetic, Square root, Logarithm, Natural Logarithm, Exponential, Maximum, Minimum, Average, Temperature/humidity
Tatalizer		Totalizing of measured data or calculated data. Interval: 1 minute to 24 hours or no interval
Shunt-resistor		Measurement of current by adding a resistor of 250Ω (for 20mA) or 100Ω (for 50mA)
16m chart		Total length of 15.6m (AL3000 only)
Aluminum die-cast		Case for horizontal high-density panel installation and

* 1 kind of the printing format is to be specified.

PEN TYPE SPECIFICATIONS

INPUT SPECIFICATIONS

Number of measuring points:
1 to 4point
Input signals: Universal input
DC voltage, thermocouple, resistance thermometer
DC current (by adding shunt resistors)
Contacts input [remote contacts input (option - up to 4 points) for operation printing for inputs]
Range setup: Programming of input types and ranges by keys
Scale setup: Programming of maximum values, minimum values, and engineering units by keys
Accuracy rating: Refer to the table of inputs.
Measuring cycle: About 100msec
Reference junction compensation accuracy:
K, E, J, T, N, Platinel II ... +/-0.5'C or less
R, S, NiMo-Ni, CR-AuFe, WRe5-WRe26, W-WRe26, U, L ... +/-1.0'C or less
(At the measurement higher than 0'C, the above errors are added to the accuracy ratings for internal reference junction compensation.)
Burnout: With a function to detect input signal disconnection for thermocouple inputs and resistance thermometer inputs
Up-scale burnout, down-scale burnout or burnout disabled is selectable for each input.
Terminal board: Detachable type, removable on wirings

PRINTING SPECIFICATIONS

Printing system: Analog tracing... Disposal cartridge pen
Digital printing... Plotter pen
Printing color: Analog tracing... 1st pen red, 2nd pen green, 3rd pen blue, 4th pen brown
Digital printing purple
Periodic data printing, Digital data printing (analog tracing continuance/ interruption), Date and time printing (at power on, every hour), Chart speed printing, Scale, unit and tag printing, Alarm activation/reset printing, Programming change mark, POC (pen offset correction) mark, List printing
Chart: Fan-fold type

	effective width	total width	total length
AL3000	100mm	114mm	10mm
AH3000	180mm	200mm	20mm

Chart speed: 1 to 600 mm/hr, 1 to 200mm/min
(Default AL3000 20mm/hr, AH3000 25mm/hr)
Phase synchronizing correction:
Time axis pen offset correction (POC)
Subtract printing: Printing of difference between two channels or between a channel and a referenced value (programmed value)
Message printing: Letters pre-programmed are printed by a key or a remote contacts (option).
5 kinds of message (time + message of maximum 15 letters)
Pen-lift function: By RECORD OFF key, all pens are lifted up simultaneously.
At the power OFF, the pen status just before the power OFF is kept.
A lever for manually lifting up/down of all pens is provided.

DISPLAY SPECIFICATIONS

Analog indication:
AL3000 ...100mm bargraph per each input point (51 segments, Same color as analog tracing is indicated at each 5 segments.)
AH3000 ...180mm bargraph per each input point (101 segments, Same color as analog tracing is indicated at each 10 segments.)
Digital display: -9999 to 99999 [optional decimal place, with cursor (by each analog tracing color)]
Display items: AL3000 ... Simultaneous display of 4-channel measured values, hour/minute, chart speed and alarm activated channel
AH3000 ... Simultaneous display of 4-channel measured values, or year, month/day, hour/minute, chart speed and alarm activated channel
Status display: Printing status, key lock, alarm-activation, chart end, fail and pen offset correction

ALARM SPECIFICATIONS

Alarm display: "ALARM" illumination, flashing of measured value at an alarm-activated channel and alarm type
Alarm types: Absolute value alarm, differential alarm, rate-of-change alarm, absolute value/standby alarm and differential/standby alarm, each 2 levels
Alarm programming:
Individual programming for each channel
Maximum 4 levels/channel
Alarm output: Option (Refer to the list of options.)

GENERAL SPECIFICATIONS

Rated power voltage:
100 to 240VAC, 50/60Hz
Power consumption: Maximum 60VA
Normal operating condition:
Ambient temperature/humidity range ...
0 to 50'C, 20 to 80%RH
Power voltage ... 90 to 264VAC
Power frequency ... 50/60Hz +/-2%
Attitude Left/right 0 to 10, Forward tilting 0, Backward tilting 0 to 30
Power failure protection:
Programmed parameters stored into EEPROM memory
Clock circuit and POC data sustained for minimum 8 years by a lithium battery (at the operation more than 8 hours/day)
Case assembly material:
Door ... ABS resin (frame) with glass
Enclosure ... Steel
Mounting: Panel mounting
Weight: AL3000 ... About 4.0kg (full options)
AH3000 ... About 9.0kg (full options)
Chart illumination: By CFL

STANDARDS

CE: EN61326 A1 Class A, EN61010-1 A2
UL: UL3111-1 (approval pending)
CSA (C-UL): C22.2, No.1010 (approval pending)
Front protection: Conforming to IEC529 IP54

OPTIONS

Options	Explanations
Alarm output	Three kinds of output (alarm, FAIL and chart-end)are possible. Output: 6 points and 12 points (AH3000 only) Maximum contact rating: MOS relay output 240V (AC, DC), 50mA (AC, DC), resistive load "a" contact mechanical relay output 240V AC 0.2A, resistive load "c" contact mechanical relay output 240V AC 0.2A, resistive load ("c" contact: not conforming to CE, UL and CSA.)
Remote contacts	By 4-point contact input (2-point common) signal, the following 6 kinds of operation are selectable. Chart speed 3-speed/chart stop, digital data print, list print, 4-point operation printing (printing of contact ON/OFF status), totalizing start/stop, 5-kind of message printing
Printing format *	Zone printing Printing area is divided into 4 zones (AH3000) or 2 zones (AL3000) Compressed/ expanded printing A part of printing area of each channel is printing compressed or expanded. Automatic range-shift printing Printing range is automatically changed into a new printing area in the event of over-range or under-range
Communications interface	3 kinds of RS-232C, RS-422A, RS-485 (to be specified) Two kinds of protocol, MODBUS and private, are built-in.
Basic mathematics	The following math-function can be executed in time order or between channels.. Arithmetic, Absolute value, Square root, Logarithm, Natural Logarithm, Exponential, Maximum, Minimum, Average, Temperature/humidity
Tatalizing/ flow correction	Totalizing of measured data and calculated results and correction of flow by pressure, temperature, etc.
Handle and rubber stands	Handle and rubber stands are mounted for easy carrying (not conforming to CE, UL and CSA.)
Aluminum die-cast door	Case for horizontal high-density panel installation and aluminum die-cast door (AL3000 only)
16m chart	Total length of 15.6m (AL3000 only)
Shunt resistor for current input	250Ω (for 20mA) and 100Ω (for 50mA)

MODELS

MULTI-POINT TYPE

AL3 7 □5 - □□□
AH3 7 □□ - □□□

Series
AL3000 series 100mm chart Hybrid Recorder
AH3000 series 180mm chart Hybrid Recorder

Input points
6: 6points (5 seconds/6 points)
2: 12 points (10 seconds/12 points)
4: 24 points (20 seconds/24 points)
A: 6 points (1 second/6 points)
B: 12 points (2 seconds/12 points)
D: 24 points (4 seconds/24 points)
Note: For AL3000, 6 or A is only available.
A, B and D are options and available in multi-point simultaneous display only.

Display
0: Multi-point sequential display
5: Multi-point simultaneous display
Note: 6-point and 12-point inputs: Simultaneous display of all points
24-point input: Alternative display of 2 groups for each 12-point simultaneous display

Communications interface (option)
N: None A: RS-422A R: RS-232C S: RS-485

Alarm output/remote contacts (option)
0: None
1: 6 (MOS relay) outputs+ remote contacts
2: 6 (mechanical relay "c" contact) outputs + remote contacts (*see note)
A: 6 (mechanical relay "a" contact) outputs + remote contacts
<The followings are only available in AH3000 series>
3: 12 (MOS relay) outputs + remote contacts
4: 12 (mechanical relay "c" contact) outputs + remote contacts (*see note)
B: 12 (mechanical relay "a" contact) outputs+ remote contacts
5: 24 (MOS relay) outputs + remote contacts
6: 24 (mechanical relay "c" contact) outputs + remote contacts (*see note)
D: 24 (mechanical relay "a" contact) outputs + remote contacts

Others (option)
0: None
1: Printing format + high-speed trace printing

Note: Not conforming to CE, UL and CSA (C-UL)

PEN TYPE

AL 3 7□P - □□□ - □□ A
AH 3 7□P - □□□ - □□ A

Series
AL3000 series Hybrid Recorders
AH3000 series Hybrid Recorders

Input points
1: 1points 2: 2 points 3: 3 points 4: 4 points

Communications interface (option)
N: None A: RS-422A R: RS-232C S: RS-485

Alarm output/remote contacts (option)
0: None
1: 6 (MOS relay) alarm outputs remote contacts
2: 6 (mechanical relay "c" contact) outputs + remote contacts (*see note)
A: 6 (mechanical relay "a" contact) outputs + remote contacts
<The followings are only available in AH3000 series>
3: 12 (MOS relaya) alarm outputs + remote contacts
4: 12 (mechanical relay "c" contact) outputs + remote contacts (*see note)
B: 12 (mechanical relay "a" contact) outputs + remote contacts

Others (option)
0: Note
1: Printing format

Mathematical function (Option)
0: None
1: Basic
2: Totalizing/flow correction
3: Basic +Totalizing/flow correction

Door/case (option)
0: Standard
1: With handle and rubber stands (*see note)
<The followings are only available in AL3000 series.>
2: Die-case door,
3: With handle and rubber stands +Die-case door (*see note)

Note : Not conforming to CE, UL and CSA

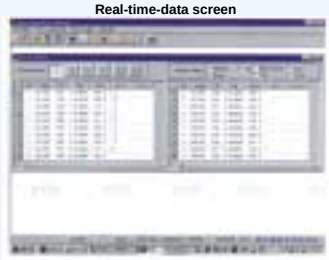
Data acquisition software package “KIDS”

The “KIDS” is a software package, through a communications interface (optional) of AL3000 and AH3000 series recorders, for storing data being measured and for playing back of the stored datal.

Main functions and features

Data processing: Maximum 100 channels (up to 5 sets)
Data acquisition, replay, trend graph, daily report creation, etc.
Communications interface: RS232C, RS422A or RS485
Stored data: Can be exported to application softwares.

Real-time-data screen



Real-time-trend screen

AL3000 AH3000 SERIES

100mm Chart 180mm Chart

HYBRID RECORDERS

INPUT

Input signals		Measuring Ranges	Reference ranges	Accuracy ratings	Display resolutions
DC voltage		-13.8 to 13.8mV	+/- 13.8mV	+/-0.1% + / - 1 digit	10 μ V
		-27.6 to 27.6mV	+/- 27.6mV		10 μ V
		-200 to 200mV	+/- 200mV		100 μ V
		-500 to 500mV	+/- 500mV		100 μ V
		-2 to 2V	+/- 2V		1mV
		-5 to 5V	+/- 5V		1mV
		-10 to 10V	+/- 10V		10mV
		-20 to 20V	+/- 20V		10mV
		-50 to 50V	+/- 50V		10mV
Thermocouple	K	-200 to 300'C	+/- 13.8mV	+/-0.1% + / - 1digit	0.1'C
		-200 to 600'C	+/- 27.6mV		0.1'C
		-200 to 1370'C	+/- 69.0mV		1'C
	E	-200 to 200'C	+/- 13.8mV		0.1'C
		-200 to 350'C	+/- 27.6mV		0.1'C
		-200 to 900'C	+/- 69.0mV		1'C
	J	-200 to 250'C	+/- 13.8mV		0.1'C
		-200 to 500'C	+/- 27.6mV		0.1'C
		-200 to 1200'C	+/- 69.0mV		1'C
	T	-200 to 250'C	+/- 13.8mV		0.1'C
		-200 to 400'C	+/- 27.6mV		0.1'C
	R	0 to 1200'C	+/-13.8mV		1'C
		0 to 1760'C	+/- 27.6mV		1'C
	S	0 to 1300'C	+/-13.8mV		1'C
		0 to 1760'C	+/- 27.6mV		1'C
	B	0 to 1820'C	+/- 13.8mV		1'C
	N	-200 to 400'C	+/- 13.8mV	+/-0.15% +/- 1digit	0.1'C
		-200 to 750'C	+/- 27.6mV		0.1'C
		-200 to 1300'C	+/- 69.0mV		1'C
	W-WRe26	0 to 2315'C	+/- 69.0mV		1'C
	WRe5-WRe26	0 to 2315'C	+/- 69.0mV	+/-0.2% +/-1 digit	1'C
	PtRh40-PtRh20	0 to 1888'C	+/- 3.8mV		1'C
	NiMo-Ni	-50 to 290'C	+/- 13.8mV		0.1'C
		-50 to 600'C	+/- 27.6mV		0.1'C
		-50 to 1310'C	+/- 69.0mV		1'C
	CR-AuFe	0 to 280K	+/- 3.8mV		0.1K
	Platinel II	0 to 350'C	+/- 3.8mV	+/-0.15% +/- 1 digit	0.1'C
		0 to 650'C	+/- 27.6mV		0.1'C
		0 to 1390'C	+/- 69.0mV		1'C
	U	-200 to 250'C	+/- 13.8mV		0.1'C
		-200 to 500'C	+/- 27.6mV		0.1'C
		-200 to 600'C	+/- 69.0mV		0.1'C
	L	-200 to 250'C	+/- 13.8mV	+/-0.1% +/-1 digit	0.1'C
		-200 to 500'C	+/- 27.6mV		0.1'C
		-200 to 900'C	+/- 69.0mV		1'C
Resistance thermometer	Pt100 (1)	-140 to 150'C	160 Ω	+/-0.15% +/-1 digit	0.1'C
		-200 to 300'C	220 Ω	+/-0.1% +/-1 digit	0.1'C
		-200 to 850'C	400 Ω		0.1'C
	Pt100 (2)	-140 to 150'C	160 Ω	+/-0.15% +/- 1 digit	0.1'C
		-200 to 300'C	220 Ω	+/-0.1% +/-1 digit	0.1'C
		-200 to 850'C	400 Ω		0.1'C
	JPt100	-140 to 150'C	160 Ω	+/-0.15% +/- 1 digit	0.1'C
		-200 to 300'C	220 Ω	+/-0.1% + / - 1 digit	0.1'C
		-200 to 649'C	400 Ω		0.1'C
	Pt50	-200 to 649'C	220 Ω		0.1'C
	Pt-Co	4 to 374K	220 Ω	+/-0.15% +/- 1 digit	0.1K

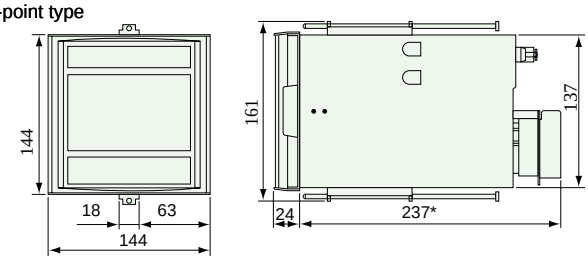
Note)Accuracy ratings are of measuring ranges at reference operation conditions.
The reference junction compensation accuracy is not included with the accuracy ratings of thermocouple inputs.
The indication equivalent to 200Ω V or 5'Cmay vary under the test environment requested by EMC directive.

K, E, J, T, R, S, B, N: IEC584, JIS C1602-1995
U (Cu-CuNi), L (Fe-CuNi): DIN43710
W-WRe26, WRe5-WRe26, Platinel II, CR-AuFe, PtRh40-PtRh20, NiMo-Ni: ASTM Vol.14.03
Pt100(1): IEC751 (1995), JIS C1604-1997
Pt100(2): IEC751 (1983), JIS C1604-1989, JIS C1606-1989
JPt100: JIS C1604-1981, JIS C1606-1986
Reference operating condition:
Ambient temperature/humidity range ... 21 to 25℃, 45 to 65%RH
Power voltage ... 100VAC +/-1%
Power frequency ... 50/60Hz +/-0.5%
Attitude ... Left/right 0', Forward tilting 0', Backward tilting 0'
Warm-up time ... More than 30 minutes

EXTERNAL DIMENSIONS

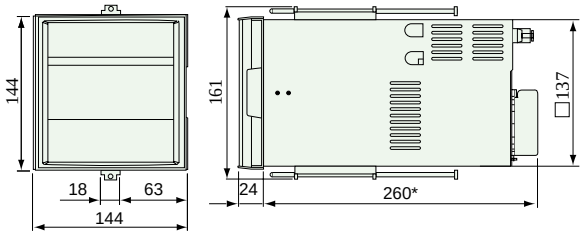
AL3000 series

Multi-point type



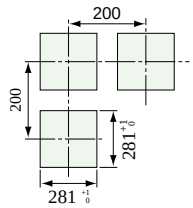
*243mm(for mechanical relay "a" contact output)

Pen type

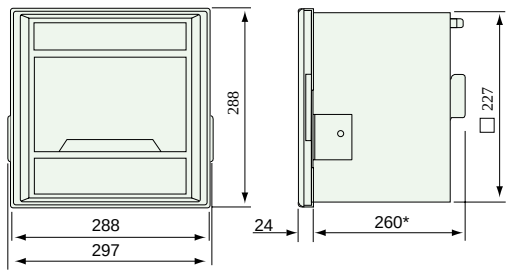


* 274mm for communications interface or remote contacts/alarm output added
285mm for mechanical reray "a" contact output

Panel cutout and minimum clearance for installation

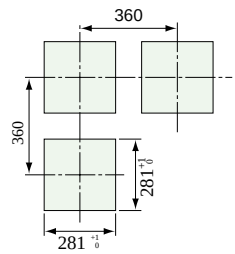


AH3000 series



* 236mm for adding alarm output of MOS relay or "c" contact mechanical relay, and communications interface
247mm for adding "a" contact mechanical relay

Panel cutout and minimum clearance for installation



*Specifications subject to change without notice.

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