

°C
%RH
<b>SHIMADEN</b>

**Series SR106A / SR186A**  
**SHIMADEN HYBRID RECORDER**



SR106A series  
DIN 144 x 144mm

SR186A series  
DIN 288 x 288mm

## **BASIC FEATURES**

- Compact Housing**
- High-Quality Ink Jet Clear Recording**
- Fully Configurable Input**
- Varied Digital Printing**
- Menu Driven Easy Operation**
- Easy Handling and Maintenance**
- Chart Paper Illumination Available (Option)**

**SPECIFICATIONS**

**Input Section**

●Number of input points:

SR106A: 5 classes: 1, 2, 3 or 6 continuous records and 6 dot record

SR186A: 7 classes: 1, 2, 3, 6 or 12 continuous records and 6 or 12 dot record

●Input signals:

Thermocouple input: B, R, S, K, E, J, T, N, W, L, U, PN

Resistance bulb input: Pt 100, JPt100 (JPt means special input in Japanese)

DC voltage input: 50mV range, 500mV range, 5V range, 50V range

Direct current input: 4 to 20mA DC, 10 to 50mA

(Note: Terminal section to be fitted with separately sold 10Ω shunt resistor and range to be made 500mV.)

Maximum allowable input voltage:

SR106A Thermocouples, resistance bulbs, DC voltage (50 mV, 500 mV range):±10V

Direct current input (5V, 50V range): ±100V

SR186A Thermocouples, resistance bulbs, DC voltage (50mV, 500mV range): ±10V

Direct current input (5V, 50V range): ±70V

●Setting and changing of input signals:

For each channel, any combination of thermocouples, resistance bulbs and DC voltage (50mV, 500mV, 5V, 50V ranges) can be made or altered by changing the setting pins inside the instrument.

●Record range specification: Can be made any range within the input range from the keyboard.

●Burn-out function: If a thermocouple or resistance bulb input lead breaks, the record will go to full scale.

●Reference ranges

Type	Input range	Input range	
Thermo-couple	B	400 – 1760 °C	752 – 3200 °F
	R	0 – 1760 °C	32 – 3200 °F
	S	0 – 1760 °C	32 – 3200 °F
	K	-200 – 1370 °C	32 to 3200°F
	E	-200 – 800 °C	32 – 3200 °F
	J	-200 – 1100 °C	32 – 3200 °F
	T	-200 – 400 °C	32 – 3200 °F
	N	0 – 1300 °C	32 – 3200 °F
	W	0 – 1760 °C	32 – 3200 °F
	L	-200 – 900 °C	32 – 3200 °F
	U	-200 – 400 °C	32 – 3200 °F
	PN	0 – 1300 °C	32 – 3200 °F
R.T.D.	JPt100	-200 – 600 °C	32 – 3200 °F
	Pt100	-200 – 600 °C	32 – 3200 °F
DC voltage	-50 – +50mV	Scaling in the range -32767 – to 32767 is possible. (Decimal point may located where required.)	
	-500 – +500mV		
	-5 – +5V		
	-50 – +50V		

- Note: N : NICOSIL-NISIL (IEC584)  
 W : +Foot 5% Re, -Foot 26% Re.W (Hoskins Mgf. Co., U.S.A)  
 L : +Foot Fe, -Foot Cu. Ni alloy (DIN43710)  
 U : +Foot Cu, -Foot Cu. Ni alloy (DIN43710)  
 PN : Platinum  
 JPt100 : JIS C 1604, 1606 (old JIS Pt100)  
 Pt100 : JIS C 1604, 1606, DIN IEC 751

- Accuracy, resolution: Performance at standard conditions (23±2 °C, 65±10% RH, power supply voltage and frequency fluctuation within ±1%, warm-up time 30 minutes or more, vertical mounting, environment with no adverse effects of external noise, etc.)

Type of input		Indication (digital)		Recording			
		Accuracy (*1)	Resolution	Accuracy	Resolution		
Thermo-couple	B	±(0.15% +1 digit) (Does not include reference junction compensation error.)	0.1°C	Indication precision ±(0.25% record span)	0.1mm		
	R		0.1°C				
	S		0.1°C				
	K		0.1°C				
	E		0.1°C				
	J		0.1°C				
	T		0.1°C				
	N		0.1°C				
	W		0.1°C				
	L		0.1°C				
	U		0.1°C				
PN	0.1°C						
R.T.D.	JPt100	±(0.15%+1 digit)	0.1°C	Indication precision ±(0.25% record span)	0.1mm		
	Pt100						
DC voltage	-50 – +50mV	±(0.15%+1digit)	10µV			Indication precision ±(0.25% record span)	0.1mm
	-500 – +500mV		100µV				
	-5 – +5V		1mV				
	-50 – +50V		10mV				

Note 1: The rating of indication accuracy is shown in % within the input span.

Note 2: Indication accuracy at 400 to 600°C of B-thermocouple is ± (0.36%+1 digit).

Note 3: Indication accuracy at -200 to -100°C of K, E, J, T, L, U-thermocouple is ± (0.36%+1 digit).

**■Recording section**

- Recording system: Ink jet system, 6 colours
- Effective recording width:
  - SR106A: 100 mm
  - SR186A: 180 mm
- Recording colours (Recording color can be assigned for each channel)
  - SR106A: 1st, (orange), 2nd (green), 3rd (purple), 4th (red), 5th (black), 6th (blue)
  - SR186A: 1st, 7th (orange), 2nd, 8th (green), 3rd, 9th (purple), 4th, 10th (red), 5th, 11th (black), 6th, 12th (blue)
- Chart paper:
  - SR106A: Olding, total length 15.08m
  - SR186A: Folding, total length 20m
- Chart speed:
  - SR106A: 5 to 400 mm/h continuous record (400mm/h is the general standard)  
401 to 1500 mm/h discontinuous records  
Dot record type.....5 to 1500 mm/h
  - SR186A: 5 to 300 mm/h continuous record (300mm/h is the general standard)  
301 to 1500 mm/h discontinuous records  
Dot record type : 5 to 1500 mm/h  
All settable in 1 mm/h steps.
- Speed setting method: Set from keyboard.
- Sample time:
  - Dot records .....30 seconds/for all channels
  - Continuous records .....Depends on chart speed.

Calculation formula:

SR106A: sample time (seconds) =  $\frac{400}{\text{chart speed (mm/h)}}$

But is not faster than 2seconds.

SR186A: sample time (seconds) =  $\frac{450}{\text{chart speed (mm/h)}}$

But is not faster than 3 seconds.

- Measurement period:
  - SR106A: 1 - 3 input points .....160ms  
6 input points.....320ms
  - SR186A: 1 to 3 input points .....160ms  
6 to 12 input points.....320ms
- Ink life:
  - SR106A: approximately 6 months for 6 point continuous records at a recording paper feed speed of (depends on conditions) 20 mm/h
  - SR186A: approximately 6 months for 6 point continuous records at a recording paper feed speed of 25 mm/h

**■Display section**

- Display system: Fluorescent display (blue-green), 20 characters × 2 lines
- Display characters:
  - SR106A: 5 × 7 dots, character height 4.16 mm, width 2.25 mm
  - SR186A: 5 × 7 dots, character height 5.0 mm, width 3.5 mm
- Display contents:
  - (1) Measured values: Temperature ....to 1st decimal place  
Voltage .....6 places (including symbols decimal point)
  - (2) Channel Nos.: SR106A: 2 places (1 - 6)  
SR186A: 2 characters (1 to 12)
  - (3) Engineering units: Maximum 7 places (°C, °F, %, kg/cm<sup>2</sup>, mmH<sub>2</sub>O, ppm, m<sup>3</sup>/h, etc.)
  - (4) Time: Year, month, day, hours, minutes
  - (5) Status display: Under recording, under digital data printing, under list printing, chart end, battery alarm, alarm, ink run-out alarm, burnout, carriage failure
  - (6) Commands for setting parameters: Displayed as alphanumeric characters

**■Printing section**

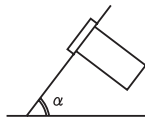
- Printing system: Ink jet system, 6 colours
- Periodic printing: Instantaneous values, units, date, time, time lines, chart speed
- Scale print: Scale values, scale lines, channel No., TAG No., unit
- Message printing: Any message with 10 kinds of 16 characters
- List printing:
  - (1) Instantaneous value lists (date, time, channel Nos., instantaneous values, units)
  - (2) Set value lists (date, time channel Nos., record range, scaling, units, alarm set values, chart speed, Tag Nos.)
  - (3) Test pattern (all characters and colour patterns)
- Alarm print-outs: Channel No., type of alarm (H, L, RH, RL), output relay No., time of detection/cancellation
- Burn-out print-out: Channel where burn-out occurred and time
- Others: Ink low warning print-out, auto-range change mark, recording start mark, recording paper feed speed change  
Note:  
SR106A: Printing is not available for more than 401 mm/h (continuous recording) or more than 51mm/h dot recording).  
SR186A: Printing is not available for more than 301 mm/h (continuous recording) or more than 51mm/h dot recording).

**■Performance, characteristics**

- Input resistance: 10MΩ or more (50mV range, thermocouples),  
approximately 100kΩ (500mV range),  
approximately 1MΩ (5V, 50V range)
- Chart speed accuracy: ±0.1% (For continuous feed of 1m or more. Does not include paper elongation/shrinkage.)
- Clock precision: ±50ppm or less (monthly variation about 2 minutes)
- Insulation resistance: 100MΩ or more (across each terminal and ground at 500V DC)
- Withstand voltage: Input terminal – input terminal .....500V AC 1 minute  
Power supply terminal – ground .....2000V AC 1 minute  
Input terminal – ground .....500V AC 1 minute  
Power terminal – input terminal .....500V AC, 1 minute  
Between alarm terminals .....750V AC, 1 minute  
(Leakage current 5mA or less, however, if the power supply is 24V DC, Leakage current of "Power supply terminal - ground" is 10mA or less)
- Reference junction compensation precision: K, E, J, T, N, L, U, PN .... ±0.5 °C  
(In case of minus input measurement : ±1.2 °C)  
R, S, B, W ..... ±1 °C  
(In case of minus input measurement : ±2.4 °C)

**■Construction**

- Mounting method: Mounted in panel (vertical panel)  
Tilt angle  $\alpha = 90$  to  $60^\circ$



- Material Case: steel plate  
Front flap frame: glass-containing polycarbonate
- Mass: SR106A Approximately 2.1kg (without options) , Approximately 2.2kg (with all options)  
SR186A Approximately 6kg (without options) , Approximately 7kg (with all options)
- External dimensions:  
SR106A 144 x 144 x 225 (199)mm  
SR186A 288 x 288 x 217 (199)mm
- Painted color: Case black: front flap frame black
- External terminals: Screw terminals (M4 thread)

**■Power supply section**

- SR106A : Supply voltage 100 to 240V AC products (9th digit of code symbol = "D")  
Power supply voltage: 100V (-15%) to 240V (+10%) AC (designation)  
Power consumption: 100VAC with all options approximately 26 VA
- SR186A : Supply voltage 100 to 240V AC products (9th digit of code symbol = "E")  
Power supply voltage: 100V (-15%) to 240V (+10%) AC (Free power supply)  
Supply frequency: 50/60Hz both employable  
Power consumption: 240V AC with all options Approximately 56VA
- SR106A/SR186A common: Supply voltage 24V DC products (9th digit of code symbol = "L")  
Power supply voltage: 24V(±10%) DC  
Power consumption: 26.4V DC with all options 37VA or less

**■Conditions for normal operation (for continuous operation of devices)**

- Ambient temperature: 0 to 50°C
- Ambient humidity: 20 to 80% RH, but temperature × humidity < 3200
- Vibration: 10 to 60Hz, 0.2m/s<sup>2</sup> {0.02 G} or less
- Mounting attitude: Forward tilt 0°, rearward tilt within 30°, left/right 0°
- Signal source resistance: Thermocouple input .....Less than 1kΩ  
Voltage input.....Less than 0.1% of input resistance  
R.T.D. input.....Less than 10Ω/wire (Resistance of each wire of 3-wire system should be balanced.)
- Warm-up time: ≥ 30 minutes
- Impact: None

**■Alarms**

- Setting method: Set from keyboard.
- Number set: Optional setting of Max. 4 points, 4 kinds (H, L, RH, RL) for each channel.
- Display: On detection, display section indication of alarm types, and output relay Nos. for each channel.
- Print-out: Print-out of Channel Nos., alarm types, output relay Nos. and detection/cancellation times on recording paper
- Output: As in supplementary specification
- Hysteresis amplitude: About 0.5% of record span

**■Transport, storage conditions**

(For transport and storage, first remove the recording head from the main unit, always remembering to close the cap.)

- Temperature: -10 to +60°C
- Humidity: 5 to 90% RH (but to be no dew condensation)
- Vibration: 10 to 60Hz, 2.45m/s<sup>2</sup> {0.25G} or less
- Impact: 294m/s<sup>2</sup> {30G} or less

**■Supplementary specification**

1. Recording paper illumination: Cold cathode fluorescent lamp
2. Alarm output external control: Special-purpose unit needed.

Unit can be mounted in rear of instrument as extra equipment at a later date.

**●SR106A:**

- Alarm output (DO): 6 point of relay contact output (1a), can be for individual channels or perform OR operation.
- Relay contact capacity: 1a contact, 240VAC, 3A (resistive load), 30VDC, 3A (resistive load)  
1b contact, 125VAC, 0.4A (resistive load), 30VDC, 2A (resistive load)

**●SR186A:**

- Alarm output (DO): 6 or 12 point of relay contact output (1a), can be for individual channels or perform OR operation.
- Relay contact capacity: Relay contact capacity: 240V AC, 3A (resistive load), 30V DC, 3A (resistive load)

**●SR106A/SR186A common**

- External control (DI): The following functions can be performed in response to external contact signals:

Recording operation start/stop (DI 1):

Contact signals can start/stop recording operations.

Recording starts when contact is closed and stops when contact is open.

Message print is started when DI1 is specified.

It is also started during recording when the contact is closed.

2-stage change of chart speed (DI 2):

Contact signals can effect a change from normal recording paper feed speed to remote mode chart speed.

Closing the contact gives remote mode chart speed.

Opening the contact gives normal chart speed.

But, message printed when DI2 has been specified.

During recording, message print is started when the contact is closed.

- Instantaneous value print-out (DI 3):

Instantaneous value lists (dates, times, channel Nos., measured values, units) are printed out in response to contact signals.

Print-out starts when the contact is closed and stops when the contact is opened.

But, latch is OFF when alarm latch function is ON. It is also OFF when the contact is closed.

Note: As the external control unit is not insulated, use it with insertion of an external relay.

Contact capacity: 12V DC, 0.05A 1a contact

## ORDERING INFORMATION

### ■Series SR106A

ITEMS	CODE	SPECIFICATIONS	
SERIES	SR106A -	Hybrid recorder, DIN 144 × 144 mm	
RECORDING SYSTEM	1	1 Continuous recording	
	2	2 Continuous recording	
	3	3 Continuous recording	
	6	6 Continuous recording	
	7	6 Dot recording	
INPUT	1	Thermocouples B, R, S, K, E, J, T, N, W, L, U, PN	
	2	R.T.D (Pt100)	
	3	±50mV, ±500mV, ±5V, ±50V DC 4–20mA Available with shunt resistor (option)	
MENU INSTRUCTION	J	Japanese	
	E	English	
POWER SUPPLY	84 -	100 (-15%) –120 (+10%) V AC 50/60Hz	
	85 -	200 (-15%) –240 (+10%) V AC 50/60Hz	
CHART PAPER ILLUMINATION (Option)	0	Without	
	1	With	
ALARM OUTPUT / EXTERNAL CONTROL (Option)	0	Without	
	1	6-points alarm output / 3-points external control	
ADDITION FUNCTION (Option)	0	Without	
REMARKS	0	Without	
	9	9 With (Please consult before ordering.)	

### ■Spare and Optional Parts

Items	Type	Remarks
Chart paper (50 divisions)	SRX00DL-5000S	6 charts / box
Recording head × 1	SRZH1001	
Alarm output / external control unit	SRZK1601	6-points alarm output / 3-points external control
Chart paper illumination	SRZL1301	
Shunt resistor 10 ±0.1%	SRZT8101	For mA input

### ● Standard Range (Factory-set when shipped)

Code	Input	Standard / Rating	Range
1	Thermocouple	K	0.0 – 1200.0 °C
2	R.T.D.	Pt100	0.0 – 0500.0 °C
3	DC voltage	-5 – 5V	0.0 – 0100.0 No Legend

## ORDERING INFORMATION

### ■Series SR186A

ITEMS	CODE	SPECIFICATIONS	
SERIES	SR186A -	Hybrid recorder, DIN 144 × 144 mm	
RECORDING SYSTEM	1	1 Continuous recording	
	2	2 Continuous recording	
	3	3 Continuous recording	
	6	6 Continuous recording	
	7	6 Dot recording	
	8	12 Dot recording	
INPUT	1	Thermocouples B, R, S, K, E, J, T, N, W, L, U, PN	
	2	R.T.D (Pt100)	
	3	±50mV, ±500mV, ±5V, ±50V DC 4–20mA Available with shunt resistor (option)	
MENU INSTRUCTION	J	Japanese	
	E	English	
POWER SUPPLY	86 -	100 (-15%) – 240 (+10%)V AC, 50 / 60Hz	
CHART PAPER ILLUMINATION (Option)	0	Without	
	1	With	
ALARM OUTPUT / EXTERNAL CONTROL (Option)	0	Without	
	1	6-points alarm output / 3-points external control	
	2	12-points alarm output / 3-points external control	
ADDITION FUNCTION (Option)	0	Without	
REMARKS	0	Without	
	9	9 With (Please consult before ordering.)	

### ■Spare and Optional Parts

Items	Type	Remarks
Chart paper (100 divisions)	SRX00BL-1000R	6 charts / box
Recording head × 1	SRZH1001	
Alarm output / external control unit	SRZK8601	6-points alarm output / 3-points external control
	SRZK8201	12-points alarm output / 3-points external control
Chart paper illumination	SRZL8301	
Shunt resistor 10 ±0.1%	SRZT8101	For mA input

### ● Standard Range (Factory-set when shipped)

Code	Input	Standard / Rating	Range
1	Thermocouple	K	0.0 – 1200.0 °C
2	R.T.D.	Pt100	0.0 – 0500.0 °C
3	DC voltage	-5 – 5V	0.0 – 0100.0 No Legend

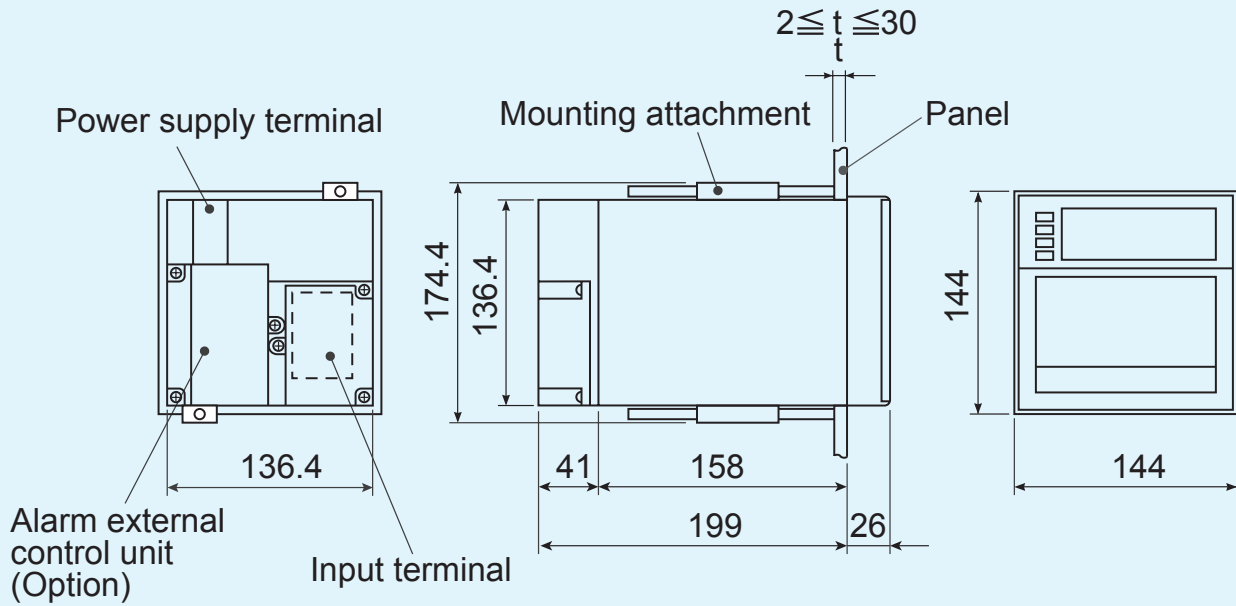


## FUNCTIONS

Function		Description
Range setting		Recording range can be set for each channel.
Input setting		Any input can be set for each channel.
Skip function		Used to skip recording, indication and alarm at any measuring point.
List printing function	Measured value list	Date, time, and measured value unit can be printed.
	Parameter list	Date, time, recording range, scaling, unit, kind of input, alarm set value, chart speed, and Tag No. can be printed.
	Test pattern	All characters and color patterns can be printed.
Periodic data printing function		Time, date, chart speed, measured value and unit can be printed at fixed intervals. Printing can be enabled/disabled from keyboard.
Message printing		Maximum 10 messages, 16-character userentered messages can be printed.
Alarm printing function		Time, channel No., kind of alarm, and output relay No. can be printed when alarm is on or off.
Unit indication		Engineering units such as °C, °F, %, mV, mA, Pa, l, etc., are indicated (setting from key board).
Scaling function		Scaling with DC voltage input is possible. (Setting of decimal point is also possible within the range of -32767 to +32767).
Subtract function		Difference between any channels is recorded (channel is set from keyboard).
Logarithm		Measurd value can be displyed and printed by 10n power.
Auto-range recording		Recording range is automatically changed for recording in the event of overrange or underrange (setting with keyboard). This function is not available for combination of zone recording and enlarged/reduced recording.
Zone recording		Recording area is divided into a maximum of 3 zones for recording. This function is not available for combination of automatic range selection and enlarged/reduced recording.
Enlarged/reduced recording		A part of recording area of each channel is expanded or contracted for recording. This function is not available for combination of automatic range selection and zone recording.
Square-root extrac- tion function		Square-root extraction of DC voltage input is possible.
Daily report function		Measured value of every hour for maximum one day (24 data) in each channel is stored for printing. Maximum, minimum and average values are also printed at the same time. ON-OFF operation, ON-OFF of each channel and operation start time/stop time can be set from keyboard.
Totalize function		Integrated value of every hour for maximum one day (24 data) in each channel is stored for printing (integration in 1 sec steps). Possible to print total value only. Total value is also printed at the same time. ON-OFF operation, ON-OFF of each channel and operation start time/stop time can be set from keyboard.
Measured value shift		Shift the zero point and inclination of the measured value so that the measured value ca
Memory backup		Set data and clock function are protected by built-in lithium battery (expected battery life, about 10 years under normal temperature).
Input filter		Response is delayed according to sudden changes in input of each channel (1st order lag filter). Time constant setting range: 0 to 900 sec (setting from keyboard).
Burnout function		When thermocouple or resistance bulb input is disconnected, it is deflected 100%. Also, it is indicated and printed at the same time.
Passcode		4 digits passcode security is available.
Language		English, German, or French is selectable for display and printing.

EXTERNAL DIMENSIONS and PANEL CUT OUT

●SR106A

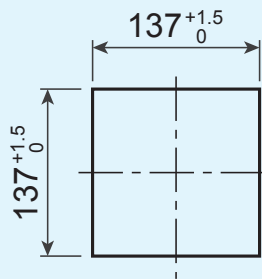


Weight :Approximately 2.1kg (without options)  
 Approximately 2.2kg (with all options)

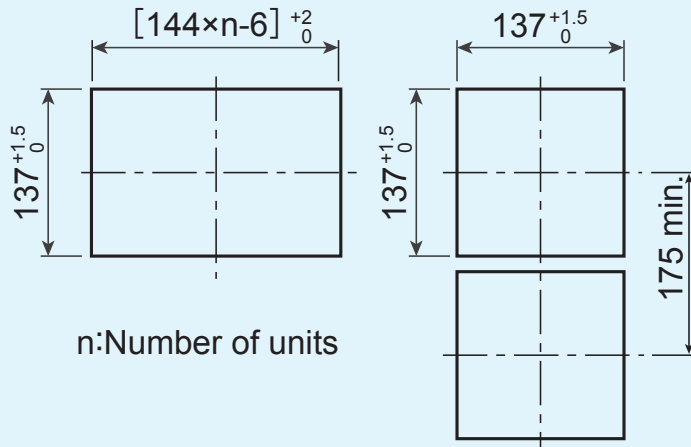
Power consumption :Approximately 26VA (100V AC with all options)  
 Less than 26VA (26.4V DC with all options)

PANEL CUTOUT

For single unit mounting



For left / right tight fit mounting

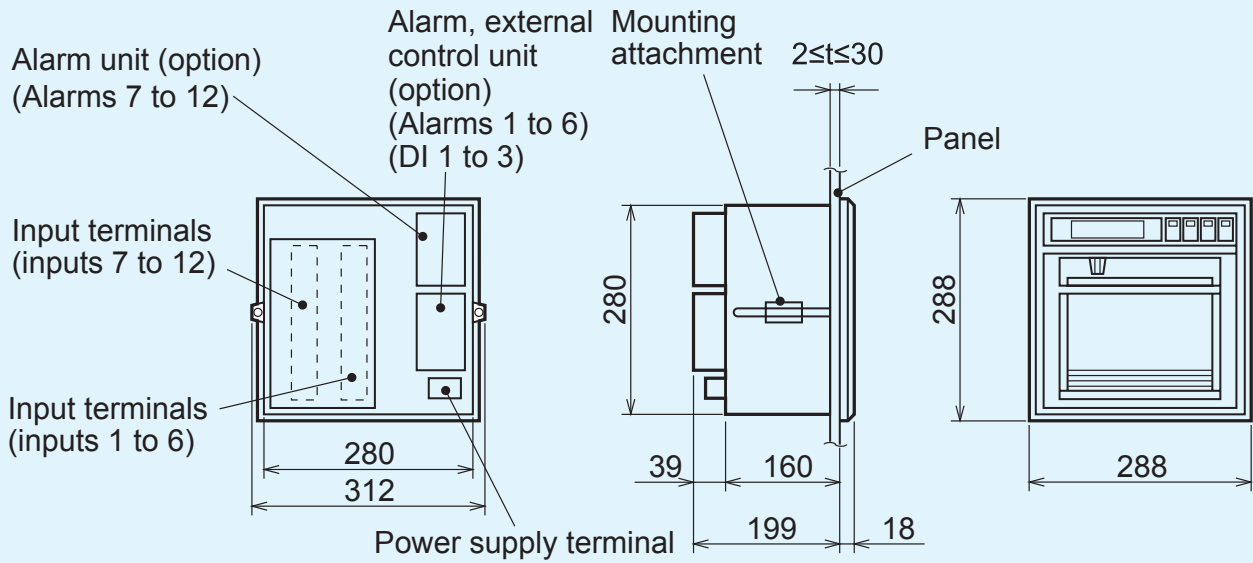


n: Number of units

Unit: mm

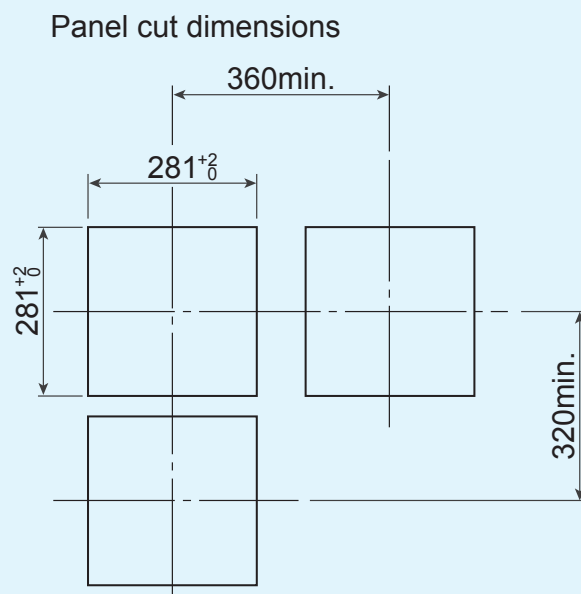
EXTERNAL DIMENSIONS and PANEL CUT OUT

●SR186A





Mass: Approximately 6kg (with all options)  
 Approximately 7kg (with all options)

Power consumption: Approximately 56VA  
 (240V AC with all options)  
 Less than 37VA  
 (26.4V DC with all options)



unit: mm

 Warning : \* The SR106A / SR186A Series is designed for the control of temperature, humidity and other physical values of general industrial equipment.  
It is not be used for any purpose which regulates the prevention of the serious effect on human life or safety.

 \* The possibility of loss or damage to your system or property as a result of failure of any part of the process exists, proper safety measures must be made before the instrument is put into use so as to prevent the occurrence of trouble.



The contents of this manual are subject to change without notice.

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