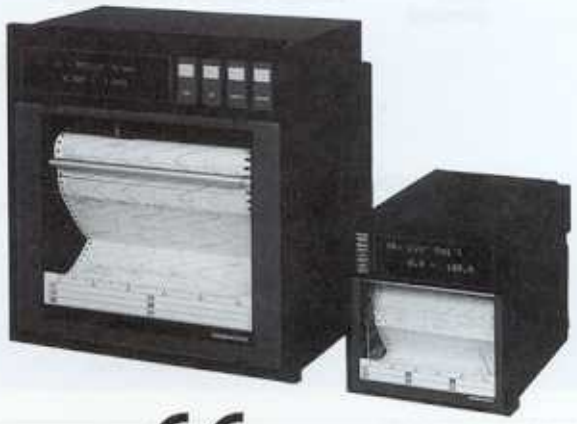
CHART RECORDER

SERIES SR106A / 186A

- 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)
- Communication Interfaces RS-485 Available (Option)



CE approved

SPECIFICATIONS

Input

Recording system and no.of input:

SR106A: Continuous recording (1, 2, 3, 6) and dot recording (6)

SR186A: Continuous recording (1, 2, 3, 6) and dot recording (6, 12)

Input signal:

Thermocouple input•••B, R, S, K, E, J, T, N, W, L, U, PN
R. T. D. input•••Pt100Ω, JPt100Ω
DC voltage input•••±50mV, ±500mV, ±5V, ±50V
DC current input•••4–20mA, 10–50mA
(A shunt resistor (option) needs to be connected to the terminal.)
Max. input voltage
• Thermocouple, R.T.D. and DC voltage (±50mV, ±500mV) •••±10V DC or less
• DC voltage input (±5V, ±50V) •••±100V DC or less

Input signal setting and change:

The setting and change of input signal between thermocouple, R.T.D. and DC voltage (±50mV, ±500mV, ±5V, ±50V) is possible for each channel by the setting pin in the instrument.

Burnout function:

When the thermocouple or R.T.D.input is disconnected, the recording is deflected to 100%.

User-selectable range (Thermocouple, R.T.D. and DC voltage):

INPUT	TYPE	°C	°F
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	-328~ 2498°F
	E	-200 ~ 800°C	-328~ 1472°F
	J	-200 ~ 1100°C	-328~ 2012°F
	T	-200 ~ 400°C	-328~ 752°F
	N	0 ~ 1300°C	32~ 2372°F
	W	0 ~ 1760°C	32~ 3200°F
	L	-200 ~ 900°C	-328~ 1652°F
	U	-200 ~ 400°C	-328~ 752°F
	PN	0 ~ 1300°C	32~ 2372°F
R.T.D.	JPt100	-200 ~ 600°C	-328~ 1112°F
	Pt100	-200 ~ 600°C	-328~ 1112°F
DC voltage		-50 ~ +50mV	Scaling is possible within the range of -32767~32767 (decimal point may be put as necessary)
		-500 ~ +500mV	
		-5 ~ +5V	
		-50 ~ +50V	

Note
N : NICROSIL-NISIL (IEC584)
W : +side 5% Re, -side 26% Re. W (Hoskins Mfg. Co., U.S.A.)
L : +side Fe, -side Cu.Ni alloy (DIN43710)
U : +side Cu, -side Cu.Ni alloy (DIN43710)
PN : Platinel
JPt100: JIS C 1604, 1606
Pt100: DIN IEC751, JIS C 1604, 1606

Accuracy and resolution:

Performance under reference conditon (23±2°C, 65±10%RH, power voltage and frequency variation±1%, warm-up time 30 minutes or more, vertical mounting, free from the effect of external noise)

INPUT		Indication (digital)		Recording	
		Accuracy	Reso-lution	Accuracy	Reso-lution
Thermo-couple	B	± (0.15% +1 digit) (without reference junction compen-sation error)	0.1°C	Indication accuracy, ±0.25% of record-ing 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 Pt100	± (0.15% +1 digit)	0.1°C		
DC voltage	-50- +50mV	± (0.15% +1 digit)	10μV		
	-500-+500mV		100μV		
	-5- +5V		1mV		
	-50-+50V		10mV		

Note : Indication accuracy is in % of reference range.
Indication accuracy of B type TC is ±0.25% between 400°C and 600°C.

Performance and Characteristics

Input resistance:
Thermocouples: > 10MΩ
±50mV: > 10MΩ
±500mV: Approx. 100kΩ
±5V and ±50V: Approx. 1MΩ

Insulation resistance:
100MΩ (between each terminal and earth, at 500V DC)

Dielecric strength:
Input terminal-input terminal: 500V AC, 1min.
Power supply terminal-ground: 2000V AC, 1min.
Input terminal-ground: 500V AC, 1min.
Power supply terminal-input terminal: 2000V AC, 1min.
Alarm terminal-alarm terminal: 750V AC, 1min.

Reference junction compensation accuracy:
K, E, J, T, N, L, U, PN•••±0.5°C
R, S, B, W••••••••••••••••••±1°C

Recording System

Writing system: Ink jet system, 6 colors
Chart width: SR106A: 100mm, SR186A: 180mm
Chart paper: SR106A: Z-fold 15m long, SR186A: Z-fold 20m long
Chart speed:
SR106A: Continuous recording type
5~400mm / h, continuous recording
401~1500mm / h, intermittent recording
Dot recording type
5~1500mm / h
Each can be set in 1 mm / h steps.
SR186A: Continuous recording type
5~300mm / h, continuous recording
301~1500mm / h, intermittent recording
Dot recording type
5~1500mm / h
Each can be set in 1 mm / h steps.

CHART RECORDER

Recording cycle: Dot recording···30 sec. / all points
Continuous recording···Depends on chart speed

<Calculation equation>

SR106A: Recording cycle (sec.) = $\frac{400}{\text{Chart speed (mm / h)}}$

(Recording cycle is more than 2 sec.)

SR186A: Recording cycle (sec.) = $\frac{450}{\text{Chart speed (mm / h)}}$

(Recording cycle is more than 3 sec.)

Measuring cycle: Input 1 to 3 points···160ms
Input 6 or 12 points···320ms

Service life of ink: (Depends on operating condition)
SR106A: About 6 months for 6 points of linear recording at 20mm / h of chart speed.
SR186A: About 6 months for 6 points of linear recording at 25mm / h of chart speed.

Printing System

Periodic data printing: Measured value, Unit, Date, Time, Time line, Chart speed, Channel no.

List printing:
(1) Measured value list (Date, Time, Channel no., Measured value, Unit)
(2) Parameter list (Date, Time, Channel no., Recording Range, Scaling, Unit, Alarm set value, Chart speed, Tag no.)
(3) Test pattern (all characters and color patterns)

Alarm printing: Channel no., alarm type (HH, H, L, LL), output relay no., on / off time

Burnout printing: Burnout channel no. and time

Other: Ink shortage message, automatic range selection mark, recording start mark, chart speed change mark
SR106A: Printing is not possible above 401mm / h (continuous recording) or 51mm / h (dot recording)
SR186A: Printing is not possible above 301mm / h (continuous recording) or 51mm / h (dot recording)

Alarm

Number of alarms: Max.4 levels (H, L, HH, LL) for each channel

Alarm action indication: Kind of alarm and output relay no.are indicated for each channel upon occurrence of alarm.

Printing: Channel no., kind of alarm, output relay no.and on / off time are printed on chart paper.

Output: See optional specifications.

Hysteresis: Approx. 0.5% of recording span

Operating Environmental Influence

Power supply variation influence: Voltage variation: SR106A···85–150V AC or 150–300V AC (50 or 60Hz)
SR186A···85–300V AC (50 or 60Hz)
100V AC basic,
Change in indication···± (0.1% + 1 digit) max.
Change in recording···±0.2% of recording span max.
Frequency variation: 47–63Hz (100V AC), 50Hz basic
Change in indication···± (0.1% + 1 digit) max.
Change in recording···±0.2% of recording span max.

Input signal source resistance or writing resistance influence:
Thermocouple···10μV per 100Ω
Voltage input···Variation of 0.1% change of resistance
Change in indication···± (0.1% + 1 digit) max.
Change in recording···±0.2% of recording span max.
R.T.D.···Variation of resistance with changes in 10Ω per wire
Change in indication···± (0.1% + 1 digit) max.
Change in recording···±0.2% of recording span, max.
(3 wires should be balanced.)

Temperature influence: Change in indication···± (0.3%+1 digit) / 10°C, max.
Change in recording···±0.5% / 10°C max.

Mounting position influence: Inclination within 30°
Change in indication•••± (0.1% + 1 digit) max.
Change in recording•••±0.2% of recording span max.

Vibration influence: Linear vibration with 10~60Hz of frequency and 0.02G of acceleration is applied to each of 3 directions for 2 hours.
Change in indication•••± (0.1% + 1 digit) max.
Change in recording•••±0.2% of recording span max.

Common mode noise rejection: 120dB at 50, 60Hz±0.1Hz

Series mode noise rejection: 30dB at 50, 60Hz±0.1Hz

Chart paper influence: Standard temperature / humidity: 20°C, 65%RH
Expansion at 85%RH•••0.4% max.
Contraction at 35%RH••• 0.5% max.

Power Requirement

Supply voltage: SR106A: 100~120V AC or 200~240V AC
SR186A: 100~240V AC

Frequency: 50 / 60Hz

Power comsumption: SR106A: About 20VA, 100V AC, without option
About 26VA, 100V AC, with option
SR186A: About 22VA, 100V AC, without option
About 37VA, 100V AC, with option

Transportation / Storage

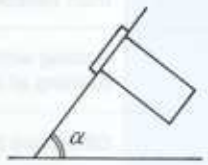
Temperature limit: 0~50°C

Humidity limit: 20~80%RH, non-condensing is required (temperature × humidity < 3200)

Vibration: 10~60Hz, 0.02G

Physical Data

Mounting method: Panel flush mounting
α=90~60°



Weight: SR106A: Approx. 2.8kg (without option)
Approx. 3.3kg (with option)
SR186A: Approx. 6kg (without option)
Approx. 7kg (with option)

External dimensions: SR106A: 144 × 144 × 199mm (H × W × D)
SR186A: 288 × 288 × 199mm (H × W × D)

Panel cutout: SR106A: 137 × 137mm
SR186A: 281 × 281mm

Optional Specifications

Chart illumination: Cold cathode fluorescent

Alarm output / 3-points external control:
(1) Alarm output (DO):
SR106A: 6 points relay contact output (1a)
SR186A: 6 or 12 points relay contact output (1a)
Note: Individual channel operation or common operation available
Relay contact capacity: 240V AC, 3A (resistive load) 30V DC, 3A (resistive load)
(2) External control (DI):
The following control is possible with external contact signal.
- Recording start / stop:
Recording start / stop is effective by a contact signal.Recording is started when the contact is closed and stopped when it is open.
- Chart speed change:
Selection between normal and remote chart speeds is effected by a contact signal Remote chart speed is selected when the contact is closed and normal when the contact is open.
- Measured value printing:
Measured value list printing (date, time, channel no., measured value,unit) is effected by a contact signal. Printing is started when the contact is closed.

Note: For external control, use a dry contact.
Contact capacity: 12V DC, 0.05A, N.O.(1a) contact

Interface function: RS-485 interface for transmitting measured value and receiving the condition of setting.

Communication system	Half-Duplex Bit Serial
Synchronizing type	Start-stop synchronizing
Code	Binary Data length: 8 bits Parity: odd number / even number / none Stop bit: 1 or 2
Communication speed	2400, 4800, 9600, 19200 bps
Number of units connected	Max. 31 units
Communication distance	Max. 1km

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 patten	All characters and color patterns can be printed.
periodic data printing function		Time, data, chart speed, measured value and unit can be printed at fixed intervals. Printing can be enabled / disable from keyboard.
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, kg / cm², ℓ, etc., are indicated (setting from keyboard).
Scaling function		Scaling with DC voltage input is possible. (Setting of decimal point is also possible within range of-32767~32767).
Subtract function		Difference between any channels is recorded (channel is set from keyboard).
Auto-range recording		Recording range is automatically changed for recording in event of overrange or underrange (setting with keyboard). This function is not available for combination of zone recording and expansion / contraction recording.
Zone recording		Recording area is divided into max. of 3 (SR106A) and 4 (SR186A) zones for recording. This function is not available for combination of automatic range selection and expansion / contraction 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 recoring.
Square-root extraction function		Square-root extraction of DC voltage inputs is possible.
Daily report function		Measured value of every hour for a day (24 data) in each channel is stored for printing. Max., min., and average values are also printed at same time. ON-OFF operation, ON-OFF of each channel and operation start time can be set from keyboard.
Data sum funtion		Integrated value of every hour for a day (24 data) in each channel is stored for printing (integration in 1 sec. steps). Total value for a day is also printed at same time. ON-OFF operation, ON-OFF of each channel and operation start time can be set from keyboard.
Memory backup		Set data and clock function are protected by built-in lithium battery (expected battery life is approx 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 R.T.D. input is disconnected, it is deflected 100%. Also, it is indicated and printed at same time.
Passcode		4-digit pass code security is available.
Language		English, German, or French can be selected for display and printing.

ORDERING INFORMATION

ITEMS	CODE	SPECIFICATIONS
SERIES	SR106A-	Hybrid recorder, DIN 144 × 144mm
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 Availble with shunt resistor (option)
MENU INSTRUCTION	J	Japanese
	E	English
POWER SUPPLY	84-	100–120V AC, 50 / 60Hz
	85-	200–240V AC, 50 / 60Hz
CHART PAPER ILLUMINATION	0	Without
	1	With
ALARM OUTPUT / EXTERNAL CONTROL	0	Without
	1	6-points alarm output / 3-points external control
INTERFACE FUNCTION	0	Without
	5	RS-485
REMARKS	0	Without
	9	With (Please consult before ordering.)

■ Spare and Optional Parts

Items	Type	Remarks
Chart paper (50 divisions) × 6 charts / box	SRX00DL-5000S	
Recording head × 1	SRZH1001 (PHZH 1001)	
Alarm output / external control unit	SRZK1601	6-points alarm output / 3-points external control
Chart paper illumination	SRZL1001	With cable connector
Shunt resistor 10Ω ±0.1%	SRZT1101	For 4–20mA or 10–50mA input
Interface unit	SR7D6467CI	RS-485

● Standard Range (Factory-set when shipped)

Code	Input	Standard / Rating	Range
1	Thermocouple	K	0–1200°C
2	R.T.D.	Pt100	0– 500°C
3	DC voltage	-5–5V	0– 100

CHART RECORDER

ORDERING INFORMATION

ITEMS	CODE	SPECIFICATIONS
SERIES	SR186A-	Hybrid recorder, DIN 288 × 288
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-	100–240V AC, 50 / 60Hz
CHART PAPER ILLUMINATION	0	Without
	1	With
ALARM OUTPUT / EXTERNAL CONTROL	0	Without
	1	6-points alarm output / 3-points external control
	2	12-points alarm output / 3-points external control
INTERFACE FUNCTION	0	Without
	5	RS-485
REMARKS	0	Without
	9	With (Please consult before ordering.)

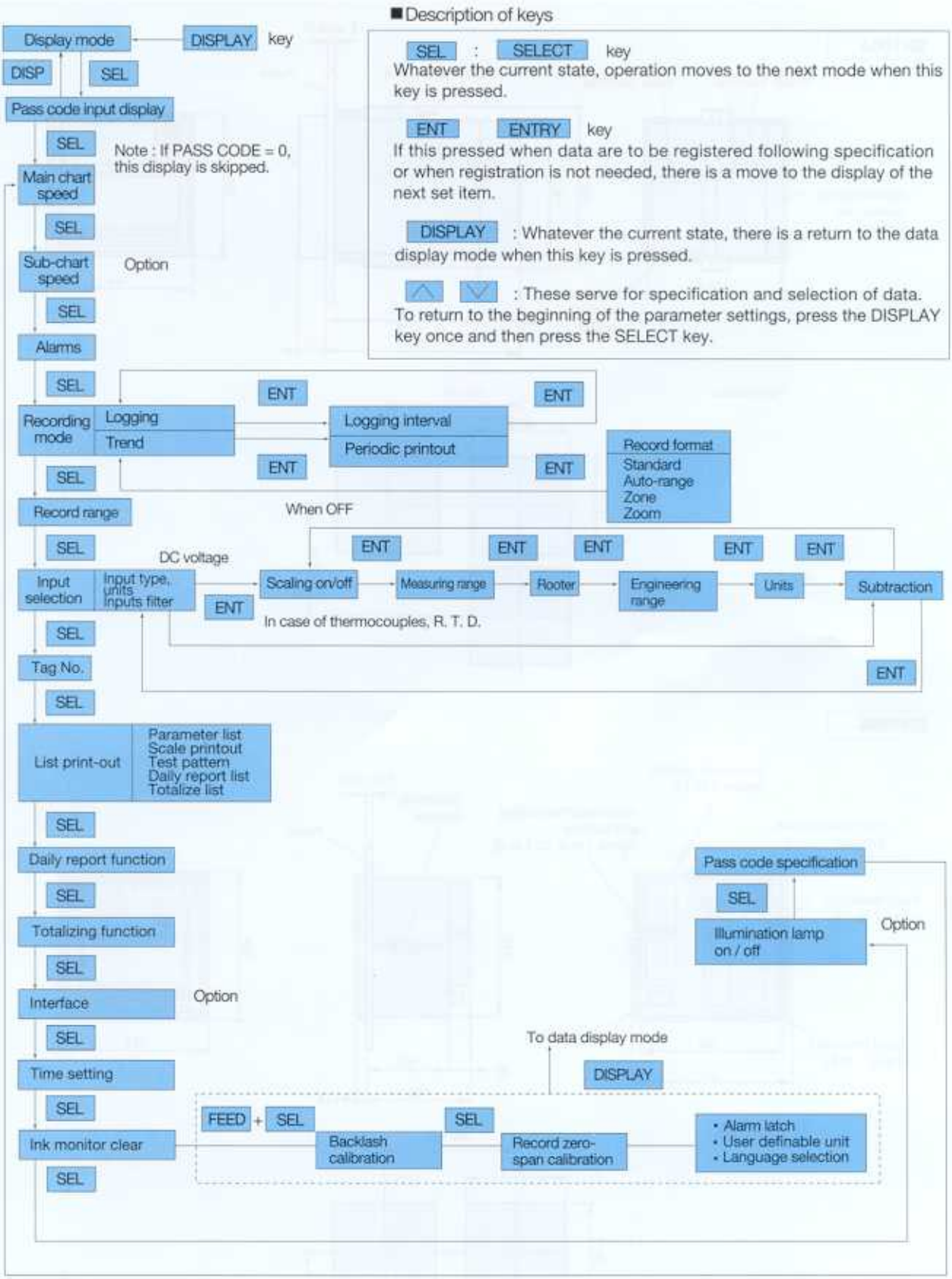
■ Spare and Optional Parts

Items	Type	Remarks
Chart paper (100 divisions) × 6 charts / box	SRX00BL-1000R	
Recording head × 1	SRZH8001 (PHZH8001)	
Alarm output / external control unit	SRZK8601	6-points alarm output / 3-points external control
Alarm output / external control unit	SRZK8201	12-points alarm output / 3-points external control
Chart paper illumination	SRZL8001	With cable connector
Shunt resistor 10Ω ±0.1%	SRZT8101	For 4–20mA or 10–50mA input
Interface unit	SR7D0834C2	RS-485

● Standard Range (Factory-set when shipped)

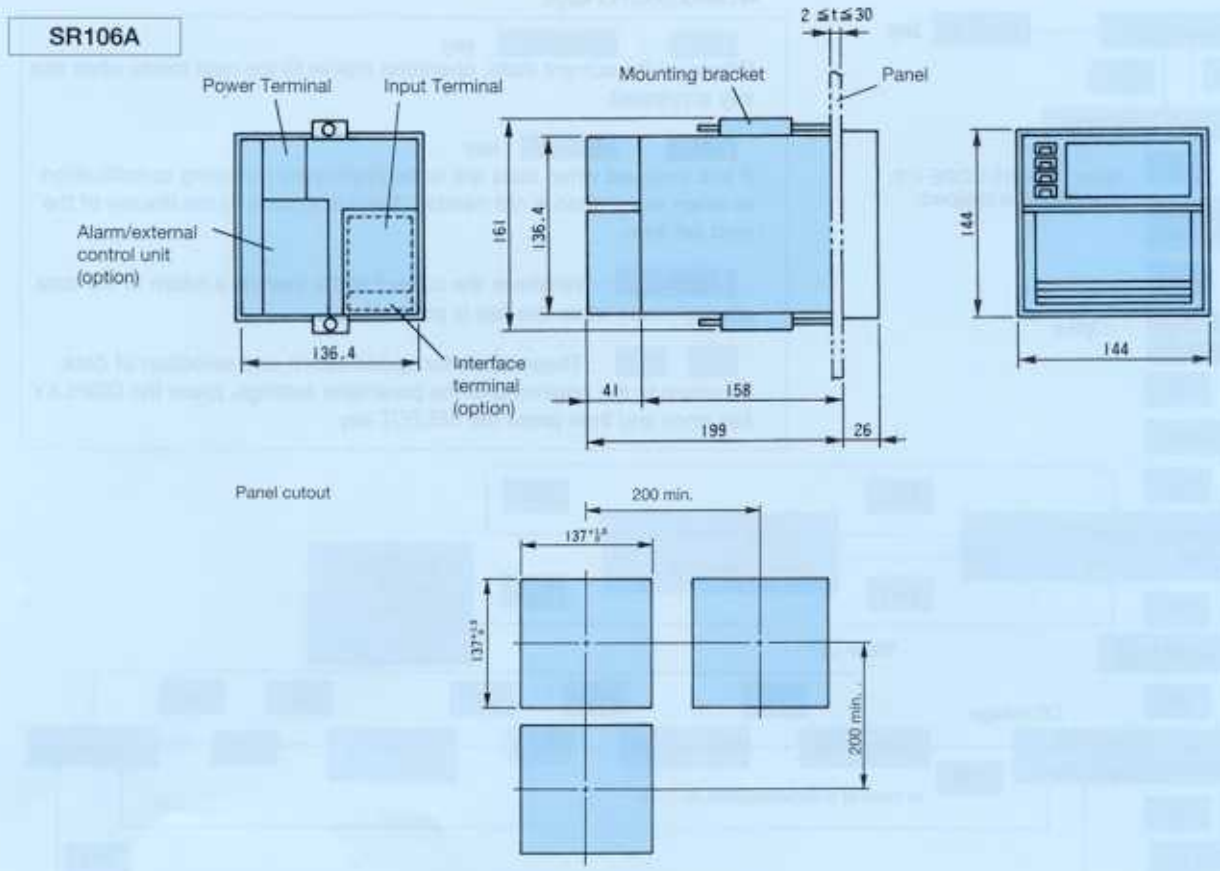
Code	Input	Standard / Rating	Range
1	Thermocouple	K	0–1200°C
2	R.T.D.	Pt100	0– 500°C
3	DC voltage	-5–5V	0– 100

Display mode



EXTERNAL DIMENSIONS

SR106A



SR186A