Shimaden, Temperature and Humidity Control Specialists

℃
%RH
SHIMADEN

SERIES SR106/SR186
SHIMADEN HYBRID RECORDER

A Revolution in Recorder Technology

The Slimmest and Lightest Recorder in the World with a Thickness of Only 199mm
Weight : SR106 (2.8kg)
SR186 (6.0kg)

BASIC FEATURES

- *Compact Housing*
- *High-Quality Ink Jet Clear Recording*
- *Fully Configurable Input*
- *Varied Digitai Printing*
- *Menu Driven Easy Operation*
- *Chart Paper Illumination Available (Option)*
- *Communication Interface RS-485 Available (Option)*

SPECIFICATIONS

Input

Recording system and no. of inputs:

SR106: Continuous recording (1, 2, 3, 6) and dot recording (6)

SR186: 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℃	752 ～ 3200°F
	R	0 ～ 1760℃	32 ～ 3200°F
	S	0 ～ 1760℃	32 ～ 3200°F
	K	-200 ～ 1370℃	-328 ～ 2498°F
	E	-200 ～ 800℃	-328 ～ 1472°F
	J	-200 ～ 1100℃	-328 ～ 2012°F
	T	-200 ～ 400℃	-328 ～ 752°F
	N	0 ～ 1300℃	32 ～ 2372°F
	W	0 ～ 1760℃	32 ～ 3200°F
	L	-200 ～ 900℃	-328 ～ 1652°F
	U	-200 ～ 400℃	-328 ～ 752°F
	PN	0 ～ 1300℃	32 ～ 2372°F
R. T. D.	JPt100	-200 ～ 600℃	-328 ～ 1112°F
	Pt100	-200 ～ 600℃	-328 ～ 1112°F
DC voltage		-50～+50mV -500～+500mV -5～+5V -50～+50V	Scaling is possible within the range of -32767～32767 (decimal point may be put as necessary)

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 condition (23±2℃, 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) Accuracy	Indication (digital) Reso-lution	Recording Accuracy	Recording Reso-lution
Thermo-couple	B	±(0.15% +1 digit) (without reference junction compen-sation error)	0.1℃	Indication accuracy, ±0.25% of record-ing span	0.1mm
	R		0.1℃		
	S		0.1℃		
	K		0.1℃		
	E		0.1℃		
	J		0.1℃		
	T		0.1℃		
	N		0.1℃		
	W		0.1℃		
	L		0.1℃		
	U		0.1℃		
	PN		0.1℃		
R. T. D.	JPt100	±(0.15% ±1 digit)	0.1℃		
	Pt100				
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℃ and 600℃.

Performance and Characteristics

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

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

Dielectric 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℃
R, S, B, W ・・・・・・・・・・・・・・± 1℃

Recording System

Writing system: Ink jet system, 6 colors

Chart width: SR106: 100mm, SR186: 180mm

Chart paper: SR106: Z-fold 15m long, SR186: Z-fold 20m long

Chart speed:
SR106: Continuous recording type
10～400mm/h, continuous recording
401～1500mm/h, intermittent recording
Dot recording type
10～1500mm/h
Each can be set in 1mm/h steps.
SR186: Continuous recording type
10～300mm/h, continuous recording
301～1500mm/h, intermittent recording
Dot recording type
10～1500mm/h
Each can be set in 1mm/h steps.

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

<Calculation equation>

SR106: Recording cycle (sec.) $= \frac{400}{\text{Chart speed (mm/h)}}$
(Recording cycle is more than 2 sec.)

SR186: 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)
SR106: About 6 months for 6 points of linear recording at 20mm/h of chart speed.
SR186: 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 SR106: Printing is not possible above 401mm/h (continuous recording) or 51mm/h (dot recording) . SR186: 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: SR106・・・85～150V AC or 150～300V AC (50 or 60Hz) SR186・・・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 wiring 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℃, max. Change in recording・・・±0.5%/10℃ 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℃, 65% RH Expansion at 85%RH・・・・0.4% max. Contraction at 35%RH・・・0.5% max.

Power Requirement

Supply voltage: SR106: 85～150V AC or 150 to 300V AC
SR186: 85～300V AC

Frequency: 50/60Hz

Power consumption: SR106: About 20VA, 100V AC, without option
About 26VA, 100V AC, with option
SR186: About 22VA, 100V AC, without option
About 37VA, 100V AC, with option

Transportation/Storage

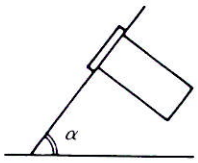
Temperature limit: 0～50℃

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

Vibration: 10～60Hz, 0.02G

Physical Data

Mounting method: Panel flush mounting
$\alpha = 90 \sim 60^{\circ}$



Weight: SR106: Approx. 2.8kg (without option)
Approx. 3.3kg (with option)
SR186: Approx. 6kg (without option)
Approx. 7kg (with option)

External dimensions: SR106: 144 × 144 × 199mm (H × W × D)
SR186: 288 × 288 × 199mm (H × W × D)

Panel cutout: SR106: 137 × 137mm
SR186: 281 × 281mm

Optional Specifications

Chart illumination: Cold cathode fluorescent

Alarm output/3-point external control:

(1) Alarm output (DO):
SR106: 6 points relay contact output (1a)
SR186: 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 effected 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