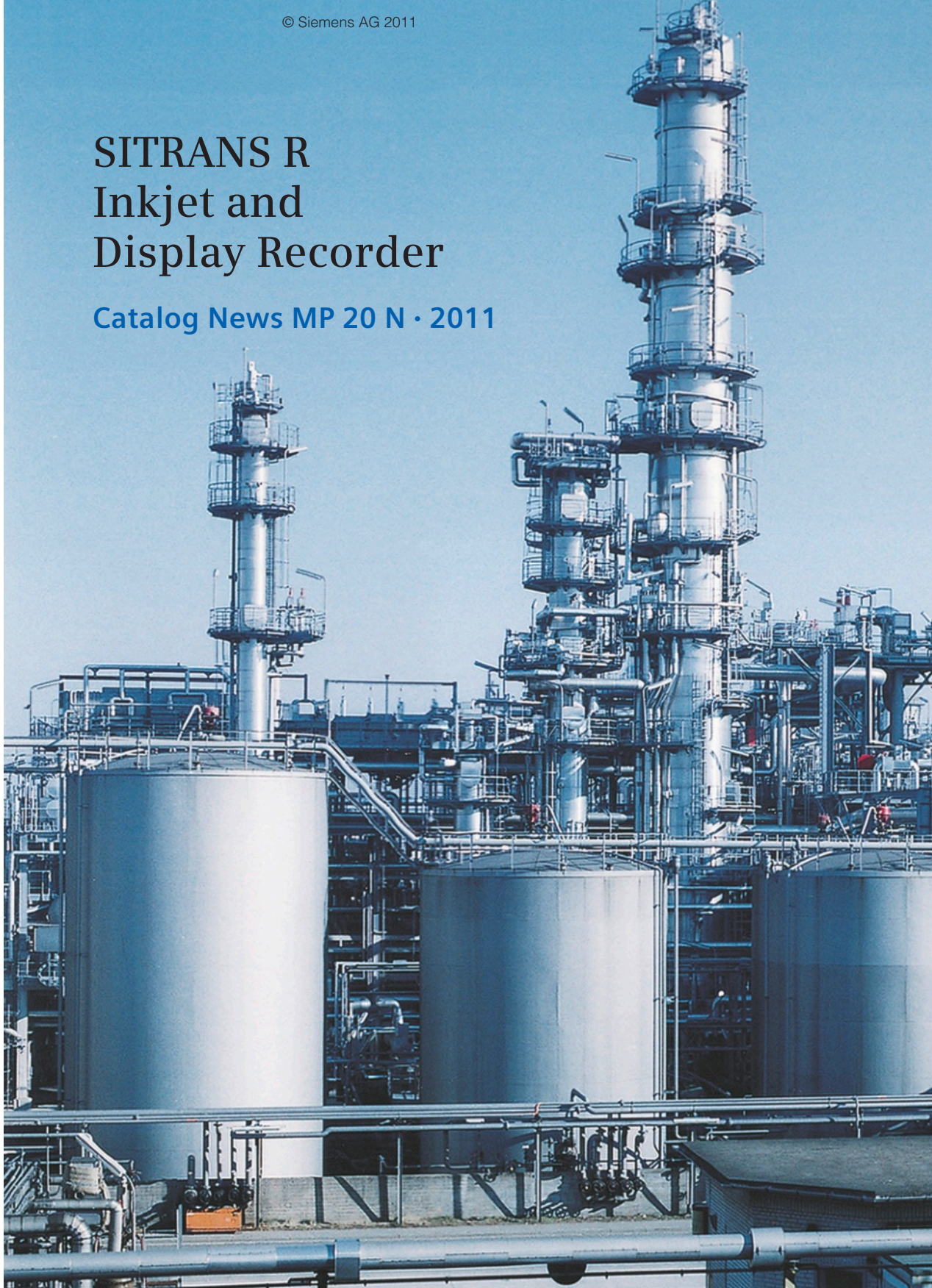
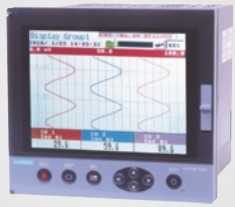


SITRANS R Inkjet and Display Recorder

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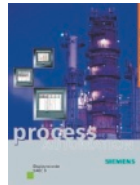
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Process Automation

SITRANS R

Inkjet and Display Recorder

Catalog News MP 20 N · 2011



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Inkjet Recorder

SITRANS R100
SITRANS R130
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Display Recorder

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SITRANS R Inkjet and Display Recorder

Inkjet Recorder

SITRANS R100 / SITRANS R130 / SITRANS R160

Overview



SITRANS R100 and SITRANS R130 can record a maximum of 6 channels (SITRANS R160: 12 channels) of universal inputs.

The adoption of an ink jet system makes it possible to record measured data in analog trace mode or to print in digital mode at a high speed. These recorders perform recording clearly in six different colors.

Function

High quality recording

- Ink jet system is used for recording and printing measured data in 6 different colors at a high speed.
- Operating noise is minimized.
- Six continuous traces without pen offset are possible with this compact size of recorder; a unique recording system is used for the first time in the industry.
- Scale of each channel is printed on chart paper, eliminating the need for scales.

Easy setting of input signals

DC voltage input, thermocouples and RTDs can be set for each channel.

Digital printing

Beside the analog recording of measured data, digital printing is also available (periodic printing, list printing, alarm printing, daily report printing, message printing).

- Periodic data printing: Channel No., date, time, unit, chart speed, measured value.
- List printing: Date, time, unit, recording range, scaling value, alarm set value, chart speed, Tag No.
- Alarm printing: Channel No., alarm type, on/off time, output relay No.

SITRANS R130 and SITRANS R160 only

- Daily report and totalized data printing: Printing of maximum, minimum, average and total of data measured during maximum 24 hours.
- Message printing: 10 messages, 16-character userentered messages.

Interactive key operation

Fluorescent indicator is used to clearly indicate alphanumeric characters and symbols.

Input mode, recording range, alarm value, chart speed, etc., can be set according to the comments indicated by the display and operating keys.

Easy handling

- A cartridge type recording device is used for easy replacement.
- Allow to draw out the chart paper while recording.
- Shortage of ink is detected in early stages and an alarm is given to the operator.
- The end of chart paper is detected and indicated on the front panel display.
- Shortage of ink and the end of chart paper alarm output is possible.

Full variety of functions

- Alarm relay output/external control (record start/stop, chart speed change, data printing, message printing). This unit can easily be connected to the recorder by user (option).
- Burnout function is provided as a standard.
- Calculation: Square root extraction and engineering unit conversion.
- Language: Selectable 3 languages in display and printing.
- Passcode security is configurable.
- Alarm print function is operational, even when the recording mode is off.
- All parameters of recording format and periodic data printing can be printed out.

SITRANS R130 and SITRANS R160 only

- Chart paper illumination lamp (option): The result of printing can be checked even in ambient light.
- Various recording: Enlarged/reduced recording, autorange recording, zone recording.
- The message print and alarm print function are operational, even when the recording mode is off.
- All parameters of recording format, daily report, totalize, message and periodic data printing can be printed out.

SITRANS R Inkjet and Display Recorder

Inkjet Recorder

SITRANS R100 / SITRANS R130 / SITRANS R160

Technical specifications

Input system

Input points	
• SITRANS R100	• 1, 2 or 3 continuous recording • 6 intermittent recording
• SITRANS R130	• 3 or 6 continuous recording • 6 intermittent recording
• SITRANS R160	6 or 12 continuous recording
Input signal	
• Thermocouple input	B, R, S, K, E, J, T, N, W, L, U, PN
• RTD input	Pt100 Ω
• DC voltage input	50 mV, 500 mV, 5 V, 50 V range
• DC current input	4 ... 20 mA DC, 10 ... 50 mA DC (Shunt resistor is required)
• Max. input voltage	Thermocouple, RTD and DC voltage (50 mV, 500 mV range): ± 10 V DC or less DC voltage input (5 V, 50 V range): ± 100 V DC or less
Setting of recording range	Setting is possible within the measuring range by using the keyboard.
Burnout function	When thermocouple or RTD input is disconnected, the recording is deflected to 100 %.
Measuring range	Note: N: NICROSIL-NISIL (IEC 584) W: +side 5 % Re, -side 26 % Re.W (Hoskins Mfg. Co., USA) L: +side Fe, -side Cu/Ni alloy (DIN 43710) U: +side Cu, -side Cu/Ni alloy (DIN 43710) PN: Platinel Pt100: DIN IEC 751
Thermocouple	
• 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)
RTD	
Pt100	-200 ... 600 °C (-328 ... 1112 °F)
DC voltage	
• -50 ... +50 mV	Scaling is possible within the range of -32767 ... +32767 (decimal point may be put as necessary)
• -500 ... +500 mV	
• -5 ... +5 V	
• -50 ... +50 V	

Recording system

Writing system	Ink jet system, 6 colors
Chart width in mm (inch)	
• SITRANS R100/SITRANS R130	100 (3.94)
• SITRANS R160	180 (7.1)
Recording color	Recording color can be assigned for each channel.
• SITRANS R100/SITRANS R130	No. 1 channel (orange), No. 2 channel (green), No. 3 channel (purple), No. 4 channel (red), No. 5 channel (black), No. 6 channel (blue)
• SITRANS R160	No. 1 and 7 channel (orange), No. 2 and 8 channel (green), No. 3 and 9 channel (purple), No. 4 and 10 channel (red), No. 5 and 11 channel (black), No. 6 and 12 channel (blue)
Chart length in m (inch)	
• SITRANS R100/SITRANS R130	Z fold 15 (590.6)
• SITRANS R160	Z fold 20 (787.4)
Chart speeds in mm (inch)/h	
• continuous recording type	
- SITRANS R100/SITRANS R130	5 ... 400 (0.2 ... 15.7)/h
- SITRANS R160	5 ... 300 (0.2 ... 11.8)/h
• intermittent recording type	
- SITRANS R100/SITRANS R130	5 ... 1500 (0.2 ... 59.1)/h
- SITRANS R160	301 ... 1500 (11.9 ... 59.1)/h
Recording cycle	Continuous recording: Depends on chart speed
• SITRANS R100/SITRANS R130	Intermittent recording: 30 s/all points
	<u>Calculation formula:</u> Recording cycle [s] = 400/Chart speed [mm/h] (not faster than 2 seconds)
• SITRANS R160	<u>Calculation formula:</u> Recording cycle [s] = 450/Chart speed [mm/h] (not faster than 3 seconds)
Measuring cycle	• Up to 3 inputs: 160 ms • More than 6 inputs: 320 ms (SITRANS R100/SITRANS R130) • 6, 12 inputs: 320 ms (SITRANS R160)
Service life of ink (depends on operating conditions)	
• SITRANS R100/SITRANS R130	About 6 months for 6 points of linear recording at 20 mm (0.8 inch)/h of chart speed
• SITRANS R160	About 6 months for 6 points of linear recording at 25 mm (0.98 inch)/h of chart speed

SITRANS R Inkjet and Display Recorder

Inkjet Recorder

SITRANS R100 / SITRANS R130 / SITRANS R160

Indicating system

Indication	Fluorescent indication (blue-green), 20 characters x 2 lines
Characters indicated	
• SITRANS R100/SITRANS R130	5 x 7 dots, 4.16 mm (0.164 inch) high, 2.25 mm (0.089 inch) wide
• SITRANS R160	5 x 7 dots, 5 mm (0.2 inch) high, 3.5 mm (0.138 inch) wide
Contents of indication	
• Measured value	Temperature: 1 digit below decimal point; Voltage: 6 digits (including sign and decimal point) • Measured value of No. 1 chan- nel to No. 6 can be indicated si- multaneously (SITRANS R100 and SITRANS R130). • Measured value of No. 1 chan- nel to No. 6 or No. 7 to No. 12 can be indicated simultaneously (SITRANS R160).
• Channel No.	• 1 digit (1 ... 6) (SITRANS R100 and SITRANS R130) • 2 digit (1 ... 12) (SITRANS R160)
• Engineering unit	Max. 7 digits (°C, °F, %, Pa, bar, ppm, m³/h, etc.)
• Tag No.	8 characters
• Time	Year, month, day, hour, minute
• Status indication	Record ON, chart end, battery alarm, alarm, ink shortage alarm, burnout, carriage failure
Configuration	These can be set according to the comments indicated by oper- ating keys as follows:
• SITRANS R100	• Passcode • Main chart speed • Sub chart speed • Alarm setting • Record mode (trend/logging) • Recording range • Input signal • List print request • Tag No. • Date and time setting • Ink monitor clear • Measured value shift

• SITRANS R130/SITRANS R160

- Passcode
- Main chart speed
- Sub chart speed
- Alarm setting
- Record mode (trend/logging)
- Recording range
- Input signal
- List print request
- Tag No.
- Daily report setting
- Totalize function
- Communication parameter
- Date and time setting
- Ink monitor clear
- Illumination on/off
- Message definition
- Measured value shift

Printing system

SITRANS R100/SITRANS R130	Ink jet system, 6 colors Printing is not available for more than 401 mm (15.8 inch)/h (con- tinuous recording), or more than 51 mm (2 inch)/h (intermittent recording).
SITRANS R160	Printing is not available for more than 301 mm (11.9 inch)/h (con- tinuous recording), or more than 51 mm (2 inch)/h (intermittent recording).
Periodic printing	Measured value, unit, date, time, time line, chart speed, channel No.
List printing	Measured value list (date, time, channel No., measured value, unit) Parameter list (date, time, chan- nel No., recording range, scaling, unit, alarm set value, chart speed, Tag No.) Test pattern (all characters and color patterns)
Message printing (SITRANS R130 and SITRANS R160 only)	10 messages, 16-character user- entered messages
Alarm printing	Channel No., alarm type (H, L, RH, RL), output relay No., on/off time
Burnout printing	Burnout channel No. and time
Other	Ink shortage message, automatic range selection mark (SITRANS R130 and SITRANS R160 only), recording start mark, chart speed change mark

SITRANS R Inkjet and Display Recorder

Inkjet Recorder

SITRANS R100 / SITRANS R130 / SITRANS R160

Performance and characteristics

Accuracy and resolution

Performance under reference condition ($23 \pm 2^\circ\text{C}$, $65 \pm 10\%$ RH, power voltage and frequency variation $\pm 1\%$, warm-up time 30 minutes or more, vertical mounting, free from the effect of external noise)

Note

Indication accuracy is in % of measuring range.

Indication accuracy of B type TC is $\pm (0.36\% + 1 \text{ digit})$ between $400 \dots 600^\circ\text{C}$ ($752 \dots 1112^\circ\text{F}$).

Indication accuracy of all type TC is $\pm (0.36\% + 1 \text{ digit})$ between $-200 \dots -100^\circ\text{C}$ ($-328 \dots -148^\circ\text{F}$).

Thermocouple

- B
- R
- S
- K
- E
- J
- T
- N
- W
- L
- U
- PN

RTD

Pt100

Indication (digital)

- Accuracy: $\pm (0.15\% + 1 \text{ digit})$ (without reference junction compensation error)
- Resolution: 0.1°C (32.18°F)

Recording

- Accuracy: Indication accuracy, $\pm 0.25\%$ of recording span
- Resolution: 0.1 mm (0.00394 inch) minimum

Indication (digital)

- Accuracy: $\pm (0.15\% + 1 \text{ digit})$
- Resolution: 0.1°C (32.18°F)

Recording

- Accuracy: Indication accuracy, $\pm 0.25\%$ of recording span
- Resolution: 0.1 mm (0.00394 inch) minimum

DC voltage

- $-50 \dots +50 \text{ mV}$
- $-500 \dots +500 \text{ mV}$
- $-5 \dots +5 \text{ V}$
- $-50 \dots +50 \text{ V}$

Indication (digital)

- Accuracy: $\pm (0.15\% + 1 \text{ digit})$
- Resolution:
 - $10 \mu\text{V}$ ($-50 \dots +50 \text{ mV}$)
 - $100 \mu\text{V}$ ($-500 \dots +500 \text{ mV}$)
 - 1 mV ($-5 \dots +5 \text{ V}$)
 - 10 mV ($-50 \dots +50 \text{ V}$)

Recording

- Accuracy: Indication accuracy, $\pm 0.25\%$ of recording span
- Resolution: 0.1 mm (0.00394 inch) minimum

Input resistance

- Thermocouple $> 10 \text{ M}\Omega$
- 50 mV range $> 10 \text{ M}\Omega$
- 500 mV range $> 100 \text{ k}\Omega$
- 5 V and 50 V range $> 1 \text{ M}\Omega$

Chart speed accuracy

$\pm 0.1\%$ (expansion and contraction of paper is not included)

Clock accuracy

$\pm 50 \text{ ppm}$ or less (monthly error; about 2 minutes)

Isolation

$100 \text{ M}\Omega$ or more (between each terminal and earth, at 500 V DC)

- Channel to channel 500 V AC , 1 min
- Power channel to ground 2000 V AC , 1 min
- Input channel to ground 500 V AC , 1 min

Reference junction compensation accuracy

- K, E, J, T, N, L, U, PN: $\pm 0.5^\circ\text{C}$ (32.9°F) (In case of minus input measurement: $\pm 1.2^\circ\text{C}/34.2^\circ\text{F}$)
- R, S, B, W: $\pm 1^\circ\text{C}$ (33.8°F) (In case of minus input measurement: $\pm 2.4^\circ\text{C}/36.32^\circ\text{F}$)

Common mode noise rejection

120 dB at $50, 60 \text{ Hz} \pm 0.1 \text{ Hz}$

Normal mode noise rejection

30 dB at $50, 60 \text{ Hz} \pm 0.1 \text{ Hz}$

Design

Mounting

Panel (may be inclined up to 30° backwards from the vertical)

- SITRANS R100/SITRANS R130

Two more recorders can be mounted side by side

Material

Case: Steel plate

Front door frame:

- ABS (SITRANS R100 and SITRANS R130)
- Polycarbonate with glass wool (SITRANS R160)

Weight

- SITRANS R100/SITRANS R130
- SITRANS R160

Approx. 2.1 kg (without option)
Approx. 2.2 kg (with option)
Approx. 6 kg (without option)
Approx. 7 kg (with option)

Case size in mm (inch)

- SITRANS R100/SITRANS R130

Bezel: 144×144 (5.67×5.67)
Depth: 199 (7.84)
Cutout: 137×137 (5.39×5.39)

- SITRANS R160

Bezel: 288×288 (11.34×11.34)
Depth: 199 (7.84)
Cutout: 281×281 (11.06×11.06)

Color

Case: Black
Front door frame: Grey

External terminal

Screw terminal (M4 screw)

SITRANS R Inkjet and Display Recorder

Inkjet Recorder

SITRANS R100 / SITRANS R130 / SITRANS R160

Power requirement

Power supply

- SITRANS R100/SITRANS R130

Rated voltage:

- 100 ... 120 V AC
- 200 ... 240 V AC
- 24 V DC

Usable range:

- 85 ... 150 V AC
- 150 ... 264 V AC
- 21,6 ... 26,4 V DC

- SITRANS R160

Rated voltage:

- AC 100 ... 240 V
- DC 24 V

Usable range:

- 85 ... 264 V AC
- 21,6 ... 26,4 V DC

Frequency

50/60Hz

Power consumption

- SITRANS R100/SITRANS R130

About 26 VA, 100 V AC, with option

About 26 VA, 24 V DC, with option

- SITRANS R160

About 37 VA, 100 V AC, with option

About 37 VA, 24 V DC, with option

Operating environment

(for devices to operate continuously)

Temperature limits

0 ... 50 °C (32 ... 122 °F)

Humidity limits

20 ... 80 % RH, non condensing is required (temperature x humidity < 3 200)

Vibration

10 ... 60 Hz, 0.2 m/s² (0.02G) or less

Mounting position

Front inclination 0°

Rear inclination 30°

Left/right inclination 0°

Signal source resistance

- Thermocouple input

≤ 1 kΩ

- Voltage input

< 0.1 % of input resistance

- RTD input

< 10 Ω per line (Resistance of each wire of 3-wire system should be balanced with others.)

Warm-up time

≥ 30 min

Shock

No external shock

Environmental protection

IEC IP50 (Front) / IP20 (Terminal)

Operating environment influence

Power supply variation influence

- Voltage variation

SITRANS R100/SITRANS R130:

- 85 ... 150 V AC or 150 ... 264 V AC, Frequency: 50/60Hz

SITRANS R160:

- 85 ... 264 V AC Frequency: 50/60Hz

- Accuracy in indication

± (0.1 % + 1 digit) max.

- Accuracy in recording

± 0.2 % of recording span, max.

- Frequency variation

47 ... 63 Hz

- Accuracy in indication

± (0.1 % + 1 digit) max.

- Accuracy in recording

± 0.2 % of recording span, max.

Input signal source resistance or wiring resistance influence

- Thermocouple

10 μV per 100 Ω

- Voltage input

Variation of 0.1 % change of resistance

- Accuracy in indication

± (0.1 % + 1 digit) max.

- Accuracy in recording

± 0.2 % of recording span, max.

- RTD input

Variation of resistance with changes in 10 Ω per line

- Accuracy in indication

± (0.1 % + 1 digit) max.

- Accuracy in recording

± 0.2 % of recording span, max. 3 wires should be balanced.

Temperature influence

- Accuracy in indication

(± 0.3 % + 1 digit)/10 °C (50 °F), max.

- Accuracy in recording

± 0.5 %/10 °C (50 °F), max.

Mounting position influence

Inclination within 30°

- Accuracy in indication

± (0.1 % + 1 digit) max.

- Accuracy in recording

± 0.2 % of recording span, max.

Vibration influence

Linear vibration with 10 ... 60 Hz of frequency and 0.2 m/s² (0.02 G) of acceleration is applied to each of 3 directions for 2 hours.

- Accuracy in indication

± (0.1 % + 1 digit) max.

- Accuracy in recording

± 0.2 % of recording span, max.

Chart paper influence

- Standard temperature/humidity

20 °C (68 °F), 65 % RH

- Expansion at 85 % RH

0.4 % max.

- Contraction at 35 % RH

0.5 % max.

Alarm

Setting method

Setting from keyboard

Number of alarm levels

Max. 4 levels for each channel

Alarm types

High (H), Low (L), High-rate of change (RH), Low-rate of change (RL)

Alarm action indication

Kind of alarm and output relay No. are indicated for each channel at 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

Alarm timing

Recognition; 1 second max.

Action; additional 1 second max.

Alarm latch

Hold the alarm display and alarm output.

Others

Shortage of ink and the end of chart paper alarm output is possible.

SITRANS R Inkjet and Display Recorder

Inkjet Recorder

SITRANS R100 / SITRANS R130 / SITRANS R160

Transportation/storage condition

Temperature limits	-10 ... +60 °C (14 ... 140 °F)
Humidity limits	5 ... 90 % RH, non condensing is required
Vibration	10 ... 60 Hz, 2.45 m/s ² (0.25 G)
Shock	294 m/s ² (30 G) or less

Optional specifications

Chart illumination (SITRANS R130 and SITRANS R160 only)	Cold cathode fluorescent
Alarm output/3-point external control:	This unit can be mounted from the rear side of the recorder.
Alarm output (DO)	• 6 points of relay contact N.O. (Normally <u>O</u>pen) • 6 or 12 points of relay contact N.O.
• Contact capacity	N.O. contact • 240 V AC/3 A • 30 V DC/3 A (resistive load)
External control (DI)	The following control is possible with external contact signal. • Recording start/stop • Chart speed change • Measured value printing • Message printing (SITRANS R130 and SITRANS R160 only)

Functions

SITRANS R100

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 list 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.
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 ... +32767).
Square-root extraction function	Square-root extraction of DC voltage input is possible.
Measured value shift	Shift the zero point and inclination of the measured value so that the measured value can be adjusted according to other instruments.
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 ... 900 s (setting from key-board).
Burnout function	When thermocouple or RTD input is disconnected, it is deflected over 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.
Alarm latch function	The alarm display and alarm output are held even after the cause of alarming was gone. ON-OFF operation can be set from key-board. Cancellation of the held alarm can be made from external control (DI).
Parameter copy	Set parameters on any channel can be copied to any other channels.

SITRANS R Inkjet and Display Recorder

Inkjet Recorder

SITRANS R100 / SITRANS R130 / SITRANS R160

SITRANS R130

Function	Description		
Range setting	Recording range can be set for each channel.	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.
Input setting	Any input can be set for each channel.		ON-OFF operation, ON-OFF of each channel and operation start time/stop time can be set from keyboard.
Skip function	Used to skip recording, indication and alarm at any measuring point.	Totalize function	Integrated value of every hour to maximum one day (24 data) in each channel is stored for printing (integration in 1 sec steps). Possible to print total value only.
List printing function			ON-OFF operation, ON-OFF of each channel and operation start time/stop time can be set from keyboard.
• Measured value list	Date, time, and measured value unit can be printed.		
• Parameter list	Parameter Date, time, recording range, scaling, unit, kind of list input, alarm set value, chart speed, and Tag No. can be printed.	Measured value shift	Shift the zero point and inclination of the measured value so that the measured value can be adjusted according to other instruments.
• Test pattern	All characters and color patterns can be printed.	Memory backup	Set data and clock function are protected by built-in lithium battery (expected battery life, about 10 years under normal temperature).
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.	Input filter	Response is delayed according to sudden changes in input of each channel (1st order lag filter). Time constant setting range: 0 ... 900 s (setting from keyboard).
Message printing	Maximum 10 messages, 16-character user-entered messages can be printed.	Burnout function	When thermocouple or RTD input is disconnected, it is deflected over 100 %. Also, it is indicated and printed at the same time.
Alarm printing function	Time, channel No., kind of alarm, and output relay No. can be printed when alarm is on or off.	Passcode	4 digits passcode security is available.
Unit indication	Engineering units such as °C, °F, %, mV, mA, Pa, l, etc., are indicated (setting from key board).	Language	English, German, or French is selectable for display and printing.
Scaling function	Scaling with DC voltage input is possible. (Setting of decimal point is also possible within the range of -32767 ... +32767).	Alarm latch function	The alarm display and alarm output are held even after the cause of alarming was gone. ON-OFF operation can be set from keyboard. Cancellation of the held alarm can be made from external control (DI).
Subtract function	Difference between any channels is recorded (channel is set from keyboard).	Parameter copy	Set parameters on any channel can be copied to any other channels.
Logarithm	Measured value can be displayed and printed by 10 ⁿ 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 extraction function	Square-root extraction of DC voltage input is possible.		

SITRANS R Inkjet and Display Recorder

Inkjet Recorder

SITRANS R100 / SITRANS R130 / SITRANS R160

SITRANS R160

Function	Description		
Range setting	Recording range can be set for each channel.	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.
Input setting	Any input can be set for each channel.		ON-OFF operation, ON-OFF of each channel and operation start time/stop time can be set from keyboard.
Skip function	Used to skip recording, indication and alarm at any measuring point.	Totalize function	Integrated value of every hour to maximum one day (24 data) in each channel is stored for printing (integration in 1 sec steps). Possible to print total value only.
List printing function			ON-OFF operation, ON-OFF of each channel and operation start time/stop time can be set from keyboard.
• Measured value list	Date, time, and measured value unit can be printed.		
• Parameter list	Parameter Date, time, recording range, scaling, unit, kind of list input, alarm set value, chart speed, and Tag No. can be printed.	Measured value shift	Shift the zero point and inclination of the measured value so that the measured value can be adjusted according to other instruments.
• Test pattern	All characters and color patterns can be printed.	Memory backup	Set data and clock function are protected by built-in lithium battery (expected battery life, about 10 years under normal temperature).
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.	Input filter	Response is delayed according to sudden changes in input of each channel (1st order lag filter). Time constant setting range: 0 ... 900 s (setting from keyboard).
Message printing	Maximum 10 messages, 16-character user-entered messages can be printed.	Burnout function	When thermocouple or RTD input is disconnected, it is deflected over 100 %. Also, it is indicated and printed at the same time.
Alarm printing function	Time, channel No., kind of alarm, and output relay No. can be printed when alarm is on or off.	Passcode	4 digits passcode security is available.
Unit indication	Engineering units such as °C, °F, %, mV, mA, Pa, l, etc., are indicated (setting from key board).	Language	English, German, or French is selectable for display and printing.
Scaling function	Scaling with DC voltage input is possible. (Setting of decimal point is also possible within the range of -32767 ... +32767).	Alarm latch function	The alarm display and alarm output are held even after the cause of alarming was gone. ON-OFF operation can be set from keyboard. Cancellation of the held alarm can be made from external control (DI).
Subtract function	Difference between any channels is recorded (channel is set from keyboard).	Parameter copy	Set parameters on any channel can be copied to any other channels.
Logarithm	Measured value can be displayed and printed by 10 ⁿ 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 4 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 extraction function	Square-root extraction of DC voltage input is possible.		

SITRANS R Inkjet and Display Recorder

Inkjet Recorder

SITRANS R100 / SITRANS R130 / SITRANS R160

Selection and ordering Data	Order No.
SITRANS R100 Paper, 100 mm	7ND6120-
	A A 0 3 - A 1
Recording points	
3 continuous recording	▶ 3
6 intermittent recording	7
Power supply	
100 ... 120 V AC 50/60 Hz	
200 ... 240 V AC 50/60 Hz	▶ 6
24 V DC	1
Alarm output/external control	
Without	
6-point alarm output/ 3-point external control	▶ A B

Selection and ordering Data	Order No.
SITRANS R130 Paper, 100 mm	7ND6121-
	A A 0 3 - A 1
Recording points	
6 continuous recording	▶ 6
6 intermittent recording	7
Power supply	
100 ... 120 V AC 50/60 Hz	
200 ... 240 V AC 50/60 Hz	▶ 6
24 V DC	1
Chart paper illumination	
Without	▶ A
With	B
Alarm output/external control	
Without	▶ A
6-point alarm output/ 3-point external control	B

Selection and ordering Data	Order No.
SITRANS R160 Paper, 180 mm	7ND6460-
	A A 0 4 - A 1
Recording points	
6 continuous recording	▶ 6
12 continuous recording	7
Power supply	
100 ... 120 V AC 50/60 Hz	▶ 1
24 V DC	4
Chart paper illumination	
Without	▶ A
With	B
Alarm output/external control	
Without	▶ A
6-point alarm output/ 3-point external control	B
12-point alarm output/ 3-point external control	C

▶ Available ex stock.

Scope of delivery

Note: Recording head is not mounted on the recorder at the time of delivery.

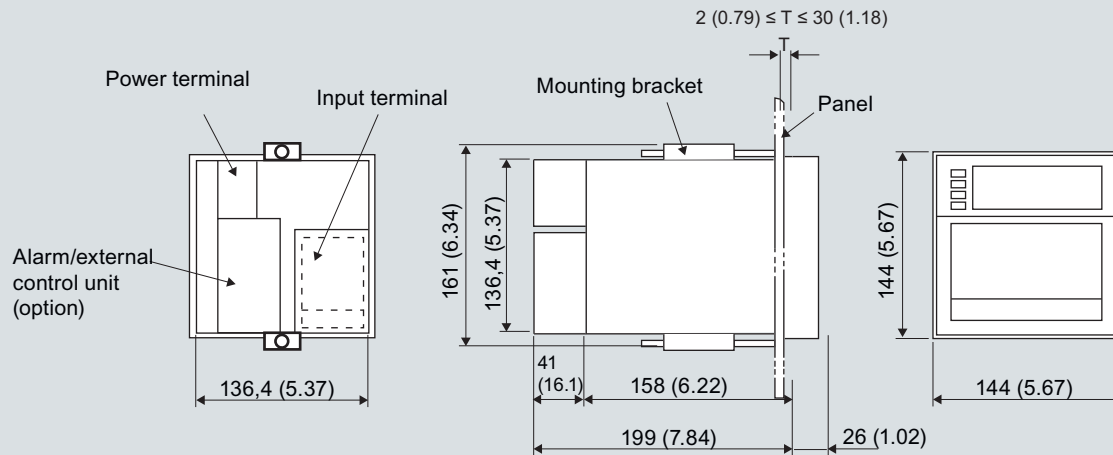
- 1 Recorder
- 2 Panel mounting brackets
- Accessories
 - 1 recording head
 - 1 chart paper
 - 1 ink absorption cloth
 - 1 fuse (only SITRANS R160)
- CD-ROM with instruction manual

Accessories

<i>SITRANS R100 / SITRANS R130</i>	Order-No.
Recording head	7ND6801-7AA
Chart paper (box of 6 pieces)	7ND6801-7AB
Chart illumination unit (only SITRANS R130)	7ND6801-7AF
Chart illumination lamp (only SITRANS R130)	7ND6801-7AG
Shunt resistor (10 Ω)	7ND6801-7AC
Alarm output/ External control unit	
6-point alarm (N.O.)/ 3-point external control	7ND6801-7AD
<i>SITRANS R160</i>	Order-No.
Recording head	7ND6801-7AA
Chart paper (box of 6 pieces)	7ND6801-7AH
Chart illumination unit	7ND6801-7AJ
Chart illumination lamp	7ND6801-7AK
Shunt resistor (10 Ω)	7ND6801-7AC
Alarm output/ External control unit	
6-point alarm/ 3-point external control	7ND6801-7AM
12-point alarm/ 3-point external control	7ND6801-7AN
6-point alarm for channel 7 ... 12	7ND6801-7AP

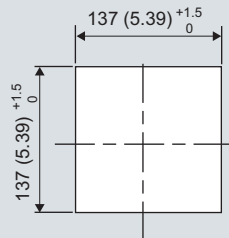
Dimensional drawings

SITRANS R100

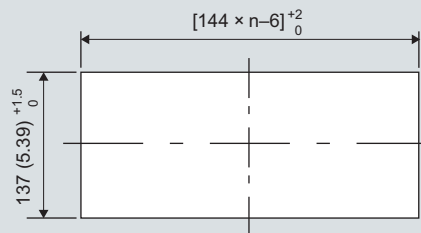


Panel cutout

When mounting one unit



When mounting multiple unit
(n: number of units to be mounted)



Note: When panel mounting, 2 brackets are necessary either on the top and bottom of the recorder

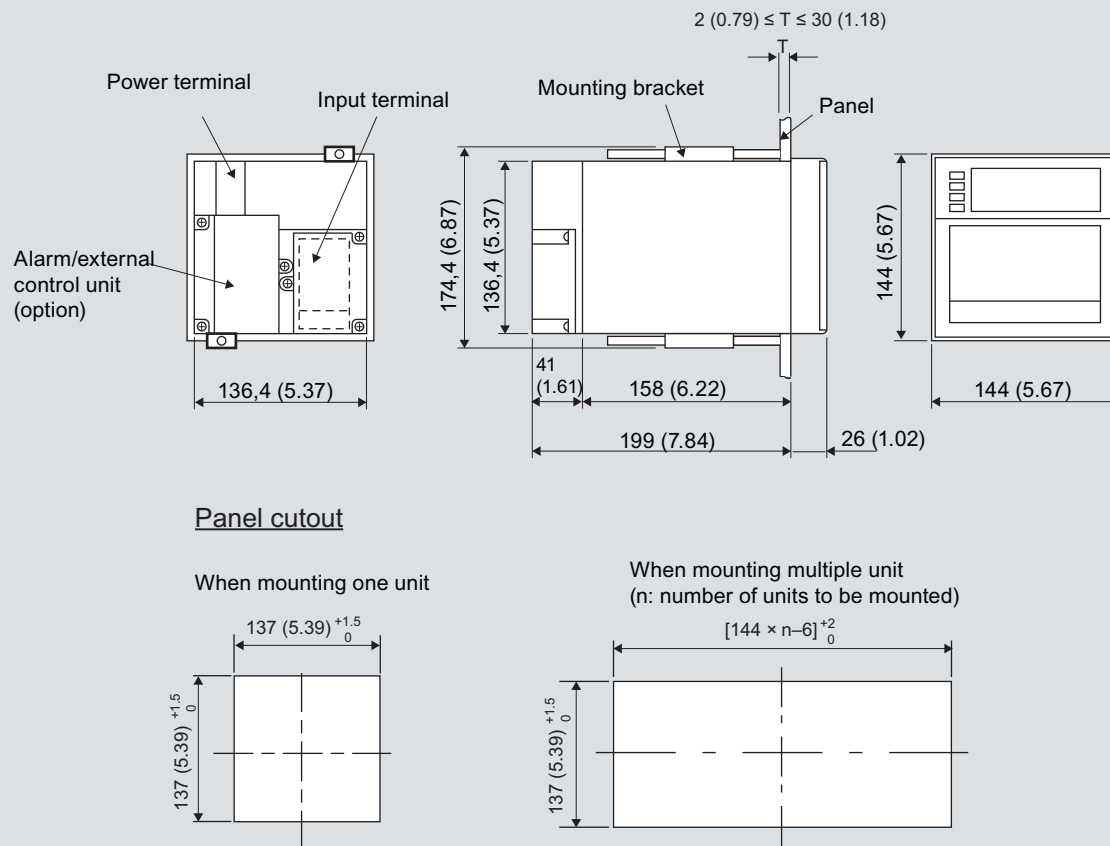
All dimensions in mm (inch)

SITRANS R Inkjet and Display Recorder

Inkjet Recorder

SITRANS R100 / SITRANS R130 / SITRANS R160

SITRANS R130



Note: When panel mounting, 2 brackets are necessary either on the top and bottom of the recorder

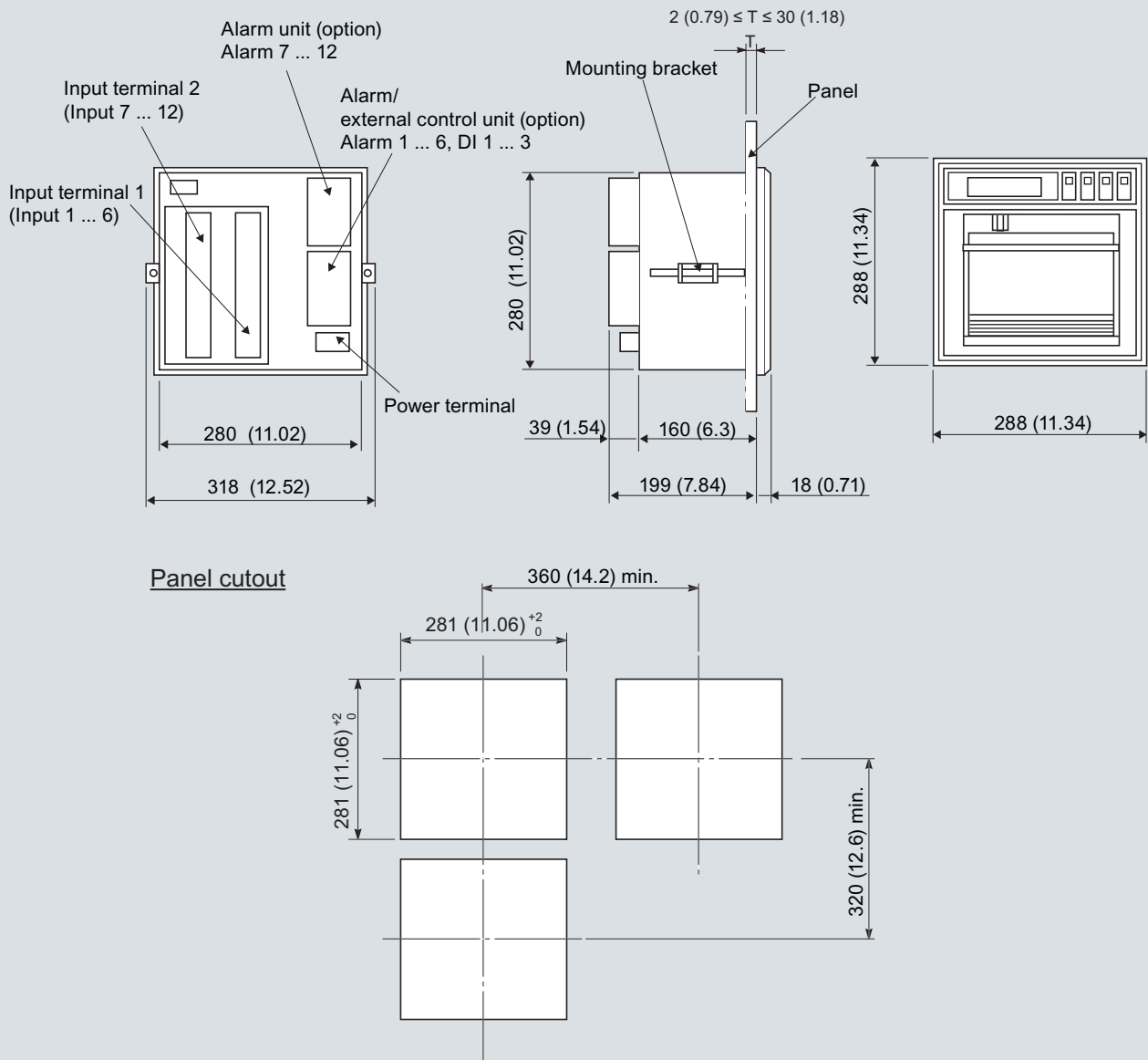
All dimensions in mm (inch)

SITRANS R Inkjet and Display Recorder

Inkjet Recorder

SITRANS R100 / SITRANS R130 / SITRANS R160

SITRANS R160



All dimensions in mm (inch)

SITRANS R Inkjet and Display Recorder

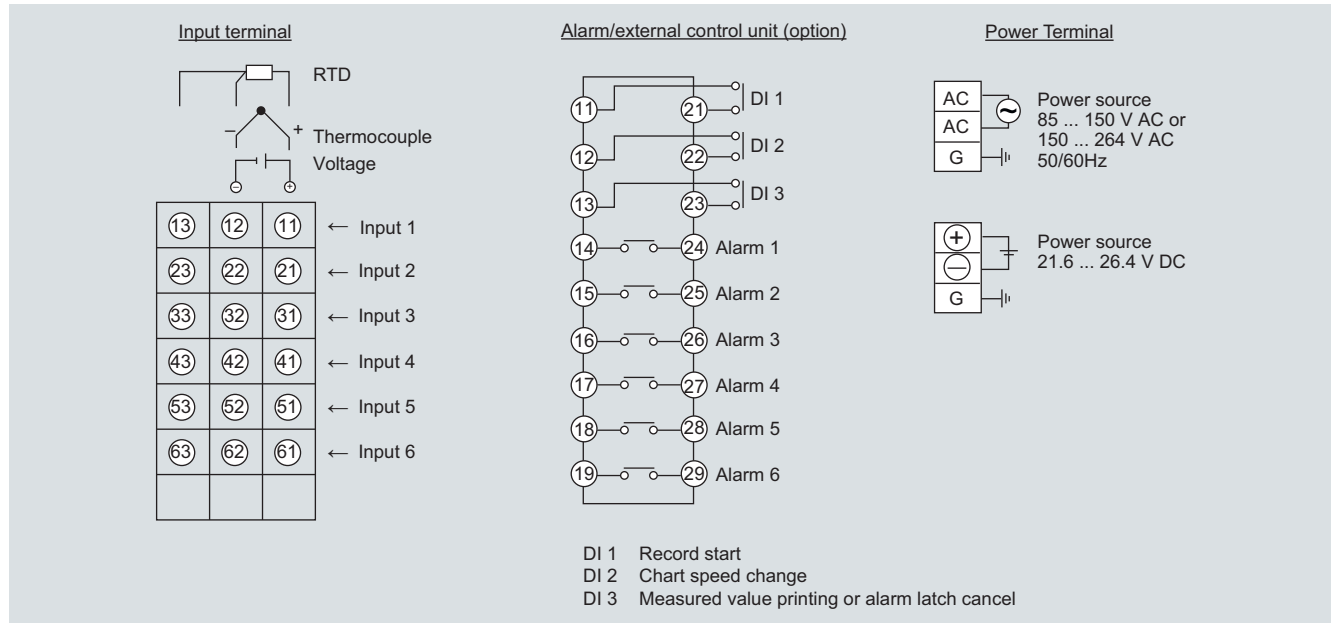
Inkjet Recorder

SITRANS R100 / SITRANS R130 / SITRANS R160

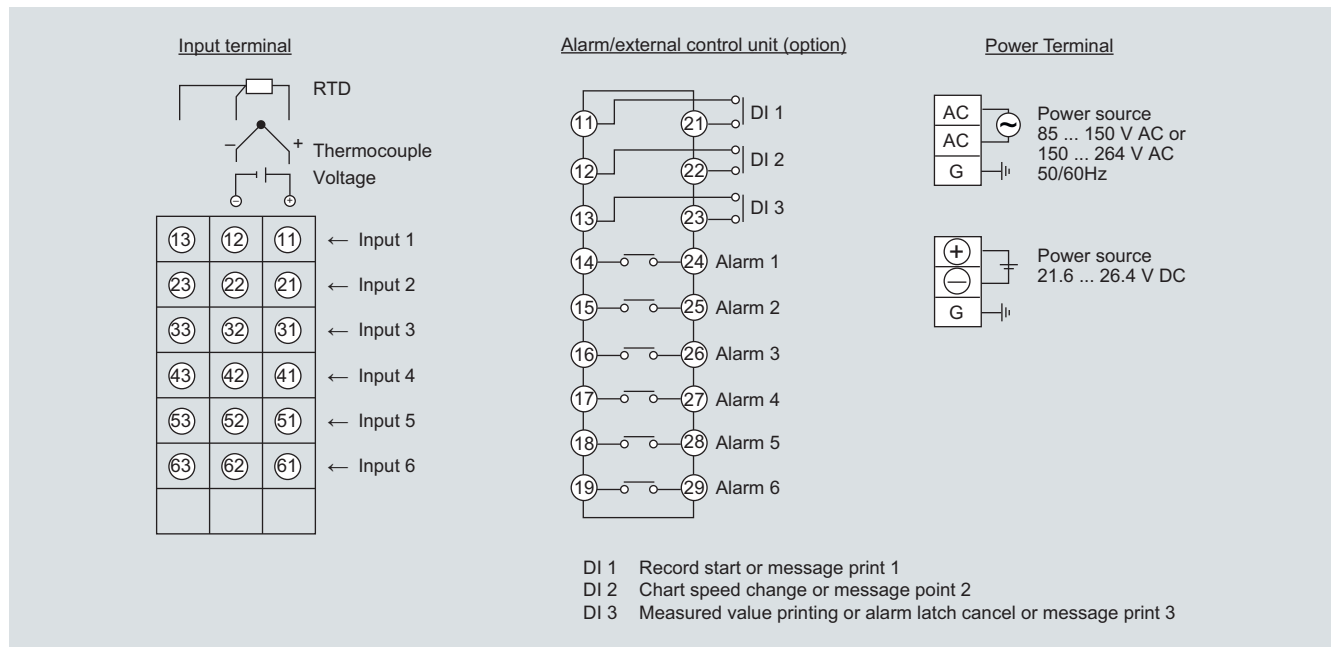
Schematics

Connections

SITRANS R100



SITRANS R130

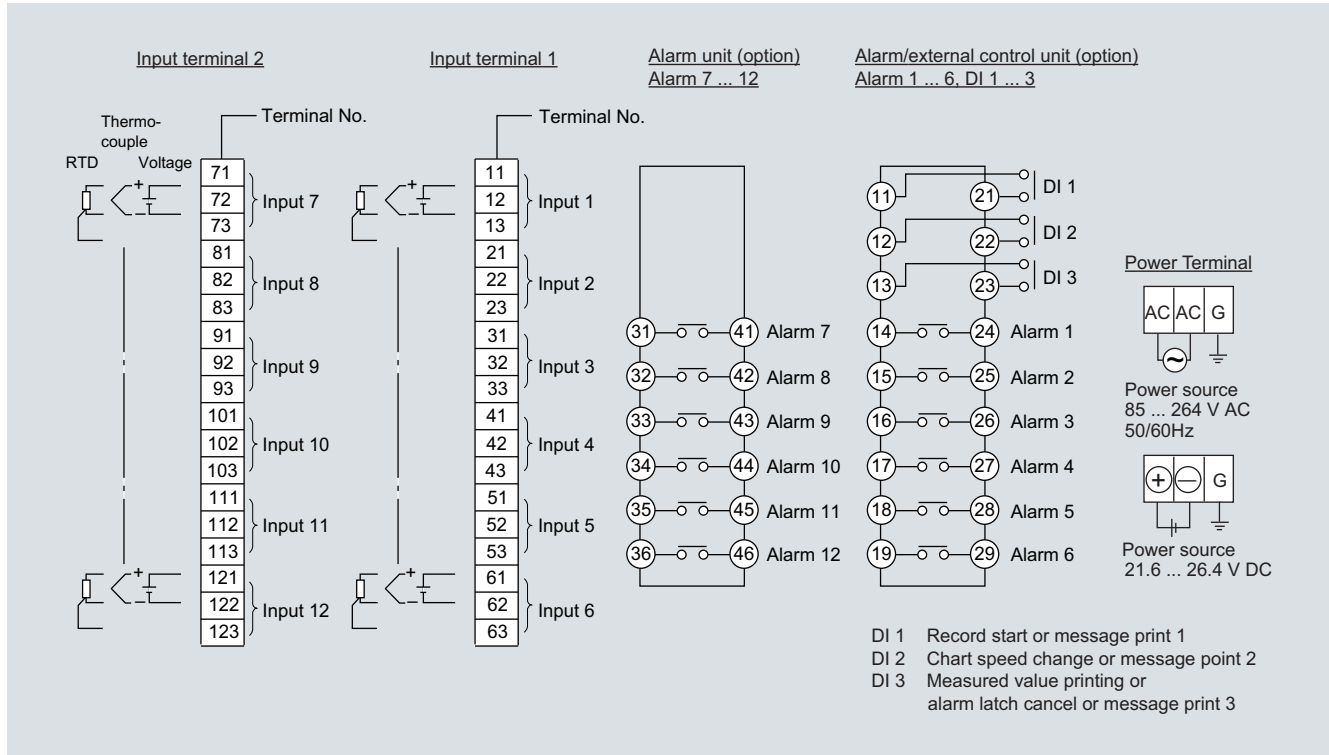


SITRANS R Inkjet and Display Recorder

Inkjet Recorder

SITRANS R100 / SITRANS R130 / SITRANS R160

SITRANS R160



More information

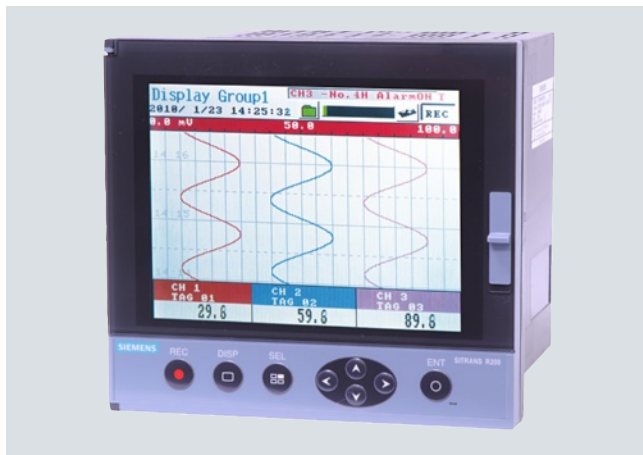
Additional information is available in the Internet under:
<http://www.siemens.com/sitrans>

SITRANS R Inkjet and Display Recorder

Display Recorder

SITRANS R200

Overview



SITRANS R200 is a display recorder that displays measured data on the LCD in real time and stores data in CompactFlash Card.

The type of input such as thermocouple, RTD, DC voltage (current), etc. can be arbitrarily set to 6 channels at the maximum.

The data stored in CompactFlash Card can be regenerated on the screen, and the use of supplied support software allows the data to be regenerated on a PC.

The data recorded in ASCII format can be directly read in a spreadsheet such as Excel, which facilitates the processing on a PC. The data recorded in binary format get analyzing by evaluation software.

Function

Capacity storage by CompactFlash Card

Measured data is periodically stored in CompactFlash Card. Storage capacity of up to 256 Mbyte allows display files for approximately 2 years to be recorded continuously at the display refresh cycle of 30 seconds (in the case of ASCII data format, 6 channels).

Quick search and display of past data

Data stored in CompactFlash Card can be displayed in succession by scrolling the screen.

Various display capability

Depending on the object of measurement, the most suitable display format can be selected from a variety of formats including bar graph display, trend display, digital display, etc.

PC support software supplied as standard

Parameter loader software that enables easy display and change of set data and data viewer software that regenerates the data stored in CompactFlash Card are supplied as standard.

Compact size

160 x 144 x 185
(Width x Height x Depth in mm, Panel mounting), 1.5 kg.

Ethernet function (Option)

FTP, Web server, e-mail and Modbus-TCP are available.

Screen saver function

If the non-operation exceeds the setting value of parameter, "LCD lights-out time", recorder turns off the backlight. Setting range of this parameter is 0 to 60 minutes.

Technical specifications

Input system

Number of input points

3 or 6 points

Input circuit

Input mutual isolation

• RTD measured current

about 1 mA

Measuring cycles

• 3 or 6 points

100 ms cycles

• Recording cycle

1 s ... 12 h

Input types

Thermocouple, RTD, DC voltage, and DC current (Shunt resistors are fitted in input terminals).

Note: Provide a shunt resistor separately. Refer to „Accessories“, page 21.

Measuring range

Note:

B, R, S, K, E, J, T, N: JIS C 1602, DIN IEC 584-1

N: NICOSIL - NISIL (IEC 584)

W: 5 % Re ... 26 % RE - W (Hoskins Mfg. Co. USA)

L: Fe-Cu - Ni (DIN 43710)

U: Cu-Cu - Ni (DIN 43710)

PN: Platinum

JPt100: JIS C 1604-1989 (old JIS Pt 100)

Pt100, Pt50: JIS 1604, DIN IEC 751

Ni100: DIN 43760, 1979

Thermocouple

• B

400 ... 1 760 °C (752 ... 3200 °F)

• R

0 ... 1 760 °C (32 ... 3200 °F)

• S

0 ... 1 760 °C (32 ... 3200 °F)

• K

-200 ... 1 370 °C (-328 ... 2 498 °F)

• E

-200 ... 800 °C (-328 ... 1 472 °F)

• J

-200 ... 1 100 °C (-328 ... 2 012 °F)

• T

-200 ... 400 °C (-328 ... 752 °F)

• N

0 ... 1 300 °C (32 ... 2 372 °F)

• W

0 ... 1 760 °C (32 ... 3 200 °F)

• L

-200 ... 900 °C (-328 ... 1 652 °F)

• U

-200 ... 400 °C (-328 ... 752 °F)

• PN

0 ... 1 300 °C (32 ... 2 372 °F)

RTD

• JPt100

-200 ... 600 °C (-328 ... 1 112 °F)

• Pt100

-200 ... 600 °C (-328 ... 1 112 °F)

• Ni100

-60 ... 180 °C (-76 ... 356 °F)

• Pt50

-200 ... 600 °C (-328 ... 1 112 °F)

• Cu50

-50 ... 200 °C (-58 ... 392 °F)

DC voltage

• 50 mV

0.00 ... 50.00 mV

• 500 mV

0.0 ... 500.0 mV

• 1 ... 5 V

1.000 ... 5.000 V

• 0 ... 5 V

0.000 ... 5.000 V

SITRANS R Inkjet and Display Recorder

Display Recorder

SITRANS R200

Selection of input types	By key operation on the front panel. Note that the same input type (thermocouple, RTD, voltage) should be selected for channel 4 and 5.
Burn-out function	Equipped in thermocouple and RTD inputs as standard, and overwings the recording to 100 % side.
• Thermocouple burn-out current	approx. 0.5 μ A
Input filter function	Settable for each channel (primary delay filter) Time constants are settable in the range from 0 ... 900 s.
Scaling function	DC voltage (current) input
• Scaling range	-32767 ... 32767
• Decimal position	Settable at any point
• Unit symbol	Settable up to 7 digits and 125+12 types
Subtraction function	Subtraction between each channel is allowed.
Square rooter function	Square rooter can be performed against the input value per each channel.
Indication system	
Display	5.7" STN color LCD (320 x 240 dots) with backlight Note: The LCD may have some pixels that do not stay on or off. Due to the characteristics of liquid crystal, the brightness may not be uniform, which is not a failure.
Color of display	14 colors
Applicable language	English, German, French (switchable)
Life of backlight	50 000 h (20 °C/68 °F) (the complete indicator unit should be replaced when replacing backlight).
Trend display	
• Direction	Vertical and horizontal
• Number of channels	6 channels or 4 channels or 3 channels for the screen (Input: 6 points at the maximum).
• Display refreshment cycles	Select from 1 s ... 12 h No numerical value display. Scale display can be selected.
Bar graph display	
• Direction	Vertical
• Number of channels	6 channels or 4 channels or 3 channels for the screen (Input: 6 points at the maximum).
• Display refreshment cycle	1 s
Digital display	
• Number of channels	6 channels or 4 channels for the screen (Input: 6 points at the maximum).
• Display refreshment cycles	1 s
Event summary display	Alarm summary and message summary can be displayed.
Ethernet log display	E-mail sending, FTP server log in/off and Modbus TCP/IP communication start/stop can be displayed.

Parameter display/set	Already-set Data Display and Set Change Display screen
Tag indication	
• Number of characters to be displayed	Up to 8 characters at 6 channels on one screen or up to 16 (= 8 x 2) characters at 4 channels on one screen.
• Characters to be displayed	Alphanumerical characters
• Tag, unit and channel number display	It depends on the screen. Refer to "Tag indication" page 20.
Historical trend display	The past data can be displayed from the Compact Flash or internal memory. The past data file can be read and displayed with scroll display function or jump the cursor to the position which you entered date and time. Scale display/no-display can be selected.
Number of screen groups	1 group (up to 6 channels per 1 group can be registered)
Keyboard	
No. of Keys	8
Function	Use to select various screens and set various parameters.
Recording function	
External memory media	Compact Flash card (format as FAT16 or FAT, or recorder can't read and write)
Recording capacity	1 Gbyte maximum (compact flash) Limiting the recording file to 64 Mbyte is recommended (for 112 hours if display refresh cycle is 1 second; refer to table "Recording capacity", page 21). If impossible, up to 256 Mbyte is tolerated. A file recorded beyond could not be opened. Note: Only the Sandisk's compact flash is warranted. And please change the compact flash every six month to prevent the data losing.
Recording method	Turning on the "REC" key allows measured data to be written at fixed cycles. Recorded as a new file whenever the recording starts.
Data save cycles	Linked to the display refreshment cycles on the "Trend display" screen. However, they are automatically set to about 1 minute if the refreshment cycles are set to less than 1 minute.
Trend data	Average, instance or min. and max. measured values out of measured data that are sampled at the measuring cycles are saved.
Event data	Saves alarm data, message data and power ON data when the power turns off and on during recording.
Storage capacity	Approximately 2 years when the display refresh cycle is 30 s (in case of 6-channel recording in ASCII data format, and 256 Mbyte compact flash used). Refer to „Recording capacity“, page 21.

SITRANS R Inkjet and Display Recorder

Display Recorder

SITRANS R200

Memory usage	Indicates the memory which has already used on the screen. When all the memory is used up, you can stop recording or delete the oldest recording file to save the newest data.	Operating condition	
Recommended card	SanDisk http://www.sandisk.com Type: SDCFB-256 (256 Mbyte).	Power voltage	90 ... 264 V AC
Recommended PC card adaptor	SanDisk Corp. SDAD-38	Supply frequency	50/60 Hz $\pm$ 2 % (both employable)
Data format	Either of ASCII or binary format can be selected. (Switching cannot be made while the recording is in progress. In the case of ASCII format, the data can be directly read on Excel, etc.) Note: The data recorded in binary format cannot be read directly. Approximately 118 bytes per sample (for 6-channel input in ASCII format) or approximately 28 bytes (for 6-channel input in binary format).	Ambient temperature	Panel-mounted: 0 ... 50 °C (32 ... 122 °F) (without Ethernet option) 0 ... 40 °C (32 ... 104 °F) (with Ethernet option) Note: In case of 30 °C (86 °F) or more of ambient temperature, this display might be fogged little bit. This is not out of order.
Alarm function		Ambient humidity	20 ... 80 % RH
No. of settings	Up to 4 alarms for each channel are settable	Vibration	10 ... 60 Hz, 0.2 m/s ² or less
Type of alarm	High/Low limits	Shock	None
Indication	Status (alarm types) is displayed on digital display unit when an alarm occurs. History display on alarm summary (Alarm start/cancel time and alarm types)	Magnetic field	400 A/m or less
Hysteresis	Set within the recording range of 0 ... 100 % (it is effective only in case of high/low limit alarm)	Signal source resistance	• Thermocouple input 1 k Ω or less • RTD input 10 Ω /wire or less (resistance of each wire of 3-wire system should be balanced)
Relay output	Number of points: 10	• Voltage input	0.1 % or less of input resistance
Alarm latch function	Keeps alarm indication and alarm output turning on after alarm reset. ON/OFF operation is performed according to key setting.	Mounting position	Forward tilt 0°, backward tilt within 30°, horizontal 0°
Power supply		Warm-up time	1 h or more after power ON
Rated power voltage	100 ... 240 V AC	Environmental protection	IEC IP50 (Front) / IP20 (Terminal)
Range of operating voltage	90 ... 264 V AC	Safety and EMC standard	
Supply frequency	50/60 Hz (both employable)	Safety standard	Based on IEC 61010-1
Power consumption	100 V AC: About 32 VA 240 V AC: About 42 VA	EMC standard	Based on EN 61326
Design		Transportation/storage conditions	
Mounting method	Panel-mounted (vertical panel)	Temperature	-10 ... +60 °C (14 ... 140 °F)
Thickness of panel in mm (inch)	2 ... 26 (0.079 ... 1.024)	Humidity	5 ... 90 % RH, no condensation
Materials	PC-ABS for case and bezel	Vibration	10 ... 60 Hz, 2.45 m/s ² or lower
Color	Grey	Shock	294 m/s ² or lower (packed state)
External dimensions (Width x Height x Depth) in mm (inch)	Panel-mounted: 160 x 144 x 185 (6.3 x 5.67 x 7.28)	Reference standard	
Weight	About 1.5 kg (no option)	Accuracy/resolution	Measuring conditions (23 $\pm$ 2 °C, 65 $\pm$ 10 % RH, power voltage, frequency fluctuation within $\pm$ 1 %, no external noise, warm-up time of 1 hour or more, vertical mounting, standard values of signal source resistance and wiring resistance within 1 %) Note 1: Digital indication accuracy is a percentage (%) of the value in the measuring range.
External terminal	Screw terminals (M3)		
RJ45	Ethernet terminal (option)		

SITRANS R Inkjet and Display Recorder

Display Recorder

SITRANS R200

Thermocouple		Effect on operation	
• B • R • S • K • E • J • T • N • W • L • U • PN	Digital indication accuracy: • $\pm (0.15 \% + 1 \text{ digit})$ • $\pm (0.3 \% + 1 \text{ digit})$ for the range shown below: - Thermocouple B: 400 ... 600 °C (752 ... 1 112 °F) - Thermocouples R and S: 0 ... 300 °C (32 ... 572 °F) - Thermocouples K, E, J, T, L, U: -200 ... -100 °C (-328 ... -148 °F) • Digital indication resolution: 0.1 °C (32.18 °F)	Effect of power supply fluctuation conditions • For the fluctuation in the range from 90 ... 264 V AC; frequency: 50/60 Hz • For the fluctuation in the range from 47 ... 63 Hz, power voltage: 100 V AC Effect of input signal resistance • Thermocouple input • DC voltage	Reading change: (0.2 % + 1 digit) or less Reading change: $\pm (0.2 \% + 1 \text{ digit})$ or less 0.5 $\mu\text{V}/\Omega$ + 1 digit or less Fluctuation for resistance value equivalent to 0.1 % of the input resistance: $\pm (0.2 \% + 1 \text{ digit})$ or lower. Reading change: $\pm (0.2 \% + 1 \text{ digit})$ or lower
RTD		Additional function (option)	
• JPt100 • Pt100 • Pt50 • Ni100 • Cu50	Digital indication accuracy: $\pm (0.15 \% + 1 \text{ digit})$ Digital indication resolution: 0.1 °C (32.18 °F) Digital indication accuracy: $\pm (0.5 \% + 1 \text{ digit})$ Digital indication resolution: 0.1 °C (32.18 °F)	• RTD (for wiring resistance of 10 Ω for 1 line (the same for 3 lines)) Effect of ambient temperature Effect of mounting position Effect of vibration	Reading change: $\pm (0.2 \% + 1 \text{ digit})$ or lower Reading change: $\pm (0.3 \% + 1 \text{ digit})/10 \text{ °C (50 °F)}$ or lower For the backward 30° slant Reading change: $\pm (0.2 \% + 1 \text{ digit})$ or lower When sine wave of 10 ... 60 Hz with the acceleration of 0.2 m/s ² is applied in each direction for 2 hours. Reading change: $\pm (0.2 \% + 1 \text{ digit})$ or lower Normal mode noise $\geq 20 \text{ dB}$ at 50, 60 Hz $\pm 0.1 \text{ Hz}$ Common mode noise $\geq 120 \text{ dB}$ at 50, 60 Hz $\pm 0.1 \text{ Hz}$
DC voltage		Alarm relay output/DI	
• 50 mV • 500 mV • 1 ... 5 V • 0 ... 5 V	Digital indication accuracy: $\pm (0.15 \% + 1 \text{ digit})$ Digital indication resolution: 10 μV Digital indication accuracy: $\pm (0.15 \% + 1 \text{ digit})$ Digital indication resolution: 100 μV Digital indication accuracy: $\pm (0.15 \% + 1 \text{ digit})$ Digital indication resolution: 1 mV	Alarm relay output External terminal Alarm relay output	A card with 10-point relay output and 5-point DI input can be mounted. M3 screw terminal Contact output (SPST:10 points), individual channel or common output (OR output) allowed. Contact rating: 150 V/3 A AC, 30 V/3 A DC (resistive load) Contact rating: 240 V/3 A AC, 30 V/3 A DC (resistive load) No-voltage contact input (5 points) The following control is allowed by contact input. • Recording start/stop • LCD turns on • E-mail sending
Error of reference contact compensation		DO1	
Max. input voltage		DO2-10	
Input resistance		DI input	
Others		On pulse width	
Clock	With calendar function (Christian era) Accuracy: $\pm 50 \text{ ppm}$ or less (monthly error: about 2 minutes)	Off pulse width	
Memory backup	Parameters are saved to the internal nonvolatile flash memory. The clock and totalized data are backed up with built-in lithium battery.	200 ms or longer	
Isolation resistance	100 M Ω or more (when measured between each terminal and ground)	200 ms or longer	
Test voltage			
• Power terminal – ground • Input terminal – ground • Alarm terminal – ground • Alarm terminal – alarm terminal • Communication terminal – ground	2 000 V AC, 1 min 500 V AC, 1 min 2 000 V AC, 1 min 750 V AC, 1 min 500 V AC, 1 min		

SITRANS R Inkjet and Display Recorder

Display Recorder

SITRANS R200

Ethernet (option)

HTTP server (Internet Explorer 6 is available)

- Measurement display

- Event summary display

- Main unit information display

- Integrated value display

FTP server (Internet Explorer 6, is available)

- File download

- File delete

- Access authentication

SMTP (e-mail client)

Modbus TC/IP

- Data read

- Data write

Support software

The following can be performed through the Ethernet function.

Note: Neither Netscape nor Mozilla Firefox are available.

Digitally displays the measurement of each channel of the recorder and alarm occurrence status.

Displays event summary including alarm ON/OFF and issuance of messages.

Displays memory use conditions and information on the main unit such as the battery end warning.

Digitally displays the integrated value of each channel of the recorder.

Note: Neither Netscape nor Mozilla Firefox are available.

Record files stored in compact flash (CF) can be downloaded from the browser.

Record files stored in CF can be deleted from the browser.

Authenticates access authority to FTP server.

Transmits e-mails to specified address under the following conditions.

- When an alarm turns on or off
- When DI is set to ON or OFF
- When an error occurs to the main unit (such as low battery or no memory space)
- At specified intervals

Settings can be read through Modbus TCP/IP communication.

Settings can be written through Modbus TCP/IP communication.

Parameter loader software

Major function

Performs various parameter setting/change of the main unit

O/S

Windows 2000/XP

Required memory

64 Mbyte or larger

Disk drive

Windows 2000/XP-capable CD-ROM drive

Hard disk capacity

Free capacity of 30 Mbyte or larger required

Printer

Windows 2000/XP-capable printer and printer driver

Note: PC loader communication cable is separately required.

Data viewer software

Major function

Regenerates the past trend record on the PC from the data in the Compact Flash. Provided with historical trend display and event display functions.

O/S

Windows 2000/XP

Required memory

64 Mbyte or larger

Disk drive

Windows 2000/XP-capable CD-ROM drive

Hard disk capacity

Free capacity of 30 Mbyte or larger required

Printer

Windows 2000/XP-capable printer and printer driver

Tag indication

Screen	No. of channel on one screen	Items			
		Tag 1	Tag 2	Unit	Channel number
Trend	4 or less	+	+	+	+
	5 or more	x		x	x
Bar graph	4 or less	+	+	+	+
	5 or more	x		x	x
Digital	All items are displayed				

x: Only 1 item can be displayed

+: Only 2 items can be displayed

Standard functions

Function	Description
Record range voluntary setting	Recording range can be set by channel.
Input type setting	Input can be set by channel (key operation on the front face). Set the same input type for channel 4 and 5. Refer to "Selecting input type", page 21.
Skip function	Skips arbitrary channel display/recording.
Trend display	
• Time display	Time is displayed at the top of the trend display screen.
• Alarm display	On occurrence of an alarm and the restoration, alarm is displayed in the alarm display field. The Compact Flash usage is displayed at the top of the bargraph.
Tag name display	By channel, maximum of 8 characters.
Screen name display	Displays the screen name (maximum of 16 characters).
Unit creation	Industrial units can be arbitrarily created. Maximum of 7 digits, 12 types.
Scaling function	Arbitrary scaling is allowed in the case of DC voltage input. Decimal point position can also be arbitrarily set in the range from -32767 ... 32767.
PV shift	Shift the zero point and slant of the reading.
Input filter	Prevents sudden fluctuation of input for each channel (primary delay filter). Time constant: 0 ... 900 s.
Burnout function	Displays the break of thermocouple/RTD input by scaling out to 100 % side.
Historical trend display	Regenerates and displays the data stored in the compact flash by scrolling the screen or jump to time when you entered.

SITRANS R Inkjet and Display Recorder

Display Recorder

SITRANS R200

Recording capacity

If the number of input points is 6, there are no events such as messages, and the data format is ASCII, the recording can be made for the period of time listed in the tables shown below.

- When the number of input points is 3, the period is approximately 1.6 times of those listed in the table.
- In binary format, the period is approximately 4 times as long as those listed in the table.

Compact Flash size	64 Mbyte				
Display refreshment cycle	1 s	10 s	30 s	1 min	10 min
Recordable capacity (about)	112 hours	66 days	199 days	398 days	10.9 years
Compact Flash size	256 Mbyte				
Display refreshment cycle	1 s	10 s	30 s	1 min	
Recordable capacity (about)	26 days	265 days	2 years	4.3 years	

When Compact Flash is not used

- Up to 800 Kbytes of the recording data and the event data can be stored in the main unit.
- In case of 6-channel in Max./Min. recording: approximately 27 000 data can be stored for 7 hours at the display refresh cycle of 1 second.

Selecting input type

The input types of channel 4 and 5 is the same.

The following input types are available. The following input types are available.

Input category	Details
Thermocouple, 50 mV	K, E, J, T, R, S, B, N, W, L, U, and PN thermocouples, 50 mV
RTD	Pt100, JPt100, Ni100, Pt50, Cu50
500 mV	500 mV
5 V	1 ... 5 V, 0 ... 5 V

Example of channel input type selection

	Input type	Input category	Description
Channel 1	K thermocouple	Thermocouple, 50 mV	The input type of the thermocouple and 50 mV is the same.
Channel 2	1 ... 5 V	5 V	
Channel 3	500 mV	500 mV	
Channel 4	K thermocouple	Thermocouple, 50 mV	
Channel 5	50 mV		
Channel 6	JPt100	RTD	

Selection and ordering Data

Order No.

SITRANS R200
Display recorder,
5 inch screen

7ND5120-

A B 1 1 - 1 A

Number of input points

3 points

5

6 points

6

Alarm (relay) output/DI input

Without

A

With

B

Communication

Without any communication

1

With Ethernet communication

2

► Available ex stock.

Scope of delivery

- 1 Recorder
- 2 Panel mounting brackets
- CD-ROM with instruction manual and PC support software
- 1 Noise filter for the power supply

Accessories

SITRANS R200

Order No.

10 Ω external shunt resistor
(required for DC current input)

7ND5801-7AA

PC card adaptor for
Compact Flash Card

7ND5801-7AB

Termination resistor for
communication

7ND5801-7AC

SITRANS R Inkjet and Display Recorder

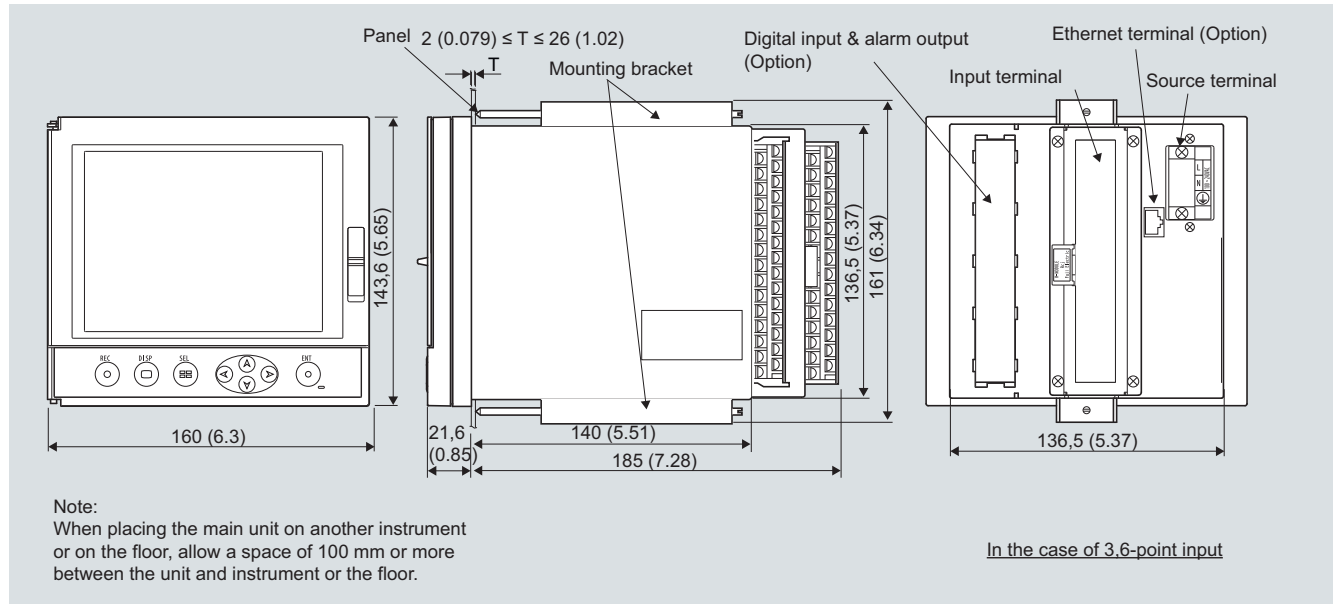
Display Recorder

SITRANS R200

Dimensional drawings

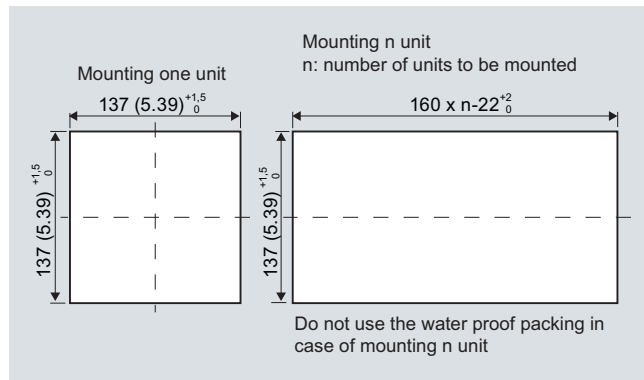
Panel mounting

In the case of 3 or 6-point input



All dimensions in mm (inch)

Panel cutout



All dimensions in mm (inch)

SITRANS R Inkjet and Display Recorder

Display Recorder

SITRANS R230 / SITRANS R260

Overview



SITRANS R230 and SITRANS R260 are display recorder that display measured data on the LCD in real time and store data in CompactFlash Card.

The type of input such as thermocouple, RTD, DC voltage (current), etc. can be arbitrarily set to 18 channels (SITRANS R230) and 36 channels (SITRANS R260) at the maximum.

The data stored in CompactFlash Card can be regenerated on the screen, and the use of supplied support software allows the data to be regenerated on a PC screen.

The data recorded in ASCII format can be directly read in a spreadsheet such as Excel, which facilitates the processing on a PC. The data recorded in binary format get analyzing by evaluation software.

Function

Capacity storage by CompactFlash Card

Measured data is periodically stored in CompactFlash Card. Storage capacity of up to 256 Mbyte allows display files for approximately one and a half years to be recorded continuously at the display refresh cycle of 30 seconds (in the case of ASCII data format, 9 channels).

Quick search and display of past data

Data stored in CompactFlash Card can be displayed in succession by scrolling the screen.

Various display capability

Depending on the object of measurement, the most suitable display format can be selected from a variety of formats including bar graph display, trend display, digital display, etc.

PC support software supplied as standard

Parameter loader software that enables easy display and change of set data and data viewer software that regenerates the data stored in CompactFlash Card are supplied as standard.

Compact size

- SITRANS R230:
160 x 144 x 185
(Width x Height x Depth in mm, Panel mounting), 1.5 kg.
- SITRANS R260:
300 x 300 x 220.5
(Width x Height x Depth in mm, Panel mounting), 4.7 kg.

18-point recording (Option) - SITRANS R230

12 types of thermocouples, 5 types of RTDs and DC voltage/current input can be recorded up to 18 points.

36-point recording (Option) - SITRANS R260

12 types of thermocouples, 5 types of RTDs and DC voltage/current input can be recorded up to 36 points.

Communication function (Option) – SITRANS R230

With RS485 (Modbus protocol) interface.

Ethernet function (Option)

FTP, Web server, e-mail and Modbus-TCP are available.

Screen saver function

Period of non-operation exceeds the setting value of parameter, "LCD lights-out time", recorder turns off the backlight. Setting range of this parameter is 0 to 60 minutes.

SITRANS R Inkjet and Display Recorder

Display Recorder

SITRANS R230 / SITRANS R260

Technical specifications

Input system

Number of input points	
• SITRANS R230	9 or 18 points
• SITRANS R260	9, 18, 27 or 36 points
Input circuit	Input mutual isolation
• RTD measured current	about 1 mA
Measuring cycles	
• SITRANS R230	
- 9 or 18 points	100 ms cycles
• SITRANS R260	
- 9 or 18 points	100 ms cycles
- 27 or 36 points	200 ms cycles
• Recording cycle	1 s ... 12 h
Input types	Thermocouple, RTD, DC voltage, and DC current (Shunt resistors are fitted in input terminals).
	Note: Provide a shunt resistor separately. Refer to „Accessories“, page 34.
Measuring range	Note: B, R, S, K, E, J, T, N: JIS C 1602, DIN IEC 584-1 N : NICOSIL - NISIL (IEC 584) W: 5 % Re ... 26 % RE – W (Hoskins Mfg. Co. USA) L: Fe-Cu – Ni (DIN 43710) U: Cu-Cu – Ni (DIN 43710) PN: Platinum JPt100: JIS C 1604-1989 (old JIS Pt 100) Pt100, Pt50: JIS 1604, DIN IEC 751 Ni100: DIN 43760, 1979
<u>Thermocouple</u>	
• B	400 ... 1 760 °C (752 ... 3200 °F)
• R	0 ... 1 760 °C (32 ... 3200 °F)
• S	0 ... 1 760 °C (32 ... 3200 °F)
• K	-200 ... 1 370 °C (-328 ... 2 498 °F)
• E	-200 ... 800 °C (-328 ... 1 472 °F)
• J	-200 ... 1 100 °C (-328 ... 2 012 °F)
• T	-200 ... 400 °C (-328 ... 752 °F)
• N	0 ... 1 300 °C (32 ... 2 372 °F)
• W	0 ... 1 760 °C (32 ... 3 200 °F)
• L	-200 ... 900 °C (-328 ... 1 652 °F)
• U	-200 ... 400 °C (-328 ... 752 °F)
• PN	0 ... 1 300 °C (32 ... 2 372 °F)

RTD

• JPt100	-200 ... 600 °C (-328 ... 1 112 °F)
• Pt100	-200 ... 600 °C (-328 ... 1 112 °F)
• Ni100	-60 ... 180 °C (-76 ... 356 °F)
• Pt50	-200 ... 600 °C (-328 ... 1 112 °F)
• Cu50	-50 ... 200 °C (-58 ... 392 °F)

DC voltage

• 50 mV	0.00 ... 50.00 mV
• 500 mV	0.0 ... 500.0 mV
• 1 ... 5 V	1.000 ... 5.000 V
• 0 ... 5 V	0.000 ... 5.000 V
Selection of input types	By key operation on the front panel. Note that the same input type (thermocouple, RTD, voltage) should be set every 2 channels. Refer to "Setting method of input types" for details.
Burn-out function	Equipped in thermocouple and RTD inputs as standard, and overwings the recording to 100 % side.
• Thermocouple burn-out current	approx. 0.5 µA
Input filter function	Settable for each channel (primary delay filter). Time constants are settable in the range from 0 ... 900 s.
Scaling function	Possible by DC voltage (current) input
• Scaling range	-32767 ... 32767
• Decimal position	Settable at any point
• Unit symbol	Settable up to 7 digits and 125+12 types
Logarithmic calculation function	The measured value of each channel can be displayed in exponent form.
Subtraction function	Subtraction between each channel is allowed.
Totalizing function	The measured value of each channel can be totalized. The base time can be selected from day, hour, minute, and second.
F value calculation function	F value (extinction value of bacteria by sterilization by heating) can be calculated from the measured temperature by each channel.
Square rooter function	Square rooter can be performed against the input value per each channel.
Mathematics function	The math function as shown below is available.

SITRANS R Inkjet and Display Recorder

Display Recorder

SITRANS R230 / SITRANS R260

• SITRANS R230	Formula: It can be set 1 main formula and 3 temporary one. • Addition • Subtraction • Multiplication • Division • Absolute value • X to the power of Y • Logarithm • Natural logarithm • Exponential function • Humidity • Average • Maximum • Minimum Input signal: • DI (DI1 ... DI10) • Totalize (channel 1 ... 30) • Analog input (channel 1 ... 30) • Constant (No. 1 ... 20), • Communication input (No. 1 ... 12)	• SITRANS R260 Color of indication Applicable language Life of backlight Trend display • Direction • Number of channels - SITRANS R230 - SITRANS R260 • Display refreshment cycles	12.1" TFT color LCD (800 x 600 dots) with backlight, no contrast adjustment. 14 colors English, German, French (switchable) 50 000 hours (20 °C/68 °F) in terms of total lighting time (the complete indicator unit should be replaced when replacing backlight) Vertical and horizontal 10 channels or 4 channels for the group on one screen (Input: 18 points at the maximum). 10, 6 or 4 channels per screen group. (Input: 72 points at the maximum). Select from 1 s ... 12 h No numerical value display. Scale display/no-display can be selected.
• SITRANS R260	The following calculation is available with the computation function. Computation function: • Addition • Subtraction • Multiplication • Division • Absolute value • Exponential • Square-root extraction • Logarithm • Natural logarithm • Exponential function • Humidity • Maximum • Minimum • Average • Integration Computation input enable: • Analog input (channel 1 ... 72) • Integration input (channel 1 ... 72) • DI (DI 1 ... 16) • Communication input (No. 1 ... 36) • Constant number (No. 1 ... 60)	Bar graph display • Direction • Number of channels - SITRANS R230 - SITRANS R260 • Display refresh cycle Analog meter display • SITRANS R230 • SITRANS R260 • Display refreshment cycles Digital display • Number of channels - SITRANS R230 - SITRANS R260 • Display refreshment cycles	Vertical 10 channels or 4 channels for the group on one screen (Input: 18 points at the maximum). 10, 6 or 4 channels per screen group. (Input: 72 points at the maximum). 1 s Display in bar graphs or in analog meters can be selected. Display for up to 4 inputs per group (input from 1 ... 4) 10, 6 or 4 channels per screen group. 1 s 10 channels or 4 channels for the group on one screen (Input: 18 points at the maximum). 10, 6 or 4 channels per screen group. (Input: 72 points at the maximum). 1 s
Indication system Indicator • SITRANS R230	Note: The LCD may have some pixels that do not stay on or off. Due to the characteristics of liquid crystal, the brightness may not be uniform, which is not a failure. 5.7" TFT color LCD (320 x 240 dots) with backlight, no contrast adjustment	Totalizing data display • Number of channels - SITRANS R230 - SITRANS R260 • Display refresh cycle	10 channels or 4 channels for the group on one screen (Input: 18 points at the maximum). 10, 6 or 4 channels per screen group. (Input: 72 points at the maximum). 1 s

SITRANS R Inkjet and Display Recorder

Display Recorder

SITRANS R230 / SITRANS R260

Event summary display	Alarm summary and message summary can be displayed. The message occurrence information and message display can be switched.	Recording method	Turning on the "REC" key allows measured data to be written at fixed cycles. Recorded as a new file whenever the recording starts.
Ethernet log display	E-mail sending, FTP server log in/off and Modbus TCP/IP communication start/stop can be displayed.	Data save cycles	Linked to the display refreshment cycles on the "Trend display" screen. However, they are automatically set to about 1 minute if the refreshment cycles are set to less than 1 minute.
Parameter display/set	Already-set Data Display and Set Change Display screen	Trend data	Average, instance or min. and max. measured values out of measured data that are sampled at the measuring cycles are saved.
Tag indication		Event data	Saves alarm data, message data and power ON data when the power turns off and on during recording.
- Number of characters to be displayed - SITRANS R230 - SITRANS R260	Note: On some screen, it can be displayed only 7 characters. Up to 8 characters (see note) at 10 channels on one screen or up to 16 (= 8 x 2) characters at 4 channels on one screen. Up to 8 characters - Up to 8 characters (see note) at 10 or 6 channel display. - Up to 16 characters at 4 channel display.	Totalizing value data	Totalizing value data at designated timing is recorded per channel. Totalized value data at designated totalized value recording cycle or the sum total is recorded in the totalizing file. You can choose which type you want to record. For each channel it can be selected as totalizing action from Analog input totalization, Digital input count or period of Digital input ON, and it can be select as totalizing period type from Daily, Weekly, Monthly, Annual, Periodic, Daily (time set) or External input signal.
- Characters to be displayed - Tag, unit and channel number display	Alphanumeric characters It depends on the screen. Refer to "Tag indication", page 32.	Configuration data (only SITRANS R260)	Configuration data can be saved. And this data can also download to recorder.
Historical trend display	The past data can be displayed from the CompactFlash Card or internal memory. The past data file can be read and displayed with scroll display function or jump the cursor to the position which you entered date and time. Scale display/no-display can be selected.	Storage capacity	Approximately 1.5 years when the display refresh cycle is 30 s (in case of 9-channel recording in ASCII data format, and 256 Mbyte CompactFlash Card used). Refer to "Recording capacity", page 32
Number of screen groups	Up to 10 channels per 1 group can be registered.	Residual capacity of memory	Indicates the memory which has already used on the screen. If the residual capacity is none, the recording stops.
- SITRANS R230 - SITRANS R260	4 groups 8 groups	CompactFlash Card	Manufactured by SanDisk http://www.sandisk.com Type: SDCFB-256 (256 Mbyte)
Keyboard		Recommended PC card adaptor	SanDisk Corp. SDAD-38
No. of Keys	8	Data format	Either of ASCII or binary format can be selected. (Switching cannot be made while the recording is in progress. In the case of ASCII format, the data can be directly read on Excel, etc.) Note: The data recorded in binary format cannot be read directly. Approximately 166 bytes per 1 sampling (for 9-channel input in ASCII format) or approximately 40 bytes (for 9-channel input in binary format).
Function	Use to select various screens and set various parameters.		
Recording function			
External memory media	CompactFlash Card (format as FAT16 or FAT, or recorder can't read and write)		
Recording capacity	1 Gbyte maximum (CompactFlash Card) Limiting the recording file to 64 Mbyte is recommended (for 112 hours if display refresh cycle is 1 second; refer to "Recording capacity", page 32). If impossible, up to 256 Mbyte is tolerated. A file recorded beyond could not be opened. Note: Only the Sandisk's CompactFlash Card is warranted. And please change the CompactFlash Card every six month to prevent the data losing.		

SITRANS R Inkjet and Display Recorder

Display Recorder

SITRANS R230 / SITRANS R260

Alarm function

No. of settings	Up to 4 alarms for each channel are settable
Type of alarm	High/Low limits
Indication	Status (alarm types) is displayed on digital display unit when an alarm occurs. History display on alarm summary (Alarm start/cancel time and alarm types)
Hysteresis	Set within the recording range of 0 ... 100 % (it is effective only in case of high/low limit alarm)
Relay output	
• SITRANS R230	Number of points: 10 (option: cannot be selected if the number of input points is 18.)
• SITRANS R260	Number of points: 20 (option: up to 2 cards with relay output can be mounted.)
Transistor output	
• SITRANS R230 (open collector)	18 points (option)
• SITRANS R260 (open collector)	16 points (option)
Alarm latch function	Keeps alarm indication and alarm output turning on after alarm reset. ON/OFF operation is performed according to key setting.

Power supply

Rated power voltage	100 ... 240 V AC
Range of operating voltage	90 ... 264 V AC
Supply frequency	50/60 Hz (both employable)
Power consumption	
• SITRANS R230	100 V AC: About 36 VA 240 V AC: About 47 VA
• SITRANS R260	100 V AC: About 65 VA 240 V AC: About 80 VA

Design

Mounting method	Panel-mounted (vertical panel)
Thickness of panel in mm (inch)	2 ... 26 (0.079 ... 1.024)
Materials	
• SITRANS R230	PC-ABS for case and bezel
• SITRANS R260	Stainless steel for case and bezel
Color	Grey (front and bezel)
External dimensions (Width x Height x Depth) in mm (inch)	
• SITRANS R230	Panel-mounted: 160 x 144 x 185 (6.3 x 5.67 x 7.28)
• SITRANS R260	300 x 300 x 220,5 (11.81 x 11.81 x 8.68)
Weight	
• SITRANS R230	About 1.5 kg (no option)
• SITRANS R260	About 4.7 kg (9-point input, without option) About 6.4 kg (full option)
External terminal	Screw terminals (M3)
RJ45	Ethernet terminal (option)

Operating condition

Power voltage	90 ... 264 V AC
Supply frequency	50/60 Hz $\pm$ 2 % (both employable)
Ambient temperature	
• Panel-mounted	0 ... 50 °C (32 ... 122 °F) (without Ethernet option) 0 ... 40 °C (32 ... 104 °F) (with Ethernet option)
Ambient humidity	20 ... 80 % RH
Vibration	10 ... 60 Hz, 0.2 m/s ² or less
Shock	None
Magnetic field	400 A/m or less
Signal source resistance	
• Thermocouple input	1 k Ω or less
• RTD input	10 Ω /wire or less (resistance of each wire of 3-wire system should be balanced)
• Voltage input	0.1 % or less of input resistance
Mounting position	Forward tilt 0°, backward tilt within 30°, horizontal 0°
Warm-up time	1 h or more after power ON
Environmental protection	IEC IP50 (Front) / IP20 (Terminal)

Safety and EMC standard

Safety standard	Based on IEC 61010-1
EMC standard	Based on EN 61326

Transportation/storage conditions

Temperature	-10 ... +60 °C (14 ... 140 °F)
Humidity	5 ... 90 % RH, no condensation
Vibration	10 ... 60 Hz, 2.45 m/s ² or lower
Shock	294 m/s ² or lower (packed state)

SITRANS R Inkjet and Display Recorder

Display Recorder

SITRANS R230 / SITRANS R260

Reference standard

Accuracy/resolution

Measuring conditions ($23 \pm 2^\circ\text{C}$, $65 \pm 10\%$ RH, power voltage, frequency fluctuation within $\pm 1\%$, no external noise, warm-up time of 1 hour or more, vertical mounting, standard values of signal source resistance and wiring resistance within 1%)

Note 1: Digital indication accuracy is a percentage (%) of the value in the measuring range.

Thermocouple

• B

• R

• S

• K

• E

• J

• T

• N

• W

• L

• U

• PN

RTD

• JPt100

• Pt100

• Pt50

• Ni100

• Cu50

DC voltage

• SITRANS R230

- 50 mV

- 500 mV

- 1 ... 5 V

- 0 ... 5 V

• SITRANS R260

- 50 mV

- 500 mV

- 5 V

Error of reference contact compensation

Digital indication accuracy:

• $\pm (0.15\% + 1 \text{ digit})$

• $\pm (0.3\% + 1 \text{ digit})$ for the range shown below:

- Thermocouple B:
400 ... 600 $^\circ\text{C}$
(752 ... 1 112 $^\circ\text{F}$)

- Thermocouples R and S:
0 ... 300 $^\circ\text{C}$ (32 ... 572 $^\circ\text{F}$)

- Thermocouples K, E, J, T, L, U:
-200 ... -100 $^\circ\text{C}$
(-328 ... -148 $^\circ\text{F}$)

• Digital indication resolution:
0.1 $^\circ\text{C}$ (32.18 $^\circ\text{F}$)

Digital indication accuracy:
 $\pm (0.15\% + 1 \text{ digit})$

Digital indication resolution:
0.1 $^\circ\text{C}$ (32.18 $^\circ\text{F}$)

Digital indication accuracy:
 $\pm (0.5\% + 1 \text{ digit})$

Digital indication resolution:
0.1 $^\circ\text{C}$ (32.18 $^\circ\text{F}$)

Digital indication accuracy:
 $\pm (0.15\% + 1 \text{ digit})$

Digital indication resolution: 10 μV

Digital indication accuracy:
 $\pm (0.15\% + 1 \text{ digit})$

Digital indication resolution:
100 μV

Digital indication accuracy:
 $\pm (0.15\% + 1 \text{ digit})$

Digital indication resolution: 1 mV

Digital indication accuracy:
 $\pm (0.15\% + 1 \text{ digit})$

Digital indication resolution: 10 μV

Digital indication accuracy:
 $\pm (0.15\% + 1 \text{ digit})$

Digital indication resolution:
100 μV

Digital indication accuracy:
 $\pm (0.15\% + 1 \text{ digit})$

Digital indication resolution: 1 mV

When measured at 0 $^\circ\text{C}$ (32 $^\circ\text{F}$) or more:

• K, E, J, T, N, L, U, PN:
 $\pm 0.5^\circ\text{C}$ (32.9 $^\circ\text{F}$)

• R, S, B, W: $\pm 1.0^\circ\text{C}$ (33.8 $^\circ\text{F}$)

Max. input voltage

Thermocouple, RTD:
 $\pm 10 \text{ V DC}$ (continuous)

Input resistance

Thermocouple, DC voltage:
about 1 M Ω

Others

Clock

With calendar function (Christian era)

Accuracy: $\pm 100 \text{ ppm}$ or less
(monthly error: about 4 minutes)

Memory backup

Parameters are saved to the internal nonvolatile flash memory. The clock and totalized data are backed up with built-in lithium battery.

SITRANS R260: Trend data is not backed up

Isolation resistance

100 M Ω or more (when measured between each terminal and ground)

Test voltage

• SITRANS R230

- Power terminal – ground

2 000 V AC, 1 min

- Input terminal – ground

500 V AC, 1 min

- Alarm terminal – ground

2 000 V AC, 1 min

- Alarm terminal – alarm terminal

750 V AC, 1 min

- Communication terminal – ground

500 V AC, 1 min

- Alarm terminal (open-collector) – ground

500 V AC, 1 min

• SITRANS R260

- Input terminal – input terminal

500 V AC, 1 min

- Power terminal – ground

2 000 V AC, 1 min

- Input terminal – ground

500 V AC, 1 min

- Alarm terminal (contact output) – ground

2 000 V AC, 1 min

- Alarm terminal (contact output) – Alarm terminal (contact output)

750 V AC, 1 min

- Communication terminal – ground

500 V AC, 1 min

- Alarm terminal (open-collector) – ground

500 V AC, 1 min

- Power terminal – input terminal

500 V AC, 1 min

SITRANS R Inkjet and Display Recorder

Display Recorder

SITRANS R230 / SITRANS R260

Effect on operation

Effect of power supply fluctuation conditions

- For the fluctuation in the range from 90 ... 264 V AC, frequency: 50/60 Hz
- For the fluctuation in the range from 47 ... 63 Hz, power voltage: 100 V AC

Effect of input signal resistance

- Thermocouple input
- DC voltage

- RTD (for wiring resistance of 10 Ω for 1 line (the same for 3 lines))

Effect of ambient temperature

Effect of mounting position

Effect of vibration

Normal mode noise

Common mode noise

Additional function (option) – SITRANS R230

Alarm relay output/DI

External terminal

Alarm relay output

- DO1
- DO2-10

DI input

- On pulse width
- Off pulse width

Reading change:
 $\pm (0.2 \% + 1 \text{ digit})$ or less

Reading change:
 $\pm (0.2 \% + 1 \text{ digit})$ or less

0.5 $\mu\text{V}/\Omega$ + 1 digit or less

Fluctuation for resistance value equivalent to 0.1 % of the input resistance: $\pm (0.2 \% + 1 \text{ digit})$ or lower.

Reading change:
 $\pm (0.2 \% + 1 \text{ digit})$ or lower

Reading change:
 $\pm (0.3 \% + 1 \text{ digit})/10^\circ\text{C}$ (50 $^\circ\text{F}$) or lower

For the backward 30° slant
Reading change:
 $\pm (0.2 \% + 1 \text{ digit})$ or lower

When sine wave of 10 ... 60 Hz with the acceleration of 0.2 m/s² is applied in each direction for 2 hours.

Reading change:
 $\pm (0.2 \% + 1 \text{ digit})$ or lower

$\geq 20 \text{ dB}$ at 50, 60 Hz $\pm 0.1 \text{ Hz}$

$\geq 120 \text{ dB}$ at 50, 60 Hz $\pm 0.1 \text{ Hz}$

A card with 10-point relay output and 5-point DI input can be mounted. Cannot be mounted if the number of input points is 18.

M3 screw terminal

Contact output (SPST:10 points), Individual channel or common output (OR output) allowed.

Contact rating:
150 V/3 A AC, 30 V/3 A DC (resistive load)

Contact rating:
240 V/3 A AC, 30 V/3 A DC (resistive load)

No-voltage contact input (5 points)
The following control is allowed by contact input.

- Recording start/stop
- Message set
- F value calculation reset
- Totalizing start/stop
- Totalizing reset
- LCD turns on
- E-mail sending

200 ms or longer

200 ms or longer

Communication, Alarm output with open-collector and DI

External terminal

Communication

- EIA RS485 Communication protocol
- Communication method

- Data type

- Parity

- Stop bit

- Communication rate

- Connection aspect

- Communication distance in m (inch)

- RS232C/RS485 Signal converter (recommendation)

Alarm output

- Electrical Rate

DI input

- On pulse width

- Off pulse width

Additional function (option) – SITRANS R260

Alarm relay output/DI

External terminal

Alarm relay output

- Rating

Alarm open collector output

External terminal

A card with communication with RS485. Modbus protocol, 18-points open-collector output and 5-points DI input is available.

- M3 screw terminal for communication
- DO11 (alarm output with open-collector)
- DI6 and power supply for DIO
- D-sublight type 25 pins connector with female terminal for DO12 ... DO28 (alarm output with open-collector), and DI7 ... DI10

Modbus (RTU)

2 wire method

Half duplex bit serial, start-stop sync type

8 bits

Odd/even/none

1 bit

9 600, 19 200 bps

Multi-drop/up to 32 recorders connectable including master station

Total extension 500 (19 685) or less

Isolated type

Manufacture:
OMRON Corporation

Model: K3SC-10

Open-collector transistor output (18 points)

30 V DC, 100 mA (resistive load)

No-voltage contact input (5 points)

The following control is allowed by contact input.

- Recording start/stop
- Message set
- F value calculation reset
- Totalizing start/stop
- Totalizing reset
- LCD turns on
- E-mail sending

200 ms or longer

200 ms or longer

Up to 2 cards with 10-point relay output can be mounted. (Maximum 20 points)

M3 screw terminal

1a contact output (10 points/card), Individual channel or common output (OR output) allowed.

Contact rating:
240 V AC/3 A, 30 V DC/3 A (resistive load)

Card having 16 alarm points (open collector output) can be mounted

M3 screw terminal

SITRANS R Inkjet and Display Recorder

Display Recorder

SITRANS R230 / SITRANS R260

Alarm output	Open-collector transistor output (16 points)
• Rating	30 V DC/0.1 A (resistive load)
<u>DI input</u>	Card having 16 DI input can be mounted
External terminal	M3 screw terminal
DI input	No-voltage contact input (16 points) Contact input allows following controls. • Recording start/stop • Message set • F value calculation reset • Totalizing start/stop • Totalized value reset • LCD (backlight) lighting • E-mail sending
• On pulse width	400 ms or longer
• Off pulse width	400 ms or longer
Ethernet (Option)	The following can be performed through the Ethernet function.
HTTP server (Internet Explorer 6 is available)	Note: Neither Netscape nor Mozilla Firefox are available.
• Measurement display	Digitally displays the measurement of each channel of the recorder and alarm occurrence status.
• Event summary display	Displays event summary including alarm ON/OFF and issuance of messages.
• Main unit information display	Displays memory use conditions and information on the main unit such as the battery end warning.
• Integrated value display	Digitally displays the integrated value of each channel of the recorder.
FTP server (Internet Explorer 6, is available)	Note: Neither Netscape nor Mozilla Firefox are available.
• File download	Record files stored in CompactFlash Card (CF) can be downloaded from the browser.
• File delete	Record files stored in CF can be deleted from the browser.
• Access authentication	Authenticates access authority to FTP server.
SMTP (e-mail client)	Transmits e-mails to specified address under the following conditions. • When an alarm turns on or off • When DI is set to ON or OFF • When an error occurs to the main unit (such as low battery or no memory space) • At specified intervals
Modbus TC/IP	
• Data read	Settings can be read through Modbus TCP/IP communication.
• Data write	Settings can be written through Modbus TCP/IP communication.

Support software	The following software is provided as standard. • PC/AT-compatible machine • Operation on PC98-series machines by NEC is not guaranteed. • Operation on self-made or shop-brand PCs is not guaranteed.
Parameter loader software	
Major function	Performs various parameter setting/change of the main unit
O/S	Windows 2000/XP
Required memory	64 Mbyte or larger
Disk drive	Windows 2000/XP-capable CD-ROM drive
Hard disk capacity	Free capacity of 30 Mbyte or larger required
Printer	Windows 2000/XP-capable printer and printer driver Note: PC loader communication cable is separately required.
Data viewer software	
Major function	Regenerates the past trend record on the PC from the data in the CompactFlash Card. Provided with historical trend display and event display functions.
O/S	Windows 2000/XP
Required memory	64 Mbyte or larger
Disk drive	Windows 2000/XP-capable CD-ROM drive
Hard disk capacity	Free capacity of 30 Mbyte or larger required
Printer	Windows 2000/XP-capable printer and printer driver

SITRANS R Inkjet and Display Recorder

Display Recorder

SITRANS R230 / SITRANS R260

Tag indication

SITRANS R230

Screen	No. of channel on one screen	Items			
		Tag 1	Tag 2	Unit	Channel number
Trend	4 or less	+	+	+	+
	5 or more	x		x	x
Bar graph	4 or less	+	+	+	+
	5 or more	x		x	x
Analog meter	4 or less	All items are displayed			
	More than 5	No. 1 ... 4		v	v
		Others		x	x
Digital	4 or less	All items are displayed			
	5 or more	v		v	v

x: Only 1 item can be displayed

+: Only 2 items can be displayed

v: 3 items can be displayed. Only Tag 2 can't be displayed

SITRANS R260

Screen	Channels per screen	Items			
		Tag 1	Tag 2	Unit	Channel number
Trend Bar graph	4 or less	All items are displayed			
	5, 6	o	-	o	o
	7 or more	x	-	x	x
Analog meter	6 or less	All items are displayed			
	7 or more	o	-	o	o
Digital		All items are displayed			

o: Displayed

x: 1 item only can be displayed

-: Nothing can be displayed

Standard functions

Function	Description
Record range voluntary setting	Recording range can be set by channel.
Input type setting	Input can be set by channel (key operation on the front face). Set the same input type for every 2 channels. Refer to "Selecting input type", Seite 33.
Skip function	Skips arbitrary channel display/recording.
Trend display	
• Time display	Time is displayed at the top of the trend display screen.
• Alarm display	On occurrence of an alarm and the restoration, alarm is displayed in the alarm display field. The CompactFlash Card usage is displayed at the top of the bar-graph.
Tag name display	By channel, Maximum of 8 characters.
Screen name display	Displays the screen name (maximum of 16 characters).
Unit creation	Industrial units can be arbitrarily created, Maximum of 7 digits, 12 types.
Scaling function	Arbitrary scaling is allowed in the case of DC voltage input. Decimal point position can also be arbitrarily set in the range from -32767 ... 32767.
PV shift	Shift the zero point and slant of the reading.
Input filter	Prevents sudden fluctuation of input for each channel (primary delay filter). Time constant: 0 ... 900 s.
Burnout function	Displays the break of thermocouple/RTD input by scaling out to 100 % side.
Historical trend display	Regenerates and displays the data stored in the CompactFlash Card by scrolling the screen or jump to time when you entered.

Recording capacity

The recording can be made for the period of time listed in the tables shown below under the following conditions:

- 9 input points
- Recording data format: ASCII
- Recording type: Maximum/minimum recording
- No alarm, no message, no other events

SITRANS R Inkjet and Display Recorder

Display Recorder

SITRANS R230 / SITRANS R260

SITRANS R230

- When the number of input points is 18, the period is approximately one half of those listed in the table.
- In binary format, the period is approximately 4 times as long as those listed in the table.

CompactFlash Card size 16 Mbyte						
Display refreshment cycle	1 s	10 s	30 s	1 min	10 min	30 min
Recordable capacity (about)	28 hours	11 days	35 days	70 days	2 years	5.7 years
CompactFlash Card size 64 Mbyte						
Display refreshment cycle	1 s	10 s	30 s	1 min	10 min	
Recordable capacity (about)	112 hours	46 days	140 days	280 days	7.7 years	
CompactFlash Card size 256 Mbyte						
Display refreshment cycle	1 s	10 s	30 s	1 min		
Recordable capacity (about)	18 days	187 days	1.5 years	3 years		

When CompactFlash Card is not used

- Up to 800 Kbytes of the recording data and the event data can be stored in the main unit.
- In case of 9-channel in Max./Min. recording: approximately 4 900 data can be stored for 1 hour at the display refresh cycle of 1 second.

SITRANS R260

When the number of input points goes on increasing, the period becomes as follows:

- 18 input points; The period is approximately one half of those listed in the table.
- 27 input points; The period is approximately one-third of those listed in the table.
- 36 input points; The period is approximately one-fourth of those listed in the table.
- In binary format, the period is approximately 4 times as long as those listed in the table.
- For recording type of mean or instantaneous value, the number of days is approximately 2 times as long.

CompactFlash Card size 64 Mbyte					
Display refreshment cycle	1 s	10 s	30 s	1 min	10 min
Recordable capacity (about)	112 hours	46 days	140 days	280 days	7.7 years
CompactFlash Card size 256 Mbyte					
Display refreshment cycle	1 s	10 s	30 s	1 min	
Recordable capacity (about)	18 days	187 days	1.5 years	3 years	

When CompactFlash Card is not used

- Up to 6 Mbytes of the recording data and the event data can be stored in the main unit.
- In case of 36-channel in Max./Min. recording: approximately 400 000 data can be stored for 11 hours at the display refresh cycle of 1 second.

Selecting input type

Basically, the input type can be every 2 channels.

- SITRANS R230: The input type of channel 2, 4, 6, 8, 11, 13, 15 and 17 can only be set in the same category of previous channel.
- SITRANS R260: The input type of channel 2, 4, 6, 8, 11, 13, 15, 17, 20, 22, 24, 26, 29, 31, 33 and 35 can only be set in the same category of previous channel.

The following input types are available.

Input category	Details
Thermocouple, 50 mV	K, E, J, T, R, S, B, N, W, L, U, and PN thermocouples, 50 mV
RTD	Pt100, JPt100, Ni100, Pt50, Cu50
500 mV	500 mV
5 V	1 ... 5 V, 0 ... 5 V

Note

- SITRANS R230: Note, however, that input type can be arbitrarily selected only for channels 9 and 18 irrespective of the type allocated to other channels.
- SITRANS R260: Note, however, that input type can be arbitrarily selected only for channels 9, 18, 27 and 36 irrespective of the type allocated to other channels.

Example of channel input type selection (for 18 points input)

	Input type	Input category	Description
Channel 1	K thermocouple	Thermocouple, 50 mV	The type of thermocouple can be arbitrarily selected for each channel.
Channel 2	T thermocouple		
Channel 3	1 ... 5 V	5 V	
Channel 4	0 ... 5 V		
Channel 5	Pt100	RTD	The type of RTD can be arbitrarily selected for each channel.
Channel 6	JPt100		
Channel 7	500 mV	500 mV	
Channel 8	500 mV		
Channel 9	J thermocouple	Thermocouple, 50 mV	Input type can be arbitrarily selected for channel 9.
Channel 10	K thermocouple	Thermocouple, 50 mV	The input type of the thermocouple and 50 mV is the same.
Channel 11	50 mV		
Channel 12	Skip	5 V	Skip can arbitrarily selected irrespective of the input type.
Channel 13	1 ... 5 V		
Channel 14	Pt100	RTD	
Channel 15	Skip		
Channel 16	Skip	500 mV	
Channel 17	500 mV		
Channel 18	50 mV	Thermocouple, 50 mV	Input type can be arbitrarily selected for channel 18.

SITRANS R Inkjet and Display Recorder

Display Recorder

SITRANS R230 / SITRANS R260

Selection and ordering Data	Order No.
SITRANS R230 Display recorder, 5 inch screen	7ND5420- ■ A B 1 2 - 1 A ■ ■
Number of input points	
9 points ▶	1
18 points ¹⁾	2
Alarm (relay) output/DI input	
Without ▶	A
With ²⁾	B
Communication	
Without any communication ▶	1
With RS485, Alarm (open-collector transistor) and DI input	2
With Ethernet communication	3
With Ethernet, RS485, Alarm (open-collector transistor) and DI input	4

▶ Available ex stock.

¹⁾ **Note 1:** Cannot be selected if "B" is selected for the 15th digit.²⁾ **Note 2:** Cannot be selected if "2" is selected for the 8th digit.

Scope of delivery

- 1 Recorder
- 2 Panel mounting brackets
- CD-ROM with instruction manual and PC support software
- 1 Noise filter for the power supply

Selection and ordering Data	Order No.
SITRANS R260 Display recorder, 12 inch screen	7ND5460 ■ A A ■ 1 - 1 A ■ ■
Number of input points	
9 points	1
18 points ▶	2
27 points	3
36 points ³⁾	4
DI input	
Without ▶	0
With (16 points)	1
Alarm output	
Without ▶	A
10 relay outputs	B
20 relay outputs	C
Transistor (open collector) 16 points	D
10 relay outputs and transistor (open collector) 16 points	E
20 relay outputs and transistor (open collector) 16 points	F
Ethernet	
Without ▶	1
With	2

▶ Available ex stock.

³⁾ **Note 1:** Cannot be selected if "B" is selected for the 15th digit.

Scope of delivery

- 1 Recorder
- 2 Panel mounting brackets
- CD-ROM with instruction manual and PC support software
- 1 Noise filter for the power supply

Accessories

SITRANS R230 / SITRANS R260	Order No.
10 Ω external shunt resistor (required for DC current input)	7ND5801-7AA
PC card adaptor for CompactFlash Card	7ND5801-7AB
Termination resistor for communication	7ND5801-7AC
D-sublight type 25 pins connector with male terminal for alarm output, which does not include cable (only SITRANS R230)	7ND5801-7AK

SITRANS R Inkjet and Display Recorder

Display Recorder

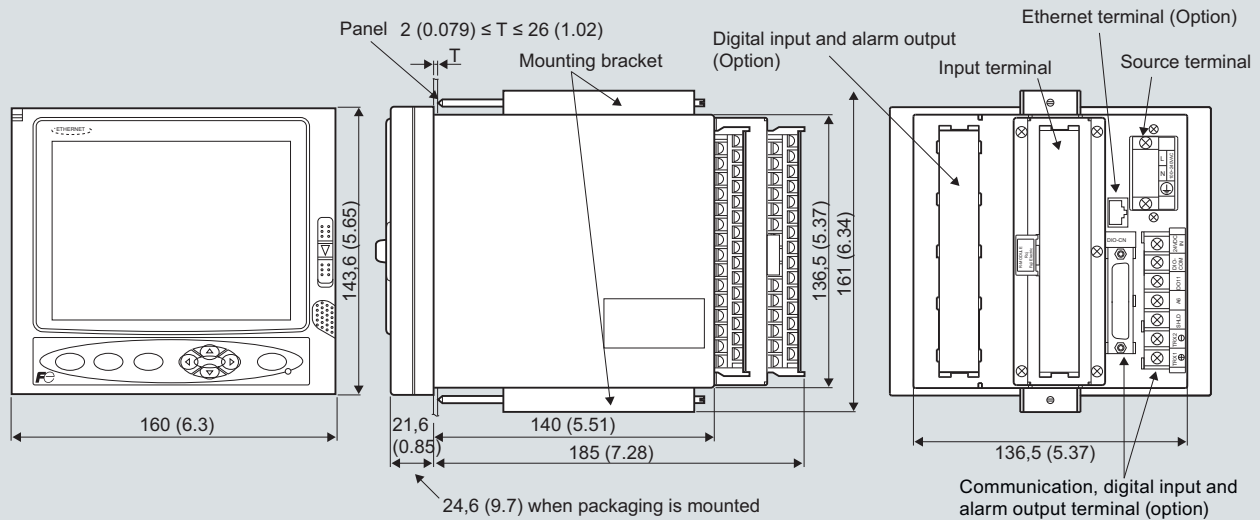
SITRANS R230 / SITRANS R260

Dimensional drawings

SITRANS R230

Panel mounting

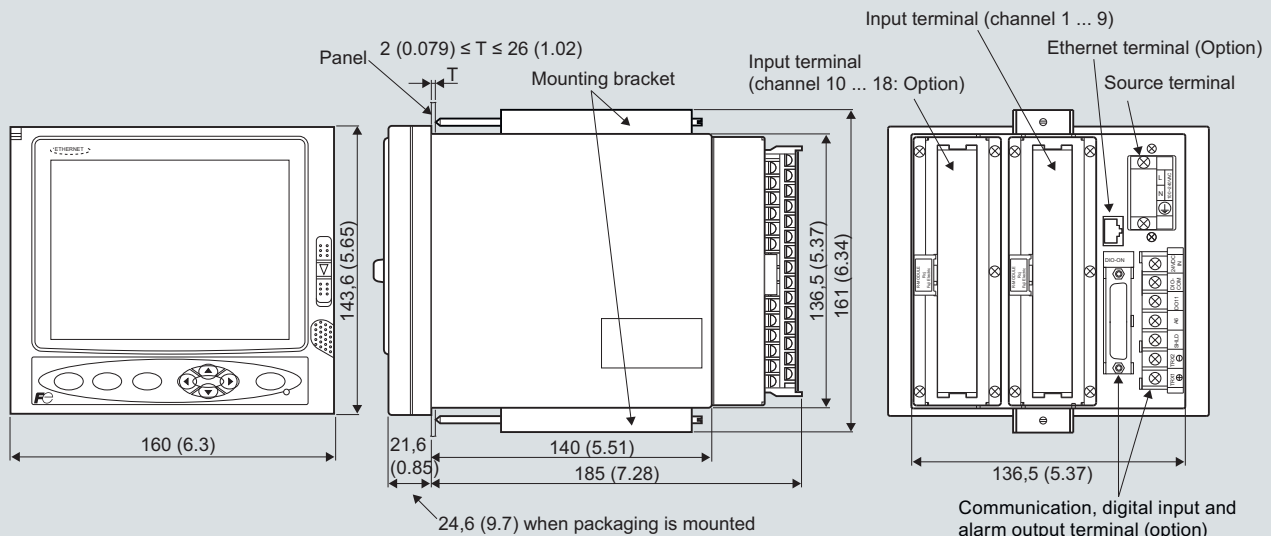
In the case of 9-point input



In the case of 9-point input

All dimensions in mm (inch)

In the case of 18-point input



In the case of 18-point input

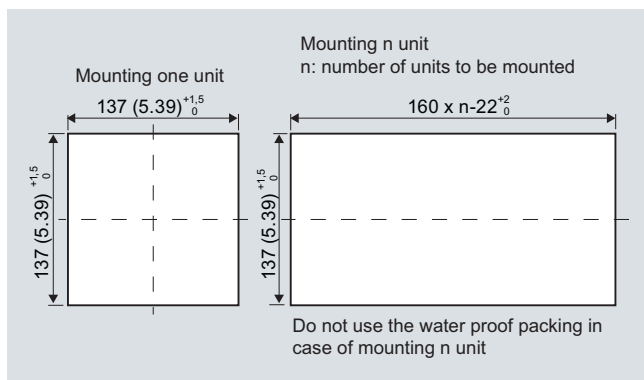
All dimensions in mm (inch)

SITRANS R Inkjet and Display Recorder

Display Recorder

SITRANS R230 / SITRANS R260

Panel cutout

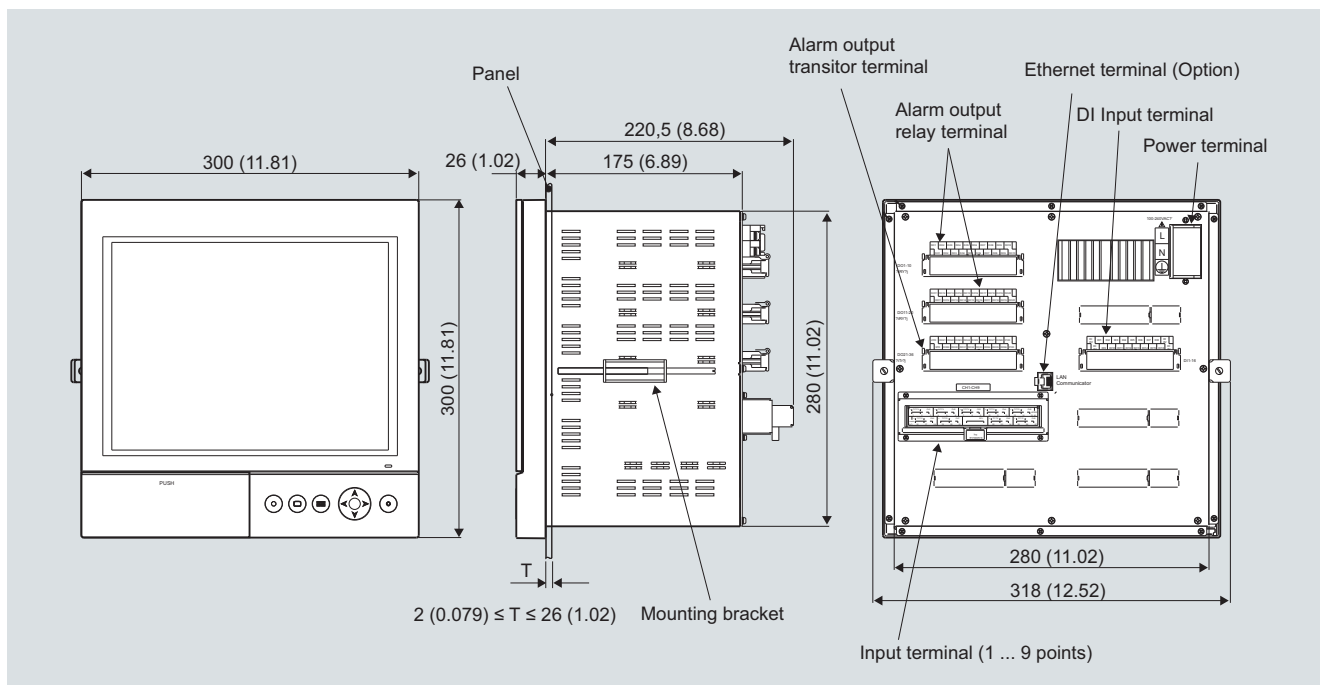


All dimensions in mm (inch)

SITRANS R260

Panel mounting

In the case of 9-point input



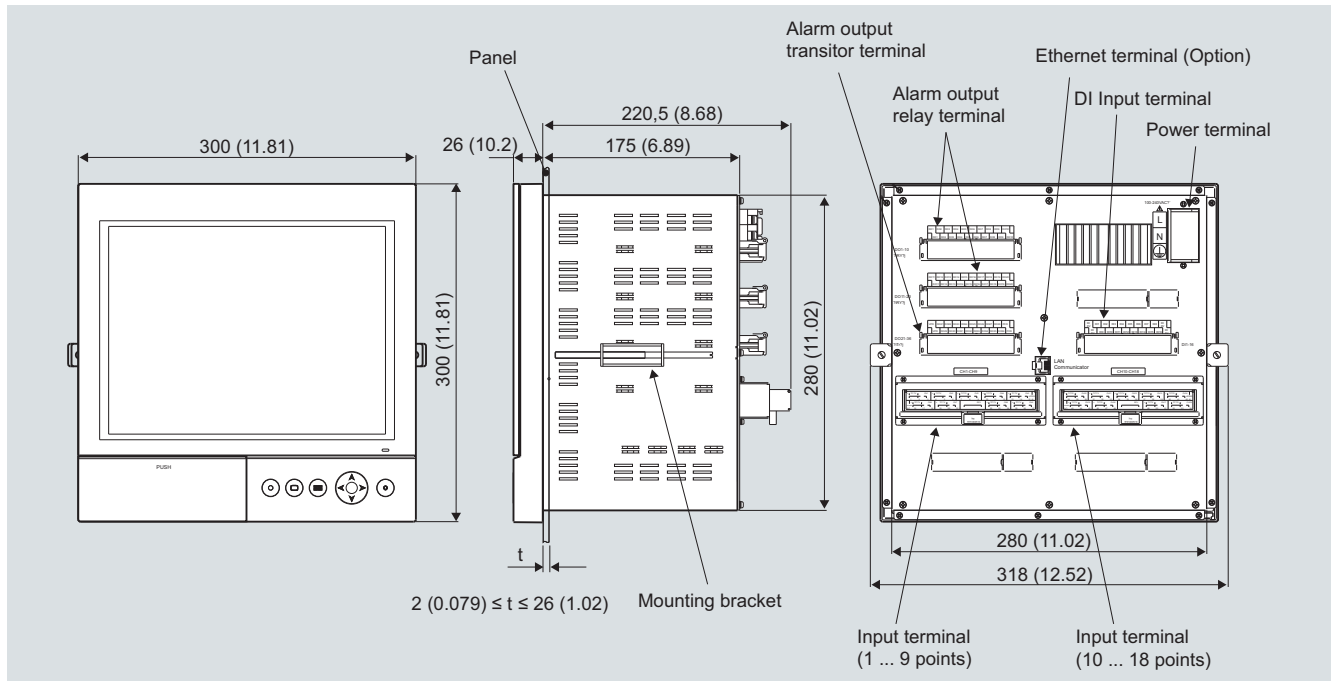
All dimensions in mm (inch)

SITRANS R Inkjet and Display Recorder

Display Recorder

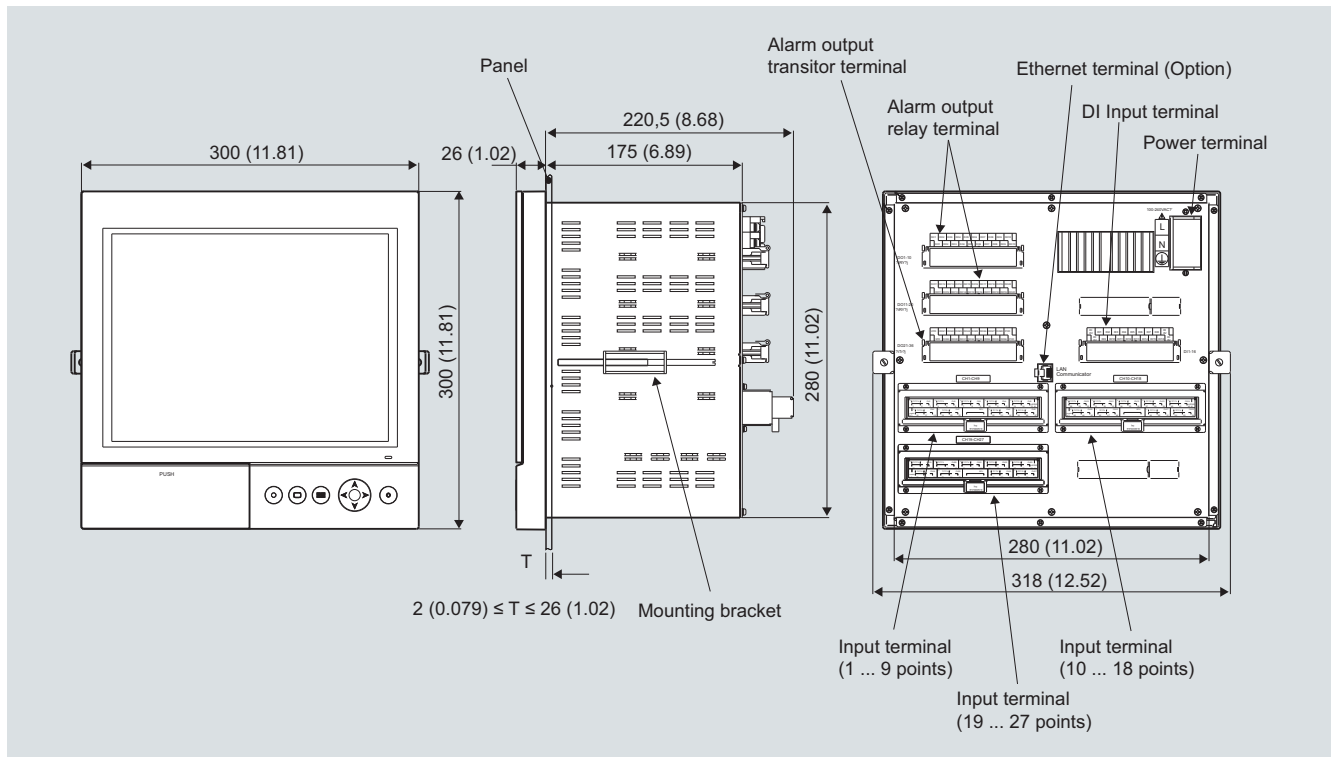
SITRANS R230 / SITRANS R260

In the case of 18-point input



All dimensions in mm (inch)

In the case of 27-point input



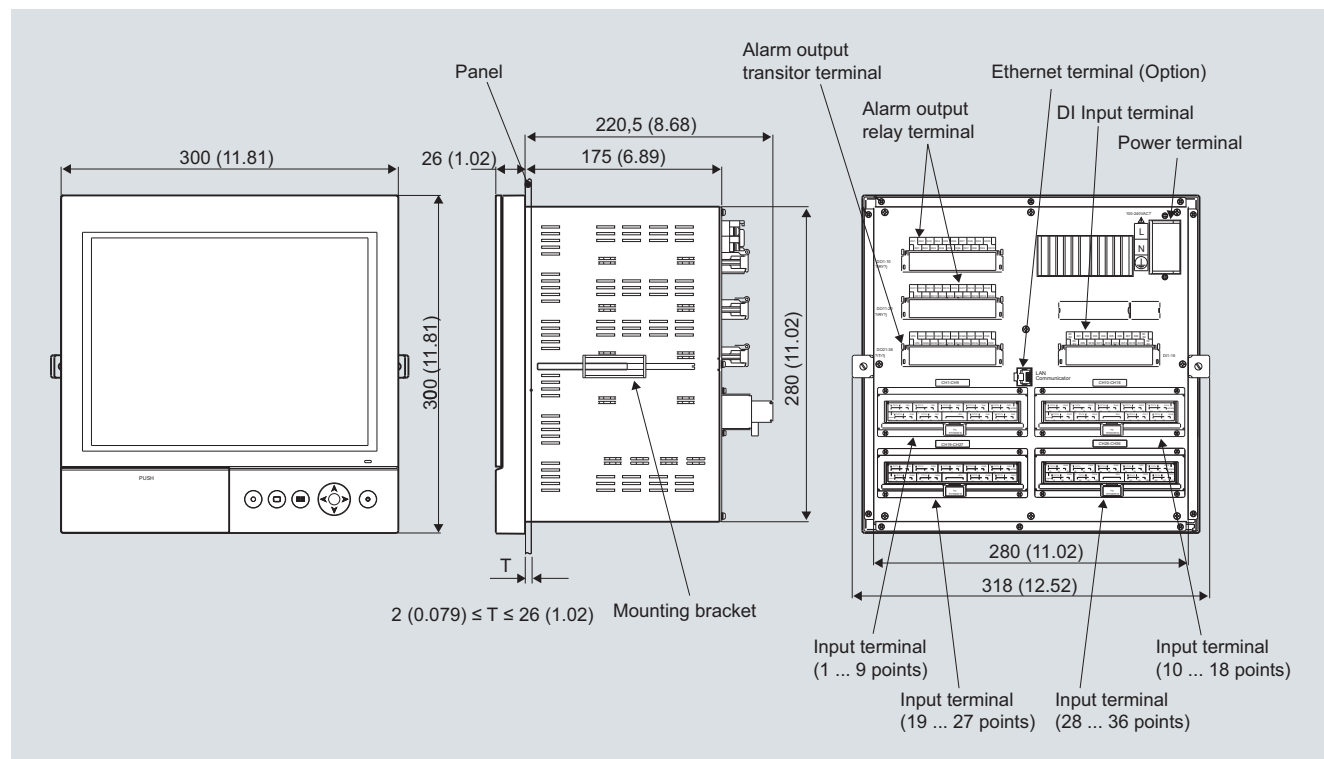
All dimensions in mm (inch)

SITRANS R Inkjet and Display Recorder

Display Recorder

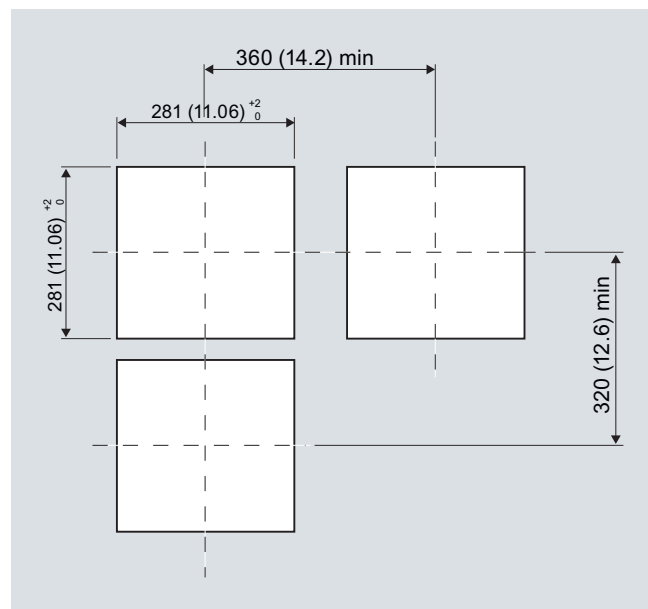
SITRANS R230 / SITRANS R260

In the case of 36-point input



All dimensions in mm (inch)

Panel cutout



All dimensions in mm (inch)

SITRANS R Inkjet and Display Recorder

Display Recorder

SITRANS R230 / SITRANS R260

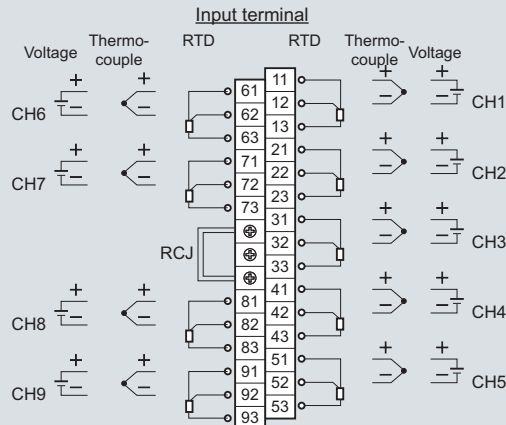
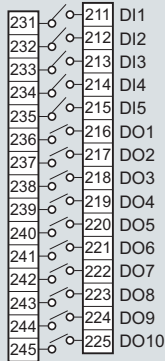
Schematics

Connections

SITRANS R230

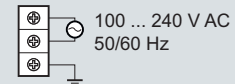
In the case of 9-point input

Alarm (relay) output / digital input terminal

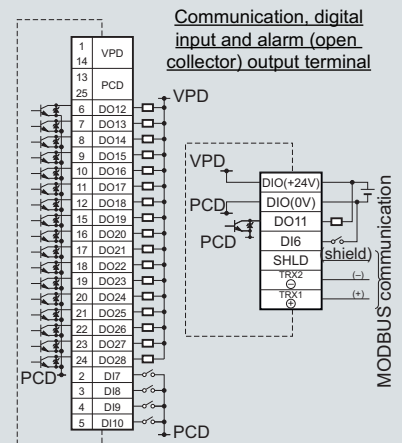


Note:
For current input, connect an optional
shunt resistance to a voltage input terminal

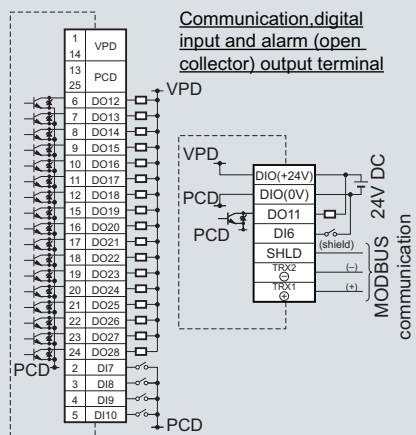
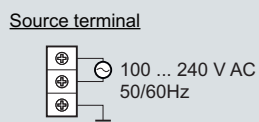
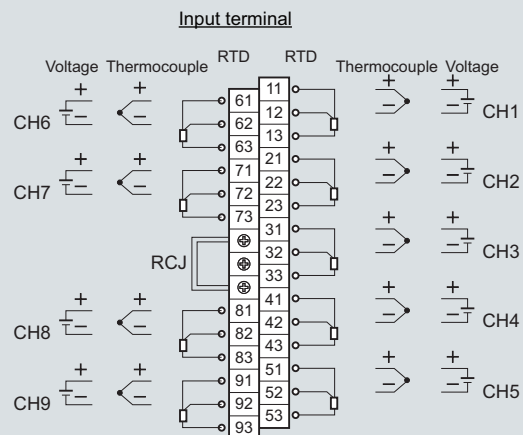
Source terminal



Digital input and alarm (open collector) output terminal. D-Sub terminal



In the case of 18-point input



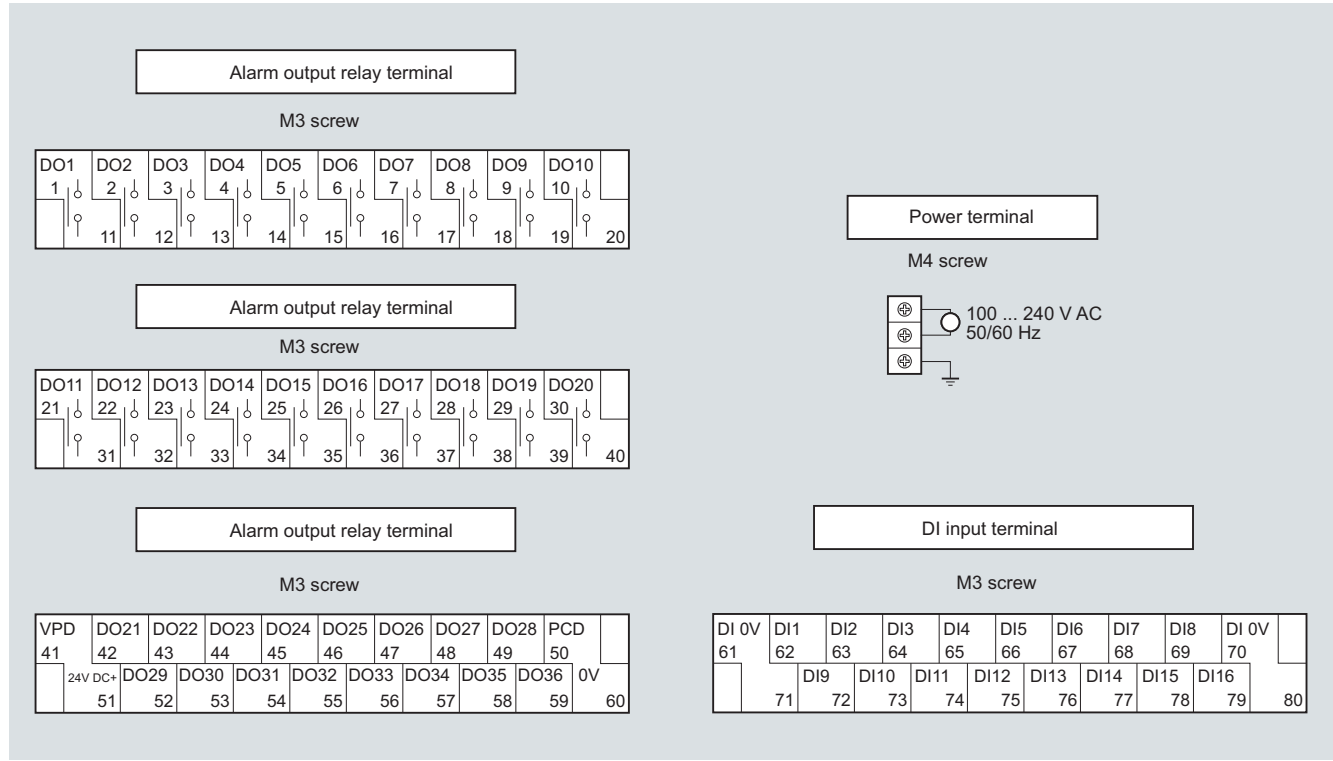
SITRANS R Inkjet and Display Recorder

Display Recorder

SITRANS R230 / SITRANS R260

SITRANS R260

In the case of 9-point, 18-point, 27-point and 36-point input



SITRANS R Inkjet and Display Recorder

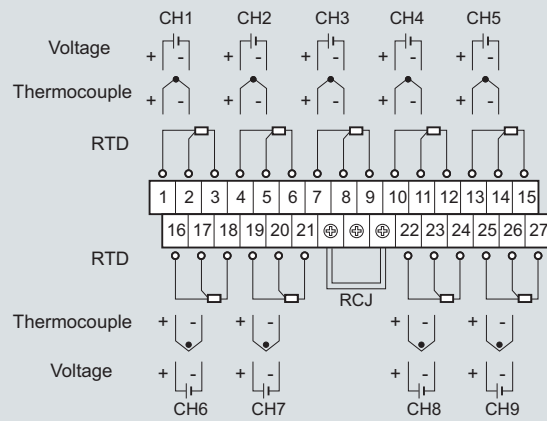
Display Recorder

SITRANS R230 / SITRANS R260

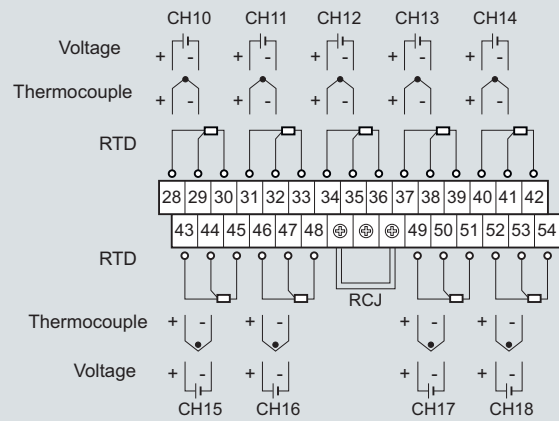
Input terminal

M3 screw

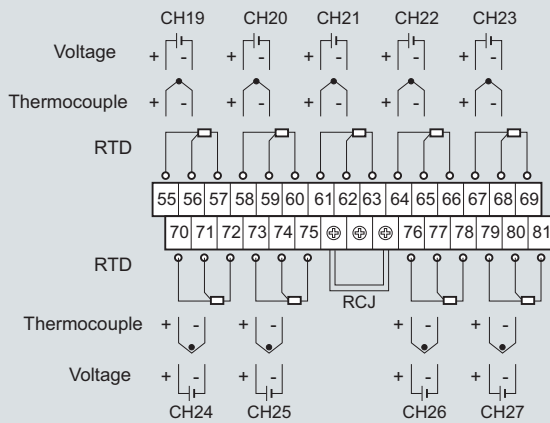
Number of input points = 1 ... 9 points



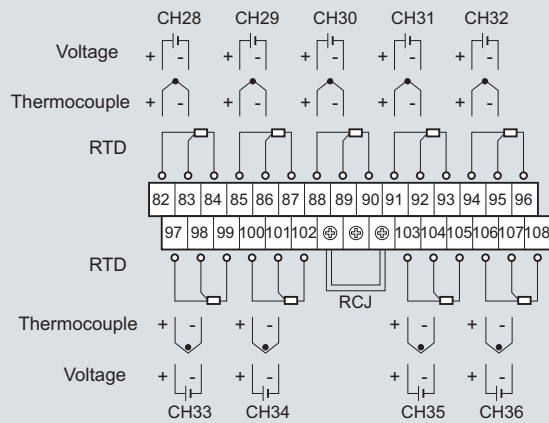
Number of input points = 10 ... 18 points



Number of input points = 19 ... 27 points



Number of input points = 28 ... 36 points



Note: For current input, connect an optional shunt resistance to a voltage input terminal

More information

Additional information is available in the Internet under:

<http://www.siemens.com/sitrans>

SITRANS R Inkjet and Display Recorder



Appendix

Conditions of sale and delivery Export regulations

Terms and Conditions of Sale and Delivery

By using this catalog you can acquire hardware and software products described therein from Siemens AG subject to the following terms. Please note! The scope, the quality and the conditions for supplies and services, including software products, by any Siemens entity having a registered office outside of Germany, shall be subject exclusively to the General Terms and Conditions of the respective Siemens entity. The following terms apply exclusively for orders placed with Siemens AG.

For customers with a seat or registered office in Germany

The "General Terms of Payment" as well as the "General Conditions for the Supply of Products and Services of the Electrical and Electronics Industry" shall apply.

For software products, the "General License Conditions for Software Products for Automation and Drives for Customers with a Seat or registered Office in Germany" shall apply.

For customers with a seat or registered office outside of Germany

The "General Terms of Payment" as well as the "General Conditions for Supplies of Siemens Automation and Drives for Customers with a Seat or registered Office outside of Germany" shall apply.

For software products, the "General License Conditions for Software Products for Automation and Drives for Customers with a Seat or registered Office outside of Germany" shall apply.

General

The dimensions are in mm. In Germany, according to the German law on units in measuring technology, data in inches only apply to devices for export.

Illustrations are not binding.

Insofar as there are no remarks on the corresponding pages, - especially with regard to data, dimensions and weights given - these are subject to change without prior notice.

The prices are in € (Euro) ex works, exclusive packaging.

The sales tax (value added tax) is not included in the prices. It shall be debited separately at the respective rate according to the applicable legal regulations.

Prices are subject to change without prior notice. We will debit the prices valid at the time of delivery.

Surcharges will be added to the prices of products that contain silver, copper, aluminum, lead and/or gold if the respective basic official prices for these metals are exceeded. These surcharges will be determined based on the official price and the metal factor of the respective product.

The surcharge will be calculated on the basis of the official price on the day prior to receipt of the order or prior to the release order.

The metal factor determines the official price as of which the metal surcharges are charged and the calculation method used. The metal factor, provided it is relevant, is included with the price information of the respective products.

An exact explanation of the metal factor and the text of the Comprehensive Terms and Conditions of Sale and Delivery are available free of charge from your local Siemens business office under the following Order Nos.:

- 6ZB5310-0KR30-0BA1
(for customers based in Germany)
- 6ZB5310-0KS53-0BA1
(for customers based outside Germany)

or download them from the Internet

www.siemens.com/industrymall

(Germany: Industry Mall Online-Help System)

Export regulations

Our obligation to fulfill this agreement is subject to the proviso that the fulfillment is not prevented by any impediments arising out of national and international foreign trade and customs requirements or any embargos and/or other sanctions.

If you transfer goods (hardware and/ or software and/ or technology as well as corresponding documentation, regardless of the mode of provision) delivered by us or works and services (including all kinds of technical support) performed by us to a third party worldwide, you shall comply with all applicable national and international (re-) export control regulations.

If required to conduct export control checks, you, upon request by us, shall promptly provide us with all information pertaining to particular end customer, destination and intended use of goods, works and services provided by us, as well as any export control restrictions existing.

The products listed in this catalog / price list may be subject to European / German and/or US export regulations.

Therefore, any export requiring a license is subject to approval by the competent authorities.

According to current provisions, the following export regulations must be observed with respect to the products featured in this catalog / price list:

AL	Number of the <u>German Export List</u> Products marked other than "N" require an export license. In the case of software products, the export designations of the relevant data medium must also be generally adhered to. Goods labeled with an "<u>AL" not equal to "N"</u> are subject to a European or German export authorization when being exported out of the EU.
ECCN	<u>Export Control Classification Number</u> Products marked other than "N" are subject to a reexport license to specific countries. In the case of software products, the export designations of the relevant data medium must also be generally adhered to. Goods labeled with an "<u>ECCN" not equal to "N"</u> are subject to a US re-export authorization.

Even without a label or with an "AL: N" or "ECCN: N", authorization may be required due to the final destination and purpose for which the goods are to be used.

The deciding factors are the AL or ECCN export authorization indicated on order confirmations, delivery notes and invoices.

Errors excepted and subject to change without prior notice.

Industry Automation, Drive Technologies and Low Voltage Distribution

Further information can be obtained from our branch offices listed in the appendix or at www.siemens.com/automation/partner

Interactive Catalog on DVD		<i>Catalog</i>	
for Industry Automation, Drive Technologies and Low Voltage Distribution		CA 01	
Drive Systems			
<u>Variable-Speed Drives</u>			
SINAMICS G110, SINAMICS G120	D 11.1		
Standard Inverters			
SINAMICS G110D, SINAMICS G120D			
Distributed Inverters			
SINAMICS G130 Drive Converter Chassis Units	D 11		
SINAMICS G150 Drive Converter Cabinet Units			
SINAMICS GM150, SINAMICS SM150	D 12		
Medium-Voltage Converters			
SINAMICS S120 Chassis Format Units and Cabinet Modules	D 21.3		
SINAMICS S150 Converter Cabinet Units			
SINAMICS DCM Converter Units	D 23.1		
<u>Three-phase Induction Motors</u>			
• H-compact	D 84.1		
• H-compact PLUS			
Asynchronous Motors Standardline	D 86.1		
Synchronous Motors with Permanent-Magnet Technology, HT-direct	D 86.2		
DC Motors	DA 12		
SIMOREG DC MASTER 6RA70 Digital Chassis Converters	DA 21.1		
SIMOREG K 6RA22 Analog Chassis Converters	DA 21.2		
<i>PDF: SIMOREG DC MASTER 6RM70 Digital Converter Cabinet Units</i>	DA 22		
SIMOVERT PM Modular Converter Systems	DA 45		
SIEMOSYN Motors	DA 48		
MICROMASTER 420/430/440 Inverters	DA 51.2		
MICROMASTER 411/COMBIMASTER 411	DA 51.3		
SIMOVERT MASTERDRIVES Vector Control	DA 65.10		
SIMOVERT MASTERDRIVES Motion Control	DA 65.11		
Synchronous and asynchronous servomotors for SIMOVERT MASTERDRIVES	DA 65.3		
SIMODRIVE 611 universal and POSMO	DA 65.4		
SIMOTION, SINAMICS S120 and Motors for Production Machines	PM 21		
SINAMICS S110	PM 22		
The Basic Positioning Drive			
<u>Low-Voltage Three-Phase-Motors</u>			
IEC Squirrel-Cage Motors	D 81.1		
MOTOX Geared Motors	D 87.1		
<u>Automation Systems for Machine Tools SIMODRIVE</u>			
• Motors	NC 60		
• Converter Systems SIMODRIVE 611/POSMO			
<u>Automation Systems for Machine Tools SINAMICS</u>			
• Motors	NC 61		
• Drive System SINAMICS S120			
<u>Mechanical Driving Machines</u>			
FLENDER Standard Couplings	MD 10.1		
FLENDER SIG Standard industrial gear unit	MD 30.1		
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