

# SBR-EW100/180

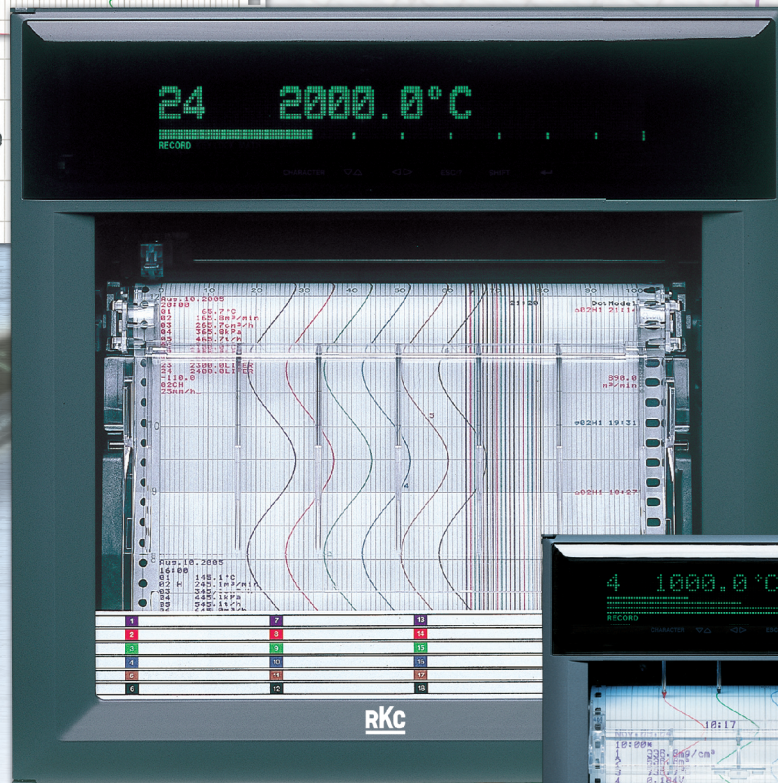
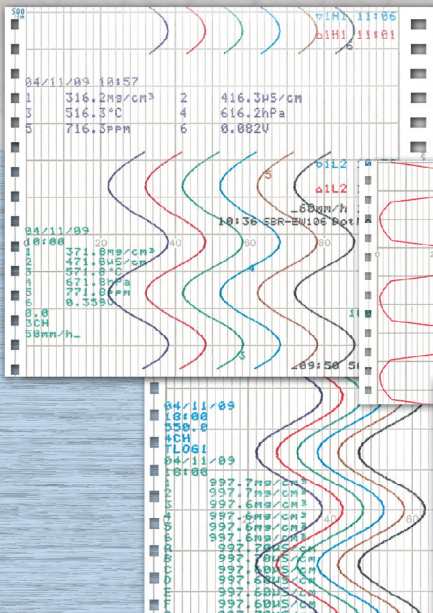
## Series

### **HYBRID RECORDER**

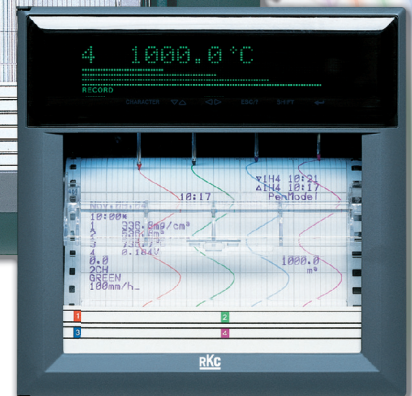


**RKc®**





EW180 24 dot model



EW100 4 pen model

## HYBRID RECORDER SBR-EW100/180 Series

### Easy to Use

- Large, VFD full dot matrix display **NEW**
- Easily navigable interactive settings **NEW**
- Enables historical trend review during recording **NEW**
- Internal illumination (high intensity white LED) **NEW**

### Compatible to Previous Model

- The felt-pen, plotter pen, cassette ribbon and chart paper are compatible to previous models (SBR-EY series).
- Rear terminal plate and depth size is same to previous models (SBR-EY series).

### Multiple Functions Meet Variety of Needs

- Broad lineup (1,2,3, or 4 pen models, and 6,12,18,24 dot models)  
\*12,18,24 dot models are only for SBR-EW180
- 6-points dot model achieves one second measurement intervals. **NEW**
- Universal input
- A wide range of input sensors **NEW**
- Supports thirty-five types including PLII, PR40-20, and NiNiMo  
\*Including options
- Mathematical functions  
No. of channels: Pen models 8ch  
Dot models Max.12ch(EW100) Max.24ch(EW180)  
Computation types: Offers general, logic, relational, and statistical computations.  
\* Assign/analog record computed results to any channel.
- RS-422A/485 interfaces



# More easy to use and easy to read.

## Multi-Display (Displays a Variety of Screens) for On-Site Monitoring.

80 kinds of display patterns are prepared.



1ch Digital + Bar graph display (EW100)



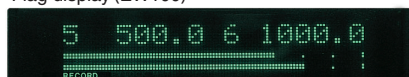
1ch Digital (EW100)



Flag display (EW100)



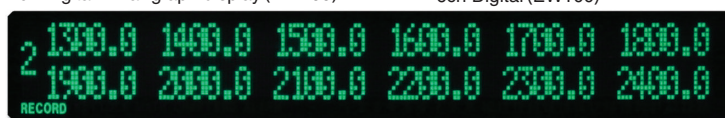
Alarm display (EW100)



2ch Digital + Bar graph display (EW100)



6ch Digital (EW100)



24ch Digital (EW180)



Alarm display (EW180)

## Navigational display Makes Setup a Snap.

The instrument features a simple configuration, with Operation mode for normal use, and Setting mode for use during setup. In Operation mode, measured values, time, and alarms are updated, and lists are printed. In Setting mode, you can enter measuring ranges, alarm values, and other parameters. Also, Setting mode offers a navigational display that eases entry of settings.



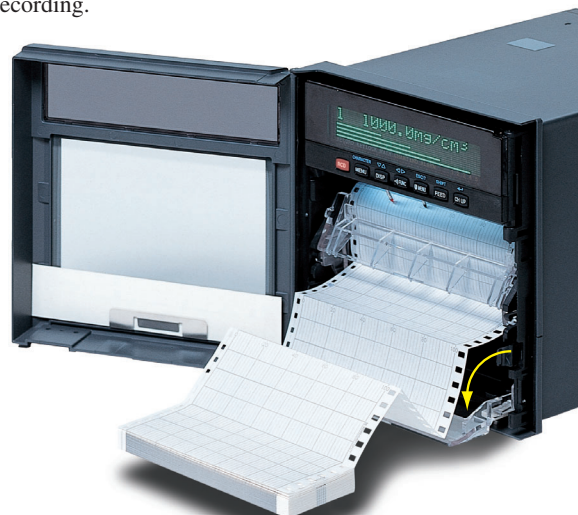
## Bright Internal Illumination

By using a high intensity white LED and light diffusing rod for the internal illumination, the visibility of the chart section has been greatly increased.



## Chart Ejection Function (EW100)

The chart cassette is equipped with a chart ejection function. You can write memos on the chart and check the historical trend during recording.



Extraction of recorded chart paper is possible.

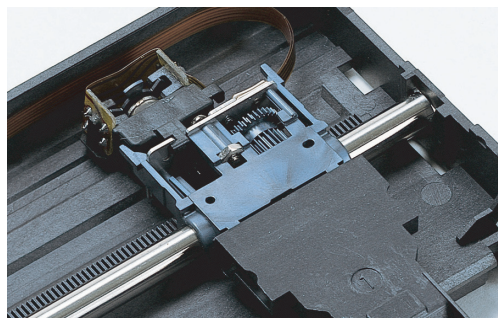
# High Reliability and High Quality

## Highly Precise & High Reliability of Actuators

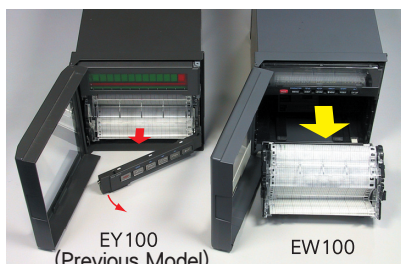
The pen servo takes advantage of an ultra-small, rack-and-pinion stepping motor. By eliminating the drive belt, transfer-related loss load is reduced, allowing a smaller servo.

The motor is controlled digitally, yielding reductions in power consumption.

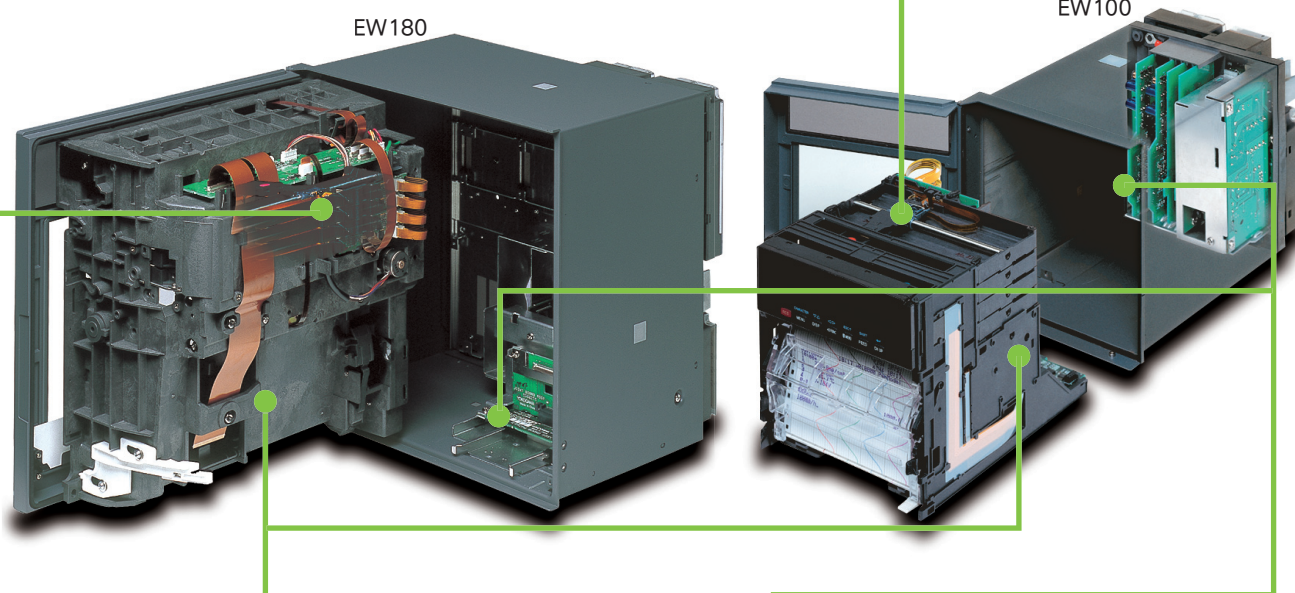
Also, the position of the pen is detected by an optical encoder.



Servo Unit and Optical Encoder



The EW100 series chart cassette can be taken out, without pulling out the operation key board.

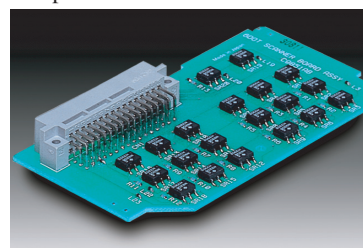


## Light Weight & Low Power Consumption

High integrated circuit and the new servo unit achieve high efficiencies and low heat emissions in all of the 1-, 2-, 3-, and 4-pen and 6-dot models while simultaneously limiting the weight to approximately 2.5 kg (EW100 6-dot model), and approximately 2.4 kg (EW100 4-pen model).

## Long Life & High Speed Scanning

For scanners that switch the input signal, high withstand voltage, low leakage current MOS FETs and high voltage output photocouplers have been combined into a high withstand voltage semiconductor relay offering high speed (6 points per second At the time of the fastest of 6-dot models) scanning, longer scanner life, and noiseless operation. High integrated circuit achieve reducing power consumption, suppressing heat emissions, and increasing the lifespan of components.



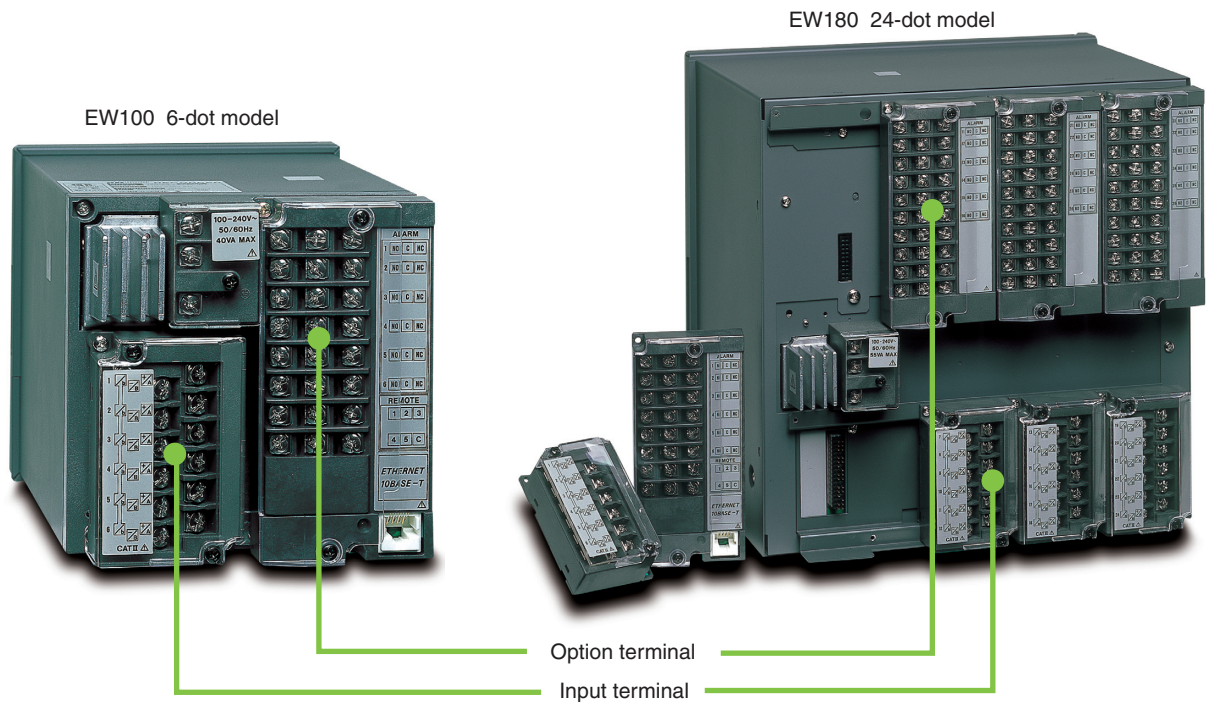
Input signal switch circuit



# Compatible to previous model (SBR-EY Series)

 The felt-pen, plotter pen, cassette ribbon and chart paper are compatible to previous models

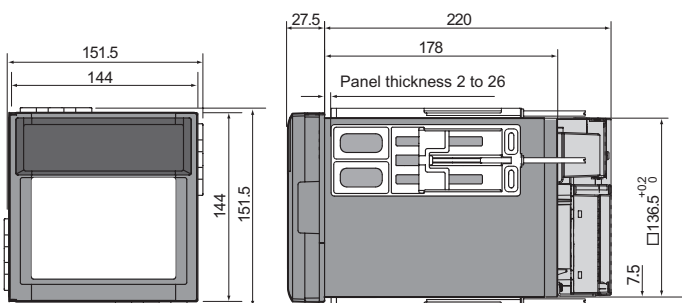
 Rear terminal plate and depth size is same to previous models



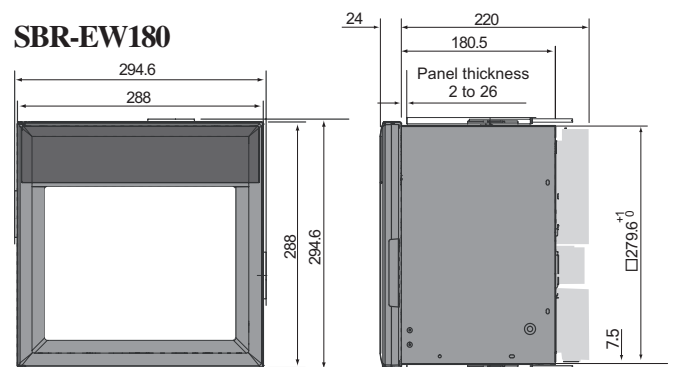
\*Individual terminals are removable, making wiring and maintenance easy.

## External Dimension (Unit:mm)

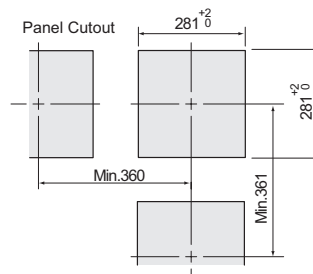
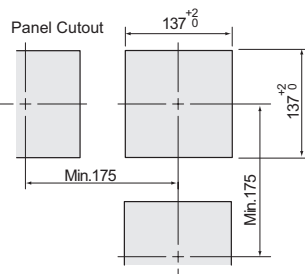
### SBR-EW100



### SBR-EW180



Note : Should be mounted by only two brackets, either on the top and bottom





# Specifications

## Input

**Number of inputs** : 1,2,3,4 (pen), 6,12\*,18\*,24\* (dot) points  
\*Only EW180 Series

### Input signal

Universal input

TC : R, S, B, K, E, J, T, N, W5Re/W26Re, W3Re/W25Re, L, U  
RTD : Pt100, JPt100

DCA : DC current (Using external shunt resistor)

DCV : DC voltage 20/60/200mV, 2/6/20/50V, 1 to 5V

DI : Digital input (Contact or DC Voltage, TTL level)

**Measurement range/accuracy**: Refer to following table

### Recording accuracy

Measurement accuracy  $\pm$  (0.3% of recording span)

\*Recording span: SBR-EW100: 100mm

SBR-EW180: 180mm

### Reference Junction Compensation

 (when measuring 0°C or up)

TYPE R, S, B, W5Re/W26Re, W3Re/W25Re :  $\pm 1^\circ\text{C}$

TYPE K, J, E, T, N, L, U :  $\pm 0.5^\circ\text{C}$

### Measurement interval

Pen model : 0.125sec/channel

Dot model : 1sec/6dot or 2.5sec/12 to 24dot

### Input Resistance:

10M or more (TC, 20mV, 60mV, 200mV range)

Approx. 1M $\Omega$  (2V range or more)

### Burnout

Available on TC and DCV (1 to 5V) range

•ON/OFF selectable (per channel)

•1-5V Burnout: less than 0.2V

### Filter

Pen model: Signal damping

•ON/OFF selectable (per channel)

Time constant (2,5,10sec)

Dot model: Moving average

•ON/OFF selectable (per channel)

Moving average cycle (2 to 16)

### Computation

Differential computation, Linear scaling

square root, Bias addition

### Measurement range/accuracy

Input	Range	Span	Measurement Accuracy	Max. Resolution	
DC V	20mV	−20.00 to +20.00mV	±(0.1% of reading+2digits)	10μV	
	60mV	−60.00 to +60.00mV		10μV	
	200mV	−200.0 to +200.0mV		100μV	
	2V	−2.000 to +2.000V		1mV	
	6V	−6.000 to +6.000V	1mV		
	20V	−20.00 to +20.00V	10mV		
	50V	−50.00 to +50.00V	10mV		
	1~5V	1.000 to 5.000V	±(0.1% of reading+2digits)	1mV	
TC	R	0.0 to 1760.0°C	±(0.15% of reading+1°C)	0.1°C	
	S	0.0 to 1760.0°C	but R, S : 0 to 100°C, ±3.7°C		
	B	0.0 to 1820.0°C	100 to 300°C, ±1.5°C		
			B : 400 to 600°C, ±2°C		
			and is not guaranteed below 400°C		
	K	−200.0 to +1370.0°C	±(0.15% of reading+0.7°C)		
			but −200 to −100°C:		
			±(0.15% of reading+1°C)		
	E	−200.0 to +800.0°C	±(0.15% of reading+0.5°C)		
	J	−200.0 to +1100.0°C	but J : −200 to −100°C:		
	T	−200.0 to +400.0°C	±(0.15% of reading+0.7°C)		
			±(0.15% of reading+1°C)		
	N	0.0 to 1300.0°C	±(0.15% of reading+0.7°C)		
	W (W5Re/W26Re)	0.0 to 2315.0°C	±(0.15% of reading+1°C)		
	L	−200.0 to +900.0°C	±(0.15% of reading+0.5°C)		
	U	−200.0 to +400.0°C	but L : −200 to −100°C:		
			±(0.15% of reading+0.7°C)		
	WRe (W3Re/W25Re)	0.0 to 2400.0°C	±(0.2% of reading+1.0°C)		
-excluding the accuracy of reference junction compensation	PR40-20*1	0.0 to 1900.0°C	Not guaranteed	0.1K	
		0 to 450°C			±(0.9% of reading +3.2°C)
		450 to 750°C			±(0.9% of reading +1.3°C)
		750 to 1100°C			±(0.9% of reading +0.4°C)
	PLII	0.0 to 1400.0°C	±(0.25% of reading +2.3°C)		
	NiNiMo	0.0 to 1310.0°C	±(0.25% of reading +0.7°C)		
	Type N(AWG14)	0.0 to 1300.0°C	±(0.2% of reading +1.3°C)		
	W/WRe26	0.0 to 2400.0°C	with in ±15.0°C		
		0 to 400°C			±(0.2% of reading +2.0°C)
		400 to 2400°C			
	Kp vs Au7Fe	0.0 to 300.0K	±4.5K ±2.5K		
		0 to 20K			
	20 to 300K				
RTD	Pt25	−200.0 to +550.0°C	±(0.15% of reading +0.6°C)	0.1°C	
	Pt50	−200.0 to +600.0°C	±(0.3% of reading +0.6°C)		
	Ni100(SAMA)	−200.0 to +250.0°C	±(0.15% of reading +0.4°C)		
	Ni100(DIN)	−60.0 to +180.0°C	±(0.15% of reading +0.4°C)		
	Ni120	−70.0 to +200.0°C	±(0.15% of reading +0.4°C)		
	J263*B	0.0 to 300.0K	±3.0K ±1.0K	0.1K	
		0 to 40K			
		40 to 300K			
	Cu53	−50.0 to +150.0°C	±(0.15% of reading +0.8°C)	0.1°C	
	Cu100	−50.0 to +150.0°C	±(0.2% of reading +1.0°C)		
Pt100	−200.0 to +600.0°C	±(0.15% of reading+0.3°C)			
JPt100	−200.0 to +550.0°C				

\*1: PR40-20 : No reference junction compensation ( 0°C fix)

Option (/N3: Expansion Inputs)

## Recording and Printing

### Recording Method

Pen model : Disposable felt pens, Plotter pen

Dot model : 6 color wire dot.

**Pen Offset Compensation** : ON/OFF selectable (Pen model only)

**Effective Recording Width** : 100mm(EW100), 180mm(EW180)

**Chart** : Plain-paper Z-fold chart (16m:EW100 20m:EW180)

**Recording Period** : Pen model: Continuous for each channel

Dot model: Max. 6ch/10sec, 12ch/15sec,  
18ch/20sec, 24ch/30sec

### Chart Speed Accuracy

Within  $\pm 0.1\%$  (for recordings longer than 1000mm, related to the grid of the chart paper)

### Chart Speed

Pen model : 5 to 12000mm/h (82 increments)

Dot model : 1 to 1500mm/h (1mm step)

### Chart Speed Change

speed 1, speed 2 change by remote control signals (option)

### Recording Colors

Pen model : pen1=red, pen2=green, pen3=blue, pen4=violet  
plotter pen=purple

Dot model : ch1,7,13,19=purple, ch2,8,14,20=red

ch3,9,15,21=green, ch4,10,16,22=blue

ch5,11,17,23=brown, ch6,12,18,24=black

\*Color can be assigned to any channel.

\*ch7 to 24: only EW180

**Pen model dead band**: 0.2% of recording span

**Dot printing model resolution**: 0.1mm

### Recording Format

Analog recording : Zone recording, Partial expanded recording

Digital printout : Channel number or TAG (Dot model only),

Alarm, Periodic printout or Report printout,

Message printout, Record start time,

Chart speed printout, List printout,

Manual printout, SET UP List printout

## Display

### Display method

VFD (101X16 dot matrix):EW100

VFD (181X16 dot matrix):EW180

### Display types

Multiple displays

Digital, bar, flag, DI/DO display etc. can be displayed.

•15 display types can be selected from approx. 80 display types.

### Status display

Recording in progress (RECORD), Shared alarm (ALARM), Channel

No. display of occurring alarm (1 to 4ch or 1 to 24),

\*ch7 to 24: only EW180

Chart end display (CHART END) For the model with option

(FAIL/chart end detection and output),

Math (MATH)

### Setting

Settings display by interactive mode. In setting, navigator method is used.

Display updated interval can be selected from AUTO/MAN.

### Bar graph display

Resolution: 1%

Measurement value: left/right (%) reference or center zero reference display.

• Each channel selectable.

Alarm: Alarm setting level display and flashing display of occurring alarm.

### Display brightness setting

Display brightness level: 1 to 8

## Alarm

### Number of Levels

Up to 4 level for each channel.

### Alarm type

High and low limits, differential high and low limits, high and low rate-of-change limits and delay high and low Interval time of rate-of-change alarms:

The measurement interval times 1 to 15

### Relay Contact Outputs (Option)

2 to 6 points selectable : EW100

2 to 24 points selectable : EW180

### Hysteresis

0.0 to 1.0% (0.1% step) of recording span

\*only High, Low alarm, common for all channels

and all levels

### Display

Set value is indicated as a point on the bar graph

\*only for bar graph display

In case of an alarm : - For digital display : Alarm type indicator

- Shared alarm display

- Alarm occurring channel No. is displayed

- For bar graph display: Flashing point indicator

## Power Supply

**Rated Power Voltage**: 100 to 240VAC

(automatically selected depending on the power supply voltage)

**Usable power voltage ranges**: 90 to 132, 180 to 264VAC

**Rated Power Frequency**: 50 / 60 Hz, automatically selected

**Power Consumption** (In balance)

EW100	100VAC	240VAC	Max.
1 to 4 pen	12VA	17VA	40VA
6 dot	13VA	18VA	40VA

EW180	100VAC	240VAC	Max.
1 to 4 pen	17VA	25VA	55VA
6 to 24 dot	17VA	23VA	55VA



## Optional Specification

### Alarm output relay (/A1, /A2, /A3, /A4, /A5)

Number of output : 2, 4, 6, 12\*, 24\* points \*: only EW180  
Relay contact rating : 250VDC/0.1A (resistance load), 250VAC (50/60Hz) /3A

### RS-422A/485 communication interface (/C3)

Measurement value and setting parameter read/write  
Conforms to RS-422A and RS-485 standard

### FAIL/chart end detection and output (/F1)

In CPU error occurrence or the chart end, output relay is activated.  
Relay contact rating : 250VDC/0.1A (resistance load), 250VAC (50/60Hz) /3A

### Clamped input (/H2)

### Non-glare door glass (/H3)

Non-glare door glass for front door

### Computation function (/M1)

Number of computation channel  
Pen model: 8 channels  
Dot model: 12 channels (EW100) 24 channels (EW180)  
Arithmetic operation, Square, Absolute, Common logarithm,  
Exponential, Power, Relational operator, Logic  
Statistical computation : Statistical type : MAX, MIN, AVE, SUM, MAX-MIN  
\*Computation channel can be recorded

### Cu10, Cu25 RTD input (/N1)

\*Pt100 and JPt100 inputs can be used together.

### 3-wire isolated RTD (/N2)

A, B, b legs of RTD are isolated for dot model

### Expansion input (/N3)

Following input types can be supported besides standard inputs.  
TC : PR40-20, PLII, NiNiMo, W/WRe26, Type N (AWG14), Kp vs Au7Fe  
RTD : Pt25, Pt50, Ni100 (SAMA), Ni100 (DIN), Ni120, J263\*B, Cu53, Cu100  
\*Cu100 :  $\pm 0.00425$  at 0°C

### Remote control (/R1)

Below actions can be assigned to up to 5 points  
Recording start/stop, Chart speed change, Message printout start,  
Manual printout start, Alarm ACK, Time set, Math start/stop, Math reset

## General Specification

### Ambient temperature and humidity

0 to 50°C [32 to 122°F], 20 to 80% RH (at 5 to 40°C [41 to 104°F])

### Input Resistance

10MΩ or more (TC, 20mV, 60mV, 200mV range)  
Approx. 1MΩ (2V range or more)

### Dielectric Strength

Power supply to ground terminal: 1500V AC (50 / 60Hz), 1 min  
Contact output terminal to ground: 1500V AC (50 / 60Hz), 1 min  
Measuring input terminal to ground: 1000V AC (50 / 60Hz), 1 min  
Between measuring input terminals: 1000V AC (50 / 60Hz), 1 min  
(except for RTD, since b-terminal is common).  
Between remote control terminal to ground: 500V DC, 1min.

### Memory backup

Lithium battery to save settings parameters  
Approx. 10 years (23±2°C, 55±10% RH)

### Safety and EMC standards

CSA CSA22.2 No.61010-1 (NRTL/C\*) installation category II,  
measurement category II pollution degree 2

\* For marking that includes NRTL, a mark with "US" (USA)  
printed on the right side of the CSA mark, and "C" (Canada)  
printed on the left side appears on this instrument.

### CE EMC directive:

EN61326 compliance (Emission: Class A,  
Immunity: Annex A)  
EN61000-3-2 compliant  
EN61000-3-3 compliant  
EN55011 compliant, Class A Group 1

### Low voltage directive:

EN61010-1 compliant, installation category II,  
measurement category II, pollution degree 2

### Settings protection function : Password method

### Internal light : White LED

### Operation position : 0° Frontwards: Within 30° from horizontal

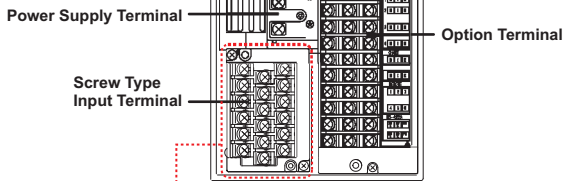
### Weight(approx.) :

●EW100  
1pen :2.1kg, 2pen :2.2kg, 3pen :2.3kg, 4pen :2.4kg, 6dot :2.5kg  
●EW180  
1pen :7.5kg, 2pen :7.5kg, 3pen :7.6kg, 4 en :7.6kg,  
6dot :8.4kg, 12dot :8.6kg, 18dot :8.8kg, 24dot :9.0kg

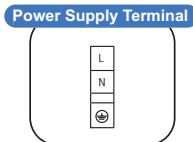
## Rear Terminal Arrangements

### SBR-EW100

6 dot model



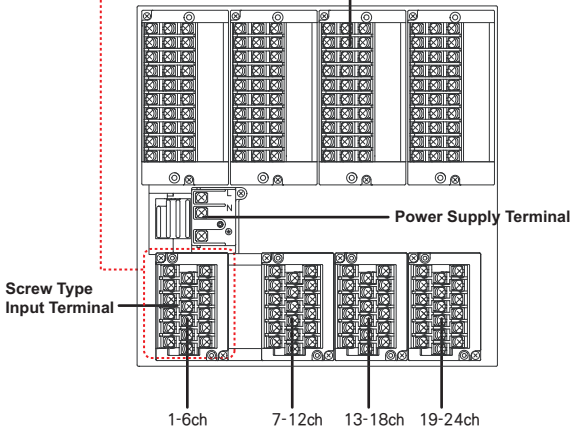
Clamped Type Input Terminal (Option)



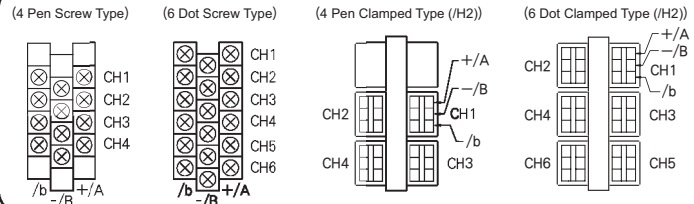
### SBR-EW180

Option Terminal

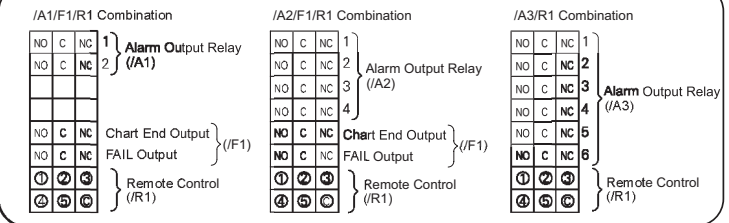
24 dot model



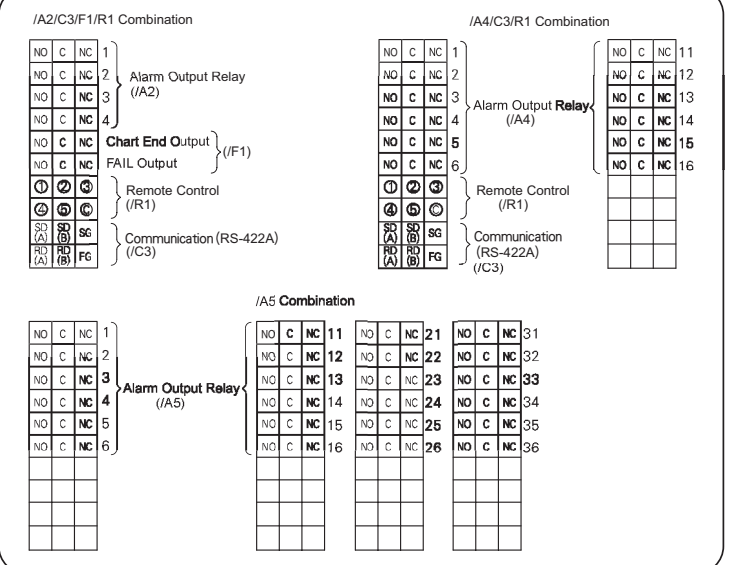
### Input Terminals



### Option Terminals (EW100)



### Option Terminals (EW180)





# Model Codes

## SBR-EW100

Model code	Option code	Description
EW101		SBR-EW100 1 pen recorder
EW102		SBR-EW100 2 pen recorder
SBR— EW103		SBR-EW100 3 pen recorder
EW104		SBR-EW100 4 pen recorder
EW106		SBR-EW100 6 dot recorder
Language	—2	English, degF & DST
Option	/A1	Alarm output relay (2 contacts)*1
	/A2	Alarm output relay (4 contacts)*1
	/A3	Alarm output relay (6 contacts)*1*2
	/C3	RS-422A/485 Interface
	/F1	FAIL/Chart end detection and output*2
	/H2	Clamped input terminal*3
	/H3	Non-glare door glass
	/M1	Mathematical Computations
	/N1	Cu10, Cu25 RTD input
	/N2	3 legs Isolated RTD*3*4
	/N3	Expansion inputs*5
	/R1	Remote controls (5 contacts)

Two or more option specification codes can be specified except for the following cases.

\*1: only one of /A1, /A2, /A3 can be selected

\*2: /A3 and /F1 can not be specified together

\*3: /H2 and /N2 can not be specified together

\*4: /N2 can be specified only for dot model

\*5: TC: PR40-20, PL II, NiNiMo, W/WRe26, Type N(AWG14), Kp vs Au7Fe  
RTD: Pt25, Pt50, Ni100(SAMA), Ni100(DIN), Ni120, J263\*B, Cu53, Cu100

## SBR-EW180

Model code	Option code	Description
EW181		SBR-EW180 1 pen recorder
EW182		SBR-EW180 2 pen recorder
EW183		SBR-EW180 3 pen recorder
SBR— EW184		SBR-EW180 4 pen recorder
EW186		SBR-EW180 6 dot recorder
EW187		SBR-EW180 12 dot recorder
EW188		SBR-EW180 18 dot recorder
EW189		SBR-EW180 24 dot recorder
Language	—2	English, degF & DST
Option	/A1	Alarm output relay (2 contacts)*1
	/A2	Alarm output relay (4 contacts)*1
	/A3	Alarm output relay (6 contacts)*1
	/A4	Alarm output relay (12 contacts)*1 *2
	/A5	Alarm output relay (24 contacts)*1 *2 *6
	/C3	RS-422A/485 Interface
	/F1	FAIL/Chart end detection and output*2
	/H2	Clamped input terminal*3
	/H3	Non-glare door glass
	/M1	Mathematical Computations
	/N1	Cu10, Cu25 RTD input
	/N2	3 legs Isolated RTD*3 *4
	/N3	Expansion inputs*5
	/R1	Remote controls (5 contacts)

Two or more option specification codes can be specified except for the following cases.

\*1: only one of /A1, /A2, /A3, /A4, /A5 can be selected

\*2: /F1 and /A5 can not be specified together

(/F1 and /A4 can not be specified together for pen model)

\*3: /H2 and /N2 can not be specified together

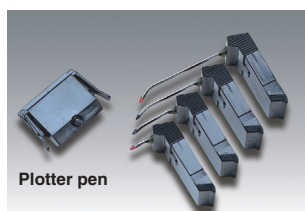
\*4: /N2 can be specified only for dot model

\*5: TC: PR40-20, PL II, NiNiMo, W/WRe26, Type N(AWG14), Kp vs Au7Fe  
RTD: Pt25, Pt50, Ni100(SAMA), Ni100(DIN), Ni120, J263\*B, Cu53, Cu100

\*6: /A5 can be specified only for dot model

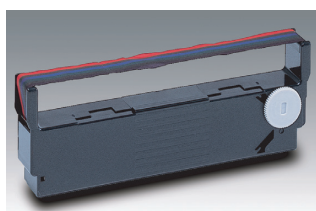
## Standard Accessories

Name	1 pen	2 pen	3 pen	4 pen	6/12/18/24 dot
Z-fold chart	1 piece	1 piece	1 piece	1 piece	1 piece
6 color ribbon cassette	—	—	—	—	1 piece
Disposable felt-pen cartridge	Red	1 piece	1 piece	1 piece	—
	Green	—	1 piece	1 piece	—
	Blue	—	—	1 piece	—
	Violet	—	—	—	1 piece
Plotter pen	Purple	1 piece	1 piece	1 piece	—
Mounting brackets	2 piece	2 piece	2 piece	2 piece	2 piece



Plotter pen

Disposable felt-pen cartridge



6 color ribbon cassette

## Separates/Optional Accessories

Name	Model code	Sales Unit	Specification
Z-fold chart for EW100	B-100EX	1	10 pieces/unit
Z-fold chart for EW180	R-100EX	1	10 pieces/unit
6 color ribbon cassette for EW100	B9901AX	1	1 pieces/unit
6 color ribbon cassette for EW180	B9906JA	1	1 pieces/unit
Disposable felt-pen cartridge	Red B9902AM	1	3 pieces/unit
	Green B9902AN	1	3 pieces/unit
	Blue B9902AP	1	3 pieces/unit
	Violet B9902AQ	1	3 pieces/unit
Plotter pen	Purple B9902AR	1	3 pieces/unit
Mounting brackets	B9900BX	2	
Shunt resistor (for screw input terminal)	415920	1	250Ω±0.1%
	415921	1	100Ω±0.1%
	415922	1	10Ω±0.1%
Shunt resistor (for clamped input terminal)	438920	1	250Ω±0.1%
	438921	1	100Ω±0.1%
	438922	1	10Ω±0.1%



•Before operating this product, read the instruction manual carefully to avoid incorrect operation.  
•This product is intended for use with industrial machines, test and measuring equipment. It is not designed for use with medical equipment.  
•If it is possible that an accident may occur as a result of the failure of the product or some other abnormality, an appropriate independent protection device must be installed.

### Caution for imitated products

As products imitating our product now appear on the market, be careful that you don't purchase these imitated products. We will not warrant such products nor bear the responsibility for any damage and/or accident caused by their use.

**RKC**® **RKC INSTRUMENT INC.**  
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