

°C

%RH

SHIMADEN

Series **SD24 & KR16**

SHIMADEN DIGITAL INDICATOR



CE approved

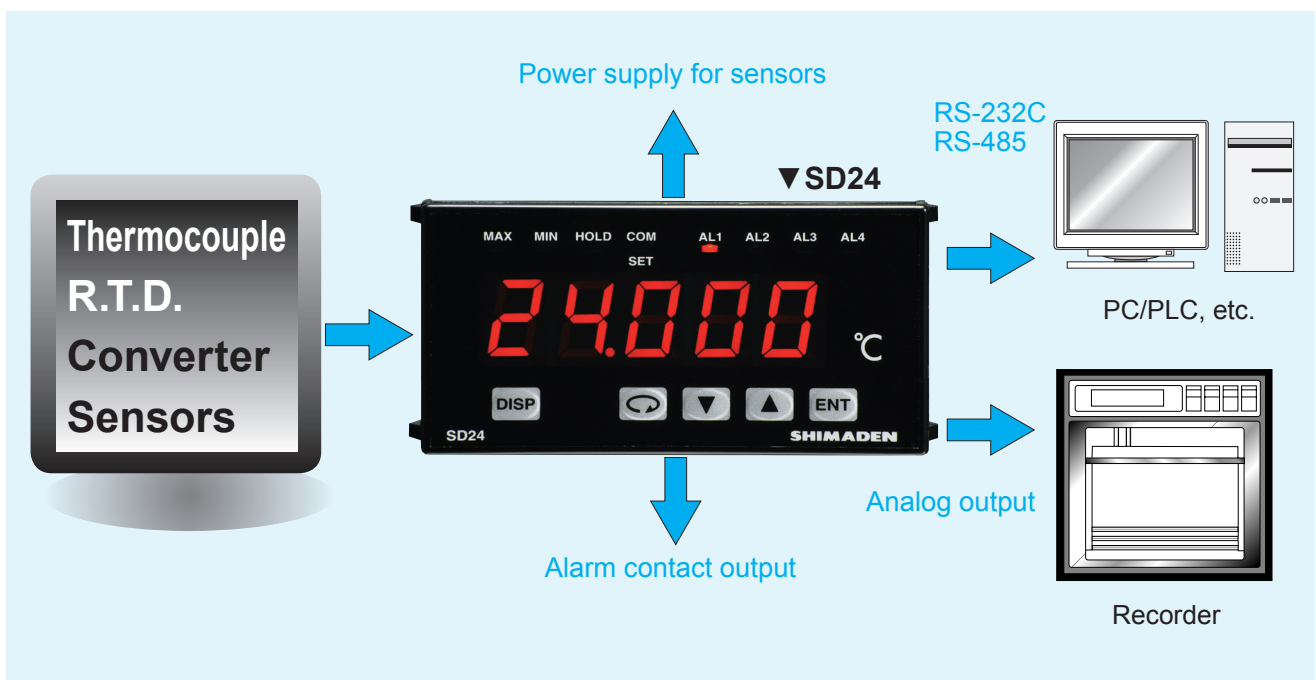
RoHS compliance

BASIC FEATURES

- High Accuracy $\pm 0.1\%$ FS+1 digit**
- 1/1000°C Resolution Indication Possible
(Pt input 0.000 – 30.000°C)**
- 3 Display Modes (Peak Hold, Bottom Hold, Display Hold)**
- External Control Input (2 points) as a Standard Feature**
- C contact (2 points) or a contact (4 points) can be selected
for alarm output.**
- Analog Output Hold Function (Hold Display Value Output)**
- Communication Function RS-485/RS-232C
(Shimaden Standard Protocol/MODBUS)**
- Linear Approximation Operation Function
(Voltage/Current Input only)**

	SD20	SD24
Number of digit	4 digits	5 digits
Accuracy	0.25%	0.1%
Input	Specified by customer	Universal
Display cycle range	0.25 sec.	0.1 sec.
RoHS compliance	Non-compliant	Compliant
Linear approximation function	Without	With
Analog output hold	Without	With

Example of use



■ **Display**

- Display methods
 - Digital display : Measured value (PV) /7 segments red LED 5 digits Height of character: Approx. 14.3 mm
 - Status display : LED lamp display
 - Green: MAX, MIN, HOLD, COM/SET
 - Red: AL1, AL2, AL3, AL4
- Display accuracy : Refer to Measuring Range Codes.
 - TC: $\pm(0.1\% \text{ FS}+1 \text{ digit})$ Excluding cold junction temperature compensation accuracy error of thermocouple input
 - Accuracy guarantee not applicable to 400°C or below of B thermocouple
 - Display value is -100°C or below with K, T thermocouples: Accuracy $\pm(0.5\% \text{ FS}+1 \text{ digit})$
 - PR40-20 thermocouple: Accuracy $\pm(0.3\% \text{ FS}+1^\circ\text{C})$
 - K thermocouple 10.0 – 30.0 K: Accuracy $\pm(0.75\% \text{ FS}+1 \text{ K})$
 - 30.1 – 70.0 K: Accuracy $\pm(0.30\% \text{ FS}+1 \text{ K})$
 - 70.1 – 350.0 K: Accuracy $\pm(0.25\% \text{ FS}+1 \text{ K})$
 - AuFe-Cr thermocouple: Accuracy $\pm(0.25\% \text{ FS}+1 \text{ K})$
 - Pt/JPt: $\pm(0.1\% \text{ FS}+0.1^\circ\text{C})$
 - mV, V: $\pm(0.1\% \text{ FS}+1 \text{ digit})$
 - mA: $\pm(0.1\% \text{ FS}+1 \text{ digit})$
 - Display accuracy maintaining range : 23°C \pm 5°C
 - Display resolution : Depends on measuring range and scaling (0.001, 0.01, 0.1, 1)
 - Measured value display range : -10 – 110% of measuring range Refer to Measuring Range Codes.
 - (Range of Pt 100: -200 – 600°C or -240 – 680°C, range of JPt 100: -200 – 500°C or -240 – 570°C)
 - Display updating cycle : 0.1 seconds
 - Input scaling function : Scaling possible for linear input (mV, V, mA), inverse scaling possible
 - Scaling range : -9999 – 30000 counts
 - Span : 10 – 40000 counts
 - Position of decimal point : None, 1, 2 and 3 digits on the right of decimal point
 - Sampling cycle : 0.1 seconds
 - PV bias : -9999 – 10000 units
 - PV slope : 0.500 – 1.500 times of input value
 - PV filter : 0 – 100 seconds
 - PV input operation : Square-root extraction (Only linear input, input low cut 0.0 – 5.0% FS)
 - Linear approximation (Only linear input) 11 points

■ **Setting**

- Set value display : Both set items and parameter are displayed on PV.
- Setting method : By operating 5 keys (**DISP**, **□**, **▼**, **▲**, **ENT**) on the front panel
- Key rock : OFF, 1 – 2 (3 level)
 - OFF: No key rock
 - 1: Only key rock screen and mode 0 screen group can be changed.
 - 2: Only key rock screen can be changed.

■ **Input**

- Type of input : Selectable from universal-input (TC, Pt, mV), voltage (V) or current (mA)
- Universal-input
 - Thermocouple : B, R, S, K, E, J, T, N, PLII, PR40-20, WRe5-26, {U, L(DIN43710)}, AuFe-Cr
 - Input resistance : 500k Ω minimum
 - External resistance tolerance : 100 Ω maximum
 - Burnout function : Standard feature (up scale)
 - Cold junction temperature compensation accuracy : $\pm 1.0^\circ\text{C}$ (18 – 28°C of ambient temperature)
 - R.T.D. : Pt100/JPt100, 3-wire type
 - Amperage : Approx. 1.1 mA
 - Lead wire tolerance range : 10 Ω maximum/wire (3 lead wires should have the same resistance.)
 - Voltage (mV) : -10 – 10, 0 – 10, 0 – 20, 0 – 50, 10 – 50, 0 – 100, -100 – 100mV DC
 - Input resistance : 500k Ω minimum
- Voltage (V) input
 - Voltage (V) : -1 – 1, 0 – 1, 0 – 2, 0 – 5, 1 – 5, 0 – 10, -10 – 10V DC
 - Input resistance : 500k Ω minimum
- Current (mA) input
 - Current : 0 – 20, 4 – 20 mA DC
 - Receiving impedance: 250 Ω
 - Isolation : Not insulated from input and DI but insulated from others

■ Alarm output (option)

- Number of output points : Selectable from a contact output 4 points (AL1, AL2, AL3, AL4) or c contact output 2 points (AL1, AL2)
- Types : Selectable from the following 12 types for AL1 – AL4
Latching function (alarm action hold function) can be allocated to absolute value alarm.
Unlatching is possible by key operation, DI or communication when latching.

AL1, AL3		AL2, AL4	
non	non	dHi	(AL1, AL3 code is other than non or SO)
HA	HA	dLO	(ditto)
LA	LA	dHL	(ditto)
HA-L	HA-L	dHi-L	(ditto)
LA-L	LA-L	dLO-L	(ditto)
SO	SO	dHL-L	(ditto)

- Event setting range : Absolute value alarm within measuring range (both higher limit and lower limit)
Deviation alarm (-9999 – 1999)
- Event action : ON-OFF action
- Hysteresis : 1 – 9999 units
- Standby action : Selectable from following 2 types
Without standby
Standby (when power is applied)
- Output type/rating : When in a contact: 240V 2 A (resistive load)
Between AL1 and AL2, and between AL3 and AL4 are common.
When in c contact: 240V 2.5 A (resistive load)
- Output updating cycle : 0.1 seconds
- Isolation : When in a contact, between AL1 and AL2, and between AL3 and AL4 are not insulated but insulated from others.
When in c contact, between AL1 and AL2 is insulated and insulated from others.

■ External control input (DI)

- Number of input points : 2 points
- Type of DI allocation : Selectable from the following 4 types for each DI
NON
HLD (hold): Maintain the current input value
RESET (reset): Reset maximum or minimum value
L_RS (unlatching)
- Action input : Non voltage contact or open collector (level action) Approx. 5V DC
- Input minimum holding time : 0.1 seconds
- Isolation : Not insulated between DI and input but insulated from others

■ Communication function (option) Exclusive selection with analog output

- Type of communication : RS-232C, RS-485
- Communication method : 2-line half duplex start-stop synchronization system
- Communication distance RS-485 : Max. 500 m (differs according to conditions)
RS-232C : Max. 15 m
- Communication speed : 2400, 4800, 9600, 19200 bps
- Data format : Selectable from among 7E1, 7E2, 7N1, 7N2, 8E1, 8E2, 8N1, 8N2
- Communication delay time : 1 – 100 msec
- Max. number of connections
RS-485 : 32 including host
RS-232C : 1
- Communication address : 1 – 255
- Communication code : ASCII, MODBUS RTU binary code only
- Communication protocol : Shimaden standard protocol / MODBUS ASCII, RTU
- Other : Start character and BCC operating method can be selected.
- Communication memory mode : Selectable from among EEP, RAM and E_R
- Isolation : Isolation for all

■ Analog output (option) Exclusive selection with communication

- Number of output points : 1 point
- Types of output : Measured value
- Output signal/rating : Current: 4 – 20 mA DC (max. load resistance 300Ω)
Voltage: 0 – 10V DC (max. load current 2 mA)
Voltage: 0 – 10mV DC (output resistance 10Ω)
- Output scaling : Within measuring range or output range (Inverse scaling possible)
- Output accuracy : ±0.1% FS (for display value)
- Output resolution : Approx. 0.01% (1/10000)
- Output updating cycle : 0.1 seconds
- Output selection when in hold : Selectable from outputting either hold input value or current input value
- Isolation : Isolation for all

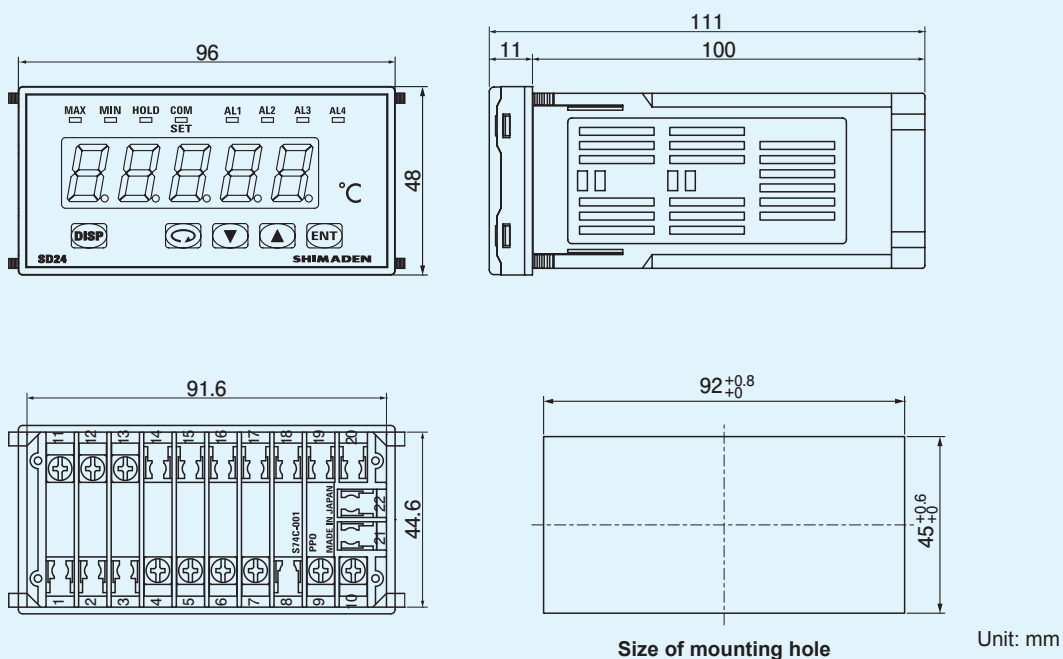
■ **Sensor power supply (option)**

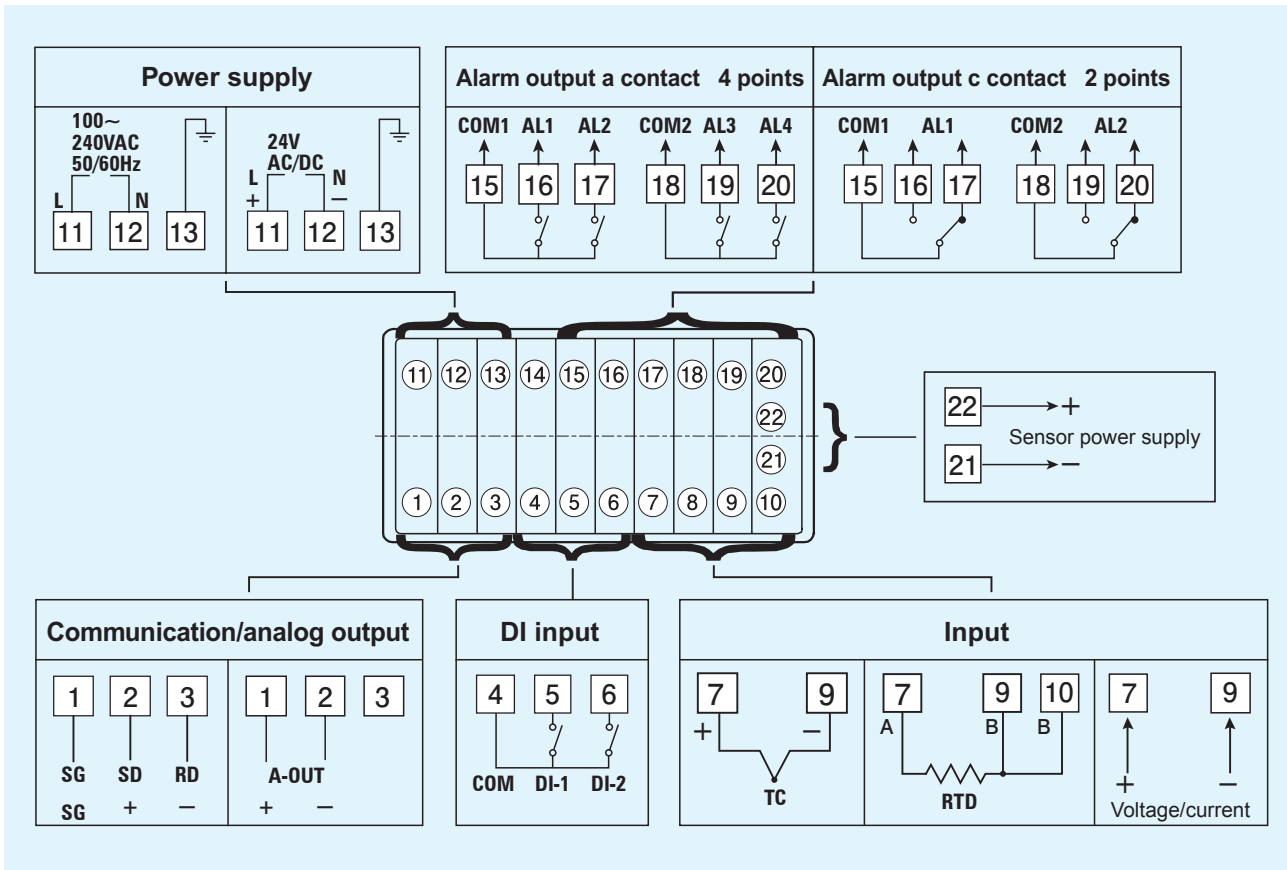
- Output rating : 24V DC 50 mA (Two H71/TH71 Series temperature/humidity sensors can be operated.)
- ON/OFF : Dependent on main body power supply
- Isolation : Isolation for all

■ **General specifications**

- Data storage : Non-volatile memory (EEPROM)
- Ambient conditions for operations
 - Temperature : -10 – 50°C
 - Humidity : Max. 90% RH (no dew condensation)
 - Elevation : Max. 2000 m above sea level
 - Category : II
 - Pollution class : 2
- Storage temperature : -20 – 65°C
- Supply voltage : 100 – 240V AC±10%, 50/60 Hz
24V AC (50/60 Hz)/DC
- Input/noise removal ratio : Normal mode minimum 40 dB (50/60 Hz)
Common mode minimum 120 dB (50/60 Hz)
- Insulation resistance : Between input/output terminals and power terminal Min. 500V DC, 20MΩ
Between ground and power terminal Min. 500V DC, 20MΩ
- Dielectric strength : Between input/output terminals and power terminal 2300V AC 1 minute
Between ground and power terminal 1500V AC 1 minute
- Power consumption : Max. 13 VA for 100 – 240V AC
Max. 9 VA for 24V AC
Max. 7 W for 24V DC
- Applicable standards EMC : EN61326: 2006
Safety : IEC61010-1 and EN61010-1: 2001
- Dust-proof and drip-proof structure : IP66 equivalent
- Material of case : PPO resin molding (flame resistant grade UL94V-1)
- External dimensions : H48×W96×D111 mm (in panel 100 mm)
- Panel thickness : 1.0 – 4.0 mm
- Panel cutout : H45×W92 mm
- Weight : 400 g maximum

EXTERNAL DIMENSIONS/PANEL CUTOUT





ORDERING INFORMATION

ITEM	CODE	SPECIFICATIONS
SERIES	SD24-	DIN 48x96 Digital Indicator, DI 2 points
INPUT	8	Universal-input Input resistance: 500kΩ minimum • Thermocouple • R.T.D.: Pt100/JPt100 • Voltage (mV): -10 – 10, 0 – 10, 0 – 20, 0 – 50, 10 – 50, 0 – 100, -100 – 100mV DC
	6	Voltage (V) Input resistance: 500kΩ minimum -1 – 1, 0 – 1, 0 – 2, 0 – 5, 1 – 5, 0 – 10, -10 – 10V DC
	4	Current (mA) Receiving impedance: 250Ω 0 – 20, 4 – 20mA DC
POWER SUPPLY	90-	100 – 240V AC±10%, (50/60 Hz)
	08-	24V AC (50/60 Hz)/DC±10%
ALARM (OPTION)	0	None
	1	Individually set/output 4 points (a contact)
	2	Individually set/output 2 points (c contact)
ANALOG OUTPUT/ COMMUNICATION FUNCTION (OPTION)	00	None
	03	0 – 10mV DC Output resistance: 10Ω
	04	4 – 20 mA DC Resistive load: 300Ω max.
	06	0 – 10V DC Load current: 2 mA max.
	50	RS-485
	70	RS-232C
SENSOR DC POWER SUPPLY (OPTION)	0	Without
	1	With 24V DC 50 mA
REMARKS	0	Without
	9	With

Refer to "Measuring Range Codes" for details of input type and measuring range.

Voltage mV, V, Current mA range
Scaling Possible
(inverse scaling possible)
Range: -9999 – 30000 units
Span: 10 – 40000 units

Input Type		Code		Measuring range			
Universal-input	Thermocouple	B	01	*1	0.0 – 1800.0 °C	0 – 3300 °F	
		R	02		0.0 – 1700.0 °C	0 – 3100 °F	
		S	03		0.0 – 1700.0 °C	0 – 3100 °F	
		K	04		-100.0 – 400.0 °C	-150.0 – 750.0 °F	
			05		0.0 – 400.0 °C	0.0 – 750.0 °F	
			06		0.0 – 800.0 °C	0.0 – 1500.0 °F	
			07		0.0 – 1370.0 °C	0.0 – 2500.0 °F	
			08	*2	-200.0 – 200.0 °C	-300.0 – 400.0 °F	
			E	09		0.0 – 700.0 °C	0.0 – 1300.0 °F
		J	10		0.0 – 600.0 °C	0.0 – 1100.0 °F	
		T	11	*2	-200.0 – 200.0 °C	-300.0 – 400.0 °F	
		N	12		0.0 – 1300.0 °C	0.0 – 2300.0 °F	
		PLII	13		0.0 – 1300.0 °C	0.0 – 2300.0 °F	
		PR40-20	14	*3	0.0 – 1800.0 °C	0 – 3300 °F	
		WRe5-26	15		0.0 – 2300.0 °C	0 – 4200 °F	
		U	16		-200.0 – 200.0 °C	-300.0 – 400.0 °F	
		L	17		0.0 – 600.0 °C	0.0 – 1100.0 °F	
		K	18	*4	10.0 – 350.0 K		
		AuFe-Cr	19	*5	0.0 – 350.0 K		
R.T.D.	Pt100 / JPt100	Pt	JPt				
		31	45	*6	-200.0 – 600.0 °C	-300.0 – 1100.0 °F	
		32	46	*7	-200.0 – 500.0 °C	-300.0 – 900.0 °F	
		33	47		-100.00 – 100.00 °C	-150.0 – 200.0 °F	
		34	48		-100.0 – 300.0 °C	-150.0 – 600.0 °F	
		35	49		-60.00 – 40.00 °C	-80.00 – 100.00 °F	
		36	50		-50.00 – 50.00 °C	-60.00 – 120.00 °F	
		37	51		-40.00 – 60.00 °C	-40.00 – 140.00 °F	
		38	52		-20.00 – 80.00 °C	0.00 – 180.00 °F	
		39	53	*8	0.000 – 30.000 °C	0.00 – 80.00 °F	
		40	54		0.00 – 50.00 °C	0.00 – 120.00 °F	
		41	55		0.00 – 100.00 °C	0.00 – 200.00 °F	
		42	56	*9	0.00 – 200.00 °C	0.0 – 400.0 °F	
		43	57		0.00 – 300.00 °C	0.0 – 600.0 °F	
44	58		0.0 – 500.0 °C	0.0 – 900.0 °F			
Voltage (mV)	-10 – 10mV	71	Initial value: 0.00 – 100.00 Programmable Scaling Lower limit: -9999 Higher limit: 30000 (Span 10 – 40000) (Inverse scaling possible) Scaleover is displayed for over 32000.				
	0 – 10mV	72					
	0 – 20mV	73					
	0 – 50mV	74					
	10 – 50mV	75					
	0 – 100mV	76					
	-100 – 100mV	77					
Voltage (V)	-1 – 1V	81					
	0 – 1V	82					
	0 – 2V	83					
	0 – 5V	84					
	1 – 5V	85					
	0 – 10V	86					
	-10 – 10V	87					
Current (mA)	0 – 20mA	94					
	4 – 20mA	95					

Thermocouple

- *1. Accuracy guarantee not applicable to 400°C or below
- *2. -100°C or below: Accuracy ±(0.5% FS+1 digit)
- *3. Accuracy ±(0.3% FS+1°C)
- *4. Accuracy 10.0 – 30.0 K ±(0.75% FS+1 K)
30.0 – 70.0 K ±(0.30% FS+1 K)
70.0 – 350.0 K ±(0.25% FS+1 K)
- *5. Accuracy ±(0.25% FS+1 K)

R.T.D.

- *6. Measured value display range: -240.0 – 680°C
- *7. Measured value display range: -240.0 – 570°C
- *8. Scaleover is displayed for over 32.000.
- *9. Scaleover is displayed for over 320.00.

KR16 SERIES PUSH BUTTON 6 POINTS SELECTOR SWITCH

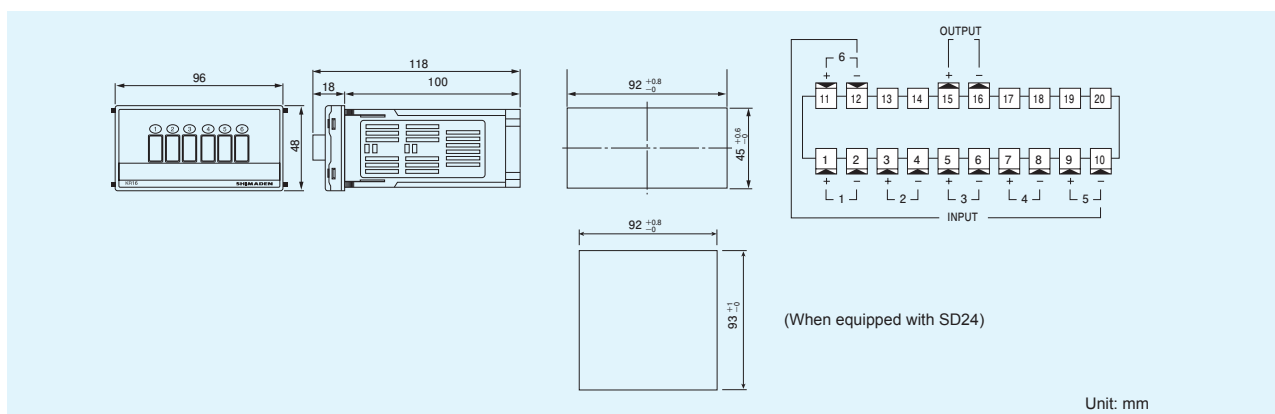
SPECIFICATIONS

● Points of switch	: 6 points	● Material	: Resin molding
● Number of switching circuits	: 2 circuits	● Color	
● Switching operation	: Push button switching	Front	: Mansel value N1 equivalent
● Applicable signal	: Thermocouple, Voltage (R.T.D. not applicable)	Case	: Mansel value N1 equivalent
● Contact rating		● External dimensions	: H48×W96×D118 mm (in panel 100 mm)
Contact method	: Slide type	● Panel cutout	: H45×W92 mm
Voltage	: 30V DC maximum	● Mounting	: Flush in panel (snap-in)
Current	: 100 mA DC maximum	● Panel thickness	: 1 – 4 mm
Contact resistance	: 300mΩ maximum	● Weight	: Approx. 250 g
● Ambient temperature/humidity	: -10 – +50°C / 90% RH maximum range conditions for operation (no dew condensation)		

ORDERING INFORMATION

ITEM	CODE	SPECIFICATIONS
SERIES	KR16-	Push button 6 points selector switch
REMARKS	0	Without
	9	With

TERMINAL ARRANGEMENT AND EXTERNAL DIMENSIONS/PANEL CUTOUT



⚠ Warning

- The SD24 series is designed for the control of temperature, humidity and other physical values of general industrial equipment. (It is not to be used for any purpose which regulates the prevention of serious effects on human life or safety.)

⚠ Caution

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



(The contents of this brochure are subject to change without notice.)

Temperature and Humidity Control Specialists

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