Shimaden, Temperature and Humidity Control Specialists

°C
%RH
SHIMADEN

Series SD24 & KR16

SHIMADEN DIGITAL INDICATOR

CE approved

RoHS compliance

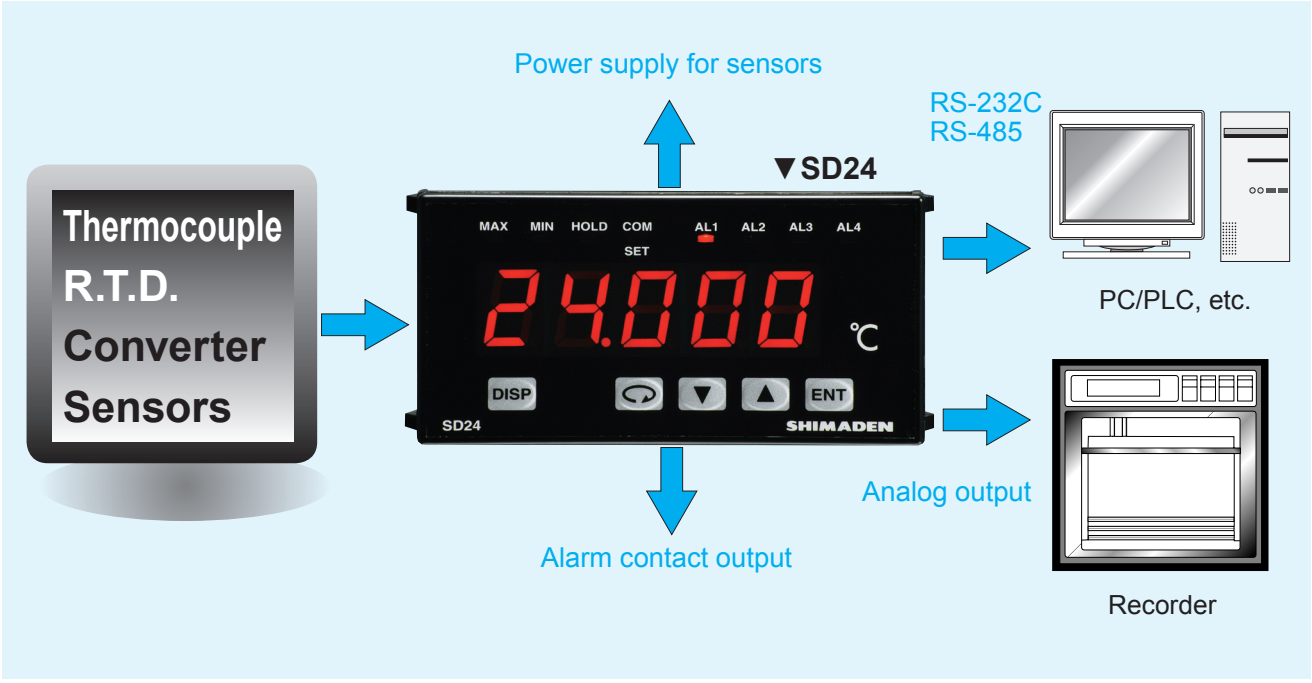
BASIC FEATURES

- ☐ *High Accuracy ±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 Protcol/MODBUS)*
- ☐ *Linear Approximation Operation Function (Voltage/Current Input only)*

Comparison with SD20 (discontinued)

	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: ±(0.1% FS+1 digit) Excluding cold junction temperature compensation accuracy error of thermocouple input
  Accuracy guarantee not applicable to 400ºC or below of B thermocouple
  Display value is -100ºC or below with K, T thermocouples: Accuracy ±(0.5% FS+1 digit)
  PR40-20 thermocouple: Accuracy ±(0.3% FS+1ºC)
  K thermocouple 10.0 – 30.0 K: Accuracy ±(0.75% FS+1 K)
  30.1 – 70.0 K: Accuracy ±(0.30% FS+1 K)
  70.1 – 350.0 K: Accuracy ±(0.25% FS+1 K)
  AuFe-Cr thermocouple: Accuracy ±(0.25% FS+1 K)
  Pt/JPt: ±(0.1% FS+0.1ºC)
  mV, V: ±(0.1% FS+1 digit)
  mA: ±(0.1% FS+1 digit)
- Display accuracy maintaining range : 23ºC ± 5ºC
- 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 – 600ºC or -240 – 680ºC, range of JPt 100: -200 – 500ºC or -240 – 570ºC)
- 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 : 500kΩ minimum
  - External resistance tolerance : 100Ω maximum
  - Burnout function : Standard feature (up scale)
  - Cold junction temperature compensation accuracy : ±1.0ºC (18 – 28ºC of ambient temperature)
- R.T.D. : Pt100/JPt100, 3-wire type
  - Amperage : Approx. 1.1 mA
  - Lead wire tolerance range : 10Ω 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 : 500kΩ minimum

Voltage (V) input

- Voltage (V) : -1 – 1, 0 – 1, 0 – 2, 0 – 5, 1 – 5, 0 – 10, -10 – 10V DC
  - Input resistance : 500kΩ minimum

Current (mA) input

- Current : 0 – 20, 4 – 20 mA DC
  Receiving impedance: 250Ω
- 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
- Hysterisis : 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

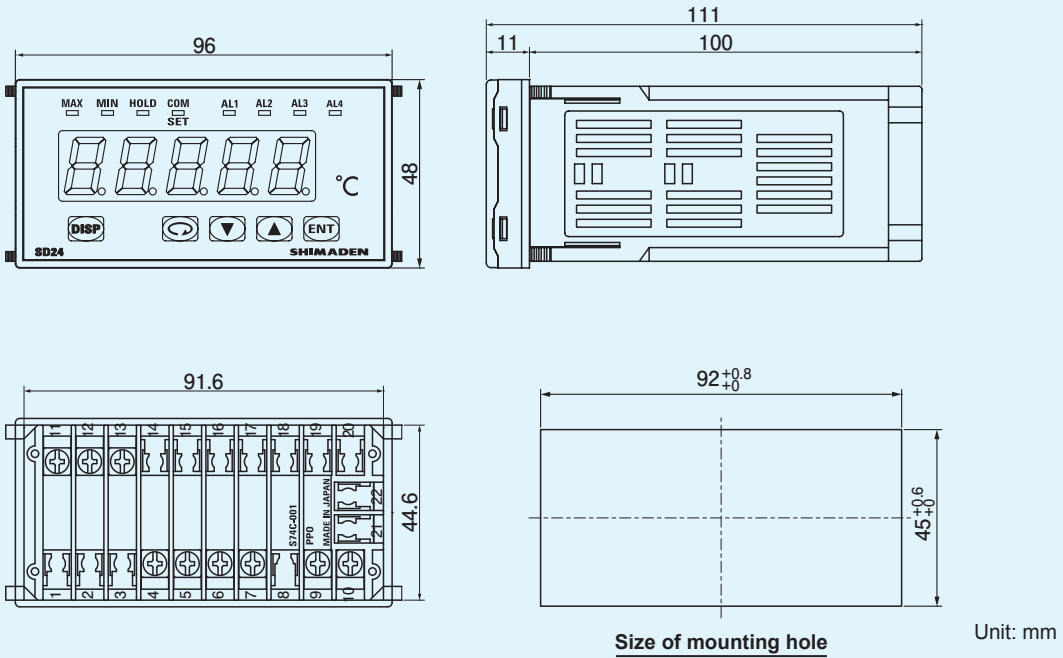
■ **Sensor power supply (option)**

- 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

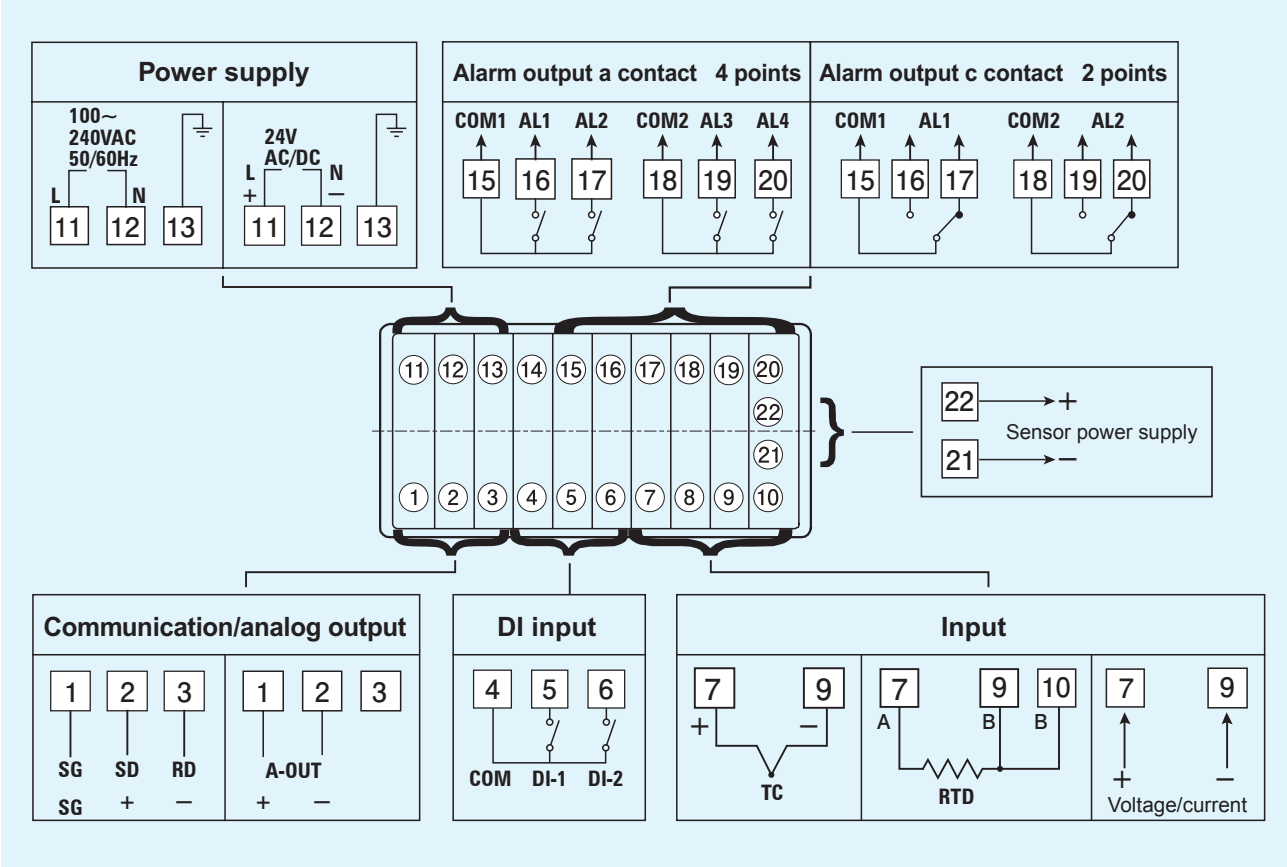
EXTERNAL DIMENTIONS/PANEL CUTOUT



Size of mounting hole

Unit: mm

TARMINAL ARRANGEMENT



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	Refer to “Measuring Range Codes” for details of input type and measuring range.
		6							Voltage (V) Input resistance: 500kΩ minimum -1 – 1, 0 – 1, 0 – 2, 0 – 5, 1 – 5, 0 – 10, -10 – 10V DC	Voltage mV, V, Current mA range Scaling Possible (inverse scaling possible) Range: -9999 – 30000 units Span: 10 – 40000 units
		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/ CONMMUNICATION FUNCTION (OPTION)					00				None	
					03				0 – 10mV DC Output resistance: 10Ω	Scaling Possible (inverse scaling possible) (within measuring range)
					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	

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.		Pt	JPt							
		Pt100 / JPt100	31		*6	-200.0	– 600.0	°C	-300.0	– 1100.0	°F
				45	*7	-200.0	– 500.0	°C	-300.0	– 900.0	°F
			32	46		-100.00	– 100.00	°C	-150.0	– 200.0	°F
			33	47		-100.0	– 300.0	°C	-150.0	– 600.0	°F
			34	48		-60.00	– 40.00	°C	-80.00	– 100.00	°F
			35	49		-50.00	– 50.00	°C	-60.00	– 120.00	°F
			36	50		-40.00	– 60.00	°C	-40.00	– 140.00	°F
			37	51		-20.00	– 80.00	°C	0.00	– 180.00	°F
			38	52	*8	0.000	– 30.000	°C	0.00	– 80.00	°F
			39	53		0.00	– 50.00	°C	0.00	– 120.00	°F
			40	54		0.00	– 100.00	°C	0.00	– 200.00	°F
			41	55		0.00	– 200.00	°C	0.0	– 400.0	°F
			42	56	*9	0.00	– 300.00	°C	0.0	– 600.0	°F
			43	57		0.0	– 300.0	°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

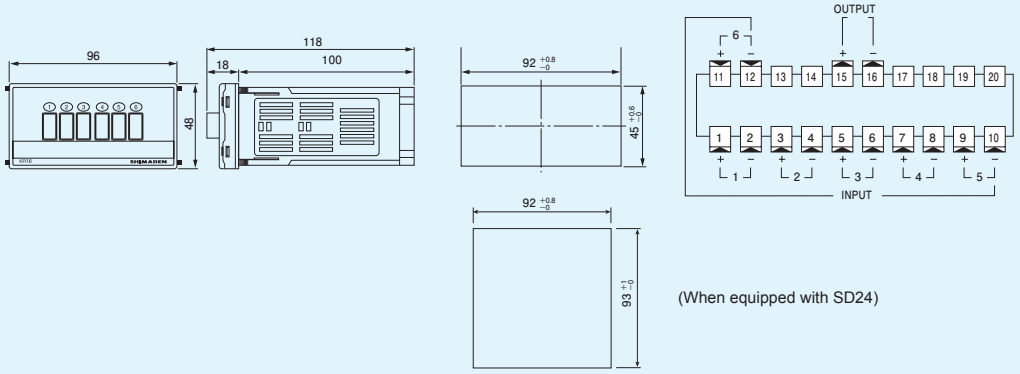
SPECIFICATIONS

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

ORDERING INFORMATION

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

TERMINAL ARRANGEMENT AND EXTERNAL DIMENTIONS/PANEL CUTOUT



(When equipped with SD24)

Unit: mm

⚠ 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.

ISO 9001 ISO 14001

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

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10DSD24130ILC