General Specifications

Model SDAU (Style R)
Digital Alarm Unit

YEWSERIES 80

GS 01B04K03-02E

■ GENERAL

The SDAU Digital Alarm Unit accepts two input signals (freely selectable from 1 to 5 V, mV, thermocouple and RTD), and six detection results in alarm detecting sections are freely connected to AND or to OR. Then they are output to alarm relays (two points, or four points for option).
Each alarm detecting section detects upper limit and lower limit alarms of input absolute value, input rate-of-change and 2-input deviation. Either a normally energized or de-energized is selectable for alarm output relays.
The display setter on the front panel can display input values and set/change parameters such as an alarm setpoint. The JHT200 Handy Terminal can also set/change parameters.

*1: The BT200 BRAIN Terminal of YOKOGAWA Electric Corporation can also be connected. The adapter for modular jack (E9786WH) is required for connecting the JHT200 Handy Terminal or BT200 to the Digital Alarm Unit.

■ INPUT/OUTPUT SIGNALS

Input Signals:

DCV Input

Input Signal	Measuring Range	Remarks
DC Voltage Input	1 to 5 V DC	Input Resistance: 1 MΩ
	-50 to 150 mV DC	Input Resistance: 1 MΩ Input External Resistance: 500 Ω or less

Thermocouple Input

Input Signal	Measuring Range (°C)	Remarks
Type K (*1)	-270.0 to 1372.0	Input Resistance: 1 MΩ Input External Resistance: 500 Ω or less
Type T (*1)	-270.0 to 400.0	
Type J (*1)	-210.0 to 1200.0	
Type E (*1)	-270.0 to 1000.0	
Type B (*1)	100.0 to 1820.0	
Type R (*1)	-50.0 to 1768.0	
Type S (*1)	-50.0 to 1768.0	
Type N (*1)	-270.0 to 1300.0	
Type W3 (*2)	0 to 2315	
Type W5 (*3)	0 to 2315	

*1: ITS-90, JIS'95

*2: ASTM E988 Standard: W97Re3-W75Re25
(tungsten97% rhenium3%-tungsten75% rhenium25%)

*3: ASTM E988 Standard: W95Re5-W74Re26
(tungsten95% rhenium5%-tungsten74% rhenium26%)

RTD Input

Input Signal	Measuring Range (°C)
JPt100 (JIS'89)	-200.0 to 510.0 °C
Pt100 (ITS-90, JIS'97)	-200.0 to 850.0 °C
Pt100 (IPTS-68, JIS'89)	-200.0 to 660.0 °C
Pt50 (JIS'81)	-200.0 to 649.0 °C

Input lead resistance : 10 Ω/lead or less

Number of Input Points

Two points (SDAU-1 type)	• Two points each 1 to 5 V DC (not isolated between inputs mutually) or • One point 1 to 5 V DC, and one point mV, thermocouple or RTD (isolated between inputs mutually)
Two points (SDAU-2 type)	Two points each universal inputs (not isolated between inputs mutually) mV, thermocouple or RTD freely selectable

Output Signals: Relay contact

Contact Capacity

100V AC	2A (Resistive load)
220V AC	0.5A (Resistive load)
30V DC	2A (Resistive load)
125V DC	0.5A (Resistive load)

Contact life expectancy: 600,000 times

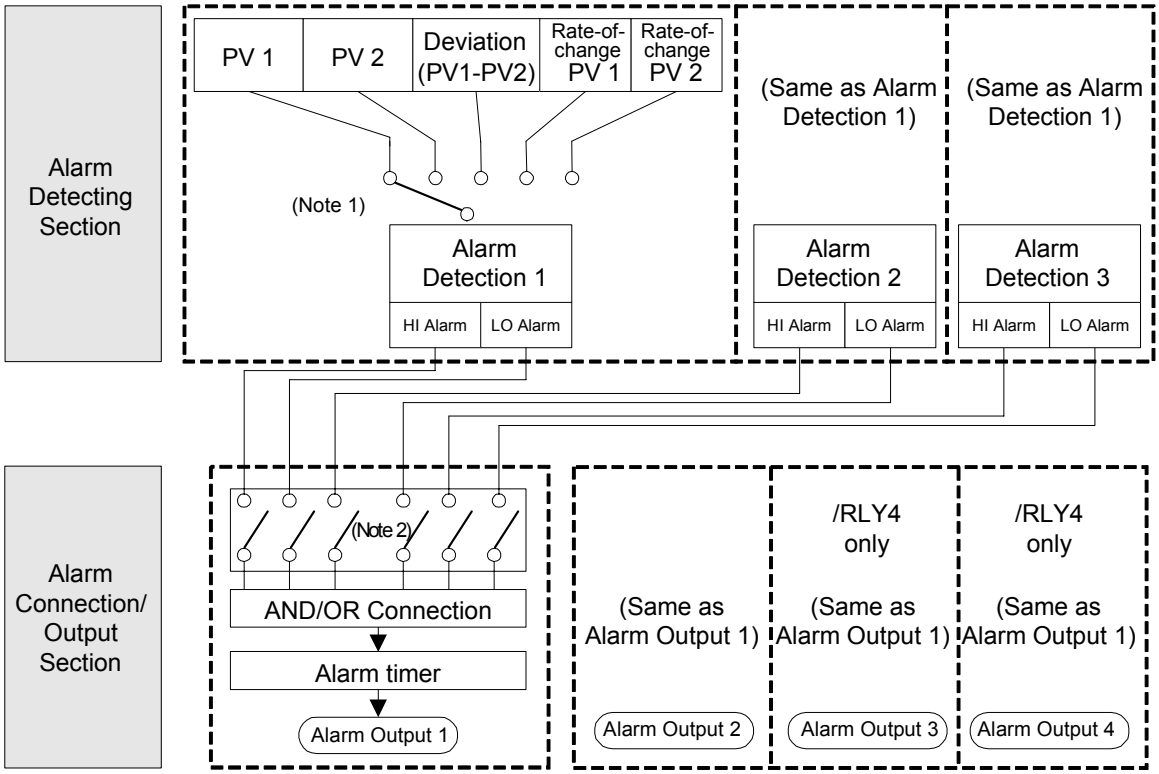
Number of Output Points:

Alarm Output	Two sets of transfer contacts Four sets of NC or NO contacts when /RLY4 option is selected.
	Specify normally energized/normally de-energized by parameter.
Failure Output	One set of NC or NO contact Always normally energized Not available when /RLY4, /VLT or /CUR option is selected.
Retransmission Output (Option)	One point 1 to 5 V DC or 4 to 20 mA DC /VLT: 1 to 5 V DC /CUR: 4 to 20 mA DC Failure output is not available. Can not be combined with /RLY4

■ ALARM FUNCTIONS

Alarm Detecting Sections	3 (each independent)	
Input Mode	Input absolute alarm 2-input deviation alarm Input rate-of-change alarm	
Alarm Setting	Upper and lower limit values, -19999 to 32000 (in engineering units)	
Hysteresis	0 to 32000 (in engineering units)	
Rate-of-Change Alarm Sampling Time	1 to 9999 s	
Alarm Output Sections (each independent)	2 or 4 when /RLY4 option is selected.	
Alarm Output Connection	Six detection results are freely connected to AND or to OR.	
Alarm Timer Mode	Alarm output (delay) timer ON/OFF delay timer	
Timer Setting	Alarm output timer	0 to 600 s (in 1-second increment) However, about a 0.2 second delay is added to the above set time to prevent wrong operation.
	Alarm ON/OFF delay (dead time) timer	0 to 999 s (in 1-second increment)
Direction of Relay Action	Set normally energized / de-energized.	
Contact	Two sets of transfer contacts or Four sets of NC or NO contacts when /RLY4 option is selected.	
Indicator Lamp	Yellow lamp (ALMn) lights up on alarm.	

■ ALARM FUNCTION BLOCK DIAGRAM



Note 1: Select one of them to use.
Note 2: Any of six types of HI Alarm / LO Alarm can be connected.

MOUNTING AND APPEARANCE

Mounting: Mount on an indoor rack.

Signal Connection: M4 screw terminals

Power Supply Connection: Grounded two-pole plug, or M4 screw terminals

External Dimensions: 180 x 48 x 300 (mm)

(Height x Width x Depth from the mounting face)

Weight: Approx. 2 kg (including rack case)

DISPLAY FUNCTIONS

Display Setter: 5 digits, 2 lines, 11-segment LED

In engineering units: -19999 to 32000

Decimal point position selectable

Indicator Lamps:

For all except /RLY4 option

Alarm status indication : ALM1,2 (yellow)	2
FAIL status indication : F (red)	1
Error indication: E (yellow)	1

For /RLY4 option

Alarm action indication : ALM1,2,3,4 (yellow)	4

Example of Display Data

Parameter Code	Description
PVn	Displays PVn
MODn	Specifies input mode n
nH	Sets upper-limit alarm nH
nL	Sets lower-limit alarm nL
AN.OR.n	Specifies AND/OR connection

n: Number of input point, number of alarm detection or number of alarm connection.

SETTING FUNCTIONS

Parameters can be set using the following three ways.

(1) Display setter on the front panel

Key switches 4

(→ (SHIFT), ↑ (INCR), SET, △)

Setting enable switch 1

(2) JHT 200 Handy Terminal (*1)

*1: The BT200 BRAIN Terminal of YOKOGAWA Electric Corporation can also be connected. The adapter for modular jack (E9786WH) is required for connecting the JHT200 Handy Terminal or BT200 to the Digital Alarm Unit.

(3) RS-485 Communication (when /COM option is specified)

NORMAL OPERATING CONDITIONS

Ambient Temperature	0 to 50°C	
Ambient Humidity	5 to 90%RH (no condensation)	
Power Supply Voltage	AC / DC both usage	
	100V version DC	20 to 130 V, no polarity
	100V version AC	80 to 138 V, 47 to 63 Hz
	220V version DC	120 to 340 V, no polarity
	220V version AC	138 to 264 V, 47 to 63 Hz

STANDARD PERFORMANCE

Performance in the standard operating condition (at 23°C±2°C, 50±10%RH)

Input Accuracy	See the table: Input accuracy in page 4.
Alarm Action Repeatability	Same as input accuracy
Effect of ambient temperature	Twice of input accuracy / 10°C
Maximum Current or Power Consumption	240 mA for 24 V DC 17 VA for 100 V AC 22 VA for 220 V AC
Insulation Resistance	Between I/O terminals and ground pin: 100 MΩ/500 V DC Between power pins and ground pin: 100 MΩ/500 V DC
Withstanding Voltage	Between input terminal and ground pin: 500 V AC for 1 minute Between output terminal, power pins and ground pin: 1000 V AC for 1 minute (100 V version) 1500 V AC for 1 minute (220 V version)
Burnout Time	Within 60 s

RECOVERY FROM POWER FAILURE

HOT Start: Continues the operation from the alarm status immediately prior to power failure.

(Hot start cannot be made for input rate-of-change alarms. When the alarm timer mode is set to alarm output timer, ALM3 and ALM4 cannot be HOT started.)

COLD Start: Power-on restart

* HOT start or COLD start is selectable by parameter.

Table: Input Accuracy

Input signal	Accuracy	
DCV input	1 to 5V DC	±0.1%
	-50.0 to 150.0mV DC	±20μV

T/C	Accuracy (*1)					
Type K	-270.0	to	0.0	°C	±{0.5+A(*2)}	°C
	0.0	to	1300.0	°C	±0.5	°C
	1300.0	to	1372.0	°C	±1.0	°C
Type T	-270.0	to	0.0	°C	±{0.3+A(*2)}	°C
	0.0	to	400.0	°C	±0.3	°C
Type J	-210.0	to	0.0	°C	±{0.3+A(*2)}	°C
	0.0	to	1100.0	°C	±0.3	°C
	1100.0	to	1200.0	°C	±1.0	°C
Type E	-270.0	to	0.0	°C	±{0.3+A(*2)}	°C
	0.0	to	900.0	°C	±0.3	°C
	900.0	to	1000.0	°C	±1.0	°C
Type B	100.0	to	600.0	°C	±{3.0+A(*3)}	°C
	600.0	to	1820.0	°C	±3.0	°C
Type R	-50.0	to	0.0	°C	±4.0	°C
	0.0	to	400.0	°C	±2.0	°C
	400.0	to	1768.0	°C	±1.0	°C
Type S	-50.0	to	0.0	°C	±4.0	°C
	0.0	to	400.0	°C	±2.0	°C
	400.0	to	1768.0	°C	±1.0	°C
Type N	-270.0	to	0.0	°C	±{1.0+A(*2)}	°C
	0.0	to	1300.0	°C	±1.0	°C
Type W3	0	to	2315	°C	±2.0	°C
Type W5	0	to	2315	°C	±2.0	°C

RTD	Accuracy				
JPt100 (JIS'89)	-200.0	to	510.0	°C	±0.25°C
Pt100 (ITS-90,JIS'97)	-200.0	to	850.0	°C	
Pt100 (IPTS-68,JIS'89)	-200.0	to	660.0	°C	
Pt50 (JIS'81)	-200.0	to	649.0	°C	

(*1)

Note 1: Effect of ambient temperature:
±0.01%/°C of measuring range

Note 2: For thermocouple inputs except type B, add the reference junction compensation error (see below) to the accuracy above.

Add the following (1) or (2), whichever is the larger:

(1) All types except types R and S: 0.5°C
Types R and S: 1°C

(2) Multiply the value in (1) by K, where K=(Thermocouple output change/°C near normal temperature) ÷ (Thermocouple output change /°C near input temperature.)

(*2)

For measured temperatures below 0 °C, add the following A to the accuracy above.

- Measured temperature : -200 °C to below 0 °C
  A = 0.0025 x | measured temperature |
- Measured temperature : below -200 °C
  A = 0.1 x | measured temperature |

(*3)

For measured temperatures below 600 °C, add the following B to the accuracy above.

- Measured temperature : 300 °C to below 600 °C
  B = 0.02 x | measured temperature - 600 |
- Measured temperature : below 300 °C
  B = 0.1 x | measured temperature - 300 | + 6

■ SELF-DIAGNOSTIC FUNCTIONS

F Lamp ON: CPU failure, A/D conversion failure, EEPROM failure, EEPROM SUM failure or RJC error

E Lamp ON: Input signal overrange(*1), input burnout, HOT start unavailable

*1: When more than 106.25%, or -6.25% or less of input range upper limit (RH) and input range lower limit (RL).

Failure Output: Failure contact output when F lamp or E lamp lights up. However, failure output action is in E lamp ON selected by parameter. (Note: Only when /CUR, /VLT or /RLY4 option is not selected.)

■ CALIBRATION FUNCTIONS

Allow 0% and 100% points to be calibrated with an accuracy of 1% or better when input signal is 1 to 5 V by display setter on the front panel.

■ WIRING RESISTANCE CORRECTION FUNCTIONS

If an error occurs because of input wiring resistance when mV DC, thermocouple or RTD input, input wiring resistance can be corrected.

■ OPTIONS

/A2ER: 220 V version with power supply plug
/NHR: Without case
/TB: With power supply terminal
/VLT: With 1 to 5 V output
/CUR: With 4 to 20 mA output
/RLY4: Four points of alarm outputs
/COM: With RS-485 communication function
/BU: Burnout upscale
/BD: Burnout downscale

■ COMMUNICATION FUNCTIONS (/COM OPTION)

Input read and parameter read/write are possible.

Communication Interface: 1 channel
Standards: EIA RS-485
Communication System: 2-wire, half-duplex
Baud Rate: 1200, 2400, 4800 and 9600 bps

Communication Protocol: MODBUS, PC link, and Ladder

Maximum Units Connectable: 31 units

Maximum Communication Distance: 1200 m

Communication cable: Shielded twisted-pair cables (AWG24 or the equivalent) for communication wiring cables.

■ RETRANSMISSION OUTPUT FUNCTIONS (/VLT and /CUR OPTIONS)

/VLT: 1 to 5 V output of measured value or 2-input deviation

/CUR: 4 to 20 mA output of measured value or 2-input deviation

Retransmission Output Accuracy (Option)	1 to 5 V DC (/VLT)	Accuracy: ±0.1% of span Load resistance: 2 kΩ or more
	4 to 20 mA (/CUR)	Accuracy: ±0.1% of span Load resistance: 750 Ω or less

Retransmission Output Accuracy Guaranteed Range:

	mV Input	Thermocouple Input	RTD Input
Span	10 to 100 mV DC	10 to 63 mV (converted based on thermo electromotive force)	50 to 500°C
Zero Elevation	Three times the span, or within ±50 mV, whichever is the smaller	Three times the span, or within ±25 mV, whichever is the smaller	Within five times the span

Retransmission output accuracy guaranteed range is within the range above and within 0.0% to 100.0% of span.

■ ACCESSORIES

Fuse 1A: 1 piece

Label sheet: 1 sheet

Reference junction bracket : For SDAU-120-xx*R/NHR or SDAU-270-xx*R/NHR

■ MODEL AND SUFFIX CODES

Model	Suffix Codes			Auxiliary Codes	Style	Optional Suffix Codes	Description
SDAU							Digital Alarm Unit
Input Signal 2	-1						Input signal 2: 1 to 5 V
	-2						Input signal 2: Universal (Note 3)
Input Signal 1		0					1 to 5 V
		1					mV
		2					TC (Thermocouple)
		3					RTD
		7					Universal (Note 3)
Always 0			0				Always 0
Available Combination Standard Specifications: SDAU-100, SDAU-110 SDAU-120, SDAU-130 SDAU-270 Auxiliary Codes: SDAU-100: -SV SDAU-110: -MV SDAU-120: from -TK to -TS SDAU-130: from -PA to -PD SDAU-270: -UN				-SV			Two points of 1 to 5 V inputs
				-MV			mV input
				-TK			Type K (ITS-90,JIS'95)
				-TT			Type T (ITS-90,JIS'95)
				-TJ			Type J (ITS-90,JIS'95)
				-TE			Type E (ITS-90,JIS'95)
				-TB			Type B (ITS-90,JIS'95)
				-TR			Type R (ITS-90,JIS'95)
				-TS			Type S (ITS-90,JIS'95)
				-PA			JPt 100 (JIS'89)
				-PB			Pt50 (JIS '81)
				-PD			Pt100 (ITS-90, JIS'97)
				-UN			Universal (SDAU-270 only) (Note 3)
Style Code					*R		Style R
Common Options						/A2ER	220 V version power supply plug
						/NHR	Without case
						/TB	With power supply terminal
						/VLT	With 1 to 5 V output (Note 1)
						/CUR	With 4 to 20 mA output (Note 1)
						/RLY4	Four points of alarm outputs (Note 1)
						/COM	With RS-485 communication function
						/BU	Burnout upscale (Note 2)
						/BD	Burnout downscale (Note 2)

Note 1: /VLT, and /CUR options can be combined with only –UN auxiliary code.
/RLY4 option can be combined with only –SV or –UN auxiliary codes.
/VLT, /CUR and RLY4 options can not be combined with each other.

Note 2: For two points of 1 to 5 V inputs (-SV), burnout upscale or burnout downscale is not selectable.

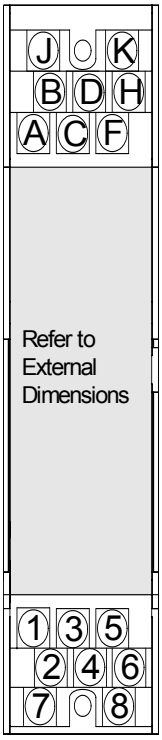
Note 3: For universal inputs, 1 to 5 V is not selectable.

■ ORDERING INSTRUCTIONS

1. Model, suffix codes and auxiliary codes, and optional suffix codes if necessary
2. SDAU-110, -120, -130: Upper limit of input range (RH1), lower limit of input range (RL1). Specify RH1 and RL1 within the measuring range of Input/output signal specifications, where RL1<RH1.
   Initial values
   RH1 parameter; 100.0 when mV input, maximum value of measuring range when temperature input
   RL1 parameter; 0.0 when mV input, minimum value of measuring range when temperature input
3. SDAU-270: Select the sensor type from the input signals in Input/Output Signals on Page 1. However, 1 to 5 V is not selectable. Initial value: Pt100 (ITS90, JIS'97)
   (Note: Sensor type is selectable for input 1 and input 2 respectively.)

■ TERMINAL CONNECTIONS

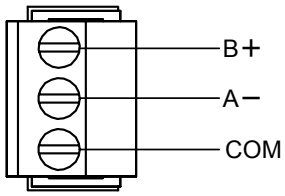
● Input/Output Terminals



Terminal Designation	Description		
	Excluding /RLY4, /VLT and /CUR	/RLY4	/VLT or /CUR
A	NC — Alarm output 1	NC,NO (*2) — Alarm output 1	NC — Alarm output 1
B	COM	COM	COM
C	NC,NO (*2) — Failure output	NC,NO (*2) — Alarm output 4	+ — Retransmission output
D	COM	COM	− — 1 to 5 V or 4 to 20 mA
F	NC — Alarm output 2	NC,NO (*2) — Alarm output 2	NC — Alarm output 2
H	COM	COM	COM
J	NO	COM — Alarm output 3	NO
K	NO	NC,NO (*2)	NO
	1 to 5 V, mV, TC Input		RTD Input
1	+ — Input 1		A — Input 1
2	−		B
3			B
4			A — Input 2
(*1) 5			B
6	+ — Input 2		A
7			B
8	−		B

*1: Terminal for connecting the reference junction bracket.
*2: Switch NC/NO using jumper.
NC: Relay normally closed contact (closed when relay de-energized).
NO: Relay normally open contact (open when relay de-energized).

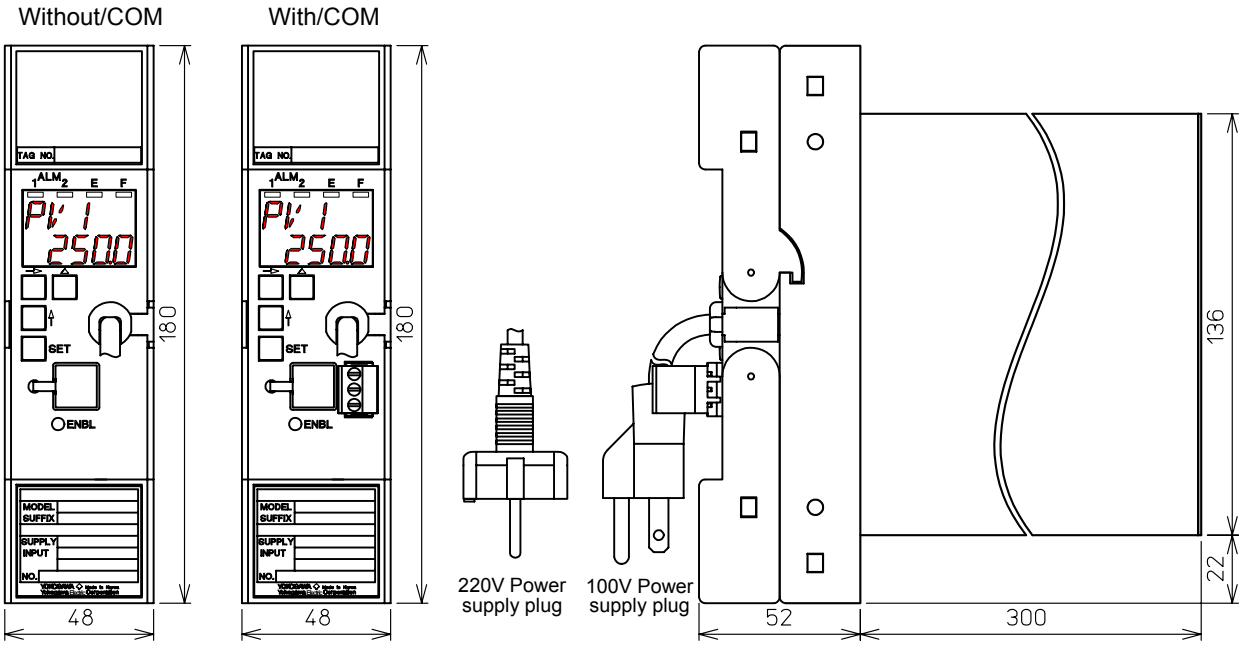
● RS485 Communication Terminals (/COM Option)



EXTERNAL DIMENSIONS

Unit: mm

• Power Supply Plug Connection Type



• Power Supply Terminal Type