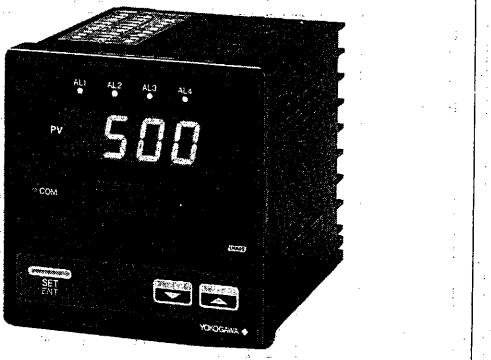
General Specifications

Model UM05
Digital Indicator (With Alarms)

OUTLINE

The UM05 is a high performance digital display alarm with a large display. It can accept input signals from a thermocouples, RTDs, or DC voltage. Two relay output alarms are available as standard. In addition, 4 relay output alarms are available as an option. Also, measured-value retransmission (4 to 20mA DC) and RS-422A communication interface functions are available as options.



DISPLAY

MEASURED-VALUE (PV) DISPLAY UNIT	4-digit (in red), 7-segment LED (parameter symbols and error codes are also displayed.)
DISPLAY RANGE	• For thermocouple and RTD input: −5 to 105% of the instrument range (See table 1 on page 2.) • For DC voltage: −1999 to 9999 with selectable decimal point
PARAMETERS DISPLAY UNIT	4-digit (in red), 7-segment LED
DISPLAY RESOLUTION	Same as the instrument range resolution For 9999 type ..... 1 For 999.9 type ..... 0.1 For 99.99 type ..... 0.01 For 9.999 type 0.001

• The measured-value display shows instrument-range code about 2 seconds after power-ON.

Alarm indication lamps: 4 (Red)

AL1	Lights up when the alarm occurs.
AL2	Lights up when the alarm occurs.
AL3	Lights up when the alarm occurs.
AL4	Lights up when te alarm occurs.

Note 1: AL3 and AL4 functions are available in case of option code /ALM4 is chosen. But, AL3 and AL4 Letters are remained even if option code /ALM4 is unchosen.

Status indication lamps: 1 (Green) Note 2

COM	Lights up during communication; flashes when a communication error occurs.

Note 2: All UM05s show COM lamp, although the functions are available only if option /RS422 is chosen.

SETTING

Setting keys (3 pcs.)	▲ Up key: Increases the set value: Each digit automatically increases. ▼ Down key: Decreases the set value: Each digit automatically decreases. Negative figure can be also set. SET ENT Set-Entry key: Used to set a value: Changes when a parameter is selected.
Set-point resolution	Same as instrument-range resolution.

- Holding the Up or Down key increases the rate at which the numbers advance.
- Key-lock (the function to prevent a change in a parameter) is enabled through an internal dip-switch operation (p.2). In this case, the pressing of a key is ignored.

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INPUT

Universal Measured Input

- Input Type/Instrument Range Selection
  The same instrument can be configured to the desired type and instrument range as listed in Table 1 by changing the internal rotary switch (Figure 1) and terminal connection. Temperatures in °C. or °F. can be changed by the parameters.

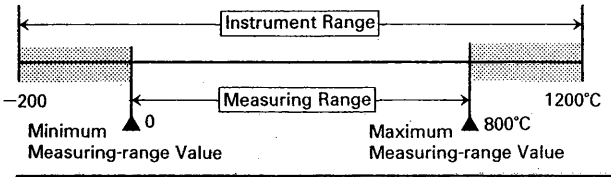
Table 1. Instrument Range Codes

Input type/instrument range					Instrument range code (Note 2)
TC	JIS	K	−200 to 1200°C	−300 to 2300°F	0
		K	−199.9 to 200.0°C	−300 to 400°F	1
		S	0 to 1700°C	0 to 3100°F	(Note 4)
		J	−199.9 to 800.0°C	−300 to 1500°F	2
		T	−199.9 to 400.0°C	−300 to 750°F	3
		E	−199.9 to 800.0°C	−300 to 1500°F	4
		R	0 to 1700°C	0 to 3100°F	5
		B	0 to 1800°C	0 to 3300°F	6
		N	0 to 1300°C	32 to 2400°F	7
	DIN	L	−199.9 to 800.0°C	−300 to 1500°F	8
		U	−199.9 to 400.0°C	−300 to 750°F	9
RTD (Note 1)	JPt100		−199.9 to 500.0°C	−199.9 to 999.9°F	A
	Pt100		−199.9 to 500.0°C	−199.9 to 999.9°F	B
mV, V, mA	0 to 10mV		Scaling is enabled in the following 4 ranges: −1999 to 9999, −199.9 to 999.9, −19.99 to 99.99, −1.999 to 9.999		C
	0 to 100mV				D
	0 to 5V				E
	1 to 5V (Note 3)				F

(Note 1) JIS'89 JPt100, JIS'89 Pt100/DIN
(Note 2) Same rotary-switch set position number.
(Note 3) 4 to 20mA requires 250 Ω, 0.1% (accuracy) resistor between terminals ⑤ and ⑧.
(Note 4) Type of TC (K or S) can be selected, using a Setup parameter when input range code is 1.

- Measuring Range Change
  The measuring range can be changed by setting the maximum and minimum measuring range values.

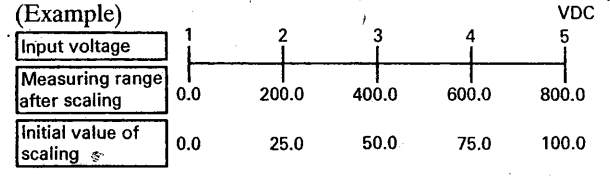
(Example)



Variable maximum and minimum measuring-range values	0 to 100% (of instrument range) where max. value > min. value

- Scaling
  For DC voltage input, complete scaling including decimal position is permitted. (The following example shows that a 1 to 5 V DC input corresponds to 0.0 to 800.0)

(Example)



- Measured Input Bias
  Measured input can be corrected to any desired value.

Variable bias range	EU (−100%)S to EU(100.0%)S (−100.0 to 100.0% of instrument-range width)

- Burnout (Action at Thermocouple/RTD Input Break)
  At burnout
  · b.out is displayed on the measured value display.
  · Upper measured-value alarm occurrence.

- Filter
  Fluctuating or unstable input signal can be attenuated by a first order lag filter.

Variable filter range	OFF (No filter), 1 to 120 seconds

- Other Input Specifications

Input-sampling Period	500ms
Input resistance	TC ... More than 1MΩ DC voltage ... Approximately 1MΩ
Allowable signal source resistance	TC ... Less than 250Ω DC voltage ... Less than 2 KΩ
Allowable wiring resistance	RTD ... Less than 10Ω/lead (However, there should be no resistance difference between 3 wires).
Allowable input voltage	TC ... Less than ±10V DC voltage ... Less than ±10V
Noise-rejection ratio	Normal mode ... 40dB (50/60Hz) Common mode ... 120dB (50/60Hz)
Applicable standard	TC ... JIS/IEC/DIN (L and U) RTD ... JIS'89 JPt100, Pt100/IEC/DIN

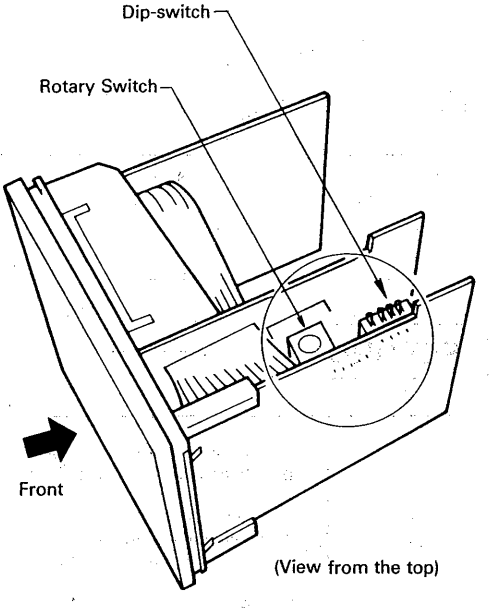


Figure 1. Rotary Switch and Dip-Switch

ALARM

- Number of Alarm Points: 2 (Standard); 4 (When /ALM4 is specified)
- Indication Lamp: LED (Red)

AL1	AL2	AL3	AL4
○	○	○	○

(Note: AL3 and AL4: Activated only when /ALM4 is specified.)

- Output Status
  Relay contact

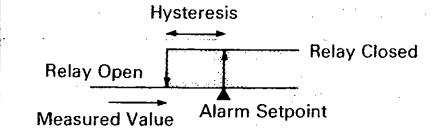
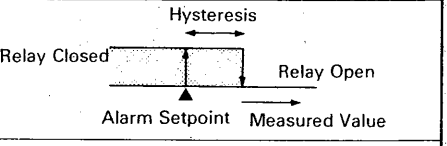
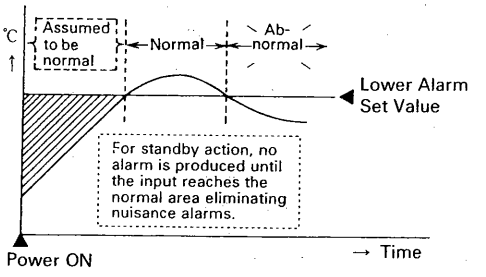
Contact capacity	250V AC 1 A (Resistive load)

- Setting Range

Alarm value	EU(0%) to EU(100%) (Minimum to maximum value in instrument range)
Hysteresis	0 to 100% of instrument-range width at factory shipment: 0.5% of instrument-range width

- Alarm Type
  The alarm action is selectable to be high or low limit alarms with or without standby action.
  Units are shipped with AL1 and AL3 configured as high limit alarm and AL2 and AL4 as low limit alarms.

Table 2. Alarms

Alarm type	Alarm action
No alarm	No action
High limit alarm	
Standby of high limit alarm	
Low limit alarm	
Standby of low limit alarm	
Standby Alarm Action	

TRANSMISSION OUTPUT

(Additional specification: /RET is added to the model number)

- Measured value is output as analog current signal
  (Isolated between input and transmission output.)

Output signal	Corresponding to a 4 to 20mA DC instrument range.
Allowable load resistance	Less than 600Ω
Accuracy	±0.3% (Of output span)

COMMUNICATION

(Additional specification: /RS422 is added to the model number)

Applicable standard	Conforms to EIA RS-422A	Max. No. of units connected	16 (Address 1 to 16)
Communication method	4-wire system, Half-duplex multi-drop connection, Start-stop Transmission: No procedure	Communication distance	500 m (max.)
Communication speed	Selected from the following by parameter. 150, 300, 600, 1200, 2400, 4800, 9600 BPS	Bit configuration (It is chosen by parameter setting)	Start bit: 1 bit Data bit: 7 or 8 bits Stop bit: 1 or 2 bits Parity bit: None; either odd or even number

GENERAL SPECIFICATIONS

Measuring Accuracy

Accuracy is displayed as plus or minus the percent of instrument range width ±1 digit (see the following table).
Digit: Minimum display unit. Same value as display resolution. Thermocouple reference-junction compensation error is not included.

Instrument range code	Input type	Instrument range	Accuracy
0	K	−200 to 1200°C	±0.3% ±1 digit
1	K	−199.9 to 200.0°C	
1	S	0 to 1700°C	
2	J	−199.9 to 800.0°C	
3	T	−199.9 to 400.0°C (Between −199.9 and 0.0°C)	±0.3% ±1 digit (±0.5% ±1 digit)
4	E	−199.9 to 800.0°C	±0.3% ±1 digit
5	R	0 to 1700°C	
6	B	0 to 1800°C (Between 0 and 400°C)	±0.3% ±1 digit (±5% ±1 digit)
7	N	0 to 1300°C	±0.3% ±1 digit
8	L	−199.9 to 800.0°C (−199.9 to 0.0°C)	±0.3% ±1 digit (±0.5% ±1 digit)
9	U	−199.9 to 400.0°C (−199.9 to 0.0°C)	±0.3% ±1 digit (±0.5% ±1 digit)
A	JPt100	−199.9 to 500.0°C (in case of 100°C span is setting) (In case of 200°C span is setting)	±0.3% ±1 digit (±0.5% ±1 digit) (±0.4% ±1 digit)
B	Pt100		
C	mV DC	0 to 10mV	±0.5% ±1 digit
D		0 to 100mV	±0.2% ±1 digit
E	V DC	0 to 5V	±0.2% ±1 digit
F		1 to 5V	
	DC mA	4 to 20mA (Note 1)	

(Note 1) Requires 250Ω ±0.1% resistor.

Power Supply/Di-electric Strength/Insulation/ Grounding

Power supply	Voltage	90 to 250V AC (Any voltage)
	Frequency	50/60Hz common use
Power consumption		Approx. 5VA (100V) Approx. 7VA (200V) (As on external fuse, a time-lag fuse of 1A is recommended.)
Memory hold		Non-volatille memory
Dielectric strength		Between power supply terminal and grounding ... 1 min at 1500V AC Between input terminal and grounding ... 1 min. at 1000V AC Between output terminal and grounding ... 1 min at 1500V AC
Insulation resistance		Between each terminal and grounding ... More than 20MΩ at 500V DC
Grounding		Through resistance of 100Ω or less.

- Power Failure Recovery Operation
  ① Normal operation within 20ms for instantaneous power failure.
  ② · After a power recovery (after a power failure of 20ms or more), the operation continues as just prior to the power failure.
  · Even if a power failure occurs, parameter constants already set are all stored.
  · For a power failure occurring while keys are being set, error code E400 may be displayed.
- Relation between Input and Output Isolation
  Isolated between input and transmission output.

Self-diagnosis

The following self-diagnosis is conducted. If any error occurs, the relevant error code is displayed on the measured-value display

Contents of error	Error code
Input burnout	b.oUt
Over-scale (More than 105% of measured range)	oUr
Under-scale (Less than −5% of measured range)	-oUr
RAM error	E000
ROM error	E001
System data error	E002
A/D converter trouble	E300
Set-parameter error	E400
Reference cold-junction compensation error	rJC (Note)
Calibration data error	Decimal point flashing
Non-volatile memory error	Measured-value display flashing
Program over-run	Indefinite display

Note: Alternate display of measured value and rJC .

Environmental Conditions

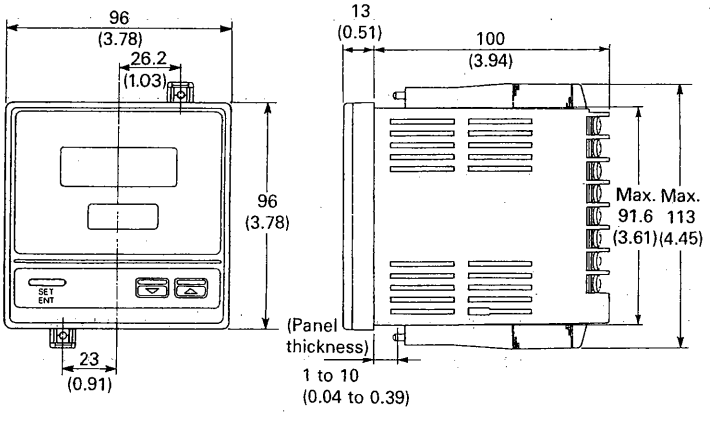
Normal operating condition (Design condition in which the instrument operates correctly and continuously).	Ambient temperature	0 to 50°C
	Ambient humidity	20 to 90% relative humidity (No condensation from moisture allowed)
	Reference cold-junction temperature compensation error	0 to 50°C. ±1.5°C However 15 to 35°C. ±1°C.
	Magnetic field	Less than 400AT/m
	Warm-up time	More than 30 min
Effect on operating condition	Ambient temperature effect	Input stability (±1μV/°C or ±0.01%/°C, whichever is greater) Output stability 4 to 20mA DC or 1 to 5V DC Less than ±0.05%/°C.
	Power supply variation	Input stability (±1μV/10% or ±0.01%/10%, whichever is greater) Output stability (4 to 20mA DC or 1 to 5V DC ±0.05%/10%)
Transport/ storage condition	Temperature	−25 to 70°C
	Humidity	5 to 95% relative humidity (No condensation from moisture allowed)

Construction/Dimensions/Weight

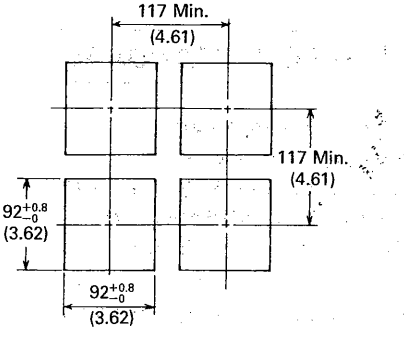
Construction	Dustproof/drip-proof construction (Front panel)
Mounting	Flash mounting (See the dimensional drawing below)
Case	Plastic molding
Dimensions	96W×96H×100Dmm
Weight	Approximately 450g

EXTERNAL DIMENSIONS

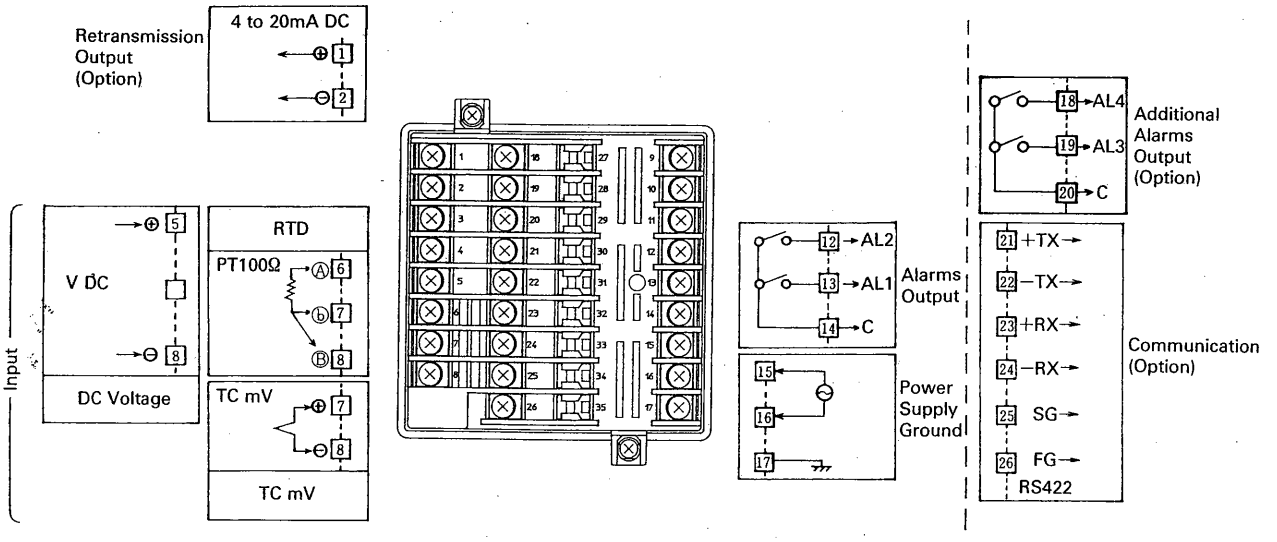
Unit: mm
(approx. inch)



Panel Cutout and Spacing



TERMINAL ALLOCATION



MODEL

Model and Suffix Code

Model	Suffix code		Description
UM05			Digital Indicator (with alarms)
Style code	*A		Style A
Optional code		/RET	Retransmission output (4 to 20mA DC)
		/RS422	RS-422A Interface
		/ALM4	Additional Alarms (From 2 to 4 Alarms)

Specify the following items when ordering:

(1) Model number and style code.
(2) Optional specification code.

Note: Range code: 0 (thermocouple type K, −200 to 1200°C.) upon factory shipment.

SAFETY STANDARD

SAFETY STANDARD:	CSA C22.2 No.142/FM-3810
POWER SUPPLY (Note)**:**	90 to 264 V AC, 50/60 Hz, 0.2 A Max.
ALARM OUTPUT RELAY CONTACT:	Max. 250 V AC, 1 A
AMBIENT TEMPERATURE:	0 to 50°C
MOUNTING LOCATION:	Non-Hazardous Location, Indoor. Mounting in an indoor (controlled environment) instrument panel.

(Note) Range of POWER SUPPLY is printed "90-250 V AC" on the Name plate put on the case. (90 to 250 V AC is Operating range.)