

THERMOCOUPLE INPUT DIGITAL PANEL METER
(4-digit, LED display type)

MODEL **47LT**

MODEL & SUFFIX CODE SELECTION

47LT-1□□□-□

MODEL

INPUT THERMOCOUPLE (field-configurable)

1 : (PR), K (CA), E (CRC), J (IC), T (CC),
B (RH), R, S, N

DC OUTPUT

0 : None

Current

Voltage

A : 4 – 20mA DC

4 : 0 – 10V DC

D : 0 – 20mA DC

5 : 0 – 5V DC

6 : 1 – 5V DC

4W : -10 – +10V DC

ALARM OUTPUT

0 : None

1 : N.O. relay contact, 4 points

2 : SPDT relay contact, 2 points

DISPLAY COLOR

R : Red

YR : Orange

G : Green

BG : Bluegreen

B : Blue

W : White

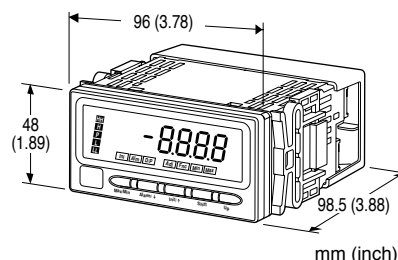
POWER INPUT

AC Power

DC Power

M2 : 100 – 240V AC

R : 24V DC



Functions & Features

- 4-digit thermocouple input digital panel meter
- 1/8 DIN size
- Moving average function to suppress the display flickering
- Max. and Min. value display
- IP66 front panel
- Separable terminal block
- Rear terminal cover for safety strapped to the meter

DISPLAY

Display: 16 mm (.63) high, 4 digits (-1999 to 9999), LED

Scaling: No scaling (input temperature indication)

Decimal point position: 10⁻¹ or none (fixed depending upon the input type)

Minimum display/setting scale: 1°C or 1°F (0.1°C for K and J, narrow span)

Read rate: Max. 40/second (25 milliseconds)

Over-range indication: 'S.ERR' flashing when the input signal is out of the usable range.

Burnout indication: 'B.ERR' flashing

Alarm status indication*

LL indicator: Turns on when the LL alarm is tripped.

L indicator: Turns on when the L alarm is tripped.

H indicator: Turns on when the H alarm is tripped.

HH indicator: Turns on when the HH alarm is tripped.

P indicator: Turns on when none of the other alarms is tripped.

Zero indication: Higher-digit zeros are suppressed.

Engineering unit indication: Sticker label attached

*Only 'P' turns on with no-alarm-output type. 'LL' or 'HH' does not turn on with dual-alarm-output type.

All setpoints can be independently set either for Hi or Lo alarm trip.

ORDERING INFORMATION

Specify code number. (e.g. 47LT-101G-M2)

GENERAL SPECIFICATIONS

Construction: Panel flush mounting

Degree of protection: IP66; applicable to the front panel for the meter mounted according to the specified panel cutout

Connection: M3 screw terminals (nickel plated steel; torque 0.6 N·m)

Material: Flame resistant resin (black)

Scaling: Programming via the front buttons

Averaging: None or moving average

Security: Prohibiting certain operations; protecting settings

INPUT & OUTPUT

■ THERMOCOUPLE

Input resistance: 1M Ω minimum

Burnout sensing: $\leq 0.1\mu\text{A}$

Temperature Range

THERMOCOUPLE		CONFORMANCE RANGE	USABLE RANGE
(PR)	$^{\circ}\text{C}$	0 to 1700	-30 to +1730
	$^{\circ}\text{F}$	32 to 3092	-22 to +3146
K (CA)	$^{\circ}\text{C}$	-200 to +1300	-230 to +1330
	$^{\circ}\text{F}$	-328 to +2372	-382 to +2426
K (CA), narrow span	$^{\circ}\text{C}$	-100.0 to +450.0	-199.9 to +500.0
E (CRC)	$^{\circ}\text{C}$	0 to 600	-30 to +630
	$^{\circ}\text{F}$	32 to 1112	-22 to +1166
J (IC)	$^{\circ}\text{C}$	-100 to +850	-130 to +880
	$^{\circ}\text{F}$	-148 to +1562	-202 to +1616
J (IC), narrow span	$^{\circ}\text{C}$	-100.0 to +350.0	-150.0 to +400.0
T (CC)	$^{\circ}\text{C}$	-200 to +400	-230 to +430
	$^{\circ}\text{F}$	-328 to +752	-382 to +806
B (RH)	$^{\circ}\text{C}$	400 to 1800	70 to 1830
	$^{\circ}\text{F}$	752 to 3272	158 to 3326
R	$^{\circ}\text{C}$	200 to 1700	-30 to +1730
	$^{\circ}\text{F}$	392 to 3092	-22 to +3146
S	$^{\circ}\text{C}$	0 to 1700	-30 to +1730
	$^{\circ}\text{F}$	32 to 3092	-22 to +3146
N	$^{\circ}\text{C}$	-200 to +1300	-230 to +1330
	$^{\circ}\text{F}$	-328 to +2372	-382 to +2426

■ DC OUTPUT

• DC Current

Operational range: -5 – +105%

Load resistance

(Range) 4 – 20mA	: 550 (Ω maximum)
0 – 20mA	: 550

• DC Voltage

Operational range: -5 – +105%

Load resistance

(Range) 0 – 10V	: 10k (Ω minimum)
-10 – +10V	: 10k
0 – 5V	: 5000
1 – 5V	: 5000

■ ALARM OUTPUT: Relay contact

Rated load: 250V AC @3A ($\cos\phi=1$)

30V DC @3A (resistive load)

Electrical life $\geq 10^5$ cycles (rate 6 cycles/min.)

Maximum switching voltage: 250V AC, 30V DC

Maximum switching power: 750VA, 90W (resistive load)

Minimum load: 5V DC @10mA

Mechanical life: $\geq 5 \times 10^6$ cycles (rate 180 cycles/min.)

INSTALLATION

Power input

AC: Operational voltage range 85 – 264V
50/60 Hz, approx. 6.5VA

DC: Operational voltage range 24V $\pm 10\%$
ripple 10% p-p max.; approx. 3W

Operating temperature: -10 to +55 $^{\circ}\text{C}$ (14 to 131 $^{\circ}\text{F}$)

Operating humidity: 30 to 90% RH (non-condensing)

Mounting: Panel flush mounting

Panel cutout: W92 \times H45 mm (3.62 \times 1.77 '')

Panel thickness: 1.6 – 8.0 mm (0.06 '' – 0.31 '')

Dimensions: W96 \times H48 \times D98.5 mm (3.78 \times 1.89 \times 3.88 '')

Weight: 300 g (0.66 lbs)

PERFORMANCE in percentage of max. span

Accuracy

Display: $\leq \pm 1^{\circ}\text{C} \pm 1$ digit (PR, K, E, J, T)

$\leq \pm 2^{\circ}\text{C} \pm 1$ digit (B, R, S, N)

Minimum display scale 1 $^{\circ}\text{C}$ or 1 $^{\circ}\text{F}$ (0.1 $^{\circ}\text{C}$ for K and J, narrow span)

Output: $\leq \pm 0.15\%$ (DC output = display + output)

Cold junction compensation error:

$\pm 3^{\circ}\text{C}$ maximum at 25 $\pm 10^{\circ}\text{C}$

$\pm 5.4^{\circ}\text{F}$ maximum at 77 $\pm 18^{\circ}\text{F}$

Temp. coefficient: $\leq \pm 0.015\%/^{\circ}\text{C}$ ($\leq \pm 0.008\%/^{\circ}\text{F}$) when the input range is set to the maximum span.

Input resolution: Max. 16 bits

Output resolution: Max. 13 bits

Response time: ≤ 0.5 second

(alarm output: 0 – 100% at 90% setpoint)

≤ 0.5 second (DC output: 0 – 90%)

Burnout response: ≤ 15 seconds

Line voltage effect: $\pm 0.1\%$ over voltage range

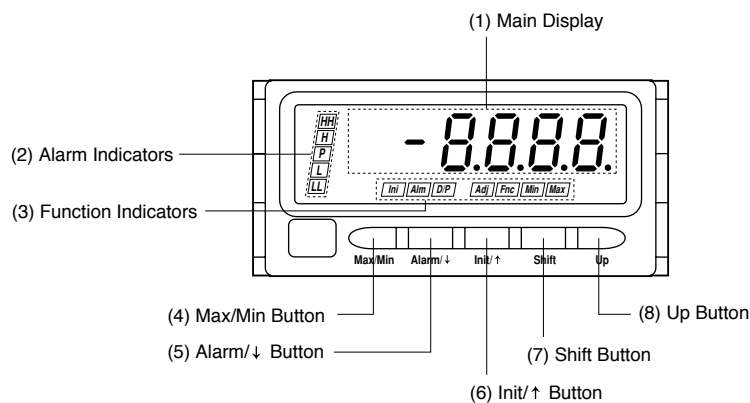
Insulation resistance: $\geq 100\text{M}\Omega$ with 500V DC

Dielectric strength: 2000V AC @1 minute (input to DC

output to HH output or H output to L output

or LL output to power to ground)

FRONT PANEL CONFIGURATION



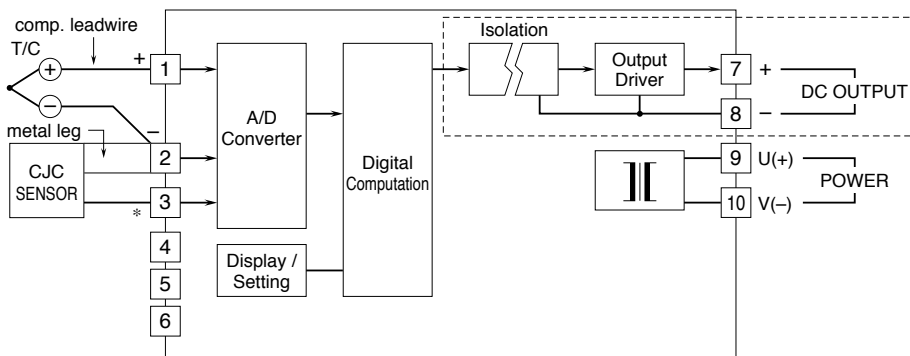
• COMPONENT IDENTIFICATION

No.	COMPONENT	FUNCTION
(1)	Main display	Indicates present values, setting values.
(2)	Alarm indicators	Indicate alarm status of the input signal.
(3)	Function indicators	Indicate setting modes and status.
(4)	Max/Min button	Used to switch the main display to show present values, maximum values or minimum values.
(5)	Alarm/↓ button	Used to move on to the alarm setting mode; or to shift through setting items in each setting mode.
(6)	Init/↑ button	Used to move on to the initial setting mode; or to shift through setting items in each setting mode.
(7)	Shift button	Used to move on to the setting standby status and shift through display digits in each setting item.
(8)	Up button	Used to change setting values.

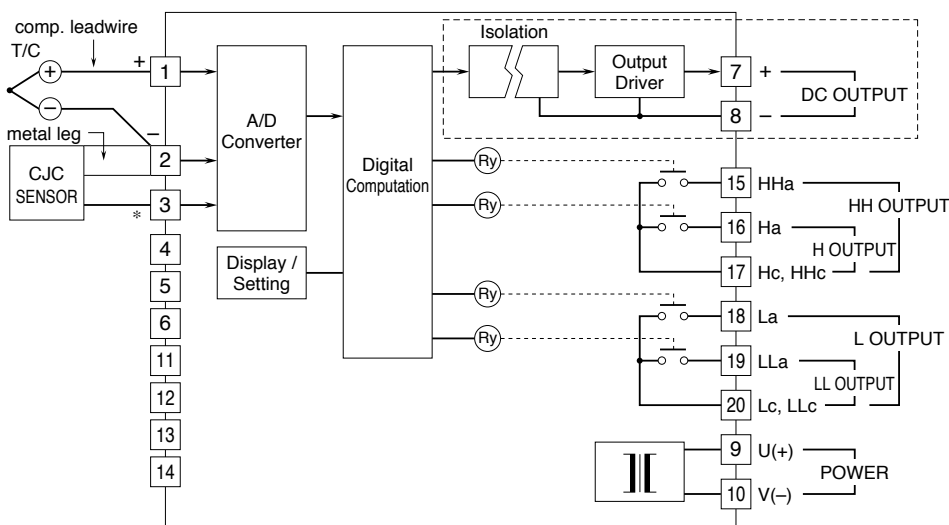
Refer to the instruction manual for details on each function.

SCHEMATIC CIRCUITRY & CONNECTION DIAGRAM

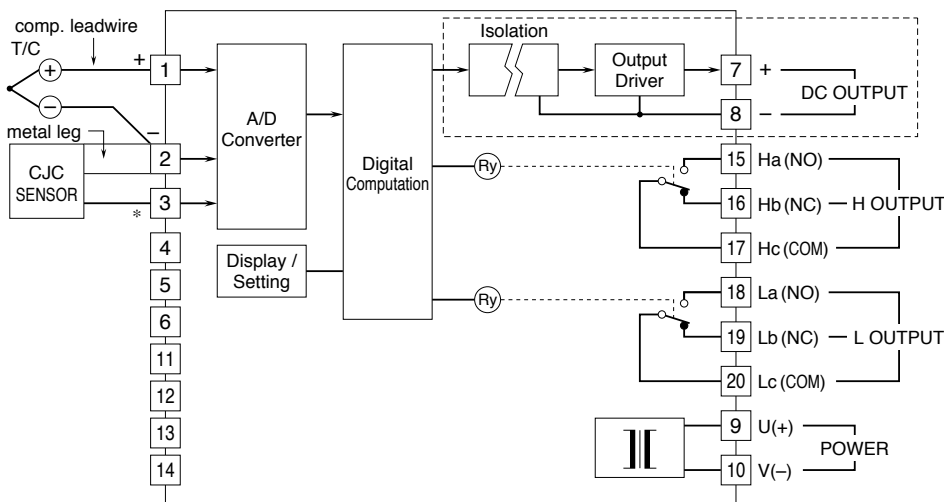
■ ALARM SUFFIX CODE 0: No alarm output



■ ALARM SUFFIX CODE 1: N.O. contact, 4 points



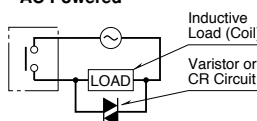
■ ALARM SUFFIX CODE 2: SPDT contact, 2 points



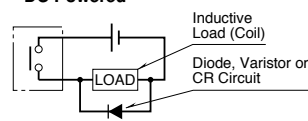
*DO NOT loosen the screw of the terminal 3.
Loosen only the terminals 1 - 2 when connecting extension wires.
Note: The section enclosed by broken line is only with DC output option.

■ Relay Protection

• AC Powered

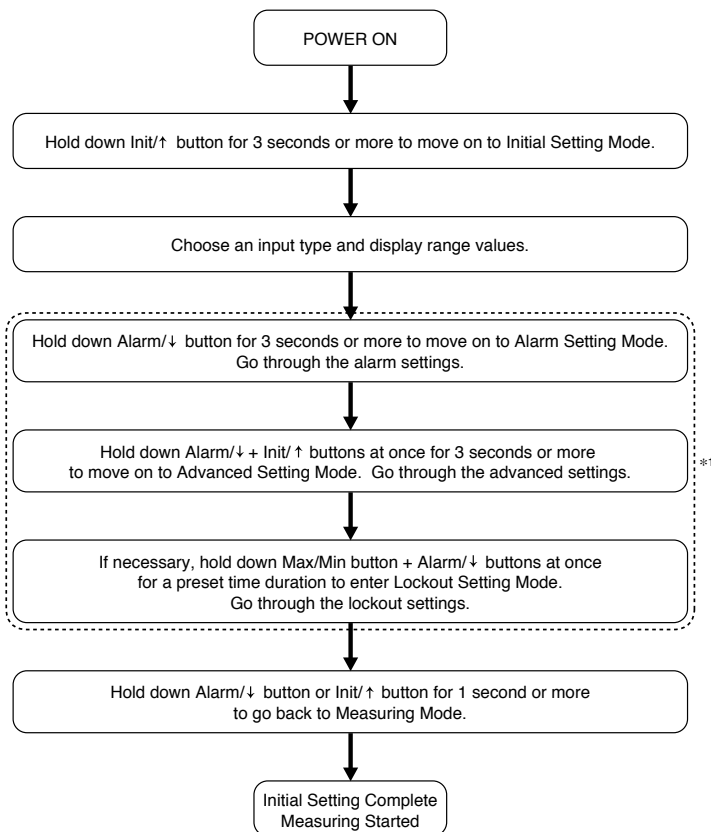


• DC Powered



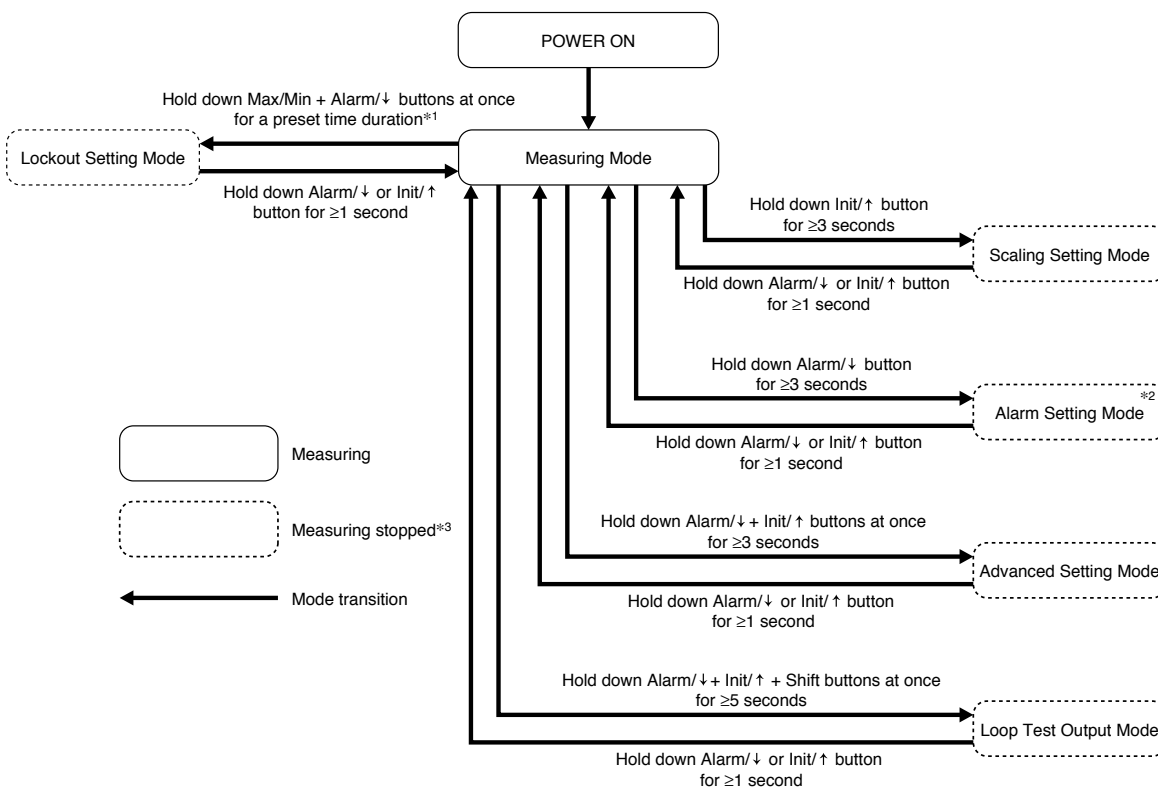
SETTING PROCEDURE

INITIAL SETTING FLOWCHART



*1. Optional settings for parameters in a broken-line section.
Alarm Setting Mode is locked with no-alarm-output type.

GENERAL SETTING FLOWCHART



Measuring
 Measuring stopped*3
 Mode transition

*1. Preset time can be specified with "Transition Time to Lockout Setting Mode" in Advanced Setting Mode.

*2. Alarm Setting Mode is locked with no-alarm-output type.

*3. The last measured values or status are held for DC and alarm outputs while the measuring is stopped.
(Except the analog output adjustments during the loop test and the initial setting)

PARAMETERS LIST

Refer to the instruction manual for details.

■ **INITIAL SETTING MODE** : Hold down **Init/↑** button for 3 seconds or more to enter Initial Setting Mode.

PARAMETER	INDICATORS	DISPLAY	FUNCTION	DEFAULT VALUE
Input type	[Ini]	P_r	(PR)	P_1
		P_1	K (CA)	
		P_2	K (CA), narrow span	
		E	E (CRC)	
		J_1	J (IC)	
		J_2	J (IC), narrow span	
		t	T (CC)	
		b	B (RH)	
		r	R	
		S	S	
Temperature unit *1	[Ini]	C	°C	C
		F	°F	
Input compensation	[Ini] [Adj]	- 1999 ... 9999 *2	Temperature input offset setting	0000
Analog output 0%	[Ini] [Adj] [Min]	- 1999 ... 9999 *2	Temperature input for 0% output	0000
Analog output 100%	[Ini] [Adj] [Max]	- 1999 ... 9999 *2	Temperature input for 100% output	0 100
Analog output 0% adjustment	[Ini] [Adj]	UP (increasing)	Analog output 0% adjustment: adjustable range -5 to 105%	Adj
	[Fnc] [Min]	$doun$ (decreasing)		
Analog output 100% adjustment	[Ini] [Adj]	UP (increasing)	Analog output 100% adjustment: adjustable range -5 to 105%	Adj
	[Fnc] [Max]	$doun$ (decreasing)		

Input compensation: Offset temperature value is added at all measuring points. No gain setting.

Analog output 0% / 100%: 0% value < 100% value

Analog output 0% / 100% adjustment: Pressing [Shift] button switches the signal to increase or decrease, and then pressing [Up] button controls it toward the desired output value. 0% value < 100% value

*1. °F indication is not available for K2 and J2 input type.

*2. -199.9 to 999.9 for K2 and J2 input type. Temperature values must be re-set if the decimal point position is shifted due to an input type change from K2/J2 to other types, or to K2/J2 from others.

■ ALARM SETTING MODE : Hold down Alarm/↓ button for 3 seconds or more to enter Alarm Setting Mode.

PARAMETER	INDICATORS	DISPLAY	FUNCTION	DEFAULT VALUE
Alarm points	<input type="checkbox"/> H <input type="checkbox"/> L <input type="checkbox"/> Fnc	<i>RLn2</i>	Dual alarm: L, H	<i>RLn2</i>
	<input type="checkbox"/> HH <input type="checkbox"/> H <input type="checkbox"/> L <input type="checkbox"/> LL <input type="checkbox"/> Fnc	<i>RLn4</i>	Quad alarm: LL, L, H, HH	<i>RLn4</i>
LL setpoint	<input type="checkbox"/> LL <input type="checkbox"/> Fnc	- 1999 ... 9999*1	LL: Setpoint value	0020
LL trip action	<input type="checkbox"/> LL <input type="checkbox"/> Fnc	<i>LnHi</i>	LL: Hi trip	<i>LnLo</i>
		<i>LnLo</i>	LL: Lo trip	
LL deadband (hysteresis)	<input type="checkbox"/> P <input type="checkbox"/> LL <input type="checkbox"/> Fnc	0000 ... 9999	LL: Deadband (hysteresis) value	0001
LL ON delay time	<input type="checkbox"/> LL <input type="checkbox"/> D/P <input type="checkbox"/> Fnc	00 ... 99	LL: ON delay time (seconds)	00
LL coil at alarm	<input type="checkbox"/> LL <input type="checkbox"/> Fnc	<i>rYEn</i>	LL: Coil energized at alarm	<i>rYEn</i>
		<i>rYdn</i>	LL: Coil de-energized at alarm	
L setpoint	<input type="checkbox"/> L <input type="checkbox"/> Fnc	- 1999 ... 9999*1	L: Setpoint value	0030
L trip action	<input type="checkbox"/> L <input type="checkbox"/> Fnc	<i>LnHi</i>	L: Hi trip	<i>LnLo</i>
		<i>LnLo</i>	L: Lo trip	
L deadband (hysteresis)	<input type="checkbox"/> P <input type="checkbox"/> L <input type="checkbox"/> Fnc	0000 ... 9999	L: Deadband (hysteresis) value	0001
L ON delay time	<input type="checkbox"/> L <input type="checkbox"/> D/P <input type="checkbox"/> Fnc	00 ... 99	L: ON delay time (seconds)	00
L coil at alarm	<input type="checkbox"/> L <input type="checkbox"/> Fnc	<i>rYEn</i>	L: Coil energized at alarm	<i>rYEn</i>
		<i>rYdn</i>	L: Coil de-energized at alarm	
H setpoint	<input type="checkbox"/> H <input type="checkbox"/> Fnc	- 1999 ... 9999*1	H: Setpoint value	0070
H trip action	<input type="checkbox"/> H <input type="checkbox"/> Fnc	<i>HnHi</i>	H: Hi trip	<i>HnHi</i>
		<i>HnLo</i>	H: Lo trip	
H deadband (hysteresis)	<input type="checkbox"/> P <input type="checkbox"/> H <input type="checkbox"/> Fnc	0000 ... 9999	H: Deadband (hysteresis) value	0001
H ON delay time	<input type="checkbox"/> H <input type="checkbox"/> D/P <input type="checkbox"/> Fnc	00 ... 99	H: ON delay time (seconds)	00
H coil at alarm	<input type="checkbox"/> H <input type="checkbox"/> Fnc	<i>rYEn</i>	H: Coil energized at alarm	<i>rYEn</i>
		<i>rYdn</i>	H: Coil de-energized at alarm	
HH setpoint	<input type="checkbox"/> HH <input type="checkbox"/> Fnc	- 1999 ... 9999*1	HH: Setpoint value	0080
HH trip action	<input type="checkbox"/> HH <input type="checkbox"/> Fnc	<i>HnHi</i>	HH: Hi trip	<i>HnHi</i>
		<i>HnLo</i>	HH: Lo trip	
HH deadband (hysteresis)	<input type="checkbox"/> P <input type="checkbox"/> HH <input type="checkbox"/> Fnc	0000 ... 9999	HH: Deadband (hysteresis) value	0001
HH ON delay time	<input type="checkbox"/> HH <input type="checkbox"/> D/P <input type="checkbox"/> Fnc	00 ... 99	HH: ON delay time (seconds)	00
HH coil at alarm	<input type="checkbox"/> HH <input type="checkbox"/> Fnc	<i>rYEn</i>	HH: Coil energized at alarm	<i>rYEn</i>
		<i>rYdn</i>	HH: Coil de-energized at alarm	
Main display flashing at alarm	<input type="checkbox"/> Fnc	<i>b 0</i>	No flashing	<i>b 0</i>
		<i>b 1</i>	Flashing in 1.0 sec. intervals	
		<i>b 2</i>	Flashing in 0.5 sec. intervals	
		<i>b 3</i>	Flashing in 0.2 sec. intervals	
		<i>b 4</i>	Flashing in 0.1 sec. intervals	

Note 1: Alarm Setting Mode is locked with no-alarm-output type.

Alarm points depend upon the model suffix code. LL and HH setpoints are usable only for quad alarm type.

Note 2: LED status: = ON, = Blinking

Note 3: Alarm is disabled when '----' is specified for the setpoint.

Note 4: All alarm setpoints are disabled (reset to '----' status) when the input type has been changed. Re-setting is required.

*1. -199.9 to 999.9 for K2 and J2 input type.

■ ADVANCED SETTING MODE :

Hold down Alarm/↓ + Init/↑ buttons at once for 3 seconds or more to enter Advanced Setting Mode.

PARAMETER	INDICATORS	DISPLAY	FUNCTION	DEFAULT VALUE
Moving average	[Fnc]	R o F F	No moving averaging	R o F F
		R 2	Moving average with 2 samples	
		R 4	Moving average with 4 samples	
		R 8	Moving average with 8 samples	
Brightness	[D/P] [Fnc]	[1	Brightness level 1 (dark)	[3
		[2	Brightness level 2	
		[3	Brightness level 3	
		[4	Brightness level 4	
		[5	Brightness level 5 (bright)	
Automatic return time to Measuring Mode	[D/P] [Fnc]	r 00... r 99	Specify in seconds	r 15
Transition time to Lockout Setting Mode	[D/P] [Fnc]	P 00... P 99	Specify in seconds	P 05
Burnout *1	[Fnc]	b n U	Upscale burnout	b n U
		b n d	Downscale burnout	
CJC sensor	[Fnc]	[o F F	CJC sensor Disabled	[o n
		[o n	CJC sensor Enabled	
Display refreshing rate *2	[Fnc]	F 000... F 999	Specify in seconds	F 000
Version indication	[Fnc]	N/A	Version number, indication only	N/A

Automatic return time to Measuring Mode: The display goes back automatically to Measuring Mode if the front buttons are left untouched for the specified time period while it is in one of the setting modes (except the loop test output mode).

With this value set to 0, the display must always be exited manually from the setting mode.

Transition time to Lockout Setting Mode: The display goes to Lockout Setting Mode only when the designated buttons are pressed for the specified time duration.

CJC sensor: Specify either the cold junction compensation is enabled or not.

*1. Do not change the setting while in the burnout condition.

*2. F00.0 = 100 msec. refreshing rate

■ LOCKOUT SETTING MODE :

Hold down Alarm/↓ + Max/Min buttons at once for a preset time duration to enter Lockout Setting Mode.

PARAMETER	INDICATORS	DISPLAY	FUNCTION	DEFAULT VALUE
Alarm setting lockout	[D/P] [Fnc]	R o F F	Unlock Alarm Setting Mode	R o F F
		R o n	Lock Alarm Setting Mode	
Initial setting lockout	[D/P] [Fnc]	i o F F	Unlock Initial Setting Mode	i o F F
		i o n	Lock Initial Setting Mode	
Advanced setting lockout	[D/P] [Fnc]	d o F F	Unlock Advanced Setting Mode	d o F F
		d o n	Lock Advanced Setting Mode	
Loop test output lockout	[D/P] [Fnc]	t o F F	Unlock Loop Test Output Mode	t o F F
		t o n	Lock Loop Test Output Mode	
Initialization	[D/P] [Fnc]	r o F F	No initialization	r o F F
		r E S t	Execute Initialization	

■ LOOP TEST OUTPUT MODE :

Hold down Alarm/↓ + Init/↑ + Shift buttons at once for 5 seconds or more to enter Loop Test Output Mode.

PARAMETER	INDICATORS	DISPLAY	FUNCTION	DEFAULT VALUE
Loop test output	[Ini] [Alm] [D/P] [Adj] [Fnc] [Min] / [Max]	- 1999... 9999*1 (display blinking)	Temperature value for the loop test output	N/A

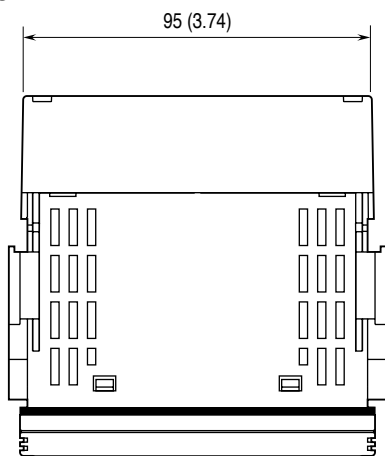
Loop test output: Pressing [Shift] button switches the signal to increase ([Max] ON) or decrease ([Min] ON), and then pressing [Up] button controls it toward the desired output value.

*1. Temperature value can be specified within the usable range for the respective sensor types.

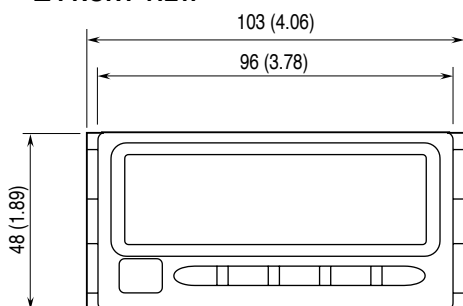
Decimal point position for K2 and J2 input type: -199.9 to 999.9

EXTERNAL DIMENSIONS & TERMINAL ASSIGNMENTS unit: mm (inch)

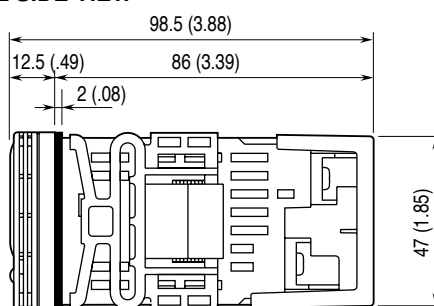
■ TOP VIEW



■ FRONT VIEW

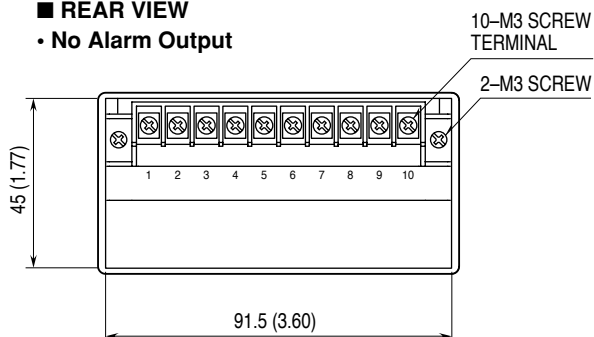


■ SIDE VIEW

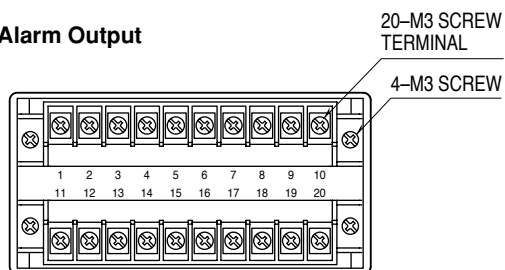


■ REAR VIEW

• No Alarm Output

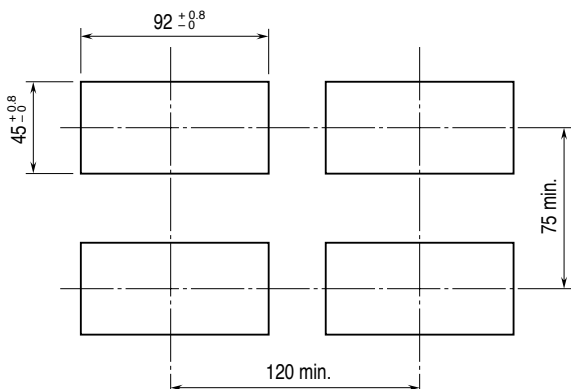


• Alarm Output



MOUNTING REQUIREMENTS

■ PANEL CUTOUT unit: mm



Panel thickness: 1.6 to 8.0 mm