

Super-mini Signal Conditioners *Mini-M Series*

THERMOCOUPLE TRANSMITTER
(PC programmable)

MODEL **M2XT2**

MODEL & SUFFIX CODE SELECTION

MODEL _____ M2XT2-□□-□□

INPUT THERMOCOUPLE*1 _____

1 : (PR)	8 : S
2 : K (CA)	9 : C (WRe 5-26)
3 : E (CRC)	N : N
4 : J (IC)	U : U
5 : T (CC)	L : L
6 : B (RH)	P : Platinel II
7 : R	0 : Specify

OUTPUT*2 _____

Current
Z1 : Range 0 – 20mA DC

Voltage
V1 : Range -2.5 – +2.5V DC
V2 : Range -10 – +10V DC

POWER INPUT

AC Power	DC Power
M2 : 100 – 240V AC	R : 24V DC
	P : 110V DC

STANDARDS & APPROVALS

/N : Without CE or UL
/CE : CE marking
/UL : UL approval (CE marking)

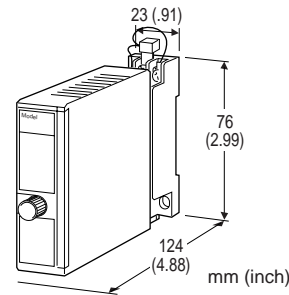
*1: Configurator software is used to change input type and temperature range.

*2: Configurator software is used to change output over the described range of the selected suffix code. For changing out of this range, set the Output Range Selectors inside the unit before software adjustment.

ORDERING INFORMATION

Specify code number and variables. Factory setting (table to the right) will be used if not otherwise specified. K thermocouple setting will be used if the input code is not specified.

- **Code number** (e.g. M2XT2-2Z1-M2/CE)
- **Temperature range** (e.g. 0 – 800°C)
- **Output range** (e.g. 4 – 20mA DC)



Functions & Features

- Accepts direct input from a thermocouple and provides a linearized process signal
- PC programmable
- Wide selection of thermocouples
- Wide ambient temperature range
- User's temperature table can be used
- CE marking
- UL approval

Typical Applications

- Small burnout sensing current enables long distance transmission with minimum offset drifts
- Electric furnace (isolation ensured even when 200V AC power for heater leaks through furnace wall)
- No burnout type can connect to a single T/C in parallel with a recorder
- Ideal for quick spare part

INPUT CODE	DEFAULT	
1	PR	0 – 1600°C
2	K	0 – 1000°C
3	E	0 – 500°C
4	J	0 – 500°C
5	T	0 – 300°C
6	B	0 – 1800°C
7	R	0 – 1600°C
8	S	0 – 1600°C
9	C (WRe 5-26)	0 – 2000°C
N	N	0 – 1000°C
U	U	0 – 300°C
L	L	0 – 500°C
P	Platinel II	0 – 1200°C
OUTPUT CODE	DEFAULT	
Z1	4 – 20mA DC	
V1	0 – 1V DC	
V2	1 – 5V DC	

RELATED PRODUCTS

- **JX configurator connection kit** (model: JXCON)

GENERAL SPECIFICATIONS**Construction:** Plug-in**Connection:** M3 screw terminals (torque 0.8 N·m)**Housing material:** Flame-resistant resin (black)**Isolation:** input to output to power**Overrange output:** Approx. -15 – +115%
(Negative current output is not provided.)**Manual zero/span adjustments:** See Front View.**Programming:** Downloaded from PC; T/C type, temp. range, output range, zero and span, simulating output, etc.**Burnout protection:** Upscale standard; downscale or no burnout optional by programming (Set to "no burnout" when the M2XT2 is connected with another instrument in parallel.)**Linearization:** Standard**Cold junction compensation:** CJC sensor attached to the input terminals**Status indicator LED:** Flashing patterns indicate different operating status of the transmitter.**Configurator connection:** 2.5 dia. miniature jack; RS-232C level**INPUT & OUTPUT****■THERMOCOUPLE:** See Table 1.**Zero suppression/elevation:** Available**Input resistance:** 1MΩ minimum**Burnout sensing:** 45nA ±10%**Temperature range:** See Table 1.**■OUTPUT****•DC Current:** 0 – 20mA DC**Operational range:** 0 – 24mA DC**Minimum span:** 1mA**Zero suppression:** Available**Load resistance:** Output drive 15V maximum
(e.g. 4 – 20mA: 750Ω [15V/20mA])**•DC Voltage:** -2.5 – +2.5V DC for V1;
-10 – +10V DC for V2**Operational range:** -3 – +3V DC for V1;
-11.5 – +11.5V DC for V2**Minimum span:** 250mV for V1; 1V for V2**Zero suppression/elevation:** Available**Load resistance:** Output drive 1mA maximum
(e.g. 1 – 5V: 5000Ω [5V/1mA])**INSTALLATION****Power input****AC:** Operational voltage range 85 – 264V
(90 – 264V for UL);
47 – 66 Hz, approx. 2.3VA**DC:** Operational voltage range for R: 24V ±10%
or P: 85 – 150V (110V ±10% for UL);
approx. 0.9W (ripple 10% p-p max.)**Operating temperature:** -30 to +60°C (-22 to +140°F)**Operating humidity:** 30 to 90% RH (non-condensing)**Mounting:** Surface or DIN rail**Dimensions:** W23×H90×D124 mm (0.91"×3.54"×4.88")
See General Spec. Sheet Figure A-2.**Weight:** 120 g (0.26 lbs)**Terminal assignment:** See General Spec. Sheet Figure B-4.**PERFORMANCE****Accuracy:** See Table 1.**Cold junction compensation error:** ±0.5°C or ±0.9°F
maximum (at 25°C ±10°C or 77°F ±18°F)**Temp. coefficient:** ±0.015%/°C (±0.008%/°F) at -5 to
+55°C (23 to 131°F) of the maximum span**Response time:** ≤0.9 seconds (0 – 90%)**Burnout response:** ≤10 seconds**Line voltage effect:** ±0.1% over voltage range**Insulation resistance:** ≥100MΩ with 500V DC**Dielectric strength:** 2000V AC @1 minute
(input to output to power to ground)**STANDARDS & APPROVALS****CE conformity:** EMC Directive (89/336/EEC)

EMI EN61000-6-4

EMS EN61000-6-2

Low Voltage Directive (73/23/EEC)

EN61010-1

Installation category II

Pollution degree 2

Max. operating voltage 300V

Input or output to power – Reinforced insulation

Input to output – Basic insulation

Approval: UL/C-UL nonincendive Class I, Division
2, Groups A, B, C, and D hazardous locations
(UL 1604, CAN/CSA-C22.2 No.213);
UL/C-UL general safety requirements
(UL 3111-1, CAN/CSA-C22.2 No.1010-1)

INPUT TYPE, RANGE & ACCURACY
TABLE 1

THERMOCOUPLE	°C				°F			
	MIN. SPAN	MAXIMUM RANGE	CONFORMANCE RANGE	ACCURACY *1	MIN. SPAN	MAXIMUM RANGE	CONFORMANCE RANGE	ACCURACY *1
(PR)	20	0 to 1760	0 to 1760	±1.00	36	32 to 3200	32 to 3200	±1.80
K (CA)	20	-270 to +1370	-150 to +1370	±0.25	36	-454 to +2498	-238 to +2498	±0.45
E (CRC)	20	-270 to +1000	-170 to +1000	±0.20	36	-454 to +1832	-274 to +1832	±0.36
J (IC)	20	-210 to +1200	-180 to +1200	±0.25	36	-346 to +2192	-292 to +2192	±0.45
T (CC)	20	-270 to +400	-170 to +400	±0.25	36	-454 to +752	-274 to +752	±0.45
B (RH)	20	100 to 1820	400 to 1760	±0.75	36	212 to 3308	752 to 3200	±1.35
R	20	-50 to +1760	200 to 1760	±0.50	36	-58 to +3200	392 to 3200	±0.90
S	20	-50 to +1760	0 to 1760	±0.50	36	-58 to +3200	32 to 3200	±0.90
C (WRe 5-26)	20	0 to 2315	0 to 2315	±0.80	36	32 to 4199	32 to 4199	±1.44
N	20	-270 to +1300	-130 to +1300	±0.30	36	-454 to +2372	-202 to +2372	±0.54
U	20	-200 to +600	-200 to +600	±0.20	36	-328 to +1112	-328 to +1112	±0.36
L	20	-200 to +900	-200 to +900	±0.25	36	-328 to +1652	-328 to +1652	±0.45
P (Platinel II)	20	0 to 1395	0 to 1395	±0.25	36	32 to 2543	32 to 2543	±0.45

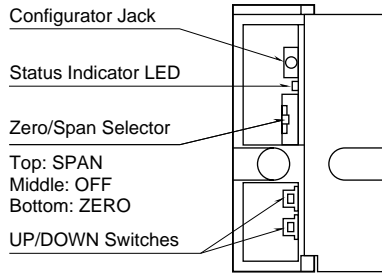
*1. [Accuracy + Cold Junction Compensation Error 0.5°C (0.9°F)] or ±0.1% of span, whichever is greater.
If the selected output span equals to or narrower than the one-tenth of the maximum span, add 0.2%.

■ CALCULATION EXAMPLES OF OVERALL ACCURACY IN %

- 1) K thermocouple, 0 – 1000°C, 4 – 20mA DC output
 Absolute value accuracy (Table 1): 0.25°C
 CJC error (0.5°C) added: 0.75°C
 $0.75^{\circ}\text{C} / 1000^{\circ}\text{C} \times 100 = 0.075 \% < 0.1\%$
 Output span 16mA (20 – 4) ≥ 2mA (max. span 20mA × 0.1) ⇒ No adding 0.2%
 ⇒ Overall accuracy including CJC error = ±0.1% of span
- 2) K thermocouple, 50 – 150°C, 2.0 – 2.5V DC output
 Absolute value accuracy (Table 1): 0.25°C
 CJC error (0.5°C) added: 0.75°C
 $0.75^{\circ}\text{C} / (150 - 50)^{\circ}\text{C} \times 100 = 0.75 \% > 0.1\%$
 Output span 0.5V (2.5 – 2.0) ≤ 0.5 (max. span 5V × 0.1) ⇒ Add 0.2%
 ⇒ Overall accuracy including CJC error = 0.75 + 0.2 = ±0.95% of span

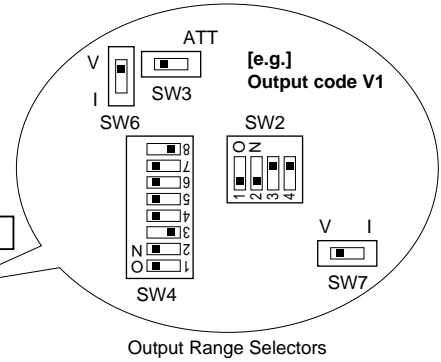
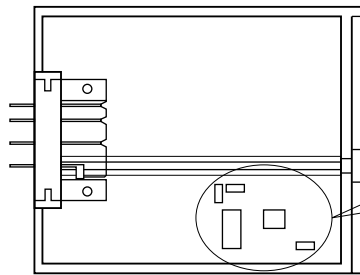
FRONT & SIDE VIEWS

■ **FRONT VIEW (with cover open)**



The front cover cannot be turned open by 180 deg. when there is no extra space between units.

■ **LEFT SIDE VIEW (with cover removed)**



Manual zero/span adjustments: $\pm 5\%$ (set to 0% and 100% respectively at factory)

Zero/span selector

ZERO: UP/DOWN switches usable for zero adjustment.

OFF: UP/DOWN switches unavailable.

SPAN: UP/DOWN switches usable for span adjustment.

UP/DOWN switches

UP: Pressing UP increases adjusted values.

DOWN: Pressing DOWN decreases adjusted values.

(Press both switches at once for resetting zero/span adjustments.)

Input range selector: fixed to Bottom position

Output range selectors

	SW2				SW3
	1	2	3	4	
V1	OFF	OFF	ON	ON	Not ATT
V2	OFF	OFF	ON	ON	Not ATT
Z1	ON	ON	OFF	OFF	Not ATT

	SW4							
	1	2	3	4	5	6	7	8
V1	ON	ON	OFF	ON	ON	*	ON	OFF
V2	ON	OFF	ON	OFF	ON	*	ON	OFF
Z1	OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF

	SW6		SW7	
	V	I	V	I
V1	ON	OFF	ON	OFF
V2	ON	OFF	ON	OFF
Z1	OFF	ON	OFF	ON

*Don't care.

SCHEMATIC CIRCUITRY & CONNECTION DIAGRAM

