

SPECIFICATIONS

Display

3 + 3 digit, 7 segment digital display

LED Indications

R: Control output ON

Keys

3 keys for digital setting

INPUT SPECIFICATIONS

Input Signal

Thermocouple (J, K, T, R, S) / RTD (Pt100)

Sampling time

250 ms

Input Filter (FTC)

0.2 to 10.0 sec

Resolution

Fixed 1° resolution

Temperature Unit

°C / °F selectable

Indication Accuracy

For TC inputs : 0.25% of FS ±1° For R & S inputs: 0.5% of F.S ± 2° (20 min of warm up time for TC inputs) For RTD inputs : 0.1% of FS ±1°

FUNCTIONAL SPECIFICATIONS Control Method

1) PID control with auto tuning

2) ON-OFF control

Proportional Band (P)

1 to 400°

Integral Time (I)

0.0 to 99.9 min

Derivative Time (D)

0 to 999 sec

Cycle Time

0.1 to 99.9 sec

Hysteresis Width

0.1 to 99.9°

Manual Reset Value

-19.9 to 19.9°

CONTROL OUTPUT: Relay or SSR

(One output at a time)

Relay contact (SPDT)

10 A @ 250V AC / 30V DC, resistive

SSR Drive Output (Voltage Pulse)

12V DC, 50 mA

POWER SUPPLY

Supply Voltage

85 to 270V AC/DC (AC: 50 or 60Hz)

OPTIONAL - 24V AC/DC

5VA max @230V AC

Temperature

Power Consumption

Operating: 0 to 50°C; Storage: -20 to 75°C

Humidity (non-condensing)

95% RH

Weight

TC533AX: 129 gms TC233AX : 180 gms TC333AX : 240 gms

SAFETY PRECAUTIONS

All safety related codifications, symbols and instructions that appear in this operating manual or on the equipment must be strictly followed to ensure the safety of the operating personnel as well as the instrument.

If the equipment is not handled in a manner specified by the manufacturer it might impair the protection provided by the equipment.

Read complete instructions prior to installation and operation of the unit.

WARNING: Risk of electric shock.

WIRING GUIDELINES

MARNING:

- 1. To prevent the risk of electric shock power supply to the equipment must be kept OFF while doing the wiring arrangement. Do not touch the terminals while power is being supplied.
- 2. To eliminate electromagnetic interference use short wire with adequate ratings; twists of the same in equal size shall be made. For the input and output signal lines, be sure to use shielded wires and keep them away from each other.
- 3. Cable used for connection to power source, must have a cross section of 1mm2 or greater. These wires shall have insulation capacity made of at least 1.5kV.
- 4. When extending the thermocouple lead wires, always use thermocouple compensation wires for wiring. For the RTD type, use a wiring material with a small lead resistance (5 Ω max per line) and no resistance differentials among three wires.
- 5. A better anti-noise effect can be expected by using standard power supply cable for the instrument.

MAINTENANCE

- 1. The equipment should be cleaned regularly to avoid blockage of ventilating parts.
- 2. Clean the equipment with a clean soft cloth. Do not use Isopropyl alcohol or any other cleaning agent.

INSTALLATION GUIDELINES

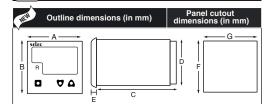
- 1. This equipment, being built-in-type, normally becomes a part of main control panel and in such case the terminals do not remain accessible to the end user after installation and internal wiring.
- 2. Do not allow pieces of metal, wire clippings, or fine metallic fillings from installation to enter the product or else it may lead to a safety hazard that may in turn endanger life or cause electrical shock to the operator.

- 3. Circuit breaker or mains switch must be installed between power source and supply terminals to facilitate power 'ON' or 'OFF' function. However this switch or breaker must be installed in a convenient position normally accessible to the operator.
- 4. Use and store the temperature controller within the specified ambient temperature and humidity ranges as mentioned in this manual.

CAUTION

- 1. When powering up for the first time, disconnect the output connections.
- 2. Fuse Protection: The unit is normally supplied without a power switch and fuses. Make wiring so that the fuse is placed between the mains power supply switch and the controller. (2 pole breaker fuse- rating: 275V AC,1A for electrical circuitry is highly recommended)
- 3. Since this is a built-in-type equipment (finds place in main control panel), its output terminals get connected to host equipment. Such equipment shall also comply with basic EMI/EMC and other safety requirements like BSEN61326-1 and BSEN61010 respectively.
- 4. Thermal dissipation of equipment is met through ventilation holes provided on chassis of equipment. Such ventilation holes shall not be obstructed else it can lead to a safety hazard.
- 5. The output terminals shall be strictly loaded to the manufacturer specified values/range.

MECHANICAL INSTALLATION



MODELS	Α	В	С	D	E	F	G
TC533AX	52	52	94	45	4	46	46
TC233AX	72	72	83.7	67	4.5	69	69
TC333AX	96	96	73	90.5	5	92	92

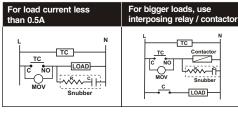
- 1. Prepare the panel cutout with proper dimensions as
- 2. Remove the clamp from the controller and push the controller into the panel cutout. Insert the clamp from the rear side until the main unit is securely fit into the panel.
- 3. The equipment in its installed state must not come in close proximity to any heating sources, caustic vapors, oils, steam, or other unwanted process by-products.
- 4. Use the specified size of crimp terminals (M3.5 screws) to wire the terminal block. Tighten the screws on the terminal block using the tightening torque within the range of 1.2 N.m.
- 5. Do not connect anything to unused terminals.

EMC Guidelines :

- 1. Use proper input power cables with shortest connections and twisted type.
- 2. Layout of connecting cables shall be away from any internal EMI source.

LOAD CONNECTIONS

- 1. The service life of the output relays depends on the switching capacity and switching conditions. Consider the actual application conditions and use the product within the rated load and electrical service life.
- 2. Although the relay output is rated at 10 amps it is always necessary to use an interposing relay or contactor that will switch the load. This avoids damage to the controller in the event of a fault short developing on the power output circuit.
- 3. Always use a separate fused supply for the "power load circuit"and do not take this from the live and neutral terminals supplying power to the controller.



ELECTRICAL PRECAUTIONS DURING USE

Electrical noise generated by switching of inductive loads can create momentary disruption, erratic display, latch up, data loss or permanent damage to the instrument.

To reduce noise:

Connect thermocouple

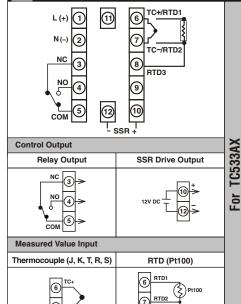
sensor according to

Doc. Name: OP INST

polarity shown.

- a) Use of snubber circuits across loads as shown above, is recommended.
- b) Use separate shielded wires for inputs.

TERMINAL CONNECTIONS



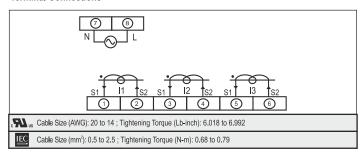
TC533AX / TC233AX / TC333AX OP293-V05 (Page 1 of 3)

For 2-wire RTD input

short terminals 7 and 8

MA2301 Ammeter - Digital

Terminal Connections



Ordering Information

Part No.	Supply	Voltage	Certification		
	110V AC	240V AC	C€	cUL us LISTED	
MA2301		-			
MA2301-230V-CE			•		
MA2301-110V-CU	-		-	-	

Note: CT Type-There is an internal CT with CT setting (5-5000A). For current input >5A, external CT is required.

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