

selecTC544A / TC244AX / TC344AX /
DTC204A-2 / DTC324A-2

Operating Instructions

**SPECIFICATIONS****Display**

4+4 digit 7-segment digital display
 4 digit DTC204A-2 / TC324A-2

LED Indications

1: Output ON
 2: Output OFF
 T: Auto tune
 S: Display mode (Application TC544A/AX)

Keys

3 key digital setting

INPUT SPECIFICATIONS**Input Signal**

Thermocouple (RTD Pt100)

Sampling time

250 ms

Input Filter (FTC)

0.2 to 0.5 sec

Resolution

0.1% of TC/RTD input or 0.5% of input

Temperature Unit

°C/°F selectable

Indication Accuracy

For TC inputs: $\pm 0.25\%$ of $F.S \pm 1^\circ$
 For R & S inputs: $\pm 0.5\%$ of $F.S \pm 2^\circ$
 (2 min warm up time for TC input)
 For RTD inputs: $\pm 0.1\%$ of $F.S \pm 1^\circ$
 (F.S = Full Scale)

FUNCTIONAL SPECIFICATIONS**Control Method**

- 1) PID control auto tuning
- 2) ON-OFF control
- 3) Heat-Cool auto-tuning

Proportional Band (P)

10 to 400%

Integral Time (I)

0 to 999 sec

Derivative Time (D)

0 to 999 sec

Cycle Time

0.1 to 9.9 sec

Hysteresis Width

0.1 to 9.9%

Dwell Timer

0 to 999 min (only for TC544A/AX)

Manual Reset Value

-19.9 to 19.9

HEAT COOL PID**Control Method**

PID

Proportional Band-Cool

0.0 to 400.0%

Cycle Time-Cool

0.1 to 99.9 sec

Dead Band

SPL to SP (programmable)

OUTPUT**Control Output (Relay or SSR user selectable):****Relay Contact (SPDT)**

0.5A resistive @ 250V/30V (DC) 544A P.S.R.V.
 10A resistive* @ 250V AC / 30V DC
 (*For DTC204A-2 / DTC324A-2)

SSR Drive Output (Voltage Pulse)

12V DC, 50 mA

Auxiliary Output:**Relay Contact (SPDT)**

0.5A resistive @ 250V AC (DC) 344A P.S.R.V.

SSR Drive Output (Voltage Pulse)

12V DC, 50 mA

POWER SUPPLY**Supply Voltage**

85 to 240V AC (50 or 60 Hz)
 Optional - 24V AC/DC

Power Consumption

6 W max @ 230V AC

Temperature

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

Humidity (non-condensing)

95% RH

Weight

TC544A : 142 gms
 TC244AX / DTC204A-2 : 200 gms
 TC344AX / DTC324A-2 : 252 gms

SAFETY PRECAUTIONS

All safety related codifications, symbols that appear in the manual must be strictly followed to ensure the safe operation of the equipment. If the equipment is handled in a manner specified by the manufacturer, the protection provided by the equipment is maintained.

Read the complete instruction manual before installation and operation of the unit.

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WARNING: Risk of electric shock.

WIRING GUIDELINES

WARNING:

1. To prevent the risk of electric shock, 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, the wiring with adequate shielding should be made. The painted output terminal lines should be shielded and kept away from each other.
3. Cables for connection to power source must have a cross-sectional area more than the size of the wires. The insulation must be at least 5kV.
4. When extending the thermocouple wires, use thermocouple compensation wires of the same type and wiring material with small resistance difference in the extension wires.
5. A better anti-noise effect can be expected by using standard power supply 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 is a built-in type and can be mounted on a panel in a dry place. Do not install it in a place where it is exposed to direct sunlight, rain, or other environmental factors.
2. Do not allow pieces of metal wire to slip into the terminal block. If necessary, use a safety cap to cover the terminal block.
3. Circuit breaker or switch must be installed between power source and supply terminal to facilitate ON/OFF function. However, this switch must be installed in a convenient place for the operator.
4. Use and store the equipment in a dry place. Do not use it in a humid or corrosive environment.

CAUTION

1. When powering up for the first time, disconnect the output connections.
2. Fuse protection should be normally supplied with the power switch. Make sure the fuse is placed in the correct position. The fuse rating should be 2.5A AC, 1A or 1.5A DC (highly recommended).
3. Since this is a built-in type, the equipment should be connected to the main control panel. Do not connect it to the output terminals of the equipment. Such equipment should comply with basic EMC/EMF and other safety requirements like BSEN61326-1 and BSEN61010 respectively.
4. Thermal dissipation of equipment is met through ventilation holes. Do not obstruct the ventilation holes. Do not place the equipment in a place where it is exposed to direct sunlight or other heat sources.
5. The output terminals should be strictly guarded by the manufacturer's specification.

MECHANICAL INSTALLATION

Outline Dimensions		Panel Cutout						
MODELS	DIM	A	B	C	D	E	F	G
TC544A		52	52	94	45	4	46	46
TC244AX / DTC204A-2		72	72	83.7	67	4.5	69	69
TC344AX / DTC324A-2		96	96	73	90.5	5	92	92

1. Prepare the panel to the dimensions shown above.
2. Fit the unit into the panel with the help of clamps.
3. The equipment is installed at a distance of 10mm from the top, bottom, and side of the panel.

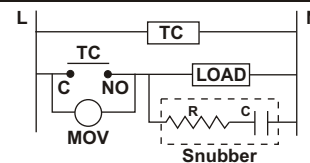
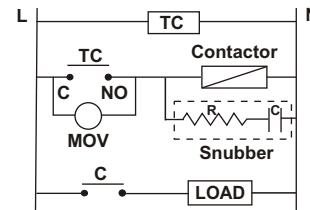
4. Use the specified screws to secure the equipment. The screws should be tightened to a torque of 0.5 Nm.
5. Do not connect the equipment to the power source until the installation is completed.

EMC GUIDELINES

1. Use proper power cable with shortest connection length.
2. Lay out the connection cable as far away from any interference source.

LOAD CONNECTIONS

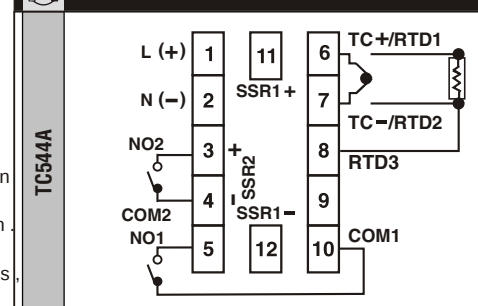
1. The service life of the output relay depends on the switch capacity. Do not consider the actual application conditions when selecting the product with the rated capacity.
2. Although the relay output is rated at 5/10A, it is always necessary to use an interposing relay or contactor to switch the load. This avoids damage to the control circuit and prevents the development of the output circuit.
3. Always use a separate supply for the power and control circuit. Do not take the line and neutral terminals of the power supply as the control terminals of the controller.

For load current less than 0.5A**For bigger loads, use interposing relay / contactor****ELECTRICAL PRECAUTIONS DURING USE**

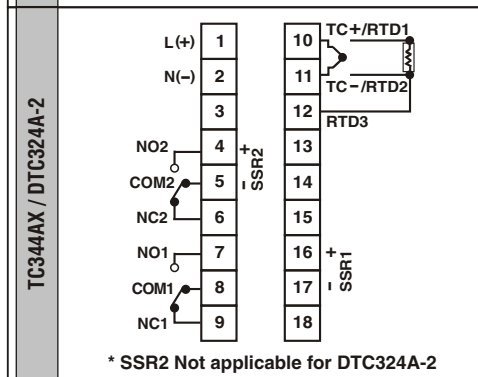
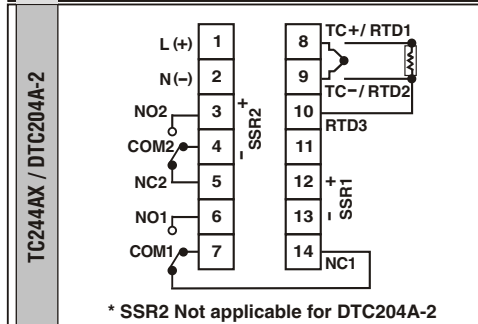
Electrical signals with inductive loads can create momentary disruption, erratic display, top data loss, or permanent damage to the instrument.

To reduce noise:

- a) Use of snubber circuit as shown above is recommended.
- b) Use separate line and neutral inputs.

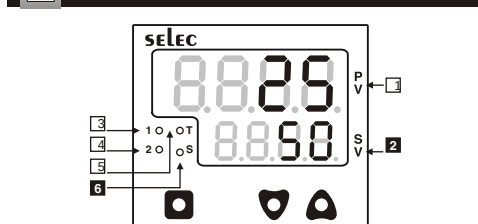
TERMINAL CONNECTIONS

TERMINAL CONNECTIONS



Use only the correct thermocouple wire or compensating cable from the probe to instrument terminals avoiding joints in the cable if possible. Failure to use the correct wire type will lead to inaccurate readings. Ensure that the input sensor connected at the terminals and the input type set in the temperature controller configuration are the same.

FRONT PANEL DESCRIPTION



1	Process-value display	1) Displays a process value 2) Displays the parameter name at configuration mode / display 3) Displays PV error condition (refer to page 2)
2	Parameter selection display	1) Displays the parameter selection at configuration mode / only (Not applicable for DTC204A-2 / DTC324A-2)
3	Control output 1 indication	The LED is lit when the control output 1 is ON
4	Control output 2 indication	The LED is lit when the control output 2 is ON
5	Tune	Auto tune : Blinking
6	Dwell timer	Blinking : Dwell timer is in operation Continuous : One shot (Not applicable for DTC204A-2 / DTC324A-2)

FRONT KEYS DESCRIPTION

FUNCTIONS	KEY PRESS
ONLINE	
To view Level 1	Press key for 3 sec.
To view Level 2	Press key for 3 sec.
To view Protection	Press + keys for 3 sec.
TCX44A/AX	Lower display selectable between SET1/SET2 / key
To view online parameters	Press key
NOTE : Elapsed / Remaining time dependent on selected parameter in level 1. (Not applicable for DTC204A-2 / DTC324A-2)	
DTC204A-2 / DTC324A-2	Display selectable between SET1/SET2 using key Note : Display shows parameter SET1/SET2 for 1 sec.
To view online parameters	Press key
To change online parameter value	Press + to change parameter value.
PROGRAMMING MODE	
To view parameter	Press key once to view the next or the same level previous function in operation.
To increase or decrease the value of a particular parameter	Press to increase the function value. to decrease the function value. Note : Parameter value will not be altered when respective level is locked.
NOTE : The unit will auto exit programming mode after 30 sec. of inactivity	
OR By pressing + + keys for 3 sec.	

INPUT RANGES (Table 1)			
FOR RTD			
INPUT	RANGES		
Resolution	1	0.1	
Pt100	°C	- 50 to 50	- 50 to 50
	°F	- 58 to 162	- 99 to 99

FOR THERMOCOUPLE			
INPUT	RANGES		
Resolution	1	0.1	
J	°C	- 99 to 750	- 99 to 750
	°F	- 288 to 1382	- 99 to 99
K	°C	- 99 to 1350	- 99 to 99
	°F	- 288 to 2462	- 99 to 99
T	°C	- 99 to 400	- 99 to 750
	°F	- 288 to 750	- 99 to 750
R & S	°C	0 to 1750	N/A
	°F	32 to 3182	N/A

ERROR DISPLAY (Table 2)			
Error	Meaning	Control Output Status	
SbP	Sensor break / over range condition	OFF	
SPE	Sensor error / under range condition	OFF	

TCX44A/AX

Programming online parameters

Setpoint 1 Default : 50
Range : ± 999.9 °C / ± 1999.9 °F
If upper display is selected as Setpoint 1, Press key will show on Upper display <50> Lower display: <OFF>
Press + / keys to increment / decrement value.

Setpoint 2 / Dead band Default : 0
Range : ± 999.9 °C / ± 1999.9 °F
If upper display is selected as Setpoint 2, Press key will show on Upper display: <0> Lower display: <OFF>
Press + / keys to increment / decrement value.

Dwell Timer Default : OFF
Range : OFF to 9999 min
If upper display is selected as Dwell Timer, Press key will show on Upper display: <OFF> Lower display: <OFF>
Press + / keys to increment / decrement time value.

DTC204A-2 / DTC324A-2

Programming online parameters

Setpoint 1 Default : 50
Range : ± 999.9 °C / ± 1999.9 °F
If online parameters selected as Setpoint 1, Press key will show on Upper display: <50> Lower display: <OFF>
Press + / keys to increment / decrement Setpoint 1 value.

Setpoint 2 / Dead band Default : 0
Range : ± 999.9 °C / ± 1999.9 °F
If upper display is selected as Setpoint 2, Press key will show on Upper display: <0> Lower display: <OFF>
Press + / keys to increment / decrement Setpoint 2 / value.

CALIBRATION CERTIFICATE

Date : _____

Model No : _____

Claimed Accuracy :
For TC inputs : $0.25\% \text{FS} \pm 1^\circ$
For R & S inputs : $0.5\% \text{ of F.S} \pm 2^\circ$
(20 min of warm up time for TC input)
For RTD inputs : $0.1\% \text{FS} \pm 1^\circ$

Sources calibrated against :
_____ / _____ then,

Multimeter calibration report no :
_____ / _____

The calibration of this unit has been verified following values :

SENSOR	CALIBRATION TEMP (°C)	DISPLAY VALUE (°C)
J	35.0	35.0
	300.0	300.0
	600.0	600.0
K	35.0	35.0
	700.0	700.0
PT100	1350	1350
	0.0	0.0
	400.0	400.0
	800.0	800.0

The thermocouple RTD curves are linearized with this microprocessor product hence the values interpolated between the readings show over also equally accurate at every point in the curve.

Units accepted as accuracy with the specification of claim accuracy certificate valid up to one year from the date of issue.

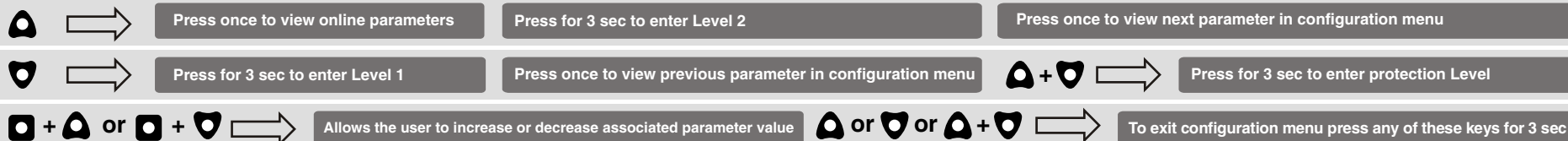
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DTC204A-2 / DTC324A-2

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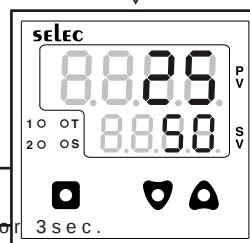
CONFIGURATION INSTRUCTIONS

KEY FUNCTIONS



OPERATIONAL MENU

POWER ON



Note: At power ON lower display shows (momentary) input type
*Lower display not applicable for DTC204A-2 / DTC324A-2

Press key for 3sec

Press key for 3sec.

Press + keys for 3sec.

Level 1				
Display	Description	Default Value	Range	Display Condition
INPT	Input type (Refer to 1)	J	J/K/T/R/S/R	—
RESL	Display Resolution	1/0.1		Not prompted for R & S type
UNIT	Temperature unit	°C	°C/°F	—
SPLL	Set point low	4.0	Min range of sensor selected to SPHL	—
SPHL	Set point high	15.0	SPLL to Max range of sensor selected	—
FILT	Filter time constant	10.2	10.2 to 10.0 sec	—
ACT1	Control action for relay 1	RE	RE/FD	Not prompted for HC=YES
CNTL	Control logic	PID	PID/ONF	—
OUT	Control Output selection	REL	REL/SSR	—
DWEL	Dwell mode enable	NO	NO/YES	—
HC	Heat-cool mode selection	NO	NO/YES	—
ACT2	Control action for relay 2	RE	RE/FD/TIME	When HC=NO, TIME prompted when DWEL=YES
ACT2	Relay 2 type	DEV	DEV/ABS	When ACT2=RE/FD
ONL	Online menu for time	REM	REM/N/ELPS	When DWEL=YES
ARST	Anti-reset wind	25.0	1.0 to 100.0 %	When CNTL=PID
FACT	Factory default (Reset all)	NO	NO/YES	—

Level 2				
Display	Description	Default Value	Range	Display Condition
TUNE	Tune	OFF	OFF/ON	For CNTL=PID
P	Proportional band	10	1.0 to 400.0 %	For CNTL=PID
I	Integral time	120	0 to 9999 sec	For CNTL=PID
D	Derivative time	30	0 to 9999 sec	For CNTL=PID
CYC1	Cycle time manual	OFF	AUTO/USRF	For CNTL=PID
CYC2	Cycle time	15.0	0.1 to 99.9 sec	For CNTL=PID
HYS1	Hysteresis 1	1.0	0.1 to 99.9 %	For CNTL=ONF
MANR	Manual reset	0.0	-19.9 to +19.9	For CNTL=RD & HC=NO
PB	Proportional band-cool	10	1.0 to 400.0 %	For CNTL=RD & HC=YES
CYC3	Cycle time-cool	15.0	0.1 to 99.9 sec	For CNTL=PID & HC=YES
HYS2	Hysteresis 2	1.0	0.1 to 99.9 %	For HC=NO or HC=YES & CNTL=ONF
DWEL	Dwell time	OFF	OFF, 1 to 9999 min	When DWEL=YES
DISP	Display bias	0.0	-19.9 to +19.9	—

Protection Level				
Display	Description	Default Value	Range	Display Condition
SP1	Lock setpoint 1	UNL	UNLK/LOCK	—
SP2	Lock setpoint 2	UNL	UNLK/LOCK	—
LVL1	Lock level 1	UNL	UNLK/LOCK	—
LVL2	Lock level 2	UNL	UNLK/LOCK	—
DWEL	Lock dwell time	UNL	UNLK/LOCK	Prompted when DWEL=YES

Note

1. Locking parameter (SP1, SP2, LVL1, LVL2 or DWEL) will not permit change in the value of respective level parameters.
Time value (online) can be altered only when DWEL is not locked in protection level.

2. Continuous operation of keys for 3 sec makes update speed faster in 3 stages after 3 sec.

* Parameter marked not applicable for DTC204A-2 & DTC324A-2
** Default value for ONF = for DTC204A-2 & DTC324A-2

(Specifications are subject to change, since continuous process)

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