

SZ-7556/58/66/68T
Instruction Manual



Touch Sensitive Temperature Controller

Introduction

The Sub-Zero Series, SZ-7556/58/66/68T are aesthetically superior versions of their predecessors.

The SZ-7556/58/66/68T are Two Relay Controller. SZ-7566/68T are specifically designed for the Panel A/C, Oil Cooler, Package A/C and similar kind of applications. SZ-7558/68T has an inbuilt Power Relay. The Controllers have special features like Power ON Time Delay for Alarm.

A number of parameters are displayed alphanumerically to set the Controller for specific application. This Controller can be used for several applications.

Temperature Range:

SZ-7556/58T	(rS = 0.1): 0.0°C to 50.0°C (rS = 1): 0°C to 50°C
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SZ-7566/68T	(rS = 0.1): -40.0°C to 99.0°C (rS = 1): -40°C to 99°C
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Cautions

WARNING: The probe and its corresponding wires should never be installed in a conduit next to control or power supply lines. The electrical wiring should be done as shown in the diagram. The power supply circuit should be connected to a protection switch. The terminals admit wires of upto 2.5sq mm.

WARNING: Improper wiring may cause irreparable damage and personal injury. Kindly ensure that wiring is done by qualified personnel only.

Maintenance: Cleaning: Clean the surface of the controller with a soft moist cloth. Do not use abrasive detergents, petrol, alcohol or solvents.

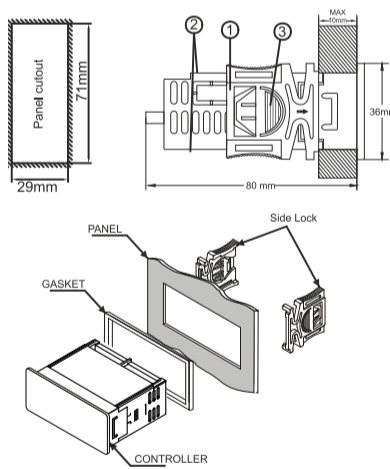
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Installation: Fixing and dimensions of panel models: To fix the unit, slide the fastener (1) through the guides (2) as per the position shown in the figure. Move the fastener in the direction of the arrow, pressing tab (3) it permits to move the fastener in the opposite direction of the arrow.

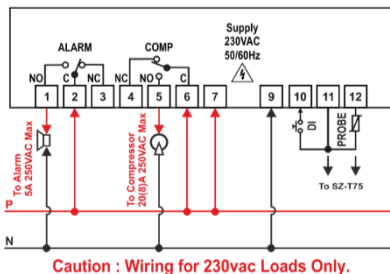
Controller: Controller should be installed in a place protected by vibration, water and corrosive gasses and where ambient temperature does not exceed the values specified in the technical data.

Probe: To give a correct reading, the probe must be installed in a place protected from thermal influences, which may affect the temperature to be controlled.

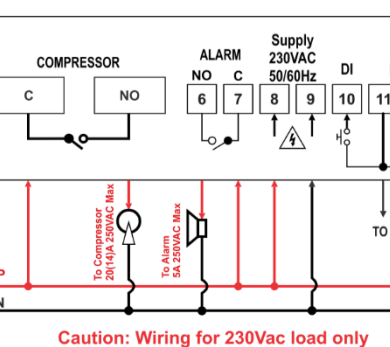
Panel Cutout & Dimensions



Suggested Wiring Diagram (for SZ-7556T / SZ-7566T)



Suggested Wiring Diagram (for SZ-7558T / SZ-7568T)



Technical Data

Housing : Black ABS Plastic, Auto-extinguish
Front Cover : Polycarbonate Plastic V0 Grade
Dimensions : Frontal: 78 X 36mm, Depth: 80mm
Panel Cutout : 29 X 71mm
Mounting : Flush panel mounting with fasteners
Protection : IP65 Front (with gasket)
Connections : Screw terminal blocks.
 < 2.5sq mm terminal only.
Display : 3 X 17mm 7 segment display
 5 LEDs for Indication
Data storage : Flash APROM Memory
Power input : 230 Vac ±10%, 50/60Hz Standard.
 Others on request.
Relay output : Compressor Relay 20(8)A, 250V AC (for SZ-7556/66T)
 Compressor Relay 20(14)A, 250V AC (for SZ-7558/68T)
 Alarm Relay 5A, 250V AC
Operating temp. : 0°C to 60°C (non-condensing)
Operating humidity : 20% to 85% (non-condensing)
Storage temp : -25.0°C to 60.0°C (non-condensing)
Measuring Range : For SZ-7556/58T
 0.0°C to 50.0°C (when rS=0.1)
 0°C to 50°C (when rS=1)
 For SZ-7566/68T
 -40.0°C to 99.0°C (when rS=0.1)
 -40°C to 99°C (when rS=1)
 : NTC Probe-SZ-T75.
Input
Digital Input (Potential Free) : Digital Input for Compressor Fault
Resolution : 1°C / 0.1°C (Selectable)
Accuracy : +/- 1s°C

User Interface

UP KEY : Used in Program Mode to increment Parameter Value. Press and hold for 1 sec, Controller will enter into Log Mode.
PRG DOWN / PROGRAM KEY : Press and hold for 2 seconds, Controller will enter the Program Mode. Used in Program Mode to decrement Parameter Value.
RST RESET KEY : Press and hold for 2 Seconds, to reset any Manual Faults present for Controller. Press and hold for 500 m seconds, to mute the Alarm Relay. This key is used to exit from Program Mode, when Display is showing Parameter Name.
SET SET KEY : Press and hold for 2 Seconds, Controller will enter into Set Mode. In Program Mode/Set Mode: Set/Save the changed value of Parameter.
+RST : Touch UP + RST keys Simultaneously to check Control Probe Temperature when nd parameter set to SP.

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5	P3	Low Temperature Limit.
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9	P5	Probe Calibration.
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26	PA	Change Password.
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Parameter List:

1. **SP** Function: To set Compressor Relay Set Point.
 Touch & hold SET key for 2 seconds.
 Display will show set value. The set point value can now be modified by using the UP/DOWN key. After selecting the desired value, touch the set key and user can see "-" which confirms that the set point has been stored in memory.

rS = 0.1			rS = 1		
Min	Max	Fac. Set	Min	Max	Fac. Set
LS+1.0	HS-1.0	1.0°C	LS+1	HS-1	1°C

2. To Set Other Parameters: Touch & hold PRG key for 2 seconds.
 Display will flash "P1".
 To select other parameters, use UP/DOWN keys.
 3. **P1** Function: To set Controller for Heating or Cooling.
 To change value use UP/DOWN keys. To set value touch SET key.
 LoL (0) = Cooling mode
 HEt (1) = Heating mode.

rS = 0.1			rS = 1		
Min	Max	Fac. Set	Min	Max	Fac. Set
P3+1.0	50.0°C	50.0°C	P3+1	50°C	50°C

4. **P2** Function: To set Maximum Allowable High Temperature Limit.
 Example: If this parameter is set to 99.0°C and the Temperature reaches or goes above 99.0°C, Display will show Ht (High Temperature) indicating that the Temperature has reached or gone above the value set in this parameter. Differential of 1.0°C is considered for clearing the Fault.

rS = 0.1			rS = 1		
Min	Max	Fac. Set	Min	Max	Fac. Set
P3+1.0	99.0°C	99.0°C	P3+1	99°C	99°C

5. **P3** Function: To set Minimum Allowable Low Temperature Limit.
 Example: If this parameter is set to -40.0°C and the Temperature reaches or goes below -40.0°C, Display will show Lt (Low Temperature) indicating that the Temperature has reached or gone below the value set in this parameter. Differential of 1.0°C is considered for clearing the Fault.

rS = 0.1			rS = 1		
Min	Max	Fac. Set	Min	Max	Fac. Set
0.0°C	P2-1.0	0.0°C	0°C	P2-1	0°C

6. **HS** Function: To set Maximum Set Point Limit.
 Once set at a particular value, this will not allow the Set Point to go above this value.
 Example: Setting this parameter at 25.0°C will not allow the Set Point to go above 24.0°C (HS-1.0).

rS = 0.1			rS = 1		
Min	Max	Fac. Set	Min	Max	Fac. Set
SP+1.0	50.0°C	50.0°C	SP+1	50°C	50°C

7. **LS** Function: To set Minimum Set Point Limit.
 Once set at a particular value, this will not allow the Set Point to go below this value.
 Example: Setting this parameter at -10.0°C will not allow the Set Point to go below -9.0°C (LS+1.0).

rS = 0.1			rS = 1		
Min	Max	Fac. Set	Min	Max	Fac. Set
0.0°C	SP-1.0	0.0°C	0°C	SP-1	0°C

8. **P4** Function: To set the Differential for Compressor Relay ON condition.
 Example:
In Cooling Mode:
 If The Set Point is Set at 10.0°C and Differential is set to 2.0°C, When the System reached 10.0°C, Compressor Relay will go OFF. Since the Differential is 2.0°C, Compressor Relay will Come ON (Restart) at 12.0°C (10.0°C + 2.0°C).
In Heating Mode:
 If The Set Point is Set at 10.0°C and Differential is set to 2.0°C, When the System reached 10.0°C, Compressor Relay will go OFF. Since the Differential is 2.0°C, Compressor Relay will Come ON (Restart) at 8.0°C (10.0°C - 2.0°C).

rS = 0.1			rS = 1		
Min	Max	Fac. Set	Min	Max	Fac. Set
1.0°C	20.0°C	2.0°C	1°C	20°C	2°C

10. **P6** Function: To set Time Delay between Compressor Relay restart.
 This parameter is used to protect the Compressor from restarting in a short period of time.
 Example: If this parameter is set at 3 minutes, the Compressor Relay goes OFF at the Set Point, it will not restart for a minimum of 3 Minutes, even if the Differential is achieved earlier. This parameter is good to protect the life of the Compressor.

rS = 0.1			rS = 1		
Min	Max	Fac. Set	Min	Max	Fac. Set
0 Min	99 Min	3 Min	0 Min	99 Min	3 Min

11. **dt** Function: Minimum ON Time for Compressor Relay.
 This parameter is used to protect the Compressor so that there is enough time for oil to return back to the Compressor. This delay starts once the Compressor Relay is ON.
 Example: If this parameter is set at 1 Minute and if the Temperature is achieved before 1 Minute, then the Compressor Relay will remain ON for minimum 1 Minute, though Set Point is achieved.

rS = 0.1			rS = 1		
Min	Max	Fac. Set	Min	Max	Fac. Set
0 Min	20 Min	0 Min	0 Min	20 Min	0 Min

12. **E1** Function: Compressor relay status in case of Probe Failure.
 When set to
 OFF (0) = Compressor relay status is OFF.
 ON (1) = Compressor relay status is ON.
 CY (2) = Compressor relay performs a duty cycle for Cn for minutes OFF and Cy for minutes ON.

rS = 0.1			rS = 1		
Min	Max	Fac. Set	Min	Max	Fac. Set
OFF	CY	CY	OFF	CY	CY

13. **En** Function: Compressor relay OFF Time during Probe Fault.
 (This parameter will be visible only when E1 is CY).
 Example: If this parameter is set to 4 Minutes, then Compressor Relay will be OFF for 4 Minutes while performing the duty cycle.

rS = 0.1			rS = 1		
Min	Max	Fac. Set	Min	Max	Fac. Set
1 Min	99 Min	4 Min	1 Min	99 Min	4 Min

14. **Ey** Function: Compressor relay ON Time during Probe Fault.
 (This parameter will be visible only when E1 is CY).
 Example: If this parameter is set to 10 Minutes, then Compressor Relay will be ON for 10 Minutes while performing the duty cycle.

rS = 0.1			rS = 1		
Min	Max	Fac. Set	Min	Max	Fac. Set
1 Min	99 Min	10 Min	1 Min	99 Min	10 Min

15. **CF0** Function: To activate or deactivate Auxiliary Digital Input for Compressor Fault.
 When set to,
 diS (0) = Auxiliary Digital Input for Compressor Fault is disabled.
 oPn (1) = Auxiliary Digital Input for Compressor Fault is activated when contact is Open.
 CLo (2) = Auxiliary Digital Input for Compressor Fault is activated when contact is Closed.

rS = 0.1			rS = 1		
Min	Max	Fac. Set	Min	Max	Fac. Set
diS	CLo	diS	diS	CLo	diS

16. **CF1** Function: To set fault sensing delay for Auxiliary Digital Input of Compressor Fault.
 Example: If CF1=5 Seconds and if Auxiliary Digital Input for Compressor Fault is present for 5 Seconds, then Fault is detected.
Note: This Parameter will be Visible only when CF0 parameter is set to oPn/CLo.

rS = 0.1			rS = 1		
Min	Max	Fac. Set	Min	Max	Fac. Set
0 sec	99 sec	5 sec	0 sec	99 sec	5 sec

17. **CF2** Function: To set Compressor Status on Fault of Digital Input.
 When set to,
 Enb (0) = No action will be performed, Alarm will be OFF.
 EnA (1) = No Action will be performed, Alarm will be ON.
 CoF (2) = Compressor will be OFF.
Note: This Parameter will be Visible only when CF0 parameter is set to oPn/CLo.

rS = 0.1			rS = 1		
Min	Max	Fac. Set	Min	Max	Fac. Set
Enb	CoF	Enb	Enb	CoF	Enb

18. **CF3** Function: To set reset mode for Compressor output, on AUX Digital Input for Compressor Fault.
 When set to,
 ALt (0) = Auto Reset.
 nAn (1) = Manual Reset after CF4 retrials in 1 hour.
 Example: If this parameter set to "nAn" mode & CF4 is set to 5 then, AUX Digital Input fault for Compressor will be cleared after 5 retrials only after pressing reset key for 500milliseconds. If this parameter is set to "ALt" mode then Compressor fault will be cleared automatically when it is healthy.

rS = 0.1			rS = 1		
Min	Max	Fac. Set	Min	Max	Fac. Set
1	10	5	1	10	5

19. **CF4** Function: No of retrials of Compressor when Manual reset is selected.
Note: This Parameter will be Visible only when CF0 parameter is set to oPn/CLo.

rS = 0.1			rS = 1		
Min	Max	Fac. Set	Min	Max	Fac. Set
-10.0°C	10.0°C	0.0°C	-10°C	10°C	0°C

20. **nd** Function: Default (Normal) display.

When set to,

$P_{r1}(0)$ = Room Temperature.

$SP(1)$ = Compressor Set Point.

Min	Max	Fac. Set
P_{r1}	SP	P_{r1}

21. **dd** Function: This parameter is used to delay the display of temperature by the set in this parameter.

Each value corresponds to 5 seconds, if the value is set to 1, it corresponds to 5 Seconds, if it is set to 2, it corresponds to 10 Seconds and so on.

Example: If this parameter is set to 1, temperature on the display will be updated after 5 seconds. The same value will be considered for calculation and logging.

In Cooling mode, Display Delay parameter is applicable when Temperature is increasing (rising). When Temperature is decreasing (falling) this parameter will not be applicable.

In Heating mode, Display Delay parameter is applicable when Temperature is decreasing (falling). When Temperature is increasing (rising) this parameter will not be applicable.

Min	Max	Fac. Set
0	36	0

22. **AL** Function: To activate alarm.

When set to,

$dis(0)$ = Alarm Relay is disable for all Faults.

$EHL(1)$ = Alarm Relay will be active for both Ht, Lt and other faults.

$EHL(2)$ = Alarm Relay will be active for Ht and other faults except Lt.

$ELT(3)$ = Alarm Relay will be active for Lt and other faults except Ht.

Min	Max	Fac. Set
dis	ELT	EHL

Note: When AL parameter is Set to enable, Alarm Relay will Activate for Probe Fail and Auxiliary Digital Input Fault.

23. **AP** Function: To set alarm polarity.

When set to,

$no(0)$ = Alarm activated at NO.

$nc(1)$ = Alarm activated at NC.

Min	Max	Fac. Set
no	nc	no

24. **Ad** Function: This parameter is used to set the Time Delay at Power ON for Alarm Indication.

Example: If this parameter is set to 20 Minutes, once the controller is powered ON, no Fault Indication will be activated for 20 Minutes.

Alarm Delay is used only for High Temperature and Low Temperature, but not for Control Probe Fails.

If Control Probe Temperature reaches or goes above P2 parameter value, High Temperature (Ht) Fault will be displayed.

If Control Probe Temperature reaches or drops below P3 parameter value, Low Temperature (Lt) Fault will be displayed.

Differential of 1°C is considered for clearing the fault.

Min	Max	Fac. Set
0 Min	99 Min	0 Min

25. **r5** Function: To set controller resolution.

This parameter when set to 0.1, it will take all parameter in 0.1°C resolution.

This parameter when set to 1, it will take all parameter in 1°C resolution.

Note: Temperature and parameter will also change accordingly.

Min	Max	Fac. Set
0.1	1	-

26. **PA** Function: To change Password.

User cannot enter into Program Mode & Set Mode, if correct Password is not entered.

If the password is kept other than 0, user need to enter correct Password to enter into Set/Program Mode.

If Password is 0, user can directly access Set/Program Mode.

Min	Max	Fac. Set
-999	999	0

27. **LP** Function: To lock keypad.

This parameter is used to lock the keypad so that tampering is not possible by by-standers.

$UnL(0)$ = keypad unlocked

$LoL(1)$ = keypad locked

When locked all parameters can only be viewed, but not modified.

Note: If LP parameter is set to LoL and if user tries to change any parameter value, "LP" will flash on the display.

LP
Flashing

Min	Max	Fac. Set
UnL	LoL	UnL

28. **FS** Function: To restore default settings of the controller.

When set to 1, All Parameters are programmed to Factory Set values.

Useful to debug setting related Problems.

When set to,

0 = FS is inactive.

1 = FS as per Default value.

Min	Max	Fac. Set
0	1	0

29. **EP** Function: To end programming.

To end programming press "SET" key

Once the key is pressed, the controller goes into the normal mode and displays the temperature and all settings are recorded.

Operating Messages		
Message	Description	Parameter
Ht	Temperature above the maximum high temperature limit.	P2
Lt	Temperature below the minimum low temperature limit.	P3
LP	Keypad Lock Keypad is locked.	LP
CF	AUX Digital Input Fault Present.	CF0
LH	Last high temperature logged.	-
LL	Last low temperature logged.	-
PFH	Temperature Probe Fail High Probe Short Circuit, or Temperature Probe is > 99.0°C	-
PFL	Temperature Probe Fail Low Probe Open Circuit, or without Probe, or Temperature Probe is < -40.0 °C	-
LrS	In log function: When LL and LH values are cleared.	-
ArS	To mute Alarm Relay.	-
FrS	To reset manual Fault.	-

LED Indications			
LED	Status	Description	Parameter
	OFF	Compressor is OFF.	SP, P4
	ON	Compressor is ON.	
	OFF	Alarm Relay is OFF.	AL
	ON	Alarm Relay is ON.	
	ON	Compressor is ON and in time delay for switching OFF. (ot parameter)	ot
	FLASHING	Compressor is in Time Delay and about to start.	P6
AUX	ON	AUX Digital Input Fault Present.	CF0, CF2
	FLASHING	AUX Digital Input Fault in Manual Reset Mode.	CF2=mAn
$^{\circ}C$	ON	When Temperature is displayed.	-

Password Function

- In Programme Mode:**
Touch & hold "PRG" key for 2sec. Display will flash "P2" parameter if "PA" value is kept "0". If other than "0", then "PA" and "0" will flash. Use "▲" and "▼" keys to enter the password. On entering correct value, display will flash the first parameter "P2". User can scroll through parameters using "▲" or "▼" keys.
- In Set Mode:**
Touch & hold "SET" key for 2sec. Display will flash set point value if "PA" parameter value is kept to "0". If other than "0", then display will flash "PA" and "0".
Use "▲" or "▼" to enter the password. On entering correct value, display will flash set point value. User can set desired value using "▲" or "▼" keys. To save the modified value use "SET" key.

High and Low temperature logging function

- How to see the Logged Values:**
LL: Last Low Temperature
LH: Last High Temperature
Touch and hold "▲" key for 1 second display will flash "LL" and the corresponding Temperature for 4 seconds. After this, Display will flash "LH" and the corresponding Temperature for 4 seconds and come out of Log mode and will Display Control Probe Temperature.
- How to reset the Logged Values:**
While the Display is showing the logged values, if user touch & holds the "SET" key for 1 seconds, the logged values will be cleared and "LrS" will be displayed.
Log Values will get reset after Power ON/OFF.

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OTHER PRODUCTS

Controlled cooling, always

Cold Room Controller
 Chiller Controller
 Two Compressor Controller
 Heating Controller
 Humidity Controller
 Pressure Controller

Ball Valves
 Globe Valves
 Hand Valves
 Flow Switches
 Solenoid Valves

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