sub-Zero ®

INDIA
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OPERATING INSTRUCTIONS

sub-Zero ®

SZ-7552-P

Instruction for SZ-7552-P
General Description

SZ-7552 is two compressor controller with separate setpoints, differentials and time delays for each compressor.

They are specifically designed for air conditioning applications wherein the compressor cuts off at setpoint and is restarted at a temperature of setpoint plus differential.

The controller features cycling of compressors so that there is no overload on one compressor.

Amongst others features, an important one is that Incase one compressor is not capable of handling the load, the second compressor will activate and both compressors will cutout at the lowest set point.

1

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Set Point	Function : To set the cutout point of the controller.
Press & hold SET key for 2 Seconds. rS = Resolution Set Parameter	Display will change to set point 1 and flash ● R1 will flash along with respective setpoint1 for compressor 1. The setpoint1 value can now be changed by using the UP/DOWN keys. After achieving the desired value, press the set key and you will see "- - -" which confirms that the set point has been stored in memory. ● R2 will flash along with respective set point 2 for compressor 2. In the similar manner use UP/DOWN key to set the desired value and press set key to confirm the settings.

rS = 0
Set Point 1 & 2

Min	Max	Fac
P3 +1.0°C	P2 -1.0°C	1.0°C

rS = 1
Set Point 1 & 2

Min	Max	Fac
P3+1°C	P2-1°C	1°C

SET

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Parameter Setting	
Press and hold PRG(prg) key for 2 seconds. prg	Display will show 'P2' and flash. To go to other parameters. Use UP / DOWN keys.

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P1 Parameter	Function: To set controller for heating or cooling.
To change the P1 parameter, press the SET key.	Use UP/DOWN keys to get desired value & press set to confirm. 0: Cooling mode and 1: Heating mode. **NOTE : T2 parameter is activated only when P1=0 (cooling).**

Min	Max	Fac.
0	1	0

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P2 Parameter	Function : To set maximum allowable high temperature limit.
To change P2 parameter, Press the SET key. rS = Resolution Set Parameter	Use UP/DOWN key to set desired value. Once set at a particular value, this will not allow both set points to go above this value. **Example :** Setting this parameter at 30.0°C will not allow both set points to go above 30.0°C. Also if the temperature reaches 30.0°C, the display will show Ht (High Temperature), indicating that the temperature has reached or gone above the value in this parameter.

rS = 0

Min	Max	Fac.
XX +1.0°C	50.0°C	50.0°C

rS = 1

Min	Max	Fac.
XX+1°C	50°C	50°C

XX = Highest Set Point

Ht

(Message on Display)

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P3 Parameter	Function : To set minimum allowable low temperature limit.
To change P3 parameter, press the SET key. rS = Resolution Set Parameter	Use UP/DOWN key to set desired value. Once set at a particular value, this will not allow both set points to go below this value. **Example :** Setting this parameter at 10.0°C will not allow both set points to go below 10.0°C. Also if the temperature reaches 10.0°C, the display will show Lt (Low Temperature), indicating that the temperature has reached or gone below the value in this parameter.

rS = 0

Min	Max	Fac.
0.0°C	XX -1.0°C	0.0°C

rS = 1

Min	Max	Fac.
0°C	XX-1°C	0°C

XX = Lowest Set Point

Lt

(Message on Display)

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P4 Parameter	Function: To set the differential of set point 1 and set point 2
To change P4 parameter, press the SET key. rS = Resolution Set Parameter	Once in this mode, ● R1 and differential of setpoint 1 will flash. use UP/DOWN keys to set desired value. Once desired value is achieved, press set key and you will see "- - -" this confirms differential for set point 1 has been stored. After up key is pressed ● R2 flashes alongwith the differential for set point 2. Use UP/DOWN keys to set desired value. Once value is achieved, press set key. This confirms differential for setpoint 2.

rS = 0
Differential 1 & 2

Min	Max	Fac.
0.5°C	20.0°C	2.0°C

rS = 1
Differential 1 & 2

Min	Max	Fac.
1°C	20°C	2°C

Example : If setpoint 1 is set at 10.0°C. and differential for setpoint 1 is set at 2.0°C, then when the system reaches 10.0°C, the relay for compressor 1 will cutout and since the differential is 2.0°C the relay will cutin(restart) at 12.0°C (10.0+2.0).

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P5 Parameter	Function : To set probe calibration.
To change P5 parameter press the SET key. rS = Resolution Set Parameter	Use UP/DOWN keys to set desired value. In time it may be possible that the display may be offset by a degree or so. To compensate for this error. you may need to add or minus the degree required to achieve the correct temperature. Setting value is from -10.0°C to + 10.0°C.

rS = 0

Min	Max	Fac.
-9.0°C	10.0°C	0.0°C

rS = 1

Min	Max	Fac.
-9°C	10°C	0°C

Example : The temperature on the display is 28.0°C, whereas the actual temperature is 30.0°C. You will need to set the P5 mode to 2.0, which mean that once out of the programming mode, the display will show temperature 30.0°C (28.0°C + 2.0°C).

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P6 Parameter	Function : Set time delay between relay restart time for comp1 and comp2.
To change P6 parameter, press the SET key. Time delay R1	● R1 & time delay of setpoint 1 will flash. Use UP/DOWN keys to set desired value. Once desired value is achieved, press set key and you will see "- - -" which confirms time delay for set point 1 has been stored in memory. After pressing UP key ● R2 flashes alongwith the time delay for setpoint 2. Use UP/DOWN keys to set desired, value.Once desired value is achieved, press set key and you will see "- - -" which confirms time delay for set point 2 has been stored in memory.

Min	Max	Fac.
0 Min	20 Min	3 Min

R1 ☀

Time delay R2

Min	Max	Fac.
0 Min	20 Min	3 Min

R2 ☀

To prevent both compressors from switching on together, there is an internal 10 second time delay between simultaneous startups to prevent an electrical surge.

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t2 Parameter	Function : To start second comp. incase comp 1 cannot achieve the lower set point.
To change t2 parameter, press the SET key.	This function is used to switch on the second compressor incase the heat load cannot be met with one compressor functioning.
Min | **Max** | **Fac.** 0 Min | 30 Min | 0 Min	**Example :** If setpoint 1 is 23 and setpoint 2 is 25 and if t2 para is set to 7 minutes, if the second comp. cuts out at 25, if comp. 1 is not able to achieve 23 for a period of 7 minutes, then after 7 minutes, second compressor will also come on and both compressors will cutout at the lower setpoint. If t2 is set less than P6, then P6 para will override t2 parameter. If set to 0, this feature will not activate. **NOTE : T2 parameter is activated only when P1=0 (cooling).**

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t3 Parameter	Function : To set minimum off time between two compressor.
To change t3 parameter, press the SET key.	This mode is used to set the time delay between the switching off of both compressors so that they do not switch off simultaneously.
Min | **Max** | **Fac.** 0 Sec | 15 Sec | 5 Sec	**Example :** If this mode is set to 3 seconds the second compressor will switch off after a minimum of 3 seconds from the first compressor switching off. If set to 0, this feature will not activate.

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t4 Parameter	Function : To avoid overloading of either compressor.
To change t4 parameter, press the SET key.	This function is used to avoid overloading of any one compressor working at a stretch over a period of time.
Min | **Max** | **Fac.** 0 Hr | 12 Hrs | 0 Hr	**Example :** If this parameter is set at 2 hours, the setpoint, differential & time delay of both compressors will interchange after 2 hours The interchange will occur every 2 hours. Time calculation will start at power on. This helps by not overworking any one compressor for long hours and increases compressor life. If for any reason the setpoints have been changed, the time calculation will start from the last change in these parameters.

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LP Parameter	Function: To Lock keypad.
To change LP parameter, press the SET key.	Use UP/DOWN keys to set desired value. This parameter can lock the keypad so that tampering is not possible by by-standers. 0 = Keypad unlocked. 1 = Keypad locked.
Min | **Max** | **Fac.** 0 | 1 | 0	When locked all parameters can only be viewed, but not modified.
⌐O ●	

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E1 Parameter	Function : Relay status on probe failure.
When display shows E1 press SET key.	Use UP/DOWN keys to set desired value. 0 = Both the relays will stay on with initial start-up delay of 2 minutes. 1 = Both compressor performs a duty cycle of 10 minutes ON and 4 minutes OFF. 2 = Both relay will stay OFF.
Min | **Max** | **Fac.** 0 | 2 | 1	

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rS Parameter	Function: To set controller Resolution.
To change rS parameter press the SET key.	Use UP/DOWN keys to set desired value.
Min | **Max** | **Fac.** 0 | 1 | 0	0 = Controller Resolution will set $0.1^{\circ}C$. 1 = Controller Resolution will set $1^{\circ}C$.

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FS Parameter	Function : To restore the default settings of the controller.
To change FS parameter press the SET key.	When set to 1 all parameters are programmed to factory values. Useful to debug setting related problems.

Min	Max	Fac.
0	1	0

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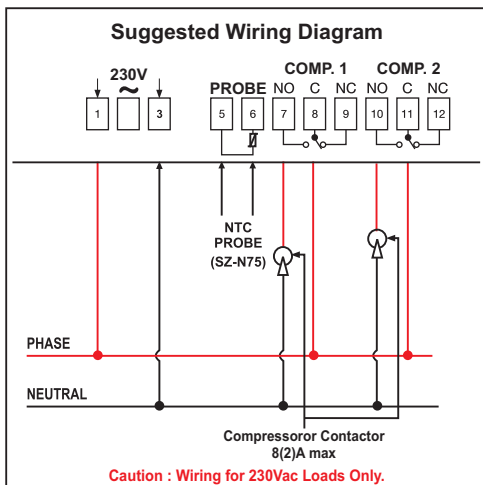| EP Parameter	Function : To set Programming.
To end the programming press the SET key.	Once the set key is pressed, the controller goes into the normal mode and displays the temperature and all settings are recorded.

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Operating messages and Icon status

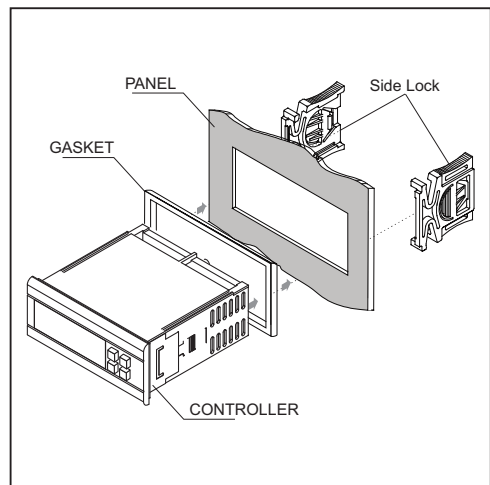| Message	Description	Parameter
Ht	Temperature equal to or above the maximum limit of the set point.	P2
Lt	Temperature equal to or below the minimum limit of the set point.	P3
PP	Probe short circuit, circuit open or without probe, or temperature >50.0°C or <0.0°C when rS = 0 and temperature >50°C or <0°C when rS=1.	
● R1 ON/OFF	Compressor 1 relay ON/OFF.	Set Point 1, P4
● R2 ON/OFF	Compressor 2 relay ON/OFF	Set Point 2, P4
⊶0 ● On/Off	Keypad locked/unlocked	LP
R1 ☀ R2 ☀ Flashing	Time delay in progress Compressor1. Time delay in progress Compressor2.	P6

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Technical Data

Housing : Black ABS Plastic, Auto-extinguish.
Frolnt Cover : Polycarbonate plastic.
Dimensions : Front :75 x 34.5 mm
Depth : 71 mm (W/o back lid).
Panel Cutout : 29 X 71mm.
Mounting : Flush panel mounting with fastners.
Front Protection : Front panel is water proof & Ip65 rated.
Connections : Screw terminal blocks.
≤2.5sq mm one wire/terminal only.
Display : 3X14.2mm (0.56") LED.
Data storage : Non-volatile EEPROM memory.
Power Input : 230 Vac +/-15%, 50Hz, (Other on request).
Operating temp. : 5°C to 50°C (Non Condensing).
Storage temp : -20°C to 70°C (non-condensing).
Compressor Relay : 2 SPDT Relay, 8(2)A/250Vac.
Input : NTC probe SZ-N75.
Range : 0.0°C to 50.0°C (rS = 0).
0°C to 50°C (rS = 1).
Resolution : 0.1°C/1°C.
Accuracy : +/-1°C.
Probe tolerance at 25°C: +/-0.3°C.

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Suggested Wiring Diagram

Caution : Wiring for 230Vac Loads Only.

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Panel cutout

MAX 10mm

71mm

34.5mm

29mm 19mm 71mm
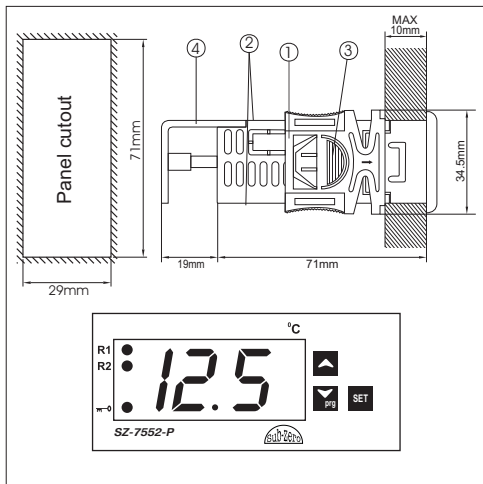
④ ② ① ③

°C

R1
R2

12.5

↑
↓ prg   SET

SZ-7552-P

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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. Once the
controller has been connected, they should be covered with
the lid ④ Silicon sealant should be applied along the
perimeter of the panel cut out or a rubber 'O' ring supplied
before the unit is fitted to obtain IP65 grade.

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.

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CAUTION

WIRING : 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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