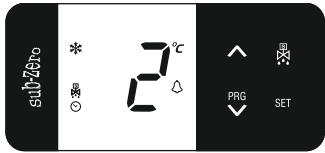


# SZ-7521T

## Instruction Manual



### Touch Sensitive Temperature Controller

#### Introduction : GENERAL DESCRIPTION

The SZ-7521T is aesthetically superior versions of their predecessors. The SZ-7521T is a Single Set Point Controller with drain valve facility. They are specifically designed for air dryer applications wherein the Compressor cuts off at set point and is restarted at a Temperature of Set Point + Differential.

Additionally these controllers offer several protection features that are easily understood by the examples in the instructions below.

A number of parameters are displayed alphanumerically to set up the instrument for each specific application.

The SZ-7521T Controller can be used for several applications with a measuring range from -45°C to 99°C.

#### 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.

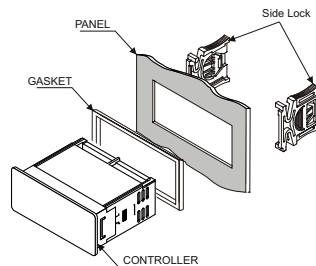
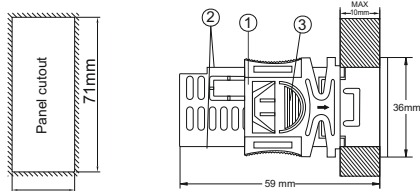
**Maintenance:** Cleaning: Clean the surface of the controller with a soft moist cloth. Do not use abrasive detergents, petrol, alcohol or solvents.  
**Notice:** The information in this document is subject to change in order to improve reliability, design or function without prior notice and does not represent a commitment on the part of the company. In no event will the company be liable for direct, indirect, special, incidental or consequential damage arising out of the use or inability to use the product or documentation, even if advised of the possibility of such damages. No part of this manual may be reproduced or transmitted in any form or by any means without the prior written permission of the company.

**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.

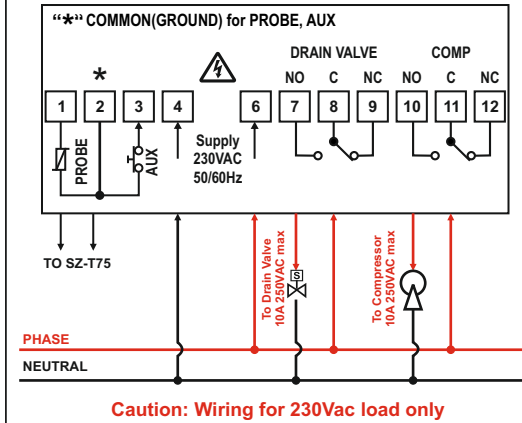
**Controller:** Controller should be installed in a place protected by vibration, water and corrosive gasses and where ambient temperature does not exceed the values specified in the technical data.

**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 and Dimensions :



### Suggested Wiring (230Vac)



#### TECHNICAL DATA

|                                       |   |
|---------------------------------------|---|
| <b>Housing</b>                        | : Black ABS Plastic, Auto-extinguish                                    |
| <b>Front Cover</b>                    | : Polycarbonate Plastic V0 Grade  |
| <b>Dimensions</b>                     | : Frontal : 78 X 36mm, Depth : 59mm                                     |
| <b>Panel Cutout</b>                   | : 29 X 71mm   |
| <b>Mounting</b>                       | : Flush panel mounting with fasteners                                   |
| <b>Protection</b>                     | : IP65 Front (with gasket)  |
| <b>Connections</b>                    | : Screw terminal blocks.<br>≤ 2.5sq mm terminal only.                   |
| <b>Display</b>                        | : 2 X 17mm 7 segment display & 5 LEDs for Indication                    |
| <b>Data storage</b>                   | : Flash APROM Memory  |
| <b>Power input</b>                    | : 230 Vac ±10 %, 50/60Hz Standard.                                      |
| <b>Relay output</b>                   | : Compressor Relay 10(1)A, 250V AC<br>Drain Valve Relay 10(1)A, 250V AC |
| <b>Operating temp.</b>                | : 0°C to 60°C (non-condensing)  |
| <b>Operating humidity</b>             | : 20% to 85% (non-condensing)   |
| <b>Storage temp</b>                   | : -25°C to 60°C (non-condensing)  |
| <b>Measuring Range</b>                | : -45°C to 99°C   |
| <b>Analog Input</b>                   | : NTC Probe-SZ-T75.   |
| <b>Digital Input (Potential Free)</b> | : AUX Digital Input for Compressor and Drain Valve                      |
| <b>Resolution</b>                     | : 1°C   |
| <b>Accuracy</b>                       | : +/- 1°C   |

#### USER INTERFACE

|                         |  |
|-------------------------|--|
| <b>UP</b>               | In Program Mode:<br><b>Scroll through parameters &amp; Increases parameter value.</b><br>In Set Mode : <b>Increases parameter value.</b>         |
| <b>PRG Down/Program</b> | Touch and hold for 2sec <b>to enter into Program Mode.</b><br>In Program Mode and Set Mode:<br><b>Decreases parameter value</b>                  |
| <b>Drain Valve</b>      | Touch & hold for 500 msec to manual Reset of Fault.<br>To force a Manual Drain, touch & hold for 2 seconds. The unit will start/stop drain mode. |
| <b>SET Set</b>          | Touch and hold for 2sec <b>to enter into Set Mode.</b><br>In Program Mode and Set Mode:<br><b>set/save the changed value of parameter.</b>       |
| <b>PRG + SET</b>        | Touch & hold to see Control Probe Temperature if default display is 1(Set Point).  |

#### INDEX

| Sr. No. | Para.     | Description   |
|---------|-----------|---|
| 1       | Set Point | Compressor set point.                               |
| 2       |           | Set other parameter.                                |
| 3       | P2        | High temperature limit.                             |
| 4       | P3        | Low temperature limit.                              |
| 5       | HS        | Maximum Set Point limit.                            |
| 6       | LS        | Minimum Set Point limit.                            |
| 7       | P4        | Differential for Compressor relay ON condition.     |
| 8       | P5        | Probe calibration.                                  |
| 9       | P6        | Time delay (Compressor relay restart after cutoff). |

#### INDEX

| Sr. No. | Para. | Description   |
|---------|-------|---|
| 10      | ot    | Minimum ON time for Compressor Relay.                             |
| 11      | E1    | Compressor Relay status in Probe Fail.                            |
| 12      | Cn    | Compressor OFF time during Probe Fault.                           |
| 13      | Cy    | Compressor Relay ON time during Probe Fault.                      |
| 14      | d1    | Drain Valve ON Duration   |
| 15      | d2    | Drain valve OFF Duration  |
| 16      | d3    | Unit for Drain Valve ON/OFF timing.                               |
| 17      | F0    | Activate Or Deactivate Auxiliary Fault Digital Input              |
| 18      | F1    | Auxiliary Fault Digital Input Sensing Delay                       |
| 19      | F2    | Output status on Auxiliary Fault Digital Input.                   |
| 20      | F3    | Set reset mode for Relay Output on Auxiliary Fault Digital Input. |
| 21      | F4    | No of retrials of Relay Output when Manual Reset is selected.     |
| 22      | dr    | Display during Drain Process.                                     |
| 23      | nd    | Default(Normal) Display   |
| 24      | Ad    | Time delay at Power ON for alarm indication.                      |
| 25      | PA    | Change Password   |
| 26      | LP    | Keypad Lock   |
| 27      | FS    | Restore factory defaults  |
| 28      | EP    | End Programming   |
|         |       | LED Indications   |
|         |       | Operating Messages  |
|         |       | Password Function   |
|         |       | Temperature Logging   |

#### Parameter List :

|                                   |  |                                |
|-----------------------------------|--|--------------------------------|
| <b>1 Set point (SP)</b>           | Function: To set Compressor Set Point.   | Min Max Fac.<br>LS+1 HS-1 0°C  |
|                                   | Touch & hold <b>SET</b> 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. |                                |
| <b>2 To set other Parameters.</b> | Display will flash "P2". To select other parameters, use UP/DOWN keys.   |                                |
|                                   | Touch & hold <b>PRG</b> key for 2 seconds.   |                                |
| <b>3 P2 Parameter</b>             | Function: To Set Maximum Allowable High Temperature Limit.   | Min Max Fac.<br>P3+1 99°C 99°C |
|                                   | To change value use <b>PRG</b> keys To set value touch "SET" key   |                                |
|                                   | <b>Example:</b> If this parameter is set to 99°C and the Temperature reaches or goes above 99°C, display will show Ht (High Temperature) indicating that the Temperature has reached or gone above the value set in this parameter.    |                                |
|                                   | <b>Ht</b> (Message on display)   |                                |
| <b>4 P3 Parameter</b>             | Function: To Set Minimum Allowable Low Temperature Limit.  | Min Max Fac.<br>-1°C P2-1 -1°C |
|                                   | <b>Example:</b> If this parameter is set to -1°C and the Temperature reaches or goes below -1°C, display will show Lt (Low Temperature) indicating that the Temperature has reached or gone below the value set in this parameter.     |                                |
|                                   | <b>Lt</b> (Message on display)   |                                |

|                        |  |                                    |
|------------------------|--|------------------------------------|
| <b>5 HS Parameter</b>  | Function: To Set Maximum Set Point Limit.  | Min Max Fac.<br>SP+1 99°C 99°C     |
|                        | Once set at a particular value, this will not allow the Set Point to go above this value.<br><b>Example:</b> Setting this parameter at 99°C will not allow the Set Point to go above 98°C (HS-1).  |                                    |
| <b>6 LS Parameter</b>  | Function: To Set Minimum Set Point Limit.  | Min Max Fac.<br>-1°C SP-1 -1°C     |
|                        | Once set at a particular value, this will not allow the Set Point to go below this value.<br><b>Example:</b> Setting this parameter at -1°C will not allow the Set Point to go below 0°C (LS+1).   |                                    |
| <b>7 P4 Parameter</b>  | Function: To set the Differential for Compressor Relay ON condition.   | Min Max Fac.<br>1°C 20°C 2°C       |
|                        | <b>Example :</b> If the Set Point is set at 0°C and Differential is set at 2°C, then when the system reaches 0°C, the Compressor Relay will go OFF. Since the Differential is 2°C, the Compressor Relay will come ON (restart) at 2°C (0°C + 2°C).   |                                    |
| <b>8 P5 Parameter</b>  | Function: To Set Probe Calibration.  |                                    |
|                        | In time it may be possible that the display may be offset by a degree or so.<br>To Compensate for this error, user may need to add or minus the degrees required to achieve the correct Temperature.<br><b>Example :</b> The Temperature on the display is 28°C, whereas the actual Temperature is 30.0°C. User will have to set the P5 parameter to 2, which means that once out of the programming mode, the Temperature on display will be 30°C (28°C + 2°C). | Min Max Fac.<br>-10°C 10°C 0°C     |
| <b>9 P6 Parameter</b>  | Function: To set time delay between Compressor Relay restart.  | Min Max Fac.<br>0 Min 99 Min 3 Min |
|                        | This parameter is used to protect the Compressor from restarting in a short period of time.<br><b>Example:</b> 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.  |                                    |
| <b>10 ot Parameter</b> | Function: Minimum ON Time For Compressor Relay.  | Min Max Fac.<br>0 Min 20 Min 0 Min |
|                        | 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.<br><b>Example:</b> 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.  |                                    |
| <b>11 E1 Parameter</b> | Function : Compressor Relay status in case of Probe Failure.   | Min Max Fac.<br>0 2 2              |
|                        | When set to<br>0 = Compressor Relay status is OFF.<br>1 = Compressor Relay status is ON.<br>2 = Compressor Relay performs a duty cycle for Cn for minutes OFF and Cy for minutes ON.   |                                    |
| <b>12 Cn Parameter</b> | Function : Compressor Relay OFF Time during Probe Fault.   | Min Max Fac.<br>1 Min 99 Min 4 Min |
|                        | <b>Example :</b> If this parameter is set to 4 minutes, then Compressor Relay will be OFF for 4 minutes while performing the duty cycle.   |                                    |
|                        | Note: When E1 is set to 0 or 1, this parameter will not be visible.  |                                    |

**13 Cy Parameter** Function : Compressor Relay ON Time during Probe Fault.

**Example :** If this parameter is set to 10 minutes, then Compressor Relay will be ON for 10 minutes while performing the duty cycle.

|       |        |        |
|-------|--------|--------|
| Min   | Max    | Fac.   |
| 1 Min | 99 Min | 10 Min |

Note: When E1 is set to 0 or 1, this parameter will not be visible.

**14 d1 Parameter** Function : To Set Drain Valve ON duration.

**Example :** If this parameter is set to 4 seconds Drain Valve will remain ON for 4 seconds.

|       |        |       |
|-------|--------|-------|
| Min   | Max    | Fac.  |
| 0 sec | 99 sec | 4 sec |

**Note: Drain process is independent of compressor working, it will take place in probe fail also.**

**15 d2 Parameter** Function : To set Drain Valve OFF duration.

**Example :** If this parameter is set to 1 minute Drain Valve will remain OFF for 1 minute.

|       |        |       |
|-------|--------|-------|
| Min   | Max    | Fac.  |
| 1 Min | 99 Min | 1 Min |

Note: When d1 is set to 0, this parameter will not be visible.

**16 d3 Parameter** Function : To set unit for Drain Valve ON/OFF timing.

If this parameter is set to,

0 = Drain ON duration is in seconds & Drain OFF duration in Minutes.  
1 = Drain ON duration is in Minutes & Drain OFF duration is in Hours.

|     |     |      |
|-----|-----|------|
| Min | Max | Fac. |
| 0   | 1   | 0    |

Note: When d1 is set to 0, this parameter will not be visible.

**17 F0 Parameter** Function : To activate or deactivate Auxillary Fault Digital Input.

If this parameter is set to,

0 = AUX Digital Input is disabled.  
1 = AUX Digital Input is activated when contact is open.  
2 = AUX Digital Input fault is activated when contact is closed.

|     |     |      |
|-----|-----|------|
| Min | Max | Fac. |
| 0   | 2   | 0    |

**18 F1 Parameter** Function : To set Auxillary Fault Digital Input sensing delay

**Example :** If F1 = 5seconds and if Auxillary Digital Input Fault is present for 5 seconds then fault is detected.

|       |        |       |
|-------|--------|-------|
| Min   | Max    | Fac.  |
| 0 sec | 99 sec | 5 sec |

Note: When F0 is set to 0, this parameter will not be visible.

**19 F2 Parameter** Function : To set Relay status on Auxillary Fault Digital Input.

If this parameter is set to,  
0 = No action will be performed, only fault message will be displayed.

1 = No action will be performed, only fault message will be displayed and Alarm icon will be ON at fault.  
2 = Compressor Relay will be OFF, fault message will be displayed and Alarm icon will be ON at fault.  
3 = Relay for drain valve will be OFF, fault message will be displayed and Alarm icon will be ON at fault.  
4 = Both Compressor and Drain Valve Relays will be OFF, fault message will be displayed and Alarm icon will be ON at fault.

|     |     |      |
|-----|-----|------|
| Min | Max | Fac. |
| 0   | 4   | 1    |

Note: When F0 is set to 0, this parameter will not be visible.

**20 F3 Parameter** Function : To set reset mode for Relay output on Auxillary Fault Digital Input.

If this parameter is set to,

0 = Auto Reset.  
1 = Manual Reset after F4 retrials in 1 hour.

**Example:** If this parameter set to "1" & F4 is set to 5 then, Digital Input Fault for relays will be cleared after 5 retrials only after pressing reset key for 2seconds.

If this parameter is set to "0" then Digital Input Fault for relays will be cleared automatically when it is healthy.

|     |     |      |
|-----|-----|------|
| Min | Max | Fac. |
| 0   | 1   | 0    |

Note: When F0 is set to 0, this parameter will not be visible.

**21 F4 Parameter** Function : No of retrials of Relay output when manual reset is selected.

**Example :** As mentioned in F3

|     |     |      |
|-----|-----|------|
| Min | Max | Fac. |
| 1   | 10  | 5    |

Note: When F0 is set to 0, this parameter will not be visible.

**22 dr Parameter** Function : This parameter is used to select display while the Drain Process is in progress.

**Example :** When this parameter is set to,

0 = While the Drain Process is ON , Control Probe Temperature will be displayed.

1 = While the Drain Process is ON, "dr" will be displayed.

|     |     |      |
|-----|-----|------|
| Min | Max | Fac. |
| 0   | 1   | 0    |

Note: When d1 is set to 0, this parameter will not be visible.

**23 nd Parameter** Function : Default (Normal) display

**Example :** If this parameter is set to,

0 = Control Probe Temperature.  
1 = SetPoint


|     |     |      |
|-----|-----|------|
| Min | Max | Fac. |
| 0   | 1   | 0    |

**24 Ad Parameter** 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 Room Sensor fail.  
If Control Probe Temperature reaches or goes above P2 parameter value, High Temperature (Ht) fault will displayed.

If Control Probe Temperature reaches or drops below P3 parameter value, Low Temperature (Lt) fault will displayed. Differential of 1°C is considered for clearing the fault.

|   |       |        |       |
|---|-------|--------|-------|
| <br>ON<br>Fault is present | Min   | Max    | Fac.  |
|   | 0 Min | 99 Min | 0 Min |

**25 PA Parameter** Function : To change Password.

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

If the password is kept other then 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. |
| -99 | 99  | 0    |

**26 LP Parameter** Function: To Lock Keypad.

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

0 = Keypad unlocked  
1 = Keypad locked

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

**Note :** If LP parameter is set to 1 and if user tries to change any parameter value, "LP" will flash on the display.

|                       |     |     |      |
|-----------------------|-----|-----|------|
| <b>LP</b><br>Flashing | Min | Max | Fac. |
|                       | 0   | 1   | 0    |

**27 FS Parameter** 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 disable.  
1 = FS as per default value.

|     |     |      |
|-----|-----|------|
| Min | Max | Fac. |
| 0   | 1   | 0    |

**28 EP Parameter** 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.

### LED Indication and Messages

| LED   | Status   | Description  | Parameter |
|---|----------|--|-----------|
|    | OFF      | Compressor is OFF.   | SP, P4    |
|   | ON       | Compressor is ON.  |           |
|    | OFF      | Drain valve output is OFF.   | d2        |
|   | ON       | Drain valve output is ON.  | d1        |
|    | OFF      | Compressor is not in time delay.                                     | ot        |
|   | ON       | Compressor is ON and in time delay for switching OFF. (ot parameter) |           |
|   | FLASHING | Compressor is in time delay and about to start.                      |           |
|  | OFF      | Alarm indication is OFF.   | -         |
|   | ON       | Alarm indication is ON.  |           |
|  | ON       | Control Probe Temperature and Temperature related parameters in °C   | -         |

### Fault Messages

| Fault Messages | Fault Description   | Parameter          |
|----------------|---|--------------------|
| <b>PP</b>      | <b>Probe fail</b><br>Probe short circuit, circuit open or without probe, or temperature is > 99°C or < -45°C. | -                  |
| <b>Lt</b>      | Low Temperature Fault.  | P3                 |
| <b>Ht</b>      | High Temperature Fault.   | P2                 |
| <b>AF</b>      | Digital Input Aux fault is present.   | F0, F1, F2, F3, F4 |
| <b>AM</b>      | Digital Input Aux fault is in Manual reset.   | F3                 |

### Operating Messages

| Messages  | Description   | Parameter |
|-----------|---|-----------|
| <b>LP</b> | Keypad Lock.  | LP        |
| <b>LL</b> | Last Low Temperature  | -         |
| <b>LH</b> | Last High Temperature   | -         |
| <b>rS</b> | In temperature log function: When LL and LH values are cleared. | -         |
| <b>PA</b> | Password to Enter to get entry into Set Mode, Program Mode.     | PA        |
| <b>dr</b> | Drain Process is ON.  | d1        |

### 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 1sec. 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 touches & holds the "SET" key for 1sec, the Logged Values will be cleared and "rS" will be displayed. Log Values will get reset after Power ON/OFF.

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Two Compressor Controller  
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Globe Valves  
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