

CombiSteel SF-103ST Digital Temperature Controller



CombiSteel SF-103ST Digital Temperature Controller User Guide

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CombiSteel SF-103ST Digital Temperature Controller



Specifications

- **Power supply:** 220V ~240VAC 50/60Hz
- **Temperature sensor:** NTC (B=3380, 10k=25)
- **Range of temperature displayed:** 45 – 99 (45 – 210) Accuracy: ± 1 (± 2)
- **Range of set temperature:** E1~E2 Factory default: 00 (32)
- **Dimension:** 77 (Length) x 35 (Width) x 32 (Depth) mm
- **Mounting hole dimension:** 71 (Length) x 29 (Width) mm
- **Relay box dimension:** 106 (Length) x 96 (Width) x 46 (Depth) mm
- **Temperature of the operating environment:** 10 – 60 (14 – 140)
- **Relative Humidity:** 20% – 90% (Non-condensing)
- **Relay contact capacity**
 - **Compressor:** N.O. 30A/250VAC (Can connect 1HP compressor, if more it needs to connect an AC contactor)
 - **Evap. fan:** N.O. 10A/250VAC
 - **Light:** N.O. 10A/250VAC

Product Usage Instructions

Front Panel Operation

1. Set temperature (compressor stop temperature) adjustment
 - **Parameter:** PA
 - **Function:** Password
 - **Set range:** 00 – 50 – 99 (Factory default: 82)

Energy Saving Control

The controller features energy-saving control options. Follow these steps to optimize energy usage:

1. **t0 Energy saving switch:** Adjust to turn energy-saving mode on or off.
2. **t1 Energy saving temp. Hysteresis:** Set the temperature difference for energy-saving mode activation.

Frequently Asked Questions (FAQ)

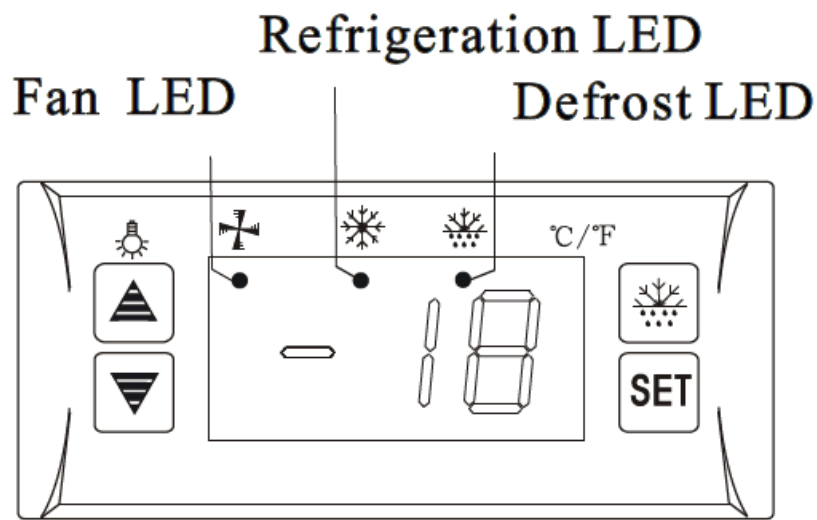
• **Q: How do I set the temperature display range?**

A: Use the Set temperature adjustment feature on the front panel to set the desired range within the specified limits.

• **Q: Can I use this controller for a compressor greater than 1HP?**

A: For compressors larger than 1HP, you will need to connect an AC contactor as specified in the relay contact capacity section.

Model: SF-103ST Digital Temperature Controller



Features of Function

- Mini-sized and integrated intelligent control and applicable to the compressor of one HP.(Include 1HP).
- Temperature Display/ Temperature Control/ Energy saving control/Manual, automatic defrost/Evap. Fan control/ Light Control /Time to end defrost/ Value Storing/ Self Testing

Specifications















1. **Power supply:**220V ~240VAC 50/60Hz
2. **Temperature sensor:** NTC (B=3380,10k=25) ,
3. **Range of temperature displayed :** 45 99 (45 210) Accuracy: 1 (2) Factory default : 00 (32)
4. **Range of set temperature:** E1~E2
5. **Dimension:**77(Length) 35(Width) 32(Depth)mm **Mounting hole dimension:**71(Length) 29(Width)mm **Relay box dimension:**106(Length) 96(Width) 46(Depth)mm
6. **Temperature of the operating environment:** 10 60 (14 140) Relative Humidity:20%~90%(Non-condensing)
7. **Relay contact capacity**
 - **Compressor:** N. O. 30A/250VAC (Can connect 1HP compressor, if more it needs to connect an AC contactor)
 - **Evap. fan:** N. O. 10A/250VAC
 - **Light:** N. O. 10A/250VAC

font Panel Operation


1. Set temperature (compressor stop temperature) adjustment

- Press **SET** button, the set temperature is displayed.
- Press **▲** or **▼** button to modify and store the displayed value. Press **SET** and display the cold-room temperature.
- If no more button is pressed within 6 seconds, the cold-room temperature will be displayed. (Set temperature adjustment range: E1 E2)

2. **Manual start/stop defrost:** Press **Defrost** button and hold for 6 seconds to defrost or stop defrost.

3. **Clock adjustment:** Press and  for  once to enter clock adjustment state, t + hour flash display, press  or  to adjust the hour, press  again for once, t + minutes flash display, press and It will exit, if no more button is pressed within 6 seconds.
4. **Refrigeration LED:** during the delay start, LED flashes. During refrigeration, the LED is on; during temperature constant state, the LED turns off.
5. **Defrost LED:** during defrosting, the LED is on; during dripping time the LED flashes.
6. **Evap. Fan LED:** during fan operation, the LED is on. When the fan stops operation, the LED is off.
7. **Light control:** press for once can turn on or turn off the light, when power on, it can still memorize.
8. **Parameters setup**
Press  button for 6 seconds to enter parameter setting(PA will display and flash);and then press  button, E1, E2 CPA, E1 will display sequentially, press  or  button to display and revise the values; if no more button is pressed within 6 seconds, it will exit and store new values. Note: only when it enters inner parameter manual (PA is displayed) and enter correct password, the parameter values can be adjusted. If the entered password is wrong, then all the parameters just can be checked and can not be changed, the set temperature adjustment is still valid. If the user forget the password, then it need to resume factory defaults.
9. **Factory default resumption:** press  or  and button simultaneously for 6 seconds, “888 ” will be displayed. At that moment all the parameters and set temperature will resume to factory default, after 6 seconds it will return to normal operation.
10. Only after enter correct password when it enters inner parameter “CPA “press  or  button can display and change password, and then  press button to confirm and store new password. (When “CPA ” value is set to “00 ” that means cancel password).

Function details

1. Temperature control(When power on, press  for once to cancel the delay and enter automatic control mode.)
- After turning on for delay time(E40), the compressor starts operating when cold room temperature (set temp.+ Hysteresis E3), and will be off when cold room temperature set temp.
 - To protect the compressor, it can not re-start unless the time when the compressor stops every time is longer than the delay time (Parameter E41).

P a r a m e t e r	Function	Set range	Defa ult	P a r a m e t e r	Function	Set range	De fau lt	
P A	Password	00 50 99	82	t0	Energy savin g switch	00=off 01=on	01	

E 1	Lower set point limit	45 set temp. 49	02 35.6	t1	Energy saving temp. Hysteresis	00 15 00 27	07 04	
E 2	Higher set point limit	Set temp. 45 113	10 50	t2	Energy saving power on time: hr	00 23hr	05 hr	
				t3	Energy saving power on time: min	00 59min	00 min	
				t4	Energy saving stop time: hr	00 23hr	11 hr	
E 3	Temp. Hysteresis	01 10 02 18	03 09	t5	Energy saving stop time: min	00 59min	00 min	
E 4 0	When power on, Comp. start delay time (Effective for the first time after power on)	00 10min	02min	t6	Light on time: hr	00 23hr	00 hr	
				t7	Light on time: min	00 59min	00 min	
E 4 1	Reach the temperature, comp. Stop, the comp. Must delay start time	00 10min	05min	t8	Light off time: hr	00 23hr	00 hr	
E 5	Offset on room temp.	05 05 09 09	-1 00	t9	Light off time: min	00 59min	00 min	
E 7	Cold-room sensor failure Compressor stop time	01 180min	15min	L S	Set temp. Adjustment mode	00=set temp. adjustable 01=set temp. Non-adjustable, can be checked only	00	
E 8	Cold-room sensor failure compressor operation time	01 180min	45min	H 1	High temperature alarm for cold-room sensor	45 H2/11 3 H2	45 11 3	
F 1	Max. Defrost duration	01 60min	10min	H 2	Low temperature alarm for cold-room sensor	H1 45 H1 49	40 40	
F 2	Defrost interval time	00 24hr	04hr					
F	Display during	00=Normal display 01= Last value		H 5	Power on alarm delay	00 180min	60 min	

4	g defrost	e before defrost 02 =Defrost code dEF	01	H 6	Continue alarm delay	00 180min	00 min	
F 5	Power on fan start mode	<ul style="list-style-type: none"> 00=Parallel with comp.(stop when defrost) 01=Continuous running(stop when defrost) 02=Parallel with comp.(start when defrost) 03= Continuous running (start when defrost) 04=when comp. Stops, on for 3 minutes and off for 1 minute (start when defrost) 05= when comp. Stops, on for 2 minutes and off for 2 minutes (start when defrost) 		A 1	Room temperature display mode	00=Normal display 01 = locked low temperature display	00	
				C F	Temperature unit	=Celsius =Fahrenheit		
				C P A	Change menu password	00-99 (if it is set to 00, that means cancel password)	82	
				F 8	After defrost fan start time	00 20min	00min	

1. Temperature display

- When A1=01, the temperature will display in low speed: in the speed of every 30 seconds 1 degree to reach the actual temperature, and do not affect the compressor work normally. When power on, and the actual temperature reach the set temperature for once, only if the cold room temperature is within the range of (set temperature+E3+2 /4), will display the set temperature, otherwise the temperature will display in low speed.

2. Defrosting by turning off compressor

- After worked for a defrost interval F2 will enter defrost state automatically. The defrost LED is on, the compressor stops.
- When reached defrost duration F1, will exit defrost and enter automatic refrigeration state.
- When the defrost interval is set to "00" , the function of automatic defrost will be cancelled.

3. Display during defrost

- When setting parameter F4=0, it will display cold room temperature normally.
- When setting the parameter F4=1, the room temp. is locked during defrost, and the last value before

defrost is displayed. When defrost ends, normal display will be resumed after 20 minutes delay of room temp. Display (or cold room temperature < set temperature + hysteresis E3). The defrost LED flashes during the locked delay.

- When setting parameter F4=2, it will display “dEF “. When defrost ends, normal display will be resumed after 20 minutes delay of room temp. Display (or cold room temperature set temperature + hysteresis E3). The defrost LED flashes during the locked delay.

4. Fan control:

- During refrigeration, the fan start mode is determined by parameter F5 outside the bracket. During defrosting, the fan start mode is determined by parameter F5 inside the bracket. After defrosting, the fan start pass F8 time. Energy saving mode temperature control Note: When the energy-saving start-up time is the same as the shutdown time, it will not enter the energy-saving mode)

When the system work to energy saving start time, the operation temperature will set to (original set temperature + t1) values automatically, flash display tE. When operate to energy saving end time, the operation temperature will adjust to the original set temperature automatically, and display normally.

When the energy saving mode t0=1, the energy saving mode start, when t0=0, the energy saving mode stop.

5. Energy saving mode light control (Note: When the lighting time is the same as the lighting time in energy-saving mode, the lighting is always on, and it can also be turned on or off manually)

- When system work to light on time, the light is on automatically. When work to light off time, the light is off automatically. During energy saving mode can press upward button to control the light switch, when work to the next light on or off time, the light is on or off automatically.

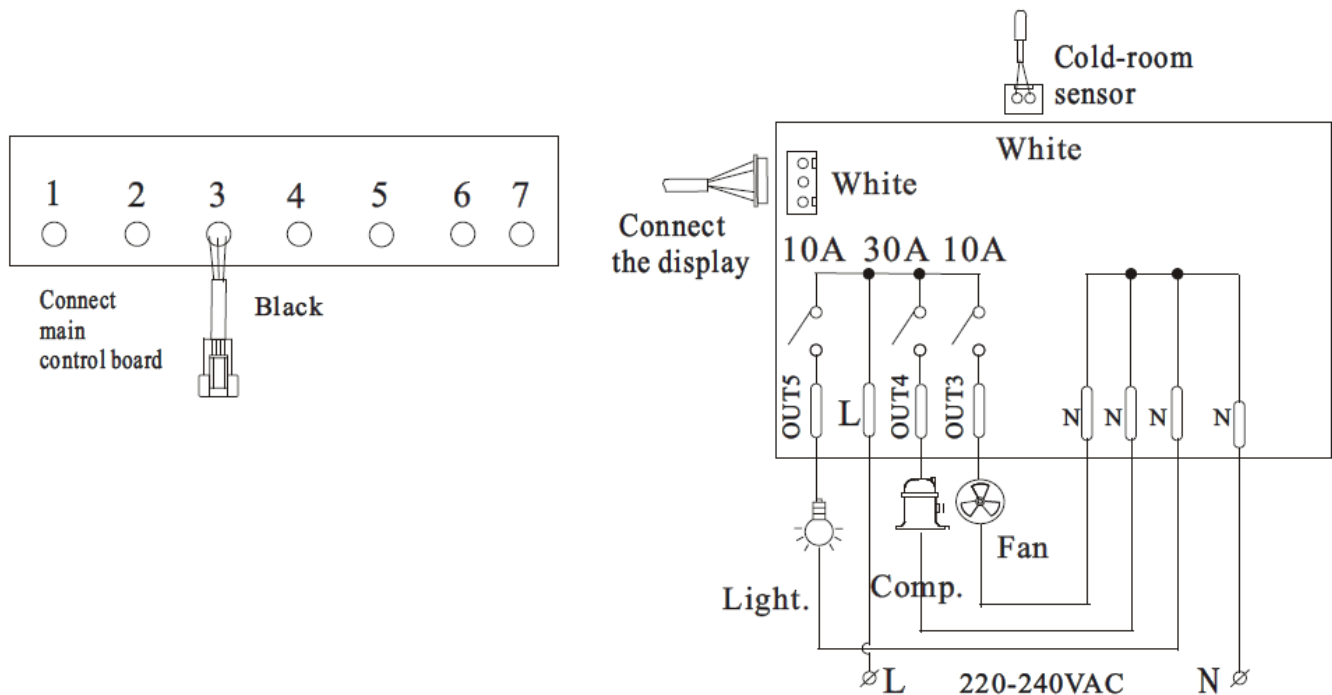
6. High/low temperature overrun alarm

After power on delay time exceeds parameter H5, when cold-room temperature is higher than the value of parameter H1, after alarm delay time (parameter H6), the cold-room temperature and Hi will display and flash, it will exit defrost and start the compressor. When cold-room temperature is lower than the value of parameter H2, after alarm delay time (parameter H6), the cold-room temperature and Lo will display and flash, the compressor control output will be disconnected .At the same time the buzzer will sound, the sound can be stopped by pressing random button.

7. Abnormal work mode:

Failure code	Description	Operation Mode
1H	Cold-room sensor is short-circuited or exceeds	Compressor works according
	high temperature limit (99 /210)	
1L	Cold-room sensor is open-circuited or exceeds	to E8, E7mode
	low temperature limit (45 / 49)	

Circuit Diagram



Notes for Installation

1. The sensor cable leads must be kept separately from main voltage wires in order to avoid high frequency noise induced. Separate the 12V low-voltage lines from the high-voltage lines of the controller.
2. When install the sensor, it shall be placed with the head upward and the wire downward.
3. In case of long-distance probe installation from the controller, the probe cable may be prolonged up to 100 m max. without any re-calibration
4. The temperature controller can not be installed in the area with water drops.
5. The temperature controller can not be installed in the corrosive and strong electromagnetic pulse interference places.

Documents / Resources

	<p>CombiSteel SF-103ST Digital Temperature Controller [pdf] User Guide</p> <p>SF-103ST Digital Temperature Controller, SF-103ST, Digital Temperature Controller, Temperatu re Controller, Controller</p>
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References

- [User Manual](#)

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