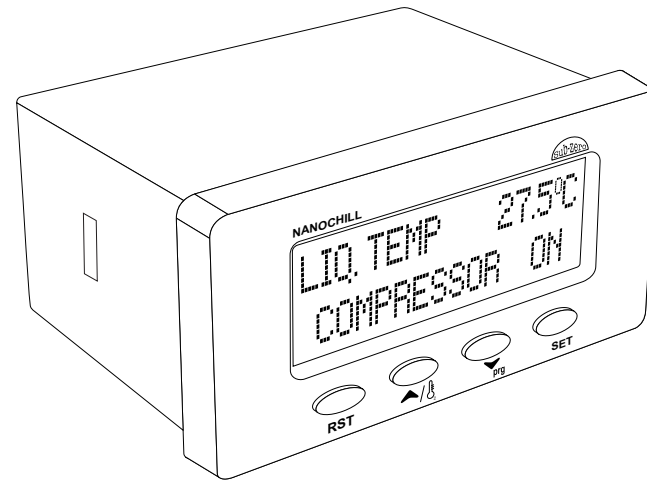




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# User Manual



**NANOCHILL  
NC-110A**



### Introduction

The Subzero "NANO CHILL-NC110A" is a controller that integrates all the basic control functions required by a chiller. A user friendly Lcd screen displays all parameters, control status and alarm messages.

### Features:

- ◆ 16X2LCD with backlight to display all parameters.
- ◆ 2 NTC probes for Liquid temp & Antifreeze
- ◆ Temperature Range : - 30.0°C to + 50.0°C (Resolution 0.5°C)
- ◆ Relay outputs : Compressor , Pump and Relay3 ( Alarm or Water Sv).
- ◆ HP,LP, Auxiliary Fault trip protection for Compressor.
- ◆ Auto/Manual reset for HP,LP and AFT.

### Items included :

NO.	ITEMS	QTY
1.	CONTROLLER	1No.
2.	TEMPERATURE SENSOR (LIQUID)	1No.
3.	SIDE LOCKS (SCREW TYPE)	2Nos.
4.	CATALOGUE	1No.
5.	TEMPERATURE SENSOR (ANTIFREEZE)	1 No.

### Optional :


NO.	ITEMS	QTY
1.	LIQUID LEVEL SENSOR	1 SET

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PARAMETER	DESCRIPTION	Pg. No.
	<b>SET MODE</b>	
CHILLER SET TEMP.	To set the cutout point of the Compressor.	05
To set other parameters.	<b>PROGRAM MODE</b>	05
CHILLER SET TEMP.	To set the cutout point of the Compressor.	05
COMP TIME DELAY.	To set compressor restart delay.	06
DIFFERENTIAL	To set temperature differential for compressor restart.	06
HI TEMP. ALARM	To set maximum allowable high temperature limit & alarm.	06
LOW TEMP. ALARM	To set minimum allowable low temperature limit and alarm..	07
AFTPROBE STATUS	To enable or disable Antifreeze function.	07
AFT SET TEMP.	To set Antifreeze tripping point.	07
AFT DIFFERENTIAL	To set Antifreeze resetting differential.	08
LIQ. PROBE CAL.	To set Main(Liquid) probe calibration.	08
AFT PROBE CAL.	To set Antifreeze probe calibration.	08
FAULT SENS LOGIC	To set tripping voltage of digital inputs .	09
LP SENSING DLY	To set LP fault sensing delay.	09
HP/AFT RST	To set HP and AFT fault to Auto or Manual reset.	09

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PARAMETER	DESCRIPTION	Pg. No.
LP FAULT RESET	To set LP fault to Auto or Manual reset.	09
LIQ. LEVEL SENSOR	To enable / disables liquid level sensing.	10
PUMP RUN LOGIC	To configure pump working logic.	10
RELAY3 LOGIC	To configure Relay3.	10
KEYPAD LOCK	To lock keypad.	11
FACTORY SET	Revert to factory set parameter.	11
SET - EXIT	To end programming	11
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Parameter List			
Min: MINIMUM Max : MAXIMUM Fact. Set : FACTORY SETTING(DEFAULT)			
Description of parameters and functions.			
Sr.No.	Parameter (LCD Message)	Parameter setting method.	
<b>SET MODE</b>			
<b>01</b>	CHILLER SET TEMP.	Function : To set the cutout point of the Compressor.	
Press and hold set key for 2 seconds and Release.		LCD will change to set mode and flash. Then press set key once & release .Set point will flash. Set point can now be changed by using UP/DOWN key. After achieving the desired range, press the SET key .	
<b>Range</b>			
<b>Min</b>	<b>Max</b>	<b>Fact. Set</b>	
Lt +0.5°C	Ht -0.5°C	10.0°C	
Lt = Low temp Limit. Ht = High temp.Limit			
<b>PROGRAM MODE</b>			
<b>02</b>	To set other parameters.	LCD will show Program Mode. And the "Chiller Set Temp" will flash. To go to other parameters, use up/ down keys.	
Hold  key for 2 seconds and Release.			
<b>03</b>	CHILLER SET TEMP.	Function : To set the cutout point of the Compressor.	
To change the parameter, press the set key.		Use UP/DOWN keys to set desired range.	
<b>Range</b>			
<b>Min</b>	<b>Max</b>	<b>Fact. Set</b>	
Lt +0.5°C	Ht -0.5°C	10.0°C	
Lt = Low temp Limit. Ht = High temp.Limit			

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Description of parameters and functions.			
Sr.No.	Parameter (LCD Message)	Parameter setting method.	
<b>04</b>	COMP. TIME DELAY	Function: To set compressor restart delay.	
To change the parameter, press the set key.		Use UP/DOWN keys to set desired range.	
<b>Range</b>			
<b>Min</b>	<b>Max</b>	<b>Fact. Set</b>	
0 Min	20 Min	3 Min	
<b>EXAMPLE:</b> If this parameter is set at 3 minutes, the compressor will cut off at the set temperature, but will not restart for a minimum of 3 minutes. This time delay is also effective at 'Power On' of the system. This safety feature is used to protect the compressor from restarting within a short period due to power fluctuations.			
<b>05</b>	DIFFERENTIAL	Function: To set temperature differential for compressor restart.	
To change the parameter, press the set key.		Use UP/DOWN keys to set desired range.	
<b>Range</b>			
<b>Min</b>	<b>Max</b>	<b>Fact. Set</b>	
1.0°C	10.0°C	2.0°C	
<b>EXAMPLE:</b> If the set point is set at 10.0°C and differential is set as 2.0°C, then when the system reaches 10°C, the compressor will cutout. Since differential is 2.0°C, the compressor will cut in (restart) at 12.0°C (10.0°C + 2.0°C).			
<b>06</b>	HIGH TEMP. ALARM	Function: To set maximum allowable high temperature limit and alarm.	
To change the parameter, press the set key.		Use UP/DOWN keys to set desired range. Once set at a particular range, this will not allow the set point to go above this range and below HI Temp Alarm setting.	
<b>Range</b>			
<b>Min</b>	<b>Max</b>	<b>Fact. Set</b>	
Chiller Set + 0.5°C	50.0°C	50.0°C	
<b>EXAMPLE:</b> Setting this parameter at 50.0°C will not allow the set point to go above 50.0°C. Also if the temperature reaches or goes above 50.0°C the display will show High Temp. Alarm & at this point the alarm will activate.			

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Description of parameters and functions.			
Sr.No.	Parameter (LCD Message)	Parameter setting method.	
07	LOW TEMP. ALARM	Function: To set minimum allowable low temperature limit and alarm.	
To change the parameter, press the set key.		Use UP/DOWN keys to set desired range. Once set at a particular range, this will not allow the set point to go below this range and above Low Temp Alarm setting.	
<b>Range</b>			
<b>Min</b>	<b>Max</b>	<b>Fact. Set</b>	
AFT Set Point +1.0°C	Set Point - 0.5°C	6.0°C	
<b>EXAMPLE:</b> Setting this parameter at 6.0°C will not allow the set point to go below 6.0°C Also, if the temperature reaches or goes below 6.0°C the display will show Low Temp. Alarm and at this point the alarm will activate.			
08	AFT PROBE STATUS	Function: To enable or disable Antifreeze probe function.	
To change the parameter, press the set key.		Use UP/DOWN keys to set desired range.	
<b>Range</b>			
<b>Min</b>	<b>Max</b>	<b>Fact. Set</b>	
Disable	Enable	Disable	
Disable= It disables the Anti. Freeze Trip function of the controller Enable = It enables the Anti. Freeze Trip function of the controller			
09	AFT SET TEMP	Function: To set Antifreeze tripping point.	
To change the parameter, press the set key.		Use UP/DOWN keys to set desired range.	
<b>Range</b>			
<b>Min</b>	<b>Max</b>	<b>Fact. Set</b>	
-30.0°C	Lt-1.0°C	5.0°C	
<b>EXAMPLE:</b> If this parameter is set to 5.0°C controller will trip the compressor on Antifreeze fault if the AFT sensor goes below 5.0°C.			

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Description of parameters and functions.			
Sr.No.	Parameter (LCD Message)	Parameter setting method.	
10	AFT DIFFERENTIAL	Function: To set fault resetting differential once it tripped of Aft set point.	
To change the parameter, press the set key.		Use UP/DOWN keys to set desired range.	
<b>Range</b>			
<b>Min</b>	<b>Max</b>	<b>Fact. Set</b>	
1.0°C	10.0°C	2.0°C	
<b>EXAMPLE:</b> If the AFT set point is set at 5.0°C and differential is set to 2.0°C then after tripping on AFT fault controller will clear the AFT fault only when the AFT Temperature goes above 7.0°C(5.0°C+2.0°C).			
11	LIQ. PROBE CAL	Function: To set Main(Liquid) probe calibration.	
To change the parameter, press the set key.		Use UP/DOWN keys to set desired range. During the course of time there may be a slight offset in the actual temperature and the temperature displayed.	
<b>Range</b>			
<b>Min</b>	<b>Max</b>	<b>Fact. Set</b>	
-10.0°C	10.0°C	0.0°C	
<b>EXAMPLE:</b> If the actual temperature is 20.0°C and the temperature on the controller shows 22.0°C set this parameter to -2.0°C and once out of this mode, the temperature will display 20.0°C. (22.0°C-2.0°C).			
12	AFT PROBE CAL	Function: To set Antifreeze probe calibration.	
To change the parameter, press the set key.		Use UP/DOWN keys to set desired range.	
<b>Range</b>			
<b>Min</b>	<b>Max</b>	<b>Fact. Set</b>	
-10.0°C	10.0°C	0.0°C	
Setting Procedure same as Liq. Probe Cal.			

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Description of parameters and functions.			
Sr.No.	Parameter (LCD Message)	Parameter setting method.	
<b>13</b>	FAULT SENS LOGIC	Function: To set tripping voltage of digital inputs .	
To change the parameter, press the set key.		Use UP/DOWN keys to set desired range.	
<b>Range</b>			
<b>Min</b>	<b>Max</b>	<b>Fact. Set</b>	
0V	230 V	230V	
		0v- Trip the compressor or pump if fault i/p is 0v 230V-Trip the compressor or pump if fault i/p is 230Vac	
<b>14</b>	LP SENSING DLY	Function:To set LP fault sensing delay.	
To change the parameter, press the set key.		Use UP/DOWN keys to set desired range.	
<b>Range</b>			
<b>Min</b>	<b>Max</b>	<b>Fact. Set</b>	
1 Sec	90 Sec	30 Sec	
		<b>EXAMPLE:</b> If this parameter is set at 30 seconds, the system will ignore low pressure alarm for 30 sec from compressor on.In this manner, a false alarm can be avoided due to low pressure at compressor start up.	
<b>15</b>	HP / AFT RST	Function: This parameter will set HP and AFT fault to Auto or Manual reset.	
To change the parameter, press the set key.		Use UP/DOWN keys to set desired range.	
<b>Range</b>			
<b>Min</b>	<b>Max</b>	<b>Fact. Set</b>	
Manual	Auto	Auto	
		Manual= it sets the HP- AFT faults for manual reset Auto= it sets the HP- AFT faults for auto reset.	
<b>16</b>	LP FAULT RESET	Function: This parameter will set LP fault to Auto or Manual reset.	
To change the parameter, press the set key.		Use UP/DOWN keys to set desired range.	

Contd.

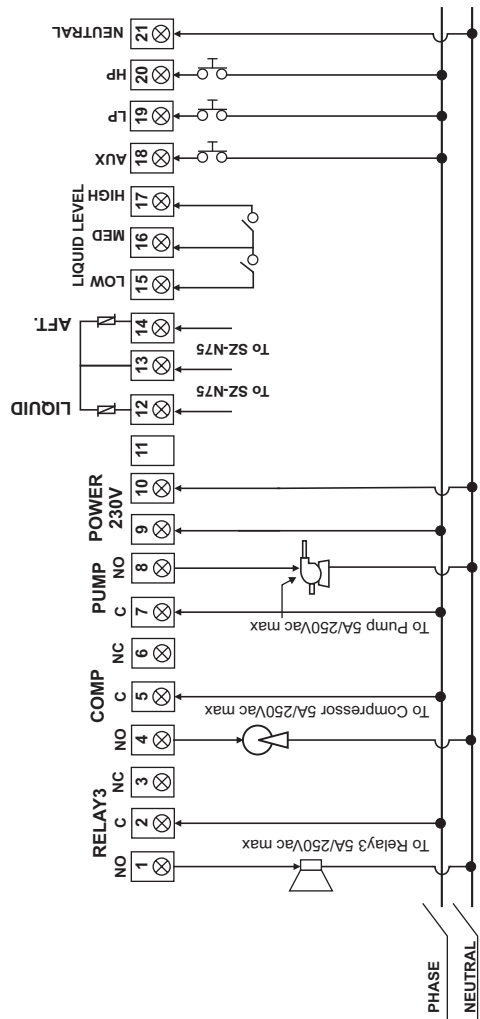
Description of parameters and functions.			
Sr.No.	Parameter (LCD Message)	Parameter setting method.	
<b>Range</b>			
<b>Min</b>	<b>Max</b>	<b>Fact. Set</b>	
Manual	Auto	Auto	
		Manual= it sets the LP fault for manual reset Auto= it sets the LP fault for auto reset.	
<b>17</b>	LIQ LEVEL SENSOR	Function: This parameter enable / disables liquid level sensing.	
To change the parameter, press the set key.		Use UP/DOWN keys to set desired range.	
<b>Range</b>			
<b>Min</b>	<b>Max</b>	<b>Fact. Set</b>	
Disable	Enable	Disable	
		Disable= This parameter disables Liquid level sensing in the controller. Enable= This parameter enables Liquid level sensing in the controller.	
<b>18</b>	PUMP RUN LOGIC	Function: This parameter configures pump working logic.	
To change the parameter, press the set key.		Use UP/DOWN keys to set desired range.	
<b>Range</b>			
<b>Min</b>	<b>Max</b>	<b>Fact. Set</b>	
Always On	With Comp	Always On	
		Always On= it sets the pump to always on mode. With Comp =In this case pump will switch ON and OFF with compressor.	
<b>19</b>	RELAY3 LOGIC	Function: This parameter configures Relay3.	
To change the parameter, press the set key.		Use UP/DOWN keys to set desired range.	
<b>Range</b>			
<b>Min</b>	<b>Max</b>	<b>Fact. Set</b>	
Alarm	Water SV	Alarm	
		<b>EXAMPLE:</b> If set to water sv,Relay3 will switch on incase of liquid level is below mid level.If set to Alarm, Relay3 will switch on for all faults .	

Description of parameters and functions.			
Sr.No.	Parameter (LCD Message)	Parameter setting method.	
20	KEYPAD LOCK	Function: To lock keypad.	
To change the parameter, press the set key.		Use UP/DOWN keys to set desired range.	
<b>Range</b>			
<b>Min</b>	<b>Max</b>	<b>Fact. Set</b>	
Disable	Enable	Disable	
		Enable = all parameters are locked to set values. Disable= Use can change the values.	
21	FACTORY SET	Function: Revert to factory set parameter.	
To change the parameter, press the set key.		Use UP/DOWN keys to set desired range.	
<b>Range</b>			
<b>Min</b>	<b>Max</b>	<b>Fact. Set</b>	
Disable	Enable	Disable	
		To restore default settings of the controller. When set to Enable, all parameters are programmed to factory settings. Used to debug setting related problems.	
22	SET - EXIT UP/DOWN - SCROLL	Function : To end programming	
To end Program mode press set key.		Once the SET key is pressed the control goes into the normal mode and displays the temperature.	
<b>Key Introduction :</b>			
<b>Key</b>	<b>Description</b>		
prb	Used in program mode and set mode to increment parameter value.		
▲	Used to view to Antifreeze (AFT) Temperature.		
▼	Used to enter into the program mode.		
prg	Used in program mode and set mode to decrement parameter value.		
RST	Press for 4 seconds to reset HP, LP, AFT faults in manual reset.		
SET	In program mode and set mode used to set the changed value of parameter or to enter into set mode.		

### Technical Data

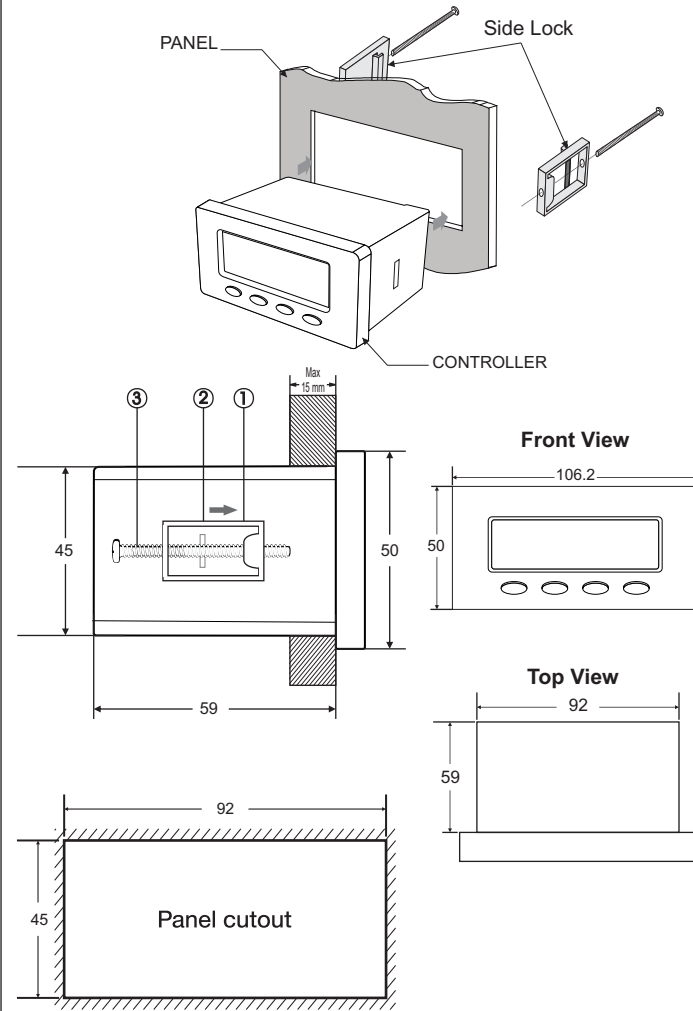
<b>Housing</b>	: ABS Plastic
<b>Dimensions</b>	: Front - 106.2 x 50 mm Depth- 59 mm
<b>Panel Cutout</b>	: 92 X 45 mm
<b>Mounting</b>	: Flush panel mounting
<b>Protection</b>	: IP54 Frontal
<b>Connection</b>	: Plugable Screw terminal blocks. ≤ 2.5mm <sup>2</sup> one wire/terminal only.
<b>Display</b>	: 16x2 LCD
<b>Data Storage :</b>	Non-Volatile EEPROM Memory
<b>Storage temp</b>	: -20°C to 70°C(non-condensing)
<b>Input</b>	: NTC Probe, SZ-N75
<b>Range</b>	: -30.0°C to +50.0°C
<b>Power Input</b>	: 230Vac +/-20%, 50Hz
<b>Operating Temp</b>	: 5°C to 50°C(non-condensing)
<b>All Relay</b>	: 5A/250Vac
<b>Resolution</b>	: 0.5°C
<b>Accuracy</b>	: +/-1°C
<b>Probe Tolerance</b>	: +/-0.3°C at 25°C

### Wiring Diagram



Caution: Wiring for 230Vac load only

### Panel Cutout & Dimensions



Note : All dimension are in mm.



## Installation

Fixing and dimensions of panel models :To fix the unit, slide the side lock① through the guides ② as per the position shown in the figure. Move the side lock in the direction of the arrow, it permits to move the fastener in the opposite direction of the arrow③ Fit the screw in the side lock in direction of the arrow to hold the controller in the panel.

## 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.

## 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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