User Manual

Cold Room Controller

CRC 1200

www.subzero.co

Index

Index

Introduction

The CRC-1200 is a panel/wall mounted controller dedicated to controlling the cold room and its various devices.

Features:

The controller controls the defrost in the system based on either an electrical heater where the compressor is stopped, or at cycle inversion using warm gas where the compressor keeps on working.

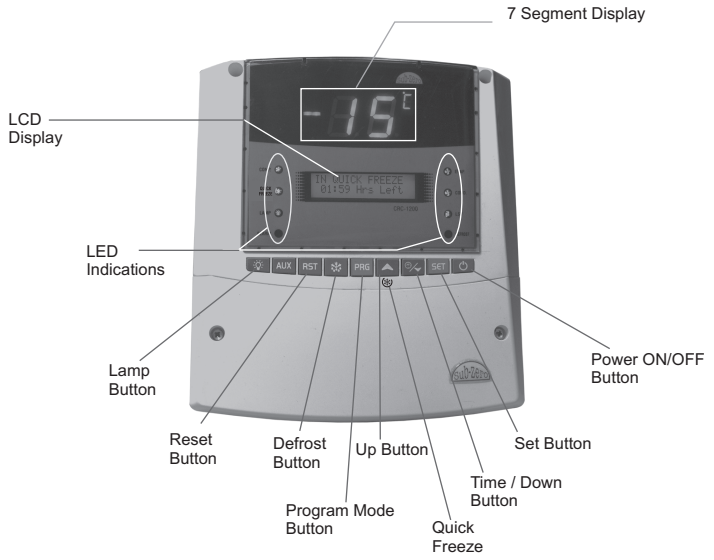
It is also possible to select the interval between defrosts and a maximum time out after which the defrost is interrupted. The same probe which controls the defrost cycle is also used to control the evaporator fans.Post drip and condensor fan control are amongst many other features in this contoller.

There are safety features which include shutting down the system incase of a fault from a pressure control or similar device.

Computer Connectivity over RS485 and Remote monitoring(Optional).

Single Operation Quick Freeze Mode(Press UP Key for 4 sec), Set system in quick freeze mode which is time based for that period new setpoint will be lower than running setpoint and system will try to achieve that setpoint, after time period over set point will be normal setpoint.

Get to Know Your Controller



Items included

NO.	ITEMS	QTY
1.	CONTROLLER	1
2.	SENSOR 3 METER	1
3.	SENSOR 5 METER	1
4.	CATALOGUE	1
5.	6 X 25 SCREW	3

Key Introduction

	Lamp ON/OFF Key		Up Key / Quick Freeze / Hold & Release LCD Messages
AUX	Auxiliary Key (unused)		Clock/Down Key
RST	Alarm Reset Key	SET	Set Key
	Defrost Key		Power Key
PRG	Program Key		Quick Freeze

MAIN SYSTEM PROGRAMMING MODE	
1> USER PROGRAM	Press SET Key to Enter Programming mode.
2> TIME SETTINGS	Press SET Key to Enter in Time settings.
3> FAULT LOG	Press SET Key to View last 10 Fault Log.
4> CLEAR FAULT LOG	Press SET Key to clear last Fault Log.
5> COPY FROM PGM KEY	Insert HOT Key and Press SET Key to program System using external Program Key.
5> DEVICE ID 1-64	Press SET Key to Change Device ID.
7> EXIT PROGRAMMING	Press SET Key to Exit Programming Mode.

Min: MINIMUM Max : MAXIMUM
Fact. Set : FACTORY SETTING(DEFAULT)

Description of parameters and functions.

Sr. No.	Parameter (LCD Message)	Parameter setting method
01	SET POINT	To set the cut-out point of the controller.
Press and hold SET key for 4 seconds and Release. SET		Display will change to set value. The set point value can now be changed by using the UP/DOWN key. After desired value, press the SET key & you will see "---" which confirms that the set point has been stored in memory.

Range		
Min	**Max**	**Fact. Set**
-20ºC	35ºC	-15ºC

Description of parameters and functions.

Sr. No.	Parameter (LCD Message)	Parameter setting method
To set other parameter		
Press & hold PRG key for 4 seconds PRG		Display will show *"SELECT MODE I > USER PROGRAM MODE"* Press SET key display will show set point. To go other parameter, use UP/DOWN keys.
02	MAX SET POINT	Function: To set the Maximum System Cooling Temperature
To change Max Set Point parameter, press the set key.		Use UP/DOWN key to set desired value. Once set at a particular value, this will not allow set points to go above this value and below QUICK FREEZE SP setting. **Example :** Setting this parameter at 30°C if the temperature reaches 30°C, this is the Ht (High Temperature) condition but at power on till 20minutes controller will not generate HT Alarm.

Range		
Min	**Max**	**Fact. Set**
SP	35ºC	35ºC

03	MIN SET POINT	Function: To set the Minimum Cooling Temperature.
To change Min Set Point parameter, press the set key.		Use UP/DOWN key to set desired value. Once set at a particular value, this will not allow set points to go above this value and below QUICK FREEZE SP setting. **Example** : Setting this parameter at -30°C will not allow the set point to go below -30°C. Also, if temperature reaches -30°C, the display will show Low Temp. Alarm indicating that the temperature has gone below the value in this parameter and at this point the alarm will come on.

Range		
Min	**Max**	**Fact. Set**
-50ºC	QFSP	-50ºC

QFSP - QUICK FREEZE SP

Description of parameters and functions.

Sr. No.	Parameter (LCD Message)	Parameter setting method
04	DIFFERENTIAL	Function: To set the differential for compressor restart.
To change DIFFERENTIAL parameter, press the set key.		Use UP/DOWN keys to set desired value.
Range		**Example :** If setpoint is set at 10°C and differential is set at 2°C, then when the system reaches 10°C, the compressor relay will cutout and since the differential is 2°C, the relay will cutin (restart) at 12°C (10°C + 2°C).
Min: 1ºC	Max: 20ºC	Fact. Set: 2ºC
05	QUICK FREEZE SP	Function: To set Quick Freeze Set Point.
To change Quick Freeze SP parameter, press the set key.		Use UP/DOWN keys to set desired value. This Parameter will set QUICK Freeze Set Point during QUICK Freezing Defrost will not occur.
Range		**Example** : If this set to -20°C, and quick freeze frequency is set to 1 hr ,then when it is set to quick freeze mode, then the Comp. will take -20°C set point for 1 hr.
Min: -50ºC	Max: SP	Fact. Set: -20ºC
06	QUICK FREEZE DUR	Function: To set Quick Freeze Duration.
To change Quick Freeze Dur parameter, press the set key.		Use UP/DOWN keys to set desired value. This is the maximum amount of time allowed for Quick Freeze. If set to “0”, there will be no quick freeze.
Range		**Example** : see QUICK FREEZE SP parameter.
Min: 0Hrs	Max: 12 Hrs	Fact. Set: 0 Hrs

Description of parameters and functions.

Sr. No.	Parameter (LCD Message)	Parameter setting method
07	ROOM PROBE CAL	Function: To set room probe 1 calibration.
To change the Room Probe Cal parameter, press the set key.		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 degrees required to achieve the correct temperature. Setting value is from -10°C to + 10°C. **Example :** The temperature on the display is 28°C, whereas the actual temperature is 30°C. You will need to set the Calib. Val to 2, which means that once out of the programming mode, the temperature will show 30°C (28°C + 2°C).
Range		
Min: -10ºC	Max: 10ºC	Fact. Set: 0ºC
08	COMP TIME DELAY	Function: To set time delay between compressors relay restart time.
To change the Comp Time Delay parameter, press the set key.		Use UP/DOWN keys to set desired value. This parameter is used to protect the compressor from restarting in a short period of time and can be set between 0 to 20 minutes. **Example :** If this parameter is set at 3 minutes, the relay will cut off at the set temperature, but 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 or even in applications where the probe is placed at places where there are sudden & short changes in temperature .
Range		
Min: 0 Min	Max: 20 Min	Fact. Set: 3 Min

Description of parameters and functions.

Sr. No.	Parameter (LCD Message)	Parameter setting method
09	DRIP TIME DUR	Function: To set drip time for defrost water.
To change the Drip Time Dur parameter, press the set key.		Use UP/DOWN keys to set desired value. During this period Compressor, Evaporator Fan, LSV relay and Heater will stay off so that the defrost water can drip and drain out.
Range: Min: 0 Min; Max: 30 Min; Fact. Set: 1 Min		
10	POST DRIP TIMING	Function: To set Post Drip Timings.
To change the Post Drip Timing parameter, press the set key.		Use UP/DOWN keys to set desired value. During this timing Compressor is ON and Evaporator Will remain OFF also Heater is OFF.
Range: Min: 15 Sec; Max: 99 Sec; Fact. Set: 30 Sec		
11	COMP ON PROBE FAIL	Function: To set Compressor function during room probe failure.
To set compressor function during room probe failure.		Use UP/DOWN keys to set desired value. 0 = Compressor Continuous ON. 1 = Compressor in Time Delay. (20Min ON / 4 Min OFF) 2 = Compressor is OFF.
Range: Min: 0; Max: 2; Fact. Set: 1		
12	CONDENSER ON DLY	Function: To Set Condensor On Delay Timings..
To change the Condenser On Dly parameter, press the set key.		Use UP/DOWN keys to set desired value. When compressor delay over Cond. Fan will come ON first, after cond. On delay over Comp will come ON.
Range: Min: 0 Sec; Max: 30 Sec; Fact. Set: 15 Sec		

Description of parameters and functions.

Sr. No.	Parameter (LCD Message)	Parameter setting method
13	EVAP FAN STOP TC	Function: To set Evaporator Fan Stop Temperature.
To change Evap Fan Stop Tc parameter, press the set key.		Use UP/DOWN keys to set desired value. This setting is used to limit the max. temperature beyond which the Evap. Fan will cut off. **Example** : If this parameter is set to 2°C, then Evap. Fan will cut off at 2°C.
Range: Min: -40°C; Max: 35°C; Fact. Set: 2°C		
14	EVAP TIME DELAY	Function: To set Evaporator Restart Time Delay.
To change Evap Time Delay parameter, press the set key.		**Example** :If this is set at 3 minutes, the Evap. Fan relay will cut off at the temp. set by Evap. Fan Stop TC. parameter but the Fan will not come on for a minimum of 3 minutes even if it's differential is achieved earlier.
Range: Min: 0 Min; Max: 20 Min; Fact. Set: 1 Min		
15	EVAP Wn COMP OFF	Function : To set Evap Fan operation when compressor is off
To change Evap Wn Comp Off parameter, press the set key.		Use UP/DOWN keys to set desired value. 0 = Evap Fan is off when compressor is OFF. 1 = Evap fan will stay on when compressor is OFF.
Range: Min: 0; Max: 1; Fact. Set: 1		
16	EVAP DIFFERENTIAL	Function : To set Evaporator Differential.
To change Evap Differential parameter, press the set key.		Use UP/DOWN keys to set desired value. **Example**:If Evap Fan Stop Tc parameter is set to 2°C, and if EVAP DIFFERENTIAL parameter is set to 2°C, then Evap. Fan will cut off at 2°C and restart only at 0°C(2°C-2°C = 0°C).
Range: Min: 1°C; Max: 20°C; Fact. Set: 2°C		

Description of parameters and functions.

Sr. No.	Parameter (LCD Message)	Parameter setting method
17	COIL PROBE CAL.	Function: To set coil probe calibration.
To change Coil Probe Cal. parameter, press the set key.		Use UP/DOWN keys to set desired value.
Range		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 degrees required to achieve the correct temperature. Setting value is from -10°C to + 10°C
Min: -10°C	Max: 10°C	Fact. Set: 0°C
18	EVAP At DEFROST	Function: To set Evap. Fan status during defrost.
To change Evap At Defrost parameter, press the set key.		Use UP/DOWN keys to set desired value. 0 = Evaporator Fan will stay OFF during defrost. 1 = Evaporator Fan will stay ON during defrost.
Range		
Min: 0	Max: 1	Fact. Set: 0
19	EVAP At DOOR OPEN	Function : Evap fan status during door open condition.
To change Evap at Door Open parameter, press the set key.		Use UP/DOWN keys to set desired value. 0 = ON 1 = OFF
Range		
Min: 0	Max: 1	Fact. Set: 0
20	DEFROST TYPE	Function : To set type of defrost.
To change Defrost Type parameter, press the set key.		Use UP/DOWN keys to set desired value. 0 = Heater defrost in which case Compressor is OFF. 1 = Hot gas defrost where Compressor is ON.
Range		
Min: 0	Max: 1	Fact. Set: 0

Description of parameters and functions.

Sr. No.	Parameter (LCD Message)	Parameter setting method
21	DEFROST COMPUTING	Function: To set type of computation for defrost time.
To change Defrost Computing parameter, press the set key.		Use UP/DOWN keys to set desired value. **0 = Total of real time.** **Example :** This means that the time calculation for defrost frequency will be for the total hours the unit has been running. **1 - Sum of total compressor operating times.** This means that for time calculation, the unit will add the total time the compressor has been in an ON mode. It keeps a record of the hours worked +/-1 Hour incase of a power failure. **Example** : If Defrost frequency is set to 6 hrs. and 3 ½ hrs have passed after unit has started and power fails, then defrost cycle will stat after 3 hours when power resumes.
Range		
Min: 0	Max: 1	Fact. Set: 0
22	DEFROST FREQUENCY	Function: To Set Defrost frequency.
To change Defrost Frequency parameter, press the set key.		Use UP/DOWN keys to set desired value. This is the amount of time between two defrost cycles.
Range		
Min: 1 Hrs	Max: 12 Hrs	Fact. Set: 4 Hrs
23	DEFROST DURATION	Function:To set Maximum Defrost duration.
To change Defrost Duration parameter, press the set key.		Use UP/DOWN keys to set desired value. This is the maximum amount of time allowed for a defrost. If set to 0, there will be no defrost cycle.

Description of parameters and functions.

Sr. No.	Parameter (LCD Message)	Parameter setting method
	Range: Min 0 Min, Max 45 Min, Fact. Set 15 min	**Example** : If this parameter is set to 15 minutes, and Defrost frequency parameter is set at 1 hr. Then '1 hr' after power is applied to the controller, defrosting for 15 minutes will take place. This cycle will repeat every '1 hr'.
24	DEFROST STOP TEMPERATURE	Function: Final defrost temperature. (Coil probe).
To change Defrost stop temperature parameter, press the set key.	Range: Min 0°C, Max 15°C, Fact. Set 4°C	Use UP/DOWN keys to set desired value. This is the maximum temperature allowable at which the defrost process will stop. **Example** :If this parameter is set to 7°C,then if defrosting is in progress then when DEFROST STOP TEMPERATURE temperature reaches 7°C, the defrost process will stop.
25	POWER ON DEFROST	Function: To activate power ON Defrost.
To change Power ON Defrost parameter, press the set key.	Range: Min 0, Max 1, Fact. Set 0	Use UP/DOWN keys to set desired value. This parameter will decide to start power ON defrost or Not. This also depend on Coil Temperature 0 = No Power Up Defrost 1 = Power Up Defrost
26	DEFROST DURATION IN COIL PRB.FAIL	Function: To set Defrost duration IN Coil probe Failure.
To change Defrost Duration IN Coil PRB. Fail parameter, press the set key.	Range: Min 1Min, Max 10 Min, Fact. Set 5 Min	This is the maximum amount of time allowed for a defrost IN Coil probe fail. **Example** : If this is set to 5 minutes, then Manual defrost for 5 minutes will take place during Coil probe fail.

Description of parameters and functions.

Sr. No.	Parameter (LCD Message)	Parameter setting method
27	PUMP DOWN	Function: To activate Solenoid Valve Relay.
To change Pump Down parameter, press the set key.	Range: Min 0, Max 1, Fact. Set 0	Use UP/DOWN keys to set desired value. 0 = SV relay will not activate. 1 = SV relay will get activated and will cut out and cut-in according to set temperature.
28	KEYPAD LOCK	Function: To activate Keypad Lock.
To change Keypad Lock parameter, press the set key.	Range: Min 0, Max 1, Fact. Set 0	This parameter can lock the keypad so that tempering is not possible by by-standers. 0 - deactivates keypad lock. 1 - activates keypad lock. This parameter can lock the keypad so that tempering is not possible by-standers. When locked all parameters can only be viewed, but not modified.
29	FACTORY RESET	Function: Revert to Factory Parameters.
To change Factory Reset parameter, press the set key.	Range: Min 0, Max 1, Fact. Set 0	Use UP/DOWN keys to set desired value. 1=Revert to factory set parameters. If we set this parameter 1 and press set Key then all factory default parameter will get loaded.
30	SAVE PROGRAMMING	Function: To save system programming parameters.
To change Save Programming parameter, press the set key.		Use UP/DOWN keys to set desired value. 1> Send To External Key. 2> Exit Programming.

Technical Data

Power supply
Controller Input Supply : 230VAC, +/-15%, 50Hz

Digital Inputs
Digital Inputs : 4Nos.
Digital Input type : 230 VAC, 3Nos.
Potential Free Contacts 1Nos.
Input Nomenclature :
1) SPPR Input
2) High pressure input from compressor
3) Low pressure input from compressor
4) Door Input(Potential Free Contacts Input)

Sensors
1)Temperature Sensor: (Room temperature & Coil temperature)
Sensor Type: NTC Thermistor
Resolution : +/-1deg.C
Accuracy : +/-1deg.C
Range : -50^{0}C to 35^{0}C.

Digital Outputs
Digital Outputs : 7
Type : Relay

Sr. No	Output Nomenclature	Output Contact Rating	Contact Arrangement
1	Compressor	8(3)A/250VAC (Inductive)	C, NO
2	Condenser Fan	8(3)A/250VAC (Inductive)	NO
3	Evaporator Fan	8(3)A/250VAC (Inductive)	NO
4	Pump Down	8(3)A/250VAC (Inductive)	NO
5	Defrost Heater	8(3)A/250VAC (Inductive)	NO
6	Panel Lamp	8(3)A/250VAC (Inductive)	NO
7	Alarm	8(3)A/250VAC (Inductive)	C, NO, NC

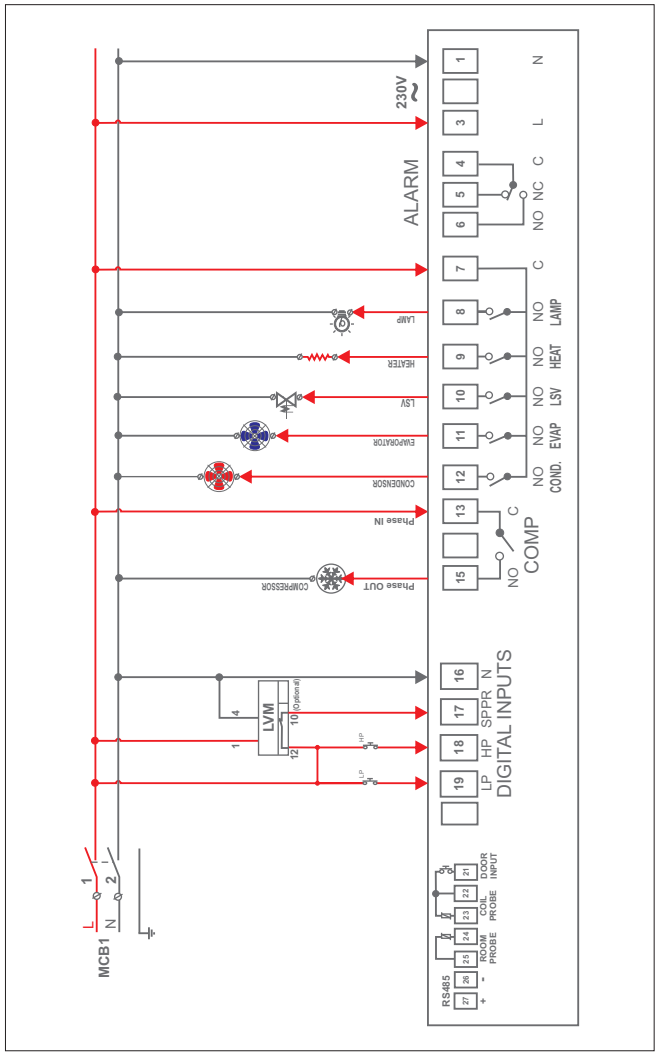
Technical Data

User Interface
Display : 2 Digit Seven Segment Display (Red)
(1.00” and 8 LEDs for indication.)
16X2 LCD Display For System Status
Keypad : 9 keys (may change)
Rs485 Connectivity : Modbus RTD Protocol
Baud Rate : 9600, N, 8, 1
Device ID : 1 (By Default)
Hot Key(Optional)

Housing
Material : ABS plastic.
Front cover : Polycarbonate plastic.
Dimensions : Length 227mm, Width 200mm, Depth 93 mm
Mounting : Panel/Wall mounting with screws.

Key Features:
- PC Connectivity Using Modbus RTU Open Protocols over RS485 and can be Interfaced with any BMS system which supports Modbus RTU Protocols.
- Remote monitoring and control using GUI Software (optional).
- Inbuilt RTC.
- QUICK Freeze Mode.
- Evaporator Fan Control based on Coil temperature.
- Door Input (Potential Free Contacts).
- Last 10 Fault Logs.
- LCD Display to show System Status and as user guide while
- programming.
- Time Based Defrost Cycle
- Manual Defrost Key
- Power Switch Key.
- Software Precaution to avoid multiple Defrost
- Additional Condenser Fan Relay
- Hot Key for programming (optional).
- Post Drip function after defrost cycle
- Software enabled power up defrost cycle
- Real time computing for Defrost cycle timing.

Suggested wiring Diagram



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.

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.

Disclaimer

This manual & its contents remain the sole property of A.S.Controls Pvt.Ltd., India and shall not be reproduced or distributed without authorization. Although great care has been taken in the preparations of this document, the company or its vendors in no event will 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. A.S.Controls Pvt.Ltd. reserves the right to make and changes or improvements without prior notice.

Warranty

This product is warranted against defects in materials and workmanship for a period of one year from the date of purchase. During the warranty period, product determined by us to be defective in form or function will be repaired or, at our option, replaced at no charge. This warranty does not apply if the product has been damaged by accident, abuse, and misuse or as a result of service or modification other than by the company. This warranty is in lieu of any other warranty expressed or implied. In no event shall the company be held liable for incidental or consequential damages, such as lost revenue or lost business opportunity arising from the purchase of this product.

OUR OTHER PRODUCTS

sub-Zero®

INDIA

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

CASTLE®

Ball Valves
Globe Valves
Hand Valves
Flow Switches
Solenoid Valves

03 / 27.08.11