sub-zero®
INDIA
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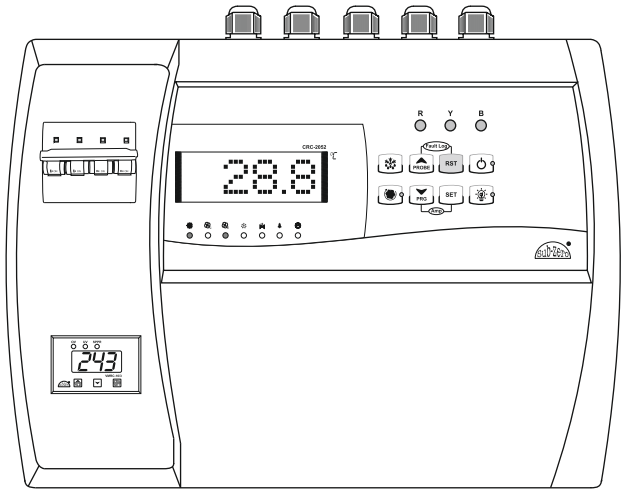
COLD ROOM ELECTRICAL PANEL

User Manual



sub-zero®

CRC-2052

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Features:

This 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.

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

A series of “safety controls” (delay at start-up, minimum disable time, minimum time between activation) protects the compressors from close starts. In case of probe error or temperature alarm, the instrument signals the event through acoustic signal and by closing the relay contact. By pressing the mute key, the buzzer is silenced.

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

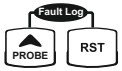
Computer Connectivity over RS485 and Remote monitoring (Optional).

Single Operation Quick Freeze Mode(Press  key for 2 sec), set system in quick freeze mode which is time based for that period new set point will be lower than running set point and system will try to achieve that set point, after time period over set point will be normal set point.

Items included

NO.	ITEMS	QTY
1.	CONTROLLER	1
2.	NTC SENSOR 5 METER	2
3.	CATALOGUE	1
4.	8 X 38 SCREW WITH RAWL PLUG	4

Key Introduction

	Used to enter in manual defrost and to stop defrost if defrosting is ON.
	Used to increment / scroll UP in Program Mode. When not in any mode if this key is pressed for 2 secs controller will enter in display Probe mode where Evap temperature can be viewed.
	Used to come mute the buzzer/Alarm & to exit any mode.
	Used to enter in fault log mode.
	Used to switch OFF/ON the controller.
	Used to enter in quick freeze mode.
	Used to decrement / scroll down in Program mode. Used to enter into the program mode.
	Used to enter into the Set mode. Also used as enter key if controller is in Set mode/program mode. Also used to save changed value.
	Used to enter in display Amp. mode where compressor current can be viewed.
	Used to switch OFF/ON the light.

Fault Messages :

Ht	High temperature alarm for Room temperature means, room temperature is equal or above the set value of P2 parameter.
Lt	Low temperature alarm for Room temperature means, room temperature is equal or below the set value of P3 parameter.
PP	Room temperature fail means, Room sensor not connected or out of range.
E-PP	Evaporator temperature fail means, Evaporator sensor not connected or out of range.
DO	Door Input Fault.
SPPR	SPPR Fault.
C-OL	Compressor over load fault.
C-UL	Compressor under load fault.
HP	HP fault.
LP	LP fault.
AUX/CTH	Auxiliary fault / Compressor Thermal Fault .
OPS	Oil Pressure Switch Fault.
C-PD	Compressor switched ON for Pump down in manual defrost

LED Indication

Messages	Mode	Discription
	ON OFF Flashing	Comp. Relay ON. Comp. Relay OFF. Comp. Relay Time delay.
	ON OFF	Cond. Relay ON. Cond. Relay OFF.
	ON OFF Flashing	Evap. Relay ON. Evap. Relay OFF. Evap. Relay Time delay.
	ON OFF Flashing	Defrost Relay ON. Defrost Relay OFF. Defrost Relay Time delay.
	ON OFF	LSV Relay ON. LSV Relay OFF.
	ON OFF	Alarm Relay ON. Alarm Relay OFF.
	Flashing	Controller is in drip time.
	ON OFF	Controller is in quick freeze mode. Controller is not in quick freeze mode.
	OFF ON	Power OFF. Power ON.
	ON OFF	Light Relay ON. Light Relay OFF.
R	ON OFF	R-phase present. R-phase absent.
Y	ON OFF	Y-phase present. Y-phase absent.
B	ON OFF	B-phase present. B-phase absent.

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

Description of parameters and functions.

Sr. No.	Parameter	Parameter setting method
	SET MODE	
	To set other parameter Press & hold SET key for 2 seconds SET	Display will show 'SP' and scroll the description of the parameter. To go to other parameters, use UP / DOWN keys. After desired value, press the SET key & you will see "----" which confirms that the parameter value has been stored in memory.
01	SP	To set the cut-out point of the controller.
	To change Set Point parameter, press the set key. **Range** **Min** | **Max** | **Fact. Set** QFS+0.5 | P2-0.5ºC | -20.0ºC	Display will change to set value. The set point value can now be changed by using the UP/DOWN key. QFS = Quick Freeze Set Point
02	QFS	To set the quick freeze set point.
	To change QFS parameter, press the set key. **Range** **Min** | **Max** | **Fact. Set** P3+0.5 | SP-0.5 | -25.0ºC	Use UP/DOWN keys to set desired value. If controller is in quick freeze mode then compressor will cut in/ cut out as per this set point till the quick freeze duration is over. SP : Set Point.
03	EXIT	End of set mode
	PROGRAM MODE	
	To set other parameter Press & hold PRG key for 2 seconds PRG	Display will show '0000'. Set correct password to enter into program mode. The display will show 'P2' and scroll the description of the parameter. To go to other parameters, use UP / DOWN keys. After desired value, press the SET key & you will see "----" which confirms that the parameter value has been stored in memory.

Description of parameters and functions.

Sr. No.	Parameter	Parameter setting method
01	P2 Parameter	**Function :** To set allowable high temperature limit.
	To change P2 parameter, press the set key. **Range** **Min** | **Max** | **Fact. Set** SP+0.5ºC | 50.0ºC | 50.0ºC HT (Message on Display)	Use UP/DOWN key to set desired value. Once set at a particular value, this will not allow the set point to go above this value and below P3 setting. **Example :** Setting this parameter at 50.0°C will not allow the set point to go above 50.0°C also if the temperature reaches 50.0°C, the display will show HT (High Temperature). The alarm will be ON. But at power on till the ADT delay is over controller will not generate HT Alarm.
02	P3 Parameter	**Function :** To set allowable low temperature limit.
	To change P3 parameter, press the set key. **Range** **Min** | **Max** | **Fact. Set** -40.0ºC | QFS-0.5ºC | -40.0ºC LT (Message on Display)	Use UP/DOWN key to set desired value. Once set at a particular value, this will not allow the set point to go below this value and above P2 setting. **Example** : Setting this parameter at -40.0°C will not allow the set point to go below -40.0°C also if the temperature reaches -40.0°C, the display will show LT (Low Temperature). The alarm will be ON.
03	P4 Parameter	**Function :** To set the differential for compressor restart.
	To change P4 parameter, press the set key. **Range** **Min** | **Max** | **Fact. Set** 0.5ºC | 20.0ºC | 2.0ºC	Use UP/DOWN keys to set desired value. **Example(Cooling Mode) :** If the set point is set at 10.0°C and differential is set at 2.0°C, then when the system reaches 10.0°C, the comp. relay will cutout. Since the differential is 2.0°C, the comp. Relay will cutin at 12.0°C (10.0°C + 2.0°C).

Description of parameters and functions.

Sr. No.	Parameter	Parameter setting method
04	P5 Parameter	**Function :** To set room probe calibration.
To change P5 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 this error, you may need to add or minus the degrees required to achieve the correct temperature.
Range		
Min	**Max** / **Fact. Set**	
-10.0ºC	10.0ºC / 0.0ºC	
		Example : The temperature on the display is 28.0°C, whereas the actual temperature is 30.0°C. You may need to set this parameter to 2.0°C, which means that once out of the programming parameter, the display will show the temperature 30.0°C (28.0°C + 2.0°C).
05	P6 Parameter	**Function :** To set time delay between compressor relay restart time.
To change P6 parameter, press the set key.		Use UP/DOWN keys to set desired value. This parameter is used to protect the fan from restarting in a short period of time and can be set between 0 to 20 minutes.
Range		
Min	**Max** / **Fact. Set**	
1 Min	20 Min / 3 Min	
		Example : If this parameter is set at 3 minutes, once compressor will cut off at the set temperature, 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 when there are power fluctuations and the compressor is switched off and on within a few seconds.

Description of parameters and functions.

Sr. No.	Parameter	Parameter setting method
06	P7 Parameter	**Function :** To set duration of defrost.
To change the P7 parameter, press the set key.		Use UP/DOWN keys to set desired value. This is maximum amount of time allowed for defrost. If set to 0, there will be no defrost cycle.
Range		
Min	**Max** / **Fact. Set**	
0 Min	99 Min / 30 Min	
		Example : If P7 is set to 15 Mins and P8 parameter is set to 1 Hr. then after every 1 Hr defrosting will take place for 15 mins.
07	P8 Parameter	**Function :** To set defrost frequency.
To change the P8 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	**Max** / **Fact. Set**	
1 Hr	31 Hrs / 6 Hr	
		Example : same as P7 parameter.
08	P9 Parameter	**Function :** To set power on defrost delay.
To change the P9 parameter, press the set key.		Use UP/DOWN keys to set desired value. This is the amount of time at power on after which defrosting will take place once.
Range		
Min	**Max** / **Fact. Set**	
0 Min	99 Min / 0 Min	
		If this parameter is set to 0, there will be no power ON defrost.
		Example : If P9 parameter is 30 mins then at power after 30 mins defrosting will take place once.

Description of parameters and functions.

Sr. No.	Parameter	Parameter setting method
09	P10 Parameter	**Function :** To set type of defrost.
To change the P10 Parameter, press the set key.		Use UP/DOWN keys to set desired value. HTR : Heater defrost where compressor is OFF. HTG : Hot Gas defrost where compressor is ON.

Range

Min	Max	Fact. Set
HTR	HTG	HTR

10	P11 Parameter	**Function :** To set drip time for defrost.
To change the P11 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 drain out.

Range

Min	Max	Fact. Set
0 Min	30 Min	1 Min

11	P12 Parameter	**Function :** To set type of computation for defrost time..
To change the P12 Parameter, press the set key.		Use UP/DOWN keys to set desired value. **REAL = 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. **CRH - 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 +/-½ Hour incase of a power failure. **Example :** If Defrost frequency is set to 6hrs. and 3.45 hrs have passed after unit has started and power fails, then defrost cycle will stat after 3½ hours when power resumes.

Range

Min	Max	Fact. Set
REAL	CRH	REAL

Description of parameters and functions.

Sr. No.	Parameter	Parameter setting method
12	P13 Parameter	**Function :** To set Defrost Stop Temperature at Time based.
To change the P13 Parameter, press the set key.		Use UP/DOWN keys to set desired value. If coil/Evap temperature is reached upto this temperature defrost will stop. **Example :** If this parameter is set to 4.0ºC, then if defrosting is in progress then when temperature reaches 4.0ºC, the defrost process will stop.

when P14 = TIME

Range

Min	Max	Fact. Set
-40.0ºC	50.0ºC	4.0ºC

when P14 = TEMP

Range

Min	Max	Fact. Set
P15+1.0	50.0ºC	4.0ºC

14	P14 Parameter	**Function :** To set Mode to start the Defrost.
To change the P14 Parameter, press the set key.		Use UP/DOWN keys to set desired value. When set to, TIME : Defrost will start on Time based as per P8 Parameter. TEMP : Defrost will start on Time or Temperature, whichever takes first to start Defrost. **Note :** when P14 Parameter set to TEMP, P13, P15 & P16 parameters reset to Factory settings. P15, P16 parameters will be visible only when P14 set to TEMP.

Range

Min	Max	Fact. Set
TIME	TEMP	TIME

Description of parameters and functions.

Sr. No.	Parameter	Parameter setting method
15	P15 Parameter	**Function :** To set Defrost start Temperature.
To change the P15 Parameter , press the set key.		Use UP/DOWN keys to set desired value. Defrost process will start when Coil Temperature is less than or equal to P15 for P16 parameter settings. When Defrost stop condition occurs due to P7 duration over or Defrost stop manually then it will check Coil Temperature should be greater than or equal to P15+1.0. **Example:** If P15 set to -28.0°C & P16 is set to 10Min, then when Coil Temperature reaches to or goes below -28.0°C for 10Min, the Defrost process will start. If Defrost stop condition occurs that time, Temperature should be greater than or equal to -27.0°C. **Note:** This Parameter is visible only when P14 is set to TEMP.

Range		
Min	**Max**	**Fact. Set**
-40.0ºC	P13-1.0	-28.0ºC

16	P16 Parameter	**Function :** To set Defrost Start Temperature Delay.
To change the P16 Parameter , press the set key.		Use UP/DOWN keys to set desired value. When Coil Temperature is less than or equal to P15 parameter, Defrost will Start After P16 duration. Example: same as P15 parameter **Note:** This Parameter is visible only when P14 is set to TEMP.

Range		
Min	**Max**	**Fact. Set**
0 Min	99Min	10 Min

Description of parameters and functions.

Sr. No.	Parameter	Parameter setting method
17	DI-D Parameter	**Function :** To select AUX or compressor thermal trip digital I/P
To change the DI-D Parameter , press the set key.		Use UP/DOWN keys to set desired value. If Selected as “AUX” then at fault it will display "AUX” on display. If Selected as “CTH” then at fault it will display “CTH”.

Range		
Min	**Max**	**Fact. Set**
AUX	CTH	CTH

18	OPS Parameter	**Function :** To Enable / Disable OPS I/P.
To change the OPS Parameter, press the set key.		Use UP/DOWN keys to set desired value. ENB : OPS I/P is enabled. DIS : OPS I/P is disabled.

Range		
Min	**Max**	**Fact. Set**
DIS	ENB	ENB

19	QFD Parameter	**Function :** To set quick freeze duration.
To change the QFD 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. **Example :** If QFS is set to -20.0ºC, and quick freeze duration is set to 1 hr ,then when it is in quick freeze mode, then the Comp. will work on -20.0ºC set point for 1hr.

Range		
Min	**Max**	**Fact. Set**
0 Hr	12 Hrs	2 Hr

Description of parameters and functions.

Sr. No.	Parameter	Parameter setting method
20	CND6 Parameter	**Function :** To set condenser ON delay timings.
To change the CND6 parameter, press the set key.		Use UP/DOWN keys to set desired value.
Range		When Compressor delay over Condenser Fan will come ON first, after cond. On delay over Comp will come ON.
Min / **Max** / **Fact. Set**		
0 Sec / 30 Sec / 15 Sec		
21	CND7 Parameter	**Function :** To set condenser status at hot gas defrost.
To change the CND7 parameter, press the set key.		Use UP/DOWN keys to set desired value.
Range		This function is used to decide the condenser status when hot gas defrost is ON. This parameter is not applicable for Heater defrost.
Min / **Max** / **Fact. Set**		At hot gas defrost,
OFF / ON / OFF		OFF : Condenser will be OFF
		ON : Condenser will be ON
22	L1 Parameter	**Function :** To set Evaporator Fan stop temperature.
To change the L1 parameter, press the set key.		Use UP/DOWN keys to set desired value.
Range		This setting is used to limit the Max. temperature beyond which the Evap.Fan will cut OFF
Min / **Max** / **Fact. Set**		**Example :** If this parameter is set to 2.0ºC, then Evap. Fan will cut OFF at 2.0ºC.
-40.0ºC / 50.0ºC / 2.0ºC		
23	L2 Parameter	**Function :** To set Evaporator Restart Delay.
To change the L2 parameter, press the set key.		Use UP/DOWN keys to set desired value.
Range		Once the fan get OFF at L1 condition, it will not get restart until L2 duration is over.
Min / **Max** / **Fact. Set**		**Example :** If this is set at 1 minutes, Evap. Fan relay will cut off at the set by Evap. Fan Stop TC. Parameter but the Fan will not come on for a minimum of 1 minutes even if it's differential is achieved earlier.
0 Min / 20 Min / 1 Min		

Description of parameters and functions.

Sr. No.	Parameter	Parameter setting method
24	L3 Parameter	**Function :** To set Evaporator Fan status at compressor off.
To change the L3 parameter, press the set key.		Use UP/DOWN keys to set desired value.
Range		OFF : Evaporator Fan will be OFF at compressor OFF.
Min / **Max** / **Fact. Set**		ON : Evaporator Fan will be ON at compressor OFF.
OFF / ON / ON		
25	L4 Parameter	**Function :** To set Evaporator Fan differential.
To change the L4 parameter, press the set key.		Use UP/DOWN keys to set desired value.
Range		**Example :** If L1parameter is set to 2.0ºC, and if Evaporator Fan differential parameter is set to 2.0ºC,then Evap. Fan will cut off at 2.0ºC and restart only at 0.0ºC. (2.0ºC-2.0ºC = 0.0ºC) (L1 - L4)
Min / **Max** / **Fact. Set**		
0.5ºC / 20.0ºC / 2.0ºC		
26	L5 Parameter	**Function :** To set Evaporator probe calibration.
To change the L5 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 -10.0ºC to + 10.0ºC.
Min / **Max** / **Fact. Set**		
-10.0ºC / 10.0ºC / 0.0ºC		
27	L7 Parameter	**Function :** To set Compressor-Evaporator Fan status at Door open condition.
To change the L7 parameter, press the set key.		Use UP/DOWN keys to set desired value.
Range		At Door Open,
Min / **Max** / **Fact. Set**		NORM : Normal.
NORM / F-C / NORM		FAN : Evaporator Fan OFF.
		COMP : Compressor OFF.
		F-C : Compressor and Evaporator Fan OFF.

Description of parameters and functions.

Sr. No.	Parameter	Parameter setting method
28	L8 Parameter	**Function :** To set Evaporator Fan status during defrost.
To change the L8 parameter, press the set key.		Use UP/DOWN keys to set desired value.
Range		OFF : Evaporator Fan OFF during defrost.
Min / **Max** / **Fact. Set**		ON : Evaporator Fan ON during defrost.
OFF / ON / OFF		
29	BUZ Parameter	**Function :** To enable / disable buzzer.
To change the BUZ parameter, press the set key.		Use UP/DOWN keys to set desired value.
Range		**Example:** ENB : Buzzer enabled. DIS : Buzzer disabled.
Min / **Max** / **Fact. Set**		
DIS / ENB / ENB		
30	AL Parameter	**Function :** This parameter is used to Enable / Disable alarm relay.
To change the AL Parameter, press the set key.		Use UP/DOWN keys to set desired value.
Range		DIS : To deactivate Alarm Relay in fault condition.
Min / **Max** / **Fact. Set**		ENB : To activate Alarm Relay in fault condition.
DIS / ENB / ENB		
31	ADT Parameter	**Function :** This parameter is used to set HT power on delay for alarm.
To change the ADT parameter, press the set key.		Use UP/DOWN keys to set desired value. **Example :** If you set this parameter to 20, once the power is switched on, the HT alarm will not activate for 20 minutes after the power is switched on. This is most useful to avoid the nuisance alarms when the ambients are high when the machine is switched on after a long time.
Range		
Min / **Max** / **Fact. Set**		
0 Min / 99 Min / 30 Min		

Description of parameters and functions.

Sr. No.	Parameter	Parameter setting method
32	ADD Parameter	**Function :** This parameter is used for time delay to activate Alarm/Buzzer relay at Door Open.
To change the ADD parameter, press the set key.		Use UP/DOWN keys to set desired value. **Example :** This Parameter is set to 60 Sec & Door is open then Alarm/Buzzer will be ON after 60sec, if AL & BUZ parameters are enabled.
Range		
Min / **Max** / **Fact. Set**		
0 sec / 600 sec / 60 sec		
33	THD Parameter	**Function :** This parameter is used to set duration for temperature hold at door open.
To change the THD parameter, press the set key.		Use UP/DOWN keys to set desired value. **Example :** This Parameter is set to 60sec, Room Temperature is -18.0°C & Door open condition occurs then Room Temp value -18.0°C at Door open condition will be hold for the 60sec, if Room Temperature is increasing. After over the Temperature hold duration display temperature will be increased by 0.1°C at every sec until it reaches current Room Temperature.
Range		
Min / **Max** / **Fact. Set**		
0 sec / 180 sec / 0 sec		
34	C-UL Parameter	**Function :** Under load limit for compressor current.
To change the C-UL parameter, press the set key.		Use UP/DOWN keys to set desired value. **Example :** If C-UL= 1.0A and compressor current is less than 1.0A then and exists till C2 current sensing delay then it is registered as UL fault. Compressor will get OFF on this fault. If after 3 retries within 1 Hour current drawn is still less than 1.0Amp the controller will trip the compressor on fault and activate respective alarm relay. Also display will flash 'C-UL'. Controller will go in manual reset mode.
Range		
Min / **Max** / **Fact. Set**		
0.0A / (C-OL -1.0)A / 1.0A		

Description of parameters and functions.

Sr. No.	Parameter	Parameter setting method
35	C-OL Parameter	**Function :** Over load limit for compressor current.
To change the C-OL parameter, press the set key.		Use UP/DOWN keys to set desired value.
Controller with 20A CT		**Example :** If C-OL= 15.0 A and compressor current is greater than 15.0 A then and exist till C2 current sensing delay then C-OL fault exists and flash on display. Compressor will be tripped on this fault.
Range		
Min	**Max** / **Fact. Set**	
(C-UL +1.0) A	20.0A / 15.0A	
Controller with 50A CT		**NOTE: 20/50A CT option available while ordering controller.**
Range		
Min	**Max** / **Fact. Set**	
(C-UL +1.0) A	50.0A / 30.0A	
36	C2 Parameter	**Function :** Current sensing time delay.
To change the C2 parameter, press the set key.		Use UP/DOWN keys to set desired value.
Range		**Example :** If C2 = 5 sec then, any current fault will be valid only when it exists for more than 5 sec.
Min	**Max** / **Fact. Set**	
5 Sec	120 Sec / 5 Sec	
37	D0 Parameter	**Function :** To enable or Disable HP sensing.
To change the D0 parameter, press the set key.		Use UP/DOWN keys to set desired value.
Range		**Example :** If this parameter is set to ENB : HP sensing is enabled. DIS : HP sensing is disabled. Setting this parameter to disable will ignore HP fault for compressor. If this parameter is set to Enable then controller will detect HP trip.
Min	**Max** / **Fact. Set**	
DIS	ENB / ENB	

Description of parameters and functions.

Sr. No.	Parameter	Parameter setting method
38	D1 Parameter	**Function :** To enable or disable LP sensing.
To change D1parameter, press the set key.		Use UP/DOWN keys to set desired value.
Range		**Example:** If this parameter is set to ENB : LP sensing is enabled. DIS : LP sensing is disabled. Setting this parameter to disable will ignore LP fault for compressor. If this parameter is set to Enable then controller will detect LP trip.
Min	**Max** / **Fact. Set**	
DIS	ENB / ENB	
39	D2 Parameter	**Function :** Fault sensing logic.
To change D2 parameter, press the set key.		Use UP/DOWN keys to set desired value.
Range		0V : 0V at HP/LP/AUX input will be sensed as fault and trip the compressor. 230V : 230V at HP/LP/AUX input will be sensed as fault and trip the compressor.
Min	**Max** / **Fact. Set**	
0V	230V / 0V	
40	D3 Parameter	**Function :** To set LP sensing delay.
To change D3 parameter, press the set key.		Use UP/DOWN keys to set desired value.
Range		**Example :** If this parameter is set to 5 sec,then LP fault will be sensed only when it present continuously for 5 Secs.
Min	**Max** / **Fact. Set**	
0 Sec	180 Sec / 30 Sec	

Description of parameters and functions.

Sr. No.	Parameter	Parameter setting method
41	D4 Parameter	**Function :** To set reset mode for HP fault.
To change D4 parameter, press the set key.		Use UP/DOWN keys to set desired value. MAN : Manual Mode. AUTO : Auto mode. If this parameter set to “MAN” mode HP fault will be cleared only after pressing reset key for 2 seconds. If this parameter is set to “AUTO” mode HP fault will be cleared automatically when it is healthy.

Range

Min	Max	Fact. Set
MAN	AUTO	AUTO

42	E1 Parameter	**Function :** To set Compressor Relay status on Probe Failure.
To change E1 parameter, press the set key.		Use UP/DOWN keys to set desired value. When set to ON : Relay will stay ON. CYC : Relay performs a duty cycle of as per TON & TOFF . OFF : Relay will stay OFF.

Range

Min	Max	Fact. Set
ON	OFF	CYC

43	TON Parameter	**Function :** To set ON cycle time for compressor at room probe fail.
To change TON parameter, press the set key.		Use UP/DOWN keys to set desired value. At room probe fail condition when E1 parameter is selected as 'CYC' then the ON cycle is specified by TON parameter.

Range

Min	Max	Fact. Set
1 Min	30 Min	10 Min

Description of parameters and functions.

Sr. No.	Parameter	Parameter setting method
44	TOFF Parameter	**Function :** To set OFF cycle time for compressor at room probe fail.
To change TOFF parameter, press the set key.		Use UP/DOWN keys to set desired value. At room probe fail condition when E1 parameter is selected as 'CYC' then the OFF cycle is specified by TOFF parameter.

Range

Min	Max	Fact. Set
1 Min	30 Min	4 Min

45	E7 Parameter	**Function :** To set Display at defrosting.
To change E7 parameter, press the SET key.		Use UP/DOWN keys to set desired value. TEMP : During defrost, temperature will be dispalyed. DEFR : During defrost, 'Defrost ON' will scroll. RHLD : During Defrost, Display Holds Room Temperature. Display Room temp. will update after Defrost/Drip time, when it goes below or equal to Hold Temperature.

Range

Min	Max	Fact. Set
TEMP	DEFR	TEMP

Note : Control Unit action will be as per Real Temperature.

46	E8 Parameter	**Function :** Defrost duration during Coil probe failure.
To change E8 parameter, press the SET key.		Use UP/DOWN keys to set desired value. **Example:** If this is set to 10 min, then manual defrost for 10 min will take place during Coil probe fail.

Range

Min	Max	Fact. Set
1 Min	15 Min	5 Min

47	LD Parameter	**Function :** To set time delay to switch off the light .
To change LD parameter, press the SET key.		Use UP/DOWN keys to set desired value. This parameter is used set the time delay to automatically switch OFF the light. If LD is set to 0 then this parameter is disabled. **Example :** If this parameter is set to 7 mins then, when light is switched ON, after 7 mins it will be switch OFF automatically.

Range

Min	Max	Fact. Set
0 Min	30 Min	7 Min

Description of parameters and functions.

Sr. No.	Parameter	Parameter setting method
48	LSD Parameter	**Function :** This parameter is used to enable / disable light relay ON at door open.
To change LSD parameter, press the SET key.		Use UP/DOWN keys to set desired value. If this parameter is set to Enable then whenever Door get open, the Light Relay will be ON. If this parameter is set to Disable then Light Relay will be ON/OFF functioning manually and as per LD parameter.

Range		
Min	**Max**	**Fact. Set**
DIS	ENB	ENB

Sr. No.	Parameter	Parameter setting method
49	PDN Parameter	**Function :** To activate Solenoid Valve relay.
To change PDN parameter, press the set key.		Use UP/DOWN keys to set desired value. DIS : Pump down disable and SV relay will active only with Compressor except Hotgas defrost. ETMP : Pump down enable at Set point when compressor tripped on Set Point. EDEF : Pump down enable at Set point when heater defrost condition occurs. **Example :** ETMP : If this parameter is set to ETMP then SV relay will be ON/FF & pump down at Set point. EDEF : If this parameter is set to EDEF then SV relay will be ON/OFF on SP & pump down only at heater defrost condition.

Range		
Min	**Max**	**Fact. Set**
DIS	EDEF	DIS

Description of parameters and functions.

Sr. No.	Parameter	Parameter setting method
50	PW Parameter	**Function :** To change password.
To change the PW parameter, press the set key.		Use UP/DOWN key to change the password. User can enter into program mode only if correct password is entered. If the password is wrong it will show 'INVALID PASSWORD'.

Range		
Min	**Max**	**Fact. Set**
0	9999	0

Sr. No.	Parameter	Parameter setting method
51	CRH Parameter	**Function :** To view Compressor run Hours.
		It will display compressor run hours. It's a read only parameter.
52	CCRH	**Function :** Clear Compressor Run Hours.

Range		
Min	**Max**	**Fact. Set**
NO	YES	NO

If this parameter is set to 'YES' compressor run hours (CRH) are cleared.

Sr. No.	Parameter	Parameter setting method
53	ID Parameter	**Function :** To set Device ID.
To change Device ID parameter, press the SET key.		This parameter is used to set the Device ID for the controller.

Range		
Min	**Max**	**Fact. Set**
1	240	-

Sr. No.	Parameter	Parameter setting method
54	BAUD Parameter	**Function :** To set Baud Rate for MODBUS Communication.
To change BAUD parameter, press the SET key.		When set to, 9.6 = 9600 19.2 = 19200 38.4 = 38400 57.6 = 57600

Range		
Min	**Max**	**Fact. Set**
9.6	57.6	-

Description of parameters and functions.

Sr. No.	Parameter	Parameter setting method
55	LP Parameter	**Function :** To activate Keypad Lock.
To change Keypad Lock parameter, press the set key.		This parameter can lock the keypad so that tempering is not possible by by-standers. NO : deactivates keypad lock. YES : activates keypad lock. On activation, all the parameters can only be viewed, but not modified. If the keypad is locked "LOCK" message will be displayed.
Range		
Min	**Max** / **Fact. Set**	
NO	YES / NO	
56	PO Parameter	**Function :** To enable/disable Power Switch.
To change PO parameter, press the SET key.		Use UP/DOWN keys to get desired value & press SET key to confirm. DIS : Disable power switch ENB : Enables power switch Controller has power switch, which if enable puts controller in active or stand by state. If ⏻ key press for 2 seconds controller will go in stand by mode, display will be as per "PDIS" parameter. To again switch to ACTIVE WORKING MODE, press power switch again for 2 seconds. All leds and display will flash and enter into NORMAL WORKING MODE.
Range		
Min	**Max** / **Fact. Set**	
DIS	ENB / DIS	
⏻		
57	PDIS Parameter	**Function :** To set display at power OFF mode.
To change PDIS parameter, press the SET key.		Use UP/DOWN keys to set desired value. At power OFF mode power OFF LED will glow & display will be as below, LED : Display Will be Blank. OFF : Display will show OFF. TEMP : Display will show Temperature.
Range		
Min	**Max** / **Fact. Set**	
LED	TEMP / LED	

Description of parameters and functions.

Sr. No.	Parameter	Parameter setting method
58	FS Parameter	**Function :** To restore default settings of the controller.
To change FS parameter, press the SET key.		Use UP/DOWN keys to set desired value. When set to YES all parameters are programmed to factory values. Useful to debug setting related problems.
Range		
Min	**Max** / **Fact. Set**	
NO	YES / NO	
59	EP Parameter	**Function:** To exit from program mode.
To exit programming parameter, press the SET key.		Once the set key is pressed, the controller goes into the normal mode and displays the Room Temperature and all settings are recorded.

Technical Data

Housing	: Plastic / Sheet Metal (as per customer requirement)
Dimensions	: **Plastic :** (H)400 x (W) 300 x (D)135 mm **Sheet Metal :** (H)450 x (W) 400 x (D)200 mm
Mounting	: Wall mounting.
Controller	: CRC-2052
Connection	: Spring clamp terminal block. 4 sq. mm wire.
Display	: 4 Digit, 1" Dot matrix Display and 13 LEDs for indication.
Data Storage	: Non-Volatile EEPROM Memory.
Power Input (Options)	: 415Vac +/-10%, 50-60Hz. 3Phase Supply with Neutral
Operating Temp	: 5^{0}C to 50^{0}C(non-condensing).
Storage temp	: -20^{0}C to 70^{0}C(non-condensing).
Output	:
Compressor Relay	: 5A/230vac
Defrost Relay	: 5A/230vac
Evap. Relay	: 5A/230vac
Condenser Relay	: 10A/230vac
Light Relay	: 5A/230vac
Alarm Relay	: 5A/230vac
LSV Relay	: 10A/230vac

Sensors :

1) Temperature sensor:

Sensor Type	: NTC Thermistor.
Resolution	: 0.1^{0}C.
Accuracy	: +/-1^{0}C.
Probe Tolerance at 25^{0}C	: +/-0.3^{0}C.
Room & Evap Temperature :	
Range	: -50.0^{0}C to 50.0^{0}C

Analog I/p:

Compressor current (R,Y,B)	
Resolution	: 0.1Amp.
Accuracy	: +/-1 Amp.

Digital Inputs:

HP, LP, Auxiliary / CTH(Compressor Thermal) , Oil Pressure Switch(OPS), Door, SPPR, R-Ph, Y-Ph, B- Ph.

Buzzer	: Internal
RS485 Connectivity	: Modbus RTU Protocol Baud Rate : 9600 (Settable) Device ID : 1 (By Default)

Instruction Manual

LVM (Line Voltage Monitor) Three Phase VMRC-10/3

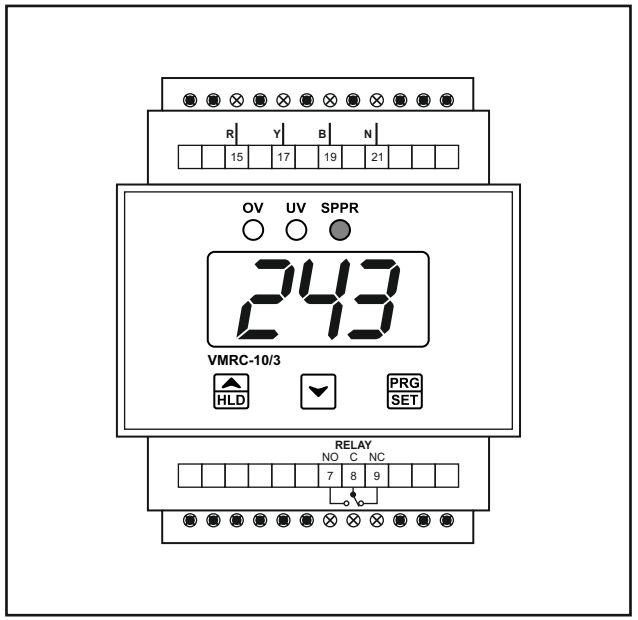
Index

Introduction

VMRC-10/3 is three phase Line voltage monitor (LVM) used to protect device from Single Phasing, voltage unbalance, phase reversal and under/over voltage. It shows real time voltages between phase and neutral.

There is an Output of alarm relay is given to the controller as SPPR input. Features are easily understood by examples in the instruction below.

Get to Know Your Controller



Description of parameters and functions.

Sr. No.	Parameter	Parameter setting method
	To set other parameter	
	Press & hold PRG key for 4 seconds PRG SET	Display will show 'rEF' and scroll the description of the parameter. To go to other parameters, use up / down keys.
01	rEF PARAMETER	Function : To set Reference voltage.
	To change the rEF Parameter, press the set key.	Use UP/DOWN keys to set desired value. Base reference voltage to calculate under voltage and over voltage values. Min and Max value will change according to display type for settings. **Example :** If dsP is L-L then Min= 381V, Max= 415V.

Range		
Min	**Max**	**Fact. Set**
381V	415V	415V

02	oU PARAMETER	Function : To set Overvoltage Limits.
	To change the oV parameter, press the set key.	Use UP/DOWN keys to set desired value. If the a/c voltages goes above this limit will trip respective a/c on Overvoltage("Ov") fault. **Example :** Over voltage is calculated depending on Reference voltage + Ov value**.** i.e, Ov Set Point = Ref + Ov , When controller trip on Ov Fault it will recover when input voltage fall below (Ref - (Ov /2)**.**

Range		
Min	**Max**	**Fact. Set**
5V	75V	35V

Description of parameters and functions.

Sr. No.	Parameter	Parameter setting method
03	uU PARAMETER	Function : To set Undervoltage Limits.
	To change the uV parameter, press the set key.	Use UP/DOWN keys to set desired value. If the a/c voltages goes below this limit will trip respective a/c on undervoltage("Uv") fault. **Example :** Under voltage is calculated depending on Reference voltage - Uv value**.** i.e Uv Set Point = Ref - Uv , When controller trip on Uv Fault it will recover when input voltage above (Ref – (Uv /2)**.**

Range		
Min	**Max**	**Fact. Set**
5V	75V	35V

04	unb PARAMETER	Function : To set Un Balance value.
	To change the unb parameter, press the set key.	Use UP/DOWN keys to set desired value. Unbalance fault raised when voltage difference between any of two phases goes above Unb value and recovers when the difference is less than (UNB/2).

Range		
Min	**Max**	**Fact. Set**
10V	120V	60V

05	ttd PARAMETER	Function : To set time delay.
	To change the ttd parameter, press the set key.	Use UP/DOWN keys to set desired value. Time delay provided to avoid false triggering, when any fault last more than TTD value then only fault is raised and this fault is applicable to Under voltage, Over voltage and Unbalance fault.(i.e., In case of Phase Loss or Phase sequence fault alarm will come immediately).

Range		
Min	**Max**	**Fact. Set**
0Sec	60Sec	10Sec

Description of parameters and functions.

Sr. No.	Parameter	Parameter setting method
06	tdr PARAMETER	Function : To set fault recover delay.
To change the tdr parameter, press the set key.		Use UP/DOWN keys to set desired value. Time delay provided to add delay in fault recover time, to avoid sudden fault triggering and reset.
Range		
Min: 0Sec	Max: 240Sec	Fact. Set: 10Sec
07	CrY PARAMETER	Function : To set calibration of voltage for r-y or r-n phase.
To change the CrY Parameter, press the set key.		Use UP/DOWN keys to set desired value. This parameter provided to calibration voltage reading. When dsP is L-L then it sets calibration for r-y. When dsP is L-n then it sets calibration for r-n.
Range		
Min: -15V	Max: 15V	Fact. Set: 0V
08	Cyb PARAMETER	Function : To set calibration of voltage for y-b or y-n phase.
To change the Cyb parameter, press the set key.		Use UP/DOWN keys to set desired value. This parameter provided to calibration voltage reading. When dsP is L-L then it sets calibration for y-b. When dsP is L-n then it sets calibration for y-n.
Range		
Min: -15V	Max: 15V	Fact. Set: 0V

Description of parameters and functions.

Sr. No.	Parameter	Parameter setting method
09	Crb PARAMETER	Function : To set calibration of voltage for r-b or b-n phase.
To change the Crb parameter, press the set key.		Use UP/DOWN keys to set desired value. This parameter provided to calibration voltage reading. When dsP is L-L then it sets calibration for r-b. When dsP is L-n then it sets calibration for b-n.
Range		
Min: -15V	Max: 15V	Fact. Set: 0V
10	dSP PARAMETER	Function : To set view display mode.
To change the dsP parameter, press the set key.		Use UP/DOWN keys to set desired value. There are two type of display output, Line to Line Voltage (L-L) and Line to Neutral (L-n), Depending on this parameter REF parameter also changes.
Range		
Min: L-L	Max: L-n	Fact. Set: L-L
11	FS PARAMETER	Function : To restore the default settings of the controller.
To change the FS parameter, press the set key.		Use UP/DOWN keys to set desired value. When set to 1, all parameters are programmed to factory values.
Range		
Min: nO	Max: YES	Fact. Set: nO

Description of parameters and functions.

Sr. No.	Parameter	Parameter setting method
12	End PARAMETER	Function :To end programming.
To change the end parameter, press the set key.		Once the set key is pressed, the controller goes into the normal mode and displays the voltage readings.

Technical Data

Main Functions : Voltage Monitoring.
Phase Sequence Monitoring.
Phase Loss and Phase Unbalance detection.
Uv and Ov Detection.
Settable Uv and Ov Parameter.

Dimensions : Front : 70mm X 45mm,
Depth : 72.3 mm

Input : R, Y, B Phases and Neutral Input.

Output : Alarm Relay : 5A Resistive.

Application :Voltage and phase sequence monitoring and controlling.
Under voltage and Over voltage detection.

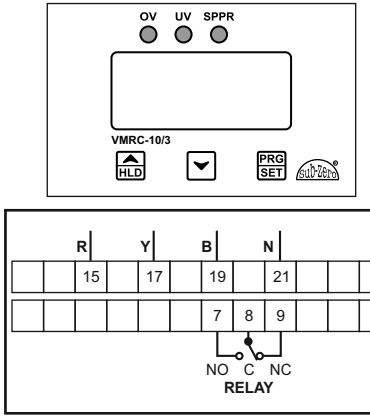
General Specification :

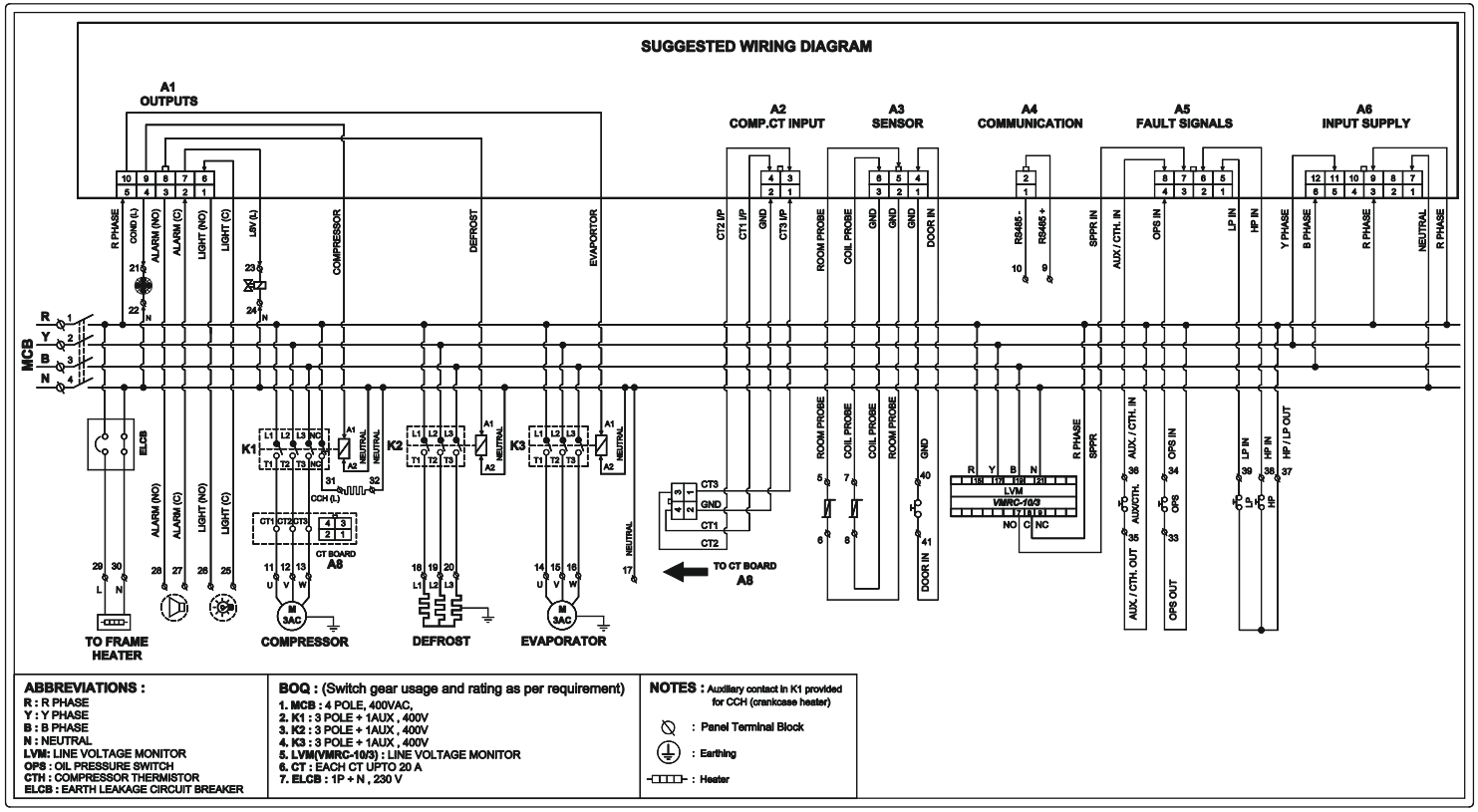
Input Voltage Range from 100VAC to 265VAC.

Mounting : Din rail mounting.

Connections : Screw terminals : ≤ 2.5sqmm one wire/terminal only.

Front View & Connetion Diagram for Three Phase Voltage Monitor (VMRC- 10/3)





1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41
R	Y	B	N					+	-	R	Y	B	R	Y	B	N	R	Y	B	L	N	L	N	C	NO	C	NO	L	N	L	N	OUT	IN	OUT	IN				GND	IN
MAIN INCOMING SUPPLY				ROOM PROBE		COIL PROBE		RS485		COMPRESSOR			EVAPORATOR				DEFROST			CONDENSER		LSV		LIGHT		ALARM		FRAME HEATER		CCH		OIL PRESSURE SWITCH		AUX. / CTH		HP / LP OUT	HP IN	LP IN	DOOR	

SUGGESTED CONNECTOR STICKER

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.

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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Flow Switches
Solenoid Valves

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