



DESCRIPTION

- Digital Temperature Controller for freezers and cooling system
- NTC/PTC input, range -40 to 130 °C
- 7-Segment 3 digit with LED status
- Defrost system with fan control and warning 8 types
- 4 Relay output for control compressor, defrost, fan and Auxiliary Relay

OPERATION

DEF-01 Digital Temperature Controller for freezers and cooling system with timer for defrost and can do cooling or heating function. The temperature sensor and thermistor NTC or PTC and Auxiliary Relay for 8 types of warning alarm. The Dongle Terminal can be connect with Option Sensor Prob and RS-485 Expansion Module for reading and copy data of controller

Press Button Method

Continuous Operation

1. Press UP + DOWN hold

Maximum Temperature Display

1. Press UP + DOWN hold until display "HI"
2. Show maximum temperature
3. Press SET 5 second for exit

Minimum Temperature Display

4. Press SET + DOWN hold until display "LO"
5. Show minimum temperature
6. Press SET 5 second for exit

Delete Maximum and Minimum Temperature

1. Press SET hold for delete Maximum or Minimum Temperature
2. Show "RST" mean finish to delete

Lock Key

1. Press DEF + SET hold until display "LOC"

Un-Lock Key

1. Press DEF + SET hold until display "ULO"

Parameter Changing

1. Press SET hold until flicker C or F
 2. Press UP or DOWN for select desire parameter
 3. Press SET for show parameter
 4. Press UP or DOWN for changing parameter
 5. Press SET for enter
- * Press SET hold or waiting 30 second for exit

Menu 2

1. Press SET hold until show as menu 1
2. Press SET + UP hold until show "M2"
3. Display parameter menu 2

Parameter move between menu 1 to 2

1. Press SET + DOWN hold at desire parameter in menu 2
- * Noter parameter in menu 1 have "." cansee in menu 2
- * Noter parameter in menu 1 have not "." cansee in menu 2

Cooling System

DEF-01 control compressor of cooling system set point value by COMP. Relay and re-operate again if temperature higher than set point follow as equation Set Point + Hysteresis. The heating system will reverse operation as Figure 1

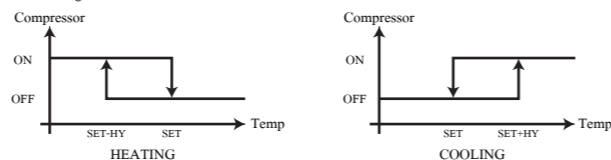


Figure 1 Compressor Operation

Compressor can be set delay time (CCT) for prevent fluctuate operation as Figure 2

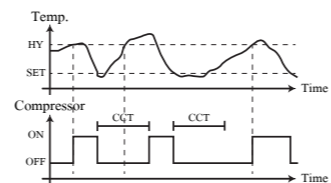


Figure 2 CCT Operation

If Room Probe ware effect or break alint detect by DEF-01 the compressor will change operation to COF or CFF (ON Time and OFF Time) as Figure 3

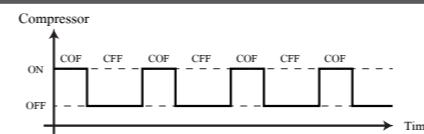


Figure 3 COF and CFF Operation

Continuous Cycle have 2 Set Point are Main Set Point (SET) and Instantaneous Set Point (CCS) follow as define period time (CCL) press to order suitable for reduce temperature during move goods to inside freezers as Figure 4

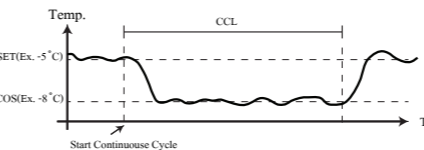


Figure 4 Continuous Cycle Operation

Energy Saving mode operate by select Digital Input for change to Instantaneous Set Point (SET + HES) suitable for freezer which require to adjust temperature during close curtain for protect cooling system Probe 2 (EVAP. Probe) for measure temperature in Evaporator to show temperature inside and end of defrost

Probe 3 is same terminal of Digital Input for measure temperature of Condenser which operate as High Low Band Alarm

Probe 4 in case of cure Digital Input, the sensor probe of Condenser must be Probe 4 which connect at Dongle Terminal (DEF-01-A4)

Defrost System

Defrost System can be control by Digital Input on period time which define DFC as Figure 5, during defrost period can be select to are time or DFT for define end of defrost system as Figure 6 and 7

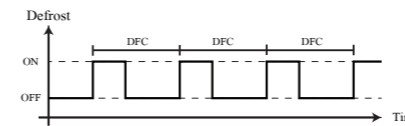


Figure 5 Defrost System by period time DFC

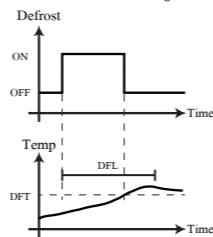


Figure 6 End of defrost system by Temperature define

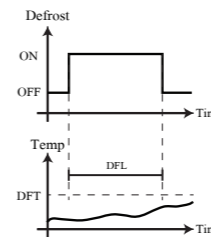


Figure 7 End of defrost system by Time define

Selectable defrost system by Electrical Heater or Hot Gas as Figure 8, they can be setting to warning higher or lower than setting value and delay time setting alarm as Figure 10

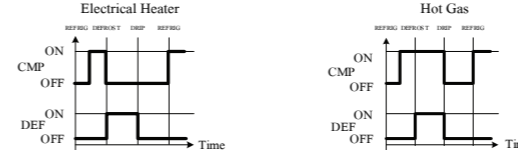


Figure 8 Defrost system types

Alarm

Setting Warning Display when High Temperature or Low Temperature Setting. It can Delay Time Setting before Alarm Display by can Select 8 Function Follow Figure 10.

Fan Operation

Fan can do RUN and STOP same as compressor or all time operation. During defrost system can be setting operation of fan as follow :

1. C-N = Fan run same time as compressor and stop for defrost period
2. O-N = Fan run all time and stop for defrost period
3. C-Y = Fan run same time as compressor and defrost period
4. C-N = Fan run all time

Digital Input Operation

Digital Input can be setting for warning alarm, start defrost operation, pressure switch, door switch or curtain switch and can be setting delay time before warning alarm

Voltage Protection

DEF-01 can be voltage protection together for over-under voltage (except 10-24 VAC/VDC supply) if supply voltage are higher or lower than set point all relay output will turn OFF to protect compressor or system and show voltage value compare with set point. The operation as Figure 9, if can be set AUX. Relay for warning

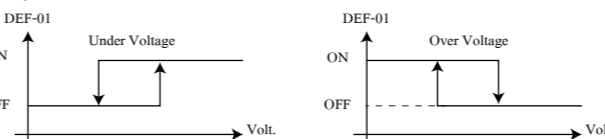


Figure 9 Voltage Protection Chart

Display Method

LED	Mode	Function
Flicker	Flicker	In Period CCT and OSD
Flicker	Flicker	In Period DDT
Flicker	Flicker	In Period OSD and FDD

Caution

Symbol	Cause
P1, P1_	Room Probe Defect
P2, P2_	Evaporator Probe Defect
P3, P3_	Third Probe Defect
P4, P4_	Fourth Probe Defect
HA	Warning High Temperature of Room Probe
LA	Warning Low Temperature of Room Probe
HA2	Warning High Temperature of Condenser
LA2	Warning Low Temperature of Condenser
EA	Warning for External Alarm
SA	Warning for External Serious Alarm
PA	Warning for Pressure Switch
DA	Warning for Door Open
LOC	Warning for Keypad Locked
NOP	OFF Probe Display

Dongle Module Instruction

Download data to DEF-01

1. Insert Dongle to DEF-01
2. Supply power to DEF-01 then display show "DOL"
3. Waiting until display show "END" or green LED on Dongle turn ON that mean finish to download

Upload data from DEF-01

1. Insert Dongle to DEF-01
2. Fine DOG parameter
3. Select "UP" then press SET button hold until display flicker show "UP"
4. Waiting until display show "END" or green LED on Dongle turn ON that mean finish to Down load

Symbol	Cause
ERR	Upload or Download Error Data
EMP	No Data In Dongle
MOD	Download Data are not Match with Controller Model

ALARM OUTPUT : Process value (PV) to be used as Alarm Output.

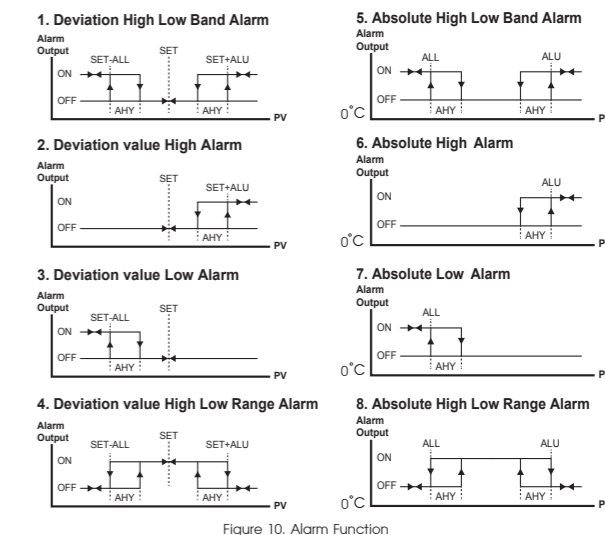
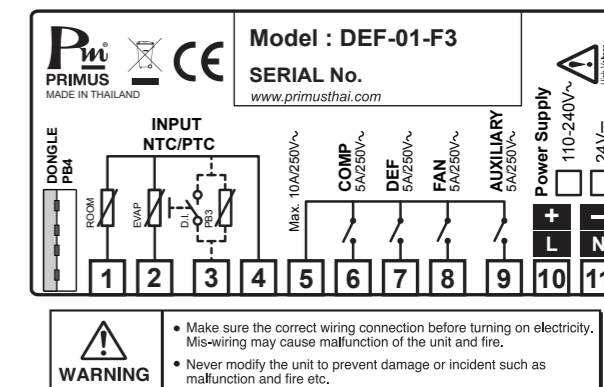


Figure 10. Alarm Function

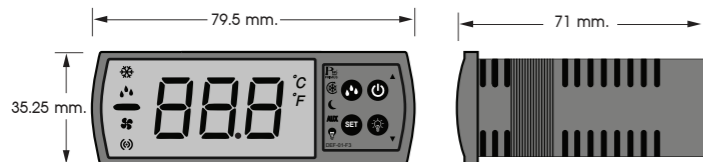
WIRING DIAGRAM



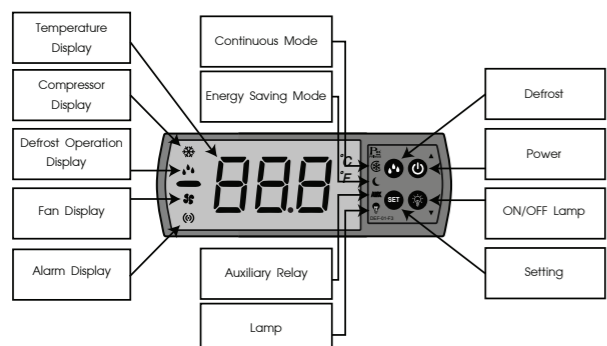
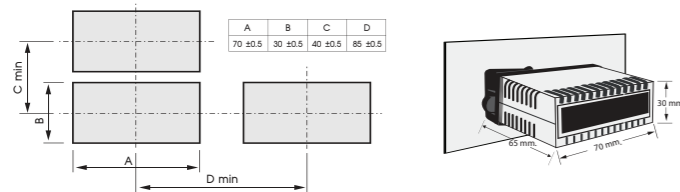
TECHNICAL SPECIFICATION

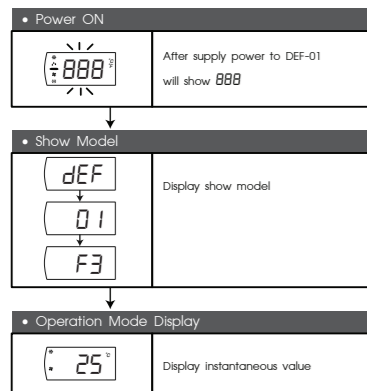
Power Supply	110 - 240 VAC		
Power Consumption	10 - 24 VAC/VDC		
Voltage Protection	2.5 VA		
Voltage Accuracy	80 - 260 VAC		
Display	± 3VAC		
Display	7-Segment Size 0.56 Inch 3 Digit		
Input	Sensor	Room NTC/PTC (-40 to 130 °C)	
	Evaporator	NTC/PTC (-40 to 130 °C)	
	Probe 3 (Option)	NTC/PTC (-40 to 130 °C)	
	Probe 4 (Option)	NTC/PTC (-40 to 130 °C)	
	Digital Input	Free Voltage Contact	
	Input Accuracy	± 2 °C	
Output	Relay	Compressor	5A 250 VAC (NO)
	Defrost	5A 250 VAC (NO)	
	Fan	5A 250 VAC (NO)	
	Auxiliary	5A 250 VAC (NO)	
Ambient Operation	Temperature	-10 °C to 60 °C	
	Humidity	85 % RH Non-Condensing	
Ambient Storage	Temperature	-20 °C to 80 °C	
	Humidity	85 % RH Non-Condensing	
Protection Degree	Front Protection Rating	IP52	
	Case Protection Rating	IP20	
Installation	Panel, Mounting		
Material	ABS-V0		
Size	35.25 x 79.5 x 71 mm.		
Weight	90 g. / 155 g.		

DIMENSION



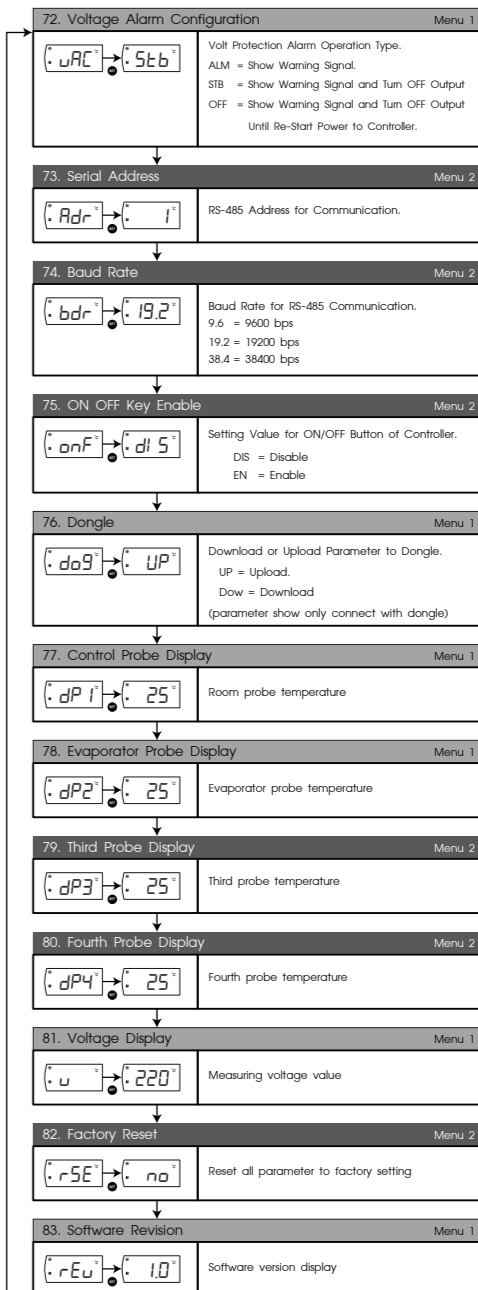
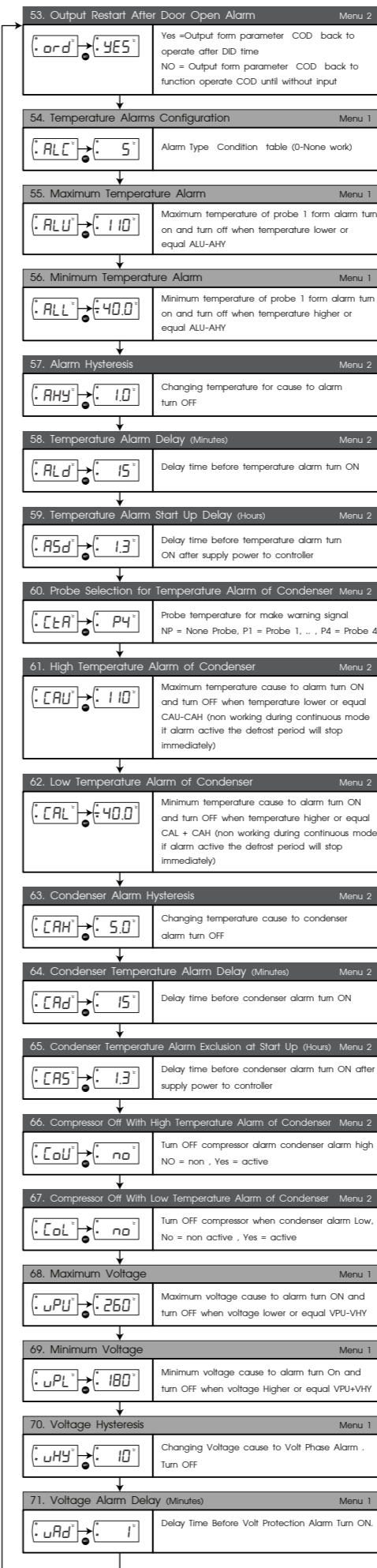
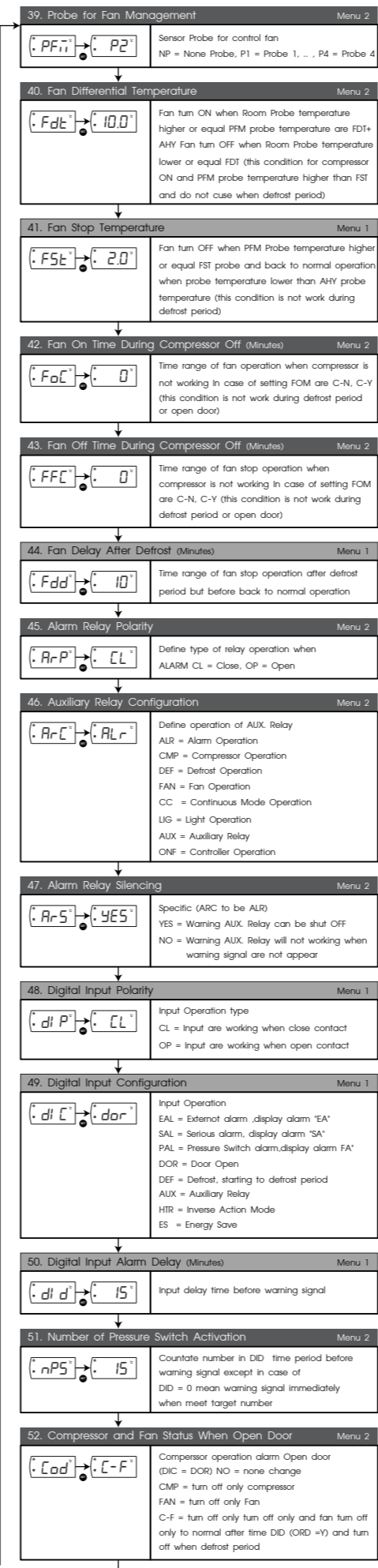
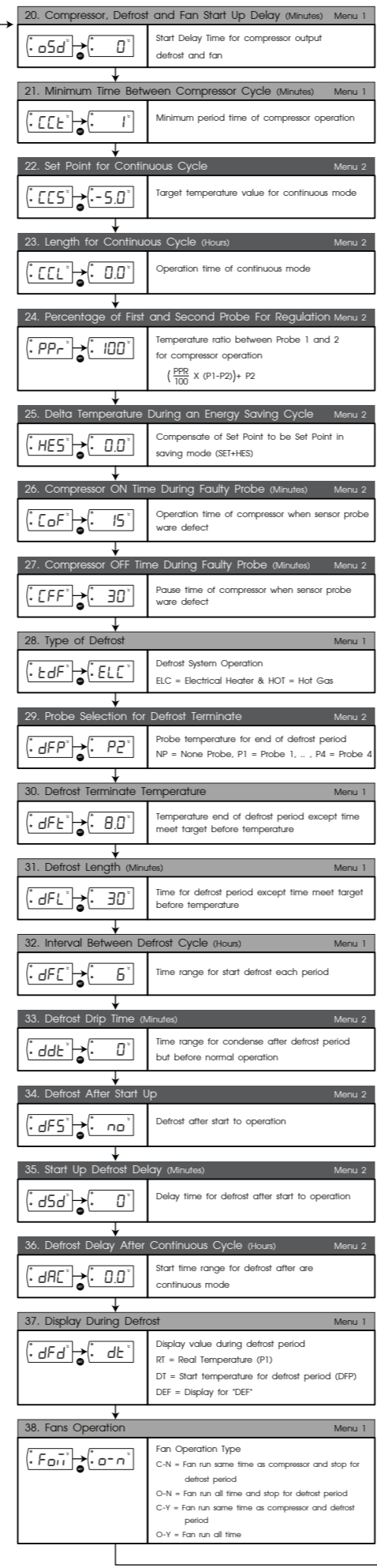
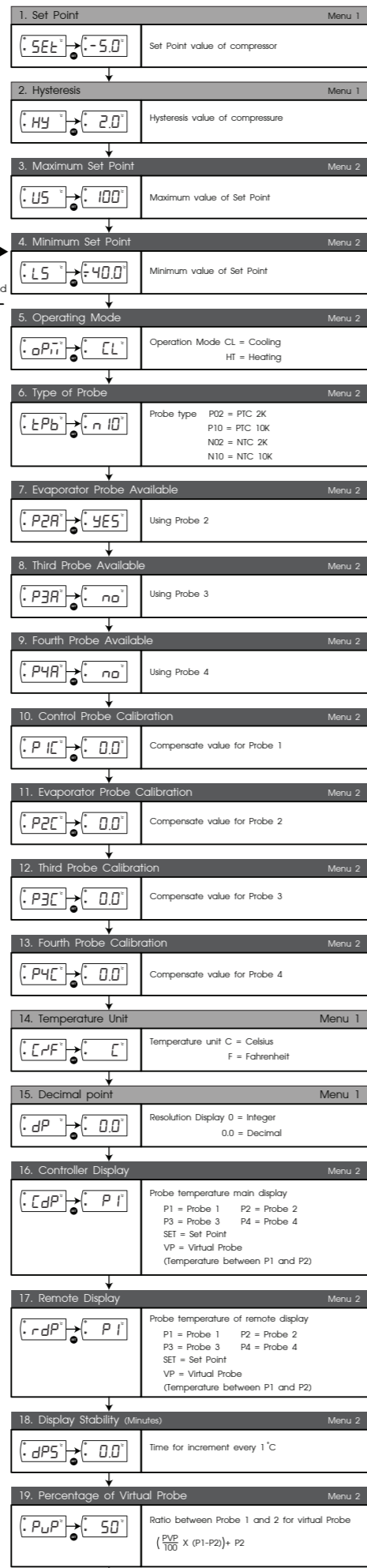
CUTTING PANEL AND INSTALLATION





DEFAULT SETTING VALUES

Description	Parameter	Value	Value
1. Set Point	SET	-5.0	LS : US
2. Hysteresis	HY	2.0	0.1 : 25.5
3. Maximum Set Point	US	100	LS : 130
4. Minimum Set Point	LS	-40.0	-40.0 : US
5. Operating Mode	OPM	CL	CL : HT
6. Type of Probe	TPB	n10	P02 : N10
7. Evaporator Probe Available	PA	YES	NO : YES
8. Third Probe Available	PA	NO	NO : YES
9. Fourth Probe Available	PA	NO	NO : YES
10. Control Probe Calibration	PIC	0.0	-20.0 : 20.0
11. Evaporator Probe Calibration	P2C	0.0	-20.0 : 20.0
12. Third Probe Calibration	P3C	0.0	-20.0 : 20.0
13. Fourth Probe Calibration	P4C	0.0	-20.0 : 20.0
14. Temperature Unit	C/F	C	C : F
15. Decimal point	DP	0.0	0 : 0.0
16. Controller Display	CDP	P1	P1 : VP
17. Remote Display	RD	P1	P1 : VP
18. Display Stability	DPS	0.0	0.0 : 20.0 min (es. 10 sec)
19. Percentage of Virtual Probe	PVP	50	0 : 100
20. Compressor Defrost and Fan Start Up Delay	OSD	0	0 : 255 min
21. Minimum Time Between Compressor Cycle	CCT	1	0 : 255 min
22. Set Point for Continuous Cycle	CCS	-5.0	-40.0 : 130
23. Length for Continuous Cycle	CCL	0.0	0.0 : 24.0 hours (es. 10 min)
24. Percentage of First and Second Probe For Regulation	PPR	100	0 : 100
25. Delta Temperature During an Energy Saving Cycle	HES	0.0	-30.0 : 30.0
26. Compressor ON Time During Faulty Probe	COF	15	0 : 255 min
27. Compressor OFF Time During Faulty Probe	COFF	30	0 : 255 min
28. Type of Defrost	EDF	ELC	ELC : HOT
29. Probe Selection for Defrost End	DSP	P2	NP : P4
30. Defrost End Temperature	DFT	8.0	-40.0 : 50.0
31. Defrost Length	DFL	30	0 : 255 min
32. Interval Between Defrost Cycle	DFC	6	0 : 120 hours
33. Defrost Dip Time	DDT	0	0 : 255 min
34. Defrost After Start Up	DPS	NO	NO : YES
35. Start Up Defrost Delay	DDO	0	0 : 255 min
36. Defrost Delay After Continuous Cycle	DAC	0.0	0.0 : 24.0 hours (es. 10 min)
37. Display During Defrost	DDF	DT	RT : DEF
38. Fan Operation	FOM	O-N	C-N : O-Y
39. Probe for Fan Management	PFM	P2	NP : P4
40. Fan Differential Temperature	FDI	10.0	0.0 : 50.0
41. Fan Stop Temperature	FST	2.0	-40.0 : 50.0
42. Fan On Time During Compressor Off	FOC	0	0 : 255 min
43. Fan Off Time During Compressor Off	FOFF	0	0 : 255 min
44. Fan Delay After Defrost	FDD	10	0 : 255 min
45. Alarm Relay Polarity	ARP	CL	OP : CL
46. Auxiliary Relay Configuration	ARC	ALR	ALR : ONF
47. Alarm Relay Silencing	ARS	YES	NO : YES
48. Digital Input Polarity	DIP	CL	OP : CL
49. Digital Input Configuration	DIC	DOR	EAL : ES
50. Digital Input Alarm Delay	DID	15	0 : 255 min
51. Number of Pressure Switch Activation	NPS	15	0 : 255
52. Compressor And Fan Status When Open Door	COD	C-F	NO : C-F
53. Output Restart After Door Open Alarm	ORD	YES	NO : YES
54. Temperature Alarms Configuration	ALC	5	0 : 8
55. Maximum Temperature Alarm	ALU	110	DEV : (0.0 : 50.0) ABS : (AL : 130)
56. Minimum Temperature Alarm	ALL	-40.0	DEV : (0.0 : 50.0) ABS : (-40.0 : AU)
57. Alarm Hysteresis	AHY	1.0	0.1 : 25.5
58. Temperature Alarm Delay	ALD	15	0 : 255 min
59. Temperature Alarm Start Up Delay	ASD	1.3	0.0 : 24.0 hours (es. 10 min)
60. Probe Selection for Temperature Alarm of Condenser	CAU	P4	NP : P4
61. High Temperature Alarm of Condenser	CAH	110	-40.0 : 130
62. Low Temperature Alarm of Condenser	CAL	-40.0	-40.0 : 130
63. Condenser Alarm Hysteresis	CAH	5	0.1 : 25.5
64. Condenser Temperature Alarm Delay	CAD	15	0 : 255 min
65. Condenser Temperature Alarm Exclusion at Start Up	CAS	1.3	0.0 : 24.0 hours (es. 10 min)
66. Compressor Off With High Temperature Alarm of Condenser	COU	NO	NO : YES
67. Compressor Off With Low Temperature Alarm of Condenser	COL	NO	NO : YES
68. Maximum Voltage	VPL	260	VPL : 10 : 260
69. Minimum Voltage	VPL	180	80 : VPL : 10
70. Voltage Hysteresis	VHY	10	0 : 50
71. Voltage Alarm Delay	VAD	1	0 : 255 min
72. Voltage Alarm Configuration	VAC	SB	ALM : OFF
73. Serial Address	ADR	1	1 : 247
74. Baud Rate	BDR	192	9.6 : 38.4
75. ON OFF Key Enable	ONF	DIS	DIS : EN
76. Dongle	DOG	UP	UP : DOW
77. Control Probe Display	CDP	-	-
78. Evaporator Probe Display	EDP	-	-
79. Third Probe Display	EDP	-	-
80. Fourth Probe Display	EDP	-	-
81. Voltage Display	V	-	-
82. Factory Reset	RSE	NO	NO : YES
83. Software Revision	REV	1.0	-



ORDERING CODE

DEF - 01 - F3 -

Power Supply	
24	10-24 VAC/VDC
220	110-240 VAC

Primus Co., Ltd.
 119 Soi Srimuang Anusorn, Suthisarnvinichai Rd.,
 Dindaeng, Bangkok 10400 Thailand.
 Tel : (662)693-7005, (662)277-8027 Fax : (662)277-3565
 E-Mail : export@primusthai.com , oversea@primusthai.com