Master Controller Setting Quick Reference Guide

(MB P/N: 19-4153 with Pressure Transducer)

NOTE: If you are replacing a Master Controller control board in a walk-in cooler or freezer with either electric or reverse cycle defrost, please see the list of typical set points on page 4. The chart shows the correct settings to follow for each defrost type.

Setting the Master Controller by Two On-Board Pushbuttons: SW1 & SW2

CHANGING THE ROOM TEMPERATURE SET POINT
Press and hold 'SW2' until the green LED starts blinking. The display will toggle between 'rS' and the room temperature set point. The red LED will be on if the set point is negative. Press 'SW1' to increase 'rS' by 1°F. Press 'SW2' to decrease 'rS' by 1°F. If no button is pushed for 20 seconds, the controller will take the new set point.

CHANGING ALL SET POINTS
Press and hold 'SW1' and 'SW2' simultaneously until the green LED starts blinking. The display will toggle between 'ro' and the actual room temperature. To scroll down, press 'SW2'. Pressing 'SW1' will increase the set point by one increment. When the set point gets to its maximum value, pressing 'SW1' will rotate it to its minimum value.

CLEARING AN ALARM
Press 'SW1' three times within five seconds to clear all alarms and restart timer.

MANUAL DEFROST
Pressing and holding pushbutton SW1 for 7 seconds will cause the controller to go into defrost cycle.

STATUS, DEFAULT AND READING DISPLAY
The status and the digital data can be displayed on both the onboard two-digit display and the remote panel display. Below is a list of the parameters of the operational status.

Onboard Two-Digit Display	Optional Panel Display	Description
SU	STUP	Indicates the status of Start Up Mode
CF	CKFN	Check fan working status. The fans run than stop during start-up mode
CP	CKP1	Check pressure transducer
oP	OKP1	Indicates the pressure transducer is working as it should
C1	CKT1	Check sensor TS1, the evaporator inlet/defrost termination temperature sensor
o1	OKT1	Indicates the TS1 is working as it should
C2	CKT2	Check sensor TS2, the evaporator suction outlet/fan cut-in temperature sensor
o2	OKT2	Indicates the TS2 is working
C3	CKT3	Check sensor TS3, the refrigerated room temperature sensor
o3	OKT3	Indicates the TS3 is working
FH	CKFH	Indicates all sensors are OK
Fd	FNDL	Indicates FAN DELAY MODE
FP	FDTP	Actual TS2 value in FAN DELAY
CL	COOL	Indicates COOL MODE
oF	OFF	Indicates OFF MODE
Pd	PMDN	Indicates PUMPDOWN MODE before an electric defrost
dF	DEFR	Indicates DEFROST MODE
Cd	DRIP	Indicates COIL DRAIN MODE
dn	DFTP	Inlet sensor TS1 value in DEFROST MODE

CHANGING PARAMETERS

A list of the parameters that can be displayed and/or changed is shown below when access to the default settings is needed. This access is usually done by a trained technician.

Onboard Two-Digit Display	**Optional Remote Panel Display**	**Description**
ro	RMTP	Refrigerated room temperature from TS3 **(-40°F to +99°F), displayed value**
Eo	POSN	Percentage the valve is open (0 to 99%)
SH	SUPH	Actual superheat in COOL MODE (TOUT-TSAT)
in	TSAT	Saturated suction temperature calculated from suction pressure Pr
oU	TOUT	Evaporator suction outlet temperature from TS2
dE	DFTP	Temperature read from the evaporator defrost termination sensor TS1
Pr	PRES	Suction pressure read from the pressure transducer ***(-14.6 to 99.0PSIG)***

Note: ***the above parameters are status variables that allow you to check the system operations; the below parameters are set points that can be changed to fit the applications***

Cn	**CMMD**	**The address to show if the evaporator operates as master/slave, standalone, or alternating mode**
Ao	ALON	Indicates a standalone system (One condensing unit + one evaporator)
n1-5	MSS1-5	Indicates if the controller is a master. The "1-5" shows the number of slaves that are supposed to be connected to this master.
S1-5	SLV1-5	Indicates if the controller is a slave. The "1-5" shows the address of this slave.
nL	MSAL	Primary evaporator of the two alternating controllers
SL	SLAL	Secondary evaproator of the two alternating controllers
nS	MSGP	The address group for a master/slave group or alternating duo **(nS=0), not used**
SS	SHSP	Superheat set point **(5 to 20 °F)**.
rS	RMSP	Room temperature set point or cut-out **(-40 to +75 °F, set point range)**
dU	DFTM	Maximum defrost duration **(10 to 99 minutes, five minute increment)**
dS	DFSP	Defrost termination temperature **(40 to 90°F, 5°F degree increment)**
PU	PDTM	Pump down timeout duration **(0 to 5 minutes)**
dr	DRTM	Drip time duration **(0 to 10 minutes)**
nd	NMDF	Number of defrosts per day **(0 to 12).** When nd = 0, demand defrost, when nd = 1 to 12, the controller uses scheduled defrost
HA	HIAL	High temperature alarm set point **(-35 to +60°F, 5°F degree increment)**
Ad	ALDL	Temperature alarm delay **(10 to 59 minutes, 5 minute increment)**
LA	LOAL	Low temperature alarm set point **(-40 to +55°F, 5°F degree increment)**
oC	OFTM	Minimum time the valve is close **(0 to 15 minutes)**
rn	RNTM	Minimum time the valve is open **(0 to 15 minutes)**
rP	RNTP	Cut-in temperature differential **(0 to +25 °F)**
PS	MPSP	Maximum suction pressure set point **(-4.6 to 99.0 PSIG)**
Pn	NPSP	Minimum pressure set point **(-14.6 to 3 PSIG)**
Hb	8HR, 12HR, 24HR, 48HR, 72HR	When in demand defrost and temperature set point is below 35°F, if '8HR', then a defrost will occur at least once every 8 hours. If '12HR', then a defrost will occur at least once every 12 hours. If '24HR', then a defrost will occur at least once every 24 hours. If '48HR', then a defrost will occur at least once every 48 hours. If '72HR', then a defrost will occur at least once every 72 hours
Ar	LGAD	Address of controller for remote data logging **(Ar = 0), not used**
Er	**DFMD**	**Defrost type (electric or reverse cycle, EL, r1 and r2)**
rr	REFR	Refrigerant type, **R404 (4A) or R22 (22)**
AL	DIF2	If in alternating mode, number of degrees above cut-in (cut-out + rP) set point to override and both controllers to go into cool mode **(3-10°F)**

ALARM DISPLAY

Any alarm will cause relay #3 to switch. All alarms have a distinct display on the controller. The green LED will be on and the red LED will blink. Multiple alarms can exist. There is a priority as to which alarm will be displayed before another.

Onboard 2 Digit Display	Optional Remote Panel Display	Description	PRIORITY
	NOAL	Displays when there are no alarms. The onboard 2 digit display will display status and temperature readings	
SP	PRSR	Pressure transducer	1
So	SCSR	Evaporator outlet temperature sensor TS2 alarm	2
SA	RMSR	Room temperature sensor TS3 alarm	3
LS	LOSH	Low superheat alarm	4
rH	HIRM	High room temperature alarm	5
rL	LORM	Low room temperature alarm	6
Sd	INSR	Defrost termination sensor TS1 alarm	7
LP	LPAL	Low pressure alarm	8
CA	CMAL	Communication alarm	9

TROUBLESHOOTING GUIDE

Trouble, Alarm Codes	Causes	Corrective Actions
Pressure transducer alarm **SP, PRSR**	• Bad transducer • Out of range • Loose wire • Wrong hook-up	• Replace the pressure transducer • Turn off power for a few seconds, turn back on • Wire correctly
Outlet sensor TS2 fails **So** **SCSR**	• Mechanical damage • Connection wire loose • Overheated • Out of range	• Tighten the connection wires on the controller terminal • When brazing suction line, take out the sensor • Install the sensor after brazing
Room sensor TS3 fails **SA** **RMSR**	• Mechanical damage • Connection wire loose • Overheated • Out of range	• Tighten the connection wires on the controller terminal • The room sensor can be replaced by surface sensor
Low superheat **LS** **LOSH**	• Superheat setting too low • Wrong locations of TS2 • Sensors may be loose • Uneven feeding of coil circuits • Overcharge of refrigerant Defective electric expansion valve (EEV) • Compressor stops	• Change to correct set point • Make sure the distributor is feeding each circuit evenly • Insulate the sensors with foam tape • Use correct refrigerant charge • Check EEV wiring • Replace defective EEV • Check compressor
High room temperature **rH** **HIRM**	• Insufficient refrigeration • Heat load too large • Compressor fails or high pressure cuts out • Evaporator fans may not run • Door open for too long • Coil iced-up	• Check system design to select a sufficient system • Replace failed compressor • Fix the evaporator fans • Keep the cold room door closed during refrigeration • Check possible air leak through the walls of cold room
Low room temperature **rL, LORM**	• Inproper low temp setpoint • Over designed system	• Change low temp set point • Re-select the system
Defrost termination sensor TS1 fails **Sd, INSR**	• Mechanical damage • Loose connection wire • Overheated • Out of range	• Tighten the connection wires on the controller terminal • Let the sensor cool down to application temperature range: -50^{o}F to $+103^{o}$F • Replace failed sensor
Low pressure alarm **LP, PAL**	• Refrigerant leak • Bad transducer	• Fix leak • Replace pressure transducer
Communication **CA, CMAL**	• Loose RS-485 coonection • Failed communication port	• Tighten the terminals • Change a new controller board

Temperature Sensor The resistance of the temperature sensor at 32°F ice water is 5,122 ohms.

Pressure Transducer RED --- +5VC, Green --- Signal Voltage, Black --- Ground; Compare gauge pressure and the "Pr" suction pressure on-board reading to make sure they both read the same (PSIG)

Electric Expansion Valve

1) The resistance between the black and white leads should be around 90 ohms. The resistance between the black and red leads should be an open.
2) The resistance between the red and green leads should be around 90 ohms. The resistance between the white and green leads should be an open.
3) The resistance between each lead and the brass housing of the valve should be an open
4) Read the AC, not DC, voltage across the black and white leads while the valve is moving. The AC voltage should be 11 to 13 VAC. The voltage will be close to 0 VAC when the valve is not moving.
5) Repeat step 4 across the red and green leads

External Relay The DC voltage between terminal 'B' and 'W' on board is 12VDC in Cool Mode

TYPICAL SET POINTS FOR CONTROLLER

		Electric Defrost			**Reversing Cycle Defrost**		
		Low Temp	**High Temp**		**Low Temp**		**High Temp**
				MCD		***WG***	
Cn	CMMD	Ao	Ao	Ao	Ao	**Ao**	Ao
nS	MSGP	0	0	0	0	0	0
SS	SHSP	10	10	10	10	**10**	10
rS	RMSP	-10	35	35	-10	-10	35
dU	DFTM	35	35	35	20	20	20
dS	DFSP	75	45	45	60	60	60
PU	PDTM	3	3	3	3	3	3
dr	DRTM	2	2	2	5	5	2
nd	NMDF	0	0	0	0	0	0
HA	HIAL	25	50	50	25	**5**	50
Ad	ALDL	59	59	59	59	59	59
LA	LOAL	-20	20	20	-20	-20	20
oC	OFTM	2	2	2	2	2	2
rn	RNTM	2	2	2	2	2	2
rP	RNTP	5	3	3	5	5	3
PS	MPSP	55	80	80	55	55	80
Pn	NPSP	0	0	0	0	0	0
Hb	8, 12 24, 48, 72	12	24	24	12	12	24
Ar	LGAD	00	00	00	00	00	00
Er	DFMD	EL	EL	EL	r1	**r2**	r1
rr	REFR	4A	22	**4A**	4A	4A	22
AL	DIF2	5	5	5	5	5	5

Please check with factory for actual set points on individual controllers.

For complete information, please refer to the ***Master Controller Installation & Operations Manual*** or contact:

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