

DIGITAL THERMOSTAT CONFIGURATION INSTRUCTIONS
for RPARTS part # 015-0004 (CAREL IR33W)
and
RPARTS part # 015-0005 (Carel IR33V)
used in
Marine Refrigeration with Holding Plates

DATE	REV	DESCRIPTION
8-1-14	1.0	New Manual Version
9-16-14	2.0	Modified configuration instructions
2-14-15	3.0	Corrections
4-16-15	4.0	Added configuration instructions for the new Full Gauge MT-512RiL
9-3-16	5.0	Added Error Codes
1-6-17	6.0	Added Control Products Inc. model TC-110D to wiring Cross Reference table

INTERMEDIATE DIGITAL THERMOSTAT CONFIGURATION

RPARTS Part Number 015-0004 (Carel Part Number IR33W00) and
RPARTS Part Number 015-0005 (Carel Part Number IR33V00)

The 015-0004 has two setpoints and two differential setting and was referred to as the "ECM controller" upgrade option for Glacier Bay refrigeration systems built between 1994 and 2008. The ECM option is also supported by the RPARTS Micro HPS 3500. The second setpoint is associated with a second set of output contacts which are enabled by an external relay that is activated by the engine ignition switch or other source of voltage when the engine or other charging source is running. This allows the control system to know when the engine and/or generator is running and use the additional power being generated to "top-off" the holding plate.

The 015-0005 is the standard digital temperature controller with a single setpoint and differential.

The programming instructions are suitable for Glacier Bay applications, as well as, other similar systems.

Programming the "C" Parameters

To make mode selections to the Carel thermostat, the following procedure is used. When programming, if the display does not show the expected values or if there is uncertainty of the current programming status, just wait for the Carel to timeout and exit the programming mode. Then start over at the first step.

1. Hold down both "PRG" and "SEL" together for about 5 seconds until the display changes.
2. Use the arrow keys to change the display to "77", then press "SET". (77 is a password).
3. The display should show "C 0", if so press "SET".
4. Use the arrow keys to change the display to "9".
5. Press "SET" to return to the parameter selection mode.
6. Then use the  arrow key to change the display to "C18" and press "SET".

7. Use the arrow keys to change the value to "0" for the scale to be displayed in degrees Centigrade or "1" for the scale to be displayed in degrees Fahrenheit.
8. Press "SEL" to enter the unit setting.
9. Press and Hold "PRG" until temperature is displayed to retain the unit setting.
10. Refer to Table 1 and use the procedure above to set all parameters listed in Table 1.

USING THE SECOND PROBE FOR BOX TEMPERATURE

The first probe is usually attached to the holding plate or roll bond evaporator located in the freezer or refrigerator box. Therefore the first probe detects the temperature of the evaporator and not the temperature of the food in the box. The Carel temperature controllers can use an optional second probe to detect the temperature of the freezer or refrigerator box ambient temperature.

If the second probe is not present it must be disabled or an error code will flash on the display. The second probe is enabled or disabled by C13.

Refer to Table 1 and use the procedure above to set C13 according to value in Table 1.

PROGRAMMING THE SET POINTS & DIFFERENTIALS

The following procedure is used to program the holding plate set point (ST1, ST2) and differential (P1, P2) parameters. The set point is the temperature at which the system will turn off, and the differential added to the set point will be the temperature at which the system will turn on.

The first set point ST1 and first differential P1 are active in the "normal" mode and control the system when the engine (or generator) is not running. The second set of parameters ST2 and P2 take over whenever the engine (or generator) is started and control the system in "engine-drive" mode. The 015-0005 only supports ST1 and P1

The Glacier Bay factory default setting for ST1 and ST2 is 22° F for the TSS-26 Glacier Bay refrigerator plate and -16° F for the TSS-10 Glacier Bay freezer plate. The factory default setting for "P1" is 8° F for the TSS-26 refrigerator plate and 16° F for the TSS-10 freezer plate. The Glacier Bay factory default setting for P2 is 4° F for the refrigerator plate and 12° F for the freezer plate. Glacier Bay freezer plates made before 2001 are TSS-5 plates. ST1 and ST2 was factory programmed for -9° F, with "P1" set at 9° F and "P2" set at 5° F.

1. Hold down "SEL" until ST1 is displayed. ST1 will flash when "SEL" is released.
2. Use the arrow keys to adjust the display until the desired system shut off temperature is displayed. This should be a few degrees below the freezing point of the plate, 22° F for a Glacier Bay refrigerator plate, and -16° F for a Glacier Bay freezer plate.
3. Press "SEL" to enter the ST1 setting.
4. After entering the "ST1" set point, enter the "ST2" set point with the arrow keys. The set point for both "ST1" and "ST2" should be entered as the same value.
5. Press "SEL" to enter the "ST2" setting.
6. Press "PRG" to retain both the "ST1" and "ST2" settings.
7. Hold down "PRG" until "P1" is displayed. "P1" will flash when "PRG" is released.

8. Use the arrow keys to adjust the display until the desired number of degrees above the setpoint the system is to turn on at appears. For a Glacier Bay refrigerator plate, this should be 8° F, for a Glacier Bay freezer plate it should be 16° F.
9. Press "SEL" to enter the "P1" setting.
10. After entering the "P1" differential, enter the "P2" differential with the arrow keys. The differential for "P2" will always be lower than "P1". Setting "P2" at a lower value will cause the compressor to start sooner when the engine is running than it does under normal operation. For a Glacier Bay refrigerator plate, this should be 4° F, the Glacier Bay freezer plate setting should be 12° F.
11. Press "SEL" to enter the "P2" setting.
12. Press "PRG" to retain both the "P1" and "P2" settings.

These settings are a starting point; they may be optimized by careful observation of system operation. Changing the values will change the run time and holdover time, at an optimum setting maximum holdover will be obtained with optimum run time. The values should be varied and records made of changes to determine the best settings for any individual system. This is time consuming and should be left to the vessel operator to experiment with to determine the best settings.

Table 1. Summary of "C" parameters and recommended settings

Parameter	Recommended Value	Comments
Password	77	Press Prg and Set together for >5 seconds until display changes to blinking 0 then press ↑ arrow to change to 77
C0	See comment	1 for Std mode (015-0005), 9 for ECM mode (015-0004)
C13	0	Probe type: 0= NTC range (-50T+110°C)
C18	1	Temperature units: 0 for C or 1 for F
C19	7	Enable 2nd Probe (NTC2) C19=0 if 2 nd probe is not present C19=7 if 2 nd probe is connected (enables box temperature display)
C33	1	Enables special mode to enable use of c36 and c37 c33=1 special mode parameters enabled
C34	1	Output 1 Relationship (ECM 015-0004 only, not used for 015-0005) C34=1 relates Output 1 to Setpoint 1 and P1
C35	0	C35=0 selects On/off type (ECM 015-0004 only, not used for 015-0005)
C36	100	(ECM 015-0004 only, not used for 015-0005)
C37	-100	(ECM 015-0004 only, not used for 015-0005)
C38	2	Output 2 Relationship (ECM 015-0004 only, not used for 015-0005) C38=2 relates Output 2 to Setpoint 2 and P2
C39	0	C35=0 selects On/off type (ECM 015-0004 only, not used for 015-0005)
C40	100	(ECM 015-0004 only, not used for 015-0005)
C41	-100	(ECM 015-0004 only, not used for 015-0005)

Table 2. Summary of Setpoint and Differential recommended settings

Parameter	Recommended Value	Comments
St1		Setpoint 1 GB TSS-26 Refrig = 22F GB TSS-10 Freezer (2001 or later) = -16F GB TSS-5 Freezer (before 2001) = -9F
St2		Setpoint 2 (ECM 015-0004 only, not used for 015-0005) Only with ECM model and Requires c0 = 9 GB TSS-26 Refrig = 22F GB TSS-10 Freezer (2001 or later) = -16F GB TSS-5 Freezer (before 2001) = -9F
P1		Differential for St1 GB TSS-26 Refrig = 8F GB TSS-10 Freezer (2001 or later) = 16F GB TSS-5 Freezer (before 2001) = 9F
P2		Differential for St2 (ECM 015-0004 only, not used for 015-0005) Only with ECM model and Requires c0 = 9 GB TSS-26 Refrig = 4F GB TSS-10 Freezer (2001 or later) = 12F GB TSS-5 Freezer (before 2001) = 5F

Error Codes

Displayed Code	Description
E01	Sensor error temperature probe 1 Possible faulty sensor or loose connection. Check connections Probe resistance changes with temperature. Check probe with ohm meter (eg.: NTC=10k at 25°C)
E02	Sensor error temperature probe 2 Possible faulty sensor or loose connection. Check connections If second probe is enabled but not present this error will be displayed. See C19 above
E03	memory corrupt Possibly caused by voltage drop during programming or very strong electromagnetic interferences. Recommend reset to factory default values by power on while holding down PRG
E04	External alarm via external contact on digital input digital input is open, check the external contact
E05	HIGH temperature threshold alarm P26 has been exceeded for a time-interval > P28
E06	LOW temperature threshold alarm P25 has been below P27 for a time-interval > P28]

Connection Cross Reference Table for Various Models

	Digital Thermostat Connections Cross Reference					
	Move wire from screw number on old to screw number on new					
Signal Name	ECM IR32W 015-0003	ECM IR33W 015-0004	Std IR32V 015-0002 Old	Std IR33V 015-0005	Std FG 015-0010	Control Products TC-110D-12V Obsolete
NO1	1	3	1	3	11	4
COM1	2	1	2	1	10	5
NC1	3	2	3	2	12	12
PWR +	4	6	4	6	8 (12v) 9 (24v)	12 (12v only)
PWR -	5	7	5	7	7	11
PRB COM	7	10	7	10	3	7
PLT PRB +	8	8	8	8	4	8
BOX PRB +	9	9	9	9	n/a	n/a
NO2	13	13	n/a	n/a	n/a	n/a
NC2	14	15	n/a	n/a	n/a	n/a
COM2	15	14	n/a	n/a	n/a	n/a