Integrated Marine Systems INC

Setup Manual

RSW Control System

Systems 10T & Under

Control Products Controllers

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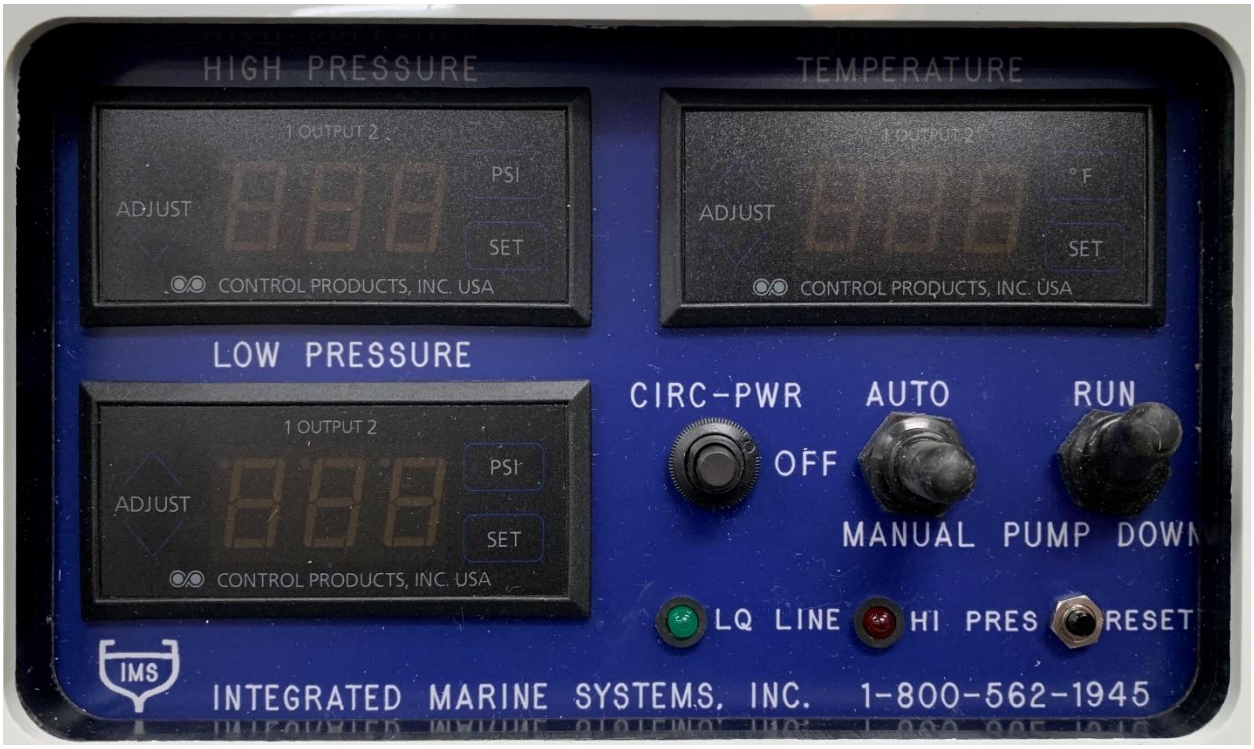
1. Control System Overview



HIGH-PRESSURE controller: Displays the refrigerant high-pressure during operation. When the programmed setpoint is reached, the controller will shut down the compressor and close the liquid solenoid. The "RESET" button will need to be pressed to re-start the unit.

LOW-PRESSURE controller: Displays the refrigerant low-pressure during operation. When the programmed setpoint is reached, the controller will shut down the compressor. When the differential setpoint is reached, the controller will start the compressor.

TEMPERATURE controller: Displays the process water temperature during normal operation. When the programmed setpoint differential is reached, the controller will close the liquid line solenoid valve. When the setpoint is reached, the controller will open the liquid line solenoid valve.

CIRC-PWR is used to switch on power to the control panel. This also functions as a 10A circuit breaker.

AUTO / OFF / MANUAL switch controls the compressor. In "AUTO" position the compressor on/off is controlled by low pressure controller. In "OFF" position the compressor is off. "MANUAL" position starts the compressor. This bypasses the low-pressure controller. It is a momentary contact switch.

RUN / PUMP DOWN switch controls the liquid solenoid valve. In “run” the valve is controlled by the temperature controller. In “pump down” the valve is closed.

LQ LINE LED indicates the liquid valve solenoid coil is energized, therefore the valve is open.

HI PRES LED indicates the unit has been shut down by the high-pressure controller.

RESET button is pressed to reset a high pressure shut down. Note: Always determine the cause of an alarm or shutdown before attempting to restart the machine.

2. SETUP

WARNING: IMPROPERLY PROGRAMMED CONTROLLERS MAY CAUSE SYSTEM DAMAGE.

NOTE: Controllers come from the factory pre-programmed. Pressure controllers should only be programmed by a qualified refrigeration technician.

2.1. Temperature Controller

See Control Products manual for programming instructions.

The Temperature Controller controls the function of the liquid line solenoid based on the process water temperature.

NOTE: The set point is the cut-in point. Example: when SP1 is set at 35 °F and DF1 at -02, the system will run until the hold is 33° before it will automatically de-energize the liquid line solenoid, pump-down and turn the compressor off. When the temperature increases to the cut-in point of 35° F, the liquid line solenoid will energize, and compressor will start when the refrigerant pressure increases above its set point. The temperature control function only works in Auto mode.

2.1.1. Calibrating the Temperature Controller

NOTE: Improperly calibrated probes may lead to chiller freeze-up and equipment damage.

Use an accurate reference thermometer, or a cup of crushed ice and fresh water, to calibrate the temperature probe and controller.

Adjust the CAL value to offset your calibration reading. Example: If the controller reads 30° in a cup full of ice water, set the CAL value to 02 to bring that reading to 32°.

2.2. Low- and High-Pressure Controllers

See Control Products manual for programming instructions.

The Low-Pressure Controller controls the function of the compressor based on the suction pressure.

The High-Pressure Controller will shut down the compressor when discharge pressure exceeds the setpoint. This requires a manual reset at the control panel.

2.3. Factory Parameter Settings

1) High Pressure Controller

Press	Display
"PSI" Button	DFI = -2
	DF2 = not active
	HI = 280
	LO = 280
	CAL = 00
Set Button	SPI = 280
	SP2 = not active

2) Temperature Controller

Press	Display
F° Button	DFI – -02
	DF2 – not active
	HI = 60
	LO = 32
	CAL = 00
Set Button	SPI = 35° for cutout* at 33°
	SP2 = not used

*temperature reached

3) Low Pressure Controller

Press	Display
"PSI" Button	DFI = 18
	HI = 10
	LO = 10
	CAL = 00
Set Button	SPI = 10
	SP2 = not active

NOTE: The set point cannot be adjusted outside of the HI and LO limits.

CONTROL PRODUCTS

Innovative Technologies in Custom Electronic Design & Manufacturing

General Description

The TC-110 series panel mount temperature controllers provide temperature display, relay control, and feature programmable setpoints, upper and lower setpoint limits, differentials and calibration.

Temperature Controllers

TC–110
TC–110H
TC–110RTD

Applications

Applications include heating, cooling, refrigeration, HVAC, food service, medical and industrial equipment.

Features

- Membrane touch-pad programming
- 0.56" high red LED display
- Programmable setpoint(s) and differential(s)
- Panel mount enclosure
- Temperature setpoint display
- LED relay status indicator(s)
- Tamper resistant programmable setpoint limits
- Available with single or dual stages

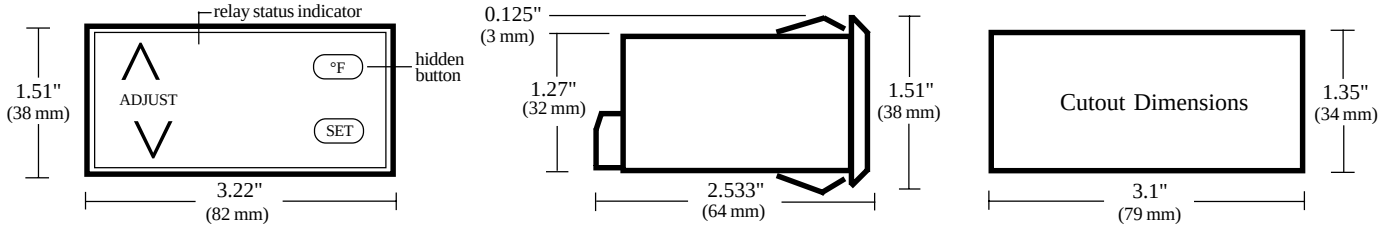
Specifications

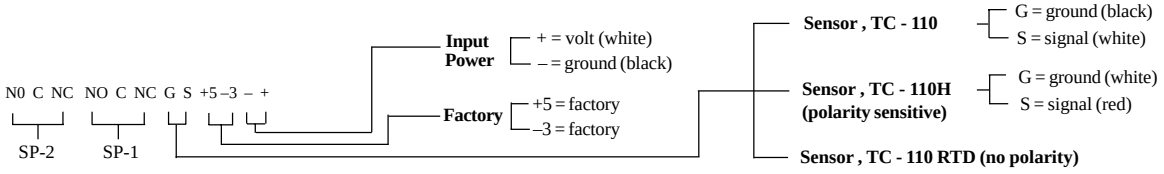
Power requirements: Available in 12 or 24 volt models - Specify AC (2VA) or DC (100 mA) voltage supply
Accuracy: ±1°F, ±1°C
Relay status indicator: Lighted while relay is activated
Relay(s) contact rating: SPDT relay, 4 Amp (24 VAC resistive).

Ambient temperature range: 20° to 158°F, – 6° to 70°C
Humidity: 90% non-condensing
Agency approvals: U.L. and C.U.L. recognized, NSF listed depending on model (consult factory)
Weight: 3.6 oz. (1.64kg)

Series	Temperature Range °F / °C	Accuracy	Sensor Type
110/111	–67° to 302°F / –55° to 150°C	±1°F/1°C	PTC, 0.25"OD x 1.75" nickel plated copper cap, 36" two conductor 24 AWG wire (included)
110H/111H	32° to 572°F / 0° to 300°C	± 2°F/1°C	PTC, 0.188"OD x 4" stainless steel cap, 36" two conductor 24 AWG wire (included)
110RTD/111RTD	–99° to 999°F / –72° to 538°C	± 2°F/1°C (over 300° span)	100 ohm platinum RTD (not included)

Dimensions & Wiring





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Programming Instructions

A. SETPOINT(S)
1. To start the programming sequence, press the SET button once. Unit displays "SP1" (setpoint 1).
2. Press the SET button again to display SP1 value.
3. To program an increase or decrease in SP1, press the appropriate ADJUST arrow.
4. Repeat steps 1 thru 3 for SP2 (setpoint 2, dual stage model only).
5. To complete the programming sequence, press the SET button until the screen goes blank. After five seconds, the unit will automatically display sensor temperature.

IMPORTANT: If the programming sequence is interrupted for more than 15 seconds or not completed to the blank screen stage, the unit will automatically revert to the temperature display mode WITHOUT acknowledging any new values (tamper resistant feature).

B. DIFFERENTIAL(S), HIGH/LOW SETPOINT LIMITS AND CALIBRATION – To program these parameters, press the "hidden" button located behind the "°F" or "°C" symbol (instead of the SET button), and repeat the programming procedure described in step A.

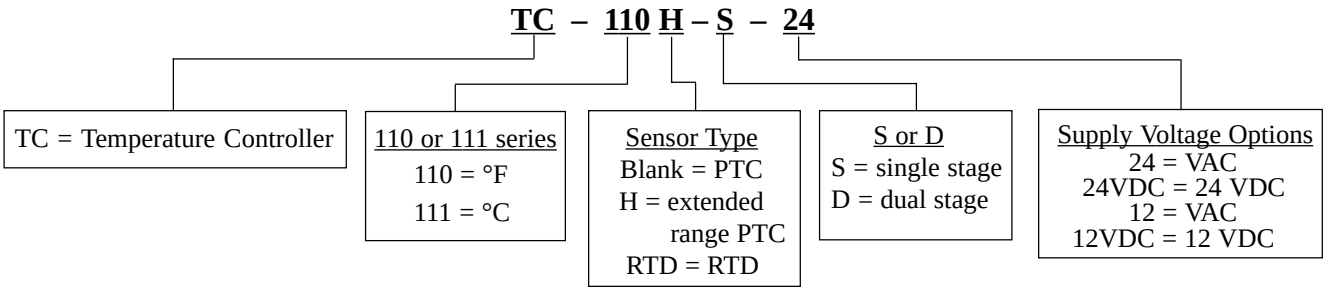
1. Differential "dIF" – setting a positive differential value will close the NO (normally open) relay(s) on temperature fall (heating applications) and open the relay(s) on temperature rise. A negative differential setting will close the NO relay(s) on temperature rise (cooling applications) and open the relay(s) on temperature fall. Differential is programmable from –30° to +30°. DO NOT SET DIFFERENTIAL AT "0".

2. High and Low Setpoint Limits "HI" and "LO" – allow you to limit the range in which the setpoints can be programmed. Also, by programming the high and low setpoint limit values to the same number, a tamper-resistant fixed setpoint is established.

3. Calibration "CAL" – Controller calibration can be programmed ±30 degrees. Unit is factory calibrated to a certified standard.

Ordering Information

Please use the following example when ordering:



Custom Design & Modifications

In addition to standard models, Control Products specializes in complete custom design of electronic controls. Modifications of our standard controls are also available. Please consult factory for more information.

Warranty

Control Products, Inc. warrants its products to be free from defects in material and workmanship under normal use for one year and is not responsible for consequential damages or installation costs of any nature. Exposure to contaminants and extreme environmental conditions such as moisture, temperature, chemicals, etc. may cause the unit to degrade or fail. Control Products accepts no liability for product applications or customer application testing.

CONTROL
PRODUCTS

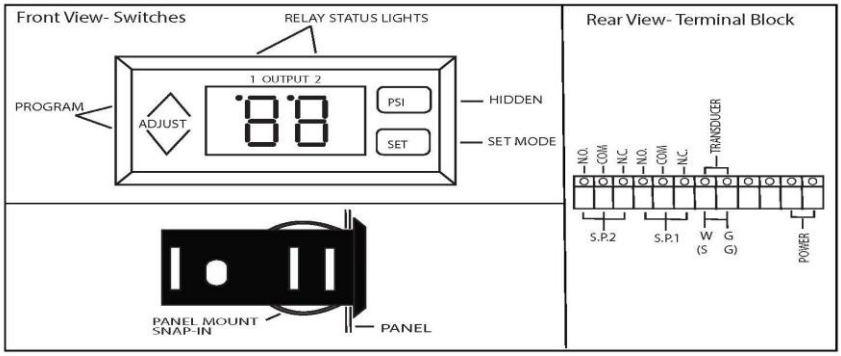
Features

- Membrane touch-pad programming
- 0.56" high red LED display
- Programmable set point(s) and differential(s)
- Panel mount enclosure
- Current Pressure Display
- LED relay status indicator
- Easy programming via LED display prompts
- Tamper resistant programmable setpoint limit
- PT Series transducer- various ranges (not included)

Specifications

Power requirements: 12 or 24 VAC, 12 or 24 VDC 2VA
Relay status indicator: Lit while relay is activated
Relay(s) contact rating: SPST relay, 10 amp (24 VAC resistive)
Ambient operating temperature range: 20º to 140º F, -6º to 60º C
Accuracy: ± 1º % of range
Connectors: Screw type terminal block for all connections
Case Dimensions: 2.95" wide x 1.325" high x2.2" deep
Bezel is 0.125" larger than cutout

Dimensions & Wiring



Programming Instructions

A. SET POINT(S) 1. To start the programming sequence, press the SET button once. Unit displays "SP1" (set point 1).
2. Press the SET button again to display SP1 Value.
3. To program an increase or decrease in SP1, press the appropriate ADJUST arrow.
4. Repeat steps 1 thru 3 for SP2 (setpoint 2, dual stage model only).
5. To complete the programming sequence, press the SET button until the screen goes blank. After five seconds, the unit will automatically display sensor temperature.

IMPORTANT: If the programming sequence is interrupted for more than 15 seconds or not completed to the blank screen stage, the unit will automatically revert to the temperature display mode WITHOUT acknowledging any new values (tamper resistant feature).

B. DIFFERENTIAL(S), HIGH/LOW SETPOINT LIMITS AND CALIBRATION – To program these parameters, press the "hidden" button located behind the "º F" symbol (instead of the SET button), and repeat the programming procedure described in step A.

1. Differential "dF1" - setting a positive differential value will close the NO (normally open) relay(s) on pressure fall (heating applications) and open the relay(s) on pressure rise. A negative differential setting will close the NO relay(s) on pressure rise (cooling applications) and open the relay(s) on pressure fall.

2. High and Low Setpoint Limits "HI" and "LO" – allow you to limit the range in which the setpoints can be programmed. Also, by programming the high and low setpoint limit values to the same number, a fixed setpoint is established.

3. Calibration "CAL" – Controller calibration can be programmed ± 30 PSI by using the "Hidden" switch and programming procedure described above.

WARRANTY - Control Products warrants its products to be free from defects in material and workmanship under normal use for one year and is not responsible for consequential damages or installation costs of any nature.

6/5/92