



# Model No. SCEBM-2      Support 877-351-4702

## DIGITAL SIGNAL CONDITIONER FOR COMBUSTION AIR BURNERS



### This manual covers the following product(s):

SCEBM-2      Signal Conditioner for ECM fan burner control

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## Overview

The Signal Conditioner EBM (SCEBM-2) is a digital signal conditioner for combustion air burners. The control has a simple five button interface with a four digit LED display. All programmable parameters can be accessed through the user menu with the five button interface. The SCEBM-2's temperature sensing operation ranges from 40°F (4°C) to 250°F (121°C). There is one temperature sensor input that connects to provide a discharge temperature, one relay output switch, and one 2-10V DC input. There is a modulating output that will power a 24V DC ECM. User parameters are stored in non-volatile memory and are retained even during a power outage. Also, the SCEBM-2 is powered by 24V AC.

## Normal Operation

The SCEBM-2 will always display the current sequence of operation, unless override is enabled or an alarm is active.

There are three different application modes that may be set for normal operation. First is VA-A, which is used for hot intermittent piloted burners. Second is VA-B, which is used for burners with an interrupted pilot. Third is NOX, which is used for low nox burners. There is a parameter access menu that may be shown by pressing the **RT▶** or **LT◀** keys.

By pressing the **UP▲** or **DN▼** key the user may change the discharge setpoint temperature. Once the key is pressed, the LED will display the text for the current setpoint temperature. Use the **UP▲** or **DN▼** key in order to set a new discharge temperature. Then press the **ENT** key to save the changes made. If a key is not pressed for 10 seconds, the SCEBM-2 will exit without saving. When adjusting the setpoint range, the setpoint cannot surpass the set Low (tLo) and High (thi) values. For instance, if the Low is set to 80°F and High is set to 150°F, the setpoint is adjustable between 80°F to 150°F.

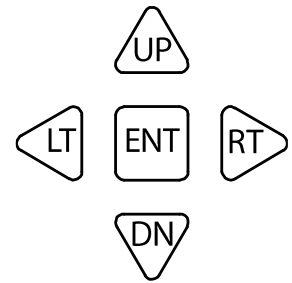


Figure 1: SCEBM-2 Keys

## Programming

Please refer to the "SCEBM-2 Menu Map" on Page 5 for programming in program mode. To enter program mode, hold the **ENT** key down for 3 seconds until "APP" is displayed. Use the **UP▲** and **DN▼** keys to navigate to the desired menu parameter as shown in column 1 on page 5. To edit a menu parameter, press the **RT▶** key once on the desired parameter. The current value of the parameter will be displayed in column 2. Use the **UP▲** and **DN▼** keys again to edit the parameters for column 2. Press the **ENT** key to save changes made or the **LT◀** key to cancel without saving and return to column 1. If a key is not pressed for 10 seconds or the **ENT** key is held for 3 seconds while in program mode, the control will return to normal mode.

## Features

Parameter Access Menu (PAM):

To enter the parameter access menu use the **RT▶** or **LT◀** keys while the control is running in normal operation with the sequence of operation displayed. The following chart shows the parameters within the menu and their value ranges. When accessing the menu with the **RT▶** key, then the value of the PWM will be shown first.

PAM		Range
PWM	→	0 -100%
RPM	→	0 -5000
Input Voltage	→	0.00 – 10.0V
Setpoint	→	-40°F to 250°F
Discharge Temperature	→	-40°F to 250°F

## Alarms:

Error messages on the SCEBM-2 will be scrolled across the display with a detailed message. This will allow users to realize the issue in order to resolve the error faster. The errors are as follows.

1. "dAS oPEn" – There is no Discharge Temperature Sensor connected to the SCEBM-2.
2. "Fan oFF" – The control is not receiving RPM feedback.

To resolve an issue check the wiring connections. Please refer to "Installation" on page 6 for proper terminal connections.

## Password:

When trying to access program mode, if the SCEBM-2 is password protected the display will show "PASS". Otherwise the display will show "APP", which is the start of program mode. If password protected, no menu settings may be altered until the correct password is entered. In order to enter the password press the **ENT** key while "PASS" is displayed and use the **UPA** and **DNV** keys to set the SCEBM-2 to the factory set password "21". Once on the number 21, press the **ENT** key again to access program mode. If the wrong password is entered then the SCEBM-2 will return to normal mode.

## Schematic Layout

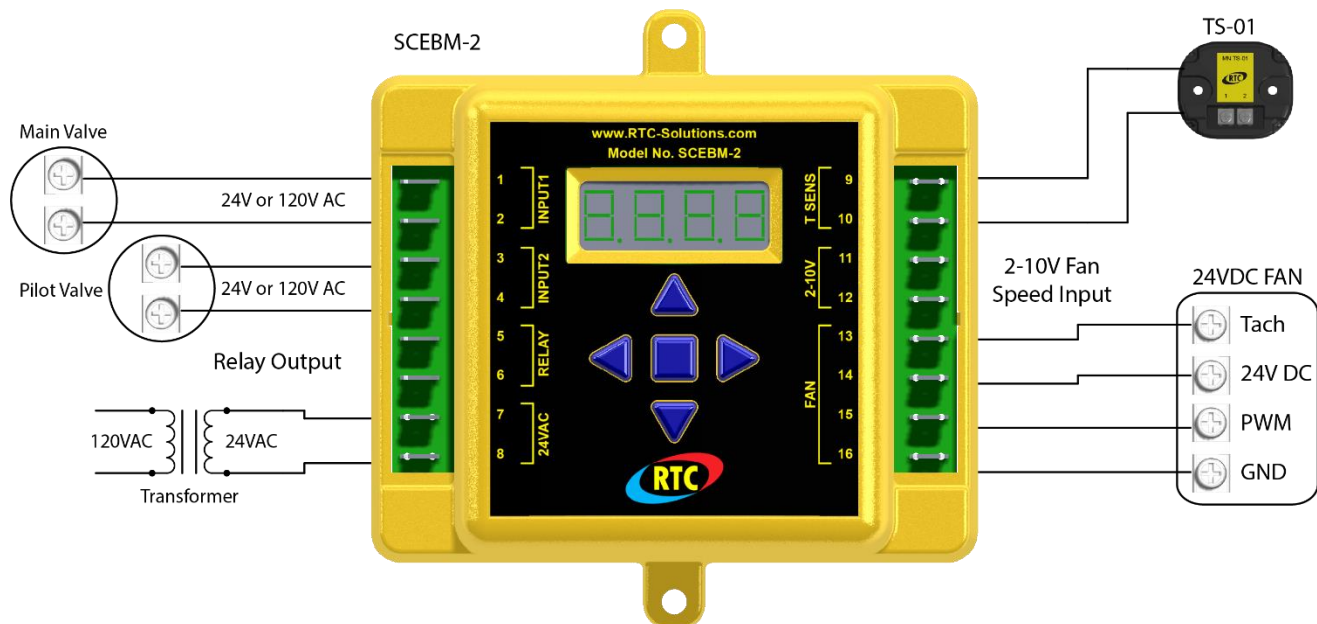


Figure 2: SCEBM-2 Schematic Layout

## Sequence of Operations

		Inputs							
Application		Pilot	Main	Tach		Display		Relay	PWM Output
VA-A		-	-	-		PRGE		Open	100%
		X	-	-		PIL		Close	Min
		X	X	-		RUN		Open	Modulate
		-	X	-		ERR		Open	Min

VA-B		-	-	-		PRGE		Open	100%
		X	-	-		PIL		Open	Min
		X	X	-		IGN		Open	Min
		-	X	-		RUN		Open	Modulate

NOX		-	-	>0		PRGE		Close	100%
		X	-	>0		SLOW		Close	Min
		X	X	>0		IGN		Close	Min
		-	X	>0		RUN		Close	Modulate
		Any		=0		AIR		Open	100%

PRGE	Purge fresh air in burner before ignition	IGN	
PIL	Detect power to the pilot valve for flame	SLOW	
RUN	Fan speed is modulating	AIR	Error. No airflow, Tach = 0
ERR	Error. Check valve connections		

## Menu Map

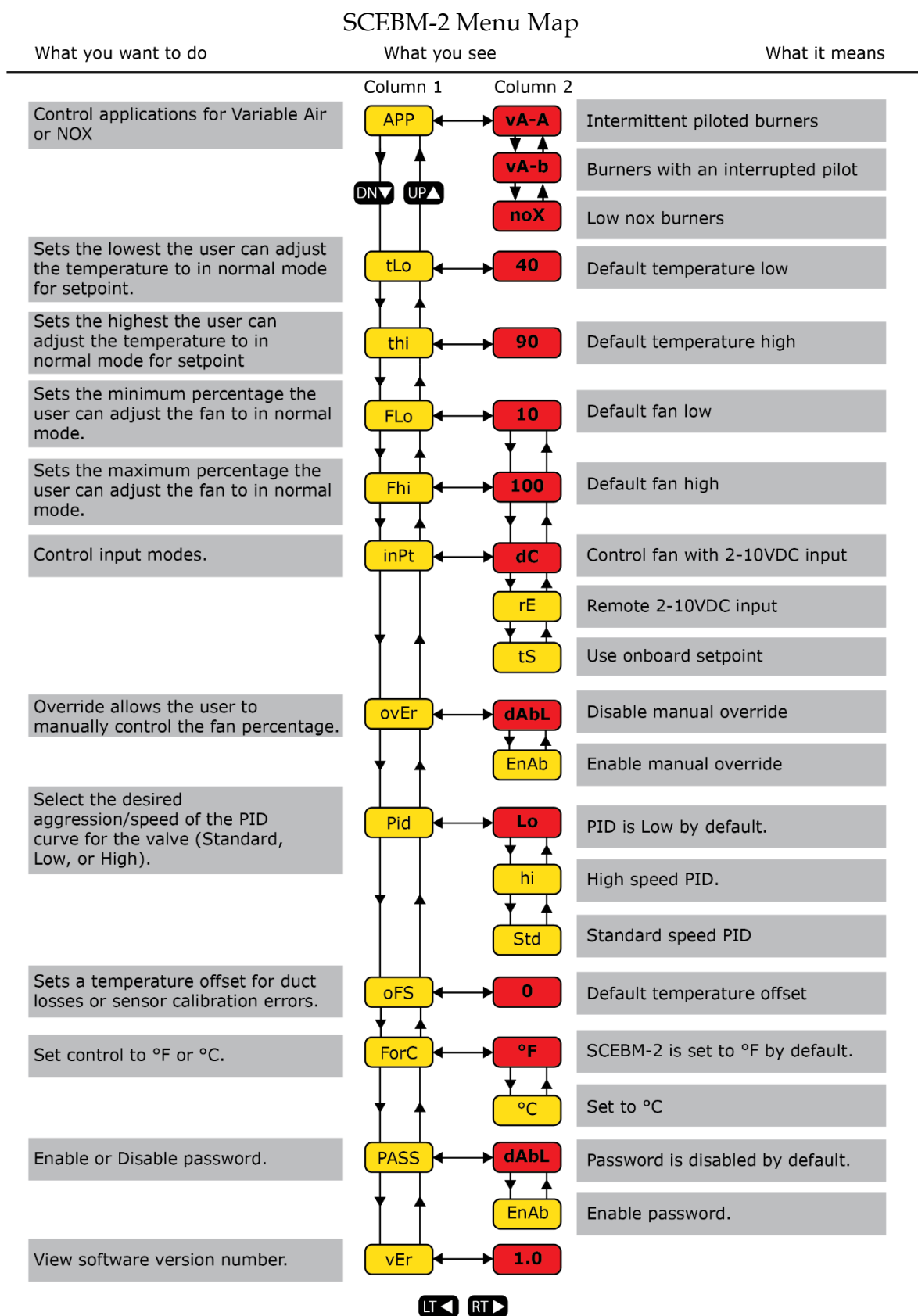


Figure 3: Menu Map

Installation

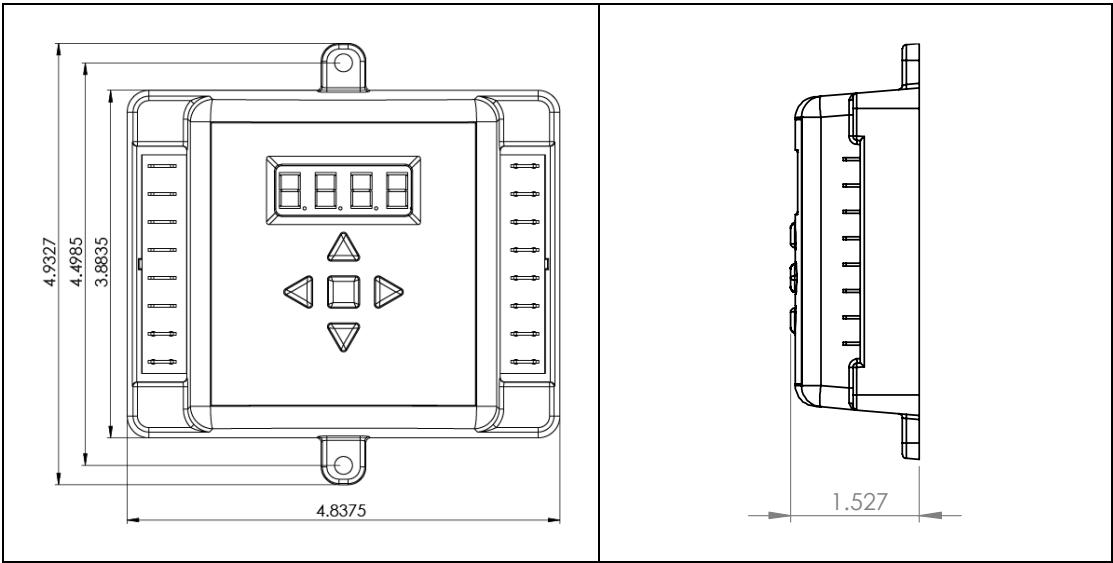


Figure 4: SCEBM-2 Front Panel

Figure 5: SCEBM-2 Side view

\*\*\* All dimensions are in inches \*\*\*

Wiring for the SCEBM-2 is convenient for the user with easy access to all terminal connections.

Figure 6: SCEBM-2  
Terminal Number Layout

1	ACIN 1 "MAIN"
2	ACIN 1 "MAIN"
3	ACIN 2 "PILOT"
4	ACIN 2 "PILOT"
5	RELAY "NO"
6	RELAY "C"
7	24V AC Hot
8	24V AC Neutral



9	TS-01
10	TS-01
11	0-10V Input(+)
12	0-10V Input(-)
13	Tach
14	24V DC
15	PWM
16	GND

Specifications

Power Requirements	24V AC
Current Rating 24V Output	1A
Ambient Temperature Limits Operating	-40°F-120°F (-40°C-49°C)
Accuracy	+/-3°F (1°C)