Model No. SCEBM-2



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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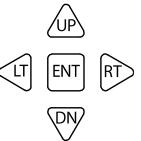
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Overview

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 representation.



By pressing the **DN** or **DN** key the user may change the discharge setpoint temperature.

Figure 1: SCEBM-2 Keys

Once the key is pressed, the LED will display the text for the current setpoint temperature. Use the Property or key in order to set a new discharge temperature. Then press the 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.

Programming

Please refer to the "SCEBM-2 Menu Map" on Page 5 for programming in program mode. To enter program mode, hold the ENI key down for 3 seconds until "APP" is displayed. Use the PA and New keys to navigate to the desired menu parameter as shown in column 1 on page 5. To edit a menu parameter, press the RID key once on the desired parameter. The current value of the parameter will be displayed in column 2. Use the PA and News again to edit the parameters for column 2. Press the RID key to save changes made or the RID key to cancel without saving and return to column 1. If a key is not pressed for 10 seconds or the RID 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 RTD or LTD 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 RTD key, then the value of the PWM will be shown first.

PAM		Range
PWM	\rightarrow	0 -100%
RPM	\rightarrow	0 -5000
Input Voltage	\rightarrow	0.00 - 10.0V
Setpoint	\rightarrow	-40°F to 250°F
Discharge Temperature	\rightarrow	-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 DNY keys to set the SCEBM-2 to the factory set password "21". Once on the number 21, press the key again to access program mode. If the wrong password is entered then the SCEBM-2 will return to normal mode.

Schematic Layout

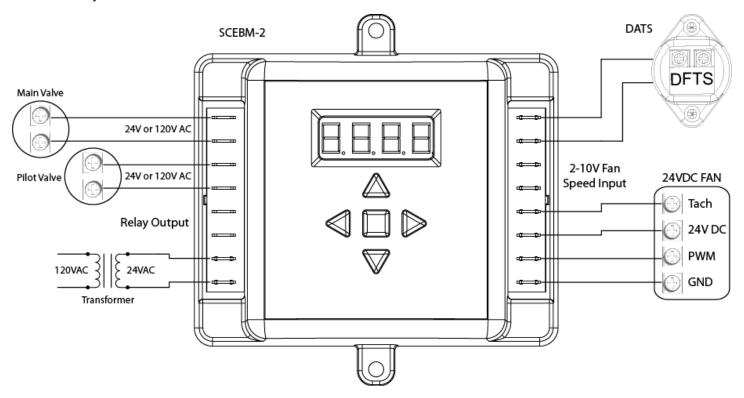


Figure 2: SCEBM-2 Schematic Layout

Sequence of Operations

	Inputs					
Application	Pilot	Main	Tach	Display	Relay	PWM Output
	-	-	-	PRGE	Open	100%
VA-A	X	-	-	PIL	Close	Min
	X	X	-	RUN	Open	Modulate
	-	Х	-	ERR	Open	Min
	-	-	-	PRGE	Open	100%
VA-B	X	-	-	PIL	Open	Min
	X	X	-	IGN	Open	Min
	-	X	-	RUN	Open	Modulate
	-	-	>0	PRGE	Close	100%
	X	-	>0	SLOW	Close	Min
NOX	X	X	>0	IGN	Close	Min
	-	X	>0	RUN	Close	Modulate
	A	ny	=0	AIR	Open	100%
PRGE Purge fresh air in burner before ignition			n IGN			
	ower to the		ve for flam	ie SLOW		
RUN Fan spee	d is modula	iting		AIR E	Error. No airflow,	Tach = 0
ERR Error. Cl	neck valve c	onnectio	ons			

SCEBM-2 Menu Map

What you see

What it means

Control applications for Variable Air or NOX

Set the lowest the user can adjust the temperature to in normal mode for setpoint.

Set the highest the user can adjust the temperature to in normal mode for setpoint.

Set the minimum percentage the user can adjust the Fan to in normal mode

Set the maximum percentage the user can adjust the Fan to in normal mode

Control input modes

Override allows the user to manually control the Fan percentage

Select the desired aggression/speed of the PID curve for the valve (Standard, Low, or High).

Set a temperature offset. For examples, to correct for duct losses or sensor calibration errors.

Set the control to convert the temperature to display either °F or °C.

The password may either be enabled or disabled.

View the software version number.

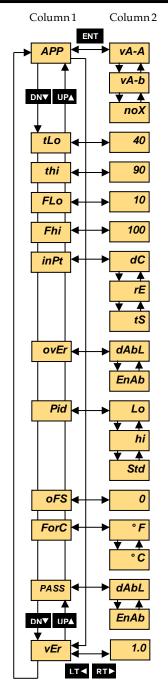


Figure 3: Menu Map

Column 1 shows the menu parameters

Column 2 shows the factory set defaults for each parameter. Temperature defaults are shown in °F.

Arrow Keys:



Up and Down: to navigate or adjust a menu parameter Right: to access column 2 for editing a parameter Left: to return to column 1 without saving a parameter Enter: to return to column 1 with saving a parameter

Low (tLo) can be set from $40^{\circ}F$ - $240^{\circ}F$ and must be at least $10^{\circ}F$ less than the High. High (thi) can set be from $50^{\circ}F$ - $250^{\circ}F$ and must be at least $10^{\circ}F$ greater than the Low. These will limit how far the user can change the temperature outside of programming mode.

Setpoint may be adjusted on the main screen with the up and down arrows, then pressing enter to save the selected setpoint.

Applications (APP):

VA-A is the intermittent piloted burners VA-B is burners with an interrupted pilot NOX is for low nox burners

Input (inPt) modes:

dC: Allows the user to directly control the fan speed with a 2-10V input

rE: Allows the user to use an external remote 2-10V input

ts. Allows the user to use the built-in onboard setpoint and ignores the 2-10V input

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Installation

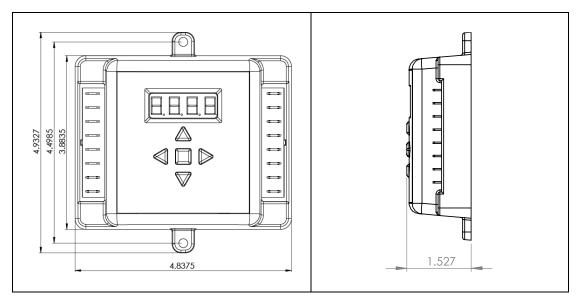


Figure 4: SCEBM-2 Front Panel

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.

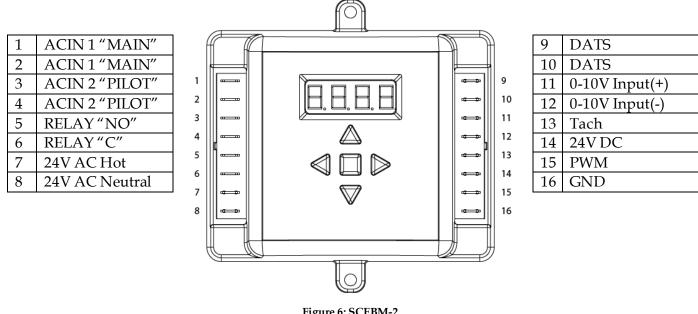


Figure 6: SCEBM-2 Terminal Number Layout

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)

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