Microset™ II Installation & Operating Instructions

Regulatory Compliance

Safety

This device has been tested and found to be in compliance with the requirements set forth in UL 916, Energy Management Equipment, and is listed by Underwriters Laboratories, Inc., for installations in the United States.

This device has been tested and found to be in compliance with the requirements set forth in C22.2, No. 205-M1983, Signal Equipment, and is Certified by Underwriters Laboratories, Inc., for installations in Canada.

Electromagnetic Compatibility (EMC)

Federal Communications Commission (FCC)

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) This device must accept any interference received, including interference that may cause undesired operation.

NOTE! This device has been tested and found to comply with the limits established for Class A digital devices. It is intended to be used in a commercial environment. Operation of this equipment in residential environments may cause harmful interference, in which case the user may be required to correct the interference at his own expense.

CAUTION! Any changes or modifications not expressly approved by Novar Controls Corporation could void your authority to operate this equipment.

Industry Canada

This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus set out in the interference-causing equipment standard entitled *Digital Apparatus*, ICES-003, of Industry Canada.

Cet appareil numérique respecte les limites de bruits radioélectriques applicables aux appareils numériques de Classe A préscrites dans la norme sur le matériel brouiller: *Appareils Numériques*, NMB-003, édictée par l'Industrie Canada.

Disclaimer

Microset™ is a trademark of Novar Controls Corporation.

The material in this manual is for information purposes only. The contents and the product it describes are subject to change without notice. Novar Controls Corporation makes no representations or warranties with respect to this manual.

In no event shall Novar Controls Corporation be liable for technical or editorial omissions or mistakes in this manual, nor shall it be liable for any damages, direct or incidental, arising out of or related to the use of this manual.

Description

Novar Controls' Microset™ II sensor is an intelligent and attractive wall unit that updates the functions of the typical wall sensor. It connects to Novar Controls' Variable Air Volume (VAV-4040) control module and serves as an occupant control center and field service tool. Sleek styling, a backlit liquid crystal display (LCD) and simple push-button controls make operation intuitive. The LCD simultaneously displays:

- Setpoint temperature (in degrees Fahrenheit) or scheduled off mode
- Room and outside air temperatures
- Mode of operation (Heating or Cooling)
- System relative humidity (optional)
- Terminal box fan status

Buttons on the front of the sensor are used to adjust the setpoint within user-specified limits (from 1 to 9 degrees, configurable in ESS32) or to activate an override.

The sensor also features field service and balancing capabilities that can be activated when the user presses the buttons on the front of the unit in specific sequences. The field service feature enables maintenance personnel to view and adjust control parameters in the field quickly and easily. The balance mode allows field technicians to calibrate the airflow, setting high and low limits while in the zone.

This document explains how to install, activate, and operate the Microset II.

Specifications

Agency Approvals

Listed device:	CUL/UL E13887
Standards used:	UL 916, Energy Management Equipment
	CSA C22.2, No. 205-M1983, Signal Equipment and
	CSA C22.2, No. 14-M1987

Power Requirements

Voltage and	Backlit Display: 24-VAC at 25 mA
Consumption:	Sensor: 5-VDC at 10 mA

Operating Environment

Temperature:	32 –158°F (0 –70°C)
Humidity:	0–90% Relative Humidity, non-condensing

Physical Dimensions

Height:	4.6 inches
Width:	3 inches
Depth:	0.7 inches

Thermistor Sensor

The thermistor is integrated with the device. The unit is a microprocessor-based sensor with a built-in analog-to-digital converter for temperature and humidity, which is designed to communicate directly to the VAV-4040.

Type:	Uni-curve Type II
Resistance:	10K at 77°F (22°C)
Interchangeability:	0.36°F (0.2°C)
Time Constant:	10 seconds (to 66% of new temperature)
Stability*:	0.036°F (0.02°C) drift per year
Accuracy*:	±0.36°F (0.2°C) over range of 32–158°F (0–70°C)

*Based on normal operating conditions.

Precautions

Observe all national and local electric codes during installation.

Activating Microset II in ESS32

The following procedure can be used to activate the Microset II in ESS32.

Step	Procedure
1	Access ESS32 and navigate to the Control Settings Menu screen for the VAV-4040 load.
2	Select the **General Parameters** option and press **enter** to display the load's general parameters.
3	Press **Tab** to display the Microset II setup option.
4	Select **21** (Microset II) and press **enter**.
5	Select **Active** (or **Inactive**, if appropriate), and press **enter**. ■ If the operator selects **Active**, Backlight options will appear. The operator can select: — **Continuous** (the backlight is always on) — **Auto** (the backlight lights only when a button is pressed and remains on for 20 seconds after button activity ceases)
6	Press **enter** repeatedly to back out of ESS32.

Once sensor operation has been activated, the sensor will use the parameters that have been programmed into ESS32 for the VAV-4040 load.

Mounting the Microset II

The Microset II is designed to be wall-mounted indoors. The mounting location should be clean, dry, and away from windows, air ducts, or other sites where environmental conditions could affect temperature readings. If the sensor is mounted on the interior of an outside wall, the wall must be thoroughly insulated so the outside air behind the sensor will not affect the sensor's readings.

The Microset II ships with the backplate on backwards to make it easier to remove the backplate during installation. The following procedure can be used to mount the sensor. Figure 1 shows the mounting dimensions for the sensor's backplate. Figure 2 shows the correct mounting procedure. Refer to Figures 1 and 2, as necessary, when mounting the sensor.

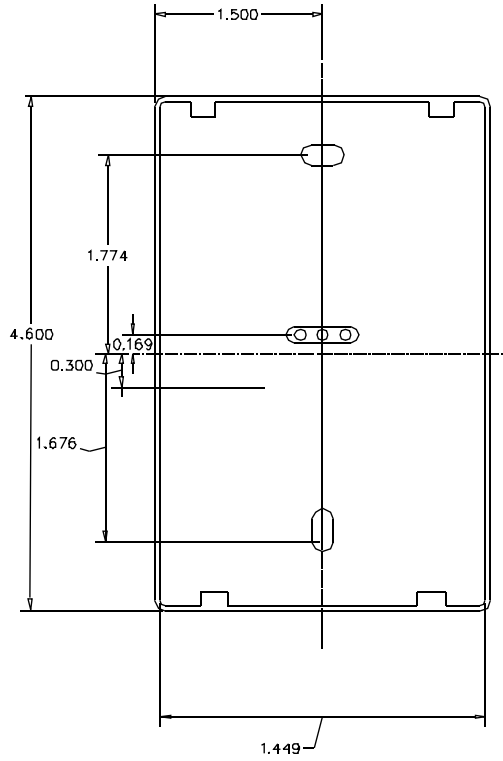| Step	Procedure
1	Remove the backplate and the wiring pigtail from the sensor.
2	Position the backplate's smooth surface against the mounting surface and mark the surface to show the location of the mounting screw holes.
3	Drill holes in the locations marked.
4	Thread the wires through the center knockout on the backplate, from front to back (smooth side).
5	Use wire nuts or other connectors to splice the Microset II wires to the wires from the VAV-4040.
6	Place the backplate against the mounting surface, adjusting the wiring as necessary, and insert and tighten the two mounting screws (supplied) to secure the backplate. **CAUTION:** Do not crimp or kink the pigtail wires.
7	Hold the sensor at an angle above the backplate and slide it down. ■ The two tabs on the inside top edge of the sensor should slide into the tab slots on the backplate.
8	Push the bottom of the sensor against the backplate until the legs on the backplate snap securely over the tab stops on the inside bottom edge of the sensor.

Figure 1. Microset II mounting dimensions (in inches)

Microset II

Microset II tabs slide down into backplate slots.

Microset II backplate secured to the mounting surface.

To VAV-4040 wiring:

Black to Terminal 15 (Override Input).
White to Terminal 14 (Common).
Orange to Terminal 3, 6, or 8 (24-VAC).

Splice Microset II pigtail to VAV-4040 wiring.
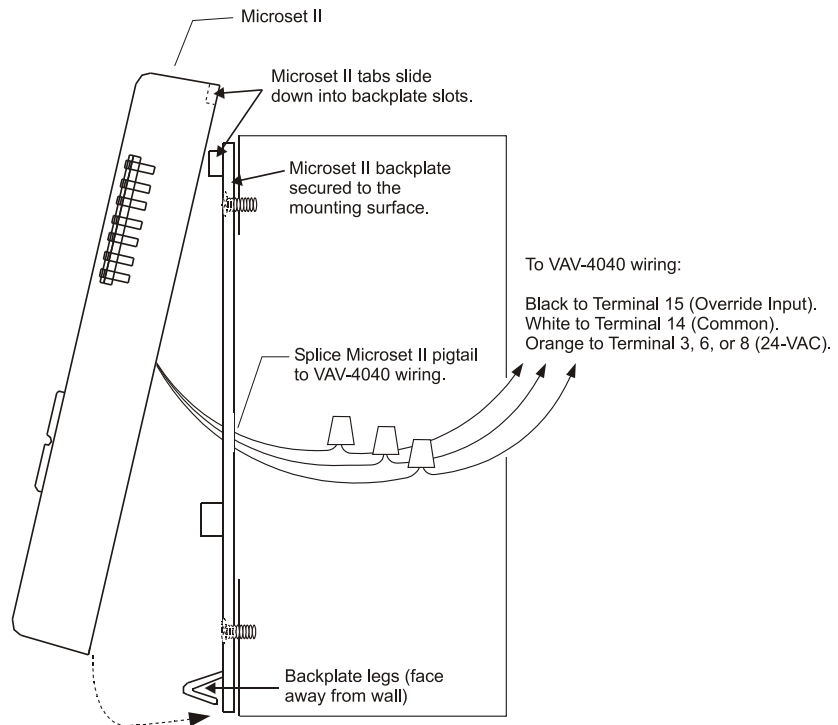
Backplate legs (face away from wall)

Figure 2. Mounting the Microset II

Removing the Microset II from the Backplate

Once mounted, if the Microset II needs to be removed from its backplate, the following procedure can be used. Refer to Figure 3, as necessary.

| Step	Procedure
1	Insert the tip of a small, flat-tipped screwdriver into the last vent slot on the bottom of the sensor.
2	Apply pressure to the backplate leg until it clears the tab stop on the inside of the sensor.
3	Pull the freed corner of the sensor gently away from the wall.
4	Repeat Steps 1–3 on the opposite side of the sensor.
5	Push upward on the bottom of the sensor until it is free from the backplate.
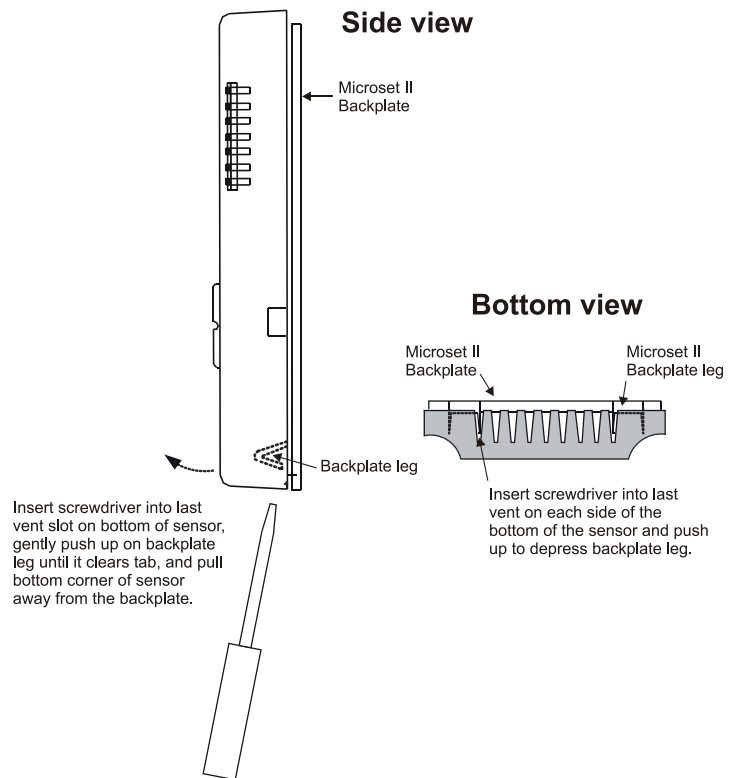
Figure 3. Removing the Microset II from its backplate

Wiring the Module

An 18–22 AWG, shielded, three-conductor cable (1,000 feet maximum length, resistance: <12) should be used to connect the Microset II to the VAV-4040 as indicated in the following table.

MICROSET II WIRE COLOR	VAV-4040 TERMINAL CONNECTION
Orange	Terminals 3, 6, or 8 (pick any one), 24-VAC The orange lead powers the backlight display. It can be left unconnected, but the backlight will not be available. **NOTE!** Do not connect the lead to a 24-VAC source that does not have common ground with the VAV-4040.
Black	Terminal 15 (Override input)
White	Terminal 14 (Common)
Shield	Terminal 10 (Ground)

NOTE! Do not run the Microset II cable in the same conduit or alongside building power cables. This can cause interference. If power cables must be crossed, cross at 90°.

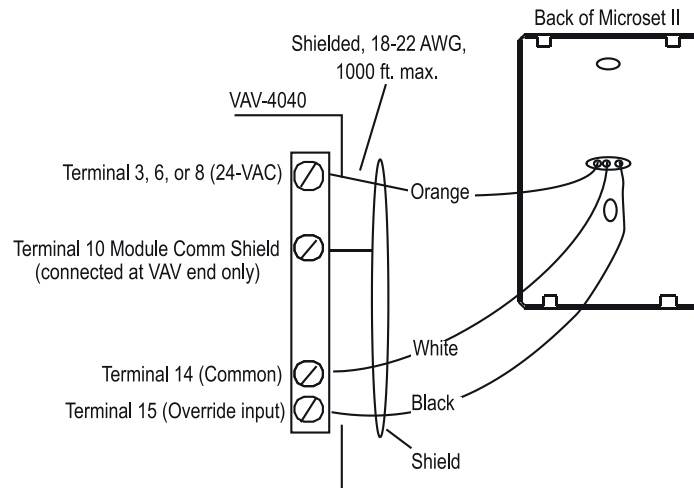Figure 4 shows the proper wiring connections.

Figure 4. Wiring connections for the Microset II and VAV-4040

Operating the Microset II

The liquid crystal display (LCD) (Figure 5) and two sets of up/down buttons (Figure 6) are located on the front of the Microset II.

The LCD displays the setpoint and the inside and outside air temperature. If a system relative humidity (RH) sensor is defined (i.e., set up in the executive module), the percent relative humidity is displayed alternately with the outside air temperature. If the VAV-4040 is in scheduled off mode, the word "Off" appears in place of the setpoint.
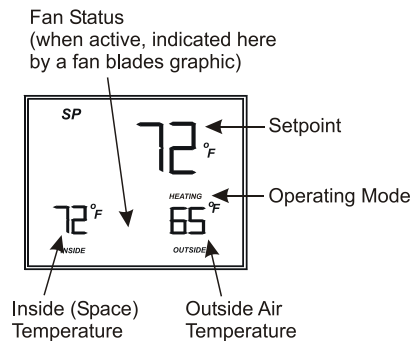

Figure 5. Microset II liquid crystal display (LCD)

If the VAV-4040 is communicating with an executive module, the only temperature setting available is the setpoint. The occupied mode setpoint is displayed on the LCD screen.

■ The right up/down buttons on the sensor can be used to implement a timed override if the VAV-4040 is in scheduled off mode (the operator presses the up button) or to cancel an override (the operator presses the down button).

■ The left up/down buttons can be used to adjust the setpoint 1 to 9 degrees, depending on how the adjustment has been configured in ESS32.

In scheduled off mode, the left up/down buttons will have no effect.

If the VAV-4040 is operating in stand-alone mode, it switches to occupied mode. The occupied mode (scheduled on) setpoint is displayed on the LCD.

■ The right down button can be used to switch to unoccupied mode. In this mode, "off" will be displayed instead of the setpoint. The right up button can be used to switch back to occupied mode.

■ The left up/down buttons can be used to adjust the setpoint in occupied mode.

Both buttons are used to put the sensor in field service mode or balance mode. Both modes are explained below.
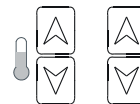

Figure 6. Microset II operating buttons

Field Service Mode

The field service mode enables an operator or a service technician to use the Microset II to view and adjust control parameters in the field quickly and easily. The following procedure can be used to enter the field service mode.

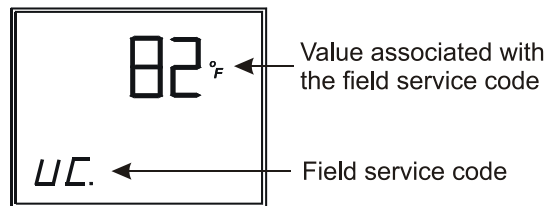| Step	Procedure
1	Press and release the left and right **up** buttons simultaneously.
2	Repeat Step 1.
3	Press the right **up** button
4	Use the left up/down buttons to set the lower right display item to the number "7."
5	Press the right **up** button to make the sensor display the first field service code and its associated value (Figure 7).

Figure 7.   LCD in field service mode

Once in the field service mode, the operator/technician can use the left buttons to scroll through the codes and the right buttons to change the values associated with the codes. The value range in field service mode is –3276 to 3276. When a value is less than –999.9, the decimal point is automatically dropped.

NOTE!   Once a value has been changed, the operator must press the left up/down button to make the system accept the change.

Table 1 lists the codes and their meanings.

Table 1. Microset II Field Service Mode Codes		
CODE	**ADJUSTABLE?**	**MEANING**
UC	No	Unoccupied cooling setpoint
UH	No	Unoccupied heating setpoint
CO	In stand-alone	Cooling offset—indicates how far above the displayed setpoint the cooling setpoint is
HO	In stand-alone	Heating offset—indicates how far below the displayed setpoint the heating setpoint is
CS	No	Occupied cooling setpoint
HS	No	Occupied heating setpoint
HI	No	This indicates how high the displayed setpoint can be set with the adjustment buttons
LO	No	This indicates how low the displayed setpoint can be set with the adjustment buttons
SP	Yes, in any mode	Displayed space temperature setpoint
CF	No	Current cubic feet/minute (cfm) reading
CU	In stand-alone	Cool maximum cfm setpoint
CL	In stand-alone	Cool minimum cfm setpoint
HU	In stand-alone	Heat maximum cfm setpoint
HL	In stand-alone	Heat minimum cfm setpoint
hS	In stand-alone	VVT switchover setpoint (based on supply air temperature)
AL	No	Not supported
SC	No	Not supported
SH	No	Not supported
HF	No	Not supported

To exit field service mode, the operator should press either the left and right up buttons or the left and right down buttons simultaneously. Field service mode ends automatically if there is no button activity for 40 minutes.

Balance Mode

Balance mode can be used to calibrate airflow and set high and low airflow limits while in the zone.

The following procedure can be used to activate the balance mode.

Step	Procedure
1	Press and release the left and right **down** buttons simultaneously.
2	Repeat Step 1.
3	Press the right **up** button.
4	Use the left up/down buttons to set the lower right display item to the number "96."
5	Press the right **up** button.

Once in the balance mode, the operator/technician can use the left buttons to scroll through the codes and the right buttons to change the values associated with the codes.

NOTE! Once a value has been changed, the operator must press the left up/down button to make the system accept the change.

Table 2 lists the codes and their meanings.

Table 2. Microset II Balance Mode Codes		
CODE	**ADJUSTABLE?**	**MEANING**
HI	No	High limit—indicates how high the displayed setpoint can be set with the adjustment buttons.
LO	No	Low limit—indicates how low the setpoint can be set with the adjustment buttons.
SP	Yes, in any mode	Displayed space temperature setpoint
CF	Yes, in any mode	Current cfm reading If this is not accurate, the arrow keys can be used to change it to the correct cfm value. This will recalibrate the cfm readings for the VAV-4040 module.
CU	In stand-alone	Cool maximum cfm setpoint
CL	In stand-alone	Cool minimum cfm setpoint
HU	In stand-alone	Heat maximum cfm setpoint
		continued

HL	In stand-alone	Heat minimum cfm setpoint
hS	In stand-alone	VVT switchover setpoint (based on supply air temperature)
SC	No	Not supported
SH	No	Not supported
HF	No	Not supported

To exit balance mode, the operator should press either the left and right up buttons or the left and right down buttons simultaneously. Balance mode ends automatically if there is no button activity for 40 minutes.

Model and Part Numbers

The part numbers provided in Table 3 should be used to order the necessary Novar Controls parts.

Table 3. Novar Controls Part Numbers		
PRODUCT	MODEL NO.	PART NO.
Variable Air Volume Controller	VAV-4040	732080000
Carbon Dioxide (CO_2) Sensor (Analog)	CO2S	770071000
Transformer	24V-XFR	730090000
Microset II Sensor	MS2	732090000

This page intentionally left blank.