DUCT SMART SENSOR (DSS)

CO2, TVOC, TEMP & RH (24V AC/DC)

| OVERVIEW |

The new Duct mounted Smart Sensor from Flamefast Controls is one of the most versatile sensors available, with unrivalled levels of flexibility and a wide range of network writable inputs and outputs, effectively doubling up as a controller.

With the ability to accurately monitor Carbon Dioxide (CO2), Total Volatile Organic Compounds (TVOC), Temperature and Relative Humidity, you can monitoring multiple parameters discretely in return air ducts, without the need for multiple devices.

BACnet and Modbus are provided as standard, as are two 0-10V inputs to allow monitoring of external devices with an analogue output. With the optional I/O module, the Smart Sensor can also provide 3x 0-10V outputs, 1x Digital Input and 1x Relay Output, all of which are network writable, so can be driven remotely to control a wide range of HVAC systems

| KEY FEATURES |

- BACnet and Modbus as standard
- 24V AC/DC Power Supply
- Pluggable terminal block, with two 24V and 0V connections for ease of termination
- Multi-parameter device
- 2x Analogue Inputs for monitoring external devices
- Optional I/O Module with 3x AO, 1x DI, 1x DO (network writable)
- 180mm Duct Probe
- Typical 10+ year life expectancy
- **UK MANUFACTURED**

DIMENSIONS

Height 158mm | Width 112mm | Depth 58mm | Probe Length 180mm

TECHNICAL SPECIFICATION

Power Supply	24V AC/DC ±10%	
Power Consumption	100mA Max	
BACnet	MS/TP over RS485 (1/10th Load) Baud: 9k6, 19k2, 38k4 or 76k8 127 Addresses (508 Unit IDs with P1/P2)	
Modbus	RTU over RS485 (1/10th Load) Baud: 9k6, 19k2 or 38k4 Parity Odd/Even, 1 or 2 Stop Bits 255 Address	
Analogue Outputs	3x 0-10V (on I/O Module)	
Analogue Inputs	2x 0-10V (2nd uses AO-3)	
Binary Input	1x 24V Input (on I/O Module)	
VFC Output	SPST - 100mA @ 24V Max (on I/O Module)	
CO2 Range	0 ~ 10,000ppm	
CO2 Output Scaling	0 ~ 2,000ppm	
CO2 Accuracy	±40 ppm +3% @ NTP	
CO2 Display Resolution	1ppm	
CO2 Sensing Method	Non Dispersive Infra-red (NDIR)	
CO2 Typical Sensor Life	10+ Year	
TVOC Range	0 ~ 2,000µg/m3	
TVOC Output Scaling	0 ~ 2,000µg/m3	
TVOC Accuracy	±5% @ NTP	
TVOC Display Resolution	1µg/m3	
TVOC Sensing Method	Metal-oxide (MOx)	
TVOC Typical Sensor Life	10+ Year	
Temp Range	0 ~ 50°C	
Temp Accuracy	±0.3°C @ 25°C	
Temp Display Resolution	0.1°C	
RH Range	0 ~ 100%	
RH Accuracy	±2% @ 20 ~ 80%	
RH Display Resolution	0.1%	
Operating Conditions	Temp	0 ~ 50°C
	Humidity	0 ~ 95% (NC)
Sampling Method	Diffusion	
IP Rating	IP66 (external to duct)	
Housing Material	PC/ABS	
Colour	Grey/Black/Clear	
Approvals	CE, UKCA	

PART NUMBERS & COMMON ACCESSORIES

PART NO	DESCRIPTION
DSS-TH	Smart Sensor - Temp & RH
DSS-CO2TH	Smart Sensor - CO2, Temp & RH
DSS-AQTH	Smart Sensor - TVOC, Temp & RH
DSS-CO2AQTH	Smart Sensor - CO2, TVOC, Temp & RH
- I	Smart Sensor I/O Module - 3xAO, 1xDI, 1xD

FLAMEFAST CONTROLS

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INSTALLATION & OPERATION
SMART SENSOR

TECHNICAL SPECIFICATION

Power Supply	24V AC/DC ±10%
Power Consumption	100mA Max
BACnet	MS/TP over RS485 (1/10th Load)
	Baud: 9600, 19200, 38600 or 76800
	127 Address
Modbus	RTU over RS485 (1/10th Load)
	Baud: 9600, 19200 or 38400
	Parity Odd/Even, 1 or 2 Stop Bits
	255 Address
Analogue Outputs	3x 0-10V
Analogue Inputs	2x 0-10V (2nd uses AO-3)
Binary Input	1x 24V Input
VFC Output	SPST – 100mA @ 24V Max
CO2 Range	0 ~ 10,000ppm
CO2 Output Scaling	0 ~ 2,000ppm
CO2 Accuracy	±40 ppm +3% @ NTP
CO2 Display Resolution	1ppm
CO2 Sensing Method	Non Dispersive Infra-red (NDIR)
CO2 Typical Sensor Life	10+ Year
TVOC Range	0 ~ 2,000µg/m³
TVOC Output Scaling	0 ~ 2,000µg/m³
TVOC Accuracy	±5% @ NTP
TVOC Display Resolution	1µg/m³
TVOC Sensing Method	Metal-oxide (MOx)
TVOC Typical Sensor Life	10+ Year
Temp Range	0 ~ 50°C
Temp Accuracy	±0.3°C @ 25°C
Temp Display Resolution	0.1°C
RH Range	0 ~ 100%
RH Accuracy	±2% @ 20 ~ 80%
RH Display Resolution	0.1%
Operating Conditions	Temp: 0 ~ 50°C, Humidity: 0 ~ 95% (NC)
Sampling Method	Diffusion
Warm-up Time	5 Seconds
Colour	Wall - Pure White (RAL9010)
	Duct – Black/Clear
Approvals	CE, UKCA

IMPORTANT – Please read carefully:

1. This product must be installed by a competent/qualified person in accordance with all relevant regulations and legislations.
2. This product must be mounted flush to the wall (or similar) using secure fixings to prevent access to the rear.
3. The sensors must be continuously powered for auto-calibration purposes.
4. The use of solvents, cleaning fluids or fine dusts near to the unit can damage the sensing elements.
5. If there is any question over the application, please contact to discuss.
6. If this equipment is used in a manner not specified by the manufacturer, protection provided may be impaired.
7. This product is designed for indoor use with standard atmospheric conditions.

MOUNTING LOCATION

Application specific mounting positions should be considered, however the below guidance will be suitable for most installations.

Typical Mounting Heights:

Application	Mounting Height
General Areas	1500mm Above Finished Floor Level
Science Classrooms	1500mm Above Finished Floor Level
Food Tech Rooms	2500mm Above Finished Floor Level (not within 100mm of ceiling)
Kitchens	2500mm Above Finished Floor Level (not within 100mm of ceiling)

Important Notes:

- Do not install in high velocity air streams (near an air Inlet/Outlet).
- Do not install next to doors or opening windows.
- Do not install in direct sunlight.

INSTALLATION

All installation details shown on the wiring diagram should be followed carefully, failure to do so could result in irreparable damage to the unit.

Screened cable should be used at all times. Any voltage induction can result in corruption of the RS485 driver or irreparable damage to the sensor.

The connection details for the Wall and Duct mount units are the same, the only difference is the mounting.

Wall Mount Enclosure

The wall mount enclosure is designed to fit on a standard single gas junction box or conduit box. Please take care when tightening fixing screws as overtightening can distort the plastic.

To open/close:

1. Remove securing screw from the bottom of the enclosure.
2. Insert a flat screwdriver into the slot behind the screw and apply pressure until the bottom of the enclosure releases.
3. Pull the front of the enclosure outward from the bottom then up to release hooks securing the top.
4. When closing, hook the clips into place, then push the bottom until the securing clip fully engages.

Duct Mount Enclosure

The duct mount enclosure is IP66 external to the duct and although a foam gasket is provided, additional sealant may be required to maintain the integrity of the duct (the use of solvent based sealant may damage the sensing elements).

To open/close:

1. Remove securing screw from the lid of the enclosure.
2. Press on both securing clips simultaneously to release then simply open using the hinge mechanism.

OPERATION

On power up, the LCD will cycle through Green, Yellow, Amber, Red then White with all segments lit to prove the correct operation of the display. During this warm-up, the volt free contact will be in the default position for the selected programme and the analogue outputs will provide 6V.

Once the warm-up is complete, the LCD will display the levels for any connected sensors, provide a traffic light indication based on live CO2/TVOC level, the relay output will change to the correct position for the programme and the voltage outputs will reflect relevant levels.

If no CO2 sensor is present, the relay will be in an alarm state.

MAINTENANCE

Due to the CO2 Automatic Background Calibration (ABC) algorithm, the sensor is effectively maintenance free. Some applications may require this to be disabled – please contact Flamefast for further details. To allow calibration to take place, the sensor must be exposed to atmospheric levels (400ppm) for at least two hours every 8 days.

If the sensor is installed as part of a Gas Safety system, the sensor should be 'bump' tested by applying a CO2 test gas, although the same result can be achieved by breathing on the sensor.

TEMPERATURE & RELATIVE HUMIDITY

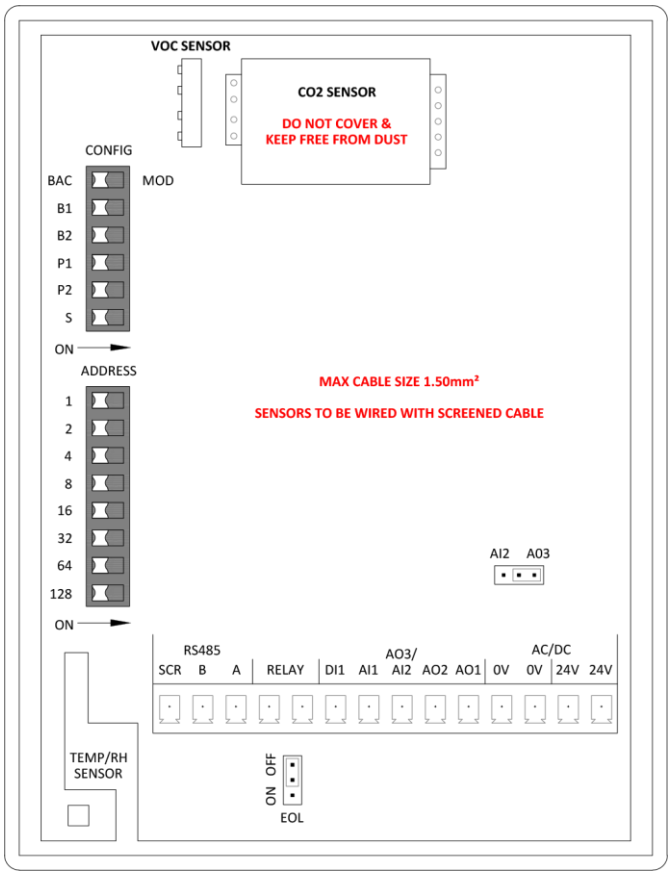
WARNING – whist the unit is able to operate on 24V +10%, anything over 24V may adversely affect the temperature and relative humidity readings due to the additional heat generated by the voltage regulators.

This can be compensated for using AV-3 and AV-4. It is suggested to compensate at the target ambient levels.

TROUBLESHOOTING

If you are having any issues, please contact Flamefast to discuss.

CONNECTION DETAILS
SMART SENSOR



ADDRESS & RS485 CONFIGURATION

Label	Configuration	Setting
1 2 4 8 16 32 64 128	MAC Address Sum of 1, 2, 4, 8, 16, 32 & 64 Example 1 + 4 ON Example 4 + 16 ON Example 32 + 64 ON	BACnet Max = 127 Modbus Max = 255 Address = 5 Address = 20 Address = 96

Label	Configuration	BACnet	Modbus
BAC/ Mod	OFF ON	BACnet Modbus	
B1 B2	B1 OFF / B2 OFF B1 OFF / B2 ON B1 ON / B2 OFF B1 ON / B2 ON	9600 19200 38400 76800	9600 19200 38400 -

Modbus	Configuration	Baud Rate, Stop Bits & Parity
P1	OFF ON	No Parity, 2 Stop Bits Parity, 1 Stop Bit
P2	OFF ON	Odd Parity Even Parity

BACnet	Configuration	Prefix for additional unique Object Identifiers
P1 P2	P1 OFF / P2 OFF P1 OFF / P2 ON P1 ON / P2 OFF P1 ON / P2 ON	1090xxx 1091xxx 1092xxx 1093xxx

S	*Reserved*

MODBUS SPECIFICATION
SMART SENSOR

#	Configuration	Unit	Range	Default
COILS (READ / WRITE)				
1	Digital Input		0 = Low, 1 = High	
2	Relay Output		0 = Inactive, 1 = Active	
HOLDING REGISTERS (READ/WRITE)				
1	CO2 Concentration	PPM	0 ~ 10,000	
2	TVOC Concentration	µg/m³	0 ~ 2,000	
3	Temperature	0.1ºC	0 ~ 500	
4	Relative Humidity	0.1%	0 ~ 1,000	
5	Analogue Output 1 Output	mV	0 ~ 10,000	
6	Analogue Output 2 Output	mV	0 ~ 10,000	
7	Analogue Output 3 Output	mV	0 ~ 10,000	
8	Backlight		0 = Green 1 = Yellow 2 = Amber 3 = Red 4 = White 5 = Off	
9	Fault Flags		0 = OK 1 = Fault	
10	CO2 Output Scaling Min	PPM	0 ~ 10,000	0
11	CO2 Output Scaling Max	PPM	0 ~ 10,000	2,000
12	Temp Output Scaling Min	0.1ºC	0 ~ 500	0
13	Temp Output Scaling Max	0.1ºC	0 ~ 500	50
14	RH Output Scaling Min	0.1%	0 ~ 1,000	0
15	RH Output Scaling Max	0.1%	0 ~ 1,000	100
16	Analogue Output 1 Min	mV	0 ~ 10,000	0
17	Analogue Output 1 Max	mV	0 ~ 10,000	10,000
18	Analogue Output 2 Min	mV	0 ~ 10,000	0
19	Analogue Output 2 Max	mV	0 ~ 10,000	10,000
20	Analogue Output 3 Min	mV	0 ~ 10,000	0
21	Analogue Output 3 Max	mV	0 ~ 10,000	10,000
22	CO2 Concentration Offset	PPM	-1,000 ~ 1,000	0
23	Temperature Offset	0.1ºC	-200 ~ 200	0
24	Relative Humidity Offset	0.1%	-500 ~ 500	0
25	CO2 Yellow Setpoint	PPM	0 ~ 10,000	800
26	CO2 Amber Setpoint	PPM	0 ~ 10,000	1,000
27	CO2 Red Setpoint	PPM	0 ~ 10,000	1,500
28	TVOC Yellow Setpoint	PPM	0 ~ 2,000	200
29	TVOC Amber Setpoint	PPM	0 ~ 2,000	300
30	TVOC Red Setpoint	PPM	0 ~ 2,000	400
31	Analogue Output 1 Target		1 = CO2 2 = TVOC 3 = Temp 4 = RH 5 = CO2/TVOC Peak	1
32	Analogue Output 2 Target			2
33	Analogue Output 3 Target			3
34	Relay Target			1
35	Relay Setpoint		Based on selected Target type	
36	Relay Hysteresis		Based on selected Target type	
37	Relay Polarity		0 = N/O 1 = N/C	0
38	Auto-calibrate On/Off		0 = OFF 1 = ON	1
39	MSI-2 Number of States		2 ~ 8	
40	MSI-2 Current State		1 ~ 8	
41	Out of Service flags. *Setting a bit makes the relevant measurement holding register (or coil) writeable from Modbus.*	Bit mask	Bit 0 = CO2 Bit 1 = TVOC Bit 2 = Temperature Bit 3 = RH Bit 4 = Analog Output 1 Bit 5 = Analog Output 2 Bit 6 = Analog Output 3 Bit 7 = Backlight Bit 8 = MSI-2 Bit 9 = Digital Input Bit 10 = Relay Output	
42-45	MSI-2 Text String – State 1	Each byte contains two ASCII characters, the first in the MSB, second in the LSB. If less than 8 characters are required for the string, then the first unused character should be value 0x00. Due to the limited nature of the LCD display, characters should either be upper case letters, numbers or space.		Factory Default
46-49	MSI-2 Text String – State 2			
50-53	MSI-2 Text String – State 3			
54-57	MSI-2 Text String – State 4			
58-61	MSI-2 Text String – State 5			
62-65	MSI-2 Text String – State 6			
66-69	MSI-2 Text String – State 7			
70-73	MSI-2 Text String – State 8			
74	MSI-2 Timer	Sec	0 = OFF 1 ~ 65,535	0
75	Temp Set Point	0.1 ºC		REAL

BACNET SPECIFICATION
SMART SENSOR

BACnet Interoperability Building Blocks Supported (Annex K)

Description	BIBB	Comments
Read Property	DS-RP-B	
Read Property Multiple	DS-RPM-B	
Write Property	DS-WP-B	
Dynamic Device Binding	DM-DDB-B	Execute Who-Is, Initiate I-Am
Dynamic Object Binding	DM-DOB-B	Execute Who-Has, Initiate I-Have
Device Comm Control	DM-DCC-B	
Reinitialize Device	DM-RD-B	

BACnet Standard Object Types Supported

Object	No Of Instance	Instance Assignments
Device Object	1	
Analog Input	7	AI-1 CO2 AI-2 TVOC AI-3 Temperature AI-4 Relative Humidity AI-5 Analog/Voltage Input 1 AI-6 Analog/Voltage Input 2 AI-7 Temp Set Point Adjust
Analog Output	3	AO-1 Voltage Output 1 AO-2 Voltage Output 2 AO-3 Voltage Output 3
Analog Value	11	AV-1 CO2 Offset AV-2 TVOC Offset AV-3 Temp Offset AV-4 RH Offset AV-5 CO2 Yellow Set Point AV-6 CO2 Amber Set Point AV-7 CO2 Red Set Point AV-8 TVOC Yellow Set Point AV-9 TVOC Amber Set Point AV-10 TVOC Red Set Point AV-11 Temp Set Point
Binary Input	1	BI-1 Digital Input
Binary Output	1	BO-1 Relay
Multi-state Input	2	MSI-1 LCD Backlight MSI-2 Momentary Switch

Device Object Properties (Required Object Properties)

Property Name /ID	Default	R/W
Object Identifier	1090000 + MAC_Address	R/W
Object Name	"FFSS_XXX", XXX = MAC address	R/W
Object Type	2	R
System Status	OPERATIONAL	R
Vendor Name	Flamefast (UK) Ltd	R
Vendor Identifier	1090	R
Model Name	FFSS	R
Location	Location	R/W
Description	Flamefast Smart Sensor	R/W
Application Software Revision	1.00	R
Protocol Version	1	R
Protocol Revision	10	R
Protocol Services Supported		R
Object List		R
Max APDU Length	480	R
Segmentation Support	NONE	R
APDU Timeout	3000 ms	R
Number APDu Retries	3	R
MaxMaster	127	R
Max_Info_Frames	1	R
Database Revision	0	R

Temperature Setpoint Adjust (AV-11)

The temperature setpoint is defined by Analog Value 11 (AV-11). When the PLUS and MINUS buttons on the front of the sensor are pressed, this adjusts the temperature setpoint by using Analog Input 7 (AI-7). The minimum and maximum temperature setpoints are set within the AI object, as is the resolution which can be set to 0.5 of 1.0 degrees Celsius. Writing to AV-11 will overwrite the AI-7 value.

Momentary Button Control Facility (MSI-2)

The Momentary button controls MSI-2, and can be configured to provide up to 8 states. Line 1 of the display can be set to display the State Text permanently or momentarily.

This can be configured to control and of the Analogue Outputs or Binary Output 1 (BO-1) depending on the setting of Proprietaries 1000 to 1003.

PRESSING A BUTTON WILL DISPLAY A WHITE BACKLIGHT FOR 5 SECONDS.

Proprietary Properties

Property ID	Description	Range
1000	Analogue Output 1 (Default 0)	0 = Network Writable 1 = AI-1 CO2 2 = AI-2 TVOC 3 = AI-3 Temperature 4 = AI-4 Relative Humidity 5 = AI-1/2 CO2/TVOC Peak Value 6 = MSI-2 Step Based No States
1001	Analogue Output 2 (Default 0)	
1002	Analogue Output 3 (Default 0)	
1003	Binary Output 1 (Default 1)	0 = Network Writable 1 = AI-1 CO2 2 = AI-2 TVOC 3 = AI-3 Temperature 4 = AI-4 Relative Humidity 5 = MSI-2 Max 2 States
1004	Relay set point	1000.0
1005	Relay hysteresis	50.0
1006	LCD Backlight Brightness (Default 100) *No CO2/TVOC Sensor Default 0*	0, 25, 50, 75, 100%
1007	LCD Config (Based on unit ordered) No CO2/No TVOC CO2 TVOC CO2/TVOC CO2/TVOC/Momentary CO2/TVOC/Momentary (Must Select) *Unit will default to the above on power up, unless set over BACnet.*	**Line 1 Line 2** 1 = MSI State* Temp 2 = MSI State* CO2 3 = MSI State* TVOC 4 = TVOC CO2 5 = MSI State CO2/TVOC (5s) 6 = TVOC CO2 **Blank if parameter not present*
1008	Display Temp (Default 1)	0 = Off 1 = On
1009	Display RH (Default 1)	0 = Off 1 = On
1010	CO2 Auto-Calibration (Default 1)	0 = Off 1 = On
1011	Force Calibrate (in Air)	1 = Calibrate
1012	Factory Reset	1 = Factory Reset
1020	MSI-2 Time Delay (1 ~ 86,400) (Reverts to State 1)	0 = Disabled 1+ = Seconds
1021 - 1028	MSI-2 State 1 to Sate 8 Text	Max 8 Characters

Analog Input Objects

Property Name /ID	Comments/Default Value	R/W
Object Identifier	OBJECT_ANALOG_INPUT:X	R
Object Name	AI-1 CO2 AI-2 TVOC AI-3 Temperature AI-4 Relative Humidity AI-5 Analog/Voltage Input 1 AI-6 Analog/Voltage Input 2 AI-7 Temp Setpoint Adjust	R R R R R/W R/W R
Object Type	0	R
Present Value	REAL	R
Status Flag	0000	R
Event State	NORMAL	R
Out-Of-Service	FALSE	R/W
Units	AI-1 PART-PER-MILLION AI-2 MICROGRAMS-PER-CUBIC-METER AI-3 DEGREES-CELSIUS AI-4 PERCENT-RELATIVE-HUMIDITY AI-5 VOLTS AI-6 VOLTS AI-7 DEGREES-CELSIUS	R R R R R/W R/W R
Min Pres Value	AI-1 0 (0 ~ 10,000) AI-2 0 (0 ~ 5,000) AI-3 0.0 (0.0 ~ 50.0) AI-4 0.0 (0.0 ~ 100.0) AI-5 0 (0.00 ~ 10.00) AI-6 0.0 (0.00 ~ 10.00) AI-7 18.00 (0.0 ~ 50.0)	R R R R R/W R/W R/W
Max Pres Value	AI-1 5000 (0 ~ 10,000) AI-2 2000 (0 ~ 5,000) AI-3 50.0 (0.0 ~ 50.0) AI-4 100.0 (0.0 ~ 100.0) AI-5 10.00 (0.00 ~ 10.00) AI-6 50.0 (0.00 ~ 10.00) AI-7 23.00 (0.0 ~ 50.0)	R R R R R/W R/W R/W
Resolution	AI-1 1 AI-2 1 AI-3 0.1 AI-4 0.1 AI-5 0.01 AI-6 0.01 AI-7 0.5 (0.5 or 1.0)	R R R R R/W R/W R/W

BACNET SPECIFICATION
SMART SENSOR

Analog Output Objects

Property Name /ID	Default	R/W
Object Identifier	OBJECT_ANALOG_OUTPUT:X	R
Object Name	AO-1 Voltage Output 1 AO-2 Voltage Output 2 AO-3 Voltage Output 3	R/W
Object Type	1	R
Present Value	REAL	R/W-OS
Status Flag	0000	R
Event State	NORMAL	R
Out-Of-Service	FALSE	R/W
Units	VOLTS	R
Min Pres Value	0.0 (0.0 ~ 10.0)	R/W
Max Pres Value	10.0 (0.0 ~ 10.0)	R/W
Resolution	0.001	R

Analog Value Objects

Property Name /ID	Default	R/W
Object Identifier	OBJECT_ANALOG_VALUE:X	R
Object Name	AV-1 CO2 Offset AV-2 TVOC Offset AV-3 Temp Offset AV-4 RH Offset AV-5 CO2 Yellow Set Point AV-6 CO2 Amber Set Point AV-7 CO2 Red Set Point AV-8 TVOC Yellow Set Point AV-9 TVOC Amber Set Point AV-10 TVOC Red Set Point AV-11 Temp Set Point	R
Object Type	2	R
Present Value	AV-1 0 (-1,000 ~ 1,000) AV-2 0 (-500 ~ 500) AV-3 0 (-20.0 ~ 20.0) AV-4 0 (-50.0 ~ 50.0) AV-5 800 (0 ~ 10,000) AV-6 1000 (0 ~ 10,000) AV-7 1500 (0 ~ 10,000) AV-8 530 (0 ~ 5,000) AV-9 935 (0 ~ 5,000) AV-10 1620 (0 ~ 5,000) AV-11 REAL (AI-7 Value)	R/W
Status Flag	0000	R
Event State	NORMAL	R
Out-Of-Service	FALSE	R/W
Units	AV-1 PART-PER-MILLION AV-2 MICROGRAMS-PER-CUBIC-METER AV-3 DEGREES-CELSIUS AV-4 PERCENT-RELATIVE-HUMIDITY AV-5 PART-PER-MILLION AV-6 PART-PER-MILLION AV-7 PART-PER-MILLION AV-8 MICROGRAMS-PER-CUBIC-METER AV-9 MICROGRAMS-PER-CUBIC-METER AV-10 MICROGRAMS-PER-CUBIC-METER AV-11 DEGREES-CELSIUS	R

Binary Input Objects

Property Name /ID	Default	R/W
Object Identifier	OBJECT_BINARY_INPUT:X	R
Object Name	BI-1 Digital Input	R/W
Object Type	3	R
Present Value	0 = OFF 1 = ON	R
Description	Digital Input	R/W
Polarity	0 = Normal 1 = Reverse	R/W
Status Flag	0000	R
Event State	NORMAL	R
Out-Of-Service	FALSE	R/W

Binary Output Objects

Property Name /ID	Default	R/W
Object Identifier	OBJECT_BINARY_OUTPUT:X	R
Object Name	BO-1 Relay	R/W
Object Type	4	R
Present Value	0 = OFF 1 = ON MSI-2 State 1 = OFF MSI-2 State 2 = ON	R/W
Description	High CO2 Level / MSI-2	R/W
Polarity	0 = Normal 1 = Reverse	R/W
Status Flag	0000	R
Event State	NORMAL	R
Out-Of-Service	FALSE	R/W

Multi-state Input Objects

Property Name /ID	Default	R/W
Object Identifier	OBJECT_MULTI_STATE_INPUT:X	R
Object Name	MSI-1 LCD Backlight Colour MSi-2 Momentary Switch	R R/W
Object Type	13	R
Present Value	REAL	R/W*
Description	MSI-1 Display Colour MSI-2 Boost / On/Off / Fan Control	R R/W
Status Flag	0000	R
Event State	NORMAL	R
Out-Of-Service	FALSE	R/W
Number of States	MSI-1 6 MSI-2 *(See below specification)*	R R/W
State Text	MSI-1 1 = Green 2 = Yellow 3 = Amber 4 = Red 5 = White 6 = Off MSI-2 Writable – Proprietary 1021-1028 *(See below specification)*	R/W-OS R/W
Time Delay	MSI-2 Writable – Proprietary 1020 *(Max 86,400 seconds)*	

Multi State Input 2 Configuration

The default for Multi-state Input 2 (MSI-2) will depend on the product ordering configuration. The number of states and associated text will default to the below, however the number of states (max 8) and text can be fully customised to suit your application, with a maximum character string of 8 displayed for each state-text.

When the button is pressed, the specified state-text will show on line 1 of the display for 5 seconds with a white backlight, unless Line 1 function is adjusted using Proprietary Property 1007 in which case it will be permanently displays (the white backlight will still timeout after 5 seconds).

If the time delay is implemented, the unit will default back to State 1 after the set number of seconds.

The factory default settings will depend on the specified Button text, however the Button print can be customised at point of order:

State	Vent Boost	Fan Off/On	Fan Control
1		*Fan Off*	*Auto*
2	*Vent ON*	*Fan On*	*Fan Low*
3	-	-	*Fan Mid*
4	-	-	*Fan Hi*
5	-	-	*Fan Off*
No of States	*2*	*2*	*5*
Time Delay	*1800*	*0*	*0*

For further information on the BACnet protocol, please visit www.bacnet.org