

## RCD-BAC Room CO<sub>2</sub> and Temperature Sensors with BACnet

The RCD-BAC sensors are designed to detect carbon dioxide concentration and temperature in the room spaces and have built-in BACnet MS/TP communication interface. The CO<sub>2</sub> sensor calibrate automatically its measurement. The RCD-BAC sensors have linear 0..10V signals outputs relating to CO<sub>2</sub>-concentration and other measurements. The sensors can be used for demand controlled ventilation in buildings.

The RCD-BAC sensors can be installed on a wall surface or on a wall mounting box in dry indoor environment. The RCD sensors come with a number of options such as display, active setpoint, extra resistive/digital inputs, occupancy detection, lux level and, 0..10Vdc measurement and passive resistive sensor elements.

The RCD-BAC sensors have an additional resistive and a digital inputs for integrating local measurements such as window contacts or external temperature sensors.

The RCD-BAC sensors can also operate as CO<sub>2</sub>, Temperature, Light Level or Humidity controllers offering single enclosure measurement and control solutions. Other features include maximum demand control for ventilation plants.



### Ordering guide

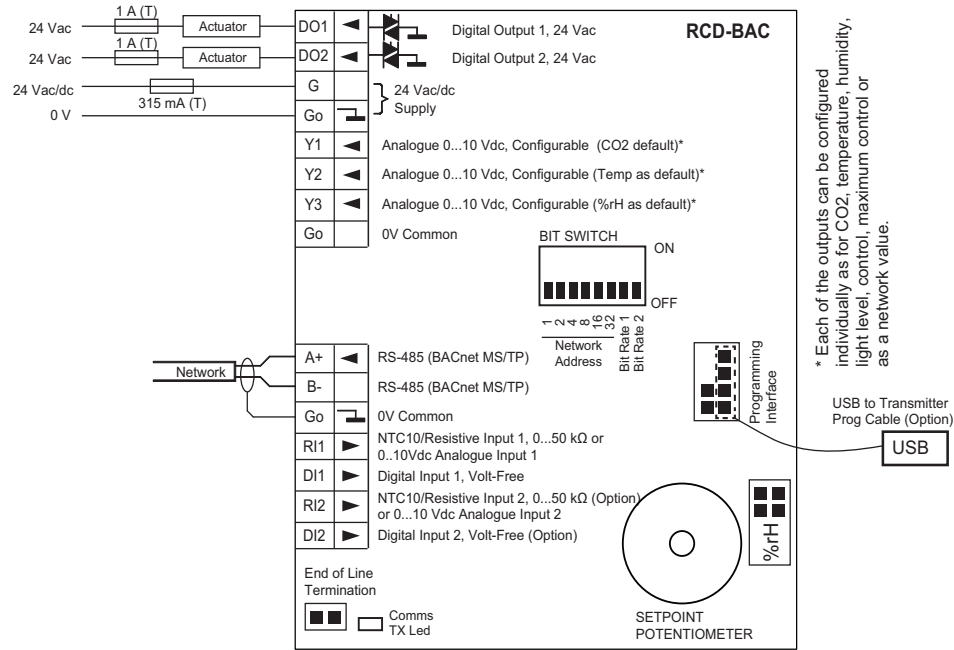
|   |                         | Type                                                                                                        | 0             | 1 | 2 | 3 | 4 | 5 | 6 |
|---|-------------------------|-------------------------------------------------------------------------------------------------------------|---------------|---|---|---|---|---|---|
| 0 | BACnet room transmitter |                                                                                                             | 6041          |   |   |   |   |   |   |
| 1 | Device type             | Room CO <sub>2</sub> transmitter, 3AO, 2DO, 1RI, 1DI                                                        | RCD-BAC       | 9 |   |   |   |   |   |
|   |                         | Room CO <sub>2</sub> and humidity transmitter, 3AO, 2DO, 1RI, 1DI                                           | RCD-BAC-RH    | B |   |   |   |   |   |
| 2 | Display                 | No display                                                                                                  |               |   | 0 |   |   |   |   |
|   |                         | Display                                                                                                     | -LCD          | 1 |   |   |   |   |   |
|   |                         | Red, yellow and green indicator lights                                                                      | -AL           | 2 |   |   |   |   |   |
| 3 | Setpoint knob / PIR     | No setpoint knob or PIR                                                                                     |               |   | 0 |   |   |   |   |
|   |                         | Active setpoint knob                                                                                        | -SP           |   | 1 |   |   |   |   |
|   |                         | Passive setpoint knob                                                                                       | -SPR          |   | 2 |   |   |   |   |
|   |                         | Occupancy detection and light level sensor                                                                  | -LL           |   | 3 |   |   |   |   |
| 4 | Push buttons            | No push buttons                                                                                             |               |   |   | 0 |   |   |   |
|   |                         | One push button                                                                                             | -PB           |   |   | 1 |   |   |   |
|   |                         | Two push buttons                                                                                            | -PB2          |   |   | 2 |   |   |   |
|   |                         | Three push buttons                                                                                          | -PB3          |   |   | 3 |   |   |   |
|   |                         | Four push buttons                                                                                           | -PB4          |   |   | 4 |   |   |   |
|   |                         | Push buttons for setpoint                                                                                   | -SPB          |   |   | 5 |   |   |   |
|   |                         | Push buttons for setpoint and one push button                                                               | -SPB-PB       |   |   | 6 |   |   |   |
|   |                         | Push buttons for setpoint and two push buttons                                                              | -SPB-PB2      |   |   | 7 |   |   |   |
| 5 | Inputs / outputs        | No inputs / outputs                                                                                         |               |   |   |   | 0 |   |   |
|   |                         | Second digital input                                                                                        | -DI2          |   |   |   | 1 |   |   |
|   |                         | Second resistive input (not available with SP/SPR options)                                                  | -RI2          |   |   |   | 2 |   |   |
|   |                         | Second digital input and second resistive input (not available with SP/SPR options)                         | -DI2-RI2      |   |   |   | 3 |   |   |
|   |                         | Two 0..10 Vdc inputs (replaces resistive input, not available with SP/SPR options)                          | -AI           |   |   |   | 5 |   |   |
|   |                         | Second digital input and two 0..10 Vdc inputs (replaces resistive input, not available with SP/SPR options) | -DI2-AI       |   |   |   | 6 |   |   |
|   |                         | Passive temperature sensor (NTC 10)                                                                         | -TE-NTC10     |   |   |   | 7 |   |   |
|   |                         | Second digital input and passive temperature sensor (NTC 10)                                                | -DI2-TE-NTC10 |   |   |   | 8 |   |   |
| 6 | Body colour             | White (RAL 9010)                                                                                            |               |   |   |   |   | 0 |   |
|   |                         | Anthracite grey                                                                                             | -GR           |   |   |   |   | B |   |

**Technical Data**

|                         |                                       |                                                                                                                                                                                                                                                                                                                                            |
|-------------------------|---------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Power Supply            | Power supply                          | 24 Vac/dc -10%/+15%, max 1 VA                                                                                                                                                                                                                                                                                                              |
| Displays and Interfaces | Option -LCD                           | LCD Display for Showing CO <sub>2</sub> , Temperature, Humidity, Light Level (configurable through the tool or BACnet)                                                                                                                                                                                                                     |
|                         | Option -AL                            | Green, Amber, Red Traffic Light LEDs (only available if -LCD not fitted) (alarm limits 750 and 1250 ppm, adjustable)                                                                                                                                                                                                                       |
|                         | Option -SP                            | Setpoint Potentiometer Knob (network or control; adjustable min/max limits)<br><i>Note: If this option is selected RI2 /AI Option (resistive input 2) are no longer available.</i>                                                                                                                                                         |
|                         | Option -SPB                           | Setpoint with 2 Push Buttons (network or control; adjustable min/max limits) <i>Note: Please select/order LCD option to visualise the setpoint. If this option is selected PB/PB2 options are replaced by setpoint buttons. If PB/PB2 are still required these are fitted underneath the SPB buttons (Locations PB3/PB4 Binary Inputs)</i> |
|                         | Option -SPR                           | Setpoint Potentiometer Knob with Passive 10KOhm Potentiometer Output                                                                                                                                                                                                                                                                       |
|                         | Option -PB                            | Push Button with Delay Timer; status available through DO1, DO2 or via Network <i>Note: If SPB option is also selected, the button is fitted underneath the SPB buttons (Location PB3 Binary Input)</i>                                                                                                                                    |
|                         | Option -PB2                           | 2 x Push Buttons with Delay Timer; status available through DO1, DO2 or via Network <i>Note: If SPB option is also selected, the buttons are fitted underneath the SPB buttons (Location PB3/PB4 Binary Inputs)</i>                                                                                                                        |
|                         | Option -PB3                           | 3 x Push Buttons with Delay Timer; status available through DO1, DO2 or via Network <i>Note: If SPB option is also selected, the PB3 option is not available</i>                                                                                                                                                                           |
|                         | Option -PB4                           | 4 x Push Buttons with Delay Timer; status available through DO1, DO2 or via Network <i>Note: If SPB option is also selected, the PB4 option is not available</i>                                                                                                                                                                           |
| Signal Outputs          | Analogue Outputs                      | 3 x 0...10 Vdc < 5 mA; 100k min impedance for 1% accuracy                                                                                                                                                                                                                                                                                  |
|                         | Digital Outputs                       | 2 x 24 Vac max. 1 A Triac; requires 24 Vac Power Supply (DO1 & DO2)<br>NOTE: Switching to 0 V                                                                                                                                                                                                                                              |
| Signal Inputs           | Resistive Input (Standard)            | 1 x NTC10/Resistive Input, 0...50 kΩ (network value)                                                                                                                                                                                                                                                                                       |
|                         | Digital Input (Standard)              | 1 x Digital Input, Volt-Free Contact, Impedance <1 kΩ<br>Pulse Counting: Max 25Hz, Min Pulse Length 20mA (Volatile)                                                                                                                                                                                                                        |
|                         | Option -RI2                           | Additional NTC10/Resistive Input, in total 2 x NTC10/Resistive Inputs, 0...50 kΩ (network values)                                                                                                                                                                                                                                          |
|                         | Option -DI2                           | Additional Digital Input, in total 2 x Digital Inputs, Volt-Free Contacts (network values), Impedance <1 kΩ<br>Pulse Counting: Max 25 Hz, Min Pulse Length 20 mA (Volatile)                                                                                                                                                                |
|                         | Option -AI                            | 2 x 0...10 Vdc Voltage Inputs (Replaces RI1 & RI2)                                                                                                                                                                                                                                                                                         |
| Sensing Characteristics | Carbon Dioxide (CO <sub>2</sub> )     |                                                                                                                                                                                                                                                                                                                                            |
|                         | Range                                 | 0...5000 ppm CO <sub>2</sub> (Range Adjustable)                                                                                                                                                                                                                                                                                            |
|                         | Accuracy                              | ± 50 ppm + 3 % of the reading @ 25 °C (@77°F)                                                                                                                                                                                                                                                                                              |
|                         | Technology                            | Auto Calibrating; Patented Non-Dispersive Infrared (NDIR)                                                                                                                                                                                                                                                                                  |
|                         | Non-Linearity                         | <1 % FS                                                                                                                                                                                                                                                                                                                                    |
|                         | Warm-Up Time                          | <20 seconds                                                                                                                                                                                                                                                                                                                                |
|                         | Response Time                         | 2 minutes                                                                                                                                                                                                                                                                                                                                  |
|                         | Temperature                           |                                                                                                                                                                                                                                                                                                                                            |
|                         | Range                                 | 0...50 °C (32...122 °F)                                                                                                                                                                                                                                                                                                                    |
|                         | Accuracy                              | ±0.5 °C                                                                                                                                                                                                                                                                                                                                    |
|                         | Humidity; Option -RH                  |                                                                                                                                                                                                                                                                                                                                            |
|                         | Range                                 | 0...100 %rH                                                                                                                                                                                                                                                                                                                                |
|                         | Accuracy                              | ±2 %rH (within 0...90 %rH)                                                                                                                                                                                                                                                                                                                 |
|                         | Light Level and Occupancy; Option -LL | <i>Note: If this option is selected RI1 (resistive input) / AI (0-10Vdc) are no longer available and need to be left disconnected.</i>                                                                                                                                                                                                     |
|                         | Range                                 | 0...3,000 Lux                                                                                                                                                                                                                                                                                                                              |

|                          | Occupancy             | Infrared Detection (Adjustable Delay)                                                                     |
|--------------------------|-----------------------|-----------------------------------------------------------------------------------------------------------|
| Communication            | BACnet Communications |                                                                                                           |
|                          | Protocol              | BACnet MS/TP                                                                                              |
|                          | Interface             | RS-485; maximum 63 devices                                                                                |
|                          | MAC Addressing        | 0...63 via a bit switch; 0...247 via tool / network                                                       |
| Connections              | Communication         | 9k6/19k2/38k4/76k8 Baud; Parity None/Even/Odd, 1 or 2 Stop Bits (baud rate adjustable through bit switch) |
|                          | Terminal Connections  | Solid and Stranded Cable; 55° Angle for Wiring                                                            |
|                          |                       | Maximum Size: 0.05 to 1.5 mm <sup>2</sup> (EN ISO) / 14 to 30 AWG (UL)                                    |
|                          |                       | Rising Clamp: Size 2.5 x 1.9mm                                                                            |
| Environmental Conditions | Operating             |                                                                                                           |
|                          | Temperature           | 0...+50 °C (32...122 °F)                                                                                  |
|                          | Humidity              | 0...95 %rh (non-cond.)                                                                                    |
|                          | Storage               |                                                                                                           |
| Standards                | Temperature           | -30...+70 °C (-22...158 °F)                                                                               |
|                          | Humidity              | 0...95 %rh (non-cond.)                                                                                    |
|                          | CE Conformity         | CE Directive 2004/108/EY<br>EN61000-6-3: 2001 (Generic Emission)<br>EN61000-6-1: 2001 (Generic Immunity). |
|                          | Degree of Protection  | IP20                                                                                                      |
| Housing                  | Housing Material      | ABS Plastics, Self Extinguishing, RAL9010 Pure White                                                      |
|                          | Mounting              | Wall or Junction Box Mounting                                                                             |
|                          | Dimensions            | W86 x H120 x D29mm                                                                                        |
|                          | Weight                | 180g                                                                                                      |

Wiring Terminals



|     |                                                                                                                                                                                                                                   |
|-----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| DO1 | Digital Output; 24 Vac Triac Switching to 0 V; max. 1 A<br><b>Warning:</b> Add external fuse (1 A (T)) for the actuator connected to the output. The fuse or correct wiring accessories are not included in the product delivery. |
| DO2 | Digital Output; 24 Vac Triac Switching to 0 V; max. 1 A<br><b>Warning:</b> Add external fuse (1 A (T)) for the actuator connected to the output. The fuse or correct wiring accessories are not included in the product delivery. |
| G   | 24Vac/dc Power Supply<br><b>Warning:</b> Add an external fuse (315 mA (T)) for the power supply. The fuse and correct wiring accessories are included in the product delivery.                                                    |
| Go  | 0 V Common                                                                                                                                                                                                                        |
| Y1  | 0...10 Vdc Analogue Output (Function Selectable)                                                                                                                                                                                  |
| Y2  | 0...10 Vdc Analogue Output (Function Selectable)                                                                                                                                                                                  |
| Y3  | 0...10 Vdc Analogue Output (Function Selectable)                                                                                                                                                                                  |
| G0  | 0 V Common                                                                                                                                                                                                                        |
| A+  | RS485 A+ Connection (BACnet)                                                                                                                                                                                                      |
| B-  | RS485 B- Connection (BACnet)                                                                                                                                                                                                      |
| G0  | 0V Common                                                                                                                                                                                                                         |
| RI1 | NTC10/Resistive Input 0...50 kΩ<br>or 0...10 Vdc Analogue Input 1                                                                                                                                                                 |
| DI1 | Digital Input; Volt-Free, Max 25Hz, Min Pulse Length 20 ms                                                                                                                                                                        |
| RI2 | NTC10/Resistive Input 0...50 kΩ<br>or 0...10 Vdc Analogue Input 2                                                                                                                                                                 |
| DI2 | Digital Input; Volt-Free, Max 25 Hz, Min Pulse Length 20 ms                                                                                                                                                                       |

Wiring Precautions

Switch off the power before any wiring is carried out. If the sensor has the LCD display fitted, unplug the LCD display and then wire the power supply and analogue outputs, if relevant.

After the wiring has been completed; plug-in the display and power up the sensor.

Digital Input Pulse Counting

Digital Inputs can be used for pulse counting up to 25Hz, minimum pulse length 20ms. The pulse count is stored in a dedicated register and can be read over the network. It is possible to write to this register to reset the value.

**NOTE:** The pulse count value is not battery backed, and therefore the network master is required to manage the data synchronisation in case of power failure.

NTC10/Resistive Inputs

The resistive inputs can be configured to operate as NCT10 inputs or Resistive Inputs. As default the inputs are configured as NTC10. The maximum measurement range is -10°C to 100°C (-40°F to 212°F). The configuration is changed via the Configuration Software.

**0-10Vdc Analogue Inputs;  
AI-Option**

If AI-option has been selected then RI1 & RI2 are converted to 0-10Vdc Inputs to measure 0-10Vdc signals (resistive inputs are no longer available).

**Y1/Y2/Y3 Analogue Output  
Operation (Modes)**

The analogue outputs Y1/Y2/Y3 can be configured for the following options.

| Output Modes                                 | Description                                                                                                                                                                                                                                                              |
|----------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Network                                      | The output is set by the network (BACnet). On the Modbus network the actual value is configured through "Y1, Y2, Y3 Override Values" parameters, respectively.                                                                                                           |
| CO <sub>2</sub> Measurement (Default for Y1) | The output represents the CO <sub>2</sub> measurement. This is scaled over 0...10V.                                                                                                                                                                                      |
| Temperature Measurement (Default for Y2)     | The output represents the temperature measurement. This is scaled over 0...10 V.                                                                                                                                                                                         |
| Humidity Measurement (requires -RH option)   | The output represents the humidity measurement. This is scaled over 0...10 V.                                                                                                                                                                                            |
| Light Measurement (requires -LL option)      | The output represents the light level measurement. This is scaled over 0...10 V.                                                                                                                                                                                         |
| CO <sub>2</sub> Control                      | The output represents the CO <sub>2</sub> control signal.                                                                                                                                                                                                                |
| Temperature Control                          | The output represents the temperature control signal.                                                                                                                                                                                                                    |
| Humidity Control (requires -RH)              | The output represents the humidity control signal.                                                                                                                                                                                                                       |
| Light Control (requires -LL)                 | The output represents the light level (LUX) control signal.                                                                                                                                                                                                              |
| Maximum Control                              | The output represents the maximum of the CO <sub>2</sub> and temperature control signals. Typically used in ventilation plants where the ventilation level is boosted based on high CO <sub>2</sub> concentration or when high room temperature is prevailing (cooling). |
| Potentiometer (SP/SPB options)               | Allows the setpoint potentiometer or push button setpoint position to be fed to the analogue output as 0..10V signal.                                                                                                                                                    |
| Max Hum/Temp                                 | The output represents the maximum of the temperature and humidity control loops.                                                                                                                                                                                         |
| Max Hum/Temp/CO <sub>2</sub>                 | The output represents the maximum of the temperature, humidity and CO <sub>2</sub> control loops.                                                                                                                                                                        |

**DO1/DO2 Digital Output  
Modes**

The DO1/DO2 digital outputs can be used to switch plants on/off based on a configured measurement and setpoint (thermostatic operation). If OC (Occupancy Sensor) option is fitted and then selected, the DO1/DO2 is used to switch output on when occupancy is detected. If the push button option (-PB) is fitted then DO1/DO2 can be set to switch ON when push button is pressed (delayed switch off).

| Digital Output Mode Options                                                 | Description (Typical Operation)                                                                                                                                                                                                                                                                                               |
|-----------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Network                                                                     | The DO1/DO2 is switched ON/OFF over the communication network.                                                                                                                                                                                                                                                                |
| CO <sub>2</sub> Control Mode (e.g. CO <sub>2</sub> High Limit Control)      | Direct Mode: The DO1/DO2 is switched ON when the CO <sub>2</sub> reading exceeds the CO <sub>2</sub> Setpoint (1000 ppm default) + CO <sub>2</sub> Digital Output Mode Hysteresis. The DO1/DO2 switches OFF when the CO <sub>2</sub> reading drops below the setpoint. The control direction is adjustable; reverse / direct. |
| Temperature Control Mode (e.g. Low Temperature Limit)                       | Reverse Mode: The DO1/DO2 is switched ON when the temperature drops below the Temperature Setpoint - Temperature Mode Hysteresis. The output is switched OFF when the temperature exceeds the Setpoint. The control direction is adjustable; reverse (heating) / direct (cooling).                                            |
| Humidity Control Mode (e.g. Humidity High Limit) (requires -RH option)      | Direct Mode: The DO1/DO2 is switched ON when the humidity reading exceeds the Humidity Setpoint (60% default) + Humidity Digital Output Mode Hysteresis, and switches OFF when the humidity drops below the Setpoint. The control direction is adjustable; reverse (humidification) / direct (de-humidification).             |
| Light Level Control (LUX) Mode (e.g. Low Light Level) (requires -LL option) | Reverse Mode: The DO1/DO2 is switched ON when the light level drops below the Light Level Setpoint - Light Level Digital Output Mode Hysteresis, and switches OFF when the level increases above Setpoint. The control direction is adjustable.                                                                               |

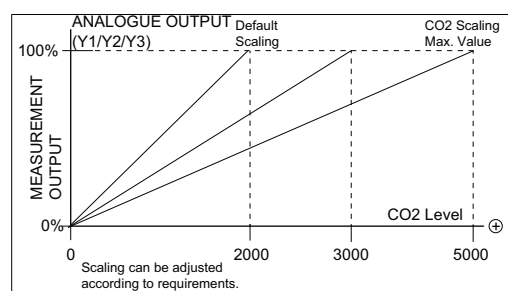
| Digital Output Mode Options                                 | Description (Typical Operation)                                                                                                                                                                                                     |
|-------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Occupancy<br>(requires -LL option)                          | The DO1/DO2 is switched ON when the occupancy sensor detects occupancy; the output remains on adjustable time "Occupancy Delay Time Setting" plus approx 10 seconds after occupancy has been detected - not available on all models |
| Push Button 1/2/3/4<br>(requires -PB/-PB2/-PB3/-PB4 option) | If the relevant option is fitted, it is possible to have the DO1 (or DO2) on for the "Push Button Delay Time" specified in the settings after the pressing of button is detected.                                                   |
| Alarm Amber Threshold                                       | The DO1/DO2 output is switched on at the Amber Alarm level.                                                                                                                                                                         |
| Alarm Red Threshold                                         | The DO1/DO2 output is switched on at the Red Alarm level.                                                                                                                                                                           |

### CO2 Measurement Output Scaling and Single Point Calibration

The RCD measures the carbon dioxide content of the room space and the measurement can be sent to any of the analogue outputs (Y1/Y2/Y3). It is also available over BACnet.

This output is scaled as default 0% = 0ppm and 100% = 2,000ppm. The scaling can be modified through Maximum CO2 Scaling parameter.

Furthermore the CO2 measurement reading can be adjusted on site using the Single Point Calibration field.



### CO2 Measurement Auto-Calibration

The CO2 sensor has automatic auto-calibration feature. This feature monitors the background CO2 level over the calibration period (8 days), and calibrates the CO2 level to the lowest point measured during this period. The sensors are supplied as factory calibrated to the typical background levels. The auto calibration logic virtually eliminates the need for manual calibration in applications where the indoor CO2 drops to outside levels during unoccupied periods.

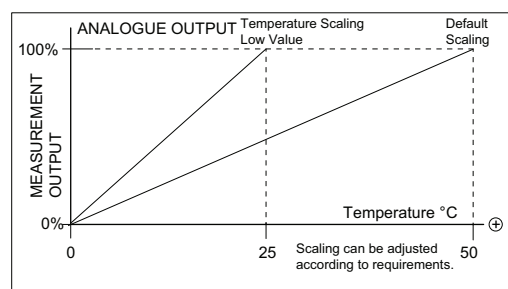
**NOTE:** If the CO2 sensor is fitted in spaces where the background level does not drop close to the typical background level (= fresh air) of 400ppm (e.g. greenhouses) it is essential that the auto-calibration feature is disabled during the commissioning.

### Temperature Measurement Output Scaling and Single Point Calibration

The RCD measures the room space temperature, and the measurement can be sent to any of the analogue outputs (Y1/Y2/Y3). It is also available over BACnet.

This output is scaled as default 0% = 0°C and 100% = 50°C. The scaling can be modified through Maximum Temperature Scaling parameter. The output can also be scaled in Fahrenheit units.

Furthermore the temperature measurement reading can be adjusted on site using the Single Point Calibration field.

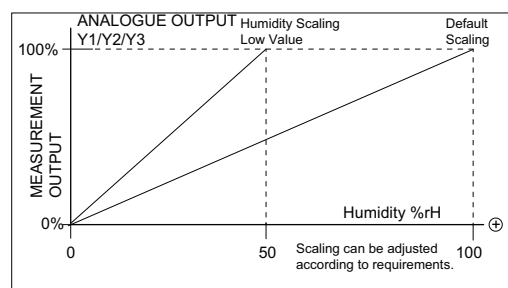


### Humidity Measurement Output Scaling and Single Point Calibration; Only when -RH Option Fitted

The RCD with -RH option measures the room space humidity. The humidity reading is available over the network (BACnet version), and the measurement can be sent to any of the analogue outputs (Y1/Y2/Y3).

This output is scaled as default 0% = 0°C and 100% = 100%rH. The scaling can be modified through Maximum Humidity Scaling parameter.

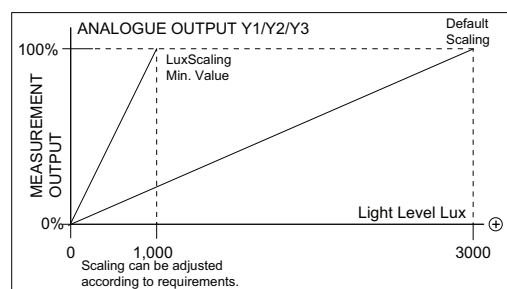
Furthermore the humidity measurement reading can be adjusted on site using the Single Point Calibration field.



### Light Level Measurement Output Scaling; Only when -LL Option Fitted

The RCD sensors fitted with -LL option measure the light level. The light level (LUX) reading is available over the network, and the measurement can be sent to any of the analogue outputs (Y1/Y2/Y3).

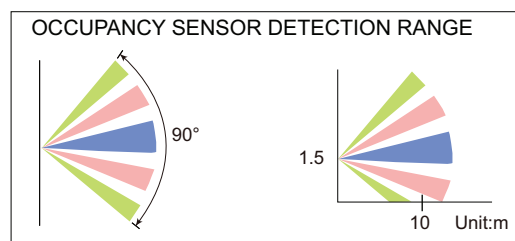
This output is scaled as default 0% = 0 LUX and 100% = 3,000 LUX). The scaling can be modified through Maximum LUX Scaling parameter.



**ENERGY SAVING FEATURE:** When the LL option is combined with the SPB (Setpoint by buttons) option, it is possible to configure the control setpoint to automatically switch to setback/boost value when the room space is not occupied.

### Occupancy Sensor (-LL Option)

The LL option offers a low power Passive Infrared Motion sensor with 21mm Fresnel lens designed for HVAC ventilation and lighting control applications. The sensor detects human body within its detection range. The LL sensor employs a dual element pyroelectric infrared sensor with advanced electronics circuitry.

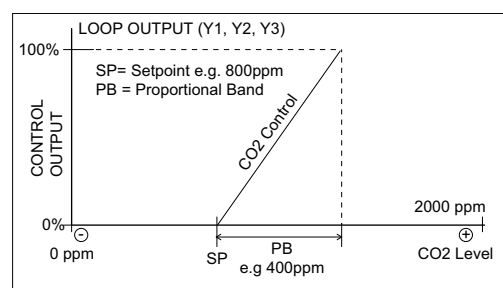


### CO2 Control Loop Operation

#### Proportional or PI Control (Reverse/ Direct)

The CO2 measurement can be used for the CO2 control. The calculated control demand is then send to the output Y1, Y2 or Y3 (depending on the corresponding analogue output mode selection).

The CO2 control loop output corresponds to the CO2 setpoint and the CO2 proportional band. If configured as Direct Control (typical), then if the CO2 level increases above the setpoint the loop output starts to modulate to 100%. When the CO2 level is the amount of the



Proportional Band above the setpoint the loop output is 100%. The configuration is done via the configuration parameters (or over the BACnet network). The CO2 control loop can also be configured to operate as Proportional + Integral control by changing the Integral Action Time from 0 to a required value.

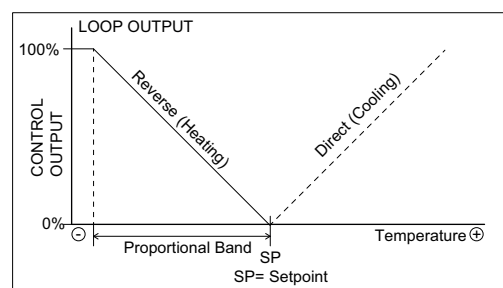
It is possible apply the Boost function to the control loop to override the output to 100% (see Boost Function for more details).

### Temperature Control Loop Operation

#### Proportional or PI Control (Reverse/ Direct)

The temperature measurement can also be used for the temperature control. The calculated control demand is then send to the output Y1, Y2 or Y3 (depending on the corresponding analogue output mode selection).

The temperature control loop output corresponds to the temperature setpoint and the temperature proportional band. If configured as Reverse Control (heating), then if the temperature level drops below the setpoint the loop output starts to modulate to 100%. When the temperature is the amount of the Proportional Band below the setpoint the loop output is 100%. In the Direct Control mode the output modulates in reverse. The configuration is done via the configuration parameters using Device Configuration Tool or over the BACnet network.



The temperature control loop can also be configured to operate as Proportional + Integral control by changing the Integral Action Time from 0 to a required value.

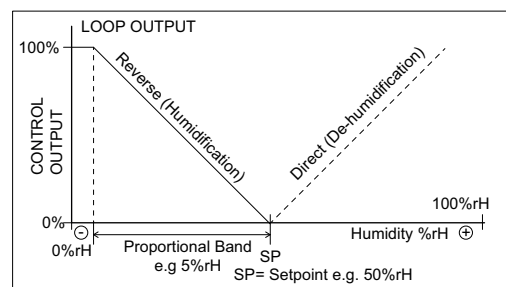
It is possible apply the Boost function to the control loop to override the output to 100% (see Boost Function for more details).

## Humidity Control Loop Operation Mode Selection; Only with RCD-BAC-RH

### Proportional or Proportional + Integral Control (Reverse/ Direct)

The humidity measurement can also be used for the humidity control. The calculated control demand is then sent to the output Y1, Y2 or Y3 (depending on the corresponding analogue output mode selection)..

The humidity control loop output corresponds to the humidity setpoint and the humidity proportional band. If configured as Reverse Control (humidification), then if the humidity level drops below the setpoint the loop output starts to modulate to 100%. When the humidity is the amount of the Proportional Band below the setpoint the loop output is 100%. In the Direct Control mode the output modulates in reverse. The configuration is done via the configuration parameters (or over the BACnet network).



The humidity control loop can also be configured to operate as Proportional + Integral control by changing the Integral Action Time from 0 to a required value.

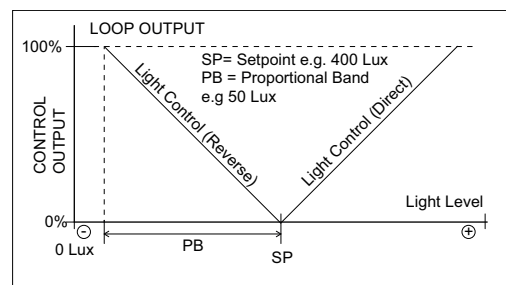
It is possible apply the Boost function to the control loop to override the output to 100% (see Boost Function for more details).

## Light Level (LUX) Control Loop Operation; Only when -LL Option Fitted

### Proportional Control (Reverse/ Direct)

The LUX measurement can also be used for the light control. The calculated control demand is sent to the output Y1, Y2 or Y3 (depending on the corresponding analogue output mode selection).

The light control loop output corresponds to the light level setpoint and the light control proportional band. If configured as Reverse Control, then if the light level drops below the setpoint the loop output starts to modulate to 100%. When the light level is the amount of the Proportional Band below the setpoint the loop output is 100%. In the Direct Control mode the output modulates in reverse. The configuration is done via the configuration parameters (or over BACnet network).



The LUX control loop can also be configured to operate as Proportional + Integral control by changing the Integral Action Time from 0 to a required value.

It is possible apply the Boost function to the control loop to override the output to 100% (see Boost Function for more details).

### Unoccupied Setpoint

If the sensor has been configured for control, then it is possible to set the control setpoint to a different setting during the unoccupied periods (controlled by the occupancy sensor). Great feature for energy savings.

## Maximum Control Loops

Each of the analogue outputs can also be configured as "Maximum Control". In this case the corresponding output (Y1, Y2, Y2) takes the maximum of the CO2 Loop and Temperature Loop outputs. This is typically used in demand based ventilation.

Furthermore the each analogue output can be configured as "Max Hum/Temp" or "Max Hum/Temp/CO2", in which case the maximum of these control loops is taken.

## Boost Function

It is possible to boost/override the control output to 100%. This can be achieved via a push button on the device (PB-options) or via a digital input. If the Push Button is used then the control output is boosted to 100% for the amount of Push Button Delay Time. When the boost is active the Blue Push Button backlight is lit. The boost can be cancelled by pressing the push button again.

When the digital input option is selected, the output is boosted to 100% when the input is closed. When the digital input is opened the output remains 100% for the time set in the parameter Digital Input Off Delay.

## Push Buttons

It is possible to fit up to four push buttons (or up to two if -SPB push button setpoint option is fitted). The push buttons can be used to activate the boost as described in Boost Function section, or used as a network user interface. The push button LED is as default controlled by the internal application i.e. the LED is ON when the push button timer is active. The push button timer can be cancelled by pressing the push button again when active.

If the Push Button LED Mode is set to BMS, then the LED can be controlled by the BMS. In typical application, when the user presses the push button, the internal timer starts, and the BMS reads the

push button status. When the push button status has been confirmed by the BMS, the BMS switches the corresponding PB LED ON and therefore sending acknowledgement to the user. It is not possible to reset the push button timer in network mode by pressing the button again.

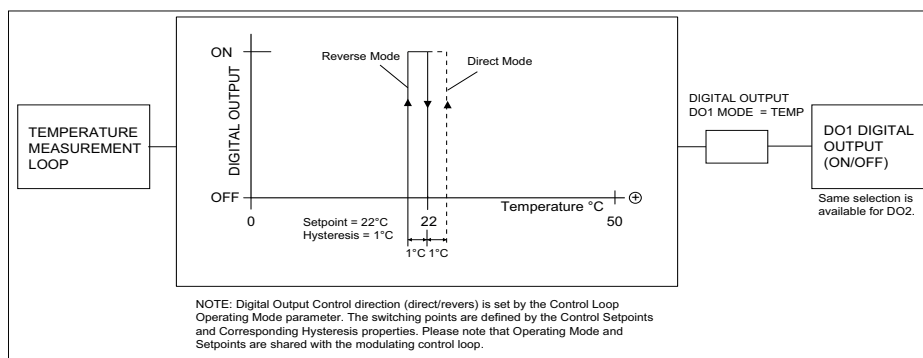
Note: If -SPB option is fitted Push Button 1 and Push Button 2 become as setpoint adjustment buttons. PB option activates Push Button 3 and PB2 option activates Push Button 3 and 4.

Note: It is possible to print the push button caps with custom legends. Please contact Produal Sales for further details.

## Digital Output DO1/DO2 Control Modes

The digital outputs DO1 or DO2 can be configured to work in any of the control modes; CO2 Control, Temperature Control; Humidity Control or LUX control; the corresponding digital output is switched ON/OFF based on the corresponding Setpoint property and the corresponding hysteresis. The direction of the operation is also adjustable through Control Loop Operating Mode Parameter.

The diagram below illustrates the operation for Temperature Control Mode. The same concept is applicable for any of the DO1/DO2 control modes (CO2, Temperature, Humidity, LUX).



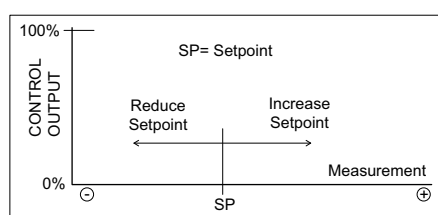
## Alarm LED / LCD Operation (-AL and -LCD Options)

If the -AL or -LCD option is fitted the transmitter can be configured to monitor the CO<sub>2</sub>, temperature, humidity or light levels for alarms. The -AL option comes with three traffic light LEDs (green/amber/red). When -LCD option is fitted the alarm condition is displayed using the backlight colours of the LCD instead of LEDs.

In both cases if the measurement exceeds the amber alarm limit then the amber LED / Backlight is switched ON. If the measurement exceeds the red alarm limit, the red LED / Backlight is switched ON. At normal condition green LED or white backlight is displayed. The alarm mode has an adjustable hysteresis to prevent the LEDs / Backlight flickering and all alarm limits are adjustable. The alarm condition is also available over the BACnet. The configuration is done via the configuration parameters (or over the BACnet).

Note: The DO1/DO2 outputs can also be configured to activate on Amber or Amber/Red alarm e.g to drive external devices in case of the alarm limit has been exceeded.

## Setpoint Potentiometer Knob (-SP option) or Setpoint with Push Buttons (-SPB option)



With setpoint options it is possible to adjust the current control setpoint. The setpoint potentiometer knob option provides rotary knob for the setpoint whereas the SPB option provides two push buttons for setpoint. The adjustment shifts the CO<sub>2</sub>, temperature, humidity or LUX setpoint up or down depending on the configuration parameter settings up to the minimum and

maximum allowable setpoints. The setpoint can also be made only to be available as a network parameter (no influence to control). In this case the value displayed is between the minimum and the maximum settings (e.g -5.0 to +5.0).

It is also possible to send the setpoint potentiometer position (-SP option) or Setpoint Push Button Setting (-SPB option) to an analogue output as 0..10V signal.

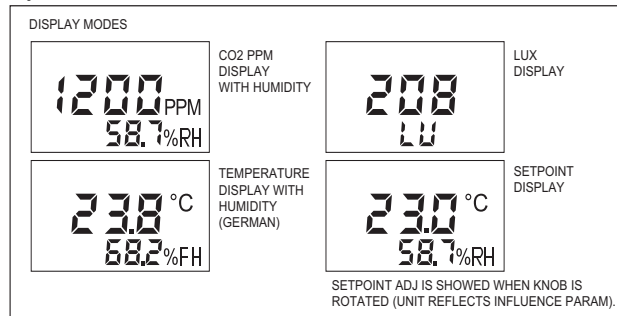
When SPB option is used, by writing the setpoint over the network resets the user adjustments to 0 if the "Reset SPA on SP Change" property is enabled (default). If "Reset SPA on SP Change" is disabled, then writing the setpoint over the network will not reset the user adjustment. In this case "Reset SPA" network variable can be used to reset the user adjustment to zero. Enabling "Save SPA" option will store the user adjustment to the non-volatile memory.

When using -SPB option it is also possible to adjust the setpoint adjustment steps between 0.1/0.5/1.0 °C/°F. If option 0.1 has been selected and the button is kept pressed, the adjustment speed accelerates automatically.

**Note: SPB option requires also -LCD option to be selected/fitted.**

## Display (Requires Option -LCD)

The LCD display shows the temperature, humidity, CO2 and LUX readings. CO2, temperature and LUX readings are primary readings displayed on the "top line". These readings can be rotated. The humidity reading is shown on the "bottom line" if -RH option has been fitted. The display has white backlight which is as default switched off. The backlight can be switched on and its intensity can be adjusted.

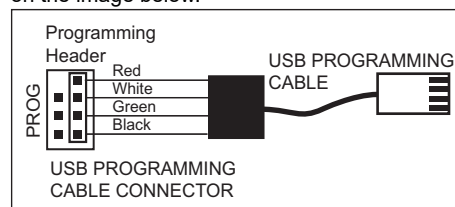


**Note:** The backlight is permanently on if activated. At 50% intensity the backlight lifetime is approx 10,000 hours. After this time the LCD module needs replacing if the backlight is required. The display continues to operate without the backlight.

## Configuration Parameters and Programming

The parameter options can be configured using the Device Configuration Tool software; or via the BACnet network using proprietary properties (see the BACnet parameter section).

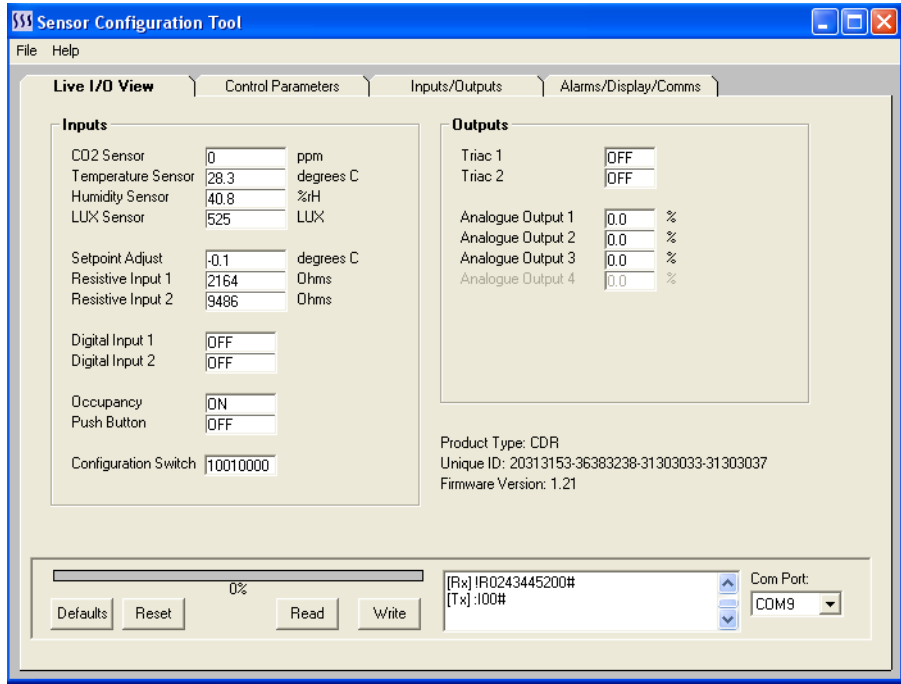
If the Device Configuration software is used, this is connected via the PC USB cable to the programming header of the transmitter. Plug-in the USB cable to the programming header as shown on the image below.



The correct process for connecting the sensor via the USB is as follows:

- Disconnect USB Connector from PC
- Disconnect the Sensor from Power
- Plug-In the 4-Way Connector to the Sensor
- Connect the USB to the PC
- Power Up the Sensor

**NOTE:** Always disconnect USB from PC before plugging the cable into the sensor.



| Common Parameters |                                                                                                                                 |
|-------------------|---------------------------------------------------------------------------------------------------------------------------------|
| Parameter Name    | Description                                                                                                                     |
| Defaults          | Reloads the default configuration from the sensor non-volatile memory. <b>Note: All modified settings are lost.</b>             |
| Reset             | Performs soft reset of the sensor. Apply after major changes.                                                                   |
| Read              | Reads the sensor data.                                                                                                          |
| Write             | Writes the new settings to the sensor (automatically stored in the non-volatile memory)                                         |
| COM Port          | Select the COM port for the USB Cable. The USB cable driver must be installed in order the Serial to TTL connection to operate. |

| Live IO-View         |                                              |                     |
|----------------------|----------------------------------------------|---------------------|
| Parameter Name       | Description                                  | Range               |
| <b>INPUTS</b>        |                                              |                     |
| CO2 Sensor           | CO2 Sensor Reading                           | 0..5,000ppm         |
| Temperature Sensor   | Temperature Sensor Reading                   | 0..50°C (32..122°F) |
| Humidity Sensor      | Humidity Sensor Reading                      | 0..100% rH          |
| LUX Sensor           | LUX Sensor Reading                           | 0..3,000 LUX        |
| Setpoint Adjust      | Setpoint Adjuster Reading                    | -500..+500          |
| Resistive Input 1    | Resistive Input 1 Reading                    | 0..50kOhms          |
| Resistive Input 2    | Resistive Input 2 Reading                    | 0..50kOhms          |
| Analogue Input 1     | Analogue Voltage Input (with AI-Option Only) | 0..100%             |
| Analogue Input 2     | Analogue Voltage Input (with AI-Option Only) | 0..100%             |
| Digital Input 1      | Digital Input 1 Status                       | Off - On            |
| Digital Input 2      | Digital Input 2 Status                       | Off - On            |
| Digital Input 3      | Digital Input 3 Status (RI1)                 | Off - On            |
| Digital Input 4      | Digital Input 4 Status (RI2)                 | Off - On            |
| Occupancy            | Occupancy Status                             | Off - On            |
| Push Button 1        | Push Button 1 Status                         | Off - On            |
| Push Button 2        | Push Button 2 Status                         | Off - On            |
| Push Button 3        | Push Button 3 Status                         | Off - On            |
| Push Button 4        | Push Button 4 Status                         | Off - On            |
| Configuration Switch | Bit Switch Status for Each Switch            | 00000000 - 11111111 |
| <b>OUTPUTS</b>       |                                              |                     |
| Triac 1              | Digital Output 1                             | Off - On            |

| Live IO-View      |                   |          |
|-------------------|-------------------|----------|
| Parameter Name    | Description       | Range    |
| Triac 2           | Digital Output 2  | Off - On |
| Analogue Output 1 | Analogue Output 1 | 0..100%  |
| Analogue Output 2 | Analogue Output 2 | 0..100%  |
| Analogue Output 3 | Analogue Output 3 | 0..100%  |

| Control Parameters |             |       |
|--------------------|-------------|-------|
| Parameter Name     | Description | Range |

**TEMPERATURE**

|                                            |                                                                            |                                                               |
|--------------------------------------------|----------------------------------------------------------------------------|---------------------------------------------------------------|
| Temperature Loop Operating Mode            | Direction of the temperature control loop.                                 | 0 = Reverse Control (Heating)<br>1 = Direct Control (Cooling) |
| Temperature Control Setpoint               | Temperature Setpoint                                                       | 0.0...150.0°C/°F (Default 20°C)                               |
| Temperature Proportional Band              | Temperature Proportional Band                                              | 1.0...150.0°C/°F (Default 50°C)                               |
| Temperature Control Integral Action        | Integral Action time of the temperature control loop. Set to 0 to disable. | 0..10,000 seconds (Default 0s)                                |
| Temperature Digital Output Mode Hysteresis | Hysteresis for the digital output temperature control function.            | 0.1...150.0°C/°F (Default 2°C)                                |
| Temperature Loop Boost Input               | Boosts the Control Output to 100%                                          | Select Push Button 1/2/3/4 or Digital Input 1/2.              |

**HUMIDITY**

|                                         |                                                                         |                                                                                |
|-----------------------------------------|-------------------------------------------------------------------------|--------------------------------------------------------------------------------|
| Humidity Loop Operating Mode            | Direction of the humidity control loop.                                 | 0 = Reverse Control (Humidification)<br>1 = Direct Control (De-humidification) |
| Humidity Control Setpoint               | Humidity Setpoint                                                       | 0.0...100.0 %rH (Default 50%)                                                  |
| Humidity Proportional Band              | Humidity Proportional Band                                              | 0.1...100.0 %rH (Default 20.0%)                                                |
| Humidity Control Integral Action        | Integral Action time of the humidity control loop. Set to 0 to disable. | 0..10,000 seconds (Default 0s)                                                 |
| Humidity Digital Output Mode Hysteresis | Hysteresis for the digital output humidity control function.            | 1.0...100.0 %rH (Default 5.0%)                                                 |
| Humidity Loop Boost Input               | Boosts the Control Output to 100%                                       | Select Push Button 1/2/3/4 or Digital Input 1/2.                               |

**AIR QUALITY (CO2 Operation)**

|                            |                                                                            |                                                     |
|----------------------------|----------------------------------------------------------------------------|-----------------------------------------------------|
| Air Quality Operating Mode | Direction of the Air Quality control loop.                                 | 0 = Reverse Control<br>1 = Direct Control (default) |
| Source                     | Air Quality Control Loop Source                                            | 0 = CO2 Sensor (default)                            |
| Setpoint                   | Air Quality Control Setpoint                                               | 0..3250ppm (Default 1,000 ppm)                      |
| Proportional Band          | Air Quality Control Proportional Band                                      | 10..5000 ppm (Default = 300 ppm)                    |
| Integral Action Time       | Integral Action time of the Air Quality Control loop. Set to 0 to disable. | 0..10,000 seconds (Default 0)                       |
| DO Hysteresis              | Hysteresis for the digital output with Air Quality Control.                | 10..5000ppm (Default 100 ppm)                       |
| Boost Input                | Boosts the Control Output to 100%                                          | Select Push Button 1/2/3/4 or Digital Input 1/2.    |

**LUX**

|                                    |                                                                    |                                                  |
|------------------------------------|--------------------------------------------------------------------|--------------------------------------------------|
| Lux Loop Operating Mode            | Direction of the LUX control loop.                                 | 0 = Reverse Control<br>1 = Direct Control        |
| Lux Control Setpoint               | LUX Setpoint                                                       | 0..3,000 Lux (Default 400 Lux)                   |
| LUX Proportional Band              | LUX Proportional Band                                              | 1..3,000 Lux (Default 400 Lux)                   |
| LUX Control Integral Action        | Integral Action time of the LUX control loop. Set to 0 to disable. | 0..10,000 seconds (Default 0s)                   |
| LUX Digital Output Mode Hysteresis | Hysteresis for the digital output LUX control function.            | 1..3,000 Lux (Default 100 Lux)                   |
| LUX Loop Boost Input               | Boosts the Control Output to 100%                                  | Select Push Button 1/2/3/4 or Digital Input 1/2. |

**SETPOINT ADJUST**

|                                 |                                                                                |                        |
|---------------------------------|--------------------------------------------------------------------------------|------------------------|
| Setpoint Adjuster Minimum Value | Sets the minimum value for the setpoint (setpoint turned fully anti clockwise) | -500..0 (Default -3.0) |
| Setpoint Adjuster Maximum Value | Sets the maximum value for the setpoint (setpoint turned fully clockwise)      | 0..500 (Default 3.0)   |

| Control Parameters                           |                                                                                                      |                                                                                                               |
|----------------------------------------------|------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|
| Parameter Name                               | Description                                                                                          | Range                                                                                                         |
| Setpoint Value Influence to Control Setpoint | Setpoint Value Influence to Control Setpoint                                                         | 0 = No Influence (network value)<br>1 = CO2 Loop<br>2 = Temperature Loop<br>3 = Humidity Loop<br>4 = Lux Loop |
| SPA Step Size                                | Setpoint Adjustment Steps (only with -SPB and only affects temperature setpoint)                     | 0 = 0.1°C/°F (default)<br>1 = 0.5°C/°F<br>1 = 1°C/°F                                                          |
| Unoccupied SPA                               | Changes the control setpoint to the set value when the space is unoccupied (requires -LL option)     | 0..500 (Default 0.0)                                                                                          |
| Save SPA                                     | Saves User Setpoint (Setpoint Adjustment) changes to non-volatile after changes have been completed. | 0 = Disabled (Default)<br>1 = Enabled                                                                         |
| Reset SPA on SP Change                       | Resets the User Setpoint Adjustment (SPA), when the setpoint is written over the network.            | 0 = Disabled<br>1 = Enabled (Default)                                                                         |

| Inputs / Outputs      |                                             |                                         |
|-----------------------|---------------------------------------------|-----------------------------------------|
| Parameter Name        | Description                                 | Range                                   |
| <b>SENSOR INPUTS</b>  |                                             |                                         |
| CO2 Offset            | One Point CO2 Calibration Field             | -200..+200ppm<br>(Default 0ppm)         |
| CO2 AO Scale          | Analogue Output Maximum CO2 Scaling         | 1000..5000 ppm<br>(Default = 2,000 ppm) |
| Temperature Offset    | One Point Temperature Calibration Field     | -3.0..+3.0°C/°K<br>(Default 0°C)        |
| Temperature AO Scale  | Analogue Output Maximum Temperature Scaling | 0.1...150.0°C/°F<br>(Default 50°C)      |
| Humidity Offset       | One Point Humidity Calibration Field        | -5.0..+5.0 %rH<br>(Default 0 %rH)       |
| Humidity AO Scale     | Analogue Output Humidity Maximum Scaling    | 0.1...100.0 %rH<br>(Default 100.0%)     |
| LUX AO Scale          | Analogue Output Maximum Lux Scaling         | 1000..3,000 Lux<br>(Default 3,000 Lux)  |
| Occupancy Off Delay   | Delay Time Setting for Occupancy            | 1..7200 Seconds (Default 600s)          |
| Push Button Off Delay | Delay Time Setting for Push Button          | 1..28,800 Seconds (Default 600s)        |
| Push Button 1 Mode    | Push Button 1 LED Mode                      | 0 = Local (default)<br>1 = BMS          |
| Push Button 2 Mode    | Push Button 2 LED Mode                      |                                         |
| Push Button 3 Mode    | Push Button 3 LED Mode                      |                                         |
| Push Button 4 Mode    | Push Button 4 LED Mode                      |                                         |
| DI1 Off Delay         | Delay Time Setting for Digital Input 1      | 0..28,800 Seconds (Default 0s)          |
| DI2 Off Delay         | Delay Time Setting for Digital Input 2      | 0..28,800 Seconds (Default 0s)          |

| OUTPUTS  |                                                           |                                                                                                                                                                                                                                                                                                                                                |
|----------|-----------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| AO1 (Y1) | Analogue Output Y1 Mode<br>Default: 1 = CO2 Sensor        | 0 = Network Value<br>1 = CO2 Measurement<br>2 = Temperature Measurement<br>3 = Humidity Measurement<br>4 = Light Measurement (LUX)<br>5 = CO2 Control<br>6 = Temperature Control<br>7 = Humidity Control<br>8 = Light Control (LUX)<br>9 = Maximum Control<br>10 = Potentiometer<br>11 = Max Hum/Temp Control<br>12 = Max Hum/Temp/CO2 Control |
| AO2 (Y2) | Analogue Output Y2 Mode<br>Default 2 = Temperature Sensor |                                                                                                                                                                                                                                                                                                                                                |
| AO3 (Y3) | Analogue Output Y3 Mode<br>Default: 3 = Humidity Sensor   |                                                                                                                                                                                                                                                                                                                                                |

| Inputs / Outputs |                                                     |                                                                                                                                                                                                                                                                                                                                     |
|------------------|-----------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Parameter Name   | Description                                         | Range                                                                                                                                                                                                                                                                                                                               |
| DO1              | Digital Output 1 Mode<br>Default: 6 = Push Button 1 | 0 = Network Value<br>1 = CO2 Relay<br>2 = Temperature Relay<br>3 = Humidity Relay<br>4 = Light Relay (LUX)<br>5 = Occupancy Relay<br>6 = Push Button 1 (PB1 Option)<br>7 = Push Button 2 (PB2 Option)<br>8 = Push Button 3 (PB3 Option)<br>9 = Push Button 4 (PB4 Option)<br>10 = Alarm Amber Threshold<br>11 = Alarm Red Threshold |
| DO2              | Digital Output 2 Mode<br>Default: 5 = Occupancy     |                                                                                                                                                                                                                                                                                                                                     |

| Alarm/Display/Comms   |                                                                                                                                            |                                                                                                   |
|-----------------------|--------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|
| Parameter Name        | Description                                                                                                                                | Range                                                                                             |
| <b>ALARMS</b>         |                                                                                                                                            |                                                                                                   |
| Alarm Source          | Alarm LED Mode                                                                                                                             | 0 = Air Quality - CO2 (default)<br>1 = Temperature<br>2 = Humidity<br>3 = LUX                     |
| Alarm Amber Threshold | Amber Alarm LED Switching Point                                                                                                            | 0..5000 (Default 750)                                                                             |
| Alarm Red Threshold   | Red Alarm LED Switching Point                                                                                                              | 0..5000 (Default 1250)                                                                            |
| Alarm Hysteresis      | Alarm LED Hysteresis                                                                                                                       | 0..5000 (Default 50)                                                                              |
| <b>DISPLAY</b>        |                                                                                                                                            |                                                                                                   |
| Temperature Units     | Temperature Unit Selection                                                                                                                 | 0 = Celsius<br>1 = Fahrenheit                                                                     |
| Language              | Language Selection (for display rH vs FH)                                                                                                  | 0 = English (default)<br>1 = German                                                               |
| Display Mode          | Display Mode                                                                                                                               | 0 = Rotate Installed<br>1 = CO2 Only<br>2 = Temperature Only<br>3 = LUX Only<br>4 = Setpoint Only |
| LCD brightness        | Brightness of the LCD                                                                                                                      | Off - 10% to 100%                                                                                 |
| <b>COMMS</b>          |                                                                                                                                            |                                                                                                   |
| BACnet Baud Rate      | BACnet Baud Rate (can only be set if BR1 and BR2 are in OFF position)                                                                      | 0 = 9600 (Default)<br>1 = 19200<br>2 = 38400<br>3 = 76800                                         |
| BACnet Parity         | BACnet Parity                                                                                                                              | None (fixed)                                                                                      |
| Stop Bits             | Stop Bits                                                                                                                                  | 1 (fixed)                                                                                         |
| Address               | BACnet Address (can only be set if all address bit switches are in OFF position)                                                           | 0..247<br>(Default 1)                                                                             |
| Device ID             | The BACnet Device ID. Change the value as required and activate the change by setting the MAC address via bit switches or by Reset Button. | 0..4,194,303<br>Default 783+MAC Address                                                           |

#### Parameter Storage

The configuration parameters are stored in the non-volatile memory. The Device Configuration Tool software will automatically store the register values on the non-volatile permanent memory after the changes are carried out. If the changes are carried out over the BACnet network, then "NonVol Update" flag is required to be forced on to save the changes. The parameter returns automatically to the off state once the values have been stored.

Setting Up BACnet Address and Baud Rate

The RCD BACnet address and the baud rate is normally set through the bit switch. It is also possible to set the address and baud rate over the configuration tool or over the BACnet communication network.

**NOTE: The new settings are activated automatically after approx 5 seconds if the bit switch positions have not been moved. In this case the controller reset is applied to activate the new settings. .**

SETTING TRANSMITTER BAUD RATE

BIT SWITCH

ON OFF

BAUD RATE 76800

ON OFF

BAUD RATE 38400

ON OFF

BAUD RATE 19200

ON OFF

BAUD RATE 9600 / NETWORK

ON OFF

Note: When the baud rate set 9600 via the bit switch it is possible to configure the baud rate via network / tool.  
Note: To activate the change the transmitter requires power cycle, or software reset via the tool.

SETTING TRANSMITTER BACNET MAC ID

The BACnet MAC ID is set by using bith switches 1 to 6 using binary decoding. Each bit switch represents the binary value and the address is set by the combination of bit switches. Few examples:

BIT SWITCH

ON OFF

BACNET MAC ID 2

ON OFF

BACNET MAC ID 9

ON OFF

Note: If all address bit switches are set OFF, then the BACnet ID can be set over the BACnet or through configuration tool.

BACnet Interoperability Building Blocks Supported (Annex K)

| Application Service        | Initiate | Execute | BIBB     |
|----------------------------|----------|---------|----------|
| ReadProperty               |          | Yes     | DS-RP-B  |
| ReadPropertyMultiple       |          | Yes     | DS-RPM-B |
| WriteProperty              |          | Yes     | DS-WP-B  |
| ReinitializeDevice         |          | Yes     |          |
| Who-Is                     |          | Yes     | DM-DDB-B |
| I-Am                       | Yes      |         |          |
| Who-Has                    |          | Yes     | DM-DOB-B |
| I-Have                     | Yes      |         |          |
| DeviceCommunicationControl |          | Yes     | DM-DCC-B |

BACnet Standard Object Types Supported

No dynamic Creation or Deletion supported. Objects, and object instances, are assigned to fixed functions within the proprietary control application of the product as follows:

| Object         | Number Of Instances | Instance Assignments                                                                                                                                                                                                                                                |
|----------------|---------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Device Object  | 1                   |                                                                                                                                                                                                                                                                     |
| Analog Input   | 7                   | AI(0) – Temperature Sensor<br>AI(1) – Calculated Setpoint<br>AI(2) – Humidity Sensor<br>AI(3) – RI1 / AI1<br>AI(4) – RI2 / AI2<br>AI(5) – CO2 Sensor<br>AI(6) – LUX Sensor                                                                                          |
| Analog Outputs | 3                   | AO(0) – Y1 Output<br>AO(1) – Y2 Output<br>AO(2) – Y3 Output                                                                                                                                                                                                         |
| Analogue Value | 9                   | AV(0) – Temperature Setpoint<br>AV(1) – Humidity Setpoint<br>AV(2) – CO2 Setpoint<br>AV(3) – LUX Setpoint<br>AV(4) – DI1 Pulse Count<br>AV(5) – DI2 Pulse Count<br>AV(6) - LCD Backlight Brightness<br>AV(7) - Amber Alarm Threshold<br>AV(8) - Red Alarm Threshold |
| Binary Input   | 7                   | BI(0) – DI1 input<br>BI(1) – DI2 Input<br>BI(2) – Occupancy<br>BI(3) – Push Button 1<br>BI(4) – Push Button 2<br>BI(5) – Push Button 3 (Third button)<br>BI(6) – Push Button 4 (Fourth Button)                                                                      |

| Object           | Number Of Instances | Instance Assignments                                                                                                                                                                                          |
|------------------|---------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Binary Output    | 9                   | BO(0) – DO1 Output<br>BO(1) – DO2 Output<br>BO(2) - SPA Reset (Only with -SPB)<br>BO(3) - PB1_LED<br>BO(4) - PB2_LED<br>BO(5) - PB3_LED<br>BO(6) - PB4_LED<br>BO(7) - Not Applicable<br>BO(8) - NonVol Update |
| MutliState Input | 1                   | MSI(0) - Alarm Level                                                                                                                                                                                          |

**Device Object Properties**  
(Required Object Properties)

| Property Name /ID    | Attributes | Range             | Default                                                      |
|----------------------|------------|-------------------|--------------------------------------------------------------|
| Object Identifier    | R/W        |                   | MAC_Address + 783000 (Adjustable)                            |
| Object Name          | R/W        | 32 Characters Max | Concatenation of product type and MAC address i.e. "RCD_001" |
| Object Type          | R          |                   | 8                                                            |
| System Status        | R          |                   | STATUS_OPERATIONAL                                           |
| Vendor Name          | R          |                   | Produal                                                      |
| Vendor Identifier    |            |                   | 783                                                          |
| Model Name           | R          |                   | URD                                                          |
| Protocol Version     | R          |                   | 1                                                            |
| Protocol Revision    | R          |                   | 10                                                           |
| Max APDU Length      | R          |                   | 480                                                          |
| Segmentation Support | R          |                   | No                                                           |
| APDU Timeout         | R          |                   | 3000 ms                                                      |
| Number APDu Retries  | R          |                   | 3                                                            |
| MaxMaster            | R          |                   | 127                                                          |
| Max_Info_Frames      | R          |                   | 1                                                            |
| Database Revision    | R          |                   | 0                                                            |

## Analogue Input Objects

|                                   | Property Name /ID | Attributes | Range                                                                                                                         | Default                                                                                                                                                                                                                                                                          |
|-----------------------------------|-------------------|------------|-------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Required Object Properties</b> | Object Identifier | R          |                                                                                                                               |                                                                                                                                                                                                                                                                                  |
|                                   | Object Name       | R          |                                                                                                                               | AI(0) – Temperature Sensor<br>AI(1) – Setpoint Adjust<br>AI(2) – Humidity Sensor<br>AI(3) – RI1 / AI1<br>AI(4) – RI2 / AI2<br>AI(5) – CO2 Sensor<br>AI(6) – LUX Sensor                                                                                                           |
|                                   | Object Type       | R          |                                                                                                                               | 0                                                                                                                                                                                                                                                                                |
|                                   | Present Value     | R/W        | AI(0): 0..150<br>AI(1): -500 ..500<br>AI(2): 0..100<br>AI(3): 0..50000<br>AI(4): 0..50000<br>AI(5): 0..5000<br>AI(6): 0..3000 |                                                                                                                                                                                                                                                                                  |
|                                   | Status Flag       | R          |                                                                                                                               |                                                                                                                                                                                                                                                                                  |
|                                   | Event State       | R          |                                                                                                                               |                                                                                                                                                                                                                                                                                  |
|                                   | Out-Of-Service    | R/W        |                                                                                                                               | FALSE                                                                                                                                                                                                                                                                            |
|                                   | Units             | R          |                                                                                                                               | AI(0): UNITS_DEGREES_CELCIUS<br>or UNITS_DEGREES_FAHRENHEIT<br>AI(1): UNITS_DEGREES_CELCIUS<br>or UNITS_DEGREES_FAHRENHEIT<br>AI(2): UNITS_PERCENT<br>AI(3): UNITS_OHMS/UNITS_PERCENT<br>AI(4): UNITS_OHMS/UNITS_PERCENT<br>AI(5): UNITS_PARTS_PER_MILLION<br>AI(6): UNITS_LUXES |
| <b>Optional Properties</b>        | None              |            |                                                                                                                               |                                                                                                                                                                                                                                                                                  |
| <b>Proprietary Properties</b>     | None              |            |                                                                                                                               |                                                                                                                                                                                                                                                                                  |

## Analogue Output Objects

|                                   | Property Name /ID | Attributes | Range  | Default                                      |
|-----------------------------------|-------------------|------------|--------|----------------------------------------------|
| <b>Required Object Properties</b> | Object Identifier | R          |        |                                              |
|                                   | Object Name       | R          |        | AO(0) = "Y1"<br>AO(1) = "Y2"<br>AO(2) = "Y3" |
|                                   | Object Type       | R          |        | 1                                            |
|                                   | Present Value     | R/W        | 0..100 |                                              |
|                                   | Status Flag       | R          |        |                                              |
|                                   | Event State       | R          |        |                                              |
|                                   | Out-Of-Service    | R/W        |        | FALSE                                        |
|                                   | Units             | R          |        | UNITS_PERCENT                                |
| <b>Optional Properties</b>        | None              |            |        |                                              |
| <b>Proprietary Properties</b>     | None              |            |        |                                              |

## Analogue Value Objects

|                                   | Property Name /ID  | Attributes | Range                                                                                                                                                                  | Default                                                                                                                                                                                                                                                             |
|-----------------------------------|--------------------|------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Required Object Properties</b> | Object Identifier  | R          |                                                                                                                                                                        |                                                                                                                                                                                                                                                                     |
|                                   | Object Name        | R          |                                                                                                                                                                        | AV(0) – Temperature Setpoint<br>AV(1) – Humidity Setpoint<br>AV(2) – CO2 Setpoint<br>AV(3) – LUX Setpoint<br>AV(4) - DI1 Pulse Count<br>AV(5) - DI2 Pulse Count<br>AV(6) - LCD Backlight Brightness<br>AV(7) - Amber Alarm Threshold<br>AV(8) - Red Alarm Threshold |
|                                   | Object Type        | R          |                                                                                                                                                                        | 2                                                                                                                                                                                                                                                                   |
|                                   | Present Value      | R/W        | AV(0): 0..150<br>AV(1): 0..100<br>AV(2): 0..5000<br>AV(3): 0..3000<br>AV(4): 0..4278190080<br>AV(5): 0..4278190080<br>AV(6): 0..10<br>AV(7): 0..5000<br>AV(8): 0..5000 |                                                                                                                                                                                                                                                                     |
|                                   | Status Flag        | R          |                                                                                                                                                                        |                                                                                                                                                                                                                                                                     |
|                                   | Event State        | R          |                                                                                                                                                                        |                                                                                                                                                                                                                                                                     |
|                                   | Out-Of-Service     | R/W        |                                                                                                                                                                        | FALSE                                                                                                                                                                                                                                                               |
|                                   | Units              | R          |                                                                                                                                                                        | AV(0) = UNITS_DEGREES_CELSIUS<br>or<br>UNITS_DEGREES_FAHRENHEIT<br>AV(1) = UNITS_PERCENT<br>AV(2) =<br>"UNITS_PARTS_PER_MILLION<br>AV(3) = UNITS_LUXES<br>AV(4) = NO_UNITS<br>AV(5) = NO_UNITS<br>AV(6) = NO_UNITS<br>AV(7) = NO_UNITS<br>AV(8) = NO_UNITS          |
|                                   | Priority Array     | R          |                                                                                                                                                                        |                                                                                                                                                                                                                                                                     |
|                                   | Relinquish Default | R/W        |                                                                                                                                                                        | AV(0) = Nonvol Temperature Setpoint<br>AV(1) = Nonvol HumiditySetpoint<br>AV(2) = Nonvol CO2 Setpoint<br>AV(3) = Nonvol LUX Setpoint<br>AV(4) = 0<br>AV(5) = 0<br>AV(6) = 0                                                                                         |
| <b>Optional Properties</b>        | None               |            |                                                                                                                                                                        |                                                                                                                                                                                                                                                                     |
| <b>Proprietary Properties</b>     | None               |            |                                                                                                                                                                        |                                                                                                                                                                                                                                                                     |

## Binary Input Objects

|                            | Property Name /ID | Attributes | Range | Default                                                                                                                                                                                                                                  |
|----------------------------|-------------------|------------|-------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Required Object Properties | Object Identifier | R          |       |                                                                                                                                                                                                                                          |
|                            | Object Name       | R          |       | BI(0) = "DI1"<br>BI(1) = "DI2"<br>BI(2) = "Occupancy"<br>BI(3) = "Push Button 1"<br>BI(4) = "Push Button 2"<br>BI(5) = "Push Button 3" = PB Option when SPB fitted<br>BI(6) = "Push Button 4" = PB2 Option Second Button when SPB fitted |
|                            | Object Type       | R          |       | 3                                                                                                                                                                                                                                        |
|                            | Present Value     | R/W        | 0..1  |                                                                                                                                                                                                                                          |
|                            | Status Flags      | R          |       |                                                                                                                                                                                                                                          |
|                            | Event State       | R          |       |                                                                                                                                                                                                                                          |
|                            | Out-Of-Service    | R/W        |       | FALSE                                                                                                                                                                                                                                    |
|                            | Polarity          | R/W        |       | POLARITY_NORMAL                                                                                                                                                                                                                          |
|                            | Active Text       | R          |       | "on"                                                                                                                                                                                                                                     |
|                            | Inactive Text     | R          |       | "off"                                                                                                                                                                                                                                    |
| Optional Properties        | None              |            |       |                                                                                                                                                                                                                                          |
| Proprietary Properties     | None              |            |       |                                                                                                                                                                                                                                          |

## Binary Output Objects

|                            | Property Name /ID  | Attributes | Range | Default                                                                                                                                                                                                |
|----------------------------|--------------------|------------|-------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Required Object Properties | Object Identifier  | R          |       |                                                                                                                                                                                                        |
|                            | Object Name        | R          |       | BO(0) = "DO1"<br>BO(1) = "DO2"<br>BO(2) = "SPA Reset"*1<br>BO(3) = "PB1_LED"*2<br>BO(4) = "PB2_LED"*2<br>BO(5) = "PB3_LED"*2<br>BO(6) = "PB4_LED"*2<br>BO(7) - Not Applicable<br>BO(8) - NonVol Update |
|                            | Object Type        | R          |       | 4                                                                                                                                                                                                      |
|                            | Present Value      | R/W        | 0..1  |                                                                                                                                                                                                        |
|                            | Status Flags       | R          |       |                                                                                                                                                                                                        |
|                            | Event State        | R          |       |                                                                                                                                                                                                        |
|                            | Out-Of-Service     | R/W        |       | FALSE                                                                                                                                                                                                  |
|                            | Polarity           | R/W        |       | POLARITY_NORMAL                                                                                                                                                                                        |
|                            | Priority Array     | R          |       |                                                                                                                                                                                                        |
|                            | Relinquish Default | R/W        |       | BINARY_INACTIVE                                                                                                                                                                                        |
|                            | Active Text        | R          |       | "on"                                                                                                                                                                                                   |
|                            | Inactive Text      | R          |       | "off"                                                                                                                                                                                                  |
| Optional Properties        | None               |            |       |                                                                                                                                                                                                        |
| Proprietary Properties     | None               |            |       |                                                                                                                                                                                                        |

Note 1: Setting "SPA Reset" to true, disables the user setpoint adjustment. Only available with -SPB option.

Note 2: Set "Push Button Mode" to BMS in order to be able to control push button LEDs. When PBx\_LED is set to 'off' the Push Button timer is reset. PBx\_LED has to be set to 'null' in order to be able to re-trigger the push button.password

## Multi-State Input Objects

|                                   | Property Name /ID | Attributes | Range                     | Default       |
|-----------------------------------|-------------------|------------|---------------------------|---------------|
| <b>Required Object Properties</b> | Object Identifier | R          |                           |               |
|                                   | Object Name       | R          |                           | "Alarm Level" |
|                                   | Object Type       | R          |                           | 13            |
|                                   | Present Value     | R/W        | 1,2,3 (Green, Amber, Red) |               |
|                                   | Status Flags      | R          |                           |               |
|                                   | Event State       | R          |                           |               |
|                                   | Out-Of-Service    | R/W        |                           | FALSE         |
|                                   | Number-Of-States  | R          |                           | 3             |
| <b>Optional Properties</b>        | None              |            |                           |               |
| <b>Proprietary Properties</b>     | None              |            |                           |               |

## Proprietary Object Types

No dynamic Creation or Deletion supported

| Object                           | Number Of Instances | Instance Assignments                                                                                                                                                                                                                   |
|----------------------------------|---------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Application Configuration Object | 1                   | Provides a container for all the proprietary application specific properties.<br>Proprietary Property Id's within the object have been deliberately chosen to correspond to the equivalent Modbus register addresses for this product. |

## App\_Config Object

|                                   | Property Name /ID | Attributes | Range | Default         |
|-----------------------------------|-------------------|------------|-------|-----------------|
| <b>Required Object Properties</b> | Object Identifier | R          |       | proprietary-128 |
|                                   | Object Name       | R/W        |       | "App_Config1"   |
|                                   | Object Type       | R          |       | proprietary-128 |
| <b>Optional Properties</b>        | None              |            |       |                 |

|                               | Property ID                             | Description                        | BACnet Data Type | Range                                                                                                                                                                                                                                                                                                                                        |
|-------------------------------|-----------------------------------------|------------------------------------|------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Proprietary Properties</b> | 40004<br>Default:<br>CO2 Sensor         | Analogue Output Y1 Mode            | Unsigned         | 0 = Network Value<br>1 = CO2 Measurement (Default)<br>2 = Temperature Measurement<br>3 = Humidity Measurement<br>4 = Light Measurement<br>5 = CO2 Control<br>6 = Temperature Control<br>7 = Humidity Control<br>8 = Light Control<br>9 = Maximum Control<br>10 = Potentiometer<br>11 = Max Hum/Temp Control<br>12 = Max Hum/Temp/CO2 Control |
|                               | 40005<br>Default:<br>Temperature Sensor | Analogue Output Y2 Mode            | Unsigned         |                                                                                                                                                                                                                                                                                                                                              |
|                               | 40006<br>Default:<br>Humidity Sensor    | Analogue Output Y3 Mode            | Unsigned         |                                                                                                                                                                                                                                                                                                                                              |
|                               | 40007                                   | AO4 Mode (Reserved for future use) | Unsigned         |                                                                                                                                                                                                                                                                                                                                              |
|                               | 40008<br>Default:<br>Push Button 1      | Digital Output 1 Mode              | Unsigned         | 0 = Network Value<br>1 = CO2 Relay<br>2 = Temperature Relay<br>3 = Humidity Relay<br>4 = Light Relay (LUX)<br>5 = Occupancy Relay<br>6 = Push Button 1 (PB1/2 Option)<br>7 = Push Button 2 (PB2 Option)<br>8 = Push Button 3 (PB3 Option)<br>9 = Push Button 4 (PB4 Option)<br>10 = Alarm Amber Threshold<br>11 = Alarm Red Threshold        |
|                               | 40009<br>Default:<br>Occupancy Relay    | Digital Output 2 Mode              | Unsigned         |                                                                                                                                                                                                                                                                                                                                              |

|  | Property ID | Description                                     | BACnet Data Type | Range                                                                             |
|--|-------------|-------------------------------------------------|------------------|-----------------------------------------------------------------------------------|
|  | 40010       | CO2 Control Setpoint                            | Unsigned         | 0..5000ppm<br>(Default 1,000 ppm)                                                 |
|  | 40011       | CO2 Proportional Band                           | Unsigned         | 10..5000 ppm<br>(Default = 300 ppm)                                               |
|  | 40012       | CO2 Control Integral Action                     | Unsigned         | 0..10,000 seconds                                                                 |
|  | 40013       | CO2 Loop Operating Mode                         | Unsigned         | 0 = Reverse Control<br>1 = Direct Control                                         |
|  | 40014       | CO2 Digital Output Mode Hysteresis              | Unsigned         | 10..5000ppm<br>(Default 100 ppm)                                                  |
|  | 40015       | Temperature Control Setpoint                    | Unsigned         | 0.0...150.0°C/°F<br>(Default 20°C)                                                |
|  | 40016       | Temperature Proportional Band                   | Unsigned         | 0.1...150.0°C/°F<br>(Default 50°C)                                                |
|  | 40017       | Temperature Control Integral Action             | Unsigned         | 0..10,000 seconds                                                                 |
|  | 40018       | Temperature Loop Operating Mode                 | Unsigned         | 0 = Reverse Control (Heating)<br>1 = Direct Control (Cooling)                     |
|  | 40019       | Temperature Digital Output Mode Hysteresis      | Unsigned         | 0.1...150.0°C/°F<br>(Default 2°C)                                                 |
|  | 40020       | Humidity Control Setpoint                       | REAL             | 0.0...100.0 %rH<br>(Default 50%)                                                  |
|  | 40021       | Humidity Proportional Band                      | REAL             | 0.1...100.0 %rH<br>(Default 20.0%)                                                |
|  | 40022       | Humidity Control Integral Action                | Unsigned         | 0..10,000 seconds                                                                 |
|  | 40023       | Humidity Loop Operating Mode                    | Unsigned         | 0 = Reverse Control (Humidification)<br>1 = Direct Control (De-humidification)    |
|  | 40024       | Humidity Digital Output Mode Hysteresis         | Unsigned         | 1.0...100.0 %rH<br>(Default 5.0%)                                                 |
|  | 40025       | Lux Control Setpoint                            | Unsigned         | 0..3,000 Lux<br>(Default 400 Lux)                                                 |
|  | 40026       | LUX Proportional Band                           | Unsigned         | 1..3,000 Lux<br>(Default 400 Lux)                                                 |
|  | 40027       | LUX Control Integral Action                     | Unsigned         | 0..10,000 seconds                                                                 |
|  | 40028       | Lux Loop Operating Mode                         | Unsigned         | 0 = Reverse Control<br>1 = Direct Control                                         |
|  | 40029       | LUX Digital Output Mode Hysteresis              | Unsigned         | 1..3,000 Lux<br>(Default 100 Lux)                                                 |
|  | 40030       | Amber Alarm LED Switching Point                 | Unsigned         | 0..5000 (Default 750)                                                             |
|  | 40031       | Red Alarm LED Switching Point                   | Unsigned         | 0..5000 (Default 1250)                                                            |
|  | 40032       | Alarm LED Hysteresis                            | Unsigned         | 0..5000 (Default 50)                                                              |
|  | 40033       | Alarm LED Mode                                  | Unsigned         | 0 = CO2 (default)<br>1 = Temperature<br>2 = Humidity<br>3 = LUX                   |
|  | 40034       | Delay Time Setting for Occupancy                | Unsigned         | 1..7200 Seconds                                                                   |
|  | 40035       | Delay Time Setting for Push Button              | Unsigned         | 1..28800 Seconds                                                                  |
|  | 40036       | Setpoint Adjuster / Potentiometer Low Position  | REAL             | -500.0..0 (-3.0) Default                                                          |
|  | 40037       | Setpoint Adjuster / Potentiometer High Position | REAL             | 0..+500.0 (3.0) Default                                                           |
|  | 40038       | Setpoint Value Influence to Control Setpoint    | Unsigned         | 0 = No Influence<br>1 = CO2 Control<br>2 = Temperature<br>3 = Humidity<br>4 = Lux |

|                                   | Property Name /ID | Attributes | Range | Default         |
|-----------------------------------|-------------------|------------|-------|-----------------|
| <b>Required Object Properties</b> | Object Identifier | R          |       | proprietary-128 |
|                                   | Object Name       | R/W        |       | "App_Config2"   |
|                                   | Object Type       | R          |       | proprietary-128 |
| <b>Optional Properties</b>        | None              |            |       |                 |

|                               | Property ID | Description                                 | BACnet Data Type | Range                                                                        |
|-------------------------------|-------------|---------------------------------------------|------------------|------------------------------------------------------------------------------|
| <b>Proprietary Properties</b> | 40039       | Temperature Unit Selection                  | Unsigned         | 0 = Celsius<br>1 = Fahrenheit                                                |
|                               | 40040       | Language Selection (for display rH vs FH)   | Unsigned         | 0 = English (default)<br>1 = German                                          |
|                               | 40041       | Display Mode                                | Unsigned         | 0 = Rotate Installed<br>1 = CO2 Only<br>2 = Temperature Only<br>3 = LUX Only |
|                               | 40042       | Analogue Output Maximum CO2 Scaling         | Unsigned         | 1000..5000 ppm<br>(Default = 2,000 ppm)                                      |
|                               | 40043       | Analogue Output Maximum Temperature Scaling | Unsigned         | 0.1...150.0°C/°F<br>(Default 50°C)                                           |
|                               | 40044       | Analogue Output Humidity Maximum Scaling    | Unsigned         | 0.1...100.0 %rH<br>(Default 100.0%)                                          |
|                               | 40045       | Analogue Output Maximum Lux Scaling         | Unsigned         | 1000..3,000 Lux<br>(Default 3,000 Lux)                                       |
|                               | 40046       | One Point CO2 Calibration Field             | REAL             | -200..+200ppm<br>(Default 0ppm)                                              |
|                               | 40047       | One Point Temperature Calibration Field     | REAL             | -3.0..+3.0°C/°K<br>(Default 0°C)                                             |
|                               | 40048       | One Point Humidity Calibration Field        | REAL             | -5.0..+5.0 %rH<br>(Default 0 %rH)                                            |
|                               | 40050       | MAC Address                                 | Unsigned         | 0..255                                                                       |
|                               | 40051       | Baud Rate                                   | Unsigned         | 0 = 9600 (Default)<br>1 = 19200<br>2 = 38400<br>3 = 76800                    |
|                               | 40067       | Hold On Delay Setting for Digital Input 1   | Unsigned         | 1..28800 Seconds                                                             |
|                               | 40068       | Hold On Delay Setting for Digital Input 2   | Unsigned         | 1..28800 Seconds                                                             |
|                               | 40069       | Push Button 1 Mode                          | Unsigned         | 0 = Local<br>1 = BMS                                                         |
|                               | 40076       | Push Button 2 Mode                          | Unsigned         | 0 = Local<br>1 = BMS                                                         |
|                               | 40077       | Push Button 3 Mode                          | Unsigned         | 0 = Local<br>1 = BMS                                                         |
|                               | 40078       | Push Button 4 Mode                          | Unsigned         | 0 = Local<br>1 = BMS                                                         |
|                               | 40080       | LCD Backlight Level                         | Unsigned         | 0..10                                                                        |
|                               | 40081       | Reset SPA on Setpoint Change                | Unsigned         | 0 = Disabled<br>1 = Enabled                                                  |
|                               | 40078       | Save SPA (user adjustment on exit)          | Unsigned         | 0 = Disabled<br>1 = Enabled                                                  |
|                               | 40082       | Setpoint Adjustment Step                    | Unsigned         | 0 = 0.1°C/°F (default)<br>1 = 0.5°C/°F<br>1 = 1°C/°F                         |
|                               | 40100       | Force Reset                                 | Unsigned         | 0 = Normal<br>1 = Force Reset                                                |

|  | Property ID | Description                             | BACnet Data Type | Range                               |
|--|-------------|-----------------------------------------|------------------|-------------------------------------|
|  | 40101       | Non Volatile Memory Update              | Unsigned         | 0 = Normal<br>1 = Update            |
|  | 40103       | Force Factory Defaults                  | Unsigned         | 0 = Normal<br>1 = Force Defaults    |
|  | 40104       | Force 0..10V Output Calibration Routine | Unsigned         | 0 = Normal<br>1 = Force Calibration |
|  | 40105       | Force CO2 Sensor Calibration Routine    | Unsigned         | 0 = Normal<br>1 = Force Calibration |
|  | 40106       | Enable / Disabled CO2 Auto-Calibration  | Unsigned         | 0 = Disable<br>1 = Enable           |
|  | 40107       | Set Manual CO2 Calibration Level        | Unsigned         | 0...5000 (Read Only)                |

**NOTE:**Information is subject to change without prior notice.

## Dimensions

