

HDH-M Room CO₂ and Temperature Transmitters with Modbus

HDH-M and HDH-M-N transmitters are designed to detect carbon dioxide concentration and temperature in the climate zone. The CO₂ sensor will become self-calibrated regularly by using patented ABCLogic™ method. Outputs, linear 0-10V signals related to CO₂-concentration and temperature, can be used for demand controlled ventilation in buildings. HDH-M models have also built-in RS485 Modbus RTU interface.

HDH transmitters can be installed on wall surface or on junction box in dry indoor environment. HDH-M-N is like HDH, but with a display. As a factory setting the display is scanning between temperature and CO₂ every 2 seconds. By pressing the button inside the desired display mode can be selected.

By changing the normal cover (and display) to the HDH-C option HDH-M (HDH-M-N) will become as a controller. Selected controller output will be available at the terminal no. 5 (AO3). Control parameters are also available via Modbus communication for remote parametrisation.

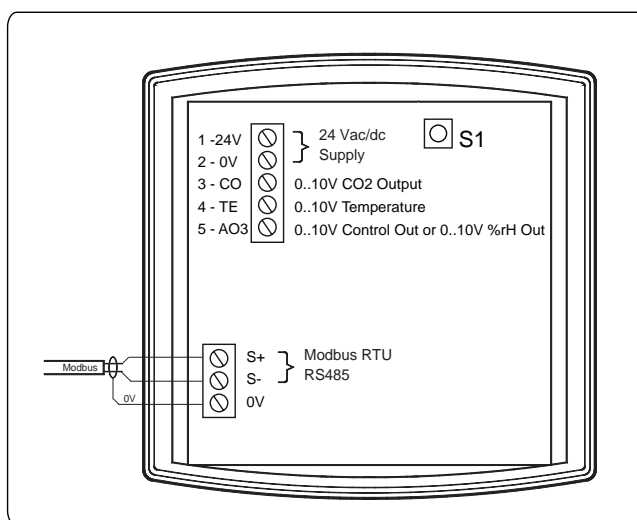


Model Type	Model	Description
	HDH-M	HDH Room CO ₂ and Temperature Transmitter with Modbus
	HDH-M-N	HDH Room CO ₂ and Temperature Transmitter with Display and Modbus
	HDH-M-RH	HDH Room CO ₂ , Temperature and Humidity Transmitter with Modbus
	HDH-M-RH-N	HDH Room CO ₂ , Temperature and Humidity Transmitter with Display and Modbus
Technical Data	Power supply	24Vac (15...28V) / 0.5VA 24Vdc (15...36V) / 0.5W
	Display (-N Models)	LCD Display for Showing CO ₂ and Temperature (configurable for CO ₂ or temperature only)
	Outputs	HDH-M: 2 x 0..10V < 2mA HDH-M-RH: 3 x 0..10V < 2mA
	Range	CO ₂ : 0...2000ppm CO ₂ Temperature: 0..50°C
	Range (RH-Option)	rH: 0..100% = 0..10 VdcrH
	Accuracy - CO ₂	± 40ppm + 3% of the reading @ 25°C (ABCLogic™)
	Accuracy - Temperature	±0.5°C
	Stability / Year	<2% FS (ABCLogic™)
	Temperature dependence	0.2% FS / °C
	Pressure dependence	0.17% reading/mbar
	Communications	Modbus RTU, Parity None, 9k6, 19k2 or 38k4 Baud Rate Note: Modbus settings available using HDH-C accessory
	Operating temperature	0°C...+50°C
	Ambient humidity	0...95%rh (non-cond.)

Response time (0...90%)	<1min
Warm-up time	<10 min
Housing	ABS-plastic, IP 20
Dimensions	W87 x H86 x D32mm

Wiring Terminals

1 - 24V	24Vac/dc power supply
2 - 0V	0V common
3 - CO2	CO2 output: 0..10Vdc = 0..2000ppm CO ₂
4 - TE	Temperature output: 0...10Vdc = 0...50°C
5 - AO3 (RH)	Control output: 0...10Vdc (HDH-C OPTION) Humidity output: 0...10Vdc (RH OPTION)
S+	Modbus RS485+
S-	Modbus RS485-
0V	0V for Modbus



ABCLogic™ & Calibration

ABCLogic™ is a patented self-calibration technique, that is designed to be used in applications where concentrations will drop to outside conditions (appr. 400 ppm) at least twice in a week period (= an unoccupied building). For applications that do not see periodic ambient conditions, ABCLogic can be turned off but a regular single point calibration of the sensor in 6 -12 months is necessary. Checking and calibration is recommended every 5th year even if ABCLogic is on.

HDH-M Controller - Adjustments via HDH-C Calibration / Controller Module

The HDH-M CO2 transmitter comes from the factory configure with Modbus speed 9600 bps and Modbus slave address 1. To re-program the setting HDH-C calibration / configuration / controller option needs to be fitted on the HDH sensor.

To change the HDH Modbus settings using HDH-C tool, please use the following instructions (for further info please refer to HDH-C data sheet).

- Fit the HDH-C unit on the HDH transmitter display connectors
- Power up the HDH
- Press + and - continuously for 5 seconds, APPL = CAL calibration display is shown
- Press + or - button, APPL = MOD is displayed
- Press OK to show Modbus slave address. Press +/- to modify the slave address.
- Press OK to the baud rate. Press +/- to modify the baud rate.
- Press OK and the new settings are saved

AO3 Mode Selection (non RH models)

KLH-M has additional analogue output that can be set over the Modbus if the humidity option has not been populated. The analogue output can also be configured to operate as a control output based on the temperature or humidity. The analogue output can be used for local control, or any other control purposes over the Modbus network, e.g. controlling a zone valve.

To Configure AO3 to Operate as a Fixed Value Set Over the Modbus

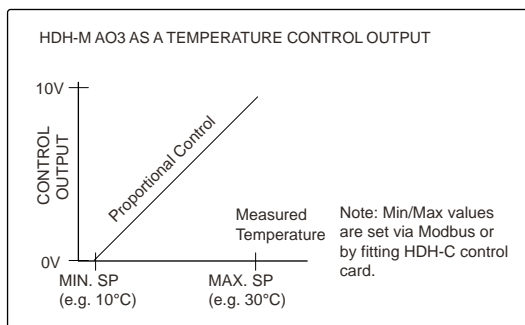
1. Enable AO3 Overdrive Enable (Modbus Coil)
2. Set the required value on the Aout3 Overdrive Value (Modbus Holding Register Write)

The output AO3 is now fixed to the value set in the Aout3 Overdrive Value register.

To Configure AO3 to Operate as Temperature Control Output

1. Disable AO3 Overdrive Enable (Modbus Coil) - if enabled
2. Set the Aout3 Select Mode to 2 or 4 (Modbus Holding Register Write).
3. Set the required TE Control Low Limit and TE Control High Limit settings.

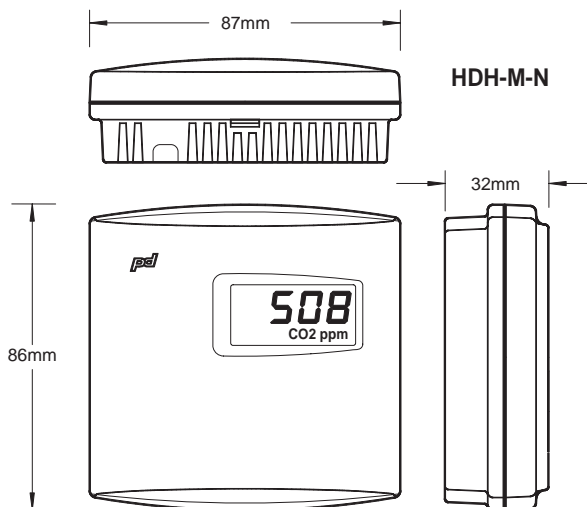
The output AO3 is now controlled based on the measured temperature and the set limits (see diagram).



To Configure AO3 to Operate as CO2 Control or Humidity Control Output

The AO3 can also be configured to operate as CO2 control output or as a humidity control output if rH option has been fitted (RH-models).

Dimensions



MODBUS REGISTERS - HDH V2.0

The controller supports the following Modbus registers and function codes. The default communication speed is 9600 bps, 8 data bits, Parity None and 1 Stop Bit. The default Modbus Slave address is 1.

Please note that Modbus register space is specified from the Modbus master perspective as in the Modbus Application Protocol specification. The Modbus registers for Function Codes 02, 03, 06 and 16 have presentation for both Modbus "address blocks" and for actual Modbus register offsets. For example, the Temperature is read from Modbus register 11 using Function Code 04. Some Modbus masters will require Function Code 04, register 1 to be entered, whereas the others will require register 30011 and Function Code 04. T

Register	Parameter Description	Data Type	Raw Data	Range
FUNCTION CODE 01 - READ COILS FUNCTION CODE 05 - WRITE SINGLE COIL FUNCTION CODE 15 - WRITE MULTIPLE COILS				
1	AO3 Overdrive Enable	Bit 0		On - Off
FUNCTION CODE 02 - READ DISCRETE INPUTS				
10001	Demo: Display Stopped	Bit 0		On - Off
FUNCTION CODE 03 - READ HOLDING REGISTERS				
40001	Coils 16-01	Unsigned 16	0..0xFFFF	
40002	Aout3 Select	Unsigned 16	0..4	0..4
40003	CO2 Control Low Limit	Signed 16	0..1950	0..1950 ppm
40004	CO2 Control High Limit	Signed 16	50..2000	50..2000 ppm
40005	TE Control Low Limit	Signed 16	0..480	0.0...48.0°C
40006	TE Control High Limit	Signed 16	20..500	2.0...50.0°C
40007	RH Control Low Limit	Signed 16	0..950	0.0...95.0 %rH
40008	RH Control High Limit	Signed 16	50...1000	5.0...100.0 %rH
30009	Aout3 Overdrive Value	Signed 16	0...1000	0.0...100.0%
FUNCTION CODE 04 - READ INPUT REGISTERS				
30001	Coils 16-01	Unsigned 16	0..0xFFFF	
30002	Aout3 Select	Unsigned 16	0..4	0..4
30003	CO2 Control Low Limit	Signed 16	0..1950	0..1950 ppm
30004	CO2 Control High Limit	Signed 16	50..2000	50..2000 ppm
30005	TE Control Low Limit	Signed 16	0..480	0.0...48.0°C
30006	TE Control High Limit	Signed 16	20..500	2.0...50.0°C
30007	RH Control Low Limit	Signed 16	0..950	0.0...95.0 %rH
30008	RH Control High Limit	Signed 16	50...1000	5.0...100.0 %rH
30009	Aout3 Overdrive Value	Signed 16	0...1000	0.0...100.0%
30010	CO2 Measurement	Signed 16	0..2000	0..2000 ppm
30011	TE Temperature	Signed 16	0..500	0.0...50.0°C
30012	RH Humidity	Signed 16	0...1000	0.0...100.0 %rH
30013	Aout3	Signed 16	0...1000	0.0...100.0 %
FUNCTION CODE 06 - WRITE SINGLE REGISTER FUNCTION CODE 16 - WRITE MULTIPLE REGISTERS				
40001	Coils 16-01	Unsigned 16	0..0xFFFF	
40002	Aout3 Select	Unsigned 16	0..4	0..4
40003	CO2 Control Low Limit	Signed 16	0..1950	0..1950 ppm
40004	CO2 Control High Limit	Signed 16	50..2000	50..2000 ppm
40005	TE Control Low Limit	Signed 16	0..480	0.0...48.0°C
40006	TE Control High Limit	Signed 16	20..500	2.0...50.0°C
40007	RH Control Low Limit	Signed 16	0..950	0.0...95.0 %rH
40008	RH Control High Limit	Signed 16	50...1000	5.0...100.0 %rH
40009	Aout3 Overdrive Value (Set over Modbus)	Signed 16	0...1000	0.0...100.0 %

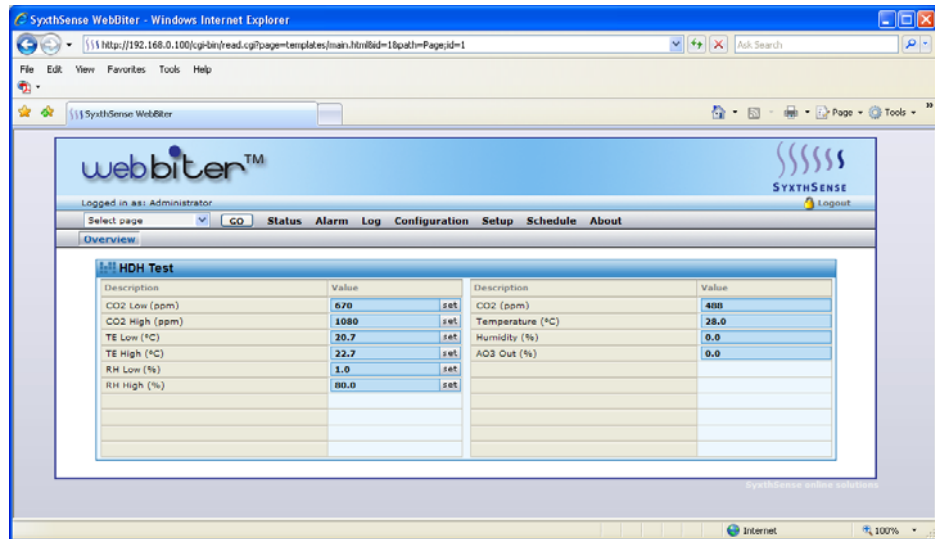
Example Modbus Master Screen

The below screen shows typical Modbus values displayed on the SyxtSense WebBiter Modbus master / web-browser interface.

WebBiter NET-CAB485 Wiring

S+ = Orange White (RS485+)

S- = Orange (RS485-)



Example Network Diagram

