

# Airlinq<sup>®</sup> – Digital BMS

## Parameters for BACNET<sup>™</sup>/IP

## BACNET<sup>™</sup>MS/TP

Manual

## BASIC INFORMATION

The present document is only valid for air handling units with firmware version 6.1 or newer. The firmware version is specified at index 111.

BACnet™ /IP: Unit IP address, gateway, DHCP settings etc. can be changed by using the configuration software that is available at Airmaster's website.

BACnet™ MS/TP: Unit address and baud rate can be changed via index 128 and 129 or by using Airlinq Service Tool that is available at Airmaster's website.

## BACNETCOMMUNICATION

Index	BMS Name	BMS Description	Access	Unit	Min	Max	Default	Resolution	Data type	Comments
128	Bacnet ms/tp addr.	BACnet™ MS/TP address.	[R/W]		0	127	0	1	Analog Value	
129	Bacnet ms/tp baud.	BACnet™ MS/TP baud rate.	[R/W]		0	3	0	1	Multi-State Value	0 = 9600 1 = 19200 2 = 38400 3 = 76800

## BASIC CONTROL SETTINGS

Index	BMS Name	BMS Description	Access	Unit	Min	Max	Default	Resolution	Data type	Comments
122	D-BMS auto vent.	Activate Automatic Operation at this input. This parameter is typically used to start/stop the air handling unit from the BMS. N.B.: Index 103, 118-121.	[R/W]		0	1	0	1	Binary Value	0 = No / Stop 1 = Yes / Start
125	D-BMS airflow %	Setpoint for desired airflow in case the unit is started by the BMS (index 122). If running by CO <sub>2</sub> sensor, set the basic flow level here, e.g. 40%.	[R/W]	%	0	100	0	1	Analog Value	
126	D-BMS temperature	Setpoint for desired inlet temperature in case the unit is started by the BMS (index 122). Please consult the manual for recommendations.	[R/W]	°C	8	40	19	0,1	Analog Value	
127	D-BMS CO <sub>2</sub> PPM	1) Leave this input at 0 ppm to allow the unit to run by CO <sub>2</sub> sensor(s) connected directly to the unit. 2) Set this input to -1 ppm to prevent the unit from running by CO <sub>2</sub> sensor(s) connected directly to the unit. 3) In case the BMS system has a CO <sub>2</sub> sensor, connect it to this input. Any ppm value greater than 0 ppm will disable any CO <sub>2</sub> sensor connected directly to the unit. N.B.: CO <sub>2</sub> limits can be adjusted: CO <sub>2</sub> minimum and maximum (index 109 and 110). For further information please consult the manual.	[R/W]	PPM	-1	5000	0	1	Analog Value	
123	D-BMS nightcool	Activate this input to request night cooling. Night cooling will only run when setpoint temperatures are exceeded during the day. The limits are adjustable via Nightcool high and low limit (index 107 and 108). For further information please consult the manual.	[R/W]		0	1	0	1	Binary Value	0 = No 1 = Yes
124	D-BMS Holiday mode	Activate holiday mode operation at this input.	[R/W]		0	1	0	1	Binary Value	0 = No 1 = Yes
118	D-BMS Start by PIR	PIR sensor is optional. In case the unit has a PIR sensor connected directly, is it allowed to start by it, or shall it only pass on the signal to the BMS system. When the unit is started by a local PIR sensor, index 133 and 134 are used as setpoints for airflow and inlet temperature.	[R/W]		0	1	1	1	Binary Value	0 = No 1 = Yes
119	D-BMS Start by CO <sub>2</sub>	CO <sub>2</sub> sensor is optional. In case the unit has a CO <sub>2</sub> sensor connected directly, is it allowed to start by it, or shall it only pass on the signal to the BMS system. When the unit is started by a local CO <sub>2</sub> sensor, index 133 and 134 are used as setpoints for airflow and inlet temperature.	[R/W]		0	1	1	1	Binary Value	0 = No 1 = Yes
120	D-BMS use timer	Is the unit allowed to start by the build in timer. The timer settings are not available via BMS, only the possibility to enable/disable the timer are available to BMS.	[R/W]		0	1	0	1	Binary Value	0 = No 1 = Yes
121	D-BMS Panel start	Control panel is optional. In case the unit has a local control panel connected, is it allowed to start by it. When the unit is started by a local control panel, index 133 and 134 are used as setpoints for airflow and inlet temperature.	[R/W]		0	1	1	1	Binary Value	0 = No 1 = Yes
103	Allow Ext. Start	In case the unit has an External Start Signal connected directly, is it allowed to start by it, or shall it only pass on the signal to the BMS system. When the unit is started by a local external start signal, index 133 and 134 are used as setpoints for airflow and inlet temperature.	[R/W]		0	1	1	1	Binary Value	0 = No 1 = Yes

## ADVANCED CONTROL SETTINGS

Index	BMS Name	BMS Description	Access	Unit	Min	Max	Default	Resolution	Data type	Comments
133	Default Airflow	Setpoint for desired airflow in case the unit is started by a local PIR, CO <sub>2</sub> , control panel or local external start (index 103, 118, 119, 121).	[R/W]	%	0	100	80	1	Analog Value	The default value is 0 % if the air handling unit is supplied with a CO <sub>2</sub> sensor.
134	Default Temperature	Setpoint for desired inlet temperature in case the unit is started by a local PIR, CO <sub>2</sub> , control panel or local external start (index 103, 118, 119, 121). Please consult the manual for recommendations.	[R/W]	°C	8	30	19	1	Analog Value	
102	PIR afterrun	Setpoint for the PIR afterrun time, local connected PIR only.	[R/W]	min	0	1080	30	1	Analog Value	The default value is 5 min if the air handling unit is supplied with a CO <sub>2</sub> sensor.
109	Min CO2	Setpoint for minimum CO <sub>2</sub> limit, when overriding flow by a CO <sub>2</sub> sensor. Consult the manual for further information on CO <sub>2</sub> control.	[R/W]	PPM	400	5000	500	50	Analog Value	
110	Max CO2	Setpoint for maximum CO <sub>2</sub> limit, when overriding flow by a CO <sub>2</sub> sensor. Consult the manual for further information on CO <sub>2</sub> control.	[R/W]	PPM	400	5000	900	50	Analog Value	
100	High Roomtemp.	Setpoint for the limit that causes the unit to enter "High Room Temperature" operation mode. Consult the manual for further description of the "High Room Temperature" operation mode.	[R/W]	°C	0	50	25	1	Analog Value	
101	Low Roomtemp.	Setpoint for the limit that causes the unit to exit "High Room Temperature" operation mode. Consult the manual for further description of the "High Room Temperature" operation mode.	[R/W]	°C	0	50	24	1	Analog Value	
107	Nightcool High	Setpoint for Night Cooling High Limit. Consult the "Night Cooling" section in the manual for further description.	[R/W]	°C	0	30	26	1	Analog Value	
108	Nightcool Low	Setpoint for Night Cooling Low Limit. Consult the "Night Cooling" section in the manual for further description.	[R/W]	°C	0	30	23	1	Analog Value	
105	Nightcool IT	Inlet Temperature setpoint when running in Night Cooling mode, started from BMS (index 123).	[R/W]	°C	0	30	16	1	Analog Value	
106	Nightcool Flow	Airflow setpoint when running in Night Cooling mode, started from BMS (index 123).	[R/W]	%	0	100	100	1	Analog Value	
114	d_AH_min_C	Coefficient for absolute humidity calculation.	[R/W]		-99,99	99,99	0	0,01	Analog Value	The default value is 3,6 if the air handling unit is supplied with electronic humidity sensors.
117	d_AH_max_C	Coefficient for absolute humidity calculation.	[R/W]		-99,99	99,99	0	0,01	Analog Value	The default value is 6,1 if the air handling unit is supplied with electronic humidity sensors.
104	Reboot	Activate this input to reboot the controller by setting the value to 1. The value will automatically return to 0.	[R/W]		0	1	0	1	Binary Value	0 = No 1 = Yes

## SENSOR SIGNALS

Index	BMS Name	BMS Description	Access	Unit	Min	Max	Default	Resolution	Data type	Comments
9	CO2 Level Room	CO <sub>2</sub> sensor is optional. The CO <sub>2</sub> concentration from a CO <sub>2</sub> sensor connected directly to the unit. N.B.: D-BMS CO2 PPM (index 127). N.B.: D-BMS Start by CO2 (index 119).	[R]	PPM	0	5000	0	1	Analog Value	
24	PIR Output	Motion sensor (PIR) is optional. The PIR signal includes the afterrun time (index 102). In case a PIR signal without afterrun time is preferred, set the afterrun time to 0. N.B.: D-BMS Start by PIR (index 118).	[R]		0	1	0	1	Binary Value	0 = Off 1 = On
23	Manuel Start	Indicates if the hardware input "External Start" is activated or not. N.B.: Allow Ext. Start (index 103).	[R]		0	1	0	1	Binary Value	0 = Off 1 = On

### SENSOR SIGNALS

Index	BMS Name	BMS Description	Access	Unit	Min	Max	Default	Resolution	Data type	Comments
1	Room Temperature	Room temperature, measured in the extraction air.	[R]	°C	-49	100	0	0,1	Analog Value	
2	Inlet Temperature	Inlet Temperature, measured at the inlet opening.	[R]	°C	-49	100	0	0,1	Analog Value	
7	Outside Temp. Vent.	Outside Temperature, measured at the air handling unit.	[R]	°C	-49	100	0	0,1	Analog Value	
8	Exhaust Temp. Vent.	Exhaust temperature, measured at the air handling unit, near the heat exchanger.	[R]	°C	-49	100	0	0,1	Analog Value	
3	Outside Temperature	Cooling module is optional. Outside temperature, measured at the cooling module. Used for both ON/OFF and inverter controlled cooling modules.	[R]	°C	-49	100	0	0,1	Analog Value	
6	Condenser Temp.	ON/OFF controlled cooling module is optional. Condenser Temperature. The Condenser is a part of the cooling module.	[R]	°C	-49	100	0	0,1	Analog Value	
5	Evaporator Temp.	ON/OFF controlled cooling module is optional. Evaporator Temperature. The Evaporator is a part of the cooling module.	[R]	°C	-49	100	0	0,1	Analog Value	
36	Evaporator In Temp.	Inverter controlled cooling module is optional. Evaporator temperature, inlet. The evaporator is a part of the comfort cooling unit.	[R]	°C	-49	100	0	0,1	Analog Value	
37	Evaporator Out Temp.	Inverter controlled cooling module is optional. Evaporator temperature, outlet. The evaporator is a part of the comfort cooling unit.	[R]	°C	-49	100	0	0,1	Analog Value	
38	Hotgas Temperature	Inverter controlled cooling module is optional.	[R]	°C	-49	100	0	0,1	Analog Value	
18	Rel. Hum Supply	Humidity sensor is optional: Humidity measured in the supply air.	[R]	%	0	100	0	1	Analog Value	
19	Rel. Hum Extraction	Humidity sensor is optional: Humidity measured in the extraction air.	[R]	%	0	100	0	1	Analog Value	
14	Supply Flow #1 + #2	Flow measurement is optional. Measured supply airflow.	[R]	m³/h	0	10000	0	1	Analog Value	
15	Extraction Flow	Flow measurement is optional. Measured extraction airflow.	[R]	m³/h	0	10000	0	1	Analog Value	
30	Tot. Power (Wh)	Energy meter is optional. The energy meter measure the energy consumption of the air handling unit.	[R]	Wh	0	4294967295	0	1	Analog Value	
34	Cool Unit Power	Energy meter and cooling module are optional. The energy meter measure the energy consumption of the cooling module.	[R]	Wh	0	4294967295	0	1	Analog Value	

### SYSTEM INFORMATION

Index	BMS Name	BMS Description	Access	Unit	Min	Max	Default	Resolution	Data type	Comments
20	System Mode	This output indicates the system operating mode for the air handling unit.	[R]		0	255	0	1	Multi-State Value	0 = Stopped 1 = Starting 2 = Auto / Running 3 = Stopping 4 = Filter Test Running 5 = Filter Calibration 6 = Night Cooling 7 = Holiday Mode 8 = Manual Mode
16	Requested Temp.	The actual inlet temperature setpoint may vary from requested value, thus the actual setpoint is available here.	[R]	°C	0	100	0	0,1	Analog Value	
17	Requested Flow	The actual air flow setpoint may vary from requested value, thus the actual setpoint is available here, e.g. due to CO <sub>2</sub> override.	[R]	%	0	100	0	1	Analog Value	
13	Pre Heater %	Preheating surface is optional. Percentage heat output relative to maximum.	[R]	%	0	100	0	1	Analog Value	
10	Comfort Heater %	Comfort heating surface is optional. Percentage heat output relative to maximum.	[R]	%	0	100	0	1	Analog Value	

**SYSTEM INFORMATION**

Index	BMS Name	BMS Description	Access	Unit	Min	Max	Default	Resolution	Data type	Comments
12	Cooling %	Comfort cooling module is optional. Percentage cooling output relative to maximum.	[R]	%	0	100	0	1	Analog Value	
11	Bypass Damper %	Bypass damper is optional. Percentage bypass position relative to maximum.	[R]	%	0	100	0	1	Analog Value	0 = full heat recovery
21	System Condition	This output indicates the system condition for the air handling unit.	[R]		-32768	32767	0	1	Analog Value	N.B.: Convert to binary representation Bit 0 = [Low Temp Process Inactive Active] Bit 1 = [High Temp Process Inactive Active] Bit 2 = [Condensation Process Inactive Active] Bit 3 = [Non Critical Hardware Fault False True] Bit 4 = [Condenser Overheated False True] Bit 5 = [Compressor Locked False True] Bit 6 = [Filter Change Needed False True] Bit 7 = [High Room Temp False True] Bit 8 = [Abnormal Filter Test Calibration Result False True] Bit 9 = [Manual Override Active False True] Bit 10 = [Comfort Cool Defrost Warning  False True] Bit 11 = [Comfort Cool Condensation Warning False True] Bit 12 = [Boost Mode Active False True] Bit 13 = [Comfort Cool Hotgas Warning False True] Bit 14 = [Comfort Cool Pressure Warning False True] Bit 15 = [Group Master Not Available Warning False True]
22	System Alarm	This output indicates system alarms for the air handling unit.	[R]		-32768	32767	0	1	Analog Value	N.B.: Convert to binary representation Bit 0 = [Low Temp Alarm False True] Bit 1 = [Condensation Alarm False True] Bit 2 = [Filter Alarm False True] Bit 3 = [Critical Hardware Fault False True]
33	Hardware errors	This output indicates the hardware status of the the air handling unit and cooling module.	[R]		0	4294967295	0	1	Analog Value	N.B.: Convert to binary representation Bit 0 = [Room TemperatureSensor OK Fault] Bit 1 = [Inlet TemperatureSensor OK Fault] Bit 2 = [Outside TemperatureSensor OK Fault] Bit 3 = [General Purpose TemperatureSensor OK Fault] Bit 4 = [Condenser TemperatureSensor OK Fault] Bit 5 = [Evaporator TemperatureSensor OK Fault] Bit 6 = [Exhaust TemperatureSensor Ventilation Unit OK Fault] Bit 7 = [Outside TemperatureSensor Ventilation Unit OK Fault] Bit 8 = [Supplyflow Sensor 1 OK Fault] Bit 9 = [Supplyflow Sensor 2 OK Fault] Bit 10 = [Extractionflow Sensor OK Fault] Bit 11 = [CO2 Sensor OK Fault] Bit 12 = [Supply Fan OK Fault] Bit 13 = [Extraction Fan OK Fault] Bit 14 = [Evaporator In TemperatureSensor OK Fault] Bit 15 = [Evaporator Out TemperatureSensor OK Fault] Bit 16 = [Hotgas TemperatureSensor OK Fault] Bit 17 = [Comfort Cooling Connection Lost OK Fault] Bit 18 = [Comfort Cooling Stepdriver  OK Fault] Bit 19 = [Comfort Cooling Frequency Inverter OK Fault] Bit 20 = [Humidity Supply Air Sensor OK Fault] Bit 21 = [Humidity Extraction Air Sensor OK Fault] Bit 22 = [Humidity Sensor Settings OK Fault]
111	Firmware version	Software version installed in the air handling unit.	[R]		0	32	6	0,001	Analog Value	

**LOCAL CONTROL PANEL**

Index	BMS Name	BMS Description	Access	Unit	Min	Max	Default	Resolution	Data type	Comments
35	Panel Flow Request	Local control panel is optional. Flow percent requested by the user via a local control panel. N.B.: Panel Flow Function (index 130).	[R]	%	0	100	0	1	Analog Value	0 = no request from user
130	Panel Flow Function	This value defines how the air handling unit respond to a change of the airflow setpoint by the user via a local control panel. "Direct": The airflow setpoint can temporarily be overridden from a local control panel. "None": The airflow setpoint can not be overridden from a local control panel. "D-BMS": A change of the airflow setpoint from a local control panel will be shown at index 35, but will not affect the actual flow setpoint directly. N.B.: Manual Override Time (index 135).	[R/W]		0	2	1	1	Multi-State Value	0 = Direct 1 = None 2 = D-BMS
135	Manual Override Time	This value defines for how long time an override of the airflow setpoint from a local control panel will be stored in the controller.	[R/W]	hour(s)	0	18	12	1	Analog Value	

**SERVICE AND FILTER INFORMATION**

Index	BMS Name	BMS Description	Access	Unit	Min	Max	Default	Resolution	Data type	Comments
29	Filter remain. days	Estimated remaining service life of the filters in days calculated by the average daily operating hours since last service.	[R]	days	0	1000	0	1	Analog Value	
32	Remain Serv. Life H	Remaining service life of filters in operating hours.	[R]	hour(s)	0	65535	0	1	Analog Value	
31	Remain Serv. Life %	Estimated remaining service life of filters in %.	[R]	%	0	101	0	1	Analog Value	0 = filter change required 100 = clean filters
132	Reset Filter Status	The filter monitoring must be reset after a filter change. Set the value to 1 to reset filter status. The value will automatically return to 0 when filter status has been reset.	[R/W]		0	1	0	1	Binary Value	0 = No 1 = Yes
136	Filter Test Mode	This parameter defines the filter test mode. "Timer": Filter monitoring using an hour counter. "Tacho": Electronic flow monitoring. "Timer and tacho": Filter monitoring using an hour counter and electronic flow monitoring.	[R/W]		0	3	3	1	Multi-State Value	0 = Off 1 = Timer (default for air handling units with AQC-L) 2 = Tacho 3 = Timer And Tacho (default for air handling units with AQC-P)
137	Life Span Warning	This value defines the operating hours before activating a filter warning at index 21.	[R/W]	hour(s)	0	8760	1500	1	Analog Value	The default value is 4000 h for CV and DV product series.
138	Life Span Alarm	This value defines the operating hours before activating a filter alarm at index 22.	[R/W]	hour(s)	0	8760	2000	1	Analog Value	The default value is 5000 h for CV and DV product series.
139	Filter Max Life Time	This value defines the maximum filter life time and for how many months the air handling unit can operate after a service reset before activating a filter alarm (index 22). The max life time alarm can be disabled by setting the value to 0.	[R/W]	month(s)	0	48	14	1	Analog Value	
140	Filter Warn. Period	This value defines the period for a filter warning at index 21 before the filter alarm activates. By using the default value of this parameter the filter warning at index 21 is activated 2 months before the maximum filter life time expires (index 139).	[R/W]	month(s)	0	12	2	1	Analog Value	
131	Run Filter Calib.	Set the value to 1 to run a filter calibration. The value will automatically return to 0 when the calibration process has finished. N.B.: Do only run a filter calibration with clean filters. N.B.: Do only run a filter calibration at the first start of an air handling unit with AQC-P control box by non standard installation e.g. on reduction of the duct size, when using more than 1 m of duct or when installing with elbows. N.B.: A new filter calibration shall be performed if the filter class is changed (from M5 to F7 etc.) during a service routine of the air handling unit with AQC-P control box.	[R/W]		0	1	0	1	Binary Value	0 = No 1 = Yes

Notes:

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Version Januar 2016 – Änderungen vorbehalten.

