Airlinq® – Digital BMS

Parameters for MODBUS® RTU RS485

Manual

AIRFLOW®

SPEZIALISTEN IN DER LÜFTUNGSTECHNIK

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 register 40030.

MODBUS Data Model: Holding Registers
Function Code: 03 Read Holding Registers
Transmission Mode: RTU, RS-485
Register Formats: Signed 16-bit Integer

MODBUS COMMUNICATION

Register	BMS Name	BMS Description	Access	Unit	Min	Max	Default	Scale	Comments
40001	Modbus Address	Setpoint for the Modbus address. N.B.: Any change of the current parameter requires a reboot (register 40057).	[R/W]		1	247	3	X1	
40002	Modbus baud	Setpoint for the Modbus baud rate. N.B.: Any change of the current parameter requires a reboot (register 40057).	[R/W]		0	5	1	X1	0 = 9600 1 = 19200 2 = 38400 3 = 57600 4 = 115200 5 = 230400
40003	Modbus Parity	Setpoint for the Modbus parity mode. N.B.: Any change of the current parameter requires a reboot (register 40057).	[R/W]		0	2	2	X1	0 = None (2 Stop bits) 1 = Odd (1 Stop bit) 2 = Even (1 Stop bit)

BASIC CONTROL SETTINGS

Register	BMS Name	BMS Description	Access	Unit	Min	Max	Default	Scale	Comments
40004	Automatic Operation: Start	Activate Automatic Operation at this input. This parameter is typically used to start/stop the air handling unit from the BMS. N.B.: Register 40042-40046.	[R/W]		0	1	0	X1	0 = No / Stop 1 = Yes / Start
40005	Automatic Operation: Flow setpoint	Setpoint for desired airflow in case the unit is started by the BMS (register 40004). If running by CO_2 sensor, set the basic flow level here, e.g. 40%.	[R/W]	%	0	100	0	X1	
40006	Automatic Operaion: IT setpoint	Setpoint for desired inlet temperature in case the unit is started by the BMS (register 40004). Please consult the maunal for recommendations.	[R/W]	°C	8	40	19	X10	
40007	Automatic Operation: CO2 input	1) Leave this input at 0 ppm to allow the unit to run by CO_2 sensor(s) connected directly to the unit. 2) Set this input to -1 ppm to prevent the unit from running by CO_2 sensor(s) connected directly to the unit. 3) In case the BMS system has a CO_2 sensor, connect it to this input. Any ppm value greater than 0 ppm will disable any CO_2 sensor connected directly to the unit. N.B.: CO_2 limits can be adjusted: CO_2 minimum and maximum (register 40050 and 40051). For further information please consult the manual.	[R/W]	PPM	-1	5000	0	X1	
40008	Night Cooling: Start	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 Night Cooling: high and low limit (register 40054 and 40055). For further information please consult the manual.	[R/W]		0	1	0	X1	0 = No 1 = Yes
40009	Holiday Mode Operation: Start	Activate holiday mode operation at this input.	[R/W]		0	1	0	X1	0 = No 1 = Yes

BASIC CONTROL SETTINGS

Register	BMS Name	BMS Description	Access	Unit	Min	Max	Default	Scale	Comments
40042	Allow Start by Local 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, register 40072 and 40073 are used as setpoints for airflow and inlet temperature.	[R/W]		0	1	1	X1	0 = No 1 = Yes
40043	Allow Start by Local CO2	CO_2 sensor is optional. In case the unit has a CO_2 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_2 sensor, register 40072 and 40073 are used as setpoints for airflow and inlet temperature.	[R/W]		0	1	1	X1	0 = No 1 = Yes
40044	Allow Start by Local 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	X1	0 = No 1 = Yes
40045	Allow Start by Local Panel	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, register 40072 and 40073 are used as setpoints for airflow and inlet temperature.	[R/W]		0	1	1	X1	0 = No 1 = Yes
40046	Allow Start by Local External 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, register 40072 and 40073 are used as setpoints for airflow and inlet temperature.	[R/W]		0	1	1	X1	0 = No 1 = Yes

ADVANCED CONTROL SETTINGS

Register	BMS Name	BMS Description	Access	Unit	Min	Max	Default	Scale	Comments
40072	Default Airflow	Setpoint for desired airflow in case the unit is started by a local PIR, CO_2, control panel or local external start (register 40042, 40043, 40045, 40046).	[R/W]	%	0	100	80	X1	The default value is 0 % if the air handling unit is supplied with a CO_2 sensor.
40073	Default Temperature	Setpoint for desired inlet temperature in case the unit is started by a local PIR, CO_2, control panel or local external start (register 40042, 40043, 40045, 40046). Please consult the maunal for recommendations.	[R/W]	°C	8	30	19	X1	
40049	PIR Afterrun Time	Setpoint for the PIR afterrun time, local connected PIR only.	[R/W]	min	0	1080	30	X1	The default value is 5 min if the air handling unit is supplied with a CO_2 sensor.
40050	CO2, Minimum	Setpoint for minimum CO_2 limit, when overriding flow by a CO_2 sensor. Consult the manual for further information on CO_2 control.	[R/W]	PPM	400	5000	500	X1	
40051	CO2, Maximum	Setpoint for maximum CO_2 limit, when overriding flow by a CO_2 sensor. Consult the manual for further information on CO_2 control.	[R/W]	PPM	400	5000	900	X1	
40047	High Room Temperature, High limit	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	X10	
40048	High Room Temperature, Low limit	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	X10	
40054	Night Cooling: High limit	Setpoint for Night Cooling High Limit, Consult the "Night Cooling" section in the manual for further description.	[R/W]	°C	0	30	26	X10	
40055	Night Cooling: Low limit	Setpoint for Night Cooling Low Limit, Consult the "Night Cooling" section in the manual for further description.	[R/W]	°C	0	30	23	X10	
40056	Night Cooling: IT setpoint	Inlet Temperature setpoint when running in Night Cooling mode, started from BMS (register 40008).	[R/W]	°C	0	30	16	X10	
40058	Night Cooling: Flow setpoint	Airflow setpoint when running in Night Cooling mode, started from BMS (register 40008).	[R/W]	%	0	100	100	X1	
40061	Absolute humidity Min. C Coefficient	Coefficient for absolute humidty calculation.	[R/W]		-99,99	99,99	0	X100	The default value is 3,6 if the air handling unit is supplied with electronic humidity sensors.
40064	Absolute humidity Max. C Coefficient	Coefficient for absolute humidty calculation.	[R/W]		-99,99	99,99	0	X100	The default value is 6,1 if the air handling unit is supplied with electronic humidity sensors.
40057	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	X1	0 = No 1 = Yes

SENSOR SIGNALS

Register	BMS Name	BMS Description	Access	Unit	Min	Max	Default	Scale	Comments
40014	CO2 output	CO_2 sensor is optional. The CO_2 concentration from a CO_2 sensor connected directly to the unit. N.B.: Automatic Operation: CO_2 input (register 40007). N.B.: Allow Start by Local CO_2 (register 40043).	[R]	PPM	0	5000	0	X1	
40015	PIR output	Motion sensor (PIR) is optional. The PIR signal includes the afterrun time (register 40049). In case a PIR signal without afterrun time is preferred, set the afterrun time to 0. N.B.: Allow start by local PIR (register 40042).	[R]		0	1	0	X1	0 = Off 1 = On
40016	External Start output	Indicates if the hardware input "External Start" is activated or not. N.B.: Allow start by External Start (register 40046).	[R]		0	1	0	X1	0 = Off 1 = On
40017	Room Temperature	Room temperature, measured in the extraction air.	[R]	°C	-49	100	0	X10	
40018	Inlet Temperature	Inlet Temperature, measured at the inlet opening.	[R]	°C	-49	100	0	X10	
40023	Outside Temperature at Ventilation Unit	Outside Temperature, measured at the air handling unit.	[R]	°C	-49	100	0	X10	
40024	Exhaust Temperature at Ventilation Unit	Exhaust temperature, measured at the air handling unit, near the heat exchanger.	[R]	°C	-49	100	0	X10	
40019	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	X10	
40021	Condenser Temperature	ON/OFF controlled cooling module is optional. Condenser Temperature. The Condenser is a part of the cooling module.	[R]	°C	-49	100	0	X10	
40022	Evaporator Temperature	ON/OFF controlled cooling module is optional. Evaporator Temperature. The Evaporator is a part of the cooling module.	[R]	°C	-49	100	0	X10	
40084	Evaporator In Temperature	Inverter controlled cooling module is optional. Evaporator temperature, inlet. The evaporator is a part of the comfort cooling unit.	[R]	°C	-49	100	0	X10	
40085	Evaporator Out Temperature	Inverter controlled cooling module is optional. Evaporator temperature, outlet. The evaporator is a part of the comfort cooling unit.	[R]	°C	-49	100	0	X10	
40086	Hotgas Temperature	Inverter controlled cooling module is optional.	[R]	°C	-49	100	0	X10	
40025	Relative Humidity, outside	Humidity sensor is optional. Humidity measured in the supply air.	[R]	%	0	100	0	X1	
40026	Relative Humidity, inside	Humidity sensor is optional. Humidity measured in the extraction air.	[R]	%	0	100	0	X1	
40036	Supply Flow	Flow measurement is optional. Measured supply airflow.	[R]	m^3/h	0	10000	0	X1	
40037	Extraction Flow	Flow measurement is optional. Measured extraction airflow.	[R]	m^3/h	0	10000	0	X1	
40040	Airhandling Unit Energy Meter	Energy meter is optional. The energy meter measure the energy consumption of the air handling unit. N.B.: decimal points are available in a seperate value (register 40041).	[R]	kWh	0	32767	0	X1	
40041	Airhandling Unit Energy Meter decimal points	Energy meter is optional. The decimal values of the air handling unit energy consumption.	[R]	kWh	0	0,999	0	X1000	
40080	Cooling Unit Power Consumption	Energy meter and cooling module are optional. The energy meter measure the energy consumption of the cooling module. N.B.: decimal points are available in a seperate value (register 40081).	[R]	kWh	0	32767	0	X1	
40081	Cooling Unit Power Consumption decimal points	Energy meter and cooling module are optional. The decimal values of the cooling module energy consumption.	[R]	kWh	0	0,999	0	X1000	

SYSTEM INFORMATION

Register	BMS Name	BMS Description	Access	Unit	Min	Max	Default	Scale	Comments
40027	System Operating Mode	This output indicates the system operating mode for the air handling unit.	[R]		0	255	0	X1	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
40038	Actual Inlet Temperature setpoint	The actual inlet temperature setpoint may vary from requested value, thus the actual setpoint is available here.	[R]	°C	0	100	0	X10	
40039	Actual Flow Setpoint	The actual air flow setpoint may vary from requested value, thus the actual setpoint is available here, e.g. due to CO_2 override.	[R]	%	0	100	0	X1	
40033	Pre Heater percent	Preheaing suface is optional. Percentage heat output relative to maximum.	[R]	%	0	100	0	X1	
40031	Comfort Heater percent	Comfort heaing surface is optional. Percentage heat output relative to maximum.	[R]	%	0	100	0	X1	
40032	Comfort Cooling percent	Comfort cooling module is optional. Percentage cooling output relative to maximum.	[R]	%	0	100	0	X1	
40035	Bypass Damper percent	Bypass damper is optional. Percentage bypass position relative to maximum. 0 means full heat recovery.	[R]	%	0	100	0	X1	0 = full heat recovery
40028	System Condition	This output indicates the system condition for the air handling unit.	[R]		-32768	32767	0	X1	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]
40029	System Alarm	This output indicates system alarms for the air handling unit.	[R]		-32768	32767	0	X1	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]

SYSTEM INFORMATION

Register	BMS Name	BMS Description	Access	Unit	Min	Max	Default	Scale	Comments
40082	Hardware Errors LSB	This output indicates the hardware status of the the air handling unit and cooling module.	[R]		-32768	32767	0	X1	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]
40083	Hardware Errors MSB	This output indicates the hardware status of the the air handling unit and cooling module.	[R]		-32768	32767	0	X1	N.B.: Convert to binary representation Bit 0 = [Hotgas Temperaturesensor|OK|Fault] Bit 1 = [Comfort Cooling Connection Lost|OK|Fault] Bit 2 = [Comfort Cooling Stepdriver |OK|Fault] Bit 3 = [Comfort Cooling Frequency Inverter|OK|Fault] Bit 4 = [Humidity Supply Air Sensor|OK|Fault] Bit 5 = [Humidity Extraction Air Sensor|OK|Fault] Bit 6 = [Humidity Sensor Settings|OK|Fault]
40030	Software Version	Software version installed in the air handling unit.	[R]		0	32	6	X1000	

LOCAL CONTROL PANEL

Register	BMS Name	BMS Description	Access	Unit	Min	Max	Default	Scale	Comments
40069	Panel Flow Request	Local control panel is optional. Flow percent requested by the user via a local control panel. N.B.: Panel Flow Funktion (register 40070).	[R]	%	0	100	0	X1	0 = no request from user
40070	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 register 40069, but will not affect the actual flow setpoint directly. N.B.: Manual Override Time (register 40074).	[R/W]		0	2	1	X1	0 = Direct 1 = None 2 = D-BMS
40074	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	X1	

SERVICE AND FILTER INFORMATION

Register	BMS Name	BMS Description	Access	Unit	Min	Max	Default	Scale	Comments
40065	Service hour count	Operating hours since last service. N.B.: Multiply the value by 10 to get actual hour count.	[R]	hour(s)	0	300000	0	DIV10	
40034	Filter, remaining service life [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	X1	
40068	Remaining Service Life [Hours]	Remaining service life of filters in operating hours.	[R]	hour(s)	0	65535	0	X1	
40067	Remaining Service Life [%]	Estimated remaining service life of filters in %.	[R]	%	0	101	0	X1	0 = filter change required 100 = clean filters
40066	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	X1	0 = No 1 = Yes
40075	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	X1	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)
40076	Life Span Warning	This value defines the operating hours before activating a filter warning at register 40028.	[R/W]	hour(s)	0	8760	1500	X1	The default value is 4000 h for CV and DV product series.
40077	Life Span Alarm	This value defines the operating hours before activating a filter alarm at register 40029.	[R/W]	hour(s)	0	8760	2000	X1	The default value is 5000 h for CV and DV product series.
40078	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 (register 40029). The max life time alarm can be disabled by setting the value to 0.	[R/W]	month(s)	0	48	14	X1	
40079	Filter Warning Period	This value defines the period for a filter warning at register 40028 before the filter alarm activates. By using the default value of this parameter the filter warning at register 40028 is activated 2 months before the maximum filter life time expires (register 40078).	[R/W]	month(s)	0	12	2	X1	
40071	Run Filter Calibration	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	X1	0 = No 1 = Yes

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