A4

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| | | | |
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| | PROCESS: | | 5 |
| | TOLER. | | Delanghe E. 4 |
| SCALE-SCHAAL | ENG. CHANGE No. BR10W434W | DATE 11/01/24 | 3 Vanooteghem J. 2 |
| UNIT mm EENHEID | | EKFCM | Vandamme P. 1 |
| PAGE BLAD | | DESCRIPTION - OMSCHRIJVING | |
| | | **PCB SPECIFICATIONS** | |
| ***DAIKIN EUROPE NV*** OOSTENDE - BELGIE | PART CODE 889000 | **AD17WW0073** | |

1st CREATION DATE

DOC.Nr. FCD-0369 rev.3

# FanCoil Modbus Communication

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1 Over view

This specification is applied for McQuay and DAIKIN Fancoil products.

2 Communication Protocol

2.1 Modbus RTU

This protocol is based on Modbus RTU.

2.2 Physical Layer

Hardware : RS-485, Half Duplex, asynchronous communication
Speed : 9600bps
Bits per Bytes : 1start bit, 8data bits (LSB sent first), No parity, 2stopbits
Error check : CRC-16

2.3 RTU Framing

Silent interval + Address + Function code + Data1,Data2,.. + CRC + Silent interval

Silent interval : 3.5 character times
Address : 8bits
Slave address is assigned address in the range of 1-64.
Adress "0" is used as the broadcast address.
Function code : 8bits

2.4 Framing Error

When the Slave detects the following error, the slave does not reply.
And after silent interval time is elapsed, the slave moves on the received Stage.

Error; CRC, parity, over run,

2.5 Function code

| Function Code | Function Name |
|---|---|
| 0 3 hex | Read Holding Registers |
| 0 4 hex | Read input Register |
| 0 6 hex | Preset Single Register |
| 1 0 hex | Preset Multiple Registers |

eg1) Read Holding registers from 40010 to 40015 of Slave address 7.

Slave address ; 0x07
Function Code ; 0x03
Start address (upper) ; 0x00
Start address (lower) ; 0x09 (Note: Holding register 40010 equals 0x0009)
Number of register (upper) ; 0x00
Number of register (lower) ; 0x06
Error check ; CRC

eg2) Read Input registers from 30020 to 30030 of Slave address 7.

| | |
|---|---|
| Slave address | ; 0x07 |
| Function Code | ; 0x04 |
| Start address (upper) | ; 0x00 |
| Start address (lower) | ; 0x13 (Note: register 30020 equals 0x0013) |
| Number of register (upper) | ; 0x00 |
| Number of register (lower) | ; 0x0B |
| Error check | ; CRC |

eg3) Preset single registers from 40015 of Slave address 7.

| | |
|---|---|
| Slave address | ; 0x07 |
| Function Code | ; 0x06 |
| Address (upper) | ; 0x00 |
| Address (lower) | ; 0x0E (Note: Holding register 40015 equals 0x000E) |
| Data (upper) | ; 0x03 |
| Data (lower) | ; 0x58 (write data 1000) |
| Error check | ; CRC |

eg4) Preset multiple registers from 40001 to 40003 of Slave address 7.

| | |
|---|---|
| Slave address | ; 0x07 |
| Function Code | ; 0x10 |
| Start address (upper) | ; 0x00 |
| Start address (lower) | ; 0x00 (Note: register 40001 equals 0x0000) |
| Number of register (upper) | ; 0x00 |
| Number of register (lower) | ; 0x03 |
| Data1 (upper) | ; 0x00 |
| Data1 (lower) | ; 0x03 (write data 3 at 40001) |
| Data2 (upper) | ; 0x00 |
| Data2 (lower) | ; 0x04 (write data 4 at 40002) |
| Data3 (upper) | ; 0x00 |
| Data4 (lower) | ; 0x05 (write data 5 at 40003) |
| Error check | ; CRC |

3 data

| Holding Register | No | Description | Units | Valid Range |
|---|---|---|---|---|
| 40001 | bit15 | N/A | ---- | |
| | ~ | N/A | ---- | |
| | bit10 | Sleep Setup | ---- | 0 = Off , 1 = On |
| | bit9 | Filter Sign Reset | ---- | 0 = Non , 1 = Reset |
| | bit8 | Electric Heater | ---- | 0 = Disable , 1 = Enable |
| | bit7 | N/A | ---- | |
| | bit6 | N/A | ---- | |
| | bit5 | Lock Key Pad - Fan speed | ---- | 0 = Unlocked , 1 = Locked |
| | bit4 | Lock Key Pad –Mode set | ---- | 0 = Unlocked , 1 = Locked |
| | bit3 | Lock Key Pad –Set point Temperature | ---- | 0 = Unlocked , 1 = Locked |
| | bit2 | Lock Key Pad – On/Off | ---- | 0 = Unlocked , 1 = Locked |
| | bit1 | Lock Key Pad - All functions | ---- | 0 = Unlocked , 1 = Locked |
| | bit0 | On/Off | ---- | 0 = Off , 1 = On |
| 40002 | | Mode | ---- | 0 = Auto , 1 = Cooling , 2 = Heating ,3 = Fan |
| 40003 | | Set Point ~~Cooling~~ Temperature | ℃/10 | |
| ~~40004~~ | | ~~Set Point Heating Temperature~~ | ~~℃/10~~ | |
| 40004 | bit15 | N/A | ---- | |
| | ~ | N/A | ---- | |
| | bit11 | Fan speed set | ---- | 0 = N/A , 1 = fixed steps , 0xF = Auto |
| | bit10 | | | |
| | bit9 | | | |
| | bit8 | | | |
| | bit7 | Max Fan speed steps | ---- | 1 - 15 |
| | bit6 | | | |
| | bit5 | | | |
| | bit4 | | | |
| | bit3 | Fan speed steps | ---- | 0 – 15 ~~(0 = off)~~<br>When Fan speed set is "fixed steps", this data is available. |
| | bit2 | | | |
| | bit1 | | | |
| | bit0 | | | |
| 40005 | bit15 | N/A | ---- | |
| | ~ | N/A | ---- | |
| | bit11 | Swing frap set | ---- | 0 = N/A , 1 = fixed position , 0xF = On |
| | bit10 | | | |
| | bit9 | | | |
| | bit8 | | | |
| | bit7 | Max Swing frap position | ---- | 1 - 15 |
| | bit6 | | | |
| | bit5 | | | |
| | bit4 | | | |
| | bit3 | Swing frap position | ---- | 0 – 15<br>When Swing frap set is "fixed position", this data is available. |
| | bit2 | | | |
| | bit1 | | | |
| | bit0 | | | |
| 40006 | | Thermostat Group number | ---- | 0-64 |
| 40007 | bit13-15 | Clock Setup | week | sun=0 , Mon=1 , ,,,,, |
| | bit8-12 | | hour | 0 - 23 |
| | bit0-7 | | min | 0 - 59 |

| Input Register | No | Description | Units | Valid Range |
|---|---|---|---|---|
| 30001 | bit15 | Door Card | ---- | 0 = Invalid , 1 = Valid |
| | bit14 | Leaving Water Temperature sensor1 | ---- | 0 = Invalid , 1 = Valid (See Note5) |
| | bit13 | Entering Water Temperature sensor1 | ---- | 0 = Invalid , 1 = Valid (See Note5) |
| | bit12 | Leaving Water Temperature sensor2 | ---- | 0 = Invalid , 1 = Valid (See Note5) |
| | bit11 | Entering Water Temperature sensor2 | ---- | 0 = Invalid , 1 = Valid (See Note5) |
| | bit10 | Humidity | ---- | 0 = Invalid , 1 = Valid |
| | bit9 | Sleep Setup | ---- | 0 = Invalid , 1 = Valid |
| | bit8 | Filter Sign | ---- | 0 = Invalid , 1 = Valid |
| | bit7 | Swing frap | ---- | 0 = Invalid , 1 = Valid |
| | bit6 | Electric Heater | ---- | 0 = Invalid , 1 = Valid |
| | bit5 | N/A | ---- | 0 = Invalid , 1 = Valid |
| | ~ | N/A | ---- | 0 = Invalid , 1 = Valid |
| | bit0 | Were Input Register data ready after power supply? | ---- | 0 = not ready , 1 = ready |
| 30002 | | Min set point - cooling | ℃/10 | |
| 30003 | | Max set point - cooling | ℃/10 | |
| 30004 | | Min set point - Heating | ℃/10 | |
| 30005 | | Max set point - Heating | ℃/10 | |
| 30006 | | Max fan speed steps | ---- | Steps <= 15 |
| 30007 | | Max swing frap positions | ---- | Positions <= 15 |
| 30008 | | Thermostat group number | ---- | |
| 30009 | | Unit Type | ---- | |
| 30010 | | Software version | ---- | |
| 30020 | bit15 | N/A | ---- | |
| | ~ | N/A | ---- | |
| | bit7 | Door card | ---- | 0 = Leave, 1 = Insert |
| | bit6 | Sleep setup | ---- | 0 = Off , 1 = On |
| | bit5 | Filter sign | ---- | 0 = Off , 1 = On |
| | bit4 | Condensation water pump | ---- | 0 = Off , 1 = On |
| | bit3 | Electric Heater | ---- | 0 = Off , 1 = On |
| | bit2 | ~~Alarm level (Alarm code : address 30029)~~ | ---- | ~~0 = No alarm , 1 = fault~~ |
| | bit1 | | | ~~2 = problem , 3 = warning~~ |
| | bit0 | On/Off | ---- | 0 = Off , 1 = On |
| 30021 | bit7-15 | Actual Mode | ---- | 0 = N/A , 1 = Cooling , 2 = Heating , 3 = Fan |
| | bit0-7 | Set Mode | ---- | 0 = Auto, 1 = Cooling , 2 = Heating , 3 = Fan |
| 30022 | | Active temperature setup | ℃/10 | |
| 30023 | | Room temperature | ℃/10 | |
| 30024 | | Cool control output | % | |
| 30025 | | Heat control output | % | |
| 30026 | bit15 | N/A | | |
| | ~ | N/A | | |
| | bit11 | Fan speed set | ---- | 0 = N/A , 1 = fixed steps , 0xF = Auto |
| | bit10 | | | |
| | bit9 | | | |
| | bit8 | | | |
| | bit7 | ~~N/A~~ Max fan speed steps | ---- | 1 - 15 |
| | ~ | | | |
| | bit4 | | | |
| | bit3 | Fan speed steps | ---- | 0 – 15 ~~(0 = off)~~ When Fan speed set is not "N/A", this data is available. |
| | bit2 | | | |
| | bit1 | | | |
| | bit0 | | | |

| Input Register | No | Description | Units | Valid Range |
|---|---|---|---|---|
| 30027 | bit15 | N/A | | |
| | ~ | N/A | | |
| | bit11 | Swing frap set | ---- | 0 = N/A , 1 = fixed position , 0xF = On |
| | bit10 | | | |
| | bit9 | | | |
| | bit8 | | | |
| | bit7 | N/A Max swing frap positions | ---- | 1 - 15 |
| | ~ | | | |
| | bit4 | | | |
| | bit3 | Swing frap position | ---- | 0 – 15<br>When Swing frap set is "fixed position", this data is available. |
| | bit2 | | | |
| | bit1 | | | |
| | bit0 | | | |
| 30028 | | Room humidity | % | |
| 30029 | bit15 | N/A | | |
| | ~ | N/A | | |
| | bit8 | | | |
| | bit7 | Alarm ID number1 | ---- | 0 means N/A.<br>e.g) circuit No |
| | bit6 | | | |
| | bit5 | | | |
| | bit4 | Alarm ID number2 | ---- | 0 means N/A.<br>e.g) compressor No, fan No. etc |
| | bit3 | | | |
| | bit2 | | | |
| | bit1 | Alarm Level | ---- | 3 : Fault 2 : Problem 1 : warning<br>0 : No Alarm |
| | bit0 | | | |
| 30030 | bit7-15 | Alarm category code | ---- | ASCII Code |
| | bit0-7 | Alarm detail code | ---- | ASCII Code |
| 30031 | | Entering water temperature1 | ℃/10 | See Note5 |
| 30032 | | Leaving water temperature1 | ℃/10 | See Note5 |
| 30033 | | Entering water temperature2 | ℃/10 | See Note5 |
| 30034 | | Leaving water temperature2 | ℃/10 | See Note5 |

NOTE1) The temperature data value is expressed by the two's complement.

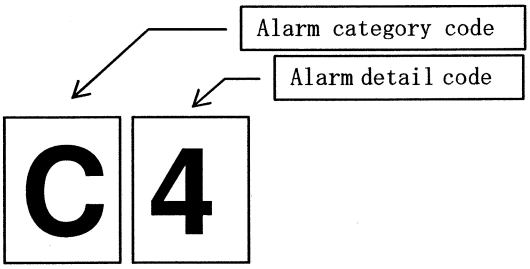
NOTE2) When the temperature or humidity data value is
0x7FFF, it means that Fancoil don't have the sensor,
0x4E20, it means sensor fault (more than upper range),
0x2710, it means sensor fault (less than lower range),

NOTE3) As central remote controller does not have a sort of EEPROM, "Thermostat group number" data need to be stored by each fancoil.

NOTE4) Alarm
When Alarm Level is "No Alarm"(= 0), Alarm ID1,2 and Alarm code is invalid.

4-1) Alarm Code
The alarm is composed of the alarm code and the alarm level. And Alarm code is composed of alarm category code and alarm detail code. Alarm level should be defined as follows.

e.g) Alarm code "C4"




| Alarm Level | Unit state |
|---|---|
| fault | Unit shutdown or Start aborted |
| problem | Unit continues to run. But some functions are restricted. |
| warning | No effect on unit control. In the future, this alarm might cause higher level alarms. |

4-2) Alarm ID number
Alarm ID number is used to show where that alarm is occurred.
[ Alarm ID number2 - Alarm ID numberl1 - Alarm Code(category + Detail) ]

e.g) Circuit2,Compressor2, Alarm Code=xx, -> 2-2-XX, Fan2 , Alarm Code =L9 -> 0-2-L9

## ★ Fan Coil alarm code(e.g)

| Alarm code | description |
|---|---|
| ~~80~~ | ~~Inlet water temperature sensor error~~ |
| ~~81~~ | ~~Outlet water temperature sensor error~~ |
| A0 | External protection |
| A1 | control PCB error or flash memory error |
| A3 | drain water level error |
| A6 | fan motor over current error |
| AF | humidifier error |
| AH | clarifier error |
| C4 | heat exchanger temperature sensor error(Entering Water temp sensor) |
| C5 | heat exchanger temperature sensor error(Leaving Water temp sensor) |
| C9 | suction air temperature sensor error |
| CJ | remote controller air(indoor) temperature sensor error |
| L3 | Main controller IC over temperature error for fan motor drive. |
| LA | IGBT error |
| L9 | Motor stalled |
| LC | Communication error between Main controller and fan motor drive. |
| P1 | Phase monitor alarm for fan motor drive. |
| U2 | DC main drive line voltage error for fan motor drive. |
| U3 | Modbus communication error |
| U5 | communication error between remote controller and control PCB |
| U8 | communication error between main and sub remote controller |
| UA | Dip Switch setting error |
| UC | communication address duplicate error |
| UE | D3 communication error |
| MA | D3 controller combination error |

NOTE5) Leaving and Entering Water Temperature sensor1 is for Cool HeatExchanger of 4Pipe fancoil and 2Pipe fancoil HeatExchange. Leaving and Entering Water Temperature sensor2 is only for Hot HeatExchanger of 4Pipe fancoil

NOTE6) Fan speed and Swing frap position

Each fancoils should calculate the steps or positions as follows.

Fan steps = Fan speed steps (40004) / Max Fan speed steps(40004) * Max Fan speed steps(30006)
Swing frap positions = Swing frap positions (40005) / Max swing frap positions (40005) * Max swing frap positions (30007)

~~Calculations % of Fan speed and Swing frap position is the following.~~
~~Fan speed (%) = (Fan speed steps / Max Fan speed steps) * 100~~
~~Swing frap position (%) = (Swing frap position / Max swing frap positions) * 100~~
~~and~~
~~Fan speed steps = 0 means that fan is stopping.~~
~~Swing frap position = 0 means that Swing frap position is home position~~

4 Structure of data area

Structure of data area is below.

30001-30010 : Input Register area where fancoil unit configuration data is descried.
30020-30031 : Input Register area where fancoil unit state data is descried.
40001-40007 : Holding Register area where command to fancoil unit is descried.

| Revision | Date | Change Description |
|---|---|---|
| Non | 05/25/2010 | Release |
| A | 05/26/2010 | > Set Point Cooling temperature and Set Point Heating temperature --> Set Point temperature.<br>> described the additional information for temperature data. (negative value is shown by the two's complement) |
| B | 05/27/2010 | > Fan speed and swing frap data were changed.<br>> NOTE1,2 were added. |
| C | 06/29/2010 | > 3 Structure of data area was added.<br>> Communication address range was changed. (0-127, -> 0-64)<br>> Added example of RTU Framing,<br>> Alarm code was updated.(30020 & 30029) |
| D | 07/21/2010 | > Address 30020 bit0 was modified. (valid/invalid -> On/Off)<br>> Valid range limitation was added to address 30006 and 30007.<br>> NOTE2) was updated.( referred to humidity data )<br>> NOTE5) was added for fan speed and swing frap. |
| E | 08/21/2010 | > Address 40001 bit3 was modified. (Set Point -> Set Point Temperature)<br>> NOTE2) was modified. (0x7FF -> 0x7FFF )<br>> Alarm code requested by Shenzhen was added. (80,81,L3,L9,LA,LC,P1,U2,UA )<br>> Alarm Level Address was move to another address.<br>> Added Alarm ID Number. |
| F | 09/04/2010 | > Added Entering and Leaving water temperature2 data. (address 30001 bit11,12, 30033,30034)<br>> Note2) was modified.(added sensor fault value)<br>> Alarm code was modified. C5 was added and 80,81 was removed. |
| G | 10/20/2010 | > Added "Set Mode" in address 30021. |
| H | 10/28/2010 | > changed the valid range of 40001 bit8(Electric Heater) from "On/Off " to "Enable/Disable". |
| I | 11/21/2010 | > changed the valid range of 40004(Fan speed set) from "0=Off" to "0=N/A".<br>> changed the valid range of 30026(Fan speed set) from "0=Off" to "0=N/A".<br>> The part of NOTE6) that explains the meaning of 0 was deleted. |
| J | 12/01/2010 | > Removed the "0=off" from valid range of 40004 and 30026 "Fan speed steps". |
| K | 12/14/2010 | > **Official release**<br>> Added "Max fan speed steps" in address 30026.<br>> Added "Max swing frap positions" in address 30027.<br>> Additional explanation was added in NOTE4)<br>> modified the explanation in NOTE6) |