# Design guide

## Modbus Interface DIII

EKMBDXA7V1

# Design guide Modbus Interface DIII EKMBDXA7V1

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## Safety Precautions

Before performing design, construction, or maintenance thoroughly, read the “Safety Precautions” in the installation manual provided with the product.

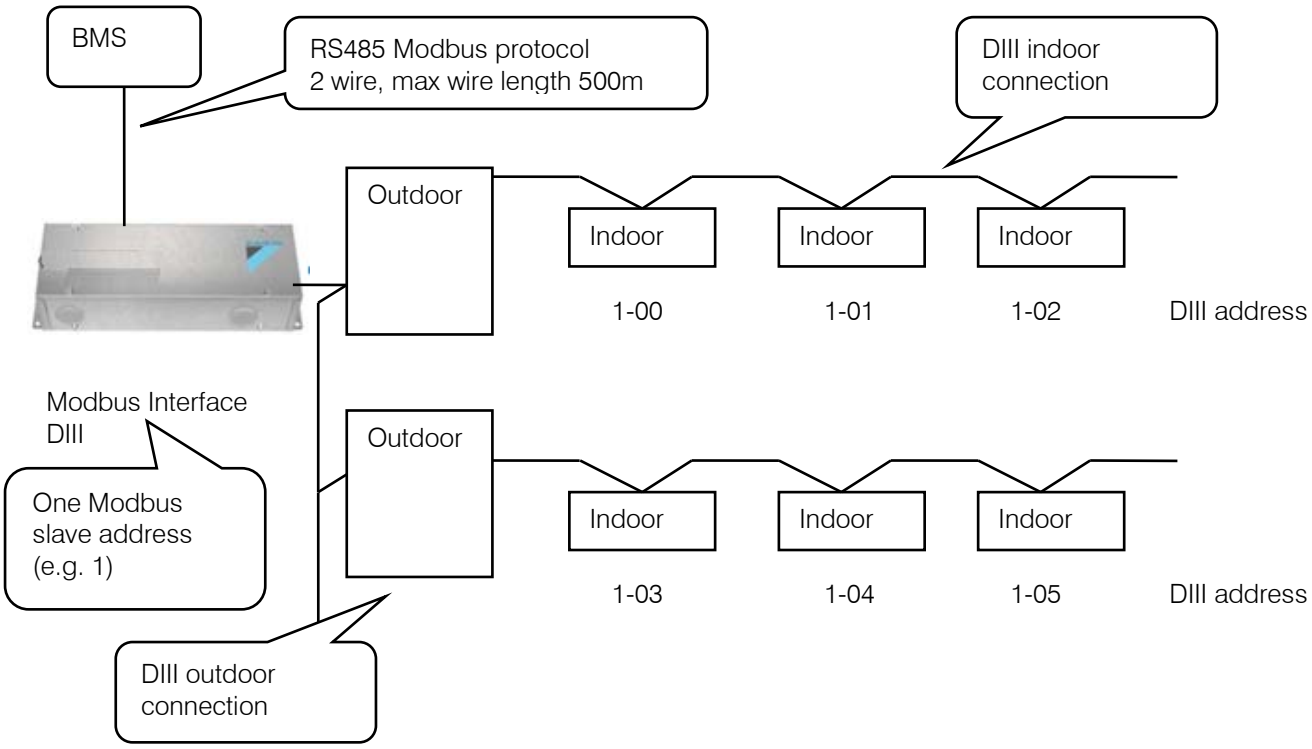
# 1. Introduction

A Building Manangement System (BMS) can control Daikin units through the Modbus protocol by using the *Modbus Interface DIII* EKMBDXA7V1

Glossary:
- BMS: Building Management System
- DIII unit: Unit with DIII communication connected to the Modbus Interface DIII.
- DIII device: A centralised device from Daikin with DIII communication (e.g. iTM, …)
- Indoor unit: As the main target is to monitor and control VRV connected indoor units, the DIII units are referred to as *indoor units*. For some systems the connected DIII units are in reality outdoor units (e.g. Applied units)

### 1.1 System layout

Typical setup (eg VRV)




DIII address (Group NO) needs to be set on an individual indoor unit or group by the connected userinterface.
Functions of each Indoor unit in a range for each register:
Example:

| Register address | DIII address functions |
|---|---|
| 31001 – 31003 | 1-00 |
| 31004 - 31006 | 1-01 |
| … | … |

## 1.2 Limitations

The number of control commands per indoor unit is limited to 7000 per year.
If the BMS controls the units by using an automatic control program, please make sure it doesn't exceed this limitation.

## 1.3 Specifications

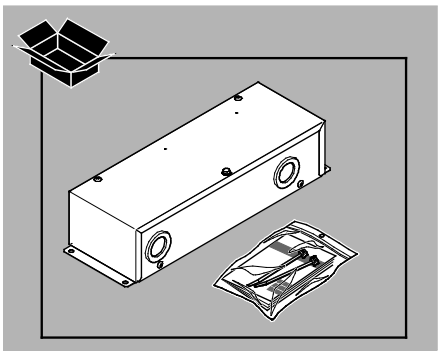
| | |
|---|---|
| Daikin equipment connection | DIII net (F1F2)<br>maximum 64 indoor units (groups) and maximum 10 outdoors (addr 1-00 till 4-15) |
| BMS equipment protocol | Modbus RS485 (2 wire, max 500m) |
| Installation place | Indoor installation |
| Operation condition | Temp range 0 till 60°C |
| Dimensions | 379 x 87 x 124 mm |
| Mass (Weight) | 2,1 kg |
| Power supply | 220 – 240 VAC 50 Hz |

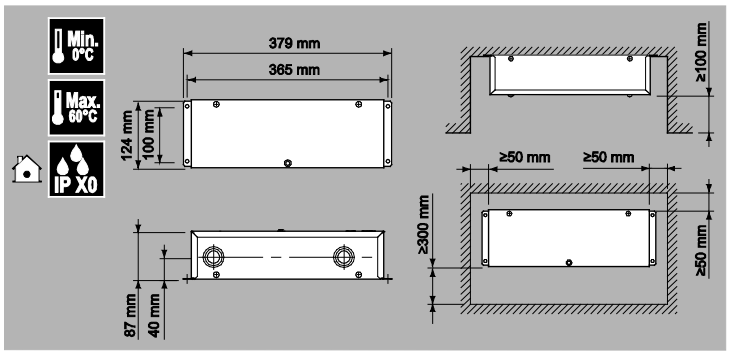
| | |
|---|---|
| Software | The *Modbus Interface DIII* software can be updated with the *Daikin Updater* PC software<br>Refer to chapter "4.2 Software update with Updater" for details |

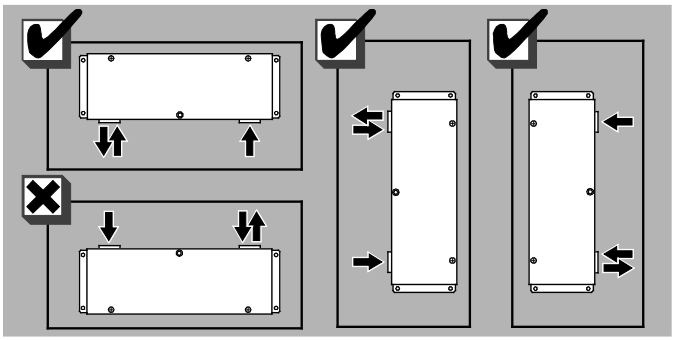
| | |
|---|---|
| Installation manual | Provided with the option |
| Design guide | Latest version available on:<br>http://www.daikineurope.com/support-and-manuals/product-information |

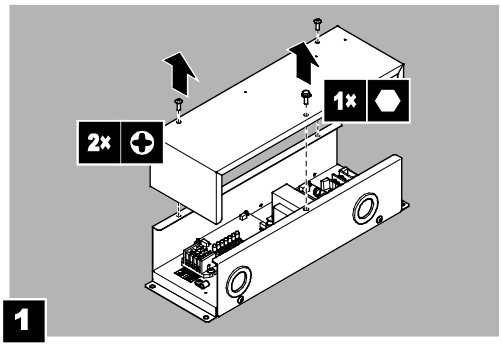
### *1.3.1 Dimensions and field wiring*

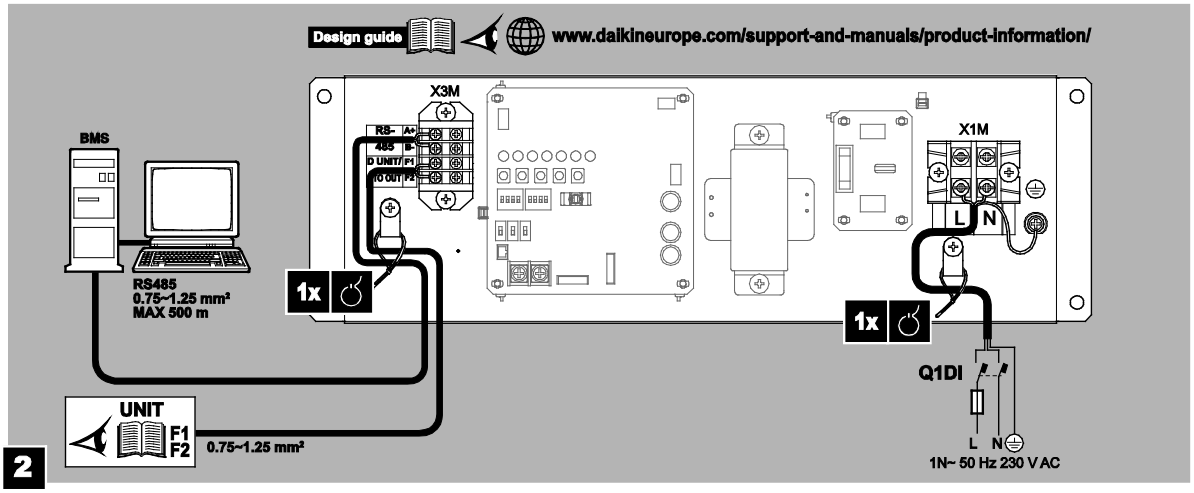
Refer to installation manual

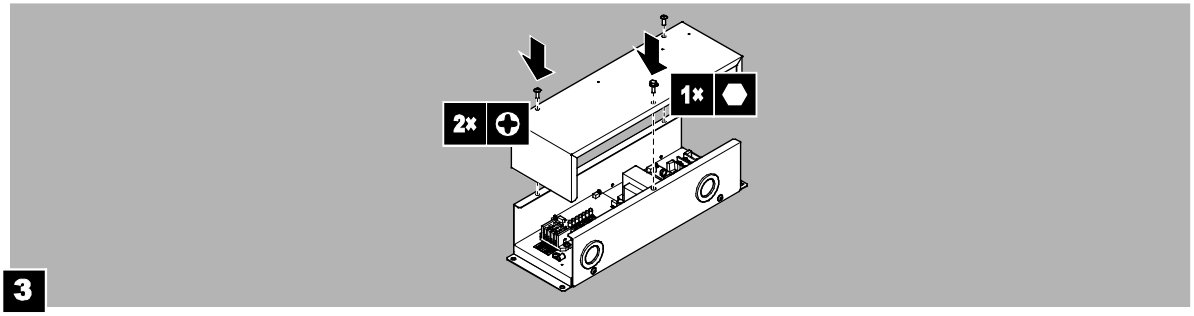




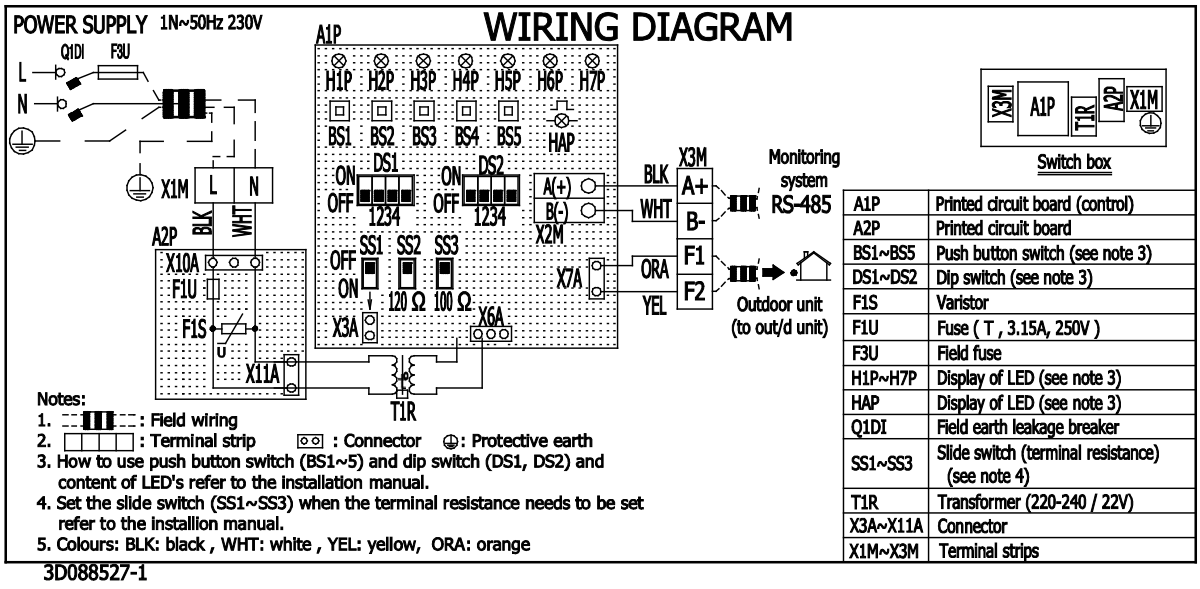





### 1.3.2 Wiring diagram




| | |
|---|---|
| A1P | Printed circuit board (control) |
| A2P | Printed circuit board |
| BS1~BS5 | Push button switch (see note 3) |
| DS1~DS2 | Dip switch (see note 3) |
| F1S | Varistor |
| F1U | Fuse ( T , 3.15A, 250V ) |
| F3U | Field fuse |
| H1P~H7P | Display of LED (see note 3) |
| HAP | Display of LED (see note 3) |
| Q1DI | Field earth leakage breaker |
| SS1~SS3 | Slide switch (terminal resistance) (see note 4) |
| T1R | Transformer (220-240 / 22V) |
| X3A~X11A | Connector |
| X1M~X3M | Terminal strips |

### 1.3.3 LED meaning

During normal operation (application is running):
H1P: DIII communication (sent)
H2P: DIII communication (receive)
H3P: RS485 communication (sent)
H4P: RS485 communication (receive)
H5P H6P H7P: no meaning
HAP: blinking at 400ms = application is running

During uploading of new software (firmware is running)
H1P till H7P: Progress indication (0 till 100%)
HAP: blinking at 200ms = firmware is running.

### 1.3.4 Termination resistance

By factory default the termination resistance is 0 Ohm (SS2=Off & SS3 =Off)

SS2 On = 120 Ohm
SS3 On = 100 Ohm
(SS2 = On & SS3 = On, not allowed)

Please slide the SS2 or SS3 to the on position to set required termination resistance value of the RS485 line.

### 1.3.5 Push buttons

BS1 till BS5 have no meaning

### *1.3.6 Dipswitch meaning*

Attention: Dipswitch on/off status is detected during power on of the PCB only.

Dipswitch DS1 & DS2 setting:

| RS485 Modbus communication speed | |
|---|---|
| DS1 pin 2:Off<br>DS1 pin 2:On | 9600 bps<br>19200 bps |
| Modbus communication parity / stop bit | |
| DS1 pin 3:Off 4:Off<br>DS1 pin 3:Off 4: On<br>DS1 pin 3:On 4:Off<br>DS1 pin 3:On 4:On | Even 1 stop bit<br>Odd 1 stop bit<br>None 2 stop bit<br>None 1 stop bit |
| Modbus address setting | |
| DS2 pin 1/2/3/4 | When Modbus address is set (eg 1..15), then modbus RS485 communication is enabled. |
| Off/Off/Off/Off | No Modbus address is set, meaning no modbus RS485 communication |
| Off/Off/Off/On<br>Off/Off/On/Off<br>…<br>On/On/On/On | Address 1<br>Address 2<br><br>Address 15 |

Attention:
During software upload with updater PC program via RS485 port a specific dipswitch setting is required.
Refer to chapter “4.2.3 Method 2) Update with a *USB/RS485 converter*.” for details.

### 1.4 Overview of compatible Daikin units ranges with DIII connection

For details see chapter "1.4.1 Overview of compatible Daikin models with DIII connection (detail)"

The Modbus Interface DIII can be connected to following units:

| | description | Brand | model range |
|---|---|---|---|
| VRV (F1,F2) | round flow -cassette 3x3 | Daikin | FXFQ –A |
| | 4Way blow cassette 2x2 | Daikin | FXZQ –A |
| | 2Way blow cassette | Daikin | FXCQ -A |
| | Corner cassette | Daikin | FXKQ –M |
| | Duct - small | Daikin | FXDQ -M |
| | Duct - slim | Daikin | FXDQ -P |
| | Duct - standard | Daikin | FXSQ – P7 |
| | Duct - high ESP | Daikin | FXMQ –A |
| | 1Way blow cassette ceiling suspended | Daikin | FXHQ –A |
| | 4Way blow cassette ceiling suspended | Daikin | FXUQ –A |
| | Wall mount | Daikin | FXAQ –P |
| | Floor standing - concealed | Daikin | FXNQ –P |
| | Floor standing - free standing | Daikin | FXLQ –P |
| HRV | Heat reclaim ventilation | Daikin | VAM…FA |
| | Heat reclaim ventilation | Daikin | VAM…FB |
| | Heat reclaim ventilation, air processing and humidification | Daikin | VKM…GBM |
| | Heat reclaim ventilation, air processing | Daikin | VKM…GB |
| VRV Hydro box | LT | Daikin | HXY…A |
| | HT | Daikin | HXHD…A |
| Air curtains | for connection to VRV | Biddle | CYVS/M/L –DK |
| Heating | Daikin Altherma Flex - small indoor | Daikin | EKHVM RD/YD...AAV1 |
| | Daikin Altherma Flex - large indoor | Daikin | EKHBRD…ACV1/Y1 |
| Applied | Inverter chillers | Daikin | EWAQ016~064BA<br>EWYQ016~064BA<br>SEHVX20~64AAW |

Following modelranges can only be combined in a setup with at least one VRV unit or with at least one other DIII device (eg iTM/…)

| | description | Brand | model range |
|---|---|---|---|
| Sky air (F1,F2) | round flow -cassette 3x3 | Daikin | FCQ(H)G –F |
| | 4Way blow cassette 2x2 | Daikin | FFQ –C |
| | Hotel duct | Daikin | FDBQ –B |
| | Duct | Daikin | FBQ – C8 |
| | Large duct | Daikin | FDQ –B/C |
| | Wall mount | Daikin | FAQ –C |
| | ceiling suspended | Daikin | FHQ –C |
| | 4-way blow ceiling suspended | Daikin | FUQ –C |
| | Floor standing | Daikin | FVQ –C |
| split (via KRP928BB2S) | All split models that are compatible with KRP928BB2S | | |
| ERQ - control box (connection to 3rd party AHU) | Pair - X + Y + W control | Daikin | EKEQFCB(A)V3 |
| | Pair - Z control | Daikin | EKEQDCBV3 |
| | Multi | Daikin | EKEQMCB(A)V3 |
| | Air curtain | Biddle | CYQS/M/L –DK |

### *1.4.1 Overview of compatible Daikin models with DIII connection (detail)*

| | description | Brand | model range | Supported models |
|---|---|---|---|---|
| Sky air (F1,F2) | round flow –cassette 3x3 | Daikin | FCQ(H)G | FCQG100FVEB<br>FCQG125FVEB<br>FCQG140FVEB<br>FCQG35FVEB<br>FCQG50FVEB<br>FCQG60FVEB<br>FCQG71FVEB<br>FCQHG100FVEB<br>FCQHG125FVEB<br>FCQHG140FVEB<br>FCQHG71FVEB |
| | 4Way blow cassette 2x2 | Daikin | FFQ | FFQ25C2VEB<br>FFQ35C2VEB<br>FFQ50C2VEB<br>FFQ60C2VEB |
| | Hotel duct | Daikin | FDBQ | FDBQ25B8V1 |
| | Duct | Daikin | FBQ | FBQ100C8VEB<br>FBQ125C8VEB<br>FBQ140C8VEB<br>FBQ35C8VEB<br>FBQ50C8VEB<br>FBQ60C8VEB<br>FBQ71C8VEB |
| | Large duct | Daikin | FDQ | FDQ125C7VEB<br>FDQ200B8V3B9<br>FDQ250B8V3B9 |
| | Wall mount | Daikin | FAQ | FAQ71CVEB<br>FAQ100CVEB |
| | ceiling suspended | Daikin | FHQ | FHQ35CAVEB<br>FHQ50CAVEB<br>FHQ60CAVEB<br>FHQ71CAVEB<br>FHQ100CAVEB<br>FHQ125CAVEB<br>FHQ140CAVEB |
| | 4-way blow ceiling suspended | Daikin | FUQ | FUQ71CVEB<br>FUQ100CVEB<br>FUQ125CVEB |
| | Floor standing | Daikin | FVQ | FVQ71CVEB<br>FVQ100CVEB<br>FVQ125CVEB<br>FVQ140CVEB |
| VRV (F1,F2) | round flow –cassette 3x3 | Daikin | FXFQ | FXFQ100AVEB<br>FXFQ125AVEB<br>FXFQ20AVEB<br>FXFQ25AVEB<br>FXFQ32AVEB<br>FXFQ40AVEB<br>FXFQ50AVEB<br>FXFQ63AVEB<br>FXFQ80AVEB |
| | 4Way blow cassette 2x2 | Daikin | FXZQ | FXZQ15A2VEB<br>FXZQ20A2VEB<br>FXZQ25A2VEB<br>FXZQ32A2VEB<br>FXZQ40A2VEB<br>FXZQ50A2VEB |
| | 2Way blow cassette | Daikin | FXCQ | FXCQ20AVEB<br>FXCQ25AVEB<br>FXCQ32AVEB<br>FXCQ40AVEB<br>FXCQ50AVEB<br>FXCQ63AVEB<br>FXCQ80AVEB<br>FXCQ125AVEB |

| | description | Brand | model range | Supported models |
|---|---|---|---|---|
| VRV (F1,F2) | Corner cassette | Daikin | FXKQ | FXKQ25MVE<br>FXKQ32MVE<br>FXKQ40MVE<br>FXKQ63MVE |
| | Duct - small | Daikin | FXDQ –M | FXDQ20M9V3B<br>FXDQ25M9V3B |
| | Duct - slim | Daikin | FXDQ –P | FXDQ15P2VE<br>FXDQ20P2VE<br>FXDQ25P2VE<br>FXDQ32P2VE<br>FXDQ40P2VE<br>FXDQ50P2VE<br>FXDQ63P2VE<br><br>FXDQ15A2VEB<br>FXDQ20A2VEB<br>FXDQ25A2VEB<br>FXDQ32A2VEB<br>FXDQ40A2VEB<br>FXDQ50A2VEB<br>FXDQ63A2VEB |
| | Duct - standard | Daikin | FXSQ | FXSQ100P7VEB<br>FXSQ125P7VEB<br>FXSQ140P7VEB<br>FXSQ20P7VEB<br>FXSQ25P7VEB<br>FXSQ32P7VEB<br>FXSQ40P7VEB<br>FXSQ50P7VEB<br>FXSQ63P7VEB<br>FXSQ80P7VEB |
| | Duct - high ESP | Daikin | FXMQ | FXMQ100P7VEB<br>FXMQ125P7VEB<br>FXMQ140P7VEB<br>FXMQ20P7VEB<br>FXMQ25P7VEB<br>FXMQ32P7VEB<br>FXMQ40P7VEB<br>FXMQ50P7VEB<br>FXMQ63P7VEB<br>FXMQ80P7VEB |
| | 1Way blow cassette ceiling suspended | Daikin | FXHQ | FXHQ100AVEB<br>FXHQ32AVEB<br>FXHQ63AVEB |
| | 4Way blow cassette ceiling suspended | Daikin | FXUQ | FXUQ100AVEB<br>FXUQ71AVEB |
| | Wall mount | Daikin | FXAQ | FXAQ15PAV1<br>FXAQ20PAV1<br>FXAQ25PAV1<br>FXAQ32PAV1<br>FXAQ40PAV1<br>FXAQ50PAV1<br>FXAQ63PAV1 |
| | Floor standing – concealed | Daikin | FXNQ | FXNQ20P2VEB<br>FXNQ25P2VEB<br>FXNQ32P2VEB<br>FXNQ40P2VEB<br>FXNQ50P2VEB<br>FXNQ63P2VEB |
| | Floor standing – free standing | Daikin | FXLQ | FXLQ20P2VEB<br>FXLQ25P2VEB<br>FXLQ32P2VEB<br>FXLQ40P2VEB<br>FXLQ50P2VEB<br>FXLQ63P2VEB |
| split (via KRP928BB2S) | All split models that are compatible with KRP928BB2S | | | |

| | description | Brand | model range | Supported models |
|---|---|---|---|---|
| HRV | Heat reclaim ventilation | Daikin | VAM…FA | VAM1000FA5VE1<br>VAM1500FA5VE1<br>VAM2000FA5VE1<br>VAM350FA5VE1<br>VAM500FA5VE1<br>VAM650FA5VE1<br>VAM800FA5VE1 |
| | Heat reclaim ventilation | Daikin | VAM…FB | VAM1000FB7VE<br>VAM1500FB7VE<br>VAM2000FB7VE<br>VAM350FB7VE<br>VAM500FB7VE<br>VAM650FB7VE<br>VAM800FB7VE |
| | Heat reclaim ventilation, air processing and humidification | Daikin | VKM…GBM | VKM100GBMV1<br>VKM50GBMV1<br>VKM80GBMV1 |
| | Heat reclaim ventilation, air processing | Daikin | VKM…GB | VKM100GBV1<br>VKM50GBV1<br>VKM80GBV1 |
| VRV Hydro box | LT | Daikin | HXY…A | HXY080A7V1B<br>HXY125A7V1B |
| | HT | Daikin | HXHD…A | Only compatible from new software integration onwards:<br>(sw ldxxxx, & production implantation date & design digit)<br>HXHD125A7V1B (ID3221, 04/2014, design digit 4) |
| Air curtains | for connection to VRV | Biddle | CYV | CYVS/M100DK80*BC<br>CYVS/M 100DK80*SC<br>CYVS/M 150DK80*BC<br>CYVS/M 150DK80*SC<br>CYVS/M 200DK100*BC<br>CYVS/M 200DK100*SC<br>CYVS/M 250DK140*BC<br>CYVS/M 250DK140*S<br>CYVL100DK125*BC<br>CYVL100DK125*SC<br>CYVL150DK200*BC<br>CYVL150DK200*SC<br>CYVL200DK250*BC<br>CYVL200DK250*SC<br>CYVL250DK250*BC<br>CYVL250DK250*SC |
| ERQ – control box (connection to 3rd party AHU) | Pair - X + Y + W control | Daikin | EKEQFCB(A)V3 | EKEQFCB(A)V3 |
| | Pair - Z control | Daikin | EKEQDCBV3 | EKEQDCBV3 |
| | Multi | Daikin | EKEQMCB(A)V3 | EKEQMCB(A)V3 |
| | Air curtain | Biddle | CYQ | CYQS150DK80*BN/*SN<br>CYQS200DK100*BN/*SN<br>CYQS250DK140*BN/*SN<br>CYQM100DK80*BN/*SN<br>CYQM150DK80*BN/*SN<br>CYQM200DK100*BN/*SN<br>CYQM250DK140*BN/*SN<br>CYQL100DK125*BN/*SN<br>CYQL150DK200*BN/*SN<br>CYQL200DK250*BN/*SN<br>CYQL250DK250*BN/*SN |

| | description | Brand | model range | Supported models |
|---|---|---|---|---|
| Heating | Daikin Altherma Flex - small indoor | Daikin | EKHVM RD/YD...AAV1 | Only compatible from new software integration onwards:<br>(sw IDxxxx, & production implantation date & design digit)<br>EKHVMRD50AAV1(ID 3221, 04/2014, design digit 6)<br>EKHVMRD80AAV1( ID 3221, 04/2014, design digit 6)<br>EKHVMYD50AAV1(ID 3221, 04/2014, design digit 6)<br>EKHVMYD80AAV1(ID 3221, 04/2014, design digit 5) |
| | Daikin Altherma Flex - large indoor | Daikin | EKHBRD…ACV1/Y1 | Only compatible from new software integration onwards:<br>(sw IDxxxx, & production implantation date & design digit)<br>EKHBRD011ACV1 (ID 3221, 04/2014, design digit 7)<br>EKHBRD011ACY1 (ID 3221 *)<br>EKHBRD014ACV1 (ID 3221, 04/2014 , design digit 7)<br>EKHBRD014ACY1 (ID 3221 *)<br>EKHBRD016ACV1 (ID 3221, 04/2014, design digit 7)<br>EKHBRD016ACY1 (ID3221 *)<br>* planned to implement in mass production (M/2014) At the moment it is executed in mass production, the design digits will be added.) |
| Applied | Inverter chillers | Daikin | EWAQ016~064BAW*<br>EWYQ016~064BAW*<br>SEHVX20~64AAW | Only compatible from new software integration onwards:<br>(sw IDxxxx, & production implantation date & design digit)<br>(ID 4044, 07/2014, design digit 4)*<br>(ID 4044, 07/2014, design digit 4)*<br>(ID 4044, 07/2014, design digit 3)*<br>* "Negative cooling leaving water setpoint" not yet available at present moment in the unit: an update of user interface software (BRC21A52 => BRC21A53) is planned in near future to enable this feature (M/2014). At the moment it is executed in mass production, the design digits will be added. |

## 1.5 Overview of compatibilty with other DIII centralised control equipment

| | | Intelligent Touch Manager | Interface for use in LonWorks® | Interface for use in BACnet® | Intelligent Touch Controller | Residential central remote controller | Central Remote controller | Unified ON/OFF controller | Schedule timer (*1) | **Modbus Interface DIII** |
|---|---|---|---|---|---|---|---|---|---|---|
| | | DCM601A51 | DMS504B51 | DMS502B51 | DCS601C51 | DCS303A51 | DCS302CA61 | DCS301BA61 | DST301BA61 | **EKMBDXA7V1** |
| Intelligent Touch Manager | DCM601A51 | OK | OK | OK | NG | NG | OK | OK | NG | **OK** |
| Interface for use in LonWorks® | DMS504B51 | OK | NG | NG | OK | NG | OK | OK | NG | **NG** |
| Interface for use in BACnet® | DMS502B51 | OK | NG | NG | OK | NG | OK | OK | NG | **NG** |
| Intelligent Touch Controller | DCS601C51 | NG | OK | OK | OK | NG | OK | OK | NG | **OK** |
| Residential central remote controller | DCS303A51 | NG | NG | NG | NG | NG | NG | NG | NG | **NG** |
| Central Remote controller | DCS302CA61 | OK | OK | OK | OK | NG | OK | OK | OK | **OK** |
| Unified ON/OFF controller | DCS301BA61 | OK | OK | OK | OK | NG | OK | OK | OK | **OK** |
| Schedule timer (*1) | DST301BA61 | NG | NG | NG | NG | NG | OK | OK | NG | **NG** |
| **Modbus Interface DIII** | **EKMBDXA7V1** | **OK** | **NG** | **NG** | **OK** | **NG** | **OK** | **OK** | **NG** | **NG** |

(*1): The schedule timer should be used in combination with the central remote controller or unified ON/OFF controller

- If using in combination with centralized control equipment, the relation between both central remote controllers is last command priority.
- if using in combination with centralized control equipment, the remote control mode is decided by the setting of the highest priority item in the priority rank.

Priority ranking of Modbus Interface DIII:
No priority ranking is implemented. Meaning, in case another D-BACS device is detected, the lock button & force OFF functions are not available.

# 2. Modbus communication

## 2.1 Modbus Interface DIII settings

| | | |
|---|---|---|
| Communication protocol | Modbus RTU<br>(according to "Modicon Modbus Protocol reference guide" PI-MBUS-300 Rev J) | Dipswitch setting |
| Communication speed | 9600 bps<br>Or 19200 bps | DS1 pin 2:Off<br>DS1 pin 2:On |
| Parity / stop bit | Even 1 stop bit<br>Odd 1 stop bit<br>None 2 stop bit<br>None 1 stop bit | DS1 pin 3:Off 4:Off<br>DS1 pin 3:Off 4: On<br>DS1 pin 3:On 4:Off<br>DS1 pin 3:On 4:On |
| One dedicated modbus address setting | 1..15 | DS2 pin 1/2/3/4<br>Addr 1: Off/Off/Off/On<br>Addr 2: Off/Off/On/Off<br>…<br>Addr 15: On/On/On/On |
| Implemented function codes | 0x03 Read Holding Registers (broadcast support)<br>0x04 Read Input Registers (broadcast support)<br>0x06 Preset Single Registers (No broadcast support)<br>0x10 Preset Multiple Registers (No broadcast support)<br>(remark: Holding Registers will not reflect the actual value)<br>(other function codes are treated as illegal function and return an exception response) | |
| Data types | Input Register:<br>Length 16 bits, Address range: 30001 - 39999<br>Holding Register<br>Length 16 bits, Address range: 40001 – 49999<br>(Data larger than 16 bits can be handled by assigning continuous addresses to registers.) | |
| Register addresses | Same address meaning for each applicable model | |

## 2.2 Communication format

### *2.2.1 Function format*

(1) Read Input Registers (0x04)
[Function]
Read values of input registers. The address and the content of input registers are described in 3. Modbus registers

[Query]
The query message specifies the start address of the register and the number of registers. The register address starts at zero: register 30001 is addressed as 0.
This function can read up to 32 registers in one query.
Here is an example of a request to slave address 1 for reading 3 register values starting from register 31001.

| Query | |
|---|---|
| Field | Data |
| Slave Address | 0x01 |
| Function Code | 0x04 |
| Start Address(Upper) | 0x03 |
| Start Address(Lower) | 0xE8 |
| Number of Registers(Upper) | 0x00 |
| Number of Registers(Lower) | 0x03 |
| Error Check CRC16(Lower) | 0x30 |
| Error Check CRC16(Upper) | 0x7B |

| Response | |
|---|---|
| Field | Data |
| Slave Address | 0x01 |
| Function Code | 0x04 |
| Data Size(Bytes) | 0x06 |
| Data1(Upper) | 0xXX |
| Data1(Lower) | 0xXX |
| Data2(Upper) | 0xXX |
| Data2(Lower) | 0xXX |
| Data3(Upper) | 0xXX |
| Data3(Lower) | 0xXX |
| Error Check CRC16(Lower) | 0xXX |
| Error Check CRC16(Upper) | 0xXX |

(2) Preset Single Register (0x06)
[Function]
Write a value to a holding register. In case of broadcast, the value is written to the same holding register of all slave units. The address and the content of the holding registers are described in
3. Modbus registers

[Query]
The query message specifies the start address of the register and a value. The register address starts at zero: register 40001 is addressed as 0. Here is an example of a request to slave address 1 for writing the value '2' to register 42002.

| Query | |
|---|---|
| Field | Data |
| Slave Address | 0x01 |
| Function Code | 0x06 |
| Address(Upper) | 0x07 |
| Address(Lower) | 0xD1 |
| Value(Upper) | 0x00 |
| Value (Lower) | 0x02 |
| Error Check CRC16(Lower) | 0x59 |
| Error Check CRC16(Upper) | 0x46 |

| Response | |
|---|---|
| Field | Data |
| Slave Address | 0x01 |
| Function Code | 0x06 |
| Address(Upper) | 0x07 |
| Address(Lower) | 0xD1 |
| Value(Upper) | 0x00 |
| Value (Lower) | 0x02 |
| Error Check CRC16(Lower) | 0x59 |
| Error Check CRC16(Upper) | 0x46 |

(3) Preset Multiple Registers (0x10)
[Function]
Write values to holding registers. In case of broadcast, the values are written to the same holding registers of all slave units. The address and the content of holding registers are described in
3. Modbus registers

[Query]
The query message specifies the start address of the register, size of data and values. The register address starts at zero: register 40001 is addressed as 0. This function can write up to 30 registers in one query. Here is an example of a request to slave address 1 for writing 2 values to register 42001 and to register 42002.

| Query | |
|---|---|
| Field | Data |
| Slave Address | 0x01 |
| Function Code | 0x10 |
| Start Address(Upper) | 0x07 |
| Start Address(Lower) | 0xD0 |
| Number of Registers(Upper) | 0x00 |
| Number of Registers(Lower) | 0x02 |
| Data Size(bytes) | 0x04 |
| Value1(Upper) | 0x00 |
| Value1(Lower) | 0x10 |
| Value2(Upper) | 0x00 |
| Value2(Lower) | 0x01 |
| Error Check CRC16(Lower) | 0x18 |
| Error Check CRC16(Upper) | 0xC6 |

| Response | |
|---|---|
| Field | Data |
| Slave Address | 0x01 |
| Function Code | 0x10 |
| Start Address(Upper) | 0x07 |
| Start Address(Lower) | 0xD0 |
| Number of Registers(Upper) | 0x00 |
| Number of Registers(Lower) | 0x02 |
| Error Check CRC16(Lower) | 0x41 |
| Error Check CRC16(Upper) | 0x45 |

(4) Exception response

In case the query message is faulty, the *Modbus Interface DIII* will reply an exception response. In normal conditions the function code of the response message is the same as the query message. But in case of an error, 0x80 is added to the function code of the response message.
The exception response includes the exception code, indicating the cause of the error.

| Exception code | Name | Cause |
|---|---|---|
| 0x01 | Illegal function | This function code is not supported. |
| 0x02 | Illegal data address | Access was attempted to an unassigned register address. |
| 0x03 | Illegal data | This query includes unauthorized data. |

[Example of exception response]
In the case of setting an illegal mode to the holding register address 42002.

| Query | |
|---|---|
| Field | Data |
| Slave Address | 0x01 |
| Function Code | 0x06 |
| Start Address(Upper) | 0x07 |
| Start Address(Lower) | 0xD1 |
| Number of Registers(Upper) | 0x01 |
| Number of Registers(Lower) | 0x0F |
| Error Check(Lower) | 0x99 |
| Error Check(Upper) | 0x13 |

| Response | |
|---|---|
| Field | Data |
| Slave Address | 0x01 |
| Function Code | 0x86 |
| Exception Code | 0x03 |
| Error Check(Lower) | 0x02 |
| Error Check(Upper) | 0x61 |

### 2.2.2 Character format

Each byte of a message is sent as character data as follows.
A character consists of start bit (0), 8 bits data, parity bit and stop bit (1). One character size is always 11 bits and stop bit 1 or 2 is selected by parity bit.

[Non Parity]

| 0 (LSB) | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 (MSB) |
|---|---|---|---|---|---|---|---|---|---|---|
| Start bit | Data | | | | | | | | Stop bit 1 | Stop bit 2 |

[Parity]

| 0 (LSB) | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 (MSB) |
|---|---|---|---|---|---|---|---|---|---|---|
| Start bit | Data | | | | | | | | Parity bit (Odd or Even) | Stop bit 2 |

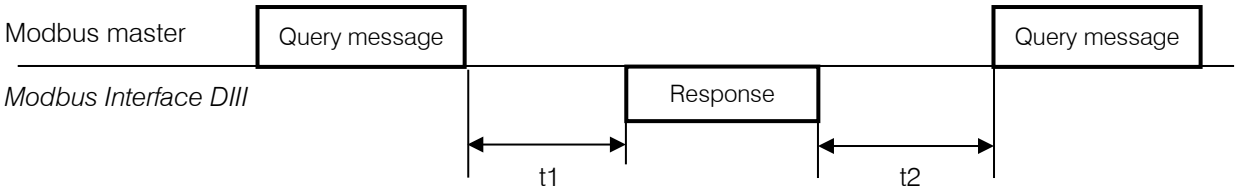
### 2.2.3 Silent internal time

Every frame needs to have silent interval time (T1-T2-T3-T4) before and after. The silent interval time is depending on communication speed.

| Baud Rate(bps) | 9600 | 19200 |
|---|---|---|
| Silent Interval Time(ms) (T1-T2-T3-T4) | 5 | 2,5 |

### 2.2.5 Response time

This *Modbus Interface DIII* responds a message after response time(t1) when this *Modbus Interface DIII* receives a query message. The response time(t1) of this adaptor is "Silent Interval Time(T1-T2-T3-T4) + 20ms".
Modbus master needs to wait to send next query message for time interval(t2) when the modbus master receives a response from the *Modbus Interface DIII*. The time interval(t2) should be more than "Silent Interval Time(T1-T2-T3-T4) + 20ms".




t1 = (T1-T2-T3-T4) + 20 (ms)  t2 >= (T1-T2-T3-T4) + 20 (ms)

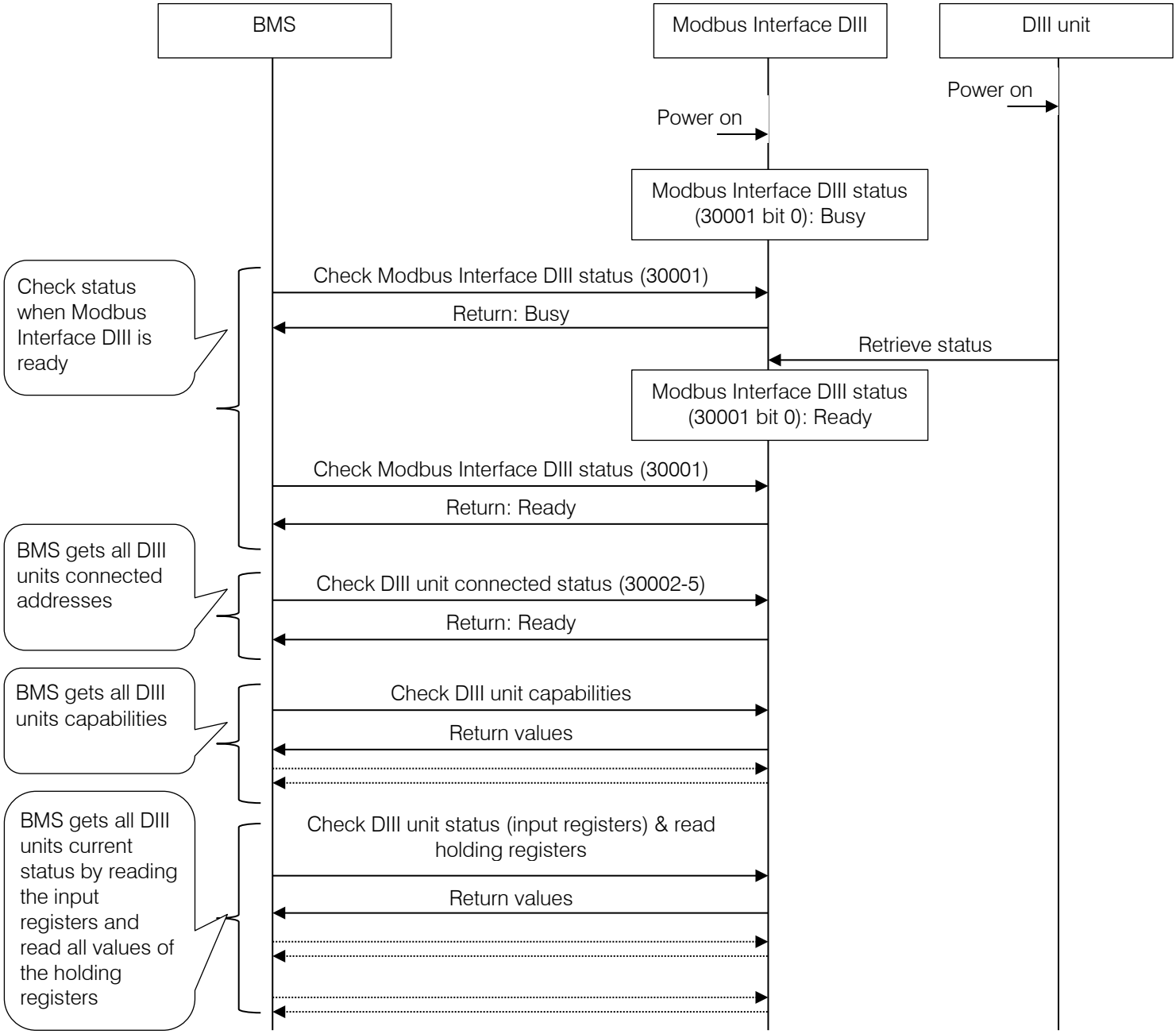
## 2.3 Communication procedure

### *2.3.1 System initialisation*

At startup:
- All input registers have values 0.
After the discovery of the DIII connected units, the “DIII unit connected status bit” (see Input registers 30002 till 30006) will be updated to “1: connected“ and the input registers of the connected DIII units (30001 and higher) will have the correct values.

- All the holding registers have initial values 0.
After the discovery of the DIII connected units, the “DIII unit connected status bit” (see input registers 30002 till 30006) will be updated to “1: connected” and the holding registers of the connected DIII units (42001 and higher) will be updated to the actual values once.

Attention: The holding values receive the actual values at the detection time only. This means this will only happen once. (Remark: also not during rediscovery)



### *2.3.2 Monitor and operate units from the BMS*

Input registers of each DIII unit: 30001 and higher

The input registers will contain the status of the connected DIII units.

In case the DIII communication is interrupted (see Input registers 30006 till 30009): then the last communicated values will remain, until the DIII communication is restored.

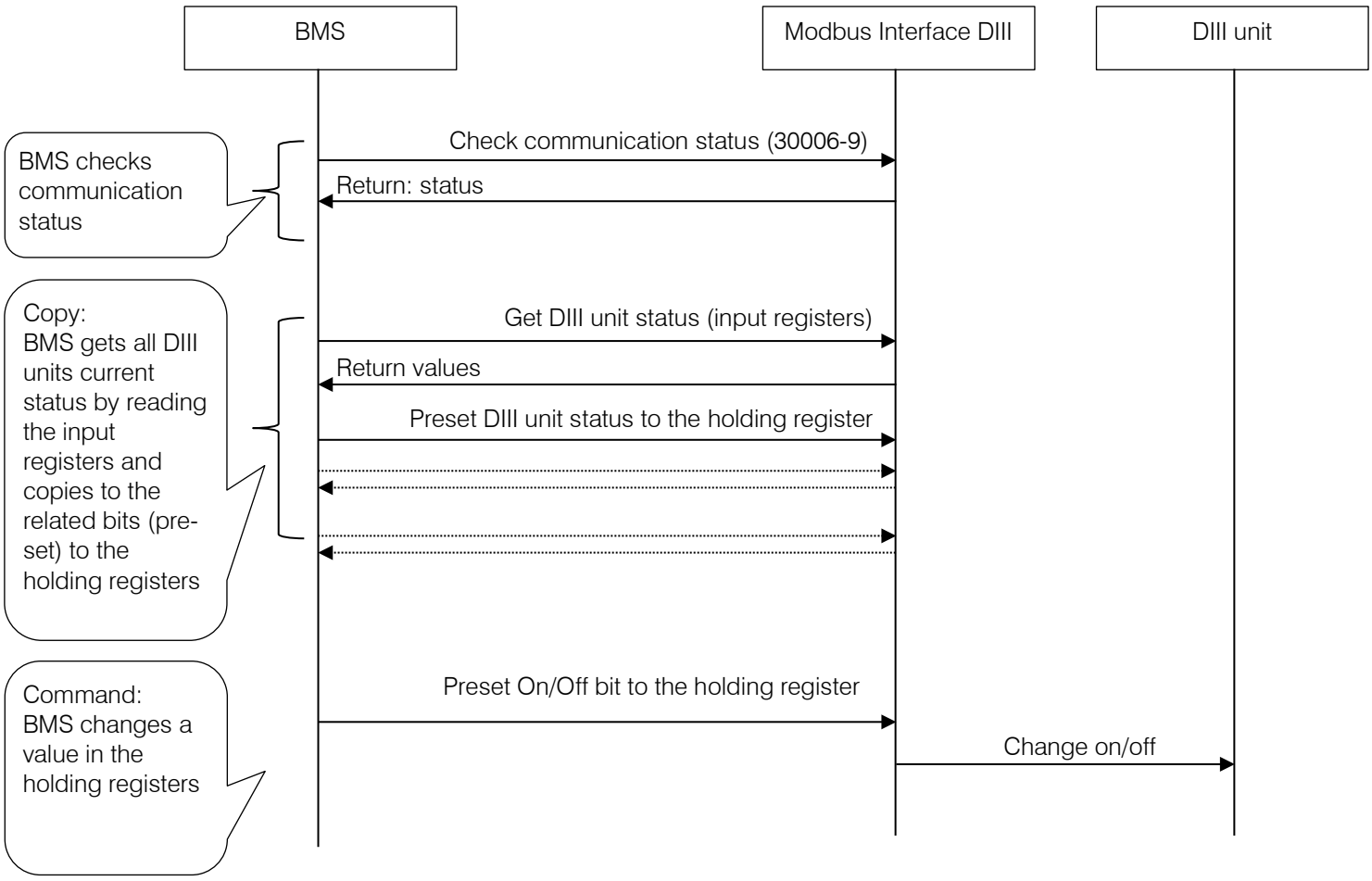
Status changes are communicated continuously to the input registers, meaning the input registers will contain the actual values.

Holding registers of each DIII unit: 42001 and higher

- Writing instructions to change a unit status (Preset Single or Multiple Registers)
When a value is written to a holding register, it will be communicated to the DIII units.

Attention: *Modbus Interface DIII* sends the command to a unit when the value of a Holding Register is changed. Especially in case that indoor units are operated from the user interface, the BMS should always get the status of indoor units and copy the received status to the Holding Registers.

Note: at start-up of the system (See 2.3.1 System initialisation) and the initial discovery of the DIII connected units, the *Modbus Interface DIII* put the actual status in the holding registers. (Remark: not during rediscovery.)

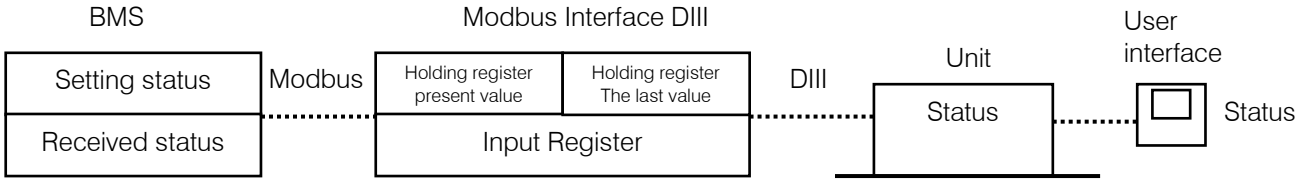


Step by step explanation of the required copy of the BMS.

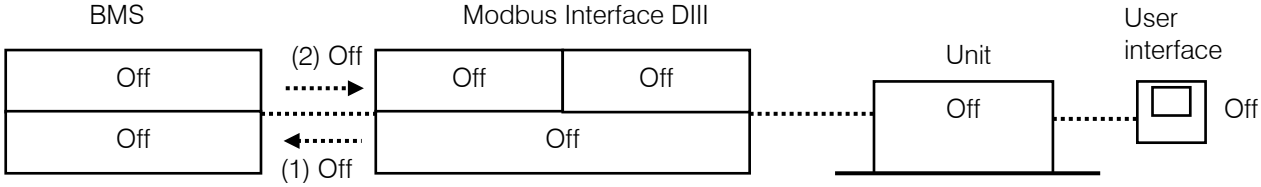
Below is an example for On/Off operation.

Note: The interval setting to the same register is over 0.5s.

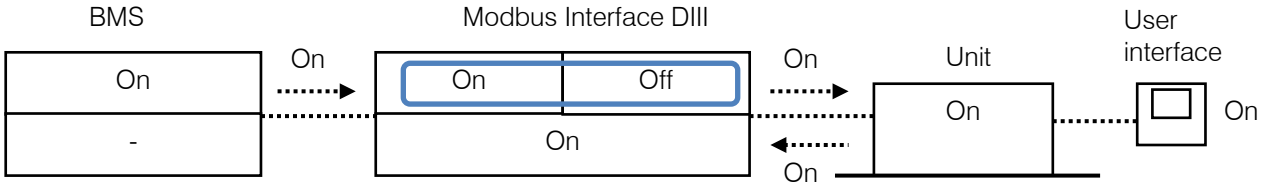
[Legend]




[On/Off operation sequence example]
1. The BMS receives the Off status of units (1) and copies the input status to Holding registers (2).

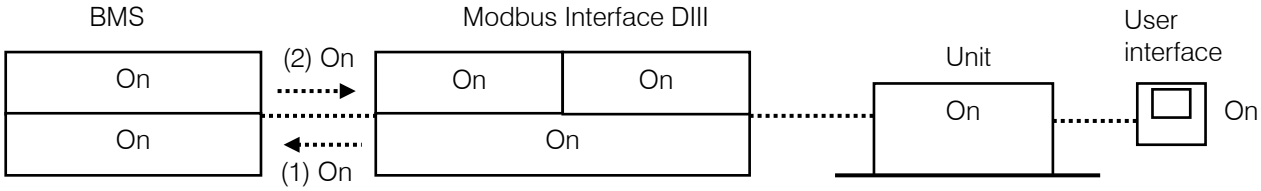



2. The BMS sends an On command to the unit.

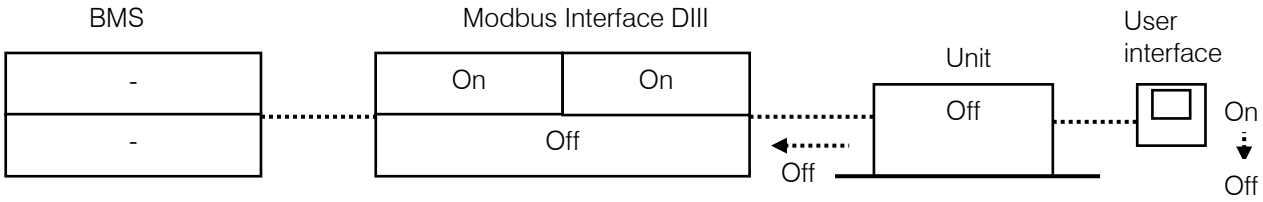



The value of the holding register is changed. So the Modbus Interface DIII sends the command to the units.

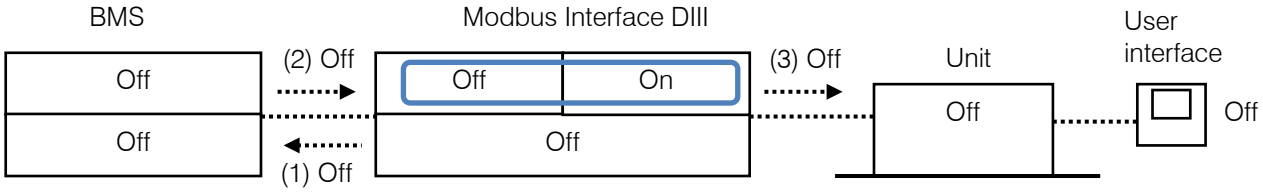
3. The BMS gets the status of the input register (1) and copies the received status to the holding registers (2).



4. The unit is switched Off by the user interface.

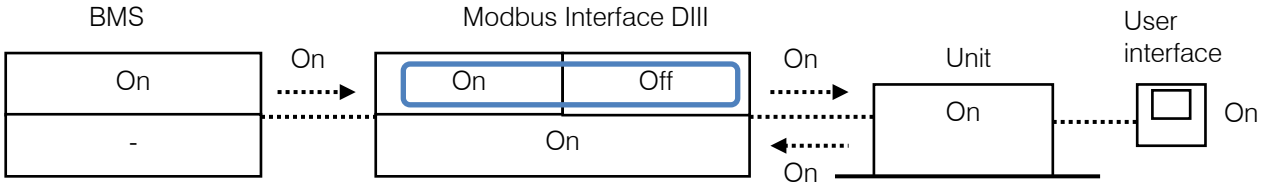



5. The BMS gets the status of the input register (1) and copies the received status to the holding registers (2).



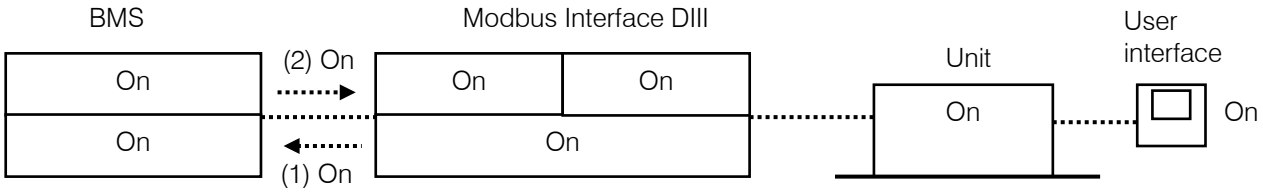

The value of the holding register is changed. So the Modbus Interface DIII sends the command to the units (3).

6. The BMS sends an On command to the unit.



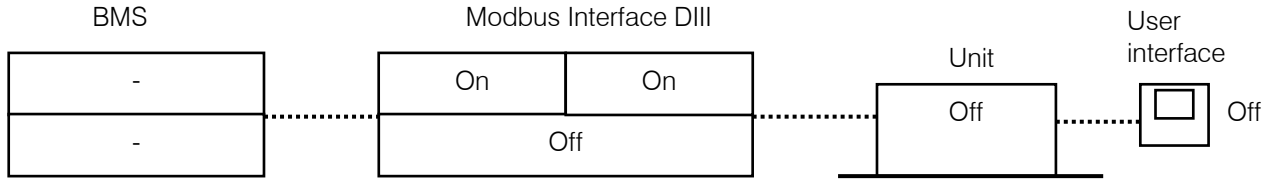

The value of the holding register is changed. So the Modbus Interface DIII sends the command to the units.

7. The BMS gets the status of the input register (1) and copies the received status to the holding registers (2).

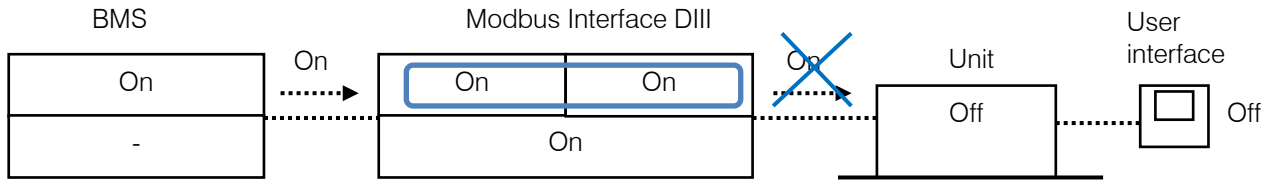


**Attention**: In case the BMS does not copy (see 5.) and sends an On command to the unit.
Then the requested On command will not be executed.

Status




The BMS sends an On command to the unit.

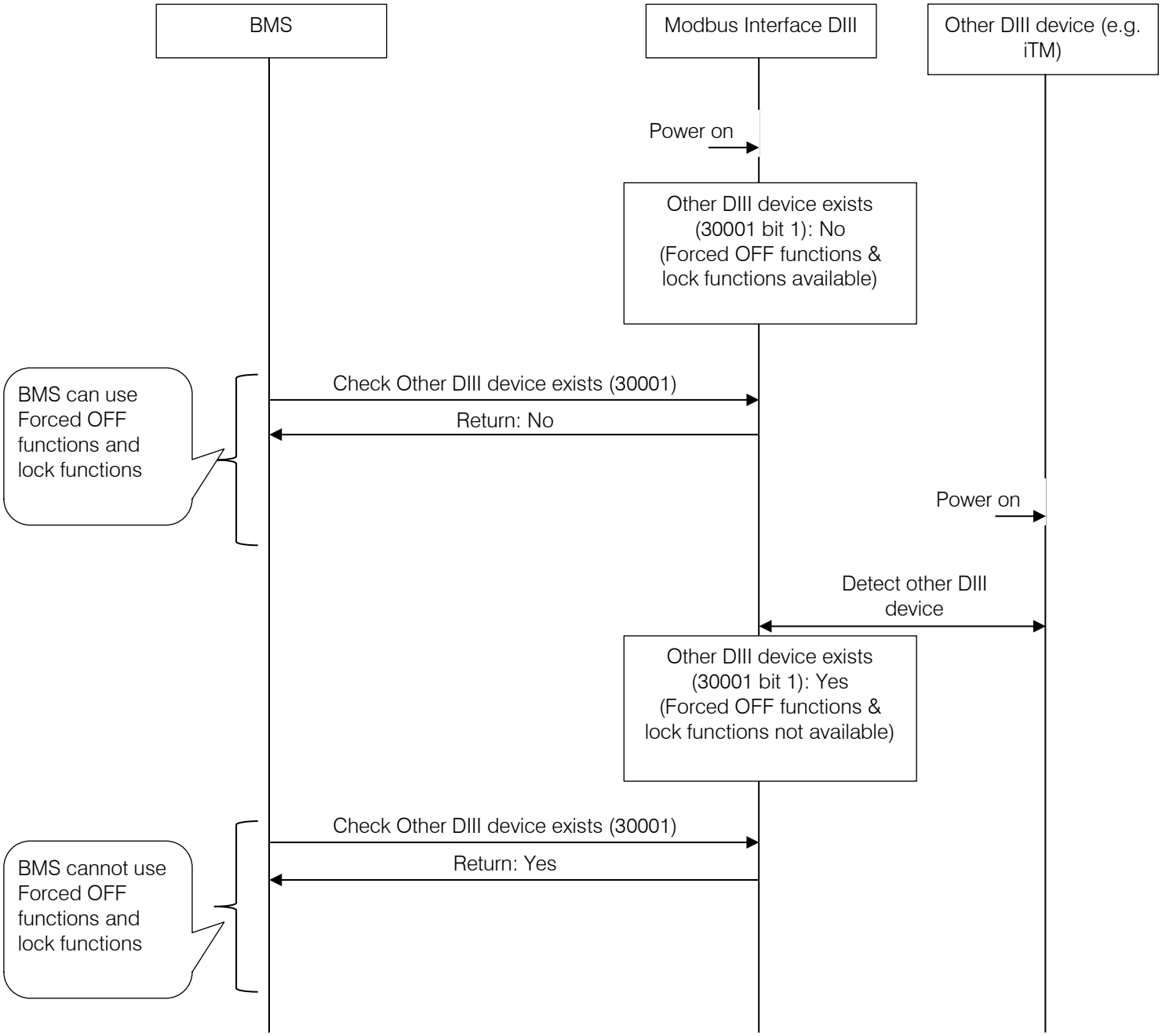



The value of the holding register is not changed. So the Modbus Interface DIII does not send the command to the units.

### *2.3.3 Other DIII devices exist in the same system*

(See 1.5 Overview of compatibilty with other DIII centralised control equipment)

No priority ranking is implemented. Meaning in case another DIII device is detected, the lock button & force OFF functions are not available.



# 3. Modbus registers

Input registers

| | |
|---|---|
| 30001 till 30009 | General *Modbus Interface DIII* status (incl. Detected DIII units & communication status of DIII units) |
| 31001 and higher | Individual DIII units information |

Holding registers

| | |
|---|---|
| 41001 | *Modbus Interface DIII* central "forced off" |
| 42001 and higher | Individual DIII units instructions |

Calculation method for input & holding registers of each connected DIII group address:

DIII group address has an "upper address" and a "lower address".
Example for 1-00: "1" is the upper address, "00" is the lower address.

Register of a DIII group address: Base register+((*upper address*-1)*16+*lower address*)*step

E.g. capability input register for 4-15: 31001+(("4"-1)*16+"15" )*3 = 31190

## 3.1. Input registers

| Input register | Bit | Description | Meaning | |
|---|---|---|---|---|
| 30001 | 15..2 | - | | |
| | 1 | Other DIII device exists | 0: No<br>1: Yes | Note: When another DIII device is connected or disconnected to the DIII, it can take up till 10 minutes to update the status of the input register.<br>(Remark: Initially delivered from factory the value is 1) |
| | 0 | Modbus Interface DIII status | 0: Busy<br>1: ready | Typical at power on of the option, the DIII communication is started with the connected DIII units. At the end of the communication start up, all the input registers and holding resisters have the correct initial values. |
| 30002 | 15..0 | DIII unit connected status | 0: not connected<br>1: connected | DIII address 1-00 (bit 0) till 1-15 (bit 15) |
| 30003 | 15..0 | | | DIII address 2-00 (bit 0) till 2-15 (bit 15) |
| 30004 | 15..0 | | | DIII address 3-00 (bit 0) till 3-15 (bit 15) |
| 30005 | 15..0 | | | DIII address 4-00 (bit 0) till 4-15 (bit 15) |
| 30006 | 15..0 | DIII unit communication status | 0: Normal<br>1: Com-munication error | DIII address 1-00 (bit 0) till 1-15 (bit 15)<br>Typically when a DIII device is connected once, and then disconnected: it can take up till 10 minutes to discover the communication error. |
| 30007 | 15..0 | | | DIII address 2-00 (bit 0) till 2-15 (bit 15) |
| 30008 | 15..0 | | | DIII address 3-00 (bit 0) till 3-15 (bit 15) |
| 30009 | 15..0 | | | DIII address 4-00 (bit 0) till 4-15 (bit 15) |

| Input register | | | | VRV | Sky-air | HRV | Split | VRV hydrobox LT & HT | Air curtains | ERQ control box | Heating | Applied |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Indoor unit capability | Fan speed capability(*not split)<br>Fan speed levels capability(*not split)<br>Fan direction capability(*not split)<br>Fan direction levels capability(*not split)<br>Dry mode capability<br>Auto mode capability<br>Heating mode capability<br>Cooling mode capability<br>Fan mode capability (*not split) | | | O | O | - | O* | O | O | O | O | O |
| 31001 (1-00)<br>31004 (1-01)<br>.. (step of 3)<br>31190 (4-15) | Bit | Description | Meaning | | | | | | | | | |
| | 15 | Fan speed capability | 0:Not exist<br>1: Exist | | | | | | | | | |
| | 14<br>13<br>12 | Fan speed steps capability | 0 till 7 | This value has only meaning if “Fan speed capability” exists<br>0: -, 1:Fix, 2: 2step, 3: 3 step, 4: 4 step, 5: 5 step, 6: -, 7: - | | | | | | | | |
| | 11 | Fan direction capability | 0:Not exist<br>1: Exist | | | | | | | | | |
| | 10<br>9<br>8 | Fan direction steps capability | 0 till 7 | This value has only meaning if “Fan direction capability” exists<br>0: -, 1:Fix, 2: 2step, 3: 3 step, 4: 4 step, 5: 5 step, 6: --, 7: - | | | | | | | | |
| | 7 | - | | | | | | | | | | |
| | 6 | - | | | | | | | | | | |
| | 5 | - | | | | | | | | | | |
| | 4 | Dry mode capability | 0:Not exist<br>1: Exist | | | | | | | | | |
| | 3 | Auto mode capability | 0:Not exist<br>1: Exist | | | | | | | | | |
| | 2 | Heating mode capability | 0:Not exist<br>1: Exist | | | | | | | | | |
| | 1 | Cooling mode capability | 0:Not exist<br>1: Exist | | | | | | | | | |
| | 0 | Fan mode capability | 0:Not exist<br>1: Exist | | | | | | | | | |

| Input register | | | | VRV | Sky-air | HRV | Split | VRV hydrobox LT & HT | Air curtains | ERQ control box | Heating | Applied |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Room temperature set point range | Set point of indoor units range<br>*for split: fixed values refer to KRP928BB2S documentation | | | O | O | - | O* | O | O | O | O | - |
| 31002 (1-00)<br>31005 (1-01)<br>.. (step of 3)<br>31191 (4-15) | Bit | Description | Meaning | | | | | | | | | |
| | 15..8 | Unit cooling set point upper limit | - 128 .. 127°C | 8 bit signed integer<br>(bit 15= sign) | | | | | | | | |
| | 7..0 | Unit cooling set point lower limit | - 128 .. 127°C | 8 bit signed integer<br>(bit 7= sign) | | | | | | | | |
| 31003 (1-00)<br>31006 (1-01)<br>.. (step of 3)<br>31192 (4-15) | 15..8 | Unit heating set point upper limit | - 128 .. 127°C | 8 bit signed integer<br>(bit 15= sign) | | | | | | | | |
| | 7..0 | Unit heating set point lower limit | - 128 .. 127°C | 8 bit signed integer<br>(bit 7= sign) | | | | | | | | |

(Note: Unit set point range is depending on unit e.g. 16 till 32°C.
In some user interfaces, it is possible to change the set point range towards the user e.g. 20 till 30°C.
But these values are independent from the unit set point range. Meaning unit set point range values are not modified. E.g. 16 till 32°C)

| Input register | | | | VRV | Sky-air | HRV | Split | VRV hydrobox LT & HT | Air curtains | ERQ control box | Heating | Applied |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Indoor unit capability | Leaving water set point exist<br>Low noise capability<br>Space heating capability<br>Reheat capability | | | - | - | - | - | O | - | - | O | O |
| 31401 (1-00)<br>31405 (1-01)<br>.. (step of 4)<br>31653 (4-15) | Bit | Description | Meaning | | | | | | | | | |
| | 15..6 | - | | | | | | | | | | |
| | 5 | Reheat capability | 0: Not exist<br>1: exist | | | | | | | | | |
| | 4 | Space heating capability | 0: Not exist<br>1: exist | | | | | | | | | |
| | 3 | - | | | | | | | | | | |
| | 2 | Low noise capability | 0: Not exist<br>1: exist | | | | | | | | | |
| | 1 | Leaving water set point exist | 0: Not exist<br>1: exist | | | | | | | | | |
| | 0 | - | | | | | | | | | | |

| Input register | | | | VRV | Sky-air | HRV | Split | VRV hydrobox LT & HT | Air curtains | ERQ control box | Heating | Applied |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Leaving water set point range | Leaving water set point range cooling and heating | | | - | - | - | - | O | - | - | O | O |
| 31402 (1-00)<br>31406 (1-01)<br>.. (step of 4)<br>31654 (4-15) | Bit | Description | Meaning | | | | | | | | | |
| | 15..8 | Unit cooling water set point upper limit | - 128 .. 127°C (unity 1°C) | 8 bit signed integer (bit 15= sign) | | | | | | | | |
| | 7..0 | Unit cooling water set point lower limit | - 128 .. 127°C (unity 1°C) | 8 bit signed integer (bit 7= sign) | | | | | | | | |
| 31403 (1-00)<br>31407 (1-01)<br>.. (step of 4)<br>31655 (4-15) | 15..8 | Unit heating water set point upper limit | - 128 .. 127°C (unity 1°C) | 8 bit signed integer (bit 15= sign) | | | | | | | | |
| | 7..0 | Unit heating water set point lower limit | - 128 .. 127°C (unity 1°C) | 8 bit signed integer (bit 7= sign) | | | | | | | | |

(Note: Unit set point range is depending on unit e.g. 5 till 20°C.
In some user interfaces, it is possible to change the set point range towards the user e.g. 10 till 15°C. But these values are independent from the unit set point range. Meaning unit set point range values are not modified. E.g. 5 till 20°C)

<table>
<tr><th colspan="2">Input register</th><th>VRV</th><th>Sky-air</th><th>HRV</th><th>Split</th><th>VRV hydrobox LT & HT</th><th>Air curtains</th><th>ERQ control box</th><th>Heating</th><th>Applied</th></tr>
<tr><td>On/Off</td><td>On/Off status of indoor units<br>* For VRV hydrobox LT & HT & Heating:<br>On/off “space cooling/heating” status and control</td><td>O</td><td>O</td><td>O</td><td>O</td><td>O*</td><td>O</td><td>O</td><td>O*</td><td>O</td></tr>
<tr><td>“Forced off”</td><td>“Forced off” status of indoor unit (for each unit separate) (by T1-T2 or by central “Forced off” from the Modbus Interface DIII) (HRV: no “Forced off” status)</td><td>O</td><td>O</td><td>-</td><td>O</td><td>O</td><td>O</td><td>O</td><td>O</td><td>O</td></tr>
<tr><td>Indoor status</td><td>Thermostat status<br>Indoor fan status (if present)<br>Heater status (if present)</td><td>O</td><td>O</td><td>-</td><td>O</td><td>O</td><td>O</td><td>O</td><td>O</td><td>O</td></tr>
<tr><td>Fan speed (Air flow rate)</td><td>LL, L, M, H, HH (depending on indoor unit capability)<br>* Air curtain:<br>CYV models: not available<br>CYQ models: available<br>* HRV (ventilation rate):<br>VAM models: available<br>VKM models: not available</td><td>O</td><td>O</td><td>O*</td><td>-</td><td>-</td><td>O*</td><td>-</td><td>-</td><td>-</td></tr>
<tr><td>Fan direction</td><td>Swing, Flap direction (depending on indoor unit capability)</td><td>O</td><td>O</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td></tr>
</table>

<table>
<tr><td rowspan="13">32001 (1-00)<br>32007 (1-01)<br>.. .. (step of 6)<br>32379 (4-15)</td><td>Bit</td><td>Description</td><td>Meaning</td><td></td></tr>
<tr><td>15</td><td>-</td><td></td><td></td></tr>
<tr><td>14<br>13<br>12</td><td>Fan speed</td><td>0 till 7</td><td>This value is depending on “fan speed steps capability” value
<table>
<tr><td>Value</td><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td></tr>
<tr><td>Fix</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>H</td><td>-</td><td>-</td></tr>
<tr><td>2step</td><td>-</td><td>L</td><td>-</td><td>-</td><td>-</td><td>H</td><td>-</td><td>-</td></tr>
<tr><td>3step</td><td>-</td><td>L</td><td>-</td><td>M</td><td>-</td><td>H</td><td>-</td><td>-</td></tr>
<tr><td>5step</td><td>-</td><td>LL</td><td>L</td><td>M</td><td>H</td><td>HH</td><td>-</td><td>-</td></tr>
</table>
HRV (ventilation rate):<br>(note for HRV: fan speed steps capability is fixed to 0)<br>For VAM units: value 3:L, 7:H</td></tr>
<tr><td>11</td><td>-</td><td></td><td></td></tr>
<tr><td>10<br>9<br>8</td><td>Fan direction</td><td>0 till 7</td><td>This value has only meaning if “Fan direction capability” exists<br>0: P0, 1: P1, 2:P2, 3: P3, 4: P4, 5: -, 6: Stop, 7: swing<br>P0 = horizontal direction<br>P4 = vertical direction</td></tr>
<tr><td>7</td><td>Thermo status</td><td>0: Off<br>1: On</td><td></td></tr>
<tr><td>6</td><td>Heater status</td><td>0:Off<br>1: On</td><td></td></tr>
<tr><td>5</td><td>Fan status</td><td>0: Off<br>1: On</td><td></td></tr>
<tr><td>4</td><td>-</td><td></td><td></td></tr>
</table>

| | | | | |
|---|---|---|---|---|
| | 3 | - | | |
| | 2 | Forced off status | 0: none<br>1: Forced off | or Indoor status of “Forced off” of digital input T1-T2 or by central “Forced off” by *Modbus Interface DIII* |
| | 1 | - | | |
| | 0 | On/off status | 0: Off<br>1: On | |

| Input register | | | | VRV | Sky-air | HRV | Split | VRV hydrobox LT & HT | Air curtains | ERQ control box | Heating | Applied |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Cooling/ Heating Operation setting mode | Depending on indoor unit capability (fan only/Cool/heat/auto/dry)<br>* for split: no fan only mode<br>* for VRV hydrobox LT&HT & heating & applied: Only Heating&Cooling<br>* for HRV: Only ventilation | | | O | O | O* | O* | O* | O | O | O* | O* |
| Filter sign | Filter sign of indoor units<br>* Air curtain:<br>CYV models: not available<br>CYQ models: available | | | O | O | O | - | - | O* | - | O | - |
| Indoor status | Defrost/hot start status<br>Operation status | | | O | O | - | O | O | O | O | O | O |
| | Cool/heat master | | | O | O | - | - | O | O | O | O | O |
| 32002 (1-00)<br>32008 (1-01)<br>.. .. (step of 6)<br>32380 (4-15) | Bit | Description | Meaning | | | | | | | | | |
| | 15<br>14 | Cool/heat master | 0 till 2 | 0: not decided<br>1: Slave<br>2: Master (means possible to change cool/heat operation mode via this indoor unit) | | | | | | | | |
| | 13 | Defrost/ hot start status | 0: Off<br>1: On | | | | | | | | | |
| | 12 | - | | | | | | | | | | |
| | 11<br>10<br>9<br>8 | Operation status | 0 till 2 | 0: Fan, 1: Heating, 2: Cooling<br>Actual running status. | | | | | | | | |
| | 7<br>6<br>5<br>4 | Filter sign status | 0: Off<br>1 till 15: On | | | | | | | | | |
| | 3<br>2<br>1<br>0 | Operation mode setting | 0 till 7 | 0: Fan, 1: Heating, 2: Cooling, 3: Auto<br>4:Ventilation,5:-,6:-,7: Dry | | | | | | | | |

| Input register | | | | VRV | Sky-air | HRV | Split | VRV hydrobox LT & HT | Air curtains | ERQ control box | Heating | Applied |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Room temperature set point | Set point of indoor units | | | O | O | - | O | O | O | O | O | - |
| 32003 (1-00) | Bit | Description | Meaning | | | | | | | | | |
| 32009 (1-01) ..(step of 6) 32381 (4-15) | 15..0 | Set point | - 127,9 .. 127,9°C (unity: 0,1°C) | 16 bit signed integer equals the value multiplied by 10 (bit 15= sign) | | | | | | | | |

| Input register | | | | VRV | Sky-air | HRV | Split | VRV hydrobox LT & HT | Air curtains | ERQ control box | Heating | Applied |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Room temperature | Suction temperature of indoor units (or user interface sensor temperature)<br>* Split: KRP928BB2S is required | | | O | O | - | O* | O | - | O | O | - |
| 32005 (1-00)<br>32011 (1-01)<br>.. (step of 6)<br>32383 (4-15) | Bit | Description | Meaning | | | | | | | | | |
| | 15..0 | Room temperature | - 511,9 .. 511,9°C (unity: 0,1°C) | 16 bit signed integer equals the value multiplied by 10<br>(bit 15= sign) | | | | | | | | |

Additional notes concerning the room temperature Or Suction temperature.
By default the Suction temperature value is applicable.

If the room temperature of the user interface (e.g. BRC1E52A/B7 or BRC2/3E52C7) is required, following settings should be confirmed on the user interface:

| Mode No. – First Code No.<br><br>( ) = group setting | Description of setting | Required values: |
|---|---|---|
| User interface settings (e.g. BRC1E52A/B7 or BRC2/3E52C7) | | |
| 1c – 1 | Thermostat sensor used for the "Auto" operation mode and the Setback function (room temperature on detailed display). | Value 02:<br>Remote controller thermistor |
| Unit settings | | |
| 10 (20) – 2 | Thermostat sensor in the remote controller | Value 03:<br>Use exclusively |
| 10 (20) – 5 | Sensor value information to DIII devices | Value 02:<br>Sensor value as set by 10-2-0X or 10-6-0X. |
| 10 (20) – 6 | Thermostat sensor in group control | Value 02:<br>Use both the unit sensor (or remote sensor if installed) AND the remote controller sensor. |

For more information, refer to the installation manual of applicable indoor unit.

| Input register | | | | VRV | Sky-air | HRV | Split | VRV hydrobox LT & HT | Air curtains | ERQ control box | Heating | Applied |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Leaving water set point | Leaving water set point cooling and heating<br>* Applied: “cooling negative leaving water set point” feature: depending if function is integrated in unit.<br>(see chapter<br><br>1.4.1 Overview of compatible Daikin models with DIII connection (detail)) | | | - | - | - | - | O | - | - | O | O* |
| 32801 (1-00)<br>32805 (1-01)<br>.. (step of 4)<br>33053 (4-15) | Bit | Description | Meaning | | | | | | | | | |
| | 15..0 | Heating water Set point | - 127,9 .. 127,9°C (unity: 0,1°C) | 16 bit signed integer equals the value multiplied by 10<br>(bit 15= sign) | | | | | | | | |
| 32802 (1-00)<br>32806 (1-01)<br>.. (step of 4)<br>33054 (4-15) | 15..0 | Cooling water Set point | - 127,9 .. 127,9°C (unity: 0,1°C) | 16 bit signed integer equals the value multiplied by 10<br>(bit 15= sign) | | | | | | | | |

| Input register | | | | VRV | Sky-air | HRV | Split | VRV hydrobox LT & HT | Air curtains | ERQ control box | Heating | Applied |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Domestic hot water | Reheat enable/ disable status<br>Storage start requested<br>Storage set point | | | - | - | - | - | O | - | - | O | - |
| Quiet mode (low noise) | | | | - | - | - | - | O | - | - | O | O |
| 32803 (1-00)<br>32807 (1-01)<br>.. (step of 4)<br>33055 (4-15) | Bit | Description | Meaning | | | | | | | | | |
| | 15..8 | Storage set point | - 128 .. 127°C (unity 1°C) | 8 bit signed integer equals the value multiplied by 10<br>(bit 15= sign) | | | | | | | | |
| | 7..3 | - | | | | | | | | | | |
| | 2 | Low noise On/Off status | 0: Off<br>1: On | | | | | | | | | |
| | 1 | Storage started request | 0: none<br>1: started request | | | | | | | | | |
| | 0 | Reheat On/Off status | 0: Off<br>1: On | | | | | | | | | |

| Input register | | | | VRV | Sky-air | HRV | Split | VRV hydrobox LT & HT | Air curtains | ERQ control box | Heating | Applied |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ventilation operation mode | *VAM models: available<br>VKM models: not available | | | - | - | O* | - | - | - | - | - | - |
| 32804 (1-00)<br>32808 (1-01)<br>.. (step of 4)<br>33056 (4-15) | Bit | Description | Meaning | | | | | | | | | |
| | 15..8 | - | | | | | | | | | | |
| | 7 | Ventilation operation mode setting | 1: Auto<br>2: Energy reclaim ventilation<br>3: Bypass | | | | | | | | | |
| | 6 | | | | | | | | | | | |
| | 5..0 | - | | | | | | | | | | |

| Input register | | | | VRV | Sky-air | HRV | Split | VRV hydrobox LT & HT | Air curtains | ERQ control box | Heating | Applied |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Error | Error, Alarm & Warning status with code and sub-code code values in ASCII code | | | O | O | O | O | O | O | O | O | O |
| 33601 (1-00)<br>33603 (1-01)<br>.. (step of 2)<br>33727 (4-15) | Bit | Description | Meaning | | | | | | | | | |
| | 15<br>14<br>13<br>12<br>11<br>10<br>9<br>8 | Error/ alarm/ warning code character (higher) | ASCII (dec) | Example:<br>0100 0011 0011 0111<br><br>Error code character (higher)<br>01000011 (bin) = 67(dec) = ASCII “C”<br><br>Error code character (lower)<br>00110111 (bin) = 55 (dec) = ASCII “7”<br><br>Error code: “C7”<br><br>Note: In case no error exists, then following<br>0011 0000 0011 0000<br>0011 0000 (bin) = 48(dec) = ASCII “0”<br><br>Error code character (lower)<br>0011 0000 (bin) = 48 (dec) = ASCII “0”<br><br>Error code: “00” (means no error) | | | | | | | | |
| | 7<br>6<br>5<br>4<br>3<br>2<br>1<br>0 | Error/ Alarm/ warning code character (lower) | ASCII (dec) | | | | | | | | | |
| 33602 (1-00)<br>33604 (1-01)<br>.. (step of 2)<br>33728 (4-15) | 15<br>14<br>13<br>12 | Error/ Alarm/ warning unit number | 0.. 15 | Note: only if different units are connected to the same DIII group address | | | | | | | | |
| | 11 | - | | | | | | | | | | |
| | 10 | Warning status | 0: Normal<br>1: Warning | (note: in case of Warning, the unit will not be stopped) | | | | | | | | |
| | 9 | Alarm status | 0: Normal<br>1: Alarm | (note: in case of Alarm, the unit will not be stopped) | | | | | | | | |
| | 8 | Error status | 0: Normal<br>1: Error | (note: in case of Error, the unit will is stopped) | | | | | | | | |
| | 7<br>6 | - | | | | | | | | | | |
| | 5<br>4<br>3<br>2<br>1<br>0 | Error/ Alarm/ Warning sub code | 0.. 63 | Note: only valid for Errors were a sub-code exists | | | | | | | | |

### 3.2 Holding registers

| Holding register | | | | VRV | Sky-air | HRV | Split | VRV hydrobox LT & HT | Air curtains | ERQ control box | Heating | Applied |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| "Forced off" | Central "Forced off" for all connected DIII units.<br>Actual behaviour depending on user interface.<br>Example:<br>BRC1E52A/B7 & BRC2/3C52C7 centralized control icon is shown and all connected DIII units are forced off.<br><br>(Note:<br>Central "forced off": Only available when no other DIII device is detected.<br>See Input register "Other DIII device exists" 30001 bit 1) | | | O | O | O | O | O | O | O | O | O |
| 41001 | Bit | Description | Meaning | | | | | | | | | |
| | 15..1 | - | | | | | | | | | | |
| | 0 | Centralised forced off | 0: none<br>1: Forced off | Initial value is 0. | | | | | | | | |

Additional information concerning the *forced off* function.

Situation 1: A DIII unit that lost communication to Modbus Interface DIII (due to wire communication problem or power outage of Modbus InterfaceDIII):

Consequence: After some minutes, the *forced off* will automatically be de-acivated by the DIII unit.

Modbus Interface DIII required actions to return to the previous state:
In case Modbus Interface DIII also had a power outage:
After the power is restored and the DIII unit is discovered then re-activation (holding register set) of *forced off* function is required.
In case Modbus Interface DIII lost communication with DIII unit:
After re-discovery, de-activation (holding register reset) and re-activation (holding register set) of *forced off* function is required.

Situation 2: A power outage of a DIII unit only
Consequence: After the power is restored, the *forced off* is automatically activated again.

Situation 3: A power outage of a DIII unit and Modbus Interface DIII at the same time:
Consequence: After the power is restored, the *forced off* is de-acivated.

Modbus Interface DIII required actions to return to the previous state:
After the power is restored and the DIII unit is discovered, re-activation (holding register set) of *forced off* function is required.

<table>
<tr><th colspan="2">Holding register</th><th>VRV</th><th>Sky-air</th><th>HRV</th><th>Split</th><th>VRV hydrobox LT & HT</th><th>Air curtains</th><th>ERQ control box</th><th>Heating</th><th>Applied</th></tr>
<tr><td>On/Off</td><td>On/Off of indoor units<br>* For VRV hydrobox LT & HT & Heating:<br>On/off “space cooling/heating”</td><td>O</td><td>O</td><td>O</td><td>O</td><td>O*</td><td>O</td><td>O</td><td>O*</td><td>O</td></tr>
<tr><td>Fan speed (Air flow rate)</td><td>LL, L, M, H, HH (depending on indoor unit capability)<br>* Air curtain:<br>CYV models: not available CYQ models: available<br>HRV (ventilation rate):<br>VAM models: available<br>VKM models: not available</td><td>O</td><td>O</td><td>O*</td><td>-</td><td>-</td><td>O*</td><td>-</td><td>-</td><td>-</td></tr>
<tr><td>Fan direction</td><td>Swing, Flap direction (depending on indoor unit capability)</td><td>O</td><td>O</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td></tr>
</table>

<table>
<tr><td rowspan="12">42001 (1-00)<br>42004 (1-01)<br>.. (step of 3)<br>42190 (4-15)</td><td>Bit</td><td>Description</td><td>Meaning</td><td></td></tr>
<tr><td>15</td><td>-</td><td></td><td></td></tr>
<tr><td>14</td><td rowspan="3">Fan speed</td><td rowspan="3">0 till 7</td><td rowspan="3">This value is depending on “fan speed steps capability” value
<table>
<tr><td>Value</td><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td></tr>
<tr><td>Fix</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>H</td><td>-</td><td>-</td></tr>
<tr><td>2step</td><td>-</td><td>L</td><td>-</td><td>-</td><td>-</td><td>H</td><td>-</td><td>-</td></tr>
<tr><td>3step</td><td>-</td><td>L</td><td>-</td><td>M</td><td>-</td><td>H</td><td>-</td><td>-</td></tr>
<tr><td>5step</td><td>-</td><td>LL</td><td>L</td><td>M</td><td>H</td><td>HH</td><td>-</td><td>-</td></tr>
</table>
(note: Fan control flag bit 7-6-5-4 must be set to value 6)<br>Note: The BMS needs to copy input register value: 32001 (1-00)… bit 14-13-12 to this holding register.<br>(note: in case no fan capability this register should be set to 0)<br><br>HRV (ventilation rate) : For VAM units:<br>Values 0/1/2:L & 3/4/5/6/7:H<br>(note for HRV: fan speed steps capability is fixed to 0)<br>(note for HRV: Fan control flag bits 7-6-5-4 are not applicable)<br>(note for HRV: Related input register with actual value: 32001 (1-00)… bit 14-13-12<br>Attention during the BMS copy: value 3 “L” of input register should be translated to value 2 “L” in holding register by the BMS to avoid a change to “H” ventilation rate.<br>Value 7 “H” of input register can be copied to equal value7 “H” in holding register.)</td></tr>
<tr><td>13</td></tr>
<tr><td>12</td></tr>
<tr><td>11</td><td>-</td><td></td><td></td></tr>
<tr><td>10</td><td rowspan="3">Fan direction</td><td rowspan="3">0 till 7</td><td rowspan="3">This value has only meaning if “Fan direction capability” exist<br>0: P0, 1: P1, 2:P2, 3: P3, 4: P4, 5: -, 6: Stop, 7: swing<br>P0 = horizontal direction<br>P4 = vertical direction</td></tr>
<tr><td>9</td></tr>
<tr><td>8</td></tr>
</table>

| | | | | |
|---|---|---|---|---|
| | | | | (note: Fan control flag must be set to value 6)<br>Note: The BMS needs to copy input register value: 32001 (1-00)… bit 10-9-8) to this holding register |
| | 7<br>6<br>5<br>4 | Fan control flag | 0: no fan control<br>6: fan control | In case fan control: This register has to be set to value 6<br>In case no fan control: this register has to be set to value 0<br>For HRV: "fan control flag" has no impact on ventilation rate control bit 14-13-12 |
| | 3 | - | | |
| | 2 | - | | |
| | 1 | - | | |
| | 0 | On/off | 0: Off<br>1: On | Note: The BMS needs to copy input register value: value: 32001 (1-00)… bit 0) to this holding register |

| Holding register | | | | VRV | Sky-air | HRV | Split | VRV hydrobox LT & HT | Air curtains | ERQ control box | Heating | Applied |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Cooling/ Heating Operation mode | Depending on indoor unit capability (fan only/Cool/heat/auto/dry)<br>* for split: no fan only mode<br>* for VRV hydrobox LT&HT & heating & applied:<br>Only Heating&Cooling | | | O | O | - | O* | O* | O | O | O* | O* |
| Filter sign | Filter sign reset of indoor units<br>* Air curtain:<br>CYV models: not available<br>CYQ models: available | | | O | O | O | - | - | O* | - | O | - |
| 42002 (1-00)<br>42005 (1-01)<br>.. (step of 3)<br>42191 (4-15) | Bit | Description | Meaning | | | | | | | | | |
| | 15..<br>8 | - | | | | | | | | | | |
| | 7<br>6<br>5<br>4 | Filter sign reset | 0: none<br>15: reset | Attention: After reset, set to value 0 again. Otherwise filter sign will never appear again. | | | | | | | | |
| | 3<br>2<br>1<br>0 | Operation mode setting | 0 till 7 | 0: Fan, 1: Heating, 2: Cooling, 3: Auto<br>4:Ventilation,5:-,6:Setpoint/Dependent ,7: Dry<br>(note 6: Set point/Dependent is used when the indoor unit is not cool/heat master)<br>Note: "illegal data" is returned in case not possible to set the value on the unit. (see chapter 2.2.1 Function format)<br>(e.g. Set holding register to "1:heating" value to a unit that cannot be put to heating)<br>(possible to check register 31001 for fan / cooling / heating / auto / dry mode capability)<br>Note: The BMS needs to copy input register value: 32002 (1-00)… bit 3-2-1-0 to this holding register | | | | | | | | |

| Holding register | | | | VRV | Sky-air | HRV | Split | VRV hydrobox LT & HT | Air curtains | ERQ control box | Heating | Applied |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Room temperature set point | Set point of indoor units | | | O | O | - | O | O | O | O | O | - |
| 42003 (1-00)<br>42006 (1-01)<br>.. (step of 3)<br>42192 (4-15) | Bit | Description | Meaning | 16 bit signed integer equals the value multiplied by 10<br>(bit 15= sign)<br><br>Remark:<br>1. In case the requested value is out of the unit set point range and/or the user interface set point range, the set point is set to the minimum limit value or higher limit value.<br>2. For the result please check for the value in the input register.<br><br>Note: The BMS needs to copy input register value: 32003 (1-00)… bit 15..0) to this holding register | | | | | | | | |
| | 15..0 | Set point | - 127,9 .. 127,9°C<br>(unity: 0,1°C) | | | | | | | | | |

| Holding register | | | | VRV | Sky-air | HRV | Split | VRV hydrobox LT & HT | Air curtains | ERQ control box | Heating | Applied |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Leaving water set point | Leaving water set point cooling and heating<br>* Applied: for cooling negative leaving water set point: depending if function is integrated in unit software. (see chapter<br><br>1.4.1 Overview of compatible Daikin models with DIII connection (detail)) | | | - | - | - | - | O | - | - | O | O* |
| 42401 (1-00)<br>42405 (1-01)<br>.. (step of 4)<br>42653 (4-15) | Bit | Description | Meaning | | | | | | | | | |
| | 15..0 | Heating water Set point | - 127,9 .. 127,9°C (unity: 0,1°C) | 16 bit signed integer equals the value multiplied by 10<br>(bit 15= sign)<br><br>Remark:<br>1. In case the requested value is out of the unit set point range and/or the user interface set point range, the set point is set to the minimum limit value or higher limit value.<br>2. For the result please check for the value in the input register.<br>Note: The BMS needs to copy input register value: 32801 (1-00)… bit 15..0 to this holding register. | | | | | | | | |
| 42402 (1-00)<br>42406 (1-01)<br>.. (step of 4)<br>42654 (4-15) | 15..0 | Cooling water Set point | - 127,9 .. 127,9°C (unity: 0,1°C) | 16 bit signed integer equals the value multiplied by 10<br>(bit 15= sign)<br><br>Remark:<br>1. In case the requested value is out of the unit set point range and/or the user interface set point range, the set point is set to the minimum limit value or higher limit value.<br>2. For the result please check for the value in the input register.<br>Note: The BMS needs to copy input register value: 32802 (1-00)… bit 15..0 to this holding register | | | | | | | | |

| Holding register | | | | VRV | Sky-air | HRV | Split | VRV hydrobox LT & HT | Air curtains | ERQ control box | Heating | Applied |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Domestic hot water | Reheat enable/ disable status<br>Storage set point | | | - | - | - | - | O | - | - | O | - |
| Quiet mode (low noise) | | | | - | - | - | - | O | - | - | O | O |
| 42403 (1-00)<br>42407 (1-01)<br>.. (step of 4)<br>42655 (4-15) | Bit | Description | Meaning | | | | | | | | | |
| | 15<br>14<br>13<br>12<br>11<br>10<br>9<br>8 | Storage set point | - 128 .. 127°C (unity 1°C) | 8 bit signed integer equals the value multiplied by 10 (bit 15= sign)<br><br>Remark:<br>1. In case the requested value is out of the unit set point range and/or the user interface set point range, the set point is set to the minimum limit value or higher limit value.<br>2. For the result please check for the value in the input register.<br>Note: The BMS needs to copy input register value: 32803 (1-00)… bit 15..8 to this holding register. | | | | | | | | |
| | 7..4 | - | | | | | | | | | | |
| | 3 | - | | | | | | | | | | |
| | 2 | Quiet mode (Low noise) On/Off | 0: Off<br>1: On | Note: The BMS needs to copy input register value: 32803 (1-00)… bit 2 to this holding register. | | | | | | | | |
| | 1 | - | | | | | | | | | | |
| | 0 | Reheat On/off | 0: Off<br>1: On | Note: The BMS needs to copy input register value: 32803 (1-00)… bit 0 to this holding register. | | | | | | | | |

| Holding register | | | | VRV | Sky-air | HRV | Split | VRV hydrobox LT & HT | Air curtains | ERQ control box | Heating | Applied |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ventilation operation mode | *VAM models: available<br>VKM models: not available | | | - | - | O* | - | - | - | - | - | - |
| 42404 (1-00)<br>42408 (1-01)<br>.. (step of 4)<br>42656 (4-15) | Bit | Description | Meaning | | | | | | | | | |
| | 15..8 | - | | | | | | | | | | |
| | 7<br>6 | Ventilation operation mode setting | (0:No meaning)<br>1: Auto<br>2: Energy reclaim ventilation<br>3: Bypass | (remark: not possible to detect if unit has capability or not)<br><br>Note: The BMS needs to copy input register value: 32804 (1-00)… bit 7-6 to this holding register. | | | | | | | | |
| | 5..0 | | | | | | | | | | | |

| Holding register | | VRV | Sky-air | HRV | Split | VRV hydrobox LT & HT | Air curtains | ERQ control box | Heating | Applied |
|---|---|---|---|---|---|---|---|---|---|---|
| user interface lock (button)<br><br>(Note: Only available when no other DIII device is detected See Input register "Other DIII device exists" 30001 bit 1) | - On/off lock (no lock, On lock, Off lock)<br>- Operation mode change lock<br>- Up-down temperature lock<br>- Fan speed lock (if fan present)<br>- Fan direction lock (if fan present)<br>Actual behaviour depending on user interface.<br>Example:<br>BRC1E52A/B7 & BRC2/3C52C7 centralized control icon is shown and locked function cannot be done.<br><br>* Split (with KRP928BB2S)<br>- On/Off lock (no lock, on/off lock)<br>- Operation mode change & set point locked together.<br>Function:<br>Locked functions are ignored.<br><br>* HRV:<br>- On/off lock (no lock, On lock, Off lock) | O | O | O* | O* | O | O | O | O | O |

| 42801 (1-00)<br>42802 (1-01)<br>.. (step of 1)<br>42864 (4-15) | Bit | Description | Meaning | |
|---|---|---|---|---|
| | 15..7 | - | | |
| | 6 | - | Fixed to 0 | |
| | 5 | User interface button fan speed (up/down) Lock | 0: Enabled<br>1: Disable | Note: for * Split (with KRP928BB2S),No meaning |
| | 4 | User interface button fan direction (up/down) Lock | 0: Enabled<br>1: Disable | Note: for * Split (with KRP928BB2S),No meaning |
| | 3 | User interface button operation mode Lock | 0: Enabled<br>1: Disable | Note: for * Split (with KRP928BB2S), Operation mode change button lock & set point (up/down) button lock |
| | 2 | User interface button set point (up/down) Lock | 0: Enabled<br>1: Disable | Note: for * Split (with KRP928BB2S), No meaning |
| | 1 | User interface button Off Lock | 0: Enabled<br>1: Disable | Note: for * Split (with KRP928BB2S), No meaning |
| | 0 | User interface | 0: Enabled | Note: for * Split (with KRP928BB2S), User interface |

| | | | | |
|---|---|---|---|---|
| | | button On Lock | 1: Disable | On/off lock |

(Note: There is no related input register with actual value)

Additional information concerning the lock function.

Situation 1: A DIII unit that lost communication to Modbus Interface DIII (due to wire communication problem or power outage of Modbus InterfaceDIII):

Consequence: After some minutes, the lock will automatically be de-acivated by the DIII unit.

Modbus Interface DIII required actions to return to the previous state:

In case Modbus Interface DIII also had a power outage:
After the power is restored and the DIII unit is discovered then re-activation (holding register set) of lock functions is required.
In case Modbus Interface DIII lost communication with DIII unit:
After re-discovery, de-activation (holding register reset) and re-activation (holding register set) of lock functions is required.

Situation 2: A power outage of a DIII unit only

Consequence: After the power is restored, the lock is automatically activated again.

Modbus Interface DIII required actions: none

Situation 3: A power outage of a DIII unit and Modbus Interface DIII at the same time:

Consequence: After the power is restored, the lock is de-acivated.

Modbus Interface DIII required actions to return to the previous state:
After the power is restored and the DIII unit is discovered, re-activation (holding register set) of lock functions is required.

# 4. Software of Modbus Interface DIII

## 4.1 Software releases

| | | Software ID & PCB label | | Software published in Updater PC program |
|---|---|---|---|---|
| June/2014 | Firmware software | ID40E1 (SP2143 v25) EB10018-1(A) | First produced models only contain firmware. This firmware enables the PCB to be updated with application software via the updater. Remark: The firmware itself does not contain any Modbus functionality. Before to use these models, please upload application software with the PC updater | - |
| July/2014 | Application software | ID40F1 (SP2450 v017) EB10018-1(B) | First release of application software containing the Modbus Interface DIII functions | Updater v1.4.1 DB v1.4.1.0 |

## 4.2 Software update with Updater

The *Modbus Interface DIII* software can be updated with the *Daikin Updater* PC software.
- At least *updater* v1.4.x is required. For availability, please contact your local service contact for the latest version.
- Products shipped at launch start-up will require a software update to be able to function.

Two possible connections to connect the PC to the *Modbus Interface DIII*:

Method 1) With the *PC USB cable* EKPCCAB3 connected to the X2A of the main board.
Method 2) With a *USB/RS485 converter* (Daikin spare - part reference 999417P) connected one on one to the RS485 Modbus port (& dipswitch DS1 off/off/off/off setting & DS2 is not off/off/off/off e.g. DS2 is off/off/off/on)

### *4.2.1 Updater*

The updater PC program can be executed without admin rights.
(Remark: only during the one time USB driver installation, admin rights are required)

#### 4.2.1.1 Updater Minimum PC requirements:

Updater (v1.4.x and higher):
- Windows XP (SP3), Windows Vista (SP2) or Windows 7 or Windows 8/8.1
- Microsoft .NET FrameWork 4.0 (aka .NET 4.0)
- Microsoft Office 2010 OR “Microsoft Access Database Engine 2010 Redistributable” (http://www.microsoft.com/en-us/download/details.aspx?id=13255)

- Pentium III 400 MHz or faster
- Free USB 2.0 port, capable of supplying 50 mA current

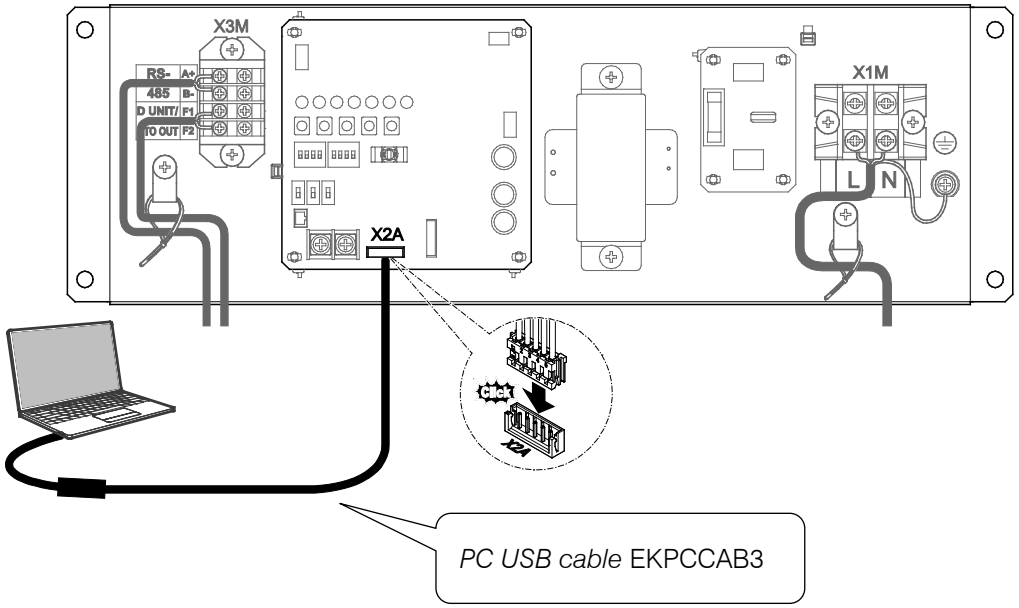
#### 4.2.1.1 EKPCCABx driver

In case *PC USB cable* EKPCCABx is used for the first time on a PC, it is required to install the following USB driver with admin rights.

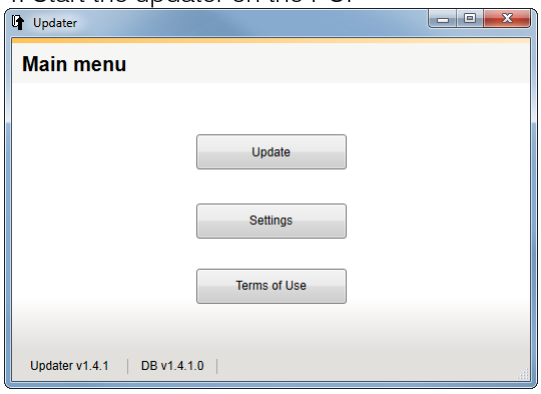
The needed USB driver can be downloaded from “http://www.ftdichip.com/Drivers/VCP.htm”
E.g. download “setup executable” “2.10.00 WHQL Certified.exe” and run with admin rights.

Follow the instructions to install.

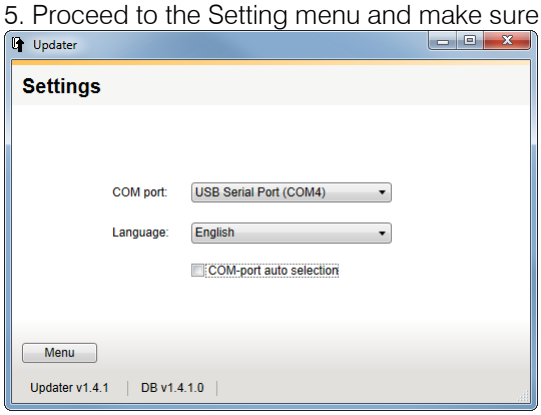
### *4.2.2 Method 1) Update with the PC USB cable EKPCCAB3.*




Instructions:
1. Make sure that the Modbus Interface DIII is powered off.
2. Connect the EKPCCAB3 cable to X2A on the mainboard (see figure).
3. Power on the Modbus Interface DIII.
4. Start the updater on the PC.

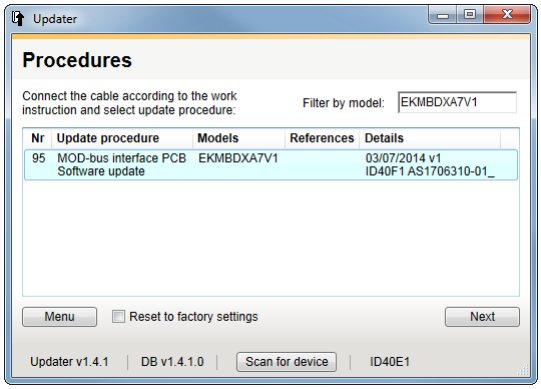



5. Proceed to the Setting menu and make sure the correct USB serial COM port is selected (e.g. COM4).



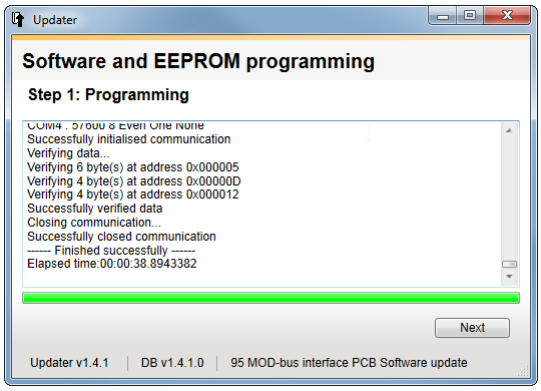

6. Proceed to the "Update Procedure Selection" window. The ID of the existing software is automatically detected.

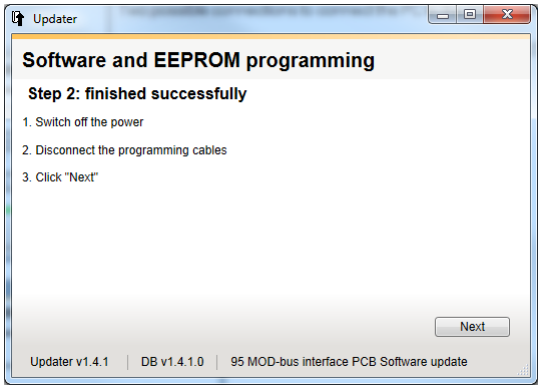
7. Fill in the model name "EKMBDXA7V1" in the filter box and select the available software.




8. Follow the on-screen instructions.

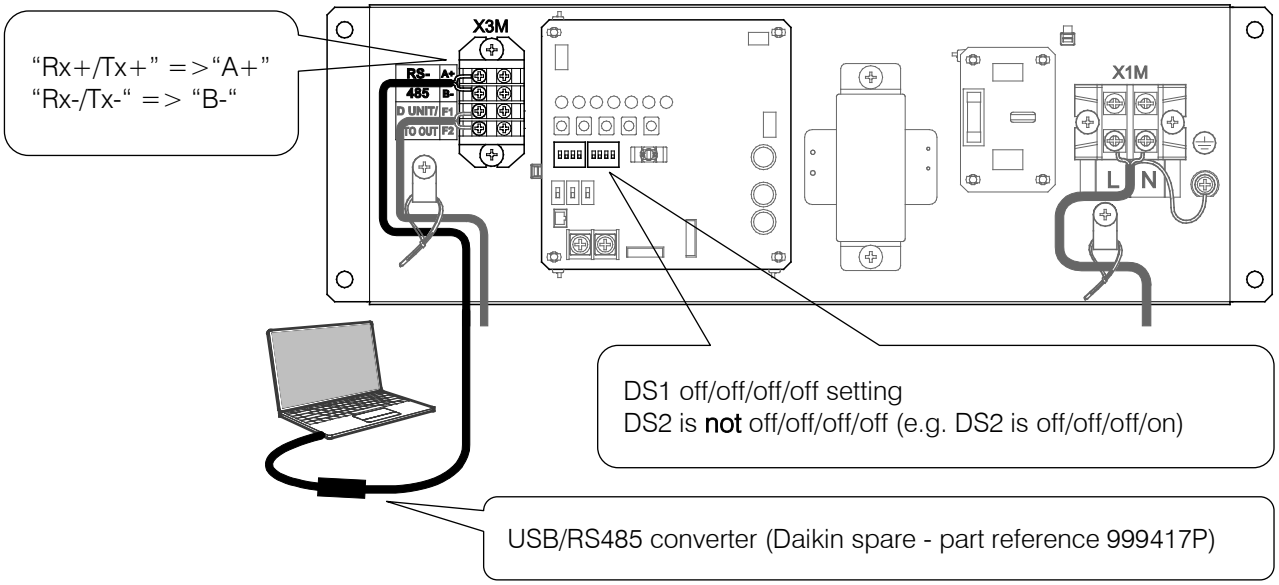
Example of a successful update:



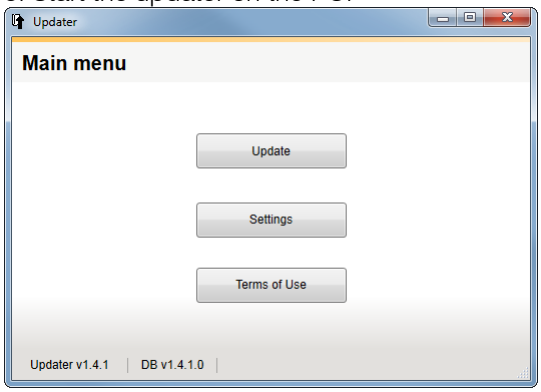

9. At the end switch off power and disconnect all programming cables.

### *4.2.3 Method 2) Update with a USB/RS485 converter.*

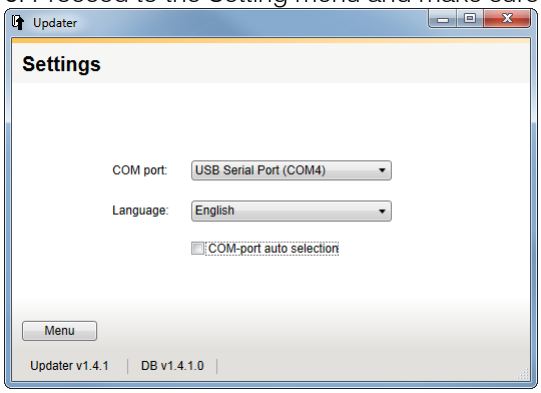



Instructions:

1. Make sure that the Modbus Interface DIII is powered off.
2. Disconnect all existing Modbus RS485 A+/B- connections and connect the USB/RS485 converter to X3M (see figure).
3. Set dipswitch DS1 & DS2 as indicated in the figure.
4. Power on the Modbus Interface DIII.
5. Start the updater on the PC.

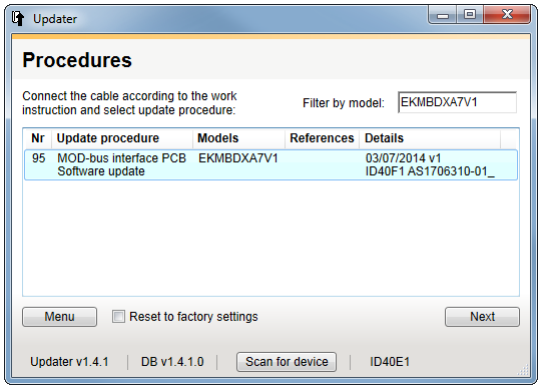



6. Proceed to the Setting menu and make sure the correct USB serial COM port is selected (e.g. COM4).



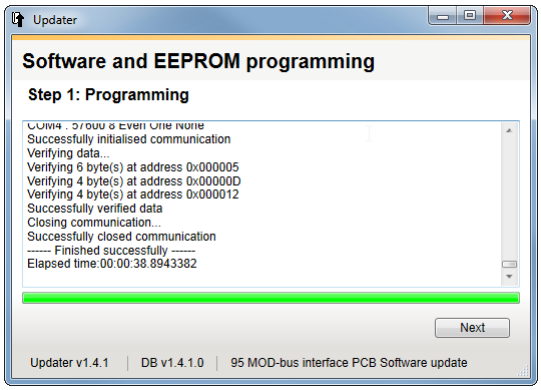

7. Proceed to the "Update Procedure Selection" window. The ID of the existing software is automatically detected.

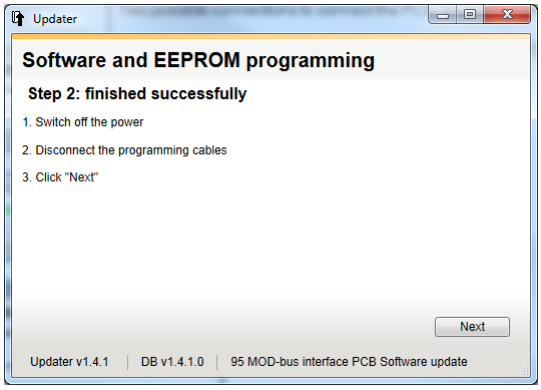
8. Fill in the model name "EKMBDXA7V1" in the filter box and select the latest available software.




9. Follow the on-screen instructions.

Example of a successful update:




10. At the end, switch off power and disconnect all programming cables.
11. Re-set the dipswitches to the required values.

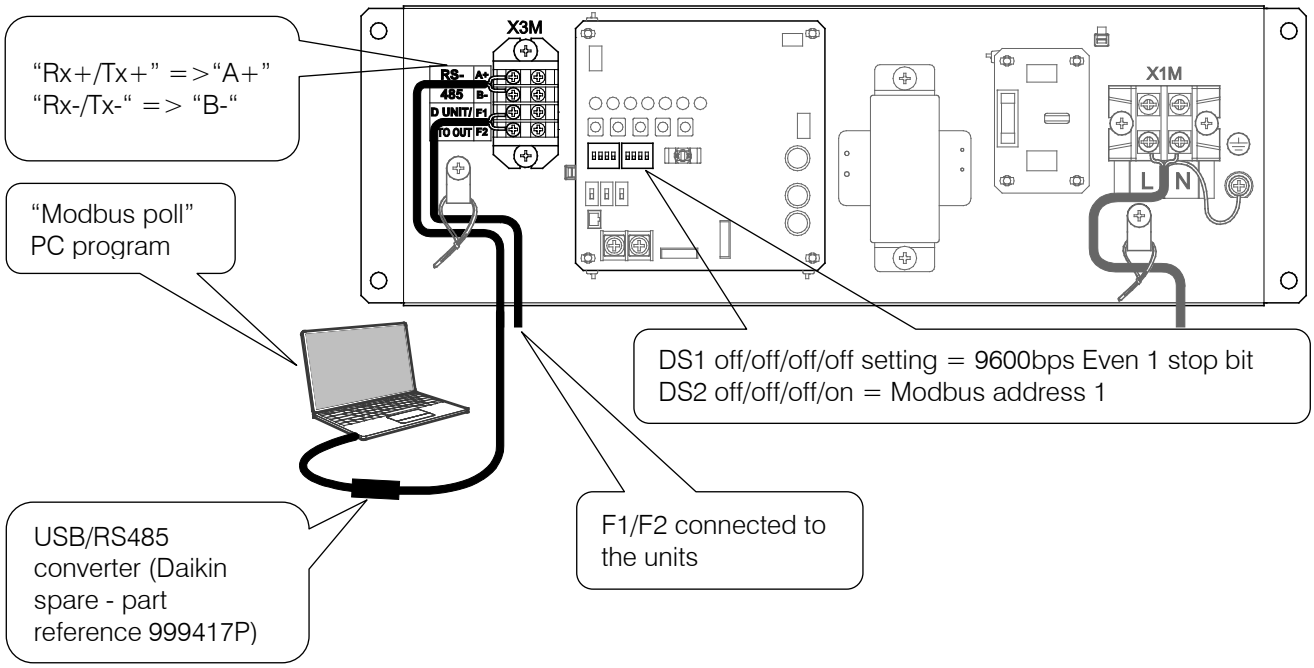
# 5. Modbus Interface DIII test operation

## 5.1 Introduction

To test the operation of the Modbus Interface DIII setup connected to the units, a Modbus master program on a PC can be used.

An example is “Modbus Poll” PC program.
Internet download location: http://www.modbustools.com/modbus_poll.asp (shareware with a time limited trial period.)

## 5.2 Outline of system

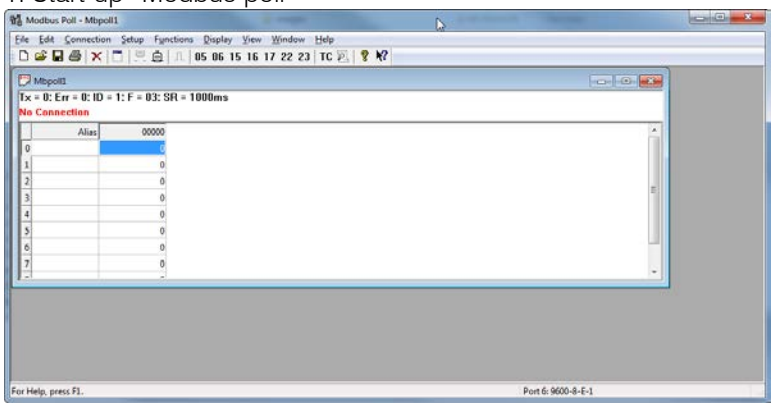


## 5.3 Test Operation Procedure

Following test examples are explained by using “Modbus poll” version 6.0.2

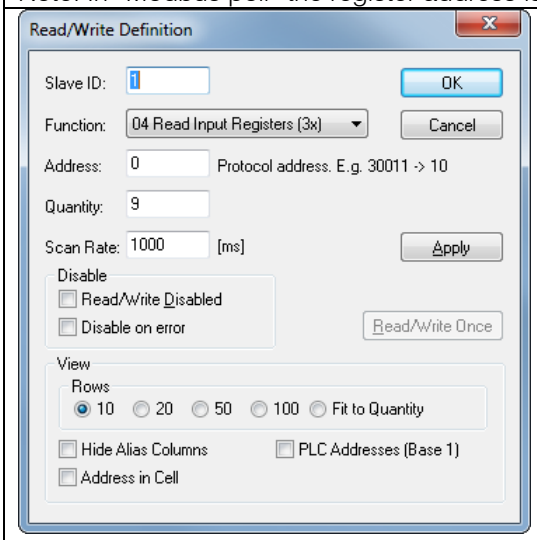
### *5.3.1 Prepare register groups*

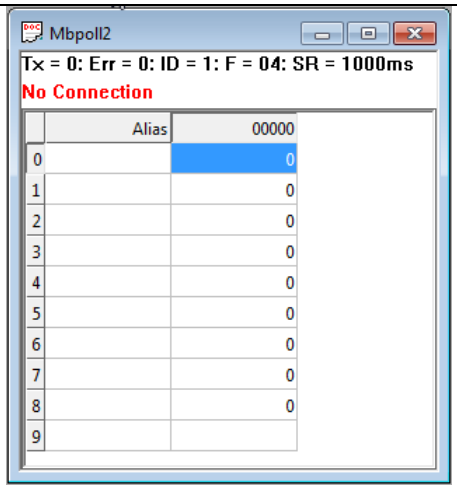
1. Start-up “Modbus poll”



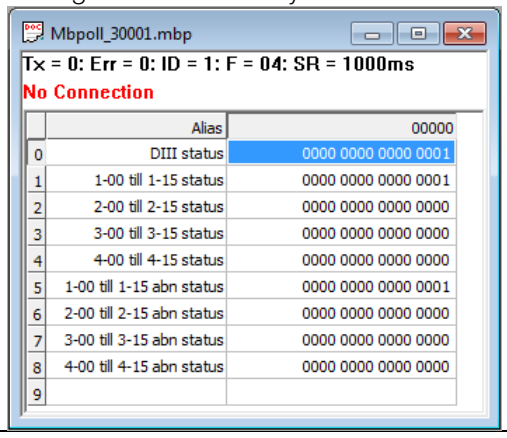

2. Setup the input registers or holding register groups by selecting following in the dropdown menu:
“File” > “New Crtl+N”
& “Setup” > “Read/Write Definition… F8”
Note: Each registers group can be separately saved by “File” > “Save as … “ (*.mbp)

Example how to define the input registers 30001 till 30008
Note: In “Modbus poll” the register address is defined as follows: 30011 -> 10



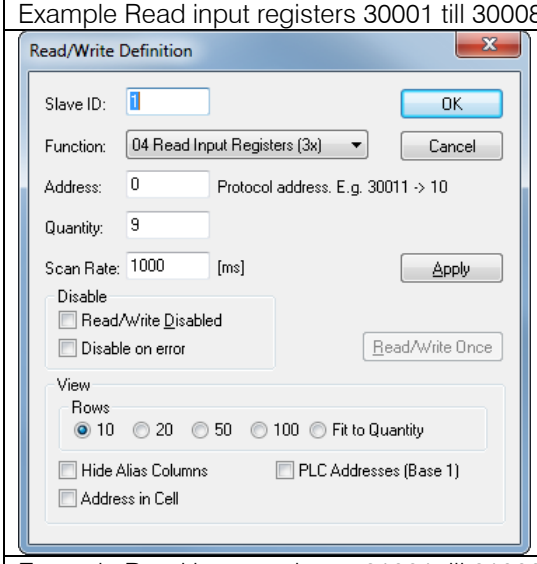



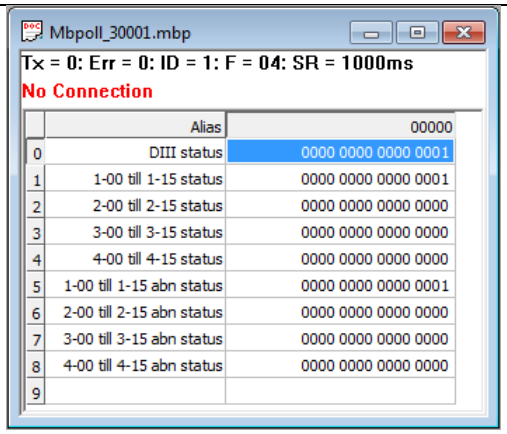

For each register the “Alias” description can be set
For each register the “Format” should be set by right clicking: “Format > binary”



3. Prepare register groups as following examples:

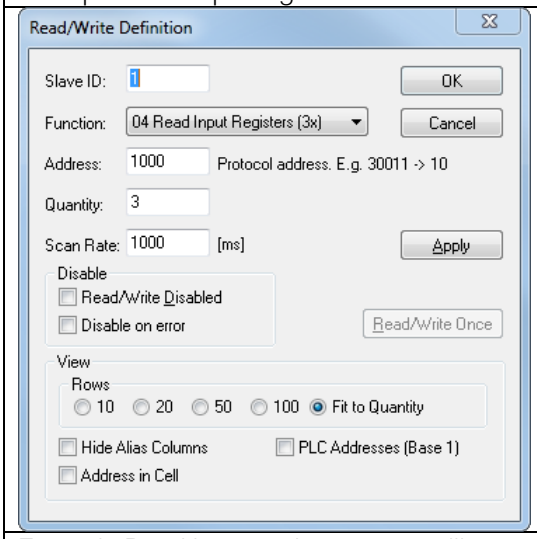
Example Read input registers 30001 till 30008

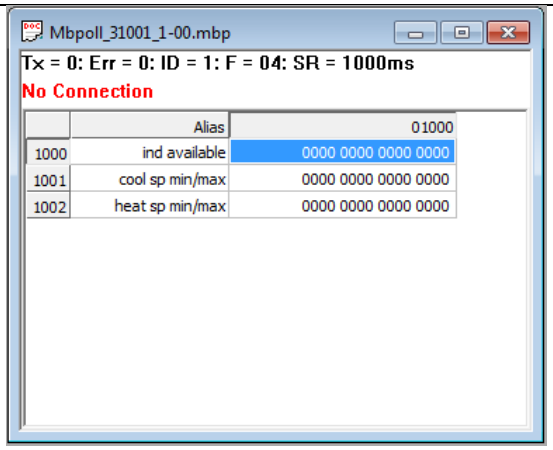



| | Alias | 00000 |
|---|---|---|
| 0 | DIII status | 0000 0000 0000 0001 |
| 1 | 1-00 till 1-15 status | 0000 0000 0000 0001 |
| 2 | 2-00 till 2-15 status | 0000 0000 0000 0000 |
| 3 | 3-00 till 3-15 status | 0000 0000 0000 0000 |
| 4 | 4-00 till 4-15 status | 0000 0000 0000 0000 |
| 5 | 1-00 till 1-15 abn status | 0000 0000 0000 0001 |
| 6 | 2-00 till 2-15 abn status | 0000 0000 0000 0000 |
| 7 | 3-00 till 3-15 abn status | 0000 0000 0000 0000 |
| 8 | 4-00 till 4-15 abn status | 0000 0000 0000 0000 |
| 9 | | |

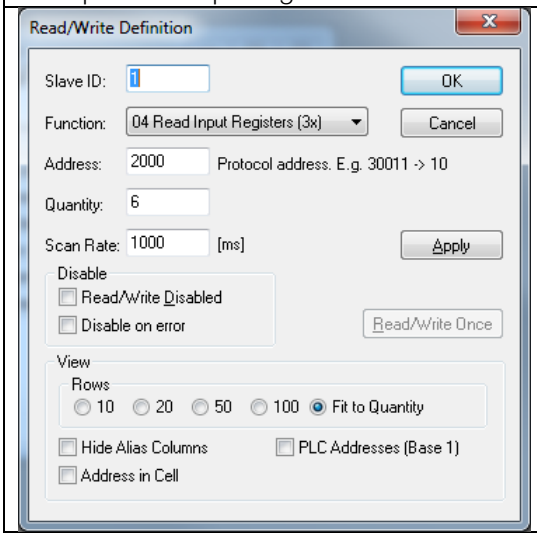
Example Read input registers 31001 till 31003

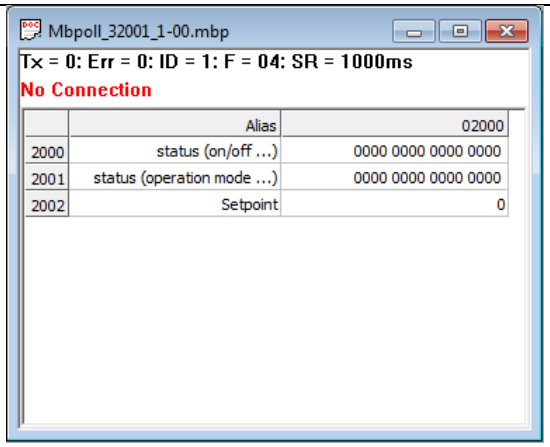



| | Alias | 01000 |
|---|---|---|
| 1000 | ind available | 0000 0000 0000 0000 |
| 1001 | cool sp min/max | 0000 0000 0000 0000 |
| 1002 | heat sp min/max | 0000 0000 0000 0000 |

Example Read input registers 32001 till 32003

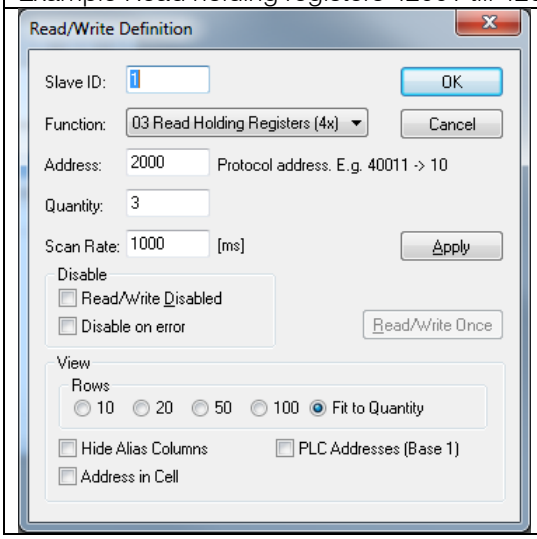


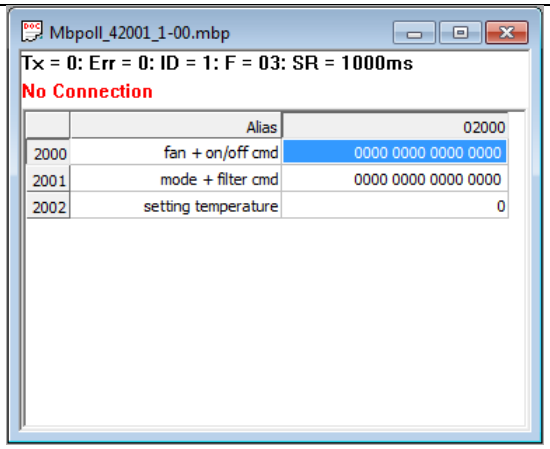




| | Alias | 02000 |
|---|---|---|
| 2000 | status (on/off ...) | 0000 0000 0000 0000 |
| 2001 | status (operation mode ...) | 0000 0000 0000 0000 |
| 2002 | Setpoint | 0 |

(for set point select “Format > Signed)

Example Read holding registers 42001 till 42003

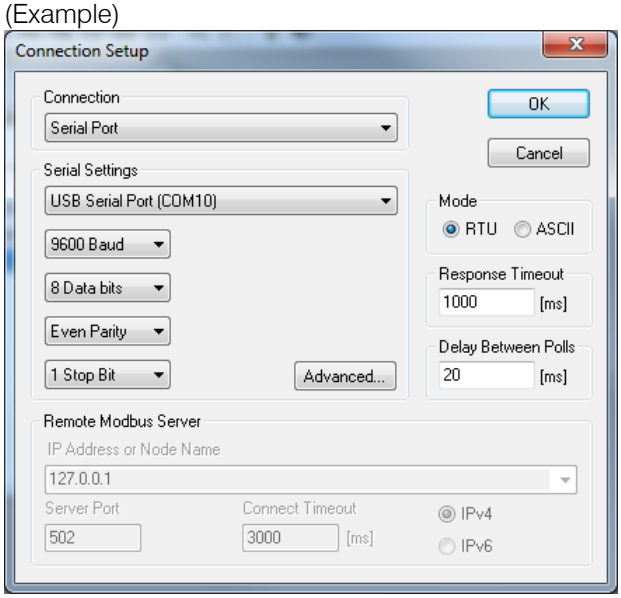



(for set point select “Format > Signed)

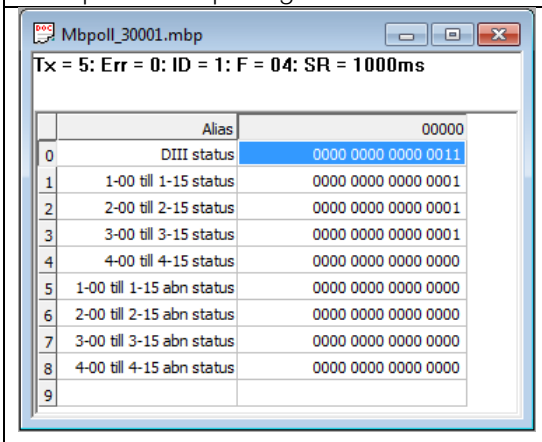
### *5.3.2 Start reading registers groups*

Select “Connection > Connect F3”
(Example)



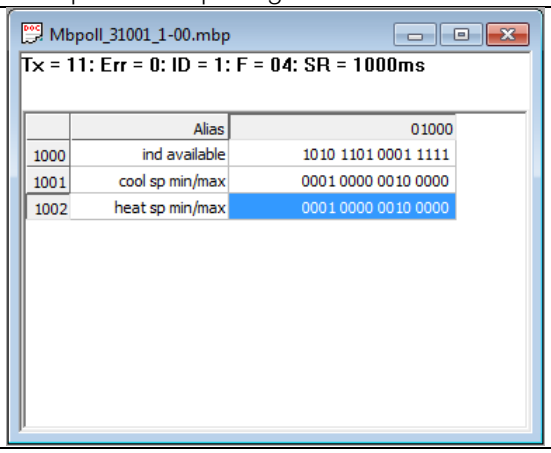

After making the correct selections, click OK to start reading the register groups.

Example Read input registers 30001 till 30008



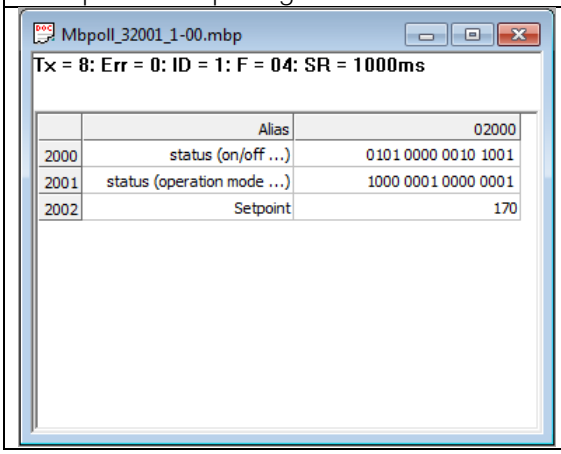

| | Alias | 00000 |
|---|---|---|
| 0 | DIII status | 0000 0000 0000 0011 |
| 1 | 1-00 till 1-15 status | 0000 0000 0000 0001 |
| 2 | 2-00 till 2-15 status | 0000 0000 0000 0001 |
| 3 | 3-00 till 3-15 status | 0000 0000 0000 0001 |
| 4 | 4-00 till 4-15 status | 0000 0000 0000 0000 |
| 5 | 1-00 till 1-15 abn status | 0000 0000 0000 0000 |
| 6 | 2-00 till 2-15 abn status | 0000 0000 0000 0000 |
| 7 | 3-00 till 3-15 abn status | 0000 0000 0000 0000 |
| 8 | 4-00 till 4-15 abn status | 0000 0000 0000 0000 |
| 9 | | |

Example Read input registers 31001 till 31003



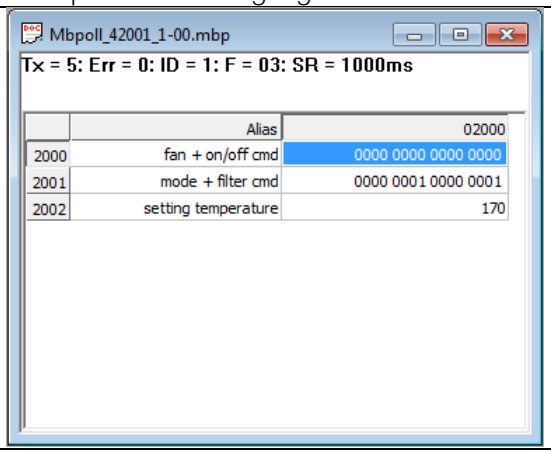

| | Alias | 01000 |
|---|---|---|
| 1000 | ind available | 1010 1101 0001 1111 |
| 1001 | cool sp min/max | 0001 0000 0010 0000 |
| 1002 | heat sp min/max | 0001 0000 0010 0000 |

Example Read input registers 32001 till 32003




| | Alias | 02000 |
|---|---|---|
| 2000 | status (on/off ...) | 0101 0000 0010 1001 |
| 2001 | status (operation mode ...) | 1000 0001 0000 0001 |
| 2002 | Setpoint | 170 |

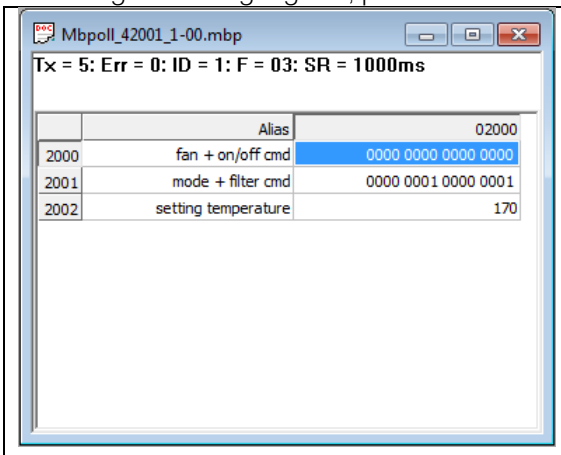
Example Read holding registers 42001 till 42003



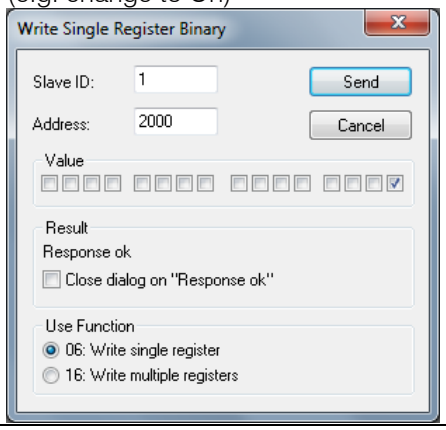

| | Alias | 02000 |
|---|---|---|
| 2000 | fan + on/off cmd | 0000 0000 0000 0000 |
| 2001 | mode + filter cmd | 0000 0001 0000 0001 |
| 2002 | setting temperature | 170 |

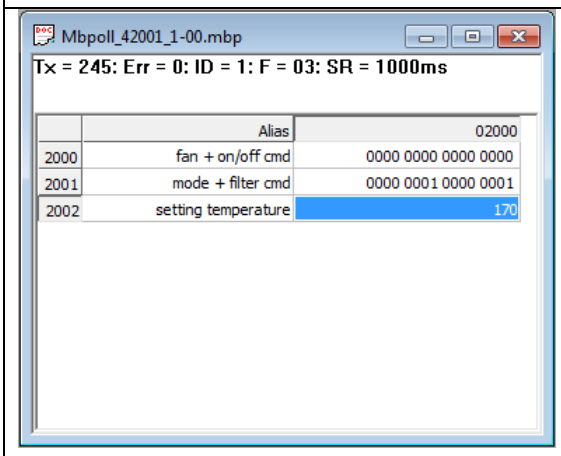
### *5.3.3 Set a holding register*

To change a holding register, proceed as follows:

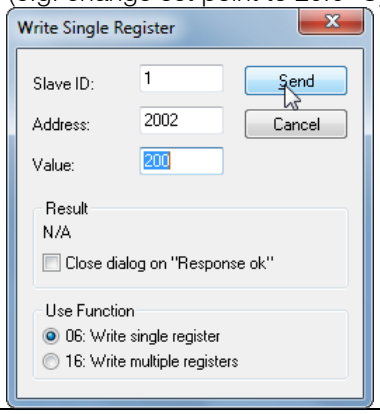



Double click on value to modify bits as follows:
(e.g. change to On)




Double click on value to modify bits as follows:
(e.g. change set point to 20.0 °C)



# 6. Trouble shooting

| Problem | Possible causes | Required actions |
|---|---|---|
| No Modbus communication | No correct Modbus address setting was present at power on of the *Modbus Interface DIII*. | During power off:<br>Set DS2 according to the required Modbus address.<br>See chapter "1.3.6 Dipswitch meaning".<br>The dipswitch on/off status is detected only at the time of power on of the PCB. |
| | No Modbus address setting is set (=DS2: Off/Off/Off/Off). | Set DS2 according to the required Modbus address.<br>See chapter "1.3.6 Dipswitch meaning". |
| | Only firmware is present on the *Modbus Interface DIII*. HAP: is blinking at a fast rate of 200ms meaning firmware is running. | Upload the latest application software.<br>See chapter "4.2 Software update with Updater". |
| Software update with updater (via RS485) fails | DS2 is set to off/off/off/off. (meaning no communication on RS485). | Change DS2 settings to e.g. off/off/off/on.<br>Refer to chapter "4.2.3 Method 2) Update with a USB/RS485 converter.". |
| A BMS set of a holding register is not reflected on the actual unit. | *Modbus Interface DIII* sends the command to a unit when the value of a Holding Register is changed. Especially in case that indoor units are operated from the user interface. | The BMS should always get the status of indoor units and copy the received status to the Holding Registers.<br>Refer to chapter "2.3.2 Monitor and operate units from the BMS". |

## 7. Revision of the document

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|---|---|
| 2014.04 | New |

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