67404 02-15 (HKT)

REH FC-BMS3 Modbus Manual

REH FC-BMS3

REH TA3

REH TD3

REH DT3

REH CT3

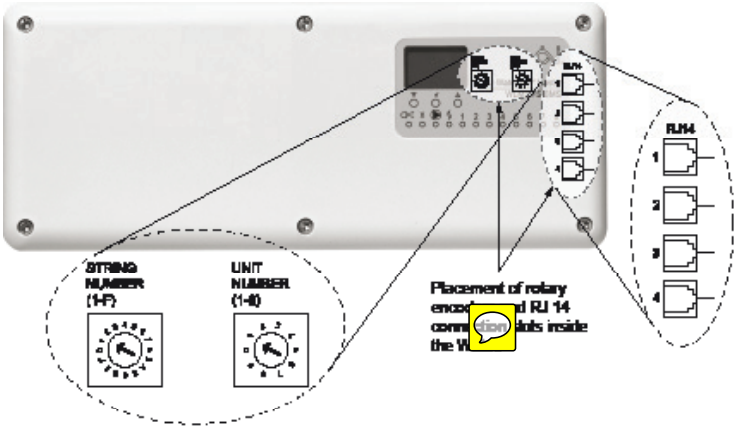
REHAU®
Unlimited Polymer Solutions

Modbus registers for REH FC-BMS3 software Version 5.0 and up

Modbus SLAVE communication settings:
38.4 Kbit/s (1 start bit, 8 data bits,1 stop bit, no parity)

Protocol: Standard RTU Modbus

Setting up the REH FC-BMS3 for Modbus communication:
There are two rotary ID encoders inside the REH FC-BMS3 master that have to be set according to the desired configuration.



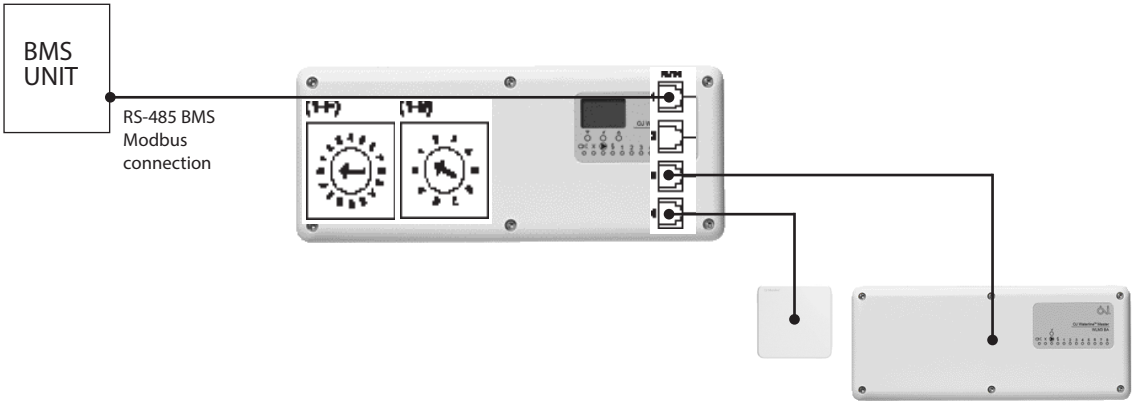
The REH FC-BMS3 MOD-ID address is always defined as LEFT Encoder*10 + RIGHT-Encoder

LEFT Encoder	RIGHT Encoder	REH FC-BMS3 MOD-ID Address	Configuration
0	1..9	1..9	Stand-alone master (Modbus connection in RJ14 slot 1 or 2)
1..9	0	10, 20, 30..90	Network master (Modbus connection in RJ14 slot 3 or 4). Connection to the REH FC-BMS3 network is through RJ14 slot 1 or 2. The network master will act as a transparent interface to all REH FC-BMS3 slave masters in the network.
1..F	1..9	11, 12, 13..159	Network slave master (Modbus communication to network slaves is through the network master). Network connection between masters is through RJ14 slots 1 and 2.

BMS - Modbus connection to a stand-alone REH FC-BMS3 master:

A REH FC-BMS3 master can be connected to a BMS system using the Modbus interface.

REH FC-BMS3 master:
Modbus ID address
Set selector switches to Left / Right = 0 / (1 to 9)
This gives the master an address between 01 and 09.
This example shows a master set to ID address no. 01



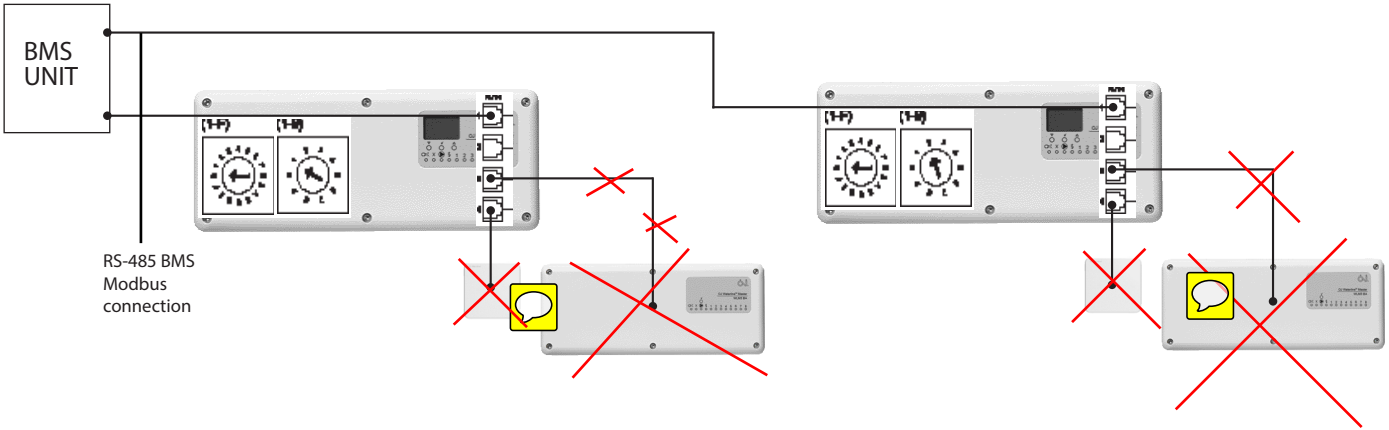
RJ14 slots 3 and 4 can be used to connect add-on modules, receivers for wireless communication, etc. as usual.

BMS - Modbus connection to several REH FC-BMS3 masters:

Up to nine stand-alone masters can be connected to the same BMS interface as long as the masters are set up with different Modbus ID addresses.

Stand-alone master number 1:
Modbus ID address
Set selector switches to Left / Right = 0 / (1 to 9)
This gives the master an address between 01 and 09.
This example shows a master set to ID address no. 01

Stand-alone master number 2:
Modbus ID address
Set selector switches to Left / Right = 0 / (1 to 9)
This gives the master an address between 01 and 09. (The address must be different to that of the other master.)
This example shows a master set to ID address no. 02



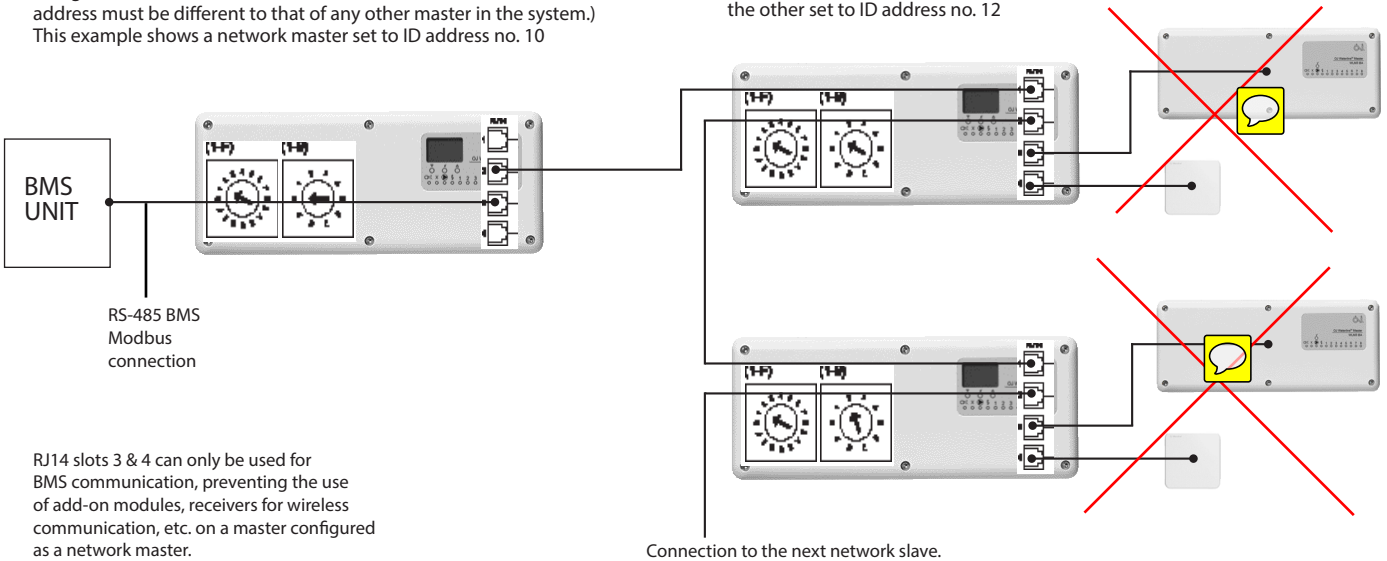
Note 1:
Instead of connecting stand-alone master number 2 direct to the BMS unit, it is possible to connect it to RJ14 slot number 2 on master number 1. This would reduce the need for several terminals on the BMS unit.

BMS - Modbus connection to a REH FC-BMS3 network:

BMS communication with up to nine different REH FC-BMS3 networks is possible.
Besides communicating directly with the BMS unit, the network master in each REH FC-BMS3 network also acts as a transparent interface for the REH FC-BMS3 network slaves connected to the network master. Every master that is connected to the BMS unit, either directly or via a network master, must have a unique Modbus ID address. (Network slaves can be both FS and BA masters)

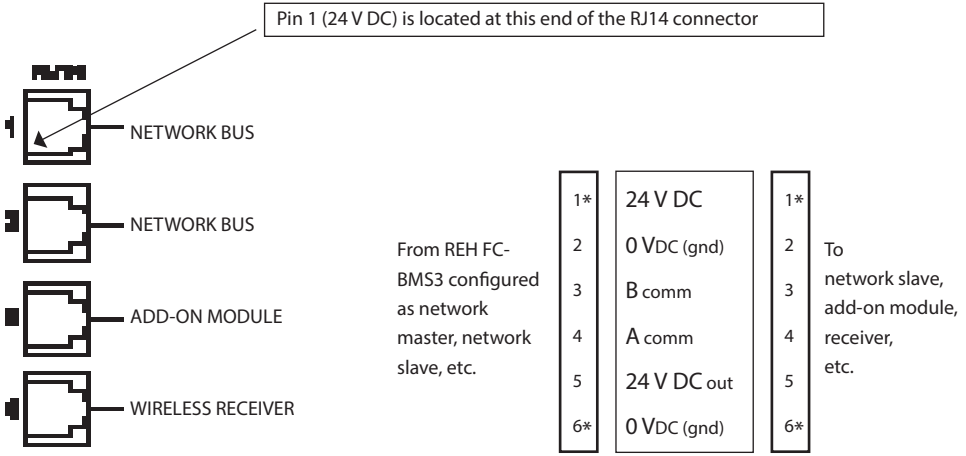
Network master:
Modbus ID address
Set selector switches to Left / Right = (1 to 9) / 0
This gives the network master an address between 10 and 90. (The address must be different to that of any other master in the system.)
This example shows a network master set to ID address no. 10

Network Slaves:
Modbus ID address
Set selector switches to Left / Right = (1 to 15) / (1 to 9)
This gives the network slave an address between 11 and 159. (The address must be different to that of any other master in the system.)
This example shows two network slaves, one set to ID address no. 11, the other set to ID address no. 12



Hardware interface:

The RJ connection used in the REHAU Intelligent system is based on 6-pin RJ connectors with the following setup.
Since only four of these are used, and no power is drained, the connector is called RJ14.
The interface is based on a standard RS-485 hardware platform.



PLEASE NOTE: The illustration shows RJ14 connectors 1 to 4 inside a REH FC-BMS3 master.

* Although these connections are not necessary, they are permitted

Communication and timing:

Comm. settings:	Baud rate: 38.4 Kbit/s (1 start bit, 8 data bits, 1 stop bit, no parity) Protocol: Standard RTU Modbus		
Comm. timing:	Stand-alone system:	Max. response time to BMS (end of BMS TX to start of REH FC-BMS3 answer):	10ms at 1 reg, 20ms at 125 reg's
	REH FC-BMS3 network system:	Max. response time to BMS (end of BMS TX to start of REH FC-BMS3 answer):	50ms at 1 reg, 130ms at 125 reg's
	Recommended max. poll speed:	>300 ms	
	Recommended timeout:	>300 ms	

Examples of BMS parameters:

BMS override of heating/cooling:

Parameter name:	BMS heat/cool override
Parameter ID:	Holding register, address 9:
Parameter function:	Read 0x03: Current status Write 0x06: 0 = no override, 1 = BMS forced heating mode, 2 = BMS forced cooling mode

Room temperature setpoint BMS override:

Parameter name:	Ch_n_Setpoint BMS override ("n" equals the channel (actuator output) number on the master)
Parameter ID:	Holding register, address 20, 30, 40 ...130 = channel 1, 2, 3 ... 14 (channel *10 + 10):
Parameter function:	Read 0x03: Current setpoint Write 0x06: 0°C = no override, 5°C <= new value <= 40°C = BMS overrides individual channel setpoint.
Example:	Holding register 0x03 address 50 overrides the setpoint for channel number 6

Standard Modbus (RTU)

Coil Stat Bits:
0x01: Read
0x05: Write Single Coil (NOTE: ON => output value = 0xFF00)
0x0F: Write Multiple Coils

Addr.	Function	Comment
0	BMS override of setback input	Allows the BMS to force the master into setback mode (0 = no override, 1 = override)
1	Supply temp. override allowed	Allows the master to simulate the supply water temp. (0 = no override)
2	App temp. override allowed	Allows the master to simulate the application temp. (0 = no override)
3	Outdoor temp. override allowed	Allows the master to simulate the outdoor temp. (0 = no override)

4	Dew point override allowed	Allows the master to override the dew point calculation (0 = no override)
5	Boiler relay override allowed	Allows the boiler relay to be forced to ON or OFF (0 = no override, 1= override)
6	Boiler relay override value	Override value of boiler relay output (0 = OFF, 1 = ON)
7	X-relay override allowed	Allows the X-relay to be forced to ON or OFF (0 = no override, 1= override)
8	X-relay override value	Override value of X-relay output (0 = OFF, 1 = ON)
9	Pump relay override allowed	Allows the pump relay to be forced to ON or OFF (0 = no override, 1= override)
10	Pump relay override value	Override value on pump relay output (0 = OFF, 1 = ON)
11	Reset run timers	Reset all run timers. After reset, the flag automatically returns to zero
12	Not used (0)	
13	Not used (0)	
14	Not used (0)	
15	Not used (0)	
16	Not used (0)	
17	Not used (0)	
18	Not used (0)	
19	Not used (0)	
n*10+10	Ch_n_Relay override allowed	Allows the channel n output relay to be forced to ON or OFF (0 = no override, 1 = override)
n*10+11	Ch_n_Relay override value	Override value of channel n output relay (0 = OFF, 1 = ON)
n*10+12	Not used (0)	
n*10+13	Not used (0)	
n*10+14	Not used (0)	
n*10+15	Not used (0)	
n*10+16	Not used (0)	
n*10+17	Not used (0)	
n*10+18	Not used (0)	
n*10+19	Not used (0)	

n = channel 1..14

InputStat Bits:

0x02: Read

Addr.	Function	Comment
0	Heating/cooling mode	Current mode (0 = heating, 1 = cooling)
1	Time switch input	Current status of time switch input (0 = night temp. (input shorted), 1 = day temp. (input open))
2	Pump output	Shows the status of the UFH pump relay (1 = active, 0 = not active).

3	Boiler output	Shows the status of the boiler relay (1 = active, 0 = not active).
4	X-output	Shows the status of the X-output relay (1 = active, 0 = not active).
5	Common humidity sensor connected	The flag indicates that a humidity sensor is connected to channel 0 (common sensor)
6	Not used (0)	
7	Not used (0)	
8	Not used (0)	
9	Not used (0)	
10	Not used (0)	
11	Not used (0)	
12	Not used (0)	
13	Not used (0)	
14	Not used (0)	
15	Not used (0)	
16	Not used (0)	
17	Not used (0)	
18	Not used (0)	
19	Not used (0)	
n*10+10	*Ch_n_Output relay	Shows the current status of the channel output relay.
n*10+11	*Ch_n_Output relay 2	Shows the current status of the channel output relay 2 (2-stage only).
n*10+12	*Ch_n_Low battery	Shows whether any unit connected to the channel is low on battery.
n*10+13	Ch_n_Humidity sensor connected	Shows whether a humidity sensor is connected to the channel.
n*10+14	Not used (0)	
n*10+15	Not used (0)	
n*10+16	Not used (0)	
n*10+17	Not used (0)	
n*10+18	Not used (0)	
n*10+19	Not used (0)	

n = channel 1..14

Input registers:

0x04: Read

Addr.	Function	Comment	Range	Resolution	Unit
0	Software ver.	Software version of master		0.01	
1	Total number of units	Number of units (sensors/controllers/etc.) on bus	0..24	1	

2	Ch_0_Unit number	Number of units on channel 0 (sensors/controllers/humidity sensors/WLAC/ etc.) on bus	0..24	1	
3	Ch_15_Unit number	Number of units on channel 15 (sensors/controllers/humidity sensors/ WLAC/etc.) on bus	0..24	1	
4	Total units with errs	The total number of units with errors	0..24	1	
5	Active channels	Bitmap showing which output channels are used (Bit0: 1 = channel 1 in use, Bit1: 1 = channel 2 in use....etc.)		1	
6	System error	Shows system errors, on the power LED for example.		1	
7	Number of network slaves	Shows the number of slaves in the network.	0..160	1	
8	Number of net. slaves with errs	Shows the number of slaves in the network with comm. errors	0..160	1	
9	Supply temp.	Current supply water temperature	-4000..12500	0.01	°C
10	App temp.	Current temperature measured by the "App" (application) sensor	-4000..12500	0.01	°C
11	Outdoor temp.	Current outdoor temperature	-4000..12500	0.01	°C
12	Mixing valve output	Shows the current mixing valve output (0-100%) (0-10 V DC or 10-0 V DC depending on settings)	0..10000	0.01	%
13	Max. dew point (all channels)	The max. dew point for all channels (0..14)	-4000..12500	0.01	°C
14	Max. humidity (all channels)	The max. humidity for all channels (0..14)	0..10000	0.01	%RH
15	PWM time	Shows the current time of a full cycling sequence (PWM period).	0..2700	1	Sec
16	PWM timer	Shows the current timer status within the full cycling sequence (PWM period).	900..2700	1	Sec
17	Not used (0)				
18	Not used (0)				
19	Not used (0)				
n*10+10	Ch_n_Number of units	Shows how many units are connected to the channel.	0..24	1	
n*10+11	Ch_n_Channel type	Shows the type of unit connected to the channel 0 = Not in use 1 = Room sensor (REH Tx3 or REH DT3) 2 = Room controller (REH CT3) 3 = Hot water controller (REH CT3/HW) 4 = Radiator controller (REH CT3/R) 5 = 2-stage controller (REH CT3/2) -1 = Error in installation		1	
n*10+12	Ch_n_Room temp.	Current room temperature	-4000..12500	0.01	°C
n*10+13	Ch_n_Room temp. setpoint	Current room temperature setpoint incl. offset	-4000..12500	0.01	°C
n*10+14	Ch_n_Error no.	Shows channel error number (0 if none).		1	
n*10+15	Ch_n_Output power %	Current channel output power	0..10000	0.01	%

n*10+16	Ch_n_Floor temp.	Current floor temperature	-4000..12500	0.01	°C
n*10+17	Ch_n_ Min. limit setpoint	Shows the actual minimum limit setpoint for the floor.	-4000..12500	0.01	°C
n*10+18	Ch_n_Max. limit setpoint	Shows the actual maximum limit setpoint for the floor.	-4000..12500	0.01	°C
n*10+19	Ch_n_Mode setting	0 = Auto, 1 = Day, 2 = Night, 3 = OFF	0..3	1	
160	Total run time, years	Total run time	0..99	1	Year
161	Total run time, days		0..365	1	Day
162	Total run time, hours		0..23	1	Hour
163	Total run time, minutes		0..59	1	Min
164	Total run time, seconds		0..59	1	Sec
165	Boiler run time, years	Boiler run time	0..99	1	Year
166	Boiler run time, days		0..365	1	Day
167	Boiler run time, hours		0..23	1	Hour
168	Boiler run time, minutes		0..59	1	Min
169	Boiler run time, seconds		0..59	1	Sec
170	Pump run time, years	Pump run time	0..99	1	Year
171	Pump run time, days		0..365	1	Day
172	Pump run time, hours		0..23	1	Hour
173	Pump run time, minutes		0..59	1	Min
174	Pump run time, seconds		0..59	1	Sec
175	X-RE run time, years	X-RE run time	0..99	1	Year
176	X-RE run time, days		0..365	1	Day
177	X-RE run time, hours		0..23	1	Hour
178	X-RE run time minutes		0..59	1	Min
179	X-RE run time, seconds		0..59	1	Sec
n*10+170	Ch_n_Dew point	Dew point for channel 1..14	-4000..12500	0.01	°C
n*10+171	Ch_n_Humidity	Humidity for channel 1..14	0..10000	0.01	%RH
n*10+172	Not used (0)				
n*10+173	Not used (0)				
n*10+174	Not used (0)				
n*10+175	Ch_n_Run time, years	Channel 1..14 run time	0..99	1	Year
n*10+176	Ch_n_Run time, days		0..365	1	Day
n*10+177	Ch_n_Run time, hours		0..23	1	Hour
n*10+178	Ch_n_Run time, minutes		0..59	1	Min
n*10+179	Ch_n_Run time, seconds		0..59	1	Sec

n = channel = 1..14

Holding registers:

0x03: Read
0x06: Single Write
0x10: Multiple Write

Addr.	Function	Comment	Range	Resolution	Unit
0	Day setpoint temp.	Day setpoint on master	500..4000	0.01	°C
1	Night setpoint temp.	Night setback setpoint on master	500..4000	0.01	°C
2	OFF setpoint temp.	OFF setpoint (= frost protection setpoint) on master	0..800	0.01	°C
3	Min. setpoint limit temp.	Min. setpoint for floor temperature limitation	1000..3000	0.01	°C
4	Max. setpoint limit temp.	Max. setpoint for floor temperature limitation	2000..4000	0.01	°C
5	Low outdoor comp. setpoint	Weather compensation, outdoor temperature setpoint, winter	-2000..1000	0.01	°C
6	High outdoor comp. setpoint	Weather compensation, outdoor temperature setpoint, summer	2000..3500	0.01	°C
7	Low supply comp. setpoint	Weather compensation, supply water temperature setpoint, winter	1000..4000	0.01	°C
8	High supply comp. setpoint	Weather compensation, supply water temperature setpoint, summer	3000..8000	0.01	°C
9	BMS heat/cool override	Forces the master into cooling or heating mode (0 = no override, 1 = heat, 2 = cool)	0..2	1	
10	Supply temp. override	Value when the master is to simulate the supply water temperature	0..9000	0.01	°C
11	App temp. override	Value when the master is to simulate the application sensor temperature	0..9000	0.01	°C
12	Outdoor temp. override	Value when the master is to simulate the outdoor temperature	-2000..9000	0.01	°C
13	Dew point override	Value when the master is to simulate the dew point temperature	0..9000	0.01	°C
14	Room temp. peak	Adjustment value for min./max. temp. over one PWM period	20..1000	0.01	°C
15	PWM min. period of time	Min. duration of a full cycling sequence (PWM period)	300..MaxSet	1	Sec
16	PWM max. period of time	Max. duration of a full cycling sequence (PWM period)	MiSet..14400	1	Sec
17	Cool offset settings	Offset settings added to normal settings when running in cooling mode	0..300	0.01	°C
18	Not used (0)				
19	Not used (0)				
n*10+10	Ch_n_Setpoint BMS override	Overrides individually any channel setpoint in system (0 = no override; 5..80 = overrides the channel setpoint with 5..80°C)	500..8000	0.01	°C
n*10+11	Ch_n_Room PB	P-band for channel n (SetVal = 0 or 300..2000, 0 = ON/OFF reg)	0..2000	0.01	°C
n*10+12	Ch_n_I-time	I-time for channel n	60..720	1	Min
n*10+13	Ch_n_ON/OFF reg. time max.	Boost time for channel n (0 = no boost)	0..12	1	Hour
n*10+14	Humidity min. setpoint	Min. humidity setpoint for channel n (0 = not used)	0..5000	0.01	%RH
n*10+15	Humidity max. setpoint	Max. humidity setpoint for channel n (10000 = not used)	5000..10000	0.01	%RH
n*10+16	Humidity hysteresis	Hysteresis for humidity registered on channel n	100..5000	0.01	%RH

n*10+17	Ch_n_Cooling mode setting	0 = heating only, 1 = heating and cooling, 2 = heating on channel n + cooling on channel n+1	0..2	1	
n*10+18	Not used (0)				
n*10+19	Not used (0)				

n = channel = 1..14

Exception codes:

1 ILLEGAL FUNCTION
2 ILLEGAL DATA ADDRESS
3 ILLEGAL DATA VALUE

Loopback function:

The WLM supports loopback with a sub-function code of zero (0x00, 0x00 in the two–byte field).

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