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WLM2-xFS Modbus Manual



WLM2



WLTA



WLTD



WLTP



WLCT2



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Modbus registers for WLM2-xFS sw. Version 2.0 and up

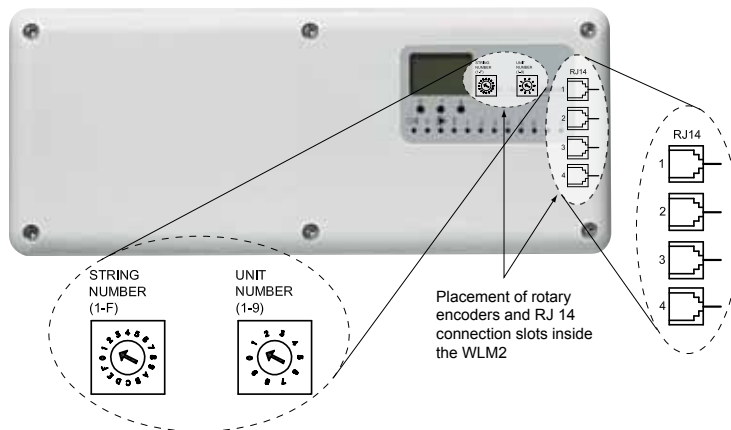
Modbus SLAVE communication settings:

38,4Kbit/s, 1 start, 8 data, 1 stop -bit no parity

Protocol: Standard RTU Modbus

Setting up the WLM2 for Modbus communication:

Inside the WLM2 Master there are two ID rotary encoders that has to be set according to the desired configuration.



The WLM2 MOD-ID address is always defined as LEFT Encoder*10 + RIGHT-Encoder

LEFT Encoder	RIGHT Encoder	WLM2 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 WLM2 Network is done through RJ14 slot 1 or 2). The Network master will act as a transparent interface to all WLM2 slave masters in the network.
1..F	1..9	11, 12, 13..159	Network Slave Master (Modbus communication to network slaves are done through the Network Master). The Network connection between Masters are done through RJ14 slot 1 and 2.

BMS - MODBUS connection to a stand alone WLM2 Master:

A WLM2-xFS/B Master can be connected to a BMS system using the MODBUS interface.

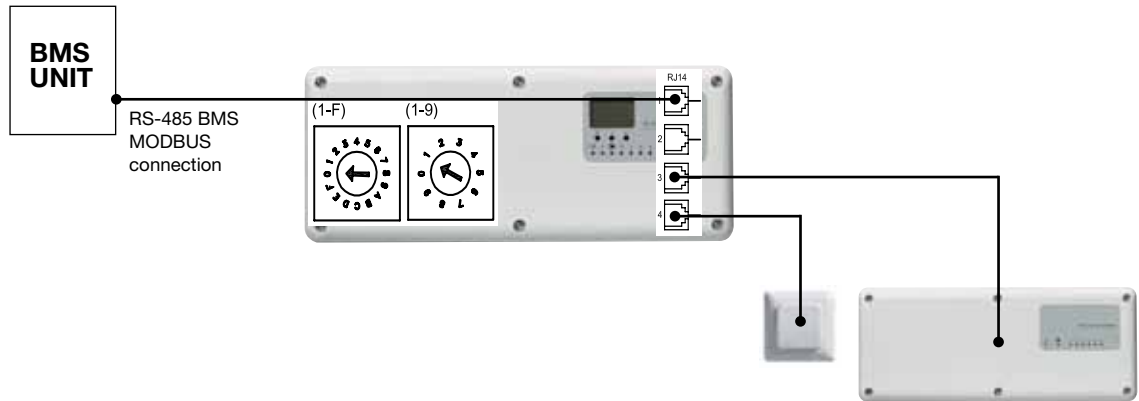
WLM2 Master:

MODBUS ID Address

Set selector switches to Left / Right = 0 / (1 to 9)

This gives the Master an address between 01 and 09.

This examples shows a Master set to ID Address no. 01



RJ14 slot 3 & 4 can be used to connect Add On modules, Receivers for wireless etc. as usual.

BMS - MODBUS connection to more WLM2 Masters:

Up to nine stand alone masters can be connected to the same BMS interface, as long as the Masters are setup 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 examples shows a Master set to ID Address no. 01

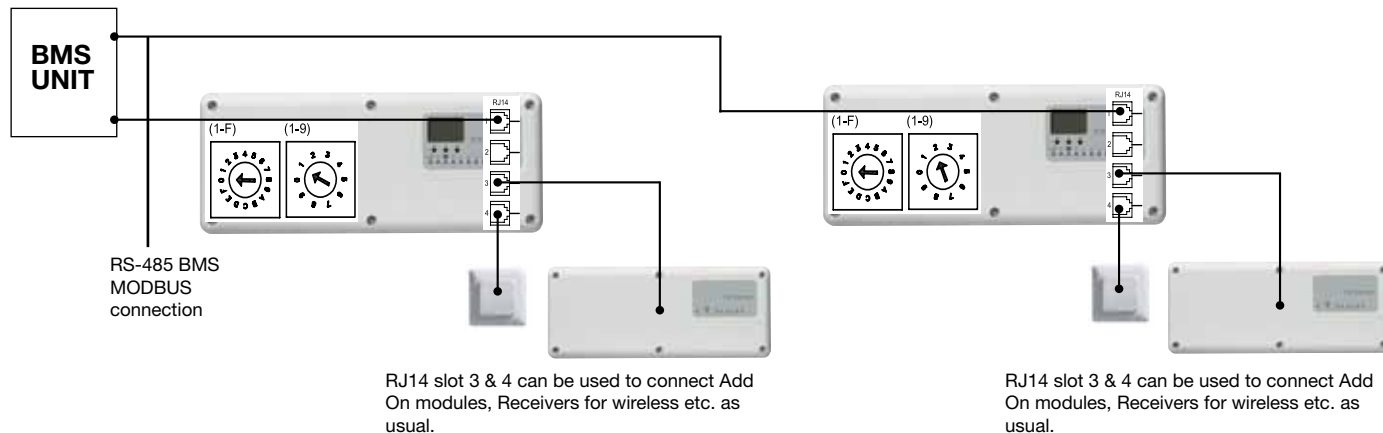
Stand alone Master number 2:

MODBUS ID Address

Set selector switches to Left / Right = 0 / (1 to 9)

This gives the Master an address between 01 and 09. (must be different than on the other Master)

This examples shows a Master set to ID Address no. 02



Note 1:

Instead of connecting Standalone Master number 2. direct to the BMS Unit, it is possible to connect to RJ14 slot number 2 on Master number 1 instead. This would free up the need of many terminals at the BMS terminal.

BMS - MODBUS connection to a WLM2 network:

BMS communication to up to nine different WLM2 networks is possible.

Besides communicating directly with the BMS unit, the Network Master in each WLM2 Network also acts as a transparent interfaces to the WLM2 Network Slaves connected to the Network Master. Every Master that is connected directly or through a Network Master to the BMS unit must have a unique MODBUS ID Address. (Network slaves does not need to be the special WLM2 with BMS type)

Network Master:

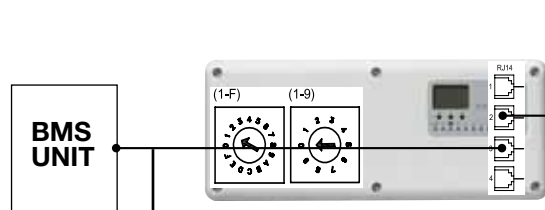
MODBUS ID Address

Set selector switches to Left / Right = (1 to 9) / 0

This gives the Network Master an address between 10 and 90.

(Must be different than any other Master in the system)

This examples shows a Network Master set to ID Address no. 10



RS-485 BMS
MODBUS
connection

RJ14 slot 3 & 4 can only be used for BMS communication, prevention the use of Add On modules and Receivers for wireless etc. on a Master configured as a Network Master.

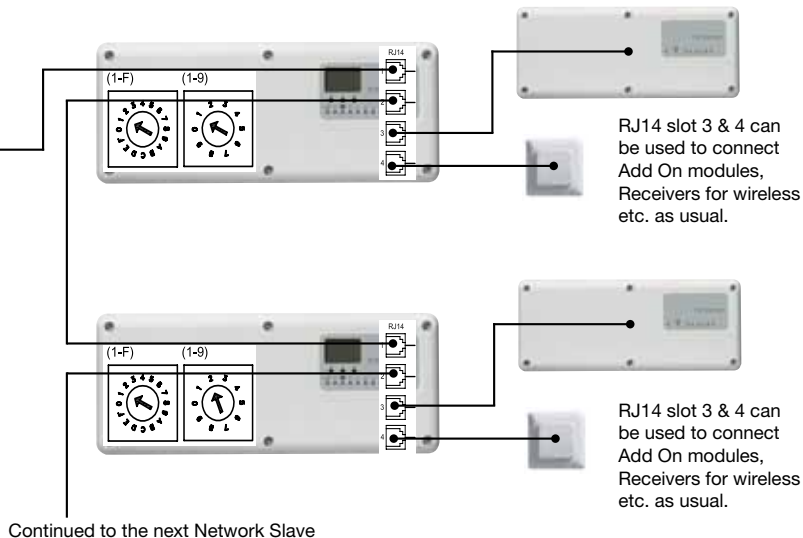
Network Slaves:

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. (must be different than on any other Master in the system)

This examples shows two network slaves, one set to ID Address no. 11 and the other set to ID address no. 12



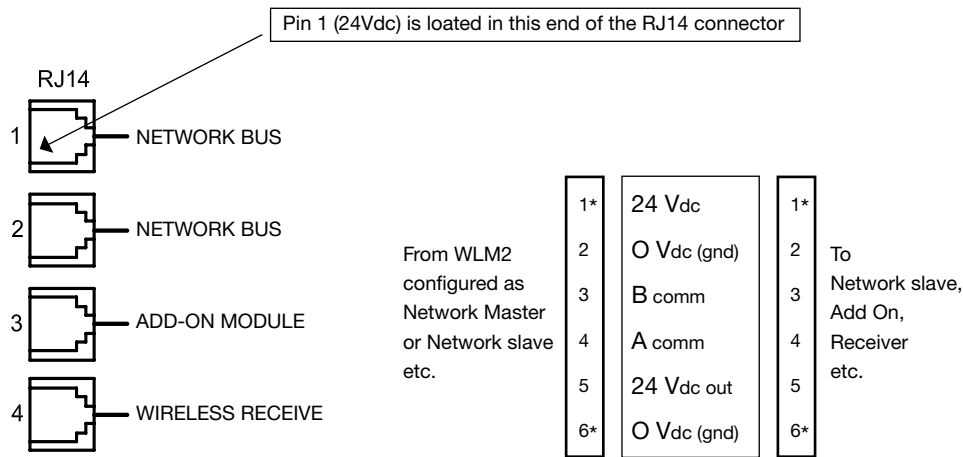
RJ14 slot 3 & 4 can be used to connect Add On modules, Receivers for wireless etc. as usual.

RJ14 slot 3 & 4 can be used to connect Add On modules, Receivers for wireless etc. as usual.

Continued to the next Network Slave

Hardware interface:

The RJ connection used in the OJ Waterline system is Based on 6 pole RJ connectors with the following connection. Since only 4 of these are used, and no power are drained, the connection is called RJ14. The interface is based on a standard RS-485 hardware platform.



PLEASE NOTE: The illustration shows the internal WLM2 master RJ14 connections 1 to 4

On the WLM2-xAO module only connections points 3 and 4 supplied

* These connections are not necessary but are allowed

Communication & timing:

Comm. settings: Baudrate: 38,4Kbit/s (1 start, 8 data, 1 stop –bit, no parity)
Protocol: Standard RTU MOD-Bus

Comm. timing: Standalone system: Max responcetime to BMS (end of BMS TX to start of WLM2 answer.): 10mS at 1 reg, 20mS at 125 reg's
WLM2 network system: Max responcetime to BMS (end of BMS TX to start of WLM answer.): 50mS at 1 reg, 130mS at 125 reg's
Recommended max poll speed: >300 ms
Recommended timeout: >300 ms

Examples of BMS parameters:

Heating/Cooling BMS override function:

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 set point 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° <= New value <= 40°C = BMS overrides individual channel setpoint.
Example: Holding register 0x03 address 50 overrides the setpoint for channel number 6

Protocol = Standard Modbus (RTU)

Coil Stat Bits:

0x01: Read

0x05: Write Single Coil (NOTE: ON => output value = 0xFF00)

0x0F: Write Multiple Coils

Register	Function	Description
0	Setback input BMS override	Forces the Master into setback mode from BMS. (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 app 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	Forces 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 on Boiler output relay 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 on 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 output relay 0=OFF, 1=ON
11	N.U. (0)	
12	N.U. (0)	
13	N.U. (0)	
14	N.U. (0)	
15	N.U. (0)	
16	N.U. (0)	
17	N.U. (0)	
18	N.U. (0)	
19	N.U. (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 on Channel n output relay 0=OFF, 1=ON
n*10+12	N.U. (0)	
n*10+13	N.U. (0)	
n*10+14	N.U. (0)	
n*10+15	N.U. (0)	
n*10+16	N.U. (0)	
n*10+17	N.U. (0)	
n*10+18	N.U. (0)	
n*10+19	N.U. (0)	

n = Channel = 1..14

InputStat Bits:

0x02: Read

Register	Function	Description
0	Heating/Cooling Mode	Current mode (0=heating, 1=cooling)
1	Timeswitch input	Current state of time switch input: 0=day temp (input shorted), 1=night 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	N.U. (0)	
6	N.U. (0)	
7	N.U. (0)	
8	N.U. (0)	
9	N.U. (0)	
10	N.U. (0)	
11	N.U. (0)	
12	N.U. (0)	
13	N.U. (0)	
14	N.U. (0)	
15	N.U. (0)	
16	N.U. (0)	
17	N.U. (0)	
18	N.U. (0)	
19	N.U. (0)	
n*10+10	*Ch_n_Channel output relay	Shows the current state of the channel output relay
n*10+11	*Ch_n_Channel output relay 2	Shows the current state of the channel output relay 2 (2-stage only)
n*10+12	*Ch_n_Channel low battery	Shows if any unit on the channel is low on battery
n*10+13	N.U. (0)	
n*10+14	N.U. (0)	
n*10+15	N.U. (0)	
n*10+16	N.U. (0)	
n*10+17	N.U. (0)	
n*10+18	N.U. (0)	
n*10+19	N.U. (0)	

n = Channel = 1..14

Input registers:

0x04: Read

Register	Function	Description	Range	Resolution	Unit
0	Software Ver	Software version of master		0,1	
1	Total UnitNum	Number of units (sensors/controllers etc) on bus	0..24	1	
2	Channel 0 UnitNum	Number of units on channel 0 (controllers) on bus	0..24	1	
3	Channel 15 UnitNum	Number of units on channel 15 (sensors/controllers/humidity sensors/WLAC etc) on bus	0..24	1	
4	Total UnitErr	Number of units with errors	0..24	1	
5	Active Channels	Bitmap showing which output channels are used (Bit0 1=channel1 in use, Bit1: 1=Channel2 in use....etc)		1	
6	System Error	Shows system errors like on the Power LED		1	
7	Number of Network slaves	Shows the number of slaves in the network	0..160	1	
8	Number of Network slaves w. Err's	Shows the number of slaves in the network whit comm.error	0..160	1	
9	Supply Temp	Current supply water temperature	-4000..12500	0,01	°C
10	App Temp	Current temperature measured on the "App" sensor	-4000..12500	0,01	°C
11	OutDoor Temp	Current outdoor temperature	-4000..12500	0,01	°C
12	Mixing valve output effect	Shows the current Mixing valve output effect - 0-100%. (0-10Vdc or 10-0Vdc depending on settings)	0..10000	0,01	%
13	Max Dew point	Shows the highest calculated dew point on the master (or the highest in the system if communicating with a network master).	-4000..12500	0,01	°C
14	Max Humidity	Shows the highest measured humidity on the master (or the highest in the system if communicating with a network master)	0..10000	0,01	%RH
15	PWM time	Show the current time of a full cycling sequence (PWM period)	0..2700	1	Sec
16	PWM timer	Show the current time state within the full cycling sequence (PWM period)	900..2700	1	Sec
17	N.U. (0)				
18	N.U. (0)				
19	N.U. (0)				
n*10+10	Ch n numberOfUnits	Shows how many Room Sensors/Controllers is present on the channel	0..24	1	
n*10+11	Ch n Channel type	Shows which type of unit is connected to the channel 0 = Not in use. 1 = Room sensor (WLTx-xx) 2 = Room Controller (WLCT2-xx) 3 = Hot Water Controller (WLCT2-xx/HW) 4 = Radiator Controller (WLCT2-xx/R) 5 = 2 stage Controller (WLCT2-xx/2)		1	

n*10+12	Ch n RoomTemp	Current room temperature	-4000..12500	0,01	°C
n*10+13	Ch n RoomSet	Current Room setpoint temperature incl. offset	-4000..12500	0,01	°C
n*10+14	Ch n ErrorNr	Shows channel error number (0 if none)			
n*10+15	Ch n Output power	Current channel output power	0..10000	0,01	%
n*10+16	Ch n FloorTemp	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	N.U. (0)				

n = Channel = 1..14

Holding registers:

0x03: Read

0x06: Single Write

0x10: Multiple Write

Register	Function	Description	Range	Resolution	Unit
0	DaySetTemp	Day setpoint on master	500..4000	0,01	°C
1	NightSetTemp	Setback setpoint on master	500..4000	0,01	°C
2	OFF_SetTemp	Off setpoint on master	300..800	0,01	°C
3	MinLimitSetTemp	Min setpoint for floor temperature limitation	1000..3000	0,01	°C
4	MaxLimitSetTemp	Max setpoint for floor temperature limitation	2000..4000	0,01	°C
5	LoOutCompSet	Weather compensation Outdoor Winter temperature setpoint	-2000..1000	0,01	°C
6	HiOutCompSet	Weather compensation Outdoor Summer temperature setpoint	2000..3500	0,01	°C
7	LoSupCompSet	Weather compensation Water Supply Summer temperature setpoint	1000..4000	0,01	°C
8	LoSupCompSet	Weather compensation Water Supply Winter temperature setpoint	3000..8000	0,01	°C
9	BMS Heat/Cool override	Forces the master into cool or heat mode (0 = no override, 1=heat, 2=cool)	0..2	1	
10	Supply Temp override	Value when the master is simulating the Supply Water temperature	0..9000	0,01	°C
11	App Temp override	Value when the master is simulation the Application sensor temperature	0..9000	0,01	°C
12	Outdoor Temp override	Value when the master is simulation the Outdoor temperature	-2000..9000	0,01	°C
13	DEW point override	Value when the master is simulation the DEW point temperature		0,01	°C
14	N.U. (0)				
15	N.U. (0)				

16	N.U. (0)				
17	N.U. (0)				
18	N.U. (0)				
19	N.U. (0)				
n*10+10	Ch_n_Setpoint BMS override	Overrides individual any channel setpoint in system (0 = no override; 5 – 40°C overrides the channel setpoint)	500..4000	0,01	°C
n*10+11	N.U. (0)				
n*10+12	N.U. (0)				
n*10+13	N.U. (0)				
n*10+14	N.U. (0)				
n*10+15	N.U. (0)				
n*10+16	N.U. (0)				
n*10+17	N.U. (0)				
n*10+18	N.U. (0)				
n*10+19	N.U. (0)				

n = Channel = 1..14

Exception Codes:

- 1 ILLEGAL FUNCTION
- 2 ILLEGAL DATA ADDRESS
- 3 ILLEGAL DATA VALUE

Loopback function:

The WLM2 supports loopback function with sub-function code zero (0x00, 0x00 in the two-byte field).



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