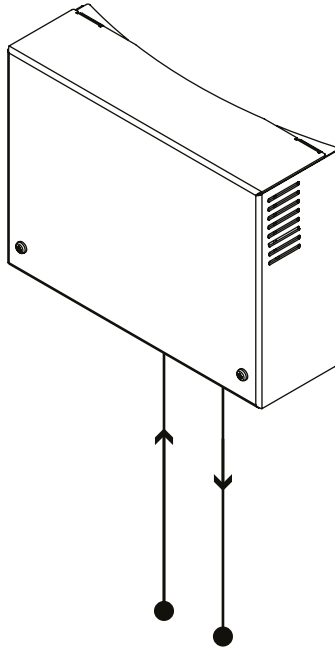# Mixergy®

Modbus integration guide

For stainless steel hot water cylinders (RS485)

Failure to install and maintain this system in accordance with these instructions will invalidate the manufacturer's warranty.

Contents

About the controller

The Mixergy RS485 controller is designed for integration into domestic and commercial building projects which utilise centralized control in the form of a PLC or BMS.

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Default parameters

The controller communicates using the modbus RTU protocol over a RS485 link. As shipped, the default communication parameters of the modbus interface are as follows:

Baud rate	9600
Serial format	8N1 (8 data bits, no parity, 1 stop bit)
Termination resistance	120 Ω
Slave address (1-255)	137

	Left	Right
On	9600	120 Ω termination
Off	19200	No termination

Communication and register map

All communication to and from the controller is handled using holding registers; the data within the registers is of type *uint16_t* (16-bit unsigned integer). The registers begin at address 0000 and are available as follows:

Holding register address	Function	Read/Write
0	System on/off	R/W
1	Set temperature	
2	Target charge	
3	Heat source	
4	Immersion state	R
5	Top sensor temp.	
6	Feedback sensor temp.	
7	Mid sensor temp.	
8	Bottom sensor temp.	
9	Current charge	
10	Cleansing flag	
11	Slave address	R/W

Register functions

A brief description of each register's function is given in the following sections.

System on/off (REG 0)

Switches the heat demand of the cylinder on or off depending on a Boolean value (1 or 0):

Register value	System state
0	Off
1	On

Register functions

Set temperature (REG 1)

Sets the operating output temperature of the cylinder in decidegrees. This is the temperature that the cylinder will aim to deliver hot water at. In the case where an indirect heat source such as a boiler or heat pump is being used to heat the cylinder, please ensure at least a 5°C difference between the cylinder set temp. and the delivered indirect loop temp.

Target charge (REG 2)

This is the charge value (0 to 100%) that the cylinder will target when it is switched on using register 0.

Heat source (REG 3)

Sets the heat source that the cylinder will use for heating, this is a value between 0 and 2. The specific heat source that is selected depends on the cylinder configuration. Please refer to the table below for guidance:

Cylinder configuration	Register value	Function
Heat pump, low temp. (HEL)	0	Heat pump only
	1	Direct electric only
	2	Direct + heat pump
Heat pump, high temp. (HES)	0	Heat pump only
	1	Direct electric only
	2	No function - reset to 0
Indirect (IDE)	0	Indirect only
	1	Direct electric only
	2	No function - reset to 0
Direct (ELE)	0	Direct electric only
	1	No function - reset to 0
	2	No function - reset to 0

Immersion state (REG 4)

Boolean value (1 or 0) which indicates whether the immersion heater is currently on or off.

Sensor temperatures (REG 5 - 8)

Returns the measured temperatures in decidegrees.

Current charge (REG 9)

Returns the measured charge in percent (0-100). This number represents the proportion of energy (i.e. hot water) stored in the cylinder.

Cleansing flag (REG 10)

The cleansing flag monitors the internal cylinder temperatures for legionella growth which occurs in the temperature range between 20°C and 45°C. The following parameters are monitored:

- Cylinder output temperature
- Cylinder bottom temperature

If either of these temperatures falls within the temperature range associated with legionella growth for longer than a fixed interval (24 hrs for the output temperature, 2 weeks for the bottom temperature), the system will flag that a cleanse is required. This flag can be cleared by setting the subsequent charge to 100% with a charge temperature >59°C.

Slave address (REG 11)

Sets the modbus slave address of the controller, integer value between 1-255.

System behaviour

Under normal operation and unless otherwise commanded, the cylinder will remain idle until the command to switch on (REG 0) is given.

Once this command is given, the cylinder will begin charging using the heat source specified (REG 3) to the temperature specified (REG 1). In the case of a direct electric call for heat, this will switch on the cylinder's immersion heater. In the case of an indirect or heat pump call for heat, this will switch the contacts of the volt-free relay (3A, 240VAC MAX.) provided on the board.

In the case of cylinders in the HEL configuration, these contacts come pre-wired into the exchanger circulation pump (which requires a 240VAC supply) fitted to the cylinder. This wiring arrangement can be changed if there is another suitable method of switching the circulator pump (such as a 3-port valve with an auxilliary switch) and the cylinder contacts are required for low voltage switching. Please refer to the 'RS485 installation guide' for full wiring schematics.