

# MBH88 - 8 Channel, MODBUS Relay Module.

## Technical Documentation



### Overview

The MBH88 is supplied in a DIN rail mounting case, and provides eight optically isolated inputs and eight volt free contact relay outputs with a current rating of up to 16Amp each. Eight isolated inputs may be used as volt free inputs (ie. direct connection to switches or sensor contacts) or as voltage inputs (5-24vdc).

The module is mains powered via an on-board isolated universal power unit. Control is by a MODBUS RTU RS485 interface with even Parity or No Parity, baud rates of 9600, 19200, 38400 or 115200, and an address range of 0 to 127. The full MODBUS specification is [here](#).

All relays have snubber circuits across the normally open contacts and are suitable for inductive loads such as motors, solenoids etc.

### Operating Temperature

-25C to +50C

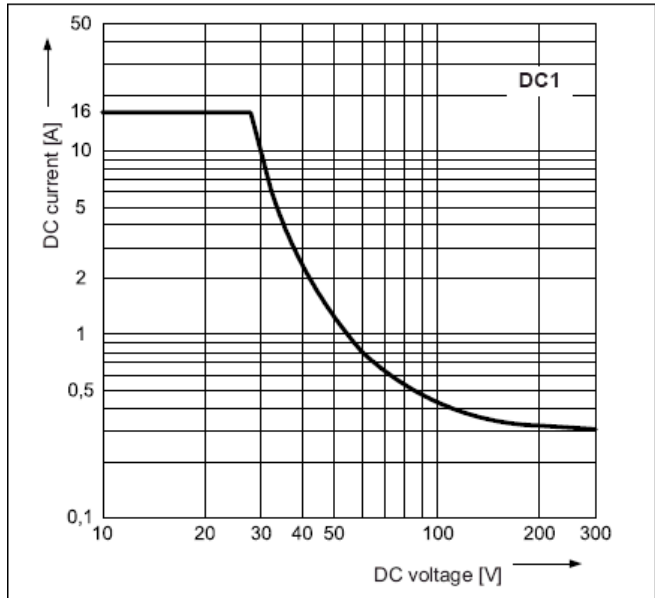
### Line (Mains) Power.

Universal input: 90 – 264Vac, 47-63Hz

## Relay power rating

If the contact load voltage and current of the relay are in the region enclosed by the solid and dotted lines in the figure below, the relay can perform stable switching operation. If the relay is used at a voltage or current exceeding this region, the life of the contacts may be significantly shortened.

Load type	Typical applications	Rating
AC1	Non inductive or slightly inductive loads	16A @ 250V A
AC15	Control of electromagnetic load (>72VA)	3A @ 120V AC 1.5A @ 240V AC
AC3	Control of Motor	750W
DC1	Non inductive or slightly inductive loads	16A @ 24V DC
DC13	Control of electromagnetic load	0.22A @ 120V DC 0.1A @ 250V DC



A full data sheet for the relays used on the MBH88 is here [HF115FD](#)

## Configuration.

The MBH88 has a 10-way switch for configuration.

SW1 selects Even Parity when on, or No Parity when off. Odd Parity is not supported.

SW2 & SW3 select the serial baud rate.

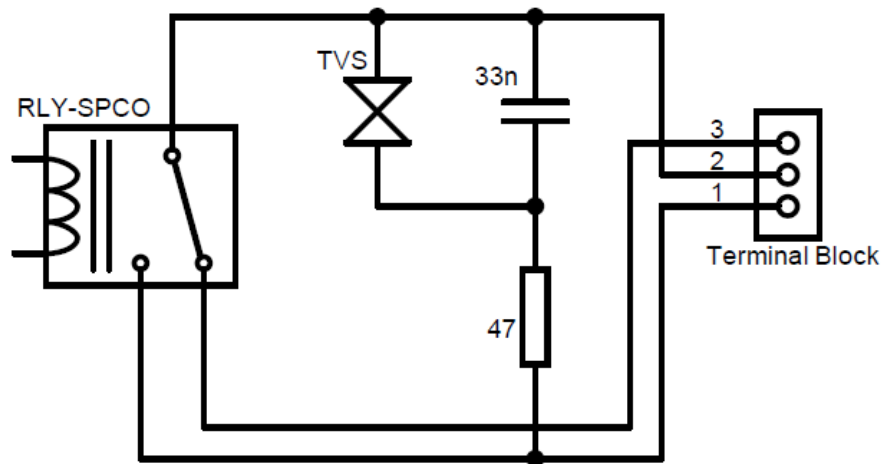
SW2	SW3	Baud Rate
off	off	9600
off	on	19200
on	off	38400
on	on	115200

SW4 through SW10 selects the MODBUS address of the module, 0 - 127.  
 In the table below a 0 represents a SW OFF, and a 1 represents a SW ON.  
 For example, if SW10 is ON and the rest are OFF, then the address is 1.

0000000	0	0100000	32	1000000	64	1100000	96
0000001	1	0100001	33	1000001	65	1100001	97
0000010	2	0100010	34	1000010	66	1100010	98
0000011	3	0100011	35	1000011	67	1100011	99
0000100	4	0100100	36	1000100	68	1100100	100
0000101	5	0100101	37	1000101	69	1100101	101
0000110	6	0100110	38	1000110	70	1100110	102
0000111	7	0100111	39	1000111	71	1100111	103
0001000	8	0101000	40	1001000	72	1101000	104
0001001	9	0101001	41	1001001	73	1101001	105
0001010	10	0101010	42	1001010	74	1101010	106
0001011	11	0101011	43	1001011	75	1101011	107
0001100	12	0101100	44	1001100	76	1101100	108
0001101	13	0101101	45	1001101	77	1101101	109
0001110	14	0101110	46	1001110	78	1101110	110
0001111	15	0101111	47	1001111	79	1101111	111
0010000	16	0110000	48	1010000	80	1110000	112
0010001	17	0110001	49	1010001	81	1110001	113
0010010	18	0110010	50	1010010	82	1110010	114
0010011	19	0110011	51	1010011	83	1110011	115
0010100	20	0110100	52	1010100	84	1110100	116
0010101	21	0110101	53	1010101	85	1110101	117
0010110	22	0110110	54	1010110	86	1110110	118
0010111	23	0110111	55	1010111	87	1110111	119
0011000	24	0111000	56	1011000	88	1111000	120
0011001	25	0111001	57	1011001	89	1111001	121
0011010	26	0111010	58	1011010	90	1111010	122
0011011	27	0111011	59	1011011	91	1111011	123
0011100	28	0111100	60	1011100	92	1111100	124
0011101	29	0111101	61	1011101	93	1111101	125
0011110	30	0111110	62	1011110	94	1111110	126
0011111	31	0111111	63	1011111	95	1111111	127

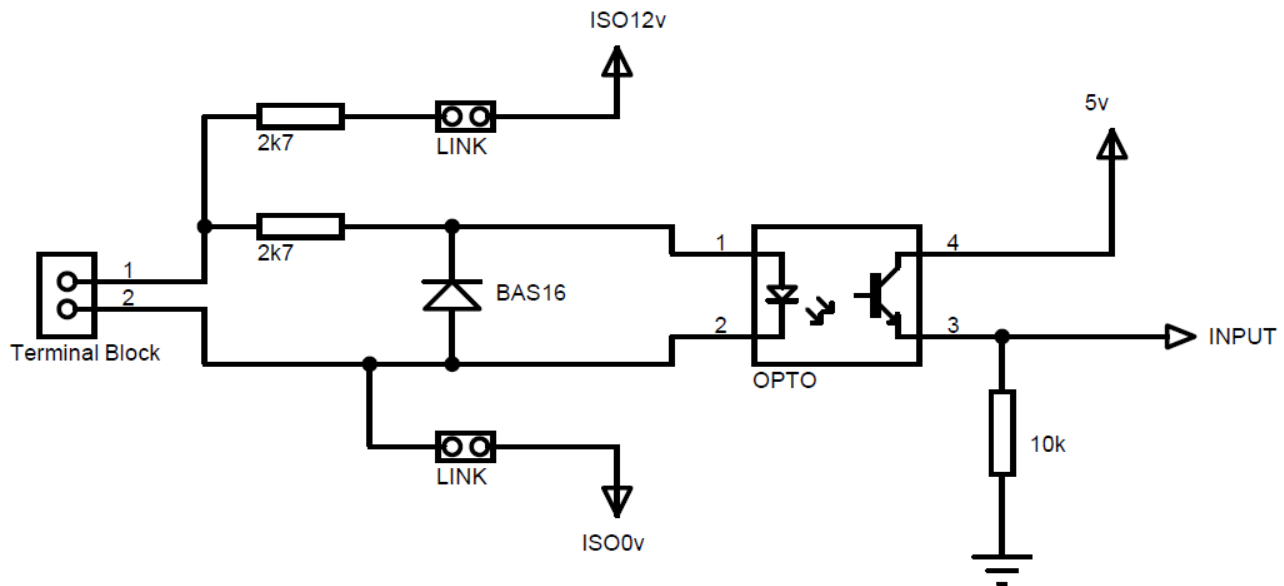
Note: The combination of address 0, 9600 Baud and No Parity (all switches off) is illegal as this places the module in boot-loader mode for firmware updating.

## Relay Outputs.



Each relay has a snubber circuit across the common and normally open contacts. Snubbers protect the relay contacts from arcing when switching inductive loads such as coils, motors, solenoids etc.

## Inputs



Each Input has two links which connect it to the isolated 12v supply. This provides a small bias current to the opto-isolator which external volt free contacts can short out. In this configuration the inputs are isolated from everything except each other as they have a common 0v connection. This is normally what you will want, however if you need an input to be totally isolated then remove both links from the pcb on that input. This will isolate the input from all other inputs, but you will need to provide an external isolated voltage to the input (5v-24v).

Note the following:

With the links in place, reading the inputs over MODBUS will read as 0 when nothing is connected and 1 when the input is connected to closed contacts.

With the links removed, reading the inputs over MODBUS will read as 1 when nothing is connected and 0 when an input voltage (5v-24v) is supplied.

## MODBUS Function Codes

The MBH88 responds to the following MODBUS function codes.

- 01 (0x01) Read Coils.
- 02 (0x02) Read Discrete Inputs.
- 05 (0x05) Write Single Coil.
- 15 (0x0F) Write Multiple Coils.

### 01 (0x01) Read Coils.

This function code will read back the current state of the relays. The “Start Address” must be in the range 1-8 and the “Quantity of Coils” must be in the range 1-8. Also the sum of these two parameters must not exceed 9.

### 02 (0x02) Read Discrete Inputs.

This function code will read back the current state of the Inputs. The “Start Address” must be in the range 1-8 and the “Quantity of Inputs” must be in the range 1-8. Also the sum of these two parameters must not exceed 9.

### 03 (0x03) Read Holding Registers

This is used only to get device information.

Reg 1 is the model number, 0x188 for the MBH88.

Reg 2 is the Hardware revision.

Reg 3 is the Firmware revision.

### 05 (0x05) Write Single Coil.

This function code is used to change the state of a single Relay. The “Output Address” must be in the range 1-8. The “Output Value” must be 0xFF00 to turn the relay on, or 0x0000 to turn it off.

### 15 (0x0F) Write Multiple Coils.

This function code is used to change the state of multiple Relays. The “Start Address” must be in the range 1-8 and the “Quantity of Coils” must be in the range 1-8. Also the sum of these two parameters must not exceed 9.

The MBH88 does not respond to any other function codes.

Make sure you only write to coils that exist and only read coils and inputs that exist. If you try to read/write I/O that does not exist on the module then the command is ignored with no response.

Connections & Dimensions

