B-MINI-01 – 4 analog inputs (resistance, voltage, current), 6 digital inputs, 2 analog outputs, 5 relay outputs, 2 SSR outputs

- **bit address = 16 * (word address – 1) + 1**

Supported Modbus functions:
01 Read Coils – read bits
02 Read Discrete Inputs – read bits
03 Read Holding Registers – read words
04 Read Input Registers – read words
15 Write Multiple Coils – write bits
16 Write Multiple Registers – write words

Register type:
R – register is read only
W – register is write only
RW – register is read/write
RWE (default value) – register is read from EEPROM, written to EEPROM, default value in brackets

name	address	type	description	note
inputs	1	R	input values	bit 0 – input 1 … bit 5 – input 6
latched value	2	R	latched values **0 –** selected level **was not** latched since last enabling of the latch function **1 –** selected level **was** latched after last enabling of the latch function	latched value is cleared by resetting according bit in **latch enable** register bit 0 – input 1 … bit 5 – input 6
latch enable	3	RW	enabling the latch function **0 –** latch function disabled, according latched value is reset **1 –** latch function enabled, latched value will be set when level selected by **latch state** register is detected on particular input	bit 0 – input 1 … bit 5 – input 6
value of channel AI1	4	R	analog input values	values represantation – see register 1003 **AI range**
value of channel AI2	5	R		
value of channel AI3	6	R		
value of channel AI4	7	R		
relay	8	RW	set / reset relay / SSR outputs	bit 0 – relay 1 … bit 6 – SSR 7

value of channel AO1	9	RW	value range is 0000hex – 0FFFhex (0dec – 4095dec) 0000hex – 0V 0FFFhex – 10V	
value of channel AO2	10	RW		
firmware version	1000	R	firmware version	FW version is **always** the same as this document version
module ID	1001	R	module identification number	module ID is F001hex
status LSB	1002 LSB	RW	module status – low byte **bit 0** – enable write to EEPROM **bit 1** – enable SW reset **bit 2** – disable write to all RW registers **bit 4** – EEPROM initialization **bit 5** – offset calibration **bit 6** – span calibration **bit 7** – enable calibration	**EEPROM initialization:** 1) start device in init mode (address DIP switch is all high – 255 – at start) 2) set DIP switch to any other value than 255 3) set status LSB bit 4, initialization is indicated in status MSB bit 2 **SW reset:** set bit 1, then write any non-zero value to reg. 1011 **calibration**: 1) start device in init mode (address DIP switch is all high – 255 – at start) 2) set DIP switch to any other value than 255 3) set status LSB bit 7, A/D coprocessor readiness is indicated in status MSB bit 3 4) select offset or span calibration by setting bit 5 or 6 of status LSB – can be set within one frame together with step 3 or 5 5) reset status LSB bit 7, finishing is indicated by resetting all calibration bits in status register span must be calibrated **after** offset

status MSB	1002 MSB	R	module status – high byte **bit 0** - 0 normal mode - 1 init mode **bit 1** - 1 next write to EEPROM register causes writing of **all** data to EEPROM - 0 next write to register is to RAM only **bit 2** – 1 – EEPROM initialized **bit 3** – 1 – A/D coprocessor is ready for calibration **bit 4** – 1 – write to all RW registers disabled **bit 5 –** 1 – SW reset enabled **bit 6 –** 1 – couldn't read valid data from EEPROM, calibration will cause writing of **all** data to EEPROM **bit 7** – 1	bit 1 ... indication that command given by bit 0 in status LSB was accepted bit 2 ... indication that command given by bit 4 in status LSB was accepted bit 3 ... indication that command given by bit 7 in status LSB was accepted bit 4 ... indication that command given by bit 2 in status LSB was accepted bit 5 ... indication that command given by bit 1 in status LSB was accepted
address	1003	RWE (1)	modbus address of the module	registers change immediately, communication parameters change after restart (data must be written to EEPROM)
baud rate	1004	RWE (13)	10_{dec} … 1 200bps 11_{dec} … 2 400bps 12_{dec} … 4 800bps 13_{dec} … 9 600bps 14_{dec} … 19 200bps 15_{dec} … 38 400bps 16_{dec} … 57 600bps 17_{dec} … 115 200bps	
serial port settings	1005	RWE (0)	**bits 0, 1** – parity 0 none 1 even 2 odd **bit 2** – stopbits 0 one stopbit 1 two stopbits	
up time	1006 1007	R	time in seconds since last restart or power up	
serial number	1008 1009	RWE (unique)	module serial number, can be written if it is zero	not implemented yet
EEPROM writes	1010	R	EEPROM writes counter	counter 0 …. FFFEh, counting stops at value FFFEh
SW reset	1011	RW	if **status LSB bit 1** (and status MSB bit 5) is set, writing non-zero value causes SW reset	
calibrations	1100	R	A/D coprocessor EEPROM writes counter (count of calibrations)	counter 0 …. FFFEh, counting stops at value FFFEh
dip switch	1101	R	actual DIP switch value	

latch state	1102	RW (0)	level to latch **0** – low **1** – high	bit 0 – input 1 … bit 5 – input 6
range for AI channels 1 and 2	1103 LSB	RWE (0x12)	**1 …Pt1000** (-50 to 150 °C) (0 to 20000) **divide value by 100 and subtract 50** to get degree Celsius **2 … voltage 0 V – 10 V** (0 to 10000) **divide value by 1000** to get volts **3 … resistance 0 – 1600 ohm** (0 to 16000) **divide value by 10** to get ohm **4 … current 0 – 20 mA** (0 to 20000) **divide value by 1000** to get miliampere **5 … resistance 0 – 5000 ohm** (0 to 50000) **divide value by 10** to get ohm **current 0 - 20mA** external 125ohm resistor must be connected	bit 0..3 - channel AI1 bit 4..7 - channel AI2
range for AI channels 3 and 4	1103 MSB	RWE (0x11)		**resistance ranges only!** bit 0..3 - channel AI3 bit 4..7 - channel AI4
AI channels	1104	RWE (0x0F)	AI channels measured by A/D coprocessor set bit selects channel for measurement **bit 0** … AI1 … **bit 3** … AI4	not implemented yet – all channels are always measured
relay com	1105	RWE (0)	**0** – communication loss is ignored for particular output **1 –** communication loss causes setting of particular output to value given by **relay state** register	bit 0 – relay 1 … bit 6 – SSR 7
relay state	1106	RWE (0)	particular output is set to value given by this register if valid modbus frame wasn't received for time given by **relay time** register and is enabled by **relay com** register	bit 0 – relay 1 … bit 6 – SSR 7
relay time	1107	RWE (30)	time period in seconds since last valid modbus frame to set outputs to values given by **relay com** and **relay state** registers	value of zero deactivates communication loss feature
relay start enable	1108	RWE (0)	**0** – no action on particular output on start of the module **1 –** output is set to value given by **relay start** register	bit 0 – relay 1 … bit 6 – SSR 7
relay start	1109	RWE (0)	particular output is set to value given by this register on start of the module if enabled by **relay start enable** register	bit 0 – relay 1 … bit 6 – SSR 7