B-AI8-01 – 8 analog inputs (resistance, voltage, current)

- **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
value of channel AI1	1	R	analog input values	values represantation – see registers 5 and 6 **AI range**
value of channel AI2	2	R		
value of channel AI3	3	R		
value of channel AI4	4	R		
value of channel AI5	5	R		
value of channel AI6	6	R		
value of channel AI7	7	R		
value of channel AI8	8	R		
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 F056hex

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	

range for AI channels 1 to 4	1102	RWE (2222hex)	**1 ...Pt1000** (-50 to 150 °C) (-5000 to 15000) **divide value by 100** 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** 125ohm resistor must be connected by appropriate dipswitch	bit 0 – bit 3... channel 1 ... bit 12 – bit 15... channel 4
range for AI channels 5 to 8	1103	RWE (2222hex)		bit 0 – bit 3... channel 5 ... bit 12 – bit 15... channel 8
AI channels	1104 LSB	RWE (0xFF)	AI channels measured by A/D coprocessor set bit selects channel for measurement **bit 0** ... AI1 ... **bit 7** ... AI8	not implemented yet – all channels are always measured
not used	1104 MSB	R		