

DATA PROTOCOL

Command 6h > Input value

<AA> 06 00 00 <Word Hi> <Word Lo> <CRC Lo> <CRC Hi>

where:

Word is the value in the format signed integer -32 768 (8000h) - 0 - 32 767 (7FFFh)

When displayed this value is recalculated with the aid of values entered in menu "INPUTS/CONFIG/MIN/MIN. Lo and MAX. Lo. Values "MIN. Hi" and "MAX. Hi" are of no significance in this case.

Response:

<AA> 06 00 00 <Word Hi><Word Lo><CRC Lo><CRC Hi>.

Command 10h > Input value

<AA> 10 00 00 00 02 04 <Lo Word Hi> <Lo Word Lo> <Hi Word Hi> <Hi Word Lo> <CRC Lo> <CRC Hi>

where:

<Hi Word><Lo Word> together they create the value LONG INT.

Input values are calculated through the following values:

$$\text{CHAN. A} = \text{MIN. A} + \frac{(\text{MAX. A} - \text{MIN. A})}{(\text{MAX.} - \text{MIN.})} \times (\text{input data} - \text{MIN.})$$

Chan. A	value to be displayed and further processed in the instrument
MIN. A, MAX. A	values entered in menu CHANNELS/CHAN. And/SETTIN.
MIN., MAX.	values entered in menu INPUTS/CONFIG
	MIN. = MIN. Hi x 65536 + MIN. Lo
	MAX. = MAX. Hi x 65536 + MAX. Lo

Response:

Command copied without data part <AA> 10 00 00 00 02 <CRC Lo><CRC Hi>.

Command 20h > NON-STANDARD COMMAND for MODBUS

making instrument control accessible through standard commands of the OM ASCII protocol

<AA> 20 <number of symbols in standard message> standard message <CRC Lo> <CRC Hi>

Response:

provided no error occurs in MODBUS frame:

<AA> 20 <number of characters in standard message> standard message <CRC Lo> <CRC Hi>

In this format is also the response ?00, reporting error in processing standard OM command.

Address field of standard message will always be 00 - here without any significance.

ERROR STATUS

In case of wrong address or CRC nothing comes back.

In case of error command (CRC is not controlled) <AA> A0 01 <CRC Lo> <CRC Hi> comes back. If an error is in 10h command error statement "2" or "3" is reported.

If other command is used than the one corresponding with selected data format, it is evaluated as error command.

In common:

<AA> instrument address - binary 1 - 247 (set in instrument menu)

<CRC Lo> <CRC Hi> is a control word according to definitions in Appendix C of MODBUS protocol description.

TERMINATING COMMUNICATION

Communication is terminated provided no data arrives during 3 1/2 characters. This period is determined with uncertainty of $\pm 250\mu\text{s}$. MODBUS has standard rates up to 19 200. For higher rate it is necessary to count with this uncertainty -

e.g. 115 200 Baud \rightarrow $500\pm 250\mu\text{s}$, 230 400 Baud \rightarrow $250\pm 250\mu\text{s}$.

FORMAT	ORDER	COMMAND	DATA
U. INT. 16	n/a	0x06	<AA> 06 00 00 <Word Hi> <Word Lo> <CRC Lo> <CRC Hi>
S. INT. 16	n/a	0x06	<AA> 06 00 00 <Word Hi> <Word Lo> <CRC Lo> <CRC Hi>
U. INT. 32	LO - HI	0x10	<AA> 10 00 00 00 02 04 <Lo Word Hi> <Lo Word Lo> <Hi Word Hi> <Hi Word Lo> <CRC Lo> <CRC Hi>
S. INT. 32	LO - HI	0x10	<AA> 10 00 00 00 02 04 <Lo Word Hi> <Lo Word Lo> <Hi Word Hi> <Hi Word Lo> <CRC Lo> <CRC Hi>
FLOAT	LO - HI	0x10	<AA> 10 00 00 00 02 04 <Lo Word Hi> <Lo Word Lo> <Hi Word Hi> <Hi Word Lo> <CRC Lo> <CRC Hi>
U. INT. 32	HI - LO	0x10	<AA> 10 00 00 00 02 04 <Hi Word Hi> <Hi Word Lo> <Lo Word Hi> <Lo Word Lo> <CRC Lo> <CRC Hi>
S. INT. 32	HI - LO	0x10	<AA> 10 00 00 00 02 04 <Hi Word Hi> <Hi Word Lo> <Lo Word Hi> <Lo Word Lo> <CRC Lo> <CRC Hi>
FLOAT	HI - LO	0x10	<AA> 10 00 00 00 02 04 <Hi Word Hi> <Hi Word Lo> <Lo Word Hi> <Lo Word Lo> <CRC Lo> <CRC Hi>

LEGEND

#	Command beginning	
<AA>	Instrument address (1...247)	
<Word xx>	16-bit data	
<Lo Word xx>	32 bit data (lower part)	
<Hi Word xx>	32 bit data (higher part)	
U.INT.16	unsigned integer	0 (0x0000)...65 535 (0xFFFF)
S.INT.16	signed integer	-32 768 (0x8000)...65 535 (0x7FFF)
U.INT.32	unsigned integer	0 (0x0000 0000)...4 294 967 295 (0xFFFF FFFF)
S.INT.32	signed integer	-2 147 483 648 (0x8000 0000)...65 535 (0x7FFF FFFF)
FLOAT	IEEE floating point	$\pm 6,80564693277058\text{E}+38$ <Hi Word Hi> = ZEEE EEE; <Hi Word Lo> = EMMM MMMM <Lo Word Hi> = MMMM MMMM; <Lo Word Lo> = MMMM MMMM Z...sign (1(0)/-1(1)); E...Exponent (-127(0x00)...0(0x7F)...128(0xFF)) M...Mantisa (1.0...2.0), highest mantisa bit is always 1 and it is covered by the lowest exponent bit e.g.: $0x3F80\ 0000 = Z*2^E*M = 1*2^0*1 = 1$