PEI-S102/103

SIP protocol usage

FW version 1.0.1 and newer

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Protocol SIP generally

Protocol SIP (Simple Io Protocol) is simple ASCII based protocol with intuitive user guidance. Simple pressing Enter key in a terminal displays basic help, which further leads the user in the next step.

Protocol distinguishes 2 basic parts

a) values – they can be read or written (if there is no restriction)

b) functions – perform a more complex action

The result of each operation (read or write of a value or function call) is signalized. Example:

```
filter-type=1
#0: OK
```

or

```
filter-type=8
#-4: BAD PARAMETER
```

The result is signalized both numerical (for easy machine processing) and textual (for easy user understanding). Error codes and text descriptions are tightly bound.

To explain an example, the filter type is allowed to be 0 to 2. Therefore, entering 1 is fine and 8 is incorrect.

Value set contains the character '= ‘and the value, see example above. Reading is done by adding a '?' character, for example:

```
FILTER-TYPE?
FILTER-TYPE=1
```

(Note - here the result of the operation is not specified, because the display of the value means that the query was successful)

If the user asks for an unknown variable value, an error is displayed. Example:

```
AAAA?
#-27: UNKNOWN COMMAND
```

The protocol has common values / functions (for all devices with SIP protocol) and values / functions for only the device (ie, other devices may not have them) for easy use in many devices.

Common values begin with the '*' character.

Common functions start with '!'.

Examples:
! LIST – displays a simple help
*TYPE? - displays the device type

Device-specific values and functions always start with a letter.

Capital letters are not distinguished. So * TYPE or *type or *Type is the same.

Common values

Value	Access	Description
*TYPE	Read	Device type
*HW	Read	HW version
*FW	Read	FW version
*SN	Read	Serial number of the device
*DATE	Read	FW compilation date

Common functions

Function	Description
!HELP	Displays a simple help
!LIST	Displays a list of values and functions
!RESET	Performs device reset
!BOOTLOADER	Activates the bootloader (for FW upgrade)
!CLEAR	Resets all device specific values
!ECHO-ON	Turns on ECHO (displaying user-entered characters). When device is powered up (or restarted), it is always turned off for easy machine processing of responses
!ECHO-OFF	Turns off ECHO
!LOGIN(<pswd>)	Performs login to the device with <pswd>. It serves as protection for example for calibration and the user usually does not have access (manufacturer has).
!LOGOUT	Performs logout
!SAVE	Saves configuration to Flash memory
!REST	Restores configuration from Flash memory
!INIT	Sets the default configuration values

Device specific values

Value	Access	Description
MODBUS	Read/write	0 = protocol SIP, 1 = protocol MODBUS
ADDR	Read/write	MODBUS address
SPEED	Read/write	Communication speed
FILTER-TYPE	Read/write	Input value filter type. Possible values are 0 - filter off 1 - floating filter (average of N values) 2 - exponential (1st order IIR filter)
FILTER-CONST	Read/write	By filter type 0 - no meaning 1 - Number of filtered samples (maximum 128) 2 - filter calculation is: OUT = (PREV * (CONST - 1) + NEW) / CONST OUT - filter output value PREV - previous output value filtered NEW - new input value CONST - filter constant (in range >= 1) The greater the constant, the higher the filtration
OUTPUT-MODE	Read/write	Analog output mode (if applicable). Values: Simple mode **0:** 0 .. 5 V **1:** 0 .. 10 V **2:** -5 .. 5 V **3:** - 10 .. 10 V **5:** 4 .. 20 mA **6:** 0 .. 20 mA **7:** 0 .. 24 mA Dual mode **16:** 0 .. 5V a 4 .. 20 mA **17:** 0 .. 10 V a 4 .. 20 mA **18:** -5 .. 5V a 4 .. 20 mA **19:** -10 .. 10 V a 4 .. 20 mA **32:** 0 .. 5V a 0 .. 20 mA **33:** 0 .. 10 V a 0 .. 20 mA **34:** -5 .. 5V a 0 .. 20 mA **35:** -10 .. 10 V a 0 .. 20 mA **48:** 0 .. 5V a 0 .. 24 mA **49:** 0 .. 10 V a 0 .. 24 mA **50:** -5 .. 5V a 0 .. 24 mA **51:** -10 .. 10 V a 0 .. 24 mA
MIN-OUT-ANGLE	Read/write	The value of the angle at which the analog output is to be exposed to the minimum value. At an angle smaller, the output analog value is also minimal.
MAX-OUT-ANGLE	Read/write	The value of the angle at which the analog output is to be exposed to the maximum value. The output analog value is also maximum at an angle greater.

TARE-VALUE	Read/write	Tare value (ie reseted on Power up / Restart)
TARE-STATE	Read/write	Tare ON status
FIXED-TARE-VALUE	Read/write	Fixed tare value (ie stored in flash memory)
FIXED-TARE-STATE	Read/write	Fixed tare ON status (ie stored in flash memory)
INPUT	Read	Input value for angle calculation (= output value of the inclinometer sensor)
ANGLE	Read	Measured angle (including taring)
OUTPUT	Read	DA converter output value set
STATUS	Read	Device status (0 = all OK)

Device specific functions

Function	Description
TARE-SET	Sets the tare value so that the resulting angle is 0 and turns on a tare state (ie, changes TARE-VALUE and TARE-STATE). **!!! Attention !!!** This tare is reset and turned off after power up / restart
FIXED-TARE-SET	Sets the fixed tare value so that the resulting angle is 0 and turns on a fixed tare state (ie, changes FIXED-TARE-VALUE and FIXED-TARE-STATE). **!!! Attention !!!** It does not automatically save to Flash memory to reduce memory wear. After successful tuning, write to Flash memory by command !SAVE.

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