MESIT Devices

MESIT Devices communication protocol

Description

MESIT Devices protocol is a binary protocol intended for communication with capacitive level sensor produced by MESIT. The current implementation supports reading its data space.

Communication line configuration

Communication line category: Serial, SerialOverUDP Device Redundant

Parameters of the asynchronous line according to design and type of connection of device:

- standard settings from the manufacturer: 38400 Baud, 8 data bits, no parity, 1 stop bit

Communication station configuration

Communication protocol: **MESIT Devices**
The station address is a decimal number that is intended for addressing a device on a data bus with more SLAVE devices.

Station protocol parameters

Parameters may be entered in the dialog window of station configuration - **Parameters** tab. These parameters may be defined:

Table 1

Full name	Description	Unit	Default value
Full Debug	Received and sent data are recorded in the communication log.	-	YES
Master Address	A decimal number that identifies a sender (D2000 KOM).	-	1
Wait First Timeout	First waiting for a response after sending a request.	Ms	100
Wait Timeout	Waiting between individual readings of the response.	Ms	100
Retry Timeout	Waiting before repeating a request.	Ms	100
Max. Wait Retry	Maximum retries of reading response.	-	6
Retry Count	Maximum retries of sending a request.	-	2

I/O tag configuration

Allowed types of I/O tags: **Ai, Ci, Di, TxtI, TxtO**

I/O tag address consists of four parameters separated by a full stop. The format is: "M.R.O.L", where:

- **M** - defines a number of the message (0-255)
- **R** - defines the type of request (0-65535)
- **O** - offset - a byte number (1, 2, etc.) in a received response where the first (lowest) byte is located
- **L** - length of a request (in bytes) count that must be read from the received response. For numerical types of I/O tags, the values of parameter "L" can be only 1, 2, and 4. For text types of I/O tags, this parameter is limited by the maximum length of the data block of response.

All these parameters are entered as decimal numbers.

As an example, we may mention the reading of fuel temperature. It is read with the help of message number 0x0C and request type 0x50. In the response, this information is in two bytes that start with offset 0x09. It means, the address of I/O tag is "12.80.9.2".

Output I/O tag addressing

In addition to reading data, the protocol supports also the writing of values into device memory. It is performed with the help of text output I/O tags. The format of I/O tag address is M[.R][#Vh[.Vd]]

- **M** - message number (0-255)
- **R** - optional application type (0-65535)
- **Vh** - optional message number of the reply to the sent message header (0-255). If a message with a message number other than *Vh* arrives in response, the writing will be considered unsuccessful. If *Vh* is not specified, each response is considered a positive confirmation.
- **Vd** - optional message number of the reply to the sent message data (0-255). If a message with a message number other than *Vd* arrives in response, the writing will be considered unsuccessful. If *Vd* is not specified, each response is considered a positive acknowledgment.

Addresses of I/O tags for Capacitive level meter type LM1.2134:

Table 2

Address	I/O tag type	Description
3.79.1.1	Ci	Basic data - level meter status. The documentation states the following possible values: • 0 - Correct level meter function • 1 - Short-circuit in the tubes or water in the tank • 2 - Compensation sensor defect. • 3 - Mechanical defect on the tubes. • 4 - Permittivity out of limits. (outside the 2-4 interval) • 5 - Operating temperature exceeded. (outside the -40°C…80°C interval) • 6 - Compensation sensor position not preset. • 7 - Analogue output error. • 8 - Error of communication with slave probe • 9 - Water presence. (between 3 and 60 seconds) • 10 - Water in the tank (over 60 seconds)
3.79.2.4	Ai	Basic data - the volume of fuel in the tank. Linear conversion required A = 0.001, B = 0, the result is volume in liters.
3.79.6.4	Ai	Basic data - relative permittivity. Linear conversion required A = 0.001, B = 0, the result is relative permittivity.
3.79.10.4	Ai	Basic data - fuel temperature in °C.
3.105.1.2	TxtI	Identification - text part of the serial number (two characters).
3.105.3.2	Ci	Identification - numeric part of the serial number (2-byte value 0-65535).
3.105.5.9	TxtI	Identification - 9-character product number (tested sample had "LM1.21345").
3.105.14.8	TxtI	Identification - 8-character firmware version (tested sample had "LM1-2.50").
4.68 4.68#228	TxtO	Calibration - clear the current calibration curve by entering an empty value "".
4.83 4.83#235.233	TxtO	Calibration - write a new calibration curve. In the value of the I/O tag it is necessary to enter individual bytes in decimal form, which are separated by a "#" character. A byte pair always represents one volume value as a 16-bit number (lower byte, higher byte). The first half of the values corresponds to the real volume of fuel in the tank, the second half of the values corresponds to the volume values measured during calibration. Example: writing value "100#0#200#0#44#1#144#1#244#1#88#2#188#2#32#3#132#3#232#3#113#0#216#0#62#1#144#1#254#1#70#2#204#2#17#3#126#3#249#3" means sending volumes of 100, 200, 300, 400, 500, 600, 700, 800, 900, 1000, 113, 216, 318, 400, 510, 582, 716, 785, 894, 1017. Of this, the first half of the values are the amounts of fuel refueled in the tank: 100, 200, 300, 400, 500, 600, 700, 800, 900, 1000 and the other half are the values measured by the level meter during calibration: 113, 216, 318, 400, 510, 582, 716, 785, 894, 1017 **Note:** the calibration is not in the official documentation of MESIT.

6 6#220	TxtO	Setting the time filter parameters. In the value of the I/O tag it is necessary to enter 2 bytes in decimal form, which are separated by a "#" character, in the form "Time#Type", e.g. "10#0", where: • Time - the size of the time filter window in seconds. The time filter works on the principle of a moving average. The allowed range is 1 - 120 seconds, a value of 1 means the filter is switched off. • Type - value 0 means that this is a normal filter. A value of 1 means that it is a working machine (e.g. an excavator) in which large level fluctuations can occur. In the case of a working machine, the filter hardening is switched on, which means counting the previous samples.
7 7#231	TxtO	Setting theft conditions. In the value of the I/O tag it is necessary to enter 6 bytes in decimal form, which are separated by the character "#", in the form "PeriodL#PeriodH#LossL#LossH#TimeL# TimeH", e.g. "60 # 0 # 1 # 0 # 10 # 0", where: • PeriodL, PeriodH - lower and higher byte of the fuel loss measurement period (in seconds). Allowed range is 10 - 64,799 seconds (i.e. 17:59:59) • LossL, LossH - lower and higher byte of the maximum allowed fuel loss (in liters), which is not yet theft. If the loss is higher, it is detected as theft. • TimeL, TimeH - lower and higher byte of the time of the state output closing time when theft is detected (in seconds). A value of 0 turns on the output permanently after the theft is detected. Allowed range is 0 - 64,799 seconds (i.e. 17:59:59)
9.70.1.1	Ci	Time filter - time filter period (in seconds). The setting is possible within setting the time filter parameters.
9.70.2.1	Di	Time filter - hardening of the time filter. A value of TRUE means that it is a working machine and that filter hardening is switched on. The setting is possible within setting the time filter parameters.
9.75.1.2	Ci	Theft condition - fuel loss measurement period (in seconds). The setting is possible within the setting of theft conditions.
9.75.3.2	Ci	Theft condition - the maximum allowable loss of fuel (in liters) for the period during which it is not yet theft. The setting is possible within the setting of theft conditions.
9.75.5.2	Ci	Theft condition - the time of the length of switching on the status output when theft is detected (in seconds). The setting is possible within the setting of theft conditions.
12.78.1.2	Ai	Accelerometer - the tilt of the X-axis. Linear conversion A=0.006, B=-180 is required, the result is an angle from the interval <-90° … 90°>.
12.78.3.2	Ai	Accelerometer - the tilt of the Y-axis. Linear conversion A=0.006, B=-180 is required, the result is an angle from the interval <-90° … 90°>.
12.78.5.2	Ai	Accelerometer - the tilt of the Z-axis. Linear conversion A=0.006, B=-180 is required, the result is an angle from the interval <-90° … 90°>.
12.78.7.2	Ai	Accelerometer - acceleration of the X-axis. Linear conversion A=0.002, B=-8 is required, the result is acceleration in g from the interval <-8 … 8>.
12.78.9.2	Ai	Accelerometer - acceleration of the Y-axis. Linear conversion A=0.002, B=-8 is required, the result is acceleration in g from the interval <-8 … 8>.
12.78.11.2	Ai	Accelerometer - acceleration of the Z-axis. Linear conversion A=0.002, B=-8 is required, the result is acceleration in g from the interval <-8 … 8>.
12.78.13.2	Ai	Accelerometer - X-axis calibration offset (deviation from the horizontal plane at the time of calibration). Linear conversion A=0.006, B=-180 is required, the result is an angle from the interval <-90°… 90°>.
12.78.15.2	Ai	Accelerometer - Y-axis calibration offset (deviation from the horizontal plane at the time of calibration). Linear conversion A=0.006, B=-180 is required, the result is an angle from the interval <-90°… 90°>.
12.78.17.2	Ai	Accelerometer - Z-axis calibration offset (deviation from the horizontal plane at the time of calibration). Linear conversion A=0.006, B=-180 is required, the result is an angle from the interval <-90°… 90°>.
12.80.1.2	Ai	Fuel quality - bioindex. Linear conversion A=0.03125, B=0 is required, the result is a bioindex in % of the interval <0 … 100>.
12.80.3.2	Ai	Fuel quality - viscosity. Linear conversion A=0.0003052, B=0 is required, the result is viscosity in mm^2/s from the interval <0 … 20.00>.
12.80.5.2	Ai	Fuel quality - density. Linear conversion A=0.0003052, B=0 is required, the result is density in kg/dm^3 from the interval <0 … 20.00>.

12.80.7.2	Ai	Fuel quality - relative permittivity. Linear conversion A=0.00012207031, B=0 is required, the result is relative permittivity from the interval <0 … 5.000>.
12.80.9.2	Ai	Fuel quality - temperature. Linear conversion A=0.0003052, B=0 is required, the result is a temperature in °C from the interval <-55.0 … +125.0>.
12.80.11.4	Ai	Fuel quality - volume at 15 ° C. Linear conversion A=0.001, B=0 is required, the result is the volume in liters adjusted to a temperature of 15 °C from the interval <0 … 10000.0>.

Literature

Changes and modifications

- May 2015: completion of I/O tag configuration

Revision of document

- Ver. 1.0 – December 3, 2014: implementation of a protocol
- Ver. 1.1 - May 26, 2015: completion of I/O tag configuration

Related pages:

Communication protocols