

## **Modbus communication for the DEGA NS II (LCD RE) NS III (LCD RE) gas transmitter**

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## Versions

| Version | Description   | Date     | Author     |
|---------|---------------|----------|------------|
| A       | First release | 7.8.2019 | T. Kupilik |
|         |               |          |            |
|         |               |          |            |

## Setting the gas transmitter into the ModBus RTU mode

The gas transmitter DEGA is set into the Modbus RTU mode by shortening jumper labeled "Modbus" on the PCB. The custom address for addressing the Modbus device on the RS485 bus is identical to the address set for the communication protocol Dega.

## Modbus RTU specification

|                         |                                                       |
|-------------------------|-------------------------------------------------------|
| Device type             | Slave                                                 |
| Baud rate               | 9600                                                  |
| Data bits               | 8                                                     |
| Stop bits               | 1                                                     |
| Parity                  | none                                                  |
| Device address          | Defined by DIP switch (1 .. 31) or by DegaConfig tool |
| Protocol                | RTU                                                   |
| Supported function code | 4 – read input register                               |
| Broadcast               | No                                                    |

## Register Map

| Address | Register | Data type | Name               | Access | Note                                     |
|---------|----------|-----------|--------------------|--------|------------------------------------------|
| 0000    | 40001    | WORD      | Status             | R      | Device status word                       |
| 0001    | 40002    | INT32     | Concentration      | R      | *1000 [channel units] (LEL, %, ppm, ...) |
| 0003    | 40004    | INT16     | Device temperature | R      | *10 [C]                                  |
| 0004    | 40005    | INT16     | Sensor temperature | R      | *10 [C]                                  |
| 0005    | 40006    | UINT16    | Supply current     | R      | Power supply current monitor [mA]        |
| 0006    | 40007    | UINT16    | Current output     | R      | Analog output value [uA]                 |

## Register 40001

Hi byte:

Status bitflags

| Bit7      | Bit6                | Bit5 | Bit4 | Bit3   | Bit2   | Bit1   | Bit0   |
|-----------|---------------------|------|------|--------|--------|--------|--------|
| ADC range | Calibration expired | PEL2 | PEL1 | Alarm4 | Alarm3 | Alarm2 | Alarm1 |

Low byte:

Error code

| Error code | Description      |
|------------|------------------|
| 0          | No error pending |

|     |                                                       |
|-----|-------------------------------------------------------|
| 1   | No sensor                                             |
| 2   | Unknown sensor type                                   |
| 3   | Invalid EL sensor type (LMP91000 configuration error) |
| 4   | Sensor EEPROM CRC error                               |
| 5   | LMP91000 does not respond (I2C error)                 |
| 6   | Fitted sensor id does not match configuration         |
| 7   | Semiconductor gas sensor diag fails                   |
| 8   | EL sensor diag fails                                  |
| 9   | Sensor is warming up                                  |
| 12  | Configuration EEPROM                                  |
| 13  | Program memory CRC error                              |
| 14  | Data memory CRC error                                 |
| 15  | IR sensor diag fails                                  |
| 129 | ADC watchdog - value too low (disconnected sensor)    |
| 130 | ADC watchdog - value too high (disconnected sensor)   |

## Register 40002 + 40003

Channel value. Register 40002 contains higher word, register 40003 contains lower word. Units depend on which sensor is fitted – check user manual or DegaConfig tool.

For example, value of 20000 for CH<sub>4</sub> detector (0-100 % LEL) means concentration of 20% LEL of CH<sub>4</sub>. For O<sub>2</sub> sensor, same value represents 20% oxygen concentration in the environment.

## Register 40004

Internal device temperature. Value 321 represents temperature 32.1 deg C.

## Register 40005

Sensor temperature. Value 321 represents temperature 32.1 deg C.

## Register 40006

Actual current consumption.

## Register 40007

Actual value of analog output. Value 15000 means that analog output is set to 15.0 mA.