INSTRUCTION MANUAL

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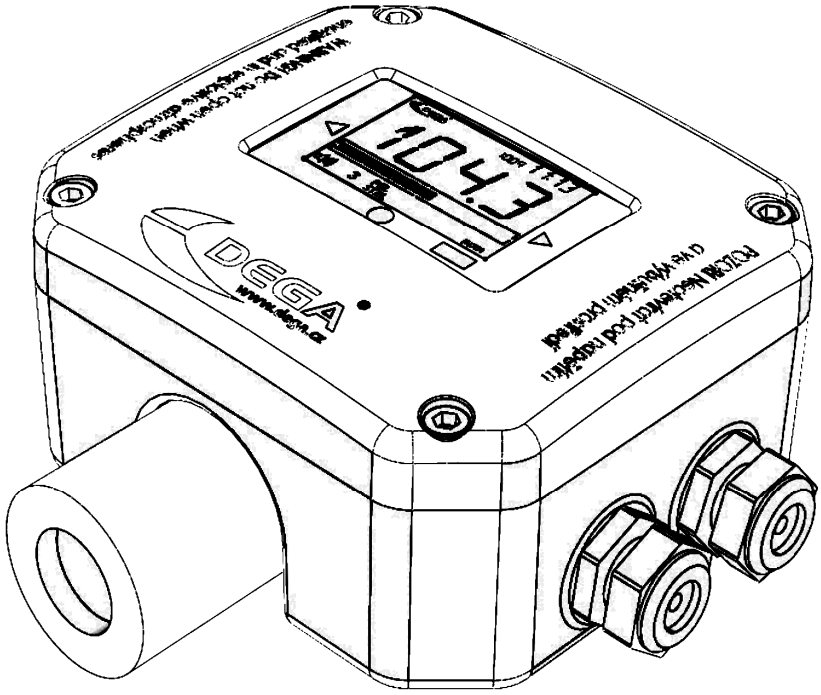
Gas Detector

DEGA NSx-yL III LCD



DEGA CZ s.r.o. reserves the right to alter the specifications of the hardware and software described in this manual at any time and without prior notice

DEGA CZ s.r.o. bears no liable for any damage resulting from use of this device

Content

For your safety

Beware of static electricity

Electronic components are sensitive to static electricity. Do not touch them directly - they may get damanged.

The device is intended to be installed by a trained person

The product is designed for installation only by a certified technician. The manufacturer is not liable for damages resulting from incorrect or improper handling.

In case of malfunction, immediately unplug from the power supply

If you notice an unusual smell or smoke emitting from the product, unplug it from the power supply, battery backup and all other attachments. Continued operation could result in injury or property damage. After disconnecting, have the device inspected at an authorized dealer or manufacturer.

Do not open the detector and do not replace the sensors in the detector in a potentially explosive atmosphere

Opening the cover and replacing the sensor in the detector in a potentially explosive atmoshpere can cause an explosion. If service is necessary, first unplug the device from the power supply. After that the device may be disassembled and the sensors may be replaced (certified partner or manufacturer).

Do not disassemble the product and ensure against it's contact with water

Contact with internal components of the product may cause an electric shock. In case of any malfuction entrust the servicing of the product exclusively to a certified service centre. Contact with water can create a short circuit in the product and consequent damange to property or personal injury.

Use appropriate cable types

To ensure compliance with the parameters of the product, only use cable types recommended in this guide.

Dispose of used products and trasmitter sensors with respect to the environment

Detector sensors contain hazardous substances. Dispose of them in accordance with the current legislation on environmental protection.

Use the detector only with the appropriate certified DEGA products

The device is certified as functionally and technically qualified only with original "DEGA" accessories. In case of using the device with any other products the manufacturer is not liable for any damages that may occur.

Undertake regular functional checks and calibrations of the detector

Perform regular "CALIBRATION" (setting the detection limits, checking the responsivness of the sensor, checking the functionality of the detector) and "OPERATIONAL AND FUNCTIONAL CHECKS" of the entire detenction system (sensor excitation with subsequent control of optical and audible alarms, triggering fans, shutdown technology, etc.). Perform calibration and operational and functional checks only at certified service centers with a valid certificate of competence or the manufacturer.

Warning: The detector automatically checks it's calibration period - the period of validity of it's calibration. After 12 months since the last calibration (Max. calibration period) the detector will transmit this fact to the host system. The detector must be calibrated immediately at a certified service center with a valid certificate of competance or the manufacturer. See section "Monitoring the calibration peridos".

Technical data and information

Supply voltage:	24 V nominal, operational range 8-30 V
Cable connections via 4-20 mA:	shielded cable 3 x 1 mm (max. 1200 m) shielded cable 3 x 1,5 mm (max. 2400 m)
Cable connections via RS485:	shielded cable 4 x 0,8 mm (max. 400 m) - see section " instalation of cabeling for RS485"
Output:	4 - 20 mA RS485 - protocol DEGA, or MODBUS Piezo buzzer
Standarts:	EN60079-0:2012, IEC60079-0:2011 EN60079-1:2014, IEC60079-1:2014
Marking according to ATEX:	Ex II 2 G Ex db IIB+H2 T6 Gb Tamb:-40°C-+60°C
Marking according to IECEx:	Ex db IIB+H2 T6 Gb Tamb:-40°C-+60°C

II – eqiupment group - non-mining environment **2 G** - eqiupment category - explosive atmospheres - zone 1
Ex d - type of protection - flameproof enclosure „d" **IIB+H2** - gas group
T6 – temperature class **Gb** - eqiupment protection level EPL **Tamb** – ambient temperature

Dimensions without cable glands:	150 x 170 x 65 mm (WxHxD)
Weight:	2,1 kg
Capacity of the internal memory of history:	44 days at 60s recording interval
Interval record storage memory:	60 s (adjustable range 1-255 s)
Dead band:	max 5 % of range

Consumption/input at 24V (output RS485)	
DEGA NSx-EL III LCD	90 mA/2,2 W
DEGA NSx-CL III LCD	135 mA/3,3 W
DEGA NSx-IL III LCD	115 mA/2,8 W
DEGA NSx-SL III LCD	135 mA/3,3 W
DEGA NSx-PL III PID LCD	154 mA/3,4 W
Consumption/input at 24V (output 4-20mA)	
DEGA NSx-EL III LCD	110 mA/2,7 W
DEGA NSx-CL III LCD	155 mA/3,7 W
DEGA NSx-IL III LCD	135 mA/3,3 W
DEGA NSx-SL III LCD	155 mA/3,7 W
DEGA NSx-PL III LCD	154 mA/3,4 W
Response time (T90)	
DEGA NSx-EL III LCD	max. 180 s - based on sensor type
DEGA NSx-CL III LCD	max. 15 s
DEGA NSx-IL III LCD	max. 15 s
DEGA NSx-SL III LCD	max. 30 s
DEGA NSx-PL III LCD	max. 15 s

Warm-Up time	
DEGA NSx-EL III LCD	max. 180 s
DEGA NSx-CL III LCD	max. 30 s
DEGA NSx-IL III LCD	max. 15 s
DEGA NSx-SL III LCD	max. 180 s
DEGA NSx-PL III PID LCD	max. 30 s
Time to stabilize (>5day without power)	
DEGA NSx-EL III LCD	1-72 h
DEGA NSx-CL III LC	max. 1 h
DEGA NSx-IL III LCD	max. 30 min
DEGA NSx-SL III LCD	max. 5 h
DEGA NSx-PL III LCD	max. 30 min
Sensor lifetime in a clean environment	
DEGA NSx-EL III LCD	2 years
DEGA NSx-CL III LCD	2 years
DEGA NSx-IL III LCD	5 years
DEGA NSx-SL III LCD	2 years
DEGA NSx-PL III LCD	5 000 h

Operational conditions

Ambient temperature:	-40 °C to +60 °C
Relative humidity:	0-95 % RH
Air pressure:	80-120 kPa
Flow of ambient air:	max. 2 m/s - flow directly to the sensor in not allowed
Protection level with a cover:	IP 54, with a DEGA WATER CAP IP 66 cover
Location:	BE3N2 - explosive atmoshpheres - zone 1 (2 G)

Terminology

The marking system for detector DEGA NSx-yL III LCD:

Gas detector DEGA NSx-yL III LCD

- Series of detectors in potentially explosive atmospheres
- Type of detected gas
- Sensor type with linear output
- Third generation product with new DEGA design
- Versions with an LCD display

DEGA NSx-EL III LCD with an electrochemical sensor

They operate on the principle of change of electrical parameters on the electrodes stored in electrolyte, due to oxidation/reduction reactions of the detected gas on it's surface. These sensors have good selectivity and the ability to detect very low concentrations of toxic gases.

DEGA NSx-CL III LCD with a catalytic sensor (Pelistor)

They operate on the principle of catalytic combustion - gas concentration is measured based on the amount of heat released in a controlled combustion reaction. The reaction is supported by a suitable temperature and the pressence of a catalyst. These sensors can be used to detect a broad range of flammable gases. The sensors are characterized by fast response,a long lifetime and high stability. A minimum of 10 % of Oxygen in the air is required for it's proper function.

DEGA NSx-IL III LCD with an infrared sensor (NDIR)

Top quality scanning method. They operate on the principle of infrared spectroscopy. The sensors have excellent selecivity in organic matter, do not require any oxygen in the atmoshpere and are resistant to catalyst poisons (sulfur and silicon

compounds) which cause a change of sensitivity of catalytic sensors. The sensors are characterized by high stability and a long lifetime.

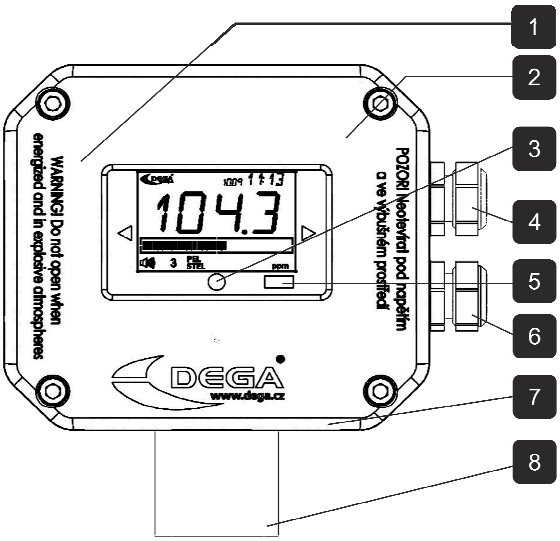
DEGA NSx-SL III LCD with a semiconductor sensor

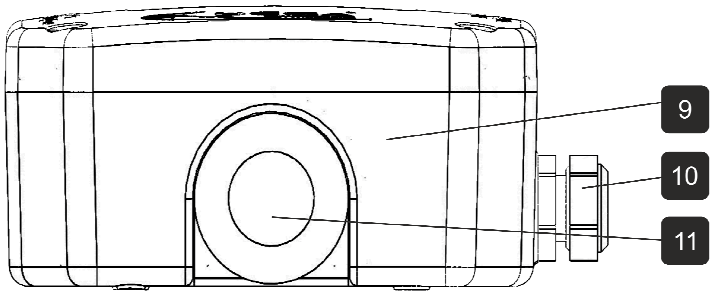
They operate on the principle of changes in electrical conductivity of semiconductors by changing the concentration of the detected gas. Their advatage is a long lifetime in a clean environment and a wide range of different types of gases and vapors. Their disadvatage is their low selectivity - the sensor largly responds to other gases for which it is not calibrated.

DEGA NSx-PL III LCD PID with a PID – photoionization sensor

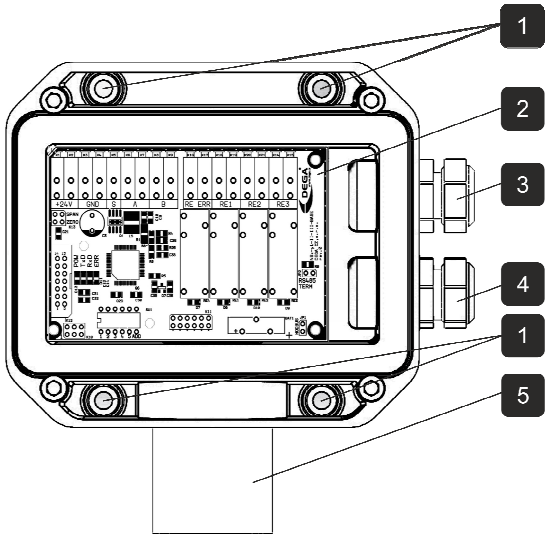
Typical photoionization detectors measure volatile organic compounds and other gases in concentrations from sub parts per billion to 10 000 parts per million (ppm). The photoionization detector is an efficient and inexpensive detector for many gas and vapor analytes. PIDs produce instantaneous readings, operate continuously, and are commonly used as detectors for gas chromatography or as hand-held portable instruments. Hand-held, battery-operated versions are widely used in military, industrial, and confined working facilities for health and safety. Their primary use is for monitoring possible worker exposure to volatile organic compounds (VOCs) such as solvents, fuels, degreasers, plastics & their precursors, heat transfer fluids, lubricants, etc. during manufacturing processes and waste handling.

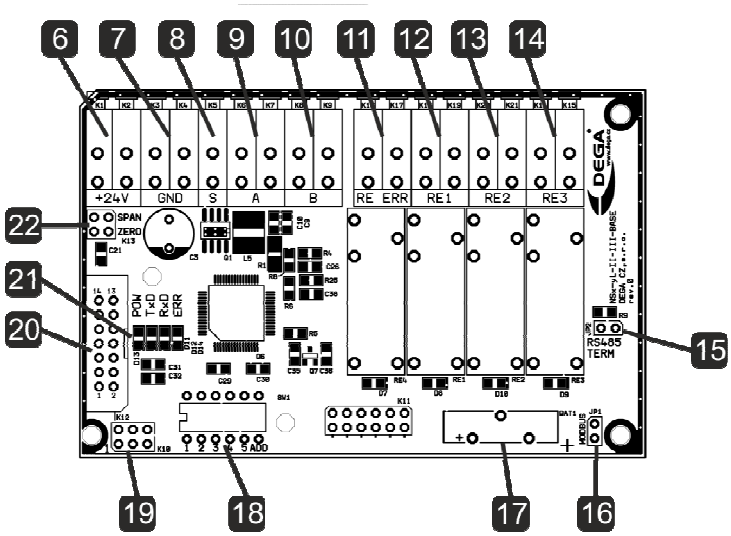
Product description





1	Magnetic control „BACK“	2	Magnetic control „FRONT“	3	Ex „d“ cable gland	4	Magnetic control „ENTER/EXIT“
5	IrDa interface	6	OptionalEx „d“ cable gland	7	Body of the removable sensor	8	Cover against splashing water (optional accessories)
9	Body of the removable sensor	10	Ex „d“ cable gland	11	Cover against splashing water (optional accessories)		





1	Mounting holes	2	PCB electronics	3	Ex „d“ cable gland	4	Optional Ex „d“ cable gland
5	Body of the removable sensor	6	Power supply terminal block+24V DC	7	Power supply terminal block GND	8	Signal terminal block 4-20 mA

9	Terminal resstor RS485 A	10	Terminal resistor RS485 B	11	Expanding contact relay ERROR	12	Expanding contact relay 1
13	Expanding contact relay 2	14	Expanding contact relay 3	15	Jumper connector of the terminal resistor RS485	16	Jumper connector of the communication protocol (DEGA/MODBUS)
17	Battery CR2032	18	DIP switch for the RS485 adress	19	Programming connector	20	LCD display connector
21	Status LED	22	Calibration jumpers				

Instalation, assembly and disassembly of the detector

Before assembling, read the valid instalation standarts EN 60079-29-2 (Selection, instalation, use and maintenance of detectors for combustible gases and oxygen) and EN 45544-4 (Guildelines for the selection, installation, use and maintenance of detectors of toxic substances).
In explosive environments the electrical installation must be performed according to DIN EN 60079.14 (Electrical instalation in hazardours areas)
Secure that the sensor is reachable by air. The detector must be in a free area with no obstacles in its way (furniture etc.)
Ensure that the input of the sensor cannot be polluted by layers of dust or other contamination.

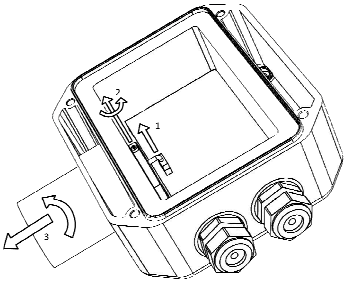
1. Assembly of the detector

The detector consists of four parts - the body of the detector, the removable sensor and Ex „d“ cable glands.

Detector assembly procedure is as follows:

a) Disassemble the detector using four screws with an internal hexagon of 5 mm.
b) Disconnect the LCD from the motherboard.
c) Mount the detector on a flat surface using four 6 mm dowels to a height above the floor according to the specification of the detected substance with the gas inlet facing downwards.
d) Pass the cable through the gland.
e) Connect the cabling to the detector terminal board according to the chapters "connection of the detector to control panels". It is only permitted to use an Ex "d" gland with an M20x1.5 thread.
f) Interconnect using M4 grounding screws. A CUPAL washer must be used.
g) Connect the LCD.
h) Assemble the detector using four screws with an internal hexagon of 5 mm.

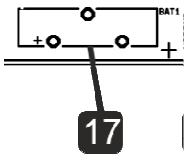
2. Replacement of the sensor module



This activity must not be performed when the detector is energized.

In case of need to replace the sensor module with a new piece, unscrew and remove the cover. Disconnect the sensor module cable from the PCB (1), loosen the sink screw (2) and unscrew the steel cylinder with the sensor (3). Screw the new sensor module, retain it with the sink screw and connect the cable to the PCB. Finally, mount the cover and connect to the power supply.

3. Replacement of the battery

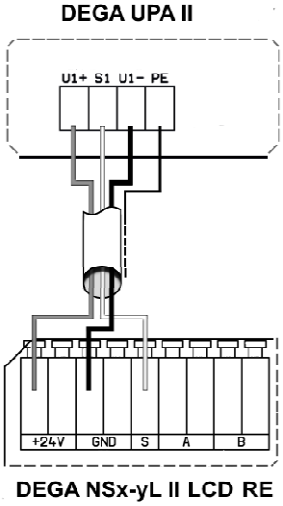


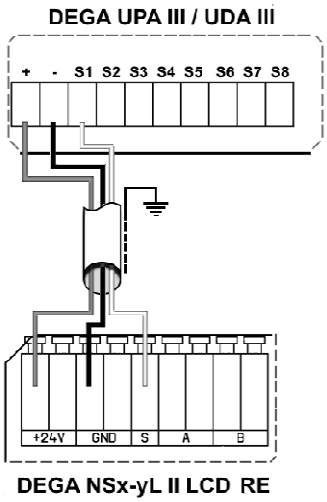
The battery lifetime in the sensor is approximately 5 years. After this time some functions of the detector may not work properly. Remove the battery from the holder and replace it with one of the recommended types. Replacing the battery in the transmitter, which is not connected to the power, will erase the internal clock.

Panasonic BR2032

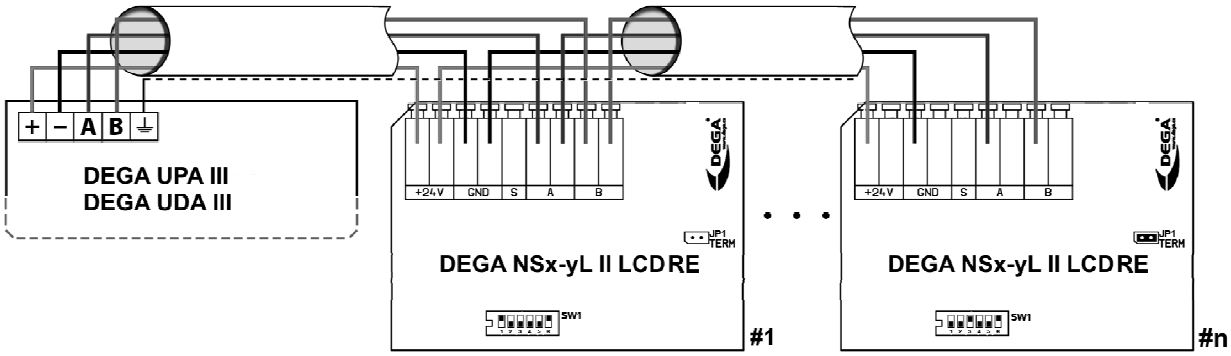
4. Connecting the detector via current loop to the controler DEGA UPA II/DEGA UPA III

Connect one detector to each channel of the controler as shown in the picture below





5. Connecting the sensor via RS485 to the controller DEGA UKAIII/DEGA UPA III/DEGA UDA III



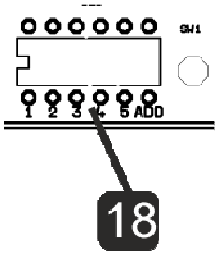
6. Installation of wiring for RS485

Wiring must be installed using bus topology and in compliance with the RS485 policy.

The maximum number of connected transmitters per controller channel is 16 (may be less depending on the configuration of the controller), while the total length of the controller (electrical distance between the controller and the last transmitter) should not exceed 400 meters.

Selecting the appropriate type of cable depends on the fire report and the protocol for determining external influences.

7. Setting the RS485 adress of the detector



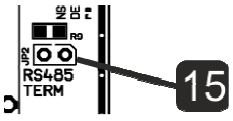
Each detector must have a unique adress within the entire bus, otherwise there will be communication collisions and malfunctions.

The detector adress can either be set internally using the DegaConfig program or using the DIP switch on the PCB.

If the position 6 (labeled ADD) is in the ON position, then the adress according to the setting of pins 1-5 is considered. Otherwise the adress set in DegaConfig is considered.

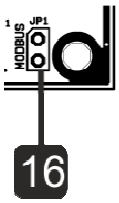
The adress can be set from range 1-31 using binary values. A table with DIP settings for individual adresses is listed in the attachment "Chart for setting the detector adress"

8. Terminating resistor



According to the RS485 specifications, the last device on the bus must be ending with a terminating resistor 120R. Plug a jumper on the JP2 connector of the last device on the bus to include the 120R terminating resistor. <u>In the default configuaration, the jumper connector is not plugged.</u>

9. Communication protocol switch DEGA/MODBUS



Plugging a jumper in the JP1 connector will swtich from the DEGA communication protocol to the MODBUS communication protocol.

Detector functions

The detector's motherboard is equipped by status LEDs, which help in detecting problems during the installation.

LED „POW“ shines at correct power
LED „TxD“ flashes when transmitting a packet via RS485
LED „RxD“ flashes when a packet is correctly recieved via RS485
LED „ERR“ shines/flashes in case of malfunction or substandart situations

1. Turning on the detector

After turning on the power the LED "POW" starts shining and the LED "ERR" starts flashing, indicating a forming sequence of the sensor and automatic testing procedures, which can take up to 180 s depending on the sensor used. The output of the current loop is 1 mA. During this sequence, testing of internal electronics and stabilization of the sensor in order to eliminate false alarms after turning on, is taking place. At this time, the display only shows the time to the beginning of the measurement loop.
After completion of the formation, a 4 mA current begins to flow on the output of the current loop and the detector starts working according to it's settings.

2. Gas detection

The detector continuously measures the detected gas concentration in the atmoshpere and converts it's current value into a 4-20 mA signal or transmits it's value to the evaluation unit via DEGA/MOBUS protocol.

3. Malfunction

In case of malfunction the LCD displays the measured concentration, an error code and a key symbol . On the PCB this condition is indicated by the yellow „ERR“ LED. The meaning of each error code is included in the attachment "Table of error codes"

4. Monitoring the calibration periods

The detector continuously checks the calibration validity of the connected sensor.

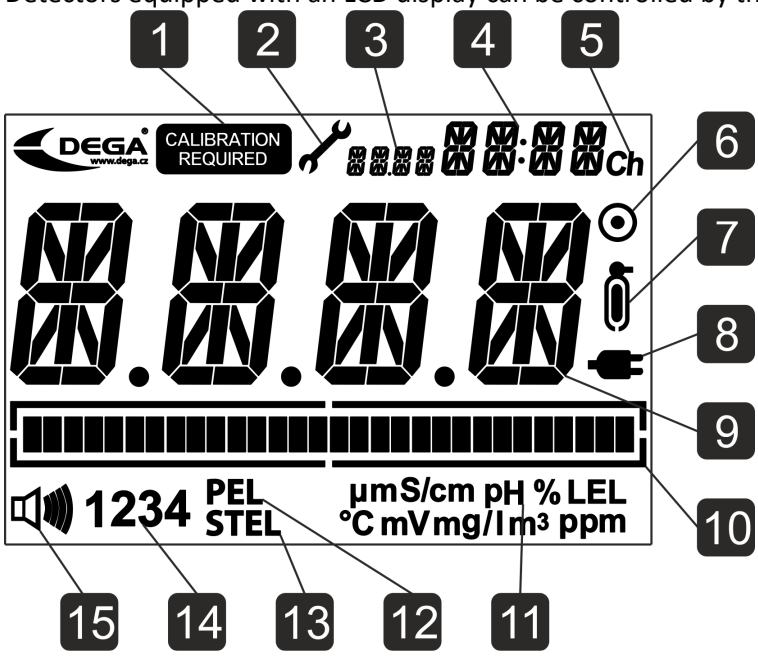
After 12 months since the last calibration (Max. calibration interval) the LED "ERR" starts flashing and an inscription CALIBRATION REQUIRED starts flashing on the LCD display. The connected sensor must be calibrated immediately. The detector will transmit the information about the ending calibration via current loop. The transmission will be the following:
10 s transmitting a 4-20 mA signal informing about the actual gas concentration following a 1 second interval of 2 mA current.

5. Reading the record of measured concentrations and alarms

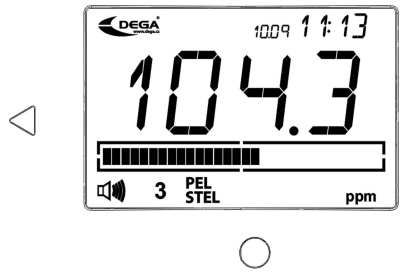
The detector periodically after 60 s stores the current detected concentration into it's internal memory. The internal memory retains data from the last 64260 measurements (cca 44 days). In order to read this information, the program DegaConfig is required. Refer to the DegaConfig program instruction.

Detector controls

Detectors equipped with an LCD display can be controlled by the magnetic contact located on the sides of the display



1	Warning: calibration required	2	Warning: Service is required
3	Data display	4	Time display
5	Channel number (adress)	6	Activated magnetic control
7	Calibration icon	8	Communication with the control panel in progress
9	Measured value	10	Bar graph of the measured value
11	Measured value units	12	Alarm PEL (exceeding long-term exposure limit)
13	Alarm STEL (exceeding short-term exposure limit)	14	Reached alarm level, alarm levels
15	Alarm indication		



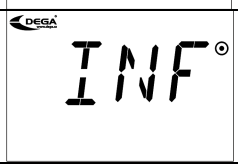
- „BACK“ move backwards in the menu, reducing the value
- „FRONT“move forwards in the menu, increasing the value
- „ENTER“ confirm/enter the menu

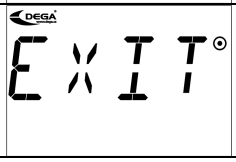
Placing a magnet into the indent „ ◯ “ for 5 s, activates the magnetic control, which is displayed by the icon „ ⊙ “ on the LCD.

Reaching level 4 alarm with catalytic and semiconductor sensors causes a ratchet phenomenon, where even after recovery from gas leak, the sensor is still in level 4 alarm and needs to be manually reset by pressing „ ◯ “.

Main menu structure:

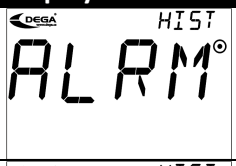
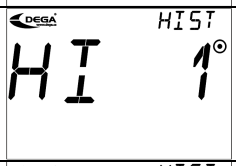
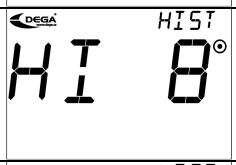
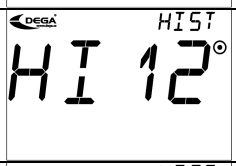
Enter the menu by holding the magnet for 5 s
|
History->-Information->-Settings->- Test->- Exit
|----------<----------|

Menu	Display	Description
History		Browsing the alarm history
Information		Information about detector settings

Settings		Detector configuration
Test		Testing the detector funcions
Exit		Return to normal operation

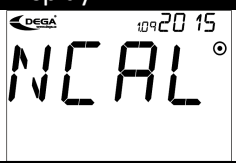
1. History menu „HIST“

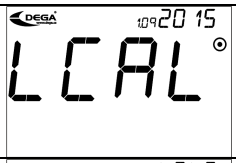
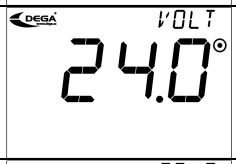
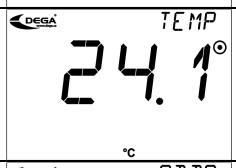
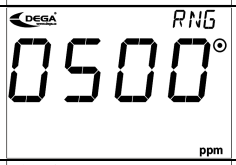
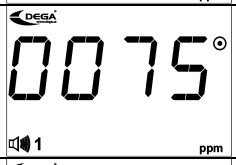
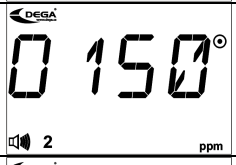
Browsing the history

Menu	Display	Description
History of all alarms		Use „◁▷“ to go trough individual alarms. Displays the date and time of the alarm. Return to the history menu „◯“
Highest concentration in the past hour		Displays the highest measured concentration and alarm for the past hour. Return to History menu „◯“
Highest concentration in the past 8 hours		Displays the highest measured concentration and alarm for the past 8 hours. Return to History menu „◯“
Highest concentration in the past 12 hours		Displays the highest measured concentration and alarm for the past 12 hours. Return to History menu „◯“
Highest concentration in the past 24 hours		Displays the highest measured concentration and alarm for the past 24 hours. Return to History menu „◯“
Highest concentration stored in the memory		Displays the highest measured concentration and alarm, that is stored in the memory. Return to History menu „◯“
Exit		Return to the main menu

2. Information menu „INF“

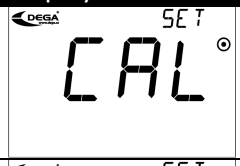
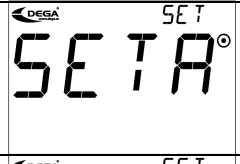
Information about settings. Sequentially displays the following information. Access previous information by pressing „◯“

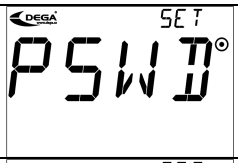
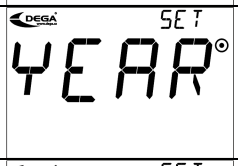
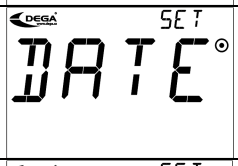
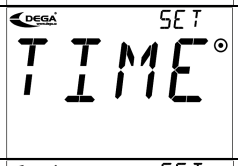
Menu	Display	Description
Date of next calibration		Displays the date of the next calibration

Date of last calibration		Displays the date of the last calibration
Power voltage		Displays the power voltage
Temperature		Displays the chip temperature (about 15°C higher than the ambient temperature)
RS485 device adress		Displays the device adress
Range up to		Measured concentration value corresponding to 20 mA current
Alarm level 1		Displays alarm level 1
Alarm level 2		Displays alarm level 2
Alarm level 3		Displays alarm level 3
Alarm level 4		Displays alarm level 4

3. Settings menu „SET“

Protected by password 0004. By enetering a wrong password, the detector returns to measurement mode. The password can be changed in the menu SET -> PSWD.

Menu	Display	Description
Calibration		Sensor calibration
Setting the alarms		Setting the alarms
Setting the range of the 20 mA current loop		Setting the range of the 20 mA current loop

Changing the password		Changing the password
Setting the year		Setting the year
Setting the date		Setting the date
Setting the time		Setting the time
Exit		

Calibration

a) Connect fresh air to the sensor input. The icon „0“ flashes. After the value stabilizes, move onto the next step using „◯“

b) Using „◁▷“ select the concentration of the calibration gas, confirm **„◯“**

c) Connect the calibration gas to the sensor input. The icon **„0“** flashes**. Wait until the value stabilizes and confirm „◯“**

d) Using „◁▷“ swtch between „YES“ - save calibration, or „NO“ - return to the Settings menu. Confirm the selected option „◯“

e) In case of saving a new calibration, the detector will restart.

Setting the alarms

a) Using „◁▷“ select the concentration for alarm 1. Confirm „◯“

b) Using „◁▷“ select the concentration for alarm 2. Confirm „◯“

c) Using „◁▷“ select the concentration for alarm 3. Confirm „◯“

d) Using „◁▷“ select the concentration for alarm 4 Confirm „◯“

e) Using „◁▷“ switch between „YES“ - save settings, or „NO“ - return to the Settings menu. Confirm the selected option „◯“

Setting the range of the 20 mA current loop

a) Using „◁▷“ select the concentration appropriate to 20 mA range. Confirm „◯“

b) Using „◁▷“ switch between „YES“ - save settings, nebo „NO“ - return to the Settings menu. Confirm the selected option „◯“

Changing the password

a) Using „◁▷“ select a number in thousands. Save the selected number „◯“

b) Using „◁▷“ select a number in hundreds. Save the selected number „◯“

c) Using „◁▷“ select a number in tens. Save the selected number „◯“

d) Using „◁▷“ select a number in units. Save the selected number „◯“

e) Using „◁ ▷“ switch between „YES“ - save settings, nebo „NO“ - return to the Settings menu. Confirm the selected option „◯“

Setting the year

a) Using „◁ ▷“ select a number in thousands. Save the selected number „◯“
b) Using „◁ ▷“ select a number in hundreds. Save the selected number „◯“
c) Using „◁ ▷“ select a number in tens. Save the selected number „◯“
d) Using „◁ ▷“ select a number in units. Save the selected number „◯“
e) Using „◁ ▷“ switch between „YES“ - save settings, nebo „NO“ - return to the Settings menu. Confirm the selected option „◯“

Setting the date

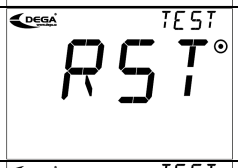
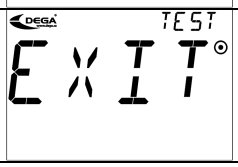
a) Using „◁ ▷“ select a number in thousands. Save the selected number „◯“
b) Using „◁ ▷“ select a number in hundreds. Save the selected number „◯“
c) Using „◁ ▷“ select a number in tens. Save the selected number „◯“
d) Using „◁ ▷“ select a number in units. Save the selected number „◯“
e) Using „◁ ▷“ switch between „YES“ - save settings, nebo „NO“ - return to the Settings menu. Confirm the selected option „◯“

Setting the time

a) Using „◁ ▷“ select a number in thousands. Save the selected number „◯“
b) Using „◁ ▷“ select a number in hundreds. Save the selected number „◯“
c) Using „◁ ▷“ select a number in tens. Save the selected number „◯“
d) Using „◁ ▷“ select a number in units. Save the selected number „◯“
e) Using „◁ ▷“ switch between „YES“ - save settings, nebo „NO“ - return to the Settings menu. Confirm the selected option „◯“

4. Test menu „TEST“

Protected by password 0004. By enetering a wrong password, the detector returns to measurement mode.
The password can be changed in the menu SET -> PSWD.

Menu		
4-20 mA current loop test		Using „◁ ▷“ set the output current in a 4-22 mA range. Return to Test menu „◯“
Digital communication test		Using „◁ ▷“ set the concentration broadcasted via RS485 in measuring range of the sensor.. Return to Test menu „◯“
Detector restart		Using „◁ ▷“ switch between „YES“ - for restart, or „NO“ for returning to Test menu. Confirm „◯“.
Return to main menu		Return to main menu

Operation, maintenance, inspection and service of the detector

1. Usage limits

To maintain proper operation of the detector it is neccesery to respect the fact, that step changes of humidity, condensation or rapid changes of pressure can cause incorrect indication of the measured value. Each sensing technology is suited for different methods of application, which is described below. All sensors are characterized by a smaller or larger cross-sensitivity to other gases than those which are set. Therefore before processing project documentation we recommend to have the air in the deployment area of the detection system analyzed.

a) **catalytic sensors:** Trace amount of vapors of silicon compounds and sulfur compounds cause a permanent loss of sensitivity, which requires recalibration or replacement of the sensor. Longterm crossing of the measuring range causes a decrease in sensitivity. In case of an atmoshpere having an oxygen content of less than 17 %, there will be an underestimaton of the measured value. In case of an atmoshpere having an oxygen content of more than 25 %, there will be an overestimation of the measured value.

b) **electrochemical sensors:** Constant exposure to toxic gases or short-term exposure to gases, which greatly exceed the maximum range of the sensor, can damage the electrochemical sensor, which requires recalibration or replacement. High temperature along with low relative humidity have a negative effect on the sensor's lifetime. In case of an atmoshpere having an oxygen content of less than 1 % for longer than 1 hour, there will be an underestimation of the measured value.

c) **infrared sensors:** Vapor acids and alkalis can etch the optical system and distort the measurements. A check or a calibration may be neccesery.

d) **semiconductor sensors:** Short-term exposure to gases or vapors of organic solvents, which greatly exceed the maximum range of the sensor, may damage the sensor and a recalibration or replacement may be required. In case of an atmoshpere having na oxygen content of less than 18 %, there will be an underestimation of the measured value.

e) **photoionization sensors:** the UV lamp or sensor must be replaced regularly, its clogging may cause loss of signal.

2. Operation

To maintain proper operation of the detector it is neccesery to respect the fact, that the presence of certain concentrations of gases or vapors, other than those for which the sensor is set, can cause an alarm, even if the concentration of the gas does not exceed the set level. Given the range of disturbing gases or vapors (diluents, exhaust gases, vapors of organic substances, disinfectants, etc.) a generally allowable concentration of interfering gases can not be determined. Data on cross-sensitivity to certail gases are included at the apporpriate sensors. Therefore before processing project documentation we recommend to have the air in the deployment area of the detection system analyzed.

3. Operation/Maintenance

In case of contamination the surface can be cleaned with a slightly moistened cloth.
The seonsors have a different lifetime depending on the sensing technology used, and environmental conditions.
Characteristics of the sensors vary over time. Therefore it is required to perform regular checks and calibrations, which can be done in two ways:

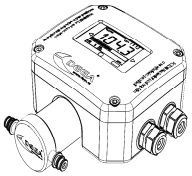
a) **1 x every six months** carry out a „**calibration“ and functional control -** adjust the sesitivity of the sensor using calibration gas and check the functionality of the system. The exact interval depends on the purity of the environment, required accuracy and the occurrance of disturbing gases in the atmoshpere.
b) **1 x every twelve months** carry out a „**calibration“ -** adjust the sesitivity of the sensor using calibration gas and check the functionality of the system. The exact interval depends on the purity of the environment, required accuracy and the occurrance of disturbing gases in the atmoshpere. Also carry out a **„functional control" 1 x every three months -** checking the function of the entire detection system using a test gas, which does not exceed the range of the sensor. We recommend using gas intended for laboratory use.

For the „functional control“ do not use means for testing fire alarm detectors!

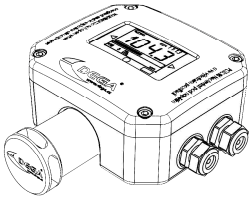
Perform calibration only at certified service centers with a valid certificate of competence or the manufacturer.
For the Czech Republic only DEGA CZ s.r.o.

Accessories and basic types of detectors

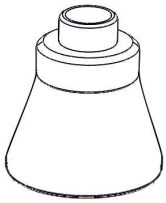
1. *Calibration adapter/connection to the gas pump DEGA GAS INLET*

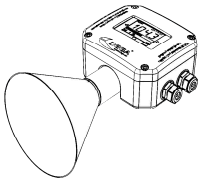


2. *Cover against splashing water DEGA WATER CAP*

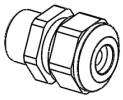


3. *Funnel for gas collection DEGA COLLECT CAP*





4. *Additional Ex „d“ cable gland*



M20x1,5

Basic type of detectors

1. *Detectors with a catalytic sensor NSx-CL III LCD*

Product code	Detector type	Detected gas	Measurement range	Measurement of current loop (4-20 mA)	Resolution	Calibration gas
40100158	DEGA NSM-CL 100 III LCD RE	Methane (CH_4) Natural gas CNG	0–100 % LEL	0-20 % LEL	0,1 % LEL	Methane 0,88 %
40100159	DEGA NSP-CL 100 III LCD RE	Butane (C_4H_{10}) Propan-Butane LPG	0–100 % LEL	0-20 % LEL	0,1 % LEL	Butane 0,32 %
40100160	DEGA NSH-CL 100 III LCD RE	Hydrogen (H_2)	0–100 % LEL	0-20 % LEL	0,1 % LEL	Hydrogen 0,8 %
40100157	DEGA NSB-CL 100 III LCD RE	Gasoline vapors	0–100 % LEL	0-20 % LEL	0,1 % LEL	Hexane 0,18 %
40100158	DEGA NSHC-CL 100 III LCD RE	Other flammable and combustible gases and vapors according to the selectivity of the sensor	0–100 % LEL	0-20 % LEL	0,1 % LEL	According to the selectivity of the sensor

2. *Detectors with an electrochemical sensor NSx-EL III LCD*

Product code	Detector type	Detected gas	Measurement range	Measurement of current loop (4-20mA)	Resolution	Calibration gas
40100111	DEGA NSCO-EL 1000 III LCD	Carbon Monoxide (CO)	0–1000 ppm	0-130 ppm	1 ppm	Carbon Monoxide 450 ppm
40100108	DEGA NSCO-EL 200 III LCD	Carbon Monoxide (CO)	0–200 ppm	0-200 ppm	0,1 ppm	Carbon Monoxide 130 ppm

40100109	DEGA NSCO-EL A500 III LCD	Carbon Monoxide (CO)	0- A500 ppm	0-500 ppm	1 ppm	Carbon Monoxide 130 ppm
40100110	DEGA NSCO-EL 2000 III LCD	Carbon Monoxide (CO)	0–2000 ppm	0-2000 ppm	1 ppm	Carbon Monoxide 130 ppm
40100112	DEGA NSA-EL 100 III LCD	Ammonia (NH_3)	0-100 ppm	0-50 ppm	0,1 ppm	Ammonia 100 ppm
40100128	DEGA NSA-EL 1000 III LCD	Ammonia (NH_3)	0-1000 ppm	0-300 ppm	1 ppm	Ammonia 100 ppm
40100130	DEGA NSA-EL 10000 III LCD	Ammonia (NH_3)	0-10000 ppm	0-10000 ppm	1 ppm	Ammonia 100 ppm
40100133	DEGA NSA-EL 500 III LCD	Ammonia (NH_3)	0-500 ppm	0-500 ppm	1 ppm	Ammonia 100 ppm
40100129	DEGA NSA-EL 5000 III LCD	Ammonia (NH_3)	0-5000 ppm	0-5000 ppm	1 ppm	Ammonia 1000 ppm
40100132	DEGA NSA-EL 2000 III LCD	Ammonia (NH_3)	0-2000 ppm	0-2000 ppm	1 ppm	Ammonia 1000 ppm
40100131	DEGA NSCL2-EL 20 III LCD	Chlorine (Cl2)	0-20 ppm	0-5 ppm	0,01 ppm	Chlorine 5 ppm
40100105	DEGA NSCL-EL 200 III LCD	Chlorine (Cl2))	0-200 ppm	0-200 ppm	0,1 ppm	Chlorine 50 ppm
40100106	DEGA NSO2-EL 1 III LCD	Oxygen (O_2)	0-1 %	0-1 %	0,01 %	Air
40100140	DEGA NSO2-EL 30 III LCD	Oxygen (O_2)	0-100 %	0-30 %	0,1 %	Air
40100141	DEGA NSO2-EL T30 III LCD	Oxygen (O_2)	0-100 %	0-30 %	0,1 %	Air
40100142	DEGA NSO3-EL 5 III LCD	Ozone (O3)	0-5 ppm	0-0,2ppm	0,01ppm	Chlorine 5 ppm
40100144	DEGA NSO3-EL 100 III LCD	Ozone (O3)	0-100 ppm	0-100 ppm	0,1ppm	Chlorine 5 ppm
40100143	DEGA NSHCL-EL 20 III LCD	Hydrogen chloride (HCl)	0-20 ppm	0-10 ppm	0,01 ppm	Hydrogen chloride 10 ppm
40100124	DEGA NSHCL-EL 200 III LCD	Hydrogen chloride (HCl)	0-200 ppm	0-200 ppm	0,1 ppm	Hydrogen chloride 25 ppm
40100125	DEGA NSH2S-EL 50 III LCD	Hydrogen sulfide (H_2S)	0-50 ppm	0-15 ppm	0,1 ppm	Hydrogen sulfide 25 ppm
40100119	DEGA NSH2S-EL 500 III LCD	Hydrogen sulfide (H_2S)	0-500 ppm	0-500 ppm	1 ppm	Hydrogen sulfide 500 ppm
40100121	DEGA NSH2S-EL 100 III LCD	Hydrogen sulfide (H_2S)	0-100 ppm	0-100 ppm	0,1 ppm	Hydrogen sulfide 25 ppm
40100118	DEGA NSH2S-EL 2000 III LCD	Hydrogen sulfide (H_2S)	0-2000 ppm	0-2000 ppm	1 ppm	Hydrogen sulfide 2000 ppm
40100120	DEGA NSNO2-EL 20 III LCD	Nitrogen dioxide (NO_2)	0-20 ppm	0-15 ppm	0,01 ppm	Nitrogen dioxide 20 ppm
40100137	DEGA NSNO2-EL 100 III LCD	Nitrogen dioxide (NO_2)	0-100 ppm	0-100 ppm	0,1 ppm	Nitrogen dioxide 20 ppm
40100138	DEGA NSNO2-EL 500 III LCD	Nitrogen dioxide (NO_2)	0-500 ppm	0-500 ppm	1 ppm	Nitrogen dioxide 100 ppm
40100139	DEGA NSNO-EL 250 III LCD	Nitric oxide (NO)	0-250 ppm	0-15 ppm	0,1 ppm	Nitric oxide 150 ppm
40100135	DEGA NSNO-EL 25 III LCD	Nitric oxide (NO)	0-25 ppm	0-25 ppm	0,1 ppm	Nitric oxide 15 ppm
40100134	DEGA NSNO-EL 1000 III LCD	Nitric oxide (NO)	0-1000 ppm	0-100 ppm	1 ppm	Nitric oxide 150 ppm
40100136	DEGA NSSO2-EL 20 III LCD	Sulfur dioxide (SO_2)	0-20 ppm	0-3,5 ppm	0,01 ppm	Sulfur dioxide 10 ppm
40100153	DEGA NSSO2-EL 200 III LCD	Sulfur dioxide (SO_2)	0-200 ppm	0-200 ppm	0,1 ppm	Sulfur dioxide 50 ppm
40100154	DEGA NSSO2-EL 2000 III LCD	Sulfur dioxide (SO_2)	0-2000 ppm	0-2000 ppm	1 ppm	Sulfur dioxide 1000 ppm
40100155	DEGA NSSO2-EL 100 III LCD	Sulfur dioxide (SO_2)	0-100 ppm	0-100 ppm	0,1 ppm	Sulfur dioxide 50 ppm
40100150	DEGA NSSO2-EL 1000 III LCD	Sulfur dioxide (SO_2)	0-1000 ppm	0-1000 ppm	1 ppm	Sulfur dioxide 1000 ppm

40100151	DEGA NSSO2-EL 10000 III LCD	Sulfur dioxide (SO_2)	0-10000 ppm	0-10000 ppm	1 ppm	Sulfur dioxide 1000 ppm
40100152	DEGA NSCH2O-EL 10 III LCD	Formaldehyde (CH2O)	0–10 ppm	0-0,7 ppm	0,01 ppm	Carbon Monoxide 130 ppm
40100094	DEGA NSCH2O-EL 1000 III LCD	Formaldehyde (CH2O)	0–1000 ppm	0-1000 ppm	1 ppm	Carbon Monoxide 450 ppm
40100096	DEGA NSCH2O-EL 50 III LCD	Formaldehyde (CH2O)	0–50 ppm	0-50 ppm	0,1 ppm	Carbon Monoxide 130 ppm
40100095	DEGA NSC2H4-EL 10 III LCD	Ethylene (C_2H_4)	0–10 ppm	0-10 ppm	0,01 ppm	Ethylene 2 ppm
40100097	DEGA NSC2H4-EL 1500 III LCD	Ethylene (C_2H_4)	0–1500 ppm	0-1500 ppm	1 ppm	Ethylene 200 ppm
40100098	DEGA NSC2H4-EL 200 III LCD	Ethylene (C_2H_4)	0–200 ppm	0-200 ppm	0,1 ppm	Ethylene 200 ppm
40100099	DEGA NSC2H4O-EL 10 III LCD	Ethylene oxide (C_2H_4O)	0–10 ppm	0-1,5 ppm	0,01 ppm	Ethylene oxide 2 ppm
40100100	DEGA NSC2H4O-EL 100 III LCD	Ethylene oxide (C_2H_4O)	0–100 ppm	0-100 ppm	0,1 ppm	Ethylene oxide 100 ppm
40100101	DEGA NSC2H4O-EL 1000 III LCD	Ethylene oxide (C_2H_4O)	0–1000 ppm	0-1000 ppm	1 ppm	Ethylene oxide 100 ppm
40100102	DEGA NSC2H4O-EL 500 III LCD	Ethylene oxide (C_2H_4O)	0–500 ppm	0-500 ppm	1 ppm	Ethylene oxide 100 ppm
40100103	DEGA NSH-EL 1000 III LCD	Hydrogen (H_2)	0–1000 ppm	0-400 ppm	1ppm	Hydrogen 1000 ppm
40100113	DEGA NSH-EL 4000 III LCD	Hydrogen (H_2)	0–4000 ppm	0-4000 ppm	1ppm	Hydrogen 1000 ppm
40100114	DEGA NSH-EL 40000 III LCD	Hydrogen (H_2)	0–400000 ppm	0–100 % LEL	0,1 %	Hydrogen 0.8% vol
40100115	DEGA NSHCN-EL 50 III LCD	Hydrogen cyanide (HCN)	0–50 ppm	0-50 ppm	1 ppm	Hydrogen sulfide 1 ppm
40100126	DEGA NSPH3-EL 5 III LCD	Phosphine (PH3)	0–5 ppm	0-0,2 ppm	0,01 ppm	Hydrogen sulfide 25 ppm
40100148	DEGA NSPH3-EL 20 III LCD	Phosphine (PH3)	0–20 ppm	0-20 ppm	0,01 ppm	Hydrogen sulfide 25 ppm
40100145	DEGA NSPH3-EL 200 III LCD	Phosphine (PH3)	0–200 ppm	0-200 ppm	0,1 ppm	Hydrogen sulfide 25 ppm
40100146	DEGA NSPH3-EL 2000 III LCD	Phosphine (PH3)	0–2000 ppm	0-2000 ppm	1 ppm	Hydrogen sulfide 250 ppm
40100147	DEGA NSSIH4-EL 50 III LCD	Silane (SiH_4)	0–50 ppm	0-5 ppm	0,1 ppm	Hydrogen sulfide 25 ppm
40100149	DEGA NSCLO2-EL 5 III LCD	Chlorine dioxide (ClO_2)	0-1 ppm	0-0,4 ppm	0,01 ppm	Chlorine 5 ppm
40100107	DEGA NSH2O2-EL 100 III LCD	Hydrogen peroxide (H_2O_2)	0-100 ppm	0-100 ppm	0,1 ppm	Sulfur dioxide 25 ppm
40100116	DEGA NSH2O2-EL 500 III LCD	Hydrogen peroxide (H_2O_2)	0-500 ppm	0-500 ppm	1 ppm	Sulfur dioxide 250 ppm
40100117	DEGA NSHBr-EL 20 III LCD	Hydrogen bromide (HBr)	0-20 ppm	0-20 ppm	0,01 ppm	Hydrogen sulfide 25 ppm
40100122	DEGA NSHBr-EL 200 III LCD	Hydrogen bromide (HBr)	0-200 ppm	0-200 ppm	0,1 ppm	Hydrogen sulfide 250 ppm
40100123	DEGA NSHF-EL 10 III LCD	Hydrogen fluoride (HF)	0-10 ppm	0-10 ppm	0,01 ppm	Nitrogen dioxide 20ppm
40100127	DEGA NSVOC-EL 20 III LCD	VOC	0-20 ppm	0-20 ppm	0,01 ppm	VOC 20ppm
40100156	DEGA NSBR2-EL 20 III LCD	Bromine (Br)	0-20 ppm	0-20 ppm	0,01 ppm	Chlorine 5 ppm
40100092	DEGA NSBR2-EL 200 III LCD	Bromine (Br)	0-200 ppm	0-200 ppm	0,1 ppm	Chlorine 50 ppm
40100093	DEGA NSALC-EL 200 III LCD	Alkohol	0-200 ppm	0-200 ppm	0,1 ppm	Ethanol 200 ppm
40100091	DEGA NSRCOOH-EL 100 III LCD	Organic acids	0-100 ppm	0-100 ppm	0,1 ppm	Ammonia 300 ppm
40100104	DEGA NSCS2-EL 100 III LCD	Carbon disulfide (C_2S)	0-100 ppm	0-100 ppm	0,1 ppm	Carbon disulfide 50ppm

3. Detectors with an infrared sensor NSx-IL III LCD

Product code	Detector type	Detected gas	Measurement range	Measurement of current loop (4-20mA)	Resolution	Calibration gas
40100164	DEGA NSCO2-IL 5 III LCD RE	Carbon dioxide (CO2)	0-5 % vol.	0-2,5 % vol.	0,1 %	Oxid uhličitý 2,5 % vol.

40100165	DEGA NSM-IL 100 III LCD RE	Methane (CH_4) Natural gas CNG	0–100 % LEL	0-20 % LEL	0,1 %	Metan 0,88 % LEL
40100166	DEGA NSP-IL 100 III LCD RE	Butan / LPG / Propan-butan	0–100 % LEL	0-20 % LEL	0,1 %	Butan 0,32 % LEL
40100168	DEGA NSC2H6-IL 100 III LCD RE	Carbon dioxide (CO2)	0-5 % LEL	0-2,5 % LEL	0,1 %	Carbon dioxide 2,5 % LEL
40100169	DEGA NSC2H5OH-IL 100 III LCD RE	Methane (CH4) / Natural gas /Coal gas / CNG	0–100 % LEL	0-20 % LEL	0,1 %	Methane 0,88 % LEL
40100173	DEGA NSC2H4-IL 100 III LCD RE	Butane / LPG / Propane-Butane	0–100 % LEL	0-20 % LEL	0,1 %	Butane 0,32 % LEL
40100171	DEGA NSC2H4O-IL 100 III LCD RE	Ethane ($C_2 H_6$)	0–100 % LEL	0-20 % LEL	0,1 %	Ethane 20 % LEL
40100172	DEGA NSC6H14-IL 100 III LCD RE	Ethanol ($C_2 H_5OH$)	0–100 % LEL	0-20 % LEL	0,1 %	Ethanol 20 % LEL
40100170	DEGA NSN2O-IL 1 III LCD RE	Ethylen (C_2H_4)	0–100 % LEL	0-20 % LEL	0,1 %	Ethene 20 % LEL
40100176	DEGA NSC5H12-IL 100 III LCD RE	Etyhelen oxide (C_2H_4O)	0–100 % LEL	0-20 % LEL	0,1 %	Etyhelen oxide 20 % LEL
40100177	DEGA NSC3H6-IL 100 III LCD RE	Hexane (Petrol)	0–100 % LEL	0-20 % LEL	0,1 %	Hexane 20 % LEL
40100175	DEGA NSHC-IL 100 III LCD RE	Nitrous oxide (N_2O)	0-1 % LEL	0-0,5 % LEL	0,01 %	Nitrous oxide 0,5 % LEL

4. Detectors with a semiconductor sensor NSx-SL III LCD

Product code	Detector type	Detected gas	Measurement range	Measurement of current loop (4-20mA)	Resolution	Calibration gas
40100163	DEGA NSY-SL 100 III LCD RE	Acetylene (C_2H_2)	0–100 % LEL	0-20 % LEL	0,1 %	20 % LEL
40100162	DEGA NSR-SL 2000 III LCD RE	Refrigerant: R401A, R404A, R407C, R32, R410A, R12, R22	0–2000 ppm	0-20 % LEL	1 ppm	According to the type of refrigerant
40100161	DEGA NSHFO-SL 2000 III	Refrigerant: R1234yf	0–2000 ppm	0-2000 ppm	1 ppm	According to the type of refrigerant

5. Detectors with a PID sensor NSx-PL III LCDPID

Product code	Detector type	Detected gas	Measurement range	Measurement of current loop (4-20mA)	Resolution	Calibration gas
40100178	DEGA NSVOC-PL III LCD RE PID	VOC	0–4000 ppm	0-500 ppm	0,1ppm	Izobutylene 300ppm

LEL - Lowest explosion level
ALARM "PEL": Permitted exposure limit - maximal permitted value of the avarage concentration over time.

Alarm settings can be chosen freely according to customer requirements in measurement range.

Add-on modules

Product code	Name	Product description
40200003	DEGA NS III Relay Modul	Internal 4-relay, 250 V/10 A
40200010	DEGA NS III RS485	Internal output RS485
40200011	DEGA NS III Buzzer	Internal buzzer on PCB, 4 VDC, 7 VDC, 30 mA, 88 dB

Attachments

1. *Chart for setting the detector address*

address	1	2	3	4	5
1	ON	OFF	OFF	OFF	OFF
2	OFF	ON	OFF	OFF	OFF
3	ON	ON	OFF	OFF	OFF
4	OFF	OFF	ON	OFF	OFF
5	ON	OFF	ON	OFF	OFF
6	OFF	ON	ON	OFF	OFF
7	ON	ON	ON	OFF	OFF
8	OFF	OFF	OFF	ON	OFF
9	ON	OFF	OFF	ON	OFF
10	OFF	ON	OFF	ON	OFF
11	ON	ON	OFF	ON	OFF
12	OFF	OFF	ON	ON	OFF
13	ON	OFF	ON	ON	OFF
14	OFF	ON	ON	ON	OFF
15	ON	ON	ON	ON	OFF
16	OFF	OFF	OFF	OFF	ON

	1	2	3	4	5
17	ON	OFF	OFF	OFF	ON
18	OFF	ON	OFF	OFF	ON
19	ON	ON	OFF	OFF	ON
20	OFF	OFF	ON	OFF	ON
21	ON	OFF	ON	OFF	ON
22	OFF	ON	ON	OFF	ON
23	ON	ON	ON	OFF	ON
24	OFF	OFF	OFF	ON	ON
25	ON	OFF	OFF	ON	ON
26	OFF	ON	OFF	ON	ON
27	ON	ON	OFF	ON	ON
28	OFF	OFF	ON	ON	ON
29	ON	OFF	ON	ON	ON
30	OFF	ON	ON	ON	ON
31	ON	ON	ON	ON	ON
32	OFF	OFF	OFF	OFF	ON

2. *Conversion between volumetric concentration and lower explosion limit of methane*

$$\%DVM = \frac{\%obj}{4{,}4} * 100$$

%DMV – level of lower explosion limit concentration in %
%obj – volume sample of gas
4,4 – lower explosive limit of methane (4.4 % by volume)

3. *Table of error codes*

code	cause	solution
1	Sensor is not present (EEPROM is not communicating)	Disconnect and reconnect the sensor, then restart the sensor by disconnecting and reconnecting the power
2	Unknows sensor type	Contact the manufacturer
3	Type 2 senesor type ID not found in the table setting LMP91000	Contact the manufacturer - FW update required
4	CRC does not match the sensor EEPROM	Sensor error - contact the manufacturer
5	LMP91000 does not respond	Sensor error - contact the manufacturer
6	The set sensor ID does not match with the connected sensor	Checking the configuration of the sensor required
7	Reserved	Reserved
8	EL sensor test error	Sensor error
9	Detector is in preheating mode	Wait a few minutes, the detector will automatically

		enter measurement mode
10	Reserved	
11	reserved	
12	Error reading the internal FLASH	Restart the detector. If the error persists, contact the manufacturer
13	Error reading the internal FLASH	Restart the detector. If the error persists, contact the manufacturer
14	Error reading the internal FLASH	Restart the detector. If the error persists, contact the manufacturer
15	Sensor error	Replace the sensor
16	The device exceeded the maximum calibration interval by 50 %	Calibration is necceserry
129	The measured value exceeds the range of -10%	If the error persists, contact the manufacturer
130	The result of the AD covertion is out of range	Contact the manufacturer

4. Signalization transmitted by the current loop 4-20 mA

Measurement: The measure concentration is directly proportional to 4-20 mA current output
Exceeding the range of measured concentrations: Current output ranges from 20-22 mA
End of valid calibration: Current output transmits the actual measured concentration for 10 s in a 4-20 mA range and for 1 s 2 mA current
Malfunction: Current output will be set to 0,5 mA
Maintenace: Current output will be set to 1 mA

5. Package content

1 x detector
1 x cable gland

General warranty terms and conditions

When following the instructions for installation, operation and maintenance, the manufacturer guarantee 24 months from the date of receipt for the product. Should the product purchased be put into operation by an entity other than the seller, the warranty period commences from the date that the product is put into operation, provided that the buyer ordered its commissioning within three weeks of its receipt. The customer expressly acknowledges that during the warranty period that extends beyond the length of the warranty period that is specified in the Commercial Code (the statutory warranty) s/he can neither require replacement of the product nor may s/he withdraw from the contract.

1. When claiming a product defect it is necessary to submit a proof of purchase that contains the following information: name and surname, name and business name, address and the warranty card, if the buyer received one from the seller. The validity of the warranty shall not be affected by non-compliance with the obligations related to the issuance of the warranty card.
2. Claims concerning the product (for a warranty repair only complete devices are accepted) may be filed during the warranty period only with the seller from which it was purchased; subsequently the seller is required to forward the product to an authorised service centre or to the manufacturer.
3. A condition for the recognition of the rights under the warranty is the installation of the product having been undertaken by an authorised person in possession of a valid certificate from the manufacturer.
5. Claims regarding a product defect that can be dealt with reasonably quickly and without additional consequences will be resolved by remedying the defect (repair) or by replacement of the product part , because in such a case it is a contradiction of the standard norms that the entire product shall be replaced (§ 616, paragraph 4 of the Commercial Code).
6. The buyer who exercises the right of warranty repair is not entitled to the return of the parts that have been replaced.
7. The warranty period can be extended for up to 48 months and its validity can be extended beyond the standard length on the basis of the conclusion of an individual warranty contract. Further information may be obtained through a specific business meeting.

This warranty is not applicable to:

- a product that has not **been put into operation by the manufacturer or by a certified employee** in possession of a valid certificate issued by the manufacturer
- A product that did not have regulary performed calibrations and functional checks by the manufacturer or by a certified employee is possession of a valid certificate issued by the manufacturer.
- damage caused by fire, water, static electricity, power surges in the electric supply or in the public network, accident, improper use of the product, wear and tear
- contamination of the product and its subsequent cleaning
- damage caused by **improper installation, any adjustment, modification** or improper manner of use inconsistent with the instruction manual, the technical standards or the applicable safety regulations in the Czech Republic
- damage to the product during transportation caused by improper handling or handling of the product in a manner contrary to the advice provided in the instruction manual
- DEGA products that have **been used in association with other than original DEGA products**, including consumables and accessories
- bearing additional parts or consumables (e.g. a foil label, seal, etc.), that are detrimental to normal wear and tear during operation, together with wear and tear of the product and its parts caused by their normal use

For the complete version of the general business conditions and of the claims procedure go to www.dega.cz

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