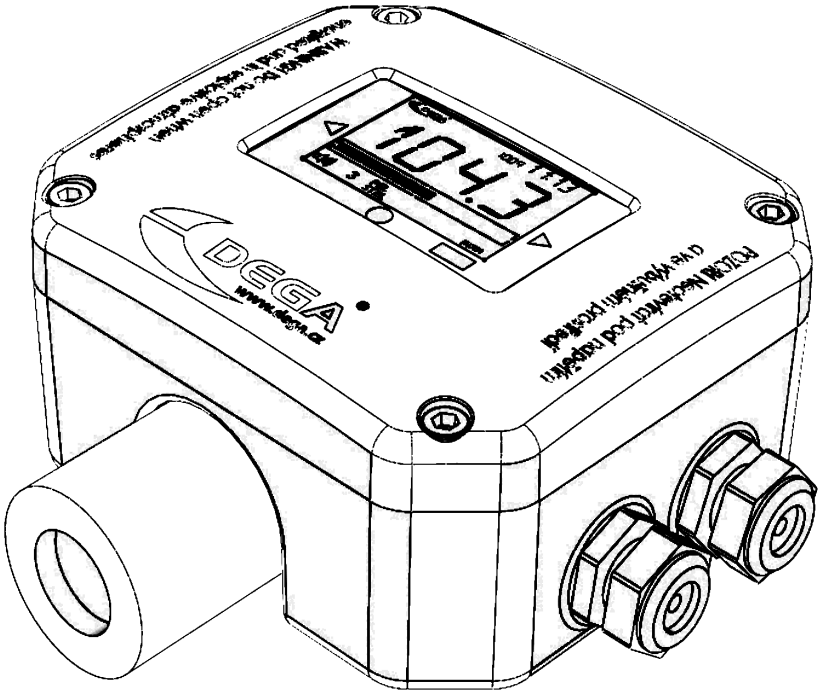
INSTRUCTION MANUAL

Gas Detector

DEGA NS III LCD / NS III LCD RE



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.

Use only suitable screws and do not repair the fixed lock

In case of loss of original screws, it is necessary to use only M6x30 Allen screws of strength class A4-80.
The verified values of the maximum width and minimum length of the structural joints of this conclusion are different from the corresponding minimum or maximum values given in the technical standard. The manufacturer must be contacted for information on joint dimensions.

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, IEC60079-0:2018 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

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:	34 days at 60 s 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

Warm-Up time

DEGA NSx-EL III LCD	some sensors max. 72 hours
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

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

Time to stabilize (>5day without power)

DEGA NSx-EL III LCD	some sensors max. 72 hours
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

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

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)

The 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.

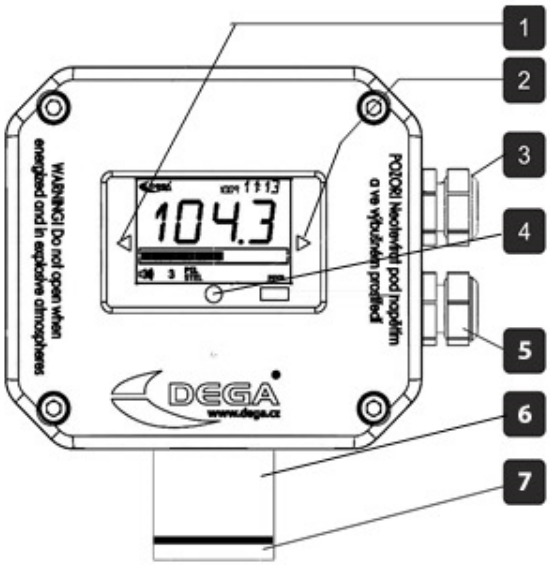
DEGA NSx-SL III LCD with a semiconductor sensor

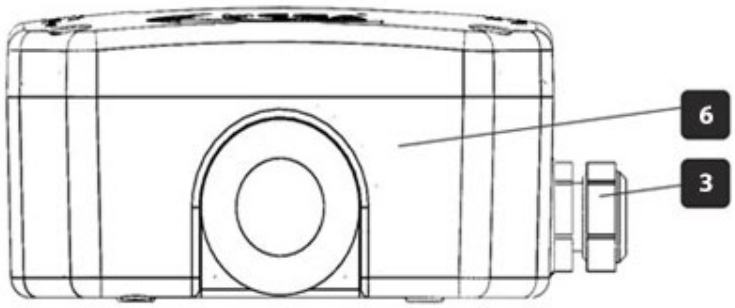
They operate on the principle of changes in electrical conductivity of semiconductors by changing the concentration of the detected gas. Their advatage is a long lifetime in a clean environment and a wide range of different types of gases and vapors. Their disadvatage is their low selectivity - the sensor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

DEGA NSx-PL III LCD PID with a photoionization sensor (PID)

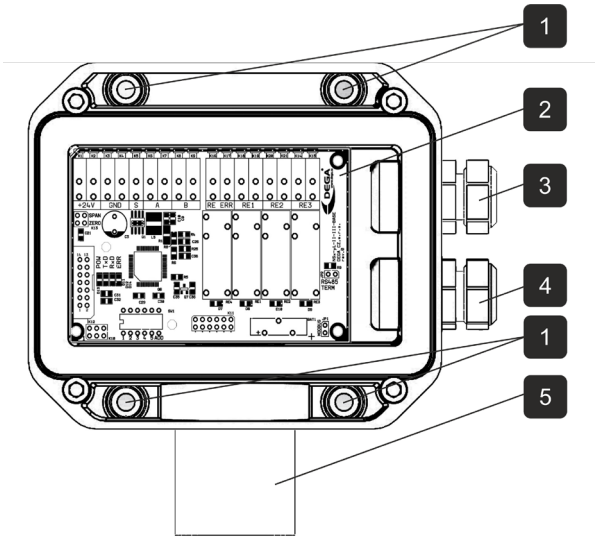
The sensitive scanning method for detection of a wide range of VOC - volatile organic compounds. The sensor does not selectively detect all VOCs in the air at concentrations in ppm.

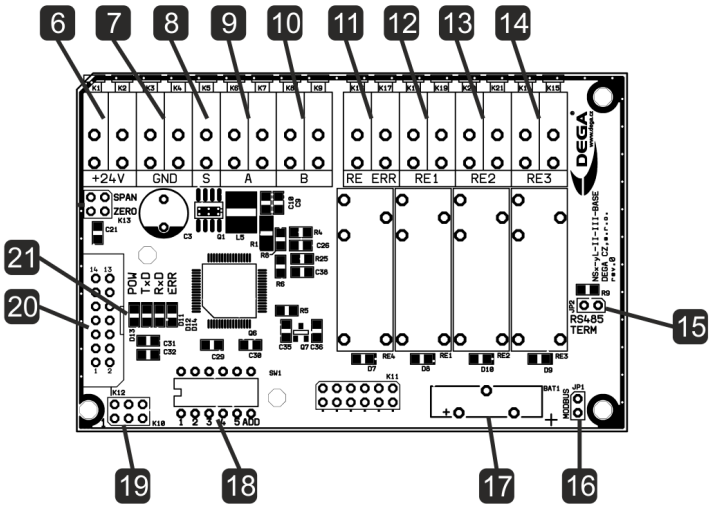
Product description





1	Magnetic control „BACK“	2	Magnetic control „FRONT“	3	Ex „d“ cable gland	4	Magnetic control „ENTER/EXIT“
5	OptionalEx „d“ cable gland	6	Body of the removable sensor	7	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 +24 VDC	**7**	Power supply terminal block GND	**8**	Signal terminal block 4-20 mA
9	Terminal block RS485 A	**10**	Terminal block 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 block RS485	**16**	Jumper connector of the communication protocol (DEGA/MODBUS)
17	Battery CR2032	**18**	DIP switch for the RS485 address	**19**	Programming connector	**20**	LCD display connector
21	Status LED						

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.

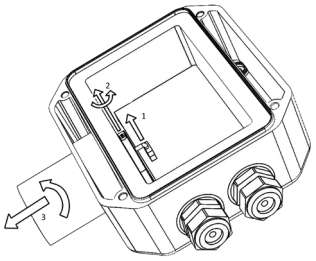
1. Assembly of the detector

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.

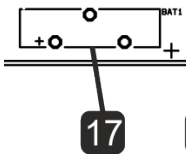
2. *Replacement of the sensor module*



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*



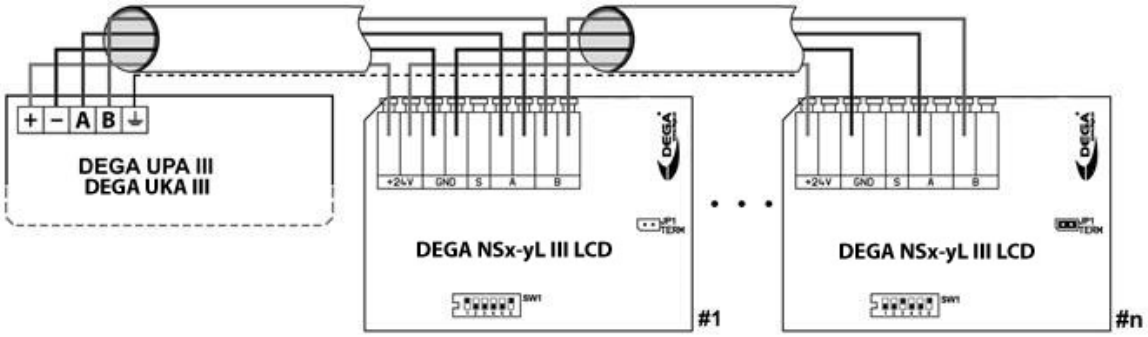
The battery lifetime in the sensor is approximately 5 years. After this time some functions of the detector may not work properly. Remove the battery from the holder and replace it with one of the recommended types. Replacing the battery in the transmitter, which is not connected to the power, will erase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



Note: Connection of transmitters with control panel only by DEGA protocol, not MODBUS protocol.

6. *Installation of wiring for RS485*

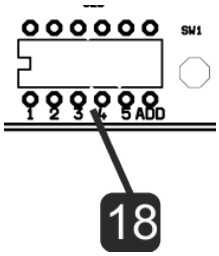
Wiring must be installed using bus topology and in compliance with the RS485 policy.

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.

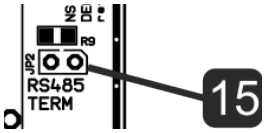
MODBUS – detailed instructions for MODBUS, see separate document „Modbus communication for the DEGA NS II (LCD) NS III (LCD) gas transmitter".

7. Setting the RS485 adress of the detector



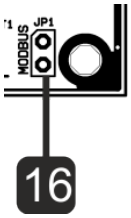
Each detector must have a unique adress within the entire bus, otherwise there will be communication collisions and malfunctions.
The detector adress can either be set internally using the DegaConfig program or using the DIP switch on the PCB.
If the position 6 (labeled ADD) is in the ON position, then 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 120 R. Plug a jumper on the JP2 connector of the last device on the bus to include the 120 R 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/MODBUS 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 orange „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.

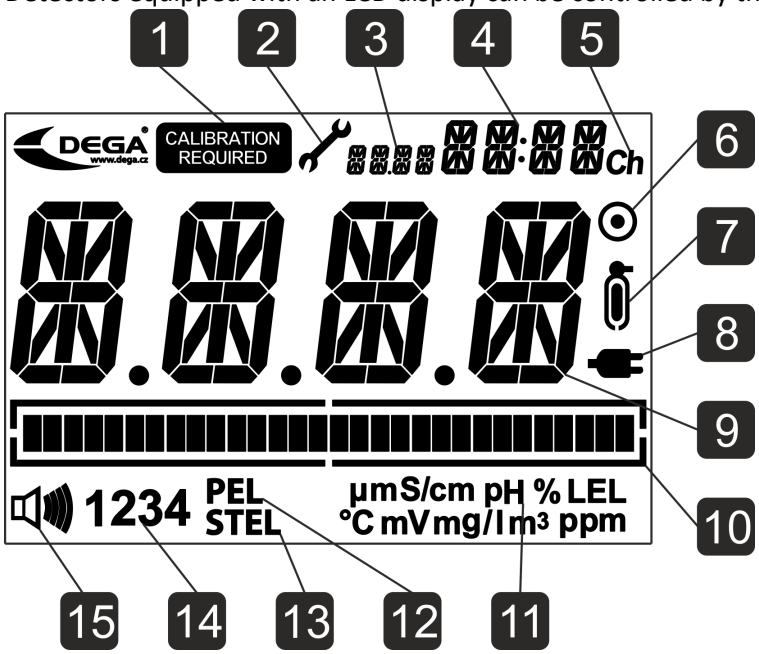
After 12 months since the last calibration (Max. calibration interval) the LED "ERR" starts flashing and an inscription CALIBRATION REQUIRED starts flashing on the LCD display. The connected sensor must be calibrated immediately. The detector will transmit the information about the ending calibration 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

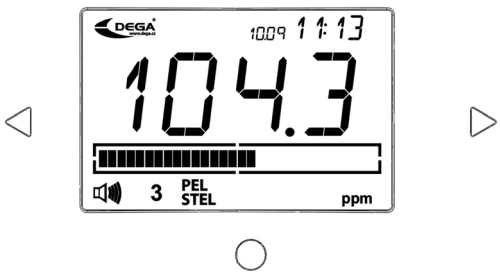
The detector periodically after 60 s stores the current detected concentration into it's internal memory. The internal memory retains data from the last 64260 measurements (cca 34 days). In order to read this information, the program DegaConfig is required. Refer to the DegaConfig program instruction.

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	Date 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 „○“.

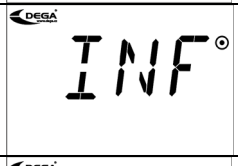
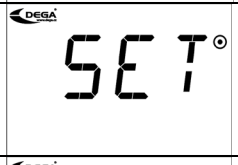
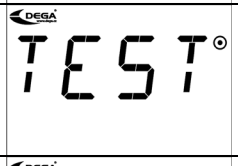
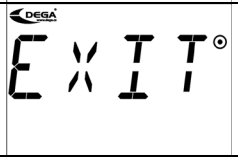
Main menu structure:

Enter the menu by holding the magnet for 5 s

|

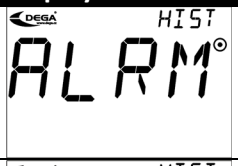
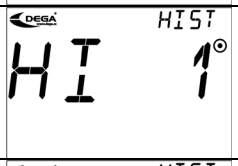
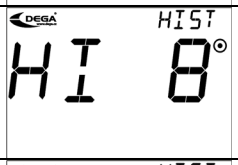
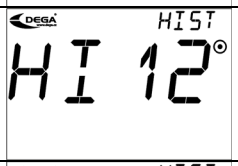
History->-Information->-Settings->- Test->- Exit

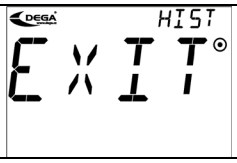
|----------<----------|

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“

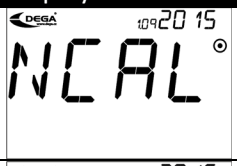
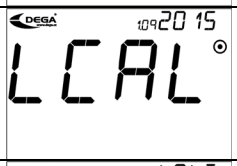
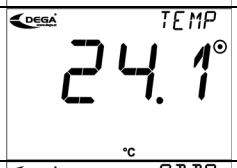
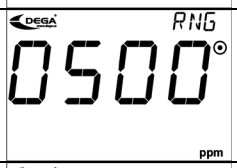
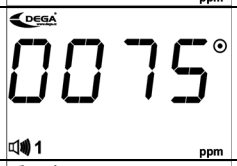
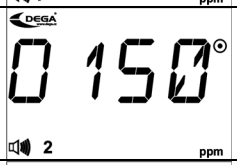
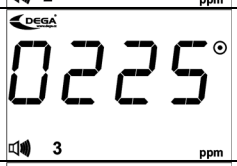
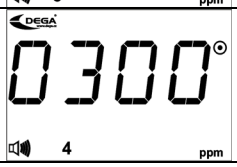
Browsing the history

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

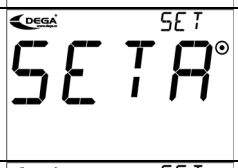
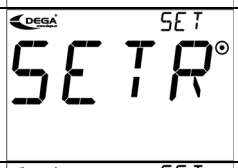
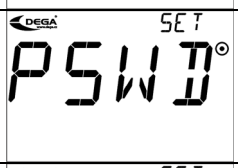
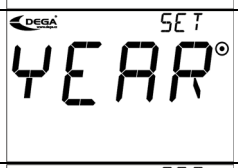
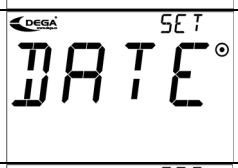
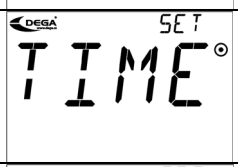
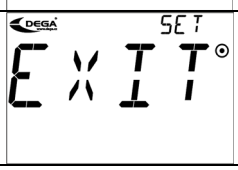
2. Information menu „INF“

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

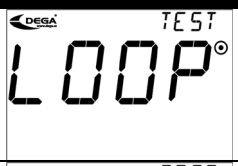
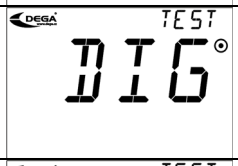
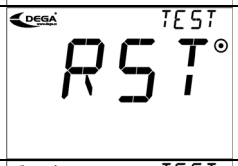
a) Using „◁ ▷“ select a number in thousands. Save the selected number „◯“
b) Using „◁ ▷“ select a number in hundreds. Save the selected number „◯“
c) Using „◁ ▷“ select a number in tens. Save the selected number „◯“
d) Using „◁ ▷“ select a number in units. Save the selected number „◯“
e) Using „◁ ▷“ 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 connected transmitters require performing of regular calibrations.

Recommended Default settings:

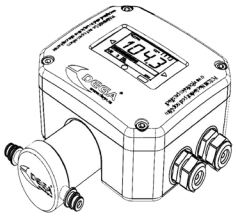
1 x every 6 months carry out a **„calibration“** - adjust the sensitivity of the sensor using calibration gas and check the functionality of the system. The exact interval depends on the purity of the environment, required accuracy and the occurrence of disturbing gases in the atmosphere.

The calibration interval can be changed by the DEGA Config software.

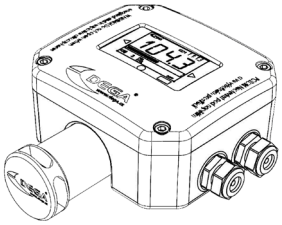
Perform calibration only at certified service centers with a valid certificate of competence or the manufacturer.
For the Czech Republic only DEGA CZ s.r.o.

Accessories

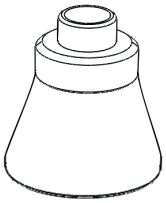
1. Calibration adapter/connection to the gas pump DEGA GAS INLET

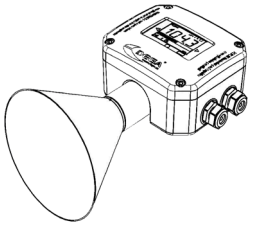


2. Cover against splashing water DEGA WATER CAP

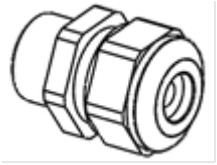


3. Funnel for gas collection DEGA COLLECT CAP





4. Additional Ex „d“ cable gland



M20x1,5

Gas specifications

Gas	Formula	CAS	Measuring range
Acetylene	C_2H_2	74-86-2	0-100 % LEL
Ammonia	NH_3	7664-41-7	0-100 ppm
Ammonia	NH_3	7664-41-7	0-1000 ppm
Ammonia	NH_3	7664-41-7	0-10000 ppm
Ammonia	NH_3	7664-41-7	0-500 ppm
Ammonia	NH_3	7664-41-7	0-5000 ppm
Ammonia	NH_3	7664-41-7	0-2000 ppm
Bromine	Br	7726-95-6	0-20 ppm
Bromine	Br	7726-95-6	0-200 ppm
Butane / Propan-Butane / LGP	C_4H_{10}	106-97-8	0-100 % LEL
Carbon dioxide	CO_2	124-38-9	0-5 % vol.
Carbon dioxide	CO_2	124-38-9	0-100 % vol.
Carbon monoxide	CO	630-08-0	0-1000 ppm
Carbon monoxide	CO	630-08-0	0-200 ppm
Carbon monoxide	CO	630-08-0	0-500 ppm
Carbon monoxide	CO	630-08-0	0-2000 ppm
Ethane	C_2H_6	74-84-0	0-100 % LEL
Ethanol	C_2H_5OH	64-17-5	0-100 % LEL
Ethylene	C_2H_4	74-85-1	0-10 ppm
Ethylene	C_2H_4	74-85-1	0-200 ppm
Ethylene	C_2H_4	74-85-1	0-1500 ppm
Ethylene	C_2H_4	74-85-1	0-100 % LEL
Ethylene oxide	C_2H_4O	75-21-8	0-10 ppm
Ethylene oxide	C_2H_4O	75-21-8	0-100 ppm
Ethylene oxide	C_2H_4O	75-21-8	0-1000 ppm
Ethylene oxide	C_2H_4O	75-21-8	0-500 ppm
Ethylene oxide	C_2H_4O	75-21-8	0-100 % LEL
Formaldehyde	CH_2O	50-00-0	0-10 ppm
Formaldehyde	CH_2O	50-00-0	0-50 ppm
Formaldehyde	CH_2O	50-00-0	0-1000 ppm
Hexane (Petrol)	C_6H_{14}	110-54-3	0-100 % LEL
Hydrogen	H_2	1333-74-0	0-100 % LEL
Hydrogen	H_2	1333-74-0	0-1000 ppm
Hydrogen	H_2	1333-74-0	0-4000 ppm
Hydrogen	H_2	1333-74-0	0-40000 ppm
Hydrogen bromide	HBr	10035-10-6	0-20 ppm
Hydrogen bromide	HBr	10035-10-6	0-200 ppm
Hydrogen cyanide	HCN	74-90-8	0-50 ppm
Hydrogen fluoride	HF	7664-39-3	0-10 ppm
Hydrogen chloride	HCl	7647-01-0	0-20 ppm
Hydrogen chloride	HCl	7647-01-0	0-200 ppm

Gas	Formula	CAS	Measuring range
Hydrogen peroxide	H_2O_2	7722-84-1	0-100 ppm
Hydrogen peroxide	H_2O_2	7722-84-1	0-500 ppm
Hydrogen sulfide	H_2S	7783-06-4	0-50 ppm
Hydrogen sulfide	H_2S	7783-06-4	0-500 ppm
Hydrogen sulfide	H_2S	7783-06-4	0-100 ppm
Hydrogen sulfide	H_2S	7783-06-4	0-2000 ppm
Chlorine	CL_2	7782-50-5	0-20 ppm
Chlorine	CL_2	7782-50-5	0-200 ppm
Chlorine dioxide	ClO_2	10049-04-4	0-50 ppm
Methane	CH_4	74-82-8	0-100 % LEL
Nitric oxide	NO	10102-43-9	0-25 ppm
Nitric oxide	NO	10102-43-9	0-250 ppm
Nitric oxide	NO	10102-43-9	0-1000 ppm
Nitrogen dioxide	NO_2	10102-44-0	0-20 ppm
Nitrogen dioxide	NO_2	10102-44-0	0-100 ppm
Nitrogen dioxide	NO_2	10102-44-0	0-500 ppm
Nitrous oxide	N_2O	10024-97-2	0-1 % vol.
Organic acids	RCOOH		0-100 ppm
Other flammable and combustible gases and vapors	HC		0-100 % LEL
Oxygen	O_2	17778-80-2	0-1 %
Oxygen	O_2	17778-80-2	0-30 %
Ozone	O_3	10028-15-6	0-5 ppm
Ozone	O_3	10028-15-6	0-100 ppm
Pentane	C_5H_{12}	109-66-0	0-100 % LEL
Phosphine	PH_3	7803-51-2	0-5 ppm
Phosphine	PH_3	7803-51-2	0-20 ppm
Phosphine	PH_3	7803-51-2	0-200 ppm
Phosphine	PH_3	7803-51-2	0-2000 ppm
Propylene	C_3H_6	115-07-1	0-100 % LEL
Refrigerant	R		0-2000 ppm
Refrigerant	HFO	754-12-1	0-2000 ppm
Silane	SiH_4	7803-62-5	0-1 ppm
Sulfur dioxide	SO_2	7446-09-5	0-20 ppm
Sulfur dioxide	SO_2	7446-09-5	0-200 ppm
Sulfur dioxide	SO_2	7446-09-5	0-2000 ppm
Sulfur dioxide	SO_2	7446-09-5	0-100 ppm
Sulfur dioxide	SO_2	7446-09-5	0-1000 ppm
Sulfur dioxide	SO_2	7446-09-5	0-10000 ppm
Volatile organic compounds	VOC		0-20 ppm (el. sensor)
Volatile organic compounds	VOC		0-3000 ppm - according to gas (PID sensor)

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

address	1	2	3	4	5	6
17	ON	OFF	OFF	OFF	ON	ON
18	OFF	ON	OFF	OFF	ON	ON
19	ON	ON	OFF	OFF	ON	ON
20	OFF	OFF	ON	OFF	ON	ON
21	ON	OFF	ON	OFF	ON	ON
22	OFF	ON	ON	OFF	ON	ON
23	ON	ON	ON	OFF	ON	ON
24	OFF	OFF	OFF	ON	ON	ON
25	ON	OFF	OFF	ON	ON	ON
26	OFF	ON	OFF	ON	ON	ON
27	ON	ON	OFF	ON	ON	ON
28	OFF	OFF	ON	ON	ON	ON
29	ON	OFF	ON	ON	ON	ON
30	OFF	ON	ON	ON	ON	ON
31	ON	ON	ON	ON	ON	ON
32	OFF	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 - solve via DEGA Config
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 - solve via DEGA Config
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, recalibration required
130	The result of the AD covertion is out of range	Recalibration required

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 NS III LCD body
1 x NS III LCD sensor unit

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

Manufacturer: DEGA CZ s.r.o., Malešická 2850/22c, 130 00 Praha 3, Czech republic
VAT: CZ 279 029 43, Telephone +420 774 447 660, E-mail: info@dega.cz, Web: www.dega.cz

User Manual ver.: 2/11/2025 9:12:00 AM