

INSTRUCTION MANUAL



Gas Detection Transmitter

DEGA NBx-yL III LCD RE



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For your safety


The transmitter must be mounted with the sensor module downwards

 To maintain IP protection, the transmitter must be mounted with the sensor module downwards


Beware of static electricity

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


The device is intended to be installed by a trained person

 The product is designed only for installation 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.

The transmitter is intended for use exclusively in a non-explosive environment

 Transmitters DEGA NBx-yL II (ZONE 2) and NBx-yL III (ZONE 1) are designed for use in potentially explosive environment.

Do not disassemble the product and ensure against the contact of its internal components with water

 Contact of internal components of the product with water may cause an electric shock. In case of any malfunction 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 damage to property or personal injury.

Use appropriate cable types



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

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



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

Use the transmitter 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 transmitter



Perform regular "CALIBRATION" (setting the detection limits, checking the responsiveness of the sensor, checking the functionality of the transmitter) and "OPERATIONAL AND FUNCTIONAL CHECKS" of the entire detection 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 at the manufacturer.

Warning: The transmitter automatically checks its calibration period - the period of validity of its calibration. After 12 months since the last calibration (max. calibration period) the transmitter will transmit this fact to the host system. The transmitter must be calibrated immediately at a certified service center with a valid certificate of competence or by the manufacturer. See section "Monitoring the calibration periods".

Technical data and information

Supply voltage:	230 V/ AC
Wire diameter range:	0,08-2,5mm ² – wire, stranded wire 0,25-1,5mm ² – stranded wire with ferrule
Output:	2x potential free relay
Dimensions without bushings	110x100x50 mm (WxHxD)
Weight:	0,3 kg

Input

DEGA NBx-EL III LCD RE	1,1 W
DEGA NBx-CL III LCD RE	2,2 W
DEGA NBx-IL III LCD RE	1,7 W
DEGA NBx-SL III LCD RE	1,7 W
DEGA NBx-PL III PID LCD RE	2,2 W

Consumption/input in the ALARM mode

DEGA NBx-EL III LCD RE	2,2 W
DEGA NBx-CL III LCD RE	3,3 W
DEGA NBx-IL III LCD RE	2,8 W
DEGA NBx-SL III LCD RE	2,8 W
DEGA NBx-PL III LCD RE PID	3,3 W

Response time (T90)

DEGA NBx-EL III LCD RE	max. 180 s – based on sensor type
DEGA NBx-CL III LCD RE	max. 30 s
DEGA NBx-IL III LCD RE	max. 30 s
DEGA NBx-SL III LCD RE	max. 30 s
DEGA NBx-PL III LCD RE PID	max. 30 s

Warm-Up time

DEGA NBx-EL III LCD RE	max. 180 s
DEGA NBx-CL III LCD RE	max. 30 s
DEGA NBx-IL III LCD RE	max. 15 s
DEGA NBx-SL III LCD RE	max. 180 s
DEGA NBx-PL III LCD RE PID	max. 15 s

Time to stabilize (>5 days without power)

DEGA NBx-EL III LCD RE	Up to several hours – based on sensor type
DEGA NBx-CL III LCD RE	max. 1 h
DEGA NBx-IL III LCD RE	max. 30 min
DEGA NBx-SL III LCD RE	max. 1 h
DEGA NBx-PL III LCD RE PID	max. 30 min

Sensor lifetime in a clean environment

DEGA NBx-EL III LCD RE	2 years
DEGA NBx-CL III LCD RE	2 years
DEGA NBx-IL III LCD RE	5 years
DEGA NBx-SL III LCD RE	2 years
DEGA NBx-PL III LCD RE PID	2 years

Operational and storage conditions

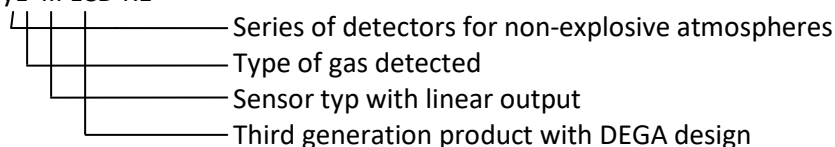
Ambient temperature:	-20°C to +60 °C (electrochemical, semiconductor and catalytic sensors) -20°C až +50°C (infrared sensors)
Relative humidity:	10-90 % RH
Air pressure:	86 - 108 kPa
Ambient air flow:	max. 2 m/s - flow directly to the sensor is not allowed
IP rating:	IP 54
Location:	BE1 - non-explosive atmospheres

Terminology

The marking system for sensors **DEGA NBx-yL III LCD RE**:

Gas sensor DEGA

NBx-yL III LCD RE



DEGA NBx-EL III LCD RE with an electrochemical sensor

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

DEGA NBx-CL III LCD RE 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 presence of a catalyst. These sensors can be used to detect a broad range of flammable gases. The sensors are characterized by fast response, long lifetime and high stability. A minimum of 10 % of Oxygen in the air is required for their proper function.

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

Top quality scanning method. They operate on the principle of infrared spectroscopy. The sensors have excellent selectivity in organic matter, do not require any oxygen in the atmosphere and are resistant to catalyst poisons (sulfur and silicon compounds) which cause a change of sensitivity of catalytic sensors. The sensors are also characterized by high stability and a long lifetime.

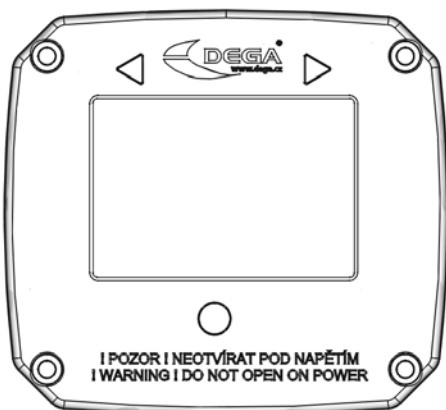
DEGA NBx-SL III LCD RE with a semiconductor sensor

The cheapest scanning method. The sensors operate on the principle of changes in electrical conductivity of semiconductors by changing the concentration of the detected gas. Their advantage is a long lifetime in a clean environment and a wide range of different types of gases and vapors. Their disadvantage is their low selectivity - the sensor largely responds to other gases, for which it is not calibrated.

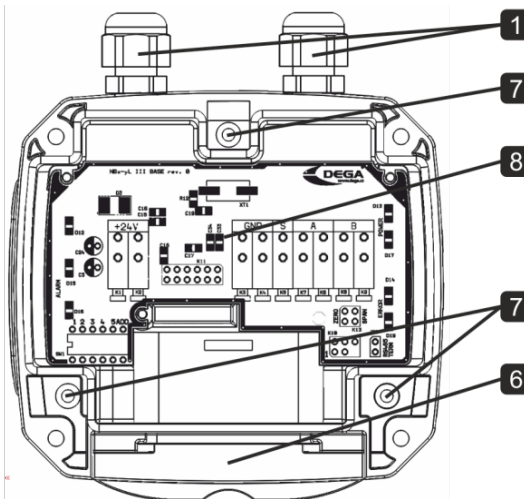
DEGA NBx-PL III LCD RE PID with a photoionization sensor

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.

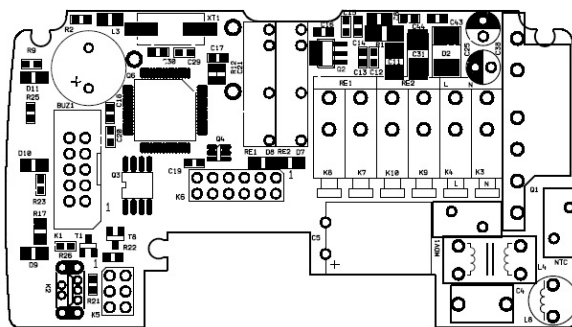
Product description



- | | |
|--|---------------------------|
| 1 Bushings | 2 Allen screws 3mm |
| 5 Magnetic control „ENTER/EXIT“ | 6 Sensor module |



- | | |
|----------------------------------|-----------------------------------|
| 3 Magnetic control „BACK“ | 4 Magnetic control „FRONT“ |
| 7 PCB with electronics | 8 PCB with electronics |



1

Power supply
terminal block 230V
- L

2

Power supply terminal
block 230V - N

3

Relay outputs
terminal block

4

Connector for service
operations

Installation, assembly and disassembly of the transmitter

Before assembling, read the valid installation standards ČSN EN 60079-29-2 (Selection, installation, use and maintenance of detectors for combustible gases and oxygen) and ČSN EN 45544-4 (Guidelines for the selection, installation, use and maintenance of detectors of toxic substances).

Make certain that the sensor input is accessible by air. The transmitter must be in an open area with no obstacles in its way (furniture etc.) Ensure that the input of the sensor is not be polluted by layers of dust or otherwise contaminated. **To maintain IP protection, the transmitter must be mounted with the sensor down.**

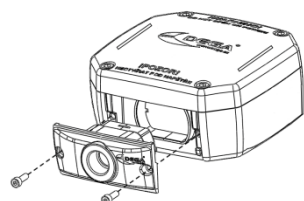
1. Assembly of the transmitter

The transmitter consists of four parts - the body of the transmitter, the removable sensor and bushings.

Transmitter assembly procedure is to be performed in the following steps:

- Disassemble the transmitter using four hexagon socket 3mm screws
- Use a screwdriver to break out holes for the bushings
- Mount the transmitter on a flat surface using three 6mm fasteners in a height above the floor with the gas entrance facing downwards, according to the specifications of the detected substance
- Direct the cables through the bushings
- Connect the wiring to the terminal block of the transmitter
- Assemble the transmitter using four hexagon socket 4mm screws

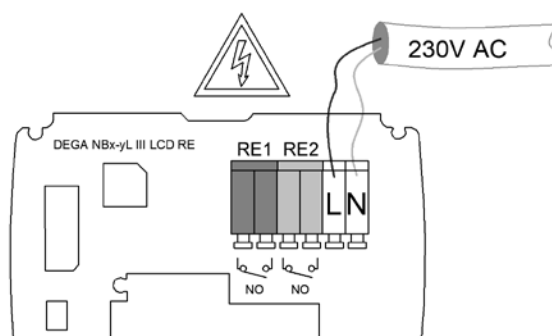
2. Replacement of the sensor module



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

Should it be necessary to replace the sensor module with a new piece, unscrew and remove the cover. Na senzorovém modulu odšroubujeme dvojici šroubů s vnitřním šestihranem 3mm a senzorový modul zapáčením zevnitř nástrojem vyjmeme. Opatrně nasuneme nový modul - nesmí dojít k zohýbání pinů. Zajistíme dvojicí šroubů a nasuneme víko, které zajistíme.

3. Connecting the transmitter - 230V AC



Transmitter functions

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

Green LED shines at correct power supply

Yellow LED flashes during sensor warm-up

Red LED shines/flashes in case of malfunction, alarm or substandard situations

1. Turning on the transmitter


After turning on the power the LED "POW" lights up and the LED "ERR" starts flashing, indicating a forming sequence of the sensor and automatic testing procedures, which can take up to 180s depending on the sensor used. The output voltage of the current loop is 1mA. During this sequence, testing of internal electronics and stabilization of the sensor in order to eliminate false alarms after turning on take place. At this time, the display only shows the time until the beginning of the measurement loop.

After completion of the forming, a 4mA current begins to flow on the output of the current loop and the transmitter starts working according to its settings.

2. Gas detection


The transmitter continuously measures the detected gas concentration in the atmosphere and converts its current value into a 4-20 mA signal or transmits its value to the evaluation unit via DEGA/MOBUS protocol. The current measured concentration and alarm status are shown on the display.

3. Malfunction

In case of malfunction the LCD screen 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 explained in Attachment 2.

4. Monitoring the calibration periods

The transmitter 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  simultaneously starts flashing on the LCD display. The connected sensor must be calibrated immediately. The transmitter will transmit the information about the ending calibration via current loop. The transmission will be as follows: 10s transmitting a 4-20mA signal informing about the current gas concentration followed by a 1 second interval of 2mA current.

5. Reading the record of measured concentrations and alarms

The transmitter periodically, after 60s, stores the current detected concentration into its 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. See the DegaConfig program user manual.

Transmitter controls

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


1

2


3


4


5





CALIBRATION REQUIRED






























1234

PEL STEL



µmS/cm pH % LEL

°C mV mg/l m³ ppm

6

7

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9

10

1

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11

13

15

2

4

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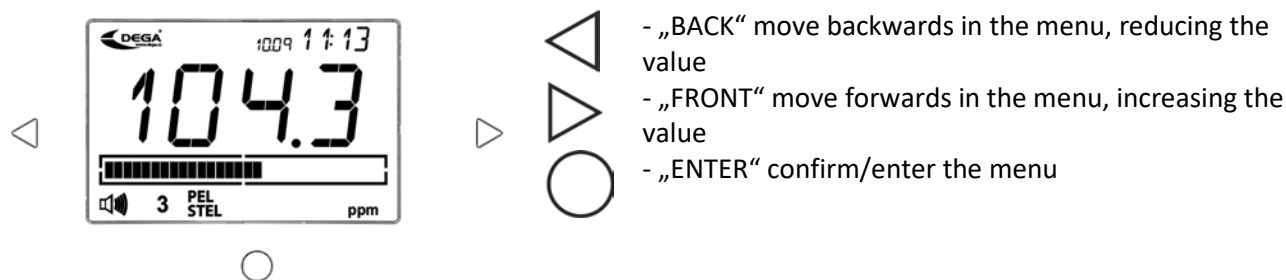
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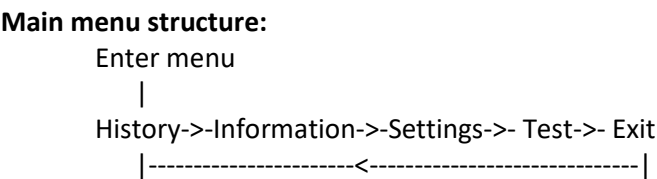
14






16



Placing a magnet into the indent „○“ for 2s activates the magnetic control, which is displayed by the icon „⊙“ on the LCD.


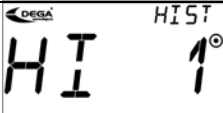
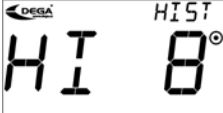
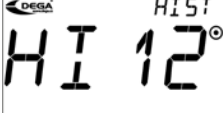


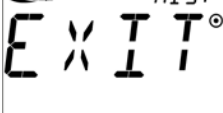
Reaching level 4 alarm in case of catalytic and semiconductor sensors causes a ratchet phenomenon, where even after recovery from gas leak, the sensor is still in level 4 alarm and needs to be manually reset by pressing „○“.



Menu	Display	Description
History	 HIST [⊙]	Browsing the alarm history
Information	 INF [⊙]	Information about transmitter settings
Settings	 SET [⊙]	Transmitter configuration
Test	 TEST [⊙]	Testing the transmitter functions
Exit	 EXIT [⊙]	Return to normal operation




6. Menu History „HIST“








Browsing the history

Menu	Display	Description
History of all alarms		Use „◀▶“ to go through 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

7. 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	 TEMP 24.1 °C	Displays the chip temperature (about 15°C higher than the ambient temperature)
RS485 device address	 ADDR 1	Displays the device address
Range up to	 RNG 0500 ppm	Measured concentration value corresponding to 20mA current
Alarm level 1	 1 ppm 0075	Displays alarm level 1
Alarm level 2	 2 ppm 0150	Displays alarm level 2
Alarm level 3	 3 ppm 0225	Displays alarm level 3
Alarm level 4	 4 ppm 0300	Displays alarm level 4











8. Settings menu „SET“

Protected by password 0004. After entering a wrong password, the transmitter returns to measurement mode. The password can be changed in the menu SET->PSWD.
















Menu	Display	Description
Calibration	 SET CAL °	Sensor calibration
Setting the alarms	 SET SETR °	Setting the alarms
Setting the range of the 20mA current loop	 SET SETR °	Setting the range of the 20mA current loop
Changing the password	 SET PSWD °	Changing the password
Setting the year	 SET YEAR °	Setting the year

Setting the date	 SET DATE [®]	Setting the date
Setting the time	 SET TIME [®]	Setting the time
Exit	 SET EXIT [®]	Return to the main menu







Calibration

- Connect fresh air to the sensor input. The icon „“ flashes. After the value stabilizes, move onto the next step using „“
- Using „ “ select the concentration of the calibration gas, confirm „“
- Connect the calibration gas to the sensor input. The icon „“ flashes. **Wait until the value stabilizes and confirm** „“
- Using „ “ switch between „YES“ - save calibration, or „NO“ - return to the Settings menu. Confirm the selected option „“
- In case of saving a new calibration, the transmitter will restart.
















Setting the alarms

- Using „ “ select the concentration for alarm 1. Confirm „“
- Using „ “ select the concentration for alarm 2. Confirm „“
- Using „ “ select the concentration for alarm 3. Confirm „“
- Using „ “ select the concentration for alarm 4. Confirm „“
- Using „ “ switch between „YES“ - save settings, or „NO“ - return to the Settings menu. Confirm the selected option „“













Setting the range of the 20mA current loop



- Using „ “ select the concentration appropriate to 20mA range. Confirm „“
- Using „ “ switch between „YES“ - save settings, or „NO“ - return to the Settings menu. Confirm the selected option „“

Changing the password











- Using „ “ select a number in thousands. Save the selected number „“
- Using „ “ select a number in hundreds. Save the selected number „“
- Using „ “ select a number in tens. Save the selected number „“
- Using „ “ select a number in units. Save the selected number „“
- Using „ “ switch between „YES“ - save settings, or „NO“ - return to the Settings menu. Confirm the selected option „“

Setting the year











- Using „ “ select a number in thousands. Save the selected number „“
- Using „ “ select a number in hundreds. Save the selected number „“
- Using „ “ select a number in tens. Save the selected number „“
- Using „ “ select a number in units. Save the selected number „“

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

Setting the date







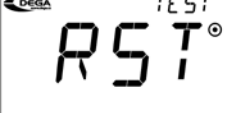


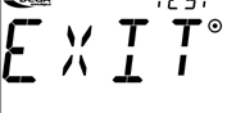
- Using „“ select a number in thousands. Save the selected number „“
- Using „“ select a number in hundreds. Save the selected number „“
- Using „“ select a number in tens. Save the selected number „“
- Using „“ select a number in units. Save the selected number „“
- Using „“ switch between „YES“ - save settings, or „NO“ - return to the Settings menu. Confirm the selected option „“

Setting the time

- Using „“ select a number in thousands. Save the selected number „“
- Using „“ select a number in hundreds. Save the selected number „“
- Using „“ select a number in tens. Save the selected number „“
- Using „“ select a number in units. Save the selected number „“
- Using „“ switch between „YES“ - save settings, or „NO“ - return to the Settings menu. Confirm the selected option „“

9. Menu Test „TEST“

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

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

Operation and maintenance of the transmitter

1. Usage limits

To maintain proper operation of the transmitter it is necessary 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, as described below. All sensors are characterized by a smaller or larger cross-sensitivity to other gases than those which they are set for. Therefore we recommend to have the air in the deployment area of the detection system analyzed before processing project documentation.

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 atmosphere with oxygen content of less than 17%, there measured value will be overvalued. In case of an atmosphere with oxygen content of more than 25%, the measured value will be undervalued.

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 atmosphere with oxygen content of less than 1% for longer than 1 hour, the measured value will be undervalued.

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

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 atmosphere with an oxygen content of less than 18 %, the measured value will be undervalued.

E) **photoionization sensors:** it is necessary to clean the UV lamp regularly, as its clogging of can cause loss of signal.

2. Operation

To maintain proper operation of the transmitter it is necessary 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 (diluent, exhaust gases, vapors of organic substances, disinfectants, etc.) a generally allowable concentration of interfering gases can not be determined. Data on cross-sensitivity to certain gases are listed at the appropriate sensors. Therefore we recommend to have the air in the deployment area of the detection system analyzed before processing project documentation.

3. Operation/Maintenance

In case of contamination, the surface can be cleaned with a slightly moistened cloth.

The sensors have a different lifetime depending on the sensing technology used and on environmental conditions.

Characteristics of the sensors vary over time. Therefore it is required to perform regular checks and calibrations, which can commence in two ways:

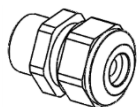
- 1x per 6 months** carry out a „**calibration**“ and **functional control** - adjust the sensitivity of the sensor using calibration gas and check the functionality of the system. The exact interval depends on the purity of the environment, required accuracy and the occurrence of disturbing gases in the atmosphere.
- 1x per 12 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. Also carry out a „**functional control**“ **1 x per 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.

Perform calibration only at certified service centers with a valid certificate of competence or at the manufacturer.

For the Czech Republic only DEGA CZ s.r.o.

Accessories

1. Additional bushing DEGA BUSHING for NBxIII



PG9

Basic type of transmitters

1. Transmitters with a catalytic sensor NBx-CL III LCD RE

Transmitter type	Detected gas	Measurement range	Measurement of current loop (4-20mA)	Standard alarm setting	Resolution	Calibration gas
DEGA NBM-CL III LCD RE	Methane (CH ₄) Natural gas CNG	0-100% DMV	0-20% DMV	1. st. 5% DMV, 2. st. 10% DMV 3. st. 15% DMV, 4. st. 20% DMV	0,1% DMV	Methane 0,88 %

DEGA NBP-CL III LCD RE	Butane (C ₄ H ₁₀) Propan-Butane LPG	0–100% DMV	0-20% DMV	1. st. 5% DMV, 2. st.10% DMV 3. st. 15% DMV, 4. st. 20% DMV	0,1% DMV	Butane 0,32 %
DEGA NBH-CL III LCD RE	Hydrogen (H ₂)	0–100% DMV	0-20% DMV	1. st. 5% DMV, 2. st.10% DMV 3. st. 15% DMV, 4. st. 20% DMV	0,1% DMV	Hydrogen 0,8 %
DEGA NBB-CL III LCD RE	Gasoline vapors	0–100% DMV	0-20% DMV	1. st. 5% DMV, 2. st.10% DMV 3. st. 15% DMV, 4. st. 20% DMV	0,1% DMV	Hexane 0,18 %
DEGA NBA-CL III LCD RE	Ammonia	0–100% DMV	0-20% DMV	1. st. 5% DMV, 2. st.10% DMV 3. st. 15% DMV, 4. st. 20% DMV	0,1% DMV	Methane 0,88 %
DEGA NBHFO-CL III LCD RE	Refrigerant HFO	0–100% DMV	0-20% DMV	1. st. 5% DMV, 2. st.10% DMV 3. st. 15% DMV, 4. st. 20% DMV	0,1% DMV	Methane 0,88 %
DEGA NBL-CL III LCD RE	Other flammable and combustible gases and vapors	0–100% DMV	0-20% DMV	1. st. 5% DMV, 2. st.10% DMV 3. st. 15% DMV, 4. st. 20% DMV	0,1% DMV	According to the selectivity of the sensor

2. Transmitters with an electrochemical sensor NBx-EL III LCD RE

Transmitter type	Detected gas	Measurement range	Measurement of current loop (4-20mA)	Standard alarm setting	Resolution	Calibration gas
DEGA NBC-EL III LCD RE	Carbon Monoxide (CO)	0- 1000 ppm	0-130 ppm	1.st.26 ppm, 2. st. 45 ppm, 3st.:87ppm, 4 st. 130 ppm ALARM "PEL": a)according to ČSN 50 291 120min./30ppm Application: Detection in residential buildings b) according to ČSN 73 6058: 30min. / 87 ppm Application: Underground garages c) according to Government regulation No.321/2007 : 8h./26 ppm Application: Working staff environment	1 ppm	Carbon Monoxide 130 ppm
DEGA NBA-EL III LCD RE	Ammonia (NH ₃)	0-1000 ppm 0-100 ppm	0-300 ppm 0-50 ppm	1. st. 75 ppm, 2. st.150 ppm 3. st. 225 ppm, 4. st.300ppm 1. st. 14 ppm, 2. st.18 ppm 3. st. 27 ppm, 4. st. 47 ppm ALARM "PEL" 20 ppm/8h	1 ppm 0,1 ppm	Ammonia 300 ppm
DEGA NBCL-EL III LCD RE	Chlorine (Cl ₂)	0-20 ppm	0-5 ppm	1. st. 0,3 ppm, 2. st.0,5 ppm 3. st. 1,5 ppm, 4. st. 3 ppm ALARM "PEL" : 0,2 ppm/8h	0,1 ppm	Chlorine 5 ppm
DEGA NBO-EL III LCD RE	Oxygen (O ₂)	0-30 % vol.	0-30 % vol.	1. st. 19% vol., 2. st.18% vol. 3. st. 16% vol., 4. st. 15% vol. or 1. st. 23% vol., 2. st.24% vol. 3. st. 26% vol., 4. st. 27% vol.	0,1 %	air
DEGA NBO3-EL III LCD RE	Ozone (O ₃)	0-5 ppm	0-0,2ppm	1. st. 0,1 ppm, 2. st. 0,13 ppm 3. st. 0,17 ppm, 4. st. 0,2 ppm ALARM "PEL" 0,05 ppm/8h	0,01ppm	Ozone 0,3 ppm
DEGA NBHCL-EL III LCD RE	Hydrogen chloride (HCl)	0-20 ppm	0-10ppm	1. st. 4,9 ppm, 2. st. 6 ppm 3. st. 8 ppm, 4. st. 9,3 ppm ALARM "PEL" 5,43 ppm/8h	0,1 ppm	Hydrogen chloride 10 ppm
DEGA NBH2S-EL III LCD RE	Hydrogene sulfide (H ₂ S)	0-50 ppm	0-15ppm	1. st. 6,5 ppm, 2. st. 8 ppm 3. st. 10 ppm, 4. st. 13 ppm ALARM "PEL" according to Government regulation No.321/2007 : 8h./7,1 ppm	0,1 ppm	Hydrogene sulfide 15 ppm
DEGA NBH2S-EL II HC	Hydrogene sulfide (H ₂ S)	0-2000 ppm	0-2000ppm	1. st. 500 ppm, 2. st. 1000 ppm 3. st. 1500 ppm, 4. st. 2000 ppm	10 ppm	Hydrogene sulfide 2000 ppm
DEGA NBNO2-EL III LCD RE	Oxid dusičitý (NO ₂)	0-20 ppm	0-15ppm	1. st. 5 ppm, 2. st. 7 ppm 3. st. 8 ppm, 4. st. 10 ppm ALARM "PEL" 4,94 ppm/8h	0,1 ppm	Oxid dusičitý 15 ppm
DEGA NBNO-EL III LCD RE	Nitrogen dioxide (NO)	0-250 ppm	0-15ppm	1. st. 5 ppm, 2. st. 7 ppm 3. st. 8 ppm, 4. st. 10 ppm ALARM "PEL" 7,57 ppm/8h	0,1 ppm	Nitrogen dioxide 15 ppm
DEGA NBSO2-EL III LCD RE	Sulfur dioxide (SO ₂)	0-20 ppm	0-3,5 ppm	1. st. 1,7 ppm, 2. st. 2 ppm 3. st. 2,5 ppm, 4. st. 3,5 ppm ALARM "PEL" 1,91 ppm/8h	0,1 ppm	Sulfur dioxide 4 ppm
DEGA NBCH2O-EL III LCD RE	Formaldehyde (CH ₂ O)	0 - 10 ppm	0-0,7 ppm	1. st. 0,3 ppm, 2. st. 0,5 ppm 3. st. 0,6 ppm, 4. st. 0,7 ppm	0,01 ppm	Formaldehyde 1 ppm
DEGA NBC2H4-EL III LCD RE	Ethylene (C ₂ H ₄)	0 - 10 ppm	0-10 ppm	1. st. 1,7 ppm, 2. st. 5 ppm 3. st. 7 ppm, 4. st. 10 ppm	0,1 ppm	Ethylene 10 ppm
DEGA NBC2H4O-EL III LCD RE	Ethylene oxide (C ₂ H ₄ O)	0 – 10 ppm	0-1,5 ppm	1. st. 0,5 ppm, 2. st. 0,8 ppm 3. st. 1,2 ppm, 4. st. 1,5 ppm	0,1 ppm	Ethylene oxide 2 ppm

DEGA NBH-EL III LCD RE	Hydrogen (H ₂)	0 - 1000 ppm	0-400 ppm	1. st. 100 ppm, 2. st. 200 ppm 3. st. 300 ppm, 4. st. 400 ppm	1ppm	Hydrogen 400 ppm
DEGA NBH-EL III LCD RE	Hydrogen (H ₂)	0 - 1000 ppm	0-400 ppm	1. st. 100 ppm, 2. st. 200 ppm 3. st. 300 ppm, 4. st. 400 ppm	1ppm	Hydrogen 400 ppm
DEGA NBHCN-EL III LCD RE	Hydrogen cyanide (HCN)	0 - 100 ppm	0-8,3 ppm	1. st. 2,5 ppm, 2. st. 5,0 ppm 3. st. 6,2 ppm, 4. st. 8,3 ppm	1 ppm	Hydrogen cyanide 10 ppm
DEGA NBPH3-EL III LCD RE	Hydrogen cyanide (PH3)	0 - 5 ppm	0-0,2 ppm	1. st. 0,06 ppm, 2. st. 0,1 ppm 3. st. 0,15 ppm, 4. st. 0,2 ppm	0,1 ppm	Hydrogen cyanide 0,3 ppm
DEGA NBSIH4-EL III LCD RE	Silane (SiH ₄)	0 - 50 ppm	0-5 ppm	1. st. 2 ppm, 2. st. 3 ppm 3. st. 4 ppm, 4. st. 5 ppm	0,1 ppm	Silane 6 ppm
DEGA NBCLO2-EL III LCD RE	Chlorine dioxide (ClO ₂)	0-1 ppm	0-0,2 ppm	1. st. 0,06 ppm, 2. st. 0,1 ppm 3. st. 0,15 ppm, 4. st. 0,2 ppm	0,01 ppm	Chlorine dioxide 0,3 ppm
DEGA NBL-EL III LCD RE	Other chemical substances according to customer requirements	According to the type of sensor		According to chemical substance	According to chemical substance	According to chemical substance

3. Transmitters with an infrared sensor NBx-IL III LCD RE

Transmitter type	Detected gas	Measurement range	Measurement of current loop (4-20mA)	Standard alarm setting	Resolution	Calibration gas
DEGA NBCO2-IL III LCD RE	Carbon dioxide (CO ₂)	0-5 % vol.	0-2,5 % vol.	1. st. 0,5%, 2. st. 1% 3. st. 2%, 4. st. 2,5%	0,1 %	Carbon dioxide 2,5%
DEGA NBM-IL III LCD RE	Methane (CH ₄) / Natural gas / Coal gas / CNG	0–100% DMV	0-20% DMV	1. st. 5% DMV, 2. st. 10% DMV 3. st. 15% DMV, 4. st. 20% DMV	0,1 %	Methane 0,88%
DEGA NBP-IL III LCD RE	Butane / LPG / Propan-Butane	0–100% DMV	0-20% DMV	1. st. 5% DMV, 2. st. 10% DMV 3. st. 15% DMV, 4. st. 20% DMV	0,1 %	Butane 0,32 %
DEGA NBB-IL III LCD RE	Gasoline vapors	0–100% DMV	0-20% DMV	1. st. 5% DMV, 2. st. 10% DMV 3. st. 15% DMV, 4. st. 20% DMV	0,1 %	Hexane 0,18 %
DEGA NBC2H6-IL III LCD RE	Ethane	0–100% DMV	0-20% DMV	1. st. 5% DMV, 2. st. 10% DMV 3. st. 15% DMV, 4. st. 20% DMV	0,1 %	Ethane 20% DMV
DEGA NBC2H5OH-IL III LCD RE	Ethanol	0–100% DMV	0-20% DMV	1. st. 5% DMV, 2. st. 10% DMV 3. st. 15% DMV, 4. st. 20% DMV	0,1 %	Ethanol 20% DMV
DEGA NBC2H4-IL III LCD RE	Ethen	0–100% DMV	0-20% DMV	1. st. 5% DMV, 2. st. 10% DMV 3. st. 15% DMV, 4. st. 20% DMV	0,1 %	Ethen 20% DMV
DEGA NBC2H4O-IL III LCD RE	Ethene oxide	0–100% DMV	0-20% DMV	1. st. 5% DMV, 2. st. 10% DMV 3. st. 15% DMV, 4. st. 20% DMV	0,1 %	Ethene oxide 20% DMV
DEGA NBC6H14-IL III LCD RE	Hexane	0–100% DMV	0-20% DMV	1. st. 5% DMV, 2. st. 10% DMV 3. st. 15% DMV, 4. st. 20% DMV	0,1 %	Hexane 20% DMV
DEGA NBN2O-IL III LCD RE	Nitrous oxide	0-1% vol	0-0,5% vol	1. st. 0,125% vol, 2. st. 0,25% vol 3. st. 0,375% vol, 4. st. 0,5% vol	0,01 %	Nitrous oxide 0,5% vol
DEGA NBC5H12-IL III LCD RE	Pentane	0–100% DMV	0-20% DMV	1. st. 5% DMV, 2. st. 10% DMV 3. st. 15% DMV, 4. st. 20% DMV	0,1 %	Pentane 20% DMV
DEGA NBC3H6-IL III LCD RE	Propene	0–100% DMV	0-20% DMV	1. st. 5% DMV, 2. st. 10% DMV 3. st. 15% DMV, 4. st. 20% DMV	0,1 %	Propene 20% DMV
DEGA NBC2H6-IL III LCD RE	Ethane	0–100% DMV	0-20% DMV	1. st. 5% DMV, 2. st. 10% DMV 3. st. 15% DMV, 4. st. 20% DMV	0,1 %	Ethane 20% DMV
DEGA NBL-IL III LCD RE	Other flammable and combustible gases and vapors according to the selectivity of the sensor	0–100% DMV	0-20% DMV	1. st. 5% DMV, 2. st. 10% DMV 3. st. 15% DMV, 4. st. 20% DMV	0,1% DMV	According to the selectivity of the sensor

4. Transmitters with a semiconductor sensor NBx-SL III LCD RE

Transmitter type	Detected gas	Measurement range	Measurement of current loop (4-20mA)	Standard alarm setting	Resolution	Calibration gas
DEGA NBC-SL III LCD RE	Carbon Monoxide (CO)	0 - 1.000 ppm	0—130 ppm.	1. st. 26 ppm, 2. st. 45 ppm 3. st. 68 ppm, 4. st. 87 ppm	1 ppm	Carbon Monoxide 130 ppm
DEGA NBM-SL III LCD RE	Methane (CH ₄) / Natural gas / CNG	0 – 100% DMV	0-20% DMV	1. st. 5% DMV, 2. st. 10% DMV 3. st. 15% DMV, 4. st. 20% DMV	0,1 %	Methane 0,88 %
DEGA NBP-SL III LCD RE	Butane (C ₄ H ₁₀) / Propane-Butane / LPG	0 – 100% DMV	0-20% DMV	1. st. 5% DMV, 2. st. 10% DMV 3. st. 15% DMV, 4. st. 20% DMV	0,1 %	Butane 0,32 %
DEGA NBA-SL III LCD RE	Ammonia (NH ₃)	0-1.000 ppm	0-20% DMV	1. st. 100ppm, 2. st. 200 ppm 3. st. 300 ppm, 4. st. 400ppm	1 ppm	Ammonia 300ppm
DEGA NBB-SL III LCD RE	Gasoline and diesel vapors	0 – 100% DMV	0-20% DMV	1. st. 5% DMV, 2. st. 10% DMV 3. st. 15% DMV, 4. st. 20% DMV	0,1 %	Hexane 0,18%
DEGA NBF-SL III LCD RE	Freon R134a	0 – 600 ppm	0-1000 ppm	1. st. 150ppm, 2. st. 300 ppm 3. st. 450 ppm, 4. st. 600ppm	1 ppm	2000ppm
DEGA NBH-SL III LCD RE	Hydrogen (H ₂)	0 - 100% DMV	0-20% DMV	1. st. 5% DMV, 2. st. 10% DMV 3. st. 15% DMV, 4. st. 20% DMV	0,1 %	0,8%

DEGA NBY-SL III LCD RE	Acetylene (C ₂ H ₂)	0 – 100% DMV	0-20% DMV	1. st. 5% DMV, 2. st.10% DMV 3. st. 15% DMV, 4. st. 20% DMV	0,1%	20 % DMV
DEGA NBR-SL III LCD RE	Refrigerant: R401A, R404A, R407C, R32, R410A, R12, R22	0 – 20.000 ppm	0-20% DMV	According to the type of refrigerant	1 ppm	According to the type of refrigerant
DEGA NBL-SL III LCD RE	Other flammable and combustible gases and vapors according to the selectivity of the sensor	0 – 100% DMV	0-20% DMV	1. st. 5% DMV, 2. st.10% DMV 3. st. 15% DMV, 4. st. 20% DMV	0,1 %	According to the detected substance

5. Transmitters with PID sensor NBx-PL III PID LCD RE

Transmitter type	Detected gas	Measurement range	Measurement of current loop (4-20mA)	Standard alarm setting	Resolution	Calibration gas
NBP-PL III PID LCD RE	Butane (C ₄ H ₁₀) / Propane-Butane / LPG	0 - 5000 ppm	0—197 ppm	1. st. 49 ppm, 2. st. 99 ppm 3. st. 147 ppm, 4. st. 198 ppm	1 ppm	Isobutylene 300ppm
NBC8H8-PL III PID LCD RE	Styrene	0 - 5000 ppm	0—94 ppm	1. st. 23 ppm, 2. st. 47 ppm 3. st. 69 ppm, 4. st. 94 ppm	1 ppm	Isobutylene 300ppm
NBC3H6O-PL III PID LCD RE	Acetone	0 - 5000 ppm	0—630 ppm	1. st. 157 ppm, 2. st. 315 ppm 3. st. 471 ppm, 4. st. 630 ppm	1 ppm	Isobutylene 300ppm
NBC7H8-PL III PID LCD RE	Toluene	0 - 5000 ppm	0—133 ppm	1. st. 33 ppm, 2. st. 66 ppm 3. st. 99 ppm, 4. st. 133 ppm	1 ppm	Isobutylene 300ppm
NBC2H5OH-PL III PID LCD RE	Ethanol	0 - 5000 ppm	0—1536 ppm	1. st. 384 ppm, 2. st. 768 ppm 3. st. 1152 ppm, 4. st. 1536 ppm	1 ppm	Isobutylene 300ppm
NBC3H8O-PL III PID LCD RE	Isopropylalcohol	0 - 5000 ppm	0—400 ppm	1. st. 100 ppm, 2. st. 200 ppm 3. st. 300 ppm, 4. st. 400 ppm	1 ppm	Isobutylene 300ppm
NBC4H8O-PL III PID LCD RE	Methylethylketon	0 - 5000 ppm	0—306 ppm	1. st. 77 ppm, 2. st. 153 ppm 3. st. 231 ppm, 4. st. 306 ppm	1 ppm	Isobutylene 300ppm
NBC8H8-PL III PID LCD RE	Styren	0 - 5000 ppm	0—94 ppm	1. st. 23 ppm, 2. st. 47 ppm 3. st. 69 ppm, 4. st. 94 ppm	1 ppm	Isobutylene 300ppm
NBL-PL III PID LCD RE	Other VOC	0 - 5000 ppm	0—500 ppm	1. st. 125 ppm, 2. st. 250 ppm 3. st. 375 ppm, 4. st. 500 ppm	1 ppm	Isobutylene 300ppm

LEL - Lowest explosion level

ALARM "PEL": Permitted exposure limit - maximal permitted value of the average concentration over time.

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

General warranty terms and conditions

When following the instructions for installation, operation and maintenance, the manufacturer guarantees 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 a 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 of the item containing the following information: name and surname, name of the seller, his identification number, in case of a legal person the name, identification number and registered office, in case of a physical person - surname, address and warranty certificate, 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 certificate.
2. Claims concerning the product (only complete devices are accepted for a warranty repair) 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 authorized service centre or to the manufacturer.
3. A condition for the recognition of the rights under the warranty is the installation of the product performed by an authorized 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 should 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 transmitter 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 regularly performed calibrations and functional checks** by the manufacturer or by a certified employee in 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 sensors of the device and their 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**
- **calibration of transmitters**, i.e. setting detection limits
- **wear or destruction of the sensors of the transmitter, including the necessity to replace them**
- 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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