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User Manual

denomination:

E-MC-NE1

Gas-concentration Measuring

Electrochemical Remote Transmitter

Gas detector manufacture and sale:
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CONTENT

1. PURPOSE OF APPARATUS

In case of industrial use, in atmospheric conditionss, measurement of concentration of dangerous materials mainly from toxic point of view and measurement of oxygen concentration in explosion-proof method in ranges assigned to sanitary limits or in higher level of measurement ranges.

2. MAIN FEATURES

- *Stationary construction*
- *Two-wire analogue system of 4...20 mA*
- *Application of electrochemical sensors (measuring transducers)*
- *Selectable concentration measurements of approx. 30 types of materials in several measuremrnt ranges*
- *Temperature compensated operation*

3. CONSTRUCTION AND OPERATION

The remote transmitter type E-MC-NE1 is of robust construction because of the requirements of explosion-dangerous industrial applications. It contains the sensor that is necessary to transform the gas concentration into electric signal (measuring transducer) and the electronics necessary for operation of the sensor and processing of its output signals. It can be mounted easily without opening the case and is suitable for accepting the transmitter cables directly via its own cable guide and series terminal. The most important data and adjustable parameters (materials and measuring ranges) that are necessary for proper use are indicated on its data plate.

The remote transmitter is operated by electrochemical sensor, suitable for operation with the material to be detected and measurement range. The sensor generates an output electric signal proportional to the concentration of detected material. The transmitter electronics amplifies this signal and transforms it into a current consumption of standard measurement range. In case of proper adjustment the transmitter consumes the current in range of 4...20 mA coming from the power supply via cables. 4 mA means 0, while 20 mA means the concentration of highest measuring limit. The current change is linear in the function of concentration.

4. TYPE VERSIONS

The remote transmitter type E-MC-NE1 has no type versions but it can be manufactured for different detected materials and measuring ranges.

The transmitter is made by adequate selection of sensor for the desired measuring task (with similar construction). When selecting the sensor not only the detected material and measurement range is taken into account but also the cross sensitivity, the stability, the operating speed, the life span and the reliability among others.

The list of detected materials by the transmitter and their technical parameters can be found in chapter of technical data (the list is widened continuously).

5. *INSTALLATION AND COMMISSIONING*

5.1. Installation

The E-MC-NE1 type transmitter is allowed to be installed which its technical data complies with.

It is prohibited to install the transmitter in explosion dangerous zone.

The transmitter can be installed in shuch places where the environment temperature complies with the temperature range specified in the technical data and it is not exposed to significant heat radiation and vibration.

The installation location of transmitter is usually determined by the design documentation of the site where it is to be placed. While making the design documentation the prescriptions of transmitter manual must be observed.

To determine the suitable location of installation of transmitter the densitiy of dangerous material(s) relative to the air, their vapor density and the possible sources of them.

The remote transmitter is a so called point detecting transmitter. The size of territory supervised by the transmitter depends mainly on the geometrical features of the establishment and physical propeties of the material to be measured. The transmitter is not capable the measure the concentration of materials that it cannot reach, therefore special care must be taken to determine the installation points and the quantity of transmitters. The area covered by the transmitter is the highest if it is not mounted on wall surface at the edge of the territory but for example on a pillar located inside the area.

The placement of the transmitter is possible on both horizontal (ceiling) and vertical surface (column or pillar) by factory made fixing plate but ***the sensing head should always face downward****. The installation location should be suitable for all the installation and maintenance works to be made on the transmitter.*

The transmitters shall be installed in a way that any mechanical effects could not damage either the transmitters or their connecting cables. Additional protection shall be applied if any danger of mechanical damage is possible, but this may not affect the operation of the transmitter.

When selecting the installation location, ***the spaces with danger of dripping and splashing water must be avoided****. The sensing head* ***must be protected from water*** *by special measures in case of necessity, (for example in sites cleaned by flexible tubes) because* ***the water contacted with the sensing head may prevent sensing****.*

5.2. Cabling

For the connection of the transmitter and its signal processing equipment some shielded transmiter cables are necessary, at least with two wires that can be identified easily. The shielding of cable shall be connected properly in each case but only at the side of processing unit.

In case of using several remote transmitters of type E-MC-NE1 simultaneously, it is allowed to contract the wires of transmitters into one multiwire cable in the necessary part of the total installation distance. In this case the continuity of shielding must also be ensured at the branching in the distribution box, and each wire at the ends of multiwire cable belonging to the transmitters have to be identified.

In the transmittes such cables are allowed to be connected which meet the dimensional and cross section requirements. In explosion dangerous zones cables with suitable mechanical protection must be used and the cable route must be designated in a way that the cable could not be exposed to any mechanical damage. For load relief of transmitter the cable must be fixed within 40 cm from it.

While cabling, for connecting sufficient length shall be ensured but the connecting shall not be carried out since it is the task of the commissioning.

5.3. Commissioning

The condition of commissioning is full observation of regulations regarding installation (chapter 5.1), cabling (chapter 5.2) and safe operation (chapter 7).

The commissioning means the checking of transmitter installation and mounting, its connection, checking of electrical parameters, its switching-on(1), and on-site check of its proper operation by measuring gas.

The checking of proper operation of transmitter (if it is to be installed individually) can also be carried out directly by measuring the current consumption, dependent on gas concentration. In this case the transmitter regarded as put into operation even without operation of further signal processing.

If the transmitter has been supplied by the manufacturer together with gas concentration measuring central unit, the checking up of operation covers both units.

Commissioning is carried out by the manufacturer's own specialist service or by partner companies contracted by the manufacturer, against payment, after prior order and appointment.

For commissioning, please contact the manufacturer's service department at the fallowing address:

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H-2040 Budaörs, Komáromi u. 22.

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or at the contracted partners of the manufacturer.

A minutes is made on commissioning. If the conditions of commissioning are not ensured by the customer the commissioning may fail by mistake of the customer. The costs of failed commissioning is covered by the customer.

Note:

(1) ***The transmitter requires stabilization time depending on its built-in sensor after switching-on****. The stabilization time can be affected by the ambient temperature and in case of certain sensors it may take even several hours.*

6. HANDLING, OPERATION

6.1. Handling units

Remote transmitter type E-MC-NE1 has the handling units for necessary adjustment. The handling units are accessible only after removing the cover of the transmitter. Using of handling units is allowed only for trained and authorized persons by observing the safe application conditions.

6.2. Connection points

There are 2 pcs of series terminal blocks in transmitter E-MC-NE1, the cable wires coming from the signal processing unit shall be connected to them. The power supply is polarity-independent.

6.3. Operation, handling

During operation of the transmitter the following considerations should be taken account:

-in case of concentration measurement of low quantity of certain materials in order to achieve adequate measuring results some sampler system may be needed.

-if the continuous power supply is interrupted provisionally, after switching back the remote transmitter requires re-stabilization time. The stabilization time depends on duration of power cut.

-any gas concentration, exceeding the measuring range significantly, may damage the built-in senor. The sensitivity and lifetime of it may be reduced depending on the overload and its duration.

-some non-desired effects (e.g. pollution of gas-intake or significant overload) require non-scheduled maintenance

- during operation between the specified limits of technical data the transmitter does not require any special handling besides periodic maintenance works.

6.4. Cleaning

The casing of transmitter can be cleaned, if necessary, except for the gas intake. It is not allowed to use aggressive solvents or chemicals for the cleaning, which can attack the casing of the apparatus, make the markings unreadable or may damage the sensor. If any pollution reaches the gas intake that may inhibit its operation maintenance work shall be initiated.

7. SAFE OPERATION

7.1. Operating conditions

The remote transmitters are allowed to be operate where the ambient temperature is within the temperature range given in the technical data and the transmitter is not exposed to significant heat radiation.

The transmitter can only be connectred to such electric equipment (gas concentration measuring device or other signal processing unit) which is necessary to its proper operation, it ensures the adequate operation taking into accout of their technical data, and separates the transmitter from network voltage with reinforced insulation, it has grounded output and it does not cause the exceeding of electric limit values indicated in technical data.

The transmitter is allowed to be connected only by shielded cable that complies with the technical requirements. The lack of shielding or armouring may casuse electromagnetic compatibility problems (EMC), that may result in false measured value, unjustified error signal, or function loss.

The transmitter shall not be exposed to such pollution (dust, paint deposits, splashing water), that may choke the gas intake because it can cause dangerous function loss without an error signal. If this condition cannot be fulfilled because of certain circumstances, additional protection should be used to the transmitter.

Concentration measurement in extreme temperature and/or pressure is not allowed without out inserting some sampling system.

The transmitter is also sensible to materials other than to be measured or those can affect its operation, therefore the effect of those materials also must be taken account.

The sensors located in the transmitter may lose their function without any error signal by the effect of load of concentration exceeding the measuring range substantially. The transmitter cannot be exposed to such effects or their operation must be tested.

The transmitter is forbidden to be modified!

Damaged tranmitter shall be switched off without delay and its maintenance shall be initiated.

7.2. Contact protection aspects

The transmitter operates with a maximum DC voltage of 28 V. FELV (functional extra low voltage) electrical eguipment with protecive housing. The electrical power supply shall be provided as specified in the operating conditions.

7.3. Meaning of abbreviations and markings applied on transmitter

CE- *European suitability marking;*

⚠ *The prescriptions of user manual shall be observed for the proper use of transmitters*

8. *TECHNICAL DATA*

Type:	*E-MC-NE1*
Ambient temperature:	*-20...+50 °C*
Air pressure:	*900...1100 hPa*
Humidity:	*15...90 RH%*
Protection:	*IP54*
Sensing principle:	*Electrochemical*
Detected material:	*According to measurement task (See chart!)*
Measuring range:	*According to measurement task (See chart!)*
Response Time:	*Depends on the built-in sensor (See chart!)*
Supply voltage:	*15 V...28 V DC*
Nominal current consumption:	*4...20 mA*
Maximum current consumption:	*25 mA*
Diameter of connected cables:	*5-9 mm*
Number of connecting wires:	*2 pcs*
Connectable wire cross section:	*0.5...2.5 mm^2 twisted, or compact*
Connectable cable type:	*Two wire shielded*
Serial resistance to the transmitter:	$R_{mes} + R_{cable} \leq 280\ \Omega$ *(if* $U \geq 22$ *V)*
Dimensions (with fastening plate):	*159,3 x 97,5 x 96,4 mm*
Weight (with fastening plate):	*approx. 0.75 kg*

Detected material	***Measuring range ****	***Response Time (T_{90}) *****
Ammonia	*50, 100, 500, 1000, 2000, 5000 ppm, 1 %(v/v)*	*< 35 s, < 40 s, < 50 s, < 60 s, < 90 s, < 120 s*
Arsenic-hydrogen	*1 ppm*	*< 30 s*
Bromine	*10, 20, 50, 200, 2000, 5000 ppm*	*< 30 s, < 60 s, < 90 s*
Diborane	*1 ppm*	*< 30 s*
Ethanol	*100, 200 ppm*	*< 25 s*
Ethylene	*10, 200, 1500 ppm*	*< 60 s*
Ethylene Oxide	*10, 20, 100, 500, 1000, 5000 ppm*	*< 120 s, < 140 s*
Fluorine	*1 ppm*	*< 80 s*
Formaldehyde	*10, 50, 1000 ppm*	*< 40 s*
Phosphine	*5, 20, 200, 500, 1000, 2000, 4000 ppm*	*< 25 s, < 30 s, < 60 s*
Phosgene	*1 ppm*	*< 120 s*
Hydrogen	*1000, 2000, 4000, 5000 ppm 1, 2, 4 %(v/v)*	*< 45 s, < 60 s, < 70 s, < 85 s, < 90 s, < 110 s*
Hydrazine	*1 ppm*	*< 120 s*
Hydrogen Bromide	*20, 200, 1000, 3000 ppm*	*< 30 s, < 60 s*
Hydrogen Cyanide	*30, 50, 100 ppm*	*< 20 s, < 30 s, < 50 s, < 200 s*
Hydrogen Fluoryde	*10 ppm*	*< 90 s*
Hydrogen Peroxide	*100, 500, 2000 ppm*	*< 60 s*
Hydrogen Selenide	*5 ppm*	*< 30 s*
Sulphur dioxide	*1, 20, 100, 200, 1000, 2000 ppm, 1 %(v/v)*	*< 15 s, < 20 s, < 25 s, < 30 s, < 45 s, < 60 s*
Hydrogen Sulphide	*10, 50, 100, 200, 500, 1000, 2000, 5000 ppm, 1 %(v/v)*	*< 20 s, < 25 s , < 30 s, < 35 s, < 40 s, < 45 s, < 60 s*
Chlorine	*10, 20, 50, 200, 2000, 5000 ppm*	*< 30 s, < 60 s, < 90 s*
Chlorine Dioxide	*1, 50 ppm*	*< 60 s, < 120 s*
Mercaptan	*14 ppm*	*< 90 s*

Detected material	***Measuring range ****	***Response Time (T_{90}) *****
Nitrogen Oxide	*1, 25, 100, 250, 1000, 2000 ppm*	*< 10 s, < 15 s, < 20 s, < 25 s, < 35 s, < 40 s, < 60 s*
Nitrogen Dioxide	*1, 20, 50, 100, 500 ppm*	*< 25 s , < 30 s, < 40 s, < 60 s*
Ozone	*1, 2, 5, 100, 200, 1000, 5000 ppm*	*< 60 s, < 150 s*
Oxygen	*1, 25, 30 %(v/v)*	*< 10 s, < 15 s*
Hydrogen Chloride	*20, 30, 50, 200, 1000, 3000 ppm*	*< 30 s, < 60 s, < 70 s, < 120 s*
Carbon Monoxide	*200, 300, 500, 1000, 2000, 4000, 5000 ppm, 1, 4 %(v/v)*	*< 10 s, < 17 s, < 20 s, < 25 s, < 30 s, < 35 s, < 40 s, < 45 s, < 60 s*
Silane	*50 ppm*	*< 60 s*
Tetrahydrothiophene	*50 mg/m^3*	*< 30 s*

** The transmitter can be manufactured with measuring ranges different to a certain extent from the given ones in the chart.*

*** The response times given in the chart are values resulted from the sensor, selected for the measuring task.*

9. GUARANTEE

*Műszer Automatika Kft grants **1 year** guarantee from the date of putting into operation for the transmitters, except built-in sensors in case of proper use, if the transmitter has been put into operation by the manufacturer's service or its contracted partner and the prescriptions of installation, putting into operation, handling, operation, safe operation and maintenance have been observed.*

*The guarantee period can be extended by **further 2 years,** if the operator or his/her representative concludes a scheduled maintenance contract with the manufacturer's service for 3 years after date of installation.*

The guarantee refers to failures originated from the manufacture. Any damages originated from transport, storing, installation or use, as well as any failure caused by not having observed the regulations of user manual, are not subject to the guarantee.

10. SERVICE, MAINTENANCE

The gas concentration measuring transmitter is a device serving for safety according to its function and application field. The prevention of any accidents endangering human life, or environment may depend on its proper operation. In any case this safety device is only capable to recognize and prevent the developing danger situation in time if its technical state allows it. Reservation of this technical state is served by the regular maintenance.

The regularity of maintenances is justified by the change of measurement features in a time period, the necessity of acurracy correction resulted from that, and the necessity of general status check that determines the explosion safety feature. The change of mesurement features is caused by the natural aging of sensor operating in the transmitter, its wear depending on the load or by the choke of gas inlet located in front of the sensor.

*Based on the aforementioned the maintenance must be carried out from the time of commissioning **3…6 monthly,** depending on the applied sensor. The maintenance of transmitter is possible together with the processing device with which it has been installed and operated (usually with gas concentration measuring central unit) to ensure its proper use. (Special rules apply to the central unit which also shall be taken into account.) The maintenance of transmitters can be carried out by the service of the manufacturer or its contracted partner company. For maintenance purposes only components and accessories compatible with the manufacturer's ones are allowed to be used. The maintenance is at the cost of the customer except for the casual guarantee covered repairs.*

In case of any extraordinary event affecting the transmitter (e.g. significant staining, submergence, high overload of concentration, damage etc.) lack of maintenance or malfunctions in spite of maintenances, extra service claim is also possible to be started. The extra service claim can be initiated at the manufacturer or its contracted partners.

In such cases the following should be indicated:

- name of institution where the transmitter is located,

-type

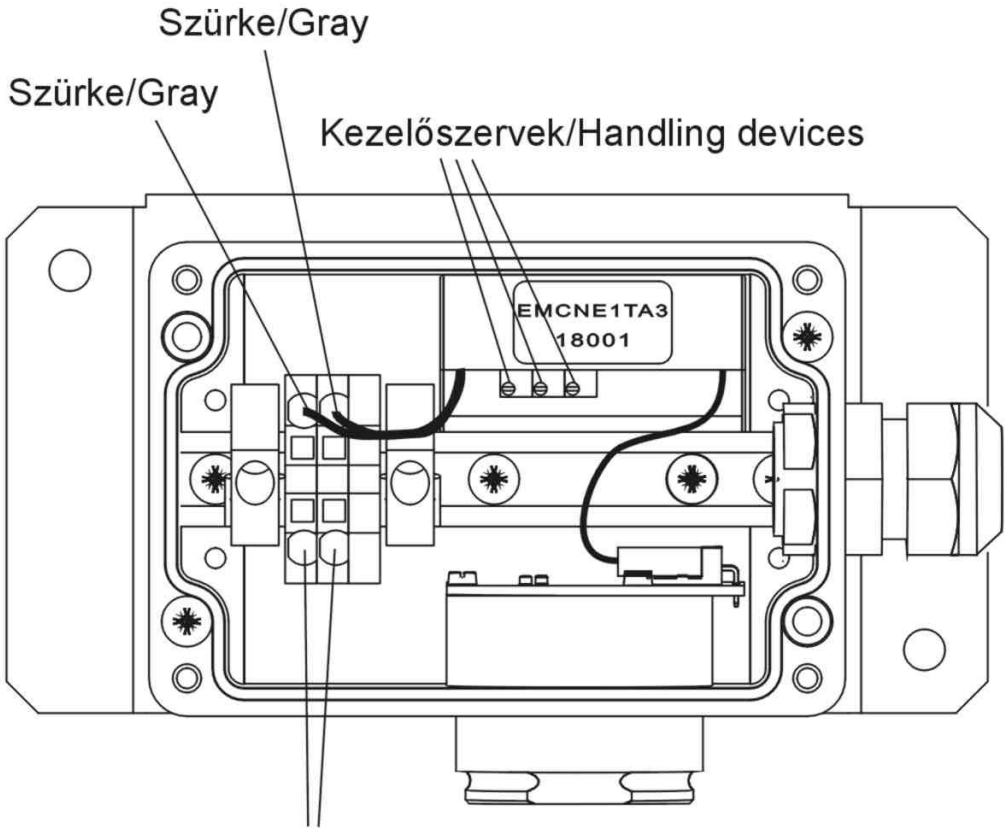
-manufacturing number,

- exact place of installation,

- extraordinary event and error feature,

- name and accessibility of contact person of the operator or the repair starting party.

E-MC-NE1 távadó belső elrendezése és csatlakozási pontjai
E-MC-NE1 transmitter inner set up and connecting points



E-MC-NE1 távadó méretei
E-MC-NE1 transmitter dimensions