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User Manual

Denomination:

E-TD-xx/M gas concentration measuring remote transmitters family

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1. PURPOSE

To transform the concentration to electric signal and transfer it in explosion dangerous environment to the installed electric gas and solvent measuring device (central unit) by cables, in a way that its own operation should not cause the ignition of the environment.

2. APPLICATION FIELD

Acording to standard MSZ EN IEC 60079-10-1:2021 in areas classed zone 1 or minor, in application group II, in category 2 or minor, to explosive mediums developing because of gases, vapours or mists.

According to MSZ EN 60079-1-29:2017 measurement of concentration of burnable and explosion dangerous materials in measurement range up to 0-100 LFL% (0-100 LEL%).

3. TYPE VERSIONS

- *E-TD-S1/M general purpose type operted by several types of semiconductor sensor*
- *E-TD-S2/M type with reduced energy claim operable by several types of semiconductor sensor*
- *E-TD-P1/M used for sensorpoisons-free environment operated by catalytic sensor*
- *E-TD-P3/M developed for sensing of methane with significant selectivity and poison resistance, operated by catalytic sensor*
- *E-TD-P4/M general purpose type operated by several types of catalytic sensors*
- *E-TD-P5/M extended temperature range type operated by catalytic sensor*

All the above type versions include protection moods of identical technical solution and similar shape, but because of using different sensors regarding their operation, the electric connection parameters and measurement properties show essential differences.

The types E-TD-S1/M, E-TD-S2/M, E-TD-P4/M and E-TD-P5/M are prepared for quick on site sensor change during their maintenances in the interest of cost saving serviceability.

The listed models can also be made with alloyed steel or tin bronze sinter filter. In the case of tin bronze sinter filters, the type designation is supplemented with the letter "B" (for example: E-TD-P5/MB).

The condition of selecting the most suitable type is the comprehensive knowledge of application environment on the basis of which may be possible and recommended to place an inquiry on proposal of manufacturer.

4. WORKING

The transmitters can work together with such equipment (central units) or other suitable signal processing units that are matching to the technical parameters of transmitters. For their operation electric power supply (heating) is necessary in case of each type version.

E-TD-S1/M, E-TD-S2/M

The measured concentration can be received from the conductivity (resistance) between the measuring outputs of the sensor. The conductity is incresing by the increase of concentration but the correlation is not directly proportional with the change of measured concentration. The conductivity based determination of measured concentration is possible on the basis of results of preliminary multi-point calibration performed on each sensor and on each sensed material.

E-TD-P1/M, E-TD-P3/M, E-TD-P4/M, E-TD-P5/M

Their operation is possible the by creation of conventional Wheatstone bridge. In this case one branch of the bridge circuit is the sensor located in the transmitter, while the other branch must be part of concentration measuring device (central unit.) The value of measured concentration can be reached from the voltage change in the bridge diagonal. The voltage change is approximately lineary proportional with the change of concentration within the measurment range. The measured voltage based concentration can be determined on the base of results of 2-meauring point preliminary calibration performed on each sensor piece.

Attention! The operation of sensor is non-linear over the mesurement range of concentration. In case of exceeding the measurement range the devices oparating the transmitters E-TD-P1/M, E-TD-P3/M, E-TD-P4/M, E-TD-P5/M must be prepared to prevent the danger of so-called ambiguous operation, featuring the catalytic sensors.

5. ABBREVIATIONS INDICATED ON REMOTE TRANSMITTERS

CE-European suitability marking; it is manufactured according to the European Union directives and standards, subject to relevant evaluation processes

1418-identification number of attesting company involved in the manufacturing phase;

Ex-marking of explosion protection;

II-application group; it can be used in areas endangered by explosion dangerous materials except in mines

2nd category; it ensures high protection level in such areas where explosion capable medium is possibly generated. The explosion safe protection methods operate in such a way that they ensure suitable safety level even in case of probale operating errors or dangerous operating conditions

G-gas; to explosion capable mediums generated by existence of gases, vapors or mists

Ex-marking; the transmitter comply with following requirements of protection

db-; flameproof enclosure

eb-; increased safety

IIC-gas group; the transmitter can also be used in areas endangered by elements of hydrogen group

Gb; equipment protection level (EPL)

T4-temperature class; the surface temperature of transmitter cannot exceed 135 ^{o}C.

T5-temperature class; the surface temperature of transmitter cannot exceed 100 ^{o}C.

BKI 16ATEX0036 X; marking of attesting institute, year of receiving certificate, serial number of certificate

⚠ *At proper use of transmitters the prescriptions of user manual shall be taken into account*

6. CONDITIONS OF SAFE OPERATION

The transmitter can only be connected to an electric equipment (gas concentration measuring apparatus or other signal processing unit) that ensure the proper operation necessary to the proper use of transmitter, by taking into account the technical data it separates the transmitter from the electric network by reinforced insulation, it has earthed output and cannot cause the excess of limit values indicated in the technical data.

The probable failure of the electrical equipment operating the transmitter must not cause a limit load greater than that described in the technical data section.

The transmitter is only alowed to be connected by shielded sheathed cabel that complies with the the technical requirements and suitable for installation in explosion dangerous area. The lack of shielding or sheathing may cause electromagnetic compatibility problems (EMC) that can result in false measured value, unjustified error signal, or function loss. The transmitter cable must be fixed close to the transmitter in the purpose of load relief.

In explosion dangerous area the transmitter is only allowed to be opened after having made it voltage free state, but only after 1 minute waiting time. (The loosening of TD..type sensing head is also means opening).

The transmitter is not allowed to be exposed to the effects of dirt (e.g. dust, paint piling, splashing liquid), or icing that can choke the pores of the sinter metal filter, because it can cause dangerous function loss without any error signal. If this precondition is not fulfilled because of some conditions, some additional protection must be ensured to the transmitter.

It is not allowed to measure the concentration in a medium of extremely temperature (outside of operating temperature range) and/or pressure without interposing a sampling system.

The transmitter is also sensitive to materials other than to be measured, therefore the cross- sensitivity caused by other materials occuring in the vicinity of the transmitter always must be taken into account.

The sensors operating in the transmitters can suffer function loss temporarily (at inhibitors) or definitively (at sensor poisons) without giving error signal. The transmitters are not allowed to be exposed to the effect of such materials, and their operation must be checked continuously by frequent tests.

The types marked with the additional letter "B" cannot be used for ammonia and acetylene gases.

The transmitter is not allowed to be modified!

7. INSTALLATION

According to standard MSZ EN IEC 60079-10-1:2021 the transmitters can only be installed in Zone 1, Zone 2 or milder classed places the technical data of which are adequate for them. The transmitter for example is prohibited to be installed in Zone 0 or in underground mines.

The transmitter can only be operated in such places where the ambient temperature complies with the temperture range given in its technical data, and theay are not exposed to heat radiation causing significant warming-up, shaking or caustic chemicals.

The place of installation is usually determined by the design documentation of establishment (where the transmitter should be installed). During preparing the design documentation the perscriptions written in the transmitter's user manual must be taken into account.

To determine the suitable installation site of transmitters it is essential condition having knowledge of zone class and zone map of establishment (at the time of preparing the design documentation or even at installations without any design documentaton), having knowledge of endangering material(s)' density or vapour density relative to the aire and the places of possibe hazard points.

The transmitter belongs to the so-called point sensing transmitters. Therefore the size of transmitter supervised area basically depends on the geometric features of establishment and the physical properties of materials to be measured. The transmitter is not capable to measure the concentration of such material which cannot get to the transmitter, therefore it is extremely important to carefully determine the measuring points and the quantity of transmitters. The area covered by the transmitter is the biggest if it is not mounted on a wall surface at the edge of the area but e.g. on a bearing pillar inside the area.

The transmitter can be mounted on both horizontal plane surface by means of prefabricated fixing plates (e.g. on ceiling) and on vertical surface (e.g. on column or bearing pillar) on condition that ***the detector head has to face downward.*** *(The dimensions of the gas collector cone must also be taken into account when applying it.) The installation place must be suitable for all the commissioning and maintenance works to be made on transmitters.*

The transmitters must be installed in a way that either the transmitters or their cables used for their cabling should not be mechanically damaged. If any danger of damage exists, further protection should be applied whicht cannot affect the transmitter operation. Places liable to water drip or water splash should be avoided during selecting the installation site.

8. PUTTIG INTO OPERATION

The condition of putting into operation is the observation of listed prescriptions on safe application (Chapter 6) and installation (Chapter 7). The putting into operation can be carried out by the manufacturer's own service or its contracted partners. The price of the transmitter does not include the prize of this job.

Putting into operation means the checking of installation, mounting, connecting and switching on of the transmitter, on-site check of proper operation by measuring gas. If the manufacturer supplied the transmitter together with processing unit (central unit) according to the order, the putting into operation happens together with the latter (in this case the central unit and the transmitter constitutes one device).

If the putting into operation fails because the conditions are not ensured by the customer for the coordinated time, it fails by the mistake of custmer. The failed putting into operation will be at the cost of the customer.

9. OPERATION

The condition of operation is the observation of listed prescriptions (Chapter 8) in connection with operation. No handling is necessary during the operation of transmitter.

If any extraordinary event occurs during its operation (for example exposed to significant staining, submergence, sensor poison or inhibitor, strong mechanical stress happens etc.) the service and maintenance actions listed in Chapter 12 shall be taken.

In case of any damage endangering the explosion safety, the transmitter shall be promptly disconnected from the current nework and actions must be taken to change the withdrawn transmitter with another one!

10. TECHNICAL DATA

E-TD-S1/M, E-TD-S1/MB

Protection mark:	*Ⓔx II 2G Ex db eb IIC T5 Gb*
Ambient temperature:	*-20...+50°C*
Allowed pressure:	*900...1100 hPa*
Allowed vapor content:	*15...90 RH%*
Protection (MSZ EN 60529:2015):	*IP54*
Built in sensing head:	*TD-S1*
Measuring range:	*0-100 LFL% (LEL%)*
Response time [1]:	*t_{50} < 20 s, t_{90} < 60 s (See the table!) [2]*
Supply voltage:	*5 V ± 0.2 V DC*
Nominal current consumption:	*167 mA, 132 mA, 80 mA, 76 mA, 63 mA (depending on the sensor)*
Nominal power:	*835 mW, 660 mW, 400 mW, 380 mW, 315 mW (depending on the sensor)*
Load limit in case of external error [3]:	*10 V, 3.75 W*
Electric output signal:	*Resistance depends on concentration (depending on the sensor)*
Electrical shock protect:	*FELV (functional extra low voltag, IEC 60364-4-41)*
Connectable cable diameter [4]:	*8-12 mm with reducing ring, 12-17 mm without reducing ring*
Number of connecting wires:	*4 pieces*
Connectable wire cross section [4]:	*0,5...2,5 mm^2 , twisted or compact*
Weight with mounting plate:	*approx. 0.65 kg (+ 0.2 kg with gas collector cone)*

	E-TD-S1/M			***E-TD-S1/MB***		
Material [5]	*Relative sensitivity [6]*	*t_{50}*	*t_{90}*	*Relative sensitivity [6]*	*t_{50}*	*t_{90}*
Hydrogen	-	*4 s*	*13 s*	-	*3.5 s*	*12 s*
Methane	-	*7 s*	*25 s*	-	*6 s*	*21 s*
Propane-butane	-	*6 s*	*20 s*	-	*5.5 s*	*19 s*

(1) The response times and relative sensitivity measured with 10l/h flow rate gases after proper processing of the electric output signal.

(2) The table contains non-guaranteed, informative data. Deviations are possible for each transmitter copy.

(3) In case of presumed most probable failure of processing unit.

(4) The technical data of connected signal-processing unit must be observed when selecting cables and cross-sections.

(5) The transmitters are also suitable for detecting many other gases and solvent vapours.

(6) The transmitters are also sensitive to materials other than those used for calibration. Due to the different non-linear operation of the built-in sensors, this relative sensitivity varies depending on the concentration, it is not a specified data.

E-TD-S2/M, E-TD-S2/MB

Protection mark:	*Ⓔx II 2G Ex db eb IIC T5 Gb*
Ambient temperature:	*-20...+65°C*
Allowed pressure:	*900...1100 hPa*
Allowed vapor content:	*15...90 RH%*
Protection (MSZ EN 60529:2015):	*IP54*
Built in sensing head:	*TD-S2*
Measuring range:	*0-100 LFL% (LEL%)*
Response time [1]:	*t_{50} < 20 s, t_{90} < 60 s (See the table!) [2]*
Supply voltage:	*5 V ± 0.2 V DC*
Nominal current consumption:	*56 mA, 42 mA (depending on the sensor)*
Nominal power:	*280 mW, 210 mW (depending on the sensor)*
Load limit in case of external error [3]:	*10 V, 2.65 W*
Electric output signal:	*Resistance depends on concentration (depending on the sensor)*
Electrical shock protect:	*FELV (functional extra low voltage, IEC 60364-4-41)*
Connectable cable diameter [4]:	*8-12 mm with reducing ring, 12-17 mm without reducing ring*
Number of connecting wires:	*4 pieces*
Connectable wire cross section [4]:	*0,5...2,5 mm^2 , twisted or compact*
Weight with mounting plate:	*approx. 0.65 kg (+ 0.2 kg with gas collector cone)*

	E-TD-S2/M			***E-TD-S2/MB***		
Material [5]	*Relative sensitivity [6]*	*t_{50}*	*t_{90}*	*Relative sensitivity [6]*	*t_{50}*	*t_{90}*
Hydrogen	*-*	*4 s*	*15 s*	*-*	*4 s*	*15 s*
Acetylene	*-*	*10 s*	*19 s*	*Not applicable for this material*		
Methane	*-*	*11 s*	*40 s*	*-*	*10 s*	*38 s*
Propane-butane	*-*	*15 s*	*39 s*	*-*	*14.5 s*	*38 s*

(1) The response times and relative sensitivity measured with 10l/h flow rate gases after proper processing of the electric output signal.

(2) The table contains non-guaranteed, informative data. Deviations are possible for each transmitter copy.

(3) In case of presumed most probable failure of processing unit.

(4) The technical data of connected signal-processing unit must be observed when selecting cables and cross-sections.

(5) The transmitters are also suitable for detecting many other gases and solvent vapours.

(6) The transmitters are also sensitive to materials other than those used for calibration. Due to the different non-linear operation of the built-in sensors, this relative sensitivity varies depending on the concentration, it is not a specified data.

E-TD-P1/M, E-TD-P1/MB

Protection mark:	*Ex II 2G Ex db eb IIC T5 Gb*
Ambient temperature:	*-20...+50 °C*
Allowed pressure:	*900...1100 hPa*
Allowed vapor content:	*15...90 RH%*
Protection (MSZ EN 60529:2015):	*IP54*
Measuring range:	*0-100 LFL% (LEL%)*
Built in sensing head:	*TD-P1*
Response time (1):	*t_{50} < 20 s, t_{90} < 60 s (See the table!) (2)*
Supply voltage:	*3.3 V ± 0.2 V DC*
Nominal current consumption:	*70 mA*
Nominal power:	*231 mW*
Load limit in case of external error (3):	*13 V, 3.75 W*
Electric output signal:	*25 mV / 1 v% methane*
Electrical shock protect:	*FELV (functional extra low voltage, IEC 60364-4-41)*
Connectable cable diameter (4, 5):	*8-12 mm with reducing ring, 12-17 mm without reducing ring*
Number of connecting wires:	*3 pieces*
Connectable wire cross section (4):	*0,5...2,5 mm^2, twisted or compact*
Weight with mounting plate:	*approx. 0.65 kg (+ 0.2 kg with gas collector cone)*

	E-TD-P1/M			***E-TD-P1/MB***		
Material (6)	*Relative sensitivity*	*t_{50}*	*t_{90}*	*Relative sensitivity*	*t_{50}*	*t_{90}*
Ammonia	*156 %*	*4 s*	*10 s*	*Not applicable for this material*		
Hydrogen	*129 %*	*2.5 s*	*7.5 s*	*132 %*	*2 s*	*4 s*
Acetylene	*90 %*	*4.5 s*	*13.5 s*	*Not applicable for this material*		
Methane	*100 %*	*4.5 s*	*13 s*	*100 %*	*4 s*	*9 s*
Ethanol	*83 %*	*4 s*	*10.5 s*	*88 %*	*2.5 s*	*7 s*
Propane-butane	*54 %*	*5.5 s*	*16 s*	*55 %*	*5 s*	*13 s*
Hexane	*54 %*	*5 s*	*12 s*	*57 %*	*3.5 s*	*7 s*
Xylene	*-*	*-*	*-*	*56 %*	*6 s*	*26 s*

Remarks:

(1) The response times and relative sensitivity measured with 10l/h flow rate gases, respectively in case of solvent vapors in fan forced chamber.

(2) The table contains non-guaranteed, informative data. Deviations are possible for each transmitter copy.

(3) In case of presumed most probable failure of processing unit.

(4) The technical data of connected signal-processing unit must be observed when selecting cables and cross-sections.

(5) Splicing of cables between the transmitter and the central unit must be avoided.

(6) The transmitters can also be used to detect some other gases and solvent vapors.

E-TD-P3/M, E-TD-P3/MB

Protection mark:	*Ex II 2G Ex db eb IIC T5 Gb*
Ambient temperature:	*-20...+50 °C*
Allowed pressure:	*900...1100 hPa*
Allowed vapor content:	*15...90 RH%*
Protection (MSZ EN 60529:2015):	*IP54*
Measuring range:	*0-100 LFL% (LEL%)*
Built in sensing head:	*TD-P3*
Response time [1]:	*t_{50} < 20 s, t_{90} < 60 s (See the table!) [2]*
Supply voltage:	*3.3 V ± 0.1 V DC*
Nominal current consumption:	*67 mA, vagy 39.5 mA (depending on setting)*
Nominal power:	*221 mW, vagy 130 mW (depending on setting)*
Load limit in case of external error [3]:	*5.5 V, 3.75 W*
Electric output signal:	*> 12 mV / 1 v% methane*
Electrical shock protect:	*FELV (functional extra low voltage, IEC 60364-4-41)*
Connectable cable diameter [4, 5]:	*8-12 mm with reducing ring, 12-17 mm without reducing ring*
Number of connecting wires:	*3 pieces*
Connectable wire cross section [4]:	*0,5...2,5 mm^2, twisted or compact*
Weight with mounting plate:	*approx. 0.65 kg (+ 0.2 kg with gas collector cone)*

	E-TD-P3/M			***E-TD-P3/MB***		
Material	*Relative sensitivity*	*t_{50}*	*t_{90}*	*Relative sensitivity*	*t_{50}*	*t_{90}*
Methane	*100 %*	*6 s*	*14 s*	*100 %*	*5 s*	*12 s*
Acetylene	*84 %*	*8 s*	*16 s*	*Not applicable for this material*		
Propane-Butane	*68 %*	*13 s*	*34 s*	*70 %*	*13 s*	*32 s*
Ammonia	*0 %*	-	-	*Not applicable for this material*		
Acetone	*0 %*	-	-	*0 %*	-	-
Diethyl-eter	*0 %*	-	-	*0 %*	-	-
Ethanol	*0 %*	-	-	*0 %*	-	-
Methanol	*0 %*	-	-	*0 %*	-	-
Toluene	*0 %*	-	-	*0 %*	-	-
Xylene	*0 %*	-	-	*0 %*	-	-

Remarks:

(1) The response times and relative sensitivity measured with 10l/h flow rate gases, respectively in case of solvent vapors in fan forced chamber.

(2) At sensible material the table contains non-guaranteed, informative data. Deviations are possible for each transmitter copy.

(3) In case of presumed most probable failure of processing unit.

(4) The technical data of connected signal-processing unit must be observed when selecting cables and cross-sections.

(5) Splicing of cables between the transmitter and the central unit must be avoided.

E-TD-P4/M, E-TD-P4/MB

Protection mark:	*Ex II 2G Ex db eb IIC T5 Gb*
Ambient temperature:	*-20...+50°C*
Allowed pressure:	*900...1100 hPa*
Allowed vapor content:	*15...90 RH%*
Protection (MSZ EN 60529:2015):	*IP54*
Measuring range:	*0-100 LFL% (LEL%)*
Built in sensing head:	*TD-P4*
Response time [1]:	*t_{50} < 20 s, t_{90} < 60 s (See the table!) [2]*
Supply current:	*200 mA ± 6 mA DC*
Produced supply voltage:	*2 V, 2.6 V DC (depending on the sensor)*
Nominal power:	*400 mW, 520 mW*
Load limit in case of external error [3]:	*360 mA, 3.75 W*
Electric output signal:	*45 mV / 1 v% methane, 25 mV / 1 v% methane (depending on the sensor)*
Electrical shock protect:	*FELV (functional extra low voltage, IEC 60364-4-41)*
Connectable cable diameter [4, 5]:	*8-12 mm with reducing ring, 12-17 mm without reducing ring*
Number of connecting wires:	*3 pieces*
Connectable wire cross section [4]:	*0.5...2.5 mm² twisted or compact*
Weight with mounting plate:	*approx. 0.65 kg (+ 0.2 kg with gas collector cone)*

	E-TD-P4/M			***E-TD-P4/MB***		
Material [6]	*Relative sensitivity*	*t_{50}*	*t_{90}*	*Relative sensitivity*	*t_{50}*	*t_{90}*
Methane	*100 %*	*9 s*	*20 s*	*100 %*	*7 s*	*16.5 s*
Hydrogen	*99 %*	*6 s*	*12 s*	*101 %*	*5 s*	*11 s*
Ammonia	*70 %*	*6 s*	*13 s*	*Not applicable for this material*		
Methanol	*34 %*	*6 s*	*19 s*	*33 %*	*5.5 s*	*13.5 s*
Propane-butane	*45 %*	*12 s*	*30 s*	*45 %*	*9.5 s*	*24 s*
Hexane	*41 %*	*10 s*	*30 s*	*43 %*	*8.5 s*	*22 s*
Ethanol	*37 %*	*7 s*	*18 s*	*39 %*	*5.5 s*	*15 s*
Toluene	*37 %*	*11 s*	*34 s*	*39 %*	*9.5 s*	*28 s*
Xylene	*33 %*	*17 s*	*54 s*	*34 %*	*12 s*	*48 s*

Remarks:

(1) The response times and relative sensitivity measured with 10l/h flow rate gases, respectively in case of solvent vapors in fan forced chamber.

(2) The table contains non-guaranteed, informative data. Deviations are possible for each transmitter copy.

(3) In case of presumed most probable failure of processing unit.

(4) The technical data of connected signal-processing unit must be observed when selecting cables and cross-sections.

(5) Splicing of cables between the transmitter and the central unit must be avoided.

(6) The transmitters can also be used to detect some other gases and solvent vapors.

E-TD-P5/M, E-TD-P5/MB

Protection mark:	*Ex II 2G Ex db eb IIC T4 Gb*
Ambient temperature:	*-40...+90°C*
Allowed pressure:	*900...1100 hPa*
Allowed vapor content:	*15...90 RH%*
Protection (MSZ EN 60529:2015):	*IP54*
Measuring range:	*0-100 LFL% (LEL%)*
Built in sensing head:	*TD-P5*
Response time [1]:	*t_{50} < 20 s, t_{90} < 60 s (See the table!) [2]*
Supply current:	*200 mA ± 6 mA DC*
Produced supply voltage:	*2 V, 2.6 V DC (depending on the sensor)*
Nominal power:	*400 mW, 520 mW*
Load limit in case of external error [3]:	*5.5 V, 3 W*
Electric output signal:	*50 mV / 1 v% methane, 60 mV / 1 v% methane (depending on the sensor)*
Electrical shock protect:	*FELV (functional extra low voltage, IEC 60364-4-41)*
Connectable cable diameter [4, 5]:	*9.5-12.5 mm*
Number of connecting wires:	*3 pieces*
Connectable wire cross section [4]:	*0.5...2.5 mm^2 twisted or compact*
Weight with mounting plate:	*approx. 0.7 kg (+ 0.2 kg with gas collector cone)*

	E-TD-P5/M			***E-TD-P5/MB***		
Material [6]	*Relative sensitivity*	*t_{50}*	*t_{90}*	*Relative sensitivity*	*t_{50}*	*t_{90}*
Hydrogen	*103 %*	*4.5 s*	*11 s*	*102 %*	*4 s*	*9.5 s*
Methane	*100 %*	*9 s*	*22 s*	*100 %*	*7.5 s*	*20.5 s*
Propane-butane	*54 %*	*11.5 s*	*34 s*	*54 %*	*11 s*	*32 s*
Methanol	*42 %*	*7.5 s*	*27 s*	*41 %*	*6 s*	*19 s*
Ethanol	*54 %*	*9.5 s*	*30 s*	*52 %*	*6.5 s*	*18.5 s*
Pentane	*71 %*	*11 s*	*33 s*	*71 %*	*8.5 s*	*28 s*
Hexane	*53 %*	*12.5 s*	*38.5 s*	*53 %*	*9 s*	*31 s*
Heptane	*45 %*	*15 s*	*45 s*	*45 %*	*9 s*	*32 s*
Toluene	*46 %*	*14 s*	*43 s*	*47 %*	*10 s*	*36 s*
Xylene	-	-	-	*45 %*	*13 s*	*49 s*

Remarks:

(1) The response times and relative sensitivity measured with 10l/h flow rate gases, respectively in case of solvent vapors in fan forced chamber.

(2) The table contains non-guaranteed, informative data. Deviations are possible for each transmitter copy.

(3) In case of presumed most probable failure of processing unit.

(4) The technical data of connected signal-processing unit must be observed when selecting cables and cross-sections.

(5) Splicing of cables between the transmitter and the central unit must be avoided.

(6) The transmitters can also be used to detect some other gases and solvent vapors.

11. 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, commissioning, 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 manual, are not subject to the guarantee.

12. SERVICE, MAINTENANCE

The gas concentration measuring transmitter is a device serving for safety according to its function and application fields. The prevention of any accidents endangering human life, material properties, environment caused by an explosion or its consequences may depend on its proper operation. In any case this safety device is only capable to recognize and prevent the evolving danger situation in time if its technical state allows it. To upkeep this technical state is served by the regular maintenances.

The regularity of maintenances is justified by the change of measurement features in a time period the necesstity 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 its load or by the choke of filter located in front of the sensor.

*Based on the above, maintenance should be performed every **3 to 6 months** from putting into operation depending on the sensor used. The maintenance of transmitter is possible together with that device with which it has been installed and operated (gas concentration measuring central unit) to ensure its proper use. (Special separate rules apply to the central unit which also shall be taket into account.) The maintenance of transmitters can be carried out by the own service of manufacturer or its contracted partner companies. 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 occasional guarantee covered repairs.*

In case of any extraordinary event affecting the transmitter (for example significant staining, submergence, sensor poison of high concentration, inhibitor or other damage) or because of lack of maintenance or malfunctions in spite of maintenances, extra service claim is also possible. The extra service claim can be initiated at the manufacturer or its contracted partners

In this case 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 requesting party.