Warsaw

MDD-256/T

USER MANUAL

edition 2W3sW36_eng

DIGITAL GAS DETECTION SYSTEM

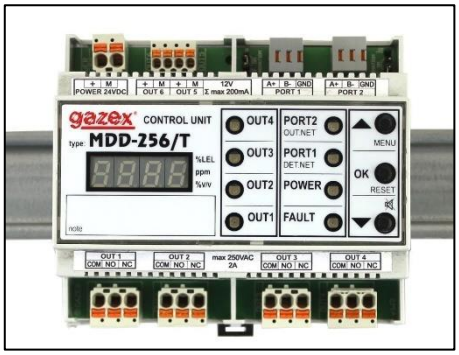
SUPERVISORY MODULE

Series [W3] *with W36 software*

BEFORE installation, please read the entire USER MANUAL.

To ensure safety during installation and operation of the device it is essential to to comply with the recommendations and warnings bearing this symbol. Proceed only if you have fully understood this manual.

Keep this Manual for reference by the System User.



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DEFINITIONS AND DESIGNATIONS USED:

gas detector – hereinafter 'detector' – a device that converts the changing concentration of gas, mist, or vapour of a specific substance in the air into an electrical signal;

sensor module – a replaceable component of the gas detector containing a gas sensor (an electronic component that is sensitive to changes in the concentration of gas in the air);

smart sensor or **smart sensor module** – a sensor module equipped, among others, with a microprocessor-based control and regulation system, event memory, calibration period exceedance notification, and an automatic test procedure – detectors with such a sensor are marked with the letter 'N' in the model symbol;

calibration gas – a type of gas or substance vapour used to set alarm thresholds (*usually: the medium the device is designed to detect*);

A1 – detector alarm status indicates that the concentration of the calibration gas around the detector exceeds the value of the first (lower) alarm threshold or the concentration value of the first alarm threshold;

A2 – detector alarm status indicates that the concentration of the calibration gas around the detector exceeds the value of the first and second (higher) alarm threshold or the concentration value of the second alarm threshold;

A3 – detector alarm status indicates that the concentration of the calibration gas around the detector exceeds the value of the third (highest) alarm threshold or the concentration value of the third alarm threshold (standard – measurement range);

calibration – verification of the detector or sensor module's response to the calibration gas and adjustment of the measurement range and the alarm levels to match the prescribed values, including A1/A2/A3 alarm thresholds;

short-form certificate of calibration (SSW) – a document confirming the correct response of the detector (A1 and A2 status) to the medium specified in the document, at specified concentrations, under specified conditions;

DG/M, DG/MR – 3-threshold gas detector with standard design (for use outside Ex zones), RS-485 interface, MODBUS RTU protocol;

DG.EN/M – 3-threshold economical gas detector with standard design (for use outside Ex zones), RS-485 interface, MODBUS RTU protocol;

DD – 3-threshold gas detector with standard design (for use outside Ex zones), for use in offices and hotels, RS-485 interface, MODBUS RTU protocol;

DEX/F – DEX® type 2-threshold explosion-proof gas detector with a flameproof shield, available in various versions, 4-wire interface;

DEX/A – DEX® type 2-threshold explosion-proof gas detector with a flameproof shield, available in various versions, 4-20mA 3-wire interface;

DEX/P – DEX® type explosion-proof concentration-measuring gas detector with a flameproof shield, available in various versions, 4-20mA 3-wire interface;

DG/F – 2-threshold gas detector with standard design (for use outside Ex zones), 4-wire;

DG.EN – 2-threshold economical gas detector with standard design (for use outside Ex zones), 4-wire interface;

DG/P – concentration-measuring gas detector with standard design (for use outside Ex zones), 4-20mA 3-wire interface;

LEL – the lower explosive limit of a given flammable substance – the highest volumetric concentration of a mixture of a flammable gas or vapour with air, below which no explosion of the mixture can occur (*values for individual substances in accordance with PN–EN 60079-20-1:2010*);

TWA – Time-Weighted Average – the maximum allowable concentration of a harmful substance in the working environment ('NDS' pursuant to the Ordinance of the Minister of Family, Labour and Social Policy of 12 June 2018, Dz.U. [*Polish Journal of Laws*] 2018, item 1286, as amended);

STEL – Short-Term Exposure Limit – the instantaneous maximum allowable concentration of a harmful substance in the working environment ('NDSCh' - as above);

ppm – parts per million (volume); ;

v/v – volume per volume;

<t_1/t_2 – time limit for the occurrence of a given factor described as 'periodic' or 'instantaneous' – means: over a period of time no longer than t_1 within a period of time no shorter than t_2;

RH – relative air humidity;

SGG3Y+ – Standard Gazex 3-Year Plus Warranty covering the period until the end of the year in which the device was manufactured and the following 3 years (*year of manufacture indicated on the nameplate => no warranty cards required*) – assigned to each MDD module;

RGG5Y+ – Extended Gazex 5-Year Plus Warranty – applicable to MDD (terms available at www.gazex.pl)

electrical **cable** vs. **wire** – a connection cable is a collection of several insulated single-core conductors (*with copper cores, single-wire or multi-wire*) within a common insulating sheath;

Periodic Inspection Record – a document containing all chronological records of gas detection system performance inspections (which the user of the system is obliged to carry out) and descriptions of any unusual events observed during the system's operation, template *(in Polish)* available at *www.gazex.pl;*

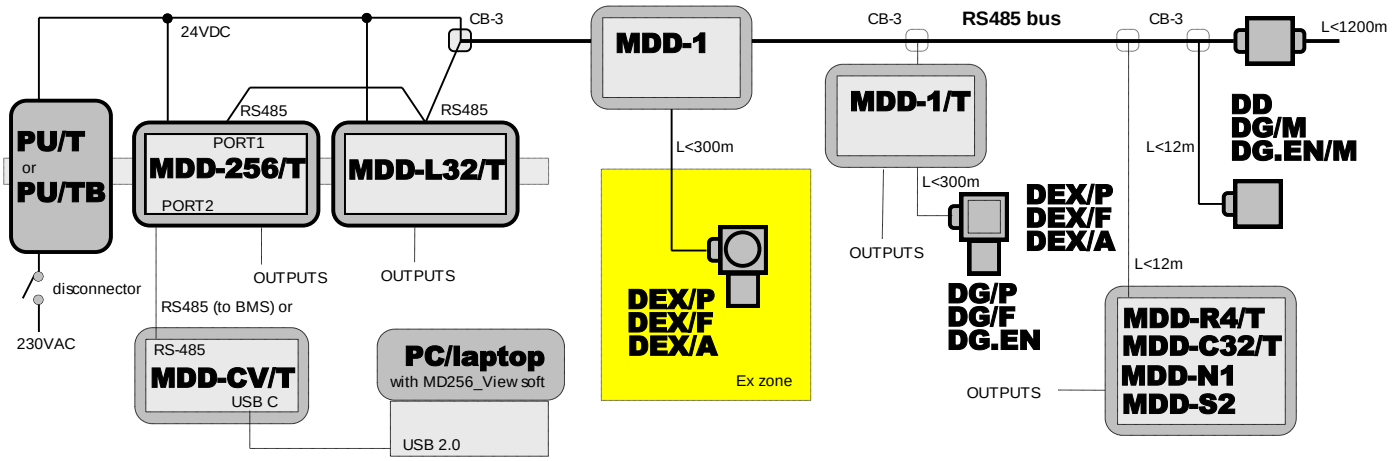
1. INTENDED USE

MDD-256/T is the primary supervisory controller of the **D**igital **G**as **D**etection **S**ystem (DGDS). The DGDS also includes digital detectors manufactured by GAZEX, such as the DD, DG/M, or DG.EN/M models, and/or detectors without an RS-485 port, connected via connection modules such as MDD-1, MDD-1/T, MDD-1x/T, MDP-1.A/TM, and MDD-N1 (for connecting external systems). The DGDS can be expanded with additional digital modules (actuators) of the following types: MDD-L32/T, MDD-C32/T, MDD-R4/T, and MDD-S2 (where detector statuses visualisation, additional relay or OC outputs, and additional signalling devices are required).
Communication between the MDD-256/T module and the components occurs in RS-485 industry standard according to the MODBUS RTU protocol. Supervision and control are carried out by the supervisory module polling individual devices cyclically. When alarm parameters are exceeded, optical alarm signals are triggered, outputs on the module (and selected additional modules) are activated, and information is sent to an external control/visualisation system via the digital network.
In the remainder of this User Manual, the MDD-256/T supervisory module will be referred to as the '**MDD**' module.

MDD features and functionalities:

- Supervises and manages a network of digital detectors and digital modules, controlling the status of the wired connection to the detectors (ensures full detection of fault statuses);
- Provides communication with detectors using the RS-485 standard (MODBUS RTU) through a galvanically isolated port;
- Enables remote configuration of the parameters of detectors connected to the bus, such as changing alarm thresholds and resetting devices;
- Allows the execution of built-in procedures that facilitate remote configuration of the detector network, such as scanning the existing network, addressing devices in new and existing networks, and erasing device addresses;
- Manages a system consisting of up to 224 detectors, which can be divided into groups of up to 32 detectors; each group forms an independent subsystem that can be configured individually;
- Oversees the operation of up to 21 actuators (but no more than 14 additional modules of the same type), which can be assigned to all detectors for global system control or assigned to a selected group of detectors for local control of specific devices/objects;
- Operates in four modes:
  - MEMORY MODE – indicates the occurrence of alarms after they have ceased;
  - CONTINUED MODE – retains active alarm states after the alarm source has disappeared;
  - NO MEMORY MODE – automatically resets the inputs and outputs on the front panel after the alarm statuses have ceased;
  SERVICE MODE – deactivates the module outputs for 1 hour;
- Independently of the above modes, two buttons on the front panel allow the activation of: SILENT MODE – mutes the internal siren; A2 LOCK MODE – deactivates the A2 voltage output for 15 minutes or until the next A2 alarm occurs;
- Provides visual alarm and fault status signals for individual detectors (LED display) and control output statuses (OUT1, OUT2, OUT3, OUT4), along with acoustic signals (built-in siren);
- Allows switching between display modes on the screen, such as collective alarms or cyclic display of the status of individual detectors;
- Stores the last 3000 events in non-volatile internal memory, including the time of occurrence and the source of the event;
- Offers various output configurations, allowing specific outputs to be assigned to certain alarms or selected zones;
- Enables precise control of output activation and deactivation delays, maintaining consistent parameters over time thanks to microprocessor control;
- two 12 VDC alarm outputs for the external signaling devices (by default - A1, A2; configurable as OUT5, OUT6);
- Configurable contact outputs (galvanically isolated) OUT1, OUT2, OUT3, and OUT4 control fans, motors, contactors, information panels, or connect to building/plant automation systems;
- Configurable fault contact output (galvanically isolated) indicates module fault status, detector connection line fault, or power failure;
- A second isolated communication channel in the RS-485 standard (Modbus RTU) ensures compatibility with external supervisory modules or 'smart building' control systems;
- Enclosure suitable for mounting on a TS35 rail in standard electrical distribution panels;
- Configuration of module settings via the keypad on the front panel;
- Removable wire connection terminals on all outputs for easier installation and servicing of the device;
- MDD operation can be visualised on a PC, with module configuration, event memory readout, and DGDS elements managed via the 'MDD256_View' software (available for download at www.gazex.pl) through an RS485/USB converter (e.g., MDD-CV/T, available from GAZEX).

SYSTEM BLOCK DIAGRAM



2. TECHNICAL PARAMETERS

Model	MDD-256/T
Supply voltage	24VDC (acceptable range: 15.0 to 30V)
Power consumption	0.1 A @24VDC (no load on 12V outputs), max 0.3A @ 24V (with max load on 12V alarm outputs)
Operating temperature	-10°C to +40°C recommended, -20°C to +45°C recommended periodically (<2h/24h)
Digital communication	PORT1 (*DET.NET network*) – RS-485 standard, MODBUS RTU protocol; in practice: up to 224 detector addresses and 21 additional devices in the network; PORT2 (*OUT.NET network*) – RS-485 standard, MODBUS RTU protocol; in theory: up to 256 addresses in the network; both ports are galvanically isolated
Event memory	Internal, non-erasable, stores the last 3000 alarm, fault, or configuration change events; can be read using 'MDD256_View' software on a PC
Visual signalling	8 LED lamps; LED display – collective network alarms or individual detector status with measurement unit indication: % range, % LEL, %v/v, or ppm
Sound signalling (standard)	Internal piezoelectric siren; intermittent tone 1Hz – A1 alarm; intermittent tone 5Hz – A2 alarm intermittent tone 10Hz – A3 alarm; continuous tone – Fault; (optional: no signalling – SILENT MODE activated from the keypad)
Module reset	via a button on the front panel
Alarm outputs	OUT5, OUT6, 12VDC, unregulated, for A1 and A2 statuses; total load = max 0.2A, for connection of signalling devices SL..., S-3x, LD-2
Contact control outputs	OUT1, OUT2, OUT3, OUT4 – relay, type NO/NC; max load: 4A (with resistive load) or max 2A (with inductive load – motors) or max. 0.6A (with pure inductive load – fluorescent lamps); max 230VAC or 24VDC; for the above – recommended minimum load for contacts: ≥100mA, ≥6V
Output deactivation	Standard: automatic – alarm state cleared after the alarm source ceases with a delay of 3 to 900 sec. (alarm memory signalled visually); option: manual – alarm status maintained on output after the alarm source ceases until manually cleared by the user (using the 'OK/Reset' button)
Dimensions and weight	106 x 90 x 65 mm, width x height x depth (6 mod. width); approx. 0.2kg
Enclosure	Polystyrene [PS], IP20; for mounting in electrical distribution panels on a 35 mm rail
Storage	In dry premises with temperatures between +5°C and +35°C; internal backup battery life – 5 years from the date of manufacture
Warranty	Standard Gazex 3-Year Plus Warranty (SGG3Y+) covering the period until the end of the year in which the device was manufactured and the following 3 years (*year of manufacture indicated on the nameplate => no warranty cards required*); extension option: up to 5 years (RGG5Y+);

3. DESCRIPTION AND METHOD OF CONNECTING

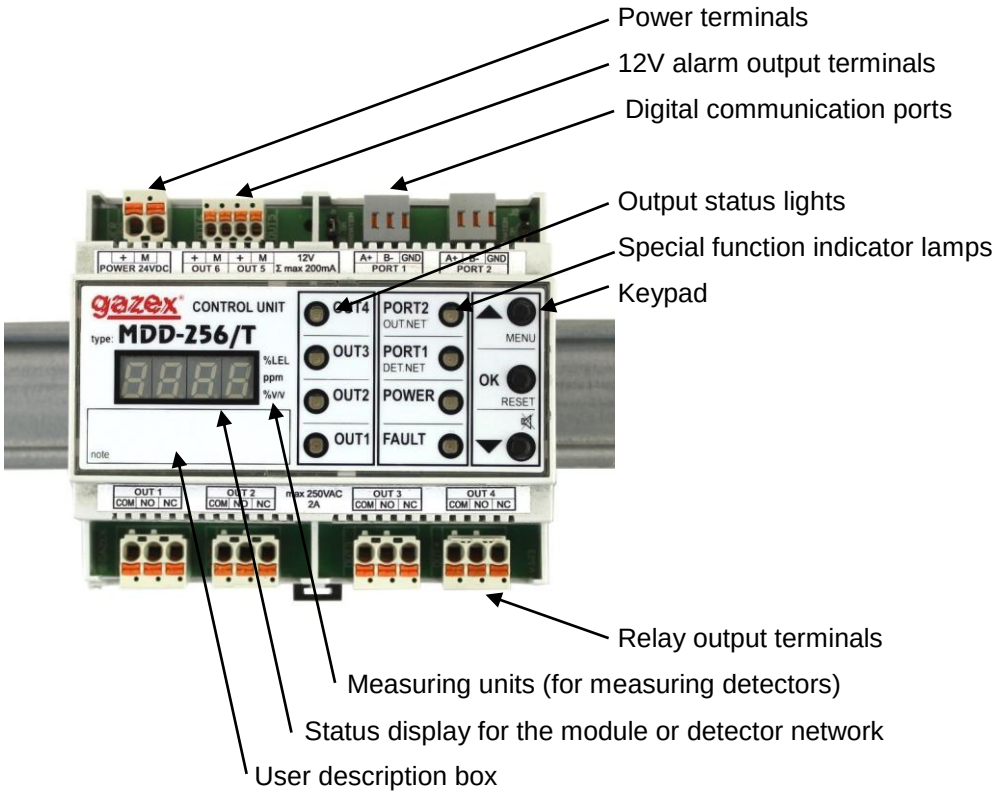


Photo 3. View of the MDD-256/T front panel (rail installation position)

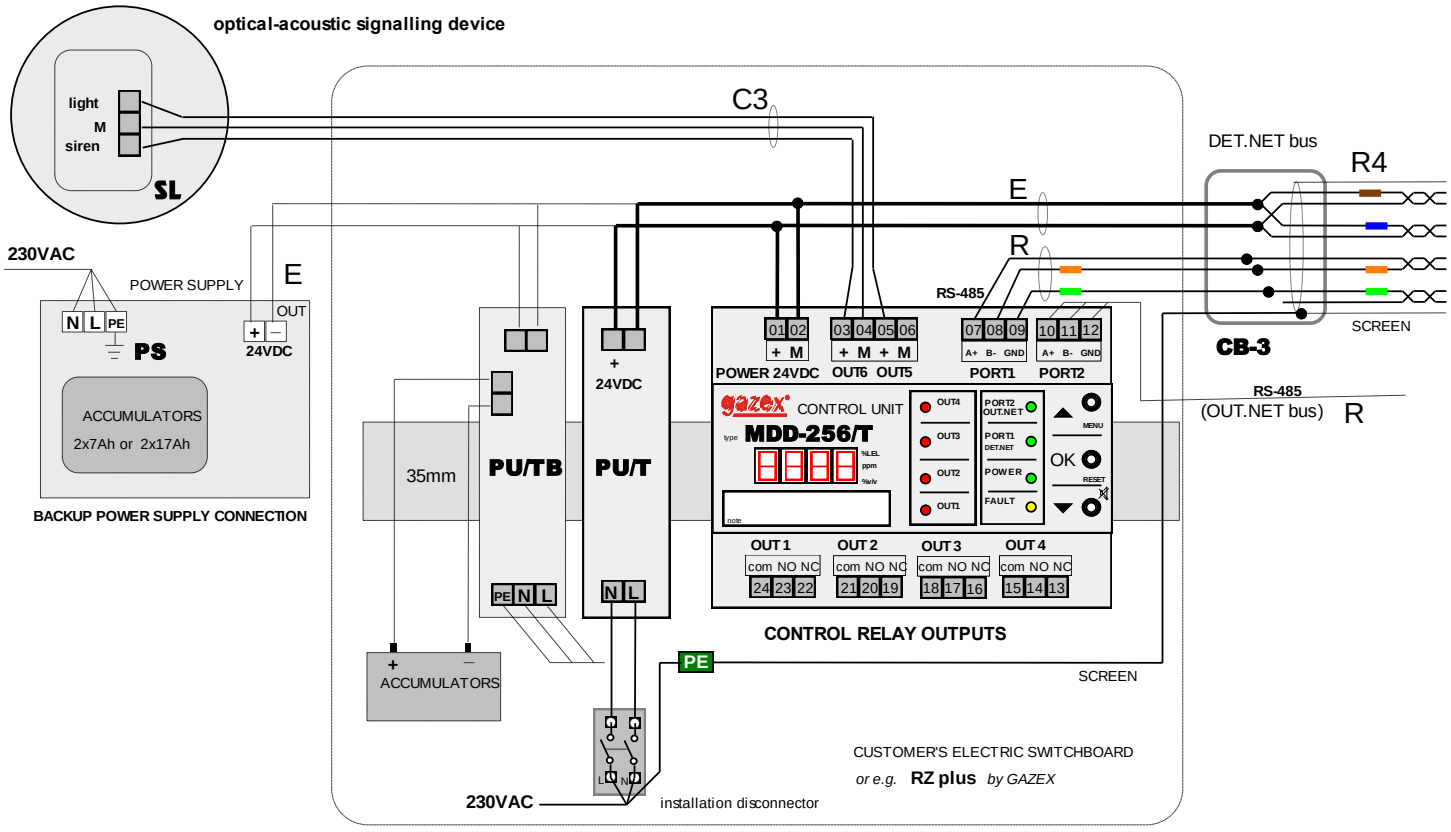


Fig. 3. View of terminal strips – electrical connections

R4 - cable 4x 2x 0,5 mm2 schielded

C3, E, R - cable markings according to the INFO-gazex P bulletin

the PE wire is connected to the SCREEN only at one point on the bus (closest to MDD-256/T)

do not connect PE wire to GDN connectors

Table 3. Functions of MDD outputs (standard - factory version):

OUTPUT TYPE / [OUTPUT NUMER] / *OUTPUT FUNCTION* / TERMINAL NUMBERS / MODULE STATUS	CONTACT								VOLTAGE 12V (*)	
	[OUT1] *A1*		[OUT2] *A2*		[OUT3] *A3*		[OUT4] *FAULT*		[OUT5] *A1*	[OUT6] *A2*
	24-23 COM-NO	24-22 COM-NC	21-20 COM-NO	21-19 COM-NC	18-17 COM-NO	18-16 COM-NC	15-14 COM-NO	15-13 COM-NC	05-06	03-04
NORMAL									0V	0V
A1									12V	0V
A2									12V	12V
A3									12V	12V
FAULT									0V	0V
E.NET FAULT	x	x	x	x	x	x			x	x

(*) The MDD outputs can be configured in various ways – the table shows the functions that are factory-set in the standard version. The method of assigning a specific alarm to a particular output and the assignment of outputs to zones can be defined by the user (see section 5.5.3.3).

x – indicates the last correct status before the fault status;

NORMAL STATUS – all devices on the DET.NET bus are in a normal state, with no alarms or faults, only green indicators are illuminated;

A1 – (A1 alarm status) at least one of the devices on the DET.NET bus indicates that the A1 concentration threshold has been exceeded, but the A2 threshold has not been reached; internal siren emits a pulsing tone; red lamps on assigned outputs [OUT...] are illuminated;

A2 – (A2 alarm status) at least one of the devices on the DET.NET bus indicates that the A2 concentration threshold has been exceeded, but the A3 threshold has not been reached; internal siren emits a pulsing tone; red lamps on assigned outputs [OUT...] are illuminated;

A3 – (A3 alarm status) at least one of the devices on the DET.NET bus indicates that the A3 concentration threshold – the measurement range – has been exceeded; internal siren emits a continuous tone; red lamps on assigned outputs [OUT...] are illuminated;

FAULT – loss of power to the MDD or internal module damage; all lamps are off;

– at least one of the devices on the DET.NET bus reports a failure FAULT. the yellow [FAULT] lamp is illuminated, and red lamps on assigned fault outputs [OUT...] may also be illuminated;

E.NET FAULT – loss of communication with at least one device on the DET.NET bus; the yellow [FAULT] lamp is illuminated, the last correct status of outputs prior to the fault is maintained, and red lamps on assigned outputs [OUT...] may also be illuminated.

4. Installing **MDD** in the system

MDD installation can begin after allowing sufficient time for the temperatures of the MDD and the surrounding air to equalise. Particularly in winter, when there are sub-zero temperatures during transport or storage, it is advisable to wait approx. 20 minutes before removing the MDD from its plastic packaging to prevent vapour condensation on the internal circuits of the device.

4.1 Secure the module in a distribution box, on a TS35 rail, outside of any explosion-hazard zones, in a place free from strong electromagnetic interference, vibrations, or shocks.

Caution! The setup can be carried out only when the power supply is off!!!

4.2 Connect the MDD module, as well as detectors and/or actuators, connection devices (with detectors), to the common [DET.NET] bus. It is recommended that digital devices are connected in series, creating a line topology. The creation of 'branches' from the bus (e.g. using a CB-3 junction box) is allowed, but such a branch should not exceed 12 metres. In Figure 4.2, device ‘C’ is connected to the bus, forming a ‘branch’.

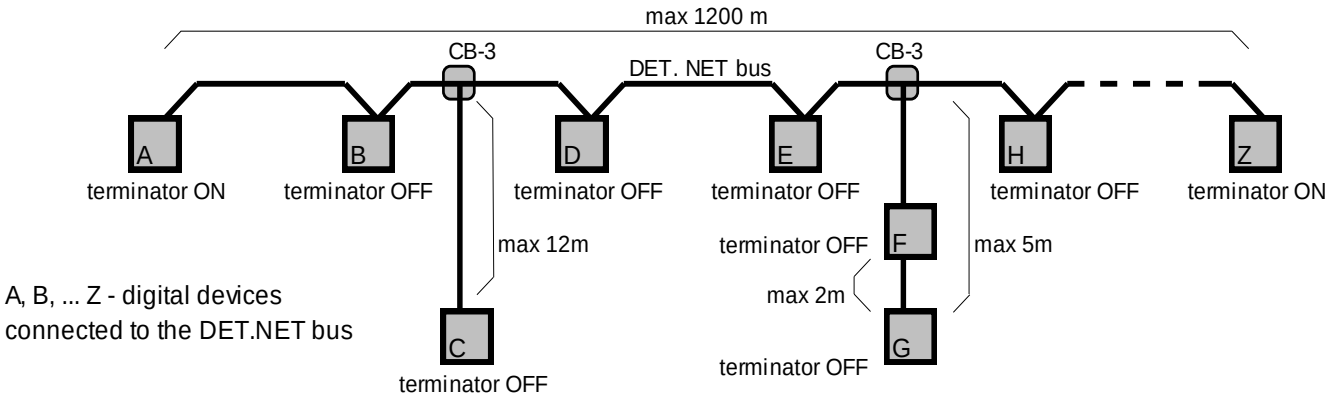


Figure 4.2 Recommended topology for connecting digital devices to the DET.NET bus and setting terminators.

Note: Any other connection of multiple bus wires by twisting the ends of the wires together is unacceptable, due to the high probability of the cores breaking off during twisting or coming loose in the future.

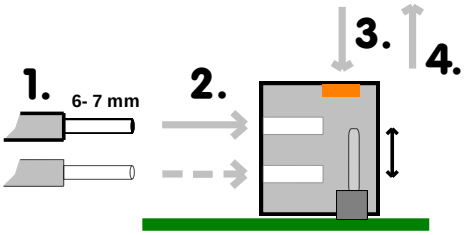
Terminators (terminating resistors) must be included in the digital devices connected at the two extreme ends of the [DET.NET] bus, in Figure 4.2 these devices are 'A' and 'Z'. If the MDD is an extreme bus device then the terminator must be enabled in the MDD by setting jumper J1 'TERMINATION' to ON. To disconnect the terminating resistor, set jumper J1 to OFF.

Note: Switching on more than two terminating resistors increases the load on the bus and may damage the MDD internal circuits responsible for data transmission. If only one termination resistor is used (or none at all), there is a possibility of reflective pulses being generated and digital communication between devices being disturbed.

Figure 4.2 Recommended topology for connecting digital devices to the DET.NET bus and setting terminators

4.2.1 Connect the bus cable 'R' fig.3 (recommended shielded cable, paired 3x 2x 0.5 mm^2 e.g. YTKSY ekw 3x2x0.8) or 'R4' (e.g. YTKSY ekw 4x2x0.8) to terminals PORT1, 'A+'→ [07], 'B-'→ [08], 'GND'. → [09].

4.2.1.1. Inserting a core into a removable terminal designed for connecting the wires of 'R', 'R4' single-wire cables (on RS-485 buses):



(1). remove core insulation over a section of 6 t o 7 mm;
(2). Use pliers to push (insert) the stripped core end into the round terminal opening; terminals are short-circuited in pairs vertically
Fig. 4.2.2. A properly inserted cable cannot be dislodged from the terminal. To remove the wire, press the orange button with a flat-bladed screwdriver as per arrow (3) and pull the wire out as indicated by arrow (4).

The terminals can be pulled off the module pins without disconnecting the bus connections.

Note: Incorrect wire polarity may prevent the entire network of detectors from starting up.
Note: Only special tools, which do not 'cripple' the cores, should be used for stripping the insulation of 'R4' wires (in practice very thin conductors). Using a knife or any other sharp tool for this purpose may cause a local reduction in the cross-section of the wire, which, when bent or pressed, can lead to the core breaking and result in a failure of communication across the entire detector bus (and this type of fault is visually difficult to locate quickly).

4.2.2 Connect the remaining devices (detectors and/or actuators, connecting with detectors) to the [DET.NET] bus, following the suggested colour scheme when connecting the wires to the corresponding terminals tab.4.2.2. The units should be connected sequentially, with all wire connections made to the double bus terminals of each unit. One terminal should be used to connect the current device at the end of the existing detector network, the other is used to lead the serial connection to the next device Fig.4.2.2.

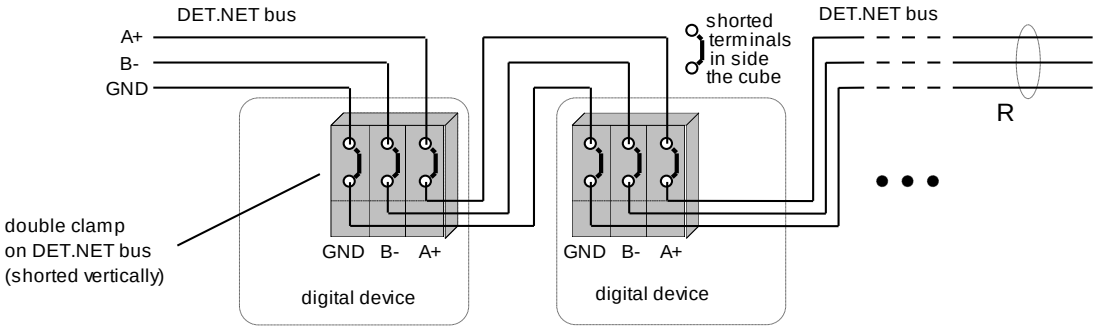


Fig. 4.2.2 Connection of further digital devices to DET.NET bus

Table 4.2.2 Suggested use of wires in cable type YTKSY ekw 4x2x0.8
(the colour of the terminal markings used on the labels of all RS-485 ports of GAZEX devices)

TERMINAL of DEVICE		WIRE from the cable type YTKSY ekw 4x2x0.8	
COLOUR	FUNCTION	COLOUR	FUNCTION
blue	power ground	blue	bus power ground
brown	power ground	brown	bus power ground
green	power ground	-	-
white and blue	+ power	white from the pair with	+ bus power ground
white and brown	+ power	white from the pair with	+ bus power ground
white and green	+ power	white from the pair with	available
grey	GND-signal ground	green	GND-signal ground
orange	RS-485 - signal B-	orange	RS-485 - signal B-
white and orange	RS-485 - signal A+	white from the pair with orange	RS-485 - signal A+
-	-	Cable shield	to mains supply PE

4.2.3 It is recommended to use shielded 'R…' cables in installations exposed to increased electromagnetic interference. The shield should be connected to the protective earth [PE] of the 230VAC mains supply, but only at one point – at the location of the MDD-256/T installation. In this case, the signal grounds (GND) of **all devices on the bus** should be connected to a common, dedicated bus wire [DET.NET] (in the MDD, the 'GND' terminal is [09]).

Note: Signal grounds on the bus must not be connected only on some devices, as this may cause data transmission errors or total bus failure. Installer practice indicates that the GND signal terminals of the bus should be connected in all devices or, under specific user conditions, the GND terminals should **not be** connected anywhere!

4.2.4 If additional devices, such as fibre optic converters, need to be installed on the [DET.NET] bus, the choice of device should be consulted with GAZEX Technical Support.

Note: The use of unverified devices on the bus may cause data transmission errors (due to improper receiver impedance matching or long response times) or, in the worst case, damage the internal circuits of other bus devices (e.g., due to the lack of galvanic isolation on the port).

4.2.5 The [DET.NET] bus can connect up to 247 devices (this applies to devices with an RS-485 port, manufactured by GAZEX). The transmission port is isolated (1kV) from the internal circuits. The MDD is protected against voltage surges. The maximum cable length between the most distant devices on the bus must not exceed 1,200 metres.

4.3 The MDD module can be connected via PORT2 to an external [OUT.NET] bus – for operation with external supervisory modules or with 'intelligent building' control systems - BMS.

4.3.1 The external bus should be connected to PORT2 – terminals 'A+'→[10], "B-"→[11], 'GND'→[12]; it is recommended to use an 'R' cable such as YTKSY ekw 2x2x0.8 type.

4.3.2 The same connection rules for devices on the [OUT.NET] bus apply as for the [DET.NET] bus (see sections 4.2.1, 4.2.3).

4.3.3 PORT2 of the MDD module is equipped with a J2 'TERMINATION' jumper, which allows the internal resistor R=120Ω to be engaged, terminating the bus to eliminate reflections resulting from impedance mismatch. If the MDD is connected at the end of the [OUT.NET] bus, the J2 jumper should be set to ON. If the MDD is placed in the middle of the bus, the jumper should be set to OFF.

Note: Leaving more terminating resistors active increases the load on the bus and may damage the MDD internal circuits responsible for data transmission.

4.3.4 The length of the [OUT.NET] bus must not exceed 1,200 metres at a speed of 9.6 kbps, or 200 metres at a speed of 57.6 kbps. The transmission port is isolated (1kV) from the other MDD circuits and is also protected against voltage surges.

The communication protocol specification for the MDD is provided in a separate document.

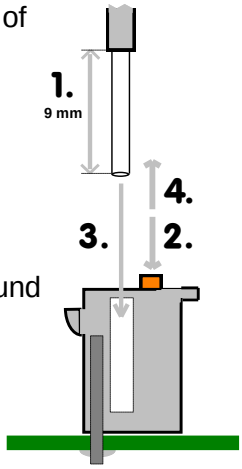
4.4 Connect external cooperating devices such as automation controllers, signalling devices, etc., to the 12V alarm outputs ([OUT5] and [OUT6]). If visual and sound signalling devices are located in the same place, it is recommended to use an integrated visual-sound signalling device, such as the SL-32 or SL-21. These can be connected to the MDD using a three-core cable 'C3' (see Fig. 3). The recommended type of cable is YKSY ekw 2x2x0.5.

4.4.1 The contact outputs [OUT1], [OUT2], [OUT3], [OUT4] can be connected to circuits of different phase mains voltage or low voltage circuits.

4.4.2 Inserting a core into a removable terminal designed for connecting single-wire and multi-wire cables (for contact outputs, 12V alarm outputs, and 24V power supply):

- remove core insulation over a section of 9 mm [1.];
- for multi-wire core cables (stranded cable) – twist the wires on the end slightly, press the orange lock button [2.], push the wire into the opening of the terminal up to the stop [3.], release the button [4.];
- for single-wire cable, use pliers or manually push the stripped core end into the round opening of the terminal up to the stop [3.].

A properly inserted cable cannot be dislodged from the terminal. The cable can be released and removed by pressing the orange button [2.].



The terminal blocks can be removed from the pins mounted to the module mounting plate without disconnecting the cables connected to the terminals.

WARNING: removal should only be carried out with the power to external circuits DISCONNECTED, especially if the voltage in the disconnected circuits may exceed the safe voltage limits!!!

The wire should be arranged in such a way that it does not exert mechanical force on the connection terminals. Solid or stranded wires (with or without ferrules) can be used.

4.5 Connect the 24V power cable 'E' (Fig. 3)⎓ from the PU.../T, PU.../TB, or PS... power supply; ensure correct polarity (the module is protected against reverse polarity).

The cross-section of the core depends directly on its total length and the number of MDD modules and detectors powered by a single power supply. The cross-section of the wires should be selected so that the supply voltage at the last detector in the series is **at least 2V higher** than the minimum permissible supply voltage (under maximum load conditions, with the control outputs switched on).

5. Configuring MDD

BEFORE POWERING ON the bus and MDD, ensure that all connections on the bus have been made correctly and securely, and in the proper sequence (any incorrect connections will prevent proper digital communication).

Check for any short circuits in the power cables (when using 'R' cables with very thin wires – potential shorts in long cables might not trigger the power supply's overload protection automatically). This could lead to overheating and permanent damage to the wires!

In the 'R4' bus cable, the unused pairs should be used as power pairs and connected in parallel (as shown in Fig. 3). This is to reduce voltage drops in the 24VDC power supply wires, which significantly affects the possible length of the bus (system range).

NOTE All described procedures and LED display messages refer to the standard version of the module. Descriptions of non-standard versions, changes, and updates can be found in any attached addenda to the user manual.

5.1 The initial configuration of the module according to the individual needs of the customer can be done using the keypad located on the front panel of the MDD.

NOTE: Press the keys gently to avoid damaging the internal circuits of the MDD.

5.2 Turn on the MDD's power (the module does not have a built-in power switch). Upon powering on, an acoustic test of the internal siren and a visual test of all display segments and indicator lamps is performed. The display will show the message

tESt, followed by information about the module version (e.g., Lw33) and the compilation date of the installed software (in the format [L.rmm], where 'r' is the last digit of the year; 'mm' is the month). This information may be required when contacting GAZEX Technical Support. The indicator lights will illuminate sequentially. During this time, the module settings are initialised.

5.3 After the testing phase, the module will enter normal operation mode based on the configuration settings stored in its internal memory (the letter n will appear in the centre of the display). The user can change configuration settings at any time using the keypad on the front panel of the module. Special functions activated via the keypad are described in section 6.5.

5.4 To make changes, press and hold the [▲] key for at least 3 seconds. Entering configuration mode will be confirmed by an intermittent acoustic signal and a request to enter the user password will be displayed on the LED screen: P000. The default password is: P001. The password is entered by adjusting the digits using the [▲] and [▼] keys and confirmed with the [**OK**] key. Entering an incorrect password will exit the menu and return to normal operation. To retry configuration changes, repeat the above steps.

Note The password provided above is the **standard password assigned to each MDD unit**. To prevent unauthorised access to module settings, **the password should be changed to a personal one** (this procedure is described later in section 5.5.4). The new password should be memorised/saved and stored in a secure location. Without this password, configuration changes cannot be made, and assistance from the manufacturer will be required (this is not covered under warranty and will be charged for).

5.5 Entering the correct password will be confirmed by an intermittent acoustic signal. The module will enter configuration mode. At this stage, all control and supervisory procedures are paused until the configuration is completed. The first item from the user menu will be displayed on the LED screen. The available menu functions are as follows:

- dnEt – DET.NET bus – configuration of the device network connected to the detector bus;
  - ddEt. – manual configuration of individual device parameters, such as DD, MDP-1.A/T,…;
  - dout. – enabling/disabling the handling of actuators, such as MDD-L32,…;
  - dScn. – automatic scanning, refreshing device addresses on the existing network;
  - dAdd. – adding new devices to the existing device network;
  - ddEL. – erasing device parameters on the DET.NET bus stored in MDD memory, along with resetting addresses in all devices connected to the bus;
- onEt – OUT.NET bus – configuration of transmission parameters for the external bus;
- out. – module outputs – parameter settings;
  - o.n. – setting output activation/deactivation delays;
  - oFun. – setting output operation modes;
  - o2on. – assigning outputs to zones;

- SErv. – assigning outputs to zones
  - PASS. – changing the user password;
  - tESt – module output test;
  - drSt. – setting MDD reset mode, triggering bus reset for detectors;
  - FACt. – restoring factory settings;
- diSP. – special LED display functions;
  - vAL. – setting the parameter display mode for devices;
  - LooP – enabling/disabling cyclic mode;
- .... – automatic menu exit.

Only one function is displayed on the LED screen at a time. To change to another function, use the [▲] or [▼] keys. To exit the menu, scroll through all available menu functions using the [▼] key.
Pressing the [**OK**] key on a specific function will enter its submenu. Navigation within a submenu is similar to the main menu. Options are selected and parameters are changed using the [▲] and [▼] keys, and confirmed with the [**OK**] key.
The following sections contain detailed descriptions of all MDD menu options.

5.5.1 dnEt. – Configuration of the DET.NET bus.

The first menu item groups all the necessary functions for the proper configuration of the DET.NET bus, i.e., the detector (module) network. From this level, the user defines device parameters, assigns network addresses to devices, refreshes the network content after changes, etc. The available functions are described below.

5.5.1.1 ddEt. – Detector settings – list of parameters:

This function is recommended when the DET.NET bus is already configured, the devices are working properly, and only manual parameter changes for individual devices are required. In this case, the user, who knows the addresses of the detectors they want to reconfigure, selects specific slave addresses from the range d.001 to d.224 and then makes changes to the settings of the selected detector. It is important to remember that after selecting the slave address, the MDD requires the user to correctly configure all the parameters of the selected detector (the full configuration path must be followed, and all detector parameters must be confirmed again).
Changes to the detector settings are made in real-time, meaning that proper communication between the MDD and the selected detector is required during parameter configuration.
If the MDD does not establish communication with the detector, this is indicated by a continuous acoustic signal, and parameter changes for the detector are blocked. In such a case, it is possible to enable/disable the handling of the detector and assign it to a specific zone.
If the MDD successfully establishes communication with the detector, this is indicated by an intermittent acoustic signal, and full configuration of the selected detector's parameters is allowed. The new parameters are stored in the MDD's memory as well as in the detector's memory.
The following describes the configuration steps for a single detector. Changes are always made using the [▲] and [▼] keys and confirmed by pressing [**OK**]. When confirming the selection of an option or group of options, the MDD sends a command to the detector. A successful change is indicated by an intermittent acoustic signal (the new settings are stored in the MDD's memory as well as in the detector's memory). Failure to establish communication or execute the command is indicated by a continuous signal (changes are not applied). After confirming all required settings, the system automatically returns to the detector list.

a) Select the detector number from the range d.001 to d.224.
   Select the number corresponding to the slave address of the detector. All changes will apply only to the selected detector.

b) Enabling/disabling detector handling:
   - dyES – detector handling enabled – the module in normal operation mode cyclically checks the status of the detector with the previously specified address;
   - dno – detector handling disabled (default setting) – the module skips the detector in normal operation mode, communication with the detector is disabled.

c) Assigning the detector to zones:
   - d.2oA – the detector is assigned to both ZONE1 and ZONE2 (default setting);
   - d.2o.1 – the detector is assigned only to ZONE1;
   - d.2o.2 – the detector is assigned only to ZONE2;
   Assigning the detector to a selected zone determines which MDD outputs will be activated in the event of an alarm or fault status in the detector.
   If communication with the detector fails, the system returns to point a).

d) Detector type and measurement unit:
- d.-P – measurement detector;
- d.-F – threshold detector.
The type of measurement unit is indicated by a horizontal line on the MDD display. Information about the detector type and measurement unit is read automatically and cannot be changed.

e) Enabling/disabling the detector:
- d.On – detector sensor power on;
- d.OFF – (default setting) detector sensor power off.
When the sensor in the detector is disabled, its measurement functions are blocked until the sensor is re-enabled. The detector will not report any alarm or fault statuses. Disabling the sensor is useful when carrying out maintenance, such as replacing the sensor in the detector, or if the sensor is damaged.

f) A3 measurement range (only for measurement detectors):
Non-editable value, automatically read from the detector.

g) Alarm types (only for measurement detectors):
- dA12 – instantaneous value alarms;
- dtAv – time-averaged alarms.
Non-editable values, automatically read from the detector.
The option dA12 activates alarms when the instantaneous signal value from the detector exceeds the set A1 and A2 thresholds. The option dtAv assigns time averaging to the alarm thresholds. Threshold A1 corresponds to the MAC value, and threshold A2 corresponds to the IMAC value. The A3 threshold, which corresponds to the measurement range, is always activated when the instantaneous signal value from the detector exceeds the A3 threshold (time averaging is disabled).

h) Alarm direction (only for measurement detectors):
- d.-- – excess (default setting);
- d.L- – deficiency.
Non-editable values, automatically read from the detector.
The excess option d.-- activates alarm thresholds if the detector signal exceeds the set alarm concentration thresholds A1 and A2, where A1 ≤ A2.
The deficiency option d.L- activates thresholds when the detector signal falls below the set alarm concentration thresholds A1 and A2, where A1 ≥ A2.

i) Setting the A2 threshold (only for measurement detectors):
The value can be adjusted between 2% and 100% of the A3 measurement range (the default factory setting is A2 = 30%).

j) Setting the A1 threshold (only for measurement detectors):
The value can be adjusted between 2% and 100% of the A3 measurement range (the default factory setting is A1 = 10%).

5.5.1.2 dout. – Actuator settings:

At this stage, the user can configure the parameters of actuators, such as MDD-L32/T, with assigned identification numbers (addresses) do.__, connected to the common DET.NET bus.

To configure the additional device, the appropriate combination of the [SLAVE ID] switch on the PCB of the configured device must be set, which corresponds to the identifier range do01 to do27 in the DGDS network (see Table 5.5.1.2.A). Then, in the MDD-256/T menu, select the appropriate identifier for the actuator and enable device handling by selecting:
- dYES – device handling enabled;
- dno – device handling disabled (factory setting).

Next, the device should be assigned to a selected group of detectors: Gr01 to Gr07 or GALL or according to Table 5.5.1.2.B. Groups from Gr01 to Gr07 include the selected 32 detectors. Assigning the additional device to one of these groups means that the device will respond only to events triggered by detectors in the selected group. Assigning the additional device to group GALL causes the device to respond to events triggered by all detectors, similar to the MDD-256/T module.

In the next step, the operation mode for the actuator outputs must be selected by choosing 2o31, 2o22, 2o12 or 2o11. A detailed description of the zone modes for different actuators is provided in Table 5.5.2.1.C.

Table 5.5.1.2.A. – Association of [SLAVE ID] with d.o… identifier in the DGDS network.

[SLAVE ID] switch setting combinations				**MDD identified in the DGDS network**		
1	**2**	**3**	**4**	**MDD-L32/T MDD-S2**	**MDD-C32/T MDD-R4/T**	**MDD-ZW**
OFF	OFF	OFF	OFF	Factory settings Communication disabled		
	OFF	OFF	ON	d.o.0.1	d.o.1.1	d.o.0.1
	OFF	ON	OFF	d.o.0.2	d.o.1.2	d.o.0.2
	OFF	ON	ON	d.o.0.3	d.o.1.3	d.o.0.3
	ON	OFF	OFF	d.o.0.4	d.o.1.4	d.o.0.4
	ON	OFF	ON	d.o.0.5	d.o.1.5	d.o.0.5
	ON	ON	OFF	d.o.0.6	d.o.1.6	d.o.0.6
	ON	ON	ON	d.o.0.7	d.o.1.7	d.o.0.7
ON	OFF	OFF	OFF	Communication disabled		
	OFF	OFF	ON	d.o.1.1	d.o.2.1	d.o.2.1
	OFF	ON	OFF	d.o.1.2	d.o.2.2	d.o.2.2
	OFF	ON	ON	d.o.1.3	d.o.2.3	d.o.2.3
	ON	OFF	OFF	d.o.1.4	d.o.2.4	d.o.2.4
	ON	OFF	ON	d.o.1.5	d.o.2.5	d.o.2.5
	ON	ON	OFF	d.o.1.6	d.o.2.6	d.o.2.6
	ON	ON	ON	d.o.1.7	d.o.2.7	d.o.2.7

Table 5.5.1.2.B – Association of group identifiers with detector addresses

Group identifier	**Addresses of supported detectors**
Gr.01	1 to 32
Gr.02	33 to 64
Gr.03	65 to 96
Gr.04	97 to 128
Gr.05	129 to 160
Gr.06	161 to 192
Gr.07	193 to 224
GALL	1 to 224

Table 5.5.2.1.C – Output operation modes of various additional devices

MDD-L32/T						
Output mode	**Contact output OUT 1**	**Contact output OUT2**	**Contact output OUT3**	**Contact output OUT4**	**Voltage output OUT5**	**Voltage output OUT6**
Zo.31	ALARM A1	ALARM A2	ALARM A3	FAULT	ALARM A1	ALARM A2
Zo.22	ALARM A1 Zone 1	ALARM A2 Zone 1	ALARM A1 Zone 2	ALARM A2 Zone 2	ALARM A1 Zone 1+2	ALARM A2 Zone 1+2
Zo.12	ALARM A1 Zone 1	FAULT Zone 1	ALARM A1 Zone 2	FAULT Zone 2	ALARM A1 Zone 1	ALARM A1 Zone 2
Zo.11	ALARM A1	ALARM A1	ALARM A1	FAULT	ALARM A1	ALARM A1
MDD-R4/T						
Output mode	**Contact output OUT 1**	**Contact output OUT2**	**Contact output OUT3**	**Contact output OUT4**	**Voltage output OUT5**	**Voltage output OUT6**
Zo.31 (d.o.1.1 – d.o.1.7)	ALARM A1 Zone 1	ALARM A2 Zone 1	ALARM A3 Zone 1	FAULT Zone 1	ALARM A1 Zone 1	ALARM A2 Zone 1
Zo.31 (d.o.2.1 – d.o.2.7)	ALARM A1 Zone 2	ALARM A2 Zone 2	ALARM A3 Zone 2	FAULT Zone 2	ALARM A1 Zone 2	ALARM A2 Zone 2
Zo.22	ALARM A1 Zone 1	ALARM A2 Zone 1	ALARM A1 Zone 2	ALARM A2 Zone 2	ALARM A1 Zone 1+2	ALARM A2 Zone 1+2
Zo.12	ALARM A1 Zone 1	FAULT Zone 1	ALARM A1 Zone 2	FAULT Zone 2	ALARM A1 Zone 1	ALARM A1 Zone 2
Zo.11 (d.o.1.1 – d.o.1.7)	ALARM A1 Zone 1 (> 2 alarms)	ALARM A2 Zone 1 (> 2 alarms)	ALARM A3 Zone 1 (> 2 alarms)	FAULT Zone 1 (> 2 alarms)	ALARM A1 Zone 1 (> 2 alarms)	ALARM A2 Zone 1 (> 2 alarms)
Zo.11 (d.o.2.1 – d.o.2.7)	ALARM A1 Zone 2 (> 2 alarms)	ALARM A2 Zone 2 (> 2 alarms)	ALARM A3 Zone 2 (> 2 alarms)	SYSTEM FAULT Zone 2 (> 2 alarms)	ALARM A1 Zone 2 (> 2 alarms)	ALARM A2 Zone 2 (> 2 alarms)
MDD-S2						
Output mode	**Contact output OUT 1**	**Contact output OUT2**	**Contact output OUT3**	**Contact output OUT4**	**Voltage output OUT5**	**Voltage output OUT6**
Zo.31 (d.o.0.1 – d.o.0.7)	ALARM A1 Zone 1	ALARM A2 Zone 1	ALARM A3 Zone 1	SYSTEM FAULT Zone 1	ALARM A1 Zone 1	ALARM A2 Zone 1
Zo.31 (d.o.1.1 – d.o.1.7)	ALARM A1 Zone 2	ALARM A2 Zone 2	ALARM A3 Zone 2	SYSTEM FAULT Zone 2	ALARM A1 Zone 2	ALARM A2 Zone 2
Zo.22	ALARM A1 Zone 1	ALARM A2 Zone 1	ALARM A1 Zone 2	ALARM A2 Zone 2	ALARM A1 Zone 1+2	ALARM A2 Zone 1+2
Zo.12	ALARM A1 Zone 1	FAULT Zone 1	ALARM A1 Zone 2	FAULT Zone 2	ALARM A1 Zone 1	ALARM A1 Zone 2
Zo.11	ALARM A1	ALARM A1	ALARM A1	SYSTEM FAULT	ALARM A1	ALARM A1
MDD-C32/T						
Output mode	**OC outputs: 1 ÷ 32**					
Zo.31 Zo.22 Zo.12 Zo.11	Functionality is set only from the MDD-C-32/T level. Changing the output mode from the MDD-256/T level does not change the functionality of the device.					
MDD-ZW						
Output mode	**Valve output ZAW1**			**Valve output ZAW2**		
Zo.31 Zo.22 Zo.12 Zo.11	The functionality is constant and independent of the selected output operating mode					
	ALARM A2 Zone 1			ALARM A2 Zone 2		

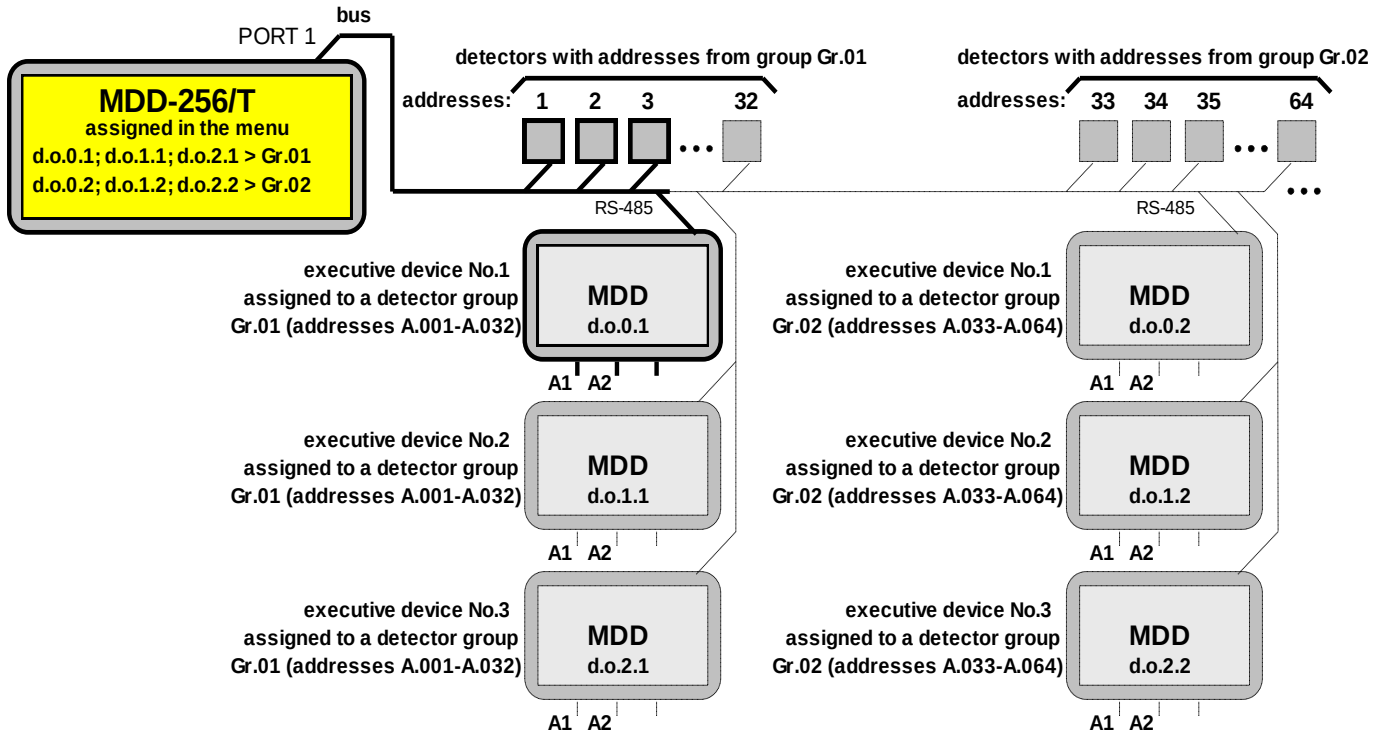


Fig. 5.5.1.2.A System diagram including actuators typically assigned to detector groups

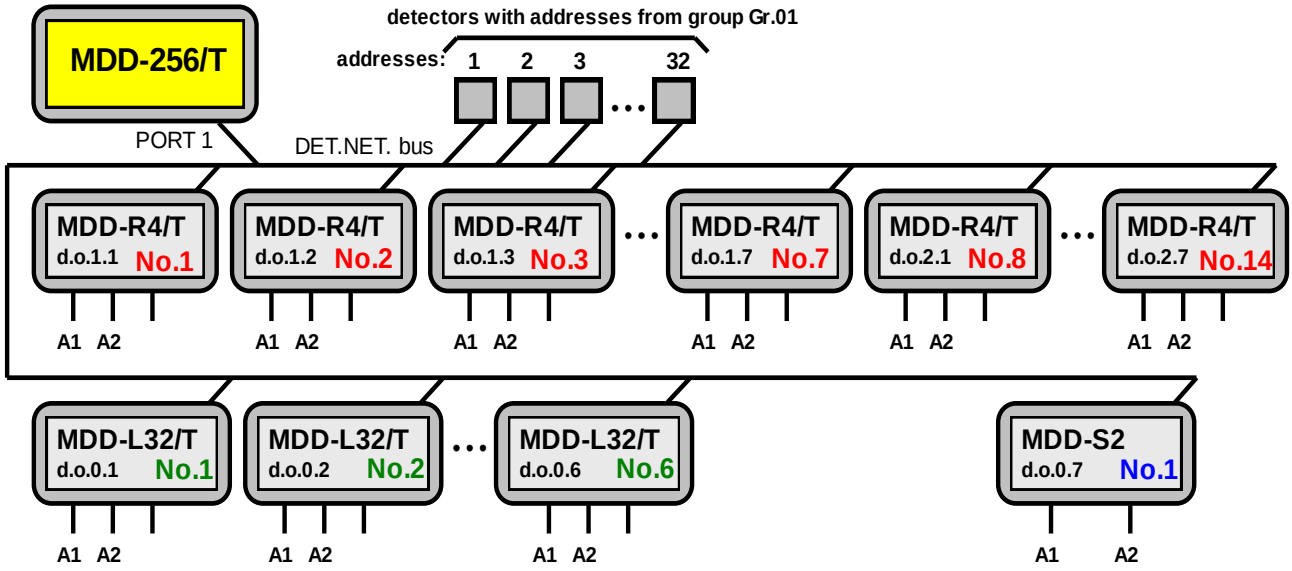


Fig. 5.5.1.2.B Example system diagram containing 21 actuators (14 pcs of MDD-R4/T, 6 pcs of MDD-L32/T, and 1 pc of MDD-S2), which have been assigned to only one detector group, Gr.01

5.5.1.3 dScn – Scanning, refreshing the existing detector network.

This function allows for a simple and quick scan of all slave addresses in the detector network ranging from A.001 to A.254, and based on this, the reconstruction of the detector network. The procedure is particularly recommended when a new MDD module is being installed in an existing, operational detector network. A prerequisite for conducting the scan is the correct connection of all detectors with unique slave addresses to the DET.NET bus and proper communication.

The procedure for scanning the detector network, which has assigned addresses, is as follows:

1) The MDD sends a request to the slave A.001 and awaits a response.
2) If there is a detector with the address A.001, it responds to the request. The MDD receives the response from the slave A.001, memorises the slave settings, and registers it in the detector network.
3) If there is no detector with the address A.001, after the required time for a valid response, the MDD skips it in the DET.NET detector network.

4) The actions listed in points 1 to 3 are repeated until all available addresses in the detector network have been scanned.

5.5.1.4 dAdd – Addressing detectors on the bus – enables the creation of a new detector network and the addition of detectors to an existing network.
This function allows for a simple and quick configuration of the detector network by assigning the required slave addresses to individual detectors. A prerequisite for conducting the addressing procedure is the correct connection of all detectors to the DET.NET bus.

After selecting this option, the module begins the detector addressing procedure by sending a start addressing command to all detectors connected to the bus. The detectors enter 'addressing mode'. The MDD displays the initial slave address A001 from which the addressing will commence. The starting address can be changed by the user using the [▲] and [▼] keys. The selection is confirmed by pressing the [**OK**] key.

The addressing procedure for detectors that do not have assigned addresses is as follows:

1) The MDD temporarily assigns an initial slave address (e.g., A001) to all detectors.
2) The MDD sends a request to the detector A001 and awaits a response.
3) The user confirms the assignment of the address A001 to the selected detector by pressing the appropriate button on the detector or by bringing a magnet close to the marked spot on the detector enclosure (depending on the type of device). Once confirmed, the selected detector permanently assigns itself the address A001, sends a response to the MDD, and exits the reporting procedure.
4) The MDD receives the response from the slave A001, memorises the slave settings, and registers it in the detector network.
5) The MDD confirms the registration of the detector by sending several requests to the detector.
6) The MDD automatically changes the slave address to the next address A002 and temporarily assigns it to the remaining detectors.
7) Steps 2 to 6 are repeated.

If the user assigns addresses to all detectors connected to the DET.NET network, they confirm the end of addressing by pressing the [**OK**] key. The module concludes the addressing procedure, saves the settings of the new detector network in non-volatile memory, and displays the number of memorised detectors on the screen. The new settings remain active until new changes are made.

The addressing procedure for detectors that have assigned addresses (adding a new, additional device, or replacing a faulty device with a new one) is as follows:

1) The MDD queries the successive detectors from the existing network (detectors exit the reporting procedure after sending a response).
2) After querying the existing network, the MDD stops at the first available address, sends a request to the detector, and awaits a response.
3) The user confirms the assignment of the displayed address to the added detector by pressing the appropriate button or bringing a magnet close to the designated spot on the detector/device enclosure (depending on the type). Once confirmed, the selected detector permanently assigns the specified address to itself, sends a response to the MDD, and exits the reporting procedure.
4) The MDD receives the response from the new detector and records it in the DET.NET network.
5) Steps 2 to 4 are repeated for the remaining new devices.

If the user assigns addresses to all detectors connected to the DET.NET network, they confirm the end of addressing by pressing the [**OK**] key. The module concludes the addressing procedure, saves the settings of the new detector network in non-volatile memory, and displays the number of memorised detectors on the screen. The new settings remain active until new changes are made.

NOTE: If the user of an extensive DGDS plans to use multiple actuators/control modules – that is, plans to have more than two zones (subsystems) requiring independent control (a maximum of 7 groups with a maximum of 32 detectors each, where each group is divided into 1 or 2 zones) – they should consider such a division into address groups when assigning addresses to individual detectors, in accordance with Table 5.5.1.2.A.

5.5.1.5 dDEL – Deleting slave addresses of detectors connected to the DET.NET bus.

This function allows the deletion of all slave addresses assigned to detectors. It is particularly recommended before starting the addressing of an unknown detector network or when some detectors may have the same slave addresses assigned. To confirm deletion, use the [▲] key to select the option YES and confirm by pressing [**OK**].

NOTE!!! Deleting will reset the addresses of all devices connected to the DET.NET bus. After deletion, all detectors will remain inactive and will require the proper addressing procedure described earlier in section 5.5.1.4

to be performed again. Additionally, the MDD will reset the memorised configuration of the detector network, disabling DET.NET bus support.

5.5.2 oUtE – Setting parameters of the OUT.NET bus.

This section is used to configure the communication parameters of the external bus, intended for MDD communication with external master devices or visualisation systems.

The settings include the following parameters:

– Slave address assigned to MDD: A001 (default setting) ÷ A247;

– Data transmission speed: b096 [kbps] (default setting), b192 [kbps], b384 [kbps], or b576 [kbps];

– Parity check: PyES – even (default setting) or Pno – none.

5.5.3 out. – Output settings.

This section groups a set of functions for configuring the required functionality of the outputs. The properties of individual functions are described in detail below.

The MDD has four contact outputs: OUT1, OUT2, OUT3, OUT4, and two voltage outputs marked: OUT5, OUT6.

5.5.3.1 o.On – Setting delay times for switching outputs on/off.

To set the timing parameters, follow these steps:

1) Select the appropriate output number from the range out.1 ÷ out6.

2) Set the activation delay for the output, which is the time (default = 10 sec.) from the moment the MDD registers a specific alarm status from at least one of the detectors connected to the bus to the moment the MDD activates the corresponding output.

The delay can be set within the range: 0003 ÷ 0300 seconds.

3) Set the deactivation delay for the output, which is the time (default = 10 sec.) from the moment the specific alarm status from detectors connected to the common bus ceases, to the moment the corresponding output is turned off.

The delay can be set within the range: 0003 ÷ 0900 seconds.

5.5.3.2 oFun. – Output functionality/mode settings.

The following module operating modes are available from the menu:

– FnAL – Normal mode with ALARM MEMORY (default setting),

– FAAL – Mode with ALARM LATCH,

– F.An – Auto-reset mode WITHOUT ALARM MEMORY,

– FSEr. – SERVICE mode for 60 minutes, preventing the activation of module outputs.

The operating mode determines specific control functionality for the MDD outputs. Depending on the set mode, the MDD either keeps the alarm status information displayed on the front panel (alarm memory) or clears the messages (no alarm memory). Additionally, MDD output activation can occur for the duration of the alarm or until manually cleared by the user (alarm latch). Details are provided in Table 5.5.3.2.

Table 5.5.3.2 Characteristics of MDD operating modes

Operating mode	Active alarm			Ended alarm		
	Optical signalling od output statuses	Internal acoustic signal	Status of alarm outputs	Optical signalling od output statuses	Internal acoustic signal	Status of alarm outputs
FnAL	Continuous	Pulsing, cycle dependent on alarm level	Active	Pulsing	Pulsing, 1s/4s	Inactive
FAAL	Continuous	Pulsing, cycle dependent on alarm level	Active	Continuous	Pulsing, cycle dependent on alarm level	Active
F.An	Continuous	Pulsing, cycle dependent on alarm level	Active	None	None	Inactive
FSEr.	Continuous	Pulsing, cycle dependent on alarm level	Inactive	Pulsing	Pulsing, 1s/4s	Inactive

Normal mode with **ALARM MEMORY** – Activates alarm and fault signalling both during and after an event. The pulsing signal after the alarm ceases is maintained until the user consciously resets the MDD. Alarm outputs are activated only for the duration of the alarm, respecting output activation and deactivation delays. The mode can be activated indefinitely.

Mode with **ALARM LATCH** – Activates alarm outputs both during the alarm and maintains this status after the event causing the alarm ends. The output will deactivate ONLY following an external user intervention (resetting the MDD using the 'OK' button). The mode can be activated indefinitely.

Mode **WITHOUT MEMORY** – Automatically resets the MDD once the alarm ends, with no user intervention required. No information about the ended alarm is left on the front panel. Acoustic signals are also disabled. The mode can be activated indefinitely. This mode is especially recommended for mechanical ventilation control systems.

SERVICE mode – Prevents the activation of MDD outputs and outputs of all actuators controlled by the MDD-256/T module for 60 minutes. The mode is recommended during gas detection system servicing. In this mode, MDD measurement functions are maintained, meaning the MDD monitors the status of connected detectors and displays information about alarms and faults on the front panel, but does not activate outputs. The mode can be deactivated at any time before the full duration from the user menu or by temporarily disconnecting the module's power supply. Enabling service mode is indicated by a pulsing POWER indicator light.

5.5.3.3 o.2on. – Assigning MDD outputs to zones.

The following options are available for MDD outputs from the menu (see Table 5.5.3.3):

– 2o.3 1 – Three alarm levels A1, A2, A3 and FAULT – no division into zones (default),
– 2o.2 2 – Two alarm levels A1 and A2, without FAULT – in two zones,
– 2o.1 2 – One alarm level A1 and FAULT – in two zones,
– 2o.1 1 – One alarm level A1 and FAULT – no division into zones.

Mode 2o.3 1 is recommended when the MDD operates a network built with MDP-1.A/T or MDD-1 measurement modules, where each detector has three alarm thresholds assigned. It should also be used for dual-threshold detector networks when it is necessary to use the FAULT output.

Mode 2o.2 2 is recommended for networks with dual-threshold detectors, in situations where it is necessary to divide detectors into 2 zones, and the contact output for FAULT is not required (FAULT status is available through PORT2 when queried by the supervisory module).

Modes 2o.1 2 and 2o.1 1 are recommended for networks with single-threshold detectors, e.g., DD type detectors.

Table 5.5.3.3 Assigning zones and alarms to individual MDD outputs

Zone mode	Contact output OUT1	Contact output OUT2	Contact output OUT3	Contact output OUT4	Voltage output OUT5	Voltage output OUT6
2o.3 1	ALARM A1	ALARM A2	ALARM A3	SYSTEM FAULT	ALARM A1	ALARM A2
2o.2 2	ALARM A1 Zone 1	ALARM A2 Zone 1	ALARM A1 Zone 2	ALARM A2 Zone 2	ALARM A1 Zone 1+2	ALARM A2 Zone 1+2
2o.1 2	ALARM A1 Zone 1	FAULT Zone 1	ALARM A1 Zone 2	FAULT Zone 2	ALARM A1 Zone 1	ALARM A1 Zone 2
2o.1 1	ALARM A1	ALARM A1	ALARM A1	SYSTEM FAULT	ALARM A1	ALARM A1

5.5.4 SErU. – Service and special functions.

This section groups a set of service and special functions used during MDD servicing. The available options are described below.

5.5.4.1 PASS. – Changing the user password.

- P.001 – Default user password (standard setting).
- P.000 ÷ P.999 – adjustable password range.

Note: To protect against unauthorised access to the module's settings, it is recommended to change the password individually. The new password should be memorised and stored in a secure location. Losing the password will prevent further configuration changes to the module, requiring intervention from the Manufacturer's Authorised Service Centre.

5.5.4.2 tESt – MDD output test.

The output test feature allows for checking the correct operation of all outputs without the need to generate alarms from detectors connected to the bus.
Outputs are activated sequentially for 10 seconds each. The currently active output is indicated by an appropriate LED on the front panel. After testing all outputs, the MDD automatically returns to the user menu. Outputs are activated in the following sequence:

Time [s]	Contact output OUT1	Contact output OUT2	Contact output OUT3	Contact output OUT4	Voltage output OUT5	Voltage output OUT6
0 – 10	active					
10 – 20		active				
20 – 30			active			
30 – 40				active		
40 – 50					active	
50 – 60						active

5.5.4.3 dr St. – Resetting the device network connected to the DET.NET bus.

From the reset settings menu, two options are available:

rSEt. – defines the method for resetting the MDD and the detector network when the user presses the [OK] button on the front panel of the MDD. When r.On is selected, each time the MDD is reset using the button, all devices in the detector network are automatically reset. When r.OFF is selected, only the MDD is reset, while the status of the devices in the detector network remains unchanged.

r.run – allows the trigger for resetting the entire detector network to be activated from the menu (independently of the 'RESET' button on the front panel).

5.5.4.4 FAct. – Restoring default MDD settings.

This option restores the default configuration settings of the MDD (as detailed in sections 5.5.1 to 5.5.5), clearing any previously entered changes. This option is particularly recommended in cases where a lack of knowledge of previous settings might inadvertently trigger MDD control and monitoring procedures that are unsuitable for the desired configuration.

5.5.5 diSP. – Enabling/disabling special functions of the LED display.

The display settings offer two options:

vAL. – setting the option v.YES enables the display of the current status of detectors during the execution of the slave address browsing procedure (as described in section 6.3). Setting the option v.no disables the display of the detector status.

LooP – Enabling the option L.YES causes the slave address browsing procedure to loop. Upon completion of displaying information about the entire detector network, the MDD automatically begins displaying information again from the start. You can interrupt the display by pressing and holding the [▼] key for 2 seconds.

6. STARTING UP THE DGDS

All devices in the Digital Gas Detection System (DGDS) equipped with RS-485 communication ports, supplied by GAZEX, have communication disabled by default (set to 'zero' address). In this status, the devices will not respond to the supervisory module's inquiries until they are assigned individual addresses. This is a safety setting, ensuring that there are no two (or more) devices with the same address in one network, which would otherwise lead to communication errors.

If a new device network is being created and there is uncertainty as to whether all devices are set to the 'zero' address, the addresses must be reset before starting the addressing process. This can be done manually for each device (according to the user manual of the specific device) or automatically via the MDD menu, option dDEL, section 5.5.1.5.

Note! Be aware that running the address reset procedure on an existing network will delete all device addresses, necessitating the repetition of the addressing procedure for the entire network.

If the detectors or modules connected to the digital bus are difficult to access at the installation site, it is recommended that the devices be addressed before installation. This can be done by connecting each device individually to the MDD and assigning them addresses sequentially. It is important to label each device with its address and the description of its physical installation location. Once this network of devices is installed, simply run the network scanning option from the MDD menu, option dScn, section 5.5.1.3, and verify that the number of detected devices and their addresses match the actual configuration.

Note! Please note that running the network scanning procedure will remove any devices from the MDD's list that do not respond to the inquiry. Therefore, before initiating scanning (function dScn), ensure that all devices in the network are powered on and connected to the bus. Scanning only changes the MDD settings and does not delete or set slave addresses in the devices connected to the bus.

The addressing procedure, option dAdd, section 5.5.1.4, can be launched when it is certain that the devices being configured have their addresses reset, or to add new devices to an existing, correctly functioning network. The required start-up steps are described below.

6.1 Turn on the power to the MDD and all devices connected to the DET.NET bus. Wait until the MDD completes the initialisation of the startup parameters (loading the last settings, testing the display and indicators), and displays the symbol nOFF on the LED screen, indicating that communication on the DET.NET bus is disabled (no detector network is configured in the MDD).

6.2 Configure the new network of detectors and/or actuators, connection devices (with detectors) connected to the DET.NET bus as follows:

1) - Ensure that the electrical connections between the detector network and the MDD module are correct.
2) - Ensure that all elements of the detection system are properly powered.
3) Enter the MDD menu (see sections 5.4 and 5.5).
4) From the main menu, select option dnEt (see section 5.5.1), and confirm by pressing [**OK**].
5) Start the addressing of the detector network by selecting option dAdd (see section 5.5.1.4), and confirm with the [**OK**] key.
   All devices connected to the DET.NET bus should indicate that they have entered addressing mode. If this does not happen, terminate the addressing procedure by pressing [**OK**] twice, locate and fix the fault (typical digital bus faults and their solutions are described in section 6.9). Once resolved, restart the addressing procedure.
   For an existing detector network, the MDD will automatically skip all occupied addresses in the network (devices already in the network will exit the reporting procedure) and stop at the first available, lowest address.
6) Set the initial device address (default is A001), and confirm by pressing [**OK**]. Upon confirmation, the MDD waits for a response from the device at the indicated address, signalling this status with a 'rotating' symbol c on the segment display.
7) Proceed to the first device and confirm the new address by following the instructions in the device's user manual (pressing the appropriate button or bringing a magnet close to the designated spot on the device enclosure). The addressed device signals the acceptance of the new address and exits the reporting procedure, resuming normal operation. (A detailed algorithm of the addressing procedure implemented in the MDD is described in section 5.5.1.4).
8) Wait a few seconds until the MDD confirms the address with an intermittent beep and displays the next address value on the LED screen.

   Note! If addressing is confirmed simultaneously on the next device before the MDD moves on to the next address, the same address will be assigned to both devices, resulting in communication errors!!!

9) If the user does not wish to maintain the addressing sequence, they may change the address to any value before confirming the next device using the [▲] and [▼] keys. Confirm the selection with the [**OK**] key. If the selected address is already occupied, the MDD will automatically increment it to the next available address.
10) Once all devices have been addressed, end the reporting procedure by pressing [**OK**]. The MDD signals the completion of the procedure by displaying the number of addressed devices, which should match the actual number of devices in the network.

6.3 Configure the remaining MDD parameters in accordance with requirements (details in section 5). Exit the menu.

6.4 Once the configuration settings are exited (or if the configuration stage is skipped by the user), the MDD enters normal operation mode, where it continuously polls the configured network of detectors connected to PORT 1. Proper communication is indicated by the blinking green [DET.NET] lamp at PORT1. The front panel displays the following information in real time: the overall status of the detector network, the statuses of outputs, power supply and RS-485 communication correctness, and any activation of special MDD functions. The methods of signalling are described below:

a) The LED segment screen indicates the current status of the detector network connected to the MDD. Alarm or fault conditions displayed are the collective statuses of the entire detector network, triggered by at least one detector. Below are explanations of the symbols:

- alarm statuses:
  - n.OFF – communication off (no active detectors);
  - n – normal status of the detector network;
  - A1 – active ALARM 1 level exceeded;
  - A2 – active ALARM 2 level exceeded;
  - A3 – active ALARM 3 level exceeded;
  - h1 – (historical) ALARM 1 was exceeded;
  - h2 – (historical) ALARM 2 was exceeded;
  - h3 – (historical) ALARM 3 was exceeded;
  - r.cAL. – recalibration required for detector;
  - Er.03 – short circuit or overload on MDD voltage outputs;
  - Er.04 – low power supply voltage;
- fault statuses or special information from devices on the DET.NET detector network:
  - E.nEt – no communication with device in DET.NET network;
  - F.dEt. – fault reported by a device on the DET.NET network;
  - d.OFF – device inactive (sensor switched off);
  - d.SEt – device in settings mode;
  - hEAt – device in warm-up mode;

b) Red lamps [OUT1] to [OUT4] indicate the status of alarm outputs:
- solid light – alarm output active;
- pulsing light in a (0.5s / 0.5s) cycle – SERVICE MODE enabled (temporary block of all outputs);
- pulsing light in a (1 sec. on / 3 sec. off) cycle – alarm output inactive (historical memory of active output);
- light off – alarm output inactive;

b) Green lamp [DET.NET] indicates the status of detector bus communication:
- pulsing light at intervals consistent with polling frequency (approx. 3–30 sec.; depending on the number of detectors in the network) – communication is correct;
- off – communication is off in the MDD module; no active detectors/devices in the DET.NET network;
- solid light – module is sending queries to the bus, but no response is received; this status could indicate lack of power to detectors, a faulty detector bus, missing termination resistors, or high interference on the bus;

c) Green lamp [POWER] indicates the power supply status of the MDD:
- solid light – power parameters within limits;
- pulsing blinks – 1 second off in a 4-second cycle – power supply is correct, SILENT MODE is enabled (internal buzzer disabled);
- pulsing light (0.5s / 0.5s) – power is correct; SERVICE MODE enabled (temporary block of all outputs);
- pulse blanking – three flashes (off for 0.5s, repeated over 4 seconds) – power is correct; A2 BLOCK MODE enabled (temporary block of voltage output A2);
- light off – no power to the module;

f) Yellow lamp [FAULT] – indicates presence of faults in the system:
- solid light – active fault status from a detector/device connected to the bus (including detector power loss), digital bus damage, or MDD module fault;
- light off – no faults;

g) The internal buzzer provides an audible indication of MDD alarm and fault statuses:
- continuous sound – any fault status;
- continuous sound – active alarm A3;
- pulsing sound in a cycle (0.2s / 0.2s) – active A2 alarm;
- pulsing sound in a cycle (0.5s / 0.5s) – active A1 alarm;
- pulsing sound in a cycle (1s / 4s) – alarm or fault status has ended (historical memory);
- no sound – normal status.

6.5 The operation of the MDD module is controlled via the keypad located on the front panel. During normal operation (not in menu mode), additional functions are permanently assigned to the keypad buttons. Pressing and holding a button for a specified time activates the following functions accordingly:

- [▲] **button** (≥1 s but < 3 s) – initiates the procedure for displaying the configuration of slave addresses on the detector bus; the LED screen sequentially displays the number of active detectors in the network, followed by the successive slave addresses of the detectors. If the option to display the detector status is enabled, after each slave address, the current status of the device is displayed. After all addresses are shown, the MDD returns to normal operation.
- [▼] **button** (≥1 s but < 3 s) – initiates the procedure for displaying current fault and alarm statuses, along with the corresponding slave addresses of detectors reporting the specific status; the LED screen sequentially displays the type of fault or alarm, followed by the slave addresses of the detectors. After all active events are displayed, the MDD returns to normal operation.
- [**OK**] **button** (≥ 3 s) – resets the module, restoring the initial register settings of the MDD as if after powering on. The reset clears the memory of signals regarding completed alarm or fault statuses.
- [▲] **button** (≥ 3 s) – enters the user menu. Holding this button at any time during module operation interrupts the MDD control and measurement processes and allows the user to make the necessary changes to the module settings.
- [▼] **button** (≥ 3 s) – activates or deactivates the internal siren. Deactivating the siren (enabling 'silent mode') is indicated by an intermittent acoustic signal and a flashing green POWER light. This option is especially recommended when the module is installed inside distribution cabinets and functions solely as a ventilation controller without the need for acoustic signals. The 'silent mode' allows the internal siren to be muted indefinitely (also after a power interruption).
- [▼] and [**OK**] **buttons** (≥ 3 s) – holding both buttons simultaneously during an active A2 alarm disables the OUT6 voltage output for 15 minutes or until a new A2 alarm is triggered.

6.6 After proper installation and detector warm-up in clean air, no audible or visual signals should be generated, and the LED screen should display the symbol  indicating the normal status of the detector network. If the screen displays the symbol  , it indicates that there are no active detectors in the network.
If other symbols are visible on the LED screen, yellow or red lights are illuminated, and an audible signal is heard, this suggests improper detector installation or incorrect MDD configuration. In this case, the bus connections and MDD settings should be checked.

6.7 The final step in verifying the **System's** operation is generating all alarm statuses for **all connected detectors** and verifying the functionality of external devices.
REQUIRED SYSTEM CHECK CONDITIONS:

- The **MDD** module is in the normal status indicated by the symbol  , with the [**POWER**] light on.
- Active devices connected to the DET.NET network are not generating any alarm or fault signals.

6.7.1 One by one generate alarm statuses for **each** detector in the DET.NET network using test gas with a known concentration value, following the instructions in the detector's user manual. After applying the gas to the detector, the MDD module's LED screen should display the message  ,  or  . Pressing the [▼] button for approximately 2 seconds will display the address of the detector that triggered the alarm. Displaying the alarm status and matching the address confirms the proper operation of the detector and module set.
If the detector's alarm signals persist for a time corresponding to the **output activation delay**, the alarm signal will be triggered at the appropriate alarm outputs, the red [**OUT1**], [**OUT2**], or [**OUT3**] lights will turn on, and the audible signal will activate. The outputs will be activated according to the zone division modes set.

6.7.2 After removing the test gas, the gas concentration in the detector will decrease, causing the LED screen to show the detector's status changing to  or  and finally displaying the message , or  (corresponding to the generated alarm number). The control outputs will return to their normal status (the red LED lights will turn off), and the audible signal will change to an intermittent sound in a 1s/4s cycle. The alarm information will remain on the LED screen until manually and deliberately cleared by the user.

6.7.3 The control procedure in 6.7.1 should be supplemented with an output test (outputs in normal mode, not 'service' mode) conducted programmatically from the user menu as described in section 5.5.4.2.
The results of the control or activation process should be recorded in the Periodic Inspection Record. Following a positive test result, the **Digital Gas Detection System** can be considered operational and functional.

6.8. PROBLEMS?

Table 6.8. Exceptional statuses of the MDD module after power-on:

EFFECT	WHY	WHAT TO DO
All lights are off.	No power to the MDD module or reverse polarity.	Power the MDD module correctly.
Only the FAULT alarm light is on.	MDD fault.	Contact the maintenance service at GAZEX.
The MDD displays this message: EnEt.	No communication between the MDD and the detector(s) on the DET.NET bus.	Due to the complexity of the problem, the procedure is detailed in section 6.9. For a detailed description of how to install DET.NET bus connections, see section 4.2 of this Manual.
The MDD displays this message: Er04.	Power supply voltage is below the acceptable threshold.	Check and correct the MDD's power supply parameters.
The MDD in A2 or A1 status displays this message: Er03.	Short circuit or overload (>200mA) on voltage output terminals OUT5 or OUT6.	Disconnect and check the external devices or alarms connected to OUT5/OUT6. When the devices are disconnected, the message should disappear.
No audible alarm triggered on the detector.	Detector operation disabled at this address; detector in service mode.	Verify if the detector is on the list of devices (press [▲] for approx. 2 s). Check the detector settings.
The MDD signals a detector alarm on the LCD but does not trigger an output.	MDD service mode enabled, or a long output delay is set.	Check the MDD configuration settings.
The MDD does not trigger output for A2 alarm from detector.	Other zone mode enabled on MDD outputs, e.g. outputs assigned only to A1 alarm.	Review zone configuration and adjust if necessary.
On power up, device alarms appear on the display for several/tens of seconds, then the alarms stop.	The detector warm-up period of 60 seconds has not been completed, or the detector was previously stored at low ambient temperatures for a long period.	Wait several minutes after power-on. After the alarms have ended, press the [**OK**] button for at least 3 s and reset the MDD display (return the module to the normal status). Correct thee warm-up time for the DET.NET bus devices.

If any effects other than those listed above are observed, contact the Authorised Service Centre or the Manufacturer.

6.9. INSTALLATION AND ACTIVATION RECOMMENDATIONS FOR THE DIGITAL BUS

The user of the MDD and the INSTALLATION TECHNICIAN must be aware of the special design of the RS-485 bus for digital communication with the detectors.

This necessitates carrying out all installation and maintenance work with the UTMOST CARE!

Systems based on digital communication between detectors and the MDD module allow the transmission of an unlimited amount of data between devices, enhancing their functionality, but require careful attention during cabling installation. The most common problems associated with a lack of digital communication between the MDD and devices on the DET.NET bus, or between the MDD and the supervisory system on the OUT.NET bus, are due to installation errors, the use of incorrect cables, poor bus topology, or the introduction of untested additional devices onto the network.
Below are the recommended installation procedures for connecting bus cables to individual devices, as well as start-up guidelines describing typical actions to be taken when the MDD reports no communication with a specific device, a group of devices, or the entire bus (indicated by the EnEt message on the MDD screen).

6.9.1 Preparation.

- Before starting the cabling installation, the installer should become familiar with the basic parameters of the RS-485 interface and follow the guidelines described in sections 4.2 and 4.3 of this Manual when designing the digital bus topology.
- The user manuals of the devices to be installed should be consulted. In cases where devices are powered and communicate via a single cable, it is advisable to use CB-3 junction boxes at points where local power is supplied to a selected group of devices. CB-3 boxes are equipped with a complete set of terminals for connecting all types of power cables (maximum cross-section 2.5 mm²).
- The digital bus cable (‘R4’) should be routed in **series** to the installation points of the individual devices and junction boxes.
- It is essential to avoid running the digital bus cables in parallel and in close proximity to other building cables that may cause increased interference (e.g. automation control, motors, inverters). An optimal solution to avoid many problems during system start-up and operation is to use shielded cables.
- All cable connections must be made with the power supply switched off.

Table 6.9.1 Exceptional statuses of the digital bus after power-on:

EFFECT	WHY	WHAT TO DO
The light on all bus devices are off.	No power supply.	Check if the system power supply is switched on. If not, turn on the power supply. Verify the correct wiring at the power supply output.
	Power supply overload ($15V > U_{power\ supply} > 0V$) caused by too many powered devices or too high inrush current at startup.	Measure the voltage at the power supply output terminals (the voltage is below the allowable threshold but not zero). Turn off the power supply. Check the number of devices on the bus. Disconnect some devices from the power supply and use an additional power supply for them.
	Short circuit at the power supply output.	Measure the resistance between the power supply terminals (with the power off). The measured value allows for an estimate of the approximate location of the short circuit – the resistance of the 'R4' twisted pair is approximately 75 Ω/km/loop for one colour pair.
	Wires incorrectly connected to the power supply output.	Check the wiring and the polarity at the power supply output. If incorrect, rectify the connection.
Signalling of some devices after power-on is off or incorrect.	Low device supply voltage caused by excessive distance from the power source (too high cable resistance).	The measured voltage at the selected device's power terminals is below the minimum allowable value. The voltage increases when the device is disconnected from the power supply (connectors removed from the pins). Use local power for some devices (reduce the distance between the devices and the power supply) or reduce the resistance of the power cables (use cables with a larger cross-section).

For any other problems, contact the maintenance service at GAZEX.

6.9.2 Checking communication between devices on the RS-485 digital bus.

The simplest and quickest way to check communication correctness is to run the addressing procedure from the supervisory module (detailed in section 6 of this Manual). This involves activating a special operating mode in all devices connected to the common bus. After starting the addressing procedure, all devices should signal the activation of the addressing mode (the signalling method depends on the device type and is described in the device's user manual). If the signalling of a group or all devices is incorrect, the addressing procedure should be interrupted in the MDD supervisory module, the digital bus fault identified and corrected, and the addressing procedure restarted. This procedure should be repeated until all devices correctly signal the addressing mode.

The first step is to rule out installation errors, such as:
- Incorrect device connections to the bus;
- Short circuits or open circuits in the transmission lines;
- Incorrect bus topology;
- Use of terminating resistors in more than two devices;
- Incorrect signal ground connections between devices.

If only a selected group of devices are not signalling the addressing mode, it is likely that a wiring connection error has occurred. Another possible cause is a significant drop in the power supply to these devices, preventing proper communication.

If **none** of the devices on the bus are signalling the addressing mode, this may indicate a fault either in the supervisory module sending digital frames or in the first device on the bus. Investigation should start there.
If the connections are correct, this may indicate a fault in the internal transmitter circuits of the supervisory module or one of the devices connected to the bus. In this case, disconnect the devices from the digital bus (simply disconnect the terminals from the device ports without unplugging the cables), leaving only the MDD supervisory module and the most distant device (to test the length of the bus). Carry out the addressing procedure. If communication is correct, connect one device at a time and repeat the addressing procedure until the faulty device is identified.
If communication fails when only two units are connected, test communication on a very short link (MDD and a slave directly next to each other). If communication still fails under these conditions, this indicates a fault in the MDD transmitter circuits. However, if the devices are communicating properly with a short link, this may indicate strong interference induced in the long bus cables, the wrong type of cabling, or improper or missing shield connections in the bus devices. In this case, check the bus cable layout to ensure that it does not run parallel to other cables that may cause increased interference.

7. MAINTENANCE / OPERATION

MDD modules are electronic devices without moving parts. They are built using semiconductor components with a long service life. Therefore, their maintenance is a periodic inspection of the system:

7.1 Periodic Inspection of the System:

- Clean the MDD from dust.
- Notify all system users about the planned inspection.
- Perform the **system test according to section 6.7** of this User Manual.

THE RECOMMENDED FREQUENCY FOR MDD PERIODIC INSPECTIONS IS AT LEAST **EVERY 3 MONTH**. *THIS IS SUFFICIENT FOR TESTING THE ELECTRICAL AND MEASURING PROPERTIES OF THE SYSTEM (see NOTE below).*

NOTE:

THE FREQUENCY OF PERIODIC INSPECTIONS *of the gas detection system with MDD modules should be determined by the operating conditions, the type of detectors used, and the importance of the system/facility in the opinion of the User:*

1) *A PERIODIC INSPECTION is recommended* ***after every replacement of a sensor module*** *or* ***calibration of any detector*** *in the system (the frequency depends on the calibration period recommended in the technical parameters of the respective detector models – refer to the relevant user manual or technical data sheet).*

2) *Additionally:*

A. ***Recommended*** *frequency of periodic DGDS inspections –* **every 3 months:**
- *for systems with detectors operating in heavily dusty, humid environments, where gas background is frequently present, and*
- *for extensive systems containing a significant number of detectors.*

B. ***Normal*** *frequency of periodic DGDS inspections –* **every 6 months:**
- *for systems with detectors operating in generally stable conditions, without exposure to a constant gas background, and*
- *for systems controlling gas valves.*

C. ***Reduced*** *frequency of periodic DGDS inspections –* **every 12 months:**
- *for systems with detectors operating in normally clean atmospheres and stable conditions, and*
- *for systems containing a small number of detectors/devices.*

- The Periodic System Inspection should also be conducted EVERY TIME after the occurrence of particular conditions in the system operation, such as:

– occurrence of extreme conditions, e.g. high gas concentration, high or very low temperature, high periodic dustiness or increase in humidity,
– high concentrations of gases which were not anticipated in the monitored zone;
– long-term operation with the alarm status activated,
– after a power outage of more than 1 hour,
– after voltage surges or strong disturbances in the electrical installation;
– after renovation or installation work that may affect the operation of the system or its configuration, etc.

– ***PLEASE NOTE:*** The above-mentioned frequency of System inspections can be considered to be in line with good engineering practice, based on over 30 years of experience of the Manufacturer. However, it should be emphasised that in the specific conditions of a given Customer, this frequency **may be subject to modification**, based on the principle that the more important the system is (for the Customer/User), i.e., the more the Customer cares about efficient, failure-free operation of the facility where the system is used, the more frequently the system should be inspected. When expecting to increase the level of operational safety of their facility, the Customer should inspect the detection system more frequently, e.g. every 4 weeks or prior to each important event/measurement. On the other hand, where the role of the detection system is considered to be less important or based on the Customer's own assessment of the reliability of the facility's components, the Customer/User may decide to extend the inspection period e.g. to 6 or 12 months.

THE SYSTEM INSPECTION INTERVAL MUST NOT EXCEED 12 MONTHS!

7.2 During operation, the use of mobile phones, radios, or other sources of strong electromagnetic fields in the immediate vicinity of the MDD should be avoided as their use may interfere with the operation of the MDD and cause false alarms.
7.2.1 During the operation of the MDD, temperatures outside the operating range (section 3) should be avoided.

ATTENTION ! IMPORTANT !

7.3 All of the following:
- results of each system inspection according to section 6.7. of this Manual,
- situations where an A2 or A3 alarm status was generated, along with the actions taken by the staff,
- power outages of the module lasting longer than 3 months,
- any observed unusual behaviour of the system

must be recorded in the Periodic Inspection Record under penalty of loss of warranty for the system components.

7.4 After a period of 10 years from the date of manufacture, the internal lithium battery must be replaced with a new one without exception. This is a paid service provided by the Manufacturer.

7.5 **<u>WARNING</u>**: Any attempt to interfere with the internal circuits of the MDD will result in the loss of warranty rights.

Pursuant to the Act of 11 September 2015 on Waste Electrical and Electronic Equipment, a used module may not be disposed of together with other household waste. It should be transferred to a specialised waste collection point. This is why it was marked with a special symbol:

Proper waste disposal protects against the adverse effects on human health and the environment.

8. MDD STORAGE

It is recommended to store the MDD in dry premises with temperatures between +5°C and +35°C. Short-term storage (<2h/8h) in ambient temperatures between -10°C and +45°C is permitted. The guaranteed life of the internal backup battery supporting the real-time clock memory is 5 years from the date of manufacture (the lifespan depends on the duration of storage without power). After 10 years from the date of manufacture, it is recommended to replace the battery with a new one – replacement must only be carried out by the Manufacturer.

PLEASE NOTE:

Due to the continuous improvement of our products and our desire to provide the most complete and detailed information possible on them and to provide the know-how necessary for the correct, long-term operation of our products based on our customers' experiences to date, GAZEX reserves the right to make minor changes to the technical specifications of the products supplied, while such changes and not included in this User Manual, and to modify the latter. For this reason, please verify and confirm with the Manufacturer that your User Manual is up to date (please state the exact type and series of the device in use and the manual version number – from the footer of the document).

9. WARRANTY TERMS AND CONDITIONS

The device is covered by the Gazex Standard Warranty 3 years plus (SGG3Y+) in Poland according to the terms and conditions of SGG3Y+ available at www.gazex.pl. Selected extracts from the SGG3Y+ terms and conditions:

...

1. GAZEX guarantees the efficient operation of devices of its own manufacture for the period up to the end of the year in which the device was manufactured and for another three years.

1.1. The year of manufacture is determined on the basis of the device's nameplate (*warranty cards are not issued!*).

1.2. If the nameplate is illegible – the year of manufacture will be determined on the basis of the serial number or the code labels on the components (*if any*) together with the records in the GAZEX electronic manufacturing surveillance system. Such verification is subject to a charge. The fee is PLN 50.00 net for each started verification of a batch of up to 10 devices.

1.3. Non-identifiable devices, i.e. with a damaged/illegible nameplate or no nameplate at all and with the GAZEX logo removed/covered permanently, shall not be subject to the warranty.

1.4. The SGG3Y+ warranty covers all devices manufactured by GAZEX after 1 January 2021 which display the year of manufacture '2021' or later on the nameplate.

...

4. The warranty does not cover damage caused by:
   a) mechanical shock, vibration and effects, thermal effects and chemical effects;
   b) damages resulting from improper storage, faulty installation or improper operating conditions contrary to the device's User Manual;
   c) failure to carry out periodic maintenance or by other negligence;
   d) deliberate action by the user, third parties or persons not authorised to carry out repairs;
   e) lightning, power line surges, or electrostatic charges;
   f) force majeure or other events beyond the Manufacturer's control.

   Consumables including, but not limited to, fuses, batteries, built-in batteries, gas sensors (which are covered by the GAZEX OGG+ Limited Warranty), porous sintered components are not covered by the warranty.

...

6. The warranty rights cease to apply in the following cases:
   a) damage to the factory seals, service seals or identification marks on the device/components;
   b) interference with the device's internal systems or making any other changes to the device or control software or when the device is operated with non-original components not supplied by GAZEX;
   c) failure to carry out periodic maintenance activities, confirmed by systematic entries in the Periodic Inspection Record (enclosed with the device or devices cooperating with it) and indicated as necessary in the device's User Manual.

   ...

The full updated terms and conditions of SGG3Y+ are available at www.gazex.pl.

FAILURE TO COMPLY with all the terms and conditions of installation and operation of the detector as described in this Manual (which shall include keeping the Periodic Inspection Record) will result in the loss of warranty rights.
An extended version of the Periodic Inspection Record is available in .pdf format at: **www.gazex.pl.**

PLEASE NOTE:

Any complaints require that a warranty repair request or post-warranty repair request is registered on: https://www.gazex.com/pl/serwis.

There is a possibility to extend the warranty to 5 years – Gazex Extended Warranty 5 year plus (RGG5Y+), according to the terms and conditions of RGG5Y+ available at www.gazex.pl.