



Warsaw

Measuring Control Unit

type/model

# INSTRUCTION MANUAL

- |                 |                  |
|-----------------|------------------|
| <b>MDP-4</b>    | <b>MDP-4.Z</b>   |
| <b>MDP-4.A</b>  | <b>MDP-4.ZA</b>  |
| <b>MDP-4.B</b>  | <b>MDP-4.ZB</b>  |
| <b>MDP-8</b>    | <b>MDP-8.Z</b>   |
| <b>MDP-8.A</b>  | <b>MDP-8.ZA</b>  |
| <b>MDP-8.B</b>  | <b>MDP-8.ZB</b>  |
| <b>MDP-16</b>   | <b>MDP-16.Z</b>  |
| <b>MDP-16.A</b> | <b>MDP-16.ZA</b> |
| <b>MDP-16.B</b> | <b>MDP-16.ZB</b> |

edition 6PU63en

series U6

Read carefully this entire manual BEFORE installation.

For safety reasons during installation and operation of the device it is



necessary to comply with recommendations and warnings marked with this symbol.

The installation can be started after the content of this manual has been fully understood.

Keep the manual as reference for the User.

**NOTE:** This device is equipped with a function blocking in the case of interference in the internal circuits!



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# 1. GENERAL PURPOSE

The **MDP-4.(-,A,B,Z,ZA,ZB)**, **MDP-8.(-,A,B,Z,ZA,ZB)**, **MDP-16.(-,A,B,Z,ZA,ZB)** U6 series Control Units are dedicated to use with 4-20mA transmitters/gas detectors type **DEX<sup>®</sup>/P** and **DG/P** series made by GAZEX. It is possible to connect **DEX<sup>®</sup>/F** and **DG/F** type threshold detectors too.

In the remainder of this Instruction, the term "detector" or "DEX" will refer to DEX/P or DG/P detectors for all types of gases, the term "MDP" will refer to MDP for all types, except that the description will apply to a specific type / model.

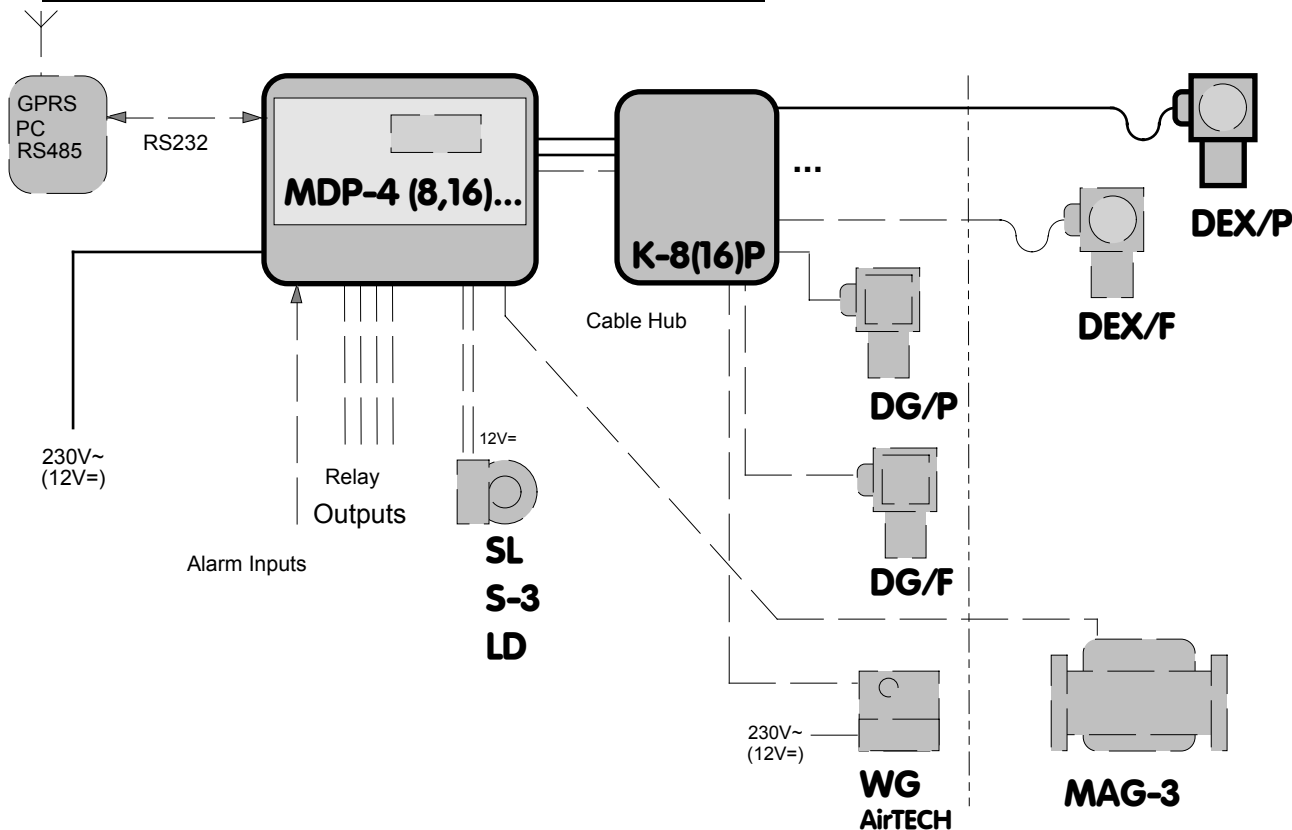
The MDP can control the work of one to four (MDP-4...), to eight (MDP-8...) or up to sixteen (MDP-16...) detectors in the measuring or threshold version. A K-8P or K-16P cable hub in **version U4** or later can be used for cooperation of MDP units with detectors. MDP-4 don't require in cooperation with the measuring detectors a cable hub, and in cooperation with at least one threshold detector needs a K-8P hub.

The MDP...-Z... unit can control independently the work of two MAG-3 shut-off valves.

## Features and functions performed by MDP:

- ◆ supplies (9VDC) individual detectors - can work with measuring detectors 4-20mA: DEX/P, DG/P and DEX/F and other threshold detectors manufactured by GAZEX, as well as with detectors equipped with relay output;
- ◆ monitors the status of a wired connection with the detectors (ensures complete detection of emergencies, clearly defining the type and location of faults);
- ◆ controls the value of current drawn by the individual detectors and in case of failure of any one of them automatically disconnects the power without blocking the work of other detectors (independent hardware and software protections);
- ◆ assigns - three alarm levels to each measuring detector: two, A1 and A2 - set by the user to any value in the full range ( $A1 \leq A2 \leq 100\%$  of range), third, A3 constant - determines the range exceeding the detector; - two alarm levels A1 and A2 to each detector;
- ◆ allows calculation of the weighted average TWA and average STEL for measuring toxic gas detectors
- ◆ allows to specify the type of display measuring units: [%] range, [% LEL], [mA] or [ppm];
- ◆ allows assigning individual detectors to one of two zones to control various external devices, depending on in which group of detectors alarm occurred (in fact it creates two detection systems);
- ◆ the MDP unit in version ...Z controls operation of two shut-off valves and controls the efficiency of the wired connection of the unit to the valves (one valve is assigned to one zone);
- ◆ allows the additional three modes of operation: SILENT MODE - silences the internal piezoceramic buzzer or temporarily blocks (for 15 minutes) the signalling device at output A2 (12V voltage); SERVICE MODE - temporarily deactivates outputs of the unit; AUTO RESET - automatically resets memory status of outputs and inputs on the unit's display after decay of emergency state,
- ◆ allows for closing the valves by manual triggering of output control signals (no need for generation of detectors' alarm signals);
- ◆ signals fault states and alarm states through generation of proper messages on graphical LCD display and turning LED lamps on, as well as by means of acoustic signals (in-built buzzer);
- ◆ allows to select the type of messages displayed on the LCD screen between the measuring window, that includes the current detector signal values scaled in measuring units, or a threshold window, that contains messages about alarms and fault of MDP
- ◆ stores in non-volatile, internal memory the last 1,600 events in 1600 with corresponding start and end times and with origin of the event;
- ◆ allows very precise setting of alarms' delays and constancy of those parameters in time thanks to microprocessor control;
- ◆ allows for 12VDC supply of additional equipment;
- ◆ by alarm inputs (galvanically separated) allows for cooperation with additional devices and units (cascade);
- ◆ 12VDC alarm outputs. control additional acoustic and optical signalling devices
- ◆ relay outputs (galvanically separated from the system) control fans, motors, contactors, information boards, or connect with building's/facility's automatics;
- ◆ activation of outputs depending on the number of alarms on the inputs: at least 1 or 2 detectors in alarm;
- ◆ relay output "FAULT" (galvanically separated) indicates the failure state of MDP, damage to fuses, damage to line connecting the detector or power failure;
- ◆ RS232 serial communication channel can work in two modes: **Printer mode** or **Modbus/RTU** - cooperation with control system of an "intelligent building" (after application of RS232/RS485 converter).

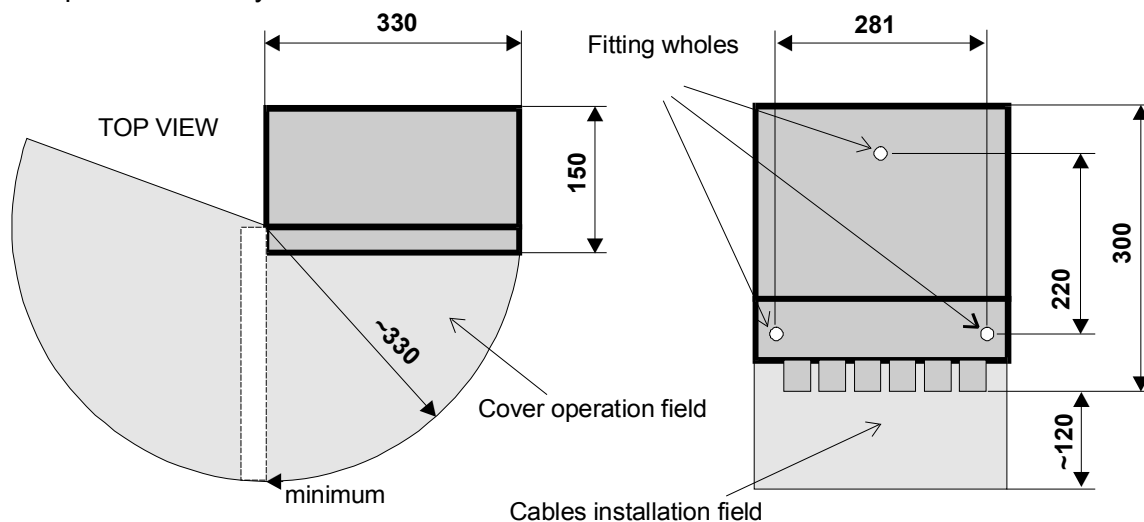
## CONNECTION BLOCK DIAGRAM



## MDP SELECTION TABLE

TYPE	MDP-	4	4.A	4.B	4.Z	4.ZA	4.ZB	8	8...	16	16...
Max. number of detectors		4	4	4	4	4	4	8	8	16	16
Alarm changeover relay OUTPUTS		2+2	2+2	2+2	2+2	2+2	2+2	2+2	as for MDP-4...	2+2	as for MDP-4...
FAULT changeover relay OUTPUTS		1	1	1	1	1	1	1		1	
12V voltage alarm OUTPUTS		2+2	2+2	2+2	2+2	2+2	2+2	2+2		2+2	
12V voltage insulated alarm INPUTS		2	2	2	2	2	2	2		2	
High-current 12V OUTPUT for control of shut-off valve		-	-	-	2	2	2	-		-	
Supply VOLTAGE		230V~	12V=	230V~	230V~	12V=	230V~	230V~		230V~	
Internal battery-powered power backup				+			+				
Recommended cable hub									K-8P		K-16P

Fig. 1.2. Required assembly area



## 2. DESCRIPTION AND MANNER OF CONNECTING IN THE SYSTEM

Fig. 2.1 View of front board (under transparent cover)

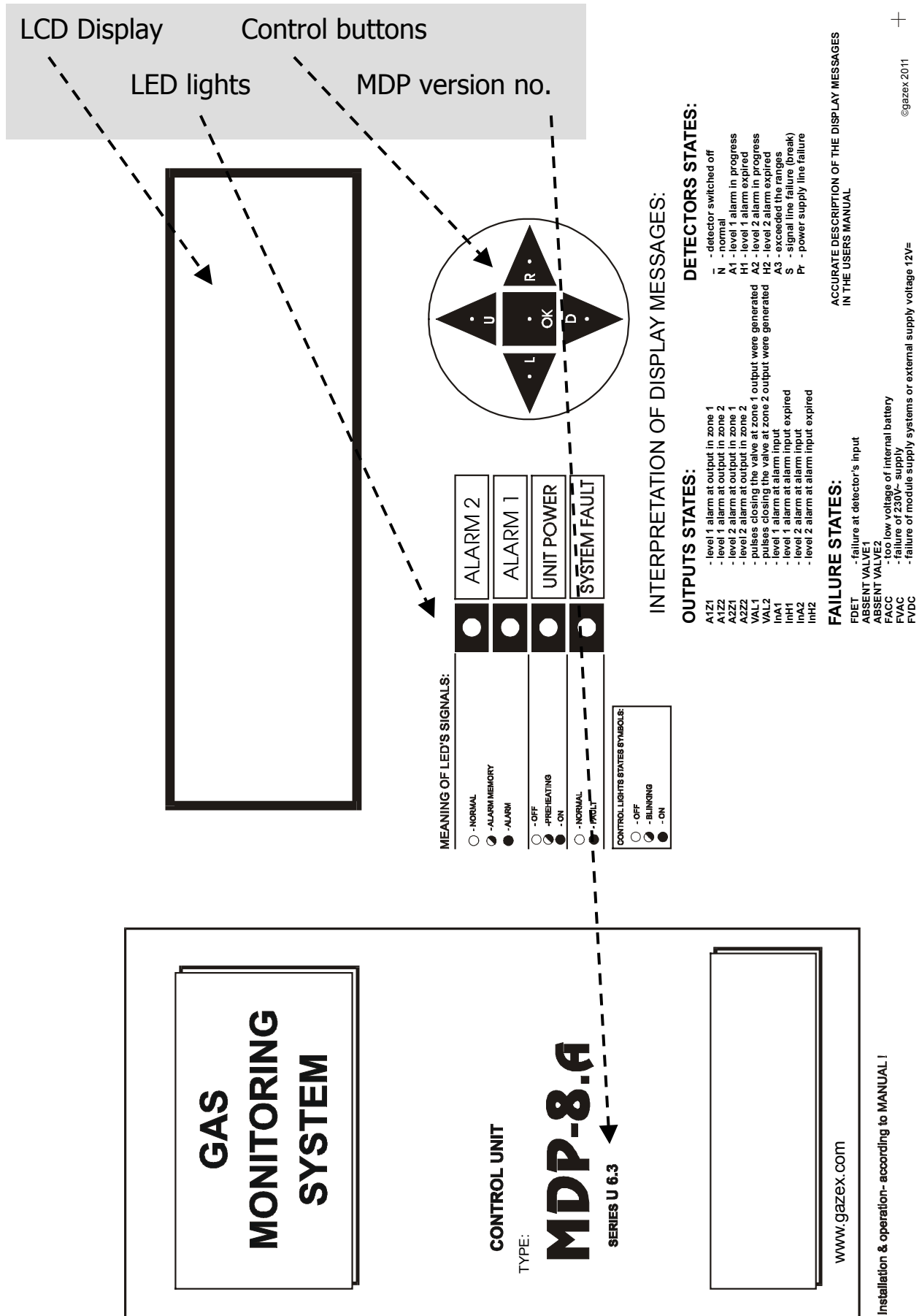


Fig. 2.2 Description of terminal strips and manner of connecting in the system

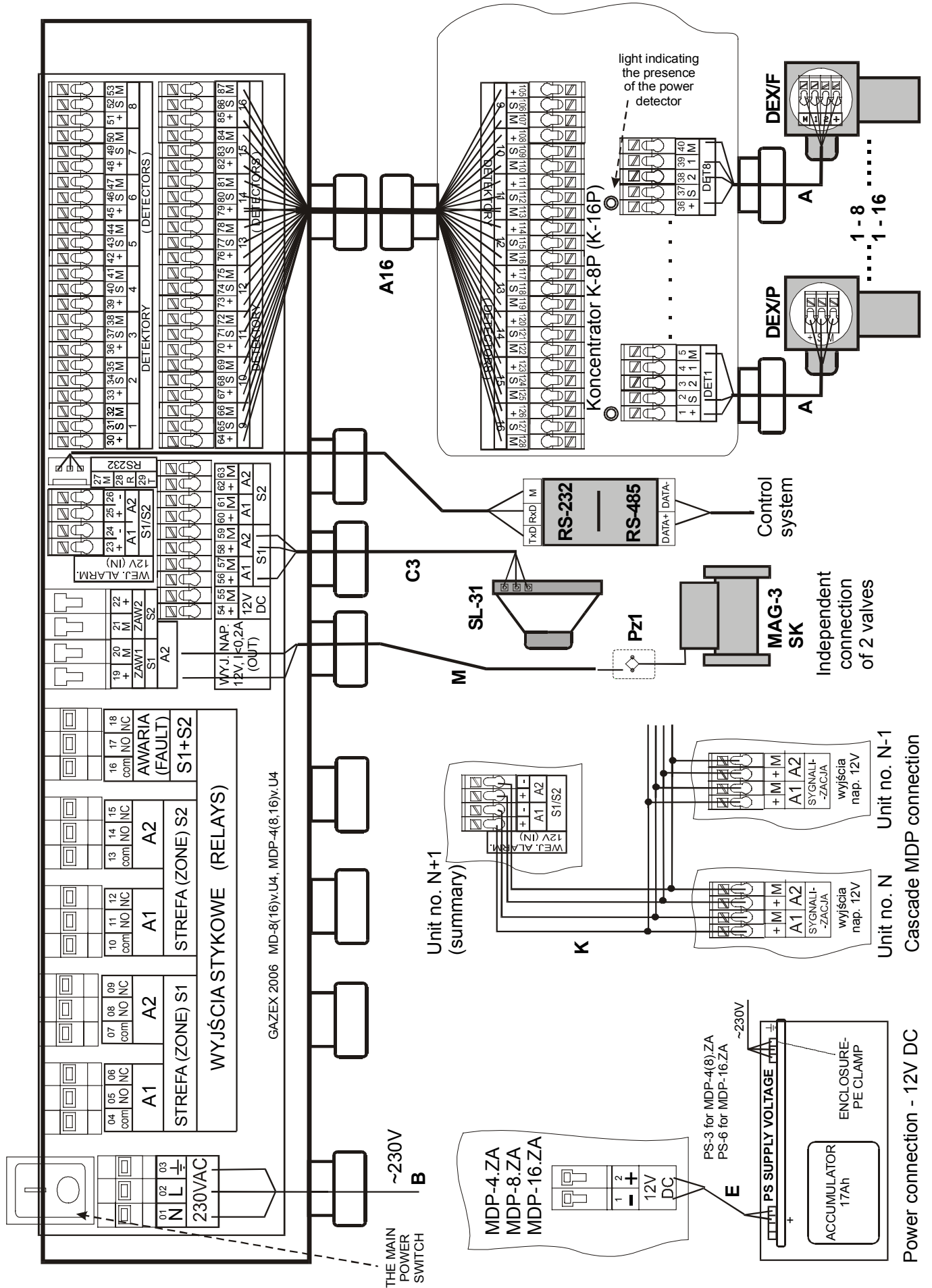


Table 2.1. Functions performed at the outputs:

UNIT STATUS	CONTACT OUTPUTS										
	FAILURE		Z1 ZONE				Z2 ZONE				
			A1		A2		A1		A2		
	Terminal no.	Pair NO-COM (17-16)	Pair NC-COM (18-16)	Pair NO-COM (05-04)	Pair NC-COM (06-04)	Pair NO-COM (08-07)	Pair NC-COM (09-07)	Pair NO-COM (11-10)	Pair NC-COM (12-10)	Pair NO-COM (14-13)	Pair NC-COM (15-13)
NORMAL	Opening	Shorting	Opening	Shorting	Opening	Shorting	Opening	Shorting	Opening	Shorting	
A1 Z1	Opening	Shorting	Shorting	Opening	Opening	Shorting	Opening	Shorting	Opening	Shorting	
A2 Z1	Opening	Shorting	Shorting *	OPENING*	Shorting	Opening	Opening	Shorting	Opening	Shorting	
A1 Z2	Opening	Shorting	Opening	Shorting	Opening	Shorting	Shorting	Opening	Opening	Shorting	
A2 Z2	Opening	Shorting	Opening	Shorting	Opening	Shorting	Shorting *	OPENING*	Shorting	Opening	
MDP power FAILURE	Shorting	Opening	version MDP-4(8,16).(B,ZB) - status of outputs according to the actual MDP status								
			version MDP-4(8,16).(-,A,Z,ZA) - status of outputs as in NORMAL state								
DETECTOR FAILURE	Shorting	Opening	status of outputs acc. to the current unit status or memory of alarm state from the damaged detector until manual reset of MD								

UNIT STATUS	12V= ALARM OUTPUTS, I <sub>out</sub> <200mA					
	Z1 ZONE			Z2 ZONE		
	A1 (56-57)	A2 (58-59)	VALVE1 (19-20)	A1 (60-61)	A2 (62-63)	VALVE2 (22-21)
NORMAL	no voltage	no voltage	no voltage	no voltage	no voltage	no voltage
A1 Z1	12VDC	no voltage	no voltage	no voltage	no voltage	no voltage
A2 Z1	12VDC	12V=	12V impulses	no voltage	no voltage	no voltage
A1 Z2	no voltage	no voltage	no voltage	12VDC	no voltage	no voltage
A2 Z2	no voltage	no voltage	no voltage	12VDC *	12VDC	12V impulses
MDP power FAILURE	version MDP-8(16)(B, ZB) - according to the current status of MDP; other versions - no voltage					
DETECTOR FAILURE	status of outputs acc. to the current unit status or memory of alarm state from the damaged detector until manual reset of MDP					

\* - forced by status of detectors at MDP inputs

**Description of MDP statuses:**

Activation of outputs from a specific zone occurs when the number of detectors indicating an alarm of one type is equal or bigger than a **minimum number of L<sub>min</sub> alarms**, specified in the user menu in "Output Off - logic" tab (1 or 2 detectors can be selected).

**NORMAL state** – number of alarms of one type at detectors' inputs does not exceed L<sub>min</sub> (no designation on LCD screen); only green power light lit on,

**A1 Z1 – alarm A1 in zone 1; at least L<sub>min</sub> detectors** of Zone 1 indicate exceeding of A1 concentration threshold (designation "A1Z1" on LCD), **but no less than L<sub>min</sub> detectors** in that zone indicate exceeding of A2, ALARM1 light is active,

**A1 Z2 – alarm A1 in zone 2; at least L<sub>min</sub> detectors** of Zone 2 indicate exceeding of A1 concentration threshold (designation "A1Z2" on LCD), **but no less than L<sub>min</sub> detectors** in that zone indicate exceeding of A2, ALARM1 light is active,

**A2 Z1 – alarm A2 in zone 1; at least L<sub>min</sub> detectors** of Zone 1 indicate exceeding of A2 concentration threshold (designation "A2Z1" on LCD), ALARM2 light active, generation of two impulses closing Zone 1 valve (designation "VAL1" on the LCD screen (if applicable),

**A2 Z2 – alarm A2 in zone 2; at least L<sub>min</sub> detectors** of Zone 2 indicate exceeding of A2 concentration threshold (designation "A2Z2" on LCD), ALARM2 light active, generation of two impulses closing Zone 2 valve (designation "VAL2" on the LCD screen (if applicable),

**MDP power supply FAULT** - all lights and display disabled (in B, ZB versions green light is flashing and the FAULT yellow light is lit),

**DETECTOR FAULT** - the FAULT yellow light is on, "FAULT" word is active on the screen and the "PR" or "S" symbol for the damaged detector(s)

Statuses for both zones are displayed independently. Other combinations of outputs' states should be treated as an emergency.

### 3. TECHNICAL PARAMETERS

Supply voltage	MDP-4(8,16).(-,B,Z,ZB) - 230V~,50Hz (admissible variations +10%,-14%) MDP-4(8,16).(A,ZA) - 12V= (admissible: 11.5V - 14.0V)
Power consumption	MDP-...(-,B,Z,ZB): max. 65W, MDP-...(A, ZA): max. 55W
Operating temperature	0°C to 40°C constantly permissible, +5°C to 35°C recommended optimal; from -5°C to 45°C temporarily permissible (<2h/8h, with front board's cover closed)
Storage temperature	5°C to 35°C, recommended for the period of > 4 weeks; -10°C to 45°C (short-term)
Number of measuring channels	4 for MDP-4..., 8 for MDP-8...; 16 for MDP-16...
Communication with the detector	measuring detector - three-lead line, 4-20mA threshold detector - four-lead line, alarm thresholds A1 and A2
Accuracy	no more than ± 2% FS
Alarm levels for DEX/P, DG/P	<b>tree:</b> warning - <b>ALARM 1 ( A1 )</b> – set of 4-20mA (0-100%) or - <b>TWA ( T1 )</b> – time-weighted average - 8h/day alarm - <b>ALARM 2 ( A2 )</b> – set of 4-20mA (0-100%) or - <b>STEL ( T2 )</b> – short term exposure limit - 15 minutes exceeded range - <b>ALARM 3 ( A3 )</b> – fixed to the value of 20 mA (100%) (only manual cleared, cuts off the power detector with a catalytic sensor)
Alarm levels for threshold detectors DEX/F, DG/F	<b>two:</b> warning - <b>ALARM 1 ( A1 )</b> alarm / shut-off - <b>ALARM 2 ( A2 )</b> <b>tree:</b> warning - <b>ALARM 1 ( A1 )</b> – set of 4-20mA (0-100%)
Failure levels for detector's signal	<b>two:</b> opening of signal line - ( <b>S</b> ) for I<2mA shorting of signal line - ( <b>Pr</b> ) for I>25mA
Alarm memory	for each channel and each level - optical (individual message on LCD + cumulative LED light, cumulative acoustic); <b>memory of output</b> signals of every level - optical
Unit reset	with the button located on the front board (access after lifting up the cover)
Event memory	internal, non-erasable, 1,600 events (alarms, emergencies, configurations)
Signal blocking	Output: default 1 min., adjustment: 1÷20 min (pre-heating of sensors) input: default 10 sec., adjustment: 3 ÷ 120 sec. (delay of inputs); output: default 10 sec., adjustment: 3 ÷ 120 sec. (delay of switching the inputs on) input: zone 1 and 2: by default 3 sec., adjustment 3 sec.÷ 15 min (independent of delay of outputs of zones 1 and 2)
Optical indication of the measurement results	graphical LCD display (messages for each detector and output) displays the current values of the signal measurement of each detector scaled in selected concentration units:% FS,% LEL, ppm or mA
Acoustic signalling	Internal piezoceramic speaker: volume ca. 60dB/1m; interrupted tone - signalling of finished alarm, continuous tone - indication of the ongoing alarm or emergency; (optional: without sound signalling = "SILENT MODE" activated from the menu)
Supplying detectors	9V=, protection against shorting and exceeding the current of 200mA, switching on detectors' power - with software via the keyboard software (available from the menu)
Signalling of failure	yellow LED light, messages on graphical display
Signalling of switching the detector on	message on the graphical display individually for each detector
Quick triggering of input signals	with buttons on front board, successive release of each contact and voltage outputs of the unit (available from user menu)
Switching outputs off	default: <b>automatic</b> - emergency state erased after decay of alarm source with the delay from 3 sec. to 15 min. (Alarm's memory on LCD), option: <b>manually</b> - alarm's status on output is maintained after decay of alarm's source until the moment of manual reset (via the keyboard with the "OK" button)
Unit supply control	LED light, green, also indicates the pre-heating MDP
Digital output	RS-232 serial port: ASCII printer mode or a Modbus/RTU protocol, parameters: 9600/19200bps,8,N/P,2/1; selection from the menu; terminal connector; optional: connecting conduit RS232, RS-232 to RS-485 converter; software used for readout of events from MDP memory (Windows 98, XP);
Relay outputs	shorting and opening for A1, A2 and FAULT, volt-free; rating: ≤ 4A (at resistance load) or ≤ 2A (at inductive load) or ≤ 0.6A (with only inductive load - fluorescent lamps); max. 230V~ or 24V=
Alarm outputs	■ 12V=, not stabilized, for A1 and A2 states independently, load = max. 0.2 A, for connection of SL-21, SL-31, S-3, LD-2 signalling devices ■ impulse, high-current for control of shut-off valves, only A2 ■ 12V= constant, not stabilized, for supplying MDX unit or other devices, max. load of 0.2 A
Alarm inputs	voltage 12V= (5-16V, max. 20mA) for A1, A2; quick-break, galvanically separated from other MDP circuits; for cascade connection of units or other devices
Overload Protection	primary 230V~ or 12V= power circuit fuse; automatically reset fuses with limitation of shorting current of NAP.12V outputs; electronic fuses with limitation of current of each detector; additional system and program protection
Dimensions/weight	300 x 330 x 150 mm, (height, width, depth in assembly position); ca. 3.6 kg
Housing	ABS, IP54, 9 gland ducts, 3-point mounting

## 4. INSTALLING MDP IN THE SYSTEM

Installation of the MDP can proceed after time necessary for compensation of temperatures of the MDP unit and the surrounding air. Especially in the winter, with temperature below zero centigrade, during transportation or storage wait 20 minutes before taking out of the foil package to prevent condensation of water vapour on internal circuits of the device. NOTE: the LCD can work improperly at temperatures <0°C!

**4.1** Mount the unit in a designated place, inaccessible to outsiders, outside the EX zone, free from strong electromagnetic interferences, vibration or shocks.

**4.1.1** Unscrew the lid of the terminal chamber- it reveals access to two assembly holes.

**4.1.2** Hang the unit on a previously prepared hook (in the middle of an indicated assembly location); mark locations of two other assembly holes (assembly position acc. to fig. 1.2)

**4.1.3** Insert pins; screw the unit in. Assembly of the unit needs to be solid, secure and without any clearance.

**4.2 Note!!! Carry out installation only when the power is off and the main switch of the MDP unit is switched off!!**

**4.3** Lead connecting cable(s) "A16" through gland seal ducts from the cable hub (1÷3 cables with a summary number of conductors > 27 for K-8P or >54 for K-16P, necessary with round section and external diameter of <13 mm). Length of the "A16" cable depends on the length of "A" cable connecting DEX detectors with the hub.

**TABLE 4.3.** Selection of conduits for detectors depending on the model of detector (with a semiconductor sensor: **-nn**, infra-red: **-(P)nR**, catalytic: **-Pn**)

Conduit (fig. 2.2)	Conductor's section mm <sup>2</sup>	Permissible length of conductors				
<b>A16</b>	0.2	1m	< 10m	< 20m	-	-
	0.5	1m	-	-	< 50m	< 100m
<b>A (-nn, -(P)nR)</b> (for the length A16 as above)	0.5	< 150m	< 150m	< 100m	< 100m	< 30m
	1.0	< 300m	< 300m	< 200m	< 200m	< 60m
	1.5	< 450m	< 450m	< 300m	< 300m	< 90m
<b>A (-Pn)</b> (for the length A16 as above)	0.5	< 100m	< 75m	< 50m	< 50m	< 15m
	1.0	< 200m	< 150m	< 100m	< 100m	< 30m
	1.5	< 300m	< 225m	< 150m	< 150m	< 40m

For detectors with electrotechnical sensors, with model designation: **-(P)nE/N** - all lengths of "A" cable in Table 4.3 (depending on "A16") can be assumed as "**<450m**".

**4.3.1** Preserve the proper sequence of connecting conduits with detectors - improper order will result in system malfunctioning.

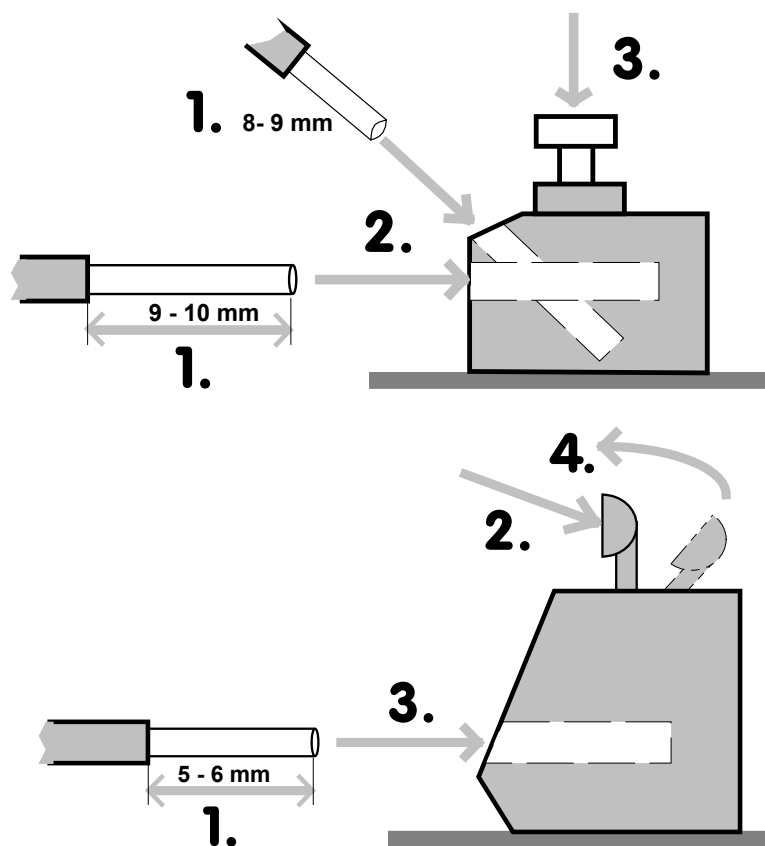
**TABLE 4.3.1. Description of connections between MDP and K-8(16)P cable hub (numbers of terminals).**

Detector no.	DET1			DET2			DET3			DET4			DET5			DET6			DET7			DET8					
Input mark	+	S	M	+	S	M	+	S	M	+	S	M	+	S	M	+	S	M	+	S	M	+	S	M	+	S	M
MDP terminal no.	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53			
K-8(16)P terminal no.	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104			

Detector no.	DET9			DET10			DET11			DET12			DET13			DET14			DET15			DET16					
Input mark	+	S	M	+	S	M	+	S	M	+	S	M	+	S	M	+	S	M	+	S	M	+	S	M	+	S	M
MDP terminal no.	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87			
K-8(16)P terminal no.	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128			





#### 4.3.2 Inserting a conductor to a self-locking terminal (straight or slanting)

1. remove the conductor's insulation at the length of exactly 9 to 10 mm (straight) or 8 to 9 mm (slanting)
  2. maximally push (insert) the exposed end of the conductor to the round opening of the terminal.
- Correctly inserted conduit cannot be pulled out of the terminal. Releasing and taking the conduit out is possible after pressing lever 3 (white or grey, according to arrow 3).

#### 4.3.3 Inserting a conductor to a spring cage terminal:

1. remove the conductor's insulation at the length of exactly 5 to 6 mm (exactly!)
  2. press the spoon level of the terminal with a thin screwdriver
  3. insert the conduit's conductor into the exposed opening in the terminal
  4. release the lever
- Correctly inserted conduit cannot be pulled out of the terminal. Release of the conduit and possibility of its removal takes place after pressing the lever.

removal  
pressing the lever.

**4.3.4** Ends of the conduits need to be prepared in such manner that after inserted into the terminal chamber conductors fastened in clamps did not have to be wrapped inside the unit and the gland's seal covered the external insulation layer of the cable. It is recommended to use wire conduits. Cord conduits can be used only with clamping sleeves. Clamping of the conduit in the gland should be solid enough to keep the conduit inside the MDP during the attempt of manual pulling it out (and to prevent the conduit from transferring mechanical forces into terminal's clamps). That will provide a proper sealing.

**4.3.5** The unit is provided with originally deactivated all detectors' circuits. During installation go to the "user menu" and activate the required number of detectors (detailed description of unit configuration can be found in section 5).

**4.4** For MDP-Z connect supply conduit "M" of valve to clamps [VALVE1] (19-20) or [VALVE2] 21-22), neutral polarization. The unit is provided with originally assembled resistors on clamps [VALVE], which need to be REMOVED before connection.



#### 4.4.1 TABLE specifying selection of "M" conduit (fig. 3) connecting the valve and the MDP:

Type of shut-off valves	The biggest length of "M" conduit [m] cross-section of conductor of a conduit			
	< 1.5 mm <sup>2</sup>	1.5 mm <sup>2</sup>	2.5 mm <sup>2</sup>	5(2x2.5)* mm <sup>2</sup>
<b>MAG-3</b>	<b>NOT RECOMMENDED</b>	<b>14</b>	<b>22</b>	<b>45</b>
<b>2 x MAG-3**</b>		<b>6</b>	<b>10</b>	<b>20</b>
<b>SK-3</b>		<b>6</b>	<b>10</b>	<b>20</b>
<b>MAG-1</b>		<b>6</b>	<b>10</b>	<b>20</b>
<b>MAG-2</b>		<b>22</b>	<b>36</b>	<b>70</b>
other shut-off valves with COD-1/10A coil		<b>6</b>	<b>10</b>	<b>20</b>
other shut-off valves with COD-1/3A coil		<b>22</b>	<b>36</b>	<b>70</b>
<b>ZB</b>		<b>30</b>	<b>50</b>	<b>100</b>

\* - ends of conduit (YDY4x2,5) inside the MDP and Pz1 should be provided with necessary adapters for 2.5 mm<sup>2</sup> (it is recommended to use WAGO blocks with self-springing clamps)

\*\* - if a single conduit is used (when laying two conduits connected in the MDP - lengths as for the "MAG-3" column)

**4.4.2** It is recommended to connect the valve with a homogenous conduit. Connection on the “M” conduit should be made as solid as possible, providing good contact on connections with the use of tight (IP44) clamp block - PZ1 on Fig. 2.2.

**4.5** Connect external auxiliary device, e.g. automatics control, external buzzer S-3, warning lamp LD-2 (YTKSY 2 x 0.5 conduits), etc. In case of positioning optical and acoustic signalling devices in the same location, it is recommended to use an integrated acoustic-optical signalling device of SL-21 or SL-31 type. Having separated functions of buzzer and lamp, it can be connected to MDP with a three-conductor conduit (YTKSY 2x2x0.5 recommended). Labelling of outputs and their features were described in Table 2.1.

**4.5.1** When it is necessary to connect a larger number of conduits (after using all factory gland ducts), additional ducts (with diameter adjusted to conduits used) need to be installed on the removable cover of the terminal chamber. Only correct ducts (IP54 or better) should be used to maintain the proper level of unit’s tightness. Walls and bottom of the unit must not be perforated! Conduits cannot be inserted directly to the unit by the drilled holes (without gland ducts) or through the seal of the terminal clamp.

**4.6** For MDP-4(8,16) connect ~230 power supply cable “B”. The unit has an internal, unipolar power switch. Maintain the proper sequence of 230V~ connection’s conduits: neutral to “N” (01), phase to terminal “L” (02), PE ground cable to terminal (03). Certainty of power supply and no interferences is a basic requirement for system efficiency and therefore conduit “B” should be connected through the isolated fuse in the switchboard. Strong overvoltage in the ~230V supply circuit can be the cause of damage of internal main supply fuse or cause interferences in operation of the MDP unit.

For the MDP version: connect the 12V= supply cable “E” from the PS-3 power supply unit (MDP-4(8)..A) or PS-6 (MDP-16...A) with the battery connected, maintain proper polarization (the unit is protected by inverted polarization), (“+” to terminal “02”, “-” to terminal 01).

Section of conductors in “E” conduit	Length of conduit “E”
1.5 mm <sup>2</sup> (YDY 2x1.5)	< 4m
2.5 mm <sup>2</sup> (YDY 2x1.5)	< 6m
5* mm <sup>2</sup> (YDY 4x2,5)	< 12m



\* - see notes under Table 4.4.1

## 5. INITIAL CONFIGURATION MDP



**NOTE:** all described procedures and messages of the LCD screen concern the standard version of the unit. Possible descriptions of non-standard versions, modifications and revisions may be found in attached appendix to the instruction manual (if any).

**NOTE:** Press the keys gently not to damage mounting plates and internal circuits of the MDP.

**5.1** The next stage of **System** activation is to configure the unit according to individual needs of the Customer. It is conducted by means of the keyboard located in the front panel of the unit accessible after opening of the transparent cover of the housing.

**5.2** Switch on the power supply with the unit’s main switch. After power is turned on a test of signalling lights is performed. The lights of Alarm2, Alarm1, Power supply, Failure are turned on and off in sequence. Then the logo of Gazex company will appear on the LCD. The logo is displayed for 5 sec. At this time initialization of unit’s settings takes place.



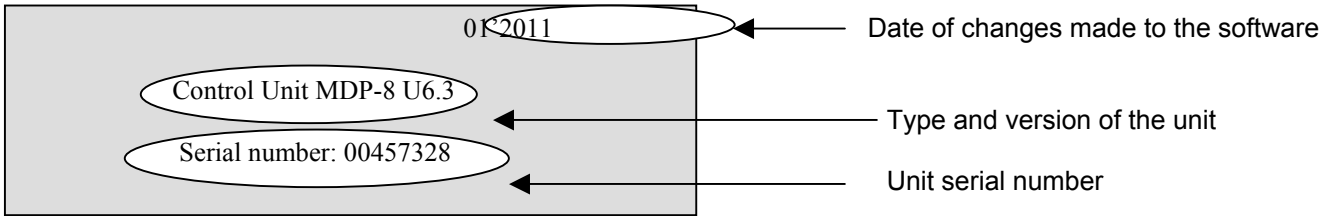
**5.3** The next stage (**optional, for selected models**) is the stage of temporary deactivation of the unit’s blocking. If the blocking is active, the dialog box presented below will be visible on the screen. The date shown in the box specifies the date, **after which** the unit will be blocked. By this time the unit is fully functional.

**TIME LOCK**  
**ACTIVATION: 2011-03-15 12:00:00**

To enter the password  
 - press the “OK” key  
 time left: 05 sec

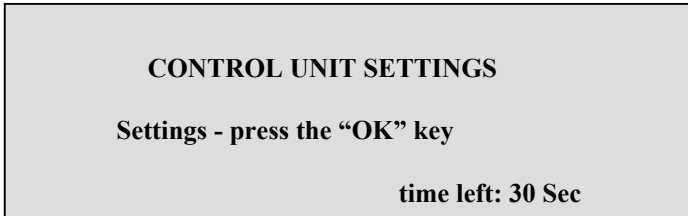
After conditions forcing the blocking are fulfilled, contact service employees of GAZEX (by phone under +48 22 6442511 or via the contact form available at [www.gazex.pl](http://www.gazex.pl) or by mail: [gazex@gazex.pl](mailto:gazex@gazex.pl)), who will provide you with the code for deactivation of temporary blocking of the unit.

5.4 After the stage of activation or omission thereof, the unit switches to configuration mode:



For 5 seconds the LCD screen will display information concerning type and version of the unit, serial number and dates of changes made to the software. That information can be required during contact with service employees of GAZEX.

The next dialog box allows for changes in the unit's settings.



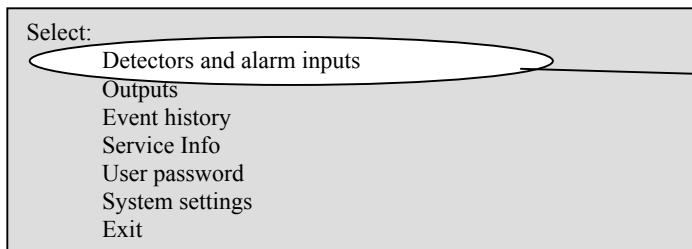
To do that press the "OK" button within 30 seconds. Then enter **user password: "LLLLL"** (press the "L" button five times).

**Note!!! The above password is a standard password assigned to all MDP units. To protect against unauthorized access of third parties to the settings, change the password**



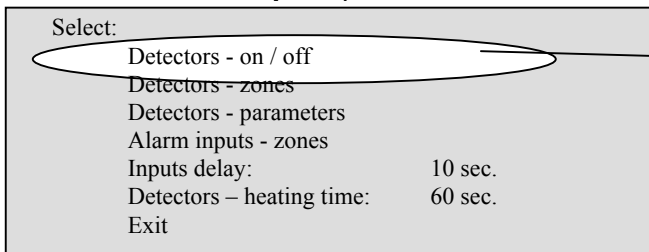
(that action has been described further in section 5.4.3). **The changed password should be remembered and kept in a safe place. Lost password will make it impossible to change the unit's configuration. The password can only be unlocked by GAZEX service (extra paid).**

After a correct password had been entered, the user menu will be displayed on the LCD with available functions:



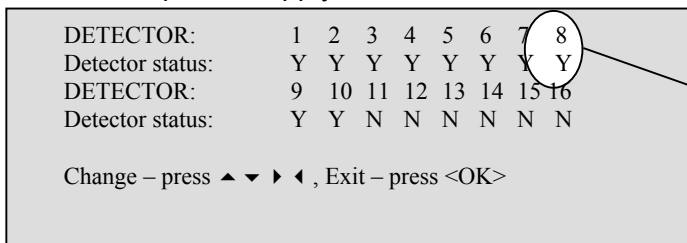
Feature selection with "U" and "D" keys, Confirmation with "OK" key

5.4.1 Detectors and alarm inputs perform the below features.



Feature selection with "U" and "D" keys, Confirmation with "OK" key

1) Detectors - power supply on/off.



Denotes: Detector 8 - switched on

The flashing "Y" or "N" symbol denotes the selected detector. Select the correct detector with "L" and "R" keys and then with "U" and "D" keys change its status into one of the following: "Y" - detector is switched on, "N" - detector is switched off. To confirm the settings, press the "OK" button.

Presence of supply of a specific detector is confirmed by a green light next to connection terminals of the detector in the K-8(16) cable hub.

## 2) Detectors - zones.

DETECTOR:	1	2	3	4	5	6	7	8
Zone:	1	1	1	1+2	1+2	1	2	1+2
DETECTOR:	9	10	11	12	13	14	15	16
Zone:	1	1+2	2	2	1+2	1	2	2

Change – press ▲ ▼ ▶ ◀, Exit – press <OK>

Denotes:  
Detector 8 - assigned to zone 1 and zone 2

The flashing cursor denotes the selected detector. Select the correct detector with “L” and “R” keys and then with “U” and “D” keys change assignment of a detector to a zone: “1” - detector is assigned to zone 1; “2” - detector is assigned to zone 2; “1+2” - detector is assigned simultaneously to both zones. To confirm the settings, press the “OK” button.

## 3) Detectors - parameters.

Detector no.:	03
- alarm A1 :	TWA
- alarm A2 :	STEL
- alarm type :	time average values
- calibration gas:	carbon monoxide
- measur. range:	500 ppm

Change - press ▲ ▼ ▶ ◀, Exit - press <OK>

Denotes:  
measuring detector no. 3,  
alarm T1 = TWA,  
alarm T2 = STEL,  
measuring range 0-500ppm

The cursor denotes the selected detector. Select the correct detector with “L” and “R” keys and then with “U” and “D” keys select a required detector’s parameter, change the parameters with “L” and “R” keys. To confirm the settings, press the “OK” button.

The parameter "alarm type" allows two choices: "thresholds levels" - the temporary value of alarm thresholds A1 and A2 adjustable over the full measuring range; "time-weighted average" - the threshold of T1 corresponds to the TWA (Time-Weighted Average - 8h/day), the threshold T2 corresponds to the STEL (Short Term Exposure Limit – 15 minut)

Note!!! For connecting the threshold detector DEX/F or DG/F to MDP select “DEX - A1,A2 thresholds”, for WG and AirTECH detectors with NC contact outputs select “BIN -thresholds A1, A2”. Cooperation with threshold detectors requires the use of cable hub K-8P or K-16P, and setting the "Cable Hub" to "connected" (see 5.4.6, 3C)

## 4) Alarm inputs - zones.

Select:	
	Zone 1
	Zone 2
	Zone 1+2
Exit	
	Current Settings: Zone 1+2

Change - ▲ ▼ ▶ ◀, Confirm - <OK>

Select correct option with “U” and “D” keys and confirm with “OK” key. Additionally a selected option is currently displayed on the LCD screen. To exit the settings, select the “Exit” option with “U” and “D” keys and then press “OK”.

5) **Inputs delay** (default = 10 sec.) is a time, for which alarm status should be maintained at the detector’s input, so it could be registered by MDP and signalled with proper message on the LCD screen. That delay can be set within the range of: 1 ÷ 120 seconds with “L” and “R” keys.

6) **Detectors heating time** (default = 60 sec.) is a time after each start of MD, during which stabilization of the detectors’ operation point necessary for their correct operation occurs. The heating time can be adjusted within the range of: 1 ÷ 15 minutes with “L” and “R” keys.

### 5.4.2 Output settings perform the following functions.

Select:		
	Outputs Off – auto / manual	
	Outputs On – delay	: 10 sec.
	Outputs Off – zone1 delay	: 3 sec.
	Outputs Off – zone2 delay	: 3 sec.
	Outputs On – zone1 logic	: 1 alarm
	Outputs On – zone2 logic	: 2 alarms
	Exit	

Feature selection with “U” and “D” keys, Confirmation with “OK” key

## 1) Outputs Off – auto / manual.

Select:		
Output Off – zone1, alarm1	:	manual/auto
Output Off – zone1, alarm2	:	manual/auto
Output Off – zone2, alarm1	:	manual/auto
Output Off – zone2, alarm2	:	manual/auto
Exit		
Change - press ▲ ▼ ▶ ◀ .		

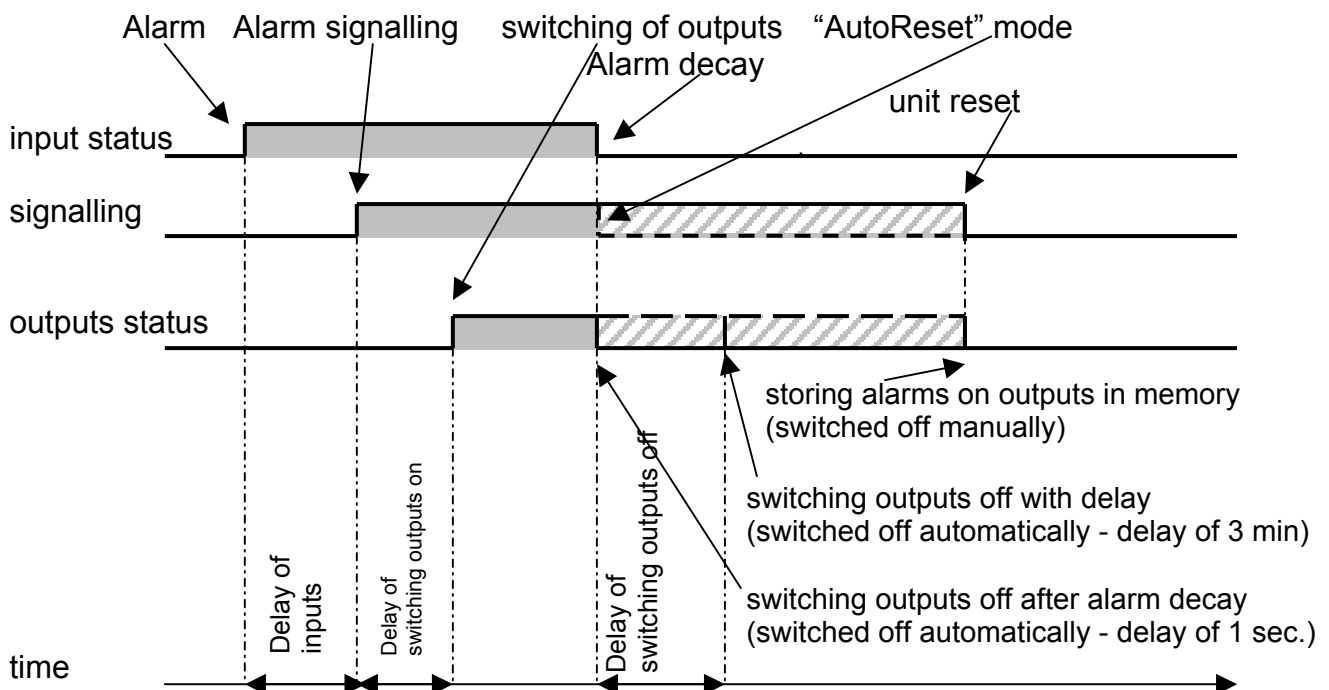
Select correct output with “U” and “D” keys and then with “L” and “R” keys change the manner of switching the output off. Manual shutdown means that the output will be switched off ONLY after external intervention of the user (unit reset with “OK” button). By this time, emergency state will be maintained at that output, even after the event that caused the alarm had ended.

Automatic shutdown means that the output will be switched off independently by the MDP after the alarm that caused the output to switch on had ended. Information about the alarm condition is indicated by the pulsating sound and relevant messages on the LCD screen until the user resets the MDP.

2) **Outputs On – delay** (delay of switching the outputs off) is a time (10 sec. by default) from the moment the MDP registers an alarm condition at detector’s input to the moment, when the MDP switches appropriate outputs on depending on location of the alarm. That delay can be set within the range of: 1 ÷ 120 seconds

3) **Outputs Off – zone1 delay** (delay of switching outputs of zone 1 off) is a time (3 sec. by default) from the moment of alarm decay to the moment outputs of zone 1 are switched off. That delay can be set within the range of: 1 sec. ÷ 15 minutes (only when automatic shutdown of zone 1 inputs is selected).

4) **Outputs Off – zone2 delay** (delay of switching outputs of zone 2 off) is a time (3 sec. by default) from the moment of alarm decay to the moment outputs of zone 2 are switched off. That delay can be set within the range of: 1 sec. ÷ 15 minutes (only when automatic shutdown of zone 2 inputs is selected).



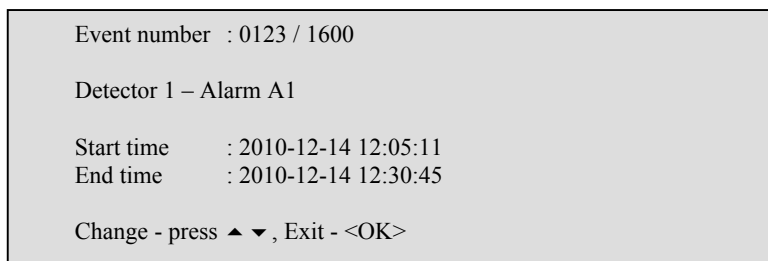
5) **Outputs Off – zone1 logic** defines the minimum quantity of a given type of alarms (A1, A2) on outputs of detectors activating outputs of zone 1. Two options available: at least 1 or two alarm states.

6) **Outputs Off – zone2 logic** defines the minimum quantity of a given type of alarms (A1, A2) on outputs of detectors activating outputs of zone 2. Two options available: at least 1 or two alarm states.

### 5.4.3 Events history performs the following functions.

Select:	
Events - viewing on LCD	Feature selection with “U” and “D” keys, Confirmation with “OK” key
Events – data transmission	
Exit	

1) **Events – viewing on LCD** allows for review of the history of past alarm, emergency and configuration events. A screen with a sample description of one event has been presented below.



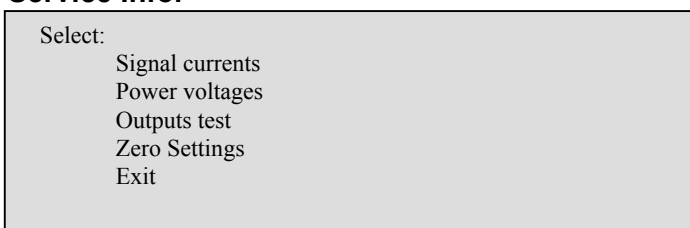
Description of messages:

- a) Event number – identification number of an event in unit’s memory. Successive numbers from 1 to 1,600 are assigned to successive events. In the case of exceeding the capacity of the buffer (1600 events), the oldest events are erased, i.e. event 1601 is registered as number 1, etc.
- b) Event description - specifies the type of the occurred alarm or failure, e.g.:
 

Detector no. - Alarm A1 (or TWA)	Detector no. - Alarm A2 (or STEL)
Detector no. - Alarm A3	Detector no - short line '+' or 'S',
Detector no - open power line '+'	Detector no - short signal line 'S'
Detector no. - open signal line 'S'	Detector no. - power off
Alarm input - Alarm A1	Alarm input - Alarm A2
Zone 1 Valve - absent valve	Zone 2 Valve - absent valve
Zone 1 Valve - impulses were generated	Zone 2 Valve - impulses were generated
External power supply fault U<190VAC	External power supply fault U>250VAC
External power supply fault U<10,5VDC	External power supply fault U>15VDC
Internal power supply fault Uint=12VDC	Internal power supply fault Udex1=9VDC
Internal power supply fault Udex2=9VDC	Control Unit - reset
Control Unit - power on	Control Unit - power off
Internal accumulator fault, no charging	Internal accumulator fault - U<14,4VDC
Control Unit - settings changing	Service Mode - enabled
Silent Mode - enabled	Auto Reset Mode - enabled
System Time - changed	MODBUS RTU Master - enabled
RWS - no communication	MODBUS RTU Slave - enabled
- c) Start time - date and time of the event,
- d) End time - date and time of the event.  
No date and time of the end of event means that the event lasted until the reset of the unit or until its switching off.

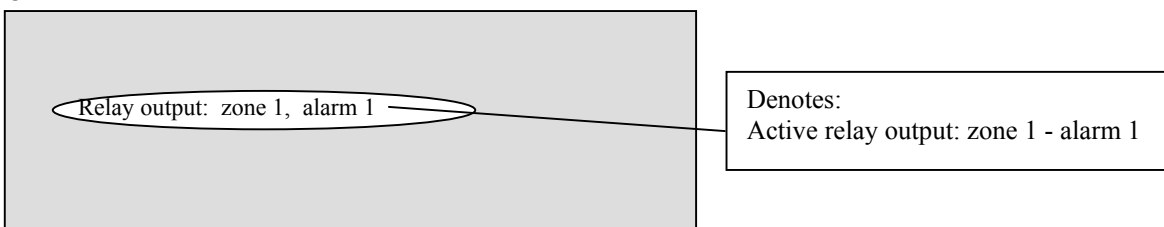
2) **Data transmission** allows readout of the history of occurred alarm events by the RS232 serial port. This **option** requires installation of special software on a PC computer (Windows 98, XP). The program enables filtration of events of individual detectors and configuration events, as well as saving history to a text file.

#### 5.4.4 Service Info.



The first two options display parameters of internal circuits of the unit, helpful in solving problems connected with system installation or in diagnosing the type and cause of unit’s failure.

**Output test** - allows checking if all outputs are correctly switched on without the necessity to generate alarms on unit’s inputs.



Outputs are switched sequentially at time = 1 sec. Currently switched on input is displayed on the LCD screen. After all the outputs are tested, MDP automatically switches to the service menu. The outputs are switched on in the following order:

1. Relay output – zone 1, alarm 1,
2. Relay output – zone 1, alarm 2,
3. Relay output – zone 2, alarm 1,
4. Relay output – zone 2, alarm 2,
5. Relay output – fault,
6. Valve output – zone 1
7. Valve output – zone 2
8. Alarm output – zone 1, alarm 1,
9. Alarm output – zone 1, alarm 2,
10. Alarm output – zone 2, alarm 1,
11. Alarm output – zone 2, alarm 2;

#### 5.4.5 User password - allows changing user password.

Change user password

Enter old password:           \*\*\*\*\*

Enter new password:         \*\*\*\*

Repeat new password:       \*\*\*\*

Password should contain 2-8 characters

In order to change the password:   - enter old password,  
  - enter new password  
  - repeat new password

After the new password has been correctly entered, a message “The password has been changed” will be displayed. The password is a combination of “U”, “D”, “L” and “R” keys and can contain from two to eight characters. When the password is being entered, it is masked with characters shown on the screen above.

**The new password should be saved and secured. This password will be required at each entrance to the unit settings. Losing the password will prevent subsequent modification of the unit by the user! The password can only be unlocked by GAZEX service employees (extra paid service).**

#### 5.4.6 System settings are protected with admin password and allow changing additional settings only by a skilled used or system installer.

To make changes as an administrator, select this option and press “OK”. Then enter **admin password: “PPPPP”** (press the “P” button five times).



**Note!!! The above password is a standard password assigned to each unit. To protect against unauthorized access of third parties to additional unit settings, change the password.**

Admin password should differ from user password. Only then access to additional unit features will be protected. **The changed password should be remembered and kept in a safe place. Lost password will make it impossible to change the unit’s additional configuration. The password can only be unlocked by GAZEX service (extra paid).**

After a correct password had been entered, the administrator menu will be displayed on the LCD with available functions:

Select:

- Time Settings
- RS232 Port Settings
- Operating Parameters
- Factory Settings
- Special Functions
- Administrator Password
- Exit

#### 1) Time Settings - allows changing current date and time settings:

Current time settings:

2002-12-30 17:55:40

Change - press ◀ ▶ ▲ ▼, Exit - press <OK>

Select item to be changed (year, month, day, hour, minute, second) with “L” and “R” keys. The selected value will be highlighted with a flashing cursor. Then set the required value with “U” and “D” keys. If date and time are set correctly, press the “OK” key.

## 2) RS232 Port Settings - allow changing transmission parameters

Change RS232 port settings:	
Operation mode	- Modbus RTU Slave
Slave address	- 1
Speed	- 9,600 bps
Data bits	- 8
Parity	- Even
Stop bits	- 1
Exit	

### a) Operation mode

- Printer - text messages sent to a port in the following format:

e.g. 2006-09-02 12:23:45 - Detector 01 - Alarm A1

2006-09-05 18:48:23 – Zone 1 – Absent Valve1;

- Modbus RTU Master - the protocol controlling the hub of RWS08(16) contact outputs or other;

- Modbus RTU Slave - the protocol for communication of the unit with external control systems (the detailed description of readout and saving of the unit’s register has been appended to the instruction as: “MDP - Modbus/RTU protocol” - available upon request);

b) Slave address - unit’s address (slave device) - change from 1÷247;

c) Speed - 9,600 bps or 19,200 bps;

d) Data bits - 8 data bits;

e) Parity - even or none;

f) Stop bits - 1 stop bit with parity control; 2 bit stops with no parity control;

## 3) Operation parameters - allows changing unit’s functionality.

Change:	
SERVICE MODE	- enabled / disabled
AUTO RESET	- enabled / disabled
CABLE HUB	- none / connected
Exit	
Change – press ◀ ▶ ▲ ▼	

a) **SERVICE MODE** - allows blocking unit’s outputs for the time of 120 minutes. Recommended during conduct of maintenance of gas detection systems. In this mode measuring activities of the unit are maintained, i.e. the unit controls the status of connected detectors, status of alarm inputs, displays information on alarms and failures on the LCD screen, but does not activate outputs. The mode can be turned off at any moment before the lapse of the full period.

b) **AUTO RESET** - the mode automatically reset the unit’s memory of alarm statuses after alarm decay; intervention of system user is not required. There are no information on alarm, which has ended on the LCD screen. Acoustic signals are also switched off. Information about occurred alarms are saved to the unit’s internal memory. The mode can be activated for an indefinite time. Especially recommended in ventilation control systems.

c) **CABLE HUB** – in "none " (the standard for the MDP-4 ...) allows you to connect the measuring detectors directly to MDP - without cable hub K-8(16)P; mode "connected" means the work with an attached hub K-8(16)P (standard mode for the MDP-8 (16 )...).



- 4) **Factory settings** - this option restores default unit settings, i.e.:
- Values of the signal detectors (4-20mA) scaled to 0-100% of range,
  - The alarm thresholds set appropriately A1=10% range, A2=30% range,
  - detectors off, assigned to the two zones "1+2",
  - alarm inputs assigned to the two zones "1 +2";
  - outputs set in auto mode;
  - The delay times set to default values;
  - unit's operation mode - normal;
- 5) **Special Functions** – this option is password-protected, intended for special purposes. Description of necessary functions is located in annexes appended to this instruction;
- 6) **Administrator password** - allows changing admin password.

Change administrator password	
Enter old password:	*****
Enter new password:	*****
Repeat new password:	*****
Password should contain 2-8 characters	

In order to change the password: - enter old password,  
- enter new password,  
- repeat new password

After the new password has been correctly entered, a message "The password has been changed" will be displayed. The password is a combination of "U", "D", "L" and "R" keys and can contain from two to eight characters. When the password is being entered, it is masked with characters shown on the screen above.



**The new password should be saved and secured. This password will be required at each entrance to the administrator's settings. Losing the password will prevent subsequent modification of the unit's system settings! The password can only be unlocked by GAZEX service (extra paid).**

## 6. START-UP MDP IN THE SYSTEM

- 6.1 After configuration is over (or configuration stage is omitted by the user), the MDP unit switches to the detectors' burn-in mode and signals that by means of a green power supply diode and a message on the LCD screen.

PRE-HEATING	
System starting,	Time left: 1 min 00 sec.

During pre-heating, duration of which is defined in the installer's menu, operation points of individual detectors need to be stabilized to operate properly. During this stage all alarm states and emergency states are blocked.

- 6.2 After pre-heating the MDP switches to normal operation. The LCD screen in real time signals statuses of inputs of detectors and alarm inputs, statuses of outputs and critical parameters of MDP unit's operation.

"Threshold screen" - displays information on current alarm states and emergency states of input/outputs of the unit and information on set operation modes.

states of detectors								states of outputs				failure states	operation modes
<b>DETECTORS</b>								<b>InH2</b>	<b>InA1</b>	<b>FDET</b>	<b>SILENT MODE</b>		
<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>A1Z1</b>	<b>A2Z1</b>	<b>FACC</b>	<b>AUTO RESET</b>		
<b>H2</b>	<b>H1</b>	<b>A1</b>	<b>A2</b>	<b>S</b>	<b>Pr</b>	<b>-</b>	<b>-</b>	<b>A1Z2</b>	<b>A2Z2</b>	<b>FVAC</b>	<b>MODBUS SLAVE</b>		
<b>9</b>	<b>10</b>	<b>11</b>	<b>12</b>	<b>13</b>	<b>14</b>	<b>15</b>	<b>16</b>	<b>VAL1</b>	<b>VAL2</b>	2005-05-24 22:36:07			
<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>N</b>	<b>N</b>	<b>-</b>	<b>-</b>						

"Measuring screen" - displays the measured values of the output signals of the detectors. The current values of 4-20mA output scaled to ranges and units specified by the user in the menu

<b>1</b>	0	%	<b>2</b>	4,1	mA	<b>3</b>	7%	LEL	<b>4</b>	5	PPM
<b>5</b>	0,4	PPM	<b>6</b>	52	PPM	<b>7</b>	447	PPM	<b>8</b>	21,2%	v/v
<b>9</b>	<0,0	%v/v	<b>10</b>	7,1	PPM	<b>11</b>	45	PPM	<b>12</b>	2,1	PPM
<b>13</b>	---	PPM	<b>14</b>	7,0	PPM	<b>15</b>	>100	%LEL	<b>16</b>	1	%
		CL2		ETO				IR			

#### 6.2.1 Signalled states of detectors' outputs:

<b>N</b> - normal,	<b>-</b> - detector switched on,
<b>A1</b> - level 1 alarm in progress,	<b>A2</b> - level 2 alarm in progress,
<b>T1</b> - TWA alarm in progress	<b>T2</b> - STEL alarm in progress;
<b>A3</b> - exceeded the range,	
<b>H1</b> - level 1 alarm expired,	<b>H2</b> - level 2 alarm expired,
<b>S</b> - failure of signal line (break),	
<b>Pr</b> - power supply failure (no or too high detector's supply current), shorting of signal line.	
<b>C</b> - recommendation of detector's calibration (detector operates, is in normal condition, by the recommended calibration deadline has elapsed).	

#### 6.2.2 Measuring ranges and units of detectors, depending on the measured medium:

Measuring range (scaled to 4-20 [mA])	The accuracy of the threshold alarm adjustment	Medium
<b>0 - 100 [% meas.range]</b>	<b>1</b>	undefined medium, the default type
<b>0,0 - 25,0 [mA] (no scale)</b>	<b>0,5</b>	undefined medium, DEX - the threshold detector, A1 and A2 alarm thresholds
<b>0 - 100 [%LEL] EX</b>	<b>1</b>	explosive gas, DEX-nK, catalytic sensor
<b>0 - 500 [ppm] CO</b>	<b>10</b>	carbon monoxide
<b>0 - 100 [ppm] NH3</b>	<b>1</b>	ammonia
<b>0 - 100 [ppm] H2S</b>	<b>1</b>	hydrogen sulphide
<b>0,0 - 25,0 [v/v] O2 (UP)</b>	<b>0,5</b>	oxygen
<b>0,0 - 25,0 [v/v] O2 (DOWN)</b>	<b>0,5</b>	oxygen
<b>0,0 - 20,0 [ppm] ETO</b>	<b>0,5</b>	ethylene oxide
<b>0,0 - 100,0 [ppm] NO</b>	<b>1</b>	nitric oxide
<b>0,0 - 20,0 [ppm] NO2</b>	<b>0,5</b>	nitric dioxide
<b>0 - 1000 [ppm] H2</b>	<b>10</b>	hydrogen
<b>0,0 - 20,0 [ppm] SO2</b>	<b>0,5</b>	sulphide dioxide
<b>0,0 - 10,0 [ppm] CL2</b>	<b>0,5</b>	chlorine
<b>0,0 - 25,0 [mA] (no scale)</b>	<b>0,5</b>	undefined medium, BIN - the threshold detector, A1 and A2 alarm thresholds
<b>0,0 - 25,0 [v/v] O2 (DOWN,UP)</b>	<b>0,5</b>	oxygen
<b>0 - 2,00 [v/v] CO2</b>	<b>10</b>	carbon monoxide
<b>0 - 100 [%LEL] IR</b>	<b>1</b>	explosive gas, DEX-nR, infra-red sensor

### 6.2.3 Signalled statuses of outputs and critical unit parameters:

<b>A1Z1</b>	-	level 1 alarm at output in zone 1,
<b>A1Z2</b>	-	level 1 alarm at output in zone 2,
<b>A2Z1</b>	-	level 2 alarm at output in zone 1,
<b>A2Z2</b>	-	level 2 alarm at output in zone 2,
<b>VAL1</b>	-	pulses closing the valve at zone 1 output were generated,
<b>VAL2</b>	-	pulses closing the valve at zone 2 output were generated,
<b>InA1</b>	-	level 1 alarm at alarm input,
<b>InA2</b>	-	level 2 alarm at alarm input,
<b>FDET</b>	-	failure at detector's input,
<b>FACC</b>	-	voltage of internal battery too low,
<b>FVDC</b>	-	failure of unit supply systems or external supply voltage 12V=
<b>FVAC</b>	-	failure of 230V~ supply,
<b>ABSENT VALVE1</b>	-	no valve at output of zone 1;
<b>ABSENT VALVE2</b>	-	no valve at output of zone 2;

### 6.2.4 Signalled operation modes:

**SILENT MODE** - the quiet operation mode causes permanent switching off of the buzzer, to switch the buzzer on: hold the "L" key for 5 seconds, to turn it off: again hold the "L" key for 5 seconds. The setting is saved in the non-volatile memory of MDP and is active after power decay or resetting the unit.

The temporary mode of "quiet operation" can concern external signalling by switching voltage outputs of A2 threshold in both S1 and S2 zones for 15 minutes; to switch them on again: simultaneously hold "L" and "OK" keys for > 5 seconds. In that mode the unit signals emergency states and alarm states only with optical signals (diodes and the display). Switching the temporary blocking on is signalled by counting down of the time left for its end. The temporary blocking of A2 voltage outputs is automatically switched off after 15 minutes or earlier, in case when a new A2 alarm appears on detectors' inputs or after the user holds "L" and "OK" keys for > 5 seconds.

**AUTO RESET** - described in section 5 in administrator menu.

**SERVICE MODE** - described in section 5 in administrator menu.

**MODBUS MASTER** - described in section 5 in administrator menu.

**MODBUS SLAVE** - described in section 5 in administrator menu.

No sound or optical signals should be generated after correct installation, while switched on detectors should be indicated with "N" sign on the LCD screen.

DETECTORS											
1	2	3	4	5	6	7	8				
N	N	N	N	N	N	-	-				
9	10	11	12	13	14	15	16				
-	-	-	-	N	N	-	-				
										2003-05-24	
										22:36:07	

**Control of MDP unit's operation** is conducted by means of the keyboard located in the front panel. During normal operation additional functions are permanently assigned to the keyboard's buttons. Pressing and holding the button will respectively cause:

- **<OK> key (3 sec.) - unit reset;**
- **<L> key (5 sec.) - switching the "silent mode" on/off;**
- **<L> and <OK> keys - switching temporary blocking of 12V alarm outputs A2 on/off.**
- **simultaneously <L> and <R> keys (5 sec.)- entering user menu;**
- **<U> and <D> keys - adjustment of illumination of the LCD screen.**

If other designations are visible on the LCD screen, yellow or red lamp is glowing and a sound signal is audible, that means incorrect installation of the detectors. Then check the connections of the detectors indicated on the LCD screen with a character other than "N" and "-" and remove the fault.

With the shut-off valve connected, the yellow light [FAULT] should be turned off. Lighting up these lights accompanied with acoustic signal of piezoceramic buzzer and lighting of "ABSENT VALVE1" or "ABSENT VALVE2" means that a valve/valves is/are not connected.

NOTE: In the case of MDP assuming temporary or constant operation with disconnected valves leave the standard characteristic resistors in "VALVE" terminals. **DO NOT** short the terminals [VALVE] by means of jumper pins!!! This can damage the internal battery or circuits of the unit during the generation of A2 status. It is forbidden to operate MDP with a connected valve and characteristic resistor left in place!!!

All circuits of inputs have independent mechanisms supervising supply current of detectors. In case of shorting of detector's supply conduits, overload of supply line or improper polarization of "A" or "A16" conduit automatic cut-off of power from a given occurs (status signalled on LCD screen with "Pr" sign, next to a specific detector number and a constant sound signal). After removal of shorting or overload, MDP restarts supply of a given line only after power supply of the unit is switched off and switched on again.

Overload or shorting of any voltage outputs “12V ALARM OUTPUTS” during **A1** or **A2** status will cause automatic switching off of automatically reset fuse. After removal of overload or shorting the internal fuse automatically restarts the normal work after not longer that several seconds.



**NOTE!!! To disable the unit in MDP-...B version equipped with internal battery support, disconnect the external power supply with main switch, then press "OK" button located on the front panel and hold it down until you disable the MDP unit (for about 10 seconds).**

6.3 The final stage of the control system's operation is to check the MDP unit and generate all alarm states for all connected detectors and to control the efficiency of external devices.

REQUIRED ASSUMPTIONS OF SYSTEM INSPECTION:

- The **MDP** unit is in normal state (after elapse of the time necessary for burn-in of sensors), the **[POWER SUPPLY]** light is on, detectors indicated with “**N**” sign are on, the value of concentrations displayed on LCD screen comply with the “zero level” specified in the instruction manuals of individual detectors.
- The unit was stored for not longer than 2 months or was connected to power supply for at least 24 hours (version B).
- **DEX/DG** detectors do not generate alarm signals (output current is consistent with the "zero level" specified in the detector manual);
- In order to obtain a measurement accuracy of the system specified in the manual, should be taken during inspection of detectors to meet the additional conditions specified in the individual manual for each detector DEX/P.

6.3.1 Generate alarms of each detector by means of test gas with a known concentration value according to the instruction manual of the detector. After a time consistent with **input delay** the indication next to the tested detector should change into **A1**, **A2** or **A3** on the LCD screen, which is a sufficient confirmation of correct cooperation of detector set with unit.

If the alarm signal A1 and A2 from the DEX detector will continue for at least the time corresponding to **output delay**, alarm signal on correct contact outputs will be generated in the zone, to which the specific detector had been assigned (message on LCD screen **A1Z1** and **A1Z2**, green **ALARM1** and **ALARM2** lights will be turned off and a constant sound signal will be activated.

In addition to measuring detectors switch on the LCD measuring screen and see if it appears with the appropriate detector measured gas concentration is compatible with the given test gas concentration (in the comparison should take into account the measurement accuracy of the unit, detector and test mixture).

6.3.2 For MDP-Z - Simultaneously with generation of the alarm state at the control output A2 of the corresponding zone, two electromagnetic pulses on **VALVE** terminals (message **VAL1** or **VAL2** on LCD screen) should be generated. Generation of the next A2 state **must** be preceded by a break for regeneration of internal batteries. The length of that break depends on the initial charging of the battery, the type of shut-off valves, the number of A2 states generated directly before the next attempt and on ambient temperature. It needs to be assumed that the break should not be shorter than 5 minutes (10 minutes for two valves) and it should be **DOUBLED** after each successive attempt (independently of the fact whether A2 was generated from detectors or with the TEST procedure). After a series of ca. 5 attempts wait for one hour or longer.

6.3.3 After removal of the test gas reduction of gas concentration in the detector takes place, which causes a change of condition of detector on the LCD screen from **H2** and/or **H1**, depending on completed alarm state and transition of red lights from constant lighting (if they were lit up) to flashing: first **ALARM2**, then **ALARM1**. The control outputs are back to normal (alarm messages disappear from the LCD screen), while the sound signal is changed to intermittent. Information about alarms remains on the display until willingly cleared by a user.

6.3.4 Check the operation of other detectors in a similar manner. When the status of all alarms is marked on the LCD screen with "**H2**" - reset the unit by pressing and holding the "OK" button located on the front panel for 3 seconds. Red lights of "**ALARM1**" and "**ALARM2**" should go off and the unit should switch to normal. **Open the valve/shut-off valves!!!**

6.3.5 The control procedure 6.3.1 should be complemented with output test conducted with software from the user menu described in section 5.4.4.

Results of control or start-up should be registered in the attached Periodical Control Protocol.

**After a positive test result the GX Active Gas Installation Safety System or the Double-threshold Gas Detection System can be considered activated and functional.**

6.4 Screw the cover of the unit's terminal chamber:

- tight gland ducts (strong enough to prevent them from transmitting mechanical loads during the attempt of pull the cable out);
- seal not used gland ducts (e.g. by tightening short sections of the conduit on them);
- tightly close the transparent unit cover. Secure opening of the cover by turning the blocking pin with a flat screwdriver into horizontal position.
- it is recommended to seal the unit's cover (to restrict outsiders' access to MDP unit);

## PROBLEM?

Before you call the manufacturer of the system, check and compare the observed effects with the one described below

**6.5 TABLE of special unit states after the power has been switched off:**

EFFECT	WHY	What to do
after the power has been switched off - the lit green "POWER" LED, no messages on the LCD display or messages are illegible and delayed	display or ambient temperature below 0°C	wait for about 15 minutes until compensation of temperatures or to provide higher temperature of the ambient air
after burn-in alarm states "A1" or "A2" are generated at detectors' inputs, which last for a few dozen seconds, then "H1" or "H2" alarms decay	with a long-term storage of DEX or low ambient temperature, the burn-in period was longer than the expected 1 minute (for detectors of low levels of calibration)	switch the unit off, enter the installer's menu, extend the burn-in time (max. 20 minutes), exit the menu;
after burn-in the detectors are in normal state, while after submitted to test gas erroneous alarms are generated	too long "A" and "A16" connecting conduits;	Reduce the length of "A" and "A16" connections;
"Pr" emergency state at input to the detector	damaged supply conductor in the "A" or "A16" conduit or shorting between conductors or improper polarization of supply	change polarization of conductors, remove shorting between conductors or exchange in conduit „A" or „A16"; switch the unit of for 10 seconds and switch it on again
"S" emergency state at input to the detector	broken signal conductor in "A" or "A16" conduit or incorrect order of signalling conductors	remove opening of conduits, correct order of conductors in conduit "A" or "A16" or exchange conduits; reset the unit with the "OK" button
emergency state "FVAC", "Power supply" diode pulsates (only in version B)	no external 230V AC supply voltage, main switch turned off or main fuse damaged (next to the main switch)	the unit supplied from internal battery - turn the power on and reset the unit with "OK" button or change the fuse (for identical one, time delay cut-out), perform the change with power off
emergency state "FVAC", the Power supply diode is constantly lit (only in version B)	information on a break of external supply longer than 60 seconds	reset the unit with the "OK" button.
Emergency state "FVDC"	- in version A denotes the drop of external supply voltage below 10.5V or damage of external supply unit or connection cable "E"	- repair the external supply unit or exchange the connection cable "E"
in alarm states signallers connected to "U=12V ALARM OUTPUTS" do not work	- shorting in the connecting conduit or a damaged signalling device - automatic reset fuses triggered; - service mode on	- switch the unit power off; remove shorting in the conduit or fix the signalling device, switch the power on - switch the service mode off
"InA1" or „InA2" emergency state	voltage connected to <b>12V alarm inputs</b> on A2 and/or A1 terminal(s) (cascade connection)	ALARM signal from external devices (parent detectors in normal state). Alarm inputs operate with 5-second delay.
valve(s) is/are not closing despite the fact that A2 state is generated and mechanical efficiency of the valve is checked	too high resistance of connecting conduit with "M" valve(s) (too small section of conductors for a given length)	change the conduit for a thicker one or install the second one (4 x 2.5 <sup>2</sup> ), connecting conductors in pairs parallel
lack of possibility to establish transmission with the unit in Modbus RTU protocol	incorrect configuration of communication parameters, incorrect unit address, damaged RS232-RS485 converter	enter system settings menu, turn Modbus RTU Slave/Master on, set the proper slave address, check transmission parameters
all lights and LCD display off	- no power or the main switch is off	- switch the power on

lack of possibility to establish RS232 serial transmission between the unit and the computer	incorrect configuration of serial communication parameters, incorrect number of serial port, blocking of serial port by other software, damaged transmission cable	close other programs using serial port, change the number of serial port or repair transmission cable
the "FACC" alarm state or valve(s) is/are not closing, despite the A2 state is generated and mechanical and electrical efficiency of the valve(s) is checked	internal battery discharged	leave the unit connected to mains for min. 24 hours (battery charging), repeat the attempt. If the result is negative again - see test below
as above, charging the battery does not improve operation of MDP unit (situation possible after several years of operation).	Conduct an additional testing of battery's efficiency explicitly specifying its suitability, as below: 1) prepare an efficient, charged gel battery 12V (min. 5Ah for alarm systems) or a car battery; 2) disconnect the connecting circuit with the valve from "VALVE" terminal; 3) connect battery clamps (neutral polarization) to cable ends twice, ONLY for a short moment (max. 0.5 sec.), 4) <b>closing</b> of the valve proves the necessity of change an internal battery for a new provided ONLY by the manufacturer; 5) <b>not closing</b> the valve indicates other causes beyond the MDP unit (consult the Manufacturer) 6) check the other valve (if connected) in a similar manner;	

In the case of observing the effects other than the above please contact your Authorized Distributor or the Manufacturer.

## 7. MAINTENANCE / OPERATION

The **MDP** unit and **DEX/DG** detectors are electronic devices devoid of operating moving parts. They were built on the basis of very durable semiconductor elements. Therefore, maintenance is reduced to Periodical System Inspection .

### 7.1. Periodical System Inspection:

- ◆ clean dust off of MDP unit's cover,
- ◆ check tightness of the transparent cover and gland ducts,
- ◆ check if the shut-off valve is open!
- ◆ notify all system users on the planned inspection or about planned cut-off of gas supply,
- ◆ **System test acc. to section 6.3.** of this Instruction Manual.

***RECOMMENDED FREQUENCY OF MDP PERIODICAL INSPECTION  
not less frequent than every 3 months, is sufficient for testing  
electrical-measurement properties of the Gas Monitoring System.***

- ◆ The Periodic System Inspection should also be performed each time after the occurrence of specific conditions in the system, i.e.:
  - occurrence of extreme conditions, e.g. high gas concentration, high or very low temperature, high periodical dustiness or increase in humidity,
  - presence of high concentration of other gases, whose presence was not foreseen in the supervised zone,
  - long-term operation with alarm state active,
  - after a power stoppage for more than 1 hour,
  - after occurrence of overvoltage or strong disturbances in electrical installation,
  - after conduct of repair works or installation works, which can influence functioning of the system or its configuration, etc.

7.2. During operation avoid using mobile phones, radio-telephones or other sources of strong electromagnetic field in the direct vicinity of the MDP unit - their use can cause interferences of MDP unit's operation and false alarms.

7.2.1 During operation MDP avoid temperatures above recommended threshold values (Chapter 3).

# NOTE! IMPORTANT!!

7.3. All:

- results of each system inspection acc. to section 6.3. of this instruction,
- situation, when the A2 alarm state was generated along with actions taken by the personnel,
- stoppage of unit's supply for more than 3 months,
- any observed unusual symptoms in system operation

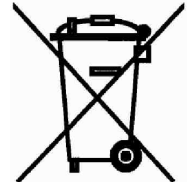
NEED TO BE included in the attached Periodical Control Protocol or otherwise you can lose warranty for system elements and the Manufacturer will be released from any responsibility for operation of the System.

7.4. After 5 years from the date of production absolutely change internal batteries and (for MDP-4(8,16).(Z,ZA,ZB)) the internal rechargeable battery for new ones. Paid service, provided by the Manufacturer.



7.5. **NOTE:** any attempt of interference in the internal circuits of the MDP unit breaches the warranty conditions and causes blocking of the unit's operation (the message on the display: "Blocked control unit. To unlock call to..."). Removal of the blocking can be performed only by GAZEX service (extra paid).

7.6. According to 2002/96/EC Directive on waste electrical and electronic equipment (WEEE), the waste unit (classified as group 9.5 equipment in accordance with the above Act) cannot be stored with other wastes. Therefore it was marked with a special symbol:



## 8. STORAGE



In order to care for the internal battery (and a possible rechargeable battery - in version MDP-4(8,16). (B,Z,ZA,ZB)), it is recommended to store the unit in dry locations with temperature within the range of +5°C to +35°C. A short-term (<2h/8h) storage in ambient temperature from -10°C do 45°C is permitted.

When storing the MDP-4(8,16).(B,Z,ZA,ZB) for a longer time, the internal battery should be recharged every 6 months. Recharging is performed by adding the 230V~ or 12V= voltage depending on MDP version (without detectors connected) for the period of at least 24 hours. After that time switch the power off.

**NOTE!!!** To disable power supply in the unit in MDP-4(8,16).(B,ZB) version equipped with internal battery support, disconnect the external power supply with main switch, then press "OK" button located on the front panel and hold it down until you disable the MDP (for about 10 seconds).

Internal battery service life is calculated at approximately 3 to 5 years (depending on operating conditions), and the internal memory backup battery - for 5 years from the date of manufacture. After 5 years from the date of manufacture replace the battery and the rechargeable battery with a new - exchange can be conducted only by the Manufacturer.

NOTICE: .....