



User Manual

Control Unit Module

Teta MOD Control 1

Product code: PW-108-A



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Remarks and reservations

-  Connection and operation of the device is allowed only after reading and understanding the contents of this document. Keep User's Manual with the device for future use.
-  The manufacturer bears no responsibility for errors, damages and failures caused by improper selection of devices and cables, improper installation or failure to understand the contents of this document.
-  Unauthorised repairs and modifications of the device are not allowed. The manufacturer bears no responsibility for the results of such interventions.
-  Excessive mechanical, electrical or environmental exposure may result in damage to the device.
-  Use of damaged or incomplete devices is not allowed.
-  The design of the gas detection system for a protected facility may involve other requirements throughout all stages of the product life.

How to use this manual?

-  The following symbols of optical indicators status are used throughout the document:







Symbol	Interpretation
	Optical indicator on
	Optical indicator flashing
	Optical indicator off
	Optical indicator status not determined (depends on other factors)

Table 1: Optical indicators status notation

-  Important parts of the text are marked as follows:



Pay special attention to information given in these fields.

-  The content of the control unit module is presented in the following way:

Example of a message presented on the display


-  This User Manual consists of a main text and attached appendices. The appendices are independent documents and can be used separately from this Manual. Page numbering of appendices starts anew with no relationship to page numbering of the main document and appendices may have their own tables of contents. In the right bottom corner of each page you can find the name (symbol) of any document included into the User Manual package with its revision (issue) number.

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1 General information

1.1 Application field

The Teta MOD Control 1 module is a control device designed for operation in the System for Gas Detection Teta Gas. The module uses the technique of Digital Data Transmission – Teta Bus that enables both power supply and addressable communication with gas detector or signalling devices via only a single pair of conductors.

The Teta MOD Control 1 Control Unit Module offers the following features:

- ✄ communication with gas detectors and signalling devices,
- ✄ control of light and sound warning devices (stack lights and beacons),
- ✄ control of shut-off solenoid valves,
- ✄ presentation of the system status on the operator's HMI,
- ✄ control of the entire system operation.



The Control Unit Module Teta MOD Control 1 is not designed for operation in areas with potentially explosive atmospheres.

Key features of gas detectors

- ✄ Handling up to 50 devices connected directly to the Teta Bus port.
- ✄ Handling up to 8 valve controllers.
- ✄ Handling up to 12 signalling devices (optical-acoustic signallers or warning LED display).
- ✄ 6 relay outputs.
- ✄ 2 binary inputs.
- ✄ Separate control outputs for flammable and toxic gases to be monitored.
- ✄ Identification of hazardous locations – in case of gas leaks on the facility area the control unit enables operators to identify locations with possible hazards.

1.2 Description of the operation

The Control Unit Module Teta MOD Control 1 scans statuses of gas detectors incorporated into the Gas Detection System Teta Gas. The scanning results are presented on the device display and also by means of LED indicators. The measured concentrations of gases and other information about the system status (e.g. defects, failures) are used to control contacts of the device outputs and executive devices (valve controllers).

The control module is furnished with mutually independent alarms and control outputs for flammable and toxic gases, which enables separation of alarm signals and autonomous control of the ventilation system. It is also possible to generate signals of the fire monitoring system if leaks of LPG are detected.

2 Safety



All activities related to connecting detectors, signallers and other system components must be carried out while Control Unit's power supply is off.



Although switching power supply of the Gas Detection and Safety System off, there is a possibility that a dangerous voltage can exist on the terminals of the control unit. It can originate from another system like for an example ventilation system that uses one of the output pins of control unit.



When performing repair, building and maintenance works, secure the device in a proper way.



Before painting the walls, make sure the device is secured.



Before painting the floors, make sure the device is secured.

3 Description of the construction

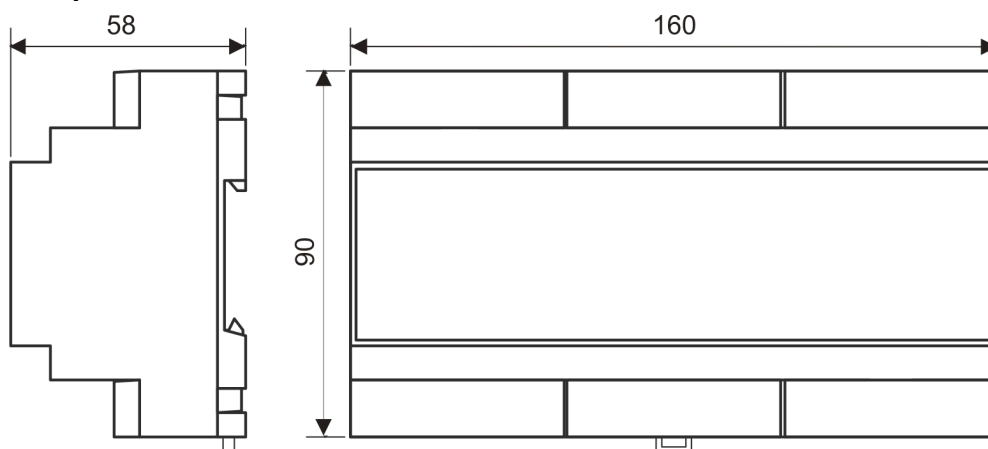


Figure 1: The construction of the device and its dimensions

4 Input-output interfaces

4.1 Electric interface

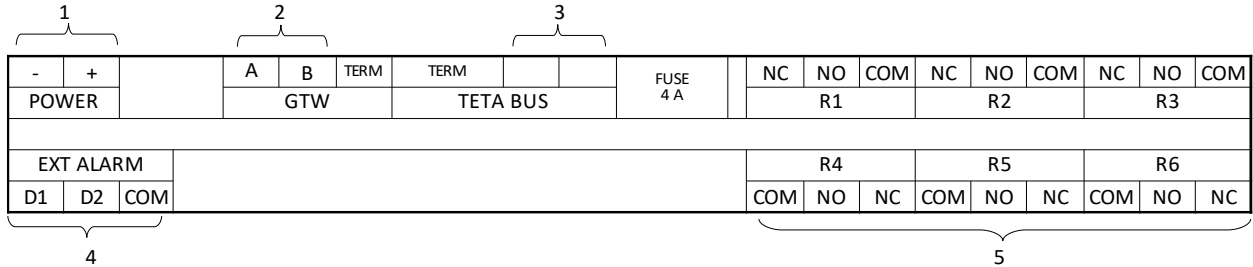


Figure 2: Electric Connections

No.	Name	Terminal	Description
1	POWER		Device supply port. Parameters – see section 18
		-	Negative. Both terminals „-“ are internally connected
		+	Positive. Both terminals „+“ are internally connected
2	GTW		Communication port, see section 4.1.2
		A	Signal line
		B	Signal line
3	TETA BUS		System communication port. Used to connect devices of the Teta series, details see section 4.1.3
			Power supply and control line for devices with Teta interface
			Power supply and control line for devices with Teta interface
4	EXTERNAL ALARM		Binary input, see section 4.1.1
		D1	External alarm input 1
		D2	External alarm input 2
		COM	Common terminal of external alarm
5	R1 – R6		Relay outputs, see section
		COM	Common terminal of relay
		NO	Normally open contact of relay
		NC	Normally closed contact of relay

Table 2: Electric interface description

Some interfaces are galvanic separated from each other. The idea is shown on the structural diagram below.

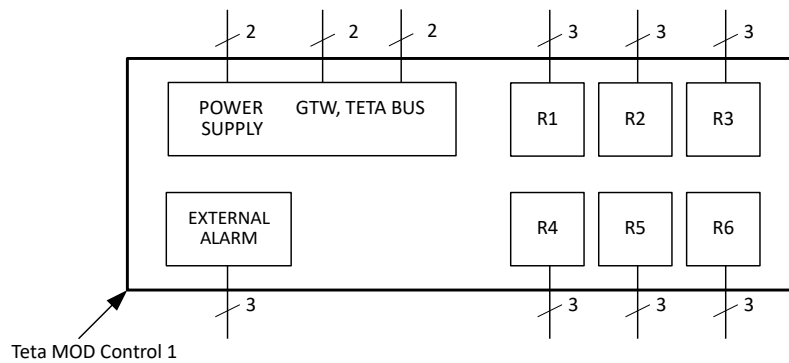


Figure 3: Galvanic separation between various interfaces of the control unit – structural diagram




4.1.1 Digital Input EXTERNAL ALARM

This input is designed to activate the status of EXTERNAL ALARM by using an external signal coming from the automation system, alarm system or from a push button.






To use it connect voltage with any polarity to terminals (parameters – see section 18).

4.1.2 GTW data transmission port

The Control Unit Module Teta MOD Control 1 is equipped with the GTW data transmission port that is designed for data exchange between the Teta Gas system and the external world (e.g. a superior PLC, SCADA system, etc.). It is a bidirectional port and also enables readouts of the following information about current status of the Teta Gas system.

-  statuses of gas detectors,
-  measured values of gas concentration,
-  statuses of relay outputs.

Data are exchanged via a digital line for serial transmission RS-485, where the control module acts as a slave device. The foregoing functionalities are implemented by readouts of registers located in the area of ‘holding registers’ of the device. The following parameters of the transmission line are available:

-  variants of the data transmission protocols MODBUS ASCII and MODBUS RTU,
-  network address of the device ranging from 1 to 255,
-  transmission rates: 4800, 9600, 19200, 38400, 57600 or 115200 bds,
-  parity control: none (N), even (E) or odd (O),
-  frame format for the MODBUS ASCII protocol: 7 or 8 data bits.

All foregoing parameters can be customized by the system operator from the level of the device user interface (see section 5.8).

See section 7 for the map of the device memory.



The GTW port is not provided with galvanic separation from the power supply line (see Figure 3), therefore it must be connected to the RS-485 line via a line separator when the connection is made to a device supplied from a different power adapter (see also the Teta Gas System Manual at tetagas.atestgaz.pl).

4.1.3 Communication port TETA BUS

The port is designed for digital transmission based on the Teta Bus protocol and dedicated for devices of the Teta series. This port also allows you to connect a Control V Valve Controller.

See section 6 for details about the system interconnections.

The transmission line of the port needs a specific polarity. See section 8.4.2 for details.

4.1.4 Relays output

The module has six universal relay outputs. These outputs can adopt one of the two statuses: active or inactive (the active state means that the voltage has been given to the relay coil). Terminals of relays can switch over to the following positions:

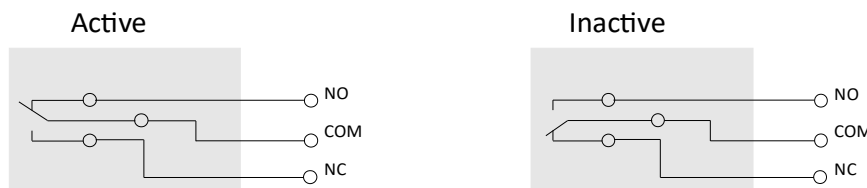


Figure 4: Relays in active and inactive state

Relays status can be checked by the user interface. Details – see section 5.8. Technical specification of outputs – see section 18.

The subsequent tables summarize functionalities that can be assigned to relay outputs of the Control Unit Module Teta MOD Control 1 depending on the specific program of the system operation.

Program 1 (garage)			
Output No.	Functionalities	Conditions for the output activation¹	Conditions for the output deactivation
R1	ALARM 1 CO/NO ₂	The first threshold for CO/NO ₂ is exceeded or EXTERNAL ALARM is activated	The monitored concentration of CO/NO ₂ drops below the first threshold and EXTERNAL ALARM becomes inactive
R2	ALARM 2 CO/NO ₂	The second threshold for CO/NO ₂ is exceeded or EXTERNAL ALARM is activated	The monitored concentration of CO/NO ₂ drops below the second threshold and EXTERNAL ALARM becomes inactive
R3	ALARM 3 CO/NO ₂	The third threshold for CO/NO ₂ is exceeded or EXTERNAL ALARM is activated	The third threshold for CO/NO ₂ is exceeded or EXTERNAL ALARM is activated
R4	ALARM 1 LPG/NG	The first threshold for LPG/NG/H ₂ is exceeded or EXTERNAL ALARM is activated	The first threshold for LPG/NG/H ₂ is exceeded or EXTERNAL ALARM is activated
R5	ALARM 3 LPG/NG	The third threshold for LPG/NG/H ₂ is exceeded or EXTERNAL ALARM is activated	The third threshold for LPG/NG/H ₂ is exceeded or EXTERNAL ALARM is activated
R6	NEGATED FAILURE	No defects	One of the controlled devices reports a defect (is in the FAILURE mode) or the control unit module is deprived power

Table 3: Configuration of relay outputs for the Program 1 of the system operation

1 See figure 4.

Program 2 (hall, a solenoid valve 230 V)			
Output No.	Functionalities	Conditions for the output activation²	Conditions for the output deactivation
R1	GENERAL ALARM (VISUAL DEVICES)	The first threshold for CO/NO ₂ or LPG/NG/H ₂ is exceeded	See section 4.1.4.1
R2	GENERAL ALARM (AUDIBLE DEVICES)	The third threshold for CO/NO ₂ or LPG/NG/H ₂ is exceeded	See section 4.1.4.2
R3	VALVE 230 V	The third threshold for LPG/NG/H ₂ is exceeded	See section 4.1.4.3
R4	ALARM 1 GENERAL	The first threshold for CO/NO ₂ or LPG/NG/H ₂ is exceeded	The monitored concentration of CO/NO ₂ or LPG/NG/H ₂ drops below the first threshold
R5	ALARM 3 GENERAL	The third threshold for CO/NO ₂ or LPG/NG/H ₂ is exceeded	The monitored concentration of CO/NO ₂ or LPG/NG/H ₂ drops below the third threshold
R6	NO DEFECTS	None of the controlled devices reports a defect (is in the FAILURE mode)	At least one of the devices within the controlled system reports a defect or no power voltage supplied to the control module


Table 4: Configuration of relay outputs for the Program 2 of the system operation

Program 3 (hall, a solenoid valve 12 V)			
Output No.	Functionalities	Conditions for the output activation²	Conditions for the output deactivation
R1	GENERAL ALARM (VISUAL DEVICES)	The first threshold for CO/NO ₂ or LPG/NG/H ₂ is exceeded	See section 4.1.4.1
R2	GENERAL ALARM (AUDIBLE DEVICES)	The third threshold for CO/NO ₂ or LPG/NG/H ₂ is exceeded	See section 4.1.4.2
R3	12 V ² VALVE ACTIVATION	The third threshold for LPG/NG/H ₂ is exceeded	The monitored concentration of LPG/NG/H ₂ drops below the third threshold
R4	ALARM 1 GENERAL	The first threshold for CO/NO ₂ or LPG/NG/H ₂ is exceeded	The monitored concentration of CO/NO ₂ or LPG/NG/H ₂ drops below the first threshold
R5	ALARM 3 GENERAL	The third threshold for CO/NO ₂ or LPG/NG/H ₂ is exceeded	The monitored concentration of CO/NO ₂ or LPG/NG/H ₂ drops below the third threshold
R6	NO DEFECTS	None of the controlled devices reports a defect (is in the FAILURE mode)	At least one of the devices within the controlled system reports a defect or no power voltage supplied to the control module

Table 5: Configuration of relay outputs for the Program 3 of the system operation

4.1.4.1 Activation of optical alarm devices

Appropriate configuration of relay outputs makes it possible to control operation of visual alarm devices.

In case of choosing the latched operation mode, exceeding first threshold of the detected substance will activate the signalling device. It will be deactivated when the concentration drops below first threshold and the button  is depressed (the latched operation mode of is shown on Figure 5).

² Details for connection of a 12 V solenoid valve are provided in the Teta Gas System Manual available at tetagas.atestgaz.pl

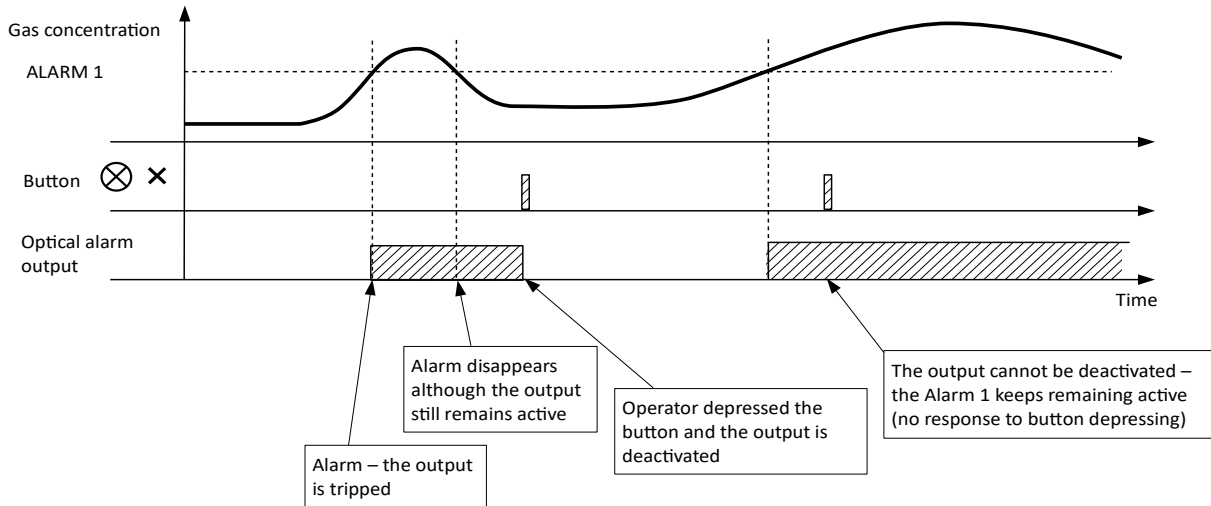


Figure 5: Operation of visual alarm devices (latched) as a function of gas concentration

In case of unlatched operation mode, exceeding first threshold of the detected substance will activate the signalling device. It will be deactivated when the concentration drops below first threshold.

Operation mode configuration – see Table 14.

4.1.4.2 Activation of acoustic alarm devices

Appropriate configuration of relay outputs makes it possible to control operation of acoustic alarm devices where the devices are activated if the third threshold for the monitored substance is exceeded and deactivated after the concentration drops below the third threshold.

It is also possible to deactivate the acoustic alarm devices for a specific time – see illustration 6. The deactivation time is 10 minutes.

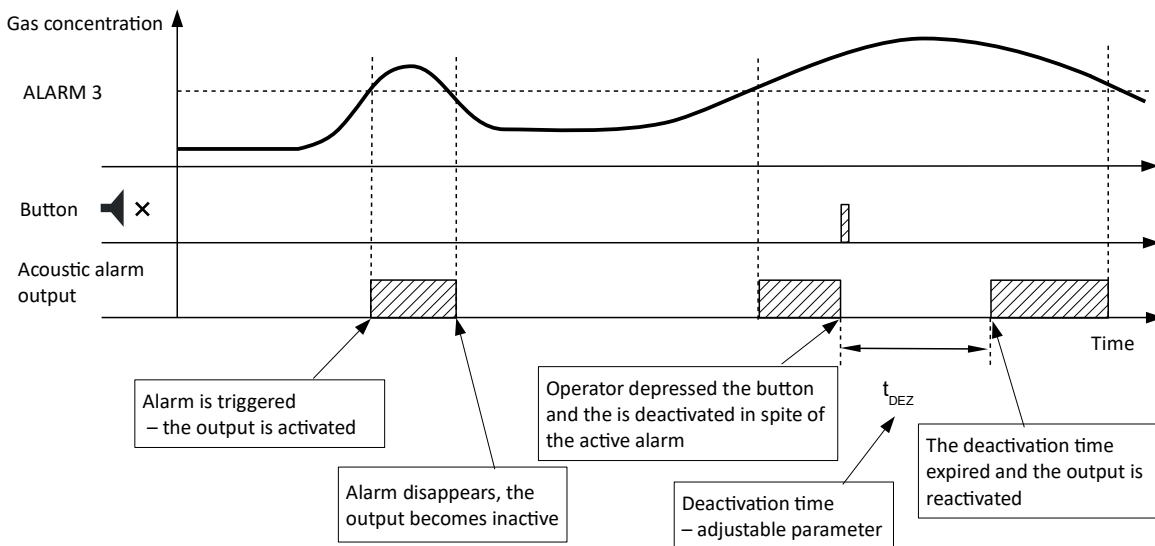


Figure 6: Operation of the output for visual alarm devices as a function of gas concentration

4.1.4.3 Actuation of solenoid valves

Appropriate configuration of relay outputs makes it possible to control solenoid valves, where exceeding of the third threshold for LPG/NG/H₂ concentration may trigger the control unit to generate three consecutive pulses capable of shutting the valve off.

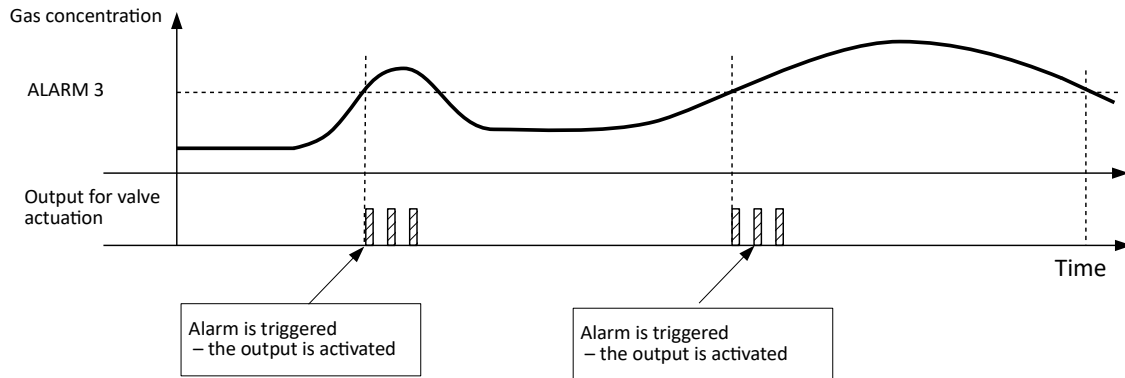


Figure 7: Operation of the output for activation of a solenoid valve as a function of gas concentration

5 User interface

5.1 Front panel

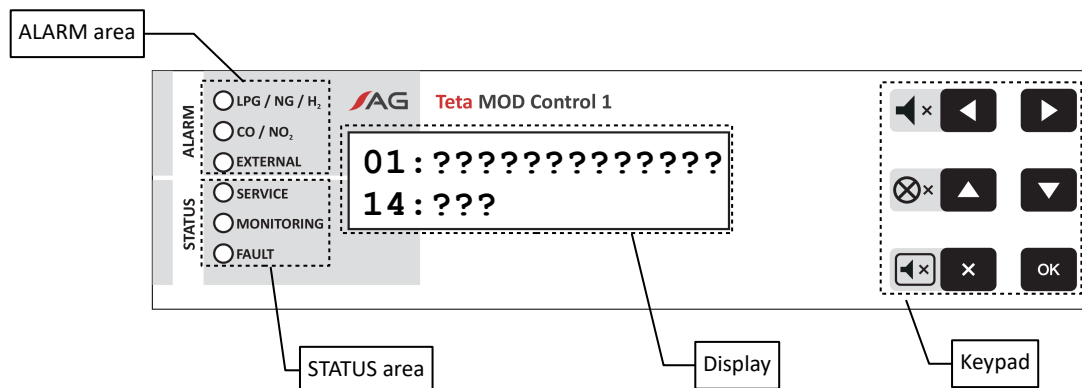


Figure 8: Teta MOD Control 1 panel

5.1.1 ALARM area

Indicator	Status / colour	Information
LPG / NG / H ₂	<input type="radio"/>	Regular operation of LPG/NG/H ₂ detectors, concentration of gases is below the established thresholds
	<input checked="" type="radio"/> / red	1 blink – the first alarm threshold is exceeded
	<input checked="" type="radio"/> / red	2 blinks – the second alarm threshold is exceeded
	<input checked="" type="radio"/> / red	3 blinks – the third alarm threshold is exceeded
CO / NO ₂	<input type="radio"/>	Regular operation of CO/NO ₂ detectors, concentration of gases is below the established thresholds
	<input checked="" type="radio"/> / red	1 blink – the first alarm threshold is exceeded
	<input checked="" type="radio"/> / red	2 blinks – the second alarm threshold is exceeded
	<input checked="" type="radio"/> / red	3 blinks – the third alarm threshold is exceeded

Indicator	Status / colour	Information
External		No voltage signals appear on EXTERNAL ALARM inputs of the control module
	/ red	Voltage signals delivered to EXTERNAL ALARM inputs of the control module

Table 6: ALARM indicators description

5.1.2 STATUS area

Indicator	Status / colour	Information
SERVICE		Active when at least one component of the system is in maintenance (e.g. heating, test, simulation or calibration)
MONITORING	/ green	Active when at least one component of the system is taking measurements of gas concentration
FAILURE	/ yellow	Active when at least one component of the system covered by the self-test functionality reports an error or a physical defect (e.g. failure of data transmission, improper configuration of a Teta MiniDet unit, defect of the measuring path within a gas detector)

Table 7: Meaning of LED indicators in the STATUS area

5.1.3 Display

The display is designed to:

- indicate statuses of all detectors, signalling devices or valves connected to the control module,
- present messages and enable navigation within on-screen menus.

5.1.4 Keypad

The user interface is operated with the use of a keypad that enables easy and intuitive navigation within various on-screen menus

In parallel to basic functions some buttons are also capable of performing alternative operations (available only in the system view – see section 5.4).

Key	Alternative functions ³	Description
		Short-time muting (deactivation) of an external audible alarm devices
		Switching an external visual warning device (stacklight) off
		Muting (deactivation) of an internal buzzer

Table 8: Description of keypad buttons

Special combinations of keypad buttons are available in the system view – see section 5.4.

Combination of buttons	Description
Simultaneous depressing	start of the interface test – see section 5.3.

Table 9: Description of a button combination

³ The alternative function is available only in the system view – see section 5.4).

5.2 User interface structure

The user manual structure is shown on the illustration below.

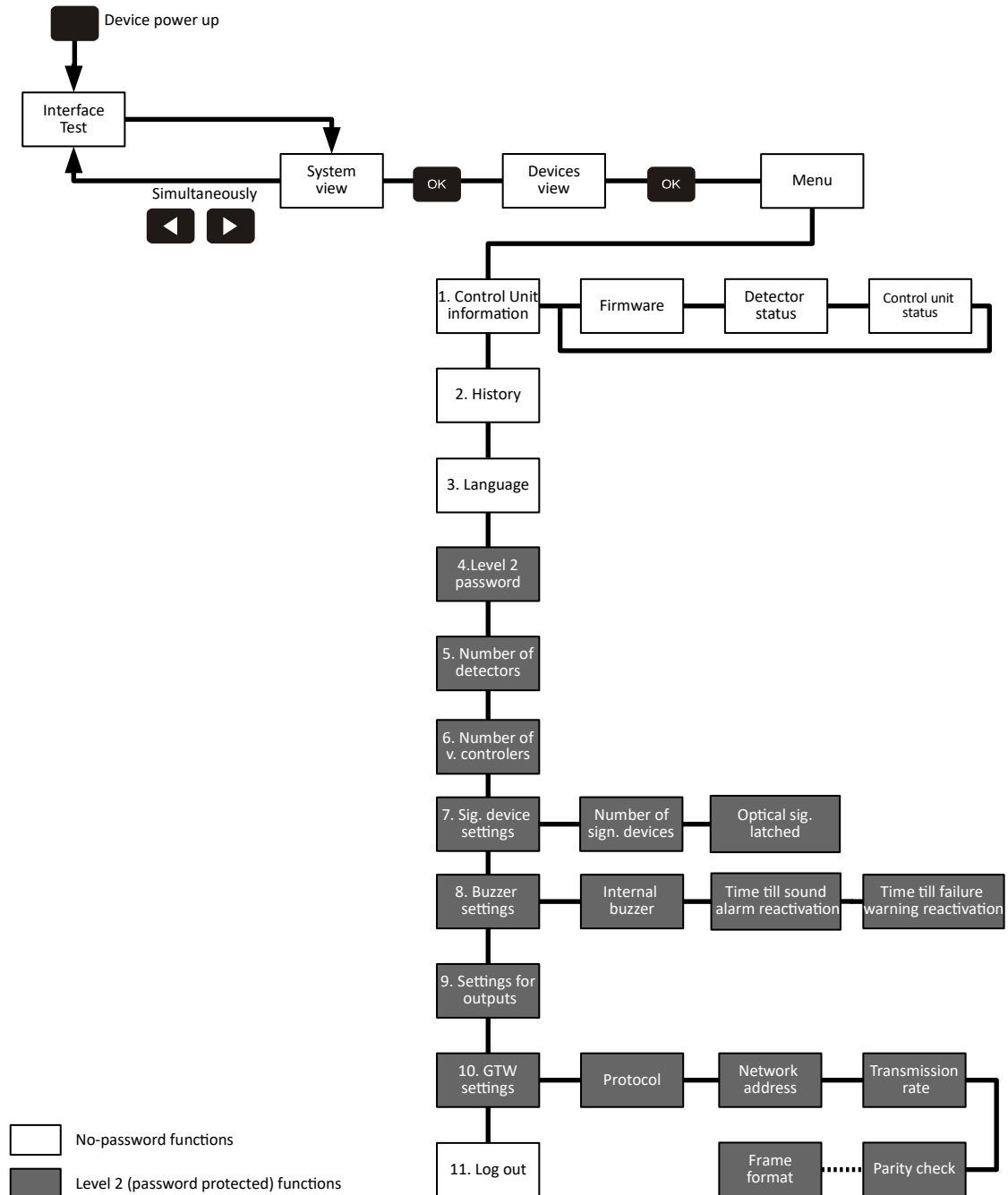









Figure 9: Interface structure

The main view available on the HMI display is the system view (see section 5.4). Upon the system power up that view is displayed right after the initial self-test of HMI is completed (see section 5.3). The system view enables navigation to the following screens:

-  view of devices layout (see section 5.5), upon depressing the button ,
-  menu of the control module (see section 5.8), by double depressing of the button ,
-  user interface test (see section 5.3), by simultaneous depressing the buttons  .

Any menu items and options that are selected by the user interface and need no intervention of the user remain active only for 10 seconds and the system automatically returns to the view of the detector layout if no button is depressed on the keypad.


Detailed description of all components within the user interface structure is provided in subsequent sections.

5.3 Power-on start of the control module and user interface self-test

Right after the power voltage of the control module is on the user manual self-test is launched. The test consists in activation of all LED indicators on the front panel and an internal buzzer⁴ with blacking of all character areas on the LCD display:








After subsequent 2 seconds the device moves to presentation of the basic screen (see section 5.4). The user interface test (i.e. the foregoing sequence of operations) can be initiated at any moment of time from the system keypad (see section 5.1.4).



It is recommended to launch the aforementioned test at least once a week to make sure that all indicating LEDs, display and buzzer are in sound operating condition.

5.4 System view

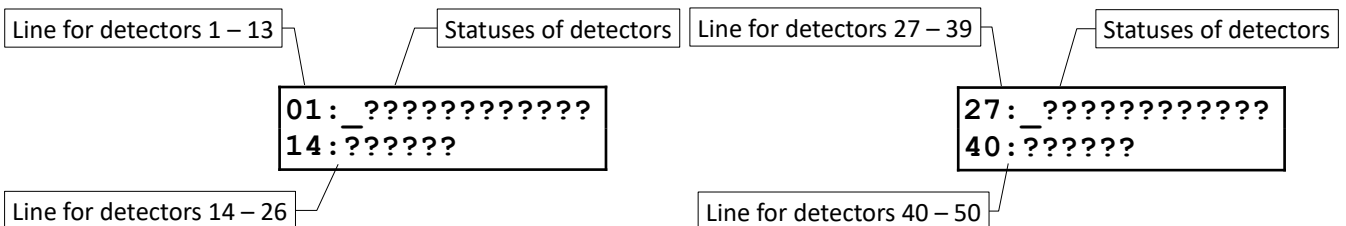
It is the screen that contains general information about the system, such as:

-  number of gas detectors and status thereof,
-  number of valve controllers and status thereof,
-  numbers of signalling devices and status thereof,
-  status of the control unit and historical events,
-  status of warning (alarm) devices.


5.4.1 Screen 1

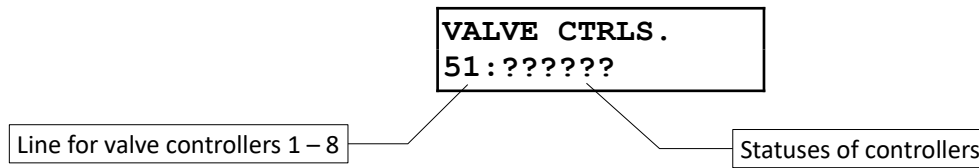
The system view comprises two screens that are shown below.


-  detectors

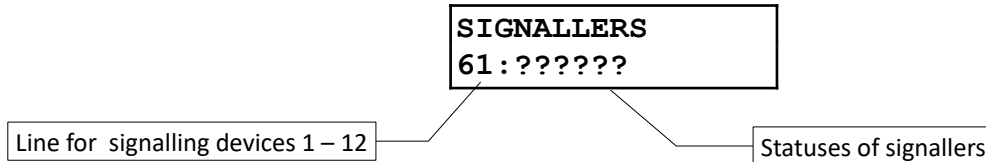


⁴ The buzzer signal may not be horned if the device is configured for operation without an internal buzzer (see section 5.6).

 valve controllers



 signalling devices



In that view the system scans all measuring channels and displays their statuses. The period for switching between the two screens is three seconds. The view can be also switched over by means of the user interface keypad.

5.4.2 Statuses of devices

It is the area where statuses of individual devices are shown. Each device is represented as a single box on the display. The following icons are available to image the device status:

Icon	Meaning		
	Detectors	Valve controllers	Signalling devices
-	Regular operation of the associated gas detector with no alarms	Regular operation of the associated valve controllers	Regular operation of the signaller
?	No transmission	No transmission	No transmission
!	Special state different from a defect, e.g. heating up	Special state – perform the valve controller test	-
✘	Detector failure	Valve controller failure	Signaller failure
?	Blinking icon, waiting for data transmission	Blinking icon, waiting for data transmission	Blinking icon, waiting for data transmission
■	Alarm threshold 1 is exceeded	-	-
■	Alarm threshold 2 is exceeded	-	-
■	Alarm threshold 3 is exceeded	-	-
! / -	Two icons are displayed alternately: Self-test in progress or simulation during regular operation of the specific detector	-	-
! / ■	Two icons are displayed alternately: Self-test in progress or simulation with the alarm threshold 1 exceeded	-	-
! / ■	Two icons are displayed alternately: Self-test in progress or simulation with the alarm threshold 2 exceeded	-	-



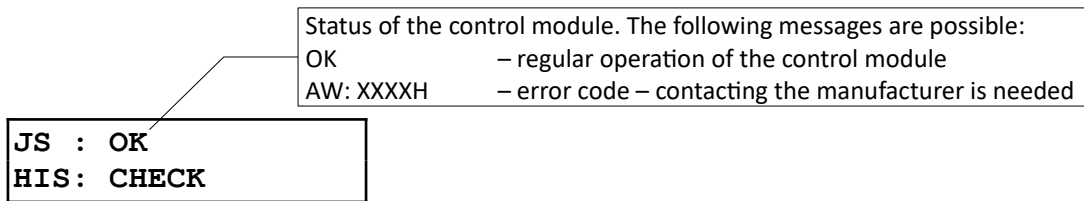
Icon	Meaning		
! / 	Two icons are displayed alternately: Self-test in progress or simulation with the alarm threshold 3 exceeded	-	-
x / 	Two icons are displayed alternately: significant of the sensor measuring range exceeded	-	-

Table 10: Icons for representation of detector statuses in the system view

5.4.3 Screen 2

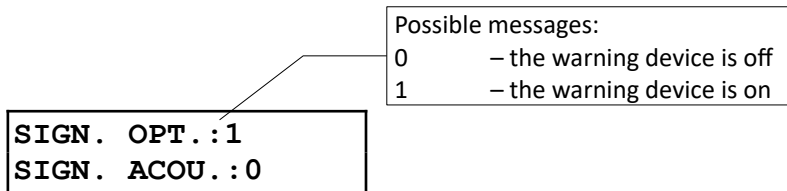
When the control module is defective or historical events are stored in its memory (see section 5.8.1 for details) and additional screen appears (is displayed periodically):



This screen never appears when the control module is in sound condition and its history of events is erased (see section 5.8.1).

5.4.4 Screen 3


When the control module collaborates with external warning /alarm devices (see sections 4.1.4.1 and 4.1.4.2 for details) the system view contains also a screen with information about statuses of these devices:



5.5 Devices view

5.5.1 Gas detector view

It is the screen where the control module alternately displays various information:

 status of the channel

Detector address

1 : CO : OK
LPG : OK

Type of gas monitored
Possible gases:
CO – carbon monoxide
LPG – propane-butane
NO₂ – nitrogen dioxide
NG – methane
H₂ – hydrogen

Status of the monitoring channel. Possible messages:


HEATING – heating up of the specific detector
OK – regular operation of the detector
ALARM 1 – alarm threshold 1 exceeded
ALARM 2 – alarm threshold 2 exceeded
ALARM 3 – alarm threshold 3 exceeded
OVRANGE – range of measurements exceeded
R.OV/FA. – significant range of measurements exceeded
SIMUL.OK – simulation of the detector operation
SIMUL.A1 – simulation of the first threshold exceeding
SIMUL.A2 – simulation of the second threshold exceeding
SIMUL.A3 – simulation of the third threshold exceeding
TEST OK – detector test passed
TEST A1 – alarm threshold 1 exceeded during the self-test
TEST A2 – alarm threshold 2 exceeded during the self-test
TEST A3 – alarm threshold 3 exceeded during the self-test
TEST OVR – range of measurements exceeded during the self-test
ERR: XXX – error associated with a specific channel
(see the table below)

Message	Description
ERR: XXX	Error associated with a communication channel with the specific detector. The error code is a hexadecimal number with the following meaning of individual bits: bit 0 – negative drift of the sensor bit 1 – excessively high level of the sensor signal bit 2 – insufficiently low level of the sensor signal bit 3 – other defects

Table 11: Error codes for communication channels with gas detectors

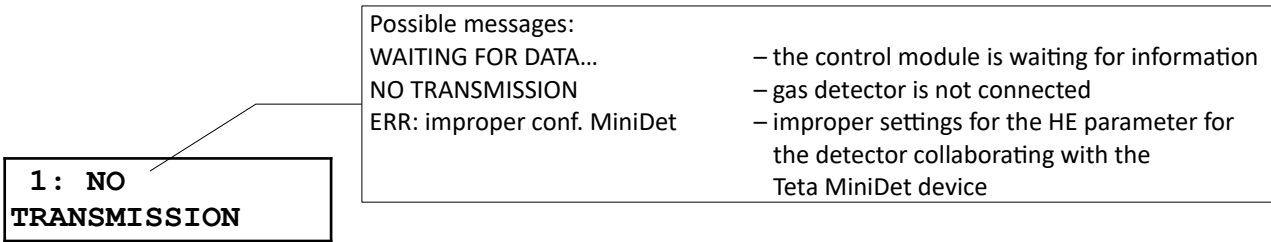
 momentary concentration

1 : CHW : 0 ppm

 and average concentration of gas measured in the specific channel

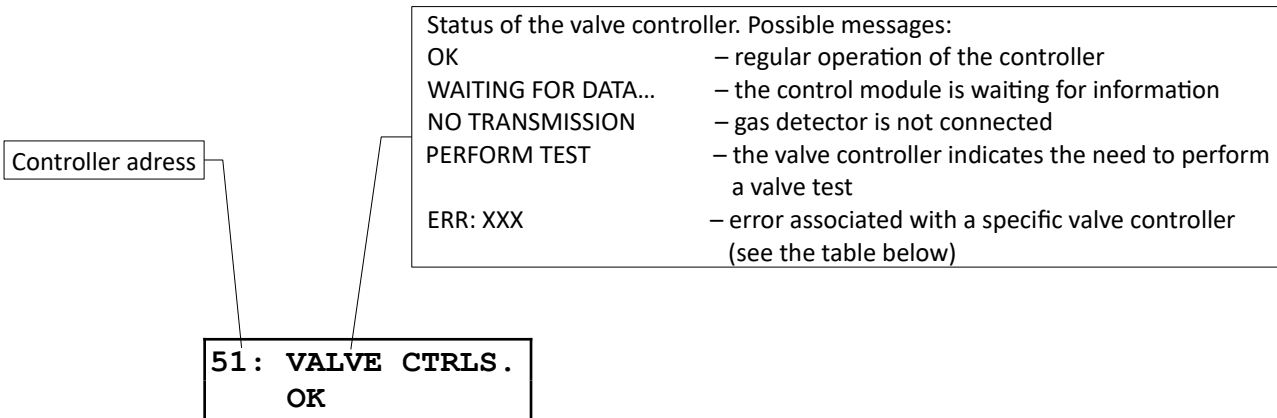
1 : SR : 0 ppm

In addition, information about other gas detector states may be displayed



5.5.2 Valve controller view

It is the screen where the control module displays information about valve controller status

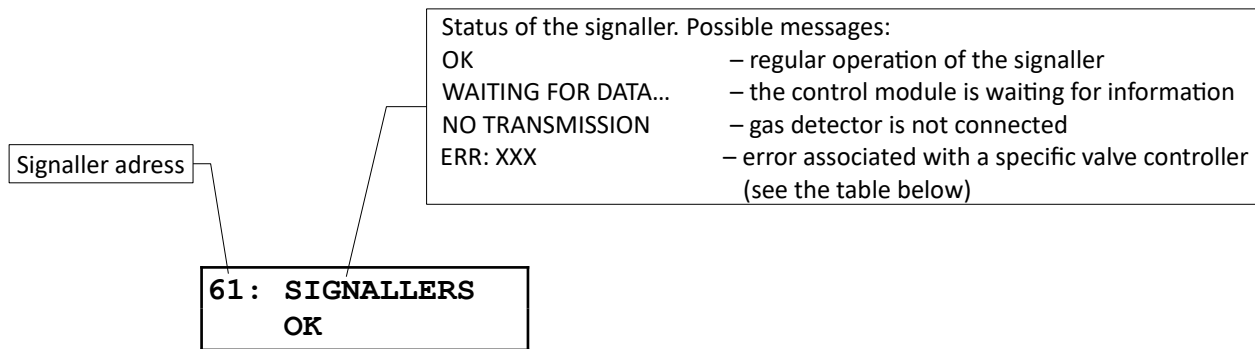


Message	Description
ERR: XXX	Error associated with valve controller. The error code is a hexadecimal number with the following meaning of individual bits: bit 0 – incorrect voltage at the battery terminals bit 1 – incorrect valve line resistance bit 2 – incorrect device supply voltage bit 3 – incorrect internal voltage of the device bit 4 – incorrect temperature inside the device bit 5 – front panel missing or malfunction bit 6 – incorrect program memory checksum bit 7 – incorrect configuration memory checksum

Table 12: Error codes for valve controller

5.5.3 Signaller view

It is the screen where the control module displays information about signaller status



Message	Description
ERR: XXX	Error associated with signaller. The error code is a hexadecimal number with the following meaning of individual bits: bit 0 – damaged acoustic signaller bit 1 – damaged optical signaller bit 2 – incorrect device supply voltage bit 3 – incorrect internal voltage of the device bit 4 – incorrect converter voltage bit 6 – incorrect program memory checksum bit 7 – incorrect configuration memory checksum

Table 13: Error codes for signaller

5.6 Buzzer – internal acoustic warning /alarm device

The control module contains an internal audible warning/alarm device (buzzer) designed to horn an audible signal when intervention of the system operator is required, for instance when a gas hazard is detected or when any part /component of the system reports an error.

The buzzer is activated under the following circumstances:



- gas alarms – exceeding of the first, second or third alarm threshold is reported by any of gas detectors connected to the control module,
- defects /errors – a defect /error is reported by any of gas detectors connected to the control module or failure of communication with detectors or a defect of the control module itself.

The activated buzzer produces a modulated audible signal with 0.5 s of sound and 0.5 s of silence.

The buzzer can be switched off (deactivated) for a specific period of time. If so, the buzzer shall horn no sound, even in case when a triggering signal is active. However, after expiration of the deactivation time the buzzer is restarted (reactivated). In addition, any new gas alarm⁵ or a system defect /error that are reported during the time when the buzzer is off are capable of the buzzer reactivation. Upon disappearing of the triggering signal the buzzer goes off.

5 A new gas alarm is understood as exceeding of the next (higher) alarm threshold on the same detector or appearing of any threshold exceeding on another detector.

The buzzer can be deactivated by means of the keypad (see section 5.1.4). The functionality of temporary deactivation is handled in a different way for gas alarms and for defect. The possible duration of the buzzer deactivation time are:

-  for gas alarms: from 1 to 90 minutes,
-  for defects /errors: from 1 to 168 hours (1 week) or permanent deactivation (the buzzer shall never be reactivated).

Settings for the foregoing parameters can be adjusted by the system user from the level of the control module menu (see section 5.8).

The buzzer can be also configured in such a way that shall be never activated (see details in section 5.8).

The illustration below presents waveforms for the internal audible signal (under the assumption that the horn is triggered by a gas alarm and the buzzer is deactivated by means of a keypad button).

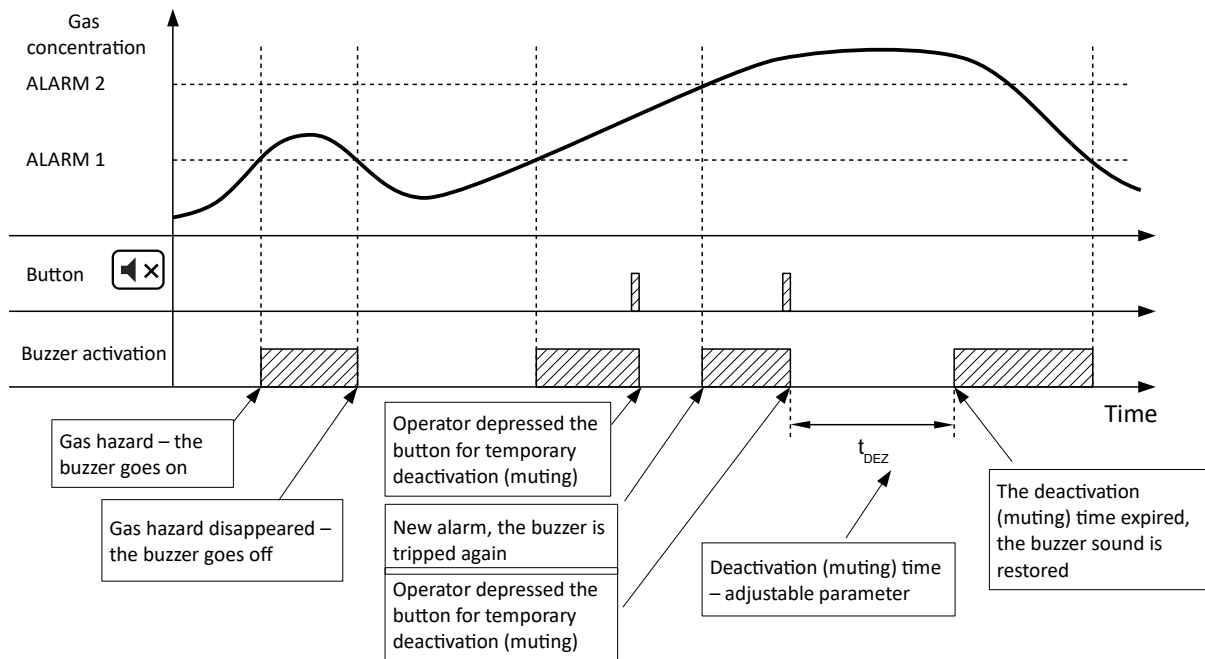




Figure 10: Keeping the internal buzzer – time diagram





5.7 Access to setting options – logging in procedure

Since the control module has several options of its operation and these options may substantially affect operation of the entire Teta Gas system and, in consequence, safety of the protected facilities, access to such crucial options is password protected. There two authorization levels:



-  level 0 – basic (unprotected) – enables viewing the indications and reading additional details about the system,
-  level 2 – parametrization level (password protected) – enables adjustments of settings for operation parameters of the system (the default password for the second level of authorization is 2000). Due to safety reasons the password must be changed prior to actual operation of the system.

By default, the authorization level is 0. Each user that has physical access to the control module is on the level 0 of authorization rights. Should a user want to select an option that requires a higher level of authorization, the user is prompted for the password:

Enter password
(level 2) : 0***

A password is a four-digit number. Due to safety reasons only one digit is visible. The digit can be adjusted by means of   buttons whilst navigation from one digit to another is possible with   buttons.

The basic (unprotected) authorization level 0 is restored when:

-  user selects the *logout* option of the menu,
-  no button of the keypad is depressed during one minute.

If incorrect password is entered three times a row the logging process is interrupted and locked for five minutes. Any attempt to access options that are password-protected shall lead to appearing of the following message:


Login failed
Wait X min

where X stands for the number of minutes that remained to unlocking of the login access.

5.8 Control unit menu

This menu comprises options that relate to operation and parameters of the Control Unit Module Teta MOD Control 1 as well as the Teta Gas system.

Description of the display content for that view – see section 5.4.

Option	Description	Factory settings
1. Device info	Presents detailed information about the control unit module, including: <ul style="list-style-type: none"> • revision number and version ID of firmware installed on the control unit, • status of control voltage at terminals of output relays (the top line contains numbers of outputs, the bottom line indicates status of each output: 1 – active, 0 – inactive), • status of the device (STATEA and STATEB internal registers). 	-
2. History	Makes it possible to change password for the password-protected level 2 of authorization rights – see details in section 5.8.1.	-
3. Language	Enables change of the HMI language – see details in section 5.8.2.	
4. Level 2 password	Makes it possible to change password for the password-protected level 2 of authorization rights – see details in section 5.7. <div style="border: 1px solid gray; padding: 10px; margin-top: 10px;">  Operators must be extremely cautious with change of the access password to the second level of authorization. When the password is lost (forgotten) only the manufacturer is able to set up a new password. </div>	2000

Option	Description	Factory settings
5. Number of detectors	Makes it possible to define the number of detectors incorporated into the system of gas detection. Users are prompted to enter the number from 1 to 50. Consecutive network addresses are assigned in the control module memory to corresponding detector channels with the numbering from 1 onward. One has to make sure that subsequent detectors have consecutive numbers within the permissible range.	1
6. Number of valve controllers	Makes it possible to define the number of valve controllers incorporated the TETA BUS into system of gas safety. Users are prompted to enter the number from 1 to 8. Consecutive network addresses are assigned in the control module memory to corresponding controller channels with the numbering from 51 onward. One has to make sure that subsequent controllers have consecutive numbers within the permissible range.	0
7. Number of signalling devices	Makes it possible to define the number of signallers incorporated into the system of gas safety. Users are prompted to enter: <ul style="list-style-type: none"> the number of gas detectors incorporated into the TETA BUS from 1 to 12. Consecutive network addresses are assigned in the control module memory to corresponding signaller channels with the numbering from 61 onward. One has to make sure that subsequent signallers have consecutive numbers within the permissible range, mode of operation – the user can selected operation latched or not (this also applies to signaling devices connected to the Teta MOD Control 1 via relay outputs). 	0 NO
8. Buzzer settings	Enables change of settings for the internal buzzer. The following parameters can be adjusted (see section 5.6): <ul style="list-style-type: none"> duration of the muting time till the buzzer reactivation for alarms, duration of the muting time till the buzzer reactivation after a defect /error, permanent deactivation of the buzzer 	10 min 8 h buzzer active
9. Settings for outputs	Makes it possible to select the program for operation of relay outputs – see details in section 4.1.4.	1
10. GTW settings	Enables communication with other systems, e.g. DCS, SCADA or fire protection systems. The following parameters can be selected: <ul style="list-style-type: none"> protocol for data transmission network address transmission rate parity control frame format (only for the MODBUS ASCII protocol). 	MODBUS ASCII 1 19200 bauds even (E) 7 data bits
11. Logout	Return to the basic (unprotected) level 0 of authorization.	-

Table 14: Menu options and factory settings

5.8.1 History

Upon the appropriate option is selected, the Control Unit Module is able to keep records on historical events. At one moment of time the historical events for a single detector are displayed:

1: CO : ERR
HIS LPG: A1

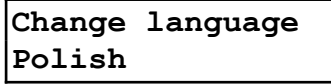
Possible messages:

- A1 – alarm threshold 1 exceeded
- A2 – alarm threshold 2 exceeded
- A3 – alarm threshold 3 exceeded 3
- ERR – error associated with a specific channel

The history of events can be erased by depressing the **OK**, and then **◀** buttons.

5.8.2 Language

Upon the system power up a user is prompted to select the user manual language.



Two languages are available, i.e.:

- Polish,
- English,
- Slovak.

6 System architecture

The location of the Teta MOD Control 1 Control Unit Module within the example of the Gas Detection & Safety System Teta Gas architecture is shown below.

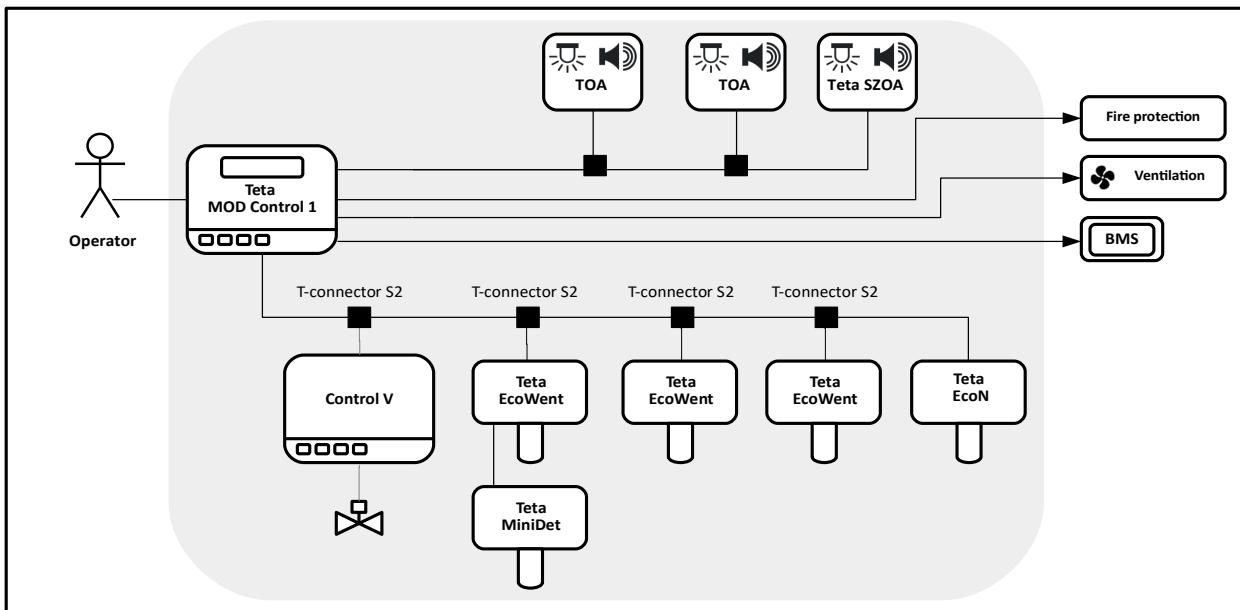


Figure 11: The Gas Detection System Teta Gas

Detailed schematic diagrams in editable format can be downloaded from tetagas.atestgaz.pl.



7 GTW memory map

Description	Type /comments	Register	Bit	Description of the bit	Bit	Description of the bit
System status	Flags	40001	0	Monitoring	6	Exp – A1
			1	Special status – failure	7	Exp – A2
			2	Special status – service	8	Exp – A3
			3	Tox – A1	9	External alarm
			4	Tox – A2	10..15	Unused
			5	Tox – A3		
Control unit status	Flags	40002	0	R1	4	R5
			1	R2	5	R6
			2	R3	6..14	Unused
			3	R4	15	Failure
Detector 1 – status	Flags	40003	0	The detector is active	2	Failure not related to measuring channels
			1	No data from detector	3..15	Unused
Detector 1 – channel 1 – status	Flags	40004	0	A1	7	Unused
			1	A2	8	Special status: failure UnderRange
			2	A3	9	Special status: failure SignalToHigh
			3	Range exceeded	10	Special status: failure SignalToLow
			4	Special status: warm-up	11	Special status: other failure
			5	Special status: test with gas	12..14	Unused
			6	Special status: simulation	15	Active channel
Detector 1 – channel 1 – information	Flags	40005	0	Quantum concentration: 0: 1, 1: 0,1	3	Information about range – bit 2
			1	Range information – bit 0 (definitions of the values are given in the table 16)	4..15	Unused
			2	Information about range – bit 1		

Description	Type / comments	Register	Bit	Description of the bit	Bit	Description of the bit
Detector 1 – channel 1 – momentary concentration	S16 ⁶	40006	-	-	-	-
Detector 1 – channel 1 – medium concentration	S16	40007	-	-	-	-

Description	Type / comments	Register
Detector 1 – channel 2 – status	Analogously to the detector 1	40008
Detector 1 – channel 2 – information		40009
Detector 1 – channel 2 – momentary concentration		40010
Detector 1 – channel 2 – medium concentration		40011

Table 15: Memory map

6 A 16-bit number with a sign.

Bit 2	Bit 1	Bit 0	Decimal value	Description of the bit
0	0	0	0	50% LEL NG
0	0	1	1	50% LEL LPG
0	1	0	2	300 ppm CO
0	1	1	3	10 ppm NO ₂
1	0	0	4	50% LEL H ₂

Table 16: Value definitions for "scope information"

The register numbers for subsequent detectors are given below.

Description	Type / comments	Register	Description	Type / comments	Register	Description	Type / comments	Register
Detector 2	Analogously to the detector 1	40012	Detector 19	Analogously to the detector 1	40165	Detector 36	Analogously to the detector 1	40318
Detector 3		40021	Detector 20		40174	Detector 37		40327
Detector 4		40030	Detector 21		40183	Detector 38		40336
Detector 5		40039	Detector 22		40192	Detector 39		40345
Detector 6		40048	Detector 23		40201	Detector 40		40354
Detector 7		40057	Detector 24		40210	Detector 41		40363
Detector 8		40066	Detector 25		40219	Detector 42		40372
Detector 9		40075	Detector 26		40228	Detector 43		40381
Detector 10		40084	Detector 27		40237	Detector 44		40390
Detector 11		40093	Detector 28		40246	Detector 45		40399
Detector 12		40102	Detector 29		40255	Detector 46		40408
Detector 13		40111	Detector 30		40264	Detector 47		40417
Detector 14		40120	Detector 31		40273	Detector 48		40426
Detector 15		40129	Detector 32		40282	Detector 49		40435
Detector 16		40138	Detector 33		40291	Detector 50		40444
Detector 17		40147	Detector 34		40300	-		-
Detector 18		40156	Detector 35		40309	-		-

Table 17: Register numbers of subsequent detectors

8 Life cycle

8.1 Transport

The device should be transported in the same way as new devices of this type. If the original box or another protection (e.g. corks) is not available, it is necessary to secure the device against shocks, vibrations and moisture on one's own, using other equivalent methods.

Transport of the device should be carried out under the environmental conditions described in the table 18.

8.2 Installation

Mount in the control cabinet on the DIN 35 rail or place in the junction box in a place accessible to authorized operators, however, if possible, in such a way as to make it difficult for unauthorized persons to access it. It is recommended to use such mounting height which allows easy access to the unit.

The module should be mounted in the orientation as shown in figure 1.

Avoid places with high humidity.

If multi-wired strands (commonly referred to as "cables") are used for connecting, the ends of these strands shall be terminated with terminal sleeves.



It is unacceptable to combine in one connector two wires which are not pinched in one cable lug.



Do not place the cable reserve in the device. Bare wires or wires surplus may create a danger of electric shock or equipment damage.



Do not leave disconnected cables inside the device.



Incorrect cable routing can lead to reducing the device's immunity from electromagnetic interference.



Unused screw contacts must be tightened.

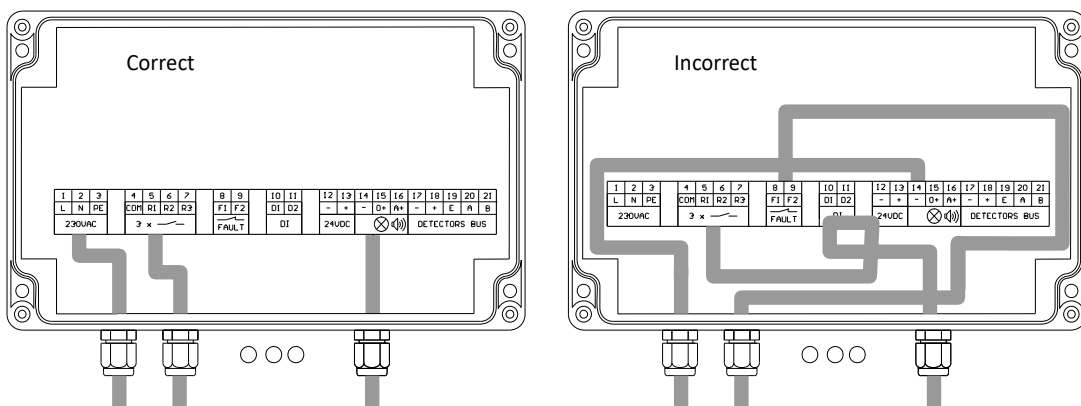


Figure 12: Example connection of cables to the device

8.3 Start-up

The device is ready to operate after the power supply is provided and the co-operating devices are connected to it.

8.4 Device / system configuration

8.4.1 Relays output configuration

Details of the relays output configuration can be found in Tabela 3, 4 and 5.

8.4.2 Terminators of communication lines

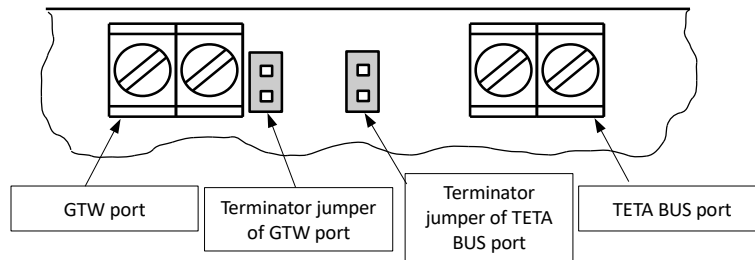


Figure 13: GTW and TETA BUS ports polarization jumpers after removing the cover

GTW and TETA BUS communication ports are equipped with terminators. To configure their work, place jumpers in the connector. Setting the jumper will activate the port terminator.

8.5 Diagnostics

Information on failures signaled by the device is given in points 5.5.1 and 5.5.2.

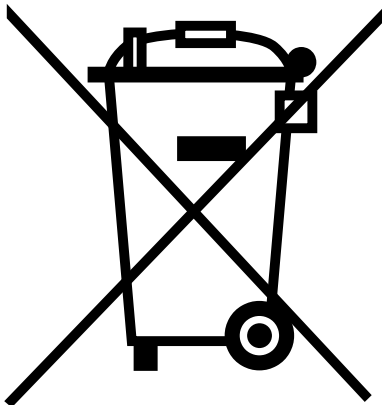
8.6 Periodical operations

The device requires periodic testing of the interface – see section 5.3 for details.

8.6.1 Maintenance

Except cleaning the external part of the enclosure, the device does not require any maintenance. The external part of the enclosure should be cleaned by means of a soft cloth moistened with water and a bit of a mild detergent.

8.7 Utilization



This symbol on a product or on its packaging indicates that the product must not be disposed of with other household waste. Instead, it is the user's responsibility to ensure disposal of waste equipment by handing it over to a designated collection point for the recycling of waste electrical and electronic equipment. The proper recycling of your waste equipment at the time of disposal will help to conserve natural resources and ensure that it is recycled in a manner that protects human health and the environment. Information about relevant designated collection points can be obtained from the Local Authority, waste disposal companies and in the place of purchase. The equipment can also be returned to the manufacturer.

9 Technical specification

Power supply <ul style="list-style-type: none"> • V_{CC} • Power consumption 	15 – 50 V $\overline{\text{---}}$ 2.5 W
Environment <ul style="list-style-type: none"> • Ambient temperatures • Humidity • Pressure • pH 	0 – 50°C 10 – 90% long term 0 – 99% short term 1013 ± 10% hPa 5,5 – 7
IP	IP 20
Digital input parameters <ul style="list-style-type: none"> • R_{IN} • Inactive (not negated) • Active (not negated) 	10 kΩ 0 – 1 V 10 – 50 V Any polarisation Whichever polarization > 1s
Digital output parameters <ul style="list-style-type: none"> • Relay 	Floating contacts, NO/NC AC1 ² : 230 V \sim / 3 A DC1: 230 V $\overline{\text{---}}$ / 0.25 A DC1: 24 V $\overline{\text{---}}$ / 3A Not protected
Digital communication parameters <ul style="list-style-type: none"> • TETA BUS port <ul style="list-style-type: none"> • Communication protocol • GTW port <ul style="list-style-type: none"> • Electric standard • Communication protocol 	Teta Bus RS-485 Modbus ASCII / RTU, 4800 – 115200 b/s, no parity / even parity/ odd parity, number of bits 7/8 (only for Modbus ASCII)
Integrated signalling equipment (visual)	LCD alphanumerical display 2 x 16 optical LEDs
Integrated signalling equipment (audible)	70 dB, 1 m distance
Protection class	III
Dimensions	See figure 1
Cable glands (cable diameter range)	0.08 – 2.5 mm ² (cable lugs 2 x 1 mm ² or 2 x 0.75 mm ² should be used for double wires)
Enclosure material	Self-extinguishing PPO
Weight	0.4 kg
Mounting	On DIN-35 / TS35

Table 18: Technical specification

10 Product marking

Product code	Device
PW-108-A	Teta MOD Control 1 Control Unit Module

Table 19: Method of product's marking

11 Appendices




- [1] DEZG123-ENG – EU Declaration of Conformity – Teta MOD Control 1

EU Declaration of Conformity

Atest Gaz A. M. Pachole sp. j. declares with full responsibility, that the product:

(Product description) Control Unit Module	(Trade name) Teta MOD Control 1	(Type identifier or Product code) PW-108
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complies with the following Directives and Standards:

-  in relation to Directive 2014/30/EU – on the harmonisation of the laws of the Member States relating to electromagnetic compatibility:
 - EN 50270:2015
-  in relation to Directive 2014/35/EU – on the harmonisation of the laws of the Member States relating to the making available on the market of electrical equipment designed for use within certain voltage limits:
 - EN 60335-1:2012
 - EN 60529:1991
 - EN 60950-1:2006
-  in relation to Directive 2011/65/UE – on the restriction of the use of certain hazardous substances in electrical and electronic equipment:
 - EN 50581:2012

This declaration of conformity is issued under the sole responsibility of the manufacturer.

Purpose and scope of use: product is intended for use in gas detection systems for residential, commercial and industrial environment.

This EU Declaration of Conformity becomes not valid in case of product change or rebuild without manufacturer's permission.

Gliwice, 25.02.2019



(Name and Signature)
Managing Director
Aleksander Pachole

Notes

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www.atestgaz.pl/en