ATEST GAZ

# User Manual


## Valve Controller

# Control V

## Product code: PW-121-X

POD-067-ENG R03

ATEST GAZ

Reliable and Innovative Gas Detection & Safety Systems

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**Systems for Monitoring, Detection and Reduction of gas hazards**

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## Remarks and reservations

- Read and understand this manual prior to connection and operation of the device. Keep the User Manual with the device for future reference.
- The manufacturer shall not be held responsible for any errors, damage or defects caused by improper selection of suitable devices or cables, errors in installation of equipment or any misuse due to failure to understand the document content.
- Unauthorised repairs and modifications of the device are not allowed. The manufacturer shall discard any responsibility for consequences of such actions.
- Exposure of the device to the impact of excessive mechanical, electric or environmental factors may lead to damage of the device.
- Operation of damaged or incomplete devices in not allowed.
- Engineering of a gas safety system for any specific facilities to be safeguarded may need consideration of other requirements during the entire lifetime of the product.
- Use of unauthorized spare parts different from the ones listed in Table 9 is strictly forbidden.

## 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 fragments of the text are highlighted in the following way:

Pay extreme attention to information provided in such framed boxes.

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 pare 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

The Control V device is a local controller for a gas shutoff valve. Its location within close vicinity of the valve and a built-in rechargeable battery make it possible to avoid many problems related to voltage drops down long electric cables and conductors.

The valve can be controlled by means of a binary signal (DI) or via the Teta data transmission interface. It is why the valve controller of Control V type perfectly enables extension of functionalities offered by any monitoring systems, in particular the Gas Safety System offered by Atest Gaz.

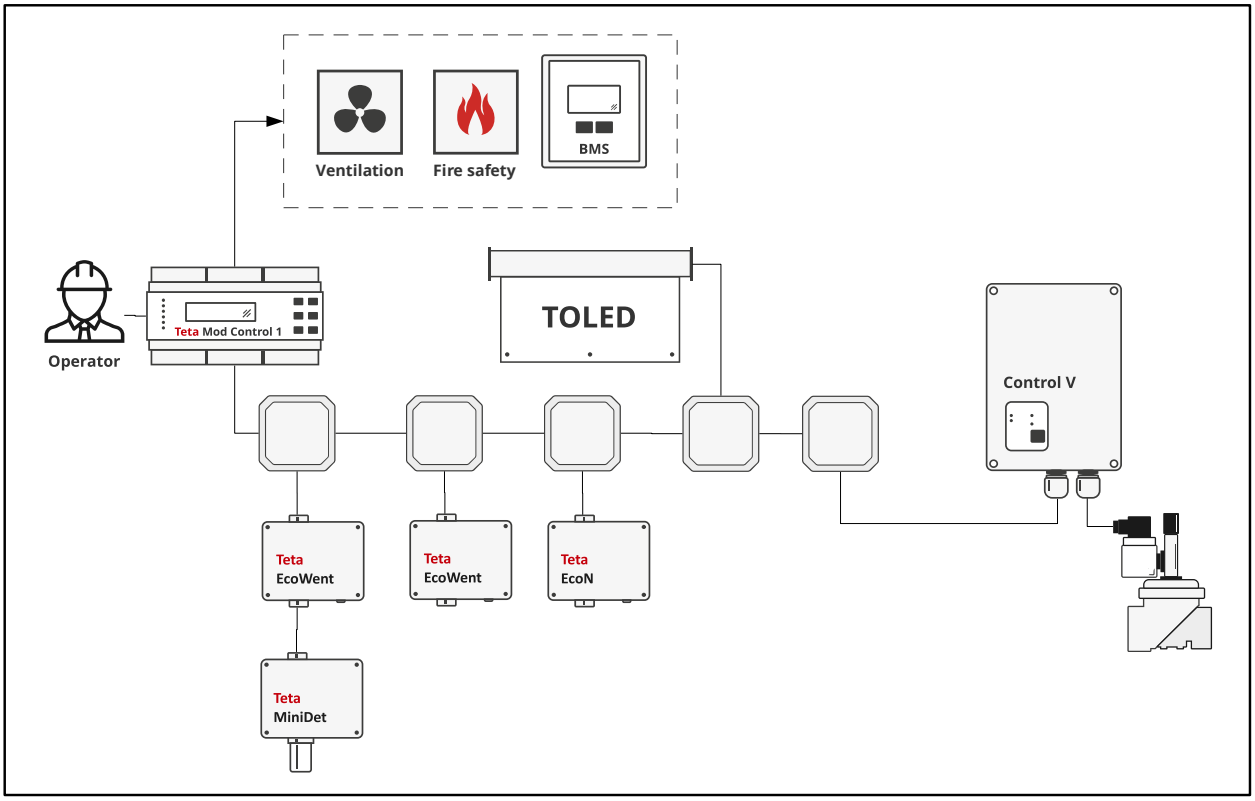



**Figure 1: Location and function of the Control V controller within the Teta Gas Safety System**

## 1.1 Operation principle

Upon receiving a command via the Teta data transmission interface or a digital input (DI) the Control V Valve Controller produces a waveform necessary to shut off a valve.

Operation of the controller is subjected to continuous monitoring of its operability and its key parameters, where such items as continuity of the line for valve control (its resistance), charging status of the embedded battery and level of power voltage are checked on-line in the automatic mode.

The Control V unit also reports a need to test the valve and enables manual execution of such a test – see details in Section 7.5.1.

# 2 Safety

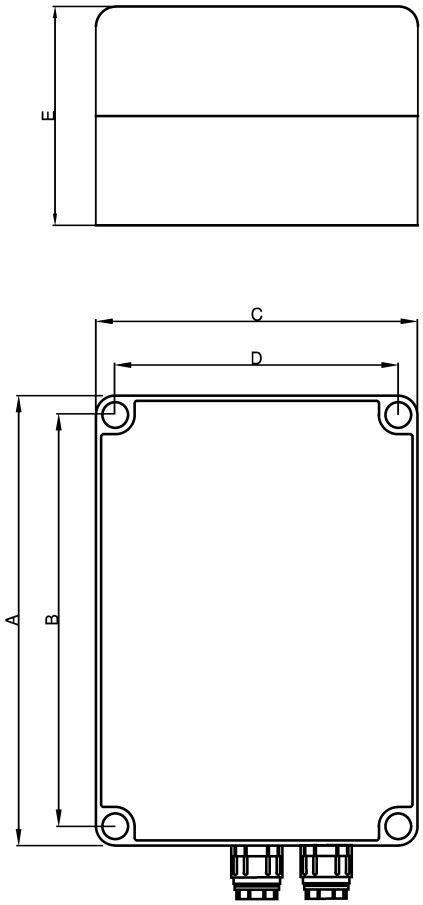
All activities related to connecting detectors, signallers and other system components must be carried out while Control Unit's power supply is off.

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 floors, make sure the device is secured.

## 3 Description of the construction




| Product code | Dimensions [mm] | | | | |
|---|---|---|---|---|---|
| | A | B | C | D | E |
| **PW-121-L-X** | 125 | 110 | 125 | 110 | 75 |
| **PW-121-H-X** | 175 | 160 | 125 | 110 | 100 |

**Figure 2: The construction of the device and its dimensions**

# 4 Input-output interfaces

## 4.1 Electric interface

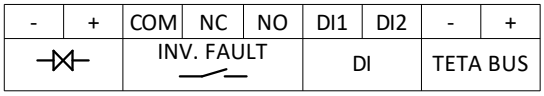



**Figure 3: Electric Connections**

| Name | Terminal | Description |
|---|---|---|
| | | Valve power supply port. Parameters – see Section 4.1.1 |
| | - | Negative |
| | + | Positive |
| INV. FAULT | | Relay output of the fault signal (inverted) – see details in Section 4.1.2 |
| | COM | Common terminal of relay |
| | NC | Normally closed contact of relay |
| | NO | Normally open contact of relay |
| DI | | Binary input – details, see Section 4.1.3 |
| | DI1 | Input DI1 |
| | DI2 | Input DI2 |
| TETA BUS | | System communication port designed to connect devices of the Teta series, see details in Section 4.1.4<br>When the unit is controlled exclusively via the DI line this port is used only for power supply of the unit. |
| | - | Power supply and control line for Teta bus / negative |
| | + | Power supply and control line for Teta bus / positive |

**Table 2: Electric interface description**

### 4.1.1 Power supply port for a valve to be controlled

The output port designed to supply a shutoff valve. The port is monitored (resistance of the output line is continuously measured) and its parameters are similar to the ones specified in Table 8.

### 4.1.2 Relay output of the fault signal

The output is active (COM and NO terminals are shorted) during faultless operation of the valve controller (neither the controller nor the power supply line for the valve are defective).

The output is inactive (COM and NO terminals are open) when any faults are detected either in the valve controller or the power supply line for the valve or power supply voltage is missing).

### 4.1.3 DI port

The port is designed for direct control of a shutoff valve by means of a signal that can be provided by another system for automatic control, an alarm system or a pushbutton. Parameters – see Table 8.

The port is configurable and the shutoff valve can be closed either by opening or closing the DI contacts – see details in Section 7.4.2.

### 4.1.4 Teta Bus port

The digital communication and power supply port compatible to the Teta BUS communication protocol. designed to connect the valve controller to the entire system of the Teta Gas Safety System. Enables both power supply and digital communication with other devices of the Teta series (PLN – Power Line Networking).

# 5 User interface

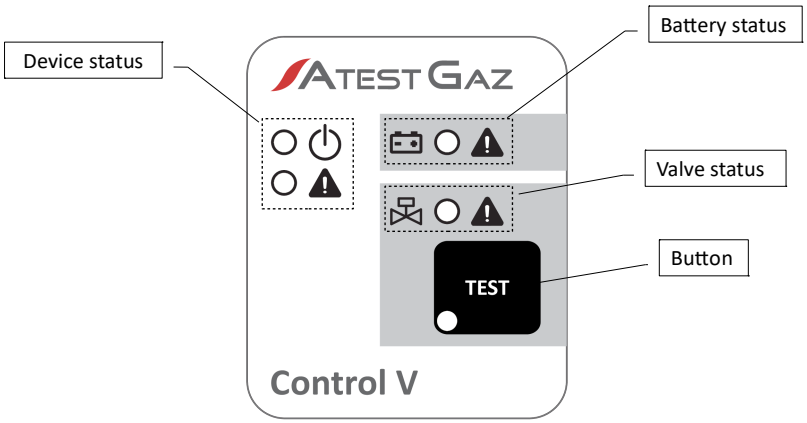



**Figure 4: Front panel**

## 5.1 Device status

| Indicator | Status / colour | Information |
|---|---|---|
| ⏻ | ● / green | Regular operation of device |
| ⚠ | ○ | No internal failures are reported |
| | ● / yellow | Internal failure of the device |

**Table 3: Meaning of LED indicators in the device status**

## 5.2 Battery status

| Indicator | Status / colour | Information |
|---|---|---|
| ⚠ | ○ | Regular operation of battery |
| | ● / yellow | Failure of the battery |

**Table 4: Meaning of LED indicators in the battery status**

## 5.3 Valve status

| Indicator | Status / colour | Information |
|---|---|---|
| ⚠ | ○ | Regular operation of valve |
| | ● / yellow | Valve failure (e.g. valve is missing, control line for the valve is shorted). |

**Table 5: Meaning of LED indicators in the valve status**

### 5.4 TEST button

The TEST button is used to manually start the valve test – see Section 7.5.1.

| Indicator | Status / colour | Information |
|---|---|---|
| TEST | ○ | No need to test the valve |
| | ◔ / green | Slow blinking of the LED indicator – test of the valve is needed (see details in Section 7.5.1) |
| | ● / green | Test of the valve is in progress |

**Table 6: Description of TEST button**

## 6 System architecture

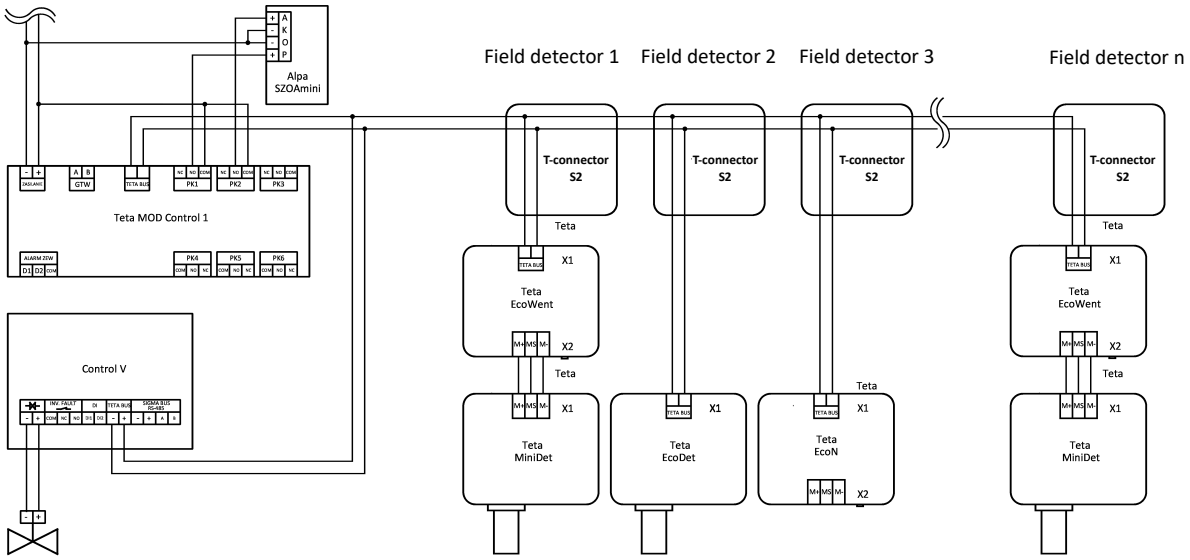



**Figure 5: Example of the Teta system layout with a Control V module included**

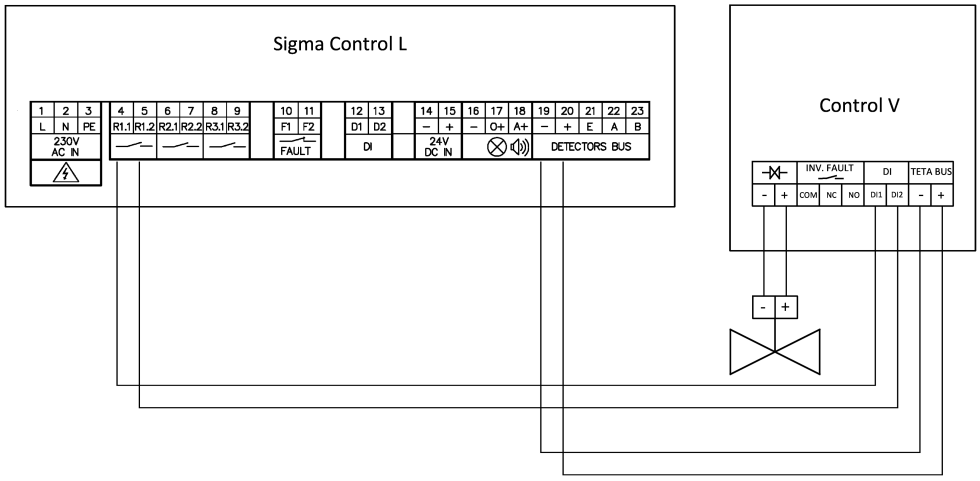



**Figure 6: Example of the Control V device connection with control unit when the DI port is used**

# 7 Life cycle

## 7.1 Transportation

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.

The device can be conveyed under environmental conditions as described in Table 8.

## 7.2 Installation

The device should be mounted on a flat a vertical wall with cable glands downwards, where the mounting position is shown in Figure 2. The location of the device should be easily accessible to operating personnel but access of unauthorized persons should be restricted as much as possible. It is recommended to install the device at the height that enable easy access to the device.

Combining two or more wires at a single terminal is not allowed if such wires are not clamped in a common cable ferrule (details see Table 8).

Leaving spare lengths of cables inside the device is not allowed. Bare wires or wires surplus may lead to a hazard of electric shock or equipment damage.

All cable cores must be terminated inside the device. Leaving unterminated cores is not allowed.

Not used screw terminals must be tightly screwed.

Incorrect routing of cables may result in impairment of the equipment immunity to electromagnetic interferences.

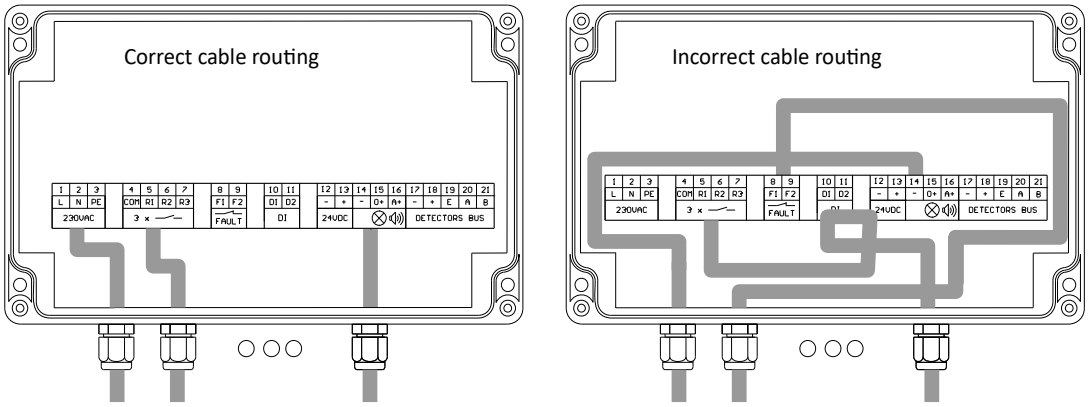



**Figure 7: Example connection of cables to the device**

### 7.2.1 Valve connection Ω

Designers of the wiring for connection of the valve controller to the shutoff valve must pay particular attention to appropriate selection of cables so that the maximum permissible resistance allowed for connection line is not exceeded: 0.2 Ω for valves with power consumption less or equal 72 W or 0.5 for valves with power consumption less or equal 36 W.

Please keep in mind that the total length of conductors is twice more than the cable length. The table below explains how to select cross-section of cable cores and length of cables for valves of various types.

| Cross-section of cable cores [mm$^2$] | Cross-section of a cable (parallel connection of cores) [mm$^2$] | Maximum length of the cable for valves with power ≤ 72 W [m] | Maximum length of the cable for valves with power ≤36 W [m] |
|---|---|---|---|
| 1.5 | 2x1.0 | not recommended | 20 |
| 2.5 | 2x1.5 | 10 | 30 |
| 4 | 2x2.5 | 20 | 50 |
| 6 | 2x4 | 30 | - |

**Table 7: Selection of cables for connection between the Control V unit and the valve**

## 7.3 Start up

After making sure that all connections are correct it is possible to power up the device.

Upon power up all indicators of the user interface panel should be on for about 1 second. Then the device switches to the mode of regular operation, which is indicated as explained in Section 5.

To check whether installation of the entire system is correct it is recommended to run a comprehensive test of the system by manual tripping of a gas alarm for the time not less than 30 seconds on any of gas detectors incorporated into the system (the procedure of alarm tripping is described in manuals for each specific gas detectors). After activation of the alarm procedure the control unit should indicate exceeding of the alarm level in a specific monitoring channel, the warning visual and sound warning devices must be activated and the valve controller must close the gas valve.

## 7.4 Configuration of the controller /system

The controller configuration is carried out by setting of appropriate switches in the SW1 dip-switch unit – see Figure 8.

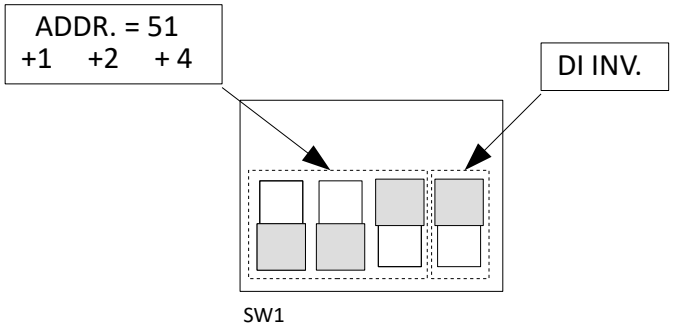



**Figure 8: Example of the controller configuration (address = 55, opening of DI contacts leads to valve shutoff)**

### 7.4.1 Address setting

The controller address ca ne set by means of switches 1...3. It is possible to set the address from 51 to 58.

### 7.4.2 Configuration of the DI port

Operation mode for the DI port can be selected by means of the switch 4.

Setting the switch to the ON position means that open contacts of the DI port lead to closing of a shutoff valve connected to the controller. On the contrary, moving the switch to the OFF position makes the controller to close the shutoff valve connected to the valve port when the contacts of the DI port are shorted (see Figure 6).

## 7.5 Maintenance schedule

It is recommended to carry out scheduled maintenance of the controller after each three months of its operation.

The scheduled maintenance includes:

- visual inspection of the system and its individual components from the outside,
- test of the valve operability.

### 7.5.1 Valve test

The controller enables manual test of the valve operation.

The reminder to initiate the valve test is activated after each three months from the last check of the valve by regular blinking of the TEST indicator.

The test is carried out manually by the system operator from the level of the valve controller. Prior to run the tests make sure that temporary shut off of gas supply is allowed at the moment according to operation procedures affective for the specific gas supply system. To run the test proceed according to the following sequence:

- depress the TEST button for about five seconds (the TEST indicator should go on afterwards),
- make sure that the controlled valve is closed,
- reopen the valve.

In any irregularities are found out in the procedure of the valve closing please contact the manufacturer or a service company.

When the controller reports the valve failure (see Table 5) or low voltage of the controller battery (see Table 4) execution of the test is disabled.

### 7.5.2 Replacement of consumables and fast wearing parts

Lifetime of consumables and fast wearing parts is listed in Table 9.

#### 7.5.2.1 Replacement of battery

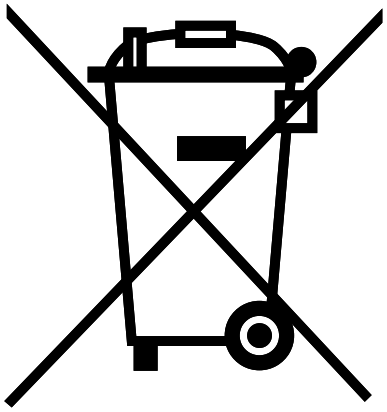
To replace the controller battery follow the procedure below:

- disconnect the controller from power voltage,
- remove the lid,
- disconnect the battery,
- replace the battery with a new one,
- repeat the disassembling procedure in the reverse order.

### 7.5.3 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.

## 7.6 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.

# 8 Technical specification

| | |
|---|---|
| Power supply<br>• $V_{CC}$<br>• Power consumption | <br>15 – 50 V ⎓<br>3 W |
| Environment<br>• Ambient temperatures<br>• Humidity<br><br>• Pressure | <br>-20 – 40°C<br>10 – 90% long term<br>0 – 99% short term<br>1013 ± 10% hPa |
| IP | IP 65 |
| Two-state outputs parameters<br>• Relay | <br>Floating contacts, NO/NC: 24 V ⎓ / 0.1 A,<br>Not protected against overloading |
| Control output for the shutoff valve<br>• Range of load resistance /power<br><br>• Guaranteed limit of the shutoff voltage<br>• Maximum resistance of the power supply line<br>• Duration of the shutoff pulse | <br>PW-121-L-X: ≥ 4 Ω / ≤ 36 W<br>PW-121-H-X: ≥ 2 Ω / ≤ 72 W<br>10.5 V<br>See Section 7.2.1<br>0.5 s |
| Parameters of the input for an external alarm signal (DI) | Connection via a potential-free contact<br>Inactive for resistance below 10 Ω<br>Active for resistance above 3300 Ω<br>Minimum duration of the switchover pulse > 1s |
| Digital communication parameters<br>• Teta BUS port<br>  • Communication protocol | <br><br>Teta BUS |
| Integrated signalling equipment (visual) | LED controls |
| Protection class | III |
| Dimension | See Figure 2 |
| Cable glands<br>• Cable diameter range | <br>5 – 10 mm |
| Cross-section of wires for clamping terminals<br>• Relay outputs, DI, TETA<br><br>• Power voltage | <br>0.08 – 2.5 $mm^2$ (use sleeves 2 x 1 $mm^2$ or 2 x 0,75 $mm^2$ for twin conductors)<br>1 – 4 $mm^2$ (use sleeves 2 x 1.5 $mm^2$ or 2 x 1 $mm^2$ for twin conductors) |
| Enclosure material | ABS |
| Weight | PW-121-L-X: 1.0 kg<br>PW-121-H-X: 2.5 kg |
| Lifetime of consumables | See Table 9, Section 9 |
| Mounting | 4 screw holes 4 mm, hole spacing:<br>PW-121-L-X: 160 x 110 mm<br>PW-121-H-X: 110 x 110 mm |

**Table 8: Technical specification**

# 9 List of consumables

| No. | Consumables | Estimated average lifetime[1] | Manufacturer | Product code |
|---|---|---|---|---|
| **{1}** | Fuse 6.3 A | - | ESKA | ESKA 887.125 |
| **{2}** | Battery 12 V, 1.3 Ah | 3 years | MW Power | MW-1,3-12 |
| **{3}** | Battery 12 V, 5 Ah | 3 years | MW Power | MW-5-12 |

**Table 9: List of consumables**

# 10 Product marking

**Control V Valve Controller PW-121-** V - DI

| | | | |
|---|---|---|---|
| V | **Valve type** | L | Coil resistance ≥ 4 Ω, power consumption ≤ 36 W |
| | | H | Coil resistance ≥ 2 Ω, power consumption ≤ 72 W |
| DI | **Digital interface** | T | Teta Bus |
| | | T.485 | Teta Bus + RS-485 |

# 11 Appendices

**[1]** DEZG-141-ENG – EC Declaration of Conformity – Control V

1 Unless otherwise stated, when operating at a temperature of 25°C.

# EU Declaration of Conformity

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

| (Product description) | (Trade name) | (Type identifier or Product code) |
|---|---|---|
| **Valve Controller** | **Control V** | **PW-121** |

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
- in relation to directive 2011/65/EU – on the restriction of the use of certain hazardous substances in electrical and electronic equipment
  - EN IEC 63000:2018
- other:
  - EN 60529:1991

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

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

Gliwice, 30.08.2022

(Name and Signature)
Managing Director
Aleksander Pachole

## Notes

## Notes

ATEST GAZ

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