ATEST GAZ

User Manual

Signal Converter

CNVS 4

Product code: PW-122-CSAI4-X

POD-068-ENG R03

ATEST GAZ

Reliable and Innovative Gas Detection & Safety Systems

We design, manufacture, implement and support:
Systems for Monitoring, Detection and Reduction of gas hazards

We invite you to familiarize yourself with our offer on **www.atestgaz.pl**

Atest Gaz A. M. Pachole sp. j.
ul. Spokojna 3, 44-109 Gliwice
Poland

tel.: +48 32 238 87 94
fax: +48 32 234 92 71
e-mail: contact@atestgaz.pl

www.atestgaz.pl

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 11 is strictly forbidden.

How to use this manual?

- 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.

Table of contents

List of Tables

List of Figures

1 Preliminary information

The Signal Converter CNVE 4/CNVS 4 is designed as a component of a Gas Safety System and is intended for operation under harsh environmental conditions of industrial plants with a broad range of ambient parameter variations (high temperatures, presence of corrosive gases, hazardous vapours, moisture and dust).
The signal converter is not an independent device, it must be combined with a measuring instrument to make up a typical gas detector.

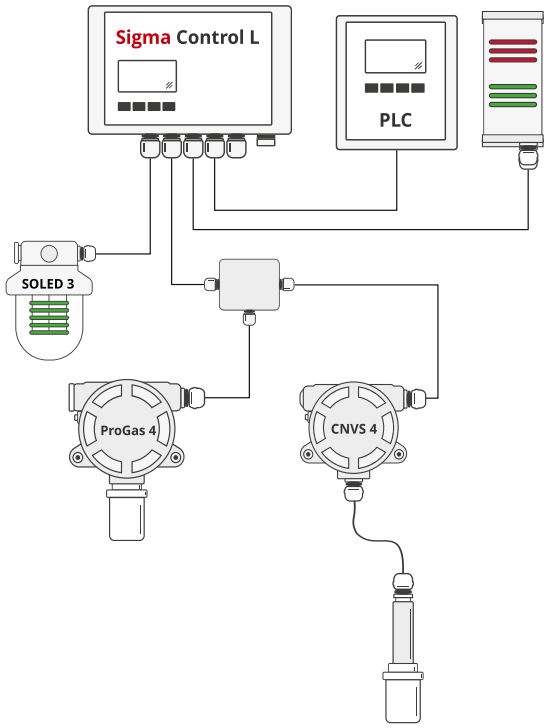


Figure 1: Installation and function of the signal converter within a Gas Safety System

1.1 Functional properties

Key advantages

- Remote operation – an external detectors can be installed far away from the converter at a poorly accessible location.
- Operation under heavy duty industrial environment.
- Broad range of ambient temperatures.
- Wide selection of user interfaces: Modbus ASCII, analog 4..20 mA, relay outputs, wireless interface (Bluetooth).
- Configurability of current flow (source /sink).

Basic functionalities

- Non-invasive calibration and configuration – calibration of the converter and setting of its parameters can be carried out with no need to open the converter enclosure or to shut down any other components of the Gas Safety System.
- Remote communication with the detector.
- Electronic compensation of ambient environment impact.

- Self-test functions with indication of faults.
- Use of the converter memory to store such parameters as CAS number of the monitored substance, name of the detector location, serial number of the device, time interval between mandatory calibrations.

1.2 Cable glands and blanking plugs

The cable gland and blanking plug are replaceable elements. To select spare ones please obey the following rules:

- operating temperature range (see Table 11),
- appropriate mounting thread – see the device nameplate,
- nylon gasket to secure the enclosure tightness (in the case of aluminum enclosures).

See details in Section 6.

1.2.1 Replacing cable glands and blanking plugs

To replace/screw the cable gland follow the procedure below:

- unscrew the gland / plug from the device (if screwed in),
- apply a small amount of technical petroleum jelly to the thread of the gland / plug,
- screw the new gland/plug (remember to use the appropriate torque specified by the manufacturer).

1.3 Cables

Make sure that the operating temperature range is consistent with the information provided in Table 11, when selecting the cables.

1.4 Operation principle

The signal converter receives an analogue signal from an external gas detector and converts it into messages that are compatible with other components of the Gas Safety System. The converter measures the signal level and compares against pre-established thresholds to inform that the following threshold levels are exceeded:

- warning 1,
- warning 2,
- alarm,
- overload.

In addition the converter is a self-testing device, therefore it informs about its defect when any irregularity in its operation are detected by a self-test.

1.5 Converter statuses

Converter status	Description
Regular operation	The converter works properly and receives measuring signals. The input signal is below any threshold level and no irregularities in operation of the device are detected.
Warning 1	The first warning signal is issued when the first specific threshold limit of the input signal is exceeded.
Warning 2	The second warning signal is issued when the second specific threshold limit of the input signal is exceeded.
Alarm	The alarm signal is issued when the alarm threshold limit of the input signal is exceeded.

Converter status	Description
Overload	The load limit for the detector is exceeded (measurement result out of range).
Converter status	**Description**
Preheating	Upon power up the converter waits some time until operation parameters of a remote (external) measuring detector are stabilized. During the preheating time the converter receives the input signal and converts the measurement results, but no output information is issued.
Calibration	It is the operation mode of the converter when its setting can be amended. The calibration mode enables checking of the converter operability but output warning or alarm signals are not issued (actually the central control module of the system takes decisions how to construe signals received from the converter). The converter can be switched over to the calibration mode by means of a relevant software tool.
Non-critical malfunctioning	Irregularity of the converter operation that compromises accuracy of its measurements (e.g. the schedules calibration time has expired).
Critical failure	The converter is failed or not present within the system.

Table 1: Statuses of the signal converter

1.6 Output signals

- RS-485 serial communication port – a digital port that enables easy integration with other systems for data transmission, HMI panels of Instrumentation & Control systems or industrial controllers – see details in Section 4.2.
- Analog 4..20 mA output – standardizes current signal that enables easy integration with other automation systems, e.g. industrial controllers – see details in Section 4.3.
- Relay outputs – enable control of actuators directly from the converter outputs – see details in Section 4.4.

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.

Despite the power supply voltage for the Gas Safety System is off, dangerous voltage may persist across terminals of the Control Unit. Such a voltage may come from another system controlled by the same unit, for instance ventilation, that use one output pin of the Control Unit.

Prior to start painting the facility floors (e.g. driveway and walkway lanes, protection coatings, anti-slip floors) secure the device against accidental splashing.

The converted is recommended to be installed in the position as shown in Figure 2.

Twist the lid on the converter enclosure with care and pay attention to the enclosure thread. Negligent screwing the lid on may result in damage of the thread.

2.1 Considerations related to the working environment

Information about condition of the working environment can be found in the Guide – "Sigma Gas Safety System" (POD-070-ENG) available for download at doc.atestgaz.pl/AG/POD/POD-070-ENGPrint.pdf.

3 Description of the construction

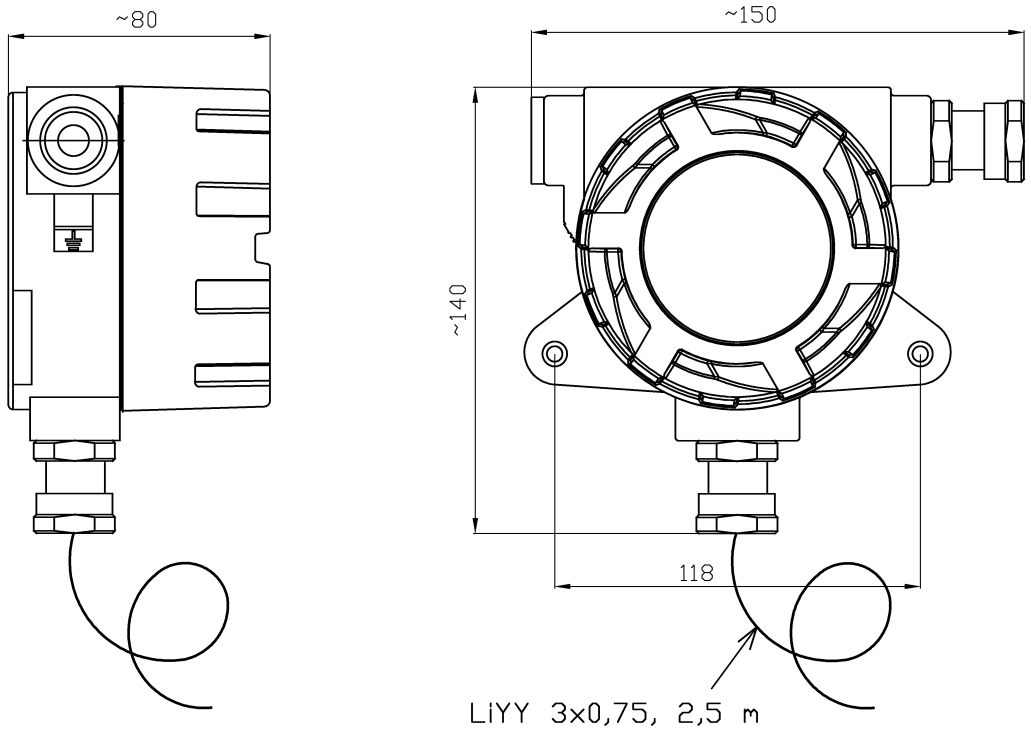


Figure 2: The construction of the device and its dimensions

4 Input-output interfaces

4.1 Electric interface

The terminal block layout depends on the device configuration (see details in Section 8). The drawings below show a terminal block for all design options.

4.1.1 Version with digital port RS-485

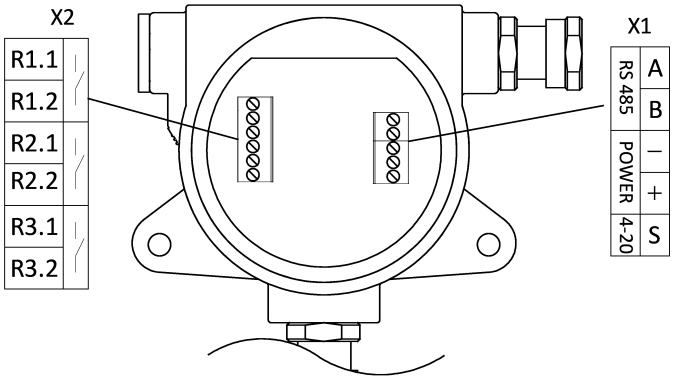


Figure 3: Layout of terminals for the device option with the RS-485 digital port

No.	Name	Terminal	Description
X1	RS-485	A, B	Signal lines for RS-485 port
	POWER	-, +	Power supply
	4-20	S	Output of the 4..20 mA current loop
X2	R1.1 – R3.2	—⁀—	Relays terminals

Table 2: Assignment of terminals for the device option with the RS-485 digital port

4.1.2 Design option with the Teta Bus digital port

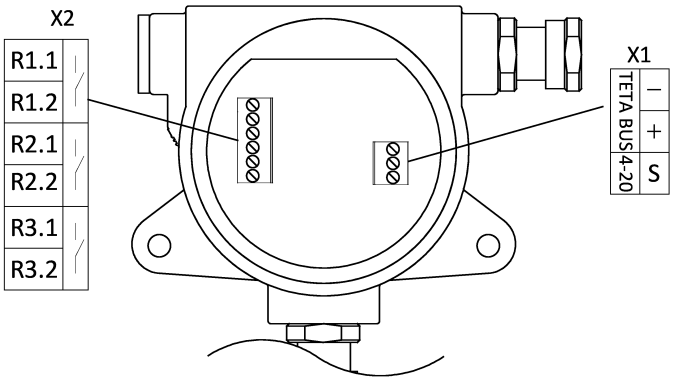


Figure 4: Layout of terminals for the device option with the Teta Bus digital port

No.	Name	Terminal	Description
X1	TETA BUS	-, +	Signal and supply line Teta Bus port
	4-20	S	Output of the 4..20 mA current loop
X2	R1.1 – R3.2	—⁀—	Relays terminal s

Table 3: Connections diagram for version with digital port Teta Bus

4.1.3 Analog input of the signal converter

An external gas detector should be wired to the signal converter by means of the LiYY 3x0.35 cable.

Core No.	Terminal	Insulation colour	Description
1	+	White	Power supply output – positive pole. Power voltage on that terminal is the same as the power voltage for the signal converter. See details in Table 11
2	S	Brown	Output of the 4..20 mA current loop
3	-	Green	Power supply output – negative pole

Table 4: Assignment of cores for the interconnecting cable

4.2 RS-485

Communication via the RS-485 employs either the Modbus ASCII or the Sigma Bus protocol (when the detector is used with other devices of the Sigma system).

For converters with the RS-485 outputs the output signal has a digital form (see Appendix [2]). In general, the converter status is specified by means of the following variables:

- measurement results expressed as percentage of the full range,
- information about exceeding of alarm thresholds,
- status information with indication of possible failures or defects, etc.

4.3 Current output

4.3.1 Operation mode – direction of electric current flow

The current output can be in two operating modes: sink or source. The method of connecting the detector for both modes is shown below.

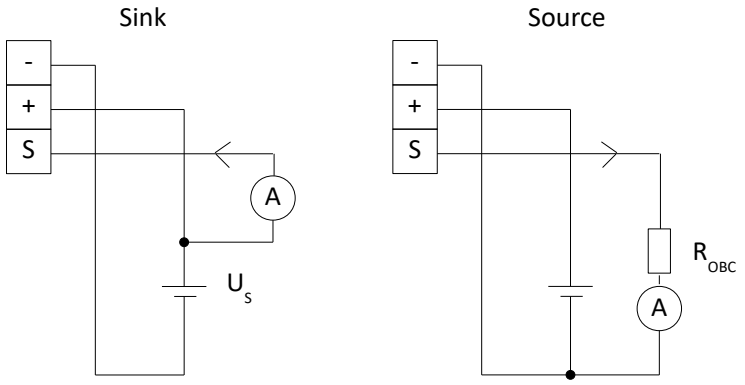


Figure 5: Layout of connection terminals for sink and source mode of the analogue port

Information about maximum values U_s and R_{load_MAX} you can find in Table 11.

Details about configuration – see Section 5.4.1.

4.3.2 Operation mode – coding information

The current signal may be proportional to the concentration of the gas detected (continuous output signal). The signal values are given in the table below.

Current output	Status
2 mA	Critical failure
From 4 mA to 20 mA	Value corresponding to the measured gas concentration: 4 mA – 0% of range 20 mA – 100% of range
22 mA	Gas overloading

Table 5: Continuous output signal

The current signal may be dependent on alarms (discrete current values). The signal values are given in the table below.

Current output	Status
2 mA	Critical failure
4 mA	No alarm
9 mA	Warning 1
11 mA	Warning 2
13 mA	Alarm
22 mA	Gas overloading

Table 6: Output current ranges for discrete outputs

The configuration of the operation mode associated with the coding of information is carried out using dedicated software – for details see section 5.4.

4.4 Relay outputs

The device has three relay outputs that can be used for the following purposes:

- tripping control contacts for status indicators
  - Warning 1,
  - Warning 2,
  - Alarm,
  - Failure,
- mode of indication: inverted or not.

The relay outputs are configured using dedicated software – see Section 5.4.

Specification of relay parameters is provided in Table 11.

4.5 Wireless interface Bluetooth (WI=BT)

Wireless interface enables the operator to control detectors from remote locations by means of dedicated software (see details in Section 5.4).

The the Bluetooth interface behaviour depends on the operation mode and position of the magnetic key. See details in Table 7.

Operation of the Bluetooth interface	Magnetic in place	The detector is seen on the list of devices with Bluetooth interface	The detector can communicate via the Bluetooth interface
Detector not available for remote control	-	No	No
Detector is always seen but can communicate only with the permanent magnet in place	No	Yes	No
	Yes		Yes
Detector is seen and can communicate only with the permanent magnet in place	No	No	No
	Yes	Yes	Yes
Detector is always seen and can communicate	-	Yes	Yes

Table 7: Operation modes of detectors with the Bluetooth interface

Figure 6 below depicts how to mount the permanent magnet on the detector housing.

Be careful to mount the permanent magnet correctly with right orientation of poles.

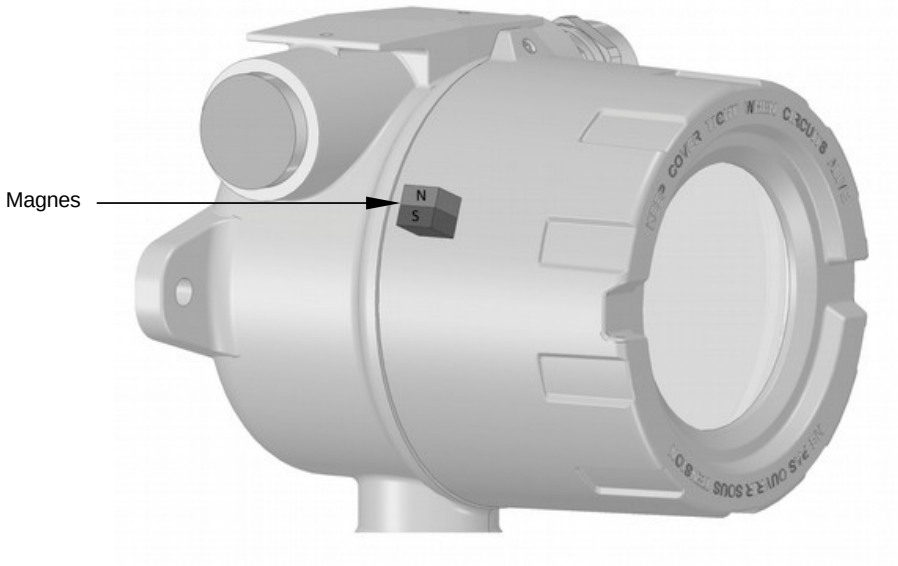


Figure 6: Device with a permanent magnet in place

Upon communication between the gas detector and the control software is established, the magnetic key/permanent magnet can be removed.

5 Life cycle

5.1 Transportation

The device can be shipped in the same way as new equipment of that type. If the original package or another protecting means (e.g. corks) is unavailable the conveyed equipment must be secured against shocks, vibrations or moisture by means of adequate methods and material at the own responsibility of the sender.

The device can be conveyed under environmental conditions as described in Table 11.

5.2 Installation

5.2.1 Equipment layout

Locations for installation of signal converters must be specified by the system designer with consideration of spots where measuring devices wired to the converter are deployed. Information can be found in the Guide – "Sigma Gas Safety System" (POD-070-ENG).

5.2.2 Device mounting

The converter should be fixed to a support structure by means of two M6 bolts in the way as is shown in Figure 2.

The manufacturer recommends to mount the device on WM8 Mounting Bracket (see Table 12) to protect the device enclosure against damage.

The bracket should be fixed to a support structure by means of two rawlplugs and M6 screws (See Fig ure 2). Then the signal converter is to be attached to the bracket.

5.2.3 Electric cabling

The applied flameproof cable glands allows to introduce cables with diameters of a specific range. The suggested cable types are included in the Guide – "Sigma Gas Safety System" (POD-070-ENG).

When performing electrical connections, it is necessary to observe the following order:

- make sure that the connected cables are disconnected from any electrical circuits and potentials,
- make sure that during installation there is no risk of explosion or fire,
- unscrew and remove the cover of the converter,
- untighten the cable gland,
- upon having the preparations completed (see Attachment [3]) introduce the cable into the enclosure via the cable inlet,

Make sure that the outer diameter of the cable corresponds to the nominal dimensions of the cable gland.

- route properly the cable inside the enclosure, play attention to mechanical stress and be aware that water can penetrate into the converter interior on the sheath of an improperly routed cable,
- tighten the cable gland,
- screw the converter cover back onto the enclosure and make sure that the sealing gasket is in place,
- make sure that the second threaded inlet is plugged by appropriate plug.

Whenever the design of a cable gland allows, cable shields should be connected to the converter inlet without introducing the shielding braid into the enclosure interior. Cable shields must never be connected to ground (GND) of the electronic PCB.

The cable shield should be insulated in the cable inlet and slightly protrude into the enclosure interior inside the device. Do never connect the shield to any point of the enclosure.

More details with regard to cable preparation and connection of the cable to the converter terminals can be found in Attachment [3].

Shielding braid should be connected to the system ground at the side of a control unit.

- fix the converter to the mounting bracket by means of bolts enclosed to the device.
- connect the measuring device (detector) to the other end of the connecting cable.

Interconnecting cables between gas detectors and signal converters should be routed far away from power supply cables, high amperage cables, preferably is separate compartments of cable trays.

Cabling of the Gas Safety System is not intrinsically safe. Cable breaks or insulation damage may be dangerous.

Should cabling is made with the use of stranded conductors (commonly referred to a wire rope), conductor ends should be clamped with a lug sleeve.

Should two or more conductor be connected to a single terminal, the only permissible solution is to clamp ends of these conductors with a common sleeve lug (see details in Table 11).

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 terminals must be tightened home.

5.3 Commissioning

The signal converter is not an independent device, so the documentation for a collaborating measuring device (gas detector) must be studied prior to embarking on the converter commissioning.

The converter behaviour upon power up is described in Table 1.

The system reliability can be checked by simulating any specific behaviour of a measuring device collaborating with the converter. The converter should issue output signals according to expectations.

It is recommended that – if possible – the commissioning of a gasometric installation should take place in conditions where there is no risk of explosion – e.g. during a standstill of the technological installations.

In case of large field systems deployed on a sizeable area signal converters are recommended to be commissioned and incorporated into the system one after another. It facilitates troubleshooting, identification and elimination of installation errors.

5.4 Configuration of the converter

Converters have two jumpers that can be used for configuration of the device – see Figure 7.

Other parameters of gas detectors are configured using dedicated software:

- Sigma Toolbox package for PCs with the Windows system,
- Detector Toolbox for Android devices.

The software can be downloaded from the manufacturer's website https://www.atestgaz.pl/en/category/software/all/all

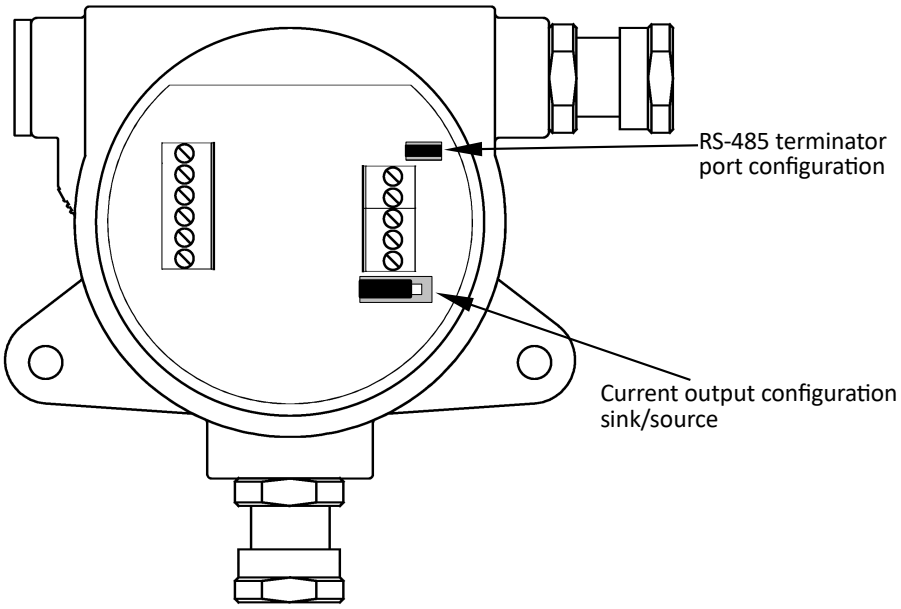


Figure 7: Converter view – configuration jumper

5.4.1 Current output configuration

The converter has a current output which, depending on the needs, can operate as a current source or sink – details see Section 4.3.1.

The configuration takes place by installing the jumper – see Table below.

Jumper settings	Operation
	Current source (default setting)
	Sink

Table 8: Current output configuration

5.4.2 End of line terminators

The communication port has an end-of-line terminator. To configure it, open the enclosure and place the jumper in the terminator (TERM.)

Jumper settings	Operation
	Port terminator – off (default setting)
	Port terminator – on

Table 9: End of line terminators configuration

5.5 Diagnostic

Information on the failures signalled by the converter can be found in Table 10.

Message	Description
AWK<failure code>	Critical failure – the detector is damaged – does not perform measurements. The failure code is a hexadecimal number, the meaning of particular bits is as follows:
	bit 0 non-volatile memory error bit 1 incorrect values in the data block bit 2 damage of electronics bit 3 damage of electronics bit 4 negative zero drift bit 5 damage of the measurement path bit 6 damage of electronics bit 7 incorrect hardware configuration bit 8 collective critical failure – active when any AWK bit is active bit 9 damage of the measurement path bit 10 damage of the measurement path bit 11 sensor signal is too high bit 12 sensor signal is too low bit 13 damage of the temperature detector bit 14 damage of the program block bit 15 damage of the data block

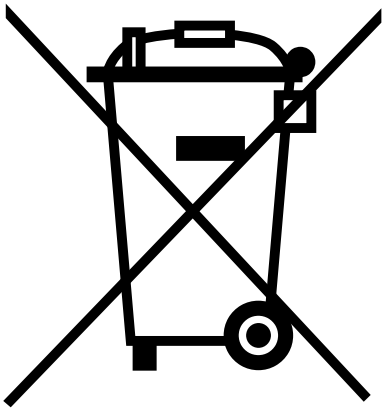
Message	Description
AWN<failure code>	Non-critical failure – malfunction of the defector that may negatively impact its measurement accuracy (e.g. exceeding of time until periodic calibration). The failure code is a hexadecimal number, the meaning of particular bits is as follows:
	bit 8 collective non-critical failure – active when any AWN bit is active bit 9 incorrect detector supply voltage bit 10 minor negative zero drift bit 11 temperature overload bit 13 calibration time is exceeded

Table 10: Failure codes

5.5.1 Maintenance

The regular maintenance of the device is limited to wiping its enclosure with a damp soft cloth. Cleaning agents that contain solvents, white spirit or alcohol are not allowed. The cable gland should also be checked – correct screwing in and no damage.

5.6 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.

6 Technical specification

Power supply • V_{CC} • Power	 15 – 50 V ⎓ 0.5 – 4 W (the value doesn't include the external gas detector supply current)	
Environment	In operation	Storage
• Ambient temperatures • Humidity • Pressure	-40 – 85 ^{O}C 10 – 90% long term, 0 – 99% short term, without condensation 1013 ± 10% hPa	0 – 40 ^{O}C 30 – 90% long term
IP	IP 63	
Analog input 4 – 20 mA • R_{IN} • I_{CC_MAX} (maximum power supply current of the external detector)	 100 Ω 200 mA	
Analog output 4 – 20 mA • Output type • R_{load_MAX} (source mode) • U_{S_MAX} (sink mode)	 Sink / source 300 Ω 30 V (max. voltage between pins „S” and „-”)	
Digital output parameters • Relays	 3x Floating contacts, 24 V ⎓ / 0.3 A, Not protected against overloading	
Digital communication parameters • RS-485 • Teta	 • RS-485, Modbus ASCII, Sigma Bus, 19200 Bd 7E1 • Teta Bus	
Parameters of wireless communication	Bluetooth 4.2	
Protection class	III	
Dimension • Power cord	See Figure 2 2.5 m	
Cable glands • Cable diameter range • External thread	 See Section 8 M20 x 1.5	
Acceptable cables	0.5 – 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	Aluminium spray epoxy
Weight	About 1.2 kg
Mounting	• To the supporting structure, 2 screw holes M6, hole spacing 118 mm with a minimum distance from the wall • We recommend using mounting brackets WM8 – see Section 7

Table 11:Technical specification

7 List of consumables

Product code	Description
PW-049-CB6	Service cable CB6
PW-064-WM8	Mounting Bracket (for wall mounting, ProGas 4)

Table 12: List of accessories

8 Product marking

CNVS 4 Signal Converter

PW-122-CSAI4- D - E - DI - AI - WI - G

D	**Display**	0	Without
E	**Enclosure**	AL	Aluminium, spray epoxy
DI	**Digital interface**	485	RS-485
		Teta	Teta Bus – *under development*
AI	**Analog interface**	0-0	Without
		420-PK	4 – 20 mA (sink/source) + 3 x relay
WI	**Wireless interface**	0	Without
		BT	Wireless interface allowing remote sensor calibration
G	**Cable gland**	0	Without
		STD.NB03	Nickel plated brass, regulated clamping range 7 – 13 mm

Table 13: Method of product's marking

9 Appendices

[1] DEZG140-ENG – EC Declaration of Conformity – CNVS 4

[2] PU-Z-113-ENG – Register map of gas detectors of PW-017, PW-044 and PW-093 type

[3] PU-Z-015-ENG – Shielded cables applied for connecting detectors – preparation and installation

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)
Signal Converter	**CNVS 4**	**PW-122-CSAI4-X**

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 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, 9.03.2023

(Name and Signature)
Managing Director
Aleksander Pachole

Register map of gas detectors of PW-017, PW-044 and PW-093 type

All the data are available in the 'holding registers' (function code 3).

Register	Name	Description	Type
40001	State_A	Detector status – the definition of bits below	flags
40002	-	Inessential data, can take any value	-
40003	N	Gas concentration A value of 0 corresponds to the 0 concentration, the value of 1000 corresponds to a concentration of the range of the detector	16 bit integer
40004	-	Inessential data, can take any value	-
40005	Sample_Cnt	Sample counter. The value is increased by 1 after each measurement. It takes values from 0 to 65 353	Total number 16 bit

State_A - detector status. The meaning of the bits is described in the table below.

Bit	Name	Description
0	Collective_W1	Gas concentration is above first warning threshold
1	Collective_W2	Crossing the second warning threshold
2	Collective_AL	Crossing the alarm threshold
3	Collective_CrFail	Collective information about a critical failure
4	Collective_NonCrFail	Collective information about a non-critical failure
5	Gas_Hi_Range	Operation on a coarse measuring channel (for type 2 and 3).
6	Gas_HiHi_Range	Gas overload
7	Sensor_Lock	Lock of the sensor (the last measurement was locked)
8	Calibration	Calibration mode
9	Test	Test mode
10	Warm_Up	Sensor warm-up
11..15	-	Inessential data, can take any value

Atest Gaz A. M. Pachole sp. j.
ul. Spokojna 3, 44-109 Gliwice, Poland
VAT No.: PL 9691433231
tel.: +48 32 238 87 94
fax: +48 32 234 92 71
e-mail: contact@atestgaz.pl

Shielded cables applied for connecting detectors – preparation and installation

The cable shall be prepared in accordance with the following guidelines (see also 1):

- the cable external sheath shall be removed at the applicable length (see 1),
- the cable shield shall be cut right by the end of the external sheath,
- the cable shield shall be protected with isolation,
- at the ends of the cables, isolated clamp sleeve shall be placed,
- he conductive part of the clamp sleeve shall have applicable length (see 1).

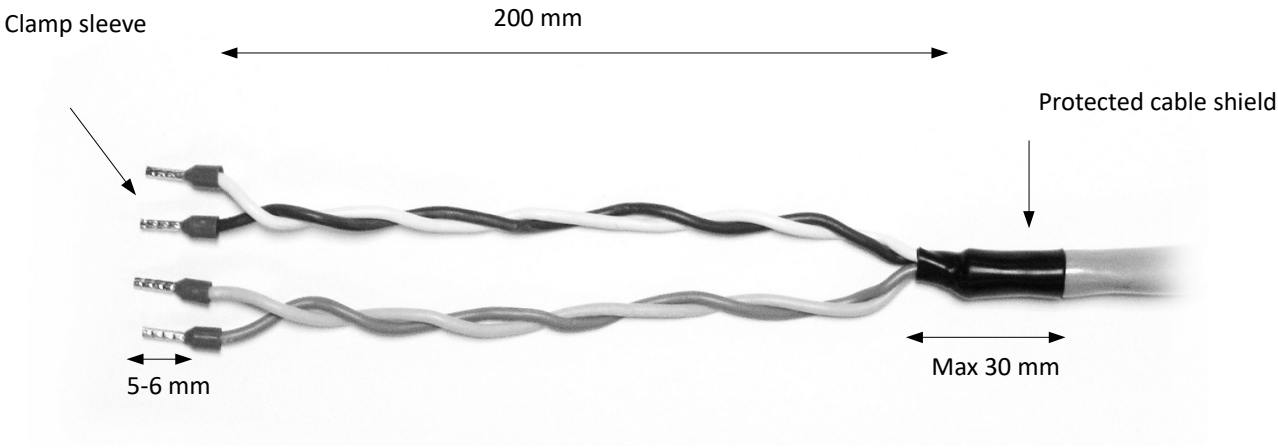


Figure 1: Cable preparation

For the systems with RS-485 interface, it is necessary to make sure that A and B transmission signals as well as + and – power supply were led with the use of the cables which belong to one pair.

The cable shall be placed in the detector as shown on figure 2. It is necessary to make sure that the shield protection is not located in the rubber element of the cable entry and that the smallest part of the cable external sheath was located inside the detector.

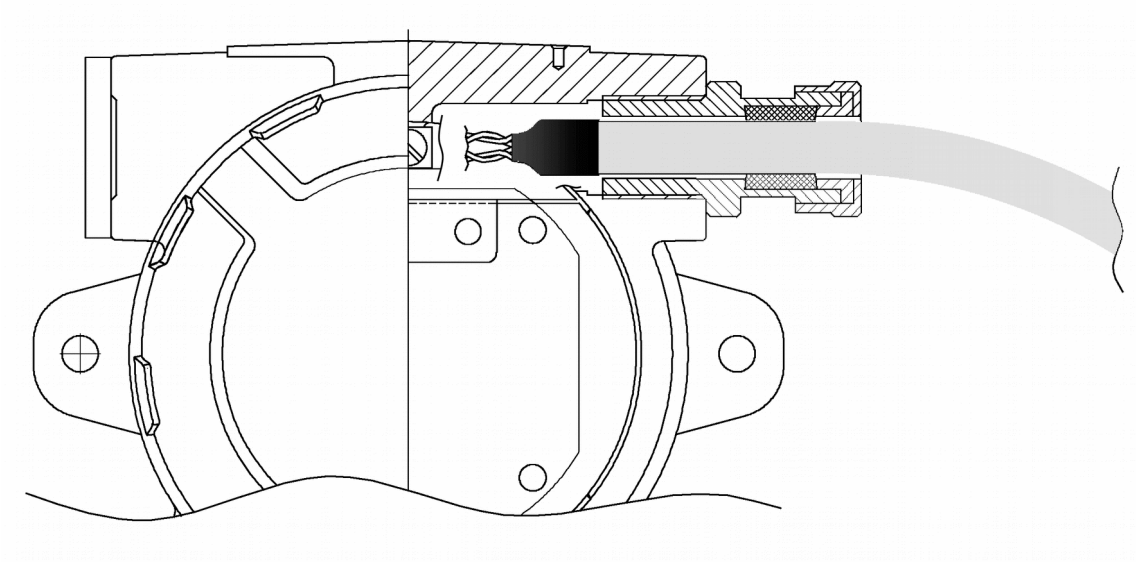


Figure 2: Placing cables in the detector

When laying the cable inside the detector enclosure, it must be remembered that:

- cables should be ordered,
- connecting cables should be kept as far away from the detector electronics as possible and routed as directly as possible to the crimp connection,
- it is necessary to minimize the amount of unnecessary conductor on the detector electronics. It is unacceptable to leave a reserve inside the detector.

ATEST GAZ

Reliable and Innovative Gas Detection & Safety Systems

Atest Gaz A. M. Pachole sp. j.
Spokojna 3, 44-109 Gliwice

tel.: +48 32 238 87 94
fax: +48 32 234 92 71
e-mail: contact@atestgaz.pl

For more details on our devices and other products and services offered by us, visit:

www.atestgaz.pl/en