ATEST GAZ

User Manual

Control Unit Module

Sigma MOD AO

Product code: PW-036-A

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**

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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 Safety 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.

- User's Manual consists of main text and appendices. Appendices are independent documents and can exist without User's Manual. Appendices have their own page numbering independent of User's Manual page numbering. These documents can also have their own tables of contents. All documents included in the User's Manual are marked in the bottom right corner with their name (symbol) and revision (issue number).

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1 General information

1.1 Brief description of the device

The Sigma MOD AO module with analogue outputs 4..20 mA is a non-portable device designed for continuous operation and installation on the DIN35 rail inside control cabinets, cubicles or other suitable enclosures that are wall-mounted inside facilities to be protected.

Gas detectors continuously measure momentary concentrations of hazardous gases and digital information about concentration values is supplied to the module with analogue outputs 4..20 mA that converts input information into corresponding levels of output currents.

1.2 Purpose

The Sigma MOD AO module is designed for collaboration with gas detectors and auxiliary devices to make up the digital system for gas detection – Sigma Gas. Gas detection systems are frequently integrated with other devices or systems for automatic control already deployed in existing industrial and other facilities and designed to use signal transmission by means of 4..20 mA current loops. If so, a need appears to provide an interface between the Sigma Gas system, which is based on digital transmission of information, and an existing system for automatic control with the 4..20 mA current loop. Only such an interface enables seamless coupling of the two systems and it is the reason why the Sigma MOD AO module is indispensable for these applications.

Key tasks of the Sigma MOD AO module include:

- readouts of digital information from gas detectors (RS-485 serial transmission with the Sigma BUS protocol),
- control of output current for eight analogue outputs 4..20 mA,
- indication of the module status (Operation /Failure).

Parameters for operation in gas detection systems:

- handling up to 8 gas detectors,
- control of 8 analog outputs 4..20 mA.

Input circuits of the Sigma MOD AO module (RS-485, USB, power supply) are electrically separated from output circuits 4..20 mA.

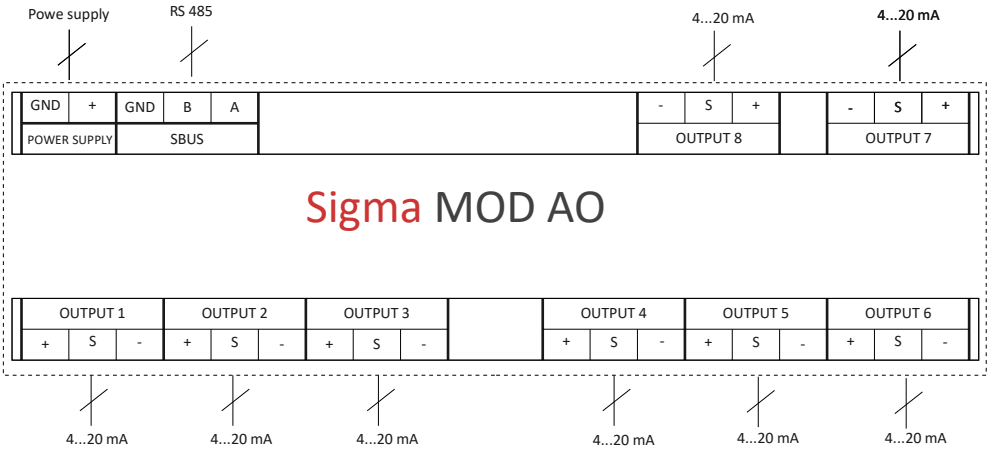


Figure 1: Structure of the Sigma MOD AO module – separation between input and output circuits

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 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.

3 Description of the construction

3.1 Dimension

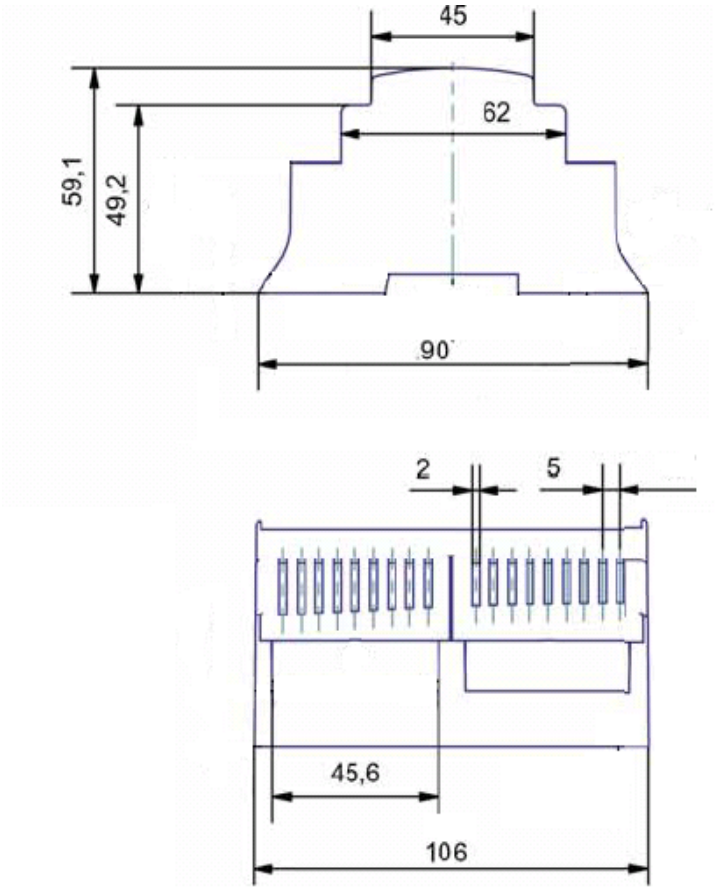


Figure 2: Dimension of device

4 Input-output interfaces

4.1 Indication of the module status

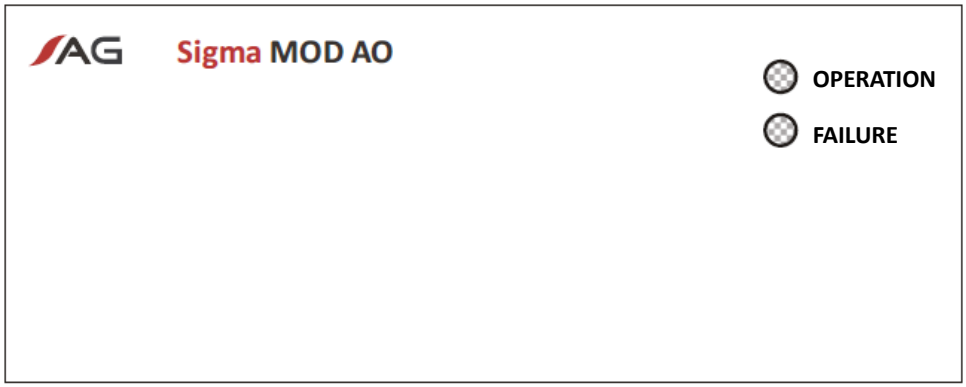


Figure 3: Sigma MOD AO front panel

Operation – the status means that:

- the device is in sound operation conditions,
- operates with default settings.

Failure – the device:

- indicates a critical failure.

4.2 Current outputs 4..20 mA

The modules can operate in two modes (see Section 6.4 for more details about configuration):

Active – see the connection below:

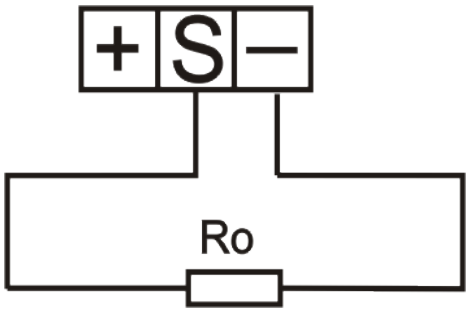


Figure 4: An active output

In that mode the circuit of a current loop is supplied from 4..20 mA outputs of the modules.

Passive – see the connection below:

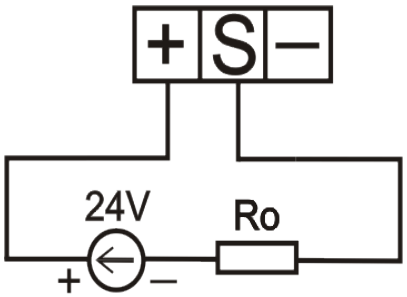


Figure 5: A passive output

In that mode the circuit of a current loop is supplied from an external source of power voltage (24...36 V).

Levels of the output current:

Status of operation	Output current
The system is stopped (STOP mode)	DEF
Detector is missing (no detector is connected)	3mA
Detector inhibited	DEF
Detector preheating	DEF
Detector calibration	DEF
Detector test	N
Critical failure of a detector	3mA
Detector is locked (LOCKED mode)	22mA
Detector is overloaded (OVERLOAD mode)	22mA
Non-critical failure of a detector	N
Normal operation of the detector	N

Table 2: Output current in various modes of the module operation

N – the output current is in proportion (4.. 20 mA) to the gas concentration reported by an appropriate detector (4..20 mA),
DEF – default current (3..22 mA) defined specifically for each separate transmission channel – see Attachment [3].

The output current of ca. 2 mA measured in any out output line indicates a failure of the Sigma MOD AO module.

4.3 Electric interfaces

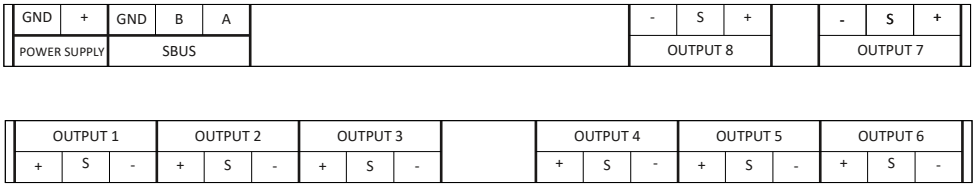


Figure 6: Electric connections

No.	Name	Terminal	Description
1	Supply		Device supply port. Parameters – see section 7
		GND	Negative. Both terminals GND are internally connected
		+	Positive. Both terminals ”+” are internally connected
2	SBUS		System communication port. Used for data exchange between devices in Sigma Gas system
		A	Signal line A
		B	Signal line B
		GND	Negative. Both terminals GND are internally connected
3	Output 1 - 8		Analog outputs for the 4...20 mA current loop
		+	Positive (+) pole for module outputs
		S	Current outputs for detector signals
		-	Negative (-) pole for module outputs

Table 3: Electric interface description

5 System architectures

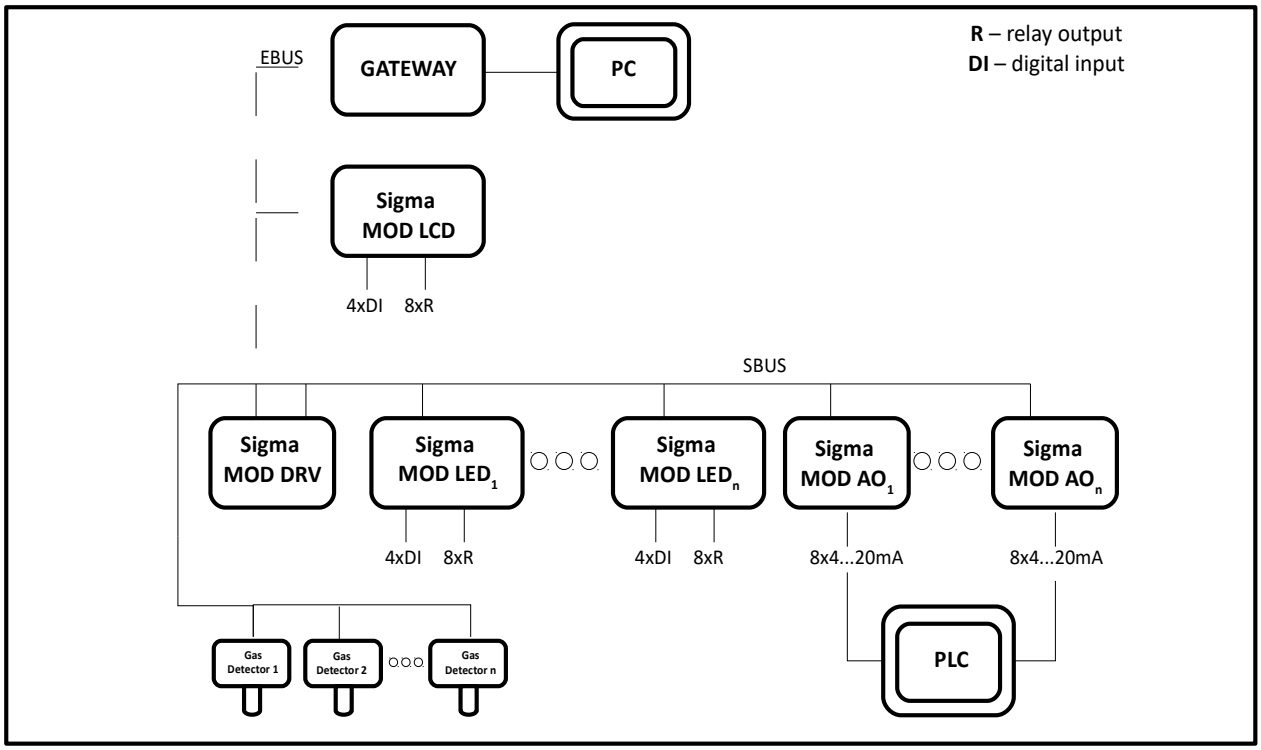


Figure 7: Example of Sigma Gas system architecture with Sigma MOD AO module

6 Life cycle

6.1 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.

The device can be conveyed under environmental conditions as described in Table 4.

6.2 Installation

Device must be mounted on a flat, vertical wall in the orientation shown in Figure 2 or 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.

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

If there is a need to connect two strands in one terminal of the device, only the connection in one common terminal sleeve is allowed (details see table 4).

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

6.3 Start-up

After all connections are made and outputs of the Sigma MOD AO module are configured according to the schematics below no other start-up operations are needed.

6.4 Configuration of the module /system

4..20 mA current outputs of the Sigma MOD AO module can be configured according to needs of the system.

Every output can be operated in either the active or passive mode, where the mode is selected by arrangement of jumpers between output terminals according to the illustration below.

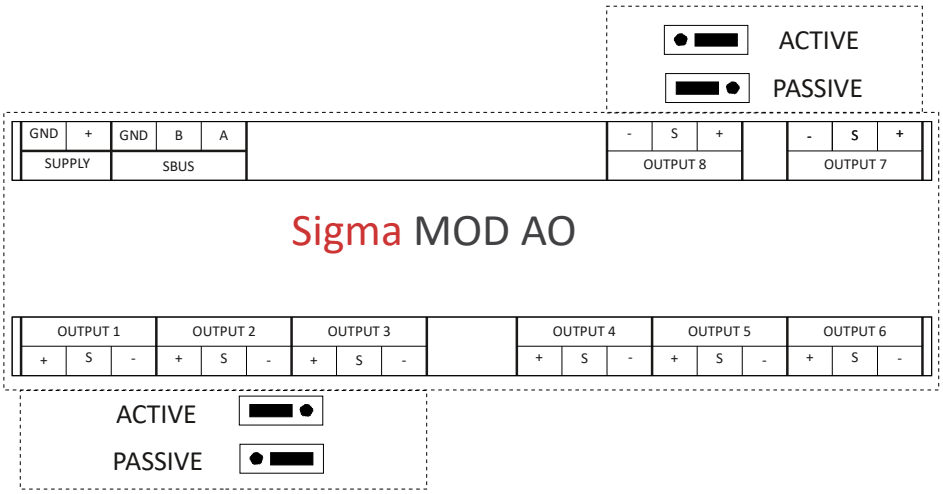


Figure 8: Current output configuration

Default configuration – see appendix [3].

6.5 Diagnostics

The device doesn't require diagnostics.

6.6 Periodical operations

6.6.1 Replacement of consumables

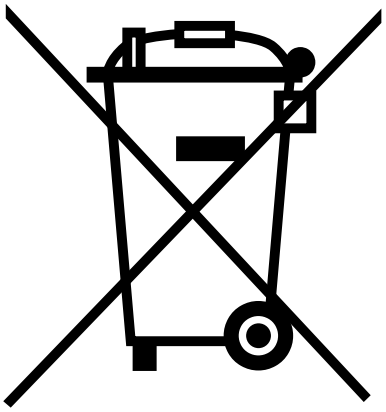
Please refer to Table 4 for the recommended lifetime and replacement schedule of fast wearing parts.

6.6.2 Maintenance

The regular maintenance of the detector is limited to wiping its housing with a damp soft cloth. Cleaning agents that contain solvents, white spirit or alcohol are not allowed.

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.

6.7 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.

7 Technical specification

Power supply • V_{CC} • Power consumption	 10 – 30 V ⎓ 10 W
Environment • Temperatures • Humidity • Pressure • PH	 -10 – 50^{O}C 10 – 80% long term 0 – 99% short term 1013 ± 10% hPa 5,5 – 7
IP	IP 20
Parameters of analogue outputs • R_{LOAD_MAX}	 750 Ω
Parameters of digital inputs • R_{IN} • Inactive • Active	 10 kΩ 0 – 1 V 10 – 30 V Any polarisation Pick-up time for output changeover > 1s

Digital communication parameters • Electric standard • Communication protocol	 RS-485 Sigma BUS
Integrated signalling equipment (optical)	LED controls
Dimension	See figure 2
Acceptable cables	1 – 2 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 ABS / PC
Weight	0.2 kg
Lifetime	10 years
Mandatory periodic inspection	Every 12 months
Mounting	DIN-35 / TS35 rail

Table 4: Technical specification

8 Product marking

Product code	Description
PW-036-A	Sigma MOD AO Control Unit Module

Table 5: Method of product's marking

9 Appendices

[1] DEZG033-ENG – EU Declaration of Conformity – Sigma MOD AO

[2] PU-Z-001-ENG – Example of the Sigma Gas System layout with multiple Sigma MOD AO modules

[3] PU-Z-002-ENG – Sigma MOD AO configuration

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)
Control Unit Module	**Sigma MOD AO**	**PW-036**

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
  - EN 61000-6-1:2007
  - EN 61000-6-2:2005
  - EN 61000-6-3:2007
  - EN 61000-6-4:2007
- in relation to directive 2011/65/EU – 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, 27.04.2020

(Name and Signature)
Managing Director
Aleksander Pachole

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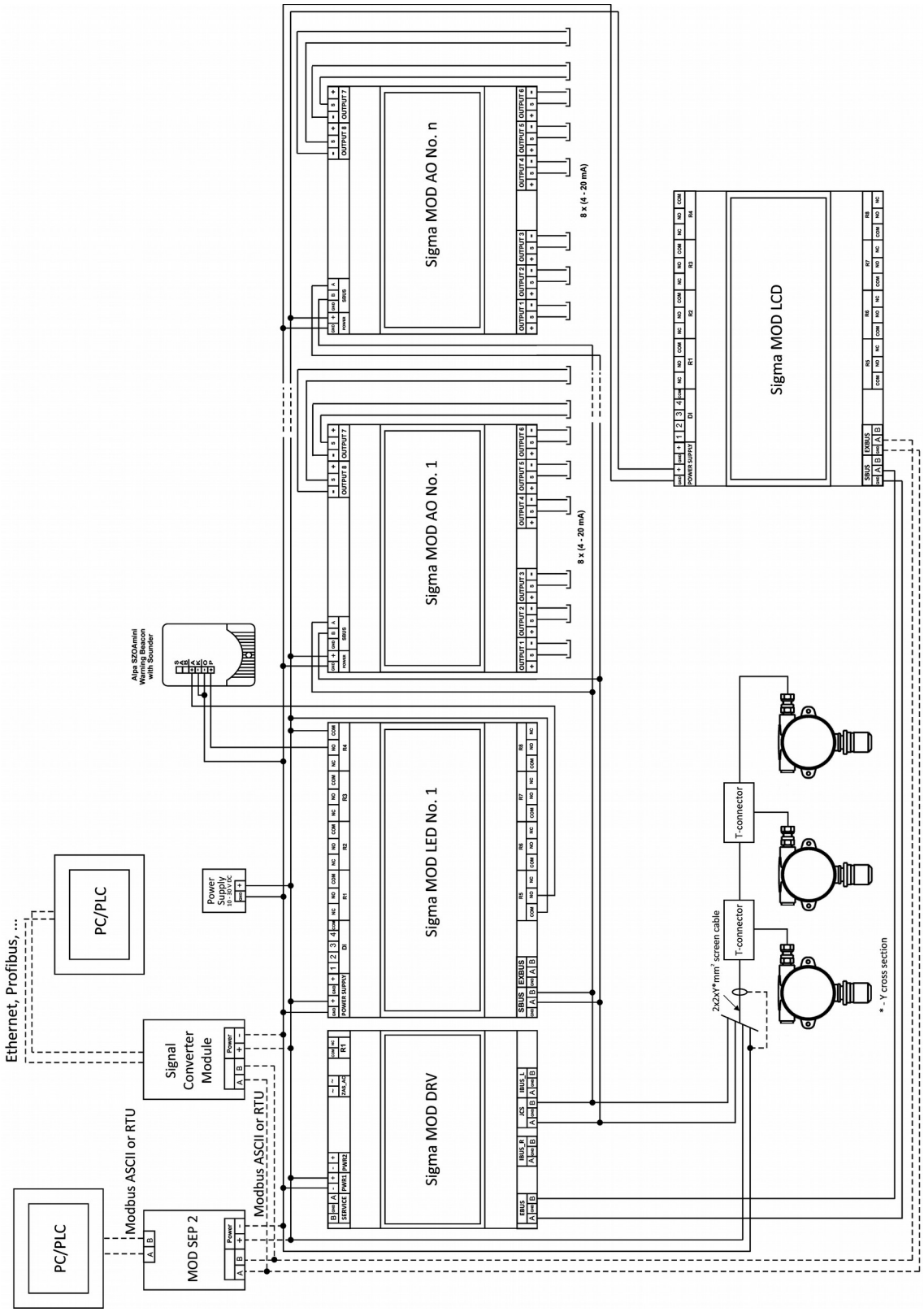
Example of the Sigma Gas System layout with multiple Sigma MOD AO modules



Sigma MOD AO configuration

Sigma MOD AO Serial no.		Product revision	R

Channel number	Gas Detector address	DEF	4-20 mA output	
			Active	Passive
1			☐	☐
2			☐	☐
3			☐	☐
4			☐	☐
5			☐	☐
6			☐	☐
7			☐	☐
8			☐	☐

Date:	Signature:	Company stamp:

Sigma MOD AO Serial no.		Product revision	R

Channel number	Gas Detector address	DEF	4-20 mA output	
			Active	Passive
1			☐	☐
2			☐	☐
3			☐	☐
4			☐	☐
5			☐	☐
6			☐	☐
7			☐	☐
8			☐	☐

Date:	Signature:	Company stamp:

Notes

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