ATEST GAZ

User Manual

Control Unit Module

Alpa MOD LED8

Product code: PW-033-A

POD-006-ENG R05

ATEST GAZ

Reliable and Innovative Gas Detection & Safety Systems

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

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

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1 Preliminary information

The Alpa MOD LED8 Control Unit Module is a device designed to detect the presence of:

- flammable gas such as natural gas (methane) and LPG (propane, propane – butane),
- vapours of volatile substances (alcohol vapour, liquid fuels),
- toxic gases (hydrogen sulphide, carbon monoxide),
- any other gas, detectable by an appropriate sensor.

Control unit module:

- reads the signals in 4 – 20 mA standard,
- signals exceeding the warning alarm thresholds,
- indicates gas detectors damage (e. g., breaking a wire),
- works with optical – acoustic beacons.

This system is designed to protect such structures as:

- residential buildings,
- public utility buildings,
- structures serving operation and distribution of gas and media,
- sewage treatment plants,
- parking lots.

A complete, typical system consists of the following elements:

- gas detectors, making direct measurement of gas concentration and transforming the information to an electrical signal. This signal is then fed to the control unit module,
- the control unit which is responsible for:
  - measuring gas detectors signals,
  - generating warnings and alarms,
  - diagnostics,
- power supply unit with a battery, responsible for power supply to the control unit module and gas detectors,
- additional external acoustic device used to directly informing about the threat.

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.

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

3 Description of the construction

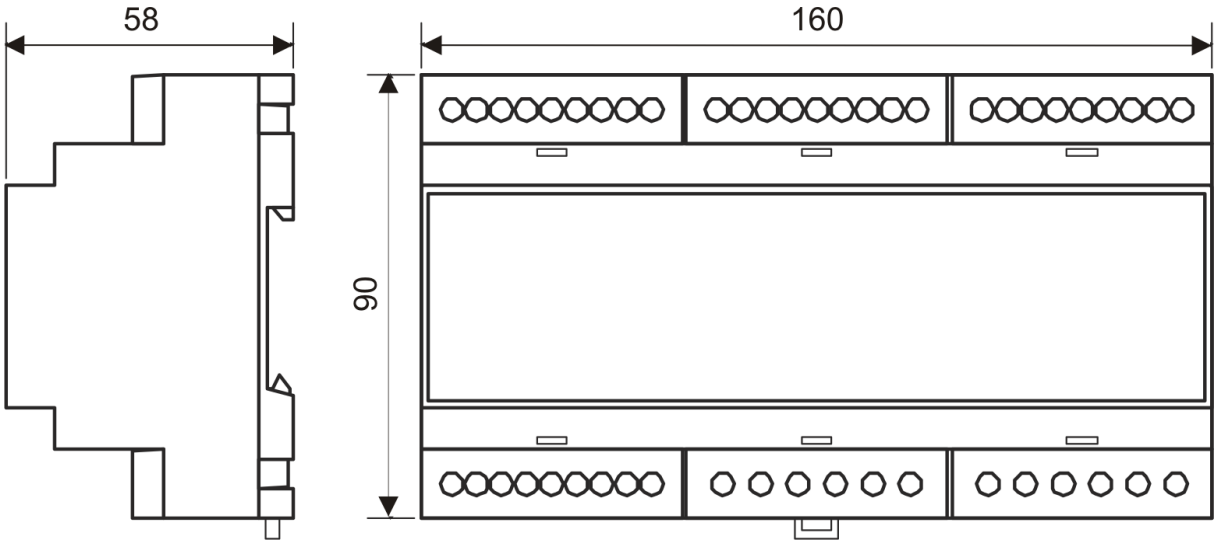


Figure 1: The construction of the device and its dimensions

4 Electric interface

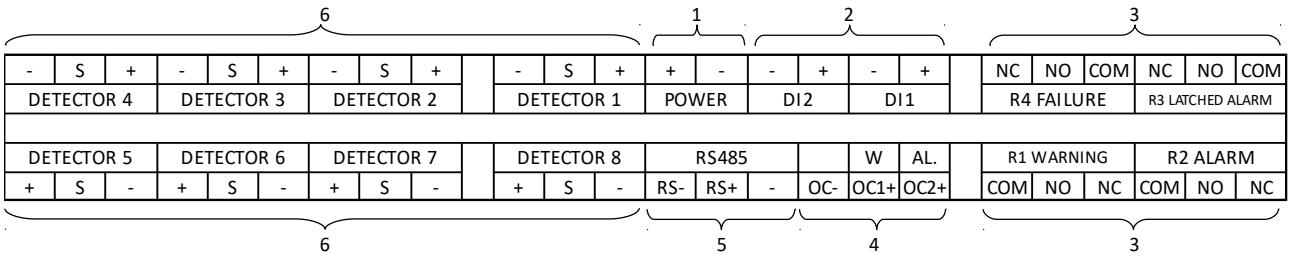


Figure 2: Electric connections

No.	Name	Terminal	Description
1	Supply		Device supply port. Parameters – see table 7
		+	Positive supply pole
		-	Negative supply pole
2	DI1 – 2		Digital inputs, see section 6.4. Parameters – see table 7
		+	Positive digital input terminal
		-	Negative digital input terminal
3	R1 – R4		Relay outputs, see section 6.4
		COM	Common terminal of relay
		NO	Normally open contact of relay
		NC	Normally closed contact of relay
4	Output OC		OC voltage outputs
		OC-	Negative common terminal OC outputs
		OC1+	Positive OC1 output terminal
		OC2+	Positive OC2 output terminal
5	RS485		RS 485 input
		RS-	Signal line RS-
		RS+	Signal line RS+
		-	Signal ground
6	1 – 8 gas detectors		Gas detectors current input
		+	Gas detectors positive supply pole
		S	Gas detectors signal terminal
		-	Gas detectors negative supply pole

Table 2: Electric interface description

5 User interface

Gas Detector performs continuous measurement of gas concentration in the surrounding area and conducts systematic tests of performance of Measuring Heads. Depending on the result of of these steps, status may be as follows:

- OK – “device working properly”,
- WARNING – “a small gas leak”,
- ALARM – “a critically high leak”,
- FAILURE – “system or gas detector damage has been detected.”

5.1 OK

This is the basic mode of operation when everything is fine ~~“OK”~~. This status is identified on the basis of only green lamps being on. In this case all relays are off, except for the FAILURE relay.

The control unit does not require special attention, except:

- frequent inspection of indications,
- systematic commissioning of servicing – as described in the final section of this documentation.

5.2 WARNING

This condition occurs when a small gas leak is detected that requires user notification in order to take appropriate control measures.

This status is indicated by:

- red ALARM light blinking  , corresponding to the alarm sensor that has detected the status,
- in this status an intermittent beep will be emitted. This signal can be blocked by pressing the CONFIRM / CLEAR – the system will read this as a note that the user has noticed the situation. This signal will sound again after 30 minutes. The warning status does not result in turning on the external sound signal,
- the OC WARNING signal is enabled, to control the optical indicator,
- the WARNING relay switches on.

Actions to be taken when WARNING is signalled:

– check the cause which, for example may be:

- a temporary gas leak due to maintenance work. In this case, the staff involved in these works are required to remove the leak and ventilate the facility,
- uncontrolled gas leak from a crack. In such a situation this fact should be reported to maintenance technician or another person responsible for the facility,
- disruption of the gas detector with other substances (final part of the documentation) – these substances should be removed from supervised premises,
- shifting of the gas detector characteristics. Gas detectors, over time tend to drift towards zero in the direction of the alarm. Therefore, if they are not periodically re-calibrated, it is possible that the warning threshold may shift to the level of clean air. The reason for this should be suspected when technical services have checked using an appropriate device that there is no gas leaks in the building, and there was no presence of interfering substances.

5.3 ALARM

It appears when concentration detected by one of the heads has exceeded the threshold value of ALARM. It is accompanied by continuous red light of the LED  at the gas detector which has detected the concentration. In this status:

- an acoustic signal is generated – just like in the warning by means of a built-in horn,

The ALARM status does not allow to turn off the horn.

- the system turns on the OC ALARM, to control the external siren. Pressing the CONFIRM / CLEAR will disable the external siren for 30 minutes,
- the relays switch on – ALARM and LATCHED ALARM. The sustained alarm relay can be cleared only after the cessation of ALARM status in any of the channels.

Action to be taken when ALARM is signalled:

- analyse the probability of any other reason than uncontrolled leakage – especially the probability of leakage initiated by maintenance technicians or probability of sensor inactivation by, for example, painters,
- if all the above causes seem unlikely:
  - remove unauthorized persons from the affected area,
  - as far as possible, allow ventilation of the premises which are at risk – by opening windows, doors (if the control module does not automatically switch on the ventilation),
  - call maintenance services to check for leaks in the installation and remove any possible leaks.

5.4 FAILURE

Alongside with the process of gas concentration measurement, the device performs number of test measurements designed to determine the technical condition of the system. The purpose of this step is to detect and signal to the user all the flaws in its operation. When faulty operation on one of the sensors is detected the device signals FAILURE. The occurrence of failure will result is enabling the internal signalling acoustic device and turning off the FAILURE relay (NC – COM contact closed). Pressing CONFIRM / CLEAR will disable the internal siren.

5.5 POWER indicator lamp

If the POWER indicator lamp is on, the Alpa MOD LED8 is operational.

The indicator lamp will be turned off:

- if Alpa MOD LED8 is defective,
- in case of decrease or loss of controller voltage or battery discharge.

5.6 Status memory

During standby, the normal status of the device is emitting light from only one indicator lamp OK in green. In case in any of the channels there is any of the following: ALARM, WARNING or FAILURE it will be signalled by an appropriate indicator lamp matching the channel. The display will light up LED flashing MEMORY, indicating that the memory contains the history of past events. In view of the fact that the control unit may be not monitored at all times, and unusual situations can occur which end by themselves and are temporary it was envisaged for them to be remembered, so that maintenance and service staff can learn about them at a later time. Displaying conditions described below is only possible if a failure, a warning or an alarm is not indicated at the time:

- pressing MEMORY will display the contents of the memory on the front panel, which will be signalled by the MEMORY indicator lamp lighting continuously,
- Pressing CONFIRM / CLEAR for 5 seconds allows to erase the memory,
- pressing the MEMORY key again will return to displaying the current status.

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.

Transport of the device should be carried out under the environmental conditions described in the Table 7.

6.2 Installation

6.2.1 Control unit and buffer power supply

The control unit with power supply and the battery must be installed in the control cabinet on DIN 35 rail or placed in a junction box in a place accessible for authorized staff, though as far as possible so as to hinder unauthorized access. Avoid locations with high humidity. Assembly height – approximately 170 cm above ground level.

If the connection was made with the use of multi-wire cables (commonly known as a "cord"), the ends of these connectors should be ended with clamp sleeves.

If there is a need to connect two conductors in one terminal of the device, the only allowable option is to connect them in a common clamping sleeve (details are provided in Table 7).

6.2.2 Installing gas detectors

The following describes the rules of location of the most popular gas detectors. Details are contained in the gas detector user manual.

Natural gas (NG)

These Gas Detectors should be deployed on the ceiling of the protected area or its vicinity (not less than approx. 40 cm. from the ceiling) so that the horizontal distance from any given point of the protected area on the ceiling to the Gas Detector does not exceed 8 meters, assuming no mechanical obstruction between the source of emissions and the gas detector. In the case of sensors mounted on the wall, they should be directed measuring side downwards.

Placement and installation of gas detectors:

- the gas detectors should be placed on the expected route of gas from the source of emissions to the ventilation grill,
- if part of the ceiling is separated from the rest of the boiler room by a divider higher than approx. 20 – 40 cm – it is recommended to install a separate gas detector for that part,
- the gas detectors should not be installed directly above the boiler, because hot air warmed by will result in "ventilating" methane out in the vicinity of the gas detector,
- on a connecting cable directly before the entry to the gas detector housing, it is recommended to make a loop or a "U" so that the water condensing on the pipe or dripping from the ceiling does not drain to the gas detector,
- for reliability reasons, it is recommended to use at least two gas detectors.

Liquid gas (LPG)

These gas detectors should be placed acc. to similar principles as methane gas detectors, taking into account the fact that both propane and butane are heavier than air and will accumulate close to the floor. This is why the gas detectors should be placed no higher than about 20 – 40 cm from the floor level.

Carbon monoxide (CO)

Due to similar density to the density of air, the gas detectors should be installed approx. 170 – 200 cm above ground level, especially in car diagnostic stations where heated exhaust gases tend to rise up.

Hydrogen sulphide (H_2S)

Hydrogen sulphide is heavier than air and will therefore lie on the floor. It is recommended to install the gas detectors at approx. 30 cm from the floor level. They should point measuring side down. In such facilities as waste water treatment plants it is recommended to install gas detectors in splash-proof housings, securing the gas detectors from direct contact with water.

When installing the Gas Detector, work according to indications of a technician or a fire protection surveyor.

6.2.3 Connecting gas detectors to the control unit

The supply line should be designed in such a way that at the lowest expected supply voltage, the value of the voltage detected by gas detectors terminals does not drop below the permissible value.

The maximum number of Alpa EcoWent XT and Alpa EcoDet XT Gas Detectors in open and closed loop is described in Appendix [3] and [4], while information about sample connection cables for the gas detectors with an output at 4 – 20 mA can be found in Section 6.2.8.

6.2.4 Connecting an external acoustic device

These connections should be carried with a cable with a cross-section compatible with the data in Table 7 – see Section 6.2.8. When using cables with the smallest diameter it should be remembered that they have relatively low mechanical strength. In justified cases, it is recommended to use PVC trays. However, do not use cables which are too thick because of a limited cross-section of chokes in the housing Cables too large in diameter may not pass through them.

6.2.5 Power source

The power supply line should be designed in such a way that, at the lowest expected supply voltage the measured voltage at the gas detector terminals does not drop below the permissible value.

On the side of the power source, the least favourable conditions should be considered. It must be assumed that in failure situation – at the time of power failure – the supply voltage from the battery terminals falls below the nominal value.

Please refer to the documentation concerning the uninterrupted power supply (for installation with 24 V power supply typical minimum supply voltage during operation on an emergency power supply battery is 21 V, below this value the system disconnects).

6.2.6 Device power supply

When selecting the cable, it is assumed that the supply voltage at the end of the cable must not fall below 60% of the value at the power source terminals.

As a standard, it is assumed that the supply voltage cannot drop below the permissible value (see the device documentation).

The power consumption of the detector is constant within the range of acceptable voltages. With the decrease of supply voltage, the current consumption from the power supply increases.

For example, if the sensor consumes 1 W

- when powered by 48 V, the supply current will be 1 W / 48 V ≈ 20 mA
- when powered by 24 V, the supply current will be 1 W / 24 V ≈ 40 mA
- when powered by 15 V, the supply current will be 1 W / 15 V ≈ 67 mA

6.2.6.1 Example – a system with a single device

Task: Select the sensor power cable under the following conditions:

Data:

- power consumption of the device: 2 W
- min. power supply voltage: 24 V
- min. UPS supply voltage: 21 V
- min. permissible device supply voltage: 15 V
- distance between the control unit and the device: 800 m

Calculations:

- min. power supply voltage at the end of the cable: 24 V*60% = 14.4 V
- min. UPS supply voltage at the end of the cable 21 V*60% = 12.6 V
- voltage comparison 14.4 V < 15 V and 12.6 V < 15 V

  min. supply voltage lower than min. allowable supply voltage of the device, so we take the highest value of 15 V for calculations
- max. current consumption of the device: 2 W / 15 V = 0.133 A
- permissible voltage drop on the line: 21 V – 15 V = 6 V
- maximum allowable line resistance: 6 V / 0.133 A = 45 Ω

Cable selection:

- cable with the cross-section of 0.5 mm^2: R(2x800 m) = 36 / 1000 * 1600 = 57.6 Ω > 45 Ω

  The cable has a resistance greater than the maximum permissible line resistance, so it does not meet the requirements and cannot be used in the system.
- cable with the cross-section of 1.0 mm^2: R(2x800 m) = 18 / 1000 * 1600 = 28.8 Ω < 45 Ω

  The resistance of the cable is less than the maximum acceptable line resistance – the requirements are satisfied so the cable can be applied to the above system.

6.2.7 Power

The power supply unit selected for the system must deliver sufficient power to cover power consumption of all devices.

The demand for power consumption of specific devices can be found in relevant user manuals for these devices.

To calculate the overall power necessary to cover the system demand the consumption of all system devices must be added up and then doubled.

6.2.8 Connection cable

The choice of the connection cable is up to the designer and should take into account the legal requirements and conditions prevailing in the facility (e.g. oil-resistant, mechanically resistant, UV-resistant, unplaned or food approved cables).

The diameter of the cable should be matched to the size of the cable gland of a specific device.

An example of a cable symbol		Approximate outer diameter [mm]
Outdoor installations	Indoor installations	
LiYCYv 300/500 V 3x1.0	LiYCY 300/500 V 3x1.0	9.1
LiYCYv 300/500 V 3x1.5	LiYCY 300/500 V 3x1.5	9.8

Table 3: Examples of cable types that can be used in 4 – 20 mA systems

6.3 Start-up

The control unit module must be supplied in accordance with parameters set out in Table 7:

Voltage supply parameters for the control unit must be also compatible with other system elements (gas detectors and signallers).

The control unit module has 4 relays with dry contacts that can be used to control the automation, traffic or ventilation systems (e. g. two-speed fan). Installing the system, you should be aware of the following things:

- for safety reasons, the device has no power switch

  It is, therefore, necessary to envisage a power circuit breaker on the power line for the device. This switch should be placed in a separate switch-box and should protect both power lines,
- relay outputs are not protected against overload. Shorting the outputs can cause irreparable damage to the control unit module. Therefore, external protection circuits should be provided, protecting these relays according to the best practices when working with this type of installation,
- in case of controlling more powerful circuits and bigger inductive load an additional controlling contractor should be used, directly controlling the device (e. g. a set of fans),
- do not exceed technical data limits shown in Table 7.

6.4 The basic configuration relay outputs and digital inputs

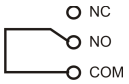
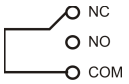
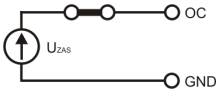
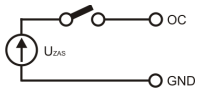
Relay output	Function	Input activation: 	Output inactivation: 
R1	**WARNING**	Warning threshold has been exceeded or DI1 or DI2 activated	The decrease in the measured gas concentrations below the warning threshold; DI1 and DI2 inactive
R2	**ALARM**	Alarm threshold has been exceeded or DI1 or DI2 activated	The decrease in the measured gas concentrations below the alarm threshold; DI1 and DI2 inactive
R3	**LATCHED ALARM**	Warning threshold has been exceeded or DI1 or DI2 activated	The decrease in the measured gas concentrations below the alarm threshold; DI1 and DI2 inactive and pressing the CONFIRM / CLEAR key
R4	**FAILURE**	None of the devices has the FAILURE status	At least one device in the system signals a failure or no power

Table 4: Relay outputs

Voltage output	Function	Input activation: 	Output inactivation: 
OC1	**WARNING**	Warning threshold has been exceeded or DI1 or DI2 activated	The decrease in the measured gas concentrations below the warning threshold; DI1 and DI2 inactive
OC2	**ALARM**	Alarm threshold has been exceeded	The decrease in the measured gas concentrations below the alarm threshold; DI1 and DI2 inactive or pressing the CONFIRM / CLEAR key

*U_{ZAS} – voltage on power supply terminal of control unit module (voltage on OC output in activation = U_{ZAS})

Table 5: OC voltage outputs

6.5 Frequency of periodical operations

The device should be subjected to periodic inspection of its technical condition. It is the user's responsibility. The user is obliged to supervise the installation on the ongoing basis, according to schedule as below:

Frequency	Description of activities
Daily	Checking the device indications
Once in a quarter	Checking the installation, mechanical defects Checking operation of the detector (by exposing it to gas)

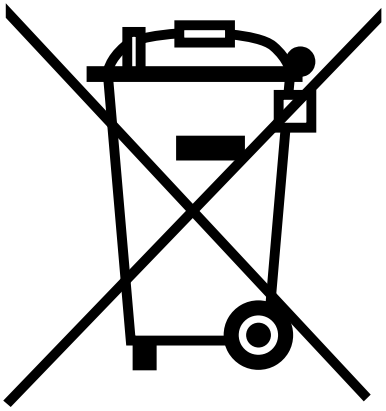
Table 6: Frequency of periodical operations

These tests are performed by a trained and qualified person. He / she is obliged to immediate notification of the manufacturer of any observations and suspicions about the status of the device.

6.5.1 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.

6.6 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.

7 Technical specification

Nominal power input • Voltage U_{ZAS} • Power P_{ZAS}	10 – 30 V ⎓ 3W[1]	
Environment	In-operation	Storage
• Ambient temperatures • Humidity	0 – 40°C 10 – 90% long term 0 – 99% short term	0 – 40°C 30 – 90% long term
IP	IP 20	
Number of analogue inputs	1 – 8	
Analogue inputs parameters • R_{IN}	200 Ω	
Digital inputs parameters • R_{IN} • Inactive • Active	10 kΩ 0 – 1 V 10 – 30 V Any polarisation. Impulse duration which is needed to change the state > 1s	
Analogue inputs parameters • Relay • OC voltage outputs	Floating contacts, NO/NC 230 V ~ / 3 A 230 V ⎓ / 0.25 A Not protected against overloading Output voltage equal to the supply voltage of Alpa MOD LED8 Maximum total load on outputs 500 mA. Not protected against overloading	
Built-in optical signalling	LED lights	
Built-in acoustic signalling	75 dB at the distance of 1 m	
Protection class	II	
Dimensions	See figure 1	
Acceptable cables	1 – 2 mm^2 (cable lugs 2 x 1 mm2 or 2 x 0.75 mm2 should be used for double wires)	
Enclosure material	Self – extinguishing PPO	
Weight	0.3 kg	
Mounting	On DIN-35 / TS35 rail	

Table 7: Technical specification

8 Appendices

[1] DEZG023-ENG – EU Declaration of Conformity – Alpa MOD LED8

[2] PU-Z-026-ENG – Wiring diagram in a star configuration

[3] PU-Z-098-ENG – Maximum quantity of Alpa EcoWent XT and Alpa EcoDet XT detectors by cable type

[4] PU-Z-106-ENG – Maximum quantity of Alpa EcoTerm XT detectors by cable type

1 The value applies only to power consumption of the Alpa MOD LED8 Control Unit Module. When determining the total power of the gas detection system the power consumption of all devices in the system, e. g. gas detectors, sirens, battery charging, etc. should be taken into account.

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	**Alpa MOD LED8**	**PW-003**

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

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, 14.03.2023

(Name and Signature)
Managing Director
Aleksander Pachole

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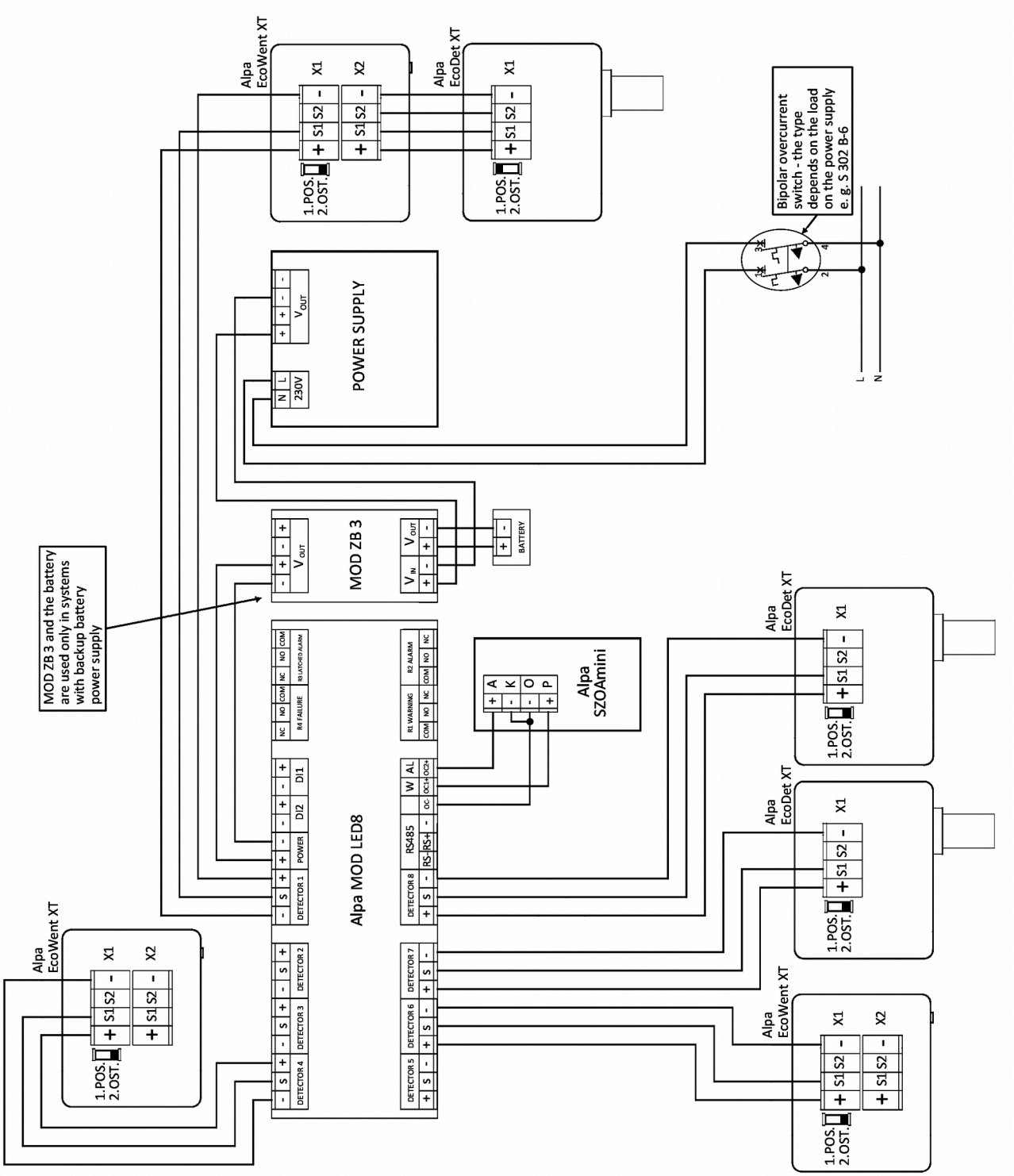
Wiring diagram in a star configuration



Maximum quantity Alpa EcoWent XT and Alpa EcoDet XT detectors by cable type

1 Open loop configuration

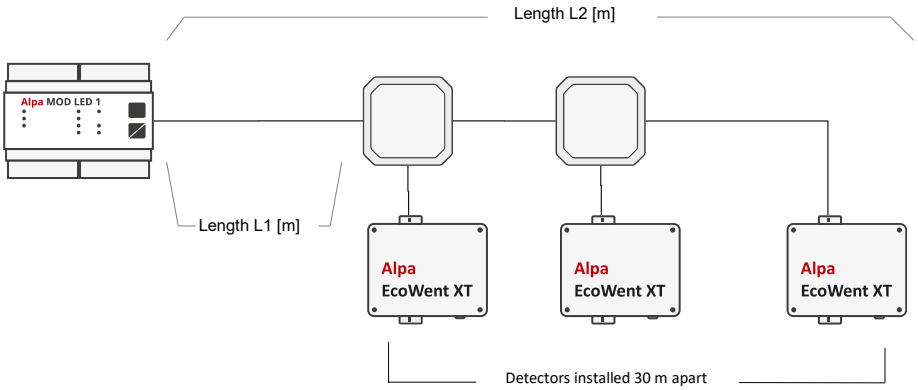


Figure 1: Open loop configuration for Alpa EcoWent XT detectors

Cross-section of a single cable conductor [mm²]	Alpa EcoWent XT Gas Detector					
	System without backup battery supply (U_{IN} = 24 V)			System with backup battery supply ($U_{IN(min)}$ = 20 V)		
	L1 [m]	L2 [m]	Quantity of detectors	L1 [m]	L2 [m]	Quantity of detectors
0,75	58	628	20	53	533	17
	91	631	19	87	537	16
	127	637	18	123	543	15
	165	645	17	163	553	14
	206	656	16	206	566	13
1	63	723	23	75	615	19
	96	726	22	109	619	18
	131	731	21	146	626	17
	168	738	20	186	636	16
	207	747	19	229	649	15
1,5	62	872	28	81	741	23
	94	874	27	115	745	22
	128	878	26	150	750	21
	163	883	25	188	758	20
	200	890	24	229	769	19
2,5	69	1389	45	53	1193	39
	100	1390	44	84	1194	38
	133	1393	43	116	1196	37
	166	1396	42	150	1200	36
	200	1400	41	184	1204	35

Table 1: Maximum quantity of Alpa EcoWent XT detectors – open loop configuration

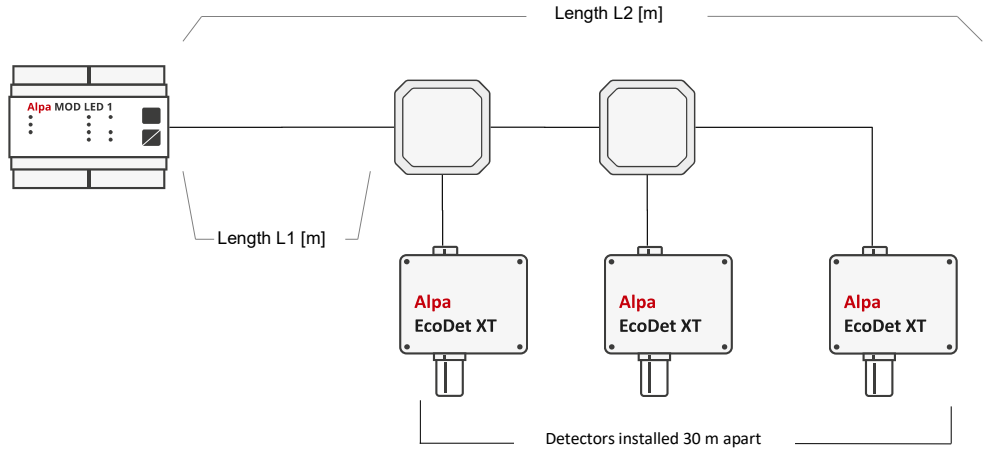


Figure 2: Open loop configuration for Alpa EcoDet XT detectors

Cross-section of a single cable conductor [mm²]	Alpa EcoWent XT Gas Detector					
	System without backup battery supply (U_{IN} = 24 V)			System with backup battery supply ($U_{IN(min)}$ = 20 V)		
	L1 [m]	L2 [m]	Quantity of detectors	L1 [m]	L2 [m]	Quantity of detectors
0,75	72	402	12	67	337	10
	109	409	11	103	343	9
	147	417	10	145	355	8
	190	430	9	194	374	7
	241	451	8	257	407	6
1	73	461	14	55	385	12
	107	463	13	89	389	11
	144	474	12	126	396	10
	184	484	11	169	409	9
	229	499	10	218	428	8
1,5	45	555	18	42	462	15
	77	557	17	74	464	14
	111	561	16	109	469	13
	146	566	15	146	476	12
	184	574	14	187	487	11
	224	584	13	234	504	10
2,5	35	725	24	28	598	20
	66	726	23	59	599	19
	98	758	22	91	601	18
	132	762	21	125	605	17
	166	766	20	160	610	16

Table 2: Maximum quantity of Alpa EcoDet XT – open loop configuration

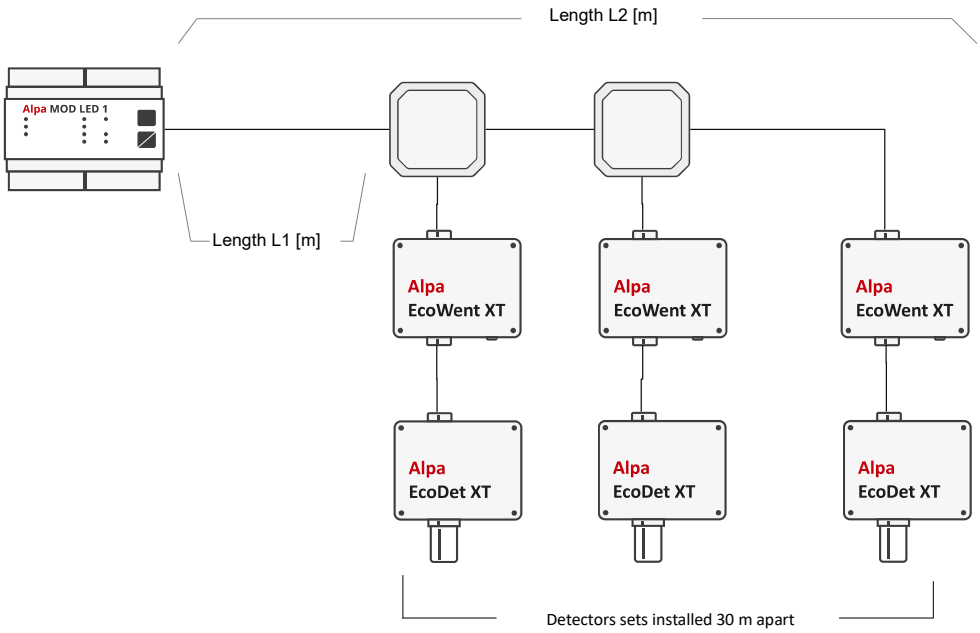


Figure 3: Open loop configuration for sets of Alpa EcoWent XT and Alpa EcoDet XT detectors

Cross-section of a single cable conductor [mm²]	A set of one Alpa EcoWent XT Gas Detector and one Alpa EcoDet XT Gas Detector					
	System without backup battery supply (U_{IN} = 24 V)			System with backup battery supply ($U_{IN(min)}$ = 20 V)		
	L1 [m]	L2 [m]	Quantity of sets	L1 [m]	L2 [m]	Quantity of sets
0,75	70	319	9	80	267	7
	107	325	8	122	278	6
	152	339	7	173	298	5
	203	359	6	243	337	4
1	58	369	11	56	305	9
	93	373	10	93	311	8
	133	382	9	135	322	7
	177	395	8	185	341	6
	229	416	7	249	374	5
1,5	78	451	13	62	373	11
	114	456	12	98	378	10
	153	464	11	138	387	9
	197	477	10	183	432	8
	245	494	9	237	424	7
2,5	66	636	20	52	532	17
	99	639	19	84	534	16
	133	643	18	118	538	15
	169	649	17	154	544	14

Table 3: Maximum quantity of sets of Alpa EcoWent XT and Alpa EcoDet XT – open loop configuration

2 Closed loop configuration

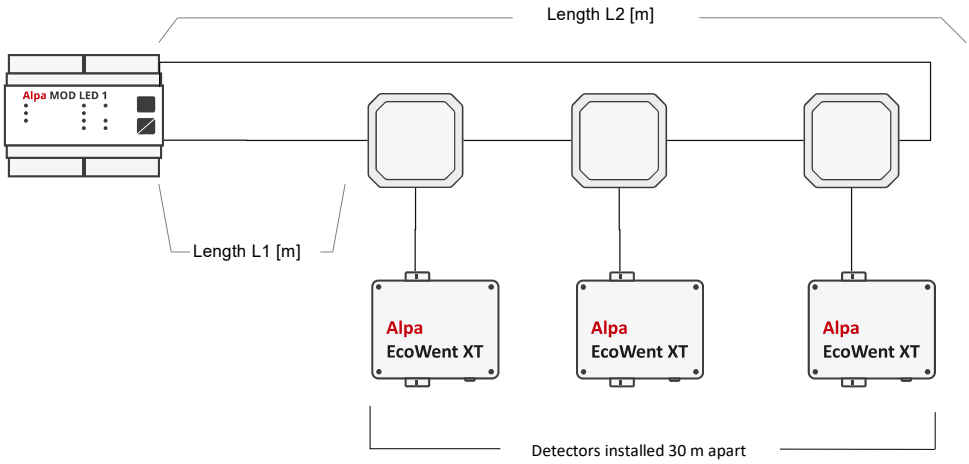


Figure 4: Closed loop configuration for Alpa EcoWent XT detectors

Cross-section of a single cable conductor [mm²]	Alpa EcoWent XT Gas Detector					
	System without backup battery supply (U_{IN} = 24 V)			System with backup battery supply ($U_{IN(min)}$ = 20 V)		
	L1 [m]	L2 [m]	Quantity of detectors	L1 [m]	L2 [m]	Quantity of detectors
0,75	57	807	26	50	680	22
	89	809	25	83	683	21
	123	813	24	118	688	20
	160	820	23	153	693	19
	198	828	22	194	704	18
	237	837	21	237	717	17
1	63	933	30	67	787	25
	96	936	29	101	791	24
	130	940	28	136	796	23
	164	944	27	172	802	22
	202	952	26	212	812	21
1,5	50	1130	36	55	955	31
	82	1132	35	87	957	30
	115	1135	34	120	960	29
	149	1139	33	155	965	28
	184	1144	32	192	972	27
	220	1150	31	230	980	26
2,5	47	1877	62	56	1616	53
	78	1878	61	87	1617	52
	110	1880	60	119	1619	51
	142	1882	59	152	1622	50
	174	1884	58	185	1625	49

Table 4: Maximum quantity Alpa EcoWent XT – closed loop configuration

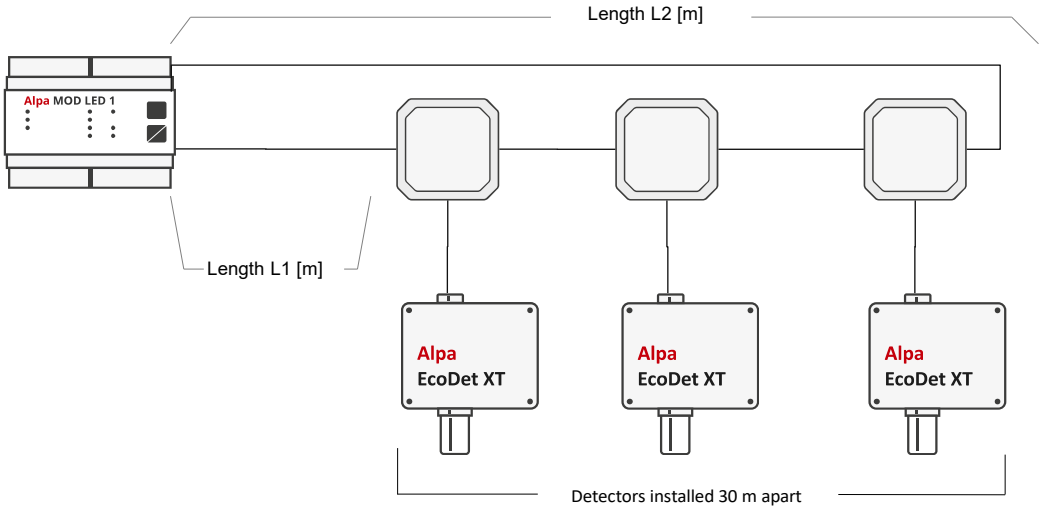


Figure 5: Close loop configuration for Alpa EcoDet XT detectors

Cross-section of a single cable conductor [mm^2]	Alpa EcoDet XT Gas Detector					
	System without backup battery supply (U_{IN} = 24 V)			System with backup battery supply ($U_{IN(min)}$ = 20 V)		
	L1 [m]	L2 [m]	Quantity of detectors	L1 [m]	L2 [m]	Quantity of detectors
0,75	45	495	16	50	410	13
	76	496	15	86	415	12
	112	502	14	120	420	11
	149	509	13	160	430	10
	190	520	12	207	447	9
	235	535	11	-	-	-
1	64	574	18	55	475	15
	97	577	17	89	479	14
	132	582	16	124	484	13
	169	589	15	163	493	12
	209	599	14	207	507	11
1,5	67	697	22	68	578	18
	99	699	21	101	581	17
	133	703	20	137	587	16
	169	709	19	174	594	15
	207	717	18	215	605	14
2,5	51	951	31	65	785	25
	82	952	30	98	788	24
	115	955	29	131	791	23
	148	958	28	166	796	22
	182	962	27	203	803	21

Table 5: Maximum quantity of Alpa EcoDet XT – closed loop configuration

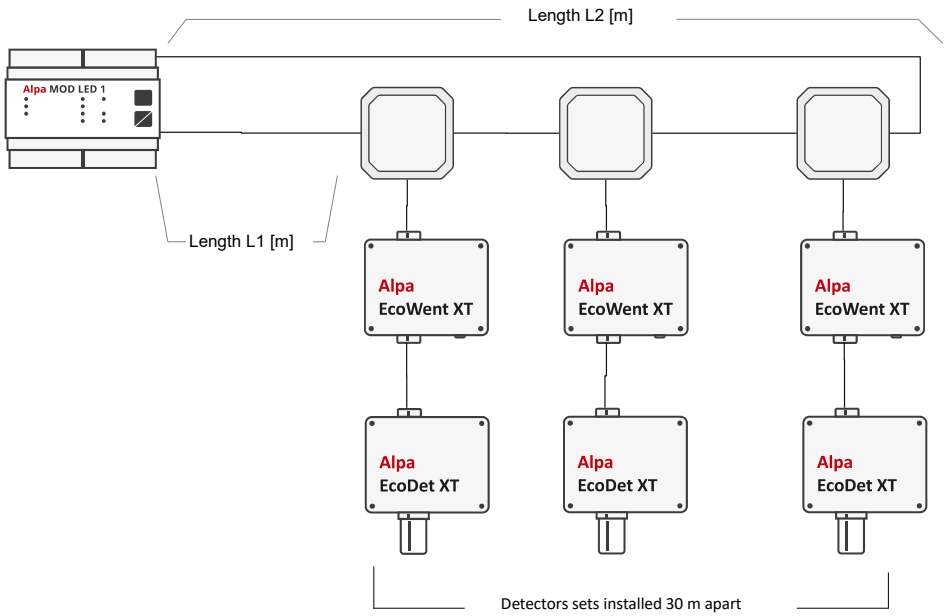


Figure 6: Closed loop configuration for sets of Alpa EcoWent XT and Alpa EcoDet XT detectors

Cross-section of a single cable conductor [mm²]	A set of one Alpa EcoWent XT Gas Detector and one Alpa EcoDet XT Gas Detector					
	System without backup battery supply (U_{IN} = 24 V)			System with backup battery supply ($U_{IN(min)}$ = 20 V)		
	L1 [m]	L2 [m]	Quantity of sets	L1 [m]	L2 [m]	Quantity of sets
0,75	53	426	13	44	355	11
	88	430	12	78	358	10
	126	437	11	162	411	9
	169	449	10	217	435	8
	218	467	9	-	-	-
1	59	494	15	71	413	12
	94	498	14	108	419	11
	131	504	13	149	429	10
	172	514	12	197	446	9
	217	528	11	252	490	8
1,5	40	599	19	66	501	15
	75	603	18	101	505	14
	108	605	17	139	512	13
	144	610	16	181	523	12
	184	619	15	228	539	11
	227	631	14	-	-	-
2,5	24	834	28	38	698	23
	55	835	27	70	700	22
	87	837	26	103	703	21
	120	840	25	137	707	20
	154	844	24	173	713	19

Table 6: Maximum quantity of sets of Alpa EcoWent XT and Alpa EcoDet XT – closed loop configuration

3 Star configuration

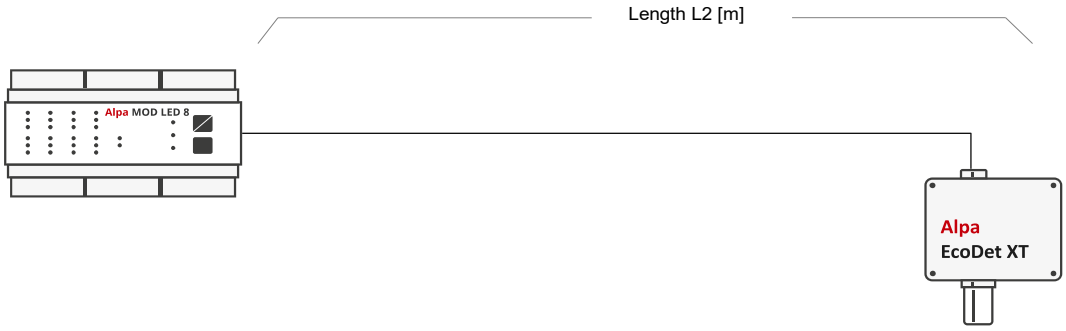


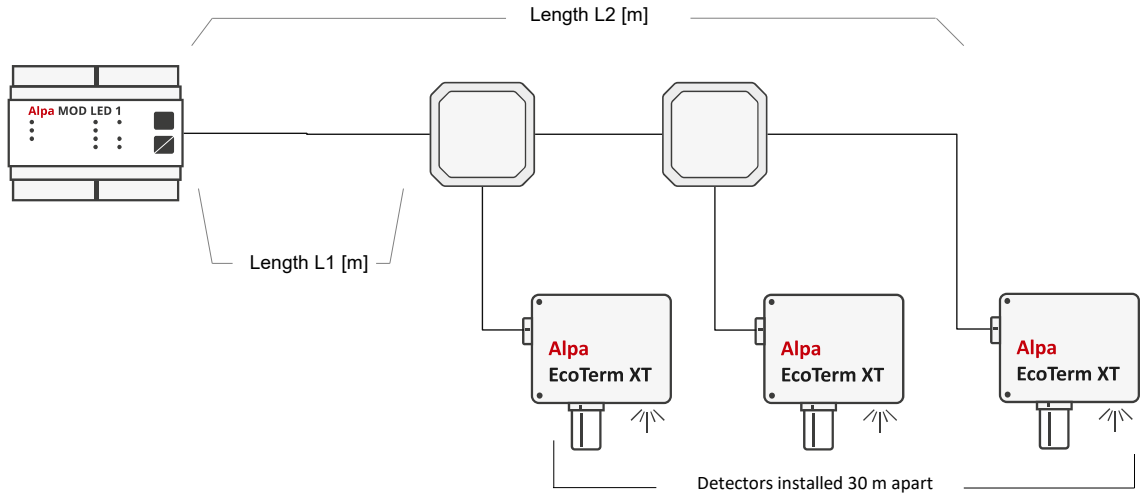
Figure 7: Star configuration

Cross-section of a single cable conductor [mm²]	System with backup battery supply ($U_{IN(min)}$ = 20 V)	
	One Alpa EcoWent XT Gas Detector at the end of the line	One Alpa EcoDet XT Gas Detector at the end of the line
	L2 [m]	L2 [m]
0,75	1400	1400
1	1400	1400
1,5	1400	1400
2,5	1400	1400

Table 7: Maximum length of cables – star configuration

Maximum quantity of Alpa EcoTerm XT detectors by cable type

1 Open loop configuration



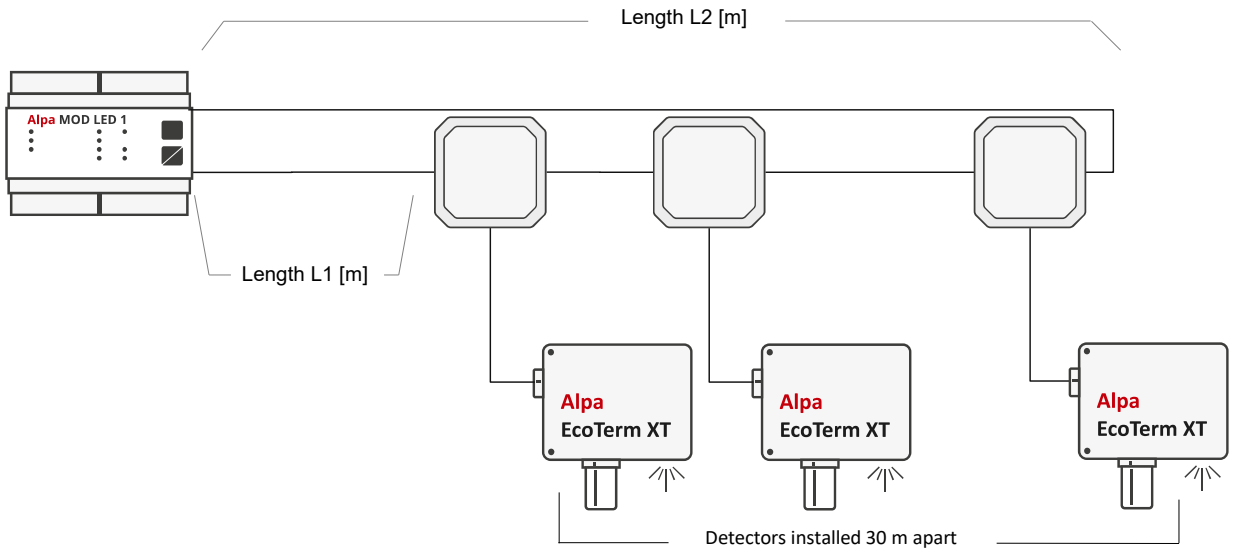
L1 – distance T-connector of the first detector from the control unit
L2 – distance T-connector of the last detector from the control unit

Figure 1: Open loop configuration

Cross-section of a single cable conductor [mm²]	Alpa EcoTerm XT Gas Detector					
	System without backup battery supply (U_{IN} = 24 V)			System with backup battery supply ($U_{IN(min)}$ = 20 V)		
	L1 [m]	L2 [m]	Quantity of detectors	L1 [m]	L2 [m]	Quantity of detectors
1	48	408	13	34	334	11
	81	411	12	67	337	10
	115	415	11	102	342	9
	153	423	10	141	351	8
	196	436	9	187	367	7
1,5	47	497	16	49	409	13
	79	499	15	82	412	12
	113	503	14	117	417	11
	148	508	13	155	425	10
	187	517	12	198	438	9
	229	529	11	248	458	8
2,5	39	669	22	42	552	18
	72	672	21	74	554	17
	104	674	20	108	557	16
	137	677	19	142	562	15
	172	682	18	179	569	14

Table 1: Maximum quantity of Alpa EcoTerm XT detectors – open loop configuration

2 Closed loop configuration



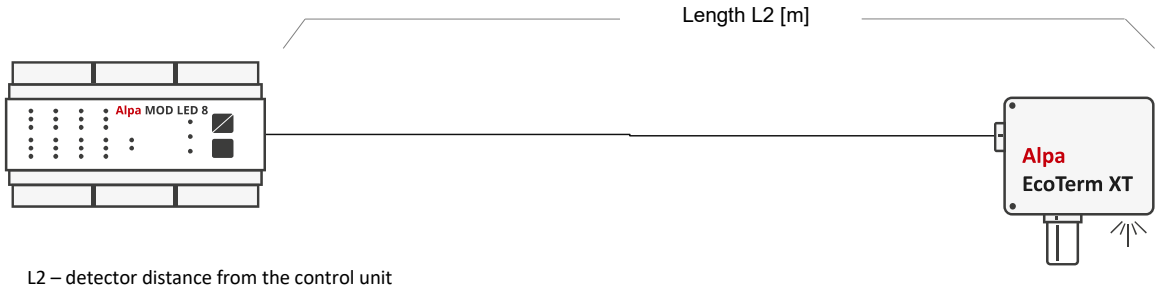
L1 – distance T-connector of the first detector from the control unit
L2 – distance T-connector of the last detector from the control unit (also the length of loop return cable)

Figure 2: Closed loop configuration for Alpa EcoTerm XT detectors

Cross-section of a single cable conductor [mm²]	Alpa EcoTerm XT Gas Detector					
	System without backup battery supply (U_{IN} = 24 V)			System with backup battery supply ($U_{IN(min)}$ = 20 V)		
	L1 [m]	L2 [m]	Quantity of detectors	L1 [m]	L2 [m]	Quantity of detectors
1	61	541	17	58	448	14
	93	543	16	90	450	13
	128	548	15	127	457	12
	166	556	14	167	467	11
	207	567	13	213	483	10
1,5	56	656	21	33	543	18
	88	658	20	64	544	17
	122	662	19	97	547	16
	157	697	18	132	552	15
	195	705	17	170	560	14
2,5	41	881	29	40	730	24
	72	882	28	72	732	23
	104	884	27	104	734	22
	139	889	26	138	738	21
	171	891	25	174	744	20
	207	897	24	211	751	19

Table 4: Maximum quantity Alpa EcoTerm XT detectors – closed loop configuration

3 Star configuration



L2 – detector distance from the control unit

Figure 3: Star configuration

Cross-section of a single cable conductor [mm^2]	System with backup battery supply ($U_{IN(min)}$ = 20 V)
	One Alpa EcoTerm XT Gas Detector at the end of the line
	L2 [m]
1	1400
1,5	1400
2,5	1400

Table 7: Maximum length of cables – star configuration

Notes

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