AMERICAN GAS SAFETY CO/NO2 Gas Detection For Enclosed Parking Structures ParkSafe Controller User Manual

Contents

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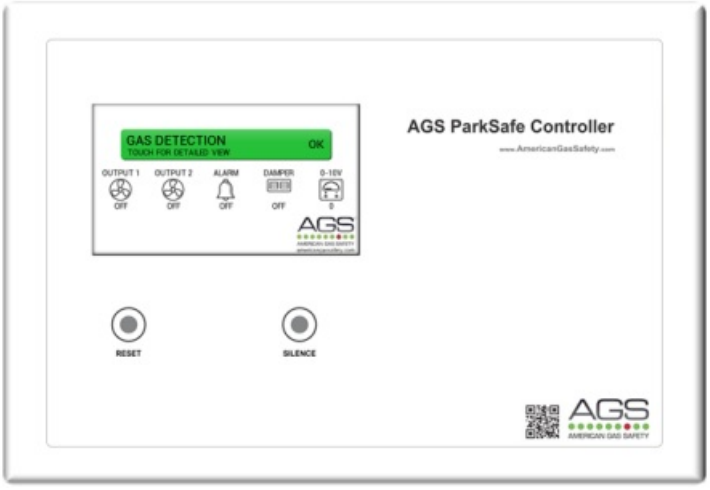


Product Information

The ParkSafe Controller is a technical device manufactured by American Gas Safety LLC. It is designed to control and monitor the levels of CO (carbon monoxide) and NO2 (nitrogen dioxide) in parking structures to ensure the safety of occupants. The controller is compatible with ParkSafe Detectors, which are addressable and connected to the controller through a RS485 RTU communication protocol.

The ParkSafe Controller should be installed in a location that is out of reach of the public, preferably inside the parking structure close to the motor control center or connecting offices. It is important to follow applicable regulations for proper placement and easy accessibility for status observation and alarm purposes.

Product Usage Instructions

1. Before installation, refer to the ParkSafe Detector manual for important information on coverage, location, and positioning. Avoid areas and conditions that are specified in the manual.
2. Installation must be carried out by trained personnel in accordance with recognized standards of the appropriate authority in your country.
3. Ensure compliance with local regulations and site procedures before performing any work.
4. Mount the ParkSafe Controller using surface mounting. It should be installed by a licensed and insured contractor.
5. When using cable glands for wire entry, make sure they are no bigger than 20mm (3/4) and separated by at least 20mm (1/2).
6. Ground the ParkSafe Detectors to limit the effects of radio frequency interference.
7. For disposal of the product at the end of its life, treat it as Waste Electrical & Electronics Equipment (WEEE). Do not mix WEEE marked products with general household waste. Contact your supplier or local authority for recycling schemes in your area.
8. Dispose of electrochemical sensors for ParkSafe detectors in an environmentally safe manner. Alternatively, securely package and return the detectors to AGS for disposal.
9. Avoid incinerating electrochemical sensors as this may emit toxic fumes.

American Gas Safety LLC
www.americangassafety.com

Safety Information

General

- Ensure that this manual is read and understood before installing / operating / maintaining the equipment.
- The information contained within this manual should be referenced for typical installation and operation only.
- For site specific requirements that may deviate from the information in this guide – contact your supplier.
- If the equipment is used in a manner not specified by the manufacturer, the safety/protection provided by the equipment may be impaired.
- This device is designed for indoor operation only.
- It is recommended that this device be commissioned upon installation and serviced annually.
- This equipment is designed to detect carbon monoxide and nitrogen dioxide when ParkSafe detectors are used. Sold separately.
- It is NOT designed to detect smoke, fire or other hazards and should NOT be used as such.
- This device provides early warning of the presence of nitrogen dioxide or carbon monoxide when Parksafe

detectors are connected, usually before a healthy adult would experience symptoms.

- This early warning is possible provided your alarm is located, installed and maintained as described in this manual.
- This device requires a continual supply of electrical power – it will not work without power.
- This device should not be used to substitute proper installation, use and / or maintenance of fuel burning appliances including appropriate ventilation and exhaust systems.
- This device does not prevent nitrogen dioxide or carbon monoxide from occurring or accumulating.
- Actuation of your alarm indicates the presence of dangerous levels of NO2 or CO.
- Seek fresh air supply and contact your local gas emergency service should you suspect a gas leak.
- This device may not fully safeguard individuals with specific medical conditions.
- If in doubt, consult a doctor / physician.
- Your product should reach you in perfect condition, if you suspect it is damaged, contact your supplier.
- Concentrations of alcohol found in many products may damage, deteriorate or affect the gas sensing elements such as; wine; deodorants; stain removers and thinners. Other gases and substances to avoid are; corrosives (i.e. chlorine & hydrogen chloride);
- alkali metals; basic or acidic compounds; silicones; tetraethyl lead; halogens and halogenated compounds!

Information on waste disposal for consumers of electrical & electronic equipment.

When this product has reached the end of its life, treat as Waste Electrical & Electronics Equipment (WEEE). Any WEEE marked products must not be mixed with general household waste, but kept separate for the treatment, recovery and recycling of the materials used. Please contact your supplier or local authority for details of recycling schemes in your area.

At the end of their working life, electrochemical sensors for ParkSafe detectors should be disposed of in an environmentally safe manner. Alternatively, all detectors can be securely packaged and returned to AGS clearly marked for disposal.
Electrochemical sensors should not be incinerated as this may cause the cell to emit toxic fumes.

Warranty Statement

All products are engineered, designed and 100% quality tested in accordance with the latest internationally recognised standards under a Quality Management System that is certified to ISO 9001. The manufacturer warrants to the original consumer purchaser, that this product will be free of defects in material and workmanship for a period of three (3) years from date of purchase. The manufacturer's liability hereunder is limited to replacement of the product with repaired product at the discretion of the manufacture. This warranty is void if the product has been damaged by accident, unreasonable use, neglect, tampering or other causes not arising from defects in material or workmanship. This warranty extends to the original consumer purchaser of the product only. Any implied warranties arising out of this sale, including but not limited to the implied warranties of description, merchantability and intended operational purpose, are limited in duration to the above warranty period. In no event shall the manufacturer be liable for loss of use of this product or for any indirect, special, incidental or consequential damages, or costs, or expenses incurred by the consumer or any other user of this product, whether due to a breach of contract, negligence, strict liability in tort or otherwise. The manufacturer shall have no liability for any personal injury, property damage or any special, incidental, contingent or consequential damage of any kind resulting from gas leakage, fire or explosion. This warranty does not affect your statutory rights.
During the above warranty period, your product will be replaced with a comparable product if the defective product is returned together with proof of purchase date. The replacement product will be in warranty for the remainder of the original warranty period or for six months – whichever is the greatest.

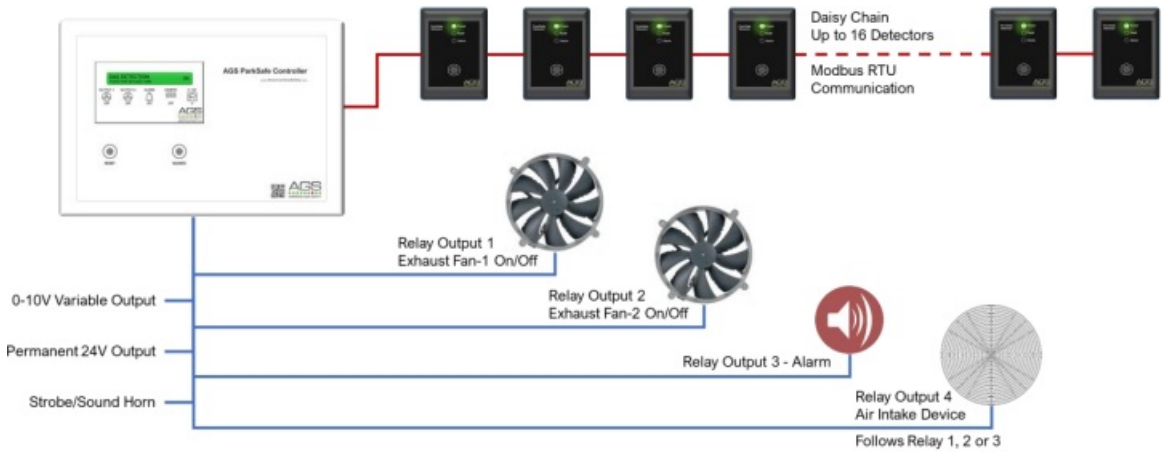
Installation

Introduction

- Refer to your ParkSafe Detector manual for important information regarding coverage, location and positioning including areas and conditions to avoid!
- Installation must be in accordance with the recognised standards of the appropriate authority in the country concerned!
- Access to the interior of the controller, when carrying out any work, must only be conducted by trained personnel!
- Before carrying out any work ensure local regulations and site procedures are followed!
- In parking structures, CO and NO2 are two of the most abundant airborne contaminants and poses significant safety concerns. The CO and NO2 levels must be controlled or ventilated when concentrations approach hazardous levels.
- The ParkSafe Controller is designed for installation into car parking facilities and enclosed garages. Paired with AGS ParkSafe Detectors (Nitrogen Dioxide and Carbon Monoxide) that will be linked via Modbus RTU protocol back to the controller and monitor the detectors in numbers up to 16 (per controller) and automatically control ventilation systems according to gas levels and an optional temperature level. The ParkSafe Controller monitoring system is capable of activating both the exhaust fan(s) and the air intake device(s) such as outside air louvers/dampers and make up air units
- The ParkSafe will make or break a dry contact internally on relay terminals [Output-1] and a second contact on [Output-2]. This is to have a live feed to the ventilation system wired through the contact so that the ParkSafe can activate ventilation systems; this can be either via a direct live feed or via a run signal. Another output relay will energise after [Output-2] has been active for an extended period. This is used for a link to a BMS or other external indication device. The ParkSafe controller also has a 0-10vdc output to allow the controller to drive VFD’s based on gas level outputs.

Typical Monitoring System

- The use of sound strobes are highly recommended!
- Consult local codes for the specific requirements!



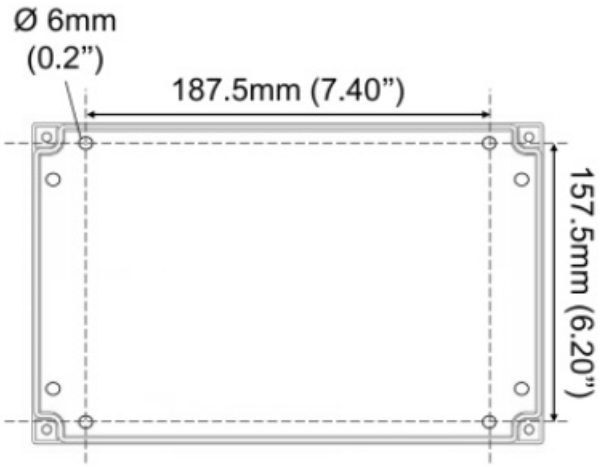
Addressable ParkSafe detectors are daisy-chained through a RS485 RTU communication protocol to the controller.

Typical ParkSafe Controller Location

- The ParkSafe controller must be located out of reach of the public.
- Preferably located inside, close to the motor control centre or in connecting offices.
- Place the controller in accordance with applicable regulations. Easy accessibility is recommended for both status observation and alarm purposes.

Mounting the ParkSafe Controller

Where cable glands are used for wire entry, use no bigger than 20mm (3/4”) separated by at least 20mm (1/2”)!
ParkSafe Detectors are grounded to limit effects of radio frequency interference!
Designed for surface mounting, it must be installed by a licensed, insured contractor.



Carefully remove the front cover from the unit by unscrewing the four M6 hex bolts located at each corner. To do this – use the socket wrench provided. Ensure the wall surface is solid and flat to prevent base distortion and mark the four 6mm (0.236”) screw holes located on the back of the enclosure to the wall. Use a suitable screw/bolt (M4x30min) and appropriate expanding plug to fix the back of the enclosure to the wall surface.
After executing the mounting and the electrical connections – replace the front cover and insert the security caps over the four M6 hex bolts.

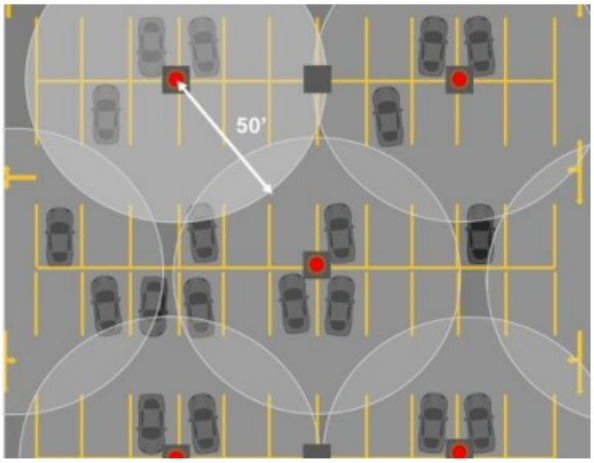
ParkSafe Detector Placement Plan

- The relative density of carbon monoxide compared to air of carbon monoxide is 0.957 (AIR =1). The carbon monoxide will disperse evenly in the air. The carbon monoxide monitors must be located as specified by your region’s building code. If not specified contact your local AGS representative.
- Detection of nitrogen dioxide is done where a significant quantity of diesel engines typically are located such as train stations, bus and truck maintenance garages, rapid transit authorities, car dealerships, ambulance bays, loading docks and diesel-powered vehicle parking structures.
- ParkSafe detectors should be mounted where a potential hazard of gas is most likely to be present. The following points should be noted when locating gas sensors. When locating detectors consider
    - The possible damage caused by natural events e.g. Rain or flooding.
    - Ease of access to the gas detector for functional testing and servicing.
    - How gas may behave due to natural or forced air currents.

The quantity of sensors is determined by the following rules of thumb:

1. The radius of coverage is 15.2 m (50 feet) per Detector or 2,310 sq.m (7,580sq.ft).

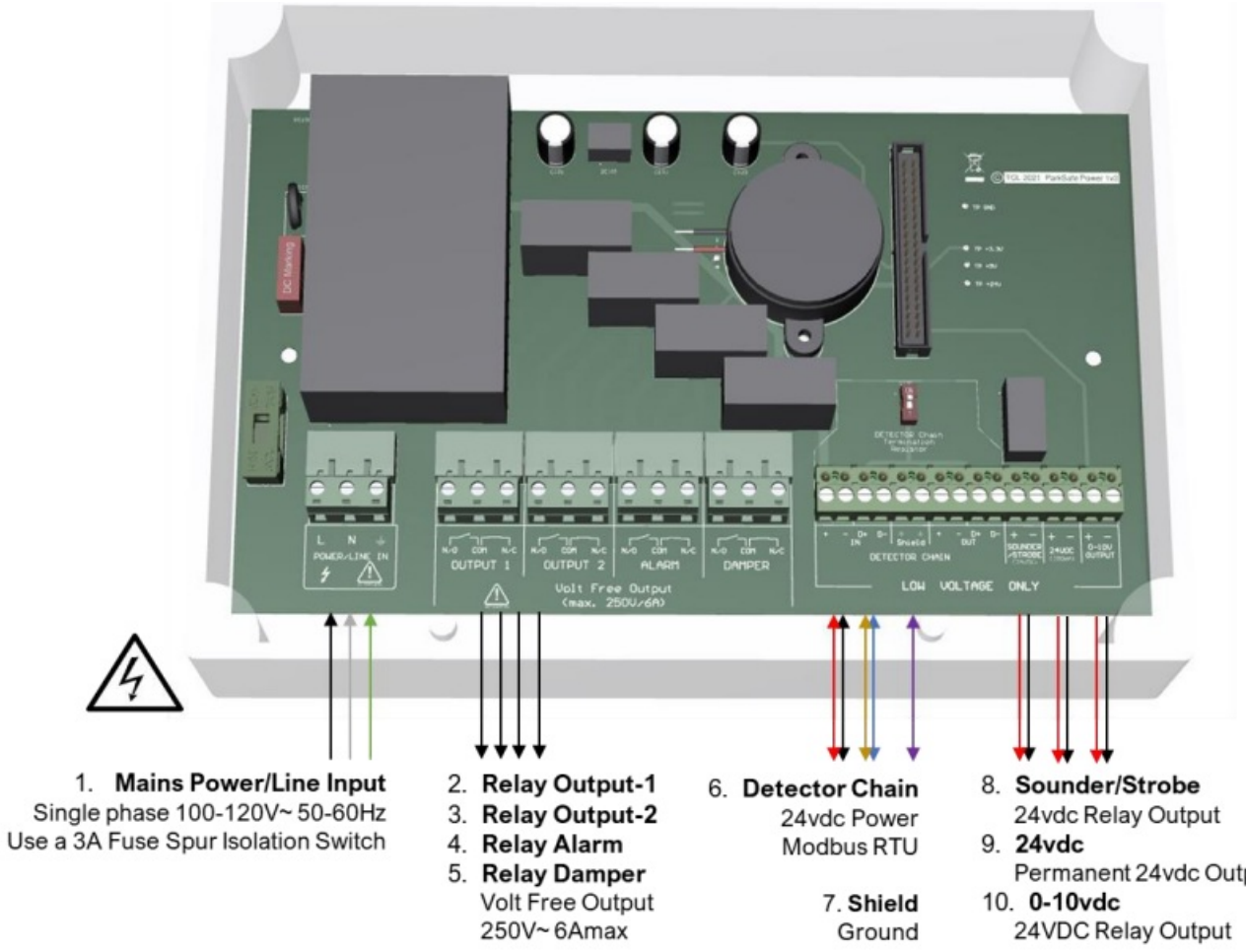
2. Use open interior support columns as much as possible to maximize the radius of coverage.
3. Each level of the parking structure must be totally covered without overlapping the coverage of the sensors.



If in doubt, contact your local AGS representative.

Electrical Connections

- Risk of Electric Shock!
- Access to the interior of the controller, when carrying out any work, must be conducted by a competent person!
- Where cable glands are used for wire entry, use no bigger than 20mm (3/4”) separated by at least 20mm (1/2”)! Use a 3A Fuse Spur isolation switch!
- Be careful when creating access for cables – Damage to circuit boards will void any warranty! Before carrying out any work ensure local regulations and site procedures are followed! Any damage attempting to remove the circuit board parts may void any warranty!
- Detectors must be grounded to limit the effects of EMC or Radio Frequency interference! For Modbus communications, a shielded cable is used!
- For field connections use wires suitable for at least 90°C (194°F)
- Do not use aluminium conductors!



Terminal Connections

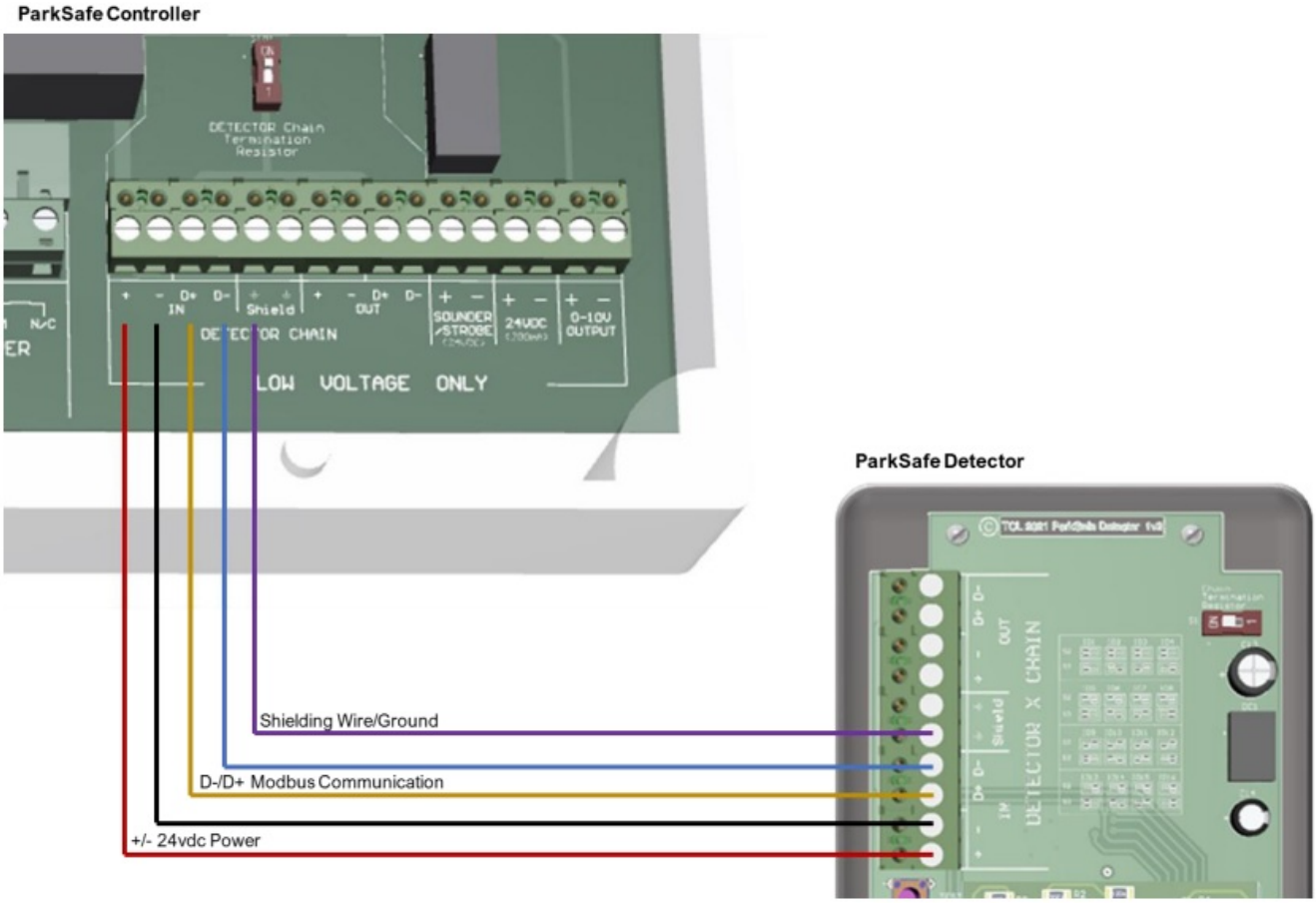
- If you are encountering noise or irregular problems with a Modbus link, the problem is likely related to grounding, incorrect shielding or wiring mains power next to Modbus wiring.
- For more information, refer to your ParkSafe detector manual.
- External wiring routed through the ‘volt free’ relays (Output 1 & 2, Alarm and Damper) require double insulated wiring for safety!

1. **POWER/ LINE IN.**
   The ParkSafe Controller requires a power supply of 100-120vac connected to the [POWER/LINE IN] connector using a 3A switched fused spur. When mains live power is connected to the controller, a red LED will illuminate on the front of the controller (AGS Logo)
2. **OUTPUT-1.**
   Switches when a ParkSafe Detector reaches ‘pre-alarm’ status. The [0-10v Output] will send 5v signal.
3. **OUTPUT-2.**
   Switches when a ParkSafe Detector reaches ‘alarm’ status. The [0-10v Output] will send a 10v signal.
4. **ALARM.**
   Switches following the [OUTPUT 2] relay when a ParkSafe Detector remains in alarm status.
   A delay time of 5,10,15,20 or 25 minutes is selectable in the system configuration settings.
5. **DAMPER.**
   Switches together with either [Output-1], [Output-2] or [Alarm] relays – selectable in the system configuration settings.

6. **DETECTOR CHAIN.**
   24vdc power and Modbus data connections to ParkSafe Detectors.
   Up to sixteen (16) ParkSafe detectors wire in series (daisy chain) up to approx. 500 yards per cable run from the controller depending on chain configuration and wire type/condition.
7. **SHEILD.**
   For Modbus communication, a shielded and twisted pair cable is used. The shielding can be of two types: braided [mesh of thin conducting wires] or foil (consisting of a thin sheet of metal covering the twisted wires).
   To ground detectors the shield connects to the dedicated [Shield] terminals.
8. **SOUNDER/ STROBE.**
   This relay output (24vdc) is for external sounder alarms/ strobe lighting and will activate on alarm.
9. **24VDC.**
   This is a permanent 24vdc power output for external auxiliary devices. Max output: 200mA.
10. **0-10V OUTPUT.**
    This output signal sends either zero or 2V under normal operating conditions – selectable in the settings menu.
    - 5V signal when [OUTPUT 1] relay switches.
    - 10V signal when [OUTPUT 2] relay switches.

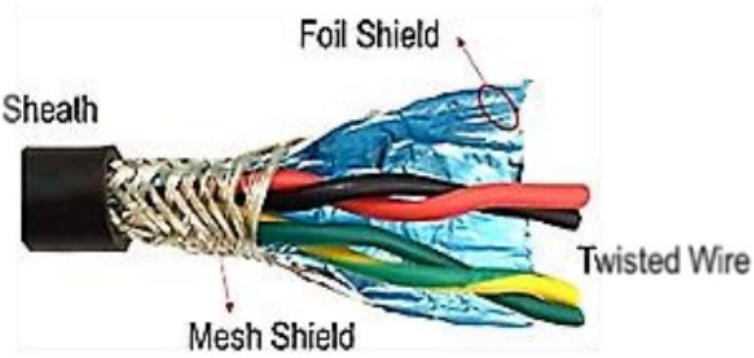
Wiring a ParkSafe Detector

- If you are encountering noise or irregular problems with a Modbus link, the problem is likely related to grounding, incorrect shielding or wiring mains power next to Modbus wiring.
- Reversing the [D+] and [D-] connections of any device can lead to the whole system to stop working owing to reverse polarity found on the terminals.
- The detector must be earthed/grounded for electrical safety and limit the effects of R/F & EMC interference!
- Ensure the [120-ohm chain termination resistor] switch on at each end of a cable run to limit noise!
- Detectors connect to either [IN] or [OUT] terminal sets!
- Consider the 24vdc power voltage drop due to cable resistance when connecting multiple detectors over long distances!



Power and Modbus data are wired between detectors with the first connected to a ParkSafe controller [Detector Chain] terminal. If using a shielded wire (recommended) then connect the shield to [Shield Wire] dedicated terminals.

For Modbus communications, a shielded cable is used. The shielding can be of 2 types: braided [mesh of thin conducting wires] or foil (consisting of a thin sheet of metal covering the twisted wires).
One example of such cable is BELDEN 3082A.



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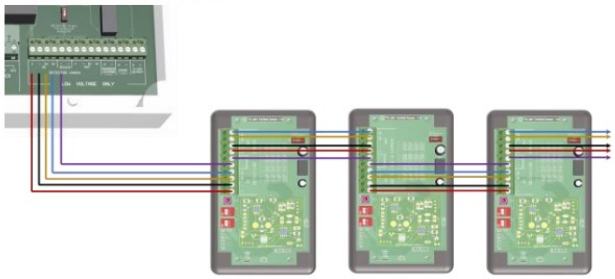
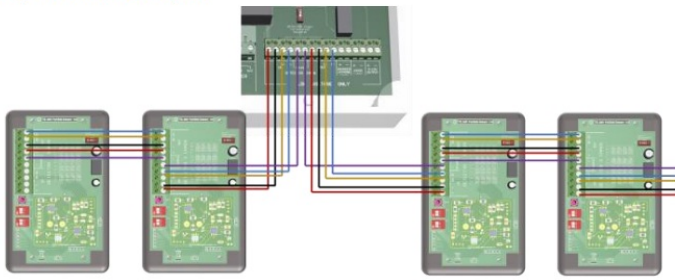
- Ensure the [120-ohm chain termination resistor] switch on at each end of a cable run to limit noise!

- Detectors connect to either [IN] or [OUT] terminal sets!
- Consider the 24vdc power voltage drop due to cable resistance when connecting multiple detectors over long distances!
- Up to sixteen (16) ParkSafe Detectors can be connected, chained in a parallel ‘daisy chain’ method up to approx. 545 yards from the controller depending on chain configuration, wire type and condition. Any other way may cause issues or damage to the overall system. It is recommended that the cable of same color should be used to connect all [D+] terminals together and similarly cable of same color is used to connect all [D-] terminals together.

Single chain example



Split chain example



Documents / Resources

	AMERICAN GAS SAFETY CO/NO2 Gas Detection For Enclosed Parking Structures ParkSafe Controller [pdf] User Manual CONO2 Gas Detection For Enclosed Parking Structures ParkSafe Controller, CONO2, Gas Detection For Enclosed Parking Structures ParkSafe Controller, For Enclosed Parking Structures ParkSafe Controller, Enclosed Parking Structures ParkSafe Controller, Parking Structures ParkSafe Controller, Structures ParkSafe Controller, ParkSafe Controller

References

- American Gas Safety | Gas Detection | Control Systems | Solenoid Valves