Laboratory Gas Pressure Proving System with CO_2

GPPS-evo

MODERN PLANT

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GPPS-evo

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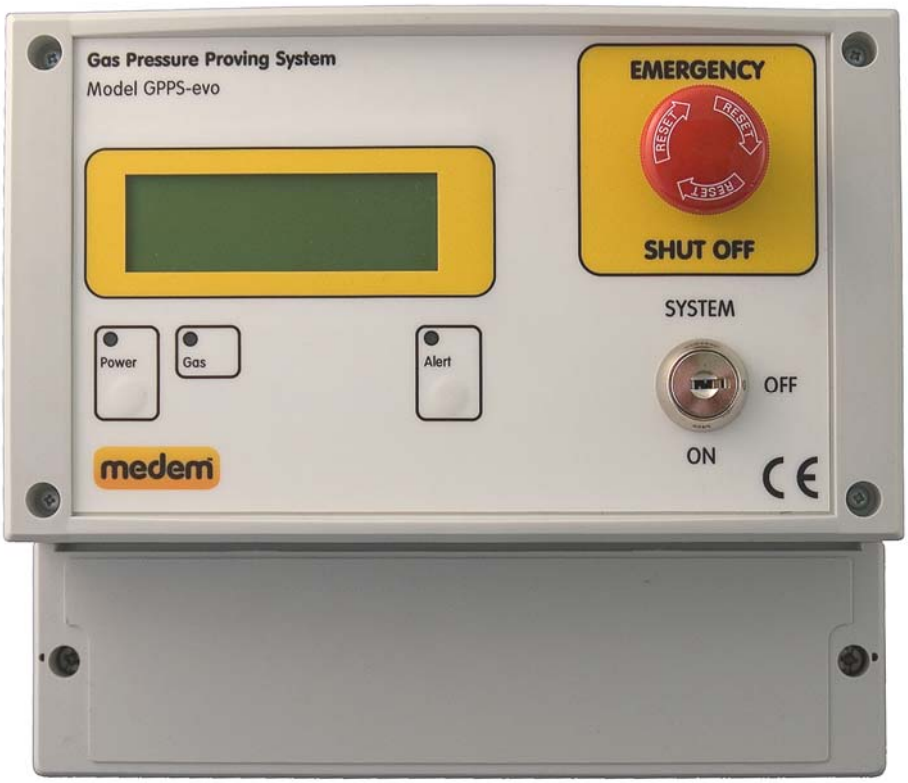


The GPPS-evo is a gas pressure proving control panel with the ability to monitor carbon dioxide levels when fitted with a Medem CO_2 detector.

It utilises Medem's patented differential proving method and is designed for use where gas taps open to atmosphere, such as in a school laboratory.

The LCD display ensures that the system is easy to use with clear system status, It will advise the teacher when the CO_2 level is rising and that the ventilation needs increasing.

The panel is fitted with auto stop shut off to isolate the gas at the end of the day.
This is a useful feature in education buildings as it stops unauthorised use of the gas out of hours.

Gas pressures and carbon dioxide levels can be displayed on the LCD by pressing the "Power" or "Alert" LED on the fascia.

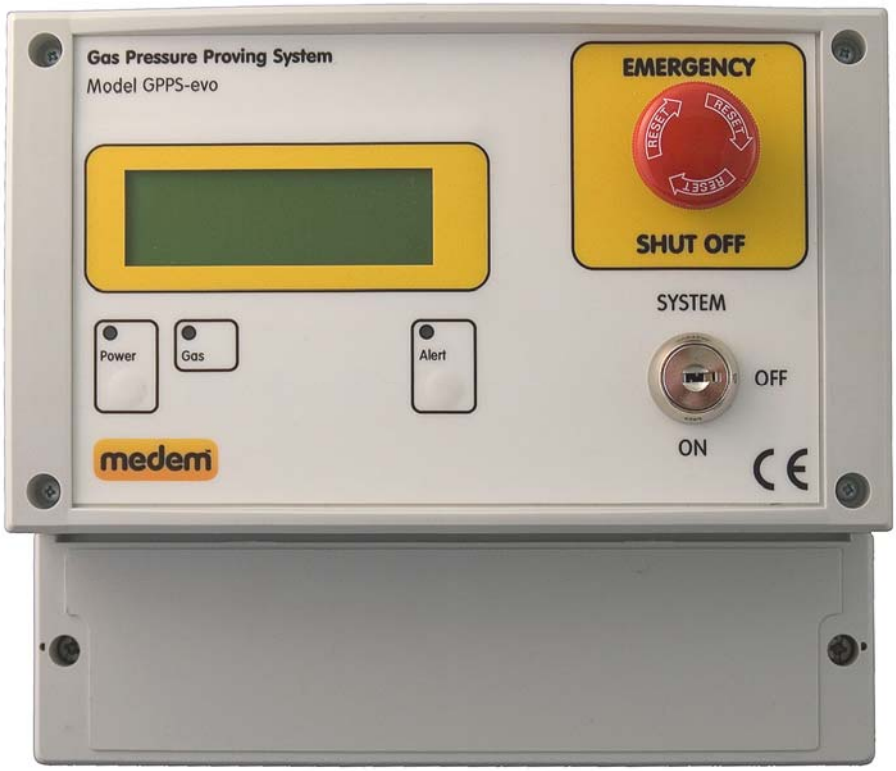
Medem (UK) Limited
L&M Business Park , Norman Road
Altrincham, Cheshire,
WA14 4ES

Cert No. 10213

Tel: +44 (0) 161 233 0600
Fax:+44 (0) 161 233 0601
Website: www.medem.co.uk
e-mail:sales@medem.co.uk

GPPS-evo

Design Features



- **Extremely simple to use,** LCD panels tells the operator its status and what to do.
- **Carbon Dioxide,** level monitoring to meet the latest standards.
- **Gas pressure measuring,** true differential pressure across the solenoid valve.
- **No nuisance tripping,** of the gas supply as can happen with mechanical switches.
- **An engineer,** as guidance, can see gas & any valve seat gas leakages on the LCD
- **All panels,** designed built and supported by Medem UK
- **Compact design,** H183 mm, W212 mm, D97 mm.
- **Easy to install,** no setting of mechanical pressure switches for each site.
- **5 year warranty,** extended to 10 years where installed or commissioned by Medem UK
- **Carbon Dioxide,** monitoring advises the teacher to increase ventilation

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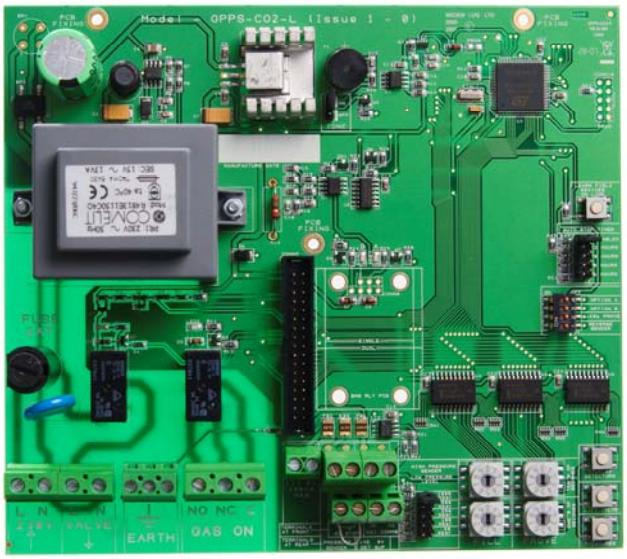

Panel Function

This system is designed for use within educational establishments where a downstream integrity check and carbon dioxide monitoring is required. CO_2 monitoring has been incorporated as a result of the department of education and Skills Building Bulletin 101 and IGEM UP11:Edition 2 which set down the allowable levels of CO_2.
Copies if the relevant sections of these standards are available on the Medem website.

The GPPS-evo is designed to protect people and property by means of testing for leaking gas each time the system is switched on.
Whether gas is escaping from an open gas tap, an appliance that has been left on or by leaking pipe work, the system will not open the gas solenoid valve should a leak be detected.

True differential gas pressure proving (patented by Medem UK) eliminates nuisance tripping of the gas supply which can occur with mechanical pressure switches and other methods that only monitor downstream of the control valve.
The GPPS-evo is **self diagnosing** in that it displays on the **LCD screen** the current status of the system.
The panel offers solutions and advice instead of the normal rows of flashing LEDS that can often be confusing to the user. In the event that the CO_2levels start to rise towards the maximum allowed in the classroom the LCD will advise that the ventilation needs to be increased. If the level continues to rise then the gas will be isolated.

Engineer functions

By pressing the "Power" or the "Alert" button on the panel the carbon dioxide or gas pressure level will be displayed on the LCD. A solenoid valve let by test can be carried out from the panel with any downstream pressure drops seen on the LCD. With a manual lift of the valve possible from an internal button.

Low incoming gas supply will be dynamically monitored ensuring safe isolation of the gas if the incoming gas pressure drops below 12mbar for 10 seconds so protecting against extinguished Bunsen burners.

It is also possible to identify a problem governor from the panel with fluctuating gas pressures displayed and an isolation should the incoming gas pressure reach 75mbar or higher.

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GPPS-evo

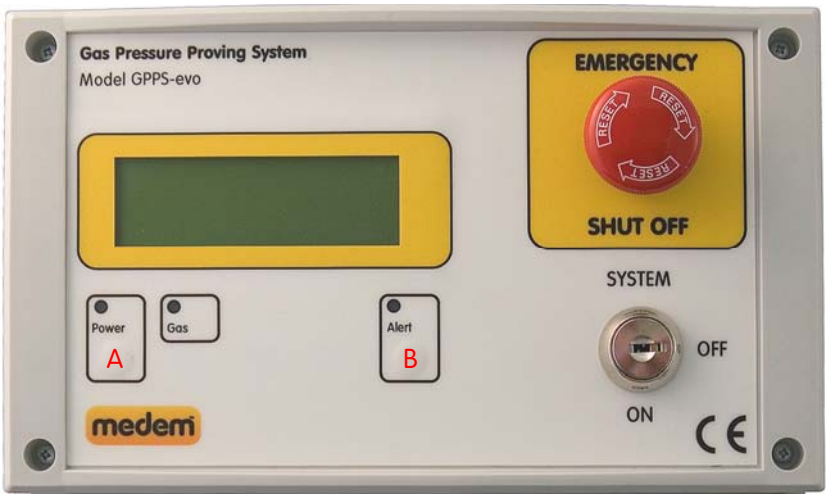
Technical data sheet

The GPPS-evo comprises of a control panel and a pressure sender unit Up to four carbon dioxide detectors can be connected to control a 230volt gas solenoid valve.
The panel housing is an ABS enclosure, rated IP65, measuring 183mm high, 212mm wide & 97mm deep.
The pressure sender unit and the gas solenoid valve are supplied with a fixing kit for connection on site.
The pressure sender unit is wired to the control panel using single pair extra low voltage wire.
The connection terminals are marked "A & B" on both the sender unit and control panel connections.
The carbon dioxide detector (AD-MED-CO2) are wired back to the panel using four core extra low voltage cable marked (MB, MA, +VE, 0V)
The 230volt mains supply to the panel should be from a 3amp fused switch.
The solenoid valve is connected to the terminals marked "Valve" on the panel.
The connections marked "EM STOP" are provided in order that extra emergency stops can be operated by the panel. Wiring of emergency stop buttons should be series normally closed, low voltage.
Shielded or mushroom type stop buttons are available from Medem UK.

At the time of installation adjustments to the system can be made to suit the individual site, these include: Auto stop timer, alarm sounder on/off, fill time and prove time for pressure proving. All are factory set for a typical installation.

Engineer functions, a let by and a dynamic pressure loss reading can be activated by the engineer using the push buttons on the circuit board or facia "Power" button (A). The Gas pressure readouts on the LCD indicating the pressure on both sides of the valve. The carbon dioxide levels can be seen by pressing the "Alert" button (B) on the panel facia.

The AD-MED-CO2. Up to four carbon dioxide detectors can be connected to the panel; by pressing the "Alert" box on the panel each connected sensors reading can be seen on the LCD. The sensors should be function checked every 6-12 months although they have a design life of 10 years. If more than one detector is fitted then they can be daisy chain connected.



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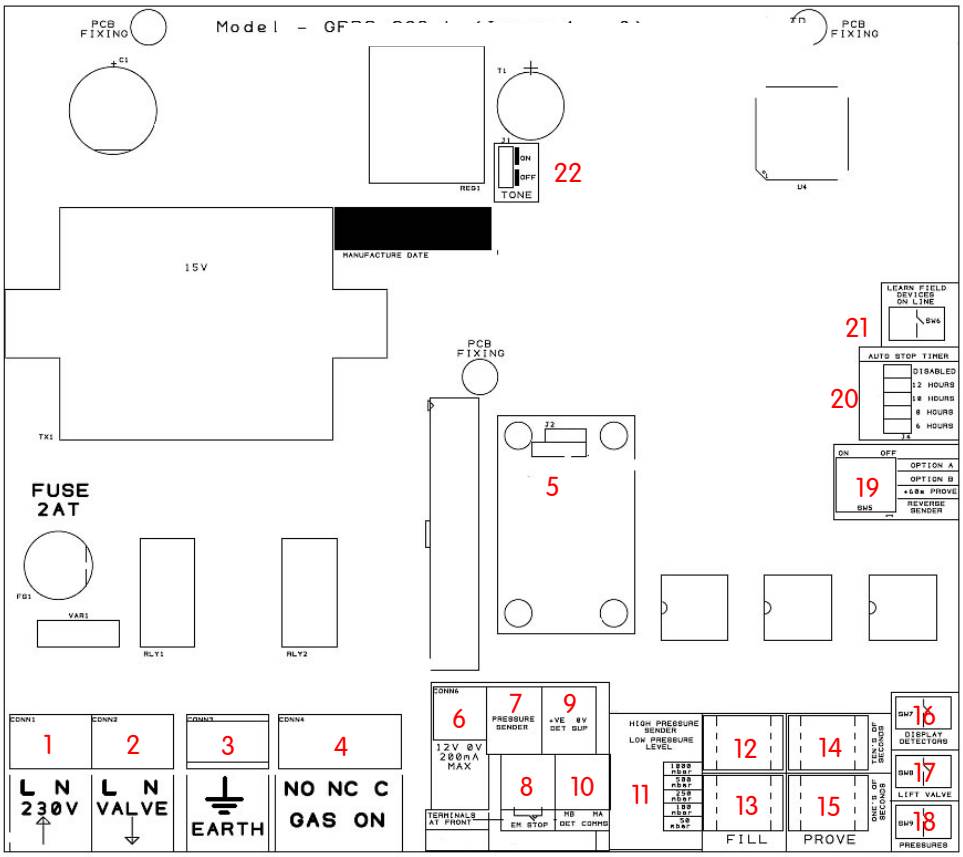

Power at 230 volts from a 3amp fused spur

Connections to panel: marked on board

1. Live & Neutral 230 volts supply from 3amp switched fuse spur
2. 230 volts out to gas solenoid valve
3. Earth connection terminals
4. Mains rated potential free relay which changes states on "Gas ON"
5. Optional BMS to indicate EM stop, or CO2 alarm (Not fitted by default - must be requested at point of order)
6. 12 volt power
7. Pressure sender unit SELV and comm's both through "A" & "B" terminals (2 wire) **MUST BE FITTED**
8. Emergency Stop terminal SELV (requires a N/C contact).
9. Power connections for CO2 detectors.
10. Comms connections for CO2 detectors
11. Low pressure trip level - for use with High pressure sender units 1 bar>
12. Fill time - "Tens of Seconds"
13. Fill time - "One's of Seconds"
14. Prove time - "Tens of Seconds"
15. Prove time - "One's of Seconds"
16. Diagnostic Function: Display detector setting on the LCD - Same function as display button B
17. Diagnostic Function: Lift valve - applies 230volts to power open the gas valve.
18. Diagnostic Function: Displays inlet and outlet gas pressure at the gas valve. - Same function as display button A
19. OptA, Doesn't isolate gas supply on high CO2 alert.
    OptB, Allow BMS relay (5) to change state on high CO2 only (i.e. doesn't change on low CO2)
    +60seconds - Adds an additional 60 seconds to the prove time for large pipe work installations
    Reverse sender - Allows the inlet/outlet signals to be switched (use under guidance from Medem)
20. Auto Stop setting (default 6 hours)
21. Learn field device button, press once only when all detectors are connected and powered (verify with button 16).
22. Internal tone - enable/disable.

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GPPS-evo Operating and Maintenance

Operation

With the system switch in the off position; the green power LED should be lit and the LCD displaying the message "Gas Proving System" all other LED should be off .

Normal operating procedure.

- Switch on GPPS-evo and wait for pressure proving cycle to complete.
- Gas should now be available for use.
- To close down.
- Close all gas taps and outlets.
- Switch off GPPS-evo panel.

If at any time there is an alert or the sounder sounds follow the on screen instructions, further information can be found below.

- The CO2 level can be viewed by pressing the button under the "Alert" LED on the panel facia.
- The gas pressures can be viewed by pressing the button under the "Power" LED on the panel facia.

Maintenance and testing

The fill time should be set at installation long enough to ensure the downstream pipe work comes up to pressure.
(factory default 5 seconds)
The prove time should be set at installation to find the smallest possible leak.
(factory default 50 seconds)

To test all features the system.

Isolate the incoming gas supply to the laboratory; turn on the GPPS-evo:
The system will indicate an alarm state and a message relating to insufficient gas pressure will be displayed and the gas will remain isolated.

Re-establish the gas supply and open a gas tap so that a demand is being made on the gas supply; turn on the GPPS-evo:
The system will indicate an alarm state and a message relating to close all gas appliances will be displayed and the gas will remain isolated.

Close the gas tap and re-test by turning the GPPS-evo on again
The system should successfully complete its gas tightness test and the LCD message will display "Gas available for use"
If the gas test still fails and you have checked that all outlets are closed then there is a gas leak on the pipe work which will require inspecting by a qualified technician i.e. Gas safe registered engineer

With the gas proven and available for use breathe onto the installed CO2 sensor:
The system will indicate a rise in CO2 and advise the operator to increase any available ventilation. If this is not done and a level of CO2 remains present at the sensor the panel will go into a high alarm condition and isolate the gas supply.
The systems are currently set to 2800ppm low alarm and 5000ppm high alarm as per HSE regulations. Although a target of 1500ppm daily average should be met as per BB101.

Continued…

Medem (UK) Limited
Project House, 19 Dallimore Road,
Roundthorn Industrial Estate,
Manchester, M23 9NX

Tel:: +44 (0) 161 233 0600
Fax::+44 (0) 161 233 0601
Website: www.medem.co.uk
e-mail:sales@medem.co.uk

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All of these procedures are dynamically carried out by the GPPS-evo system each and every time it is switched on. The system should only be turned on during lessons and switched off when the classroom is not in use so the gas supply remains isolated.

There should be a manual operational test on any installed Emergency stop buttons, which when operated will isolate the gas supply and remain isolated until a manual reset is completed.

A yearly test and inspection of the solenoid valve and let by test should be carried out by a qualified technician i.e. Gas safe registered engineer

The detectors are designed to have very low drift so recalibration on site is not required but should be replaced every 5 years in a clean environment but consideration should be given to replacement after 3 years if contamination is a possibility. A functionality test should be carried out every 6 months.

The system should be switched off using the on/off switch at the end of a lesson/service so a new pressure test can be completed ensuring there are no leaking or open appliances

Due to the Medem GPPS-evo being a digital system that checks its self every time it is switched on there are no recalibration requirements necessary

The system and fans should be switched off at the end of a day or service if no one will be remaining in the room so the gas supply will remain isolated.

If at any time there is an alert or the sounder sounds follow the on screen instructions, further information can be found both in the installation instructions or by contacting Medem (UK) Ltd.

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Important

Please read this sheet as it contains important information

Before commencing installation please familiarise yourself to the equipment by reading the comprehensive installation instructions. If in doubt then please call 0161 233 0600. Out of hours please call 07894 684080 or 07843 355163.

It is a statutory requirement that this safety system is installed and commissioned to the satisfaction of the manufacturer.

A commissioning certificate must be issued to the end user along with instructions for the operation of the equipment.

As the Manufacturer Medem UK should commission this safety system whereupon a commissioning report will be forwarded to the installing agent who should provide a copy to the end user.

At the point of our commissioning an individual serial number will be attached to the system along with a 24 help line number. Photos and all relevant information for the installation will then be stored on the Medem site database to be accessed in the event of a call on the 24 hour help line. The warranty period for the panel and sender unit will then be extended to Ten years.

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Gas pressure proving system with CO2 detection

The GPPS-Evo is a gas pressure proving system designed to ensure that there are no gas leaks downstream of the control valve at switch on. The system when installed with a AD-MED-CO2 sensor will monitor the atmosphere for CO_2. The system comprises of a mains powered panel capable of operating up to four CO_2 sensors and a pressure sender unit. The sensors are pre-calibrated by Medem (UK) Ltd such that they only require to be addressed then connected to the panel and functionally tested.

The system carries out a downstream integrity check on the supply line and continually checks that the incoming gas pressure is sufficient. It also monitors the carbon dioxide level to ensure that the HSE set levels are not exceeded.

Should the carbon dioxide level rise above 2800ppm the panel LCD will advise the staff to "increase ventilation". Should the maximum allowed level of carbon dioxide (5000ppm) be reached the system will isolate the gas (after 45 seconds) and advise the staff to ventilate the room.

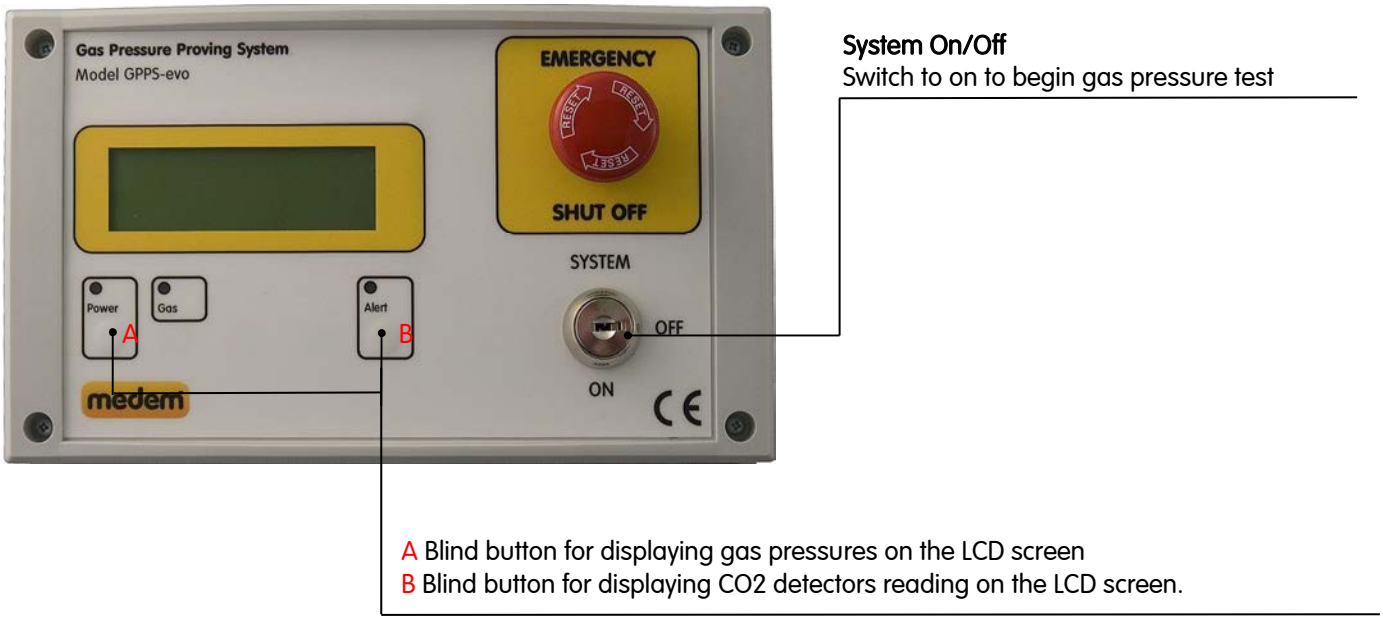
Gas pressures and carbon dioxide levels can be displayed on the LCD by pressing the "gas on" or "alert" LED on the fascia.

Control Panel *the front of the panel has the following controls and indications:*

Emergency stop button
On/off switch
Blind buttons A and B

LED indications:

Power On - green
Gas On - red……...**blind button for displaying gas pressures on the LCD screen.**
Alert – yellow….**blind button for displaying connected CO2 detectors on the LCD screen**

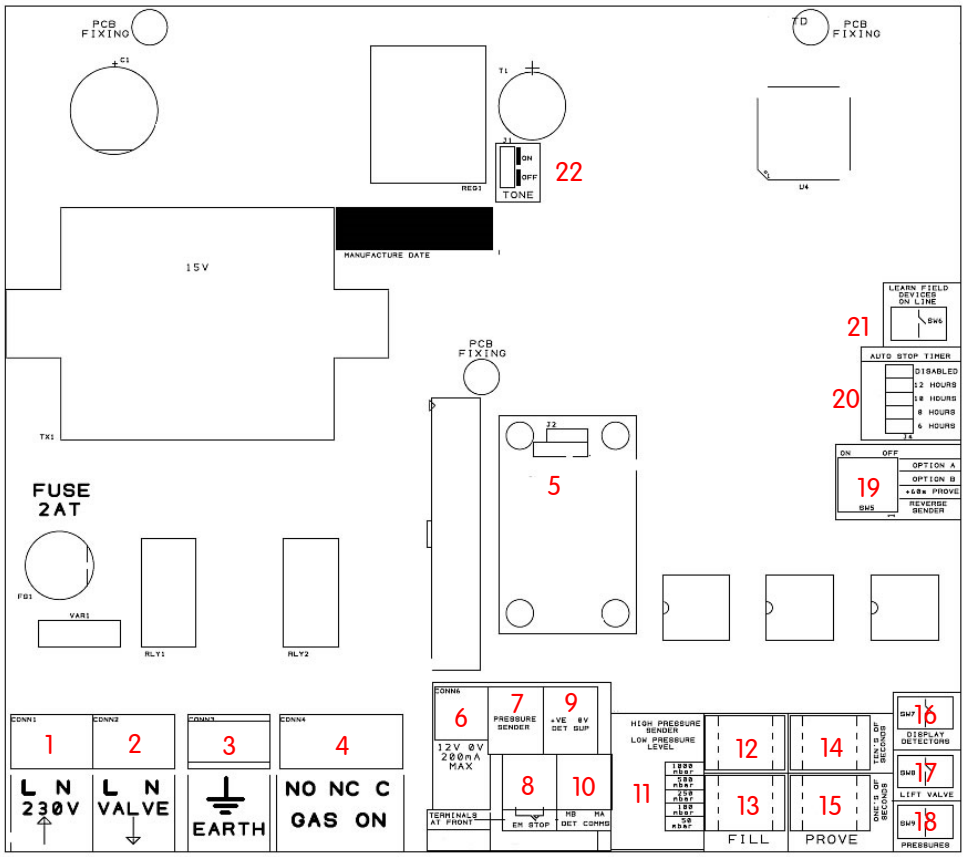


Other points to note
The maximum cable length between a detector and the control panel should not exceed 100 metres, If the distance between the main panel and the detectors is greater than 20metres 1mm cable should be used on the +VE, 0v terminals.

Pressure Sender Unit Mounting. This has an inlet and an outlet port (1/4 inch NPT). The inlet must be connected to the inlet test point on the solenoid valve (see fitting kit page) and the outlet port after the solenoid valve typically using 8mm OD copper pipe. Use the appropriate Medem fitting kit to fit the control valve size. The pressure sender is connected to the control panel with low voltage two core cable using the terminal marked A & B. **NOTE: This is low voltage and should be segregated from mains wiring.**

GPPS-evo

Main features

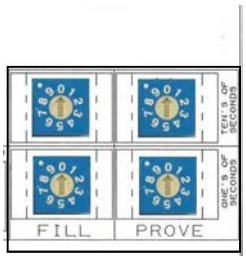


Power at 230 volts from a 3amp fused spur

Connections to panel: marked on board

1. Live & Neutral 230 volts supply from 3amp switched fuse spur
2. 230 volts out to gas solenoid valve
3. Earth connection terminals
4. Mains rated potential free relay which changes states on "Gas ON"
5. Optional BMS to indicate EM stop (Not fitted by default - must be requested at point of order)
6. 12 volt power
7. Pressure sender unit SELV and comm's both through "A" & "B" terminals (2 wire) **MUST BE FITTED**
8. Emergency Stop terminal SELV (requires a N/C contact).
9. Power connections for CO2 detectors.
10. Comms connections for CO2 detectors
11. Low pressure trip level - for use with High pressure sender units 1 bar>
12. Fill time - "Tens of Seconds"
13. Fill time - "One's of Seconds"
14. Prove time - "Tens of Seconds"
15. Prove time - "One's of Seconds"
16. Diagnostic Function: Display detector setting on the LCD - Same function as display button B
17. Diagnostic Function: Lift valve - applies 230volts to power open the gas valve.
18. Diagnostic Function: Displays inlet and outlet gas pressure at the gas valve.
19. OptA, Doesn't isolate gas supply on high CO2 alert.
    OptB, Allow BMS relay (5) to change state on high CO2 only (i.e. doesn't change on low CO2)
    +60seconds - Adds an additional 60 seconds to the prove time for large pipe work installations
    Reverse sender - Allows the inlet/outlet signals to be switched (use under guidance from Medem)
20. Auto Stop setting (default 6 hours)
21. Learn field device button, press once only when all detectors are connected and powered (verify with button 16).
22. Internal tone - enable/disable.

5. **BMS Relay PCB.** For connection to a BMS to indicate, Low CO2 alert. Max switching 48 volts 1 amp (not fitted by default)
(Factory fit, must be fitted at point of order)
Switch OptB (19) Allow this to change state to High CO2 alert



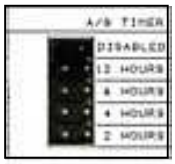
12 14 **Gas Fill Time.** The Fill Time should be set such that there is sufficient time to fill an empty pipe work system to full / normal pressure while ensuring a minimum escape of gas where a leak exists.

13 15 **Gas Prove Time.** This should be set such that the smallest leak can be detected. This time can be set up to a maximum of 99 seconds. Increasing this time effectively makes the system more sensitive to gas leaks. (Factory default setting is 50 seconds). An extra 60 seconds prove time can be added onto the 99 seconds by adjusting the DIP switch under the options bank, see No 19.

16. Display detectors. Pressing and holding this button will display the currently connected and learnt detectors on the LCD screen, it will show the ID and the state "Ok", "Pre-alarm" and "High alarm". The same function can be preformed by pressing display "blind button B".

17. Diagnostic Function: Lift valve - applies 230volts to power open the gas valve. This allows you to manually pressurise upstream of the valve.

18. Diagnostic Function: This will display both the inlet and outlet gas pressure at the gas valve on the LCD screen. This allows a visual indication of the gas tightness of the installation as well as an indication of the solenoid function. The same action can be preformed by pressing display "blind button A".



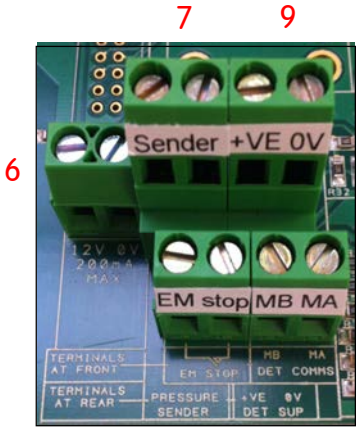
20. The auto-stop timer function allows the system to be set to turn the gas off after a pre-determined period of time. This is to help ensure the gas can not be left on and available while unattended i.e. over night, or between lessons (default setting is 6 hrs)

21. Learn Field devices
Any gas detectors connected to the system will require "learning". First ensure all detectors are set to a unique ID address using the selector switch on the detectors themselves (address's 1 to 4 only). Having addressed each detector press the learn field devices button (21), the system will scan and store any connected detectors. To verify that all detectors have

Blind buttons
For easy access when setting up and telephone support there are two blind buttons on the front panel behind the label.

A: Display detectors, see button 16.

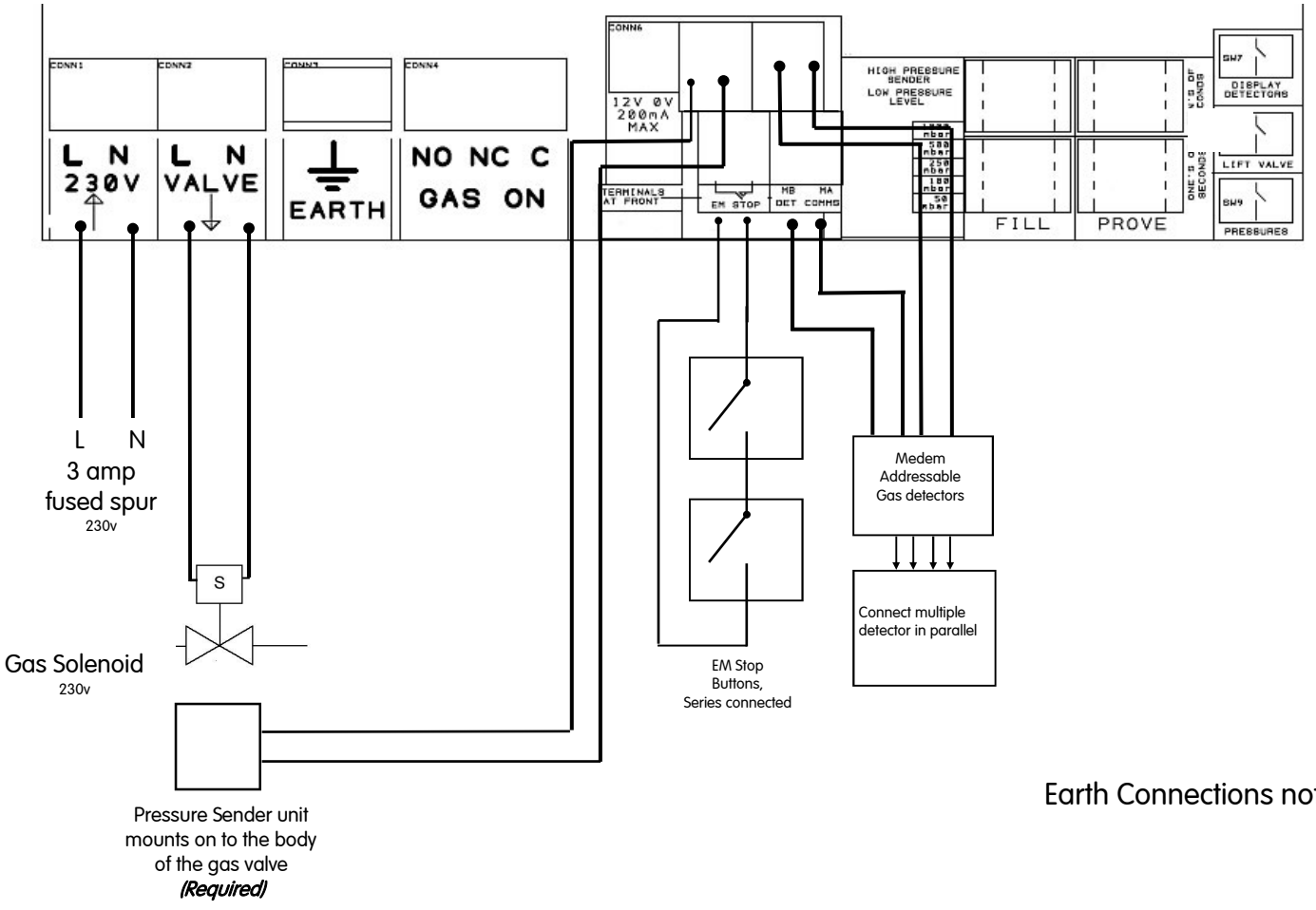
B: Display gas pressures, see button 18.



Detector Terminals

6. 12 volt: A 12 volt supply terminal for use with the BMS (Max load 200mA)
7. Sender : Two wire connection between the main panel and sender unit SELV and comm's both through "A" & "B" terminals (2 wire) **MUST BE FITTED**
8. Emergency Stop terminal (requires a N/C contact). For multiple stop buttons wire in series, a fire panel can also be connected here.
9. +VE & Ov: Power connections for CO2 detectors.
10. MB & MA: Communications connections for CO2 detectors

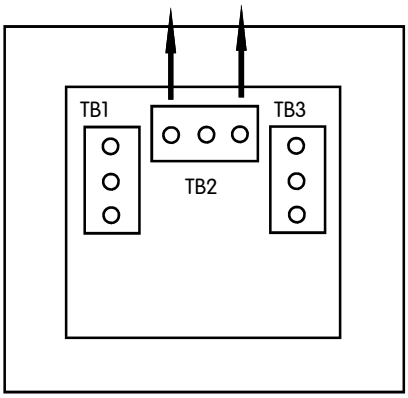
Schematic



Earth Connections not shown

To EM Stop connections in

Single Switch

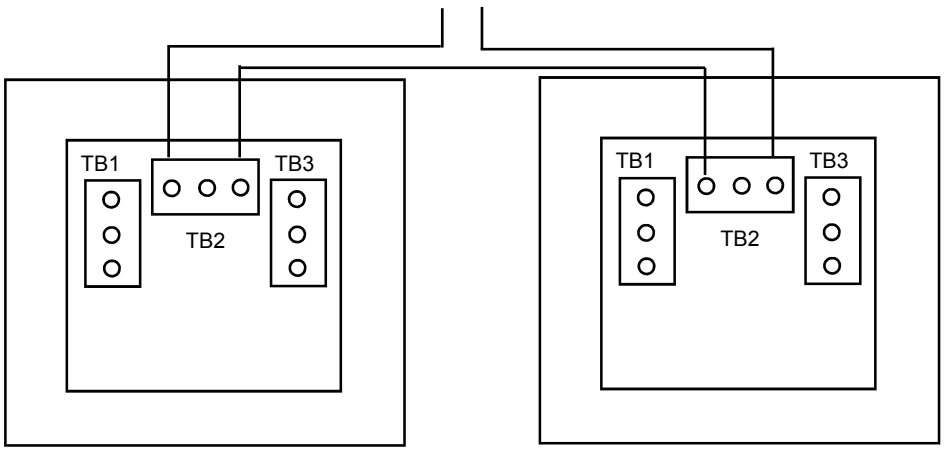


Use terminals TB2 A and TB2 C

To EM Stop connections in the panel

Multiple Switches

Wire in series



Use terminals TB2 A and TB2 C

Use terminals TB2 A and TB2 C

Remote stop buttons can be connected to the panel terminal marked as "EM STOP" (number 6). The remote buttons must be wired as above in order to provide a "closed contact" for the control panel.

Detector Location

Detector location will vary dependant on the individual characteristics of the target gas that is being monitored for. The descriptions below describe the position for each detector after considering these characteristics.

Natural Gas
Natural gas detectors should be mounted at high level on a wall approximately 150mm from the ceiling height and avoiding corners and potential dead air areas.

Natural gas detectors should not be mounted below the height of the top of a doorway for example. This is because as the gas is slightly lighter than air it will rise filling the room from the ceiling down and will spill through the top of a door opening into the next room. If the detectors are mounted below this height then it will take longer the gas to reach the detector.

LPG
LPG gas is heavier than air so detectors need to be mounted at low level 100mm from the floor, consideration should be given to any potential mopping or wet floor height.

Carbon Monoxide
Carbon Monoxide is similarly weighted to air so detectors should be mounted between 1 to 2 meters from the floor.

Carbon Dioxide
Classroom Carbon Dioxide detectors under guidance from IGEM/UP11/Edition2 should be mounted at a seated head height. However following onsite experience this mounting height can make detectors susceptible to false readings due to direct breath contact. We would suggest following the guidance for mounting as per a commercial kitchen to reduce the potential for false alarm readings.

Commercial kitchen Carbon Dioxide detectors should be installed so they monitor the general level of CO2 within the cooking area. They should be mounted above standing head height and between 1m and 3m from the cooking line. Care should be taken so they are not located close to the edge of a canopy or in direct flow of the supply or extract ventilation.

For additional information or guidance on site specific requirements please don't hesitate to contact us.

Detector Testing

Any installed gas detector can be tested by allowing a small amount of the target gas onto the detector head until a change of state is registered on the control panel.

If the level of gas applied is of the set low alarm level, the LED on the detector will change from a solid green to a flashing red. An LED* or LCD* message indicating a low level alarm detection combined with an audible alarm on the panel will begin.

If the level of gas drops below the set low alarm level the detector LED will return to a solid green and the panels audible alarm and LED* or LCD* message will clear.

Should an emergency shut-off valve be connected to the panel this will remain open during a low alarm level detection.

If the level of gas applied is of the high alarm level or above, the LED on the detector will change from a solid green to a solid red. An LED* or LCD* message indicating a high level alarm detected combined with an audible alarm on the panel will begin.

Should an emergency shut-off valve be connected to the panel this will automatically close.

Once the level of gas drops below the high alarm level the audible alarm will continue and the high alarm LED* or LCD* message will remain.

The valve cannot be reinstated until the gases have been cleared and the control panel reset.

**LED, LCD or both visual outputs will change dependant on the model of the control panel connected.*

GPPS-evo Checklist

It is essential that the installation of the GPPS-Evo is carried out in the order given below to ensure the correct operation of the system.

This guide, when completed, should be posted to Medem UK in order that the warranty period can be activated.

Site Name

Installing Company

Engineers Name

Date Completed

Return one copy of this sheet to the address below:

Modern Plant Limited,
Otter House, Naas Road, Clondalkin, Dublin 22
Tel: 00353 1 461 4300
E: sales @ modernplant.ie, W: www.modernplant.ie

With the panel fitted to the wall the following steps should be followed.

1. Connect the control valve twin & earth to the marked terminals Gas valve.
2. Connect BMS, beacons, sounders etc to the relay outputs.
3. Connect the pressure sender unit to the marked terminals A & B.
4. Connect any additional EM stop buttons and thermal links in series to the terminals marked “EM stop”.
5. Each detector has a address switch and each switch should be set to a different number “1 - 4”. Then connect the gas detectors to terminals marked “detectors” on the panel. Detectors can be wired “Daisy chain”.
6. At this point check that the sender unit has been fitted to the control valve and that gas is available.
7. Connect the 3 amp fused spur 240 volt supply to marked terminals.
8. Once power is connected to the panel the detectors will flash the green LEDs for 90 seconds after which the LEDs will be on continuously.
9. Press the “learn field button” this is on the main circuit board on the right hand side, just over half way up the board. Pressing this once allows the panel to learn how many detectors are fitted. **This stage must be completed even if no gas sensors are fitted.**
10. Press hold the “display detectors” button whilst checking on the LCD display that all the detectors have been recognised by the panel. A recognised detector will appear as “CO2” in the second section of each row. Count the number of “seen” Detectors on screen and ensure total is the same as the number of detectors installed. NM in the third column means that number is not monitored.
11. At this point turn the on/off switch to the on position and the panel will test to ensure gas tightness and provided there are no leaks the panel will allow gas and the gas on LED will light. Should the gas test fail then press the pressure button to see the gas pressure in mbars on both sides of the valve. Thus you can see the pressure drop downstream provided the valve is closed.
12. Check that the panel can see the smallest allowable pressure drop if it does not then increase the proving time by adjusting the blue rotary dials on the circuit board.

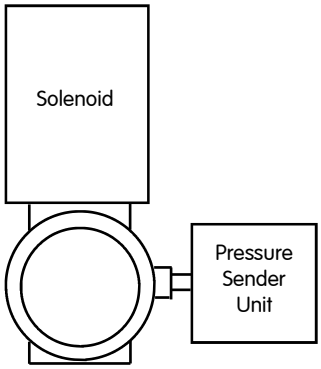
Please do not hesitate to call for advice on the following number:
00353 1 461 4300 office hours

Tick as each step is completed	
1: All wiring checked tight and connected as per the installation instructions.	
2: Each detector has been set an individual number by adjusting the address selector switch.	
3: The “learn ” button has been pressed even if no sensors are fitted.	
4: Each detector has been recognised by the panel.	
5: All detectors have a solid green LED Illuminated when not in alarm.	
6: On applying a little CO2 gas to the detectors the LED turns red and the panel alarms giving the appropriate warning before closing the gas valve.	
7: The fill and prove time are set such that the smallest allowable pressure drop can be seen during the pressure test.	
8: On activating each emergency stop button the panel alarms and closes the control valve.	

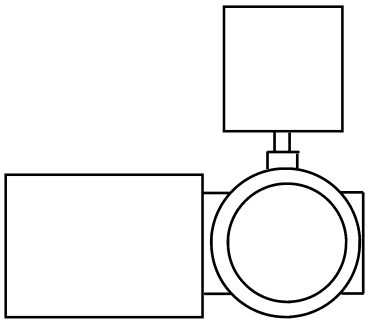
Detector type	Carbon Dioxide	Number fitted	8

Mounting of gas solenoid valve with Sender Unit for Medem Gas Pressure Proving System

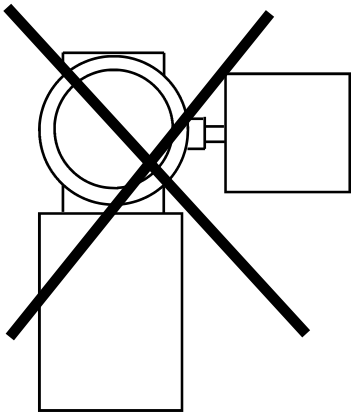
Correct



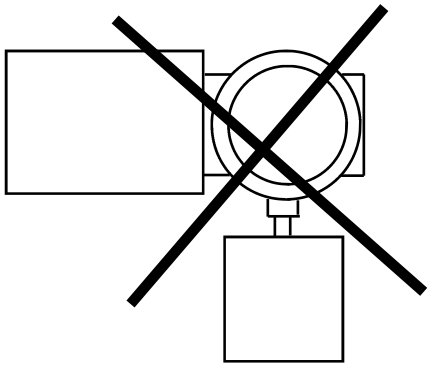
Correct



Incorrect



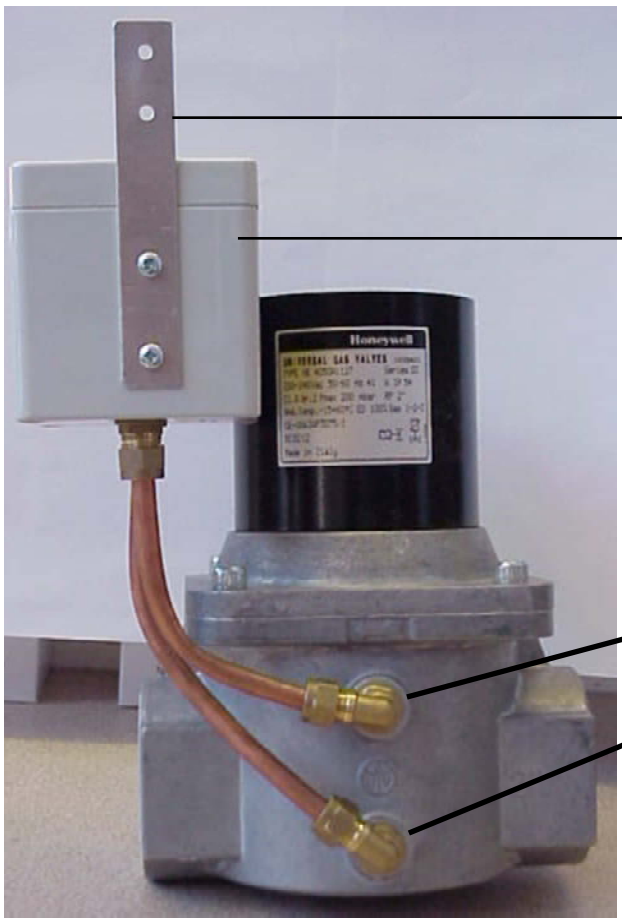
Incorrect



Never mount the valve such that the Solenoid or Sender Unit are below the horizontal.

In addition, check that the valve is correctly installed with regard to the direction of the flow of gas and that the Sender Unit is fitted the correct way round, (Sender Unit cable gland should be on the outlet side of the Solenoid Valve).

MOUNTING DETAILS FOR PRESSURE SENDER UNIT ON VALVE



NOTES:
Solenoid coil of the valve should never be mounted below the horizontal.

Pressure sender unit should never be mounted upside down (to protect from water ingress)

CONTENTS OF FITTING KIT FOR SOLENOID VALVE

Approx 400mm length

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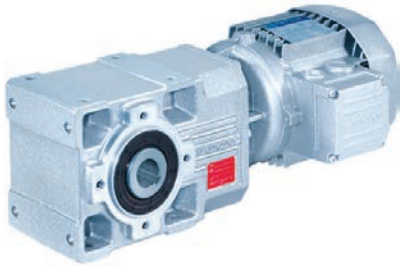

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