Gasflag

Single Channel Control Panel
Alarm Only Apparatus

Installation, Operation and Maintenance Instructions

1 Introduction

1.1 Description

The Gasflag is a single channel control panel designed to monitor remote 4-20 mA gas detectors. The Gasflag is an alarm only apparatus providing two independent user configurable alarm relays, which can be used to control external visual or audible alarms. The Gasflag is designed to work in safe areas only but can be used to monitor gas levels in hazardous areas using a suitable detector. The Gasflag does not require calibration and has been designed for one man installation.

The Gasflag consists of a single shell with a front panel containing a ACCEPT/RESET switch and four illuminating LEDs.

- 'POWER HEALTHY', green LED
  Indicates the system is running. If this LED is extinguished the system is not running.

- 'SYSTEM FAULT', yellow LED
  When illuminated indicates there is a system fault.

- 'ALARM 1', red LED
  When illuminated indicates alarm level 1 is exceeded.

- 'ALARM 2', red LED
  When illuminated indicates alarm level 2 is exceeded.

The Gasflag contains two PCBs. The RELAY PCB is located in the back of the shell, on the right hand side. This board contains the relays and electrical connections. The second PCB is located in the lid of the shell, on the left hand side. This CONTROL PCB contains the links to configure the Gasflag, the test points for attaching a Digital Volt Meter (DVM) and alarm level adjustment potentiometers.

The RELAY PCB contains the electrical connections for POWER IN, POWER OUT (for daisy chaining Gasflag units) and SENSOR. It also provides volt-free contacts for Alarm 1, Alarm 2 and Fault, and a screwdriver for adjusting the alarm levels. All connections and earth settings are clearly labeled on the PCB.

Gasflag may be supplied with a 100-240 Vac power supply (E07998) for providing 24Vdc. The power supply has red and black blades for connecting to the Gasflag power terminals. The power supply is suitable for powering up to two Gasflag control panels.

2 Installation

When carrying out any installation work, ensure that local regulations and site procedures are followed.

2.1 Mounting

The Gasflag control unit is designed for wall mounting in a non-hazardous location and is suitable for indoor environments in light industrial or commercial use. Fixing holes are provided to attach the unit.

The Gasflag is not suitable for outdoor or hazardous environments.

2.2 Cabling requirements

Cabling to Gasflag must be in accordance with the recognised standards of the appropriate authority in the country concerned, and must also meet the electrical requirements of the unit. Crowcon recommends the use of 2-core twisted pair cable. Gasflag requires a supply of 18-28 Vdc, please refer to local regulations for earthing requirements.

Gasflag may optionally be supplied with a plug-in power supply. If Gasflag is to be permanently installed a safety device, the power supply must be permanently wired to a dedicated AC spur fed from a circuit breaker, marked as the disconnecting device for the Gasflag. The circuit breaker must comply with the relevant requirements of IEC 947-1 and IEC 947-3. These procedures ensure that the installation complies with the requirements EN 61010-1 (Low Voltage Directive). Please refer to the gas detector or 4-20 mA device manual for cabling requirements. Generally there must be a supply of 10 V at 20 mA to the detector terminals.

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2.3 Electrical connections

SOURCE Link 10A + 10B in position B   SINK Link 10A + 10B in position A
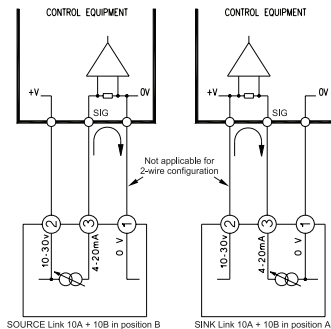
Figure 2.1 Electrical connections for 4-20 mA device

3 Configuration

3.1 Setting alarm levels 1 and 2.

The test points for ALARM 1, ALARM 2 and 0 V can be found on the CONTROL PCB. The alarm level adjustment potentiometers can be found to the right of the test points marked as VR10 and VR11.

A DVM capable of measuring up to 200 mV with at least 10 MΩ input resistance is required. DO NOT USE a moving coil meter as this will affect the values read, leading to inaccurate setting of the trip points. Refer to the specification sheet supplied with the unit for the preset alarm settings.

To set Alarms

1 Connect the negative probe of the DVM to 0 V and positive probe of the DVM to the appropriate alarm test point.

     The alarm range of 4-20 mA is read as 40 - 200 mV on the DVM.

2 Adjust the potentiometer VR10 (Alarm 1) and VR11 (Alarm 2) to read the desired gas alarm level.

Alarm mV = $\dfrac{160 \times \text{alarm level}}{\text{gas range}}$ + 40

For example, if the gas alarm is required at 50% LEL on a 0-100% LEL detector then adjust the setting so that the DVM reads 120 mV, equivalent to 12 mA in the detector loop.

3 Write the gas type, gas range and alarm level value on the sticky label provided on the CONTROL PCB. We recommend that both the alarm levels and the mV setting is recorded.

3.2 Alarm configuration

When you have completed the alarm level settings the next stage is to configure the alarm settings using the links provided on the CONTROL PCB, this table can be found printed on the CONTROL PCB.

3.2.1 Alarm 1 and Alarm 2 configuration

A RISING alarm is suitable for most detectors as a 'rise' in gas level is the most commonly monitored action. A FALLING alarm is typically used to monitor oxygen levels as a fall in the oxygen level is most critical. LINKS 15 and 17 set the Gasflag configuration for ALARM 1 and 2. The links should be set to A for FALLING or B for RISING.

The Gasflag alarms can be configured to operate as LATCHED or NON-LATCHED. When an alarm level is exceeded and has been configured as LATCHED, the alarm relay will switch state and remain in that state until the control panel is reset even if the gas level falls to normal values. A NON-LATCHED alarm relay will switch state when the alarm level is exceeded but will return to normal if the gas level returns to normal. LINKS 16 and 18 set the Gasflag configuration for ALARM 1 and 2, the links should be set to A for NON-LATCHING or B for LATCHING.

3.2.2 Alarm and fault relay settings

The fault relay will change state if the current level in the detector loop drops below 3 mA or rises above 23.5 mA. The relays can be configured to work as NORMAL (de-energised) or FAILSAFE (energised). Typical configuration is to set ALARM 1 and 2 as NORMAL (LINKS 12 and 13 to A) and FAULT as FAILSAFE (LINK 14 to B).

When configuring these settings please ensure that local regulations and site procedures are followed.

3.2.3 Alarm buzzer settings

The Gasflag control panel default setting for the BUZZER is ENABLED. The BUZZER can be disabled using LINK 11. Set this link to A to enable the BUZZER and to B to disable the BUZZER.

The BUZZER is typically disabled if external alarm devices are added.

3.3 Remote alarm devices

Audible and visual alarm devices can be connected to the Gasflag control panel from the screw terminal blocks marked ALARM 1, ALARM 2 and FAULT on the RELAY PCB.

Crowcon can provide a wide range of alarms and indicators for operation in safe and hazardous areas.

Contact Crowcon for further details of suitable devices.

3.3.4 Power to an external alarm device through the alarm relay

The Gasflag control panel can be used to provide the power supply for an external alarm device. "Figure 3.1" shows the electrical connections required.
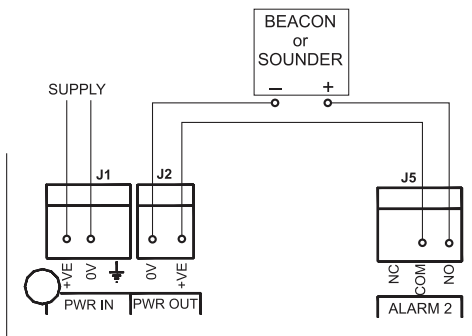

Figure 3.1 Electrical connections for powering an external alarm device

3.4 Setting earthing requirements

The Gasflag control panel provides flexible earthing arrangements. The LINKS 1 and 2 on the RELAY PCB allows earthing configuration for 0 V and SCREEN. The links are summarised in the table below.

Table 3.1: Gasflag earthing configurations

LINK	A	B
LK1	Isolate 0 V from earth	Link 0 V to earth
LK2	Link SCREEN to 0 V	Link SCREEN to earth

When configuring these settings please ensure that local regulations and site procedures are followed.

4 Operation

Table 4.1 summarises the action of pressing the ACCEPT/RESET button on the ALARM and FAULT RELAYS, the LED indication and the BUZZER in the event of gas levels increasing and returning to normal.

The left column in the lower portion of the table for 'Reducing gas levels' are marked to indicate LATCHING and NON-LATCHING system configuration.

Table 4.1: LATCHING (L) and NON-LATCHING (N)

	ACTION	RELAY INDICATION	LED INDICATION	BUZZER INDICATION
	OK	Not active	No alarm LEDs	No sound
	Increasing gas levels (or reducing if oxygen sensor) L and N			
	Gas level > Alarm 1	Alarm 1	Alarm 1 LED	Sound
	Press ACCEPT/RESET	Alarm 1	Alarm 1 LED	No sound
	Gas level > Alarm 2	Alarm 1 and 2	Alarm 1 & 2 LEDs	Sound
	Press ACCEPT/RESET	Alarm 1 and 2	Alarm 1 and 2 LEDs	No sound
	†Gas level > full scale range	Fault	Fault LED	1 Hz beep
	†Press ACCEPT/RESET	Fault	Fault LED	No sound
	Reducing gas levels (or increasing if oxygen sensor)			
L N	†Gas level < full scale range	Alarm 1 and 2	Alarm 1 and 2 LEDs	No sound
L	Gas level < Alarm 2	Alarm 1 and 2	Alarm 1 and 2 LEDs	No sound
L	Press ACCEPT/RESET	Alarm 1	Alarm 1 LED	No sound
N	Gas level < Alarm 2	Alarm 1	Alarm 1 LED	No sound
L	Gas level < Alarm 1	Alarm 1	Alarm 1 LED	No sound
L	Press ACCEPT/RESET	Not active	No alarm LEDs	No sound
N	Gas level < Alarm 1	Not active	No alarm LEDs	No sound

† This condition will only arise if the output from the detector is NOT clamped below 23.5 mA.

4.1 Fault condition

If the Gasflag senses a fault from a short or open circuit condition the Fault Relay will change state, the Fault LED will illuminate and the BUZZER will sound a 1 Hz bleep. The fault alarm is non-latching and will return to normal if the fault condition clears.

5 Daisy Chaining Multiple Gasflag Control Panels

A number of Gasflag control panels can be daisy chained together in series. The first Gasflag unit is connected to an external power supply and is subsequently used to supply the power to the next Gasflag unit. The total number that can be supported will depend on the power supply rating. The Gasflag is supplied with a power supply unit capable of powering up to two Gasflag units. If more then two units are to be daisy chained together then a higher rated power supply is needed. In the "Figure 5.1" electrical connections for connecting two Gasflag units together is shown.
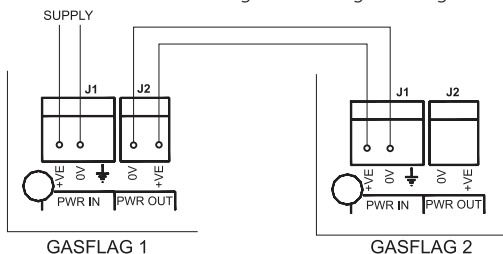

Figure 5.1 Electrical connections for daisy chaining two Gasflags

6. Specification

Dimensions	145 x 210 x 46 mm
Weight	<500 g
Sensor connection	Two or three wire connection to sensor via screened cable
Operating voltage	18-28Vdc
4-20 type	Selectable source or sink
Fault current	<3 mA and >23.5 mA
Operating temperature	–20°C to +70°C (–4°F to 158°F)
Humidity	0-99% RH, non-condensing
Trip point hysteresis	Alarm hysteresis set at approximately 0.5 mA Fault hysteresis set at approximately 0.2 mA
Response time (typical)	Time to alarm <1 second
Connections	Terminals accept cables of cross sectional area 0.5 to 2.5 mm2
Relay outputs	Single pole change-over for use with dc signals. The relay contacts are rated 1 A at 30 V dc
Optional power supply	24 Vdc 750 mA

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