

BX150 Gas Detection Controller



BX150 1 Channel Panel Mounted Gas Detection Controller

1

Channel

Panel Mounted
Only

Manual
test
Self-diagnostic

4-20mA

IP42



FEATURES

- Single channel protection
- 230VAC or 12VDC supply
- Panel mounted only
- Positive safety option
- Internal audible alarm
- Manual test function
- Self-diagnostic
- Detection of Toxic 0-300ppm / Explosive Gas(es) 0-20%LEL
- 4-20mA signal input
- 2 alarm stages - Pre-alarm and main alarm
- Sensor fault relay output
- IP42 protective rating
- CE certified and approved to EN 61010-1, EN 50270, EN 50271, EN 45544-3, EN 60079-29-1
- 3 year guarantee

OVERVIEW

The BX150 is a single channel, panel mounted gas detection controller. It can be connected to toxic and explosive sensors.

If the remote sensor senses the presence of gas, it sends a proportional 4-20mA signal back to the BX150. When the first alarm level is reached the pre-alarm relay is activated (See Alarm Settings). If the level continues to rise the main alarm relay will be energised.

For explosive or toxic gases, the electrical supply to the safety shut off valve is broken when the main alarm threshold is reached. A general alarm is sounded.

Should the controller enter fault condition the safety shut off valve closes to failsafe. A self-diagnostic feature looks for return sensor voltage and ensures correct functionality.

The BX150 controller is compatible with all the Duomo conventional sensors shown on pages 6 & 7.

SPECIFICATION

Power

Power Supply	230VAC 50Hz $\pm$ 10%
Secondary Battery	12VDC $\pm$ 10% max 2.2Ah
Battery Charger	Charger capacity 2.2Ah
Power Consumption	12V - 2.5W maximum 230V - 9W maximum
Relay Contact Range	10A resistive

Alarm Settings

Pre-Alarm No.1	13% LEL / 200ppm
Pre-Alarm No.2	N/A
Main Alarm	Fixed at 20% LEL / 300ppm
Sensor Fault	Short circuit, interruption, sensor deterioration

Technical Specification

Dimensions	Width 48mm Height 96mm Depth 119mm
Display	N/A
Mounting	Panel mounted
Input Signal	4-20mA
Device Precision	1% FS
Reaction Time	<2 seconds
Working Temperature	-10°C to 40°C
Start-up Self-Diagnostic Delay	120 seconds
Protective Rating	IP42

Configuration

Positive Safety	Yes (ON/OFF)
Main Alarm Relay Actuation	Yes (Latching/Temporary Alarm)
Gas Type Selection	Yes (Toxic/Explosive)
Timed Sensor Test Facility	No
Emergency Stop Connections	No
O ₂ Compatibility as Standard	No

Peripheral Specification

No. of Remote Sensors	1
Maximum Sensor Distance	100m
Cable Diameter for Sensors	1mm ² CSA (Screened and earthed at the controller end)

Compatibility

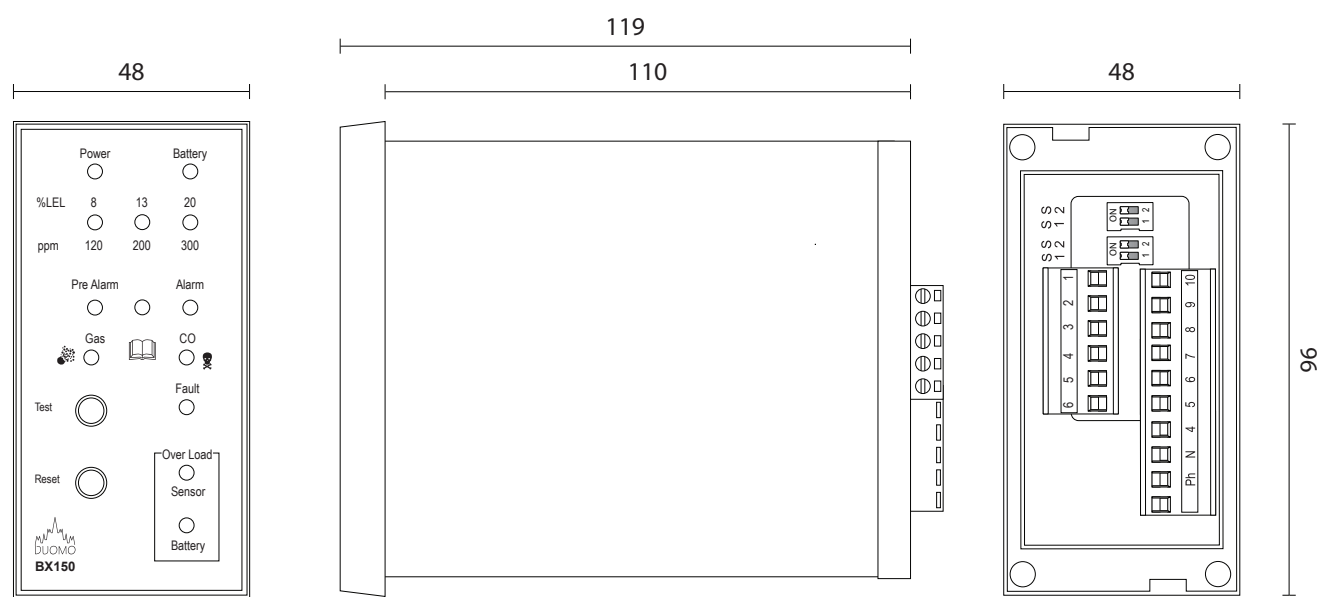
Sensor Compatibility	All Duomo sensors
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Approvals, Certifications and Guarantee

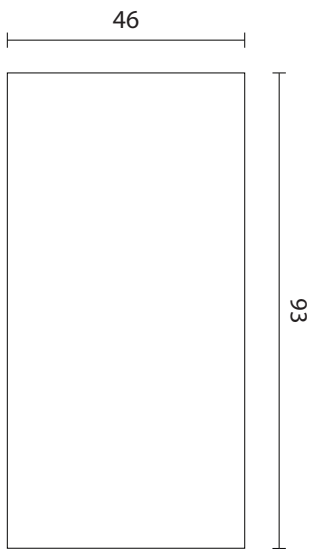
Approvals	EN 61010-1, EN 50270, EN 50271, EN 45544-3, EN 60079-29-1
Guarantee	3 year as standard



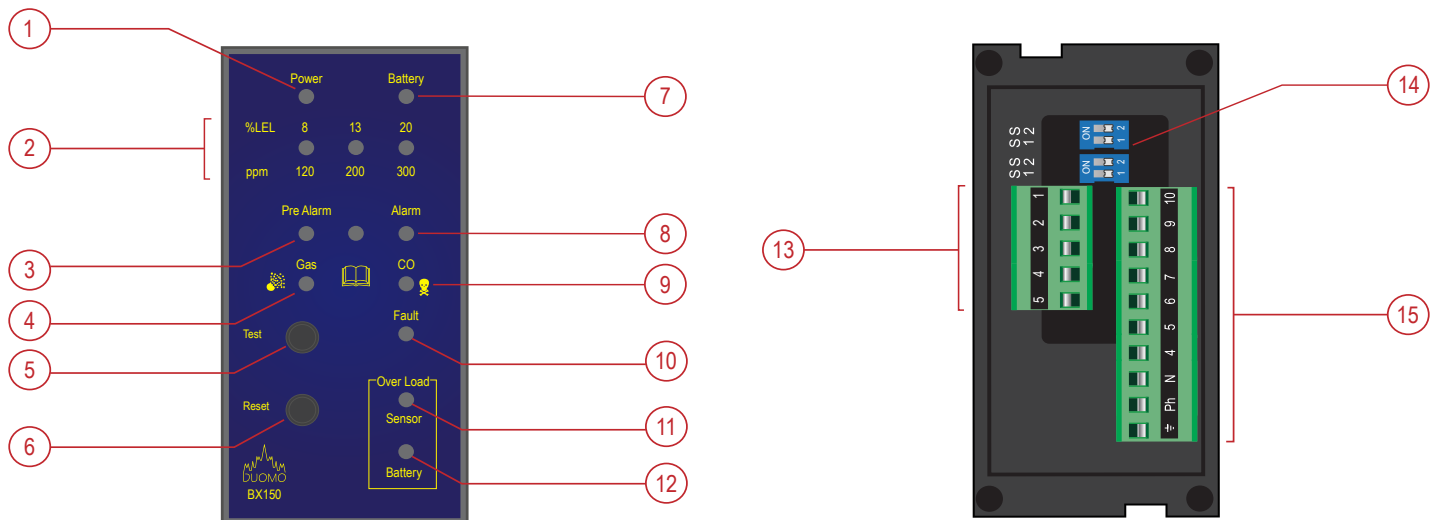
Overall Dimensions (mm)



Cutout Dimensions (mm)



BX150 Fascia & Connections Layout



No	Description	Purpose & Functionality
1	POWER	LED illuminates when supply voltage is applied LED flashes during self diagnosis start up
2	GAS LEVEL INDICATORS	Displays current level of gas detected
3	PRE ALARM	LED illuminates to level of gas sensed. 8 - 13 - 20% L.E.L and 120 - 200 - 300ppm
4	EXPLOSIVE	Illuminates when internal DIP switch for explosive gas is set to the GAS position
5	TEST BUTTON	When pressed checks sequence and function of BX150
6	RESET BUTTON	When pressed resets detector after alarm or fault condition
7	BATTERY	LED illuminates when BX150 is being powered by standby batteries LED flashes when battery has low charge
8	MAIN ALARM	20% L.E.L concentration of gas detected Main alarm relay actuated
9	TOXIC	Illuminates when internal DIP switch for carbon monoxide is set to the carbon monoxide position
10	FAULT	Indicates a fault condition (short circuit, sensor fault, loss of signal or incorrect connection of sensor)
11	OVER LOAD SENSOR	Short circuit or high absorption in the sensors
12	OVER LOAD BATTERY	Battery not connected properly or anomalous voltage consumption
13	SIGNAL TERMINAL BLOCK	Sensor connection terminals (<i>See Wiring Schematic for connection instructions</i>)
14	DIP SWITCHES	BX150 DIP switch options for functionality. (<i>See Configuring the BX150 on next page for instructions</i>)
15	POWER TERMINALS	Power terminal connections (<i>See Wiring Schematic for connection instructions</i>).

Configuring the BX150

The BX150 has a DIP switch on the rear panel. Switch 1 is used to control the main alarm delay. Switch 2 is used to configure the main alarm latching mode. Switch 3 is used to select whether the unit detects toxic or explosive gases.

The BX150 can be configured to provide several modes of operation. The configurable parameters are:



Dip Switch 1 (nearest terminal block)

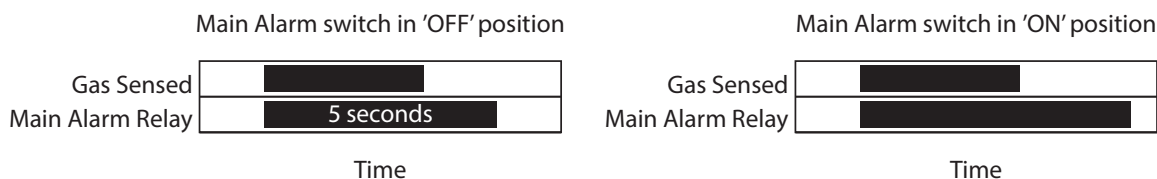
Intrinsic safety determines the condition of the main alarm relay and hence the operation of the gas valve. When it is 'ON' the relay is in a normally open state. When it is 'OFF' the relay is in a normally closed state. NOTE: This affects how the gas valve operates and means that you may need to change how it is wired to the BX150.

Example shows Intrinsic Safety On.



Dip Switch 2 (nearest terminal block)

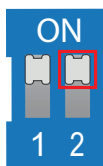
Main alarm relay actuation method. This can be configured to provide either a latching or a temporary alarm operation. When the main alarm is actuated in an alarm condition if the switch is in the 'ON' position the relay will remain in this position even after the concentration of gas has reduced below the alarm threshold. If the switch is in the 'OFF' position the main alarm relay will actuate for 60 seconds and then if the level of gas has dropped will return to the voltfree main alarm relay to the running condition. The indication on the panel fascia and the audible alarm will still indicate main alarm. This mode of operation is used when using manual reset gas valves and battery back-up systems for extending standby battery life. **Example shows latching main alarm configuration.**



Dip Switch 3

Type of gas to be sensed. These are GAS or CO. The symbols on the front fascia of the detector are EN standard symbols and refer to any explosive or toxic gas. If toxic gas, e.g. carbon monoxide is to be sensed on a given zone move the switch to the OFF position. If explosive, e.g. natural gas, LPG, hydrogen etc. move the switch to the ON position.

Example shows explosive gas setting.

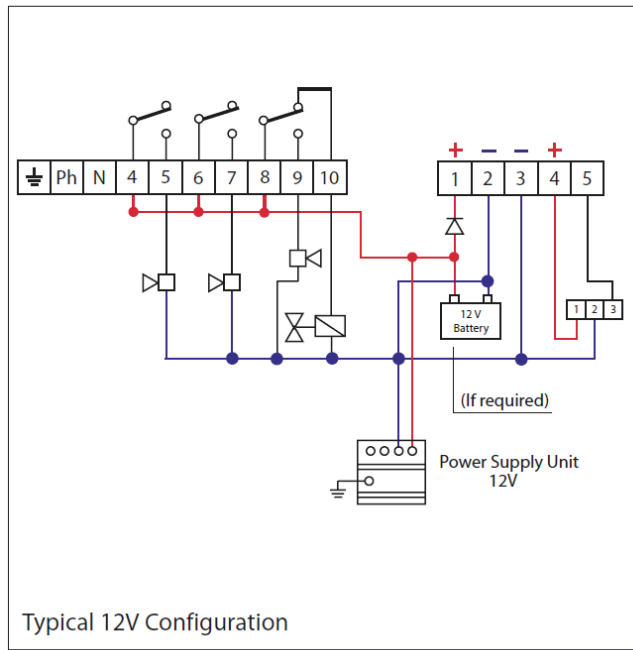
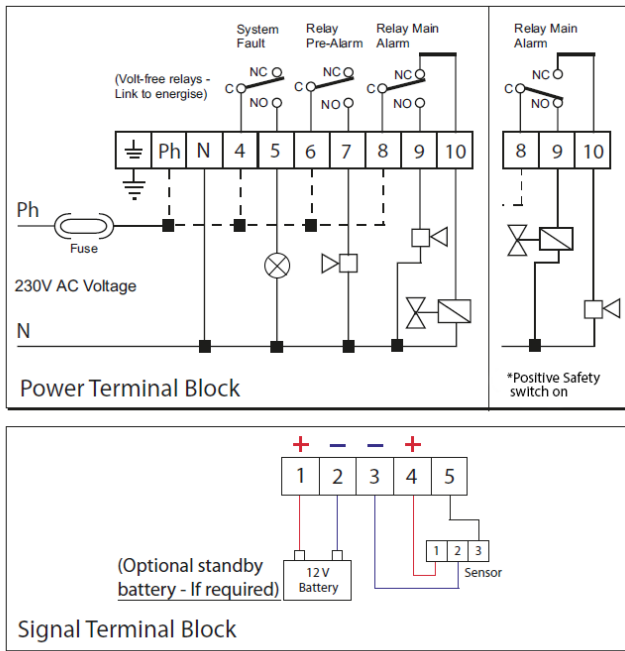


Dip Switch 4

Enable or disable the zone, ON position to enable the zone, OFF position to disable the zone.

Example shows the zone enabled.

BX150 wiring schematic

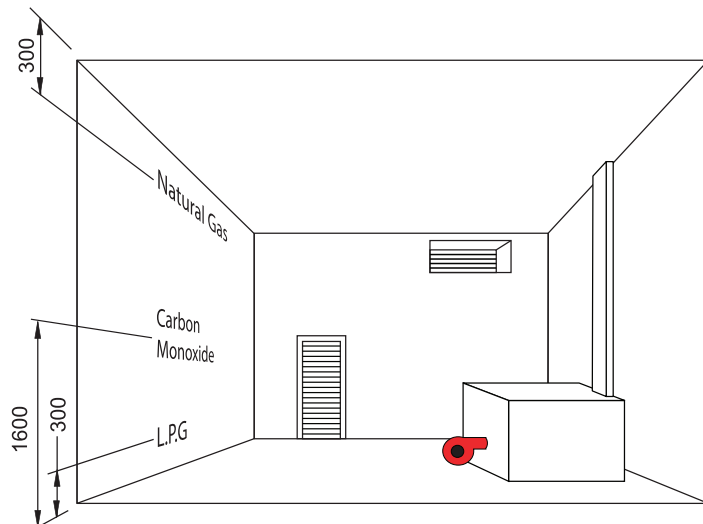


Electrical Installation

The BX150 is a safety device designed to give audible alarms and automatically provide latched electrical isolation of associated gas safety shut off valves in the event of a gas leak or build up of toxic gases.

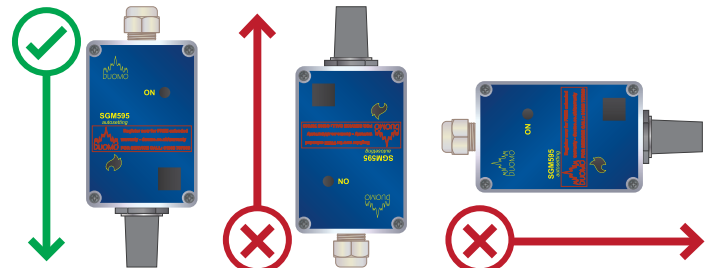
The sensors can be located up to 100m from the gas detector. Cable size should be 1mm² CSA. If the sensor cables are run separately in specific conduit it is not essential to use screened cable but if the cables are routed through conduit or trunking containing other wiring the use of screened cable is advisable. The wiring should be performed by a qualified person in accordance with current regulations. The plug-in terminal rail makes installation easy and quick. Do not mount close to any heat source or in an area where moisture is likely to effect operation. The IP rating of this unit is IP42. Sensors should be positioned as shown below.

If you require any guidance on this please call Duomo technical support on +44 1905 797989.



Sensor Installation

The sensors must be mounted as shown below with the sintered head pointing vertically down. When replacing sensors never separate a sensing head from its PCB. The sensor will have been calibrated using this particular board and therefore will not function correctly with any other.



Important Notes

Always check the wiring before powering up the system.

Do not test this sensor with anything other than Duomo test gas (See 'BX150 Operation' section for further information). Concentrations above this will damage the sensor and shorten sensor life.

The installation of this gas detector does not release the user from observing all the regulations concerning the characteristics of the installation and the use of gas appliances; the ventilation of the protected environment and the removal of products of combustion. Duomo will not be held responsible or liable for any damage caused to people, property or animals resulting from incorrect connection, installation or application of this gas detector. To ensure correct function after installation Duomo provide a commissioning service using calibrated test gases. For this service call +44 1905 797989.

Sensor range for use with BX150

CO233A CO Sensor

CO

4-20mA



IP65



Technical Specification

Gas(es) Detected	Carbon Monoxide
Dimensions	Width 100mm Height 100mm Depth 60mm
Display	6 Colour Digital Display
Sensor Technology	Electrochemical
Settings	Preset to TWA and STEL Standards
Output Signal	4-20mA
Sensor Range	0-300ppm
Working Temperature	-20°C to +50°C
Autosetting	Yes
Protective Rating	IP65
Approvals	EN 50270, EN 50271 & EN 45544-1-3 Compliant

CO100AR CO Sensor

CO

4-20mA

IP66



Technical Specification

Gas(es) Detected	Carbon Monoxide
Dimensions	Width 100mm Height 100mm Depth 60mm
Display	N/A
Sensor Technology	Electrochemical
Settings	Preset to TWA and STEL Standards
Output Signal	4-20mA
Sensor Range	0-300ppm
Working Temperature	-20°C to +50°C
Autosetting	Yes
Protective Rating	IP66 (Enclosure) IP65 (Sintered Head)
Approvals	EN 50270, EN 50271 & EN 45544-1-3 Compliant

CO100P CO Sensor - For Car Parks

P
CAR PARKS

CO

4-20mA

IP66



Technical Specification

Gas(es) Detected	Carbon Monoxide
Dimensions	Width 100mm Height 100mm Depth 60mm
Display	N/A
Sensor Technology	Electrochemical
Settings	Preset to TWA (Alarm 1 and 2) & STEL Standards (Alarm 3)
Output Signal	4-20mA
Sensor Range	0-300ppm
Working Temperature	-20°C to +50°C
Autosetting	Yes
Protective Rating	IP66 (Enclosure) IP65 (Sintered Head)
Approvals	EN 50270, EN 50271 & EN 50545-1 Compliant

SG895 ATEX Sensor

10+
Gases

4-20mA

IP65



Technical Specification

Gas(es) Detected	Natural Gas, LPG, Ammonia, Hydrogen, Acetylene, Gasoline, Methanol, Ethanol, White Spirit, Acetone, Hexane, Ethyl Acetate, Toluene
Dimensions	Width 100mm Height 133mm Depth 70mm
Sensor Technology	Pellistor
Settings	0-20% LEL (0-300ppm for Carbon Monoxide)
Output Signal	4-20mA
Sensor Range	0 - 100% of LEL or diff. in ppm
Working Temperature	-10°C to +70°C
Autosetting	Yes
Protective Rating	IP65
Approvals	EN 50270, EN 50271, EN 60079-0, EN 60079-1, EN 60079-31, EN 60079-29-1

Sensor range for use with GS100M

HCF100 Refrigerant Gas Sensor

Refrigerant
Gases

4-20mA

IP55



Technical Specification

Gas(es) Detected	Freons (Inc R134A, R404A, R407C, R410A)
Dimensions	Width 76mm Height 150mm Depth 58mm
Display	N/A
Sensor Technology	Semiconductor
Settings	N/A
Output Signal	4-20mA
Sensor Range	0-300ppm
Working Temperature	-10°C to +60°C
Autosetting	Yes
Protective Rating	IP55
Approvals	EN 50270, EN 378-1, (EU) No 517/2014 of the European Parliament and of the Council of 16 April 2014

SGM595 Natural Gas or LPG Sensor

Natural
Gas

Propane

4-20mA

IP55



Technical Specification

Gas(es) Detected	Natural Gas and LPG
Dimensions	Width 73mm Height 108mm Depth 57mm
Display	N/A
Sensor Technology	Catalytic
Settings	N/A
Output Signal	4-20mA
Sensor Range	5% to 20% LEL
Working Temperature	-10°C to +60°C
Autosetting	Yes
Protective Rating	IP55
Approvals	EN 50270, EN 50271, EN 60079-29-1

SGF104 Oxygen Sensor

O₂

4-20mA

IP64



Technical Specification

Gas(es) Detected	Oxygen
Dimensions	Width 100mm Height 100mm Depth 60mm
Sensor Technology	Optical (Fluorescence based)
Settings	19.5 or 18.5% of O ₂ (depletion), 22.5, 23.5% (excess)
Output Signal	4-20mA
Sensor Range	0-25%
Working Temperature	-30°C to +60°C
Autosetting	Yes
Protective Rating	IP64
Approvals	EN 50270, EN 50271, EN 50104

SG500 Natural Gas or LPG Sensor

Natural
Gas

LPG

4-20mA

IP30



Technical Specification

Gas(es) Detected	Natural Gas or LPG
Dimensions	Width 110mm Height 50mm Depth 35mm
Sensor Technology	Catalytic
Settings	N/A
Output Signal	4-20mA
Sensor Range	0-20% LEL
Working Temperature	-0°C to +40°C
Autosetting	No
Protective Rating	IP30 (Enclosure)
Approvals	EN 50270, EN 50271, EN 60079-29-1

BX150 Operation test procedure

Before powering up the BX150 once again check that all electrical connections are correct.

- 1 Apply power using the proper external switch. This switch should be fitted with protection fuses.
- 2 All of the lights on the fascia will light up in turn. This will take approximately 20 seconds. This checks the function of all the LED's.
- 3 The ON LED will remain flashing for about 90 seconds. This is the sensor warm-up period. The gas detector will not provide gas detection during this period. When the ON light becomes constant the detector is in operation.

By pushing and maintaining pressure on the manual TEST button a function test can be performed.

The sequence will be:

 - a) The 8% LEL / 120ppm LED will be actuated.
 - b) The 13% LEL / 200ppm and the pre-alarm LED will be actuated. The pre-alarm relay will be changed over and the buzzer will then issue a low frequency sound.
 - c) The 20% LEL / 300ppm and main alarm LED will be actuated. In addition to keeping the pre-alarm relay switch on, the main alarm relay will be changed over. The alarm LED will light to show that the system is in alarm and the buzzer will issue a higher frequency sound.

By releasing the the manual TEST button the LED's will go out and the audible alarm will cease. If a latched alarm function on the main relay is configured this will remain on until the RESET button is pressed.
- 5 In order to conduct a full function test it is essential to use Duomo or equivalent calibrated test gas. The maximum concentrations are;
 - 40% LEL for Methane in air
 - 350ppm for Carbon monoxide
 - 0.85% (MOL) for Propane

Using higher concentrations can reduce sensor life. **Note:** Never test using neat gas. This will poison the sensor.
- 6 To simulate a sensor fault situation disconnect the sensor plug. The detector will go into a FAULT alarm and the sensor fault relay will be actuated.

The control unit will then carry out the following:

 - a) The FAULT and MAIN ALARM LED's will light up and blink
 - b) The buzzer will issue a continuous sound
 - c) The FAULT and MAIN ALARM relays will switch.

Reconnect the return cable and press RESET to restore the control unit functioning.

In case of alarm

Extinguish any naked flames.

Do not switch lights or electrical devices on or off.

Open all windows and door to increase ventilation.

- If the ALARM LED is off the levels of gas have dropped. A responsible, qualified person is now safe to find the cause of the alarm.
- If the alarm sound remains constant and the cause is not evident or not possible to eliminate turn off the emergency isolation valves to the area and contact your gas provider emergency line. They will advise accordingly.

Troubleshooting

The Problem	The Solution
The BX150 does not start up	Check that the 230V mains power is correctly connected. If powered by the battery, check that the 12V DC power is correctly connected.
The Fault LED is illuminated	Check that the connecting cables from the BX150 to the sensors are intact, that the sensors are properly powered and that the signal cable is correctly connected.
The Overload Sensor LED is illuminated	Check that; • The power polarity has not been inverted • No short-circuit is present • The probes were not damaged during installation, that no excessive current absorption is present
The Overload Battery LED is illuminated	Check that the connection cables are not shortcircuited, that the polarity has been inverted and the battery is not damaged.
The BX150 is repeatedly issuing an alarm	Check that there are no gas leaks If the alarm signal and the fault indicator LED turn on together, check the sensor.
The BX150 is issuing an alarm and does not shut off the devices connected to it	Check that the wiring is correct and that the DIP switch has been set properly. All relays must be free from electrical power. Check the drawing of the connections.
A 12V solenoid valve, which does not work well, is connected to the BX150	Direct connection of 12V solenoid valves or sirens to the BX150 is not permitted. An external power unit must always be used. The BX150 gives a maximum current of 50mA.

Still experiencing difficulties?

If you have made the checks above and are still experiencing difficulties then please call **Duomo (UK) Ltd** on **+441905 797989** for technical assistance.

Commissioning, Service & Maintenance

Commissioning

It is strongly recommended that this BX150 gas detection system is commissioned and serviced by Duomo Commissioning Engineers or engineers approved by Duomo. A quotation for commissioning or service will be provided upon request.

Email site details and preferred date for commissioning or service to sales@duomo.co.uk to the Duomo Service Department. Or call **+44 1905 797989**

The benefits of this equipment being commissioned by Duomo are:

- **On board spares** - If for whatever reason this equipment doesn't function correctly Duomo engineers will have spares on board to ensure that the commissioning is successful.
- **A Duomo Commissioning Certificate is provided** - A certificate from the original manufacturer ensures that the commissioning or servicing carried out is at a high professional standard by a competent and qualified service engineer.

It is prudent to make electrical connection to the detector terminal plus when withdrawn and leave the plug off the detector so that the Duomo Engineer is the first to power up the unit on site. This allows wiring to be checked prior to commissioning and avoids damage due to incorrect connection. Guarantees for this product will become void if damage is caused by the installer.

Maintenance

This detector must be function checked as described above using calibrated test gas every 6 months.

To arrange for a Duomo engineer to conduct this work or to arrange a service contract please call **+44 1905 797989**.

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BX150 14112023 rev5

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01905 797989

www.duomo.co.uk
sales@duomo.co.uk

 [linkedin.com/company duomo-uk](https://www.linkedin.com/company/duomo-uk)

 [@DuomoUK](https://twitter.com/DuomoUK)

5 The Furlong, Berry Hill Industrial Estate, Droitwich, Worcestershire, WR9 9AH