Rev. 3. -02/2019

DUOMO

Instruction Booklet

Product: Duomo CHCO

Natural Gas and Carbon Monoxide detector - TYPE A

THIS IS AN IMPORTANT DOCUMENT. IT CONTAINS INFORMATION REGARDING: INSTALLATION, SAFE AND PROPER OPERATION AND REGULAR CHECKING OF THIS NATURAL GAS AND CARBON MONOXIDE DETECTOR.

CE 96125

Contents

1. Application

The Duomo CHCO detects the presence Natural gas and carbon monoxide using dual sensor technology.

The Duomo CHCO detector is ideally suited for people with some physical disability that might delay a manual response to an alarm. It is a fixed, wall mounted system with a permanently connected 230 Volt electrical supply.

The CHCO is fitted with an output function for triggering different ancillary devices, for example Gas Shut-off valve. If the apparatus is installed in homes equipped with gas appliances, the output signal may be used for triggering a shut-off valve on the incoming mains gas pipe. Such a valve should require a manual action for resetting to the open position - see Duomo Type EVRM Valves.

For CO detection in addition to shutdown of the incoming gas supply, the CHCO can also start a Ventilation fan. See Important Note regarding Ventilation fan.

2. Technical specification:

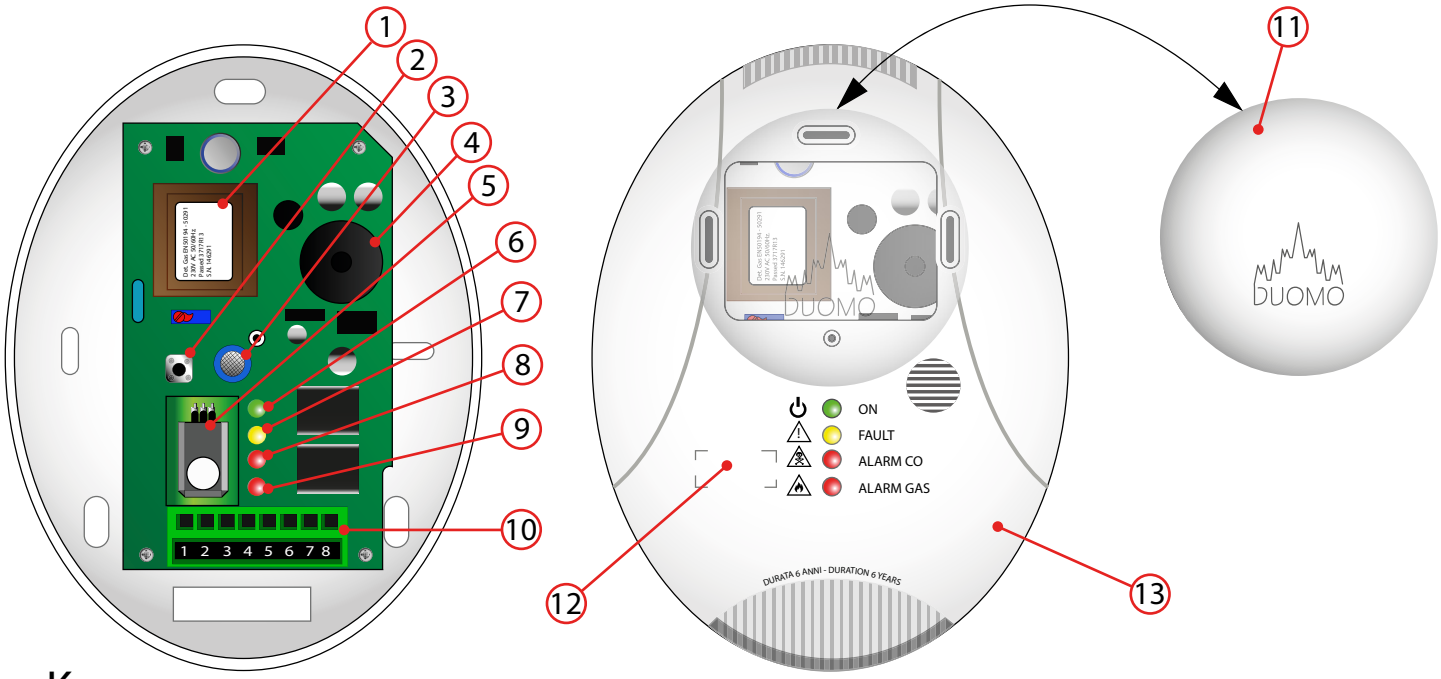
Product description: Type A Gas Detector for Natural Gas and Carbon monoxide.
Outputs: Alarm relay (Volt-free) for Carbon Monoxide
Alarm relay (Volt-free) for Natural Gas
Conformity: BS EN 50291, BS EN 50194, CEI 216-3, BS EN 50270, BS EN 61010
Warranty Period: 2 year warranty - extendible to 3 years by registering online
Continuous Power Supply: 230V +/- 10% 50/60Hz.
Power consumption: 3.5 Watts at 230 V.
External Supply Fuse Rating: 5A
Compatible Gas valve: MANUAL RESET ONLY.
See Duomo EVRM Type valves
Protective Rating: IP 42
Working Temperature: From -10ºC up to 40ºC
Operational Humidity Range: 0-90% condensing
Sensor Types:
Carbon Monoxide - Nemoto Electrochemical
Natural Gas - Nemoto Catalytic
CE Certification Number: 96125
Dimensions: L 150mm , W 115mm, D 53mm.
Interconnecting Cable size: 1mm
Maximum permissible output Load: 4A
Alarm Conditions:

Natural Gas Alarm at > 10% LEL.

Table 1 - Carbon Monoxide Alarm thresholds

CO Concentration	Without alarm before (minutes)	With alarm before (minutes)
30	120	-
50	60	90
100	10	40
300	-	3

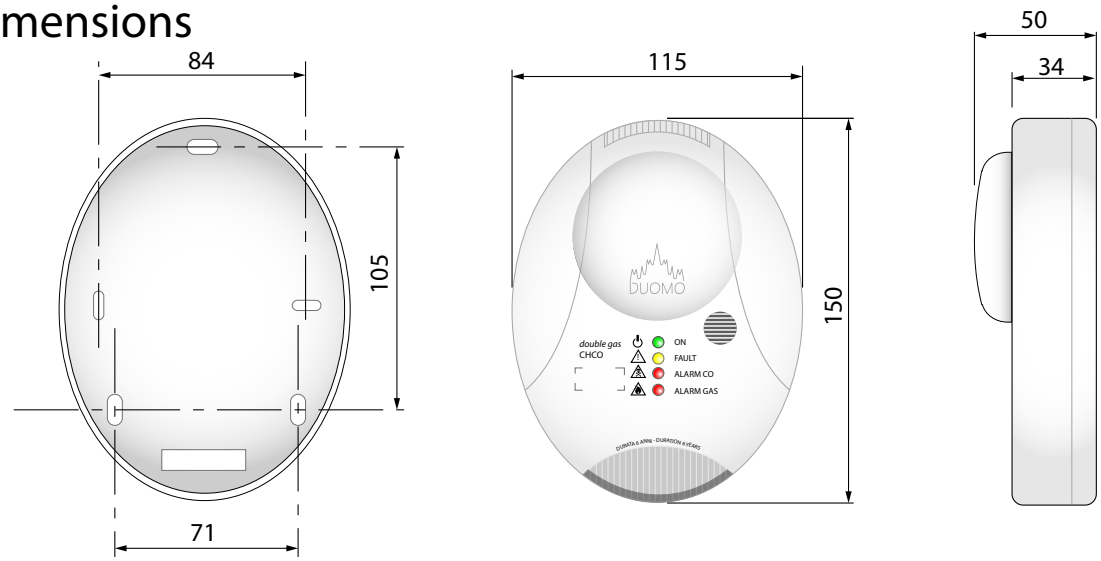
3. Layout and Key to components



Key

1. Product Label. Displays: Gas -European Standard EN50194 & EN50291, serial number, date and country of manufacture and supply voltage and frequency.
2. Test button**. This button should only be used to simulate a gas alarm after installation.**
3. Catalytic Natural Gas sensor element.
4. Sounder.
5. Electrochemical Carbon monoxide sensor element.
6. **On** Light. This light flashes as soon as power is applied. After 100 seconds the light stops flashing and is permanently lit until power is disconnected.
   Note: During the diagnostic warm up phase the CHCO will not detect gas.
7. **Fault** Light. Becomes lit when either the Natural Gas or the CO sensor element becomes inoperative.
8. **Alarm CO** Light.
9. **Alarm Gas** light.
10. Cable connection Terminals
11. Dome cover on CHCO fascia. Remove to find Product label.
12. Affix label here to show the 'Replace by date'.
    This sticker must be applied by the installing engineer. The life of this detector is 5 years.
13. Ovolus enclosure - Material ABS Self extinguishing.

4. Dimensions

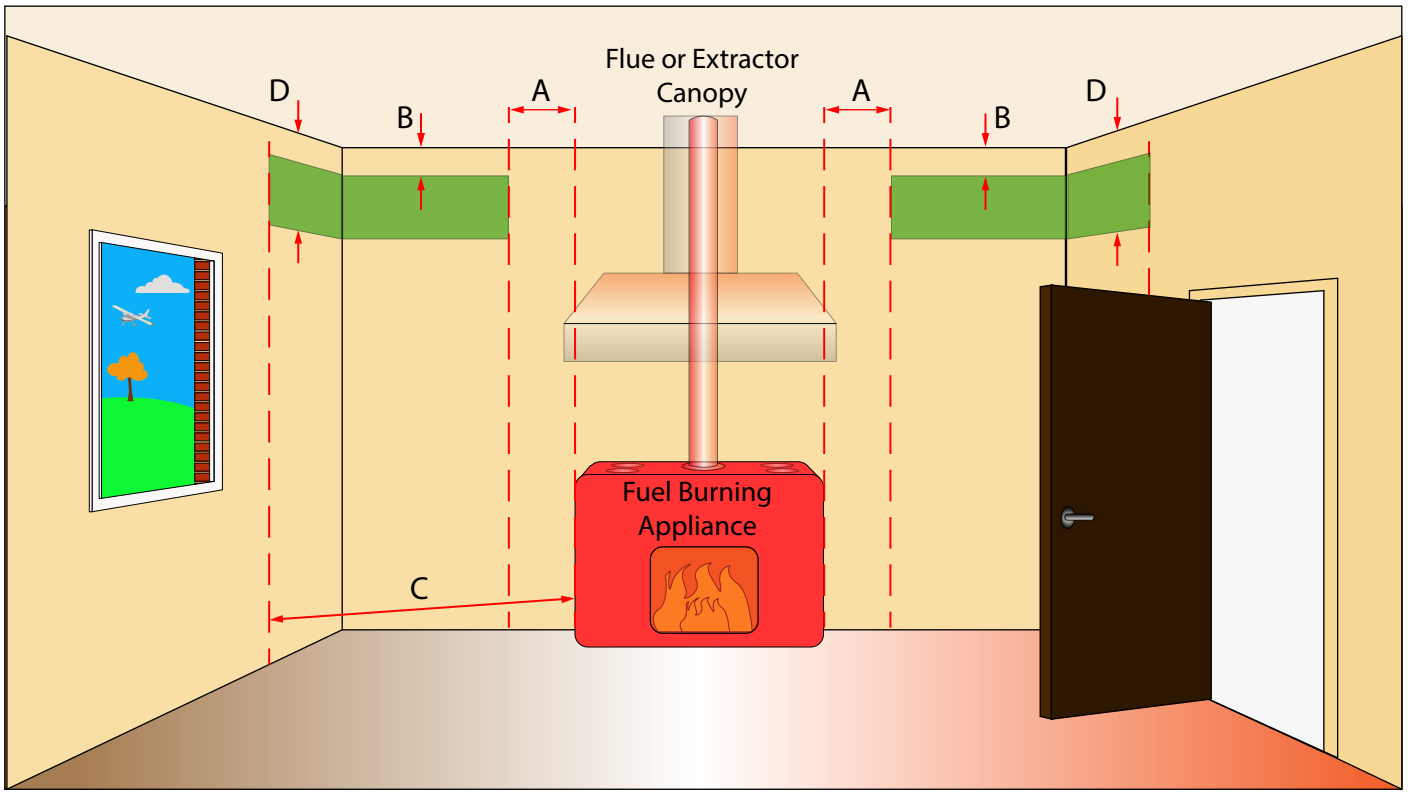


5. Positioning the CHCO

Ideally, a CHCO should be installed in every room containing a gas appliance. If this is not practicable, the gas detector should be installed in the room where a gas escape is most likely to occur; this would typically be the kitchen, due to the presence of a gas cooker and other gas appliances.

The CHCO should be installed above the level of a possible gas escape and near the ceiling (typically < 0.3m from the ceiling), in a place where air movements are not impeded by furniture and furnishings.

The location should not be vulnerable to impact or splashing during normal routine operations such as cleaning in the area. For further information see BS EN50292 and BS EN50244

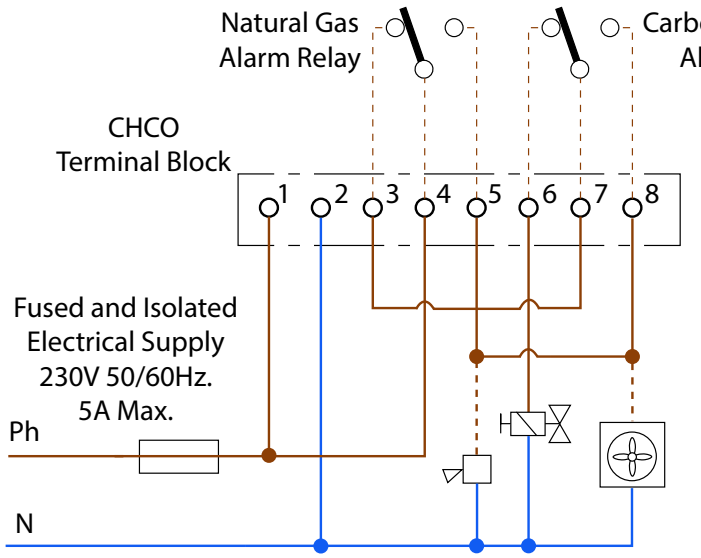


Key to Positioning Diagram

Fuel Burning Appliance: This could be a Fire, Cooker, Boiler, or any other gas fired appliance.
Flue or Extractor canopy: Used to remove the products of combustion from the room under normal circumstances.
Dimension A - 1m
Dimension B - 0.15m
Dimension C - Maximum distance from appliance - 3m CO and 5m Natural Gas.
Dimension D - For Natural Gas < 0.3m - For CO < the distance from the ceiling to the top edge of any openable window and any door.

The CHCO resets automatically however any connected devices such as Gas valves must be of a manual reset type. See Duomo EVRM Gas shut off valves. https://duomo.co.uk/product/evrm-manual-reset-solenoid-gas-valve/

6. Typical Wiring Schematic



Key

Additional Audible Alarm (If Fitted)

Manaul Reset Gas Shut off Valve

Ventilation Fan (IF Fitted)

Important Note:
The combined load of all external components connected to the device must not exceed 4A. For larger loads auxiliary contactors must be used. Call Duomo Technical Department for further information.

7. Operation.

This device requires a permanent electrical supply. **DO NOT USE A PLUG IN LEAD.**

Initial Power up

The green 'On' light (6) will flash for approximately 90 Seconds. This is the warm up period. During this time the detector will not sense Gas or Carbon Monoxide.

The green 'On' light (6) will stop flashing and will remain continuously lit.

To test the detector operation without applying calibrated test gas press the Test Button (2) inside the enclosure. This test should only be conducted by a competent person. This test is used to establish the correct operation of connected devices and does not replace the requirement to Test using Calibrated test gas at least once a year.

Testing with calibrated test gas
Expose the Natural Gas sensor (3) to the a 20% LEL Test Gas. This Gas can be purchased from Duomo.
Expose the Carbon Monoxide sensor to Carbon Monoxide test gas from 30 to 300ppm. Please note the alarm test times for lower concentrations is extended to meet EN50291. See table 1 of this document.

Once the CHCO sounds the alarm the relevant Alarm light will be lit for whichever gas is detected. Internal switches or relays may be used for triggering a shut-off valve on the incoming mains gas pipe and to apply power to a remote alarm beacon or a ventilation fan, or both. Check correct functionality of all connected devices.

Remove the test gas, the detected level of gas will drop and the CHCO will auto-reset. That is to say the alarm relays will return to the no gas position. Note: Although the power supply is reinstated to the Gas valve, due to the type of valve to be used with this detector (Manual Reset Only). *see e) of Emergency Actions other considerations Page*

8. Ventilation Fan Important Note:

Any ventilation fan connected to this device must bring air into the room and not exhaust from it.

Exhaust gases from fuel burning appliances installed in the home may be drawn back from the flue system, if the action of an extractor fan (airflow from inside to outside) is stronger than the flue draught. In the event of a partially or fully blocked flue, the extraction fan may increase the release of exhaust gases into the room, and also the subsequent increased production of carbon monoxide.
A ventilation fan can increase the ventilation rate, provided that the airflow it creates is from outside to inside. It is essential to establish that any fan used to increase ventilation is correctly installed to ensure that the air supply inside the premises is not impaired by airflow from inside to outside.

9. Avoiding False alarms

This detector is designed to minimise the possibility of nuisance alarms. It is however possible that the detector could also respond to brief exhaust gas emissions, for example during the initial start-up of an appliance. Also, hydrogen acts as an interferent and can arise from some battery charging activities and the curing of concrete or cement under certain circumstances. Volatile Organic Compounds (VOCs), e.g. alcohols, which may eventually activate the alarm, can be generated from use of damp-proofing materials or other coatings containing alkylalkoxysilanes.

If any of the above contaminant gases are likely to be temporarily produced in the vicinity of the CHCO detector increase ventilation by open doors or windows.

10. Toxic effects of Carbon Monoxide

Carbon monoxide (CO) is a colourless, odourless, non-irritating gas classified as a chemical asphyxiant whose toxic action is a direct result of the hypoxia produced by a given exposure - CO is rapidly absorbed through the lungs, diffuses across the alveolar capillary membrane and is reversibly
bound with haemoglobin as carboxyhaemoglobin (COHb).
The affinity of haemoglobin for CO is over 200 times its affinity for oxygen. This reduces the oxygen carrying capacity of the blood, and has an effect on the dissociation of oxyhaemoglobin, which further reduces the oxygen supply to the tissues. CO is chemically unchanged in the body, and is eliminated in expired air. The elimination is determined by the same factors that applied during absorption. The half-life while breathing room air is 2 h - 6,5 h depending on the initial COHb level.
If the CO level in the inhaled air is constant, the level of COHb in the blood will approach an equilibrium (Saturation) state after several hours. However, the rate at which the equilibrium is reached depends on many factors, e.g. lung ventilation rate (physical activity) and alveolar capillary transfer, cardiac parameters, initial blood haemoglobin concentration, barometric pressure, oxygen and carbon dioxide concentration in the inhaled air, but the two most important factors in determining the COHb level are the CO concentration and the duration of exposure.

Table 2. Health effects of COHb blood levels on healthy adults

% COHb	Effects
0,3 – 0,7	Normal range in non-smokers due to endogenous CO production
0,7 – 2,9	No proven physiological changes
2,9 – 4,5	Cardiovascular changes in cardiac patients
4 – 6	Usual values observed in smokers, impairment in psycho-motor tests
7 – 10	Cardiovascular changes in non-cardiac patients (increased cardiac output and coronary blood flow)
10 – 20	Slight headache, weakness, potential burden on foetus
20 – 30	Severe headache, nausea, impairment in limb movements
30 – 40	Severe headache, irritability, confusion, impairment in visual acuity, nausea, muscular weakness, dizziness
40 – 50	Convulsions and unconsciousness
60 – 70	Coma, collapse, death
Source:	U.S. Environmental Protection Agency 1984

11.

Emergency actions when:

Carbon Monoxide is detected.

If CHCO initiates a Carbon monoxide alarm signal, and the ALARM CO light is lit, it is recommended that the following actions are taken in the order given:

1) keep calm and open all doors and windows to increase the rate of ventilation, but see also item a) below.

Stop using all fuel-burning appliances and ensure, if possible, that they are turned off, e.g. for gas
appliances, isolate the emergency control valve; This will already be isolated if connected to the appropriate terminal on the CHCO.

2) if the alarm continues to be activated, then evacuate the premises. Leave the doors and windows open, and only re-enter the building when the alarm has stopped. In multi-occupancy and multi-storey premises, ensure that all the occupants are alerted to the risk;

3) get medical help for anyone suffering the effects of carbon monoxide poisoning (see Table 2.) and advise that carbon monoxide inhalation is suspected;

4) telephone the appropriate appliance servicing and/or maintenance agency or, when necessary, the relevant fuel supplier on their emergency number or the national Gas Emergency Service Provider, if appropriate, so that the source of carbon monoxide emissions can be identified and corrected. Unless the reason for the alarm is obviously spurious (see item c) below), do not use the fuel-burning appliances again, until they have been checked and cleared for use by a competent person according to national regulations.

Natural Gas is detected

In the event of a Gas Alarm sounding and the ALARM GAS light being lit on the CHCO detector Fascia or the smell of gas even without an alarm:

Keep calm, and carry out the following actions, not necessarily in the order given:

– extinguish all naked flames, including all smoking material;
– turn off all gas appliances;
– do not switch on or off any electrical equipment, including the gas detection apparatus;
– turn off the gas supply at the gas main control and/or (with a LPG supply) the storage tank;
– open doors and windows to increase ventilation;
– do not use a telephone in the building where the presence of gas is suspected.

If the alarm continues to operate, even after an alarm resetting action where appropriate, and the cause of the leak is not apparent and/or cannot be corrected, vacate the premises and IMMEDIATELY NOTIFY the gas supplier and/or the gas emergency 24 h-service in order that the installation may be tested and made safe, and any necessary repair carried out.

If the alarm stops and the reason for the alarm having operated is identified, (for example a gas tap switched on with the burner unlit), after stopping the gas release and ensuring that all appliances are turned off, the main gas supply may be reinstated by manually resetting the manual reset solenoid valve type EVRM.
see e) *Emergency Actions - Other considerations*

12. Emergency Actions - Other considerations

In addition, the following items may modify the actions recommended above and, where appropriate, should be taken into consideration at the time of installing the apparatus:

a) It should be recognised that increasing ventilation rates may actually lead to higher levels of indoor carbon monoxide concentration under certain circumstances. Examples of such an occasion would be from a nearby vehicle exhaust or during extremely bad traffic pollution, especially in cold weather. It is therefore possible that outdoor conditions could be a factor in triggering domestic carbon monoxide alarms.

b) There may be another source of carbon monoxide emission inducing the alarm, for example

– a large amount of tobacco smoke,
– town gas,
– emission from a smouldering fire.

c) The alarm may be induced by other substances. (See 9. Avoiding False Alarms)

d) Particular situations could result in exposure to emissions from neighbouring premises, especially in multi-occupancy and multi-storey properties. There may be special problems with shared or poorly-sited flues, for example, which could lead to ingress of carbon monoxide from elsewhere in the same building. Such possibilities should be fully investigated when installing the apparatus.

e) The CHCO provides an output signal which may be used to activate an ancillary device, such as a ventilation fan or gas shut-off valve. Once triggered, these devices may need to be manually reset, but this should not be done until the source of carbon monoxide or fuel gas escape has been identified and the fault corrected.

13. Maintenance

This device should be tested periodically ideally every 6 months but a minimum of every 12 months. The procedure is described in 7. Operation. In the unlikely event that the CHCO fails its routine test, please contact Duomo technical department on 01905 797989. Advice will be given as to the best course of action. You will need to provide the date of purchase and the serial number of the CHCO.

14. Anticipated Lifetime of the CHCO.

From date of supply the CHCO has an anticipated lifespan of 6 years. This will be indicated on the label placed on the fascia of the device during installation. Dated stickers are provided loose in the packing. These must be applied by the installer of the device.

The CHCO has an automatic end-of-life feature that raises a fault-warning signal when it is necessary to replace the apparatus. This actuates when the return signal from either the Natural Gas Sensor or the carbon monoxide sensor falls outside pre-set values. If the fault light (7. Layout of Components) becomes lit the unit will fail safe and the CHCO must be replaced.

15. Warranty Period

From date of manufacture the warranty period is 2 years. This is extendible to 3 years by registering this product online at https://duomo.co.uk/product-warranty/ .

16. Declaration of Conformity

Unit 5 The Furlong
Berry Hill Industrial Estate
Droitwich, Worcestershire, WR9 9AH.
Telephone: 01905 797989 - Fax:01905 774296
V.A.T.number: 641099931 - Company registration number:2914620

DECLARATION OF CONFORMITY

Natural gas & Carbon Monoxide detector Art. **CHCO**

It conforms to the following regulations:

Electromagnetic compatibility **(2014/30/EU – EMC)**
according to **CEI-EN50270:2006 "**Electromagnetic compatibility. Electrical apparatus for the detection and measurement of combustible gases, toxic gases or oxygen"

Electrical safety **(2014/35/EU – LVD)**
according to **EN 60335-1:2013 "**Household and similar electrical appliances - Safety - Part 1:General requirements"

Reference Norms The above mentioned appliances are manufactured and tested according to Norms**: BS EN 50194-1:2009** "Electrical apparatus for the detection of combustible gases in domestic premises. Test methods and performance requirements", BS **EN 50291-1:2010+A1:2012** "Electrical apparatus for the detection of carbon monoxide in domestic premises. Test methods and performance requirements" and **EN 50271:2010** "Electrical apparatus for the detection and measurement of combustible gases, toxic gases or oxygen. Requirements and tests for apparatus using software and/or digital technologies"

RoHS Mark

The above mentioned appliances are designed according to the DIRECTIVE 2011/65/EC (RoHS) and do not contain:
Lead
Mercury
Cadmium
Hexavalent Chromium (Chromium IV)
Polybrominated Biphenyls (PBB)
Polybrominated Diphenyl Ethers (PBDE)

RoHS Compliant

GasTest

Natural gas
Mains Power Supply 230V AC within 2% of rating
Volume Ratio of Gas Litres input up to 10% of L.E.L.+/- 3%
Temperature 23^{0}C for the entire duration of the test +/- 2% of rating
Relative Humidity 45% for the entire duration of the test +/- 10%
Constant Barometric Pressure for the entire duration of the test +/- 1kPa **Gas Speed**
0.35m/s
Calibration at 10% of L.E.L.+/- 3% tolerance
Carbon monoxide
Mains Power Supply 230V AC within 2% of rating
Volume Ratio of Gas Litres input up to
Temperature 23^{0}C for the entire duration of the test +/- 2% of rating
Relative Humidity 45% for the entire duration of the test +/- 10%
Constant Barometric Pressure for the entire duration of the test +/- 1kPa **Gas Speed**
0.35m/s
Calibration according to Norms and below table parameters

30 ppm	**after 120 minutes**
50 ppm	**after 60 minutes**
100 ppm	**after 10 minutes**
300 ppm	**immediate**

Additional notes
The above outlined detector conforms to regulation 2014/30/EU, 2014/35/EU and the CE mark applied on the product refers to this regulation. The product was subjected to tests using a typical configuration.

Technical Director
Duomo (UK) Ltd
Phillip Wild

Droitwich, December 2017

DISPOSAL OF OLD ELECTRICAL & ELECTRONIC EQUIPMENT (EU directive 2012/19/EU) This symbol on the product or its packaging to indicates that this product shall not be treated as household waste. Instead, it shall be handed over to the applicable collection point for the recycling of electrical and electronic equipment, such as for example: - sales points, in case you buy a new and similar product - local collection points (waste collection centre, local recycling centre, etc...). By ensuring this product is disposed of correctly, you will help prevent potential negative consequence for the environment and human health, which could otherwise be caused by inappropriate waste handing of this product. The recycling of materials will help to conserve natural resources. For more detailed information about recycling of this product, please contact your local city office, your house hold waste disposal service or the shop where you purchased the product. Attention: in some countries of the European Union, the product is not included in the field of application of the National Law that applies the European Directive 2012/19/EU and therefore these countries have no obligation to carry out a separate collection at the "end of life" of the product

DUOMO

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