

Belimo Gas Monitors



Operating Manual



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1.0 General description

Safety Note

This user manual provides all required information to properly install, operate, and maintain a Belimo gas monitoring system. Installation, operation, and maintenance not in accordance with this manual can result in a hazardous situation or harm. Please read and understand this document before installing and servicing your own system.

General Description

Closely monitoring the quality of air that we breathe improves our wellbeing. It keeps us safe and comfortable, as well as saves energy and money by allowing for on demand ventilation as opposed to continuous or scheduled ventilation.

All Belimo gas monitors are factory calibrated and can monitor up to two different gases simultaneously. All monitors feature internal audible and visual alarms, and CAN bus communication that allows for standalone operation. Select models provide direct control through analog outputs and relays, and integration into a building management system (BMS) through BACnet MS/TP. All monitors are wired daisy chain, allowing up to 32 devices per chain, and can be easily assigned to groups on-site to zone ventilation on the same network. Optional accessories include communication modules, relay units, sensor modules, calibration kits, external horn and strobe alarms, transformers, duct and splash proof enclosures, high low kits, and security screws. All Belimo branded gas monitoring products come with a five-year warranty and all sensor modules come with a one-year warranty.



1.1 Warnings

- All Belimo gas monitors are designed to monitor for air quality and gas leaks, that under normal conditions, are not constantly present in high concentrations.
- All devices must be powered down during installation, and prior to operation and maintenance.
- All Belimo gas monitoring systems must be installed, operated, and maintained by trained personnel in accordance with local codes. It is their responsibility to provide a safe and functional system.
- Installers must take caution for electrostatic discharge (ESD) during installation, service, and replacement of sensor modules.
- Install devices in locations that are easily serviceable, safely accessible, and protected from physical damage from cars, forklifts, equipment, etc.
- To prevent electrical interference, keep all devices and wiring away from mercury vapor lights, variable speed drives, and radio repeaters.
- To prevent mechanical interference, keep all devices and wiring away from electrical shock, continuous mechanical shock, and vibration.
- Substances to avoid include silicon vapor, paint fumes, and solvents, which can destroy or affect gas monitor performance.
- Do not paint any gas monitors or accessories.
- Protect gas monitors from continuous exposure to water with a splash proof enclosure.
- Use accessories and parts meeting or exceeding Belimo specifications.
- For all applications more than one device should be installed to limit the chance of failures.
- All gas monitors require a warm up time to operate normally (See section 3.4).
- Belimo gas monitors and communication modules can be password protected.
- Belimo gas monitors are required to be calibrated annually or more frequently as specified. Upon calibration, it is highly recommended to verify proper operation of the gas monitoring system.
- All Belimo gas monitors sensing methane, propane, and hydrogen are required to have their sensor modules replaced annually, not recalibrated.
- Intended applications include residential, light commercial, and light industrial. Non intended applications include heavy commercial, heavy industrial, or hazardous locations.



WARNING: DO NOT PAINT THE MONITOR

1.2 Applications

- **Residential Applications**
 - Private homes
 - Apartment buildings
 - Condominium buildings
 - Parking garages
- **Light Commercial Applications**
 - Schools
 - Hospitals
 - Commercial buildings
 - Shopping malls
 - Service centers
 - Retail
 - Offices
 - Hotels
 - Warehouses
 - Data centers
- **Light Industrial Applications**
 - Food processing plants
 - Textile plants
 - Vehicle and machinery facilities
 - Warehouses
- **Vehicle Emissions (CO, NO₂)**
 - Enclosed parking garages
 - Loading docks
 - Automotive maintenance facilities
 - Truck maintenance facilities
 - Fire stations
 - Ambulance bays
 - Boiler rooms
 - Warehouses
- **Indoor Air Quality (CO₂)**
 - Breweries
 - Indoor greenhouses
 - Grow farms
 - Warehouses
- **Combustible and Toxic Gases (NH₃, CH₄, C₃H₈, H₂, H₂S, CL₂, O₂ Leak, O₂ Depletion)**
 - Food processing plants (NH₃)
 - Cold storage (NH₃)
 - Ice rinks (NH₃)
 - Landfills (NH₃, H₂S, CH₄)
 - Water and wastewater treatment plants (NH₃, H₂S, CL₂)
 - Recycle centers (NH₃, H₂S)
 - Natural gas monitoring (CH₄)
 - Commercial kitchens (C₃H₈, CH₄)
 - Laboratories (C₃H₈, O₂ Leak, O₂ Depletion)
 - Warehouses (C₃H₈, H₂)
 - Lead acid battery charging stations (H₂)
 - Swimming pool mechanical rooms (CL₂)
 - Medical labs (O₂ Leak, O₂ Depletion)
 - Hospitals (O₂ Leak, O₂ Depletion)
 - Welding facilities (O₂ Leak, O₂ Depletion)
- **Refrigerant Gas Leak Detection (Broadband Infrared)**
 - Mechanical rooms
 - Compressor rooms
 - Locations where refrigerant is stored

1.3 Features

- Gas monitors sense up to two different gases in each device
- Stand-alone operation through CAN bus and integrated operation through BACnet MS/TP
- Adjustable alarm levels, delays, relays, and analog outputs
- Factory calibrated field replaceable sensor modules
- Programmable LCD display and four button keypad
- Binary input for external switch or input (fan on or damper open)
- BACnet Testing Laboratories (BTL) listed smart sensor

1.4 Specifications

- Supply:
 - 24 V AC, 50/60 Hz, 0.21 A, 5 VA
 - 24 V DC, 0.07 A, 5W
- Relays (SPDT), 5A @ 125 V AC / 4A @ 24 V DC, non-inductive
- Operating temperature range, -20°C...+40°C (-4°F...+104°F)
- For indoor use
- Flame resistant polycarbonate ABS plastic enclosure rated to UL94 5VA and NEMA 2 IP44
- Certified by CSA according to C22.2. No. 61010-1
- Certified to UL according to 61010-1
- Certified to UL according to UL 2075 and ULC-S588 for the following models: 22G02-5A, 22G02-5B, 22G02-5C, 22G14-5A, 22G14-5B, 22G14-5C, 22G0214-5A, 22G0214-5B, 22G0214-5C
- Analog outputs of 4...20 mA or 2...10 V (user selectable)
- Pollution degree 2
- Installation category II
- Maximum altitude 2000 m (6560 ft)
- Ambient humidity 15...90% RH continuous, 0...99% RH intermittent, non condensing

1.5 User Interface

- Home screen on the back lit LCD display shows gas types, gas concentrations, and alarm level statuses
- LCD display and 4 button keypad to program and calibrate the gas monitor
- Optional password protection
- Red LED alarm indicators for alarm level 1 and 2
- High intensity white LED strobe and audible alarm (80 dB) for alarm level 3
- Top, bottom, and back conduit knockouts

2.0 Model selection guide

Gas Monitors

22G	xx	yy	-5	..
	Gas Type Identification Number, Top Sensor	Gas Type Identification Number, Bottom Sensor		Model of Gas Monitor

22Gxxyy-5A

- CAN bus
- BACnet MS/TP
- 1 relay
- 2 analog outputs

22Gxxyy-5B

- CAN bus
- BACnet MS/TP
- 2 relays

22Gxxyy-5C

- CAN bus



Communication Modules

C	-22G	-5	..
			Model of Communication Module

C-22G-5A

- CAN bus
- BACnet MS/TP
- 1 relay
- 2 analog outputs

C-22G-5B

- CAN bus
- BACnet MS/TP
- 2 relays

C-22G-5C

- CAN bus



Relay Units

C	-22G	-50
Relay Unit		

C-22G-50

- CAN bus
- 4 relays



Sensor Modules

R	-G	XX
Gas Type Identification Number		



Miscellaneous Accessories

A	-22G	-A	XX
Accessory Identification Number			



APPLICATION	GAS TYPE	ABBREVIATION	GAS TYPE IDENTIFICATION NUMBER	MEASURING RANGE
Vehicle Emissions	Carbon Monoxide	CO	02	0...250 ppm
		CO Null H ₂	03	0...250 ppm
	Nitrogen Dioxide	NO ₂	14	0...10 ppm
Indoor Air Quality	Carbon Dioxide	CO ₂	15-003	0...2000 ppm
			15-005	0...5000 ppm
			15-006	0...10000 ppm
Combustible and Toxic Gases	Ammonia	NH ₃	04	0...250 ppm
	Methane	CH ₄	05	0...50% LEL
	Propane	C ₃ H ₈	06	0...50% LEL
	Hydrogen	H ₂	08	0...50% LEL
	Hydrogen Sulfide	H ₂ S	16	0...50 ppm
	Chlorine	CL ₂	17	0...10 ppm
	Oxygen Leak	O ₂ Leak	22	0...50% O ₂
	Oxygen Depletion	O ₂ Depletion	23	0...50% O ₂
	Argon	Ar (O ₂ Depletion)	23	0...50% O ₂
	Helium	He (O ₂ Depletion)	23	0...50% O ₂
Refrigerant Gas Leak Detection	Infrared Broadband Refrigerant	IR Ref.	21	0...2000 ppm
	R11, R22, R23, R32, R123, R125, *R134A, R404A, R407A, R407C, R407F, R410A, R448A, R449A, R452A, R455A, R507, R513A, R1233zd, R1234yf, R1234ze			
	*Default			

3.0 Installation

3.1 Placement

Coverage area

All Belimo gas monitors are diffusion type monitors. Guidelines for the placement of diffusion type monitors are based on the reasonable delay for gas to get from the source to the sensor.

- For air quality control of exhaust emissions and accumulations of toxic gases the generally acceptable maximum radius of coverage is 50 feet (15 meters). Approximately 7800 square feet (700 square meters).
- For leak detection of combustible gases, ammonia, and refrigeration gases, the generally acceptable maximum radius of coverage is 30 feet (10 meters). Approximately 2800 square feet (300 meters).

The coverage area of any gas monitor does not extend beyond any obstruction that impedes the natural circulation of air. This includes walls, stairs, elevators, shelving with solid fill, tool chests, etc. The gas monitor must "see" the area of coverage; if not, additional gas monitors are required.

Mounting height (based on gas density relative to air)

1. For gases with a **lighter density to air**:
Ammonia (NH₃), Methane (natural gas, CH₄), Hydrogen (H₂):
Install at 1 to 3 feet (0.3 to 0.9 meters) from the ceiling
2. For gases with a **similar density to air**:
Carbon monoxide (CO), Carbon dioxide (CO₂), Oxygen leak (O₂ leak),
Oxygen depletion (O₂ dep.):
Install at 3 to 7 feet (1 to 2 meters) from the floor.

Nitrogen dioxide (NO₂): If diesel exhaust is **under** vehicles, or if the ceiling height is 15 feet or less, install at 3 to 7 feet (1 to 2 meters) from the floor.

Nitrogen dioxide (NO₂): If diesel exhaust is **above** vehicles, or if the ceiling height is above 15 feet, install at half the ceiling height and above the vehicles.

3. For gases with a **heavier density to air**:
Propane (C₃H₈), Hydrogen Sulfide (H₂S), Chlorine (CL₂), Refrigerants:
Install at 1 to 2 feet (0.3 to 0.5 meters) from the floor.

For all types of gas monitors avoid drafts, obstacles, aerosols, and silicones and place them in the center of their area of coverage as much as possible. In all cases the gas monitors must be installed above obstructions to allow circulation of air. Example: maintenance garages in automobile dealerships where tool chests, worktables, and storage racks typically line all walls.

Installation on round columns

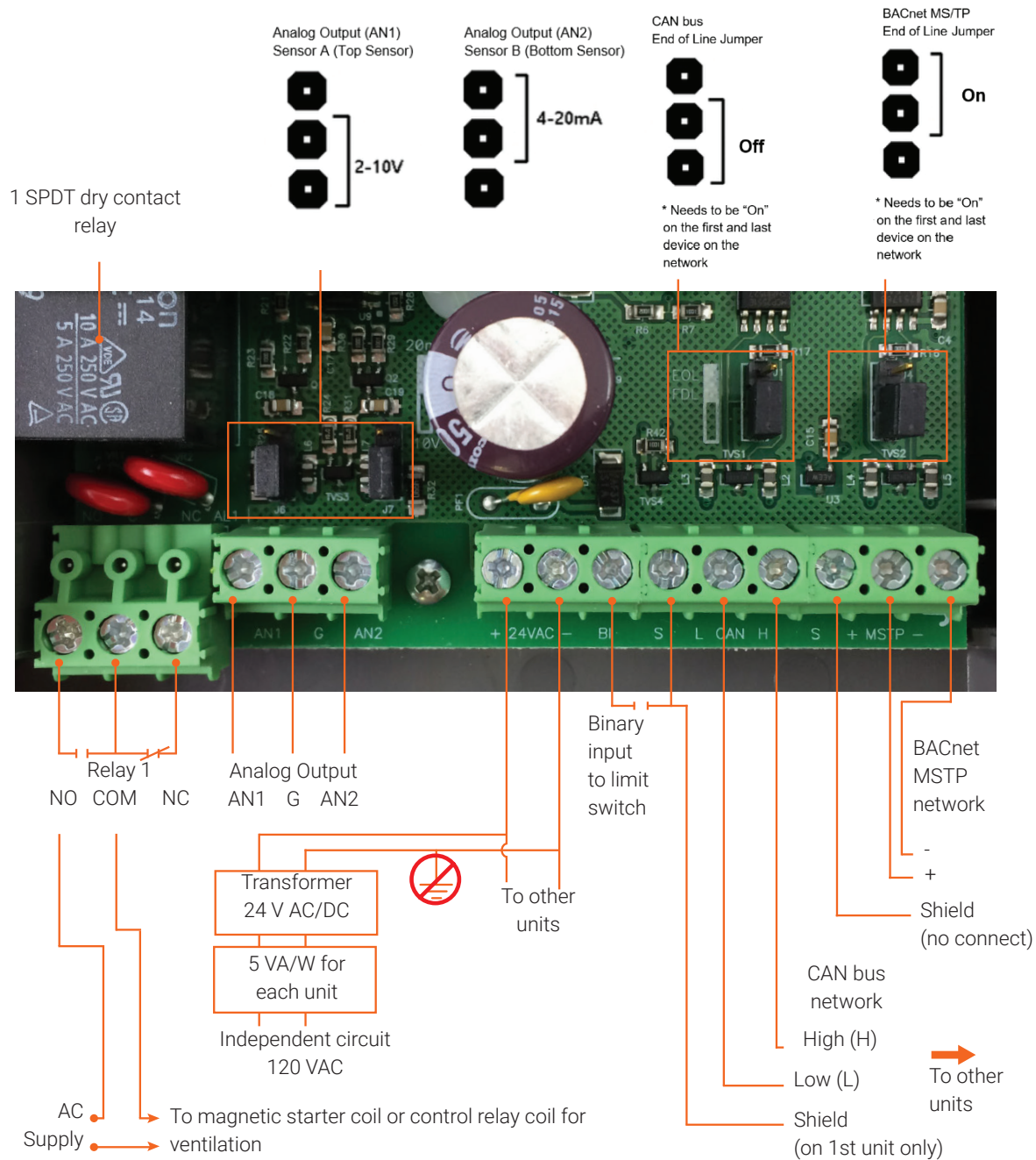
Please follow coverage area and mounting height recommendations above. To install gas monitors on round columns, use the yellow feet provided with the gas monitor for stability. The yellow feet are not required if installed on a flat wall.

3.2 Wiring

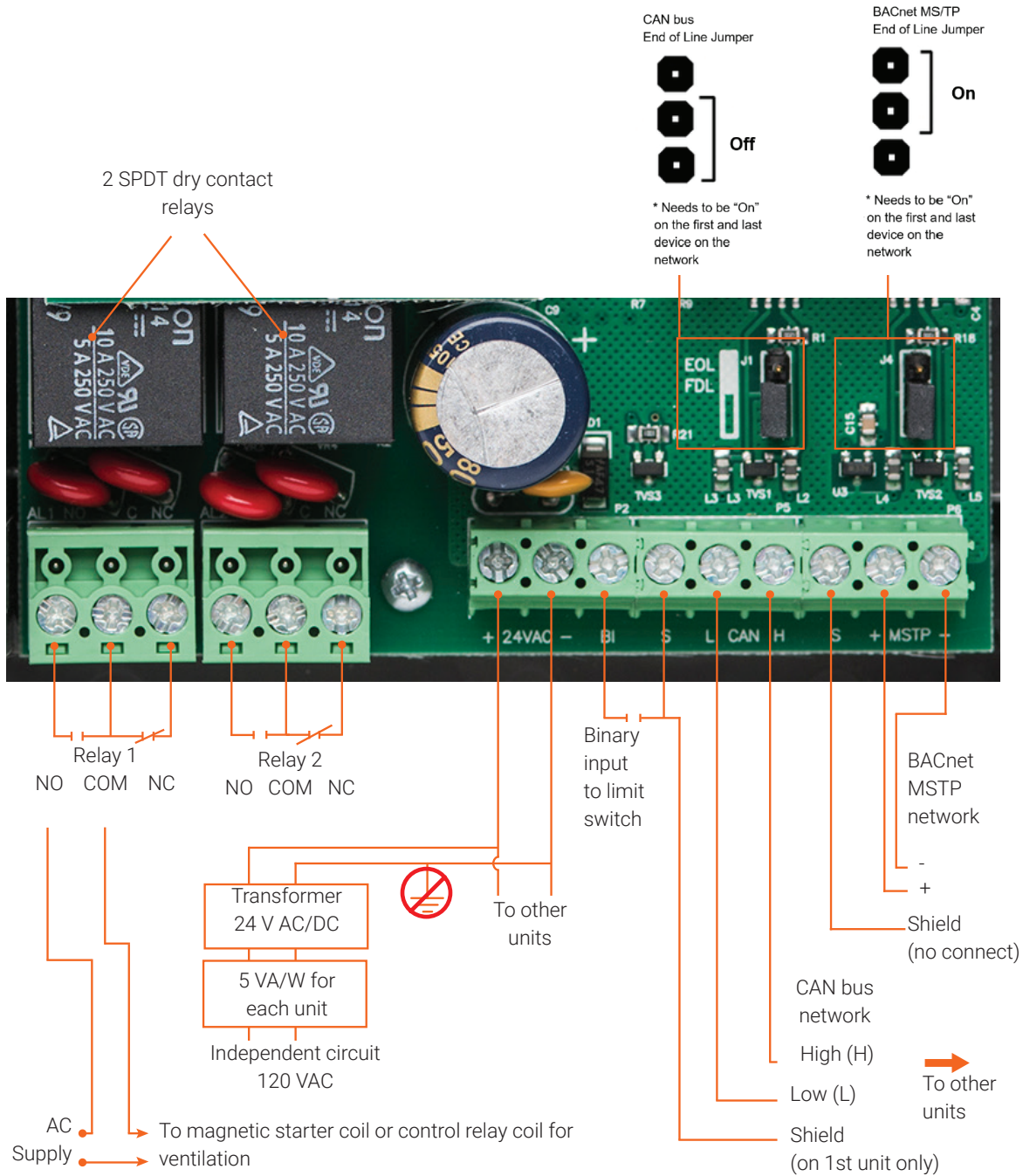
Use x1 14...20 AWG (2.5...0.5 mm²) or x2 18...20 AWG (0.75...0.5 mm²) for power.

Use 22...24 AWG (0.34...0.25 mm²) twisted pair, low capacitance, shielded, communication cable for BACnet MS/TP and CAN bus.

3.2.1 Wiring Diagram -A Model (22Gxx-5A / C-22G-5A)

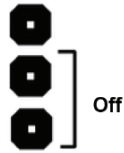


3.2.2 Wiring Diagram -B Model (22Gxx-5B / C-22G-5B)

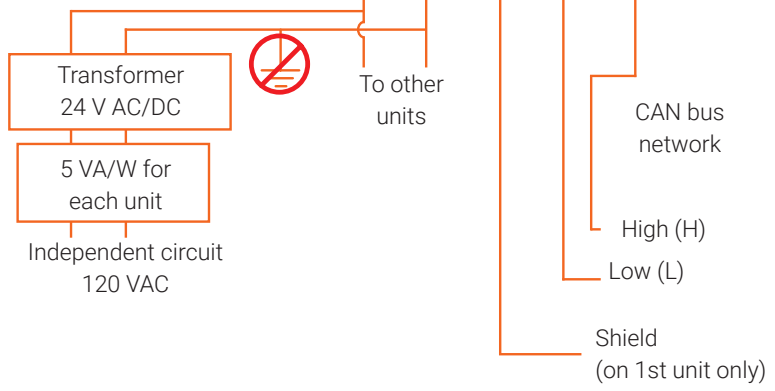
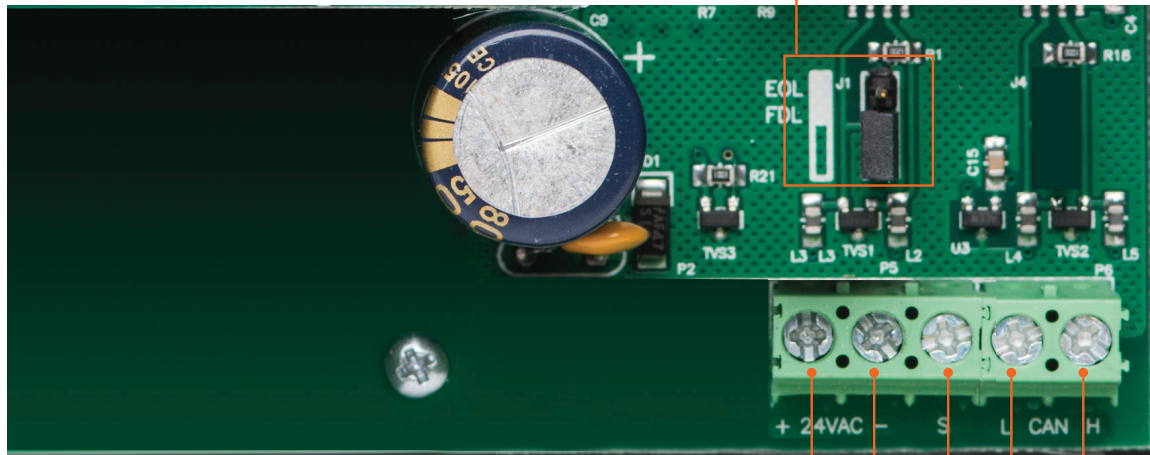


3.2.3 Wiring Diagram -C Model (22Gxx-5C / C-22G-5C)

CAN bus
End of Line Jumper



* Needs to be "On"
on the first and last
device on the
network



3.3 Warm-up Time

All Belimo gas monitors require a warm up time for the sensor elements to stabilize.

GAS TYPE IDENTIFICATION NUMBER	DESCRIPTION	WARM UP TIME
02, 03, 04, 14, 16, 17	02 (Carbon Monoxide) 03 (Carbon Monoxide Null H2) 04 (Ammonia) 14 (Nitrogen Dioxide) 16 (Hydrogen Sulfide) 17 (Chlorine)	5 minutes
15-xxx	15-003 (Carbon dioxide, 0...2000 ppm) 15-005 (Carbon dioxide, 0...5000 ppm) 15-006 (Carbon dioxide, 0...10000 ppm)	10 minutes
21	21 (Infrared Broadband Refrigerant)	1 hour
05, 06, 08	05 (Propane / Natural Gas) 06 (Methane) 08 (Hydrogen)	24 hours
22, 23	22 (Oxygen Leak) 23 (Oxygen Depletion)	48 hours

*The warm up times in this table are required for the sensor modules to fully stabilize.

3.4 Check List

Important

All wiring must conform to local building codes, regulations and laws. If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

1. Use ½ inch EMT conduit for all wiring.
2. A switch or circuit breaker must be included in the installation. It must be suitably located and easily reached in a secure location and identified as the disconnect for the "Gas Monitoring System".
3. Install enclosed 120 to 24 V AC/DC or 240 to 24 V AC/DC transformer. For the size of transformer allow 5 VA or 5 W for each gas monitor, communication module, and relay unit. Use x1 14...20 AWG (2.5...0.5 mm²) or x2 18...20 AWG (0.75...0.5 mm²) wire for power. Do not tie the secondary to ground. Connect multiple devices to one transformer. Ensure that the polarity of the power connections is the same at each device, otherwise communication will not function.
4. Connect relay contacts (usually relay 1) to ventilation system. Use a magnetic starter so that the gas monitor, communication module, or relay unit contacts energize the starter coil and not the fan motor directly. Relay contacts are rated at 5 amps @ 125 VAC non-inductive.
5. For multiple devices inter-connected using CAN bus, connect a 22...24 AWG (0.34...0.25 mm²) twisted pair, low capacitance, shielded communication cable from screw "L" and "H" on one device to the next, and continue the

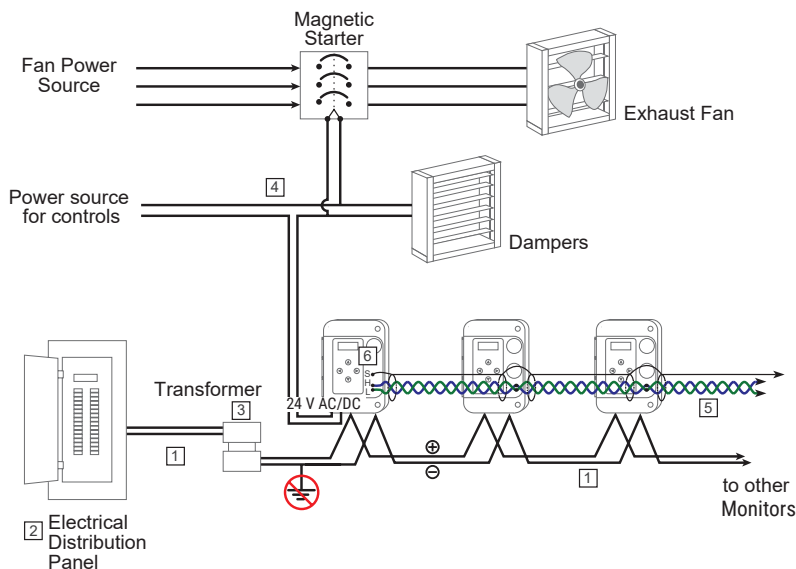
daisy chain to the last device. Maintain the same polarity on each unit. Do not use star, T, or H junctions, only a continuous daisy chain. Make all daisy chain connections at the devices. Connect the shield to "S" on the first device only and join shields together at each additional devices after the first.

6. When using CAN bus or BACnet MS/TP, Move the end-of-line jumper to the on position (top two pins) on the first and last devices on the daisy chain only. A communication module or relay unit can be located anywhere on the chain. Ensure all device's EOL jumpers are off (bottom two pins) if they are in the middle of the chain. Device addresses can be in any location on the chain.
7. Power on the units. They will display the gas types, gas concentrations, and alarm level statuses. First, set the CAN bus address on each gas monitor or communication module on the CAN bus network. Press → until you reach option 39. Press ↑ to switch from 0 to change the CAN bus address. Press ↑ and ← simultaneously to save, then press and hold ← for a few seconds to return home.

To verify if the devices are communicating correctly, change setting no. 56 on one device. Press → until you reach option 56. Press ↑ to switch from 0 to 1, to turn on the network display. Press ↑ and ← simultaneously to save (the screen will show "OK" if it was saved correctly), then press and hold ← for a few seconds to return home. The unit will display each device connected on CAN bus in order of their address. If the unit does not display all of the devices on the network, check the following:

- each unit must have a unique address, setting 39, with no duplicates
- end-of-line jumpers are set on units at ends of cable only
- polarity of the communication cable and the AC/DC 24 V is the same on all units
- verify wire connections for shorts, and loose wires, etc.

8. To further test communication, press and hold the up button on any monitor for at least 5 seconds to start manual mode (5 minutes). This will close the relay 1 on that unit and all of the other units on the network. See section 5 to set up a configuration for multiple zones.



4.0 Operation

4.1 Screen Display

The LCD shows the gas type, concentration, and alarm level status. If the gas monitor has two sensor modules, the display will alternate between them.

1 indicates that alarm level one has been reached. The alarm level one parameter is configurable per settings 0, 1, 2 for sensor A (top sensor) and 18, 19, 20 for sensor B (bottom sensor). It can also be activated by other gas monitors on the CAN bus network per setting 36.

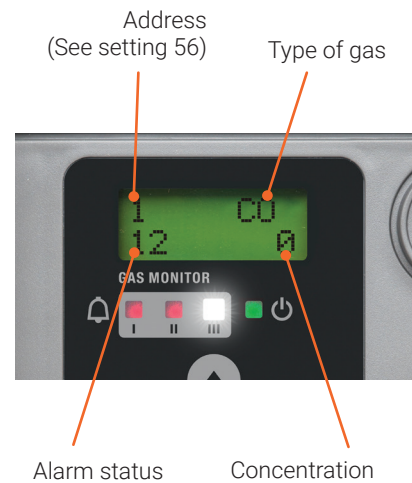
2 indicates that alarm level two has been reached. The alarm level two parameter is configurable per settings 3, 4, 5 for sensor A (top sensor) and 21, 22, 23 for sensor B (bottom sensor). It can also be activated by other gas monitors on the CAN bus network per setting 37.

3 indicates that alarm level three has been reached. The alarm level three parameter is configurable per settings 6, 7, 8 for sensor A (top sensor) and 24, 25, 26 for sensor B (bottom sensor). It can also be activated by other gas monitors on the CAN bus network per setting 38.

M indicates that manual override is active. It provides the ability to test the ventilation system and manually bring in fresh air. To activate the manual override, go to the home screen and press and hold ↑ for at least 5 seconds to start. To adjust the time interval when the manual override automatically turns off, click ↑ again to increase the time between 5 to 60 minutes. The alarm level 1 activates (or 1 and 2, or 1, 2, and 3 per setting 69) and transmits messages (settings 9-17 for sensor A and 27-35 for sensor B) to other monitors on the CAN bus network. The monitor will return to normal operation after the time runs down. To cancel the manual override, press ↓ several times to reduce the time left to run, or from the home screen, press ↓ several times until it turns it off. M also is displayed when the auto cycle is on; refer to setting 73.

T indicates that alarm one is on due to high ambient temperature reading (setting 51), this can be useful during summer ventilation. Please note that all gas monitors and communication modules have an internal temperature sensor. It turned on, the home screen will alternate between showing the gas type, gas concentration, alarm level status, and the temperature. To turn this on, press → until you reach option 44. Press ↑ to switch from 0 to 1, to turn on the temperature display. Press ↑ and ← simultaneously to save, then press and hold ← for a few seconds to return home.

To view the firmware of the device at any time, press and hold ← and ↓ at the same time. The firmware will display on the LCD.



4.2 Default Alarm Levels

Alarm level thresholds are factory set with default values but should be set to suit local regulations.

APPLICATION	GAS TYPE	GAS TYPE IDENTIFICATION NUMBER	MEASURING RANGE	ALARM LEVEL 1 (DEFAULT)	ALARM LEVEL 2 (DEFAULT)	ALARM LEVEL 3 (DEFAULT)
Vehicle Emissions	Carbon Monoxide (CO)	02	0...250 ppm	25 ppm	35 ppm	75 ppm
	Carbon Monoxide (CO Null H ₂)	03	0...250 ppm	25 ppm	35 ppm	75 ppm
	Nitrogen Dioxide (NO ₂)	14	0...10 ppm	0.5 ppm	1.0 ppm	2.0 ppm
Indoor Air Quality	Carbon Dioxide (CO ₂)	15-003	0...2000 ppm	800 ppm	1200 ppm	1500 ppm
	Carbon Dioxide (CO ₂)	15-005	0...5000 ppm	2000 ppm	3000 ppm	4000 ppm
	Carbon Dioxide (CO ₂)	15-006	0...10000 ppm	2000 ppm	3000 ppm	4000 ppm
Combustible and Toxic Gases	Ammonia (NH ₃)	04	0...250 ppm	25 ppm	50 ppm	100 ppm
	Methane (CH ₄)	05	0...50% LEL	10% LEL	15% LEL	20% LEL
	Propane (C ₃ H ₈)	06	0...50% LEL	10% LEL	15% LEL	20% LEL
	Hydrogen (H ₂)	08	0...50% LEL	10% LEL	15% LEL	20% LEL
	Hydrogen Sulfide (H ₂ S)	16	0...50 ppm	2.5 ppm	3.5 ppm	7.5 ppm
	Chlorine (CL ₂)	17	0...10 ppm	0.5 ppm	1.0 ppm	2.0 ppm
	Oxygen Leak (O ₂ Leak)	22	0...50% O ₂	24% O ₂	27% O ₂	30% O ₂
	Oxygen Depletion (O ₂ Depletion)	23	0...50% O ₂	18% O ₂	17% O ₂	16% O ₂
Refrigerant Gas Leak Detection	Infrared Broadband Refrigerant (IR)	21	0...2000 ppm	250 ppm	350 ppm	750 ppm

4.3 Changing Settings

Press → and ← to move through the programmable settings. If the keypad lock is on then enter the passcode first. The screen will display the setting number, a short description of the setting (e.g. AL1 for alarm level 1 set point) and the current setting. To change the programmable settings, press the ↑ or ↓ buttons to increase or decrease the value.

Press the ↑ or ↓ buttons to increase or decrease the setting.

To save, press ↑ and ← buttons at the same time. The word "OK" will appear. If you do not see "OK" and the new value on the screen it is because the buttons were not pressed simultaneously and the new value was not saved. Please try again.

4.4 Password Protection

All Belimo gas monitors and communication modules can be password protected with a six-keystroke passcode. This locks the keypad and programmable settings to protect them from being tampered with. The default passcode is ↑↓↑↓↑↓. To create a unique six keystroke passcode, please follow the steps below.

1. Press → to enter settings.
2. Press and hold → until you reach setting MO PASS?
*This is the last setting and it does not have a number.
3. Press ↑ to enter a new passcode.
4. Enter any six keystroke passcode using the ↑ ↓ ← → buttons.
5. Re-enter the six keystroke passcode using the ↑ ↓ ← → buttons.
6. Press and hold → until you reach setting 49 (Keyboard Lock).
7. Press ↑ to switch 0 to 1.
8. Press ↑ and ← at the same time to save.
*If saved correctly the word "OK" will appear on the LCD. If you do not see "OK" and the new value on the LCD, it is because the buttons were not pressed at the same time. Please try again.
9. Hold ← for five seconds to return to the home screen. You should now be locked out. Input your passcode to access the programmable settings.
*If you enter your passcode and it does not work the first time, wait ten seconds and try again. Remember your pass code.

4.5 List of Settings

All programmable settings (shown in section 4.4) are factory set with default values to facilitate set up and commissioning and can be changed at any time. Alarm level thresholds are also factory set with default values but should be set to suit local regulations. Upgrading firmware will not affect user settings. Note: Hold left and down arrows at the same time to display firmware version.

Programmable settings for sensor A (top sensor module)

NO.	NAME	DESCRIPTION	RANGE	DEFAULT
0	AL1	Alarm 1 threshold, activates relay 1	by sensor type	
1	A1Del	Alarm 1 delay on (seconds)	2...1000	30
2	A1Off	Alarm 1 delay off (seconds)	0...1000	20
3	AL2	Alarm 2 threshold, activates relay 2	by sensor	
4	AL2Del	Alarm 2 delay on (seconds)	2...1000	30
5	AL2Off	Alarm 2 delay off (seconds)	0...1000	20
6	AL3	Alarm 3 threshold, sounder	by sensor type	
7	A3Del	Alarm 3 delay on (seconds)	2...1000	180
8	A3Off	Alarm 3 delay off (seconds)	0...1000	20
9	A1Tx	Alarm 1 transmit message, CAN bus	0...255	1
10	A1Tx	Alarm 1 transmit message, CAN bus	0...255	*0
11	A1Tx	Alarm 1 transmit message, CAN bus	0...255	*0
12	A2Tx	Alarm 2 transmit message, CAN bus	0...255	2
13	A2Tx	Alarm 2 transmit message, CAN bus	0...255	*0
14	A2Tx	Alarm 2 transmit message, CAN bus	0...255	*0
15	A3Tx	Alarm 3 transmit message, CAN bus	0...255	3
16	A3Tx	Alarm 3 transmit message, CAN bus	0...255	*0
17	A3Tx	Alarm 3 transmit message, CAN bus	0...255	*0

*0 = inactive

Programmable settings for sensor B (bottom sensor module)

NO.	NAME	DESCRIPTION	RANGE	DEFAULT
18	AL1-B	Alarm 1 threshold, activates relay 1	by sensor type	
19	A1Del	Alarm 1 delay on (seconds)	2...1000	30
20	A1Off	Alarm 1 delay off (seconds)	0...1000	20
21	AL2-B	Alarm 2 threshold, activates relay 2	by sensor type	
22	A2Del	Alarm 2 delay on (seconds)	2...1000	30
23	A2Off	Alarm 2 delay off (seconds)	0...1000	20
24	AL3-B	Alarm 3 threshold, sounder and strobe	by sensor type	
25	A3Del	Alarm 3 delay on (seconds)	2...1000	180
26	A3Off	Alarm 3 delay off (seconds)	0...1000	20
27	A1Tx	Alarm 1 transmit message, CAN bus	0...255	1
28	A1Tx	Alarm 1 transmit message, CAN bus	0...255	*0
29	A1Tx	Alarm 1 transmit message, CAN bus	0...255	*0
30	A2Tx	Alarm 2 transmit message, CAN bus	0...255	2
31	A2Tx	Alarm 2 transmit message, CAN bus	0...255	*0
32	BiTx	Binary input transmit message when limit switch is closed, CAN bus. See 3.2.1	0...255	0
33	A3Tx	Alarm 3 transmit message, CAN bus	0...255	3
34	A3Tx	Alarm 3 transmit message, CAN bus	0...255	*0
35	A3Tx	Alarm 3 transmit message, CAN bus	0...255	0

*0 = inactive

Programmable settings for the gas monitor. (Not specific for each sensor module)

NO.	NAME	DESCRIPTION	RANGE	DEFAULT
36	R1Rx	Receive message to activate relay 1, CAN bus	0...255	1
37	R2Rx	Receive message to activate relay 2, CAN bus	0...255	2
38	R3Rx	Receive message to activate sounder and strobe CAN bus	0...255	*0
39	Adr	Monitor identification address, CAN network	0...31	*0
40	AnZA	Accessing this option forces analog output A to low for testing with multimeter only and no external cables attached. Use up and down arrows to adjust lowest setting (2 V or 4 mA) and save	0...1023	180
41	AnSA	Accessing this option forces analog output A to high for testing with multimeter only and no external cables attached. Use up and down arrows to adjust highest setting (10 V or 20 mA)	0...1023	
42	AnZB	As option 40 but for output B	0...1023	
43	AnSB	As option 41 but for output B	0...1023	
44	Temp	Temperature display enable off/on	0/1	*0
45	Aud	Local audio and visual alarms enabled on alarm 3	0/1	1
46	BAC	BACnet MSTP mode select 0 = BACnet communication disabled 1 = BACnet communication enabled 2 = BACnet communication enabled and display all sensors on CAN bus	0/1/2	*0
47	BMA	BACnet MAC address	0...127	1
48	BBR	BACnet baud rate 0 = 9600 1 = 19200 2 = 38400 3 = 76800	0/1/2/3	3
49	KBL	Keyboard lock, blocks access to options	0/1	*0
50	TMod	Temperature modify/calibrate	-9°F +9°C	*0
51	ATHi	High temperature alarm limit used for summer ventilation. Alarm 1 is activated when temperature exceeds option. Changing programmable setting 72 (temperature units, °C/°F) will auto convert programmable settings 51 and 55 back to their default values.	0...90°C 0...150°F	60°C 40°F

*0 = inactive

Programmable settings for the gas monitor. (Not specific for each sensor module)

NO.	NAME	DESCRIPTION	RANGE	DEFAULT
52	W/U	Warm up delay disables alarms, seconds	0...255	60
53	BMM	BACnet maximum MAC address when polling for master	0...127	127
54	BDiag	BACnet diagnostic display while accessing this option. In format XXXXYZZ. Where YY is MAC address (in hex) of the monitor that just passed the token to the current one. ZZ is the monitor to which the token was passed to. Example 0305 would display on monitor with MAC address 4		
55	ATLo	Low temperature alarm limit (alarm 3). 0=off Changing programmable setting 72 (temperature units, °C/°F) will auto convert programmable settings 51 and 55 back to their default values.		*0
56	Net	Enables the home screen of any device to remotely view all devices on the CAN bus network. 1 = 0n	0/1	*0
57	Ref-A	To select scale and type of refrigerant gas for sensor A. Available refrigerants to select: R11, R22, R23, R32, R123, R125, *R134A, R404A, R407A, R407C, R407F, R410A, R448A, R449A, R452A, R455A, R507, R513A, R1233zd, R1234yf, R1234ze When replacing a methane (R-G05) or propane (R-G06) sensor module, setting 57 and / or 58 must be used to confirm that the proper gas type is selected.	select from list	R134a
58	Ref-B	When replacing a methane (R-G05) or propane (R-G06) sensor module, setting 57 and / or 58 must be used to confirm that the proper gas type is selected.		
59	FltTx	Fault alarm transmit message, CAN bus. Will transmit this message through CAN bus to activate relays when a fault or error is present on the gas monitor.	0...255	*0
60	ADTxA	Analog drive transmit message, sensor A (top sensor) CAN bus	0...255	*0
61	AMinA	Analog drive. Minimum percent of scale for zero output. Sensor A (top sensor)	0...100	3
62	AMaxA	Analog drive. Maximum percent of scale for full scale output. Sensor A (top sensor)	0...100	100
63	ADRxA	Receive message code to control local analog output. Sensor A (top sensor)	0...255	*0
64	ADTxB	Analog drive transmit message, sensor B (bottom) CAN bus	0...255	*0

*0 = inactive

Programmable settings for the gas monitor. (Not specific for each sensor module)

*0 = inactive

NO.	NAME	DESCRIPTION	RANGE	DEFAULT
65	AMinB	Analog drive. Minimum percent of scale for zero output. Sensor B (bottom sensor)	0...255	3
66	AMaxB	Analog drive. Maximum percent of scale for full scale output. Sensor B (bottom sensor)	0...100	100
67	ADRxB	Receive message code to control local analog output. Sensor B (bottom sensor)	0...255	*0
68	Baud	Baud rate for CAN bus network maximum wire length is 1500 feet at rate 0 and 3000 feet at rate 1	0..1	*0
69	Man	Manual override from home screen activates alarms 1, 1+2, 1+2+3. See section 4.1	1..3	1
70	BDI	BACnet device instance Enter part 1 (1000 to 4,194,303) Press right arrow Enter part 2 (0 to 999)	0...4,194, 303	60,000 +BMA
71	Light	0 = backlight on when keyboard activated 1 = backlight always on	0...1	0
72	°C/°F	0 = °C, 1 = °F Changing programmable setting 72 will auto convert programmable settings 51 and 55 back to their default values.	0...1	0
73	Cycle	Automatic cycle timer Alarm 1 00C = total Cycle time in minutes Press right arrow 00R = Run time in minutes	0...255	00/00
74	Age	Sensor module A (top sensor) age in days Press right arrow to display Sensor module B (bottom sensor)		0
75	VSD A	Variable Speed Drive logic analog output A Combines Analog outputs over CAN bus. See options 60-66 0 = highest reading wins 1= sensor readings are averaged 2= auto ramping increases analog output by one-minute intervals on alarm 1 and decreases when below alarm.	0/1/2	0
76	RDAL	Reset Default Alarms 0 = Sensor A (top sensor) 1 = Sensor B (bottom sensor) 2 = Both sensors	0/1/2	0
77	NQty	Number of monitors on the CAN bus	0...32	*0
	MO PASS?	Passcode Protection Allows the user to select a six-keystroke passcode to lock the keypad and programmable settings		

4.6 Sequence of Operation

1. Gas monitors and communication modules are preloaded with default programmable settings for normal operation and can be changed by the user at any time via the key pad.
2. On power-up the display will show the firmware version number and the warm up timer will count down (setting 52, default 1 minute). Relays are inactive during this time. Press any button to cancel the warm-up period. To view the firmware version number at any time, press ← and ↓ at the same time.
3. The home screen on the LCD display will show the gas types, gas concentrations, and alarm level statuses. For gas monitors monitoring two gases, the display will alternate between the two gas types showing the gas type and concentration of each. If the network display option is turned on (setting 56, default turned off for all gas monitors and on for communication modules) the display will show each device that is connected via the CAN bus network, its address, gas type, gas concentration, alarm level status, and temperature (if setting 44 is set to 1). Each gas monitor will display for 3 seconds and then cycle to the next, lowest address to the highest and then start again.
4. If the gas level rises above the alarm 1 set point, then the delay on timer will start (by default it is set to 30 seconds). The delay on is how long the gas has to remain above the alarm level set point until the alarm turns on. It is used to prevent false alarms and to stop the fan from constantly fluctuating on and off. The timer will clear and reset if the gas drops below the alarm level 1 set point.
5. If the gas level stays above the alarm 1 set point longer than the delay on timer (default 30 seconds), alarm level 1 will activate, causing a red LED to turn on and relay one to energize (only on -A, -B models). The gas monitor will transmit a message through CAN bus saying alarm level 1 has been activated (sends out a 1 by default, programmable setting 9, 10, 11 for top sensor and 27, 28, 29 for bottom sensor). Relay 1 will stay energized as long as the gas level remains above the alarm 1 set point. In addition to this, any other gas monitors, communication modules, or relay units on CAN bus with the same relay 1 receive message (setting 36, set to 1 by default) will also activate their alarm level 1, and energize their relay 1.
6. If the gas level drops below the alarm 1 set point, then the delay off timer will start (by default it is set to 20 seconds). The delay off is how long the gas has to remain below the alarm level set point until the alarm turns off. It is used to prevent false alarms and to stop the fan from constantly fluctuating on and off. The timer will clear and reset if the gas rises above the alarm level 1 set point.
7. When the delay-off timer times out relay 1 will de-energize, the alarm level 1 red LED will turn off and the relay 1 transmit message will stop being sent, thereby de-energising relays on other devices. Please note there is a 20 second delay on the CAN bus network when a code has stopped being sent.

8. If the temperature exceeds the high temperature alarm limit (programmable setting 51), relay 1 will activate, the alarm 1 red LED will turn on and the alarm 1 transmit message will be sent via the CAN bus network to other gas monitors and communication modules. When the temperature drops below the high temperature alarm limit, the alarm 1 will be turned off and the alarm 1 transmit message will stop being sent.
9. If the gas level rises to the alarm level 2 set point, then the alarm level 2 delay on timer will begin, and after timing out, the on-board relay 2 will activate, and the alarm 2 red LED will turn on. The relay 2 transmit message (default = 2) will be sent out on the CAN bus network activating remote units with that same relay 2 receive message (option 37). Note that all 3 alarms operate independently and can be higher or lower than the others.
10. When the current gas concentration drops below the alarm level 2 set point for longer than the alarm 2 delay off setting, the relay 2 will turn off, the relay 2 red LED will turn off, and the relay 2 transmit message will stop being sent on the CAN bus network.
11. When the gas concentration rises above the alarm level 3 set point for more than the alarm 3 delay on timer the audible alarm will sound, the flashing white LED strobe light will activate (programmable setting 45, enabled by default), a 3 will appear in the bottom left corner of the display, and the alarm 3 transmit message (default 3) will be sent to other gas monitors and communication modules. The alarm level 3 audible and visual alarm can be silenced by pressing any button.
12. When the gas concentration drops below the alarm 3 set point for longer than the alarm 3 delay off setting then the audible alarm and strobe flasher will stop and the alarm level 3 transmit message will stop being sent on the CAN bus network.
13. If a gas monitor experiences any faults, the device will transmit the fault transmit message, (programmable setting 59, disabled by default), to other gas monitors and communication modules on the CAN bus network.
14. Manual override mode is available to test relay functions and to activate ventilation. From the home screen press and hold the up arrow for at least 5 seconds. Press the up arrow to increase the timer by 5 minutes per click up to 60 minutes. The screen will display MAN 5 and timer will energize relay 1 and send the alarm 1 transmit message on the CAN bus network. After the time runs down the unit will return to automatic operation. To cancel, press the down arrow several times to reduce the timer to zero and return to normal operation. To activate alarm level 2 or 3 as well with this procedure, set option 69 to 2 or 3.

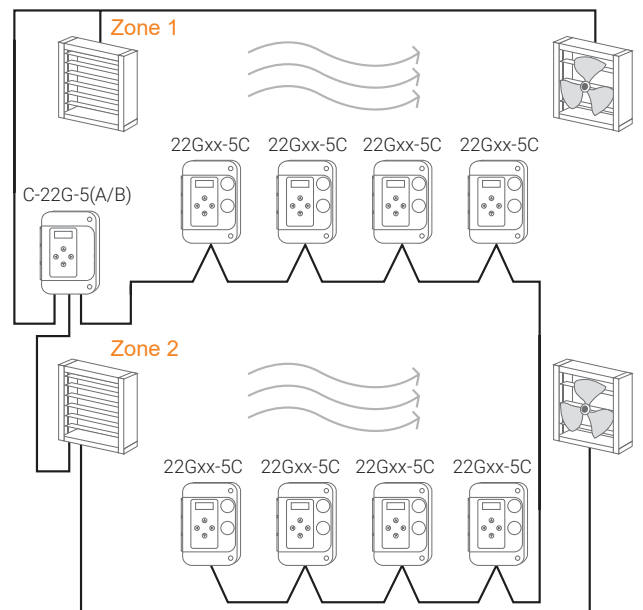
This sample sequence of operation shows the operation of a basic network for one zone. See section 4 Operation to see how to change settings and section 5 Configurations for setting up multiple zones.

5.0 Network configuration (CAN bus)

5.1 Using CAN bus with a communication module

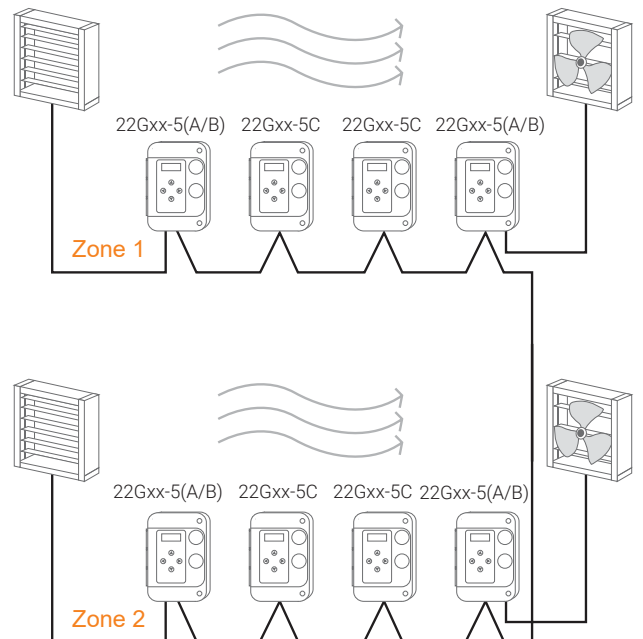
A communication module serves as the central control point for the ventilation system. Model 22Gxx-5y gas monitors transmit alarm commands to the central communication module, and the communication module physically controls external devices (ex: fans, dampers, etc.)

A communication module will display up to 31 devices (not including itself) on the CAN bus network. It also displays the address, gas type, gas concentration, and alarm status for each device. The optional one or two SPDT relays on board can be configured to activate at different concentrations of gas or to operate different ventilation systems, zones or groups. If more than two relays are needed a relay unit (C-22G-50) can be added which has four additional SPDT relays.



5.2 Using CAN bus without a communication module

Any 22Gxx-5A or 22Gxx-5B gas monitors which have relays and/or analog outputs can physically control external devices (ex: fans, dampers, etc.). The use of a dedicated communication module is optional to add a display in some specific location, such as before entering a mechanical room or to interface with several fan starters located in one place. Starters and air dampers are connected to the gas monitor closest to it in each zone.



5.3 Default Configuration

Gas monitors and communication modules are shipped pre-loaded with default settings which can be changed in the field to suit the desired sequence with simple keypad input. When a gas monitor or communication module goes into alarm level 1, 2 or 3 it activates its relays and transmits a message to other devices to activate their alarm levels and relays also. The alarm 3 transmit message is transmitted by default, but the alarm level 3 receive message (programmable setting 38) by default is turned off so the audible alarms and strobe operate locally and not everywhere. The ventilation system can be connected to any of the relays (usually level 1 relay). If the transmit and receive codes are not adjusted, all gas monitors will operate in one ventilation zone. Default alarm level set points are for general guidance and testing and should be set to suit local regulations.

5.4 Creating Zones or Groups

To control multiple zones on the same network, set the transmit messages on each gas monitor to different messages for each zone. The default transmit messages are 1, 2, 3 for alarm levels 1, 2, 3 for zone 1.

- For zone 2 monitors set transmit messages to 4, 5, 6
- For zone 3 monitors set messages to 7, 8, 9, and so on

5.5 Addresses

Set each gas monitor, communication module, and relay unit to a different CAN bus address (setting 39). 1, 2, 3, 4 etc. It is important to have no duplicates on the same daisy chained network.

5.6 Relay Outputs

Relay number 1 and 2 will activate if the gas on that monitor goes into alarm level 1, or 2. It will also activate when it sees it's receive code (setting 36, 37) on the CAN bus network sent by other gas monitors. If more than 2 relays are needed, a relay unit (C-22G-50) can be added which has four additional SPDT relays. It can be installed anywhere on the CAN network.

A communication module has no sensors on board so the relays will only activate when it sees it's receive codes on the network. The communication module could control two zones via its two relays. When no communication module is used, gas monitor physically connected to an external device (ex: fan, damper, etc.) will activate if it detects a gas, or when it sees its receive codes on the network.

6.0 Maintenance

All gas monitors and sensor modules are factory calibrated. To maintain accuracy, it is essential that the gas monitors must be calibrated by a qualified technician once or twice per year, depending on the application and gas being monitored. Gas monitors sensing methane, propane, and hydrogen are required to have their sensor modules replaced once per year.

6.1 Sensor Module Types

GAS TYPE	GAS TYPE IDENTIFICATION NUMBER	SENSOR MODULE TYPE
Carbon Monoxide (CO)	02	Electro-Chemical
Carbon Monoxide (CO Null H ₂)	03	
Nitrogen Dioxide (NO ₂)	14	
Ammonia (NH ₃)	04	
Hydrogen Sulfide (H ₂ S)	16	
Chlorine (CL ₂)	17	
Oxygen Leak (O ₂ Leak)	22	
Oxygen Depletion (O ₂ Dep.)	23	
Methane (CH ₄)	05	Catalytic
Propane (C ₃ H ₈)	06	
Hydrogen (H ₂)	08	
Carbon Dioxide (CO ₂ , 0...2000 ppm)	15-003	Infrared ABC Logic
Carbon Dioxide (CO ₂ , 0...5000 ppm)	15-005	Infrared Dual Channel
Carbon Dioxide (CO ₂ , 0...10000 ppm)	15-006	
Infrared Broadband Refrigerant (IR)	21	Infrared Broadband

6.2 Calibration Procedure Overview

All sensor modules used in Belimo gas monitors are either electro-chemical, catalytic, or infrared types. Regardless of the type of sensor module, certified gas bottles of $\pm 2\%$ accuracy (or better) should be used for both the zero and the span point. In conjunction with certified gas bottles, it is recommended to use the Belimo calibration kit (A-22G-A22) that includes a regulator (0.5 LPM), tube, and cap to adjust the sensitivity of the sensor module due to normal aging. For calibrating the span point, please use a certified gas bottle that is within the specified range of the sensor module.

6.3 Calibration Procedure: Electro-Chemical and Catalytic Sensor Modules

1. Use certified gas bottles of $\pm 2\%$ accuracy (or better) for calibration.
2. Before calibrating, ensure the gas monitors have been powered for a minimum of the warm up time of the sensor modules. For electro chemical type, the warm up time is 5 minutes, for catalytic type, the warm up time is 24 hours, for infrared dual channel type, the warm up time is 10 minutes.
3. Press \rightarrow to enter settings.
4. Press \uparrow and \rightarrow at the same time to enter the calibration mode.
 - *When calibrating the top sensor module (sensor A), stay at SAZ.
 - *When calibrating the bottom sensor module (sensor B), press the \rightarrow button twice to get to SBZ.
5. While at SAZ (sensor A) or SBZ (sensor B) flood the certified zero gas over the sensor module. To do this, connect the zero gas bottle to the Belimo regulator, and insert the calibration cap onto the sensor hole located on the gas monitor front cover. Flood the sensor with the zero gas at a flow rate of 0.5 LPM for 90 seconds or until the reading stabilizes. To calibrate gas monitors it is important to keep the front cover on, and make sure it is securely screwed to the base. When not using the Belimo calibration cap, it is important that the calibration cap you are using has a small outlet hole, otherwise the pressure will increase and distort the reading.
6. Adjust gas reading to 0 with the \uparrow and \downarrow buttons.
7. Press \uparrow and \leftarrow at the same time to save.
8. Press \rightarrow and \leftarrow to get to SAS (sensor A span) or SBS (sensor B span).
9. While at SAS (sensor A span) or SBS (sensor B span) flood the certified span gas over the sensor module. To do this, connect the span gas bottle to the Belimo regulator, and insert the calibration cap onto the sensor hole located on the gas monitor front cover. Flood the sensor with the span gas at a flow rate of 0.5 LPM for 90 seconds or until the reading stabilizes. For chlorine on average stabilization time takes 5 to 10 minutes. To calibrate gas monitors it is important to keep the front cover on, and make sure it is securely screwed to the base. When not using the Belimo calibration cap, it is important that the calibration cap you are using has a small outlet hole, otherwise the pressure will increase and distort the reading.
10. Adjust gas reading by pressing the \uparrow and \downarrow buttons until the concentration on the gas monitor and calibration gas bottle match.
11. Press \uparrow and \leftarrow at the same time to save.
Press and hold down \leftarrow to exit the calibration mode.

6.4 Calibration Procedure: Infrared ABC Logic and Infrared Dual Channel Sensor Modules

1. Use a certified gas bottle of $\pm 2\%$ accuracy (or better) for calibration.
2. Before calibrating, ensure the gas monitors have been powered for a minimum of the warm up time of the sensor modules. For infrared ABC logic type, the warm up time is 10 minutes.
3. Press \rightarrow to enter settings.
4. Press \uparrow and \rightarrow at the same time to enter the calibration mode.
5. Do not calibrate SAZ (sensor A) or SBZ (sensor B).
6. Press \rightarrow and \leftarrow to get to SAS (sensor A span) or SBS (sensor B span).
7. While at SAS (sensor A span) or SBS (sensor B span) flood the certified span gas over the sensor module. To do this, connect the span gas bottle to the Belimo regulator, and insert the calibration cap onto the sensor hole located on the gas monitor front cover. Flood the sensor with the span gas at a flow rate of 0.5 LPM for 90 seconds or until the reading stabilizes. To calibrate gas monitors it is important to keep the front cover on, and make sure it is securely screwed to the base. When not using the Belimo calibration cap, it is important that the calibration cap you are using has a small outlet hole, otherwise the pressure will increase and distort the reading.
8. Adjust gas reading by pressing the \uparrow and \downarrow buttons until the concentration on the gas monitor and calibration gas bottle match.
9. Press \uparrow and \leftarrow at the same time to save.
10. Press and hold down \leftarrow to exit the calibration mode.

6.5 Calibration Procedure: Infrared Broadband Sensor Modules

1. Use certified gas bottles of $\pm 2\%$ accuracy (or better) for calibration.
2. Before calibration install the infrared broadband gas monitors on site, on a vertical level surface. ensure the gas monitors have been powered for a minimum of the warm up time of the sensor modules. For infrared broadband type, the warm up time is 1 hour.
3. Press \rightarrow to enter settings.
4. Press and hold \rightarrow until you reach setting 57 (Select Desired Refrigerant Type). Press the \uparrow and \downarrow buttons to find the desired refrigerant that the gas monitor will detect. By default the gas monitor will detect R134A. To save press \uparrow and \leftarrow at the same time. If saved correctly, the LCD screen will display **** OK ****. Press and hold \leftarrow until the home screen is displayed. The targeted refrigerant along with its concentration will be displayed in the screen.
5. Press \rightarrow to enter settings.
6. Press and hold \rightarrow until you reach setting 54 (Zero Reset). This setting is used to set the zero point of the gas monitor. Check if setting 54 is displaying any value other than 0. If any value other than 0 is shown, and there is no refrigerant gas present, reset the zero point by pressing \uparrow and \downarrow at the same time. Once again, allow 1 hour after the reset for the gas monitor to stabilize.
7. Verify that setting 54 (Zero Reset) displays 0. If a non 0 value between ± 5 exists, change this value to 0 by adjusting the Sensor A Zero (SAZ) . To do this go to the home screen, press \uparrow and \rightarrow at the same time to enter the calibration mode, and adjust SAZ gas reading to 0 (the top value) with the \uparrow and \downarrow buttons. Press \uparrow and \leftarrow at the same time to save. If it does not repeat step 6.

8. Press and hold ← until the home screen is displayed.
9. Press ↑ and → at the same time to enter the calibration mode.
10. While at SAZ (sensor A) flood the certified zero gas over the sensor module. To do this, connect the zero gas bottle to the Belimo regulator, and insert the calibration cap onto the rectangular sensor hole located on the gas monitor front cover. Flood the sensor with the zero gas at a flow rate of 0.5 LPM for 90 seconds or until the reading stabilizes. To calibrate gas monitors it is important to keep the front cover on, and make sure it is securely screwed to the base. When not using the Belimo calibration cap, it is important that the calibration cap you are using has a small outlet hole, otherwise the pressure will increase and distort the reading.
11. Adjust gas reading to 0 with the ↑ and ↓ buttons.
12. Press ↑ and ← at the same time to save.
13. Press → and ← to get to SAS (sensor A span)
14. While at SAS (sensor A span) flood the certified span gas over the sensor module. To do this, connect the span gas bottle to the Belimo regulator, and insert the calibration cap onto the sensor hole located on the gas monitor front cover. Flood the sensor with the span gas at a flow rate of 0.5 LPM for 90 seconds or until the reading stabilizes. To calibrate gas monitors it is important to keep the front cover on, and make sure it is securely screwed to the base. When not using the Belimo calibration cap, it is important that the calibration cap you are using has a small outlet hole, otherwise the pressure will increase and distort the reading.
15. Adjust gas reading by pressing the ↑ and ↓ buttons until the concentration on the gas monitor and calibration gas bottle match.
16. Press ↑ and ← at the same time to save.
17. Press and hold down ← to exit the calibration mode.

6.6 Sensor Module Replacement

All sensor modules are factory calibrated but are required to be recalibrated at a minimum of once per year. When installing gas monitors in locations above 2000 ft (610 m), it is recommended to perform calibration upon installation.

1. Remove the existing sensor module by opening the gas monitor cover and pulling the sensor module out from the gas monitor. The entire sensor module should be removed, which includes the sensing element and the small green PCB board attached to it.
2. Install the new sensor module by removing it from its packaging and inserting the metal pins into the the correct location on the gas monitor.
3. Press → to enter settings.
4. Press ↑ and → at the same time to enter the calibration mode.
*When replacing the top sensor module (sensor A), stay at SAZ.
*When replacing the bottom sensor module (sensor B), press the → button twice to get to SBZ.
5. Press ↑ and ← at the same time to register the sensor module. The gas level will then be displayed on the top line of the LCD.
6. Press and hold down ← to exit the calibration mode.

6.7 Sensor Module Expected Life Span and End of Life

All sensor modules have an expected life span and an end of life. The expected life span is how long the sensor module will last (under normal conditions) until it should be replaced with a new one. Please note that the exact lifespan of the sensor module is heavily dependent on the application, including how dirty the environment is and how much of the target gas is present in the environment.

The end of life is a safety precaution, and it is how long the sensor module can stay powered in the gas monitor until the gas monitor will go into alarm to tell the end user it is time to replace the sensor module.

APPLICATION	GAS TYPE	NOMENCLATURE	EXPECTED LIFESPAN (YEARS)	END OF LIFE (YEARS)
Vehicle Emissions	Carbon Monoxide (CO)	02	5...8	10
	Carbon Monoxide (CO Null H ₂)	03	2...4	5
	Nitrogen Dioxide (NO ₂)	14	2...4	5
Indoor Air Quality	Carbon Dioxide (CO ₂)	15-003	10	13
	Carbon Dioxide (CO ₂)	15-005	10	13
	Carbon Dioxide (CO ₂)	15-006	10	13
Combustible and Toxic Gases	Ammonia (NH ₃)	04	2...4	5
	Methane (CH ₄)	05	4...7*	9*
	Propane (C ₃ H ₈)	06	3...5*	8*
	Hydrogen (H ₂)	08	4...7*	9*
	Hydrogen Sulfide (H ₂ S)	16	2...4	5
	Chlorine (CL ₂)	17	2...4	5
	Oxygen Leak (O ₂ Leak)	22	3...6	8
	Oxygen Depletion (O ₂ Depletion)	23	3...6	8
	Argon (Ar), (O ₂ Depletion)	23	3...6	8
	Helium (He), (O ₂ Depletion)	23	3...6	8
	Nitrogen (N ₂), (O ₂ Depletion)	23	3...6	8
Refrigerant Gas Leak Detection	Infrared Broadband Refrigerant (IR)	21	5...10	15

* Methane (CH₄), Propane (C₃H₈), and Hydrogen (H₂) sensor modules are required to be replaced annually. They are not recommended to be re calibrated.

6.8 Fault Monitoring

FAULT CODE	MESSAGE
0	Error cleared (no error)
1	No sensor
2	Low voltage
4	High voltage
8	Sensor A missing or not registered
10	Sensor B missing or not registered
18	Both sensors missing or not registered
20	Sensor A end of life (need to replace sensor)
40	Sensor B end of life (need to replace sensor)
60	Both sensors end of life
80	CAN error: Qty not matching option 77
Err-S	Missing sensors

Notes:

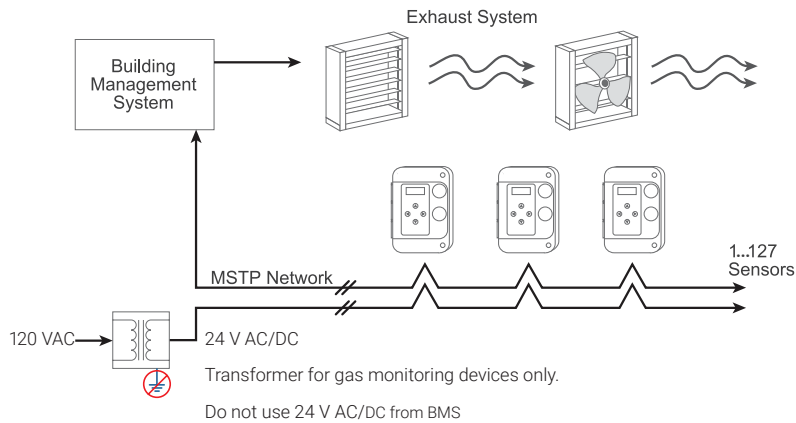
- For 22Gxx-5A & C-22G-5A model, any fault from above table will turn the corresponding analog output to 0V/0mA
- On BACnet, any fault from above table will change the System Status of the Device Object to Non-Operational

7.0 Network configuration (BACnet MS/TP)

For instructions on changing settings, see section 4.3

Setting 46	BACnet Mode select 0 = communication disabled 1 = communication enabled 2 = communication enabled and display all monitors on CAN network	0, 1, 2	*0
Setting 47	BACnet MAC address	0-127	0
Setting 48	Baud rate	0 = 9600 1 = 19200 2 = 38400 3 = 76800	3
Setting 53	Max Master	0-127	127
Setting 54	Diagnostic tool to test MSTP communication. Format XXXXYYZZ where YY= ID of device that passed token to current sensor and ZZ = ID of device that received token.		
Setting 70	Device ID	4,194,303	60,000+BMA

Ventilation Controlled by BACnet Building Automation



Object Table

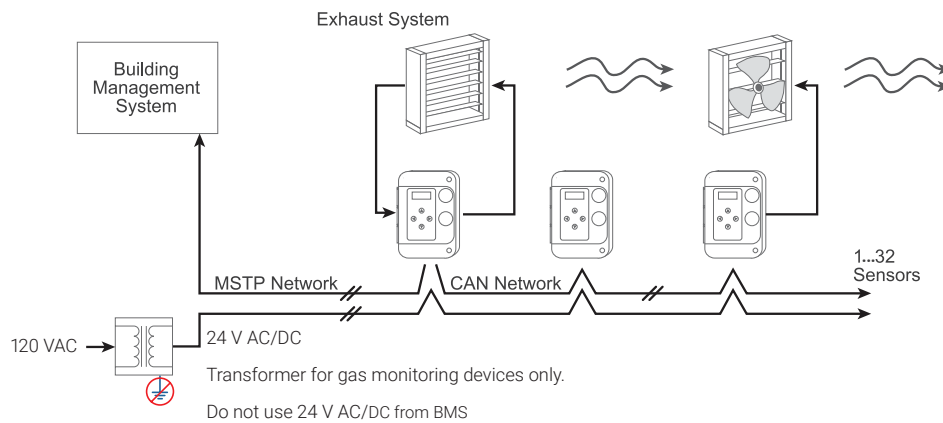
TYPE AND INSTANCE	OBJECT NAME	OBJECT PROPERTY	PARAMETER
AV0	gas reading 1	Present value (R)	Gas reading local sensor A
AV1	gas reading 2	Present value (R)	Gas reading local sensor B
AV2	Ambient temperature	Present value (R)	Temperature in celsius
BI 0	Input 1	Present value (R)	Auxiliary input state 0/1
BO 0	Relay 1	Present value (R/W)	Relay 1 status on 0/1
BO 1	Relay 2 or alarm 2	Present value (R/W)	Relay 2 or alarm 2 status 0/1
BO 2	Alarm 3	Present value (R/W)	Alarm 3 Indicator status 0/1
AV XYY	Gas reading XYY	Present value (R)	Gas reading remote sensors if setting 46=2

X = sensor 1 (top) or 2 (bottom),

YY = CAN Address

Analog value for each gas reading will display description of gas type and scale

Ventilation Controlled directly by Gas Sensors



Exceptional service

At Belimo, we continually invest in new technologies that increase customer value by improving occupant comfort, energy efficiency, simplified installation, and maintenance-free operation. Our sales team is available to consult and provide insight and advice on how to achieve the best solution to help increase your system performance. Belimo will continue to focus on providing you with exceptional product availability, fast delivery times, and world-class customer service and technical support. We remain dedicated to continuously improve our standards and are committed to providing you with the highest value possible.

Whatever your HVAC application, our global network of support experts are on hand and ready to assist.



Global support



Tested quality



On-time delivery



Extensive service



Complete product range

