

INTELLIGAS®

Gas leak detection system

for heating rooms and similar environments

LYC18



Electronic control unit for gas leak detection with up to 4 sensors aimed to drive one or two gas flow cut-off 12VDC normally closed (NC) or normally open (NO) solenoid valves. Single threshold sensors with tin dioxide sensing element. Possible control of auxiliary devices (hooters, flashing lights, fans...) or 230VAC solenoid valves through built-in relays. 24VAC power supply. Built-in battery charger for optional external 12V buffer battery charge with automatic intervention in case of power failure.

Use

LYC18 control unit is used, connected to QA..13/A sensors, for optical/acoustic signaling or to drive one / two gas flow cut-off valves in presence of dangerous concentrations of:

- methane (CH₄)
- LPG
- carbon monoxide (CO)

note: up to 4 sensors QA..13/A can be connected to the control unit, even for different gases

Available models

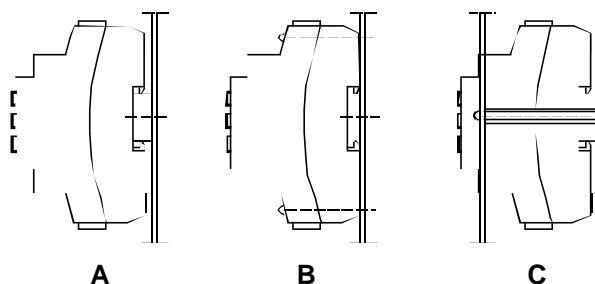
<u>Description</u>	<u>Type</u>
Control unit	LYC18
Sensor for methane gas IP44	QAG13/A
Sensor for LPG gas IP44	QAG13.P/A
Sensor for carbon monoxide (CO) IP44	QAO13/A
Gas solenoid valves 12V DC	E..D (NC) or E..E (NO)
Gas solenoid valves 230V AC	E..D-AC (NC) or E..E-AC (NO)

Mounting

LYC18

The LYC18 can be installed as follows:

- A Onto a DIN bar minimum length 170 mm
- B Onto a wall using 2 screws
- C On panel front end using a DIN bar minimum length 195mm and 2 hex spacers 50 mm, screws and washers.

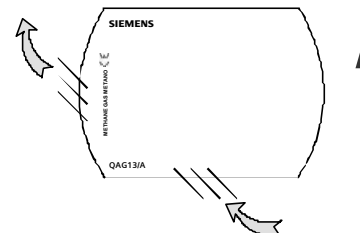


Sensors QA..13

In a position exposed to natural air circulation. Never close to suction grids, openings towards building outside or in place subject to water jets and anyhow near possible gas leakage places. Besides:

- QAG13/A:** High, at about 30cm (1 ft) from the ceiling, for light gas detection like methane (CH₄) or town gas.
- QAG13.P/A:** Low, at about 30cm (1 ft) from the floor, for heavy gas detection like LPG (Propane, Butane, etc.).
- QAO13/A:** At about 1.5m (5 ft) from the floor, for detection of carbon monoxide (CO) with density similar to air.

Respect the correct mount orientation in order to ensure the normal convection air flow inside the sensor.



Check that environmental specifications of the installation place are compatible with the values listed on technical data.

Wiring



It is possible to use common electric cables. However, when installing in places exposed to high electromagnetic fields, use of shielded cables is recommended.

The LYC18 must be powered at 24VAC.

There is no protection against accidental connection with 230 V on the 24 V side.

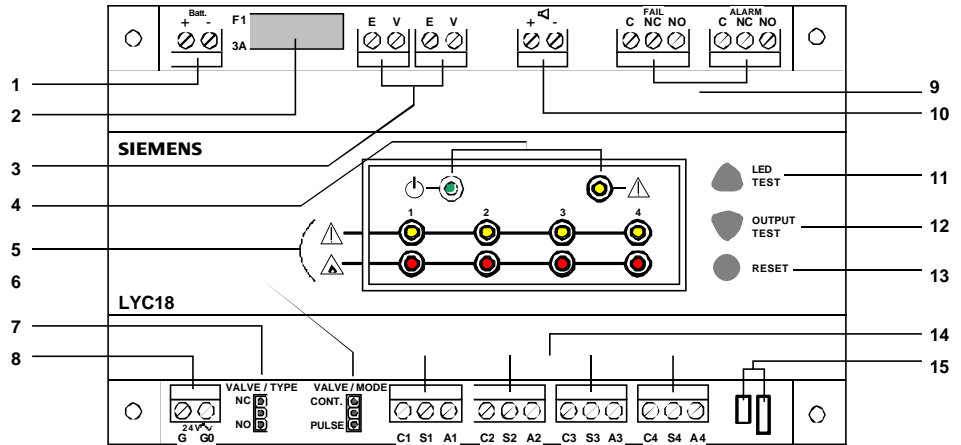
Use double-insulation safety transformers; they should be sized for continuous operation at rated power (please refer to technical data).

As a general rule:

Comply with local regulation about wiring. The device should be directly connected to mains and be **permanently powered up**. Check that sensors QA..13/A are compatible with the gas type to be detected and make certain that connected solenoid valve is compatible with the control unit.

Case

The control unit is included in a case suitable for mounting on a DIN bar and a processing and control PCB.



1. Terminal for 12V battery
2. Battery protection fuse T3.15A
3. Terminal for 2 12VDC 2 x 13W max solenoid valves
4. LEDs for control unit status indication
5. LEDs for sensors status indication
(for complete functionality please refer to functional table)
6. VALVE MODE Jumper for operating mode selection of EV output
(active only with VALVE TYPE jumper = NO)
 - CONT = continuous
 - PULSE = impulse (1 impulse every 10s)
7. VALVE TYPE Jumper for solenoid valve type selection
 - NC = Normally Closed
 - NO = Normally Open
8. Terminal for 24VAC power supply
9. Terminals for SPDT relays output (ALARM) and fault (FAIL)
10. Piezoelectric hooter output 12VDC 300mA max
11. LED test button
12. OUTPUT test button
13. RESET button
14. Terminals for sensors QA..13/A
15. Not used

Commissioning

Please carefully read and follow enclosed instructions and retain them with the equipment for any future need.

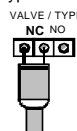
The control unit and sensors are monitoring equipment, so they must not be tampered: never touch the sensor or electronics.

LED TEST button = temporarily turns all LEDs ON in order to check their integrity.

OUTPUT TEST button = if pressed for at least 5s, starting from normal operating condition, temporarily activates all outputs (valve + relay + hooter output) in order to check regular operation of intervention and signal devices.

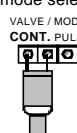
Jumper Setup

Jumper for valve type selection



Set JP2 jumper VALVE TYPE to NC for normally closed valves type E..D (delivery condition) or to NO for normally open valves type E..E.

Jumper for valve mode selection



Set JP3 jumper VALVE MODE only in case of normally open valves use. CONT position allows to set EV output constantly powered in case of gas alarm, while PULSE position allows to set it powered by impulses at 10s intervals.

Every change of jumper setup should be made under power off. Alternatively, if change is made under power on conditions, the control unit must be powered off for at least 5s.

Make certain that supplied termination resistors 18Kohm 1/4W are disconnected from sensor inputs if sensors are installed, while they must remain connected to any unused sensor inputs (terminals C and S).

If no Intelligas valve should be connected to EV output, insert a valve termination Rv 1.8Kohm 1/2W (supplied with the equipment) in the EV terminal. This will avoid any wrong valve fault signal.

Operation

After powering up (24V AC) the control unit LYC18 carries out these phases in sequence:

1. Sensors preheating phase. During this phase, about 1min, the detection system is not operational. Moreover, it is not possible to open the solenoid valve if normally closed, while it is possible to if normally open.
2. TEST phase. During this phase, about 3min, all internal timers are zeroed in order to facilitate sensor test (alarm simulation).
3. Normal operation phase. This is the normal operating phase of the control unit while both gas alarm monitoring and self test for plant faults (sensor and valve) and system faults (control unit) are active.

In presence of dangerous gas or carbon monoxide concentrations control unit LYC18 enters gas alarm phase and carries out these operations:

- Closes the fuel gas cut-off solenoid valve(s) and avoids it can be open again until alarm condition is true. Closing is made as follows:
 - NC Valve(s) type = voltage cut-off from EV terminals
 - NO Valve(s) type = voltage feed to EV terminals, by impulses or continuously (please refer to VALVE MODE jumper),
- Activates flashing of red alarm LED for the respective sensor
- Activates the piezoelectric hooter (if connected to its terminal)
- Activates auxiliary devices (if connected to alarm relay)

Once gas alarm condition is passed the control unit must be reset to normal operation. Press RESET button on front side: the control unit carries out the following operations:

- makes possible manual opening of cut-off valve(s)
- deactivates flashing of red alarm LED of the sensor under alarm conditions, that turns steady on
- deactivates the piezoelectric hooter (if connected to its terminal))
- deactivates auxiliary devices (if connected to alarm relay)

At any moment, starting from normal operating condition, it is possible to activate again TEST phase by pressing RESET button for at least 5s.

Note:

Return to normal operating condition by pressing RESET button is possible only if there are no active alarms.

WARNING:

The sensors must be replaced within the 5th year from installation date

LYC18 Functional Table								
FUNCTIONS	GREEN LED	CONTROL UNIT YELLOW LED	SENSOR YELLOW LEDS	SENSOR RED LEDS	EV outputs (2) (NC valve)	Alarm RELAY output	Fail RELAY output	Hooter output
Sensors preheat phase	Flash.(1Hz)	ON	ON	ON	Voltage absence	De-energized	De-energized	Inactive
TEST phase	Flash.(2Hz)	ON	ON	ON	Voltage presence	Energized	Energized	Inactive
Normal operation	ON	ON	ON	ON	Voltage presence	Energized	Energized	Inactive
Gas alarm	ON	ON	ON	Flash.(1Hz)*	Voltage absence	De-energized	Energized	Active
Sensor fault (up to 3)	ON	ON	Flash.(1Hz)*	OFF*	Voltage presence	Energized	De-energized	Active
Sensors fault (all)	ON	OFF	Flash.(1Hz)	OFF	Voltage absence	De-energized	De-energized	Active
Valve fault	ON	Flash.(1Hz)	ON	ON	Voltage absence	Energized	De-energized	Active
Hooter fault	ON	Flash.(2Hz)	ON	ON	Voltage presence	Energized	De-energized	Active
General fault	ON	OFF	OFF	OFF	Voltage absence	De-energized	De-energized	Active

* relevant to the sensor(s) concerned with alarm and/or fault

The simultaneousness of two or more events causes a combined management of LEDs and outputs according to a given priority.

An alarm or fault condition during test phase (3 min) causes flashing of the relevant red or yellow LEDs at 2Hz frequency instead of 1 Hz as indicated in function table. This latter will be valid for events starting from normal operating condition.

The external hooter fault is detected when both of these conditions take place:

- active output by alarm or fault (please refer to functional table)
- shorted output

Restore of normal operating conditions takes place automatically within 5 seconds after removal of the short circuit on hooter output.

Environmental compatibility and disposal



This product was developed and manufactured using materials and processes which take full account of environmental issues and which comply with our environmental standards. Please note the following for disposal at the end of the product life, or in the event of its replacement:

- For disposal, this product is defined as waste from electrical and electronic equipment ("electronic waste"); do not dispose of it as household waste. This applies particularly to the PCB assembly.
- Always use the most environmentally compatible method of disposal, in line with the state-of-the-art technology in environmental protection, recycling, and waste management.

Observe all current local laws and regulations.

- Always aim for maximum re-use of the basic materials at minimum environmental stress. Observe any notes on materials and disposal that may be attached to individual components.
- Use local depots and waste management companies, or refer to your supplier or manufacturer to return used products or to obtain further information on environmental compatibility and waste disposal.

Shipping case

The LYC18 shipping case can be recycled. Retain it for future use or in case of product return to the manufacturer.

Hints for design

Respect current regulations for wiring. The devices should be directly connected to mains (that is with no switches, etc.) and be permanently powered up.

The positive logic operation of relays means an always energized contact (C-NC open) in no alarm and/or fault condition.

EV control outputs are solid state type and are sized for an INTELLIGAS[®] solenoid valve with 13W maximum absorbed power each (26W tot). They are not to be used to drive solenoid valves with higher power consumption.


Ordering

Indicate control unit number and sensor corresponding to the gas type to be detected

LYC18	Gas detection control unit for up to 4 sensors
QAG13/A	Sensor IP44 for Methane detection (CH4)
QAG13.P/A	Sensor IP44 LPG detection
QAO13/A	Sensor IP44 for carbon monoxide (CO) detection

Technical data

Control unit LYC18

Power supply voltage	24VAC +/-10%
Frequency	50 Hz
Power consumption	32VA max (with battery under charge)
Control Outputs	- 2 electronic 12VDC (26W max total) - 2 SPDT Relays 250V 5(3)A (alarm and fault)
Operation Logic	Positive (normally energized relays, de-energize in case of alarm and/or fault)
Type of controlled solenoid valves (see data sheet n° 7684).	normally closed type E..D / E...DFL or normally open type E...E
Connections length (one cable per valve)	80m max (sensor and NO solenoid valves) 40m max (NC solenoid valves)
Cable cross section	1.5mm ² min (sensors and solenoid valves)
Connectable sensors	Max 4 (type QA..13/A)
Optical indications	Green LED (power presence / TEST) Control unit yellow LED (control unit / solenoid valves fault) Sensors yellow LEDs (sensors fault) Red LEDs (gas alarm)
Timers	3s between alarm acknowledgement from sensors and solenoid valves, relay outputs and relevant LEDs activation.
Allowed room temperature	0...+50°C (operation) -20...+70°C (transport and storage)
Allowed room humidity	20...90% R.H. non condensing
Case	PC polycarbonate
Protection	IP20 – EN60529
Dimensions	174 x 106 x 56.5 mm
 compliance	
Regulations	Low voltage 73/23 CEE Electromagnetic Compatibility 89/336 CEE
Standards	EN60335-1 EN50270

Sensor QA..13/A

Sensing element	Tin dioxide semiconductor
Case	Self-extinguishing ABS
Protection degree	IP44 if correctly installed
Allowed room temperature	0...50°C (operation) -20...+70°C (transport and storage)
Allowed room humidity	30...90% R.H. non condensing
Alarm threshold	QAG13/A= 10000ppm methane (20% LEL) QAG13.P/A= 3700ppm LPG (20% LEL) QAO13/A= 200ppm CO LEL = Lower Explosivity Limit ppm = part per million
Sensors Average Lifetime	5 years from installation date
Sensor covered surface	About 40m ² (indicative)

Built-in relays

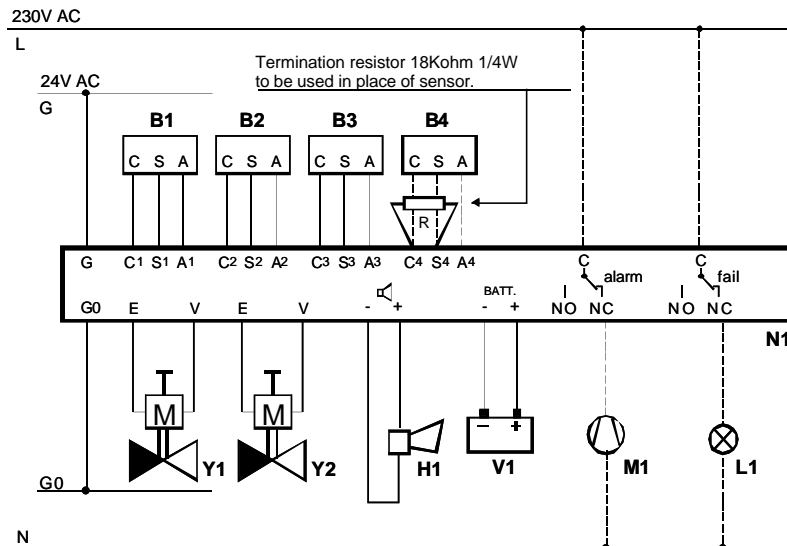
Operation	Positive Logic (normally energized). De-energize in case of alarm / fault
Contact	Changeover, voltage free 250VAC 5(3)A

Built-in battery charger

Charge voltage	13.8VDC
Charge current	0.5A max
Battery protection fuse	T3.15A 250V 5x20
Connectable Battery	12V 6÷10 Ah (not supplied by Siemens)
Buffer charge with automatic intervention current limit	

Wiring diagrams

Diagram 1: Control unit LYC 18 with 4 sensors QA..13/A and 2 12V DC solenoid valves type E..D. 12V buffer battery and piezoelectric hooter. Optional control of signal lamps and air extractors.



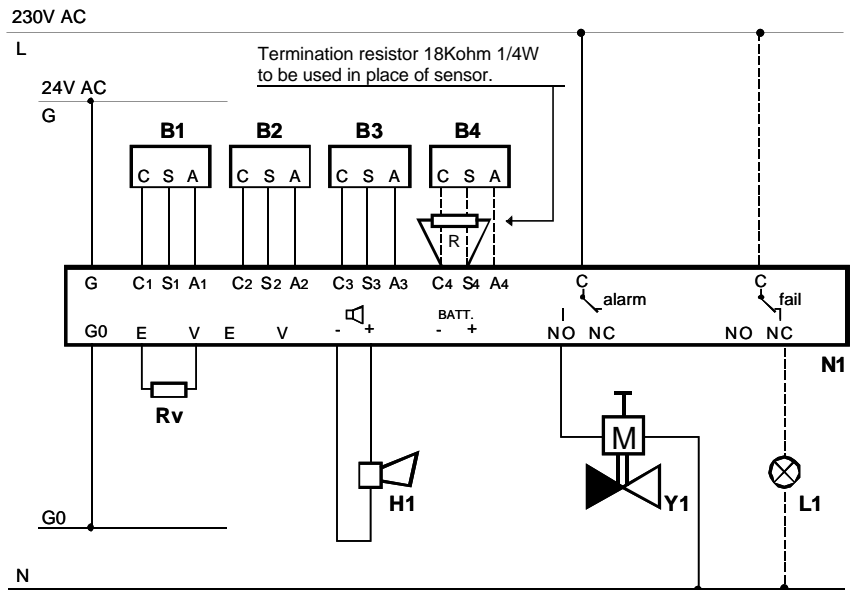
Symbols:

N1 = Control unit LYC18
 B1÷ B4 = Sensors QA..13/A
 Y1÷Y2 = Intelligas NC solenoid valves 12VDC
 type E..D / E..DFL
 H1 = piezoelectric hooter 12VDC 300mA max
 V1 = Battery 12V 6÷10Ah
 R = sensor termination resistor 18Kohm 1/4W

Options

M1 = air extractor
 L1 = signal lamp

Diagram 2: Control unit LYC18 with 4 sensors QA..13/A and 230V AC solenoid valve type E..D-AC. Piezoelectric hooter. Optional control for signal lamp.



Symbols:

- N1 = Control unit LYC18
- B1 ÷ B4 = Sensors QA..13/A
- H1 = 12VDC piezoelectric hooter 300mA max
- Y1 = Intelligas NC solenoid valve 230VAC type E..D-AC / E..DFL-AC
- R = sensor termination resistor
- Rv = solenoid valve termination resistor

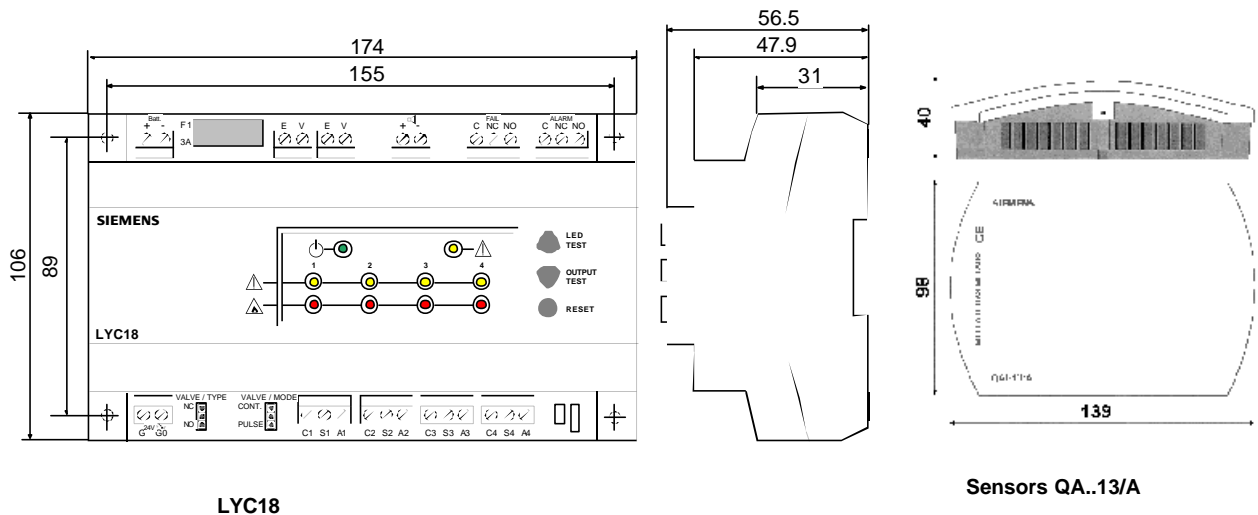
Options

- L1 = 230VAC signal lamp

Note:

The valve termination resistor ($R_v = 1.8\text{Kohm } 1/2W$) is to be inserted between EV terminals only if those outputs are not used

Dimensions



Dimensions in mm

Subject to modifications