

Gas detector Moon-2 series

Installation Manual



These instructions shall be used by qualified service personnel only, who have been duly trained to install and maintain Gas detection systems.



WARNINGS

Valid for all variants of IP and ATEX Gas detectors

- Do not install and connect the gas detector without carefully reading these instructions. All operations must be executed by skilled personnel who are aware of the regulations and has attended a technical training course on products included in this manual.
- The housing must be earthed (grounded).
- Keep the sensor away from gas substances or solvents such as silicone and derivatives, acetone, all types of paints, alcohol & derivatives, cleaning solvents, turpentine, bleach, etc. These agents could damage the sensitive part of the sensor or permanently change the original setting. Strictly avoid to test the sensors with lighters or generic spray cans.
- When the sensor is outdoor installed, it's necessary to put an adequate cover over the sensor to avoid being directly wet by rain or snow.
- Do not install the sensor closed to vents, high speed air or vortexes.
- During the installation or maintenance of ATEX gas detectors, before opening the housing, make sure that the power is OFF (either 24Vdc or current loop) and that the application area is safe. Otherwise, it's forbidden to open the sensor and execute connections.
- Do not disconnect any connectors or plug-in cards when the sensor is powered up.
- When the installation is completed, it's necessary to execute the electrical tests on the sensors by using the proper software, working with the simulation functions, generating pre-alarm, alarm and fault conditions and checking the exact match in the control panel or in any other device connected to the sensors
- For ATEX gas detectors it's mandatory to read carefully the safety instructions contained in the package.
- The Gas detector must be installed vertically with its nose facing down (see pictures).



- Do not unplug the connector of the sensitive element when it's powered and do not power the sensor when the head is not available
- The installation height is determined by the type of gas to be detected. Here below there are some examples; in case the type of gas is not included in this list, please check the specific gravity to avoid installation errors.
- **Examples :**
- Heavy gases: about 30 cm from the ground (eg. propane, gasoline vapors etc.)
- Light gases: about 30 cm from the ceiling (eg. Methane, Hydrogen, etc)
- The Oxygen and Carbon Monoxide gas detectors have to be installed mainly at ca. 1,60 cm from the ground.

Gas detector Moon series - Overview

The new generation of gas detectors Moon series is available with 5 different sensing elements, in order to provide a very large range of Gas detection applications.

The sensor can be combined with 6 different Communication Interfaces that can be selected according to the installation needs. Details and diagrams in the next pages.

The detector has been designed to give to the installer the possibility to check the sensor parameters, set and change the sensor element, provide maintenance service directly on-site, through a dedicated software application (Level 1 and Level 2).

Level 1

Access without password: it is possible verify the set parameters and make tests as alarm, prealarm and fault simulations.

L1 visualization

- Production year and serial number, sensor type, sensor code, unit of measure, gas head FW version, base board FW version.
- Indication of alarm and prealarm status, fault status and fault type.
- Prealarm and alarm threshold
- Prealarm and alarm filters
- 4-20mA working range
- Initialization delay
- Sensor life (working hours)
- Alarms number (only real alarms occurred during sensor life are counted, not software simulation).

Level 2

Password protected: it is possible set the sensor, with the support of calibrated gas cylinders, without any electronic adjustment trough trimmers or jumper, but easily trough the software interface. Moreover, it is possible finalize the sensor element (head) substitution, even by software. This function is conformed to the international technical norms in order to protect the detector from external sabotage or setting modification by not authorized personal.

The head substitution can be done only with a new one (same item). A different head will generate a failure into the detector.

L2 Parameters editing

- Prealarm and alarm threshold
 - Prealarm and alarm filters
 - 4-20mA working range
 - Initialization delay
- Sensor element (head) substitution
- Calibration

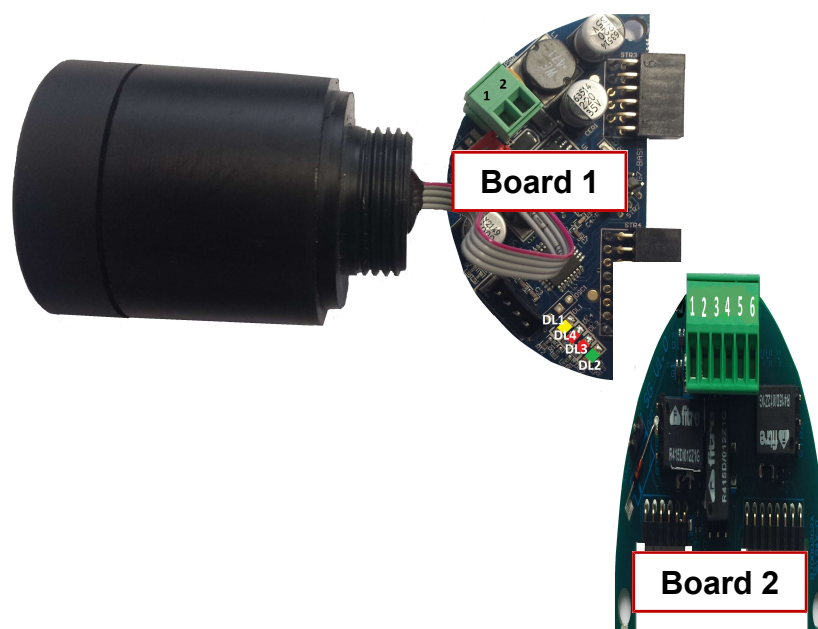
Gas detector Moon series - G7(AP) E7(AD) Products range

Description

Industrial gas detectors, available with IP55 metal housing or **ATEX II 2G Ex-d IIC T6** housing. The detector is combined with two boards: the first card controls the sensing element, and depends to the detected Gas type; the second one controls the communication to the control device (see the table below) and it is available either for connection to specific panels or for connection to normal electrical cabinets and PLC.

Sensors for automatic gas detection are generally suitable for explosion risks, Hydrocarbons (L.E.L. detection), toxicity Ammonia, Carbon Monoxide (ppm detection) and Oxygen control (% detection).

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Gas detector Moon series - Technical Features

General Features

Power Supply:	12/24Vdc
Semiconductor sensors:	Max 50/80 mA (StBy/Alarm)
Catalytic sensors:	Max 70/100 mA (StBy/Alarm)
Electrochemical cell sensors:	Max 30/60 mA (StBy/Alarm)
Infrared sensors:	Max 40/60 mA (StBy/Alarm)
Operating temperature:	0 to 40 °C with compensation measurement
Humidity	Up to 90% relative, non-condensing
Max air speed	10 m/sec

Mechanical Features

G7 metal housing



IP55 ADFT
Dim. (HxWxD) 141x100x60mm
Weight 370gr

E7 explosion proof housing



ATEX II 2G Ex-d IIC T6 GB
Dim. (HxWxD) 165x90x80
Weight 1000 g

E7 explosion proof housing Touch



ATEX II 2G Ex-d IIC T6 GB
Dim. (HxWxD) 165x80x90
Weight 3200 g

Standard Thresholds

L.E.L.:	15% prealarm and 30% alarm
P.P.M.:	100ppm prealarm and 200ppm alarm
Oxygen (defect):	19% prealarm and 16% alarm
Oxygen (excess):	23% prealarm and 25% alarm

Electronic Base Board

LEDs Description

LD1 yellow color, failure. It indicates the presence of different types of faults, depending on the type of flashing, and also indicates the warm up time set.

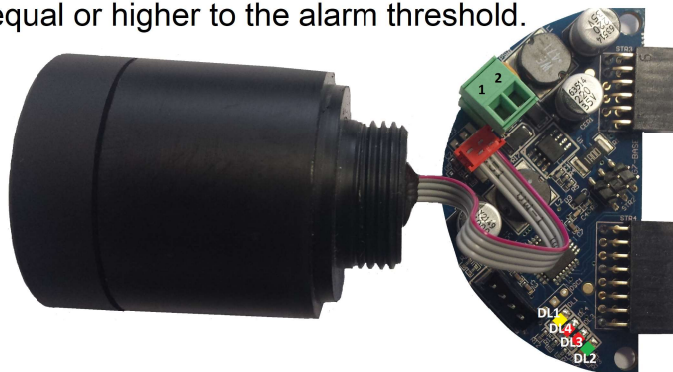
LD2 green color, power supply presence.

LD3 red color, prealarm, Gas presence equal or higher to the prealarm threshold.

LD4 red color, alarm, Gas presence equal or higher to the alarm threshold.

J1 Terminal board

1	Negative
2	Positive 12/24 Vdc



Meaning of the flashing Leds mentioned above

Leds' flashes for special status

The initial status of WARM-UP or Maintenance active standards are indicated with a particular number of flashing:

GREEN LED always on

YELLOW LED flashing at one second

If the system is blocked due to the power supply voltage or its measurement, both LEDs will flash in high frequency (5 pulses per second) at the same time; when the voltage goes back to normal levels, the flashing continues for 8 seconds, after that the system resets. (it simulates a shutdown and a new ignition)

If the microcontroller is in fault the two LEDs flash in high frequency for 25 seconds alternating, at the end of this short period the system resets and attempts to restart (but most probably the fault is permanent), after few seconds, if the fault persists, the systems start again to flash.

Leds' flashes that indicate the various types of sensor faults

The fault status, correctly detected by the system, is displayed on the two green LEDs, RUN and the yellow one of FAULT:

- the yellow LED lights up steadily indicating a sensor anomaly.
- the green LED flashes with short pulses at 0.2 seconds, each packet is separated from the next with a pause of 2 seconds
- the number of flashes of each package identifies the type of fault;

1. flash= the power supply voltage is out of range.
2. flashes = no voltage.
3. flashes = sensor different and incompatible from the one installed
4. flashes = sensor different from the one installed but compatible.
5. flashes = configuration parameters failure.
6. flashes = failure of the board-card where the sensor is installed.
7. flashes = saturation of the gas measurement or extra range of the measurement.
8. flashes = sensor is at the end of its life.
9. flashes = thermal failure.
10. flashes = semiconductor sensor potentiometer's failure

LIFE OF THE SENSORS

The average life of the sensors:

- Catalytic: in a clean environment the life can be of 3/4 years. In presence of pollution, the average life is reduced and as well the sensitivity.
- Electrochemical cell: in a clean environment, the life can be of 2/3 years. In presence of pollution, the average life of the sensor rapidly decreases.
- Semiconductor: in a clean environment the life can be of 3/4 years. In presence of pollution, the average life rapidly decreases and the values reading is altered.
- Infrared: in a clean environment the life can be of 5 years.

MAINTENANCE

- The Gas detectors maintenance is mandatory and it ensures the proper functioning of the sensor.
- The maintenance has to be planned according to the installation site and to the deterioration experienced by the sensors in the various environments, at least every 6 months.
- All operations must be executed in compliance with the relevant regulations in force.

Description

The interface has been developed in order to be connected directly to control panels with Vega (Argus) protocol Loop lines. The communication supports the different sensor types (Methane, Hydrogen, Propane, etc) and the real time analogy value with three types of measurement units: **L.E.L, P.P.M, %**

J1 Terminal board

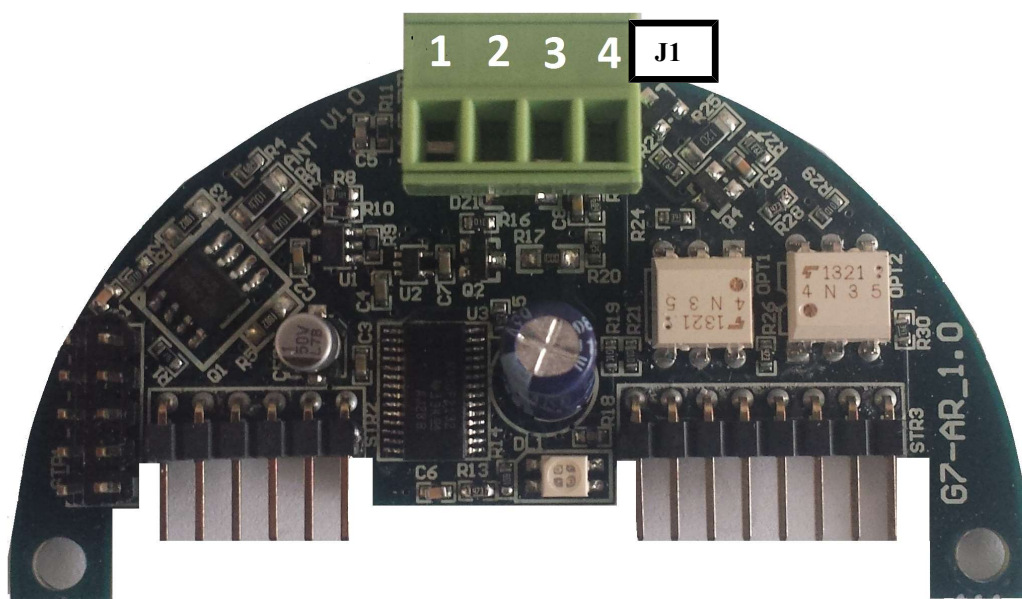
- 1 + Loop IN
- 2 + Loop OUT
- 3 - Loop IN
- 4 - Loop OUT

Sensor addressing

Fig. 1



The sensor address is set with the programmer tool VPU1000, image1
Connect VPU1000 to terminals 2 and 3 of the J1 terminal board, use the arrow buttons to select the required address and confirm with the button "write"; it is possible to verify the address set with the button "x".



G7-RL 3 Relais interface

Description

The 3 relays interface provide a free of voltage relay for each single event: alarm, prealarm and detector fault.

It is possible to set each single relay contact as NO or NC, trough the jumpers on board.
Power supply can be set to 12Vdc or 24Vdc opening or closing the dedicate jumper.

J1 Terminal board

- 1 Alarm output
- 2 Alarm output
- 3 Prealarm output
- 4 Prealarm output
- 5 Failure output
- 6 Failure output

Settings

- STR3 Opened **24Vdc** - Closed **12Vdc**
- STR4 Prealarm position 1-2 NC, 2-3 NO
- STR5 Alarm position 1-2 NC, 2-3 NO
- STR6 Failure position 1-2 NC, 2-3 NO

Technical Features

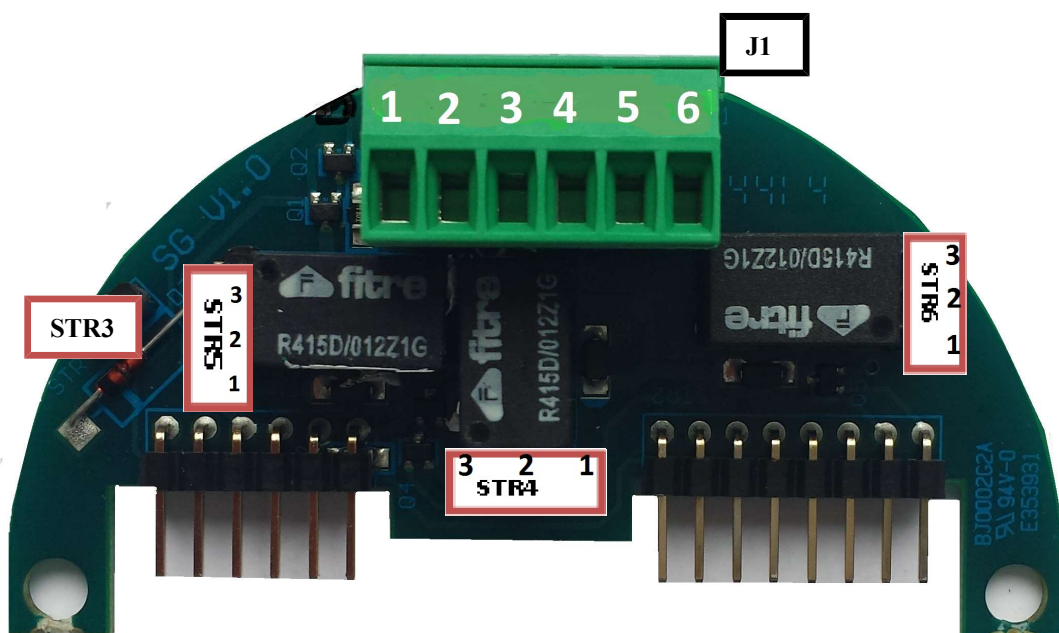
Power Supply 12/24 Vdc

Relay contacts current max 1A @ 30Vdc

Relay contacts current max 0,5A @ 12Vdc

IMPORTANT NOTE:

Using relays interface, it's mandatory to have a power supply of at least 10 Vdc when working at 12Vdc, or at least 22 Vdc when working at 24 Vdc.



G7-RL 4 4 Relais interface

Description

The 4 relays interface provide a free of voltage relay for each single event: alarm, prealarm, prealarm 2 and detector fault.

It is possible to set each single relay contact as NO or NC, through the jumpers on board.

Power supply can be set to 12Vdc or 24Vdc opening or closing the dedicate jumper.

J1 Terminal board

- 1 Alarm output
- 2 Alarm output
- 3 Prealarm output
- 4 Prealarm output
- 5 Failure output
- 6 Failure output

J1 Terminal board

- 7 Prealarm output 2
- 8 Prealarm output 2

Settings

- STR3 Opened **24Vdc** - Closed **12Vdc**
- STR4 Prealarm position 1-2 NC, 2-3 NO
- STR5 Alarm position 1-2 NC, 2-3 NO
- STR6 Failure position 1-2 NC, 2-3 NO
- STR2 Prealarm 2 position 1-2 NC, 2-3 NO

Technical Features

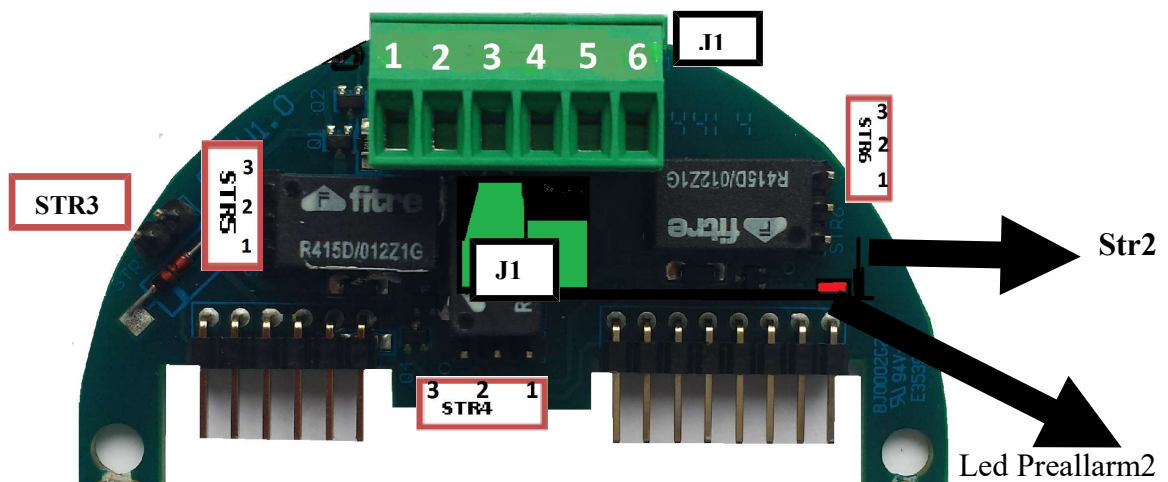
Power Supply 12/24 Vdc

Relay contacts current max 1A @ 30Vdc

Relay contacts current max 0,5A @ 12Vdc

IMPORTANT NOTE:

Using relays interface, it's mandatory to have a power supply of at least 10 Vdc when working at 12Vdc, or at least 22 Vdc when working at 24 Vdc.



Description

The interface is developed to keep simple the connection to input modules, or to conventional panels, requires this interface has to be ordered with the specific resistors, for the specific panel/modules.

The resistors have to be pre-configured in manufacturer laboratories.

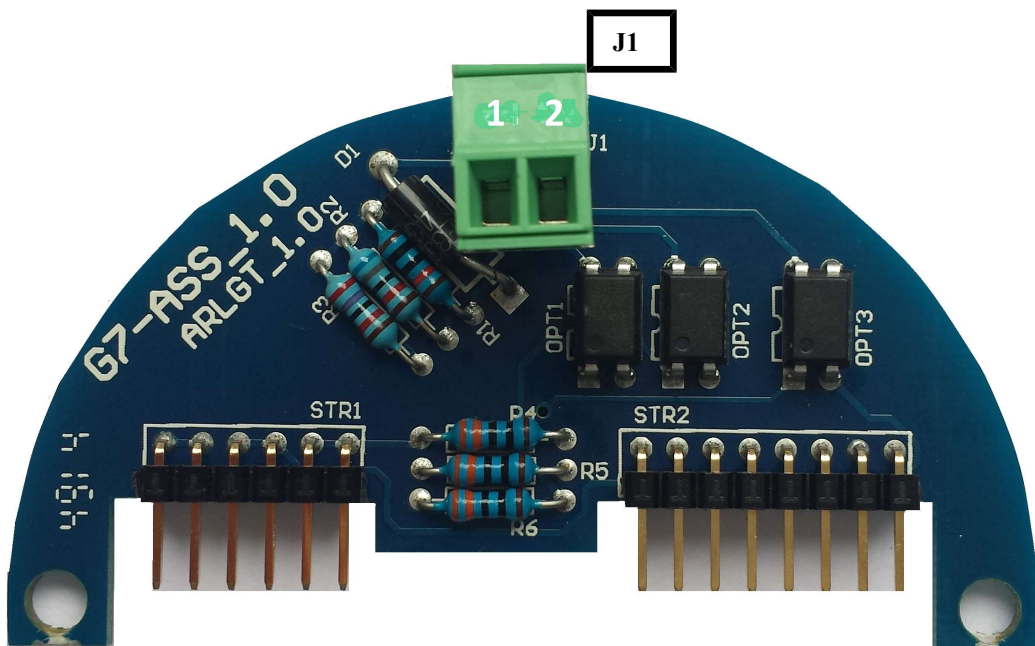
The interface allows 2 wires connection without any balancing resistor.

J1 Terminal board

- 1 Zone positive
- 2 Zone negative

IMPORTANT NOTE:

Before connecting the interface to the module or to the panel, verify that the balancing resistors are correct for the module/panel itself.



G7-42 4-20mA Interface

Description

The G7-42 interface manages a 4-20mA output in the following way:

1. Active output with positive signal (Default)
2. Active output with negative signal
3. Passive output with positive signal
4. Passive output with negative signal

Electronic Board type G7-42

Settings

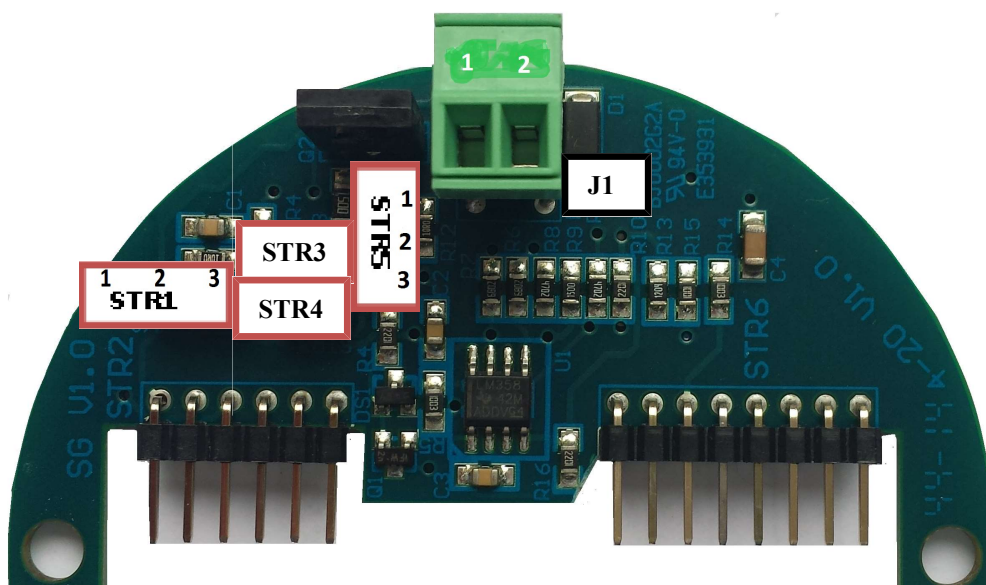
Type	Board G7-42			
	Str1	Str3	Str4	Str5
1	Close 2-3	Open	Close	Close 2-3
2	Close 1-2	Close	Open	Close 1-2
3	Open	Open	Close	Close 2-3
4	Open	Close	Open	Close 1-2

J1 Terminal board

Terminal	Type 1	Type 2	Type 3	Type 4
1	Positive	Negative	Positive	Negative
2	Negative	Positive	Negative	Positive

IMPORTANT NOTE:

Jumpers can be only moved when the board is switched off (without power supply).
Verify very well the right output type required, before power on.



G7-LE ENEA protocol Interface

Description

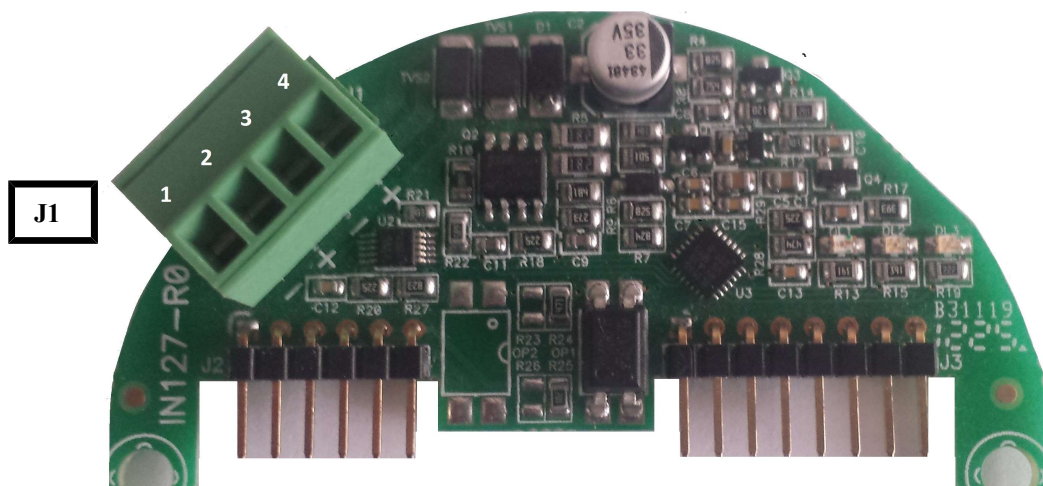
The interface has been developed in order to be connected directly to control panels with ENEA (INIM) protocol Loop lines. The communication support the different sensor types (Methane, Hydrogen, Propane, etc) and the real time analogy value with three types of measurement units: **L.E.L, P.P.M, %**

J1 Terminal board

- 1 - Loop IN
- 2 + Loop IN
- 3 - Loop OUT
- 4 + Loop OUT

Sensor addressing

As other ENEA devices, G7-LE interface has a serial-number address on board.
To assign to the control panel, refer to ENEA manuals and documentation.



Description

The interface provides separate open-collector outputs for prealarm, alarm and failure. Below, all the possible connection to input modules or to conventional zone, through resistors set by dip switches, based on the requirements of the control unit.

- Prealarm output open collector NPN opto-isolated
- Alarm output open collector NPN opto-isolated
- Failure output open collector NPN opto-isolated

J1 Terminal board

1	+ Prealarm electronic output	Collector	NPN max 60 mA at 30V
2	- Prealarm electronic output	Emitter	NPN max 60 mA at 30V
3	+ Alarm electronic output	Collector	NPN max 60 mA at 30V
4	- Alarm electronic output	Emitter	NPN max 60 mA at 30V
5	+ Failure electronic output	Collector	NPN max 60 mA at 30V
6	- Failure electronic output	Emitter	NPN max 60 mA at 30V

DIP-SWITCHES OPERATION SETTINGS AND DESCRIPTION

DIP. S1 DIP-SWITCH SENSOR SETTING

- 1** - Dip to associate failure output to prealarm output
If this dip is set to off, it inserts an 820ohm resistor in series to output
- 2** - Dip to select the optoisolated prealarm output
If this dip is set to on, it inserts a 2,2Kohm resistor in parallel to output with **Str1 open**
- 3** - Dip to select the optoisolated prealarm output
If this dip is set to on, it inserts a 2,2Kohm resistor in parallel to the alarm output
- 4** - Dip to associate failure output to prealarm output
If this dip is set to off, it inserts a 820ohm resistor in series

DIP. S2 DIP-SWITCH SENSOR SETTING:

- 1 - Dip to select the optoisolated prealarm output
If this dip is set to off, it inserts a 1Kohm resistor in series to output
- 2 - Dip to select the optoisolated alarm output
If this dip is set to on, it inserts a 10Kohm resistor in parallel to the alarm output that will be disconnected in case of detector failure
- 3 - Dip to select the optoisolated prealarm output
If this dip is set to on, it inserts a 3,2Kohm resistor in series to the prealarm output
- 4 - Dip to select the optoisolated prealarm output
If this dip is set to on, it inserts a 10Kohm resistor in parallel to output with **Str1 closed**

IMPORTANT NOTE:

The wiring below, refers to the connections of two different zones: the first to collect the prealarm, and the second for alarm and failure. Alarm and End of Line resistors should be set with switches S1 and S2 according to the connected panel.

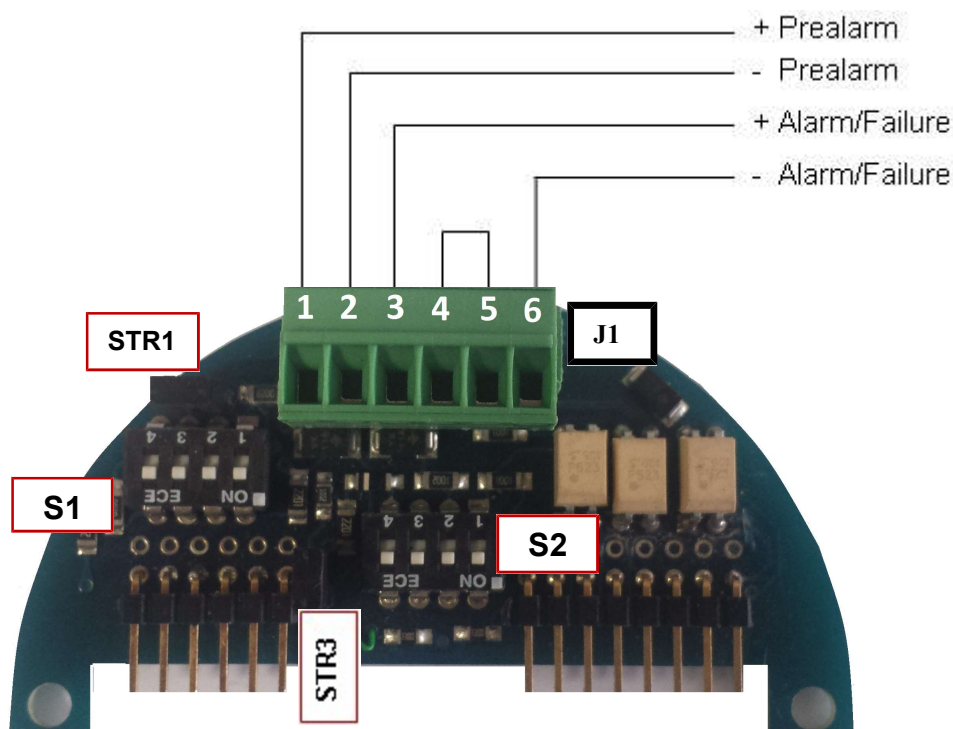
































TABLE: VARIOUS SENSORS SETTING TYPES

TYPE	DIP S1	DIP S2	Str3	Str1	N
Free outputs for prealarm/alarm/failure for external relays control. Max 30Vdc. DEFAULT SETTINGS			Closed	Closed	1
Prealarm output. In case of prealarm, it inserts in series a <u>820ohm resistor</u> on Terminals 1&2 of J1			Closed	Closed	2
Prealarm output. In case of prealarm, it inserts in series a <u>1000ohm resistor</u> on Terminals 1&2 of J1			Closed	Closed	3
Prealarm output. In case of prealarm, it inserts in series a <u>1820ohm resistor</u> on Terminals 1&2 of J1			Closed	Closed	4
Prealarm output. In case of prealarm, it inserts in series a <u>2200ohm resistor</u> on Terminals 1&2 of J1			Closed	Open	5
Prealarm output. In case of prealarm, it inserts in series a <u>3080ohm resistor</u> on Terminals 1&2 of J1			Closed	Open	6
Prealarm output. In case of prealarm, it inserts in series a <u>3200ohm resistor</u> on Terminals 1&2 of J1			Closed	Open	7
Prealarm output. In case of prealarm, it inserts in series a <u>4020ohm resistor</u> on Terminals 1&2 of J1			Closed	Open	8

<p>Prealarm output. In case of prealarm, it inserts in parallel a <u>1803ohm resistor</u> on Terminals 1&2 of J1</p>			<p>Closed</p>	<p>Closed</p>	<p>9</p>
--------------------------------------------------------------------------------------------------------------------------	-----------------------------------------------------------------------------------	-------------------------------------------------------------------------------------	---------------	---------------	-----------------

TYPE	DIP S1	DIP S2	Str3	Str1	N
<p>Prealarm output. It inserts in parallel a <u>2200 ohm resistor</u> on Terminals 1&2 of J1</p>			<p>Open</p>	<p>Closed</p>	<p>10</p>
<p>Prealarm output. It inserts in parallel a <u>10 Kohm resistor</u> on Terminals 1&2 of J1</p>			<p>Closed</p>	<p>Closed</p>	<p>11</p>
<p>Alarm output. In case of alarm, it inserts in series a <u>820ohm resistor</u> on Terminals 3&4 of J1</p>			<p>Closed</p>	<p>Closed</p>	<p>12</p>
<p>Alarm output. In case of alarm, it inserts in series a <u>1000ohm resistor</u> on Terminals 3&4 of J1</p>			<p>Closed</p>	<p>Closed</p>	<p>13</p>
<p>Alarm output. In case of alarm, it inserts in series a <u>1820ohm resistor</u> on Terminals 3&4 of J1</p>			<p>Closed</p>	<p>Closed</p>	<p>14</p>
<p>Alarm output. In case of alarm, it inserts in parallel a <u>1803ohm resistor</u> on Terminals 3&4 of J1</p>			<p>Closed</p>	<p>Closed</p>	<p>15</p>
<p>Alarm output. It inserts in parallel a <u>2200ohm resistor</u> on Terminals 3&4 of J1</p>			<p>Closed</p>	<p>Closed</p>	<p>16</p>
<p>Alarm output. It inserts in parallel a <u>1K0ohm resistor</u> on Terminals 3&4 of J1</p>			<p>Closed</p>	<p>Closed</p>	<p>17</p>

NOTE: Darkened dip-switches must not be considered.

IMPORTANT NOTE. Use a proper shielded cables size, conforming installation features, and connect the shield.

G7-MB Modbus

Description

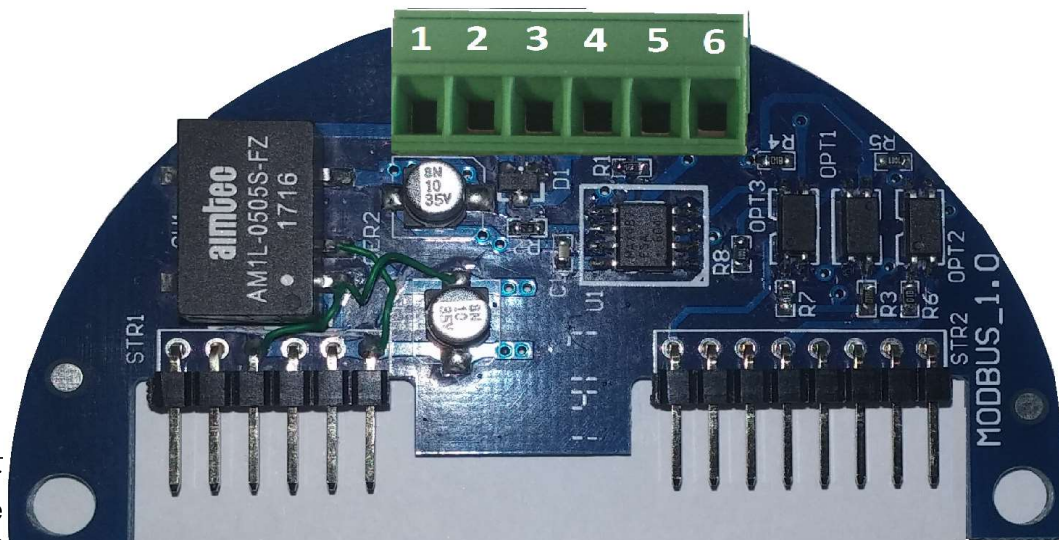
The interface has been designed to communicate directly with the PLC Central unit, for the complete functioning of the sensor according to the regulations.

J1 Terminal board

- 1 – OUT BUS
- 2 + OUT BUS
- 3 GND
- 4 GND
- 5 – IN BUS
- 6 + IN BUS

Addressing

Sensor addressing will only be possible using the software or the application for the management of the moon 2 sensor.



Disposal Instructions

This product falls within the scope of Directive 2012/19/EU concerning the management of waste electrical and electronic equipment (RAEE).

The product must not be disposed along household waste, as it is composed by various materials that can be recycled in suitable facilities. Please be informed through the municipal local authority regarding the location of the ecological platforms suitable for receiving the product for disposal and its subsequent correct recycling.

We remind you that, against a purchase of an equivalent product, the distributor is required to collect the product to be disposed free of charge.

The product is not potentially dangerous for human health and the environment, as it does not contain harmful substances as per EEC directive 2015/863, but if abandoned in the environment it has a negative impact on the ecosystem.

Read the instructions carefully before using the product for the first time. It is recommended not to use the product for any purpose other than that for which it was intended, as there is a danger of electric shock if used improperly.

The symbol of the crossed-out bin, present on the label placed on the product, indicates the compliance of this product with the legislation relating to waste electrical and electronic equipment.

The abandonment of the equipment in the environment or its illegal disposal are punishable by law





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