





ELECTRONIC VOLUME CONVERSION DEVICE TYPE 1 Class I and II WITH POT PROTOCOL

INTRODUCTION

ICARUS is an eletronic volume conversion device for gas PTZ Type 1, realized with integrated sensors for pressure and temperature. Associated with a MID meter, it provides the measurement of the volume calculated at the basic conditions of +15°C and 1,01325 bar. It complies to norm UNI 9167:2020, it's installed in measurement points of the transport network to perform fiscal gas measurements.

ICARUS is compliant to norm UNI EN 12405-1:2010 and meets the requirements of Directive MID n°2014/32/UE as per attachment MI-002 (Gas Volumes conversion Devices).

ICARUS is compliant to norm UNI 11629:2021 "Gas Measurement Systems - Hourly based gas measurement devices connected directly to the transport network" (POT Protocol).

ICARUS can also be used as a back-up device (DLC volumetric data logger), maintaining the same functionalities of the type 1 conversion device.

TECHNICAL CARACHTERISTICS

Pressure Measurement:

ICARUS is equipped with an external absolute pressure transducer connected to the CASE via a 3 meter cable. The pressure connection is a 1/4" GAS fitting.

- Available Ranges:
 - 0,6 ÷ 2,5 bar A;
 - 0,6 ÷ 6,0 bar A;
 - 0,9 ÷ 10,0 bar A;
 - 3,0 ÷ 30,0 bar A; 8,0 ÷ 81,0 bar A.
 - 8,0 ÷ 81,0 Dar A.
- Accuracy: 0,1% of the full scale value.

Temperature Measurement:

ICARUS is equipped with a PT1000 sensor, 4 wires class A, compliant to European Legislation EN IEC 60751.

The 4 wires connection guarantees highly accurate measurements regardless of cable lenght. The sensor is connected to the calculation unit via cable typically 3 meters long. Measurement range is $-20^{\circ}C/+60^{\circ}C$.

Conversion Function:

ICARUS calculates gas volumes at basic conditions, compliant to norm UNI EN 12405-1:2010. The compressibility factor calculation can be chosen between the two following algorithms: -ISO 12213-3:2010 (SGERG 88);

-AGA NX19.

Flow Calculation:

ICARUS calculates and provides average and immediate flow data, at basic conditions and measurement conditions.

Keyboard:

The keyboard is composed by 5 buttons to move with ease within the menus.



Display:

Wide graphic display LCD 128x64.



1- Volume totalizers in a single screen

2- Intuitive interface

Inputs:

ICARUS has 4 digital inputs:

- LF input for connection to meter with emitter of low frequency pulses (max. frequency 10 Hz);
- HF input Namur type for meter connection with an emitter of high frequency pulses (max frequency 10 kHz). HF input works only if ICARUS is connected to external power;
- Input meter alarm;
- Device status input;

Outputs:

ICARUS has 3 impulsive outputs open collector type, that can be programmed to repeat the following values: corrected volumes, uncorrected volumes, alarms.

Serial Ports:

ICARUS has 3 serial ports:

- 1 optical serial port for local PC communication (configuration, data download);
- 1 serial port RS232 for PC or GSM modem communication, installed in a safe zone;
- 1 serial port RS485 with MODBUS RTU protocol, to comunicate with an external data acquisition device (DCS) or with ICA4, a device with multiple interface to be installed in a Safe Area.

Power supply:

- ICARUS can be powered:
- with an internal lithium battery (3.6V) ATEX;
- with an external power supply (15 Vdc max);
- with a solar panel;

The internal battery meets the requested requirements of ATEX Directive, and guarantees an autonomy of 5 years in normal operating conditions. With an external power supply available, the battery works as a back-up.

ICA4 DEVICE

ICARUS communicates with its interface for Safe Zone ICA4, that also provides external power supply. ICARUS communicates with ICA4 via serial link RS485. ICA4 device can be powered with 230Vac or 24 Vdc and has a wide range of additional features. Particularly:

Serial Ports:

ICA4 has 5 serial ports:

- 1 serial port RS485 to communicate with Icarus;
- 1 serial port RS485 with POT protocol to communicate with RIU or other device for remote reading;
- 1 serial port RS485 to communicate with gas chromatograph or gas quality analysis device;
- 1 serial port RS232 with POT protocol to link with a GSM modem or local PC;
- 1 serial port can be configured as RS485 or RS232 to comunicate with an external data acquisition device (DCS).

Inputs:

ICA4 has 4 digital status inputs.

Digital outputs:

ICA4 has 3 impulsive open collector type outputs and 1 impulsive Relay type output.

Analogical Outputs:

ICA4 has 3 configurable analogical outputs 4-20 mA.





INSTALLATION

ICARUS is generally installed in a hazardous area classified as "Zone 1", near gas pipes. If configured as fiscal measurement device, it's always connected to a communication device for transferring gas consumption data. In the measurement points of the Transport Network, ICA4 interface device is installed in a safe area and is connected to ICARUS via safety barriers. ICARUS' case has 4 threaded holes positioned at the corners, on the back of the device. The internal diameter of the holes is 4 mm. Via these holes, ICARUS can be fixed to a wall or a plate using M4 screws.

Note: The installer must always be sure that the case is electrically connected to the ground. If needed, a ground wire can be connected between the fixing screws and the earth point of the electrical power supply system.

ENVIRONMENT CONDITIONS:

- Ambient temperature: -25 °C ÷ +55 °C;
- Storage temperature: -40 °C ÷ +80 °C;
- Relative humidity: 0 % ÷ 100 %

MID CERTIFICATION:

ICARUS is certified in compilance to MID Directive 2014/32/UE with UE Type Examination Certificate n. 0407-MID-144 (IG-205-2016).

ATEX CERTIFICATION:

ICARUS is an INTRINSICALLY SAFE electrical device. ATEX certified for ZONE 0:

- II 1G Ex ia IIC T4 Ga
- II (1)G [Ex ia Ga] IIC





