

PTZ-BOX V2 Electronic Volume Converter Documentation and Technical Specifications



Gas - Measurement



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Advantages

- Advanced conversion device for gas volume meters (approved for custody transfer)
- Relevant type approvals available
- Low cost / high performance
- Second pulse input for sensor check
- Easy installation, operation and maintenance
- Small size and weight
- Software for Windows™ included
- Extended communication options
- Suitable for zone 1 and zone 2

The PTZ-BOX is designed to meet

- EN 12405,
- German DIN standards and the rigid German regulations for custody transfer,
- and other relevant international standards

Display

PTZ-BOX V2 is equipped with a 10 character numeric LCD. This display is operated by pushing two buttons on the front panel. It gives access to the current values, set values and errors.

Operation

The PTZ-BOX V2 is a battery or line powered compact volume converter for gas volume measurement applications. Applications are with gas flow meters like diaphragm meters, turbine meters, rotary piston meters, and vortex shedding meters.

It is equipped with an energy-saving pressure transmitter and a temperature probe. This equipment is supplied integrally with the converter.

The converter uses volume pulses generated by a gas meter, measures pressure and temperature, and calculates the compressibility factor Z of the gas as well as the conversion factor C . From these input values given, it calculates the volume at base conditions, the base flow rate and the actual flow rate. The counted pulses from the gas meter can be checked by connecting a second pulse sensor.

The volume measured at actual conditions is converted to volume at base conditions according to EN 12405, complying with most other standards.

The compressibility factors Z and Z_b may be fixed for all gas types or calculated according to several methods for natural gas:

- $Z/Z_b = 1$ (Ideal gas) or $Z/Z_b = \text{const.} \neq 1$
- AGA NX 19 or AGA NX 19 mod
- AGA 8 G1 or G2
- SGERG 88

Communication

The PTZ-BOX V2 can be easily configured using the software and a PC or notebook.

Available serial interfaces are infrared as well as RS 232 and RS 485 cable connections. By means of these interfaces the device can be connected directly to a computer or via line modem, GSM modem, radio modem or GPRS connection. Local read out can also be performed by using a handheld computer (PDA).

In zone 1, RS 485 must be used in combination with an IS barrier (see "Additional Equipment").

The device can also be accessed by DCS or SCADA systems via Modbus RTU or dedicated protocols.

Alarms

The following error modes are registered:

- Pressure or temperature above maximum or below minimum
- Gas meter's actual flow rate above Q_{max}
- Diagnostic status in case of an internal error
- Battery capacity below 10 %
- Setting log full
- Gas meter manipulation (if connected)
- Pulse sensor error (if 2 sensors are connected)

Memory

The EEPROM memory provides storage capacity for

- 21 monthly records
- 8 years of daily records
- 25344 records (standard set of parameters) or 11264 records (extended set of parameters) settable at intervals of 5 to 60 minutes (that is 34 months of information with hourly intervals and standard set of parameters)
- Status archives and setting archive

Power Supply

The standard power supply is a lithium battery. The life time of that battery is a minimum 6 years, providing a measurement interval of 10 seconds or more and communication via serial interface once a day. When the battery power is below 10 %, it will generate an alarm for a battery change.

As an option, the PTZ-BOX V2 can be powered by an intrinsically safe power supply. The battery will provide power, in case of line power failure.

Documentation

Each PTZ-BOX V2 is provided with the following documentation:

- IOM Installation, Operation and Maintenance Manual (hardcopy)
- CD-ROM with
 - IOM (manual as pdf-softcopy)
 - Software for configuration and read out
- Specification data sheet with the preset parameters of the device

Installation

The PTZ-BOX V2 is delivered with equipment for wall mounting or for mounting at the pipe upstream or downstream of the meter. A weldolet with thermo-well is also supplied (common sizes and threads).

Pre-assembly in the factory is an alternative. The temperature probe needs a thermo-well close to the gas meter: Downstream of a gas turbine meter or upstream of a rotary gas meter. For custody transfer applications in many countries, you need a second thermo-well and a three-way-valve in the pressure line. The vemm tec gas meters can be provided with a thermo-well in the meter body, but this is not permitted by some local metrological services.

Initial Verification and Calibration

The optional factory calibration certificate is often sufficient when a calibration document is required.

NMi initial verification certificate can be supplied as an option.

Legal calibration certificates for other countries are available on request.

Optional Equipment

- Infrared head for RS 232 serial interface, to be used for easy read out and configuration via PC or notebook (USB connection requires a converter), 2.5 m or 12 m cable length
- Cables for connecting RS 232 or RS 485, provided with male plug (IP 65)
- Intrinsically safe communication modules, barriers and power supplies
- Analogue output module 4 – 20 mA
- Telemetric modules complete with power supply, modems, barriers and safety modules, configuration according to your specifications
- Thermo-wells, thread-o-lets, three-way-valves and other accessories



Electronic Volume Converter PTZ-BOX V2 with temperature probe Pt 1000

Table: Technical specifications PTZ-BOX V2

Enclosure	Dimensions: 100 x 120 x 70 mm Weight: 1.2 kg Material: Aluminium alloy IP 65: According to EN 60529
Operating conditions	Temperature: -25 to +60 °C (standard) -40 to +60 °C (optional) Storage temperature: -40 to +60 °C
Power	Dedicated intelligent Lithium battery Life time with battery power: 6 years minimum (under specified conditions of use) Optional: External power supply (IS) 4.7 to 10.0 V DC
Inputs Pulses Tamper switch Pressure transmitter Temperature probe	1 or 2 LF contact inputs (Reed or Wiegand) 100 / 10 / 1 / 0.1 / 0.01 m3/imp with 4 Hz max. frequency Contact, if available in gas meter Piezo resistance sensor, mounted in the casing, with the following ranges: 0.8 - 5.2 bar(a) 0.9 - 3.0 bar(a) 2.0 - 10 bar(a) 2.0 - 5.2 bar(a) 4.0 - 20 bar(a) 3.0 - 10 bar(a) 7.0 - 35 bar(a) 14 - 70 bar(a) Other ranges on request Connection: 6 mm Ermeto M12x1.5 Pt 1000 probe, fixed to the device
Sample frequency	Battery operation: 10 / 15 / 20 / 30 s Line power: Every 2 seconds
Display	10 digits LCD, showing actual values, settings and errors
Calculation	Compressibility calculation according to EN 12405 and other standards: AGA NX 19 (standard or mod) AGA 8 G1 or G2 SGERG 88 or fixed value
Accuracy	Base volume: < ± 0.15 % under reference conditions < ± 0.50 % in the whole range of pressure and temperature sensors

Registers Monthly Daily Custom	21 records of 12 values 3072 records (8 years) of 20 values 25344 records of 9 values or 11264 records of 20 values (The custom archive can hold 34 months of information with 9 values stored at hourly intervals).
Intervals Status archive Setting archive	5 / 10 / 15 / 20 / 30 / 60 minutes 500 records of error messages 500 records of setting changes
Outputs Pulse outputs Serial outputs	Unconverted flow (scalable) Converted flow (scalable) Alarms (settable pulse width) Pulses are provided as pulse train at the beginning of each measuring period. Infra red port RS 232 (IS) RS 232 port (not intrinsically safe) and RS 485 port (IS) combined in one socket with connector (IP 65) Communication speed selectable: 19.2 / 9.6 / 4.8 kbit/s
Alarms	Error status at high or low pressure or temperature, high flow rate, low battery, manipulation with gas meter, pulse error and internal errors
Intrinsic safety	II 2G EEx ia IIC T4/T3 FTZÜ 05 ATEX 0164X
Metrological approvals	Netherlands Measurement Institute (NMI) TC3572, T6794 and others
Protection against manipulation	A password is required to change the settings. The sealable configuration switch must be put to the "set" mode. The device can be protected by seals (user or metrological service).
Software	The included software package enables configuration and read out of the device. Values can be exported to several standard software packages (Excel, Access, Paradox, Foxpro) or to text formats or XML.
Data exchange	Scada systems can access the device via Modbus RTU or via optionally dedicated protocols.



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