Annex No. 1 – Technical specification for gas volume converters

1. Area of validity

This technical specification applies to gas volume converters with integrated data recorder (hereinafter referred to only as the "electronic volume converters") and is based on RWE GZM20.0450 technical standard.

This specification applies to electronic volume converters connected to turbine, rotating, and membrane gas meters used in the equipment for natural gas measurement.

This specification applies to the procurement of electronic volume converters for RWE Group companies in the Czech Republic.

2. General requirements

Design of all electronic volume converters purchased by the contracting entity must comply with generally binding legal regulations, relevant Czech technical standards (in particular ČSN EN 12 405-1+A2) and with this technical specification.

All electronic volume converters must be primarily verified by the manufacturer.

3. Technical requirements

The electronic volume converter with integrated modem (one complex equipment comprising a GSM modem for remote data transmission, for Zone 2 installation)

Conversion to reference conditions

- reference temperature: T_v = 288.15 K (t_v = 15 °C)
- reference pressure: p_v = 101.325 kPa (p_v =1.01325 bar)

Converter power supply

- battery powered design
- minimum battery life of 5 years
- battery replacement must be possible without loss of data stored in integrated data recorder and without damaging any official seals
- possibility of external power supply connection

Display

- data displayed in CZ localization
- possibility of switching to/from daylight saving time
- display of current measured values and real time clock (as the minimum, operating quantity counter, converted quantity, pressure, and temperature will be displayed)
- time of change from one day to another at 06:00 a.m. with the possibility of variable change to 00:00
- display of data from archive memory of daily and hourly values (as the minimum, the operating quantity counter, converted quantity, difference in operating quantities, difference in converted quantities, pressure, and temperature will be displayed)

Pressure converter

- internal design
- the pressure converter must be connected in Ermeto M12x1.5 (L), diam. 6mm
- the unit must be equipped with pressure converters with range from 0.9 to 70.0 bar abs., with maximum of 4 sensors with the following range:

        - at least from 0.9 bar abs. to at least 5.0 bar abs., for most frequently measured value of 4 bar abs.
        - at least from 2.0 bar abs. to at least 10.0 bar abs., for most frequently measured value of 5.5 bar abs.
        - at least from 7.0 bar abs. to at least 35.0 bar abs., for most frequently measured value of 23 bar abs.
        - at least from 14.0 bar abs. to at least 70.0 bar abs., for most frequently measured value of 36 bar abs.
    - maximum possible error in measured value 0.5%
    - typical error should be specified as the percentage of the measured value.

Temperature converter

- external design, required range in the minimal interval from - 20 to + 50 °C
- will be supplied in metallic design (max. 0.6 mm) with approximately 2-meter cable
- required minimum accuracy of +/- 0.15°C

Long-term stability of sensors

- required maximum error of +/- 0.1%

Algorithm for compressibility degree calculation

- AGA8 DC92
- option S - GERG-88

Digital (binary/pulse) inputs

- at least two
- possibility of pulse input from Wiegand and/or comparable sensor
- possibility of pulse input from reed contact

Input LF pulse frequency

- minimum of up to 8 Hz

Digital (binary/pulse) outputs

- at least two outputs
- must function either as pulse or as alarm output according to the setup

Communication channels

- at least RS 232 / 485 and fiber optic IEC1107
- transmission speed for RS 232 - 9600 b
- MODBUS communication protocol (documentation is required) + communication head

Integrated data recorder

- hourly data archive - at least hourly data for the past 6 months
- daily data archive - at least daily data for the past 400 days
- monthly data archive - at least monthly data for the past 15 months
- the interval of data storage into the memory must be freely programmable
- counter statuses with the possibility of setup
- status archive - for at least 250 records
- settings archive - for at least 200 records

Installation in environments with gas explosion hazard

- approval pursuant to the Council Directive 94/9/CE (ATEX) - all electronic volume converters will be located in zone 2

Required electronic volume converter protection

- Minimum protection of IP 54

Possibility of remote FW upgrade (remote download)

- convenient but not mandatory

Approvals and certificates

- confirmation of EC design test pursuant to Directive 2004/22/EC of the European Parliament and of the Council of 31 March 2004 on measuring instruments (MID)
- final test pursuant to MID must be carried out for each instrument and shall, as the minimum, comprise test of Adding
- the measurement deviation pursuant to EN 12405-1 and functional test of pulse inputs / data interfaces
- document a protocol pursuant to ATEX,
- we require documented EMC and EMI tests

Accessories

- operating manual in Czech language, EC type approval certificate including measures necessary for meters integrity assurance (sealing, software identification, etc.);
- software localized into CZ for parameterization of the electronic volume converter and reading, compatible with WIN 7 and higher
- installation panel for joint mounting of the electronic volume converter and three-way valve
- material for mounting onto the pipeline
- three-way valve PN 100 with Ermeto M12x1.5 connection, diam. 6mm

Integrated device for remote data transmission

- the entire device is integrated in the electronic volume converter
- battery powered design
- minimum battery life of 5 years
- possible battery replacement must be possible without the loss of data stored in the integrated data recorder and without damage to any official seals
- the entire equipment intended for installation in Zone 2
- GSM 900/1800 modem for use in the Czech Republic, with power supply and aerial
- modem with preset protocol for immediate functionality with the electronic volume converter, including communication protocol provision
- required battery life of 5 years when communicating over the modem with the frequency once in a day

4. Miscellaneous

- all used labels must be attached to last, they must remain legible under normal light, thermal, and atmospheric conditions for the entire service life of the equipment
- the supply must take place without any damage to the electronic volume converter's exterior and without influencing its measuring accuracy. The supply must comprise specific documents specifying in particular the number of instruments and serial numbers
- the supplier undertakes to provide a free reference sample with agreed design (subject to agreed product modifications) upon contracting entity's request after the contract is granted
- the manufacturer (supplier) shall ensure that the instrument has all the characteristics that proper usage or foreseeable misuse will not pose any threat to safety, health, and lives of individual groups of persons (operator, user, third persons)
- the product information must provide the user with all relevant information so that the user can assess and protect themselves against any threats to lives and health of all

kinds relating to usage of the product during usual or reasonably foreseeable usage period, which is not obvious without relevant warning notices

- after the contract is granted, any product changes by the manufacturer are allowed only with consent of the contracting entity's Technical Product Management, with consent of the purchaser responsible for metering, and also subject to compliance with the provisions of Act No. 137/2006 Coll., on public procurement, as amended and supplemented
- product changes of any kind shall be agreed with the contracting entity's Technical Product Management in sufficient advance. Any non-approved changes identified by the contracting entity will result in usage prohibition and the supplier shall bear all incurred costs
- the manufacturer (supplier) shall ensure free provision of the electronic volume converter's communication protocol for communication path establishment (driver) and for instrument's incorporation into the standard data reading system of the RWE Group companies in the Czech Republic (AVE2), no later than 1 month from contract execution
- the manufacturer (supplier) shall ensure free provision of cooperation for communication path establishment (driver) and for instrument's incorporation into the standard data reading system of the RWE Group companies in the Czech Republic (AVE2)
- the price of performance shall comprise transport of electronic volume converters to the address specified by the contracting entity within the Czech Republic
- the manufacturer (supplier) shall ensure primary training (including training materials) of customer's employees within the seat of RWE Distribuční služby, Brno, with focus on installation and operation (34 persons - 2 day training) and further for 20 persons (technicians) for electronic volume converters operation (1 day training) including certificate issue. All costs (except the training room rent) shall be borne by the trainer. The training shall focus in particular on equipment installation and operation as demonstrated directly on the product.
- execution of a separate service agreement on repairs of electronic volume converters, with delivery and issue point within the Czech Republic, with maximum period of 30 calendar days between receiving and returning the repaired item. More details are available in the contract. An agreement regarding location and contact person (including relevant contact) shall be made after contract execution.

5. Subsequent verification after 5 years

- execution of service agreement with the contracting entity regarding assurance of subsequent verification (after 5 years from the primary verification and after 10 years from the primary verification)
- provision of a delivery and issue point within the Czech Republic
- price offer for battery replacement including required material (after 5 years from the primary verification and after 10 years from the primary verification)
- appraisal including transport to/from the service facility and subsequent verification at a certified AMS within EU, including valid agreement submitting
- maximum period for subsequent volume converter verification after delivery - 15 calendar days.

6. Standards, directives, and regulations

ČSN EN 12405-1 + A2	Gas meters, Gas volume converters
Act No. 505/1990 Coll.,	on metrology, as amended
Government Decree No. 464/2005	which determines the technical requirements on meters
Directive 2004/22/EC	Directive of the European Parliament and Council 2004/22/EC of 31 March 2004 on meters
Technical rules TPG G 902 01	Conversion and expression of natural gas volume
Directive 94/9/EC	ATEX (Atmospheres Explosibles) Equipment and protective systems intended for use in environments with explosion hazard
RWE – technical standard for networks GZM20.0450	Compact volume converters with integrated data recorder - Technical specification

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Datum: 2015.03.23 13:55:47 +01'00'