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MICRO-C1

Single Stream Compact Electronic Volume Corrector

CERTIFIED
MID MODULE B

KEY FEATURES

- Approved for legal metrology. EN 12405 and MID compliant
- Software compliant to Welmec 7.2
- Certified for use in hazardous locations
- Dual streams. PTZ correction, energy and mass in main stream
- AGA 8, NX19, GERG, ISO 6976 and mass calculations
- AGA 5 energy calculations
- Suitable for LF/HF meters
- Direct mounting on gas meters with mechanical encoder
- Direct NAMUR sensor interface with built-in sensor power
- Internal or external pressure sensor configuration
- External DC power input
- Pluggable 4G communications with 3G and 2G fallback
- Up to 4 concurrent TCP connections via GPRS interface
- Configurable cryout function via GPRS channels or SMS
- Accepts incoming data calls originated by remote systems via GSM
- Remote monitoring, configuration, and diagnostics
- Remote firmware update
- Hourly, daily, monthly archive, min/max/average data
- User-configurable data logging feature
- Alarm and event logging
- Modbus RTU/TCP support with configurable addressing
- Modbus master protocol support
- Built-in RS-232, RS-485 and optical interfaces
- Plugable RS-232, RS-485 interface options
- Station telemetry with I/O channels
- Ultra low power. 10 years typical, 5 years minimum battery life
- Separate battery for GPRS interface
- Graphics LCD with backlight. Always on display option.
- RTC with synchronization and daylight saving support
- Compact, durable housing. IP66 rated.
- Push-in terminals for easy field wiring
- Complete with software

MICRO-C1 is a compact, high accuracy, single stream volume corrector intended for high performance industrial gas metering with or without remote telemetry.

This best in class EVC introduces superior measurement stability, accuracy, and reliability. It provides full set of calculations normally found in flow computers.

It can be easily interfaced with variety of field devices and systems by means of its local communication ports and I/O channels. Its advanced remote communication capabilities allows realization of large scale centralized metering systems. Newly added 4G interface provides superior remote communication performance.

Approved for Legal Metrology

MICRO-C1 has been approved by NMI Netherlands for legal gas metering as per the EN 12405 standard. This involves a complete set of stringent test procedures to verify that the product performs its functions and maintains performance under severe environmental conditions.

Instrument software is also compliant to Welmec 7.2 of the MID 2014/32/EU/2015 and includes extensions L, S, T, D and I-2.

Self-Contained for Hazardous Locations

MICRO-C1 supports completely self-contained operation in hazardous locations.

Certified DC outputs, both for powering external analog or smart type transmitters and NAMUR sensors, eliminate the need for costly external intrinsically safe power supplies and zener barriers.

User-configurable HF input allows direct connection of NAMUR sensors, further eliminating the need for external certified converters.

Broad Range of Calculations

Calculations include volume, density, heating value, compressibility, energy and mass as per the AGA 8, NX19, GERG, ISO 6976, and AGA 5 standards.

Extensive Remote Communication Features

MICRO-C1 offers comprehensive features for modern, Internet based remote access via GPRS networks. All configuration, reporting, monitoring and diagnostics facilities are also available remotely via designated communication channels, to form a modern supervisory distribution management system which requires very low number of visits to remote stations and fewer personnel for network operations and maintenance.

MICRO-C1 supports multiple, simultaneous TCP connections. This means number of host systems in different locations may access a remote instrument without influencing each other. This allows concurrent operation of multiple remote monitoring systems in different nature, such as utility SCADA systems, distribution management systems, and other legal monitoring systems belonging to upper level government organizations.

MICRO-C1 is also able to maintain most of its remote communications features even in battery mode. This gives a great advantage when remote sites are difficult to reach and mains power is unavailable, and also eliminates the need for costly solar power systems. It can perform periodic reporting at scheduled times of day via the GPRS interface, exchange data with remote center, transfer runtime and archive information, and execute scheduled tasks.

The internal GPRS/GSM interface, when operating in GSM mode, also accepts incoming data calls originated by authorized remote systems. It also allows any instrument alarm(s) be associated with number of SMS recipients, to send text messages upon alarm occurences.

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BASIC SPECIFICATIONS

POWER

Primary (EVCD)battery	3.6V certified battery. 10 years typ. 5 years min., under the specified operating conditions.
GPRS/GSM battery	3.6V certified battery, 5 years min., under the specified operating conditions.
External DC input	3.9...4.2V / 0.75A max.

GENERAL

Ambient temperature	-30˚C...+70˚C operating, -25˚C...+70˚C classification accord. to MID 2014/32/EU
Relative humidity	95% non-condensing
Dimensions	180H x 240W x 70D mm
Weight	1.3 kg
Housing	IP66 polycarbonate
Display	120 x 240 graphics LCD with backlight
Keyboard	6 front panel keys
Mechanical environment class	M2
Electromagnetic environment class	E2

CERTIFICATES AND APPROVALS

Measurements and calculations	NMI EN12405-A2, MID 2014/32/EU (T11476/T11509/TC10745)
Safety	KIWA ATEX II 1 G Ex ia [ia IIC] IIB T3 Ga (KIWA 15ATEX0049X)
CE	IEC 61000-4-2 (ESD), IEC 61000-4-3 (EM), IEC 61000-4-4 (EFT), IEC 61000-4-5 (Surge), IEC 61000-4-6 (Conducted), IEC 61000-6-4 (Emission)

COMMUNICATIONS

Pluggable GPRS option board (P3)	4G with 3G and 2G fallback, QUAD band GPRS/GSM, dial-in feature, SMS, TCP/IP client or server
Antenna	2.4 dBi internal antenna standard. External high gain antenna optional.
SIM card holder	Internal micro SIM
On-board RS-232 (P1)	Full duplex, 150...115200 bps, 7...9 bits, 1/1.5/2 stop bits, none/odd/even parity
On-board RS-485 (P2)	Half duplex, 1/8 load, fail-safe, 150...115200 bps, 7...9 bits, 1/1.5/2 stop bits, none/odd/even parity
RS-232 option board (P3)	Full duplex, 150...115200 bps, 7...9 bits, 1/1.5/2 stop bits, none/odd/even parity
RS-485 option board (P3)	Half duplex, 1/8 load, fail-safe, 150...115200 bps, 7...9 bits, 1/1.5/2 stop bits, none/odd/even parity
Optical (P4)	Full duplex, 9600 bps, 8 bits, 1 stop bit, no parity (native protocol only)
Protocols	Auto detect Native, Modbus RTU/TCP Slave, Modbus RTU Master, Smart Sensor (P2 only)

METROLOGY

Pressure inputs	
Analog	PT1, AI1, AI2, and AI3 inputs for 0/4...20mA external transmitters, reading accuracy ≤ 0.005% FS
Smart	Industrial RS-485 (P2) interface for Type LD20 (TC11267) sensor(s)
Transmitter power	12.6V / 0.15A max.
Temperature sensor input	RTD1 input, 2 wire Pt1000 sensors, 5th order polynomial linearization, reading accuracy ≤ 0.01˚C
Temperature transmitter inputs	AI1, AI2, and AI3 inputs for 0/4...20mA external transmitters, reading accuracy ≤ 0.005% FS
LF/HF input (main stream)	
LF mode	Dry reed contact, closed ≤ 10kΩ, open ≥ 500kΩ, 4Hz max., 0.2 sec on/off time min., 5m cable max.
HF mode	DIN 19234 NAMUR or 0-10V pulse, 5kHz max. integral 1kΩ termination resistor, closed < 1.2mA, open > 2.2mA
NAMUR sensor power	9.5V / 54mA max., 5m cable max.
LF input (aux stream)	DI2 input for dry reed contacts, closed ≤ 10kΩ, open ≥ 500kΩ, 4Hz max., 0.2 sec on/off time min., 5m cable max.
Input scan rate	≥ EN12405-1 Par. 6.1.4
Smart pressure transmitter	Type LD20 (TC11267) smart, industrial RS-485 interface, 3/10/16/30 bara, accuracy ≤ 0.15% FS, 5m cable max.
Analog pressure transmitter	0...1/2/5/10/20/50/100 bara, 0.25% standard, 0.1% optional, -40˚C...+100˚C, 5m cable max.
Temperature sensor	2 wire Pt1000, DIN EN 60751, class A standard, 5m cable max.

ANALOG INPUTS

Channels	PT1, AI1-AI3, 0/4...20mA, reading accuracy ≤ 0.005% FS

DIGITAL INPUTS

Channels	DI1-DI8, dry reed contacts, closed ≤ 10kΩ, open ≥ 500kΩ, 50ms debounce filter, 0...60s digital filter

DIGITAL OUTPUTS

Channels	DO1-DO4, open collector, 30V/0.15A max., 10Hz pulse rate max., 50ms on time min.