Itron

CORUS
Gas Volume Converter

Applications

CORUS is an electronic volume converter dedicated to commercial and industrial applications. It converts the actual volume measured by the gas meter to reference conditions. Thus, CORUS is a key element in the whole Itron chain, from the meter to billing data. CORUS uses the measured working values of volume, pressure and temperature to provide:

> the converted volume
> the conversion factor
> the compressibility factor
  (several formulas available)
> a large database
> pulse retransmission

Description

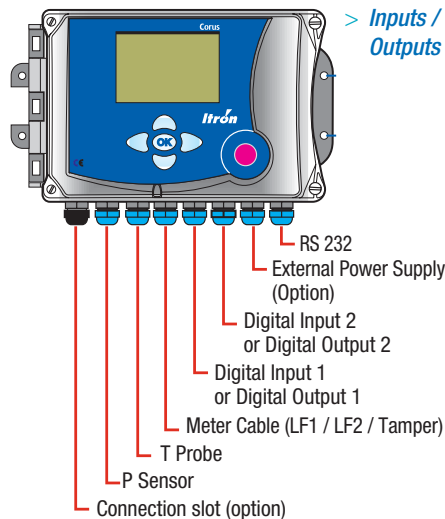The volume registered by the meter is converted to reference conditions using the formula :

$$Vb = \frac{Pm}{Pb} \ \frac{Tb}{Tm} \ \frac{Zb}{Zm} \ Vm$$

Terminology

Vm unconverted volume registered by the meter
Vb converted volume in reference (base) conditions
Tm gas temperature in operating conditions
Tb reference (base) temperature
Pm gas pressure in operating conditions
Pb reference (base) pressure
Zm compressibility factor in operating conditions
Zb compressibility factor in reference (base) conditions

CORUS is built in an IP65 enclosure, for wall or meter mounting. Thanks to its accurate piezo-resistive pressure sensor and its 4 wires PT1000 temperature probe, CORUS provides an accurate conversion on the whole temperature range.

CORUS non-metrological firmware can be updated in the field without stopping operations and without breaking the metrological seals (MID). Its large integrated database can be customised to fit the customers' needs. Recorded data and number records can be freely set.

CORUS is the base element of a complete and extremely flexible system, perfectly adaptable to the customer's requirements:

> Consumption, pressure, temperature monitoring through its large database for billing purposes
> Monitoring functions for gas stations
> Remote reading solutions through PSTN, GSM, GPRS or TCP/IP with several integrated communication protocols:
  • IEC-62056-21 (IEC-61107)
  • MODBUS RTU
  • IDOM

> *Inputs / Outputs*

RS 232
External Power Supply (Option)
Digital Input 2 or Digital Output 2
Digital Input 1 or Digital Output 1
Meter Cable (LF1 / LF2 / Tamper)
T Probe
P Sensor
Connection slot (option)

> *T, PT, PTZ Gas Volume Converter*
> *Conforms to European Standard EN 12405-1 and EN 12405-1/A1*
> *MID approval*
> *ATEX approval for installation in hazardous area (zone 0)*
> *Large integrated database*
> *Compressibility according to AGANX19, S-GERG, AGA 8 (gross or detailed methods) or Table of Z*
> *RS 232 and optical port for local / distant communication*
> *High accuracy on the whole temperature / pressure range*
> *Autonomous or external power supply*
> *Large graphic display*
> *Possibility to download new firmware in the field*
> *Internal optional slot for "Ex":*
  • *PSTN modem*
  • *RS-485 ports (x2)*
  • *2nd pressure sensor input*

> *DELTA meter with CORUS*

> **FLUXI 2000 meter with CORUS**

Technical Features

Approvals
• MID:
  - Module B – T10114 rev.1
  - Module D – n° LNE13281 rev.0
• Metrology: approval according to EN12405-1 and EN12405-1/A1 (European Standard)
• ATEX: device of category 1 approved to be used in hazardous area zone 0, ia IIC T4 classification (zone1, ia e mb IIC T4 classification with internal PSTN modem)
• CE Marking: compliant with 89/336/EEC (EMC), 94/9/EC (ATEX) and 2004/22/EC (MID Directive)

Temperature Sensor
• Platinum PT 1000 (1000Ω at 0° C) probe
• Class A accuracy according to EN60751
• Casing: stainless steel tube for insertion into a thermowell (Ø 6 mm)
• Cable length: 2.5m or 0.8 m

Pressure Sensor
• Absolute pressure sensor designed for CORUS application (gauge pressure sensors available on request)
• Silicon piezo-resistive sensor
• Overpressure up to 150% of Pmax
• Available in 3 ranges:
  - 0.9 to 10 bar absolute
  - 3 to 30 bar absolute
  - 7.2 to 80 bar absolute
• Connection adapter: 1/4" BSP (Gas) male
• Typical Accuracy: <0.15 %rd over the whole pressure range

Volume Input
• Dry contact, passive LF Reed type switch
• Maximum frequency 2Hz
• Programmable input pulse weight (0.001, 0.01, 0.1, 1, 10, 100)
• Second LF input for coherence function
• Associated tampering detection input
• Cyble® sensor ATEX module

Compressibility
• Main formulas available:
  - S-GERG
  - AGA8 Gross method 2
  - AGA8 Detailed method
  - AGANX19
  - AGANX19 modified
  - Table of Z (16 coefficients formula)
  - Fixed Z (PT conversion)

Accuracy
According to EN12405, overall accuracy on conversion factor is better than ± 0.5 % at reference conditions and better than 1% at rated operating conditions.
• Typical accuracy better than ± 0.2 %

Display and Keyboard
• Graphic display
• All metrologic data and alarm status available
• Translatable messages to any language
• Specifics icons for application (see page 3)
• Possibility to show graphs for P, T, Z, C, Qm, Qb, P2
• 5-Button keyboard
• Possibility to program main parameters by keyboard
• Possibility to display the whole database

Digital Inputs (On/Off1, On/Off2, Tamper)
• Station monitoring
• Normally open or normally closed programmable status
• Connection to any On/Off signal type (Station door contact, safety valve position, pressure switch,..) in hazardous areas.

Digital Outputs
2 Digital, isolated ouputs fully programmable as:
• Unconverted volume pulse retransmission
• Converted volume pulse retransmission
• Alarm retransmission
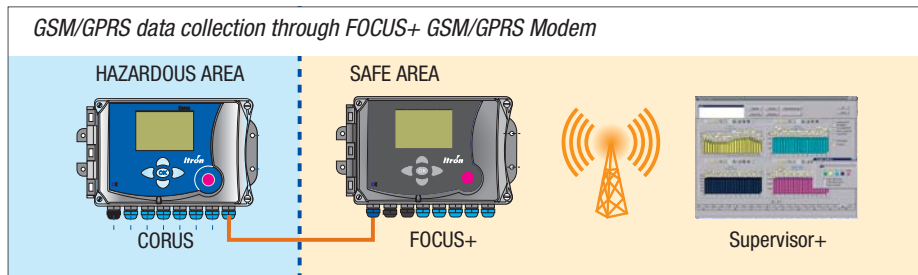• 4/20 mA output (through an external F/I "Ex" module)
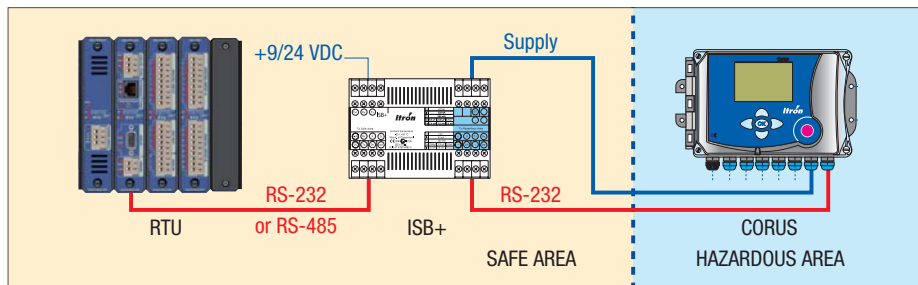
Alarms
The following alarms are managed by the CORUS:
• Temperature (Min, Max, Sensor failure)
• Pressure (Min, Max, Sensor failure)
• Conversion factor (Min, Max)
• Unconverted and converted flow-rate (Min, Max)
• Coherence
• Interval consumption
• Tamper
• On/Off 1 and On/Off 2
• External power supply outage
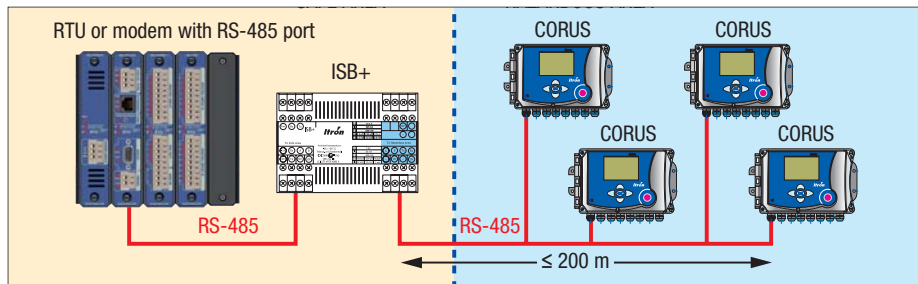• Warning thresholds (T, P, P2)

System Overview

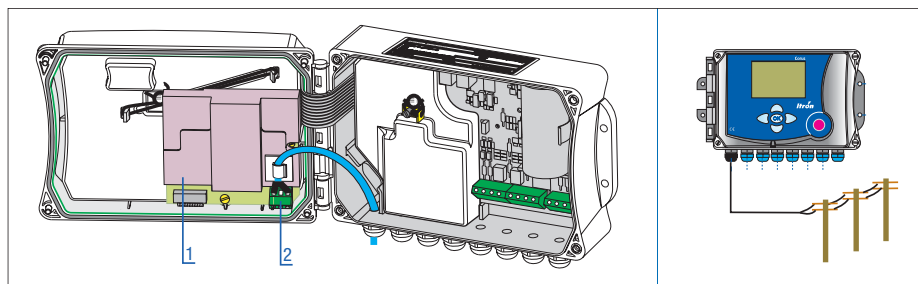## Distant communication *(Connection to CORUS RS 232 or RS 485 port)*

GSM/GPRS data collection through FOCUS+ GSM/GPRS Modem

HAZARDOUS AREA   SAFE AREA

CORUS   FOCUS+   Supervisor+

Direct connection to standard devices *(RTU, TCP/IP interface, standard modem, PC...)*

+9/24 VDC   Supply

RTU   RS-232 or RS-485   ISB+   RS-232   CORUS
SAFE AREA   HAZARDOUS AREA

Distant communication through internal RS-485 board *(up to 4 CORUS on the same bus)*

RTU or modem with RS-485 port   CORUS   CORUS

ISB+   CORUS   CORUS

RS-485   RS-485   ≤ 200 m

Distant communication through internal "Ex" PSTN Modem

1   2

Upstream pressure monitoring with P2 internal board

Gas regulator   CORUS

P2   Volume

Upstream pressure

Meter   (Delta/Fluxi)
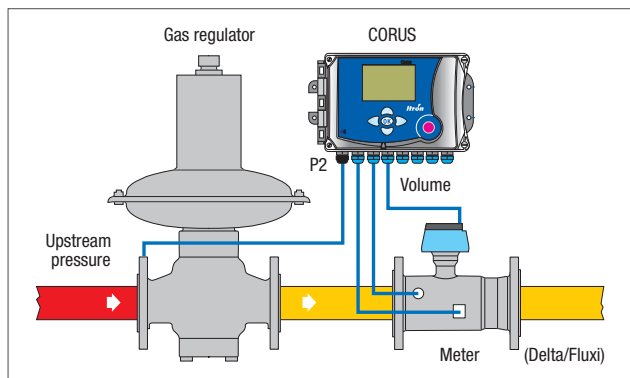
Local communication through optical port

Optical Head

PC

Note book
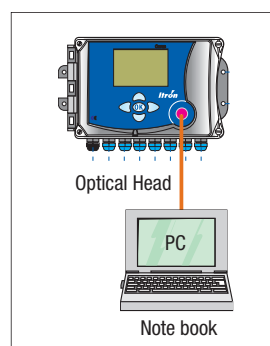
> **Graphic Display**

Possibility to translate messages

INDEX	VALUE	ALARM	DATA	CONFIG

 Unconverted volume :
19348725.000 m3

 Converted volume :
24284651.283 Nm3

Graphic display function

INDEX	VALUE	ALARM	DATA	CONFIG

4.2

4.0
P (bar)   **4.025**
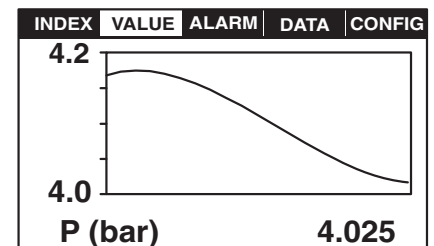
Specific icons for CORUS applications

🔋	Battery supply mode and status
🔌	External supply mode and status
	Alarm presence (active, memorized)
✖	Incoming pulse from meter
Ⓟ	Pressure alarm (active, memorized)
Ⓣ	Temperature alarm (active, memorized)
☎	Communication in progress

Main Specifications

Overall accuracy of the C factor	Maximum Error < 0.5 % - Typical Error < 0.2%
Conversion range	Pressure: 0.9 bar to 80 bar - Temperature: according Z formula
Power supply	Battery or external (through Ex module)
Autonomy	5 years (battery version) in typical conditions
Ambient temperature range	-25° C to +55° C
Enclosure	IP65 polycarbonate box
Volume input	LF input (2 Hz max); Reed switch type or Cyble® sensor ATEX module Second input for coherence function
Temperature sensor	PT1000 class A; 4 wires
Pressure sensor ranges	[0.9 /10] bara, [3 /30] bara and [7.2 /80] bara (gauge pressure sensors available on request)
Pressure sensor type	Piezo-resistive sensor
Outputs	2 Channels fully configurable as pulse, alarm or 4/20 mA*
User Interface	Graphic display + 5 button keyboard
Communication	Optical serial port and RS232 serial port
Metrol. cables length (P, T, LF)	2.5 m or 0.8 m
Option	Internal "Ex" PSTN modem (V32bis) RS-485 dual port board P2 second pressure input board

* through external F/I converter

Dimensions

Database

CORUS provides 6 different logs:

> Hourly log: last 1440 hours (2 months)
> Daily log: last 124 days (4 months)
> Monthly log: last 24 months
> Interval log:
  - from 3100 to 5900 records according selected data
  - interval programmable from 1 to 60 mn
> Events log: last 800 events
> Parameters log: last 200 records

Power Supply

> Battery operating or external supply mode (mains or solar)
> Battery:
  - Specific 17 A.h lithium battery pack including all required protections for intrinsic safety
  - Pack can be changed in hazardous area without interrupting the normal operation of the device
 - 5 years autonomy in typical conditions

> External power:
  - External "Ex" specific supply module required providing 6 to 12 V DC to the CORUS
  - Main battery (17 A.h) remains in the product, acting as backup battery in case of mains cuts.
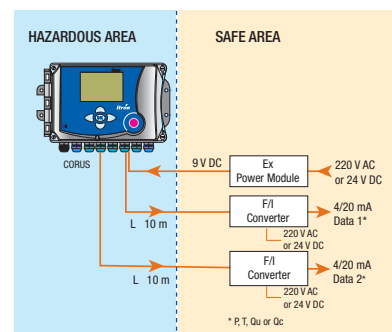
Ordering information:

- Pressure range
- Formula for Z calculation
- LF input cable type
- Battery or external supply
- Metrologic cables length
- Language for display
- Accessories
- MID sealing
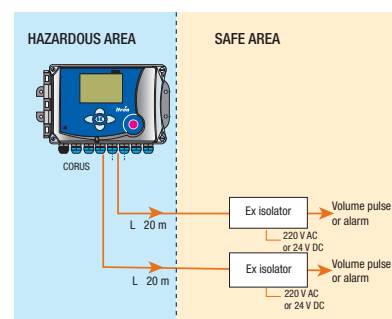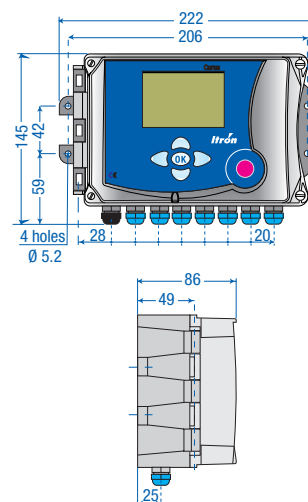
> *Configuration with pulse outputs*

> *Configuration with 4 / 20 mA outputs*

About Itron Inc.

Itron Inc. is a leading technology provider to the global energy and water industries. Our company is the world's leading provider of metering, data collection and utility software solutions, with nearly 8,000 utilities worldwide relying on our technology to optimize the delivery and use of energy and water. Our products include electricity, gas and water meters, data collection and communication systems, including automated meter reading (AMR) and advanced metering infrastructure (AMI); meter data management and related software applications; as well as project management, installation, and consulting services. To know more, start here: www.itron.com

For more information, contact your local sales representative or agency.

Itron France
Rue des Temps Modernes - BP 23
86361 Chasseneuil-du-Poitou Cedex
France
Phone: +33 (0)5 49 62 70 00
Fax: +33 (0)5 49 62 70 89
www.itron.com

© Copyright 2009, Itron. All Rights Reserved. - Itron reserves the right to change these specifications without prior notice.

GA-CORUS-EN-V1.0-2008.12