

XFC^{G4} 6200/6201EX

Flow computer



Overview

Based on ABB Totalflow XSeries technology, the XFC^{G4} 6200EX series offers an explosion proof product for differential or linear metering and automation systems. The XFC^{G4} 6200EX series are accurate, reliable flow computers with the capability to measure and monitor gas flow in compliance with AGA, API and ISO standards. These units are expandable, provide exceptional control and meet many automation requirements.

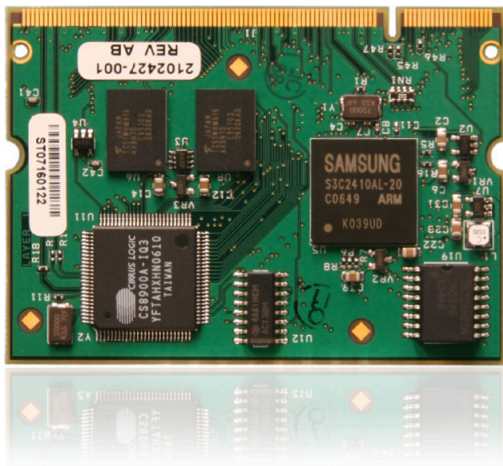
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Description

The XFC^{G4} 6200EX includes an integrated high accuracy digital sensor (EXIMV) to measure differential pressure, static pressure and temperature from a single differential primary measurement device. The XFC^{G4} 6201EX includes an integrated high accuracy digital sensor to measure static pressure and temperature plus an onboard pulse input or serial input from a single linear/ultrasonic or Coriolis primary measurement device. With the exception of the integrated sensors, both models are identical (software, I/O, communications and electronics). The XFC^{G4} 6200EX series has multi-tube measurement capability. Up to 8 differential measurement applications per RS-485 communications port when utilizing MOD-BUS multivariable sensors (plus 1 tube type application utilizing the integrated sensor) are possible. The number of linear meter applications is limited by the available I/O and device configuration. Additional 'tube' or measurement applications are easily invoked with simple user or factory configuration.

The XFC^{G4} 6200EX series feature a powerful 203Mhz ARM920T 32 bit microprocessor, Windows CE operating system and utilizes a unique 'engine card' design. The engine card contains the processor, application firmware and memory components. The processing and memory capability of this device, allows the user to run more applications faster than ever before.



Standard

- Explosion proof enclosure
- LCD display (4 X 16)
- Main electronics board
- Engine card with 203 Mhz processor
- Termination board
- 1 10BaseT Ethernet port (RJ45 on main board)
- 2 RS232/485 software selectable com ports for re-mote communications
- 3 local configuration ports are available. Serial or USB are available to the optional external PCCU connection and Class I Bluetooth is standard.
- Externally powered from 9 to 30 VDC
- Onboard User IO : 1 AI, 1 DI/PI, 1 DO
- Access to optional I/O daughter card
- 64MB FLASH (program storage/configuration)
- 32MB RAM (program execution/data storage)
- Integral multivariable transducer (EXIMV). DP/SP or SP only

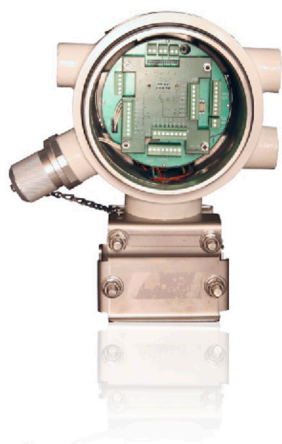
Optional

- Twelve (12) I/O point daughter card
- Manifold
- Externally accessible local communications fixture (USB or Serial)
- 100 ohm platinum RTD
- Mounting Kit
- Separate battery backup, power supply package

Totalflow consistently provides new and innovative products and systems in support of accurate, reliable and auditable gas measurement. As such, the XFC^{G4} 6200/6201EX includes features grounded on a thorough understanding of the natural gas industry's custody transfer and measurement needs.

Features

- Low cost, high reliability design
- Cast aluminum enclosure, powder coated
- Low power consumption
- LCD 4 × 16 character display standard
- Stable time base (accurate integration)
- User selectable simple dual level security code data protection or enhanced user configurable role based access control (RBAC)
- Monitors operation limits for detection, and reporting of abnormal conditions
- Complies with API 21.1 standard for custody transfer devices
- 40+ days historical records (user configurable for additional hourly and daily data records)
- Full calculation of flow rates, volumes and energy in accordance with AGA 3-85, AGA 3-92, ISO- 5167 and AGA-5 once per second
- Support for gas orifice, linear, coriolis primary elements
- Super compressibility calculations per NX-19, AGA8-92 gross or detail, ISO 12213-2
- Smart (temperature and pressure compensated) integral, factory calibrated, multi-variable smart sensor
- Flow retention during user sensor calibration
- Selectable 3 or 5 point user calibration; DP, SP and RTD (RTD also supports single point bias/ offset adjustment).
- 100 ohm platinum RTD resistance curve fit with user programmable single point offset or 3/5 point user calibration for RTD input
- 100 ohm platinum RTD
- Programmable DP no flow cut-off
- Software selectable (RS232/RS485/RS422) communications ports
- Hazardous area certifications: CSA C/US, ATEX and IECEx
- Type 3R/IP53 (with breather-drain option); Type 4X/IP66 without breather-drain option)
- Real time clock (lithium battery powered)
- Advanced embedded data logger
- Multi-tube capability
- Programmable alarm filtering and exception reporting capabilities
- Multiple protocol options including Totalflow packet protocol and various MODBUS protocols
- User programmable MODBUS registers
- User programmable math and logic (EZ Blocks)
- IEC 61131 user programming environment
- I/O expansion via optional daughter card
- Software control of power to communications equipment



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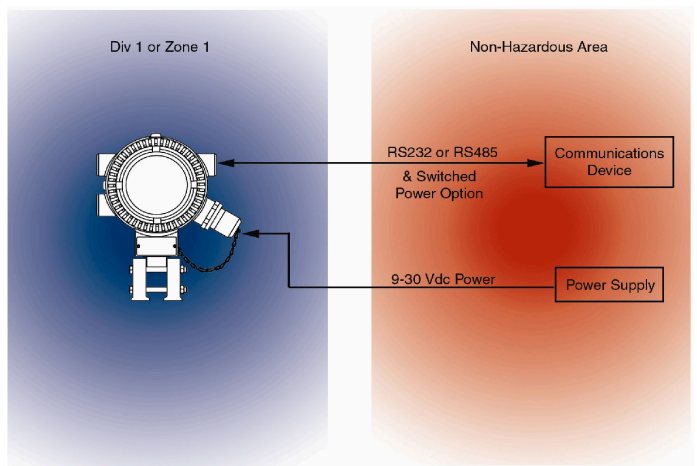
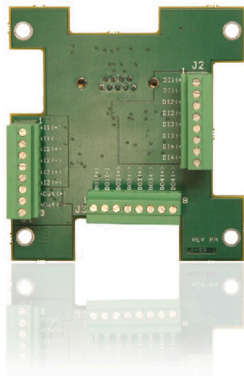
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Hardware modularity

Hardware functionality of the XFC^{G4} 6200/6201EX can be extended in a flexible and simple way by adding an optional I/O daughter card. The system recognizes the additional I/O automatically and configures the I/O Scanner subsystem accordingly.

The I/O Daughter Card provides an additional 12 I/O points to the XFC^{G4} 6200/6201EX. The I/O is fixed with a combination of

Analog and Digital points. The analog point configuration is comprised of three (3) 0-10V (10K ohm impedance) inputs and one (1) 0 to 20mA output. (The analog output is a „SINK“ mode and must be used in conjunction with an external power source) The digital point configuration is comprised of four (4) digital inputs and four (4) digital outputs. The digital inputs also function as event counters and are capable of accepting NAMUR type sensor signals. The digital outputs are optically-isolated type 1A switches capable of switching 200 mA of 48 VDC or 40 VAC at 60 °C (140 °F).



Software modularity

The software platform represents significant modularization through use of object oriented design principles. Standard Totalflow applications can be enabled in our factory or by the user, one or more times on the same device. It is this framework that allows the support for multi-tube measurement and allows the user to enable only the applications that they may require.

Standard software applications include:

- AGA3 orifice measurement
- ISO 5167 orifice measurement
- VCone measurement
- AGA7 rotary/turbine/ultrasonic measurement
- Gas Coriolis measurement
- Trending; extremely flexible data logger, easily configured by user
- PID control (AO only)
- RAMS (Alarming, Exception Reporting)
- EZ Blocks (graphical, similar to “function block”, simple custom math / logic)
- IEC 61131 (complex math / logic)
- Selectable Units (user selectable engineering units)
- Tank Level Application
- Therms master application (MODBUS master interface to gas chromatograph)
- Therms slave application (MODBUS slave interface to gas chromatograph)
- Totalflow NGC (gas chromatograph) Ethernet interface
- Multiple protocols: Totalflow native low power, MODBUS slave (RTU/ASCII), MODBUS master (RTU/ASCII), LevelMaster, Enron MODBUS (includes historical data)
- Advanced user configurable Plunger Lift applications
- MODBUS Multivariable sensor interface
- Trending (extremely flexible and powerful user configurable data logger)
- Pump controller (normally used in coal bed methane wells to control “down hole” pumps)

General specifications

Dimensions

Nominal Diameter : 6 inches (15.24 cm)

Nominal Length : 8 inches (20.32 cm)

Weight

Nominal : 16.5 pounds (7.48 kg)

Enclosure

Type 3R / IP53 with breather drain installed; Type 4X / IP66 without breather drain

Certification

CSA C/US Class 1, Div 1, Groups C, D T6; IECEx Ex d IIB T6; ATEX  II 2 G Ex d IIB T6

Mounting

Pipe Mount

Operating temperature (ambient)

–40 to 140 °F (–40 to 60 °C)

Mechanical vibration

Tested according to procedures derived from IEC 60068-2-6. Meets or exceeds 10-60 Hz 0.075 mm displacement amplitude / 60-500 Hz 1g specifications taken from IEC 61298-3.

EMC requirements

Emissions:

European regions:

EN55022 Class B emissions (radiated)

North America regions:

CFR 47, Part 15, Subpart B, Class B, FCC emissions
ICES-003 Issue 2, Rev. 1, Class B ITE emissions

Immunity: European Regions:

EN 61000-6-1 Immunity:

EN61000-4-2:95, ESD, ± 8 k V Air, ± 4 k V Contact

EN61000-4-3:95 RF Immunity, 10 V/m

EN61000-4-4:95 EFT, 2 k V

EN61000-4-6:95 conducted susceptibility, 10Vrms

EN61000-4-8:93 power frequency magnetic field 3A/m

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Electronics

Power

External DC voltage 9 to 30 VDC

Memory

- Program execution and data stored in 32MB PSRAM (lithium battery backup)
- Windows® CE operating system, application programs, and configuration files stored in 64MB Flash

Communications ports

- 3 - dedicated PCCU local configuration Ports; 1- RS232, 1- USB (both ports available internally:
 - user must specify which of these ports is to be utilized at the optional external MMI connection when ordering), and standard Class I Bluetooth wireless
- 2 - remote: RS232, RS485 or RS 422 (software selectable)
- 1 - 10BaseT Ethernet

EX device current draw

- Basic single differential measurement application without additional I/O ~25 mA @ 13.8 V (~345 mW)
- Bluetooth device enabled but not paired with host device: ~0 ma (~0 mW)
- Bluetooth device enabled and paired with host (not transferring data) ~8 mA @ 13.8 V (~110 mW)
- Bluetooth device enabled, paired and communicating with host ~15 mA @ 13.8 V in short bursts; not continually (~207 mW)
- Ethernet enabled: ~18.6 mA @ 13.8 V (~257 mW)
- I/O Daughter Card DO are optically isolated. ~5.1 mA @ 13.8 V per DO when closed (~71 mW)

LCD interface

Dedicated interface for 4 x 16 Liquid Crystal Display (LCD)

Security switch

On/Off dual-level on-board security switch; also supports enhance role based access control (user configurable, multilevel, multi-user security)

Time base stability

± 7.5 ppm (parts per million)

Scan rate

All Inputs Sampled at 1Hz Rate

AGA-3/AGA-7/ISO5167/VCone calculations

Calculations are tested to be within ± 50 ppm (parts per million) as stated in API 14.3.4

Integral Multivariable (EXIMV)

Specifications

Multivariable unit

Temperature limits

Compensated -20 to 140°F (-29 to 60°C)

Operational -40 to 140°F (-40 to 60°C)

Storage -40 to 185°F (-40 to 85°C)

Resolution

24 Bit analog-to-digital conversion (0.000012% FS)
(0.0012% FS effective signal resolution)

Mounting specification

Change from perpendicular (front to back / around x-axis) ≤
0.5% URL (can be corrected with calibration)

Static Pressure

Accuracy (including linearity, hysteresis, & repeatability at reference conditions)

± 0.075% of User Calibrated Spans from 20% to 100% of URL

Ambient temperature effect within the operational temperature limit

± 0.075% of URL ± 0.06% of Reading

Reproducibility

± 0.1%

Differential pressure (XFC^{G4} 6200EX differential version only)

Accuracy (including linearity, hysteresis & repeatability at reference conditions)

± 0.075% of User Calibrated Spans from 20% to 100% of URL

Ambient temperature effect within the operational temperature limit

± 0.075% of URL ± 0.06% of Reading

Stability (for 12 months)

± 0.1% of URL

Reproducibility

± 0.1%

Static pressure effect (DP Zero)

+ 0.03% of URL per 1500 PSI (103.42 bar); 3200 PSI (220.63 bar) maximum

Static pressure effect (DP Span)

+ 0.1% of reading per 1500 PSI (103.42 bar); 3200 PSI (220.63 bar) maximum

Temperature

Process range

-80 to +750°F (-62 to 399°C)

Accuracy (as shipped from factory)

± 0.35°F (± 0.2°C) over operating range

Accuracy (after single point field calibration)

± 0.2°F (± 0.12°C) repeatability over operating range

Available Ranges

XFC^{G4} 6200EX (differential version)

	DP (inches H ₂ O)			
AP (psia)		500	1500	3200
	250	✗	✗	
	400	future	future	future
	800	✗	✗	future

Available Ranges XFC^{G4} 6201EX (linear version)

AP (psia)	100	500	1500	3200
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EXIMV sensors

Single seal rated (ANSI/ISA 12.27.01)

6200EX (DP/SP): PMax = 3000 psi

6201EX (SP): PMax = 1450 psi

- Wetted materials meet NACE MR0175/ISO 15156
- Process fluids: -62°C to 110°C

Contact us

ABB Inc.**Process Automation
Main Office**

7051 Industrial Boulevard
Bartlesville, OK 74006
USA

Tel: +1 918 338 4888
+1 800 341 3009
Fax: +1 918 338 4699

ABB Inc.**Process Automation**

3700 W Sam Houston Parkway
South, Ste. 600
Houston, TX 77042
USA

Tel: +1 713 587 8000
Fax: +1 713 266 4335

ABB Inc.**Process Automation**

3900 S. County Rd. 1290
Odessa, TX 79765
USA

Tel: +1 432 563 5144
Fax: +1 432 563 8043

ABB Inc.**Process Automation**

2 Acee Dr.
Natrona Heights, PA 15065
USA

Tel: +1 724 295 6100
Fax: +1 724 295 6560

ABB Inc.**Process Automation**

4300 Stine Rd.
Ste. 405-407
Bakersfield, CA 93313
USA

Tel: +1 661 833 2030
Fax: +1 661 833 2034

ABB Inc.**Process Automation**

2705 Centennial
Liberal, KS 67901
USA

Tel: +1 620 626 4352
Fax: +1 620 626 4354

www.abb.com/totalflow

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