

INTRODUCTION

Based on ABB Totalflow XSeries technology, the μFLO 6210/6213 (microFLO) is a *little sibling* to the XFC and XRC (eXtendable Flow Computer and eXtendable Remote Controller).

The μFLO is an accurate and reliable single tube orifice gas flow computer with the capability to measure and monitor gas flow in compliance with AGA and API standards. The μFLO 6200 Series includes:



Standard

- NEMA 3R aluminum alloy enclosure
- LCD display
- Main electronics board
- RS232/485 software selectable remote communications port¹
- Configuration port
- Charger controller
- 512K FLASH (Program Storage)
- 512K PROM (Flash Loader)
- 512K RAM (Data Storage)
- 32K E2PROM (software config)
- Very stable time-base
- Integral multivariable transducer (IMV)

Optional

- Internal re-chargeable lead acid battery (up to 26AH)²
- Internal communications kit including pre-tested cables and mounting bracket³
- Internal communications device³
- Charging Source (Solar, AC or DC)
- Manifold
- 100 ohm platinum RTD
- Mounting Kit
- COMM+IO Board (field terminals for wiring, one DI and one DO)

Totalflow consistently provides new and innovative products and systems in support of accurate, reliable and auditable gas measurement. As such, the μFLO

6210/6213 includes features grounded on a thorough understanding of the natural gas industry's custody transfer and measurement needs.

FEATURES

- Low cost, high reliability design
- Aluminum enclosure, powder coated
- Low power consumption
- Flexible accommodation of communications hardware³
- Cost effective communications kits³
- LCD 2 × 24 character display standard
- Stable time base (accurate integration)
- Rechargeable, lead acid batteries²
- Solar, AC or DC charging options
- Dual level security code data protection
- 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 up to 180+ days of hourly and daily data records)
- Calculation of flow rates, volumes and energy in accordance with AGA 3-85, AGA 3-92 and ISO-5167 and AGA-5
- Optional support for other primary elements
- Super compressibility calculations per NX-19 or AGA8-92 Gross or Detail
- Smart (temperature and pressure compensated) integral, factory calibrated, multi-variable transducer
- Flow retention during user transducer calibration
- Selectable 3 or 5 point user calibration
- Programmable DP zero cut-off
- 100 ohm platinum RTD
- Automatic internal calibration of RTD with user programmable offset
- Configurable communications port (RS232/RS485)¹
- Class I, Division 2 Groups C and D, CSA C/US Hazardous Area Classification
- Real time clock that keeps running on lithium battery
- Advanced embedded data logger
- Programmable alarm filtering and exception reporting capabilities

- Multiple protocol options including Totalflow packet protocol and various modbus protocols
- User programmable modbus register maps
- User programmable math and logic sequences

STANDARD DISPLAY

The 2 line by 24 segment LCD can be used to view parameters, statuses and alarms. Multiple display items can be organized into one or more groups that automatically scroll onto the display for viewing.

As supplied, the display is pre-configured to scroll through flow rate, static pressure, differential pressure, temperature, current day's volume, previous day's volume, volume totalizer, and battery voltage.

The Standard Display Format, as depicted here, includes the item name, value and units as well as 8 status/alarm annunciators.

Optionally, a small plot can be presented concurrent

FLOW RATE		±	LC
123.4	MCFD	↑	

with its display item. Two plotting formats are supported.

UNLIKE OTHER FLOW COMPUTER OPTIONS...

NAME		
DATA	UNITS	
Plot Format 16 x 24 Pixels		

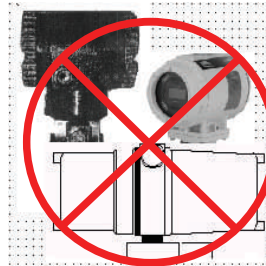
NAME		
DATA	UNITS	
Plot Format 8 x 48 Pixels		

Unlike charts, the μFLO (microFLO) performs integration once per second rather than the usual once every 12 minutes (or so). It also allows you to monitor status or production and operations without driving to the site, and it can automatically trigger an alarm that will call 24/7. The μFLO (microFLO) never has runny ink, and uses more accurate, state-of-the-art multivariable electronic transducers, rather than bellows, diaphragms or discrete electronic transducers.

Unlike “retooled” process industry Ex devices, the μFLO (microFLO) is a custody transfer instrument designed, from the ground up, for the natural gas industry.



The μFLO 6213's single enclosure accommodates everything you need for both measurement and communications. It can be supplied from our factory with communications equipment and factory tested cables already installed.



The μFLO 6210/6213 can also be supplied with pre-configured software and pre-calibrated transducers. You merely mount the unit, plumb to the manifold, and connect the battery and antenna in order to complete the installation.

The attributes described above result in a lower cost, more reliable measurement system.

Shown here, is a μFLO 6213 with 26AH battery, OEM Spread Spectrum Radio (accommodates virtually all models of radios) and Communications Kit (pre-built and pre-tested cables).



The μFLO 6210 is a smaller size unit than the μFLO 6213 and does not support an internal battery or internal communications options. A separate enclosure is needed to house the battery, charger and any communication devices that may be required. The μFLO 6210 may also be configured as a modbus multivariable transducer to measure differential pressure, static pressure and temperature from a single differential pressure meter run and provide this data via modbus to another XSeries device. This could be either an XFC (eXtendable Flow Computer) on an XRC (eXtendable Remote Controller). The μFLO 6210 must be located in a CSA C/US Class 1, Division 2, Groups C & D hazardous classification area.

General Specifications		μFLO 6210	μFLO 6213
Dimensions	Width	9.99 in. (253.80 mm)	12.76 in. (324.00 mm)
	Height	13.21 in. (335.43 mm)	17.81 in. (452.40 mm)
Installed Depth	Pipe Mount	10.68 in. (271.32 mm)	11.58 in. (294.23 mm)
	Wall Mount	10.12 in. (256.97 mm)	11.02 in. (279.88 mm)
Weight (w/o Battery)		Approx 10.6 lbs (3.96 kg)	Approx 15.1 lbs. (5.64 kg)
Max Battery Capacity		NA ²	26AH
Certification		CSA C/US Class 1, Division 2, Groups C & D hazardous area classification. (ATEX Zone 2 pending)	
Mounting		Wall, pipe, or direct	
Operating Temperature (ambient)		-40 to 140°F (-40 to 60 °C)	
Humidity		0 - 95% non-condensing	
EMC Requirements		EMMISSIONS: <i>European Regions:</i> EN55022 Class A Emissions (Radiated & Conducted) <i>North America Regions:</i> CFR 47, Part 15, Subpart B, Class A, FCC Emissions ICES-003 Issue 2, Rev. 1, Class A ITE Emissions	
		IMMUNITY: <i>European Regions:</i> EN50082-1:98 Immunity EN61000-4-2:95, ESD, ± 8 kV Air, ± 4 kV Contact EN61000-4-3:95 RF Immunity, 10 V/m EN61000-4-4:95 EFT, 1 kV EN61000-4-5:95 Surge; 1kV line to line, 2kV line to earth EN61000-4-6:95 Conducted Susceptibility, 3 Vrms EN610004-8:93 Power Frequency Magnetic Field 3 A/m EN610004-11:94 Voltage DIP and interrupt	

¹ RS232 Communications will require an optional cable (cable option varies depending on the communication device). RS485 will require the optional COMM+IO board - this provides wiring terminals, additional surge protection, one DI and one DO

² μFLO 6213 only. The μFLO 6210 enclosure is smaller and does not support a battery inside the enclosure (will require external power)

³ μFLO 6213 only. The μFLO 6210 enclosure is smaller and does not support communications kits, brackets or devices (will require a separate enclosure for remote communications hardware)

μFLO 195 Board	
Power	Nominal 12 VDC battery
Charger	Solar or 16-18 VDC
Memory	• Data stored in 512K SRAM. (lithium battery backup) • Applications programs stored in 512K Flash. • Flash loader stored in 512K PROM • Registry and Configuration files stored in 32K E²PROM • Transducer factory calibration data stored in separate E²PROM
Comm Ports	• 1 - dedicated – PCCU (Local Configuration Port) • 1 - RS232/RS485 configurable (Remote Communications Port)¹
LCD Interface	Dedicated interface for Liquid Crystal Display (LCD)
Security Switch	On/Off Dual-level On-board Security Switch
Time Base Stability	± 7.5 ppm (parts per million)
Scan Rate	1 Time per Second

Integral Multivariable (IMV) Specifications	
Multivariable Unit	
Temperature Limits	Compensated -20 to 140°F (-29 to 60°C) Operational (certified) -40 to 140°F (-40 to 60°C) Storage -40 to 185°F (-40 to 85°C)
Resolution	16 Bit maximum resolution (0.0003% FS) (0.004% FS effective signal resolution)
Vibration Performance	1.5 INW per G (2G maximum) at 1 Hz, decreasing to zero at 1KHz in straight line mode
Mounting Specification	Change from perpendicular front to back / around X-axis will be ≤ 1.5 INW (can be corrected with calibration)
Reference Conditions	Temperature at most recent factory or user calibration; Static Pressure and Differential Pressure ≤ 100% of URL
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 per 160 °F (71 °C)	± 0.15% of URL ± 0.125% of Reading
Stability (for 12 months)	± 0.1% of URL
Differential Pressure	
Accuracy (including linearity, hysteresis and repeatability at reference conditions)	± 0.075% of user calibrated spans from 20% to 100% of URL
Ambient Temperature Effect per 160 °F	± 0.15% of URL ± 0.125% of Reading
Stability (for 12 months)	± 0.1% of URL
Static Pressure Effect (DP Zero)	± 0.03% of URL per 1500 PSI (3200 PSI maximum)
Static Pressure Effect (DP Span)	± 0.1% of reading per 1500 PSI (3200 PSI maximum)
Temperature	
Process Range	-80 to +230°F (-62 to 110°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									
	DP (inches H2O)								
AP (psia)		100	150	250	500	1000	1500	2000	3200
	100	X		X	X	X	X		
	150	X	X	X	X	X	X	X	
	250	X	X	X	X	X	X	X	X
	400			X		X	X		X
	800						X		X

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