

NEW

Now Includes
VeriCal™ In-Situ Calibration
Verification Option
for GF90 & GF03

FCI Model GF03 Flare and Variable Mixed Gas Flow Measurement System

*Unique Single-Insertion Flow Technology
With Gas Compensation Provides Superior Accuracy
And Lowest Total Cost Solution*



FCI GF03 Flow Meter

- Petroleum Refineries
- Chemical Production with VOC by-products
- Offshore Gas Production and Extraction Facilities
- Water and Waste Treatment Plants
- Fossil Fuel Power Plants
- Drilling Platforms
- Landfills

FCI FLUID COMPONENTS
INTERNATIONAL LLC

GF03 Meets the Challenge in Difficult Gas Flow Measurement

Today plant operators do not have to sacrifice accuracy to get a low cost flare flow meter. Historically, variable gas composition and harsh operating conditions have limited operator selection between flow metering systems that offer marginal accuracy and those that are expensive to purchase, install and maintain. FCI's new GF03 Flow Meter uses innovative, single insertion flow measurement technology that meets the most stringent environmental performance and accuracy requirements with a total installed cost at a fraction of ultrasonic devices.

Flare gas flow meters must feature extremely wide turndown in order to accurately detect both leak rate velocities down to 0.5 SFPS (0.15 NMPS) as well as high flow blow down velocities that can exceed 200 SFPS (61 NMPS). Further, the flow meters must be accurate in the presence of widely varying gas compositions and temperatures as plant relief valves and different processes send varying rates and concentrations of hydrocarbon, hydrogen and other gases through the flaring system. The GF03 measures a wide range from 0.5 to 275 SFPS (0.15 to 84 NMPS) with 0.1 SFPS (0.03 NMPS) resolution over a temperature range from -50° to +350° F (-46° to +177° C). To ensure maximum performance and integrity, FCI calibrates the GF03 using the actual gas compositions of your specific application.

Experienced plant personnel understand that minimally invasive, easily installed flow metering solutions that resist clogging and minimize downtime result in long lasting value. The GF03 is quickly installed through a single process connection that can be configured for hot tapping and easy isolation and removal. Its rugged all welded design and NEMA Type 4X enclosures result in long service life and minimal maintenance in all operating conditions.

FCI Unique Design

FCI's GF03 is specially designed for gas flows in flares and in other mixed or variable gas composition applications. Utilizing FCI's proprietary combination of flow detection and real time integrated mixed gas compensation (patents pending), the GF03 provides excellent accuracy and repeatability in changing, mixed gas applications. It is so effective, that even broad variations in Hydrogen (H₂) gas are accommodated keeping the GF03 accurate in the constantly changing flare line.

Low Cost, and Low Maintenance

FCI's single insertion probe design offers fast, simplified installation and more reliability at a lower cost than any other solution. The GF03 combines flow, temperature and optional pressure sensing within a single insertion probe. The FCI solution features efficient single penetration hot tapping, ball valve isolation and a calibration verification option without process shutdown or removal. There is minimal pressure drop and only one sealed tap point as opposed to four with ultrasonic type products.

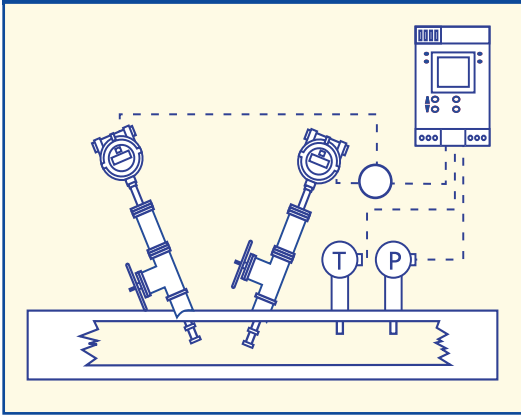
- Main Flares
- Flare Vents, Lateral & Tributary Lines
- Clean and Emergency Service Flares
- General Service Flares
- Wastewater Flares
- Wellhead Flares
- Flared Bio Gas
- Tank Flares
- Digester Gas Flares
- Offshore Platform Flares

Horizontal top mount installation

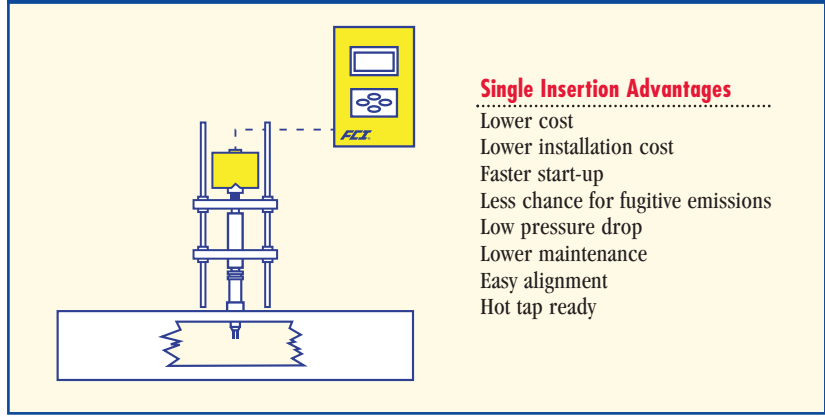


Transmitter/Readout in optional explosion proof aluminum enclosure

Multi-Insertion Ultrasonic Flow Meter



Single Insertion GF03 Flow Meter

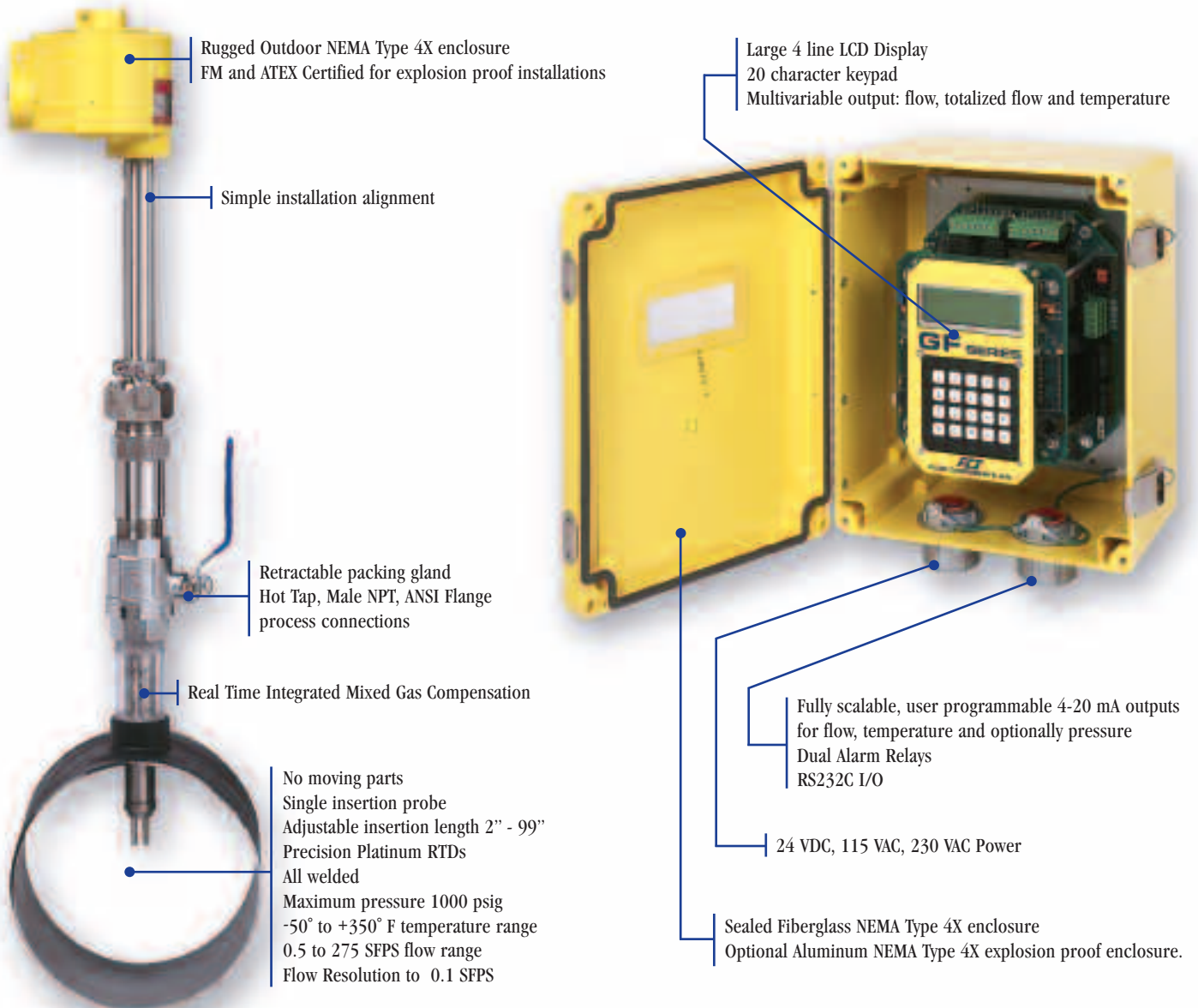


Single Insertion Advantages

- Lower cost
- Lower installation cost
- Faster start-up
- Less chance for fugitive emissions
- Low pressure drop
- Lower maintenance
- Easy alignment
- Hot tap ready

The GF03 Flow System

The flare metering system includes a precision flow element and a flow readout/transmitter housed in a weatherproof enclosure (or optional explosion proof rated housing). The flow element and the transmitter can be located up to 1000' (305 M) apart. System power of 24 VDC or 110-130 VAC or 210-230 VAC is user selectable. User information from the transmitter includes flow rate, totalized flow, temperature and optionally pressure. Outputs from the transmitter include two fully scalable and user assignable 4-20 mA signals, two alarm relays, RS232C serial I/O port and optional HART, Profibus, Modbus and 2-way Ethernet ports.





Mixed Gas Calibration Stand

Worldwide Experience

FCI is a leading worldwide supplier of gas flow products. With over 40 years experience in flare gas flow applications, FCI products remain hard at work in even the most demanding environments. With our no moving part, non-fouling, low maintenance sensor designs, FCI products stay installed longer.

As an ISO 9001, (2000) certified manufacturer, FCI follows stringent quality assurance procedures and is a continuous improvement manufacturer. FCI combines breakthroughs in sensor design and production methods with state-of-the-art NIST traceable calibration facilities to produce long lasting flow measurement solutions.

FCI has an extensive network of worldwide factory-trained sales and service offices offering continuous 24 hour customer service. Qualified factory support assures getting the right instrumentation and configuration for each application. Look to the distinctive yellow flow meters from FCI for total confidence in flow measurement.

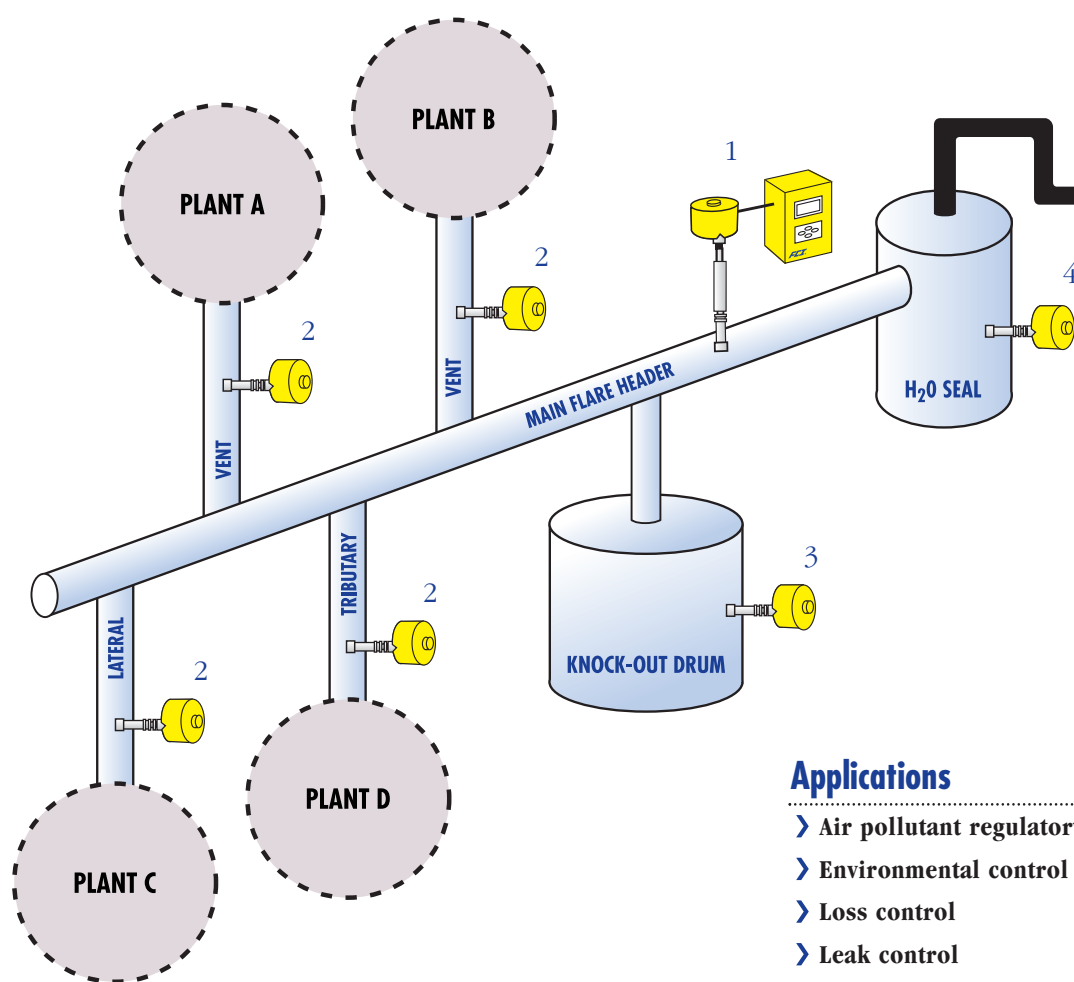


Precision Calibration in FCI Flow Laboratory

To ensure optimum accuracy, performance and quality, FCI owns and operates a best-in-class test and NIST traceable calibration laboratory. FCI product developments are subjected to rigorous testing and calibration integrity validation using high-speed data acquisition systems and precision flow calibration equipment. Every GF03 Meter shipped from FCI is also extensively tested and then calibrated using actual gases under customer conditions to assure their quality and performance.

FCI Flow Meter and Switch Applications Throughout the Flaring Process

Whether plant objectives call for process improvement, cost reductions, emission reductions or all of these, operators will find FCI flow meter and switch products to meet them. In Flare systems throughout the world and in all industries FCI products are used to optimize, automate, identify, alarm, monitor and report. Whether the system is a single-line service flare or a complex array of multiple tributaries and multiple gases, FCI has the application experience and product solutions that will perform with accuracy, reliability and repeatability second to none.



- 1 FCI GF03 Main Header Flare Flow Meter
- 2 FCI GF03, GF90, ST98 Flow Meters
- 3 FCI FLT, Nutec™ Series Level Detection, Valve Actuating Alarms
- 4 FCI FLT, Nutec™, RF Series Wet/Dry Interface Detection Switches

Applications

- › Air pollutant regulatory reporting
- › Environmental control
- › Loss control
- › Leak control
- › Material balancing
- › Relief valve monitoring
- › Smokeless flare control
- › Waste gas flare measurement
- › Gas well gathering
- › Tanker loading/unloading vent monitoring
- › Steam Control



GF03 Specifications

General

Velocity Range: 0.5 to 275 SFPS (0.15 - 84 NMPS)

For higher ranges consult factory

Accuracy: $\pm 2\%$ to 5% of rdg. > 1 SFPS

Resolution: 0.1 SFPS (0.03 NMPS)

Turndown Ratio: 2:1 to 600:1

Repeatability: $\pm 0.5\%$ rdg.

Duct/Pipe Sizes: 2.5 inch (63.5 mm) pipe minimum

Connections: (between element and display/transmitter)

Electrical: Two (2); 8 conductor, shielded

Cable Type: 16 to 24 Ga

Maximum Length: 1000 ft (305 m)

Flow Element

Type: Thermal Dispersion

Material/Construction: 316L SST, all welded

Powering: By transmitter

Weight: 8-10 lbs (3.6-4.5 kg) min.

Installation: Insertion, single penetration;
2 to 99 inches (51 mm to 252 cm) adjustable

Connections: 1 inch NPT, 1 1/4 inch NPT, ANSI Flange,
or retractable low or medium packing gland assembly.

Enclosure Rating: Class 1, Div 1, Groups B-G, NEMA Type 4X

Environmental:

Operating Temperature: -50° to +350° F (-46° to +177° C)

Operating Pressure: 0:100 psig [0:6.89 bar(g)]

Proof Pressure: 0:1000 psig [0:68.9 bar(g)]

Flow Transmitter

Display (Type, Size): LCD 4 line x 20 characters/line

Keypad (Type, functions): Alpha-numeric for programming

Outputs:

Analog: Two user selectable and scalable as 4-20mA,
0-10 Vdc, 0-5 Vdc, 1-5 Vdc; flow rate, temperature,
pressure (Opt.)

Digital (Standard): Serial RS-232C

Digital (Optional): HART, Profibus, Modbus, 2-way Ethernet

Alarm Relay Contacts: Two (2), 10A, adjustable
set point

Input Power: 24 Vdc, 115 Vac, 230 Vac, user selectable

Protection/Isolation: Standard Galvanic; Optional individual
analog isolation

Weight: 11 lb (5 kg) with Fiberglass housing, 25 lb (11.3 kg)
with Explosion proof housing

Enclosure Ratings:

Standard: NEMA Type 4X, Fiberglass

Optional: Class 1, Div 1, Groups B through G, NEMA Type 4X

Installation Methods: Wall/Panel mount

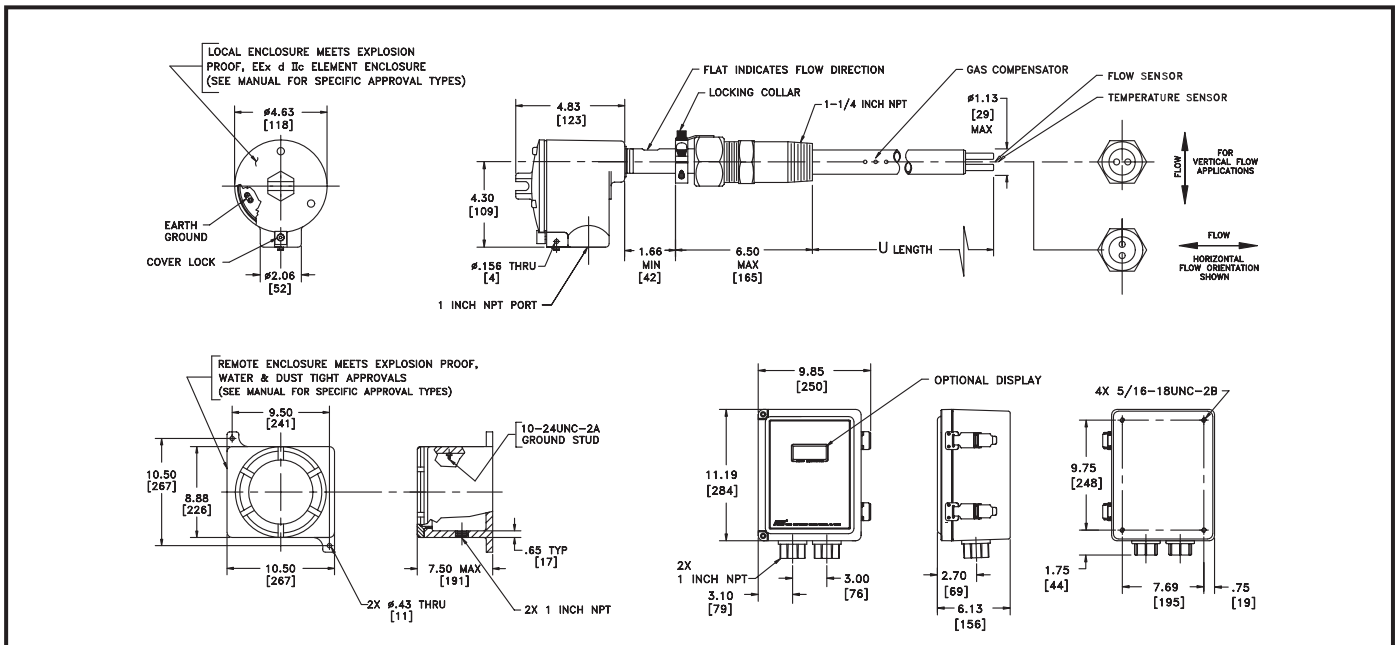
Connections: 1 inch NPT conduit connections

Environmental:

Operating Temperature: 0° to 140° F (-18° to +60° C)

Storage: 0° to 140° F (-18° to +60° C)

At reference operating conditions of 70°F, 14.7 psia [21.1°C, 1.013 bar(a)], and
straight-pipe run 20d upstream, 10d downstream. (For lesser straight-pipe runs or
obstructed runs, consult FCI factory about Vortab flow conditioners.) FCI is a
continuous improvement company. Specifications subject to change without notice.



Your local FCI representative:

FCI FLUID COMPONENTS
INTERNATIONAL LLC

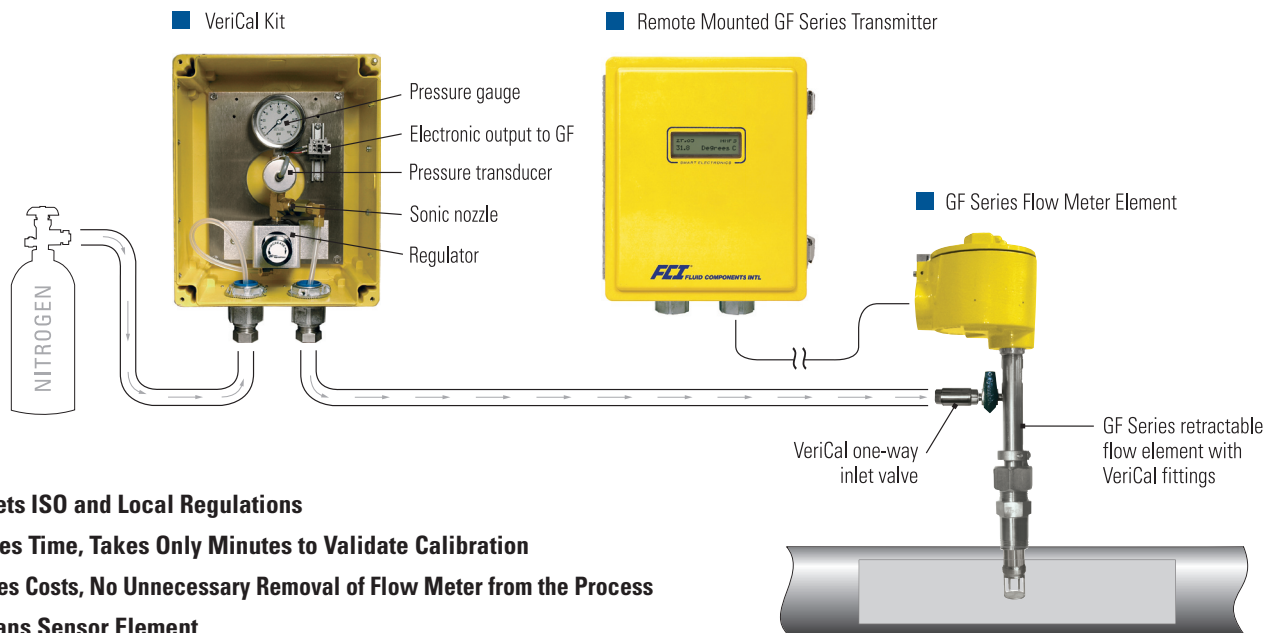
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ISO 9001:2000 and AS9100 certified

In-Situ Calibration Verification Option for Model GF90 and GF03 Gas Flow Meters



- Meets ISO and Local Regulations
- Saves Time, Takes Only Minutes to Validate Calibration
- Saves Costs, No Unnecessary Removal of Flow Meter from the Process
- Cleans Sensor Element

Validate Flow Meter Performance In The Installation

FCL's GF90 and GF03 gas flow meter models can be optionally provided with a unique and FCI-patented* in-situ calibration verification system. The VeriCal option provides periodic field validation and verification of the flow meter's measuring performance and calibration, all without extracting the flow meter from the pipe or process. In gas flow processes with procedures or regulations requiring periodic calibration verifications, the GF90 or GF03, outfitted with the VeriCal option, provide the most convenient and lowest cost solution.

A secondary benefit of the VeriCal system is that sensor elements are cleaned by the nitrogen gas, which helps ensure performance and reduce routine maintenance.

The VeriCal option is comprised of three components:

- A specially modified and fitted GF flow element. This special flow element includes a welded and sealed inlet valve, internal tubing, and an exit port near the flow sensors, plus additional calibration steps and documentation. After the GF90 or GF03 system has been precision calibrated in FCI's NIST traceable flow laboratory, the lab also flows nitrogen to obtain five (5) base line measurement points across the flow range to which all field checks using the VeriCal system can be compared. With each VeriCal outfitted GF90 or GF03 element, FCI provides a printed document showing the five base line flow readings for use by your field technicians.
- A VeriCal kit with fixtures and fittings to meter and control a precise flow of nitrogen** across the GF flow element. The VeriCal kit provides a specially designed 100 psig [6.9 bar (g)] pressure regulator, a high accuracy pressure transducer with a 4-20mA output, a sonic nozzle, and pressure gauge packaged in a NEMA 4 (IP66) rated enclosure. The kit is fully portable, or can be permanently mounted. The VeriCal kit also includes a 25 foot [7.6 m] air hose with quick disconnect fittings to connect the kit to the GF flow element, and a 25 foot [7.6 m] 2-conductor cable to connect the kit's electronic output to the GF transmitter's auxiliary input terminals (order part number 020849-01). In applications where an electronic output to the GF's transmitter is not desired or cannot be implemented, and less accuracy is acceptable, a VeriCal kit without the pressure transducer and output cable is available† (order part number 020849-02).

- A user-supplied nitrogen source with a hose, regulated 125 to 150 psig [8.6 to 10.3 bar(g)], either from an installed plant line or a portable supply tank. Typical test requires approximately 40 ft³ [1.1 m³] of nitrogen. Consult your local FCI representative about available refillable nitrogen supply options.

How It Works

With the VeriCal kit attached to the GF90/GF03 flow meter and to the nitrogen** source, a positive pressure nitrogen injection is introduced. The GF90/GF03 digital display provides a precise readout of the pressure from the pressure transducer's output†, the flow rate, and temperature. With the GF90/GF03 flow element fully retracted from the actual flow stream, and the GF operating in the VeriCal mode, the user adjusts the pressure to inject small controlled doses of nitrogen at a specified pressure. The nitrogen flow passes directly by the GF90/GF03 flow element at highly repeatable rates and the measured flow readings on the GF90/GF03 display are compared to the base line readings in the document provided by FCI. This procedure can be performed as often as desired.

* VeriCal is manufactured in accordance with U.S. Patent Number 7,201,033B2

** Other gases may be used; Contact FCI for specification information

† In VeriCal kit without the pressure transducer; no digital readout of pressure is displayed, and the user adjusts pressure based on the analog dial of the gauge in the kit.

VeriCal Specifications

Pressure Range: 0 to 100 psig [0 to 6.9 bar (g)]

Process Temperature Range: Procedure is conducted at ambient temperature.

Agency Approvals: FM, CSA, ATEX pending for VeriCal system. Contact FCI for availability.

GF Flow Element:

Material of Construction: 316L Stainless steel
 Process Connection: Retractable packing gland
 Process Temperature: 350°F [177°C] maximum