

FC70A

Flow Computers and Batch Controllers

Description

The FC70A Series Flow Computers & Batch Controllers are a family of multipurpose, microprocessor-based products which display and transmit flow data and provide control capabilities. These powerful units support up to six basic functions:

- Linearization of flowmeter inputs
- Compensation for change in fluid temperature
- Batch control with high- and low-speed delivery
- Programmable high and low rate alarms
- Selectable rate or total display
- Mass or volumetric flow

User-friendly, menu-driven software with English language prompts and help messages simplify the FC70A programming. This allows the user to select the output and control options for various processes. Local programming is accomplished through the front panel and the sixteen-digit alphanumeric display. Remote programming is accomplished by utilizing the RS485 port and a compatible computer terminal. RS232 to RS485 converters are optional.

The compact FC70A features a DIN enclosure with a waterproof NEMA 4X/IP65 front panel.

The FC70A is powered by line or low voltage DC. The removable plug-in terminal blocks simplify wiring.

Applications

The FC70A will receive inputs directly from a flowmeter with a frequency output. The following flowmeters will interface with the FC70A:

- Turbine Meters
- Magnetic Meters
- Vortex Meters
- Positive Displacement Meters
- Coriolis Meters
- Ultrasonic Meters
- Thermal Mass Meters



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Features

Linearization Model

- 16-digit fluorescent display
- 20-point flow input linearization
- 6-digit rate indication in engineering units
- 10-digit total indication in engineering units
- Optically isolated 4–20 mA analog flow output
- High-low rate alarms
- 24 VDC accessory output power
- Self-diagnostics
- Scrolling help messages
- 5 remote control inputs
- RS485 communications

Batch/Temperature Compensation Model

- All features of Linearization Model
- Dual-relay batch control
- UVC temperature compensation
- Accepts 4–20 mA temperature input

Mass Model

- All features of Linearization Model
- All features of Batch/Temperature Compensation Model
- Compensates for changes in density
- Mass or volumetric flow rates

Operating Functions

Linearization "L" Model

The Linearization Model provides 20-point linearization of the flowmeter input to improve flowmeter accuracy.

The FC70A-L calculates in engineering units and has a ten-digit display for total. A setpoint control with an output transistor can provide a pulse signal for remote totalization.

Rate indication is in engineering units with a six-digit display. The FC70A-L provides programmable high and low rate alarms with an optically isolated 4–20 mA rate output.

Batch/Temperature Compensation "B" Model

The Batch/Temperature Compensation Model has all of the features of the Linearization Model plus batch control and temperature compensation features.

The batch control function available on the FC70A-B has a dual relay output to initiate the solenoid valves for fast or slow delivery. The six-digit display counts the measured flow delivered up to the setpoint limit. If the flow does not stop at the setpoint limit, a batch setpoint overrun will initiate an alarm to warn the user of the condition.

Batching can be reset by the front panel or by a remote signal. For continuous batching operations, automatic recycling is available with a programmable time delay selected between batches.

Fluid temperature compensation is provided for viscosity-sensitive flowmeters on the FC70A-B. The temperature input is processed by the flow computer to determine the viscosity of the fluid. A Universal Viscosity Curve in the computer memory enables the flow computer to calculate the compensated flow rate. As the viscosity changes, the fluid temperature compensation feature improves the accuracy of the measurement.

Mass "M" Model

The Mass Model has all of the features of the Linearization and Batch/Temperature Compensation Models, plus the ability to compensate for changes in fluid density and to display actual mass flow rates.

The FC70A-M flow computer accepts a 4–20 mA temperature transducer signal and holds a 10-point user-defined temperature vs. density table in memory. Accurate mass flow rates are then calculated using continuously updated density values.

Program Menus

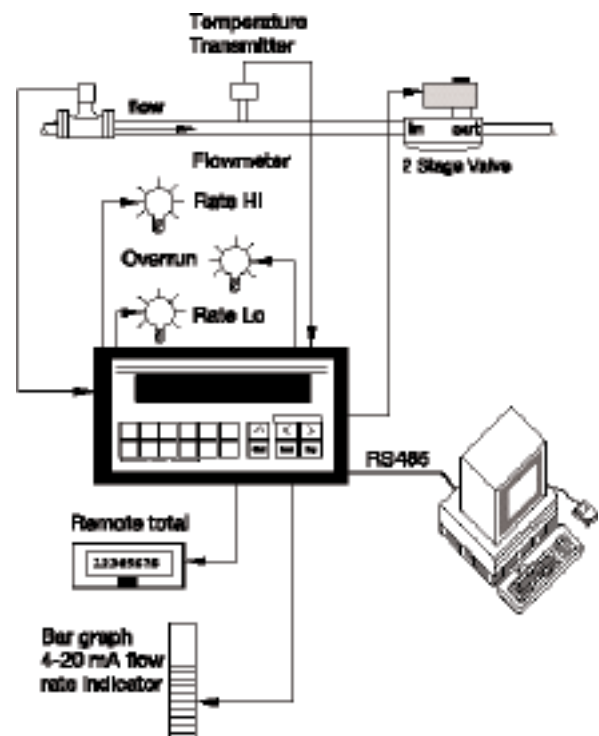
Programming of the FC70A is accomplished through the front panel keyboard as well as through a two-way RS485 multi-drop communication port.

The keyboard setup for the FC70A is established by stepping through a simple column and row format. For easy understanding and accessibility, program menus are arranged by the following functions: calibration input, totalizer and rate functions, batch control, and program of other functions.

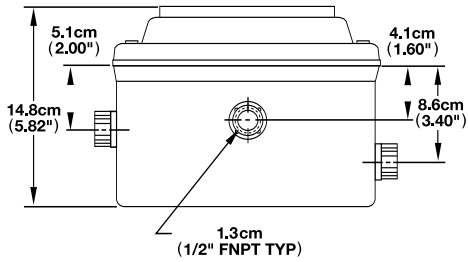
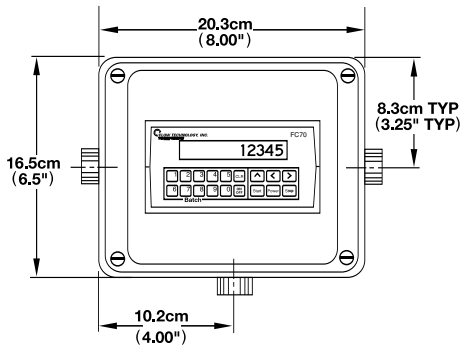


The FC70A-B1-A6 is shown mounted directly on a Flow Technology 2-inch turbine flowmeter. The FC70A is housed in a NEMA 4X/IP65/Exn enclosure with two conduit hubs. The enclosure is also available with MS connectors for cable connections. The FC70A panel mount configuration has a watertight seal which meets NEMA 4X/IP65 standards.

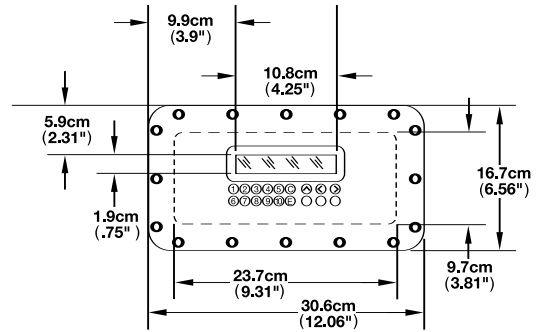
Typical Application



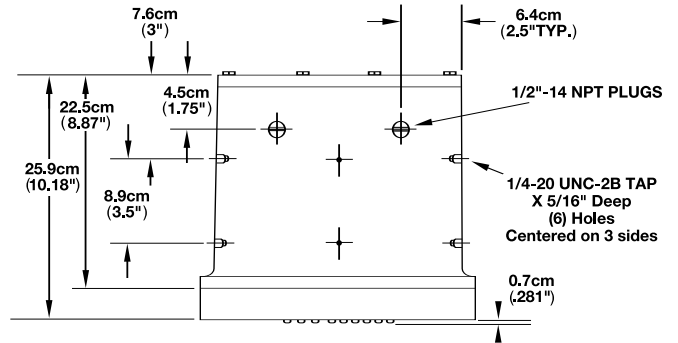
Enclosure Options



6 and 7 = Field Mounted NEMA 4X/IP65

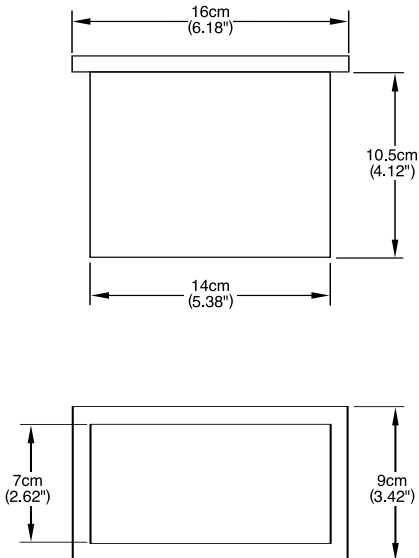


Explosion-Proof, Class I, Div. 1, Group D
Double Flange with 18 Buttons



8 = Explosion-Proof, Class I, Div. 1,
Group D, Double Flange

FC70A Case Dimensions



0 = Standard Panel Mounted NEMA 4X

Model Numbering System



Basic Model No.

Version

- L = Linearization
- B = Batch/Temperature Compensation
- M = Mass

Power

- 1 = 120 VAC/24 VDC
- 2 = 240 VAC/24 VDC

Flow Input

- A = Low Level (Magnetic Pickoff)
- B = Pulse
- C = RF Carrier*
- D = Other RF Carrier*

Enclosure

- 0 = Standard Panel Mounted NEMA 4X/IP65
- 5 = Exn, ExnA II T6
- 6 = Field Mounted NEMA 4X/IP65 Conduit Hubs
- 7 = Field Mounted NEMA 4X/IP65 MS Connector
- 8 = Explosion-Proof, Class I, Div. 1, Group D with Buttons
- 8NB = Explosion-Proof, Class I, Div. 1, Group D without Buttons (square enclosure with round window lid)

*Available only with enclosure options 6, 7 & 8NB.

Specifications

	Model # Code	Specifications		Specifications
Input Power			Enclosures (cont'd)	
120 VAC/24 VDC	1	+10%, -15%, 50/60 Hz @ 0.2 amps	Options	Class I, Division 1, Group D, explosion-proof
240 VAC/24 VDC	2	+10%, -15%, 50/60 Hz @ 0.2 amps or 18–27 VDC, 0.4 amps max., 6 watts max.		Field mounted NEMA 4X/IP65 conduit hubs
Flowmeter Input Type				Field mounted NEMA 4X/IP65 MS connector
Low Level (Mag. Pickoff)	A	40 K ohms		Exn, ExnA II T6
Impedance:		20 mV–100 VDC	Standard Outputs	
Voltage:		Adj. 20–120 mV	Accessory Power	24 VDC ±5%, 100 mA max. (85 mA max. with modulated carrier input). Not available on 24 VDC input powered units.
Hysteresis:			Batch Control	Versions B and M only
Adj.	B	5.8 K ohms to +5 VDC	Type:	2 relays for fast and slow delivery
Impedance:			Contacts:	Each relay has 1 form C contact rated 240 VAC, 5 amps resistive
Voltage:				Versions B and M only
Low		0–1.3 VDC	Overrun Alarm	1 NPN transistor for detecting batch overruns
High		2.8–24 VDC	Type:	
Response:		0–5 kHz, min. pulse width 50 µsec.	Rate Alarms	2 NPN transistors for indicating rate outside high/low setpoints
RF Carrier Pickoff	C	Available with enclosures 6, 7 & 8NB only	Type:	150 mA max., 30 VDC blocking max. Follows, latched or timed from 0.01–99.99 seconds
Carrier Frequency:		45 kHz	Rating:	
Frequency Response:		0.5–3500 Hz	Operation:	
Inductance:		1 mH	Linearized Scaled Totalizer Pulse or Final Setpoint Alarm	1 NPN transistor to indicate final setpoint reached or for remote totalizing
Other RF Carrier	D	Available with enclosures 6, 7 & 8NB only	Type:	150 mA max., 30 VDC blocking max. Programmable to act either as alarm or as Linearized Scaled Totalizer Pulse
Carrier Frequency:		45 kHz		
Frequency Response:		0.5–3500 Hz		
Inductance:		330 µH		
Standard Inputs				
Control Inputs		To reset all alarms and counters		
Purpose:		5		
Quantity:		Contact closure to ground or NPN transistor to ground		
Type:		5.8 K ohms to +5 VDC	Rating:	
Impedance:			Operation:	
Voltage:				
Low		0–1.0 VDC		
High		3.5–24 VDC	Output pulse width selectable from:	
Min. Response:			Fast:	125 µsec. pulse width, 1.5 kHz max. frequency
Low to High		30 ms	Medium:	2 msec. pulse width, 200 Hz max. frequency
High to Low		30 ms	Slow:	50 msec. pulse width, 10 Hz max. frequency
Temperature Input		Versions B and M only	Flow Rate	Analog 4–20 mA current loop, optically isolated
Type:		4–20 mA, Adj. 3.75 to 20.25 mA	Type:	Compliance voltage 12–23 VDC
Impedance:		100 ohms		2 Hz
Response:		2 Hz		±0.1% @ 77° F (25° C), ±0.25% over temp.
Accuracy:		±0.1% @ 77° F (25° C), ±0.25% over range		
Linearization				
Points		20		
Resolution		Pulses/unit volume (Kpv) 0.001 – 999999		
		Frequency to Viscosity ratio (Hz/v) 0.01 – 9999		
		Kinematic Viscosity (v) 0.100 – 800.1 cst.	Display	
Method		Straight line interpolation between points	Characters	16 alphanumeric
Frequency		1.1 – 5000 Hz	Type	Vacuum fluorescent
Calculation Accuracy		±0.1% of reading	Size	0.2 inches (5.1 mm) high
System Accuracy		Application dependent	Response	2 Hz
Enclosures			Communications	
Standard		Panel mounted NEMA 4X/IP65	Type	RS485 multi-drop
			Baud Rate	1200, 4800, 9600
			Parity	Space, Even, Odd
			Protocol	Opto-22 compatible
			Converter	RS232 to RS485 available
			Environmental	
			Temperature	
			Operating:	32° F to 130° F (0° C to 55° C)
			Storage:	-40° F to 160° F (-40° C to 70° C)
			Humidity	0 to 85% RH non-condensing
			Front Panel	Sealed to NEMA 4X standard

Specifications are for reference only and are subject to change without notice.

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