Application FC04

Single Channel
Flow Computer

for Mass Analog Flowmeter

Features

- **Tailored for mass analog flow input**
- **Versatile "user value" available on main menu**
- **Selection of second language and user tags**
- **RTC logging with up to 100 entries at user-specified scheduled times**
- **Programmable pulse width and scaling of pulse output**
- **4-20mA retransmission**
- **RS-232 and RS-485 (optional) serial ports**
- **Modbus RTU, Printer and other serial port protocols**
- **Front panel adjustment of 8-24V DC output voltage**
- **Backlit display**

$C \, \epsilon$

Overview

The 505 FC04 application pack is a rate totaliser for the measurement of a product. It uses the 4-20mA analog output from a mass flowmeter.

The flow computer displays the flow rate, resettable total and the accumulated total in the units of measure according to the purchase order.

The analog input can be scaled as well as having filtering, square law or non-linear correction and cutoff points applied to the signal.
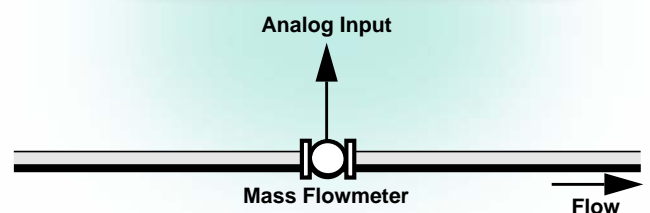
A freely programmable "user value" on the main menu can serve as a setpoint for the 4-20mA output or as an operator identifier to be logged.

Calculations

To derive the flow rate, the analog input is normalised to a value (A) between 0 and 1.

$$massflow = (M_f max - M_f min)A + M_f min$$

$$mass = \int (massflow \cdot \Delta t)$$

Analog Input

Mass Flowmeter

Flow

A c c u r a c y • *Q u a l i t y* • *P e r f o r m a n c e*

Displayed Information

The front panel display shows the current values of the input variables and the results of the calculations. A list of the variables for this application and their type (total or rate) is shown at the end of this document.

The instrument can be supplied with a real-time clock for data logging of up to 100 entries of the variables as displayed on the main menu.

Communications

There are two communication ports available as follows:

- RS-232 port
- RS-485 port

The ports can be used for remote data reading, printouts and for initial application loading of the instrument.

Retransmission Outputs

The instrument can re-transmit any main menu variable. The digital outputs can re-transmit totals as pulses. If the instrument has the advanced option, it outputs rates as a 4-20mA signal.

Relay Outputs

The relay alarms can be assigned to any of the main menu variables of a rate type. The alarms can be fully configured including hysteresis. Two relays are standard.

Software Configuration

The instrument can be further tailored to suit specific application needs including units of measurement, custom tags, second language or access levels. A distributor can configure these requirements before delivery.

Instrument parameters including units of measurement can be programmed in the field, according to the user access levels assigned to parameters by the distributor.

All set-up parameters, totals and logged data are stored in non-volatile memory with at least 30 years retention.
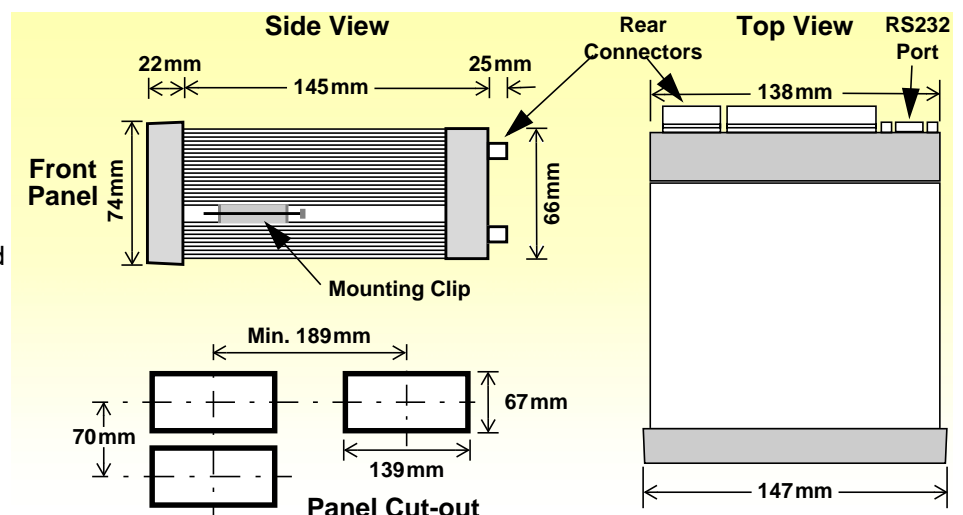
Terminal Designations

Terminal	Label		Designation	Comment
1	RS485	+	RS485 (+)	
2		-	RS485 (-)	
3		G	Comms ground	
4	RS232	Tx	RS232 data out	Same RS232 port as DB9 connector
5		Rx	RS232 data in	
6		C	CTS (Clear to send)	
7	Io	+	4-20mA output	Advanced option
8	SG	-	Signal Ground 0V	
9	Li	+	Logic input	
10	D OUT	1+	Open collector o/p 1	Digital outputs
11		2+	Open collector o/p 2	
12	Ii	+	4-20mA input	Mass flow
13	SG	-	Signal Ground 0V	
14	Fi	+	Frequency input	Not used
15	Vo	+	8-24 volts DC output	70mA power limited
16	G	-	DC Ground	
17	Vi	+	DC power input	DC power in 12-28V
18	SH	E	Shield terminal	
19	RELAYS	R1	Relay 1	
20		RC	Relay Common	
21		R2	Relay 2	
E	AC MAINS	E	Mains ground	AC power in 95-135V or 190-260V
N		N	Mains neutral	
A		A	Mains active	
RS232 port			9-pin serial port	

Dimension Drawings

Part Number

505.XXXXXX-FC04
see **Product Codes** to select required features

Default Application software:
505-FC04-000000

Side View

22mm 145mm 25mm

Front Panel 74mm 66mm

Mounting Clip

Min. 189mm

70mm 67mm

139mm

Panel Cut-out

Rear Connectors Top View RS232 Port

138mm

147mm

Specifications

Operating Environment

Temperature	0°C to +60°C (conformal coating) +5°C to +40°C (no coating)
Humidity	0 to 95% non condensing (conformal coating) 5% to 85% non condensing (no coating)
Power Supply	95...135 V AC or 190...260 V AC or 12...28 V DC
Consumption	6W (typical)
Protection	Sealed to IP65 (Nema 4X) when panel mounted
Dimensions	147mm (5.8") width 74mm (2.9") height 167mm (6.6") depth

Display

Type	LCD with 7-digit numeric display and 11-character alphanumeric display (backlit optional)
Digits	15.5mm (0.6") high
Characters	6mm (0.24") high
LCD Backup	Last data visible for 15min after power down (optional)
Update Rate	0.3 second

Non-volatile Memory

Retention	> 30 years
Data Stored	Setup, Totals and Logs

Approvals

Interference	CE compliance
Enclosure	ATEX, FM, CSA and SAA approved enclosures available for hazardous areas

Real Time Clock (Optional)

Battery Type	3 volts Lithium button cell (CR2032)
Battery Life	5 years (typical)

4-20mA Input

Overcurrent	100mA absolute maximum rating
Impedance	250 Ohms (to common signal ground)
Accuracy	0.1% typical full scale (20°C) 0.2% (full temperature range)
Non-linearity	Up to 20 correction points (flow inputs)

Remote Key Input

Signal Type	CMOS, TTL, open collector, reed switch
Configuration	One input set as one of front five keys

Relay Output

No. of Outputs	2 relays
Voltage	250 volts AC, 30 volts DC maximum
Current	3A maximum

Communication Ports

Ports	RS-232 port RS-485 port
Baud Rate	2400 to 19200 baud
Parity	Odd, even or none
Stop Bits	1 or 2
Data Bits	8
Protocols	Modbus RTU, Printer*

Transducer Supply

Voltage	8 to 24 volts DC, programmable
Current	70mA @ 24V, 120mA @ 12V maximum
Protection	Power limited output

Pulse/Digital Output

Signal Type	Open collector, non-isolated
Switching	200mA, 30 volts DC maximum
Saturation	0.8 volts maximum
Pulse Width	Programmable: 10, 20, 50, 100, 200 or 500ms

4-20mA Output (Optional)

Supply	24 volts DC internal, non-isolated
Resolution	0.05% full scale
Accuracy	0.05% full scale (20°C) 0.1% (full temperature range, typical)

*Important: Specifications are subject to change without notice.
Printer protocol is available only if RTC option is installed.*

Ordering Information

Product Codes

Model	Supplementary Code						Description
505 .						- FC04	
Enclosure	1						Panel mount enclosure
	2						Field mount enclosure (not yet available)
	3/5						Explosion proof Ex410 with metric glands (5 specifies heater version)
	4/6						Explosion proof Ex410 with NPT glands (6 specifies heater version)
Output Options		0					**Basic** - RS232 and RS485 serial ports, 2 relays, 2 pulse outputs, rear key input
		1					**Advanced** - also includes 4-20mA o/p and Real-time clock for printer output and logging (100 logs)
Extra Options			2				9 way DB connector for RS232 serial port
Power Supply				E			For 220/240 VAC
				A			For 110/120 VAC
				D			For DC power only 12-28 VDC
Display Panel Options					S		Standard (no backlight & LCD backup)
					F		Fully optioned (with backlight & LCD backup)
PCB Protection						C	**Conformal coating** - required for maximum environmental operating range. Recommended to avoid damage from moisture and corrosion.
						N	**None** - suitable for IEC standard 654-1 Climatic Conditions up to Class B2 (Heated and/or cooled enclosed locations)
Application Pack Number						FC04	Defines the application software to be loaded into the instrument

Example full product part number is 505.112EFC-FC04 (this is the number used for placing orders).

Main Menu Variables

Main Menu Variables	Default Units	Preferred Units	Variable Type
Mass	kg		Total
Mass Flowrate	kg/min		Rate
User Value	- - -		Rate

500 Series in Ex410 Enclosure