

# Application FG01

## Generic Flow Computer

for Frequency Flow and Analog Sensors



### Features

- Frequency flow input for mass or volume
- 4-20mA input acts as multiplier, divider or independently
- Can convert mass to volume or volume to mass
- Versatile “user value” available on main menu
- Freely assignable alarms for high or low levels
- 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



### Overview

The 505 FG01 application allows for great flexibility in configuring its operation before delivery:

- the frequency input can accept either volumetric or mass flow
- the analog input can accept either temperature, pressure, density or unitless values
- the analog input can operate independently or as a multiplication factor/divider to derive the resultant mass or volumetric flow.

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.

This application, by default, is set up to accept a volume flow input, multiplied by a density on the 4-20mA input to determine the mass flow rate and total.

### Calculations

The calculation of totals are exact as the instrument collects all pulses detected on the input.

$$total = pulses / k-factor$$

The flow rate is derived from an accurately measured frequency:

$$flow = frequency / k-factor$$

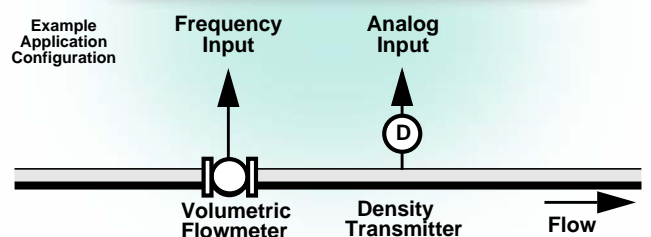
The analog input is normalised to a value (A) between 0 and 1.

$$Analog\ Value = (Vmax - Vmin)A + Vmin$$

The resultant values are then:

$$FACTOR\ result = Flow \times Analog\ Value$$

$$DIVIDER\ result = Flow / Analog\ Value$$



## 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

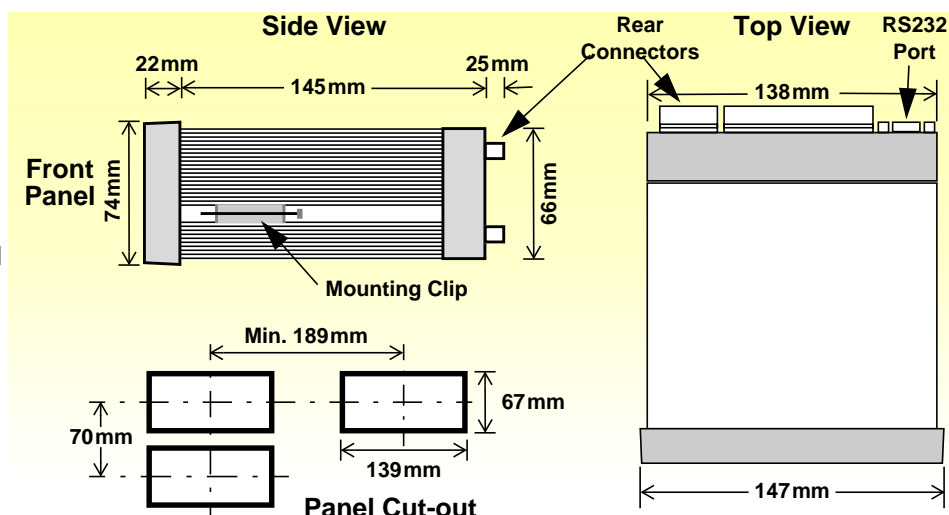
Terminal Label	Designation	Comment
1	+	RS485 (+)
2	-	RS485 (-)
3	G	Comms ground
4	Tx	RS232 data out
5	Rx	RS232 data in
6	C	CTS (Clear to send)
7	Io	4-20mA output
8	SG	Signal Ground 0V
9	Li	Logic input
10	1+	Open collector o/p 1
11	2+	Open collector o/p 2
12	li	4-20mA input
13	SG	Signal Ground 0V
14	Fi	Frequency input
15	Vo	8-24 volts DC output
16	G	DC Ground
17	Vi	DC power input
18	SH	Shield terminal
19	R1	Relay 1
20	RC	Relay Common
21	R2	Relay 2
E	E	Mains ground
N	N	Mains neutral
A	A	Mains active
RS232 port		9-pin serial port

## Dimension Drawings

### Part Number

505.XXXXXX-FG01  
see **Product Codes** to select required features

Default Application software:  
505-FG01-000000



# Specifications

## Operating Environment

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

## Display

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

## Non-volatile Memory

<b>Retention</b>	> 30 years
<b>Data Stored</b>	Setup, Totals and Logs

## Approvals

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

## Real Time Clock (Optional)

<b>Battery Type</b>	3 volts Lithium button cell (CR2032)
<b>Battery Life</b>	5 years (typical)

## Frequency Input (General)

<b>Range</b>	0 to 10kHz
<b>Overvoltage</b>	30V maximum
<b>Update Time</b>	0.3 sec
<b>Cutoff frequency</b>	Programmable
<b>Configuration</b>	Pulse, coil or NPS input
<b>Non-linearity</b>	Up to 10 correction points

## Pulse

<b>Signal Type</b>	CMOS, TTL, open collector, reed switch
<b>Threshold</b>	1.3 volts

## Coil

<b>Signal Type</b>	Turbine and sine wave
<b>Sensitivity</b>	15mV p-p minimum

## NPS

<b>Signal Type</b>	NPS sensor to Namur standard
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## 4-20mA Input

<b>Overcurrent</b>	100mA absolute maximum rating
<b>Impedance</b>	250 Ohms (to common signal ground)
<b>Accuracy</b>	0.1% typical full scale (20°C) 0.2% (full temperature range)

## Relay Output

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

## Communication Ports

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

## Transducer Supply

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

## Pulse/Digital Output

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

## 4-20mA Output (Optional)

<b>Supply</b>	24 volts DC internal, non-isolated
<b>Resolution</b>	0.05% full scale
<b>Accuracy</b>	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	- FG01						
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						<b>Basic</b> - RS232 and RS485 serial ports, 2 relays, 2 pulse outputs, rear key input
	1						<b>Advanced</b> - 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					<b>Conformal coating</b> - required for maximum environmental operating range. Recommended to avoid damage from moisture and corrosion.
		N					<b>None</b> - suitable for IEC standard 654-1 Climatic Conditions up to Class B2 (Heated and/or cooled enclosed locations)
Application Pack Number						FG01	Defines the application software to be loaded into the instrument

Example full product part number is 505.112EFC-FG01 (this is the number used for placing orders).

## Main Menu Variables

Main Menu Variables	Default Units	Preferred Units	Variable Type
Total (Volume)	L		Total
Flowrate (Volume)	L/min		Rate
Analog Input (Density)	kg/m <sup>3</sup>		Rate
ResultingTotal (Mass)	kg		Total
Resulting Flow (Mass)	kg/min		Rate
User Value	- - -		Rate

Labels in brackets reflect factory default configuration. Other configurations are available, consult your distributor for any change from the default variable names or units of measurement.



500 Series in Ex410 Enclosure

[www.contrec.co.uk](http://www.contrec.co.uk)



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