

Application GC02

General Gas Flow Computer

for Analog Flowmeters



Features

- Tailored for volumetric analog flow input such as vortex flowmeters
- Allows for stacked flow inputs
- Calculations based on a variety of General Gas equations
- Selection of second language and user tags
- RTC logging with over 1000 entries
- 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 515 GC02 application measures the volume, corrected volume and mass of a general gas. The instrument uses an analog volume flow input and analog temperature and pressure sensor inputs.

The flowmeter input signal can be selected as either 0-5V, 1-5V or 4-20 mA. Minimum and maximum points are programmed and non-linear correction points can be used to better reflect the flowmeter's behaviour.

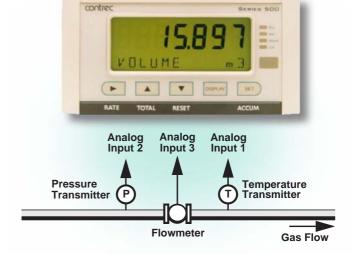
The properties of a gas are calculated using common industry standard equations of state. These equations use a simplified set of parameters to quickly and accurately determine the value of compressibility and actual quantity of gas.

Calculations

A variety of calculations are available to suit the nature of the gas and the measurement conditions. The calculations are valid for the vapour phase of a gas.

Equations Of State:

- Ideal Gas
- Redlich-Kwong
- Soave-Redlich-Kwong
- Peng-Robinson



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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 over 1000 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 (optional)

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

Isolated Outputs

The opto-isolated outputs can re-transmit any main menu variable. The type of output is determined by the nature of the assigned variable. Totals are output as pulses and rates are output as 4-20 mA signals. One output is standard, a second output is available as an option.

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 with additional two relays available as an option.

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.

Temperature and Pressure Input Types

Temperature sensor input(s) can be either PT100, PT500, 4-20 mA, 0-5 V or 1-5 V signals. Pressure sensor input(s) can be either 4-20 mA, 0-5 V or 1-5 V signals.

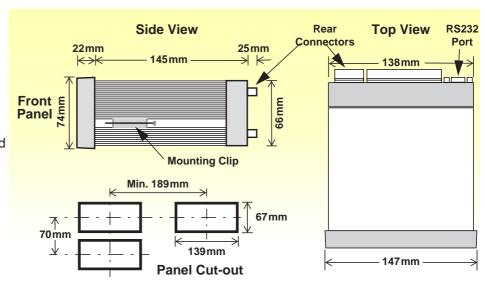
Terminal Designations

	Termina Label		Designation	Comment	
3	SG	-	Signal ground	For AINP1 RTD Input	
5	EXC V	2+	Excitation Term 2+		
7	AINP1	+	Analog Input ch 1 (+)	Temperature Input	
8		-	Analog Input ch 1 (-)	. omporatare input	
9	AINP2	+	Analog Input ch 2 (+)	Pressure Input	
10		-	Analog Input ch 2 (-)		
11	AINP3	+	Analog Input ch 3 (+)	Main or Low Flow Input	
12	74141 0	-	Analog Input ch 3 (-)	main or Low How input	
13	AINP4	+	Analog Input ch 4 (+)	High Flow Stacked Input	
14	7 (11 4)	-	Analog Input ch 4 (-)		
15	Vo	+	8-24 volts DC output	Overload protected	
16	G	-	DC Ground	DC power in 12-28V	
17	Vi	+	DC power input		
18	SH	Е	Shield terminal		
19		+	RS485 (+)		
20	RS485	-	RS485 (-)	Optional RS485 port	
21		G	RS485 ground		
22		1+	Switch 1		
23	1.0010	2+	Switch 2		
24	LOGIC INPUTS	3+	Switch 3		
25		4+	Switch 4		
26		C-	Signal ground		
27	OUT1	+	Output ch 1 (+)		
28	0011	-	Output ch 1 (-)		
29	OUT2	+	Output ch 2 (+)	Optional output	
30	0012	-	Output ch 2 (-)	Οριίσται σαίραι	
31		RC	Relay common		
32		R1	Relay 1		
33	RELAYS	R2	Relay 2		
34		R3	Relay 3	Optional relays	
35		R4	Relay 4	Optional relays	
Е	4.0	E Mains ground		1.0	
N	AC MAINS	N	Mains neutral	AC power in 100- 240VAC	
Α	, 10	Α	Mains active	577.0	
RS2	232 port		9-pin serial port		

Dimension Drawings Part Number

515.XXXXXX-GC02 see **Product Codes** to select required features

Default Application software: 515-GC02-000000



Specifications

Operating Environment

Temperature -20°C to +60°C (conformal coating)

+5°C to +40°C (no coating)

0 to 95% non condensing (conformal coating) Humidity

5% to 85% non condensing (no coating)

100-240 V AC (+/-10%) 50-60 Hz (+/-10%) or **Power Supply**

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 (panel option) 167mm (6.6") depth

Display

Backlit LCD with 7-digit numeric display and **Type**

11-character alphanumeric display

Digits 15.5mm (0.6") high Characters 6mm (0.24") high

LCD Backup Last data visible for 15min after power down

Update Rate 0.3 second

Non-volatile Memory

Retention > 30 years

Data Stored Setup, Totals and Logs

Approvals

C ∈ compliance Interference

Enclosure IECEx, ATEX and CSA approved enclosures

available for hazardous areas

Real Time Clock (Optional)

Battery Type 3 volts Lithium button cell (CR2032)

Battery Life 5 years (typical)

Analog Input (General)

100mA absolute maximum rating Overcurrent

Update Time < 1.0 sec

Configuration RTD, 4-20mA, 0-5V and 1-5V input **Non-linearity** Up to 20 correction points (some inputs)

RTD Input

Sensor Type PT100 & PT500 to IEC 751

Connection Four Wire -200°C to 350°C Range

Accuracy 0.1°C typical (-100°C to 300°C)

4-20mA Input

Impedance 100 Ohms (to common signal ground)

0.05% full scale (20°C) **Accuracy**

0.1% (full temperature range, typical)

0-5 or 1-5 Volts Input

10MOhms (to common signal ground) **Impedance**

Accuracy 0.05% full scale (20°C)

0.1% (full temperature range, typical)

Logic Inputs

Signal Type CMOS, TTL, open collector, reed switch

Overvoltage 30V maximum

Relay Output

No. of Outputs 2 relays plus 2 optional relays

250 volts AC, 30 volts DC maximum Voltage

(solid state relays use AC only)

Current 3A maximum

Communication Ports

Ports RS-232 port RS-485 port (optional)

Baud Rate 2400 to 19200 baud **Parity** Odd, even or none

1 or 2 **Stop Bits Data Bits** 8

Protocols ASCII, Modbus RTU, Printer*

Transducer Supply

8 to 24 volts DC, programmable Voltage

70mA @ 24V, 120mA @ 12V maximum Current

Power limited output **Protection**

Isolated Output

No. of Outputs 1 configurable output (plus 1 optional) Configuration Pulse/Digital or 4-20mA output

Pulse/Digital Output

Signal Type Open collector

200 mA, 30 volts DC maximum **Switching**

Saturation 0.8 volts maximum

Pulse Width Programmable: 10, 20, 50, 100, 200 or 500ms

4-20mA Output

Supply 9 to 30 volts DC external

Resolution 0.05% full scale

0.05% full scale (20°C) Accuracy

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		
515 .							GC02			
	1							Panel mount enclosure		
Enclosure	2					Field mount enclosure (NEMA 4X / IP66)				
Lilologuic	3/5							Explosion proof Ex d (IECEx/ATEX), metric glands (5 specifies heater)		
	4/6							Explosion proof Ex d (CSA), NPT glands (6 specifies heater)		
		0						4 logic inputs, 1 isolated output, 2 relays (only relay type 1 is available), RS232 (DB9) communication port		
Output Opti	ons	ons 1				4 logic inputs, 2 isolated outputs, 4 relays, real-time clock data logging, RS232 (DB9) and RS485 communication ports				
			4 logic inputs, 2 isolated outputs, 4 relays, real-time clock data logging, RS232 (DB9) and Ethernet/RF communication ports (not yet available)							
			1					Electromechanical relays only		
Relay Type			2					2 electromechanical and 2 solid state relays		
			3					Solid state relays only (not yet available)		
Power Supp	oly			U				Inputs for 12-28VDC and 100-240 VAC, 50-60Hz (Previous Models: A = 110/120 VAC, E = 220/240 VAC)		
		D				Input for 12-28VDC power only				
Display Panel Option S					s			Standard option (now with backlight & LCD backup) (original Full option: F, with Infra-Red comms, no longer available)		
PCB Protection						С		Conformal coating - required for maximum environmental operating range. Recommended to avoid damage from moisture and corrosion.		
N N						N		None - suitable for IEC standard 654-1 Climatic Conditions up to Class B2 (Heated and/or cooled enclosed locations)		
Application Pack Number GC02							GC02	Defines the application software to be loaded into the instrument		

Example full product part number is 515.111USC-GC02 (this is the number used for placing orders).

Main Menu Variables

Main Menu Variables	Default Units	Preferred Units	Variable Type
Volume	m^3		Total
Volume Flowrate	m ³ /min		Rate
Corrected Volume	m ³		Total
Corrected Flowrate	m ³ /min		Rate
Mass	kg		Total
Mass Flowrate	kg/min		Rate
Temperature	Deg C		Rate
Pressure	MPa		Rate
Compressibility Factor			Rate



500 Series in Ex410 Enclosure



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