Model 515

Application CB02

Secure Blending Controller

for Volumetric Frequency Flowmeters

Features

- **Tailored for volumetric frequency flow input**
- **ID Tag validation, preprogrammed ratio %**
- **Pump demand contact**
- **Selection of various modes of operation**
- **Process line control via DCV (digital control valve)**
- **Remote PERMISSIVE input to control delivery's state**
- **Displays general purpose analog inputs**
- **Includes user programmable value into delivery log**
- **Allows for simplified main menu**
- **Allows for non-linear correction**
- **Storage of 1000 transactions with time and date stamp**
- **Selection of second language and user tags**
- **Selectable protocols on serial ports including Modbus RTU and Printer output**
- **Backlit display with LCD backup**

CE

Overview

The 515 CB02 application is a secure blending controller measuring the volume flow in a main and process lines using frequency flow inputs.

The main and process flows are used to determine the net volume flow. The operator can view the ratio of totals as well as the ratio of flow rates.

The control of the process flow is via a digital control valve. The control responsiveness and flowrate deadband can be adjusted to reduce wear on valves.

The instrument can be set to prompt for a valid ID-Tag before a delivery can be commenced. The valid ID-Tag also sets the pre-programmed target ratio % and is stored as a part of the logged transaction record.
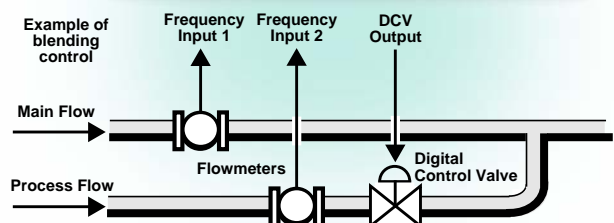
Calculations

The total and flowrate are derived from accurately measured frequency and the number of received pulses.

volume = pulses / k-factor

volume flow = frequency / k-factor

The controller caters for blending points before and after the main flowmeter. The process flow is a ratio of the net (combined) flow (0 to 100% range).

$$Ratio\% = \frac{P_{flow}}{Net_{flow}} \times 100$$

Accuracy • Quality • Performance

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 storage of up to 1000 transactions with time and date stamps.

Communications

There are currently two communication ports available as follows:

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

The ports are available 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. Totals are output as pulses and rates are output as 4-20mA signals. Alternatively, the outputs can be configured to provide application specific digital signals like flow error, pump demand, etc.

Relay Outputs

The relay outputs 3 and 4 control the blending flow via a digital control valve. The relay output 2 provides a pump demand contact and the relay 1 can be used as a fully programmable alarm for any rate type variable.

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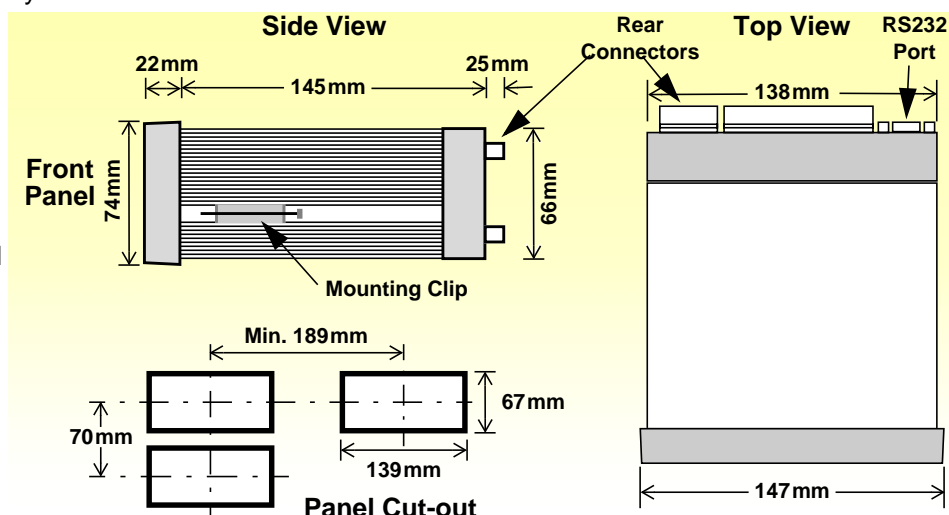
Instrument parameters including units of measurement can be programmed in the field, according to the user access levels assigned to parameters by the distributor.

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	FINP	1+	Frequency Input 1+	Main flow Input
2	FINP	2+	Frequency Input 2+	Process flow Input
3	SG	-	Signal ground	
5	EXC V	2+	Excitation Term 2+	For AINP1 RTD Input
6	EXC V	3+	Excitation Term 3+	For AINP2 RTD Input
7	AINP1	+	Analog Input ch 1 (+)	General Purpose Input 1
8		-	Analog Input ch 1 (-)	
9	AINP2	+	Analog Input ch 2 (+)	General Purpose Input 2
10		-	Analog Input ch 2 (-)	
15	Vo	+	8-24 volts DC output	Overload protected
16	G	-	DC Ground	
17	Vi	+	DC power input	DC power in 12-28V
18	SH	E	Shield terminal	
19		+	RS485 (+)	
20	RS485	-	RS485 (-)	Modbus RTU control
21		G	RS485 ground	
22		1+	Switch 1	Permissive Input
23		2+	Switch 2	
24	LOGIC INPUTS	3+	Switch 3	
25		4+	Switch 4	
26		C-	Signal ground	
27	OUT1	+	Output ch 1 (+)	
28		-	Output ch 1 (-)	
29	OUT2	+	Output ch 2 (+)	
30		-	Output ch 2 (-)	Optional output
31		RC	Relay common	
32		R1	Relay 1	Alarm
33	RELAYS	R2	Relay 2	Pump demand
34		R3	Relay 3 (DCV Open)	Digital control valve
35		R4	Relay 4 (DCV Hold)	
E	AC MAINS	E	Mains ground	AC power in 100-240VAC
N		N	Mains neutral	
A		A	Mains active	
RS232 port			9-pin serial port	

Dimension Drawings

Part Number

515.XXXXXX-CB02
see **Product Codes** to select required features

Default Application software:
515-CB02-000000

Side View — 22mm, 145mm, 25mm, Front Panel, 74mm, 66mm, Mounting Clip

Rear Connectors — **Top View**, **RS232 Port**, 138mm, 147mm

Panel Cut-out — Min. 189mm, 70mm, 67mm, 139mm

Specifications

Operating Environment

Temperature	-20°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	100-240 V AC (+/-10%) 50-60 Hz (+/-10%) or 12-28 V DC
Consumption	6W (typical)
Protection	Sealed to IP65 (Nema 4X) when panel mounted
Dimensions (panel option)	147mm (5.8") width 74mm (2.9") height 167mm (6.6") depth

Display

Type	Backlit LCD with 7-digit numeric display and 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

Interference	CE compliance
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)

Frequency Input (General)

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

Pulse

Signal Type	CMOS, TTL, open collector, reed switch
Threshold	1.3 volts

Coil

Signal Type	Turbine and sine wave
Sensitivity	15mV p-p minimum

NPS

Signal Type	NPS sensor to Namur standard

Analog Input (General)

Overcurrent	100mA absolute maximum rating
Update Time	< 1.0 sec
Configuration	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
Range	-200°C to 350°C
Accuracy	0.1°C typical (-100°C to 300°C)

4-20mA Input

Impedance	100 Ohms (to common signal ground)
Accuracy	0.05% full scale (20°C) 0.1% (full temperature range, typical)

0-5 or 1-5 Volts Input

Impedance	10MOhms (to common signal ground)
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 mechanical relays plus 2 relays
Voltage	250 volts AC, 30 volts DC maximum (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
Stop Bits	1 or 2
Data Bits	8
Protocols	ASCII, Modbus RTU, Printer*, ID-Tag

Transducer Supply

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

Isolated Output

No. of Outputs	2 configurable outputs
Configuration	Pulse/Digital or 4-20mA output

Pulse/Digital Output

Signal Type	Open collector
Switching	200mA, 30 volts DC maximum
Saturation	0.8 volts maximum

4-20mA Output

Supply	9 to 30 volts DC external
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
515 .						- CB02	
Enclosure	1						Panel mount enclosure
	2						Field mount enclosure (NEMA 4X / IP66)
	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)
Output Options		0					4 logic inputs, 1 isolated output, 2 relays (only relay type 1 is available), RS232 (DB9) communication port
		1					4 logic inputs, 2 isolated outputs, 4 relays, real-time clock data logging, RS232 (DB9) and RS485 communication ports
		2/3					4 logic inputs, 2 isolated outputs, 4 relays, real-time clock data logging, RS232 (DB9) and Ethernet/RF communication ports (not yet available)
Relay Type			1				Not available
			2				2 electromechanical and 2 solid state relays
			3				Solid state relays only (not yet available)
Power Supply				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		Standard option (now with backlight & LCD backup) *(original Full option: F, with Infra-Red comms, no longer available)*
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						CB02	Defines the application software to be loaded into the instrument

Example full product part number is 515.111USC-CB02 (this is the number used for placing orders).

Main Menu Variables

Main Menu Variables	Default Units	Preferred Units	Variable Type
*Net Volume	L		Total
Net Flowrate	L/min		Rate
Main Line Volume	L		Total
Main Line Flowrate	L/min		Rate
*Process Line Volume	L		Total
Process Line Flowrate	L/min		Rate
Volumetric Ratio	%		Rate
Flowrate Ratio	%		Rate
Flowrate Deviation	L/min		Rate
*Analog Input 1	metres		Rate
*Analog Input 2	metres		Rate
*Target Ratio	- - -		Rate
User Value	- - -		Rate
Batch ID Tag	- - -		- - -

* - These variables form the simplified main menu.

500 Series in Ex410 Enclosure