

Application CB01

Blending Controller

for Volumetric Frequency Flowmeters



Features

- Tailored for volumetric frequency flow input
- 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
- PRESET and FLUSH volume parameters to automatically adjust ratio setpoint
- 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



Overview

The 515 CB01 application is a blending controller measuring the volume flow in a main and process lines using frequency flow inputs.

The blending controller can operate in PRESET, ON-OFF (manual) and RELEASE mode of operation. The latest mode allows for easier tuning of the control loop.

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.

Calculations

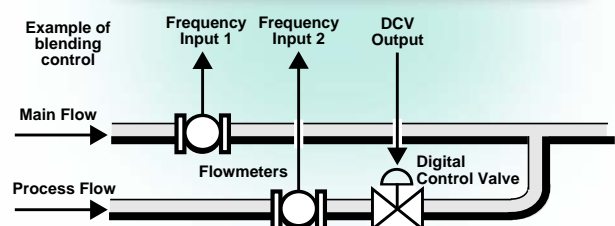
Blend Point Location.

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 80100% range).

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

During delivery the ratio setpoint is modified to cater for the flush volume:

$$SP_{ratio(mod.)} = P_{ratio} \cdot \frac{Preset}{Preset - Flush}$$



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.

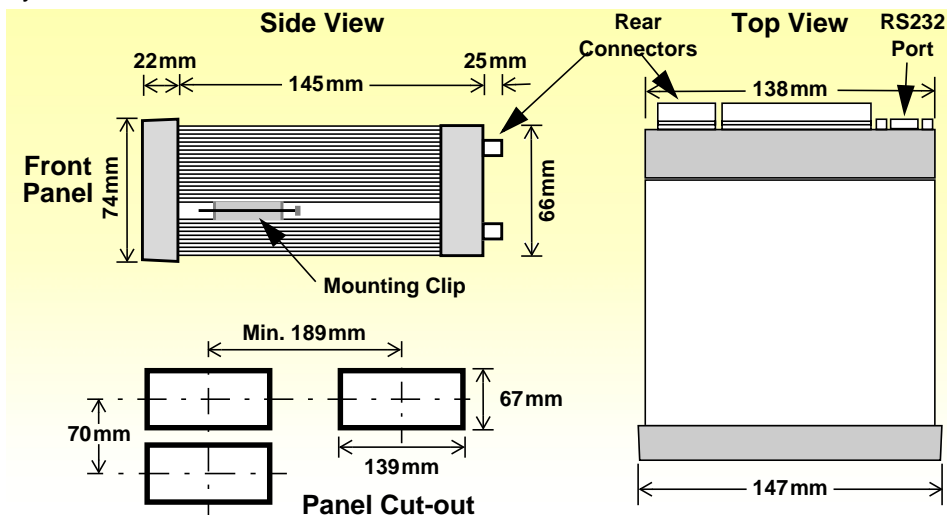
Instrument parameters including units of measurement can be programmed in the field, according to the user access levels assigned to parameters by the distributor.

Dimension Drawings

Part Number

515.XXXXXX-CB01
see **Product Codes** to select required features

Default Application software:
515-CB01-000000



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+
2	FINP 2+	Frequency Input 2+
3	SG	Signal ground
15	Vo	8-24 volts DC output
16	G	DC Ground
17	Vi	DC power input
18	SH	E Shield terminal
19		+
20	RS485	- RS485 (+)
21		- RS485 (-)
		G RS485 ground
22		1+ Switch 1
23		2+ Switch 2
24	LOGIC INPUTS	3+ Switch 3
25		4+ Switch 4
26		C- Signal ground
27		+ Output ch 1 (+)
28	OUT1	- Output ch 1 (-)
29		+ Output ch 2 (+)
30	OUT2	- Output ch 2 (-)
31		RC Relay common
32		R1 Relay 1
33	RELAYS	R2 Relay 2
34		R3 Relay 3 (DCV Open)
35		R4 Relay 4 (DCV Hold)
E		E Mains ground
N	AC MAINS	N Mains neutral
A		A Mains active
RS232 port		9-pin serial port

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	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	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	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)

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
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Logic Inputs

Signal Type	CMOS, TTL, open collector, reed switch
Overvoltage	30V maximum

Relay Output

No. of Outputs	2 mechanical relays plus 2 solid state 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*

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

4-20 mA 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	- CB01	
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	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	E	For 220/240 VAC
	A	For 110/120 VAC
	D	For DC power only 12-28 VDC
Display Panel Option	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	CB01	Defines the application software to be loaded into the instrument

Example full product part number is 515.112EFC-CB01 (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



500 Series in Ex410 Enclosure

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