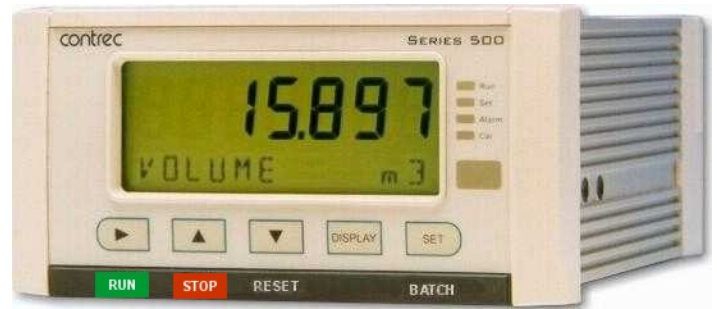Model 515

Application BS01

Secure Dual Stage Batch Controller

for Volumetric Frequency Flowmeters

Features

- **Tailored for volumetric frequency flow input**
- **Single or Dual stage control**
- **Unload, Preset or manual On-Off modes**
- **Special quadrature flow input feature allows for forward and reverse totalising in On-Off batch mode**
- **Quick access to common batch quantities**
- **No-flow, leakage and overflow error detection**
- **Remote RUN/STOP/RESET**
- **Allows for permissive with prompt**
- **ID Tag validation, security and storage**
- **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 BS01 application is a secure dual stage batch controller for reliable measurement of preset quantities using a volume frequency input. The instrument can be set to accept a valid ID-Tag, via an 'iButton' reader on the serial port and/or prompt for connection of a permissive before a batch can be commenced.

It provides the operator with clear prompts and local readout. The ID-Tag number is stored as a part of the logged transaction record and can be used to link deliveries to external databases. Standard 500 Series batching features such as automatic overrun compensation, quick access to common presets and flow timeouts are included.

The instrument is compatible with a wide range of flowmeter frequency outputs, including millivolt signals, reed switches, Namur proximity switches and pulse trains via its smart front-panel program selection.
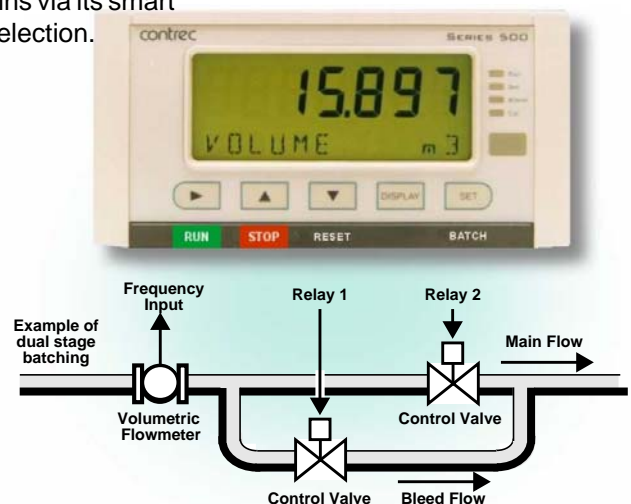
Calculations

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

Automatic overrun compensation calculates the new valve closure point to ensure correct delivery by averaging the overrun amount from the last three complete batches.

The overrun compensation value is valid for a new preset value provided the stored overrun is less than 20% of the new preset.

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 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 retransmit 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 4-20mA signals. One output is standard, a second output is available as an option.

Relay Outputs

The relay outputs 1 and 2 are used to control the flow of product for each delivery. These contacts are normally open and can be used to drive external relays, valves, pump circuits etc. The advanced option provides another two relays that can be used as fully programmable alarms 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.
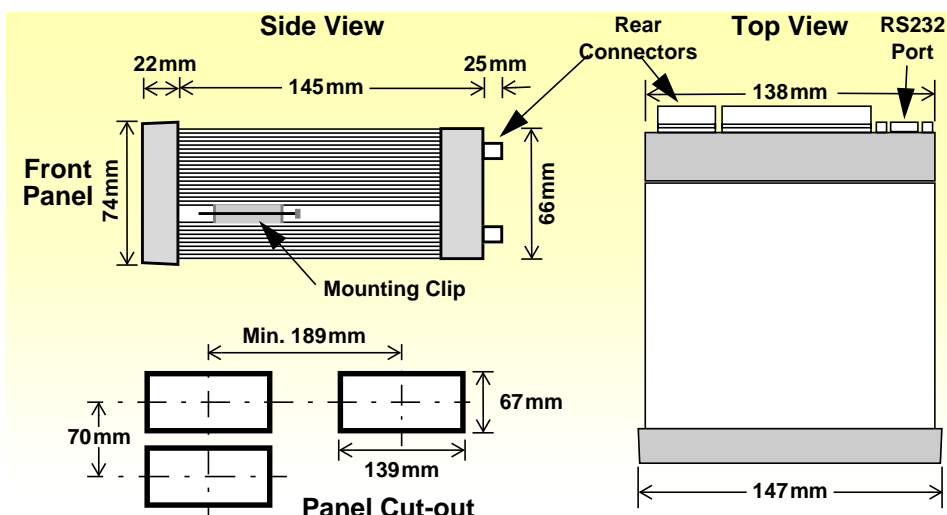
Terminal Designations

	Terminal Label		Designation	Comment
1	FINP	1+	Frequency Input 1+	Volumetric flow Input 1
2	FINP	2+	Frequency Input 2+	Volumetric flow Input 2
3	SG	-	Signal ground	
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 (-)	Optional RS485 port
21		G	RS485 ground	
22		1+	Switch 1	Remote Run
23		2+	Switch 2	Remote Stop/Reset
24	LOGIC INPUTS	3+	Switch 3	Reserved
25		4+	Switch 4	Permissive Input
26		C-	Signal ground	
27	OUT1	+	Output ch 1 (+)	
28		-	Output ch 1 (-)	
29	OUT2	+	Output ch 2 (+)	Optional output
30		-	Output ch 2 (-)	
31		RC	Relay common	
32		R1	Relay 1	Single Stage Control
33	RELAYS	R2	Relay 2	Dual Stage Control
34		R3	Relay 3	Optional relays
35		R4	Relay 4	
E		E	Mains ground	
N	AC MAINS	N	Mains neutral	AC power in 100-240VAC
A		A	Mains active	
RS232 port			9-pin serial port	

Dimension Drawings

Part Number

515.XXXXXX-BS01
see **Product Codes** to select required features

Default Application software:
515-BS01-000000

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	-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	C€ 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 (3kHz for pulse security)
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

Logic Inputs

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

Relay Output

No. of Outputs	2 relays plus 2 optional 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	1 configurable output (plus 1 optional)
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

4-20mA 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 .					-	BS01	
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				Electromechanical relays only
			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						BS01	Defines the application software to be loaded into the instrument

Example full product part number is 515.111USC-BS01 (this is the number used for placing orders).

Main Menu Variables

Main Menu Variables	Default Units	Preferred Units	Variable Type
Volume	L		Total
Volume Flowrate	L/min		Rate
Batch ID Tag	- - -		- - -

500 Series in typical Ex d enclosure