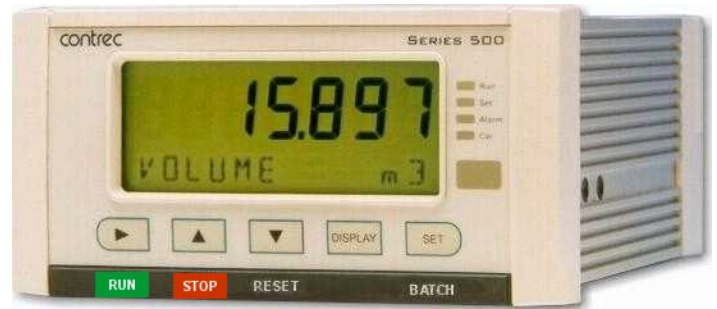


# Application BR04

## Batch/Ratio

## Process Controller

### for Mass Analog Flowmeters



### Features

- Tailored for mass analog flow input
- Single or Dual stage control
- Preset or manual On-Off modes
- Easy access to batch and flow rate presets
- No-flow, leakage and overflow error detection
- Remote RUN/STOP/RESET
- Allows for permissive with prompt
- Uses PI Loop Control
- “Flushing” available via external logic signal
- 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 BR04 application is a batching flow controller for delivery of preset quantities at preset flowrates using a mass analog input. Batch control can operate in preset or on-off modes, while flow control can be set to local (manual) or PI loop mode.

This application provides the operator with clear local readout including flowrate deviation and can be controlled via communications in more automated systems. There is quick access to commonly used preset values directly from the front panel if access has been authorized.

The PI control of the process flow is via a 4-20mA proportional valve or pump controller. It has integral wind-up protection, a deadband, output hold and ramp time that can be programmed to reduce wear on valves and actuators and provide for bumpless operation.

### Calculations

There are three types of control modes in which the process flow is dependent on the main flow. These are RATIO, BLEND-1 and BLEND-2 modes where the relationship between the flows are as follows:

Ratio Control Mode.

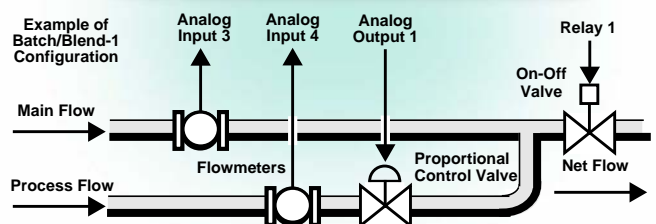
The process flow is a ratio of the main flow (0 to 400% range).

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

Blend Control Modes.

These modes cater for blending points before and after the main flowmeter. The process flow is a ratio of the net (combined) flow (0 to 80% range).

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



## 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

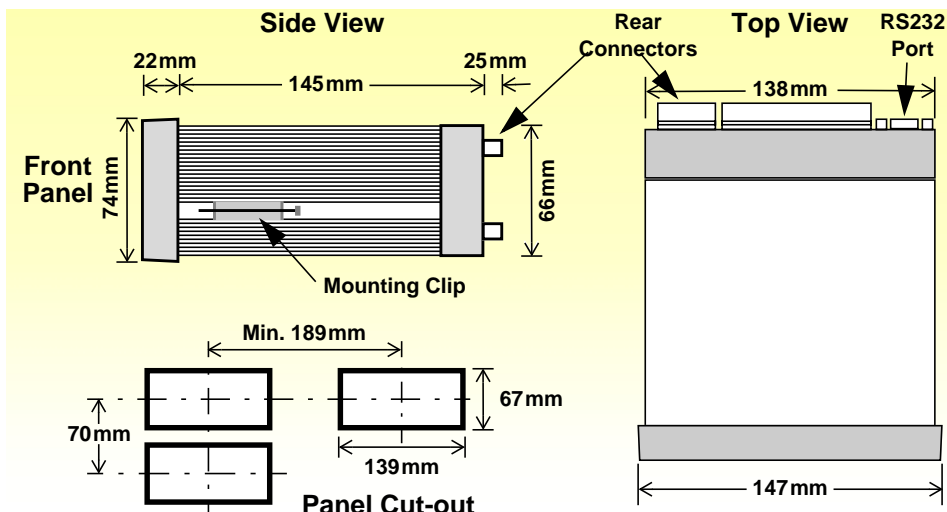
Terminal Label	Designation	Comment
3 SG	- Signal ground	
11 AINP3	+ Analog Input ch 3 (+)	Main Flow Input
12	- Analog Input ch 3 (-)	
13 AINP4	+ Analog Input ch 4 (+)	Process Flow Input
14	- Analog Input ch 4 (-)	
15 Vo	+ 8-24 volts DC output	Overload protected
16 G	- DC Ground	
17 Vi	+ DC power input	DC power in 12-28V
18 SH	E Shield terminal	
19	+ RS485 (+)	Optional RS485 port
20 RS485	- RS485 (-)	
21	G RS485 ground	
22	1+ Switch 1	Remote Run
23	2+ Switch 2	Remote Stop
24 LOGIC INPUTS	3+ Switch 3	Remote Reset
25	4+ Switch 4	Permissive Input
26	C- Signal ground	
27	+ Output ch 1 (+)	Process control output
28	- Output ch 1 (-)	
29	+ Output ch 2 (+)	Optional output
30	- Output ch 2 (-)	
31	RC Relay common	Single Stage Control
32	R1 Relay 1	
33 RELAYS	R2 Relay 2	Dual Stage Control
34	R3 Relay 3	
35	R4 Relay 4	Optional relays
E	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-BR04  
see **Product Codes** to select required features

Default Application software:  
515-BR04-000000



# Specifications

## Operating Environment

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

## Display

<b>Type</b>	Backlit LCD with 7-digit numeric display and 11-character alphanumeric display
<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
<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>	IECEX, ATEX and CSA 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)

## Analog Input (General)

<b>Overcurrent</b>	100mA absolute maximum rating
<b>Update Time</b>	< 1.0 sec
<b>Configuration</b>	4-20mA, 0-5V and 1-5V input
<b>Non-linearity</b>	Up to 20 correction points (some inputs)

## 4-20mA Input

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

## 0-5 or 1-5 Volts Input

<b>Impedance</b>	10MΩ (to common signal ground)
<b>Accuracy</b>	0.05% full scale (20°C) 0.1% (full temperature range, typical)

## Logic Inputs

<b>Signal Type</b>	CMOS, TTL, open collector, reed switch
<b>Overvoltage</b>	30V maximum

## Relay Output

<b>No. of Outputs</b>	2 relays plus 2 optional relays
<b>Voltage</b>	250 volts AC, 30 volts DC maximum (solid state relays use AC only)
<b>Current</b>	3A maximum

## Communication Ports

<b>Ports</b>	RS-232 port RS-485 port (optional)
<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>	ASCII, 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

## Isolated Output

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

## Pulse/Digital Output

<b>Signal Type</b>	Open collector
<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

<b>Supply</b>	9 to 30 volts DC external
<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
515	- BR04	
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	<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	BR04	Defines the application software to be loaded into the instrument

Example full product part number is 515.111USC-BR04 (this is the number used for placing orders).

## Main Menu Variables

Main Menu Variables	Default Units	Preferred Units	Variable Type
Net Mass	kg		Total
Net Flowrate	kg/min		Rate
Main Line Mass	kg		Total
Main Line Flowrate	kg/min		Rate
Process Line Mass	kg		Total
Process Line Flowrate	kg/min		Rate
Process Mass Ratio	%		Rate
Process Flowrate Ratio	%		Rate
Control Output	%		Rate
Flowrate Deviation	%		Rate



500 Series in typical Ex d enclosure

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



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