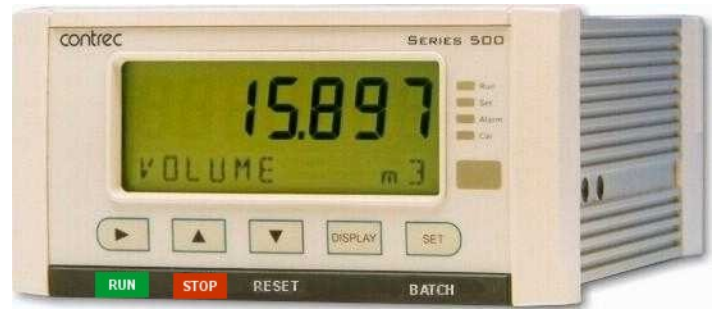


# Application BC02

## Dual Stage Batch Controller

for Volumetric Analog Flowmeters



### Features

- Tailored for volumetric analog input such as vortex flowmeters
- Single or Dual stage control
- Quick access to common batch quantities
- No-flow, leakage and overflow error detection
- Remote RUN/STOP/RESET
- Allows for square law and non-linear correction
- Storage of 100 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 505 BC02 application is a dual stage batch controller for reliable measurement of preset quantities using a volumetric analog input. Used as a single or dual stage controller it is suitable for fast batch applications.

It provides the operator with clear local readout 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. Automatic overrun compensation caters for system delays such as valve closure for precise volumes.

The analog input can be scaled as well as having filtering, square law or non-linear correction and cutoff points applied to the signal.

### Calculations

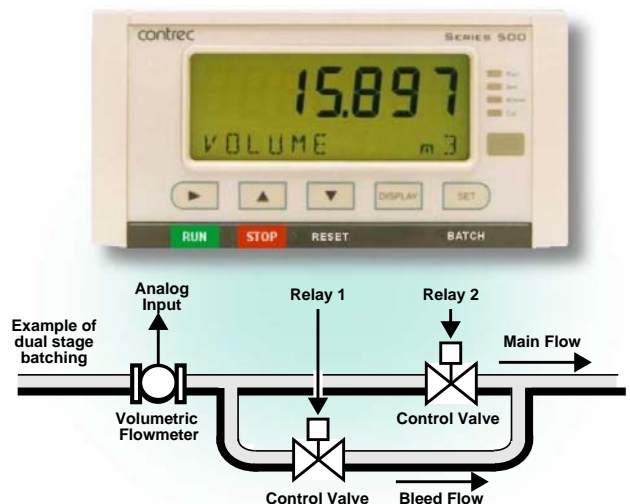
To derive the flow rate, the analog input is normalised to a value (A) between 0 and 1.

$$volumeflow = (V_{fmax} - V_{fmin})A + V_{fmin}$$

$$volume = \int (volumeflow \cdot \Delta t)$$

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.



## 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 100 transactions with time and date stamps.

## Communications

There are two communication ports available as follows:

- RS-232 port
- RS-485 port

The ports are available for remote data reading, printouts and for initial application loading of the instrument.

## Retransmission & Control Outputs

The instrument can retransmit any main menu variable. The digital outputs can retransmit totals as pulses or operate as logic levels for control or error outputs. If the instrument has the advanced option, it outputs rates as a 4-20mA signal.

## 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.

## 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.

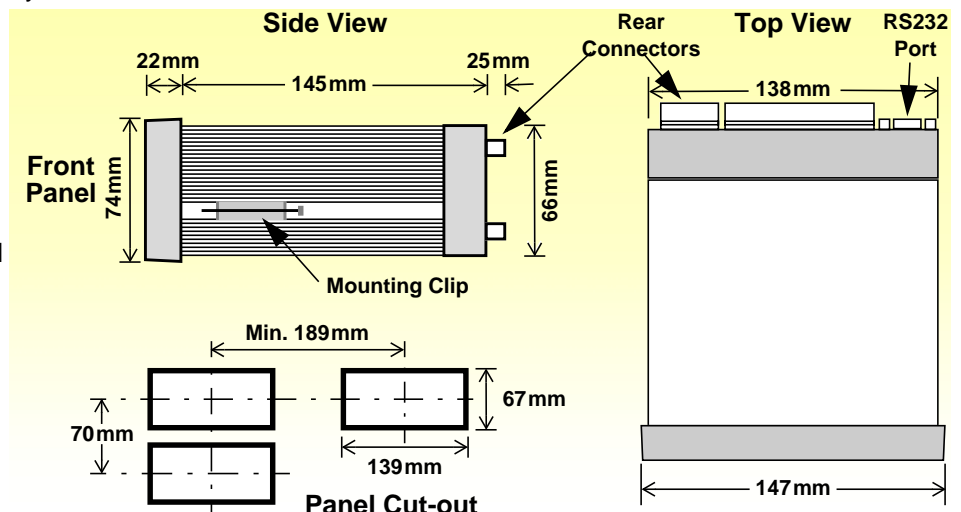
Instrument parameters including units of measurement can be programmed in the field, according to the user access levels assigned to parameters by the distributor.

## Dimension Drawings

### Part Number

505.XXXXXX-BC02  
see **Product Codes** to select required features

Default Application software:  
505-BC02-000000



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	+	RS485 (+)
2	-	RS485 (-)
3	G	Comms ground
4	Tx	RS232 data out
5	Rx	RS232 data in
6	C	CTS (Clear to send)
7	Io	4-20mA output
8	SG	Signal Ground 0V
9	Li	Logic input
10	1+	Open collector o/p 1
11	2+	Open collector o/p 2
12	Ii	4-20mA input
13	SG	Signal Ground 0V
14	Fi	Signal input
15	Vo	8-24 volts DC output
16	G	DC Ground
17	Vi	DC power input
18	SH	Shield terminal
19	R1	Relay 1
20	RC	Relay Common
21	R2	Relay 2
E	E	Mains ground
N	N	Mains neutral
A	A	Mains active
RS232 port		9-pin serial port

# Specifications

## Operating Environment

<b>Temperature</b>	0°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>	95-135 V AC or 190-260 V AC 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)

## 4-20mA Input

<b>Overcurrent</b>	100mA absolute maximum rating
<b>Impedance</b>	250 Ohms (to common signal ground)
<b>Accuracy</b>	0.1% typical full scale (20°C) 0.2% (full temperature range)
<b>Non-linearity</b>	Up to 20 correction points (flow inputs)

## Remote Logic Inputs

<b>Signal Type</b>	Voltage free contact, open collector
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## Relay Output

<b>No. of Outputs</b>	2 relays
<b>Voltage</b>	250 volts AC, 30 volts DC maximum
<b>Current</b>	3A maximum

## Communication Ports

<b>Ports</b>	RS-232 port RS-485 port
<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>	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

## Pulse/Digital Output

<b>Signal Type</b>	Open collector, non-isolated
<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 (Optional)

<b>Supply</b>	24 volts DC internal, non-isolated
<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
505	- BC02						
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	1						<b>Advanced</b> - Base features of RS232 and RS485 serial ports, 2 relays, 2 pulse outputs, rear key input. Plus 4-20mA o/p and Real-time clock for printer output and logging (100 logs) <i>(Basic option: 0, no longer available)</i>
Extra Options	2						9 way DB connector for RS232 serial port
Power Supply		A					Inputs for 12-28VDC and 110/120 VAC, 50-60Hz
		E					Inputs for 12-28VDC and 220/240 VAC, 50-60Hz
		D					Input for 12-28VDC power only
Display Panel Options		S					Standard option (now with backlight & LCD backup) <i>(original Full option: F, with Infra-Red comms, no longer available)</i>
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					BC02		Defines the application software to be loaded into the instrument

Example full product part number is 505.112ESC-BC02 (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



500 Series in Ex410 Enclosure

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