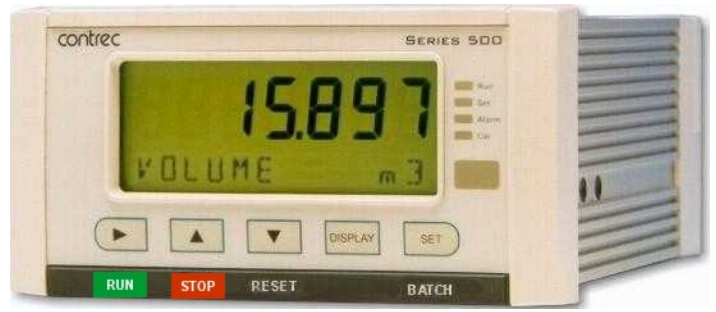


# Application BC01

## Dual Stage Batch Controller

for Volumetric Frequency Flowmeters



### Features

- Tailored for volumetric frequency flow input
- Single or Dual stage control
- Quick access to common batch quantities
- No-flow, leakage and overflow error detection
- Remote RUN/STOP/RESET
- Allows for 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 BC01 application is a dual stage batch controller for reliable measurement of preset quantities using a volumetric frequency 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 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

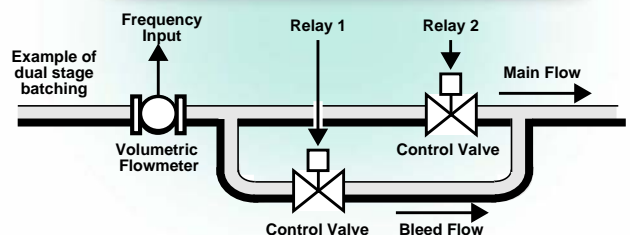
The total and flowrate are derived from accurately measured frequency and the number of received pulses.

$$volume = pulses / k-factor$$

$$volume\ flow = frequency / k-factor$$

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.



## 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.

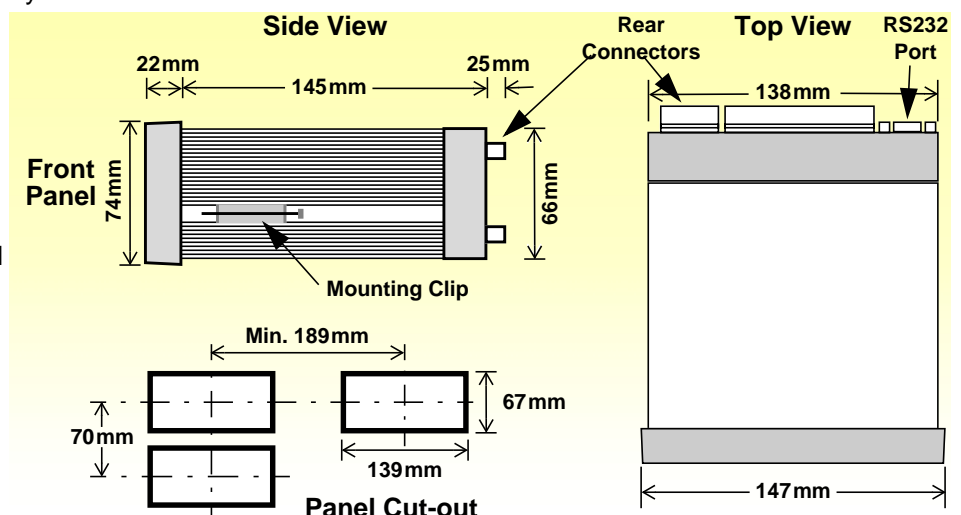
Instrument parameters including units of measurement can be programmed in the field, according to the user access levels assigned to parameters by the distributor.

## Dimension Drawings

### Part Number

505.XXXXXX-BC01  
see **Product Codes** to select required features

Default Application software:  
505-BC01-000000



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             | li          | Signal input         |
| 13             | SG          | Signal Ground 0V     |
| 14             | Fi          | Frequency 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    |

Same RS232 port as DB9 connector

Advanced option

Remote run

Digital outputs

Remote stop/reset

Volumetric flow

70mA power limited

DC power in 12-28V

Single stage

Dual stage

AC power in 95-135V or 190-260V

# Specifications

## Operating Environment

|                                      |  |
|--------------------------------------|--|
| <b>Temperature</b>                   | 0°C to +60°C (conformal coating)<br>+5°C to +40°C (no coating)                       |
| <b>Humidity</b>                      | 0 to 95% non condensing (conformal coating)<br>5% to 85% non condensing (no coating) |
| <b>Power Supply</b>                  | 95-135 V AC or 190-260 V AC<br>or 12-28 V DC   |
| <b>Consumption</b>                   | 6W (typical)   |
| <b>Protection</b>                    | Sealed to IP65 (Nema 4X) when panel mounted  |
| <b>Dimensions<br/>(panel option)</b> | 147mm (5.8") width<br>74mm (2.9") height<br>167mm (6.6") depth                       |

## Display

|                    |   |
|--------------------|---|
| <b>Type</b>        | Backlit LCD with 7-digit numeric display and<br>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<br>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)                    |

## Frequency Input (General)

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

## Pulse

|                    |  |
|--------------------|--|
| <b>Signal Type</b> | CMOS, TTL, open collector, reed switch |
| <b>Threshold</b>   | 1.3 volts                              |

## Coil

|                    |                       |
|--------------------|-----------------------|
| <b>Signal Type</b> | Turbine and sine wave |
| <b>Sensitivity</b> | 15mV p-p minimum      |

## NPS

|                    |                              |
|--------------------|------------------------------|
| <b>Signal Type</b> | NPS sensor to Namur standard |
|--------------------|------------------------------|

## Remote Logic Inputs

|                    |                                      |
|--------------------|--------------------------------------|
| <b>Signal Type</b> | Voltage free contact, open collector |
|--------------------|--------------------------------------|

## 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<br>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)<br>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                     | - BC01             |   |  |  |  |      |  |
| 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)<br><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)<br><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 |                    |   |  |  |  | BC01 | Defines the application software to be loaded into the instrument  |

Example full product part number is 505.112ESC-BC01 (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

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



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