Specifications

Function (programmable)	counter, RPM meter or combined
Analog Input (programmable)	0(4)…20 mA, 0…5(10) V
Input Isolation	none
Digital Inputs (CLEAR, GATE)	dry NO contact or from NPN/PNP sensor
Maximum Input Frequency	500 Hz
Sensor Supply Output	12…24 VDC, 60 mA
Relay Outputs:	up to 4
Electromechanical relay	5A/250VAC with NO/NC contact
MOS gate	0.1A/60V, optically isolated
Transistor gate	open collector NPN 40mA/40V
Output for external SSR	5...24 VDC, 50 mA
- Out1	☐ relay, ☐ MOS, ☐ open collector, ☐ ext. SSR
- Out2	☐ relay, ☐ MOS, ☐ open collector, ☐ ext. SSR
- Out3	☐ relay, ☐ MOS, ☐ open collector, ☐ ext. SSR
- Out4	☐ relay, ☐ MOS, ☐ open collector, ☐ ext. SSR
Analog Output	☐ 0…20 mA, ☐ 4…20 mA, ☐ 0…10 V
Power Supply	☐ 230 VAC, ☐ 115 VAC, ☐ 90…250 VAC/DC, ☐ 24 VAC, ☐ 12…24 VAC/DC
Consumption	less than 6 VA
Operating Temperature / Humidity	-10…65 °C / 0…85% RH
Protection Class: front / terminals	IP65 / IP20

Warranty and Support

…………………………
serial number

…………………………
manufacturing date

QC check mark ….………(passed)
                  (stamp)

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QD-8.2.4-WC

Warranty

Technical support

In the unlikely event that you encounter a problem with your BASI devices, please call your local dealer or contact directly our support team.

BASI instrument ab

6-DIGIT MULTIFUNCTIONAL COUNTER WITH ANALOG INPUT

BDC34

OPERATION MANUAL

Please read this Operation Manual before mounting and operating!
Save the Manual for future references!

Modes of Operation – part III

MODE 6

One-shot Time
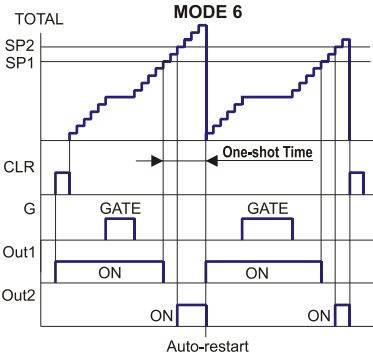
Auto-restart

Operation Mode 6 (Dosing Mode)

Mode = 6

♦ BDC34 counts up and initializes at receiving CLEAR command or – when the value of **One-shot Time** is other than '0' – after the auto-restart time.

♦ Output Out1 activates with CLEAR command or after auto restart and stays ON until counter reaches SP1.

♦ With **Relay Output 2 Link** set to cnt and **Relay 2 Direction** – to _V++, output Out2 activates when SP2 is reached.

TOTAL and BATCH

As a totalizer, BDC34 integrates the input to total or total batches, counted from 0 to SP1.

♦ To see the **TOTAL** or **BATCH**, press and hold ⊼ or ⊻ while BDC34 is at Basic Level, **Display Alternative 1** value is totAL , and **Display Alternative 2** – bAtch.

♦ To clear the **TOTAL**, press [START CLEAR] or use the CLEAR input (see '**CLEAR Functions**') while holding ⊼.

♦ To clear the **BATCH**, press [START CLEAR] or use the CLEAR input (see '**CLEAR Functions**') while holding ⊻.

RATE (flow-rate, RPM)

BDC34 can act as RMP or flow meter depending on RATE-linked parameters (see parameter table).

Displaying

♦ While BDC34 operates at Basic level, its display readings depend on device function and respective display parameters (see parameter table).

♦ During programming, the upper display shows the parameter symbol and the lower – its value.

♦ When the counter overflows (value > 999999), BDC34 displays alternatively the leftmost (starting with c) and the rightmost value part at a 2-second interval.

Parameter Programming

💣* - *Changing decimal point position reflects the real value of all parameters linked to the parameter!*

E.g.: changing **DP Position TOTAL** *value from (x1) to (x0.1) would change a* **Set Point 1** *value of 100 to 10.0!!!*

⚠ **Note:**
If the new value has not been confirmed and no key has been pressed for a certain period of time, value adjustment automatically ceases, and the parameter retains its initial value.

Setting numerical parameter value

♦ Enter parameter value adjustment mode (see '**Program Levels**').

♦ The whole part of the value appears on the display, and the rightmost digit blinks.

♦ To increase or decrease the blinking digit value, use respectively ⊼ or ⊻.

♦ To select another digit, press ◆.

♦ Confirm the adjusted value with ◆ + ⊼.

♦ If the new value is within the limits, BDC34 accepts it and goes on to the next parameter. Otherwise, the device displays the same parameter and waits for a correct value to be set.

Setting symbolic parameter value

♦ Enter parameter value adjustment mode.

♦ Read the blinking parameter value.

♦ To change the value, use ⊼ and ⊻, and to confirm, press ◆ + ⊼.

BDC34 with analog input is a fully programmable totalizing counter / rate (RPM) meter that can be adapted to a wide variety of counting, measuring, and controlling applications. It is equipped with two 6-digit LED displays and 2 control inputs allowing 7 different operating modes. Up to 4 relays and 1 analog output may be installed, enhancing the counter to an integral part of your control application.

## Mounting and Wiring

Mounting

Place BDC34 into a 90x42 mm panel cut-out and tighten using the enclosed brackets.

Wiring

♦ Connect BDC34 in accordance with the wiring diagram on the left.
♦ If analog output is installed instead of relay output Out2 (see '**Specifications**'), wire it via terminals 7(-) and 9(+).

⚠ **Important notes:**

♦ *Power supply polarity does not matter!*
♦ *Each control input may be either dry contact or electronic.*
♦ *Sensor voltage may be taken from inside or from an external source.*
♦ *If the NPN sensor does not have a resistor, add an appropriate one (1...30 kΩ)!*
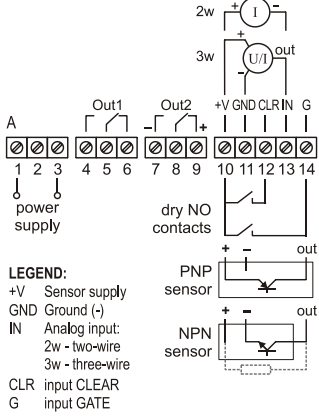
LEGEND:
+V Sensor supply
GND Ground (-)
IN Analog input:
    2w - two-wire
    3w - three-wire
CLR input CLEAR
G   input GATE

Analog Input Setting
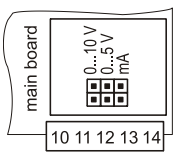
♦ Remove the electronic block from the housing and find the configuration jumpers located on the main board.
♦ To set the desired analog input type (before programming), short out the respective jumper.

CLEAR Functions 11

functions
(for CNT, TOTAL, and BATCH):

	Parameter 'Clear Algorithm'
both CLEAR key and input are enabled to clear the counter	**Clear Algorithm** = 0
only CLEAR input is enabled to clear the counter	**Clear Algorithm** = 1
CLEAR input enables CLEAR key to clear the counter	**Clear Algorithm** = 2
both CLEAR key and input are disabled	**Clear Algorithm** = 3

Calibrating

⚠ **Note:**

The calibration MUST be completed for ALL input types! Once started, all calibration steps must be carried out!

♦ Set **Calibration mode** to YES.
♦ Press and hold ◆ until t1-cAL displays.
♦ The upper display shows the calibrated input type and the lower one shows ------.
♦ Set jumpers for 0...10 V range.
♦ Simulate 0 V input.
♦ Confirm calibration point t1__u0 with ◆ + ⩓ or go to the next with ⩓.
♦ Simulate 10 V input.
♦ Confirm t1_u10 or skip with ⩓.
♦ Set jumpers for 0...5 V range.
♦ Simulate 0 V input.
♦ Confirm t1_uu0 or go to the next.
♦ Simulate 5 V input.
♦ Confirm t1_uu5 or go to the next.
♦ Set jumpers for mA range.
♦ Simulate 0 mA input.
♦ Confirm t1__i0 or go to the next.
♦ Simulate 4 mA input.
♦ Confirm t1__i4 or go to the next.
♦ Simulate 20 mA input.
♦ Confirm t1_i20 or go to the next.
♦ To exit calibration, select rtn.

Program Levels – part I 4

STEP 1: Keyboard unlock

♦ Hold the ◆ key pressed at power-on, and release it after Loc" appears on the display.
♦ Using ⩓ or ⩔, select E"EY and set with ◆ + ⩓.
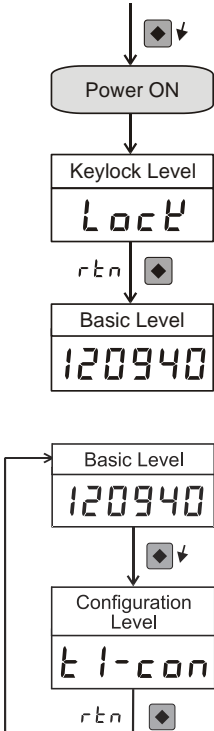♦ To return to Basic level, select rtn and press ◆.

Basic level

At Basic level, BDC34 indicates the selected measured parameter with a resolution, according to the **Point Position** parameter.

STEP 2: Configuration level

This level contains the configuration parameters of the device.

♦ From Basic level, press and hold ◆.
♦ To enter Counter configuration, release the key while t1-con is displayed.
♦ Use ⩓ or ⩔ to choose a parameter (see the table on pages 6 & 7) and press ◆ to enter the parameter value adjustment mode.
♦ To return to Basic level, press ⩓ + ⩔ or select rtn and press ◆.

⚠ *If no key has been pressed for 5 s, the device automatically exits Configuration level.*
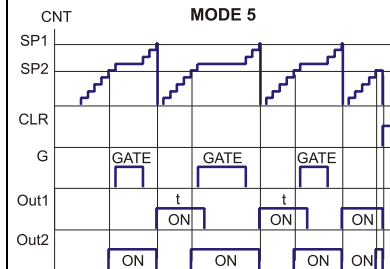
Modes of Operation – part II 9

Operation Mode 3

Mode = 3

♦ BDC34 counts up and initializes at receiving CLEAR command.
♦ Out1 activates at SP1 and stays ON for a period set with **One-shot Time** or until initialization.
♦ With **Relay Output 2 Link** set to cnt and **Relay 2 Direction** – to _V++, output Out2 activates when SP2 is reached.
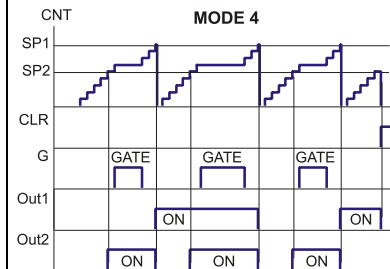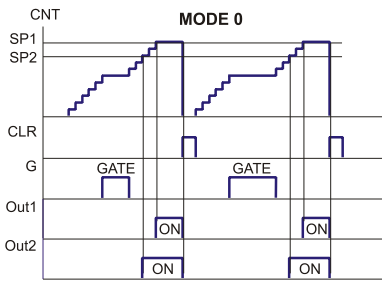
Operation Mode 4

Mode = 4

♦ BDC34 counts up to SP1, automatically initializes, and starts a new cycle.
♦ Out1 switches ON/OFF alternatively when counter reaches SP1.
♦ With **Relay Output 2 Link** set to cnt and **Relay 2 Direction** – to _V++, output Out2 activates when SP2 is reached.
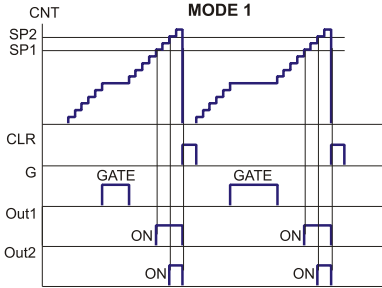
Operation Mode 5

Mode = 5

♦ BDC34 counts up to SP1, automatically initializes, and starts a new cycle.
♦ Out1 activates at SP1 and stays ON for a period set with **One-shot Time**.
♦ With **Relay Output 2 Link** set to cnt and **Relay 2 Direction** – to _V++, output Out2 activates when SP2 is reached.
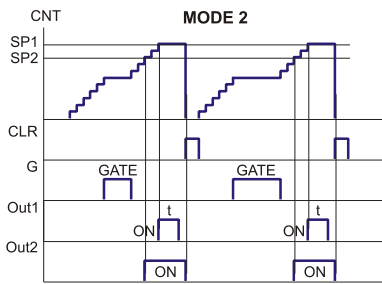
Operation Mode 0

Mode = 0

- ♦ BDC34 counts up to SP1, stops, and initializes at receiving CLEAR command.
- ♦ Output Out1 activates when counter reaches SP1 and stays ON until initialization.
- ♦ With **Relay Output 2 Link** set to cnt and **Relay 2 Direction** – to _V++, output Out2 activates when SP2 is reached.

Operation Mode 1

Mode = 1

- ♦ BDC34 counts up and initializes at receiving CLEAR command.
- ♦ Output Out1 activates when counter reaches SP1 and stays ON until initialization.
- ♦ With **Relay Output 2 Link** set to cnt and **Relay 2 Direction** – to _V++, output Out2 activates when SP2 is reached.

Operation Mode 2

Mode = 2

- ♦ BDC34 counts up to SP1, stops, and initializes at receiving CLEAR command.
- ♦ Output Out1 activates at SP1 and stays ON for a period set with **One-shot Time** or until initialization (one-shot).
- ♦ With **Relay Output 2 Link** set to cnt and **Relay 2 Direction** – to _V++, output Out2 activates when SP2 is reached.
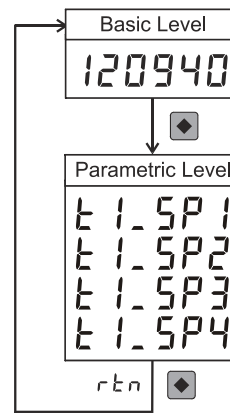
STEP 3: Parametric level

This level contains the control algorithm parameters. If no relay output is installed, this level does not show up.

- ♦ Enter from Basic level by pressing ◆ briefly.
- ♦ Use ⌃ and ⌄ to browse the respective group of parameters (see the table on pages 6 & 7).
- ♦ To enter the displayed parameter value adjustment mode, press ◆.
- ♦ To return to Basic level, press ⌃ + ⌄ or select rtn and press ◆.

⚠ *If no key has been pressed for 20 s, the device automatically exits Parametric level.*

STEP 4: Keyboard lock (if necessary)

- ♦ Hold the ◆ key pressed at power-on, and release it after Loc" appears on the display.
- ♦ Using ⌃ or ⌄, select ESP or d"EY (see the table overleaf) and set with ◆ + ⌃.
- ♦ To return to Basic level, select rtn and press ◆.

Parameter	Symbol	Description	Value	Unit	Notes
Configuration Parameters (These parameters are part of Configuration level)					
Mode	t1_pod	Operating mode selection	0 … 6	-	defines counter operating mode (see '**Modes of Operation**')
Save	t1_SAv	Saves cnt value at power-off	no, YES	-	YES saves cnt current value in non-volatile memory
Clear Algorithm	t1_cAG	Function of CLEAR input (key)	0 … 3	-	defines CLEAR input and key (see '**CLEAR Functions**')
DP Position RATE ☝✳	t1_dPr	RATE display decimal point position	x1, x0.1, x0.01, x0.001	-	**affects all parameters linked with RATE and with the same units**
Input Type	t1_inP	Analog input signal type	i0, i4, u10, u5	-	0...20 mA, 4...20 mA, 0...10 V, 0...5 V (see '**Analog Input Setting**')
Input Low	t1_iLo	RATE value corresponding to LOW input range	-10000 … 10000	ISU	ISU = input signal units (e.g.: l/min)
Input High	t1_iHi	RATE value corresponding to HIGH input range	-10000 … 10000	ISU	
Display Offset	t1_oFS	Adds a constant to the measured input value	-10000 … 10000	ISU	display offset
Filter Time	t1_Ft	Relative time constant of the input filter	0 … 255	-	higher value for better filtration
Filter Band	t1_Fb	Action zone of the input filter	0 … 3000	-	
DP Position TOTAL ☝✳	t1_dPt	TOTAL display decimal point position	x1, x0.1,..., x0.00001	-	**affects all parameters linked with TOTAL and with the same units**
DP Position SCALE ☝✳	t1_dPS	SCALE display decimal point position	x1, x0.1,..., x0.00001	-	**affects SCALE TOTAL value**
Scale TOTAL	t1_ScL	TOTAL scaling coefficient	0.00001 … 999999	-	TOTAL = RATE*SCALE*DP (allows displaying TOTAL in other units)
Time Base RATE	t1_tbS	(Flow) RATE time base	sec, min, hour, day	-	e.g.: l/s, t/h, m^3/day
Low Flow Cutoff	t1_coF	Minimum flow rate limit	-10000 … 10000	ISU	all values under the limit will be accepted as '0'
Linear Transformation	t1_Lin	Input value transformation after measurement	Lin, Sqrt	-	Lin - linear; Sqrt - further square root transformation [2]
One-shot Time	t1_oSt	Duration of the one-shot output	0 … 3000.0	sec.	for modes 2, 3, and 6 (in mode 6, value > 0 is auto-restart time)
Display Direction	t1_ddr	Display counting direction	uP, dn	-	uP displays from 0 to SP1; dn displays from SP1 to 0
Display 1	t1_d1L	Parameter displayed on upper display	cnt tIpE totAL bAtch rAtE	-	cnt- current count (can be zeroed/manipulated in different modes); tipE- time passed after cnt zeroing; totAL- total count (special zeroing only); bAtch- batch count (special zeroing only); rAtE- (flow)rate / RPM;
Display 2	t1_d2L	Parameter displayed on lower display			
Display Alternative 1	t1_d1A	Alternative parameter on upper display (press ⬆)			
Display Alternative 2	t1_d2A	Alternative parameter on lower display (press ⬇)			
Relay Output 2 Link [1]	t1_r2L	Defines parameter linked to **Out2**			
Relay Output 3 Link [1]	t1_r3L	Defines parameter linked to **Out3**			
Relay Output 4 Link [1]	t1_r4L	Defines parameter linked to **Out4**			
Relay 2 Direction [1]	t1_r2d	Control action direction of **Out2**	_V++,++L_	-	_V++ - relay ON over set-point; ++L_ - relay ON under set-point
Relay 3 Direction [1]	t1_r3d	Control action direction of **Out3**			
Relay 4 Direction [1]	t1_r4d	Control action direction of **Out4**			
Calibration mode	t1_cAL	Enable access to calibration mode	no, YES	-	YES enables calibration mode
Parameters of the control algorithm (These parameters are part of Parametric level)					
Set Point 1 [1]	t1_SP1	Set-point value of relay output **Out1**	-99999 … 999999		**Out1 is always linked to TOTAL and the Operation Modes**
Set Point 2 [1]	t1_SP2	Set-point value of relay output **Out2**	-99999 … 999999		see **Relay Output 2 Link**
Set Point 3 [1]	t1_SP3	Set-point value of relay output **Out3**	-99999 … 999999		see **Relay Output 3 Link**
Set Point 4 [1]	t1_SP4	Set-point value of relay output **Out4**	-99999 … 999999		see **Relay Output 4 Link**
Keyboard locking Parameter					
Keyboard Lock Mode	Loc"	Keyboard locking mode	E"EY, ESP, d"EY	-	ESP - enables set-point; E"EY - enables all; d"EY - all locked

[1] These parameters do not appear if the respective relay is not installed!

[2] If square root transformation is selected, the RATE value will be always displayed with decimal point!