

Inputs	2 pulse inputs
Input Type	dry NO contact or from NPN/PNP sensor
Input Isolation	none
Maximum Input Frequency	up to 5 kHz
Display Range	0...5000000
Sensor Supply Output	<input type="checkbox"/> 5 VDC, <input type="checkbox"/> 24 VDC, <input type="checkbox"/> 12...24 VDC
Supply Output Load	max. 60 mA
Output (K1):	<input type="checkbox"/> relay, <input type="checkbox"/> MOS, <input type="checkbox"/> open collector, <input type="checkbox"/> ext. SSR
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, 30 mA
Output Impulse Width (PLT)	0.02...1.2 s
Maximum Output Frequency	0.5/PLT [Hz]
Power Supply	<input type="checkbox"/> 230 VAC, <input type="checkbox"/> 115 VAC, <input type="checkbox"/> 90...250 VAC/DC, <input type="checkbox"/> 24 VAC, <input type="checkbox"/> 12...24 VAC/DC, isolated less than 6 VA
Consumption	-10...65 °C / 0...85% RH
Operating Temperature / Humidity	<input type="checkbox"/> IP65, <input type="checkbox"/> IP54 / IP20
Protection Class: front / terminals	

## Warranty and Support

.....  
serial number

.....  
manufacturing date

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

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### Warranty

COMEKO warrants this product to be free from defects in materials and workmanship for 2 years. If your unit is found to be defective within that time, we will promptly repair or replace it. This warranty does not cover accidental damage, wear or tear, or consequential or incidental loss. This warranty does not cover any defects caused by wrong transportation, storage, installation, or operating (see 'Specifications').

### Technical support

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

QD-8.2.4-WC

## 2-CHANNEL FLOW-RATE COUNTER

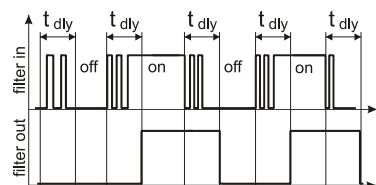
# CT34SB

## OPERATION MANUAL



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

## Input Filtration



### Delay filter

This filtration removes dry contact parasite vibrations as shown on the left. The delay time  $t_{dly}$  is defined by In1 Filter Delay or In2 Filter Delay. For electronic sensors, delay time must be zeroed!


### Low-pass filter

This filter is available only for the current flow-rate measurement (not for totalizer). It is defined by the parameters In1 Filter Time (In2 Filter Time) and In1 Filter Band (In2 Filter Band).

## Error Messaging

Message	Parameter	Error type
Er:or1	-	Out of range: input frequency too high
Er:or2	Math Function In1 Scale Factor In2 Scale Factor	Out of range: calculated Rate 1(2) value too high
Er:or3	Math Function Totalizer Input Scale Factor	Out of range: total value too high
Er:div0	Math Function In1 Scale Factor In2 Scale Factor	Division by zero: Math = A/B and no signal on Channel 2

- In some cases, CT34SB finds non-conformities in parameter values that must be corrected before operating at Basic level.
- The device indicates such kind of problems by displaying error messages as given on the left.

 Maximum displayed value of rate or total counts is limited to 5 000 000 !

## Parameter Programming








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.





### Counter parameters

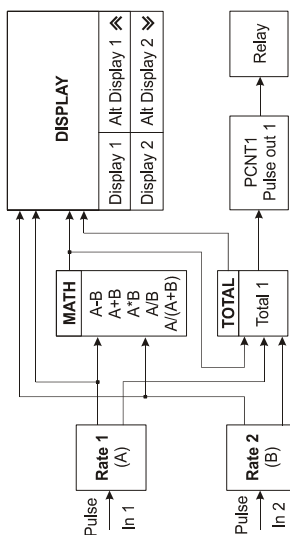
CT34SB is a programmable device whose service behavior is determined by a set of parameters. All the parameters, along with their names, symbols, and value ranges, are given in the Table of Parameters (pages 6 & 7).

### Setting numerical parameter value

- While the symbol of the parameter to be adjusted is on the upper display, the whole part of the current value appears on the lower 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 correct, CT34SB 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

- Read the blinking parameter value on the lower display.
- To change the value, use  and , and to confirm, press  + .



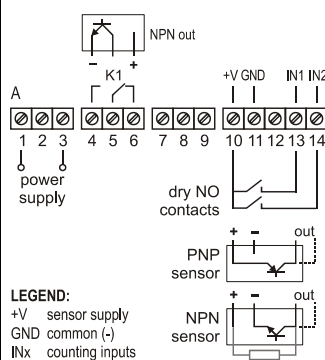
CT34SB is a specialized 2-channel fully programmable flow-rate totalizing counter. The instrument is especially designed to measure pulse signals from 2 different flow meters. Its software allows convenient programmable scaling of both measured flow signals and applying various calculations on both flow rates. CT34SB is equipped with two 6-digit LED displays indicating current flow rates, mathematically calculated values as well as accumulated total counts. The counter may also have an optional relay output for generating an impulse when certain total value is reached (dosing function). A functional block diagram of CT34SB is shown on the left.



The undersigned hereby declares, on behalf of COMECO Inc., that this device has been manufactured in compliance with standards EN 61000 and EN 61010, and meets the requirements of Directives 2004/108/EC and 2006/95/EC.

Vladimir Sakaliyski  
CEO  
COMECO Inc.

## Mounting and Wiring



## Mounting

Place CT34SB into a 90x42 mm panel cut-out and tighten into place using the enclosed mounting brackets.

## Wiring

Connect CT34SB as shown on the left.



## Important notes:

- ◆ Power supply polarity does not matter!
- ◆ Each 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 resistor, add one (1...30 kΩ)!

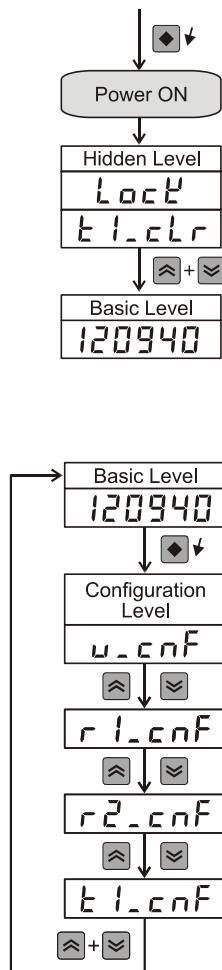
## Waste Disposal



*Do not dispose of electronic devices together with household waste material!*

If disposed of within European Union, this product should be treated and recycled in accordance with the laws of your jurisdiction implementing the WEEE Directive 2002/96 on the Waste Electrical and Electronic Equipment.

## Program Levels



## Hidden level

- ◆ Hold the key pressed at power-on for at least 10 s and release it after **LocL** appears on the upper display.
- ◆ Unlock the keyboard by adjusting **Keyboard Lock Mode** parameter value to **EEEE** (see 'Parameter Programming').
- ◆ Go to the next parameter with or .
- ◆ If needed, clear the totalizer by setting **Clear Total** to **YES**. Otherwise, leave to **NO**.
- ◆ To return to Basic level, press simultaneously + .

## Basic level

At Basic level, both CT34SB displays indicate input or calculated value(s) (see 'Displaying') according to the **Display1(2) Link** and **Display1(2) Decimal Point** parameters.

## Configuration level

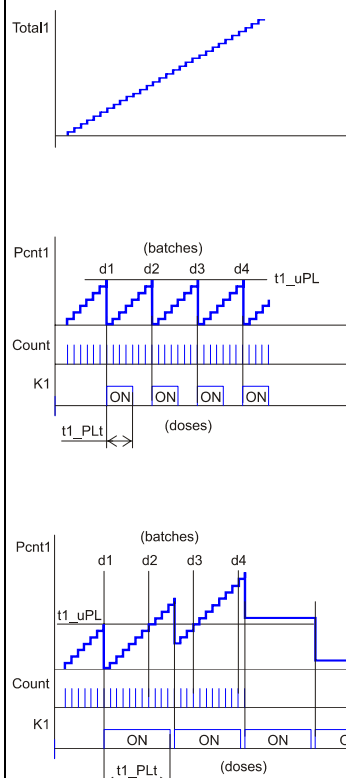
This level contains 4 configuration menus.

- ◆ From Basic level, press and hold .
- ◆ To enter Display and Function Menu, release the key while **u.cnf** is displayed and adjust menu parameters (see 'Parameter Programming') according to the Table of Parameters.
- ◆ Use or to browse other menus: Rate 1 Configuration (**r1.cnf**), Rate 2 Configuration (**r2.cnf**), and Total 1 Configuration (**t1.cnf**)
- ◆ Select a menu with and adjust its respective parameters according to the Table of Parameters.
- ◆ Return to Basic level with + .

## Keyboard lock

- ◆ Enter Hidden level.
- ◆ To disable the keyboard, set **Keyboard Lock Mode** to **EEEE**
- ◆ To return to Basic level, use + .

## Totalizing and Dosing Output



CT34SB totalizer accumulates the flow volume. It can be linked to Rate 1, Rate 2, or Math blocks using the **Totalizer Input** parameter. The totalizer is controlled by parameters **Time Base**, **Scale Factor**, and **Cut-Off** (see 'Scaling').

## Totalizing accumulators

CT34SB totalizer has 2 accumulators: Total 1 and PCNT1.

- ◆ Total 1 does not depend on dosing output and counts all pulses coming from the linked source until cleared.
- ◆ PCNT1 is used for dosing – to generate output impulses for every batch of counts (certain volume). Batches are defined by parameter **Units Per Output Pulse** and the output impulse – by its width **Pulse Width**.
- ◆ A case, in which the output pulses are short enough is illustrated on the left. PCNT1 resets every time when reaches the batch set point **Units Per Output Pulse** and generates output impulses.
- ◆ If output impulse width is greater than **Units Per Output Pulse** value (where F is counting frequency), PCNT1 will increase until the new output impulse starts and will decrease with the batch value. Thus, even if the input signal stops, PCNT1 will generate the necessary output impulses.
- ◆ Both accumulators are energy independent and keep their values until cleared.

Flow K-factor pulse/unit	Required Flow Rate units	In1 Time Base	In1 Scale Factor
710 p/l	l/h	Hour	710.000
710 p/l	m <sup>3</sup> /h	Hour	(1000*710)= 710000
710 p/l	Gal/h	Hour	(3.7854*710)= 2687.63
710 p/l	l/min	Min	710.000
2690 p/gal	gal/h	Hour	2690.00
2690 p/gal	l/h	Hour	(2690/3.7854)= 710.625
710 p/l	l/h	no	(3600/710)= 5.0704
710 p/l	l/min	no	(60/710)= 0.08451



Maximum input frequency is defined as  $F_{max} = \text{FlowRate}_{max} * K\text{-factor}$  (with the same units!) and is used to determine Input 1(2) frequency according to the Table of Parameters.

Flow Rate units/TB	Totalizer units	In1 Time Base	In1 Scale Factor
l/h	l	Hour	1.0000
l/min	l	Min	1.0000
l/h	m <sup>3</sup>	Hour	0.001
m <sup>3</sup> /h	l	Hour	1000.00
gal/h	gal	Hour	1.0000
l/h	gal	Hour	1/3.7854= 0.26417
l/h	l	no	1/3600= 0.00028
m <sup>3</sup> /h	l	no	1000/3600= 0.27778
l/min	l	no	1/60= 0.01667
l/min	gal	no	1/(60*3.7854)= 0.00440

### Scaling block Rate 1(2)



This scales the input signal to fit flow-meter specifications using parameters In1 Scale Factor, In2 Scale Factor, In1 Time Base, and In2 Time Base. Scale Factor (SF) is a floating-point scaling coefficient with 2 meanings:

- ◆ If Time Base (TB) ≠ no,  $\text{RATE}_x = F_x[\text{Hz}] * \text{TB}[\text{s}] / \text{SF}$ , where  $F_x$  is the input frequency and SF = K-factor of the flow meter.
- ◆ When Time Base = no,  $\text{RATE}_x = F_x[\text{Hz}] * \text{SF}$ . In this case only SF is used for scaling.







### Totalizer scaling

This scales the totalizer input, which is linked to Rate 1, Rate 2, or Math block. The scaling parameters are In1 Scale Factor and In1 Time Base.

- ◆ If flow-rate units are the same as totalizing units, set TB = flow-rate TB, and SF = 1.0000.
- ◆ If required totalizing units differ from flow-rate units, set TB = flow-rate TB or no, and SF to appropriate scale value.

- ◆ CT34SB has 4 display modules – 2 main displays (upper and lower) as well as 2 alternative displays. The alternative displays are accessible from Basic level by pressing  for Alt Display 1 and  for Alt Display 2.
- ◆ Each display can indicate one of the following values – Rate 1, Rate 2, Math, Total 1 and PCNT1 – depending on the parameters defining input link: Display1(2) Link and AltDisplay1(2) Link.
- ◆ When a display overflows (value > 999 999), it shows alternatively the rightmost 6 digits and the leftmost value part preceded by the symbol 'C'.
- ◆ If a display is not linked (switched off), it shows - - - - -.
- ◆ If there is no signal on a linked display, it shows blinking - - - - -.
- ◆ When CT34SB is at Hidden level or at Configuration level, the upper display indicates parameter symbol, while the lower one indicates its value.

Parameter	Symbol	Description
<b>Display and Function Configuration (W-FcnF Menu)</b>		
Display1 Link	<i>d51Ln</i>	Defines what will be displayed on Display 1
Display1 Decimal Point	<i>d51Pt</i>	Display 1 decimal point position
Display2 Link	<i>d52Ln</i>	Defines what will be displayed on Display 2
Display2 Decimal Point	<i>d52Pt</i>	Display 2 decimal point position
AltDisplay1 Link	<i>Ad1Ln</i>	Defines what will be displayed on Alt Display 1
AltDisplay1 Decimal Point	<i>Ad1Pt</i>	Alt Display 1 decimal point position
AltDisplay2 Link	<i>Ad2Ln</i>	Defines what will be displayed on Alt Display 2
AltDisplay2 Decimal Point	<i>Ad2Pt</i>	Alt Display 2 decimal point position
Math Function	<i>MAth</i>	Math function applied on Rate 1 (A) and Rate 2 (B)
<b>Rate1 / Channel 1 Configuration (r1-FcnF Menu)</b>		
In1 Filter Time	<i>r1-Ft</i>	Relative time constant of the input low-pass filter
In1 Filter Band	<i>r1-Fb</i>	Zone around measured value with active filter
In1 Time Base	<i>r1-tb5</i>	Flow-rate time base
In1 Scale Factor	<i>r1-ScF</i>	Scaling coefficient applied on Input 1
In1 Frequency	<i>r1-Fr</i>	Frequency type of Input 1
In1 Filter Delay	<i>r1-dL</i>	Input 1 filter delay time
In1 Timeout	<i>r1-tou</i>	Maximum time for waiting signal on Input 1
<b>Rate 2 / Channel 2 Configuration (r2-FcnF Menu)</b>		
Same parameters as for Rate 1 / Channel 1 but with index '2'		
<b>Total 1 Configuration (t1-FcnF Menu)</b>		
Totalizer Input	<i>t1-LnL</i>	Defines totalizer input source (link)
Time Base	<i>t1-tb5</i>	Flow-rate time base
Scale Factor	<i>t1-ScF</i>	Scaling coefficient applied on totalizer input
Cut-Off	<i>t1-coF</i>	Defines the lowest acceptable flow rate
Units Per Output Pulse	<i>t1-uPL</i>	PCNT1 count units to generate 1 output impulse
Pulse Direction	<i>t1-Pdr</i>	Polarity of the impulse generated by PCNT1
Pulse Width	<i>t1-PLt</i>	Width of the impulse generated by PCNT1
<b>Hidden Level Parameters (Hidden Menu)</b>		
Keyboard Lock Mode	<i>LokL</i>	Keyboard locking mode
Clear Total	<i>t1-clr</i>	Clears Total 1 and PCNT1 accumulators

Value	Unit	Notes
<i>rATE1, rATE2, MAthTotAL1, Pcnt1.oFF</i>		
-	-	Rate 1(A), Rate 2(B), Math result, Total, Total set-point, or turned off
x1, x0.1, x0.01, x0.001	-	
see <b>Display1 Link</b>	-	Rate 1 (A), Rate 2 (B), Math result, Total, Total set-point, or turned off
x1, x0.1, x0.01, x0.001	-	
see <b>Display1 Link</b>	-	switch to alternative display using 
x1, x0.1, x0.01, x0.001	-	
see <b>Display1 Link</b>	-	switch to alternative display using 
x1, x0.1, x0.01, x0.001	-	
<i>A-b, A+-b, Ab, A'Ab, A-rA+-b</i>	-	A-B, A+B, A*B, A/B, and A/(A+B)
0 ... 255	-	Higher value gives better filtration (set '0' to turn off filtration).
0 ... 1000	-	Filter is active only within this zone (set '0' to turn off filtration).
<i>no, SEc, n, n, Hour, dAY</i>	-	If 'no', rate is calculated by <b>Scale Factor</b> with time base of 1 s
0.00001...999999	-	floating decimal point is moving with  + 
<i>LoFr, Hi, Fr</i>	-	< 500Hz (low frequency), > 500Hz (high frequency)
0 ... 9.999	s	removes dry contact vibrations effect (set to '0' for electronic sensor)
0...120	s	if no input signal during this time, CT34 will accept value '0'
<i>rATE1, rATE2, MAth.oFF</i>		
-	-	can be linked to Rate 1 (A), Rate 2 (B), Math result, or unlinked
<i>no, SEc, n, n, Hour, dAY</i>	-	If 'no', rate is calculated by <b>Scale Factor</b> with time base of 1 s
0.00001...999999	-	floating decimal point is moving with  + 
0.00001...999999	-	All flow values under minimum will be accepted as '0' flow rate
0...30000	-	batch (dose); '0' switches off the totalizer output function
<i>--F7-- or --LJ--</i>		positive or negative
20....1200	ms	pulse width (every impulse marks a dose)
<i>EEEy, dEEy</i>	-	<i>EEEy</i> - enable keyboard; <i>dEEy</i> - disable keyboard
<i>no. yE5</i>	-	accessible only when the keyboard is enabled