ELGO ELECTRIC

COUNTER 301

+000000

Operating Instructions

PRESET - COUNTER   301
Single Preset Counter

S/E ◄ ▲ R

Product Marking

| 3 | 0 | 1 | - | | | - | A |
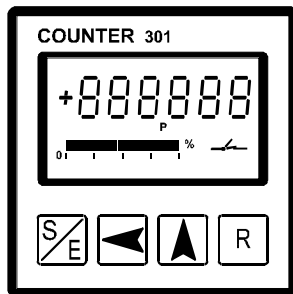
	Power supply	Input voltage	Control output	Sensor power supply	Counting frequency
0 1	230 VAC 50/60Hz	AC	1 Relays	none	15 Hz
0 2	230 VAC 50/60Hz	DC	1 Relays	24 VDC unregulated	50 Hz
0 3	230 VAC 50/60Hz	DC	1 Transistor	24 VDC unregulated	50 Hz
0 4	120 VAC 50/60Hz	AC	1 Relays	none	15 Hz
0 5	120 VAC 50/60Hz	DC	1 Relays	24 VDC unregulated	50 Hz
0 6	120 VAC 50/60Hz	DC	1 Transistor	24 VDC unregulated	50 Hz
0 7	24 VAC 50/60Hz	AC	1 Relays	none	15 Hz
0 8	24 VAC 50/60Hz	DC	1 Relays	24 VDC regulated	50 Hz
0 9	24 VAC 50/60Hz	DC	1 Transistor	24 VDC regulated	50 Hz
1 0	24 VDC	AC	1 Relays	none	15 Hz
1 1	24 VDC	DC	1 Relays	none	50 Hz
1 2	24 VDC	DC	1 Transistor	none	50 Hz

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1. Safety Instructions

This instrument was manufactured and tested according to the applicable technical standards. It complies with all the safety regulations as shipped from the factory.

Installation and startup must be performed by skilled electricians.

Do not operate the instrument until it is fully assembled.

If safe operation of the instrument can no longer be ensured, stop and secure it against accidental operation.

If instrument failure or malfunction may cause personal injury or material damage, use additional safety measures such as limit switches, guards, etc.

Read the Operating Instructions carefully before startup.

⚠ Note the safety instructions marked with this warning symbol in this manual!

2. Operation

Model 301 is a compact up-/down Single Preset Counter.

4 keys are available for preset value selection.
The preset value (**P**) is saved in EEPROM.

The Preset Counter has two counting inputs:
     Counting input IN1   count up
     Counting input IN2   count down

Control output OUT is assigned to preset value (**P**). The control output is designed as relay output or transistor output depending on the product specification. Depending on the wiring of input Reset Selection RS, a bistable signal or a monostable signal is generated when the preset value is reached. The state of the output is shown by contact symbol in the display.

Depending on the wiring of input Reset Selection RS, there are two possible kinds of resetting, including output signal times of control output OUT:

1. Manually resetting to zero using the **R** key or electrically using input **R**.
   The bistable signal is generated when the preset value (**P**) is reached. The signal is deactivated by resetting.
2. Automatically resetting to zero when the preset value (**P**) is reached.
   The monostable signal is generated at the same time. The signal is deactivated after 200 ms.

The startup state of input RS determines the kind of resetting.

The keys for making changes in the preset value, which would result in changes in the control function, are blocked using lock input DL. The keys for display control remain operational.

During operation, you can switch the display between Preset Counter and preset value (**P**) using the **S/E** key. This change does not affect the control function of the counter.

⚠️ Do not change the preset value (**P**) during operation. This will affect the control function of the counter:

After changing a preset value (by activating one digit), the control output is automatically switched off and the incoming counting pulses are no longer counted. After the preset value (**P**) is confirmed, counting is resumed from the point of interruption.

When the count reaches the preset value (**P**), the control output is reactivated.

Bar graph

The preset (**P**) has a bar graph display. The bar graph is graduated in %, with the total length corresponding to 100%. The minimum resolution is 5%.

The bar graph shows the ratio of the current counter value to the programmed preset value (**P**) in %.

Data retention and control characteristics at power supply on/off

⚠️ The current counter value is saved in EEPROM if the power supply is turned off. The control output is turned off at the same time. The saved data is reloaded and counting is resumed from the point of interruption when the power supply is turned on again. The control output is not activated again until the count reaches the preset value (**P**).

3. Installation

Mounting

Insert the counter through the cutout in the front panel. Then slide the mounting frame over the back of the counter body and push firmly forward against the front panel. The mounting frame provides for quick and reliable mounting and compensates for variations in the panel thickness if approximately uniform attachment forces are applied.

The counter is provided with a gasket integrated in the housing, which allows a Class IP 54 seal with the panel.

Having completed the installation, you can start wiring.

If the counter has to be removed from the panel, insert suitable fixtures in each of the four mounting frame side brackets. This allows the mounting frame to expand, so it can be easily removed.

Terminals

Screw terminal 1	NPN	Control output / Transistor output
	-	or no connection
Screw terminal 2	-	no connection
Screw terminal 3	L1	Power supply
Screw terminal 4	N	Power supply
Screw terminal 5	NC	Control output / Closed contact relay
	-	or no connection
Screw terminal 6	NO	Control output / Working contact relay
	-	or no connection
Screw terminal 7	COM	Control output / Contact relay
	-	or no connection
Screw terminal 8	GND	Ground
	-	or no connection
Screw terminal 9	VS	Sensor power supply
	-	or no connection
Screw terminal 10	R	Reset input
Screw terminal 11	IN2	Counting input 2
Screw terminal 12	IN1	Counting input 1
Screw terminal 13	RS	Reset selection input
Screw terminal 14	DL	Lock data input

Driving circuit

Type:	301 - 01 - A	301 - 04 - A	301 - 07 - A

Counting input 2

Counting input 1

Reset input

Reset selection

Lock data

	12	11	10	
13				**9**
14				**8**
1		OUT		**7**
2				**6**
	3	**4**	**5**	

Control output

Control output

L1 and N are interchangeable   L1   N

Connection:

Counting input 1	Counting input 2
Reset input	

Contact as transducer

L1 or N

10 / 11 / 12

⚠ Please note that there is no galvanic isolation between terminals 3, 4 and 10 to 14.

Type:	301 - 02 - A	301 - 05 - A	301 - 08 - A

Counting input 2

Counting input 1

Reset input

Reset selection

Lock data

	12	11	10	
13				**9**	→ 24VDC
14				**8**	→ 0V
1		OUT		**7**
2				**6**
	3	**4**	**5**	

Control output

Control output

L1 and N are interchangeable   L1   N

Connection:

Counting input 1	Counting input 2
Reset input	

Contact as transducer

24VDC

10 / 11 / 12

Inductive sensor as transducer

24VDC

IS   10 / 11 / 12

0V

⚠ Please note that, in model 301-08-A, there is no galvanic isolation between terminals 3, 4 and 8 to 14.

Type: 301 - 03 - A   301 - 06 - A   301 - 09 - A

Counting input 2
Counting input 1
Reset input
Reset selection
Lock data
Control output

12	11	10	
13			9
14			8
1	OUT		7
2			6
	3	4	5

24VDC
0V

L1 and N are interchangeable   L1   N

Connection:

Counting input 1   Counting input 2
Reset input

Contact as transducer

24VDC   →   10 / 11 / 12

Inductive sensor as transducer

24VDC
IS   →   10 / 11 / 12
0V

⚠ Please note that, in model 301-09-A, there is no galvanic isolation between terminals 3, 4 and 1, 8 to 14.
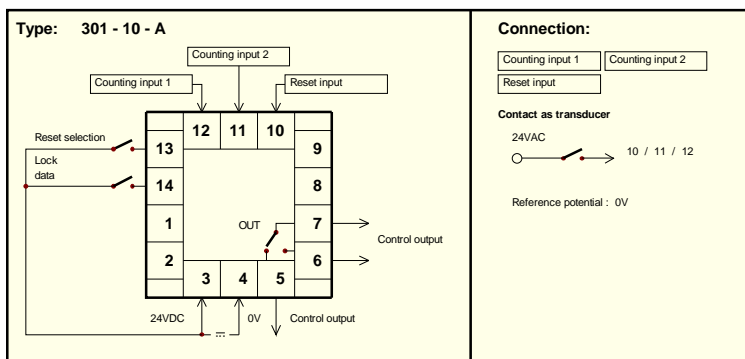
Type: 301 - 10 - A

Counting input 2
Counting input 1
Reset input
Reset selection
Lock data

12	11	10	
13			9
14			8
1	OUT		7
2			6
	3	4	5

Control output

24VDC   0V   Control output

Connection:

Counting input 1   Counting input 2
Reset input

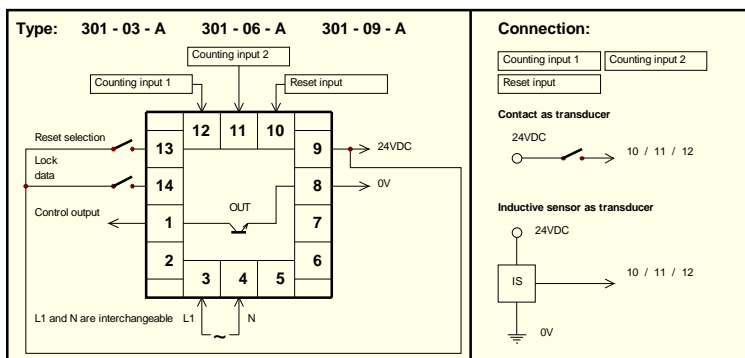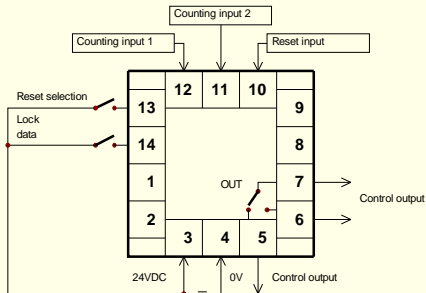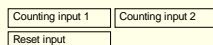**Contact as transducer**

24VAC   →   10 / 11 / 12

Reference potential : 0V

⚠ Please note that there is no galvanic isolation between terminals 3, 4 and 10 to 14.

Type: 301 - 11 - A

Counting input 2
Counting input 1
Reset input

Reset selection
Lock data

12	11	10
13		9
14		8
1	OUT	7
2		6
3	4	5

OUT
Control output

24VDC   0V   Control output

Connection:

| Counting input 1 | Counting input 2 |
| Reset input | |

Contact as transducer

24VDC

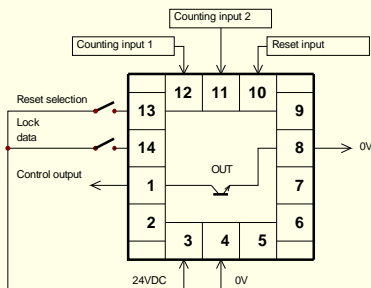10 / 11 / 12

Inductive sensor as transducer

24VDC

IS

10 / 11 / 12

0V

⚠ Please note that there is no galvanic isolation between terminals 3, 4 and 10 to 14.

Type: 301 - 12 - A

Counting input 2
Counting input 1
Reset input

Reset selection
Lock data
Control output

| 12 | 11 | 10 |
| 13 | | 9 |
| 14 | | 8 | → 0V
1	OUT	7
2		6
3	4	5

24VDC   0V

Connection:

| Counting input 1 | Counting input 2 |
| Reset input | |

Contact as transducer

24VDC

10 / 11 / 12

Inductive sensor as transducer

24VDC

IS

10 / 11 / 12

0V
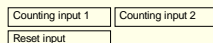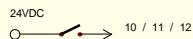
⚠ Please note that there is no galvanic isolation between terminals 3, 4 and 1, 8, 10 to 14.

4. Preset Value Programming
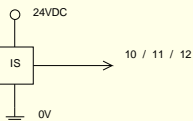
Explanation of keys

$\boxed{\text{S/E}}$	**S**elect / **E**nter	With this key (**S/E**) you can choose between display Preset Counter and Preset value (**P**) and confirm changed preset values.
$\boxed{\blacktriangleleft}$	Next Digit	With this key (**<**) you can switch to the next digit.
$\boxed{\blacktriangle}$	Shift	With this key (**^**) you can increase numerical values.
$\boxed{\text{R}}$	**R**eset	With this key (**R**) you can reset.

The counter has the following displays:
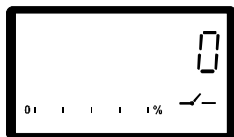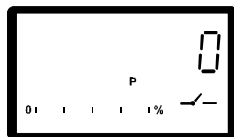
Preset Counter   Preset value (**P**)

The displays show the factory defaults.
Upon initial startup or when the power supply is turned on, the Preset Counter display appears automatically.
You can access all the other menu items by repeatedly pressing **S/E**.

You can assign a preset value (**P**) to the Preset Counter.

To do so, display preset value (**P**) by pressing **S/E**.
Now set the desired values as follows:

1. Press **<** :
   The first digit is activated, i.e., it starts flashing.
2. Next, press **^** :
   Holding the key down: The value quickly goes up to the desired value.
   Pressing and releasing: The value goes up step by step.

   You can reset an activated value to 0 by pressing **R**.

3. Press **<**:
   The set value is confirmed.
   At the same time, the next digit is activated, i.e., it starts flashing.

   Set the other values in the same manner.
   Then

4. Press **S/E**:
   The preset value selected is saved in EEPROM and displayed.

5. Press **S/E** again:
   The next display appears.

5. Technical Specification

General
   Display
   Special LC-Display, 6 digits, 7mm character height, incl. sign,
   leading zero blanking
   Display capacity   +/- 999999
   Power supply

230 VAC	50/60Hz	absolute limits	207 to 253 VAC
120 VAC	50/60Hz	absolute limits	100 to 132 VAC
24 VAC	50/60Hz	absolute limits	22 to 29 VAC
24 VDC		absolute limits	22 to 29 VDC

   Connection L1, N in any order
   Power consumption

for 230 VAC	approx. 4 VA
for 120 VAC	approx. 4 VA
for 24 VAC	approx. 2 VA
for 24 VDC	approx. 1,5 W

   Data retention
   in EEPROM
   minimum 10 years (for the entire operating temperature range)
   Electromagnetic compatibility (EMC)

Emission	EN 55011	Group 1	Class B
Immunity	EN 50082-2		

   Isolation voltage according to EN 61010-1
   300 V$_{eff}$, Contamination level 2, Overvoltage category III
   Safety class according to DIN VDE 0411
   Safety class II

Electrical connection
  Screw terminal, combined Pozidriv head screw P, size 1
  Pin cross section max.   2 x 1,5 mm²
  Pin cross section min.   2 x 0,2 mm²
Safety classification according to IEC 529
  IP 65   front
Temperature / humidity
  Operating temperature range   - 10°C to + 50°C
  Storage temperature range   - 20°C to + 70°C
  Temperature / humidity   90% relative humidity at 38°C
Vibration resistance according to IEC 68-2-6
  Frequency range 10 to 500 Hz
  0,35 mm or 5g amplitude
  10 Frequency cycles per axle
Dimensions
  Front   48 mm x 48 mm
  Total depth   95 mm
Mounting
  Panel mounting with mounting frame
  Front cutout according to DIN 43700   45 +0,6 mm x 45 +0,6 mm
  Panel thickness   0,8 mm to 7 mm
Weight
  approx. 200 g
Housing material / Combustion characteristics
  PA, PC Plastics   V0 combustion characteristics
                                            according to UL standard 94

Inputs

Counting inputs IN1 und IN2 for DC input voltage
  Pulse shape   any
  Signal level   L<= 3 VDC   H>= 10 VDC
  Voltage amplitude max.   +/-60 VDC
  Input impedance   approx. 18 kOhm
  Counting frequency (duty cycle 1:1)   50 Hz
      Pulse duration min.   10 ms
      Pulse tracing min.   10 ms
  Counting edge   High/Low
Counting inputs IN1 and IN2 for AC input voltage
  Pulse shape   switch closure to power supply
  Voltage amplitude max.   power supply max.
  Input impedance   approx. 39 kOhm (230/120VAC),
                                            approx. 9 kOhm (24VAC)

Counting frequency (duty cycle 1:1)	15 Hz
Pulse duration min.	30 ms
Pulse tracing min.	30 ms
Counting edge	High/Low
Reset input R for DC input voltage	
Pulse shape	any
Signal level	L<= 3 VDC H>= 10 VDC
Voltage amplitude max.	+/-60 VDC
Input impedance	approx. 18 kOhm
Pulse duration min.	10 ms
Reset edge	High/Low
Reset input R for AC input voltage	
Pulse shape	switch closure to power supply
Voltage amplitude max.	power supply max.
Input impedance	approx. 39 kOhm (230/120VAC), approx. 9 kOhm (24VAC)
Pulse duration min.	30 ms
Reset edge	High/Low
Lock input DL	
Static characteristics	
Input open	keys unlocked
Input 24 VDC for DC input voltage	keys locked
Input L1 or N for AC input voltage	keys locked
Reset selection RS	
Input is inquired when the power supply is turned on	
Input open	manually resetting using the **R** key or electrically using input R, bistable signal
Input 24 VDC for DC input voltage	automatically resetting when the
Input L1 or N for AC input voltage	preset value (**P**) is reached monostable signal 200 ms
Outputs	
Sensor power supply VS	
for power supply 230 VAC, 120 VAC	24 VDC unregulated
for power supply 24 VAC	24 VDC +/- 5% regulated
Current consumption max.	50 mA
Reference potential	0 VDC
Control outputs NO and NC as relay outputs	
Arrangement	1 Form C
Switching power max.	750 VA / 100 W
Switching voltage max.	250 VAC / 30 VDC
Switching current max.	3 A
Life expectancy, mechanical	5 Mill. events

Dielectric strength coil / contact	5 kVAC
Surge strength coil / contact	10 kV
Insulation distance	8 mm
Reference contact	output COM
Control output NPN as transistor output	
Open - collector	npn-switch
Switching voltage max.	45 VDC
Switching current max.	100 mA
Low voltage max.	
for 10 mA switching current	0,4 VDC
for 100 mA switching current	1,6 VDC
Reference potential	0 VDC

6. Troubleshooting

⚠ The following checklist should help you to troubleshoot any problems with the instrument. Turning the instrument off and then on again after about 10 seconds may solve the problem in the simplest cases. Make sure to observe the safety instructions in Section 1.

	Problem	Possible causes
1	No display	- Power supply is not on or is too low - Sensor power supply is overloaded
2	Display present, but the instrument does not count	- Sensor or wire is defective - Input voltage does not reach the specified signal level - Min. pulse duration or min. pulse tracing min. is incorrect
3	No control function	- Preset value is not set - Wires are defective or are incorrectly connected