



## **EZM-4931 96 x 48 DIN 1/8 Incremental Encoder Input Programmable Counter**

- 6 digits Process (PV) and 6 digits Set (SV) Value Display
- Operation with 2 Set Value
- Reset , Pause and ChA-ChB Counting Inputs
- Operation with Automatic and Manual Reset
- NPN/PNP input Types
- x1 / x2 / x4 Phase Shifting Property
- Multiplication Coefficient, Division Coefficient and Point Position
- Parametric , Two point (Low Scale - High Scale) and Multiplication - Division Coefficient Reading Adjustment
- RS-232 Serial Communication with Modbus RTU Protocol
- Input Frequency Max. 200kHz
- Max. Input Frequency Selection

## ABOUT INSTRUCTION MANUAL

Instruction manual of EZM-4931 Programmable Counter consists of two main sections. Explanation of these sections are below. Also, there are other sections which include order information and technical specifications of the device. All titles and page numbers in instruction manual are in “**CONTENTS**” section. User can reach to any title with section number.

### **Installation:**

In this section, physical dimensions of the device, panel mounting, electrical wiring, module mounting in the device, physical and electrical installation of the device to the system are explained.

### **Operation and Parameters:**

In this section, user interface of the device, how to access to the parameters, description of parameters are explained.

Also in these sections, there are warnings to prevent serious injury while doing the physical and electrical mounting or using the device.

Explanation of the symbols which are used in these sections are given below.



This symbol is used for safety warnings. User must pay attention to these warnings.



This symbol is used to determine the dangerous situations as a result of an electric shock. User must pay attention to these warnings definitely.



This symbol is used to determine the important notes about functions and usage of the device.

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## EU DECLARATION OF CONFORMITY

**Manufacturer's Name** : EMKO ELEKTRONIK A.S.  
**Manufacturer's Address** : DOSAB, Karanfil Sk., No:6,  
16369 Bursa, TURKEY

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The manufacturer hereby declares that the product:

**Product Name** : Programmable Counter  
**Type Number** : EZM-4931  
**Product Category** : Electrical equipment for measurement, control and laboratory use

Conforms to the following directives :

2006 / 95 / EC The Low Voltage Directive

2004 / 108 / EC The Electromagnetic Compatibility Directive

has been designed and manufactured to the following specifications:

EN 61000-6-4:2007 EMC Generic Emission Standard for Industrial Environments

EN 61000-6-2:2005 EMC Generic Immunity Standard for Industrial Environments

EN 61010-1:2001 Safety Requirements for electrical equipment for measurement, control and laboratory use

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### When and Where Issued

04<sup>th</sup> January 2011

Bursa-TURKEY

### Authorized Signature

Name : Serpil YAKIN

Position : Quality Manager

## 1.Preface

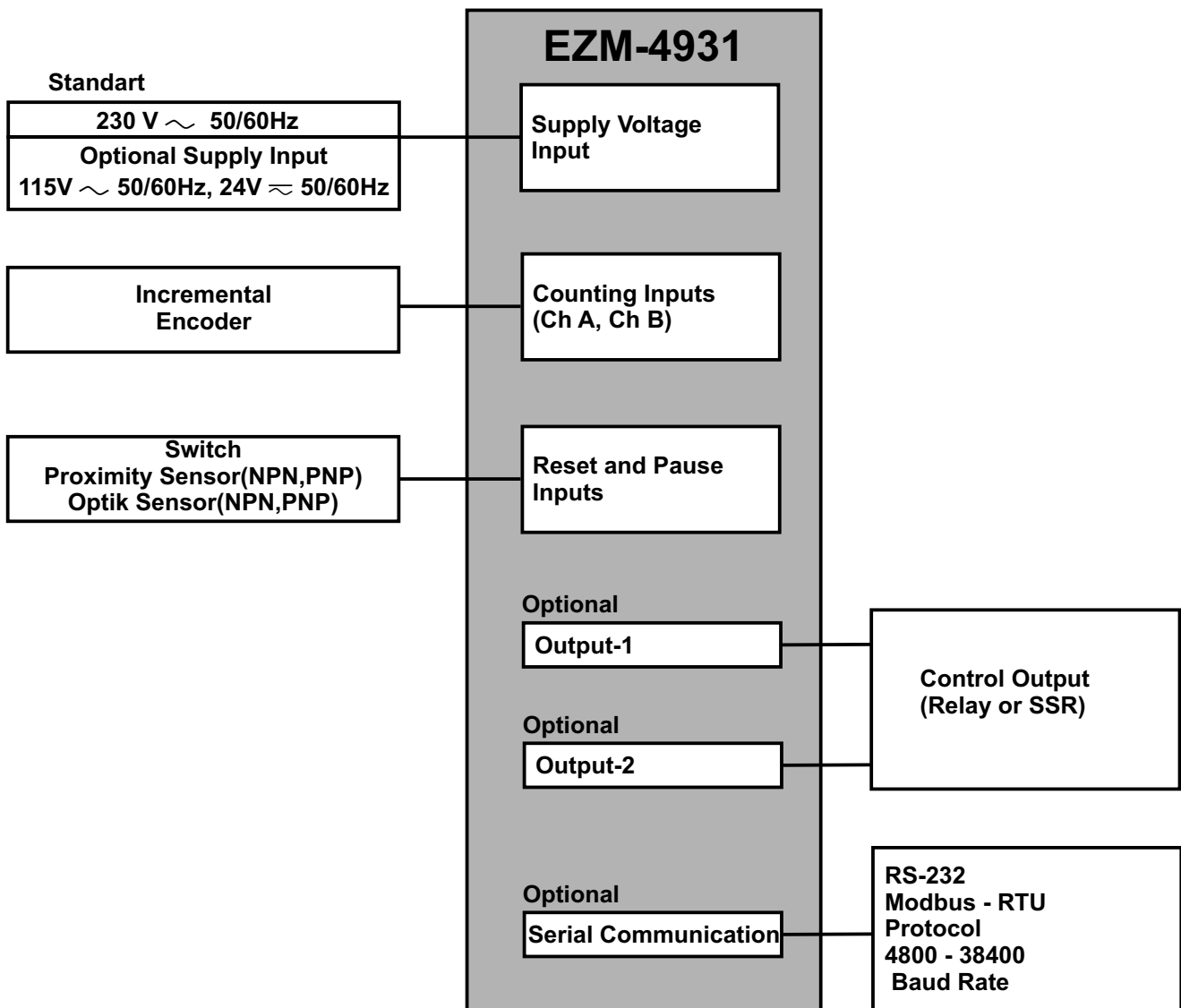
EZM Series Programmable Counter can be used in package machines, production and quality control rollers, in cutting and processing machine of glass, plastic, marble, sheet, iron, fabric all measuring and controlling of dimension, count, total count, speed, cycle, productivity, time and can be adapted easily to all mechanical construction and automation system. They can be used in many application with their control outputs, serial communication unit and output modules.

Some application fields which they are used are below:

### Application Fields

Measuring Dimension and Control Automation,  
In Cutting and Processing machine of glass, plastic, marble, sheet, iron and fabric  
Package machines,  
Quality Control rollers,  
Filling Systems,  
Tool Benchs,

## 1.1 General Specifications



## 1.2 Ordering Information

EZM-4931 <sub>(96x48 1/8 DIN)</sub>	A	BC	D	E	/	FG	HI	/	U	V	W	Z
		00			/		0	/		0	0	0

A	Supply Voltage
2	24V $\approx$ (-%15;+%10), 50/60Hz
4	115 V $\sim$ (-%15;+%10), 50/60 Hz
5	230 V $\sim$ (-%15;+%10), 50/60 Hz

D	Serial Communication
0	None
1	RS-232

E	Output-1
00	None
01	Relay Output ( 5A@250V $\sim$ Resistive Load )
02	SSR Output (10mA @ 5V $\equiv$ )

FG	Output-2
00	None
01	Relay Output ( 5A@250V $\sim$ Resistive Load )
02	SSR Output (10mA @ 5V $\equiv$ )

U	Encoder Supply Voltage
0	12V $\equiv$
1	5V $\equiv$

All order information of EZM-4931 Programmable Counter are given on the table at left. User may form appropriate device configuration from information and codes that at the table and convert it to the ordering codes.

Firstly, supply voltage then output modules and other specifications must be determined. Please fill the order code blanks according to your needs.

Please contact us, if your needs are out of the standards.



$\sim$  Symbol means Vac,

$\equiv$  Symbol means Vdc

$\approx$  Symbol means Vac and Vdc

## 1.3 Warranty

EMKO Elektronik warrants that the equipment delivered is free from defects in material and workmanship. This warranty is provided for a period of two years. The warranty period starts from the delivery date. This warranty is in force if duty and responsibilities which are determined in warranty document and instruction manual performs by the customer completely.

## 1.4 Maintenance

Repairs should only be performed by trained and specialized personnel. Cut power to the device before accessing internal parts.

Do not clean the case with hydrocarbon-based solvents (Petrol, Trichlorethylene etc.). Use of these solvents can reduce the mechanical reliability of the device. Use a cloth dampened in ethyl alcohol or water to clean the external plastic case.

## 2. Installation



Before beginning installation of this product, please read the instruction manual and warnings below carefully.

In package ,

- One piece unit
- Two pieces mounting clamps
- One piece instruction manual

A visual inspection of this product for possible damage occurred during shipment is recommended before installation. It is your responsibility to ensure that qualified mechanical and electrical technicians install this product.

If there is danger of serious accident resulting from a failure or defect in this unit, power off the system and separate the electrical connection of the device from the system.

The unit is normally supplied without a power switch or a fuse. Use power switch and fuse as required.

Be sure to use the rated power supply voltage to protect the unit against damage and to prevent failure.

Keep the power off until all of the wiring is completed so that electric shock and trouble with the unit can be prevented.

Never attempt to disassemble, modify or repair this unit. Tampering with the unit may results in malfunction, electric shock or fire.

Do not use the unit in combustible or explosive gaseous atmospheres.

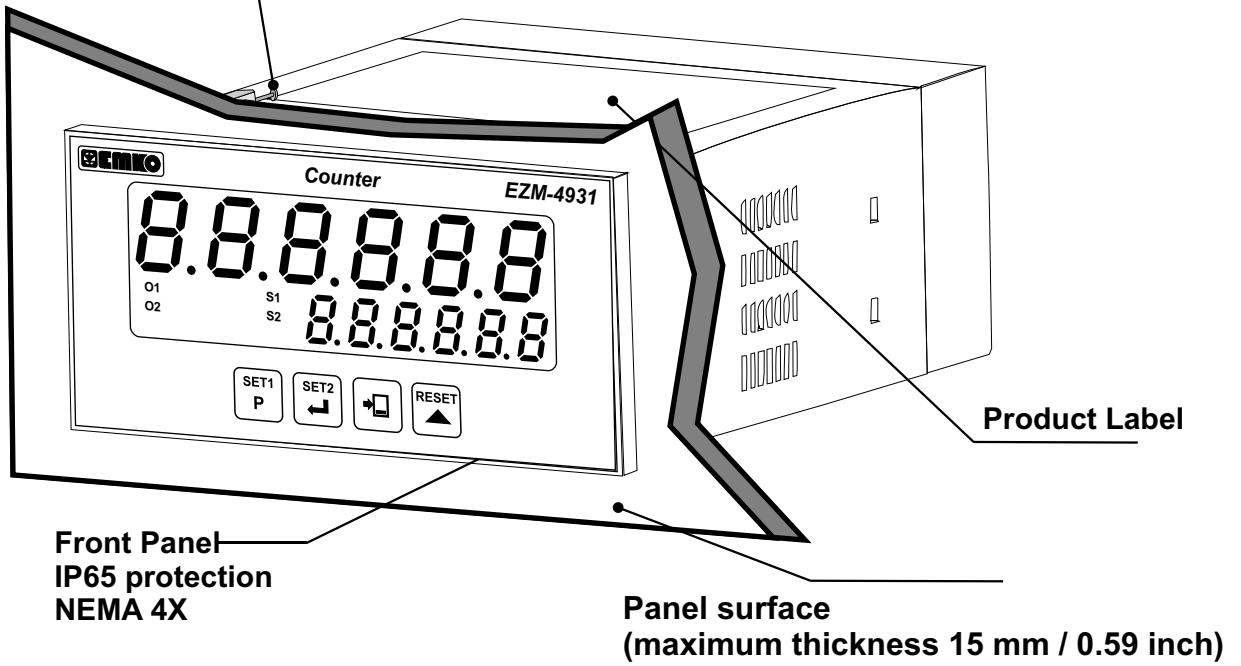
During the equipment is putted in hole on the metal panel while mechanical installation some metal burrs can cause injury on hands, you must be careful.

Montage of the product on a system must be done with it's fixing clamps. Do not do the montage of the device with inappropriate fixing clamp. Be sure that device will not fall while doing the montage.

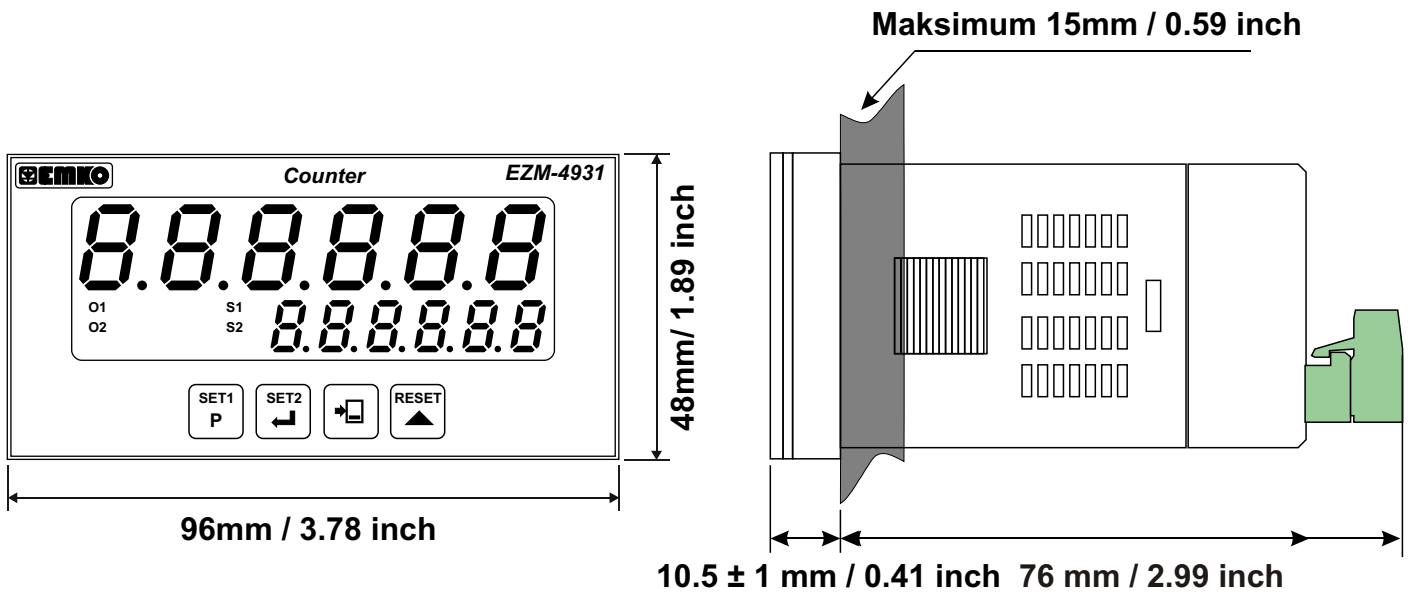
It is your responsibility if this equipment is used in a manner not specified in this instruction manual.

## 2.1 General Description

Mounting Clamp

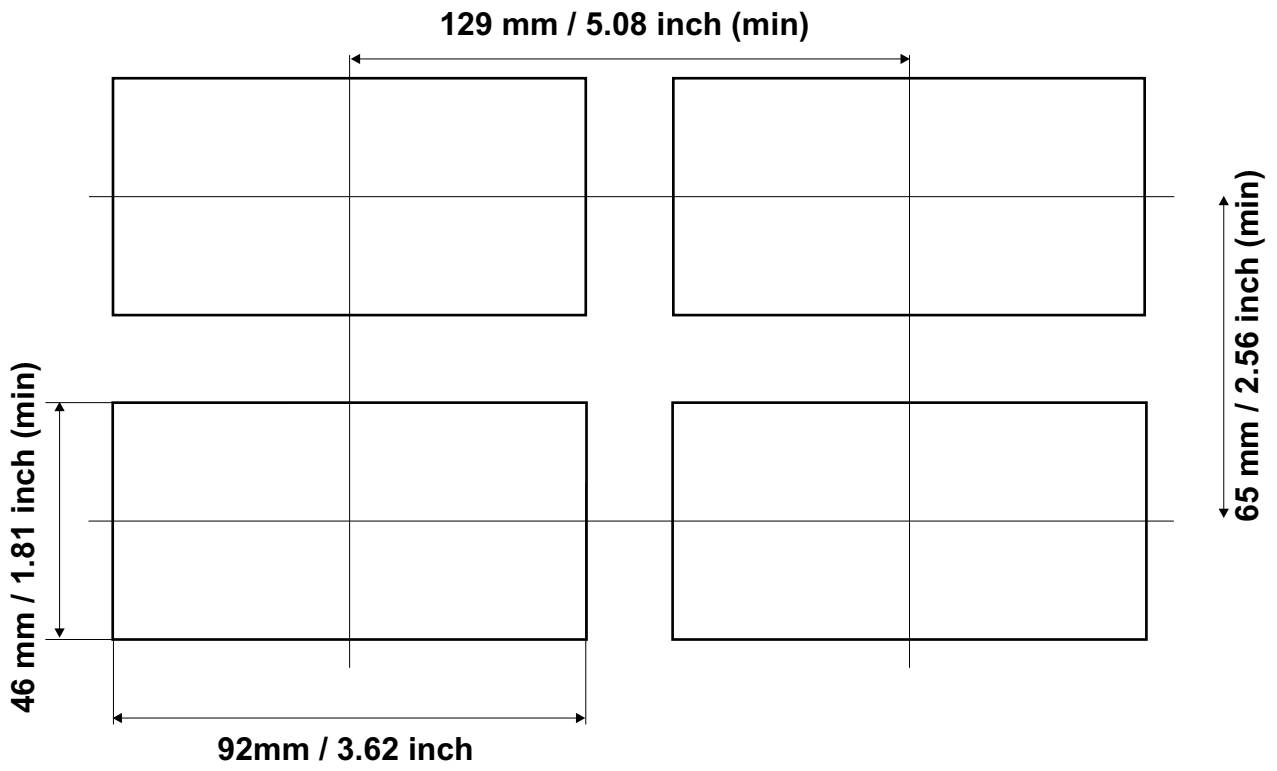


## 2.2 Dimensions





## 2.3 Panel Cut-Out



## 2.4 Environmental Ratings

### Operating Conditions



Operating Temperature : 0 to 50 °C



Max. Operating Humidity : 90% Rh (non-condensing)



Altitude : Up to 2000m.



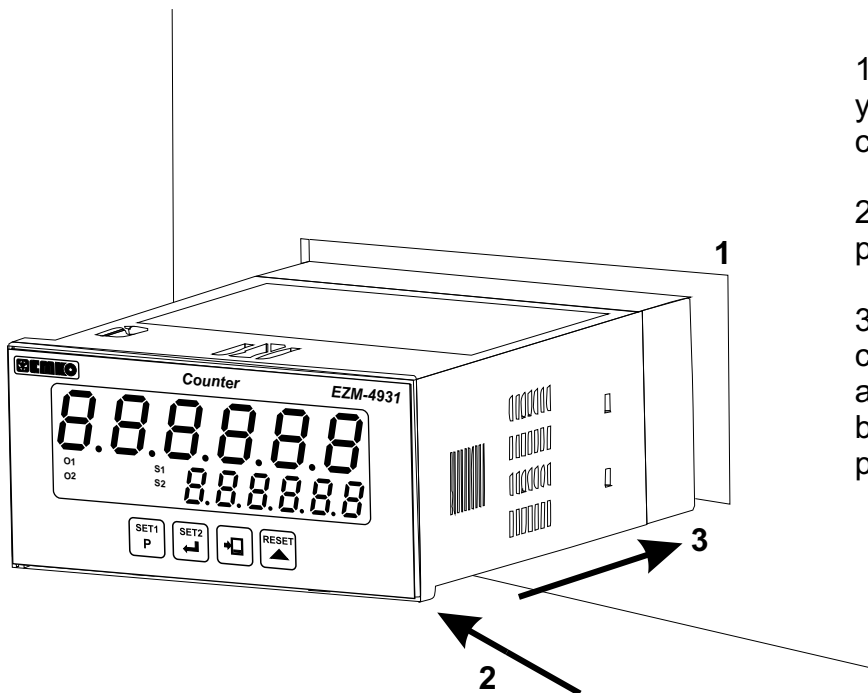
#### Forbidden Conditions:

Corrosive atmosphere

Explosive atmosphere

Home applications (The unit is only for industrial applications)

## 2.5 Panel Mounting



1-Before mounting the device in your panel, make sure that the cut-out is the right size.

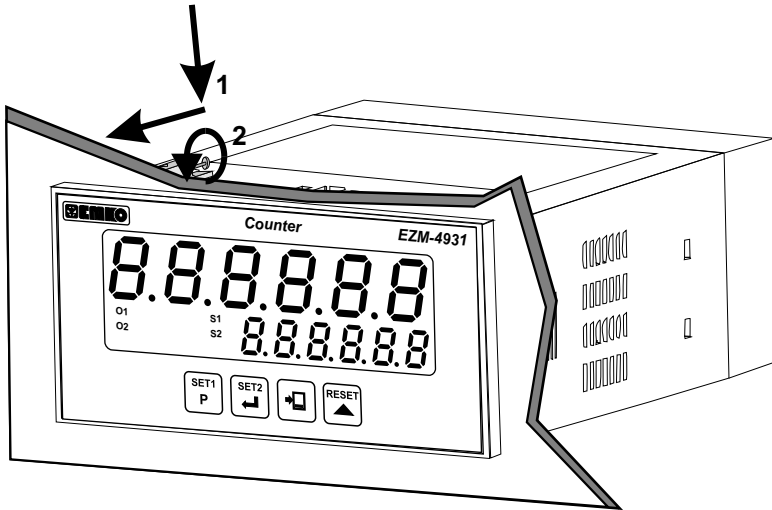
2-Check front panel gasket position

3-Insert the device through the cut-out. If the mounting clamps are on the unit, put out them before inserting the unit to the panel.



During installation into a metal panel, care should be taken to avoid injury from metal burrs which might be present. The equipment can loosen from vibration and become dislodged if installation parts are not properly tightened. These precautions for the safety of the person who does the panel mounting.

## 2.6 Installation Fixing Clamp



The unit is designed for panel mounting.

1-Insert the unit in the panel cut-out from the front side.

2- Insert the mounting clamps to the holes that located top and bottom sides of device and screw up the fixing screws until the unit completely immobile within the panel

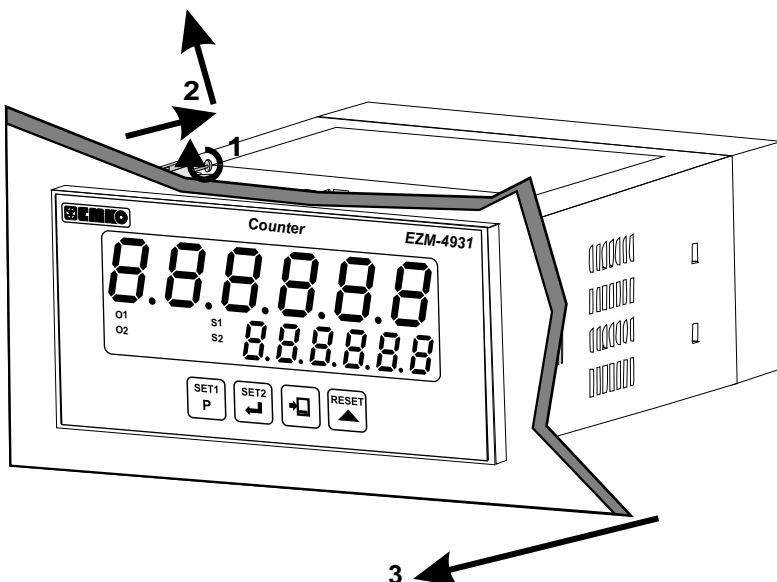


**Montage of the unit to a system must be done with it's own fixing clamps. Do not do the montage of the device with inappropriate fixing clamps. Be sure that device will not fall while doing the montage.**

## 2.7 Removing from the Panel



**Before starting to remove the unit from panel, power off the unit and the related system.**



1-Loosen the screws.

2-Pull mounting clamps from top and bottom fixing sockets.

3-Pull the unit through the front side of the panel

### 3. Electrical Wirings



You must ensure that the device is correctly configured for your application. Incorrect configuration could result in damage to the process being controlled, and/or personal injury. It is your responsibility, as the installer, to ensure that the configuration is correct.

Parameters of the device has factory default values. These parameters must be set according to the system's needs.



Only qualified personnel and technicians should work on this equipment. This equipment contains internal circuits with voltage dangerous to human life. There is severe danger for human life in the case of unauthorized intervention.

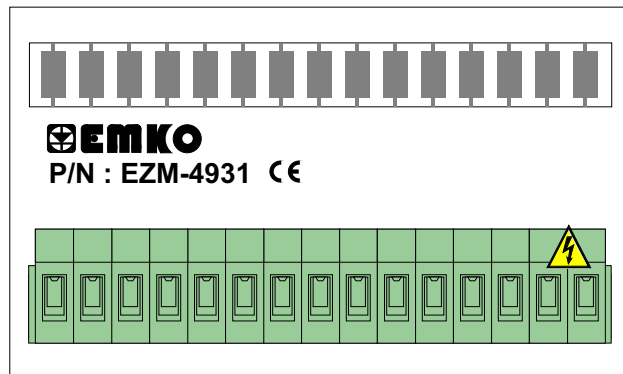


Be sure to use the rated power supply voltage to protect the unit against damage and to prevent failure.



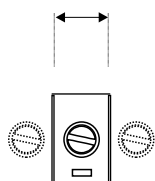
Keep the power off until all of the wiring is completed so that electric shock and trouble with the unit can be prevented.

#### 3.1 Terminal Layout and Connection Instructions



Max. 2.5mm / 0.098 inch

Wire Size:  
14AWG/1mm<sup>2</sup>  
Solid /Stranded



Torque  
0,5Nm



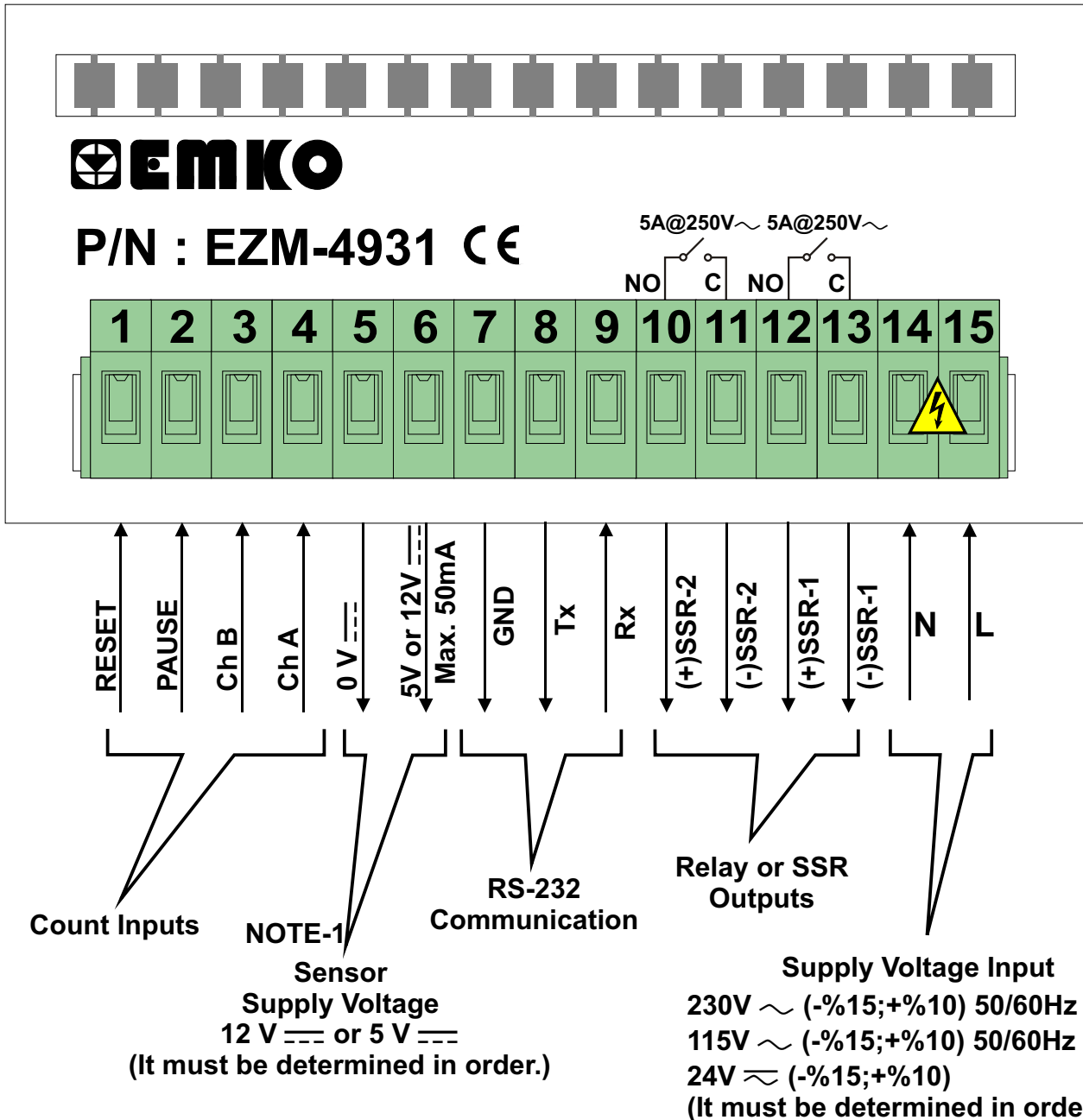
Screw driver  
0,8 x3mm



### 3.2 Electrical Wiring Diagram



Electrical wiring of the device must be the same as 'Electrical Wiring Diagram' below to prevent damage to the process being controlled and personnel injury.



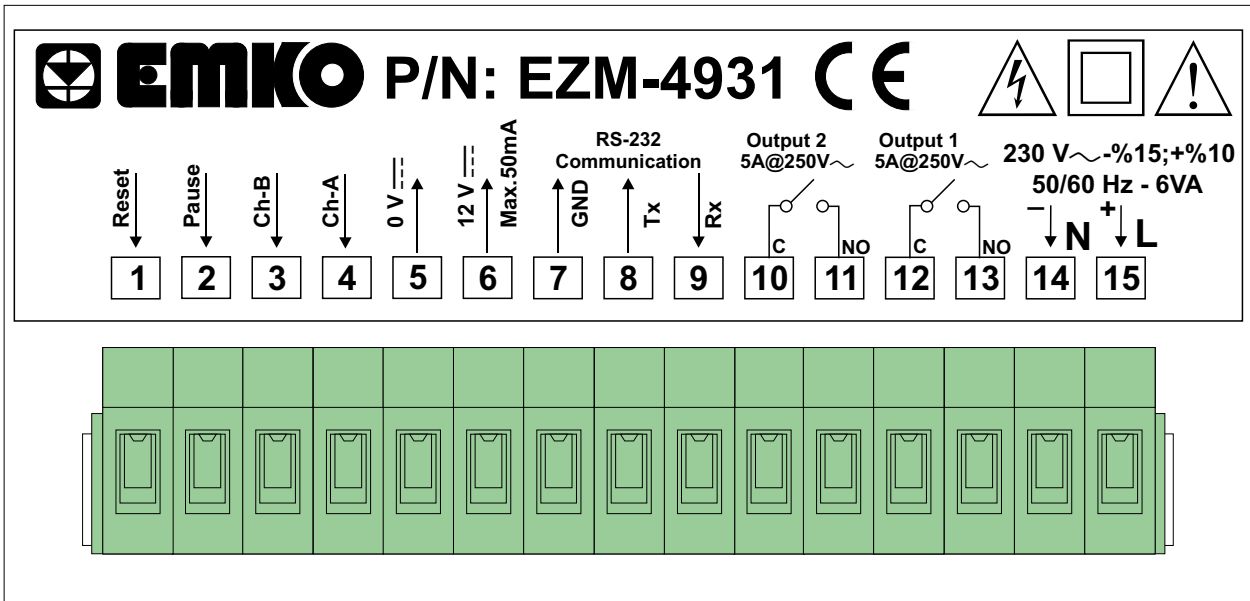
**NOTE-1 : Sensor supply voltage:**

If Power Supply is 230V~ or 115V~ , then Sensor supply voltage is 5V (± 05%) or 12V (- %30;+%10), 50 mA maximum short circuit protection.

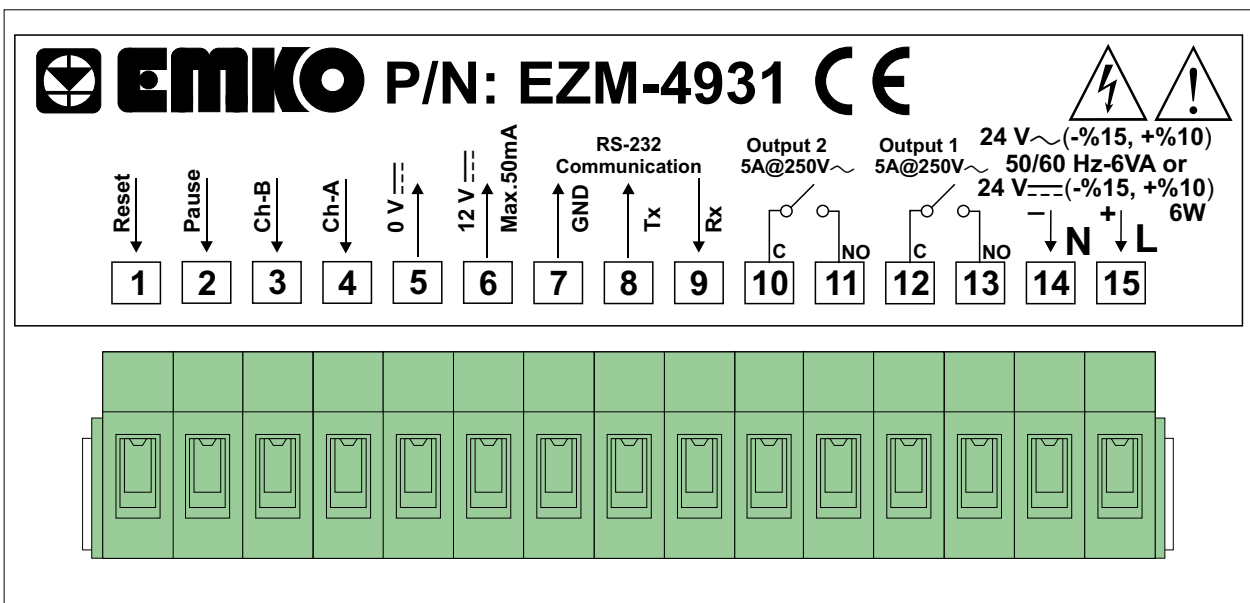
If Power Supply is 24V ~ , then Sensor supply voltage is (12V or 5V)±05%, 50 mA maximum short circuit protection.

### 3.3 View of Device Label

#### Device Label for 230V ~ Supply Voltage Input and Relay Outputs

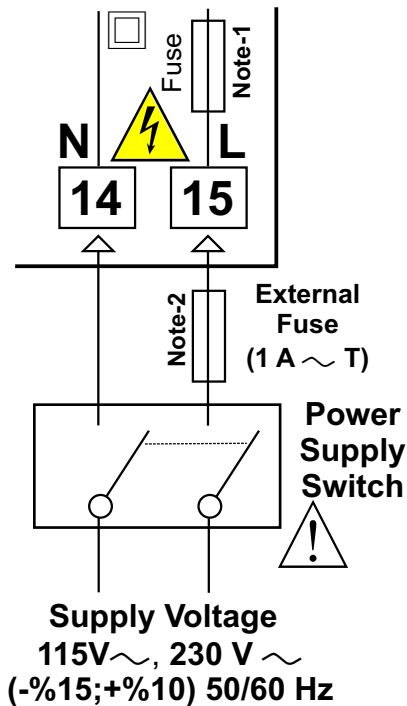


#### Device Label for 24V ~ Supply Voltage Input and Relay Outputs

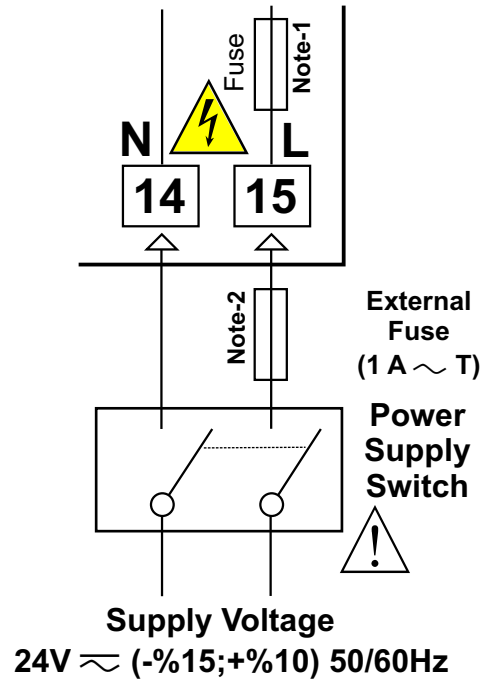


### 3.4 Connection of Device Supply Voltage Input

Connection of Universal Supply Voltage Input



Connection of Universal Supply Voltage Input



**Note-1 :**

There is internal 33 R fusible flameproof resistor in 115V $\sim$  50/60 Hz and 230V $\sim$  50/60 Hz  
There is internal 4R7 fusible flameproof resistor in 24V $\approx$  (-15%;+10) 50/60Hz

**Note-2 :** External fuse is recommended



Make sure that the power supply voltage is the same indicated on the instrument.

Switch on the power supply only after that all the electrical connections have been completed.

Supply voltage range must be determined in order. While installing the unit, supply voltage range must be controlled and appropriate supply voltage must be applied to the unit. Controlling prevents damages in unit and system and possible accidents as a result of incorrect supply voltage.



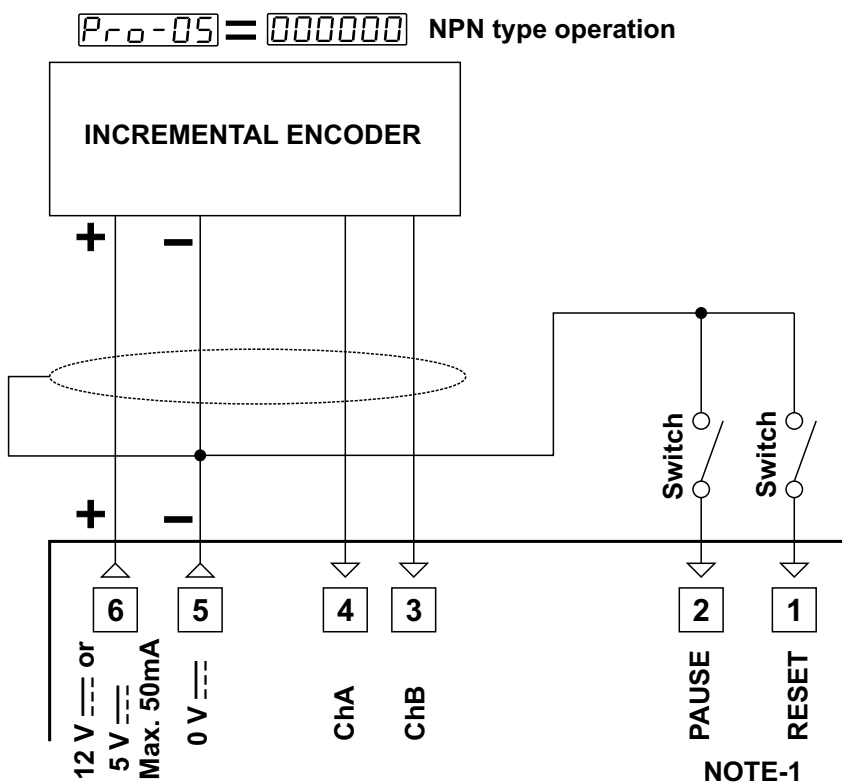
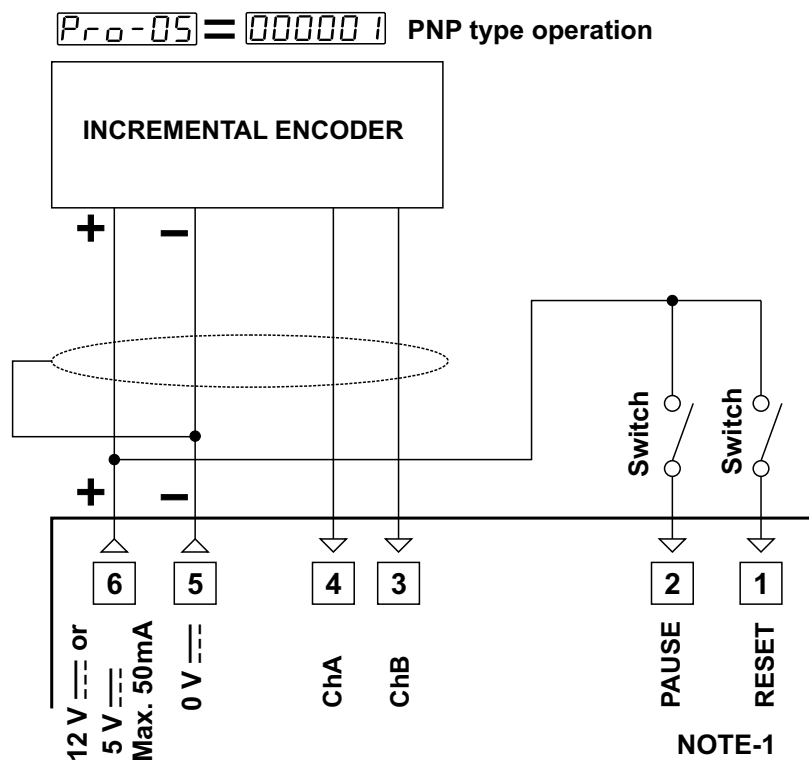
There is no power supply switch on the device. So a power supply switch must be added to the supply voltage input. In accordance with the safety regulations, the power supply switch shall bring the identification of the relevant instrument. Power supply switch shall be easily accessible by the user.

Power switch must be two poled for separating phase and neutral. On/Off condition of power switch is very important in electrical connection. On/Off condition of power switch must be signed for preventing the wrong connection.

If an external fuse is used, it must be on phase connection in  $\sim$  supply input.

### 3.5 Counting Input Connection

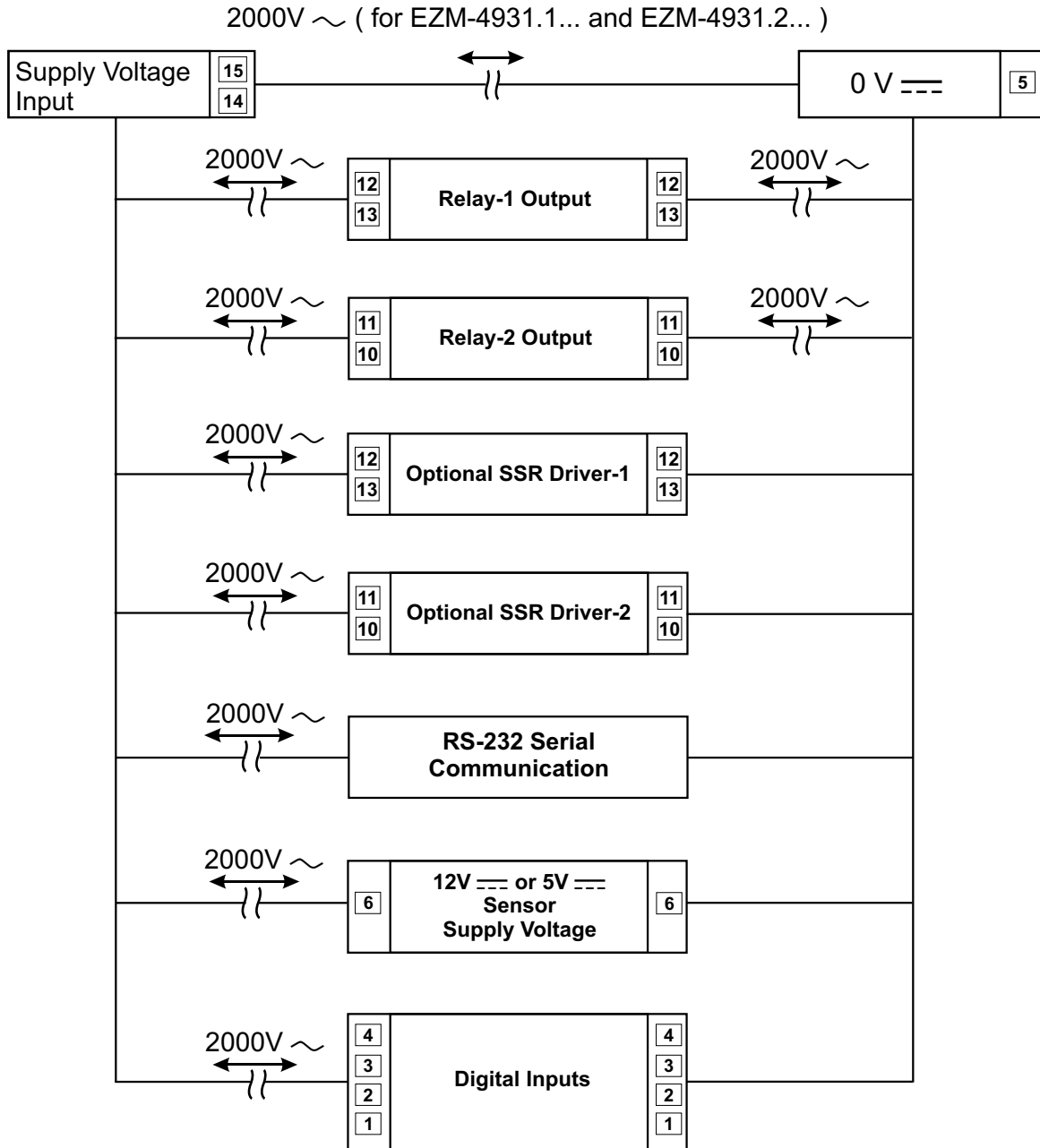
#### 3.5.1 Incremental Encoder & Switch Connection



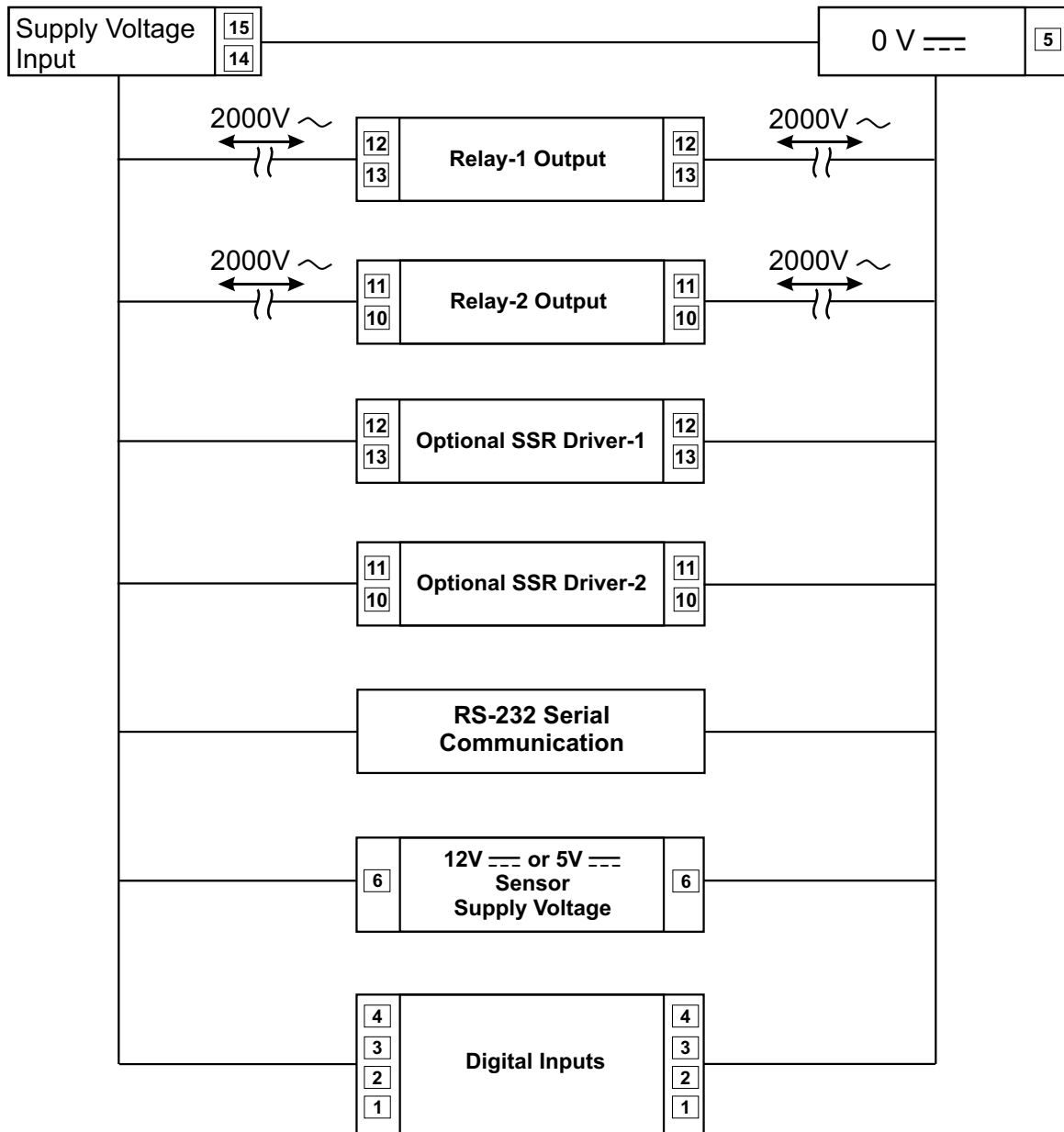
NOTE-1 : Reset and Pause inputs have protection time against electrical contact debounce. Protection time can be set with **Pro-03** parameter (2 - 50 msec.).



### 3.6 Galvanic Isolation Test Values of EZM-4931 Programmable Counter

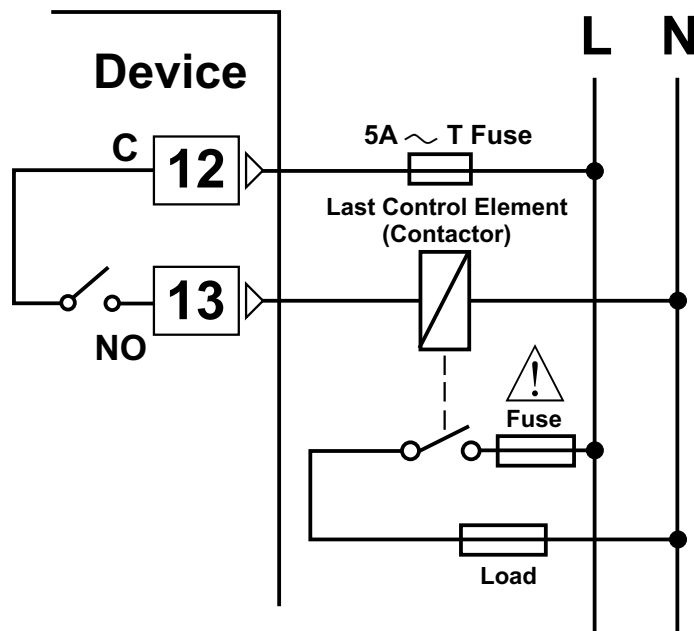


### Galvanic Isolation Test Values For 24 V $\sim$ Power Supply



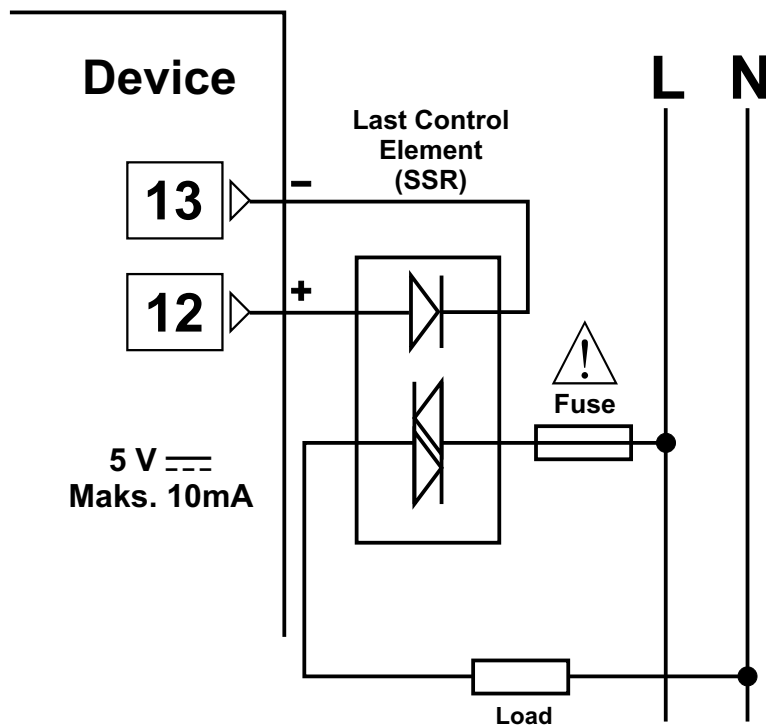
### 3.7 Output Connections

#### 3.7.1 Relay-1 Output Connection



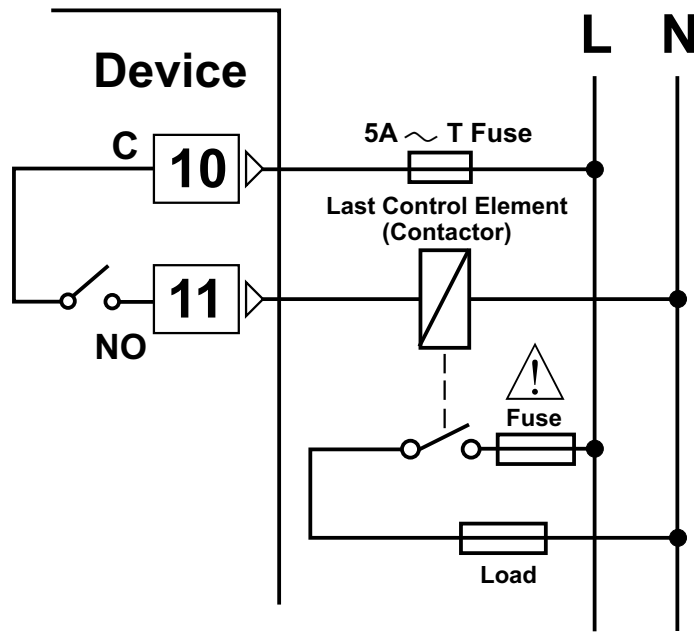
Fuses must be selected according to the applications.

#### 3.7.2 SSR Driver-1 Output Connection



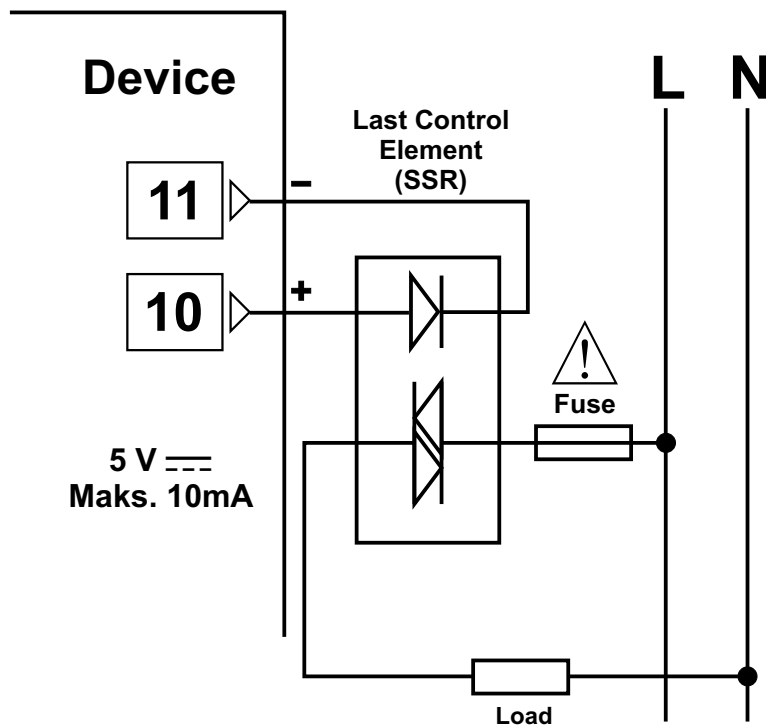
Fuses must be selected according to the applications.

### 3.7.3 Relay-2 Output Connection



Fuses must be selected according to the applications.

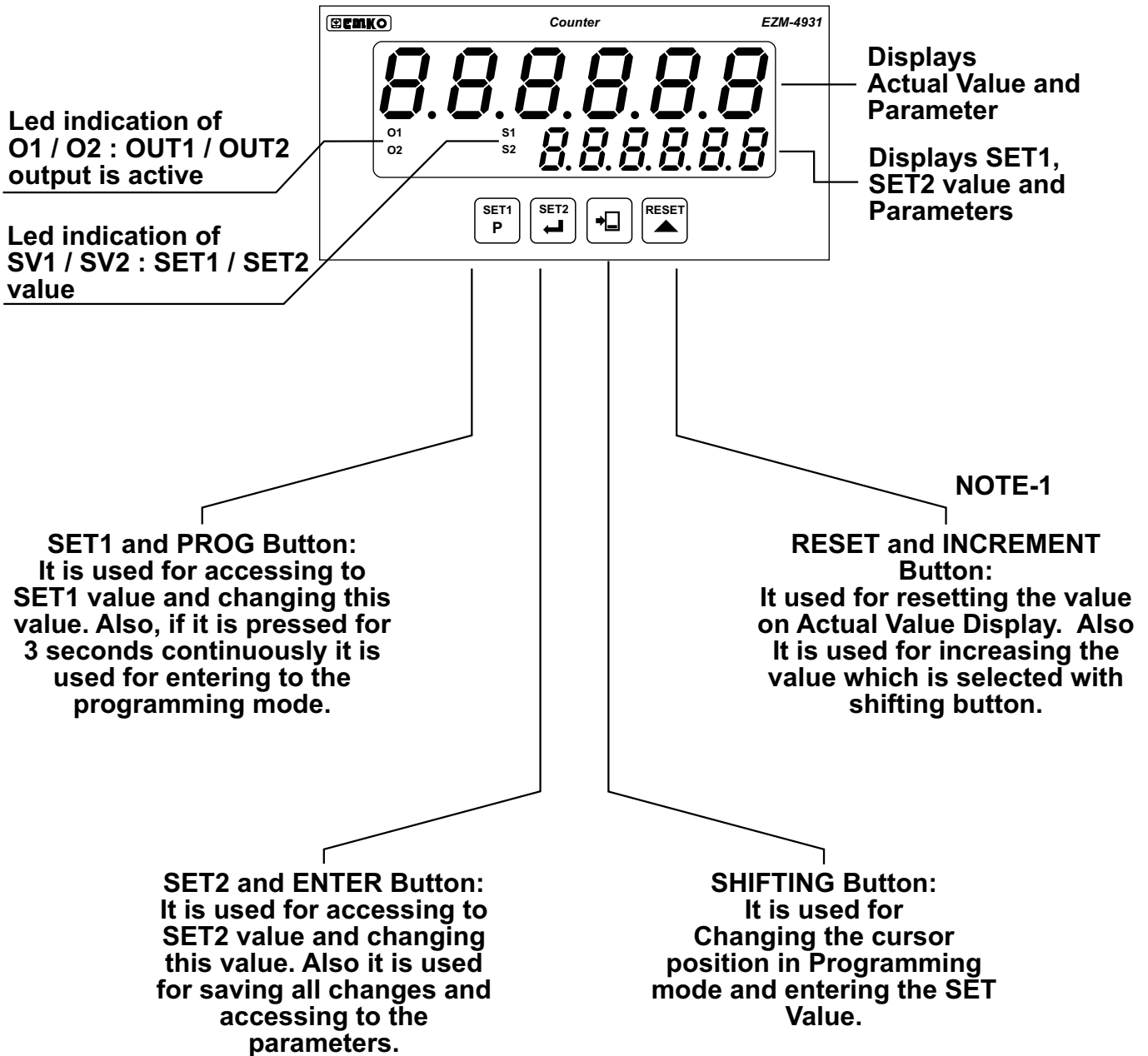
### 3.7.4 SSR Driver-2 Output Connection



Fuses must be selected according to the applications.

## 4. Definition of Front Panel and Accessing to the Set Parameters

### 4.1 Definition of Front Panel

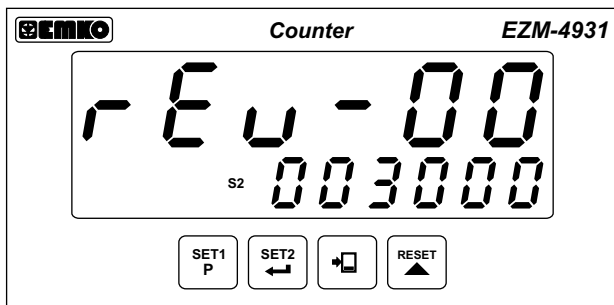
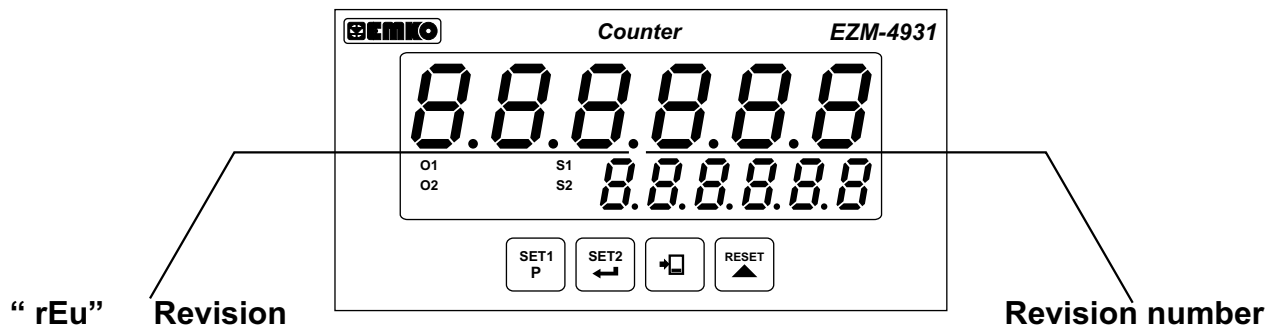


**NOTE-1 :** Adjusting the device, while the Two Point Reading Adjustment mode ( $Pr0-10 = 000001$ ), lower adjustment value  $Pr0-13$  and Upper adjustment value  $Pr0-14$  can be negative. For example ; While most significant digit ( 6th digit ) of lower adjustment value is changed from 0 to 9 with increment button, after 9, “-” character is shown. If when “-” character is on the most significant digit ( 6th digit ) of Lower adjustment value and Enter button is pressed, adjustment value becomes negative.

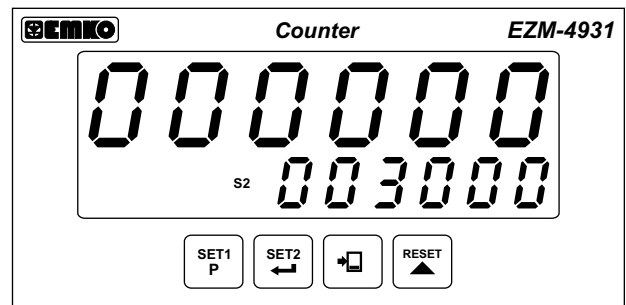
## 4.2 Power On Observation of EZM - 4931 Programmable Counter and Software Revision on the Display

When power is applied to the device, software revision number of the controller is momentarily illuminated on actual value display. Then operation screen is observed.

When power on, view of the screen is shown below:



Software Revision



Operation Screen is shown



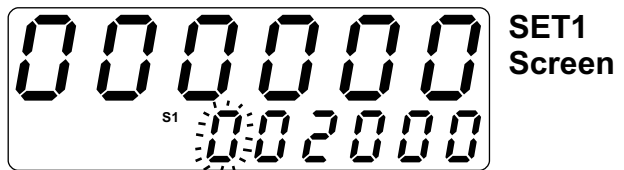
If there is an unexpected situation while opening the device, power off the device and inform a qualified personnel.

### 4.3 Adjustment of SET Value

#### Changing SET1 value.



When shift button is pressed, 6th digit of SET1 value starts to flash.



Press SET1 button to exit without saving Set value.

When shift button is pressed, 5th digit of SET1 value starts to flash.



When shift button is pressed, 4th digit of SET1 value starts to flash.



Increase the flashing value with increment button.

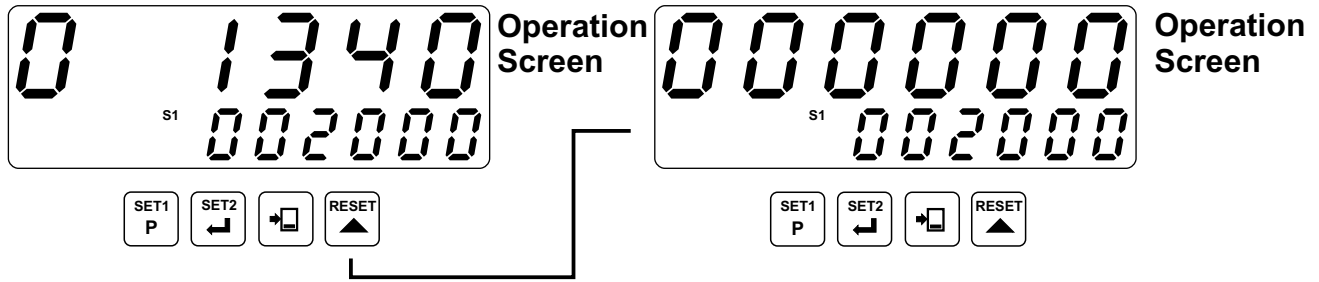


Save the value as SET1 value by pressing Enter button.



If **Pr0-07** Reset and Set Protection parameter is **000002**, **000003** or **000004** then SET1 value can not be changed. For details, refer to parameters section.

## 4.4 Resetting the Count Value



When RESET button is pressed, Actual Value becomes the Reset-Offset Value.



If `Pro-07` Reset and Set Protection parameter is `000001` or `000003` then Count Value can not be reset. For details, refer to parameters section.



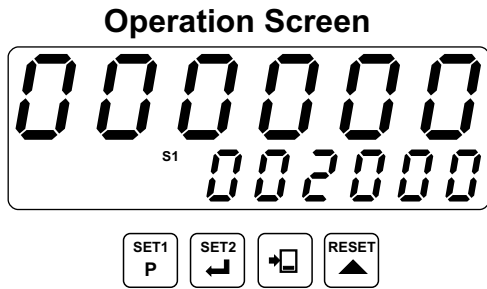
RESET operation can be realized by Reset button or applying signal to the RESET input. These two operations are named MANUAL RESET in parameters section.

At the end of MANUAL RESET operation, Count Value becomes Reset Offset Value `Pro-09`.

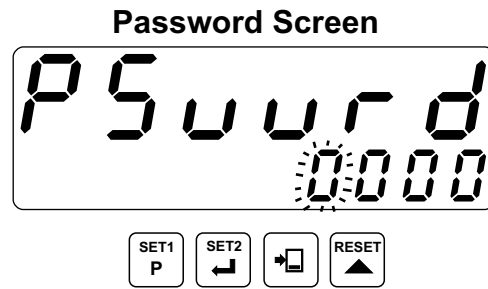


## 4.5 Accessing to the Program Parameters

In this section Accessing to the Program parameters process is shown.  
For details on parameters refer to **PROGRAM PARAMETERS** section.

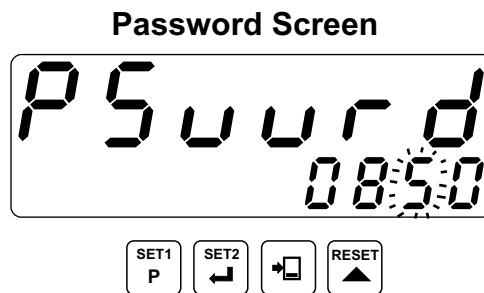


When PROG button is pressed for 3 seconds, password screen will be display.

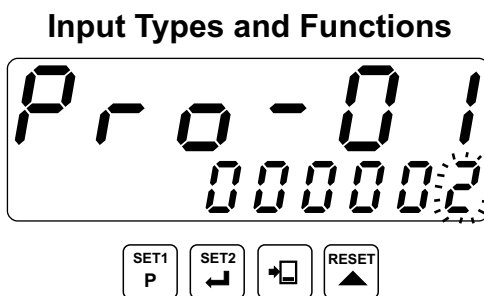


Enter password with shift and increment buttons.

The most significant digit of the parameter (4th digit for this parameter) flashes.



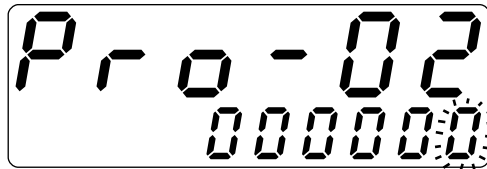
Press Enter button to confirm password.



You can change the parameter with INCREMENT button, save it to the memory and pass to the next parameter with ENTER button.

Press ENTER button

Press PROG button to exit from programming section without doing any changes.



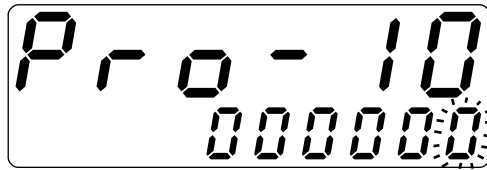
### Max. Input Frequency

You can change the parameter with INCREMENT button, save it to the memory and pass to the next parameter with ENTER button.

Press ENTER button.



Press PROG button to exit from programming section without doing any changes.



### Adjustment Type Selection

You can change the parameter with INCREMENT button, save it to the memory and pass to the next parameter with ENTER button.

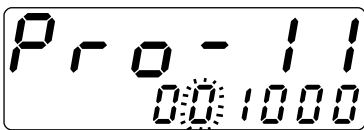
Press ENTER button.



Press PROG button to exit from programming section without doing any changes.

If **Pro-10** is **000000** ;  
Parametric Reading Adjustment

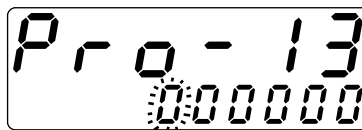
### Encoder Type



Pitch

If **Pro-10** is **000001** ;  
Two Point Reading Adjustment

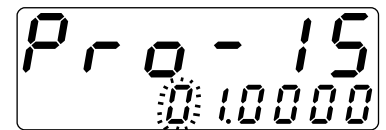
### Min. Value for dual point adjustment value



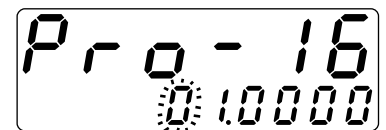
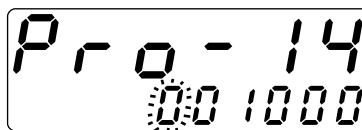
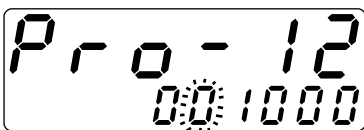
Max. Value for dual point adjustment value

If **Pro-10** is **000002** ;  
Multiplication - Division  
Coefficient Reading Adjustment

### Multiplication Coefficient



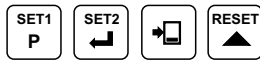
Division Coefficient





### Output Functions

You can change the parameter with INCREMENT button, save it to the memory and pass to the next parameter with ENTER button.



Press PROG button to exit from programming section without doing any changes.

Press ENTER button.



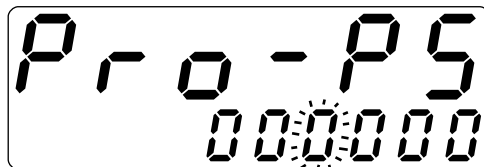
### Return to Factory Settings

You can change the parameter with INCREMENT button, save it to the memory and pass to the next parameter with ENTER button.



Press PROG button to exit from programming section without doing any changes.

Press ENTER button.



### Program Password

User can change the parameter with INCREMENT button, save it to the memory and pass to the next parameter with ENTER button.

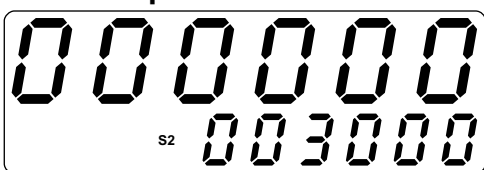


When **PSuwr0** password screen is shown if ENTER button is pressed without entering the password, this Parameter can not be observed.

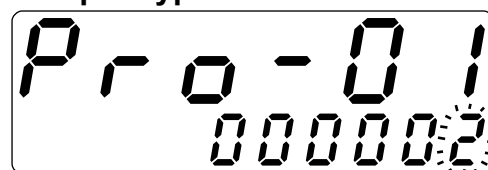
The most significant digit of the parameter (4th digit for this parameter) flashes.

Continue to press ENTER button for scanning all parameters.

### Operation Screen



### Input Types and Functions



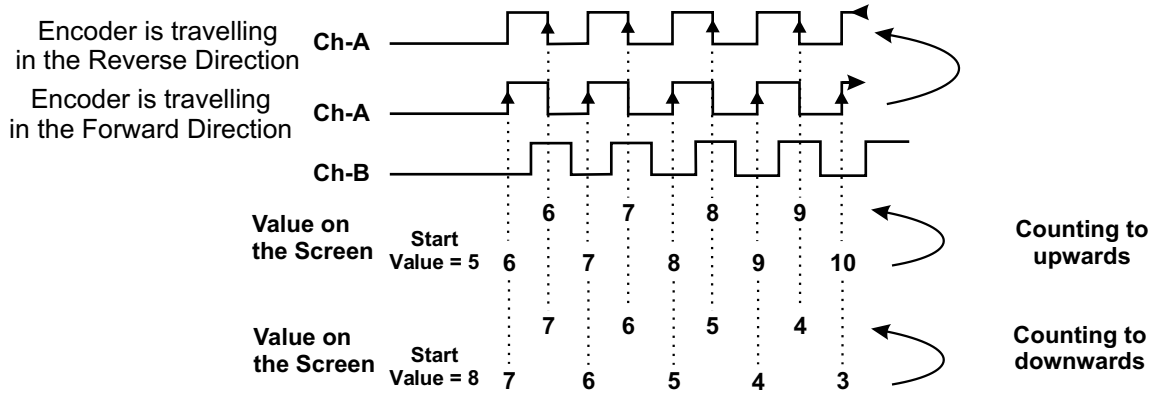
## 5. Program Parameters

Pro-01

**Input Types and Functions.**  
 (Default = 2) MODBUS ADDRESS: 40001.

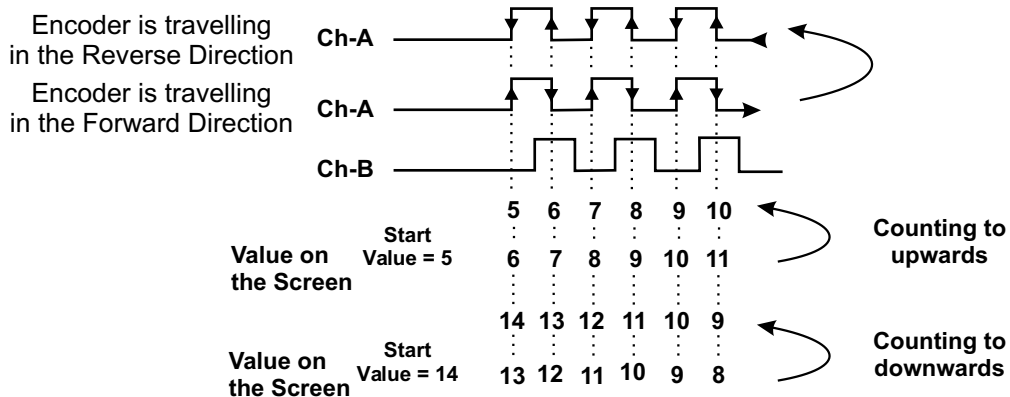
000000

**x1 Phase Shifting** (for incremental encoders)  
 Upcount on rising edge of Ch-A input when Ch-B is at 0  
 Downcount on rising edge of Ch-A input when Ch-B is at 1



000001

**x2 Phase Shifting** (for incremental encoders)  
 Upcount on rising edge of Ch-A when Ch-B is at 0  
 Downcount on rising edge of Ch-A when Ch-B is at 1  
 Upcount on falling edge of Ch-A when Ch-B is at 1  
 Downcount on falling edge of Ch-A when Ch-B is at 0

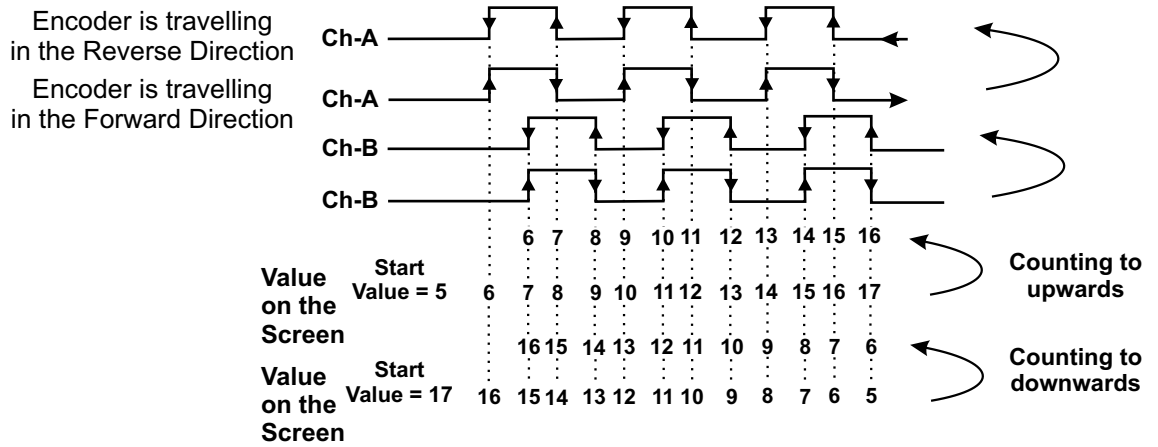


000002

**x4 Phase Shifting** (for incremental encoders)

- Upcount on rising edge of Ch-A when Ch-B is at 0
- Downcount on falling edge of Ch-A when Ch-B is at 0
- Downcount on rising edge of Ch-A when Ch-B is at 1
- Upcount on falling edge of Ch-A when Ch-B is at 1

- Downcount on rising edge of Ch-B when Ch-A is at 0
- Upcount on falling edge of Ch-B when Ch-A is at 0
- Upcount on rising edge of Ch-B when Ch-A is at 1
- Downcount on falling edge of Ch-B when Ch-A is at 1



Pr0-02

**Max. Input Frequency**  
(Default = 0) MODBUS ADDRESS:40002.

000000

100kHz < Input Frequency < 200kHz

000001

50kHz < Input Frequency < 100kHz

000002

25kHz < Input Frequency < 50kHz

000003

12kHz < Input Frequency < 25kHz

000004

0kHz < Input Frequency < 12kHz

Pro-03

**Filter time for Reset and Pause Input**  
(Default = 50) MODBUS ADDRESS:40003.

It is used to protect against the electrical contact debounce or the signal that is less than the determined pulse time.  
It can be adjusted from 000002 to 000050 millisecond.

Pro-04

**Counting Direction**  
(Default = 0) MODBUS ADDRESS:40004.

000000

Upcount (0 Preset).

000001

Downcount (Preset 0).

Pro-05

**Sensor Type Selection**  
(Default = 0) MODBUS ADDRESS:40005.

000000

NPN type sensor selected

000001

PNP type sensor selected

Pro-06

**Point Position for Display**  
(Default = 0) MODBUS ADDRESS:40006.

000000

No point

000000

000001

Between first and second digits

000000

000002

Between second and third digits

000000

000003

Between third and fourth digits

000000

000004

Between fourth and fifth digits

000000

Pro-07

**Reset and Set protection (For accessing from front panle)**  
(Default = 0) MODBUS ADDRESS:40007.

000000

There is no Reset and Set protection.

000001

Only RESET button protection is active. Actual value can not be reset by Reset button.  
Actual value can be reset only reset input is active.

000002

SET1 and SET2 can not be changed.

000003

Full protection ; Reset protection is active, also SET1 and SET2 can not be changed.

000004

SET1 can not be changed.

000005

SET2 can not be changed.

Pro-08

**Reset Input Change**  
(Default = 0) MODBUS ADDRESS:40008.

000000

Reset on rising edge of Reset input.

000001

Reset on falling edge of Reset input.

Pro-09

**Reset Offset**  
(Default = 0) MODBUS ADDRESS: LOW WORD = 40009, HIGH WORD = 40010.

It can be adjusted from 000000 to 999999 .

For details, refer to the section where output functions Pro-17 are defined.

Pro-10

**Reading Adjustment Type Selection**  
(Default = 0) MODBUS ADDRESS:40011.

000000

Parametric (one point) Reading Adjustment  
Encoder Type and Pitch value must be entered

000001

Two Point Reading Adjustment  
Min. Value for dual point adjustment value and Max. Value for dual point adjustment value must be entered.

000002

Multiplication - Division Coefficient Reading Adjustment  
Multiplication and Division Coefficient value must be entered.

Pro-11

**Encoder Type**  
(Default = 1000) MODBUS ADDRESS: 40012.

**NOTE-1** Number of pulse of Encoder is used pulse.  
It can be adjusted from  to  pulse/rnd.

Pro-12

**Pitch**  
(Default = 1000) MODBUS ADDRESS: 40013.

**NOTE-1** Encoder's amount of progress on an round.  
It can be adjusted from  to  mm/rnd.

Pro-13

**Min. Value for dual point adjustment value**  
(Default = 0) MODBUS ADDRESS: LOW WORD = 40014, HIGH WORD = 40015.

**NOTE-2** Encoder, manually brought to the lower point after that low point value is entered for two point reading adjustment. It can be adjusted from  to .

Pro-14

**Min. Value for dual point adjustment value**  
(Default = 1000) MODBUS ADDRESS: LOW WORD = 40016, HIGH WORD = 40017.

**NOTE-2** Encoder, manually brought to the upper point after that high point value is entered for two point reading adjustment. It can be adjusted from  to .

Pro-15

**Multiplication Coefficient**  
(Default = 01.0000) MODBUS ADDRESS: LOW WORD = 40018, HIGH WORD = 40019.

**NOTE-3** It can be adjusted from  to . Changes in this parameter is evaluated when counting starts.  
If this value is  Multiplication is not performed.

Pro-16

**Division Coefficient**  
(Default = 01.0000) MODBUS ADDRESS: LOW WORD = 40020, HIGH WORD = 40021.

**NOTE-3** It can be adjusted from  to . Changes in this parameter is evaluated when counting starts.  
If this value is  Division is not performed.

**NOTE - 1 : Reading Adjustment Type Selection parameter  is , then these parameters can be accessed.**

**NOTE - 2 : Reading Adjustment Type Selection parameter  is , then these parameters can be accessed.**

**NOTE - 3 : Reading Adjustment Type Selection parameter  is , then these parameters can be accessed.**



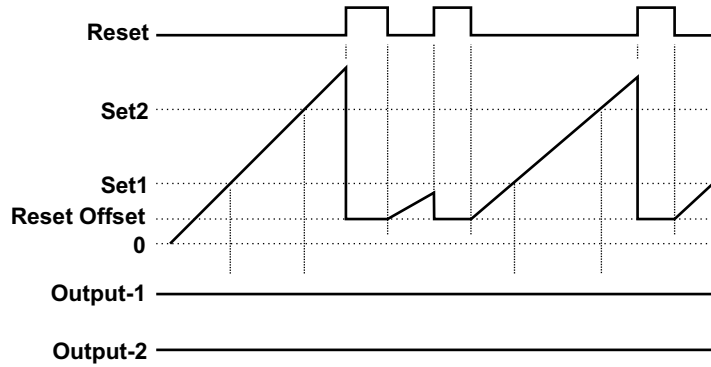
Pro-17

Output Functions  
(Default=1) MODBUS ADDRESS:40022.

Pro-17=000000

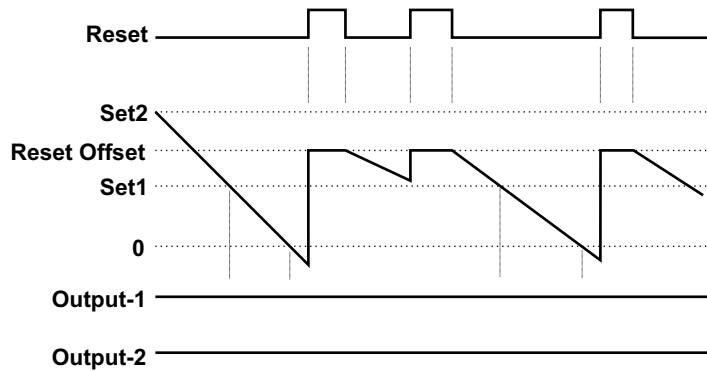
Manual Reset-0.  
Device continues to count till manual reset is applied.

Counting direction : 0 P (Upcount) Pro-04 = 000000



Device continues to count till manual reset is applied.  
When Manual Reset happens, count value becomes Reset Offset value. Outputs are not active in this parameter.

Counting direction : P 0 (Downcounting) Pro-04 = 000001



Device continues to count till manual reset is applied.  
When Manual Reset happens, count value becomes Reset Offset value. Outputs are not active in this parameter.

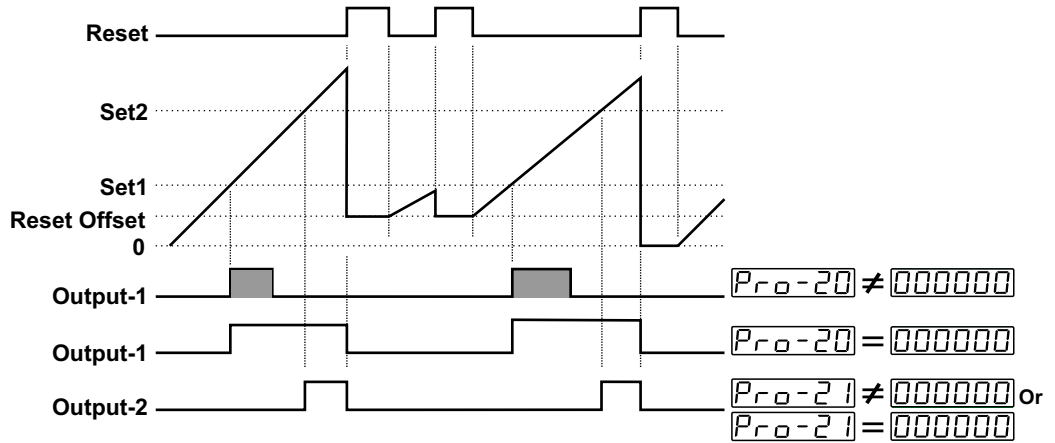
Pro-17 = 000001

**Manual Reset-1.**

Device continues to count till manual reset is applied.  
 (Output PulseTime Pro-21 is not considered)

Counting direction : 0 P (Upcount)

Pro-04 = 000000



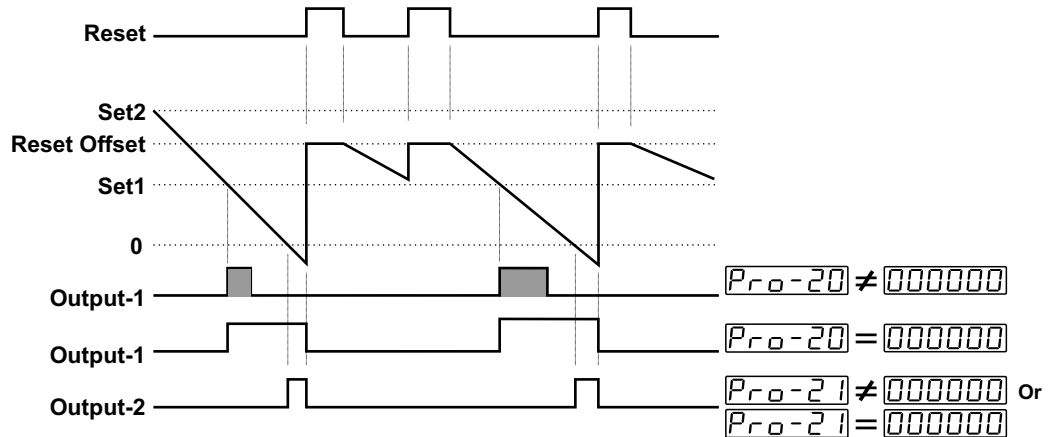
When count value reaches to SET1 value, Output-1 becomes active. If Output-1 pulse time Pro-20 is 000000, Output-1 does not change condition until manual reset input is active. If Output-1 pulse time Pro-20 is not 0, at the end of the pulse time Output-1 becomes inactive.

When count value reaches to SET2 value, Output-2 becomes active. Counting continues over SET2 value. When Manual Reset happens, count value becomes Reset Offset value.

Output-2 pulse time Pro-21 is not considered.

Counting direction : P 0 (Downcounting)

Pro-04 = 000001



When the count value reaches to SET1 value, Output-1 becomes active. If Output-1 Pulse Time Pro-20 is 000000, Output-1 does not change condition until manual reset input is active. If Output-1 pulse time Pro-20 is not 0, Output-1 becomes inactive at the end of the pulse time. When actual value reaches to 000000, Output-2 becomes active. Counting continues under 000000. When Manual Reset happens, count value becomes Reset Offset value.

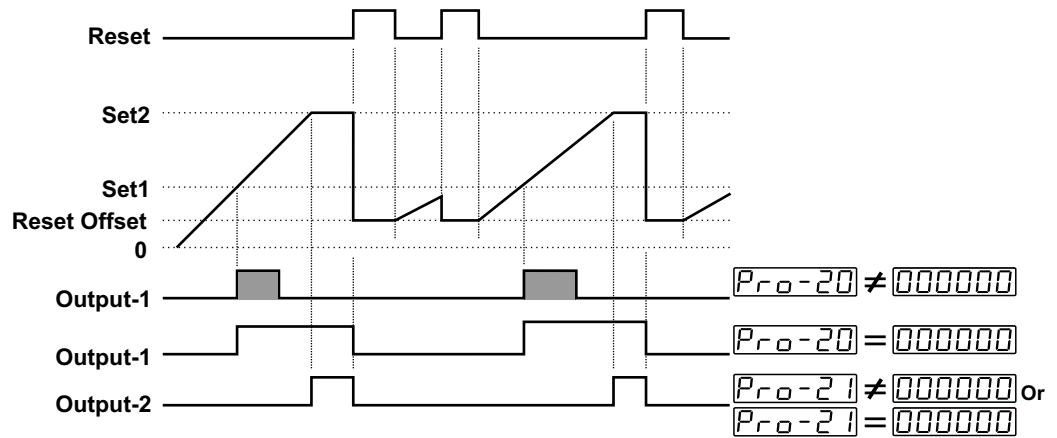
Output-2 pulse time Pro-21 is not considered.

Pr0-17 = 000002

Manual Reset-2.  
(Output-2 Pulse Time Pr0-21 is not considered)

Counting direction : 0 P (Upcount)

Pr0-04 = 000000



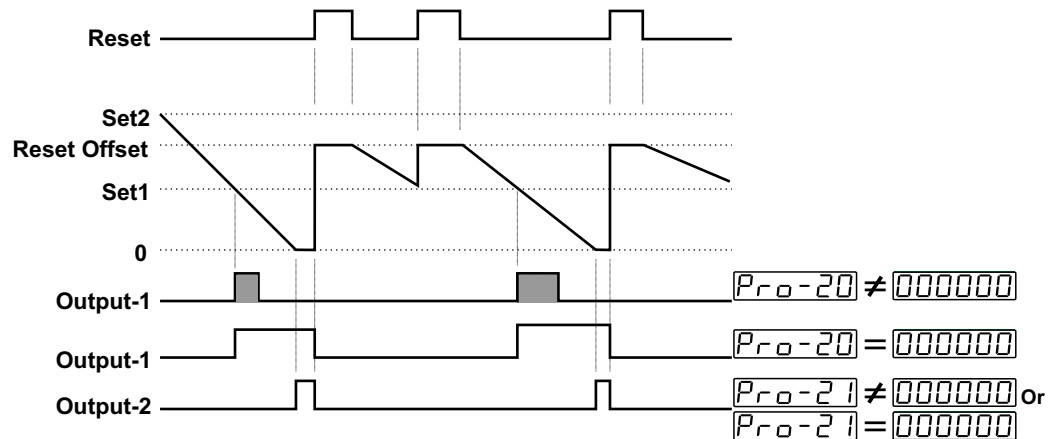
When the count value reaches to SET1 value, Output-1 becomes active. If Output-1 pulse time Pr0-20 is 000000, Output-1 does not change position until manual reset input is active. If Output-1 pulse time Pr0-20 is not 0, Output-1 becomes inactive at the end of the pulse time.

When the count value reaches to SET2 value, Output-2 becomes active. Counting does not continue over SET2 value. For starting to count manual reset input must be active. When Manual Reset happens, count value becomes Reset Offset value.

Output-2 Pulse Time Pr0-21 is not considered.

Counting direction : P 0 (Downcounting)

Pr0-04 = 000001



When the count value reaches to SET1 value, Output-1 becomes active. If Output-1 pulse time Pr0-20 is 000000, Output-1 does not change condition until manual reset input is active. If Output-1 pulse time Pr0-20 is not 0, Output-1 becomes inactive at the end of the pulse time.

When the count value reaches to 000000 value, Output-2 becomes active. Counting does not continue under 000000. For starting to count manual reset input must be active. When Manual Reset happens, count value becomes Reset Offset value.

Output-2 pulse time Pr0-21 is not considered.

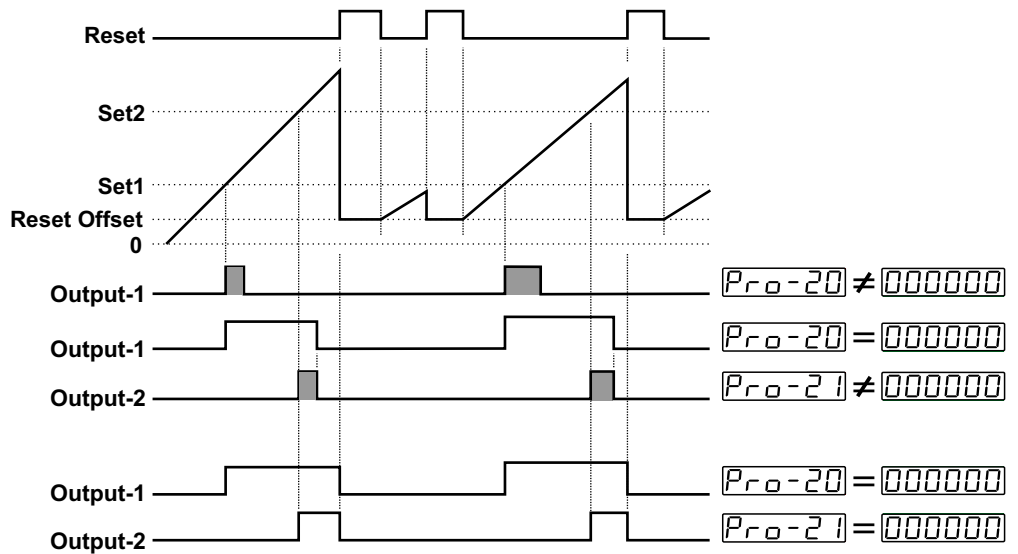
Pro-17 = 000003

### Manual Reset-3.

Counting continues until Manual Reset input is active.

Counting direction : 0 P (Upcount)

Pro-04 = 000000

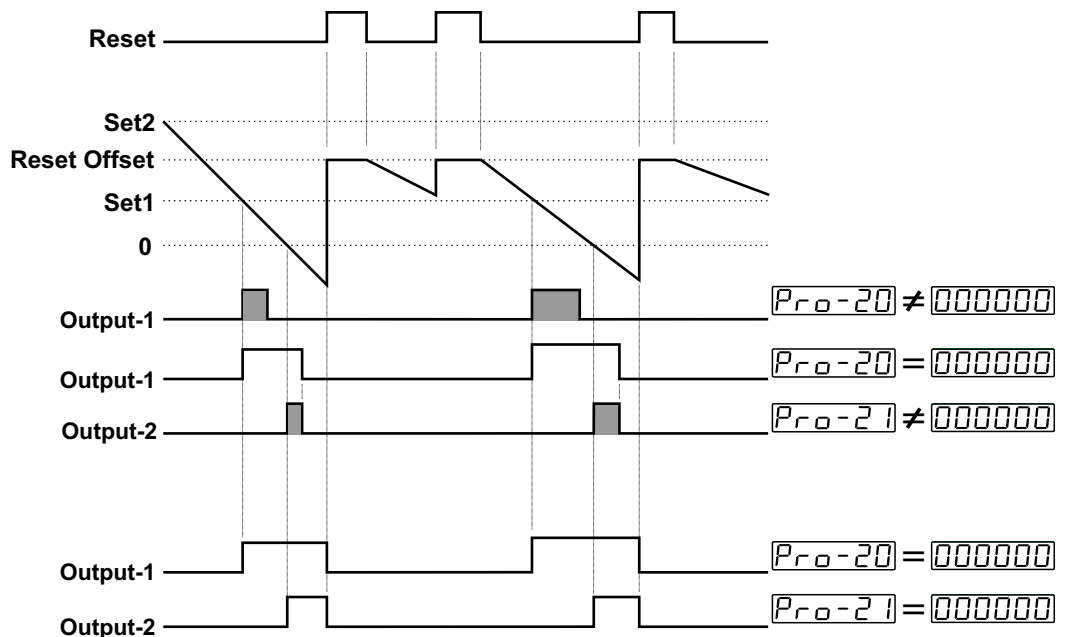


When the count value reaches to SET1 value, Output-1 becomes active. If Output-1 Pulse Time  $Pro-20$  is not 0, Output-1 changes position at the end of the pulse time. If Output-1 Pulse Time  $Pro-20$  is 000000, it changes position until Manual Reset input is active or according to Output-2.

When the count value reaches to SET2 value, Output-2 becomes active. Counting continues until manual reset input is active. If Output-2 Pulse Time  $Pro-21$  is not 0, Output-2 changes position at the end of the pulse time. In this case, if Output-1 is active, it becomes inactive with Output-2. When Manual Reset happens, count value becomes Reset Offset value.

Counting direction : P 0 (Downcount)

Pro-04 = 000001



When the count value reaches to SET1 value, Output-1 becomes active. If Output-1 pulse time  $Pr_0-20$  is not 0, Output-1 changes position at the end of the pulse time. If Output-1 Pulse Time  $Pr_0-20$  is  $000000$ , it changes position until Manual Reset input is active or according to Output-2.

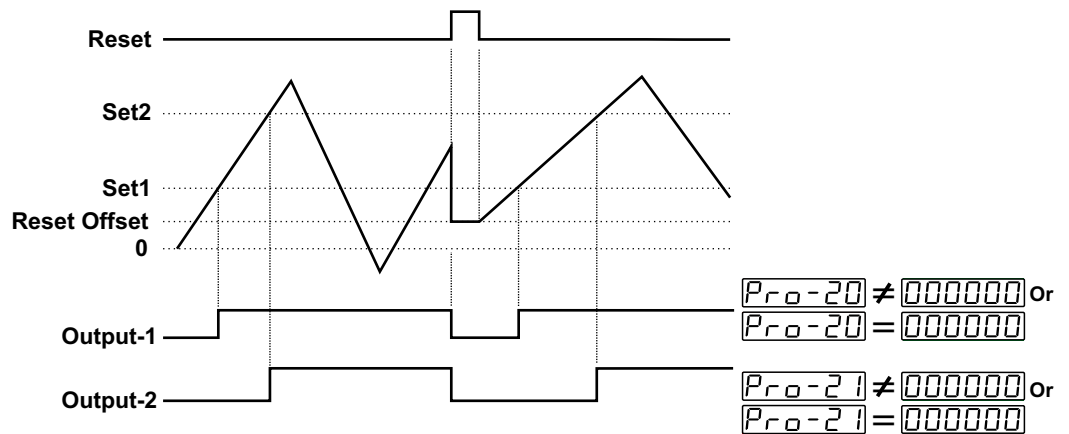
When count value reaches to  $000000$  value, Output-2 becomes active. Counting continues until manual reset input is active. If Output-2 Pulse time  $Pr_0-21$  is not 0, Output-2 changes position at the end of the pulse time. In this case, if Output-1 is active, it becomes inactive with Output-2. When Manual Reset happens, count value becomes Reset Offset value.

$Pr_0-17 = 000004$

#### Manual Reset-4.

Counting continues until Manual Reset input is active. Pulse times  $Pr_0-20$  and  $Pr_0-21$  is not considered.

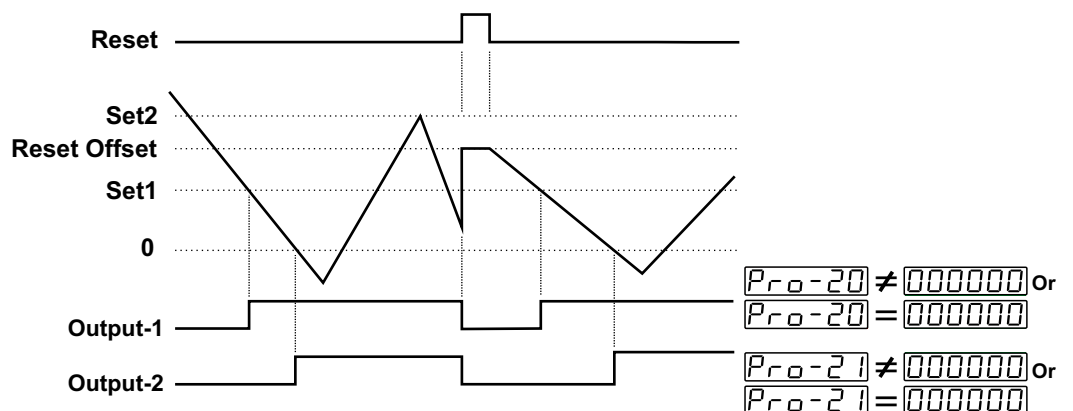
Counting direction : 0 P (Upcount)  $Pr_0-04 = 000000$



When the count value reaches to SET1 value, Output-1 becomes active. Output-1 does not change position until manual reset input is active. Output-1 pulse time  $Pr_0-20$  is not considered.

When the count value reaches to SET2 value, Output-2 becomes active. Output-2 does not change position until manual reset input is active. Output-2 pulse time  $Pr_0-21$  is not considered. When Manual Reset happens, count value becomes Reset Offset value.

Counting direction : P 0 (Downcount)  $Pr_0-04 = 000001$

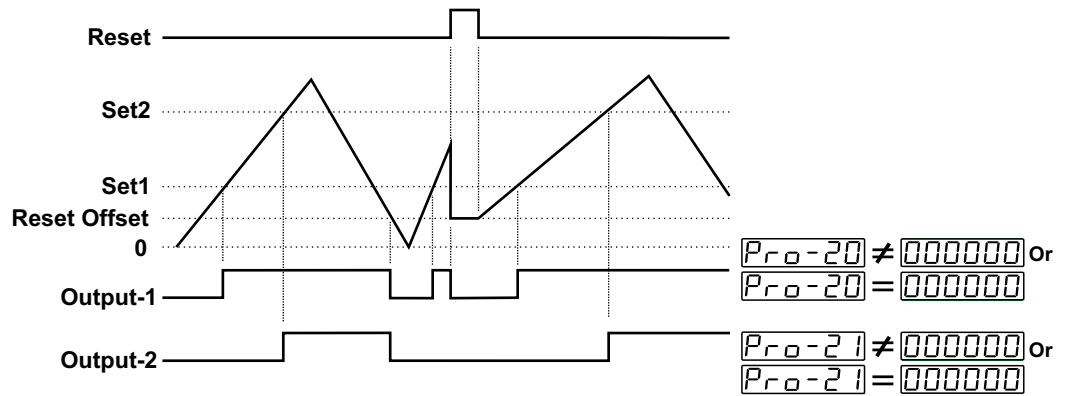


When the count value reaches to SET1 value, Output-1 becomes active. Output-1 does not change position until manual reset input is active. Output-1 pulse time  $Pr_0-20$  is not considered. When the count value reaches to  $000000$  value, Output-2 becomes active. Output-2 does not change position until manual reset input is active. Output-2 pulse time  $Pr_0-21$  is not considered. When Manual Reset happens, count value becomes Reset Offset value.

$Pr_0-17 = 000005$

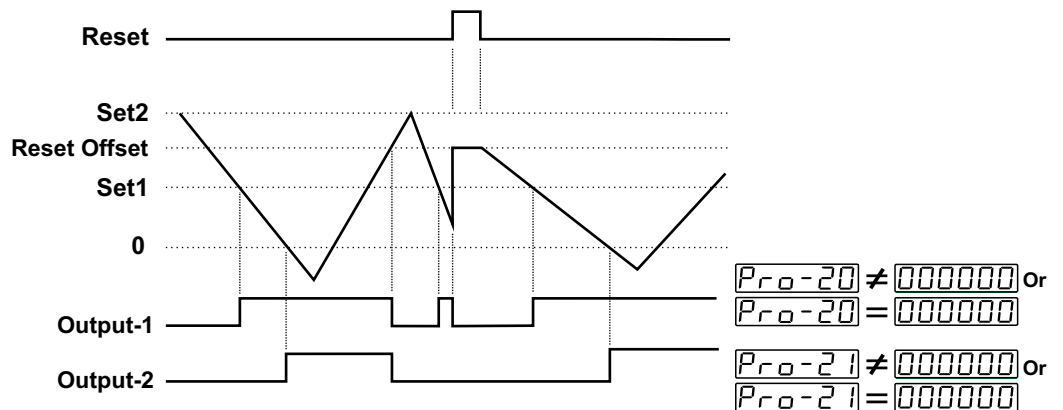
**Manual Reset-5.**  
**Counting continues until Manual Reset input is active.**  
**Pulse times  $Pr_0-20$  and  $Pr_0-21$  is not considered.**

Counting direction : 0 P (Upcount)  $Pr_0-04 = 000000$



When the count value reaches to SET1 value, Output-1 becomes active. Output-1 does not change, condition until manual reset input is active or Count value becomes equal to Reset Offset value. Output-1 pulse time  $Pr_0-20$  is not considered. When the count value reaches to SET2 value, Output-2 becomes active. Output-2 does not change, condition until manual reset input is active or Count value becomes equal to Reset Offset value. Output-1 pulse time  $Pr_0-21$  is not considered.

Counting direction : P 0 (Downcount)  $Pr_0-04 = 000001$

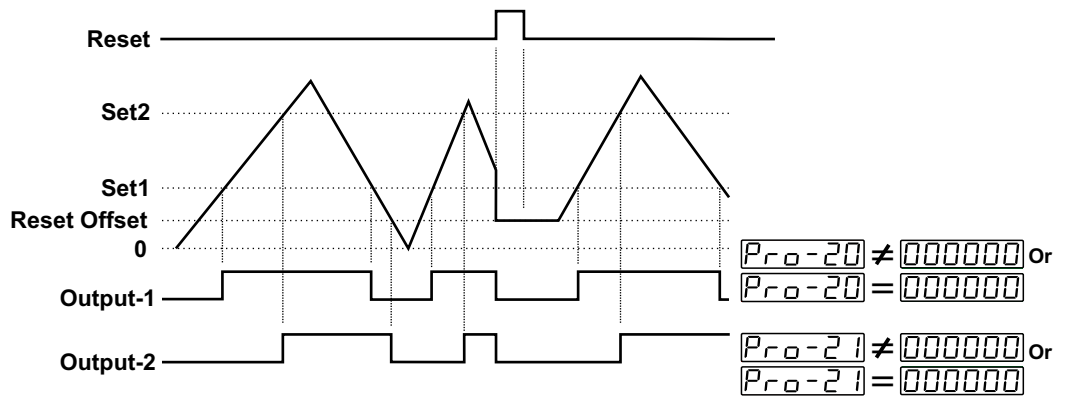


When the count value reaches to SET1 value, Output-1 becomes active. Output-1 does not change, condition until manual reset input is active or Count value becomes equal to Reset Offset value.  
 Output-1 pulse time  $Pr0-20$  is not considered.  
 When the count value reaches to  $000000$  value, Output-2 becomes active. Output-2 does not change, condition until manual reset input is active or Count value becomes equal to Reset Offset value.  
 Output-1 pulse time  $Pr0-21$  is not considered.

$Pr0-17 = 000006$

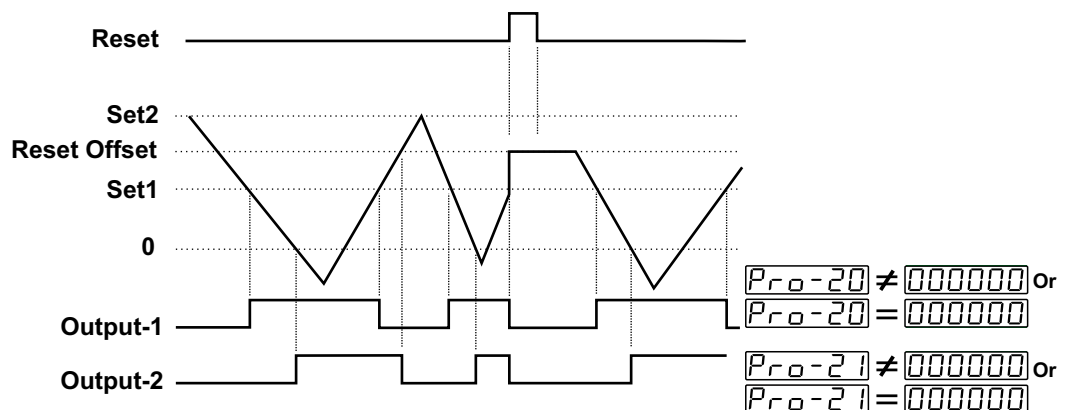
**Manual Reset-6.**  
**Counting continues until Manual Reset input is active.**  
**(Output-2 Pulse Time  $Pr0-21$  is not considered)**

Counting direction : 0 P (Upcount)  $Pr0-04 = 000000$



When count value reaches to SET1 value, Output-1 becomes active. If Output-1 pulse time  $Pr0-20$  is  $000000$ , Output-1 does not change condition until manual reset input is active. If Output-1 pulse time  $Pr0-20$  is not 0, at the end of the pulse time Output-1 becomes inactive.  
 When count value reaches to SET2 value, Output-2 becomes active. Output-2 does not change, condition until manual reset input is active or Count value becomes equal to Reset Offset value.  
 Output-2 pulse time  $Pr0-21$  is not considered.

Counting direction : P 0 (Downcount)  $Pr0-04 = 000001$



When count value reaches to SET1 value, Output-1 becomes active. If Output-1 pulse time  $Pr_o-20$  is  $000000$ , Output-1 does not change condition until manual reset input is active. If Output-1 pulse time  $Pr_o-20$  is not 0, at the end of the pulse time Output-1 becomes inactive.

When count value reaches to  $000000$  value, Output-2 becomes Active. Output-2 does not change, condition until manual reset input is active or Count value becomes equal to Reset Offset value.

Output-2 pulse time  $Pr_o-21$  is not considered.

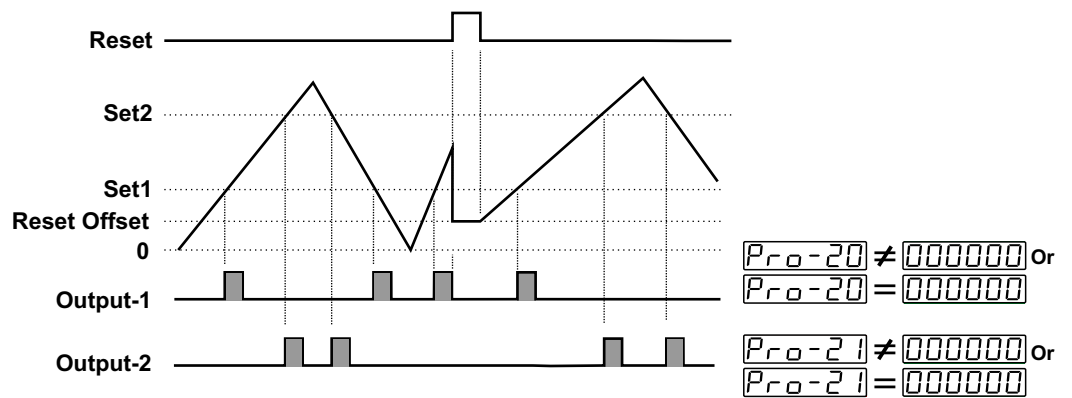
$Pr_o-17 = 000007$

**Manual Reset-7.**

**Counting continues until Manual Reset input is active.**

**Counting direction : 0 P (Upcount)**

$Pr_o-04 = 000000$

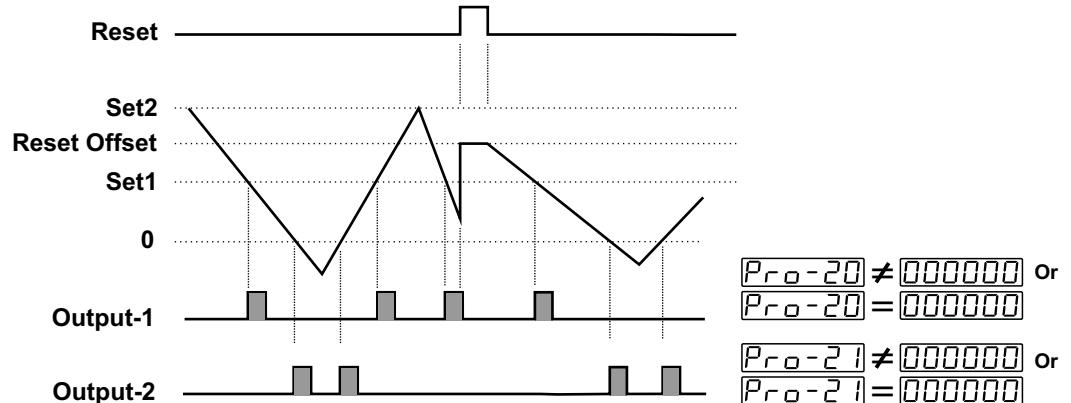


When count value reaches to SET1 value, Output-1 becomes active. If Output-1 pulse time  $Pr_o-20$  is  $000000$ , Output-1 does not change condition until manual reset input is active. If Output-1 pulse time  $Pr_o-20$  is not 0, at the end of the pulse time Output-1 becomes inactive.

When count value reaches to SET2 value, Output-2 becomes active. If Output-2 pulse time  $Pr_o-21$  is  $000000$ , Output-2 does not change condition until manual reset input is active. If Output-2 pulse time  $Pr_o-21$  is not 0, at the end of the pulse time Output-2 becomes inactive.

**Counting direction : P 0 (Downcount)**

$Pr_o-04 = 000001$

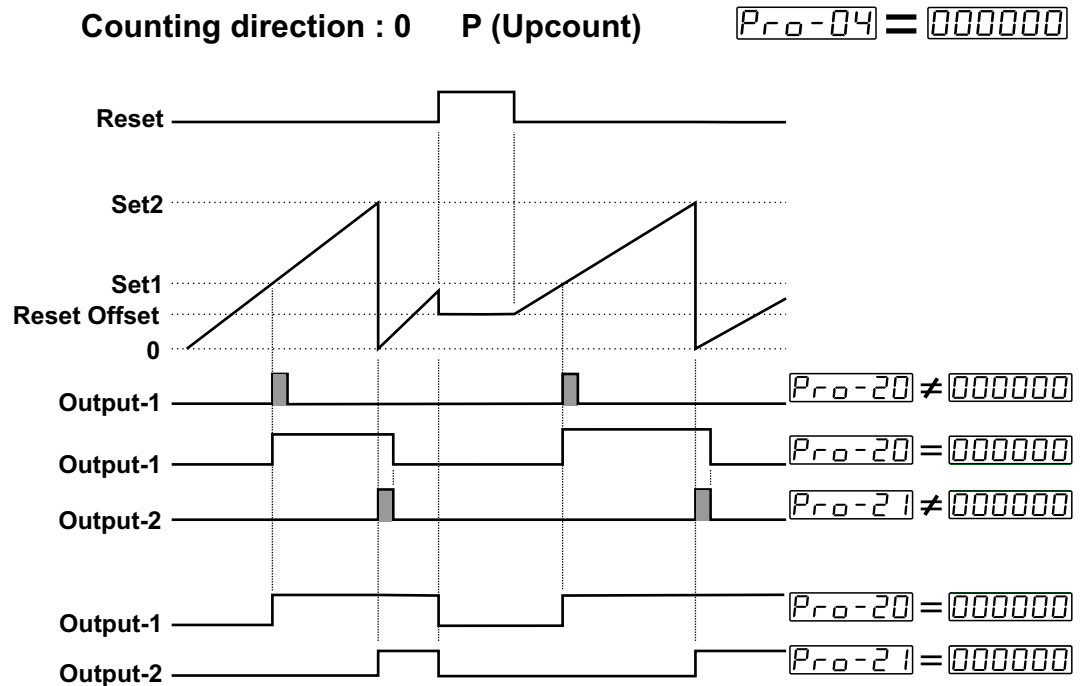




When count value reaches to SET1 value, Output-1 becomes active. If Output-1 pulse time  $Pr_{o-20}$  is  $000000$ , Output-1 does not change condition until manual reset input is active. If Output-1 pulse time  $Pr_{o-20}$  is not 0, at the end of the pulse time Output-1 becomes inactive.

When count value reaches to  $000000$  value, Output-2 becomes active. If Output-2 pulse time  $Pr_{o-21}$  is  $000000$ , Output-2 does not change condition until manual reset input is active. If Output-2 pulse time  $Pr_{o-21}$  is not 0, at the end of the pulse time Output-2 becomes inactive.

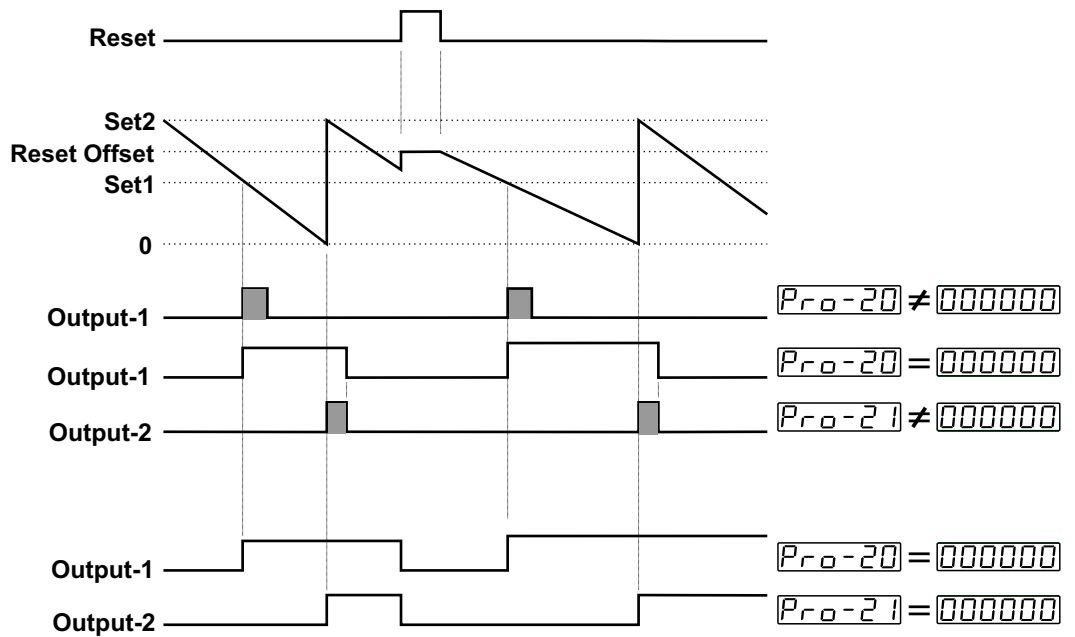
$Pr_{o-17} = 000008$  Automatic Reset-1.



When the count value reaches to SET1 value, Output-1 becomes active. If Output-1 pulse time  $Pr_{o-20}$  is not 0, Output-1 changes position at the end of the pulse time. If Output-1 Pulse Time  $Pr_{o-20}$  is  $000000$ , it changes position until Manual Reset input is active or according to Output-2 position.

When the count value reaches to SET2 value, Output-2 becomes active. Count value is reset. If Output-2 pulse time  $Pr_{o-21}$  is not 0, Output-2 changes position at the end of the pulse time. In this case, if Output-1 is active, it becomes inactive with Output-2.

Counting Direction : P 0 (Downcount)  $Pr0-04 = 000001$



When the count value reaches to SET1 value, Output-1 becomes active. If Output-1 pulse time  $Pr0-20$  is not 0, Output-1 changes position at the end of the pulse time. If Output-1 Pulse Time  $Pr0-20$  is  $000000$ , it changes position until Manual Reset input is active or according to Output-2 position.

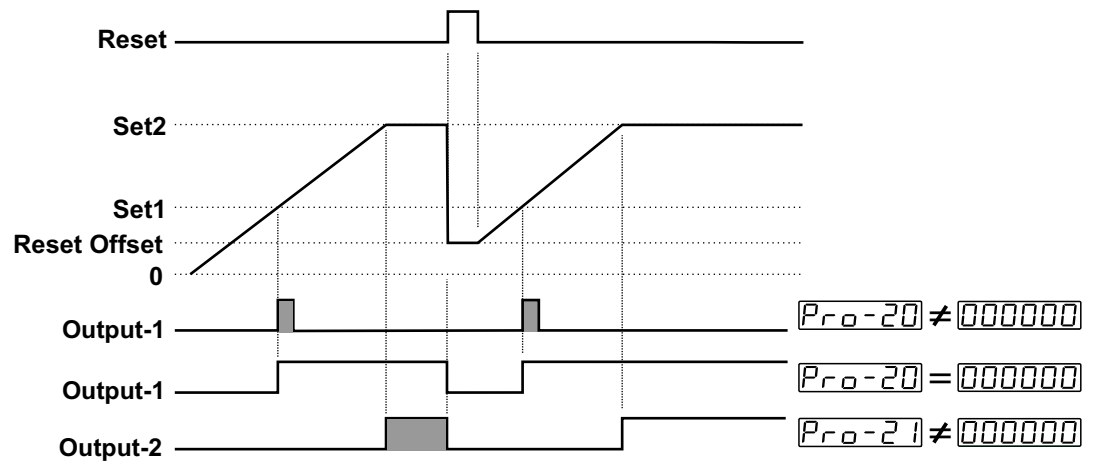
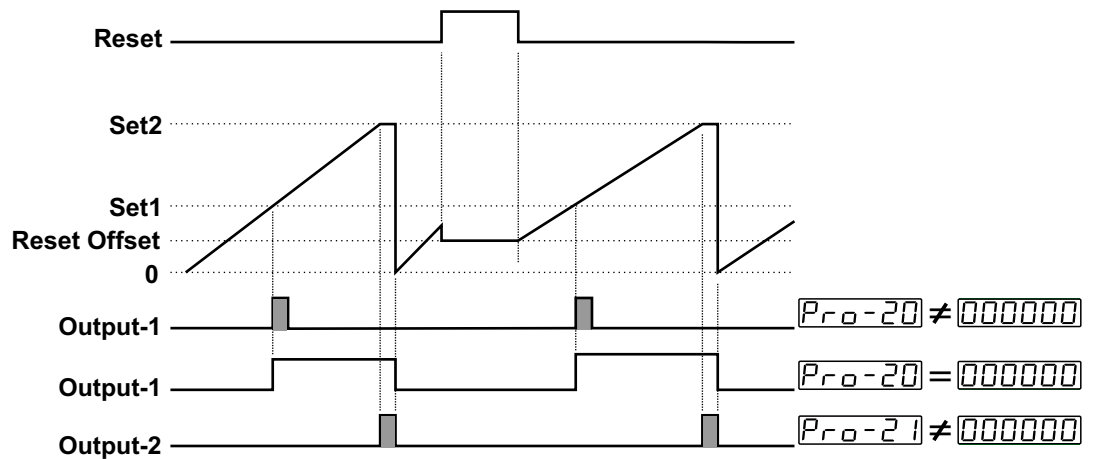
When the count value reaches to  $000000$  value, Output-2 becomes active. Count value becomes equal to Set-2 value and counting is started again. If Output-2 pulse time  $Pr0-21$  is not 0, Output-2 changes position at the end of the pulse time. In this case, if Output-1 is active, it becomes inactive with Output-2.

Pr0-17=000009

### Automatic Reset-2.

Counting direction : 0 P (Upcount)

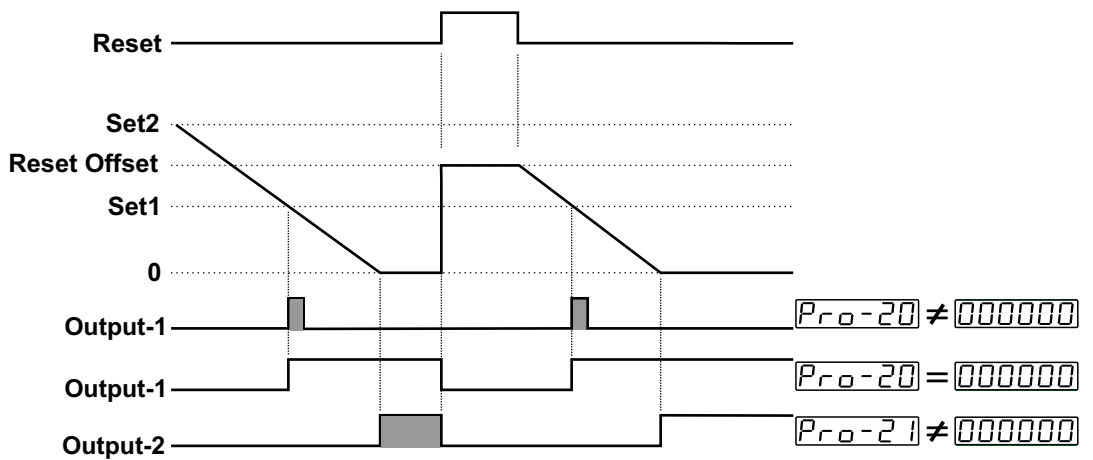
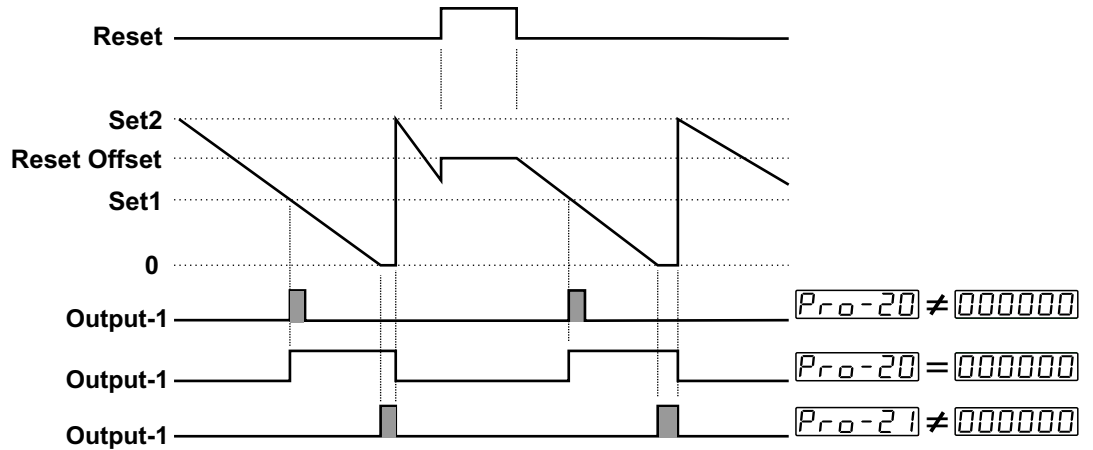
Pr0-04 = 000000



When the count value reaches to SET1, Output-1 becomes active. If Output-1 pulse time  $Pr0-20$  is not 0, Output-1 changes position at the end of the pulse time. If Output-1 Pulse Time  $Pr0-20$  is 000000, it changes position until Manual Reset input is active or according to Output-2 position.

When the count value reaches to SET2, Output-2 becomes active. Counting is stopped. If Output-2 pulse time  $Pr0-21$  is not 0, count value is reset and Output-2 becomes inactive at the end of the pulse time. In this case, if Output-1 is active, it becomes inactive with Output-2.

Counting direction : P 0 (Downcount)  $Pr_0-04 = 000001$

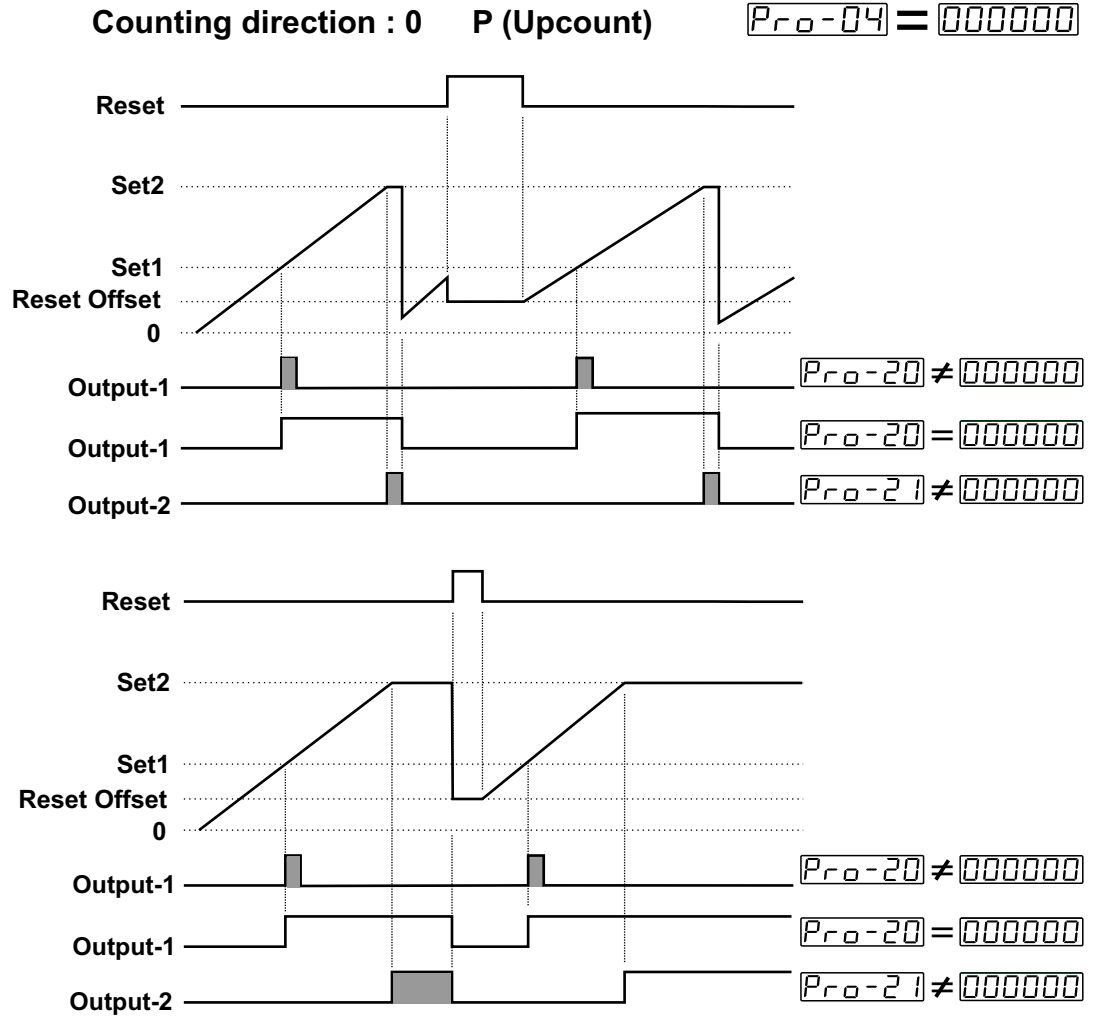


When the count value reaches to SET1, Output-1 becomes active. If Output-1 pulse time  $Pr_0-20$  is not 0, Output-1 changes position at the end of the pulse time. If Output-1 Pulse Time  $Pr_0-20$  is  $000000$ , it changes position until Manual Reset input is active or according to Output-2 position.

When the count value reaches to  $000000$  value, Output-2 becomes active. Counting is stopped. If Output-2 pulse time  $Pr_0-21$  is not 0, count value becomes equal to SET2 value, counting is started again and Output-2 becomes inactive. In this case, if Output-1 is active, it becomes inactive with Output-2.

Pro-17 = 0000 10

### Automatic Reset-3.

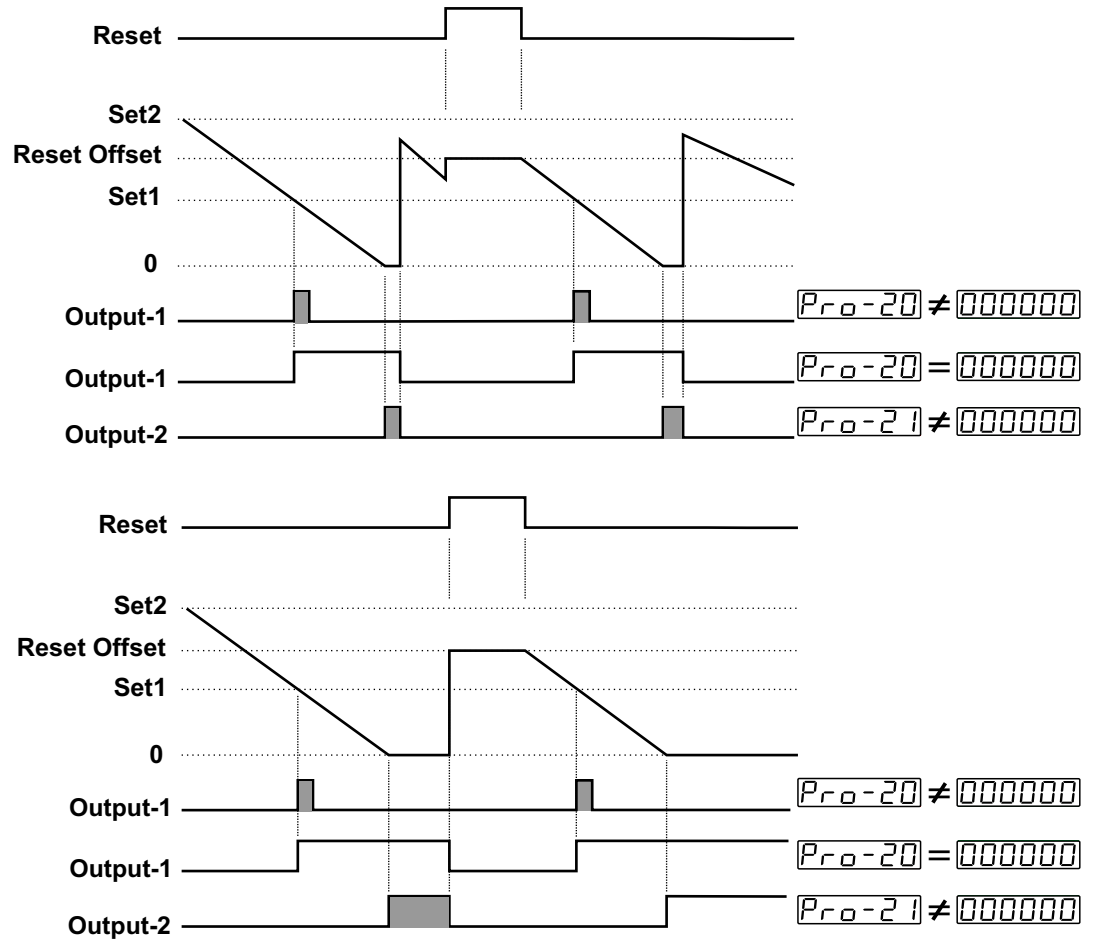


When the count value reaches to SET1, Output-1 becomes active. If Output-1 pulse time  $Pro-20$  is not 0, Output-1 changes position at the end of the pulse time. If Output-1 Pulse Time  $Pro-20$  is 000000, it changes position until Manual Reset input is active or according to Output-2 position.

When the count value reaches to SET2, Output-2 becomes active and count value is reset.

When the count value reaches to SET2, Output-2 becomes active and count value is reset. But SET2 value is observed in actual value display. If Output-2 pulse time  $Pro-21$  is not 0, count value is observed in actual value display and Output-2 becomes inactive. In this case, if Output-1 is active, it becomes inactive with Output-2.

Counting direction : P 0 (Downcount)  $Pr_0-04 = 000001$



When the count value reaches to SET1, Output-1 becomes active. If Output-1 pulse time  $Pr_0-20$  is not 0, Output-1 changes position at the end of the pulse time. If Output-1 Pulse Time  $Pr_0-20$  is  $000000$ , it changes position until Manual Reset input is active or according to Output-2 position.

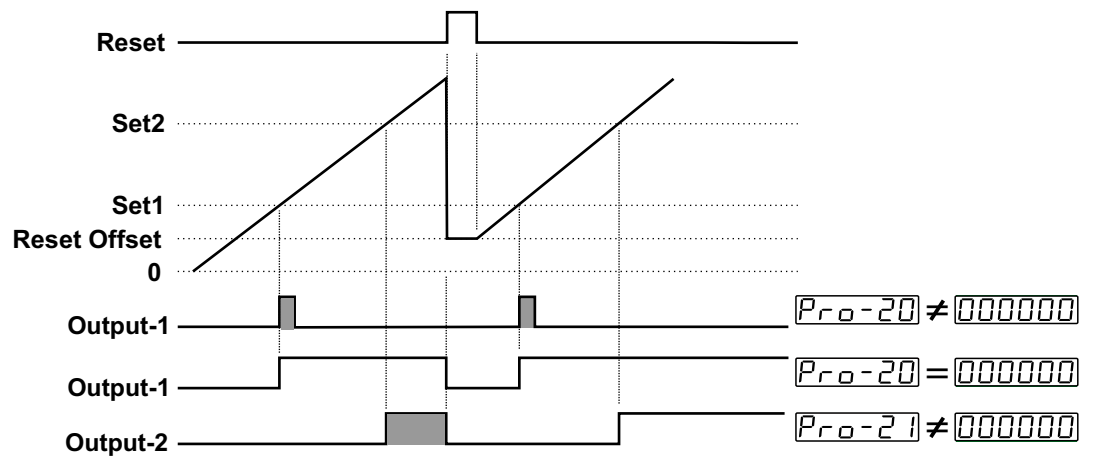
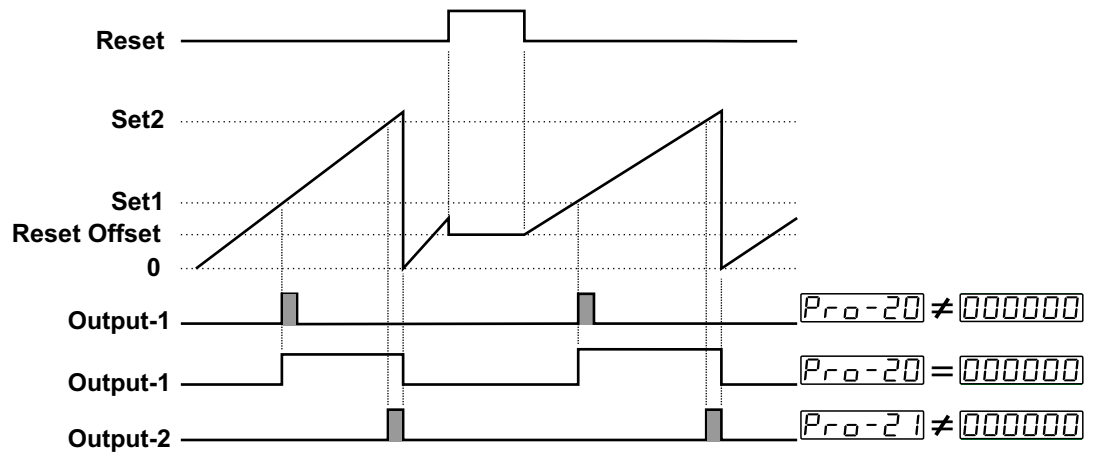
When the count value reaches to  $000000$  value, Output-2 becomes active, count value becomes equal to SET2 and counting continues. But  $000000$  is observed in actual value display. If Output-2 pulse time  $Pr_0-21$  is not 0, count value is observed in actual value screen and Output-2 becomes inactive at the end of the pulse time. In this case, if Output-1 is active, it becomes inactive with Output-2.

Pr0-17 = 000011

### Automatic Reset-4.

Counting direction : 0 P (Upcount)

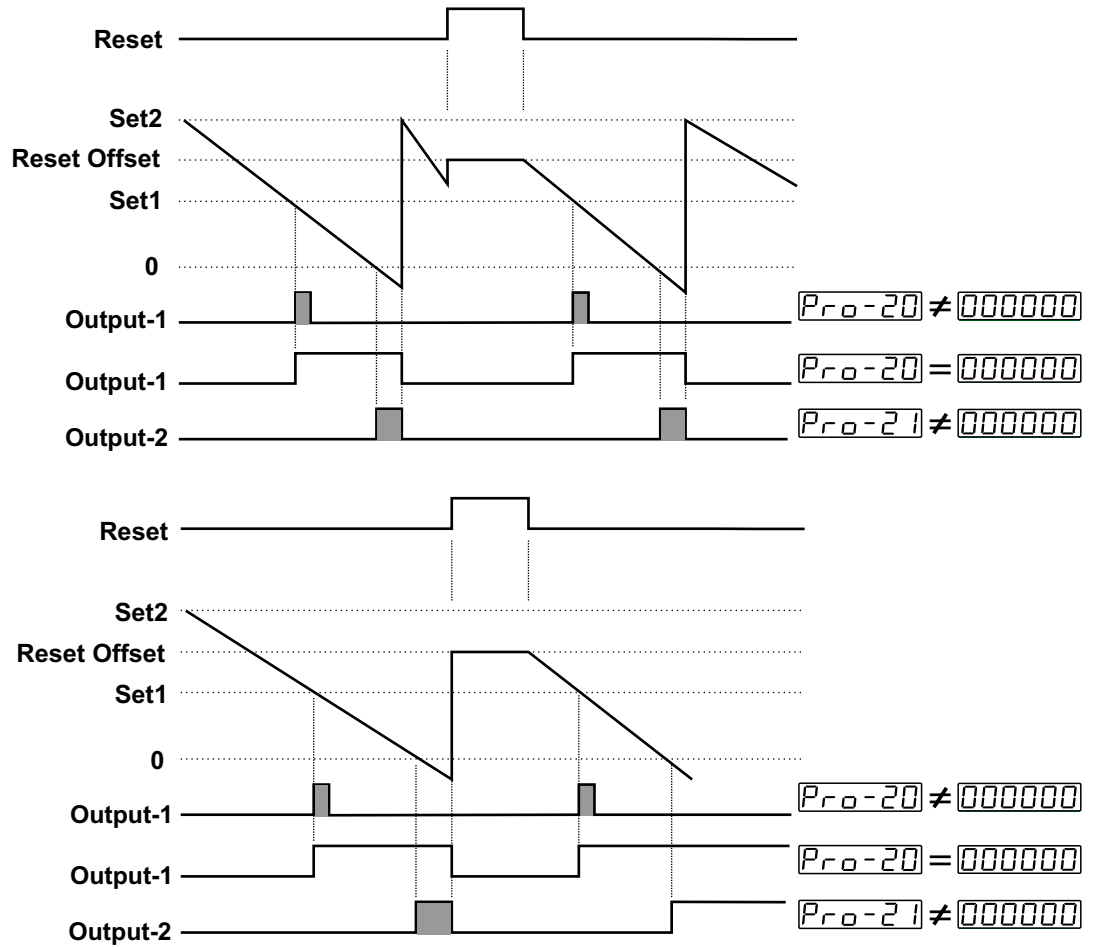
Pr0-04 = 000000



When the count value reaches to SET1, Output-1 becomes active. If Output-1 pulse time  $Pr0-20$  is not 0, Output-1 changes position at the end of the pulse time. If Output-1 Pulse Time  $Pr0-20$  is 000000, it changes position until Manual Reset input is active or according to Output-2 position.

When the count value reaches to SET2, Output-2 becomes active and counting continues over 0. If Output-2 pulse time  $Pr0-21$  is not 0, count value is reset and Output-2 becomes inactive at the end of the pulse time. In this case, if Output-1 is active, it becomes inactive with Output-2.

Counting Direction : P 0 (Downcount)  $Pr0-04 = 000001$



When the count value reaches to SET1, Output-1 becomes active. If Output-1 pulse time  $Pr0-20$  is not 0, Output-1 changes position at the end of the pulse time. If Output-1 Pulse Time  $Pr0-20$  is  $000000$ , it changes position until Manual Reset input is active or according to Output-2 position.

When count value reaches to  $000000$  value, Output-2 becomes active and counting continues under 0. If Output-2 pulse  $Pr0-21$  time is not 0, count value becomes equal to SET2 and Output-2 becomes inactive. In this case, if Output-1 is active, it becomes inactive with Output-2.



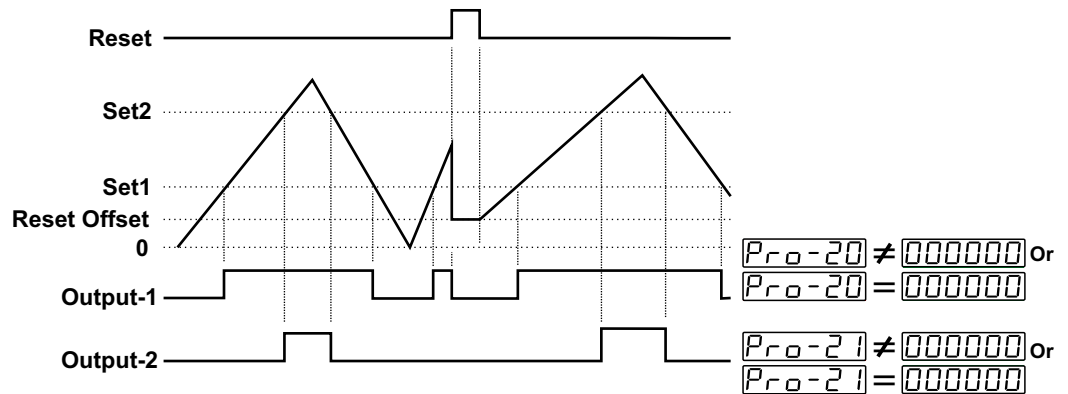
Pro-17 = 0000 12

### Automatic Reset-5.

Pulse times  $Pro-20$  and  $Pro-21$  is not considered.

Counting direction : 0 P (Upcount)

$Pro-04 = 000000$

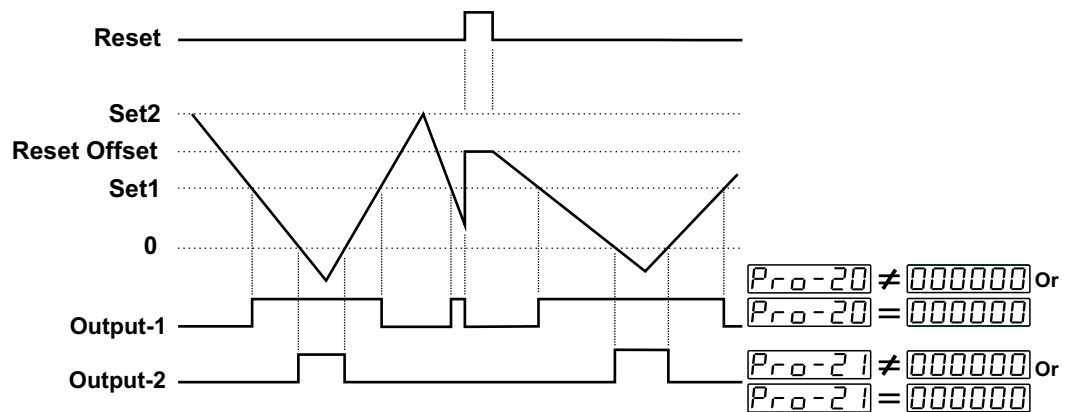


If count value is equal or greater than SET1 value, then Output-1 becomes active. Output-1 pulse time  $Pro-20$  is not considered.

If count value is equal or greater than SET2 value, then Output-2 becomes active. If count value is less than SET2 value, Output-2 becomes inactive. Output-2 pulse time  $Pro-21$  is not considered.

Counting direction : P 0 (Downcount)

$Pro-04 = 000001$



If count value is equal or less than SET1 value, then Output-1 becomes active. If it is greater than SET1 value, Output-1 becomes inactive. Output-1 pulse time  $Pro-20$  is not considered.

If count value is equal or less than  $000000$  value, then Output-2 becomes active. If count value is greater than  $000000$  value, then Output-2 becomes inactive. Output-2 pulse time  $Pro-21$  is not considered.

Pro-18

**Output-1 Operation Form**  
( Default = 0 ) MODBUS ADDRESS:40023.

000000

Output-1 Normally non-energised.

000001

Output-1 Normally energised.

Pro-19

**Output-2 Operation Form**  
( Default = 0 ) MODBUS ADDRESS:40024.

000000

Output-2 Normally non-energised.

000001

Output-2 Normally energised.

Pro-20

**Output-1 Pulse Time**  
( Default = 0000.00 ) MODBUS ADDRESS:40025.

It determines how long Output-1 will be active.

It can be adjusted from 000000 to 009999 seconds.

If it is 000000 second, then it operates indefinitely.

For details, refer to the section where output functions Pro-17 are defined.

Pro-21

**Output-2 Pulse Time**  
( Default = 0000.00 ) MODBUS ADDRESS:40026.

It determines how long Output-2 will be active.

It can be adjusted from 000000 to 009999 seconds.

If it is 000000 second, then it operates indefinitely.

For details, refer to the section where output functions Pro-17 are defined.

Pro-22

**Max Set Value**  
(Default=999999)MODBUS ADDRESS: LOW WORD=40027,HIGH WORD= 40028.

Maximum value for Set Values.

It can be adjusted from 000000 to 999999 .

Pro-23

**Min Set Value**  
(Default=000000)MODBUS ADDRESS: LOW WORD=40029,HIGH WORD= 40030.

Minimum value for Set Values.

It can be adjusted from 000000 to 999999 .

Pro-24

**Display Type Selection**  
( Default = 0 ) MODBUS ADDRESS:40031.

000000

Display value is incremental encoder counter value.

000001

Display value is calculated value.

Pro-25

**Saving Count Value (Power down back-up)**  
(Default = 0) MODBUS ADDRESS:40032.

000000

Count value is saved to memory when power is disconnected and restored on power up.

000001

Count value is not saved to memory when power is disconnected. When power up 000000 is shown on the screen.

Pro-26

**Slave Address**  
(Default = 1) MODBUS ADDRESS:40033.

Device address for serial communication bus.  
It can be adjusted from 000001 to 000247.

Pro-27

**Communication Parity Selection**  
(Default = 0) MODBUS ADDRESS:40034.

000000

No parity.

000001

Odd Parity.

000002

Even Parity.

Pro-28

**Baud Rate**  
(Default = 1) MODBUS ADDRESS:40035.

000000

4800 Baud Rate.

000001

9600 Baud Rate.

000002

19200 Baud Rate.

000003

38400 Baud Rate.

Pro-29

**Communication Stop Bit selection**  
(Default = 0) MODBUS ADDRESS:40036.

000000

1 Stop Bit.

000001

2 Stop Bits.

Pro-30

**Return to Factory Settings**  
( Default = 0 ) MODBUS ADDRESS:40037.

Restore all settings to factory default. This parameter has a special password.

Pro-PS

**Program Password**  
( Default = 0 ) MODBUS ADDRESS:40038.

It is used for accessing to the program parameters. It can be adjusted from 000000 to 009999 .

If it is 000000 , there is no password protection while accessing to the parameters.

When programming button is pressed, ProG will appear on the display.

If program password is not "0" while accessing to the program parameters ;

1- If user does not enter the Password value correctly ; operation screen will appear without entering to operator parameters.

2- When Password in top display and 000000 in bottom display, if user presses ENTER button without entering password (for observing the parameters):

User can see all parameters except Program Password but device does not allow to do any changes with parameters.

( Please refer to Section 7. Failure Messages in EZM-4931 Programmable Counter (1) )

## 6. Read Input Register Command

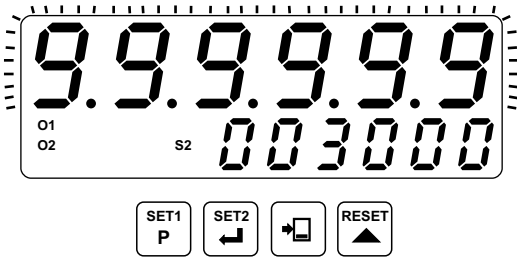
Input registers can not be changed by the user. Input registers can be only read.

<b>Adres</b>	<b>Parameter Name</b>	<b>Range</b>
30001	Preset Active Value Signed	0 – Positive / 1 – Negative
30002	Preset Active Value High	0 - 1
30003	Preset Active Value Low	0 - 65535
30004	None	0
30005	None	0
30006	NPN / PNP Status	0 – NPN / 1 – PNP
30007	None	0
30008	Out1 Status	0 – Passive / 1 – Active
30009	Out2 Status	0 – Passive / 1 – Active
30010	SSR1 Status	0 – Passive / 1 – Active
30011	SSR2 Status	0 – Passive / 1 – Active
30012	None	0
30013	Count Active Value High	0 - 1
30014	Count Active Value Low	0 - 65535
30015	Device Type & Revision	0 - 65535
30016	Display Decimal Point	0 - 4
30017	Set Point-1 Value High	0 - 1
30018	Set Point-1 Value Low	0 - 65535
30019	Set Point-2 Value High	0 - 1
30020	Set Point-2 Value Low	0 - 65535

## 7. Failure Messages in EZM-4931 Programmable Counter

1-If the password is not **000000**, user can access to the parameters without entering the password and by pressing ENTER button.

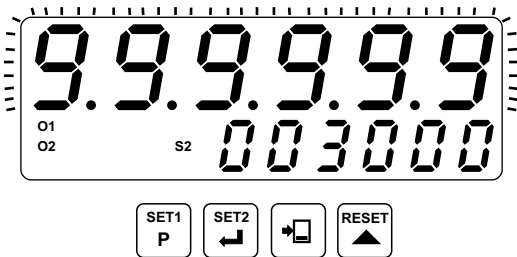
User can see all parameters except for programming password parameter **Prd-PS** but user can not do any changes in parameters. If password is entered for accessing to the parameters correctly, most significant digit of the parameter flashes. But if the password is not entered, flashing of the most significant digit is not realised.



2-If Actual Value is flashing;

It appears if any of the count value is greater than the maximum count value.

To remove this warning and reset the count value press RESET button.



3-If Actual Value is flashing and counting is stopped ;  
It appears if any of the count value is lower than the minimum count value.

To remove this warning and reset the count value press RESET button.

## 8. Specifications

<b>Device Type</b>	: Programmable Counter.
<b>Housing &amp; Mounting</b>	: 96mm x 48mm x 86.5mm 1/8 DIN 43700 plastic housing. For panel mounting. Panel cut-out is 92x46mm.
<b>Protection Class</b>	: NEMA 4X (IP65 at front, IP20 at rear).
<b>Weight</b>	: Approximately 0.29 Kg.
<b>Environmental Ratings</b>	: Standard, indoor at an altitude of less than 2000 meters with none condensing humidity.
<b>Storage / Operating Temperature</b>	: -40 °C to +85 °C / 0 °C to +50 °C.
<b>Storage / Operating Humidity</b>	: 90 % max. (None condensing).
<b>Installation</b>	: Fixed installation.
<b>Over Voltage Category</b>	: II.
<b>Pollution Degree</b>	: II. Office or workplace, none conductive pollution.
<b>Operating Conditions</b>	: Continuous.
<b>Supply Voltage and Power</b>	: 230 V ~ (-%15 / +%10) 50/60 Hz. 6VA. 115 V ~ (-%15 / +%10) 50/60 Hz. 6VA. 24 V ~ (-%15 / +%10) 50/60 Hz. 6VA. 24 V = (-%15 / +%10) 6W.
<b>Electrical Characteristics Of Digital Inputs</b>	: Rated voltage : 16 V = @ 5mA. Maximum continuous permissible voltage : 30 V =. Logic 1 minimum level : 3 V =. Logic 0 maximum level : 2 V =.
<b>Maximum Input Frequency</b>	: If $\overline{PrO-02}$ = 0 ; 200 kHz. If $\overline{PrO-02}$ = 1 ; 100 kHz. If $\overline{PrO-02}$ = 2 ; 50 kHz. If $\overline{PrO-02}$ = 3 ; 25 kHz. If $\overline{PrO-02}$ = 4 ; 12 kHz.
<b>Output Types</b>	: -Relay Output on Resistive Load 5A@250V~. 100.000 operation (Full Load). - SSR Driver Output. (Max 10mA@5V = ).
<b>Optional Communication Type</b>	: RS-232 Communication.
<b>Communication Protocol</b>	: MODBUS RTU.
<b>Process Display</b>	: 13 mm Red 6 digit LED display.
<b>Set Display</b>	: 8 mm Green 6 digit LED display.
<b>Led Indicators</b>	: SV1 (Set1 value), SV2 (Set2 value), O1 / 2 (Control Output ) LEDs.
<b>Approvals</b>	: GOST-R, C E .