

СИ20

Pulse counter



User guide

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Warning notice system

Explanation of the symbols and keywords used:



DANGER

DANGER indicates an **imminent dangerous situation** that will result in death or serious injuries if not prevented.



CAUTION

CAUTION indicates a **potentially dangerous situation** that could result in minor injuries.



NOTICE

NOTICE indicates a **potentially dangerous situation** that could result in damage to property.



NOTE

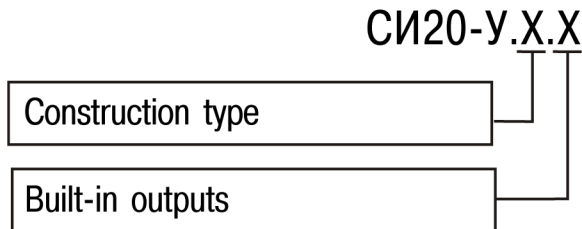
NOTE indicates helpful tips and recommendations, as well as information for efficient and trouble-free operation.

Introduction

This document provides detailed information about the operation principle, design, configuration, installation and maintenance of the pulse counter CI20, hereinafter referred to as Device.

Connection, setup and maintenance should be made only by qualified specialists after reading this manual.

The device is produced in various modifications, that are encrypted in code of full conventional designation.



Construction type:

H – wall-mounting housing;

Ц1 – panel-mounting housing (square front panel, 96x96 mm);

Ц2 – panel-mounting housing (rectangular front panel, 96x48 mm).

Built-in outputs:

P – electromagnetic relay;

К – transistor optocoupler of *n-p-n* type;

С – triac optocoupler.

The example of designation used for ordering and in other products documentation:

Pulse counter **СИ20-У.Щ1.Р ТУ 4278-009-46526536-2012.**

1 Purpose and Function

The Device is a universal counter that can be used for a wide range of automation tasks. It is designed to count the number of pulses coming to its inputs in direct and opposite direction and to convert further this number into a physical value (using multiplication by given multiplier).

The device allows to perform the following functions:

- count-up pulses from the connected sensors;
- converting the number of pulses into real units of measurement;
- powering sensors from the built-in 24 V DC power source;
- load control by two built-in output;
- saving counting results when power is turned off.

2 Specifications

2.1 Specifications

Main technical specification of the device is given in *Table 2.1*.

Table 2.1 – Device features

Item	Value
Power supply	
AC: <ul style="list-style-type: none">• supply voltage• frequency	90...264 V (nominal values – 110, 220 or 240 V) 47...63 Hz (nominal values – 50 and 60 Hz)
DC:	20...34 V (nominal value – 24 V)
Maximum power consumption	max. 5 VA

Table 2.1 (continued)

Item	Value
Inputs	
Number of control inputs	4
Current sensors poll	2 mA
Nominal supply voltage of the sensors	24 V
Internal power supply	
Nominal DC voltage	24 V
Maximum output current	50 mA
Instability of output supply voltage	max. 10 %
Pulsation level, max.	100 mV
Pulse counter	
Number of display digits	6
Counting speed	max. 2 500 Hz
Duration of input pulses	min. 200 μ s
Range of values of the multiplier	from 0.00001 to 99999
Frequency of input filter	1...2500 Hz
Pulse ratio	min. 2
Limit of permissible basic error (according to GOST24907)	± 1 junior digit
Outputs	
Number of outputs	1
Current switched by relay contacts	max. 8 A (at 220 V AC and $\cos \varphi > 0.4$)

Table 2.1 (continued)

Item	Value
Current of transistor optocoupler load	max. 0.4 A (at 50 V)
Current of optotriac load	max. 0.4 A
Housing	
Dimensions: wall-mounting H panel-mounting Ц1 panel-mounting Ц2	105 × 130 × 65 mm 96 × 96 × 65 mm 96 × 48 × 100 mm
Protection class: wall-mounting H panel-mounting Ц1 and Ц2	IP44 IP54 (front panel side)
Device features	
Weight, max.	1 kg
Average service life	8 years

2.2 Operating conditions

The device is designed for operation in following conditions:

- closed explosion-proof rooms without aggressive vapors and gases;
- ambient temperature from -20 to +70 °C;
- upper limit of relative humidity is max. 95 % at 35 °C and lower temperatures without moisture condensation;
- atmospheric pressure from 84 to 106.7 kPa.

In terms of resistance to electromagnetic influences and the level of radiated radio interference, the device corresponds to class A equipment in accordance with GOST 51522-1999 (IEC 61326-1).

In terms of resistance to mechanical influences during operation the device corresponds to group of performance N2 in GOST R 52931-2008.

According to the resistance to climatic impacts during operation, the device corresponds to the execution group V4 according to GOST R 52931-2008.

**NOTICE**

Requirements in terms of external influencing factors are mandatory as related to safety requirements.

3 Security measures

**CAUTION**

There is life-threatening voltage of up to 250 V on terminal block. Any connections to the device and maintenance work should be carried out only when the device power is turned off.

By the method of protection from electric shock the device corresponds to class II according to GOST 12.2.007.0-75.

While operating, maintaining and checking, it is necessary to comply with GOST 12.3.019-80, Rules of the technical operation of electrical consumers and Safety rules for operating electrical equipment.

Do not allow moisture to contact the output connector and the internal electrical elements of the device. It is forbidden to use the device in corrosive environments containing acids, alkalis, oils, etc. in the atmosphere.

4 Mounting

4.1 Installation of device in housing H

To connect Device:

1. Fasten the bracket with three M4 × 20 screws on the surface intended for mounting the Device (see *Figure 4.2*).



NOTICE

Bracket mounting screws are not included.

2. Hook the fixing bracket from the back panel of device to the upper edge of the wall bracket.
3. Attach device to the bracket with the supplied screw.

Demount the device in the reverse order.



NOTICE

Remove the cover before wiring. Fasten the base of the device to the bracket with a supplied screw.

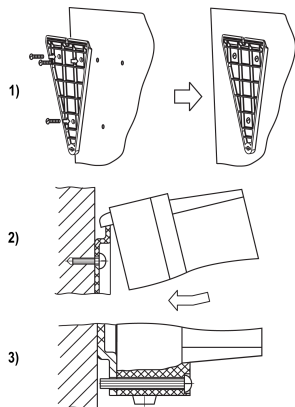


Figure 4.1 – Installation of wall-mounting device

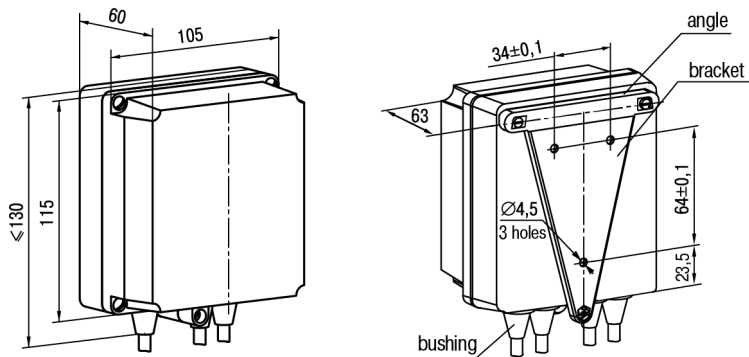


Figure 4.2 – Dimensions of H housing



NOTICE

The bushings need to be cut in accordance with the diameter of the lead-in cable.

4.2 Installation of device in housing Щ1

To connect Device:

1. Prepare a place for mounting on the control panel (see *Figure 4.4*).
2. Install the gasket on the frame of the device to ensure degree of protection IP54.
3. Insert the device into a specially prepared hole on the front of the control panel.
4. Insert the supplied retainers into holes on the sides of the device.
5. Tighten supplied screws M4 x 35 in the holes of each retainer so that the device is firmly pressed to the front of the control panel.

Demount the device in reverse order.

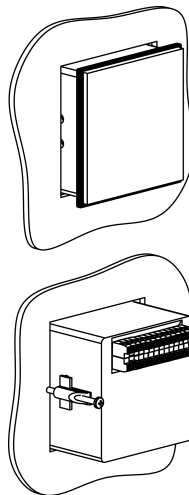


Figure 4.3 – Installation of panel-mounting device

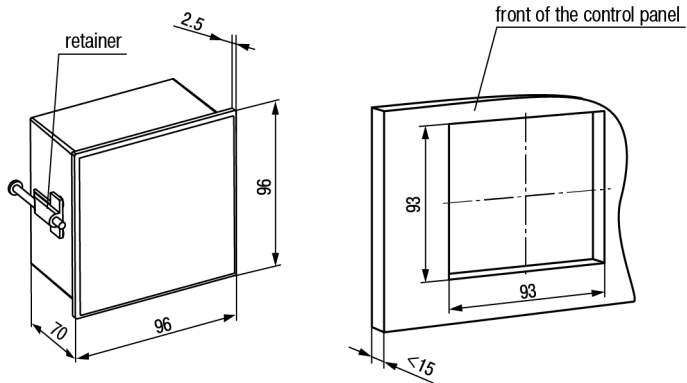


Figure 4.4 – Dimensions of Ц1 housing

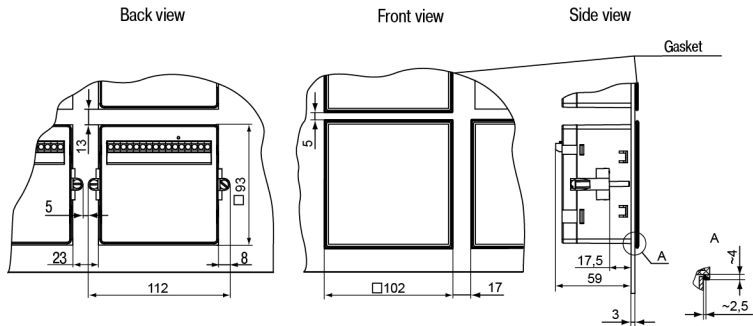


Figure 4.5 – Device in Щ1 housing mounted in the control panel with 3 mm thickness

4.3 Installation panel-mounting device in Ψ 2 housing

To connect Device:

1. Prepare a place for mounting on the control panel (see *Figure 4.7*).
2. Install the gasket on the frame of the device to ensure degree of protection IP54.
3. Insert the device into a specially prepared hole on the front of the control panel.
4. Insert the supplied retainers into holes on the sides of the device.
5. Tighten supplied screws M4 x 35 in the holes of each retainer so that the device is firmly pressed to the front of the control panel.

Demount the device in reverse order.

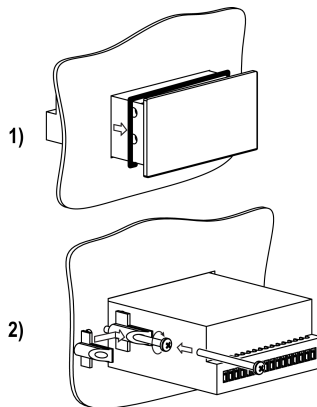


Figure 4.6 – Installation of panel-mounting device

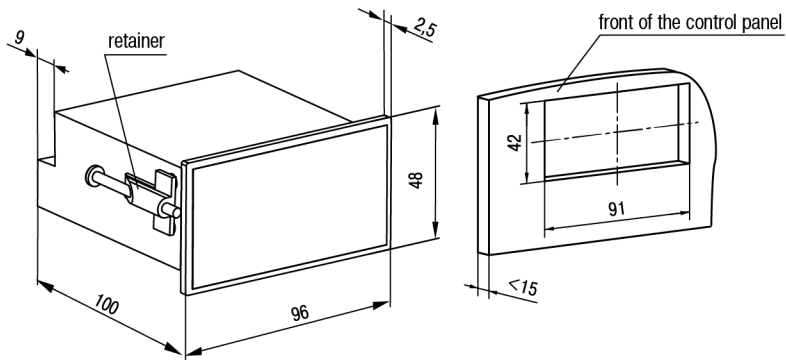


Figure 4.7 – Dimensions of $\mathbb{U}2$ housing

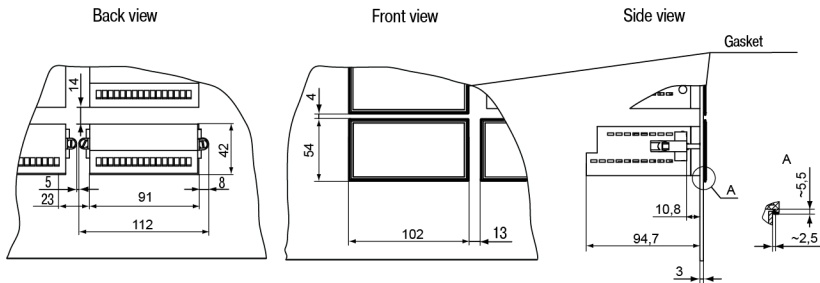


Figure 4.8 – The device in Щ2 housing mounted in the control panel thickness of 3 mm

5 Electrical connection

5.1 Wiring recommendations

To ensure the reliability of electrical connections it is recommended to use copper stranded cables, the ends of which should be carefully cleaned and tinned. Otherwise use cable lugs before connection. Cable conductors should be stripped so that their bare ends do not protrude beyond the terminal strip after connecting to the device. The cable cross section must be not more than 1 mm².

General requirements for connection lines:

- During the cabling, communication lines that connect the Device with sensors must be isolated to a separate circuit (or several circuits) and placed separately from power cables or other sources of high-frequency and impulse interferences;

- To protect the Device inputs from the effects of industrial electromagnetic interference, the communication lines between Device and sensors should be shielded. Special cables with shielding or grounded steel pipes of suitable diameter can be used. The cable shielding should be connected to the functional ground terminal (FE) in the control panel;
- Network interference filters should be installed in the power supply lines;
- Spark-fighting filters should be installed in the switching lines of power equipment.

When installing the system in which the Device operates, you should follow the rules for effective grounding:

- all grounding lines must be laid in Y-connected circuit, ensuring good contact with the grounding element;
- all earthing circuits must be made with wires of the largest possible cross-section;
- it is forbidden to connect the device terminal "Common" with grounding lines.

5.2 Getting Started



DANGER

After unpacking the device, make sure that it has not been damaged during transportation.

If the Device was kept for a long time at a temperature below minus 20 °C, then before turning it on and starting work, it should be kept in a room with a temperature corresponding to the operating range for 30 minutes.

To connect Device:

1. Connect the Device to a power source.

**CAUTION**

Before applying power to the Device, check that the supply voltage and its level are correct.

2. Connect primary transducers to the Device inputs.
3. Connect actuators to the Device outputs.
4. Apply power to the Device.
5. Set up the Device.
6. Power off the Device.

5.3 Pin assignment

Screw terminals are located on the back wall (panel-mounting) or inside the device (wall-mounting). The terminal block contacts assignment is shown in *Figure 5.1*.

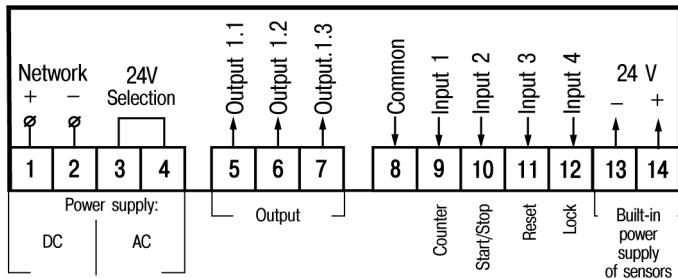


Figure 5.1 – Pin assignment



CAUTION

If the device is powered from a DC voltage network, then terminals 3 and 4 of the screw terminal block must be interconnected by a jumper.

5.4 Connection of switching devices and sensors



CAUTION

Inputs of the Device (pins 9 – 12 at the terminal block) support supply voltage from 0 to 24 V. Any voltage out of this range is prohibited.

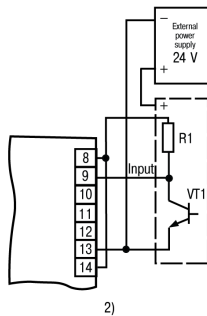
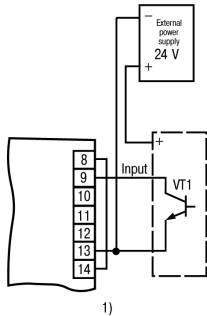


Figure 5.3 – Connection of n-p-n-sensors: 1) active; 2) passive

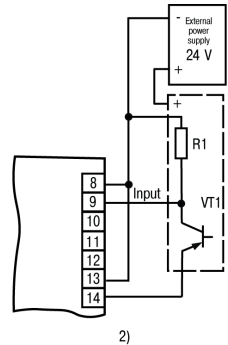
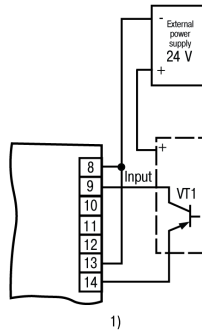


Figure 5.4 – Connection of p-n-p-sensors: 1) active; 2) passive

5.5 Connecting load to the outputs

Outputs can be made in the form of electromagnetic relays (P), transistor (K) or triac (C) optocouplers. The outputs are used for direct load control (on/off) or for control by more powerful elements: contactors, solid state relays, thyristors or triacs. The outputs are galvanically isolated from the circuit of the Device.

Scheme of connecting the load to the electromagnetic relay is shown in *Figure 5.5*.

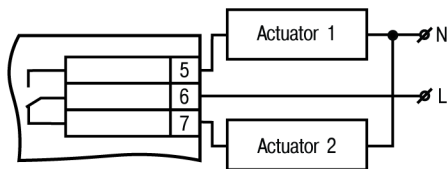


Figure 5.5 – Scheme of connecting load to the output of type P

A transistor optocoupler is usually used to control a low-voltage relay (up to 50 V), see *Figure 5.6*.



CAUTION

In order to avoid failure of the transistor due to the large self-induction current, it is necessary to install a VD1 diode (KD103 or similar type) in parallel to the relay coil.

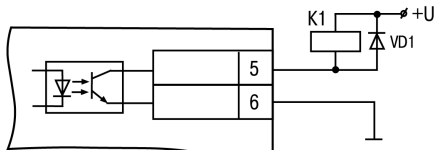


Figure 5.6 – Scheme of connecting load to the output of type K

The optosimistor is connected to the control circuit of the power triac through the limiting resistor R1 according to the scheme shown in *Figure 5.7*.

**NOTICE**

Nominal value of the resistor determines the current of the triac.

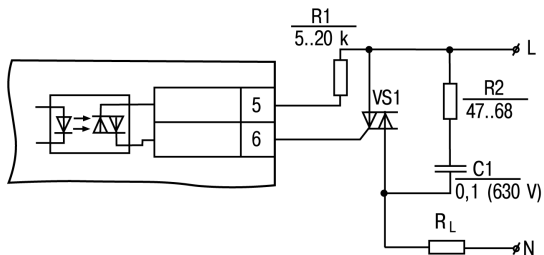


Figure 5.7 – Scheme of connecting a power triac to the output of type C

Optosimistor can also control a pair of anti-parallel connected thyristors (see *Figure 5.8*).

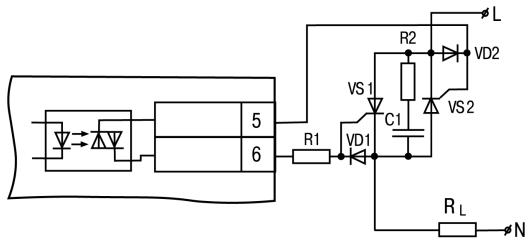


Figure 5.8 – Scheme of connecting two anti-parallel connected thyristors to the output of type C



CAUTION

It is recommended to connect a filtering circuit (RC) to the terminals of thyristors or triacs in order to prevent breakdown due to high-voltage power surges in the network.

6 Operation of the Device

6.1 Principle of operation

Functional diagram of the Device is shown in *Figure 6.1*.

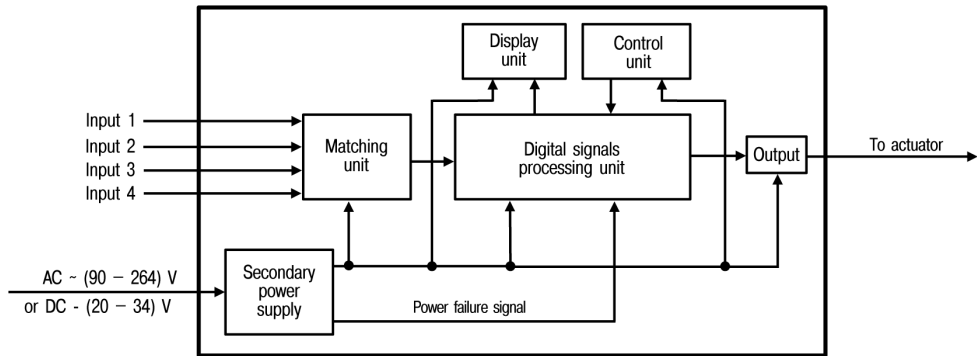


Figure 6.1 – Functional diagram

The Device has four independent digital *inputs* for external control signals. You can connect to the inputs:

- switching devices (buttons, switches, reed switches, relays, etc.);
- sensors with output *n-p-n*-transistor with an open collector;
- sensors with output *p-n-p*-transistor.

The levels of the input signals are converted and processed in the *matching unit* and then sent to the *digital signal processing unit* that performs:

- filtering of input signals;

- counting pulses applied to the device inputs;
- conversion of the value from the counter into real physical value;
- comparing signal value to the setpoint before displaying;
- generation of signals for controlling the **outputs** according to a specified algorithm.

Control unit includes buttons for entering parameters of the device.

Display unit displays the measurement results or operating parameters on the indicators and shows the counter status using LEDs.

Internal power supply converts the supply voltage for all units of the device and generates a signal indicating the loss of supply voltage.

6.2 Control and indication

Elements of indication and control are located on the front panel of the device (see *Figures 6.2 and 6.3*):

- seven-segment six-digit digital indicator;
- five LEDs;
- four/five buttons (depending on the type of housing).



Figure 6.2 – Front panel of the device in housings for wall-mounting H and panel-mounting Щ1



Figure 6.3 – Front panel of the device in housing for panel-mounting Щ2

Table 6.1 – Digital indicator

Operating mode	Displayed information
Operation	Current counter value
Setup	Name and value of the selected parameter or setpoint value (see <i>Appendix A A</i>)

Table 6.2 – LED States


LED	Status	Value
	Lights	Key lock is on
СБР	Lights	Input Reset is enabled
БЛК	Lights	Input Lock is enabled
СТАРТ/СТОП	Lights	Current device operation mode (pulse counting or stop)
ВЫХ	Lights	Output enabled

Table 6.3 – Buttons










Button	Operating mode	Function
	Operation	Reset counting register and device readings. Return to the current saved setpoint value during editing process
	Setup	Returning the value of the parameter before changing it during the editing process
 	Operation	Change the values of setpoint
	Setup	View parameter values and edit them
 NOTICE 	is not available on the housing ШЦ2.	

Table 6.3 (continued)

Button	Operating mode	Function
	Operation	Select editable digit when changing parameter value (used with buttons  and )
	Setup	
	Operation	View and change the setpoint value (if the setpoint value is not locked)
	Setup	Enter and exit the settings group Enter and exit the parameter editing mode Save the new parameter value in non-volatile memory of the device

6.3 Switch on and operation

During operation (see *Figure 6.4*), the Device counts the number of pulses arriving at its **counting** input (input 1), converts this quantity into a physical value, and displays the value on the indicator.

The counter of the Device operates in the mode of direct counting (counting of pulses from zero upward). If the maximum counting value (999999) is exceeded, the number of counted pulses is reset and the counter continues counting.

The logic of the counter on the **start/stop** signal (input 2) is as follows:

- the first impulse (starting) comes to this input and enables the counting;
- when the next (stop) pulse arrives, the counting stops.

If there is an active **Reset** signal (input 3), the number of counted pulses is reset.

Block (input 4) prevents the transmission of the counting pulses to the Device input. While this signal is active, counting is blocked.



CAUTION

The setpoint is specified with the same accuracy as for counting physical values. The multiplier can be set from 0.00001 to 99999. The conversion of counting results (result of multiplying) will be rounded up.

The counter also **filters** the input signals with two filters. The first one filters the signal on the counting input by pulse duration (from 1 to 2500 Hz), the second filters signal on the control inputs of the Device (from 200 to 999999 μ s).

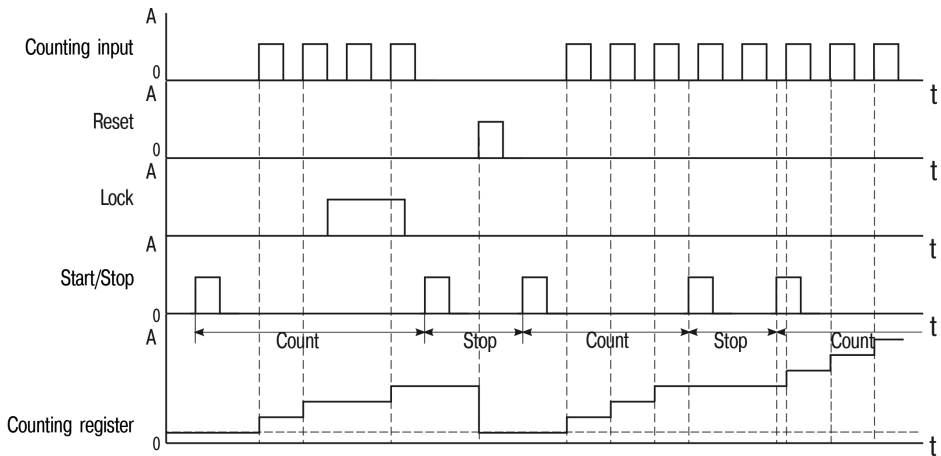



Figure 6.4 – Device operation diagram

7 Setup

7.1 Sequence of setup

The Setup mode is intended for viewing and editing the device parameters. New parameters are saved to non-volatile memory of the device.

To enter (or exit) the Setup mode, press and hold button  for at least 2 seconds.

While editing, if no button is pressed within 2 min., device automatically returns to parameter view mode.

When device enters Setup for the first time, indicator shows *PASS*. Enter a new 4-digit password (default is **0000**), save it and memorise. This password is further required for changing the device settings and for restoring factory settings (*dEFAULT*).



NOTICE

If you forgot your password, Setup mode can be entered with password **1098**.

Structure of the device settings menu and sequence of pressing the buttons for setup is shown in *Figure 7.1*.

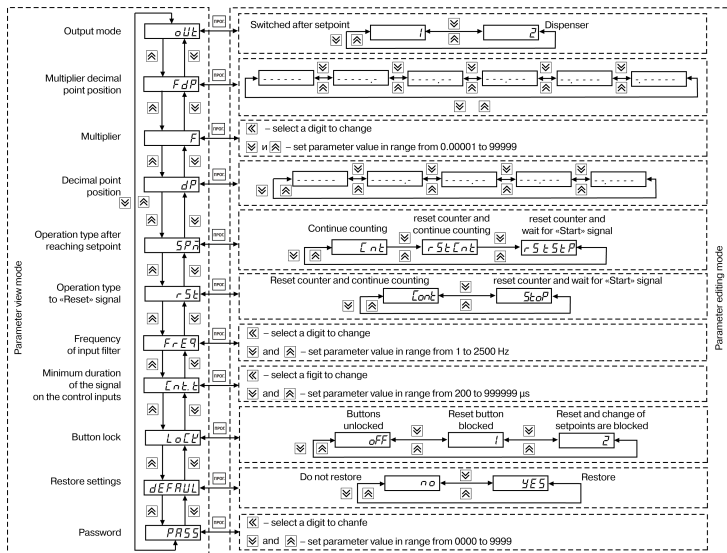


Figure 7.1 – Device settings menu

Since the **FDP** and **DP** parameters set restrictions on each other (the number of displayed digits after the decimal point in the counting results can not be larger than the number of digits after the decimal

point of the entered multiplier), editing of parameters **FDP**, **DP**, **F** should be performed in the following sequence:

- to increase the number of displayed digits after the decimal point (decimal point offset to the left):
 - set parameter **FDP**;
 - set parameter **F**;
 - set parameter **DP**.
- to decrease the number of displayed digits after the decimal point (decimal point offset to the right):
 - set parameter **DP**.
 - set parameter **FDP**;
 - set parameter **F**.

Due to the restrictions imposed by the Dispenser mode ($oUt=2$), it is recommended to change the mode of operation of the control unit in the following sequence:

- set parameter **SPM**;
- set parameter **rSt**;
- set parameter **oUt**.



NOTICE

The list of configurable parameters of the device and their possible values is shown in *Appendix A A*.

7.2 Setting the operating mode of the counter

Available types of counting (depending on the values of specified parameters) are presented in *Table 7.1*.

Table 7.1 – Types of counting

N- o.	Parameter			Illustration
	$oLlt$	$SP\bar{n}$	rSt	
1	Switch- ed after set- point (i)	Reset counter and continue counting ($rSt\bar{L}nt$)	Reset counter and continue counting ($\bar{L}ont$)	<p>The illustration is a timing diagram with six horizontal channels labeled A, 0, A, 0, A, 0, A, 0, A, 0, A, 0. The signals are: Counting input (A), Start/Stop (A), Reset (A), Lock (A), Output (A), and Count limit Setpoint (A). The Counting input is a regular square wave. Start/Stop has two pulses. Reset has one pulse. Lock is a pulse. Output is a square wave that resets to zero when the Count limit Setpoint is reached. Counter readings are shown as a staircase that resets to zero when the Count limit Setpoint is reached.</p>
<p>NOTICE This combination of parameters only resets the counter and does not provide activation of the output.</p>				

Table 7.1 (continued)

N-o.	Parameter			Illustration
	oUt	$SP\bar{n}$	rSt	
2	Switched after set-point (i)	Reset counter and continue counting ($rSt\bar{L}nt$)	Reset the counter and wait for signal "Start" ($StoP$)	<p>The timing diagram for mode 2 shows a periodic counting input (A) with a period of 1 unit. The start/stop signal (A) consists of three pulses, each occurring after a setpoint is reached. The reset signal (A) is a single pulse occurring after the second setpoint. The lock signal (A) is a pulse that occurs during the first setpoint. The output (A) is a step function that increases at each setpoint and remains constant until the next setpoint. The count limit setpoint (A) is a dashed line that increases at each setpoint. The counter readings (A) are a step function that increases at each setpoint and remains constant until the next setpoint.</p>
3	Switched after set-point (i)	Reset the counter and wait for signal "Start" ($rStStP$)	Reset counter and continue counting ($\bar{L}ont$)	<p>The timing diagram for mode 3 shows a periodic counting input (A) with a period of 1 unit. The start/stop signal (A) consists of four pulses, each occurring after a setpoint is reached. The reset signal (A) is a single pulse occurring after the third setpoint. The lock signal (A) is a pulse that occurs during the first setpoint. The output (A) is a step function that increases at each setpoint and remains constant until the next setpoint. The count limit setpoint (A) is a dashed line that increases at each setpoint. The counter readings (A) are a step function that increases at each setpoint and remains constant until the next setpoint.</p>

Table 7.1 (continued)

N-o.	Parameter			Illustration
	$o\dot{L}t$	$SP\bar{n}$	rSt	
4	Switched after set-point (i)	Reset the counter and wait for signal "Start" ($rStStP$)	Reset the counter and wait for signal "Start" ($StoP$)	

Table 7.1 (continued)

N-o.	Parameter			Illustration
	$o\bar{L}t$	$SP\bar{n}$	rSt	
5	Switched after set-point (i)	Continue counting ($\bar{L}nt$)	Reset counter and continue counting ($\bar{L}ont$)	

Table 7.1 (continued)

N-o.	Parameter			Illustration
	oUt	$SP\bar{n}$	rSt	
6	Switched after set-point (i)	Continue counting ($\bar{L}n\bar{t}$)	Reset the counter and wait for signal "Start" ($StoP$)	

Table 7.1 (continued)

N-o.	Parameter			Illustration
	$o\dot{L}t$	$SP\bar{n}$	rSt	
7	Dis- penser (\mathcal{L})	Reset the counter and wait for signal "Start" ($rStStP$)	Reset the counter and wait for signal "Start" ($StoP$)	<p>The timing diagram illustrates the operation of a dispenser counter. It features seven vertical channels: Counting input, Start/Stop, Reset, Lock, Output, Count limit, and Setpoint. The Counting input channel shows a continuous stream of pulses. The Start/Stop channel shows periodic pulses that initiate counting. The Reset channel shows a single pulse that resets the counter. The Lock channel shows a pulse that locks the counter. The Output channel shows pulses that occur when the counter reaches the setpoint. The Count limit channel shows a horizontal line representing the maximum count. The Setpoint channel shows a horizontal line representing the target count. The Counter readings channel shows the count increasing from zero to the setpoint and then resetting to zero.</p>

Table 7.1 (continued)

N-o.	Parameter			Illustration
	oUt	$SP\bar{n}$	rSt	
8	Dis-penser (\bar{c})	Continue counting ($En\bar{c}$)	Reset the counter and wait for signal "Start" ($StoP$)	<p>The timing diagram illustrates the operation of the device for parameter 8. It shows several signals over time (t):</p> <ul style="list-style-type: none"> Counting input: A series of regular pulses. Start/Stop: A signal that starts counting and stops it at various points. Reset: A signal that resets the counter. Lock: A signal that locks the counter. Output: A signal that is active during counting. Count limit: A signal that indicates when the counter has reached its limit. Setpoint: A signal that indicates the target value. Counter readings: A signal that shows the current value of the counter.

8 Maintenance

8.1 Maintenance

Safety measures (see *Section 3*) should be observed during the maintenance.

Maintenance of the device has to be carried out at least once in 6 months and includes the following procedures:

- checking the mounting of the device;
- checking the screw connections;

- removing dust and dirt from the terminal board of the device.

9 Marking

The housing of the device is marked with:

- name of the device;
- protection class of the housing according to GOST 14254;
- voltage and frequency of supply;
- power consumption;
- class of protection against electric shock according to GOST 12.2.007.0;
- approval mark for measuring devices;
- EAC mark;
- country of origin;
- device serial number and year of manufacture.

Consumer packaging is marked with:

- name of the device;
- EAC mark;
- country of origin;
- device serial number and year of manufacture.

10 Packaging

Device should be packed according to GOST 23088-80 into consumer packaging, made of paperboard (according to GOST 7933-89).

Packaging of the device for mail delivery is performed according to GOST 9181-74.

11 Transportation and storage

The device must be transported in closed transport of any kind. The fastening of containers during transport should be carried out in accordance with the rules applicable to the respective modes of transport.

The transport conditions must be in accordance with IEC 61131-2-2012 at ambient temperature from – 40 to + 55 °C in compliance with the protection measures against impacts and vibrations.

Transportation should be carried out in a shipping container individually or in over-packs.

The storage conditions in the packaging at the manufacturer's and consumer's warehouse must comply with IEC 61131-2-2012. In the air no aggressive impurities must be present.

The device should be stored in the racks.

12 Scope of delivery

Item	Quantity
Device	1 piece
Passport and warranty card	1 piece
User manual	1 piece
Calibration method (on request)	1 piece
Fasteners	1 set

**NOTICE**

The manufacturer reserves the right to make additions to the scope of delivery.

13 Warranty

The manufacturer guarantees conformity of the Device to requirements of technical conditions (TY) under the conditions of operation, transportation, storage and installation.

Warranty period of operation: **24 months** from the date of sale.

In case of failure of the Device during the warranty period at observance of conditions of operation, transportation, storage and installation the manufacturer undertakes to provide free repair or replacement.

The procedure for transferring the Device to repair is described in the passport and in the warranty card.

Appendix A. Device parameters

Table A.1 – Configurable parameters

Parameter		Allowed values	Comments	Default
Designation	Item			
	Setpoint	000000 - 999999	from 000000 to 999999	000000
out	Output mode	1	Switched after setpoint. The output is triggered if the number of counted pulses is greater than setpoint value or equal to it.	1
		2	Dispenser mode. The output is triggered if the number of counted pulses is in the range from zero to the setpoint value, and the last pulse that arrived at the "Start/Stop" input of the counter was the starting one.	
FdP	Multiplier decimal point position	----	-	----
		---.		
		--.		
		.-		
		-.---		
F	Multiplier	0.00001 - 99999	from 0.00001 to 99999	1
dP	Decimal point position	----	-	----
		---.		
		--.		
		.-		
		-.---		

Table A.1 (continued)


Parameter		Allowed values	Comments	Default
Designation	Item			
SPn	Operation type after reaching setpoint	Cnt	Continue counting without resetting	rStCnt
		rStCnt*	Reset counter and continue counting	
		rStStP	Reset counter and stop counting The counter is waiting for the "Start" signal	
rSt	Operation type to "Reset" signal	Cnt*	Reset counter and continue counting	Cnt
		StoP	Reset counter and stop counting The first impulse that came after the reset to the "Start/Stop" input will be considered as the starting one.	
 NOTICE * These parameters are not available in the Dispenser mode ($oUt = 2$).				
FrEq	Frequency of input filter	1 - 2500	Filtering signals at the counting input of the device (from 1 to 2500 Hz) - filter 1. This parameter in the digital signal processing unit of the device is converted to the minimum pulse duration (t_{min}): $t_{min} = \frac{1}{2 \cdot FrEq}$	2500
Cnt.t	Minimum duration of the	200 - 999999	Filtering signals at the control inputs of the device (from 200 to 999999 μ s) - filter 2	200

Table A.1 (continued)

Parameter		Allowed values	Comments	Default
Designation	Item			
	signal on the control inputs			
<i>LoCK</i>	Button lock	<i>oFF</i>	Buttons unlocked	<i>oFF</i>
		<i>1</i>	Reset counter button locked	
		<i>2</i>	Reset and change of setpoints are blocked	
<i>dEFAULT</i>	Restore factory settings	<i>no</i>	Do not restore settings	<i>no</i>
		<i>YES</i>	Restore settings	
<i>PASS</i>	Password	<i>0000 - 9999</i>	from 0000 to 9999	<i>0000</i>



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