ЕАС

LLC Energo-Souz

DIGITAL POSITION INDICATOR УП 9256

Operating Manual

УИМЯ.411600.077 РЭ

This operating manual (hereinafter referred to as "OM") is intended for familiarization with the technical characteristics and the principle of operation of the digital position indicator УП 9256 (hereinafter referred to as "PI") for the purpose of correct operation and maintenance of the PI.

1 DESCRIPTION AND OPERATION OF THE PRODUCT

1.1 Purpose

1.1.1 The PI is designed to convert the signal from a sensor of an on-load tap-changer (hereinafter referred to as the "Changer") into a digital code, to display a position number of the changer on the reading device with its subsequent conversion into a unified analog output signal, to transfer the conversion results to PC using RS-485 port.

Communication with the PC shall be enabled in accordance with the MODBUS RTU communication protocol.

Built-in relays enable switching of external circuits when the input signal lowers, exceeds the set response value or reaches the boundary values, when the position of a drive is switched to a position of a higher or lower number.

Presence of analog output, RS-485 output and built-in relays shall be specified by the customer when making an order.

The PI is designed for operation with selsyn sensors, resistive sensors, current position sensors and ДП 9256 discrete position encoders.

In this case, power to the selsyn sensor may be supplied both from the PI and an external source, which shall be specified by the customer when making an order.

1.1.2 The PI is designed for operation at the production premises outside the residential buildings.

1.1.3 The PI is not designed for operation at the fire- and explosion-hazardous premises.

1.1.4 The PI is designed for operation at an ambient temperature from 40 ° C below zero to 50 ° C above zero and air humidity of 80% at 25 ° C above zero.

1.1.5 Regarding protection of maintenance personnel against electric shock, in accordance with GOST 12.2.091-2012 the PI is classified as the equipment of measurement category III.

1.1.6 There is no galvanic coupling between the input, output circuits and power circuits in the PI.

1.2 Technical specifications

1.2.1 The changer position number displayed on the reading device is from -99 to 99 for the resistive and current sensors. This being said, the number of positions does not exceed 100.

The changer position number displayed on the reading device is from -99 to 99 for the selsyn sensors; this being said, the number of positions does not exceed 100. However, if the data are displayed in degrees the changer position number displayed on the reading device is from 0 to 359, and the number of positions is always equal to 360.

The changer position number displayed on the reading device is from -99 to 99 for the ДП 9256 discrete position encoder; this being said, the number of positions does not exceed 98.

Initial and end position numbers are set by the customer at the site, except for the cases when data are displayed in degrees for the selsyn sensor (always from 0 to 359).

1.2.2 The following may be used as sensors:
Resistive sensor:
- input signal - resistance of the changer. The overall resistance of the changer is from 25 to 999 ohms.

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Checked by:		Babora				Digital position indicator УП 9256 Operating Manual		O1	2	43
Examined by:		Zhernosek						LLC Energo-Souz		
Approved by:		Valentin								
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Selsyn sensor:

- input signal - signal from the selsyn sensor. The initial and end positions shall be set at the installation site.

Current sensor:

- input signal - direct current from 0 to 20 mA.

ДП 9256 discrete position encoder:

- input signal:

- position of the changer in the "contact unit", up to 14 positions per one encoder. The number of encoders per one PI is not more than 7 (corresponding to 98 positions).

- signal from the BCD output of the on-load tap-changer drive, up to 99 positions. The number of encoders per one PI is one.

The type of sensor shall be chosen by the customer from among the sensors for which a specific PI is designed, and it shall be done directly on the site.

1.2.3 The output analog signal range may be chosen directly at the site from among the possible values: 0 - 5, ± 5, 4 - 20, 0 - 20 mA.

1.2.4 The load resistance range at the analog output is 0 to 500 ohms for the ranges of 4-20 and 0-20 mA or 0 to 3 kilo-ohms for the ranges of 0-5 and ± 5 mA.

1.2.5 Relays built into the PI allow switching voltage of up to 400 V. Switching current is up to 120 mA.

1.2.6 The power may be supplied to the PI by one of the following ways:

-a) AC voltage source of 220 V ± 10% at a frequency of 50 Hz;

-b) AC voltage source of 85-264 V (nominal value 220 V) at a frequency of 50 Hz or DC voltage source of 120-300 V (nominal value 220 V);

-c) DC voltage source of 18-36 V (nominal value 24 V);

-d) AC voltage source of 110 V ± 10% at a frequency of 50 Hz;

The power supply option shall be specified by the customer when making an order.

The power may be supplied to the selsyn sensor by one of the following ways:

- built-in AC voltage source of 24 V;

- external AC voltage source of 12-250 V by order of the customer.

1.2.7 During transportation the PI can withstand temperatures from 50 ° C below zero to 50 ° C above zero and relative humidity of 98% at 35 ° C above zero.

1.2.8 Power consumed by the PI from the power circuit shall not exceed 7,5 V • A.

1.2.9 The PI may be manufactured in the form of a plastic casing of two designs: version E with overall dimensions 98x98x138 mm (front panel 96x96 mm); version P with overall dimensions 120x120x138 mm (front panel 120x120 mm).

When ordering the PI the design shall be indicated after indication of the type (УП 9256Е, УП 9256Р).

1.2.10 Weight of the PI is not more than 1.0 kg.

1.2.11 In accordance with GOST 14254-96 degree of protection of the casing shell is IP20.

1.2.12 Average service life is at least 10 years.

1.2.13 Electrical insulation of the PI circuits withstands a test voltage of almost sinusoidal form with a frequency of 50 Hz for 1 minute. The value of such test voltage is indicated in Table 1.

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Table 1

Circuit name	Test voltage, kV
Casing – network, all inputs, all outputs, relay contacts	2,21
Network – all inputs, all outputs, relay contacts	1,69
All inputs - relay contacts	
Relay contacts – all outputs	1,06
All inputs - all outputs	
Output RS-485 – analog output	0,84
Note: When checking insulation it's necessary to take into account presence or absence of the circuits in accordance with the indicator modification.	

1.2.14 Electrical resistance of insulation of the PI circuits, indicated in Table 1, is not less than:
- 20 mega-ohms in normal conditions;
- 5 mega-ohms at the upper temperature value in operating conditions.

1.3 Device components

1.3.1 The scope of delivery includes:
Position indicator - 1 pc.
Datasheet - 1 copy.
Operating manual - 1 copy*
CD with demo software (if there is a RS-485 port) - 1 pc*.
Packaging box - 1 pc.
Note - *When delivering to one address, 1 copy is delivered for every 3 position indicators.

1.4 Design and operation

The PI structurally consists of the following main components: casing, front panel, processing and power supply boards, indication board, analog output board, RS-485 interface board and relay board.
Casing and front panel are made of insulating material.
Mounting of the PI on the panel is carried out with the use of four clamps supplied along with the PI.
Algorithm of built-in relay operation:
Relay K1 "The upper limit is reached" closes when the end position number is reached.
Relay K2 "Exceeding the set limit" closes when the changer reaches or exceeds the set limit.
Relay K3 "Lowering the set limit" closes when the changer reaches or lowers the set limit.
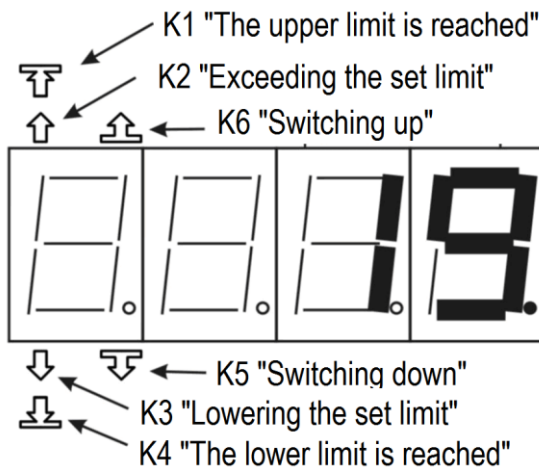Relay K4 "The lower limit is reached" closes when the initial position number is reached.
Relay K5 "Switching down" closes for a time period of 0.1-25 seconds (set by the customer) when the drive switches to the position of a lower number.
Relay K6 "Switching up" closes for a time period of 0.1-25 seconds (set by the customer) when the drive switches to the position of a higher number.
The fact of relay action is duplicated on the front panel by way of switching on the corresponding light-emitting diodes.

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K1 "The upper limit is reached"
K2 "Exceeding the set limit"
K6 "Switching up"
K5 "Switching down"
K3 "Lowering the set limit"
K4 "The lower limit is reached"

The lower value of the analog output corresponds to the number of initial position of the changer, the upper value of the analog output corresponds to the number of end position of the changer.

If there is a RS-485 port, two "Transmission" LEDs are installed on the front panel:

Red
Green
Transmission
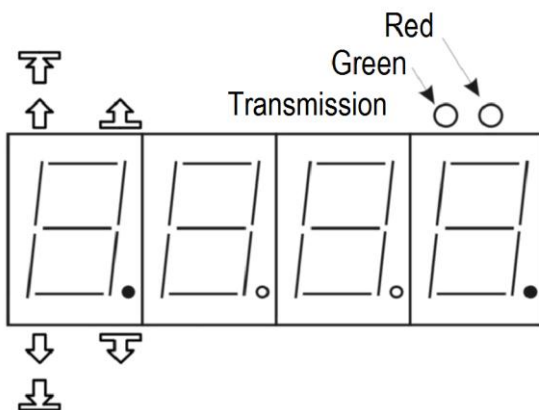
The "Green" LED flashes when the PI receives data through the RS-485 port, the "Red" LED flashes when the PI responds.

The electrical connection diagram is shown in Appendix A.

Description of the reading device's display modes is given in Appendix B.

Description of the communication protocol is given in Appendix C.

1.5. Labeling and sealing

1.5.1 The front panel of the PI is marked with the following information:
- type and design;
- trademark and the name of the manufacturer;
- LEDs indicating the relay status;
- LEDs indicating connection with the RS-485 port;
- "Raise" and "Lower" keys labeled as "↑" and "↓";
- short name of the key SELECT (ВЫБОР) "В";
- inscription "Made in Belarus".

1.5.2 The back wall of the casing is marked with the following information:
- purpose of the contacts;
- voltage of the selsyn-sensor (if available);
- designation of the current type, units of measurement and nominal values of voltage, power frequency and power consumed from the power supply circuit;

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- "Attention!" symbol;
- digital code of the PI design.
- serial number in accordance with the manufacturer's numbering system, where the first two digits are the last digits of the year of manufacture.

2 INTENDED USE

2.1 Safety measures

2.1.1 Personnel authorized to work with the PI shall familiarize themselves with the "Regulations for Operation of Consumer Electrical Installations" approved by the State Energy Supervision Authority, as well as with the safety rules for operation of installations with voltage up to 1000 V.

2.1.2 It is prohibited:

A) to operate the PI in conditions and modes different from those specified in this manual;

B) to connect external mechanisms without disconnecting the power supply circuit, input and output signals;

C) to operate the PI in the event of breakage of the external mechanism's wires.

2.1.3 Hazard – power supply voltage, voltage, switching relay and power supply to the selsyn-sensor.

Measures for protection against the above mentioned hazard include checking the electrical resistance of insulation.

In case of emergency conditions and emergency operating modes, the PI shall be immediately switched off.

2.1.4 Fire protection in the rooms where the PI is operated shall be achieved by way of:

A) using automatic fire alarm systems;

B) using fire extinguishing means;

C) organizing prompt warning and evacuation of people.

2.1.5 The PI shall be used in conditions corresponding to the degree of pollution I in accordance with GOST 12.2.091-2012.

2.2 Preparation for use

2.2.1 It is essential that you read this operating manual carefully before you start operating the PI.

2.2.2 If before operating, the PI has been in climatic conditions different from the operating conditions, it is necessary to keep the PI at a temperature of 15 to 25 ° C above zero and air humidity of 30 to 80% for at least 4 hours.

2.2.4 Before installing the PI, it is necessary to check that all parameters are set correctly (see Appendix B) and, if necessary, to adjust them.

2.2.5 The PI shall be fastened to the panel with the use of clamps.

2.2.6 To put the PI into operation it is necessary to:

- connect input circuits, power supply circuits and output circuits;

- apply the power supply voltage and input signal to the PI by switching on the switching equipment.

3 MAINTENANCE

3.1 In-service surveillance over the operation of the PI shall be carried out by persons who this equipment is assigned to.

3.2 Preventive inspection

Preventive inspection shall be carried out within the time limits provided by the corresponding consumer's instructions.

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Procedure for preventive inspection:
- to disconnect the connected circuits;
- to perform an external examination of the PI, to remove dirt and moisture from the casing using a dry cloth;
- to make sure that there is no mechanical damage to the PI.

4 STORAGE

4.1 The PI shall be stored in warehouses on the shelves in the manufacturer's packaging at an ambient temperature of 0 to 40 ° C above zero and relative humidity of not more than 80%. There should not be any dust, gases and vapours causing corrosion in the storage rooms.

4.2 The PI without package should be stored at an ambient temperature of 10 ° C to 35 ° C above zero and relative humidity of 80% at 25 ° C above zero.

5 TRANSPORTATION

5.1 When loading, unloading and transporting, it is necessary to follow the requirements based on the handling signs "This side up" and "Fragile. Handle with care" applied to the shipping container.

5.2 Transportation of the PI may be carried out in closed vehicles of any kind at a temperature from 50 ° C below zero to 50 ° C above zero.

6 MANUFACTURER'S WARRANTEES

6.1 The manufacturer guarantees that the PI meets the requirements of this operating manual provided that the operating, storage and transportation conditions are complied with.

6.2 The warranty service period is 18 months from the date of putting into operation.

6.3 The warranty storage period is 6 months from the date of manufacture.

7 MANUFACTURER'S ADDRESS

Republic of Belarus
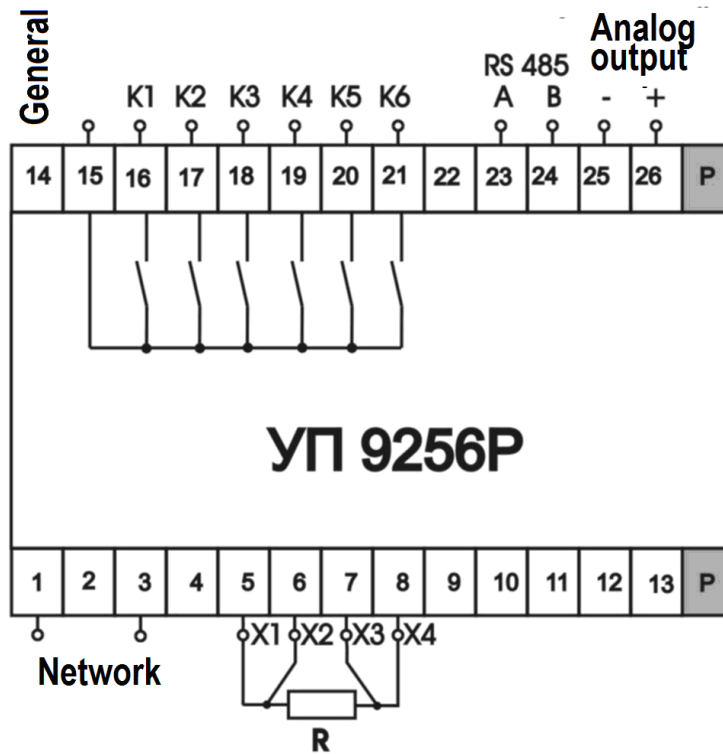210601 Vitebsk, ul. S. Pankova 3, LLC Energo-Souz, www.ens.by
Phone / fax (10375212) 23-72-80, 23-72-77, 23-72-88, E-mail: energo@vitebsk.by
Sales department: phone / fax (10375212) 26-12-59, 26-19-23, Energo-soyz2@yandex.ru

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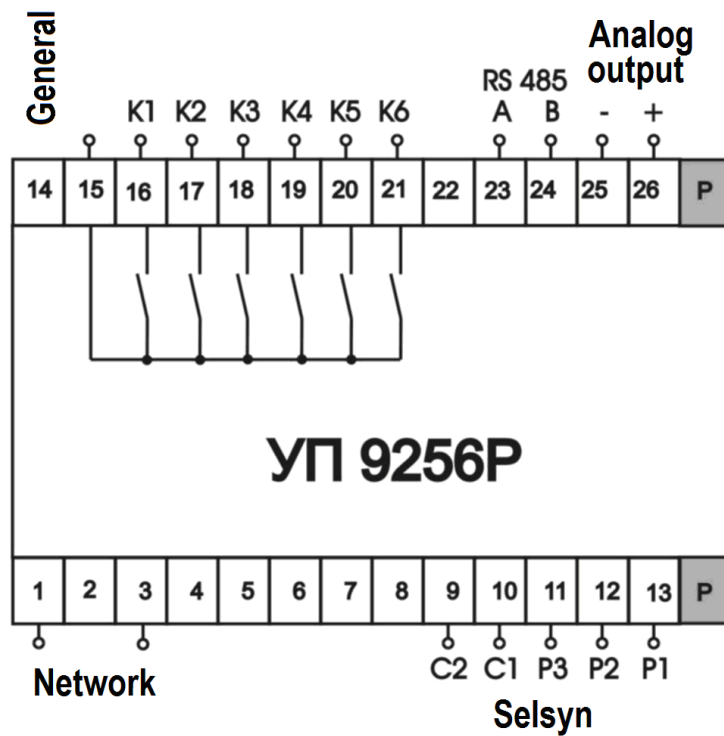| Orig. Inv. No. | Signature and date | Repl. inv. No. | Orig. Inv. No. | Signature and date |

APPENDIX A

(for information)

R - changer;
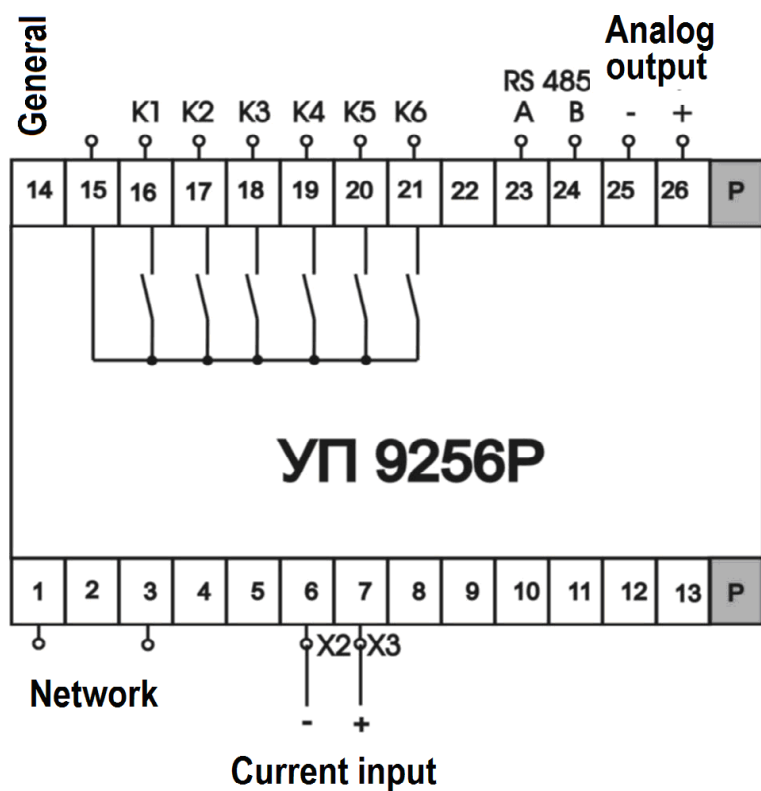K1 – relay "The upper limit is reached"
K2 – relay "Exceeding the set limit"
K3 – relay "Lowering the set limit"
K4 – relay "The lower limit is reached"
K5 – relay "Switching down"
K6 – relay "Switching up"

Symbol «P» against the grey background – this output is available only in the PI of the «P» design.

Figure A.1 – Electrical connection diagram for the PI
when using a resistive sensor

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K1 – relay "The upper limit is reached"
K2 – relay "Exceeding the set limit"
K3 – relay "Lowering the set limit"
K4 – relay "The lower limit is reached"
K5 – relay "Switching down"
K6 – relay "Switching up"

Symbol «P» against the grey background – this output is available only in the PI of the «P» design.

Figure A.2 – Electrical connection diagram for the PI
when using a selsyn sensor

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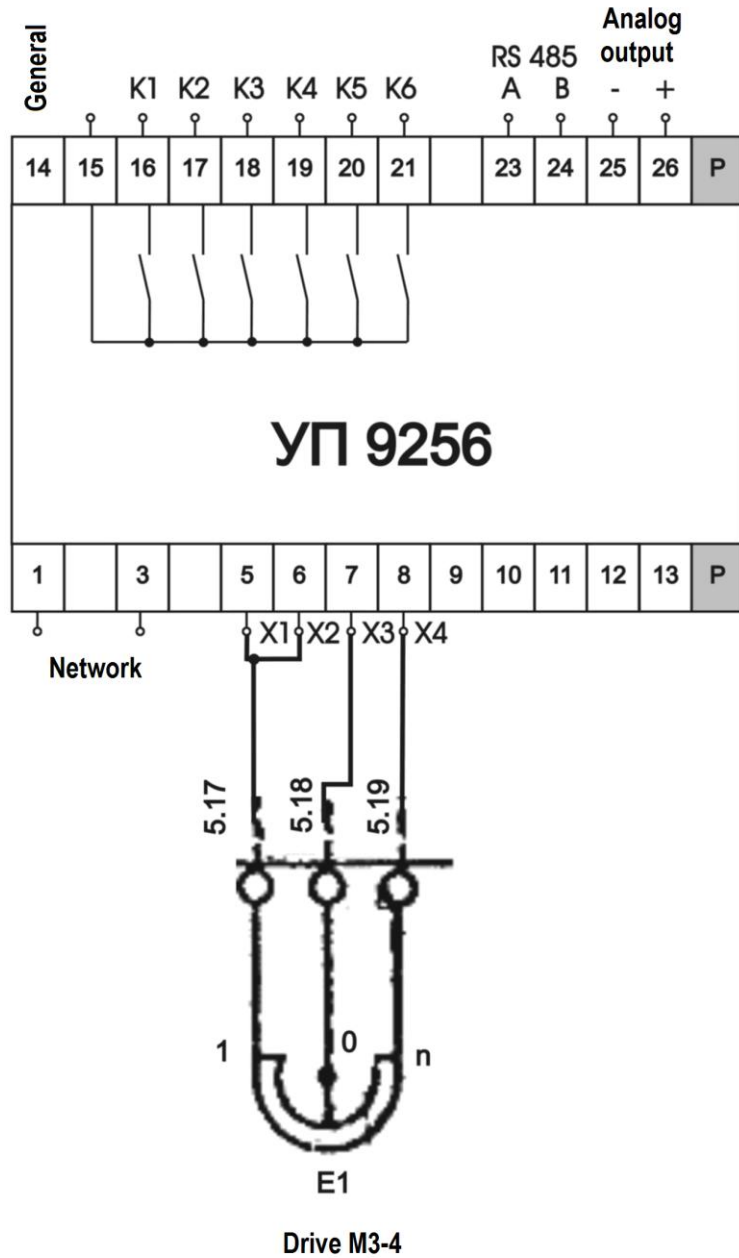| Orig. Inv. No.	Signature and date	Repl. inv. No.	Orig. Inv. No.	Signature and date

K1 – relay "The upper limit is reached"
K2 – relay "Exceeding the set limit"
K3 – relay "Lowering the set limit"
K4 – relay "The lower limit is reached"
K5 – relay "Switching down"
K6 – relay "Switching up"

Symbol «P» against the grey background – this output is available only in the PI of the «P» design.

Figure A.3 – Electrical connection diagram for the PI
when using a current sensor

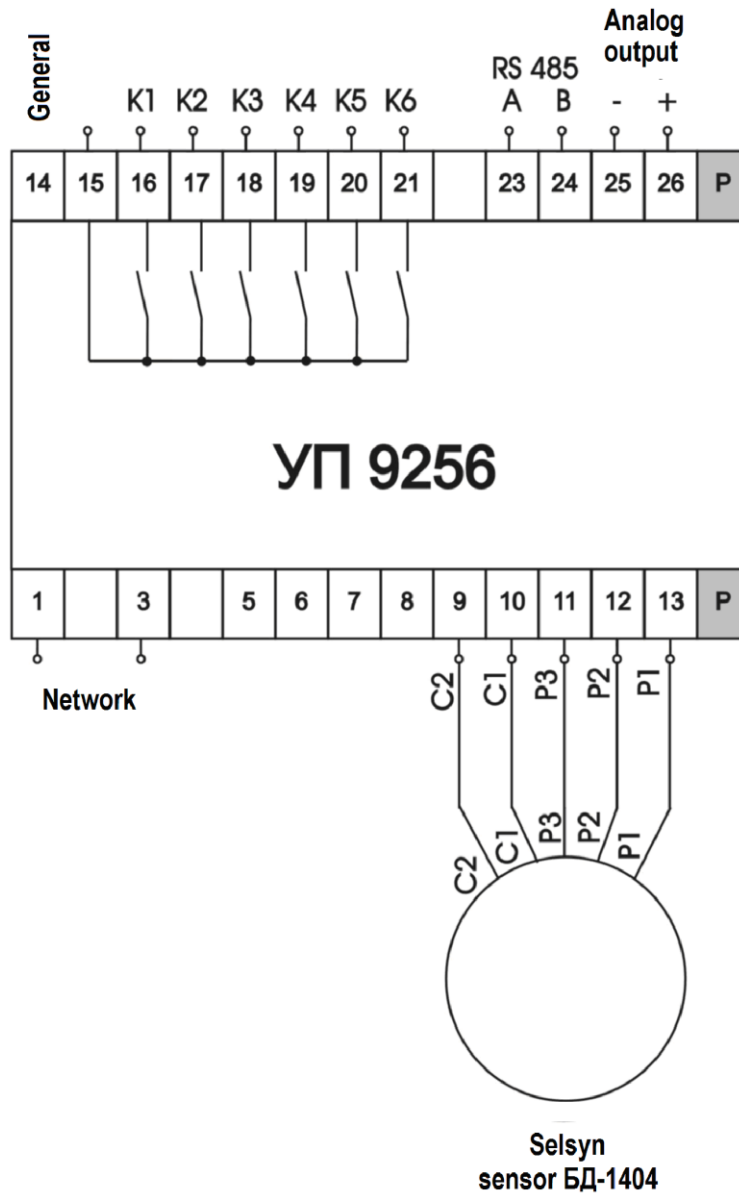| Change	Page	Document No.	Signature	Date		
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K1 – relay "The upper limit is reached"
K2 – relay "Exceeding the set limit"
K3 – relay "Lowering the set limit"
K4 – relay "The lower limit is reached"
K5 – relay "Switching down"
K6 – relay "Switching up"

Symbol «P» against the grey background – this output is available only in the PI of the «P» design.

Figure A.4 – Electrical diagram of connection of the PI
to the M3-4 motor drive

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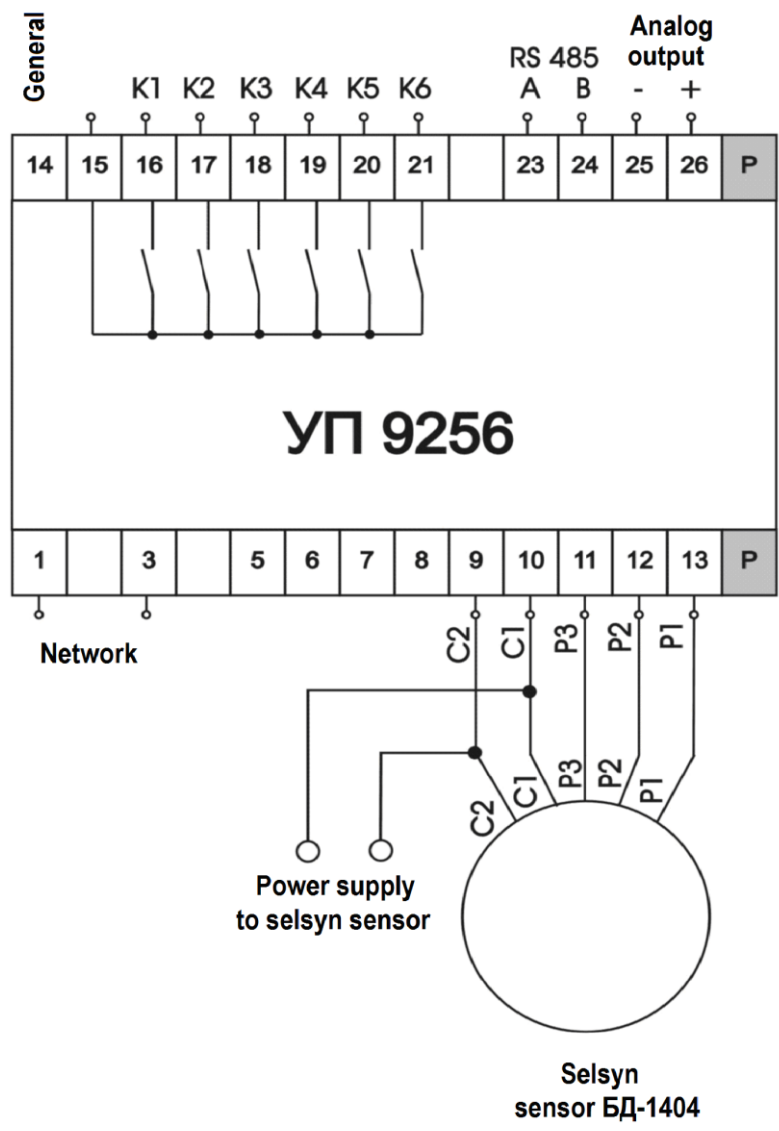| Orig. Inv. No.	Signature and date	Repl. inv. No.	Orig. Inv. No.	Signature and date

Selsyn sensor БД-1404

ATTENTION! It's not allowed to use an external power source for a selsyn sensor if the PI 9256 has a built-in power source for the selsyn sensor

K1 – relay "The upper limit is reached"
K2 – relay "Exceeding the set limit"
K3 – relay "Lowering the set limit"
K4 – relay "The lower limit is reached"
K5 – relay "Switching down"
K6 – relay "Switching up"

Symbol «P» against the grey background – this output is available only in the PI of the «P» design.

Figure A.5 – Electrical diagram of connection of the PI
to the selsyn sensor (supply of power to the selsyn sensor from the PI)

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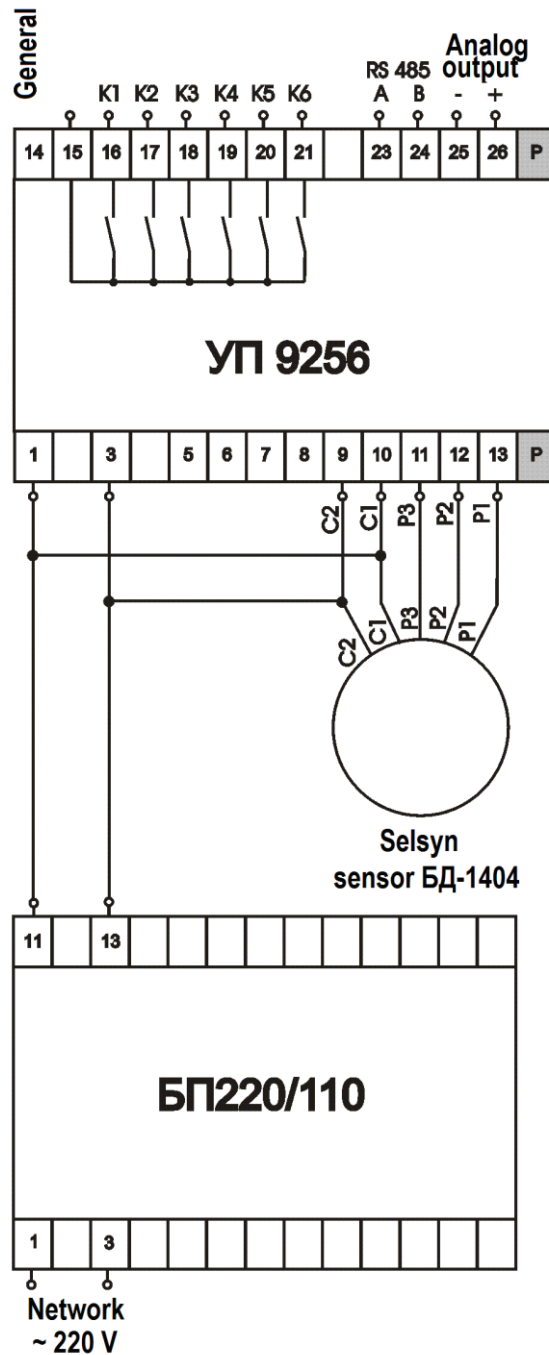| Orig. Inv. No.	Signature and date	Repl. inv. No.	Orig. Inv. No.	Signature and date

K1 – relay "The upper limit is reached"
K2 – relay "Exceeding the set limit"
K3 – relay "Lowering the set limit"
K4 – relay "The lower limit is reached"
K5 – relay "Switching down"
K6 – relay "Switching up"

Symbol «P» against the grey background – this output is available only in the PI of the «P» design.

Figure A.6 – Electrical diagram of connection of the PI
to the selsyn sensor (external source of power supply to the selsyn sensor)

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K1 – relay "The upper limit is reached"
K2 – relay "Exceeding the set limit"
K3 – relay "Lowering the set limit"
K4 – relay "The lower limit is reached"
K5 – relay "Switching down"
K6 – relay "Switching up"

Symbol «P» against the grey background – this output is available only in the PI of the «P» design.

Figure A.7 – Electrical diagram of connection of the PI
(power supply ~110 V ±10 %) to the selsyn sensor (power supply ~110 V) along with БП220/110
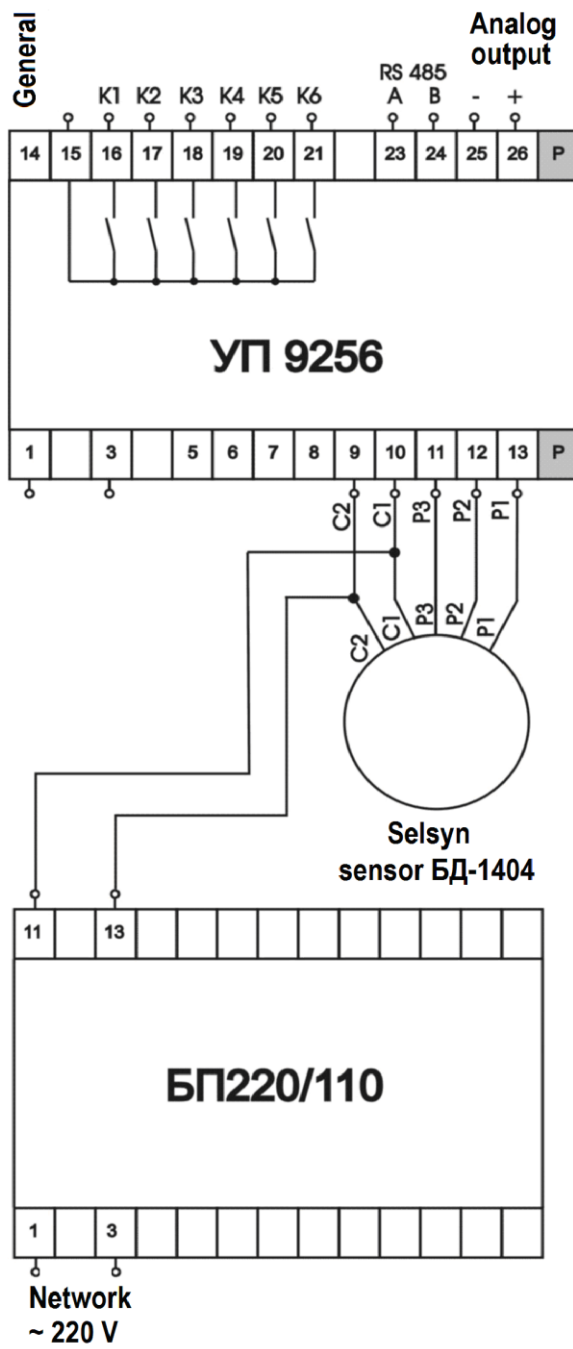
Figure A.8 – Electrical diagram of connection of the PI
(power supply ~ 220 V ±10 %) to the selsyn sensor (power supply ~110 V) along with БП220/110

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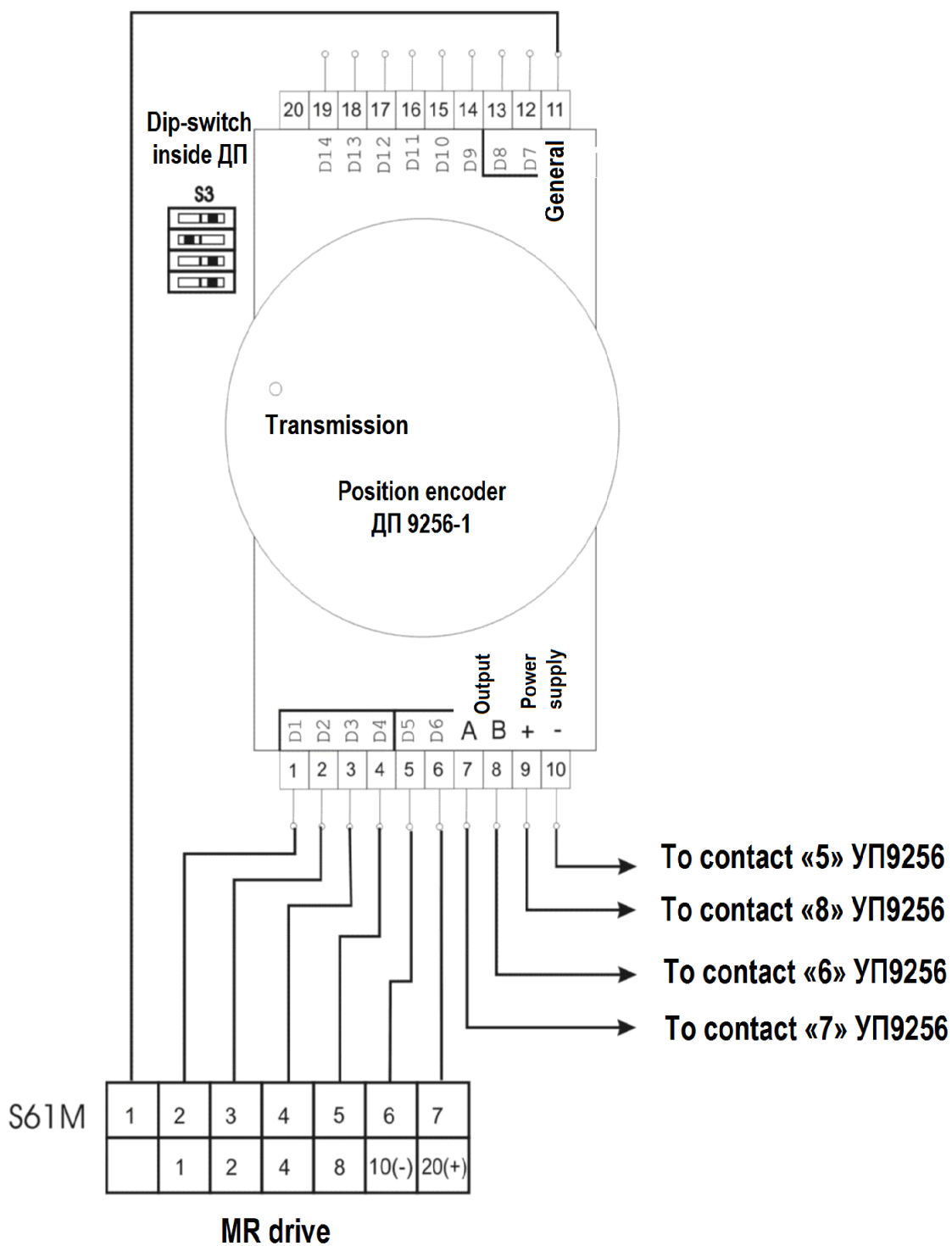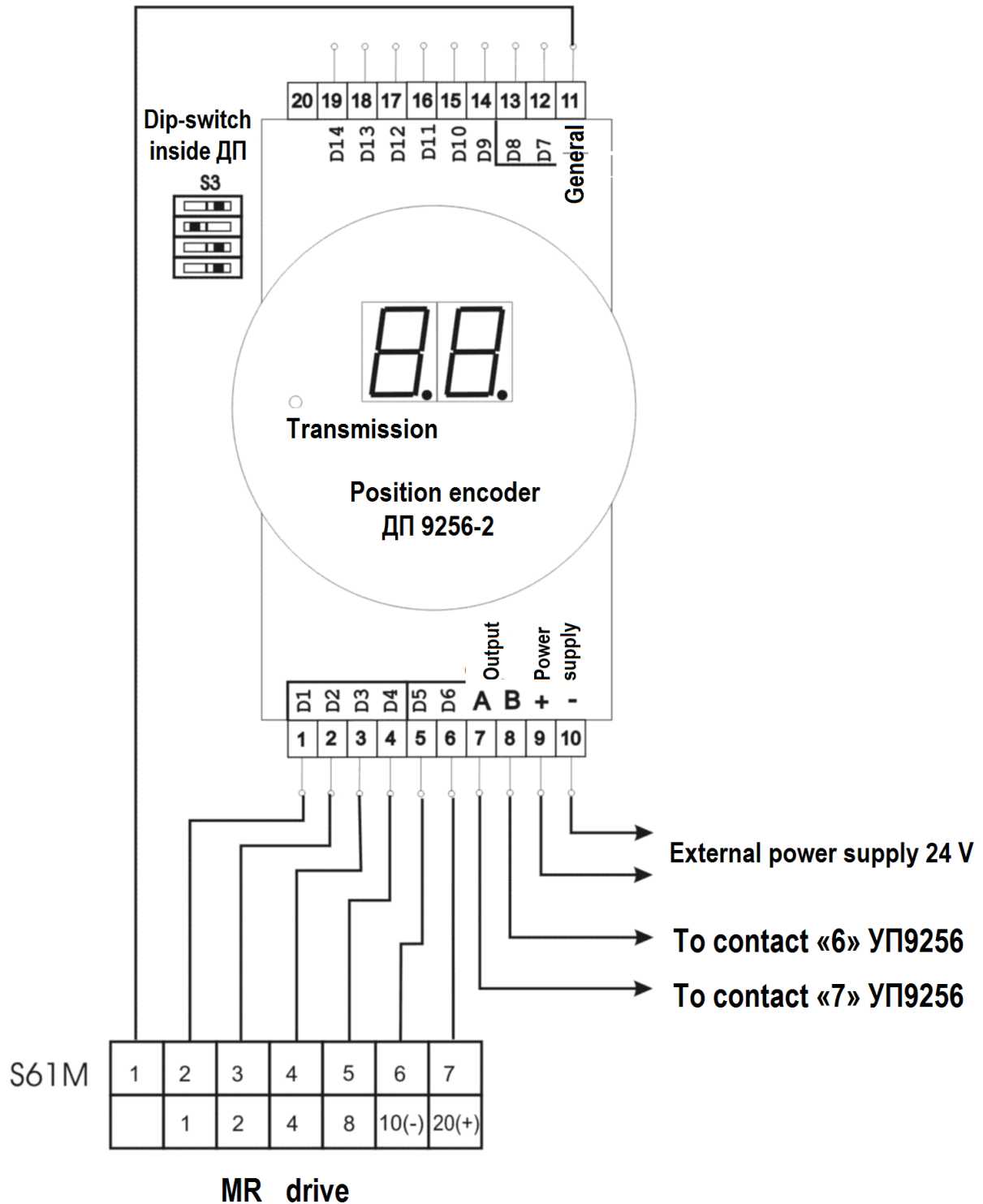# Connection of ДП 9256-1 to the MR drive for work with a BCD-signal

Dip-switch inside ДП

S3

Transmission

Position encoder ДП 9256-1

20	19	18	17	16	15	14	13	12	11
	D14	D13	D12	D11	D10	D9	D8	D7	General

Output **Power supply**

D1	D2	D3	D4	D5	D6	A	B	+	-
1	2	3	4	5	6	7	8	9	10

To contact «5» УП9256

To contact «8» УП9256

To contact «6» УП9256

To contact «7» УП9256

S61M

1	2	3	4	5	6	7
	1	2	4	8	10(-)	20(+)

MR drive

Figure A.9 - Connection of ДП 9256-1 to the MR drive for work with a BCD-signal

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Connection of ДП 9256-2 to the MR drive for work with a BCD-signal

	20	19	18	17	16	15	14	13	12	11
		D14	D13	D12	D11	D10	D9	D8	D7	General

Dip-switch inside ДП

S3

Transmission

Position encoder ДП 9256-2

	Output	Power supply	
D1	D2	D3	D4	D5	D6	A	B	+	−
1	2	3	4	5	6	7	8	9	10

→ External power supply 24 V

→ To contact «6» УП9256

→ To contact «7» УП9256

S61M

1	2	3	4	5	6	7
	1	2	4	8	10(−)	20(+)

MR drive

Figure A.10 - Connection of ДП 9256-2 to the MR drive for work with a BCD-signal

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Connection of ДП 9256-1 to the drives that have a "contact unit", where the number of contacts corresponds to the number of positions of the drive
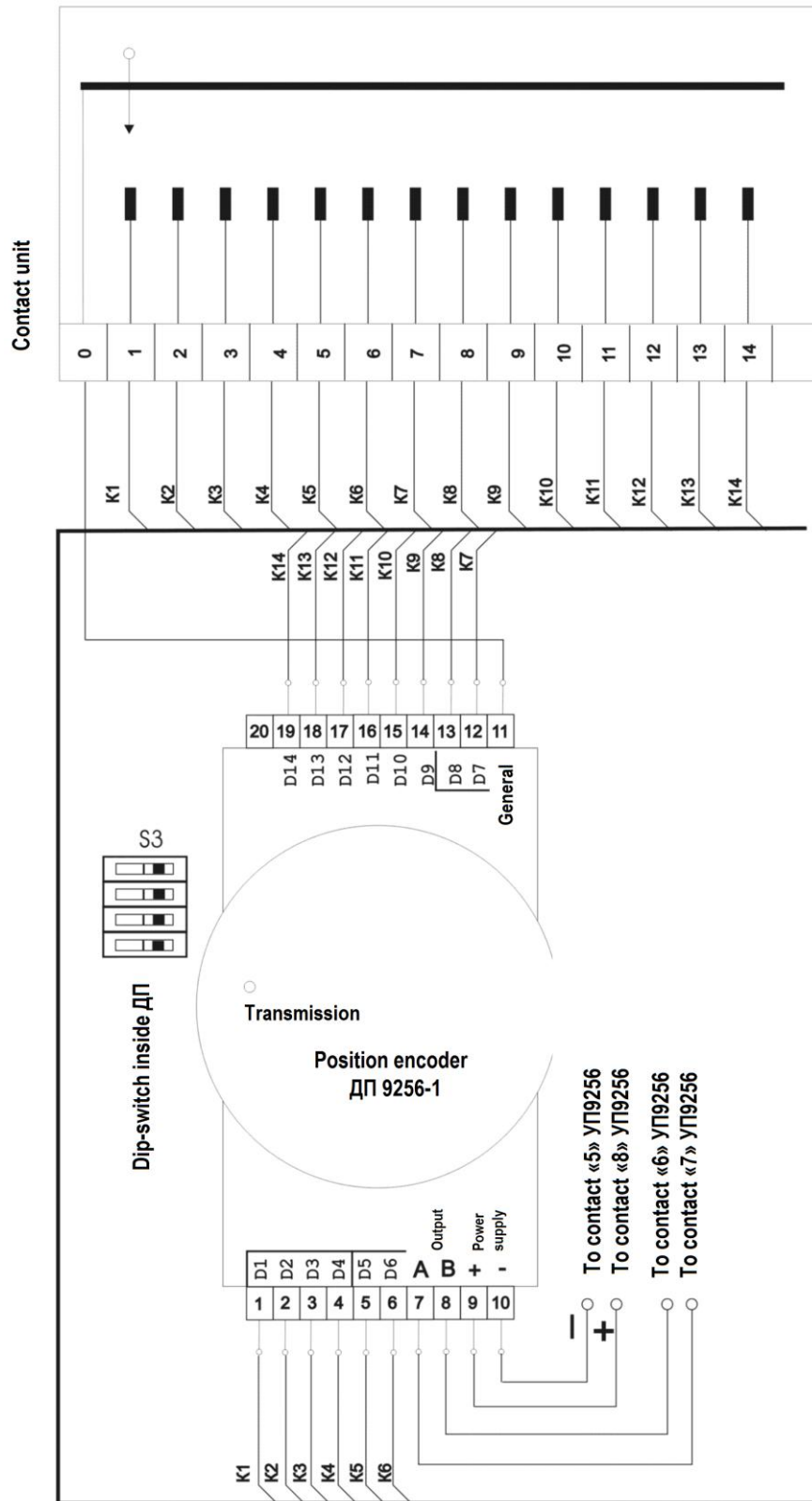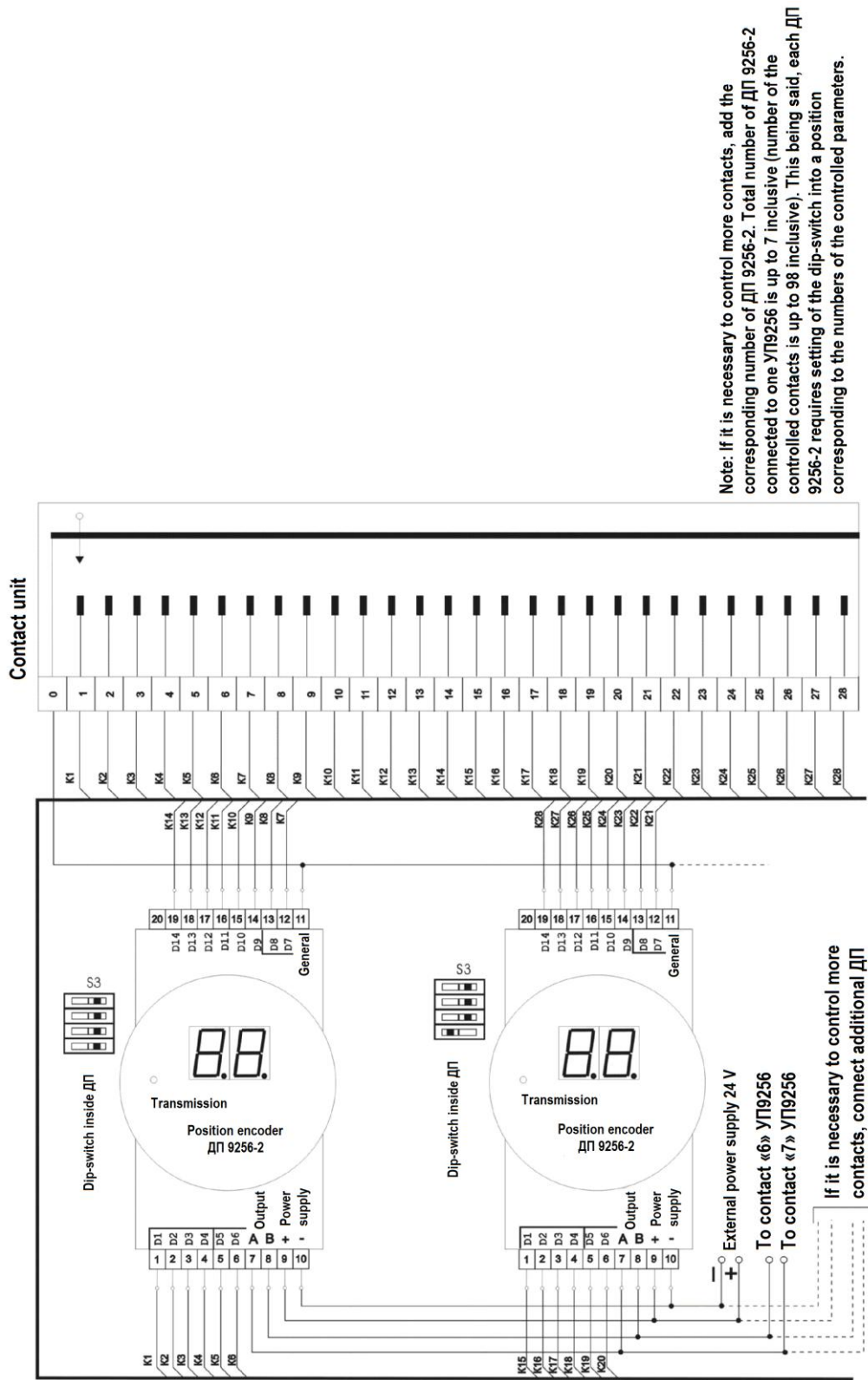

Figure A.11 - Connection of ДП 9256-1 to the drives that have a "contact unit", where the number of contacts corresponds to the number of positions of the drive

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Note: If it is necessary to control more contacts, add the corresponding number of ДП 9256-2. Total number of ДП 9256-2 connected to one УП9256 is up to 7 inclusive (number of the controlled contacts is up to 98 inclusive). This being said, each ДП 9256-2 requires setting of the dip-switch into a position corresponding to the numbers of the controlled parameters.

Figure A.12 - Connection of ДП 9256-2 to the drives that have a "contact unit", where the number of contacts corresponds to the number of positions of the drive

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APPENDIX B
(for information)

Description of the УП9256 reading device's display modes

The "B" key on the front panel of the PI allows you to select a display mode on the reading device (hereinafter referred to as the "RD").

The key may be pressed by two ways: "short" pressing (up to 1 second), "long" pressing (more than 2 seconds).

When the PI is switched on, it is in the mode 1 - the display mode "Changer position numbers".

In case of "short" press of the "B" key, the sequential search of the display modes is enabled:

Mode 2: Sensor type;

Mode 3: Initial position number;

Mode 4: End position number;

Mode 5: Value of the input signal corresponding to the initial position of the sensor;

Mode 6: Value of the input signal, corresponding to the end position of the sensor;

Mode 7: Operation of the PI in case of an error;

Mode 8: Delay in setting a new position;

Mode 9: Direction of rotation of the selsyn sensor;

Mode 10: Relay threshold for lowering;

Mode 11: Relay threshold for exceeding;

Mode 12: "Switching down" relay actuation time;

Mode 13: "Switching up" relay actuation time;

Mode 14: Analog output type;

Mode 15: Device number in the network;

Mode 16: Transmission rate code;

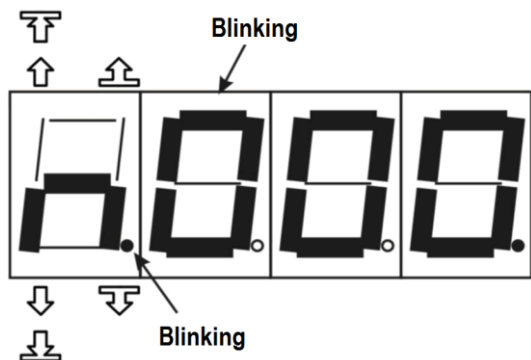Mode 17: Disabling the indication of data transmission through RS485;

Mode 18: Point-to-point adjustment (available only in the "programming" mode);

Mode 19: Password to enter the "programming" mode (available only in the "programming" mode);

Further along the circle starting from the mode 2. If there are no any functional units in the PI, their parameters are not displayed.

Adjustment of the parameters using the keys on the front panel may be done in the "programming" mode. To enter the "programming" mode, it is necessary to "long" press the "↑" and "↓" keys simultaneously.

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Then you should enter the password (default password is "123"). Transition between digit positions is carried out by "long" pressing the "B" key, and the adjustment of the data is carried out using the keys "↑" - raise and "↓" - lower. A flashing dot in the first digit position indicates that the PI is in the "programming" mode. The password may be in the range from -99 to 999. If you do not press any keys in the "programming" mode, the PI will switch to the main mode after 2 minutes.

To adjust the displayed parameter, you need to "long" press the "B" key and the PI will switch to the mode of adjustment of the current parameter. Transition between the digit positions is also carried out by "long" pressing the "B" key. If you "long" press the "B" key when the cursor is in the rightmost digit position (low-order), then the new data will be saved in non-volatile memory. Adjustment of the data is carried out using the keys "↑" - raise and "↓" - lower. If the newly entered value is outside the limits of the allowed values, such value will not be saved.

Brightness of the indicator's light changes with the use of the "↑" and "↓" keys in the mode 1. To save the current brightness, it is necessary to "long" press the "B" key in the mode 1.
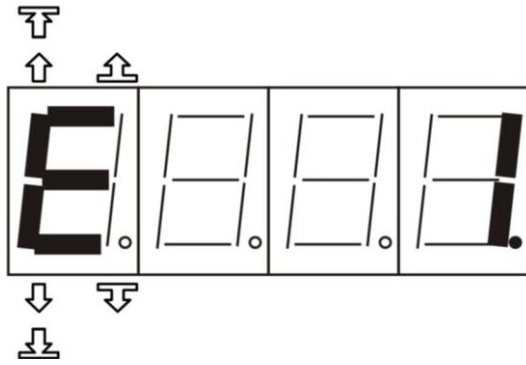
Mode 1: Drive sensor position number
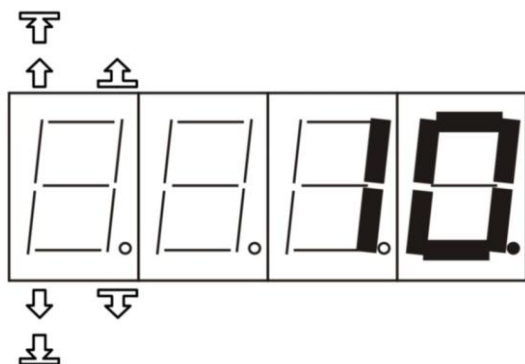
May take on a value from -99 to 99.

While working the PI may report an error. In this case, the symbol "E" is displayed in the high-order digit.

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Code on the display is decoded bit by bit as follows:

Bit 1 - voltage at the inputs C1 and C2 is less than 40% of the nominal power supply voltage of the selsyn sensor;

Bit 2 - there is no current in the excitation winding (only if power supplied to the selsyn-sensor from the PI);
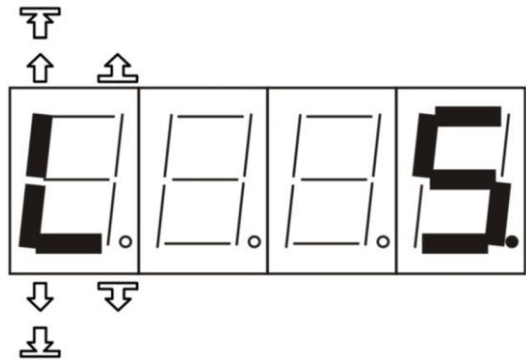
Bit 3 - position sensor is in an undetermined area (only for resistive or current sensors).

The remaining bits are "0".

If an error occurs, the PI works in accordance with a value set in the parameter "Operation of the PI in case of an error" (see Mode 7).
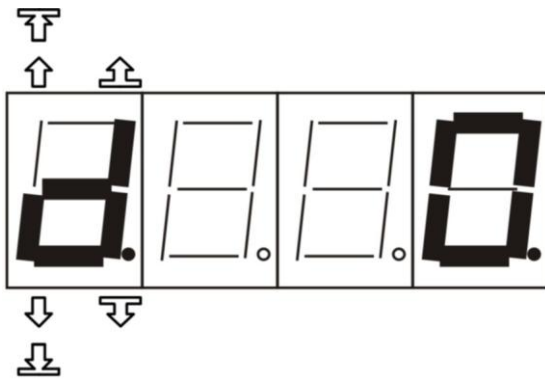
If an error occurs, the PI will leave the drive position value, analog output value, relay status in the state that they have had been in right before detection of the error.

To see the drive position value effective right before detection of the error, you need to press "↑" or "↓" key (change of brightness is not possible when the error is displayed).

Mode 2: Sensor type

0 - resistive sensor;
1 - selsyn - sensor;
2 - selsyn - sensor (displayed in degrees);
3 - current sensor;
4 - ДП9256 in the "contact unit" mode
5 - ДП9256 in the mode of BCD encoder (direct - closed contact is "1")
6 - ДП9256 in the mode of BCD encoder (inverse -closed contact is "0")

When changing the sensor type, the following parameters shall be set in accordance with Table B.1.

Table B.1

| Newly selected sensor type number	0	1	2	3	4	5, 6
Initial position number	0	0	0	0	1	1
End position number	19	19	359	19	14	14
Input signal value corresponding to the initial position of sensor	0	0	0	0.0	1	1
Input signal value corresponding to the end position of sensor	500	190	359	20.0	14	14
Relay threshold for lowering	2	2	2	2	2	2
Relay threshold for exceeding	12	12	12	12	12	12

Change of the following parameters: "Sensor type", "Initial position number", "End position number", "Input signal value corresponding to the initial position of sensor", "Input signal value corresponding to the end position of sensor", "Direction of rotation of the selsyn sensor", triggers linear recalculation of the internal tables according to the set initial position, end position and values corresponding to the initial and end positions.

In this case, the internal tables for the following switching directions - bottom-up and up-bottom - become the same (see Mode 18).

Internal table - correspondence of the changer position number to the value of the input signal.

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Mode 3: Initial position number
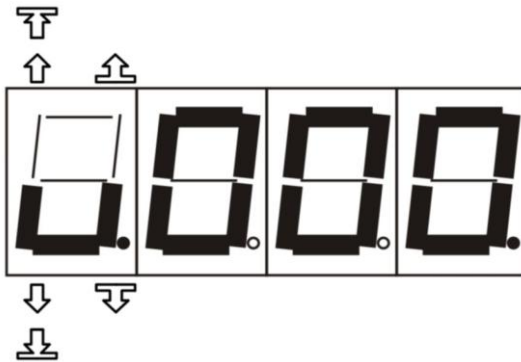
May take on a value from -99 to 99. The "initial position number" shall be different from the "end position number". Besides, difference between these numbers shall be not more than 100. For the sensor type 2 the "Initial position number" is 0. By default see Table B.1.

Mode 4: End position number
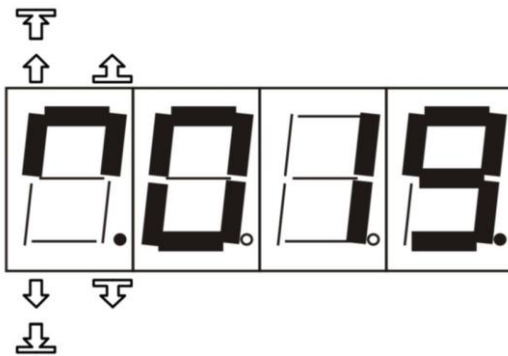
May take on a value from -99 to 99. The "end position number" shall be different from the "initial position number". Besides, difference between these numbers shall be not more than 100. By default see Table B.1.

For the sensor type 2 the "End position number" is always equal to 359.

Mode 5: Value of the input signal corresponding to the initial position of sensor
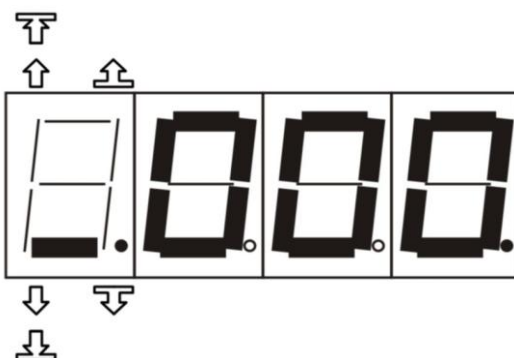
May take on a value depending on the sensor type:
- for selsyn sensor – rotation angle in degrees;
- for resistive sensor - resistance in Ohms (from 0 to 999 Ohm);

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- for current sensor - in milli-amperes (from 0.0 to 20.0 mA).

You can change these values in two ways in the programming mode:

- "long" pressing the "↓" key will set the input signal value corresponding to the initial position equal to the current one;

- "long" pressing the "B" key will allow you to enter the value manually.

By default see Table B.1.

Mode 6: Value of the input signal, corresponding to the end position of sensor

May take on a value depending on the sensor type:

- for selsyn sensor – rotation angle in degrees;

- for resistive sensor - resistance in Ohms (from 0 to 999 Ohm);

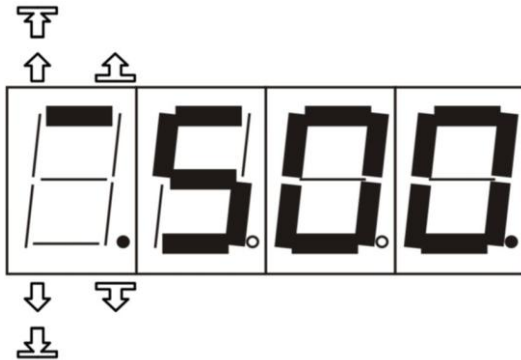- for current sensor - in milli-amperes (from 0.0 to 20.0 mA).

You can change these values in two ways in the programming mode:

- "long" pressing the "↑" key will set the input signal value corresponding to the end position number equal to the current one;

- "long" pressing the "B" key will allow you to enter the value manually with the use of «↑» «↓» keys.

For the sensor type 2 the "Input signal value corresponding to the end position number" is always equal to 359 and is not used for calculation of the angle. You can set only the "input signal value corresponding to the initial position number", i.e. bias, for the sensor type 2.

By default see Table B.1.

Mode 7: Operation of the PI in case of an error
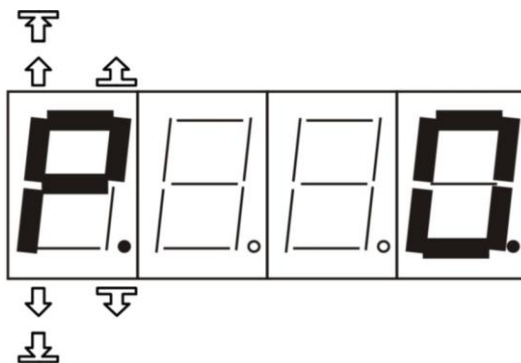
Parameter "Operation of the PI in case of an error" may take on either "0" or "1". The default value is "0".

"0" - If an error occurs, the PI will leave the drive position value, analog output value, relay status in the state that they have had been in right before detection of the error. The PI will automatically resume operation after elimination of the error.

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"1" - If an error occurs, the PI will leave the drive position value, analog output value, relay status in the state that they have had been in right before detection of the error. To resume operation of the PI, you need to dump and recover the power supply voltage with a pause of at least 5 seconds.
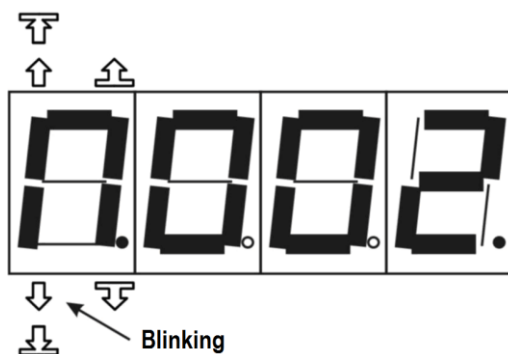
Mode 8: Delay in setting a new position
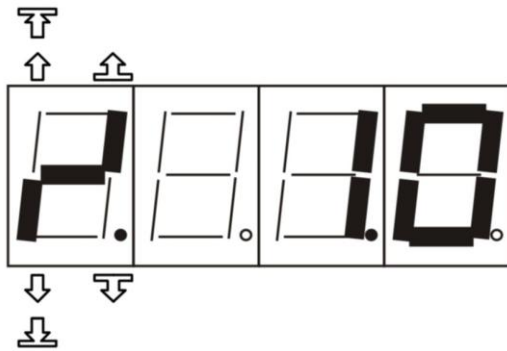
When the drive is switched to a new position, after the time period equal to "Delay in setting a new position", the PI will change the measured position to a new one. It may take on a value from 0.2 to 25.0 seconds. Default value is 1.0 sec.

Mode 9: Direction of rotation of the selsyn sensor
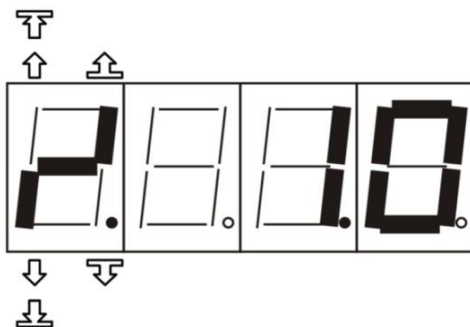
0 – inverse (clockwise)
1 – direct (counterclockwise)
1 by default.

Mode 10: Relay threshold for lowering

The relay for lowering is actuated when the sensor position value is equal to or below the set threshold. It may take on a value from -99 to 99 for the sensor types 0, 1, 3, 4, 5, 6. For the sensor type 2 the value is from 0 to 359. By default see Table B.1.

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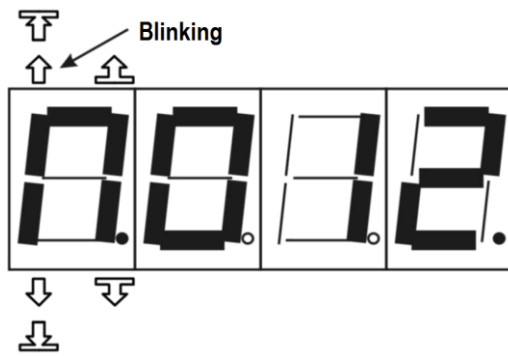| Orig. Inv. No.	Signature and date	Repl. inv. No.	Orig. Inv. No.	Signature and date

Mode 11: Relay threshold for exceeding

The relay for exceeding is actuated when the sensor position value is equal to or above the set threshold. It may take on a value from -99 to 99 for the sensor types 0, 1, 3, 4, 5, 6. For the sensor type 2 the value is from 0 to 359. By default see Table B.1.
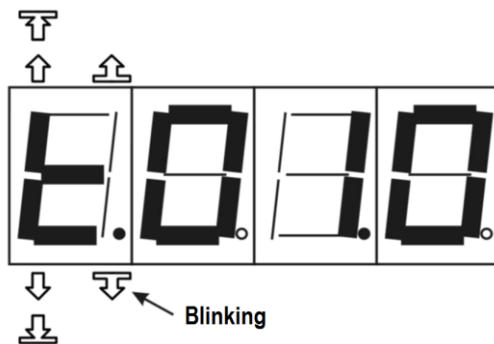
Mode 12: "Switching down" relay actuation time

"Switching down" relay actuation time is time when the relay is actuated upon switching of the sensor to the position of a lower number. It may take on a value from 0.1 to 25.0 seconds. Default value is 1.0 sec.

Mode 13: "Switching up" relay actuation time
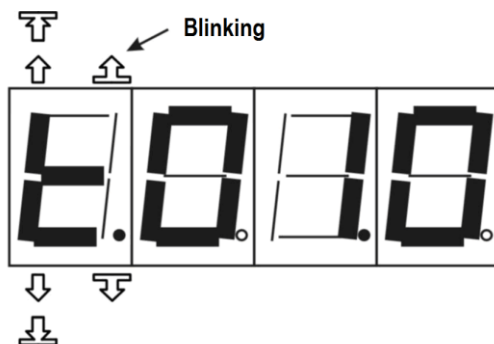
"Switching up" relay actuation time is time when the relay is actuated upon switching of the sensor to the position of a higher number. It may take on a value from 0.1 to 25.0 seconds. Default value is 1.0 sec.

Attention! For the correct operation of the PI the parameters "Switching down" relay actuation time" and "Switching up" relay actuation time" shall be less than time for switching of the drive to another position.

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Mode 14: Analog output type
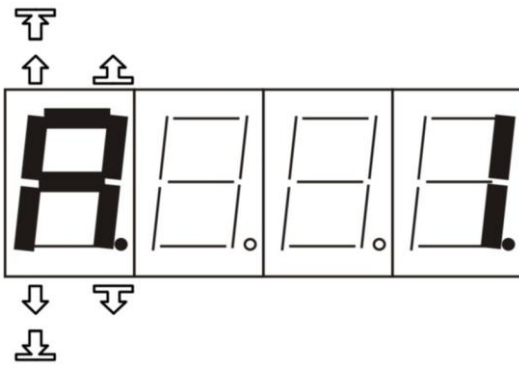
«Analog output type»   0 – disabled or not available
                          1 - minus 5 mA – plus 5 mA
                          2 - 0 mA – plus 5 mA
                          3 - 0 mA – plus 20 mA
                          4 - plus 4 mA – plus 20 mA
                          0 (disabled) by default.

Mode 15: Device number in the network
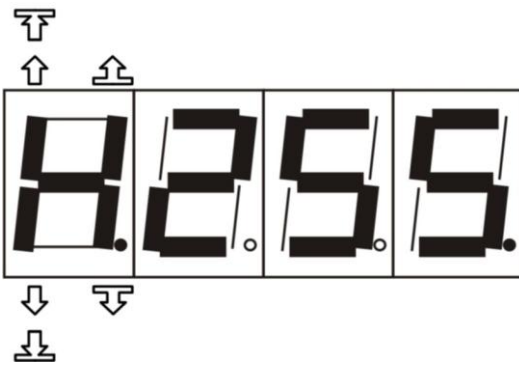
"Device number in the network" may take on a value from 1 to 255. The default value is 255.

Mode 16: Transmission rate code
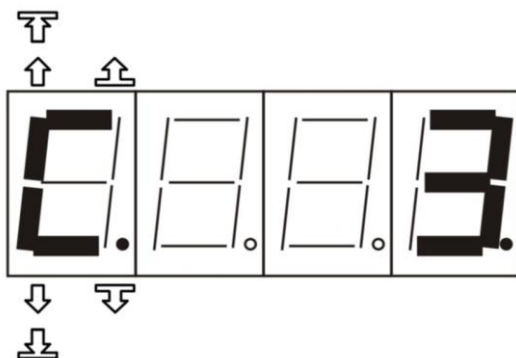
Possible values of the "Transmission rate code": 0 – 1200 baud, 1 – 2400 baud; 2 – 4800 baud; 3 – 9600 baud; 4 – 19200 baud; 5 – 28800 baud; 6 – 38400 baud; 7 – 57600 baud; 8 – 115200 baud.
The default "Transmission rate code" is 3 – 9600 baud.

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Mode 17: Disabling the indication of data transmission through RS485
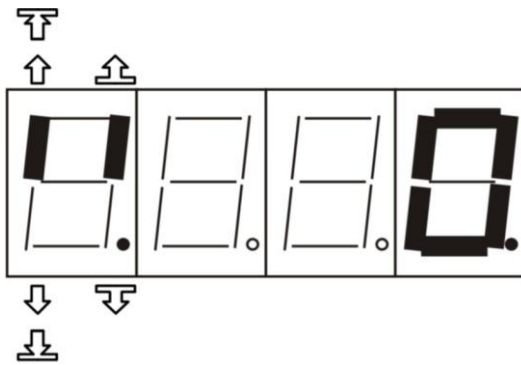
May take on the value 0 or 1:

    0 - indication of data transmission through RS485 is allowed;

    1 - indication of data transmission through RS485 is not allowed;

    1 by default.

Mode 18: Point-to-point adjustment

From bottom to top
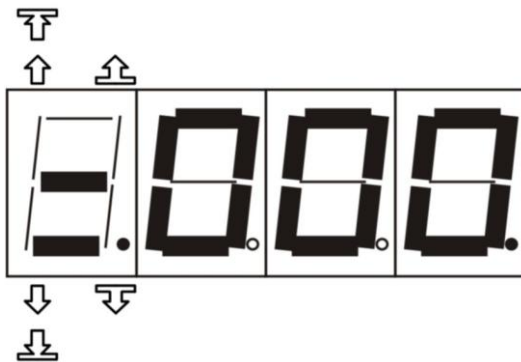
From top to bottom
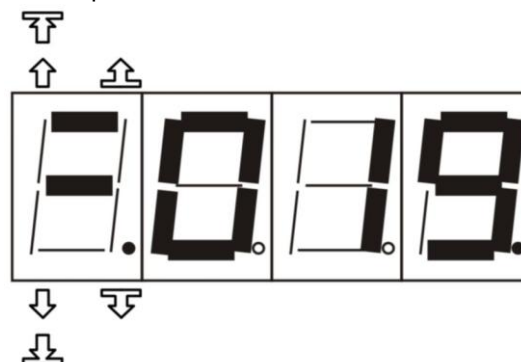
    The "Point-to-Point Adjustment" mode allows to set the value actually measured by the PI for a given changer position.

    In order to eliminate the backlash of the mechanism (for the selsyn sensor only), you can set different tables of values to change the position of the regulator from the bottom up (from the lower position number to the

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higher one) and from the top down (from the higher position number to the lower one). The up-bottom table shall be applied only to the selsyn sensor.

Entering the adjustment mode: simultaneous "long" press of the "↑" and "↓" keys, so the symbol "two strips: lower one and middle one" (bottom-up table) or "two strips: upper one and middle one" (up-bottom table) will start blinking. Exiting the adjustment mode: only simultaneous "long" press of the "↑" and "↓" keys. (While being in the point-to-point adjustment mode, you can not exit the "programming" mode if the keys are not pressed within 2 minutes).

"Short" press of "↑" or "↓" key – to change the position number.

Simultaneous "long" press of the "B" key and "↑" key – to switch to the bottom-up table adjustment. In this mode, when adjusting the point, the values for both tables (bottom-up and up-bottom) are saved.

Simultaneous "long" press of the "B" key and "↓" key – to switch to the up-bottom table adjustment. In this mode, when adjusting the point, the values only for the bottom-up table are saved.

"Long" press of the "B" key will set the current value for the selected point and change the current point by 1 according to the selected direction.

Mode 19: Password to enter the "programming" mode (available only in the "programming" mode)
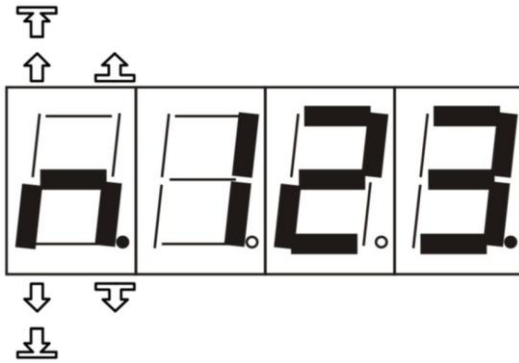
The password may be in the range from -99 to 999. Default password is «123».

APPENDIX C

(for information)

Communication protocol

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The MODBUS communication protocol, RTU mode, is used in the PI.

Transmission format - 8 bits without parity check.

Transmission rate -1200 baud; 2400 baud; 4800 baud; 9600 baud; 19200 baud; 28800 baud; 38400 baud; 57600 baud; 115200 baud. Default transmission rate is 9600 baud;

The PI number in the network shall be in the range from 1 to 255 and set by the customer. Default PI number in the network is 255.

The MODBUS functions supported by this PI:

Function 1 - reading the relay status;

Function 3 - reading the registers of settings (4x - bank);

Function 4 - reading the input registers (3x - bank);

Function 6 – installation of a single register of settings (4x - bank).

Function 1 is used to determine the status of the relays built into the PI. Query format for function 1:

SLAVE	01	START	LENGTH	CRC

where SLAVE   address of the requested PI (1 byte);
       01   code of the function (1 byte);
       START   start address of the requested data (2 bytes, high-order byte then low-order byte);
       LENGTH   quantity of the requested data (2 bytes, high-order byte then low-order byte);
       CRC   control cyclic code (2 bytes, high-order byte then low-order byte).

The PI will respond only if START = 0000h, and LENGTH = 0006h. If START and (or) LENGTH are not equal to the abovementioned values, the PI throws **exception** (see exceptions).

Response format for **function 1**:

SLAVE	01	01	DATA	CRC

Where SLAVE   address of the responding PI (1 byte);
       01   code of the function (1 byte);
       01   quantity of the transmitted bytes of data (1 byte);
       DATA   relay status bytes, where:
              bit 0 – "The lower limit is reached" relay status (К4);
              bit 1 – "The upper limit is reached" relay status (К1);
              bit 2 – "Lowering the set limit" relay status (К3);
              bit 3 – "Exceeding the set limit" relay status (К2);
              bit 4 – "Switching down" relay status (К5);
              bit 5 – "Switching up" relay status (К6);
              All other bits are always equal to «0»;
       CRC   control cyclic code (2 bytes, high-order byte then low-order byte).

If the bit is set in the field "DATA", the corresponding relay is activated.

Function 3 is used to determine the settings for this PI. Query format for function 3:

SLAVE	03	START	LENGTH	CRC

where SLAVE   address of the requested PI (1 byte);
       03   code of the function (1 byte);
       START   start address of the requested data (2 bytes, high-order byte then low-order byte);

LENGTH   quantity of the requested data (2 bytes, high-order byte then low-order byte);

CRC   control cyclic code (2 bytes, high-order byte then low-order byte).

START and LENGTH shall be in the range that is in accordance with Table C.1, otherwise the PI throws **exception**.

If START = 5000h and LENGTH = 0008h words, the PI will show its name (codes KOI8-R) and the software release number. If START is 5000h and LENGTH is not equal to 0008h words, the PI throws **exception**.

Response format for **function 3**:

SLAVE	03	BYTES	DATA…	CRC

Where SLAVE   address of the responding PI (1 byte);

03   code of the function (1 byte);

BYTES   quantity of the transmitted bytes of data (1 byte);

DATA…   data for transmission;

CRC   control cyclic code (2 bytes, high-order byte then low-order byte).

A feature of this command is that double-byte data (WORDS) are requested. The response always contains the high-order byte first and then the low-order byte. Here's Table C.1, which summarizes all possible requested data with their addresses and lengths.

Table B.1

Data name	Start address (origin) of data, words	Length of data, words
Brightness code	0000h	0001h
Sensor type	0001h	0001h
Initial position number	0002h	0001h
End position number	0003h	0001h
Value of the input signal corresponding to the initial position number of sensor	0004h	0001h
Value of the input signal, corresponding to the end position number of sensor	0005h	0001h
Operation of the PI in case of an error	0006h	0001h
Delay in setting a new position	0007h	0001h
Direction of rotation of the selsyn sensor	0008h	0001h
Relay threshold for lowering	0009h	0001h
Relay threshold for exceeding	000Ah	K0001h
"Switching down" relay actuation time	000Bh	0001h
"Switching up" relay actuation time	000Ch	0001h
Analog output type	000Dh	0001h
Transmission rate code, PI's number in the network	000Eh	0001h
Disabling the indication of data transmission through RS485	000Fh	0001h
Serial number of device	3003h	0002h
PI's name, release number	5000h	0008h

Important!

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Change of the following parameters: "Sensor type", "Initial position number", "End position number", "Input signal value corresponding to the initial position number of sensor", "Input signal value corresponding to the end position number of sensor", "Direction of rotation of the selsyn sensor", triggers linear recalculation of the internal tables according to the set initial position, end position and values corresponding to the initial and end positions. In this case, the internal tables for the following switching directions - bottom-up and up-bottom - become the same (see Mode 18 Appendix B).

"Brightness code" - at the address 0000h high-order byte - brightness code. The brightness code is a number from 0 to 31, where 0 – indicator doesn't glow, 31 - maximum brightness. Default value is 31.

"Brightness code" - at the address 0050h word - brightness code. The brightness code is a number from 0 to 31, where 0 - indicator doesn't glow, 31 - maximum brightness. The following values are used: 11 - gradation 0; 15 - gradation 1; 21 - gradation 2; 31 - gradation 3. Default value is 31.

"Sensor type" - the parameter is represented as a two's complement, may take on the following values:

0 - resistive sensor;

1 – selsyn sensor;

2 – selsyn sensor (displayed in degrees);

3 - current sensor;

4 - ДП 9256 in the "contact unit" mode

5 - ДП 9256 in the mode of BCD-encoder mode (direct - closed contact is "1")

6 - ДП 9256 in the mode of BCD-encoder (inverse-closed contact is "0")

When changing the sensor type, the following parameters shall be set in accordance with Table B.1.

"Initial position number" may take on a value from -99 to 99. The "initial position number" shall be different from the "end position number". Besides, difference between these numbers shall not be more than 100. For the sensor type 2, the "initial position number" is always 0. By default see Table B.1.

"End position number" may take on a value from -99 to 99. The "end position number" shall be different from the "initial position number". Besides, difference between these numbers shall not be more than 100. For the sensor type 2, the "initial position number" is always 359. By default see Table B.1.

The number of positions differs from the end position number. For example, if the end position number is 19 and the initial position number is 0, then the number of positions is 20.

"Value of the input signal corresponding to the initial position number of sensor" may take on a value depending on the sensor type:

- for selsyn sensor – rotation angle in tenths, from 0 to 3590;

- for resistive sensor - resistance in tenths of Ohm (from 0 to 9990);

- for current sensor - in micro-amperes (from 0 to 20000);

- for ДП 9265 in the "contact unit" mode from 1 to 98;

- for ДП 9265 in the mode of BCD encoder from 0 to 99.

By default see Table B.1.

"Value of the input signal corresponding to the end position number of sensor" may take on a value depending on the sensor type:

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- for selsyn sensor - rotation angle in tenths, from 0 to 3590;
- for resistive sensor - resistance in tenths of Ohm (from 0 to 9990);
- for current sensor - in micro-amperes (from 0 to 20000);
- for ДП 9265 in the "contact unit" mode from 1 to 98;
- for ДП 9265 in the mode of BCD-encoder from 0 to 99.

By default see Table B.1.

For the sensor type 2 the "Value of the input signal corresponding to the end position" is always equal to 3590 and is not used for calculation of the angle. You can set only the "input signal value corresponding to the initial position number", i.e. bias, for the sensor type 2.

"Operation of the PI in case of an error" - the parameter is represented as a two's complement and may take on the value "0" or "1". Default value is 0.

"0" - If an error occurs, the PI will leave the drive position value, analog output value, relay status in the state that they have had been in right before detection of the error. The PI will automatically resume operation after elimination of the error.

"1" - If an error occurs, the PI will leave the drive position value, analog output value, relay status in the state that they have had been in right before detection of the error. To resume operation of the PI, you need to dump and recover the power supply voltage with a pause of at least 5 seconds.

"Delay in setting a new position" - the parameter is represented as a two's complement and may take on a value from 2 to 250, which corresponds to 0.2 to 25.0 seconds.

When the drive is switched to a new position, after the time period equal to "Delay in setting a new position", the PI will change the measured position to a new one. Default value is 10, which corresponds to 1.0 sec.

"Direction of rotation of the selsyn sensor" - default value is 1;

0 - inverse (clockwise);

1 - direct (counter-clockwise).

"Relay threshold for lowering" - the parameter is represented as a two's complement and can be in the range from -99 to 99 for the sensor types 0, 1, 3, 4, 5, 6, and 0 to 359 for the sensor type 2. The relay for lowering is actuated when the sensor position value is equal to or below the set threshold. By default see Table B.1.

"Relay threshold for exceeding" - the parameter is represented as a two's complement and can be in the range from -99 to 99 for the sensor types 0, 1, 3, 4, 5, 6, and 0 to 359 for the sensor type 2. The relay for exceeding is actuated when the sensor position value is equal to or above the set threshold. By default see Table B.1.

"Switching down" relay actuation time" - time in tenths of a second, when the relay is actuated upon switching of the sensor to the position of a lower number. The parameter is represented as a two's complement and can be in the range from 1 to 250. (1 is 0.1 second, 250 is 25 seconds). Default value is 10, which corresponds to 1.0 sec.

"Switching up" relay actuation time"- time in tenths of a second, when the relay is actuated upon switching

of the sensor to the position of a higher number. The parameter is represented as a two's complement and can be in the range from 1 to 250. (1 is 0.1 second, 250 is 25 seconds). Default value is 10, which corresponds to 1.0 sec.

Attention! For the correct operation of the PI the parameters "Switching down" relay actuation time" and "Switching up" relay actuation time" shall be less than time for switching of the drive to another position.

"Analog output type"   0 – disabled or not available

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1 - minus 5 mA – plus 5 mA
2 - 0 mA – plus 5 mA
3 - 0 mA – plus 20 mA
4 - plus 4 mA – plus 20 mA

Default "analog output type" is 0.

"Transmission rate code" and "PI's number in the network" are two functionally different bytes, combined into one WORD to reduce the length of the requested data. In the word, the high-order byte is the transmission rate code, the low-order byte is the PI's number in the network. Possible values of the "Transmission rate code": 0 – 1200 baud, 1 – 2400 baud; 2 – 4800 baud; 3 – 9600 baud; 4 – 19200 baud; 5 – 28800 baud; 6 – 38400 baud; 7 – 57600 baud; 8 – 115200 baud. Default transmission rate code is 3 – 9600 baud. PI's number in the network is 255, unless otherwise specified in the order.

"Disabling the indication of data transmission through RS485" – default value is 0.
May be either 0 or 1:
    0 - indication of data transmission through RS485 is allowed;
    1 - indication of data transmission through RS485 is not allowed;

"Serial number of device" format is unsigned long (**available starting from June 1, 2015**)
3003h - lower part of the serial number;
3004h - upper part of the serial number.

At the address 5000h you can find the "PI's name and release number", the data length is 0008h.

"PI's name, release number" – the format is as follows (byte-be-byte) –

Before the dot   "PI's name":
    Codes KOI8-R - У (0F5h); П (0F0h); 9 (039h) 2 (032h); 5 (035h); 6 (036h);
    Dot .(02Eh)
After the dot
     "Release number":
    Codes KOI8-R – 0 (030h); 1 (031h);

Unused bytes are filled with a space character (020h).

Function 4 is used to determine the type of the requested PI and to obtain a code corresponding to the input signal. Query format for **function 4**:

SLAVE	04	START	LENGTH	CRC

where SLAVE   address of the requested PI (1 byte);
        04   code of the function (1 byte);
        START   start address of the requested data (2 bytes, high-order byte then low-order byte);
        LENGTH   quantity of the requested data (2 bytes, high-order byte then low-order byte);
        CRC   control cyclic code (2 bytes, high-order byte then low-order byte).

The PI will respond only if START is in the range from 0000h to 0001h and LENGTH is in the range from 0001h to 0002h. It is necessary to take into account that: START + LENGTH shall not be more than 0002h. If

START and (or) LENGTH are out of the abovementioned ranges, the PI throws **exception**.

Response format for **function 4**:

SLAVE	04	BYTES	DATA…	CRC

where SLAVE   address of the responding PI (1 byte);

04   code of the function (1 byte);
BYTES   quantity of the transmitted bytes of data (1 byte);
DATA…   data for transmission;
CRC   control cyclic code (2 bytes, high-order byte then low-order byte).

A feature of this command is that double-byte data (WORDS) are requested. The response always contains the high-order byte first and then the low-order byte. Here's Table C.2, which summarizes all possible requested data with their addresses and lengths.

Table C.2

Data name	Start address (origin) of data, words	Length of data, words
Drive's sensor position number	0000h	0001h
Error code	0001h	0002h

«Drive's sensor position number» may take on a value from -99 to 99 for the sensor types 0, 1, 3 and from 0 to 359 for the sensor type 2. The data are represented as a two's complement.

«Error code»:

Bit 1 - voltage at the inputs C1 and C2 is less than 40% of the nominal power supply voltage of the selsyn sensor;

Bit 2 - there is no current in the excitation winding (only if power supplied to the selsyn sensor is from the PI);

Bit 3 - position sensor is in an undetermined area (only for resistive, current sensors or ДП9256).

Bit 4 - ДП9256 is not found (when working with ДП9256).

The remaining bits are "0"

Function 6 is used for remote programming of the PI operation modes.
Query format for **function 6**:

SLAVE	06	START	DATA	CRC

where SLAVE address of the requested PI (1 byte);
    06   code of the function (1 byte);
    START address of the register used for transmission (2 bytes, high-order byte then low-order byte);
    DATA   data recorded in the register (2 bytes, high-order byte then low-order byte);
    CRC   control cyclic code (2 bytes, high-order byte then low-order byte).

START may take on a value that is in accordance with Table C.3, otherwise the PI throws **exception**.

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Response format for **function 6**:

SLAVE	06	START	DATA	CRC

where SLAVE   address of the requested PI (1 byte);
       START   address of the register used for transmission (2 bytes, high-order byte then low-order byte);
       DATA   data recorded in the register (2 bytes, high-order byte then low-order byte);
       CRC   control cyclic code (2 bytes, high-order byte then low-order byte).

Table C.3

Data name	Start address (origin) of data, words	Length of data, words
Brightness code	0000h	0001h
Sensor type	0001h	0001h
Initial position number	0002h	0001h
End position number	0003h	0001h
Value of the input signal corresponding to the initial position number of sensor	0004h	0001h
Value of the input signal, corresponding to the end position number of sensor	0005h	0001h
Operation of the PI in case of an error	0006h	0001h
Delay in setting a new position	0007h	0001h
Direction of rotation of the selsyn sensor	0008h	0001h
Relay threshold for lowering	0009h	0001h
Relay threshold for exceeding	000Ah	0001h
"Switching down" relay actuation time	000Bh	0001h
"Switching up" relay actuation time	000Ch	0001h
Analog output type	000Dh	0001h
Transmission rate code, PI's number in the network	000Eh	0001h
Disabling the indication of data transmission through RS485	000Fh	0001h
Command register	1000h	0001h

Purpose of the registers is the same as for function 3.

In the PIs manufactured before **June 1, 2015**, when making records in the registers at the addresses from 0000h to 000Fh, new data are placed in the buffer. Data are saved in nonvolatile memory when a word 55AAh is recorded in the command register (address 1000h).

Starting from June 1, 2015, new data are saved in non-volatile memory immediately, it means that there is no need to use the command register to save data in nonvolatile memory. To maintain software compatibility, making records in the command register is possible, but does not lead to any changes.

The PI supports broadcast recording using function 06.

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Exceptions

If during the operation an error is detected in the CRC field, the PI will not respond.

The PI supports the following exceptions:

Exception code	Description
01	Invalid function code
02	Invalid data address
03	Invalid data
06	PI is engaged in action

Response format for exception:

SLAVE	0x80|CMD	Code	CRC

where   SLAVE   address of the requested PI (1 byte);
          0x80|CMD   code of the function that detected an error with the set high-order bit (1 byte);
          Code   exception code (1 byte);
          CRC   control cyclic code (2 bytes, high-order byte then low-order byte).

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APPENDIX D

(for information)

Overall and installation dimensions and marking of the panel for mounting the PI
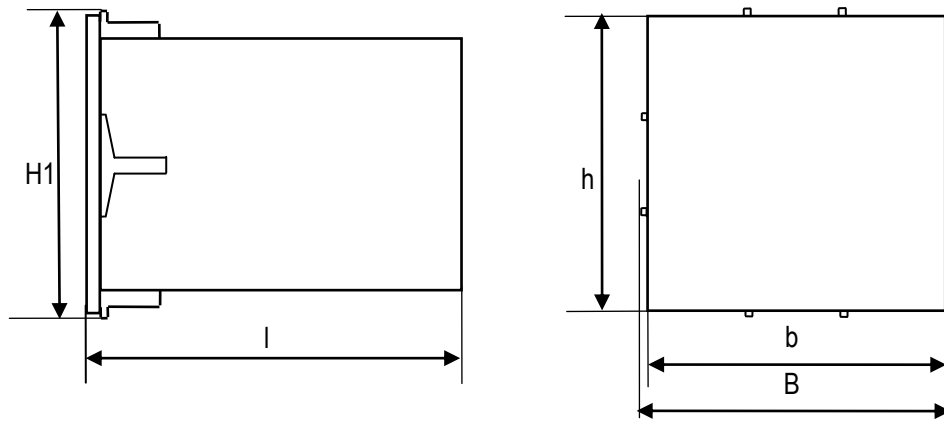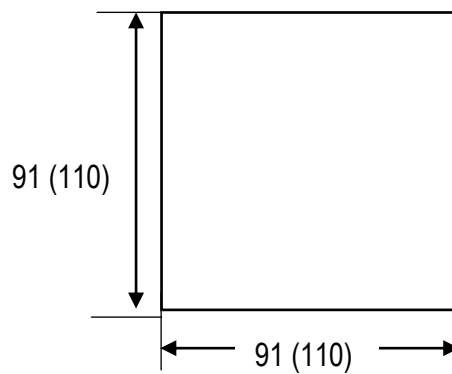

Design	Height, mm		Width, mm		Length (l), mm
	H	h	B	b	
E	98	96	98	96	138
P	120		120		138

Figure D.1 – Overall dimensions of the PI

91 (110)

91 (110)

Note – Numbers outside the brackets are the installation dimensions of the PI of "E" design, and numbers within the brackets – the PI of "P" design

Figure D.2 – Marking of the panel for mounting the PI

APPENDIX E

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Description of the PI when making an order

It is necessary to indicate the following information in the order and in the documentation of other products where the PI may be used: PI's type and design, digital code defining the input (types of sensors with which this PI can operate), presence or absence of RS-485 port, presence or absence of relays, presence or absence of analogue output, power supply source, indication colour, availability of selsyn sensor and its power supply source.

The digital code shall be loosely indicated according to the example of the order given below:

УП 9256 X X X X X X X X

Power supply voltage of selsyn sensor:
For input codes "1", "3", "7":
 0 – from the external source with the voltage of ~ 110 V at 50 Hz;
 1 – from УП 9256 with voltage ~ 24 V at 50 Hz
 2 – from the external source, indicate the voltage when ordering – from 12 V to 250 V at 50 Hz;
For input codes "2", "4", "5", "6":
 Always 0

Indication colour:
 З – green;   К – red;   Ж – yellow.

Power supply:
 1 - AC voltage source of 220 V ± 10% at 50 Hz;
 2 - AC voltage source of 85-264 V at 50 Hz or DC voltage source of 120-300 V;
 3 - DC voltage source of 18-36 V;
 4 - AC voltage source of 110 V ± 10% at 50 Hz.

Analog output:
 0 – analog output is absent;
 1 – analog output is present;
(Analog output in УП 9256 is universal. Analog output type may be chosen directly at the site from among: 0-5, ±5, 4-20, 0-20 mA).

Relay:
 0 – absent; 1 – present[(1)]

RS-485 port:
 0 – absent; 1 – present

Input:
 1 – resistive sensor, current sensor, selsyn sensor, ДП 9256[(2)];
 2 – only resistive sensor;
 3 – only selsyn sensor;
 4 – only current sensor;
 5 – resistive and current sensor;
 6 – only position sensor ДП 9256 (encoder)[(2)];
 7 – resistive sensor, current sensor, selsyn sensor

Design:
 E – front panel 96x96; P – front panel 120x120

*Notes:
(1) – Design with relays means that the device has 6 relays:
   "reaching threshold values" relay – 2 pc.;
   "reaching set values" relay (blocking) – 2 pc.;
   "raising or lowering drive position" relay – 2 pc.
(2) - ДП 9256 sensor shall be ordered separately.

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Starting from June 1, 2015, if it is necessary to supply power to the selsyn sensor from the PI, then you can use the PI with power supply codes "1", "2", "3", "4".

Example of a code when ordering the PI of "P" design working with a resistive sensor, current sensor, selsyn sensor. The device also has RS-485 port, built-in relays, analog output; power to the PI is supplied from the AC voltage source of 220 V or DC voltage source of 220 V, indication colour is green, power to the selsyn sensor is supplied from the PI: УП 9256Р 7111231.

Example of a code when ordering the PI of "E" design working with a resistive sensor, current sensor, selsyn sensor. The device also has RS-485 port, built-in relays, analog output; power to the PI is supplied from the AC voltage source of 220 V or DC voltage source of 220 V, indication colour is red, power to the selsyn sensor is supplied from the external source of 110 V: УП 9256Е 71112К0-110V.

At the customer's request, an external power supply unit for selsyn sensor - БП220/24 or БП220/110 - may be included in the scope of delivery.

Power to БП220/24 and БП220/110 is supplied from the AC voltage source of 220 V ± 10% with a frequency of 50 Hz. The output voltage of БП220/24 is 24±3.6 V of AC voltage at 50 Hz, with current of not more than 125 mA. The output voltage of БП220/110 is 110±16.5 V of AC voltage at 50 Hz, with current of not more than 450 mA. БП220/110 can simultaneously supply power to one selsyn sensor and one УП 9256 (design with power supply of 110 V of AC voltage).

To work with drives that have a "contact unit", where the number of contacts corresponds to the number of positions, the ДП 9256 sensor may be included in the scope of delivery at the customer's request.

ДП 9256 -Х

Type:
1 – power supplied from УП9256[1];
2 – external power supply source of 24 V (DC)[2]

*Notes:
[1] ДП 9256-1 shall be connected directly to УП9256. In this case the number of positions controlled using one УП9256 and one ДП 9256-1:
with drives that have a BCD-output – up to 100 (0-99)
with drives that have a "contact unit", where the number of contacts corresponds to the number of the drive positions – up to 14 inclusive.
ДП 9256-1 doesn't have built-in indication.

[2] ДП 9256-2 may be used individually for transmission of information to the telecontrol system through RS485. Also, when you choose this option, if you use drives that have a "contact unit", where the number of contacts corresponds to the number of the drive positions, up to seven ДП 9256-2 may be connected to one УП9256. In this case the number of positions controlled using one УП9256 and seven ДП 9256-2 is up to 98 inclusive.
ДП 9256-2 has built-in indication.

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