



**CURRENT TRANSDUCER
E1842C**

Operation manual

49501860.3.0015 PЭ

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This operation manual contains information for using and operating Current Transducer E1842C (further – Transducer) and information on packing, transportation and storage.
Read this manual before operation.

1 Description and operation

1.1 General Information

1.1.1 Transducer is intended for a linear alternating-current converting to unified output signal of a direct current and can be applied to monitoring currents of electrical systems with rated voltage up to 660 V, the equipment of technical diagnostics, for an integrated automation of plants of power engineering and different industries.

Transducer is a single-channel hardware product. The transducer has the through hole for embedding in current distributor.

Transducer corresponds to engineering factors TY 4227-008-49501860-02.

Transducer is mounted on the rail TH-35 in accordance with ГOCT P MЭK 60715-2003 or immediately on the panel.

Transducer is hardware SSI product of the third order according to ГOCT 12997-84.

Protection of the transducer against environmental activity is ordinary.

Guard level: IP00 (ГOCT 14254-96, IEC 529-89).

Operating Environment:

- Climatic affecting for C4 Group (ГOCT 12997-84):

- Ambient Air Temperature-30°C to 50°C;

- Relative Humidity at 35°Cup to 95 %;

- Atmospheric affecting for P1 Group (ГOCT 12997-84):

- Atmospheric pressure84-106 kPa (630-800 mm Hg).

- Mechanical affecting for N2 Group (ГOCT 12997-84):

- Vibration frequency up to 55 Hz;

- Acceleration amplitude up to 4,5 g

Standard conditions for use:

- Ambient Air Temperature 20 ± 5 °C;

- Relative Humidity.....30 to 80 %;

- Input frequency, Hz $50,0 \pm 0,5$;

- Load resistance, Ω 200 – 300;

- Waveform of the input signal is sinusoidal. The distortion factor shall not exceed 2 %.

1.2 Characteristics

1.2.1 Transducer ensures linear converting an alternating-current to a direct current output signal.

Input current ranges are: from 0 up to 25 A; from 0 up to 50 A; from 0 up to 100 A.

The output current range is from 0 up to 20 mA.

1.2.2 The load resistance range is from 0 up to 500 Ω . Normal range of load resistance values is from 200 up to 300 Ω .

1.2.3 Limits of the intrinsic error are $\pm 0,5\%$ of the fiducial value.

Upper value of output signal range (20 mA) is taken as a fiducial value.

1.2.4 Variations from influencing magnitudes given in table 1.

Table 1

Name of influencing magnitude	Value of influencing magnitude	Variation, % of the fiducial value
Ambient Air Temperature	- 30 to 50 °C	$\pm 0,4$ on 10 °C of temperature variation
Relative Humidity	to 95% at 35 °C	$\pm 0,9$
Frequency of the input quantity	45 to 65 Hz	$\pm 0,5$
External magnetic field of frequency 45-65 Hz by strength	to 400 A/m	$\pm 0,5$
Load resistance, Ω	0 to 200; above 300 to 500 incl.	$\pm 0,25$

1.2.5 When harmonic distortion is 5 %, limits of error are:

- for 2-th, 4-th, 6-th, 8-th harmonic $\pm 1\%$ of the fiducial value;
- for 3-th, 5-th, 7-th, 9-th harmonic $\pm 2\%$ of the fiducial value.

1.2.6 Set-up time of performance (heating-up time) is 10 min.

1.2.7 Ripple amplitude is no more than 0,2 %.

1.2.8 The transducers satisfy the requirement 1.2.3:

- on expiring a setup time of performance;
- at grounding one of output contacts;
- when effecting sine-wave vibrations in accordance with ГOCT 12997 for N2 Group.

1.2.9 Setting time of output signal for an input step is no more than 1 s.

1.2.10 Transducer withstands a long-lived break of a load circuit without failures. Output voltage at a break of a load circuits is no more than 30 V.

- 1.2.11 Transducer withstands 120 % overload by an input signal during 2 hours.
 1.2.12 Transducer withstands short-term overloads by input signal according to table 2.

Table 2

Current multiplicity	Number of overloads	Duration	Interval between overloads
2	10	10 s	10 s
7	2	15 s	60 s
10	5	3 s	2,5 s

Output current, when overloading, is no more 40 mA (when load resistance value is 500 Ω).

1.2.13 Isolation between input and output circuits withstands a testing voltage of practically sine-wave shape by frequency from 45 up to 65 Hz during 1 min:

- 3,5 kV RMS – in standard conditions;
- 2,0 kV RMS – to 95% R.H. at 35°C.

1.2.14 Electrical insulation resistance between input and output circuits is not less:

- 100 MΩ - in standard conditions;
- 20 MΩ - to 80% R.H. at 50°C;
- 2 MΩ - to 95% R.H. at 35°C

1.2.15 Overall dimensions 70x80x77 mm.

1.2.16 Weight 0,3 kg.

1.2.17 Average error-free running time 75000 hour.

1.2.18 Average durability..... 10,5 years.

1.3 Construction

1.3.1 General form of Transducer can be seen in Annex B.

1.3.2 Transducer has the following parts:

- Case;
- Cover;
- Component board;
- Measuring transformer;
- Latch.

1.3.3 The terminals established on a cover ensure strengthening a component board and reliable contact of conductors of a plated circuit to the bringing wires.

The cover is mounted to a case through four screws, which can be sealed up.

The transducer has the through hole for embedding by a main lead of measurable circuits.

The latch ensures mounting the transducer to the rail or panel depending on variant of installation.

1.4 Functional description

1.4.1 Transducer is carried out on a principle of direct conversion. It falls into the transducers of a rectifier type.

1.4.2 Transducer Schematic is shown in Annex A.

Transducer Schematic is composed of following parts:

- measuring transformer which is also element of a galvanic isolation, its primary winding is a main lead of measurable circuits;
- bridge rectifier;
- smoother reducing a ripple of a rectified signal;
- current-limited circuit on the voltage-reference diodes which safeguard simultaneously a transducer output from occurrence of a signal of a reverse polarity.

1.5 Marking and sealing

1.5.1 The following information is marked on a cover of the transducer:

- The name and type designation;
- Manufacturer's mark;
- Input and output signals rated;
- Unit symbols of input and output signals;
- Load resistance range;
- Overvoltage category;
- Module of intrinsic error;
- Designation of numbers and polarity of terminal;
- Serial number and two last digits of issue Year.

1.5.2 Sealing of the transducer is yielded with a bitumen mastic №1 (according to GOST 18680-73) applies on one of four located on a cover screws

1.6 Packing

1.6.1 The transducer is delivered in transport container.

1.6.2 In transport container there is:

- Operation manual (1 copy for set of 50 transducers or on separate delivering);
- Packing leaf.

1.6.3 The transducer is packaged into individual packing.

The passport is inserted inside the individual packing.

2 Uses to assignment

2.1 Operational constraints

2.1.1 The transducer is not intended for operation in requirements explosion-hazard and hostile environment.

2.1.2 The transducer must not be effected by direct heat up to temperature more 50°C. The transducer should be placed on the premises without sharp temperature fluctuation and off the sources of strong electromagnetic field.

2.2 Preparation for use

2.2.1 Check integrity of packing after deriving the transducer. Unpack it. Take out the transducer, make exterior survey, and get sure that any apparent mechanical damages are missing. Check completeness of delivering according to table 3.

Table 3

Name and nomenclature	Quantity
Transducer	1
Current transducer E1842C. Passport	1
Current transducer E1842C. Operation manual	1*
Individual package	1
Latch	1**
* On a batch in quantity 50 pieces, delivered at the one address	
** Set on the case	

2.2.2 Check the information on a cover of the transducer on correspondence to required parameters.

2.3 Use

2.3.1 All operations on mounting and maintenance should be making with observance of live rules on provision of safe service.

2.3.2 Make arranging a place of mounting of the transducer on plant according to Annex C.

2.3.3 Installation of the transducer on plant

2.3.3.1 When mounting the transducer *on the rail*:

- place a latch according to figure C.1 to link the protuberances of a case to edge of the rail;
- push a case up to its fixing.

The mounting of the transducer on the rail is supposed at mount the rail on a horizontal or vertical plane.

When the rail is mounted on the vertical plane, its distortion from a horizontal position should not be more than 15°.

2.3.3.2 When mounting the transducer *on the panel*:

- fix a latch on the panel with the help of two screws according to figure C.2;
- pull the transducer over a latch against the stop.

Use two screws with a diameter 4 mm to fasten a latch on the panel. Screws should not overhang a mounting plane of the latch.

When mounting the transducer on a latch it is necessary to provide on object a place not less than 15 mm for initial fixing of the transducer.

2.3.4 Run a main lead of measurable circuit trough the open-end hole of the transducer.

2.3.5 Fix exterior conductive wires on terminals according to the table of connections, which is located on a cover of the transducer.

2.3.6 Verify the correspondence of output parameters of a radiant of a signal to data-ins of the transducer. Verify quality of wiring.

2.3.7 Turn on an input signal on the transducer.

2.4 Operation in extreme conditions

2.4.1 You should turn out the transducer immediately in case of originating an emergency condition of operation.

3 Maintenance and repair

3.1 Safety

3.1.1 The qualified personnel should execute operations of maintenance.

3.1.2 The transducer corresponds to ГОСТ P 52319-2005 (IEC 61010-1:2001).

Insulation class is primary. Pollution degree is 2. Overvoltage category is III. Rated voltage of measurable circuit is 660 V.

3.1.3 IT IS FORBIDDEN: TO CHANGE EXTERIOR ASSOCIATIONS, WHEN INPUT SIGNAL IS AVAILABLE IN THE TRANSDUCER.

3.2 Order of maintenance

3.2.1 It is recommended quarterly to carry out routine inspection in field. For this purpose:

- to turn input signal off;
- to delete from a case a dust;
- to test a condition of a case; to be convinced of absence of mechanical failures; to test a condition of mounting;
- to turn input signal on the transducer after the termination of survey on.

3.2.2 If the transducer is mounted on the rail, you can carry demounting by release of a latch by a screwdriver inserted into a recess in the bottom of the case.

3.3 Troubleshooting data

3.3.1 You can see the enumeration of possible defects and methods of their elimination in table 4.

Table 4

Defect	Probable reason	Method of elimination
The voltage on secondary windings of a measuring transformer misses	Break or short closure of secondary windings of the transformer	Exchange an transformer
The output signal is not present at presence of an input signal	Break or short closure in wiring	Check voltages on capacitors C1, C2, C3. Eliminate break or short closure
The voltage on an rectifier output misses (V1)	Bridge Rectifier (V1) does not work	Exchange an defective Bridge Rectifier
Intrinsic error exceeds an acceptable value insignificantly	The tuning of the transducer is necessary	Make tuning with the help of by adjusting windings of the transformer

3.3.2 The specialized repair enterprise eliminates all failures.
The transducer should pass calibration after repair and be sealed up.

3.3.3 You can see the mode of operations of transducer key elements in table 5 (for load resistance 500 Ω).

Table 5

Circuit element	Voltage ($\pm 10\%$)	
	alternating	direct
Winding of the transformer T1	25 V	
Capacitor C1		24 V
Capacitor C2		22 V
Capacitor C3		10 V

3.4 Metrology monitoring

3.4.1 To confirm real values of the metrology characteristics and fitness of the transducer to application, they can be exposed to calibration according to the document 49501860.3.0009 МП «Преобразователь измерительный переменного тока Е1842С. Методика поверки» (Е1842С Current Transducer. Calibration procedure), which was matched with ВНИИМС (Russian Research Institute for Metrological Service).

Recalibration interval is 2 year.

4 Storage

4.1 Before introduction in operation the transducers should be stored in storehouses according to ГOCT 12997-84.

4.2 Storage conditions for transducers in transport container:

- Ambient Air Temperature 5 to 40 °C;
- Relative Humidity at 25 °C up to 80 %.

4.3 Storage conditions for transducers in individual packing:

- Ambient Air Temperature 10 to 35 °C;
- Relative Humidity at 25 °C up to 80 %.

4.4 The contents of a dust, steams of acids and alkalis, aggressive gases and other harmful admixtures calling corrosion should not exceed the contents of the corrosion-active agents for the atmosphere of a type 1 (ГOCT 15150-69).

5 Transportation

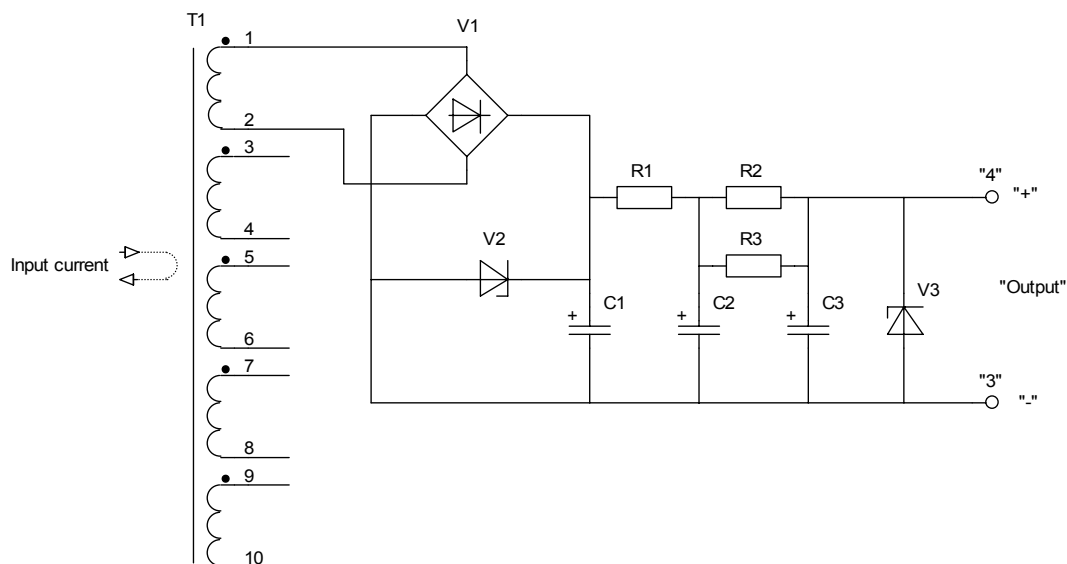
5.1 The transducers in transport container can be transported in the closed vehicles of any type. When air transporting, the transducers should be disposed in heated hermetic bays.

5.2 Values of climatic and mechanical effects on the transducer at transportation should be in limits:

- Ambient Air Temperature - 50 to 50 °C;
- Relative Humidity at 35 °C up to 95 %;
- Atmospheric pressure, kPa (mm Hg) 84-106 (630-800).
- Impacts with peak shock acceleration 98 m/sec².

Annex A (informative)

Transducer Schematic



Поз. Position	Наименование Name	Кол. Quant.	Примечание Remark
C1...C3	Конденсатор RLC 013-50 В-47 мкФ ± 20% VISHAY BCCOMPONENTS	3	Capacitor
R1	Резистор RC-1206-130 Ом ± 5% YAGEO	1	Resistor
R2, R3	Резистор RC-1206-1,2 кОм ± 5% YAGEO	2	Resistor
T1	Трансформатор (см. табл.)	1	Transformer according to table
V1	Мост выпрямительный MB4S FAIRCHILD	1	Bridge Rectifier
V2	Стабилитрон 1.5SMC47A ON SEMICONDUCTOR	1	Voltage-reference
V3	Стабилитрон SMAZ12-13 DIODES	1	Voltage-reference

Обозначение Designation	T1	Входной ток, А Input AC range, A
49501860.3.0015	49501860.5.0043	0 - 25
-01	49501860.5.0043-01	0 - 50
-02	49501860.5.0044	0 - 100

Figure A.1

Annex B
(informative)

General Form of the Transducer

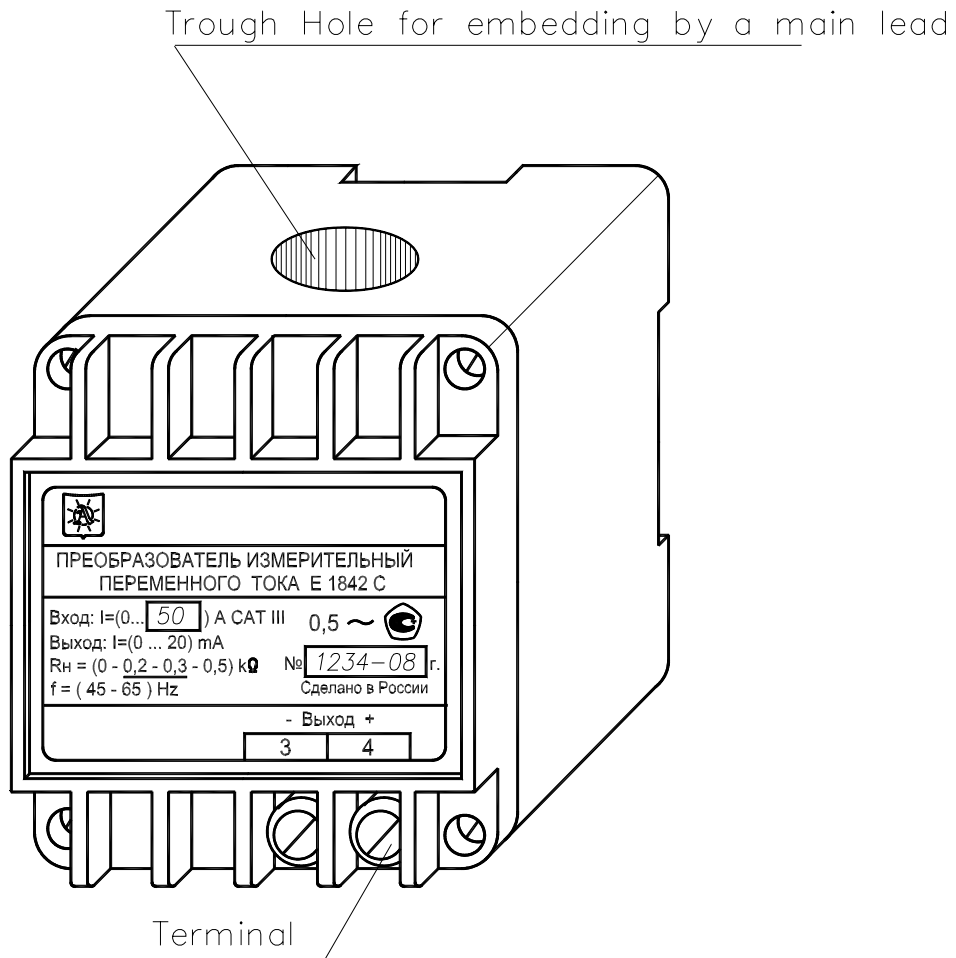


Figure B.1

Annex C (informative)

Variants of Transducer Mounting

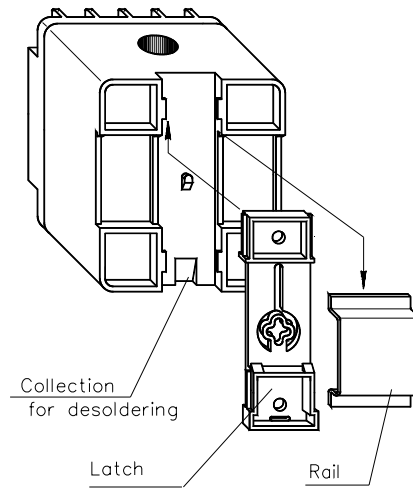


Figure C.1 Mounting on the rail

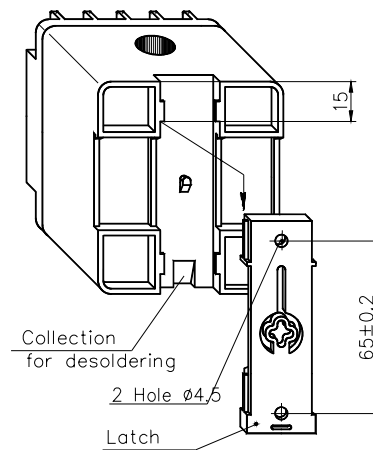


Figure C.2 Mounting on the panel