



**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 (hereinafter Transducer) and information on its packing, transportation and storage.  
Carefully read this manual before operation.

## 1 Description and operation

### 1.1 General Information

1.1.1 Transducer converts alternating current (AC) to unified output signal direct current (DC). Transducers can be used for monitoring currents in diagnostic electrical equipment and another electric systems; for complex automation of various types of industrial facilities.

Transducer is a single-channel hardware product. Transducer requires no power supply.

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

Transducer is mounted on the rail TH-35 in accordance with ГОСТ Р МЭК 60715-2003 or immediately on the panel.

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

Protection of the transducer against environmental activity is ordinary.

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

Operating Environment:

- Climatic affecting for C4 Group (ГОСТ 12997-84):
  - Ambient Air Temperature .....-30°C to 50°C;
  - Relative Humidity at 35°C .....up to 95 %;
- Atmospheric affecting for P1 Group (ГОСТ 12997-84):
  - Atmospheric pressure .....84-106 kPa (630-800 mm Hg).
- Mechanical affecting for N2 Group (ГОСТ 12997-84):
  - Vibration frequency up to 55 Hz;
  - Acceleration amplitude up to 4,5 g

Standard conditions for use:

- Ambient Air Temperature ..... $20 \pm 5$  °C;
- Relative Humidity.....30 to 80 %;
- Input frequency, Hz ..... $50,0 \pm 0,5$ ;
- Load resistance,  $\Omega$  .....200 – 300;
- Waveform of the input signal is sinusoidal. The distortion factor shall not exceed 2 %.

## 1.2 Characteristics

1.2.1 Transducer converts alternating current to unified output signal direct current (DC). 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  $\Omega$ . Normal range of load resistance values is from 200 up to 300  $\Omega$ .

1.2.3 Limits of the intrinsic error are  $\pm 0,5$  % of fiducial value. Upper value of output signal range (20 mA) is taken as a fiducial value.

1.2.4 Additional errors due to influencing quantities are given in table 1.

Table 1

Influencing quantity	Values	Limits of additional error, %
Ambient Air Temperature	- 30 to 50 °C	$\pm 0,4$ for every 10 °C of temperature variation
Relative Humidity	to 95% at 35 °C	$\pm 0,9$
Input signal frequency	45 to 65 Hz	$\pm 0,5$
Strength of external magnetic field with frequency 45-65 Hz, A/m	400 A/m	$\pm 0,5$
Load resistance, $\Omega$	0 to 200; above 300 to 500 incl.	$\pm 0,25$

1.2.5 Limits of error due to 5 % harmonic distortion:

- 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 Output signal ripple amplitude is 0,2 % at most.

1.2.8 Transducer satisfies characteristics described in 1.2.3 if:

- set-up (heating-up) time is expired (without regard to overall operation time);
- one of output terminals is grounded;
- transducer is being affected by sinusoidal vibration 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 remains operable in case if load circuit is broken for long time. In this case, output voltage does not exceed 30 V.

1.2.11 Transducer withstands overload of 120 % of input signal for 2 hours .

1.2.12 Transducer withstands short-time 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

When transducers is being overloaded, its output does not exceed 40 mA (when load resistance value is 500  $\Omega$ ).

1.2.13 Isolation between case and output circuits withstands practically sinusoidal testing voltage with frequency 45-65 Hz for 1 minute:

- 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 case and output circuit is, at least:

- 100 M $\Omega$  - in standard conditions;
- 20 M $\Omega$  - to 80% R.H. at 50°C;
- 2 M $\Omega$  - 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 mean time to failure ..... 75000 hours.

1.2.18 Average operation time..... 10,5 years.

### 1.3 Construction

1.3.1 General form of Transducer is presented in Annex B.

1.3.2 Transducer has the following parts:

- Case;
- Cover;
- PCB;
- Measuring transformer;
- Latch.

1.3.3 Terminals mounted on cover are also used for fixing PCB in case.

The cover is fixed to case with four self-tapping screws (these screws are sealable).

The transducer has the through hole for putting wire of measured circuit.

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

## **1.4 Functional description**

1.4.1 Transducer utilizes principle of direct conversion. Transducer fall into category of rectifier-type transducers.

1.4.2 Transducer Schematic is shown in Annex A.

Transducer Schematic is composed of following parts:

- measuring transformer which also provides galvanic isolation, its primary winding is a main lead of measured circuit;
- bridge rectifier;
- smoothing circuit for decreasing ripple of output signal;
- Current-limiting circuit (based on Zener diodes) which also protect output circuit against signal of reverse polarity.

## **1.5 Marking and sealing**

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

- Name and type designation;
- Manufacturer's mark;
- Unit symbols of input and output signals;
- Load resistance range;
- Overvoltage category;
- Module of intrinsic error;
- Designation of numbers and polarity of output terminals;
- Serial number (two last digits describe year of manufacture).

1.5.2 Sealing of the transducer is done with a bitumen mastic №1 (according to ГОСТ 18680-73) and applies over one of four self-tapping screws.

## **1.6 Packing**

1.6.1 The transducer is delivered in transportation packing.

1.6.2 In transport container there is:

- Operation manual (1 copy for set of 50 transducers for or for every separate delivery);
- Packing list.

1.6.3 The transducer is packaged in individual packing.

The passport is inserted inside the individual packing.

## 2 Intended use

### 2.1 Operational constraints

2.1.1 The transducer is not intended for operation in aggressive and explosive-hazard environments.

2.1.2 The transducer must not be affected by direct heating from heat source which have temperature over 50°C. The transducer should be placed in buildings where there are no sharp temperature variations or high-strength sources of magnetic field.

### 2.2 Preparation for use

2.2.1 After receiving the package, make sure that the packing is not damaged. Then unpack the package and make sure that content of package is not damaged and every item is in place. List of items is presented in 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 ** Should be installed on case of transducer	

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

### 2.3 Use

2.3.1 To provide safety, all operations on mounting and maintenance should be done with respect to rules of safe usage of electric systems in which transducers should be installed.

2.3.2 Layout work at place of installation should be done 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 latch on case of transducer (latch snap should be fixed to ledge on case);
- fix lower snaps of latch on edge of rail and then gently push at the case of transducer until it is fixed on rail.

Mounting on rail can be done if rail is mounted to horizontal or vertical surface.

When the rail is mounted on the vertical plane, its distortion from horizontal position should not exceed 15°.

2.3.3.2 When mounting the transducer *on the panel*:

- unfix latch from case
- fix a latch on the panel using two screws (4mm diameter) according to figure C.2;

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

When mounting the transducer on latch, it is necessary to provide free space of at least 15 mm for first mounting of transducer.

2.3.4 Put a main lead of measured circuit through the hole of the transducer.

2.3.5 Fix wires to output terminals with respect to polarity.

2.3.6 Make sure that transducer input signal range is suitable for measuring current of the circuit.

2.3.7 Turn on an input signal on the transducer.

## **2.4 Operation in case of emergency**

2.4.1 In case of emergency, input signal should be immediately turned OFF.



### 3 Maintenance and repair

#### 3.1 Safety

3.1.1 Only qualified personnel should execute operations on maintenance.

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

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

3.1.3 IT IS FORBIDDEN TO MAKE EXTERNAL CONNECTION IF INPUT SIGNAL IS ON.

#### 3.2 Order of maintenance

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

- turn input signal OFF;
- remove dust from case of transducer;
- examine case, connectors and mountings for absence of mechanical damage;
- after inspection is done, turn ON input signal

3.2.2 To unfix transducer from rail, insert screwdriver in groove located at lower part of transducer case.

#### 3.3 Troubleshooting

3.3.1 Faults, probable reasons and solutions are given in table 4

Table 4

Fault	Probable reason	solution
There is no voltage at transformer winding	Break or short-circuit of transformer winding	Replace transformer
No output signal while input signal is ON	Break or short-circuit in wiring	Check voltage on C1-C3 capacitors. Eliminate break or short-circuit
There is no voltage at the output of rectifier	Bridge Rectifier (V1) has failed	Replace bridge rectifier
Intrinsic error exceeds an acceptable value insignificantly	It is necessary to adjust the transducer	Adjust the transducer using additional adjustment windings of the transformer

3.3.2 All faults should be eliminated by repair enterprise. After repair, transducers should pass calibration and be resealed.

3.3.3 Approximate voltages at main components of the transducer are given in table 5. These values are true for 500  $\Omega$  of load resistance.

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 be sure that metrological characteristics are acceptable and are in accordance with metrological characteristics presented in this manual, transducer should be calibrated every 2 years. Calibration procedure should be done in accordance with document 49501860.3.0009 МП «Преобразователь измерительный переменного тока Е1842С. Методика поверки» (Е1842С Current Transducer. Calibration procedure).

Recalibration interval is 2 year.

## 4 Storage

4.1 Before putting in operation, transducers should be stored in storehouses according to GOST 12997-84.

4.2 Storage conditions for transducers packed in transportation package:

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

4.3 Storage conditions for transducers in individual package:

- 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 leading to corrosion should not exceed maximum tolerable value of content of corrosion-active substances for atmosphere of type 1 according to GOST 15150-69.

## 5 Transportation

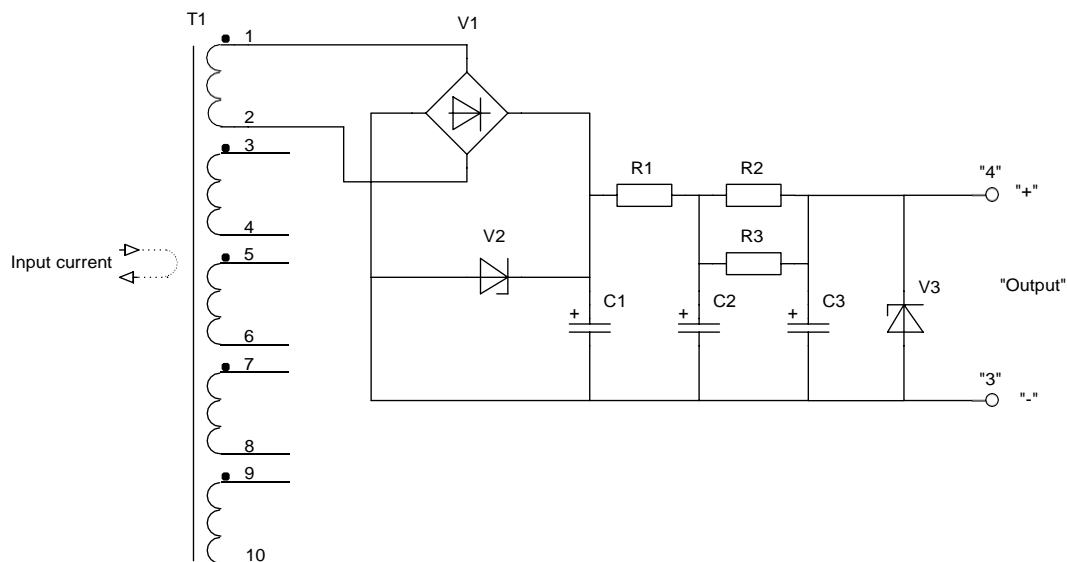
5.1 When packed in transportation package, transducers can be transported on vehicle of any type. In case of transportation on plane, transducers should be placed in hermetic heated chambers.

5.2 Values of climatical and mechanical influencing quantities 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).
- Peak value of shock acceleration..... 98 m/sec<sup>2</sup>.

## Annex A (informative)

### Transducer Schematic



Element	Name	Quantity.	Remark
C1...C3	Capacitor RLC 013-50 B-47 мкФ ± 20% VISHAY BCCOMPONENTS	3	Capacitor
R1	Capacitor RC-1206-130 Ом ± 5% YAGEO	1	Resistor
R2, R3	Resistor RC-1206-1,2 кОм ± 5% YAGEO	2	Resistor
T1	Transformer (see table)	1	Transformer according to table
V1	Bridge rectifier MB4S FAIRCHILD	1	Bridge Rectifier
V2	Zener diode 1.5SMC47A ON SEMICONDUCTOR	1	Zener-diode
V3	Zener diode SMAZ12-13 DIODES	1	Zener diode

Designation	T1	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**

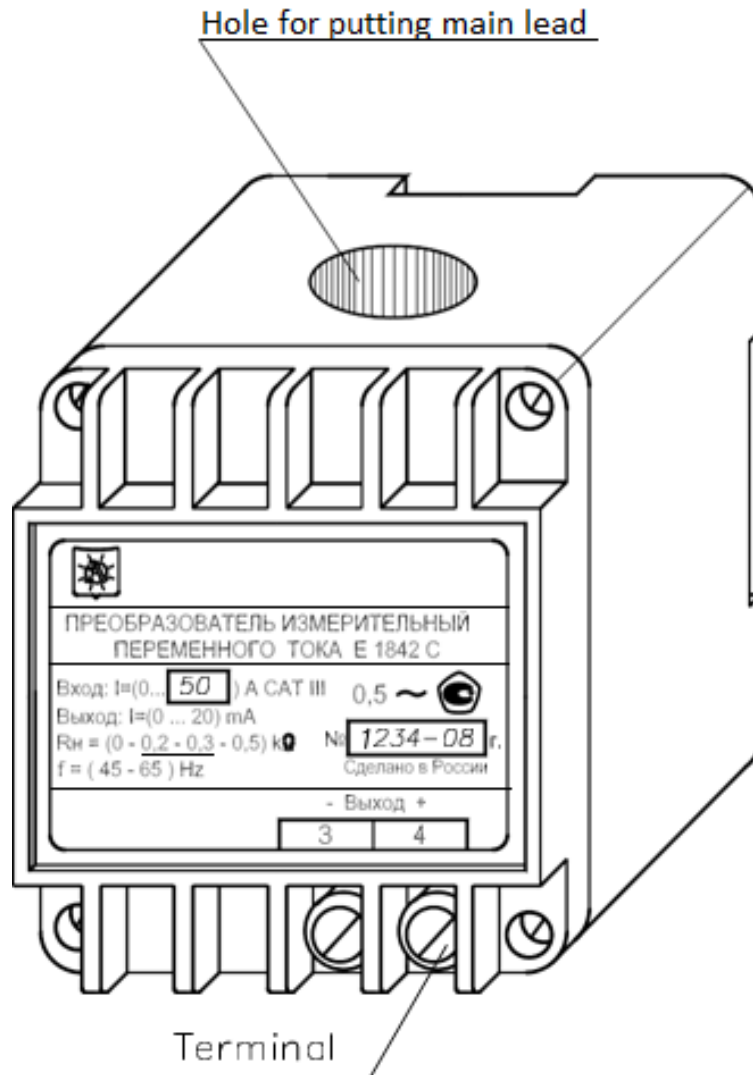


Figure B.1

## Annex C (informative)

### Variants of Transducer Mounting

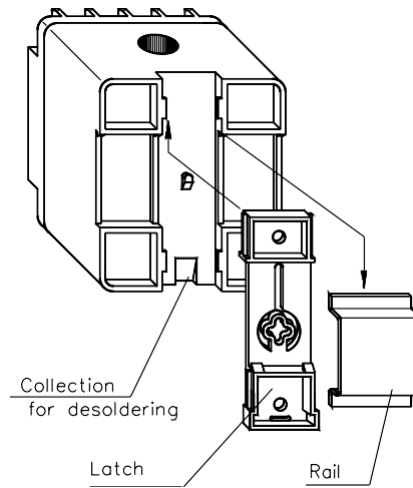


Figure C.1 Mounting on the rail

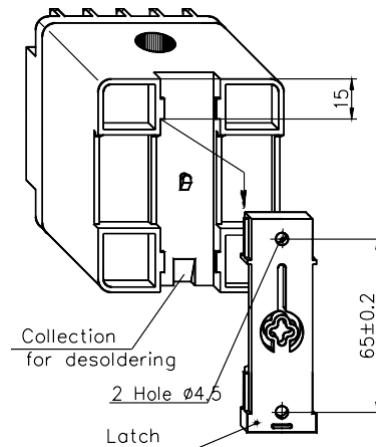


Figure C.2 Mounting on the panel