

IT5000
Adjustable current source

User Manual

Edition 6

2018

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INTRODUCTION

This User Manual describes an adjustable current source IT5000 (IT5000 or the unit below) and contains information about its design, operation principles, operation, maintenance and other information required for proper operation of the unit.

1. SAFETY REQUIREMENTS

1.1. While the unit is being used as intended, the “Interbranch rules for Labour Safety (Safety Rules) When Operating Electrical Systems”, “Safety requirements for Operation of Electrical Installations on Consumer Side” in the part dedicated to LV installations (circuits below 1000V) and corresponding local electrical safety requirements must be observed.

1.2. IT5000 must be grounded. The ground terminals of the Generating Transformer GT-IT5000 and Regulating Transformer LATR-IT5000 (marked as ) must be connected to the grounding bus.

1.3. You must NOT make any connections to the equipment of the test system until you have made sure that supply voltage is removed from the system.

2. GENERAL INFORMATION AND OPERATION PRINCIPLE

2.1. Purpose and fields of application

IT5000 is a source of current used for generating test currents within 0.05 to 6000A range on the primary side of the reference current transformer and transformer under test.

2.2. Operating conditions

Environmental conditions for operation, transportation and storage:

- Lower value of operating temperature+1 °C
- Upper value of operating temperature+35 °C
- Lower value of transportation and storage temperature-50 °C
- Upper value of transportation and storage temperature+50 °C
- Relative humidity 30–80 %
- Atmospheric pressure..... 84–106 kPa (630–795 mm Hg).

2.3. Scope of supply

The scope of supply is represented in Table 1.

Table 1

Name and description	Q-ty
Generating transformer GT-IT5000	1
Regulating voltage transformer LATR-IT5000	1
Resistor box GT-IT5000	1
Set of cables:	
K-240 (cross section — 240 mm ² , length — 2 m)	2
K-120 (cross section — 120 mm ² , length — 2 m)	2
K-50 (cross section — 50 mm ² , length — 6 m)	1
K-16 (cross section — 16 mm ² , length — 2 m)	2
K-5 (cross section — 5 mm ² , length — 2 m)	2
LATR-GT (length — 4 m)	1
Power supply cable LATR-IT5000 (length — 2 m)	1
User manual	1
Package	3

2.4. Specifications

- Range of output current setting..... 0.05–6000 A
- Output current setting error±10 %
- Input voltage range..... (220 ± 10 %) V
- Mains (power supply) frequency (50 ± 1 %) Hz
- Power consumption (no more than) 5 kVA

- Max. time of continuous operation see Table 2
- Interval between operation cycles 20 min
- Mean time to failure under operating conditions (at least) 50 000 h
- Average lifetime (at least) 10 years
- Overall dimensions
 - Generating transformer GT-IT5000 (no more than) 380 × 170 × 310 mm
- Regulating transformer LATR-IT5000 (no more than) 540 × 270 × 250 mm
- Weight (no more than):
 - Generating transformer GT-IT5000 21 kg
 - Regulating transformer LATR-IT5000 23 kg
 - Set of cables 25 kg

2.5. Design and operation

A connection diagram of the unit is given in Fig. 1. The LATR-IT5000 regulating transformer is connected to a 220V (AC) power supply. The “Output” female connector of LATR-IT5000 is connected to the “Input” male connector of the generating transformer GT-IT5000 via the cable LATR-GT. Cables marked K-240, K-120, K-50, and K-16 are used as primary conductor cables to form an external primary winding (current loop). One of these cables is passed through the side hole in the GT-IT5000 module and connected to the primaries of instrument current transformers. When testing the CT at 1% and 5% test points (250, 200, and 150A currents), LATR-IT5000 and GT-IT5000 are connected via the Resistor box GT-IT5000.

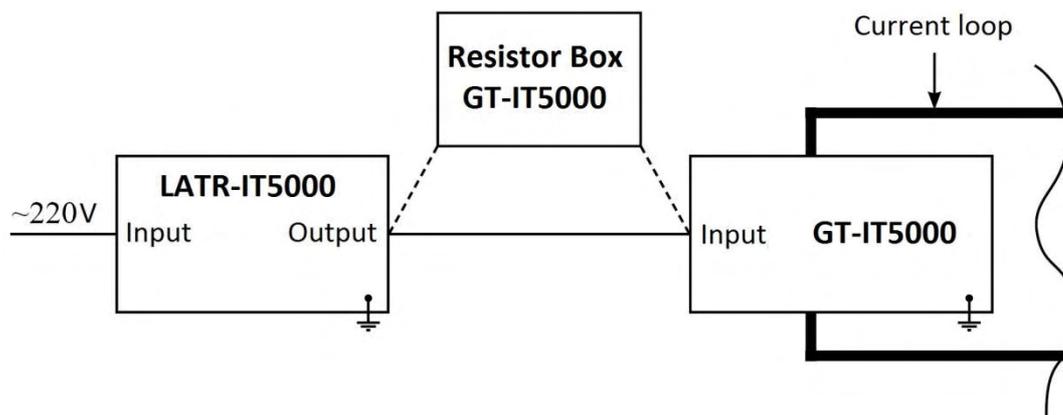


Fig.1. Connection diagram

Note!

The cables used as primary conductors must be rated for the current passing through the primary winding.

3. OPERATION

3.1. Operating restrictions

3.1.1. During operation the environmental conditions must comply with the requirements specified in section 2.2.

3.1.2. The time of continuous operation of the unit at the maximum current must not exceed the values specified in Table 2.

3.2. Preparing for operation

1) Connect the grounding terminals of the GT-IT5000 and LATR-IT5000 modules (marked \oplus) to the grounding bus.

2) Turn the output voltage regulating knob on LATR-IT5000 to the leftmost (zero) position.

3) Set the Power switch on the LATR-IT5000 front panel to the OFF (lower) position.

4) Set the switches C1–C4 on the LATR-IT5000 front panel to the lower positions.

3.3. Operation

1) Make connections to the IT5000 modules as shown in Fig.1. Make connections among the test system components as per wiring diagram shown in Fig. 2.

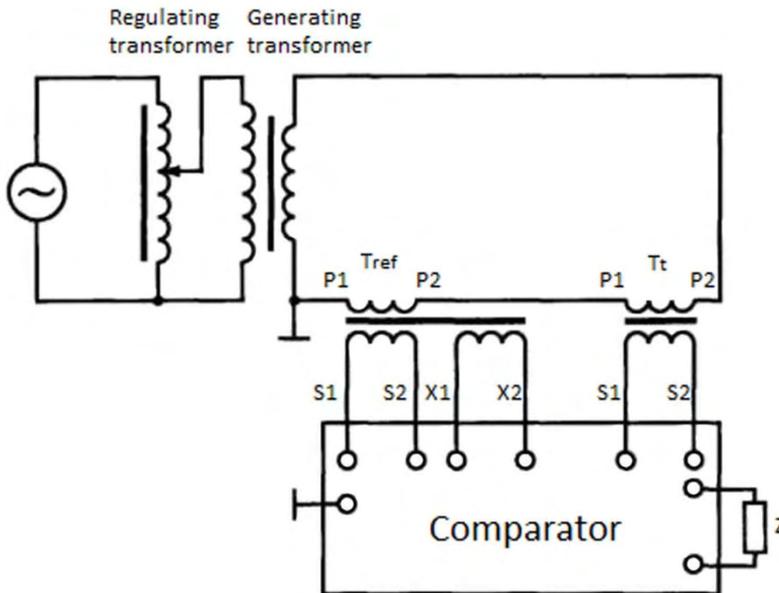


Fig. 2. Transformer test system based on comparison method

\sim — power supply (generator); T_{ref} — reference transformer; T_t — tested transformer; P1, P2 — primary terminals; S1, S2 — secondary terminals; X1, X2 — auxiliary secondary winding terminals; z — burden

2) Select the primary conductor cable (to be passed through the hole of the generating transformer) considering the maximum values for current and the time of continuous operation given in Table 2.

Table 2

Cable specifications

Cable	Max current, A	Max time of continuous operation, min
K-16	120	15
K-50	600	1.5
K-120	1200	4
K-240	3000	1.5
K-240 + K-240 (2 cables in parallel)	5000	1.5

3) Set the Power switch on the LATR-IT5000 front panel to the ON position.

4) Smoothly turn the voltage regulation knob on LATR-IT5000 to pass the required primary (test) current by monitoring its value on the secondary side (on the comparator's screen) considering the transformer ratio.

While increasing the voltage across the LATR-IT5000 outputs, monitor the value of output current on the built-in ammeter (this value shall not exceed 20A). The output current of LATR-IT5000 can be reduced by means of compensation of the reactive current component using the built-in capacitors connected/disconnected with the switches C1-C4. The number of the capacitors connected is selected so as to provide the minimal current on the LATR's output.

Notes

1. The switches C1-C4 on the LATR-IT5000 front panel are used to connect/disconnect compensating capacitors from the minimum (C1) to the maximum (C4) values of capacitance.
2. When testing the CT at 1% and 5% test points (250, 200, and 150A currents), LATR-IT5000 and GT-IT5000 are connected via the Resistor box GT-IT5000.

The inductance of cables will be reduced, and hence the higher values of current in the current loop will be obtained, if the cables going to and from the CT under test are placed as close to each other as possible (see Fig. 3a).

To get the higher values of current in the current loop, the number of primary turns going through GT-IT5000 may be increased (see Fig. 3b).

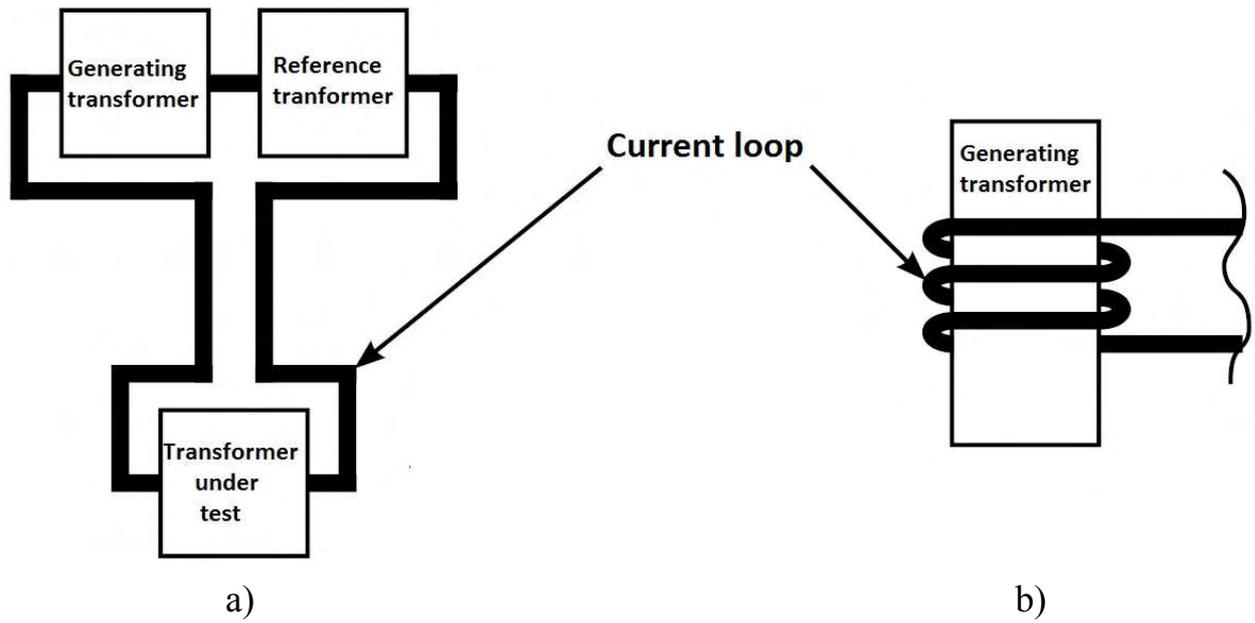


Fig.3. Arrangement of cables:
Generating transformer — GT-IT5000

5) When the work is complete, turn the voltage regulation knob on LATR-IT5000 to the leftmost (zero) position and turn off the power supply.

4. MAINTENANCE

The routine maintenance includes:

- Cleaning the housing and contact surfaces of the unit from dust and dirt
- Visual inspection of the unit for external damages

5. REPAIR

The faulty IT5000 can be repaired only by the manufacturer. For repairs under warranty, or at any other time, please contact the manufacturer.

6. STORAGE AND TRANSPORTATION

IT5000 can be transported in any enclosed vehicle. For the environmental conditions during transportation see section 2.2

7. WARRANTY

7.1. The IT-5000 adjustable current source is warranted against defects in manufacture or material **for a period of 4 (four) years** from the date of purchase from the manufacturer. The unit believed to be defective may be sent within the warranty period to the manufacturer for inspection (the warranty claim enclosed, transportation prepaid). If the inspection confirms that the product is defective, it will be repaired or replaced (at manufacturer's option) at no charge, within the limitations specified below (paragraph 7.2), and returned prepaid to the location specified in the buyer's warranty claim. All replaced parts become the property of the manufacturer.

7.2. Conditions

In the event of any failure or defect in manufacture or material during the warranty period (provided that the transportation, storage and operating conditions outlined in this User's Manual are fulfilled), send IT5000 to the Manufacturer along with the sales invoice or other proof of the ownership and date of purchase. If the purchase documents are absent, the warranty period is calculated from the date of manufacture of the unit.

The Manufacturer retains the right to reject a warranty claim in the following cases:

- 1) The warranty claim is filled out incompletely, incorrectly or illegibly
- 2) The unit has:
 - Serial number altered or removed or illegible

This warranty is not applicable for:

- 1) Damages to IT5000 caused during shipment to and from the Manufacturer's site.
- 2) Parts requiring regular maintenance or replacement due to natural wear
- 3) Consumable parts (parts, the nature of which is to become worn or depleted with use)
- 4) Damages to IT5000 caused by:
 - a) Any use other than correct use described in the User's Manual including:
 - Handling of the unit resulting in mechanical damages or other defects including any changes or modifications to the unit
 - Installation or use of the unit in a manner inconsistent with the technical and safety laws or standards in force in the country where it is installed or used
 - Any maintenance other than correct maintenance described in the User's Manual
 - b) Damages caused by condition or defects of a system or its elements with which or as part of which IT5000 was used, excluding the other Manufacturer's products intended for use with IT5000
 - c) Damages caused by accessories or ancillary equipment not made or authorized by the Manufacturer with respect to their type, condition or characteristics

d) Damages caused by any repair or attempt to repair the unit executed by an unauthorized person or company

e) Damages caused by adjustments or modifications made to the unit without prior written consent of the Manufacturer

f) Damages caused by negligent handling

g) Damages caused by accidents, fire, ingress of liquids, chemicals or other materials, flood, vibration, heat, improper ventilation, variations of supply voltage, improper power supply or input voltage, electrostatic discharge including lightning, or any other impacts or external actions beyond the reasonable control of the Manufacturer and not covered by the technical documentation for the unit

7.3. The Manufacturer establishes the lifetime for the products outlined above of 4 (four) years from the date of purchase from the Manufacturer. *Please note that the warranty period and lifetime differ from each other.*

7.4. The Manufacturer shall in no circumstances be liable for any direct or indirect damages or losses, whether incidental, consequential or otherwise, including but not limited to loss of profits, loss of use or any deletion, corruption, destruction or removal of data, disclosure of confidential information or infringement of privacy, data recovery expenses, losses arising out of interruption of commercial, production or other activities based on use or loss of use of the unit.

Manufacturer's address (for warranty claims):

Russia

OOO NPP Mars-Energo

V.O. 13 Line 6-8, office 41H, St. Petersburg

Tel: +7 812 327-21-11; +7 812 331-87-35

E-mail: mail@mars-energo.ru

www.mars-energo.com

Estonia

ESME OU

Kadastiku 25a, Narva, Estonia 21004

Tel: +372 56809999

E-mail: mail@esme.ee

8. PACKING FORM

Adjustable current source IT5000, serial number _____ has been packed by the Manufacturer in compliance with the Technical Requirements in force.

Packer signature: _____ (*Initials and name*)

Date: _____

9. ACCEPTANCE FORM

Adjustable current source IT5000, serial number _____ has been manufactured in compliance with the Technical Requirements in force and has been approved as suitable for operation.

Head of Quality Control Department: _____ (*Initials and name*)

Corporate Seal:

Date: _____

Date of sale _____

(Corporate Seal) _____ (*Initials and name*)

10. WARRANTY CLAIM

In the event of any failure or defect in manufacture or material during the warranty period (provided that the transportation, storage and operating conditions outlined in this User's Manual are fulfilled), send IT5000 to the Manufacturer along with the warranty claim containing the following information:

- Model and serial number
- Date of manufacture
- Date of putting IT5000 into operation
- Condition of the manufacturer's seals (in place, destroyed, absent)
- Description of the failure or defect
- Buyer details (Company name, address, etc., including the name and phone number of a contact person).