المتطورة لتكنولوجيا الطاقة الجديدة والتحكم

Advanced **G**reen **E**nergy & **C**ontrol

Transformer Step Indicator

M A N U A L

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For your safety, please read the following before using.

1. Safety Cautions

⚠ **Warning**

1. **It must be mounted on Panel.**
   It may give an electric shock.
2. **Do not connect terminals while power on.**
   It may give an electric shock.
3. **Do not disassemble and modify this unit. If it is necessary please contact us.**
   It may give an electric shock and cause fire.
4. **Please check the terminals numbers when connecting power lines.**
   It may cause fire.
5. **When cleaning the unit, do not use water or an oil-based detergent.**
   It may cause an electric shock or fire and so the unit will be damaged.
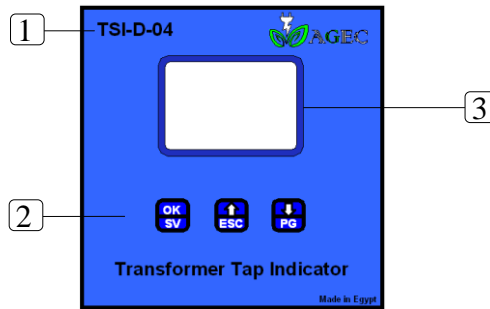6. **Please connect properly after checking the polarity.**
   It may cause fire.

2. Features:

1- Measure and display the transformer tap position.

2- Different inputs select (Resistance, 4-20mA or 0-20mA).

3- Internal power supply output 24VDC-0.3A.

4- Current output (0-20mA or 4-20mA)

5- Adjust the low and high values (Scaling).

6- All setting stored in EEPROM.

7- Seven segment display

8- Parameters adjust via keypad.

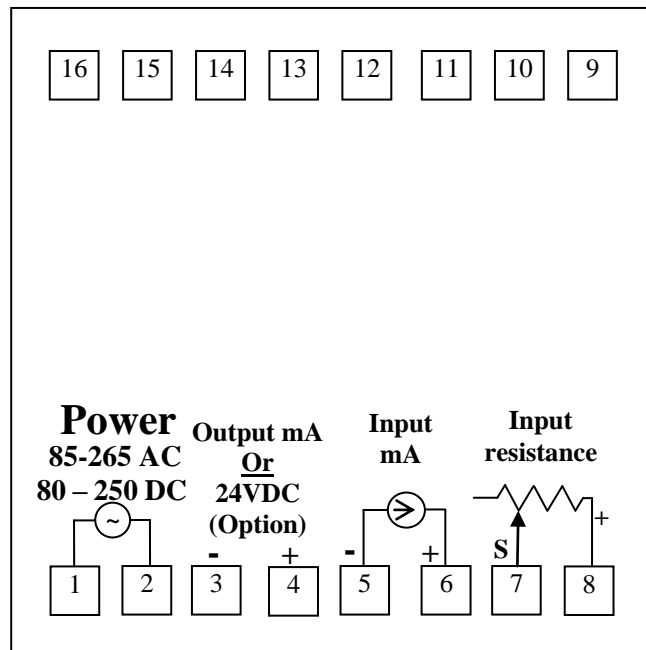# 3. Device identification
3.1. Front

1. Model number
2. 3 tactile push button keys
3. Step indicator display

3.2. Terminal Connection

4. Operation theory

The TSI-D-04 used to monitor the tap of the transformer in transformation stations and show it in 2 seven segment.

The TSI-D-04 after connecting the power it shows the tap of transformer.

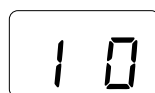The TSI-D-04 contains 3 tactile push button keys under the display used to:

- Select the input resistance or mA.
- Adjust the total number of steps
- Adjust one step resistance in ohm.
- Select the output current mA (0-20mA or 4-20mA).

When the user want to change the total no. of steps and the one step resistance this will discuss in programming section

5. Operations Procedures:

5.1. Start up :

First when connect power to the indicator the display will show for example the following:

$$\boxed{\ 1\ \ 0\ }$$

This reading is the actual value according to input type, No. of steps and transformer position.

4.1 Settings :

To enter to the programming mode:

- Press and hold [PG] for 3 sec.
- The screen will show $P9$ which mean programming mode.
- Still press until the screen show $I\,n$ which mean type of input ($r5$: resistance , $\bar{n}A$: mA)

To select between resistance and mA:

- Press **OK SV** when the screen shows In, the screen will show the adjusted mode (for example : $r5$

- To set the mode to mA, Press **PG**, the screen will show mA.

- To set the mode to resistance, Press **ESC**, the screen will show $r5$.

- Then press **OK SV** , the screen will show St.

To set the total number of steps St:

- Press **OK SV** when the screen shows St, the screen will show the adjusted number (for example : 19

- To change the value, Press **PG** or **ESC** , until set the required value.

- Then press **OK SV** , the screen will show $5u$.
- If the mode is $r5$, the screen will show $r5$ and if the mode is mA , the screen will show md.

To select between 0-20mA and 4-20mA mode md

- Press **OK SV** when the screen shows md, the screen will show the adjusted mode (for example : $0m$

- To set the mode to 4-20mA, Press **PG** , the screen will show $4m$.

- To set the mode to 0-20mA, Press **ESC**, the screen will show $0m$.

- Then press **OK SV** , the screen will show $o5$.

To set the resistance of each step $r5$:

- Press **OK SV** when the screen shows $r5$, the screen will show the adjusted number (for example : 10

- To change the value, Press **PG** or **ESC** , until set the required value.

- Then press **OK SV** , the screen will show $5u$.
- Then the screen will show $o5$.

To select between 0-20mA and 4-20mA output o5

- Press [OK SV] when the screen shows o5, the screen will show the adjusted mode (for example : Om̄

- To set the mode to 4-20mA, Press [PG], the screen will show 4m̄.

- To set the mode to 0-20mA, Press [ESC], the screen will show Om̄.

- Then press [OK SV] , the screen will show In.

To exit from the programming mode:

- Press and hold [ESC] when the screen shows In , St ,m̄d or o5.
- The screen will show E5 which mean exit from programming mode.
- Still press until the screen show actual step of the transformer.

6. Notes:

- If the device is not connected to resistance nor mA modes, it should give an error message: Er

- If the current step exceed the maximum step, the device should give an out of range error message: ot

- The maximum step can range from 2 to 99 steps.
- The One-Step-Resistance can range from 2 to 99 Ω.

7. Technical Specifications:

7.1 Electrical Specifications:

Inputs:
Power supply range   : 85 -265 VAC or 80-250 VDC
Signal current range : 4-20mA or 0-20mA
Resistance range   : 180 Ω (17 -19 Step).

Outputs:
Power supply   : 24 VDC – 0.3 A (option)
Signal current range : 4-20mA or 0-20mA (option)

7.2 Mechanical Specifications:

Dimension : 9.6 cm * 9.6 cm * 11.2 cm

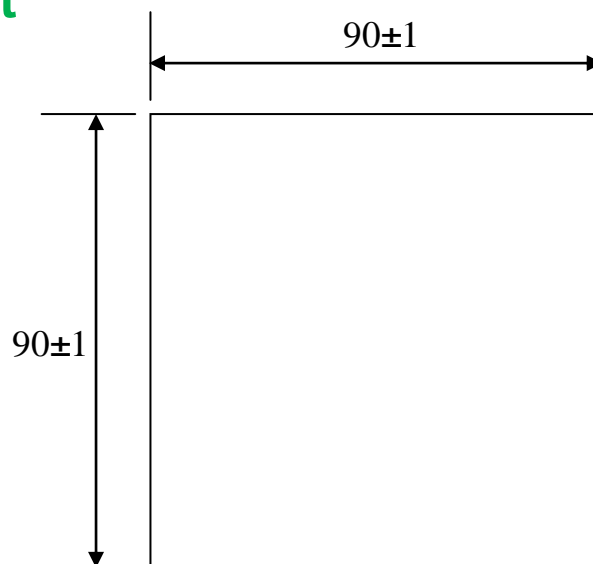### 7.3 Protection Specifications

Electrical: 1A fuse and 250VAC varistor in power input.
Temperature : +5°C to +60°C.
Enclosure IP : IP 45.
- ➢ The enclosure is isolated according to standard EN 60439-1 specification.
- ➢ The enclosure is protected against external mechanical shocks.

8. Panel Cutout

90±1

90±1

(Unit: mm)

9. Ordering information

TSI - ☐ - ☐☐

Transformer Step Indicator ←

A : Analog
D : Digital

→ Version