USERS MANUAL

POSITION INDICATOR - IPTE

SUMMARY

INTRODUCTION

The IPTE TAP Position Indicator is intended for the Remote TAP Position Indication of Transformers they use OLTCs with transmission module.

The IPTE box is constructed of Aluminum within DIN standards for panel mounting, with dimensions 48x96x142mm.

IPTE was built following strict quality standards and designed to withstand severe working conditions. Can be installed in power substation yards, offshore platforms, and chemical industries. Meets the levels of requirements, supportability, and reliability according to **IEC, DIN, IEEE, ABNT** norms**.**

IPTE has an entry that is intended to receive the signal from a Transmission Module, in this way it is possible to indicate the current TAP position on the instrument display in simple numerical form (1...51) or bilateral (-24...0...24), programmable, and it is also possible to provide the indication through an analog universal output that can be 0 to 1, 0 to 5, 0 to 10, 0 to 20 or 4 to 20mA (or other if requested) and digital output (RS485) with Modbus RTU and DNP 3(L1) Protocols which makes it possible to remotely access all configuration parameters as well as commands to upload and download TAP, change the Status from Automatic / Manual and Remote / Local. IPTE is also equipped with a feature for indicating the failure of reading the signal that occurs if there is a change in TAP that has a time greater than 10 seconds or if there is some type of failure in the reading of the Transmission module, such as cable break, resistor etc.

INTRODUCTION

• 4-digit high-brightness display, height 20 mm and decimal place 13 mm (red);
• Measurement range from 0 to 50 Positions (0 to 5000 Ohms) maximum step of 100 Ohms;
• Signal input from the Potentiometric Crown (milliAmpere or resistive);
• Universal power supply 48 to 265 Vdc / Vac;
• RS-485 Digital Output (ANSI / TIA / EIA-485-A) with Modbus RTU and DNP 3 (Level 1) protocol for remote access to all measured parameters;
• Analog 0 to 1 mA, 0 to 5 mA, 0 to 10 mA, 0 to 20 mA and 4 to 20 mA configurable directly on the front;
• Front USB 2.0 for parameterization through UseEasy ™ software;
• Stores the maximum and minimum TAP achieved in the period in memory;
• Fault Indication Contact (Watchdog);
• Box of high mechanical resistance, built entirely in aluminum;
• Degree of protection IP20 (NBR IEC 60529);
• Auto Baud Rate from 2400 to 57,600 bps (Automatically detects the speed of the Communication network);
• Box of high mechanical resistance, built entirely in aluminum standard DIN IEC 61554;
• Small size 48x96x140mm;
• Easy parameterization and use;
• 2 year warranty;

TECHNICAL DATA

DIGITAL TAP POSITION INDICATOR – IPTE	
Operating Voltage	48 to 265 Vdc/Vac 50/60 Hz
Operating Temperature	-40 to +85°C
Consumption	< 15 W
TAP Measurement Input	Resistive Crown from 0 to 5000 Ohms 0 to 20 mA or 4 to 20 mA transducer
Measuring Range	-50 a 50 TAP's – Programável (50 pos.)
Analog Output Options and Maximum Load	0 ... 1 mA – 8000 Ohms
	0 ... 5 mA – 1600 Ohms
	0 ... 10 mA – 800 Ohms
	0 ... 20 mA – 400 Ohms
	4 ... 20 mA – 400 Ohms
Maximum Analog Output Error	0.25% of end of scale
Output Contacts	8 - Potential Free
Maximum Switching Power	70 W / 250 VA
Maximum Switching Voltage	250 Vdc / Vac
Maximum Driving Current	6.0 A
Serial Communication Port	RS-485 **(ANSI/TIA/EIA-485-A)**
Communication protocol	Modbus RTU or DNP 3.0 (Slave)
Auto Baud Rate	2400 to 57600 bps
Box (DIN EIC 61544)	48 x 96 x 140 mm – Alluminum
Fixing the Equipment	Panel Flush Mount
Degree of Protection (NBR IEC 60529)	IP 20

TYPE TEST PERFORMED

• Applied Voltage (IEC 60255-5): 2kV / 60Hz / 1 min. (against land);

• Immunity and Electrical Transients (IEC 60255-22-1): 2.5kV / 1.1MHz / 2 sec. / 400 outbreaks / sec;

• Electrostatic Discharges (IEC 60255-22-2): Air mode = 8kV / Counted mode = 6 kV;

• Immunity to radiated electromagnetic disturbance (IEC61000-4-3): 80 to 1000 MHz / 10V / m;

• Immunity to Fast Electrical Transients (IEC60255-22-4): Power / Input / Outputs = 4KV / common 2kV;

• Surge Immunity (IEC60255-22-5): phase / neutral 1KV, 5 per polar. (±) - phase-ground / neutral-ground 2KV, 5 per polar (±);

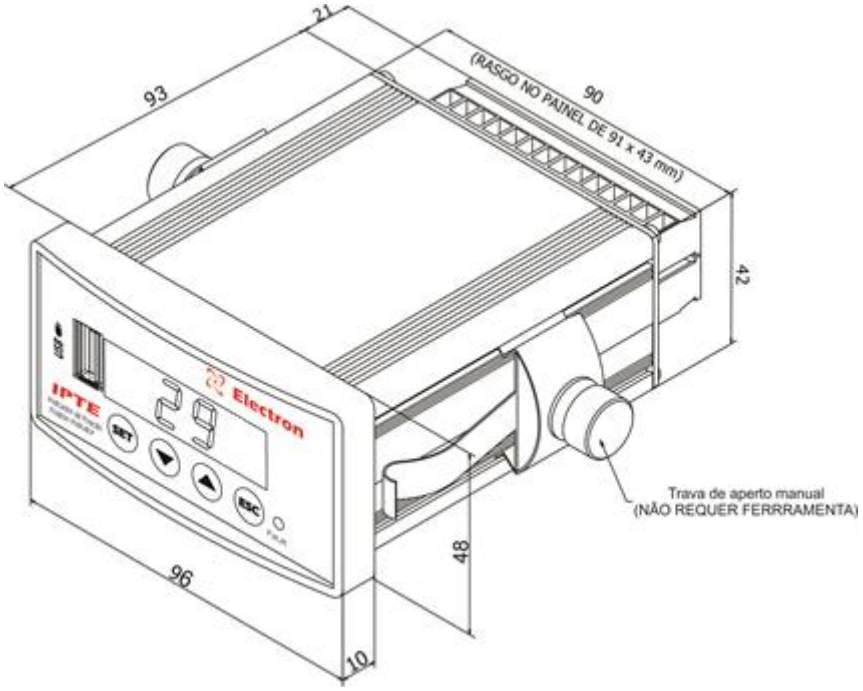
• Immunity to conducted electromagnetic disturbances (IEC 61000-4-6): 0.15 to 80 MHz / 10V / m;

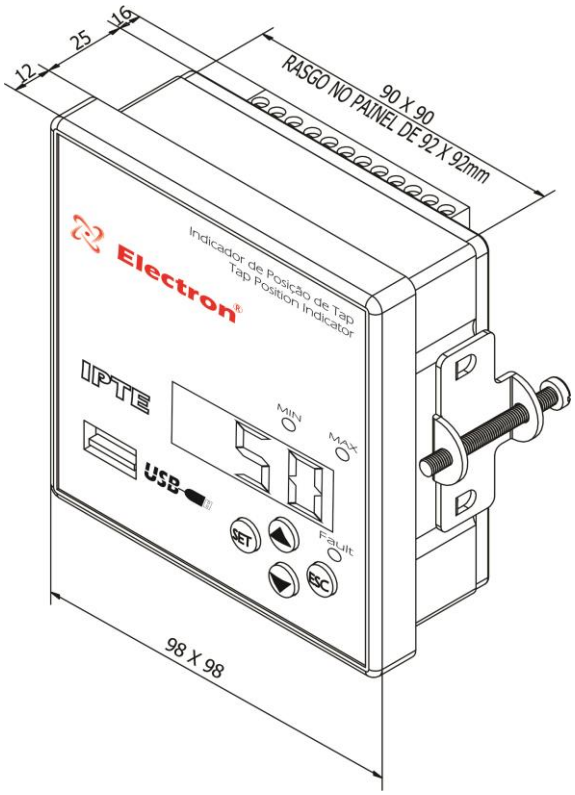
• Climate Test (IEC 60068-21-14): - 40ºC + 80ºC / 72 hours;

• Vibration resistance (IEC 60255-21-1): 3 axes / 10 to 150Hz / 2G / 160min / axis;

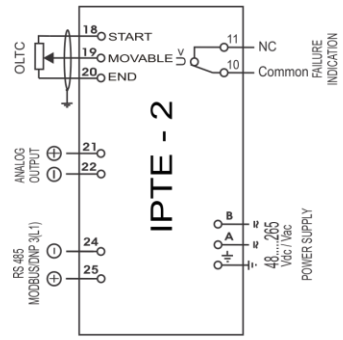
• Vibration Response (IEC 60255-21-1): 3 axes / 0.075mm-10 at 58 Hz / 1G from 58 to 150 Hz / 8min / axis;

DIMENSIONS

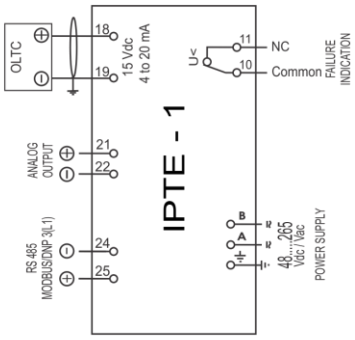

21
93
90
(RASGO NO PAINEL DE 91 x 43 mm)
42
Trava de aperto manual
(NÃO REQUER FERRRAMENTA)
48
96
10


16
25
12
90 X 90
RASGO NO PAINEL DE 92 X 92mm
Electron
Indicador de Posição de Tap
Tap Position Indicator
IPTE
MIN
MAX
USB
Fault
SET
ESC
98 X 98

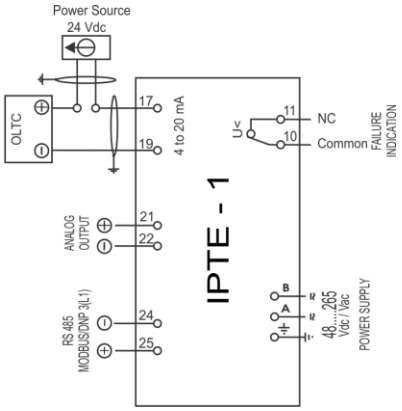
CONNECTION DIAGRAM



Resistive Input up to 5000 Ω

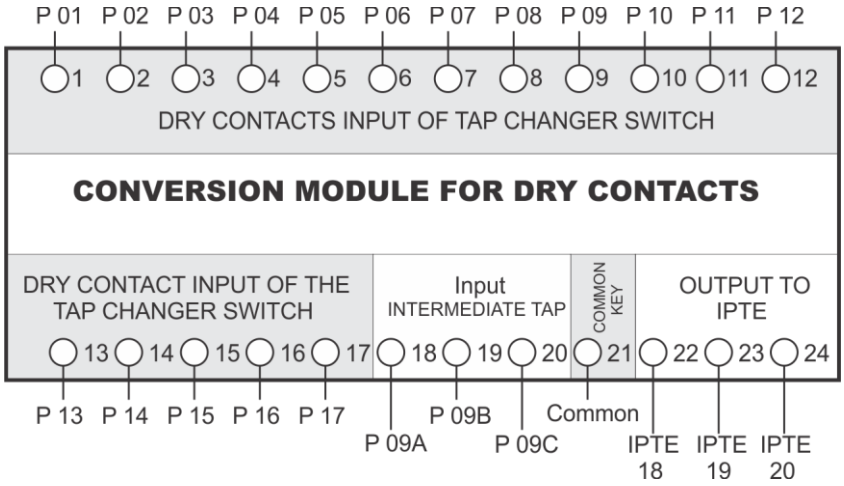


Active Input 4 to 20 mA



Passive Input 4 to 20 mA

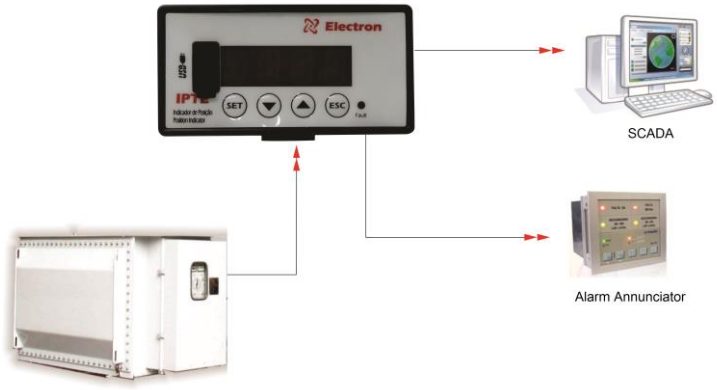
TRANSMITTER MODULE CONNECTION DIAGRAM FOR 17 POSITIONS

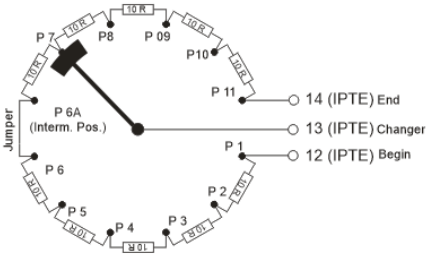


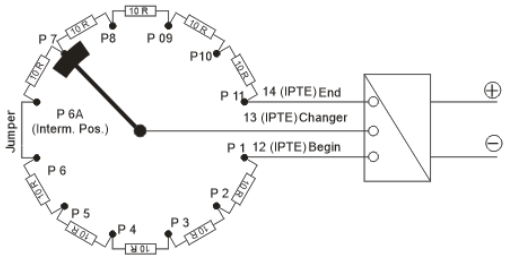
**** This module must be used when the switch crown is made of dry contacts, without resistors.***

***** Jump the contacts of the intermediate TAP´s with the same voltage position.***

APPLICATION EXAMPES







ORDER SPECIFICATION

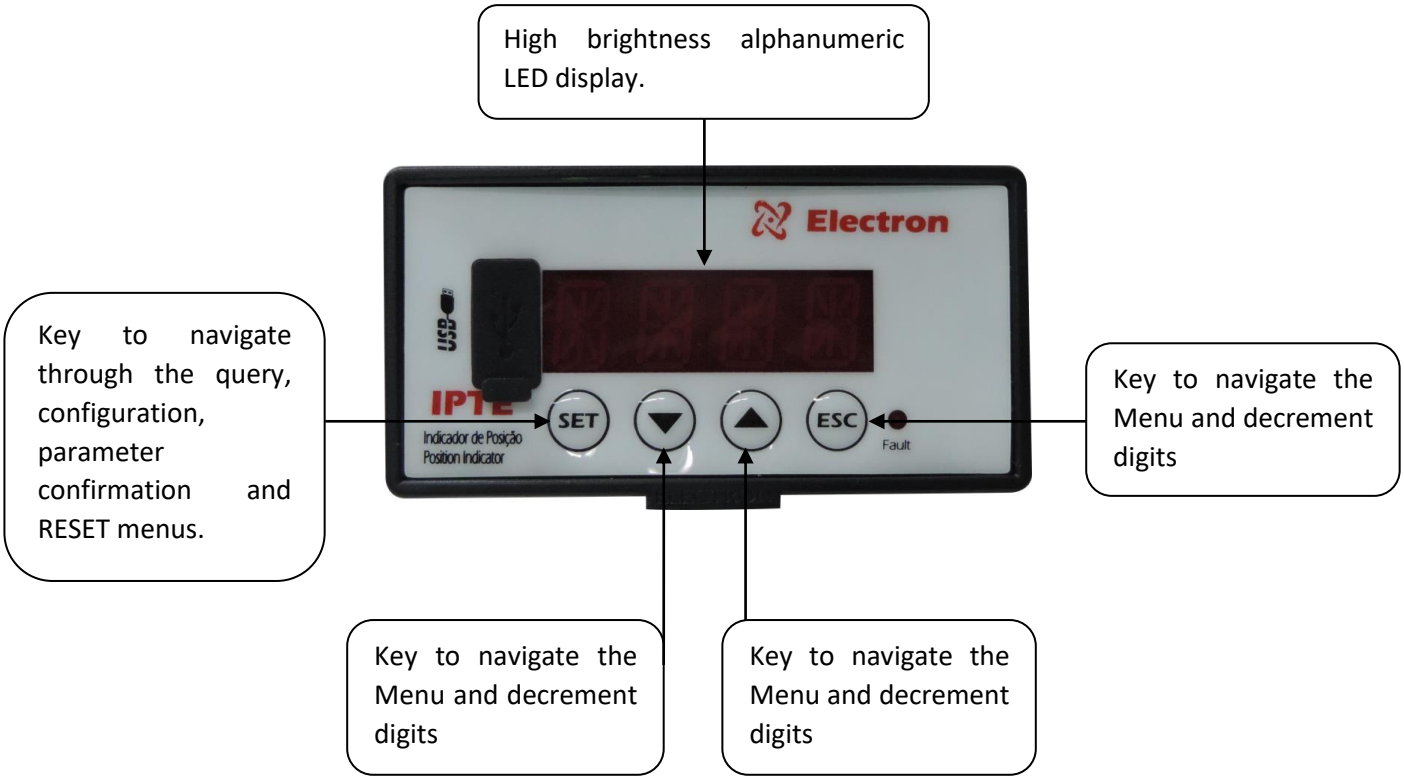
IPTE - [ ]

Set of Resistors Signal (IPTE input)	
1	4 ... 20mA
2	Resistive

MTCS - [ ]

Quantity of Positions

KNOWING IPTE

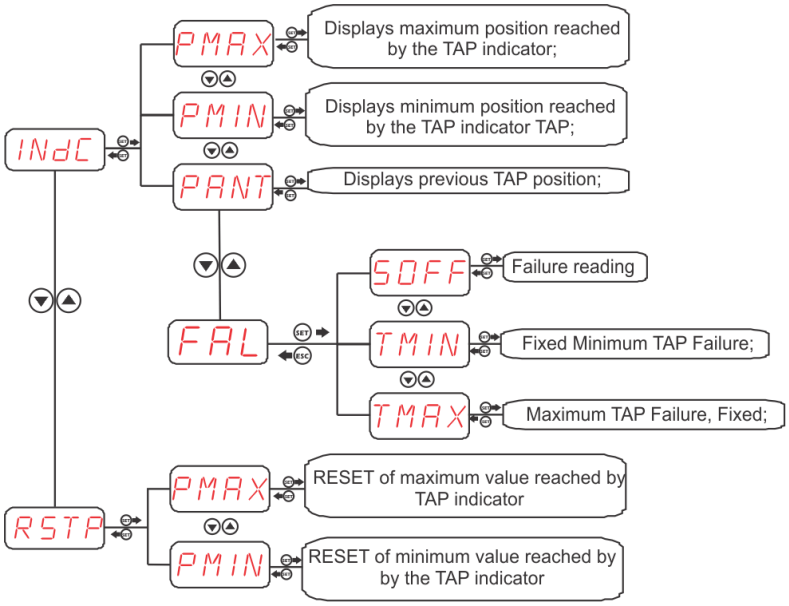


CONSULT MENU

To access this menu, press the **SET** key. Using the decrement key and or increment select the option INdC then press the **SET** key, then use the increment key or the decrement key to navigate the menu, to consult the desired parameter press the **SET** key, to return press the **ESC** key.

MENU	PARAMETER		DESCRIPTION
INdC	PMAX		Screen for querying the Maximum Position Reached by the TAP Indicator. To return to the root menu, press the **ESC** key.
	PMIN		Screen for querying the Minimum Position Reached by the TAP Indicator. To return to the root menu press the **ESC** key**.**
	PANT		Tela para consultar a Posição anterior de TAP. Para retornar ao menu raiz, pressione a tecla **ESC**.
	FAL	Screen to consult the fault(s) that occurred in the indicator.	
		SOFF	Crown reading failure;
		TMIN	Minimum TAP failure corrected;
		TMAX	Maximum TAP failure reached;
RSTP	Menu to delete the record of Maximum or Minimum Position and start a new period. When the maximum and / or minimum values are automatically deleted, the current record becomes the stored value. To return to the root menu, press the **ESC** key.		
	PMAX		RESET of maximum value reached by the TAP indicator by pressing the **SET** key;
	PMIN		RESET the minimum value reached by the TAP indicator by pressing the **SET** key;

CONSULTATION MENU FLOWCHART



CONFIGURATION MENU

Press **SET** on CONF a four digits number will shows u path the LED screen, it is the password reminder that is configured in the IPTE, then 0000 will appear Use the increment and / or decrement key to enter the password, to confirm the chosen number and move to the next square press the SET key, to return to the previous number press the **ESC** key.

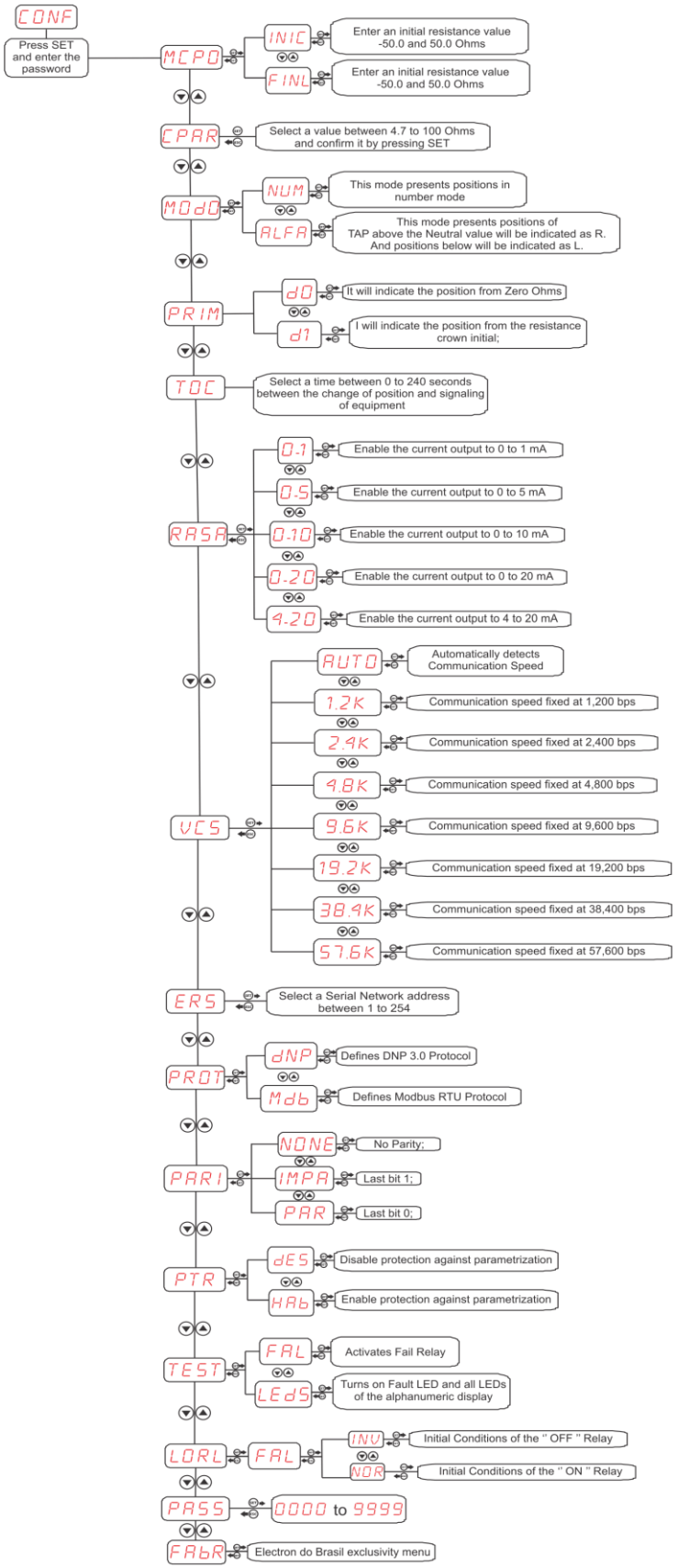
If the typed four digits password is correct, the configuration menu is available and the initials at the LED display will be MCPO. Otherwise the 0000 will appear again.

MENU	PARAMETER	VARIABLE	DESCRITION
MCPO	→ Menu to Set the indication position range. **Note:** After configuring the Start and End position, IPTE automatically recognizes the total number of switch positions and the analog output varies in this range.		
	INIC	-50.0 to 50.0	Use the increment / decrement key to set the initial position value and press **SET;**
	FINL	-50.0 to 50.0	Use the increment / decrement key to set the initial position value and press **SET**
CPAR	Menu to set the resistive step or the transmission module (MTCS)		
	---	4.7 to 100 Ohms	Select the Step and confirm press **SET**;
MOdO	→ Menu for choosing the TAP position indication mode on the IPTE Display. Select the option for how positions are displayed and press **SET**.		
	NUM	---	In this mode the indicator will display the positions in numerical mode;
	ALFA	---	In this mode the indicator will show the TAP positions above the neutral value are indicated as R, positions below will be indicated as L.
PRIM	→ Menu for choosing the TAP position indication mode on the IPTE display. Select the resistive read mode option and press **SET**.		
	d0	---	It will indicate the position from Zero Ohms;
	d1	---	It will indicate the position from the initial resistance of the resistive step;
TOC	→ Menu for configuring the switching time. Configure the desired time, and press **SET**.		
	---	0 to 240 seconds	Select the time between the position changing and the equipment signaling;
RASA	→ Select the analog output (21 and 22 contacts). Configure the desired communication speed and press **SET**.		
	0-1	---	Enable the current output to 0 to 1 mA;
	0-5	---	Enable the current output to 0 to 5 mA;
	0-10	---	Enable the current output to 0 to 10 mA;
	0-20	---	Enable the current output to 0 to 20 mA;
	4-20	---	Enable the current output to 4 to 20 mA;

CONFIGURATION MENU

MENU	PARAMETER	VARIABLE	DESCRIPTION
VCS	→ Adjust Serial Communication Speed menu. Press SET and set the desired communication speed.		
	AUTO	---	Automatically detects the communication speed;
	1.2K	---	Communication speed fixed at 1,200 bps;
	2.4K	---	Communication speed fixed at 2,400 bps;
	4.8K	---	Communication speed fixed at 4,800 bps;
	9.6K	---	Communication speed fixed at 9,600 bps;
	19.2K	---	Communication speed fixed at 19,200 bps;
	38.4K	---	Communication speed fixed at 38,400 bps;
	57.6K	---	Communication speed fixed at 57,600 bps;
ERS	→ Menu to adjust the Network Address. Configure the Serial Network address using the increment key or the decrement key and press **SET.**		
	---	1 to 254	Each equipment connected to the RS 485 network (24 and 25 contact) must have an address different from the others, so that the computer can identify it;
PROT	→ Communication Protocol selection menu. Configure the desired option and press **SET**.		
	dNP	---	Configure the DNP 3.0 Serial Communication protocol;
	MdB	---	Configures the Modbus RTU Communication protocol;
PARI	→ Parity selection menu. Configure the desired option and press **SET**.		
	NONE	---	Without parity;
	IMPA	---	Last message bit to be transmitted will be 1;
	PAR	---	Last message bit to be transmitted will be 0;
PTR	→ Parameter write protection menu by RS485. Select the resistive reading mode option and press **SET**.		
	dES	---	Disable write protection;
	HAb	---	Enables write protection;
TEST	→ Menu to test the Relay activations and LED lighting. Select the relay logic option and press **SET**.		
	FAL	---	Activates the fault relay after pressing the SET key;
	LEdS		Activates all LEDs on the Display after pressing the SET key;
LORL	→ Selection menu for choosing Relay Logic. **OBS:** ***The IPTE factory password is 0000. In case of loss or forgetting the password, contact Electron do Brasil and inform the password reminder number;***		
	FAL	INV	Initial Conditions of the “Off” Relay;
		NOR	Initial Conditions of the “Driven” Relay;

CONFIGURATION MENU FLOWCHART



CONFIGURATION MENU

PASS	---	0000 a 9999	To change the numbers, use the increment and / or decrement keys, to confirm the chosen digit and move on to the next, Press **SET**, to return to the previous digit, press **ESC**
FAbR	---	---	Electron do Brasil exclusive menu To quit, press **ESC**.

TROUBLESHOOTING

Display	Cause	Solution
SOFF	Reliable sensor signal does not reach IPTE	Check and replace if the sensor cable is not shielded.
		Check sensor cable grounding.
		Check and eliminate possible bad contact.

The IPTE automatically returns to the reading mode when normalized, to reset the IPTE press the **SET** key for approximately 5 seconds, until the word REST appears on the display, then release the **SET** key and the equipment will restart.

IPTE has a fault contact (relay 4), it will act in case of SOFF or if there is a power failure.

IMPORTANT RECOMMENDATIONS

Before putting the equipment into operation, check the following recommendations:

1. All sensors and equipment must be grounded, do not use the same grounding point for power and for the sensor so that there is no potential difference.

The properly grounded sensors and power supply prevent malfunctions or damage in the event of disturbances, surges, and equipment inductions.

2. Use 120 Ohms resistors in the communication network (RS-485) at the 2 ends of the transmission line (start and end) in order to generate the potential difference necessary for the correct functioning of the communication network.

3. Do not use IPTE directly in the SOL, whenever it is installed in the field it is important to have a panel with smoked glass, so that the ultraviolet rays that attack the frontal polycarbonate are filtered, in this way the life of the equipment will be extended.

WARRANTY TERM

The TAP Digital Electron Position Indicator has a warranty period of two years from the date of sale set out in the invoice, with coverage for any manufacturing defects that make it inappropriate or inappropriate for the intended applications.

Warranty exclusion

The warranty does not cover transportation costs for technical assistance, freight, and insurance for product shipments with indications of defects or malfunctions. The following events are also not covered: Natural wear of parts due to continuous and frequent use, damage to the outside caused by falls or improper packaging; attempted to repair/breach of seal with damage caused by people not authorized by Electron and in disagreement with the instructions that are part of the technical description.

WARRANTY TERM

Warranty Loss

The product will automatically lose its warranty when:

The instructions for use and assembly contained in this manual and the installation procedures contained in Standard NBR 5410 are not observed;

Subject to conditions outside the limits specified in the respective technical specifications.

Violated or repaired by someone other than Electron's technical team;

The damage is caused by a fall or impact;

Infiltration of water or any other liquid occurs;

Overload occurs that causes the degradation of product components and parts.

Warranty utilization

To take advantage of this guarantee, the customer must send the product to Electron together with a copy of the purchase invoice, properly packaged so that there is no damage in transportation. For prompt assistance, it is recommended to send as much information as possible regarding the detected defect. The IPTE will be analyzed and subjected to complete functioning tests.

The analysis of the product and its eventual maintenance will only be carried out by the Electron do Brasil technical team at its headquarters.

CONFORMITY CHART

Download link:

http://electron.com.br/wp/wp-content/uploads/2014/09/CARTA-DE-CONFORMIDADE-PORTUGUÊS.pdf

UPTADATE CONTROL

Revision Nº 0 June 2020.
- English version of the Users Manual.