
# IPTP - TAP AND PARALLELISM INDICATOR AND CONTROLLER

Catalog

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## INTRODUCTION

The IPTP TAP Position Indicator and Parallelism Control is intended for the remote indication of the TAP position of Transformers using potentiometric crown on-load changers. Manages parallelism Manages parallelism using the master-follower method in three-phase and single-phase transformers with up to 32 networked equipment where only 1 (one) is listed as MASTER and this supervises all the others through an intelligent communication protocol that is capable of detecting and indicating which of the networked equipment has failures and even making autonomous decisions, as well as providing information to automatically generate a self-diagnosis of the entire system, in order to speed up possible operator intervention or maintenance.

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

The IPTP has an input that is intended to receive the signal from a potentiometric crown, in this way it is possible to indicate on the instrument display the current TAP position in a simple numerical (1...51) or bilateral (-24...0...24) way, programmable, and it is also possible to provide the indication through an analog universal output that can be from 0 to 1, 0 to 5, 0 to 10, 0 to 20 or 4 to 20mA (or other as requested) and or digital output (RS485) with Modbus RTU and DNP 3(L1) protocol that allows to remotely access all configuration parameters as well as commands to raise and lower TAP, change the Status of Automatic / Manual and Remote / Local. The IPTP is also equipped with a resource to indicate a failure to read the signal that occurs if there is a change in the TAP for more than 10 seconds or if there is some type of failure in the reading of the potentiometric crown, such as cable breakage, resistor burnout, etc.

## KEY FEATURES

- High-brightness 3-digit display, 20mm height and 13mm decimal place;
- Measurement ranges from 0 to 50 Positions (0 to 5000 Ohms) maximum pitch of 100 Ohms;
- Potentiometric chorus signal input (mA or resistive);
- Universal power supply 48 to 265 Vdc/Vac;
- RS485 Digital Output **(ANSI/TIA/EIA-485-A)** with Modbus RTU and DNP 3 (Level 1) protocol for remote access to all measured parameters;
- Analog output from 0 to 1, 0 to 5, 0 to 10, 0 to 20 and 4 to 20 mA configurable via front;
- Front USB Type-C for parameterization via UseEasy™ software;
- Stores in memory the maximum and minimum TAP reached in the period;
- Contact for Failure Indication (Watchdog);
- Activation to raise and lower TAP directly on the front or via RS485;
- 2 NA contacts to go up and down TAP;
- 3 Contacts for remote indication of the status of the Monitor;
- 2 Contacts for remote access programming;
- High mechanical resistance case, built entirely in aluminum;
- IP20 degree of protection **(NBR IEC 60529);**
- Auto Baud Rate from 2400 to 57,600 bps (Automatically Detects Communication Network Speed);
- High mechanical strength housing, built entirely in DIN IEC **61554 standard aluminum;**
- Reduced size 98x98x52mm;
- 2 years warranty;

## TECHNICAL DATA

| TAP AND PARALLELISM POSITION INDICATOR – IPTP | |
|---|---|
| **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<br>0 to 20 mA or 4 to 20 mA transducer |
| **Measurement Range** | -50 to 50 TAP's – Programmable (50 pos.) |
| **Analog Output and Maximum Load Options** | 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 |
| **Outgoing Contacts** | 4 – Free of potential |
| **Maximum Switching Power** | 70 W / 250 VA |
| **Maximum Switching Voltage** | 6.0 A |
| **Maximum Driving Current** | RS485 **(ANSI/TIA/EIA-485-A)** |
| **Serial Communication Port** | Modbus RTU and DNP 3 Level 1 |
| **Auto Baud Rate** | 2,400 to 57,600 bps |
| **Housing (DIN IEC 61544)** | 98 x 98 x 52 mm - Aluminum |
| **Equipment Attachment** | Flush Panel Mounting |
| **Degree of Protection (NBR IEC 60529)** | IP 20 |

Table 1 – IPTP technical data

## TYPE TESTS 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): Alim /Input./ Outputs =4KV/ common 2kV;
- Surge Immunity (IEC60255-22-5): phase/neutral 1KV, 5 per polar. (±) - 2KV phase-to-ground/neutral-to-ground, 5 per polar (±);
- Immunity to conducted Electromagnetic disturbances (IEC61000-4-6): 0.15 to 80 MHz / 10V/m;
- Climate Test (IEC60068-21-14):- 40ºC + 80ºC / 72 hours;
- Vibration Resistance (IEC60255-21-1): 3 axes / 10 to 150Hz / 2G / 160min/axis;
- Vibration Response (IEC60255-21-1): 3-axis / 0.075mm-10 at 58 Hz / 1G from 58 to 150 Hz / 8min/axis;

## DIMENSIONS

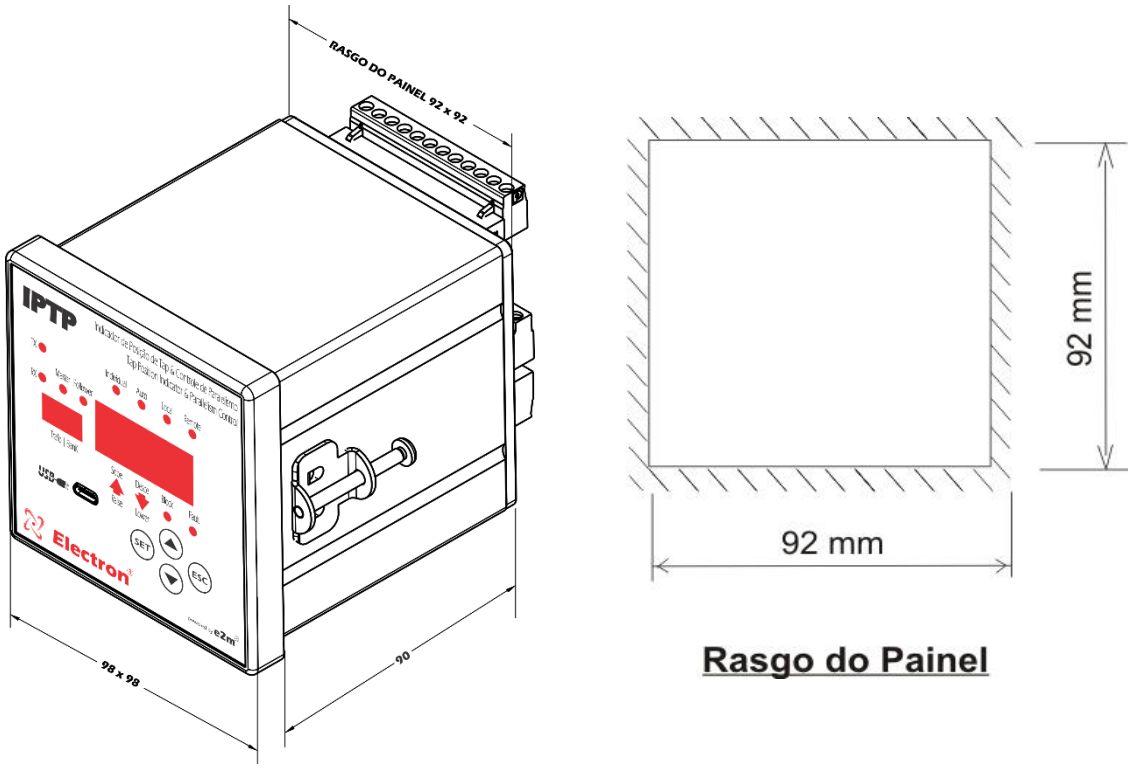
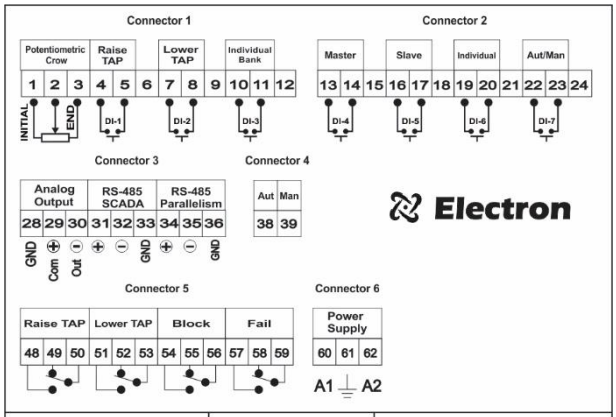



Figure 1 – IPTP Dimension

## CONNECTION DIAGRAM - IPTP




| | | |
|---|---|---|
| Modelo / Código | Model / Code | IPTP / PA0394 |
| Tensão de Operação | Operation Voltage | 48 ~ 275 Vcc / Vca - 50 / 60 Hz |
| Entrada De Sensores | Sensors Input | Resistive Crown 0 to 5000 Ohms<br>7 Digital Input (Dry Contact) |
| Contatos De Saída | Output Contact | 6 Amper - 70W / 250 VA |
| Comunicação Serial | Serial Communication | RS 485 - 2 wires<br>Modbus RTU and DNP3 - L1 |
| Saídas Analógicas | Analogs Outputs | 0~1mA, 0~5 mA, 0~10mA,<br>0~20 mA or 4~20 mA |

*Figure 2 – IPTP Connection Diagram*

## PREVENTIVE MAINTENANCE

| PREVENTIVE AND CORRECTIVE MAINTENANCE | | | | | | | |
|---|---|---|---|---|---|---|---|
| Items to be checked preventively | | | Verification Frequency | | | | Corrective action |
| SHARE | Verification Elements | ACTIVITIES | Every Month | Every 3 Months | Every 6 Months | Every 1 Year | When Needed |
| VERIFICATION | Fastening clip and snapping to the rail | Fixing to the panel door or panel bottom | | X | | | Retightening, Fitting, Terminal Change, or Screw Change |
| | Terminal Blocks and Connector Comb | Attachment and attachment to equipment | | X | | | |
| | | Tightening of the screws in the fastening of the conductors | | X | | | |
| | Sensors | Integrity / Positioning / Fastening | | | X | | Replacement, repositioning and/or fixing of sensors |
| | Sensor well in oil transformers | Oil level in the well | | | X | | Oil filling to indicated level |
| TESTS & MEASUREMENTS | Relays and Digital Outputs | Individual drive test | | | X | | Forward to Electron do Brasil technical assistance |
| | LEDs and Displays | Test drive LEDs and display segments | | | X | | |
| | Navigation buttons | Navigation test of the navigation buttons | | | X | | |
| | Sensor Input | Gauge sensor inputs using a standard | | | | X | |
| | Input voltage of equipment supply | Measure Supply Input Voltage | | | X | | Override voltage input values according to equipment model |
| | RS485 communication outputs | Communication and command testing in the supervisory system | | | X | | Forward to Electron do Brasil technical assistance |
| | Milliampere Current Signal Inputs | Measure, compare and measure input signal in passive and/or active mode | | | X | | |
| | Signal Outputs of milliampere current | Measure, compare and measure input signal in passive and/or active mode | | | X | | |
| CLEANING | Terminal blocks and connector comb and connection box | Debris, Impurities and Moisture | X | | | | Cleaning with a dry cloth, compressed air and vacuum cleaner |
| | Aluminum Equipment Enclosure | | X | | | | |
| | Front of the Equipment Display | | X | | | | |
|   | **1 - Keeping the equipment within the ideal working temperature (50°C to 60°C) extends the useful life and avoids corrective maintenance.**<br>**2 - The accumulation of dust and impurities in the facilities can cause short-circuiting and burning of equipment and sensors.**<br>**3 - After 10 years of use, it is recommended to replace the equipment.** | | | | | | |

Table 2 – Preventive maintenance

## APPLICATION EXAMPLES

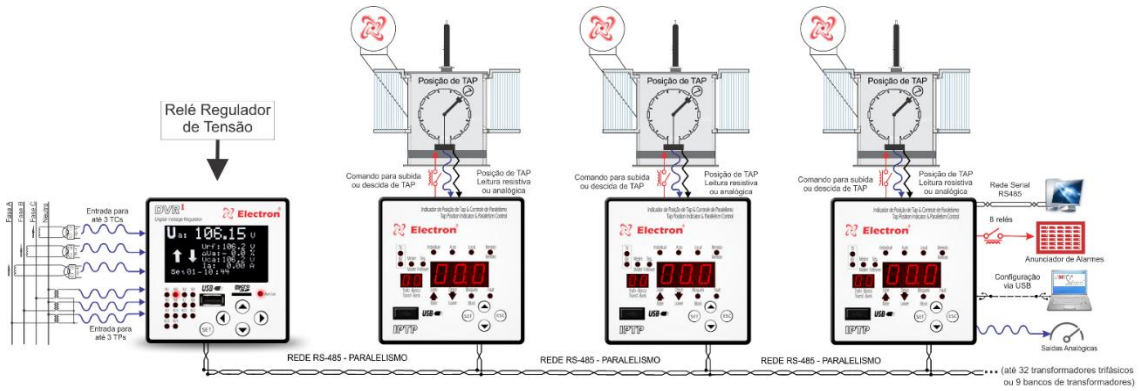



Figure 3 – Application example 1

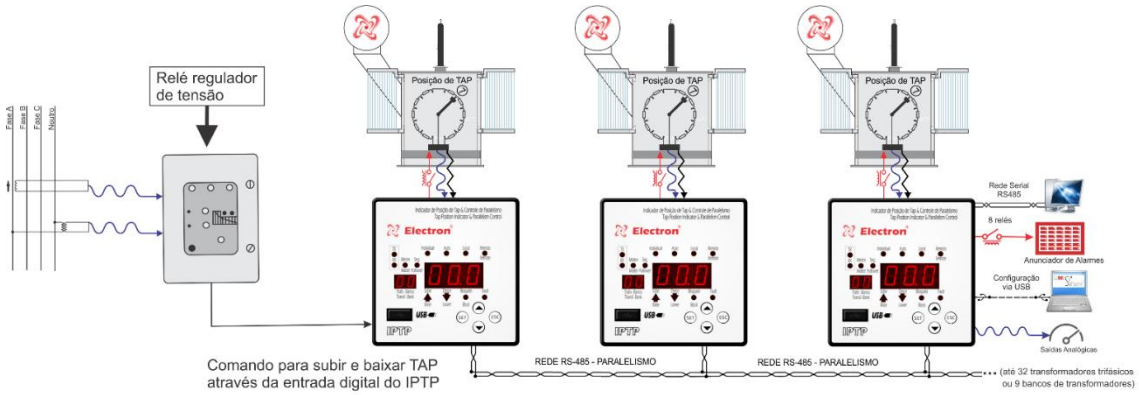



Figure 4 – Application example 2

## ACCESSORIES

MÓDULO TRANSMISSOR DE ATÉ 35 POSIÇÕES


Figure 5 – Position Transmission Module (up to 35 tap positions)

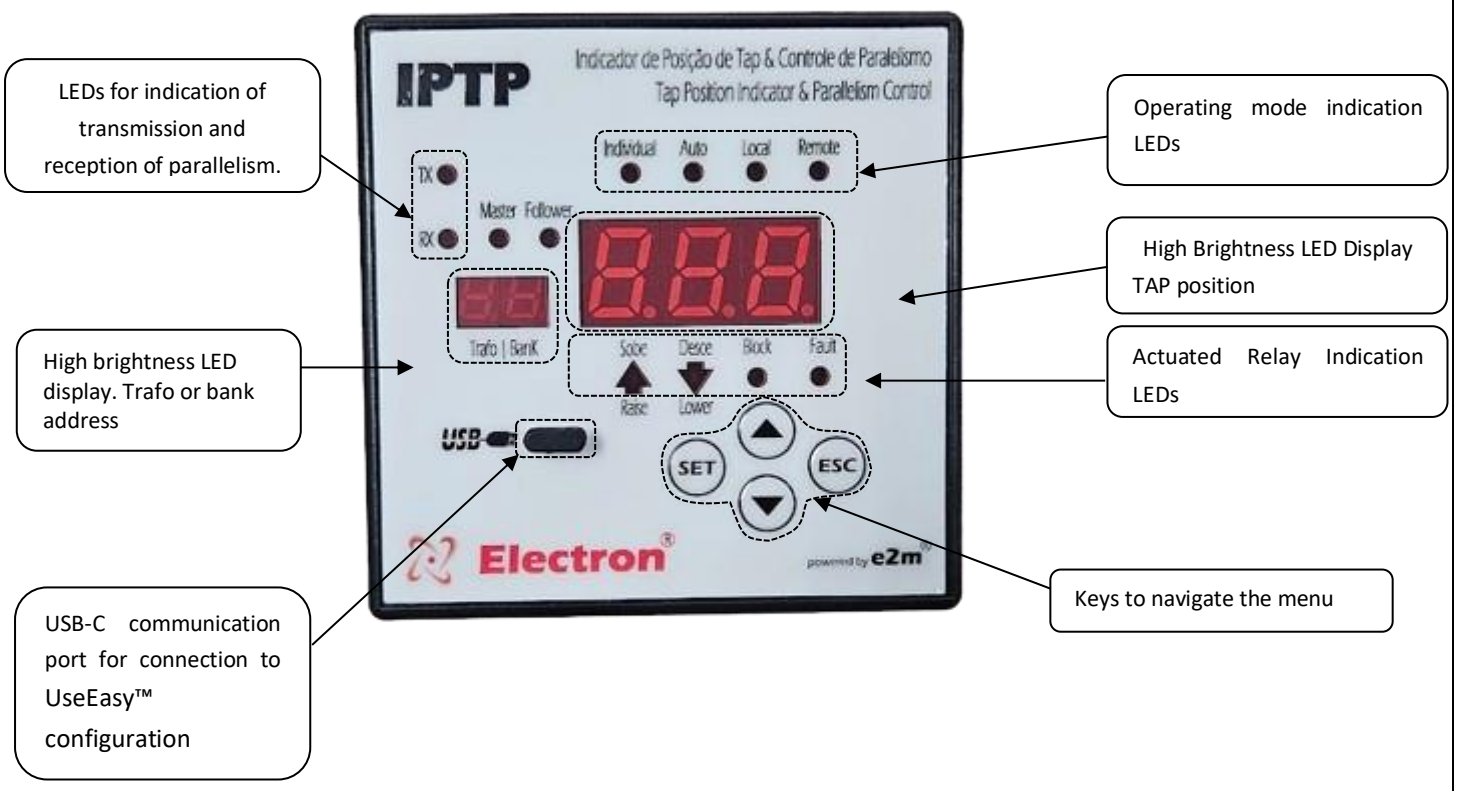
## PROCUREMENT SPECIFICATION

INDICADOR E CONTROLADOR DE PARALELISMO

IPTP - ☐

| SINAL DA COROA | |
|---|---|
| 1 | Resistiva |
| 2 | 4 a 20 mA |

## GETTING TO KNOW IPTP




Note: when configured in individual bank in the topology of the Transformer Bank, the individual led is flashing.

Figure 6 – getting to know the IPTP

## IMPORTANT RECOMMENDATIONS

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

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

Properly grounded sensors and power prevent malfunctions or damage in cases of disturbances, surges, and inductions in the equipment.

2. Use in the communication network (Rs485) resistors of 120 Ohms at the 2 ends of the transmission line (start and end) in order to generate the potential difference necessary for the correct operation of the communication network.

3. Do not use IPTP directly on the SUN, 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 front polycarbonate are filtered, in this way the life of the equipment will be prolonged.

## WARRANTY TERM

The TAP POSITION INDICATOR & PARALLELISM CONTROL – IPTP Electron has a warranty period of two years from the date of sale stated on the invoice, with coverage for any manufacturing defects that make it unsuitable or unsuitable for the applications it is intended for.

***Disclaimer of Warranty***

The warranty does not cover transportation expenses for technical assistance, freight and insurance for shipment of a product with evidence of defect or malfunction. The following events are also not covered: Natural wear and tear of parts due to continuous and frequent use, damage to the outside caused by falls or improper packaging; attempt to repair/break a seal with damage caused by persons not authorized by Electron and in disagreement with the instructions that are part of the technical description.

***Loss of Warranty***

The product will automatically lose its warranty when:

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

Subjected to conditions outside the limits specified in the respective technical descriptions.

Tampered with or repaired by a person other than Electron's technical staff;

The damage is caused by a drop or impact;

Infiltration of water or any other liquid occurs;

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

***Use of the Warranty***

To enjoy this warranty, the customer must send the product to Electron along with a copy of the purchase invoice properly packaged so that there is no damage in transport. For emergency care, it is recommended to send as much information as possible regarding the defect detected. It will be analyzed and subjected to complete functional tests.

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