

CATALOG

TAP POSITION INDICATOR & PARALLELISM
CONTROL – IPTP



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INTRODUCTION

The position indicator and parallelism control **IPTP** is intended to control, supervise, and indicate the TAP position remotely on transformers that use on-load tap changers. The **IPTP** was built in compliance with strict quality standards, using state-of-the-art electronic components (SMD), has a high-brightness LED display with 3-digit and is designed to withstand harsh working conditions. It can be installed in energy substation yards, offshore platforms, and chemical industries. It meets the requirements, support, and reliability levels according to IEC, DIN, IEEE, ABNT standards. The **IPTP** aluminum enclosure has high mechanical resistance and creates a Faraday cage that elevates the immunity of electronic circuits in case of noise induction and electric discharge shocks. The enclosure also acts as a heatsink, extending the life of the IED and meets DIN standards for panel mounting, with dimensions 96x96x52mm. The enclosure has a degree of protection IP20 according to NBR IEC 60529.

As a signal input, the **IPTP** receives information from the resistances of the potentiometer crown or current input from 0 to 20 mA or 4 to 20 mA, in this way it is possible to program the indication on the display to the front panel, the TAP position of the on load tap changer by the numeric simple (1 ... 51), bilateral (-24 ... 0 ... 24) or alphanumeric (L16 ... N ... R16) or other, as requested by the customer.

For universal analog signal output, the **IPTP** has an output that can be 0..1, 0..5, 0..10, 0..20 or 4..20mA (or other as required) and digital output with Modbus RTU and DNP 3 (L1) protocols that remotely allow access to all configuration parameters as well as TAP upload and download commands, change the status of Automatic/Manual and Remote/Local (a dedicated RS485 output for parallelism and another RS485 output for Scada system).

The **IPTP** is also equipped with features to indicate signal read failure, which occurs in the change of TAP position, if it has a time greater than 10 seconds or some type of failure in the potentiometer crown reading, such as cable rupture, resistor burning, etc.

There is also the storage function in memory of the maximum TAP and the minimum TAP reached in the period.

It also has the following contacts: 1 NOC relay to command the TAP rise and 1 NAF relay to control the TAP decrease; 1 NOC relay in case of OLTC lock; 1 NOC relay for fault indication (Watchdog); 1 digital output RS485 for communication with supervisory system; 1 configurable analog output (0..1, 0..5, 0..10, 0..20 or 4..20 mA) for TAP indication; 1 digital output dedicated RS485 for the parallelism function; 2 digital inputs for rise/decrease TAP; and 4 digital inputs for selection of the working mode.

There is a USB 2.0 front for parameterization through the software UseEasy™ (free for download on Electron's website). This allows the user to enter the default values in the transformer calculation, programming the **IPTP**, or verify that the parameterized values in the **IPTP** are correct. A much simple way and without the need to access these values through the equipment screen. It has another facility that is the AUTO DIAGNOSIS. In case of an error, alarm, or shutdown, the **IPTP** itself will perform an analysis on the parameters entered and will alert you to the possible causes of the event. As a result, the unplanned downtime will be lower compared to competitor equipment.

MAIN FEATURES

- High-brightness 3-digit display height of 20 mm and decimal place of 13 mm;
- Measurement range from 0 to 50 Positions (0 to 5000 Ohms) maximum step of 100 Ohms;
- Potentiometric 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 0 to 1, 0 to 5, 0 to 10, 0 to 20 and 4 to 20 mA configurable via 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);
- Drive to raise and lower TAP directly on the front or via RS485;
- 2 NA contacts for raising and lowering TAP;
- 3 Contacts for remote indication of the Monitor status;
- 2 contacts for remote access programming;
- 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;
- 2 year warranty;

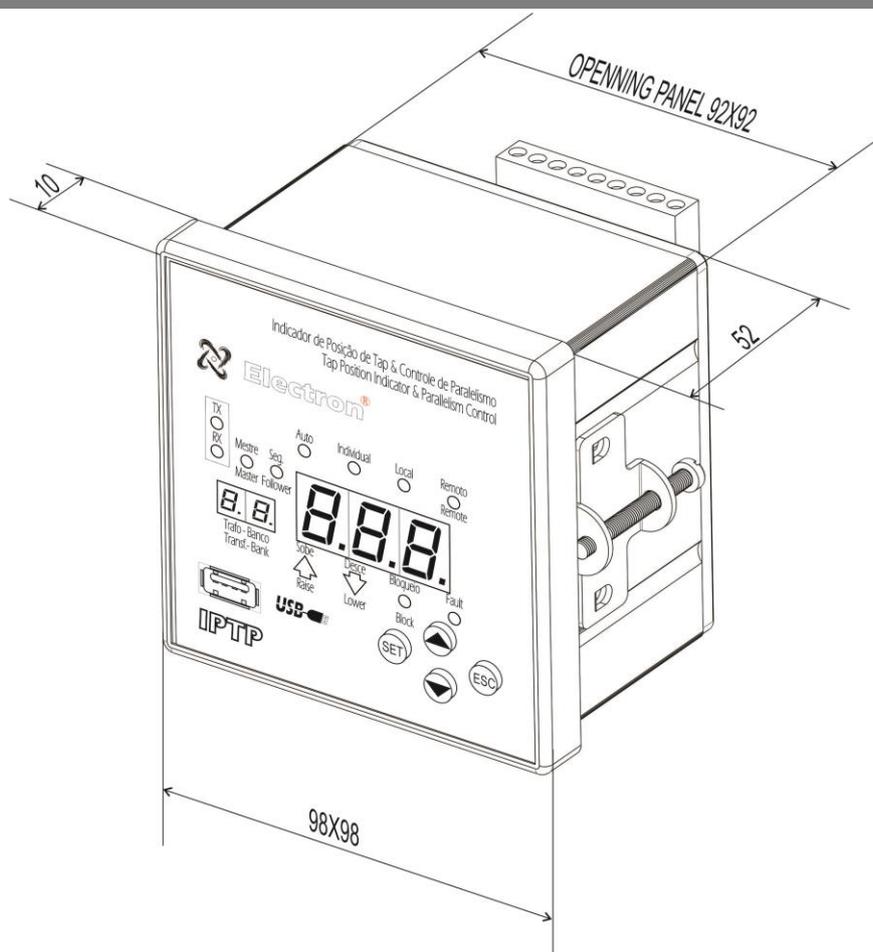
TECHNICAL DATA

POSITION INDICATOR & PARALLELISM CONTROL - IPTP	
Power Supply	48 to 265 Vdc/Vca 50/60 Hz
Temperature Operation	-40 to + 85°C
Consumption	<15 W
Position Measurement Input	Potentiometer Crown 0 to 5000 Ohms Transducer 0 to 20 mA or 4 to 20 mA
Measurement Range	-50 to 50 TAP's – Programable (50 pos.)
Analog Outputs and Maximum Load Options	0 ... 1mA - 8000 Ohms
	0 ... 5mA - 1600 Ohms
	0 ... 10mA - 800 Ohms
	0 ... 20mA - 400 Ohms
	4 ... 20mA - 400 Ohms
Maximum Analog Output Error	0,25% end of scale
Output Contacts	4 - Potential Free
Maximum Switching Power	70 W / 250 VA
Maximum Switching Voltage	250 Vcc/Vca
Maximum Conduction Current	6,0 A
Serial Network Communication Port SCADA	RS 485(ANSI/TIA/EIA-485-A)
Communication protocol	Modbus RTU and DNP 3 L1
Auto Baud Rate	2400 to 57.600 bps
Enclosure (DIN IEC 61554)	96 x 96 x 52 mm – Aluminium

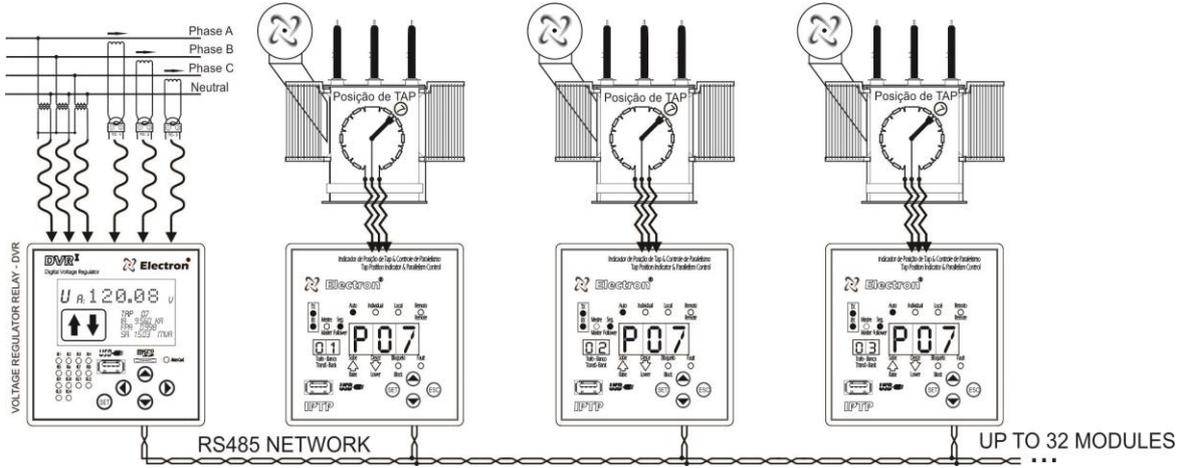
Fixing	Panel Mounting
Protection Degree	IP 20

TYPE TESTS PERFORMED

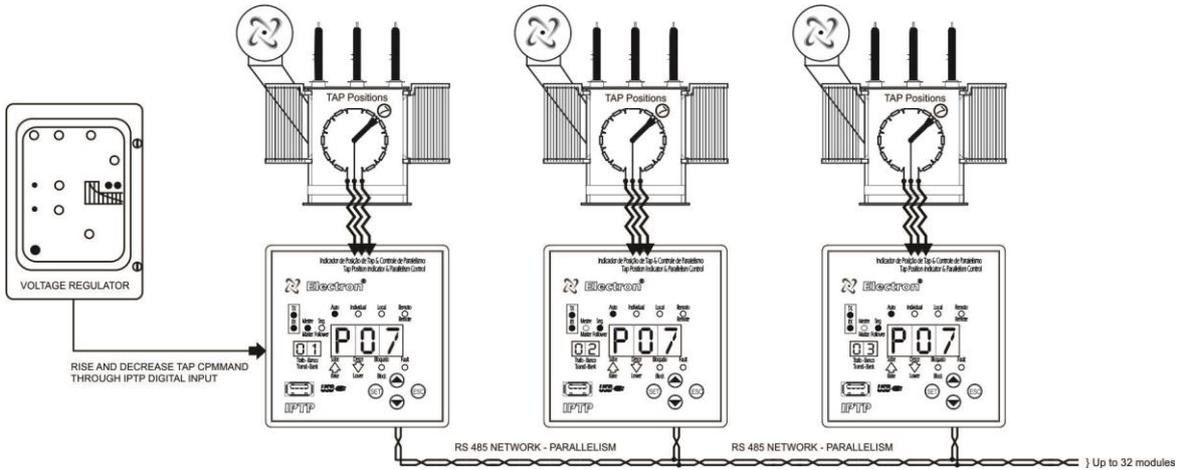
- Insulation Voltage (**IEC 60255-5**): 2kV / 60Hz / 1 min. (to ground);
- Voltage impulse (**IEC 60255-5**): 1.2/50 μ seg. / 5kV / 3 neg. and 3 pos. / 5 segs. Interval;
- Voltage impulse (**IEC 60255-5**): 1.2/50 μ seg. / 5kV / 3 neg. and 3 pos. / 5 segs. Interval;
- Irradiated electromagnetic field immunity (**IEC 61000-4-3**): 80 to 1000 MHz / 10V/m;
- Fast electrical transient immunity (**IEC 60255-22-4**): Power./Input./Output=4KV/Serial port. 2kV;
- Surge immunity (**IEC 60255-22-5**): phase/neutral 1kV, 5 per polar. (\pm) - phase-ground/neutral-ground 2kV, 5 per pole (\pm);
- Conduced electromagnetic perturbations immunity (**IEC 61000-4-6**): 0,15 to 80 MHz / 10V/m;
- Climatic test (**IEC 60068-21-14**): -40°C + 85°C / 72 hours;
- Vibration resistance (**IEC 60255-21-1**): 3 axis / 10 to 150Hz / 2G / 160min/axis;
- Vibration response (**IEC 60255-21-1**): 3 axis / 0,075mm-10 to 58 Hz / 1G of 58 to 150 Hz / 8min/axis.

DIMENSIONS


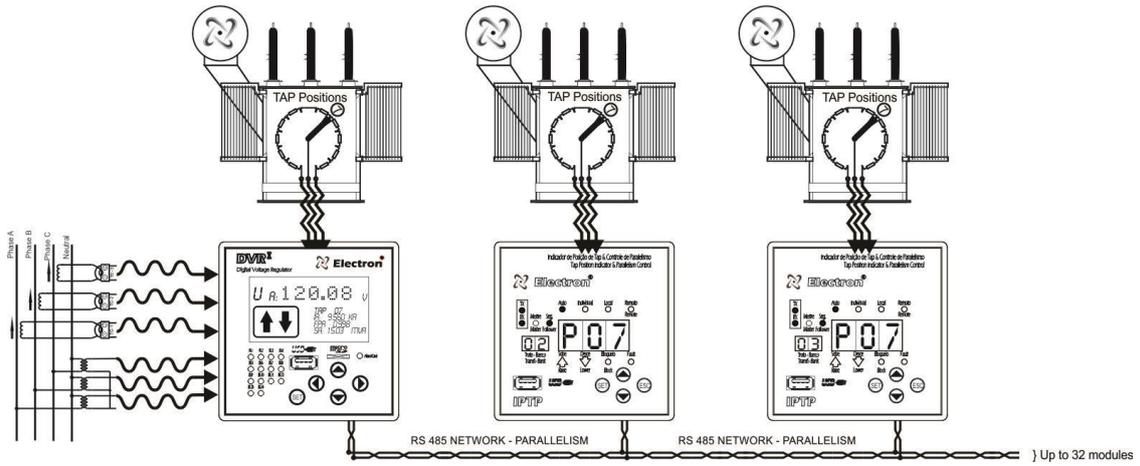
APPLICATION EXAMPLES



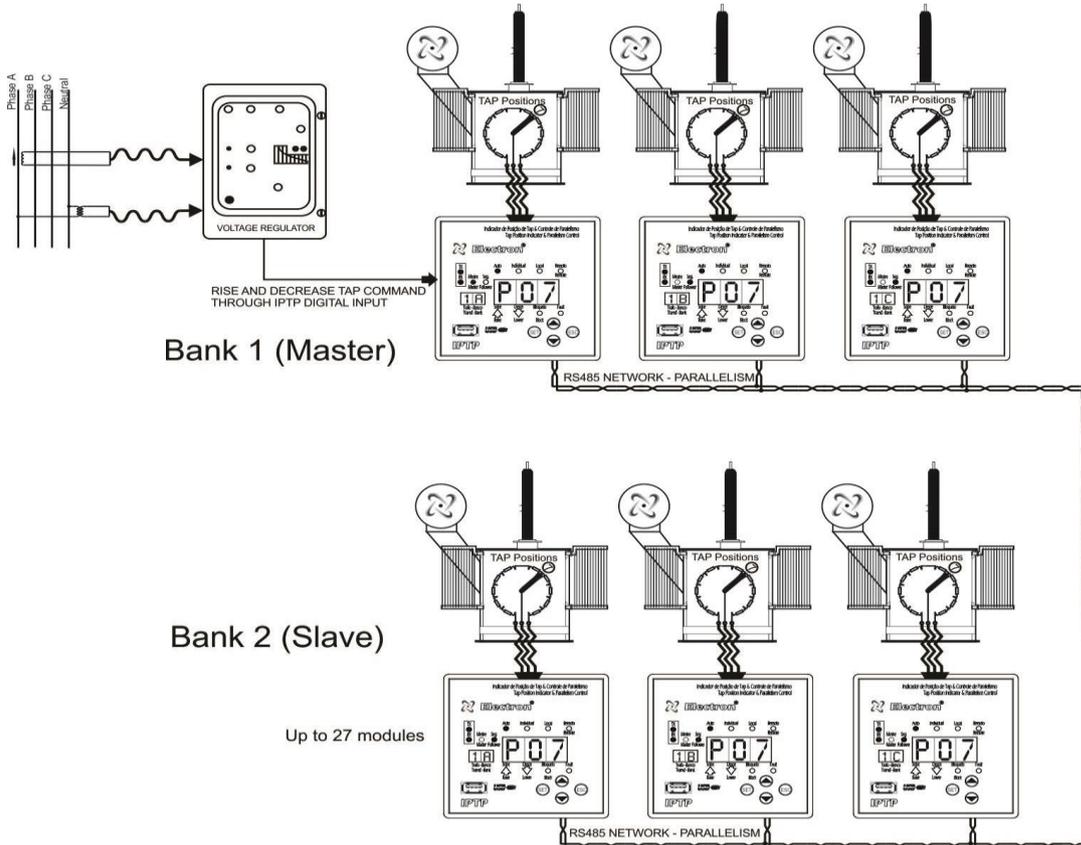
EXAMPLE 1 - Three-phase transformers bank operating in parallel connected by dedicated RS485 port commanded by the DVR



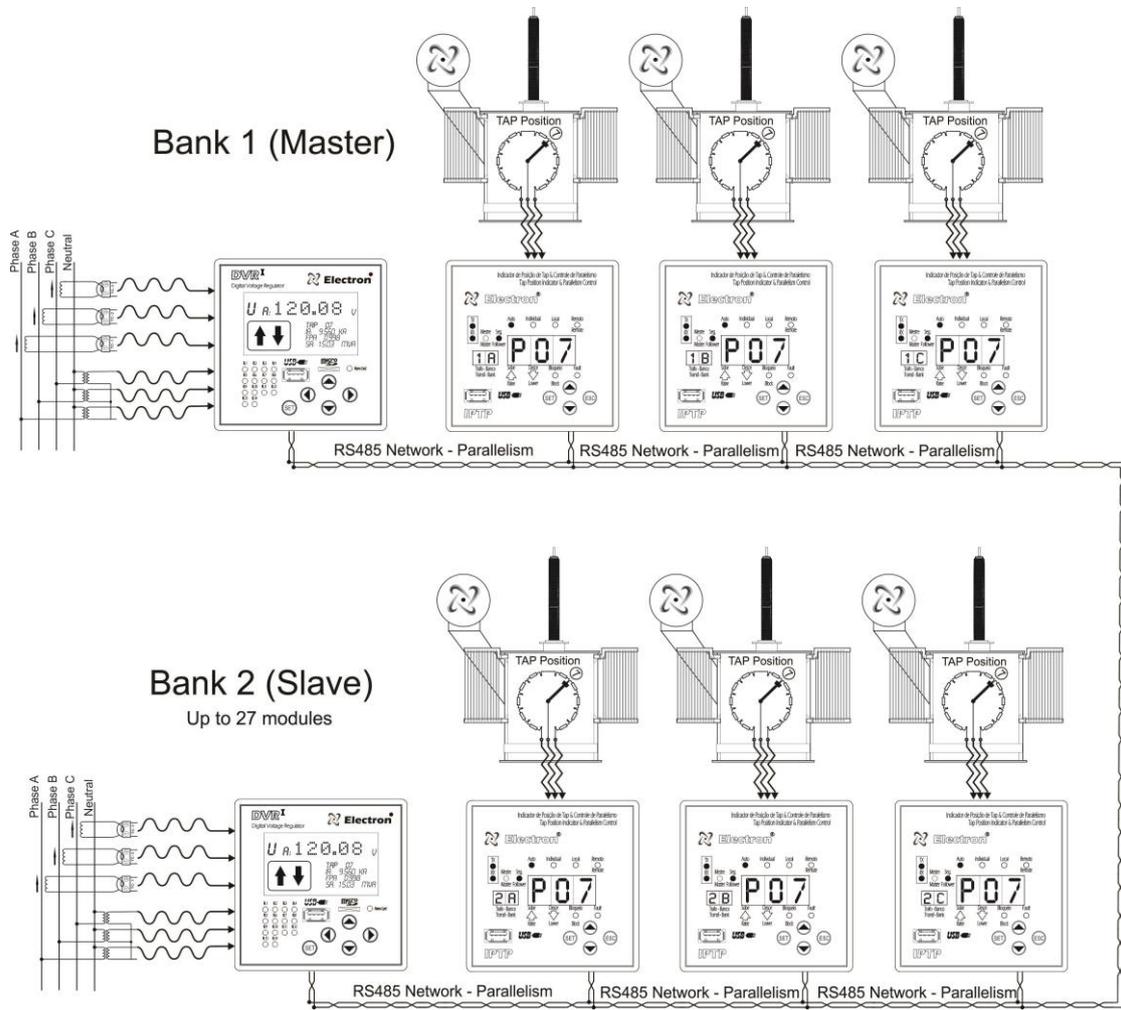
EXAMPLE 2 - Three-phase transformers bank operating in parallel, connected by the dedicated RS485 port controlled by the voltage regulator through the digital input of the IPTP



EXAMPLE 3 - Three-phase transformers bank operating in parallel connected by the dedicated RS485 port commanded by the voltage regulator (DVR) installed in the master transformer

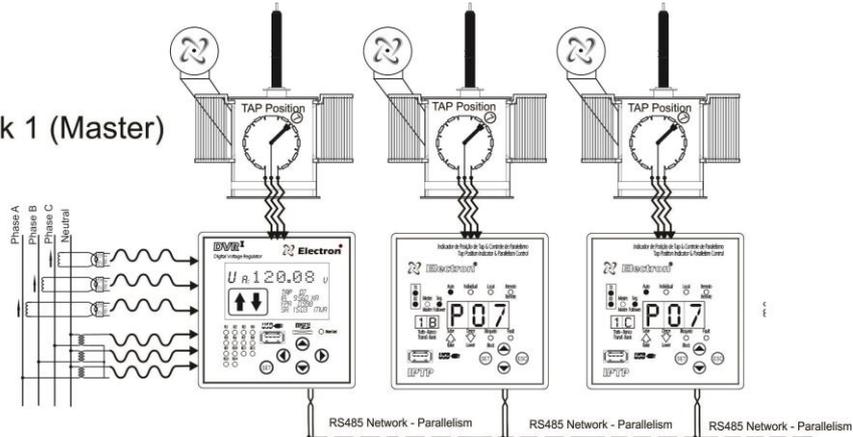


EXAMPLE 4 - Single-phase transformer bank operated in parallel connected by the dedicated RS485 port controlled by voltage regulator MK20 through the digital input of the IPTP

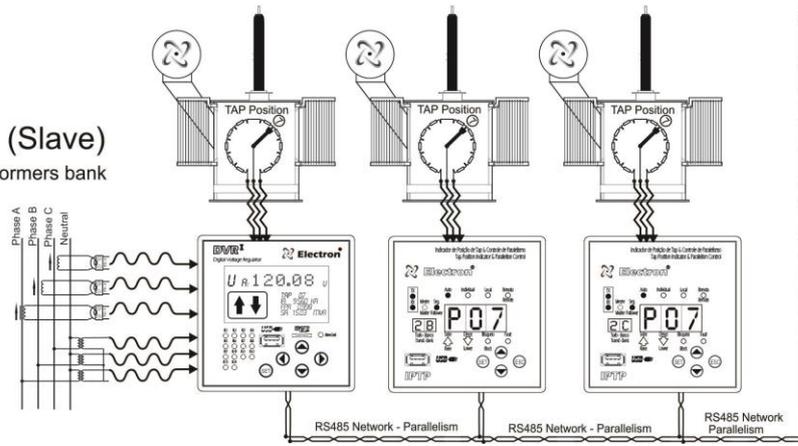


EXAMPLE 5 - Single-phase transformers bank operating in parallel connected by the dedicated RS485 port controlled by the voltage regulator (MASTER x SLAVE bank)

Bank 1 (Master)

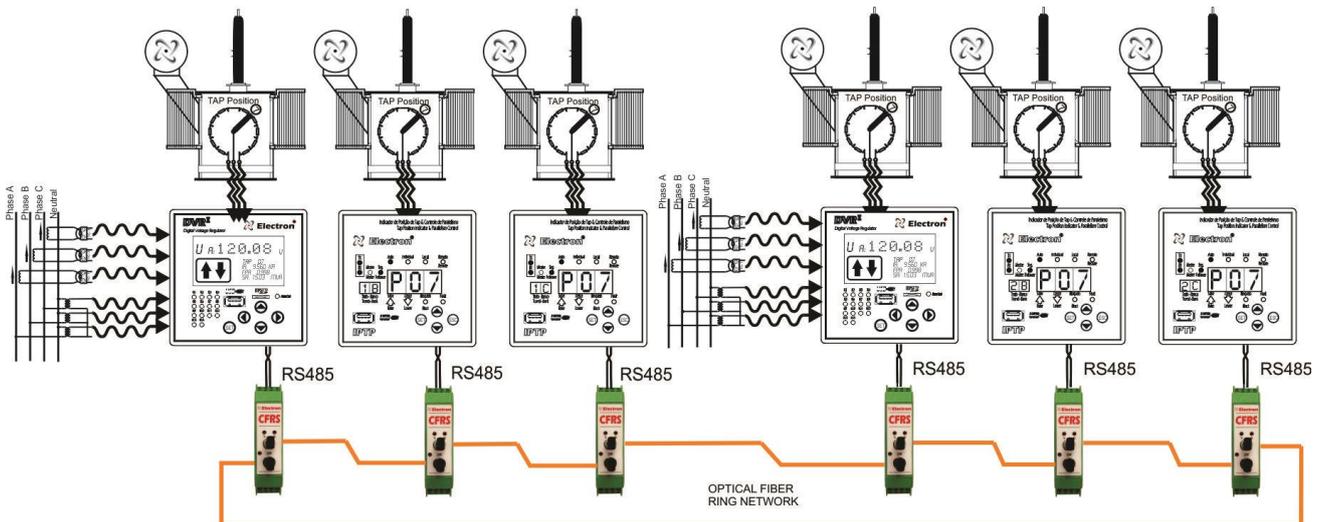


Bank 2 (Slave)
Up to 9 transformers bank



Bank 1 (Master)

Bank 2 (Slave)



EXAMPLE 7 - Single-phase transformers bank operating in parallel connected by RS485 network x fiber optic converter (Electron recommends using fiber-optic network in situations where there may be electromagnetic inductions, electrical noise, atmospheric discharges or surges of voltages)

ACCESSORIES

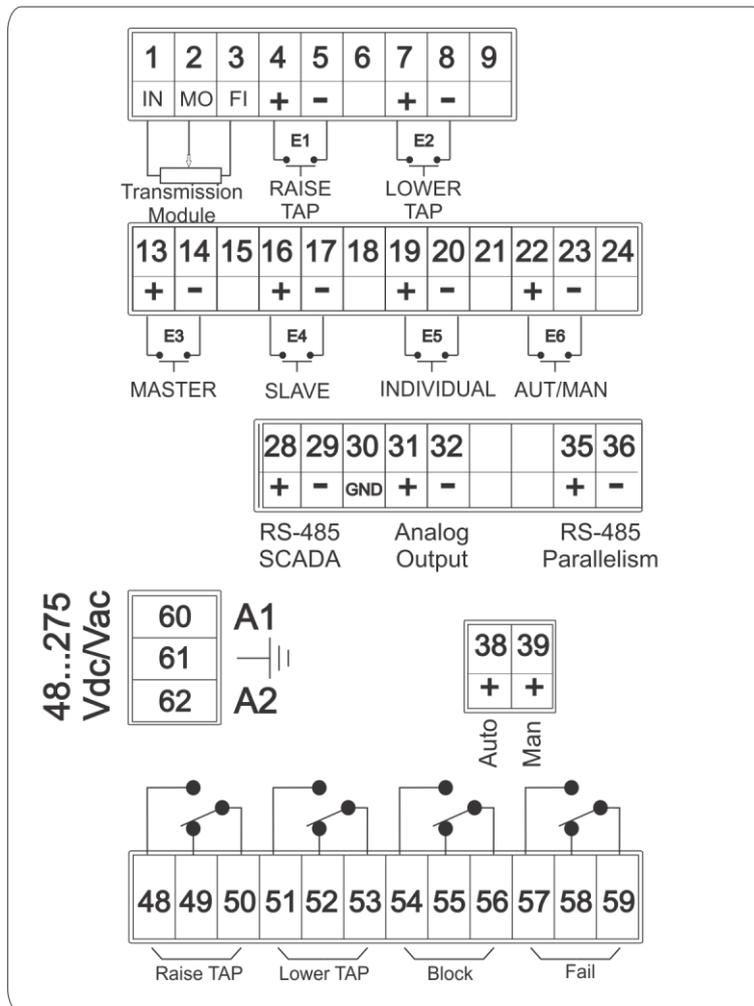


DRY CONTACT TRANSDUCER MODULE
UP TO 35 POSITIONS PA0374



BOX FOR EXTERNAL USE
PA0223

CONNECTION DIAGRAM



IPTP - TAP POSITION INDICATOR & PARALLELISM CONTROL

ORDER SPECIFICATION

IPTP -

<i>TAP Changer Signal</i>	
1	4 ... 20mA
2	Resistive