



Monitemp Plus

Catalogue

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INTRODUCTION

The Monitemp Plus **Temperature Monitor** was developed to monitor oil and winding temperature, control ventilation, protect power and distribution transformers (ANSI 49I and ANSI 49).

The **Monitemp Plus** was built obeying strict quality standards and uses state-of-the-art electronic components (SMD), its hardware was designed to withstand severe working conditions, and can be installed directly on the panel of the power transformer, reactor, panels in the yard of power substations, marine platforms and chemical industries. It meets the levels of requirements, supportability and reliability according to IEC, DIN, IEEE and ABNT standards.

As signal input the **Monitemp Plus** allows up to 3 (three) PT-100 temperature sensors (EM 60751 – DIN 43760), also has 2 (two) configurable analog outputs that can be from 0 to 1 mA, 0 to 5 mA, 0 to 10 mA, 0 to 20 mA and 4 to 20 mA, which mirror the oil temperature and the winding temperature, 1 (one) digital output RS-485 (ANSI/TIA/EIA-485-A) with MODBUS RTU and DNP 3.0 (Level 1) protocols chosen by the user, which allows access to all parameters of **MoniTemp Plus** including remote control of the drives in real time, has Setpoints for parameterization of temperatures for Oil Alarm, Winding Alarm, Oil Shutdown, Winding Shutdown, Oil Shutdown, Winding Shutdown, Activation of the 1st and 2nd ventilation group, the signals are made through 8 isolated and potential-free Relays.

The display mode of the **MoniTemp Plus** display is fully configurable, being able to show the highest temperature at the moment, or fix on the display the channel temperature that the operator wants, or else, using the SCAN function, a complete scan is made on all channels continuously. Through the indicative front LEDs and also through the data communication port it is possible to identify which of the channels caused the alarm, the shutdown or the activation of the fans, all functions and parameterizations are easily configured directly on the instrument panel or using the USB port with the UseEasy™ Software that accompanies the equipment or through the RS485 communication port (ANSI/TIA/EIA-485-A) with the MODBUS and DNP3.0 (Level 1) protocols that are native to the equipment.

MAIN FEATURES

- 4-digit display of high luminosity height of 20 mm and decimal place of 13 mm (red);
- Accuracy of 0.25% (FS) and indication of 1 decimal place;
- Simultaneous indication on the display of the 3 monitored temperatures (environment, oil and winding);
- Temperature measuring range from -50 to 250°C;
- Extended operating temperature (-40°C to +85°C);
- Compensated input for PT-100 3-wire sensors (**EM 60751 – DIN 43760**);
- Current input (**TRUE RMS**) from 0 to 10 Amperes with external CT Split Core;
- Universal power supply 48 to 265 VDC/Vac;
- RS485 Digital Output (**ANSI/TIA/EIA-485-A**) with **MODBUS RTU protocol and DNP3.0 (Level 1)** for remote access to all measured parameters and commands;
- Front USB 2.0 for parameterization through UseEasy™ software;
- Access Password Protection for direct parameterization through the display of the **MoniTemp Plus**;
- Auto Baud Rate from 2,400 to 57,600 bps (Automatically Detects the speed of the Communication network);
- Analog outputs configurable via keyboard or **UseEasy™** Software can be from 0 to 1 mA, 0 to 5 mA, 0 to 10 mA, 0 to 20 mA and 4 to 20 mA, for any of the measured channels;
- Drive of up to 2 groups of ventilation or pumps, directly in the front or Remote through the Serial;
- Programmable exercise and ventilation;
- Thermal Image Calculation based on IEC 354-1991, IEEE std C57.91-1995 and NBR 5416-1997;
- Query on the display of the Final Temperature Gradient for the current load (Oil-Winding);
- Query on the transformer charging percentage display;
- Consultation in the display of the load current of the Transformer (KA);
- Consultation of maximum temperature reached by the display (Oil, Winding and environment);
- 01 Relay (NA) with capacity of 6 amps for Oil Alarm (NF on request);
- 01 Relay (NA) with capacity of 6 amps for Winding Alarm (NF on request);
- 01 Relay (NA) with capacity of 6 amps for Oil Shutdown (NF on request), with programmable timing;
- 01 Relay (NA) with capacity of 6 amps for Winding Shutdown (NF on request), with programmable timing;
- 01 Relay (NA) with capacity of 6 amperes for signaling the start of counting the shutdown timing;
- 01 Relay (NA) with capacity of 6 amperes for temperature differential alarm between sensors 1 and 2;
- 01 Relay (NF) with capacity of 6 amps for signaling fault in the monitor (watchdog);
- 01 Relay (NF) with capacity of 6 amps for ventilation or pump drive, with programmable hysteresis and timed interlocking between groups;
- High mechanical strength housing, built entirely in standard aluminum (**DIN IEC 61554**);
- Reduced size 48 x 96 x 96 mm;
- Easy parameterization and use;
- 2 years warranty;

TECHNICAL DATA

Digital Temperature Monitor – MoniTemp Plus	
Operating Voltage	48 to 265 Vdc/Vac 50/60 Hz
Operating Temperature	-40 to +85°C
Storage Temperature	-50 to +60°C
Consumption	< 15 W
Temperature Measurement Input	PT-100 3-wire (EM 60751 – DIN 43760)
Measuring Range	-50 to 250°C
Analog Outputs 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 Measurement Input Error	0.25% of the end of the scale
Maximum Analog Output Error	0.25% of the end of the scale
Outgoing Contacts	8 Relays – Potential Free
Maximum Switching Power	70 W / 250 VA
Maximum Switching Voltage	250 Vac/Vac
Maximum Driving Current	6.0 A
Serial Communication Port	RS485 (ANSI/TIA/EIA-485-A)
Communication Protocol	MODBUS RTU and DNP 3.0 – Level 1 (Slave)
Auto Baud Rate	2,400 to 57,600 bps
Box (DIN EIC 61544)	48 x 96 x 96 mm – Painted aluminium
Equipment Fixation	Panel door with steel latch stainless
Degree of Protection (NBR IEC 60529)	IP40 (Front), IP 20 (Connectors)
Current Transformer – TC Split Core	
Output Signal	4 to 20 mA
Measuring Range	0 to 10 Aca
Maximum Error of Measurement Inputs	1% of the end of scale
Linearity	1% of the end of scale
Operating Temperature	-40 to +85°C
Storage Temperature	-50 to +60°C

Table 1 – Technical Data

TYPE TESTS CARRIED OUT

- Applied Voltage (**IEC 60255-5**): 2kV / 60 Hz / 1 min. (Against Earth);
- Voltage Impulse (**IEC 60255-5**): 1.2/50µsec. / 5KV / 3 neg and 3 pos / 5 secs. Interval;
- Electrostatic Discharges (**IEC 6025-22-2**): Air Mode = 8KV / Counted Mode = 6 KV;
- Immunity to irradiated electromagnetic disturbance (**IEC 61000-4-3**): 80 to 1000 Mhz / 10 V/m;
- Immunity to Fast Electrical Transients (**IEC 60255-22-4**) Alim/Entr./ Outputs = 4 KV/Common. 2KV;
- Immunity to conducted electromagnetic disturbances (**IEC 61000-4-6**): 0.15 to 80 MHz/10V/m;
- Climate test (**IEC 60255-21-1**) **3-axis** / 0.075 mm – 10 to 58 Hz / 1G from 58 to 150 Hz / 8 min/ axis;

DIMENSIONS

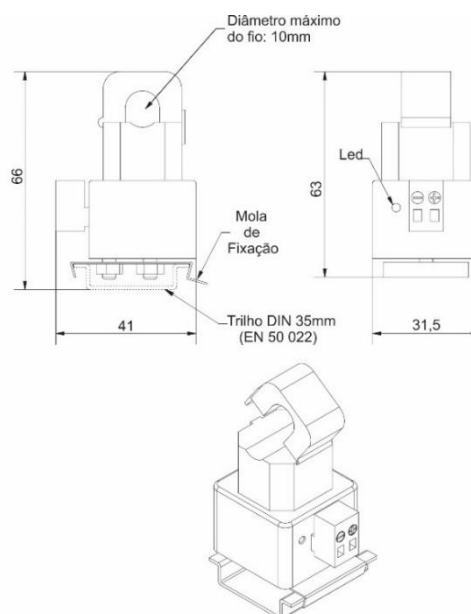
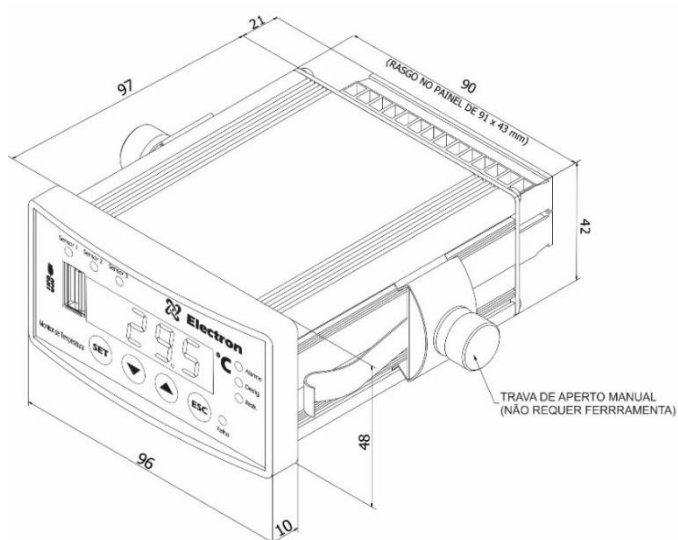


Figure 1 – Monitemp plus dimension

CONNECTION DIAGRAMS

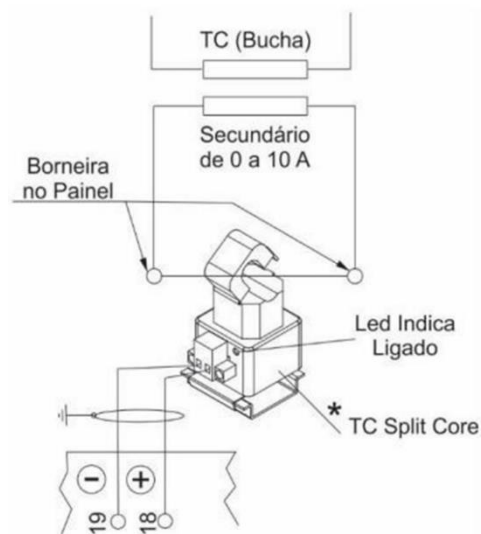
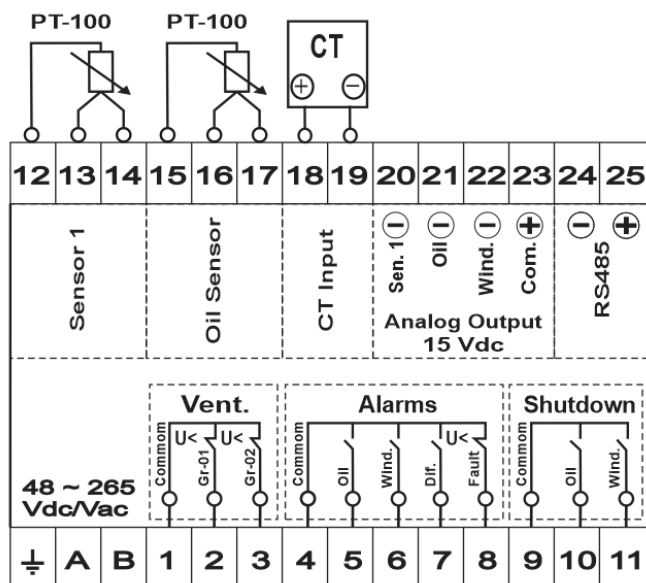


Diagrama de ligação do TC

Figure 2 – Monitemp plus Diagram

CONNECTION DIAGRAMS

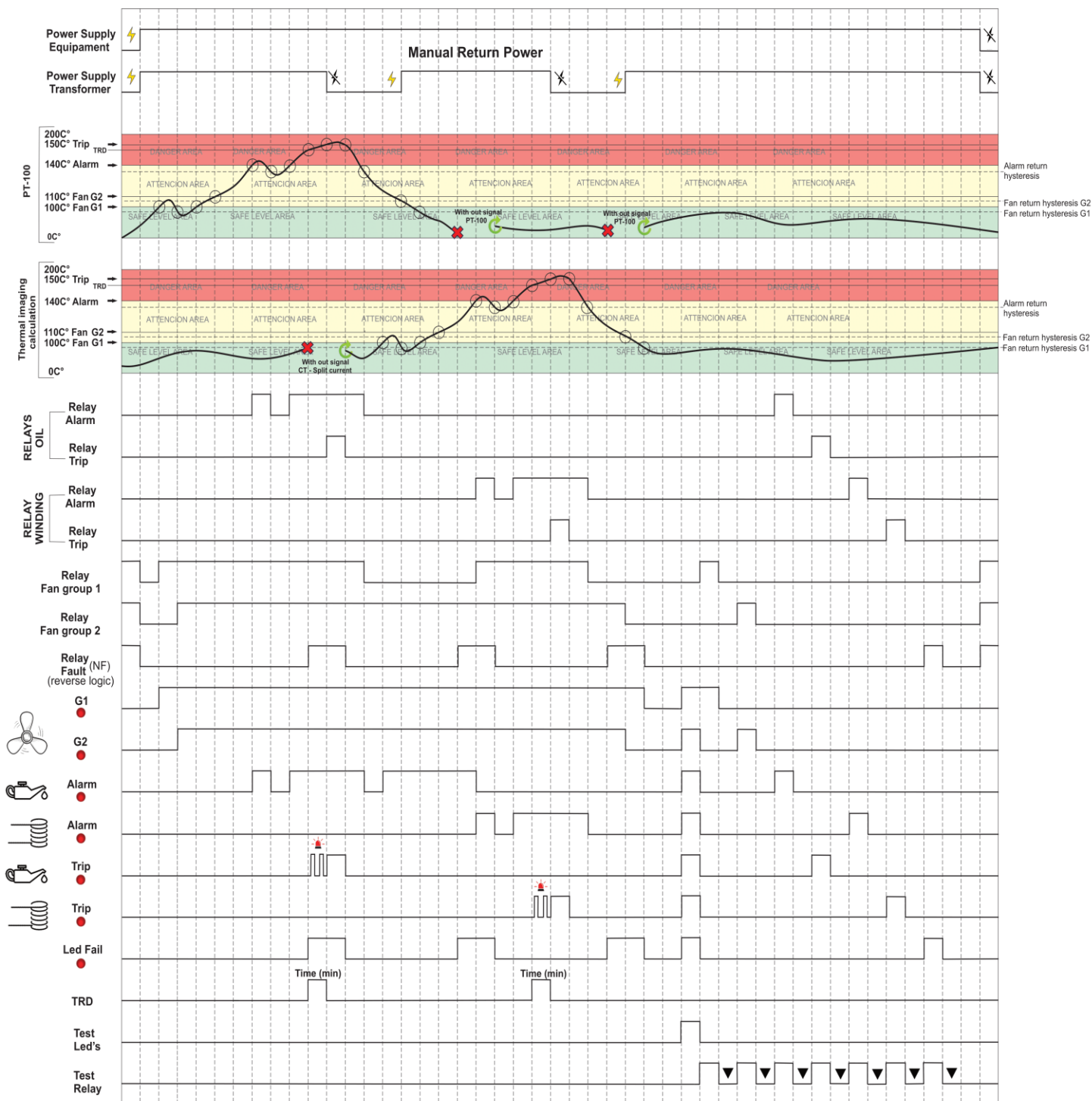


Table 2 – Chart of operation

PREVENTIVE MAINTENANCE

PREVENTIVE AND CORRECTIVE MAINTENANCE							
Items to be checked preemptively			Scan Frequency				Corrective action
SHARE	Verification Elements	ACTIVITIES	Every Mont h	Every 3 Months	Every 6 Months	Every 1 Year	When Needed
VERIFICATIO N	Fastening and fitting clip on the rail	Attachment to panel door or panel bottom		X			Retightening, Fitting, terminal exchange or screw exchange
	Terminals and Connector Comb	Fastening and fitting into the equipment		X			
		Tightening of the screws in the attachment 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		Filling with oil up to the indicated level
TESTS & MEASUREME NTS	Relays and Digital Outputs	Individual drive test			X		Forward to technical assistance of Electron do Brasil
	Led's and Displays	Test drive Led's and display segments			X		
	Navigation buttons	Navigation test of navigation buttons			X		
	Sensor Input	Measure sensor inputs using a pattern				X	
	Input Supply Voltage of the equipment	Measure Power Input Voltage			X		Replace voltage input values according to equipment model
	RS-485 communication outputs	Communication and command testing in the supervisory system			X		Forward to technical assistance of Electron do Brasil
	Milliampere Current Signal Inputs	Measure, compare, and measure input signal in passive and/or active mode			X		
	Milliampere Current Signal Outputs	Measure, compare, and measure input signal in passive and/or active mode			X		
CLEANING	Terminals and Comb of connectors and connection box	Debris, Impurities and Moisture	X				Cleaning with dry cloth, compressed air and vacuum cleaner
	Aluminum equipment enclosure		X				
	Front of the Equipment Display		X				
 ATENÇÃO	1 - Keeping the equipment within the ideal working temperature (50°C to 60°C) prolongs the useful life and avoids corrective maintenance. 2 - The accumulation of dust and impurities in the installations can cause short circuit and burning of equipment and sensors. 3 - After 10 years of use it is recommended to replace the equipment.						

Table 3 – Preventive maintenance

APPLICATION EXAMPLES

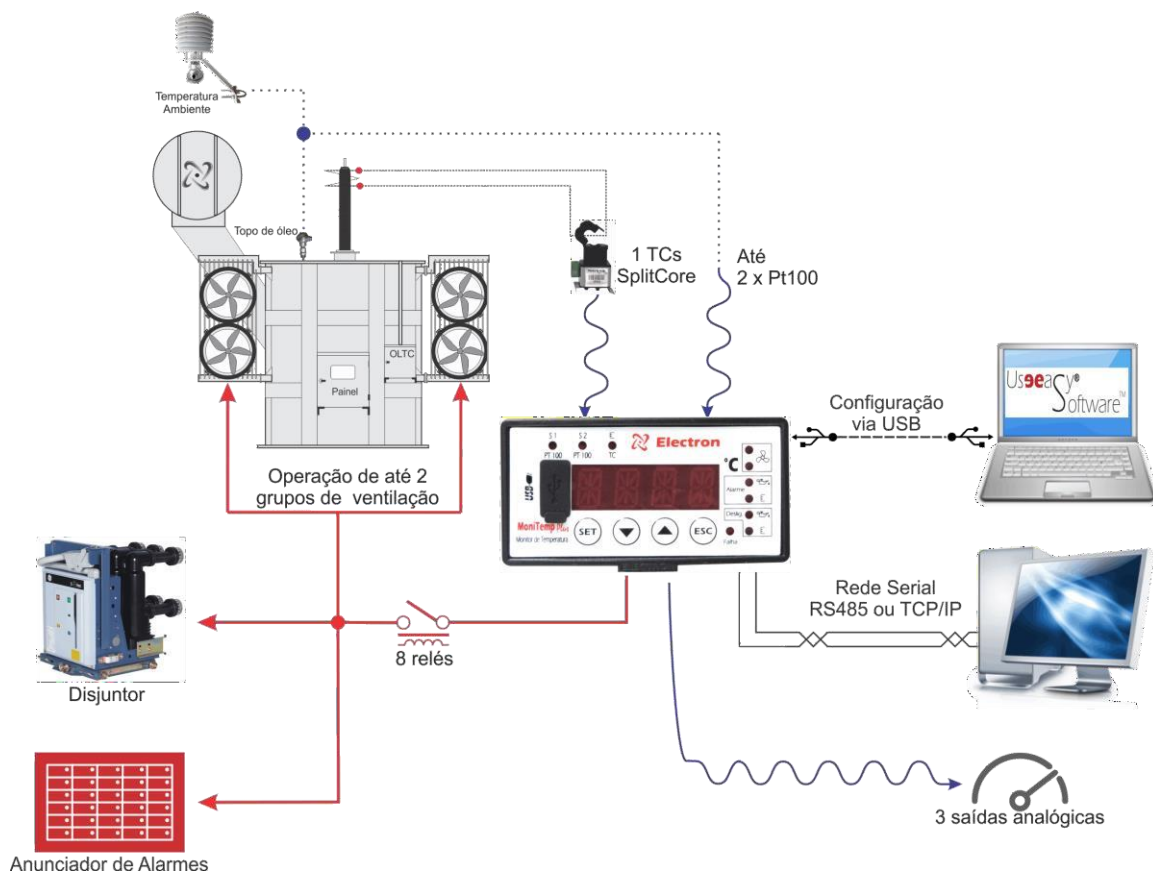


Figure 3 – Application example

APPLICATION EXAMPLES

Electron do Brasil has a line of accessories that can be purchased together in order to offer a complete solution to meet your application with practicality. We have listed some of the main accessories that can be used for operation of Monitemp plus.



PT-100 STFE temperature sensor: This sensor can be built with silicone bulb, stainless steel or Teflon. With electrical insulation capacity options of 2 kV, 10 kV or 15 kV. The PT-100 STFE temperature sensor has as a measuring principle to evaluate the variation of electrical resistance with temperature using the temperature coefficient of pure platinum (0.385 Ohm/K), according to IEC 751 (DIN 43760). Ideal for temperature monitoring of dry-type transformer windings due to its high accuracy and quality of materials, the PT-100 3-wire sensor is widely used in the market, as it greatly reduces the possibility of measurement error due to the compensation principle of the third sensor terminal.

Link to Electron's PT100 STFE temperature sensor page:
<https://electron.com.br/site/produtos/rtd-pt100-2/>



PT-100 STE temperature sensor: This sensor is built stainless steel bulb AISI-304 injected aluminum head (IP 65) and adjustable bucim with BSP 3/4" and 1/2" threads or can be manufactured according to design. Its measuring principle is to evaluate the variation of electrical resistance with temperature using the temperature coefficient of pure platinum (0.385 Ohm/K), according to IEC 751 (DIN 43760). Ideal for installations subject to inclement weather and electrical disturbances for temperature monitoring of transformers and machines that require high measurement accuracy in environments subjected to electrical noise and weathering. The PT-100 3-wire sensor is widely used in the market, as it greatly reduces the possibility of measurement error due to the compensation principle of the third sensor terminal.

Link to Electron's PT100 STFE temperature sensor page:
<https://electron.com.br/site/produtos/rtd-pt100/>



Double door panel for outdoor/outdoor use: Box for external use with double door for mounting instruments, accessories and passage of control wires and power of the power transformer. The external door contains glass display with protection against UV rays for viewing the quantities measured by the temperature monitor and the panel contains special paint that is resistant against weather and its degree of protection is IP 55.

Link to the page of the double port panel for external use – IP 55:
<https://electron.com.br/site/produtos/painel-para-uso-externo-ip55/>



Reference card for PT-100 signal: This accessory was developed to perform the verification of the temperature value displayed by equipment with input of RTD PT-100 sensors of 3 wires. It consists of precision resistors that send an equivalent fixed and constant resistance signal for selection between 3 different ranges, 0 °C (100 Ohms), 26 °C (110.9 Ohms) and 200 °C (175.86 Ohms).

Link to the Reference Card page for PT-100 sign:
<https://electron.com.br/site/produtos/>

SPECIFICATION FOR ORDER

	PRODUTO	QUANTIDADE
	MoniTemp Plus – Monitor de Temperatura de Óleo e Enrolamentos	Quantidade: 1

RECOMMENDED SETTINGS

Before putting into operation the equipment check the following recommendations:

1. All sensors as well as equipment must be grounded.
2. Properly grounded sensors and power supply prevent malfunction or damage in cases of disturbances, surges, and inductions in the equipment.
3. Use in the communication network (Rs485) resistors of 120 Ohms at the 2 ends of the transmission line (beginning and end) in order to generate potential difference necessary for the correct functioning of the communication network.
4. Only use with MoniTemp Plus the original accessories that come with the equipment (TC Split core), as they have been rigorously tested together to ensure maximum efficiency and performance in the operation of the set.
5. Do not use the Monitor directly in the SOL, whenever it is installed in the field it is important that it has a panel with smoked glass, in order to filter the ultraviolet rays that attack the front polycarbonate, in this way the life of the equipment will be prolonged.

WARRANTY

The MoniTemp Plus Electron has a warranty period of two years from the date of sale consigned on the invoice, with coverage for any manufacturing defects that make it inappropriate or unsuitable for the applications it is intended.

Disclaimer of Warranty

The warranty does not cover transportation expenses for technical assistance, freight and insurance for shipment of product with evidence of defect or malfunction. The following events are also not covered: Natural wear of parts by continuous and frequent use, damage to the outside caused by falls or improper packaging; attempted repair / violation of 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 Standard NBR 5410 are not observed;

- Subjected to conditions outside the limits specified in the respective technical descriptions.
- Breached or repaired by a person 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 degradation of components and parts of the product

Use of the Warranty

To take advantage of this guarantee the customer must send the product to Electron along with a copy of the purchase invoice duly packed so that there is no damage in transport. For an emergency service it is recommended to send as much information as possible regarding the defect detected. The equipment will be analyzed and subjected to complete operating 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.

