Electron

Monitemp Plus

CATALOGUE

INDEX

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 in compliance with 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 in the power transformer panel, reactor, in panels in the yard of power substations, offshore platforms and chemical industries. Meets the levels of demand, supportability and reliability according to IEC, DIN, IEEE and ABNT standards.

With signal input, **Monitemp Plus** allows up to 2 (three) PT-100 temperature sensors (EM 60751 – DIN 43760), 1 input for current measurement for winding and also has 3 (three) 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, that mirror the oil temperature and the winding temperature, 1 (one) RS-485 digital output (ANSI/TIA/EIA-485-A) with MODBUS RTU and DNP 3.0 (Level 1) protocols chosen by the user, which allows access to all **MoniTemp Plus** parameters including remote command of the drives in real time, has Setpoints for temperature parameterization for Oil Alarm, Winding Alarm, Oil Shutoff, Winding Shutoff, Activation of the 1st and 2nd ventilation group, signaling is made through 8 isolated and potential-free Relays.

The display display mode of the **MoniTemp Plus** is fully configurable, being able to show the highest temperature at the moment, or fix the channel temperature of the desired channel on the display, or using the SCAN function, a complete scan of all channels is made continuously. Through the indicative front LED's 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™** Softwarethat comes with 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.

KEY FEATURES

- High-brightness 4-digit display, 20mm height and 13mm decimal place (red);
- Accuracy of 0.25% (FS) and indication of 1 decimal place;
- Simultaneous indication on the display of the 3 monitored temperatures (ambient, oil and winding);
- Temperature measurement range from -50 to 250ºC;
- Extended operating temperature (-40°C to +85°C);
- Compensated input for PT-100 3-wire sensors **(EN 60751 – DIN 43760);**
- Current input **(TRUE RMS)** from 0 to 10 Amps with external Split Core CT;
- Universal power supply 48 to 265 VDC/Vac;
- RS485 Digital Output **(ANSI/TIA/EIA-485-A)** with **MODBUS RTU and DNP3.0 (Level 1)** protocol for remote access to all measured parameters and commands;
- Front USB Type-C for parameterization via **UseEasy™ software**;
- Access Password Protection for direct parameterization via the **MoniTemp Plus**;
- Auto Baud Rate from 2,400 to 57,600 bps (Automatically Detects Communication Network Speed);
- 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;
- Activation of up to 2 groups of ventilation or pumps, directly on the front or Remote through Serial;
- Programmable Exercise and Ventilation;
- Thermal Image Calculation based on IEC 354-1991, IEEE std C57.91-1995 and NBR 5416-1997 standards;
- Consultation on the display of the Final Temperature Gradient for the current load (Oil-Winding);
- Consultation on the transformer loading percentage display;
- Consultation on the display of the load current of the Transformer (KA);
- Consultation of maximum temperature reached by the display (Oil, Winding and environment);
- 01 Relay (NO) with a capacity of 6 amperes for Oil Alarm (NC on request);
- 01 Relay (NA) with a capacity of 6 amperes for Winding Alarm (NC on request);
- 01 Relay (NO) with a capacity of 6 amperes for Oil Shutdown (NC on request), with programmable timing;
- 01 Relay (NO) with a capacity of 6 amperes for Winding Shutdown (NC on request), with programmable timing;
- 01 Relay (NO) with a capacity of 6 amperes for signaling the start of counting the timing of the shutdown;
- 01 Relay (NA) with a capacity of 6 amperes for temperature differential larm between sensors 1 and 2;
- 01 Relay (NF) with a capacity of 6 amperes for signaling fault on the monitor (watchdog);
- 01 Relay (NF) with a capacity of 6 amperes for ventilation or pump activation, with programmable hysteresis and timed interlocking between groups;
- High mechanical strength housing, constructed entirely of standard aluminum **(DIN IEC 61554);**
- Small size 50 x 98 x 83.5 mm;
- Easy parameterization and use;
- 2 years warranty;

TECHNICAL DATA

Digital Temperature Monitor – MoniTemp Plus	
Operating Voltage	48 a 265 Vcc/Vca 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 (EN 60751 – DIN 43760)
Measurement Range	-50 to 250°C
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 Measurement Input Error	0.25% of end-of-scale
Maximum Analog Output Error	0.25% of end-of-scale
Outgoing Contacts	8 Relés – Potencial Books
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 Attachment	Panel Door with Steel Clip stainless
Degree of Protection (NBR IEC 60529)	IP40 (Front), IP 20 (Connectors)
Corrente Transformer – TC Split Core	
Exit Signal	4 to 20 mA
Measurement Range	0 to 10 Aca
Maximum Error of Measurement Inputs	1% of end-of-scale
Linearity	1% of end-of-scale
Operating Temperature	-40 to +85°C
Storage Temperature	-50 to +60°C

Table 1 – Technical Data

TYPE TESTS PERFORMED

- Applied Voltage **(EIC) 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 radiated electromagnetic disturbance **(IEC 61000-4-3):** 80 to 1000 Mhz / 10 V/m;
- Immunity to Fast Electrical Transients **(IEC 60255-22-4)** Alim/Input/Outputs = 4 KV/Common. 2KV;
- Immunity to conducted electromagnetic disturbances **(IEC 61000-4-6**): 0.15 to 80 MHz/10V/m;
- Climate testing **(IEC 60255-21-1)** 3shafts / 0.075 mm – 10 to 58 Hz / 1G from 58 to 150 Hz /8 min/ axis;

DIMENSIONS

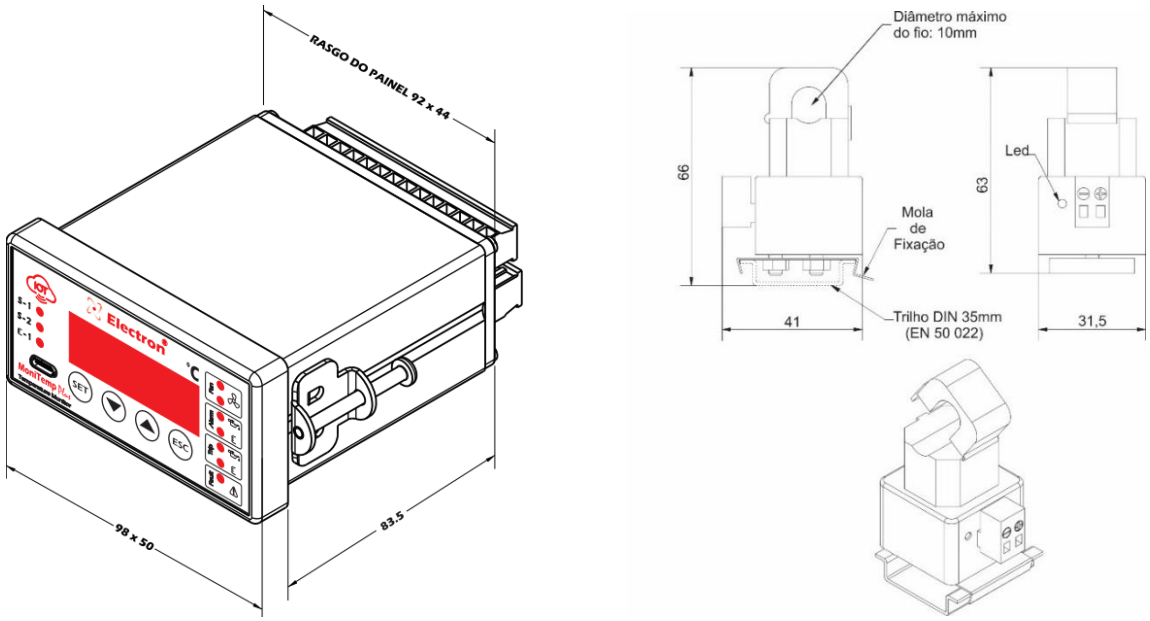

Figure 1 – Monitemp plus dimension

CONNECTION DIAGRAMS

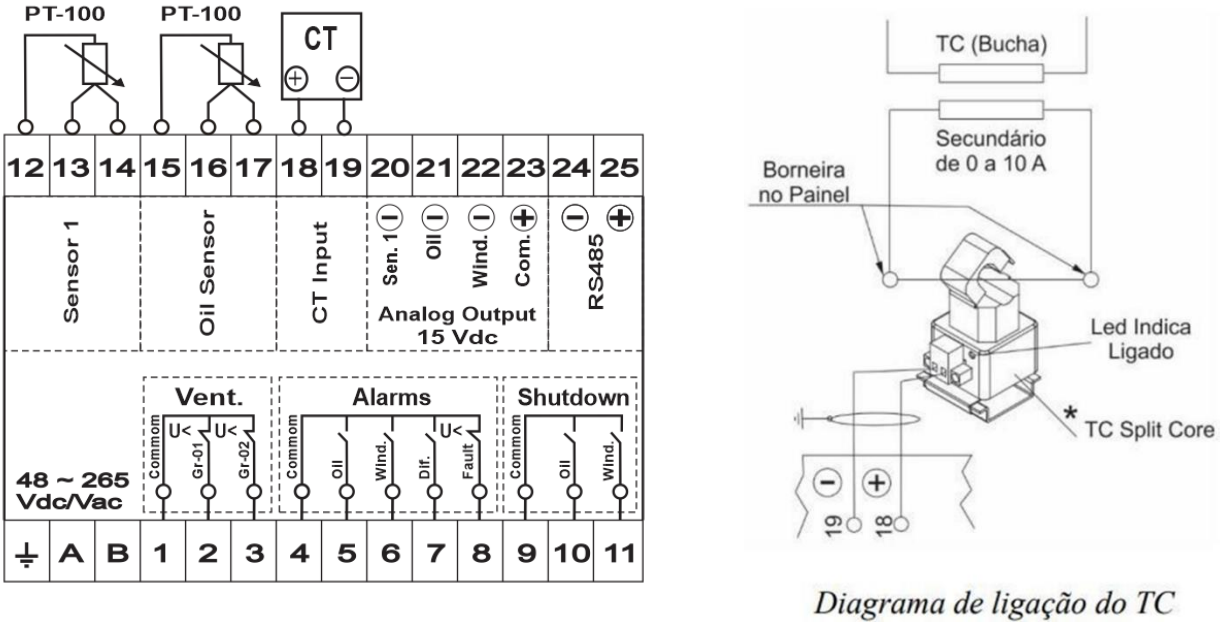

Figure 2 – Monitemp plus diagram

OPERATION CHART

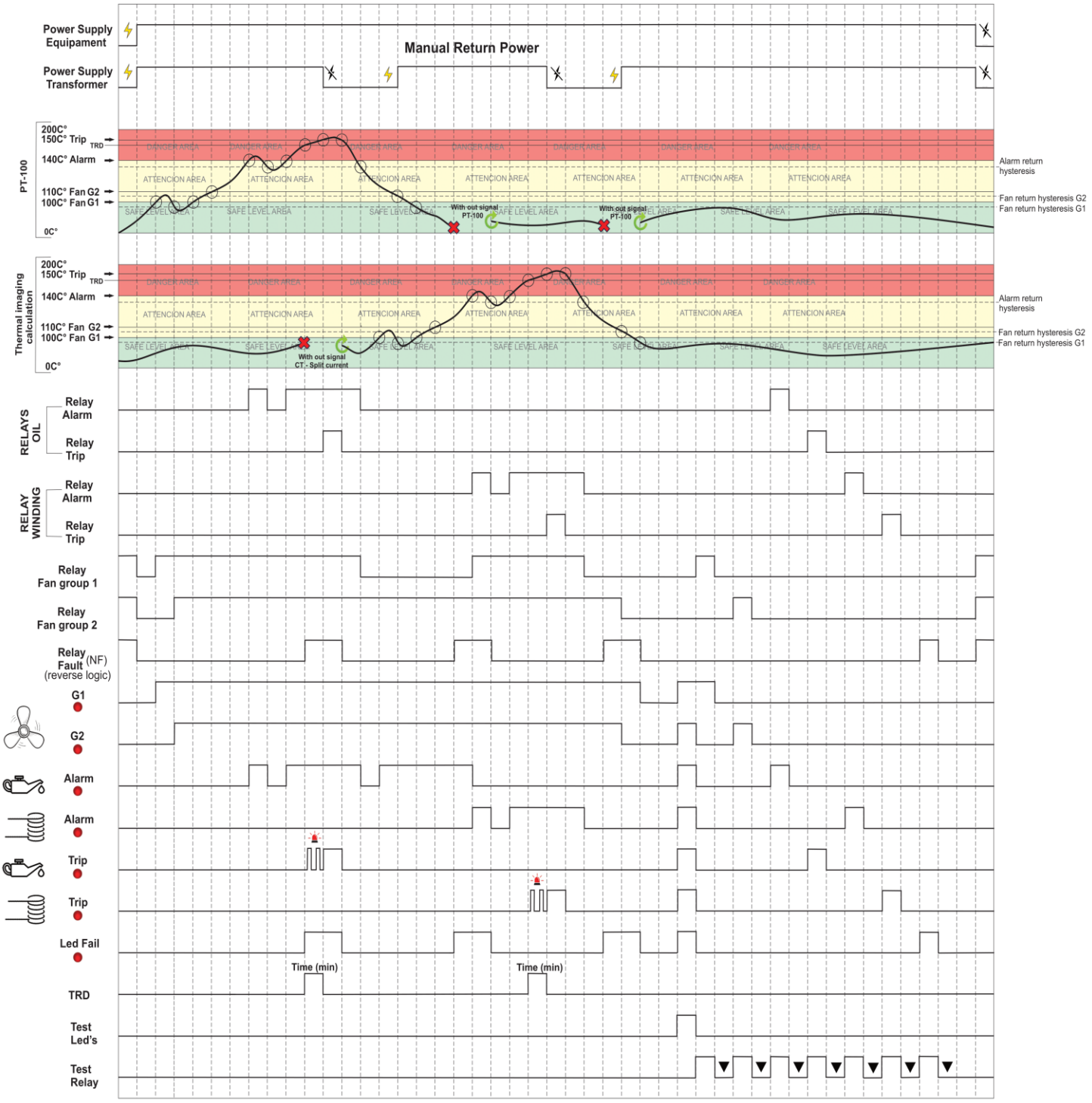

Table 2 – Operating chart

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 pente	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
	Led's e Displays	Test Triggering Led's 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
	RS-485 Communication Outputs	Communication and command testing in the supervisory system			X		Forward to Electron do Brasil technical assistance
	Milliampere running Sinal 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				
ATENÇÃO	**1 - Keeping the equipment within the ideal working temperature (50°C to 60°C) extends the useful life and avoids corrective maintenance.** **2 - The accumulation of dust and impurities in the facilities can cause short-circuiting 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

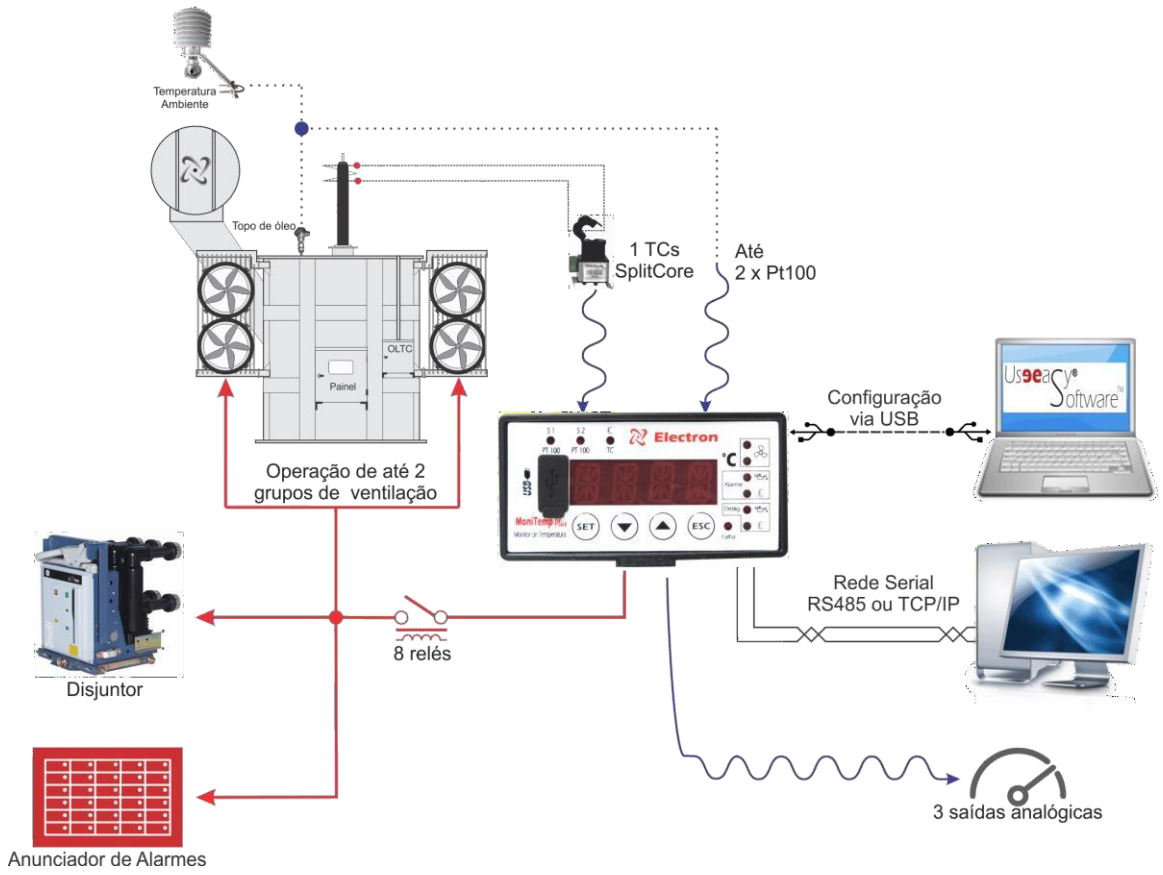

Figure 3 – Application example

INSTALLATION ACCESSORY

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

PT-100 STFE Temperature Sensor: This sensor can be constructed with silicone, stainless steel, or Teflon bulb. With electrical insulation capacity options of 2 kV, 10 kV or 15 kV. The PT-100 STFE temperature sensor has as its measurement 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 windings of dry-type transformers due to its high precision 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 terminal of the sensor.

Electron PT100 STFE Temperature Sensor Page Link:
https://electron.com.br/site/produtos/rtd-pt100-2/

PT-100 STE Temperature Sensor: This sensor is constructed of AISI-304 stainless steel bulb, injected aluminum pumphead (IP 65) and adjustable gland with 3/4" and 1/2" BSP threads, or can be manufactured according to design. Its measurement 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 weather and electrical disturbances for temperature monitoring of transformers and machines that require high measurement accuracy in environments subjected to electrical noise and weather. The PT-100 3-wire sensor is widely used in the market, as the possibility of measurement error is greatly reduced due to the compensation principle of the third terminal of the sensor.

Electron PT100 STFE Temperature Sensor Page Link:
https://electron.com.br/site/produtos/rtd-pt100/

Double door panel for outdoor/outdoor use: Box for outdoor use with double port for mounting instruments, accessories and passing control wires and power of the power transformer. The external door contains a glass viewer with UV protection 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.

Dual Port Panel for Outdoor Use – IP 55 Page Link:
https://electron.com.br/site/produtos/painel-para-uso-externo-ip55/

PT-100 signal reference card: This accessory was developed to verify the temperature value displayed by equipment with PT-100 3-wire RTD sensor input. It consists of precision resistors that send a resistive value 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).

Reference Card page link for PT-100 signal:
https://electron.com.br/site/produtos/

RECOMMENDED SETTINGS

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

1. All sensors as well as equipment must be grounded.

2. Properly grounded sensors and power prevent malfunctions 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 (start and end) in order to generate the potential difference necessary for the correct operation of the communication network.

4. Only use with the 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 on the SUN, whenever it is installed in the field it is important to have 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.

MoniTemp Plus Electron has a warranty period of two years from the date of sale recorded 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 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. The equipment 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.