



Thermal Protection Relay – EP4-IoT

Manual.

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INTRODUCTION

The EP4 IOT **Thermal Protection Relay** is designed to simultaneously supervise up to four (4) temperature channels. It is used to protect and monitor dry transformers, motors, bearings, machinery, and industrial processes as specified in the **ANSI table**. The **EP4 IOT** is a high-precision and reliable instrument, controlling transformer ventilation (ON/OFF), alarms and shutdowns (TRIP), with timing options.

The EP4 IOT **Thermal Protection Relay** has been built following strict quality standards and uses high-quality electronic components and state-of-the-art technology (SMD). Its hardware is designed to withstand harsh working conditions and can be installed directly in transformers, panels in power substation yards, offshore platforms, and chemical industries. It meets the levels of demand, supportability and reliability established by IEC, DIN, IEEE and ABNT standards.

With signal inputs, the **EP4 IOT** allows the connection of up to 4 PT100 temperature sensors (EN60751-DIN 43760) and up to 1 universal and configurable 2-wire 15 VDC active analog output, with a range of 0 to 1mA, 0 to 5mA, 0 to 10mA, 0 to 20mA or 4 to 20mA. This output can be used to reflect the highest temperature recorded at the time. The analogue output also features the SCAN function, which simultaneously reflects all temperature channel values. This configuration can be carried out directly on the EP4 IOT panel or **via the EP4 IOT™ software with BLUETOOTH or USB connection**.

The EP4 IOT **Thermal Protection Relay** has a built-in WiFi **modem** with a built-in 3 dBi antenna. When **enabled by the user**, this feature allows the connection to the Internet. Once the connection is established, **the EP4 IOT** immediately makes the collected and measured data available on an **MQTT Broker Server**. This is accessible through the **MONITRAFO.com** monitoring platform, where users can easily sign up, choose the plan that best suits their needs, and set up projects with one or multiple substations or transformers.

In this way, you get full control to monitor in real time all measured quantities, drives, alarms, maintenance, transformer health status and much more. This can be done using the platform in any internet browser or through the MONITRAFO APP, available on the **Play Store (Android)** and the **App Store (iOS)**.

The **EP4 IOT uses the MQTT communication protocol**, integrating with the **MONITRAFO.com** platform to enable complete online monitoring of your transformer. In addition, **it integrates ARTIFICIAL INTELLIGENCE, MACHINE LEARNING, DATABASE, PROGRAMMABLE FUNCTIONS, CALCULATIONS AND NOTIFICATIONS, MAINTENANCE SCHEDULE tools**. In the event of a loss of Internet connection, the **EP4 IOT** stores all measurements from the period when communication was unavailable. When the connection is restored, the data is sent to the **MONITRAFO.com** and stored in a database for queries, calculations, and more.

It is also possible to use the API available on the platform to integrate **EP4 IOT** with other platforms, such as **Azure, Google Cloud, AWS, IBM, SAP**, among others.

Thanks to the implementation of these advanced technologies, **the transformer becomes a smart device** capable of identifying changes in the transformer's behavior within its standard operating cycle and sending notifications via email, SMS, and apps whenever the system detects these abnormal variations. This provides you with a robust tool that significantly enhances your ability to make effective decisions.

In addition, the EP4 IOT **Thermal Protection Relay** also has an RS-485 digital output with Modbus-RTU protocol and DNP 3* (L1), which allows access to all parameters, including remote commands for real-time triggers using a SCADA supervisor. 3 independent temperature setpoints are available for each sensor and 4 relays, 3 of which are isolated, independent and potential-free drive relays (NO) that can be used for alarms, shutdowns (TRIP) and FAN (ventilation) triggering, and 1 isolated, independent and potential-free relay (NC) to indicate faults (watchdog).

The display mode on the display is fully user configurable, allowing you to maintain the highest temperature on the display at the time, any of the temperatures selected by the operator, or use the SCAN function that features a continuous scan of all temperature channels. The front indicator LEDs and the data communication port make it possible to identify the channel that caused the alarm, shutdown or activation of the fans. All functions and parameterizations can be easily configured directly on the device panel or via the **EP4 IOT™** software with **BLUETOOTH** or **USB connection**.

The EP4 IOT Thermal Protection Relay is built in a high mechanical strength aluminum housing, with measurements of 98x98x37mm, following DIN IEC 61554 standards for panel fixing.

MAIN FEATURES

Communication Protocols

- MQTT – TLS/SSL - WIFI
- DNP3 – Level 1 (SERIAL)
- DNP3 – Level 1 (TCP/IP) - WIFI
- Modbus-RTU (SERIAL)
- Modbus-RTU (TCP/IP) - WIFI

Communication Ports

- **Built-in WIFI modem**
 - Standards: 802.11 b/g/n/e/i;
 - WPA/WPA2/WPA-Enterprise security protocol;
 - AES/RSA/ECC/SHA encryption;
 - Data rate up to 150 Mbps;
 - 3 dBi (isotropic decibel) recessed antenna
 - Transmit Power up to 21 dBm (decibel milliwatt);
- **Bluetooth**
 - Class 2 – 2.5 mW (4 dBm);
 - FIPS-type cryptography;
 - Version 4.2 BR / EDR and BLE (Low Energy);
- **USB**
 - Version 2.0;
 - Transfer Rate 480Mbps;
 - Micro-B Connector Type
- **RS 485**
 - Standard ANSI/TIA/EIA-485-A;
 - Max. 32 equipments;
 - Half duplex;
 - Multipoint;
 - Max. distance 1,200 meters;
 - 2 metal wires;
 - Automatic speed from 1,200 to 57,600 bps

Dimensions & Power Supply

- Compact equipment with a depth of 37mm;
- Universal Power Supply 24-275 Vdc/Vac;

Human Machine Interface (HMI)

- Red high-brightness numeric display with 3 digits;
- Simultaneous indication of the 4 monitored temperatures;
- 4 Navigation keys;
- 13 LED's on the front for event indications;
- Intuitive menus for consultation and parameterization

Measurement Input

- 4 inputs for temperature measurement with PT100 type sensor 3-wire (EN60751-DIN43760);
- 0.5% Accuracy (FS)
- Temperature measurement range 0°C to 200°C;

Digital Outputs to Relays

- 01 Relay (NAF) with a capacity of 10 amperes for Temperature Alarm;
- 01 Relay (NAF) with a capacity of 10 amps for FAN (cooling);
- 01 Relay (NAF) with a capacity of 10 amperes for TRIP;
- 01 Relay (NAF) with a capacity of 10 amperes for Fault Indication (watchdog);
- Intuitive menus for consultation and parameterization.
-

Analog Output

- 01 Analog Output (Active 15Vdc) from 0 to 1mA, 0 to 5mA, 0 to 10mA, 0 to 20mA or 4 to 20mA configurable by the user;

TYPE Tests Attended

- Applied Voltage (IEC 60255-5): 2kV / 60Hz / 1 min. (against the ground);
- Voltage Impulse (IEC 60255-5): 1.2 / 50 μ sec. / 5kV / 3 neg. and 3 pos. / 5 sec. Interval;
- 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): 1KV phase/neutral, 5 per polar (\pm) – 2KV phase-to-ground/neutral-to-ground, 5 per polar (\pm);
- Immunity to conducted electromagnetic disturbances (IEC61000-4-6): 0.15 to 80 MHz / 10V/m;
- Climate Test (IEC60068-21-14): – 40°C + 85°C / 72 hours;
- Vibration Resistance (IEC60255-21-1): 3-axis / 10 to 150Hz / 2G / 160min / axis;
- Vibration Response (IEC60255-21-1): 3-axis / 0.075mm-10 at 58Hz / 1G from 58 to 150Hz / 8min / axis.

TECHNICAL DATA

EP4-IoT THERMAL PROTECTION RELAY	
Operating Voltage	24 to 275 Vdc/VAC 50/60 Hz
Operating Temperature	-40°C to + 85°C
Power Consumption	< 15 W
Temperature Measurement Input	Up to 4 Sensors - PT100 Ohm at 0°C, 2 and 3 wires (EN 60751 - DIN 43760)
Measuring Range	0°C to 200°C
15Vdc Active Analog Output and Maximum Load.	0 ... 1mA - 8000 Ohms
	0 ... 5mA - 1600 Ohms
	0 ... 10mA - 800 Ohms
	0 ... 20mA - 400 Ohms
	4 ... 20mA - 400 Ohms
Maximum Input Measurement Error	0.5% end-of-scale
Maximum Analog Output Error	0.5% end-of-scale
Output Contacts	4 (NAF) – Potential-Free
Maximum Switching Power	70 W / 250 VA
Maximum Switching Voltage	250 Vac/125Vdc
Maximum Driving Current	10 Amps
Front Communication Port	USB 2.0 - Type-C connector
Serial Communication Port	RS 485 – 2-wire (ANSI/TIA/EIA-485A)
WI-FI	Standards B/G/N/E/I
	WPA/WPA2/WPA-Enterprise;
	Up to 150Mbps data rate
	3dBi Inlaid Antenna
Bluetooth	Up to 21dBm Transmit Power
	Version 4.2 BR / EDR and BLE (Low Energy)
Communication Protocol	Modbus RTU, Modbus TCP (WI-FI), DNP3 L1, DNP3 L1 – TCP (WI-FI) and MQTT TLS/SSL – (WIFI)
Auto Baud Rate	1,200 to 57,600bps
Caixa DIN IEC 61554	98 x 98 x 37 mm or 98 x 98 x 57 mm
Fixation	Panel Door with Steel Cleat
Protection	IP40 (front), IP 20 (connectors)

Table 1 – EP4-IOT Thermal Protection Relay Technical Data

DIMENSIONS AND CONNECTION DIAGRAM

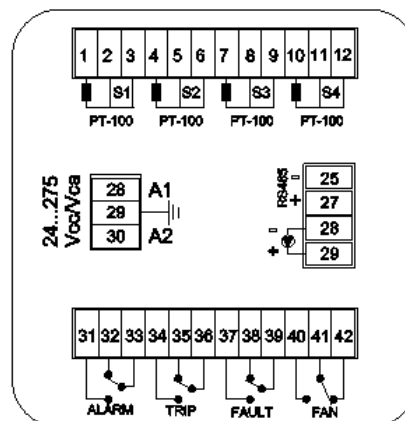
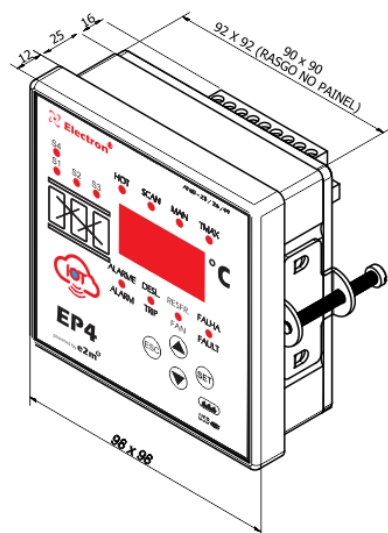


Fig. 1 – EP4-IoT Dimensions Fig. 2 – EP4-IoT IoT Connection Diagram

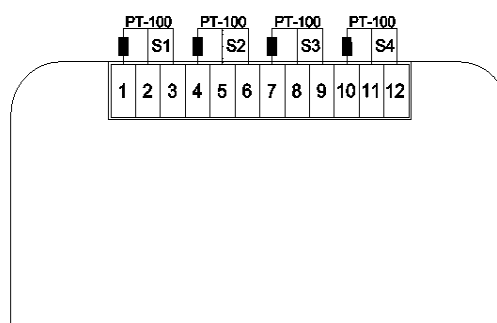
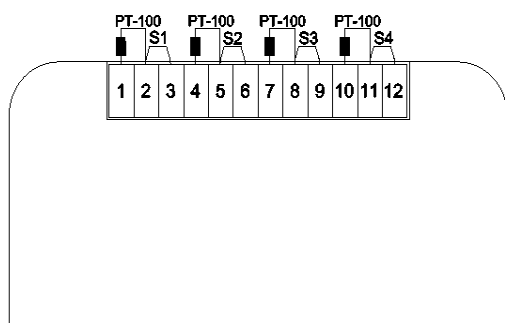


Fig. 3 – Diagram of 2-wire connection sensors Fig. 4 – Diagram of 3-wire connection sensors

APPLICATION EXAMPLE

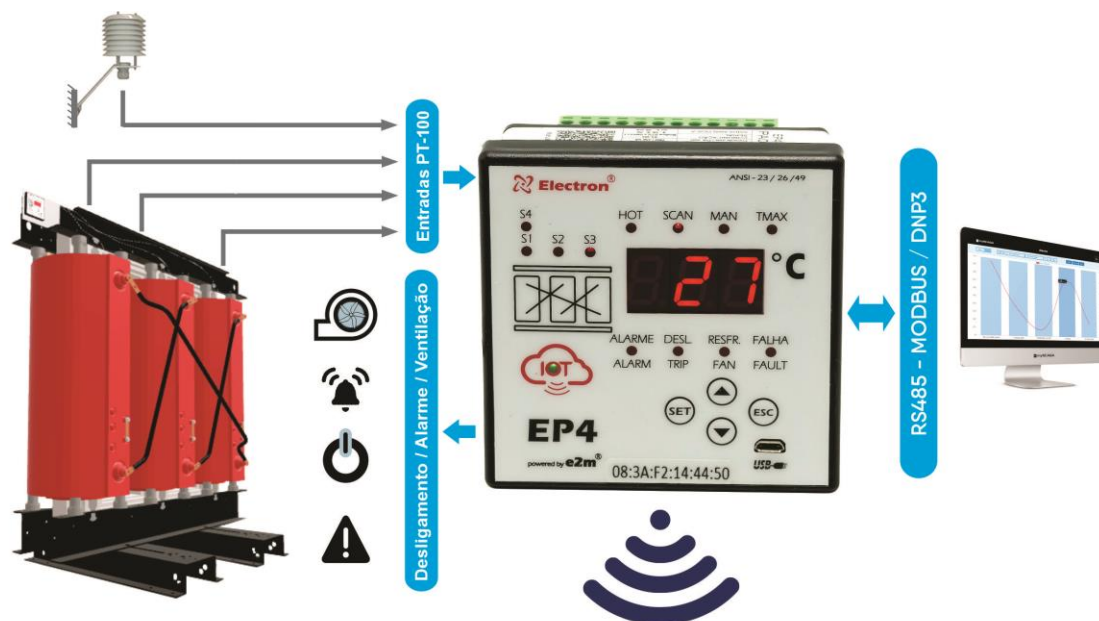


Fig. 5 – Application Example Sending Data to MONITRAFO.com

OPERATION CHART

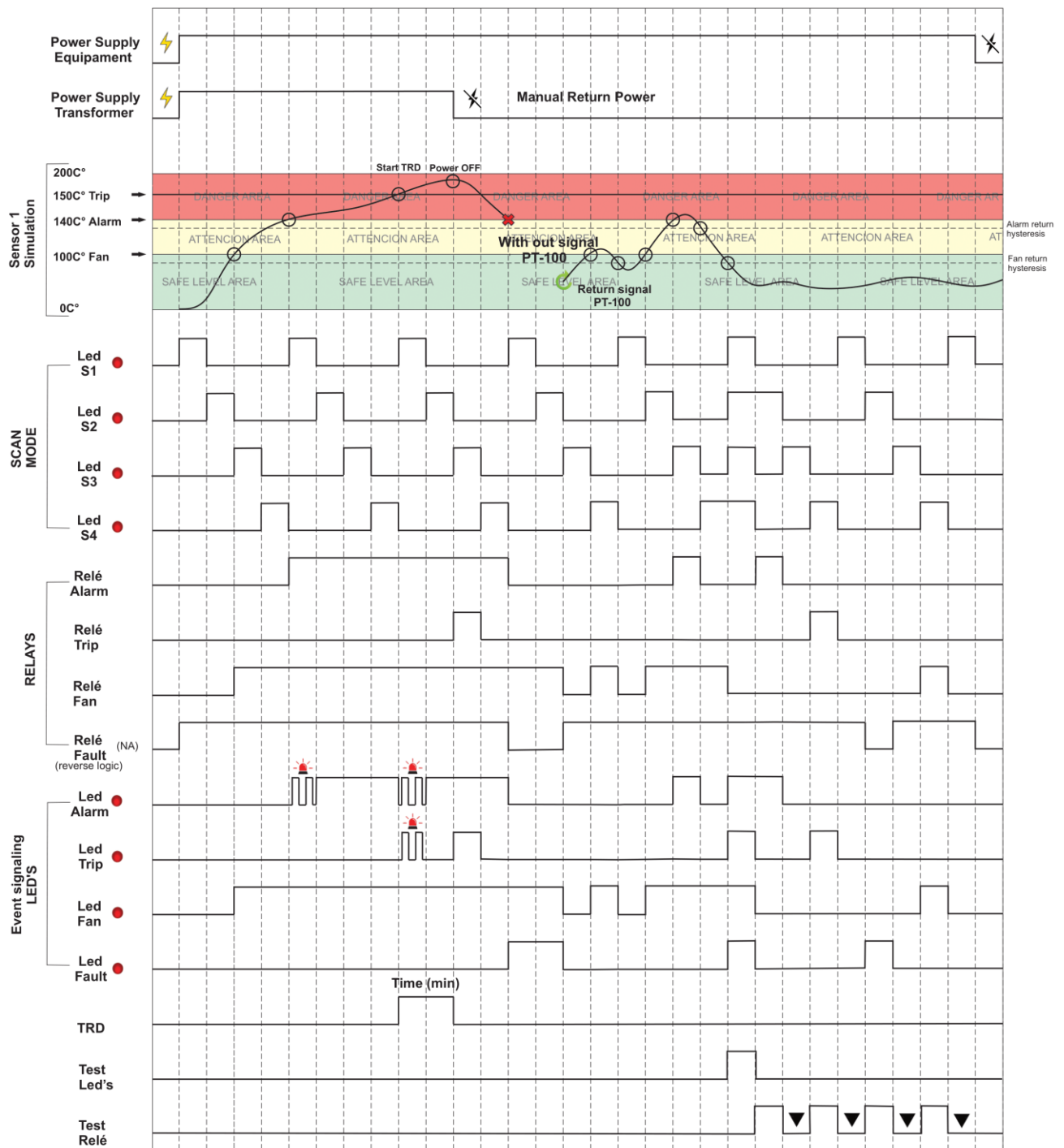


Fig. 6 – Operation Chart

PREVENTIVE MAINTENANCE


PREVENTIVE AND CORRECTIVE MAINTENANCE							
Items to be checked preemptively			Frequency of Verification				Corrective action
SHARE	Verification Elements	ACTIVITIES	Every Month	Every 3 Months	Every 6 Months	Every 1 Year	When Needed
VERIFICATION	Fastening clip and snap to the rail	Fixing to the panel door or panel bottom		X			Retightening, Fitting, changing terminals or changing screws
	Terminal blocks and connector comb	Attachment and attachment to the equipment		X			
		Tightening the screws in fixing the conductors		X			
	Sensors	Integrity / Positioning / Fixation			X		Replacement, Repositioning and/or Attachment of Sensors
	Sensor Well in Oil Transformers	Oil level in the well			X		Filling with oil to the indicated level
TESTS & MEASUREMENTS	Digital Relays and Outputs	Individual drive test			X		Refer to technical assistance from Electron do Brasil
	Led's e Displays	Test Lead Led's and Display Segments			X		
	Navigation buttons	Navigation test of navigation buttons			X		
	Two-Sensor Input	Benchmarking sensor inputs using a standard				X	
	Input voltage Supply equipment	Measure Power Input Voltage			X		Override voltage input values according to equipment model
	RS-485 communication outputs	Communication and command testing in the supervisory system			X		Refer to technical assistance from Electron do Brasil
	Milliampere Current Signal Inputs	Measuring, comparing, and gauging input signal in passive and/or active mode			X		
	Signal outputs of milliampere current	Measuring, comparing, and gauging input signal in passive and/or active mode			X		
CLEANING	Terminal blocks and connector comb and junction box	Debris, Impurities and Moisture	X				Cleaning with a dry cloth, compressed air and vacuum cleaner
	Aluminum Equipment Enclosure		X				
	Front Display of the equipment		X				
<div> ATENÇÃO</div>	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 circuits and burnout of equipment and sensors.						
	3 - After 10 years of use, it is recommended to replace the equipment.						

Table 2 – Preventive maintenance

INSTALLATION ACCESSORIES

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 EP4-IoT operation.



PT-100 STFE Temperature Sensor: This sensor can be constructed with silicone, stainless steel or Teflon bulb. With a choice of 2 kV, 10 kV or 15 kV electrical insulation capacity. The PT-100 STFE temperature sensor has as its measuring principle the evaluation of the variation of electrical resistance with temperature using the temperature coefficient of pure platinum (0.385 Ohm/K) in accordance with IEC 751 (DIN 43760). Ideal for temperature monitoring of dry-type transformer windings 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 head (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 inclement weather and electrical disturbances for temperature monitoring of transformers and machines that require high measurement accuracy in environments subject to electrical noise and weathering. 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 external use with double door for mounting instruments, accessories and passing control and power wires of the power transformer. The external door contains a glass display with UV protection for viewing the quantities measured by the temperature monitor and the panel contains special paint that is weather resistant and its degree of protection is IP 55, as per NBR IEC 60529:2017.

Outdoor Dual Door Panel Page Link – IP 55:

<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 fixed and constant equivalent 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/>

SPECIFIC TO ORDER

- Temperature Monitor for Dry Type Transformer Model : **EP4-IOT**

GETTING TO KNOW EP4 IOT

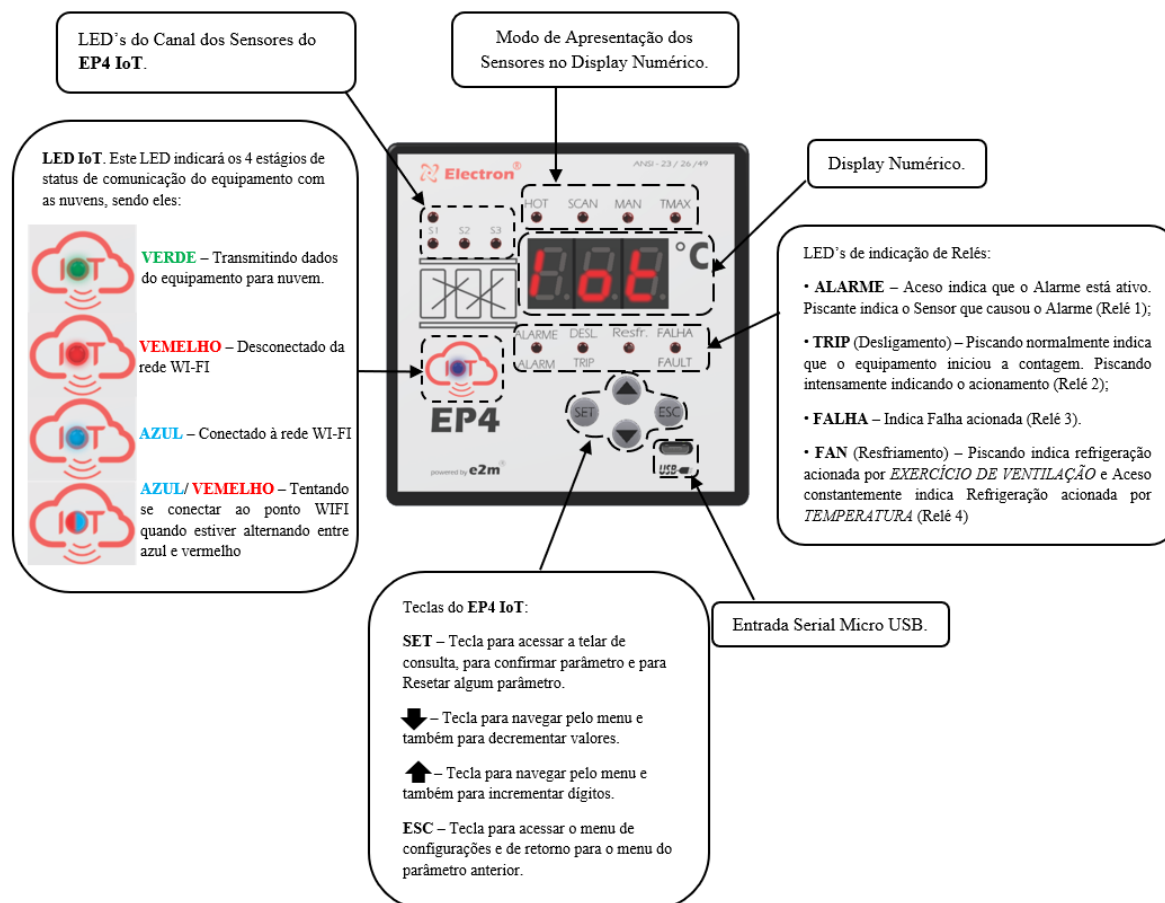
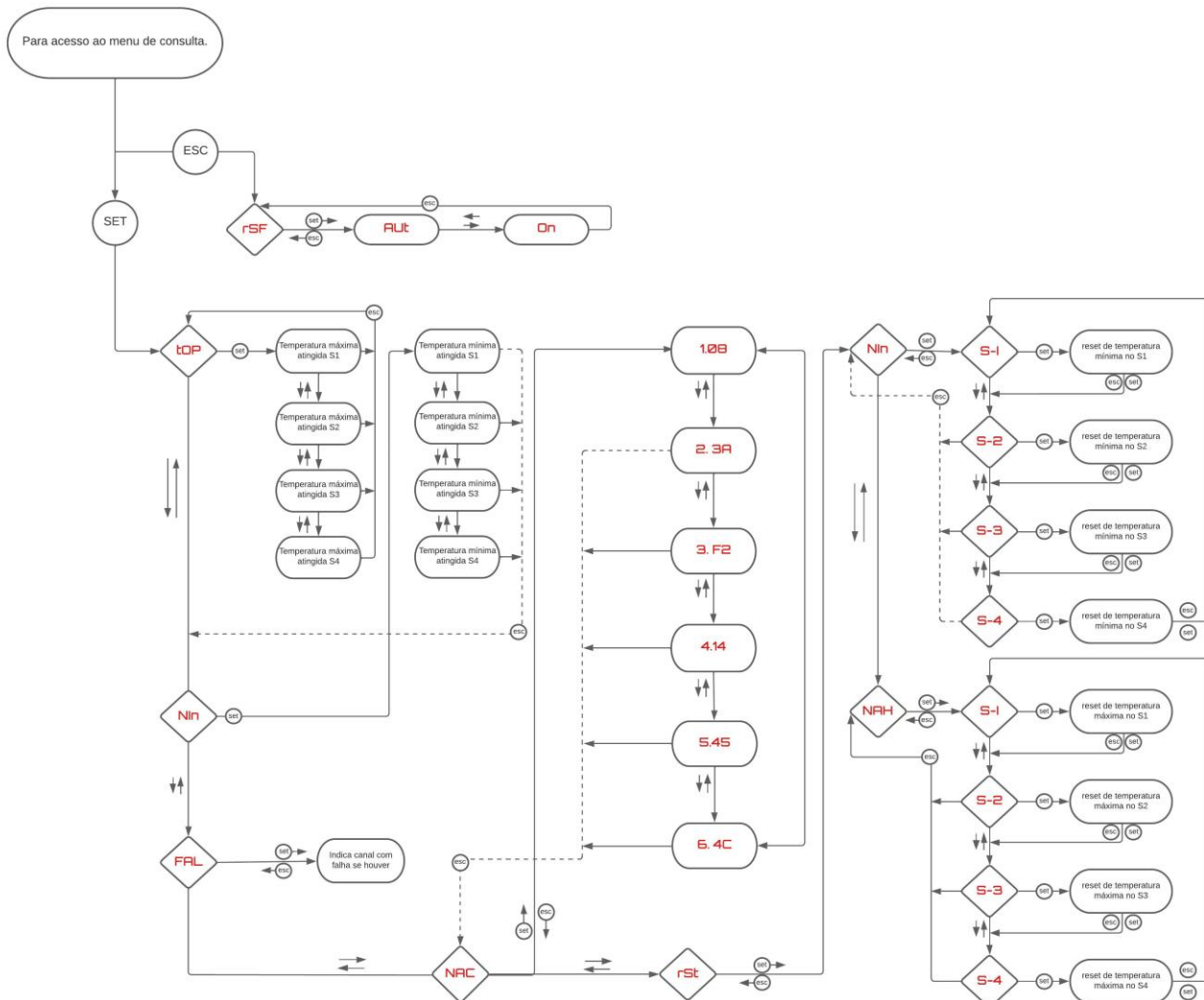


Fig. 8 – EP4-IoT front-end as serial input.

QUERY MENU FLOWCHART

In the query and parameterization menu, use the **SET** key to confirm, the **ESC** key to go back/exit, and the increment and decrement keys "**∨** **^**" to navigate.

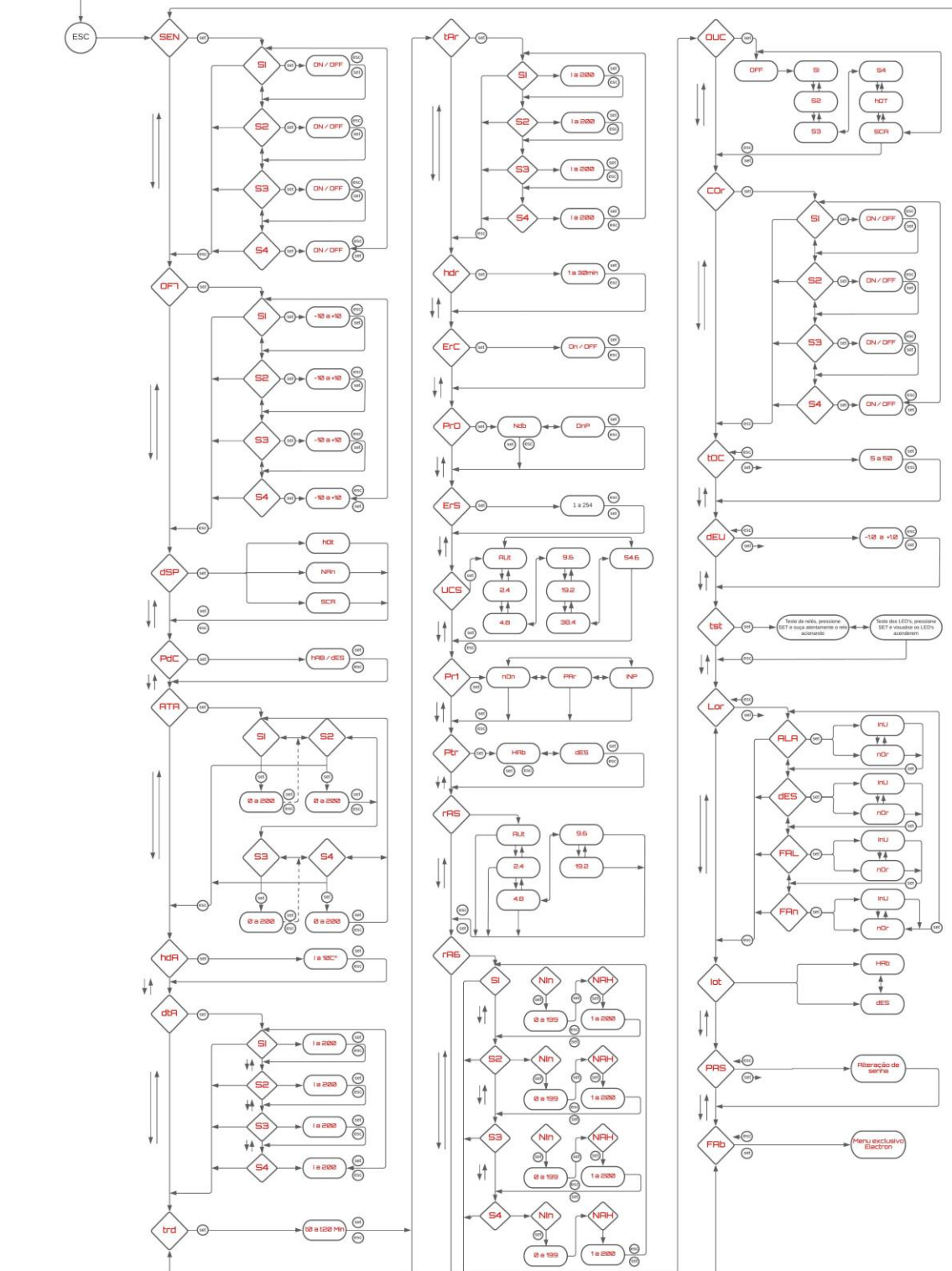


QUERY MENU

Precione SET to access the query menu.

Query Menu		
Parameter	Variable	Description
toP	51/54	Menu to view the maximum temperature reached by each sensor. Use the increment and decrement keys to select the desired sensor and view its respective maximum temperature.
Min	51/54	Menu to view the minimum temperature reached by each sensor. Use the increment and decrement keys to select the desired sensor and view its respective minimum temperature.
FAL	-----	Menu to view which temperature channel is failing.
MAC	-----	Displays the MAC number of the machine that identifies your network card.
rSt	-----	Menu to reset the maximum temperatures reached.
➤ To access the menu (RSF) Precione the ESC key.		
rSF	-----	Enables/Disables

Precione ESC por 5 segundos para entrar no menu de parametrização




CONFIGURATION MENU

To access the configuration menu, press the ESC telca for approximately 5 seconds.

Parameter	Variable	Description
SEN	S1/S4	Menu to enable or disable the temperature channel for sensor reading (ON / OFF).
dSP	Hot In SCA	Temperature channel view mode. <ul style="list-style-type: none"> ➤ Hot – Visualization of the channel with higher temperature. ➤ Nan – Visualization of temperature channels manually. ➤ SCA – Scan mode that checks all temperature measurement channels.
OF1	S1/S4	Parameterization menu to define temperature deviation correction. (-10 to +10)
PdC	HRb/dES	Parameterization menu to define whether or not there will be a decimal place requirement.
minutES	S1/S4	Menu to configure the alarm trigger temperature (High Temperature Alarm). When any sensor reaches the configured temperature, the ALARM relay is triggered and the ALARM LED on the front of the equipment begins to flash indicating that the alarm is active. Set the desired ALARM relay drive temperature for each sensor and confirm it by pressing the SET key.
HdA	-----	Menu for setting Hysteresis (Alarm Shutdown Hysteresis). Temperature difference to deactivate the ALARM relay and can be adjustable with values between 0°C and 10°C. Example: If the temperature (AtA) is programmed at 100°C and the difference (hdA) programmed at 5°C, the ALARM relay LED will be flashing between the 95°C and 100°C variations and will turn off only when the temperature reaches any value below 94.9°C. Set the desired Alarm Hysteresis value and confirm it by pressing the SET key.
dtA	S1/S4	Menu for setting Shutdown Temperature (High Temperature Shutdown). When the sensor reaches the temperature configured in this menu (dtA) the TRIP relay LED will begin to blink initiating the time count (trd) for the shutdown. During the count, the time set in trd will also be shown on the numeric display. Example: If the Display displays d 1 it means that the shutdown will occur within 1 minute. At the end of the count, the LED of the TRIP relay will be flashing intensely on the front of the equipment indicating its drive and the equipment that the system is protecting will be turned off. If the configured value is 0', the TRIP relay will trigger immediately. Set the shutdown temperature of each sensor and confirm by pressing the SET key.
trd	-----	Menu to adjust the Timing for shutdown from 0 to 20 minutes. When the temperature of the dtA sensors S1, S2 or S3 reaches the configured value, EP4 will start counting the time to effect the shutdown. If the configured value is '0', the TRIP relay will trigger immediately. Set the desired Shutdown time and confirm by pressing the SET key.
tAr	S1/S4	Menu to adjust the Cooling Drive Temperature (Ventilation). Upon reaching the value programmed in this parameter, the FAN Relay will trigger and its respective LED will illuminate, indicating the activation of cooling.
HdR	-----	Cooling Hysteresis Menu, temperature difference to turn the Chiller on and off. Example: If the temperature set in the TAR menu is 65°C and this menu, hdR, is at 5°C the chiller will turn off when the temperature is less than or equal to 59.9°C. That is, with exactly 5°C of difference less than the parameterized value in the TAR menu.
ErC	-----	Menu schedule of the daily exercise of the fans. On Daily exercise disabled; OFF Daily exercise enabled;

		Select the option you want, and then confirm by pressing the SET key . After 1 minute of the programming confirmation in On the Ventilation Exercise will be triggered for the first time for 5 minutes (LED FAN flashing), this cycle will be repeated every 24 hours after the first activation. NOTE: If the equipment is de-energized the cycle will be repeated.
Pro	Mdb DnP	Menu to enable one of two Communication Protocol options: - Press the SET key on Mdb to enable the Modbus RTU Communication Protocol. - Press the SET key on DnP to enable DNP 3.0 Communication Protocol
ErS	-----	Serial Network Parameterization Menu
UCS	Aut 2.4 4.8 9.6 19.2 38.4 54.6	Communication speed parameterization menu. ➤ Automatic; ➤ 2.400; ➤ 4.800; ➤ 9.600; ➤ 19.200; ➤ 38.400; ➤ 54.600.
IN	No By Odd	Parameterization menu and communication parity. ➤ No = nenhuma ➤ By ➤ Odd
PtR	WRuE SOME	Parameter Write Protection Menu: Enables write protection; Disables write protection; Select the Output option and confirm it by pressing SET .
rAS	-----	Menu to set the scale on the current output: ➤ 4.20 ➤ 0.20 ➤ 0.10 ➤ 0.5 ➤ 0.1
rA6	S1/S4	Menu setting the maximum current output range and minimum to mirror the Temperature read.
OUC	OFF S1 S2 S3 S4 hOT SCA	Menu to adjust the channel to be transmitted in the analog output: OFF Disables analog temperature transmission output; S1 Enables the temperature of Sensor 1 in the Analog Output; S2 Enables the temperature of Sensor 2 in the Analog Output; S3 Enables the temperature of Sensor 3 in the Analog Output; S4 Enables the temperature of Sensor 4 in the Analog Output; hOT Enables the highest temperature in the Analog Output; SCA Enables mirroring of the analog output in scan mode, to enable the sensors see "lot" menu. And set presentation time in the "tOC" menu.
CoLOUR	S1/S4	Enables/Disables.
Ocd	-----	Parameterization menu to configure the time (Seconds) of stabilization of the analog output, when using the "OUC" menu in "SCA" mode.
CRuE	-----	Menu to adjust the deviation of the current output. Allows you to make a correction in the current outputs by adding or subtracting the configured value. ut1 - Set the value to add or subtract from the magnitude mirrored by current output Before making any changes to the offset of the output of current check: If the rAS menu configuration is correct 0-1 mA, 0-5 mA, 0-10 mA, 0-20 mA or 4-20 mA, if menu the rA6 is configured

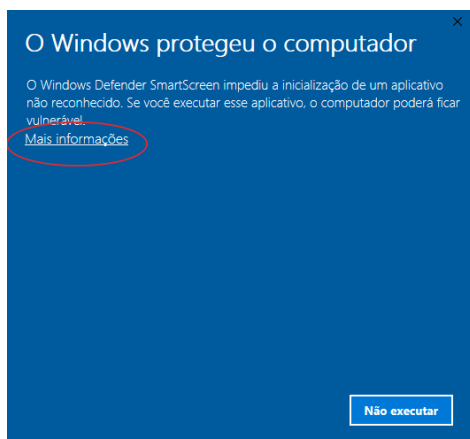
		with the correct start and end of scale and if in the menu Ra6 is configured to mirror the correct sensor. So that this correction parameterization can be made the deviation has to be linear
LED'S	-----	Press the SET key and watch all the LED's light up.
CHERP	ALARM TRIP FAULT FAN	 <p>Attention when using this menu, it activates the relay outputs and lights the EP4 IOT LEDs so that the operator can make sure they work. However, if the monitor is in operation and the TRIP relay (shutdown) is connected to the protection of the system, it will trigger and the protection and the system will operate by turning off the transformer or the machine that it is protecting.</p> <p>RL 1 - "Triggers relay 1 after pressing the SET key " (ALARM Relay). RL 2 - "Triggers relay 2 after pressing the SET key" (TRIP Relay). RL3 - "Triggers relay 3 after pressing the SET key " (RELAY FAULT). RL4 - "Triggers relay 4 after pressing the SET key " (FAN Relay).</p>
Lor	win9 des fal fan	<p>Menu for choosing Relay Drive Logic.</p> <p>nOr – Initial Conditions of the "Normal" Relay. inU – Initial Conditions of the "Inverse" Relay.</p> <p>Select the Logic you want and confirm by pressing the SET key.</p>
lot	hab des	Parameterization menu for Enables/Disables Wifi Communication
PAS	-----	Parameterization menu for password change.
FAB	-----	Exclusive Electron menu.

DOWNLOAD DO SOFTWARE EP4 IOT NO WINDOWS 10

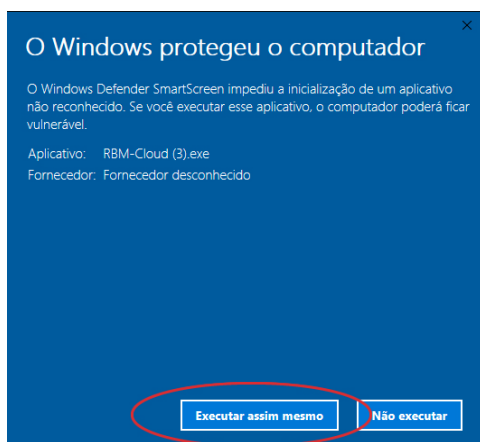
2) After downloading the application, run the 'EP4 IOT-IoT.exe' file.

IMPORTANT: If your browser or your anti-virus for a few minutes to complete the download. The same procedure should be repeated when running the file because some anti-virus or even Windows Defender block functions of our software.

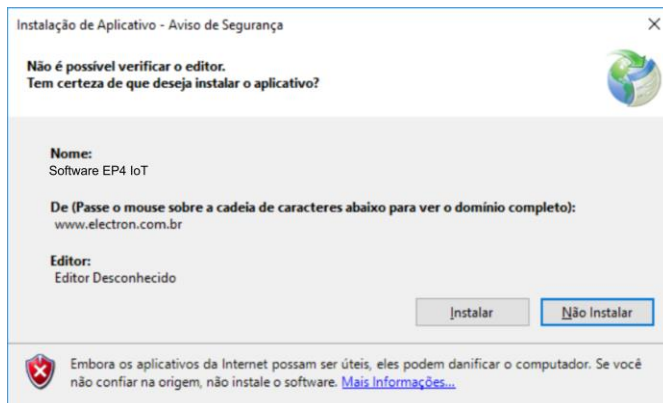
If you are using Windows 10 the same windows should appear on your computer requiring the appropriate permissions to continue and access our application. Our applications and files are totally safe and free of malicious resources.



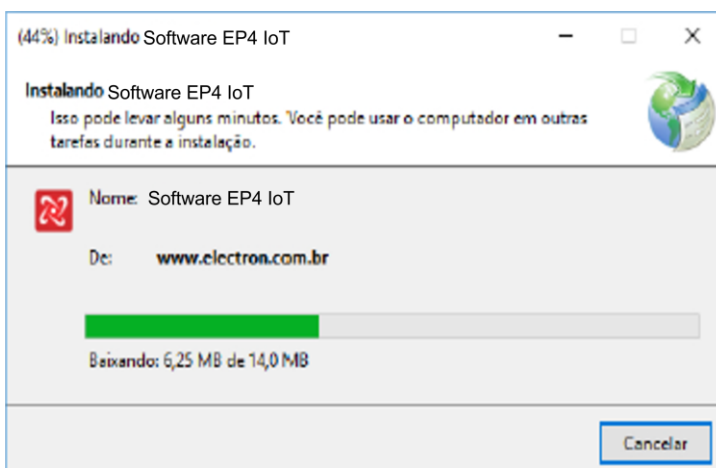
3) If this window has appeared on your computer, click on the underlined option "More information" and then, proceed to step 4.



4) Now click on the 'Run anyway' button allowing the resources of our application to be accessed.

EP4 IOT SOFTWARE INSTALLATION ON WINDOWS 10

5) In this step, click the "Install" button.



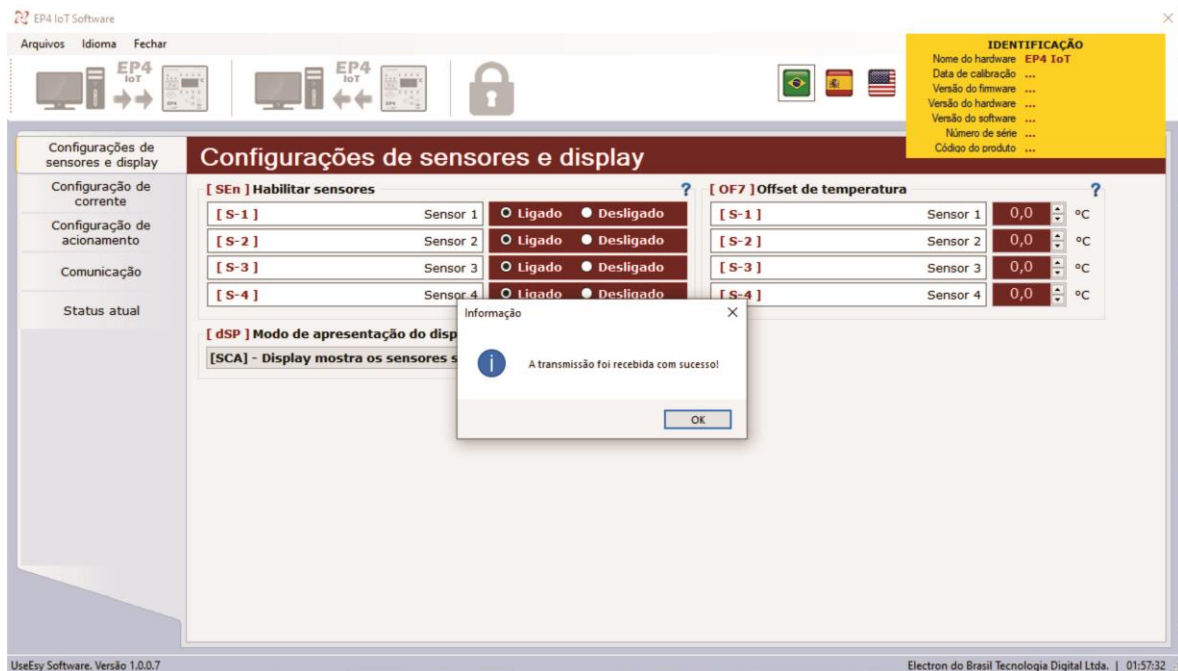
6) Aguarde a finalização do término do download.

CONFIGURING EP4 IOT VIA SOFTWARE

Connect your EP4 IOT IoT equipment using the micro-B USB cable: after plugging it into your machine, plug the USB end into a computer or notebook so that the software can identify it.

When connecting the equipment, the software will display an Information window with the following message: **The broadcast was successfully received.**, as shown in the figure below. Click **OK**.

Note that the settings options on top of the software that were previously unavailable will be available for the configuration of the equipment.



1 – Files

Open parameters file ...

Allows you to open in the software a file of parameters of the EP4_IOT equipment.

Save parameters file ...

Export the current parameters of your machine by creating a file in the format . EP4_IOT.

Print the EP4 Parameter Values IOT_IoT.

Allows printing with the parameters of the equipment.

2 – Languages

Portuguese – Standard

Sets the software to the Portuguese language.

Spanish

Sets the software to the Spanish language.

English

Sets the software to the English language.

3 – Closes the software

Closes the software.

4 – Send parameters

Sends parameters from the equipment to the Software.


NOTE: A window will appear asking for the password, by manufacturing default, the password is 0000. If the password entered is incorrect, there will be no parameter sending to the Software.


5 – Receive parameters

Receives parameters from the equipment in the Software.


6 – Change password access

Changes your password to a new password. To do this, enter the current password and in the following fields, enter your new password and click the OK button, as illustrated in the figure below.

 Altera a senha de acesso ✕

Digite a senha atual: 

Digite uma nova senha:

Redigite a nova senha: 



7 – Drive settings

[SEn] Habilitar sensores

[S-1]	Sensor 1	<input type="radio"/> Ligado <input type="radio"/> Desligado
[S-2]	Sensor 2	<input type="radio"/> Ligado <input type="radio"/> Desligado
[S-3]	Sensor 3	<input type="radio"/> Ligado <input type="radio"/> Desligado
[S-4]	Sensor 4	<input type="radio"/> Ligado <input type="radio"/> Desligado

[SEn] Enable Sensors:

On: Sensor reading enabled

Off: Sensor reading disabled

[OF7] Offset de temperatura

[S-1]	Sensor 1	0,0	°C
[S-2]	Sensor 2	0,0	°C
[S-3]	Sensor 3	0,0	°C
[S-4]	Sensor 4	0,0	°C

[OF7] Temperature Offset: Allows you to make a correction in the measurement of the sensors by adding or subtracting temperature values.

[dSP] Modo de apresentação do display

[SCA] - Display mostra os sensores sequencialmente

[hOt] - Display mostra o sensor com a temperatura mais Alta

[SCA] - Display mostra os sensores sequencialmente

[MAn] - Display mostra os sensores manualmente

[dSP] Display presentation mode: Select one of the 3 temperature display modes on the EP4 – IoT display, which are:

[hOT] – The display will display the sensor that is recording the highest temperature;

[SCA] – The display will display the temperature of each sensor sequentially;

[MAn] – The display will display the temperature of the sensor by manually selecting with the use of the increment and decrement keys

8 – Current Configuration:

[rAS] Range da saídas analógica

0 a 20mA

0 a 1mA

0 a 5mA

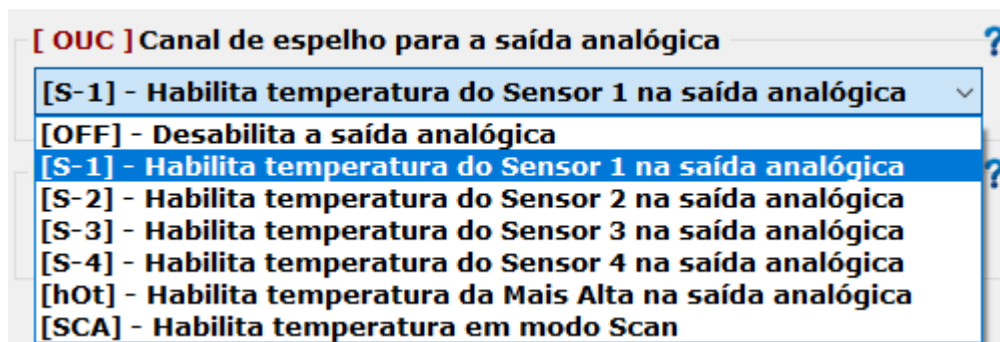
0 a 10mA

0 a 20mA

4 a 20mA

[rAS] Analog output range:

Menu for choosing the range value of the current output



[OUC] Mirror channel for analog output: Menu to adjust the channel you want to transmit in the analog output, among which:

[OFF] disables analog temperature transmission output

[S-1] enables temperature of Sensor 1;

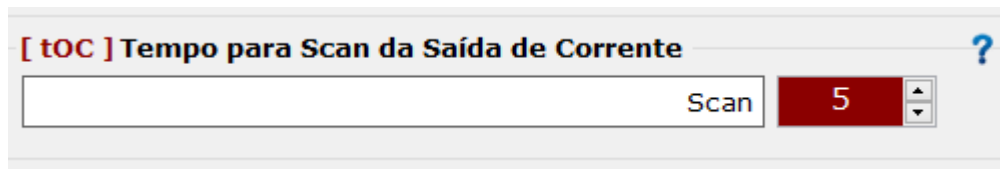
[S-2] enables Sensor 2 temperature;

[S-3] enables temperature of Sensor 3;

[S-4] enables temperature of Sensor 4;

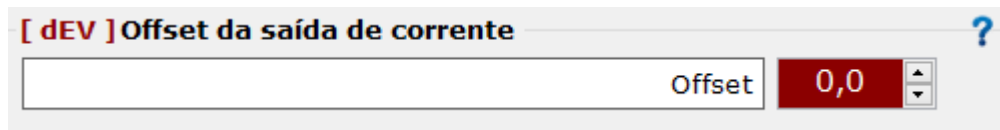
[hOt] enables higher temperature in analog output;

[SCA] enables the display of the temperature of all sensors in the analog output;



[tOC] Mirror channel for analog output:

Select the Scan time of the analog output channels.



[dEV] allows you to make correction in the current output by adding or subtracting the desired value.

[rAG] Range da temperatura para saídas analógica ?

Sensores	Inicial	Final
[S-1] Sensor 1	0,0 °C	200,0 °C
[S-2] Sensor 2	0,0 °C	200,0 °C
[S-3] Sensor 3	0,0 °C	200,0 °C
[S-4] Sensor 4	0,0 °C	199,4 °C

[rAG] select the maximum and minimum temperature value of each sensor to be mirrored in the analog outputs.

9 – Drive Configuration:

[LOr] Lógica de acionamentos dos relés ?

[ALA] Relé de alarme	<input checked="" type="radio"/> Inversa <input type="radio"/> Normal
[dES] Relé de desligamento	<input checked="" type="radio"/> Inversa <input type="radio"/> Normal
[FAn] Relé de falha	<input type="radio"/> Inversa <input checked="" type="radio"/> Normal
[FAL] Relé do grupo de refrigeração	<input checked="" type="radio"/> Inversa <input type="radio"/> Normal

[LOR] Alarm triggering logic: Menu to choose the initial conditions of each Relay.

[AtA] Select between "Inverse" and "Normal" the initial conditions of triggering the Alarm Relay;

[dES] Select between "Inverse" and "Normal" the initial conditions for triggering the Shutdown Relay;

[FAn] Select between "Inverse" and "Normal" the initial conditions of triggering the Fault Relay;

[FAL] Select between "Inverse" and "Normal" the initial drive conditions of the cooling group Relay;

[tAr] Temperatura de acionamento da refrigeração ?

Sensor	Grupo
[S-1] Sensor 1	90,0 °C
[S-2] Sensor 2	90,0 °C
[S-3] Sensor 3	90,0 °C
[S-4] Sensor 4	90,0 °C

[tAr] Refrigeration drive logic: To adjust the cooling drive temperature.

[hdr] Histerese de desligamento da refrigeração ?

Histerese	10,0 °C
-----------	---------

[hdr] Cooling shutdown hysteresis: Select the differential value to turn off transformer ventilation;

[ErC] Exercícios de refrigeração ?

Exercícios

☒ Ligado ☐ Desligado

[ErC] Cooling exercises: Programming of the daily exercise of transformer ventilation;

[rSF] Grupos de refrigeração ?

Automático

Automático

Manual

[rSF] Cooling exercises: Set up automatic or manual cooling actuation;

[AtA] Alarmes por temperatura alta ?

[S-1]

Sensor 1

140,0 °C

[S-2]

Sensor 2

140,0 °C

[S-3]

Sensor 3

140,0 °C

[S-4]

Sensor 4

140,0 °C

[AtA] High Temperature Alarms: Configure the Setpoint to trigger the High Temperature Alarm Relay;

[AtA] Alarmes por temperatura alta ?

[S-1]

Sensor 1

140,0 °C

[S-2]

Sensor 2

140,0 °C

[S-3]

Sensor 3

140,0 °C

[S-4]

Sensor 4

140,0 °C

[hda] Alarm Shutdown Hysteresis: Configure the High Temperature Alarm Relay Setpoint triggering;

[hda] Histerese de Desligamento dos Alarmes ?

Histerese

5,0 °C

[dTa] High Temperature Shutdown: Configure the High Temperature Shutdown Relay (TRIP) drive setpoint;

[dtA] Desligamento por temperatura alarme ?

[S-1]

Sensor 1

150,0 °C

[S-2]

Sensor 2

150,0 °C

[S-3]

Sensor 3

150,0 °C

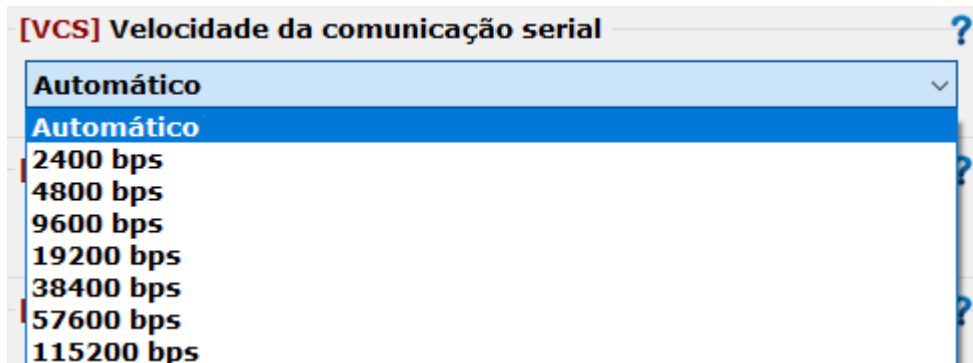
[S-4]

Sensor 4

150,0 °C

[trd] Shutdown Delay Time: Set the High Temperature Shutdown Relay (TRIP) drive delay time count;

10 – RS485 configuration:



[VCS] Velocidade da comunicação serial

Automático

2400 bps

4800 bps

9600 bps

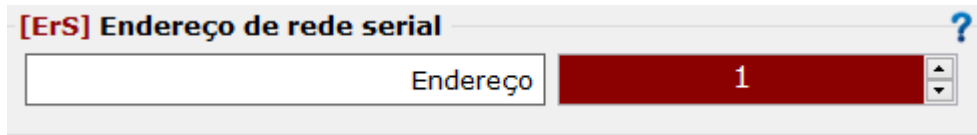
19200 bps

38400 bps

57600 bps

115200 bps

[VCS] Serial Communication Speed: Select one of the serial communication speed options (BaudRate);



[ErS] Endereço de rede serial

Endereço

1

[ErS] Serial network address: Select a unique number for the identification of the equipment in the serial network;

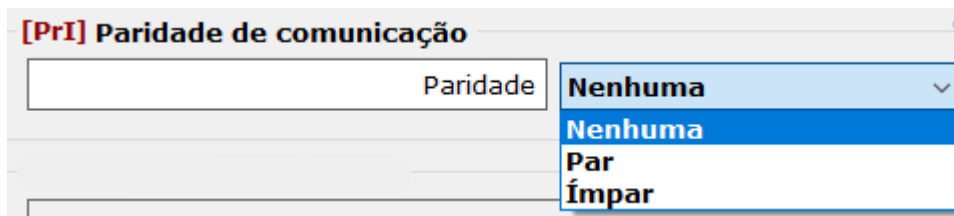


[PrO] Protocolo de comunicação

Protocolo

☒ DNP 3 Nível 2 ☐ Modbus RTU

[PrO] Communication Protocol: Enable the communication protocol, DNP3.0 level 1 or Modbus RTU;



[PrI] Paridade de comunicação

Paridade

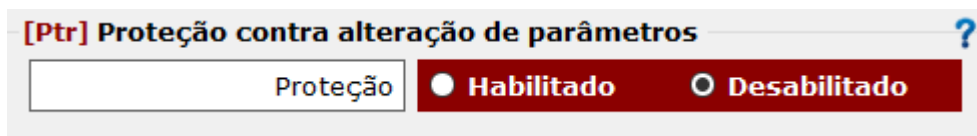
Nenhuma

Nenhuma

Par

Ímpar

[PrI] Communication Parity: Select the last bit to be transmitted for data integrity checking between Even and Odd or disable this function.

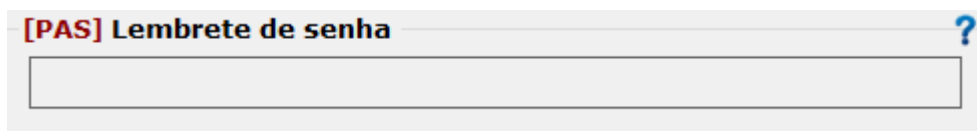


[Ptr] Proteção contra alteração de parâmetros

Proteção

☒ Habilitado ☐ Desabilitado

[Ptr] Parameter change protection: Serial network configuration against parameter change.



[PAS] Lembrete de senha

[PAS] Password reminder: In case of loss or forgetting of password, please contact Electron da Brasil.

11 – IoT Configuration:

Habilita a comunicação WiFi

Comunicação
☒ **Habilitado**
☐ **Desabilitado**

Enables WIFI communication: Enable or disable the WIFI communication function of the equipment.

MAC Address

Endereço MAC
AB:12:CD:34:EF:56

MAC Address: When connecting the machine to your notebook or computer, this field will display the MAC Address of the same;

Usuário e senha

Usuário	iot
Senha Wi-Fi	iotelectron
Redes disponíveis	<div> ▼ </div>

Atualizar

User: This field will display the name of the internet point selected under **Available networks**.

Wi-Fi Password: Enter the access password for the selected internet point.

Available networks: Select the internet point you want to connect to.

12 – Current Status:

Status atual

Executar status
Gravar em arquivo

```

IDENTIFICAÇÃO DO EQUIPAMENTO =====
- Modelo do equipamento .....: EP4 IoT
- Data de Calibragem .....: 02/07/2020
- Versão do firmware .....: 2.00
- Versão do hardware .....: 238.03
- Versão software .....: 2.00
- Número de série .....: 1006
- Código do produto .....: 411111
Status =====
    
```

Run status: Click this option to check all equipment information.

Record status: Click this option to save this information to file.

DEFECT SOLUTION

The sensor automatically returns to reading mode when the error is normalized, to reset the EP4 IOT press the **SET** key **for approximately 5 seconds until the word rST** appears on the display, **then release and the** EP4 IOT Protection Relay will restart. The **EP4 IOT** will trigger the **FAULT** relay (terminals 37, 38 and 39) in case the display displays the **OFF** parameter or if there is a power drop.

Display	Cause	Solution
OFF	EP4 IOT does not receive signal Reliable sensor	<ul style="list-style-type: none">• Check and Replace the sensor cable if it is not shielded.• Check grounding of the sensor cable.• Check and eliminate possible bad contact in the connectors.• Replacement of the temperature sensor if it is damaged.

IMPORTANT RECOMMENDATIONS

Before putting into operation the equipment check the following recommendations:

1. All sensors as well as equipment must be grounded, do not use the same grounding point for power and for the sensor if it is used to ensure that there is no potential difference between them. Properly grounded sensors and power supply prevent malfunction or damage in cases of disturbances, surges, and inductions in the equipment.
2. Do not use the **EP4 IOT** directly in the sun, whenever it is urged 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.

WARRANTY TERM

The **EP4 IOT** Electron has a warranty period of two years from the date of sale consigned in 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;
- Violated 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;
- Overload occurs that causes degradation of components and parts of the product.

Use of the guarantee

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, referring to the defect detected. This will be analyzed and subjected to full functional tests.

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

DECLARATION OF CONFORMITY

Available for download at the following email address:

<https://electron.com.br/pt-br/produtos/EP4 IoT/>

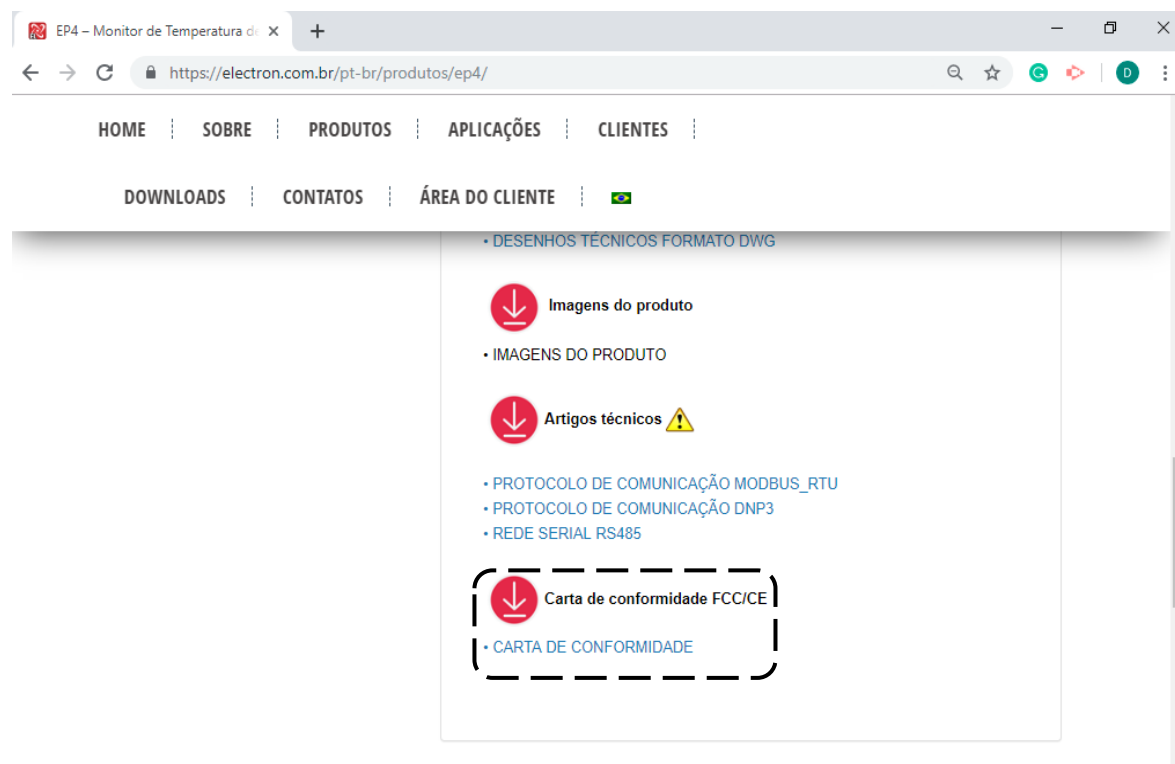


Figure 9 - Download Declaration of Conformity