LAD

Catalog

Temperature Monitor for Dry Transformers, Motors and Generators

Thermal monitoring of electric equipments, such as dry transformers, motors, generators and other is essential for its safe operation, allowing to retrieve maximum yield from these assets without endangering or shortening its service life.

The LAD temperature monitor has six inputs for temperature measurements, allowing the monitoring of multiple temperatures. Some of the typical applications for LAD are listed bellow:

- Phases A, B and C temperatures of dry transformers with double windings;
- Phases A, B and C, core and ambient temperature of a dry transformer;
- Phases A, B and C of two different dry transformers;
- Oil temperature in small transformers where there is no need to measure winding temperature (for winding temperature, see TS, TM1 and TM2 monitors);
- Temperature of stators, bearings, lubricant oils and other in motors and generators.

Individual alarm and trip levels are adjusted for each of the measured temperatures, so that permanent damage to equipments is avoided. Optional settings for automatic control of two stages of forced cooling (fans, for instance) are also available.

Main Features:

- IED (Intelligent Electronic Device) specifically designed for application conditions (electromagnetic interference, extreme temperature);
- Indication of temperature in loco through display with programmable indication modes: show highest temperature, automatic screen roll or fixed measurement display;
- Optional engineering algorithm for winding insulation ageing online calculation;
- High luminosity LED type displays for easy visualization ;
- RS-485 communication ports for integration with supervisory systems or remote monitoring. Modbus and DNP 3.0 (optional) communication protocols are available;
- Inputs for up to six temperature sensors type Pt100W @ 0ºC with self-calibration , ensuring high level of accuracy and stability throughout the entire ambient temperature range;
- Programmable analog output (optional) for remote temperature indication. Programmable output ranges: 0...10, 0...20 or 4...20 mA;
- Output relays for alarm and self-diagnostics indication, trip and forced cooling command;
- Self-diagnostics for detection of internal faults. Complete absence of mechanical parts for parameter definition and calibration;

Optional Features

OPTIONAL 1: DNP3.0 PROTOCOL:

User selectable communication protocol: Modbus RTU or DNP3.0 level 1. DNP3.0 protocol with support for 1ms resolution time-stamp.

OPTIONAL 2: ANALOG OUTPUT

Programmable analog output for remote temperature reading indication, user selectable for display of highest temperature or a pre-defined temperature. Programmable output range: 0...1, 0...5, 0...10, 0...20 or 4...20mA.

OPTIONAL 3: FAN AND PUMP EXERCISE

The fan exercise function keeps fans and / or pumps from remaining inactive for prolonged periods of time in transformers operating under low load conditions or during periods of low ambient temperatures. This avoids axle blocking due to accumulation of dirt, grease dry out or bird nesting. Fans are switched on every day, based on the equipment's internal clock and depending on selections made by users:

- Hour and minute for start up of fans and/or pumps;
- Total daily fan and/or pump operation time, from 0 to 999 minutes.

OPTIONAL 4: ON-LINE CALCULATION OF WINDING INSULATION AGING

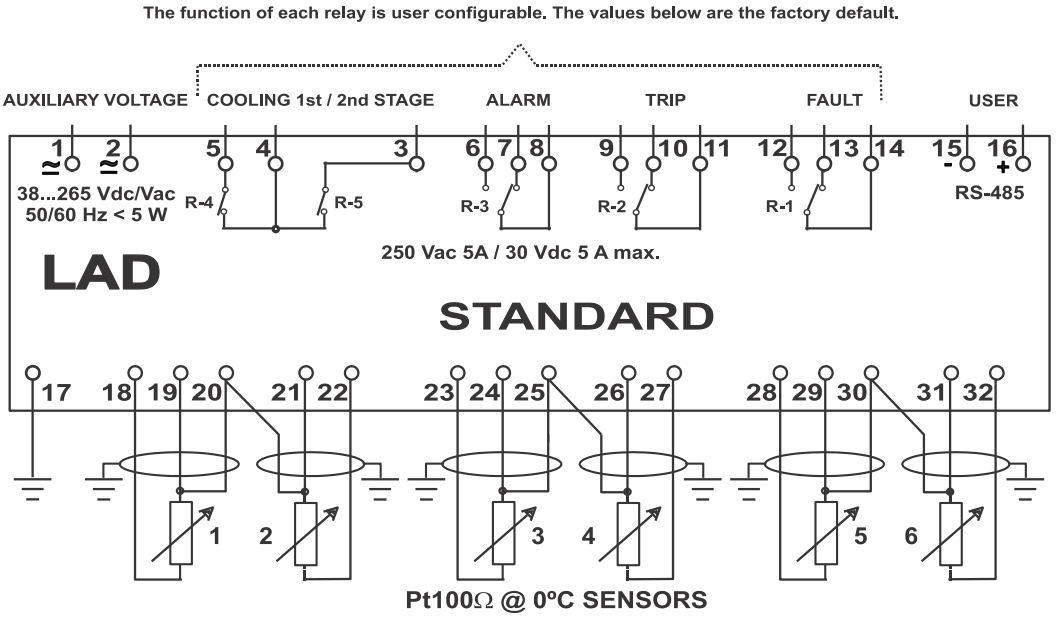
Calculation of the aging effects. On-line monitoring of loss of life of the winding insulation, providing important information for the diagnosis and prognosis of the condition of equipment:

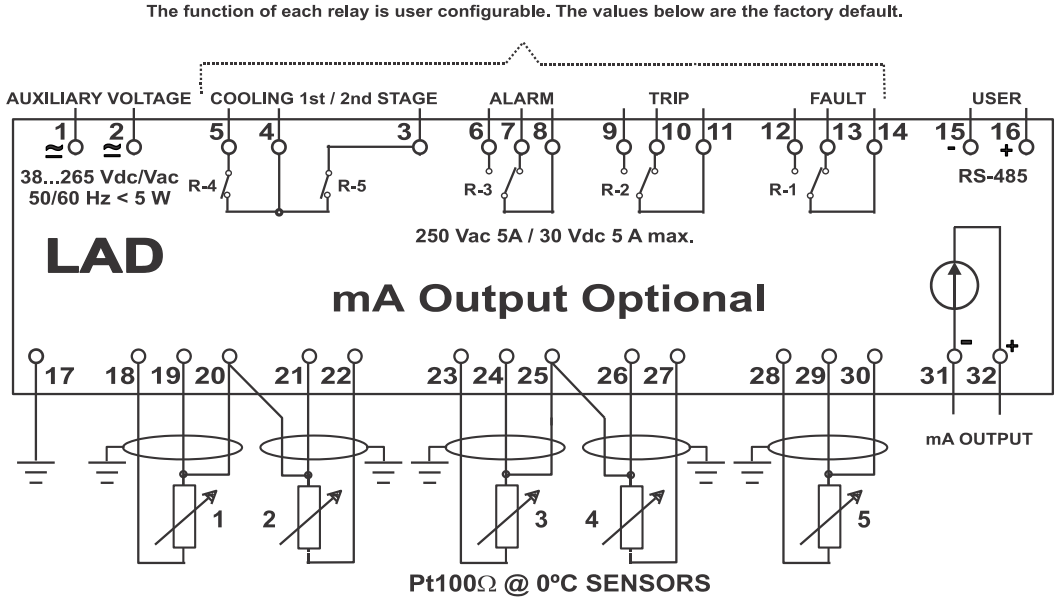
- Current percentage of life remaining, 100% (new insulation) to 0% (end of life of isolation);
- Average loss of life of isolation, in % per day, calculated over a time period selectable by the user;
- Extrapolation of lifetime remaining for insulation, calculated on the basis of the above variables (percentage of remaining life and the average rate of loss of life);

Technical Specifications

Element	Description / Interval
Power suply:	38 to 265 Vac/Vdc 50/60 Hz
Maximum power consumption:	< 5 W
Service temperature:	-10 a +70 ºC
Protection degree:	Front Panel IP50 Back Part IP 20
Wire size-removable connectors	0,3 a 2,5 mm², 22 a 12 AWG
Mounting:	Embedded in panel
Temperature measurement:	Six inputs (five if analog mA output optional is active)
Sensor:	Pt100 Ω @ 0 ºC with continuous self-calibration
Range:	-55 ... 200ºC
Maximum error @ 20ºC:	0.5% of full scale
Deviation by temperature variation:	20 ppm/ºC
Connection type:	3-wire sensor
Analog Output (optional):	One (uses slot of RTD 6 temperature input)
Maximum error:	0.5 % of full scale
Options (selections) and maximum load:	0...10 mA, 1 kΩ 0...20 mA, 500Ω 4...20 mA, 500Ω
Relay ouputs:	Three convertible and two NC, potential free.
Maximum switching capability:	250 Vac 5A / 30 Vdc 5 A
Serial Communication Port:	1 RS-485 for monitoring / supervisory systems
Communication Protocol:	Modbus RTU or DNP 3.0 level 1 (optional)

Electrical Installation Diagram



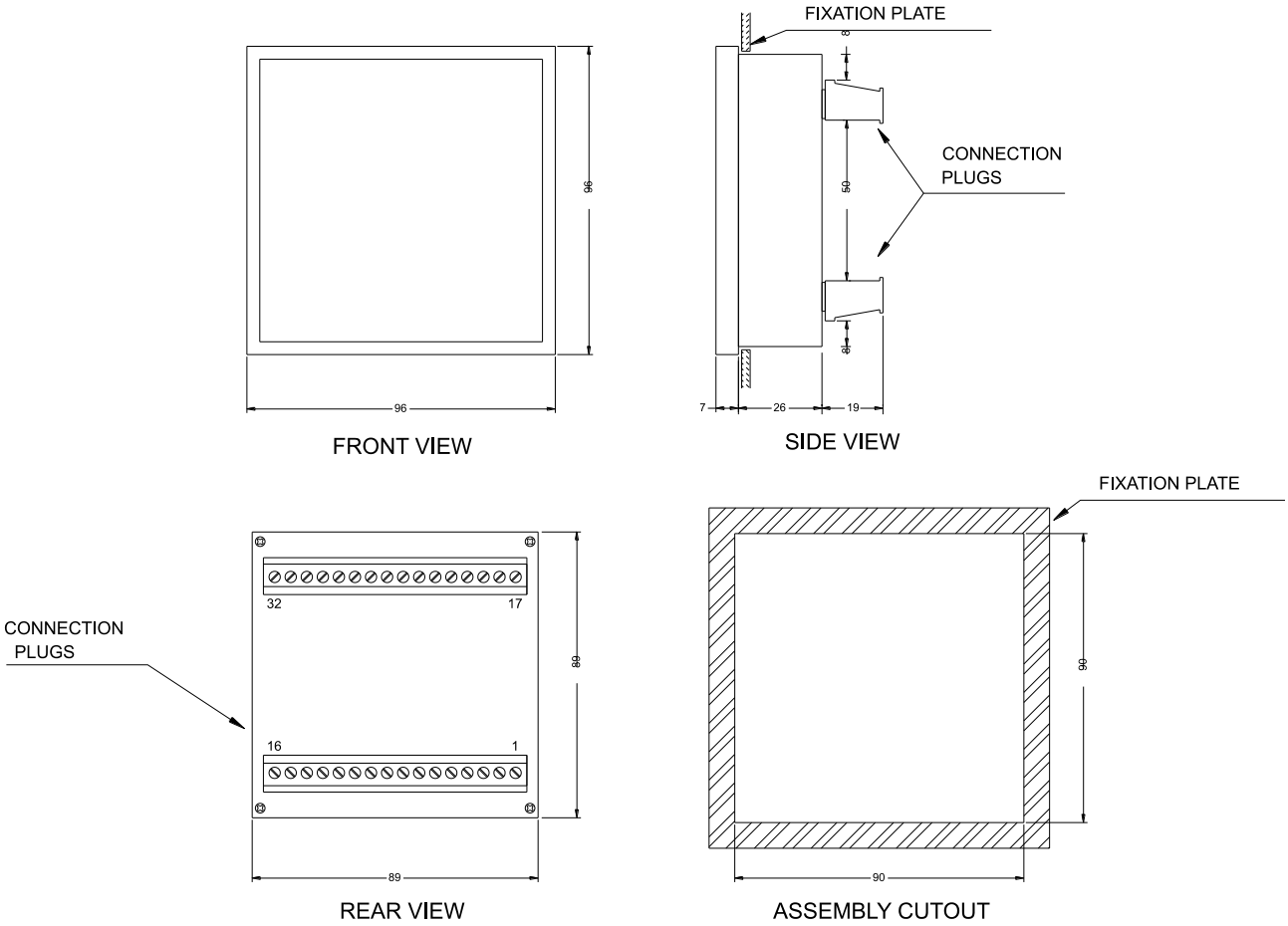


OBSERVATIONS:

1) When the analog mA output optional is active, the input for temperature sensor RTD6 will not be available.

2) All contacts are shown as if LAD is desenergized.

Dimensions



Order Specification

The temperature monitor for is a universal device. The operating characteristics are selected by way of program menus. These adjustments can be made directly on its front panel or by using the RS-485 serial communication port.

Power input is universal (38 to 265 Vdc/Vac 50/60Hz). Therefore, in ordering the device all that needs to be specified is:

- Temperature Monitor for Dry Transformers – LAD;
- Desired amount;
- Desired optional features in each equipment:

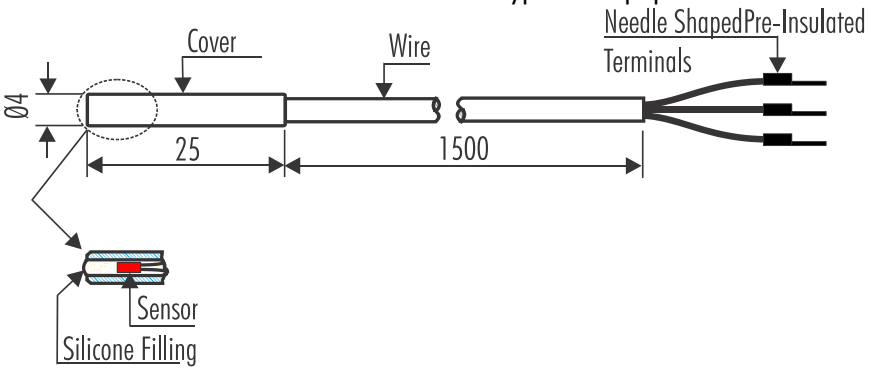
✓ Optional 1: DNP 3.0 Protocol;
✓ Optional 2: Analog Output;
✓ Optional 3: Fan and Pumps Exercise;
✓ Optional 4: Online Calculation of Winding Insulation Ageing;

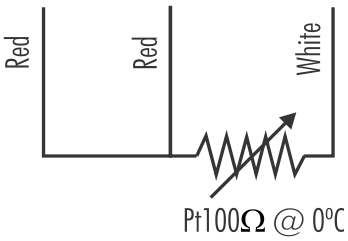
- Accessory items for LAD installation.

Optional Accessories

PT100Ω @ 0ºC TEMPERATURE SENSORS:

Temperature measurements in dry transformers, motors, generators and other equipments monitores by LAD is achieved using Pt100Ω @ 0ºC sensors. As additional supply, Treetech offers adequate sensors for installation in dry transformers, according to the drawing bellow. Ask us about special dimensions and other sensor models for installation in other types of equipment.





CHARACTERISTICS:

- Standard: ASTM E1137, B Class
- Factor: Alfa: 0,385Ω / ºC
- Wiring: Flexible tinned copper 22 AWG
- Insolation: PTFE (Teflon)
- Protection: PTFE Pipe
- Protection Degree: IP 68 (at Pt100 sensor end)

AMBIENT TEMPERATURE SENSOR:

LADs temperature inputs can be used to measure CDC, motors, generators, ambient temperature and other. If one them will be used to measure external environment temperature, the PT100 sensor must be installed in a thermal shelter that will minimize reading errors caused by direct sunlight incidence, rain, winds, etc. When necessary, Treetech has suitable shelters for these situations available as optional accessories.

CABINET FOR OUTDOOR INSTALLATION

The LAD must always be sheltered from weather conditions. Thus, it is often installed inside some building, like a control room. When it's not convenient, as when retrofitting old transformers, the LAD may be supplied in an easy to install weather-proof cabinet.

CHARACTERISTICS:

- Fastening: Bolted with high load capacity magnets
- LADs fastening: Removable rack
- Wiring connections: Multipolar removable plug at the bottom of the cabinet
- Protection degree: IP55
- Insulation Test: 2kV, 50/60 Hz, 1 min.

BRAZIL
Treetech Sistemas Digitais Ltda
Praça Claudino Alves, 141, Centro
CEP 12.940-000 - Atibaia/SP
+ 55 11 2410-1190
comercial@treetech.com.br
www.treetech.com.br