



OIL LEVEL MONITOR - MNO

Manual

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INTRODUCTION

The Oil Level Monitor for Transformers and Reactors MNO, is a microprocessed equipment of high precision that indicates the level of oil in scale that varies between 0 and 100 %, and provides this indication in an analog output (0 to 1, 0 to 5, 0 to 10, 0 to 20 or 4 to 20mA), and in an Rs485 serial output with Modbus RTU protocol and DNP 3 (L1) allowing remote access to the Monitor through a supervisory system.

The MNO 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 in power transformers and reactors, in panels in the yard of power substations, offshore platforms and chemical industries. Meets the levels of requirements, supportability and reliability according to IEC, DIN, IEEE, ABNT standards.

As signal input the MNO has 1 input for configurable resistive signal from 0 to 5000 ohms, or current signal input from 4 to 20mA, for the monitored value (measured) it is possible to make 3 levels of programming for actuation of the contacts (High Level, Low Level and Shutdown), 3 outputs of independent NAF relays and 1 NF fault signaling relay, 1 configurable analog output that can be from 0 to 10; 0 to 20 or 4 to 20mA, 1 Rs485 output with Modbus RTU protocol and DNP 3.0, all parameters can also be configured directly on the front of the equipment or through the RS485 serial output.

MAIN FEATURES

- 4-digit display of 13.8mm high high LED high (red);
- Precision of 1 (one) decimal place;
- Level measurement range from 0 to 100%;
- Compensated input for resistive buoy or in 4 to 20mA;
- Universal power supply 48 to 265 Vdc/Vac;
- Digital output Rs485 (ANSI/TIA/EIA-485-A) with Modbus RTU protocol and DNP 3 (L1) (Level1);
- Analog output of 0a1, 0a5, 0a10, 0a20 and 4a20mA configurable directly on the front;
- Stores in memory the maximum and minimum levels reached;
- NAF Alarm Contact for maximum level with programmable hysteresis;
- NAF Alarm Contact for minimum level with programmable hysteresis;
- Timed NAF Shutdown Contact, to maximum and/or minimum level that reaches the configured value;
- Contact for Fault Indication (watchdog);
- High mechanical strength box, built entirely in aluminum;
- Degree of protection (NBR IEC 60529) IP40 (Front) and IP30 (Rear);
- Auto Baud Rate from 2,400 to 57,600 bps (Automatically Detects the speed of the Communication network);
- Reduced size 48x96x140mm;
- Easy parameterization and use;
- 2 years warranty;

TECHNICAL DATA

Operating Voltage	48 to 265 Vdc/Vac 50/60 Hz
Operating Temperature	-40 to + 85°C
Consumption	< 15 W
Level Measurement Input	Boia (0 to 5000 ohms or 4 to 20 mA)
Measuring Range	0 to 100%
Analog Outputs and Maximum Load Options *	0 ... 1 mA – 8000 Ohms*
	0 ... 5 mA – 8000 Ohms
	0 ... 10 mA – 8000 Ohms
	0 ... 20 mA – 8000 Ohms
	4 ... 20 mA – 8000 Ohms
Maximum Error of Measurement Inputs	0.25% of the end of the scale
Maximum Analog Output Error	0.25% of the end of the scale
Outgoing Contacts	4 – Free of Potential
Maximum Switching Power	40W / 250 VA
Maximum Switching Current	6.0 A
Maximum Driving Current	RS485 (ANSI/TIA/EIA-485-A)
Serial Communication Port	Modbus RTU and DNP 3.0 (Slave)
Auto Baud Rate	2,400 to 57,600 bps
Box (DIN IEC 61554)	48 x 96 x 140 mm – Aluminium
Equipment Fixation	Built-in Panel Mount
Degree of Protection (NBR IEC 60529)	TP40 (front) and IP30 (rear)

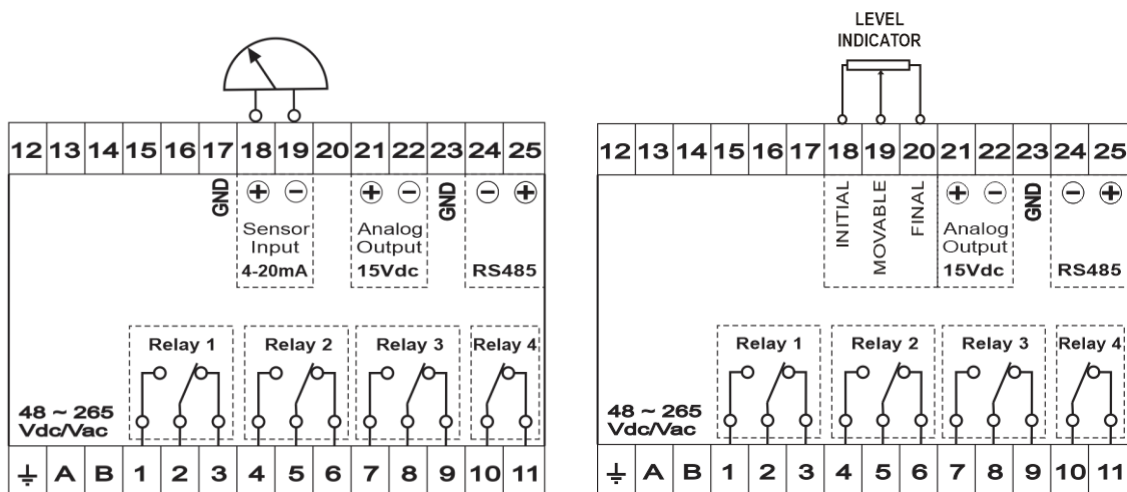
Table 1 – Technical data of the MNO.

• TYPE TESTS

- Applied Voltage (IEC 60255-5): 2kV / 60Hz / 1 min. (against land);
- 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 irradiated electromagnetic disturbance (IEC61000-4-3): 80 to 1000 MHz / 10V/m;
- Immunity to Fast Electrical Transients (IEC60255-22-4): Alim/Entr./Outputs=4KV/common. 2kV;
- Surge Immunity (IEC60255-22-5): phase/neutral 1KV, 5 per polar. ($\pm$) - phase-earth/neutral-earth 2KV, 5 per polar ($\pm$);
- Immunity to Conducted Electromagnetic Disturbances (IEC61000-4-6): 0.15 to 80 MHz / 10V/m;
- Climate Test (IEC60068-21-14): - 10°C + 70°C / 72 hours;
- Vibration Resistance (IEC60255-21-1): 3 axes / 10 to 150Hz / 2G / 160min/axis;
- Vibration Response (IEC60255-21-1): 3 axes / 0.075mm-10 to 58 Hz / 1G from 58 to 150 Hz / 8min/axis;

CONNECTION DIAGRAMS

MNO - 2 - mA signal input (active 15Vdc) MNO - 1 - Resistive signal input



MNO - 3 - mA signal input (passive 24Vdc)

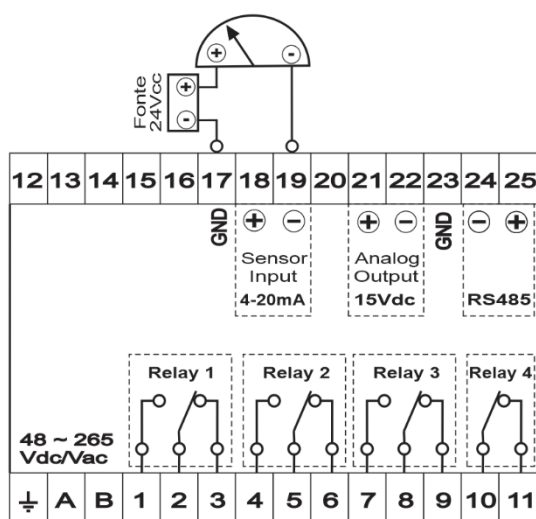


Figure 1 – Connection diagrams

DIMENSIONS

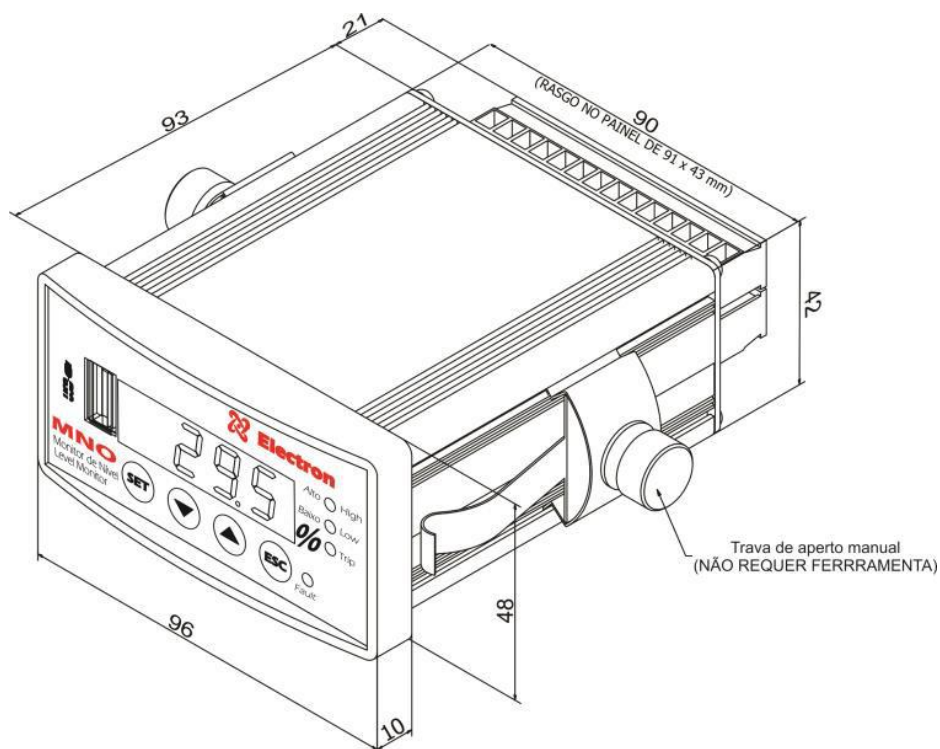


Figure 2 – Dimension

APPLICATION EXAMPLE

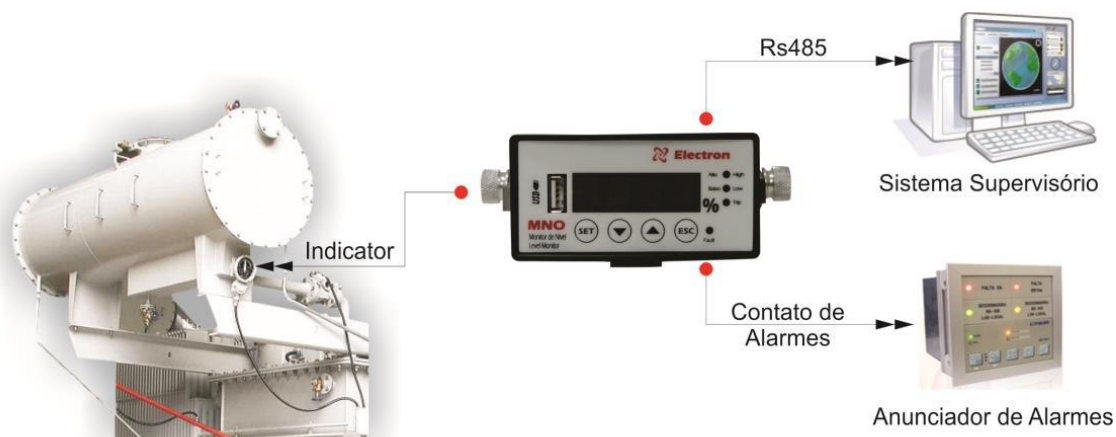


Figure 3 – Application Example

OPERATION CHART

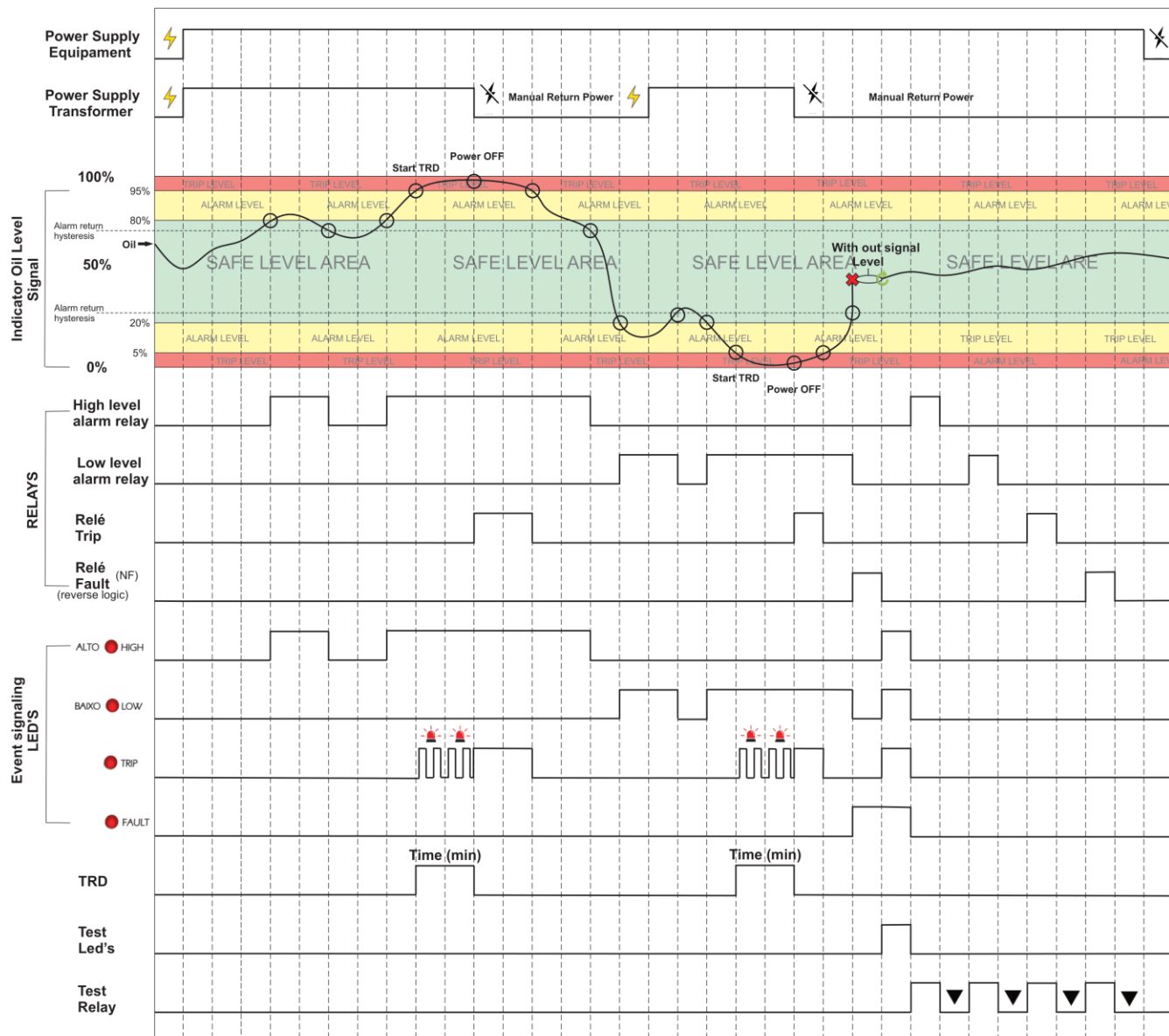


Figure 4 – Operation Chart

PREVENTIVE MAINTENANCE

PREVENTIVE AND CORRECTIVE MAINTENANCE							
Items to be checked preemptively			Scan Frequency				Corrective action
SHARE	Verification Elements	ACTIVITIES	Every Month	Every 3 Months	Every 6 Months	Every 1 Year	When Needed
VERIFICATION	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			
	Indicators	Integrity / Positioning / Fastening			X		Replacement, Repositioning and/or fixing of indicators
	Sensor well in Oil Transformers	Oil level in the well			X		Filling with oil up to the indicated level
TESTS & MEASUREMENTS	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		
	Input of Indicators	Measure indicator entries 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 2 – Preventive maintenance

INSTALLATION SOFTWARE FOR PARAMETERIZATION - USEEASY

- 1) Access the software page on our Website <https://electron.com.br/site/software/>
- 2) Find your equipment and download the corresponding software

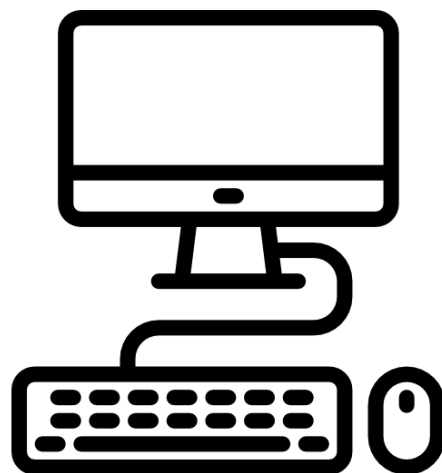
MNO - Monitor de Nível de
Óleo

Solicite Orçamento

SOFTWARE USE EASY

**Use_Easy_Cloud**Versão: 1.0
Tamanho: 286.83
KB
Data de
modificação
12/04/2023

Baixar



ACCESSORIES FOR INSTALLATION

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 MNO operation.



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 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 NBR IEC 60529:2017.

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/>

ORDER SPECIFICATION

Monitor de Nível de Óleo- MNO

<i>Sensor de Entrada</i>	
1	Resistiva
2	4 a 20 mA