

DI

CATALOG



Digital Indicator

The DI Digital Indicator is a microprocessed electronic equipment for remote supervision of different variables of transformers and power reactors. It allows the measurement of up to 8 variables, for instance: the DI can indicate the temperature of the insulating oil plus the temperatures of 3 windings, oil moisture, water in oil, of a same transformer or the temperatures of the phases A, B, C and backup of a single-phase transformer bank. The 8 indications are discriminated through LEDs on the frontal panel of the DI, which displays the variable that is being indicated. The input variables are individually configured by the user with the beginning and end of measuring scale. The alarm threshold of each variable is programmable on two levels, and if any one of the monitored variables goes over the limit, the corresponding LED starts flashing and a contact is activated for use in the alarm system.

The DI has an analog output for remote indication which reflects the variable that has been configured by the user, and it also has an RS485 Serial Communication port, with Modbus RTU or DNP 3.0 Protocol (Optional) which allows reading variables and remote alarm threshold changes.

Main Characteristics:

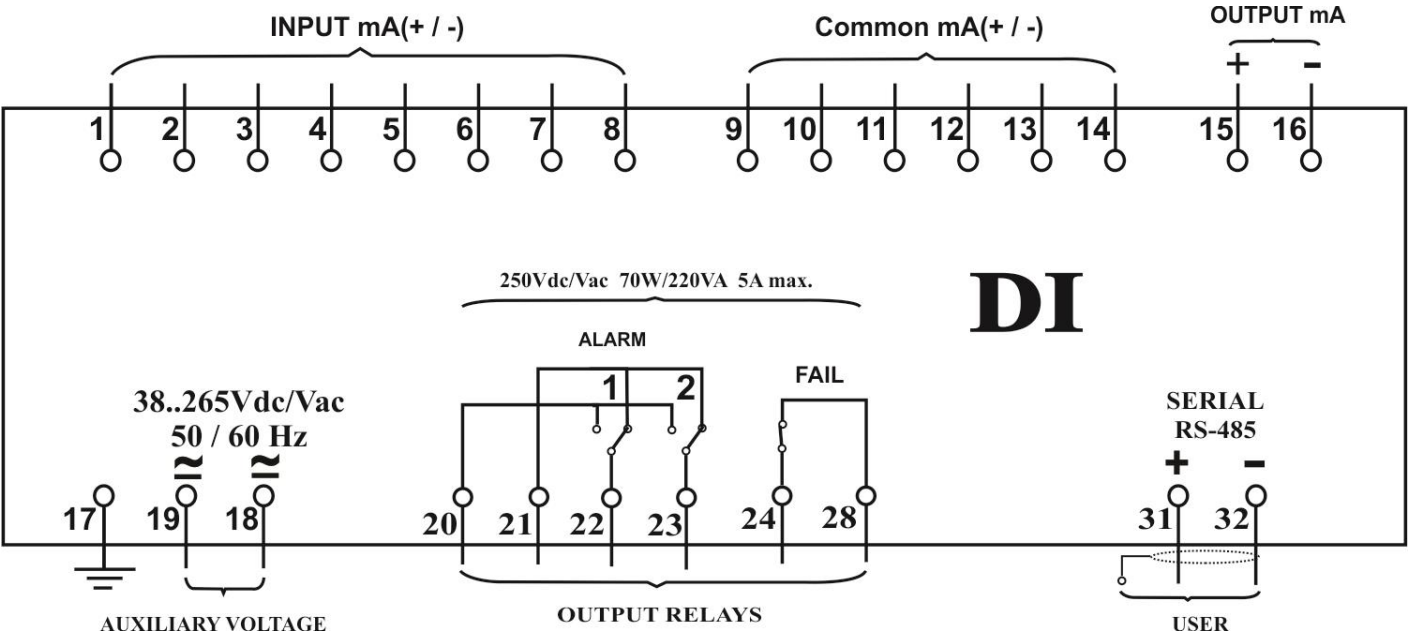
IED (Intelligent Electronic Device) specifically designed for the substation outdoor conditions (interferences, extreme temperatures);

- Local indication of temperatures on a display, with programmable indication mode: automatic screen scrolling or indication of a fixed channel;
- High brightness LED display for easy viewing;
- RS485 serial communication port for integration to supervisory systems or remote monitoring systems. Modbus RTU or DNP 3.0 Open communication protocols (Optional);
- Current loop input of 0...1, -1...1, 0...5, -5...5, 0...10, -10...10, 0...20, -20...20, or 4...20mA ; configured by the user
- 1 Analog output for remote indication. Programmable output range: 0...1, -1...1, 0...5, -5...5, 0...10, -10...10, 0...20, -20...20, or 4...20mA ; configured by the user
- Output relays for two-level alarm indications (NO or NC contact - configured by the user), internal failure (NO contact);
- Internal clock with date, time, and non-volatile memory to store measurements (optional);
- Self-diagnosis to detect internal failures. Total absence of mechanical parts for parameterization and calibration.

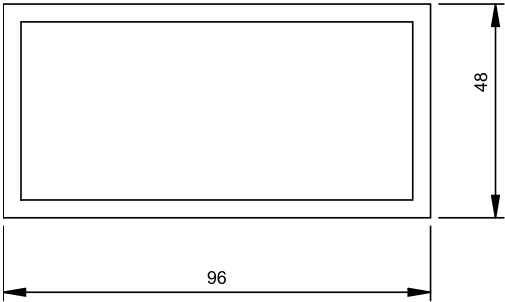
Technical Data

Item	Interval / Description
Supply	
Power Supply Voltage:	38 to 265 Vac/Vdc 50/60 Hz
Maximum Consumption:	< 5 W
Operating Temperature	-40 to +85 °C
Degree of Protection:	IP 20
Connections:	0,3 to 2,5 mm ² / 22 to 12 AWG
Mounting:	Built-in panel
Inputs	
Quantity and type:	8 current analog inputs
Adjustment ranges (configurable in parameter setting):	0 to 1 mA 0 to 5 mA 0 to 10 mA 0 to 20 mA 4 to 20 mA -1 to 1 mA -5 to 5 mA -10 to 10 mA -20 to 20 mA
Maximum Error:	0,5 % of full scale
Impedance:	65 Ω +- 1 %
Setting range of start and end of scale :	-999 a 9999 (decimal point adjustment)
Digital Outputs	
Quantity and type:	2 reversible contacts and one NC
Maximum switching Voltage:	70 W (dc) / 220 VA (ac)
Maximum switching Voltage:	250Vdc/250 Vac
Maximum conduction current:	5 A
Analog Outputs	
Quantity and type:	1 current analog output
Adjustment ranges (configurable in parameter setting):	0 to 1 mA / 10 kΩ 0 to 5 mA / 2 kΩ 0 to 10 mA / 1 kΩ 0 to 20 mA / 500 Ω 4 to 20 mA / 500 Ω -1 to 1 mA / 10 kΩ -5 to 5 mA / 2 kΩ -10 to 10 mA / 1 kΩ -20 to 20 mA / 500 Ω
Maximum Error:	0,5 % of full scale
Communication	
Quantity and type:	1 RS-485 port
Communication Protocols:	RTU Modbus (standard) or DNP3.0 level 1 (optional)

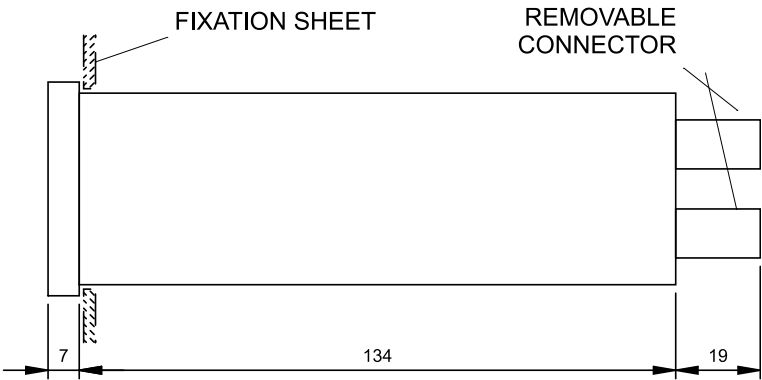
Connection Diagram



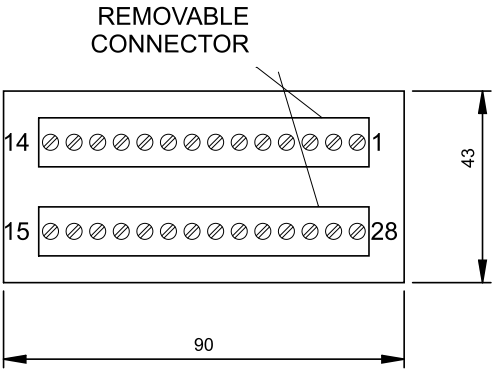
Dimensions



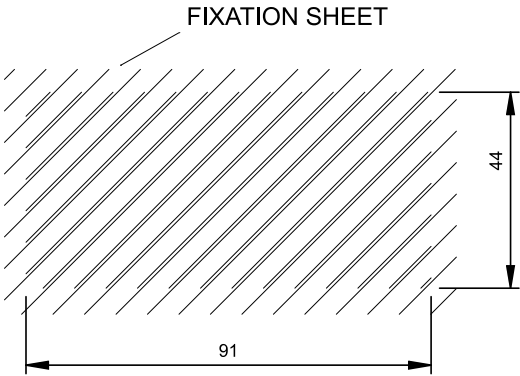
FRONT VIEW



SIDE VIEW



REAR VIEW



SHEET CUT-OUT FOR MOUNTING

ALL DIMENSIONS IN mm

Type Testing

Surge Immunity (IEC60255-22-5):	
Phase-Neuter Surges:	1 kV, 5 per polarity (+/-)
Phase-Ground and Neuter-Ground Surges:	2 kV, 5 per polarity (+/-)
Immunity to Electric Transients (IEC 60255-22-1) and (IEEE C37.90.1)	
1st cycle peak value	2.5 kV
Frequency:	1.1 MHz
Time and repetition rate:	2 seconds, 400 surges/sec.
Displacement at 50%:	5 cycles
Voltage pulse (IEC 60255-5):	
Waveform:	1.2 / 50 seg.
Amplitude and energy:	5 kV
Number of pulses:	3 negatives and 3 positives, interval
Applied Voltage (IEC 60255-5):	5s
Bearable voltage at the industrial frequency:	2 kV 60Hz 1 min. against ground
Radiated Electric Field Immunity (IEC 61000-4-3/IEC60255-22-3):	
Frequency:	26 to 2000 MHz
Field intensity:	10 V/m
Immunity to Conducted Electromagnetic Disturbances (IEC 60255-22-6)	
Frequency:	0.15 to 80 MHz
Field intensity:	10 V/m
Immunity to Electric Transients (IEC 60255-22-2) and (IEEE C37.90.3)	
Air mode:	8 kV, ten discharges per polarity
Contact mode:	6 kV, ten discharges per polarity
Immunity to Rapid Electric Transients (IEC60255-22-4) and (IEEE C.37.90.1)	
Power supply, input and output test:	4 kV
Serial communication test:	2 kV
Environmental Testing: (IEC 60068-2-14):	
Temperature Range:	-40 to +85°C
Total testing time:	120 hours

Vibration response: (IEC 255-21-1):

Test applied: 3 axes (X, Y and Z), sinusoidal
Amplitude: 0.075mm from 10 to 58 Hz
Intensity: 1G from 58 to 150 Hz
Duration: 8 min/axis

Vibration endurance (IEC 255-21-1):

Test applied: 3 axes (X, Y and Z), sinusoidal
Frequency: 10 a 150 Hz
Intensity: 2G
Duration: 160 min/axis

Optional Accessories

Option 1 - DNP3.0 Protocol

Communication Protocol selectable by the user from Modbus RTU and DNP 3.0 level 1; DNP 3.0 Protocol with Time-Stamp support with 1ms accuracy.

Option 2 - Mass Memory

Non-volatile memory to store variable measurements, OLTC operations and triggered alarms. The user selects which variable groups he wants to store, and they can be recorded in the memory by:

- Time interval between recordings selected by the user, or;
- Variation in any of the variables that is higher than the dead band value selected by the user, or;
- Status change in any of the output relays (1st alarm level, 2nd alarm level or self-diagnosis).

Option 3 - Cabinets for Outdoor installation

The Digital Indicator - DI must always be sheltered against the weather, and for this purpose it is installed, in general, inside a control panel or inside a building. When this is inconvenient, such as, for example, when old transformers are refurbished, the DI can be supplied in a weatherproof cabinet, easy to be installed.

Characteristics	
Mounting on the transformer:	Bolted or with high load capacity magnets.
DI mounting:	On a sliding rack
Wiring connection:	Removable multi-polar plug at the bottom of the cabinet
Degree of protection:	IP 55
Insulation test:	2kV, 50/60 Hz, 1 min.



Order specifications

The Digital Indicator-DI is a universal piece of equipment, with its characteristics selected in its programming menus through its frontal panel or through the RS485 serial port. The power supply input is universal (38 to 265 Vdc/Vac 50/60Hz).

Therefore in the equipment purchase order it is necessary to specify the following:

- DI Digital Indicator
- Quantity;
- Desired Optional Functions (more than one optional item can be specified for the same equipment).



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