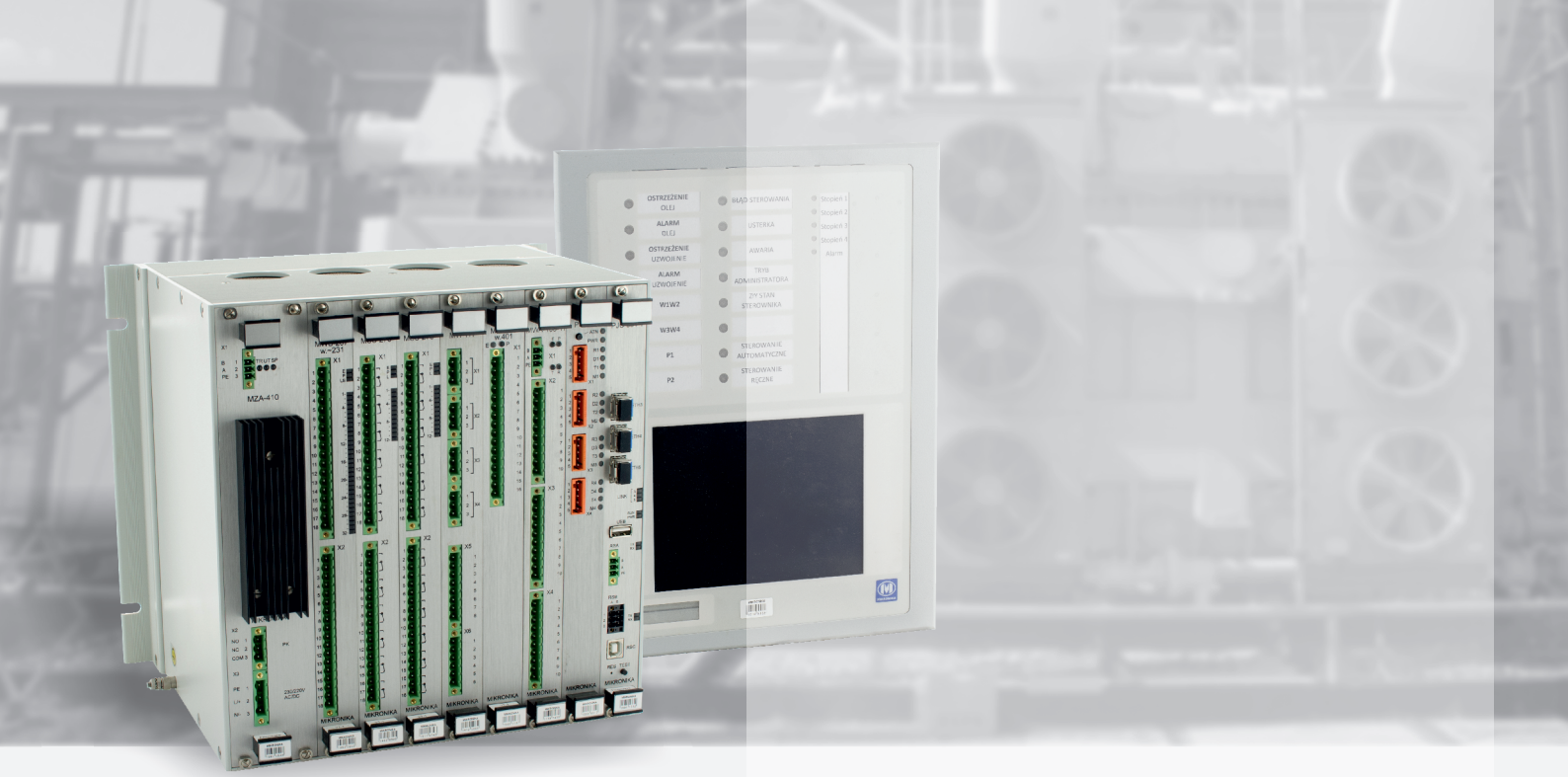


SO-52v11-eMC

intelligent transformer cooling controller

Stable temperature is crucial for transformer failure-free exploatation! Our device controls its cooling system to ensure optimal temperatures of oil, core and windings.

Our controller recognizes the operation conditions and reacts adequately. Let's say, it performs intelligent control.

The controller can also perform other measurements and signalizations related to the transformer operation, thus reducing the number of installed devices in the control cabinet.

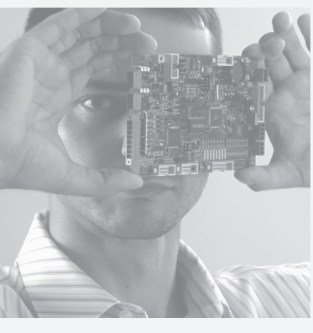
Advantages:

- implemented thermal model of each winding
- temperature and current criterial algorithm of cooling
- configurable inputs for resistive or current sensors
- PN-EN 61850 or any protocol cooperation with supervision systems
- up to 4 independent Ethernet channels in the 100Base-FX standard
- RS-485 connections for supporting devices or „smart" sensors
- local or remote LCD terminal with a touch keyboard
- the possibility of introducing winding temperature measurement from fiber optic sensors
- modular structure allows the increase the number of inputs and outputs

Basing on measurements of the top oil temperature of the tank, transformer load and information about the present state of cooling, the controller calculates the hot-spot temperature. These calculations are performed for those cooling modes for which parameters of a thermal model have been defined.

The controller switches on and off drives of pumps and fans grouped appropriately for a given cooling stage to stabilize the oil and windings temperatures, regardless of the load and ambient conditions. The controls according to the current criterion are performed simultaneously.

The calculated allowable loads and times to exceed the defined load limits for nominal operation, long overload, short overload operation are transferred to supervising centres or local SCADA.



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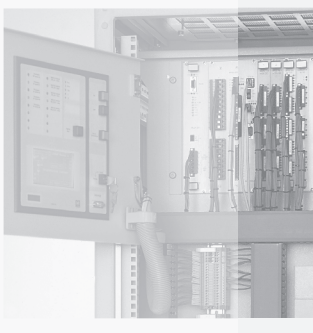
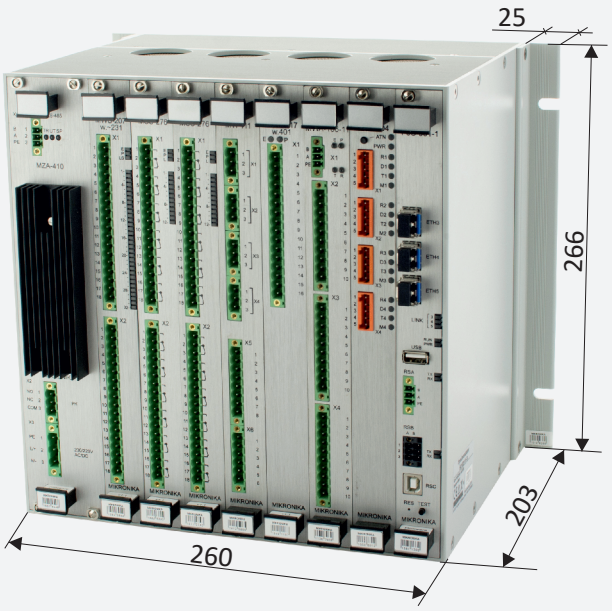


Functions performed

- calculation of maximum winding temperature
- determination the aging of paper insulation
- control stages of cooling
- monitor the states of cooling groups
- react to alarm thresholds of winding and oil temperatures
- reconfigure algorithm of leading cooling group operation
- prevent so-called „pump stagnation”
- monitor the oil level in a transformer
- communicate with external systems and devices
- acquire other signals and measurements
- calculate the allowable operation load and time limits based on a parameterized thermal model
- recording on the memory card of measurements recorded and determined by the controller



Technical data

structure	mudular	output indicator	up to 16 outputs 0.2A/220V DC or more
LCD screen	built-in or external	transmission channels	RS-485, RS-232, 8x RS-485 (option)
current measurements	3, 6 or 9 inputs 0÷1A/AC or 0÷5A	network connections	Ethernet 100Base-FX, up to 4 channels
current measurements	up to 8 inputs 4÷20mA / one module	modem	option GSM/GPRS or PSTN
temp. measurements	up to 8 resistance inputs / one module	power supply	220V AC/DC or 24V DC
binary inputs	up to 32 inputs 24V/220V DC / one module	power consumption	20VA

Four-stage cooling system, an example