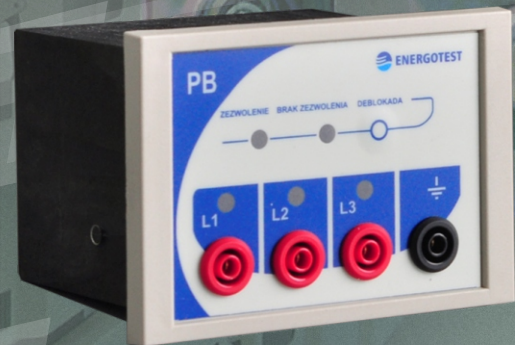


Do you certainly check the voltage in your switchgear?



Voltage indicators and interlock relay for MV switchgears

operate with capacitive insulators,

Clearly identify the voltage in each of MV switchgear bay makes a significant contribution to improve work safety!

In the typical MV switchgears voltage transformers (VT) are used for the voltage measurement. In practice there are many installations where, due to the switchgear size minimalization need, using of VT's is very difficult and often impossible. The cost of VT's also important, especially in simple switchgears.

The optimum solution for obtaining information about the presence of voltage in MV switchgear buys is using of voltage indicators operating with capacitive insulators.

Energotest in this field offers a wide range of products suitable for different needs.

WN-IEC - indicator accordance with PN-EN 61243-5 standard,

WN, Wnd - indicators accordance with PN-EN 62271-206 standard,

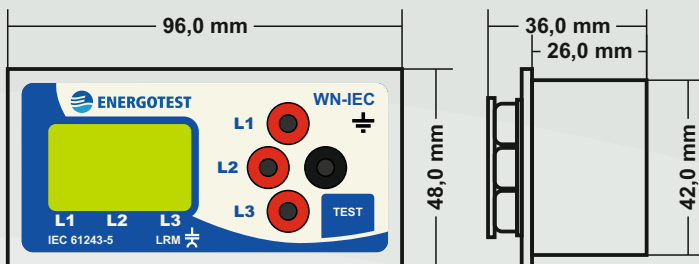
PB - indicator WN and earthing switch interlock relay with desinterlock button,



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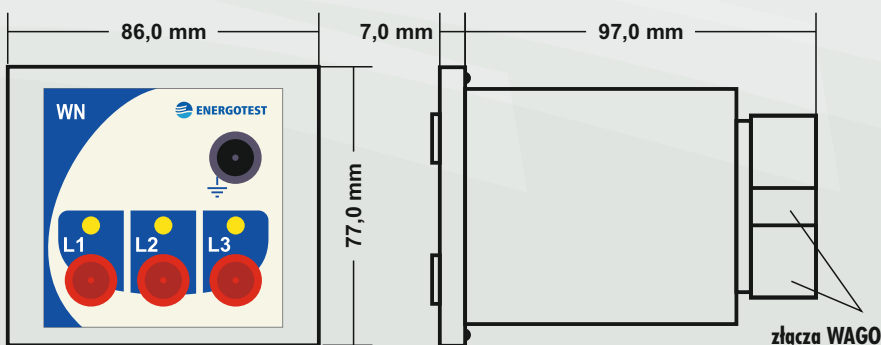
▶ Basic characteristics of indicator WN-IEC:

- ▶ Fulfills the requirements of PN-EN 61243-5 standard (work under voltage - indicator systems of voltage presence) and PN-EN 62271-206 standard (medium voltage devices -voltage indicators systems),
- ▶ Operate with capacitive insulators of various manufacturers,
- ▶ Sensitivity of the indicator set in factory to adjust to the insulator parameters. Accepted level of insulator output currents are in range of 8 ... 500 μ A,
- ▶ Has integrated structure (has plug-in socket and optical indicators),
- ▶ The presence of voltage is signaled independently for each phase on liquid crystal display,
- ▶ Detection system does not need a separate power supply source, energy is received from capacitive insulators,
- ▶ Equipped with a self-test system (also operating in the absence of voltage),
- ▶ Increases operator safety - Plug-in sockets are protected by a spark gap, which reduces the voltage on the sockets in case of a capacitive insulator failure,
- ▶ It has standard output on plug-in sockets (2.5 μ A 5V) suitable for dis connected type; LRM voltage and LRM phases,
- ▶ Protection degree is IP 54.



▶ Basic characteristics of indicator WN:

- ▶ Fulfills the requirements of PN-EN 62271-206:2011,
- ▶ Operate with capacitive insulators of various manufacturers,
- ▶ Sensitivity of the indicator set in factory to adjust to the insulator parameters. Accepted level of insulator output currents are in range of 20...500 μ A,
- ▶ Has integrated structure (has plug-in socket and optical indicators),
- ▶ The presence of voltage is signaled independently for each phase by LED's,
- ▶ Detection system does not need a separate power supply source, energy is received from capacity insulators,
- ▶ Protection degree is IP 54 .



WN-IEC - indicator accordance with PN-EN 61243-5 standard



Warning!

"Standard 61243-5 was designed with the intention of achieving the same level of safety when indicating the absence or presence of voltage as with conventional voltage indicators" (standard quotation).

Despite this, it is recommended to check the system using conventional voltage indicators before operations in MV bay.

WN - indicators accordance with PN-EN 62271-206 standard

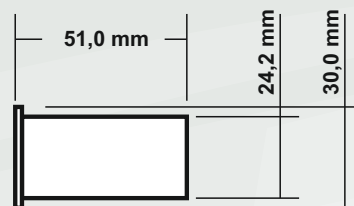
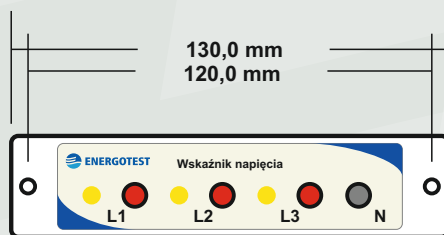


Wnd - indicators accordance with PN-EN 62271-206 standard - compact version



► Basic characteristics of indicator Wnd (Compact version)

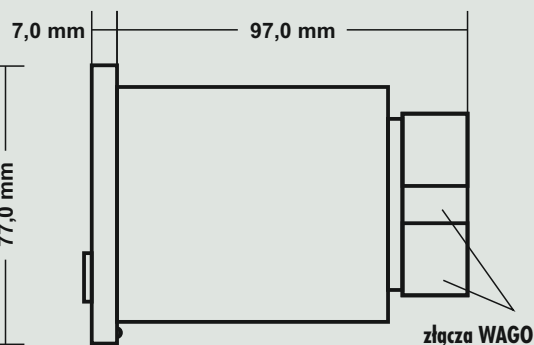
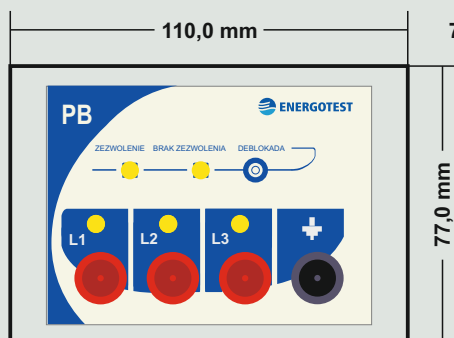
- Fulfills the requirements of PN-EN 62271-206:2011,
- Operate with capacitive insulators of various manufacturers,
- Sensitivity of the indicator set in factory to adjust to the insulator parameters. Accepted level of insulator output currents are in range of 20...500 μ A,
- Has integrated structure (has plug-in socket and optical indicators),
- The presence of voltage is signaled independently for each phase by LED's,
- Detection system does not need a separate power supply source, energy is received from capacitive insulators,
- Monochromatic, transparent housing,
- Protection degree is IP 40.



► Basic characteristics of PB device:

- Fulfills the requirements of PN-EN 62271-206 standard,
- Operate with capacitive insulators of various manufacturers,
- Sensitivity of the indicator set in factory to adjust to the insulator parameters. Accepted level of insulator output currents are in range of 20...500 μ A,
- Has integrated structure (has plug-in socket and optical indicators),
- The presence of voltage is signaled independently for each phase by LED's,
- Detection system does not need a separate power source, energy is received from connected capacity insulators,
- Equipped with relay interlock earthing switch against its energizes under voltage (detection system is independent to the interlock system),
- Equipped with desinterlock button works in without voltage state,
- Protection degree is IP 54.

PB - Indicator and earthing switch interlock relay with desinterlock button



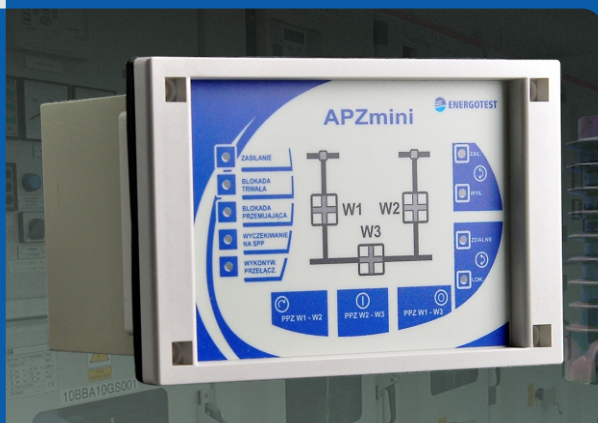
Others devices cooperating with voltage indicators

Phase comparator WNf



- ▶ It allows connection to indicators phase in the right order,
- ▶ Phase comparator connected to existed voltage indicator system may be used (for checking) as an portable voltage indicator,
- ▶ Dedicated for Energotest's – WN-IEC , Wnd, WN, PB devices.

APZmini



It performs tranfer power supply in the following cycles:

- ▶ Automatic transfer supply (ATS),
- ▶ Return transfer supply (RTS),
- ▶ Planed transfer supply (PTS),
- ▶ Automatics supply switch on (ASS).

The **APZmini** is a unique system for automatic transfer power supply in MV and LV switchgears operates witch voltage indicators. VT's does not need. Basic characteristics of device:

- ▶ Has a modular structure, it has a central unit (**APZmini**) and executive (measure, control) elements (**PB**),
- ▶ Can be prepared for switchgear:
 - MV (PB is an measurement sensor and tripping controller)
 - LV (PB04 is an measurement sensor and tripping controller),
- ▶ There are standard configuration of inputs and outputs,
- ▶ Can work in one of the seven different configuration of switchgear power supply,
- ▶ Is connected with executive elements (PB,PB04) by wire with DB9 connectors,
- ▶ Can operate with master system (SCADA) working as a field controller,
- ▶ Has events recorder function,
- ▶ Has small size which allows easy assembly in each switchgears.

Lack of voltage transformers (VT's), low cost of design, simplicity of assembly and the startup makes this solution as the cheapest manner of power supply change over.

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