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# CATALOGUE DATA SHEET

Hermetically sealed oil immersed transformer

## 250 kVA 15.75 / 0.42kV

№218-2025-36

| Technical parameters | | |
|---|---|---|
| | **Parameter description** | **Value** |
| 1 | Transformer type | MarkoEco2 250/15.75-0.42 AkAAo (Tier2) |
| 2 | Construction type | |
| • | Hermetically sealed | YES |
| • | With conservator | NO |
| 3 | **Rated power (kVA)** | **250 kVA** |
| 4 | Frequency (Hz) | 50 Hz |
| 5 | Primary winding HV | |
| • | Rated voltage (V) | **15750 V** |
| • | Tappings | ±3×2,5% |
| • | Winding material | Cooper (Cu) |
| • | Insulation level Um/AC/LI | 17.5/38/95 |
| 6 | Secondary winding LV | |
| • | Rated voltage (V) | **420 V** |
| • | Winding material | Cooper (Cu) |
| • | Insulation level Um/AC/LI | 1.1/8/– |
| 7 | **Vector group** | **Dyn 5** |
| 8 | Standards | EN 60076, EN 50588-1, EN 50708-1 |
| 9 | Cooling | ONAN |
| 10 | Installation | Outdoor / Indoor |
| 11 | Installation altitude | up to 1000 m a.s.l. |
| 12 | Ambient | -25 °C ... +40 °C |
| 13 | Rated temperature rise | |
| • | Oil | 60 K |
| • | Winding | 65 K |
| 14 | **No load losses (W)** | **270 W** |
| 15 | **Load losses (W)** | **2350 W** |
| 16 | **Short circuit impedance (%)** | **4% (±10%)** |
| 17 | Approximate dimensions | |
| • | Length (mm) | 1100 mm |
| • | Width (mm) | 800 mm |
| • | Height (mm) | 1450 mm |
| • | Wheel spacing (mm) | 520 mm |
| 18 | Approximate weight | |
| • | Cooper (kg) | 252 kg |
| • | Core (kg) | 500 kg |
| • | Tank (kg) | 150 kg |
| • | Oil (kg) | 230 kg |
| • | Total (kg) | 1552 kg |
| 19 | Corrosion protection | Galvanizing plus final coating RAL 7033 |

| Standard equipment required for grid operation | | | |
|---|---|---|---|
| | **Equipment item** | **pcs.** | **Additional description** |
| 1 | Porcelain insulators HV side | 3 | |
| 2 | Porcelain insulators LV side | 4 | |
| 3 | Tap changer | 1 | +/- 3 x 2,5% (hand operated) |
| 4 | Nameplates | 2 | |
| 5 | Lifting lugs | 2 | |
| 6 | Earthing terminals | 3 | |
| 7 | Bidirectional rollers | 4 | |
| 8 | Thermometer pocket | 1 | |
| 9 | Bimetal thermometer with indicator | 1 | |
| 10 | Oil drain valve | 1 | |
| 11 | Lockable oil filling plug | 1 | |
| 12 | Oil level indicator | 1 | Enables continuous oil level monitoring |
| 13 | Filling pipe with safety valve | 1 | Oil filling and overpressure relief |
| 14 | Pressure relief valve | 1 | Controlled overpressure discharge |
| 15 | Electrostatic screens | - | PV dedicated design |
| **Optional equipment** | | | |
| 1 | DGPT2 ® | | |
| 2 | Anti vibration pads | | |
| 3 | TOC HV transformer terminals | | |
| 4 | TOC LV transformer terminals | | |
| 5 | EUROMOLD ® 250A | | |
| 6 | Integrated OLTC by Reinhausen | | |
| 7 | Unpainted version | | |
| 8 | Version with conservator | | |

## Technical description

Energeks MarkoEco2 hermetic oil transformers are designed and manufactured in accordance with European standards and applicable operating standards for MV/LV equipment. The design is based on ONAN natural oil cooling and copper windings ensuring low load losses thanks to high thermal and mechanical resistance. The equipment **meets the requirements of EN 60076, EN 50588-1 and EN 50708-1, and complies with EcoDesign (Stage II) and EU REG 548/2014 regulations.**

## Short circuit parameters

Transformers with **rated power above 400 kVA are manufactured with short circuit voltage of 6% (±10%)** at rated tap position, in accordance with commonly applied technical requirements in distribution networks and design documentation for this power class.
All transformers are equipped with **regulation tappings ±3 × 2.5%**, enabling proper voltage level compensation.
Each transformer is supplied with a **complete set of equipment required for grid operation, compliant with standards applicable to MV/LV transformers used in distribution, industrial and commercial networks.**

## Anti-corrosion protection

All steel components of the tank, cover and external equipment are protected by **a coating system compliant with PN EN ISO 12944, corrosion category C3H**, intended for operation in environments with increased corrosive aggressiveness.
The protection system includes a primer layer and a top coat, each in a different colour, in accordance with dual layer coating principles. The top coat is grey and resistant to insulating cooling medium, weather conditions and UV radiation.

## Documentation and conformity

Each transformer is supplied with:

• catalogue data sheet, installation instructions & technical documentation
• type test reports or certified copies
• documents confirming compliance with EN 60076 1 Transformers Part 1 General requirements
• reports issued by PCA accredited bodies or bodies being signatories to EA MLA, IAF MLA or ILAC MRA agreements
• confirmation of participation of the accreditation body in international accreditation recognition agreements
• EC Declaration of Conformity confirming compliance with applicable EU directives and regulations
• warranty card defining warranty conditions and operating rules
• documentation confirming that the transformer is manufactured under a quality management system compliant with ISO 9001
• documentation confirming that the manufacturer operates an environmental management system compliant with ISO 14001
**The documentation is complete and compliant with requirements applicable to MV transformers within the European Union,** facilitating acceptance procedures, approvals and integration with power installations.

## Applications

MarkoEco2, hermetically sealed oil immersed transformers are intended for a wide range of applications in distribution, industrial and commercial power engineering. T**echnical parameters and equipment configurations meet standards applied by distribution system operators in Poland**, including PGE, Tauron, Enea and Energa Orlen, as well as other DSOs, facilitating integration with MV/LV infrastructure.

The transformers are used in:

• industrial installations and manufacturing plants supplying CNC machines, production lines and automation systems, stabilizing voltage under dynamic load changes and cooperating with UPS systems and backup power systems
• photovoltaic installations as voltage step up elements from inverters to LV or MV level, compliant with EN 50588 1, used in rooftop and ground mounted farms, also in versions with electrostatic screens for PV
• prefabricated container substations, where compact dimensions and rolling system enable easy integration with E House modules and station enclosures
• backup and emergency power supply systems cooperating with generator sets and automatic transfer systems, ensuring stability and continuity of supply for critical facilities
• commercial facilities and local distribution networks such as office buildings, shopping centres and logistics hubs, with the possibility of integration with SCADA and BMS systems