

# Minera MP

## Oil Immersed Medium Power Transformers



Electrical  
Energy



Wind  
Farm



Refinery



Mining,  
Minerals  
& Metals



Make the most of your energy<sup>SM</sup>

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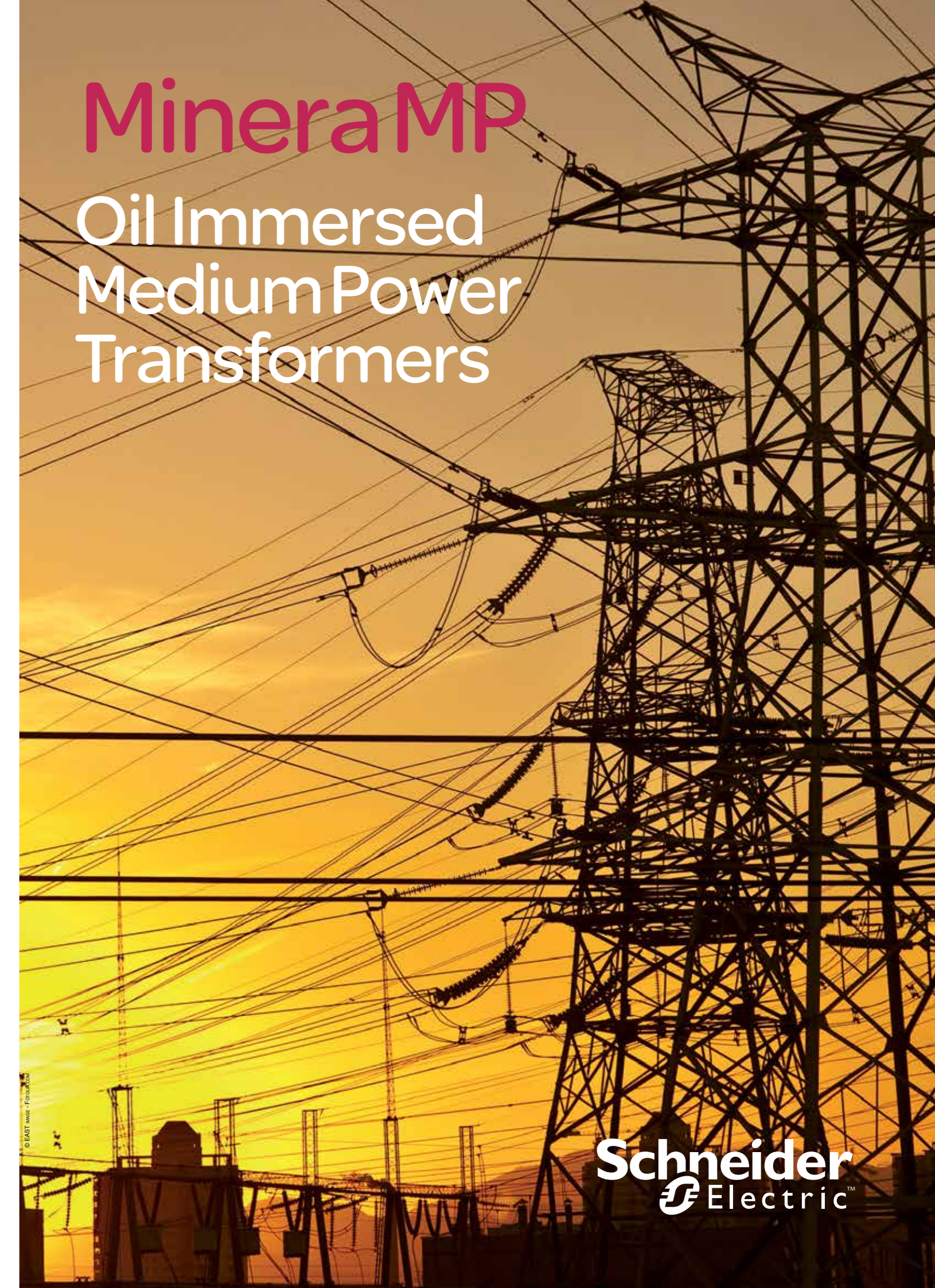
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As standards, specifications and designs change from time to time, please ask for confirmation of the information given in this publication.

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# Minera MP

## Oil Immersed Medium Power Transformers



**Schneider**  
Electric

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## > Minera MP oil immersed medium power transformer

Minera MP oil-immersed medium voltage power transformer is dedicated to all applications up to 80 MVA and is designed to meet your needs. Our broad range for Minera MP transformers includes:

- Three phase units (single phase available on request)
- Ratings up to 80 MVA, 50 or 60 Hz
- Voltage insulation level up to 170 kV
- Breathing or sealed type
- A wide range of accessories
- High capacity cooling options such as ONAN, ONAF, OFAF, OFWF or others upon request
- Standard or low noise levels
- Off-circuit tap changer (OCTC) or on load tap changer (OLTC)



Minera MP oil-immersed transformers are also available upon request for special applications including rectifier, hazardous area transformers, reactors (shunt and series), auto-transformers, step-up transformers, Solar power plant, Wind Mill Application etc.

Minera MP oil-immersed transformers meet the requirements of international standards such as ANSI, IEEE, IEC as well as other international/national standards.

## > The right tune for your network

Depending on your application and the different environmental influences you meet, we are able to deliver you a large variety of Minera MP transformers. Schneider Electric's R&D team has created special designs for all your particular needs:

- Breathing type and sealed type,
- For indoor application in buildings or industrial plants and in compact distribution substations,
- For outdoor applications,
- Normal noise level for urban or residential areas
- Normal, low or very low level of losses

As customer satisfaction is our main concern, we constantly improve our manufacturing process, thus we are able to speed up delivery time while ensuring that all ISO 9001, ISO 14001 and/or ISO 18001 requirements are met at each production step. To ensure this high level of quality, our Minera MP transformers undergo routine tests in accordance with international standards such as IEC, ANSI standards. We can also provide type tests or special tests on request.



ISO 9001, ISO 14001 and ISO 18001 Transformers units certifications

## > High quality level for more reliability

Our company follows a policy of continuous improvement taking into account the latest worldwide developments. This ensures that our transformers are state-of-the-art and fully compliant with the modern world's highest requirements: fast delivery time, improved quality and recycling capacities, reduced size and, on request, very low noise and losses values.

### Magnetic core

The transformer's magnetic core is manufactured from a high grade, cold-rolled, grain-oriented silicon steel. The lamination stacking is step lap type. The magnetic core is generally a multi-layer circular cross section and the slitting and cutting of the magnetic core is made by automated machines. In order to reduce transformer sound level to a minimum, the magnetic core and its framework are carefully sized to minimize the vibrations and, in particular, magnetostriction effects, which constitute the main sources of sound in medium power transformers. Moreover, in order to reduce the no-load losses and / or the no-load transformer current, the quality of the magnetic steel and the induction, together with the design of the magnetic core, are carefully chosen to meet the requirements.

### Tank construction

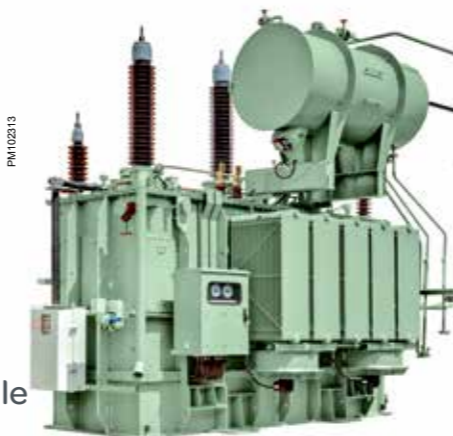
The main tank construction type is panel radiator type. The corrugated wall tank is also available in some ranges. Radiators are welded or removable. Tank welding is done by qualified welders. To validate the oil-tightness after complete assembly, the tank is leak tested under gas or liquid overpressure.

### Low voltage windings

The low voltage winding material is copper or Aluminium according to the rated power. The shape of the conductor is rectangular or foil type. To obtain a controlled temperature gradient, cooling ducts are added in the coil. The low voltage winding is built around the magnetic core. An insulating barrier is wound or installed around the low voltage coil in order to provide an electrical separation between LV and HV coils.

### Surface protection

One of our major quality commitment is to provide high-quality surface protection. The coating (painting) type is chosen in accordance with the environmental conditions considering the degree of pollution, humidity, etc. Zinc Spray / Hot dip galvanized Tank, HV/ LV covers and conservator can also be provided.



### High voltage winding

The high voltage winding material is copper or Aluminium according to the rated power. To obtain a controlled temperature gradient, the cooling ducts are added in the coil. High voltage coils are in long layers or disc type. Due to recent developments in the winding process, interlayer insulation and wire insulation have allowed the automation of the winding process.

### Tappings

The tap changers allow voltage adjustment for a variation of the supply network voltages on the primary side of the transformer or for increasing or decreasing the secondary voltage. Tappings are provided on the primary winding connected to an off-circuit or on-load tap changer. The operating handle for hand operated tap changer is mounted outside. In general, tapping range for off-load tap changer is 3, 5 or 7 position and for on-load tap changer it is from 7 to 27 positions. We provide tap position & range as per customer requirements.

## > Customer benefits



- Extremely versatile
- Robust construction
- High quality and reliability
- Continuous improvement
- Tailor made
- Highly economical thanks to reduced operating and maintenance costs
- Strong after sales support

## > Technical characteristics



Oil-immersed medium power transformers	With oil conservator or sealed
Manufacturing standards	IEC, ANSI, BS, AS, GOST, IEEE, IS, BS, etc.
Rated power	4 MVA - 80 MVA
Voltage level	Up to 170 kV
Phases	One or three phase unit
Voltage regulation	With off-circuit tap changer or on-load tap changer
Short circuit impedance	On request as per customer requirement
Rated frequency	50 Hz or 60 Hz
Vector groups	Dy, Yy, Yd as standard, others on request
Material thermal class insulation	According to IEC 60085 class A, and as per customer requirement
Temperature rise	Mean winding temperature rise: 65 K Top oil temperature rise: 60 K With ambient temperature in accordance with IEC 60076-1 The temperature of the oil cooling air should not exceed: <ul style="list-style-type: none"> <li>• 20°C yearly average</li> <li>• 30°C monthly average during the hottest month</li> <li>• 40°C at any time</li> </ul> For others ambient temperatures, winding and oil temperature rise can be adapted
Type of cooling	ONAN (Oil Natural Air Natural) (ONAF, OFAF, ODAF, OFWF or ODWF on request)
Dielectric liquid	Mineral oil according to IEC or ANSI standard (silicon, synthetic ester or vegetal oil on request).
Short circuit withstand ability	The transformers are designed to withstand the thermal and dynamic effects resulting of a secondary short-circuit in accordance with IEC 60076-5.
Sound level	The measurement (A-weighted sound pressure LpA) and the calculation of sound level (A-weighted sound pressure LwA) are done in accordance with IEC 60076-10. The sound level requirements are in accordance with national standards.
Installations	Indoor or outdoor
HV & LV terminals	HV terminals: plug-in or porcelain bushings LV terminals: busbars or porcelain bushings On request: cable boxes according to client / manufacturer standard or norm (i.e BS) requirements
Accessories	<ul style="list-style-type: none"> <li>• Standard: lifting lugs, earthing terminal, name and rating plate, oil filling plug, tap changer, bidirectional rollers if applicable.</li> <li>• Standard for sealed transformers: filling pipe or gas filling valve, oil drain valve, oil thermometer, oil level indicator.</li> <li>• Standard for transformers with conservator: oil level indicator, Buchholz relay, oil thermometer, dehydrating breather, terminal box, oil filling &amp; draining valves, filtering valves.</li> </ul> On request: pad lock / locking device for HV plug-in bushings, pressure relief device, pressure relay with contact, explosion vent, winding thermometer, sudden pressure relay, pressure monitor, rubber bag (only for conservator type), Gas analyzing purpose systems (such as Hydran), Seal-in Relay, Current Transformers for protection and measuring, Automatic Voltage Regulator Panel for OLTC, etc.