UNINDO

MINERA

Oil-immersed Distribution and
Medium Power Transformers



We offer you a complete range of oil-immersed distribution and medium power transformers adapted to the structure of your distribution network and suited to standard and special applications.

Our Large industrial worldwide platform provides a full range of produts at our customer's doorstep ensuring a shorter delivery time

QUALITY BASED ON YEARS OF EXPERIENCE

With more than 40 years of technical expertise and over two million oil-immersed transformers installed worldwide, we constantly design and improve the **Minera** transformer range to ensure optimum reliability and safety of your installations while offering the most cost-effective solution. You are sure to invest in a proven technology constantly enhanced in our competence centers.

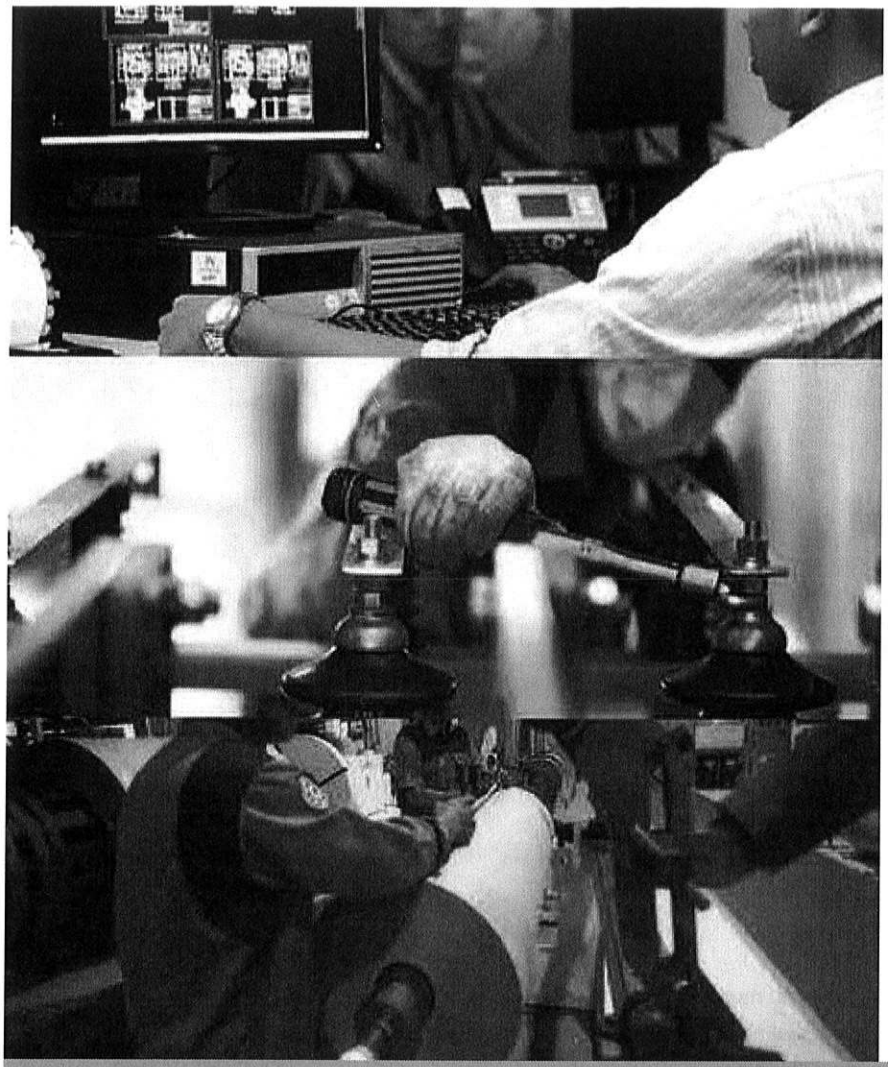
Our standard range of **Minera** transformers is available as:
Three phase units (single phase available on request)
With ratings up to 20 MVA, 72.5kV, 50/60 Hz (Higher ratings available on request)
Naturally cooled (ONAN) or air-forced (ONAF) upon request

We also offer transformers for special applications (rectifier, Oil & Gas Zone II, earthing, welding, transformers with OLTC, reactors, etc.)

Minera oil-immersed transformers meet the requirements of international standards such as ANSI, IEC, SPLN and individual country standards.

CUSTOMER BENEFITS

- High quality and realibility
- Economically optimized
- Capitalization of losses
- Reduced dimensions
- Solid construction
- Long life-cycle
- Low maintenance
- Eco-friendly solution



MINERA, THE RIGHT TUNE FOR YOUR NETWORK

Depending on the application and environmental influences, you might require a different type of oil-immersed transformer. Minera can deliver the flexibility you require:

- Breathing type with conservator, hermetically sealed or nitrogen gas cushion sealed type
- For indoor applications: in buildings or industrial plants, or in compact distribution substations
- For Outdoor applications: ground mounted but also pad or pole mounted
- Low noise levels for urban or residential areas
- Normal, low or very low level of losses to enhance the distribution network efficiency
- Vegetable Oil available on request



We constantly improve our manufacturing processes.

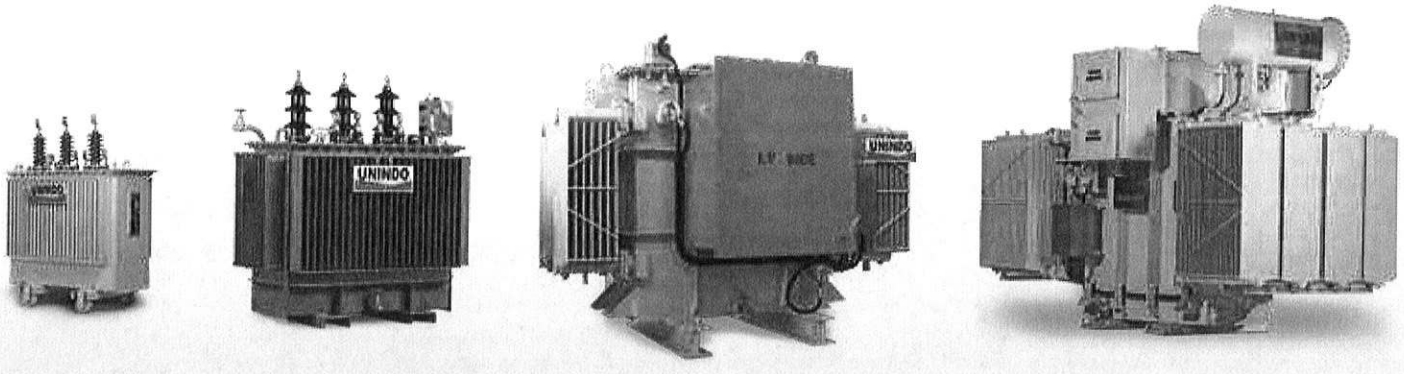
HIGH QUALITY LEVEL FOR MORE RELIABILITY

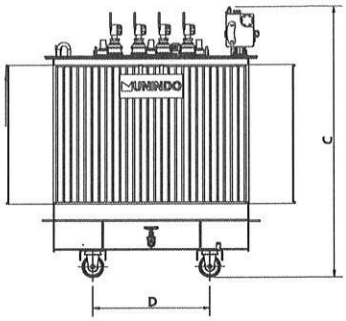
As a customer satisfaction is our main concern, we constantly improve our manufacturing processes. We have reduced our delivery times while ensuring a high quality level. All of our **Minera** oil-immersed transformer production sites are ISO 9001 or ISO 14001 and OHSAS 18001 certified.

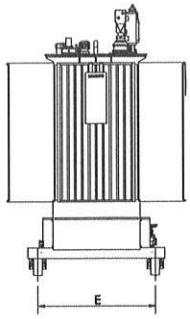
To ensure this high level of quality, our **Minera** transformers undergo routine tests in accordance with IEC standards. We can also proceed to type test or special tests on request.

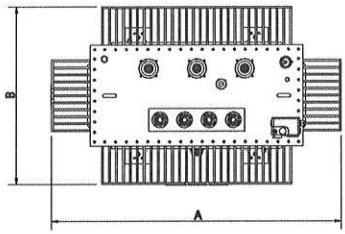
Our company follows a policy of continuous improvement taking into account the latest worldwide developments. This ensures that transformers are state-of-the-art and comply fully with the most strict requirements: fast delivery time, improved quality and recycling capabilities, reduced size and, on request, very low noise and very low losses.

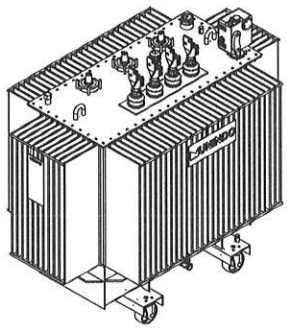
ISO 9001
ISO 14001
OHSAS 18001
BUREAU VERITAS
Certification











PRIVATE TRANSFORMER								
Highest System Voltage (HV)	Rated Power	Dimension (mm)					Weights (kg)	
KV	KVA	A	B	C	D	E	Total Inc Oil	Oil
<= 24 kV	400	1460	860	1457	670	670	1280	335
	500	1660	970	1512	670	670	1530	380
	630	1660	1020	1557	670	670	1760	475
	800	1700	1020	1657	670	670	2100	540
	1000	1800	1090	1737	820	820	2350	600
	1250	1880	1130	1787	1070	1070	3020	750
	1600	2000	1170	1845	1070	1070	3520	925
	2000	2300	1370	1845	1070	1070	4395	1155
	2500	2340	1370	2045	1070	1070	5390	1330
	3000	2580	1530	2188	1070	1070	6300	1670
	3150	2580	1530	2188	1070	1070	6310	1670

PLN TRANSFORMER - SPLN 03								
Highest System Voltage (HV)	Rated Power	Dimension (mm)					Weights (kg)	
KV	KVA	A	B	C	D	E	Total Inc Oil	Oil
<= 24 kV	25	800	470	1195	450	450	485	160
	50	1040	628	1234	450	450	490	180
	100	1150	667	1341	520	520	715	190
	160	1340	640	1356	520	520	1025	265
	200	1290	670	1446	520	520	1050	220
	250	1325	680	1461	520	520	1150	230
	315	1250	860	1679	520	520	1470	300
	400	1250	860	1679	670	670	1520	290
	630	1830	1040	1780	670	670	2215	530
	1000	1980	1140	1899	820	820	3155	726



IKPP, Serang - Indonesia


Thamrin City, Shopping Centre and Apartement, Jakarta - Indonesia

OIL-IMMERSED DISTRIBUTION TRANSFORMERS	Hermetically sealed, conservator type or $N_2^?$ Gas Cushion Type
RATED POWER	25 - 20.000 kVA (higher rating available on request)
INSULATION LEVEL	According to IEC U_M = 1.1, 3.6,7.2, 12, 17.5, 24, 36,72 kV According to ANSI up to 69 kV (higher ratings available on request)
PHASES	3-phase (single phase is available on request)
TAPPINGS	±2.5% or ± 2x2.5% (or different ranges on request)
SHORT CIRCUIT IMPEDANCE	Uk=4% for P < 630 kVA and $U_M \leq$ 24 KV Uk=4 or 4.5% for P ≤ 630 kVA and U_M = 36 kV Uk=6% or above for P > 630 kVA Difference value also available on request
RATED FREQUENCY	50 Hz (60 Hz on request)
VECTOR GROUPS	Yzn recommended up to 50 kVA with $U_M \leq$ 24Kv Yzn recommended up to 100 kVA with U_M = 36 kV Dyn for all other rated power (any vector group according to IEC, ANSI, and other international Standards) Dyn for all other rate power (any other vector group according to IEC, ANSI, and other international Standards)
MATERIAL THERMAL CLASS INSULATION	According to IEC 60085 class A
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 cooling air should not exceed: • 20°C yearly average • 30°C monthly average of the hottest month • 40°C at any time For other ambient temperatures, winding and oil temperature rise should be adapted
TYPE OF COOLING	ONAN (Oil Nature Air Natural) or ONAF on request
DIELECTRIC LIQUID	Mineral oil according to IEC or ANSI standard On request : silicon, midel, vegetable oil
ABILITY TO WITHSTAND SHORT-CIRCUIT	The transformers are designed to withstand the thermal and the dynamic effects resulting from a secondary short-curcuit in accordance with IEC 60076-5
SOUND LEVEL	The measurement (A-weighted sound pressure LpA) and the calculation of sound level(A-weighted sound level 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 On request : protective boots for HV/LV bushings
ACCESSORIES	• Standard : lifting lugs, earthing terminal, name and rating plate, oil filting plug, off circuit tap changer, bidirectional rollers if applicable (out of scope hanging pole transformer) • On request : pad lock/locking device for HV plug-in bushings and /or tap changer, protective relay (DGPT2, RIS, DMCR,...), oil level indicator, thermometer, with or without contacts, pressure relief device, pressure relay with contact, oil drain plug with/without sampling device, filling valve, drain valve, explosion vent, winding temperature indicator (OTi + WTI) Accessories for conservator : dehydrating breathing Buncholz relay, drain plug, oil level indicator.

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