

CONCEPT

Single phase insulated power voltage transformers are connected to the high-voltage system and used for a direct supply of low-voltage-level electrical power for station service or remote consumers. Based on the well-proven design of the VPU open-core inductive voltage transformer, the VPT power voltage transformer inherits all the features and advantages of that type of instrument transformer and combines them with design traits specific for power transformers for an exceptional power delivery solution.

APPLICATION

Power voltage transformers can be used for a multitude of applications, with the most common listed below:

- Power supply of auxiliary systems and services within a substation
- Power supply of remote industrial consumers (communication towers and antennae, mines, pump stations)
- Temporary supply of local consumers during substation construction
- Rural electrification

PERFORMANCE

- Um: 72,5 kV up to 550 kV
- Rated output: 10 – 333 kVA single phase
- Rated secondary voltage according to customer requirements (typically from 120 V to 1000 V)
- One or two power windings for individual use, serial, parallel or open delta connections
- Additional measuring or protection windings with various accuracy options available
- Unique design with an open magnetic core – ensuring ferroresonance immunity and service safety

WHY USE A POWER VOLTAGE TRANSFORMER?

- Reliable power supply directly from the high-voltage system
- Dual function - Possible provisions for power supply and measuring or protection purposes in a single enclosure
- Eliminates the need for auxiliary supply via a power transformer tertiary winding or a separate distributive transformer
- Small footprint due to a compact design
- Substantial reduction in building costs of a substation intended for the supply of power to remote consumers or rural electrification
- High operation safety

MAIN FEATURES

- High-quality paper-oil main insulation
- Partial discharge free on power-frequency withstand voltage
- Hermetically sealed with a stainless-steel bellows oil expansion system
- Standard ambient temperatures from -35°C to +40°C, extreme temperature range available upon request
- High quality porcelain or composite (silicone shed) insulator, depending on customer preference
- High level of seismic performance according to the latest revision of the IEEE 693 standard. Conformance to any national or regional standard also possible
- Minimum oil design and PCB free – environment friendly
- Explosion safe design that limits the energy under internal fault conditions
- Advanced corrosion protection for maritime, industrial or other demanding installation locations
- Maintenance free

INCLUDED ACCESSORIES

- Series and parallel reconnection of the power winding
- Terminal for dielectric dissipation factor (tgδ) measurement
- Oil level indicator
- Transport shock indicators
- Bolt or connector for transformer earthing
- Oil sampling valve
- Provisions for lifting

OPTIONAL ACCESSORIES

- Up to two additional metering or relaying windings
- Off-load voltage regulation in the secondary terminal box
- Internal overpressure indicator
- PT-100 probe for the continuous measurement of thermal performance
- Low voltage fuse or circuit breaker in the secondary terminal box

STANDARD CHARACTERISTICS AND DIMENSIONS

Our units are custom made according to customer specification and preference. The table below contains indicative values referring to our standard units with porcelain insulators. Any dimension or characteristic listed can vary, depending on electrical, mechanical and environmental parameters specified in the customers' inquiry. The values are susceptible to change in the course of technical development.

TYPE	HIGHEST VOLTAGE FOR EQUIPMENT [kV]	RATED POWER-FREQUENCY WITHSTAND VOLTAGE [kV]	RATED LIGHTNING IMPULSE WITHSTAND VOLTAGE [kV]	DESIGN		DIMENSIONS [mm]			WEIGHT [kg]	OIL VOLUME [l]
				SIZE	RATED POWER [kVA]	TOTAL HEIGHT	BASE MOUNTING	CREEPAGE DISTANCE		
VPT-72,5	72,5	140	325	Small	Up to 25	3170	□ 450	> 1815	950	204
				Medium	Up to 50	3325	□ 650		1350	275
				Large	Up to 100	4390	□ 750		2350	506
				Extra Large	Up to 333	6710	□ 1200		5950	1458
VPT-123	123	230	550	Small	Up to 25	3170	□ 450	> 3075	950	204
				Medium	Up to 50	3325	□ 650		1350	275
				Large	Up to 100	4390	□ 750		2350	506
				Extra Large	Up to 333	6710	□ 1200		5950	1458
VPT-145	145	275	650	Small	Up to 25	3170	□ 450	> 3625	950	204
				Medium	Up to 50	3325	□ 650		1350	275
				Large	Up to 100	4390	□ 750		2350	506
				Extra Large	Up to 333	6710	□ 1200		5950	1458
VPT-170	170	325	750	Small	Up to 25	3170	□ 450	> 4250	950	204
				Medium	Up to 50	3325	□ 650		1350	275
				Large	Up to 100	4390	□ 750		2350	506
				Extra Large	Up to 333	6710	□ 1200		5950	1458
VPT-245 / VPT-300	245 / 300	460	1050	Small	Up to 50	4390	□ 750	> 6125	2450	506
				Medium	Up to 100	5285	□ 800		3050	605
				Large	Up to 150	5695	□ 800		4090	946
				Extra Large	Up to 333	6710	□ 1200		5950	1458
VPT-362	362	510	1175	Small	Up to 50	5190	□ 750	> 9050	2550	605
				Medium	Up to 100	5285	□ 800		3050	605
				Large	Up to 150	5695	□ 800		4090	946
				Extra Large	Up to 333	6710	□ 1200		5950	1458
VPT-420	420	630	1425	Small	Up to 50	5190	□ 750	> 10500	2550	605
				Medium	Up to 100	5285	□ 800		3050	605
				Large	Up to 150	5695	□ 800		4090	946
				Extra Large	Up to 333	6710	□ 1200		5950	1458
VPT-525	550	680	1550	Small	Up to 50	6375	□ 900	> 13750	3550	1045
				Large	Up to 150	6710	□ 1200		5950	1458
				Extra Large	Up to 333	7140	□ 1200		7500	1716

VPT

POWER VOLTAGE TRANSFORMERS
72,5 to 550 kV
10 to 333 kVA

KONČAR
Končar - Instrument transformers, Inc.



Quality assurance

Končar power voltage transformers are designed in compliance with IEC, ANSI/IEEE, GOST, AS, IS, CAN/CSA, JIS or any other relevant standard. Product quality is assured through a certified quality standard, the ISO 9001, covering all aspects of design, production and testing. Končar - Instrument transformers Inc. is ISO 14001 and ISO 45001 certified, ensuring compliance with environmental and occupational health standards. Our testing facilities are accredited according to the ISO/IEC 17020 and 17025 standards, with results traceable to any ILAC signatory worldwide.

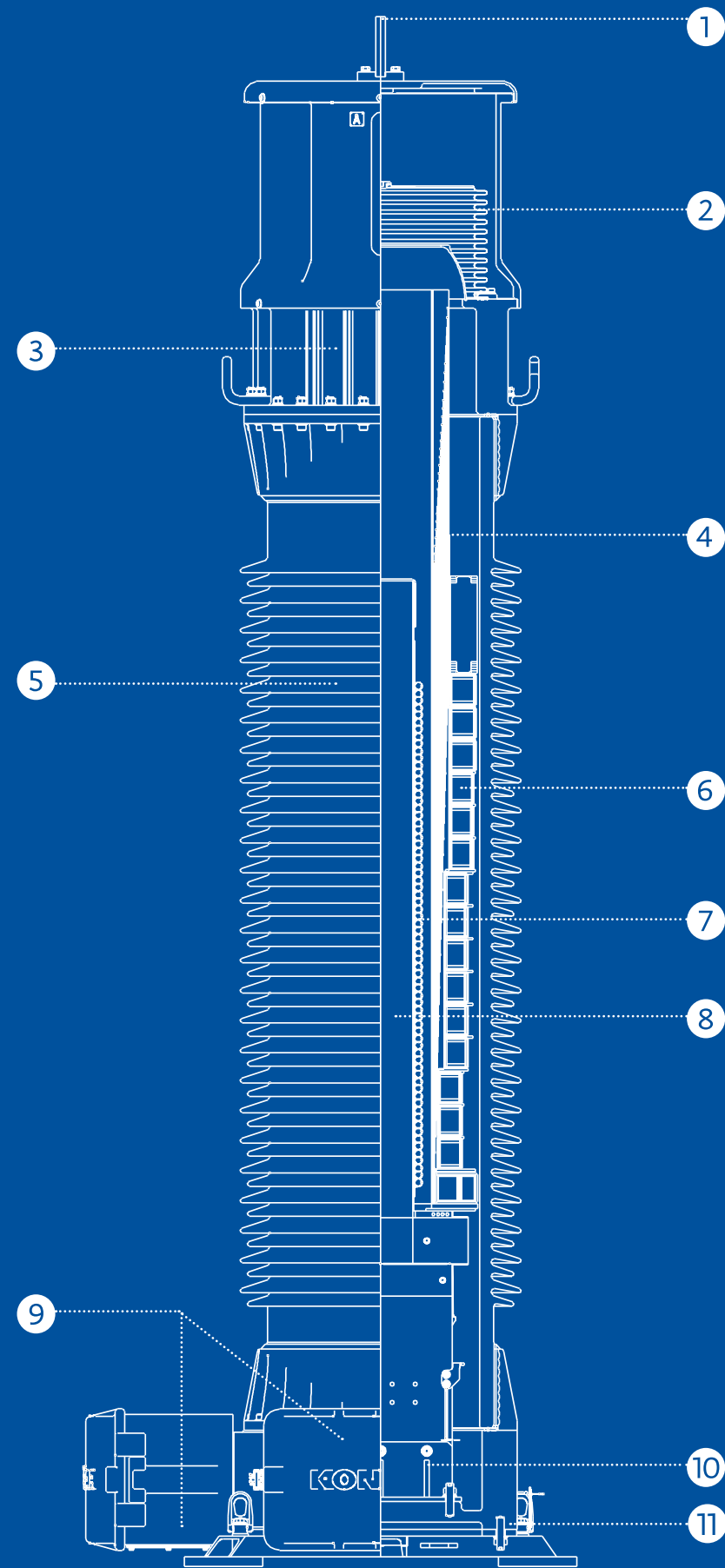


TRANSFORM EVERYDAY

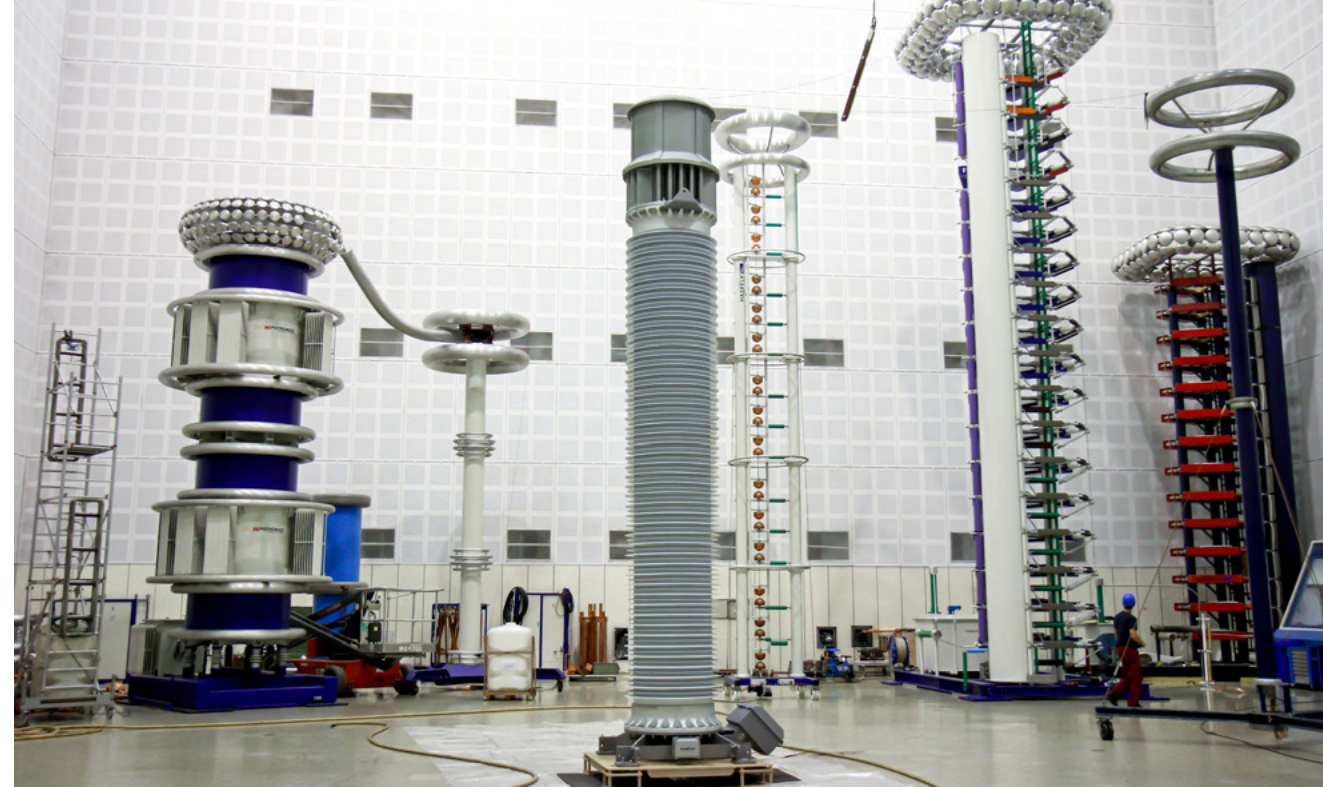
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|--|------------------------------|------------------------|
| 1. PRIMARY TERMINAL | 5. INSULATOR | 10. BASE ASSEMBLY |
| 2. STAINLESS STEEL BELLOWS / OIL LEVEL INDICATOR | 6. SECTIONED PRIMARY WINDING | 11. OIL SAMPLING VALVE |
| 3. HEAT SINK | 7. SECONDARY WINDING | |
| 4. MAIN INSULATION | 8. OPEN CORE | |
| | 9. SECONDARY TERMINAL BOXES | |



DESIGN

Primary Winding

The advantage of the open-core design lies in having the primary winding composed of multiple sections uniformly stacked vertically along the height of the transformer. This ensures a controlled distribution of dielectric stress on internal and external insulation.

Due to a slender design and a large surface for heat transfer, the sectioned primary winding ensures excellent cooling properties.

Off-load tapping can be provided on either the secondary or the primary winding. In both cases, the tap connections are available in the secondary terminal box.

Magnetic Core and Secondary Windings

The magnetic core is made of stacked silicone steel sheets. The open core (single limb) ensures a linearized magnetizing characteristic of the transformer, which eliminates the possibility of ferroresonance within the power system.

Secondary windings are wound with high-grade insulated copper conductor directly onto the core. For improved short circuit withstand capability, a large conductor cross-section and a system of mechanical supports is used, thus ensuring a safe operation in fault conditions.

In order to minimise stray losses, the secondary winding is made from several enamel-insulated conductors connected in parallel or from stranded cables, depending on the power rating of the transformer.

Paper-Oil Insulation

The high-voltage primary side is insulated from the low-voltage secondary side with oil-impregnated paper of high dielectric strength.

Conductive capacitive screens are inserted between layers of paper insulation to adequately distribute the high-frequency overvoltages. The paper insulation is dried in high vacuum and impregnated with high-grade inhibited or uninhibited, degassed and dried (moisture content of no more than 2 ppm) mineral transformer oil.

The paper-oil insulation is closed in and hermetically sealed from ambient air with stainless steel bellows, which also compensate for thermal oil expansion and serve as both an expansion mechanism and an oil level indicator.

All these features ensure excellent and long-lasting dielectric properties of the transformer's main insulation system.

We guarantee the oil in our transformers does not contain polychlorinated biphenyls and terphenyls (PCB & PCT).

Insulator

As per request, external insulation can be either porcelain or composite. Porcelain insulators are made of the highest quality C130 aluminous porcelain, while the composite insulators are composed of a glass-fibre reinforced resin tube and silicone rubber sheds.

The insulator creepage distance is based on the ambient air pollution and is to be quoted in the inquiry.

Enclosure

The transformer enclosure consists of the base assembly, insulator, heat sink, bellows and bellows cover.

The active part of the transformer is located inside the insulator. This concept is similar to that of a power transformer bushing and is designed to achieve minimal oil volume.

The transformer base is made of high-quality steel, which is hot dip galvanized and additionally painted for long-lasting corrosion resistance. It contains the secondary terminal box, oil sampling and filling valve, lifting lugs, earthing terminals and an optional oil overpressure indicator. Several levels of corrosion protection can be specified, depending on environmental conditions at the installation site.

The size and type of the earthing terminals are to be defined in the inquiry. The standard connection is bolt type (M12 x 35) or a stranded copper conductor clamp.

Every transformer is subjected to a rigorous vacuum sealing test to ensure a perfect hermetical sealing of the entire enclosure.

The VPT power voltage transformers have been seismically tested and meet all the requirements of the latest version of the IEEE 693 Standard or equivalent seismic standards.

Terminals

The high-voltage primary terminal can be made of aluminium or galvanic corrosion-protected electrolytic copper. The terminal shape and type is selected according to the applicable standards, unless specified otherwise in the inquiry.

Secondary terminals, along with protective devices and other additional accessories, reside in the secondary terminal box. Cable glands or plates provide entry to the box and are designed according to customer specification and preference.

The size, type and material of the secondary terminals depend on the transformer power rating, relevant standard and customer requirements and practice.

Explosion-Safe Design

One of the main advantages inherited from the inductive voltage transformer design is service safety.

In an unlikely case of a failure between turns or between layers within the primary winding, the fault remains localized to only one section and cannot spread to the entire primary winding. This feature limits the fault current and ensures inherent explosion safety of the VPT power voltage transformers. This feature is independent of the insulator type.

Furthermore, in case of an unexpected oil pressure rise, the controlled pressure compensation and release take place through the metallic bellows without spilled oil, thus preventing a more severe damage to the transformer. This also results in the mechanical detachment of the bellows cover, which can serve as an additional disconnect mechanism from the HV grid. Finally, our transformers can be equipped with an oil overpressure indicator used to signal the operator or a control system in case of an irregular pressure rise and operate as a simple, robust and reliable on-line monitoring system.

KEY VALUES

EXPERIENCE

More than 70 years of experience in the design, manufacture, testing and delivery of instrument transformers

PRESENCE

Over 100 countries across all continents

EXPERTISE

We are not only manufacturers, but also engineers and researchers. Turn to us for advice, recommendations and guidance

TAILOR-MADE DESIGN

We cater to any customer requirement
Your units are being built just for you

LONGEVITY

Our insulation system design philosophy, rigorous internal testing criteria and advanced quality control allow us to declare a 50-year service life of our units

SERVICE

Continuous after-sales services are always available for any questions or doubts you may have, both technical and commercial