DDN/DFN SERIES

Coupling capacitor:
model DFN up to 800 kV;
model DDN up to 170 kV.

DESIGN AND MANUFACTURING

Coupling capacitors consist of a number of capacitors connected in series. The capacitors, impregnated with high grade dielectric oil, are housed in one or more insulators. Each of them forms an hermetically sealed independent unit, with a very stable capacitance over time.

The high frequency terminal for the PLC signal comes out from the bottom of the unit and it is connected to the HF carrier accessories.

CHARACTERISTICS

- Carrier accessories for HF signal transmission.
- Robust mechanical strength.
- Excellent response under extreme environmental conditions: Temperatures from -60°C up to +60°C, high altitudes, seismic hazard areas, violent winds, etc.
- Maintenance-free throughout their complete lifespan of more than 30 years. Only periodic monitoring is recommended.
- Hermetically sealed to guarantee complete water tightness with the minimum volume of oil. Each unit is tested individually.
- Metallic oil level compensating system that effectively regulates changes in oil volume mainly caused by temperature.
- Officially homologated in-house testing facilities.
- Quality management system certifications: ISO9001, ISO14001 and OHSAS 18001.
- Each unit is routine tested following applicable standards.
- Complete type tests reports following international standards.
- Compliance to any international or domestic standards.
- Environmentally friendly. The materials used for construction are recyclable and resistant to the elements. Its advanced design adheres to environmental regulations using high-quality insulating oils, free of PCBs.
- Reduced size due to a compact design that is easy to transport, store and install, and which reduces visual impact.

OPTIONS:

- Line trap mounted on top of the Coupling Capacitor.
- Porcelain or polymeric insulators.
- Wide range of capacitance values available.
- Wide range of primary terminals.

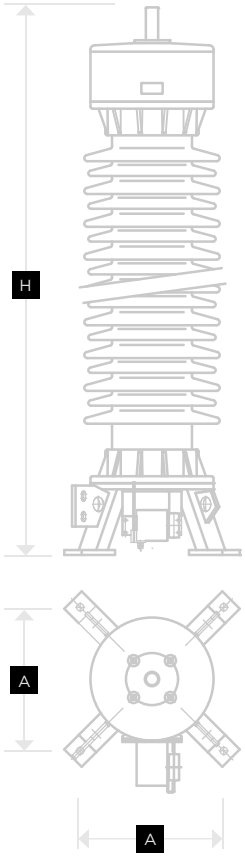
RANGE

This series is named with the letters DDN or DFN followed by 2 or 3 numbers indicating the maximum service voltage for which they have been designed.

The table shows the range currently manufactured by ARTECHE. These characteristics are merely indicative. ARTECHE can manufacture these transformers to comply with any domestic or international standard.

Coupling capacitors

Model	Highest Voltage (kV)	Rated insulation level			Standard capacitance (pF)	High capacitance (pF)	Standard creepage distance (mm)	Dimensions		Weight (kg)
		Power frequency (kV)	Lightning impulse (BIL) (kVp)	Switching impulse (kVp)				A (mm)	H (mm)	
DDN-72	72.5	140	325	-	10300	25500	1825	450	1235	115
DDN-100	100	185	450	-	5700	14300	2500	450	1325	120
DDN-123	123	230	550	-	5600	14000	3075	450	1585	145
DDN-145	145	275	650	-	3900	19500	3625	450	1675	150
DDN-170	170	325	750	-	7500	16500	4250	450	1805	170
DFN-245	245	460	1050	-	5800	11000	6125	450	2625	255
DFN-300	300	460	1050	850	6000	12500	7500	450	2945	305
DFN-362	362	510	1175	950	4500	10100	9050	450	3415	345
DFN-420	420	630	1425	1050	3500	7700	10500	450	4335	495
		575	1300	950						
DFN-525	(525) 550	680	1550	1175	3000	6200	13125	450	5300	890
		800	1800	1173						
DFN-765	(765) 800	880	1950	1425	3000	4500	15300	450	6760	1095
		975	2100	1550						



These dimensions and weights are approximate based on standard requirements.
For detailed values please consult with Arteche. Higher capacitances available on request.

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Power Voltage Transformers (PVT) also known as Station Service Voltage Transformers (SSVT) are used to supply Low Voltage power directly from a High Voltage line up to 550kV. Located within the own substation they can provide power up to 333kVA per phase in a reliable and cost-effective way. They offer a wide range of applications, but they excel when substation auxiliary service power supply is needed in remote areas, making them an ideal solution for Renewable Energy substations.

PVTs were firstly used in North America decades ago. Due to the nature of the electrical network, SSVTs were intended to cover the auxiliary power supply needs in switching substations where neither a Power Transformer or a distribution line were available. Since then, the power output capabilities and the applications have expanded dramatically mainly for Renewable Energies.

PVTs design is close to an inductive voltage transformer to satisfy the dielectric requirement, coupled to a larger core similar to that used in distribution transformers. Using advanced materials and design, a fully rated compact dielectric design is developed. Such design is very akin between all kinds of PVTs despite there are different characteristics between them. PVTs are developed in both the oil and SF_6 insulated format, with a direct phase to ground connection and galvanic insulation between primary and secondary windings, which are coiled over the same magnetic core with independent insulation.

Low losses with impedance protection to limit fault currents.

APPLICATIONS

Power Voltage Transformers can be used within any high voltage substation as a low voltage power source to supply the substation auxiliary services (control and protection equipment, air-con, lightning, security systems, etc.). For this application, regulations require two or three reliable and independent sources. PVT is also exclusive and dedicated auxiliary service power source that ensure the reliability of the substation and compliance with the regulations. It can be used as a primary or back-up source.

These are some of the cases where PVTs can be used within substations:

- **Power supply for switching stations**. Switching substations are used to connect several transmission lines. The difference with usual step-up or step-down substations is that there is not any power transformer, and therefore, auxiliary service power supply cannot be obtained from the power transformer tertiary winding. Moreover, these substations are mostly located in remote areas, so distribution lines are not usually present nearby. The alternative options to PVTs are a new dedicated MV line (high construction and maintenance costs and unreliable) or a Diesel generator (Fuel cost, maintenance, CO_2 emissions).
- **Power Supply for Renewable Energy Substations**. High Voltage substations are needed to connect renewable energy generation plants such as wind or solar farms, to the main transmission network. These power plants are usually located in isolated areas, so a brand-new infrastructure is often needed (substation, transmission lines, and the like). Depending on the size, location and climate conditions, the LV power needs range between 100-500kVA. A transmission line connecting this substation to the main transmission system is therefore needed with a typical voltage ranging from 115 to 500kV. PVTs are located within the HV switchyard, and they can be connected in the busbars or at the entrance of the line, depending on the overall substation design.
- **Power supply for Conventional Substation Auxiliary services**. Unlike in the switching stations, there are usually distribution lines and/or medium voltage switchyards available within the substation, so the PVT can be used as a backup source.

Out of substations, PVTs can also be used as a LV power source. There are situations where there are not distribution networks in the area and power could be obtained directly from the HV line. Some of these applications are listed below:

- **Rural Electrification**. PVTs can act as a power source for supplying reliable power to small communities where there are no distribution lines nearby, but there are transmission lines. This application supplies low voltage power directly from HV line in an economical and practical way. With a single instrument transformer, up to 333kVA can be taken directly from a 245kV line and hundreds of households can get a cheap and reliable access to electricity. It is estimated that the costs saving compared to the traditional substation range between 60 to 80%.