Shunt Reactors for Medium and High-Voltage Networks
Versatile Shunt Reactors

Shunt reactors are used for various areas of application:
• Compensation of capacitive reactance of transmission cables, in particular in networks with light or no load.
• Reduction of system-frequency overvoltages when a sudden load drop or no load occurs.
• Improvement of the stability and efficiency of energy transmission.

Two type of shunt reactors are manufactured:
• With iron core divided by air gaps
• Without iron core, with magnetic return circuit.

The shunt reactors offer individual problem solutions:
They satisfy all the specified requirements regarding voltage, rating, type of operation, low-noise and low-loss levels, connection method and type of cooling, as well as transportation and installation.
Windings, insulation, tank, monitoring devices and connection method are the same as those found in the construction of transformers. However, shunt reactors have some special structural features and master certain problems due to physical factors differently.

Oil-filled shunt reactors are normally made with ONAN cooling, for high ratings also with ONAF cooling.

**Assembly of the iron core components:**
Insertion of the radially laminated limb column.

**Detail of an iron core divided by air gaps:**
Production has to satisfy very stringent standards to meet the specified tolerances.

**Accuracy in production is essential:**
Making low-vibration cores with radially laminated iron packages with particularly hard air-gap material.

**Coil and core assembly:**
33.3 Mvar single-phase shunt reactor 500/3 kV.

**Types of shunt reactors:**

- **a) Single-phase type with and without iron core and with magnetic return circuit.**
- **b) Three-phase type with iron core, with and without magnetic return circuit.**
Our Company can look back on more than a century of experience in the sector of transformers as the construction of shunt reactors has proved. In the course of the years we came up with many constructive solutions. The examples of applications listed below give some idea of the various technical implementations.

For the 275 kV network in Kuwait:
250 Mvar three-phase shunt reactor, 50 Hz frequency, ONAF cooling with cable connection box. For testing, the boxes are turned and bushings inserted.

Designed for very low noise emissions and compact dimensions:
150 Mvar shunt reactor, 345 kV.
Figure on the left: with sound-damping hood, sound pressure level of 59 dB(A) measured at a distance of 0.3 m.
Figure below: without hood, with separate radiator bank.
Unit with reduced overall losses:
110 Mvar shunt reactor, 400 kV, with attached radiators, ONAN cooling.
Siemens is one of the world’s leading suppliers of shunt reactors. This is confirmed by the great number of units sold with voltages of up to 735 kV and ratings up to 250 Mvar.

For the 400 kV cable network in Jiddah, Saudi Arabia:
250 Mvar three-phase shunt reactors, 60 Hz, ONAF cooling.
In the UHV test bay in Nuremberg (Figure on the left):
135 Mvar three-phase shunt reactor, 525 kV, being successfully tested and situated in Canada (Figure below).

Up to the highest voltages:
110 Mvar single-phase shunt reactors, 735/√3 kV for Canada.

For operation in the Danish high-voltage network:
60 Mvar shunt reactor, 420 kV, ONAN cooling.

Two 115-tonne consignments for overseas:
Loading one of the 250 Mvar three-phase shunt reactors on a ship in Rotterdam.
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