# HIGH VOLTAGE REACTORS



Product Spectrum



## Air Core Reactors

With more than 60 years of successful field experience, Trench is the recognized world leader in the design and manufacture of air-core dry-type power reactors for all utility and industrial applications.

A unique customer design approach, along with fully integrated engineering and manufacturing facilities in North America, South America and Europe, has enabled Trench to become the technical leader for high-voltage inductors worldwide.

#### PROVEN RELIABILITY

- · Trench developed today's air-core reactor technology
- Trench is the largest reactor manufacturer in the world
- Over 250,000 units in service worldwide
- Product lifetime of 30+ years
- All units are custom designed based on:
  - Over 6 decades of experience
  - Continuous R&D and product improvement
  - Three competence centers around the world
  - Management system certified to ISO 9001, 14001 and 45001







Reactors connected in series with the line or feeder.

#### **CURRENT-LIMITING REACTORS**

reduce the short-circuit current to levels within the rating of the equipment on the load side of the reactor (up to  $765 \, kV/2100 \, kV \, BIL$ )

### CAPACITOR REACTORS

are installed in series with a shunt-connected capacitor bank to limit inrush currents due to switching, to limit outrush currents due to close-in faults, and to control the resonant frequency of the system due to the addition of the capacitor banks (up to 765 kV/2100 kV BIL)

#### BUFFER REACTORS FOR ELECTRIC ARC FURNACES

stabilize the arc when operated at low electrode current and long arc length for the highest possible efficiency of the furnace

#### **DUPLEX REACTORS**

are current-limiting reactors that consist of two half coils magnetizing against each other. These reactors provide a desirable low reactance under normal conditions and a high reactance under fault conditions

#### LOAD-FLOW CONTROL REACTORS

are series-connected on transmission lines up to 765 kV.

The reactors change the line impedance characteristic so that load flow can be controlled, thus ensuring maximum power transfer over adjacent transmission lines











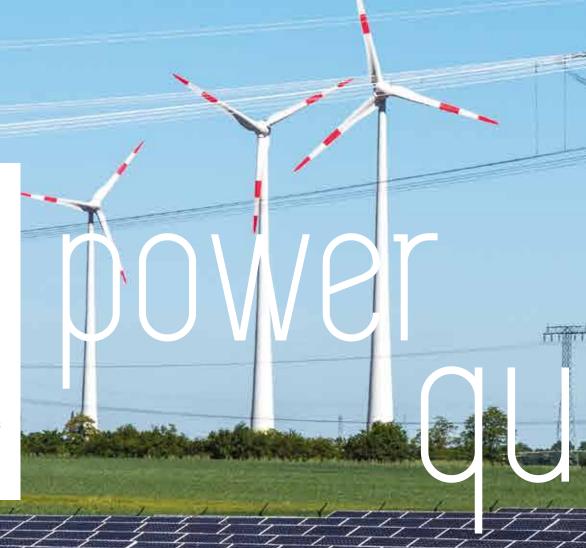
Filter reactors are used in conjunction with capacitor banks to form tuned harmonic filter circuits, or with capacitor banks and resistors to form broadband harmonic filter circuits.

If inductance adjustment for fine-tuning is required, the tapping range and tolerances must be specified.

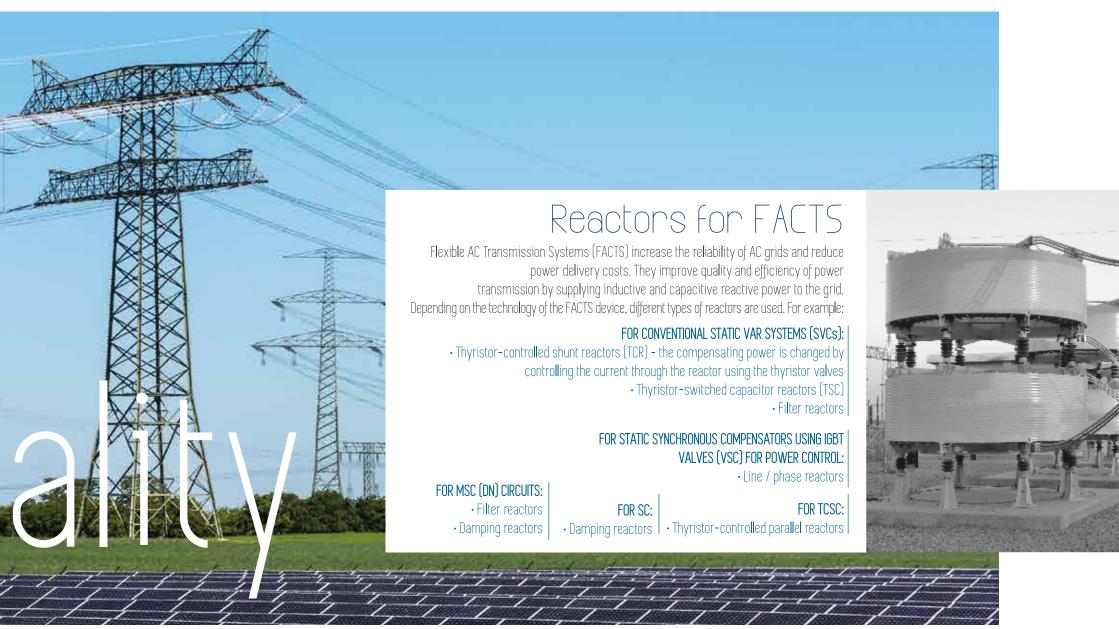
Many filter applications require a  $\mathbb Q$  factor that is much lower than the natural  $\mathbb Q$  of the reactor.

This is often achieved by connecting a resistor in the circuit.

An economical alternative is the addition of a de-Qing ring structure on a reactor. This can reduce the Q factor of the reactor by as much as one tenth without the necessity of installing additional damping resistors. These rings, mounted on the reactor, are easily coupled to the magnetic field of the reactor. This eliminates the concern of space, connection and reliability of additional components such as resistors.

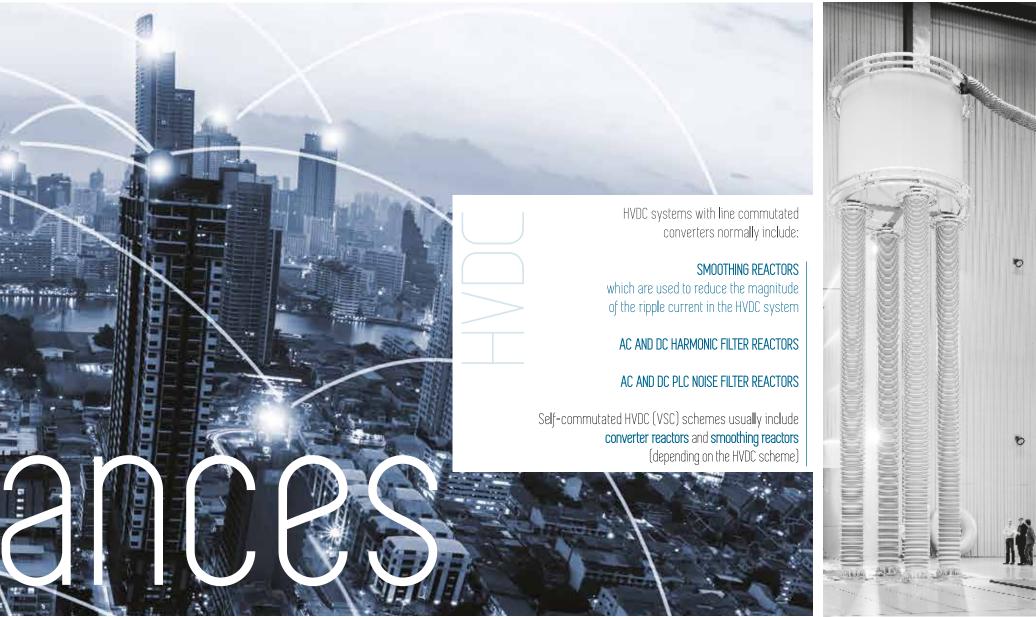


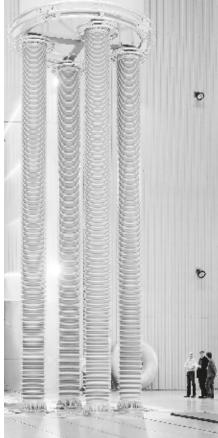


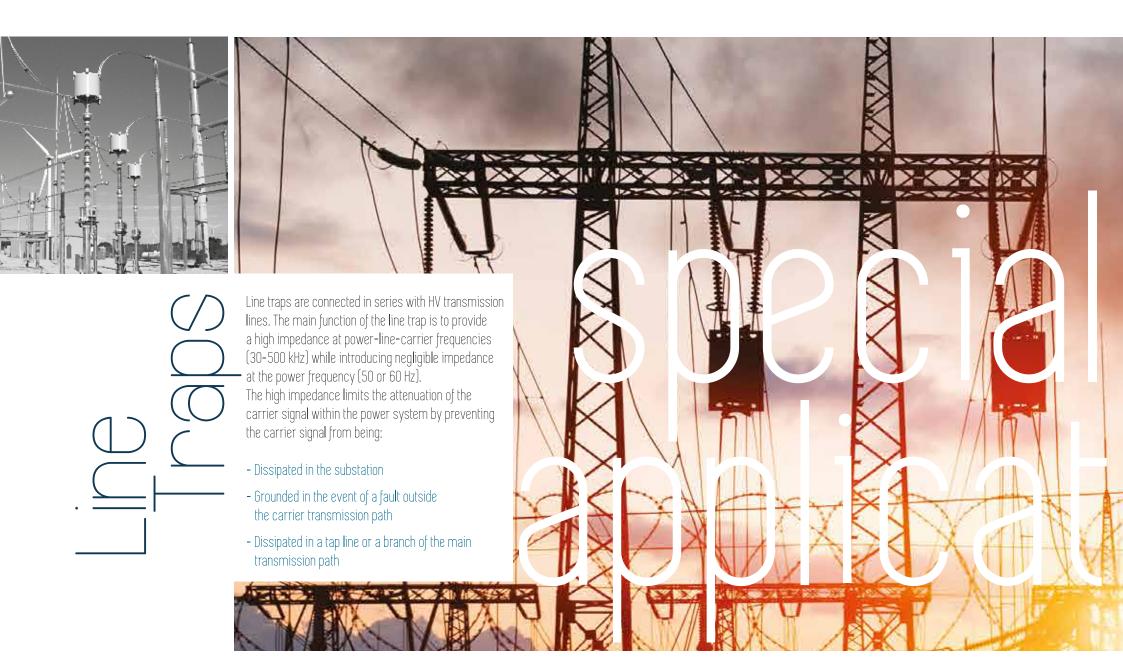


















### CPR 500

The capacitor filter protection relay (CPR 500) is specifically designed to provide comprehensive protection of medium and high voltage capacitor banks and filter installations.

#### PROTECTION FUNCTIONS:

Peak repetitive overvoltage protection to the 50th harmonic

Overcurrent, undercurrent & earth fault protection

Neutral unbalance protection with residual compensation

Line unbalance protection

Thermal protection for capacitor, inductor & resistor elements

Dual breaker fail protection with programmable logic

Capacitor re-switching protection









compensate for the capacitive line-to-earth current during a 1-phase earth fault. Because the electric system is subject to changes, the inductance of the ASC used for neutral earthing must be variable. Trench utilizes the plunger core coil, or the moveable-core design. Based on extensive experience in design, construction and application of ASCs, Trench products meet the most stringent requirements for earth-fault compensating techniques. The arc-suppression coil represents the central element of the Trench earth-fault protection system. In addition to the ASC, Trench offers a variety of advanced electronic earth fault compensation controllers and earth fault detection systems.







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