

# Protect and control your transformers

A power transformer is a significant investment, which deserves the best protection.

TODAY'S TECHNOLOGY ALSO allows reliable voltage control functions to be integrated into the same device as the protection functions to provide an economical solution without separate voltage regulating relays.

ABB has designed a numerical, multi-functional RET 521 terminal for the protection, monitoring and control of two- and three-winding power transformers, autotransformers, generator-transformer units, special railway transformers and shunt reactors - an ideal solution even for the most demanding applications.

This terminal provides complete protection, including the required back-up protection, and it can be equipped with an advanced voltage control functionality for a single transformer and for up to eight parallel transformers in any combination of parallel groups.

## Protection with unrivalled sensitivity

The primary task of RET 521 terminals is to protect power transformers. To do this, they incorporate a wide range of protection functions.

For instance, the differential protection function with up to five restraint inputs features an outstanding sensitivity down to two per cent for turn-to-turn faults.

The underimpedance, non-directional, directional and/or voltage controlled overcurrent functions, together with the thermal overload and overexcitation functions provide the necessary back-up protection.

This, together with fast and sensitive restricted earth-fault protection of stabilized low impedance type, with sensitivity down to one per cent of the total number of turns, ensures comprehensive protection for power transformers.

## Voltage control

A motor-driven on-load tap-changer (OLTC) regulates the voltage on the secondary side of the power transformer. The voltage control function generates a pulse to the OLTC once the measured voltage deviates from the set reference value by more than the preset deadband for a given time. Time delay is used to avoid unnecessary operation during short voltage deviations.

Tap changer control function includes line drop compensation and a load shedding functionality based on voltage reduction. Tap changer position monitoring with mA or BCD signals enables the supervision of the correct tap changer operation.

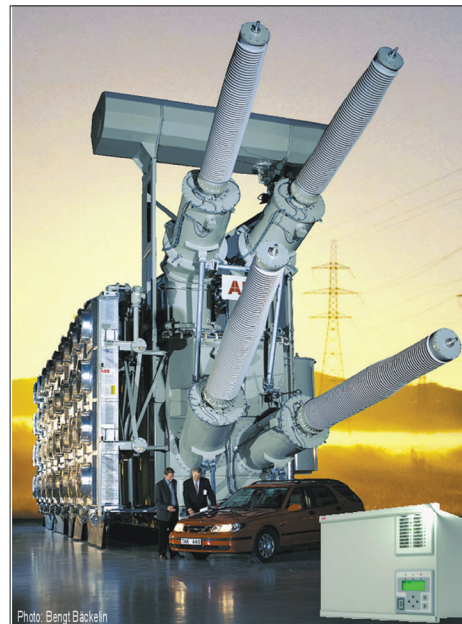
## Parallel transformers

For the control of parallel transformers, the RET 521 utilizes the minimum circulating current principle. This ensures the correct split of reactive power flow through all transformers connected in

the parallel group in accordance with their rating. At the same time, it ensures the proper regulation of the voltage level. The unique design of RET 521 allows the control system to automatically follow changes in the substation topology.

Correct tap-changer control is ensured by using the average value of measured voltages of all RET 521 units within the group.

This feature also allows easy and efficient supervision of VTs.



RET 521 terminals can be used for protecting and controlling power transformers of any size, from the smallest to the world's biggest. The freely programmable LED module of the terminal indicates, for instance, which protection function has operated.

Automatic control for a hot-stand-by transformer can also be included.

The RET 521 terminal is capable of measuring voltage on both sides of the transformer. When combined with user-specific logics, this feature helps prevent power system voltage collapse. ●

## Iraq signs power deal with Iran

POWER-STARVED IRAQ has signed an agreement with Iran to buy electricity, interim energy minister, Ayham Al-Samarrai said recently after completing a three-day visit to Iraq's former enemy.

"We have signed a letter of intent with the Iranian electricity minister, under the terms of which Iran will provide Iraq with between 100 and 130 MW of electricity," Samarrai told reporters in the southern city of Baquba.

"This quantity is not sufficient to resolve Iraq's problems, which require 15,000 MW," he said.

Commissions have been set up to strengthen co-operation in the power sector between the countries, which fought a bloody eight-year war.

Iraq currently produces 5,000 MW, far short of the 20,000 MW estimated requirements outlined by Samarrai last November. He said the country should be able to produce 12,000 MW by the end of this year.

Power shortages in conflict-shattered Iraq, which sits on massive oil reserves, frequently plunge cities and towns into darkness.