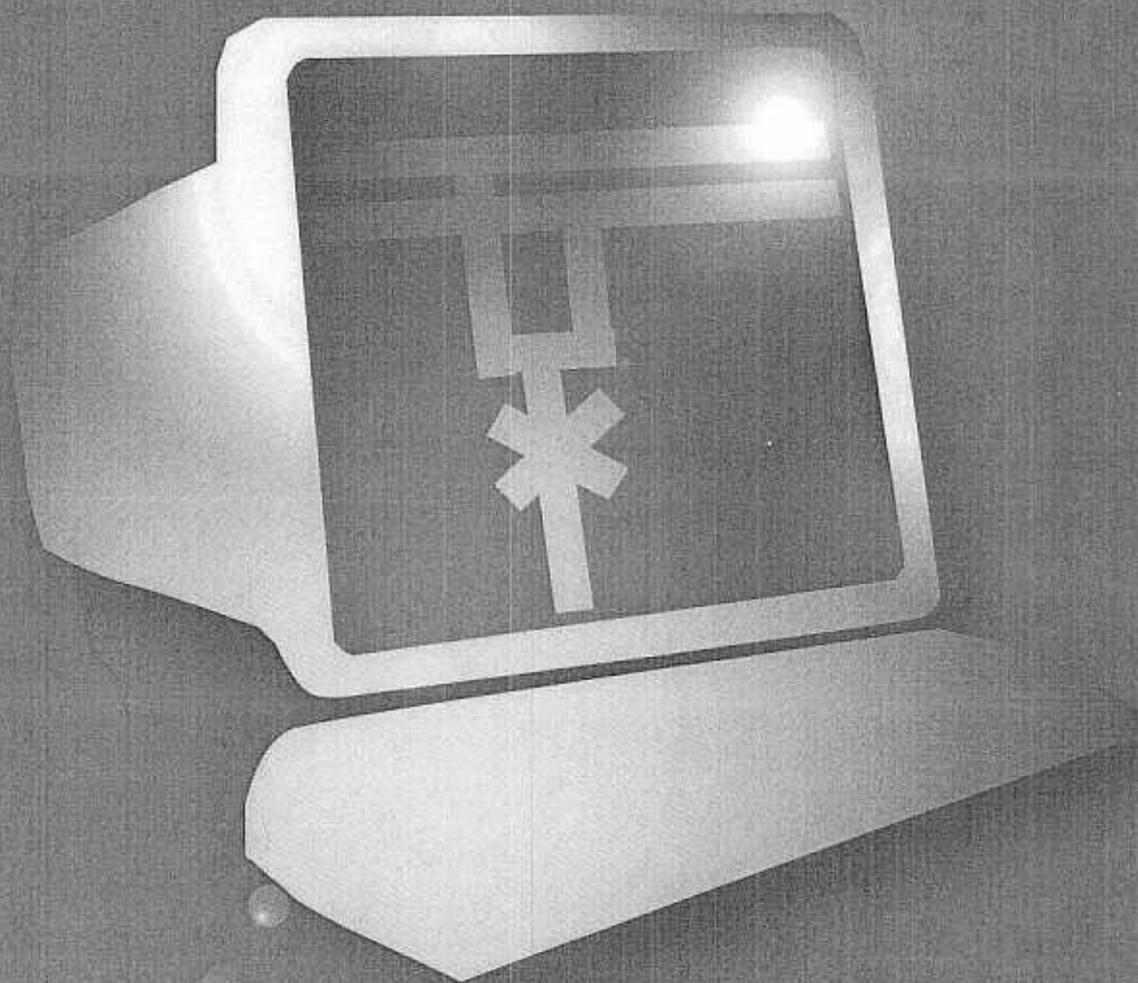


# Bay

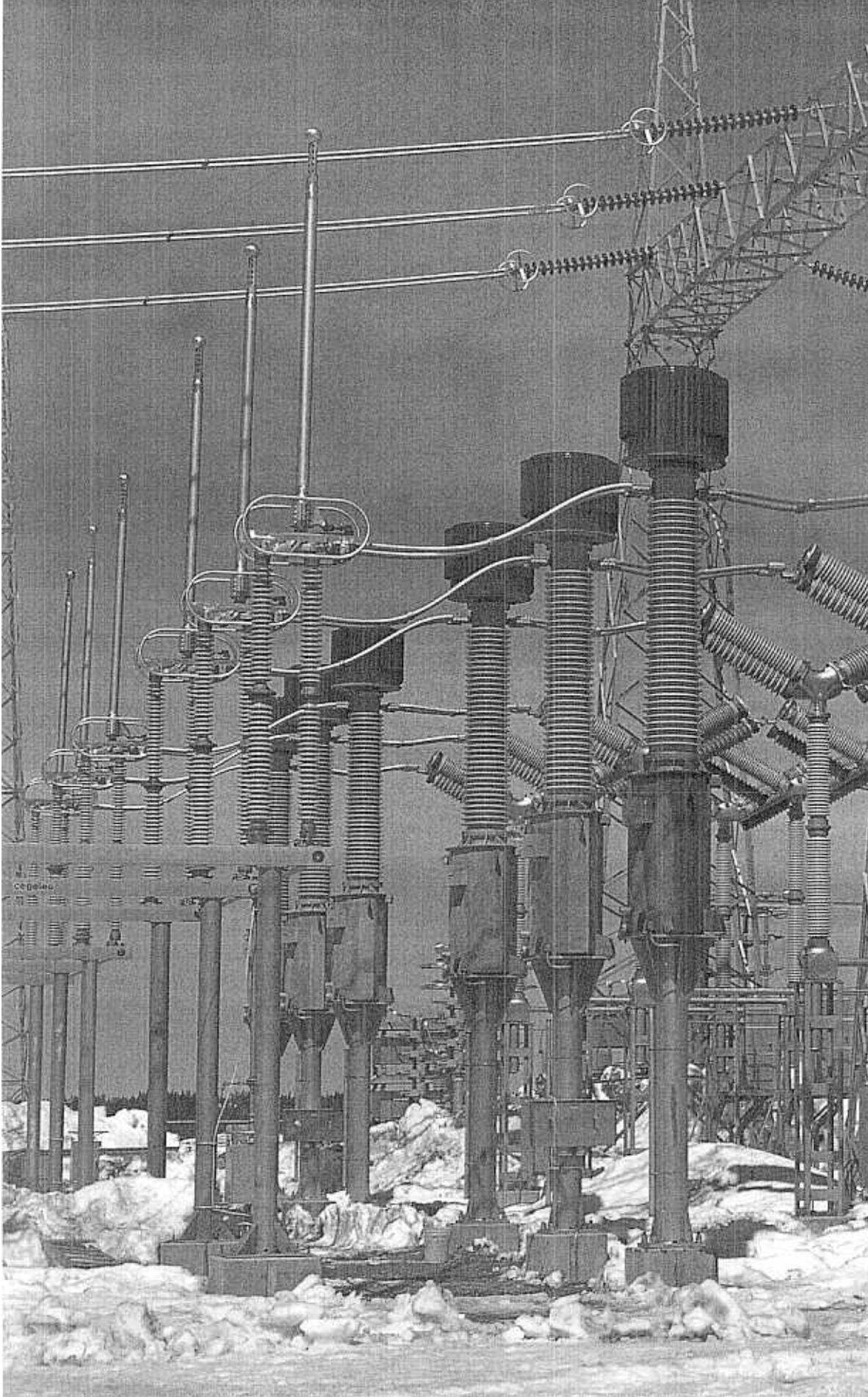
*Protection, Monitoring and Control*



*Panorama*

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**ABB**



Environmental concern in combination with increased demand for electric power imposes demands for better utilisation of the electric power network. In the race to improve utilisation efficiency, conventional technologies are no longer sufficient. The most recent generation of Information Technology (IT) brings protection and control terminals to the utility personnel instead of the other way around. This means benefits in terms of improved utilisation, substantial cost savings and new ways of acquiring all the information necessary for the efficient management of a power network.



# Substation Control with customer value

The main purpose of a Substation Automation System is to supervise, control and protect the transmission and distribution of electric power, i.e. to ensure the reliable flow of power. Traditionally this has been done with separate relays, installed in several cubicles per bay. However, modern demands for reduced costs, better utilisation and more efficient power network management call for solutions to satisfy a variety of requirements. Today's world of Information Technology (IT), information/super-highways and computers is rapidly improving the range of solutions available. IT is playing an increasingly important role in the area of Substation Control.

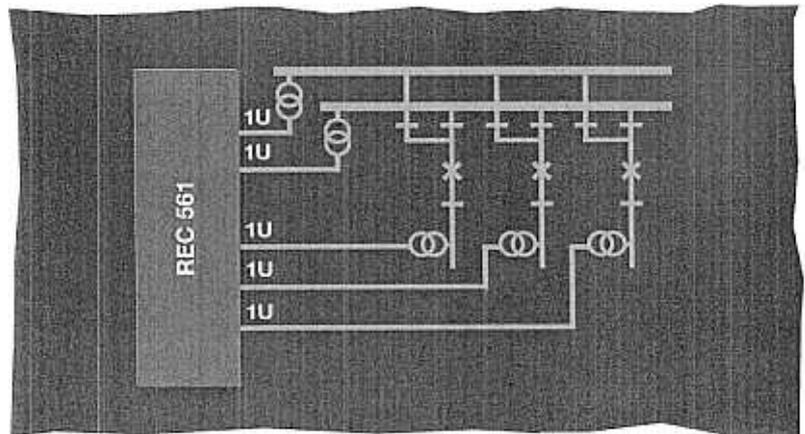
Just as a Local Area Network is the backbone in a PYRAMID® Substation Automation system, so too is knowledge the backbone of the REC 561 control terminal. Years of experience in the supply of protection and control terminals in Substation Automation applications have helped structure a versatile basis for handling different requirements. The result: the REC 561.

The flexible REC 561 terminal is suitable for various configurations stretching from cost-efficient solutions with a high degree of dependence, to optimised high-availability configurations. REC 561 control terminals include features which provide solutions for cost-effective configurations to meet the demand for uninterrupted power flow.

In cost-optimised solutions, one REC 561 handles the supervision and control of three high-voltage bays, with a separate synchro-check of each bay.

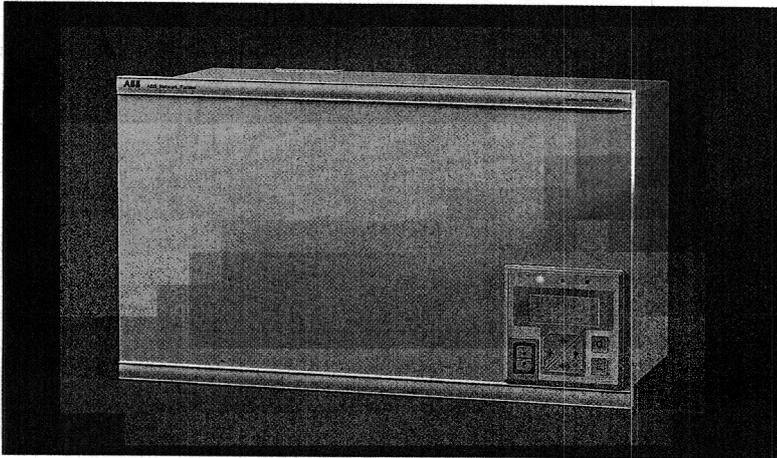


Information Technology is changing our way of working.



Reliable and cost-efficient power network management.

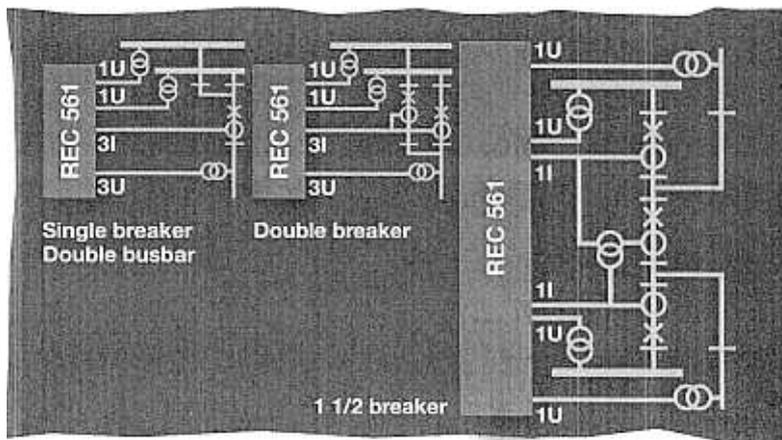
# Functionality of control terminal REC 561



The REC 561 control terminal is used at bay level in a Substation Control System to control and supervise circuit breakers, disconnectors and earthing switches, in any kind of switchgear/busbar arrangement.

Standardised pre-tested functions such as high-voltage apparatus control, interlocking, synchro-check and automatic reclosing are examples of useful functions in a bay, which can be implemented in the same hardware or control terminal while retaining high availability in the complete system. Binary and analog process signals are connected directly to REC 561, which fulfils the same EMC standards as applicable for

Application examples of different switchgear arrangements connected to REC 561.



high-voltage protections. The terminal is also provided with command output boards with double-pole outputs and supervision functions to ensure a high degree of security against unwanted operations.

## High-voltage apparatus control

The apparatus control function performs open and close commands for high-voltage apparatus and indicates status. This facility handles commands coming from different operator locations such as a station MMI, control centre or local panel.

## Interlocking

Interlocking means inhibiting the operation of high-voltage apparatuses in a switchgear, so as to prevent damage to the switchgear and personal injury to operators.

The interlocking function consists of software modules located in each control terminal. For station-wide interlocking, communication between modules in different bays is performed via the communication bus or hard-wired via the binary inputs/outputs.

## Pole discordance protection

This function applies to circuit breakers with individual operation gears per pole. A discordance caused by one pole failing to close or open can be tolerated only for a limited duration, for instance at single-phase reclosing.

## Configurable logic

A large number of configuration logic circuits such as OR gates, AND gates and timers are built into the REC 561 terminal and are thus available to the user.

#### **Time-tagged events**

All events are time-tagged at source, so the REC 561 terminal provides considerable accuracy with a resolution of 1 ms with minute pulse for synchronisation.

#### **Remote serial communication**

Two serial communication ports are available within the REC 561. This enables the control terminal to be integrated into the Substation Monitoring and/or the Substation Control System at the same time.

#### **Pulse counters for metering**

This function counts energy pulses for kWh and kvarh from external energy meters.

#### **Presentation of phase values**

Provides information on the actual primary and secondary phases of the voltages and currents as they enter the terminal.

#### **Synchronism and energising check**

This function provides an enable signal at set voltage, phase and frequency conditions across the breaker that should be closed.

#### **Fuse failure supervision**

Together with the energising check function there is a fuse failure detection facility to block uncontrolled energising in the event of a blown VT secondary fuse or tripped fuse switch.

#### **Single and/or three-phase auto-reclosing**

The reclosing function can be selected to perform single-phase and/or three-phase reclosing from eight single-shot to multi-shot reclosing programs.

#### **Breaker-failure protection**

The measurement is based on adaptive signal detection in order to achieve a high degree of security and sensitivity, together with a short resetting time.

#### **Loss of power system voltage**

This function will provide a delayed three-phase trip in case of loss-of-power system voltage in all three phases.

It can be used as a preparatory step for power system restoration.

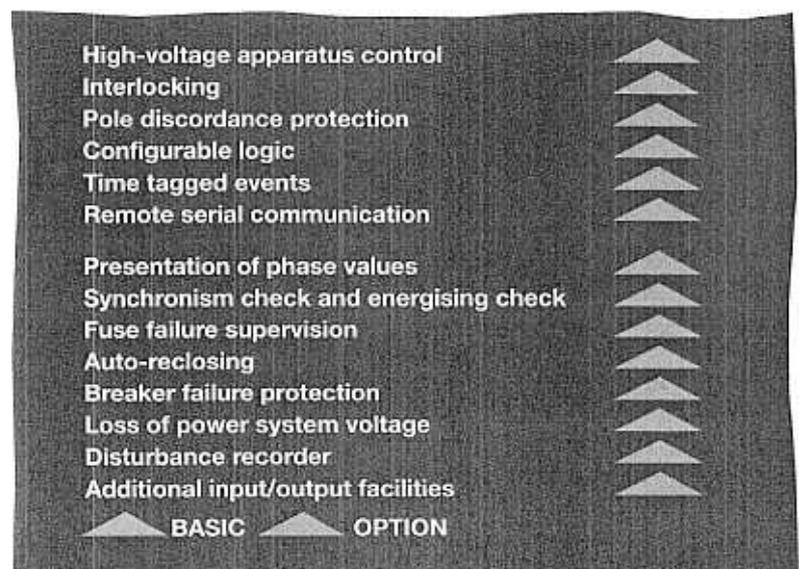
#### **Disturbance recorder**

A high-performance disturbance recorder can be included. The disturbance recorder can memorise up to 10 analogue and 48 binary signals and the minimum recording time is 10 seconds. Pre-fault and post-fault times can be set.

#### **Additional input/output facilities**

The basic version of REC 561 includes input/output (I/O) boards comprising twenty binary inputs and seventeen output relay contacts. Up to eleven additional I/O boards, each of them comprising sixteen binary inputs or twelve command outputs, or mixed boards with eight inputs and twelve outputs, or six analogue input channels for mA signals, are available as options.

Available functions.



# The 500 Series platform design

The use of this common platform, including all documentation, makes it extremely easy to integrate new products from the same range into the system.

A new product will be familiar from the beginning as regards programming, engineering, documentation and the man-machine interface (MMI). This implies easier training for a whole range of protection and control terminals.

Using this common platform also gives a minimum cost for stock and maintenance, since the same hardware is used in different types of protection and control terminals.

The platform is multiprocessor-based, which gives high redundancy and high security.

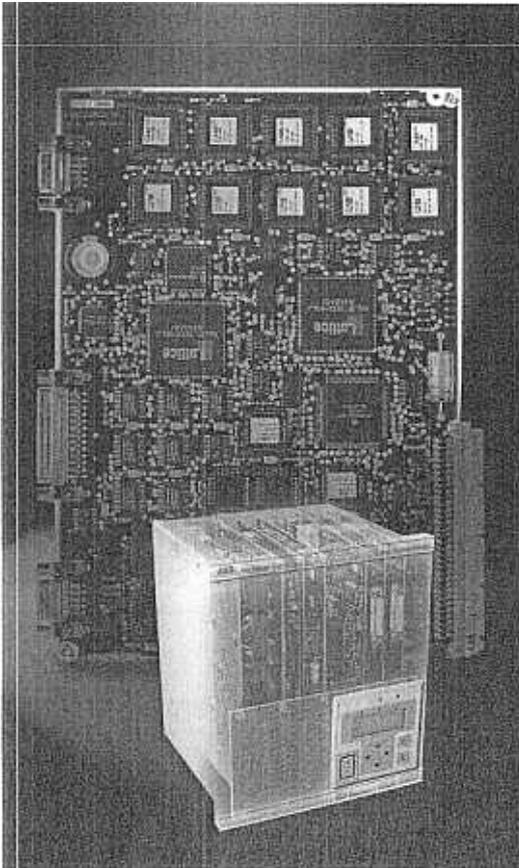
The multiprocessor scheme also ensures internal independence of the different functions, essential for defined trip times irrespective of the number of options added to the processor.

Behind the front there is an inter-connection board to which circuit boards are plugged from the rear.

There are modules with input transformers, A/D conversion, modules for processing, power supply and binary input and output signals. All binary inputs and relay outputs are configurable for different functions.

Electrical connections are made by screw terminals at the rear. The control terminal can be mounted in a 19" rack, or it can be flush or semi-flush mounted in a panel by using different mounting accessories.

The relays in the 500 Series can be equipped with two communication ports operating independently of each other, permitting simultaneous communication with two different masters. This gives the user the possibility of having both a monitoring and a control system in the same station.



The 500 Series uses the same hardware and software platform for protection and control applications. This results in a user-friendly product which is programmable through the built-in MMI, the PC connection at the front, the Station Monitoring System or Substation Control System. With the compact, safe and user-friendly 500 Series it is possible to configure your own intelligent terminal to provide optimum performance. This can reduce both installation and maintenance costs and also enable more efficient power system management reducing operational and disturbance costs and allowing better utilisation of the high-voltage equipment.

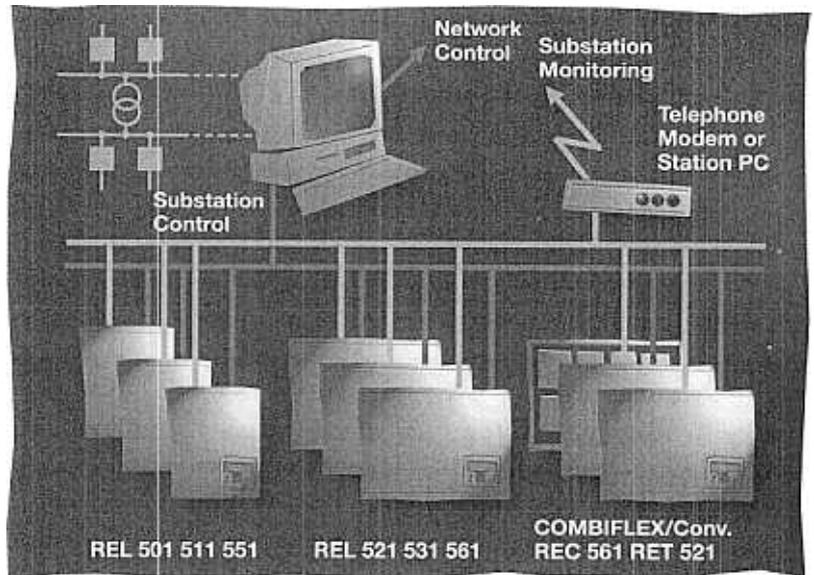


Each protection and control terminal is always equipped with a built-in local MMI, but a PC can also be connected to the front as a complement, for maintenance and fast commissioning.

# The intelligent path to reliable communication

The 500 Series is a part of the PYRAMID® concept for Substation Automation and the Panorama concept for Power Network Management: the intelligent terminal in the intelligent substation for the intelligent power network, from generation to consumption.

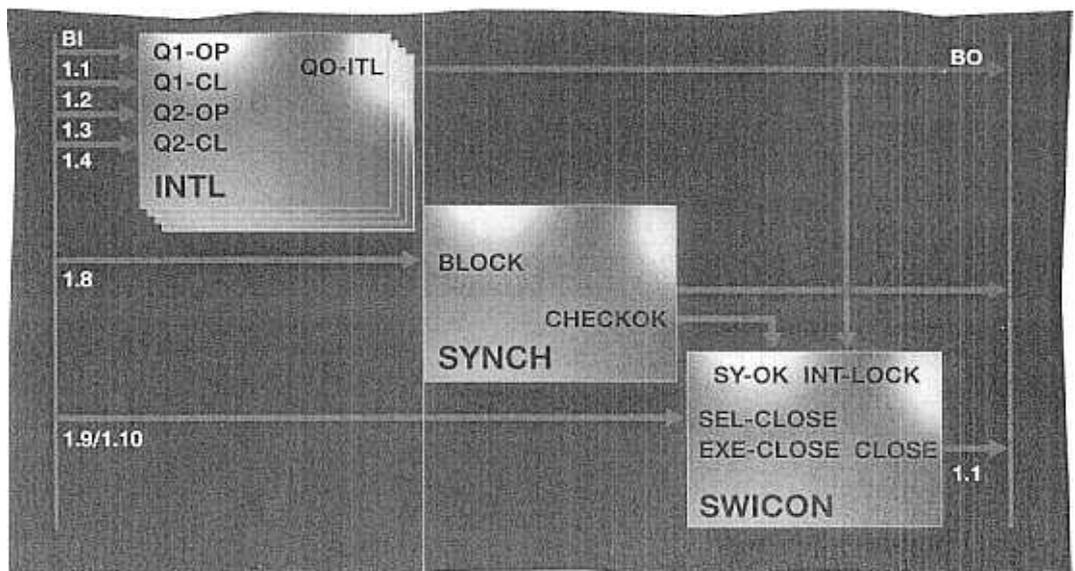
In the intelligent substation, the communication philosophy is of the utmost importance in order to provide the right information to the right person at the right time, and in a reliable way. For this reason, the numerical protection and control terminals in the 500 Series can be equipped with two remote communication ports operating independently of each other, permitting simultaneous communication with the Substation Control and Substation Monitoring System.



Communication gives possibilities of intelligent sharing of information.

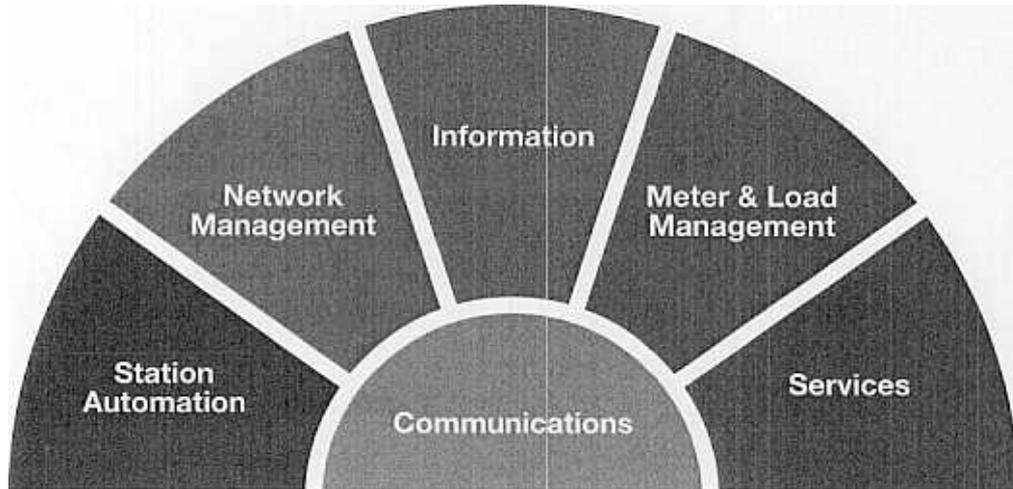
# The intelligent way of engineering

REC 561 has excellent application flexibility through its wide range of available options and configuration combinations. The user can define necessary connections between different functions according to the system needs. Functional inputs and outputs as well as terminal binary outputs, can simply be configured by means of a front connected PC. A number of free logical elements (AND, OR, Timers) enables configuration of different requirements for customer engineering.



# Bay

*Protection, Monitoring and Control*



*Panorama* is the ABB solution for efficient and reliable management of power networks.

*Panorama* stands for an open view in all directions, utilizing innovative information technology.

*Panorama* enables the user to always be in perfect control of the power process, from generation to consumption.

*Panorama* is the complete concept for today and for the future, from ABB Network Partner.

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