

AUTOMATICA DELL'INTERRUTTORE PER SF6 (3% PROGRAMMATA) E' ATTUATA DAI CIRCUITI DELL'INTERRUTTORE

\*\* SEZIONATORE NON PRESENTI SIMULATO IN LOGICA APERTO E A RIPOSO

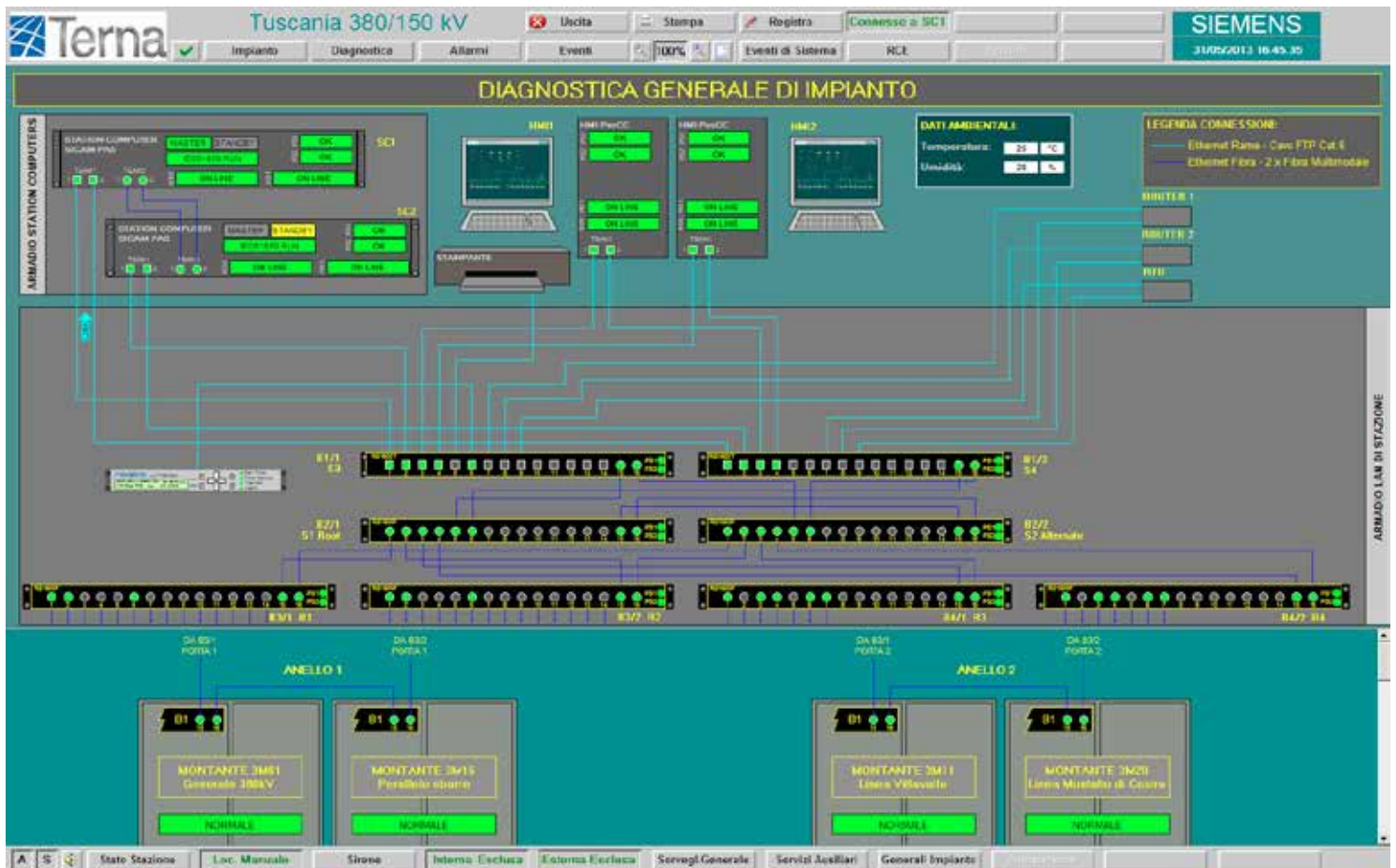


Cesit Ingegneria S.P.A.  
www.cesit.net

Commissioning and Diagnostics

# Protection, Control and Monitoring Systems

The know-how of Cesit Ingegneria's Energy Automation team in electrical protection devices, the development of supervision and control systems and data transmission networks serving power generation, transmission and distribution plants, combined with its state-of-the-art measuring and diagnostic instrumentation, enables us to perform all the necessary tests and checks for commissioning any type of protection, control and monitoring system.





## Circuit tests and primary injection

- Primary injections on HV, MV and LV line modules
- Primary injection testing of transformers and generators for the purpose of checking CT and VT ratio and verifying correct use of secondary systems and protection and measurement circuits and the alignment of differential protection devices
- Checking of correct installation of differential protection devices by means of primary injection with 400 A, 1000 A or 5000 A boosters
- Circuit testing prior to powering up the circuits of control and monitoring equipment
- Activation and testing of protection systems for generator sets, motors, transformers, lines and busbar systems

## CT and VT testing

- Primary injection up to 5,000 A and 24,000 V
- Polarity testing
- Insulation measurement
- Transformation ratio measurement
- Angle error measurement
- Magnetisation curve measurement
- Burden measurement

## Measuring instruments

- Activation and testing of power measurement devices (measuring converters, power meters)

## Electrical protection device testing

- Measurement of tripping thresholds and characteristics by means of three-phase and six-phase digital relay test sets
- Configuration of protection devices and creation of customised logics
- Simulation of any type of fault on:
  - maximum current protection devices
  - distance protection relays
  - busbar differential protection devices
  - transformer differential protection devices
  - line differential protection devices
  - alternator differential protection devices
  - multi-function protection devices for motors
- Testing of automatic slow recloser programmes
- Testing of automatic fast recloser programmes
- Testing of safety logic
- Testing of logical and electrical interlocks
- Testing of synchrocheck relays
- Speed testing
- Disturbance data record checks

## Experience on protection relays:

- ABB
- Siemens
- Alstom
- FIR
- Areva
- GE
- SEL
- CEE
- SEB
- Schlumberger
- ASEA
- Muratori
- Thytronic
- Microelettrica Scientifica
- Beckwith

## SCADA and RTU

- Testing of local and remote indications
- Testing of copper and fibre optic LAN connections
- Remote monitoring of HV/MV substations for power generation (wind, hydroelectric, etc. ) and distribution plants
- Remote management of MV/LV substations for power generation (photovoltaic) and distribution plants (primary and secondary substations)

## Test instruments and software tools

- Qty. 3 three-phase multifunction digital devices for relay testing
- Qty. 2 six-phase multifunction digital devices for relay testing
- Qty.1 automatic test and diagnostic device for GOOSE testing in accordance with IEC 61850 protocol
- Qty. 2 IRG-B signal synchronisation interfaces
- Qty. 2 GPS signal synchronisation interfaces
- Qty. 5 current injectors for primary injection testing
- Software packages for programming and configuration of protection relays
- Diagnostic tools for SCADA systems
- Diagnostic tools for IEC 61850 communication protocol
- Diagnostic tools for IEC 60870-5-101 communication protocol
- Diagnostic tools for IEC 61850-5-103 communication protocol
- Diagnostic tools for IEC 61850-5-104 communication protocol