STCE

SMALL, MEDIUM AND HIGH CAPACITY REMOTE TERMINAL UNIT (RTU)

STCE is an integrated system for remote control, chronological events recording and local automation of the electrical power networks. Modular, flexible and compatible with all the main protocols, both standard and proprietary, it is the ideal solution for every kind of network, even the most complex ones.
STCE manages the information from and towards the plant in an integrated way with the other electronic devices available in the station and it allows a fast, punctual and flexible communication with the network management centres. Its excellent performances make it suitable above all within the power networks, both in the HV/VHV transmission substations and in the HV/MV distribution substations. The modular architecture and the distributed intelligence optimize its employment, which is made easier by several mechanical solutions. STCE guarantees a nearly absolute availability. It offers the possibility to back-up all centralized parts and a high ability of chronological discrimination and synchronization. Sophisticated configuration and diagnostic equipment allow easy, prompt and effective maintenance intervention.

Main integrated functions

RTU

- Acquisition of simple or multiple digital signals, of analogue or digital measurements, of power impulses
- Setting of commands and of set-points
- Programming of filters, scale factors and threshold values
- Up to 6 control centres with IEC 60870-5-101 and 104 or with other kinds of protocols
- Employment within dedicated, switched or IP networks
- Realization of distributed architectures with station LAN
- Concentration of information coming from remote equipment or from local IEDs with standard or proprietary protocols
- Conversion from proprietary to standard protocols

CHRONOLOGICAL EVENTS RECORDING

- Chronological events recording with 1 ms resolution
- Memorization, local printing and differed transmission of timed events
- Local time synchronization, from the control centre or through GPS/IRIG-B or by NTP server
- Recording of network perturbations
- Phase Measurement
- Recording and transmission of COMTRADE files

LOCAL AUTOMATION - PLC

- Processing and correlations among the gathered data
- Configuration of anyway complex SW algorithms for the generation of local automations and commands sequences
- Programming according to the IEC 61131-3 standard
- Interlocking functions

CONFIGURATION AND DIAGNOSTIC

- Full functionality with a PC locally or remotely connected through IP network
- Web server access to diagnostic data and to recorded files
- Direct generation of plant documentation at the end of the configuration

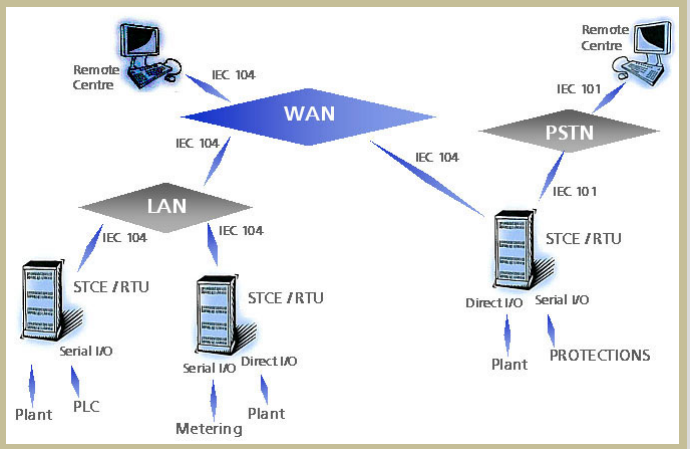
Flexibility of the plant architecture

The STCE equipment allows realizing concentrated or distributed systems.
In the first case, thanks to its architecture expandability (3 sub-racks in addition to the basic one, housed into a rack), a single STCE equipment can seat up to 49 I/O units and it can control about 10.000 points.
The processing capabilities distributed all over the I/O units avoid, even in very wide configurations, any performance lowering.
In case of distributed configurations, the optical fibre station LAN connects on the contrary many smaller STCE equipment, anyone of which is dedicated to a bay unit or to a plant portion. In this case as well, the whole system offers all performances, included the possibility to manage interrelations among the different plant units.
An operator station for the local control and one or more remote control centres as well can be connected to the station LAN, if necessary through a STCE equipment carrying out the function of communication gate.
The distributed systems with STCE equipments can be configured to be compliant with the data structures and with the protocols required by the IEC standards. With every kind of architecture it is anyway possible to redound the centralized units of the equipment (main CPU board and power supply devices in hot back-up), thus obtaining an nearly absolute working guarantee.

With a multi-level architecture the STCE equipment can be employed both as a front-end for data detection and as a concentrator operating in two distinct ways:

Gateway:
it concentrates the plant information allowing the protocol address mapping and the protocol conversion between centre and periphery;

Proxy:
it concentrates the plant information, rerouting them in a transparent way respecting procedures and exchanged applicative data, without modifying the utilized protocol addressing.



Fast configuration and maintenance

All configuration and maintenance functions can be carried out by mean of a simple personal computer locally connected or remotely through IP network.

The equipment offers a WEB server function as well, to access through a browser to the diagnostic information and to all recorded events. The web Server manages three user levels:

- normal for the only visualization;
- privileged for the equipment restart operations, for the CPU FW transfer operations, for the COMTRADE file management and for the password change.
- sending commands (with password protection)

The starting configuration or the following updating are guided by a window menu, to fulfil in a very fast and secure way all parameters of communication and of plant interface.

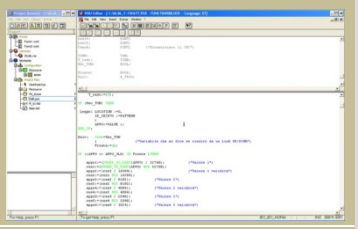
Possible faults during the data input or incongruence among the same data are immediately notified to the operator.

Specific programs allow the data input for high level structures, contemporaneously obtaining an effective plant documentation. In an analogue way it is possible to visualize the whole equipment diagnostic, the state of all inputs, all communications in progress with the relevant statistic data. Moreover, the possibility to redound the central unit allows the maintenance man working continuously with the highest accuracy and promptness, both locally or by remote.

Automation Functions - PLC

The PLC software package allows realizing freely programmable automation sequences, without any additional hardware and guaranteeing the complete integration with STCE/RTU peripheral units (SELTA Functional Blocks) and the direct interaction with runtime database, besides:

- Customization of the Functional Blocks
- Possibility to verify the on-line automation state
- Internal simulator for the automation verification
- Availability of several programming languages compliant with the IEC 61131:
  - Ladder Diagram (LD)
  - Functional Block Diagram (FBD)
  - Structured Text (ST)
  - Instruction List (IL)

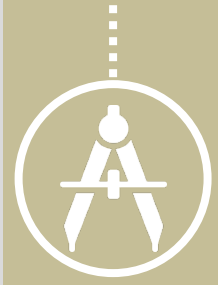


Advanced Monitoring

- Chronological events recording:
  - 1ms resolution
  - events trigger
  - configurability of the recording number, of the events number for every registration, longest duration and e prefault time
- Events storing and transmission with relevant time parameters
- Time synchronization
  - through GPS receiver
  - in IRIG-B unmodulated format
  - by NTP server
  - through 101-104 protocol
- Oscilloperturbographic recordings:
  - current inputs: 1 A o 5 A
  - voltage inputs: 57.7 V
  - analogue inputs sampling frequency up to 6Ksample/s
  - two kinds of interface: 4A+4V e 4V+4V
  - up to 64 digital inputs with 500 $\frac{s}{}$ sampling frequency
  - file format: COMTRADE
  - configurability of the times of prefault, postfault and maximum recording lenght
- files transfer through communication protocol or directly by equipment web server
- Phase measurement:

Measurement of:

  - current phase: 1 A o 5 A
  - voltage phase: 57.7 V
  - positive, negative and zero sequence phase
  - up to 16 digital inputs
  - up to 4 digital outputs (trigger generation)
  - compliant with the IEEE C37.118 (reporting rate from 20 up to 100 ms)
  - daily 100 ms recordings with COMTRADE format accessible by web server
  - ETH 10/100BT or 100FX connection
- Measurements management with 8 thresholds:
  - 4 thresholds on positive range (HH, H, L, LL)
  - 4 thresholds on negative range (LL, L H, HH)
- Communication with GPRS Modem
- Stand by channel for communication diagnostic
- 61850 2.0 client protocol
- Load shedding procedure



Mechanical solutions

The STCE equipment is available in 4 mechanical versions:

	STCE/RTU	STCE/MRE	STCE/RTU-S	STCE/RTU-S19
DIMENSIONS	400X485X280 mm	400X485X280 mm	300x277x206 mm	150x485x280 mm
POWER SUPPLY	24 / 48 / 110 / 220 Vdc 230Vac	24 / 48 / 110 / 220 Vdc 230Vac	24-48-110 Vdc	24 / 48 / 110 / 220 Vdc 230Vac
CAPACITY HW (max. I/O units)	49	10	3	3
REDOUNDACY	Power supply and CPU	-	-	-
AUTOMATIONS	IEC 61131-3	IEC 61131-3	IEC 61131-3	IEC 61131-3
SYNCHRONISM	GPS / IRIG-B / NTP / 101-104 Protocol	GPS / IRIG-B / NTP / 101-104 Protocol	GPS / IRIG-B / NTP / 101-104 Protocol	GPS / IRIG-B / NTP / 101-104 Protocol
OSCILLOPERTURBOGRAPHY	2 Ksample/s	6 Ksample/s	2 Ksample/s	2 Ksample/s

Technical Features

Environmental conditions

IEC 60870-2-2, C1 class

- working temperature: -20... +70°C
- relative humidity: 5 ... 95%
- storage temperature: -40 ... +70°C

Electromagnetic compatibility

- CE declaration
- Emissions: CEI EN 50081-2 - Industrial Environments
- Equipment immunity: CEI EN 50082-2 and ENEL R EMC 02 – H environment
- I/O circuits immunity: IEC EN 60870-2.1 liv. 3 and ENEL R EMC 02 - liv.f
- Insulation: IEC EN 60870-2.1 - VW3 class

Power Supply

Standard power supply voltage:

- 24/48 Vcc ±20%
- 110 Vcc -20 ÷ +15%
- 220 Vcc -20 ÷ +15%
- 230 Vac -20 ÷ +15%

Modularity of the I/O boards

64 digital optoinsulated inputs

- input voltage: 24 Vdc, 48 Vdc, 110 Vdc, 132 Vdc, 220 Vdc

64 digital optoinsulated outputs

- solid state relay
- maximum output power 100 mA
- simultaneous contacts closure

32 analogical optoinsulated inputs (uni- and bipolar)

- input current: ±20 mA and intermediate ranges, 4÷20 mA
- input voltage: ±10 Vdc and intermediate ranges

8 analogue optoinsulated outputs

- output current: ±20 mA and intermediate ranges, 4÷20 mA
- output voltage: ±10 Vdc and intermediate ranges

2x32 relay command outputs

- pulse commands (single and double)
- control 1/N
- max. switching voltage: 220 Vdc

2x16 simultaneous and continuous command outputs

- pulse commands (single and double)
- continuous commands (single)
- setpoint up/down
- simultaneous commands
- max. switching voltage 220 Vdc

16 analogue AC current inputs

8 analogue AC voltage inputs

32 digital inputs + 10 command outputs+ 8 analogue inputs

- inputs digital voltages: 24 Vdc, 48 Vdc, 110 Vdc
- input current: ±20 mA and intermediate ranges, 4□20 mA
- input voltages: ±10 Vdc and intermediate ranges
- pulse commands (single and double)
- control 1/N
- max. switching voltage 220 Vdc

4 serial channels

- electric interfaces: RS232, RS422, RS485

2 serial channels + Ethernet interface

- electric interfaces: RS232, RS422, RS485
- Ethernet interface: 10BT

4 serial channel and 2 Ethernet interfaces

- electric interfaces: RS232, RS485
- Ethernet interface: 10/100BT

Processing capability

- Managed variables: max. 10000
- Communication buffer: max. 6000 events for every connected centre
- Web server memory : max. 6000 events

Communication Protocols (enabled by the configuration suite)

Towards the centres (max. 6):

- IEC 60870-5-101
- IEC 60870-5-104
- HNZ
- 61850 (Report / GOOSE)

Within the station LAN:

- IEC 60870-5-104
- UCA2

Towards IED, remote RTUs, protections:

- IEC 60870-5-101
- IEC 60870-5-103
- IEC 60870-5-104
- DNP3.0
- IEC 61107
- MODBUS (IP and serial)
- UCA2
- IEC61850 V1 and V2

(other protocols available on request)

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