



Substation Automation and Protection

PRODUCT CATALOGUE

Energy Sector

NEO 3000

Table of Content

NEO 3000 Substation System	3
FPC 680 Multifunctional feeder terminal	11
FPC 680i Multifunctional industrial numerical relay	18
FPC 200 Family of multifunctional numerical relays	20
CAU 380 Bay Computer	22
MCE 940 SCADA	30
SCU 810 with IEC 61850 - System Communication Unit	34



NEO 3000 Substation System

Energy Sector

NEO 3000

Substation System

Introduction

The supply of electrical energy occupies an important position in the life of modern society. Operation of commerce, industry, transport, health service and private household are all dependent on regular and dependable supply of electrical energy. The quality of supplied electrical energy also depends on information about the state of power system. A successful power system operation therefore requires the use of state-of-the-art secondary equipment, which enables protection, monitoring, supervision and control of individual devices as well as whole power system.

Tradition, Know-how and Modern Technology

Iskra Sistemi has a long and outstanding tradition in the development, engineering, manufacture and marketing of protection, monitoring, control and communication systems in the field of power generation, transmission and distribution.

The Power System Protection and Control business area of Iskra Sistemi founded in 1949 began with the development and production of electro-mechanical protective relays.

Today the division continues the tradition of reliable and quality products with high-tech numerical protection relays and power control equipment. Individual access to the customer, wide range of applications, skilled experts, engineering, commissioning and maintenance of supplied systems are essential factors before investing in power systems. Continuous R&D, number of satisfied customers and several hundred domestic and international references makes Iskra Sistemi a trustworthy partner.

Family members

NEO 3000 Substation system is based on functionality of the following devices:

- MCE 940 SCADA software
- SCU 810 with IEC 61850 System Communication Unit
- FPC 680 Multifunctional Feeder Terminal
- CAU 380 Bay Computer
- CAU 36X Series pole-top RTU
- ECU032 Serial port extension unit

Additional

Turnkey installation of NEO 3000 Substation system requires additional auxiliary devices of own or third-party manufacture.

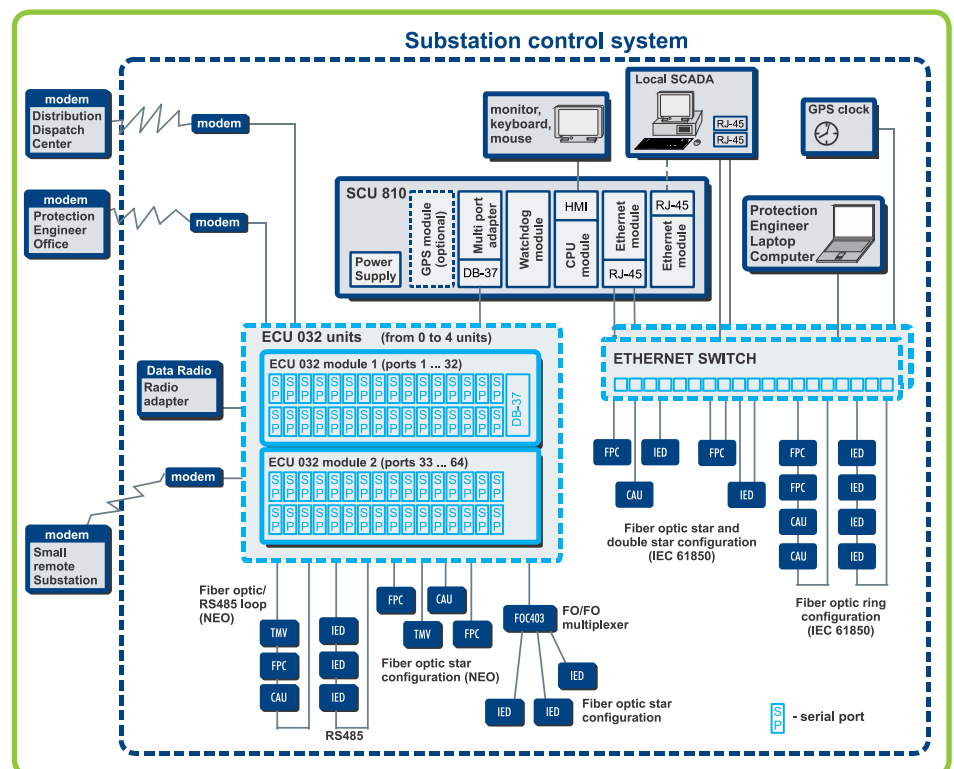
- Optical network switches
- GPS system clock
- Modems
- Inverters and UPS systems

Use

Modular design, simplified installation, scalability, easy maintenance, secure fiber optics connections and user friendly SCADA (System Control And Data Acquisition) software with local HMIs (Human Machine Interface) all together form a system that works in real life. Devices of NEO 3000, compatibility with wide range of NEO 2000 devices and third-party IEDs and proved auxiliary equipment makes turnkey projects possible.

NEO 3000 Substation System

Substation control and protection system NEO 3000 Substation was designed with highest regard for security, dependability and the wide scope of functions. It consists of substation SCADA computer, system communication unit, numerical protection relays and acquisition and control modules. It is designed as distributed system with control levels from bay level to the distribution dispatch center (see below figure). NEO 3000 devices and third-party devices which support IEC 61850 are connected to system by optical ethernet (ring or star connection). Older NEO 2000 devices and third-party IEDs (Intelligent Electronic Device) can be connected via serial communication by optic or electric cables. NEO 3000 devices are assembled in accordance with international protection standards and can be fitted in control cabinets close to the primary equipment. NEO 3000 Substation standard functions are GPS/NTP clock synchronization, power quality monitoring, interactive graphical system representation, system tools for local or remote configuring etc. System communication unit also utilize protocol converter function and therefore integration of third-party IEDs is not an issue.



NEO 3000

Substation System

FPC 680 Multifunctional Feeder Terminal

FPC 680 multifunctional feeder terminal is electronic device that comprise wide range of functions for protection and control of medium or low voltage feeders. Different types of modules are available to provide the complete solution for medium or low voltage switchgear protection and also backup protection of transformers and transmission lines.

FPC 680 is IEC 61850 certified by KEMA (Level A) independent laboratories.



Communication

- Communication via fiber optic or RJ45 Ethernet (optional serial communication – RS232, RS485 or optical)
- Front and/or back RJ45 Ethernet interface for NEO 3000® Power System Manager parameterizing and analysis tools®
- Communication using IEC 61850 (optional DNP3 or IEC 60870-5-10x protocols)
- System time synchronization over NTP/SNTP or through other comm. protocols

Application

Can be used in the following types of utility networks:

- Solidly earthed systems
- Resistor earthed systems
- Petersen-coil compensated systems
- Isolated systems

Control

- internal data acquisition (protection operation, automatic reclosing and other internal signalization)
- external data acquisition (switching elements, alarm devices) - up to 44 DI
- power relay outputs - up to 16 DO
- synchro-check- V, deg & Hz (25)
- time tagging (high resolution events)
- Local and remote setting

Monitoring and measurements

- Current, voltage, power, frequency and power factor measurements
- Energy metering
- Fault recording
- Event recording
- Transient disturbance recorder (DREC)
- Power Quality Monitoring
- Statistical data processing (operation counters of protection devices, automatic reclosing units and circuit breakers)
- Breaker I2t monitoring
- Trip circuit monitoring (TCM)
- Self-monitoring

Local Display Unit (LDU)

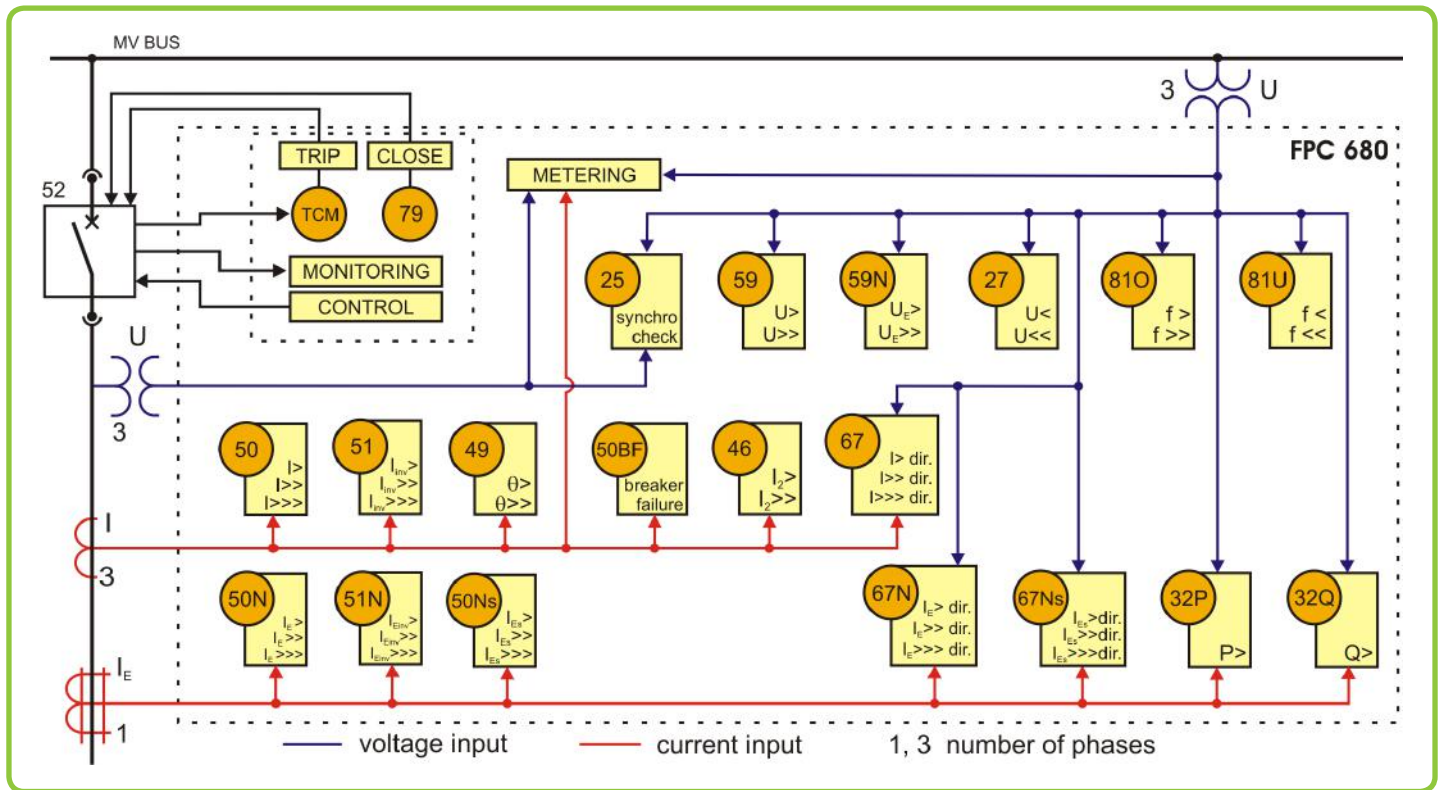
- Graphic LCD display with single line diagram
- Control for switching elements
- Showing measurements and alarms
- Event list
- Local/Remote switch with LED indication
- Easy to use navigation keys
- Open/Close control keys
- Ready LED + Alarm LED + 16 programmable LEDs
- 6 programmable function keys
- Front Ethernet RJ-45 communication port for local connection to device

Protection

- Three-phase overcurrent directional/non directional protection with definite/inverse time operation (50,51,67)
- Earth-fault directional/non directional protection with definite/inverse time operation, Var/Watt-metric method (50N,51N,67N,32N)
- Sensitive earth-fault directional/non directional protection with definite time operation, Var/Watt-metric method (50Ns,51Ns,67Ns,32Ns)
- Over/under voltage protection (59/27)
- Under/over frequency protection (81U/81O)
- Residual voltage protection (59N)
- Thermal overload protection (49)
- Negative sequence overcurrent protection (46)
- Auto-recloser (79)
- Circuit breaker failure protection (50BF)
- External protection
- Multiple protection setting groups

NEO 3000

Substation System



Main features

Total feeder protection functionality

Phase, earth-fault and negative sequence overcurrent with definite and inverse time directional/non-directional protection elements. Over/under-voltage, over/under-frequency, thermal overload protections and auto-recloser function.

Complete feeder control

Local and remote control of feeder switching elements applied through configurable interlocking.

Measurements and energy metering

Complete range of voltage, current, frequency, active and reactive power and power factor measurements with reactive and apparent double tariff forward/reverse energy metering.

Fault and event recording

Fault recording with 1 ms resolution time tagging.

Disturbance recorder and power quality monitoring (PQM)

Disturbance recorder with capability of 8 recordings, 6 seconds each. Monitoring of parameters such as THD, sags and swells is up to 40th harmonic order.

Communication capabilities

Easy integration of the module within substation control and protection system through IEC 61850 protocol, (optional DNP3 and IEC 60870-5-10x protocols).

Legend:

25	Synchrocheck
27	Undervoltage protection
59	Oversvoltage protection
32P	Directional Active Power protection
32Q	Directional Reactive Power protection
46	Negative Sequence Overcurrent protection
49	Thermal overload protection
50BF	Breaker Failure protection
50, 50N	Phase/Neutral Definite time Overcurrent protection (two stages)
51, 51N	Phase/Neutral Inverse time Overcurrent protection (two stages)
52	Circuit breaker control
59N	Neutral Oversvoltage protection
67, 67N	Directional Phase/Neutral with Definite/Inverse-time Overcurrent protection
67Ns/50Ns	Directional/non directional sensitive earth fault Overcurrent protection
81 O/U	Over/Underfrequency protection
TCM	Trip circuit monitoring
79	Auto-reclosure

NEO 3000

Substation System

CAU 380 Bay Computer

CAU 380 bay computer is designed for data acquisition, processing and transmission of process data as well as for local automation tasks in the substations. Modular design, scalability and PQM functions are the essential qualities to meet the novel power system control standards. Various models of different sizes and functionality are available.

CAU 380 is IEC 61850 certified by KEMA (Level A) independent laboratories.



Control

- internal data acquisition
- external data acquisition (switching elements, alarm devices) - up to 110 DI
- power relay outputs - up to 24 DO
- synchro-check- V, deg & Hz (25)
- Voltage regulation
- Fault current detection
- Time tagging (high resolution events)
- Local and remote setting

Local Display Unit (LDU)

- Graphic LCD display with single line diagram
- Control for switching elements
- Showing measurements and alarms
- Event list
- Local/Remote switch with LED indication
- Easy to use navigation keys
- Open/Close control keys
- Ready LED + Alarm LED + 16 programmable LEDs
- 6 programmable function keys
- Front Ethernet RJ-45 communication port for parameterizing

Monitoring and measurements

- Current, voltage, power, frequency and power factor measurements
- Energy metering
- Event recording
- Transient disturbance recorder (DREC)
- Power Quality Monitoring
- Statistical data processing (circuit breakers)
- Self-monitoring

Communication

- Communication via fiber optic or RJ45 Ethernet (optional serial communication – RS232, RS485 or optical)
- Front and/or back RJ45 Ethernet interface for NEO 3000® Power System Manager parameterizing and analysis tools®
- Communication using IEC 61850 (optional DNP3 or IEC 60870-5-10x protocols)
- System time synchronization over NTP/SNTP or through other comm. protocols

Application

Control and data acquisition for the following cases:

- HV transmission lines
- HV coupling and measuring bays
- HV and MV transformers
- MV feeders
- MV capacitor banks
- Utility applications (gas, water, district heating etc.)

NEO 3000 Substation System

IEC 61850 Certificate Level A by KEMA

IEC 61850 Certificate Level A¹

Page 10

International Users Group

No. 7410040-MOC/NC 11-1009

Issued to:
Iskra Sistemi, d.d.
Stegnje 21
Ljubljana 1000
Slovenia

For the product:
NEO 3000 FPC 600
Hardware version: FPC 600-F03
Software version: 1.0

issued by: **KEMA**

The product has not shown to be non-conforming to:
IEC 61850-6, 7-1, 7-2, 7-3, 7-4 and 8-1
Communication networks and systems in substations

The conformance test has been performed according to IEC 61850-10 with product's protocol, model and technical issue implementation conformance statements: 'FPC600_21C3.doc ver. 1.1', 'FPC600_MICS.doc ver. 1.1', 'FPC600_TICS.doc ver. 1.1' and product's user information for testing: 'FPC600_21C3.doc ver. 1.0'

The following IEC 61850 conformance blocks have been tested with a positive result (number of relevant and executed test cases / total number of test cases as defined in the UCA International Users Group Device Test Procedures v2.0):

1 Basic Exchange (20/24)	14 GOOSE Publish (9/12)
2 Data Set (0/1)	21 GOOSE Subscribe (10/10)
3 Data Set Definition (25/25)	12a Device Control (7/11)
5 Unfiltered Reporting (15/18)	12b Enhanced SBC Control (10/19)
6 Buffered Reporting (17/17)	13 Time Synchronization (4/5)

The Certificate includes a summary of the test results as carried out at Iskra Sistemi in Slovenia with UniCADm 61850 version 2.21.02 with test suite 3.22.05 and UniCA 91850 analyzer 4.21.03. The test is based on the UCA International Users Group Device Test Procedures, version 2.0. This document has been issued for information purposes only, and the original paper copy of the KEMA report No. 7410040-MOC/NC 11-1009 will prevail.

The test has been carried out on one single specimen of the product as referred above and submitted to KEMA by Iskra Sistemi. The manufacturer's production process has not been assessed. This Certificate does not imply that KEMA has certified or approved any product other than the specimen tested.

Amstelveen, June 15 2011

M. Adriaens
Regional Director Management & Operations Consulting

P. G. Baarsma
Test Engineer

¹ Level A - Independent Testlab with certified ISO 9000 or ISO 15025 Quality System

Page 20

Applicable Test Procedures from the UCA International Users Group Device Test Procedures version 2.0

Conformance Block	Mandatory	Conditional
1 Basic Exchange	Ass1, Ass2, Ass3, Ass4, Ass5, Ass6, Ass7, Ass8, Ass9, Ass10, Ass11, Ass12, Ass13, Ass14, Ass15, Ass16, Ass17, Ass18, Ass19, Ass20, Ass21, Ass22, Ass23, Ass24, Ass25, Ass26, Ass27, Ass28, Ass29, Ass30, Ass31, Ass32, Ass33, Ass34, Ass35, Ass36, Ass37, Ass38, Ass39, Ass40, Ass41, Ass42, Ass43, Ass44, Ass45, Ass46, Ass47, Ass48, Ass49, Ass50, Ass51, Ass52, Ass53, Ass54, Ass55, Ass56, Ass57, Ass58, Ass59, Ass60, Ass61, Ass62, Ass63, Ass64, Ass65, Ass66, Ass67, Ass68, Ass69, Ass70, Ass71, Ass72, Ass73, Ass74, Ass75, Ass76, Ass77, Ass78, Ass79, Ass80, Ass81, Ass82, Ass83, Ass84, Ass85, Ass86, Ass87, Ass88, Ass89, Ass90, Ass91, Ass92, Ass93, Ass94, Ass95, Ass96, Ass97, Ass98, Ass99, Ass100	Srv6, Srv7, Srv8, Srv9, Srv10, Srv11, Srv12, Srv13, Srv14, Srv15, Srv16, Srv17, Srv18, Srv19, Srv20, Srv21, Srv22, Srv23, Srv24, Srv25, Srv26, Srv27, Srv28, Srv29, Srv30, Srv31, Srv32, Srv33, Srv34, Srv35, Srv36, Srv37, Srv38, Srv39, Srv40, Srv41, Srv42, Srv43, Srv44, Srv45, Srv46, Srv47, Srv48, Srv49, Srv50, Srv51, Srv52, Srv53, Srv54, Srv55, Srv56, Srv57, Srv58, Srv59, Srv60, Srv61, Srv62, Srv63, Srv64, Srv65, Srv66, Srv67, Srv68, Srv69, Srv70, Srv71, Srv72, Srv73, Srv74, Srv75, Srv76, Srv77, Srv78, Srv79, Srv80, Srv81, Srv82, Srv83, Srv84, Srv85, Srv86, Srv87, Srv88, Srv89, Srv90, Srv91, Srv92, Srv93, Srv94, Srv95, Srv96, Srv97, Srv98, Srv99, Srv100
2 Data Set	Dev11, Dev12, Dev13, Dev14, Dev15, Dev16, Dev17, Dev18, Dev19, Dev20, Dev21, Dev22, Dev23, Dev24, Dev25, Dev26, Dev27, Dev28, Dev29, Dev30, Dev31, Dev32, Dev33, Dev34, Dev35, Dev36, Dev37, Dev38, Dev39, Dev40, Dev41, Dev42, Dev43, Dev44, Dev45, Dev46, Dev47, Dev48, Dev49, Dev50, Dev51, Dev52, Dev53, Dev54, Dev55, Dev56, Dev57, Dev58, Dev59, Dev60, Dev61, Dev62, Dev63, Dev64, Dev65, Dev66, Dev67, Dev68, Dev69, Dev70, Dev71, Dev72, Dev73, Dev74, Dev75, Dev76, Dev77, Dev78, Dev79, Dev80, Dev81, Dev82, Dev83, Dev84, Dev85, Dev86, Dev87, Dev88, Dev89, Dev90, Dev91, Dev92, Dev93, Dev94, Dev95, Dev96, Dev97, Dev98, Dev99, Dev100	
2+ Data Set Definition	Dev1, Dev2, Dev3, Dev4, Dev5, Dev6, Dev7, Dev8, Dev9, Dev10, Dev11, Dev12, Dev13, Dev14, Dev15, Dev16, Dev17, Dev18, Dev19, Dev20, Dev21, Dev22, Dev23, Dev24, Dev25, Dev26, Dev27, Dev28, Dev29, Dev30, Dev31, Dev32, Dev33, Dev34, Dev35, Dev36, Dev37, Dev38, Dev39, Dev40, Dev41, Dev42, Dev43, Dev44, Dev45, Dev46, Dev47, Dev48, Dev49, Dev50, Dev51, Dev52, Dev53, Dev54, Dev55, Dev56, Dev57, Dev58, Dev59, Dev60, Dev61, Dev62, Dev63, Dev64, Dev65, Dev66, Dev67, Dev68, Dev69, Dev70, Dev71, Dev72, Dev73, Dev74, Dev75, Dev76, Dev77, Dev78, Dev79, Dev80, Dev81, Dev82, Dev83, Dev84, Dev85, Dev86, Dev87, Dev88, Dev89, Dev90, Dev91, Dev92, Dev93, Dev94, Dev95, Dev96, Dev97, Dev98, Dev99, Dev100	
5 Unfiltered Reporting	Rpt1, Rpt2, Rpt3, Rpt4, Rpt5, Rpt6, Rpt7, Rpt8, Rpt9, Rpt10, Rpt11, Rpt12, Rpt13, Rpt14, Rpt15, Rpt16, Rpt17, Rpt18, Rpt19, Rpt20, Rpt21, Rpt22, Rpt23, Rpt24, Rpt25, Rpt26, Rpt27, Rpt28, Rpt29, Rpt30, Rpt31, Rpt32, Rpt33, Rpt34, Rpt35, Rpt36, Rpt37, Rpt38, Rpt39, Rpt40, Rpt41, Rpt42, Rpt43, Rpt44, Rpt45, Rpt46, Rpt47, Rpt48, Rpt49, Rpt50, Rpt51, Rpt52, Rpt53, Rpt54, Rpt55, Rpt56, Rpt57, Rpt58, Rpt59, Rpt60, Rpt61, Rpt62, Rpt63, Rpt64, Rpt65, Rpt66, Rpt67, Rpt68, Rpt69, Rpt70, Rpt71, Rpt72, Rpt73, Rpt74, Rpt75, Rpt76, Rpt77, Rpt78, Rpt79, Rpt80, Rpt81, Rpt82, Rpt83, Rpt84, Rpt85, Rpt86, Rpt87, Rpt88, Rpt89, Rpt90, Rpt91, Rpt92, Rpt93, Rpt94, Rpt95, Rpt96, Rpt97, Rpt98, Rpt99, Rpt100	Rpt6, Rpt7, Rpt8, Rpt9, Rpt10, Rpt11, Rpt12, Rpt13, Rpt14, Rpt15, Rpt16, Rpt17, Rpt18, Rpt19, Rpt20, Rpt21, Rpt22, Rpt23, Rpt24, Rpt25, Rpt26, Rpt27, Rpt28, Rpt29, Rpt30, Rpt31, Rpt32, Rpt33, Rpt34, Rpt35, Rpt36, Rpt37, Rpt38, Rpt39, Rpt40, Rpt41, Rpt42, Rpt43, Rpt44, Rpt45, Rpt46, Rpt47, Rpt48, Rpt49, Rpt50, Rpt51, Rpt52, Rpt53, Rpt54, Rpt55, Rpt56, Rpt57, Rpt58, Rpt59, Rpt60, Rpt61, Rpt62, Rpt63, Rpt64, Rpt65, Rpt66, Rpt67, Rpt68, Rpt69, Rpt70, Rpt71, Rpt72, Rpt73, Rpt74, Rpt75, Rpt76, Rpt77, Rpt78, Rpt79, Rpt80, Rpt81, Rpt82, Rpt83, Rpt84, Rpt85, Rpt86, Rpt87, Rpt88, Rpt89, Rpt90, Rpt91, Rpt92, Rpt93, Rpt94, Rpt95, Rpt96, Rpt97, Rpt98, Rpt99, Rpt100
6 Buffered Reporting	Rpt1, Rpt2, Rpt3, Rpt4, Rpt5, Rpt6, Rpt7, Rpt8, Rpt9, Rpt10, Rpt11, Rpt12, Rpt13, Rpt14, Rpt15, Rpt16, Rpt17, Rpt18, Rpt19, Rpt20, Rpt21, Rpt22, Rpt23, Rpt24, Rpt25, Rpt26, Rpt27, Rpt28, Rpt29, Rpt30, Rpt31, Rpt32, Rpt33, Rpt34, Rpt35, Rpt36, Rpt37, Rpt38, Rpt39, Rpt40, Rpt41, Rpt42, Rpt43, Rpt44, Rpt45, Rpt46, Rpt47, Rpt48, Rpt49, Rpt50, Rpt51, Rpt52, Rpt53, Rpt54, Rpt55, Rpt56, Rpt57, Rpt58, Rpt59, Rpt60, Rpt61, Rpt62, Rpt63, Rpt64, Rpt65, Rpt66, Rpt67, Rpt68, Rpt69, Rpt70, Rpt71, Rpt72, Rpt73, Rpt74, Rpt75, Rpt76, Rpt77, Rpt78, Rpt79, Rpt80, Rpt81, Rpt82, Rpt83, Rpt84, Rpt85, Rpt86, Rpt87, Rpt88, Rpt89, Rpt90, Rpt91, Rpt92, Rpt93, Rpt94, Rpt95, Rpt96, Rpt97, Rpt98, Rpt99, Rpt100	Rpt6, Rpt7, Rpt8, Rpt9, Rpt10, Rpt11, Rpt12, Rpt13, Rpt14, Rpt15, Rpt16, Rpt17, Rpt18, Rpt19, Rpt20, Rpt21, Rpt22, Rpt23, Rpt24, Rpt25, Rpt26, Rpt27, Rpt28, Rpt29, Rpt30, Rpt31, Rpt32, Rpt33, Rpt34, Rpt35, Rpt36, Rpt37, Rpt38, Rpt39, Rpt40, Rpt41, Rpt42, Rpt43, Rpt44, Rpt45, Rpt46, Rpt47, Rpt48, Rpt49, Rpt50, Rpt51, Rpt52, Rpt53, Rpt54, Rpt55, Rpt56, Rpt57, Rpt58, Rpt59, Rpt60, Rpt61, Rpt62, Rpt63, Rpt64, Rpt65, Rpt66, Rpt67, Rpt68, Rpt69, Rpt70, Rpt71, Rpt72, Rpt73, Rpt74, Rpt75, Rpt76, Rpt77, Rpt78, Rpt79, Rpt80, Rpt81, Rpt82, Rpt83, Rpt84, Rpt85, Rpt86, Rpt87, Rpt88, Rpt89, Rpt90, Rpt91, Rpt92, Rpt93, Rpt94, Rpt95, Rpt96, Rpt97, Rpt98, Rpt99, Rpt100
6a GOOSE publish	Rpt1, Rpt2, Rpt3, Rpt4, Rpt5, Rpt6, Rpt7, Rpt8, Rpt9, Rpt10, Rpt11, Rpt12, Rpt13, Rpt14, Rpt15, Rpt16, Rpt17, Rpt18, Rpt19, Rpt20, Rpt21, Rpt22, Rpt23, Rpt24, Rpt25, Rpt26, Rpt27, Rpt28, Rpt29, Rpt30, Rpt31, Rpt32, Rpt33, Rpt34, Rpt35, Rpt36, Rpt37, Rpt38, Rpt39, Rpt40, Rpt41, Rpt42, Rpt43, Rpt44, Rpt45, Rpt46, Rpt47, Rpt48, Rpt49, Rpt50, Rpt51, Rpt52, Rpt53, Rpt54, Rpt55, Rpt56, Rpt57, Rpt58, Rpt59, Rpt60, Rpt61, Rpt62, Rpt63, Rpt64, Rpt65, Rpt66, Rpt67, Rpt68, Rpt69, Rpt70, Rpt71, Rpt72, Rpt73, Rpt74, Rpt75, Rpt76, Rpt77, Rpt78, Rpt79, Rpt80, Rpt81, Rpt82, Rpt83, Rpt84, Rpt85, Rpt86, Rpt87, Rpt88, Rpt89, Rpt90, Rpt91, Rpt92, Rpt93, Rpt94, Rpt95, Rpt96, Rpt97, Rpt98, Rpt99, Rpt100	Rpt6, Rpt7, Rpt8, Rpt9, Rpt10, Rpt11, Rpt12, Rpt13, Rpt14, Rpt15, Rpt16, Rpt17, Rpt18, Rpt19, Rpt20, Rpt21, Rpt22, Rpt23, Rpt24, Rpt25, Rpt26, Rpt27, Rpt28, Rpt29, Rpt30, Rpt31, Rpt32, Rpt33, Rpt34, Rpt35, Rpt36, Rpt37, Rpt38, Rpt39, Rpt40, Rpt41, Rpt42, Rpt43, Rpt44, Rpt45, Rpt46, Rpt47, Rpt48, Rpt49, Rpt50, Rpt51, Rpt52, Rpt53, Rpt54, Rpt55, Rpt56, Rpt57, Rpt58, Rpt59, Rpt60, Rpt61, Rpt62, Rpt63, Rpt64, Rpt65, Rpt66, Rpt67, Rpt68, Rpt69, Rpt70, Rpt71, Rpt72, Rpt73, Rpt74, Rpt75, Rpt76, Rpt77, Rpt78, Rpt79, Rpt80, Rpt81, Rpt82, Rpt83, Rpt84, Rpt85, Rpt86, Rpt87, Rpt88, Rpt89, Rpt90, Rpt91, Rpt92, Rpt93, Rpt94, Rpt95, Rpt96, Rpt97, Rpt98, Rpt99, Rpt100
6b GOOSE subscribe	Rpt1, Rpt2, Rpt3, Rpt4, Rpt5, Rpt6, Rpt7, Rpt8, Rpt9, Rpt10, Rpt11, Rpt12, Rpt13, Rpt14, Rpt15, Rpt16, Rpt17, Rpt18, Rpt19, Rpt20, Rpt21, Rpt22, Rpt23, Rpt24, Rpt25, Rpt26, Rpt27, Rpt28, Rpt29, Rpt30, Rpt31, Rpt32, Rpt33, Rpt34, Rpt35, Rpt36, Rpt37, Rpt38, Rpt39, Rpt40, Rpt41, Rpt42, Rpt43, Rpt44, Rpt45, Rpt46, Rpt47, Rpt48, Rpt49, Rpt50, Rpt51, Rpt52, Rpt53, Rpt54, Rpt55, Rpt56, Rpt57, Rpt58, Rpt59, Rpt60, Rpt61, Rpt62, Rpt63, Rpt64, Rpt65, Rpt66, Rpt67, Rpt68, Rpt69, Rpt70, Rpt71, Rpt72, Rpt73, Rpt74, Rpt75, Rpt76, Rpt77, Rpt78, Rpt79, Rpt80, Rpt81, Rpt82, Rpt83, Rpt84, Rpt85, Rpt86, Rpt87, Rpt88, Rpt89, Rpt90, Rpt91, Rpt92, Rpt93, Rpt94, Rpt95, Rpt96, Rpt97, Rpt98, Rpt99, Rpt100	Rpt6, Rpt7, Rpt8, Rpt9, Rpt10, Rpt11, Rpt12, Rpt13, Rpt14, Rpt15, Rpt16, Rpt17, Rpt18, Rpt19, Rpt20, Rpt21, Rpt22, Rpt23, Rpt24, Rpt25, Rpt26, Rpt27, Rpt28, Rpt29, Rpt30, Rpt31, Rpt32, Rpt33, Rpt34, Rpt35, Rpt36, Rpt37, Rpt38, Rpt39, Rpt40, Rpt41, Rpt42, Rpt43, Rpt44, Rpt45, Rpt46, Rpt47, Rpt48, Rpt49, Rpt50, Rpt51, Rpt52, Rpt53, Rpt54, Rpt55, Rpt56, Rpt57, Rpt58, Rpt59, Rpt60, Rpt61, Rpt62, Rpt63, Rpt64, Rpt65, Rpt66, Rpt67, Rpt68, Rpt69, Rpt70, Rpt71, Rpt72, Rpt73, Rpt74, Rpt75, Rpt76, Rpt77, Rpt78, Rpt79, Rpt80, Rpt81, Rpt82, Rpt83, Rpt84, Rpt85, Rpt86, Rpt87, Rpt88, Rpt89, Rpt90, Rpt91, Rpt92, Rpt93, Rpt94, Rpt95, Rpt96, Rpt97, Rpt98, Rpt99, Rpt100
12a Device control	Ctrl1, Ctrl2, Ctrl3, Ctrl4, Ctrl5, Ctrl6, Ctrl7, Ctrl8, Ctrl9, Ctrl10, Ctrl11, Ctrl12, Ctrl13, Ctrl14, Ctrl15, Ctrl16, Ctrl17, Ctrl18, Ctrl19, Ctrl20, Ctrl21, Ctrl22, Ctrl23, Ctrl24, Ctrl25, Ctrl26, Ctrl27, Ctrl28, Ctrl29, Ctrl30, Ctrl31, Ctrl32, Ctrl33, Ctrl34, Ctrl35, Ctrl36, Ctrl37, Ctrl38, Ctrl39, Ctrl40, Ctrl41, Ctrl42, Ctrl43, Ctrl44, Ctrl45, Ctrl46, Ctrl47, Ctrl48, Ctrl49, Ctrl50, Ctrl51, Ctrl52, Ctrl53, Ctrl54, Ctrl55, Ctrl56, Ctrl57, Ctrl58, Ctrl59, Ctrl60, Ctrl61, Ctrl62, Ctrl63, Ctrl64, Ctrl65, Ctrl66, Ctrl67, Ctrl68, Ctrl69, Ctrl70, Ctrl71, Ctrl72, Ctrl73, Ctrl74, Ctrl75, Ctrl76, Ctrl77, Ctrl78, Ctrl79, Ctrl80, Ctrl81, Ctrl82, Ctrl83, Ctrl84, Ctrl85, Ctrl86, Ctrl87, Ctrl88, Ctrl89, Ctrl90, Ctrl91, Ctrl92, Ctrl93, Ctrl94, Ctrl95, Ctrl96, Ctrl97, Ctrl98, Ctrl99, Ctrl100	Ctrl2, Ctrl3, Ctrl4, Ctrl5, Ctrl6, Ctrl7, Ctrl8, Ctrl9, Ctrl10, Ctrl11, Ctrl12, Ctrl13, Ctrl14, Ctrl15, Ctrl16, Ctrl17, Ctrl18, Ctrl19, Ctrl20, Ctrl21, Ctrl22, Ctrl23, Ctrl24, Ctrl25, Ctrl26, Ctrl27, Ctrl28, Ctrl29, Ctrl30, Ctrl31, Ctrl32, Ctrl33, Ctrl34, Ctrl35, Ctrl36, Ctrl37, Ctrl38, Ctrl39, Ctrl40, Ctrl41, Ctrl42, Ctrl43, Ctrl44, Ctrl45, Ctrl46, Ctrl47, Ctrl48, Ctrl49, Ctrl50, Ctrl51, Ctrl52, Ctrl53, Ctrl54, Ctrl55, Ctrl56, Ctrl57, Ctrl58, Ctrl59, Ctrl60, Ctrl61, Ctrl62, Ctrl63, Ctrl64, Ctrl65, Ctrl66, Ctrl67, Ctrl68, Ctrl69, Ctrl70, Ctrl71, Ctrl72, Ctrl73, Ctrl74, Ctrl75, Ctrl76, Ctrl77, Ctrl78, Ctrl79, Ctrl80, Ctrl81, Ctrl82, Ctrl83, Ctrl84, Ctrl85, Ctrl86, Ctrl87, Ctrl88, Ctrl89, Ctrl90, Ctrl91, Ctrl92, Ctrl93, Ctrl94, Ctrl95, Ctrl96, Ctrl97, Ctrl98, Ctrl99, Ctrl100
12b Enhanced SBC control	Ctrl1, Ctrl2, Ctrl3, Ctrl4, Ctrl5, Ctrl6, Ctrl7, Ctrl8, Ctrl9, Ctrl10, Ctrl11, Ctrl12, Ctrl13, Ctrl14, Ctrl15, Ctrl16, Ctrl17, Ctrl18, Ctrl19, Ctrl20, Ctrl21, Ctrl22, Ctrl23, Ctrl24, Ctrl25, Ctrl26, Ctrl27, Ctrl28, Ctrl29, Ctrl30, Ctrl31, Ctrl32, Ctrl33, Ctrl34, Ctrl35, Ctrl36, Ctrl37, Ctrl38, Ctrl39, Ctrl40, Ctrl41, Ctrl42, Ctrl43, Ctrl44, Ctrl45, Ctrl46, Ctrl47, Ctrl48, Ctrl49, Ctrl50, Ctrl51, Ctrl52, Ctrl53, Ctrl54, Ctrl55, Ctrl56, Ctrl57, Ctrl58, Ctrl59, Ctrl60, Ctrl61, Ctrl62, Ctrl63, Ctrl64, Ctrl65, Ctrl66, Ctrl67, Ctrl68, Ctrl69, Ctrl70, Ctrl71, Ctrl72, Ctrl73, Ctrl74, Ctrl75, Ctrl76, Ctrl77, Ctrl78, Ctrl79, Ctrl80, Ctrl81, Ctrl82, Ctrl83, Ctrl84, Ctrl85, Ctrl86, Ctrl87, Ctrl88, Ctrl89, Ctrl90, Ctrl91, Ctrl92, Ctrl93, Ctrl94, Ctrl95, Ctrl96, Ctrl97, Ctrl98, Ctrl99, Ctrl100	Ctrl2, Ctrl3, Ctrl4, Ctrl5, Ctrl6, Ctrl7, Ctrl8, Ctrl9, Ctrl10, Ctrl11, Ctrl12, Ctrl13, Ctrl14, Ctrl15, Ctrl16, Ctrl17, Ctrl18, Ctrl19, Ctrl20, Ctrl21, Ctrl22, Ctrl23, Ctrl24, Ctrl25, Ctrl26, Ctrl27, Ctrl28, Ctrl29, Ctrl30, Ctrl31, Ctrl32, Ctrl33, Ctrl34, Ctrl35, Ctrl36, Ctrl37, Ctrl38, Ctrl39, Ctrl40, Ctrl41, Ctrl42, Ctrl43, Ctrl44, Ctrl45, Ctrl46, Ctrl47, Ctrl48, Ctrl49, Ctrl50, Ctrl51, Ctrl52, Ctrl53, Ctrl54, Ctrl55, Ctrl56, Ctrl57, Ctrl58, Ctrl59, Ctrl60, Ctrl61, Ctrl62, Ctrl63, Ctrl64, Ctrl65, Ctrl66, Ctrl67, Ctrl68, Ctrl69, Ctrl70, Ctrl71, Ctrl72, Ctrl73, Ctrl74, Ctrl75, Ctrl76, Ctrl77, Ctrl78, Ctrl79, Ctrl80, Ctrl81, Ctrl82, Ctrl83, Ctrl84, Ctrl85, Ctrl86, Ctrl87, Ctrl88, Ctrl89, Ctrl90, Ctrl91, Ctrl92, Ctrl93, Ctrl94, Ctrl95, Ctrl96, Ctrl97, Ctrl98, Ctrl99, Ctrl100
13 Time sync	Dev1, Dev2, Dev3, Dev4, Dev5, Dev6, Dev7, Dev8, Dev9, Dev10, Dev11, Dev12, Dev13, Dev14, Dev15, Dev16, Dev17, Dev18, Dev19, Dev20, Dev21, Dev22, Dev23, Dev24, Dev25, Dev26, Dev27, Dev28, Dev29, Dev30, Dev31, Dev32, Dev33, Dev34, Dev35, Dev36, Dev37, Dev38, Dev39, Dev40, Dev41, Dev42, Dev43, Dev44, Dev45, Dev46, Dev47, Dev48, Dev49, Dev50, Dev51, Dev52, Dev53, Dev54, Dev55, Dev56, Dev57, Dev58, Dev59, Dev60, Dev61, Dev62, Dev63, Dev64, Dev65, Dev66, Dev67, Dev68, Dev69, Dev70, Dev71, Dev72, Dev73, Dev74, Dev75, Dev76, Dev77, Dev78, Dev79, Dev80, Dev81, Dev82, Dev83, Dev84, Dev85, Dev86, Dev87, Dev88, Dev89, Dev90, Dev91, Dev92, Dev93, Dev94, Dev95, Dev96, Dev97, Dev98, Dev99, Dev100	Dev6, Dev7, Dev8, Dev9, Dev10, Dev11, Dev12, Dev13, Dev14, Dev15, Dev16, Dev17, Dev18, Dev19, Dev20, Dev21, Dev22, Dev23, Dev24, Dev25, Dev26, Dev27, Dev28, Dev29, Dev30, Dev31, Dev32, Dev33, Dev34, Dev35, Dev36, Dev37, Dev38, Dev39, Dev40, Dev41, Dev42, Dev43, Dev44, Dev45, Dev46, Dev47, Dev48, Dev49, Dev50, Dev51, Dev52, Dev53, Dev54, Dev55, Dev56, Dev57, Dev58, Dev59, Dev60, Dev61, Dev62, Dev63, Dev64, Dev65, Dev66, Dev67, Dev68, Dev69, Dev70, Dev71, Dev72, Dev73, Dev74, Dev75, Dev76, Dev77, Dev78, Dev79, Dev80, Dev81, Dev82, Dev83, Dev84, Dev85, Dev86, Dev87, Dev88, Dev89, Dev90, Dev91, Dev92, Dev93, Dev94, Dev95, Dev96, Dev97, Dev98, Dev99, Dev100



CAU 36X Series Remote Terminal Unit

CAU 36X is a family of devices intended for use in Distribution Automation Systems. The device combines all functions of feeder data acquisition, data processing, load-break switch control and communication functions.

The most distinctive advantage of the CAU 36X devices is their built-in over-current and earth-fault detection functions. Faults on the feeder are detected by means of protection-class algorithms that are based on Digital Signal Processing technology. In order to prevent false detection, a number of digital measurements have been taken through the possibility of accurate parameter setting and exact monitoring of feeder state.

CAU 36X devices can collect analog data from a distribution feeder by means of the majority of CTs available on the market. The use of transducers is not required since they are already a constituent part of the CAU 36X devices. Additional equipment such as fault detectors or indicators is no longer required.

Functions

Each CAU 36X provides a variety of functions. They are used according to project needs. Since SW is modular it is easy to add new modules which can be developed upon customer needs. Beside common functions (transducer-less measurement collection, power calculations, SOE ...), we provide some special functions:

Fault detection

CAU 36X provides fault current detection function, which follows ARC function in substations and independently signals excursion over set values and follow reclosures (up to 5). It will also detect direction of fault.

Voltage regulation

Voltage regulation function is also integrates. Voltage is regulated over RAISE/LOWER commands. Function will compare current voltage with requested voltage and execute regulation according to predefined limits and conditions. It will also signal if the limits are reached or the commands are blocked by any reason.

Scheduler

Scheduler provides possibility to program up to 20 time dependent operations.

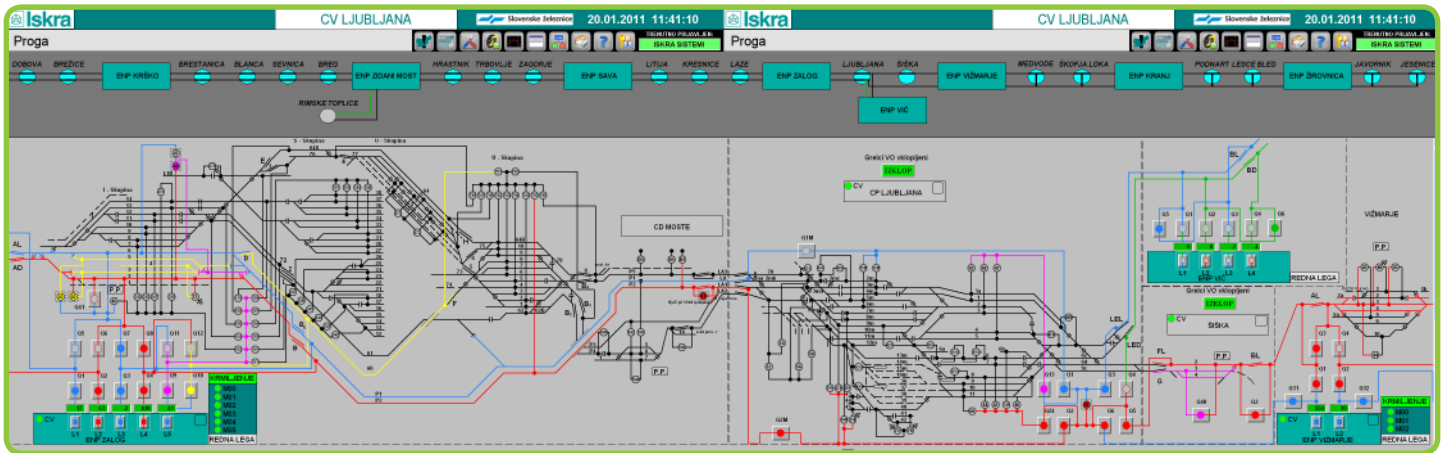
NEO 3000

Substation System

MCE 940 SCADA

MCE 940 is used for real time process monitoring and control on different control levels, specially designed for power utilities. Control over the system is granted with real time interactive power system display that comprehends voltage, current and demand metering. Control secured by interlocking, events presented with single or group alarms and continuous archiving of historical data into the database are the most common features of the MCE 940 SCADA. Statistical data of protection relays and circuit breakers are stored in the database and can be displayed at any time for maintenance activities.

MCE 940 SCADA is built on open design basis so it can offer great applicability. Desires of the customer can be reached with functional, graphical and statistical adaptations.

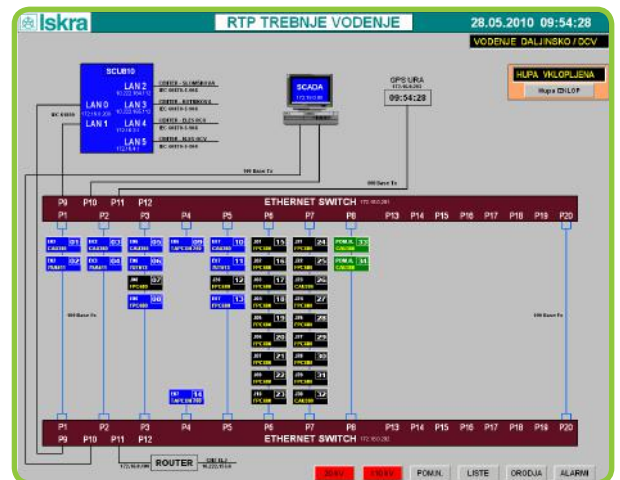
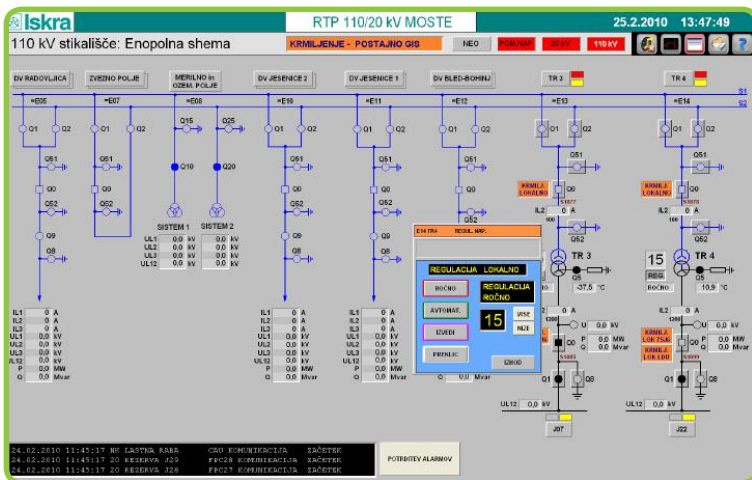


Application

- Substations
- Distributions control centers
- Transmissions control centers
- Industrial/traffic power supplies control centers

Features

- Distributed, Client/Server Architecture
- MCE 940 is designed for both small stand-alone and network applications.
- Share data with Oracle, SQL Server, Access and other SQL based databases.
- Supported communication protocols:
 - IEC 61850
 - IEC 60870-5-104 protocol
 - OPC,
- Security system enables control of access to data and application.



NEO 3000

Substation System

SCU 810 with IEC 61850 – System Communication Unit

The SCU 810 module is a complex communication device intended for the interconnection of any intelligent electronic device (IED) of Iskra Sistemi's NEO 3000 (NEO 2000) Substation Control and Protection System and of any third-party vendors. IED is considered as numerical protection relay, bay computer, intelligent RTU, energy counter and alike, that is used within the substation.

The SCU 810 device covers communication functions needed within substation and functions of data handling, world time synchronization and substation automation. It can serve also as interconnection gateway between hierarchically different control system levels from substation to utility dispatching centers, where data from geographically spread substations are grouped into a single database that forms an integrated supervision system of a wider area power system.

SCU 810 is a multi-protocol device that enables simultaneous communication with different IEDs connected on separate communication ports using various protocols. Hardware extension of communication ports is possible by using ECU 032 extension unit that provides up to 64 ports.

For communication with devices over IEC 61850 there can be used optical network with star or ring configuration.

SCU 810 also supports number of inevitable automatic functions when it is used as a master automation controller in Distribution Automation System.



Application

The SCU 810 device can be implemented anywhere where the basic function of a communication gateway is needed and/or integration of IEDs is required. The typical applications are:

- Central communication device in HV and MV substations and for Distribution Automation Systems
- The communication interface in either a control or maintenance center
- Integration of IEDs into substation or central SCADA systems
- Communication gateway for Protection Management Systems (PMS)
- Protocol conversion in all communication directions

Features

- Basic communication node to communication between IEDs and control centers of different manufacturers
- Support of backup communication paths
- Support of communication protocols supported by different manufacturers
- Remote control, monitoring and configuration of IEDs
- Support of internal and external GPS or DCF clock or over NTP time synchronization
- PLC functions (acc. to IEC 61131)
- Non-volatile memory (for drives, application data, etc.)
- Set point facility
- Self-supervision and watch dog
- Integrated diagnostic software

Additional

SCU 810 can also interconnect devices with serial optical and electrical ports. Depending on application, number of ports may exceed the port capacity of the unit. In that case one or two ECU 032 (Extension Communication Unit) are used to increase the number of serial ports. In that way up to 64 serial ports can be implemented with single SCU 810 unit.



FPC 680
Multifunctional feeder terminal

FPC 680

Multifunctional feeder terminal

Description

FPC 680 is a comprehensive and cost effective feeder management IED for protection, control, measuring and supervision of utility and industrial distribution substations. FPC 680 is a member of NEO3000® Substation system and a part of FPC protection and control product series. FPC 680 also features necessary control functions constituting an ideal solution for feeder bay control. The FPC 680 support the IEC 61850 substation automation standard including horizontal GOOSE communication offering seamless connectivity to substation automation and SCADA systems.

FPC 680 can be used in applications of any MV networks and also as a back-up protection for HV power lines and transformers. Wide range of setting parameters enables FPC 680 to be used in solidly earthed, resistor earthed isolated and compensated networks. Control of feeder can be applied locally through local display unit LDU or remotely through substation control system.

Communication interface with IEC 61850 protocol enables integration of FPC 680 within substation control system and remote control centers.

FPC 680 is IEC 61850 certified by KEMA (Level A) independent laboratories.



FPC 680i protection relay



Main features

Total feeder protection functionality

Phase, earth-fault and negative sequence overcurrent with definite and inverse time directional/non-directional protection elements, including inrush restraint and cold load pickup.

Over/under voltage, over/under frequency, thermal overload protections and auto-recloser function.

Complete feeder control

Local and remote control of feeder switching elements applied through configurable interlocking.

Measurements and energy metering

Complete range of voltage, current, frequency, active and reactive power and power factor measurements with reactive and apparent double tariff forward/reverse energy metering.

Fault and event recording

Fault recording with 1ms resolution time tagging.

Disturbance recorder and power quality monitoring (PQM)

Disturbance recorder with capability of up to 50 recordings, up to 9 seconds each, COMTRADE format. Monitoring of parameters such as THD, sags and swells and harmonics up to 40th order.

Communication capabilities

Easy integration of the module within NEO3000 substation control and protection system through IEC 61850, DNP3, IEC 60870-5-104, IEC 60870-5-101, IEC 60870-5-103 and Modbus RTU protocols.

Intuitive user interface

Relay parameterizing, measurements and alarming, control with single line diagram presentation can be applied through graphical or textual Local Display Unit (LDU).

NEO3000 Power System Manager software tool

PC based software tool for device parameterizing, commissioning, testing, diagnostics and maintenance.

Protection configuration with NEO3000 Power System Manager is simple and intuitive, with graphic representation of connections between functions inside the relay. Yet it also provides depth by giving user the possibility of configuring every parameter.

FPC 680

Multifunctional feeder terminal

Protection

FPC 680 provides complete range of protection functions for medium voltage switchgear, motors and transformers.

Phase and earth overcurrent protection (50, 50N, 51, 51N)

Overcurrent protection is based on measurements of phase and residual currents (or calculation zero sequence current from symmetrical components). Three stages can be set independently to definite time or inverse-time (IEC) characteristics. Inrush restraint or cold load pickup is applied for all overcurrent stages using set time or via binary input blocking.

Phase and earth directional overcurrent protection (67, 67N)

Phase and earth protections can be applied with directional elements. Fault current detection is determined using voltages of healthy phases. Direction determination in case of earth faults can be configured to respond to configurable value of corresponding residual voltage (or calculation zero sequence voltage from symmetrical components).

Sensitive earth directional/non-directional protection (50Ns, 51Ns, 67Ns)

Using sensitive current input the protection against high-resistance faults is achieved. Sensitive directional earth fault protection is in operation parallel to directional earth fault protection, resulting in secure operation when direction detection is disturbed.

Over-voltage, residual over-voltage and under-voltage protection (59, 59N, 27)

Two stages of over- and two stages of under-voltage protection can be applied for phase voltages and two stages of overvoltage protection can be applied for residual voltage (or calculation zero sequence voltage symmetrical component). Every stage is set separately.

Frequency protection (81L, 81H)

Frequency protection operation is based on periodical samples of system frequency and it is used for load shedding of system load. It operates using frequency hysteresis for under and over frequency settings that is defined by the user. When using frequency protection for load shedding, use of coordinated load shedding scheme for specified bus is essential. Two stages of over- and two stages of under-frequency protection can be applied.

Negative sequence overcurrent protection (46)

Negative sequence protection against unbalanced or reverse currents it is also used for protection of single or semi-pole faults of feeder, when the fault current is lower than nominal load current. For ensured tripping the minimal and maximal phase load currents condition is used. FPC 680 offers two stages of negative sequence protection.

Phase unbalance protection (46DP)

Provide protection against unbalanced phase currents by operating to trip the circuit breaker when a fixed percentage of unbalance exists between any two phases.

Thermal overload protection (49)

Power flow through the feeder causes the feeder to heat depending on heat constant and environment conditions. TOP uses conductor physical parameters and load current of the feeder to calculate the temperature of the feeder. Results are used for two stage protection (alarm and trip) to prevent feeder overheating and in that way optimize load of the feeder.

Busbar protection (50BB)

When the FPC 680 is applied for back-up protection of the secondary winding of power transformer it can also perform protection of MV busbars. Busbar protection is integrated in protection scheme of MV switchgear, where high stage overcurrent protection pickup signals of each feeder are received via GOOSE or are hardwired to the FPC 680. FPC 680 on MV side of transformer start the busbar protection algorithm for any fault on any MV feeder, but it trips only in cases when it is not blocked by tripping of any MV feeder protection relay. That means that the bus-bar scheme eliminates only faults on the busbars and skips the faults that occur on feeders.

Breaker failure protection (50BF)

When a trip signal is issued to the circuit breaker the current should drop after specified time. That time is usually defined by the circuit breaker brake time. In case that circuit breaker is still closed after set time, than FPC 680 sends a trip command to all feeders connected to the same busbars. This protection can also be used in combination with busbar protection.

External protection

In some applications new feeder terminals are added to existing protection relays that are kept in function. For these cases FPC 680 offers hardwired connection of the existing protection relay to the digital input for immediate or delayed tripping of existing protection relays. That is appropriate to achieve exact time tagging avoiding separate acquisition unit.

Auto-recloser (79)

All protection functions of FPC 680 can be equipped with auto-recloser. The function enables grouping trip signals in groups with same settings (up to 10 groups).

Functional overview

Protection

- Three-phase overcurrent directional/non directional protection with definite/inverse time operation (50/51,67)
- Earth-fault directional/non directional protection with definite/inverse time operation, Var/Watt-metric metod (50N/51N/67N/32N)
- Sensitive earth-fault directional/non directional protection with definite time operation, Var/Watt-metric metod (50Ns/51Ns/67Ns/32Ns)
- REF 64
- Over/under voltage protection (59/27)
- Under/over frequency protection (81L/81H)
- Residual voltage protection (59N)
- Thermal overload protection (49M, 49T)
- Negative sequence overcurrent protection (46)
- Phase unbalance protection (46DP)
- Temperature monitoring (up to 8 sensors) (38/49T)
- Locked rotor, excessive starting time (48/51LR/14)
- Starts per hour (66)
- Thermostat/Buchholz switch (26/63)
- Auto-recloser (79)
- Circuit breaker failure protection (50BF)
- External protection
- Multiple protection setting groups

Control

- Internal data acquisition (protection operation, automatic reclosing and other internal signalization)
- external data acquisition (switching elements, alarm devices) - up to 44 DI
- power relay outputs - up to 16 DO
- synchro-check- V, deg & Hz (25)
- Time tagging (high resolution events)
- Local and remote setting

Monitoring and measurements

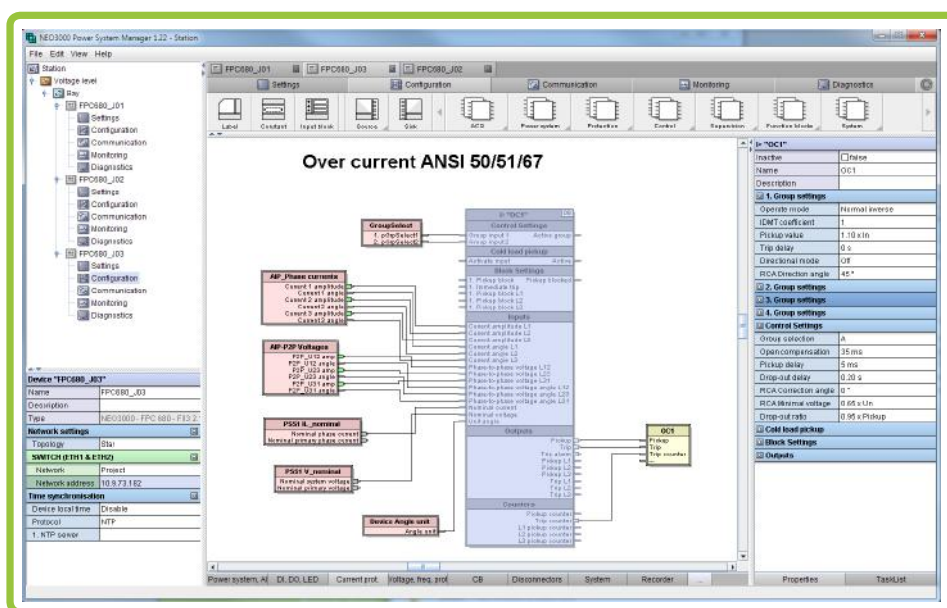
- Current, voltage, power, frequency and power factor measurements
- Energy metering
- Fault recording
- Event recording
- Transient disturbance recorder (DREC)
- Power Quality Monitoring
- Statistical data processing (operation counters of protection devices, automatic reclosing units and circuit breakers)
- Breaker I2t monitoring
- Trip circuit monitoring (TCM)
- Self-monitoring
- Fault location monitoring

Local Display Unit (LDU)

- Textual or graphical LCD display with single line diagram
- Web LDU interface
- Control for switching elements
- Showing measurements and alarms
- Event list
- Local/Remote switch with LED indication
- Easy to use navigation keys
- Open/Close control keys
- Ready LED + Alarm LED + 16 programmable LEDs
- 6 programmable function keys
- Front Ethernet RJ-45 communication port for local connection to device

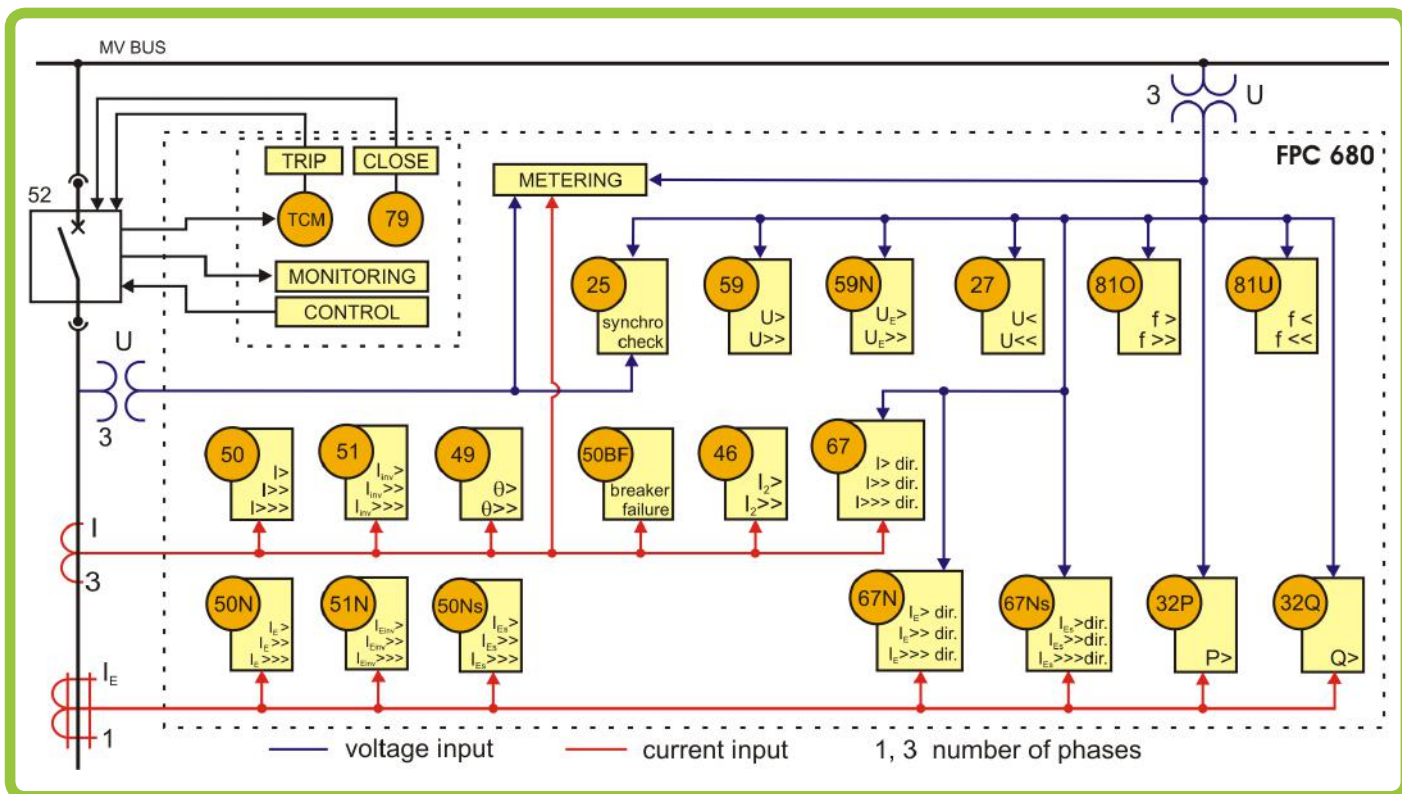
Communication

- Communication via dual fiber optic or RJ45 Ethernet with support for redundancy rings HSR, and RSTP.
- Serial communication – RS232, RS485 or optical.
- Front and/or back RJ45 Ethernet interface for NEO 3000® Power System Manager® parameterizing and analysis tools
- Communication using IEC 61850 (optional DNP3, IEC 60870-5-10x or Modbus protocols)
- System time synchronization over NTP/SNTP or through other communication protocols



FPC 680

Multifunctional feeder terminal



Application

- Control and protection of medium voltage distribution and industrial overhead or cable feeders, bus couplers, motors and transformers
- Suitable for solidly earthed, resistor earthed, Petersen-coil compensated and insulated power networks
- Backup protection for power lines, power transformers and busbars of all voltage levels

Control and monitoring

FPC 680 is much more than just a powerful numerical relay because it also comprehends all the control functions that perfect IED for integration in distributed substation control systems. All information from FPC 680 can be also transmitted through IEC 61850 communication protocol to higher level equipment (e.g. SCADA, protocol gateways, control centers,...) and also via GOOSE transmission to other IED supporting IEC 61850.

Inputs and outputs

FPC 680 acquires electrical values and digital signaling through analogue and digital inputs. As current inputs are indispensable for most protection functions, voltage inputs expand the functionality of device also for monitoring the feeder's power flow, energy, power quality (PQM) and useful disturbance recorder. All together the device offers up to 9 current and voltage analog inputs, 1 DC (mA or voltage) analog input, up to 44 digital inputs and up to 16 digital outputs. Each digital input is configured to type and input logic of digital signal, while digital outputs can be freely configured for external signaling and switchgear control.

Circuit breaker ware monitoring

Circuit breaker monitoring is realized with I2t function that determines circuit breaker poles ware through determination of switching current. I2t function records circuit breaks due protection tripping and due control command. When cumulative number of breaks at nominal current approaches to set value that is defined by circuit breaker characteristic, the alarm signal is issued. I2t function also collects complete per-phase statistics of circuit breaker, such as number of all breaks, breaks due short circuit, CB poles ware, etc.

Protection conditional operation

For example when malfunction occurs on voltage measuring circuits, under-voltage protections would operate although the feeder voltage remains unchanged. That undesired protection operation can be eliminated by using the auxiliary contacts of the miniature circuit breaker for voltage measuring circuits that are hardwired to digital input of FPC 680. Voltage protection can be therefore blocked by using configured digital input.

Same principle can be applied to any other protection function. Therefore user can configure easily which external conditions shall affect operation of each protection function.

Synchro-check (25)

Synchro-check function provides supervised joining of the feeder to busbars in single or double busbar systems. Using measurements of voltage, frequency and phase angle of busbars and feeder the FPC 680 can perform manual or automatic feeder synchronization. Mode of operation is synchronous or asynchronous.

Local/remote control

Using input and output capabilities FPC 680 offers complete control of switchgear either locally or remotely. FPC 680 provides acquisition of digital and analogue values, and control over relay outputs. In that way it is ideal solution for complete control of switchgear from different control levels.

FPC 680

Multifunctional feeder terminal

Local control is possible via optional Local Display Unit (LDU) that displays single line diagram, measurements, metering, statistic counters, alarm lists and enables user SCADA-like supervision over feeder. LDU can also be ordered as decoupled unit from FPC 680 it can be used on the cubicle door while FPC 680 is situated inside low-voltage compartment. Selection of control level can be applied via LDU Local/Remote button (or hardware lock) or external digital input (selection switch). Remote control is possible from substation level SCADA or remotely from dispatch center.

Fault locator (21)

Provides accurate distance to fault calculation and information about fault type, resistance and amplitude. It can minimize the outages after a persistent fault. It can also be used to find weak spot on the line.

Communication

FPC 680 comprehends two Ethernet communication ports for use with IEC 61850 communication protocol (optional DNP3 TCP/IP, IEC 60870-5-104). Front Ethernet port on LDU is used for bay level configuration by using NEO 3000 Power System Manager (PSM) application software. Optional FPC 680 includes two serial communication ports for protocols like DNP3, IEC 60870-5-103 and IEC 60870-5-101.

Ethernet ports can be delivered with RJ45 or ST Glass Fiber Optic interface, while serial ports can be RS232, ST Glass Fiber Optic or RS485 interface. Accurate time is distributed via Ethernet NTP/SNTP protocol or via protocol clock sync.

Measuring and Metering

Measurements are acquired using voltage and currents inputs. Nominal values of each input are configurable.

Following measurements are performed by FPC 680:

- currents: I1, I2, I3, IE,
- voltages: U1, U2, U3, UE, U12, U23, U31
- power measurements: P, Q, S
- power factor: PF
- frequency: f
- active and reactive energy: forward and reverse, high and low tariff
- energy metering using external digital input for external energy counter pulse output.
- current symmetrical sequence component calculations (I1, I2, IO)
- voltage symmetrical sequence component calculations (U1, U2, U0)
- Power quality measurements (harmonics up to 40, THD, RMS...)

Local Display Unit (LDU)

FPC 680 is equipped with integrated (optional standalone) Local Display Unit (LDU). LDU represents graphical or textual simple screen operation panel that enable local control from cubicle door and hence avoiding the need of push-buttons.

Hardware properties:

- LCD size with resolution of 128x64 or 240x128 pixels
- navigation buttons (6)
- control buttons (3)
- Local/Remote/Bypass button with LEDs
- programmable LEDs (16)
- programmable function keys (up to 6)

Functions:

- display of single line diagram with interactive representation and control of circuit breakers, disconnection switches, etc.
- chronological event list
- alarm list
- measurements (U, I, P, Q cos , f,...)
- change protection parameters settings via LDU
- selection between Local/Remote bay control
- 16 programmable LEDs for alarm indication
- 6 programmable function keys

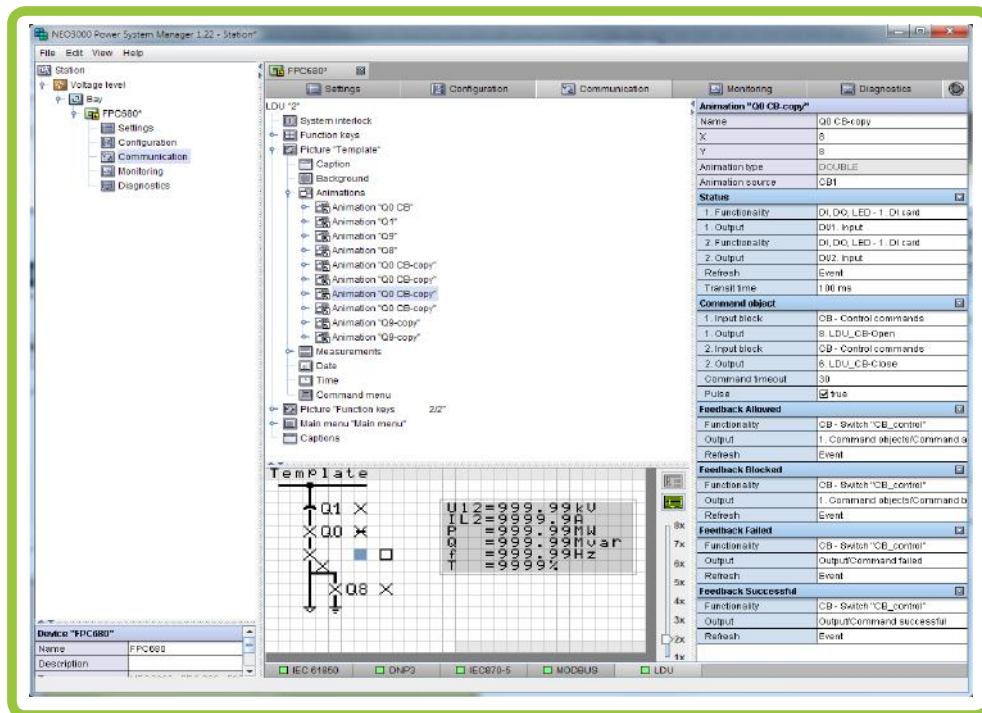
Device configuration with PC

FPC 680 is a part of NEO 3000 Substation protection and control system.

Since all communication between device and NEO3000 Power System Manager tool is done via TCP/IP media, there are several ways to establish remote diagnostics, configuration and testing of device behavior. For local access optional USB Ethernet adapter is available.

Local display is completely user configurable.

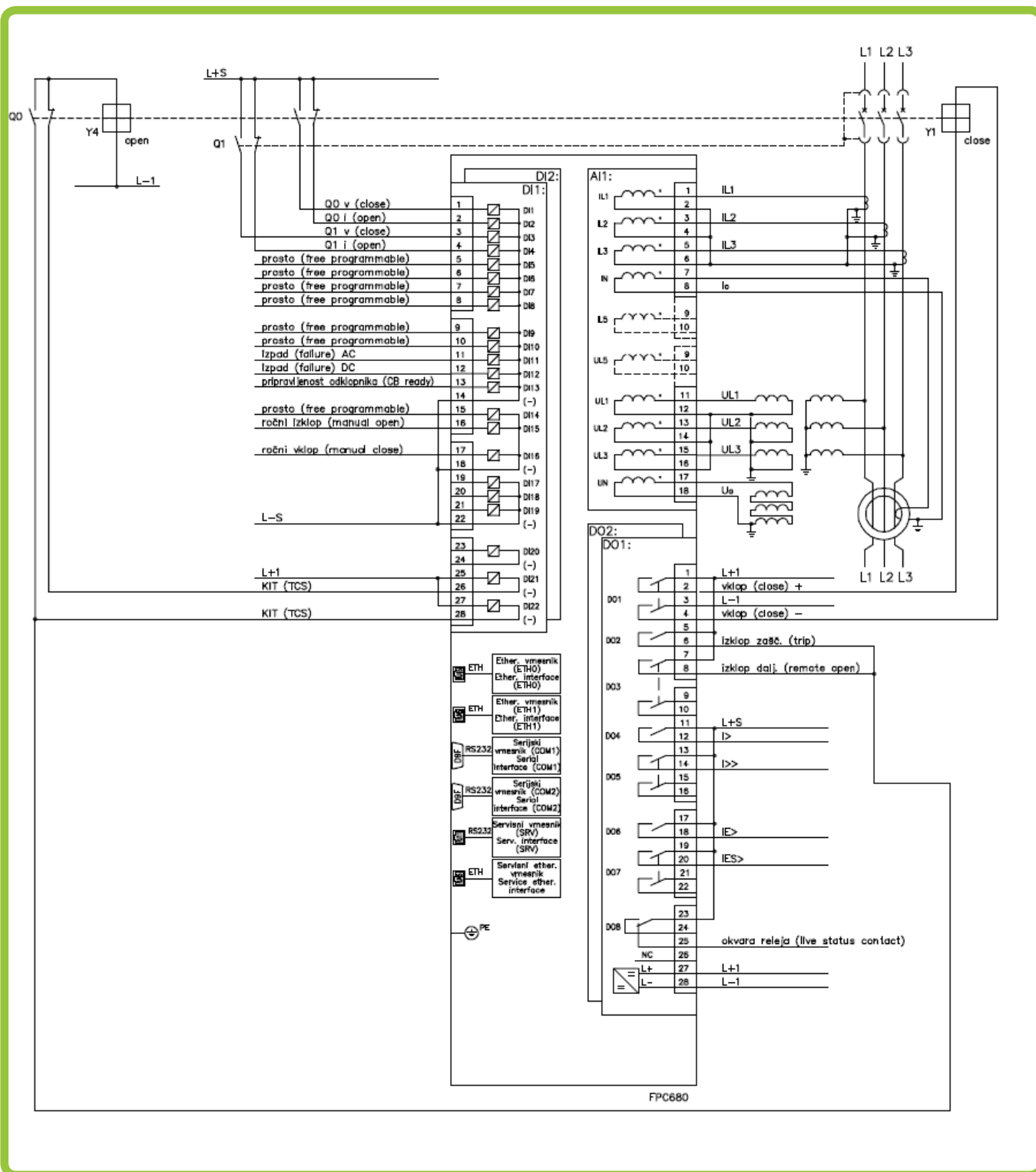
User can create new picture or he can choose from the predefined. Animated elements can also be user created (up to 10). There are max. number of 5 pages/images, each can contain up to 50 animations and 6 measurements.



FPC 680

Multifunctional feeder terminal

Typical wiring of the FPC680 unit



FPC 680

Multifunctional feeder terminal

Device Web Interface

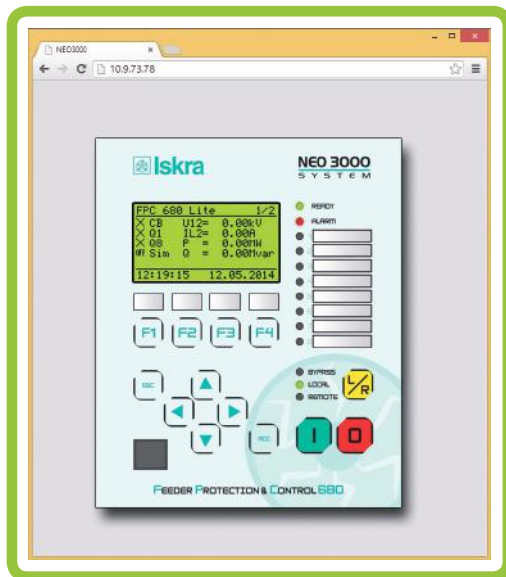
Analysis and parameterizing software

Basic tool for nowadays engineers are laptop computers that makes surveillance of IEDs easier. FPC 680 uses a software package NEO 3000 Power System Manager (PSM) for parameterizing, analysis and commissioning.

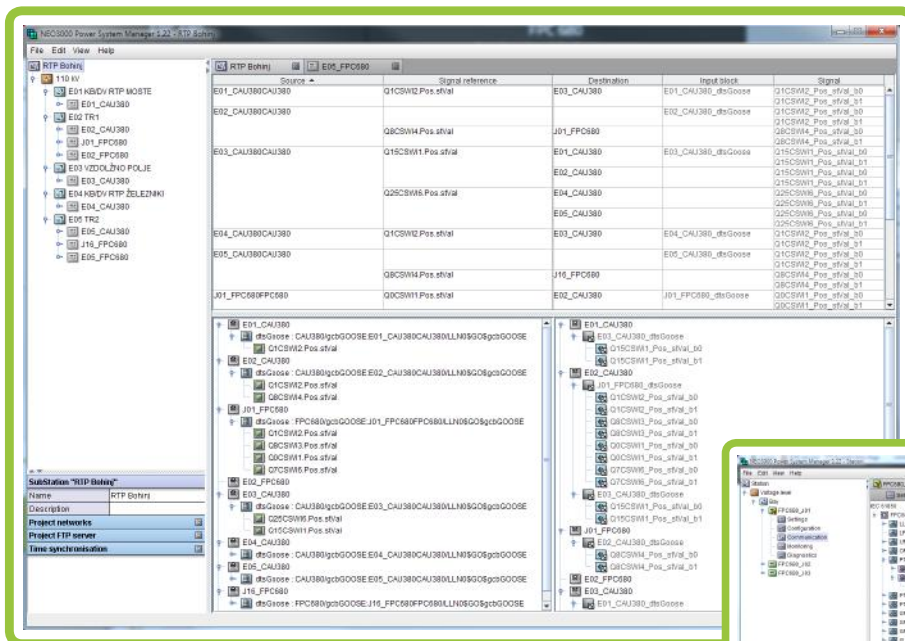
NEO 3000 Power System Manager

NEO 3000 Power System Manager is PC based software that makes handling with NEO 3000 substation control and protection system simple. Under password protected access the user can set parameters of FPC 680 device via transparent graphical and tree based menus. It enables online or offline setting of device parameters.

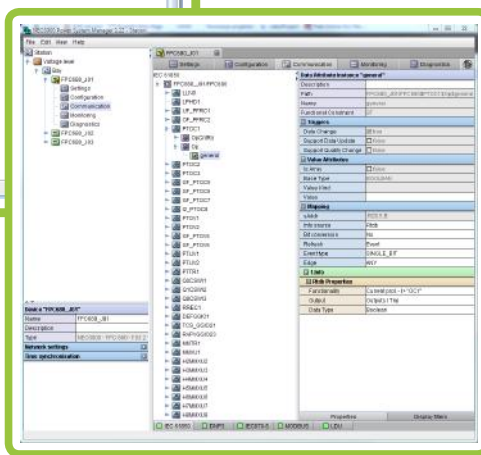
It also provides a powerful tool for configuring communication protocols - it supports DNP3 (serial or ethernet), IEC870-5-101, IEC870-5-103, IEC870-5-104, Modbus and 61850 MMS and GOOSE.



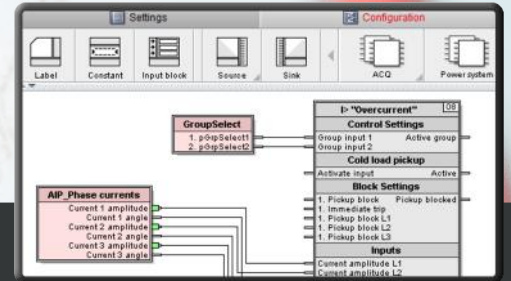
NEO3000 Power System Manager



GOOSE is mapped via source - destination views. Connection from one device to another is created by selecting data set or its member from the left (source) window and clicking on the device in the right (destination) window.



61850 MMS configuration editor gives user the possibility of connecting device process data to logical nodes, objects and attributes. User can create and configure data sets and control blocks.



Fully configurable

FPC 680i

Multifunctional industrial numerical relay

FPC 680 is a multifunctional intelligent electronic device for protection and control of feeders, motors or transformers. It offers comprehensive and cost effective solution for protection, control, measuring and supervision of utility and industrial distribution substations. FPC 680 can be used in applications of any MV networks and also as a back-up protection for HV power lines and transformers. Wide range of parameters enables FPC 680 to be used in solidly earthed, resistor earthed isolated and compensated networks.

FPC 680 is a member of NEO3000® Substation system and can be integrated to any other new or existing substation automation and SCADA system. It supports the IEC 61850 substation automation standard including horizontal GOOSE communication and all common communication protocols enabling seamless connectivity with support for HSR/PRP and RSTP.

FPC 680 is IEC 61850 certified by KEMA (Level A) independent laboratories.

Feeder, motor or transformer protection functionality

Intuitive graphical user interface

Fault and event recording

Measurements and energy metering

NEO3000 Power System Manager software tool

Disturbance recorder and power quality monitoring

Multiple communication capabilities with RSTP and HSR/PRP

Fully configurable for solving a variety of scenarios

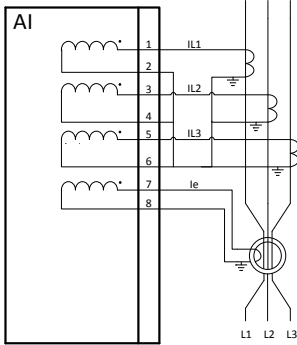
IEC 61850 certified

FPC 680i

Multifunctional industrial numerical relay

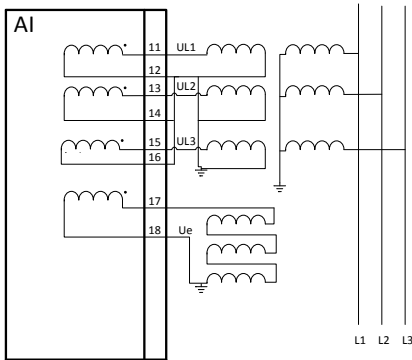
Current application:

- F01 Current protection
- M01 Motor current protection
- T01 Transformer current protection



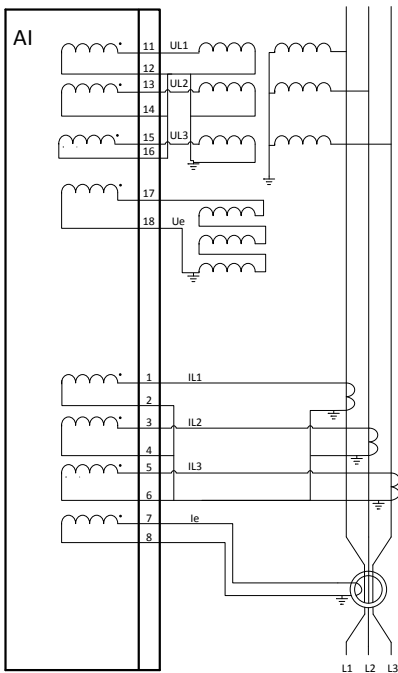
Voltage application

- F02 Voltage protection



Current and voltage application:

- F03 Current and Voltage protection
- F04 Current and Voltage protection with Synchro check
- F05 Current and Voltage protection with Shunt protection
- F06 Current and Voltage protection with IuB protection
- F07 Current and Voltage protection with Differential protection
- T03 Transformer Current and Voltage protection
- M03 Current and Voltage protection for motors



Product type comparison		F01	F02	F03	F04	M01	M03	T01	T03
Current protections									
50/51/51B	3 phase overcurrent / IDMT / Inrush r. / CLPU	3		4	4	3	4	3	3
67	3 phase directional overcurrent	opt.		✓	✓	opt.	✓	opt.	✓
50/51 N/G	Earth fault overcurrent / IDMT / Inrush r. / CLPU	4		6	8	4	6	4	6
67N/51N	Earth fault directional overcurrent	opt.		✓	✓	opt.	✓	opt.	✓
67Ns	Earth-fault directional sensitive o.c.	opt.		✓	✓	opt.	✓	opt.	✓
32NQ	Earth fault directional watt-metric	opt.		✓	✓	opt.	✓	opt.	✓
32NP	Earth fault directional VAR-metric	opt.		✓	✓	opt.	✓	opt.	✓
64REF	Restricted earth-fault				4	2	4	2	4
46	Negative sequence overcurrent / unbalance	2		2	4	2	2	2	2
Voltage protections									
27	Phase-to-phase undervoltage		2	4	4		4		4
27R	Remanent undervoltage		1	2	2		✓		✓
27D	Positive sequence undervoltage		2	2	2		2		2
27S	3 phase undervoltage		1	1	1		✓		✓
59	Phase-to-phase overvoltage		2	4	4		2		2
59N	Neutral voltage displacement		2	2	2				
47	Negative sequence overvoltage		2	2	2		2		2
59N	Residual overvoltage		2	2	2		2		2
81H	Overfrequency		1	2	2		2		2
81L	Underfrequency		2	4	4		2		2
Power and machine protections and diagnostic									
49F	3 phase thermal overload (feeders & cables)	2		2	2	2	2	2	2
49T	3 phase thermal overload (transformers)							2	2
49M (RMS)	3 phase thermal overload (motors)					2	2		
38/49T	Temperature monitoring (up to 8 sensors)	1		2	2	1	2	1	2
48/51LR/14	Locked rotor, excessive starting time					1	2		
66	Starts per hour					1	2		
26/63	Thermostat / Buchholz switch			✓	✓			✓	✓
	External trip	2		2	2	2	2	2	2
Automation and diagnostic									
94/69	Circuit breaker control and monitoring	1	1	2	2	1	2	2	2
50BF/62BF	Circuit breaker failure	✓	✓	✓	✓	✓	✓	✓	✓
74TCS	Trip circuit supervision (TCS)	2	2	2	2	2	2	2	2
79	Auto-reclosure	1	1	2	2			1	2
25	Synchro-check		1		1	1	1		1
	Voltage regulator		1		1				1
69	Disconnecter control	4	4	6	6	4	6	4	6
86LR/94	Lockout Relay	✓	✓	✓	✓	✓	✓	✓	✓
60	Fuse failure supervision	opt.	opt.	opt.	opt.	opt.	opt.	opt.	opt.
21FL	Fault locator			✓	✓		✓		✓
	Running hours	✓	✓	✓	✓	✓	✓	✓	✓
	IEC 6 1131 Function Blocks	✓	✓	✓	✓	✓	✓	✓	✓
General device data									
Power supply	24V DC, 48-60V DC, 110-125V DC, 220-250V DC								
Communication	IEC 61850 MMS with GOOSE, IEC 60870-5-101, IEC 60870-5-103, IEC 60870-5-104, DNP3, Modbus*								
	Dual fiber optic or RJ45 Ethernet PRP/HSR								
Dimensions	220 x 176 x 187 mm (W x H x D)								

Type F05 is based on F03 with Shunt protection. Type F06 is based on F03 with IuB.

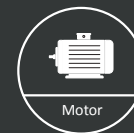
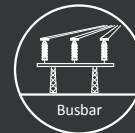
✓ included, opt. optional, 1-6 number of functions

*Customer's choice



Fast commissioning

FPC 200



Family of multifunctional numerical relays

FPC 200 is a family of current and voltage digital protection relays with easy to use interface meant for variety of solutions in industry and power distribution.

Its robust design enables it to be placed in demanding industrial environments such as petrochemical industry.

Setting can be done completely through user friendly local display unit. Visual experience is enhanced through new edition of interface software MiQen featuring specially designed menus where electrical attributes are graphically and numerically displayed in real time.

Transferring settings between different devices has never been easier thanks to special front panel USB port. Same settings are simply transferred from one device to another using USB stick which can also be used to save fault recordings, counters and software updates.

FPC 200 is a member of NEO3000® Substation system and can be integrated to any other new or existing substation or automation.

Feeder, busbar, motor or transformer protection functionality

Robust design for industrial usage

Fast and simple commissioning

Fault and event recording

Intuitive user interface

Multiple communication capabilities

Numerical and graphical MiQen software tool

Easy data transfer with USB stick

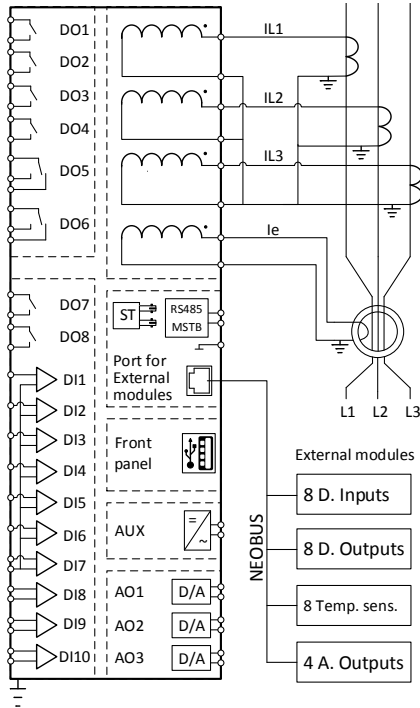
Up to 10 Digital inputs and 8 outputs

FPC 200

Family of multifunctional numerical relays

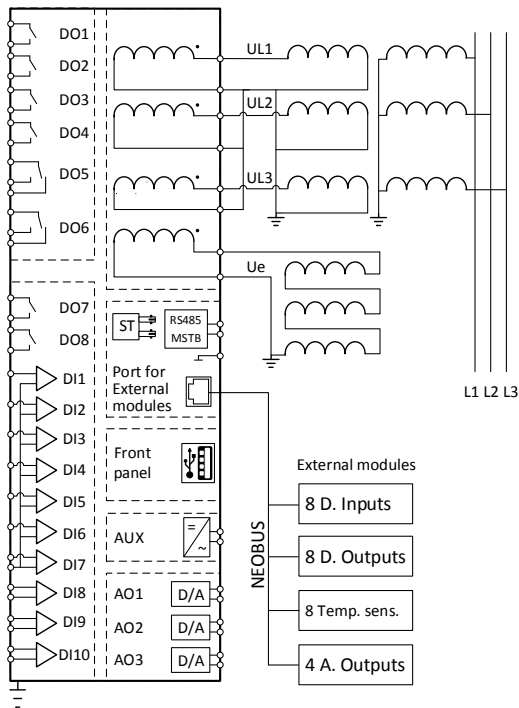
Current application:

- F1, F3 Feeder protection
- M1, M3 Motor protection
- T1, T3 Transformer protection



Voltage application

- B2, B3 Busbar protection



Product type comparison	F1	F3	B2	B3	M1	M3	T1	T3
Current protection								
Overcurrent IDMT with inrush restraint and Cold Load Pick-up	50/51	4	4		4	4	4	4
Earth fault overcurrent IDMT with inrush restraint and Cold Load Pick-up	50/51 N/G	4	4		4	4	4	4
Restricted earth-fault	64REF				2			2
Negative/unbalance sequence overcurrent	46	1	1		1	1	1	1
Phase undercurrent	37				1	1		
Voltage protection								
Phase-to-phase undervoltage	27		4	4				
Remanent undervoltage	27R		1	1				
Positive sequence undervoltage	27D		4	4				
Phase-to-phase overvoltage	59		4	4				
Neutral voltage displacement	59N		4	4				
Residual overvoltage	59N		4	4				
Overfrequency	81H		1	1				
Underfrequency	81L		4	4				
Rate of change of frequency (df/dt)	81R			1				
Power and machine protection and diagnostic								
3 phase thermal overload	49				✓	✓	✓	✓
Temperature monitoring (up to 8 sensors)*	38/49T				✓	✓	✓	✓
Locked rotor, excessive starting time	48/51LR/14				✓	✓		
Starts per hour	66				✓	✓		
Thermostat / Buchholz switch	26/63						✓	✓
External trip		✓	✓	✓	✓	✓	✓	✓
Automation and diagnostic								
Circuit breaker control and monitoring	94/69	✓	✓	✓	✓	✓	✓	✓
Circuit breaker failure	50BF/62BF		✓					✓
Trip circuit supervision	74TCS	✓	✓	✓	✓	✓	✓	✓
Auto-reclosure	79	✓	✓					
Lockout Relay	86LR/94	✓	✓	✓	✓	✓	✓	✓
Cumulative breaking current		✓	✓	✓	✓	✓	✓	✓
Metering								
Phase current, RMS, THD, Harmonics, Residual current I ₀		✓	✓		✓	✓	✓	✓
Earth current sensitive		Opt.	Opt.		Opt.	Opt.	Opt.	Opt.
Ph. & PPV voltages, RMS, THD, Harmonics			✓	✓				
Frequency		✓	✓	✓	✓	✓	✓	✓
Communication								
IEC 61850 MMS					optional			
DNP3					optional			
Modbus					optional			
Conformity to standards								
IEC 60529 - Degree of protection					IP 52			
Auxiliary power supply								
24-48 V _{DC} and 48-275 V _{DC or AC}								
Dimensions (H x W x D)								
176 x 150 x 125 mm								

✓ included, Opt. optional, 1-4 number of functions
* External temperature module TEM

NEO 3000 SYSTEM



CAU 380 Bay Computer

THE FAMILY OF EQUIPMENT DEDICATED FOR POWER UTILITIES

Energy Sector



CAU 380

Bay Computer

Description

CAU 380 is a comprehensive and cost effective bay computer for control, measuring and supervision of utility and industrial distribution substations. CAU 380 is a member of NEO 3000® Substation system and a part of CAU control product series. The CAU 380 supports the IEC 61850 substation automation standard including horizontal GOOSE communication offering seamless connectivity to substation automation and SCADA systems.

CAU 380 can be used in applications of any HV/MV/LV networks. Control of feeder or bay can be applied locally through local display unit LDU or remotely through substation control system.

Communication interface with IEC 61850 protocol enables integration of CAU 380 within substation control system and remote control centers.

CAU 380 is IEC 61850 certified by KEMA (Level A) independent laboratories.



Main features

Complete feeder control

Local and remote control of feeder switching elements applied through configurable interlocking.

Measurements and energy metering

Complete range of voltage, current, frequency, active and reactive power and power factor measurements with reactive and apparent double tariff forward/reverse energy metering.

Fault and event recording

Fault recording with 1ms resolution time tagging.

Disturbance recorder and power quality monitoring (PQM)

Disturbance recorder with capability of up to 20 recordings, up to 9 seconds each, COMTRADE format. Monitoring of parameters such as THD, sags and swells and harmonics up to 40th order.

Communication capabilities

Easy integration of the module within NEO 3000 substation control and protection system through IEC 61850 protocol, (optional DNP3, IEC 60870-5-104, IEC 60870-5-101 and IEC 60870-5-103 protocols).

Intuitive user interface

Bay computer parameterizing, measurements and alarming, control with single line diagram presentation can be applied through Local Display Unit (LDU).

NEO3000 Power System Manager software tool

PC based software tool for device parameterizing, commissioning, testing, ...

CAU 380

Bay Computer

Functions

Control

- internal data acquisition
- external data acquisition (switching elements, alarm devices) - up to 110 DI
- power relay outputs - up to 24 DO
- synchro-check- V, deg & Hz (25)
- Voltage regulation
- Fault current detection
- Time tagging (high resolution events)
- Local and remote setting

Monitoring and measurements

- Current, voltage, power, frequency and power factor measurements
- Energy metering
- Event recording
- Transient disturbance recorder (DREC)
- Power Quality Monitoring
- Statistical data processing (circuit breakers)
- Self-monitoring

Local Display Unit (LDU)

- Graphic LCD display with single line diagram
- Control for switching elements
- Showing measurements and alarms
- Event list
- Local/Remote switch with LED indication
- Easy to use navigation keys
- Open/Close control keys
- Ready LED + Alarm LED + 16 programmable LEDs
- 6 programmable function keys
- Front Ethernet RJ-45 communication port for parameterizing

Communication

- Communication via fiber optic or RJ45 Ethernet (optional serial communication – RS232, RS485 or optical)
- Front and/or back RJ45 Ethernet interface for NEO 3000® Power System Manager® parameterizing and analysis tools
- Communication using IEC 61850 (optional DNP3 or IEC 60870-5-10x protocols)
- System time synchronization over NTP/SNTP or through other comm. protocols

Application

- Control of HV/MV/LV transmission, distribution and industrial overhead or cable feeders/bays, bus couplers, measuring bays, capacitor banks
- Transformer bays (HV, MV)
- Distribution automation system (FRTU)
- Suitable for solidly earthed, resistor earthed, Petersen-coil compensated and insulated power networks

Control and monitoring

CAU 380 is much more than just a powerful bay computer because it also comprehends all the control functions that perfect IED for integration in distributed substation control systems. All information from CAU 380 can be also transmitted through IEC 61850 communication protocol to higher level equipment (e.g. SCADA, protocol gateways, control centers,...) and also via GOOSE transmission to other IED supporting IEC 61850.

Inputs and outputs

CAU 380 acquires electrical values and digital signaling through analogue and digital inputs. Current and voltage inputs expand the functionality of device also for monitoring the feeder/bay power flow, energy, power quality (PQM) and useful disturbance recorder. All together the device offers up to 9 current and voltage analog inputs, 9 DC (mA or Voltage) analog inputs, up to 110 digital inputs and up to 24 digital outputs. Each digital input is configured to type and input logic of digital signal, while digital outputs can be freely configured for external signaling and switchgear control.

Synchro-check (25)

Synchro-check function provides supervised joining of the feeder/bay to busbars in single or double busbar systems. Using measurements of voltage, frequency and phase angle of busbars and feeder the CAU 380 can perform manual or automatic feeder synchronization. Mode of operation is synchronous or asynchronous.

Voltage regulation

Voltage regulation function provides regulation of voltage over RAISE/LOWER commands to tap changer. Function compares measured voltage with settable requested voltage (parameter or via communication as set-point command) and execute regulation command according predefined limits and conditions. It will also detect if the limits are reached or the command is blocked by any reason.

CAU 380

Bay Computer

Fault current detection

CAU 380 provides also fault current detection function, which follows ARC function in substations and independently signals excursion over set values and follows reclosures (up to 5). It also detects direction of fault (forward or reverse direction).

Local/remote control

Using input and output capabilities CAU 380 offers complete control of switchgear either locally or remotely. CAU 380 provides acquisition of digital and analogue values, and control over relay outputs. In that way it is ideal solution for complete control of switchgear from different control levels.

Local control is possible via optional Local Display Unit (LDU) that displays single line diagram, measurements, metering, statistic counters, alarm lists and enables user SCADA-like supervision over feeder. LDU can also be ordered as decoupled unit from CAU 380 it can be used on the cubicle door while CAU 380 is situated inside low-voltage compartment. Selection of control level can be applied via LDU Local/Remote button (or hardware lock) or external digital input (selection switch). Remote control is possible from substation level SCADA or remotely from dispatch center.

Measuring and Metering

Measurements are acquired using voltage and currents inputs. Nominal values of each input are configurable.

Following measurements are performed by CAU 380:

- currents: I1, I2, I3, IE
- voltages: U1, U2, U3, UE, U12, U23, U31
- power measurements: P, Q, S
- power factor: PF
- frequency: f
- active and reactive energy: forward and reverse, high and low tariff
- energy metering using external digital input for external energy counter pulse output.
- current symmetrical sequence component calculations (I1, I2, I0)
- voltage symmetrical sequence component calculations (U1, U2, U0)
- Power quality measurements (harmonics up to 40, THD, RMS...)

Communication

CAU 380 comprehends two Ethernet communication ports for use with IEC 61850 communication protocol (optional DNP3 TCP/IP, IEC 60870-5-104). Front Ethernet port on LDU is used for bay level configuration by using NEO 3000 Power System Manager (PSM) application software. Optional CAU 380 includes two serial communication ports for protocols like DNP3, IEC 60870-5-103 and IEC 60870-5-101.

Ethernet ports can be delivered with RJ45 or ST Glass Fiber Optic interface, while serial ports can be RS232, ST Glass Fiber Optic or RS485 interface. Accurate time is distributed via Ethernet NTP/SNTP protocol or via protocol clock sync.

Local Display Unit (LDU)

CAU 380 is equipped with integrated (optional standalone) Local Display Unit (LDU). LDU represents simple screen graphic operation panel that enable local control from cubicle door and hence avoiding the need of push-buttons.

Hardware properties:

- LCD size with resolution of 240 x 128 pixels
- navigation buttons (6)
- control buttons (3)
- Local/Remote/Bypass button with LEDs
- programmable LEDs (16)
- programmable function keys (6)

Functions:

- display of single line diagram with interactive representation and control of circuit breakers, disconnection switches, etc.
- chronological event list
- alarm list
- measurements (U, I, P, Q cos , f,...)
- change control parameters settings via LDU
- selection between Local/Remote bay control
- 16 programmable LEDs for alarm indication
- 6 programmable function keys

Remote configuration

CAU 380 is a part of NEO 3000 Substation protection and control system.

Since all communication between device and NEO3000 Power System Manager tool are done via TCP/IP media, there are several ways to establish remote diagnostics, configuration and testing of device behavior.

CAU 380 Bay Computer

Analysis and parameterizing software

Basic tool for nowadays engineers are laptop computers that makes surveillance of IEDs easier. CAU 380 uses a software package NEO 3000 Power System Manager (PSM) for parameterizing, analysis and commissioning.

NEO 3000 Power System Manager

NEO 3000 Power System Manager is PC based software that makes handling with NEO 3000 substation control and protection system simple. Under password protected access the user can set parameters of CAU 380 device via transparent graphical and tree based menus. It enables online or offline setting of device parameters.

The screenshot displays the NEO3000 Power System Manager software interface. The main window shows a substation diagram with various components like AIP (Active Input Protection) and OC (Overcurrent) protection devices. The left sidebar shows a tree view of the substation structure, including buses (BUS1, BUS2) and feeders (J01, J02, J03, J04). The top menu bar includes File, Edit, View, and Help. The main toolbar contains icons for Label, Constant, Input block, Source, Sink, ACQ, Power system, Protection, Costal, Supervision, Function block, and Manager. The right sidebar shows the configuration settings for the selected device, including a 'b-OC1' block with various settings like Operate mode, IDMT coefficient, Pickup value, Trip delay, and Directional made. The bottom status bar shows the current view and sheet information.

CAU 380

Bay Computer

Technical data

Control and monitoring

Metering

Currents:	IL1, IL2, IL3, IE
Range:	0,01 – 20 x In
Accuracy:	≤ ± 0.2% Full scale
Voltages:	U1, U2, U3, UE, U12, U23, U31
Range:	0,005 – 1,5 x Un
Accuracy:	≤ ± 0.1% Full scale
Power:	Active (P), Reactive (Q),
	Apparent (S)
Range:	0,05 – 1,2 x Pn
Accuracy:	< 0,5% Pn
Power factor:	cos Fi, total power
Range:	-1 to +1
Frequency:	f
Range:	40,00 – 60,00 Hz
Energy:	active, reactive
Acquisition:	internally calcu- lated,
digital	through external inputs
No. of tariffs:	two
Measuring method:	four quadrant

Synchro-check (25)

Amplitude diff.:	3 – 80 °	3-100 % Un
Angle diff.:		
Frequency diff.:	0,01 – 2,00 Hz	
Maximal synchronization time:	0,00 – 300,00 s	

Disturbance Recorder

Data channels:	9 analog, 64 digital
Sampling rate:	32/64/128 sam- ples per cycle
Trigger source:	external digital
input and	internal digital data
Storage capacity:	up to 20 recordings, up to 9s each
Storage media:	non-volatile flash, remote FTP server
Recording format:	COMTRADE

Power Quality Monitoring (PQM)

Monitoring values:	Spectral analysis up to 40th har- monic,
swells	THD, TRMS, sags &

Inputs

Nominal frequency:	50 Hz
--------------------	-------

Current inputs

Rated current In:	1 or 5 A
Range:	up to 20 x In
Consumption:	<0,06 VA at In= 1 A <0,3VA at In= 5 A

Overload:

continuous:	4 x In
10s:	30 x In
1s:	100 x In
10ms:	250 x In

Voltage inputs

Rated voltage Un:	100-150 V, 300 V
Range:	up to 150 V, 300 V
Consumption:	<0,23 VA at Un
Overload:	150 V continuous, 300 V continuous

External digital inputs

Quantity of inputs:	22 (optional up to 110)
Nominal voltage:	24V DC / 48-60V DC 110-125V DC /
220V DC	
Permitted voltage	
Offset:	+/- 20%
Consumption:	<0,5 mA

Relay outputs

Quantity of relays:	8 (optional up to 24)
Contacts:	4 x DO: 2xNO, 3 x DO: 1xNO
Ready relay (8thDO):	1xCO
Trip/signal output	programmable
assignment:	
Switching capacity:	make: 14 A break: 1000 W @
cos Fi=1	permanent: 8 A
Switching voltage:	250 V DC
Switching reliability:	1mio. switching

Communication interfaces

Front port on LDU

Layout:	100BaseTx (RJ45)
Usage:	used for local configuration, diagnosis and testing

Rear ports (Ethernet, Serial, System)

Up to 2 x Ethernet	
layouts:	100BaseTx (RJ45), 100BaseFx (ST glass FO)
Up to 2 x Serial	
layouts:	RS232 (DB9), RS485, ST MM glass FO
1 x System layouts:	RS232 (RJ11)
Serial Baud rate:	up to 115,2 kbps
Protocols:	IEC 61850 (MMS + Goose) IEC 60870-5-101
(optional)	IEC 60870-5-103
(optional)	IEC 60870-5-104
(optional)	DNP3 or Modbus

Time synchronization

NTP/SNTP Ethernet (optional via comm. protocol)	
Resolution: ± 1 ms	
Accuracy: ± 5 ms	

Power supply

Rated voltage:	24V DC, 48-60V DC, 110-125V DC, 220-
250 V DC	
Permissible tolerance:	- 20/+30%
Power consumption:	<20 W, typ. 15W
Voltage loss hold-up time:	>20 ms

Operating conditions

Temperature:	
Storage:	-20°C to +70°C
Operate:	-10°C to +55°C
Operate:	-10°C to +70°C
(housing for	ex-
tended temp. range)	
Humidity:	up to 95% non-condensing

Mechanical design

Material:	stainless steel
Protection class:	IP 54 (front LDU), IP40 (housing), IP20 (housing for
extended	
Mounting type:	temp. range) flush or surface

Dimensions:

Small housing (1/2 19", 4U)	
(WxHxD): 220 x 176 x 187 mm	
Medium housing (2/3 19", 4U)	
(WxHxD): 290 x 176 x 187 mm	
Large housing (19", 4U)	
(WxHxD): 440 x 176	

x 187 mm
Weight:

Small housing (1/2 19", 4U):	max. 4,1 kg
Medium housing (2/3 19", 4U):	max. 5,1 kg
Large housing (19", 4U):	max. 7,1 kg

Type tests

Rated insulation	
voltage test:	IEC 60255-5, table 1
Dielectric test	
voltage test:	IEC 60255-5, table 1, series B, clause 6
Insulation	
resistance test:	IEC 60255-5, clause 7
Impulse	
voltage test:	IEC 60255-5, clause 8
Electrical	
disturbances test:	IEC 60255-22-1, class 3
Electrostatic	
discharge	
immunity test:	IEC 61000-4-2, level 4
Radiated	
immunity test:	IEC 61000-4-3, level 3; IEC 60255-22-3, class 3; IEC 61000-4-3, class 3; ENV 50204 (GSM), level 3;
Fast transient/burst	
immunity test:	IEC 61000-4-4, level 4; IEC 60255-22-4, class 4; ANSI/IEEE C.37.90.1;
Surge	
immunity test:	IEC 61000-4-5, level 4
Conducted	
immunity test:	IEC 61000-4-6, level 3
Power frequency	
magnetic field	
immunity test:	IEC 61000-4-8, level 4
Pulse magnetic field	
immunity test:	IEC 61000-4-9, level 5
Damped oscillatory	
magnetic field	
immunity test:	IEC 61000-4-10, level 4
Oscillatory transient	
immunity test:	IEC 61000-4-12, level 4; IEC 61000-4-18, level 3; ANSI/IEEE C.37.90.1; IEC 60255-25
Emissions test:	
Power	
interruption test:	IEC 60255-11
Power frequency	
immunity test:	IEC 60255-22-7; IEC 61000-4-16
Temperature test:	IEC 60068-2-1; IEC 60068-2-2
Temperature	
gradient test:	IEC 60068-2-14
Humidity test:	IEC 60068-2-30
Damp heat test:	IEC 60068-2-78
Vibration	
(sinusoidal) test:	IEC 60068-2-6
Shock and	
bump tests:	IEC 60068-2-27
Seismic test:	IEC 60255-21-3
Communication test:	
	IEC 61850 Certificate Level A (IEC 61850-10 Ed1)

CAU 380

Bay Computer

IEC 61850 Certificate Level A by KEMA



IEC 61850 Certificate Level A¹

Page 1/2

International Users Group

No. 74100480-MOG/INC 11-1589

Issued to:
Iskra Sistemi, d.d.
Stegne 21
Ljubljana 1000
Slovenia

For the product:
NEO 3000 FPC 680
Hardware version: FPC 680-F03
Software version: 1.0



The product has not shown to be non-conforming to:
IEC 61850-6, 7-1, 7-2, 7-3, 7-4 and 8-1
Communication networks and systems in substations

The conformance test has been performed according to IEC 61850-10 with product's protocol, model and technical issue implementation conformance statements: "FPC680_F03.doc ver. 1.5", "FPC680_MCS.doc ver. 1.1", "FPC680_TICS.doc ver. 1.0" and product's extra information for testing: "FPC680_FIXIT.doc ver. 1.9".

The following IEC 61850 conformance blocks have been tested with a positive result (number of relevant and executed test cases / total number of test cases as defined in the UCA International Users Group Device Test Procedures V2.2b):

1: Basic Exchange (20/24)	6a: GOOSE Publish (8/12)
2: Data Sets (3/6)	9b: GOOSE Subscriber (10/10)
2+: Data Set Definition (23/23)	12a: Direct Control (7/11)
5: Unbuffered Reporting (15/16)	12d: Enhanced SBO Control (12/19)
6: Buffered Reporting (17/25)	13: Time Sync (4/5)

This Certificate includes a summary of the test results as carried out at Iskra Sistemi in Slovenia with UniCAim 61850 version 3.23.02 with test suite 3.23.00 and UniQA 61850 analyzer 4.21.03. The test is based on the UCA International Users Group Device Test Procedures version 2.2b. This document has been issued for information purposes only, and the original paper copy of the KEMA report No. 74100480-MOG/INC 11-1589 will prevail.

The test has been carried out on one single specimen of the product as referred above and submitted to KEMA by Iskra Sistemi. The manufacturer's production process has not been assessed. This Certificate does not imply that KEMA has certified or approved any product other than the specimen tested.

Amstern, June 12 2011

M. Adriaansen
Regional Director Management & Operations Consulting

R.S. Masnik
Test Engineer

1 Level A - Independent Test Lab with certified ISO 9000 or ISO 17025 Quality System

Copyright © KEMA Nederland B.V., Amstern, the Netherlands. All rights reserved. Please note that an electronic version of this KEMA certificate is provided to KEMA's customer in accordance with its policy. It is prohibited to create or change the any version and/or content, including but not limited to adding to the parts, in case of a conflict between the electronic version and the original version the original paper version issued by KEMA will prevail.

KEMA Nederland B.V.
Utrechtseweg 310, 6812 AR Amstern, P.O.Box 6035, 6800 ET Amstern, The Netherlands
T +31 28 306 20 20, F +31 28 381 36 53, sales@kema.com, www.kema.com



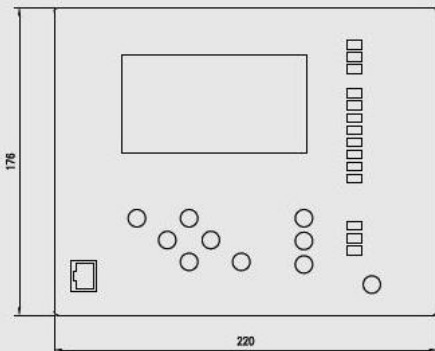
Page 2/2

Applicable Test Procedures from the UCA International Users Group Device Test Procedures version 2.2b:

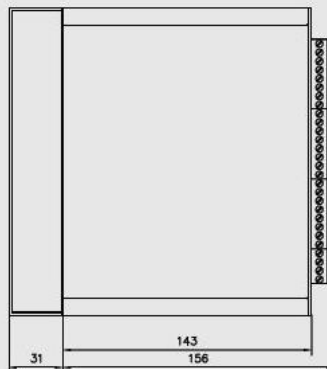
Conformance Block	Mandatory	Conditional
1: Basic Exchange	Aw1, Aw2, Aw3, Aw10, Aw14, Aw16, Aw19 Sw1, Sw2, Sw3, Sw4, Sw5, Sw11abcd, Sw14	Sw6, Sw7, Sw8, Sw11e, Sw12, Sw13
2: Data Sets	Dset1, Dset10a, Dset11a	
2+: Data Set Definition	Dset2, Dset3, Dset4, Dset5, Dset6, Dset7, Dset8, Dset9 Dset10cd, Dset12, Dset13, Dset14, Dset16, Dset16, Dset17, Dset18, Dset19, Dset110, Dset111, Dset112, Dset113, Dset114, Dset115	
5: Unbuffered Reporting	Rp1, Rp2, Rp3, Rp4, Rp7, Rp10 Rp11, Rp12, Rp13, Rp14	Rp5, Rp6, Rp8, Rp9, Rp15
6: Buffered Reporting	B1, B2, B3, B4, B7, B8, B9, B12 B11, B12, B13, B14, B15	B5, B6, B10, B11
6a: GOOSE publish	Gsp1, Gsp3, Gsp4, Gsp7	Gsp1, Gsp11
6b: GOOSE subscriber	Gos1a, Gos2, Gos3, Gos11, Gos12, Gos13, Gos14, Gos15, Gos16	Gos1b
12a: Direct control	DC1a, DC1b DC1c1, DC1c2	DC2, DC7, DC11
12d: Enhanced SBO control	CS1a, CS1b, CS1c, CS1d, CS1e, CS1f, CS1g SBOcs1, SBOcs2, SBOcs3	CS2, CS7, CS11
13: Time sync	Tm1, Tm2, Tm11	Tm3

All configuration file and data model tests have been successfully performed for the product variants using the same hardware and software version: NEO 3000 CAU 380

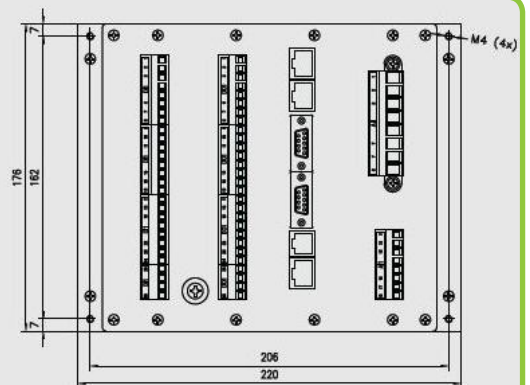
Dimensional drawings example



FRONT VIEW



SIDE VIEW



BACK VIEW

Flush mounting small housing (1/2 19", 4U) layout is represented. All units are in millimeters.

CAU 380

Bay Computer

Ordering

Extra Small housing	SW	H	AI	C1	C2	C3	C4	PS								
Small housing	SW	H	AI	C1	C2	C3	C4	PS	S1	S2						
Medium housing	SW	H	AI	C1	C2	C3	C4	PS	S1	S2	S3	S4				
Large housing	SW	H	AI	C1	C2	C3	C4	PS	S1	S2	S3	S4	S5	S6	S7	
My configuration																

SW – Software type

- C01 – Control
- C02 – Control with Synchro check
- C03 – Control with Voltage regulator
- C04 – Control with Synchro check and Voltage regulator
- C05 – Control with Fault Current Detection

H - Housing layout

- Type
 - T – flush mounting with integrated Textual LDU ⁽⁶⁾
 - L – flush mounting with integrated LDU
 - N – surface mounting without LDU
 - D – surface mounting with detachable LDU
 - Z – surface mounting with integrated LDU
- Size
 - 1 – Small housing (1/2 19", 4U) (slots S1 ... S2)
 - 2 – Medium housing (2/3 19", 4U) (slots S1 ... S4)
 - 3 – Large housing (19", 4U) (slots S1 ... S8)
 - 4 – Small housing for extended temp. range (1/2 19", 4U) (slots S1 ... S2)
 - 5 – Medium housing for extended temp. range (2/3 19", 4U) (slots S1 ... S4)
 - 6 – Large housing for extended temp. range (19", 4U) (slots S1 ... S8)
 - 7 – Size 170 x 190 for extended temp. range ⁽⁶⁾
 - 8 – Size 220 x 190 for extended temp. range (slots S1, S2) ⁽⁶⁾

AI - AI AC configuration

- AC board type
 - N – none
 - A – 4 CT + 4 VT ⁽⁵⁾
 - B – 5 CT + 4 VT ⁽⁵⁾
 - C – 4 CT + 5 VT ⁽⁵⁾
 - I – 4 CT + 4 VT + 4 CT ⁽⁵⁾
 - J – 4 CT + 3 VT + 5 CT ⁽⁵⁾
 - L – 4 VT
- Current measuring inputs
 - N – none
 - 1 – 1 A current input
 - 5 – 5 A current input
- Voltage measuring inputs
 - N – none
 - 1 – 150 V voltage input
 - 3 – 300 V voltage input
- DC measuring input (1 pcs)
 - N – none
 - C – 1 AI DC input 20 mA
 - V – 1 AI DC input +/- 10 V

C1, C2 - Ethernet Communication ports

- Connector
 - N – none (only system)
 - E – 100BaseTx (RJ45)
 - F – 100BaseFx (ST Glass F.O.)
- Communication protocol
 - N – none
 - G – IEC 61850 MMS with GOOSE
 - 4 – IEC 60870-5-104
 - D – DNP3 (TCP/IP)

C3, C4 - Serial Communication ports

- Connector
 - N – none (only system)
 - 2 – RS232 (DB9 female)
 - F – ST Glass F.O.
 - 5 – RS485
- Communication protocol
 - N – none
 - 1 – IEC 60870-5-101
 - 3 – IEC 60870-5-103
 - D – DNP3
 - M – Modbus

PS - Auxiliary supply voltage

- | | | |
|-----------|---------------------------|-----------------------------------|
| DO + 8 DI | 1 – 19 – 30 V DC + 8 DO | M1 – 19 – 30 V DC + 5 |
| DO + 8 DI | 2 – 38 – 72 V DC + 8 DO | M2 – 38 – 72 V DC + 5 |
| | 3 – 88 – 150 V DC + 8 DO | M3 – 88 – 150 V DC + 5 DO + 8 DI |
| | 4 – 176 – 300 V DC + 8 DO | M4 – 176 – 300 V DC + 5 DO + 8 DI |
| | 5 – 170 – 330 V AC + 8 DO | M5 – 170 – 330 V AC + 5 DO + 8 DI |

S1..S7 – Slot configuration

- NN – none
- R8 – DO board (8 relays) ⁽²⁾⁽³⁾
- B1 – DI board (22 Digital Inputs) 24 V DC (with LEDs) ⁽³⁾
- B2 – DI board (22 Digital Inputs) 48-60 V DC (with LEDs) ⁽³⁾
- B3 – DI board (22 Digital Inputs) 110-125 V DC (with LEDs) ⁽³⁾
- B4 – DI board (22 Digital Inputs) 220 V DC (with LEDs) ⁽³⁾
- M1 – DIO board (15 Digital Inputs) 24 V DC + 4 relays (with LEDs) ^(3a)
- M2 – DIO board (15 Digital Inputs) 24-60 V DC + 4 relays (with LEDs) ^(3a)
- M3 – DIO board (15 Digital Inputs) 110-125 V DC + 4 relays (with LEDs) ^(3a)
- M4 – DIO board (15 Digital Inputs) 220 V DC + 4 relays (with LEDs) ^(3a)
- D8 – AI DC board (8 inputs) ⁽⁴⁾

Legend:

- ⁽²⁾ up to 2 boards max
- ⁽³⁾ sum of all DI and DO boards up to 7 boards max
- ^(3a) DIO board uses addressing of two boards (DI + DO board)
- ⁽⁴⁾ 1 board max
- ⁽⁵⁾ CT range is 20 x In
- ⁽⁶⁾ Housing layout Type T and size 7 and 8 only

Ordering examples:

CAU 380 – C02 / L2 / C51N / FG / FG / NN / NN / 3 / R8 / B3 / B3 / B3
 CAU 380 – C01 / L1 / A51N / FG / FG / NN / NN / 3 / B3 / B3



MCE 940 SCADA

Energy Sector

MCE 940 SCADA

Description

The MCE 940 forms a powerful Supervisory, Control and Data Acquisition software (SCADA) intended specially for power distribution applications. The MCE 940 comprises functions of supervision, data collecting, control, data storage, analysis and graphical display by using single-line diagrams, interactive blocks and data charts. The MCE 940 is not limited in size of application and it can be used for any control level; from control of a single MV substation to control of the whole utility network. Due to its unique possibilities of expansion and customization it can be used for virtually any application.

Using Windows® based graphic screens the MCE 940 displays a real-time condition of substation, actual measurements and it helps the operator to make appropriate decisions in any given situation. Commands with integrated interlocking additionally prevent the operator from executing false commands.

The MCE 940 is a sub-module of the NEO 3000 substation control and protection system that shares the usual qualities of customization and open architecture options. These qualities offer satisfaction through possible further expansion and additional improvement throughout entire lifetime of the system.

Features

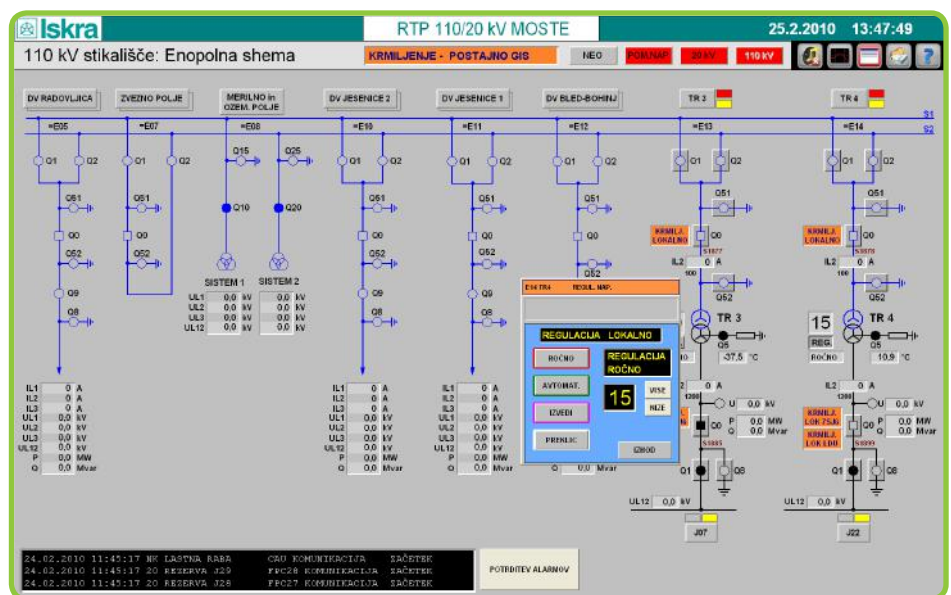
- Real-Time Process of Monitoring and Control
- Distributed Client/Server Architecture
- The MCE 940 is designed for both small stand-alone and networked applications
- Shares data with Oracle, SQL Server, Access and other SQL based relational databases
- Security system enables control of access to data and applications

Graphics

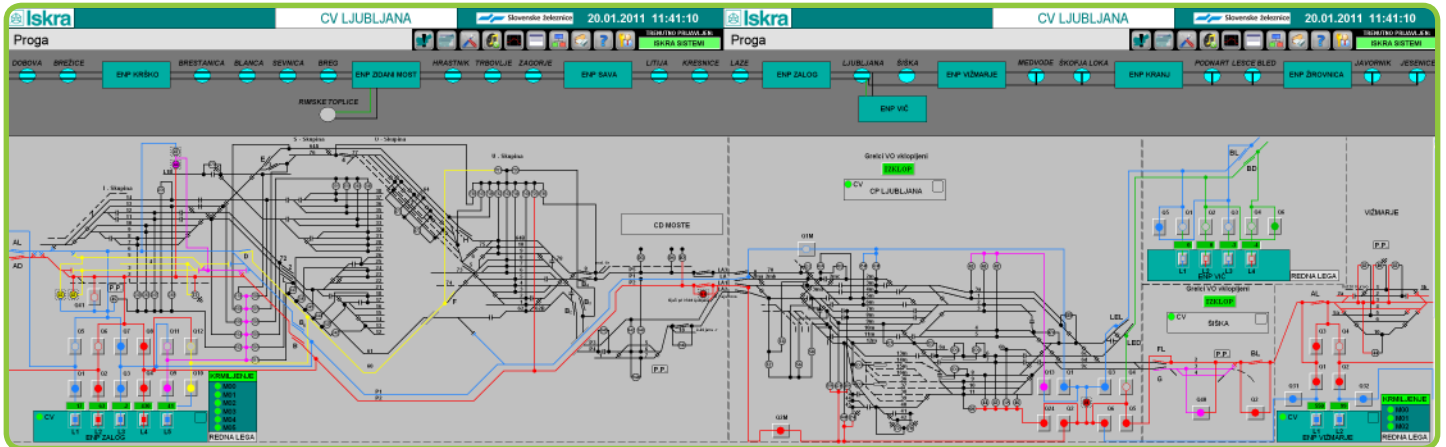
- Graphical display of Single-line diagrams
- Automatic topology coloring
- Zooming, panning and decluttering

Description

- Real-time display of the status and analog measurements of the power system
- Support for Geographic Information System (GIS)
- Commands with integrated interlocking
- Sequence control
- Alarming
- Trending
- Equipment statistics (number of breaker operations with maintenance alarming)
- Tags (elements with stored value after any reloading of the system)
- Events in high time-resolution (fault events, analog and digital)
- Energy metering
- Operational statistics of protection relays and circuit breakers
- Storing of historical data in the relational archive database
- Automatic print-out of events
- Lists of currently present and unacknowledged alarms
- List of inactive unacknowledged alarms
- Off-normal list
- Reports and print-outs at operators request
- User based security
- User control areas
- Maintenance mode for single points or entire RTUs (silencing alarms, command prevention)
- Status of LAN devices (servers, printers switches ...)
- Operator notes with integrated MS Word and MS Excel
- Simple integration of additional functions



MCE 940 SCADA



Control

MCE 940 includes the following control functions:

- Control switching elements
- Interlocking
- Simultaneous control prevention
- Control locking
- Control timeout
- Checking the success of the command execution
- Select Before Operate commands (SBO)
- Alarming of unexecuted commands
- Suppression of Alarms for Operator-Initiated Changes
- Manual data entry

Description

The MCE 940 incorporates a user friendly interface for process monitoring. Monitoring of the primary equipment condition is possible via process displays and special displays with unacknowledged, persistent and unacknowledged non-persistent alarms. In order to enable the operator to act quickly and properly in the event of a failure all irregularities are signaled by individual alarms. Operator can be guided to the source of alarm directly from single-line diagrams by marking specific areas of system, where the alarm occurred.

The alarm summary display combines unacknowledged and present alarms with the possibility of another list of non-present unacknowledged alarms. The alarms are displayed on the screen until they are acknowledged and until the signals state changes back to normal. The off-normal list is intended for the display of any abnormal states in the system.

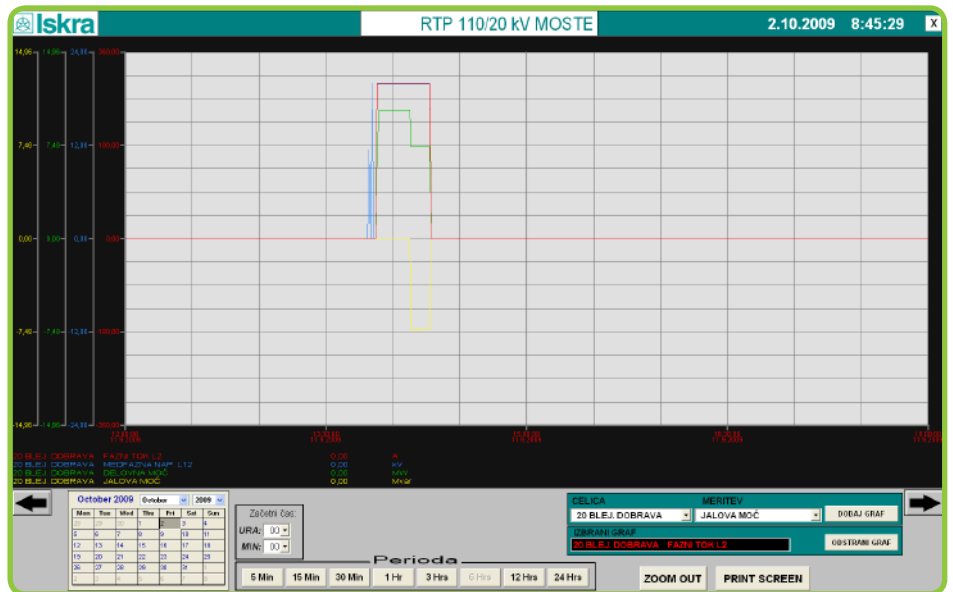
The process display shows the system status. When an abnormal event occurs, the operator receives enough information about the event to make the correct decision.

Protocols

- IEC 61850
- IEC 60870-5-104
- 3rd party OPC
- Various protocols with the use of SCU810 communication gateway

Application

- Substations
- Distributions control centers
- Transmissions control centers
- Industrial/traffic power supplies control centers



MCE 940 SCADA

Historical data

The reports program module is intended for displays and print-outs at the operator's request. The following displays and print-outs are built into the MCE 940 system: event list, alarm list, measurement list, energy metering reports, daily load report, daily load curve and more.

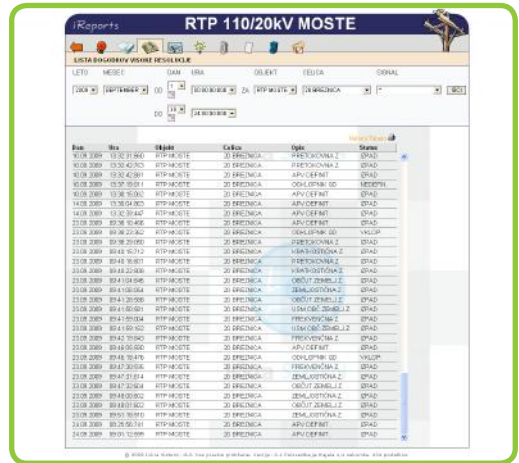
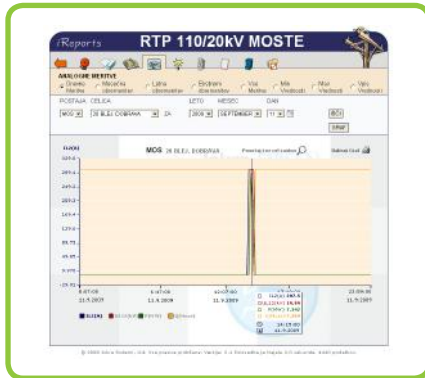
Event list is used for later analysis. Characteristic of this list is that you can create several filters for important system events arranged according to time (1 ms resolution).

The MCE 940 system supports two types of print-outs:

- Automatic print-out of all events
- Print-outs at operator's request

Historical data is stored in a standard SQL relational database, so it is easy to create additional custom-made reports using standard tools.

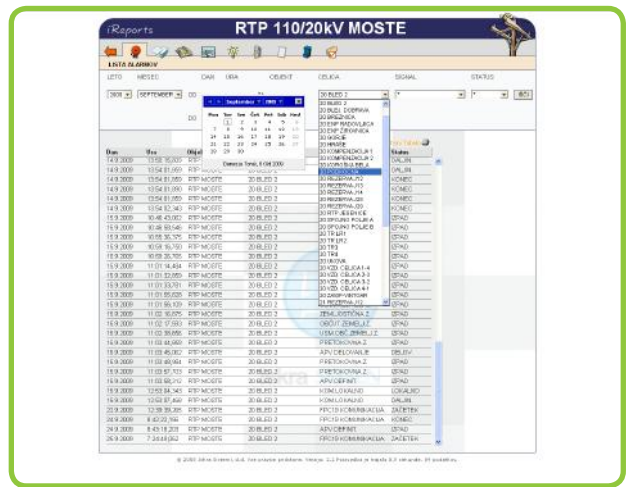
Historical data can be shared with other SQL-based relational databases such as Oracle, Access, SQL server, MySQL, etc.



Platform

The MCE 940 software package runs on a Windows 7®, Windows® Server 2008 operating system environment. A full compatibility of the MCE 940 with those multi-task and multi-user operating systems grants long-term stability and carefree operation.

Industrial grade computers are chosen to provide dependable operation without interruptions. The minimum time between failures (MTBF) is declared to be 100,000 hours.



NEO 3000 SYSTEM



SCU 810 with IEC 61850 - System Communication Unit

Energy Sector



SCU 810 with IEC 61850 - System Communication Unit

Description

The SCU 810 module is a complex communication device intended for the interconnection of any intelligent electronic device (IED) of Iskra Sistemi's NEO 3000 (NEO 2000) Substation Control and Protection System and of any third-party vendors. IED is considered as numerical protection relay, bay computer, intelligent RTU, energy counter and alike, that is used within the substation. The SCU 810 device covers communication functions needed within substation and functions of data handling, world time synchronization and substation automation. It can serve also as interconnection gateway between hierarchically different control system levels from substation to utility dispatching centers, where data from geographically spread substations are grouped into a single database that forms an integrated supervision system of a wider area power system. SCU 810 is a multi-protocol device that enables simultaneous communication with different IEDs connected on separate communication ports using any listed protocols. Hardware extension of communication ports is possible by using ECU 032 extension unit that provides up to 64 ports. For communication with devices over IEC 61850 there can be use optical network with star or ring configuration. SCU 810 also supports number of inevitable automatic functions when it is used as a master automation controller in Distribution Automation System.

Features

- Basic communication node to communication between IEDs and control centers of different manufacturers
- Support of backup communication paths
- Support of communication protocols supported by different manufacturers
- Remote control, monitoring and configuration of IEDs
- Support of internal and external GPS or DCF clock or over NTP time synchronization
- PLC functions (acc. to IEC 61131)
- Non-volatile memory (for drives, application data, etc.)
- Set point facility
- Self-supervision and watch dog
- Integrated diagnostic software



Application

The SCU 810 device can be implemented anywhere where the basic function of a communication gateway is needed and/or integration of IEDs is required. The typical applications are:

- Central communication device in HV and MV substations and for Distribution Automation Systems
- The communication interface in either a control or maintenance center
- Integration of IEDs into substation or central SCADA systems
- Communication gateway for Protection Management Systems (PMS)
- Protocol conversion in all communication directions

SCU 810 with IEC 61850 - System Communication Unit

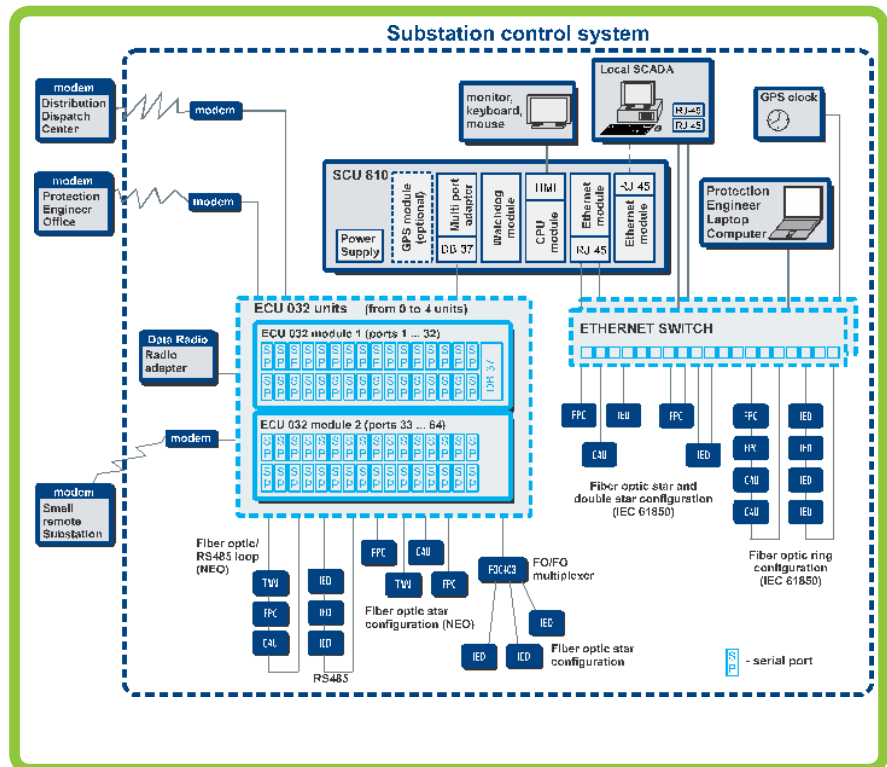
Physical Interfaces

Selection of an appropriate type of physical interface depends on requirements of the individual application. The SCU 810 is based on modular platform that enables device layouts with different amount and physical layout of serial and Ethernet interfaces. For smaller applications up to 4 serial interfaces can be integrated inside SCU810 housing. Using additional external serial port multiplier units ECU 032, up to 64 serial interfaces can be comprised within single SCU 810. External serial port multiplier unit ECU 032 is a modular unit for extension of physical serial ports. Each ECU 032 can hold up to 32 serial ports with physical layouts adapted to specific application. For larger applications up to two ECU 032 units can be connected to single SCU 810 unit. Detailed information about ECU 032 can be found in Extended Communication Unit ECU 032 leaflet. Due to harsh electromagnetic environment inside substations, communication media inside substation has to be electromagnetically resistant. Communication between IEDs and SCU 810 is therefore applied by fiber optic cables or electromagnetic resistant RS485 connection. For communication inside substation control room RS232 or Ethernet connection is used.

Gateway Function

The SCU 810 is designed for interconnection of the Iskra Sistemi's control and protection IEDs, third-party IEDs and control centers:

- NEO 3000 IEDs (FPC 680, CAU 380)
- NEO 2000 IEDs (CAU 300 series, FPC 500 series, DAU 200 series)
- Any IEDs of different manufactures which support IEC 61850
- Any IEDs of third production by using internationally recognized communication protocols (see list on the last page)
- Station or dispatching control centers (NEO 3000 Control Center and others)
- Local SCADA MCE 940 for substation level control



Protocol converter function

SCU810 can also be used as protocol converter in smaller applications without external serial port multiplier unit ECU 032. Beside smaller amount of serial interfaces and inability to host internal GPS clock it provides all functionalities of normal sized SCU810.

Protocol converter function

- Time synchronization (via protocol, GPS clock, DCF clock, NTP/SNTP)
- Collection and transmission of energy metering from IEDs
- Collection and transmission of condition of individual IEDs
- Collection and transmission of high resolution events (1 ms time resolution)

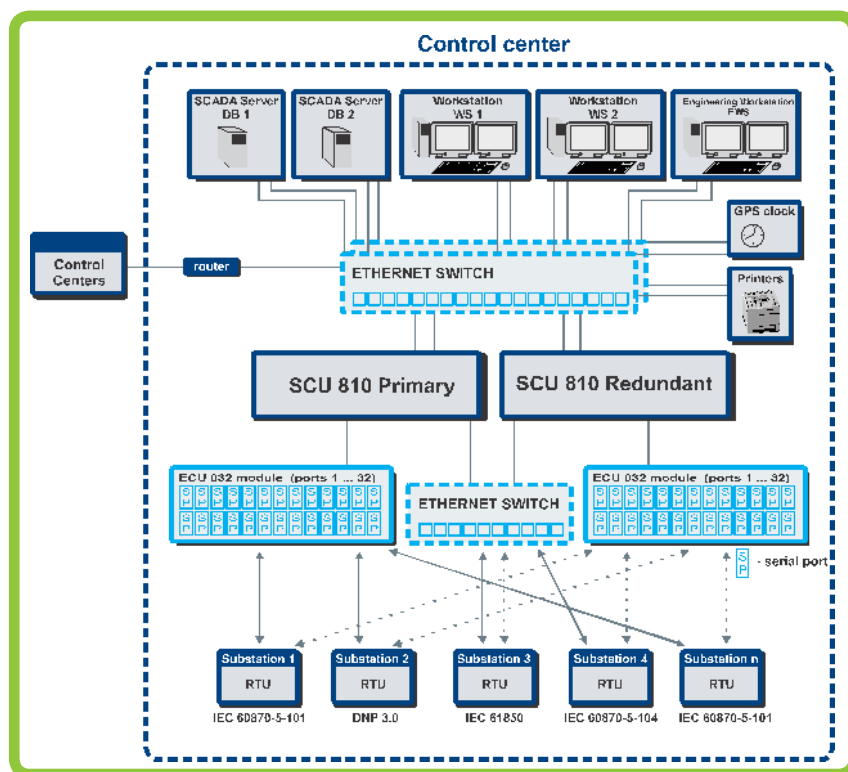
Remote configuration of IED

The SCU 810 offers the unique function of remote configuration and remote service access to IEDs. That enables service access to the settings of the device and fault recording from any point in the communication network that SCU 810 is connected to. Using that function in larger scale permits utility company to establish Protection Management System (PMS) for integral control of numerical protection relays and other IEDs. The function is not limited by IED vendor as SCU 810 uses standard serial communication interfaces.

SCU 810 with IEC 61850 - System Communication Unit

SCU810 as FEP in control center

SCU 810 can be used as front end processor in control center. In this case one SCU 810 operates as primary and the other as redundant. SCU 810 communicates with substations over external serial port multiplicator or redundant Ethernet network. If there is only one serial communication channel from substation CMU 100 device can be used to connect both SCU 810 on same communication line. SCU 810 also supports redundancy on Ethernet for communication with SCADA.



Technical data

OPERATING CONDITIONS

Power supply nominal voltage	9 - 36 VDC (e.g. +24 V @ 5 A)
Power consumption:	40 W
Storage temperature:	-20 – 80°C
Operating temperature:	-10 – 55°C
Humidity:	95% non-condensing
System Design:	Fanless with no internal cooling, SSD

MECHANICAL SYSTEM

Dimensions (W, H, D):	195 x 238 x 177 mm
Weight:	5,0 kg
Mounting:	Wallmount, Stand, Panel
Monitor connection:	Dual DVI-D independent

I/O INTERFACE: (Up to 1 x PCIe, 3 x PCI slots)

LAN: 2 x 10/100/1000 Base-Tx RJ45 ports-integrated

Serial Ports: 2 x RS-232 with DB9 connectors-integrated

USB Ports: 4 x USB 2.0 - integrated

Additional communication interface (via card slots)

- up to 6 Ethernet ports
- up to 4 serial ports
- up to 64 serial ports (using ECU 032 units)

Protocols

NEO (IEC 60870-5)	Iskra	CC
IEC 60870-5-101		CC
IEC 60870-5-104		CC
DNP 3.0		CC
NEO (IEC 60870-5)	Iskra	IED
IEC 61850		IED
IEC 60870-5-101		IED
IEC 60870-5-102		IED
IEC 60870-5-103		IED
Courier (IEC 60870-5)	SEG	IED
DPU2000 ASCII	Iskra Emeco	IED
RS485 Pro	Elcontrol	IED
STOM	Electrex	IED
Modbus ASCII	Elcontrol	IED
Modbus RTU Kilometer	GE	IED
Modbus RTU, ASCII	Universal	IED
GE Protocol	SEL	IED
Procome	Team Ateche	IED
SEL	ABB	IED
Empros		IED
SPA		IED
GPS ASCII		TS
DCF ASCII		TS
NTP/SNTP		TS