

FPC series

Family of multifunctional numerical relay



History

- ▶ 1946 Iskra Company is founded
- ▶ 1947 First switchgear is developed in Kranj
- ▶ 1964 Railway department is formed

- ▶ 1991 Slovenia proclaims independence
- ▶ Company is renamed and reformed into Iskra d.d.
- ▶ We continue to provide technological advance solutions

Our strength comes
from our knowledge



Company presentation

- ▶ Among the largest 40 Slovenian exporters
- ▶ More than 1100 employees
- ▶ 81 R&D employees
- ▶ Almost 70 years of tradition

- ▶ Annual sales 97.4 million EUR in 2013
- ▶ Gross turnover 99.8 million EUR in 2013

Fields of Work

- **ENERGY SECTOR**
- **EFFICIENT INSTALLATIONS**
- **ELECTROTECHNICAL COMPONENTS**
- **TRAFFIC**
- **TELECOMMUNICATIONS**
- **IT & BUSINESS SOLUTIONS**
- **MAINTENANCE & MANAGEMENT**
- **SERVICES**

Major Customers

▶ BORZEN

Electro Energy Market provider



▶ Elektro Ljubljana

Electro distribution Company



▶ Elektro Gorenjska

Electro distribution Company



▶ ELES

Electric Network Operator



▶ HSE

Holding of Slovenian Electro Companies



▶ Sava Powerplants



▶ Slovenian Municipalities

▶ Slovenia Railways



▶ Hydro-system Zletovica



▶ RIKO



▶ MEA

Metropolitan Electricity Authority
Thailand



▶ PEA

Provincial Electricity Authority Thailand

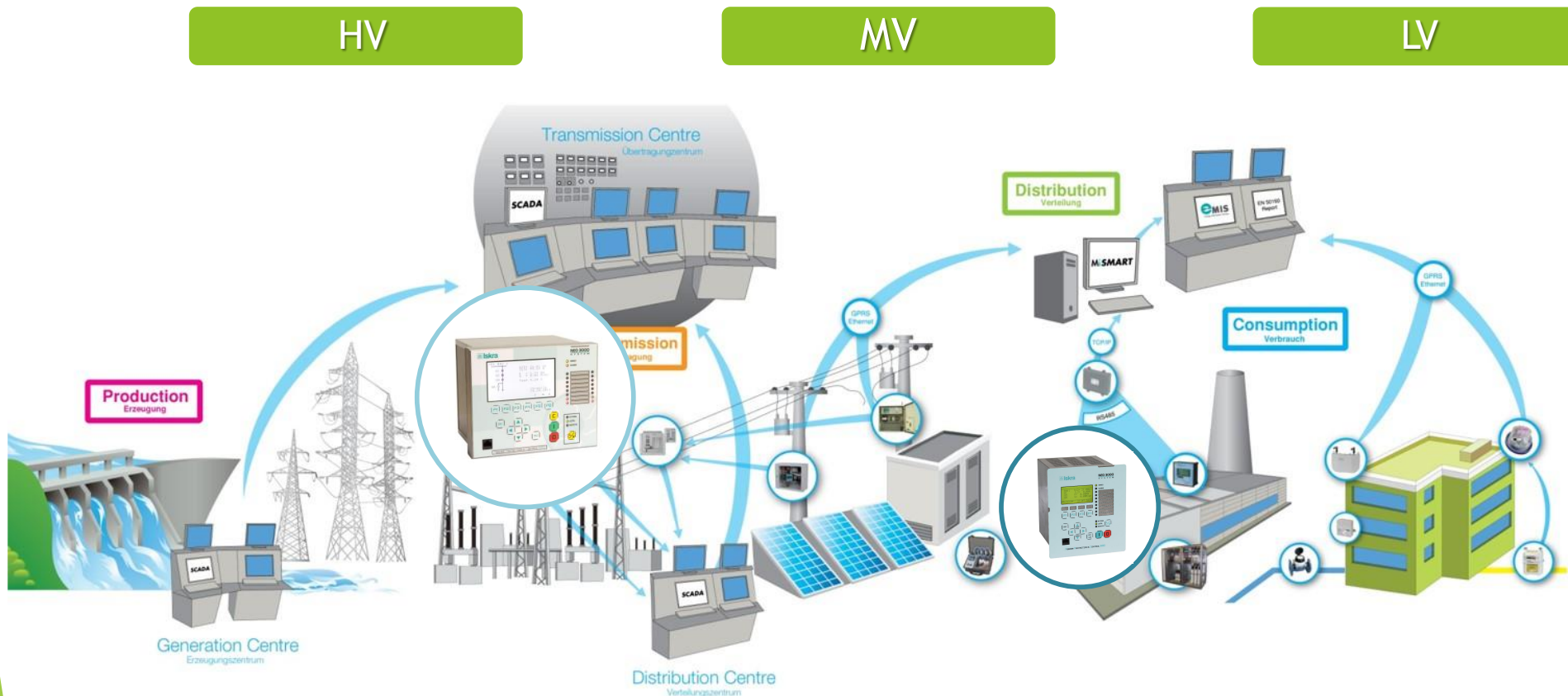


▶ Iran Tablo



Energy sector

- ▶ Automation of power plants
- ▶ Production and development of relays, communication equipment,
- ▶ Protection and control in distribution and industry



NEO 3000 Series of protection relays

FPC 200 series

Current protections for Substation, Transformer and Motor
Voltage and frequency protections for Busbar

Usual
applications

FPC 400 series

Current, Voltage and Frequency protections for Substations,
Transformers, Generators, Capacitors, Busbars and Motors

Demanding
applications

FPC 680 series

Current, Voltage and Frequency protections for Substations,
Transformers, Generators, Capacitors, Busbars and Motors

Custom
applications

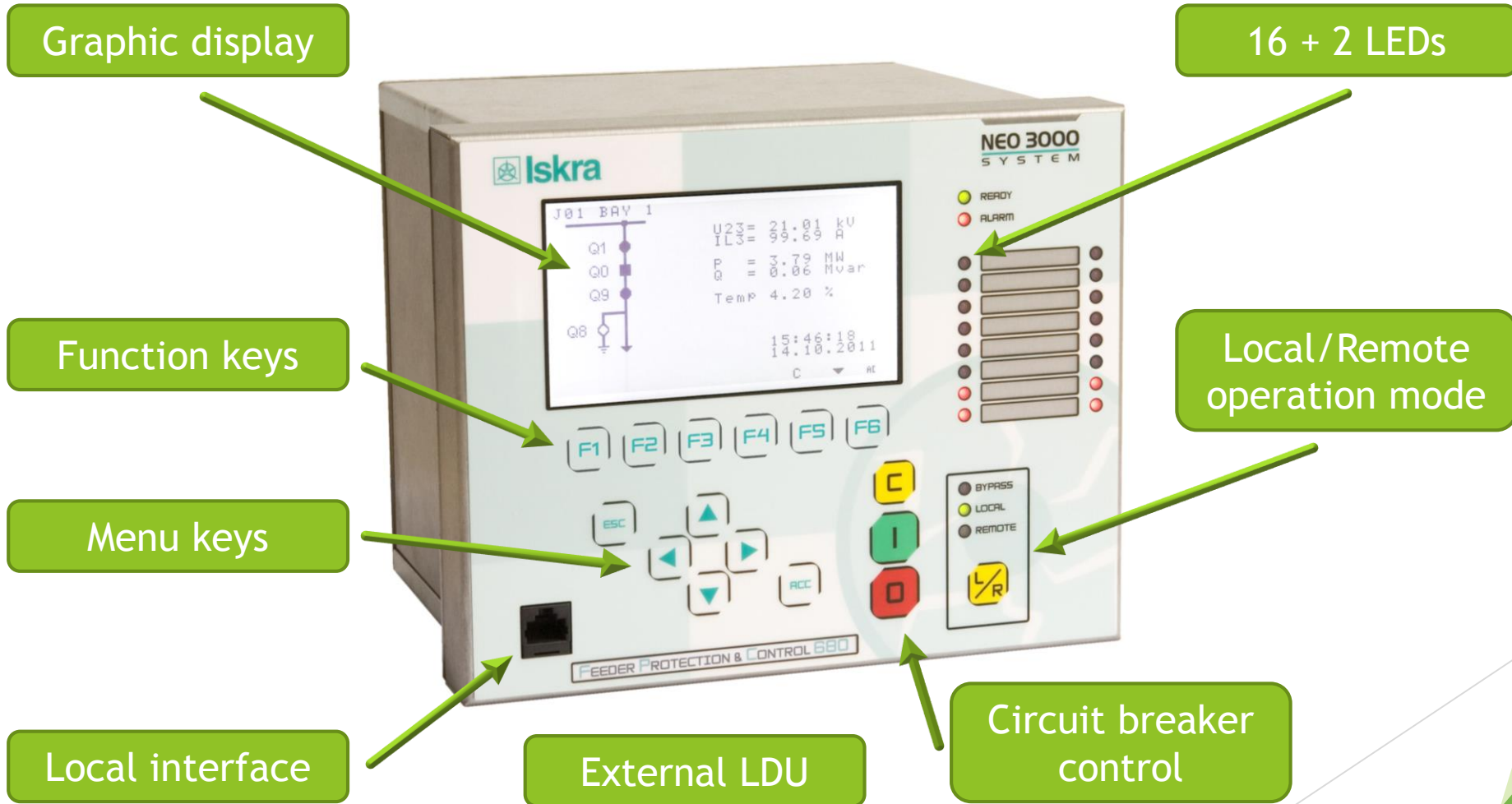
FPC 680



FPC 680i



Enhanced Local display Unit



Rear panel configuration

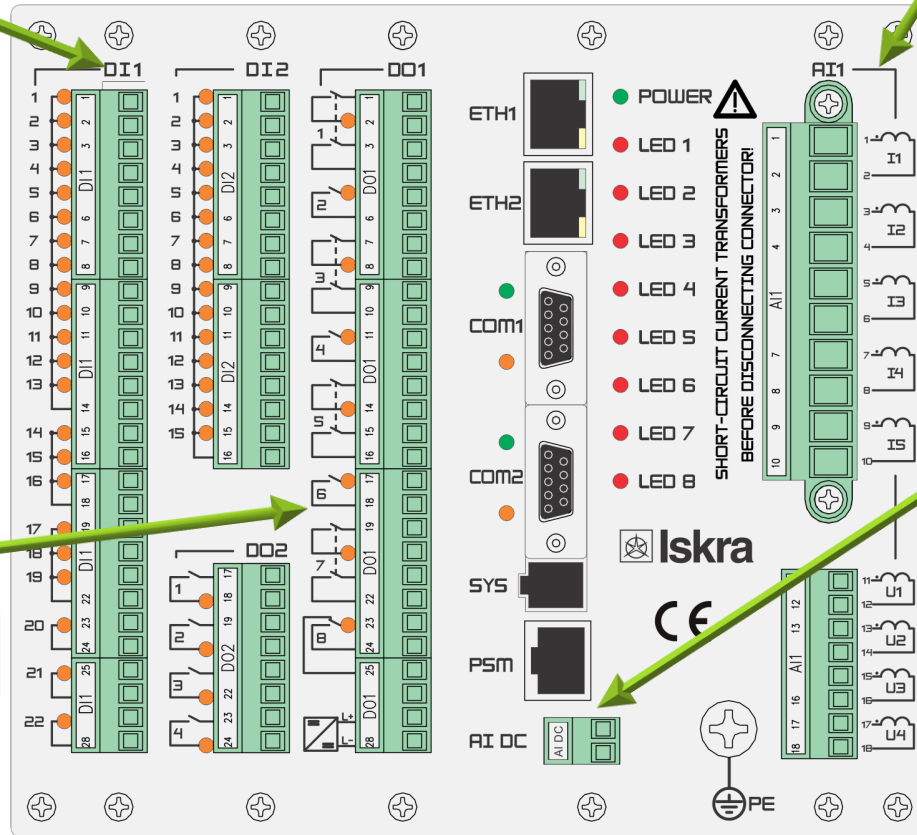
154 Digital Inputs

12 Analog Inputs

- ▶ 0 - 8x current
0 - 4x voltage
- ▶ 0 - 5x current
0 - 7x voltage

32 Digital Outputs

Analog Input DC



Measuring and Metering

- ▶ Current, voltage, power, frequency and power factor
- ▶ Active and reactive energy
- ▶ Power quality measurement
- ▶ External energy metering
- ▶ Symmetrical sequence components calculation
- ▶ Disturbance recording

Configurable
input nominal
values

40 harmonics

THD

RMS

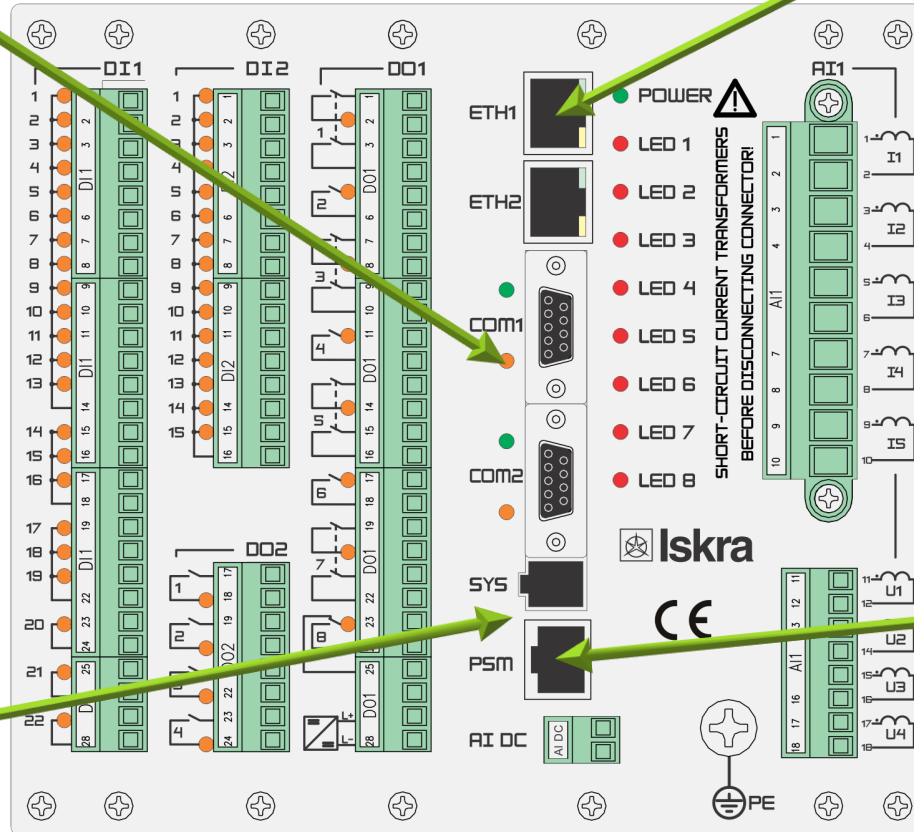
Communication

2 x Serial

- ▶ R232 DB9
- ▶ RS485
- ▶ ST MM glass FO
- ▶ MSTB

System port

- ▶ RS232 RJ11



2 x Ethernet

- ▶ 100BaseTx RJ45
- ▶ 100BaseFx ST glass FO

PSM port:
Local settings
External display

Communication Supported protocols

- ▶ IEC 61850 (MMS+Goose)
- ▶ IEC 60870-5-101
- ▶ IEC 60870-5-103
- ▶ IEC 60870-5-104
- ▶ DNP3

- ▶ Modbus RTU
- ▶ Modbus RTU over TCP
- ▶ Modbus TCP

Redundancy

Star

Double Star

Ring - RSTP

Industrial FPC 680i

FPC 680
functionality



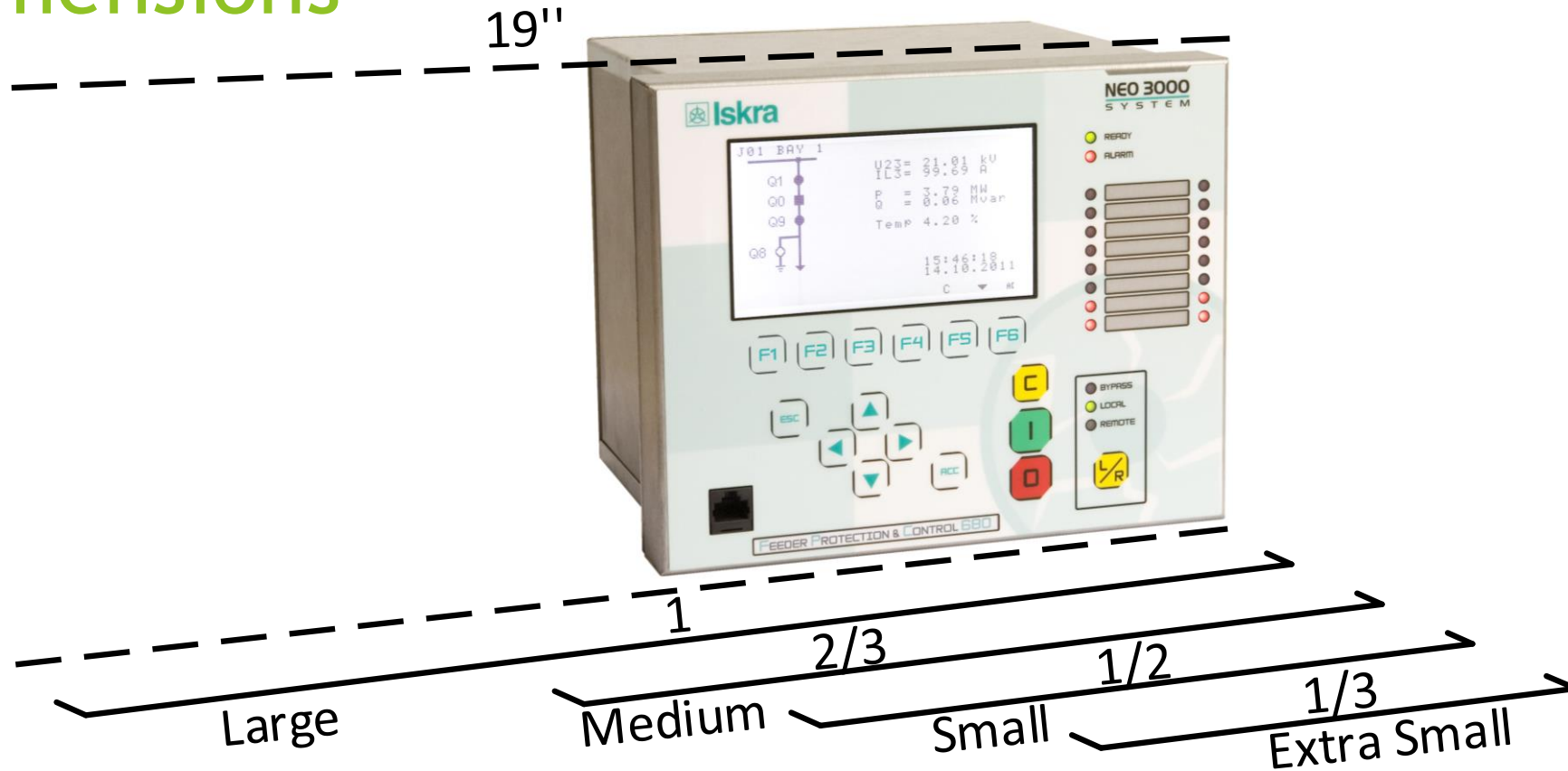
Textual display

IP 52

Robust design

Challenging environment

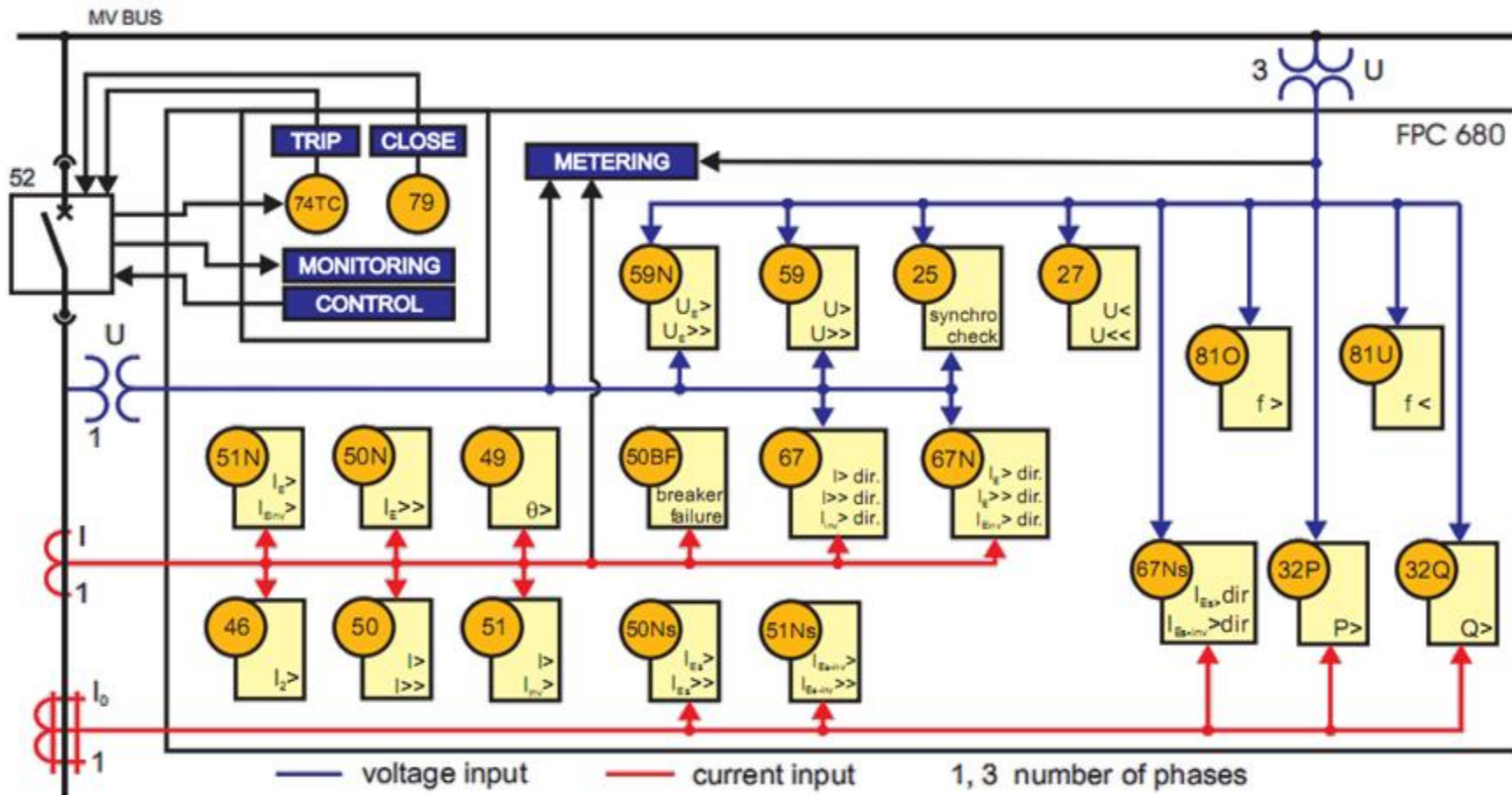
Dimensions



FPC 680 – SW/H/AI/C1/C2/C3/C4/PS/S1/S2/S3/S4/S5/S6/S7/S8

- ┌-----Extra small housing-----┐
- ┌-----Small housing-----┐
- ┌-----Medium housing-----┐
- ┌-----Large housing-----┐

Supported protection functions



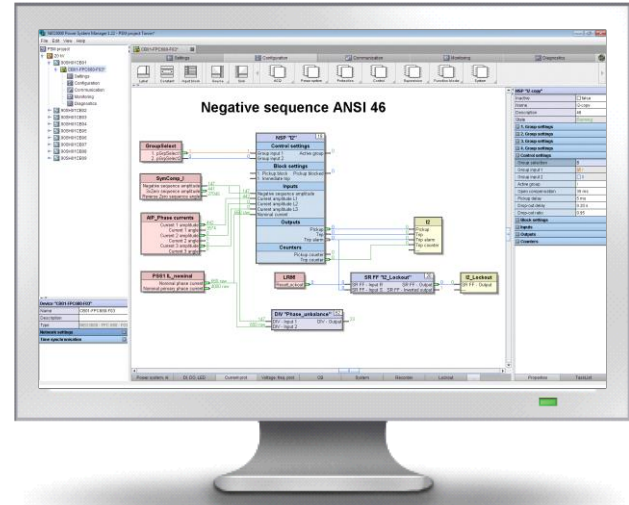
Software types

Current		Current and voltage	
F01	Basic protections	F03	Basic protections
M01	Motor protection	F04	Synchro-check
T01	Transformer protection	F05	Shunt protection
Voltage		F06	IuB protection
F02	Basic protections	F07	Differential protection
		M03	Motor protection
		T03	Transformer protection

Configure device with PSM



Real time view



- ### General benefits
- Function blocks
 - Read any device settings
 - Store projects
 - Control multiple devices

- ### Modify
- Display screen measurements
 - One pole scheme
 - Function keys

Numerical and graphical PSM software

NEO3000 Power System Manager 1.22 - PSM project Tarom*

File Edit View Help

PSM project

- 20 kV
 - 90SH01CB01
 - CB01-FPC680-F03*
 - Settings
 - Configuration
 - Communication
 - Monitoring
 - Diagnostics
 - 90SH01CB02
 - 90SH01CB03
 - 90SH01CB04
 - 90SH01CB05
 - 90SH01CB06
 - 90SH01CB07
 - 90SH01CB08
 - 90SH01CB09

Settings Configuration Communication Monitoring Diagnostics

Label Constant Input block Source Sink ACQ Power system Protection Control Supervision Function blocks System

Negative sequence ANSI 46

GroupSelect

- 1. pGpSelect1
- 2. pGpSelect2

SymComp_I

- Negative sequence amplitude: 147
- 3xZero sequence amplitude: 442
- Reverse Zero sequence angle: 18371

AIP_Phase currents

- Current 1 amplitude: 441
- Current 1 angle: 347
- Current 2 amplitude: 0
- Current 2 angle: 0
- Current 3 amplitude: 0
- Current 3 angle: 0

PSS1 IL_nominal

- Nominal phase current: 650 raw
- Nominal primary phase current: 4000 raw

NSP "I2" 19

Control settings

- Group input 1: Active group
- Group input 2: 0

Block settings

- 1. Pickup block: Pickup blocked
- 1. Immediate trip: 0

Inputs

- Negative sequence amplitude: 147
- Current amplitude L1: 441
- Current amplitude L2: 0
- Current amplitude L3: 0
- Nominal current: 650 raw

Outputs

- Pickup: 0
- Trip: 0
- Trip alarm: 0

Counters

- Pickup counter: 0
- Trip counter: 0

I2

- Pickup: 0
- Trip: 0
- Trip alarm: 0
- Trip counter: ---

LR86

- ResetLockout: 0

SR FF "I2_Lockout" 20

- SR FF - Input R: 0
- SR FF - Input S: 0
- SR FF - Output: 0
- SR FF - Inverted output: 1

I2_Lockout

- SR FF - Output: ---

DIV "Phase_unbalance" 162

- DIV - Input 1: 147
- DIV - Input 2: 650 raw
- DIV - Output: 23

NSP "I2-copy"

Inactive	<input type="checkbox"/>	false
Name		I2-copy
Description		46
State		Running
1. Group settings		
2. Group settings		
3. Group settings		
4. Group settings		
Control settings		
Group selection		B
Group input 1	<input checked="" type="checkbox"/>	1
Group input 2	<input type="checkbox"/>	0
Active group		1
Open compensation		35 ms
Pickup delay		5 ms
Drop-out delay		0.20 s
Drop-out ratio		0.95
Block settings		
Inputs		
Outputs		
Counters		

Device "CB01-FPC680-F03"

Name	CB01-FPC680-F03
Description	
Type	NEO3000 - FPC 680 - F03
Network settings	
Time synchronisation	

Power system, AI DI, DO, LED Current prot. Voltage, freq. prot. CB System Recorder Lockout Properties TaskList

KEMA certificate for 61850



IEC 61850 Certificate Level A¹

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International
Usersgroup

No. 74100480-MOC/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

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: "FPC680_PICS.doc ver. 1.3", "FPC680_MICS.doc ver. 1.1", "FPC680_TICS.doc ver. 1.0" and product's extra information for testing: "FPC680_PIXIT.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)	9a GOOSE Publish (6/12)
2 Data Sets (3/6)	9b GOOSE Subscribe (10/10)
2+ Data Set Definition (23/23)	12a Direct Control (7/11)
5 Unbuffered Reporting (15/18)	12d Enhanced SBO Control (12/19)
6 Buffered Reporting (17/20)	13 Time Synchronization (4/5)

This Certificate includes a summary of the test results as carried out at Iskra Sistemi in Slovenia with UniCASim 61850 version 3.23.02 with test suite 3.23.00 and UniCA 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-MOC/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.

Amhem, June 15 2011


M. Adriaensen
Regional Director Management & Operations Consulting


R.S. Massink
Test Engineer

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

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More information

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