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sanion Leading Company in Power Utility Automation

New Excellent Product(NEP) Certificate

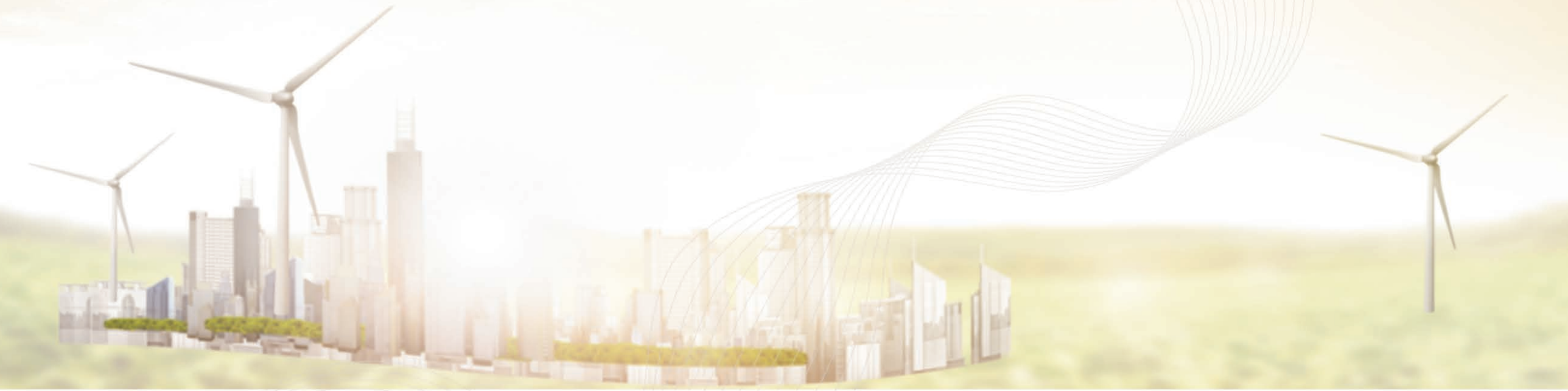
KEPCO TRUSTED PARTNER
www.kepco.co.kr/trustedpartner

SANION CO., LTD.

Sanion will ensure trust and satisfaction for
the customers as a company specialized in eco-friendly
power utility automation technology through creative
technology development and excellent talents training.

sanion

Make Dreams Come True! No.1 in Korea



With a complete trust from its customers,
Sanion will grow to become a power utility
automation company.

Prologue

Our goal is to establish the smart grid system through self innovating and relentless technical development.

Sanion has grown to become a total automation system supplier, providing systems that combine Intelligent Electronic Device (IED) and advanced communication technologies through commercializing a wide range of EHV, HV and MV class IED products with the microprocessor-based digital application technologies.

Sanion will move forward with its future vision of becoming the global leader in the power utility automation industry by creating synergy between the development of substation automation and the distribution automation/consumer equipment area, the development of power equipment and service for private sectors and the research in the renewable energy.

Sanion will become a global leader in power utility automation
industry through relentless research and development.

We will secure our unique competitiveness and do our best for the satisfaction of our customers.

CEO Message

It is clear that the energy issue is one of the crucial problems to be solved for our mankind to prosper.
I believe that only tireless invest-ment and efforts can secure and develop the technology to solve the issue.
At Sanion, we guarantee the reliability of the power supply through accumulated technologies and experiences from our continuous research.
We aim to provide eco-friendly products with high quality and reliability to our customers.
Furthermore, we are trying to contribute as a company with integrity to our environment and society as well as our customers.
As the world needs more energy than ever in the history of the mankind, the reliability and eco-friendly aspects of electrical energy will continue to become essential issues in the future.
Thus, we are committed to ceaseless technical developments and investments to enhance reliability, flexibility, convenience, economic feasibility and eco-friendliness of power energy system especially in the field of smart power utility automation which would establish ourselves a global leading brand in the industry.
We promise to establish trust with our customers by delivering the highest-quality products, thus becoming a beloved company in the industry.

Chief Executive Officer
Lee Dong-ryul Lee Dong Ryul

Sanion is a power utility automation company which puts its priority on customer satisfaction.

We will become a specialist leading the paradigm in the power utility automation.

Company history

1997. 08 Founded as Sanion, Co., Ltd. (Yeoksam-dong, Gangnam-gu, Seoul)

1998. 01 Established a research center / Commercialized EMS RTUs

1999. 06 Commercialized of Feeder Remote Terminal Unit (FRTU) to control of switchgear for distribution automation

2001. 03 Acquired ISO 9001 quality management certification / developed and supplied recloser controller
11 Developed Code Division Multiple Access (CDMA) data communication system

2002. 06 Demonstrated CDMA data communication systems at KEPCO Pohang Branch
07 Moved to Mullae-dong, Yeongdeungpo-gu, Seoul
11 Supplied new FRTU to Shandong, China

2003. 04 Developed Demand Controller (DC) and commercialized Direct Load Control (DLC) system / acquired the license for the communication work business
09 Distributed CDMA data communication system nationwide / selected as an INNO-BIZ company (Small and Medium Business Administration)
11 Developed VHF remote control and monitoring system / developed PDA software for electrical safety checking

2004. 06 Distributed VHF remote control and monitoring system nationwide

2005. 05 Registered as software business
09 Acquired the approval for Demand Controller according to KEPCO's specification
10 Participated in the strategic core projects for Power IT such as Development Intelligent Distribution System, Development of High Value Added Electrical Services
12 Participated in Development of active Telemetrics project which is one of the strategic core projects for Power IT

2006. 04 Developed and supplied bay control IED for GIS
09 Developed and supplied preventive diagnostic DAUs for GIS

2007. 04 Selected as an innovative electric power venture company (KEPCO)
06 Developed digital TRS systems / contracted for the project developing the wireless bridge device for distribution automation (KEPCO)
09 Participated in the Microgrid project which is one of the strategic core projects for Power IT

2008. 11 Completed the development of wireless bridges for automated distribution system and applied to pilot projects / participated in the Development of Digital Substation project which is one of the strategic core projects for Power IT

2009. 06 Participated in the Smart distribution system R&D project

2010. 11 Participated in the establishment of smart grid pilot complex in Jeju (IED, PCS, DGM, etc)

2011. 05 Completed the commissioning of 154kV transmission line (T/L) protection IED for KEPCO Jocheon-Seongsan T/L in Jeju
09 Completed the development of IEDs for substation automation project which is one of the strategic core projects for Power IT (evaluated as an "innovative outcome" by Korea Institute of Energy Technology Evaluation and Planning)

2012. 11 Registered as a qualified provider of "154kV T/L Protection Panel/IED Panel" for KEPCO

2013. 04 Acquired New Excellent Product (NEP) certification for "154kV T/L Protection Panel/IED Panel" (Ministry of Trade, Industry and Energy)
10 Registered as a qualified provider of 3 types of "154kV Transformer Control/Monitoring IED's" and 2 types of "170kV GIS Control IED's" for KEPCO
11 Registered as a qualified provider of "154kV Transformer Protection Panel" for KEPCO

2014. 05 Designated as a top-quality supplier of power system devices and equipment for KEPCO
09 Completed the development of 154kV Busbar protection IED, having the process bus capability

2015. 01 Completed the development of compact type fault recorder
06 Acquired the license for the electrical construction business

2016. 03 Moved to Geomdan industrial complex, Incheon / registered as a qualified provider of "154kV Short-Distance T/L Protection Panel/IED Panel" for KEPCO
04 Acquired the 3-year extension of NEP certification / registered as a qualified provider of "154kV Transformer Protection IED Panel" for KEPCO
08 Registered as a qualified provider of "345kV T/L Protection Panel" for KEPCO

2017. 03 Registered as a qualified provider of "345kV Breaker Failure Protection Panel" for KEPCO
07 Registered as a qualified provider of "154kV Busbar Protection Panel/IED Panel" for KEPCO
09 Registered as a qualified provider of 4 types of "23kV GIS IED's" for KEPCO

Trusted company specialized
in power utility automation.

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Transmission line protection panel

Transmission lines are one of the electrical power grid facilities used for electricity transmission from the generators to the consumers.

Transmission lines typically connect between substations. Since the length of transmission lines spans dozens of kilometers by nature, transmission lines are exposed to natural environment and thus vulnerable to fault due to natural factors such as rain, wind and lightening. Thus, the faults occur on the transmission lines more frequently than on the other types of facilities.

A reliable transmission line protection scheme is necessary because transmission lines not only deliver electricity but also have great impacts on stability of electrical power systems due to changes in power flows when they get fault.

An IED is applied as a reliable main protection relay with a protection function that is designed to protect the target transmission line section, and a separate IED is applied for backup protection having another protection function to widely protect the series of transmission lines.

154kV transmission line protection panel

An 154kV transmission line protection panel has a primary protection IED with PCM communication based current differential protection method (87L) and a secondary protection IED having 3–staged distance based protection method (21G, 21S). In addition, high–speed reclosing function (79) is activated in the primary protection IED.

154kV short–distance transmission line protection panel

Transmission lines in urban areas are installed underground by their nature. Thus, their length should be short. Since impedance–based distance protection scheme is not able to provide enough reliability for short distance transmission lines, the secondary protection for such short distance transmission lines tends to adapt both distance protection and the current differential protection.

In summary, an 154kV short distance transmission line protection panel applies PCM communication based current differential protection method (87L) as primary protection and combination of 87L and 3–staged distance method (21G, 21S) as secondary protection. Like the case of 154kV transmission line protection panel, high–speed reclosing function (79) is activated in the primary protection IED.

345kV transmission line protection panel

Primary and secondary protection functions in 345kV transmission line protection panels are basically the same as the ones in 154kV transmission line protection panels. However, taking into account of the characteristics of circuit breakers that are able to trip by phases, the IEDs provide single–phase trip or 3–phase trip function depending on the type of faults. Since 345kV transmission line have a priority over 154kV transmission line, two identical panels are installed redundantly to provide reliability in protection. Like the case in 154kV transmission line protection panels, high–speed reclosing functions (79) are individually embedded in each of two primary protection IEDs with one of them activated according to the operation condition of the substation.

Division	Item	Specification		
		SLP–K120	SLP–K140	SLP–K310
Ratings	Input power	DC 90~140[V], 60Hz	DC 90~140[V], 60Hz	DC 90~140[V], 60Hz
	Rated voltage (PT)	110/√3[V]	110/√3[V]	115/√3[V]
	Rated current (CT)	5[A]	5[A]	5[A]
	Digital output	10[A] : 250VAC 24 points	10[A] : 250VAC 32 points	10[A] : 250VAC 48 points
	Digital input	DC 70 ~ 150[V] 40 points	DC 70 ~ 150[V] 36 points	DC 70 ~ 150[V] 24 points
Communication	Communication port	USB B–Type, Ethernet, Fiber optic	RS–232, Ethernet, Fiber optic	RS–232, Ethernet, Fiber optic
	Protocol	IEC 61850, TCP/IP, IEEE C37.94	IEC 61850, TCP/IP, IEEE C37.94	IEC 61850, TCP/IP, IEEE C37.94
Time sync.		IRIG–B, SNTP	IRIG–B, SNTP	IRIG–B, SNTP

Main functions of differential current protection IED (SLP-Kxxx-87)

- Phase-segregated current differential protection (87L)
- Highly sensitive zero-sequence current differential protection for high-impedance ground faults (87G)
- Undervoltage and overcurrent based fault detection (UV/UVS/UVD, OC/OCD/OCG, OVG)
- High-speed one time auto-reclosing (79) (SLP-K310: single and 3-phase trip and reclosing)
- Transmission of trip information to opposite end to prevent single-end tripping
- Direct transfer trip (DTT) for circuit breaker failures (SLP-K310)
- Compensation for line charging current
- STUB and SOTF protection trip (SLP-K310)
- Out-of-step protection trip (SLP-K310)
- CT and PT failure detection
- External fault detection to prevent wrong tripping due to CT saturation
- Automated compensation for different CT ratios at both transmission line ends
- High-speed long-distance peer-to-peer communication between two IEDs based on IEEE C37.94 protocol
- Redundant communication lines for improved communication reliability
- Fully IEC 61850 compliant, Edition 1

Main functions of distance protection IED (SLP-Kxxx-21)

- 3-staged (zone) distance protection (21) based on quadrilateral characteristics (SLP-K310: zone 4 applied for detecting faults on the overhead or underground portion of the line)
- Overcurrent based fault detection (OC/OCD/OCG)
- Undervoltage based fault detection (UV/UVS/UVD) (SLP-K310)
- Zero-sequence current compensation for zone 1&2 and zone 3 respectively
- Prevention of wrong tripping due to heavy load or overreach
- Power swing detection and zone 1/2/3 trip blocking
- Out-of-step protection trip (SLP-K310)
- STUB and SOTF protection trip (SLP-K310)
- Open line fault detection by detecting negative-sequence current and zero-sequence voltage
- PT failure detection, CT failure detection (SLP-K310)
- Fully IEC 61850 compliant, Edition 1

SLP-K120

SLP-K140

SLP-K310

Busbar protection panel

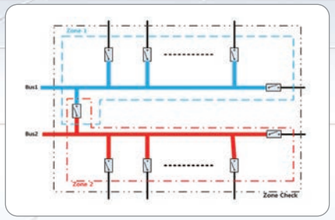
A busbar is one of the power system facilities in the substation, which concentrates and re-distributes electric power by connecting transmission lines and transformer banks.

In case of a busbar fault, the fault current is very large. If the fault learing gets delayed, it migt be extended to a much wider range of faults.

There are various types of busbar structures such as radial type, ring type or double type busbar. Among these types, double busbar is most widey used because it is able to shorten fault duration and provide high reliability and good maintainability. In particular, 345kV class adapts 1.5CB structure in which 3 circuit breakers are placed between the two busbars.

154kV busbar protection panel provides current differential protection function to ensure fast and accurate fault detection in a double busbar structure and to isolate faults and safely protect the busbar.

Busbar protection function is internally divided into the separate zone (zone 1 or 2) protection to detect busbar with a fault. The entire busbar protection detects which part of the busbar has a fault. For example, if both entire bus-bar protection and separate protection for zone 1 detect a fault, the busbar protection function determines that a fault has occurred on No. 1 busbar.



Sanion's 154kV busbar protection panel, which is developed and manufactured by pure domestic technology, consists of multiple bay units (BU) which monitor the current of each feeders connected to the busbar and collect status information of circuit breakers and disconnecting switches. It also consists of a central unit (CU) which performs current dif-ferential protection by using the current values and status information received from the bus. In addition, CU measures the voltage of each busbar to use it for fault detection.

Main functions of central unit (SBP-K110-CU)

- Phase-segregated current differential protection (87B)
- Undervoltage based fault detection (UV/UVS/UVD)
- Overcurrent protection (50BF) for circuit breaker failures
- CT and PT failure detection and alarming
- External fault detection to prevent wrong tripping due to CT saturation
- Busbar-bridged protection according to the status conditions of DS's and alarming for abnormal conditions
- Automated compensation for different CT ratios
- Communication with multiple BUs based on high speed serial communication (1Gbps, fiber optic)
- Fully IEC 61850 compliant, Edition 1
- Self-monitoring on a regular basis

Main functions of bay unit (SBP-K110-BU)

- Current measurement and status monitoring of CB, DS and BFI for two feeders
- Communication with CU based on high speed serial communication (1Gbps, fiber optic)
- Self-monitoring on a regular basis

Division	Item	Specification	
		SBP-K110-CU	SBP-K110-BU
Ratings	Input power	DC 90~140[V], 60Hz	DC 90~140[V], 60Hz
	Rated voltage(PT)	110/√3[V]	-
	Rated current(CT)	-	5[A]
	Digital output	10[A] : 250VAC 24 points	10[A] : 250VAC 14 points
	Digital input	DC 70 ~ 150[V] 24 points	DC 70 ~ 150[V] 24 points
Commu nication	Communication port	RS-232, Ethernet, Fiber optic	RS-232, Fiber optic
	Protocol	IEC 61850, TCP/IP	-
Time sync.		IRIG-B, SNTP	-

Transformer protection panel

Electricity produced by generators is supplied to consumers through electrical power system facilities. During the process, transmission efficiency is very important as it is directly related to the economic feasibility.

In order to increase the transmission efficiency, the voltage of the electric power produced by the generators is stepped up to the transmission level. During the transmission process, the voltage of the electric power is stepped down to the distribution level and finally supplied to the electricity consumers.

Such voltage step–up and step–down processes are performed through power transformers. Thus, a power transformer is an important facility that greatly affects the efficiency and the stability of the power transmission. In addition, power transformers are very expensive facilities requiring a considerable amount of cost and time to repair critical failures. Therefore, power transformers require protection functions with high speed and excellent reliability.

Since a power transformer in the normal condition provides the same capacity at both primary and secondary sides, the current ratio differential protection based on this principle is used as the main protection. The overcurrent function is used as the backup protection for the primary and secondary sides of the transformer, respectively.

When a Neutral Grounding Reactor (NGR) is applied to the secondary side of a transformer to limit the external ground fault current, zero–sequence overvoltage protection function is applied to protect the NGR.

Main functions of transformer protection IED (STP–K1x0)

- Protection for 2–winding transformer
- Selection of the protected transformer and CT wiring types
- Primary current set (5 channels) and secondary current set (5 channels) available (STP–K110)
- Primary current set (4 channels), secondary current set (4 channels) and 4 voltage channels available (STP–K120)
- Phase–segregated high–speed current differential protection (87HOC)
- Phase–segregated current ratio differential protection (87R)
- Prevention of wrong tripping due to inrush current
  - In comparison with the magnitude of the fundamental frequency component, the current is judged as inrush current when the magnitude of the second harmonic component is bigger than the preset ratio
  - In case of inrush current, mode selection of trip blocking among phase–segregated trip blocking, one–phase trip blocking and two–or–more–phase trip blocking
- Instantaneous, definite–time, and inverse–time phase overcurrent protection and zero–sequence overcurrent protection for each phase of each current set
- Phase overvoltage protection and zero–sequence overvoltage protection (STP–K120)
- Fully IEC 61850 compliant, Edition 1

Division	Item	Specification	
		STP–K110	STP–K120
Rated	Input power	DC 90~140[V], 60Hz	DC 90~140[V], 60Hz
	Rated voltage(PT)	110/√3[V]	110/√3[V]
	Rated current(CT)	5[A]	5[A]
	Digital output	10[A] : 250VAC 20 points	10[A] : 250VAC 28 points
	Digital input	DC 70 ~ 150[V] 36 points	DC 70 ~ 150[V] 24 points
Communication	Communication port	USB B–Type, RS–232, Ethernet, Fiber optic	RS–232, Ethernet, Fiber optic
	Protocol	IEC 61850, TCP/IP	IEC 61850, TCP/IP
Time sync.		IRIG–B, SNTP	IRIG–B, SNTP

Breaker failure protection panel

A circuit breaker is an electrical switch designed to prevent power system facilities from being damaged by fault current. It plays a major role in protection of the electrical power system facilities.

In summary, the corresponding IED detects the fault and generate a trip signal when a fault occurs in power system facilities such as a transmission line or a transformer. At this time, it is a circuit breaker which receives the trip signal from the IED and actually disconnects the faulted facility from the entire power system.

However, a mechanical failure may occur at any time since a circuit breaker is a mechanical equipment. In the case of such failure, the circuit breaker cannot execute proper operations such as opening and closing. If the such failed breaker could not disconnect a faulted power equipment from the entire grid system, the fault current would be spread to the surrounding equipment and lead to a serious situation.

Thus, it is necessary to have protection panels that can detect the failures of circuit breakers and send the trip signal to all the circuit breakers required to prevent the power system fault from spreading over the sur-rounding normal power system facilities. Such protection panels are called circuit breaker failure protection panels.

345kV circuit breaker failure protection panel is embedded with three independent IEDs, one for each circuit breaker in the 1.5 CB-type busbar. When overcurrent continues to exist even with a trip signal generated by a protection IED, circuit breaker failure protection IED determines that some circuit breaker has failed and trips the corresponding circuit breaker.

Main functions of circuit breaker failure protection IED (STP-K120-BF)

- 2-staged overcurrent detection for each phase
- Receive the phase-segregated or three-phase trip signals from external protection IEDs through digital input channels
- Operating timer setting
- Self-monitoring on a regular basis

Division	Item	Specification
Rated	Input power	DC 90~140[V], 60Hz
	Rated voltage(PT)	110/√3[V]
	Rated current(CT)	5[A]
	Digital output	10[A] : 250VAC 28 points
	Digital input	DC 70 ~ 150[V] 24 points
Communication	Communication port	RS-232, Ethernet, Fiber optic
	Protocol	IEC 61850, TCP/IP
Time sync.		IRIG-B, SNTP

Fault recorder panel

In power plants or substations, a variety of events may occur, including the following: device operation or control for electrical power facilities and the operation of circuit breakers by protection devices in case of failure in power plants or substations.

Accurate analysis for those various events plays a crucial role not only in stable and reliable operation of the power system facilities but also in measures to prevent potential accidents in the future.

Fault recorder panel provides a function to record, store and analyze a wide range of power system data.

Main functions of fault recorder (SPR-K010)

- Provision of high precision measurement data using high sampling frequency (7680Hz)
- Provision of various activation conditions for saving fault waveforms and events
- Activation by upper/lower limits
  Activation by the rate of changes (of volt age, current, frequency and power)
  Activation by specified digital inputs
  Activation by power swing detection
  Manual / automatic activation
- 48 analog channels (12 voltage and 36 current channels) and 96 digital channels available
- Fault waveform recording in IEEE C37.111 COMTRADE format
- Automatic and manual transmission of event data
- Fault location
- IRIG-B time synchronization
- Synchro-phasor transmission in accordance with IEEE C37.118
- Self-monitoring on a regular basis

Division	Item	Specification
Rated	Input power	DC 90~140V, 60Hz
	Rated voltage(PT)	115V/√3[V] 12 channels
	Rated current(CT)	5[A]
	Digital output	10[A] : 250VAC 96 points
	Digital input	DC 70 ~ 150[V] 8 points
Communication	Communication port	RS-232, Ethernet, Fiber optic
	Protocol	IEC 61850, IEEE C37.118, TCP/IP
Display		10.4 inch Color TFT-LCD (1024 x 768)

Bay Controller

Main features

- Editing the single line diagram on the dedicated PC S/W
- Controlling and interlocking for field equipments such as circuit breakers and disconnecting switchgears
- Programming trip and control logics
- Saving the events in 1ms resolution
- Recording fault waveforms in IEEE C37.111 COMTRADE format
- Self-monitoring on a regular basis
- Measuring in high precision (1.0 class or lower)

- **SOC-K110**
  - Applied for 170kV GIS T/L, T/R, B/T or B/S bay
  - Instantaneous overcurrent (50) detection for phase and ground faults
  - Time overcurrent (51) detection for phase and ground faults
  - Various standard and user-defined time-current (TC) curves
  - Unbalanced load (46) detection through zero-sequence current (I0) monitoring
  - CT and PT failure detection

- **SUF-K110**
  - Applied for 170kV GIS PT & ES bay
  - 8-step definite-time underfrequency (81U) protection
  - Automatic busbar selection for frequency measurement
  - Fast frequency measurement in every ½ cycle
  - High-precision frequency measurement within the error range of ±5mHz
  - Instantaneous and definite-time phase undervoltage (27) protection for each bus

- **SUR-K210**
  - Applied for 25.8kV GIS main, D/L, S.Tr, SC, B/T, B/S or PT bay
  - Instantaneous overcurrent (50) detection for phase and ground faults
  - Time overcurrent (51) detection for phase and ground faults
  - Various standard and user-defined time-current (TC) curves
  - Unbalanced load (46) detection through zero-sequence current (I0) monitoring
  - Voltage magnitude and phase synchronism checking (25)
  - Phase overvoltage (59) detection and neutral overvoltage trip/alarm (59GT/59GA)
  - Phase undervoltage (27) detection
  - Automatic reclosing (79) up to 4 times

Division	Item	Specification		
		SOC-K110	SUF-K110	SUR-K210
Rated	Input power	DC 90~140[V], 50/60Hz	DC 90~140[V], 60Hz	DC 90~140[V], 50/60Hz
	Rated voltage(PT)	110/√3[V]	110/√3[V]	110/√3[V]
	Rated current(CT)	1[A]/5[A]	5[A]	1[A]/5[A]
	Digital output	10[A] : 250VAC 28 points	10[A] : 250VAC 28 points	10[A] : 250VAC 14 points
	Digital input	DC 70~150[V] 64 points	DC 70~150[V] 64 points	DC 70~150[V] 24 points
	Analog input	2 channels	2 channels	2 channels
Communication	Communication port	USB B-Type, RS-232, Ethernet, Fiber optic	USB B-Type, RS-232, Ethernet, Fiber optic	RS-232, Ethernet, Fiber optic
	Protocol	IEC 61850, TCP/IP	IEC 61850, TCP/IP	IEC 61850, TCP/IP
Time sync.		IRIG-B, SNTP	IRIG-B, SNTP	IRIG-B, SNTP

- **STC-K110-(M/P)**
  - IED for power transformer monitoring, control, measurement and interlocking
  - Monitoring the operation of mechanical relays in transformers and lockout trip
  - Controlling transformer OLTC(auto/manual, OLTC sliding block)
  - Controlling transformer cooling fans
  - Digital voltage meter (DVM)

- **SSP-K110**
  - IED for IEC 61850 based substation for power provision, fire prevention and security
  - Instantaneous overcurrent (50) and time overcurrent (51) detection for phase and ground faults
  - Monitoring and controlling of substation power facilities
  - Monitoring and controlling for fire prevention and security facilities

Division	Item	Specification		
		STC-K110-M	STC-K110-P	SSP-K110
Rated	Input power	DC 90~140[V], 60Hz	DC 90~140[V], 60Hz	DC 90~140[V], 60Hz
	Rated voltage(PT)	110/√3[V]	110/√3[V]	110/√3[V]
	Rated current(CT)	5[A]	5[A]	5[A]
	Digital output	10[A] : 250VAC 28 points	10[A] : 250VAC 12 points	10[A] : 250VAC 28 points
	Digital input	DC 70~150[V] 48 points	DC 70~150[V] 24 points	DC 70~150[V] 64 pPoints
	Analog input	10 channels	10 channels	10 channels
	RTD input	4 channels (PT100, Ni120, Cu10)	4 channels (PT100, Ni120, Cu10)	4 channels (PT100, Ni120, Cu10)
Communication	Communication port	USB B-Type, RS-232, Ethernet, Fiber optic	USB B-Type, RS-232, Ethernet, Fiber optic	RS-232, Ethernet, Fiber optic
	Protocol	IEC 61850, TCP/IP	IEC 61850, TCP/IP	IEC 61850, TCP/IP
Time sync.		IRIG-B, SNTP	IRIG-B, SNTP	IRIG-B, SNTP

Feeder Remote Terminal Unit (FRTU)

- Feeder Remote Terminal Unit (FRTU) is a core component of the distribution automation system. The FRTU is interfaced with the automatic switchgear to provide a function to remotely control the automated switchgear by the operating system and to provide information acquired on the distribution line.

- Usage
  - Detection and indication of the faults by monitoring distribution line data in real-time and separation of the faulted section by remote control
- Main functions
  - Obtaining distribution line data (current/voltage, power factor, active/reactive/apparent power)
  - Detection of a distribution line fault (instantaneous/permanent fault)
  - Embedded Fault Indicator
  - Monitoring status of the switchgear and control box
  - Remote control (open, close)
  - Data communication with the remote operating system using DNP protocol
  - Local and remote setting

- Benefits
  - Reduction of the time to detect the faults by monitoring distribution line data in real-time
  - Minimization of blackout zone and time by separating the faulted section and recovering the healthy section by remote control
  - Improvement of power quality through managing distribution line information

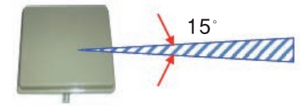
Recloser controller

- Recloser controller is interfaced with the recloser actuating body. It detects a fault current flow when the fault occurs on the distribution line, generates a trip signal after the time is derived according to the selected Time-Current Curve (TCC) to prevent the fault from spreading and generates a reclosing signal after a specified time to recover power supply in case of an instantaneous fault
- Usage
  - Preventing a fault on the distribution line from spreading
  - Operating in cooperation with the substation IEDs and other recloser controllers
- Main functions
  - Obtaining distribution line data (current/voltage, power factor, active/reactive/apparent power)
  - Tripping up to 4 times and reclosing up to 3 times
  - Embedded fault indicator
  - Monitoring the conditions of recloser equipment
  - Local and remote control
  - Event Report, Load Profile
  - Data communication with the main server using DNP 3.0 protocol
  - 48 kinds of time-current curves (TCCs) available
  - CLPU (cold load pickup) and inrush restraint functions
  - Local and remote setting
  - Sequence coordination, sequence trip
  - Battery & lamp test

DAS wireless bridge

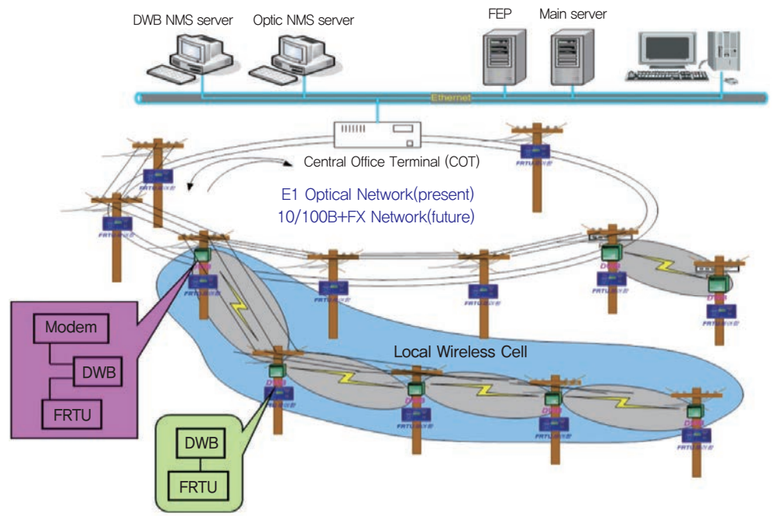
- Long distance wireless communication network free from operating cost
  - Use the ISM band (no approval/license required)
  - Max. reach of communication is 3km (LOS)
- Complying proper environmental and security standards
- Avoidance of frequency interference
  - Automatic channel hopping to recover communication from interference
- Communication route recovery
  - Automatic re-routing in case of communication failure due to failure of DWB(s) in the routing path
- Dual antenna system (MIMO)
  - MIMO capability with two separate antennas
- Security functions
  - Device authentication and data encryption
  - Automatic frequency hopping to avoid interference from other wireless devices such as wireless LAN

Main unit



Directional antenna [19dBi]

System configuration



Distribution Panel / Cabinet Panel

Overview

- Electricity receiving facilities that can be installed and operated either indoor or outdoor

Features

- Quality assurance system for each process in accordance with ISO 9001
- Compliance with various domestic and international standards
- Standardization of the design and manufacturing process
- Manufacturing of the products that meet the customer's needs and field conditions

Usage

- Generation plants, substations, industrial plants, buildings, water treatment facilities, general-purpose factories and apartment-type factories

Low voltage panel

Medium voltage panel

Item		Medium voltage panel		Low voltage panel
Rated voltage		24 / 25.8 kV	3.6 / 7.2 / 12 / 15 kV	600V
Rated current		400 ~ 2000 A	630 ~ 2000 A	300 ~ 5000 A
Rated frequency			50 or 60 Hz	
Rated short time current : 1sec		Max. 25 kA	Max. 25 kA	Max. 50 kA
Operating voltage		DC 110 or 125 V , AC 110 or 220 V		
Enclosure dimensions	W (mm)	1200 ~ 1800	800 ~ 1000	800 ~ 1000
	H (mm)	2350 ~ 2550	2350 ~ 2550	2350 ~ 2550
	D (mm)	2500	1500 ~ 2500	1500 ~ 2500

MCC

Power panels / cabinet panels

Item		MCC	Power panels / cabinet panels
Rated voltage		440 , 380 , 220 V	
Rated current		10 ~ 800 A	
Rated frequency		50 or 60 Hz	
Rated short time current:1sec		Max. 65 kA	
Operating voltage		DC 110 or 125 V , AC 110 or 220 V	
Enclosure dimensions	W (mm)	600	400 ~ 1200
	H (mm)	2350	400 ~ 2200
	D (mm)	600	130 ~ 250

Optimized production

Various factors have been taken into consideration in the design process to keep the power plants and substations in their optimal condition.

Unlike the standard quality certification which confirms whether the product has passed the highest standard test, our products are checked whether they compiles with national and international standards throughout the whole process of design, production, testing and inspection.

Sanion is fully committed to basic standards covering conformity, deviation, properties and technology.

Sanion will do its best to produce the products with the best quality that offers maximum satisfaction for all its customers and make contribution to create values for the customers.