ENTEC
ELECTRIC & ELECTRONIC CO., LTD.

www.entecene.co.kr

ENhanced TECHnology

Smart + Green + Human

Company History

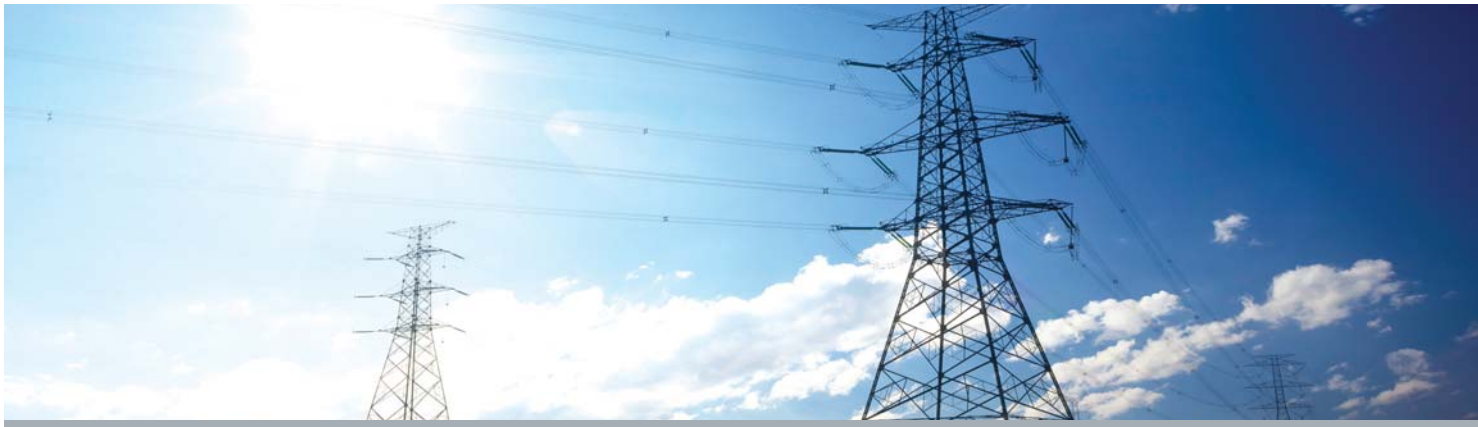
Leading, challenge to make better tomorrow to open new road, the real leader..

Steps that Entec has made, was the history to explore and development for new land. From the power transmission and distribution industry, to Power IT, Metro & Railway and Nuclear industry, Entec has created and innovated to enormous products to support the better services to the customer.
Standing on the top is not the last completion, it is the beginning of innovation for creation. Beyond the Korea, till the day of becoming the world best leader, Entec's challenge will go on.

1996 Established
1997 Accomplished ISO 9001
1999 Developed 27kV SF_6 Gas Recloser and passed KEMA Type Test
Certificate of New Technology for SF6 Gas Recloser
2000 Excellent Enterprise Award
Developed 15kV SF_6 Gas Recloser and passed KEMA Type Test
Developed 38kV SF_6 Gas Recloser and passed CESI Type Test
2001 Excellent Korean Technology Award with High Speed Circuit Breaker (HSCB)
Developed 38kV 16kA SF_6 Gas Recloser and passed KEMA Type Test
INNO-BIZ Company Award
2002 Developed at first 27kV Solid Recloser in Korea and passed KEMA Type Test
Korean New Technology Award "KT mark" with DC Circuit Breaker
Passed CESI Type Test with DC Circuit Breaker for Nuclear Power Plant
2003 Patent with Solid Recloser & Sold Load Break Switch
2004 Patent for small current interruption technology for DC Circuit Breaker
2005 Taiwan Power Company 13 Million US dollar project Award (1ST)
- 4 Way SF_6 Gas Pad Mount Switchgear
2006 Taiwan Power Company 13 Million US dollar project Award (2nd)
2007 Korea Electric Power Industry Code (KEPIC) Quality Assurance Award
2008 25.8kV Solid Insulated Switchgear (SIS) Type Test passed at KERI
2009 Supply of 25.8kV SIS to Seoul Metro Traction Substation
2010 Developed 15kV Solid Recloser and passed KEMA Type Test
Developed 25.8kV Epoxy Fault Interrupter and passed KERI Type Test
Korean Word-Class Product Award with DC Switchgear
2011 Developed 38kV Solid Recloser and passed KERI Type Test
Developed 24kV SF_6 Gas RMU and passed KERI Type Test
Awarded with 10M US$ Project(1,000 sets RMU) from PEDEE in Syria
Awarded with 6M US$ DAS(Distribution Automation System) Project in India
2012 27kV Solid Recloser Type Test passed at CESI
2013 Developed 25.8KV Solid Capacitor Switch and passed KERI Type Test
Developed 12kV Solid Dielectric Ring Main Unit and Passed KERI Type Test
2014 Developed 17.5kV SF_6 Gas RMU and passed CESI, KERI Type Tests
Developed 17.5kV SF_6 Gas RMU and passed CESI, KERI Type Tests
2015 Developed SCADA system 'ARGOS' and installed on Seoul Metro System
Developed 15.5kV Single Phase Solid Recloser and passed KERI Type Test
2016 Developed 25.8kV Draw-Out Solid Insulated Switchgear passed KERI Type Test
2017 Accomplished ISO 14001
Developed Load Break Switch, Power Circuit Breaker, Disconnector Switch for DC Power System
2018 Developed 38kV Solid Recloser (RVD type) and Passed KERI Type Test
2019 Developed 25.8kV Solid Submersible SWGR and Passed KERI Type Test

Closer to the customer and together, more convenient and happier for better life...

Power Distribution system solution to maximize the electricity efficiency and safety, Distribution Automation system solution integrated with Power IT, Intelligent system operation solution of Metro & Railway system. Now, environmentally friendly products solution for green energy*!*
Your fresh and delight day will always be with Entec's humanism technology



Power Transmission & Distribution

Solid dielectric equipments are widely developed not only Distribution line equipments but also Transmission line equipments, for instance, Solid Insulated Switchgear(SIS), Solid Insulated Recloser/Load break switch for pole mount and Solid Insulated Circuit Breaker and Load Break Switch. Solid dielectric technology provides the solution to protect Environment from pollution by not using SF6 gas and Oil. And also enhances products safety.
With the reliable gas products know-how, Entec emphasize more on Environmentally friendly products in order to make Green Energy Network for the future.

Solid Recloser

Characteristics

- Environmentally friendly product
- Vacuum Interrupter
- Magnetic Actuator mechanism
- Maintenance free
- Intelligent Protection Relay
- Manual Open/Close Capability

Three Phase Solid Recloser Ratings

Rated voltage	15kV	27kV	38kV
Rated current	630A	630/800A	800/1250A
Impulse withstand voltage(BIL)	110kV	150kV	170kV
AC Power frequency withstand voltage	50kV	60kV	70kV
Short time current	16kA	12.5/16kA	16kA
Making current	41.6kA	32.5/41.6kA	41.6kA

Single Phase Solid Recloser Ratings

Rated voltage	15kV	27kV
Rated current	630A	800A
Impulse withstand voltage(BIL)	110kV	150kV
AC Power frequency withstand voltage	50kV	60kV
Short time current	16kA	16kA
Making current	41.6kA	41.6kA

Gas Recloser

Characteristics

- Magnetic Actuator mechanism
- Vacuum Interrupter
- Intelligent Protection Relay
- Manual Open/Close Capability

Ratings

Rated voltage	15kV	27kV	38kV
Rated current	630A	630A	800A
Impulse withstand voltage(BIL)	110kV	150kV	170kV
AC Power frequency withstand voltage	50kV	60kV	70kV
Short time current	12.5kA	12.5kA	16kA
Making current	32.5kA	32.5kA	41.6kA

Epoxy Insulated Fault interrupter (EFI)

Characteristics

- Epoxy Insulation & Vacuum Interrupter application
- Environmentally friendly interrupter
- Manual/Electrical Operation
- One shot open fault current interrupter

Ratings

Rated voltage	25.8kV
Rated current	400A
Rated breaking capacity	12.5kV
Rated making time	3 Cycles
AC Power frequency withstand voltage	60kV/1min. (dry)
Impulse withstand voltage	150kV BIL

Solid Load Break Switch

Characteristics

- Environmentally friendly product
- Vacuum Interrupter
- Spring Toggle mechanism
- Maintenance Free
- Intelligent Protection Relay
- Manual Open/Close Capability

Ratings

Rated voltage	12kV	27kV
Rated current	630A	630A
Impulse withstand voltage(BIL)	125kV	150kV
AC Power frequency withstand voltage	50kV	60kV
Short time current	20kA	12.5kA
Making current	41.6kA	32.5kA

Gas Load Break Switch

Characteristics

- Puffer Principle mechanism
- Quick open and close operation

Ratings

Rated voltage	15.5kV	25.8kV	36kV
Rated current		630A	
Impulse withstand voltage(BIL)	110kV	150kV	170kV
AC Power frequency withstand voltage	50kV	60kV	70kV
Short time current	16kA	12.5/16kA	12.5kA
Making current	41.6kA	32.5kA	32.5kA

Solid Capacitor Switch

Characteristics

- Reactive power control capacitor switch
- Frequent trip purpose upto 3 phase, 3,200KVA

Ratings

Rated voltage	15kV (Single phase)	27kV (Single phase /Three phase)	38kV (Single phase)
Capacitive Switching Current	200A	200A	400A
Short time current	4.5kA/1s	4.5kA/1s	6.25kA/1s
Impulse withstand voltage	110kV	150kV	200kV

Power Transmission & Distribution

Solid Pad Mount SWGR

Characteristics

- Environmentally friendly product
- No SF_6 gas use
- Circuit Breaker Part : Magnetic Actuator Mechanism
- Switch Part : Spring Toggle Mechanism

Ratings

Rated voltage	12kV	25.8kV
Rated current	630A	
Short circuit making current	20kA	12.5kA
AC Power frequency withstand voltage	110kV	125kV
Impulse withstand voltage	50kV	60kV

Gas Pad Mount SWGR

Characteristics

- All circuit independent operation function
- 3 position Operation
- Remote operation available

Ratings

Rated voltage	12kV	25.8kV
Rated current	630A	
Short circuit making current	12.5kA	12.5kA
AC Power frequency withstand voltage	110kV	125kV
Impulse withstand voltage	50kV	60kV

Solid Submersible SWGR

Characteristics

- Compact switchgear with combination of switches and circuit breakers.
- Spring toggle mechanism
- Protection degree: IP 67 (Waterproof)
- Three position switch available

Ratings

Rated voltage	25.8kV
Rated current	630A
Impulse withstand voltage(BIL)	125kV
AC Power frequency withstand voltage	60kV
Short time current	12.5kA/3sec
Making current	32.5kV

Solid dielectric Ring Main Unit [Extensible]

Characteristics

- Environmentally Friendly Solid Dielectric Application
- Convenient extension by modular structure
- High Reliability of breaking
- Improved Safety by double layer case
- Compact size and easy installation
- Various compose with LBS, FUSE and CB.

Ratings

Classification	SW	CB	FUSE	SW	CB	FUSE	SW	CB	FUSE
Rated voltage(kV)	12			25.8			36		
Rated frequency(Hz)	50/60			50/60			50/60		
Impulse withstand voltage(kV)	75			125			170		
AC Power frequency withstand voltage(kV)	28			60			70		
Rated current(A)	630	630	63	630	630	125	630		
Rated breaking current(kA)	-	20	16	-	15/16	12.5	20		
Rated making current(kA, peak)	52	52	40	32.5/41.6			52		
Rated short-time withstand current(kA, 3S)	20	20	-	12.5/16(1s)			20		

ECO Ring Main Unit

Characteristics

- Permanent Magnetic Actuator Mechanism
- SF_6 Gas Free unit using Dry air type
- Serial interlock between VI and Disconnect Switch [Air]
- Main switch interlocked with Earthing switch for reliability and safety

Ratings

Classification	SW	CB	SW	CB
Rated voltage [KV]	15		27	
Rated Frequency [Hz]	50/60		50/60	
Impulse withstand voltage [kV]	95		125	
AC Power frequency withstand voltage [kV]	36		60	
Rated current [A]	630		630	
Rated breaking current [kA]	-	20	-	16
Rated making current [kA, peak]	52	32.5/41.6	52	32.5/41.6
Rated short-time withstand current [kA, 3S]	20	12.5/16	20	12.5/16

SF_6 Gas Insulated Ring Main Unit

Characteristics

- Spring Charged Mechanism
- 3 Cycles interruption Capability
- Self-Powered Relay (ETR20)and Digital Relay

Ratings

Item	SW/CB	SW/CB/FUSE
Rated voltage	17.5kV	24kV
AC Power frequency withstand voltage	50kV	50kV
Impulse withstand voltage	110kV BIL	125kV BIL
Rated current	630A	630A
Breaking capacity -Short circuit breaking current -Making capability	21kA / 21kA 54.6kA / 54.6kA	16kA / 25kA 40kA / 40kA

Solid Insulated Switchgear(SIS)

Characteristics

- Single/Double busbar system
- Environmentally friendly product
- Solid Dielectric application
- Magnetic Actuator mechanism
- Fire retardant
- Interlock system between CB, DS, ES and Relay
- Close Loop System(CLS) :
- Fault acknowledgement by signaling in fiber optic communication(Peer to peer)
- No remote operation required(Close Loop Algorithm operation)

Ratings

Rated voltage	7.2kV	15kV	25.8kV	40.5kV
Rated current	630A	630/ 1250A	630/1250/ 2000A	630/ 2500A
Interruption current	12.5kA	12.5kA	25kA	31.5kA
Duty	0-0.3s-CO-15s-CO			

Draw-out Solid Insulated Switchgear(SIS)

Characteristics

- VCB Part Draw-out Type
- Magnetic Actuator Mechanism
- Compat Size(Max 38% Reduction Compared to MCSG)

Power Transmission & Distribution

Cubicle type Gas Insulated Switchgear (CGIS)

Characteristics

- Permanent magnetic actuator mechanism
- Maintenance free (10,000 times operation)
- Cubicle type GIS
- Gas pressure monitoring device and over voltage release device application

Ratings

Classification		Rating
Rated voltage		25.8 kV, 3 Phase
AC Power frequency withstand voltage	Phase-Ground	70 kV / 1 min
	DS Phase-Phase	77 kV / 1 min
Impulse withstand voltage	Phase-Ground	150 kV / 1.2 ×50 ㎲sec
	DS Phase-Phase	165 kV / 1.2 ×50 ㎲sec
Control and operation circuit withstand voltage		2 kV / 1 min
Rated short-time current	Effective value(r.m.s)	25kA / 1 sec
	Max. Peak value	65 kA, Peak
Rated current	Main busbar and 2000A circuit	2000 A
	Distribution line and 600A circuit	600 A
Rated gas pressure / Alarm pressure		0.03 / 0.015 MPa.G at 20℃

145kV Hybrid Switchgear

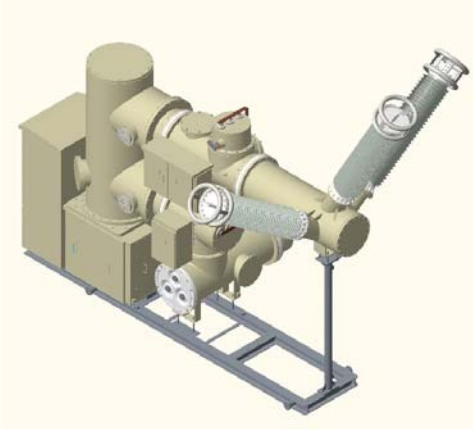
Characteristics

- External current transformers
- Composite bushing
- Combined disconnector
- Combined disconnector
- SF_6 Gas Insulation

Ratings

Rated insulation level	
Rated voltage	145kV
Rated frequency	60Hz
Rated power frequency withstand voltage (1min)	
Common value	275kV
Across the isolating distance	315kV
Rated lightning impulse withstand voltage	
Common value kV	650kV
Across the isolating distance	750kV
Current ratings	
Rated direct current	3,150A
Rated short-time withstaand current	40kA
Rated short-circuit duration	3s
Rated peak withstand current	104kA

170kV Gas Insulated Switchgear



Characteristics

- Well proven and reliable technology
- High performance ratings
- Long service life
- High availability
- Economic efficiency and low maintenance costs
- Safe encapsulation

Ratings

Rated insulation level	
Rated voltage	170kV
Rated frequency	60Hz
Rated power frequency withstand voltage (1min)	
Common value	325kV
Across the isolating distance	325kV
Rated lightning impulse withstand voltage	
Common value kV	750kV
Across the isolating distance	860kV
Current ratings	
Rated direct current	Up to 4,000A
Rated short-time withstand current	50kA
Rated short-circuit duration	1s
Rated peak withstand current	130kA

Metro & Railway & Renewable Energy

Korea first manufacture of 1800V/900V DC Switchgear becomes major supplier in Korea as Domestic metro system gets developed and extended. Technical capability and its reliability were attested at KERI in Korea and at IPH in Germany.
Entec provides DC Power System protection with High Speed Circuit Breaker which uses magnetic actuator mechanism and it operates with digital relay and HMI. DC disconnector is also interactive with DC HSCB for user safety.
Various type of silicon rectifier can be fit with any specification.
As Environment Protection issue gets attention, Public transportation also gets attention in order to decrease air pollution by maximizing public transportation. It is one of the important key to protect environment from pollution by using Metro system as public transportation.

Metro

DC Switchgear

Characteristics

- High quality DC High Speed Circuit Breaker(HSCB), Load Break Switch(LBS) and Disconnector(DS) application.
- Compact design
- Digital Protection relay system application.
- Absolute Insulation capability
- Convenient Circuit Breaker Withdraw
- Fire retardant
- Interlock among HSCB, LBS, DS and Panels
- SMBA Excellent Product
- Internal Arc Tested EMC Compatibility

Ratings

Model	ETGR 21	ETGR 22
Nominal voltage	DC 750[V]	DC 1,500[V]
Rated voltage	DC 900[V]	DC 1,800[V]
Insulation voltage	DC 1,800[V]	DC 3,000[V]
Rated interrupting over voltage	1.5~2 × rated voltage	
Rated current	2,600/4,000/5,000/6,000/8,000 [A]	
Rated making and breaking capacity	178[kAp]/125[kA]	114[kAp]/80[kA]
Operation duty	O-15sec-CO-15sec-CO-60sec-CO (max fault, max energy, distant fault)	
di/dt (Current rising rated vs time)	24.2 X 10^6 [A/S]	25.2 X 10^6 [A/S]
Mechanical durability	20,000 times	
AC Power frequency withstand voltage(60[Hz], 1min.)	5.5[kV]	11[kV]
Lightning impulse (1.2x50 μs)	220/220kV	
Rated operation, control voltage	DC 110[V]	
Over vurrent release Pick-up	5 ~ 15 [kA]	
Max. Ambient temp / Avg. Temp.	40[℃]/35[℃]	
Altitude	≤2,000[m]	

Metro & Railway & Renewable Energy

High Speed Circuit Breaker (HSCB)

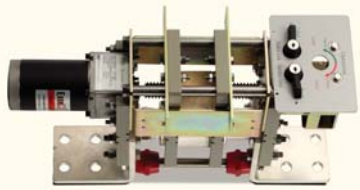
Characteristics

- High Durability and Reliability
- Magnetic Actuator Mechanism & Electrical holding Mechanism available
- Sufficient electric current capacity and Heat withstand
- High Insulation capability
- Quality Assurance
- Compact design
- Enhanced small current interrupting capability
- KT Mark
- Panel interface

Ratings

Model	ETGR 21	ETGR 22
Nominal voltage	DC 750[V]	DC 1,500[V]
Rated voltage	DC 900[V]	DC 1,800[V]
Insulation voltage	DC 1,800[V]	DC 3,000[V]
Rated interrupting over voltage	1.5~2 ×rated voltage	
Rated current	2,600/4,000/5,000/6,000/8,000 [A]	
Rated making and breaking capacity	178[kAp]/125[kA]	114[kAp]/80[kA]
Operation duty	O-15sec-CO-15sec-CO-60sec-CO (max fault, max energy, distant fault)	
di/dt (Current rising rated vs time)	24.2 X 10^6 [A/S]	25.2 X 10^6 [A/S]
Mechanical durability	20,000 times	
AC Power frequency withstand voltage(60[Hz], 1min.)	5.5[kV]	11[kV]
Lightning impulse (1.2x50 μs)	220/220kV	
Rated operation, control voltage	DC 110[V]	
Over vurrent release Pick-up	5 ~ 15 [kA]	
Max. Ambient temp / Avg. Temp.	40[℃]/35[℃]	
Altitude	≤2,000[m]	

DC Disconnector Switch



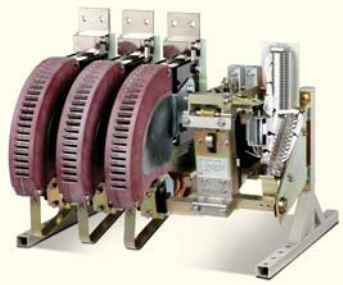
Characteristics

- Various ratings for various applications
- High durability with compact size
- Manual/Motorized operation
- Flexible installation arrangement
- Robust but simple structure with easy maintenance

Ratings

Rated voltage	DC 1,800V
Rated current	1,000A/2,000A/4,000A /6,000A/8,000A
Insulation voltage	3,000V
AC Power Frequency Withstand Voltage[Phase to Earth]	9.2kV [1 min]
AC Power Frequency Withstand Voltage[Phase to Phase]	11kV [1 min]
Operation Time [sec]	〈6

DC Contactor



Characteristics

- Applicable in various fields
- Flexible configuration and installation arrangement
- High reliability with wide range of rating selection
- Bi-directional making and breaking capacity
- Easy maintenance

Ratings

Rated voltage	DC 600V	DC 1.000V	DC 1,500V
Frame size	1,000A/1,250A/1,600A/2,500A/3,200A/4,000A/5,000A		
Mechanical durability	100,000 Cycles		
Insulation voltage	3.82kVdc		
Maximum electrical switching frequency	6,000 Cycles		

Silicon Rectifier

Characteristics

- Various type (2,000/3,000/4,,000/5,000kW)
- 6 pulse or 12 pulse design
- Disk type silicon diode apply
- Compact design
- Duty Class VI
- Low ripple and high efficiency
- Fault handling in each module
- Real time temperature monitoring
- Information acquisition function(HMI)
- Report function
- PPS Excellent product
- SMBA Excellent product

Ratings

Rated input voltage	AC 300V(600V)	AC 600V(1,200V)
Rated output voltage	DC 750V	DC 1,500V
Rated continuous current	1,333/2,667A	1,333/2,000/2,667A
Diode type	Silicone	

Human Machine Interface

ETCPU200 HMI is a device to manage the ETCPU200 locally or remotely.
ETCPU200 HMI separated from the ETCPU200 obtains data via communication so that one HMI can manage several the ETCPU200.
The graphic LCD of large size allows of easily accessing intuitive and various information.
The setting point change and the circuit breaker control are performed through authentication procedure of password.

Graphic LCD

- 240 X 128 resolution
- Support English, Korean and Chinese etc.
- Representation of the single-line diagram of the system and several types of figures
- CCFL Backlight power-saving function

Program Port

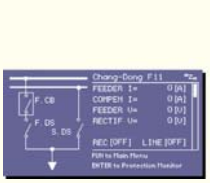
- Port for interfacing with PC Application Software

LED Display

- Indicates the state of connected devices
- Six user-defined LED

Key Board

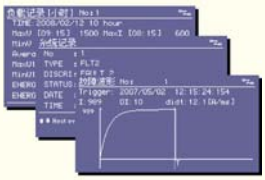
- Operates the HSCB, changes the set point and views the saved event
- Touch Screen available(Option)



SINGLE-LINE DIAGRAM AND CONTROL

MEASUREMENT

SETTING



EVENT

STATUS

Protection IED ETCPU200/300

Characteristics

- Metering : Current(Feeder, Compensation, Termal), Positive/Negative Power, Energy
  Voltage(Feeder, Rectifier, Diff' Voltage)
- Recording function : System, Diagnostic, Operation and Fault Event, Fault Wave, Load Profile
- PLC function
- Multi communication protocol : DNP3.0, MODBUS, IEC60870-5-101/104, IEC61850(ETCPU300)
- Control : Interconnecting Relay(85F), DC Reclosing(82), Line Test(LT)
- Protection : di/dt, ⊿I/⊿VI, Over Current(76D), Reverse Current(32), Under Voltage(80), Over Voltage(45), Diff' Voltage, Thermal Protection(26F), Ground Protection (64D), Frame Leakage Protection

Metro & Railway & Renewable Energy

AC Railway

Indoor Solid Insulated Switchgear

Characteristics

- Mechanically interlocked main circuit [CB, DS, ES] mold as one body
- P.M.A mechanism, 10,000 times of operations guaranteed
- High resistance to environmental influence
- Solid insulation
- Trouble free DS, ES structure for reliable operation
- Withdrawable VCB for even more convenient maintenance

Ratings

Rated voltage	29kV	
Model	Fixed type	Draw-out type
Rated current	630/2,500A	1,250/2,000A
AC power Frequency Withstand Voltage	95/110kV[Phase to earth/CB/DS pole to pole]	
Lightning impulse (1.2x50 μs)	220/220kV	
Short time current[3 sec]	82.5kAp/31.5kA	
Making capacity	82kAp	

Solid insulated Outdoor Circuit Breaker(EROCB-2)

Characteristics

- Environmentally friendly product
- Railway outdoor substation application
- Maintenance free
- Vacuum Interrupter (30 times of short circuit capability)
- Electro Magnetic Actuator (EMA)

Ratings

Insulation method	Solid dielectric
Rated voltage	31.5kV
Rated current	2000A
Rated breaking current	31.5kA
Mechanical durability	10,000times
AC Power frequency withstand voltage	140/90kV/min
Impulse withstand voltage	325/185kV

DC Power System

DC Air Circuit Breaker

Characteristics

- Applicable in various fields
- Flexible configuration and installation arrangement
- High reliability with wide range of rating selection
- With-drawable type available
- Easy maintenance

Application

- Renewable energy [Solar, wind, hydro etc.]
- Railway application
- DC power supply and distribution equipment and others
- Building, Vessel, and Industrial facilities

Ratings

Rated voltage	DC 1,000V	DC 1,500V
Frame size	1,000A/1,600A/2,000A/2,500A/3,200A/4,000A/5,000A	
Short current and short time current	35 ~ 65kA	
Mechanical Durability	10,000 cycles	
Insultation voltage	3.82kVdc	

Power IT

Distribution Automation System provide rapid Electricity Network management and also support Smart Grid.
Entec provides various types of Protection relays and Control panels for Recloser, Switch and Circuit Breaker.

Some of controllers and protection relays are built up with RTU for Distribution Automation System application.
RTU built-in controllers and protection relays provide more efficient operation and enhanced System Control in Distribution Line.

Distribution Automation System (DAS)

Overhead Line

EVRC2A-NT

Automatic Recloser Protection Relay(RTU Built-In)

- 51, 50, 46, 67, 27, 59, 81, 25, 79, CLPU, etc.
- Multi Communication Protocol : DNP3.0, MODBUS, IEC 60870-5-101/ 104, IEC61850
- PLC, PQM, GPS, IRIG, Fault Locator, Contact Wear Monitor, Loop Control, 2 Ethernet Ports (Fiber Optic Option), Wifi, MMS etc

ETR300-R

Automatic Recloser Protection Relay(RTU Built-In)

- 51, 50, 46, 67, 27, 32, 59, 81, 25, 79, CLPU, HIZ etc.
- Multi Communication Protocol : DNP3.0, MODBUS, IEC 60870-5-101/104, IEC 61850
- PLC, PQM, GPS, IRIG, Fault Locator, Contact Wear Monitor, Loop Control, 2 Ethernet Ports (Fiber Optic Option), Event COMFEDE and COMTRADE Option, Wifi, MMS etc

ETCAP121

Capacitor Switch Controller (RTU Built-In)

- Auto/Manual Capacitor Control
- VAR/Volt/Time Control
- Multi Communication Protocol : DNP3.0, MODBUS and IEC 60870-5-101/104

ETMFC610

Multi-Function Relay (RTU Built-In)

- FI(Fault Indicator) Function
- Open Phase, Live Load Block, Synchro.Check, etc.
- Loop Control Function (Auto Sectionalizer & Tie Point Switch)
- Multi Communication Protocol : DNP3.0, MODBUS, IEC 60870-5-101/104, IEC61850
- PLC, PQM, GPS, IRIG, SMS, WIFI, MMS etc.

Power IT

ETMFC50

Multi-Function Controller for Auto Sectionalizing Switch and Fault Interrupter

- 51, 50, Sectionalizer Function, Overcurrent Lock Function and Contact Wear Monitor
- Programmable SCADA I/O port

ETRTU101

Distribution Automation Remote Terminal Unit for Load Break Switch

- FI(Fault Indicator) Function
- Open Phase, Live/Dead Line, Phase Unbalance, Fault Directional Detect
- DNP3.0 Communication Protocol

Under Ground Line

ETR-102

Dual Protection Relay

(Two Circuit Breaker Protection Relay)

- OCR(51,50,46,CLPU) ×2
- Demand Trip, Contact Wear Monitor
- MODBUS Communication Protocol
- Programmable SCADA I/O port

ETCCU104

Multi-way Circuit Breaker Controller for Closed-Loop System(Pad type)

- 51, 50, 46, 27, 59, 25, CLPU, etc.
- Closed/Opened Loop System Operation Function
- Self Healing Protection
- Multi Communication Protocol : DNP3.0, MODBUS and IEC 60870-5-101/104

ETR304/ETR306

Multi-way Circuit Breaker Controller for Closed-Loop System(Pad type) up to 4 ways or 6 ways

- 51, 50, 46, 27, 59, 25, CLPU, etc.
- Closed/Opened Loop System Operation Function
- Self Healing Protection
- Multi Communication Protocol : DNP3.0, MODBUS and IEC 60870-5-101/104

ETR20/ETR20H

Overcurrent Protection Relay for RMU

- Self Power
- OCR(51P, 50P, 51N, 50N) Protection

ETTSC50

Auto Load Transfer Switch Controller

- Transition Suppressor Function for Momentary Power failure, Load-Side Momentary Failure
- Protection Function for Load-side Failure

ETRTU104

Distribution Automation Remote Terminal Unit for Load Break Switch(Pad type)

- FI(Fault Indicator) Function
- Open Phase, Live/Dead Line, Phase Unbalance, Fault Directional Detect
- DNP3.0 Communication Protocol

Protection Relay for Substation

ETR500-F/T/M/DG/FV
Protection IED (Intelligent Electronic Device) for Feeder/Transformer/Motor/Distributed Generator/Feeder and PT protection

ETR600-F/T/M/G
Protection IED(Intelligent Electronic Device) for Feeder/Transformer/Motor/Generator protection

ETR200-VI/V/IM
Protection IED(Intelligent Electronic Device) for Voltage-current/Voltage/Motor protection

Protection and Control for Metro

ETCPU200
DC Protection Relay
- Frame Leakage, di/dt and ⊿I/⊿VI protection, 76D, 32, 80, 45, 26F, 64D, 85F, 82, Line Test, etc.
- DNP3.0 and MODBUS Communication Protocol
- PLC Function

ETCPU200 HMI
Human Machine Interface for DC Protection Relay
- Graphic LCD 240 ×128 pixels
- Multi-Language Support (English, Korean, Chinese, etc.)
- Single-Line Diagram Support

ETCPU300C
DC Protection Relay
- Frame Leakage, di/dt and ⊿I/⊿VI protection, 76D, 32, 80, 45, 26F, 64D, 85F, 82, Line Test, etc.
- Graphic LCD : Graph/Single-Line Diagram and Multi- Language Support
- Multi Communication Protocol : DNP3.0, MODBUS and IEC 60870-5- 101/104, IEC61850
- PLC Function

ETDCU100
Data Concentrator Unit
- Max Device 10 EA
- Communication Map Configuration
- Programmable SCADA I/O port
- Multi Communication Protocol : DNP3.0, MODBUS and IEC 60870-5-101/104, IEC61850

ETDCU200
Data Concentrator Unit
- Max Device 24 EA
- Communication Map Configuration
- Higher System Reliability by Duplex Configuration (Optional)
- Multi Communication Protocol : DNP3.0, MODBUS and IEC 60870-5-101/104, IEC61850

ETDTS
Data Transfer System
- Communication relay for Substation
- High-Capacity Communication Relay, Programmable SCADA I/O port
- Increase System Reliability by Duplex Configuration(Optional)
- SIO 8ch.(4 ports per Channel)
- Multi Communication Protocol : DNP3.0, MODBUS and IEC 60870-5-101/104, IEC61850

IHMI
Human Machine Interface for DC Substation Automation System
- PLC, Touch Screen and Multi-Language Support
- Multiple Device Connection through Ethernet and RS485
- Multi Communication Protocol : DNP3.0, MODBUS and IEC 60870-5-101/104, IEC61850

Protection and Control for Railway

ETR600-FL/SL
Protection IED (Intelligent Electronic Device) for Distance relay, Catenary protection and Single line protection in AC railway system

ETFL600
Protection IED (Intelligent Electronic Device) for Fault locator application in AC railway system

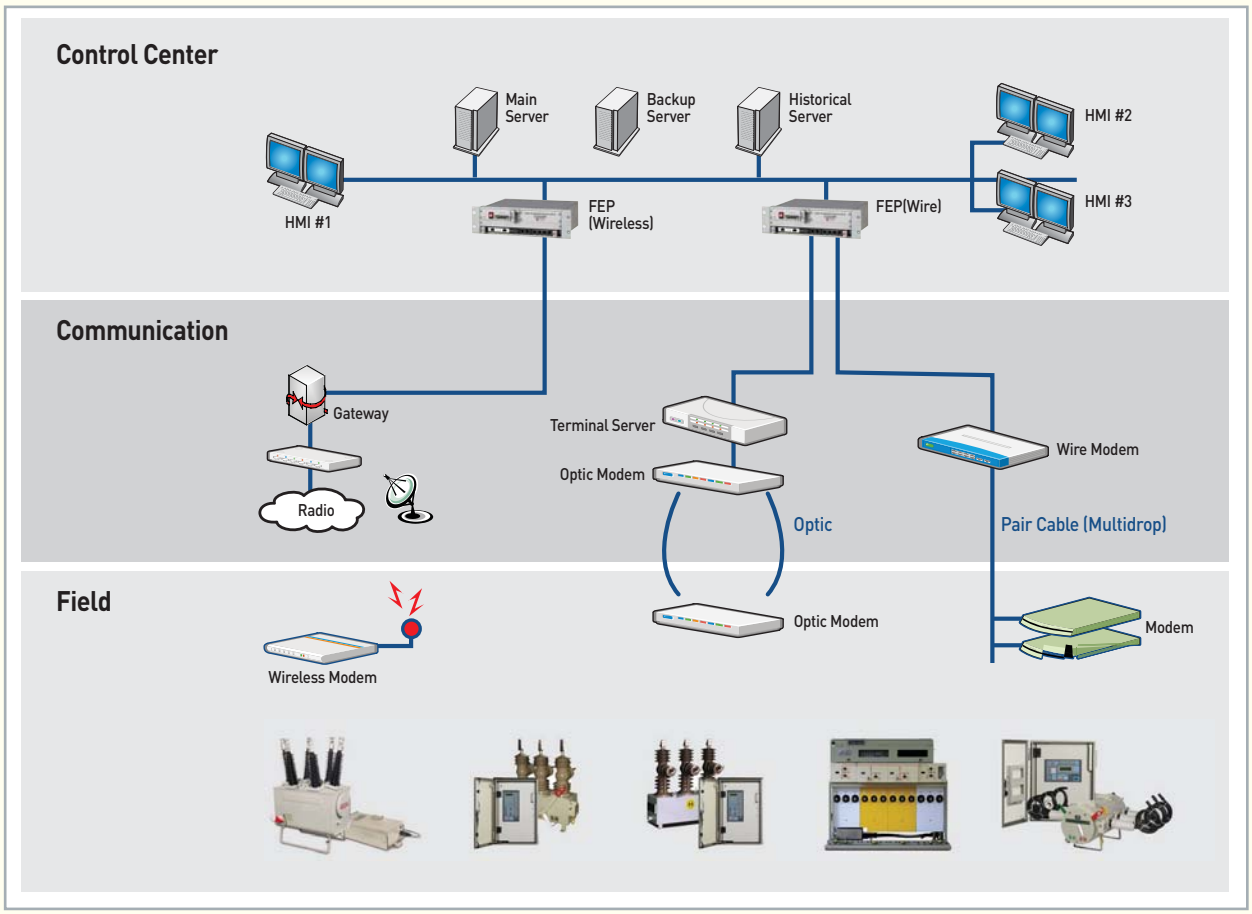
Nuclear Power Plant MCCB Protection Relay

ETDR101
DC Overcurrent Protection Relay
- Q-Class Protective Relay
- OCR, OCGR Protection
- Available NuclearPower Plant MCCB Pannel

Renewable Energy

ETPCS(Inverter)
Grid-connected PV PCS(3kW, 50kW)
- Maximum Power Point Tracking(MPPT)
- Protection and Diagnosis Function
- Hi-Efficiency, User-Friendly Interface

DAS System Diagram



NOTE) FEP : Front End Processor, HMI : Human Machine Interface

ARGOS (SCADA & ETRTU 3000)

'ARGOS' that can be applied to a variety of power system is for monitoring and control according to changes in the power plant site. Main features are monitoring, control, alarm processing, recording, report. Argos is an integrated monitoring and control system and designed for the remote control and protection system in the field of distribution. It is designed as an open system to be compatible with the communication standard of the international standard widely used in industry.

Main Features

Availability
- Information can be modified by using easily managing editor, administration system in accordance with the purpose.
- Users can check the status of field devices in real time through a variety Viewer.
- Simple setup and protocol conversion is possible and can be used for various types of system.

Stability
- This prevents the loss of information and the download time in an emergency through the 'ARGOS DC'.

Flexibility
- ARGOS operates without any restriction in Windows Version.
- Users can change the environment by setting a simple configuration.

Communication
- DNP 3.0 / IEC 60870 / IEC 61850 / MODBUS
- Modem / Fiber Optic / Ethernet / RS422 / 485

- 7,000 times of DI / DO / AI Point

Remote monitoring, control and Measuring
- Circuit Breaker Open/Close
- SOE (Sequence Of Event) Information
- Remote measurement of voltage, Active/Reactive Power, frequency, power factor

Simulator
- System Monitoring & System Function Test & System, Equipment history management
- Database Create, modify, store, edit and manage

Usage
- ETRTU3000 monitors power equipment such as substations, metro, railway, water and sewage systems and other industrial equipment. Also, it transmits information to the power plant connected with various communication interfaces and standard protocols as SCADA. The system has reliability in configuring a redundancy-system.

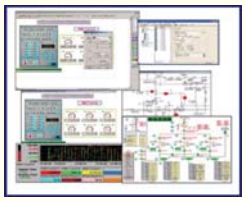
Power IT

SCADA

Remote Terminal Unit(RTU)

Remote Monitoring, Measuring and Controlling Device for Power System Operation Facility

- Power Plant, Substation Installation
- Real Time Operating System
- Multi-Host(LAN port, Serial port), Multi- Protocol(DNP3.0, MODBUS and IEC 60870-5-101/104)



Electrical Equipment Control & Monitoring System(ECMS)

- Real Time Operating System
- System Standard Time Synchronization, Remote Monitoring, Intelligent System and System Management(DB, Event, Management, etc)
- Multi-Host(LAN port, Serial port), Multi-Protocol(DNP3.0, MODBUS and IEC 60870-5-101/104)

Others

Faulted Circuit Indicator and Target

Fault Current Detector and Fault Location Indicator for Underground Transmission, Distribution Line

- Tripping Current : 3~5 Times of Load Current (Min. Pickup 300A)

ETCPU200 TI

ETCPU200 Simulator

- ETCPU200 Operation Check by DC System Fault Simulation
- Fault Simulation Generator

Wireless Current Meter (WCM)

Pole Transformer Load Current Measurement from ground

- Range : 1~1600A
- Wireless Transmit Receive distance : 20m

RTS2010

Relay Test Device(OCR, OCGR, DOCR, DOCGR, OVR, UVR and Reclosing Relay, etc.)

- Optimized Relay Testing Device
- Max 1.5Arms x3ch., Max 7Vrms x4ch.
- Moment Output, Harmonic Output Power, Ramp Function, OCR Function and Sequence Function

EVD-12N

Live Line Voltage Detector

- 15kV, 27kV, 38kV
- AC 3-Phase Voltage Detection, Lamp Indication (Flash)
- Operational without Power Supply

ETHC-100

Humidity Controller

- Range : 20~95%
- Accurate Humidity Measurement by Insulator Humidity Sensor
- Automatic Humidity Control

ETIT-100

Isolation Transducer

- 1500Vac Dielectric Strength
- 0.5% Tolerance, Rapid Reaction Time

ETIO10

External I/O Unit

- Stand alone or Interface with ETR300R
- Input 12ch.(250/125/48/24/12Vdc)
- Output 8ch.(300Vac/350Vdc)

Nuclear Power Plant Equipment

Nuclear Power Plant is one of the major electricity generation plants. High quality with outstanding performance products is required from excellent companies. Entec provides DC Motor Control panel and its Q-Class DC Circuit Breaker to Motor Control Centre in Nuclear Power Plant.

Q-Class DC Circuit Breaker

Characteristics

- Withdrawable type panel application
- Spring charge mechanism
- Micro-processor based Digital Protection Relay
- Q-class certified
- Motor Control Circuit Breaker
- CESI and KERI type tested

Ratings

Model	ETNB	
Type	E1600-Q(Class-1E)	E1600-Q-N(NON Class-1E)
Maximum Voltage	DC300[V]	
Rated Voltage	DC250[V]	
Rated Current	1600[A]	
Frame Current	800[A], 1600[A]	800[A], 1600[A]
Rated making current	83P / 50[kA]	
Number of pole	2	
Operation Duty	O-15sec-CO	
Operation Method	Spring Charge Operation	
Control Voltage	DC125/250[V]	
Interruption medium	Air breaking	
Trip Device	Digital OCR(ETDR-101)	
Auxiliar Contact	4a,2b,(external) Capacity: 30A/250VAC, 20A/125VDC	
Trip status	1a,(external) Capacity: 8A/250VAC, 0.2A/300VDC	

DC Motor Control Panel

Characteristics

- High Interruption capacity[50kA]
- Durability min. 4850 times of no load operation and 500[1,600A]/1750[800A] times of load operations : Spring charged mechanism
- Seismic Qualification
- Nuclear Power Plant DC motor control panel

Ratings

Model	DC motor controller
Type	ETMC-A,B,C,D
Max. Voltage	DC 300[V]
Rated Voltage	DC 125/250[V]
Rated Current	1600[A]
Frame Current	800/1600[A]
Rated making and breaking capacity	83p/50[kA]
Composition	Circuit Breaker Level 1, 2, 3 stack
Control Voltage	DC 125/250[V]
Operation method	Manual Spring Operation
Circuit Breaker type	Drawer type
Breaking method	Air Breaking
Trip Device	Digital OCR, Manual

ENhanced **TEC**hnology

Smart + Green + Human

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