



PRODUCT LIST

Global Leading Company in Medium Voltage
Distribution Line Switchgears

Executive Summary

EN Technologies (“EN”) is leading supplier of medium voltage circuit switchgear in the electricity industry ,

Korea and operates two factories and one R&D center in Korea and a branch office in Beijing , China.

EN has been official supplier for KEPCO(Korea Electric Power corporation . www.kepcoco.kr) EN was awarded in 2007 by “KEPCO”

as most innovative electricity venture and EN was selected as Technical Innovation Company

from Small and Medium Business Administration in Korea. The Company has achieved ISO 9001 and CE-mark certification.

EN has product line of medium voltage (10~38 KV) power switchgear, gas insulated multiple circuit breaker and load breaker

which are used to ensure safety in the power distribution line. The Company has developed 25.8kV GIS(“Gas Insulated Switchgear”)

and 72.5kV, and 126kV classes are under development.

EN has been qualified for rigorous product certification test by international standard (IEC)

at Korea Electric Research Institute(www.keri.er.kr) and China Electric Power Research Institute (www.epri.ac.cn).

EN Technologies Inc. is concentrating our best and sincere energies on electricity industry in order to make our customer happy.

We always believe in “ Customer first”.

History

- 2010 – CEO received Presidential Award at 2010 Entrepreneur Festival
 - Achieved Green Technology Certification from [Ministry of Land, Transport and Maritime Affairs]
 - 10 Million Dollar Export Award [The Korea International Trade Association]
 - Nominated as Global Leading Product from [Ministry of Knowledge Economic]
 - Nominated as World Class Company[Small and Medium Business Corporation]
 - Expanded factory of Power Distribution BU to \$40M capacity
 - Established Joint-Venture company in Shanghai, China
- 2009 – E P R Test performed and qualified by EPRI(Energy Power Research Institute)
 - Nominated as Great Performed Vendor from KEPCO
 - Single PPM Certificate Achievement (Small and Medium Business Administration. 1-07-2-1658)
 - Achieve 72.5kV Gas Insulated Switchgear order from Korea Rail Network Authority (ebid.krnetwork.or.kr)
- 2008 – Developed 72.5kV Gas Insulated Switchgear and qualified qualified tender in Korea Rail Network Authority
- 2007 – Selected as an Export Promising Small and Medium Business (Gyeonggi Small and Medium Business Administration Export Support)
 - Selected as a Innovative Electric Power Venture Company (Korea Electric Power Corporation No.2007-32)
 - Selected as a Inno-Biz (Small and Medium Business Administration No.7061-988)
- 2006 – CEPRI Certificate for RMU(Ring Main Unit) by China Electronic Science Researches
 - KRS(load switchgear for underground) certified and registered as authorized product at Korea Electric Power Corporation
 - KRC(multi-circuit breaker) certified and registered as authorized product at Korea Electric Power Corporation
 - KPS(pole-top load switchgear) certified and registered as authorized product at Korea Electric Power Corporation
 - CEPRI Certificate for EPS(Pole-top load switchgear) by China Electronic Science Researches
- 2005 – CEPRI Certificate for RMF(Ring Main Unit with fuse) by China Electronic Science Researches
 - Achieved the ISO 9001 Certificate (QMS-2128) Established the Beijing branch office
- 2004 – Certified as Venture Company (new technology company) by Small & Medium Business Administration, Reg. no. 41625231-1-00656.
 - Certified as Superior Technology Company by the Kibo Technology Fund(www.kibo.co.kr)
 - Established R&D center certified by Korea Industrial Technology Association(www.koita.or.kr), certification no. 20041678
- 2003 – EN Technologies Inc. was established (www.entech.biz)



EN Creative Energy to the World
TECHNOLOGIES

Certifications



ISO 9001 Certified



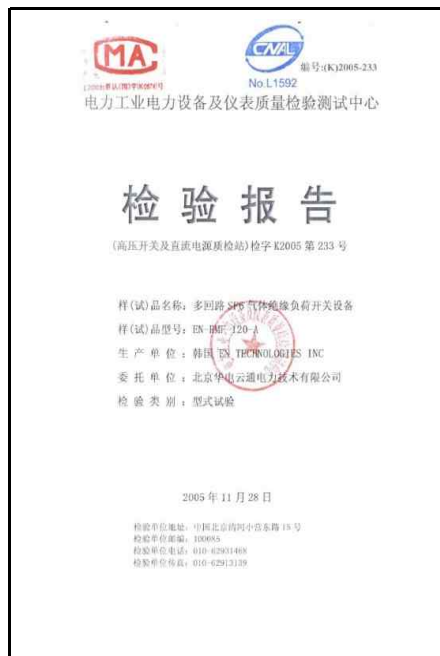
ISO 14001 Certified



One-KEPCO Exporting Business Group



TEST REPORTS [KERI] ACHIEVEMENTS



TEST REPORTS [CEPRI] ACHIEVEMENTS

EN RMC series(Ring Main Circuit breaker)

Simple outdoor substation, customer transfer substations and distribution substations
Industrial plants and underground stations

Highly Reliability

- Maintenance-free concept
- Pure puffer techniques, no leakage current path between open contacts.
- Switchgear vessel made of stainless steel
- SF6 gas insulation and interruption.
- At atmospheric gas pressure, it ensure the rated insulation and interruption capabilities.
- Sealed pressure system

Safety

- Safe-to-touch and hermetically sealed enclosure
- Overpressure relief device
- Pad lock
- Easy installation and operation

Controller

- Close/open
- Lock/Unlock
- Local/Remote
- Voltage/Current measuring and signals for FRTU
- Rechargeable battery with the charger

Relay

- DSP, μ -processor based relay
- Fault indicator

EN 155S Relay



Self powered relay

PAC-E100



Overcurrent relay

EN 255R Relay



Dual overcurrent relay



With DS type



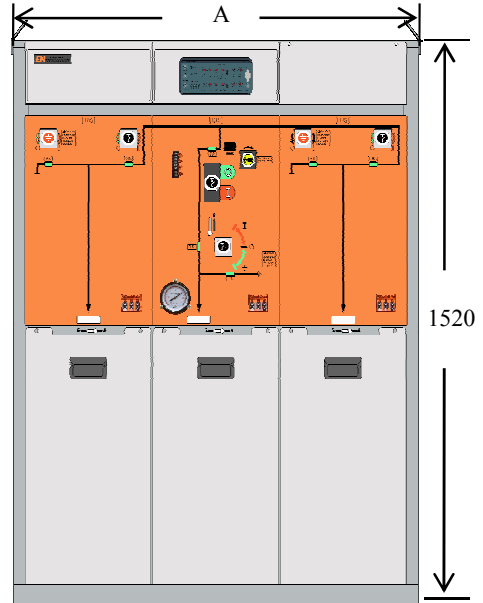
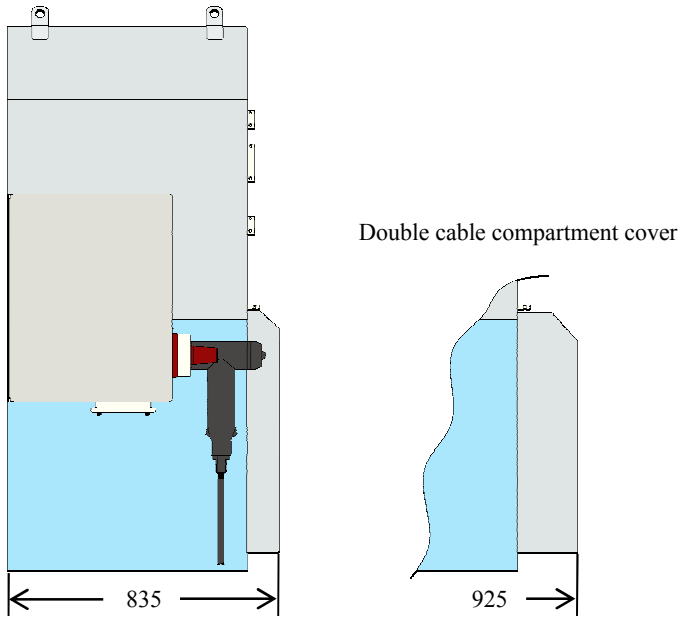
Without DS type

SPECIFICATIONS

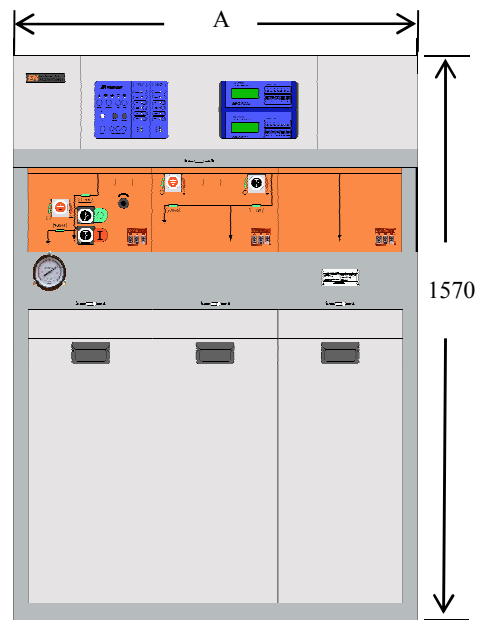
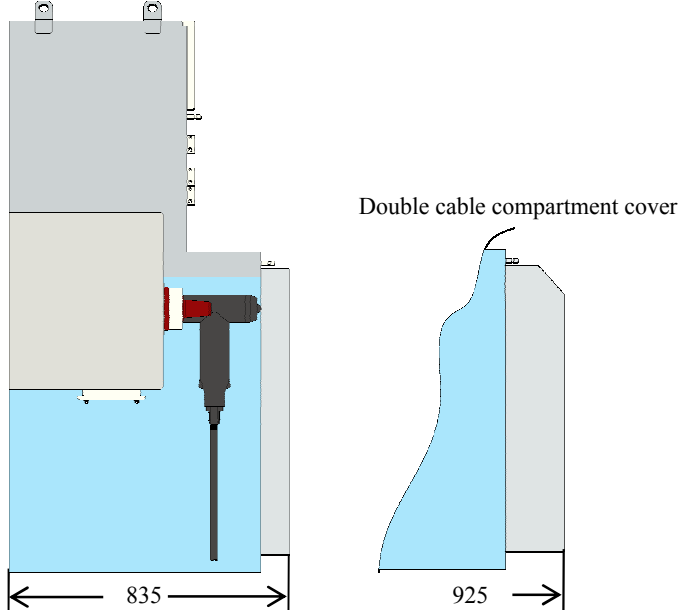
Ambient temperature	-25 ~ 70 °C	
Relative humidity	0 ~ 95%	
Maximum altitude	2000m	
Rated voltage	12kV	27kV
Rated frequency	50/60Hz	
Mechanical endurance		
Circuit Breaker	10,000CO	2000CO
Switch	5,000CO	1,000CO
Earthing Switch	1,000CO	1,000CO
Dielectric tests		
Lighting impulse	85/95kV	125kV
Power frequency 1min	42/49kV	60kV
Short-circuit tests		
Main circuit switch	25kA 2sec	25kA 1sec
Circuit Breaker	20kA 4sec	20kA 1sec
T10	O-0.3s CO-180s-CO / 1time	
T30	O-0.3s CO-180s-CO / 1time	
T60	O-0.3s CO-180s-CO / 1time	
T100s	O-0.3s CO-180s-CO / 2times	
	O/10times, CO/11times	
T100a	O/3times	
Earthing fault	O-0.3s CO-180s-CO / 1time	
Temperature rise test		
Main circuit switch	630A	
Gas leak test		
Leak rate	Less than 0.1% per year	
Rated filling pressure	0.04 Mpa	

Dimension

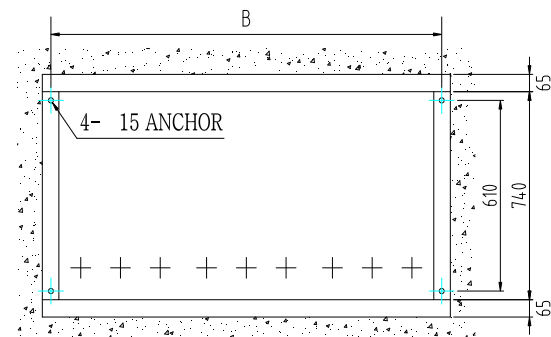
RMC (with DS)



RMC (without DS)



BASE



unit: mm

RMC	A	B
2-way	830	787
3-way	1210	1167
4-way	1590	1547
5-way	1970	1927
6-way	2350	2307

EN RMF series(Ring Main Fuse-switch combination)

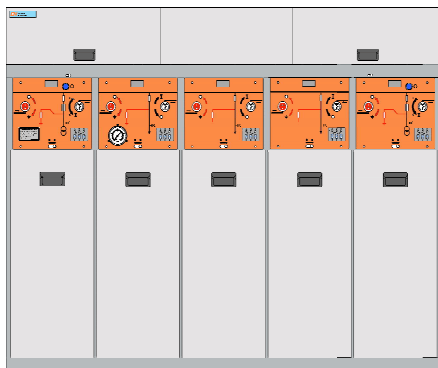
Simple outdoor substation, customer transfer substations and distribution substations
Industrial plants and underground stations

Highly Reliability

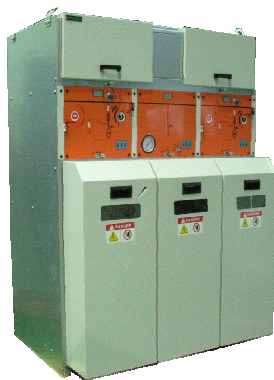
- Pure puffer techniques, no leakage current path between open contacts.
- At atmospheric gas pressure, it ensure the rated insulation and interruption capabilities.
- Switchgear vessel made of stainless steel
- Maintenance-free concept
- SF6 gas insulation and interruption.
- Sealed pressure system(above 30 years)
- Climate-independent

Safety

- Operation interlock with manual shutter
- Safe-to-touch and hermetically sealed enclosure
- HV parts are only accessible when outgoing feeders are earthed
- Overpressure relief device
- The speed of close/open is independent of the speed of lever movement.
- Pad lock
- Easy installstion and operation



Type: RMF 230M
(2 Fused switches and 3 Ring switches)



Type: RMF 201M
(2 Fused switches and 1 dummy)



RMF control(auto type only)



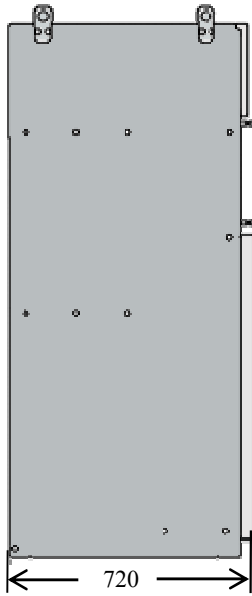
Type: RMF 040M

SPECIFICATIONS

Ambient temperature	-25 ~ 70 °C	
Relative humidity	0 ~ 95%	
Maximum altitude	2000m	
Rated voltage	15kV	27kV
Rated frequency	50/60Hz	
Mechanical endurance		
Switch	5000CO	
Earthing Switch	1000CO	
Dielectric tests		
Lighting impulse	85/95kV	125/145kV
Power frequency 1min	42/49kV	50/60kV
Short-circuit tests		
Main circuit switch	25kA 2sec	25kA 1sec
Earthing Switch	25kA 1sec	25kA 1sec
Make-break tests		
Active load	630A/100CO	
Closed loop	630A	
Cable charging	25A	
Line charging	2.5A	
Earthing fault	30A	
Transfer current	1550A	1250A
Making tests		
Switch	63kA peak, 5C	
Fuse-switch combination	31.5kA	
Temperature rise test		
Main circuit switch	630A	
Fuse-switch combination	125A	
Gas leak test		
Leak rate	Less than 0.1% per year	
Rated filling pressure	0.04 Mpa	
Protection class		
Tank	IP67	
Fuse Door, Cable box	IP3X	

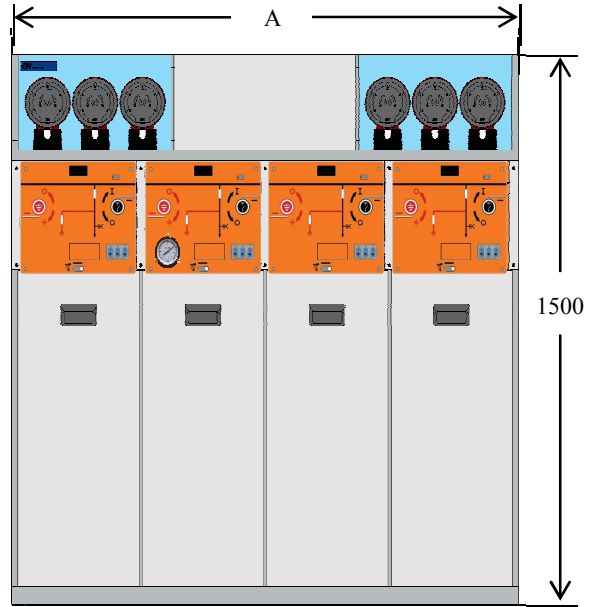
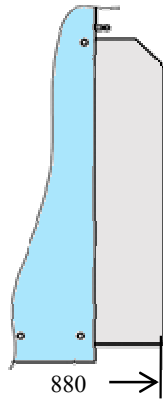
Dimension

Fuse-switch combination

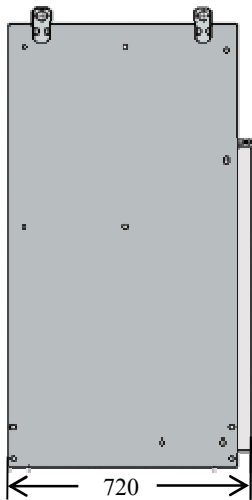


Single cable compartment cover

Double cover

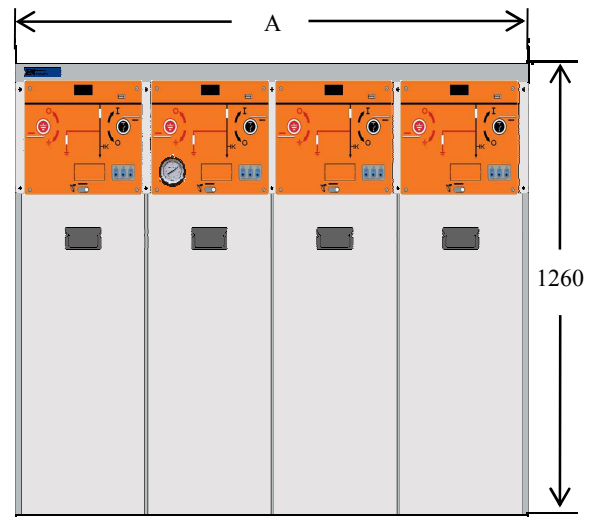
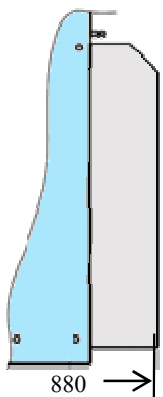


Switch only (manual type)

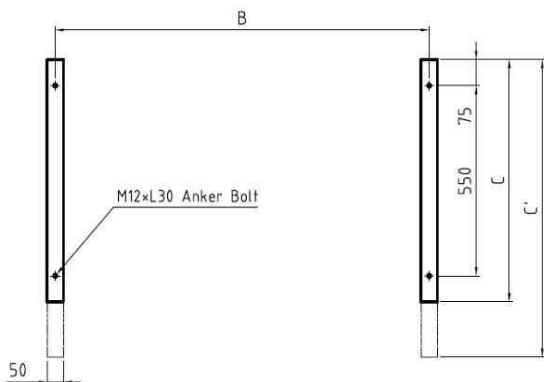


Single cable compartment cover

Double cover



BASE



unit: mm

RMF	A	B	C	C'
2-way	788	748	700	860
3-way	1168	1128		
4-way	1548	1508		
5-way	1928	1888		
6-way	2308	2268		

C: single cable compartment cover

C': double cable compartment cover

EN KPS series(Pole mounted switch)

Overhead distribution line

Feature

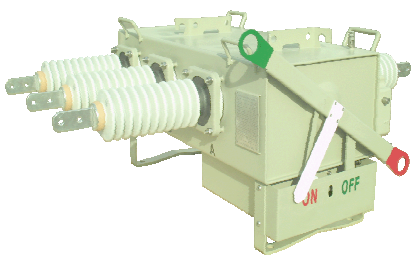
- Counter of operation times
- Front and bottom On/OFF indicator
- Pressure gauge

Safety

- Hermetically sealed enclosure
- Overpressure relief device
- Manual locking device
- Low gas pressure interlock device
- Easy installation and operation

Highly Reliability

- Switchgear vessel made of stainless steel
- Double sealing techniques with EPDM rubber
- Maintenance-free concept
- SF6 gas insulation and interruption.
- Climate-independent
- Simple operating mechanism
- At atmospheric gas pressure, it ensure the rated insulation and interruption capabilities.
- Pure puffer techniques, no leakage current path between open contacts.



Front view [KPS-260A]






Front view [KPS-260M]

SPECIFICATIONS

Ambient temperature	-25 ~ 70 °C	
Relative humidity	0 ~ 100%	
Maximum altitude	2000m	
Rated voltage	12kV	27kV
Rated frequency	50/60Hz	
Mechanical endurance	5000CO	
Dielectric tests		
Lighting impulse	85/95kV	150kV
Power frequency	42/49kV	60kV
Short-circuit tests		
Main circuit	25kA/2sec	20kA/1sec
Make-break tests		
Active load	630A	
Closed loop	630A	
Cable charging	25A	
Line charging	2.5A	
Earthing fault	30A	
Making tests		
Switch	63kA peak, 3C	52kA peak, 3C
Temperature rise test		
Main circuit	630A	
Gas leak test		
Gas leak test	Less than 0.1% per year	
Rated filling pressure	0.1 Mpa	
Protection class		
Tank	IP67	

* Total weight of Main Unit only : Less than 130 kg

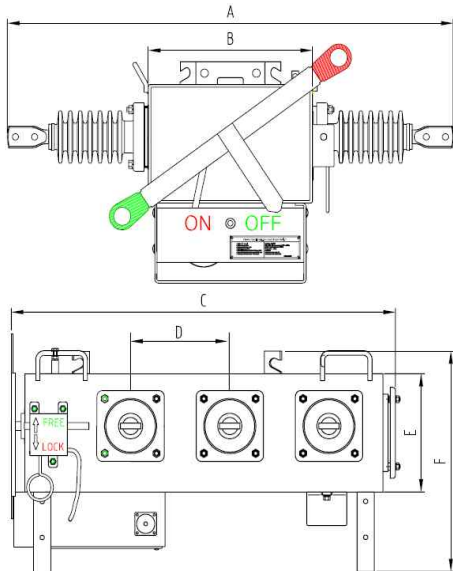
Bushing & Terminal

Porcelain bushing + Moldcone lead	
Porcelain bushing + NEMA terminal	
Epoxy bushing + NEMA terminal	

LBS control cubicle

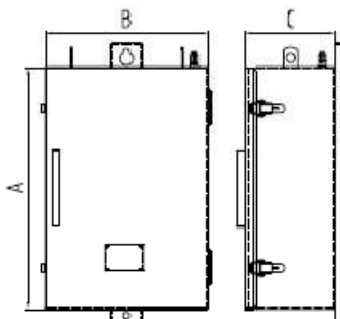


Dimension



unit: mm

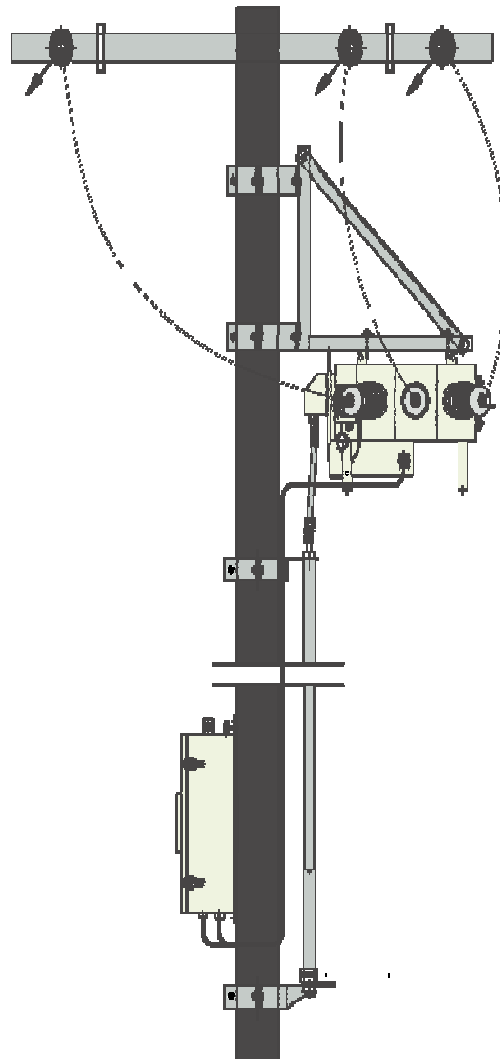
Measured points	A	B	C	D	E	F	G
Specified values	1012	2000	380	260	485	890	230



unit: mm

Measured points	A	B	C
Specified values	650	450	250

Mounting



EN ERC series(Automatic Circuit Recloser)

Reclosers are used on overhead distribution systems to detect and interrupt momentary faults within short period of time and re-close back to avoid black out and also to avoid major failure of power line to be spread.

Feature

- PMA
- Bottom On/OFF indicator
- Pressure gauge

Safety

- Hermetically sealed enclosure
- Overpressure relief device
- Manual tripping/locking device
- Low gas pressure interlock device
- Easy installation and operation

Highly Reliability

- Switchgear vessel made of stainless steel
 - Maintenance-free concept
 - SF6 gas insulation
 - Climate-independent
 - Simple operating PMA
- At atmospheric gas pressure, it ensure the rated insulation and interruption capabilities.



SPECIFICATIONS

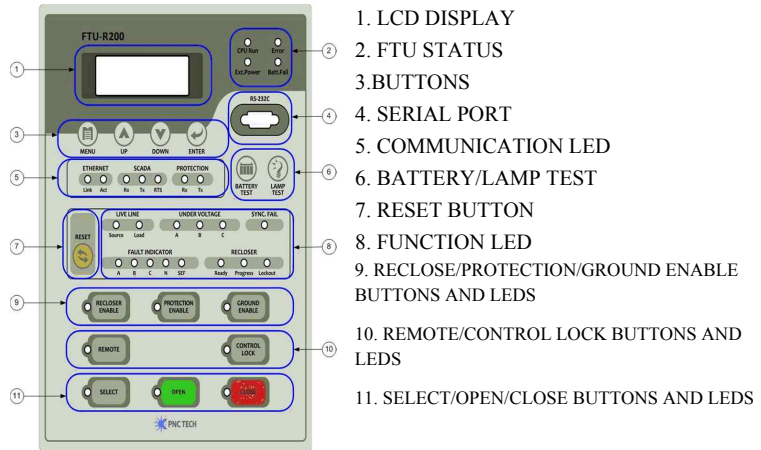
Maximum system Voltage	15kV	27kV	38kV
Norminal frequency	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz
Rated continuous current	630 / 800A	630 / 800A	630 / 800A
Short time withstand current	12.5 / 16kA	12.5 / 16kA	12.5 / 16kA
Fault make capacity (RMS)	12.5 / 16kA	12.5 / 16kA	12.5 / 16kA
Fault make capacity (Peak)	32.5 / 41.6kA	32.5 / 41.6kA	32.5 / 41.6kA
Operating time (Close/Open)	0.1 / 0.05s	0.1 / 0.05s	0.1 / 0.05s
Mechanical endurance	10000	10000	10000
Breaking capacity			
Load switching	630 / 800A	630 / 800A	630 / 800A
Ling charging switching	2A	5A	5A
Cable charging switching	10A	25A	40A
Fault break capacity	12.5 / 16kA	12.5 / 16kA	12.5 / 16kA
Lightning impulse withstand level			
Phase to earth	110kV	150kV	170kV
Phase to Phase	110kV	150kV	170kV
Across interrupter	110kV	150kV	170kV
Power frequency withstand voltage			
Phase to earth	50kV	60kV	70kV
Phase to Phase	50kV	60kV	70kV
Across interrupter	50kV	60kV	70kV
Fault pick up			
Phase		10 ~ 900A (step:1)	
Earth		5 ~ 900A (step:1)	
Reclosing			
Reclose interval 1 st		0.3 ~ 180s (step:0.1)	
Reclose interval 2 nd		1 ~ 180s (step:1)	
Reclose interval 3 rd		1 ~ 180s (step:1)	
Reclose interval 4 th		1 ~ 180s (step:1)	
Reset time		3 ~ 180s (step:1)	

Protection

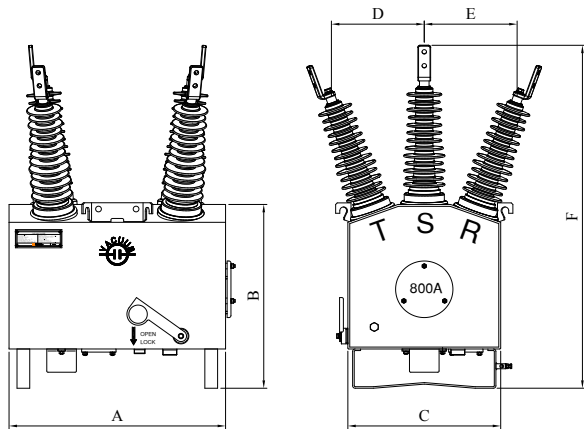
Fault passage indicator

- ▶ 3-stage over current protection (directional or non-directional)
 - Fast and delayed TC trip elements for phase and earth fault
 - Definite time over-current element
 - Definite time HCT (High current trip)
- ▶ SEF(Sensitive earth fault) detection
- ▶ Cold load protection(pickup adjustment)
- ▶ Magnetizing inrush restraints
- ▶ Sequence coordination
- ▶ Open line detection
- ▶ Phase sync. fail detection
- ▶ Over voltage, under voltage, under /over frequency
- ▶ Auto reclosing (up to 4 shots)

Recloser control

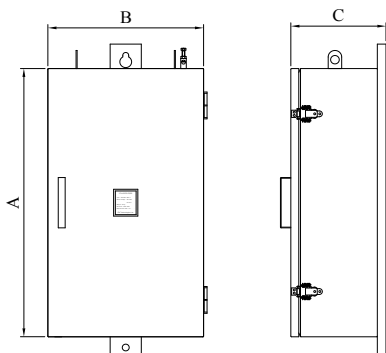


Dimension



unit: mm

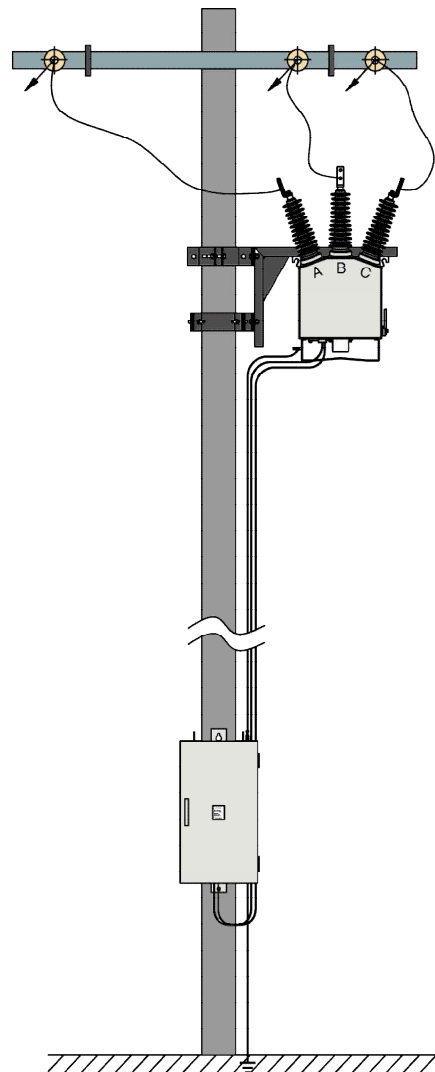
Rated voltage	A	B	C	D	E	F
15kV	680	585	480	270	270	990
27kV	680	585	480	270	270	1090
38kV	750	665	560	350	350	1295



unit: mm

Rated voltage	A	B	C
15/27/38kV	800	450	275

Mounting



EN GIS series(25.8kV Gas Insulated Switchgear)

All-in-one Compact Gas Insulated Switchgear combining Circuit Breaker, Disconnecting Switch, and Earthing Switch by using SF6 gas for unification of Metal Enclosed Distribution Panel and making higher

Features

- Achieve safety through hermetically sealed SF6 gas
- Prevention operator from mal-operation (mechanical, electrical interlock)
- Indicator for applying electric current, operation status (voltage detector)
- Equipped the pressure relief device for inner breakdown
- Prevention from trouble expansion into individual gas section
- Extend service life and safety applying patented circuit breaker

Highly Reliability

- Achieve equipment reliability using Vacuum interrupter
- Outstanding accuracy based on digital relay and meta
- Apply three dimensions structural analysis and electric field analysis technique

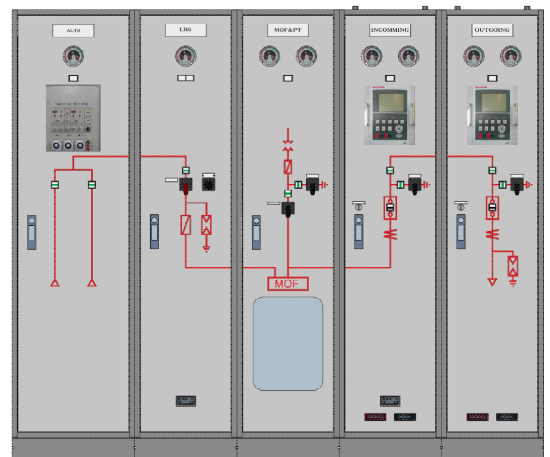
Safety

- Securement of stability for complete sealed type of live part
- Protection from operator mal-operation (technical, electrical interlock)
- Satisfy securing device against internal breakdown
- Protection from fault expansion by each gas division

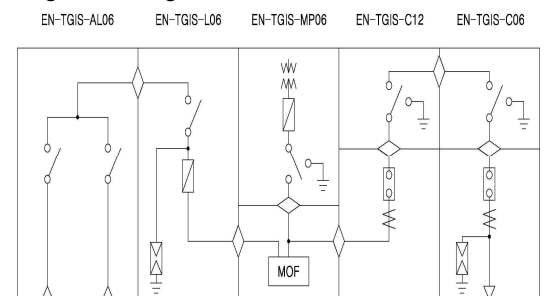
Economic & Practicality

- Minimization of installation area (lower 30%)
- Convenience of Maintenance by modulation of individual Panel
- Easy transport and installation by laying out light weight and compact design

Standard Construction of EN-TGIS Series



Single Line Diagram



SPECIFICATIONS

PANEL	EN-TGIS-AL06	EN-TGIS-L06	EN-TGIS-MP06	EN-TGIS-C12	EN-TGIS-C06
Rated voltage (kV)	25.8	25.8	25.8	25.8	25.8
Rated current (A)	630(1250)	630(1250)	630(1250)	1250(2000)	630
Circuit configuration	3PH	3PH	3PH	3PH	3PH
Rated frequency (Hz)	50/60	50/60	50/60	50/60	50/60
Rated power frequency withstand voltage (kV)	50	70	70(77)	70(77)	70(77)
Impulse withstand voltage (kV)	150	150	150(165)	150(165)	150(165)
Partial discharge extinction voltage					
Phase to ground (pC)	≤10	≤10	≤10	≤10	≤10
Rated short time withstand current					
RMS (kA/sec)	16/1	25/1	25/1	25/1	25/1
Peak (kAp)	41.6	65	65	65	65
Rated gas pressure -at 20 °C (MPa·G)	0.05	0.05	0.05	0.05	0.05
Rated minimum gas pressure -at 20 °C (MPa·G)	0.03	0.03	0.03	0.03	0.03
Operation voltage of control circuit (Vd.c.)	Note.1	110	110	110	110
International Protection	IP4X	IP4X	IP4X	IP4X	IP4X

Note.1 : EN-TGIS-AL06 power circuit supply voltage is AC220V, and operation circuit supply voltage is DC24V.

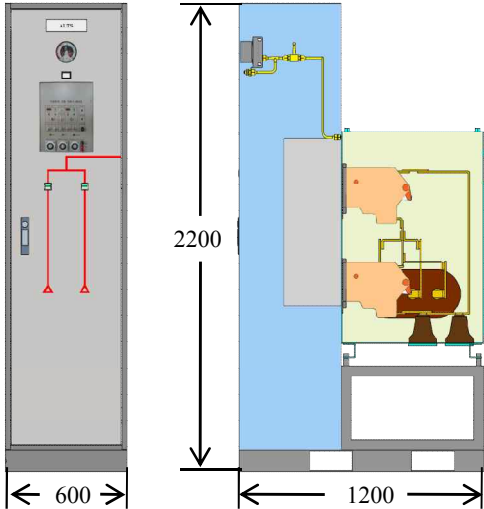
Note.2 : withstand voltage dimension in bracket is same with DS(Disconnecting Switch) figure between poles.

Note 3 : () is an optional under customers request and requirement

Structure and Feature of EN-TGIS Series

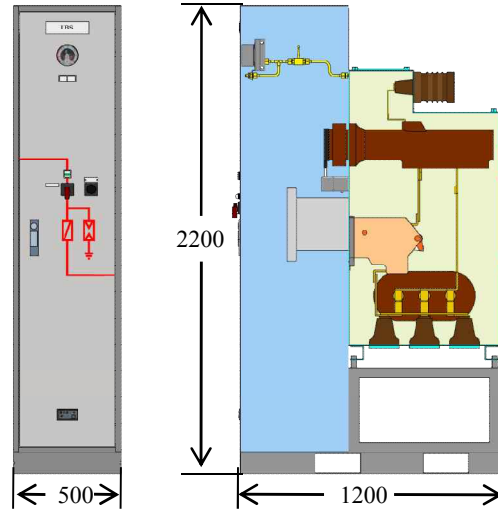
EN-TGIS-AL06

About ALTS (Automatic Load Transfer Switches)



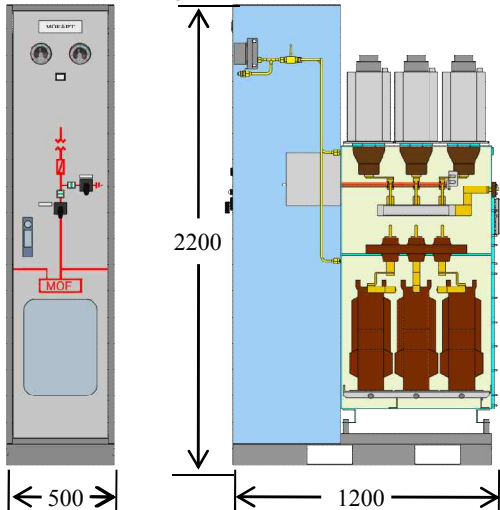
EN-TGIS-L06

About LBS (Load Break Switch)



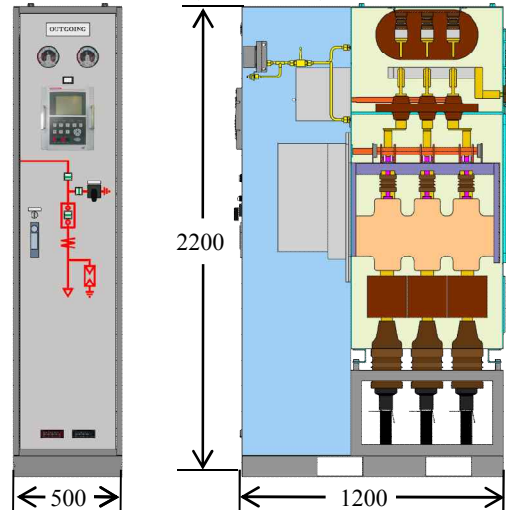
EN-TGIS-MP06

About MOF(Metering Out Feet)+PT(Potential Transformer)



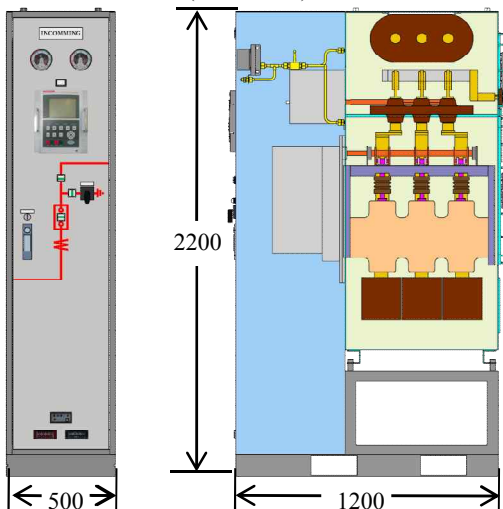
EN-TGIS-C06

About OUTGOING (Feeder VCB)



EN-TGIS-C12

About INCOMMING (Main VCB)



INCOMMING (Main VCB)



Option

1. Cable Connecting Method
T-Connector (630A)
Plug Termination (1250A/630A)
2. Docking type
Spacer (necessity of gas site operation)
Plug-in (needless of gas site operation)
3. Form of bus bar
is capable of change to user's request

EN GIS series(72.5kv Gas Insulated Switchgear)

Features

- Multi switching device using SF6 Gas filled sealed metalize enclosure which contain CB, DS and ES.
- Minimized installing area
- Main protection system for power line of Railroad application
- High reliability by using SF6 Gas completely sealed enclosure
- High safety with No Power Out or fault by contact
- Bus bar contained by metal seal
- Local Control Panel and Open/Close indicator provided



SPECIFICATIONS

Ambient temperature	-25 ~ 40 °C	Operation system	Motorized Spring type
Relative humidity	0 ~ 95%		
Maximum altitude	2000m	Breaking type	SF6 gas
Rated voltage	72.5kV		
Rated frequency	50 / 60Hz	Short time current	
		R.M.S	20kA
Dielectric tests		Peak	52kAp
Lighting impulse	325 / 375 kV	Duration	1s
Power frequency 1min - Switch	140 / 160kV		
Power frequency 1min - Control	2kV / 1 min		
		Rated current	2000A
Partial Discharge		Breaking current	20 kA , rms
Earth	50.2kV, below 5pc	Making current	52 kA , Peak
Phase	87kV, below 5pc	Breaking time	3 Cycle

Summary of the EN technologies products

EN RMC series

Ring Main Circuit breaker and switch combination
Switch, circuit breaker and dummy combination design with up to 6 feeders
SF₆ gas insulation and interruption and VI interruption
12kV ~ 27kV 630A 20/25kA 60kV 125 kV BIL



EN RMF series

Ring Main Fuse-switch combination
Switch, fuse-switch and dummy combination design with up to 6 feeders
SF₆ gas insulation and interruption.
12kV ~ 27kV 630A 25kA 60kV 125 kV BIL



EN KPS series

Pole Top Switch
SF₆ gas insulation and interruption
12kV ~ 38kV 630A 25kA 70kV 170 kV BIL
DSP, μ -processor based control Including FRTU function



EN ERC series

Automatic Circuit Recloser
SF₆ gas insulation and VI interruption
12kV ~ 38kV 800A 16kA 60kV 150 kV BIL
DSP, μ -processor based control Including FRTU function



EN GIS series

25.8kV Gas Insulated Switchgear
All-in-one Compact Gas Insulated Switchgear
combining Circuit Breaker, Disconnecting Switch, and Earthing Switch
25.8kV 1250(2000)A 25kA 70kV 150 kV BIL



EN GIS series

72.5kV Gas Insulated Switchgear
Multi switching device using SF₆ Gas filled sealed metalize enclosure
which contain CB, DS and ES
72.5kV 2000A 20kA 140kV 325kV BIL



Global Leader in Switchgear & Power Distribution System



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