

COMPACT SUBSTATION GUIDE



Certificate Number FM35831

The substation is a compact enclosure consisting of MV switchgear, a transformer and an LV switchboard located in three separate compartments which are segregated from each other by means of partitions in order to ensure personnel safety. Accessibility to operate or maintain the equipment is through lockable doors provided for each compartment to maximise security. Assembly of the complete substation is factory ready to minimise site installation time and cost. All equipment is of high quality and tested as a complete unit.

MV SWITCHGEAR

- Free standing SF6 RMU.
- Up to 12KV, 630A ring switches, 250A Tee-off CB.
- SF6 insulated ring switch with vacuum circuit breaker.
- Protection with TLF (Time Limit Fuse) or self/auxiliary powered relay.
- Fully interlocked protection with padlocking facilities.
- Single line mimic diagram for simple and safe operation.
- Voltage presence & earth fault indicators.



Figure 1 - Ring Main Unit

TRANSFORMER

- Wide range of transformers up to 1500kVA.
- Highly energy efficient minimising losses.
- Dry or sealed type.
- Plug-in bushings.
- Off-load tap changer.
- Winding temperature and oil monitoring relay.



Figure 2 - Transformer

LV SWITCHBOARD

- Feed using solid busbars direct from transformers.
- Circuit switching using Moulded Case Circuit Breakers protection (MCCB).
- MCCB type of incomer up to 2500A.
- MCCB type of outgoing feeders up to 630A.
- Feeder terminals suitable for both Cu/Al.
- Current transformers for power metering.



Figure 3 - LV Switchboard

ENCLOSURE

- Manufactured from 2 to 3 mm hot-dipped zinc coated mild steel.
- Finished with electrostatic Polyester powder paint.
- RAL 7032 standard paint finish.
- Compartment doors with natural ventilation.
- Double skin roof to minimise heating by solar radiation.
- Lockable compartment doors.
- Lifting by forklift or crane possible.
- IP34D for HV & LV compartment.
- IP22D for Transformer compartment.
- Suitable for outdoor installation.



Figure 4 - Compact Substation

CHARACTERISTICS OF COMPACT SUBSTATIONS

MV SWITCHGEAR

Electrical Characteristics

Rated voltage		12kV
Rated impulse withstand voltage		75kV
Rated frequency		50Hz
Rated normal current	Ring Switches	630A
	Tee-off CB	250A
Rated breaking current	Tee-off CB	20kA
Rated short circuit making current	Ring Switches	50kA
	Tee-off CB	50kA
Rated duration of short circuit	Ring Switches	20kA, 3sec
	Tee-off CB	20kA, 3sec

TRANSFORMER

Dry or sealed type

Rated power	500kVA	1000kVA	1500kVA
Rated voltage		12kV	
Rated impulse withstand voltage		75kV	
Power frequency test voltage		28kV	
Rated voltage ratio at principal tapping		11/0.4	
Rated frequency		50Hz	
Vector Group		Dyn11	
Off circuit tapping range		±2.5% x 2	
Short circuit impedance	4%	5%	6%
No load loss	700W	1250W	1722W
Load Losses	7150W	12200W	16500W
Efficiency			
100% load at 1.0 PF	98.54%	98.72%	98,91%
Sound level (dB)	56dB	58dB	60dB

LV SWITCHBOARD

Rated operational voltage	400V		
Rated impulse withstand voltage	6kV		
Power frequency test voltage	2kV		
Rated frequency	50Hz		
Number of busbars	4		
Rated current	Up to 2500A		
MCCB for incoming Rated current / No of poles	800A / 3P	1600A / 3P	2500A / 3P
MCCB for outgoing Rated current / No of poles	320A / 3P		
Trip Method	Electronic/Thermomagnetic		

ENCLOSURE

Material	Galvanised steel
Thickness of enclosure plate:	
Sides (mm), Bottom (mm), Top (mm)	2mm, 3mm, 1.5mm
Thickness of coating (µm)	70 - 90 µm
Color	Pebble grey RAL 7032
Painting method	Polyester electrostatic powder painting
Dimensions	3200 x 2200 x 2500 (mm) (WxDxH)

Other transformer rating and LV switchboard can be customised as per client's requirements.



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