

# Package Substation Range upto 24kV

Factory-built MV/LV Outdoor Substations



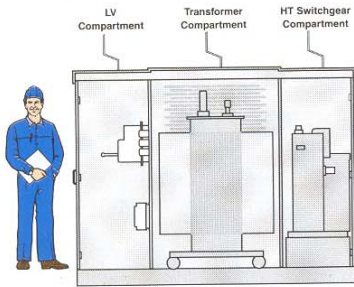
Package Substation



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# Package Substation



**Package Substations supply up to 1000 KVA of Electrical Power to LV Networks. These functional assemblies are:**

- factory-built and tested
- ready for network connection
- equipped for outdoor operation
- in compliance with IEC 61330 (optional)
- equipped for manual or remote controlled MV network management

## Description of Outdoor Substations

*outdoor substations basically comprise:*

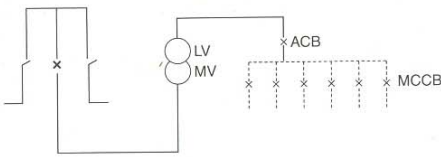
- a 2 mm thick painted GI enclosure mounted on a hot-dip galvanized 4 mm thick GI base. Access to the operating bay and to the transformer itself is provided by two double doors located on each side of substation. The doors can be padlock and/or lock-protected. The partitions between the compartments are in 2 mm thick GI
- **HT Switchgear** is a compact SF6 insulated ring main unit with 1, 2, 3 or 4 functions
- **Transformer** is oil-immersed or cast resin type
- **LV Switchboard:**
  - either a fuse-protected feeder board fitted with a main incomer and 4 to 12 feeders
  - a rack fitted with an Incoming ACB and MCCB outgoing feeders
  - customised design as per requirements (optional)

### ■ MV and LV connections

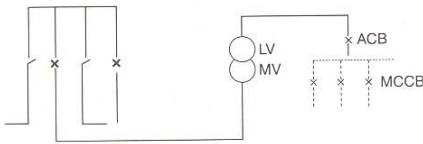
#### Accessories:

- internal arcing withstand equipment
- internal lighting of MV and LV compartments
- safety notices
- oil holding tank
- **Optional Equipment**
  - LV metering     W200-Substation monitoring device     300kVar, APFC panel
  - MV metering     Flair-fault passage indicators
  - T200 remote control interface for RMUs. All functions allowing remote control and monitoring of substations are combined in this unit.

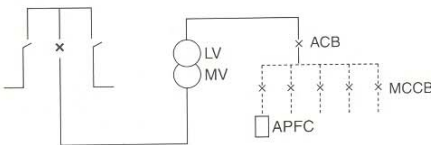
**Figure-1  
LR61**



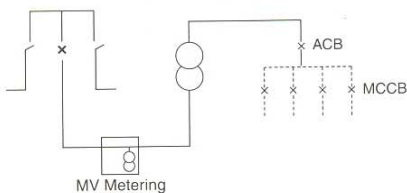
**Figure-2  
PSI-1**



**Figure-3  
PSI-2**



**Figure-4  
PSI-3**



## Standard Variants

Model	Configuration
LR61	3 way, Ringmaster with upto 1000kVA oil transformer and LV
PSI-1	Extensible Ringmaster with upto 1000 kVA oil transformer and LV
PSI-2	3 way RM6 with upto 1000kVA oil transformer, 300kVar APFC and LV
PSI-3	3 way Ringmaster with MV metering, upto 1000kVA oil transformer and LV



MV Compartment with Ring Master Type RMU



LV Compartment



The T200 remote control interface for RMUs



Internal arcing withstand test

## Characteristics of Outdoor Package Substations

### General Characteristics

Ambient temperature	normal operating conditions	upto 40°C
	operation in very hot climates	+50°C derating of MV and LV switchboards
Standard colour		RAL 1001 (cream)
Outdoor operation		yes
Compartmented		yes
Type of ventilation		natural
Degree of standard protection	MV and LV compartments	IP34
	transfo compartment	IP21
Rated enclosure class as per IEC 61330		10

### Electrical Characteristics

Rated voltage (kV)		12/17.5	24
Rated insulation level	kV rms, 50 Hz 1 min.	28/38	50
	kV impulse, 1.2/50 µs	75/95	125
Rated frequency (Hz)		50	

### Switch connection to MV network

Rated current (A)		630
Max. allowable impulse	kA rms - 1 s	12.5 to 25
Current withstand	kA peak	31.5 to 62.5

### Transformer protected by fuse-switch or circuit breaker

Rated current (A)		200
Breaking capacity (A)	transformer off-load	16
	cable off-load	30
Short-circuit breaking Capacity (kA rms)	fuse-switch	12.5 to 25
	circuit breaker	12.5 to 25
Making capacity (kA peak)	fuse-switch	31.5 to 62.5
	circuit breaker	31.5 to 62.5

### Immersed transformer

Rated power (kVA)		150 to 1000
Rated secondary voltage (V)		440
Vector group		Dyn or Yzn, depending on power
Tapping range (%)		±2.5 or ±5 or ±2.5/±5

### Low voltage system

LV switchboard is either:

- fitted with a fuse-protected feeder board comprising:
  - 400 to 2500 A rated main incomer (switch or circuit breaker),
  - 125 to 800 A rated fuse-protected feeders (4-12);
- fitted with a 250 to 2000 A rated air circuit breaker and, 60 to 800 A circuit breaker feeders.

Compliance with standards	IEC 439-1; BS EN 60439 part 1;
	IEC 947-1 and 947-2
Metering devices (LV & MV)	yes (optional)

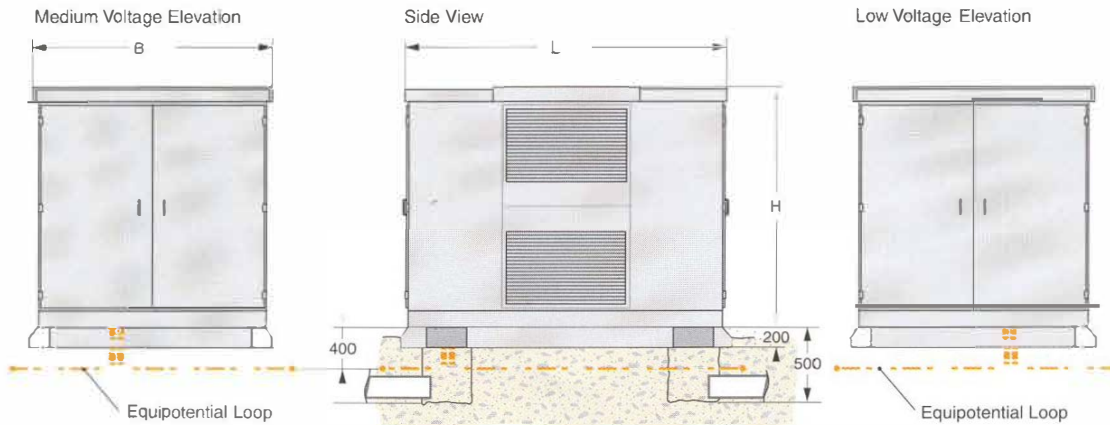
### Remote control interface functions:

- back-up supply to motor units and remote transmission interface
- control of MV switch opening/closing
- monitoring of all substation states
- detection of a fault current at MV incomers
- remote metering of current in MV cables
- communication with the remote control system (whatever the selected mode: GSM telephone line, radio, optic fiber and the protocol used)
- chronological event logging
- control room operation from an operator console and/or portable PC

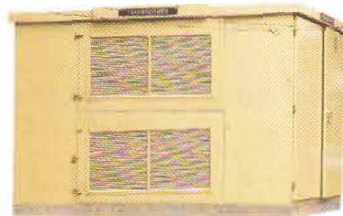
### Standards

The Package substations comply with IEC1330 recommendations and the main components of the substation comply with various international and national standards and recommendations: IEC, BS, VDE, UTE, HN,... Package substations have successfully passed internal arcing withstand tests.

# General Installation and Civil Works Layout



With APFC



Without APFC

## Dimensions and Weight

	LR61	PSI-1	PSI-2	PSI-3
(H) height (mm)	2100	2100	2100	2100
(L) overall length walls/roof (mm)	2850	2850	3300	3300
(B) overall width walls/roof (mm)	2000	2000	2000	2000
weight (kg)	1300	1500	2000	2000

## Transport and Installation

Package substations are delivered in a protective cover or optionally packed for sea transport. They are fitted with a lifting beam.

Package substations dimensions allow 20-feet open top container transport. Units are delivered fully equipped, only the concrete foundation slab and external cable connections are required on site.

Commissioning and operating instructions are provided with each substation.

## Some References

- Reliance Energy, New Delhi
- DLF Construction, Gurgaon
- NDPL, New Delhi
- KINFRA, Cochin
- CIDCO, New Mumbai
- AECO, Ahmedabad
- Idea Cellular, New Delhi