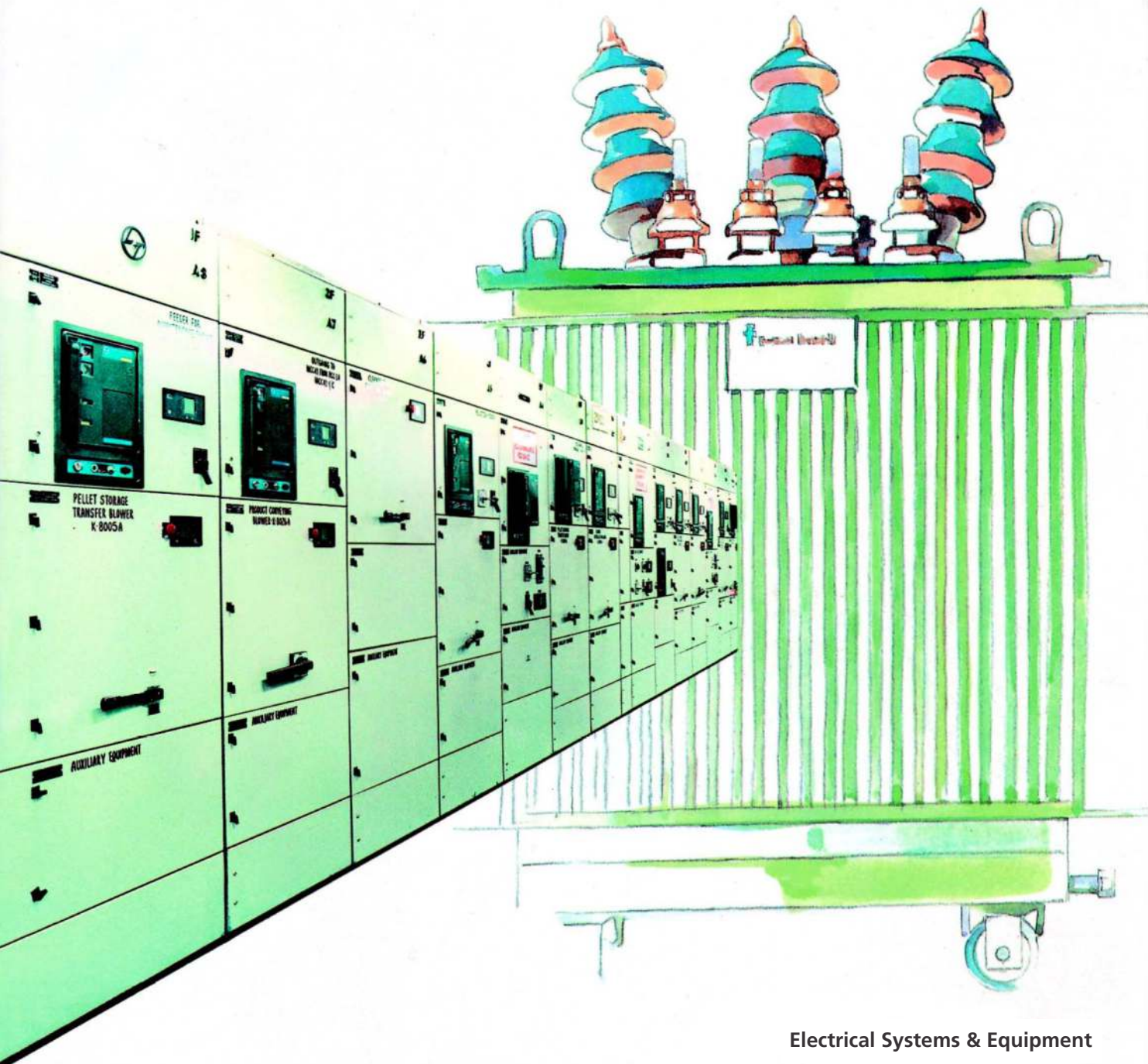


Power Control Centre Type TF

A flexible system with
innovative features

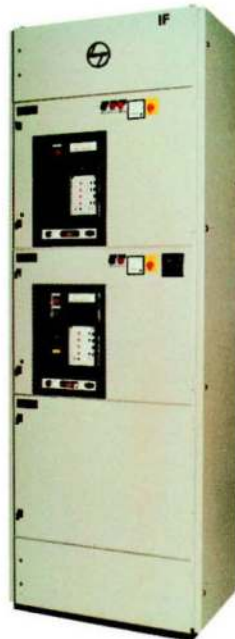




PCC type TF housing intelligent electronic devices.



Compartment housing ACB with microprocessor based release.



PCC type TF designed specifically with multi-tier arrangement.

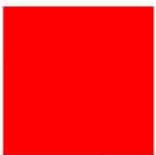
E&A sets a new standard of service, reliability and convenience in the field of low-voltage power distribution with type TF, its latest Power Control Centre.

Type TF crystallises the knowledge and experience gained from over 35 years in key industry sectors. Its flexible design facilitates adaptation to suit diverse requirements. Type TF switchboard can withstand extreme ambients and provides greater safety, accessibility and ease of installation. The design of TF meets the latest national and international standards.

L&T Switchgear A tradition of setting new standards

At E&A, the Total Quality Management concept puts customer delight at the focus of all operations.

An insight into all aspects of customer requirements combined with a sustained effort to infuse innovative elements of design into existing products have helped E&A set international benchmarks in low voltage power distribution systems. Rigorous in-house quality checks during assembly, backed by state-of-the-art quality control infrastructure - systems certified for ISO 9001 (1994) by BVQI - form the core of all operations.



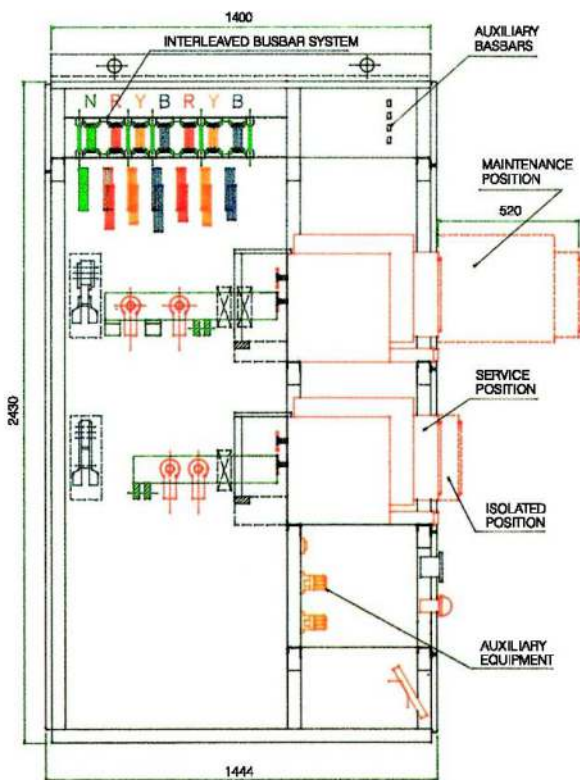
Power Control Centre, Type TF

PCC type TF is a product of E&A's computer integrated manufacturing facilities. It introduces an innovative concept in India: the Interleaved Busbar System, a concept that reduces power losses in the system. TF incorporates E&A's latest state of the art ACB, in fully drawout construction up to 6300A. Auxiliary equipment and control accessories can be accommodated in the same or adjacent compartment.

The ACBs can be mounted in multi-tier arrangement. Each ACB feeder is compartmentalised and has a hinged door for independent access during maintenance. The frame of each vertical section is assembled using 'C' profile steel members which are bolted together to enhance structural strength. The compartment height is adjustable for maximum utilisation of panel space, in steps of 150 mm.



4000A ACB racked out in maintenance position



DIMENSIONS ARE IN MM

TECHNICAL SPECIFICATIONS

Dimensions (in mm):	
Height	2430 (2550 with ventilation hoods)
Width	600, 800, 1050, 1350
Depth	944, 1444
Rated Service Voltage	Upto 690V AC**
Rated Frequency	50/60 Hz
Busbar Fault Level Withstand	100 kA*
Busbar System	TPN-E (with manually isolable neutral) or TP-E
Maximum Rating of Busbar	5000A*
Cabling Space	530x610mm for power cabling 2x445x352 for control cabling.
Degree of Protection	IP54
Type of Internal Separation	Form 3/4

*Higher fault level available on request

* Higher ratings available on request

**Other voltage available on request



Interlaced link work for buscoupler

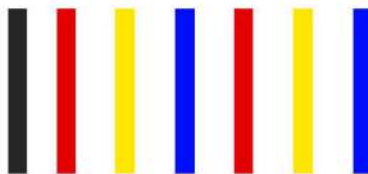


Interlaced and totally insulated busbar system with moulded supports.

BUSBAR ARRANGEMENT



CONVENTIONAL SYSTEM



INTERLEAVED SYSTEM

Busbar System

The busbar system can be either TPN-E or TP-E. Each vertical section is provided with its own set of vertical droppers and vertical earthbar.

Horizontal busbars run throughout the length of the switchboard. Auxiliary busbars have a separate chamber.

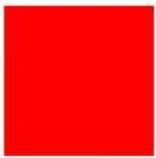
Interleaved Busbar System

In the conventional busbar system, conductors of each phase are grouped together. At higher current ratings in each phase, more than one flat of busbars are used. These flats are placed quite close to each other. As a compounded result of 'skin effect' and 'proximity effect', current distribution in each flat of the same phase is uneven. It also results in unequal temperature rise in different phases. At very high currents, say above 2500A, any enlargement of the cross section of conductors does not result in a proportionate increase in the current carrying capacity of busbars.

The Interleaved Busbar System, therefore, offers a cost effective solution, specially at high currents. In this busbar system, conductors of each phase are placed as R-Y-B-R-Y-B instead of RR-YY-BB. Such an arrangement offers much lower impedance. Also, impedance of each phase is fairly even. This results in uniform temperature rise in all three phases.

Interleaving of busbars also reduces dynamic forces caused by short circuits, enabling the system to withstand much higher fault levels.

The Interleaved Busbar System thus enhances the busbar current carrying capacity, and therefore enables optimum utilisation of busbar conductors. Reduced power loss leads to energy savings. The reduction in temperature rise, especially important in high ambients, increases the reliability and life of equipment, and also reduces ventilation and cooling requirements.



Total Protection of Busbar

The horizontal busbars and vertical droppers are enclosed in separate chambers. Horizontal busbars, vertical droppers and incoming links are totally sleeved with heat shrunk PVC. This ensures protection against accidents due to tracking caused by dust, humidity and vermin. All joints on horizontal busbars can be provided with snap-fit joint shrouds to provide a completely insulated system.

Moulded Support System

Busbar supports are made of fibreglass reinforced thermosetting plastic. Individual supports for each phase eliminate risk of tracking between phases.

Feeder

Type TF incorporates E&A's reliable ACB Drawout ACBs rated from 800A to 6300A can be accommodated. In addition, Type TF can house fuse switches, MCCBs and capacitor feeders in fixed versions. Up to six fuse switch or MCCB feeders and up to four capacitor feeders can be accommodated in one panel.



ACB cradle with spring loaded safety shutters and telescopic rails. Auxiliary equipment can be mounted in same compartment.



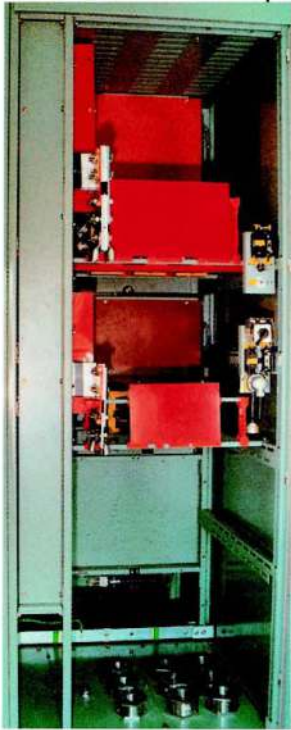
Panel is designed to accommodate ACB, MCCB and switch-fuse units



Breaker in 'Test Position', with the door closed.



Storage slot for racking handle.



Shrouded linkwork ensures complete safety in cable alley.



Wide cable alley facilitates termination even for a large number of cables.

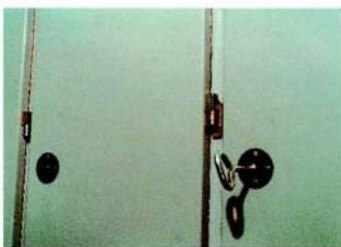
Cabling

The cabling chamber of each panel is at the rear and is separated from the busbar zone and ACB compartment. The cabling space can be extended to accommodate extra cables by an add-on chamber. To enhance safety, the control terminals can be mounted in a separate compartment below the ACB chamber, away from power cables.

Safety Interlock

Door interlock ensures safety of operating personnel.

- The door cannot be opened unless the breaker is in 'Isolated Position'.
- The breaker cannot be racked in or out of the 'Service Position' unless the door is closed.
- Defeat facility is provided to facilitate testing/inspection.

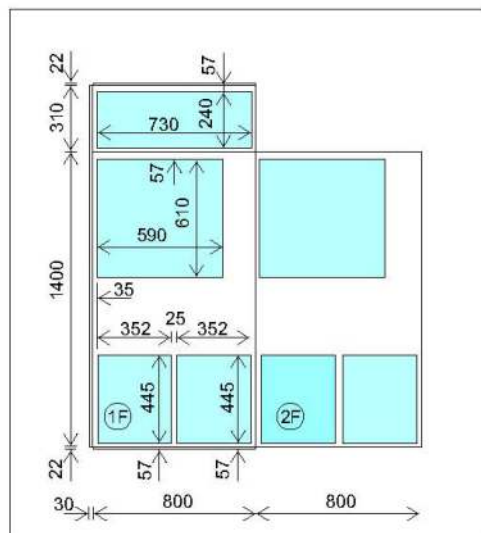


Cable alley door with locking facility.



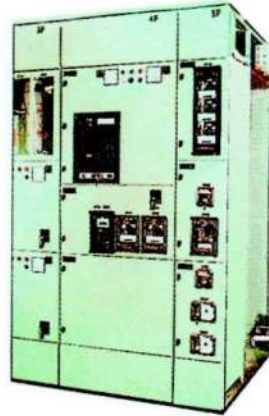
Door interlock defeat facility

Typical foundation plan with cabling space details.



Other Features

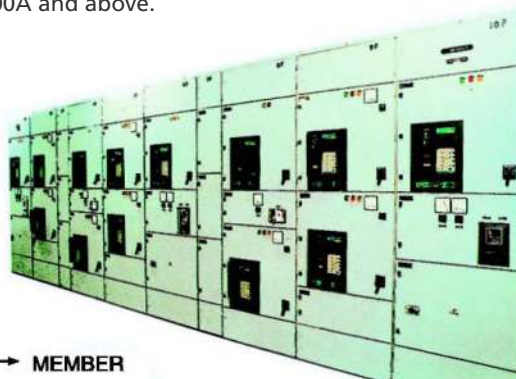
- The TF boards can be coupled with MCC type TO for an economical design: Power-cum-Motor Control Centre.
- Separate 320mm wide relay panel accommodates additional relays, kWh meters...
- Facility for busduct termination.
- Door camlock engages the door in first quadrant of its turn and compresses the gasket in the second quadrant. It is supported by a double lip door gasket for dust proofing.
- Up to 13 auxiliary busbars can be accommodated in a separate auxiliary busbar chamber.
- Clearly defined, tooled-up link work and dropper concept avoid criss-crossing of links and cables and facilitates multi-tier feeder arrangement.
- Flexible compartment heights effectively utilise available panel space.
- Click fit busbar joint shrouds.
- Control wiring using wire harness techniques where wire routing charts are prepared on computer. Identical wiring is carried out for identical panels. This helps fault tracing and facilitates site changes or modifications, when required.
- Ventilation with hoods and louvres for busbar rating of 2500A and above.



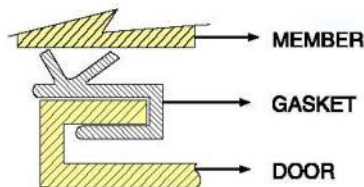
PCC type TF with a panel to accommodate protection relays



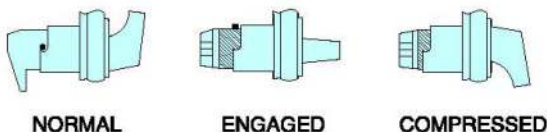
Auxiliary busbar arrangement and interpanel wire terminations.



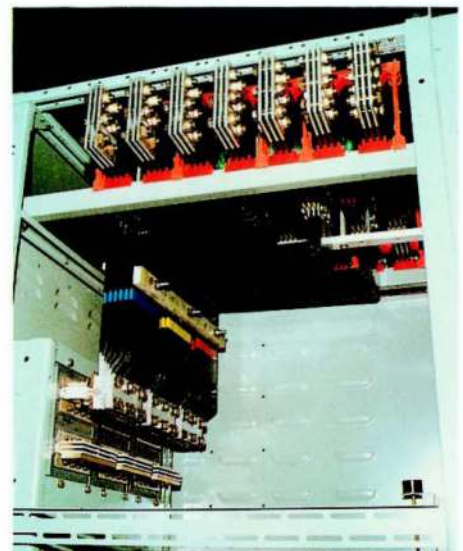
Adjustable compartment heights for effective utilisation of space.



DOUBLE LIP GASKET ON DOOR



TWIN ACTION DOOR CAMLOCK



Well defined interleaved link connection between horizontal busbars and ACB.



Overview of switchboard assembly shop.



Concurrent engineering integrates design and manufacturing processes.



Stage inspection during assembly ensures reliability.



Air Circuit Breaker assembly shop.



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