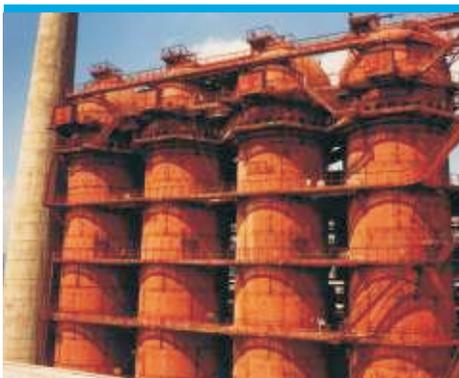


MEHER  
Capacitors  
is becoming  
**Schneider**  
Electric

**MEHER**<sup>TM</sup>



MEDIUM AND HIGH VOLTAGE CAPACITORS, CAPACITOR BANKS AND SYSTEMS



Meher Capacitors offers reliable and innovative products and solutions in the fields of Reactive Power Compensation, Power Quality and Energy Management to customers in India & abroad.

Meher is an ISO-9001,2000 certified manufacturing company, it has state-of-the-art facilities in production, design and testing.

The founders and key personnel have over 25 years of consolidated international experience in design, development and manufacturing of Power Capacitors, Reactors, Power Factor Correction Equipment, Harmonic Filters, Measuring Devices and Energy Management Systems.

Our innovative products are designed and built on sound engineering principles with total quality and customer satisfaction as a guiding rule.

We are committed to delivering a positive value to each and every client, backed by our dedication to the highest standards of client satisfaction, reliability and integrity.

After all, anything else is simply not good enough!

**Ayesha Wajid**

Managing Director

# Medium And High Voltage Capacitor Units



MV & HV Capacitor units

Meher Capacitors offers a wide range of MV and HV capacitors and systems for industrial and utility networks. The products are engineered and manufactured at our state-of-the-art plant at Bangalore, India.

Meher MV and HV power capacitor units are designed and manufactured to achieve reliable performance under a variety of application conditions.

The capacitor technology used is generically referred to as 'FILM + FOIL' technology i.e. the dielectric is plastic film and the conducting material is metal foil.

All capacitors comply with IS: 13925\_1998-Part 1&2, IEC 60871 – Part 1/2/3/4 and various other international standards.

The power capacitor units basically

comprise of a large number of individual elements (windings) which are connected in suitable series-parallel combinations. Each element has several layers of dielectric and suitable conducting plates.

The dielectric used is a specially surface treated, high electrical strength polypropylene film. The surface treatment of the film enables superior impregnation of the winding, thereby enabling higher performance levels necessary in adverse application conditions.

The conducting plates are specially processed capacitor grade aluminum foil.

Two types of foil are generally used:

- Mechanically slit foil
- Laser cut foil

The aluminum foil is wound in such a manner that one edge extends beyond the dielectric. This is called 'Extended Foil Construction'. The other edge of the foil which is inside the winding is always folded if mechanically slit foil is used. However, if laser cut foil is used, edge folding is not required (laser cut foil is used only in special cases or on customer request). A typical extended foil construction is shown in Figure 1.

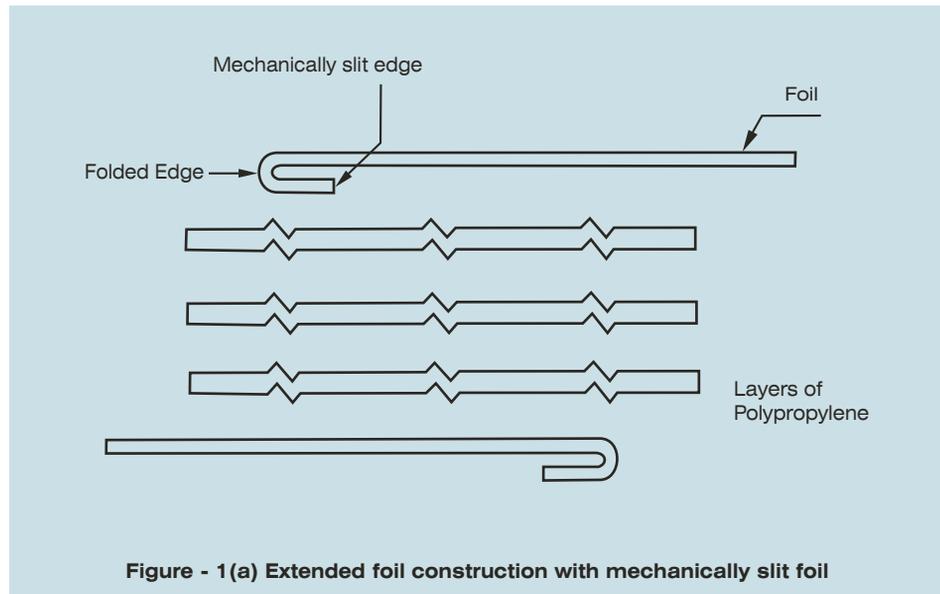
The need for using two different types of foil is to meet varying system parameters and performance requirements in different application conditions.

# Medium And High Voltage Capacitor Units

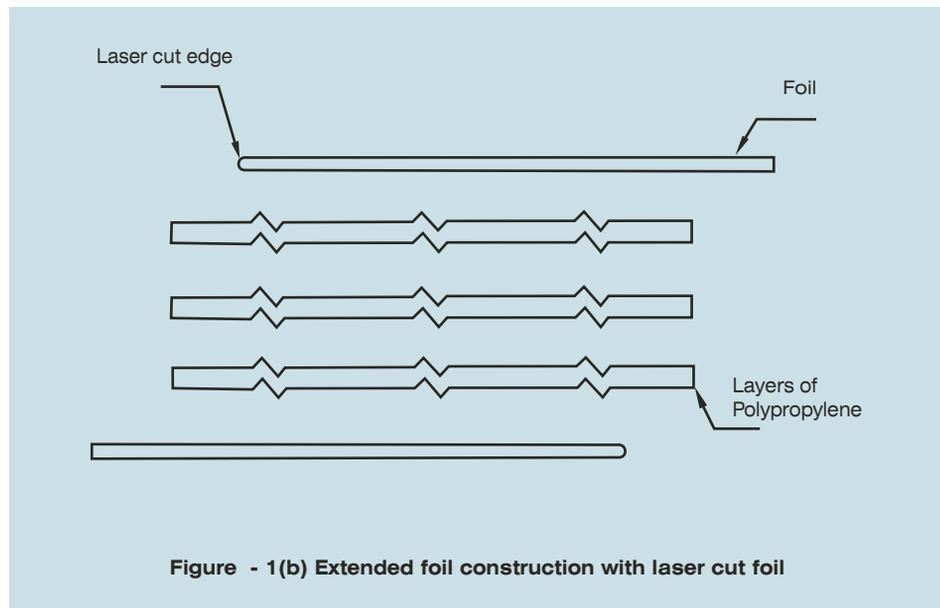
The wound capacitor elements are assembled into stacks which are thereafter wrapped with multiple layers of high grade insulating material to ensure sufficient insulation between live parts and the metal enclosure. The insulated stacks are then assembled into suitable metal enclosures which are made from either mild steel or stainless steel depending on application conditions and customer preferences.

The assembled capacitor stacks are then subjected to a prolonged, high vacuum drying and impregnation process. The fluid used for impregnation is high grade synthetic insulating oil which is specially processed before being used. The impregnating fluid is non-PCB type and is characterized by low bio-accumulation and rapid biodegradation in the environment. The bushings are designed to ensure leak free performance of the capacitors.

Power capacitors are generally provided with internal discharge resistors which enable the capacitor to discharge from its peak voltage value to a safe value as per international standards.



**Figure - 1(a) Extended foil construction with mechanically slit foil**



**Figure - 1(b) Extended foil construction with laser cut foil**

The reliability of the MV and HV capacitors and systems is the result of:

- Careful selection and sourcing of raw materials and components
  - Intensive testing on all materials used
  - Advanced production techniques and high automation levels to minimize human error
  - Stringent process quality checks
  - Comprehensive final testing
  - Pilot assembly for every bank to ensure correct matching of parts
  - Extensive experience and expertise in application engineering
- Our quality assurance system is based on quality directives that are binding throughout the company. It allows integration of national and international standards with customer specifications and our own performance criteria.

# Medium And High Voltage Capacitor Units

Power capacitor unit protection is usually achieved by two distinct fuse arrangements:

- External Fuse
- Internal Fuse

In the case of external fuse capacitors, each capacitor unit is protected by an external fuse which may be expulsion or HRC type. The external fuse will isolate the complete capacitor unit from the circuit in the event of any internal fault.

In the internal fuse capacitor, each capacitor element is provided internally with a fuse as a result of which only the faulty element will be isolated from the circuit thereby allowing the capacitor unit to remain in circuit with a slightly reduced output.

A general external fuse and internal fuse arrangement is shown in Figure 2. The dimensional details of some typical capacitor units of external and internal fuse type are given in Figure 3 (a & b) and in Table 1 & 2.

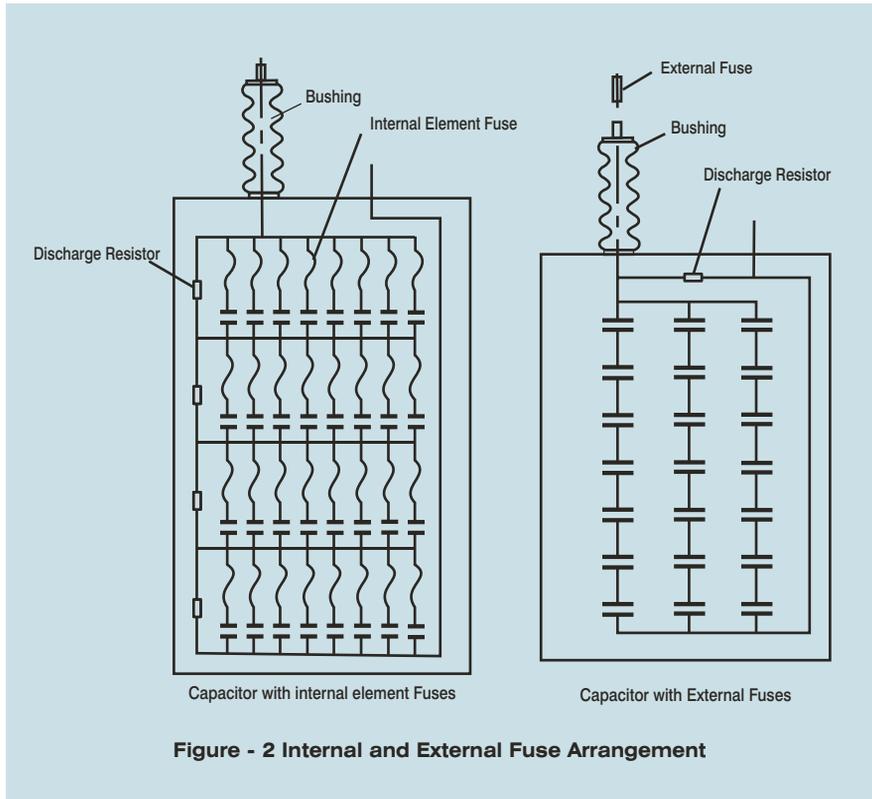


Figure - 2 Internal and External Fuse Arrangement

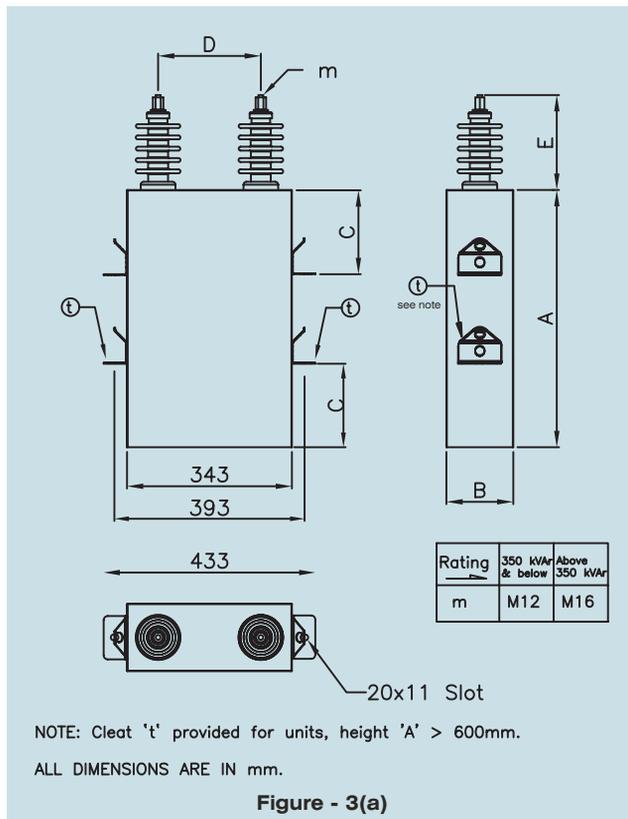


Figure - 3(a)

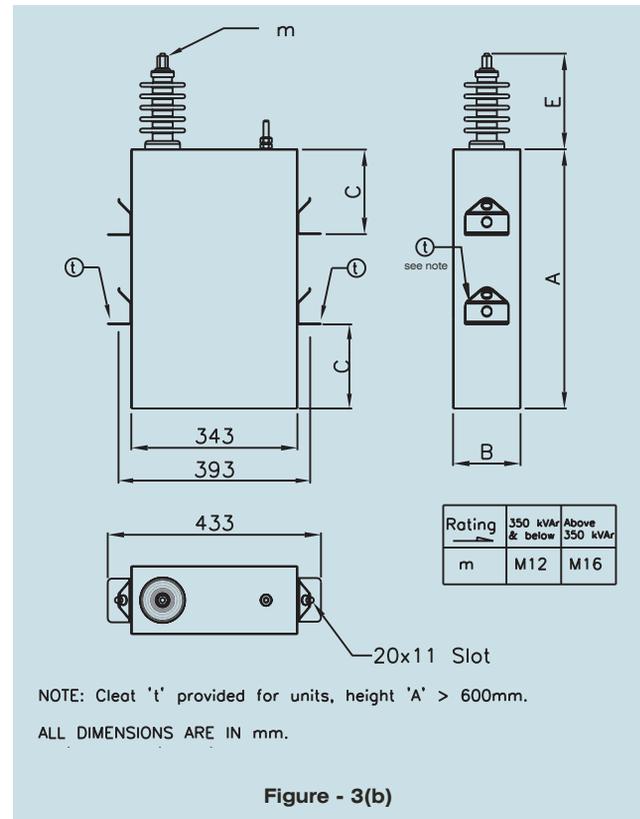


Figure - 3(b)

# Medium And High Voltage Capacitor Units

Note: Dimensions and weights are indicative. Binding dimensions and weights are order specific. Please contact Meher for exact details.

**Table-1 - MV Capacitors without internal fuses (external fuse protected)**

Capacitor Unit			Capacitor Unit Dimensions (in mm)					Unit Weight kgs
Output kVAr	Voltage kV	BIL kV	A	B	C	D	E	
50	1.8 - 3.6	75	160	138	191	220	230	12
	3.6 - 7.3	75	160	138	191	220	230	
	7.3 - 12	95	160	138	191	220	230	
100	1.8 - 3.6	75	320	138	191	220	230	21
	7.3 - 12	75	320	138	191	220	230	
	3.6 - 7.3	95	320	138	191	220	230	
150	1.8 - 3.6	75	480	138	191	220	230	30
	7.3 - 12	95	480	138	191	220	230	
	12 - 22	150	480	138	191	220	301	
200	7.3 - 12	95	640	138	191	220	230	38
	12 - 22	150	640	138	191	220	301	
250	7.3 - 12	95	800	138	191	220	230	48
	12 - 22	150	800	138	191	220	301	
300	7.3 - 12	95	960	138	191	220	230	57
	12 - 22	150	960	138	191	220	301	
350	7.3 - 12	95	675	178	191	220	230	58
	12 - 22	150	675	178	191	220	301	
400	7.3 - 12	95	765	178	191	220	230	65
	12 - 22	150	765	178	191	220	301	

**Table-2 - MV Capacitors with Internal fuses**

Capacitor Unit			Capacitor Unit Dimensions (in mm)					Unit Weight kgs
Output kVAr	Voltage kV	BIL kV	A	B	C	D	E	
150	3.6 - 7.5	75	431	138	191	220	230	25
	7.3 - 10.5	95	431	138	191	220	230	
200	7.3 - 10.5	95	574	138	191	220	230	33
250	7.3 - 10.5	95	718	138	191	220	230	42
300	7.3 - 10.5	95	861	138	191	220	230	50
350	7.3 - 10.5	95	780	178	191	220	230	62
400	7.3 - 10.5	95	860	178	191	220	230	70

# Medium And High Voltage Capacitor Systems For Industrial Applications

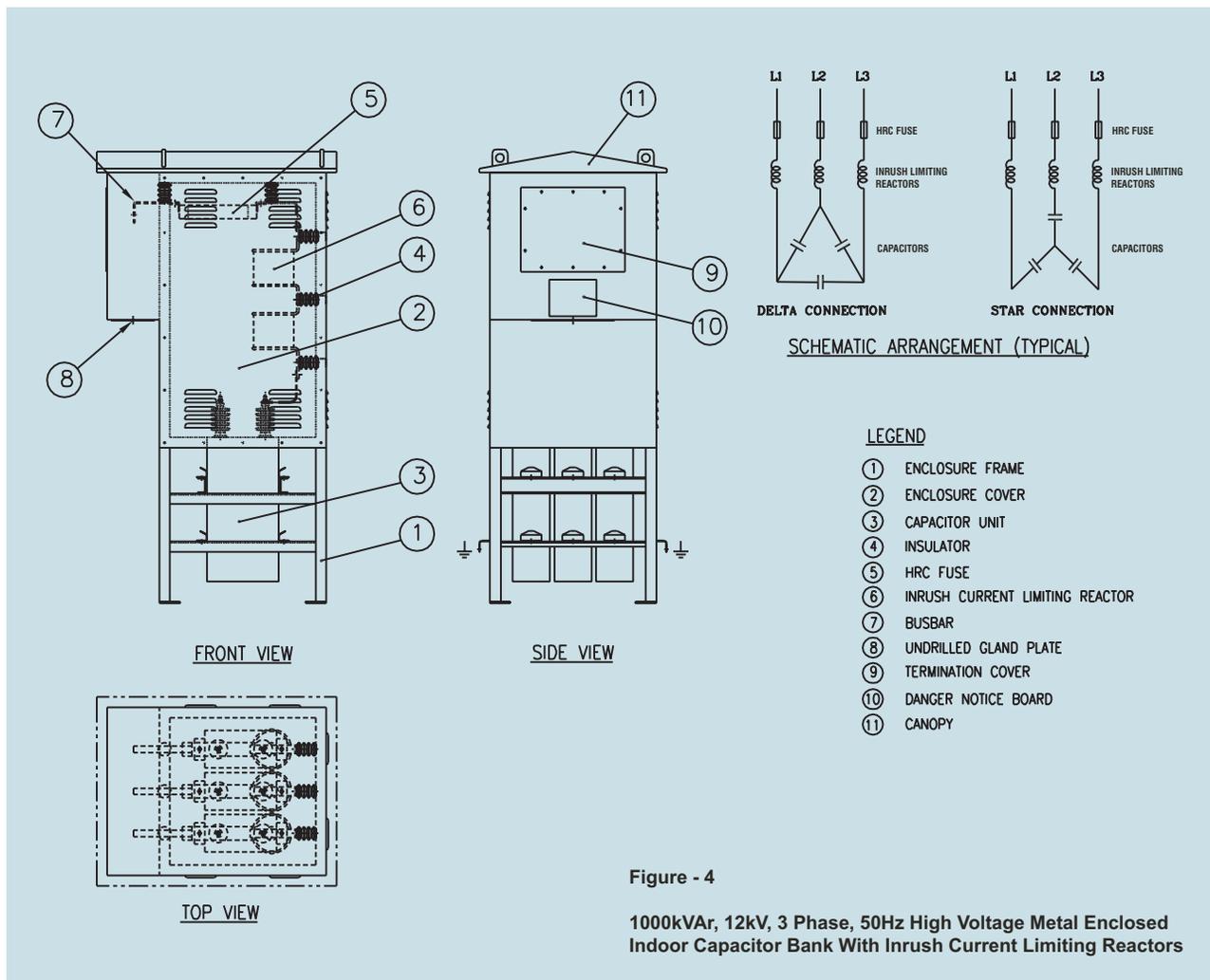


Figure - 4

1000kVAR, 12kV, 3 Phase, 50Hz High Voltage Metal Enclosed Indoor Capacitor Bank With Inrush Current Limiting Reactors

The need for MV and HV capacitors to be installed in industrial electrical networks is primarily to meet the compensation requirements of individual MV induction motors and for overall power factor compensation at the MV / HV bus.

The compensation / power factor correction requirements at MV / HV levels are normally encountered in large, power intensive installations and process industries. Typical examples are:

- Steel, Aluminum and other metallurgical plants
- Cement plants
- Chemical, Fertilizer and other process industries
- Large pumping installations

The capacitor banks are generally metal enclosed and protected against accidental contact. Therefore, there is usually no need for fencing of the capacitor bank installation.

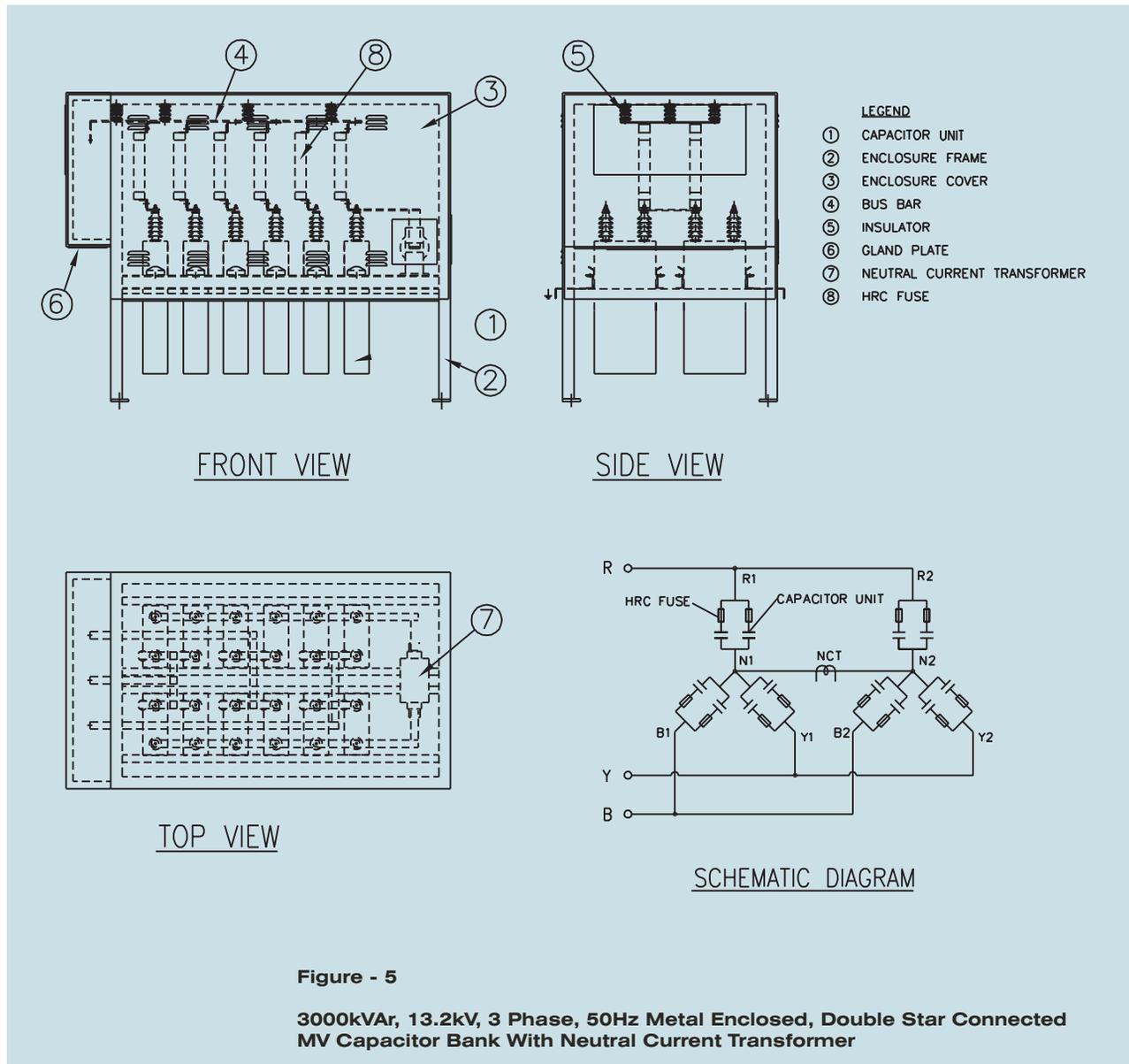
Meher offers compact metal enclosed MV and HV capacitor banks in a range of design options which comply with international standards.

The banks are delivered complete with all parts mounted and internal connections made. Therefore, installation and commissioning of such banks is simple and quick. The only external connections needed are the power supply cables and relay connections for protection.

A typical 1000kVAR, 12kV, 3 Phase, 50Hz metal enclosed indoor MV capacitor bank is shown in Figure 4.

Ratings, dimensions and other details shall be made available on request

# Medium And High Voltage Capacitor Systems For Industrial Applications



The construction of the capacitor bank allows for easy periodic checks and maintenance work at site.

Due to the modular construction of the banks, it is usually possible to add capacitor units to achieve higher outputs. This is a major benefit to the user since the bank output can be modified at minimal cost.

Bank ratings of MV & HV capacitor systems for industrial applications

start from around 100kVAr and go upto several thousand kVAr depending upon the application requirements.

A typical 3000kVAr, 13.2kV, 3 Phase, 50Hz Metal Enclosed, Double Star Connected MV Capacitor Bank used for central / group compensation is shown in Figure 5.

Ratings, dimensions and other details shall be made available on request

# Medium Voltage Pole Mounted Capacitor Banks



11kV, 600kVAr Automatically switched pole mounted capacitor bank

Meher offers MV pole mounted capacitor banks suitable for:

- Upto 38kV, 100 – 2400 kVAr
- 50 / 60 Hz
- Outdoor application
- Mounting on single or double distribution poles
- Switching with pole mounted capacitor switches

Based on application requirements, MV pole mounted capacitor banks may be:

- Single or three phase type
- Internally or externally fused

The structural material for pole mounting racks may be of aluminum alloy or steel depending on application conditions and installation environment.

Pole mounted capacitor banks can be configured in a wide range of sizes and voltages. Additionally, they can also be provided with various accessories such as manual or automatic load break switches and control / automation equipment. Lightning arrestors and / or instrument transformers can also be mounted on the racks.

The design of the pole mounted banks can be made to allow addition of various accessories after initial installation. This enhances the future flexibility and expansion options of the bank.

Pole mounted banks are completely factory assembled and delivered with all interconnections suitably pre-wired and ready for pole mounted installation.

A typical pole mounted capacitor bank arrangement along with the automatic switching device is shown above.

**Ratings, dimensions and other details shall be made available on request**

# Medium And High Voltage Capacitor Banks For Substations



72.5kV, 30MVar, 3 phase, 50 Hz, externally fused, double star connected capacitor bank installation in a 400kV/220kV/66kV utility substation

Meher and HV substation capacitor banks find application in electrical substations of transmission and distribution networks and industrial installations. They are generally outdoor type and comprise of capacitor racks, elevating structure (to achieve necessary ground clearance if required), base and inter-rack insulators to provide desired insulation (BIL) and connecting materials such as busbars or braided connectors.

The banks may be connected in series or series-parallel arrangement and the units may be mounted vertically or horizontally as required. The structural materials may be of steel or aluminum as necessary.

The capacitor banks are usually upwards of 1.0MVar for all voltages up to 132kV, 50 / 60Hz. The capacitor banks may be externally fused or internally fused based on customer requirements and application conditions.

The capacitor bank design can be made suitable for mounting of various equipment like inrush current limiting series reactors, neutral current transformers etc.

A typical external fuse bank installation is shown above.

We have extensive experience in supplying such engineered systems involving MV and HV capacitor banks as well as MV and HV switchgear and protection equipment to various industries and utilities.

The scope of supply includes capacitor banks with all associated equipment like circuit breaker, lightning arrestors, protection panels, instrument transformers, reactors and disconnectors. Each item is specially sized, procured / manufactured to ensure an efficient, integrated and reliable system performance.

Figures 6 & 7 show typical outdoor MV substation capacitor banks.

Ratings, dimensions and other details shall be made available on request

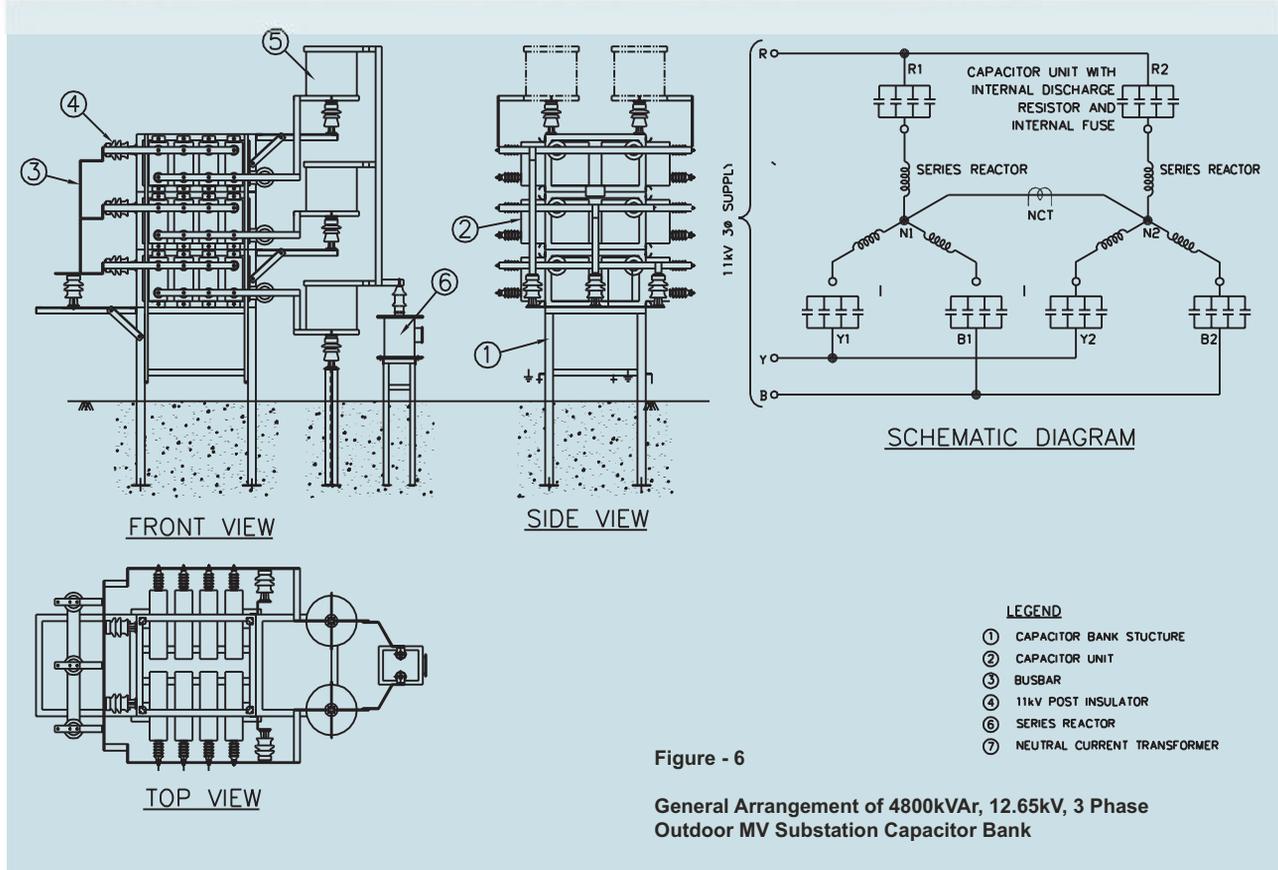


Figure - 6

General Arrangement of 4800kVar, 12.65kV, 3 Phase Outdoor MV Substation Capacitor Bank

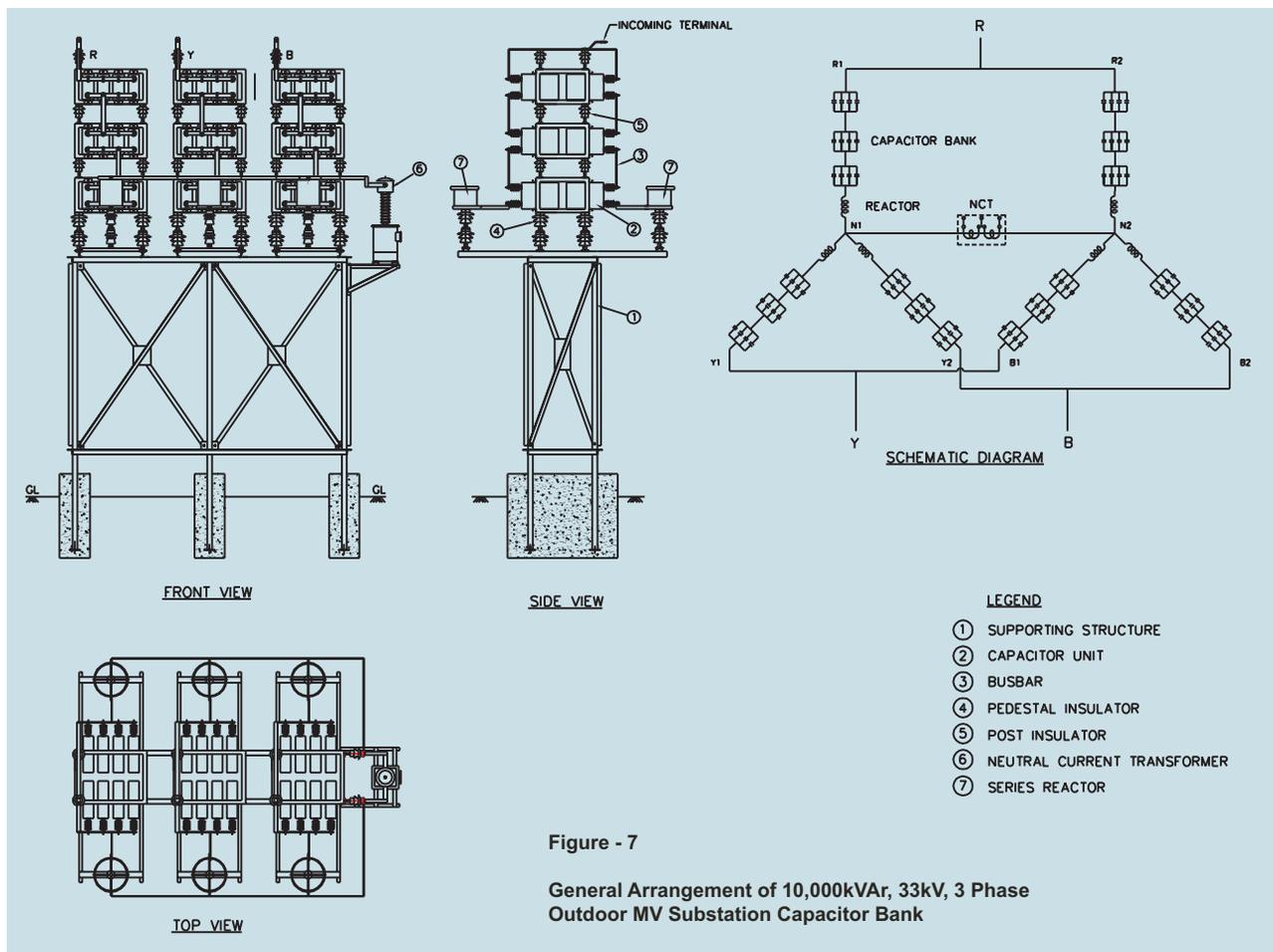
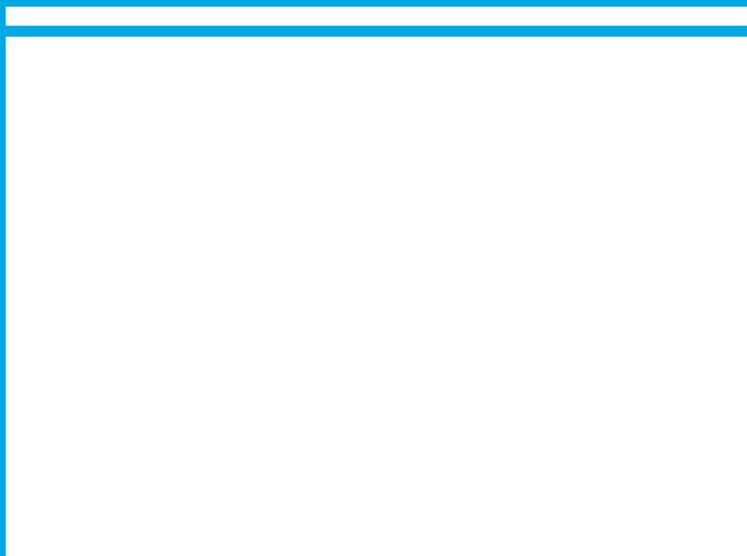


Figure - 7

General Arrangement of 10,000kVar, 33kV, 3 Phase Outdoor MV Substation Capacitor Bank

**Contact your nearest dealer:**



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