MEGAWIN

MACTOR
Series

Scan to contact us

Safe and reliable MV switchgear for sustainability

Outdoor Vacuum Circuit Breakers

Up to 36kV

Welcome to
MEGAWIN

MEGAWIN is a leading brand of medium voltage products in India, offering complete range of medium voltage switchgear, dry type transformers, protection & control devices and solutions for voltage classes up to 36kV.

MEGAWIN dedicates itself to benefitting the society at large by innovation, so as to achieve a more productive, safe, reliable and sustainable future. This is achieved through low down-time, maximized operator safety, low cost of ownership and enhanced product life cycle through low maintenance & up-keep cost.

MEGAWIN dedicates itself to benefitting the society at large by innovation

Leveraging the deep domain knowledge and application engineering experience, MEGAWIN delivers products that are engineered for life and benefitting solutions across power utility sector, large process industries like steel, cement, textile, mining, power generation, transmission and distribution, commercial establishments like Banks, BPOs, IT Parks, and national infrastructure like railways, airports, shipyards and renewable energy production.

About us

After a humble start in 1987, by manufacturing substitute parts for almost every imported switchgear, the Company grew steadily in size, infrastructure and product portfolio. Today, with 5 large state-of-the-art factories, equipped with the latest in manufacturing and testing technology, the Company manufactures almost all parts of the finished electrical products, in-house.

MEGAWIN attributes it's success to their core strength, i.e., Integrated Design & Manufacturing. Assisted by a strong research and development team, with decades of experience in the specific field of engineering, the company combines latest switchgear technology available from all over the world, combines & packs them efficiently so as to present an optimum and versatile switchgear solution for a variety of applications in all segments of Industries.

MEGAWIN has moulded its success on innovation. Since inception of the brand, its architects opted that innovation is the key to success for every product in the brand. Presently the company is ranked among the best medium voltage product manufacturers across the nation and recognized for giving solutions that focus on enhancing efficiency, reliability and safe distribution of electricity.

During the span of last four decades, passion for innovation to achieve success and un-deterred hard work earned MEGAWIN phenomenal prominence in medium voltage market segment to the extent that that MEGAWIN products are preferred by choice not only in India but also in the global market.

MACTOR

Smart solution for distribution networks

Mactor is a solid dielectric single pole vacuum circuit breaker with in built current and voltage sensors and vacuum interrupters operated with time proven magnetic actuator mechanism. This outdoor Vacuum circuit breaker is aimed to improve the reliability and quality of power with the maintenance benefits of a solid dielectric insulated device. equipped with automatic and manual trip operation.

These SCADA compatible units that comes with a control cabinet fitted with breaker control unit, microprocessor based relay, battery, battery charger and provision for FRTU.

Mactor are ideally suited for primary, secondary and distribution substations.

Standards

Your m-Smart series of metal clad air insulated switchgear provides safety and protection for a wide range of applications ranging from power utilities, industries and infrastructure by complying with the latest IEC standards

- IS/IEC 62271-1 -General purpose
- IEC 62271-200 -Switchgear
- IEC 62217- 100 -Circuit breaker
- IEC 60255- Measuring relays and protective equipment
- IEC 60044-7-8 Electronic current and voltage sensors

MACTOR - Outdoor Switchgear

Safe and reliable MV switchgear for sustainability

Current Sensors:

Current sensors are direct replacement to conventional current transformers. They provide a wide current range in one design, avoiding the need to specify. These liner devices are failure as they don not have an iron core and do not saturate even at 40 times the primary current. Each current sensor is build for both metering (class 0.2) and protection (5P40).

Voltage Sensors:

Voltage sensors are direct replacement to conventional potential transformers. They work on a proven capacitive voltage divider principle which helps to operate in a linear fashion over a wide range.

Accurate

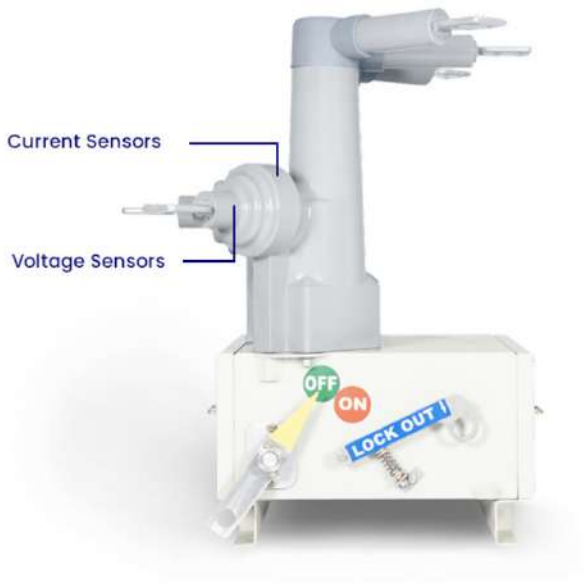
Embedded current and voltage sensors

Failure Free

Metering

Protection

Safe



Magnetic actuators:

MACTOR comes with modern, state of the art, highly reliable magnetic actuators which uses forces from magnets form operating the circuit breaker. The technology and unparalleled benefits make them maintenance free.

- 100,000 mechanical operations without any maintenance
- Fewer moving parts (8 parts)
- No links and latches; lubrication and periodic maintenance is avoided
- Faster close/open time
- Low power consumption
- Light weight (45 kgs)

100,000 operations

Consumes less energy

Light Weight

Maintainence free

Feeder Manager (MF 790c):

m-Smart series comes with a comprehensive SCADA compatible feeder manager (MF790c) that offers metering, protection, control and annunciation all built in one unit.

Metering

Protection

Communication

Annunciation

MACTOR 12

Magnetic Actuator	100,000 operations	Manitenance free
Current Sensor	Wide range and accurate	Failure proof
Voltage Sensor	High accuracy	Failure proof
MF790C controller	Protection, metering and annunciation	Comprehensive
SCADA	Complete remote operation	

MACTOR 36

Magnetic Actuator	100,000 operations	Maintenance Free
Current Sensor	Wide range and accurate	Failure proof
Voltage Sensor	High accuracy	Failure proof
MF790C controller	Protection, metering and annunciation	Comprehensive
SCADA	Complete remote operation	

Basic Design

MACTOR operates electrically by energizing a magnetic actuator system with a completely sealed housing. Each pole contains a vacuum interrupter with embedded current and voltage sensors sealed in solid dielectric insulation for mechanical and high dielectric strength.

1. Vacuum Interrupters

Each pole consists of encapsulated vacuum interrupter.

2. Embedded current and Voltage sensors

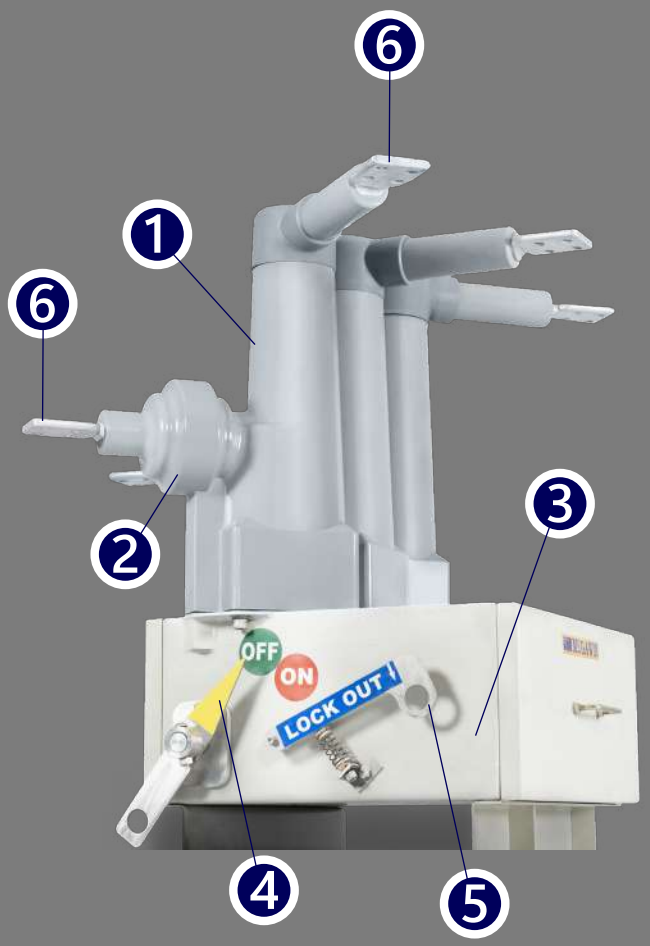
Each pole consists of current and voltage sensors embedded in Hydrophobic cycloaliphatic epoxy.

3. Magnetic actuator mechanism

The magnetic actuator mechanism located in a sealed housing.

4. Visible indications

ON/OFF position indicator located in the side, indicates clear indications to the operator from a distance.



5. Manual tripping lever

External manual trip is provided on the side; when in the down position, it maintains the recloser in a lockout position unit it is manually restored.

6. HT terminals

Standard copper terminals are provided for incoming and outgoing HT terminals.

Control cabinet

The control cabinet houses feeder manager (MF790c), battery, battery charger, breaker control unit, provision for FRTU with all necessary connector options

- The control cabinet is built for outdoor application which can be mounted on a pole for secondary distribution or pedestal mount for sub station.
- It is tested for IP55
- Includes a 24 V battery charger with 12 V and 24 V outputs
- Eliminates the need for expensive rewiring of I/O signals accepting existing connector plugs for Power, Control, Voltages and Currents with the same pin sequence.

- Accepts the existing communications connections for Serial TIA-232, TIA-485, Fiber Optic and IRIG-B.
- Simplifies upgrading communications to optional true embedded Ethernet ports in the M-7679 R-PAC allowing for multi-user multi-protocol access to the advanced metering, PQ and DFR information collected by the control.

HCEP Insulation

Hydrophobic Cycloaliphatic Epoxy (HCEP) is used as the insulating medium for each pole. They provide water resistance, preventing water from developing completely wetted, resistively conductive surfaces on outdoor insulation. As a result, leakage currents are reduced which increases reliability by minimizing the risk of insulation flashover. Furthermore, reducing discharge activity translates into decreased insulator erosion and increased insulator life expectancy. HCEP does not become resistively conductive when exposed to moisture..

Solid Dielectric material

Suited for heavily polluted area

Reliable and longer life expectance

UV protected

Surface arc tracking resistant

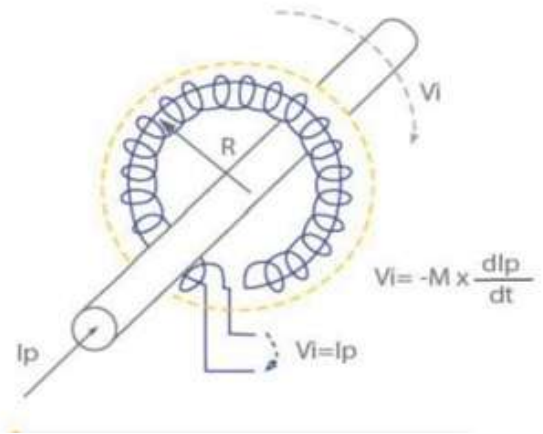
HCEP Properties

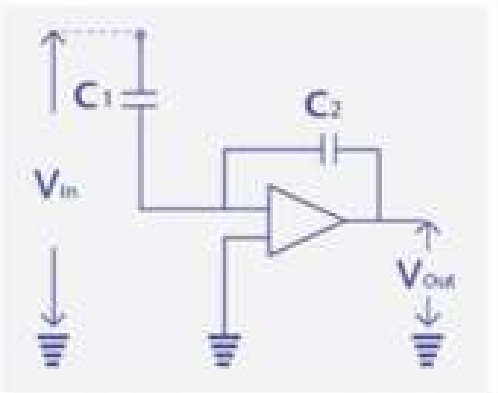
- Improved water beading
- Leakage currents are low
- Less discharge activity
- Reduced probability of flashover
- Minimal erosion of insulation
- Highly reliable
- Improved life expectancy

Advantages

- Best suited for heavily polluted areas
- light weight
- Enhanced reliability
- Improved outdoor aging
- High mechanical strength

Current & Voltage Sensors





Current Sensors: These, work on the principle of induced voltage in a coil under alternating electromagnetic flux around a current carrying conductor. The voltage thus developed is processed by a microprocessor and interpreted to indicate true magnitude of Current flowing in the conductor. Current sensors do not contain iron core. So, no losses, no saturation, no overheating. Accuracy is a linear characteristic over a wide range of Current. As the potential developed between open ends of the Sensor coil is very small, no thermo-dynamic force occurs even if terminals are left open by mistake. Being light in weight, due to absence of iron core, they can be mounted conveniently.

Voltage Sensors: These, work on the principle of capacitive voltage divider between a live part and earth potential. They contain two capacitors which divide the input signal. Current proportional to dv/dt is derrived through capacitor connected across high voltage line and earth (ground). Integrating these signals in a microprocessor, voltage proportional to the high voltage can be obtained and displayed. Absence of iron core has made these Voltage Sensors highly accurate and totally safe to handle voltage surges, as there is no ferro-resonance.

Being light in weight they can be mounted in a variety of ways in shapes making their presence almost invisible.

Magnetic Actuator mechanism:

This mechanism is a bi-stable magnet system, in which an armature switches over from one end position to another, by an additional electro-magnetic field created by two electrically excited coils (closing coil and opening coil), which are energized momentarily for a few milli-seconds only just to bias the magnetic field. Therefore, no elaborate arrangement for auxiliary supply is required to sustain the ON/OFF operations. MEGAWIN developed an electronic control unit that caters to the momentary impulse power needed for the operating coils.

The armature is held in one of the end positions by strong magnetic field of magnets. The armature is connected to the operating shaft mechanically coupling the 3 poles of a 3 phase circuit breaker. Thus every time armature changes position from one end to other, switchgear ON / OFF function is achieved.

Feeder Manager (MF790c)

In-built metering, protection, control, communication & annunciation

The MF790c is a comprehensive controller that comes with in-built metering, protection, control, communication and annunciation. This controller is designed to work with current sensors and voltage sensors. It can take three current and six voltage inputs.

Protection

Three stages of protection

- Low set (IDMT/DTL). Used for grading (IEC characteristics)
- Wise set with DTL can be used as low set to minimise trip time for overload condition or can be used as second high set with time delay
- High set instantaneous protection for clearing nearer fault with heavy current.

Sensitive earth fault protection

- Tuned to fundamental frequency
- Most useful for high resistance earth fault

Circuit breaker fail protection (CBF)

- Dedicated current setting
- Detection time setting

Voltage protections

- Single/ three phase over voltage protection
- Single/ three phase under voltage protection
- Residual voltage protection
- Two stage protection for OV/OV and residual V
- Inverse and definite time delay characteristics

Other protections

- Master trip function with configurable hand reset trip contact
- DC healthy protection
- Repeat relay for external/ non trip functions through digital input switch hand reset option
- Self monitoring

Metering

- Three phase currents
- Three phase to neutral voltage
- Three phase to phase voltage
- Self monitoring
- Reactive power
- Residual currents
- Power factor for each phase
- MVA and MW demand
- Real power

Additional Measurements

- Protection trip count
- Last line side and bus side supply interruption duration

Circuit breaker monitoring

- Trip circuit supervision
- Protection trip count alarm
- Formula

Data records

- 100 fault records with time stamp
- 500 event record with 5ms resolution with time and datastampings.

Control

- The breaker can be controlled with local push buttons or from remote through digital inputs or through communication
- Password lock for setting and control (two passwords)
- In-built closing logic
- TRIP LOCK facility to lock the breaker in tripped condition for feeder maintenance

Annunciation

- Visual indication will start flashing on sensing its input function
- The same function can be configured to initiate audible alarm through digital output
- On accepting the fault, the alarm will reset and the LEDs will glow steadily
- Non trip alarm and trip can be separated

Communication

- Front universal serial bus port can be used to connect to a laptop/PC
- Rear end RS-485 port
- Ethernet port
- Communication protocols: IEC 60870-5-103,104, MODBUS and IEC 61850

Visual indication

Mimic:	LCD display:
• Front universal serial bus port can be used to connect to a laptop/PC	• 16 x 2 character LCD display
• Rear end RS-485 port	• 4 digit pneumatic password protected
• Ethernet port	• 16 letters feeder identification label
• Communication protocols: IEC 60870-5-103,104, MODBUS and IEC 61850	• Trip information with phase indications and time stampings

Fixed visual indications

- Device healthy
- DV healthy
- Voltage trip
- Phase trip
- Earth trip
- Ready to accept
- General protection start/trip
- System setting LED
- CAP spring charge trip circuit healthy
- Ready to reset
- Wide set
- High set
- Local/Remote
- Trip locked

Configurable visual indications

Eight dual coloured (red/yellow) LED indications

- Can be set to provide indications for external functions like protection elements operation/push switch operations.
- Can be set to provide indications for external functions through digital inputs (Eg. Buchholz trip).
- Can be set for self reset/hand reset through accept/reset push button

Digital inputs

- Digital inputs=15
- Remaining 11 are configurable.
- 4 numbers are dedicated for DC healthy, TCS, Capacitor spring charge and breaker status
- Can have delay up to 24 hrs either on pick up, drop off or both

Digital outputs

- Digital inputs=8
- Remaining 5 are configurable.
- 3 numbers are dedicated device healthy, trip and close
- Each DO can be set as hand or electrical reset, self reset.

Cold load pick up function

- After long supply interruption, if the breaker is closed the setting needs to be changed to cater for immediate inrush load current
- This is achieved with group change facility. Any group will switch over to group 10 if cold load is opted.
- During cold load, load based reset to original group to time based reset to original group or both can be set
- If load based reset is opted then group 9/10 will use its wide set setting as under current set with time delay to do this function

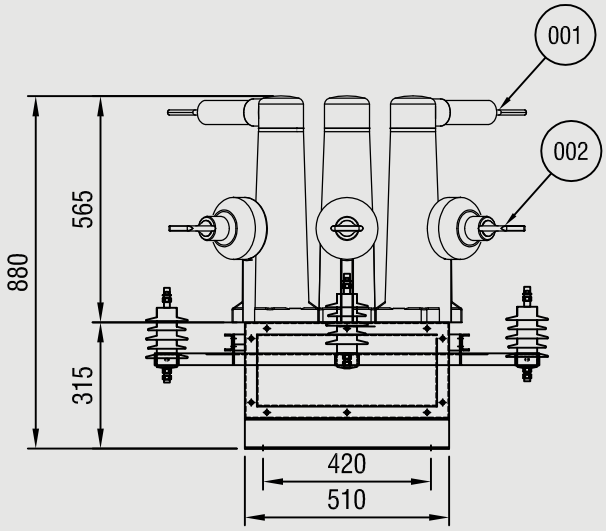
Auto reclosing function

- Five trips, four dead times, four recloses multi shot auto reclose.
- Independent dead times for P/F, E/F, SEF in each shot.
- Blocking reclose shots using protections and vice versa feature is available
- Block auto reclose as a whole auto reclose ON/OFF facility.
- Block auto reclose for the typr of fault tripping for each shot P/F, E/F (IMMT, HIGH SET, WIDE SET) and SEF.
- Common reclaim time which starts immediately upon reclose
- LOCKOUT for unsuccessful reclosure.
- AUTO RECLOSER CYCLY STARTED/ LOCKOUT indication can be programmed.

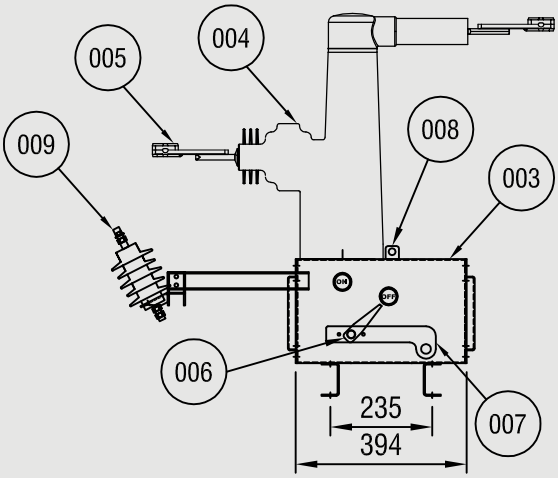
Sectionalising function

- Supply interruption count = 4
- Sectionalizing function can be made ON/OFF
- Supply interruption count should have exceeded the set value and all phase current and voltage should be zero followed by a fault to trip the sectionaliser.
- If auto reclosing function is made OFF, sectionalising function will appear.
- Reclaim time (sequence reset time) – completion of this time will initiate the supply interruption count for trip
- Automatic group change based on direction of power flow- AGBD facility

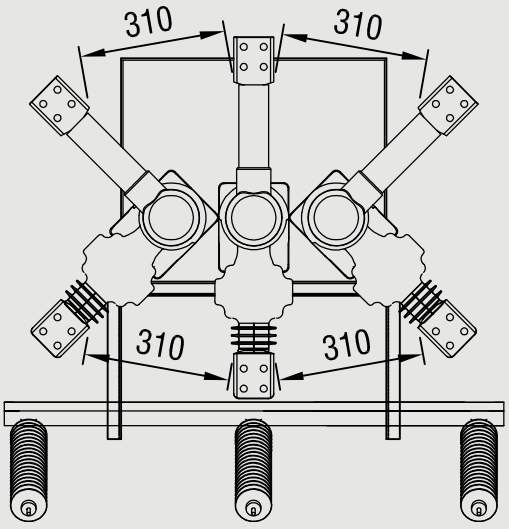
MACTOR 12



FRONT VIEW



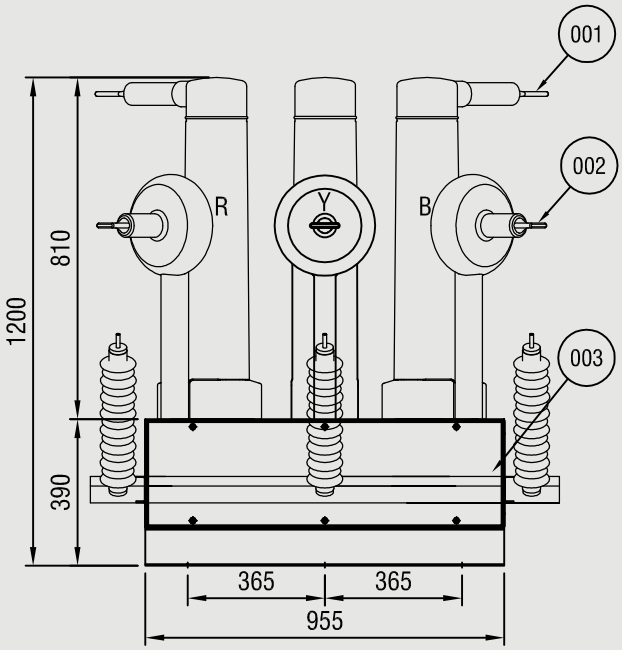
SIDE VIEW



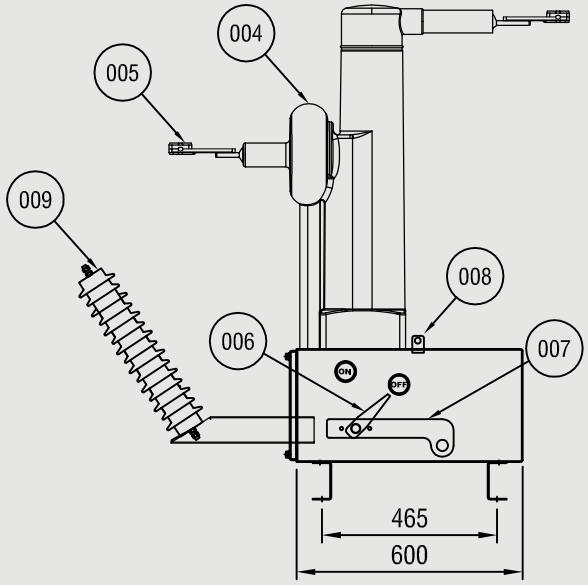
PLAN VIEW

001. Top Terminal
002. Bottom Terminal
003. Actuator Mechanism Box
004. Current & Voltage Sensor
005. Terminal Port
006. Mechanical ON/OFF Indication
007. Manual Tripping Lever
008. Lifting Hook
009. Surge Arrester

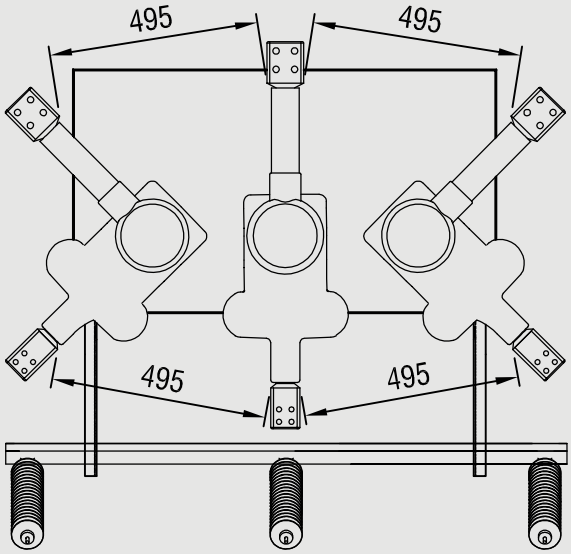
MACTOR 36



FRONT VIEW



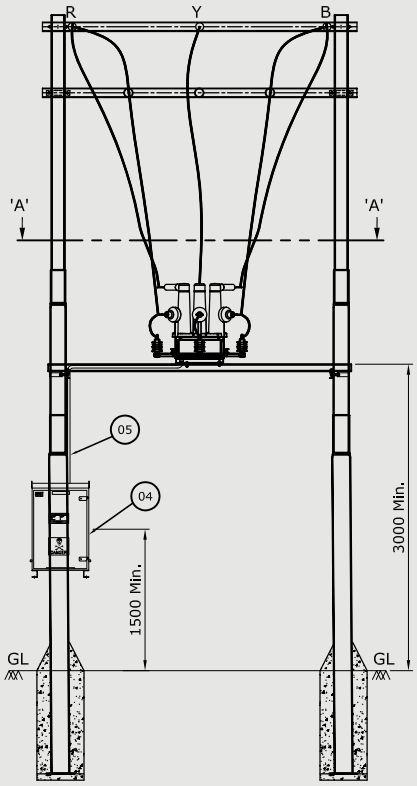
SIDE VIEW



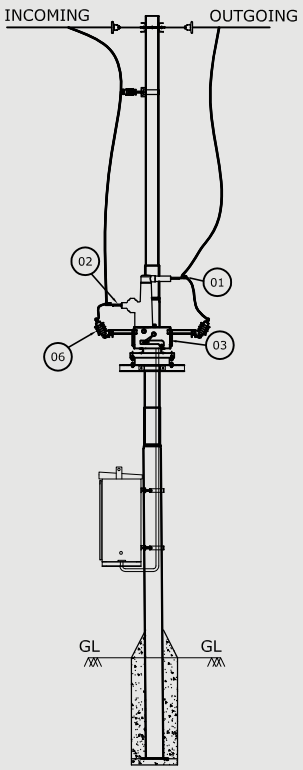
PLAN VIEW

1. Top Terminal
2. Bottom Terminal
3. Actuator Mechanism Box
4. Current & Voltage Sensor
5. Terminal Port
6. Mechanical ON/OFF Box
7. Manual Tripping Lever
8. Lifting Hook
9. Surge Arrester

MACTOR 12

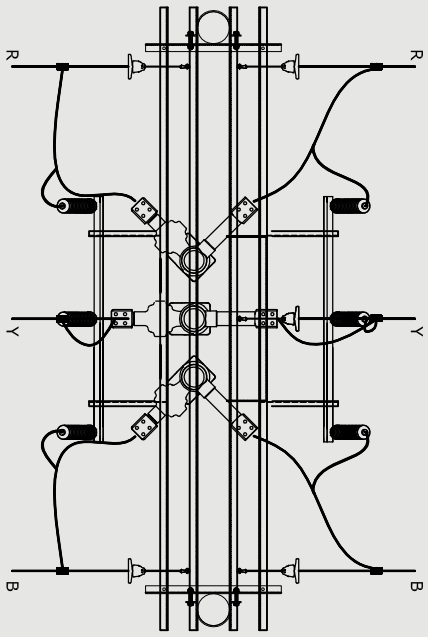


FRONT VIEW

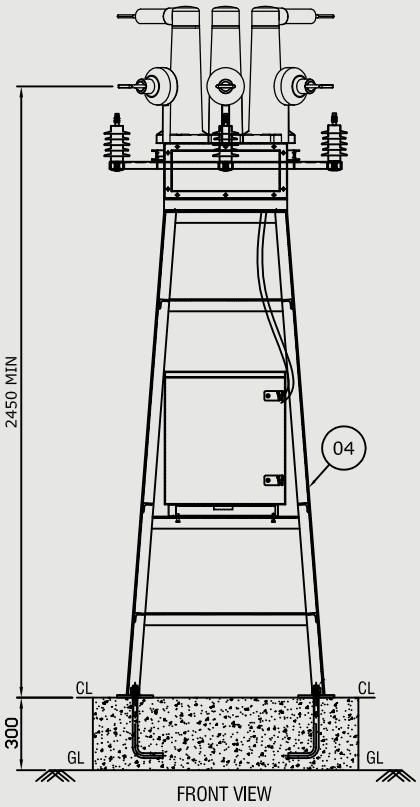


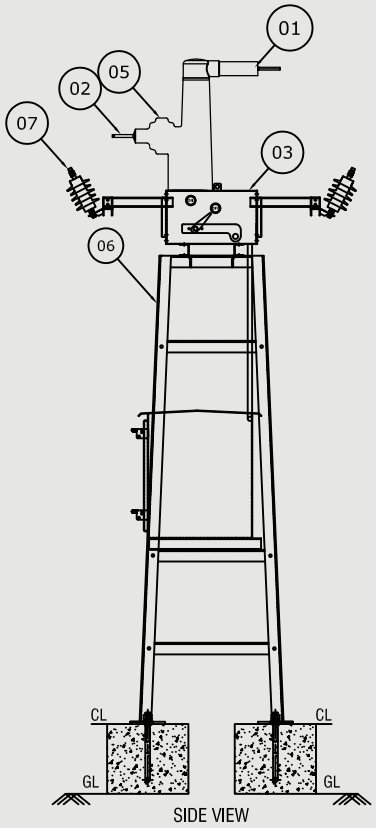
SIDE VIEW

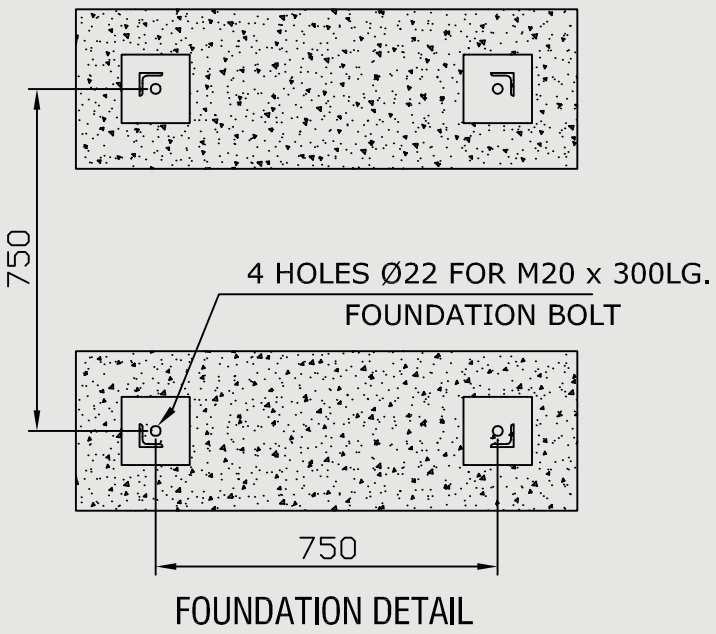
1. Top Terminal
2. Bottom Terminal
3. Mechanism Box
4. Control Unit
5. Pole Mounting
6. Surge Arrester



SECTION - 'AA'
(SCALE 1:2)

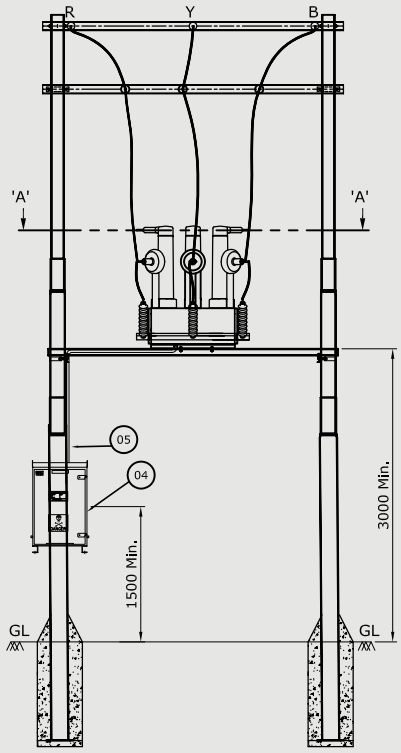




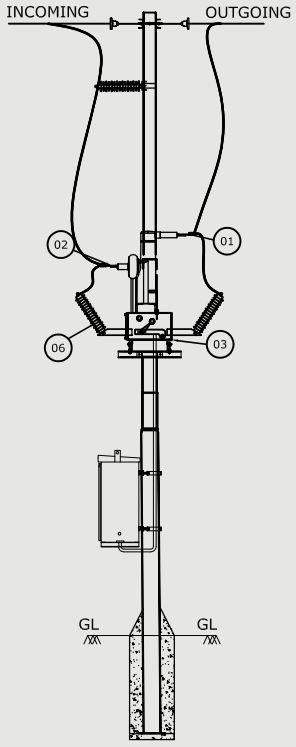


1. Top Terminal
2. Bottom Terminal
3. Mechanical Box
4. Structure Mounting
5. RACK IN / OUT OP. PORT
6. Current & Voltage Sensor
7. Structure Mounting
8. SURGE ARRESTER

MACTOR 36

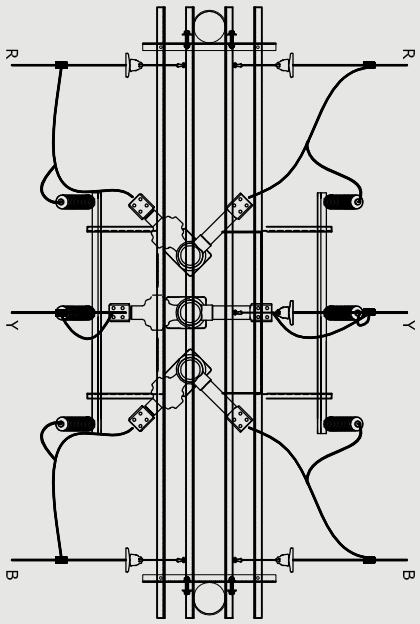


FRONT VIEW

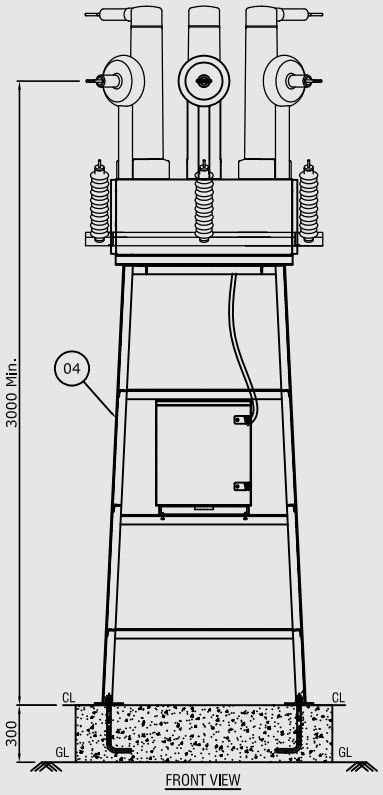


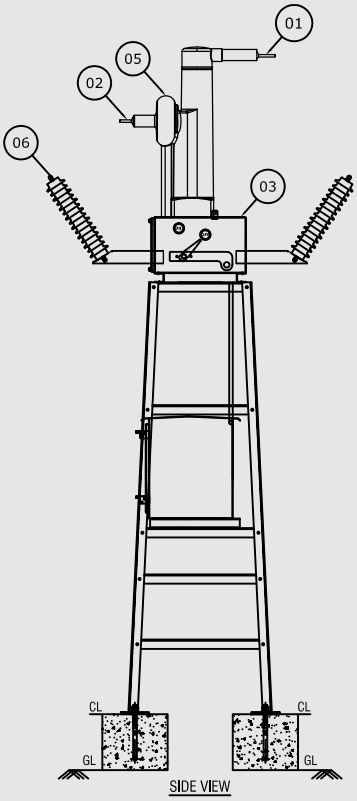
SIDE VIEW

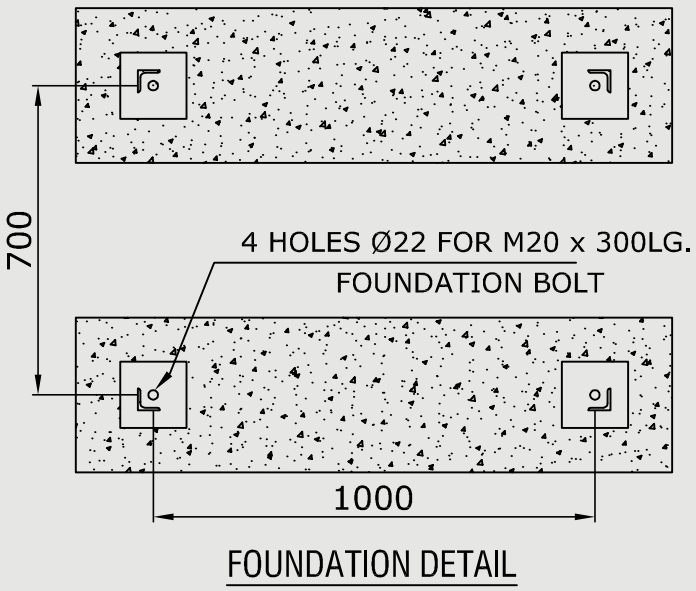
1. Top Terminal
2. Bottom Terminal
3. Mechanism Box
4. RACK IN / OUT OP. PORT
5. Control Unit
6. Pole Mounting
7. SURGE ARRESTER



SECTION - 'AA'
(SCALE 1:2)







1. Top Terminal
2. Bottom Terminal
3. Mechanism Box
4. Structure Mounting
5. Current & Voltage Sensor
6. SURGE ARRESTER

Current Sensor selection chart

The current sensor and voltage sensor rating for various transformer loads are provided with a standard selection chart

Environment immunity

Rated Current of Sensor in Amps (A)	Load Current Range in AMPS	
	FROM	TO
60	5	100
250	20	415
750	50	1250

Voltage Sensor selection

Nominal Primary Voltage (Upn)	3300/√3
	6600/√3
	11000/√3
	22000/√3
	33000/√3

Guaranteed technical particulars

MACTOR

Parameters	12kV	24kV / 36kV
System Voltage	12kV	24kV / 36kV
Rated Voltage	11kV	24kV / 33kV
Rated normal Current	1250A/1600A	1250A/1600A
Short time current withstand capacity	25kA	25kA
Rated Frequency	50Hz	50Hz
Power Frequency withstand voltage	28kV(rms) for_min	70kV(rms) for_min
Lightning impulse withstand voltage	75kV peak	170kV peak
Short circuit breaking current for circuit breaker	25kA/3Sec	25kA/3Sec
Short circuit making current for circuit breaker	62.5KA	62.5KA
Degree of protection (outdoor)	IP65	IP65
Design ambient temperature	50℃	50℃
Rated insulation level	12kV/28kV/75kV	36kV/70kV/170kV
Operating Sequence	O-.3S-CO-3M-CO-3M-CO	
Dielectric medium	Solid Dielectric Medium	
Breaking medium	Vacuum	
Operating Mechanism	Magnetic Actuator	
Mechanical life	1,00,000 Operations	
Electrical life at rated current	100 Operations	
Auxilliary Voltage	24V	24V
Relevant standards	IEC 62271-100, IEC 62271-200	
Installation	Single pole, Two pole and Pedestal	

Contact us

E-mail
info@megawin.co.in

Call
+91-8929599797

Website
www.megawinswitchgear.com

Address
MEGAWIN SWITCHGEAR-P-LTD
Post Box No.: 434, Alagapuram Post,
Perumal Malai Adivaram,
Salem 636 004, India

Scan here for location