

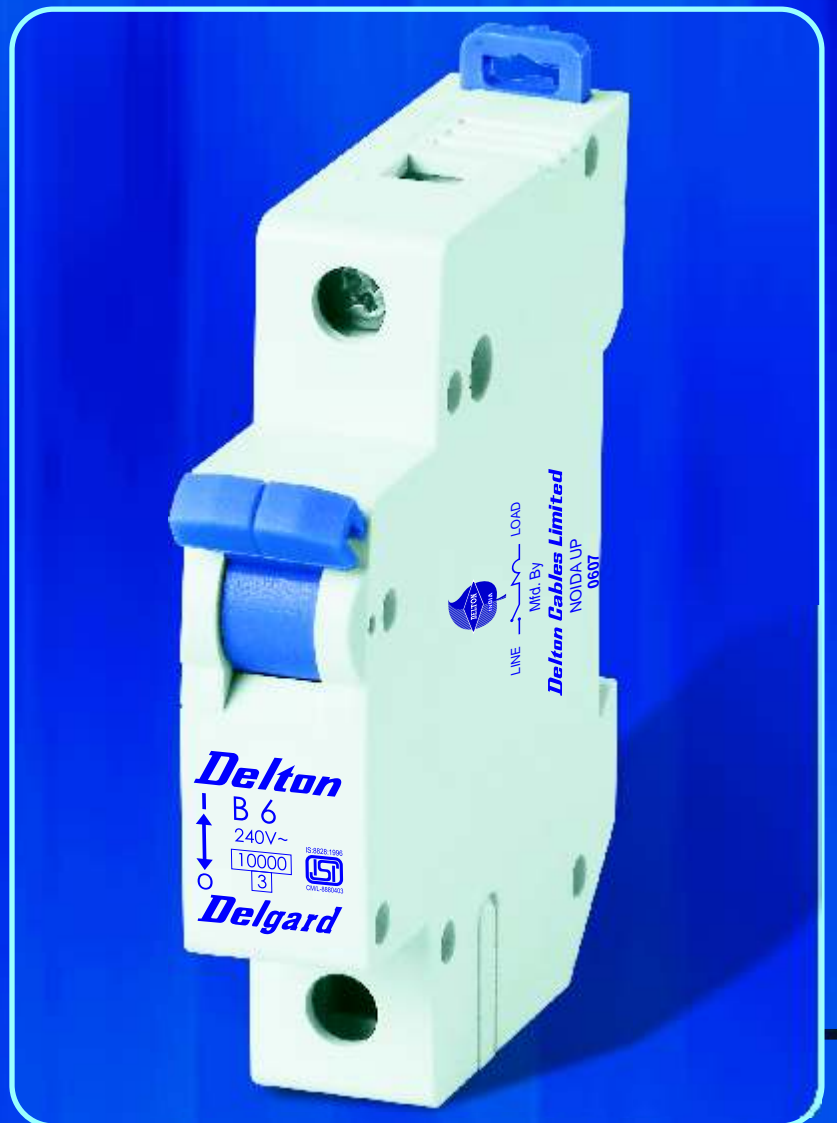


Delton

WE CONNECT FOR LIFE

conquer fear

with *Delgard* MCB



- Rating 0.5 Amp to 125 Amps
- 1 Pole to 4 Pole
- Full Range tested for 10000 Amps
- Isolators upto 125 Amps AC22A
- Lighting & inductive load series B & C
- Designed for utmost safety
- Conforms to IS & IEC specs.



Delton Cables Ltd. is an ISO 9001: 2000 certified company committed to Quality and Customer Satisfaction. Delton provides competence in Cable technology covering measurement, control, communication and power distribution applications for different environmental conditions, as used in exploration, metal, oil, refining or gas processing sites, petrochemical, chemical, power generation and similar applications. Our specialization is in manufacturing tailor – made cables as per customer’s specifications. Established in the year 1948 with a foresighted vision, a pioneering spirit, innovative approach, indigenously developed technology, the expertise of a highly motivated and professional team, excellent infrastructure facilities and sales network together synergised for the ultimate expression of customer delight, quality and safety.

Delton –Conquer Fear

New Delgard SFP* MCB’s from Delton using new engineering plastics for mechanical strength, higher operational endurance and highly flame retardant body material is aiming to set new standards for ‘simple but superior’ electrical circuit protection to conquer fear of electrical fires due to short circuits and damage to electrical equipments due to over load performance, dependability and protection are strong in-built features.

Delton is an established name in the electrical industry. Delton products have been the first choice of discerning buyers and demanding customers. Our Switchgears including MCB’s are being manufactured in our well equipped and modern plant with state of the art R&D facilities. Our Miniature Circuit Breaker has been tested for 10 KA short circuit capacity at CPRI, Bhopal.





Miniature Circuit Breaker

Delgard Miniature Circuit Brakers are used to control & protect electrical circuits from overload & short circuit current, conforming to the latest IS 8828:1996 & IEC 898:95 specifications. Delgard MCB's and Distribution Boards offer easy & reliable solutions. Besides the routine and type tests at CPRI, Delgard MCB's are subjected to additional tests for greater safety , better & reliable performance.

Function / Mechanism

Thermal Release - Under overload condition the bimetal strip deflects and trips the operating mechanism

Magnetic release - In case of short circuit high current the magnetic coil activates the plunger to strikes and trips the operating mechanism

Design & Construction

Delgard SFP* MCB's have been developed & designed to provide total safety, ease of installation & connection, offer easier identification of faulty circuits and quick restoration.

Mid Trip : Under fault condition the MCB Trips and the knob comes in the center position. This clearly indicates that MCB has tripped due to fault and not any mischief.

Energy Saving: The low power loss as stipulated in the IS 8828:96 & IEC 898:95 has been taken care in designing of Delton MCB's. The low watt loss figures of Delton MCB contributes significantly to the energy saving.

DIN Rail Mounting: Delton MCB's can be mounted on standard 35 mm Din Rail by snap action. No time wastage in installing and replacing. The special lockable design of Snap Pusher / Din Rail clip makes the removal of MCB effortless.

Shock Proof: Finger and hand touch safe. Tested as per the test clause 9.6 of IS 8828:1996 & IEC 898:95 protection against electric shock.

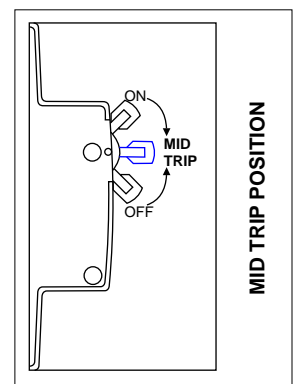
Housing : The housing of MCB is injection moulded from special grade PBT as per international specifications. The housing and other moulded components are fire retardant, anti-tracking and non hygroscopic. The housing can with stand high temperature and is impact resistant. The non-hygroscopic nature of PBT material makes the MCB shock proof under humid conditions.

Isolation: Contacts made of pure silver inlaid into copper strip, ensure long life and operational safety against contact welding and erosion.

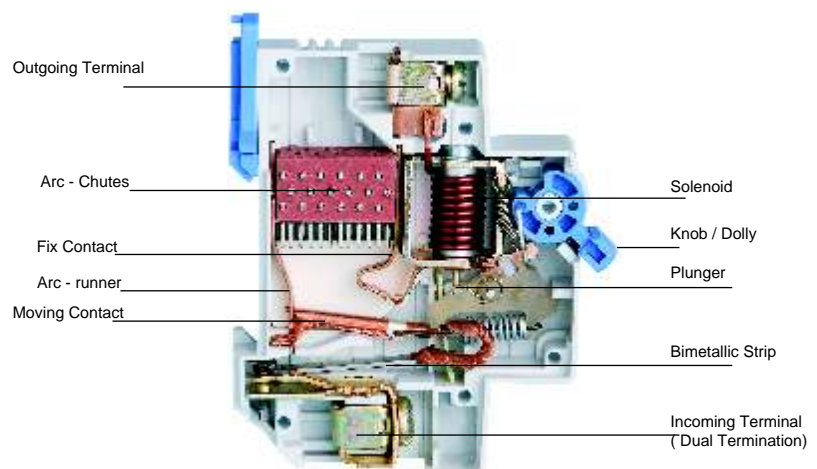
Current Limiting Action: Current limiting action ensures that the MCB operate before the full prospective fault current is allowed to develop. Minimum let through energy in the event of fault ensures the safety & protection of wires / cables and downstream equipment in the system.

Operating Mechanism: Delton MCB have a quick make & break Trip Free Mechanism. In the event of an over current or short circuit the MCB automatically interrupts all poles even if the MCB toggle is held in ON position.

Easy Installation: The design of terminals makes the wiring easier. Combination box type terminals with combination head screws on both sides with deep serrations ensure spark less and firm connections. The bigger terminal size can accommodate higher conductor size for better termination. The bi-connection facility simplifies connection in various application areas.



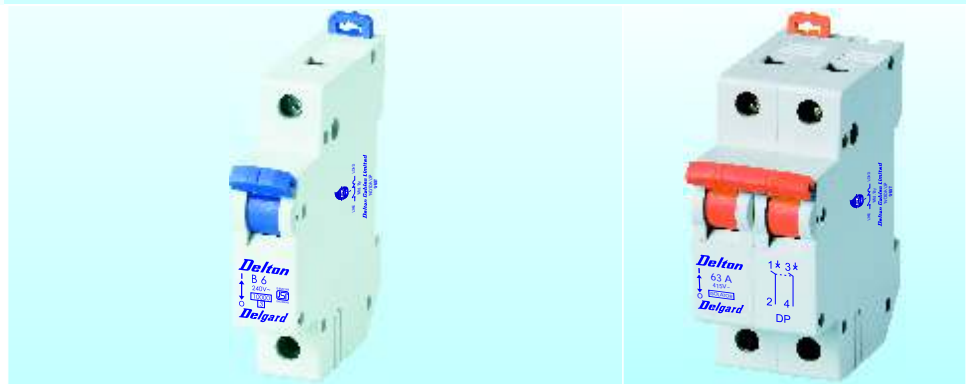
Internal View of Delgard MCB



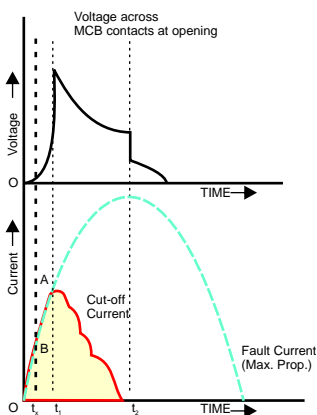
Technical Information

| | | |
|------------------------|---|----------------------------|
| Rating | : | 0.5 to 125 Amps |
| Voltage Rating | : | 240/415V AC & DC |
| No. of Poles | : | 1P,1P+N,2P,3P,3P+N,4P |
| Breaking Capacity | : | 10000 Amps (10KA) |
| Characteristics curves | : | B & C Curve # D on Request |

| Standard Conformity | MCB | | | ISOLATOR |
|--|----------------------------|--|----------------|------------------------------------|
| | IS 8828: 96 & IEC 898-1995 | | | IS 13947-3: 93 & IEC 60947-3: 2001 |
| Type/Series | B | C | D# | |
| Rated Current (In) | A | 0.5 - 63 & 80-125 | | 40 - 63 & 80-125 |
| Rated Voltage (ac) (Ue) | V | 240/415 | 240/415 | 240/415 |
| Rated Frequency | Hz | 50 / 60 | 50 / 60 | 50 / 60 |
| Nos. of Poles (Execution) | | 1P, 1P+N, 2P, 3P, 3P+N, 4P | | 1P, 2P, 3P, 4P |
| Rated Short Circuit Breaking Capacity kA | | 10 | 10 | 10 |
| Utilization Category | | M10 | M10 | M10 |
| Magnetic Release Setting | | (3-5)In | (5-10)In | (10-20)In |
| Rated Insulation Voltage (Ui) | V | 660 | 660 | 660 |
| Rated Impulse Voltage (Uimp) | kV | 4 | 4 | 4 |
| Electrical / Mechanical Endurance (Min. no. of operations) | | 30,000 | 30,000 | 30,000 |
| Ambient Temperature (°C) | | -5 to +55 | -5 to +55 | -5 to +55 |
| Terminal Capacity (max) | sq.mm | 25 | 25 | 25 |
| Vibration | g | 3 | 3 | 3 |
| Shock | | 40mm free fall | 40mm free fall | 40mm free fall |
| Protection Class | | IP-20 | | |
| Installation Position | | Vertical / Horizontal | | |
| Mounting | | Clip on DIN Rail (35mm) | | |
| Case & Cover | | Moulded, from special grade PBT as per international specifications. | | |



Current Limiting Design



In a current limiting breaker, the tripping mechanism & arc control is so designed that under short circuit conditions, the contacts are physically separated and the electrodynamic forces set up by fault current assist the extinction in less than half cycle.

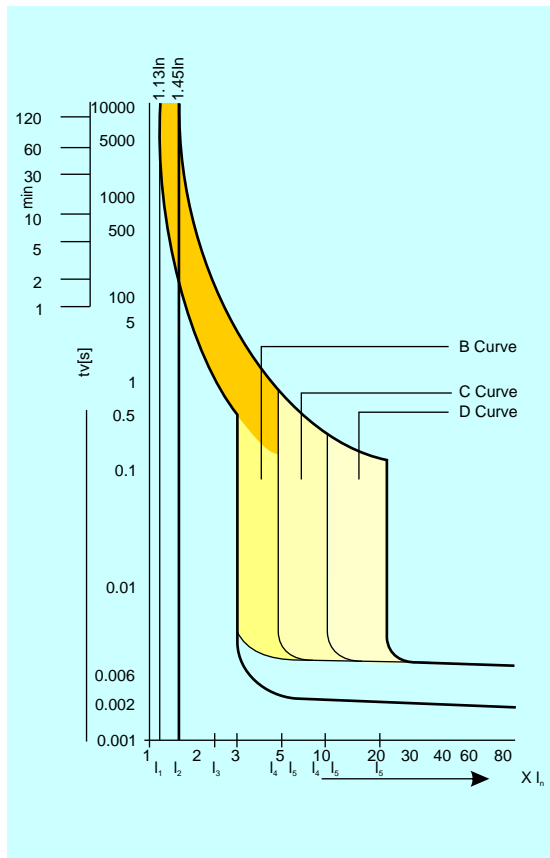
The figure shows the current limiting effect of a circuit breakers.

Fault Traces for Voltage & Current

- 0 = Point of fault initiation
 - t_x = Contact opening time (i.e., beginning of arc)
 - t_1 = Current / Voltage peak (i.e., limitation of current)
 - t_2 = Arc extinction time
- (i.e., complete shutdown of fault current)



Characteristics Curves



| Type of MCB | Thermal Tripping | | | | Magnetic Tripping | |
|-------------|------------------------------|---------------------------|----------------------|-----------------------|-----------------------|-----------------------|
| | No tripping current I_1 | Tripping current I_2 | Time Limits t | Hold current I_4 | Trip current I_5 | Time Limits t |
| 'B' Curve | $1.13 \times I_n$ | | $\approx 1\text{hr}$ | $3 \times I_n$ | | $\approx 0.1\text{s}$ |
| | | $1.45 \times I_n$ | $< 1\text{hr}$ | | $5 \times I_n$ | $< 0.1\text{s}$ |
| 'C' Curve | $1.13 \times I_n$ | | $\approx 1\text{hr}$ | $5 \times I_n$ | | $\approx 0.1\text{s}$ |
| | | $1.45 \times I_n$ | $< 1\text{hr}$ | | $10 \times I_n$ | $< 0.1\text{s}$ |
| 'D' Curve | $1.13 \times I_n$ | | $\approx 1\text{hr}$ | $10 \times I_n$ | | $\approx 0.1\text{s}$ |
| | | $1.45 \times I_n$ | $< 1\text{hr}$ | | $20 \times I_n$ | $< 0.1\text{s}$ |

Tripping Characteristics

Based on the Tripping Characteristics, MCBs are available in 'B', 'C' and 'D' curve to suit different types of applications.

'B' Curve: for protection of electrical circuits with equipment that does not cause surge current (lighting and distribution circuits)

Short circuit release is set to (3 - 5) I_n

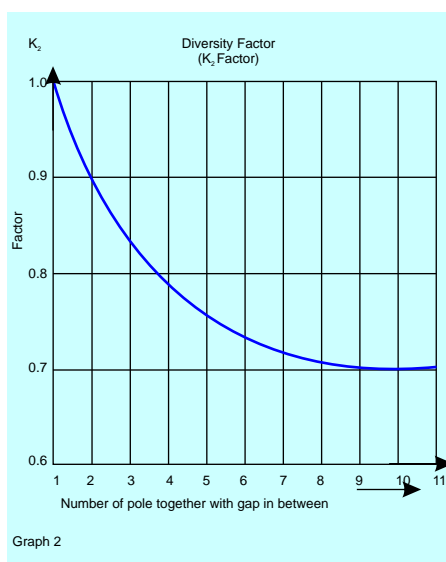
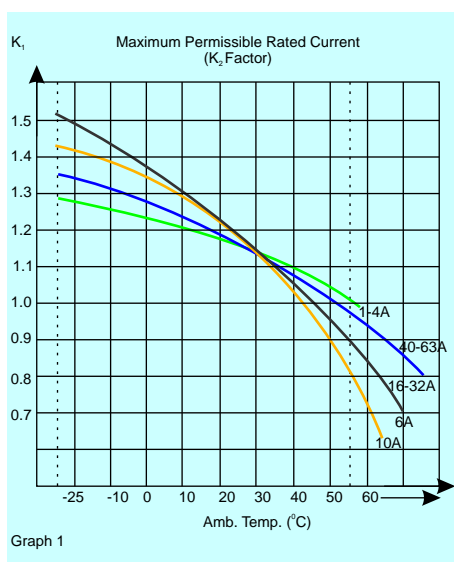
'C' Curve: for protection of electrical circuits with equipment that causes surge current (inductive loads and motor circuits)

Short circuit release is set to (5 - 10) I_n

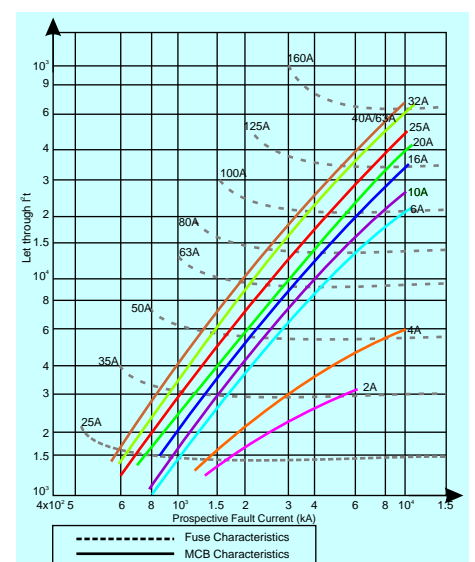
'D' Curve: for protection of electrical circuits which causes high inrush current, typically 12-15 times the thermal rated current (transformers, X-ray machines etc.)

Short circuit release is set to (10 - 20) I_n

Ambient Temperatures Compensation / Diversity Factor Chart



Let through energy I^2t



| | | | |
|-------------|-----------------------|---|---|
| Calculation | I_n / switch | = | $K1 \times K2 \times I_n$ |
| Example | 4 MCBs with I_n | = | 10A, and the amb. temp. is 50°C kept with no gap in between |
| Solution | K1 | = | 0.89 (from graph 1) |
| | K2 | = | 0.78 (from graph 2) |
| | I_n / pole | = | $0.89 \times 0.78 \times 10 = 6.94 \text{ A}$ |



For Household Application

The power loss value declared are at rated current.

| Appliance | Capacity watt (Load) (230 VAC 1 ph) | Current Rating of MCB | Type of MCB | Rated Current Amp. | Max. allowable Watt loss per pole as per IS : 8828-1996, IEC 898-95 | Delton MCB Max. Watt Loss per pole | | | | |
|--------------------------------|--|-----------------------|-----------------|--------------------|---|------------------------------------|------|------------|---------------------|-----|
| Air Conditioner | 1.0 tonnes | 10A | "C" series | 1 | 3 | 1.3 | | | | |
| | 1.5 tonnes | 16A | "C" series | | | | | | | |
| | 2.0 tonnes | 20A | "C" series | | | | | | | |
| Refrigerator | 165 litres | 3A | "C" series | 2 | 3 | 1.5 | | | | |
| | 350 litres | 4A | "C" series | | | | | | | |
| Oven cum Griller | 4500W | 32A | "B" series | 4 | 3.0 | 0.7 | | | | |
| | 1750W | 10A | "B" series | | | | | | | |
| Oven Only | 750W | 6A | "B" series | 6 | 3.0 | 0.9 | | | | |
| Hot Plate Only | 2000W | 10A | "B" series | | | | | | | |
| Room Heater | 1000W | 6A | "B" series | 8 | 3.0 | 1.3 | | | | |
| | 2000W | 10A | "B" series | | | | | | | |
| Washing Machine | 300W | 2A | "C" series | 10 | 3.5 | 1.6 | | | | |
| | | | | 13 | | | | | | |
| Washing Machine With heater | 1300W | 8A | "C" series | 16 | 3.5 | 2.1 | | | | |
| | | | | 20 | | | | | | |
| Water Heater (Storage/instant) | 1000W | 6A | "B" series | 25 | 4.5 | 2.3 | | | | |
| | | | | 2000W | | | 4.5 | 3.0 | | |
| | | | | 3000W | | | | | 6.0 | 3.3 |
| | | | | 6000W | | | | | | |
| Electric iron | 6A | "B" series | 50 | 9.0 | 6.0 | | | | | |
| | 8A | | "B" series | | | 63 | 13.0 | 7.2 | | |
| Auto toaster (2 silces) | 1200W | 8A | | "B" series | 80 | Under Consideration | | | Under Consideration | |
| | | | Electric Kettle | | 1500W | | 10A | "B" series | | 100 |
| 125 | Under Consideration | Under Consideration | | | | | | | | |

Rating of MCBs for lighting ("B" Series)

| Lamp (Watt) | Number of Lamps | Rating (A) |
|-------------|-----------------|------------|
| 20W | 8 | 1 |
| | 12 | 1.5 |
| 40W | 2 | 0.5 |
| | 10 | 2 |
| 60W | 12 | 2.5 |
| | 1 | 0.5 |
| | 4 | 1.5 |
| | 8 | 3 |
| 80W | 12 | 4 |
| | 1 | 0.5 |
| | 2 | 1 |
| | 5 | 2 |
| | 8 | 4 |
| 100W | 12 | 5 |
| | 1 | 1 |
| | 2 | 1.5 |
| | 4 | 2.5 |

Rating of MCBs for Motor ("C" Series)

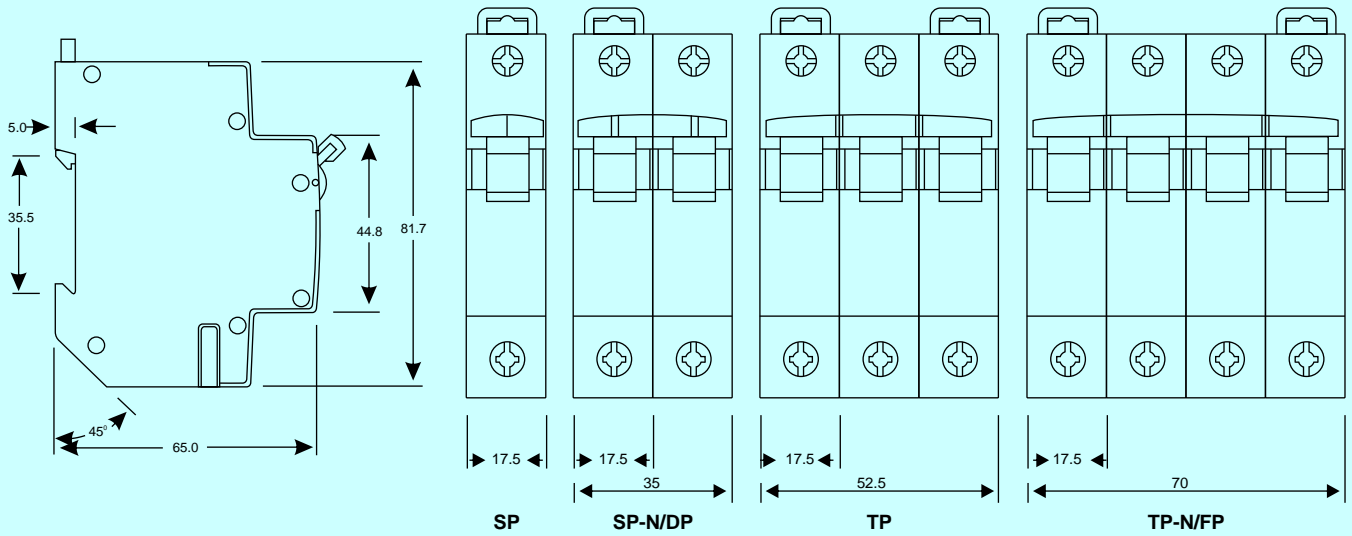
| Motor HP | kW | Star Delta | MCB Ratings DOL |
|----------|-------|------------|-----------------|
| 1.0 | 0.75 | - | 1.5A |
| 1.5 | 1.10 | - | 2.5A |
| 2.0 | 1.50 | - | 3.0A |
| 3.0 | 2.25 | - | 5.0A |
| 5.0 | 3.75 | 8A | 8.0A |
| 6.0 | 4.50 | 10A | 10.0A |
| 7.5 | 5.50 | 13A | 13.0A |
| 10.0 | 7.50 | 16A | 16.0A |
| 12.5 | 9.30 | 20A | 20.0A |
| 15.0 | 11.00 | 25A | 25.0A |
| 17.5 | 13.00 | 25A | 25.0A |
| 20.0 | 15.00 | 32A | 32.0A |
| 25.0 | 18.50 | 40A | 40.0A |
| 30.0 | 22.50 | 50A | 50.0A |
| 35.0 | 26.00 | 63A | 63.0A |



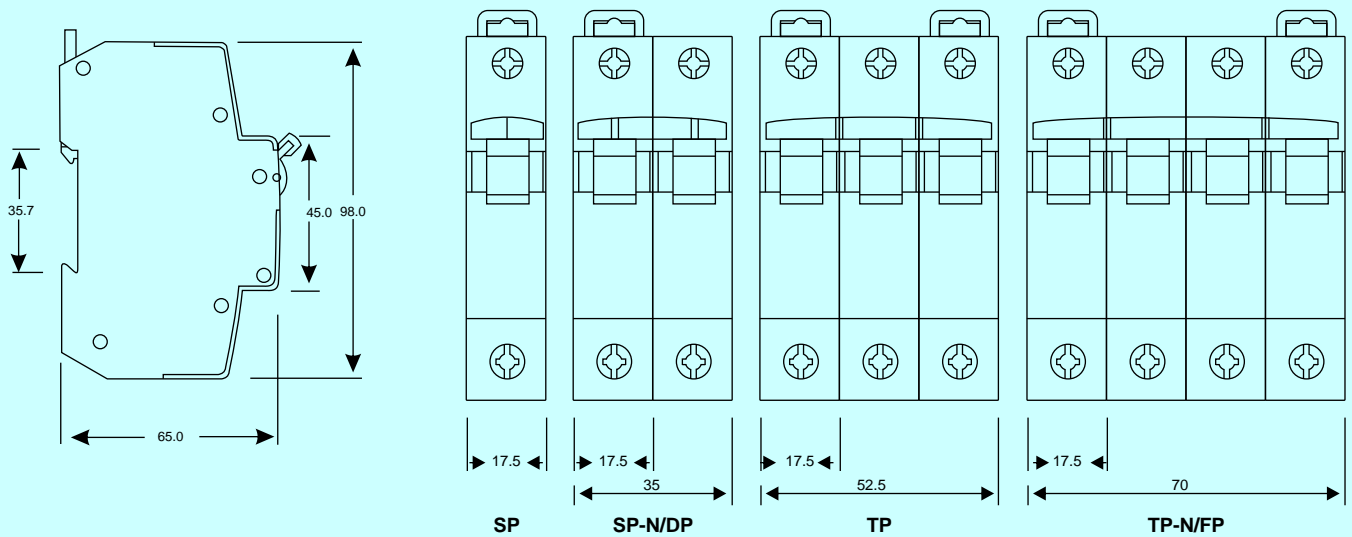
Dimension



MCB & ISOLATOR 0.5 to 63 Amps



MCB & ISOLATOR 80 to 125 Amps





Other Range

- Cable package for GSM system
- PE insulated jelly filled cables
- LAN cables
- Teflon insulated high temp cables
- Compensating Cables
- PVC/XLPE Power /Control Cables
- Zero Halogen Cables
- Single Core Wires
- PVC insulated indoor Telephone Cables
- PVC/PE insulated copper screened multicore/multipair Cables
- Polyurethane sheathed Cables
- Cables for Railway application
- RF and Coaxial Cables
- PVC/XLPE insulated steel wire braided multicore Cables
- Special Cables as per customer requirements
- Distribution Board
- MCB Changeover Switches

Delton Cables Limited

An ISO 9001:2000 Certified Company

Delton House, 4801, Bharat Ram Road, 24, Darya Ganj, New Delhi-110 002 Phones: 011-23273905-07 Fax: 011-23280375, 23272178
Email: dcl@deltoncables.com , dealer@deltoncables.com Web Site: www.deltoncables.com

Branch Offices - MUMBAI : 022-24936501 KOLKATA : 033-22824388 CHENNAI : 044-28587702 BANGALORE : 080-22263934 HYDERABAD : 09392430680

**Representative - Bhubaneswar - 09437961873, Chandigarh - 09872074555, Guwahati - 09864060319,
Jaipur - 09414047818, Lucknow - 09415578950, Rourkela - 09437962725**