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CHAPTER 01

AC SPD Type 2 20kA :

Installed at the distribution board, offering protection against surges from external sources and internally generated surges within a building. They are the most common type used in residential and commercial buildings. Their types as mentioned below:-

1.1) THACS-II10 & THACS-II20

A) NEW SURGE MODEL

MODEL AND SPECIFICATION	THACS-II10					THACS-II20				
Max. continuous operating voltage Uc (V)	275	320	385	420	750	275	320	385	420	750
Voltage protection level Up (kV)	1.0	1.2	1.0	1.5	2.0	1.2	1.4	1.2	1.8	2.5
Max. Discharging Current Imax (kA) (8/20us)	10					20				
Nominal discharge current (8/20µs) In (kA)	5					10				
Response time tA (ns)	<25									
Protection Grade	Ip20									
Standard	IEC61643-11									
Indication of invalidation	Green: Normal, Red failure									
Application	Several protection for in line									
Remote Signal Function	Can also picking									
Remarks	Other maxi continuous operating voltage can be customized									

1.1) THACS-II10 & 20

B) OB MODEL

MODEL AND SPECIFICATION	THACS-II10					THACS-II20				
Max. continuous operating voltage Uc (V)	275	320	385	420	750	275	320	385	420	750
Voltage protection level Up (kV)	1.0	1.2	1.3	1.6	2.0	1.2	1.4	1.5	1.8	2.5
Max. Discharging Current Imax (kA) (8/20us)	10					20				
Nominal discharge current (8/20µs) In (kA)	5					10				
Response time tA (ns)	<25									
Standard	IEC61643-11									
Protection Grade	Ip20									
Indication of invalidation	Green normal, red failure									
Application	Several protection for in line									
Remote Signal Function	Can also picking									
Remarks	Other maxi continuous operating voltage can be customized									

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MRP = INDIAN RUPEES

CHAPTER 1.2

AC SPD Type-2 40kA :

1.1) THACS-II10 & 20

C) INTEGRATED SHEILD MODEL

MODEL AND SPECIFICATION	THACS-II10					THACS-II20				
Max. continuous operating voltage Uc (V)	275	320	385	420	750	275	320	385	420	750
Voltage protection level Up (kV)	1.2	1.4	1.5	1.8	2.5	1.0	1.2	1.3	1.6	2.0
Max. Discharging Current Imax (kA) (8/20us)	10					20				
Nominal discharge current (8/20μs) In (kA)	5					10				
Response time tA (ns)	<25									
Standard	IEC61643-11									
Protection Grade	Ip20									
Indication of invalidation	Green normal, red failure									
Application	Several protection for in line									
Remote Signal Function	Can also picking									
Remarks	Other maxi continuous operating voltage can be customized									

1.2) THACS-II40

A) NEW SURGE MODEL

MODEL AND SPECIFICATION	THACS-II40							
Max. continuous operating voltage Uc (V)	48	175	275	320	385	420	750	1000
Voltage protection level Up (kV)	0.6	1.3	1.5	1.5	1.5	1.8	3.0	3.5
Max. Discharging Current Imax (kA) (8/20us)	40							
Nominal discharge current (8/20μs) In (kA)	20							
Response time tA (ns)	<25							
Protection Grade	Ip20							
Standard	IEC61643-11							
Indication of invalidation	Green: Normal, red: Invalidation							
Application	Several protection for in line							
Remote Signal Function	Can also picking							
Remarks	Other maxi continuous operating voltage can be customized							

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1.2) THACS-II40-NPE

B) NPE MODEL

MODEL AND SPECIFICATION	THACS-II40-NPE				
Uc(VAC) Maxi continuous operating voltage	L-N	275	320	385	420
	N-PE	255			
Up (kV) voltage protective level	L-N	1.5	1.6	1.8	2
	N-PE	1.2			
Max. Discharging Current Imax (kA) (8/20us)	40				
Nominal discharge current (8/20μs) In (kA)	20				
Response time tA (ns)	<25				
Protection Grade	Ip20				
Standard	IEC61643-11				
Indication of invalidation	Green: normal, Red failure				
Application	Line-level protection				
Remote Signal Function	Can also picking				
Remarks	Other maxi continuous operating voltage can be customized				

1.2) THACS-II40

C) OB MODEL

MODEL AND SPECIFICATION	THACS-II40							
Max. continuous operating voltage Uc (V)	48	175	275	320	385	420	750	1000
Voltage protection level Up (kV)	0.6	1.3	1.5	1.6	1.8	2.0	3.0	3.5
Max. Discharging Current Imax (kA) (8/20us)	40							
Nominal discharge current (8/20μs) In (kA)	20							
Response time tA (ns)	<25							
Protection Grade	Ip20							
Indication of invalidation	Green normal, red failure							
Application	Several protection for in line							
Remote Signal Function	Can also picking							
Remarks	Other maxi continuous operating voltage can be customized							

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1.2) THACS-II40

D) INTEGRATED SHEILD MODEL

MODEL AND SPECIFICATION	THACS-II40							
Max. continuous operating voltage Uc (V)	48	175	275	320	385	420	750	1000
Voltage protection level Up (kV)	0.6	1.3	1.5	1.6	1.8	2.0	3.0	3.5
Max. Discharging Current Imax (kA) (8/20us)	40							
Nominal discharge current (8/20µs) In (kA)	20							
Response time tA (ns)	<25							
Protection Grade	Ip20							
Indication of invalidation	Green normal, red failure							
Application	Incoming line secondary protection							
Remote Signal Function	Can also picking							
Remarks	Other maxi continuous operating voltage can be customized							

1.2) TX-AC-320V-40-T2

E) INTEGRATED SHEILD MODEL

MODEL AND SPECIFICATION	TX-AC-320V-40-T2	
Max. continuous operating voltage Uc (V)	320V	
Phase	1 ph	3 Ph
Voltage protection level Up (kV)	1.5	
Max. Discharging Current Imax (kA) (8/20us)	40	
Nominal discharge current (8/20µs) In (kA)	20	
Response time tA (ns)	<25	
Protection Grade	Ip20	
Indication of invalidation	Green normal, red failure	
Application	Incoming line secondary protection	
Remote Signal Function	Can also picking	
Remarks	Other maxi continuous operating voltage can be customized	

OR = ON REQUEST
MRP = INDIAN RUPEES

CHAPTER 1.3

AC SPD Type-2 60kA :

1.3) THACS-II60

A) NEW SURGE MODEL

MODEL AND SPECIFICATION	THACS-II60				
Max. continuous operating voltage Uc (V)	275	320	385	420	1000
Voltage protection level Up (kV)	1.5	1.5	2.0	2.2	3.5
Max. Discharging Current Imax (kA) (8/20us)	60				
Nominal discharge current (8/20μs) In (kA)	30				
Response time tA (ns)	<25				
Protection Grade	Ip20				
Standard	IEC61643-11				
Indication of invalidation	Green: Normal, Red failure				
Application	Line-level protection				
Remote Signal Function	Can also picking				

1.3) THACS-II60

B) 27MM OB MODEL

MODEL AND SPECIFICATION	THACS-II60				
Max. continuous operating voltage Uc (V)	275	320	385	420	1000
Voltage protection level Up (kV)	1.6	1.8	2.0	2.2	3.5
Max. Discharging Current Imax (kA) (8/20us)	60				
Nominal discharge current (8/20μs) In (kA)	30				
Response time tA (ns)	<25				
Protection Grade	Ip20				
Indication of invalidation	Green normal, red failure				
Application	Line-level protection				
Remote Signal Function	Can also picking				
Remarks	Other maxi continuous operating voltage can be customized				

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CHAPTER 1.4

AC SPD Type 2 80kA :

1.3) THACS-II60

C) INTEGRATED SHEILD MODEL

MODEL AND SPECIFICATION	THACS-II60				
Max. continuous operating voltage Uc (V)	275	320	385	420	1000
Voltage protection level Up (kV)	1.6	1.8	2.0	2.2	3.5
Max. Discharging Current Imax (kA) (8/20us)	60				
Nominal discharge current (8/20μs) In (kA)	30				
Response time tA (ns)	<25				
Protection Grade	Ip20				
Indication of invalidation	Green normal, red failure				
Application	Line-level protection				
Remote Signal Function	Can also picking				
Remarks	Other maxi continuous operating voltage can be customized				

1.4) THACS-II80

A) NEW SURGE MODEL

MODEL AND SPECIFICATION	THACS-II80			
Max. continuous operating voltage Uc (V)	275	320	385	420
Voltage protection level Up (kV)	1.8	2.0	2.3	2.5
Max. Discharging Current Imax (kA) (8/20us)	80			
Nominal discharge current (8/20μs) In (kA)	40			
Response time tA (ns)	<25			
Protection Grade	Ip20			
Standard	IEC61643-11			
Indication of invalidation	Aging Invalidation: Green: Normal, Red failure			
Application	Line-level protection			
Remote Signal Function	Can also picking			
Remarks	Other maxi continuous operating voltage can be customized			

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CHAPTER 1.5

AC SPD Type-2 100kA & 120kA & 150kA :

1.4) THACS-II80

B) 27MM OB MODEL

MODEL AND SPECIFICATION	THACS-II80			
Max. continuous operating voltage Uc (V)	275	320	385	420
Voltage protection level Up (kV)	1.8	2.0	2.3	2.5
Max. Discharging Current Imax (kA) (8/20us)	80			
Nominal discharge current (8/20μs) In (kA)	40			
Response time tA (ns)	<25			
Protection Grade	Ip20			
Indication of invalidation	Green normal, red failure			
Application	Line-level protection			
Remote Signal Function	Can also picking			
Remarks	Other maxi continuous operating voltage can be customized			

1.5) THACS-II100&120&150

A) NEW SURGE MODEL

MODEL AND SPECIFICATION	THACS-II100				THACS-II120			THACS-II150			
Max. continuous operating voltage Uc (V)	275	385	420		275	320	385	275	320	385	420
Voltage protection level Up (kV)	1.8	2.5	2.5		1.8	2	2.3	2	2.5	3.2	3.5
Max. Discharging Current Imax (kA) (8/20us)	100				120			150			
Nominal discharge current (8/20μs) In (kA)	50				60			80			
Response time tA (ns)	<25										
Protection Grade	Ip20										
Standard	IEC61643-11										
Indication of invalidation	Aging failure: colorless Normal, red failure										
Application	Line-level protection										
Remote Signal Function											
Remarks											

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CHAPTER 02

AC SPD Type-1 15&25kA :

Installed at the service entrance, designed to protect against external surges, such as those caused by lightning or utility switching. The various variants in type 1 type of SPD are mentioned below:-

2.1) THACS-I15&25

A) NEW SURGE MODEL

MODEL AND SPECIFICATION	THACS-I15	THACS-I25
Lightning protection zone	1 Class 1	
Max. continuous operating voltage Uc(V)	275, 385, 420, 440	
Voltage protection level Up(kV)	2.5	
Maximum inrush current	15	25
Nominal discharge current (8/20µs) In (kA)	50	
Response time tA (ns)	<_25	
Ambient temperature	~40 C ~+ 80C	
Protection Grade	Ip20	
Standard	IEC61643-11	
Indication of invalidation	Colorless is normal, Red failure	
Remote Signal Function	Can also picking	
Installation	35mm Mounted on a 35mm rail	

2.2) THACS-I15

B) INTEGRATED SHEILD MODEL

MODEL AND SPECIFICATION	THACS-I15	THACS -I25
Rated operating voltage (Un)	220/50-80Hz	
Max.continuous operating voltage Uc (V)	275, 320, 385, 420, 440, 690	
Lightning protection zone	LPZ0A LPZ0B-LPZ1	
Insulation resistance	>100M Ω	
Voltage protection level Up (kV)	<2.5kV	
Response time tA (ns)	<100ns	
Maximum inrush current	15~25A	
Nominal discharge current (8/20µs) In (kA)	15~20A	
Range of working temperature	~40C ~+ 80C	
Air Humidity	_<95%	
Protection Grade	Ip20	
Installation	35mm The card is attached to the 35mm rail	

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CHAPTER 03

AC SPD Type 1+2 40kA :

Installed near the point of use, providing additional protection for specific devices or circuits against residual surges that may pass through Type 1 or Type 2 devices.

3.1) THACS-II40

A) NEW SURGE MODEL

3.2) THACS-NPE

B) NPE MODEL

MODEL AND SPECIFICATION	THACS-II40
Max. continuous operating voltage Uc (V)	385
Voltage protection level Up (kV)	2
Max. Discharging Current Imax (kA) (8/20us)	40
Nominal discharge current (8/20µs) In (kA)	20
Response time tA (ns)	<25
Protection Grade	Ip20
Indication of invalidation	Green normal, red failure
Application	Incoming line secondary protection
Remote Signal Function	Can also picking
Remarks	Other maxi continuous operating voltage can be customized

MODEL AND SPECIFICATION	THACS-NPE				
Max. continuous operating voltage Uc (V)	275 V	320 V	385 V	420 V	440 V
Voltage protection level Up (kV)	2				
Max. Discharging Current Imax (kA) (8/20us)	40				
Nominal discharge current (8/20µs) In (kA)	20				
Response time tA (ns)	<25				
Protection Grade	Ip20				
Indication of invalidation	Green normal, red failure				
Application	Incoming line secondary protection				
Remote Signal Function	Can also picking				
Remarks	Other maxi continuous operating voltage can be customized				

OR = ON REQUEST
MRP = INDIAN RUPEES

CHAPTER 3.1

AC SPD Type 1+2 60kA :

3.1) THACS-II60

A) INTEGRATED SHEILD MODEL

MODEL AND SPECIFICATION	THACS-II60				
Max. continuous operating voltage Uc (V)	275	320	385	420	440
Voltage protection level Up (kV)	1.8				
Max. Discharging Current Imax (kA) (8/20us)	60				
Nominal discharge current (8/20µs) In (kA)	30				
Response time tA (ns)	<25				
Protection Grade	Ip20				
Indication of invalidation	Green normal, red failure				
Application	Line-level protection				
Remote Signal Function	Can also picking				
Remarks	Other maxi continuous operating voltage can be customized				

CHAPTER 4

DC SPD Type-2 40kA :

Installed at the distribution board, offering protection against surges from external sources and internally generated surges within a building. They are the most common type used in residential and commercial buildings. Their types as mentioned below:-

A) NEW SURGE MODEL

MODEL AND SPECIFICATION	THDCS-40PV					
No of Poles	2 pole			3 pole		
Max.continuous operating voltage Uc (V)	500	600	800	1000	1200	1500
Voltage protection level Up (kV)	2.8			3.5		
Max. Discharging Current Imax (kA) (8/20us)	40					
Nominal discharge current (8/20µs) In (kA)	20					
Response time tA (ns)	<25					
Protection Grade	Ip20					
Indication of invalidation	Green normal, red failure					
Application	Line-level protection					
Remote Signal Function	Can also picking					
Remarks	Other maxi continuous operating voltage can be customized					

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CHAPTER 4.1

DC SPD Type 1+2 :

Installed near the point of use, providing additional protection for specific devices or circuits against residual surges that may pass through Type 1 or Type 2 devices.

B) INTEGRATED SHEILD MODEL

MODEL AND SPECIFICATION	THDCS-40PV					
No of Poles	2 pole			3 pole		
Max.continuous operating voltage Uc (V)	500	600	800	1000	1200	1500
Voltage protection level Up (kV)	2.8			3.5		
Max. Discharging Current Imax (kA) (8/20us)	40					
Nominal discharge current (8/20μs) In (kA)	20					
Response time tA (ns)	<25					
Inrush Current limp (kA)	5kA					
Protection Grade	Ip20					
Indication of invalidation	Green normal, red failure					
Application	Line-level protection					
Remote Signal Function	Can also picking					
Remarks	Other maxi continuous operating voltage can be customized					

APPLICATION OF SPD

By diverting or limiting surge current, SPDs help to prevent immediate or cumulative damage to electrical devices, extending their lifespan and ensuring continued operation.

INSTALLATION

- Installed at the junction of Lightning protection zone (herein referred as LPZ) like LPZ1 or LPZ2 zone and LPZ3 zone using 35mm standard guide rails, connecting copper stranded wires with 2.5~16 sq.mm cable.
- Each pole of SPD must be protected with the use fuses or miniature circuit breakers or special backup protectors for voltage protection.
- Places of application: Suitable for household distribution boxes, computer equipment, and information equipment. In front of or nearest socket box of electronic equipment and control equipment.

MAIN STRUCTURE AND WORKING PRINCIPLE

- SPD has a built-in disconnected. When the SPD fails due to overheating or breakdown, the disconnected can automatically disconnect it from the power grid and give an indication signal at the same time.
- The visible window displays green when the SPD is working normally, and displays red when it falls to disengage.
- 1P+N, 2P+N, 3P+N are composed of 1P, 2P, 3P SPD+NPE zero—ground protection modules, which are used in TT, TN-S and other power supply systems.

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CHAPTER 5

DC FUSE

Overview

A DC fuse, or direct current fuse, is a protective device used in electrical circuits that operate on direct current (DC) power. The primary function of a fuse is to interrupt the flow of current in the circuit when it exceeds a specified level, preventing damage to the connected devices or components and reducing the risk of electrical fires.

Here is an overview of key aspects related to DC fuses:

Functionality: Overcurrent Protection: DC fuses protect circuits from excessive current, which can occur due to short circuits, overloads, or faults.

Circuit Interruption: When the current exceeds the fuse's rated value, it causes the fuse element to melt or blow, breaking the circuit and stopping the flow of electricity.

Construction:

a) Fuse Element: Typically made of a material with a low melting point, such as a metal wire or alloy. The element is the part that melts or breaks when exposed to excessive current.

b) Fuse Body: The housing that contains the fuse element, providing protection and insulation.

c) End Caps: Connect the fuse to the circuit and secure it in place.

Voltage Rating: DC fuses have a specific voltage rating that indicates the maximum voltage they can safely interrupt. It's crucial to use fuses with the appropriate voltage rating for the DC circuit.

Applications: DC fuses find applications in various systems, including automotive electronics, solar power systems, battery banks, telecommunications equipment, and other DC-powered devices.

Sizing and Selection: Proper selection of fuse ratings is essential to ensure adequate protection without frequent nuisance trips. Factors such as current, voltage, and time-current characteristics are considered during the sizing process.

Testing and Replacement: Periodic testing of DC fuses is recommended to ensure their functionality. Fuses that have blown or shown signs of wear should be replaced promptly with fuses of the same type and rating.

Standards and Regulations: DC fuses should comply with relevant industry standards and regulations to ensure their reliability and safety. Common standards include those set by organizations like the International Electro technical Commission (IEC) and Underwriters Laboratories (UL).

Understanding the specific requirements of your DC circuit and choosing the appropriate type and rating of a fuse is crucial for maintaining the safety and reliability of the electrical system

Type :

The main type of fuses are mentioned below:-

5.1) TXPV-30DN

MODEL AND SPECIFICATION	TXPV-30DN							
Part	Fuse holder	Fuse link						
Max.continuous operating voltage Uc (V)	1000							
Current Rating (A)	30A	2A	5A	10A	15A	20A	25A	30A
Material	ABS (FR Material)	Body: Ceramic | Terminal: Pure Silver copper Fuse Element: Silver Millenium						
Size	75 x 18 mm	10 x 38 mm						
Standard	IEC60269-1 & 2	IEC60269-6						
Indication of invalidation	Disconnection of fuse element							

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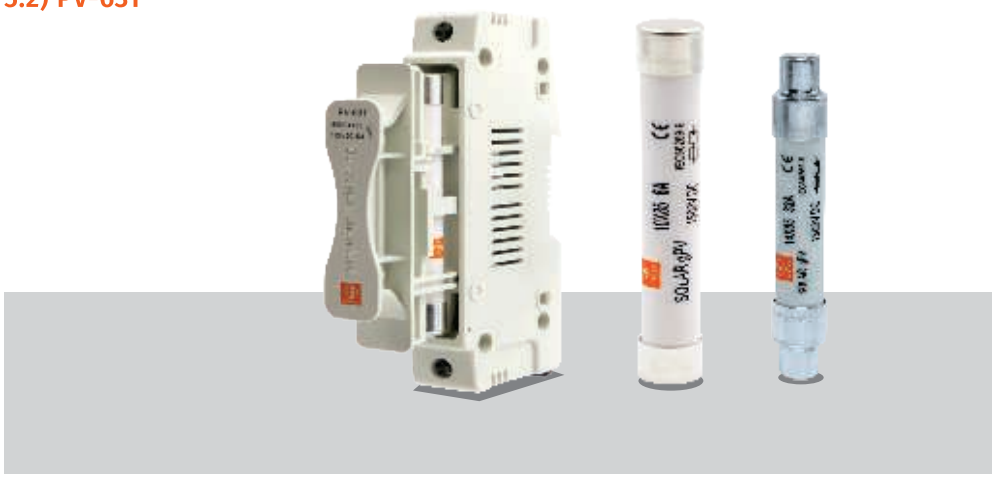
5.2) PV-63T



MODEL AND SPECIFICATION	PV-63T									
Part	Fuse holder	Fuse link								
Max.continuous operating voltage Uc (V)	1500									
Current Rating (A)	32A & 50A	2A	4A	6A	10A	16A	20A	25A	32A	40A	50A
Material	ABS (FR Material)	Body: Ceramic | Terminal: Pure Silver copper Fuse Element: Silver Millenium								
Size	75 x 18 mm	10 x 85 mm								14 x 85 mm
Standard	IEC60269-1 & 2	IEC60269-6								
Indication of invalidation	Disconnection of fuse element									

Working Principle

- A DC fuse operates on the basic principle of interrupting the flow of electrical current in a circuit to protect the circuit components from overcurrent conditions. The fundamental working principle of a DC fuse is similar to that of an AC fuse, but there are some key differences to consider.
- The core component of a fuse is the fuse element, which is typically a thin wire or strip made of a material that has a relatively low melting point. The fuse element is chosen based on the expected current-carrying capacity of the circuit. In normal operating conditions, when the current in the circuit is within the rated capacity of the fuse, the fuse element remains intact, allowing the current to flow through the circuit without any interruption.
- When an overcurrent condition occurs due to a short circuit or excessive load in the circuit, the current flowing through the fuse exceeds its rated capacity. This increased current causes the fuse element to heat up. As the current continues to rise beyond the fuse's rated capacity, the fuse element heats up to the point where it reaches its melting or vaporization temperature. At this critical temperature, the fuse element melts or vaporizes, creating an open circuit and interrupting the flow of current.
- By interrupting the circuit, the fuse protects the connected devices and components from the damaging effects of overcurrent. It helps prevent fires, damage to equipment, and ensures the safety of the electrical system.

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CHAPTER 6

DC MCB

Overview

- A DC (Direct Current) MCB (Miniature Circuit Breaker) is an electrical device designed to protect electrical circuits and equipment from overcurrent conditions. It serves a similar purpose to a DC fuse but offers the advantage of being reusable after tripping. Here's an overview of the DC MCB and its key features:
- A DC MCB is primarily designed to interrupt the flow of electrical current in a circuit when there is an overcurrent condition, such as a short circuit or excessive load. Unlike fuses, MCBs can be manually reset after tripping, providing a convenient way to restore power to the circuit once the cause of the overcurrent is addressed.

Construction: DC MCBs consist of a switch mechanism and a trip mechanism. The switch mechanism allows for manual operation, enabling users to turn the circuit on and off. The trip mechanism is designed to detect overcurrent conditions and automatically trip (open) the circuit to interrupt the current flow.

Trip Characteristics: DC MCBs are available with different trip characteristics, such as Type B, Type C, and Type D, each suited for specific applications with varying levels of inrush current and time-delay requirements.

Type B MCBs are suitable for general-purpose applications.

Type C MCBs are designed for circuits with moderate inrush currents, typically found in motor control applications.

Type D MCBs are suitable for circuits with high inrush currents, such as those connected to transformers and welding machines.

Voltage Ratings: DC MCBs are designed to operate within specific voltage ranges, and it's crucial to choose an MCB with an appropriate voltage rating for the DC system it protects.

Polarity Sensitivity: DC MCBs are often polarity-sensitive, meaning they are designed to handle the specific characteristics of direct current, including the direction of current flow.

Installation: DC MCBs are typically DIN rail-mounted for easy installation in electrical distribution panels or enclosures. They are commonly used in solar power systems, battery banks, and other DC electrical systems.

Testing and Resetting: DC MCBs play a crucial role in protecting DC circuits and connected equipment from damage due to overcurrent conditions, ensuring the safety and reliability of electrical systems

Type :

The main type of fuses are mentioned below:-

6.1) SINGLE POLE (1P)

MODEL AND SPECIFICATION	SINGLE POLE												
Max.continuous operating voltage Uc (V)	250												
Frame	63A									125A			
Current Rating (A)	6A	10A	16A	20A	25A	32A	40A	50A	63A	63A	80A	100A	125A
Breaking Capcity (Icu=75%)	10kA												
Trip Curve	C												
Standard	IEC 60947-2												
Mounting	35mm Dinrail												
Indication of invalidation	Tripping												

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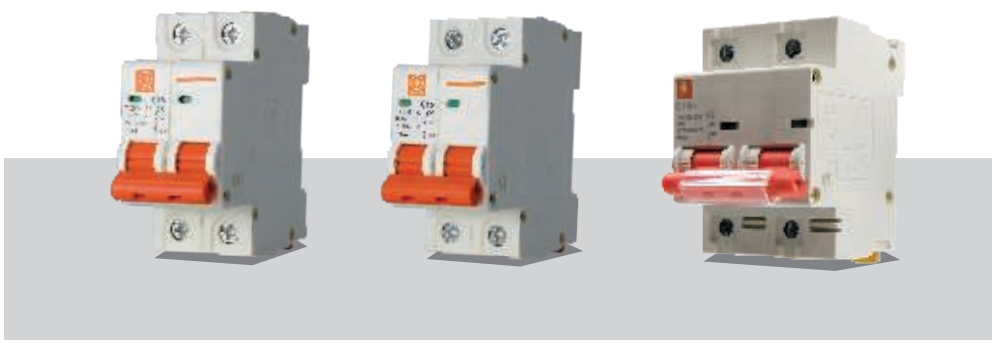
6.2) DUAL POLE (2P)



MODEL AND SPECIFICATION	DUAL POLE							
Max.continuous operating voltage Uc (V)	500		800		550			
Frame	63A				125A			
Current Rating (A)	16A	32A	50A	63A	63A	80A	100A	125A
Breaking Capcity (Icu=75%)	10kA							
Trip Curve	C							
Standard	IEC60947-2							
Mounting	35mm Dinrail							
Indication of invalidation	Tripping							

6.3) FOUR POLE (4P)

MODEL AND SPECIFICATION	FOUR POLE							
Max.continuous operating voltage Uc (V)	1000							
Frame	63A				125A			
Current Rating (A)	16A	32A	50A	63A	63A	80A	100A	125A
Breaking Capcity (Icu=75%)	10kA							
Trip Curve	C							
Standard	IEC60947-2							
Mounting	35mm Dinrail							
Indication of invalidation	Tripping							

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Working Principle

- The working principle of a DC (Direct Current) MCB (Miniature Circuit Breaker) involves the detection of overcurrent conditions and the subsequent interruption of the electrical circuit to protect the connected equipment. Here's a step-by-step overview of the working principle:
- A DC MCB consists of a switching mechanism that allows manual control of the circuit. It typically includes a handle that can be moved between the "on" and "off" positions, enabling users to control the flow of current through the circuit. DC MCBs employ either a bimetallic strip or a magnetic trip mechanism, or a combination of both, to detect overcurrent conditions.
- When there is an increase in current beyond the rated capacity, the bimetallic strip within the MCB heats up. The bimetallic strip is made of two different metals with different coefficients of thermal expansion. As it heats up, the metals expand at different rates, causing the strip to bend. This bending action triggers the mechanical linkage connected to the switch, forcing it to trip and open the circuit.
- In addition to or instead of the bimetallic strip, DC MCBs may use a magnetic trip mechanism. This mechanism responds to rapid increases in current, such as those caused by short circuits. A strong magnetic field is created when a high current flows through the MCB, pulling on the magnetic trip mechanism and causing the circuit to trip.
- After tripping due to overcurrent, the MCB can be manually reset by moving the handle to the "off" position and then back to the "on" position. This reset action restores the MCB to its operational state, allowing the circuit to be re-energized.
- DC MCBs are often designed to be polarity-sensitive, considering the direction of current flow in a DC circuit. This ensures proper operation and protection in both positive and negative current scenarios.

CHAPTER 7

Surge circuit breaker

7.1) THSCB

Overview

THSCB 50/6 OHz. 380V TT. TN=S. TN=C. IT. TN-C-S 1/IEC61643-1|.

The THSCB backup protector is suitable for TT. TN=S, TN-C, IT, TN-CS and other power supply systems with AC 50/60 0Hz, 380V and below, for Surge protector devices that protect against lightning strikes or other transient over voltages. Protection.

The THSCB complies with IEC61643-1I.

Scope of use

- Selective disconnection of the passed power frequency current and lightning current can effectively protect the SPD from melting and short-circuiting due to abnormal transient over—voltage, resulting in serious fire accidents.
- Selective breaking of the passed power frequency current and lightning can effectively protect the SPD from causing the SPD starting voltage to drop below the power supply voltage and increase the power leakage current, resulting in a serious fire accident.

  When the SPD has lightning current, the external device will not be accidentally tripped, so that the lightning protection of the electrical equipment is always in the effective state.

Why SCB - Surge Circuit Breaker?

The issue of mismatching between surge protection devices (SPDs) and fuses or breakers has been effectively addressed through the implementation of Surge Current Bypass (SCB) technology, successfully mitigating the problem of SPD failure ignition trips.

Traditionally, fuses or breakers were connected in series before lightning protection devices, leading to four key areas of mismatching:

Delayed Disconnection: During lightning protective device degradation or overvoltage events in the distribution circuit, lightning protection devices could short-circuit to ground, causing fuses or breakers to struggle in quickly disconnecting.

Limited Capability: Fuses or breakers, originally designed for power distribution, often couldn't handle the temporary energy of lightning currents, increasing the risk of tripping or explosion and compromising lightning protection effectiveness.

High Up Value: Lightning currents passing through breakers often resulted in a very high Up value, diminishing the ability of lightning protection devices to adequately safeguard equipment.

Transformer Power Lines: Fuses or breakers faced difficulty in quick disconnection within power installed lines connected to transformers during short circuits, prolonging the potential damage to equipment.

With SCB technology, surge currents are effectively diverted, bypassing the fuses or breakers and preventing them from experiencing excessive stress or tripping. This ensures reliable protection of equipment against surges, even in high-risk scenarios such as lightning strikes.

Where does SCB install?

By installing a Surge Circuit Breaker (SCB) at the forefront of a Surge Protective Device (SPD), four critical issues can be effectively addressed simultaneously:

Swift Disconnection: In scenarios where lightning protective devices degrade or overvoltage occurs in the distribution circuit, the SCB can swiftly disconnect to prevent firing of the lightning protective devices. With a breaking current of less than 3 A, this ensures timely protection against potential surges.

Robust Performance: The SCB, when integrated in series ahead of the SPD, can withstand lightning currents of up to 100kA without tripping or sustaining damage. This ensures the uninterrupted functionality of the SPD even under extreme surge conditions, maintaining its efficacy in protecting equipment.

Low Up Value: As the lightning current passes through the SCB, the Up value remains very low, comparable to that of copper with equivalent length. This minimizes the impedance experienced by the surge current, optimizing the performance of the SPD in dissipating surges.

High Breaking Capacity: With a breaking capacity exceeding that of plastic breakers, the SCB can handle surge currents of up to 100kA. This high breaking capacity ensures robust protection against surges, enhancing the reliability of the entire surge protection system.

In summary, the integration of an SCB in the front end of an SPD provides a comprehensive solution to multiple challenges, ensuring efficient and reliable protection against surge-related risks.

OR = ON REQUEST
MRP = INDIAN RUPEES

Working Principle

The Surge Circuit Breaker (SCB) serves as the dedicated external disconnected for Surge Protective Devices (SPDs), developed in accordance with article 430.3 of the IEC61643-4-43 standard. Its purpose is to implement suitable over-current protection measures before circuit-related hazards arise.

Primarily, the SCB addresses issues concerning the rapid tripping of SPDs in response to following currents or leakage currents, while ensuring that lightning currents do not trigger its trip mechanism. This capability prevents potential fire hazards caused by SPDs and prolongs the effectiveness of equipment lightning protection. By doing so, it resolves the limitations of commonly used fuses and breakers, which may create protection blind spots.

Designed to complement voltage switching type SPDs and voltage limiting type SPDs within low-voltage power supply systems, the Surge Circuit Breaker emerges as the ideal matching device. Its integration enhances the overall reliability and performance of surge protection systems, ensuring robust safeguarding against electrical surges.

Product Usage

The selective disconnection of power frequency currents and lightning currents plays a crucial role in safeguarding Surge Protective Devices (SPDs) from short-circuiting and potential fire hazards due to abnormal transient over-voltage.

By effectively segregating power frequency currents from lightning currents, SPDs are shielded from scenarios where their starting voltage drops below the power supply voltage, leading to increased power frequency leakage currents and the risk of fire accidents.

Furthermore, this selective division ensures that when lightning currents are present, the external disconnected remains stable and will not inadvertently trip. This ensures that the lightning protection of electrical equipment remains consistently effective, enhancing overall safety and reliability.

Scope of application

The Surge Circuit Breaker, designed as a specialized backup protector, offers expert backup defense for Surge Protection Devices (SPDs) responsible for safeguarding power supplies across multiple tiers.

It finds suitability in locations where SPD lightning protection systems are already in place, such as industrial and civil construction sites, electrical infrastructure, communication networks, road transportation facilities, petrochemical installations, and various other industrial sectors.

Its application ensures comprehensive backup protection, reinforcing the effectiveness of SPDs and maintaining the integrity of power supplies in critical infrastructure settings.

Features

- Parametric control tripping mechanism to selectively disconnect the passing current
- Low residual current and high withstand voltage
- Modularization module, small size, easy to install with SPD
- Full specifications, meeting the SPD support of T1, T2and T3
- 35mm rail installation, in line with general installation requirements

The main technical parameters

MODEL AND SPECIFICATION	THSCB-II 20	THSCB-II 40	THSCB-II 60	THSCB-II 80	THSCB-II 100	THSCB-115	THSCB-125
Ie Non-Tripping surge current	20kA(8/20μs)	40kA(8/20μs)	60kA(8/20μs)	80kA(8/20μs)	100kA(8/20μs)	15kA)10/350μs)	25kA(10/350μs)
Non-tripping impulse current withstand capability	10kA(8/20μs)	20kA(8/20μs)	30kA(8/20μs)	40kA(8/20μs)	50kA(8/20μs)	Iimp:15 kA (10/350μs)	Iimp:25 kA (10/350μs)
	20kA(8/20μs)	40kA(8/20μs)	60kA(8/20μs)	80kA(8/20μs)	100kA(8/20μs)		
Ue rated operating voltage	230/400VAC						
Ui rated insulation voltage	400VAC						
Ii current trip value	3+- 1A						
Tos power frequency short circuit bracking time	<_40ms						
To power frequency load current breaking time	<_50ms						
Mechanical life	4000						
Electrical life	4000						
Protection Grade	Ip20						
Wiring scew	M5						
Connecting cable small area	2.5mm2						
Connecting cable area	25mm2						
Dimensions (1P)(mm)	85*72*73.5mm						
Normal working environment	-25~+60C						
Mounting rail	35mm(EN60715)						

OR = ON REQUEST
MRP = INDIAN RUPEES

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