

GENERAL PRODUCT CATALOGUE

Xoren® electric

Xoren®
electric

X Koren Electric is a leading brand delivering innovative and sustainable solutions for the electrical industry. With our low-voltage switchgear products, we continue to operate as a strong player in the sector, and since our establishment, we have proudly ranked among Turkey's Top 100 Fastest Growing Companies every year with remarkable consistency. In 2024, we were honored to rank 19th on this prestigious list, and we also climbed to 140th on the Fortune 500 Turkey list, further increasing our recognition both locally and internationally. These achievements reinforce X Koren Electric's leading position in the industry while underlining our commitment to innovation and quality.

On the occasion of the 100th anniversary of our Republic, we transitioned to local production, taking pride in contributing to our country and economy. We continuously improve our manufacturing processes by examining them meticulously in our factory. We stand out with our environmentally friendly production practices and adopt a zero-waste approach, minimizing all forms of waste. We have officially documented this environmental awareness and sustainability commitment through our Zero Waste Certificate. Guided by our motto "In the path of light for a bright future", we contribute to spreading and making light visible.

Our product portfolio includes a wide range of low-voltage protection and measuring devices such as Miniature Circuit Breakers, Current Transformers, Contactors, Residual Current Circuit Breakers, fuse switch disconnectors, and NH fuses, all compliant with national and international quality standards. We take great pride in offering these products to our customers with 100% local capital.

As a company that places great emphasis on sustainability, we invest heavily in renewable energy sources and energy efficiency to reduce our carbon footprint and leave a more livable world for future generations. By using environmentally friendly technologies, we play a leading role in protecting natural resources and combating climate change.

Our journey, which began in 2006 as a South Korean brand, gained a new dimension in 2019 when we became an independent Turkish company. Today, we serve electricity distribution companies, electrical and energy firms, contractors, machinery manufacturers, public institutions, municipalities, universities, and various industrial organizations through our active and widespread sales network and solution partners across Turkey and around the world.

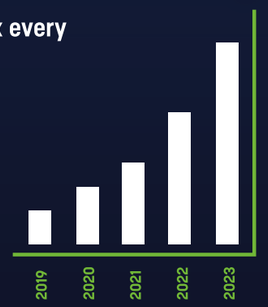
Rapidly advancing in the race for leadership in the sector, we have made our mark with the achievements we have attained in a short period. At X Koren Electric, with our innovative products and quality-oriented production philosophy, we stand out not only in the local market but also globally. Our exports have already reached 70 countries in just one year, and we continue to take further steps forward in this field every day.

Made in **Türkiye**



We continue to grow and expand our sales network every year,driven by our strong vision and mission.





YERLİ ÜRETİM · TSE · TÜV NORD · CE · IEC · EAC · RoHS ÇEVRE DOSTU · AEEE · ISO · TR EN · SIFIR ATIK

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VALID FOR ALL OUR PRODUCTS
2 YEARS WARRANTY

MINIATURE CIRCUIT BREAKER

X Koren Electric Miniature Circuit Breakers are electromechanical devices that protect electrical circuits from overcurrents and short-circuit currents while also performing the switching function of opening and closing the circuit.

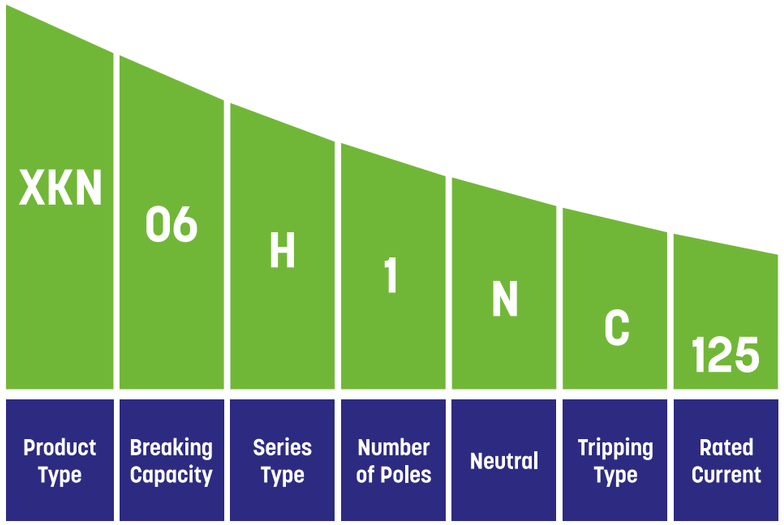
When the current flowing through the circuit exceeds a certain level for various reasons, the tripping mechanism operates automatically, cutting off the current in the circuit. This prevents damage to the connected equipment and reduces the risk of potential fire hazard

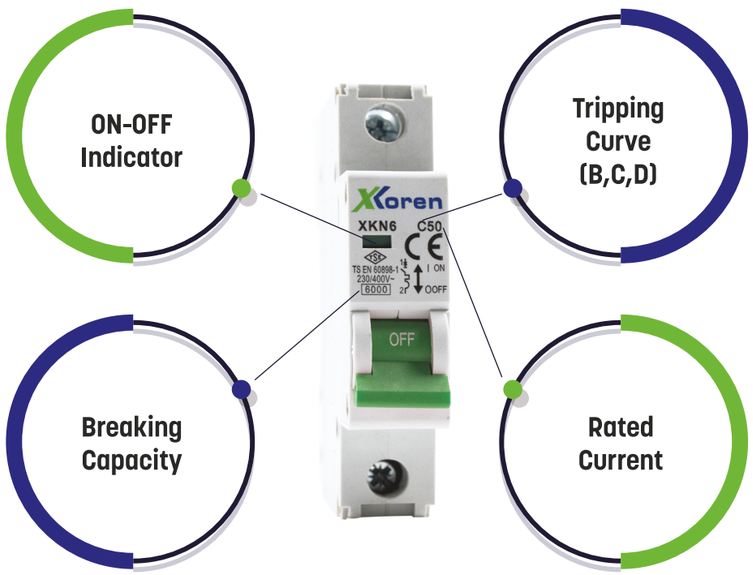




www.xkoren.com

Product Code and Label Information





GENERAL PRODUCT CATALOG

MINIATURE CIRCUIT BREAKER

XKN 3kA Miniature Circuit Breaker



Miniature Circuit Breaker			XKN3			
Protection			Protection against Overload and Short Circuit Currents			
Number of Poles		P	1	2	3	4
Rated Operational Voltage	Ue	VAC	230/400	400		
Rated Insulation Voltage	Ui	V	690			
Rated Impulse Withstand Voltage	Uimp	kV	4			
Type of Current to be Protected			AC			
Operating Frequency		Hz	50/60			
Ultimate Short Circuit Breaking Capacity	Icu	kA	3			
Rated Current	**In**	**A**	**1,2,3,4,6,10,16,20,25,32,40,50,63**			
Tripping Curve			B,C,D			
Standards			IEC EN 60898-1			
Operating Ambient Temperature Range		°C	-25....+55			
Storage Ambient Temperature Range		°C	-40....+70			
Electrical Life		op.	4.000			
Mechanical Life		op.	20.000			
Protection Degree			IP20			
Pollution Degree			2			
Maximum Terminal Tightening Torque		Nm	2,5			
Altitude		m	≤2000			
Mounting		mm	35mm DIN Rail			
Terminal Cross-Section		mm^2	1~25			
Accessories	Auxiliary Contact		✓			
	Alarm Contact		✓			
	Shunt Trip Release		✓			
	Under Voltage Release		✓			

XKN 3kA Miniature Circuit Breaker



Miniature Circuit Breaker			XKN3 (H Series)			
Protection			Protection against Overload and Short Circuit Currents			
Number of Poles		P	1	2	3	4
Rated Operational Voltage	Ue	VAC	230/400	400		
Rated Insulation Voltage	Ui	V	690			
Rated Impulse Withstand Voltage	Uimp	kV	6			
Type of Current to be Protected			AC			
Operating Frequency		Hz	50/60			
Ultimate Short Circuit Breaking Capacity	Icu	kA	3			
Rated Current	**In**	**A**	**80,100,125**			
Tripping Curve			B,C,D			
Standards			IEC EN 60898-1			
Operating Ambient Temperature Range		°C	-25....+55			
Storage Ambient Temperature Range		°C	-40....+70			
Electrical Life		op.	4.000			
Mechanical Life		op.	20.000			
Protection Degree			IP20			
Pollution Degree			2			
Maximum Terminal Tightening Torque		Nm	3			
Altitude		m	≤2000			
Mounting		mm	35mm DIN rail			
Terminal Cross-Section		mm^2	25~50			
Accessories	Auxiliary Contact		✓			
	Alarm Contact		✓			
	Shunt Trip Release		✓			
	Under Voltage Release		✓			

GENERAL PRODUCT CATALOG

MINIATURE CIRCUIT BREAKER

XKN H Series 4,5kA Miniature Circuit Breaker



Miniature Circuit Breaker			XKN4 (H Series)			
Protection			Protection against Overload and Short Circuit Currents			
Number of Poles		P	1	2	3	4
Rated Operational Voltage	Ue	VAC	230/400	400		
Rated Insulation Voltage	Ui	V	690			
Rated Impulse Withstand Voltage	Uimp	kV	6			
Type of Current to be Protected			AC			
Operating Frequency		Hz	50/60			
Ultimate Short Circuit Breaking Capacity	Icu	kA	4,5			
Rated Current	**In**	**A**	**80,100,125**			
Tripping Curve			B,C,D			
Standards			IEC EN 60898-1			
Operating Ambient Temperature Range		°C	-25....+55			
Storage Ambient Temperature Range		°C	-40....+70			
Electrical Life		op.	4.000			
Mechanical Life		op.	20.000			
Protection Degree			IP20			
Pollution Degree			2			
Maximum Terminal Tightening Torque		Nm	3			
Altitude		m	≤2000			
Mounting		mm	35mm DIN rail			
Terminal Cross-Section		mm^2	25~50			
Accessories	Auxiliary Contact		✓			
	Alarm Contact		✓			
	Shunt Trip Release		✓			
	Under Voltage Release		✓			

XKN 6kA Miniature Circuit Breaker



Miniature Circuit Breaker			XKN6			
Protection			Protection against Overload and Short Circuit Currents			
Number of Poles		P	1	2	3	4
Rated Operational Voltage	Ue	VAC	230/400	400		
Rated Insulation Voltage	Ui	V	690			
Rated Impulse Withstand Voltage	Uimp	kV	4			
Type of Current to be Protected			AC			
Operating Frequency		Hz	50/60			
Ultimate Short Circuit Breaking Capacity	Icu	kA	6			
Rated Current	**In**	**A**	**1,2,3,4,6,10,16,20,25,32,40,50,63**			
Tripping Curve			B,C,D			
Standards			IEC EN 60898-1			
Operating Ambient Temperature Range		°C	-25....+55			
Storage Ambient Temperature Range		°C	-40....+70			
Electrical Life		op.	4.000			
Mechanical Life		op.	20.000			
Protection Degree			IP20			
Pollution Degree			2			
Maximum Terminal Tightening Torque		Nm	2,5			
Altitude		m	≤2000			
Mounting		mm	35mm DIN Rail			
Terminal Cross-Section		mm^2	1~25			
Accessories	Auxiliary Contact		✓			
	Alarm Contact		✓			
	Shunt Trip Release		✓			
	Under Voltage Release		✓			

GENERAL PRODUCT CATALOG

MINIATURE CIRCUIT BREAKER

XKN H Series 6kA Miniature Circuit Breaker



Miniature Circuit Breaker			XKN6 (H Series)			
Protection			Protection against Overload and Short Circuit Currents			
Number of Poles		P	1	2	3	4
Rated Operational Voltage	Ue	VAC	230/400	400		
Rated Insulation Voltage	Ui	V	690			
Rated Impulse Withstand Voltage	Uimp	kV	6			
Type of Current to be Protected			AC			
Operating Frequency		Hz	50/60			
Ultimate Short Circuit Breaking Capacity	Icu	kA	6			
Rated Current	**In**	**A**	**80,100,125**			
Tripping Curve			B,C,D			
Standards			IEC EN 60898-1			
Operating Ambient Temperature Range		°C	-25....+55			
Storage Ambient Temperature Range		°C	-40....+70			
Electrical Life		op.	4.000			
Mechanical Life		op.	20.000			
Protection Degree			IP20			
Pollution Degree			2			
Maximum Terminal Tightening Torque		Nm	3			
Altitude		m	≤2000			
Mounting		mm	35mm DIN rail			
Terminal Cross-Section		mm^2	25~50			
Accessories	Auxiliary Contact		✓			
	Alarm Contact		✓			
	Shunt Trip Release		✓			
	Under Voltage Release		✓			

XKN 10kA Miniature Circuit Breaker



Miniature Circuit Breaker			XKN10			
Protection			Protection against Overload and Short Circuit Currents			
Number of Poles		P	1	2	3	4
Rated Operational Voltage	Ue	VAC	230/400	400		
Rated Insulation Voltage	Ui	V	690			
Rated Impulse Withstand Voltage	Uimp	kV	4			
Type of Current to be Protected			AC			
Operating Frequency		Hz	50/60			
Ultimate Short Circuit Breaking Capacity	Icu	kA	10			
Rated Current	**In**	**A**	**1,2,3,4,6,10,16,20,25,32,40,50,63**			
Tripping Curve			B,C,D			
Standards			IEC EN 60898-1			
Operating Ambient Temperature Range		°C	-25....+55			
Storage Ambient Temperature Range		°C	-40....+70			
Electrical Life		op.	4.000			
Mechanical Life		op.	20.000			
Protection Degree			IP20			
Pollution Degree			2			
Maximum Terminal Tightening Torque		Nm	2,5			
Altitude		m	≤2000			
Mounting		mm	35mm DIN rail			
Terminal Cross-Section		mm^2	1~25			
Accessories	Auxiliary Contact		✓			
	Alarm Contact		✓			
	Shunt Trip Release		✓			
	Under Voltage Release		✓			

XKN H Series 10kA Miniature Circuit Breaker

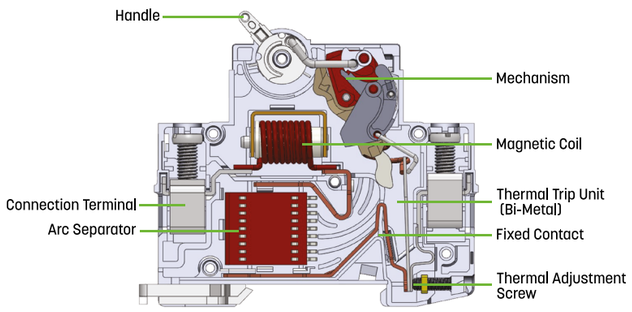


Miniature Circuit Breaker			XKN10 (H Series)			
Protection			Protection against Overload and Short Circuit Currents			
Number of Poles		P	1	2	3	4
Rated Operational Voltage	Ue	VAC	230/400	400		
Rated Insulation Voltage	Ui	V	690			
Rated Impulse Withstand Voltage	Uimp	kV	6			
Type of Current to be Protected			AC			
Operating Frequency		Hz	50/60			
Ultimate Short Circuit Breaking Capacity	Icu	kA	10			
Rated Current	**In**	**A**	**80,100,125**			
Tripping Curve			B,C,D			
Standards			IEC EN 60898-1			
Operating Ambient Temperature Range		°C	-25....+55			
Storage Ambient Temperature Range		°C	-40....+70			
Electrical Life		op.	4.000			
Mechanical Life		op.	20.000			
Protection Degree			IP20			
Pollution Degree			2			
Maximum Terminal Tightening Torque		Nm	3			
Altitude		m	≤2000			
Mounting		mm	35mm DIN rail			
Terminal Cross-Section		mm^2	25~50			
Accessories	Auxiliary Contact		✓			
	Alarm Contact		✓			
	Shunt Trip Release		✓			
	Under Voltage Release		✓			

General Information



XKoren miniature circuit breakers are electromechanical devices that protect electrical circuits from overcurrents and short-circuit currents while also performing the function of switching the circuit on and off.
When the current flowing through the circuit exceeds a certain level due to various reasons, the tripping mechanism automatically interrupts the current, preventing damage to connected equipment and reducing the risk of fire hazards. These circuit breakers are manufactured in compliance with the IEC 60898-1 standard and are available with breaking capacities of 3 kA, 4,5 kA, 6 kA, and 10 kA.



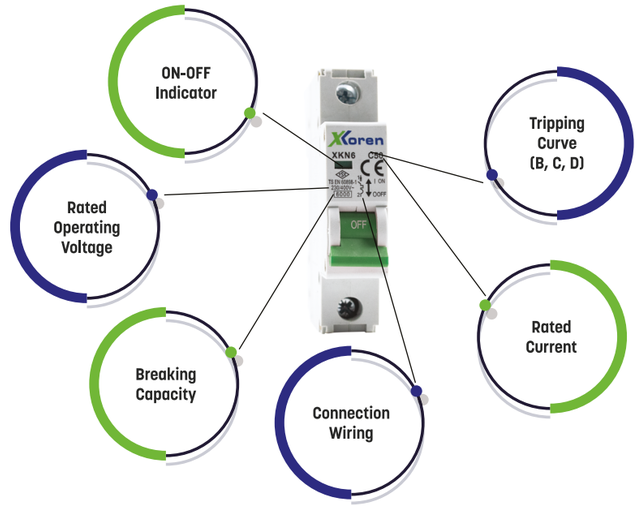
Operating Temperature Conditions

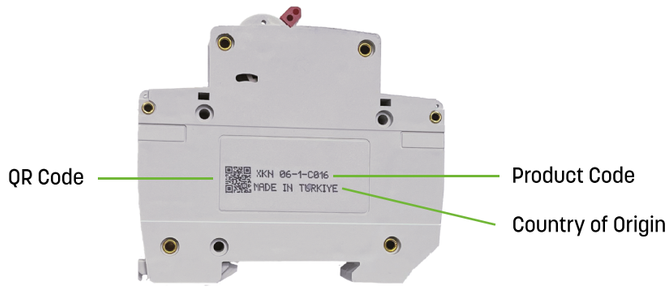
XKoren miniature circuit breakers are designed for use at ambient temperatures ranging from -25°C to +55°C and at altitudes not exceeding 2000 meters. The overload protection tripping units are calibrated based on a reference temperature of 30°C. However, if the breakers are to be used at different temperatures, necessary adjustments should be made using the temperature compensation chart. Additionally, at altitudes above 2000 meters, factors such as a reduction in dielectric (insulation) properties and changes in air cooling efficiency must be considered. Under such conditions, the performance of the circuit breaker may vary depending on environmental factors such as altitude and temperature. XKoren circuit breakers are available with breaking capacities of 3 kA, 4,5 kA, 6 kA, and 10 kA. They are classified into B, C, and D characteristics based on their application and the current levels they handle. Their rated current range is from 1A to 125A, and they are available in different pole configurations, including 1P, 2P, 3P, 4P, 1P+N, and 3P+N, depending on their function in the circuit. Manufactured in compliance with IEC 60898-1 and TS EN 60898-1 standards, XKoren miniature circuit breakers feature a flame- and fire-resistant thermoplastic housing and a highquality contact mechanism for reliable performance.

Ambient Operating Temperature Table

In(A)\C	-10	0	10	20	30	35	40	45	50	55	60
1	2,1	1,9	2	1,9	1	1,5	1,3	1,4	1,4	1,3	1,3
2	2,3	2,2	2,2	2,1	2	2	1,9	1,9	1,9	1,8	1,8
3	3,5	3,4	3,3	3,2	3	3	2,9	2,8	2,7	2,7	2,7
4	4,7	4,5	4,3	4,2	4	3,9	3,9	3,8	3,7	3,6	3,5
6	7	6,7	6,5	6,3	6	5,9	5,8	5,7	5,6	5,4	5,3
10	12	11	11	10	10	9,9	9,7	9,5	9,4	9	8,9
16	19	18	17	17	16	16	15	15	15	14	14
20	23	22	22	21	20	20	19	19	19	18	18
25	29	28	27	26	25	25	24	24	23	23	22
32	37	36	35	33	32	32	31	30	30	29	28
40	47	45	43	42	40	39	39	38	37	36	35
50	58	56	54	52	50	49	48	47	46	45	44
63	73	71	68	66	63	62	61	60	58	57	56

Principles of Miniature Circuit Breaker Definition





- Miniature Circuit Breaker Tripping and Non-Tripping Conditions
- Miniature Circuit Breaker Breaking Capacity (3kA, 4,5kA, 6kA, 10kA)
- Miniature Circuit Breaker Pole Number (1P, 2P, 3P, 4P)
- Miniature Circuit Breaker Tripping Curve (B, C, D)

Thermal Tripping Table

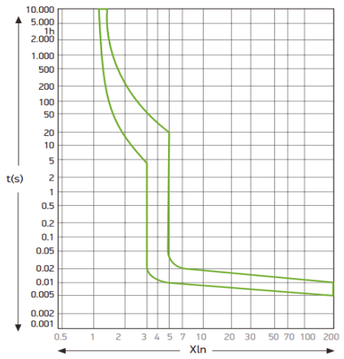
Rated Current (In)	Test Current	Tripping time	Result (Tripping)
In ≤ 63 A	1.13 In	t ≥ 1 hours	No
In > 63 A	1.13 In	t ≤ 2 hours	No
In ≤ 63 A	1.45 In	t < 1 hours	Yes
In > 63 A	1.45 In	t < 2 hours	Yes
In ≤ 32 A	2.55 In	1 s < t < 60 s	Yes
In > 32 A	2.55 In	1 s < t < 120 s	Yes

Magnetic Tripping Table

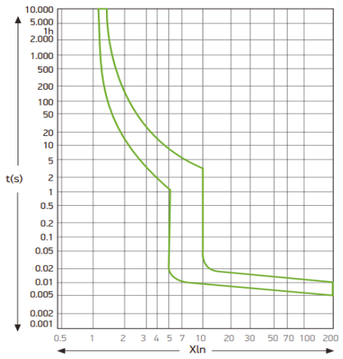
Tripping Characteristic	Rated Current (In)	Test Current	Tripping time	Result
B	All	3 In	t> 0.1 s	Non- Tripping
B	All	5 In	t < 0.1 s	Tripping
C	All	5 In	t> 0.1 s	Non- Tripping
C	All	10 In	t < 0.1 s	Tripping
D	All	10 In	t> 0.1 s	Non- Tripping
D	All	20 In	t < 0.1 s	Tripping

Miniature Circuit Breaker Selection Criteria

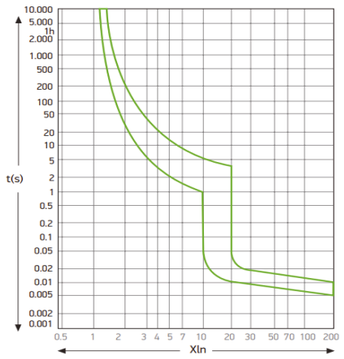
Current-Time Characteristics



B Curve



C Curve



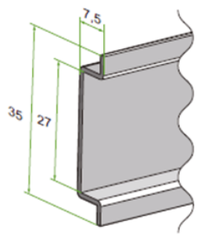
D Curve

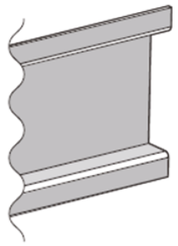
Miniature Circuit Breaker Selection Based on Instantaneous Tripping Curves

B-Curve: Used for protecting incandescent lamps, heaters, and PLC systems.
C-Curve: Suitable for protecting fluorescent lamps, power outlet circuits, machines, lowpower
motors, air conditioners, refrigeration units, and power distribution panels.
D-Curve: Used for protecting motor starters, pumps, compressors, capacitors, welding, and
spot welding machines.

Mounting and Connection Features

XKoren miniature circuit breakers are designed to be easily mounted on 35mm DIN rails in accordance with the EN 60715 standard.
These breakers can accommodate cables up to 50mm in diameter, and can also be connected using a common busbar. The maximum tightening torque for the connection screws is 2,5 Nm; exceeding this value may damage the terminal clamps or screws. Although energy input can be made from the top or bottom, it is recommended to connect the energy input from the top. The connection terminals have an IP20 protection rating, providingprotection against touch, in accordance with EN 60529.





A DIN rail is a metal rail system used for the easy mounting and organizing of electrical and electronic components, especially circuit breakers, relays, power supply units, and other devices requiring installation. "DIN" is an abbreviation for Deutsche Institut für Normung (German Institute for Standardization). DIN rails are manufactured according to international standards and come in various sizes for different applications.
Material: DIN rails are typically made of steel and are protected by galvanizing or stainless steel coating, providing both durability and resistance to corrosion.
DIN EN 60715 Standard: This standard specifies the dimensions and characteristics of DIN rails.

Frequency Effect

The frequency variation has no effect on the overload release of the circuit breaker. However, the instantaneous tripping value of the circuit breaker increases as the frequency increases, with the
following coefficients:

Frequency	Instantaneous Tripping Value		
	B	C	D
17-60	3-5	5-10	10-20
100	3.3-5.5	5.5-11	11-22
200	3.6-6	6-12	12-24
400	4.5-7	7.5-15	15-30

Power Loss

XKoren miniature circuit breakers are designed to create minimal energy loss in the circuits to which they are connected. The power losses per pole are well below the maximum values specified in IEC 60898-1.

Rated Current (A)	Maximum Power Loss Measured Per Pole (W)	Maximum Power Loss (W) According to IEC/ EN 60898-1
2	0.74	3
6	1	3
10	2.1	3
16	2.5	3.5
20	3	4.5
25	2.3	4.5
32	4	6
40	4.9	7.5
50	5.11	9
63	5.8	13

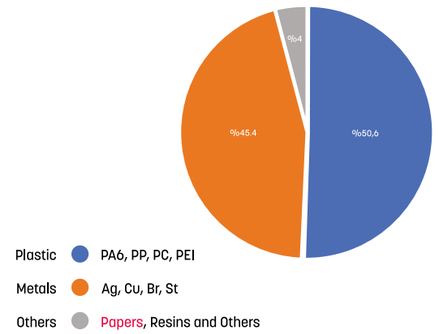
Protection for Motor Circuits

Motors draw instantaneous peak currents that can reach 12-15 times their nominal currents
when starting. Therefore, D-type automatic circuit breakers should be used to protect motor
circuits, except for low-power motors. The miniature circuit breakers used in motor circuits
provide full protection against short circuits, but only partial protection against overloads.
For overload protection, it is recommended to protect the motor circuit with a thermal relay.

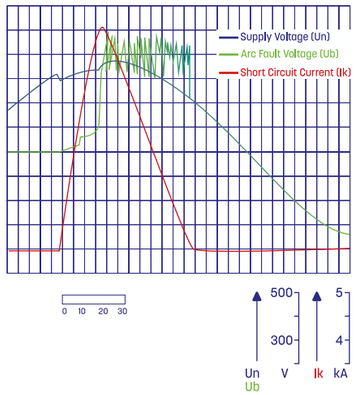
220-240 V Single Phase Asynchronous Motor				Miniature Circuit Breaker	
Rated Power		Rated Current (A)	Inrush Current (A)	Tripping Curve	Rated Current(A)
kW	Hp				
0.18	0.25	1.5	18	C or D	6
0.37	0.5	3	36	C or D	6
0.55	0.75	4.5	54	D	6
0.75	1	5.5	66	C or D	10
1.1	1.5	8.5	102	D	10
1.5	2	10.5	126	C v D	16
2.2	3	15.5	186	D	20
3	4	20	240	D	32
3.75	5	24	288	D	32
5.5	7.5	34	408	D	40
7.5	10	45	540	D	63

400-415 V Three Phase Asynchronous Motor				Miniature Circuit Breaker	
Rated Power		Rated Current (A)	Inrush Current (A)	Tripping Curve	Rated Current(A)
kW	Hp				
0.18	0.25	0.7	8.4	C	6
0.37	0.5	1.35	16.2	C	6
0.55	0.75	1.55	18.6	C	6
0.75	1	1.93	23.2	C	6
1.1	1.5	2.5	30	C	6
1.5	2	3.5	42	C or D	6
2.2	3	4.8	57.6	D	6
3	4	6.4	76.8	D	10
3.75	5	7.8	93.6	D	10
5.5	7.5	11	132	D	16
7.5	10	14.4	172.8	D	16
9.33	12.5	17.3	207.6	D	20
11	15	21	252	D	25
15	20	28	336	D	32
18.5	25	35	420	D	40
22	30	40	480	D	40
30	40	54	648	D	63

Raw Material Component Ratios of Miniature Circuit Breakers



Current Limiting Feature of the Miniature Circuit Breaker in Case of Short Circuit Interruption



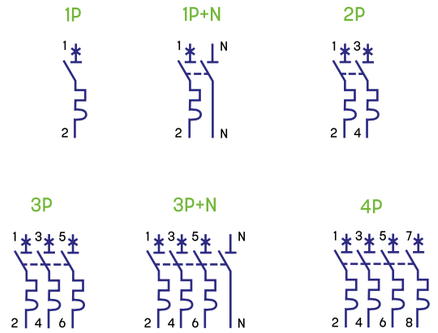
1- Arc fault path towards the arc chamber; the arc fault is divided; exponential increase of UB.

2- Dissipation of the arc fault in the arc chamber.

3- Increase in arc fault voltage in the contact egion, cooling and expansion of the arc ault.

Blue Line: Supply Voltage
Green Line: Arc Fault Voltage
Red Line: Short Circuit Current

Wiring Diagram



Accessories

Model	Description	Code
AC-XKN3	XKN3 Auxiliary Contact (1NO+1NC)	AC-XKN3
AL-XKN3	XKN3 Alarm Contact (1NO+1NC)	AL-XKN3
AC-XKN6	XKN6 Auxiliary Contact (1NO+1NC)	AC-XKN6
AL-XKN6	XKN6 Alarm Contact (1NO+1NC)	AL-XKN6
AC-XKN10	XKN10 Auxiliary Contact (1NO+1NC)	AC-XKN10
AL-XKN10	XKN10 Alarm Contact (1NO+1NC)	AL-XKN10
NC-XKN3	XKN3 Shunt Trip Release (DC24)	NC-XKN3/24V DC
	XKN3 Shunt Trip Release (AC240)	NC-XKN3/240V AC
	XKN3 Shunt Trip Release (AC415)	NC-XKN3/415V AC
NC-XKN6	XKN6 Shunt Trip Release (DC24)	NC-XKN6/24V DC
	XKN6 Shunt Trip Release (AC240)	NC-XKN6/240V AC
	XKN6 Shunt Trip Release (AC415)	NC-XKN6/415V AC
NC-XKN10	XKN10 Shunt Trip Release (DC24)	NC-XKN10/24V DC
	XKN10 Shunt Trip Release (AC240)	NC-XKN10/240V AC
	XKN10 Shunt Trip Release (AC415)	NC-XKN10/415V AC
LV-XKN3	XKN3 Undervoltage Release (AC240)	LV-XKN3
LV-XKN6	XKN3 Undervoltage Release (AC240)	LV-XKN6
LV-XKN10	XKN3 Undervoltage Release (AC240)	LV-XKN10
AC-XKN10 DC	DC Auxiliary Contact (1NO+1NC)	AC-XKN10DC

GENERAL PRODUCT CATALOG

MINIATURE CIRCUIT BREAKER

ORDER LIST

3kA B TYPE

XKN 3kA B (3In-5In) Curve

	Type (Order) Code	Rated Current (In)	Explanation	Box Quantity	Carton Quantity
1 Pole	XKN 03-1-B001	1	3kA 1P B01A	12	240
	XKN 03-1-B002	2	3kA 1P B02A	12	240
	XKN 03-1-B003	3	3kA 1P B03A	12	240
	XKN 03-1-B004	4	3kA 1P B04A	12	240
	XKN 03-1-B006	6	3kA 1P B06A	12	240
	XKN 03-1-B010	10	3kA 1P B10A	12	240
	XKN 03-1-B016	16	3kA 1P B16A	12	240
	XKN 03-1-B020	20	3kA 1P B20A	12	240
	XKN 03-1-B025	25	3kA 1P B25A	12	240
	XKN 03-1-B032	32	3kA 1P B32A	12	240
	XKN 03-1-B040	40	3kA 1P B40A	12	240
	XKN 03-1-B050	50	3kA 1P B50A	12	240
	XKN 03-1-B063	63	3kA 1P B63A	12	240
2 Pole	XKN 03-2-B001	1	3kA 2P B01A	6	120
	XKN 03-2-B002	2	3kA 2P B02A	6	120
	XKN 03-2-B003	3	3kA 2P B03A	6	120
	XKN 03-2-B004	4	3kA 2P B04A	6	120
	XKN 03-2-B006	6	3kA 2P B06A	6	120
	XKN 03-2-B010	10	3kA 2P B10A	6	120
	XKN 03-2-B016	16	3kA 2P B16A	6	120
	XKN 03-2-B020	20	3kA 2P B20A	6	120
	XKN 03-2-B025	25	3kA 2P B25A	6	120
	XKN 03-2-B032	32	3kA 2P B32A	6	120
	XKN 03-2-B040	40	3kA 2P B40A	6	120
	XKN 03-2-B050	50	3kA 2P B50A	6	120
	XKN 03-2-B063	63	3kA 2P B63A	6	120
3 Pole	XKN 03-3-B001	1	3kA 3P B01A	4	80
	XKN 03-3-B002	2	3kA 3P B02A	4	80
	XKN 03-3-B003	3	3kA 3P B03A	4	80
	XKN 03-3-B004	4	3kA 3P B04A	4	80
	XKN 03-3-B006	6	3kA 3P B06A	4	80
	XKN 03-3-B010	10	3kA 3P B10A	4	80
	XKN 03-3-B016	16	3kA 3P B16A	4	80
	XKN 03-3-B020	20	3kA 3P B20A	4	80
	XKN 03-3-B025	25	3kA 3P B25A	4	80
	XKN 03-3-B032	32	3kA 3P B32A	4	80
	XKN 03-3-B040	40	3kA 3P B40A	4	80
	XKN 03-3-B050	50	3kA 3P B50A	4	80
	XKN 03-3-B063	63	3kA 3P B63A	4	80
4 Pole	XKN 03-4-B001	1	3kA 4P B01A	3	60
	XKN 03-4-B002	2	3kA 4P B02A	3	60
	XKN 03-4-B003	3	3kA 4P B03A	3	60
	XKN 03-4-B004	4	3kA 4P B04A	3	60
	XKN 03-4-B006	6	3kA 4P B06A	3	60
	XKN 03-4-B010	10	3kA 4P B10A	3	60
	XKN 03-4-B016	16	3kA 4P B16A	3	60
	XKN 03-4-B020	20	3kA 4P B20A	3	60
	XKN 03-4-B025	25	3kA 4P B25A	3	60
	XKN 03-4-B032	32	3kA 4P B32A	3	60
	XKN 03-4-B040	40	3kA 4P B40A	3	60
	XKN 03-4-B050	50	3kA 4P B50A	3	60
	XKN 03-4-B063	63	3kA 4P B63A	3	60

MINIATURE CIRCUIT BREAKER

3kA C TYPE

XKN3 3kA C (5In-10In) Curve

	Type (Order) Code	Rated Current (In)	Explanation	Box Quantity	Carton Quantity
1 Pole	XKN 03-1-C001	1	3kA 1P C01A	12	240
	XKN 03-1-C002	2	3kA 1P C02A	12	240
	XKN 03-1-C003	3	3kA 1P C03A	12	240
	XKN 03-1-C004	4	3kA 1P C04A	12	240
	XKN 03-1-C006	6	3kA 1P C06A	12	240
	XKN 03-1-C010	10	3kA 1P C10A	12	240
	XKN 03-1-C016	16	3kA 1P C16A	12	240
	XKN 03-1-C020	20	3kA 1P C20A	12	240
	XKN 03-1-C025	25	3kA 1P C25A	12	240
	XKN 03-1-C032	32	3kA 1P C32A	12	240
	XKN 03-1-C040	40	3kA 1P C40A	12	240
	XKN 03-1-C050	50	3kA 1P C50A	12	240
	XKN 03-1-C063	63	3kA 1P C63A	12	240
2 Pole	XKN 03-2-C001	1	3kA 2P C01A	6	120
	XKN 03-2-C002	2	3kA 2P C02A	6	120
	XKN 03-2-C003	3	3kA 2P C03A	6	120
	XKN 03-2-C004	4	3kA 2P C04A	6	120
	XKN 03-2-C006	6	3kA 2P C06A	6	120
	XKN 03-2-C010	10	3kA 2P C10A	6	120
	XKN 03-2-C016	16	3kA 2P C16A	6	120
	XKN 03-2-C020	20	3kA 2P C20A	6	120
	XKN 03-2-C025	25	3kA 2P C25A	6	120
	XKN 03-2-C032	32	3kA 2P C32A	6	120
	XKN 03-2-C040	40	3kA 2P C40A	6	120
	XKN 03-2-C050	50	3kA 2P C50A	6	120
	XKN 03-2-C063	63	3kA 2P C63A	6	120
3 Pole	XKN 03-3-C001	1	3kA 3P C01A	4	80
	XKN 03-3-C002	2	3kA 3P C02A	4	80
	XKN 03-3-C003	3	3kA 3P C03A	4	80
	XKN 03-3-C004	4	3kA 3P C04A	4	80
	XKN 03-3-C006	6	3kA 3P C06A	4	80
	XKN 03-3-C010	10	3kA 3P C10A	4	80
	XKN 03-3-C016	16	3kA 3P C16A	4	80
	XKN 03-3-C020	20	3kA 3P C20A	4	80
	XKN 03-3-C025	25	3kA 3P C25A	4	80
	XKN 03-3-C032	32	3kA 3P C32A	4	80
	XKN 03-3-C040	40	3kA 3P C40A	4	80
	XKN 03-3-C050	50	3kA 3P C50A	4	80
	XKN 03-3-C063	63	3kA 3P C63A	4	80
4 Pole	XKN 03-4-C001	1	3kA 4P C01A	3	60
	XKN 03-4-C002	2	3kA 4P C02A	3	60
	XKN 03-4-C003	3	3kA 4P C03A	3	60
	XKN 03-4-C004	4	3kA 4P C04A	3	60
	XKN 03-4-C006	6	3kA 4P C06A	3	60
	XKN 03-4-C010	10	3kA 4P C10A	3	60
	XKN 03-4-C016	16	3kA 4P C16A	3	60
	XKN 03-4-C020	20	3kA 4P C20A	3	60
	XKN 03-4-C025	25	3kA 4P C25A	3	60
	XKN 03-4-C032	32	3kA 4P C32A	3	60
	XKN 03-4-C040	40	3kA 4P C40A	3	60
	XKN 03-4-C050	50	3kA 4P C50A	3	60
	XKN 03-4-C063	63	3kA 4P C63A	3	60

MINIATURE CIRCUIT BREAKER

3kA D TYPE

XKN3 3kA D (10In-20In) Curve

	Type (Order) Code	Rated Current (In)	Explanation	Box Quantity	Carton Quantity
1 Pole	XKN 03-1-D001	1	3kA 1P D01A	12	240
	XKN 03-1-D002	2	3kA 1P D02A	12	240
	XKN 03-1-D003	3	3kA 1P D03A	12	240
	XKN 03-1-D004	4	3kA 1P D04A	12	240
	XKN 03-1-D006	6	3kA 1P D06A	12	240
	XKN 03-1-D010	10	3kA 1P D10A	12	240
	XKN 03-1-D016	16	3kA 1P D16A	12	240
	XKN 03-1-D020	20	3kA 1P D20A	12	240
	XKN 03-1-D025	25	3kA 1P D25A	12	240
	XKN 03-1-D032	32	3kA 1P D32A	12	240
	XKN 03-1-D040	40	3kA 1P D40A	12	240
	XKN 03-1-D050	50	3kA 1P D50A	12	240
	XKN 03-1-D063	63	3kA 1P D63A	12	240
2 Pole	XKN 03-2-D001	1	3kA 2P D01A	6	120
	XKN 03-2-D002	2	3kA 2P D02A	6	120
	XKN 03-2-D003	3	3kA 2P D03A	6	120
	XKN 03-2-D004	4	3kA 2P D04A	6	120
	XKN 03-2-D006	6	3kA 2P D06A	6	120
	XKN 03-2-D010	10	3kA 2P D10A	6	120
	XKN 03-2-D016	16	3kA 2P D16A	6	120
	XKN 03-2-D020	20	3kA 2P D20A	6	120
	XKN 03-2-D025	25	3kA 2P D25A	6	120
	XKN 03-2-D032	32	3kA 2P D32A	6	120
	XKN 03-2-D040	40	3kA 2P D40A	6	120
	XKN 03-2-D050	50	3kA 2P D50A	6	120
	XKN 03-2-D063	63	3kA 2P D63A	6	120
3 Pole	XKN 03-3-D001	1	3kA 3P D01A	4	80
	XKN 03-3-D002	2	3kA 3P D02A	4	80
	XKN 03-3-D003	3	3kA 3P D03A	4	80
	XKN 03-3-D004	4	3kA 3P D04A	4	80
	XKN 03-3-D006	6	3kA 3P D06A	4	80
	XKN 03-3-D010	10	3kA 3P D10A	4	80
	XKN 03-3-D016	16	3kA 3P D16A	4	80
	XKN 03-3-D020	20	3kA 3P D20A	4	80
	XKN 03-3-D025	25	3kA 3P D25A	4	80
	XKN 03-3-D032	32	3kA 3P D32A	4	80
	XKN 03-3-D040	40	3kA 3P D40A	4	80
	XKN 03-3-D050	50	3kA 3P D50A	4	80
	XKN 03-3-D063	63	3kA 3P D63A	4	80
4 Pole	XKN 03-4-D001	1	3kA 4P D01A	3	60
	XKN 03-4-D002	2	3kA 4P D02A	3	60
	XKN 03-4-D003	3	3kA 4P D03A	3	60
	XKN 03-4-D004	4	3kA 4P D04A	3	60
	XKN 03-4-D006	6	3kA 4P D06A	3	60
	XKN 03-4-D010	10	3kA 4P D10A	3	60
	XKN 03-4-D016	16	3kA 4P D16A	3	60
	XKN 03-4-D020	20	3kA 4P D20A	3	60
	XKN 03-4-D025	25	3kA 4P D25A	3	60
	XKN 03-4-D032	32	3kA 4P D32A	3	60
	XKN 03-4-D040	40	3kA 4P D40A	3	60
	XKN 03-4-D050	50	3kA 4P D50A	3	60
	XKN 03-4-D063	63	3kA 4P D63A	3	60

MINIATURE CIRCUIT BREAKER

3kA H SERIES

XKN3-H 3kA B (3In ~ 5In) Curve (H Series)



	Type (Order) Code	Rated Current (In)	Explanation	Box Quantity	Carton Quantity
1 Pole	XKN 03-H1-B080	80	3kA 1P B80A	12	120
	XKN 03-H1-B100	100	3kA 1P B100A	12	120
	XKN 03-H1-B125	125	3kA 1P B125A	12	120
2 Pole	XKN 03-H2-B080	80	3kA 2P B80A	6	60
	XKN 03-H2-B100	100	3kA 2P B100A	6	60
	XKN 03-H2-B125	125	3kA 2P B125A	6	60
3 Pole	XKN 03-H3-B080	80	3kA 3P B80A	4	40
	XKN 03-H3-B100	100	3kA 3P B100A	4	40
	XKN 03-H3-B125	125	3kA 3P B125A	4	40
4 Pole	XKN 03-H4-B080	80	3kA 4P B80A	3	30
	XKN 03-H4-B100	100	3kA 4P B100A	3	30
	XKN 03-H4-B125	125	3kA 4P B125A	3	30

XKN3-H 3kA C (5In-10In) Curve (H Series)



	Type (Order) Code	Rated Current (In)	Explanation	Box Quantity	Carton Quantity
1 Pole	XKN 03-H1-C080	80	3kA 1P C80A	12	120
	XKN 03-H1-C100	100	3kA 1P C100A	12	120
	XKN 03-H1-C125	125	3kA 1P C125A	12	120
2 Pole	XKN 03-H2-C080	80	3kA 2P C80A	6	60
	XKN 03-H2-C100	100	3kA 2P C100A	6	60
	XKN 03-H2-C125	125	3kA 2P C125A	6	60
3 Pole	XKN 03-H3-C080	80	3kA 3P C80A	4	40
	XKN 03-H3-C100	100	3kA 3P C100A	4	40
	XKN 03-H3-C125	125	3kA 3P C125A	4	40
4 Pole	XKN 03-H4-C080	80	3kA 4P C80A	3	30
	XKN 03-H4-C100	100	3kA 4P C100A	3	30
	XKN 03-H4-C125	125	3kA 4P C125A	3	30

XKN3-H 3kA D (10In-20In) Curve (H Series)



	Type (Order) Code	Rated Current (In)	Explanation	Box Quantity	Carton Quantity
1 Pole	XKN 03-H1-D080	80	3kA 1P D80A	12	120
	XKN 03-H1-D100	100	3kA 1P D100A	12	120
	XKN 03-H1-D125	125	3kA 1P D125A	12	120
2 Pole	XKN 03-H2-D080	80	3kA 2P D80A	6	60
	XKN 03-H2-D100	100	3kA 2P D100A	6	60
	XKN 03-H2-D125	125	3kA 2P D125A	6	60
3 Pole	XKN 03-H3-D080	80	3kA 3P D80A	4	40
	XKN 03-H3-D100	100	3kA 3P D100A	4	40
	XKN 03-H3-D125	125	3kA 3P D125A	4	40
4 Pole	XKN 03-H4-D080	80	3kA 4P D80A	3	30
	XKN 03-H4-D100	100	3kA 4P D100A	3	30
	XKN 03-H4-D125	125	3kA 4P D125A	3	30

MINIATURE CIRCUIT BREAKER

4,5kA B TYPE

XKN4 4,5kA B (3In-5In) Curve

	Type (Order) Code	Rated Current (In)	Explanation	Box Quantity	Carton Quantity
1 Pole	XKN 04-1-B001	1	4,5kA 1P B01A	12	240
	XKN 04-1-B002	2	4,5kA 1P B02A	12	240
	XKN 04-1-B003	3	4,5kA 1P B03A	12	240
	XKN 04-1-B004	4	4,5kA 1P B04A	12	240
	XKN 04-1-B006	6	4,5kA 1P B06A	12	240
	XKN 04-1-B010	10	4,5kA 1P B10A	12	240
	XKN 04-1-B016	16	4,5kA 1P B16A	12	240
	XKN 04-1-B020	20	4,5kA 1P B20A	12	240
	XKN 04-1-B025	25	4,5kA 1P B25A	12	240
	XKN 04-1-B032	32	4,5kA 1P B32A	12	240
	XKN 04-1-B040	40	4,5kA 1P B40A	12	240
	XKN 04-1-B050	50	4,5kA 1P B50A	12	240
	XKN 04-1-B063	63	4,5kA 1P B63A	12	240
2 Pole	XKN 04-2-B001	1	4,5kA 2P B01A	6	120
	XKN 04-2-B002	2	4,5kA 2P B02A	6	120
	XKN 04-2-B003	3	4,5kA 2P B03A	6	120
	XKN 04-2-B004	4	4,5kA 2P B04A	6	120
	XKN 04-2-B006	6	4,5kA 2P B06A	6	120
	XKN 04-2-B010	10	4,5kA 2P B10A	6	120
	XKN 04-2-B016	16	4,5kA 2P B16A	6	120
	XKN 04-2-B020	20	4,5kA 2P B20A	6	120
	XKN 04-2-B025	25	4,5kA 2P B25A	6	120
	XKN 04-2-B032	32	4,5kA 2P B32A	6	120
	XKN 04-2-B040	40	4,5kA 2P B40A	6	120
	XKN 04-2-B050	50	4,5kA 2P B50A	6	120
	XKN 04-2-B063	63	4,5kA 2P B63A	6	120
3 Pole	XKN 04-3-B001	1	4,5kA 3P B01A	4	80
	XKN 04-3-B002	2	4,5kA 3P B02A	4	80
	XKN 04-3-B003	3	4,5kA 3P B03A	4	80
	XKN 04-3-B004	4	4,5kA 3P B04A	4	80
	XKN 04-3-B006	6	4,5kA 3P B06A	4	80
	XKN 04-3-B010	10	4,5kA 3P B10A	4	80
	XKN 04-3-B016	16	4,5kA 3P B16A	4	80
	XKN 04-3-B020	20	4,5kA 3P B20A	4	80
	XKN 04-3-B025	25	4,5kA 3P B25A	4	80
	XKN 04-3-B032	32	4,5kA 3P B32A	4	80
	XKN 04-3-B040	40	4,5kA 3P B40A	4	80
	XKN 04-3-B050	50	4,5kA 3P B50A	4	80
	XKN 04-3-B063	63	4,5kA 3P B63A	4	80
4 Pole	XKN 04-4-B001	1	4,5kA 4P B01A	3	60
	XKN 04-4-B002	2	4,5kA 4P B02A	3	60
	XKN 04-4-B003	3	4,5kA 4P B03A	3	60
	XKN 04-4-B004	4	4,5kA 4P B04A	3	60
	XKN 04-4-B006	6	4,5kA 4P B06A	3	60
	XKN 04-4-B010	10	4,5kA 4P B10A	3	60
	XKN 04-4-B016	16	4,5kA 4P B16A	3	60
	XKN 04-4-B020	20	4,5kA 4P B20A	3	60
	XKN 04-4-B025	25	4,5kA 4P B25A	3	60
	XKN 04-4-B032	32	4,5kA 4P B32A	3	60
	XKN 04-4-B040	40	4,5kA 4P B40A	3	60
	XKN 04-4-B050	50	4,5kA 4P B50A	3	60
	XKN 04-4-B063	63	4,5kA 4P B63A	3	60

MINIATURE CIRCUIT BREAKER

4,5kA C TYPE

XKN4 4,5kA C (5In-10In) Curve

	Type (Order) Code	Rated Current (In)	Explanation	Box Quantity	Carton Quantity
1 Pole	XKN 04-1-C001	1	4,5kA 1P C01A	12	240
	XKN 04-1-C002	2	4,5kA 1P C02A	12	240
	XKN 04-1-C003	3	4,5kA 1P C03A	12	240
	XKN 04-1-C004	4	4,5kA 1P C04A	12	240
	XKN 04-1-C006	6	4,5kA 1P C06A	12	240
	XKN 04-1-C010	10	4,5kA 1P C10A	12	240
	XKN 04-1-C016	16	4,5kA 1P C16A	12	240
	XKN 04-1-C020	20	4,5kA 1P C20A	12	240
	XKN 04-1-C025	25	4,5kA 1P C25A	12	240
	XKN 04-1-C032	32	4,5kA 1P C32A	12	240
	XKN 04-1-C040	40	4,5kA 1P C40A	12	240
	XKN 04-1-C050	50	4,5kA 1P C50A	12	240
	XKN 04-1-C063	63	4,5kA 1P C63A	12	240
2 Pole	XKN 04-2-C001	1	4,5kA 2P C01A	6	120
	XKN 04-2-C002	2	4,5kA 2P C02A	6	120
	XKN 04-2-C003	3	4,5kA 2P C03A	6	120
	XKN 04-2-C004	4	4,5kA 2P C04A	6	120
	XKN 04-2-C006	6	4,5kA 2P C06A	6	120
	XKN 04-2-C010	10	4,5kA 2P C10A	6	120
	XKN 04-2-C016	16	4,5kA 2P C16A	6	120
	XKN 04-2-C020	20	4,5kA 2P C20A	6	120
	XKN 04-2-C025	25	4,5kA 2P C25A	6	120
	XKN 04-2-C032	32	4,5kA 2P C32A	6	120
	XKN 04-2-C040	40	4,5kA 2P C40A	6	120
	XKN 04-2-C050	50	4,5kA 2P C50A	6	120
	XKN 04-2-C063	63	4,5kA 2P C63A	6	120
3 Pole	XKN 04-3-C001	1	4,5kA 3P C01A	4	80
	XKN 04-3-C002	2	4,5kA 3P C02A	4	80
	XKN 04-3-C003	3	4,5kA 3P C03A	4	80
	XKN 04-3-C004	4	4,5kA 3P C04A	4	80
	XKN 04-3-C006	6	4,5kA 3P C06A	4	80
	XKN 04-3-C010	10	4,5kA 3P C10A	4	80
	XKN 04-3-C016	16	4,5kA 3P C16A	4	80
	XKN 04-3-C020	20	4,5kA 3P C20A	4	80
	XKN 04-3-C025	25	4,5kA 3P C25A	4	80
	XKN 04-3-C032	32	4,5kA 3P C32A	4	80
	XKN 04-3-C040	40	4,5kA 3P C40A	4	80
	XKN 04-3-C050	50	4,5kA 3P C50A	4	80
	XKN 04-3-C063	63	4,5kA 3P C63A	4	80
4 Pole	XKN 04-4-C001	1	4,5kA 4P C01A	3	60
	XKN 04-4-C002	2	4,5kA 4P C02A	3	60
	XKN 04-4-C003	3	4,5kA 4P C03A	3	60
	XKN 04-4-C004	4	4,5kA 4P C04A	3	60
	XKN 04-4-C006	6	4,5kA 4P C06A	3	60
	XKN 04-4-C010	10	4,5kA 4P C10A	3	60
	XKN 04-4-C016	16	4,5kA 4P C16A	3	60
	XKN 04-4-C020	20	4,5kA 4P C20A	3	60
	XKN 04-4-C025	25	4,5kA 4P C25A	3	60
	XKN 04-4-C032	32	4,5kA 4P C32A	3	60
	XKN 04-4-C040	40	4,5kA 4P C40A	3	60
	XKN 04-4-C050	50	4,5kA 4P C50A	3	60
	XKN 04-4-C063	63	4,5kA 4P C63A	3	60

GENERAL PRODUCT CATALOG

MINIATURE CIRCUIT BREAKER

4,5kA D TYPE

XKN4 4,5kA D (10In-20In) Curve

	Type (Order) Code	Rated Current (In)	Explanation	Box Quantity	Carton Quantity
1 Pole	XKN 04-1-D001	1	4,5kA 1P D01A	12	240
	XKN 04-1-D002	2	4,5kA 1P D02A	12	240
	XKN 04-1-D003	3	4,5kA 1P D03A	12	240
	XKN 04-1-D004	4	4,5kA 1P D04A	12	240
	XKN 04-1-D006	6	4,5kA 1P D06A	12	240
	XKN 04-1-D010	10	4,5kA 1P D10A	12	240
	XKN 04-1-D016	16	4,5kA 1P D16A	12	240
	XKN 04-1-D020	20	4,5kA 1P D20A	12	240
	XKN 04-1-D025	25	4,5kA 1P D25A	12	240
	XKN 04-1-D032	32	4,5kA 1P D32A	12	240
	XKN 04-1-D040	40	4,5kA 1P D40A	12	240
	XKN 04-1-D050	50	4,5kA 1P D50A	12	240
	XKN 04-1-D063	63	4,5kA 1P D63A	12	240
2 Pole	XKN 04-2-D001	1	4,5kA 2P D01A	6	120
	XKN 04-2-D002	2	4,5kA 2P D02A	6	120
	XKN 04-2-D003	3	4,5kA 2P D03A	6	120
	XKN 04-2-D004	4	4,5kA 2P D04A	6	120
	XKN 04-2-D006	6	4,5kA 2P D06A	6	120
	XKN 04-2-D010	10	4,5kA 2P D10A	6	120
	XKN 04-2-D016	16	4,5kA 2P D16A	6	120
	XKN 04-2-D020	20	4,5kA 2P D20A	6	120
	XKN 04-2-D025	25	4,5kA 2P D25A	6	120
	XKN 04-2-D032	32	4,5kA 2P D32A	6	120
	XKN 04-2-D040	40	4,5kA 2P D40A	6	120
	XKN 04-2-D050	50	4,5kA 2P D50A	6	120
	XKN 04-2-D063	63	4,5kA 2P D63A	6	120
3 Pole	XKN 04-3-D001	1	4,5kA 3P D01A	4	80
	XKN 04-3-D002	2	4,5kA 3P D02A	4	80
	XKN 04-3-D003	3	4,5kA 3P D03A	4	80
	XKN 04-3-D004	4	4,5kA 3P D04A	4	80
	XKN 04-3-D006	6	4,5kA 3P D06A	4	80
	XKN 04-3-D010	10	4,5kA 3P D10A	4	80
	XKN 04-3-D016	16	4,5kA 3P D16A	4	80
	XKN 04-3-D020	20	4,5kA 3P D20A	4	80
	XKN 04-3-D025	25	4,5kA 3P D25A	4	80
	XKN 04-3-D032	32	4,5kA 3P D32A	4	80
	XKN 04-3-D040	40	4,5kA 3P D40A	4	80
	XKN 04-3-D050	50	4,5kA 3P D50A	4	80
	XKN 04-3-D063	63	4,5kA 3P D63A	4	80
4 Pole	XKN 04-4-D001	1	4,5kA 4P D01A	3	60
	XKN 04-4-D002	2	4,5kA 4P D02A	3	60
	XKN 04-4-D003	3	4,5kA 4P D03A	3	60
	XKN 04-4-D004	4	4,5kA 4P D04A	3	60
	XKN 04-4-D006	6	4,5kA 4P D06A	3	60
	XKN 04-4-D010	10	4,5kA 4P D10A	3	60
	XKN 04-4-D016	16	4,5kA 4P D16A	3	60
	XKN 04-4-D020	20	4,5kA 4P D20A	3	60
	XKN 04-4-D025	25	4,5kA 4P D25A	3	60
	XKN 04-4-D032	32	4,5kA 4P D32A	3	60
	XKN 04-4-D040	40	4,5kA 4P D40A	3	60
	XKN 04-4-D050	50	4,5kA 4P D50A	3	60
	XKN 04-4-D063	63	4,5kA 4P D63A	3	60

MINIATURE CIRCUIT BREAKER

4kA H SERIES

XKN4-H 4,5kA B (3In ~ 5In) Curve (H Series)



	Type (Order) Code	Rated Current (In)	Explanation	Box Quantity	Carton Quantity
1 Pole	XKN 04-H1-B080	80	4,5kA 1P B80A	12	120
	XKN 04-H1-B100	100	4,5kA 1P B100A	12	120
	XKN 04-H1-B125	125	4,5kA 1P B125A	12	120
2 Pole	XKN 04-H2-B080	80	4,5kA 2P B80A	6	60
	XKN 04-H2-B100	100	4,5kA 2P B100A	6	60
	XKN 04-H2-B125	125	4,5kA 2P B125A	6	60
3 Pole	XKN 04-H3-B080	80	4,5kA 3P B80A	4	40
	XKN 04-H3-B100	100	4,5kA 3P B100A	4	40
	XKN 04-H3-B125	125	4,5kA 3P B125A	4	40
4 Pole	XKN 04-H4-B080	80	4,5kA 4P B80A	3	30
	XKN 04-H4-B100	100	4,5kA 4P B100A	3	30
	XKN 04-H4-B125	125	4,5kA 4P B125A	3	30

XKN4-H 4,5kA C (5In-10In) Curve (H Series)



	Type (Order) Code	Rated Current (In)	Explanation	Box Quantity	Carton Quantity
1 Pole	XKN 04-H1-C080	80	4,5kA 1P C80A	12	120
	XKN 04-H1-C100	100	4,5kA 1P C100A	12	120
	XKN 04-H1-C125	125	4,5kA 1P C125A	12	120
2 Pole	XKN 04-H2-C080	80	4,5kA 2P C80A	6	60
	XKN 04-H2-C100	100	4,5kA 2P C100A	6	60
	XKN 04-H2-C125	125	4,5kA 2P C125A	6	60
3 Pole	XKN 04-H3-C080	80	4,5kA 3P C80A	4	40
	XKN 04-H3-C100	100	4,5kA 3P C100A	4	40
	XKN 04-H3-C125	125	4,5kA 3P C125A	4	40
4 Pole	XKN 04-H4-C080	80	4,5kA 4P C80A	3	30
	XKN 04-H4-C100	100	4,5kA 4P C100A	3	30
	XKN 04-H4-C125	125	4,5kA 4P C125A	3	30

XKN4-H 4,5kA D (10In-20In) Curve (H Series)



	Type (Order) Code	Rated Current (In)	Explanation	Box Quantity	Carton Quantity
1 Pole	XKN 04-H1-D080	80	4,5kA 1P D80A	12	120
	XKN 04-H1-D100	100	4,5kA 1P D100A	12	120
	XKN 04-H1-D125	125	4,5kA 1P D125A	12	120
2 Pole	XKN 04-H2-D080	80	4,5kA 2P D80A	6	60
	XKN 04-H2-D100	100	4,5kA 2P D100A	6	60
	XKN 04-H2-D125	125	4,5kA 2P D125A	6	60
3 Pole	XKN 04-H3-D080	80	4,5kA 3P D80A	4	40
	XKN 04-H3-D100	100	4,5kA 3P D100A	4	40
	XKN 04-H3-D125	125	4,5kA 3P D125A	4	40
4 Pole	XKN 04-H4-D080	80	4,5kA 4P D80A	3	30
	XKN 04-H4-D100	100	4,5kA 4P D100A	3	30
	XKN 04-H4-D125	125	4,5kA 4P D125A	3	30

MINIATURE CIRCUIT BREAKER

6kA B SERIES

XKN6 6kA B (3In-5In) Curve



	Type (Order) Code	Rated Current (In)	Explanation	Box Quantity	Carton Quantity
1 Pole	XKN 06-1-B001	1	6kA 1P B01A	12	240
	XKN 06-1-B002	2	6kA 1P B02A	12	240
	XKN 06-1-B003	3	6kA 1P B03A	12	240
	XKN 06-1-B004	4	6kA 1P B04A	12	240
	XKN 06-1-B006	6	6kA 1P B06A	12	240
	XKN 06-1-B010	10	6kA 1P B10A	12	240
	XKN 06-1-B016	16	6kA 1P B16A	12	240
	XKN 06-1-B020	20	6kA 1P B20A	12	240
	XKN 06-1-B025	25	6kA 1P B25A	12	240
	XKN 06-1-B032	32	6kA 1P B32A	12	240
	XKN 06-1-B040	40	6kA 1P B40A	12	240
	XKN 06-1-B050	50	6kA 1P B50A	12	240
	XKN 06-1-B063	63	6kA 1P B63A	12	240
2 Pole	XKN 06-2-B001	1	6kA 2P B01A	6	120
	XKN 06-2-B002	2	6kA 2P B02A	6	120
	XKN 06-2-B003	3	6kA 2P B03A	6	120
	XKN 06-2-B004	4	6kA 2P B04A	6	120
	XKN 06-2-B006	6	6kA 2P B06A	6	120
	XKN 06-2-B010	10	6kA 2P B10A	6	120
	XKN 06-2-B016	16	6kA 2P B16A	6	120
	XKN 06-2-B020	20	6kA 2P B20A	6	120
	XKN 06-2-B025	25	6kA 2P B25A	6	120
	XKN 06-2-B032	32	6kA 2P B32A	6	120
	XKN 06-2-B040	40	6kA 2P B40A	6	120
	XKN 06-2-B050	50	6kA 2P B50A	6	120
	XKN 06-2-B063	63	6kA 2P B63A	6	120
3 Pole	XKN 06-3-B001	1	6kA 3P B01A	4	80
	XKN 06-3-B002	2	6kA 3P B02A	4	80
	XKN 06-3-B003	3	6kA 3P B03A	4	80
	XKN 06-3-B004	4	6kA 3P B04A	4	80
	XKN 06-3-B006	6	6kA 3P B06A	4	80
	XKN 06-3-B010	10	6kA 3P B10A	4	80
	XKN 06-3-B016	16	6kA 3P B16A	4	80
	XKN 06-3-B020	20	6kA 3P B20A	4	80
	XKN 06-3-B025	25	6kA 3P B25A	4	80
	XKN 06-3-B032	32	6kA 3P B32A	4	80
	XKN 06-3-B040	40	6kA 3P B40A	4	80
	XKN 06-3-B050	50	6kA 3P B50A	4	80
	XKN 06-3-B063	63	6kA 3P B63A	4	80
4 Pole	XKN 06-4-B001	1	6kA 4P B01A	3	60
	XKN 06-4-B002	2	6kA 4P B02A	3	60
	XKN 06-4-B003	3	6kA 4P B03A	3	60
	XKN 06-4-B004	4	6kA 4P B04A	3	60
	XKN 06-4-B006	6	6kA 4P B06A	3	60
	XKN 06-4-B010	10	6kA 4P B10A	3	60
	XKN 06-4-B016	16	6kA 4P B16A	3	60
	XKN 06-4-B020	20	6kA 4P B20A	3	60
	XKN 06-4-B025	25	6kA 4P B25A	3	60
	XKN 06-4-B032	32	6kA 4P B32A	3	60
	XKN 06-4-B040	40	6kA 4P B40A	3	60
	XKN 06-4-B050	50	6kA 4P B50A	3	60
	XKN 06-4-B063	63	6kA 4P B63A	3	60





MINIATURE CIRCUIT BREAKER

6kA C SERIES

XKN6 6kA C (5In~10In) Curve

	Type (Order) Code	Rated Current (In)	Explanation	Box Quantity	Carton Quantity
1 Pole	XKN 06-1-C001	1	6kA 1P C01A	12	240
	XKN 06-1-C002	2	6kA 1P C02A	12	240
	XKN 06-1-C003	3	6kA 1P C03A	12	240
	XKN 06-1-C004	4	6kA 1P C04A	12	240
	XKN 06-1-C006	6	6kA 1P C06A	12	240
	XKN 06-1-C010	10	6kA 1P C10A	12	240
	XKN 06-1-C016	16	6kA 1P C16A	12	240
	XKN 06-1-C020	20	6kA 1P C20A	12	240
	XKN 06-1-C025	25	6kA 1P C25A	12	240
	XKN 06-1-C032	32	6kA 1P C32A	12	240
	XKN 06-1-C040	40	6kA P C40A	12	240
	XKN 06-1-C050	50	6kA 1P C50A	12	240
	XKN 06-1-C063	63	6kA 1P C63A	12	240
2 Pole	XKN 06-2-C001	1	6kA 2P C01A	6	120
	XKN 06-2-C002	2	6kA 2P C02A	6	120
	XKN 06-2-C003	3	6kA 2P C03A	6	120
	XKN 06-2-C004	4	6kA 2P C04A	6	120
	XKN 06-2-C006	6	6kA 2P C06A	6	120
	XKN 06-2-C010	10	6kA 2P C10A	6	120
	XKN 06-2-C016	16	6kA 2P C16A	6	120
	XKN 06-2-C020	20	6kA 2P C20A	6	120
	XKN 06-2-C025	25	6kA 2P C25A	6	120
	XKN 06-2-C032	32	6kA 2P C32A	6	120
	XKN 06-2-C040	40	6kA 2P C40A	6	120
	XKN 06-2-C050	50	6kA 2P C50A	6	120
	XKN 06-2-C063	63	6kA 2P C63A	6	120
3 Pole	XKN 06-3-C001	1	6kA 3P C01A	4	80
	XKN 06-3-C002	2	6kA 3P C02A	4	80
	XKN 06-3-C003	3	6kA 3P C03A	4	80
	XKN 06-3-C004	4	6kA 3P C04A	4	80
	XKN 06-3-C006	6	6kA 3P C06A	4	80
	XKN 06-3-C010	10	6kA 3P C10A	4	80
	XKN 06-3-C016	16	6kA 3P C16A	4	80
	XKN 06-3-C020	20	6kA 3P C20A	4	80
	XKN 06-3-C025	25	6kA 3P C25A	4	80
	XKN 06-3-C032	32	6kA 3P C32A	4	80
	XKN 06-3-C040	40	6kA 3P C40A	4	80
	XKN 06-3-C050	50	6kA 3P C50A	4	80
	XKN 06-3-C063	63	6kA 3P C63A	4	80
4 Pole	XKN 06-4-C001	1	6kA 4P C01A	3	60
	XKN 06-4-C002	2	6kA 4P C02A	3	60
	XKN 06-4-C003	3	6kA 4P C03A	3	60
	XKN 06-4-C004	4	6kA 4P C04A	3	60
	XKN 06-4-C006	6	6kA 4P C06A	3	60
	XKN 06-4-C010	10	6kA 4P C10A	3	60
	XKN 06-4-C016	16	6kA 4P C16A	3	60
	XKN 06-4-C020	20	6kA 4P C20A	3	60
	XKN 06-4-C025	25	6kA 4P C25A	3	60
	XKN 06-4-C032	32	6kA 4P C32A	3	60
	XKN 06-4-C040	40	6kA 4P C40A	3	60
	XKN 06-4-C050	50	6kA 4P C50A	3	60
	XKN 06-4-C063	63	6kA 4P C63A	3	60

MINIATURE CIRCUIT BREAKER

6kA D SERIES

XKN6 6kA D (10In-20In) Curve

	Type (Order) Code	Rated Current (In)	Explanation	Box Quantity	Carton Quantity
1 Pole	XKN 06-1-D001	1	6kA 1P D01A	12	240
	XKN 06-1-D002	2	6kA 1P D02A	12	240
	XKN 06-1-D003	3	6kA 1P D03A	12	240
	XKN 06-1-D004	4	6kA 1P D04A	12	240
	XKN 06-1-D006	6	6kA 1P D06A	12	240
	XKN 06-1-D010	10	6kA 1P D10A	12	240
	XKN 06-1-D016	16	6kA 1P D16A	12	240
	XKN 06-1-D020	20	6kA 1P D20A	12	240
	XKN 06-1-D025	25	6kA 1P D25A	12	240
	XKN 06-1-D032	32	6kA 1P D32A	12	240
	XKN 06-1-D040	40	6kA 1P D40A	12	240
	XKN 06-1-D050	50	6kA 1P D50A	12	240
	XKN 06-1-D063	63	6kA 1P D63A	12	240
2 Pole	XKN 06-2-D001	1	6kA 2P D01A	6	120
	XKN 06-2-D002	2	6kA 2P D02A	6	120
	XKN 06-2-D003	3	6kA 2P D03A	6	120
	XKN 06-2-D004	4	6kA 2P D04A	6	120
	XKN 06-2-D006	6	6kA 2P D06A	6	120
	XKN 06-2-D010	10	6kA 2P D10A	6	120
	XKN 06-2-D016	16	6kA 2P D16A	6	120
	XKN 06-2-D020	20	6kA 2P D20A	6	120
	XKN 06-2-D025	25	6kA 2P D25A	6	120
	XKN 06-2-D032	32	6kA 2P D32A	6	120
	XKN 06-2-D040	40	6kA 2P D40A	6	120
	XKN 06-2-D050	50	6kA 2P D50A	6	120
	XKN 06-2-D063	63	6kA 2P D63A	6	120
3 Pole	XKN 06-3-D001	1	6kA 3P D01A	4	80
	XKN 06-3-D002	2	6kA 3P D02A	4	80
	XKN 06-3-D003	3	6kA 3P D03A	4	80
	XKN 06-3-D004	4	6kA 3P D04A	4	80
	XKN 06-3-D006	6	6kA 3P D06A	4	80
	XKN 06-3-D010	10	6kA 3P D10A	4	80
	XKN 06-3-D016	16	6kA 3P D16A	4	80
	XKN 06-3-D020	20	6kA 3P D20A	4	80
	XKN 06-3-D025	25	6kA 3P D25A	4	80
	XKN 06-3-D032	32	6kA 3P D32A	4	80
	XKN 06-3-D040	40	6kA 3P D40A	4	80
	XKN 06-3-D050	50	6kA 3P D50A	4	80
	XKN 06-3-D063	63	6kA 3P D63A	4	80
4 Pole	XKN 06-4-D001	1	6kA 4P D01A	3	60
	XKN 06-4-D002	2	6kA 4P D02A	3	60
	XKN 06-4-D003	3	6kA 4P D03A	3	60
	XKN 06-4-D004	4	6kA 4P D04A	3	60
	XKN 06-4-D006	6	6kA 4P D06A	3	60
	XKN 06-4-D010	10	6kA 4P D10A	3	60
	XKN 06-4-D016	16	6kA 4P D16A	3	60
	XKN 06-4-D020	20	6kA 4P D20A	3	60
	XKN 06-4-D025	25	6kA 4P D25A	3	60
	XKN 06-4-D032	32	6kA 4P D32A	3	60
	XKN 06-4-D040	40	6kA 4P D40A	3	60
	XKN 06-4-D050	50	6kA 4P D50A	3	60
	XKN 06-4-D063	63	6kA 4P D63A	3	60

MINIATURE CIRCUIT BREAKER

6kA H SERIES

XKN6-H 6kA B (3In~5In) Curve (H Series)



	Type (Order) Code	Rated Current (In)	Explanation	Box Quantity	Carton Quantity
1 Pole	XKN 06-H1-B080	80	6kA 1P B80A	12	120
	XKN 06-H1-B100	100	6kA 1P B100A	12	120
	XKN 06-H1-B125	125	6kA 1P B125A	12	120
2 Pole	XKN 06-H2-B080	80	6kA 2P B80A	6	60
	XKN 06-H2-B100	100	6kA 2P B100A	6	60
	XKN 06-H2-B125	125	6kA 2P B125A	6	60
3 Pole	XKN 06-H3-B080	80	6kA 3P B80A	4	40
	XKN 06-H3-B100	100	6kA 3P B100A	4	40
	XKN 06-H3-B125	125	6kA 3P B125A	4	40
4 Pole	XKN 06-H4-B080	80	6kA 4P B80A	3	30
	XKN 06-H4-B100	100	6kA 4P B100A	3	30
	XKN 06-H4-B125	125	6kA 4P B125A	3	30

XKN6-H 6kA C (5In~10In) Curve (H Series)



	Type (Order) Code	Rated Current (In)	Explanation	Box Quantity	Carton Quantity
1 Pole	XKN 06-H1-C080	80	6kA 1P C80A	12	120
	XKN 06-H1-C100	100	6kA 1P C100A	12	120
	XKN 06-H1-C125	125	6kA 1P C125A	12	120
2 Pole	XKN 06-H2-C080	80	6kA 2P C80A	6	60
	XKN 06-H2-C100	100	6kA 2P C100A	6	60
	XKN 06-H2-C125	125	6kA 2P C125A	6	60
3 Pole	XKN 06-H3-C080	80	6kA 3P C80A	4	40
	XKN 06-H3-C100	100	6kA 3P C100A	4	40
	XKN 06-H3-C125	125	6kA 3P C125A	4	40
4 Pole	XKN 06-H4-C080	80	6kA 4P C80A	3	30
	XKN 06-H4-C100	100	6kA 4P C100A	3	30
	XKN 06-H4-C125	125	6kA 4P C125A	3	30

XKN6-H 6kA D (10In~20In) Curve (H Series)



	Type (Order) Code	Rated Current (In)	Explanation	Box Quantity	Carton Quantity
1 Pole	XKN 06-H1-D080	80	6kA 1P D80A	12	120
	XKN 06-H1-D100	100	6kA 1P D100A	12	120
	XKN 06-H1-D125	125	6kA 1P D125A	12	120
2 Pole	XKN 06-H2-D080	80	6kA 2P D80A	6	60
	XKN 06-H2-D100	100	6kA 2P D100A	6	60
	XKN 06-H2-D125	125	6kA 2P D125A	6	60
3 Pole	XKN 06-H3-D080	80	6kA 3P D80A	4	40
	XKN 06-H3-D100	100	6kA 3P D100A	4	40
	XKN 06-H3-D125	125	6kA 3P D125A	4	40
4 Pole	XKN 06-H4-D080	80	6kA 4P D80A	3	30
	XKN 06-H4-D100	100	6kA 4P D100A	3	30
	XKN 06-H4-D125	125	6kA 4P D125A	3	30

GENERAL PRODUCT CATALOG

MINIATURE CIRCUIT BREAKER

6kA NEUTRAL (P+N)

XKN6 Neutral Breaking 6kA C Curve (5In-10In)



	Type (Order) Code	Rated Current (In)	Explanation	Box Quantity	Carton Quantity
1P+N	XKN 06-1N-C001	1	6kA 1P+N C01	6	120
	XKN 06-1N-C002	2	6kA 1P+N C02	6	120
	XKN 06-1N-C003	3	6kA 1P+N C03	6	120
	XKN 06-1N-C004	4	6kA 1P+N C04	6	120
	XKN 06-1N-C006	6	6kA 1P+N C06	6	120
	XKN 06-1N-C010	10	6kA 1P+N C10	6	120
	XKN 06-1N-C016	16	6kA 1P+N C16	6	120
	XKN 06-1N-C020	20	6kA 1P+N C20	6	120
	XKN 06-1N-C025	25	6kA 1P+N C25	6	120
	XKN 06-1N-C032	32	6kA 1P+N C32	6	120
	XKN 06-1N-C040	40	6kA 1P+N C40	6	120
	XKN 06-1N-C050	50	6kA 1P+N C50	6	120
	XKN 06-1N-C063	63	6kA 1P+N C63	6	120
3P+N	XKN 06-3N-C001	1	6kA 3P+N C01A	3	60
	XKN 06-3N-C002	2	6kA 3P+N C02A	3	60
	XKN 06-3N-C003	3	6kA 3P+N C03A	3	60
	XKN 06-3N-C004	4	6kA 3P+N C04A	3	60
	XKN 06-3N-C006	6	6kA 3P+N C06A	3	60
	XKN 06-3N-C010	10	6kA 3P+N C10A	3	60
	XKN 06-3N-C016	16	6kA 3P+N C16A	3	60
	XKN 06-3N-C020	20	6kA 3P+N C20A	3	60
	XKN 06-3N-C025	25	6kA 3P+N C25A	3	60
	XKN 06-3N-C032	32	6kA 3P+N C32A	3	60
	XKN 06-3N-C040	40	6kA 3P+N C40A	3	60
	XKN 06-3N-C050	50	6kA 3P+N C50A	3	60
	XKN 06-3N-C063	63	6kA 3P+N C63A	3	60

XKN6-H Neutral Breaking 6kA C Curve (5In-10In)



	Type (Order) Code	Rated Current In(A)	Explanation	Box Quantity	Quantity Per Cartoon
1P+N	XKN 06-H1N-C080	80	6kA 1P+N C80A	6	60
	XKN 06-H1N-C100	100	6kA 1P+N C100A	6	60
	XKN 06-H1N-C125	125	6kA 1P+N C125A	6	60
3P+N	XKN 06-H3N-C080	80	6kA 3P+N C80A	3	30
	XKN 06-H3N-C100	100	6kA 3P+N C100A	3	30
	XKN 06-H3N-C125	125	6kA 3P+N C125A	3	30

MINIATURE CIRCUIT BREAKER

10kA B TYPE

XKN10 10kA B (3In-5In) Curve

	Type (Order) Code	Rated Current (In)	Explanation	Box Quantity	Carton Quantity
1 Pole	XKN 10-1-B001	1	10kA 1P B01A	12	240
	XKN 10-1-B002	2	10kA 1P B02A	12	240
	XKN 10-1-B003	3	10kA 1P B03A	12	240
	XKN 10-1-B004	4	10kA 1P B04A	12	240
	XKN 10-1-B006	6	10kA 1P B06A	12	240
	XKN 10-1-B010	10	10kA 1P B10A	12	240
	XKN 10-1-B016	16	10kA 1P B16A	12	240
	XKN 10-1-B020	20	10kA 1P B20A	12	240
	XKN 10-1-B025	25	10kA 1P B25A	12	240
	XKN 10-1-B032	32	10kA 1P B32A	12	240
	XKN 10-1-B040	40	10kA 1P B40A	12	240
	XKN 10-1-B050	50	10kA 1P B50A	12	240
	XKN 10-1-B063	63	10kA 1P B63A	12	240
2 Pole	XKN 10-2-B001	1	10kA 2P B01A	6	120
	XKN 10-2-B002	2	10kA 2P B02A	6	120
	XKN 10-2-B003	3	10kA 2P B03A	6	120
	XKN 10-2-B004	4	10kA 2P B04A	6	120
	XKN 10-2-B006	6	10kA 2P B06A	6	120
	XKN 10-2-B010	10	10kA 2P B10A	6	120
	XKN 10-2-B016	16	10kA 2P B16A	6	120
	XKN 10-2-B020	20	10kA 2P B20A	6	120
	XKN 10-2-B025	25	10kA 2P B25A	6	120
	XKN 10-2-B032	32	10kA 2P B32A	6	120
	XKN 10-2-B040	40	10kA 2P B40A	6	120
	XKN 10-2-B050	50	10kA 2P B50A	6	120
	XKN 10-2-B063	63	10kA 2P B63A	6	120
3 Pole	XKN 10-3-B001	1	10kA 3P B01A	4	80
	XKN 10-3-B002	2	10kA 3P B02A	4	80
	XKN 10-3-B003	3	10kA 3P B03A	4	80
	XKN 10-3-B004	4	10kA 3P B04A	4	80
	XKN 10-3-B006	6	10kA 3P B06A	4	80
	XKN 10-3-B010	10	10kA 3P B10A	4	80
	XKN 10-3-B016	16	10kA 3P B16A	4	80
	XKN 10-3-B020	20	10kA 3P B20A	4	80
	XKN 10-3-B025	25	10kA 3P B25A	4	80
	XKN 10-3-B032	32	10kA 3P B32A	4	80
	XKN 10-3-B040	40	10kA 3P B40A	4	80
	XKN 10-3-B050	50	10kA 3P B50A	4	80
	XKN 10-3-B063	63	10kA 3P B63A	4	80
4 Pole	XKN 10-4-B001	1	10kA 4P B01A	3	60
	XKN 10-4-B002	2	10kA 4P B02A	3	60
	XKN 10-4-B003	3	10kA 4P B03A	3	60
	XKN 10-4-B004	4	10kA 4P B04A	3	60
	XKN 10-4-B006	6	10kA 4P B06A	3	60
	XKN 10-4-B010	10	10kA 4P B10A	3	60
	XKN 10-4-B016	16	10kA 4P B16A	3	60
	XKN 10-4-B020	20	10kA 4P B20A	3	60
	XKN 10-4-B025	25	10kA 4P B25A	3	60
	XKN 10-4-B032	32	10kA 4P B32A	3	60
	XKN 10-4-B040	40	10kA 4P B40A	3	60
	XKN 10-4-B050	50	10kA 4P B50A	3	60
	XKN 10-4-B063	63	10kA 4P B63A	3	60

GENERAL PRODUCT CATALOG

MINIATURE CIRCUIT BREAKER

10kA C TYPE

XKN10 10kA C (5In-10In) Curve

	Type (Order) Code	Rated Current (In)	Explanation	Box Quantity	Carton Quantity
1 Pole	XKN 10-1-C001	1	10kA 1P C01	12	240
	XKN 10-1-C002	2	10kA 1P C02	12	240
	XKN 10-1-C003	3	10kA 1P C03	12	240
	XKN 10-1-C004	4	10kA 1P C04	12	240
	XKN 10-1-C006	6	10kA 1P C06	12	240
	XKN 10-1-C010	10	10kA 1P C10	12	240
	XKN 10-1-C016	16	10kA 1P C16	12	240
	XKN 10-1-C020	20	10kA 1P C20	12	240
	XKN 10-1-C025	25	10kA 1P C25	12	240
	XKN 10-1-C032	32	10kA 1P C32	12	240
	XKN 10-1-C040	40	10kA 1P C40	12	240
	XKN 10-1-C050	50	10kA 1P C50	12	240
	XKN 10-1-C063	63	10kA 1P C63	12	240
2 Pole	XKN 10-2-C001	1	10kA 2P C01	6	120
	XKN 10-2-C002	2	10kA 2P C02	6	120
	XKN 10-2-C003	3	10kA 2P C03	6	120
	XKN 10-2-C004	4	10kA 2P C04	6	120
	XKN 10-2-C006	6	10kA 2P C06	6	120
	XKN 10-2-C010	10	10kA 2P C10	6	120
	XKN 10-2-C016	16	10kA 2P C16	6	120
	XKN 10-2-C020	20	10kA 2P C20	6	120
	XKN 10-2-C025	25	10kA 2P C25	6	120
	XKN 10-2-C032	32	10kA 2P C32	6	120
	XKN 10-2-C040	40	10kA 2P C40	6	120
	XKN 10-2-C050	50	10kA 2P C50	6	120
	XKN 10-2-C063	63	10kA 2P C63	6	120
3 Pole	XKN 10-3-C001	1	10kA 3P C01	4	80
	XKN 10-3-C002	2	10kA 3P C02	4	80
	XKN 10-3-C003	3	10kA 3P C03	4	80
	XKN 10-3-C004	4	10kA 3P C04	4	80
	XKN 10-3-C006	6	10kA 3P C06	4	80
	XKN 10-3-C010	10	10kA 3P C10	4	80
	XKN 10-3-C016	16	10kA 3P C16	4	80
	XKN 10-3-C020	20	10kA 3P C20	4	80
	XKN 10-3-C025	25	10kA 3P C25	4	80
	XKN 10-3-C032	32	10kA 3P C32	4	80
	XKN 10-3-C040	40	10kA 3P C40	4	80
	XKN 10-3-C050	50	10kA 3P C50	4	80
	XKN 10-3-C063	63	10kA 3P C63	4	80
4 Pole	XKN 10-4-C001	1	10kA 4P C01	3	60
	XKN 10-4-C002	2	10kA 4P C02	3	60
	XKN 10-4-C003	3	10kA 4P C03	3	60
	XKN 10-4-C004	4	10kA 4P C04	3	60
	XKN 10-4-C006	6	10kA 4P C06	3	60
	XKN 10-4-C010	10	10kA 4P C10	3	60
	XKN 10-4-C016	16	10kA 4P C16	3	60
	XKN 10-4-C020	20	10kA 4P C20	3	60
	XKN 10-4-C025	25	10kA 4P C25	3	60
	XKN 10-4-C032	32	10kA 4P C32	3	60
	XKN 10-4-C040	40	10kA 4P C40	3	60
	XKN 10-4-C050	50	10kA 4P C50	3	60
	XKN 10-4-C063	63	10kA 4P C63	3	60

MINIATURE CIRCUIT BREAKER

10kA D TYPE

XKN10 10kA D (10In-20In) Curve

	Type (Order) Code	Rated Current (In)	Explanation	Box Quantity	Carton Quantity
1 Pole	XKN 10-1-D001	1	10kA 1P D01	12	240
	XKN 10-1-D002	2	10kA 1P D02	12	240
	XKN 10-1-D003	3	10kA 1P D03	12	240
	XKN 10-1-D004	4	10kA 1P D04	12	240
	XKN 10-1-D006	6	10kA 1P D06	12	240
	XKN 10-1-D010	10	10kA 1P D10	12	240
	XKN 10-1-D016	16	10kA 1P D16	12	240
	XKN 10-1-D020	20	10kA 1P D20	12	240
	XKN 10-1-D025	25	10kA 1P D25	12	240
	XKN 10-1-D032	32	10kA 1P D32	12	240
	XKN 10-1-D040	40	10kA 1P D40	12	240
	XKN 10-1-D050	50	10kA 1P D50	12	240
	XKN 10-1-D063	63	10kA 1P D63	12	240
2 Pole	XKN 10-2-D001	1	10kA 2P D01	6	120
	XKN 10-2-D002	2	10kA 2P D02	6	120
	XKN 10-2-D003	3	10kA 2P D03	6	120
	XKN 10-2-D004	4	10kA 2P D04	6	120
	XKN 10-2-D006	6	10kA 2P D06	6	120
	XKN 10-2-D010	10	10kA 2P D10	6	120
	XKN 10-2-D016	16	10kA 2P D16	6	120
	XKN 10-2-D020	20	10kA 2P D20	6	120
	XKN 10-2-D025	25	10kA 2P D25	6	120
	XKN 10-2-D032	32	10kA 2P D32	6	120
	XKN 10-2-D040	40	10kA 2P D40	6	120
	XKN 10-2-D050	50	10kA 2P D50	6	120
	XKN 10-2-D063	63	10kA 2P D63	6	120
3 Pole	XKN 10-3-D001	1	10kA 3P D01	4	80
	XKN 10-3-D002	2	10kA 3P D02	4	80
	XKN 10-3-D003	3	10kA 3P D03	4	80
	XKN 10-3-D004	4	10kA 3P D04	4	80
	XKN 10-3-D006	6	10kA 3P D06	4	80
	XKN 10-3-D010	10	10kA 3P D10	4	80
	XKN 10-3-D016	16	10kA 3P D16	4	80
	XKN 10-3-D020	20	10kA 3P D20	4	80
	XKN 10-3-D025	25	10kA 3P D25	4	80
	XKN 10-3-D032	32	10kA 3P D32	4	80
	XKN 10-3-D040	40	10kA 3P D40	4	80
	XKN 10-3-D050	50	10kA 3P D50	4	80
	XKN 10-3-D063	63	10kA 3P D63	4	80
4 Pole	XKN 10-4-D001	1	10kA 4P D01	3	60
	XKN 10-4-D002	2	10kA 4P D02	3	60
	XKN 10-4-D003	3	10kA 4P D03	3	60
	XKN 10-4-D004	4	10kA 4P D04	3	60
	XKN 10-4-D006	6	10kA 4P D06	3	60
	XKN 10-4-D010	10	10kA 4P D10	3	60
	XKN 10-4-D016	16	10kA 4P D16	3	60
	XKN 10-4-D020	20	10kA 4P D20	3	60
	XKN 10-4-D025	25	10kA 4P D25	3	60
	XKN 10-4-D032	32	10kA 4P D32	3	60
	XKN 10-4-D040	40	10kA 4P D40	3	60
	XKN 10-4-D050	50	10kA 4P D50	3	60
	XKN 10-4-D063	63	10kA 4P D63	3	60

MINIATURE CIRCUIT BREAKER

10kA H SERIES

XKN10-H 10kA B (3In-5In) Curve (H Series)

	Type (Order) Code	Rated Current (In)	Explanation	Box Quantity	Carton Quantity
	XKN 10-H1-B080	80	10kA H 1P B80A	12	120
1 Pole	XKN 10-H1-B100	100	10kA H 1P B100	12	120
	XKN 10-H1-B125	125	10kA H 1P B125A	12	120
	XKN 10-H2-B080	80	10kA H 2P B80A	6	60
2 Pole	XKN 10-H2-B100	100	10kA H 2P B100A	6	60
	XKN 10-H2-B125	125	10kA H 2P B125A	6	60
	XKN 10-H3-B080	80	10kA H 3P B80A	4	40
3 Pole	XKN 10-H3-B100	100	10kA H 3P B100A	4	40
	XKN 10-H3-B125	125	10kA H 3P B125A	4	40
	XKN 10-H4-B080	80	10kA H 4P B80A	3	30
4 Pole	XKN 10-H4-B100	100	10kA H 4P B100A	3	30
	XKN 10-H4-B125	125	10kA H 4P B125A	3	30

XKN10-H 10kA C (5In-10In) Curve (H Series)

	Type (Order) Code	Rated Current (In)	Explanation	Box Quantity	Carton Quantity
	XKN 10-H1-C080	80	10kA H 1P C80A	12	120
1 Pole	XKN 10-H1-C100	100	10kA H 1P C100A	12	120
	XKN 10-H1-C125	125	10kA H 1P C125A	12	120
	XKN 10-H2-C080	80	10kA H 2P C80A	6	60
2 Pole	XKN 10-H2-C100	100	10kA H 2P C100A	6	60
	XKN 10-H2-C125	125	10kA H 2P C125A	6	60
	XKN 10-H3-C080	80	10kA H 3P C80A	4	40
3 Pole	XKN 10-H3-C100	100	10kA H 3P C100A	4	40
	XKN 10-H3-C125	125	10kA H 3P C125A	4	40
	XKN 10-H4-C080	80	10kA H 4P C80A	3	30
4 Pole	XKN 10-H4-C100	100	10kA H 4P C100A	3	30
	XKN 10-H4-C125	125	10kA H 4P C125A	3	30

XKN10-H 10kA D (10In-20In) Curve (H Series)

	Type (Order) Code	Rated Current (In)	Explanation	Box Quantity	Carton Quantity
	XKN 10-H1-D080	80	10kA H 1P D80A	12	120
1 Pole	XKN 10-H1-D100	100	10kA H 1P D100A	12	120
	XKN 10-H1-D125	125	10kA H 1P D125A	12	120
	XKN 10-H2-D080	80	10kA H 2P D80A	6	60
2 Pole	XKN 10-H2-D100	100	10kA H 2P D100A	6	60
	XKN 10-H2-D125	125	10kA H 2P D125A	6	60
	XKN 10-H3-D080	80	10kA H 3P D80A	4	40
3 Pole	XKN 10-H3-D100	100	10kA H 3P D100A	4	40
	XKN 10-H3-D125	125	10kA H 3P D125A	4	40
	XKN 10-H4-D080	80	10kA H 4P D80A	3	30
4 Pole	XKN 10-H4-D100	100	10kA H 4P D100A	3	30
	XKN 10-H4-D125	125	10kA H 4P D125A	3	30

10kA NEUTRAL (P+N)

XKN10 Neutral Breakiing 10kA C (5In-10In) Curve

	Type (Order) Code	Rated Current (In)	Explanation	Box Quantity	Carton Quantity
1P+N	XKN 10-1N-C001	1	10kA 1P+N C01A	6	120
	XKN 10-1N-C002	2	10kA P+N C02A	6	120
	XKN 10-1N-C003	3	10kA 1P+N C03A	6	120
	XKN 10-1N-C004	4	10kA 1P+N C04A	6	120
	XKN 10-1N-C006	6	10kA 1P+N C06A	6	120
	XKN 10-1N-C010	10	10kA 1P+N C10A	6	120
	XKN 10-1N-C016	16	10kA 1P+N C16A	6	120
	XKN 10-1N-C020	20	10kA 1P+N C20A	6	120
	XKN 10-1N-C025	25	10kA 1P+N C25A	6	120
	XKN 10-1N-C032	32	10kA 1P+N C32A	6	120
	XKN 10-1N-C040	40	10kA 1P+N C40A	6	120
	XKN 10-1N-C050	50	10kA 1P+N C50A	6	120
	XKN 06-1N-C063	63	10kA 1P+N C63A	6	120
3P+N	XKN 10-3N-C001	1	10kA 3P+N C01A	3	60
	XKN 10-3N-C002	2	10kA 3P+N C02A	3	60
	XKN 10-3N-C003	3	10kA 3P+N C03A	3	60
	XKN 10-3N-C004	4	10kA 3P+N C04A	3	60
	XKN 10-3N-C006	6	10kA 3P+N C06A	3	60
	XKN 10-3N-C010	10	10kA 3P+N C10A	3	60
	XKN 10-3N-C016	16	10kA 3P+N C16A	3	60
	XKN 10-3N-C020	20	10kA 3P+N C20A	3	60
	XKN 10-3N-C025	25	10kA 3P+N C25A	3	60
	XKN 10-3N-C032	32	10kA 3P+N C32A	3	60
	XKN 10-3N-C040	40	10kA 3P+N C40A	3	60
	XKN 10-3N-C050	50	10kA 3P+N C50A	3	60
	XKN 10-3N-C063	63	10kA 3P+N C63A	3	60



XKN10 - H 10kA C (5In-10In) Curve (H Series)

	Type (Order) Code	Rated Current (In)	Explanation	Box Quantity	Carton Quantity
1P+N	XKN 10-H1N-C080	80	10kA 1P+N C80A	6	60
	XKN 10-H1N-C100	100	10kA 1P+N C100A	6	60
	XKN 10-H1N-C125	125	10kA 1P+N C125A	6	60
3P+N	XKN 10-H3N-C080	80	10kA 3P+N C80A	3	30
	XKN 10-H3N-C100	100	10kA 3P+N C100A	3	30
	XKN 10-H3N-C125	125	10kA 3P+N C125A	3	30



GENERAL PRODUCT CATALOG

MINIATURE CIRCUIT BREAKER

Miniature Circuit Breaker Accessories

Auxiliary Contact & Alarm Contact



Type (Order) Code	Auxiliary Contact	Explanation	Box Quantity	Carton Quantity
AC-XKN3	1NO+1NC	Auxiliary Contact for XKN3(1NO+1NC)	16	320
AL-XKN3	1NO+1NC	Alarm Contact for XKN3(1NO+1NC)	16	320
AC-XKN6	1NO+1NC	Auxiliary Contact for XKN6(1NO+1NC)	16	320
AL-XKN6	1NO+1NC	Alarm Contact for XKN6(1NO+1NC)	16	320
AC-XKN10	1NO+1NC	Auxiliary Contact for XKN10(1NO+1NC)	16	320
AL-XKN10	1NO+1NC	Alarm Contact for XKN10(1NO+1NC)	16	320

Shunt Trip Release



Type (Order) Code	Rated Operating Voltage	Explanation	Box Quantity	Carton Quantity
NC-XKN3/24V DC	24V DC	Shunt Trip Release for XKN3(DC24)	16	320
NC-XKN3/240V AC	240V AC	Shunt Trip Release for XKN3(AC240)	16	320
NC-XKN3/415V AC	415V AC	Shunt Trip Release for XKN3(AC415)	16	320
NC-XKN6/24V DC	24V DC	Shunt Trip Release for XKN6(DC24)	16	320
NC-XKN6/240V AC	240V AC	Shunt Trip Release for XKN6(AC240)	16	320
NC-XKN6/415V AC	415V AC	Shunt Trip Release for XKN6(AC415)	16	320
NC-XKN10/24V DC	24V DC	Shunt Trip Release for XKN10(DC24)	16	320
NC-XKN10/240V AC	240V AC	Shunt Trip Release for XKN10(AC240)	16	320
NC-XKN10/415V AC	415V AC	Shunt Trip Release for XKN10(AC415)	16	320

Under voltage Release



Type (Order) Code	Rated Operating Voltage	Explanation	Box Quantity	Carton Quantity
LV-XKN3	240V AC	Under Voltage Release for XKN3(AC240)	16	320
LV-XKN6	240V AC	Under Voltage Release for XKN6(AC240)	16	320
LV-XKN10	240V AC	Under Voltage Release for XKN10(AC240)	16	320

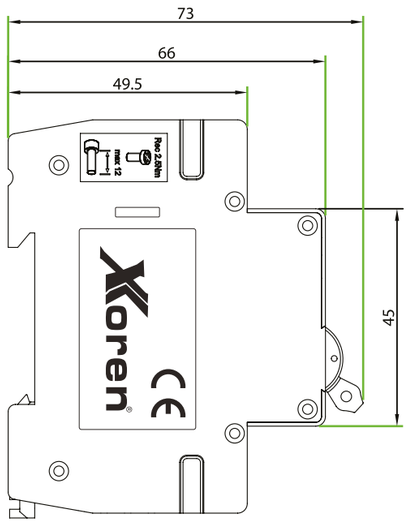
DC Miniature Circuit Breaker Auxiliary Contact

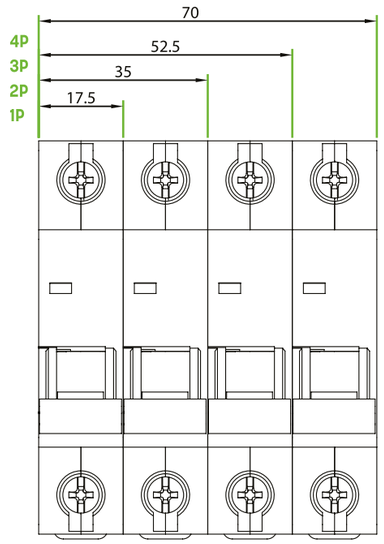


Type (Order) Code	Auxiliary Contact	Explanation	Box Quantity	Carton Quantity
AC-XKN10DC	1NO+1NC	Auxiliary Contact for XKN10DC(1NO+1NC)	16	320

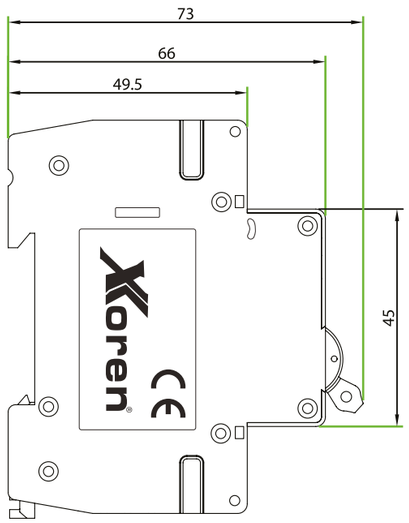
DIMENSIONS

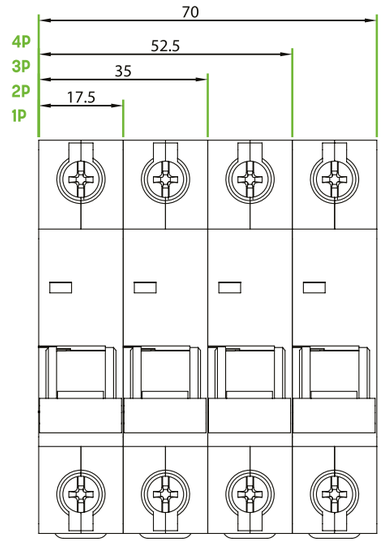
XKN 3-4,5kA (1A-63A)





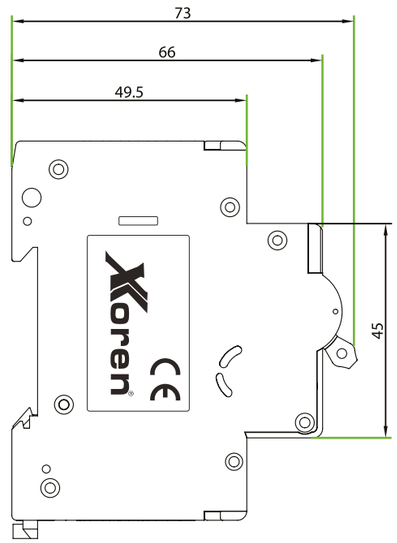
XKN 6kA (1A-63A)

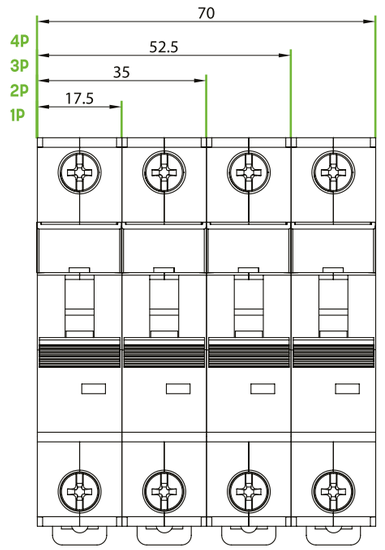




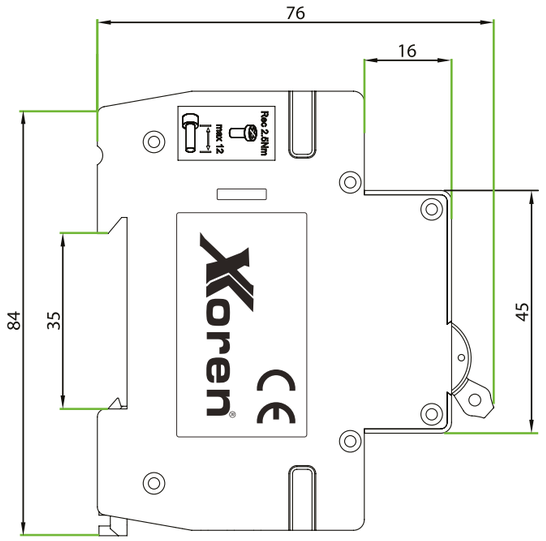
DIMENSIONS

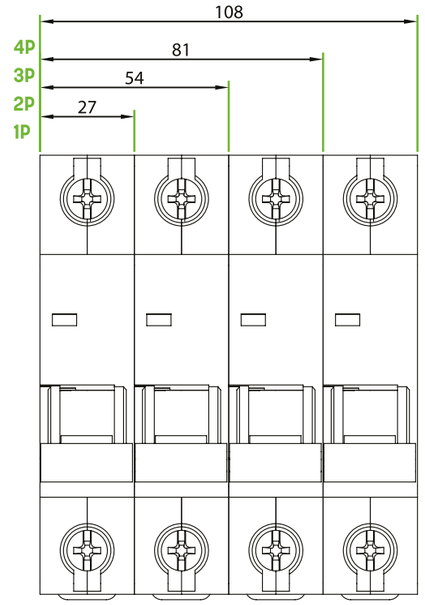
XKN 10kA (1A-63A)



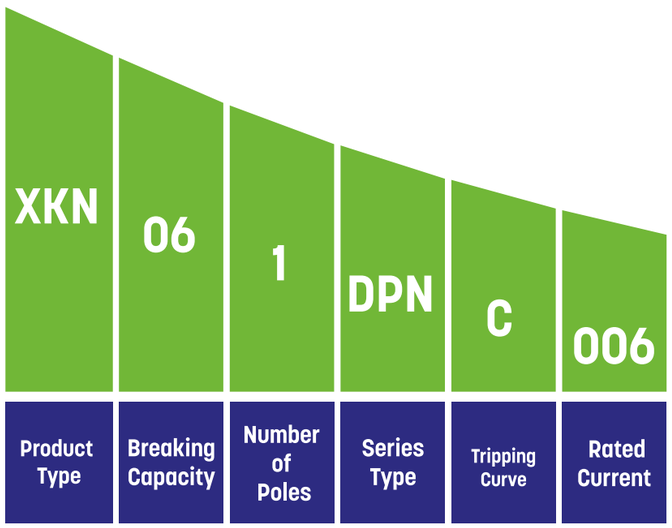


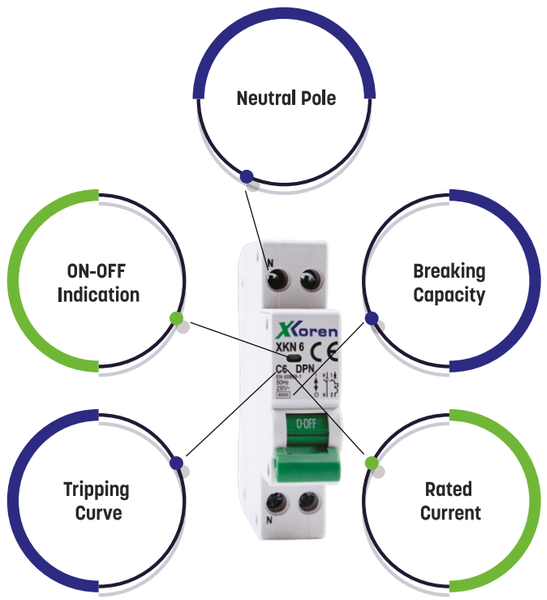
XKN H Series 3-4,5-6-10kA (80A-125A)





XKN DPN MINIATURE CIRCUIT BREAKER





GENERAL PRODUCT CATALOG

MINIATURE CIRCUIT BREAKER

XKN DPN Miniature Circuit Breaker

XKN6 C Type DPN Miniature Circuit Breaker



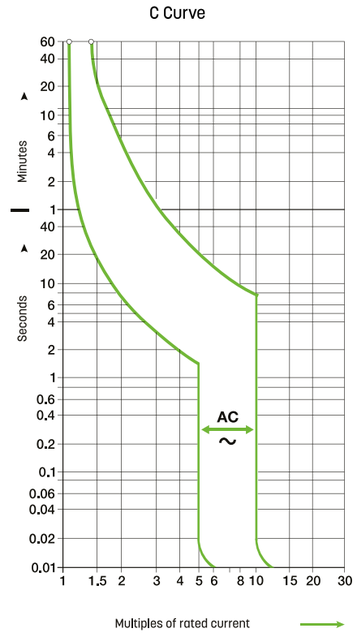
DPN Miniature Circuit Breaker			XKN6 DPN
Protection			Protection against Overload and Short Circuit Currents
Number of Poles		P	1
Rated Operating Voltage	Ue	VAC	230/400
Rated Insulation Voltage	Ui	V	690
Rated Impulse Withstand Voltage	Uimp	kV	4
Type of Current to be Protected			AC
Operating Frequency		Hz	50/60
Ultimate Short-Circuit Breaking Capacity	Icu	kA	6
Rated Current	**In**	**A**	**6,10,16,20,25,32**
Tripping Curve			C
Standards			IEC/EN 60898-1
Operating Ambient Temperature Range		°C	-25....+55
Storage Ambient Temperature Range		°C	-40....+70
Electrical Life		op.	4.000
Mechanical Life		op.	20.000
Protection Degree			IP 20
Pollution Degree			2
Maximum Terminal Tightening Torque		Nm	2,5
Altitude		m	≤2000
Mounting		mm	35mm DIN Rail
Terminal Cross-Section		mm^2	1~25
Accessories	Auxiliary Contact		✓
	Auxiliary Contact		✓
	Shunt Trip Release		✓
	Undervoltage Release		✓

XKN DPN Miniature Circuit Breaker

General Information



Current-Time Breaking Characteristics



XKoren, DPN Circuit Breakers are manufactured in 6kA capacities. DPN (Phase + Neutral Circuit Breaker) miniature circuit breakers are compactly designed circuit breakers specifically created to save space. They are commonly used in electrical panels to protect both the phase and neutral lines. Their functions are as follows:

Definition: Compact miniature circuit breakers that protect the circuit by disconnecting both the phase and neutral lines simultaneously in the event of overload, short circuit, or leakage current situations.

Operating Principle: When overload or short circuit is detected, the internal mechanism is triggered, and the circuit is automatically opened, thereby protecting the system and connected equipment.

Applications: DPN circuit breakers are commonly used in electrical panels in residential homes, commercial buildings, and small industrial facilities. They are preferred for space-saving purposes.

DPN circuit breakers provide advantages in confined spaces due to their compact design and two-pole protection feature.

GENERAL PRODUCT CATALOG

MINIATURE CIRCUIT BREAKER

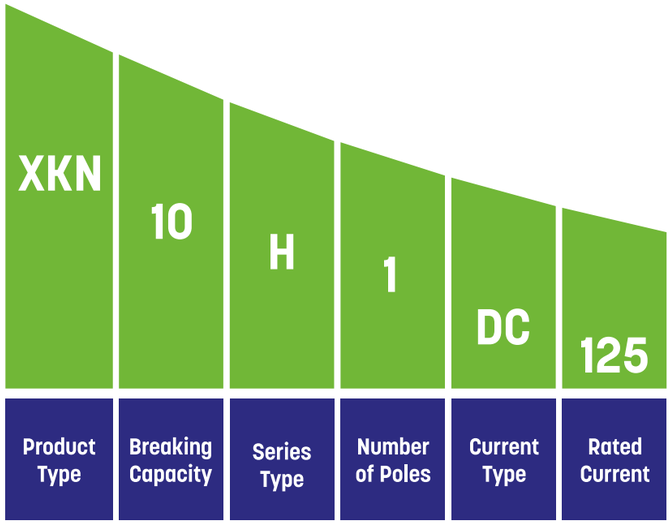
ORDER LIST

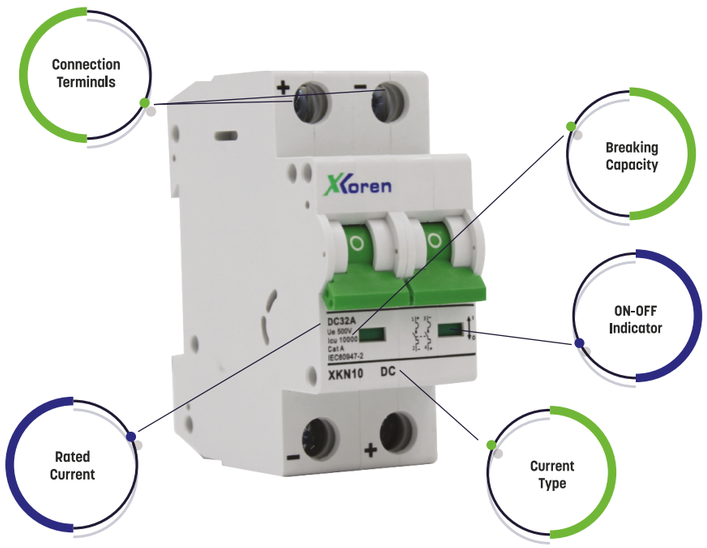
DPN XKN Miniature Circuit Breaker

DPN Miniature Circuit Breaker 6 kA



Type (Order) Code	Rated Current (In)	Explanation	Box Quantity	Carton Quantity
XKN 06-1DPN-C006	6	6kA 1P DPN C06A	12	240
XKN 06-1DPN-C010	10	6kA 1P DPN C10A	12	240
XKN 06-1DPN-C016	16	6kA 1P DPN C16A	12	240
XKN 06-1DPN-C020	20	6kA 1P DPN C20A	12	240
XKN 06-1DPN-C025	25	6kA 1P DPN C25A	12	240
XKN 06-1DPN-C032	32	6kA 1P DPN C32A	12	240





GENERAL PRODUCT CATALOG

DC MINIATURE CIRCUIT BREAKER

XKN DC 6kA Miniature Circuit Breaker



DC Miniature Circuit Breaker			XKN6 DC		
Protection			Against overload and short-circuit currents		
Number of Poles		P	1	2	4
Nominal Operational Voltage	Ue	V DC	250	500	1.000
Nominal Insulation Voltage	Ui	V	1000		
Nominal Impulse Withstand Voltage	Ulimp	kV	4		
Type of Current to be Protected			DC		
Operating Frequency		Hz	50/60		
Ultimate Short - Circut Breaking Capacity	Icu	kA	6		
Rated Current	In	A	1,2,3,4,6,10,16,20,25,32,40,50,63		
Tripping Curve			C		
Standards			Complies with IEC EN 60947-2		
Humidity		%	95		
Operating Temperature Range		°C	-25.....+55		
Storage Temperature Range		°C	-40....+70		
Electrical Life		op.	4.000		
Mechanical Life		op.	20.000		
Degree of Protection			IP 20		
Pollution Degree			2		
Max. Terminal Tightening Torque		Nm	2,5		
Altitude		m	<2000		
Mounting		mm	35mm DIN Rail		
Terminal Cross-Section		mm^2	1~25		

XKN DC 6kA Miniature Circuit Breaker



DC Miniature Circuit Breaker			XKN10 DC		
Protection			Against overload and short-circuit currents		
Number of Poles		P	1	2	4
Nominal Operational Voltage	Ue	V DC	250	500	1.000
Nominal Insulation Voltage	Ui	V	1000		
Nominal Impulse Withstand Voltage	Ulimp	kV	4		
Type of Current to be Protected			DC		
Operating Frequency		Hz	50/60		
Ultimate Short - Circut Breaking Capacity	Icu	kA	10		
Rated Current	In	A	1,2,3,4,6,10,16,20,25,32,40,50,63		
Tripping Curve			C		
Standards			Complies with IEC EN 60947-2		
Humidity		%	95		
Operating Temperature Range		°C	-25.....+55		
Storage Temperature Range		°C	-40....+70		
Electrical Life		op.	4.000		
Mechanical Life		op.	20.000		
Degree of Protection			IP 20		
Pollution Degree			2		
Max. Terminal Tightening Torque		Nm	2,5		
Altitude		m	<2000		
Mounting		mm	35mm DIN Rail		
Terminal Cross-Section		mm	1~25		

XKN H Series 6kA Miniature Circuit Breaker



DC Miniature Circuit Breaker			XKN10 DC (H Series)		
Protection			Against overload and short-circuit currents		
Number of Poles		P	1	2	4
Nominal Operational Voltage	Ue	V DC	250	500	1000
Nominal Insulation Voltage	Ui	V	1000		
Nominal Impulse Withstand Voltage	Ulimp	kV	6		
Type of Current to be Protected			DC		
Operating Frequency		Hz	50/60		
Ultimate Short - Circut Breaking Capacity	Icu	kA	10		
Rated Current	In	A	80,100,125		
Tripping Curve			C		
Standards			Complies with IEC EN 60947-2		
Humidity		%	95		
Operating Temperature Range		°C	-25.....+55		
Storage Temperature Range		°C	-40....+70		
Electrical Life		op.	4.000		
Mechanical Life		op.	20.000		
Degree of Protection			IP 20		
Pollution Degree			2		
Max. Terminal Tightening Torque		Nm	3		
Altitude		m	<2000		
Mounting		mm	35mm DIN Rail		
Terminal Cross-Section		mm^2	25~50		

DC MINIATURE CIRCUIT BREAKER

General Information



XKoren DC miniature circuit breakers (MCB) are produced with 6 kA and 10 kA breaking capacities, rated current values ranging from 1 A to 63 A, and 1, 2, and 4-pole options. These circuit breakers are critical components used to provide overcurrent and short-circuit protection in direct current (DC) circuits. Since DC circuits are commonly used in solar power systems, electric vehicles, and industrial applications, these miniature circuit breakers play a crucial role in enhancing system safety.

Primary Function of DC Miniature Circuit Breakers

DC miniature circuit breakers (MCB) operate by interrupting the circuit in case of overcurrent or short circuit, thereby stopping the flow of energy and preventing further damage to the system. Thanks to their internal mechanisms, they automatically trip when a predetermined current limit is reached, ensuring safe system operation and preventing devices or cables from overheating and sustaining damage.

Selection and Operating Principle of Miniature Circuit Breakers in DC Circuits

The tripping values of miniature circuit breakers used in DC circuits are approximately 40% higher than those in alternating current (AC) circuits. This difference is due to the constant current direction in DC circuits and the fact that sudden current changes in DC systems tend to be higher. For instance, a B-type 10 A AC circuit breaker typically trips between 30 A and 50 A in AC circuits, whereas in a DC circuit, the same breaker would trip between 42.5 A and 70 A. This means that DC circuits require higher tripping values.

Applications of DC Miniature Circuit Breakers

DC miniature circuit breakers are used in applications such as solar energy systems, electric vehicles, telecommunications infrastructure, and industrial applications. Since DC power transmission is more efficient, these breakers ensure safety in high-voltage and high-current DC systems.

Operating Principle of DC MCB

A DC miniature circuit breaker (MCB) protects electrical circuits from overcurrent and short circuits in direct current systems. It operates through two main mechanisms:

Thermal trip unit: A bimetallic strip bends due to heat generated by prolonged overcurrent, triggering the breaker to open.

Magnetic trip unit: A sudden surge of current induces a strong magnetic field that rapidly activates the trip mechanism to interrupt the circuit.
Since DC current has no zero-crossing point, arc suppression is more challenging. Therefore, DC MCBs use arc chutes and extended contact gaps to extinguish the arc efficiently.

AC and DC Circuit Breaker: Key Differences and Applications

Circuit breaker are critical safety components designed to protect electrical circuits from overcurrent and short circuits. However, there are significant structural and functional differences between AC (Alternating Current) and DC (Direct Current) circuit breaker.

1. Current Interruption Mechanism
- AC circuit breaker can extinguish the arc more easily because the current direction changes periodically, allowing the arc to break naturally.
- DC circuit breaker, on the other hand, must interrupt a continuous current flow, requiring larger contact gaps and special arc-extinguishing mechanisms.

GENERAL PRODUCT CATALOG

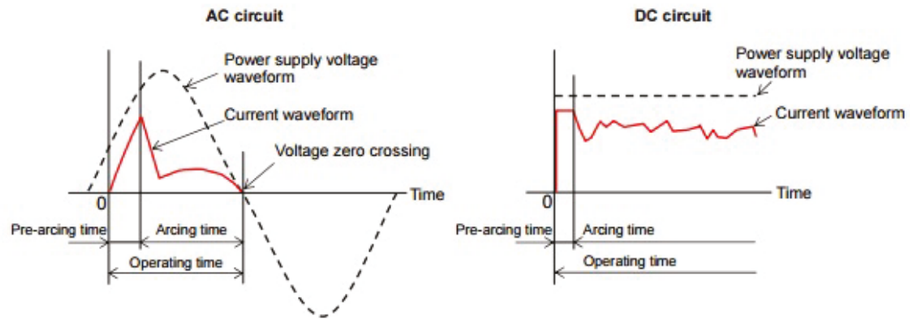
DC MINIATURE CIRCUIT BREAKER

2. Application Areas
- AC circuit breaker are commonly used in residential, industrial, and commercial electrical distribution systems.
- DC circuit breaker are preferred in solar power systems, battery storage units, electric vehicles, and railway systems, where direct current is utilized.

3. Structural Differences
- DC circuit breaker are generally larger and made from more durable materials due to higher insulation requirements.
- AC circuit breaker tend to have a more compact design as they do not require such extensive insulation.

4. Breaking Capacity
- The arc-extinguishing process in DC circuit breaker is more challenging, so their breaking capacity must be optimized for specific applications.
- AC circuit breaker, on the other hand, function more reliably in standard grid connections.

5. Operating Conditions
- Factors such as high temperature, humidity, and environmental conditions can significantly impact DC circuit breaker performance.
- Choosing the right circuit breaker based on system requirements and environmental conditions is crucial for safety and efficiency.



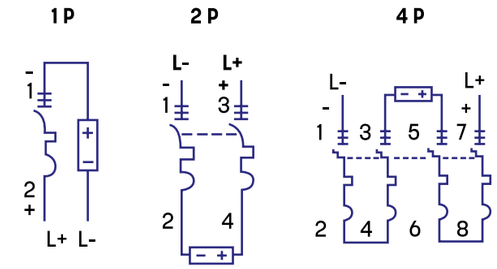
Conclusion AC and DC circuit breaker are designed for different applications and must be selected carefully to ensure safety and efficiency in electrical systems. Choosing the correct circuit breaker enhances system reliability and prevents potential failures.

Breaking Capacity and Safety of DC Miniature Circuit Breakers

DC miniature circuit breakers (MCBs) are designed with various breaking capacities across different voltage ranges, ensuring system safety even under high voltages and currents. With breaking capacities of 6kA and 10kA, these MCBs demonstrate their ability to interrupt the circuit during overcurrent or short-circuit conditions in high-power DC circuits. This capacity prevents overloading of devices and cables, enabling safe operation of DC circuits

In conclusion, XKoren DC miniature circuit breakers provide overcurrent and short-circuit protection in DC circuits, ensuring the safe transmission of energy.

Wiring Diagram



DC MINIATURE CIRCUIT BREAKER

ORDER LIST

DC Miniature Circuit Breaker

6 kA, Type C DC Miniature Circuit Breaker

1 Pole



Type (Order) Code	Rated Current (In)	Explanation	Box Quantity	Carton Quantity
XKN 06-1-DC001	1A	6kA 1P DC01A	12	120
XKN 06-1-DC002	2A	6kA 1P DC02A	12	120
XKN 06-1-DC003	3A	6kA 1P DC03A	12	120
XKN 06-1-DC004	4A	6kA 1P DC04A	12	120
XKN 06-1-DC006	6A	6kA 1P DC06A	12	120
XKN 06-1-DC010	10A	6kA 1P DC10A	12	120
XKN 06-1-DC016	16A	6kA 1P DC16A	12	120
XKN 06-1-DC020	20A	6kA 1P DC20A	12	120
XKN 06-1-DC025	25A	6kA 1P DC25A	12	120
XKN 06-1-DC032	32A	6kA 1P DC32A	12	120
XKN 06-1-DC040	40A	6kA 1P DC40A	12	120
XKN 06-1-DC050	50A	6kA 1P DC50A	12	120
XKN 06-1-DC063	63A	6kA 1P DC63A	12	120

2 Pole



XKN 06-2-DC001	1A	6kA 2P DC01A	6	60
XKN 06-2-DC002	2A	6kA 2P DC02A	6	60
XKN 06-2-DC003	3A	6kA 2P DC03A	6	60
XKN 06-2-DC004	4A	6kA 2P DC04A	6	60
XKN 06-2-DC006	6A	6kA 2P DC06A	6	60
XKN 06-2-DC010	10A	6kA 2P DC10A	6	60
XKN 06-2-DC016	16A	6kA 2P DC16A	6	60
XKN 06-2-DC020	20A	6kA 2P DC20A	6	60
XKN 06-2-DC025	25A	6kA 2P DC25A	6	60
XKN 06-2-DC032	32A	6kA 2P DC32A	6	60
XKN 06-2-DC040	40A	6kA 2P DC40A	6	60
XKN 06-2-DC050	50A	6kA 2P DC50A	6	60
XKN 06-2-DC063	63A	6kA 2P DC63A	6	60

4 Pole



XKN 06-4-DC001	1A	6kA 4P DC01A	3	30
XKN 06-4-DC002	2A	6kA 4P DC02A	3	30
XKN 06-4-DC003	3A	6kA 4P DC03A	3	30
XKN 06-4-DC004	4A	6kA 4P DC04A	3	30
XKN 06-4-DC006	6A	6kA 4P DC06A	3	30
XKN 06-4-DC010	10A	6kA 4P DC10A	3	30
XKN 06-4-DC016	16A	6kA 4P DC16A	3	30
XKN 06-4-DC020	20A	6kA 4P DC20A	3	30
XKN 06-4-DC025	25A	6kA 4P DC25A	3	30
XKN 06-4-DC032	32A	6kA 4P DC32A	3	30
XKN 06-4-DC040	40A	6kA 4P DC40A	3	30
XKN 06-4-DC050	50A	6kA 4P DC50A	3	30
XKN 06-4-DC063	63A	6kA 4P DC63A	3	30

DC MINIATURE CIRCUIT BREAKER

10 kA, Type C DC Miniature Circuit Breaker

1 Pole



Type (Order) Code	Rated Current (In)	Explanation	Box Quantity	Carton Quantity
XKN 10-1-DC001	1A	10kA 1P DC01A	12	240
XKN 10-1-DC002	2A	10kA 1P DC02A	12	240
XKN 10-1-DC003	3A	10kA 1P DC03A	12	240
XKN 10-1-DC004	4A	10kA 1P DC04A	12	240
XKN 10-1-DC006	6A	10kA 1P DC06A	12	240
XKN 10-1-DC010	10A	10kA 1P DC10A	12	240
XKN 10-1-DC016	16A	10kA 1P DC16A	12	240
XKN 10-1-DC020	20A	10kA 1P DC20A	12	240
XKN 10-1-DC025	25A	10kA 1P DC25A	12	240
XKN 10-1-DC032	32A	10kA 1P DC32A	12	240
XKN 10-1-DC040	40A	10kA 1P DC40A	12	240
XKN 10-1-DC050	50A	10kA 1P DC50A	12	240
XKN 10-1-DC063	63A	10kA 1P DC63A	12	240

2 Pole



XKN 10-2-DC001	1A	10kA 2P DC01A	6	120
XKN 10-2-DC002	2A	10kA 2P DC02A	6	120
XKN 10-2-DC003	3A	10kA 2P DC03A	6	120
XKN 10-2-DC004	4A	10kA 2P DC04A	6	120
XKN 10-2-DC006	6A	10kA 2P DC06A	6	120
XKN 10-2-DC010	10A	10kA 2P DC10A	6	120
XKN 10-2-DC016	16A	10kA 2P DC16A	6	120
XKN 10-2-DC020	20A	10kA 2P DC20A	6	120
XKN 10-2-DC025	25A	10kA 2P DC25A	6	120
XKN 10-2-DC032	32A	10kA 2P DC32A	6	120
XKN 10-2-DC040	40A	10kA 2P DC40A	6	120
XKN 10-2-DC050	50A	10kA 2P DC50A	6	120
XKN 10-2-DC063	63A	10kA 2P DC63A	6	120

4 Pole



XKN 10-4-DC001	1A	10kA 4P DC01A	3	60
XKN 10-4-DC002	2A	10kA 4P DC02A	3	60
XKN 10-4-DC003	3A	10kA 4P DC03A	3	60
XKN 10-4-DC004	4A	10kA 4P DC04A	3	60
XKN 10-4-DC006	6A	10kA 4P DC06A	3	60
XKN 10-4-DC010	10A	10kA 4P DC10A	3	60
XKN 10-4-DC016	16A	10kA 4P DC16A	3	60
XKN 10-4-DC020	20A	10kA 4P DC20A	3	60
XKN 10-4-DC025	25A	10kA 4P DC25A	3	60
XKN 10-4-DC032	32A	10kA 4P DC32A	3	60
XKN 10-4-DC040	40A	10kA 4P DC40A	3	60
XKN 10-4-DC050	50A	10kA 4P DC50A	3	60
XKN 10-4-DC063	63A	10kA 4P DC63A	3	60

10 kA, Type C DC Miniature Circuit Breaker (H Series)

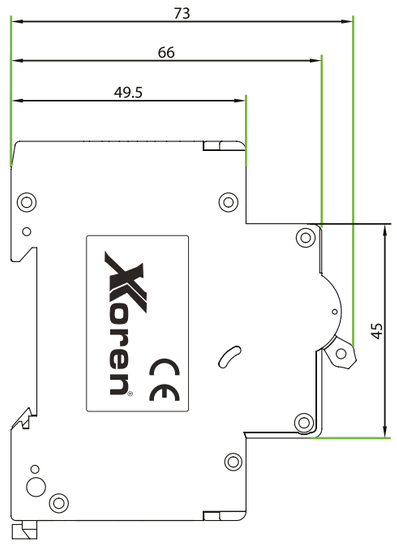
	Type (Order) Code	Rated Current (In)	Explanation	Box Quantity	Carton Quantity
1 Pole 	XKN 10-H1-DC080	80A	10kA 1P DC80A	8	160
	XKN 10-H1-DC100	100A	10kA 1P DC100A	8	160
	XKN 10-H1-DC125	125A	10kA 1P DC125A	8	160
2 Pole 	XKN 10-H2-DC080	80A	10kA 2P DC80A	4	80
	XKN 10-H2-DC100	100A	10kA 2P DC100A	4	80
	XKN 10-H2-DC125	125A	10kA 2P DC125A	4	80
4 Pole 	XKN 10-H4-DC080	80A	10kA 4P DC80A	2	40
	XKN 10-H4-DC100	100A	10kA 4P DC100A	2	40
	XKN 10-H4-DC125	125A	10kA 4P DC 125A	2	40

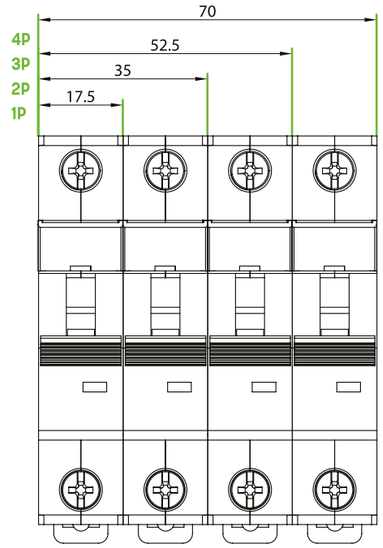
GENERAL PRODUCT CATALOG

DC MINIATURE CIRCUIT BREAKER

DIMENSIONS

XKN DC 6-10kA (1A-63A)





Product Code and Label Information





GENERAL PRODUCT CATALOG

ISOLATOR

Isolator



ISOLATOR			XYA			
Number of Poles		P	1	2	3	4
Rated Operational Voltage	Ue	VAC	230		400	
Rated Insulation Voltage	Ui	V	500			
Rated Impulse Withstand Voltage	Uimp	kV	6			
Operating Frequency		Hz	50/60			
Service Short -Circuit Breaking Capacity	Ics	kA	2.5			
Rated Current	In	A	**40,63,80,100,125**			
Standarts			IEC EN 60947-3			
Category			AC-22A, AC-21B			
Protection Degree			IP20			
Installation			35mm DIN Rail			
Electrical Life		op.	3.000			
Mechanical Life		op.	8.500			

General Information



XYA isolators allow for safe operation in electrical circuits for specific processes or maintenance purposes. They are essential electrical components used to completely disconnect a part of an electrical circuit or system from the power supply.

The main function of this switch is to create a visible physical break in the circuit, completely cutting off the electrical flow in the Isolated area. While circuit breakers automatically disconnect the circuit in case of overload or fault, Isolators are manually operated and are typically used for safety and maintenance purposes.

When devices are operated in the open state, accidents may occur independently of the device, which is why most devices require an isolators.

Isolators are manufactured in various configurations, such as single-pole, double-pole, or multi-pole, to adapt to different usage scenarios. This versatility offers a wide range of applications, from simple residential installations to large-scale industrial systems.

One of the most prominent features of these switches is their ability to create a visible break in the circuit. This allows maintenance personnel to visually confirm that the connection has been disconnected before intervening, thus increasing the safety level.

In conclusion, Isolators are indispensable components that play a critical role in ensuring safety in electrical systems, facilitating maintenance processes, and supporting compliance with electrical standards.

Technical Specifications:

- **Number of Poles:** 1P, 2P, 3P, 4P
- **Rated Insulation Voltage:** 500V
- **Rated Current:** 40A, 63A, 80A, 100A, 125A

Importance and Applications of AC Isolators:

Alternating current (AC) Isolators are critical components used to ensure safety in electrical systems and simplify maintenance processes. These switches provide safe isolation by disconnecting AC power sources from loads for maintenance, repair, or emergency situations.

AC isolators have a wide range of applications in residential, commercial, and industrial systems. They are used in power distribution systems, industrial machinery, and HVAC (heating, ventilation, and air conditioning) systems, among others. They are also designed to accommodate various voltage and current levels, ranging from household appliances to large-scale industrial equipment.

One of the most important features of these switches is their ability to provide complete electrical Isolation by cutting both live and neutral connections in the circuit. Models with multi-pole designs are available, particularly for more complex systems like three-phase power systems. AC isolators are manufactured to handle high loads, with resistance to electrical arcs, offering long-term durability.

Modern AC isolators are equipped with weather-resistant enclosures (e.g. IP-rated protection) for use in outdoor or harsh environmental conditions. This makes them suitable for safe operation in systems like rooftop solar inverters.

Key Factors to Consider in Isolators

When selecting an Isolator, the most important factors to consider include voltage and current ratings, number of poles, and durability. These features ensure the safe and efficient operation of the switch.

GENERAL PRODUCT CATALOG

ISOLATOR

Voltage and Current Ratings

The maximum voltage and current ratings that an Isolator can carry are critical for safety. These ratings vary for AC and DC systems and should be selected according to the circuit's needs. For example, residential AC Isolators typically carry up to 230V, while industrial versions can handle up to 11kV. XKoren Isolators have a rated insulation voltage of 500V. Incorrect selection can lead to overheating, arcing, and safety risks.

Number of Poles

The number of poles determines how many circuits or phases the isolator can isolate at the same time. This varies according to system requirements:

- **Single-pole isolators** are used for simple AC circuits, typically in single-phase circuits. They are usually found on the live side of the circuit; therefore, before performing maintenance, we must ensure that the power to this side is turned off. Since the neutral leg remains connected, single-pole switches are not as safe as double-pole switches when disconnecting power.
- **Double-pole models** enhance safety by isolating both the live and neutral lines.

Durability and Weather Resistance

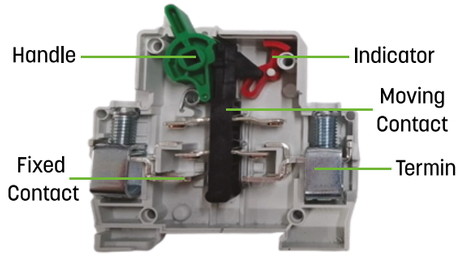
For outdoor or harsh environments, the IP rating and material quality of Isolators are of great importance.

- **XKoren isolators** have an IP20 protection rating. This ensures protection against large solid objects and finger contact. They are typically used in enclosed electrical panels or in dry and clean indoor environments.

Conclusion

When selecting the appropriate Isolator, the system's voltage and current requirements, the number of poles, and suitability for environmental conditions should be carefully considered. By taking these factors into account, a safe and long-lasting Isolation solution is ensured.

Isolator Internal Structure



Components and Operation of AC Isolators

AC isolators are housed within durable enclosures designed to withstand external factors. These robust enclosures contain a switch mechanism that allows manual control of the electrical circuit.

When the switch is in the **ON** position, it permits the flow of AC current through the circuit, enabling connected devices or systems to operate. When turned **OFF**, it physically disconnects the circuit, preventing AC power from passing and ensuring safe system isolation.

These switches are designed to match specific voltage levels, frequency, and current ratings. To ensure reliability and long service life in electrical systems, they are equipped with advanced arc suppression technologies to minimize the risks associated with switching operations.

1. Basic Operating Principle

AC isolators function through an internal mechanism operated by a manual lever or an automatic system. Their working principle is as follows:

- **Open Position (OFF):** When the switch is open, its internal contacts are separated, preventing electrical current from flowing through the circuit. This fully isolates the connected devices or systems.
- **Closed Position (ON):** When the switch is closed, the internal contacts connect, completing the circuit and allowing AC current to pass through.

2. Internal Structure and Mechanical Components

The main components of an AC Isolator include:

- **Contacts:** Metal parts responsible for opening and closing the electrical circuit.
- **Spring Mechanism:** Ensures the switch opens or closes quickly. It moves rapidly to minimize arc formation, especially at high currents.
- **Poles:** Indicate how many phases the switch can control simultaneously. Single-phase systems use single-pole (1P) switches, while three-phase systems use three- or four-pole (3P or 4P) versions.
- **Arc Suppression Chamber**: A specially designed component that controls arcs that may form when the switch is turned ON or OFF in high-voltage circuits. If arc formation is not controlled, it can lead to overheating and electrical damage.

AC isolators are based on simple mechanical principles but incorporate advanced safety and durability features. Equipped with arc suppression technology and robust contacts, they ensure safe operation even at high current levels. They are considered critical components for the safe and efficient functioning of electrical systems.

GENERAL PRODUCT CATALOG

ISOLATOR

ORDER LIST

Isolator

1 Pole



Type (Order) Code	Rated Curren (In)	Explanation	Box Quantity	Carton Quantity
XYA 1-40	40A	1P 40A	12	120
XYA 1-63	63A	1P 63A	12	120
XYA 1-80	80A	1P 80A	12	120
XYA 1-100	100A	1P 100A	12	120
XYA 1-125	125A	1P 125A	12	120

2 Pole



Type (Order) Code	Rated Curren (In)	Explanation	Box Quantity	Carton Quantity
XYA 2-40	40A	2P 40A	6	60
XYA 2-63	63A	2P 63A	6	60
XYA 2-80	80A	2P 80A	6	60
XYA 2-100	100A	2P 100A	6	60
XYA 2-125	125A	2P 125A	6	60

3 Pole



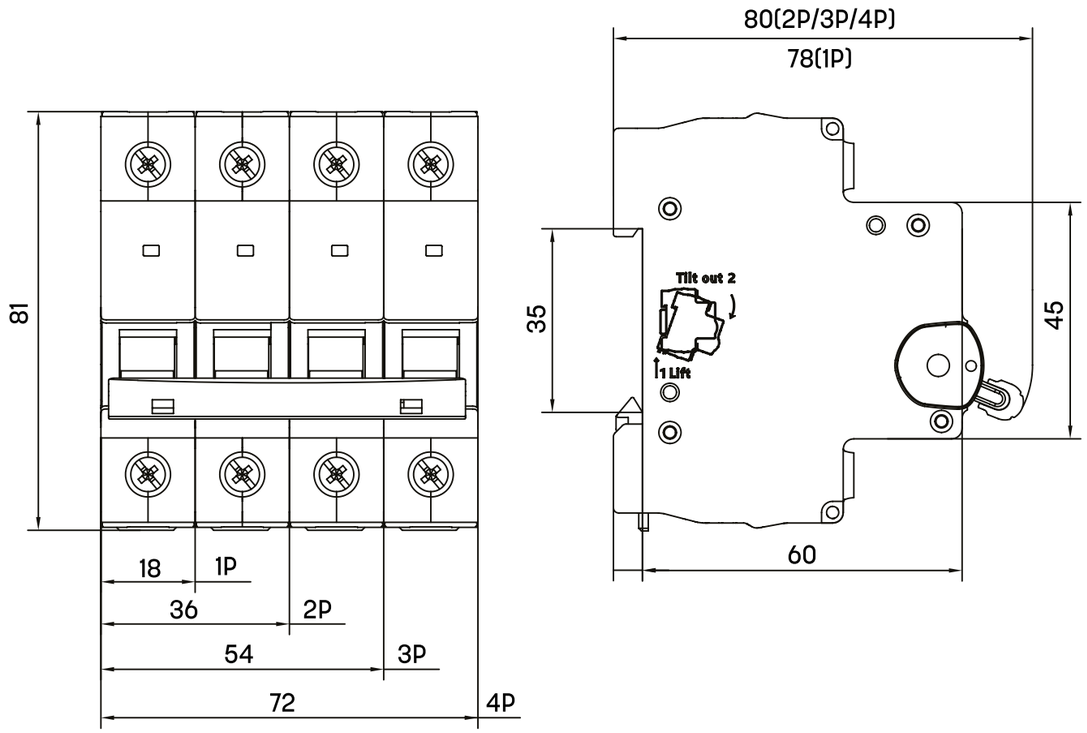
Type (Order) Code	Rated Curren (In)	Explanation	Box Quantity	Carton Quantity
XYA 3-40	40A	3P 40A	4	40
XYA 3-63	63A	3P 63A	4	40
XYA 3-80	80A	3P 80A	4	40
XYA 3-100	100A	3P 100A	4	40
XYA 3-125	125A	3P 125A	4	40

4 Pole



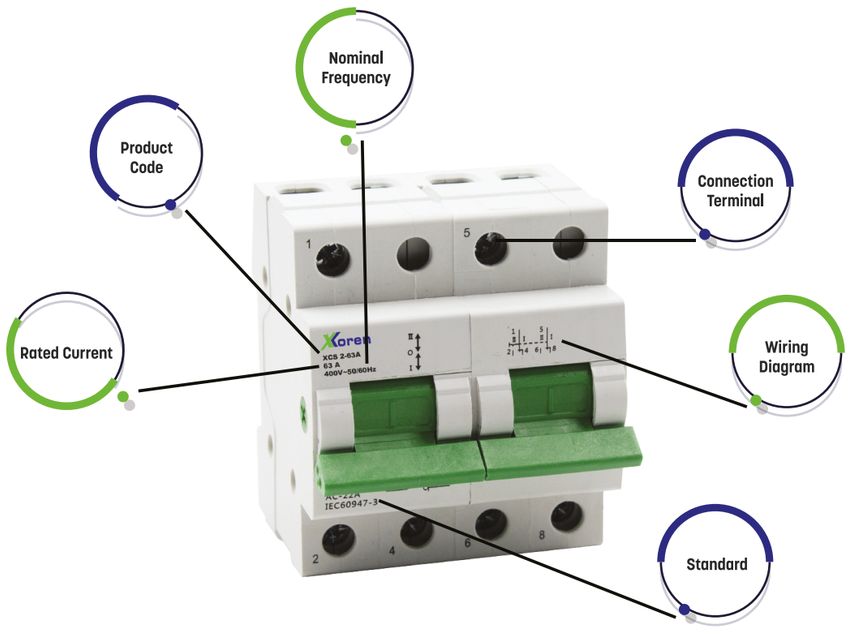
Type (Order) Code	Rated Curren (In)	Explanation	Box Quantity	Carton Quantity
XYA 4-40	40A	4P 40A	3	30
XYA 4-63	63A	4P 63A	3	30
XYA 4-80	80A	4P 80A	3	30
XYA 4-100	100A	4P 100A	3	30
XYA 4-125	125A	4P 125A	3	30

DIMENSIONS



Product Code and Label Information

XCS	1	25
Product Type	Number of Poles	Rated Current



Changover Switch



Changeover Switches	Symbol	Unit	XCS
Number of Poles		P	1, 2, 3, 4
Rated Operational Voltage	Ue	VAC	230/240
Rated Insulation Voltage	Ui	V	500
Rated Current		A	25,40,63,100,125
Operating Frequency		Hz	50 / 60
Pollution Degree			2
Standards			IEC 60947-3
Electrical Life		op.	1.500
Mechanical Life		op.	8.500
Max. Operation Period		op./h	25
Terminal Connection Type			cable busbar
Rated Short Circuit Capacity			20Ie, t=0.1 sn
Maximum Terminal Tightening Torque		Nm	3.5
Category			AC-22A
Protection Class			IP20
ON/OFF Indicator			✓

GENERAL PRODUCT CATALOG

CHANGEOVER SWITCHES

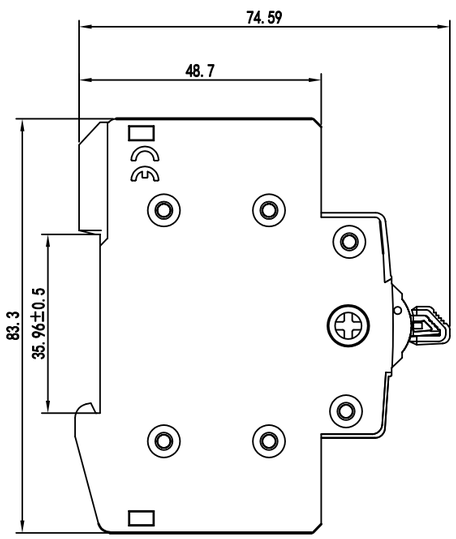
General Information

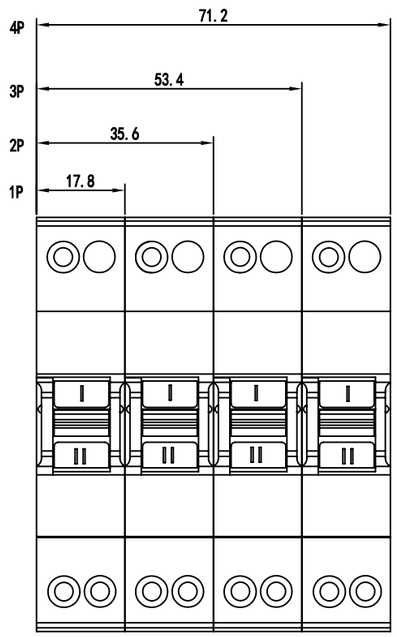
Changeover switches are mechanical switches used to safely direct, open, or close the flow of electricity. These switches are commonly known as "on-off switches" and perform the function of controlling electrical flow in a simple way. They are also referred to as "changeover switches."

The main features and applications of changeover switches are as follows:

•**Simple Design:** Changeover switches typically provide a simple on-off function. The user can cut off or redirect the electrical flow by moving the switch. This makes them highly practical.
•**Safety:** Controlling electrical flow ensures the safe operation of devices. They may also have features that enhance safety in high-voltage or high-current situations.
•**Industrial Applications:** Changeover switches are widely used in industrial machines, automation systems, and energy management systems. These switches play a crucial role in turning electrical devices and machines on or off.
•**Ease of Use:** With their user-friendly design, changeover switches can be easily operated by users of all ages. This feature makes them popular in household appliances as well.
•**Durability:** Changeover switches are designed to be long-lasting and durable. They are typically made of metal or sturdy plastic materials, making them resistant to various weather conditions and harsh environmental factors.
•**Various Application Areas:** These switches are not only used in homes but also have a wide range of applications in industrial machines, the automotive sector, and even medical devices.
•**Different Types:** Changeover switches can be found in single-pole, double-pole, single-direction, or multi-directional models. The user can choose the appropriate type of switch based on their needs.
As a result, changeover switches play an important role in controlling electrical flow. With their reliable and durable designs, they are preferred in both everyday life and industrial applications. These switches can be designed to manage different types of devices, going beyond a simple on/off function. Therefore, they have become an indispensable part of modern electrical systems.

DIMENSIONS





GENERAL PRODUCT CATALOG

CHANGEOVER SWITCHES

ORDER LIST

Changeover Switch



	Type (Order) Code	Rated Current (In)	Explanation	Box Quantity	Carton Quantity
1 Pole	XCS 1-25	25A	1P 25A	12	120
	XCS 1-40	40A	1P 40A	12	120
	XCS 1-63	63A	1P 63A	12	120
	XCS 1-100	100A	1P 100A	12	120
	XCS 1-125	125A	1P 125A	12	120
2 Pole	XCS 2-25	25A	2P 25A	6	60
	XCS 2-40	40A	2P 40A	6	60
	XCS 2-63	63A	2P 63A	6	60
	XCS 2-100	100A	2P 100A	6	60
	XCS 2-125	125A	2P 125A	6	60
3 Pole	XCS 3-25	25A	3P 25A	8	80
	XCS 3-40	40A	3P 40A	8	80
	XCS 3-63	63A	3P 63A	4	40
	XCS 3-100	100A	3P 100A	4	40
	XCS 3-125	125A	3P 125A	4	40
4 Pole	XCS 4-25	25A	4P 25A	6	60
	XCS 4-40	40A	4P 40A	6	60
	XCS 4-63	63A	4P 63A	2	20
	XCS 4-100	100A	4P 100A	2	20
	XCS 4-125	125A	4P 125A	2	20

VALID FOR ALL OUR PRODUCTS
2 YEARS WARRANTY

RESIDUAL CURRENT CIRCUIT BREAKER

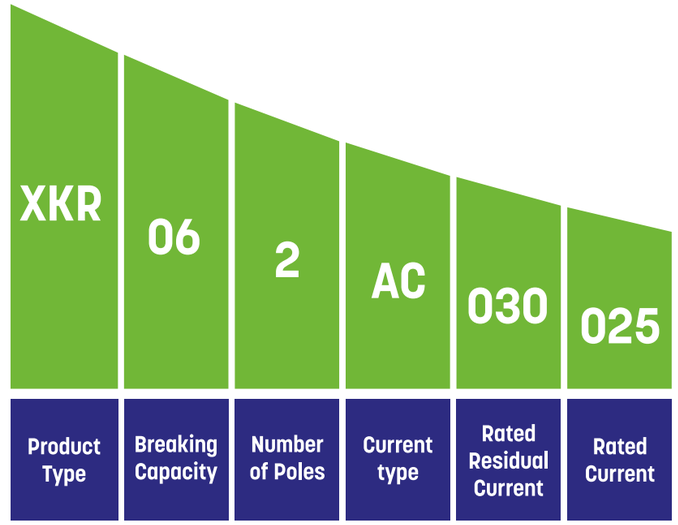
It is the safest product for detecting and protecting against leakage currents in electrical circuits. Thus, it provides protection against electric shocks caused by indirect contact. It protects people and equipment from potentially harmful thermal and dynamic stresses caused by any overcurrent.

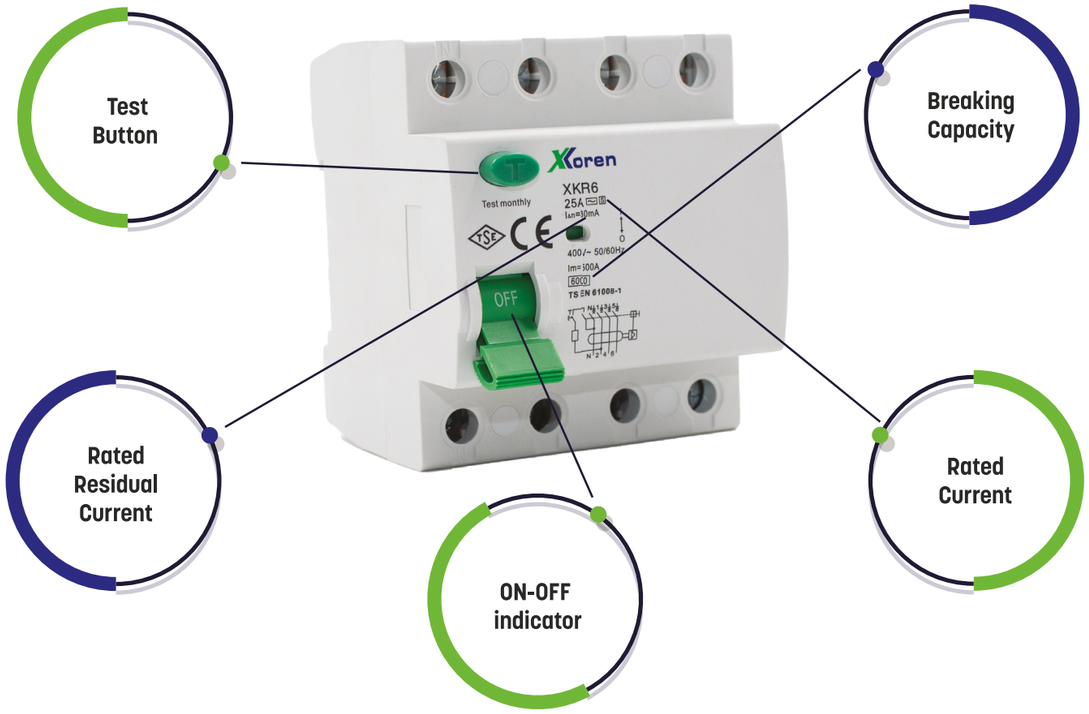
X Koren Electric Residual Current Circuit Breakers (RCCBs) provide comprehensive protection against all types of leakage current faults with a high-quality and complete product range.

The new XKR RO Residual Current Circuit Breakers with Over Current offers both residual current protection and overcurrent protection, combining the functions of an RCCB and an miniature circuit breaker in a single compact unit for enhanced safety.



Product Code and Label Information





XKR 6kA AC Type Residual Current Circuit Breakers (RCCB)



Residual Current Circuit Breaker			XKR6-AC	
Protection			Life Protection, Fire Protection	
Number of Poles		P	2	4
Rated Operational Voltage	Ue	VAC	230	400
Rated Insulation Voltage	Ui	V	690	
Rated Impulse Withstand Voltage	Uimp	kV	6	
Protection Class			AC	
Operating Frequency		Hz	50/60	
Service Short-Circuit Breaking Capacity	Ics	kA	6	
Rated Current	**In**	**A**	**25,32,40,63,80,100,125**	
Rated Residual Current	**I△n**	**mA**	**30,300**	
Residual Current Tripping Range			0,5... 1xI n	
Residual Current Tripping Time	General	ms	<300	
	Delayed **S**		**130 < t < 500**	
Standards			IEC EN 61008-1	
Operating Temperature Range		˚C	-25...+55	
Storage Temperature Range		˚C	-40...+70	
Electrical Life		op.	6.000	
Mechanical Life		op.	20.000	
Tripping Unit Type			Electromechanics	
Degree of Protection			IP20	
Pollution Degree			2	
Altitude		m	≤2000	
Mounting		mm	35mm DIN rail	
Terminal Cross-Section		mm²	≤35	
Waveform Detection	**Wave Form**		**Different waveform impact ranges**	
Sine Wave AC	~		0.5 - I n	

XKR 10kA AC Type Residual Current Circuit Breakers (RCCB)



Residual Current Circuit Breaker			XKR10-AC	
Protection			Life Protection, Fire Protection	
Number of Poles		P	2	4
Rated Operational Voltage	Ue	VAC	230	400
Rated Insulation Voltage	Ui	V	690	
Rated Impulse Withstand Voltage	Uimp	kV	10	
Protection Class			AC	
Operating Frequency		Hz	50/60	
Service Short-Circuit Breaking Capacity	Ics	kA	10	
Rated Current	**In**	**A**	**25,32,40,63,80,100,125**	
"Rated Residual Current	**I△n**	**mA**	**30,300**	
Residual Current Tripping Range			0,5... 1xI n	
Residual Current Tripping Time	General	ms	<300	
	Delayed **S**		**130 < t < 500**	
Standards			IEC EN 61008-1	
Operating Temperature Range		˚C	-25...+55	
Storage Temperature Range		˚C	-40...+70	
Electrical Life		op.	6.000	
Mechanical Life		op.	20.000	
Tripping Unit Type			Electromechanics	
Degree of Protection			IP20	
Pollution Degree			2	
Altitude		m	≤2000	
Mounting		mm	35mm DIN rail	
Terminal Cross-Section		mm²	≤35	
Waveform Detection	**Wave Form**		**Different waveform impact ranges**	
Sine Wave AC	~		0.5 - I n	

XKR 6kA A Type Residual Current Circuit Breakers (RCCB)



Residual Current Circuit Breaker			XKR6-A	
Protection			Life Protection, Fire Protection	
Number of Poles		P	2	4
Rated Operational Voltage	Ue	VAC	230	400
Rated Insulation Voltage	Ui	V	690	
Rated Impulse Withstand Voltage	Uimp	kV	6	
Protection Class			**A**	
Operating Frequency		Hz	50/60	
Service Short-Circuit Breaking Capacity	Ics	kA	6	
Rated Current	**In**	**A**	**25,32,40,63,80,100,125**	
"Rated Residual Current	**I△n**	**mA**	**30,300**	
Residual Current Tripping Range			0,5... 1xI n	
Residual Current Tripping Time	General	ms	<300	
	Delayed **S**		**130 < t < 500**	
Standards			IEC EN 61008-1	
Operating Temperature Range		˚C	-25...+55	
Storage Temperature Range		˚C	-40...+70	
Electrical Life		op.	6.000	
Mechanical Life		op.	20.000	
Tripping Unit Type			Electromechanics	
Degree of Protection			IP20	
Pollution Degree			2	
Altitude		m	≤2000	
Mounting		mm	35mm DIN rail	
Terminal Cross-Section		mm²	≤35	
Waveform Detection	**Wave Form**		**Different waveform impact ranges**	
Sine Wave AC	~		0.5 - I n	
Pulsating DC	⎍		0.35 - 1.4 I n	

XKR 10kA A Type Residual Current Circuit Breakers (RCCB)



Residual Current Circuit Breaker			XKR10-A	
Protection			Life Protection, Fire Protection	
Number of Poles		P	2	4
Rated Operational Voltage	Ue	VAC	230	400
Rated Insulation Voltage	Ui	V	690	
Rated Impulse Withstand Voltage	Uimp	kV	10	
Protection Class			**A**	
Operating Frequency		Hz	50/60	
Service Short-Circuit Breaking Capacity	Ics	kA	10	
Rated Current	**In**	**A**	**25,32,40,63,80,100,125**	
Rated Residual Current	**I△n**	**mA**	**30,300**	
Residual Current Tripping Range			0.11... 1.4xI n	
Residual Current Tripping Time	General	ms	<300	
	Delayed **S**		**130 < t < 500**	
Standards			IEC EN 61008-1	
Operating Temperature Range		˚C	-25...+55	
Storage Temperature Range		˚C	-40...+70	
Electrical Life		op.	6.000	
Mechanical Life		op.	20.000	
Tripping Unit Type			Electromechanics	
Degree of Protection			IP20	
Pollution Degree			2	
Altitude		m	≤2000	
Mounting		mm	35mm DIN rail	
Terminal Cross-Section		mm²	≤35	
Waveform Detection	**Wave Form**		**Different waveform impact ranges**	
Sine Wave AC	~		0.5 - I n	
Pulsating DC	⎍		0.35 - 1.4 I n	

XKR 6kA B Type Residual Current Circuit Breakers (RCCB)



Residual Current Circuit Breaker			XKR6-B	
Protection			Life Protection, Fire Protection	
Number of Poles		P	2	4
Rated Operational Voltage	Ue	VAC	230	400
Rated Insulation Voltage	Ui	V	500	
Rated Impulse Withstand Voltage	Uimp	kV	4	
Protection Class			B	
Operating Frequency		Hz	50/60	
Service Short-Circuit Breaking Capacity	Ics	kA	6	
Rated Current	In	A	25,32,40,63,80,100,125	
Rated Residual Current	I△n	mA	30, 300	
Residual Current Tripping Time	General	ms	<300	
Standards			IEC EN 61008-1	
Operating Temperature Range		°C	-25....+55	
Storage Temperature Range		°C	-40....+70	
Electrical Life		op.	6000	
Mechanical Life		op.	20000	
Tripping Unit Type			Electromechanics	
Degree of Protection			IP20	
Pollution Degree			2	
Altitude		m	≤2000	
Mounting		mm	35mm DIN rail	
Terminal Cross-Section		mm²	≤35	
Waveform Detection	Wave Form		Different waveform impact ranges	
Sine Wave AC	∿		0.5 - I△n	
Pulsating DC	⩘		0.35 - 1.4 I△n	
High Frequency (up to 1kHz)	150Hz		0.5 - 2.4 I△n	
	400Hz		0.5 - 6 I△n	
	1000Hz		1 - 14 I△n	
Two-phase full-wave rectification	∿∿		0.5 - 2 I△n	
Three-phase full-wave rectification	⩘⩘		0.5 - 2 I△n	
Direct Current (DC)	⎓		0.5 - 2 I△n	

XKR 10kA B Type EV Residual Current Circuit Breakers (RCCB)



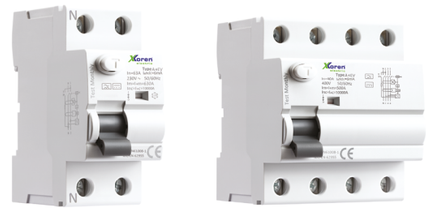
Residual Current Circuit Breaker			XKR10-B	
Protection			Life Protection, Fire Protection	
Number of Poles		P	2	4
Rated Operational Voltage	Ue	VAC	230	400
Rated Insulation Voltage	Ui	V	500	
Rated Impulse Withstand Voltage	Uimp	kV	4	
Protection Class			**B**	
Operating Frequency		Hz	50/60	
Service Short-Circuit Breaking Capacity	Ics	kA	10	
Rated Current	In	A	**25,32,40,63,80,100,125**	
"Rated Residual Current	I△n	mA	**30,300**	
"Residual Current Tripping Time	General	ms °C	<300	
Standards		°C	IEC EN 61008-1	
Operating Temperature Range		op.	-25....+55	
Storage Temperature Range		op.	-40....+70	
Electrical Life			6000	
Mechanical Life			20000	
Tripping Unit Type			Electromechanics	
Degree of Protection		m	IP20	
Pollution Degree		mm	2	
Altitude		mm²	≤2000	
Mounting			35mm DIN rail	
Terminal Cross-Section			≤35	
Waveform Detection	**Wave Form**		**Different waveform impact ranges**	
Sine Wave AC	∿		0.5 - I n	
Pulsating DC	⩘		0.35 - 1.4 I n	
High Frequency (up to 1kHz)	150Hz		0.5 - 2.4 I n	
	400Hz		0.5 - 6 I n	
	1000Hz		1 - 14 I n	
Two-phase full-wave rectification	∿∿		0.5 - 2 I n	
Three-phase full-wave rectification	⩘⩘		0.5 - 2 I n	
Direct Current (DC)	⎓		0.5 - 2 I n	

XKR6 6kA EV Residual Current Circuit Breakers (RCCB)



Residual Current Circuit Breaker			XKR6-B	
Protection			Life Protection, Fire Protection	
Number of Poles		P	2	4
Rated Operational Voltage	Ue	VAC	230	400
Rated Insulation Voltage	Ui	V	500	
Rated Impulse Withstand Voltage	Uimp	kV	4	
Protection Class			**EV**	
Operating Frequency		Hz	50/60	
Service Short-Circuit Breaking Capacity	Ics	kA	6	
Rated Current	**In**	**A**	**25,32,40,63,80,100,125**	
Rated Residual Current	**I△n**	**mA**	**30,300**	
Residual Current Tripping Time		ms	<300	
Standards			IEC EN 61008-1	
Operating Temperature Range		˚C	-25...+55	
Storage Temperature Range		˚C	-40...+70	
Electrical Life		op.	6.000	
Mechanical Life		op.	20.000	
Tripping Unit Type			Electromechanics	
Degree of Protection			IP20	
Pollution Degree			2	
Altitude		m	≤2000	
Mounting		mm	35mm DIN rail	
Terminal Cross-Section		mm²	≤35	
Waveform Detection	**Wave Form**		**Different waveform impact ranges**	
Sine Wave AC			0.5 - I n	
Pulsating DC			0.5 - 1.4 I n	
High Frequency (up to 1kHz)	150Hz		3 - 6mA	
	400Hz		3 - 6mA	
	1000Hz		3 - 6mA	
Two-phase full-wave rectification			0.5 - 2 I n	
Three-phase full-wave rectification			0.5 - 2 I n	
Direct Current (DC)			0.5 - 2 I n	

XKR10 10kA EV Residual Current Circuit Breakers (RCCB)



Residual Current Circuit Breaker			XKR10-B	
Protection			Life Protection, Fire Protection	
Number of Poles		P	2	4
Rated Operational Voltage	Ue	VAC	230	400
Rated Insulation Voltage	Ui	V	500	
Rated Impulse Withstand Voltage	Uimp	kV	4	
Protection Class			**EV**	
Operating Frequency		Hz	50/60	
Service Short-Circuit Breaking Capacity	Ics	kA	10	
Rated Current	**In**	**A**	**25,32,40,63,80,100,125**	
Rated Residual Current	**I△n**	**mA**	**30,300**	
Residual Current Tripping Time		ms	<300	
Standards			IEC EN 61008-1	
Operating Temperature Range		˚C	-25...+55	
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Electrical Life		op.	6.000	
Mechanical Life		op.	20.000	
Tripping Unit Type			Electromechanics	
Degree of Protection			IP20	
Pollution Degree			2	
Altitude		m	≤2000	
Mounting		mm	35mm DIN rail	
Terminal Cross-Section		mm²	≤35	
Waveform Detection	**Wave Form**		**Different waveform impact ranges**	
Sine Wave AC			0.5 - I n	
Pulsating DC			0.5 - 1.4 I n	
High Frequency (up to 1kHz)	150Hz		3 - 6mA	
	400Hz		3 - 6mA	
	1000Hz		3 - 6mA	
Two-phase full-wave rectification			0.5 - 2 I n	
Three-phase full-wave rectification			0.5 - 2 I n	
Direct Current (DC)			0.5 - 2 I n	

General Information



Residual current circuit breakers (RCCBs) are electromagnetic devices used in electrical installations, especially for protecting people from electric shocks. These devices detect the difference between the currents flowing through the phase and neutral conductors in the circuit, and when the differential current reaches a certain level, they disconnect the circuit. These types of devices are crucial for protecting human health and reducing fire risks. Residual current circuit breakers use a toroid (magnetic core) and a relay (electronic sensing element) to detect the imbalance in the current in the circuit. Normally, the currents flowing through the phase and neutral lines in an electrical circuit are equal. However, when a leakage current occurs (for example, when a person contacts electricity or when the insulation of a cable is damaged), a difference between these two currents arises. This difference is detected by the circuit breaker, and when the differential current reaches a certain threshold, it disconnects the circuit. In this way, potential dangers caused by leakage currents are prevented.

In a residual current circuit breaker, attention should be paid to the protection classes for safety. The protection class is determined by checking the values of 30mA and 300mA, and based on the system's requirements, the appropriate protection class is identified.

A leakage current of 30 mA that can pass through the human body represents a value close to the danger threshold. Electric shocks can cause serious injuries or even death, depending on the intensity of the current passing through the body. A 30 mA residual current circuit breaker, known as a "life-saving" breaker, disconnects the circuit when the leakage current in the electrical system approaches this level, ensuring the safety of human life.

In electrical installations, heating or burning of standard cable materials and connections may occur due to the effects of electrical leakage currents. The 300 mA residual current circuit breaker is a device used to reduce fire risk. When it detects a leakage current approaching 300 mA, it disconnects the circuit, thereby preventing risks such as cable insulation melting, burning, or ignition. These devices provide important protection for fire safety.

When selecting a residual current circuit breaker, attention should be paid to the protection class, operating current, the desired leakage current level for protection, and the number of poles, based on the system's requirements. Since residual current circuit breakers do not provide protection against overload or short-circuit currents, an automatic fuse must always be connected before the circuit breaker in the circuit.

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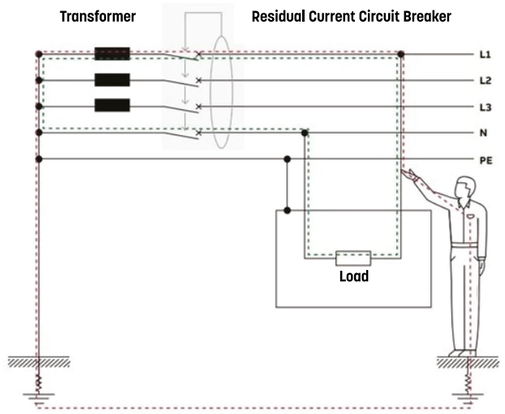
RESIDUAL CURRENT CIRCUIT BREAKER



XKoren residual current circuit breakers, produced in the rated current range from 25 A to 125 A, with breaking capacities of 6 kA and 10 kA, are manufactured in 2-pole and 4-pole configurations in accordance with IEC/EN 61008-1 standard.

Residual current circuit breakers may trip once the leakage current (residual current) value displayed on them reaches 50% of the specified rating, as per the standards. The natural leakage currents of electrical devices in the circuit should be calculated, and the sum of the natural leakage currents must not exceed the nominal leakage current value of the breaker (30/300 mA).

The rated current of residual current circuit breakers should be equal to or greater than the rated current of the automatic fuse or compact breaker connected before them. It should be ensured that the current passing through the residual current circuit breaker does not exceed its nominal rated current.

For proper operation of residual current circuit breakers, the neutral and ground conductors in the circuit must not come into contact behind the breaker. The connection between the neutral and ground conductors can interfere with the proper functioning of the breaker and may lead to safety risks.

Residual current circuit breakers are critical for ensuring the safety of electrical systems, especially for protecting people from electric shocks. The correct selection of circuit breakers should be based on the system's needs, including the correct nominal leakage current value, rated current, and appropriate protection functions. Additionally, a systematic wiring arrangement and proper grounding must be applied to ensure compatibility with other components in the circuit.

Residual Current Circuit Breaker (RCCB) Selection

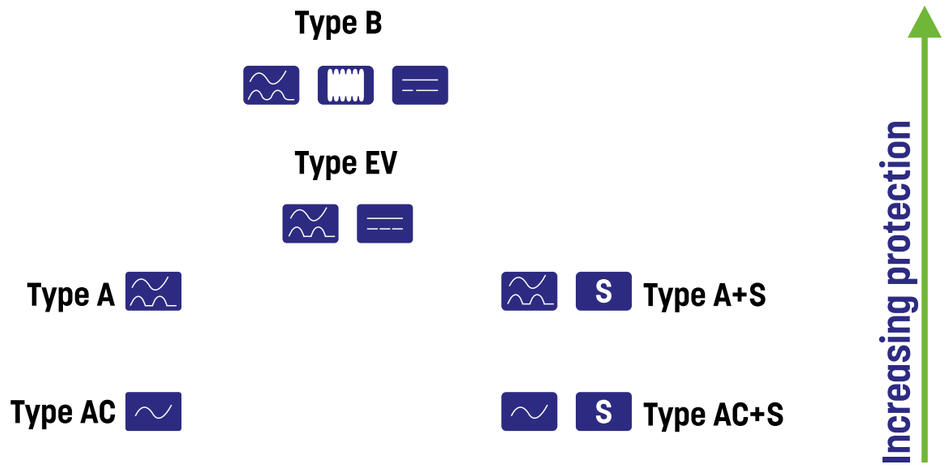
When selecting a residual current circuit breaker (RCCB), the following factors should be taken into consideration:

Protection Class: The leakage current level that the device will protect against should be appropriate for the type and purpose. For example, 30 mA should be preferred for human protection and 300 mA for fire protection.

Operating Current: The rated current of the residual current circuit breaker should be compatible with other devices in the circuit. The rated current of the breaker should be equal to or greater than the rated current of the connected automatic fuse or compact breaker.

Nominal Leakage Current Value: The nominal leakage current value of the breaker should be compatible with the natural leakage currents in the system. The natural leakage currents generated by electrical devices during operation should be collectively calculated, and the total value should not exceed the breaker's nominal leakage current.

Suitable Type of Residual Current Circuit Breaker Selection



Considerations When Ordering a Residual Current Circuit Breaker

The compatibility of all loads/devices in an electrical circuit with the type of residual current protection circuit breaker protecting the circuit must be thoroughly checked.

Type	Sembols	Description	Places of Use / Equipment to Protect
B		Used to detect and protect AC currents. Used in all types of leakage faults. The most universal group.	Furnace, electric shower, induction oven, incandescent lamp immersion heater, almost all equipment for residential, offices, hospitals etc.
EV		It is used for type A protection and leakage detection and protection for DC currents up to 6mA.	Charging columns or wall boxes for charging electric vehicles.
A+S	S	Used in type A residual current switches for tripping with 40ms delay.	In type A current areas; industrial systems, commercial buildings, welding machines, heaters, furnaces, ovens, residences, etc.
A		It is used to detect and protect pulsating DC leakage currents as well as AC current.	Inverter (inverter-single phase), power supplies for class IT devices, lighting equipment including fan, pampers, LED driver and dimmer, induction cooker, electric vehicle charging equipment with flat leakage DC current less than 6 mA, etc.
AC+S	S	Used in AC type residual current switches for tripping with 40ms delay.	In AC type current areas; industrial systems, commercial buildings, welding machines, heaters, furnaces, residential buildings, etc.
AC		It is only used to detect and protect AC currents.	Oven, electric shower, induction furnace incandescent lambs, immersion heater etc.

Operating Current: The rated current of the residual current circuit breaker must be at least the same as or greater than the rated current of the preceding automatic fuse or compact circuit breaker. Additionally, it is important that the current passing through the circuit breaker does not exceed its nominal rated current.

For the proper selection of XKoren residual current circuit breakers, four main factors must be considered:

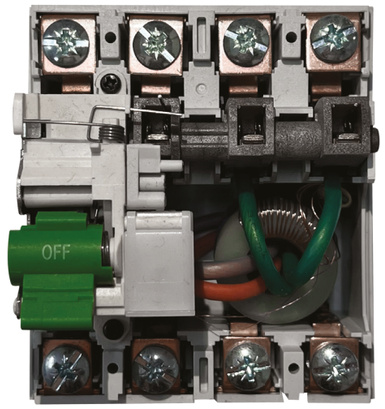
1.Residual Current Protection Value: Circuit breakers with a sensitivity of 30 mA should be preferred for protecting individuals from direct or indirect electrical contact. For fire protection, circuit breakers with a sensitivity of 300 mA should be used.

2.Rated Current Value: The rated current of the residual current circuit breaker must be at least equal to or greater than the rated current of the preceding automatic fuse or compact circuit breaker. Additionally, it is important that the current passing through the circuit breaker does not exceed its nominal rated current.

3.Number of Poles: For single-phase systems, 2-pole residual current circuit breakers should be used, while for three-phase systems, 4-pole residual current circuit breakers are required.

4.Selectivity: Residual current circuit breakers are produced for general use and for delayed protection (S-type).

Structure of the Circuit Breaker





Operating Principle of Residual Current Circuit Breakers

Residual current circuit breakers are important safety devices used in electrical installations to protect individuals from electric shocks. These devices operate based on electromagnetic principles and detect the imbalance between the phase and neutral lines in the circuit. When a leakage current occurs, the breaker disconnects the circuit. This operating principle demonstrates the circuit breaker's ability to provide high safety.

Operating Principle: Toroidal Transformer and Magnetic Field Detection

The fundamental operating principle of residual current circuit breakers is based on the use of a toroidal transformer. This transformer detects the magnetic field generated by the currents flowing through the phase and neutral lines. The toroidal transformer is typically ring-shaped, passing through the phase and neutral lines, and continuously monitors the magnetic field created by the currents in both lines.

1.Normal Operating Conditions:

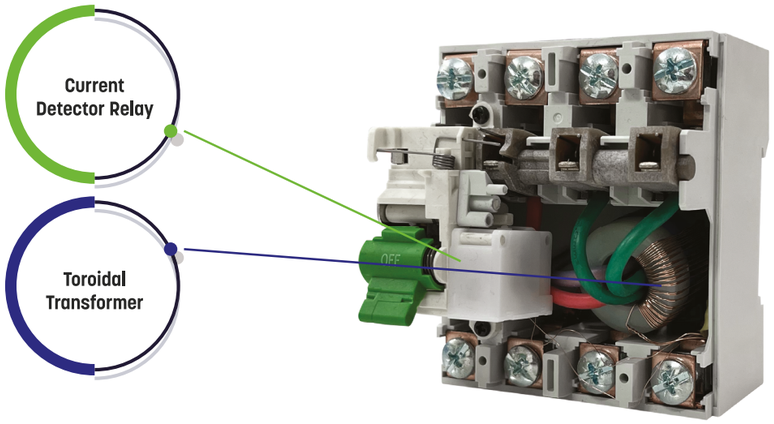
Under normal operating conditions, the phase current and the neutral current in the
circuit are equal in magnitude and opposite in direction. In this case, the magnetic fields generated by the two currents balance each other out, resulting in a total magnetic field of zero. In other words, the vector sum of the currents in the phase and neutral lines cancels each other out. In this balanced state, no net magnetic field is generated in the toroidal transformer, and the device does not actively operate.

2.Fault Condition (Leakage Current):

However, when an insulation fault occurs (such as a device's insulation breaking down or a cable shifting position), an imbalance arises between the phase and neutral currents. In this situation, the currents flowing through the phase and neutral lines are no longer equal. This imbalance creates a difference, known as the leakage current, which generates a magnetic field in the toroidal transformer. Leakage current is electrical energy that escapes from the phase line or neutral line to the ground or another conductor. This leakage current disrupts the magnetic field in the toroidal transformer and is transmitted to the breaker's detection system.

3.Detection and Tripping of the Breaker:

The toroidal transformer detects this imbalance and identifies the occurrence of a leakage magnetic current. The transformer measures the leakage current and sends this difference to a current relay, which triggers the opening of the device. The current relay activates the trip coil when the magnitude of the leakage current exceeds a certain threshold (for example, 30 mA). The trip coil triggers the mechanism of the breaker and opens the circuit. This process ensures that the device opens, eliminating the risk of electric shock and ensuring safety. If the leakage current is large enough to cause the breaker to trip, the circuit is interrupted, protecting both users and electrical equipment.



Operating Cycle

The operating cycle of the leakage current protection circuit breaker is as follows:

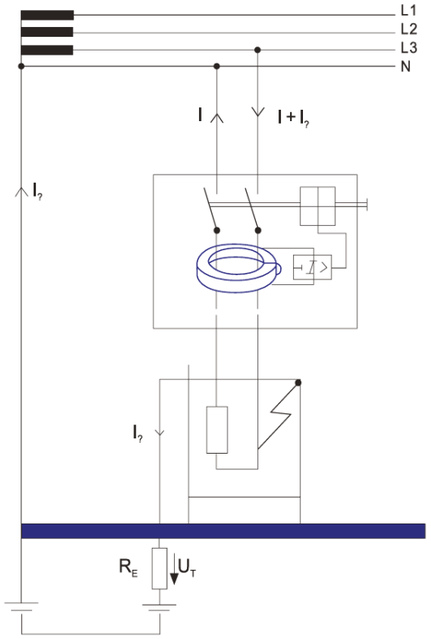
1.Phase and Neutral Current Balance:
a.Normally, the currents flowing through the phase and neutral lines are equal in magnitude and opposite in direction.
b.In this case, the toroidal transformer generates zero net magnetic flux, as the opposing magnetic fields cancel each other out.

2.Insulation Failure and Imbalance:
a.In the event of an insulation failure, a difference arises between the phase and neutral currents, creating an imbalance in the magnetic field.
b.This imbalance leads to the creation of a leakage magnetic current in the toroidal transformer.

3.Detection and Response:
a.The toroidal transformer detects the leakage current, and this information is processed by the current relay.
b.When the leakage current exceeds a certain threshold (e.g., 30 mA), the current relay sends the signal required to interrupt the circuit.

4.Circuit Break:
a.Upon activation by the current relay, the trip coil is engaged, and the breaker mechanism is triggered, cutting off the circuit.

Leakage current protection circuit breakers are highly effective safety devices designed to detect leakage currents in electrical systems and prevent these currents from reaching dangerous levels. The magnetic field detection principle of the toroidal transformer ensures the precise operation of the device. Imbalances caused by insulation failures are immediately detected, triggering the breaker to open, thereby minimizing risks to human health, equipment safety, and the potential for fire hazards.



The Differences Between Electromechanical and Electronic Residual Current Circuit Breakers

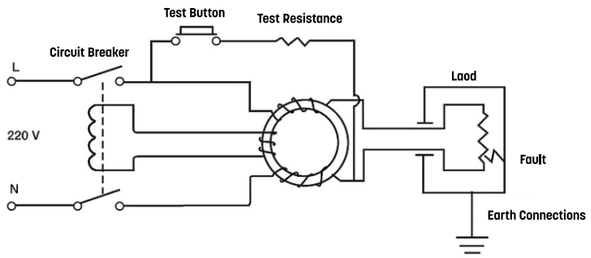
Electromechanical Residual Current Circuit Breakers (RCCBs):

Electromechanical residual current circuit breakers are devices that typically operate using magnetic and mechanical components. These breakers detect leakage currents in the circuit and operate independently to disconnect the circuit. Their working principle is based on the magnetic field difference created by the phase and neutral lines. These breakers work directly through integrated magnetic and mechanical systems in the circuit without requiring additional voltage.

This characteristic allows electromechanical breakers to provide reliable protection even at low and high voltages. Additionally, even in the case of a broken neutral line, they can continue to provide protection by detecting leakage currents in the phase line. That is, even if the neutral line is disconnected, the breaker will continue to trip due to leakage current in the phase line, as its operation principle is independent of the electrical supply voltage. Therefore, these types of breakers demonstrate high durability in terms of safety and are especially preferred in applications where safety requirements are paramount.

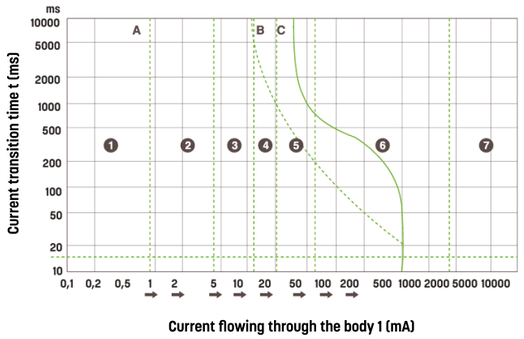
Electronic Residual Current Circuit Breakers (RCCBs):

Electronic residual current circuit breakers are equipped with more advanced technology, typically using semiconductor components and digital processing circuits. These breakers operate on a different working principle than electromechanical breakers and require an additional voltage source to function. Electronic breakers are capable of more precise measurements and can detect various leakage current levels, providing faster response times. However, the biggest disadvantage of these breakers is that if the neutral line is disconnected, the auxiliary voltage is also lost, causing the protection function to completely fail. That is, if the neutral line is severed, the breaker cannot receive the necessary power to provide protection, which jeopardizes the safety of the system.
In conclusion, electromechanical residual current circuit breakers provide a safer and more durable solution because they do not require an auxiliary voltage, while electronic residual current circuit breakers, although more precise, are limited in terms of safety. Despite the advantages of electronic breakers, the loss of their ability to trip the circuit when the neutral line is broken makes them weak in terms of safety standards.



Effect of Leakage Current on the Human Body

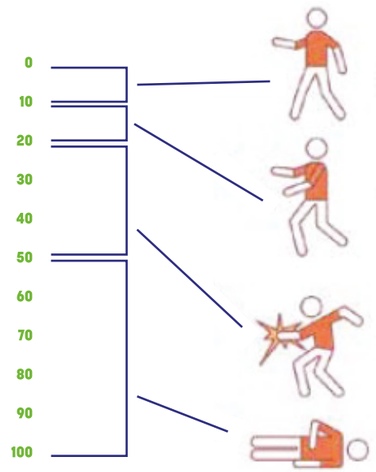
The effect of current on the human body is directly related to the duration of exposure to the current. A current of around 80 mA passing through the heart for more than 0.3 seconds can disrupt heart contractions and lead to dangerous fibrillation, which often results in death. The normal duration of the heart's functioning cycle is approximately 750 milliseconds (0.75 seconds), during which the electrical activity of the heart continues smoothly.



This graph illustrates the relationship between the current intensity passing through the body and the duration of its passage, as well as its effects on the human body. In the graph, current intensity (I) is shown in milliamperes (mA) and the duration of the current passage (t) is presented in milliseconds (ms) and seconds (s).

Current Zone	Current Intensity	Effect on the Human Body
1	0.01 mA	Perceptible current threshold: tingling sensation in the hand.
2	5.15 mA	Ability to release the held object is retained; mild pain occurs in the hand and arm, and blood pressure decreases
3	25-80 mA	Tolerable current intensity: blood pressure increases, heart rhythm becomes irregular, breathing becomes difficult, reversible cardiac arrest may occur. Consciousness is generally maintained; however, some individuals may faint at currents above 50 mA.
	80-100 mA	Depending on the duration of current exposure, ventricular fibrillation may occur and consciousness is lost. (Fibrillation does not occur with electric shocks shorter than 0.2 seconds.)
4	>3-8 mA	Blood pressure rises, cardiac arrest occurs, lungs swell, and consciousness is lost.

- **Region 1:** Typically no effect, currents that are not felt.
- **Region 2:** Currents that may induce a mild sensation in the body but are not hazardous.
- **Region 3:** May cause pain and muscle contractions, but generally does not pose serious danger.
- **Region 4:** Can lead to severe muscle contractions and difficulty breathing. This region is dangerous.
- **Region 5:** High risk of heart fibrillation (irregular heartbeat). This region is very dangerous.
- **Region 6:** While the risk of fibrillation decreases, there is a risk of heart stoppage.
- **Region 7:** High current values, typically leading to heart stoppage.
- **Curve A:** Represents the lowest dangerous level.
- **Curve B:** Indicates a moderate level of danger.
- **Curve C:** Represents the highest level, with a very high probability of heart fibrillation.



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Protection Against Electric Shocks

Installations should be ensured through measures taken for both direct and indirect contact situations. In electrical networks, the contact of living beings with a system that has developed fault current can occur in two different forms:

- Direct Contact
- Indirect Contact

According to the IEC/EN 60364 standard, the acceptable voltage limit for an electrical installation in fault conditions, without causing a fatal risk, is 50 V. Especially in damp and wet environments, due to the changes in the conductivity properties of the surroundings, this limit is reduced further, and the touch voltage limit is considered to be 25 V.

Protection Devices and Disconnection Times

The following table shows the limits of disconnection times for protection devices at different touch voltages in accordance with the IEC/EN 60364 standard:

Touch Voltage (V)	Tripping Time (s)
50 V and below	5 seconds or less
25 V and below (humid environments)	1 second and shorter

These times are determined to provide effective protection against electric shocks. To enhance the safety of the installation, suitable protection devices and disconnection times should be selected considering these values.

Touching voltage (V)	Dry environment UL≤50V Max. breaking time (s)
< 50	5
50	5
75	0.6
90	0.45
120	0.34
150	0.27
220	0.17
350	0.08
500	0.04

Touching voltage (V)	Dry environment UL≤50V Max. breaking time (s)
25	5
50	0.48
75	0.3
90	0.25
150	0.1
220	0.05
500	0.02

Contact Conditions

Direct Contact

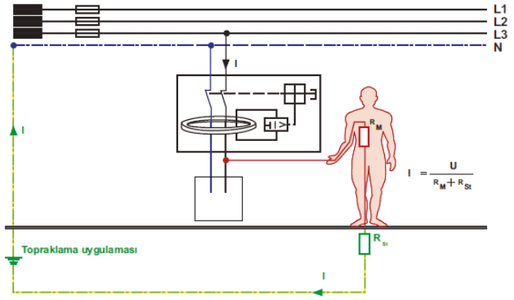
Direct contact refers to a dangerous situation where a person comes into direct contact with an electrically energized part (live terminal). In this case, electrical current flows through the human body toward the ground line or neutral point.

The electrical resistance of the human body can vary depending on the conditions of contact. Specifically, the humidity of the environment significantly affects the magnitude of the current passing through the body.

- **Dry Environments:** In dry and dry air conditions, the average electrical resistance of the human body is approximately 2600 ohms. This value applies when the skin surface is dry, and moisture interactions are minimal. However, considering the voltage level in contact with the body, this resistance is an important factor in determining the current intensity.
- **Humid Environments:** As the humidity of the environment increases, the electrical resistance of the human body decreases. In moist environments, the amount of electrical current passing through the body can increase significantly. The resistance of the human body in humid conditions can range between 600 and 800 ohms. This is because the conductivity created by the water on the body's surface allows the current to pass more easily toward the ground line.

These resistance values are critical in selecting electrical safety measures and protective devices. The intensity of the electrical current in the body determines whether direct contact will lead to dangerous consequences. As the current magnitude increases, the risks of heart failure or serious injuries also rise

In the case of direct contact, the current passing through a person's body can be calculated based on Ohm's Law. This calculation depends on the relationship between the body's resistance and the applied voltage. The applied voltage is typically considered as the line voltage (voltage relative to phase).



Current Calculation Formula:

I = U/R

- I: Current passing through the body (amperes, A)
- U: Voltage applied during contact (volts, V)
- R: Resistance of the human body (RM + RSt) (ohms, Ω)

V: The voltage applied during contact, which is typically the network line voltage or high-voltage line. This value can vary between different voltage levels, such as 50V, 230V, 400V.

R: The electrical resistance of the human body varies depending on environmental conditions (wet, dry) and the individual's physical characteristics. In a dry environment, this value is typically around 2600 ohms, while in a wet environment, it can range between 600 and 800 ohms.

Example Calculation:

Let's assume a person directly contacts a 230 V line voltage, and since the environment is dry, the body resistance is considered to be 2600 ohms.

- V = 230 V
- R = 2600 Ω

When we apply the formula:
I = 230/2600 ≈ 0.088A (88mA)
In this case, the current passing through the person will be approximately 88 mA.

Warning:

Indirect contact occurs when a fault in the insulation of an electrical device causes voltage to appear on its outer surface. In such a situation, individuals who come into contact with the outer surface of the device can be exposed to electric current indirectly. If this voltage exceeds the human body's touch voltage threshold, the risk of electric shock arises, potentially leading to serious injury or even death.
To prevent indirect contact and ensure safety, proper grounding of devices is of paramount importance. The voltage generated on the outer surface due to insulation failure should be safely directed to the ground via the grounding system. This is a critical safety measure, and if grounding is performed incorrectly, the danger increases.

Residual Current Circuit Breakers (RCCBs)

Residual current circuit breakers (RCCBs) are safety devices designed to detect leakage currents in electrical systems and automatically disconnect the circuit when the leakage exceeds a specified threshold. These breakers are used to reduce the risk of indirect contact and enhance safety. With RCCBs, leakage currents on devices or systems can be detected and interrupted at an early stage, preventing potential hazards.

Residual Current Circuit Breakers (RCCBs) Categories

Residual current circuit breakers (RCCBs) are generally manufactured in two main categories:

1.Life Protection (30 mA): According to the IEC/EN 60479-1 standard, a leakage current of 30 mA is considered a critical level for human health. Given the human body's sensitivity to electric current, leakage currents of 30 mA and above can pose fatal risks. RCCBs designed for personal protection disconnect the power supply when leakage currents reach or exceed 30 mA, preventing users from being exposed to electric shock hazards.

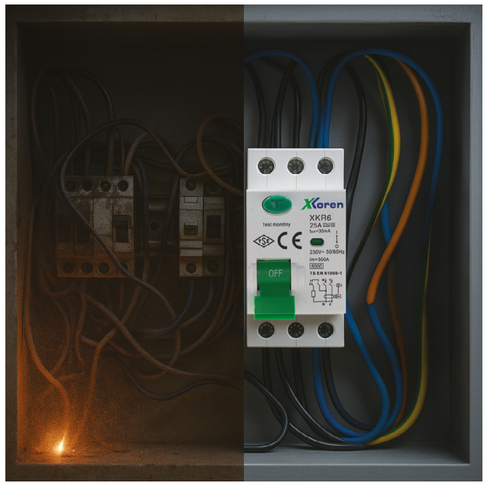
2.Fire Protection (300 mA): Leakage currents of 300 mA can occur in electrical devices or installations, particularly due to degraded insulation, faulty connections, or short circuits. At this level, the heat generated by electrical arcs can pose a significant fire hazard. RCCBs designed for fire protection detect leakage currents of 300 mA and above, cutting off the circuit to mitigate fire risks.

In conclusion, indirect contact protection and residual current protection play a fundamental role in ensuring electrical safety. The use of RCCBs for personal and fire protection enables the early detection of hazardous leakage currents in electrical devices and installations. This, in turn, safeguards both human health and environmental safety.

Fire Protection with Residual Current Circuit Breakers

Fires in electrical installations typically originate from three main causes:

1.Damage or Aging of Cable Insulation: Over time or due to mechanical impact, the integrity of cable insulation may deteriorate.
2.Overheating and Melting of Insulation Due to Overcurrent: Excessive currents passing through cables can cause the insulation material to overheat and melt.
3.Leakage Currents in Insulation: Insulation faults in cables or electrical devices can lead to leakage currents.



RCCBs designed for fire protection help prevent such risks by detecting and interrupting leakage currents before they reach dangerous levels.

According to IEC/EN 60364 standard tests, dust, moisture, and other conductive particles accumulating within a 4 mm gap in electrical installations can gradually heat up and reach a current level capable of igniting a fire. It has been determined that such conditions pose a significant fire hazard. Test results indicate that the current value capable of causing ignition in these environments is 300 mA.

Based on these findings, the protection threshold for residual current devices (RCDs) used for fire prevention has been set at 300 mA. This means that residual current circuit breakers detect leakage currents of 300 mA and above, disconnecting the circuit to prevent fire risks and ensure safety.

By doing so, the likelihood of electrical faults escalating into fires is minimized, and the overall safety level of installations is significantly enhanced.

Indirect Contact and the Relationship Between Grounding Systems and Current Protection Circuit Breakers

When the outer metal casing of an electrically powered device becomes energized due to insulation failure, indirect (or secondary) contact occurs. In this situation, individuals coming into contact with the faulty device may be exposed to touch voltage, facing a serious risk of electric shock. To prevent indirect contact, the fault current must be detected and eliminated as quickly as possible.

When insulation failure occurs in one of the phase conductors, the magnitude of the fault current passing through the ground and the safety measures taken to prevent indirect contact are directly dependent on the grounding system used. In this context, according to the IEC/EN 60364 standard, low-voltage (LV) networks are classified into three categories:

- **TN Type Networks:** Neutral is grounded, and the device body is connected to the neutral.
- **TT Type Networks:** Neutral is grounded, and the device body is grounded separately.
- **IT Type Networks:** Neutral is not grounded, and the device body is grounded.

The TN system is further divided into three subgroups based on the configuration of the neutral (N) and grounding (PE) conductors:

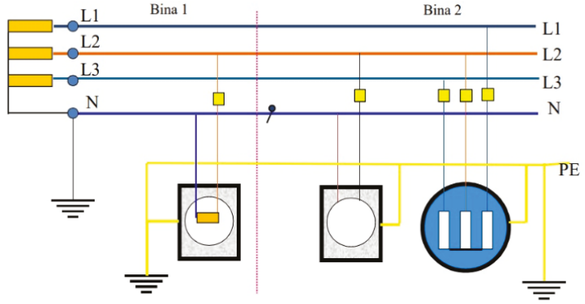
- **TN-C:** The neutral (N) and grounding (PE) conductors are combined, using a PEN conductor.
- **TN-S:** The neutral (N) and grounding (PE) conductors are drawn separately.
- **TN-C-S:** In part of the network, the neutral (N) and grounding (PE) conductors are combined (PEN), while in another part, they are drawn separately.

In Turkey, the TT type grounding system is commonly used. In this system, the neutral of the supplying low-voltage (LV) distribution transformer is grounded to provide "operational grounding." In residential and commercial buildings, "protective grounding" is implemented to ground the metal casings of devices, and the metal casings of these devices are connected to the main grounding system through the protective earth (PE) conductor.

The TT System and Residual Current Protection

In an electrical network with a TT type grounding system, residual current circuit breakers (RCCBs) are used to provide protection against direct or indirect contact. These breakers detect leakage currents that may occur in the network and eliminate the hazard. For 30 mA and 300 mA residual current protection circuit breakers, the total resistance of the grounding system must be below the limits determined by the allowed maximum touch voltage.

Therefore, for the TT grounding system to operate effectively, both the operational and protective groundings must be correctly implemented, and the residual current circuit breakers must be appropriately selected and installed. This ensures the safety of users and helps prevent electrical accidents.



TT Şebeke

Cable Selection and Cross-Section for Residual Current Circuit Breaker (RCCB)

For the proper operation of residual current circuit breakers (RCCBs), it is crucial that the cables used have the appropriate cross-sectional area. The cable cross-section should be selected according to the breaker's working capacity and the current values in the system.
The cable cross-section is determined by considering the maximum current the conductor can carry, the voltage drop, and ensuring safe operating conditions. Additionally, it should be compatible with the rated current value of the RCCB, preventing any overheating, voltage loss, or safety issues.

In general, for 30 mA residual current circuit breakers, a cable cross-section of 1.5 mm^2 or larger is recommended. However, this value may vary depending on the system's power, length, and the characteristics of the devices used. When selecting cables, the suitability of insulation materials and environmental factors should also be considered.
Cable selection is a critical factor for the safety and efficient operation of the system, and therefore, it should always be made in compliance with local regulations and standards.

The table below provides some data on the conductor cross-section and the approximate general diameter of the insulation cable. This information will help determine the appropriate cross-sections and cable diameters that meet the system's requirements during the cable selection process. As the cable diameter increases, the current-carrying capacity of the conductor also increases, which is a critical factor for systems with higher power requirements. Cable diameters should be carefully selected, taking into account ease of installation, space constraints, and safety standards.

Kablo Boyutu ve Akım Derecelendirme Tablosu

Cross-sectional area of conductor (mm^2)	Approximate cross-sectional area of the insulating cable (mm)	Current rating	
		Single Phase (A)	Three phase (A)
1.5	2.9	17.5	15.5
2.5	3.53	24	21
4.0	4.4	32	28
6.0	4.68	41	36
10	5.98	57	50
16	6.95	76	68
25	8.7	101	89
35	10.08	125	110

Considerations for Using Residual Current Circuit Breakers (RCCBs)

1.Each phase of the Residual Current Circuit Breaker (RCCB) must be protected by an automatic fuse.

2.The short-circuit withstand current of the RCCB must not be lower than the expected short-circuit current at the point where the breaker is connected.

3.The nominal current of the RCCB must not be lower than the current passing through the circuit it is connected to. Otherwise, the breaker may be damaged due to overheating.

4.RCCBs do not provide protection against short circuits. Therefore, protection devices such as automatic fuses must be used to protect against short circuits and overload currents in the system.

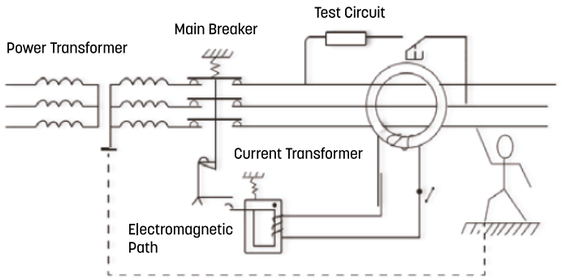
5.Grounding must be performed in systems where RCCBs are used. Additionally, the neutral and phase lines must be isolated and independent from the ground.

6.After the RCCB is connected to the system, methods that could damage the system or the breaker, such as short-circuiting the outputs, must never be used.

7.The neutral line, along with the phases, must always pass through the breaker. Attention should be paid to the input-output directions, ensuring that the same input-output phases are connected.

8.When connecting loads with a leakage current of 30 mA or higher to a RCCB with a 30 mA threshold, which typically trips after 15 mA, frequent unwanted tripping may occur in the system. Therefore, it is crucial to calculate the potential leakage currents of all devices in the system before selecting the breaker.

9.RCCBs do not provide protection in case of a ground fault or contact in the upper part of the connection point, up to the input side.



If the residual current circuit breaker trips outside of a test application and cannot be reset, the following actions should be taken:

•Disconnect all automatic fuses after the residual current circuit breaker and reset the breaker. If the residual current circuit breaker resets, sequentially activate the automatic fuses one by one until the RCCB trips again. If the RCCB trips, there is an insulation fault in the circuit, and it must be addressed.
•If the residual current circuit breaker still cannot be reset after disconnecting all automatic fuses, isolate all conductors, including the neutral, from the output of the RCCB. If the RCCB can be reset, there is an insulation fault in the distribution board where the RCCB is located. If the RCCB still cannot be reset after isolating all conductors, the RCCB is faulty.

Types of Residual Current Circuit Breakers (RCCBs)

Residual Current Circuit Breakers (RCCBs) are produced in two different types based on the detection of fault duration: delayed and non-delayed types.

•**Non-Delayed Type RCCBs:** These breakers disconnect the circuit without delay in the event of a fault, within less than 300 ms, at the rated residual current level (e.g., 30 mA).
•**Delayed Type RCCBs:** These breakers open the circuit with a minimum delay of 130 ms when a fault occurs at the rated residual current level.

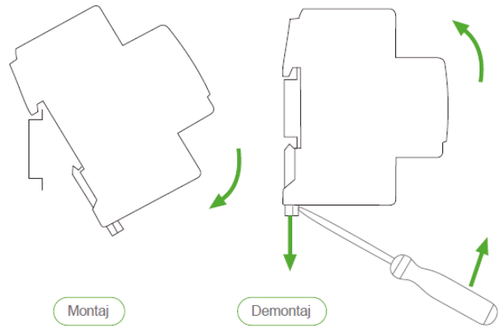
GENERAL PRODUCT CATALOG

RESIDUAL CURRENT CIRCUIT BREAKER

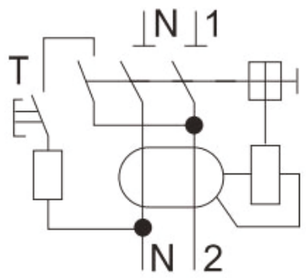
In practice, especially with fault currents exceeding 300 mA in the system, a 30 mA residual current circuit breaker used at the entrance of an apartment can disconnect the circuit before the 300 mA residual current circuit breaker at the meter output, potentially leaving the entire system without power. Therefore, it is preferred that the residual current circuit breakers at the meter output are of the delayed type.

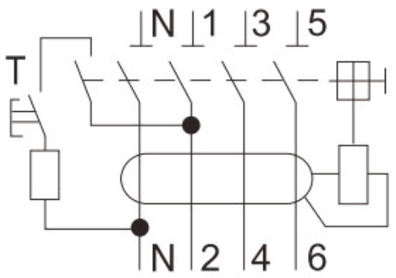
By using delayed type residual current circuit breakers in conjunction with non-delayed type breakers, selectivity can be achieved in the event of a fault. This allows larger fault currents to disconnect only the circuit in the affected area, while breakers in other areas continue to operate without disconnecting. This feature enhances the system's safety and prevents unnecessary power outages.

XKoren residual current circuit breakers are optimized for mounting on a 35 mm wide DIN rail, with a maximum cable connection capacity of 35 mm². The tightening torque applied to screw connections should not exceed 3 Nm. The connection terminals have an IP20 protection rating in accordance with the IEC/EN 60529 standard.



Wiring Diagram





Residual Current Circuit Breakers

6kA AC Type 30mA

2P



Type (Order) Code	Rated Current (In)	Explanation	Box Quantity	Carton Quantity
XKR 06-2AC30-025	25A/30mA	6kA 2P AC Type 30mA 25A	1	100
XKR 06-2AC30-032	32A/30mA	6kA 2P AC Type 30mA 32A	1	100
XKR 06-2AC30-040	40A/30mA	6kA 2P AC Type 30mA 40A	1	100
XKR 06-2AC30-063	63A/30mA	6kA 2P AC Type 30mA 63A	1	100
XKR 06-2AC30-080	80A/30mA	6kA 2P AC Type 30mA 80A	1	100
XKR 06-2AC30-100	100A/30mA	6kA 2P AC Type 30mA 100A	1	100
XKR 06-2AC30-125	125A/30mA	6kA 2P AC Type 30mA 125A	1	100

4P



Type (Order) Code	Rated Current (In)	Explanation	Box Quantity	Carton Quantity
XKR 06-4AC30-025	25A/30mA	6kA 4P AC Type 30mA 25A	1	50
XKR 06-4AC30-032	32A/30mA	6kA 4P AC Type 30mA 32A	1	50
XKR 06-4AC30-040	40A/30mA	6kA 4P AC Type 30mA 40A	1	50
XKR 06-4AC30-063	63A/30mA	6kA 4P AC Type 30mA 63A	1	50
XKR 06-4AC30-080	80A/30mA	6kA 4P AC Type 30mA 80A	1	50
XKR 06-4AC30-100	100A/30mA	6kA 4P AC Type 30mA 100A	1	50
XKR 06-4AC30-125	125A/30mA	6kA 4P AC Type 30mA 125A	1	50

6kA AC Type 300mA

2P



Type (Order) Code	Rated Current (In)	Explanation	Box Quantity	Carton Quantity
XKR 06-2AC300-025	25A/300mA	6kA 2P AC Type 300mA 25A	1	100
XKR 06-2AC300-032	32A/300mA	6kA 2P AC Type 300mA 32A	1	100
XKR 06-2AC300-040	40A/300mA	6kA 2P AC Type 300mA 40A	1	100
XKR 06-2AC300-063	63A/300mA	6kA 2P AC Type 300mA 63A	1	100
XKR 06-2AC300-080	80A/300mA	6kA 2P AC Type 300mA 80A	1	100
XKR 06-2AC300-100	100A/300mA	6kA 2P AC Type 300mA 100A	1	100
XKR 06-2AC300-125	125A/300mA	6kA 2P AC Type 300mA 125A	1	100

4P



Type (Order) Code	Rated Current (In)	Explanation	Box Quantity	Carton Quantity
XKR 06-4AC300-025	25A/300mA	6kA 4P AC Type 300mA 25A	1	50
XKR 06-4AC300-032	32A/300mA	6kA 4P AC Type 300mA 32A	1	50
XKR 06-4AC300-040	40A/300mA	6kA 4P AC Type 300mA 40A	1	50
XKR 06-4AC300-063	63A/300mA	6kA 4P AC Type 300mA 63A	1	50
XKR 06-4AC300-080	80A/300mA	6kA 4P AC Type 300mA 80A	1	50
XKR 06-4AC300-100	100A/300mA	6kA 4P AC Type 300mA 100A	1	50
XKR 06-4AC300-125	125A/300mA	6kA 4P AC Type 300mA 125A	1	50

6 kA A Type

6kA AC Type 30mA

2P



Type (Order) Code	Rated Current (In)	Explanation	Box Quantity	Carton Quantity
XKR 06 2AA30-025	25A/30mA	6kA 2P A Type 30mA 25A	1	100
XKR 06 2AA30-032	32A/30mA	6kA 2P A Type 30mA 32A	1	100
XKR 06 2AA30-040	40A/30mA	6kA 2P A Type 30mA 40A	1	100
XKR 06 2AA30-063	63A/30mA	6kA 2P A Type 30mA 63A	1	100
XKR 06 2AA30-080	80A/30mA	6kA 2P A Type 30mA 80A	1	100
XKR 06 2AA30-100	100A/30mA	6kA 2P A Type 30mA 100A	1	100
XKR 06 2AA30-125	125A/30mA	6kA 2P A Type 30mA 125A	1	100

4P



Type (Order) Code	Rated Current (In)	Explanation	Box Quantity	Carton Quantity
XKR 06 4AA30-025	25A/30mA	6kA 4P A Type 30mA 25A	1	50
XKR 06 4AA30-032	32A/30mA	6kA 4P A Type 30mA 32A	1	50
XKR 06 4AA30-040	40A/30mA	6kA 4P A Type 30mA 40A	1	50
XKR 06 4AA30-063	63A/30mA	6kA 4P A Type 30mA 63A	1	50
XKR 06 4AA30-080	80A/30mA	6kA 4P A Type 30mA 80A	1	50
XKR 06 4AA30-100	100A/30mA	6kA 4P A Type 30mA 100A	1	50
XKR 06 4AA30-125	125A/30mA	6kA 4P A Type 30mA 125A	1	50

6kA A Type 300mA

2P



Type (Order) Code	Rated Current (In)	Explanation	Box Quantity	Carton Quantity
XKR 06 2AA300-025	25A/300mA	6kA 2P A Type 300mA 25A	1	100
XKR 06 2AA300-032	32A/300mA	6kA 2P A Type 300mA 32A	1	100
XKR 06 2AA300-040	40A/300mA	6kA 2P A Type 300mA 40A	1	100
XKR 06 2AA300-063	63A/300mA	6kA 2P A Type 300mA 63A	1	100
XKR 06 2AA300-080	80A/300mA	6kA 2P A Type 300mA 80A	1	100
XKR 06 2AA300-100	100A/300mA	6kA 2P A Type 300mA 100A	1	100
XKR 06 2AA300-125	125A/300mA	6kA 2P A Type 30mA 125A	1	100

4P



Type (Order) Code	Rated Current (In)	Explanation	Box Quantity	Carton Quantity
XKR 06 4AA300-025	25A/300mA	6kA 4P A Type 300mA 25A	1	50
XKR 06 4AA300-032	32A/300mA	6kA 4P A Type 300mA 32A	1	50
XKR 06 4AA300-040	40A/300mA	6kA 4P A Type 300mA 40A	1	50
XKR 06 4AA300-063	63A/300mA	6kA 4P A Type 300mA 63A	1	50
XKR 06 4AA300-080	80A/300mA	6kA 4P A Type 300mA 80A	1	50
XKR 06 4AA300-100	100A/300mA	6kA 4P A Type 300mA 100A	1	50
XKR 06 4AA300-125	125A/300mA	6kA 4P A Type 300mA 125A	1	50

RESIDUAL CURRENT CIRCUIT BREAKER

10 kA AC Type

10kA AC Type 30mA

2P



Type (Order) Code	Rated Current (In)	Explanation	Box Quantity	Carton Quantity
XKR 10-2AC30-025	25A/30mA	10kA 2P AC Type 30mA 25A	1	100
XKR 10-2AC30-032	32A/30mA	10kA 2P AC Type 30mA 32A	1	100
XKR 10-2AC30-040	40A/30mA	10kA 2P AC Type 30mA 40A	1	100
XKR 10-2AC30-063	63A/30mA	10kA 2P AC Type 30mA 63A	1	100
XKR 10-2AC30-080	80A/30mA	10kA 2P AC Type 30mA 80A	1	100
XKR 10-2AC30-100	100A/30mA	10kA 2P AC Type 30mA 100A	1	100
XKR 10-2AC30-125	125A/30mA	10kA 2P AC Type 30mA 125A	1	100

4P



Type (Order) Code	Rated Current (In)	Explanation	Box Quantity	Carton Quantity
XKR 10-4AC30-025	25A/30mA	10kA 4P AC Type 30mA 25A	1	50
XKR 10-4AC30-032	32A/30mA	10kA 4P AC Type 30mA 32A	1	50
XKR 10-4AC30-040	40A/30mA	10kA 4P AC Type 30mA 40A	1	50
XKR 10-4AC30-063	63A/30mA	10kA 4P AC Type 30mA 63A	1	50
XKR 10-4AC30-080	80A/30mA	10kA 4P AC Type 30mA 80A	1	50
XKR 10-4AC30-100	100A/30mA	10kA 4P AC Type 30mA 100A	1	50
XKR 10-4AC30-125	125A/30mA	10kA 4P AC Type 30mA 125A	1	50

10kA AC Type 300mA

2P



Type (Order) Code	Rated Current (In)	Explanation	Box Quantity	Carton Quantity
XKR 10-2AC300-025	25A/300mA	10kA 2P AC Type 300mA 25A	1	100
XKR 10-2AC300-032	32A/300mA	10kA 2P AC Type 300mA 32A	1	100
XKR 10-2AC300-040	40A/300mA	10kA 2P AC Type 300mA 40A	1	100
XKR 10-2AC300-063	63A/300mA	10kA 2P AC Type 300mA 63A	1	100
XKR 10-2AC300-080	80A/300mA	10kA 2P AC Type 300mA 80A	1	100
XKR 10-2AC300-100	100A/300mA	10kA 2P AC Type 300mA 100A	1	100
XKR 10-2AC300-125	125A/300mA	10kA 2P AC Type 300mA 125A	1	100

4P



Type (Order) Code	Rated Current (In)	Explanation	Box Quantity	Carton Quantity
XKR 10-4AC300-025	25A/300mA	10kA 4P AC Type 300mA 25A	1	50
XKR 10-4AC300-032	32A/300mA	10kA 4P AC Type 300mA 32A	1	50
XKR 10-4AC300-040	40A/300mA	10kA 4P AC Type 300mA 40A	1	50
XKR 10-4AC300-063	63A/300mA	10kA 4P AC Type 300mA 63A	1	50
XKR 10-4AC300-080	80A/300mA	10kA 4P AC Type 300mA 80A	1	50
XKR 10-4AC300-100	100A/300mA	10kA 4P AC Type 300mA 100A	1	50
XKR 10-4AC300-125	125A/300mA	10kA 4P AC Type 300mA 125A	1	50

RESIDUAL CURRENT CIRCUIT BREAKER

10 kA A Type

10kA AC Type 30mA

2P



Type (Order) Code	Rated Current (In)	Explanation	Box Quantity	Carton Quantity
XKR 10-2AA30-025	25A/30mA	10kA 2P A Type 30mA 25A	1	100
XKR 10-2AA30-032	32A/30mA	10kA 2P A Type 30mA 32A	1	100
XKR 10-2AA30-040	40A/30mA	10kA 2P A Type 30mA 40A	1	100
XKR 10-2AA30-063	63A/30mA	10kA 2P A Type 30mA 63A	1	100
XKR 10-2AA30-080	80A/30mA	10kA 2P A Type 30mA 80A	1	100
XKR 10-2AA30-100	100A/30mA	10kA 2P A Type 30mA 100A	1	100
XKR 10-2AA30-125	125A/30mA	10kA 2P A Type 30mA 125A	1	100

4P



Type (Order) Code	Rated Current (In)	Explanation	Box Quantity	Carton Quantity
XKR 10-4AA30-025	25A/30mA	10kA 4P A Type 30mA 25A	1	50
XKR 10-4AA30-032	32A/30mA	10kA 4P A Type 30mA 32A	1	50
XKR 10-4AA30-040	40A/30mA	10kA 4P A Type 30mA 40A	1	50
XKR 10-4AA30-063	63A/30mA	10kA 4P A Type 30mA 63A	1	50
XKR 10-4AA30-080	80A/30mA	10kA 4P A Type 30mA 80A	1	50
XKR 10-4AA30-100	100A/30mA	10kA 4P A Type 30mA 100A	1	50
XKR 10-4AA30-125	125A/30mA	10kA 4P A Type 30mA 125A	1	50

10kA AC Type 300mA

2P



Type (Order) Code	Rated Current (In)	Explanation	Box Quantity	Carton Quantity
XKR 10-2AA300-025	25A/300mA	6kA 2P A Type 300mA 25A	1	100
XKR 10-2AA300-032	32A/300mA	6kA 2P A Type 300mA 32A	1	100
XKR 10-2AA300-040	40A/300mA	6kA 2P A Type 300mA 40A	1	100
XKR 10-2AA300-063	63A/300mA	6kA 2P A Type 300mA 63A	1	100
XKR 10-2AA300-080	80A/300mA	6kA 2P A Type 300mA 80A	1	100
XKR 10-2AA300-100	100A/300mA	6kA 2P A Type 300mA 100A	1	100
XKR 10-2AA300-125	125A/300mA	6kA 2P A Type 300mA 125A	1	100

4P



Type (Order) Code	Rated Current (In)	Explanation	Box Quantity	Carton Quantity
XKR 10-4AA300-025	25A/300mA	6kA 4P A Type 300mA 25A	1	50
XKR 10-4AA300-032	32A/300mA	6kA 4P A Type 300mA 32A	1	50
XKR 10-4AA300-040	40A/300mA	6kA 4P A Type 300mA 40A	1	50
XKR 10-4AA300-063	63A/300mA	6kA 4P A Type 300mA 63A	1	50
XKR 10-4AA300-080	80A/300mA	6kA 4P A Type 300mA 80A	1	50
XKR 10-4AA300-100	100A/300mA	6kA 4P A Type 300mA 100A	1	50
XKR 10-4AA300-125	125A/300mA	6kA 4P A Type 300mA 125A	1	50

10 kA AC+S Type

10kA AC+S Type(Delayed) 30mA

2P



Type (Order) Code	Rated Current (In)	Explanation	Box Quantity	Carton Quantity
XKR 10-2ACS30-025	25A/30mA	10kA 2P AC+S Type 30mA 25A	1	100
XKR 10-2ACS30-032	32A/30mA	10kA 2P AC+S Type 30mA 32A	1	100
XKR 10-2ACS30-040	40A/30mA	10kA 2P AC+S Type 30mA 40A	1	100
XKR 10-2ACS30-063	63A/30mA	10kA 2P AC+S Type 30mA 63A	1	100
XKR 10-2ACS30-080	80A/30mA	10kA 2P AC+S Type 30mA 80A	1	100
XKR 10-2ACS30-100	100A/30mA	10kA 2P AC+S Type 30mA 100A	1	100
XKR 10-2ACS30-125	125A/30mA	10kA 2P AC+S Type 30mA 125A	1	100

4P



Type (Order) Code	Rated Current (In)	Explanation	Box Quantity	Carton Quantity
XKR 10-4ACS30-025	25A/30mA	10kA 4P AC+SType 30mA 25A	1	50
XKR 10-4ACS30-032	32A/30mA	10kA 4P AC+S Type 30mA 32A	1	50
XKR 10-4ACS30-040	40A/30mA	10kA 4P AC+S Type 30mA 40A	1	50
XKR 10-4ACS30-063	63A/30mA	10kA 4P AC+S Type 30mA 63A	1	50
XKR 10-4ACS30-080	80A/30mA	10kA 4P AC+S Type 30mA 80A	1	50
XKR 10-4ACS30-100	100A/30mA	10kA 4P AC+S Type 30mA 100A	1	50
XKR 10-4ACS30-125	125A/30mA	10kA 4P AC+S Type 30mA 125A	1	50

10kA AC+S Type(Delayed) 300mA

2P



Type (Order) Code	Rated Current (In)	Explanation	Box Quantity	Carton Quantity
XKR 10-2ACS300-025	25A/300mA	10kA 2P AC+S Type 300mA 25A	1	100
XKR 10-2ACS300-032	32A/300mA	10kA 2P AC+S Type 300mA 32A	1	100
XKR 10-2ACS300-040	40A/300mA	10kA 2P AC+S Type 300mA 40A	1	100
XKR 10-2ACS300-063	63A/300mA	10kA 2P AC+S Type 300mA 63A	1	100
XKR 10-2ACS300-080	80A/300mA	10kA 2P AC+S Type 300mA 80A	1	100
XKR 10-2ACS300-100	100A/300mA	10kA 2P AC+S Type 300mA 100A	1	100
XKR 10-2ACS300-125	125A/300mA	10kA 2P AC+S Type 300mA 125A	1	100

4P



Type (Order) Code	Rated Current (In)	Explanation	Box Quantity	Carton Quantity
XKR 10-4ACS300-025	25A/300mA	10kA 4P AC+S Type 300mA 25A	1	50
XKR 10-4ACS300-032	32A/300mA	10kA 4P AC+S Type 300mA 32A	1	50
XKR 10-4ACS300-040	40A/300mA	10kA 4P AC+S Type 300mA 40A	1	50
XKR 10-4ACS300-063	63A/300mA	10kA 4P AC+S Type 300mA 63A	1	50
XKR 10-4ACS300-080	80A/300mA	10kA 4P AC+S Type 300mA 80A	1	50
XKR 10-4ACS300-100	100A/300mA	10kA 4P AC+S Type 300mA 100A	1	50
XKR 10-4ACS300-125	125A/300mA	10kA 4P AC+S Type 300mA 125A	1	50

B Type

10kA B Type 30mA

2P



Type (Order) Code	Rated Current (In)	Explanation	Box Quantity	Carton Quantity
XKR 10-2BB30-025	25A/30mA	10kA 2P B Type 30mA 25A	1	100
XKR 10-2BB30-040	40A/30mA	10kA 2P B Type 30mA 40A	1	100
XKR 10-2BB30-063	63A/30mA	10kA 2P B Type 30mA 63A	1	100

4P



Type (Order) Code	Rated Current (In)	Explanation	Box Quantity	Carton Quantity
XKR 10-4BB30-025	25A/30mA	10kA 4P B Type 30mA 25A	1	50
XKR 10-4BB30-040	40A/30mA	10kA 4P B Type 30mA 40A	1	50
XKR 10-4BB30-063	63A/30mA	10kA 4P B Type 30mA 63A	1	50

10kA B Type 300mA

4P



Type (Order) Code	Rated Current (In)	Explanation	Box Quantity	Carton Quantity
XKR 10-2BB300-025	25A/300mA	10kA 2P B Type 300mA 25A	1	100
XKR 10-2BB300-040	40A/300mA	10kA 2P B Type 300mA 40A	1	100
XKR 10-2BB300-063	63A/300mA	10kA 2P B Type 300mA 63A	1	100

4P

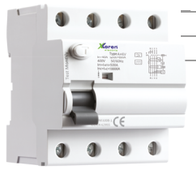


Type (Order) Code	Rated Current (In)	Explanation	Box Quantity	Carton Quantity
XKR 10-4BB300-025	25A/300mA	10kA 4P B Type 300mA 25A	1	50
XKR 10-4BB300-040	40A/300mA	10kA 4P B Type 300mA 40A	1	50
XKR 10-4BB300-063	63A/300mA	10kA 4P B Type 300mA 63A	1	50

EV Type

10kA EV Type 30mA

2P	Type (Order) Code	Rated Current (In)	Explanation	Box Quantity	Carton Quantity
	XKR 10-2EV30-025	25A/30mA	10kA 2P EV Type 30mA 25A	1	100
	XKR 10-2EV30-040	40A/30mA	10kA 2P EV Type 30mA 40A	1	100
	XKR 10-2EV30-063	63A/30mA	10kA 2P EV Type 30mA 63A	1	100

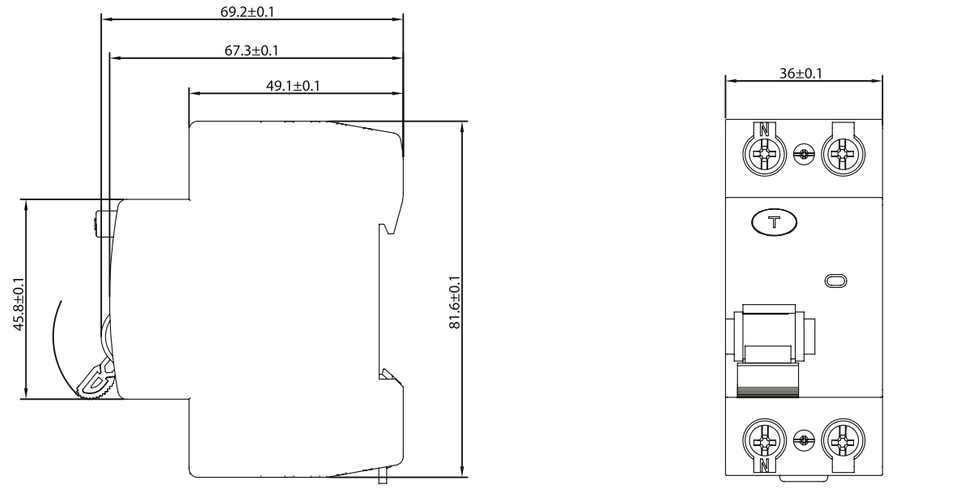
4P	Type (Order) Code	Rated Current (In)	Explanation	Box Quantity	Carton Quantity
	XKR 10-4EV30-025	25A/30mA	10kA 4P EV Type 30mA 25A	1	50
	XKR 10-4EV30-040	40A/30mA	10kA 4P EV Type 30mA 40A	1	50
	XKR 10-4EV30-063	63A/30mA	10kA 4P EVType 30mA 63A	1	50

GENERAL PRODUCT CATALOG

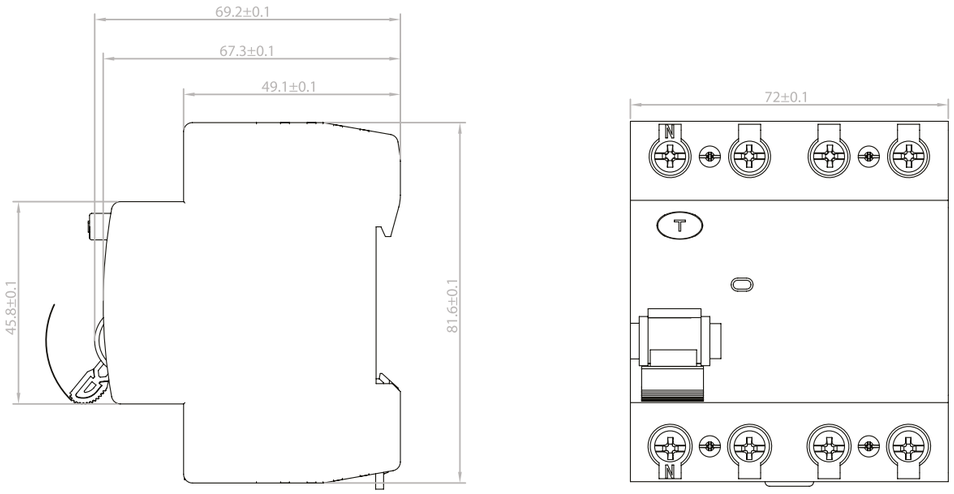
RESIDUAL CURRENT CIRCUIT BREAKER

DIMENSIONS

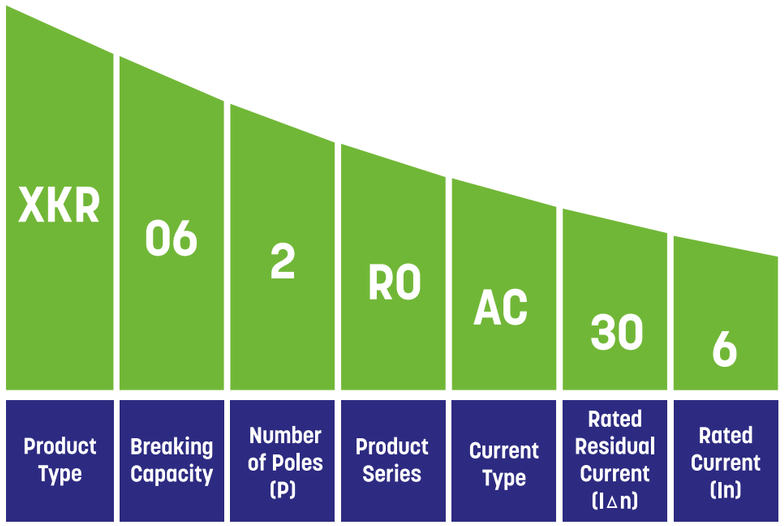
XKR 6kA/10kA 2P

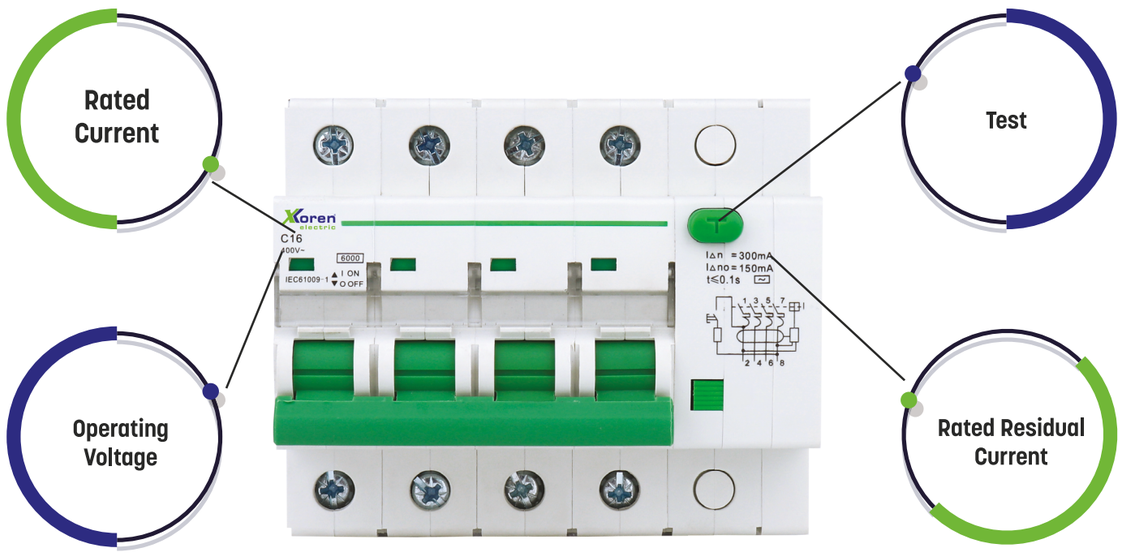


XKR 6kA/10kA 4P



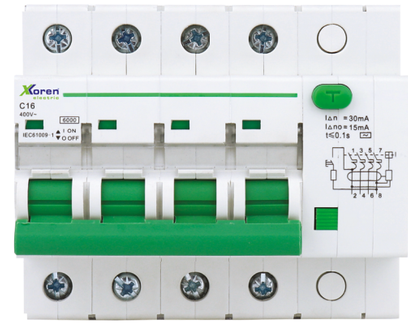
Product Code and Label Information





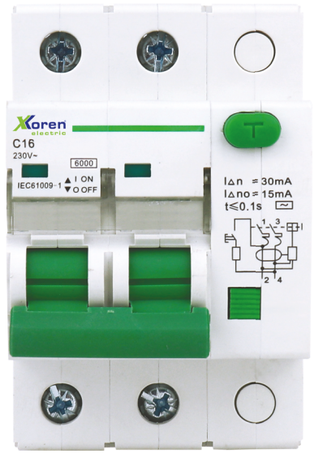
XKR6 RCBO





Kaçak Akım Korumalı Otomatik Sigortalar			XKR6-RO	
Protection			Life Protection (30mA) / Fire Protection (300mA)	
Number of Poles		P	2	4
Rated Operational Voltage	Ue	VAC	230	400
Rated Insulation Voltage	Ui	V	690	
Rated Impulse Withstand Voltage	Uimp	kV	6	
Protection Class			**AC**	
Operating Frequency		Hz	50/60	
Breaking Capacity	Ics	kA	6	
Rated Current	**In**	**A**	**6,10,16,20,25,32,40,50,63**	
Tripping Curve			C	
Rated Residual Current	**I△n**	**mA**	**30/300**	
Residual Current Tripping Range			0.5...1xI△n	
Residual Current Tripping Time		ms	<300	
Standards			IEC EN 61009-1	
Operating Temperature Range		˚C	-25...+55	
Storage Temperature Range		˚C	-40...+70	
Electrical Life		op.	6.000	
Mechanical Life		op.	20.000	
Tripping Unit Type			Electronic	
Degree of Protection			IP 20	
Pollution Degree			2	
Altitude		m	≤2000	
Mounting		mm	35mm DIN rail	
Terminal Cross-Section		mm^2	≤25	≤16

General Information



XKoren XKR-RO RCBOs are protective devices designed to enhance electrical system safety by providing both residual current (earth fault) and overcurrent protection. These devices detect and interrupt leakage currents (earth faults) and overcurrent conditions, reducing the risk of fire, electric shock, and equipment damage.

An RCBO combines:
Residual Current Circuit Breaker (RCCB): Provides residual current protection.
Miniature Circuit Breaker (MCB) / Moulded Case Circuit Breaker (MCCB): Provides overcurrent protection.

This means an RCBO can detect both short circuits and earth faults within the same circuit, ensuring comprehensive protection.

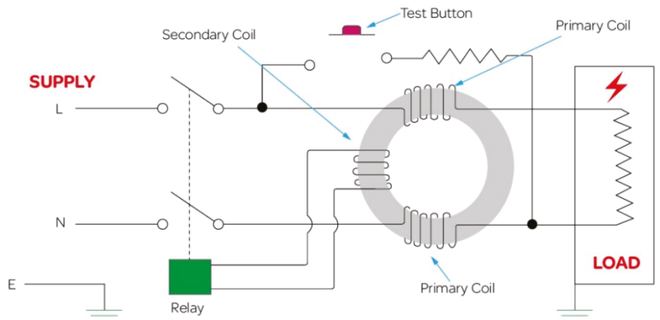
Operating Principle

An RCBO trips the circuit when it detects an electrical leakage (e.g., an electrical device leaking current to earth) or an overcurrent condition.

Residual Current Protection: Leakage currents typically result from insulation failures or grounding faults. If a person becomes part of the leakage current path, it may lead to severe electric shock.

Overcurrent Protection: Overcurrent occurs due to excessive load or short circuits, potentially damaging electrical components or causing fire hazards.

RCBOs ensure a fast and reliable disconnection to maintain electrical safety and system integrity.



Applications

XKR-RO RCBOs can be safely and effectively used in the following areas:

Residential: Ensures the safety of electrical installations in homes.

Offices: Minimizes electrical hazards in office environments.

Industrial Facilities: Protects equipment in factories and industrial plants.

Commercial Buildings: Enhances safety in shopping malls, hotels, and other commercial structures.

GENERAL PRODUCT CATALOG

RESIDUAL CURRENT CIRCUIT BREAKERS WITH OVERCURRENT

General Information

Parameter	Specification
Number of Poles	2P and 4P
Rated Residual Current (IΔn)	30mA (Life protection) and 300mA (fire protection)
Breaking Capacity (Ics)	6kA
Rated Current (In)	6A, 10A, 16A, 20A, 25A, 32A, 40A, 50A, 63A
Operating Voltage (Ue)	230/400V AC
Operating Class	AC Type

Advantages

Dual Protection

XKR-RO RCBOs provide both residual current and overcurrent protection, eliminating the need for separate RCCBs and MCBs.

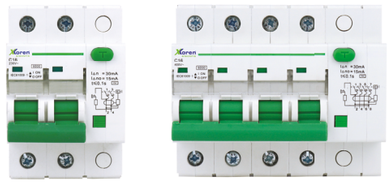
Compact Design

Integrating residual current protection and circuit breaker functions into a single device saves space in electrical panels, making it ideal for installations with limited space.

Enhanced Safety
Protects people from electric shocks and safeguards equipment from overcurrent damage, significantly reducing fire and equipment failure risks.

High Sensitivity
Detects even small leakage currents and rapidly disconnects the circuit, ensuring a high level of safety.

Easy Maintenance
Quickly identifies both overcurrent and residual current faults, simplifying troubleshooting and maintenance processes.



Differences Between RCBO and MCB & Their Applications

MCB **(Miniature Circuit Breaker)** and RCBO **(Residual Current Breaker with Overcurrent Protection)** are essential components for electrical system protection. However, they serve different purposes and provide distinct types of protection.

MCB (Miniature Circuit Breaker)

MCB is a protective device designed to safeguard electrical systems against **short circuits** and **overloads.** It monitors the current flow and disconnects the circuit if the predefined limits are exceeded. MCBs ensure that electrical loads operate within safe limits, preventing damage due to excessive current.

However, **MCBs do not provide protection against residual current (earth faults) or electric shock hazards.** They are solely designed to respond to excessive current caused by overload or short circuit conditions.

RCBO (Residual Current Circuit Breakers with Overcurrent)

RCBOs offer **dual protection** by monitoring both **residual current (earth leakage)** and overcurrent. These devices continuously track the flow of current through the live and neutral conductors.

If a residual current (earth fault) occurs–such as leakage due to insulation failure or a person accidentally touching a live wire–the RCBO will trip to prevent electric shock.

If an **overcurrent condition** arises due to short circuits or excessive load, the RCBO will disconnect the circuit to prevent equipment damage and fire hazards.
Because of this **enhanced protection**, RCBOs are especially useful in areas where **water exposure is a concern or where electric shock risks are high.**

Application Areas & Selection Criteria

MCBs are typically used for **short circuit and overload protection** in applications such as:

Lighting systems
Air conditioners
General electrical circuits
Devices that do not have direct water exposure
RCBOs, on the other hand, provide compr**ehensive protection** and are ideal for:
Sockets (power outlets)
Water heaters
Electrical appliances near water (e.g., bathrooms, kitchens, outdoor installations)
Locations where electric shock risks are high

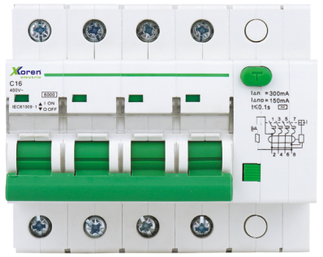
Protection Levels

Device	Short Circuit Protection	Overload Protection	Earth Fault Protection	Electric Shock Protection
MCB	✔ Yes	✔ Yes	✘ No	✘ No
RCBO	✔ Yes	✔ Yes	✔ Yes	✔ Yes

As a conclusion; RCBOs provide a more **comprehensive level of protection** compared to MCBs, as they safeguard against **both overcurrent and residual current (earth leakage).**

For applications where **only short circuit and overload protection** is needed, **MCBs** are a suitable choice. However, in environments where **electric shock and earth faults pose a risk, RCBOs** should be used to ensure maximum safety.





GENERAL PRODUCT CATALOG

RESIDUAL CURRENT CIRCUIT BREAKERS WITH OVERCURRENT

ORDER LIST

Residual Current Circuit Breakers with Overcurrent (RCBO)

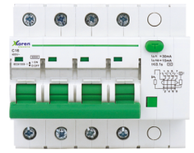
6kA AC Type 30mA RCBO

2P



Type (Order) Code	Rated Current (In)	Explanation	Box Quantity	Carton Quantity
XKR 06 2-R0-AC30-6	6A/30mA	6kA 2P RCBO AC Type 30mA 6A	4	80
XKR 06 2-R0-AC30-10	10A/30mA	6kA 2P RCBO AC Type 30mA 10A	4	80
XKR 06 2-R0-AC30-16	16A/30mA	6kA 2P RCBO AC Type 30mA 16A	4	80
XKR 06 2-R0-AC30-20	20A/30mA	6kA 2P RCBO AC Type 30mA 20A	4	80
XKR 06 2-R0-AC30-25	25A/30mA	6kA 2P RCBO AC Type 30mA 25A	4	80
XKR 06 2-R0-AC30-32	32A/30mA	6kA 2P RCBO AC Type 30mA 32A	4	80
XKR 06 2-R0-AC30-40	40A/30mA	6kA 2P RCBO AC Type 30mA 40A	4	80
XKR 06 2-R0-AC30-50	50A/30mA	6kA 2P RCBO AC Type 30mA 50A	4	80
XKR 06 2-R0-AC30-63	63A/30mA	6kA 2P RCBO AC Type 30mA 63A	4	80

4P



XKR 06 4-R0-AC30-6	6A/30mA	6kA 4P RCBO AC Type 30mA 6A	2	40
XKR 06 4-R0-AC30-10	10A/30mA	6kA 4P RCBO AC Type 30mA 10A	2	40
XKR 06 4-R0-AC30-16	16A/30mA	6kA 4P RCBO AC Type 30mA 16A	2	40
XKR 06 4-R0-AC30-20	20A/30mA	6kA 4P RCBO AC Type 30mA 20A	2	40
XKR 06 4-R0-AC30-25	25A/30mA	6kA 4P RCBO AC Type 30mA 25A	2	40
XKR 06 4-R0-AC30-32	32A/30mA	6kA 4P RCBO AC Type 30mA 32A	2	40
XKR 06 4-R0-AC30-40	40A/30mA	6kA 4P RCBO AC Type 30mA 40A	2	40
XKR 06 4-R0-AC30-50	50A/30mA	6kA 4P RCBO AC Type 30mA 50A	2	40
XKR 06 4-R0-AC30-63	63A/30mA	6kA 4P RCBO AC Type 30mA 63A	2	40

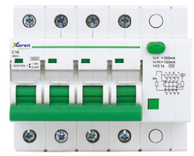
6kA AC Type 300mA RCBO

2P



Type (Order) Code	Rated Current (In)	Explanation	Box Quantity	Carton Quantity
XKR 06 2-R0-AC300-6	6A/300mA	6kA 2P RCBO AC Type 300mA 6A	4	80
XKR 06 2-R0-AC300-10	10A/300mA	6kA 2P RCBO AC Type 300mA 10A	4	80
XKR 06 2-R0-AC300-16	16A/300mA	6kA 2P RCBO AC Type 300mA 16A	4	80
XKR 06 2-R0-AC300-20	20A/300mA	6kA 2P RCBO AC Type 300mA 20A	4	80
XKR 06 2-R0-AC300-25	25A/300mA	6kA 2P RCBO AC Type 300mA 25A	4	80
XKR 06 2-R0-AC300-32	32A/300mA	6kA 2P RCBO AC Type 300mA 32A	4	80
XKR 06 2-R0-AC300-40	40A/300mA	6kA 2P RCBO AC Type 300mA 40A	4	80
XKR 06 2-R0-AC300-50	50A/300mA	6kA 2P RCBO AC Type 300mA 50A	4	80
XKR 06 2-R0-AC300-63	63A/300mA	6kA 2P RCBO AC Type 300mA 63A	4	80

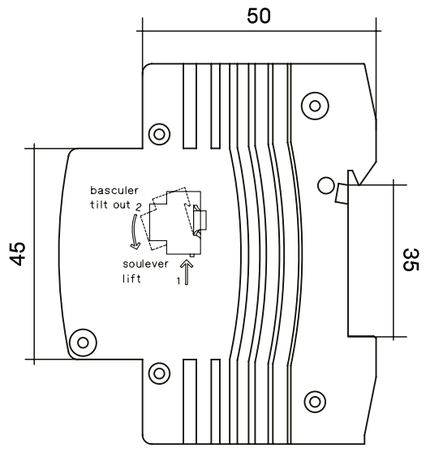
4P



XKR 06 4-R0-AC300-6	6A/300mA	6kA 4P RCBO AC Type 300mA 6A	2	40
XKR 06 4-R0-AC300-10	10A/300mA	6kA 4P RCBO AC Type 300mA 10A	2	40
XKR 06 4-R0-AC300-16	16A/300mA	6kA 4P RCBO AC Type 300mA 16A	2	40
XKR 06 4-R0-AC300-20	20A/300mA	6kA 4P RCBO AC Type 300mA 20A	2	40
XKR 06 4-R0-AC300-25	25A/300mA	6kA 4P RCBO AC Type 300mA 25A	2	40
XKR 06 4-R0-AC300-32	32A/300mA	6kA 4P RCBO AC Type 300mA 32A	2	40
XKR 06 4-R0-AC300-40	40A/300mA	6kA 4P RCBO AC Type 300mA 40A	2	40
XKR 06 4-R0-AC300-50	50A/300mA	6kA 4P RCBO AC Type 300mA 50A	2	40
XKR 06 4-R0-AC300-63	63A/300mA	6kA 4P RCBO AC Type 300mA 63A	2	40

DIMENSIONS

RCBO



Width

Pole	1P+N	2P+N	3P+N	4P+N
Size mm	35	54	80	98

VALID FOR ALL OUR PRODUCTS
2 YEARS WARRANTY

MOULDED CASE CIRCUIT BREAKERS

X Koren Electric Moulded Case Circuit Breakers (MCCBs), with options both with and without coils, offer a wide range of current ratings and limiting features. Thanks to their high breaking capacity, they can be safely used in all electrical systems.

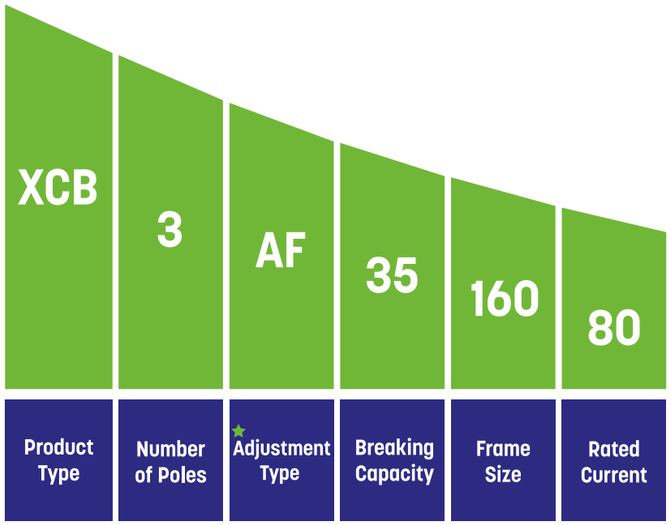
They provide thermal protection in case of overload and magnetic protection in case of short circuits, serving as circuit breakers in distribution and control panels. They ensure reliability with TSE certification and offer extensive accessory support.

With the new 'H Series MCCBs', X Koren Electric delivers enhanced thermal-magnetic adjustment, electronic control options, and a new tripping mechanism, providing high efficiency and safety with 100% Icu-Ics short-circuit breaking capacity.



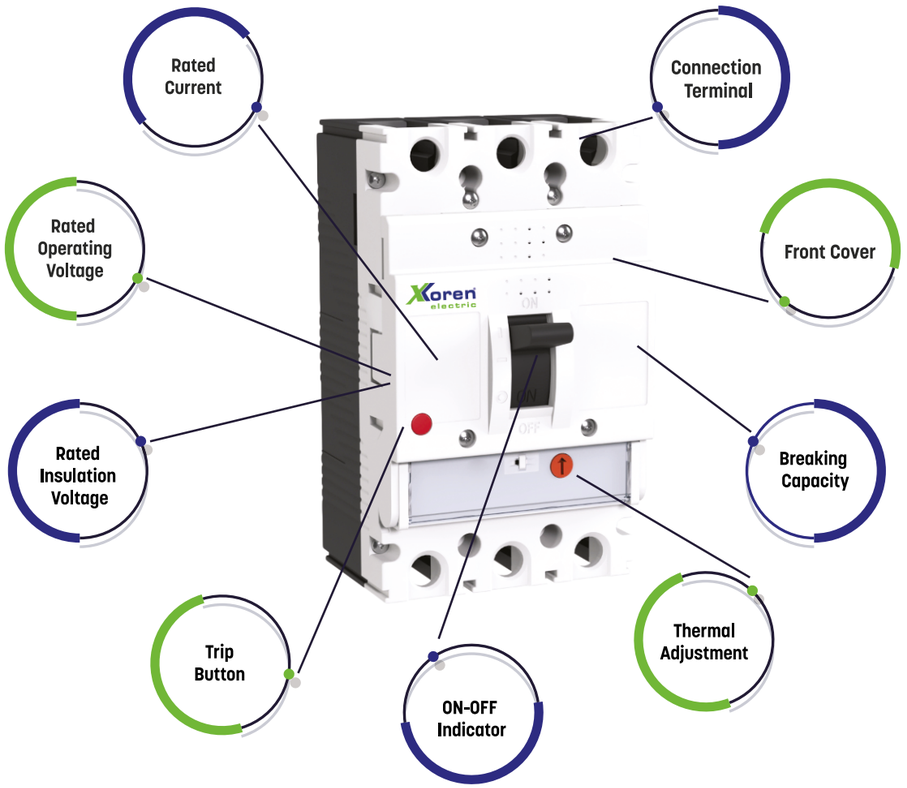


Product Code and Label Information



★ **Adjustment Type**

- **XF:** Without Thermal Protection / Magnetic Fixed Type Circuit Breaker
- **FF:** Thermal Fixed / Magnetic Fixed Type Circuit Breaker
- **AF:** Thermal Adjustable / Magnetic Fixed Type Circuit Breaker
- **AA:** Thermal Adjustable / Magnetic Adjustable Type Circuit Breaker
- **EB:** Electronic Type With Button Thermal Adjustable / Magnetic Adjustable Circuit Breaker
- **EL:** Electronic Type With LCD Thermal Adjustable / Magnetic Adjustable Circuit Breaker



Without Thermal Protected / Magnetic Fixed Type Moulded Case Circuit Breaker (XF Type)



MCCB				XCB-160	XCB-250	XCB-400	XCB-630	XCB-800	XCB-1600
Number of Poles			P	3, 4					
Rated Operating Voltage		Ue	VAC	400					
Rated Insulation Voltage		Ui	V	690					
Rated Impulse Withstand Voltage		Uimp	kV	8					
Operating Frequency			Hz	50 / 60					
Rated Current		In	A	16,20,25,32,40,50, 63,80,100,125,160	200, 250	300, 400	500, 630	800	1000, 1250, 1600
Ultimate / Service	690VAC	Icu/Ics	kA	5/3	5/3	10/7	10/7	10/7	10/7
Short-Circuit	**400VAC**	Icu/Ics	kA	**50/35**	**50/35**	**70/50**	**70/50**	**80/50**	**80/40**
Breaking Capacity	230VAC	Icu/Ics	kA	70/50	70/50	100/70	100/70	100/70	100/70
Category				A, B					
Thermal Adjustment				-					
Magnetic Adjustment				Fixed					
Standards				IEC EN 60947-2					
Operating Temperature			°C	-25....+55					
Storage Temperature			°C	-40....+70					
Electrical Life			op.	2.000	2.000	1.500	1.500	1.000	500
Mechanical Life			op.	8.000	8.000	4.000	4.000	2.500	2.500
Accessories	Shunt Trip Release			✓					
	Under Voltage Release			✓					
	Auxiliary Contact			✓					
	Alarm Contact			✓					
	Motor Mechanism			✓					
	Rotary Handle (Direct)			✓					
	Rotary Handle (Extended)			✓					
	Terminal Cover			✓					
	Phase Barrier			✓					

XCB Thermal Fixed / Magnetic Fixed Type Moulded Case Circuit Breakers (FF Type)



MCCB				XCB-160	XCB-250	XCB-400	XCB-630	XCB-800	XCB-1600
Number of Poles			P	3, 4					
Rated Operating Voltage		Ue	VAC	400					
Rated Insulation Voltage		Ui	V	690					
Rated Impulse Withstand Voltage		Uimp	kV	8					
Operating Frequency			Hz	50 / 60					
Rated Current			A	16,20,25,32,40,50, 63,80,100,125,160	200, 250	300, 400	500, 630	800	1000, 1250, 1600
Ultimate /Service	690VAC	Icu/Ics	kA	5/3	5/3	10/7	10/7	10/7	10/7
Short-Circuit	**400VAC**	Icu/Ics	kA	**50/35**	**50/35**	**70/50**	**70/50**	**80/50**	**80/40**
Breaking Capacity	230VAC	Icu/Ics	kA	70/50	70/50	100/70	100/70	100/70	100/70
Category				A, B					
Thermal Adjustment				Fixed					
Magnetic Adjustment				Fixed					
Standards				IEC EN 60947-2					
Operating Temperature			°C	-25....+55					
Storage Temperature			°C	-40....+70					
Electrical Life			op.	2.000	2.000	1.500	1.500	1.000	500
Mechanical Life			op.	8.000	8.000	4.000	4.000	2.500	2.500
Accessories	Shunt Trip Release			✓					
	Under Voltage Release			✓					
	Auxiliary Contact			✓					
	Alarm Contact			✓					
	Motor Mechanism			✓					
	Rotary Handle (Direct)			✓					
	Rotary Handle (Extended)			✓					
	Terminal Cover			✓					
	Phase Barrier			✓					

GENERAL PRODUCT CATALOG

MOULDED CASE CIRCUIT BREAKERS

Thermal Adjustable / Magnetic Fixed Type Moulded Case Circuit Breakers (AF Ty



MCCB				XCB-160	XCB-250	XCB-630	XCB-1000	XCB-1600
Number of Poles			P	3, 4				
Rated Operating Voltage		Ue	VAC	400				
Rated Insulation Voltage		Ui	V	750				
Rated Impulse Withstand Voltage		Uimp	kV	8				
Operating Frequency			Hz	50 / 60				
Rated Current		In	A	16,20,25,32,40,50, 63,80,100,125,160	200, 250, 300(3P)	300(4P),400, 500, 630	800,1000(3P)	1000(4P), 1250, 1600
Ultimate / Service	690VAC	Icu/Ics	kA	5/5	10/10	10/10	10/10	10/10
Short-Circuit	**400VAC**	Icu/Ics	kA	**25**	**35**	**42**	**36**	**65**
Breaking Capacity	230VAC	Icu/Ics	kA	50/50	70/70	70/70	70/70	100/100
Category				A, B				
Thermal Adjustment				(0.7-1)In			(0.4-1)In	
Magnetic Adjustment				Fixed			Electronic	
Standards				IEC EN 60947-2				
Operating Temperature			°C	-25....+55				
Storage Temperature			°C	-40....+70				
Electrical Life			op.	1.000	1.000	1.000	1.000	1.000	500
Mechanical Life			op.	7.000	7.000	4.000	4.000	4.000	2.500
Accessories	Shunt Trip Release			✓					
	Under Voltage Release			✓					
	Auxiliary Contact			✓					
	Alarm Contact			✓					
	Motor Operator			✓					
	Rotary Handle (Direct)			✓					
	Rotary Handle (Extended)			✓					
	Terminal Cover			✓					
	Phase Barrier			✓					

XCB H Series Thermal Adjustable / Magnetic Fixed Type Moulded Case Circuit Breakers (AF Type)



MCCB				XCB H- 160	XCB H- 250	XCB H-400	XCB H -630	XCB H-800
Number of Poles			P	3, 4				
Rated Operating Voltage			Ue VAC	400				
Rated Insulation Voltage			Ui V	1000				
Rated Impulse Withstand Voltage			Uimp kV	8				
Operating Frequency			Hz	50 / 60				
Rated Current			In A	16,20,25,32,40,50, 63,80,100,125,160	200,250	300, 400,	500, 630	800
Ultimate / Service	690VAC	Icu/Ics	kA	5/5	10/10	10/10	10/10	10/10	10/10
Short-Circuit	**400VAC**			**25/25**	**36/36**	**36/36**	**36/36**	**60/60**	**60/60**
Breaking Capacity	230VAC			50/50	70/70	70/70	70/70	100/100	100/100
Category				A				
Thermal Adjustment				(0.7-1)In				
Magnetic Adjustment				Fixed				
Standards				IEC EN 60947-2				
Operating Temperature			°C	-25....+55				
Storage Temperature			°C	-40....+70				
Electrical Life			op.	1.500	1.500	1.000	1.000	500
Mechanical Life			op.	8.500	8.500	7.000	7.000	2.500
Accessories	Shunt Trip Release			✓				
	Under Voltage Release			✓				
	Auxiliary Contact			✓				
	Alarm Contact			✓				
	Motor Operator			✓				
	Rotary Handle (Direct)			✓				
	Rotary Handle (Extended)			✓				
	Terminal Cover			✓				
	Phase Barrier			✓				

GENERAL PRODUCT CATALOG

MOULDED CASE CIRCUIT BREAKERS

XCB H Series Thermal Adjustable / Magnetic Adjustable Type Moulded Case Circuit Breakers (AA Type)



MCCB				XCB H- 160	XCB H- 250	XCB H-400	XCB H -630	XCB H-800
Number of Poles			P	3, 4				
Rated Operating Voltage			Ue VAC	400				
Rated Insulation Voltage			Ui V	1000				
Rated Impulse Withstand Voltage			Uimp kV	8				
Operating Frequency			Hz	50 / 60				
Rated Current			In A	80,100,125,160	200,250	300,400	500,630	800
Ultimate / Service	690VAC	Icu/Ics	kA	10/10			10/10	
Short-Circuit	**400VAC**			36/36			60/60	
Breaking Capacity	230VAC			70/70			100/100	
Category				A				
Thermal Adjustment				(0.7-1)In				
Magnetic Adjustment				(6-8-10)*In				
Standards				IEC EN 60947-2				
Operating Temperature			°C	-25....+55				
Storage Temperature			°C	-40....+70				
Electrical Life			op.	1.500	1.500	1.000	1.000	500
Mechanical Life			op.	8.500	8.500	7.000	7.000	2.500
Accessories	Shunt Trip Release			✓				
	Under Voltage Release			✓				
	Auxiliary Contact			✓				
	Alarm Contact			✓				
	Motor Operator			✓				
	Rotary Handle (Direct)			✓				
	Rotary Handle (Extended)			✓				
	Terminal Protective Cover			✓				
	Phase Barrier			✓				

XCB H Series Electronic Type With Button Thermal Adjustable / Magnetic Adjustable Type Moulded Case Circuit Breakers (EB Type)



MCCB									
Number of Poles			P	VAC	3, 4				
Rated Operational Voltage		Ue	VAC		400				
Rated Insulation Voltage		Ui	V		1000				
Rated Impulse Withstand Voltage		Uimp	kV		8				
Operating Frequency			Hz		50 / 60				
Rated Current		In	A		125, 160	200, 250	300, 400	500, 630	800	1000, 1250, 1600
Ultimate / Service	690VAC	Icu/Ics	kA		10/10			10/10		10/10
Short-Circuit	**400VAC**				36/36			60/60		65/65
Breaking Capacity	230VAC				70/70			100/100		100/100
Category					B					
Standards					IEC EN 60947-2					
Operating Temperature Range			˚C		-25....+55					
Storage Temperature Range			˚C		-40....70					
Electrical Life			op.		1.000	1.000	1.000	1.000	500	500
Mechanical Life			op.		7.000	7.000	4.000	4.000	2.500	2.500
Long Delay Time		tr	s		12-60-100-150+OFF					
Short-Circuit Protection for Low-Level Fault		Isd	A		(2-12)*Ir					(2-10)*Ir
Short-Time Delay		tsd	s		0,06-0,1-0,2-0,3sn+OFF		0,06-0,1-0,2-0,3-0,4-0,5-1,0sn+OFF			
Accessories	Shunt Trip Release				✓					
	Undervoltage Release				✓					
	Auxiliary Contact				✓					
	Alarm Contact				✓					
	Motor Operator				✓					
	Rotary Handle Mechanism				✓					
	Rotary Handle Mechanism				✓					
	Terminal Protective Cover				✓					
	Phase Barrier				✓					

GENERAL PRODUCT CATALOG

MOULDED CASE CIRCUIT BREAKERS

XCB H Series Electronic With LCD Thermal Adjustable / Magnetic Adjustable Type Moulded Case Circuit Breakers (EL Type)



MCCB					XCB H-250	XCB H-400	XCB H-630	XCB H-800
Number of Poles			P	VAC	3, 4			
Rated Operational Voltage		Ue	VAC		400			
Rated Insulation Voltage		Ui	V		1000			
Rated Impulse Withstand Voltage		Uimp	kV		8			
Operating Frequency			Hz		50 / 60			
Rated Current		In	A		250	400	630	800
Ultimate / Service	690VAC	Icu/Ics	kA		10/10		10/10	
Short-Circuit	**400VAC**				36/36		60/60	
Breaking Capacity	230VAC				70/70		100/100	
Category					B			
Standards					IEC EN 60947-2			
Operating Temperature Range			˚C		-25....+55			
Storage Temperature Range			˚C		-40....+70			
Electrical Life			op.		1.500	1.000	1.000	500
Mechanical Life			op.		8.500	7.000	4.000	2.500
Long Delay Time		tr	s		12-150sec+OFF in 1-second steps			
Short-Circuit Protection for Low-Level Fault		Isd	A		200-3000A in 1A steps	320-4800A in 1A steps	504-7560A in steps of 1A	640-9600A in 1A steps
Short-Time Delay		tsd	s		0.1sec+OFF in steps of 0.02sec			
Accessories	Shunt Trip Release				✓			
	Undervoltage Release				✓			
	Auxiliary Contact				✓			
	Alarm Contact				✓			
	Motor Operator				✓			
	Rotary Handle Mechanism				✓			
	Rotary Handle Mechanism				✓			
	Terminal Protective Cover				✓			
	Phase Barrier				✓			

General Information

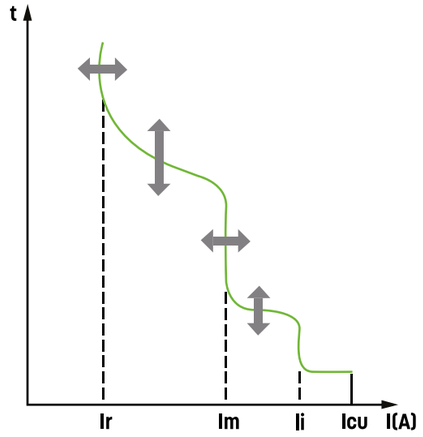


XKoren moulded case circuit breakers are devices designed to ensure the safety of electrical circuits by providing protection against electrical faults such as overload, short circuit, and ground leakage current. As critical safety components in electrical systems, molded case circuit breakers incorporate both thermal and magnetic trip mechanisms. The thermal trip mechanism detects overheating caused by excessive current and disconnects the circuit, while the magnetic trip mechanism rapidly interrupts the circuit in case of sudden short-circuit currents, ensuring effective protection.

Electrical Parameters of Moulded Case Circuit Breakers

According to the **TS EN 60947-2** standard, some key electrical parameters related to moulded case circuit breakers are as follows.

Voltage (V)	Ue	Rated Operational Voltage
	Ui	Rated Insulation Voltage
	Uimp	Rated Impulse Withstand Voltage
Current (A)	In	Rated Current
	Ith	Rated Thermal Current
Short Circuit (kA)	Icm	Short Circuit Making Capacity
	Icu	Ultimate Short Circuit Breaking Capacity
	Ics	Service Short Circuit Breaking Capacity
	Icw	Rated Short-Time Withstand Current
Trip Unit	Ir	Adjustable Overload Current
	1.05xIr	Overload No-Trip Current
	1.30xIr	Overload Trip Current
	Ii	Instantaneous Trip Current
	Isd	Short-Time Trip Current



- **Ir:** Overload setting current
- **Im:** Delayed setting current in short circuit
- **Ii:** Instantaneous tripping current
- **Icu:** Ultimate short circuit breaking capacity

Short Circuit Breaking Capacities in Moulded Case Circuit Breakers (Icu, Ics, Icw)

Moulded case circuit breakers are circuit breakers that serve the function of safely interrupting and limiting short circuit currents in electrical systems. The short circuit breaking capacities are defined by three key parameters: the ultimate short-circuit breaking capacity (Icu), the service short-circuit breaking capacity (Ics), and the rated short-time withstand current (Icw).

Ultimate Short Circuit Breaking Capacity (Icu)

Icu (Ultimate Breaking Capacity) is the maximum short-circuit current that the moulded case circuit breaker can interrupt twice consecutively (O (Open) - t (time) - CO (Close/Open)) at the manufacturer's rated operational voltage. This capacity refers to the highest short-circuit current that the circuit breaker can safely interrupt and is specified in terms of the effective value (rms).

Test Sequence:

Open (O): First interruption of the short-circuit current.

Time (t): The time it takes for the circuit breaker to recover.

Close/Open (CO): The circuit breaker is closed and then opened again to interrupt the same short-circuit current a second time.

Note: After the Icu test, the moulded case circuit breaker is not expected to continue carrying the rated current, but it should have completed the interruption process.

Service Short Circuit Breaking Capacity (Ics)

Ics (Service Breaking Capacity) is the maximum short-circuit current that the moulded case circuit breaker can interrupt three times consecutively (O - t - CO - t - CO) at the rated operational voltage.

Test Sequence:

- **Open (O):** First interruption of the short-circuit current.
- **Time (t):** The recovery time of the circuit breaker (at least 3 minutes).
- **Close/Open (CO):** The second interruption of the short-circuit current.
- **Time (t):** The waiting time after the second interruption.
- **Close/Open (CO):** The third open-close operation.

Note: After the Ics test, the moulded case circuit breaker must be able to carry its nominal current.

Relationship Between Ics and Icu:

Ics is typically specified as a percentage of Icu, such as 50%, 75%, or 100%.

The Ics value must be at least 25% of Icu. XKoren H series moulded case circuit breakers have an Ics value of 100% of Icu.

Rated Short-Time Withstand Current (Icw)

Icw (Short-Time Withstand Current) is the short-circuit current value that the moulded case circuit breaker can withstand for a specified duration under defined test conditions without sustaining any damage. It is given in effective value (rms).

Test Conditions and Delay Time:

The Icw value refers to the current that the moulded case circuit breaker can withstand during a specified delay time, aimed at delaying instantaneous tripping under short-circuit current.
Preferred delay times:
0.05 sec, 0.1 sec, 0.25 sec, 0.5 sec, 1 sec.

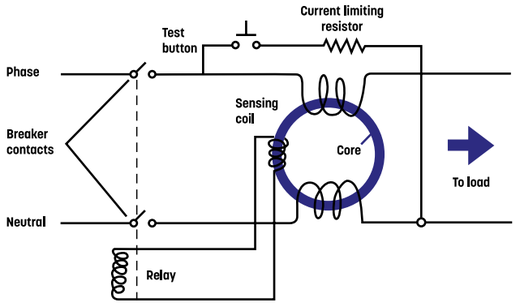
In Rated Current (A)	The lowest value of the rated short-time withstand current (Icw) (kA).
In≤ 2500 In>2500	The value greater than 12 times the rated current (In) or 5 kA is 30 kA.

The Icw value must not be lower than the minimum values specified to ensure that the moulded case circuit breaker operates in harmony with protection relays and overcurrent systems. It refers to the capacity of the moulded case circuit breaker to withstand short-circuit current for a certain period of time without damage and is directly related to the delayed protection settings.

As a result, Icu specifies the maximum short-circuit current that the moulded case circuit breaker can interrupt, and no condition to carry the rated current after opening and closing is required. Ics is the value that the breaker must carry the rated current after a specific number of opening and closing operations and is calculated as a percentage of Icu. These parameters are the most critical technical features determining the short-circuit performance of moulded case circuit breakers and are essential to provide safe and effective protection in electrical systems. The main functions of moulded case circuit breakers are as follows:

- **Opening and closing the circuit:** Enables the control of the electrical circuit and the opening/closing operations.
- **Protection against overloading:** Prevents damages caused by excessive current in the electrical circuit.
- **Protection against short-circuit currents:** Prevents the flow of high current during short circuits and ensures the safety of the system by interrupting the circuit.

• **Protection against earth leakage currents:** Provides protection against earth leakage currents through the combination of leakage current relay and toroidal transformer.



Technical Specifications

The technical specifications of XKoren moulded case circuit breakers are as follows:

• **Rated Current Range:** Operates within a current range from 16 A to 1600 A.
• **Rated Insulation Voltage:** Provides rated insulation voltage up to 750 V AC, indicating high insulation strength of the device.
• **Number of Poles:** Available in 3-pole or 4-pole options, ensuring compatibility with different circuit configurations.
• **Short-Circuit Breaking Capacity:** Offers high short-circuit breaking performance with capacities ranging from 25, 35, 36, 42, 50, 60, 65, 70 and 80 kA (Icu).
• **Rated Impulse Withstand Voltage:** Provides rated impulse withstand voltage up to 8 kV, offering high resistance to lightning strikes and sudden voltage fluctuations.
• **Accessory Options:** A wide range of accessories to adapt to various applications, providing ease of use and customizable features.
• **Limiting Feature:** The high-current limiting feature ensures safe interruption of excessive currents in the circuit without damaging the device or the system.
• **Alloy Silver Contacts:** Long-lasting and reliable performance is achieved by using alloy silver contacts, ensuring high durability and conductivity.
• **Material Quality:** The cover and body are made from BMC (Bonded Material Composite) material with high electrical and mechanical properties, enhancing the durability and safety of the device.

Moulded Case Circuit Breaker Types and Protection Features

XKoren moulded case circuit breakers are classified according to different protection types: XF, FF, AF, AA, EL, EB.

XF,FF and AF Type- Basic Protection, Compact and Reliable Solution

XKoren XF, FF and AF type moulded case circuit breakers (MCCBs) provide fast and reliable protection against overload and short circuits with fixed thermal and/or magnetic trip mechanisms.
•**XF Type:** Includes only magnetic protection. Ideal for high inrush current systems (such as motors) where thermal protection is not required.
•**FF Type:** Equipped with a fixed thermal / fixed magnetic protection. It is a cost-effective and durable solution for residential, commercial, and industrial applications.
•**AF Type:** Moulded case circuit breakers with adjustable thermal and fixed magnetic protection, designed for reliable performance under varying load conditions. Offers breaking capacities up to 65 kA at 400 VAC, and complies with IEC EN 60947-2 standards. Suitable for both residential and industrial applications requiring precise protection settings.
XF, FF and AF type comply with IEC/EN 60947-2 standards and stand out with their compact design, and high short-circuit breaking capacities (Up to 80 kA at 400 VAC).

H Series AF, AA, EB, EL Type - Advanced Protection and Flexible Settings

XKoren H series AF, AA, EB, and EL type MCCBs offer enhanced system security with adjustable thermal and magnetic settings, high breaking capacities, and advanced features.
•**H Series:** Specially designed for harsh environmental and industrial conditions; this series offers high durability and long service life.
•**AF Type:** Provides precise protection under different load conditions with adjustable thermal + fixed magnetic trip settings.
•**AA Type:** Features adjustable thermal and magnetic trip levels, allowing optimal compatibility with various load profiles.

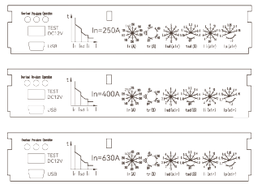
•**EB and EL Type:** The EB (Electronic Button) type features electronic protection settings that are adjusted via push buttons, offering precise control for long-time, short-time, instantaneous, and ground fault protection. In contrast, the EL (Electronic Display) type integrates an LCD screen for easier parameter adjustment and advanced fault diagnostics. Both types comply with IEC/EN 60947-2 and offer high breaking capacities up to 65 kA at 400 VAC. Designed for demanding applications, they provide reliable performance with configurable delay settings and comprehensive accessory options.
These MCCB series are ideal for industrial facilities, panel systems, motor protection, infrastructure, and commercial projects, offering flexible usage and maximum safety.

Selection of Electronic Button Moulded Case Circuit Breakers

Key criteria for selecting a molded case circuit breaker expected to provide effective and safe protection include:

• Rated current (In)
• Rated insulation voltage (Ui)
• Rated maximum short-circuit current (Icu)
• Ambient temperature
• Characteristics of the load to be protected
• Additional features (remote tripping, protection against leakage currents, undervoltage protection, remote on/off, etc.)

By correctly identifying these criteria, a moulded case circuit breaker can meet the expected protection and other functions.



Ir: Overload long delay setting current
tr: Overload long delay setting time
Isd: Short circuit delay setting current
tsd: Short circuit delay setting time
Ii: Short circuit instantaneous setting current
IRN: Short circuit short delay setting time alarm
Ready: Operation light
Alarm: Alarm light
>90%Ir: Pre-alarm light
>105%Ir: Overload alarm light
LSI: Three-stage protection light



Moulded Case Circuit Breaker Components and Functions:

• **Body:** The main structure that houses all the components and protects them from external factors.
• **Contacts:** In moulded case circuit breakers, contacts are the primary components responsible for transmitting current to the circuit and performing the switching (on/off) operation. Contacts are made from materials designed to ensure high electrical conductivity. During operation, the contacts move to open or close the circuit, ensuring the safe transmission or interruption of high currents. The quality and design of the contacts are crucial factors that directly affect the circuit breaker's long-term and reliable operation. Additionally, thanks to proper material selection and design, contacts ensure safe switching even under high voltage and current conditions.

• **Moving and Fixed Bars:** These are the main components of the moulded case circuit breaker that conduct electrical current and operate with magnetic forces. The moving bar moves during the opening and closing operations, opening or closing the circuit. The fixed bar supports this movement, provides electrical conductivity, and ensures the safe connection or separation of contact surfaces during high current passage. The design of the bars is a critical
factor that affects the switching capacity and lifespan of the circuit breaker.

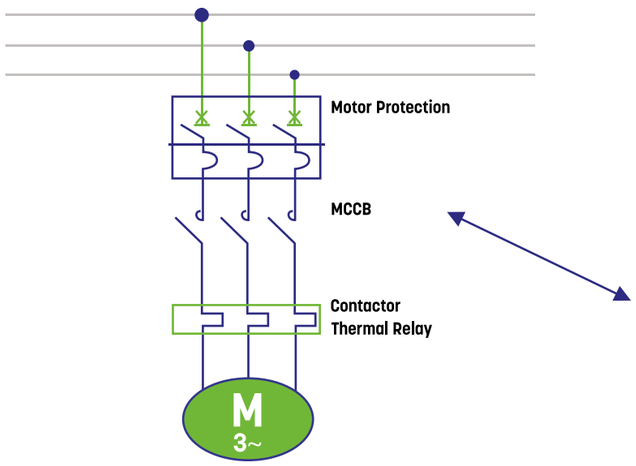
• **Spring Mechanism:** This component ensures the rapid opening and closing of the contacts. For proper operation, the spring mechanism separates the contacts at a specific speed to interrupt the current and safely open the circuit. Additionally, during closing, the springs quickly bring the contacts together by applying the correct tension. This mechanism optimizes the opening and closing times of the circuit breaker and improves performance.

• **Arc Separator:** The arc separator safely extinguishes the arc formed when the circuit breaker is opened and prevents its spread. Arc formation occurs due to electrical sparks between contact surfaces when the circuit breaker opens, which can cause severe damage. The arc separator ensures that the arc is quickly extinguished, preventing excessive heating and potential damage to the system. This element increases the safety of the circuit breaker and helps protect other components in the circuit.

• **Bi-metal (Bimetallic Strip):** A component used to interrupt the circuit in case of overcurrent. Bi-metal consists of two metals with different thermal expansion coefficients joined together, which bend as they heat up. During an overcurrent situation, the strip bends due to eating, separating the contacts and interrupting the circuit. This mechanism allows the circuit breaker to quickly open under overload or short-circuit conditions, ensuring the safety of the electrical system.

• **Reset Mechanism:** This mechanism is used to manually open and close the circuit breaker. Through this mechanism, the user can operate the circuit breaker as desired. The reset mechanism provides control over the circuit breaker and ensures its compatibility with
automatic on/off functions. Manual resetting also plays an important role in the maintenance and repair processes of the circuit breaker.

• **Connection Terminals:** These are the input and output terminals that allow the circuit breaker to be connected to the circuit. The terminals integrate the circuit breaker into the electrical circuit and ensure the safe transmission of energy. Typically, the terminals hold electrical conductors with screw connections, providing a secure connection that is unaffected by external factors like overcurrent or vibration.





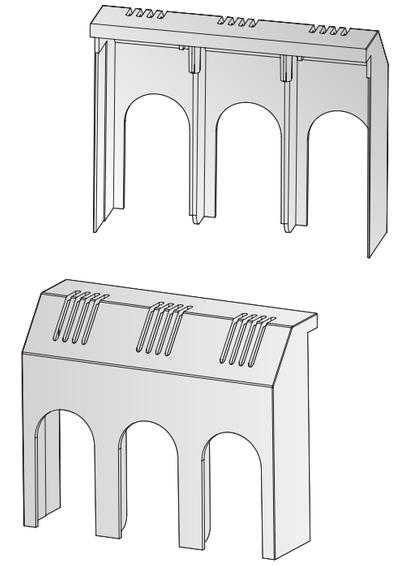
GENERAL PRODUCT CATALOG

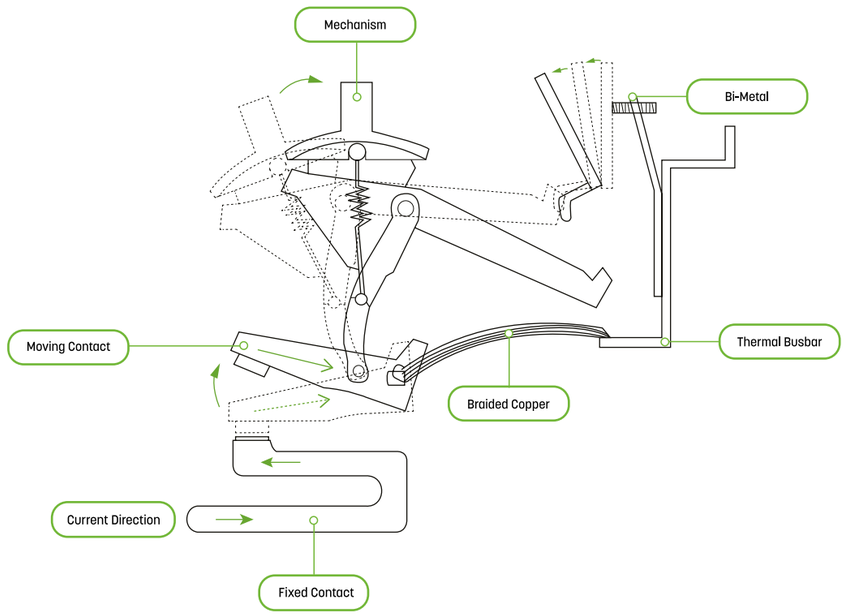
MOULDED CASE CIRCUIT BREAKERS

Terminal Cover:

Prevents arcing between phases and short circuits, increasing the surface arc path length. It also provides protection against human contact and external impacts. This cover ensures the circuit breaker is protected from external factors, thus enhancing operator safety. Additionally, the cover increases the circuit breaker's resistance to environmental factors, improving its long-term durability.

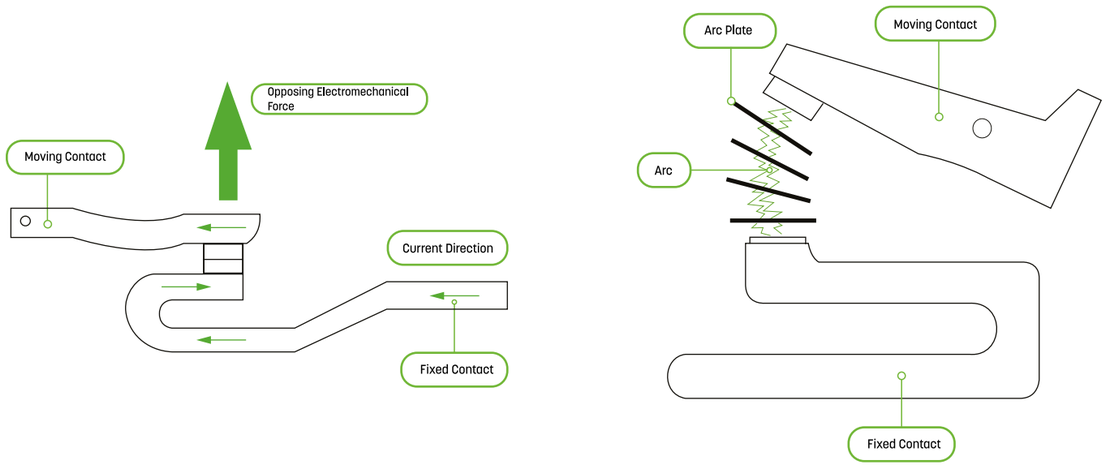
• **High Safety:** Made from thermoplastic material, it prevents arc formation and phase to phase arcing.
• **Insulation and Protection:** By covering the terminal area of the moulded case circuit breaker, it minimizes the risk of human contact and the likelihood of short circuits caused by external impacts.
• **Environmental Durability:** Provides protection against external factors such as dust, dirt, and moisture, ensuring long-lasting and reliable connections.
• **Corrosion Prevention:** Prevents oxidation of metal terminals, enhancing the system's performance.
• **Neat and Aesthetic Design:** Offers a more organized appearance in electrical panels





Limiter:

It is the mechanism in moulded case circuit breakers that ensures the contacts open more quickly during a short circuit. The limiter rapidly detects sudden current surges in the circuit and shortens the contact opening time, helping to limit the effect of the short circuit current. This prevents the contacts from overheating and malfunctioning, enhancing the safety of the circuit breaker. The limiter optimizes the opening speed of the breaker, performing a quick disconnection and preventing system damage due to short circuits.

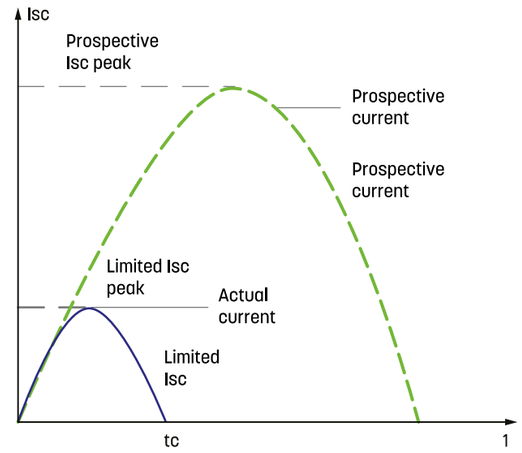


High Current / Limiting Relationship:

XKoren circuit breakers, thanks to their advanced current limiting technology, have a high currentlimiting capacity. The limiter feature prevents the current from exceeding a certain level during conditions such as high inrush currents, sudden current surges, or short-circuit currents, thereby protecting system components from excessive current damage. This system works with special arc chambers and a fast tripping mechanism within the breaker. During a short-circuit event, the contacts of the breaker open within milliseconds to interrupt the current and extinguish the generated arc energy through special plates. As a result, the short-circuit current transferred to the grid is significantly limited, and the response time of thermal-magnetic protection mechanisms is optimized, providing a safer tripping operation. This feature is critical for industrial plants, commercial buildings, and sensitive electrical systems. It not only enhances system safety but also contributes to the longevity of equipment, minimizes downtime, and improves operational efficiency.

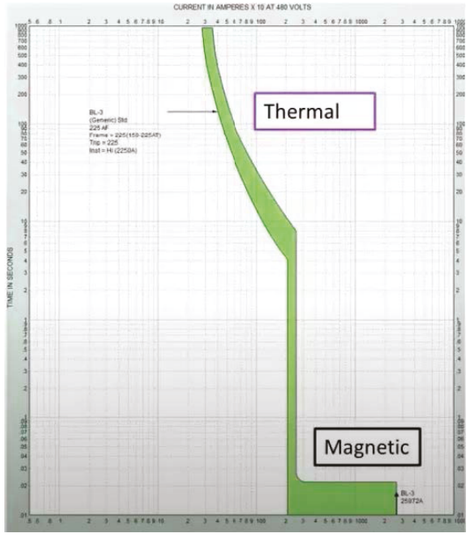
Protection Feature Under Short-Circuit Conditions:

XKoren circuit breakers effectively protect electrical systems against overcurrent conditions thanks to their advanced short-circuit protection mechanisms. High currents generated during a short-circuit event can cause significant thermal and mechanical stresses on system components. In such cases, XKoren breakers quickly trip the circuit within milliseconds using instantaneous trip and current limiting features, preventing equipment damage and enhancing system safety.



Operating Principle and Protection Mechanisms Thermal-Magnetic Protection

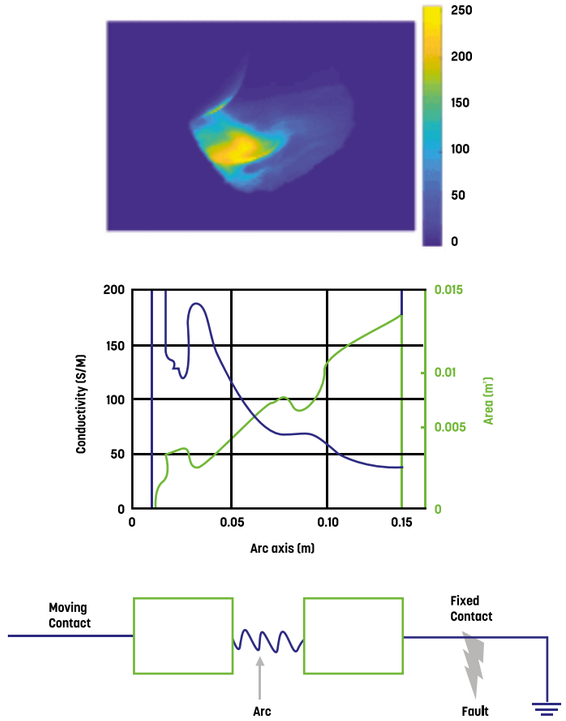
- **Thermal Protection:** In the event of overcurrent, the bimetallic element inside the breaker heats up and triggers the tripping mechanism after a certain time delay. This feature provides protection against overload currents.
- **Magnetic Protection:** Since short-circuit currents occur suddenly and at high levels, the breaker's magnetic protection mechanism is activated to initiate instantaneous tripping. Triggered by an electromagnet, this mechanism minimizes the short-circuit duration, ensuring the safety of the system.



The TCC (Time-Current Characteristic) graph clearly shows the thermal and magnetic tripping behaviors. The thermal element responds faster as the current level increases, causing the breaker to open the circuit in a shorter period as the current rises. Magnetic tripping activates instantly when a certain current threshold is exceeded, typically opening the circuit within 0.02 seconds.

Arc Extinguishing and Current Limiting Technology

- **The high-energy arc** formed during a short circuit is quickly controlled and dispersed thanks to **specially designed arc chambers and extinguishing plates.**
- **Current limiting technology** significantly reduces the current level during a short circuit, **minimizing mechanical and thermal damage to conductors and other electrical components.**



Selectivity and Coordination

• XKoren moulded case circuit breakers are designed to work in harmony with both lower and upper-level protection devices according to the principle of selectivity. This ensures that only the faulty section is disconnected, allowing the rest of the system to continue operating.
• Time delay and instantaneous tripping settings optimize protection coordination, preventing false trips and minimizing outage times.

Advantages and Industrial Applications

• Rapid intervention against sudden short circuit currents enhances system security and durability.
• The current limiting feature reduces the load on the network during a short circuit, extending the life of equipment.
• The principle of selectivity ensures continuity in critical systems while preventing unnecessary power outages.
• Provides reliable protection in industrial plants, commercial buildings, energy distribution centers, and environments with sensitive electronic devices.

With these advanced short circuit protection mechanisms, XKoren moulded case circuit breakers offer high standards in terms of safety, durability, and efficiency, playing a critical role in modern electrical systems.

Protection states in moulded case circuit breakers under overcurrent conditions, a moulded case circuit breaker must perform two main protection functions:

1. Protection against overload conditions
2. Protection against short circuit conditions

XKoren moulded case circuit breakers are developed to provide safe protection against both overload and short circuit conditions. These breakers play a critical role in ensuring the safety of electrical circuits and provide reliable protection, especially in industrial systems. Now, let's take a
closer look at how these breakers provide protection under overload conditions and their short circuit protection functions.

1. Protection Against Overload Conditions
Overload protection ensures that the circuit is automatically opened when the current exceeds the device's carrying limits, preventing system damage. This is critical for motors, generators, distribution lines, and other electrical devices. The circuit breaker interrupts the circuit under overload conditions to prevent faults caused by overheating or overloading due to excessive current. This helps maintain the system's longevity and safe operation.

• Adjustable Overload Current (Ir)
The effectiveness of overload protection is achieved through adjustable overload current (Ir). Ir is determined as a function of the rated current (In) of the breaker, and by selecting a specific value, the overload current levels can be adjusted. This adjustment can be customized based on varying load conditions and the system's requirements. Ideally, Ir is set between 110% and 125% of the rated current. This value typically triggers the circuit breaker
to open when there is a buildup of loads exceeding the device's nominal capacity.

Conditions for Tripping and Not Tripping Under Overcurrent Conditions
According to TS EN 60947-2 standard, Section 7.2.1.2.4, the conditions for tripping and nottripping under overcurrent conditions are subject to specific time delays. Based on the inverse time delay operation principle:

Rated Current (A)	Non-Tripping Time (1.05In)	Tripping Time (1.30xIn)
≤63	1 hour	1 hour
>63	2 hours	2 hours

Tripping Time: As the level of overcurrent increases, the breaker's tripping time decreases. In other words, once the current exceeds a certain level (Ir), the time to open the circuit speeds up. This ensures protection of the system in cases of sudden overloads.

Non-Tripping Time (Delayed Operation): In situations where the overload condition is less critical, the breaker allows a certain delay before tripping the circuit. This ensures the system continues to operate during temporary and short-term overloads. However, if the overload persists for a prolonged period, the breaker will interrupt the circuit.

This inverse time delay protection ensures that the system is not affected by temporary overloads while also allowing safe disconnection in cases of prolonged overloading.

2. Protection Against Short-Circuit Conditions

Short-circuit protection detects short-circuit currents in the system and rapidly interrupts the circuit to protect it. Short-circuit conditions are among the most dangerous situations in electrical systems, and short-circuit currents can suddenly reach very high levels. In such cases, the magnetic tripping mechanism of the breaker is activated to protect the circuit and prevent damage to other
components.

• Magnetic Tripping Mechanism
During a short circuit, the current rises very quickly, triggering the breaker's magnetic mechanism to cut the circuit. This magnetic protection provides an immediate response to rapid current increase, ensuring the device opens quickly. In the event of a short circuit, the circuit is usually interrupted within a few milliseconds, preventing further damage.

Applications and Protection Mechanisms of Moulded Case Circuit Breakers

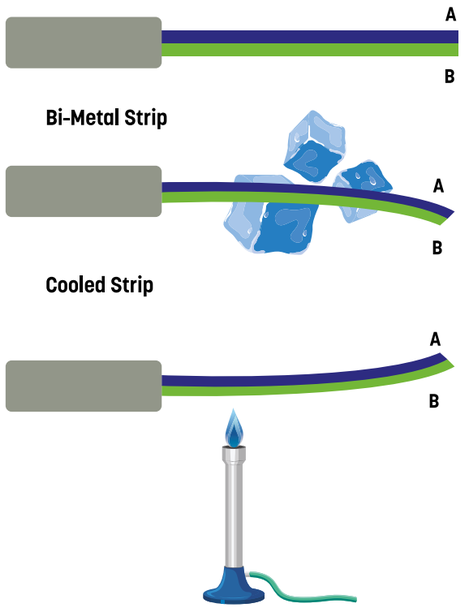
• Adjustable Overload Current (Ir) and Thermal Protection Mechanism
In moulded case circuit breakers, the adjustable overload current (Ir) is proportional to the rated current (In) and is a critical parameter for determining the opening and non-opening limits under overload conditions. According to TS EN 60947-2, Section 7.2.1.2.4, the tripping and non-tripping tests under overcurrent conditions must be performed in accordance with the inverse time delay operation principle of the breaker.

Overcurrent Conditions Opening and Non-Opening Test
The test should be conducted with all poles of the moulded case breaker energized and at reference temperature.

If the test environment differs from the reference temperature, the test current must be recalculated using a temperature correction factor based on the temperature balancing table.

Moulded case circuit breakers overload protection mechanisms are typically calibrated for a 40°C ambient temperature and undergo verification tests at this temperature.

Thermal Protection and Bi-Metal Mechanism
In moulded case circuit breakers with thermal-magnetic trip mechanisms, overload protection is provided by using a bi-metal material. Bi-metal consists of two metals with different thermal expansion coefficients and triggers the circuit opening mechanism during overload conditions.



Heating and Bending:
Due to prolonged current flow above the nominal level, the bi-metal strip expands and triggers the mechanical tripping mechanism, disconnecting the circuit.

Inverse Time Delay Tripping:
The thermal protection mechanism operates with a delay depending on the current level. As the current level increases, the tripping times shorten, ensuring protection against overload.

Temperature Compensation:
Changes in ambient temperature can affect the operating characteristics of the bi-metal strip. These variations are balanced through compensation mechanisms, allowing the circuit breaker to operate stably under different conditions.
In this way, the moulded case circuit breaker minimizes thermal stress caused by overloads and ensures the continuous and safe operation of electrical systems.

Rated Current (A)	0°C	5°C	10°C	15°C	20°C	25°C	30°C	40°C	50°C	60°C
25	31	30	29	30	29	28	25	24	22	22
32	40	39	38	37	36	35	34	33	30	28
40	49	47	46	45	44	43	42	40	38	35
50	61	59	58	56	55	54	53	51	48	44
63	76	74	72	71	69	68	66	64	60	57
80	98	96	94	92	90	88	86	83	78	75
100	122	120	118	116	113	111	109	106	100	96
125	149	147	144	142	139	136	134	131	124	119
160	190	186	183	181	178	175	172	169	160	154
200	240	234	230	226	223	219	216	212	201	194
250	301	294	287	280	276	271	267	263	249	240
315	379	370	362	354	346	338	332	327	309	298
400	482	471	459	452	446	439	431	424	399	380
500	617	602	590	569	556	545	534	524	491	480
630	777	753	740	719	700	688	675	663	620	605
800	993	882	860	850	840	800	780	760	740	755

Applications of Moulded Case Circuit Breakers

Industrial Applications
Moulded case circuit breakers are widely used in factories and production facilities to protect machinery, production lines, and power distribution networks. In such applications, they ensure the safety of devices against hazards like overcurrent, short circuits, and overvoltage.

Building Electrical Systems
Moulded case circuit breakers are used in residential buildings, commercial properties, offices, and shopping malls to ensure the safety of electrical systems. These devices protect power distribution lines and electrical equipment, reducing fire risks and extending the electrical life of devices.

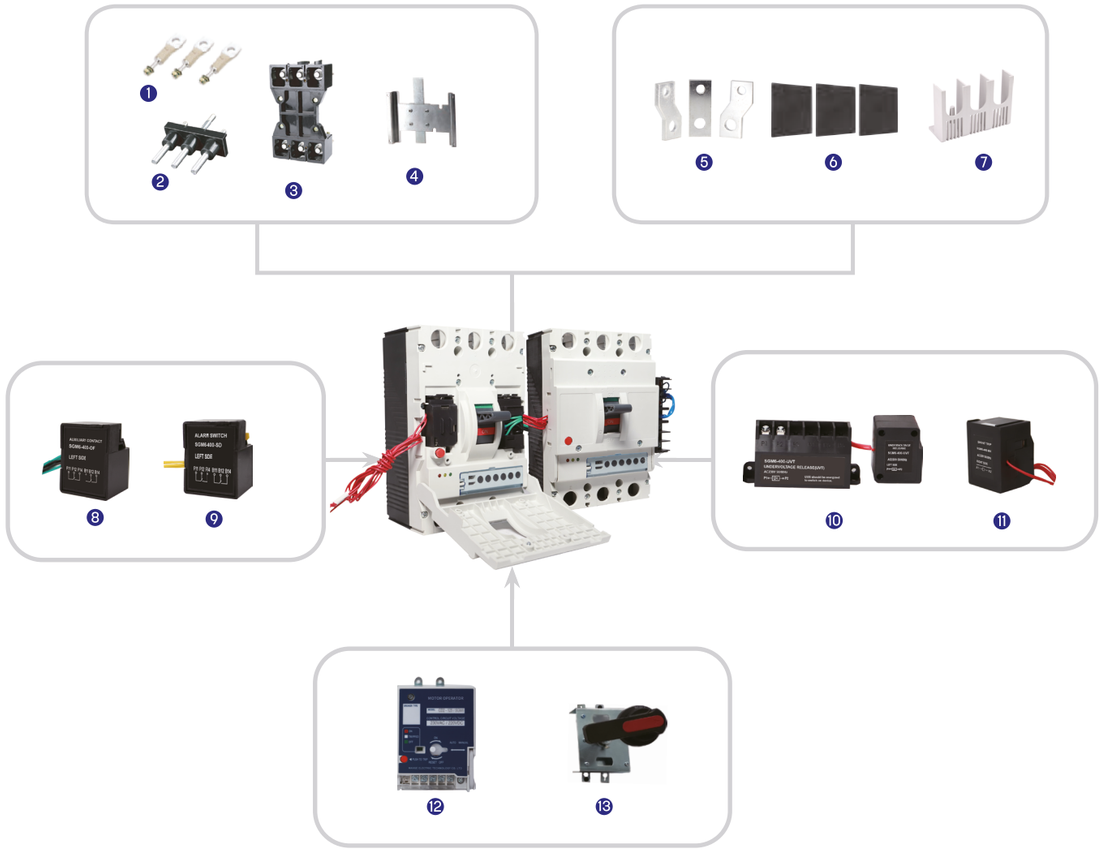
Power Distribution and Traffic Management
Moulded case circuit breakers are utilized to safely distribute electrical energy and protect highvoltage infrastructure. Faults that may occur in high-voltage lines are quickly detected and isolated by circuit breakers, preventing power outages and equipment damage.

Motor Control Systems
Moulded case circuit breakers are preferred for protecting electric motors from overcurrent, undervoltage, phase loss, and other faults. These systems ensure the efficient operation of motors while preventing potential failures.

Motor Protection
Moulded case circuit breakers play a crucial role in protecting electric motors. Motors can be damaged due to conditions such as overcurrent, overheating, phase loss, or undervoltage. Moulded case circuit breakers safeguard motors from such faults, ensuring efficient operation and extending their lifespan. Additionally, they offer adjustable thermal and magnetic protection features according to the motor's operating conditions.

Technical Specifications	Description
Rated Current	The breaker's rated current should be suitable for the circuit it will protect.
Short-Circuit Breaking Capacity	The breaker must be capable of interrupting the highest possible current in the circuit.
Rated Operating Voltage	A breaker model should be selected according to the operating voltage of the circuit.
Number of Poles	The breaker must have the appropriate number of poles for 3-phase or 4-phase systems.
Overcurrent and Short-Circuit Protection	The thermal and magnetic protection features must be suitable for the system.
Mounting Type	The breaker type should be selected based on whether it will be panel-mounted or surface-mounted.
Accessories	Additional accessories such as auxiliary contacts and remote switching modules should be specified when ordering.
Compliance with Standards	The breaker's compliance with national and international standards should be verified.

H Series Accessories



1. Fixed Rear Connection
2. Plug-in Rear Connection
3. Plug-in Front Connection
4. Mechanical Lock
5. Extension Bar
6. Phase Barrier
7. Terminal Cover
8. Auxiliary Contact
9. Alarm Contact
10. Undervoltage Release
11. Shunt Trip Release
12. Motor Mechanism
13. Rotary Handle

GENERAL PRODUCT CATALOG

MOULDED CASE CIRCUIT BREAKERS

Auxiliary Contact



An Auxiliary Contact is an accessory connected to the auxiliary circuit of the switching device. It is used to indicate whether the circuit breaker is in the ON or OFF position.

Accessory Name	ON	OFF / Trip
Auxiliary Contact	F12 — F11 F14	F12 — F11 F14

Electrical Parameters			
Conventional Thermal Current		3A	
Utilization Category		AC 15	DC 13
Operating Frequency 50 Hz	AC 400V	0.3A	
	AC 220V		0.15A

Alarm Contact



An accessory used to indicate whether the circuit breaker is in the ON or OFF position. When the alarm contact indicates that the circuit breaker is in the **Trip** state, there are five possible causes:

- Overload or short-circuit fault.
- Shunt release operation.
- Residual current fault.
- Line fault and undervoltage release operation.

Electrical Parameters			
Accessory Name	ON	OFF / Trip	
Alarm Contact	F12 — F11 F14	F12 — F11 F14	

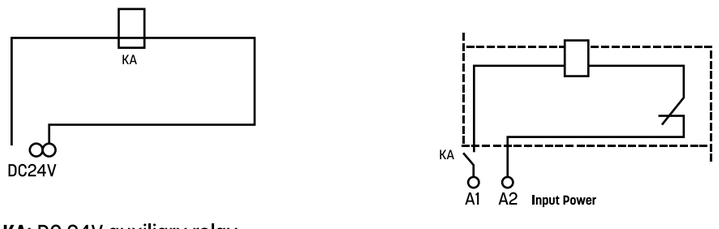
Electrical Parameters			
Conventional Thermal Current		3A	
Utilization Category		AC 15	DC 13
Operating Frequency 50 Hz	AC 400V	0.3A	
	AC 220V		0.15A

Shunt Trip Release



The **shunt trip release** must reliably trip the compact circuit breaker at voltages between **70% and 110%** of the rated operating voltage (Ue). After the moulded case circuit breaker is tripped by the shunt trip coil, it must be manually reset in the field.

Electrical Wiring Diagram



KA: DC 24V auxiliary relay, with a contact current rating of 1A.

Undervoltage Release



Under Voltage Release:

- The circuit breaker must reliably trip at voltages between 35% and 70% of the rated operating voltage.
- It should allow the circuit breaker to trip at voltages between 85% and 110% of the rated operating voltage.
- It must prevent the circuit breaker from tripping when the voltage drops below 35% of the rated operating voltage.

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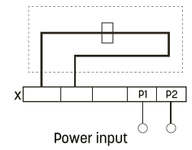
MOULDED CASE CIRCUIT BREAKERS

Electrical Wiring Diagram



Note: X-Terminal block
Note: In the discontinuous box, it is the connection diagram for the accessories of the circuit breaker.

Mechanical Locking



Mechanical Locking is designed to prevent both power sources from being connected to the load simultaneously. The locking system mechanically prevents a circuit breaker from moving from the closed position, thereby disabling the breaker as long as the other circuit breaker is in the open position.

Rear Connection



It is easy to install and connect products at the rear connection.

Phase Barrier



Intermediate phase barriers can enhance the insulation performance between phases. Even when the products are mounted, installation can be performed from the front of the product. Intermediate phase barriers will be provided as standard: **4 pieces** for 3P products and **6 pieces** for 4P products.

Terminal Cover



Protection Degree: IP30
Protects against contact with the main circuit.

Rotary Handle



Rotary Handle Operating Mechanism

The moulded case circuit breaker can be operated by turning the handle, and the ergonomically designed rotary handle makes the operation of the circuit breaker more flexible.

User Visualization Information/Adjustment:

- **3-position indicator:** OFF, ON, and TRIP.
- The circuit breaker cannot be operated when the door is open.
- The door cannot be opened when the circuit breaker is in the ON position.
- The extended handle axis length can be specially produced according to the distance from the back of the circuit breaker to the door.

Manual Operation: Operate 180° clockwise only. Do not operate counterclockwise.

- Withstand Voltage Test:

The test should be performed between the incoming terminals P1 and P2, excluding terminals S1, S2, and S4.

For power frequency withstand voltage testing, apply 1890 V.

Note: Withstand voltage testing is prohibited when the rated voltage is DC 24 V.

- Electrical Operation Restrictions:

During electrical operation, P1 and P2 must not be connected to terminals S1, S2, or S4.

Motor Mechanism:



Used for remote electrical closing, opening, and re-tripping of the circuit breaker in automated control applications.

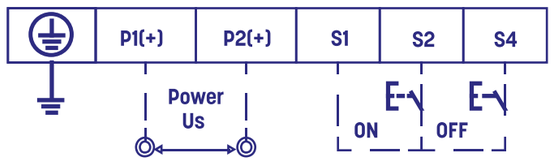
- **Rated Voltage of the Electric Operating Mechanism:**

AC 400 V, AC 230 V / DC 220 V, AC/DC 110 V, DC 24 V

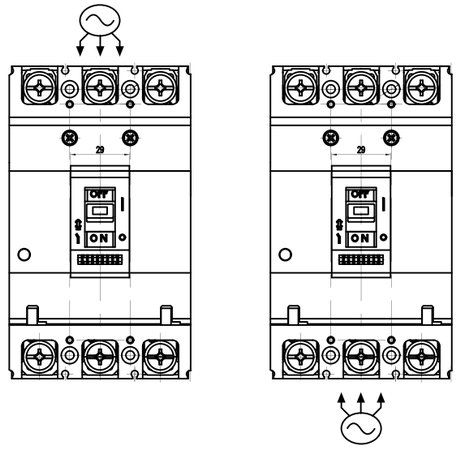
- **Operating Voltage Range:**

85% - 110% of the rated operational voltage (Ue)

Electrical Wiring Diagram



Note



XKoren MCCBs allow for line connections from both the top and bottom terminals. Nevertheless, top terminal connections are preferred to ensure proper operation and enhanced safety.

GENERAL PRODUCT CATALOG

MOULDED CASE CIRCUIT BREAKERS

XFC Residual Current Protected Moulded Case Circuit Breaker



MCCB				XFC-125	XFC-250	XFC-400
Number of Poles		P		4		
Rated Operational Voltage		Ue	VAC	400		
Rated Insulation Voltage		Ui	V	1000		
Rated Impulse Withstand Voltage		Uimp	kV	8		
Operating Frequency			Hz	50/60		
Rated Current		In	A	16,20,25,32,40,50, 63,80,100,125	160,200,250	300,350,400
Ultimate / Service Short-Circuit Breaking Capacity	690VAC	Icu/Ics	kA	5/3	10/7	10/7
	400VAC			35/26,25	50/37,5	70/52,5
	230VAC			50/35	70/50	100/70
Category				A		
Standards				IEC EN 60947-2		
Operating Range Temperature Range			°C	-25....+55		
Storage Range Temperature Range			°C	-40....70		
Electrical Life			op.	2.000	2.000	1.500
Mechanical Life			op.	8.000	8.000	4.000
Accessories	Shunt Trip Release			✓		
	Undervoltage Release			✓		
	Auxiliary Contact			✓		
	Alarm Contact			✓		
	Motor Mechanism			✓		
	Rotary Reset Handle			✓		
	Rotary Reset Handle			✓		
	Terminal Cover			✓		
	Phase Barrier			✓		

XFC Residual Current Protected Moulded Case Circuit Breaker

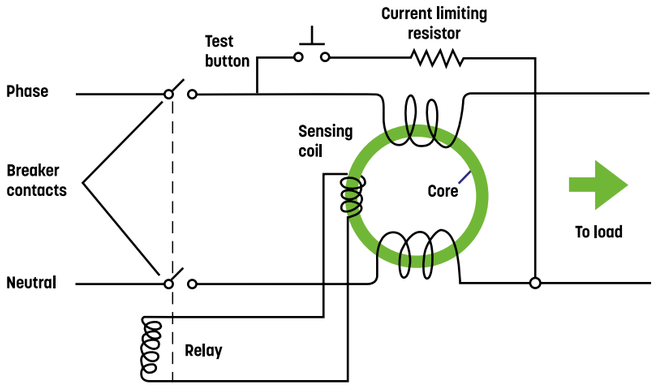
GENERAL

Residual current protected moulded case circuit breakers are advanced circuit breakers that provide safety against ground fault currents, in addition to overcurrent and short-circuit protection. Thanks to the integrated residual current relay and toroidal transformer, they continuously monitor leakage currents and automatically trip the circuit if the leakage current exceeds the set threshold. This feature reduces the risk of electric shock, ensuring human safety, and helps protect facilities against fire risks. Available in models sensitive to both AC and DC leakage currents, they can be used in various systems. With adjustable leakage current threshold values and delay times, customized protection for specific applications can be provided. Designed for industrial, commercial, and residential applications, these circuit breakers are produced in compliance with IEC/EN 60947-2 and IEC 61008-1 standards. With high breaking capacity, they safely manage large loads while providing leakage current protection, supporting the stable operation of the system. Thanks to their modular structure, they are suitable for panel mounting and can be integrated into different projects with a wide range of accessory options. The low power consumption during operation contributes to energy efficiency. By enhancing the safety of electrical installations, they extend the lifespan of equipment and help reduce maintenance costs. The user-friendly design offers easy installation and operation.

Operating Principle

The residual current protected moulded case circuit breaker is a protection device with high sensitivity, specifically designed to detect ground faults. Its operating principle is based on detecting any imbalance or leakage current in the system. These devices sense current changes occurring anywhere in the system, particularly in the grounding line. When a ground fault occurs, the residual current protected moulded case circuit breaker trips the circuit, thus preventing dangers such as electric shock.

One of the most important components of the residual current protected moulded case circuit breaker is the **toroidal transformers**, which detect ground leakage currents. These transformers monitor the flow of electrical current and detect imbalances caused by ground faults. The current difference between the phases generates a magnetic field, producing electromotive force. If a ground fault occurs, the imbalance between the phases increases the electromotive force, allowing the fault to be detected. This electromotive force corresponding to the current is processed by the device's electronic circuit, and the system is deactivated. This process helps to safely detect ground faults and take preventive measures.



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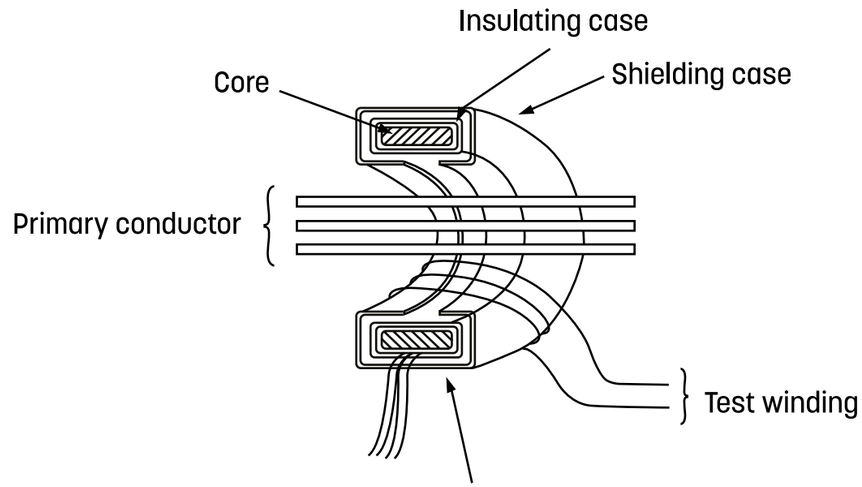
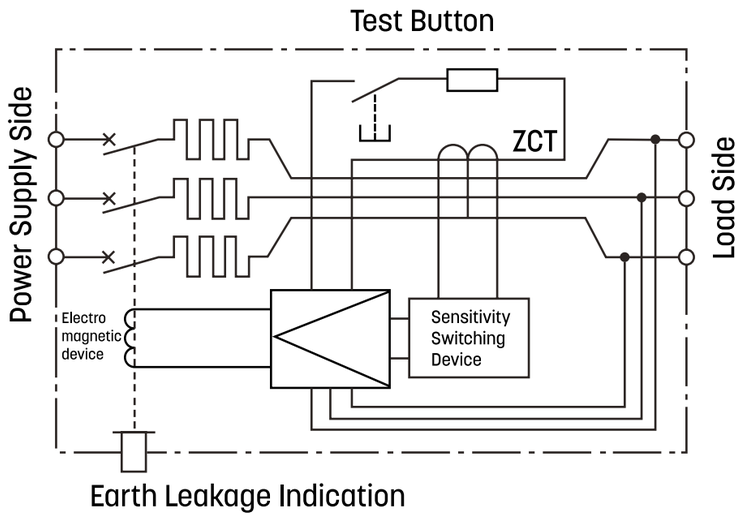
MOULDED CASE CIRCUIT BREAKERS

Toroidal Transformer Internal Structure





MOULDED CASE CIRCUIT BREAKERS

ORDER LIST

FF Type

Thermal Fixed / Magnetic Fixed Type Moulded Case Circuit Breakers



3P	Type (Order) Code	Rated Current (In)	Explanation	Box Quantity	Carton Quantity
	XCB 3FF50-0160-0016	16	3P Thermal Fixed /Magnetic Fixed Type 50kA 160 Frame 16A	1	20
	XCB 3FF50-0160-0020	20	3P Thermal Fixed /Magnetic Fixed Type 50kA 160 Frame 20A	1	20
	XCB 3FF50-0160-0025	25	3P Thermal Fixed /Magnetic Fixed Type 50kA 160 Frame 25A	1	20
	XCB 3FF50-0160-0032	32	3P Thermal Fixed /Magnetic Fixed Type 50kA 160 Frame 32A	1	20
	XCB 3FF50-0160-0040	40	3P Thermal Fixed /Magnetic Fixed Type 50kA 160 Frame 40A	1	20
	XCB 3FF50-0160-0050	50	3P Thermal Fixed /Magnetic Fixed Type 50kA 160 Frame 50A	1	20
	XCB 3FF50-0160-0063	63	3P Thermal Fixed /Magnetic Fixed Type 50kA 160 Frame 63A	1	20
	XCB 3FF50-0160-0080	80	3P Thermal Fixed /Magnetic Fixed Type 50kA 160 Frame 80A	1	20
	XCB 3FF50-0160-0100	100	3P Thermal Fixed /Magnetic Fixed Type 50kA 160 Frame 100A	1	20
	XCB 3FF50-0160-0125	125	3P Thermal Fixed /Magnetic Fixed Type 50kA 160 Frame 125A	1	20
	XCB 3FF50-0160-0160	160	3P Thermal Fixed /Magnetic Fixed Type 50kA 160 Frame 160A	1	20
	XCB 3FF50-0250-0200	200	3P Thermal Fixed /Magnetic Fixed Type 50kA 250 Frame 200A	1	16
	XCB 3FF50-0250-0250	250	3P Thermal Fixed /Magnetic Fixed Type 50kA 250 Frame 250A	1	16
	XCB 3FF70-0400-0300	300	3P Thermal Fixed /Magnetic Fixed Type 70kA 400 Frame 300A	1	4
	XCB 3FF70-0400-0400	400	3P Thermal Fixed /Magnetic Fixed Type 70kA 400 Frame 400A	1	4
	XCB 3FF70-0630-0500	500	3P Thermal Fixed /Magnetic Fixed Type 70kA 630 Frame 500A	1	2
	XCB 3FF70-0630-0630	630	3P Thermal Fixed /Magnetic Fixed Type 70kA 630 Frame 630A	1	2
	XCB 3FF70-0800-0800	800	3P Thermal Fixed /Magnetic Fixed Type 70kA 800 Frame 800A	1	2
	XCB 3FF80-1600-1000	1000	3P Thermal Fixed /Magnetic Fixed Type 80kA 1600 Frame 1000A	1	1
	XCB 3FF80-1600-1250	1250	3P Thermal Fixed /Magnetic Fixed Type 80kA 1600 Frame 1250A	1	1
	XCB 3FF80-1600-1600	1600	3P Thermal Fixed /Magnetic Fixed Type 80kA 1600 Frame 1600A	1	1



4P	Type (Order) Code	Rated Current (In)	Explanation	Box Quantity	Carton Quantity
	XCB 4FF50-0160-0016	16	4P Thermal Fixed /Magnetic Fixed Type 50kA 160 Frame 16A	1	16
	XCB 4FF50-0160-0020	20	4P Thermal Fixed /Magnetic Fixed Type 50kA 160 Frame 20A	1	16
	XCB 4FF50-0160-0025	25	4P Thermal Fixed /Magnetic Fixed Type 50kA 160 Frame 25A	1	16
	XCB 4FF50-0160-0032	32	4P Thermal Fixed /Magnetic Fixed Type 50kA 160 Frame 32A	1	16
	XCB 4FF50-0160-0040	40	4P Thermal Fixed /Magnetic Fixed Type 50kA 160 Frame 40A	1	16
	XCB 4FF50-0160-0050	50	4P Thermal Fixed /Magnetic Fixed Type 50kA 160 Frame 50A	1	16
	XCB 4FF50-0160-0063	63	4P Thermal Fixed /Magnetic Fixed Type 50kA 160 Frame 63A	1	16
	XCB 4FF50-0160-0080	80	4P Thermal Fixed /Magnetic Fixed Type 50kA 160 Frame 80A	1	16
	XCB 4FF50-0160-0100	100	4P Thermal Fixed /Magnetic Fixed Type 50kA 160 Frame 100A	1	16
	XCB 4FF50-0160-0125	125	4P Thermal Fixed /Magnetic Fixed Type 50kA 160 Frame 125A	1	16
	XCB 4FF50-0160-0160	160	4P Thermal Fixed /Magnetic Fixed Type 50kA 160 Frame 160A	1	16
	XCB 4FF50-0250-0200	200	4P Thermal Fixed /Magnetic Fixed Type 50kA 250 Frame 200A	1	12
	XCB 4FF50-0250-0250	250	4P Thermal Fixed /Magnetic Fixed Type 50kA 250 Frame 250A	1	12
	XCB 4FF70-0400-0300	300	4P Thermal Fixed /Magnetic Fixed Type 70kA 400 Frame 300A	1	4
	XCB 4FF70-0400-0400	400	4P Thermal Fixed /Magnetic Fixed Type 70kA 400 Frame 400A	1	4
	XCB 4FF70-0630-0500	500	4P Thermal Fixed /Magnetic Fixed Type 70kA 630 Frame 500A	1	2
	XCB 4FF70-0630-0630	630	4P Thermal Fixed /Magnetic Fixed Type 70kA 630 Frame 630A	1	2
	XCB 4FF70-0800-0800	800	4P Thermal Fixed /Magnetic Fixed Type 70kA 800 Frame 800A	1	2
	XCB 4FF80-1600-1000	1000	4P Thermal Fixed /Magnetic Fixed Type 80kA 1600 Frame 1000A	1	1
	XCB 4FF80-1600-1250	1250	4P Thermal Fixed /Magnetic Fixed Type 80kA 1600 Frame 1250A	1	1
	XCB 4FF80-1600-1600	1600	4P Thermal Fixed /Magnetic Fixed Type 80kA 1600 Frame 1600A	1	1

MOULDED CASE CIRCUIT BREAKERS

ORDER LIST

AF Type

Thermal Adjustable / Magnetic Fixed Type Moulded Case Circuit Breakers



3P	Type (Order) Code	Rated Current (In)	Explanation	Box Quantity	Carton Quantity
	XCB 3AF25-0160-0016A	16	3P Thermal Adjustable /Magnetic Fixed Type 25kA 160 Frame 16A	1	16
	XCB 3AF25-0160-0020A	20	3P Thermal Adjustable /Magnetic Fixed Type 25kA 160 Frame 20A	1	16
	XCB 3AF25-0160-0025A	25	3P Thermal Adjustable /Magnetic Fixed Type 25kA 160 Frame 25A	1	16
	XCB 3AF25-0160-0032A	32	3P Thermal Adjustable /Magnetic Fixed Type 25kA 160 Frame 32A	1	16
	XCB 3AF25-0160-0040A	40	3P Thermal Adjustable /Magnetic Fixed Type 25kA 160 Frame 40A	1	16
	XCB 3AF25-0160-0050A	50	3P Thermal Adjustable /Magnetic Fixed Type 25kA 160 Frame 50A	1	16
	XCB 3AF25-0160-0063A	63	3P Thermal Adjustable /Magnetic Fixed Type 25kA 160 Frame 63A	1	16
	XCB 3AF25-0160-0080A	80	3P Thermal Adjustable /Magnetic Fixed Type 25kA 160 Frame 80A	1	16
	XCB 3AF25-0160-0100A	100	3P Thermal Adjustable /Magnetic Fixed Type 25kA 160 Frame 100A	1	16
	XCB 3AF25-0160-0125A	125	3P Thermal Adjustable /Magnetic Fixed Type 25kA 160 Frame 125A	1	16
	XCB 3AF25-0160-0160A	160	3P Thermal Adjustable /Magnetic Fixed Type 25kA 160 Frame 160A	1	16
	XCB 3AF35-0250-0200A	200	3P Thermal Adjustable /Magnetic Fixed Type 25kA 250 Frame 200A	1	6
	XCB 3AF35-0250-0250A	250	3P Thermal Adjustable /Magnetic Fixed Type 25kA 250 Frame 250A	1	6
	XCB 3AF35-0250-0300A	300	3P Thermal Adjustable /Magnetic Fixed Type 35kA 250 Frame 300A	1	6
	XCB 3AF42-0630-0400A	400	3P Thermal Adjustable /Magnetic Fixed Type 42kA 630 Frame 400A	1	4
	XCB 3AF42-0630-0500A	500	3P Thermal Adjustable /Magnetic Fixed Type 42kA 630 Frame 500A	1	4
	XCB 3AF42-0630-0630A	630	3P Thermal Adjustable /Magnetic Fixed Type 42kA 630 Frame 630A	1	4
	XCB 3AF36-1000-0800A	800	3P Thermal Adjustable /Magnetic Fixed Type 36kA 1000 Frame 800A	1	2
	XCB 3AF36-1000-1000A	1000	3P Thermal Adjustable /Magnetic Fixed Type 36kA 1000 Frame 1000A	1	1
	XCB 3AF65-1600-1250A	1250	3P Thermal Adjustable /Magnetic Fixed Type 65kA 1600 Frame 1250A	1	1
	XCB 3AF65-1600-1600A	1600	3P Thermal Adjustable /Magnetic Fixed Type 65kA 1600 Frame 1600A	1	1



4P	Type (Order) Code	Rated Current (In)	Explanation	Box Quantity	Carton Quantity
	XCB 4AF25-0160-0016A	16	4P Thermal Adjustable /Magnetic Fixed Type 25kA 160 Frame 16A	1	12
	XCB 4AF25-0160-0020A	20	4P Thermal Adjustable /Magnetic Fixed Type 25kA 160 Frame 20A	1	12
	XCB 4AF25-0160-0025A	25	4P Thermal Adjustable /Magnetic Fixed Type 25kA 160 Frame 25A	1	12
	XCB 4AF25-0160-0032A	32	4P Thermal Adjustable /Magnetic Fixed Type 25kA 160 Frame 32A	1	12
	XCB 4AF25-0160-0040A	40	4P Thermal Adjustable /Magnetic Fixed Type 25kA 160 Frame 40A	1	12
	XCB 4AF25-0160-0050A	50	4P Thermal Adjustable /Magnetic Fixed Type 25kA 160 Frame 50A	1	12
	XCB 4AF25-0160-0063A	63	4P Thermal Adjustable /Magnetic Fixed Type 25kA 160 Frame 63A	1	12
	XCB 4AF25-0160-0080A	80	4P Thermal Adjustable /Magnetic Fixed Type 25kA 160 Frame 80A	1	12
	XCB 4AF25-0160-0100A	100	4P Thermal Adjustable /Magnetic Fixed Type 25kA 160 Frame 100A	1	12
	XCB 4AF25-0160-0125A	125	4P Thermal Adjustable /Magnetic Fixed Type 25kA 160 Frame 125A	1	12
	XCB 4AF25-0160-0160A	160	4P Thermal Adjustable /Magnetic Fixed Type 25kA 160 Frame 160A	1	12
	XCB 4AF35-0250-0200A	200	4P Thermal Adjustable /Magnetic Fixed Type 35kA 250 Frame 200A	1	4
	XCB 4AF35-0250-0250A	250	4P Thermal Adjustable /Magnetic Fixed Type 35kA 250 Frame 250A	1	4
	XCB 4AF42-0630-0300A	300	4P Thermal Adjustable /Magnetic Fixed Type 42kA 630 Frame 300A	1	4
	XCB 4AF42-0630-0400A	400	4P Thermal Adjustable /Magnetic Fixed Type 42kA 630 Frame 400A	1	2
	XCB 4AF42-0630-0500A	500	4P Thermal Adjustable /Magnetic Fixed Type 42kA 630 Frame 500A	1	2
	XCB 4AF42-0630-0630A	630	4P Thermal Adjustable /Magnetic Fixed Type 42kA 630 Frame 630A	1	2
	XCB 4AF36-1000-0800A	800	4P Thermal Adjustable /Magnetic Fixed Type 36kA 1000 Frame 800A	1	2
	XCB 4AF65-1600-1000A	1000	4P Thermal Adjustable /Magnetic Fixed Type 65kA 1600 Frame 1000A	1	1
	XCB 4AF65-1600-1250A	1250	4P Thermal Adjustable /Magnetic Fixed Type 65kA 1600 Frame 1250A	1	1
	XCB 4AF65-1600-1600A	1600	4P Thermal Adjustable /Magnetic Fixed Type 65kA 1600 Frame 1600A	1	1

ORDER LIST

FF Type Accessories

Auxiliary Contact Block

Model	Type (Order) Code	Mounting	MCCB To Be Used With	Box Quantity	Carton Quantity
AX	AC 100L-S	R Phase	XCB-FF50-0160(3P&4P)	16	160
	AC 250L-S	R Phase	XCB-FF50-0250(3P&4P)	12	120
	AC 400L-S	R Phase	XCB-FF70-0400(3P&4P)	10	100
	AC 630L-S	R Phase	XCB-FF70-0630(3P&4P)	10	100
	AC 800L-S	R Phase	XCB-FF70-0800(3P&4P)	10	100
	AC 1600R-S	T Phase	XCB-FF80-1600(3P&4P)	5	50

Alarm Contact

Model	Type (Order) Code	Mounting	MCCB To Be Used With	Box Quantity	Carton Quantity
AL	AL 100L-S	R Phase	XCB-FF50-0160(3P&4P)	16	160
	AL 250L-S	R Phase	XCB-FF50-0250(3P&4P)	12	120
	AL 400L-S	R Phase	XCB-FF70-0400(3P&4P)	10	100
	AL 630L-S	R Phase	XCB-FF70-0630(3P&4P)	10	100
	AL 800L-S	R Phase	XCB-FF70-0800(3P&4P)	10	100
	AL 1600R-S	T Phase	XCB-FF80-1600(3P&4P)	5	50

Shunt Trip Release

Model	Type (Order) Code	MCCB To Be Used With	Box Quantity	Quantity carton
SHT	NC 100-S	XCB-FF50-0160(3P&4P)	25	250
	NC 250-S	XCB-FF50-0250(3P&4P)	25	250
	NC 400-S	XCB-FF70-0400(3P&4P)	16	160
	NC 630-S	XCB-FF70-0630(3P&4P)	16	160
	NC 800-S	XCB-FF70-0800(3P&4P)	16	160
	NC 1600-S	XCB-FF80-1600(3P&4P)	12	120

Undervoltage Release

Model	Type (Order) Code	MCCB To Be Used With	Box Quantity	Carton Quantity
UVR	LV 100-S	XCB-FF50-0160(3P&4P)	25	250
	LV 250-S	XCB-FF50-0250(3P&4P)	25	250
	LV 400-S	XCB-FF70-0400(3P&4P)	16	160
	LV 630-S	XCB-FF70-0630(3P&4P)	16	160
	LV 800-S	XCB-FF70-0800(3P&4P)	16	160
	LV 1600-S	XCB-FF80-1600(3P&4P)	12	120

Rotary Handle

Model	Type (Order) Code	MCCB To Be Used With	Box Quantity	Carton Quantity
SH	SH 100-S	XCB-FF50-0160(3P&4P)	1	6
	SH 250-S	XCB-FF50-0250(3P&4P)	1	4
	SH 400-S	XCB-FF70-0400(3P&4P)	1	2
	SH 630-S	XCB-FF70-0630(3P&4P)	1	1
	SH 800-S	XCB-FF70-0800(3P&4P)	1	1
	SH 1600-S	XCB-FF80-1600(3P&4P)	1	1

Extended Type Rotary Handle

Model	Type (Order) Code	MCCB To Be Used With	Box Quantity	Carton Quantity
ESH	ESH 100-S	XCB-FF50-0160(3P&4P)	1	6
	ESH 250-S	XCB-FF50-0250(3P&4P)	1	4
	ESH 400-S	XCB-FF70-0400(3P&4P)	1	2
	ESH 630-S	XCB-FF70-0630(3P&4P)	1	1
	ESH 800-S	XCB-FF70-0800(3P&4P)	1	1
	ESH 1600-S	XCB-FF80-1600(3P&4P)	1	1



NC 1600-S



NC 250-S



LV 400-S

GENERAL PRODUCT CATALOG

MOULDED CASE CIRCUIT BREAKERS

ORDER LIST

FF Type Accessories

Motor Mechanism

Model	Type (Order) Code	Rated Operating Voltage (VAC)	MCCB To Be Used With	Box Quantity	Carton Quantity
MOT	MOT 100-S	220 -240	XCB-FF50-0160(3P&4P)	1	8
	MOT 250-S	220 -240	XCB-FF50-0250(3P&4P)	1	6
	MOT 400-S	220 -240	XCB-FF70-0400(3P&4P)	1	4
	MOT 630-S	220 -240	XCB-FF70-0630(3P&4P)	1	4
	MOT 800-S	220 -240	XCB-FF70-0800(3P&4P)	1	2
	MOT 1600-S	220 -240	XCB-FF80-1600(3P&4P)	1	1

Mechanical Locking

Model	Type (Order) Code	MCCB To Be Used With	Box Quantity	Carton Quantity
XML	XML 100 3-S	XCB-FF50-0160(3P)	1	12
	XML 250 3-S	XCB-FF50-0250(3P)	1	12
	XML 400 3-S	XCB-FF70-0400(3P)	1	12
	XML 630 3-S	XCB-FF70-0630(3P)	1	12
	XML 800 3-S	XCB-FF70-0800(3P)	1	12
	XML 1600 3-S	XCB-FF80-1600(3P)	1	12
	XML 100 4-S	XCB-FF50-0160(4P)	1	12
	XML 250 4-S	XCB-FF50-0250(4P)	1	12
	XML 400 4-S	XCB-FF70-0400(4P)	1	12
	XML 630 4-S	XCB-FF70-0630(4P)	1	12
	XML 800 4-S	XCB-FF70-0800(4P)	1	12
	XML 1600 4-S	XCB-FF80-1600(4P)	1	12

Rotary Handle Lock

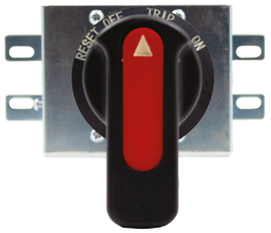
Model	Type (Order) Code	MCCB To Be Used With	Box Quantity	Carton Quantity
SHL	SHL 100-S	XCB-FF50-0160(3P&4P)	1	10
	SHL 250-S	XCB-FF50-0250(3P&4P)	1	10
	SHL 400-S	XCB-FF70-0400(3P&4P)	1	10
	SHL 630-S	XCB-FF70-0630(3P&4P)	1	10
	SHL 800-S	XCB-FF70-0800(3P&4P)	1	10
	SHL 1600-S	XCB-FF80-1600(3P&4P)	1	10

Extension Bar

Model	Type (Order) Code	MCCB To Be Used With	Box Quantity	Carton Quantity
BUSB	BUSB-400S/3P-S	XCB-FF70-0400(3P)	6	300
	BUSB-630S/3P-S	XCB-FF70-0630(3P	6	300
	BUSB-800S/3P-S	XCB-FF70-0800(3P)	6	300
	BUSB-1000S/3P-S	XCB-FF80-1600(3P)	6	300
	BUSB-1250S/3P-S	XCB-FF80-1600(3P)	6	300
	BUSB-1600S/3P-S	XCB-FF80-1600(3P)	6	300
	BUSB-400S/4P-S	XCB-FF70-0400(4P)	8	240
	BUSB-630S/4P-S	XCB-FF70-0630(4P)	8	240
	BUSB-800S/4P-S	XCB-FF70-0800(4P)	8	240
	BUSB-1000S/4P-S	XCB-FF80-1600(4P)	8	240
	BUSB-1250S/4P-S	XCB-FF80-1600(4P)	8	240
	BUSB-1600S/4P-S	XCB-FF80-1600(4P)	8	240



MOT 250-S



ESH 250-S

ORDER LIST

AF Type Accessories

Auxiliary Contact Block

Model	Type (Order) Code	Mounting	MCCB To Be Used With	Box Quantity	Carton Quantity
AX	AC 100L-A	R Phase	XCB-AF25-0160(3P&4P)	2	100
	AC 250L-A	R Phase	XCB-AF35-0250(3P&4P)	1	50
	AC 630L-A	R Phase	XCB-AF42-0630(3P&4P)	1	50
	AC 800L-A	R Phase	XCB-AF36-1000(3P&4P)	1	50
	AC 1600R-A	T Phase	XCB-AF65-1600(3P&4P)	1	50

Alarm Contact

Model	Type (Order) Code	Mounting	MCCB To Be Used With	Box Quantity	Carton Quantity
AL	AL 100L-A	R Phase	XCB-AF25-0160(3P&4P)	2	100
	AL 250L-A	R Phase	XCB-AF35-0250(3P&4P)	1	50
	AL 630L-A	R Phase	XCB-AF42-0630(3P&4P)	1	50
	AL 800L-A	R Phase	XCB-AF36-1000(3P&4P)	1	50
	AL 1600R-A	T Phase	XCB-AF65-1600(3P&4P)	1	50

Shunt Trip Release

Model	Type (Order) Code	Rated Operating Voltage (VAC)	MCCB To Be Used With	Box Quantity	Carton Quantity
SHT	NC 100-A	220VAC	XCB-AF25-0160(3P&4P)	2	100
	NC 250-A	220VAC	XCB-AF35-0250(3P&4P)	1	50
	NC 630-A	220VAC	XCB-AF42-0630(3P&4P)	1	50
	NC 800-A	220VAC	XCB-AF36-1000(3P&4P)	1	50
	NC 1600-A	220VAC	XCB-AF65-1600(3P&4P)	1	50

Undervoltage Release

Model	Type (Order) Code	Rated Operating Voltage (VAC)	MCCB To Be Used With	Box Quantity	Carton Quantity
UVR	LV 100-A	220VAC	XCB-AF25-0160(3P&4P)	2	100
	LV 250-A	220VAC	XCB-AF35-0250(3P&4P)	1	50
	LV 630-A	220VAC	XCB-AF42-0630(3P&4P)	1	50
	LV 800-A	220VAC	XCB-AF36-1000(3P&4P)	1	50
	LV 1600-A	220VAC	XCB-AF65-1600(3P&4P)	1	50

Rotary Handle

Model	Type (Order) Code	MCCB To Be Used With	Box Quantity	Carton Quantity
SH	SH 100-A	XCB-AF25-0160(3P&4P)	2	100
	SH 250-A	XCB-AF35-0250(3P&4P)	1	50
	SH 630-A	XCB-AF42-0630(3P&4P)	1	50
	SH 800-A	XCB-AF36-1000(3P&4P)	1	50
	SH 1600-A	XCB-AF65-1600(3P&4P)	1	50

Extended Type Rotary Handle

Model	Type (Order) Code	MCCB To Be Used With	Box Quantity	Carton Quantity
ESH	ESH 100-A	XCB-AF25-0160(3P&4P)	2	100
	ESH 250-A	XCB-AF35-0250(3P&4P)	1	50
	ESH 630-A	XCB-AF42-0630(3P&4P)	1	50
	ESH 800-A	XCB-AF36-1000(3P&4P)	1	50
	ESH 1600-A	XCB-AF65-1600(3P&4P)	1	50

GENERAL PRODUCT CATALOG

MOULDED CASE CIRCUIT BREAKERS

ORDER LIST

AF Type Accessories

Motor Mechanism

Model	Type (Order) Code	Nominal Operating Voltage(VAC)	MCCB To Be Used With	Box Quantity	Carton Quantity
MOT	MOT 100-A	220 -240 VAC	XCB-AF25-0160(3P&4P)	1	6
	MOT 250-A	220 -240 VAC	XCB-AF35-0250(3P&4P)	1	4
	MOT 630-A	220 -240 VAC	XCB-AF42-0630(3P&4P)	1	2
	MOT 800-A	220 -240 VAC	XCB-AF36-1000(3P&4P)	1	1
	MOT 1600-A	220 -240 VAC	XCB-AF65-1600(3P&4P)	1	1

Mechanical Locking

Model	Type (Order) Code	MCCB To Be Used With	Box Quantity	Carton Quantity
XML	XML 100 3-A	XCB-AF25-0160(3P)	1	12
	XML 250 3-A	XCB-AF35-0250(3P)	1	12
	XML 630 3-A	XCB-AF42-0630(3P)	1	12
	XML 800 3-A	XCB-AF36-1000(3P)	1	12
	XML 1600 3-A	XCB-AF65-1600(3P)	1	12
	XML 100 4-A	XCB-AF25-0160(4P)	1	12
	XML 250 4-A	XCB-AF35-0250(4P)	1	12
	XML 630 4-A	XCB-AF42-0630(4P)	1	12
	XML 800 4-A	XCB-AF36-1000(4P)	1	12
	XML 1600 4-A	XCB-AF65-1600(4P)	1	12

Handle Lock

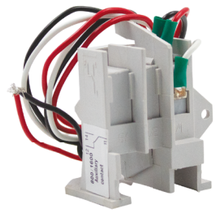
Model	Type (Order) Code	MCCB To Be Used With	Box Quantity	Carton Quantity
SHL	SHL 100-A	XCB-AF25-0160(3P&4P)	1	10
	SHL 250-A	XCB-AF35-0250(3P&4P)	1	10
	SHL 630-A	XCB-AF42-0630(3P&4P)	1	10
	SHL 800-A	XCB-AF36-1000(3P&4P)	1	10
	SHL 1600-A	XCB-AF65-1600(3P&4P)	1	10

Extension Bar

Model	Type (Order) Code	MCCB To Be Used With	Box Quantity	Carton Quantity
BUSB	BUSB-630A/3P-A	XCB-AF42-0630(3P)	6	120
	BUSB-800A/3P-A	XCB-AF36-1000(3P)	6	120
	BUSB-1250A/3P-A	XCB-AF65-1600(3P)	6	120
	BUSB-1600A/3P-A	XCB-AF65-1600(3P)	6	120
	BUSB-630A/4P-A	XCB-AF42-0630(4P)	8	160
	BUSB-800A/4P-A	XCB-AF36-1000(4P)	8	160
	BUSB-1250A/4P-A	XCB-AF65-1600(4P)	8	160
	BUSB-1600A/4P-A	XCB-AF65-1600(4P)	8	160



LV 250-A



AC1600R-A



MOT 250-A



ESH 800-A

MOULDED CASE CIRCUIT BREAKERS

ORDER LIST

H Series AF Type

H Series Thermal Adjustable / Magnetic Fixed Type Moulded Case Circuit Breakers (Icu-Ics%100)

3P	25kA	Type (Order) Code	Rated Current (In)	Explanation	Box Quantity	Carton Quantity
		XCB H3AF25-0160-0016A	16	3P Thermal Adjustable / Magnetic Fixed 25kA 160 Frame 16A	1	20
		XCB H3AF25-0160-0020A	20	3P Thermal Adjustable / Magnetic Fixed 25kA 160 Frame 20A	1	20
		XCB H3AF25-0160-0025A	25	3P Thermal Adjustable / Magnetic Fixed 25kA 160 Frame 25A	1	20
		XCB H3AF25-0160-0032A	32	3P Thermal Adjustable / Magnetic Fixed 25kA 160 Frame 32A	1	20
		XCB H3AF25-0160-0040A	40	3P Thermal Adjustable / Magnetic Fixed 25kA 160 Frame 40A	1	20
		XCB H3AF25-0160-0050A	50	3P Thermal Adjustable / Magnetic Fixed 25kA 160 Frame 50A	1	20
		XCB H3AF25-0160-0063A	63	3P Thermal Adjustable / Magnetic Fixed 25kA 160 Frame 63A	1	20
		XCB H3AF25-0160-0080A	80	3P Thermal Adjustable / Magnetic Fixed 25kA 160 Frame 80A	1	20
		XCB H3AF25-0160-0100A	100	3P Thermal Adjustable / Magnetic Fixed 25kA 160 Frame 100A	1	20
		XCB H3AF25-0160-0125A	125	3P Thermal Adjustable / Magnetic Fixed 25kA 160 Frame 125A	1	20
		XCB H3AF25-0160-0160A	160	3P Thermal Adjustable / Magnetic Fixed 25kA 160 Frame 160A	1	20

3P	36kA&60kA	Type (Order) Code	Rated Current (In)	Explanation	Box Quantity	Carton Quantity
		XCB H3AF36-0160-0016A	16	3P Thermal Adjustable / Magnetic Fixed 36kA 160 Frame 16A	1	16
		XCB H3AF36-0160-0020A	20	3P Thermal Adjustable / Magnetic Fixed 36kA 160 Frame 20A	1	16
		XCB H3AF36-0160-0025A	25	3P Thermal Adjustable / Magnetic Fixed 36kA 160 Frame 25A	1	16
		XCB H3AF36-0160-0032A	32	3P Thermal Adjustable / Magnetic Fixed 36kA 160 Frame 32A	1	16
		XCB H3AF36-0160-0040A	40	3P Thermal Adjustable / Magnetic Fixed 36kA 160 Frame 40A	1	16
		XCB H3AF36-0160-0050A	50	3P Thermal Adjustable / Magnetic Fixed 36kA 160 Frame 50A	1	16
		XCB H3AF36-0160-0063A	63	3P Thermal Adjustable / Magnetic Fixed 36kA 160 Frame 63A	1	16
		XCB H3AF36-0160-0080A	80	3P Thermal Adjustable / Magnetic Fixed 36kA 160 Frame 80A	1	16
		XCB H3AF36-0160-0100A	100	3P Thermal Adjustable / Magnetic Fixed 36kA 160 Frame 100A	1	16
		XCB H3AF36-0160-0125A	125	3P Thermal Adjustable / Magnetic Fixed 36kA 160 Frame 125A	1	16
		XCB H3AF36-0160-0160A	160	3P Thermal Adjustable / Magnetic Fixed 36kA 160 Frame 160A	1	16
		XCB H3AF36-0250-0200A	200	3P Thermal Adjustable / Magnetic Fixed 36kA 250 Frame 200A	1	12
		XCB H3AF36-0250-0250A	250	3P Thermal Adjustable / Magnetic Fixed 36kA 250 Frame 250A	1	12
		XCB H3AF36-0400-0300A	300	3P Thermal Adjustable / Magnetic Fixed 36kA 400 Frame 300A	1	4
		XCB H3AF36-0400-0400A	400	3P Thermal Adjustable / Magnetic Fixed 36kA 400 Frame 400A	1	4
		XCB H3AF60-0630-0500A	500	3P Thermal Adjustable / Magnetic Fixed 60kA 630 Frame 500A	1	4
		XCB H3AF60-0630-0630A	630	3P Thermal Adjustable / Magnetic Fixed 60kA 630 Frame 630A	1	4
		XCB H3AF60-0800-0800A	800	3P Thermal Adjustable / Magnetic Fixed 60kA 800 Frame 800A	1	4

4P	25kA	Type (Order) Code	Rated Current (In)	Explanation	Box Quantity	Carton Quantity
		XCB H4AF25-0160-0016A	16	4P Thermal Adjustable / Magnetic Fixed 25kA 160 Frame 16A	1	16
		XCB H4AF25-0160-0020A	20	4P Thermal Adjustable / Magnetic Fixed 25kA 160 Frame 20A	1	16
		XCB H4AF25-0160-0025A	25	4P Thermal Adjustable / Magnetic Fixed 25kA 160 Frame 25A	1	16
		XCB H4AF25-0160-0032A	32	4P Thermal Adjustable / Magnetic Fixed 25kA 160 Frame 32A	1	16
		XCB H4AF25-0160-0040A	40	4P Thermal Adjustable / Magnetic Fixed 25kA 160 Frame 40A	1	16
		XCB H4AF25-0160-0050A	50	4P Thermal Adjustable / Magnetic Fixed 25kA 160 Frame 50A	1	16
		XCB H4AF25-0160-0063A	63	4P Thermal Adjustable / Magnetic Fixed 25kA 160 Frame 63A	1	16
		XCB H4AF25-0160-0080A	80	4P Thermal Adjustable / Magnetic Fixed 25kA 160 Frame 80A	1	16
		XCB H4AF25-0160-0100A	100	4P Thermal Adjustable / Magnetic Fixed 25kA 160 Frame 00A	1	16
		XCB H4AF25-0160-0125A	125	4P Thermal Adjustable / Magnetic Fixed 25kA 160 Frame 125A	1	16
		XCB H4AF25-0160-0160A	160	4P Thermal Adjustable / Magnetic Fixed 25kA 160 Frame 160A	1	16

MOULDED CASE CIRCUIT BREAKERS

ORDER LIST

H Series AF & AA Type

Thermal Adjustable / Magnetic Fixed Type Moulded Case Circuit Breakers (Icu-Ics%100)

4P	36kA & 60kA	Type (Order) Code	Rated Current (In)	Explanation	Box Quantity	Carton Quantity
		XCB H4AF36-0160-0016A	16	4P Thermal Adjustable /Magnetic Fixed Type 36kA 160 Frame 16A	1	12
		XCB H4AF36-0160-0020A	20	4P Thermal Adjustable /Magnetic Fixed Type 36kA 160 Frame 20A	1	12
		XCB H4AF36-0160-0025A	25	4P Thermal Adjustable /Magnetic Fixed Type 36kA 160 Frame 25A	1	12
		XCB H4AF36-0160-0032A	32	4P Thermal Adjustable /Magnetic Fixed Type 36kA 160 Frame 32A	1	12
		XCB H4AF36-0160-0040A	40	4P Thermal Adjustable /Magnetic Fixed Type 36kA 160 Frame 40A	1	12
		XCB H4AF36-0160-0050A	50	4P Thermal Adjustable /Magnetic Fixed Type 36kA 160 Frame 50A	1	12
		XCB H4AF36-0160-0063A	63	4P Thermal Adjustable /Magnetic Fixed Type 36kA 160 Frame 63A	1	12
		XCB H4AF36-0160-0080A	80	4P Thermal Adjustable /Magnetic Fixed Type 36kA 160 Frame 80A	1	12
		XCB H4AF36-0160-0100A	100	4P Thermal Adjustable /Magnetic Fixed Type 36kA 160 Frame 100A	1	12
		XCB H4AF36-0160-0125A	125	4P Thermal Adjustable /Magnetic Fixed Type 36kA 160 Frame 125A	1	12
		XCB H4AF36-0160-0160A	160	4P Thermal Adjustable /Magnetic Fixed Type 36kA 160 Frame 160A	1	12
		XCB H4AF36-0250-0200A	200	4P Thermal Adjustable /Magnetic Fixed Type 36kA 250 Frame 200A	1	8
		XCB H4AF36-0250-0250A	250	4P Thermal Adjustable /Magnetic Fixed Type 36kA 250 Frame 250A	1	8
		XCB H4AF36-0400-0300A	300	4P Thermal Adjustable /Magnetic Fixed Type 36kA 400 Frame 300A	1	4
		XCB H4AF36-0400-0400A	400	4P Thermal Adjustable /Magnetic Fixed Type 36kA 400 Frame 400A	1	4
		XCB H4AF60-0630-0500A	500	4P Thermal Adjustable /Magnetic Fixed Type 60kA 630 Frame 500A	1	4
		XCB H4AF60-0630-0630A	630	4P Thermal Adjustable /Magnetic Fixed Type 60kA 630 Frame 630A	1	4
		XCB H4AF60-0800-0800A	800	4P Thermal Adjustable /Magnetic Fixed Type 60kA 800 Frame 800A	1	2

Thermal Adjustable / Magnetic Adjustable Type Moulded Case Circuit Breakers (Icu-Ics%100)

3P	36kA & 60kA	Type (Order) Code	Rated Current (In)	Explanation	Box Quantity	Carton Quantity
		XCB H3AA36-0160-0080A	80	3P Thermal Adjustable /Magnetic Adjustable Type 36kA 160 Frame 80A	1	16
		XCB H3AA36-0160-0100A	100	3P Thermal Adjustable /Magnetic Adjustable Type 36kA 160 Frame 100A	1	16
		XCB H3AA36-0160-0125A	125	3P Thermal Adjustable /Magnetic Adjustable Type 36kA 160 Frame 125A	1	16
		XCB H3AA36-0160-0160A	160	3P Thermal Adjustable /Magnetic Adjustable Type 36kA 160 Frame 160A	1	16
		XCB H3AA36-0250-0200A	200	3P Thermal Adjustable /Magnetic Adjustable Type 36kA 250 Frame 200A	1	12
		XCB H3AA36-0250-0250A	250	3P Thermal Adjustable /Magnetic Adjustable Type 36kA 250 Frame 250A	1	12
		XCB H3AA36-0400-0300A	300	3P Thermal Adjustable /Magnetic Adjustable Type 36kA 400 Frame 300A	1	4
		XCB H3AA36-0400-0400A	400	3P Thermal Adjustable /Magnetic Adjustable Type 36kA 400 Frame 400A	1	4
		XCB H3AA60-0630-0500A	500	3P Thermal Adjustable /Magnetic Adjustable Type 60kA 630 Frame 500A	1	4
		XCB H3AA60-0630-0630A	630	3P Thermal Adjustable /Magnetic Adjustable Type 60kA 630 Frame 630A	1	4
		XCB H3AA60-0800-0800A	800	3P Thermal Adjustable /Magnetic Adjustable Type 60kA 800 Frame 800A	1	2

4P	36kA & 60kA	Type (Order) Code	Rated Current (In)	Explanation	Box Quantity	Carton Quantity
		XCB H4AA36-0160-0080A	80	4P Thermal Adjustable /Magnetic Adjustable Type 36kA 160 Frame 80A	1	12
		XCB H4AA36-0160-0100A	100	4P Thermal Adjustable /Magnetic Adjustable Type 36kA 160 frame 100A	1	12
		XCB H4AA36-0160-0125A	125	4P Thermal Adjustable /Magnetic Adjustable Type 36kA 160 frame 125A	1	12
		XCB H4AA36-0160-0160A	160	4P Thermal Adjustable /Magnetic Adjustable Type 36kA 160 frame 160A	1	12
		XCB H4AA36-0250-0200A	200	4P Thermal Adjustable /Magnetic Adjustable Type 36kA 250 frame 200A	1	8
		XCB H4AA36-0250-0250A	250	4P Thermal Adjustable /Magnetic Adjustable Type 36kA 250 frame 250A	1	8
		XCB H4AA36-0400-0300A	300	4P Thermal Adjustable /Magnetic Adjustable Type 36kA 400 frame 300A	1	4
		XCB H4AA36-0400-0400A	400	4P Thermal Adjustable /Magnetic Adjustable Type 36kA 400 frame 400A	1	4
		XCB H4AA60-0630-0500A	500	4P Thermal Adjustable /Magnetic Adjustable Type 60kA 630 frame 500A	1	4
		XCB H4AA60-0630-0630A	630	4P Thermal Adjustable /Magnetic Adjustable Type 60kA 630 frame 630A	1	4
		XCB H4AA60-0800-0800A	800	4P Thermal Adjustable /Magnetic Adjustable Type 60kA 800 frame 800A	1	2

ORDER LIST

H Series EB & EL Type

Electronic Type With Button Moulded Case Circuit Breakers (Icu-Ics%100)

3P 36kA & 60kA & 65kA



Type (Order) Code	Rated Current (In)	Explanation	Box Quantity	Carton Quantity
XCB H3EB36-0160-0125A	125	3P Electronic Type With Button 36kA 160 Frame 125A	1	16
XCB H3EB36-0160-0160A	160	3P Electronic Type With Button 36kA 160 Frame 160A	1	16
XCB H3EB36-0250-0250A	250	3P Electronic Type With Button 36kA 250 Frame 250A	1	12
XCB H3EB36-0400-0300A	300	3P Electronic Type With Button 36kA 400 Frame 300A	1	12
XCB H3EB36-0400-0400A	400	3P Electronic Type With Button 36kA 400 Frame 400A	1	4
XCB H3EB60-0630-0500A	500	3P Electronic Type With Button 60kA 630 Frame 500A	1	4
XCB H3EB60-0630-0630A	630	3P Electronic Type With Button 60kA 630 Frame 630A	1	4
XCB H3EB60-0800-0800A	800	3P Electronic Type With Button 60kA 800 Frame 800A	1	2
XCB H3EB65-1600-1000A	1000	3P Electronic Type With Button 65kA 1600 Frame 1000A	1	1
XCB H3EB65-1600-1250A	1250	3P Electronic Type With Button 65kA 1600 Frame 1250A	1	1
XCB H3EB65-1600-1600A	1600	3P Electronic Type With Button 65kA 1600 Frame 1600A	1	1

4P 36kA & 60kA & 65kA



Type (Order) Code	Rated Current (In)	Explanation	Box Quantity	Carton Quantity
XCB H4EB36-0160-0125A	125	4P Electronic Type With Button 36kA 160 Frame 125A	1	12
XCB H4EB36-0160-0160A	160	4P Electronic Type With Button 36kA 160 Frame 160A	1	12
XCB H4EB36-0250-0250A	250	4P Electronic Type With Button 36kA 250 Frame 250A	1	8
XCB H4EB36-0400-0300A	300	4P Electronic Type With Button 36kA 400 Frame 300A	1	8
XCB H4EB36-0400-0400A	400	4P Electronic Type With Button 36kA 400 Frame 400A	1	4
XCB H4EB60-0630-0500A	500	4P Electronic Type With Button 60kA 630 Frame 500A	1	4
XCB H4EB60-0630-0630A	630	4P Electronic Type With Button 60kA 630 Frame 630A	1	4
XCB H4EB60-0800-0800A	800	4P Electronic Type With Button 60kA 800 Frame 800A	1	2
XCB H4EB65-1600-1000A	1000	4P Electronic Type With Button 65kA 1600 Frame 1000A	1	1
XCB H4EB65-1600-1250A	1250	4P Electronic Type With Button 65kA 1600 Frame 1250A	1	1
XCB H4EB65-1600-1600A	1600	4P Electronic Type With Button 65kA 1600 Frame 1600A	1	1

Electronic Type With LCD Moulded Case Circuit Breakers (Icu-Ics %100)

3P 36kA & 60kA



Type (Order) Code	Rated Current (In)	Explanation	Box Quantity	Carton Quantity
XCB H3EL36-0250-0250A	250	3P Electronic Type With LCD 36kA 250 Frame 250A	1	12
XCB H3EL36-0400-0400A	400	3P Electronic Type With LCD 36kA 400 Frame 400A	1	4
XCB H3EL60-0630-0630A	630	3P Electronic Type With LCD 60kA 630 Frame 630A	1	4
XCB H3EL60-0800-0800A	800	3P Electronic Type With LCD 60kA 800 Frame 800A	1	2

4P 36kA & 60kA



Type (Order) Code	Rated Current (In)	Explanation	Box Quantity	Carton Quantity
XCB H4EL36-0250-0250A	250	4P Electronic Type With LCD 36kA 250 Frame 250A	1	8
XCB H4EL36-0400-0400A	400	4P Electronic Type With LCD 36kA 400 Frame 400A	1	4
XCB H4EL60-0630-0630A	630	4P Electronic Type With LCD 60kA 630 Frame 630A	1	4
XCB H4EL60-0800-0800A	800	4P Electronic Type With LCD 60kA 800 Frame 800A	1	2

GENERAL PRODUCT CATALOG

MOULDED CASE CIRCUIT BREAKERS

ORDER LIST

H Series Accessories

Mechanical Lock

Type (Order) Code	Explanation	Box Quantity	Carton Quantity
XML-H 160	Mechanical Lock for XCB H Series 160	1	1

Motor Mechanism

Type (Order) Code	Explanation	Box Quantity	Carton Quantity
MOT-H 250	Motor Mechanism for XCB H Series 250	1	1

Auxiliary Contact

Type (Order) Code	Explanation	Box Quantity	Carton Quantity
AC-H 160L	Auxiliary Contact for XCB H Series 160 (left)	1	10
AC-H 250R	Auxiliary Contact for XCB H Series 250 (Right)	1	10
AC-H 630L	Auxiliary Contact for XCB H Series 630 (left)	1	10

Shunt Trip Release

Type (Order) Code	Explanation	Box Quantity	Carton Quantity
NC-H 160L	Shunt Trip Release for XCB H Series 160(left)	1	10
NC-H 630L	Shunt Trip Release for XCB H Series 630 (left)	1	10
NC-H 160R	Shunt Trip Release for XCB H Series 160(Right)	1	10
NC-H 250R	Shunt Trip Release for XCB H Series 250 (Right)	1	10
NC-H 630R	Shunt Trip Release for XCB H Series 630 (Right)	1	10

ORDER LIST

Residual Current Protected Moulded Case Circuit Breakers

Without Shunt Trip Release	Model	Type (Order) Code	Rated Current (In)	Explanation	Box Quantity	Carton Quantity
	XFC-104	XFC 435-125-16	16A	4P 35kA 125 Frame 16A	1	16
		XFC 435-125-20	20A	4P 35kA 125 Frame 20A	1	16
		XFC 435-125-25	25A	4P 35kA 125 Frame 25A	1	16
		XFC 435-125-32	32A	4P 35kA 125 Frame 32A	1	16
		XFC 435-125-40	40A	4P 35kA 125 Frame 40A	1	16
		XFC 435-125-50	50A	4P 35kA 125 Frame 50A	1	16
		XFC 435-125-63	63A	4P 35kA 125 Frame 63A	1	16
		XFC 435-125-80	80A	4P 35kA 125 Frame 80A	1	16
		XFC 435-125-100	100A	4P 35kA 125 Frame 100A	1	16
		XFC 435-125-125	125A	4P 35kA 125 Frame 125A	1	16
	XFC-254	XFC 450-250-160	160A	4P 50kA 250 Frame 160A	1	12
		XFC 450-250-200	200A	4P 50kA 250 Frame 200A	1	12
		XFC 450-250-250	250A	4P 50kA 250 Frame 250A	1	12
	XFC-404	XFC 470-400-300	300A	4P 70kA 400 Frame 300A	1	4
		XFC 470-400-350	350A	4P 70kA 400 Frame 350A	1	4
		XFC 470-400-400	400A	4P 70kA 400 Frame 400A	1	4

With Shunt Trip Release	Model	Type (Order) Code	Rated Current (In)	Explanation	Box Quantity	Carton Quantity
	XFC-104	XFC B435-125-16	16A	4P 35kA 125 Frame 16A	1	16
		XFC B435-125-20	20A	4P 35kA 125 Frame 20A	1	16
		XFC B435-125-25	25A	4P 35kA 125 Frame 25A	1	16
		XFC B435-125-32	32A	4P 35kA 125 Frame 32A	1	16
		XFC B435-125-40	40A	4P 35kA 125 Frame 40A	1	16
		XFC B435-125-50	50A	4P 35kA 125 Frame 50A	1	16
		XFC B435-125-63	63A	4P 35kA 125 Frame 63A	1	16
		XFC B435-125-80	80A	4P 35kA 125 Frame 80A	1	16
		XFC B435-125-100	100A	4P 35kA 125 Frame 100A	1	16
		XFC B435-125-125	125A	4P 35kA 125 Frame 125A	1	16
	XFC-254	XFC B450-250-160	160A	4P 50kA 250 Frame 160A	1	12
		XFC B450-250-200	200A	4P 50kA 250 Frame 200A	1	12
		XFC B450-250-250	250A	4P 50kA 250 Frame 250A	1	12
	XFC-404	XFC B470-400-300	300A	4P 70kA 400 Frame 300A	1	4
		XFC B470-400-350	350A	4P 70kA 400 Frame 350A	1	4
		XFC B470-400-400	400A	4P 70kA 400 Frame 400A	1	4

GENERAL PRODUCT CATALOG

MOULDED CASE CIRCUIT BREAKERS

ORDER LIST

Residual Current Protected Moulded Case Circuit Breakers Accessories

Residual Current Protection Auxiliary Contact Block

Model	Type (Order) Code	Box Quantity	Carton Quantity
AX	AC-F 100	16	160
	AC-F 250	12	120
	AC-F 400	10	100

Residual Current Protection Alarm Contact

Model	Type (Order) Code	Box Quantity	Carton Quantity
AL	AL-F 100	16	160
	AL-F 250	12	120
	AL-F 400	10	100

Residual Current Protection Shunt Trip Release

Model	Type (Order) Code	Box Quantity	Carton Quantity
SHT	NC-F 100	25	250
	NC-F 250	25	250
	NC-F 400	16	160

Undervoltage Release (UVR)

Model	Type (Order) Code	Box Quantity	Carton Quantity
UVR	LV-F 100	25	250
	LV-F 250	25	250
	LV-F 400	16	160

Rotary Handle

Model	Type (Order) Code	Box Quantity	Carton Quantity
SH	SH-F 100	1	6
	SH-F 250	1	4
	SH-F 400	1	2

Extended Rotary Handle

Model	Type (Order) Code	Box Quantity	Carton Quantity
ESH	ESH-F 100	1	6
	ESH-F 250	1	4
	ESH-F 400	1	2

Residual Current Protection Motor Mechanism

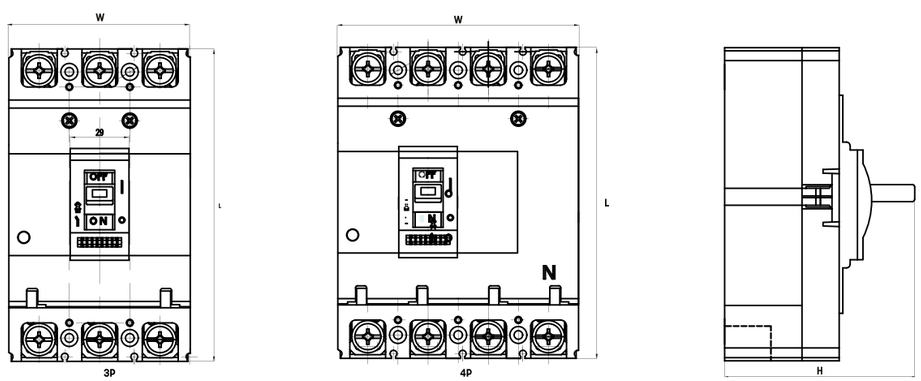
Model	Type (Order) Code	Box Quantity	Carton Quantity
MOT-R	MOT-F 100	1	8
	MOT-F 250	1	6
	MOT-F 400	1	4

Residual Current Protection Mounting Busbar

Model	Type (Order) Code	Box Quantity	Carton Quantity
BUSB	BUSB-400/KAK	8	160

DIMENSIONS

XCB XF/FF Series 160/250/400/630/800/1600

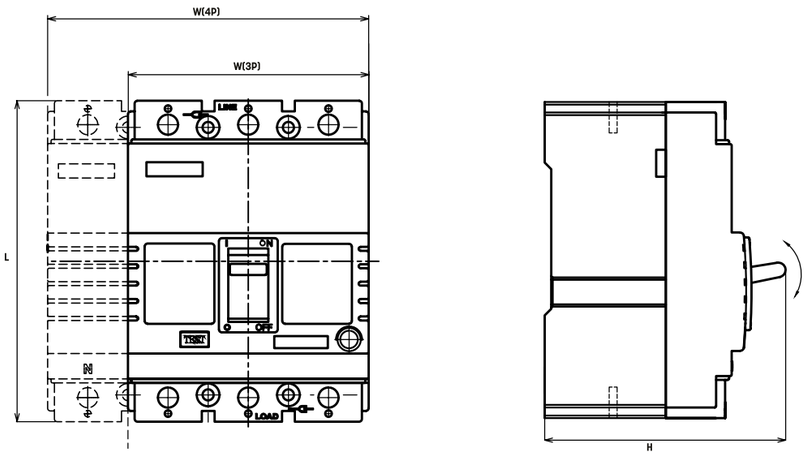


Dimensions mm(L×W×H)						
Frame Size		160	250	400	630/800	1600
3P	Length	155	165	342	457	510
	Width	90	105	141	212	210
	Height	93	94	156	156	189.6
4P	Length	155	165	342	457	510
	Width	120	140	185	282	280
	Height	93	94	156	156	189.6

GENERAL PRODUCT CATALOG

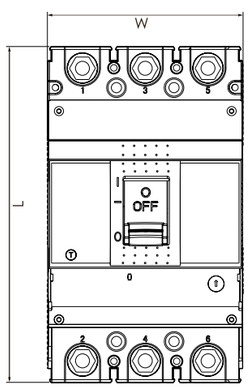
MOULDED CASE CIRCUIT BREAKERS

XCB AF Series 160/250/400/630/1000



Dimensions mm(L×W×H)					
Frame Size		160	250	630	1000
3P	Length	120	170	255	268
	Width	90	105	140	210
	Height	92	135	135	160(800A), 162(1000A)
4P	Length	120	170	255	268
	Width	120	140	184	280
	Height	92	135	135	160(800A), 162(1000A)

XCB H Series AF/AA Type 160/250/400/630/800



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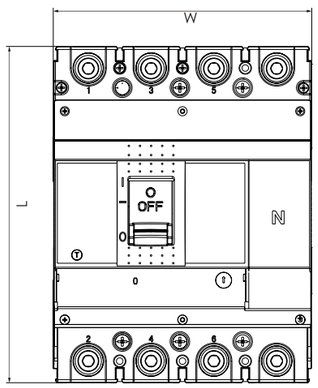

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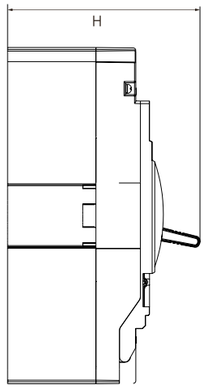
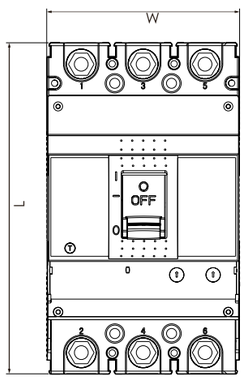


Dimensions mm(L×W×H)						
Frame Size		160	250	400	630	800
3P	Length	155	165	257	257	280
	Width	92	107	140	150	210
	Height	92	100	148	148	155
4P	Length	155	165	257	257	280
	Width	122	142	197	197	280
	Height	92	98	148	148	155

XCB H Series AA Type 160/250/400/630/800



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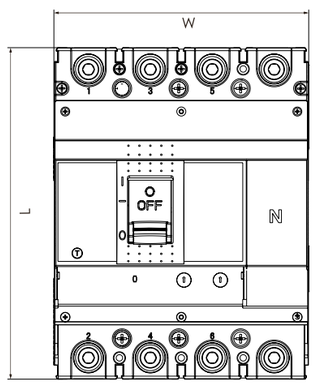
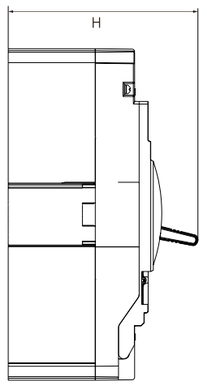
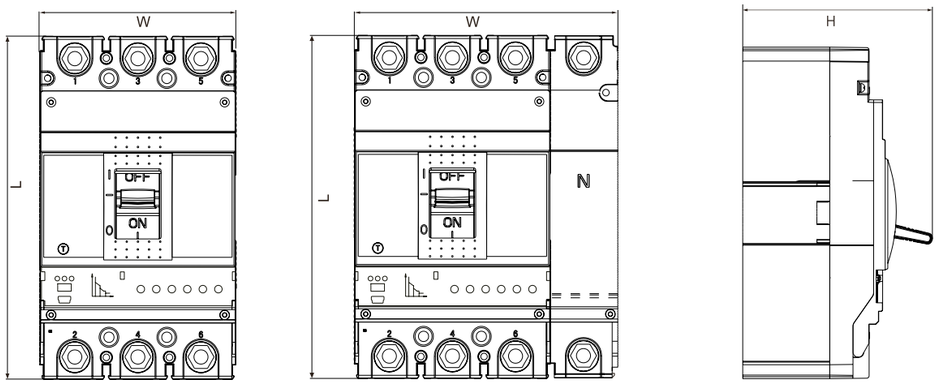


4P



Dimensions mm(L×W×H)						
Frame Size		160	250	400	630	800
3P	Length	155	165	257	257	280
	Width	92	107	140	150	210
	Height	92	100	148	148	155
4P	Length	155	165	257	257	280
	Width	122	142	197	197	280
	Height	92	98	148	148	155

XCB H Series EB Type 160/250/400/630/800



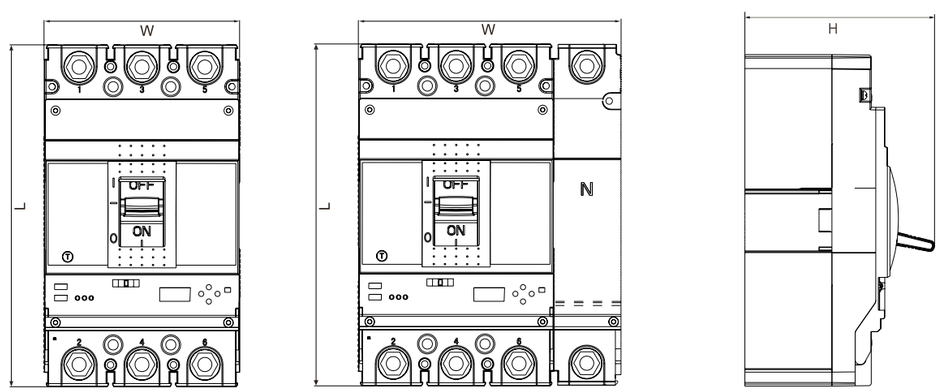
3P 4P

Dimensions mm(L×W×H)					
Frame Size		250	400	630	800
3P	Length	165	257	257	280
	Width	107	150	150	210
	Height	102	152	152	155
4P	Length	165	257	257	280
	Width	142	197	197	280
	Height	102	152	152	155

GENERAL PRODUCT CATALOG

MOULDED CASE CIRCUIT BREAKERS

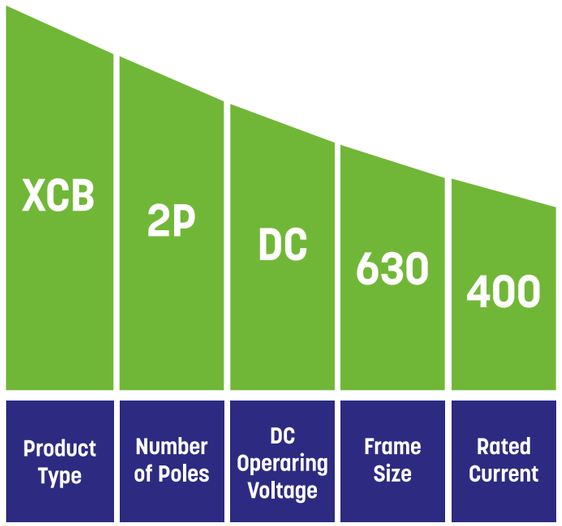
XCB H Series EL Type 250/400/630/800

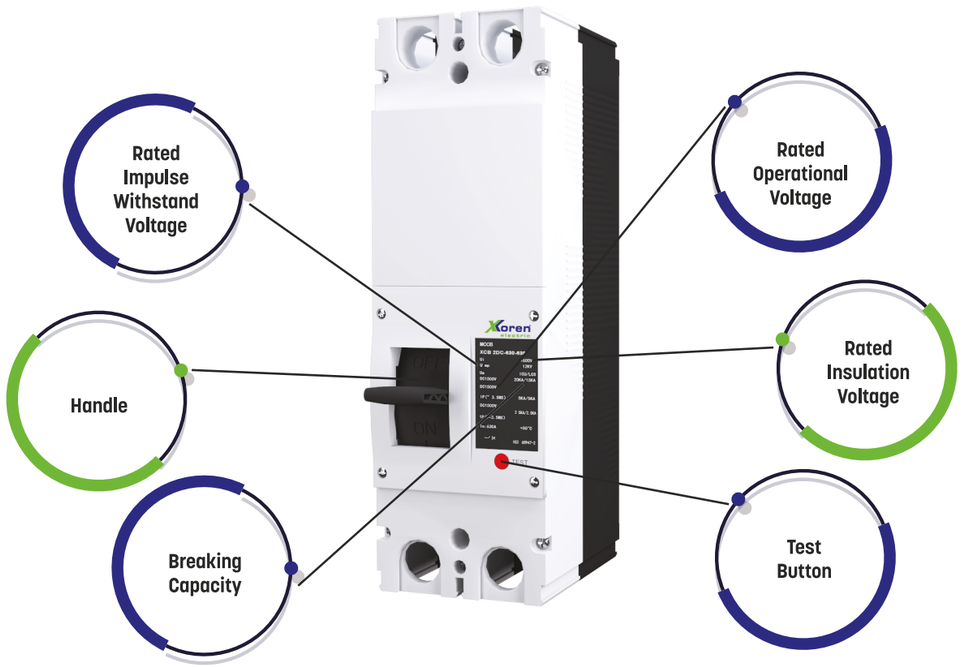


3P 4P

Dimensions mm(L×W×H)					
Frame Size		250	400	630	800
3P	Length	165	257	257	280
	Width	107	150	150	210
	Height	102	152	152	155
4P	Length	165	257	257	280
	Width	142	197	197	280
	Height	102	152	152	155

Product Code and Label Information





GENERAL PRODUCT CATALOG

DC MOULDED CASE CIRCUIT BREAKER

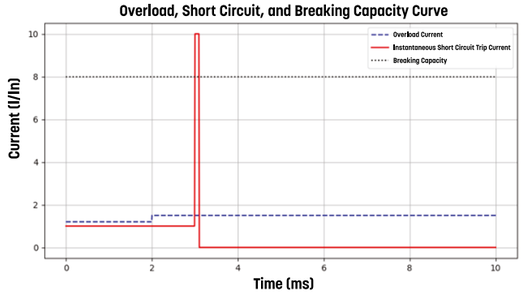
DC MOULDED CASE CIRCUIT BREAKER



DC MOULDED CASE CIRCUIT BREAKER			XCB DC		
Type			XCB DC-400	XCB DC-500	XCB H-630
Number of Poles		P	2		
Rated Operational Voltage	Ue	VDC	1500		
Rated Insulation Voltage	Ui	V	1600		
Rated Impulse Withstand Voltage	Ulimp	kV	12		
Operating Frequency		Hz	50/60		
Rated Current	In	A	400	500	630
Ultimate Short-Circuit Breaking Capacity	Icu	kA	20		
Service Short-Circuit Breaking Capacity	Ics	kA	75% Icu		
Standards			IEC EN 60947-2		
Operating Temperature Range		°C	-25.....+55		
Storage Temperature Range		°C	-40.....70		
Electrical Life		op.	5.000		
Mechanical Life		op.	15.000		

General Information





DC moulded case circuit breakers (MCCBs) are one of the most critical protection devices used to ensure safety and continuity in electrical systems. These breakers protect the system from damage by preventing overload and short-circuit conditions in direct current (DC) circuits. With their ability to operate at high rated voltages, reliable short-circuit breaking capacity, and long service life, DC MCCBs are widely used in industrial and commercial applications.

Technical Features of DC Moulded Case Circuit Breakers

1. Electrical and Mechanical Structure
DC MCCBs are designed to ensure safe breaking operations in high-voltage DC systems. Unlike AC breakers, they use specialized DC arc extinguishing technology to interrupt the current. Since DC current flows continuously in a single direction, extinguishing the arc is more challenging. Therefore, DC MCCBs are equipped with special magnetic arc chambers and extended contact gaps.

Operating Principle

DC MCCBs are specifically designed to provide reliable protection at high current and voltage levels. These devices automatically trip and disconnect the circuit upon detecting an overload or short circuit, thereby protecting electrical systems. Since DC current is continuous, magnetic arc extinguishing systems are employed to prevent prolonged arcing. Additionally, the energy generated during the breaking process is rapidly dissipated, enhancing system safety.

- **Overload Condition:** Under overload conditions, the circuit breaker tolerates the current for a certain period but disconnects the circuit with a delay once the nominal current limit is exceeded.
- **Short Circuit Condition:** When short-circuit currents reach extremely high levels, the circuit breaker rapidly disconnects the circuit to protect the equipment and system.
- **Breaking Capacity:** Indicates the maximum current level the circuit breaker can safely interrupt; beyond this level, it may fail to protect the circuit.
- **Time-Current Behavior:** As the current increases, the circuit breaker's response time accelerates, meaning it trips instantly at high currents while operating with a delay under low overload conditions.

Application Areas of DC Moulded Case Circuit Breakers

DC moulded case circuit breakers provide a reliable protection solution in various industrial and commercial areas where direct current is used:

- **Solar Energy Systems:** Protects photovoltaic panels and inverter systems.
- **Energy Storage Systems:** Ensures safe energy distribution in lithium-ion and other battery systems.
- **Electric Vehicle Charging Stations:** Prevents overloading and short circuits in DC power lines.
- **Railway and Metro Systems:**Provides protection in high-voltage DC power systems.
- **Telecommunication Infrastructure:** Ensures reliable circuit interruption in uninterruptible power supplies (UPS).

GENERAL PRODUCT CATALOG

DC MOULDED CASE CIRCUIT BREAKER

Differences Between DC and AC Moulded Case Circuit Breakers

The primary difference between DC and AC moulded case circuit breakers lies in their design, which is tailored to the type of current they handle. In AC systems, the alternating current crosses zero voltage at every cycle, making arc extinguishing easier. However, in DC circuits, the current flows in a constant direction without zero crossings, making arc extinction more challenging. Therefore, DC moulded case circuit breakers:

- Have larger contact gaps.
- Utilize magnetic and thermal tripping mechanisms for precise interruption.
- Feature specialized arc chambers to safely extinguish arcs.
- Offer high voltage endurance.

In contrast, AC moulded case circuit breakers have a more compact design and are commonly used in residential and commercial electrical distribution systems.

In conclusion, DC moulded case circuit breakers play a crucial role in protecting high-voltage DC systems. Their specialized design allows them to be widely used in applications ranging from solar energy systems to electric vehicle charging stations. With high breaking capacity, excellent temperature tolerance, and long mechanical lifespan, they provide safe and efficient energy management in industrial environments. Selecting the appropriate circuit breaker for the right application is essential for ensuring system safety and efficiency.

ORDER LIST

DC Moulded Case Circuit Breaker

Type (Order) Code	Rated Current (In)	Explanation	Box Quantity	Carton Quantity
XCB 2DC-630-400	400A	2P DC Type 630 Frame 400A 1500V	1	2
XCB 2DC-630-500	500A	2P DC Type 630 Frame 500A 1500V	1	2
XCB 2DC-630-630	630A	2P DC Type 630 Frame 630A 1500V	1	2



VALID FOR ALL OUR PRODUCTS
2 YEARS WARRANTY

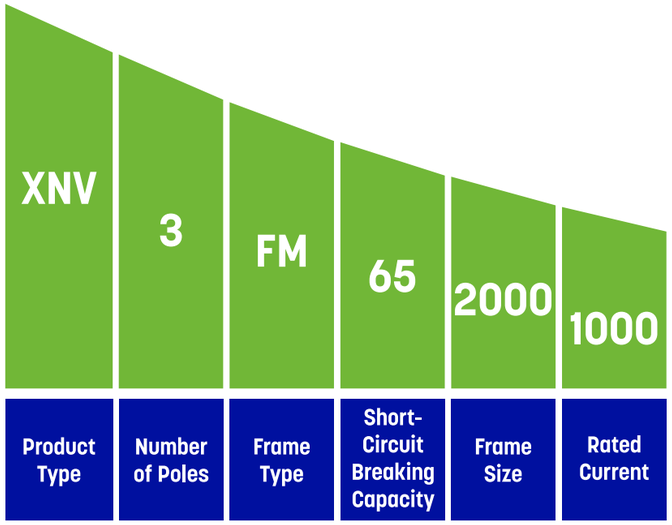
AIR CIRCUIT BREAKERS ACB

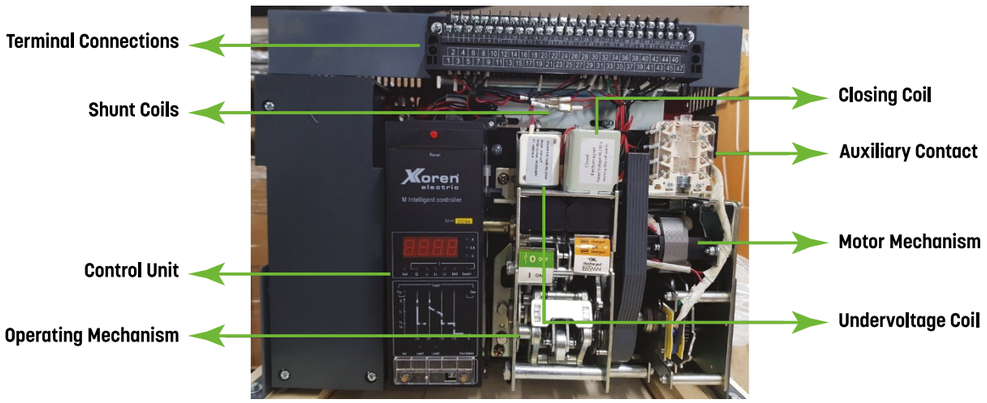
Compatible with SCADA systems, unit-type L/S/I/G time settings provide a transparent and reliable solution for energy management. These Air Circuit Breakers are designed to effectively control electrical circuits, ensure protection in overcurrent conditions, and manage the flow of energy. With their durable design and reliable performance, Air Circuit Breakers offer safe and efficient energy control across a wide range of applications, from industrial facilities to building management systems





Product Code and Label Information





AIR CIRCUIT BREAKERS (ACB)



AIR CIRCUIT BREAKERS (ACB)				2000 Frame (E Series)	2000 Frame	3200 Frame	4000 Frame	6300 Frame
Poles			P	3,4				
Rated Operational Voltage		Ue	VAC	690				
Rated Insulation Voltage		Ui	V	1000				
Rated Impulse Withstand Voltage		Uimp	kV	8				
Frequency			Hz	50/60				
Rated Current		In	A	800,1000,1250,1600	400,630,800,1000,1250, 1600, 2000	2500,3200	4000	5000,6300
Ultimate Short Circuit Breaking Capacity	400V	Icu	kA	42	80	100	100	120
	690V			42	50	65	65	85
Operating Short-Circuit Breaking Capacity	400V	Ics	kA	31,5	50	65	65	100
	690V			31,5	40	40	65	75
Rated Short-Circuit Closing Capacity	400V	Icm	kA	176/0.2	176/0.2	220/0.2	220/0.2	264/0.2
	690V			105/0.25	105/0.25	143/0.2	143/0.2	187/0.2
Rated Short-Time Withstand Current (0-t-CO, AC400V 0.4 second)	400V	Icw	kA	60	50	65	65/80 (MCR)	85/100 (MCR)
	690V			50	40	50	50/65 (MCR)	65/75 (MCR)
Power Consumption	3P	P	W	360	360	1200	1500	2000
	4P			450	450	1750	1700	2300
Resistance of Each Pole	Fixed Type	R	μΩ	11	11	9	9	9
	Draw Out Type			20	20	14	14	10
Standards				IEC 60947-2				
Category				A,B				
Trip Unit				Electronics				
Protection Type				L/S/I/G				
Electrical Life			op.	5.000	500	500	500	500
Mechanical Life			op.	10.000	10.000	5.000	5.000	2.000
Full Breaking Time			ms	20 ~ 30				
Full Closing Time			ms	55 ~ 70				
Long Time Delay Setting Current		Ir1	A	(0.4-1)*In				
Long Time Delay Range		tl	s	0-480				
Short Time Delay Setting Current		Ir2	A	(0.4-15)*In				
Short Time Delay Range		ts	s	0.1-1				
Instantaneous Breaking Current		Ir3	A	In...50kA+OFF				
Earth Fault Current		Ir4	A	(0.2-0.8)*In+OFF				
Accessories	Undervoltage Release			✓				
	Delayed Low Voltage Release			✓				
	Auxiliary Contacts			✓				
	Motorized Mechanism			✓				
	Closing Electromagnet			✓				
	Mechanical Lock			✓				
	Shunt Trip Coil			✓				

General Information



The **Air Circuit Breaker (ACB)** is a type of circuit breaker designed to safely switch and protect high current loads in low-voltage electrical systems. ACBs are commonly used in energy distribution systems and large industrial facilities.

The **XKoren XNV series air circuit breakers** are suitable for 690V rated voltage and rated currents from 400A to 6300A, operating at 50/60 Hz for AC circuits. They are used to distribute electrical energy and protect electrical equipment in circuits from overload, undervoltage, short circuits, and single-phase ground faults.

Operating Principle

Air circuit breaker (ACB) are designed to provide protection against overloads, short circuits, and ground faults. The operating principle consists of the following steps:

Normal Operation: Opening or closing the circuit is performed through a mechanical system.
Short Circuit Condition: When a short circuit current is detected, the magnetic trip mechanism quickly cuts the circuit to protect the equipment.

Overload Condition: The thermal trip mechanism opens the circuit when the current reaches the predetermined threshold, preventing overload.

Voltage Drop or Phase Loss: If abnormal voltage conditions are detected by electrical protection relays, the system can automatically disconnect the circuit.

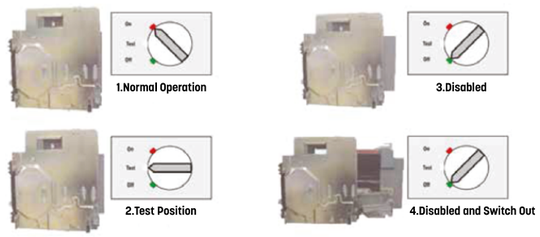
With intelligent and selective protection functions, **XKoren air circuit breakers** enhance the reliability of the power supply and prevent unnecessary power outages. They are especially used in the distribution systems of smart buildings, power plants, factories, mines (690V), and high-tech modern buildings.

Technical Specifications

Rated Current (In): 400 A - 6300 A
Breaking Capacity: 42 kA - 100 kA (Rated short-circuit breaking capacity)
Voltage Level: Up to 690 V
Number of Poles: 3 or 4 poles versions
Operating Mechanism: Manual or motorized mechanism
Protection Functions: Overcurrent, short circuit, and ground leakage protection with thermal-magnetic or electronic protection relays

Drawer and Fixed Air Circuit Breakers

There is no difference in terms of operation and protection between **drawer-type air circuit breakers** and **fixed air circuit breakers.** The only difference is that in drawer-type breakers, the drawer case and the main body can be separated from each other with the help of a handle, which allows for faster and easier maintenance and repair of the electrical system. Additionally, in drawer-type breakers, when in test mode, the breaker's maintenance and functionality can be checked without de-energizing the system.



Advantages

- Provides reliable protection due to its high short-circuit breaking capacity.
- Easy maintenance and replacement due to its modular design.
- Offers remote monitoring and control through electronic relays.
- Long-lasting due to its high-performance contact structure.
- Maintenance tasks are more convenient thanks to the drawer-type design.

Applications

Air circuit breakers are commonly used in the following areas:
- Industrial facilities and factories
- Energy distribution centers
- Large buildings and infrastructure systems
- Generator panels and critical backup systems
- Smart building distribution systems

As a result, air circuit breakers play a critical role in modern electrical systems due to their high current capacities and advanced protection features. Circuit breakers with smart and selective protection functions, such as the **XKoren XNV series,** enhance the reliability of the power supply and prevent unnecessary power outages. Proper selection and regular maintenance are crucial for the safety and continuity of the electrical system.

Short-Circuit Breaking Capacity and Thermal Withstand Current

Table 1 below shows the rated short-circuit breaking capacity and short-time withstand current of the Air Circuit Breaker (ACB). Since there is no arc propagation outside the ACB, the arc distance is considered as "zero".

Table 1: Short-Circuit Breaking Capacity

Rated Current (In) [A]		2000	3200	4000	6300
Ultimate Short-Circuit Breaking Capacity (Icu) (kA), O-CO	400V	80	100	100	120
	690V	50	65	65	85
Short-Time Making Current n × Icu (kA) / cosφ	400V	176/0.2	220/0.2	220/0.2	264/0.2
	690V	105/0.25	143/0.2	143/0.2	187/0.2
Service Breaking Capacity (Ics) (kA), O-CO-CO	400V	50	80	80	100
	690V	50	50	65	75
Short-Time Withstand Current (Icw) (kA), 1s, delay 0.4s, O-CO	400V	50	65	65/80 (MCR)	85/100 (MCR)
	690V	40	50	50/65 (MCR)	65/75 (MCR)

Note: Values in the table are valid for both line and load sides.

Continuous Current Ratings According to Ambient Temperature

Maximum power consumption: 360 W. Table 2 below shows the continuous current carrying capacity of the circuit breaker based on ambient temperature conditions.

Ambient Temperature (°C)	630A	800A	1000A	1250A	1600A	2000A	2500A	3200A	4000A	5000A	6300A
40	630A	800A	1000A	1250A	1600A	2000A	2500A	3200A	4000A	5000A	6300A
50	630A	800A	1000A	1250A	1550A	1900A	2300A	3000A	3800A	5000A	6300A
60	630A	800A	1000A	1250A	1550A	1800A	2200A	2800A	36000A	4800A	6100A

Protection Features and Functions of Overcurrent Relay

General Features

•The ACB provides **Long-Time Delay (Ir1), Short-Time Delay (Ir2), Instantaneous (Ir3),** and **Ground Fault (Ir4)** protection functions.

Table 3: Setting Ranges and Tolerances

Protection Type	Setting Range	Tolerance
Long-Time (Ir1)	(0.4–1) × In	±10%
Short-Time (Ir2)	(0.4–15) × In	±10%
Instantaneous (Ir3)	50kA, 75kA, 100kA	±15%
Ground Fault (Ir4)	(In = 2000–4000 A): 0.2–0.8 In (Max. 1200 A, Min. 160 A)	±10%
	(In = 6300 A): 0.2–1.0 In	±10%

Note: In applications requiring three-zone protection, care must be taken to avoid overlap of setting values.

Long-Time Delay Protection Feature

The long-time delay trip characteristic is defined by:

$I^2tL = (1.5 \times Ir1)^2 \times tL$

•For currents in the range of 1.05–2.0 × Ir1, the operating time is shown in Table 4.
•Time tolerance: ±15%.
•tL: Long-time delay setting time for 1.5 × Ir1
•TL: Actual operating time for long-time delay protection

Table 4: Typical Delay Times for 1.5 × Ir1 (in seconds)

1.05Ir1	1.3Ir1	1.5Ir1 (Set Time)	15	30	60	120	240	480
>2h no action	<1h no action	2Ir1 action time	8.4	16.9	33.7	67.5	135	270

Short-Time Delay Protection Feature

•The short-time protection is **definite-time** type.
•If inverse-time behavior is required, the system will automatically switch to definite-time mode for currents above 8 × Ir1.
•Time tolerance: ±15%.

Table 5: Fixed Delay and Reset Times

Delay Time (s)	0.1	0.2	0.3	0.4
Reset Time (s)	0.06	0.14	0.23	0.35

Functions of the Air Circuit Breaker

Ammeter Function

•The controller displays the instantaneous operating current of each phase as well as ground fault current.
•By default, the highest phase current is shown.
•Displayed information may include:
Configured parameter values
Test values
Fault current
Trip duration

Voltmeter Function

•The **line voltage of each phase** is measured and displayed.
•By default, the **maximum line voltage** is displayed.

Remote Monitoring and Self-Diagnosis Features

•The controller has **self-diagnostic capability** for internal faults.
•In case of a system fault, an error or alarm code (e.g., "E") may be generated, and the **computer system can be rebooted.**
•Upon user request, the **circuit breaker may be opened remotely.**
•If the **ambient temperature reaches 80°C**, the controller triggers an alarm and may issue a low-level trip command to disconnect the breaker.

•The **intelligent controller** provides output signals for:
Overload
Ground fault
Short-circuit
Load monitoring
Pre-alarm
Trip indicator (OCR)
These are available via **contactor** or **optocoupler** output.
•This enables **remote monitoring and control** for end users.
•**Contact Ratings:** DC 28V 3A / AC 125V 3A

Setting Function

All protection parameters can be configured via the **Set** and **Store** buttons on the controller:

1.Press the **Set** button to select the desired mode (modes are indicated by LEDs).
2.Adjust the desired parameter value using the **+ / –** buttons.
3.Press the Store button to save the value (the **Store LED** blinks once to confirm the action).
4.Parameters should **not be adjusted in a cross-linked manner** without considering interdependencies.
5.After resetting the controller, previously configured parameters can be checked again using the **Set** button.

Test Function

The controller's protection functions can be tested using the **Set, Trip, Non-Trip, and Reset** buttons:

•A simulated fault test current can be set using the Set and **+ / –** buttons (this value is **not stored)**.
•Press **Trip or Non-Trip** to initiate the test:
Trip: The circuit breaker opens.
Non-Trip: The circuit breaker does not open; only the indicator is tested.
•After each test, press **Reset or Clear** before starting another test.

Note: Regardless of the ground fault trigger/alarm mode, the system will interpret the test as a trip signal. However, it has lower priority compared to overload protection.
Wiring Diagram
•If a fault is detected during the test, the controller **automatically aborts** the process and enters **fault mode.**

Load Monitoring Function

•The device offers two load monitoring levels:
ILc1 setting range: (0.2 – 1) × In
ILc2 setting range: (0.2 – 1) × In

ILc1 Delay Characteristics:
•**Inverse time delay**
•Time setting: ½ **of the long-time delay setting**

ILc2 Delay Characteristics:
1.Inverse time delay: ¼ of the long-time delay setting
2.Definite time delay: Fixed at **60 seconds**

Protection Scenario:
•When the ILc1 level is exceeded**, non-critical loads are disconnected gradually.**
•This ensures **power continuity** for critical loads and the main circuit.
•When the current drops below the **ILc2** threshold, **previously disconnected loads are reconnected with a delay.**
•The user may select **either of the two monitoring functions.**

Protection characteristics are illustrated in **Figures 3 and 4.**

MCR Trip and Simulated Trip Protection

•The **MCR (Manual Controlled Release) protection and simulated trip function** can be **disabled upon user request.**
•These functions are typically **disabled during short-time delay tripping tests.**

Low-Level Short-Circuit and High-Level Instantaneous Tripping

•The device performs the tripping operation even under low-level short-circuit current conditions.
•In the event of an extremely high short-circuit current, a direct trip signal is issued without activating the processor.

Thermal Memory Function

•After an overload or short-time delay tripping, the device is equipped with a thermal memory function that simulates the behavior of a bimetal element.
•Retention times in memory:
Overload energy: 30 minutes
Short-time delay energy: 15 minutes
•If another fault occurs during this retention period, the trip time will be reduced.
•When the device is de-energized, the thermal memory is automatically reset.

Overcurrent Tripping Protection Characteristic Curve

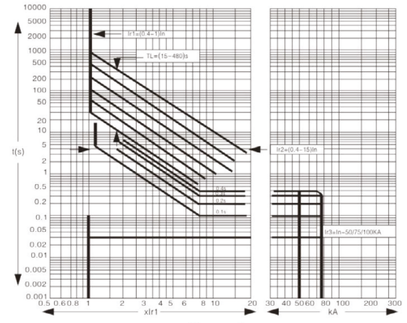


Figure 1

Load-Dependent Values (1)

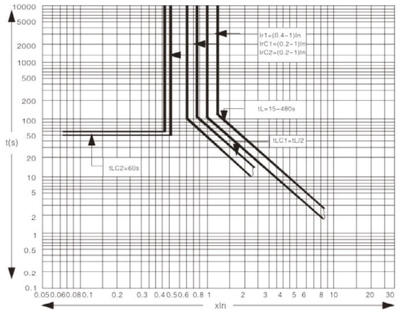


Figure3

Ground Fault Protection Characteristic

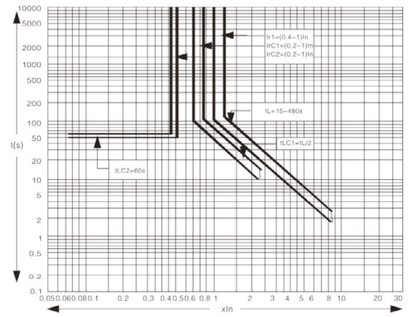


Figure3

Load-Dependent Values (2)

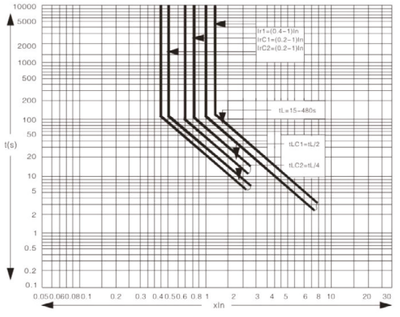


Figure4

Operating Performance of Air Circuit Breakers

The operating performance of an air circuit breaker is expressed in terms of the number of operation cycles, as shown in Table 6.

Table 6 - Total Number of Operation Cycles

Rated Current (A)	Total Number of Operation Cycles
2000	10,000
3200 / 4000	5,000
6300	2,000

Shunt Trip Coil, Undervoltage Trip Coil, Motor Operating Mechanism, and Intelligent Control Unit

The rated operating voltage and power consumption of the shunt trip coil, undervoltage trip coil, motor operating mechanism, closing coil, and intelligent control unit are provided in Table 7.

Table 7 - Rated Operational Voltage and Required Power

Required Power \ Rated Voltage			AC (50Hz) Voltage		DC Voltage	
			220V	380V	110V	220V
Shunt Trip Coil			24 VA	36 VA	24 W	24 W
Undervoltage Trip Coil			24 VA	36 VA	-	-
Closing Coil (Electromagnet)			24 VA	36 VA	24 W	24 W
Electric Operating Mechanism	Rated Frame Current	2000A	85VA	85VA	85W	85W
		3200A-4000A	110VA	110VA	110W	110W
		6300A	150VA	150VA	150W	150W
Inteligent Controller Supply Voltage			AC220V ,AC380V, DC220V ,DC110V			

Note: The reliable operating voltage range for the trip coils is 70%-110% of the rated voltage. For the closing coil and motor operating mechanism, the reliable voltage range is 85%-110% of the rated voltage.

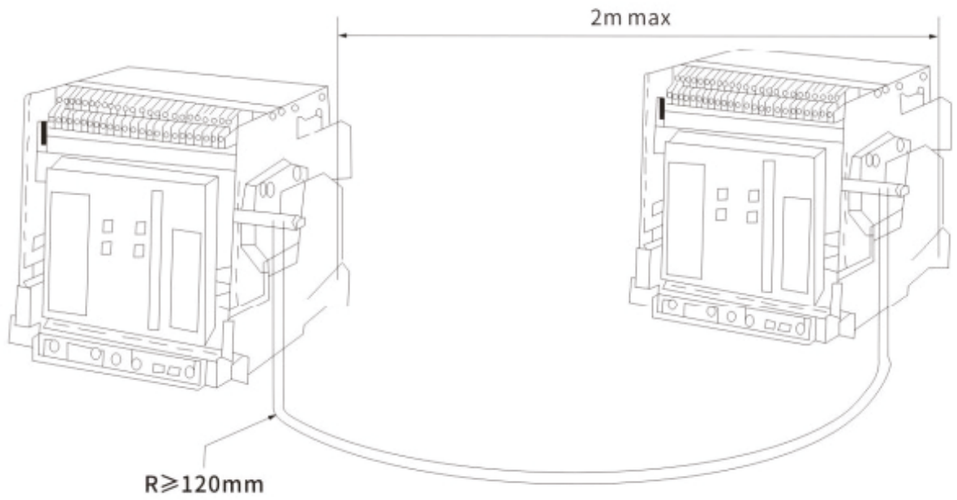
Undervoltage Trip Coil

Category		Delayed Undervoltage Trip Coil	
Trip Delay Time		1, 3, 5 seconds delay	Instantaneous
Tripping Voltage Thresholds	%35-%70Ue	Circuit breaker trips reliably	
	≤35 %Ue	Circuit breaker cannot close	
	(85-110%) Ue	Circuit breaker closes reliably	
If the supply voltage recovers to 85% of Ue within half of the preset delay time, tripping will not occur.		Circuit breaker cannot close	-

Note: The accuracy of the delay time is ±10%.

Mechanical Interlocking Unit

The wire-type mechanical interlock is used to cross-lock two circuit breakers in horizontal or vertical configurations. Its purpose is to prevent the unintentional closing of one breaker when the other is already in the ON (closed) position.



Operation and Commissioning

Before connecting terminal blocks, follow the steps below to check the breaker mechanism:

1.Move the handle on the breaker up and down until a “click” sound is heard.
After the click is heard, the handle will move freely.
2.When the charging mechanism is fully energized, the breaker is ready to close.
The energy storage indicator will show "Charged".
3.Press the I (PUSH ON) button to close the breaker contacts.
The ON-OFF indicator changes to ON.
The charging mechanism status changes to "Discharged".
4.Press the O (PUSH OFF) button to open the breaker contacts.
The ON-OFF indicator changes to OFF.
The energy status of the charging mechanism remains "Discharged".

Note:
In circuit breakers equipped with a motorized charging mechanism, the mechanism is automatically recharged by the motor after every ON-OFF operation. Therefore, the breaker is always ready for closing.

Reset and Parameter Setting Instructions

General Instructions:
1.Before switching the circuit breaker ON, press the “Clear light” button to return the controller to normal mode.
2.Then press the mechanical “Reset” button to enable operation.
3.If custom settings are required, they must be specified at the time of order. Otherwise, the default factory settings are as follows:
- **Long-time delay (Ir1):** 1.0 × In
  Time for 1.5 × Ir1: 15 seconds
- **Short-time delay (Ir2):** 8 × Ir1
  Time delay: 0.4 seconds (for In ≥ 4000 A)
- **Instantaneous trip (Ir3):** 12 × In (for In ≥ 4000 A)
- **Ground fault protection (Ir4):** 0.4 × In
  Time delay: 0.2 seconds

Control Panel Functions
1.Reset Button:
Must be pressed once after the breaker trips due to a fault, in order to re-close the breaker.

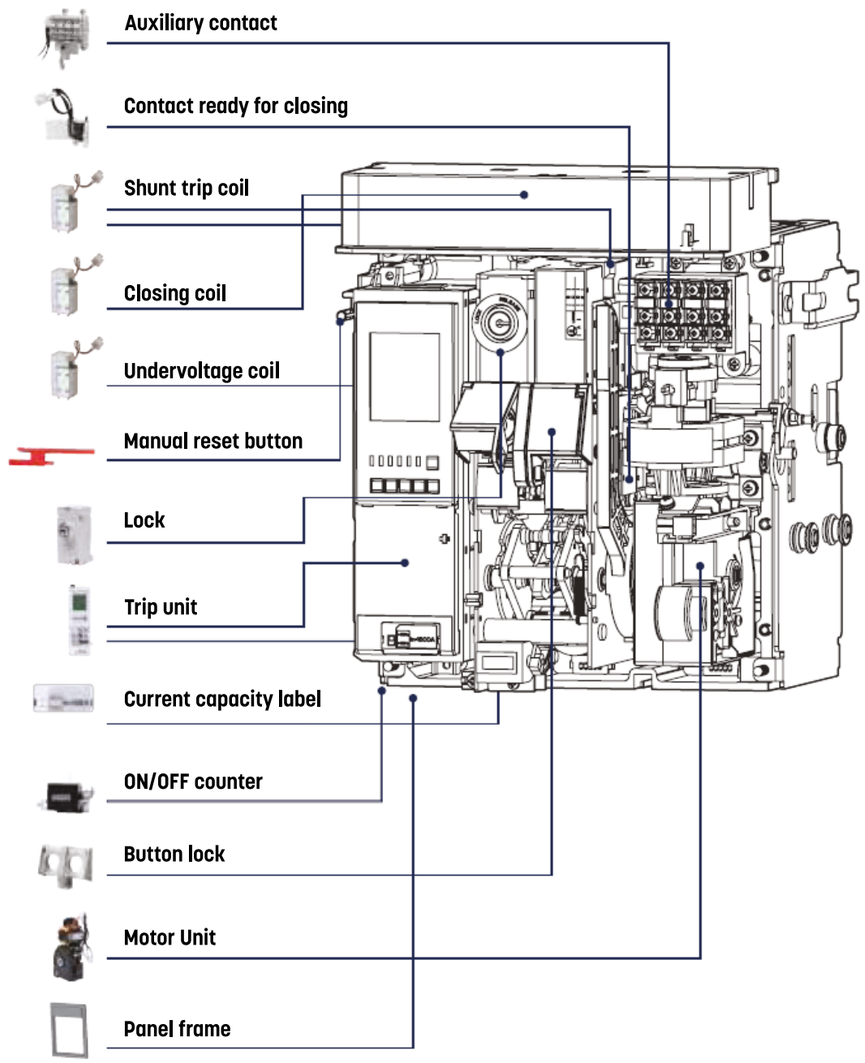
If not pressed, the breaker cannot be closed.

2.Voltage/Time Display:
Displays voltage or time values, depending on the operating mode.
3.Option Button:
In normal operation, it cyclically displays voltage values.
In the event of a fault or during fault checking, it cyclically displays fault current or trip time.
4.LED Indicator:
Shows various status information and categories.
5.Clear Light Button:
Must be pressed after setting, testing, or before closing the breaker.
Ensures that the tripping mechanism remains in normal operating condition.
6.Set Button:
Used to check or configure current- and time-based protection characteristics.
Also allows navigation between different configuration modes.
7.Fault Check Button:
After pressing the Clear Light button, press this button to display the last fault condition, including the fault current and/or trip time.
Use the “Option” button to toggle between values.

8.Trip and Non-Trip Buttons:
Used for testing protection functions.
Trip: Initiates a test that opens the breaker.
Non-Trip: Initiates a test without opening the breaker (for indicator check).
9.Store and "+" Buttons:
Used to set and confirm current or time protection parameters.

Protection Settings:
Ir4 Ground fault protection current setting
Ir1 Long-time delay current setting
Ir2 Short-time delay current setting
Ir3 Instantaneous current setting
tG Ground fault protection time setting
tL Long-time delay trip time setting
tS Short-time delay trip time setting

ACCESSORIES



ACCESSORIES

XKoren Air Circuit Breakers (ACBs) can be equipped with a variety of modular accessories. These accessories enhance the functionality of the breaker, ensuring safe and efficient power management.

1.Undervoltage Trip Unit (UVT)
Automatically trips the breaker when the supply voltage drops below a defined threshold.
Enhances system safety by protecting the circuit during sudden voltage failures.

2.Delayed Undervoltage Trip Unit
Prevents immediate tripping during short-term voltage dips by introducing a delay.
Protects against transient voltage fluctuations.

3.Auxiliary Contact (AX)
Used to monitor the ON, OFF, or TRIPPED status of the breaker.
Suitable for remote signaling and status indication.

4.Motorized Operating Mechanism (MCH)
Allows remote closing and opening of the circuit breaker.
Ideal for high-power applications where manual operation is difficult.

5.Closing Coil (CC)

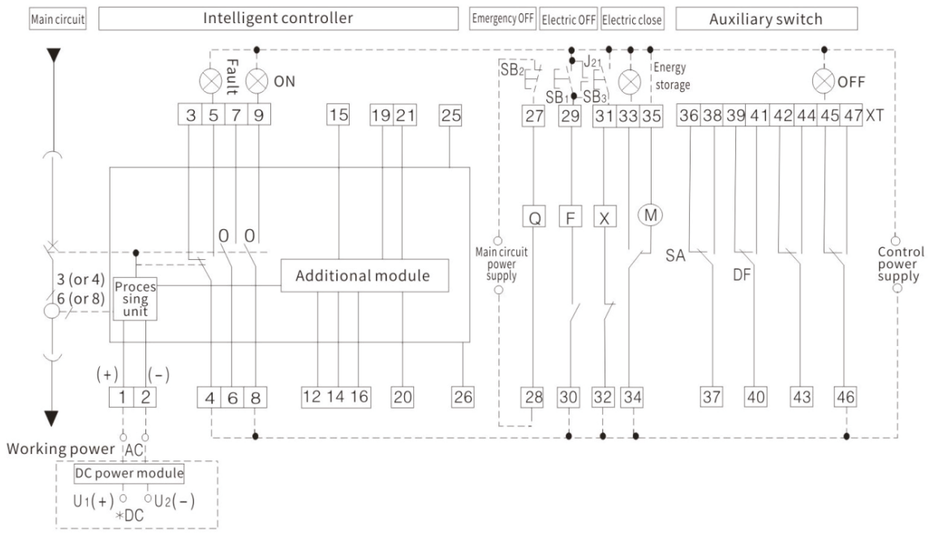
Enables the remote closing of the breaker.
Integrates easily with automation and control systems for remote operation.

6.Mechanical Interlock (MI)
Prevents simultaneous closing of two breakers within the same system.
Ensures safety and is critical in transfer or interlocking systems.

7.Shunt Trip Coil (STC)
Allows remote tripping of the circuit breaker.
Can be linked with overcurrent, residual current, or other protective devices for coordinated protection.

XKoren air circuit breakers offer flexible installation options and are suitable for a wide range of industrial applications.
By selecting the appropriate accessories, users can customize and optimize power management based on their system requirements.

Cable Connection Terminals



Notes and Terminal Descriptions

1.Note 1:

If the control supply voltages of components F, X, and M are different, they must be connected to separate power sources (Each component must have its own independent power input).

2.Note 2:
Terminal #35 can either:
•Be connected directly to the power supply for automatic energy pre-storage mode, or
•Be connected through a normally open (NO) push button in series to the power supply for manual energy pre-storage mode.

3.Note 3:
If requested by the user, a normally closed (NC) contact output can be provided via terminals #6 and #7.

4.Note 4:
When the intelligent controller operates with DC power, it is mandatory to add a DC power module. In this case, terminals #1 and #2 must not be connected directly to the AC power supply.

5.Note 5:
•**Secondary connection of the DC power module:**
Input: Connect the DC power source (e.g., DC110V or DC220V) to terminals U1 (+) and U2 (–).
Output: Connect the two output terminals of the DC module to secondary base terminals 1 (+) and 2 (–).

Component Definitions:
•**SB1:** Trip push button (for shunt release)
•**SB2:** Undervoltage trip push button
•**SB3:** Close push button
•**X:** Closing electromagnet
•**M:** Energy storage motor
•**XT:** Terminal block (connection terminal)
•**Q:** Undervoltage trip or delayed undervoltage trip mechanism
•**O:** Normally open (NO) contact - rated up to 3A/AC380V
•**Signal Lamp:** Must be provided by the user（ ）
•**DF:** Auxiliary Contact
• **F:** Shunt Release.
•**SA:** Motor Micro Switch

ORDER LIST

Air Circuit Breaker

Fixed-Motorized (3P)

Type (Order) Code	Rated Current (In)	Explanation	Box Quantity	Carton Quantity
XNV 3FM65-2000-1000	1000A	3P Fixed-Motorized 65kA 2000 Frame 1000A	1	1
XNV 3FM65-2000-1250	1250A	3P Fixed-Motorized 65kA 2000 Frame 1250A	1	1
XNV 3FM65-2000-1600	1600A	3P Fixed-Motorized 65kA 2000 Frame 2000A	1	1
XNV 3FM65-2000-2000	2000A	3P Fixed-Motorized 85kA 2000 Frame 3200A	1	1
XNV 3FM85-3200-2500	2500A	3P Fixed-Motorized 85kA 3200 Frame 2500A	1	1
XNV 3FM85-3200-3200	3200A	3P Fixed-Motorized 85kA 3200 Frame 4000A	1	1
XNV 3FM100-4000-4000	4000A	3P Fixed-Motorized 100kA 4000 Frame 4000A	1	1
XNV 3FM100-6300-5000	5000A	3P Fixed-Motorized 100kA 4000 Frame 5000A	1	1
XNV 3FM100-6300-6300	6300A	3P Fixed-Motorized 100kA 4000 Frame 6000A	1	1

*Our prices include the trip coil, closing coil and motor.

Fixed-Motorized (4P)

Type (Order) Code	Rated Current (In)	Explanation	Box Quantity	Carton Quantity
XNV 4FM65-2000-1000	1000A	4P Fixed-Motorized 65kA 2000 Frame 1000A	1	1
XNV 4FM65-2000-1250	1250A	4P Fixed-Motorized 65kA 2000 Frame 1250A	1	1
XNV 4FM65-2000-1600	1600A	4P Fixed-Motorized 65kA 2000 Frame 2000A	1	1
XNV 4FM65-2000-2000	2000A	4P Fixed-Motorized 85kA 2000 Frame 3200A	1	1
XNV 4FM85-3200-2500	2500A	4P Fixed-Motorized 85kA 3200 Frame 2500A	1	1
XNV 4FM85-3200-3200	3200A	4P Fixed-Motorized 85kA 3200 Frame 4000A	1	1
XNV 4FM100-4000-4000	4000A	4P Fixed-Motorized 100kA 4000 Frame 4000A	1	1
XNV 4FM100-6300-5000	5000A	4P Fixed-Motorized 100kA 4000 Frame 5000A	1	1
XNV 4FM100-6300-6300	6300A	4P Fixed-Motorized 100kA 4000 Frame 6000A	1	1

*Our prices include the trip coil, closing coil and motor.

Withdrawable-Motorized (3P)

Type (Order) Code	Rated Current (In)	Explanation	Box Quantity	Carton Quantity
XNV 3DM65-2000-1000	1000A	3P Withdrawable-Motorized 65kA 2000 Frame 1000A	1	1
XNV 3DM65-2000-1250	1250A	3P Withdrawable-Motorized 65kA 2000 Frame 1250A	1	1
XNV 3DM65-2000-1600	1600A	3P Withdrawable-Motorized 65kA 2000 Frame 2000A	1	1
XNV 3DM65-2000-2000	2000A	3P Withdrawable-Motorized 85kA 2000 Frame 3200A	1	1
XNV 3DM85-3200-2500	2500A	3P Withdrawable-Motorized 85kA 3200 Frame 2500A	1	1
XNV 3DM85-3200-3200	3200A	3P Withdrawable-Motorized 85kA 3200 Frame 4000A	1	1
XNV 3DM100-4000-4000	4000A	3P Withdrawable-Motorized 100kA 4000 Frame 4000A	1	1
XNV 3DM100-6300-5000	5000A	3P Withdrawable-Motorized 100kA 4000 Frame 5000A	1	1
XNV 3DM100-6300-6300	6300A	3P Withdrawable-Motorized 100kA 4000 Frame 6000A	1	1

*Our prices include the trip coil, closing coil and motor.

Withdrawable-Motorized (3P)

Type (Order) Code	Rated Current (In)	Explanation	Box Quantity	Carton Quantity
XNV 4DM65-2000-1000	1000A	4P Withdrawable-Motorized 65kA 2000 Frame 1000A	1	1
XNV 4DM65-2000-1250	1250A	4P Withdrawable-Motorized 65kA 2000 Frame 1250A	1	1
XNV 4DM65-2000-1600	1600A	4P Withdrawable-Motorized 65kA 2000 Frame 2000A	1	1
XNV 4DM65-2000-2000	2000A	4P Withdrawable-Motorized 85kA 2000 Frame 3200A	1	1
XNV 4DM85-3200-2500	2500A	4P Withdrawable-Motorized 85kA 3200 Frame 2500A	1	1
XNV 4DM85-3200-3200	3200A	4P Withdrawable-Motorized 85kA 3200 Frame 4000A	1	1
XNV 4DM100-4000-4000	4000A	4P Withdrawable-Motorized 100kA 4000 Frame 4000A	1	1
XNV 4DM100-6300-5000	5000A	4P Withdrawable-Motorized 100kA 4000 Frame 5000A	1	1
XNV 4DM100-6300-6300	6300A	4P Withdrawable-Motorized 100kA 4000 Frame 6000A	1	1

*Our prices include the trip coil, closing coil and motor.

GENERAL PRODUCT CATALOG

Xoren electric Explanation

AIR CIRCUIT BREAKER (ACB)

E Series

Fixed-Motorized (3P)

Type (Order) Code	Rated Current (In)	Explanation	Box Quantity	Carton Quantity
XNV 3FM42-2000-800	800A	3P Fixed-Motorized 42kA 2000 Frame 800A	1	1
XNV 3FM42-2000-1000	1000A	3P Fixed-Motorized 42kA 2000 Frame 1000A	1	1
XNV 3FM42-2000-1250	1250A	3P Fixed-Motorized 42kA 2000 Frame 1250A	1	1
XNV 3FM42-2000-1600	1600A	3P Fixed-Motorized 42kA 2000 Frame 1600A	1	1

*Our prices include the trip coil, closing coil and motor.

Fixed-Motorized (4P)

Type (Order) Code	Rated Current (In)	Explanation	Box Quantity	Carton Quantity
XNV 4FM42-2000-800	800A	4P Fixed-Motorized 42kA 2000 Frame 800A	1	1
XNV 4FM42-2000-1000	1000A	4P Fixed-Motorized 42kA 2000 Frame 1000A	1	1
XNV 4FM42-2000-1250	1250A	4P Fixed-Motorized 42kA 2000 Frame 1250A	1	1
XNV 4FM42-2000-1600	1600A	4P Fixed-Motorized 42kA 2000 Frame 1600A	1	1

*Our prices include the trip coil, closing coil and motor.

Withdrawable-Motorized (3P)

Type (Order) Code	Rated Current (In)	Explanation	Box Quantity	Carton Quantity
XNV 3DM42-2000-800	800A	3P Withdrawable-Motorized 42kA 2000 Frame 800A	1	1
XNV 3DM42-2000-1000	1000A	3P Withdrawable-Motorized 42kA 2000 Frame 1000A	1	1
XNV 3DM42-2000-1250	1250A	3P Withdrawable-Motorized 42kA 2000 Frame 1250A	1	1
XNV 3DM42-2000-1600	1600A	3P Withdrawable-Motorized 42kA 2000 Frame 1600A	1	1

*Our prices include the trip coil, closing coil and motor.

Fixed-Motorized (4P)

Type (Order) Code	Rated Current (In)	Explanation	Box Quantity	Carton Quantity
XNV 4DM42-2000-800	800A	4P Withdrawable-Motorized 42kA 2000 Frame 800A	1	1
XNV 4DM42-2000-1000	1000A	4P Withdrawable-Motorized 42kA 2000 Frame 1000A	1	1
XNV 4DM42-2000-1250	1250A	4P Withdrawable-Motorized 42kA 2000 Frame 1250A	1	1
XNV 4DM42-2000-1600	1600A	4P Withdrawable-Motorized 42kA 2000 Frame 1600A	1	1

*Our prices include the trip coil, closing coil and motor.

Air Circuit Breaker Accessories

Motor Mechanism

Type (Order) Code	Coil Operating Voltage	Explanation	Box Quantity	Carton Quantity
XNV-MOT	AC200~250V	Motorized Mechanism	1	10

Closing Coil

Type (Order) Code	Coil Operating Voltage	Explanation	Box Quantity	Carton Quantity
XNV-NC	AC/DC 200~250V	Closing Coil	2	20

Shunt Trip Coil

Type (Order) Code	Coil Operating Voltage	Explanation	Box Quantity	Carton Quantity
XNV-NA	AC/DC 200~250V	Shunt Trip Coil	2	20

Undervoltage Coil

Type (Order) Code	Coil Operating Voltage	Explanation	Box Quantity	Carton Quantity
XNV-LVS	AC/DC 200~250V	Auxiliary Contact Blocks	2	20
XNV-LVT	AC/DC 200~250V	Auxiliary Contact Blocks (Time Delayed)	2	20
XNV-LVTM	AC/DC 380~480V	Time Delay Module	2	20

Auxiliary Contact Blocks

Type (Order) Code	Auxiliary Contact	Explanation	Box Quantity	Carton Quantity
XNV-AC	5A5K	Auxiliary Contact	1	10

Mechanical Lock Unit

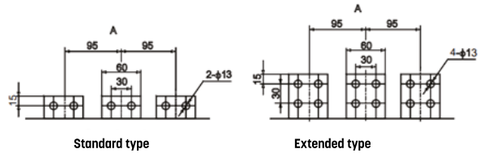
Type (Order) Code	Explanation	Box Quantity	Carton Quantity
XNV-MEK	Mechanical Lock	1	10

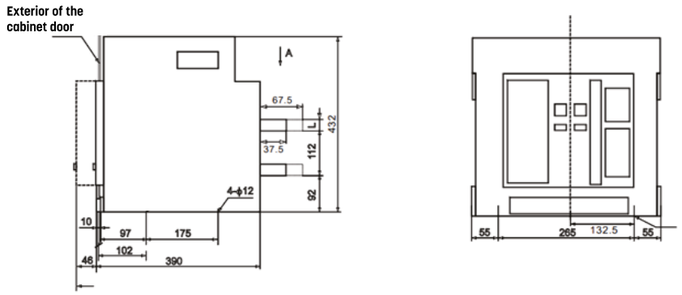
DIMENSIONS

XNV AIR CIRCUIT BREAKER (ACB)

XKN 2000 3P Drawer Type

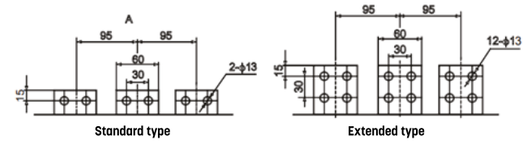
Current Evaluation	L(mm)
2000A	20
1000A-1600A	15

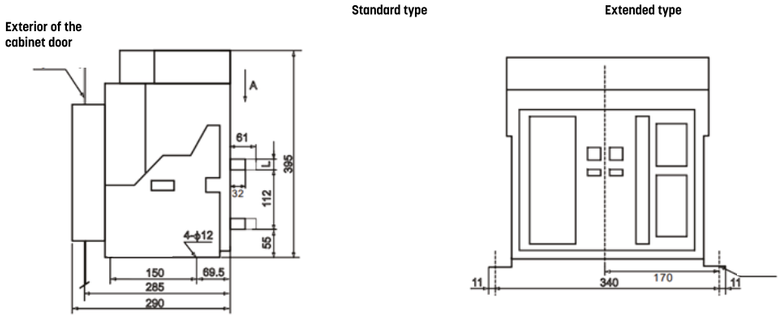




XKN 2000 3P Fixed Type

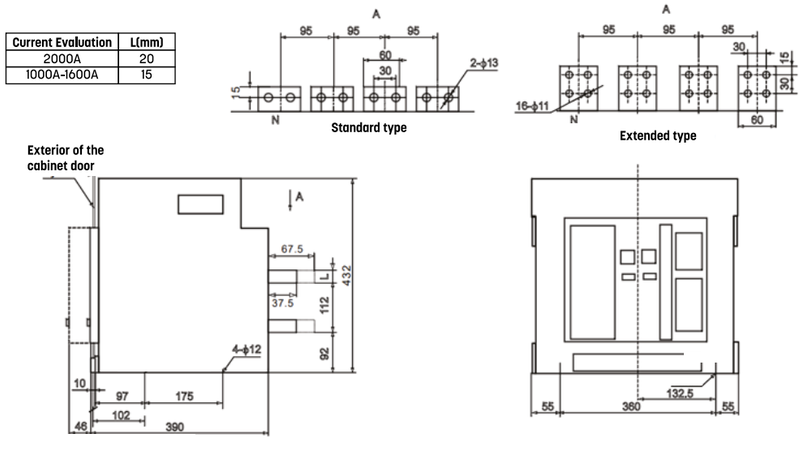
Current Evaluation	L(mm)
2000A	20
1000A-1600A	15





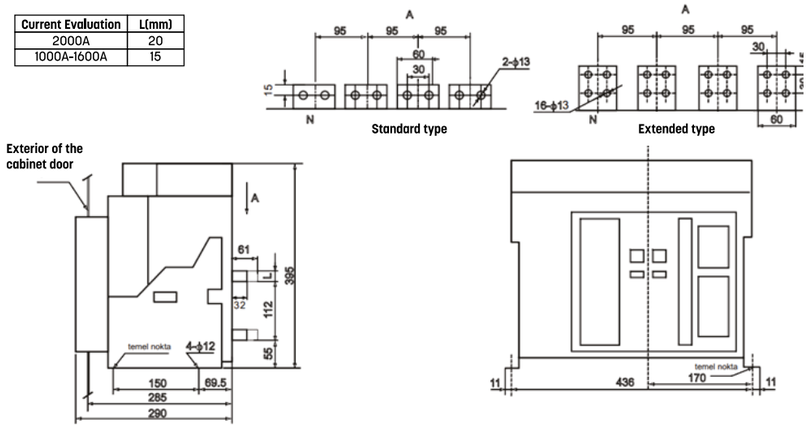
XKN 2000 4P Drawer Type

Current Evaluation	L(mm)
2000A	20
1000A-1600A	15



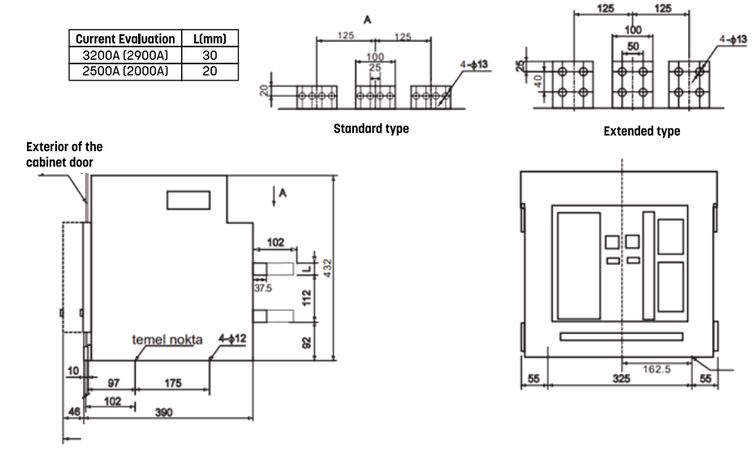
XKN 2000 4P Fixed Type

Current Evaluation	L(mm)
2000A	20
1000A-1600A	15



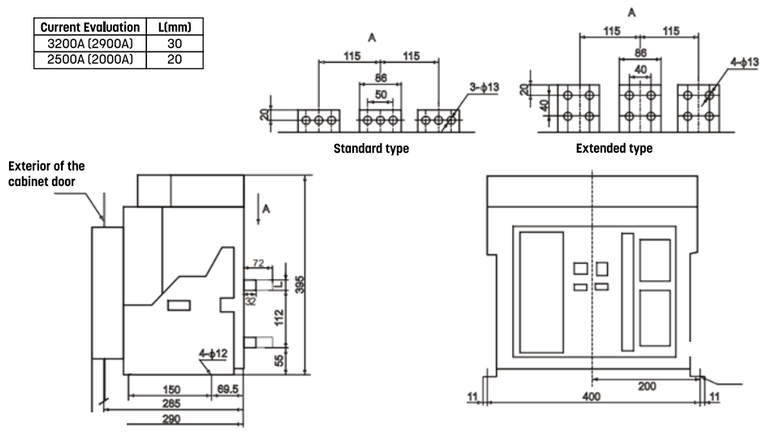
XKN 3200 3P Drawer Type

Current Evaluation	L(mm)
3200A (2900A)	30
2500A (2000A)	20



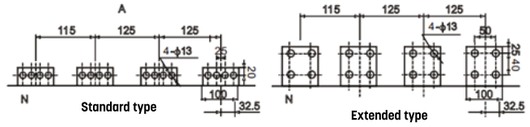
XKN 3200 3P Fixed Type

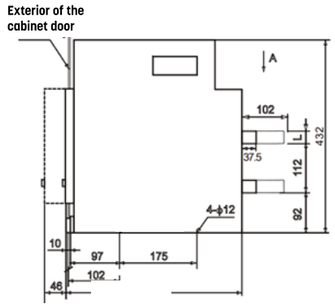
Current Evaluation	L(mm)
3200A (2900A)	30
2500A (2000A)	20

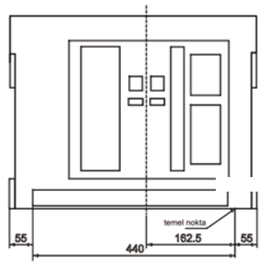


XKN 3200 4P Drawer Type

Current Evaluation	L(mm)
3200A (2900A)	30
2500A (2000A)	20

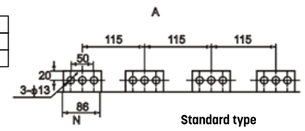


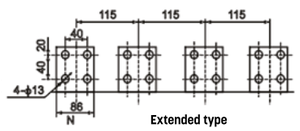


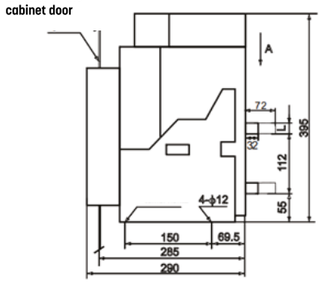


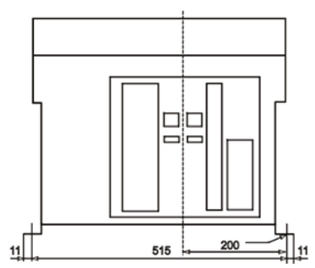
XKN 3200 4P Fixed Type

Current Evaluation	L(mm)
3200A (2900A)	30
2500A (2000A)	20



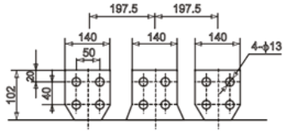


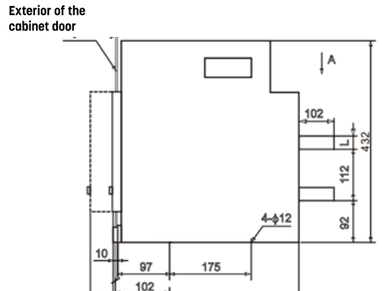


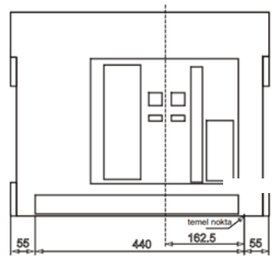


XKN 4000 3P Drawer Type

Current Evaluation	L(mm)
4000A	30
3600A	30

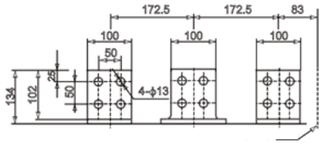


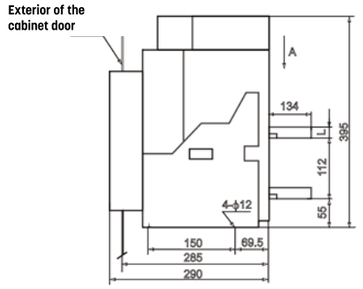


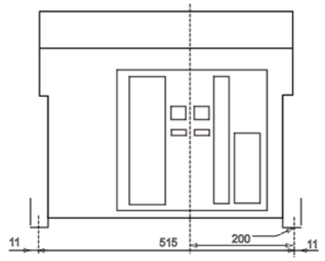


XKN 4000 3P Fixed Type

Current Evaluation	L(mm)
4000A	30
3600A	30

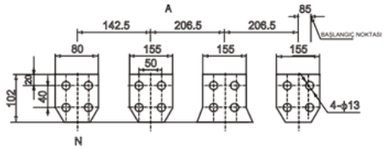


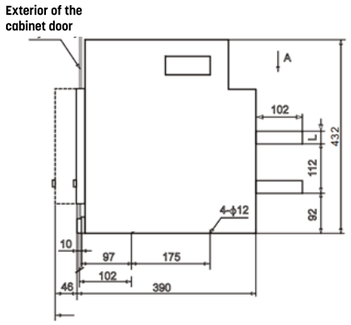


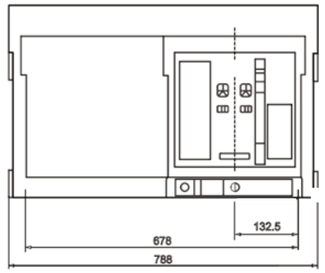


XKN 4000 4P Fixed Type

Current Evaluation	L(mm)
4000A	20
3600A	20

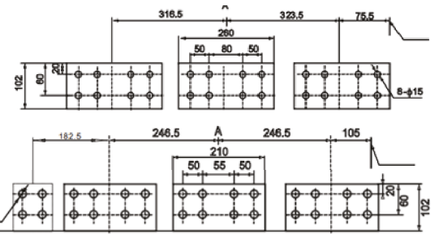


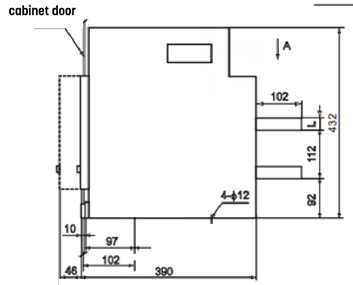


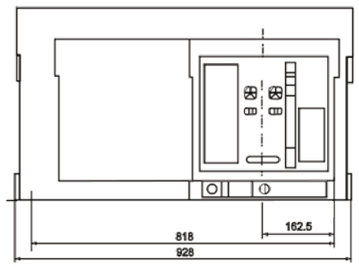


XKN 6300 3P (5000A/4000A 4P) Drawer Type

Current Evaluation	L(mm)
6300A	30
5000A	30
4000A	20

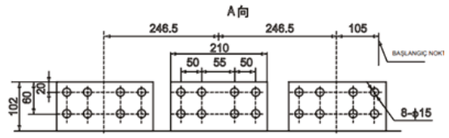


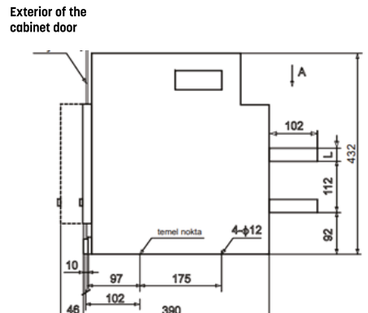


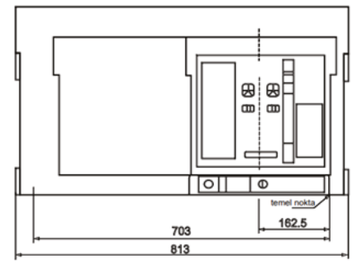


XKN 6300 3P (5000A/4000A) Drawer Type

Current Evaluation	L(mm)
5000A	30
4000A	20

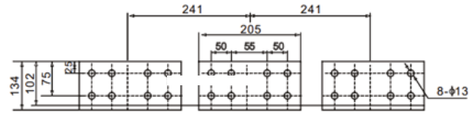


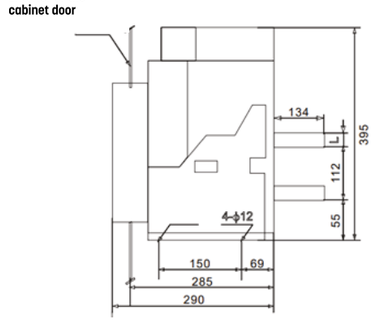


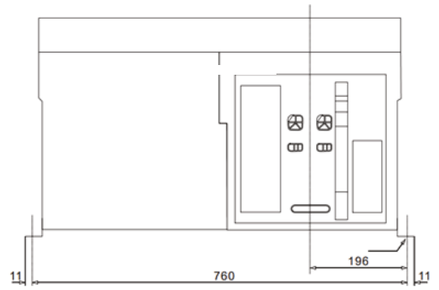


XKN 6300 3P (5000A/4000A) Fixed Type

Current Evaluation	L(mm)
5000A	30
4000A	20







VALID FOR ALL OUR PRODUCTS
2 YEARS WARRANTY

CONTACTORS

X Koren Electric offers a comprehensive range of contactors for complex applications.

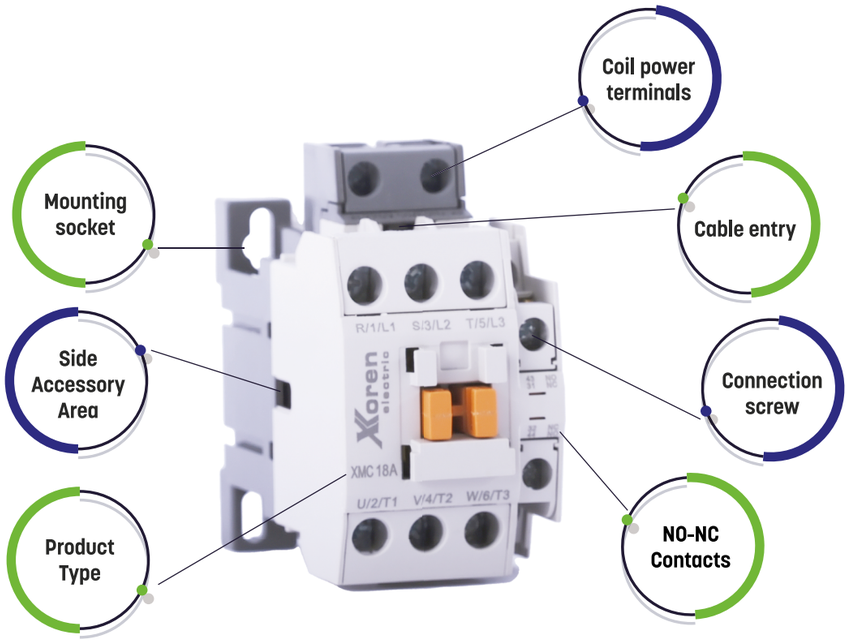
The XMC Contactor Series revolutionizes the way contactors are used, enabling reliable operation worldwide.

With the XLC Contactor Series, X Koren Electric meets low-voltage contactor requirements at the highest level, while the DC models provide advanced solutions contributing to the renewable energy sector. With the new "Smart Contactor," X Koren Electric offers a compact design that integrates 3 contactors and 1 relay in a single unit. This design saves wiring space in electrical plans and provides cost savings by eliminating the need for multiple products.

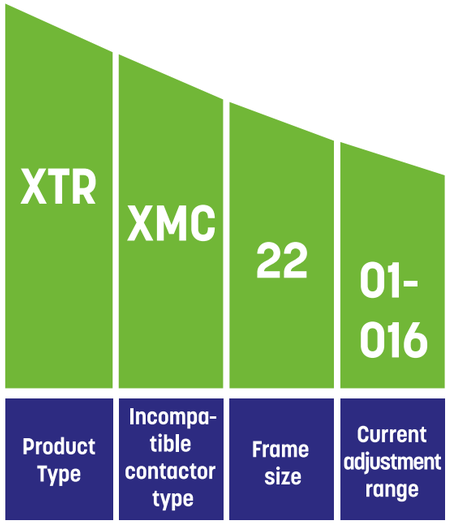


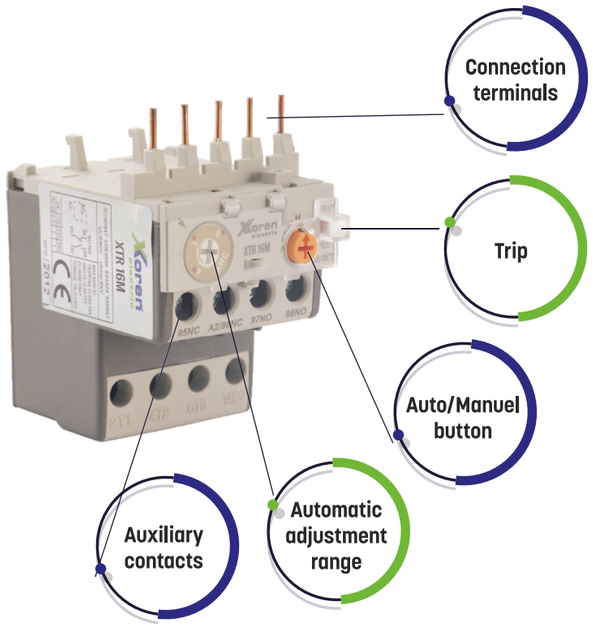
Product Code and Label Information

XMC	C	3	AC	220	22	009
Product Type	Compen-sation	Number of poles	Current type	Operating voltage	Frame size	Rated Current



CONTACTORS





GENERAL PRODUCT CATALOG

CONTACTORS

XMC Series 3P Magnetic Power Contactors

3P Magnetic Power Contactors / XMC Series			Symbol	Unit	XMC										
					22 Frame				40 Frame		85 Frame				100 Frame
Type					XMC 9/3	XMC 12/3	XMC 18/3	XMC 22/3	XMC 32/3	XMC40/3	XMC 50/3	XMC 65/3	XMC 75/3	XMC 85/3	XMC 100/3
Number of Poles				P	3										
Rated Operational Voltage			Ue	VAC	24, 48, 220										220
Rated Insulation Voltage			Ui	V	690						1000				
Rated Impulse Withstand Voltage			Uimp	kV	8										
Operating Frequency				Hz	50/60										
Rated Thermal Current	AC-1			A	25	25	40	40	50	60	80	100	110	135	150
Current and Power Ratings	AC-3	200/240V		kW	2.5	3.5	4.5	5.5	7.5	11	15	18.5	22	25	30
				A	11	13	18	22	32	40	55	65	75	85	105
		380/440V		kW	4	5.5	7.5	11	15	18.5	22	30	37	45	55
				A	9	12	18	22	32	40	50	65	75	85	100
		500/550V		kW	4	7.5	7.5	15	18.5	22	30	33	37	45	55
				A	7	12	13	22	28	32	43	60	65	75	85
		690V		kW	4	7.5	7.5	15	18.5	22	30	33	37	45	55
				A	5	9	9	18	20	23	28	35	42	45	65
	AC-5a			A	14	16	25	30	40	55	80	85	105	115	125
Standards					IEC EN 60947-4-1										
Operating Temperature Range				°C	-25...+55										
Storage Temperature Range				°C	-40...+70										
Electrical Life				op.	2.000.000										
Mechanical Lifet				op.	20.000.000										
Maximum Operating Period				op/h	1800										
Maximum Terminal Tightening Torque				Nm	2				3.5						9
Accessories	Auxiliary Contacts (Standard)				1NO+1NC				2NO+2NC						-
	Auxiliary Contact Options				1NO+1NC, 2NO+2NC, 4NO, 4NC, 3NO+1NC, 1NO+3NC, 2NO, 2NC										1NO+1NC,2NO+2NC
	Side				✓										
	Top				✓										

XMC FV Series 3P Magnetic Power Contactors

3P Magnetic Power Contactors / XMC Series			Symbol	Unit	XMC			
					150 Frame		200 Frame	
Type					XMC 125/3	XMC 150/3	XMC 180/3	XMC 220/3
Number of Poles				P	3			
Rated Operational Voltage			Ue	VAC	100-240 AC / 100-220 DC			
Rated Insulation Voltage			Ui	V	1000			
Rated Impulse Withstand Voltage			Uimp	kV	8			
Operating Frequency				Hz	50/60			
Rated Thermal Current	AC-1		Ith	A	150	200	230	260
Current and Power Ratings	AC-3	200/240V		kW	37	45	55	75
				A	125	150	180	250
		380/440V		kW	60	75	90	132
				A	120	150	180	250
		500/550V		A	60	90	110	132
				kW	90	140	180	200
		690V		A	60	90	110	132
				kW	70	100	120	150
	AC-5a			A	150	180	220	260
Standards					IEC EN 60947-4-1			
Operating Temperature Range				°C	-25....+55			
Storage Temperature Range				°C	-40....+70			
Electrical Life				op.	500.000			
Mechanical Lifet				op.	10.000.000			
Maximum Operating Period				op/h	1800			
Maximum Terminal Tightening Torque				Nm	9			
Accessories	Auxiliary Contacts (Standard)				-			
	Auxiliary Contact Options				2NO+2NC			
	Side				-			
	Top				-			

XMC Series 4P Magnetic Power Contactors

4P Magnetic Power Contactors / XMC Series			Symbol	Unit	XMC									
					22 Frame				40 Frame		85 Frame			
Type					XMC 9/4	XMC 12/4	XMC 18/4	XMC 22/4	XMC 32/4	XMC40/4	XMC 50/4	XMC 65/4	XMC 75/4	XMC 85/4
Number of Poles				P	4									
Rated Operational Voltage			Ue	VAC	220									
Rated Insulation Voltage			Ui	V	690						1000			
Rated Impulse Withstand Voltage			Uimp	kV	8									
Operating Frequency				Hz	50/60									
Rated Thermal Current	AC-1		Ith	A	20	20	25	32	50	60	80	100	110	135
Current and Power Ratings	AC-3	400V		kW	4	5.5	7.5	11	15	18.5	22	30	37	45
				A	9	12	18	22	32	40	50	65	75	85
		690V		kW	4	7.5	7.5	15	18.5	22	30	33	37	45
				A	5	9	9	18	20	23	28	35	42	45
Standards					IEC EN 60947-4-1									
Operating Temperature Range				°C	-25...+55									
Storage Temperature Range				°C	-40...+70									
Electrical Life				op.	2.000.000									
Mechanical Lifet				op.	20.000.000									
Maximum Operating Period				op/h	1800									
Maximum Terminal Tightening Torque				Nm	2				3.5					
Accessories	Auxiliary Contacts (Standard)				-									
	Auxiliary Contact Options				1NO+1NC, 2NO+2NC									
	Side				✓									
	Top				✓									

XLC Series 3P Magnetic Power Contactors (9A-85A)

3P Magnetic Power Contactors / XLC Series			Symbol	Unit	XLC									
					22 Frame				40 Frame		85 Frame			
Type					XLC 9/3	XLC 12/3	XLC 18/3	XLC 22/3	XLC 32/3	XLC40/3	XLC 50/3	XLC 65/3	XLC 75/3	XLC 85/3
Number of Poles				P	3									
Rated Operational Voltage			Ue	VAC	220									
Rated Insulation Voltage			Ui	V	690									
Rated Impulse Withstand Voltage			Uimp	kV	8									
Operating Frequency				Hz	50/60									
Rated Thermal Current	AC-1		Ith	A	20	20	30	40	50	60	80	80	125	125
Current and Power Ratings	AC-3	400V		kW	4	5.5	7.5	11	15	18.5	22	30	37	45
				A	9	12	18	22	32	40	50	65	75	85
		690V		kW	5.5	7.5	10	15	18.5	30	37	37	45	45
				A	6.6	8.9	12	18	21	34	39	42	49	49
Standards					IEC EN 60947-4-1									
Operating Temperature Range				°C	-25...+55									
Storage Temperature Range				°C	-40...+70									
Electrical Life				op.	2.000.000									
Mechanical Lifet				op.	20.000.000									
Maximum Operating Period				op/h	1800									
Maximum Terminal Tightening Torque				Nm	2				3.5					
Accessories	Auxiliary Contacts (Standard)				1NO or 1NC									
	Auxiliary Contact Options				1NO+1NC, 2NO+2NC									
	Side				✓									
	Top				✓									

XLC Series 3P Magnetic Power Contactors (115A-1000A)

3P Magnetic Power Contactors / XLC Series			Symbol	Unit	XLC									
					115 Frame	150 Frame	185 Frame	225 Frame	265 Frame	330 Frame	400 Frame	500 Frame	630Frame	800 Kasa	1000 Kasa
Type					XLC 115/4	XLC 150/4	XLC 185/4	XLC 225/4	XLC 265/4	XLC 330/4	XLC 400/4	XLC 500/4	XLC 630/4	XLC 800/4	XLC 1000/4
Number of Poles				P	3										
Rated Operational Voltage			Ue	VAC	220										
Rated Insulation Voltage			Ui	V	690										
Rated Impulse Withstand Voltage			Uimp	kV	8										
Operating Frequency				Hz	50/60										
Rated Thermal Current	AC-1		Ith	A	200	200	275	280	350	360	430	580	850	850	1200
Current and Power Ratings	AC-3	400V		kW	55	75	90	110	132	160	200	250	335	400	500
				A	115	150	185	225	265	330	400	500	630	800	1000
		690V		kW	80	100	110	140	160	220	280	330	450	475	670
				A	70	90	108	115	170	190	235	290	360	486	-
Standards					IEC EN 60947-4-1										
Operating Temperature Range				°C	-25...+55										
Storage Temperature Range				°C	-40...+70										
Electrical Life				op.	2.000.000										
Mechanical Lifet				op.	20.000.000										
Maximum Operating Period				op/h	1800										
Maximum Terminal Tightening Torque				Nm	16										
Accessories	Auxiliary Contacts (Standard)				2NO+2NC										
	Auxiliary Contact Options				1NO+1NC, 2NO+2NC										

XLC Series 4P Magnetic Power Contactors (9A-85A)

4P Magnetic Power Contactors / XLC Series			Symbol	Unit	XLC									
					22 Frame				40 Frame		85 Frame			
Type					XLC 9/4	XLC 12/4	XLC 18/4	XLC 22/4	XLC 32/4	XLC40/4	XLC 50/4	XLC 65/4	XLC 75/4	XLC 85/4
Number of Poles				P	4									
Rated Operational Voltage			Ue	VAC	220									
Rated Insulation Voltage			Ui	V	690						1000			
Rated Impulse Withstand Voltage			Uimp	kV	8									
Operating Frequency				Hz	50/60									
Rated Thermal Current	AC-1		Ith	A	20	20	25	32	50	60	80	100	110	135
Current and Power Ratings	AC-3	400V		kW	4	5.5	7.5	11	15	18.5	22	30	37	45
				A	9	12	18	22	32	40	50	65	75	85
		690V		kW	4	7.5	7.5	15	18.5	22	30	33	37	45
				A	5	9	9	18	20	23	28	35	42	45
Standards					IEC EN 60947-4-1									
Operating Temperature Range				°C	-25...+55									
Storage Temperature Range				°C	-40...+70									
Electrical Life				op.	2.000.000									
Mechanical Lifet				op.	20.000.000									
Maximum Operating Period				op/h	1800									
Maximum Terminal Tightening Torque				Nm	2				3.5					
Accessories	Auxiliary Contacts (Standard)				-									
	Auxiliary Contact Options				1NO+1NC, 2NO+2NC									
	Side				✓									
	Top				✓									

XLC Series 4P Magnetic Power Contactors (115A-1000A)

4P Magnetic Power Contactors / XLC Series			Symbol	Unit	XLC										
					115 Kasa	150 Kasa	185 Kasa	225 Kasa	265 Kasa	330 Kasa	400 Kasa	500 Kasa	630 Kasa	1000 Kasa	1000 Kasa
Type					XLC 115/4	XLC 150/4	XLC 185/4	XLC 225/4	XLC 265/4	XLC 330/4	XLC 400/4	XLC 500/4	XLC 630/4	XLC 800/4	XLC 1000/4
Number of Poles				P	4										
Rated Operational Voltage			Ue	VAC	220										
Rated Insulation Voltage			Ui	V	690							1000			
Rated Impulse Withstand Voltage			Uimp	kV	8										
Operating Frequency				Hz	50/60										
Rated Thermal Current	AC-1		Ith	A	200	200	275	280	350	350	430	580	850	850	1200
Current and Power Ratings	AC-3	400V		kW	55	75	90	110	132	132	200	250	335	400	500
				A	115	150	185	225	265	265	400	500	630	800	1000
		690V		kW	80	100	110	140	160	160	280	330	450	475	670
				A	70	90	108	115	170	170	235	290	360	486	-
Standards					IEC EN 60947-4-1										
Operating Temperature Range				°C	-25....+55										
Storage Temperature Range				°C	-40....+70										
Electrical Life				op.	2.000.000										
Mechanical Lifet				op.	20.000.000										
Maximum Operating Period				op/h	1800										
Maximum Terminal Tightening Torque				Nm	16										
Accessories	Auxiliary Contacts (Standard)				-										
	Auxiliary Contact Options				2NO+2NC										

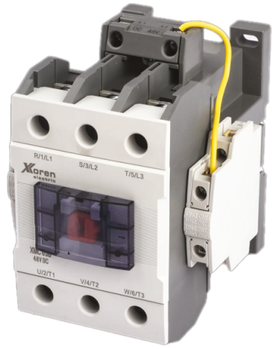
XMC C Series 3P Compensation Contactors

3P Power Factor Correction Contactors / XMC C Series			Symbol	Unit	XLC									
					22 Frame				40 Frame		85 Frame			
Type					XMC C3/9	XMC C3/12	XMC C3/18	XMC C3/22	XMC C3/32	XMC C3/40	XMC C3/50	XMC C3/65	XMC C3/75	XMC C3/85
Number of Poles				P	3									
Rated Operational Voltage			Ue	VAC	220									
Rated Insulation Voltage			Ui	V	690						1000			
Rated Impulse Withstand Voltage			Uimp	kV	8									
Operating Frequency				Hz	50/60									
Rated Thermal Current	AC-1		Ith	A	14	18	24	26	36	48	58	66	78	92
Rated Current	AC-3	400V	In	A	9	12	18	22	32	40	50	65	75	85
Maximum Motor Power	AC-3	400V		kVAr	0,5-1-1,5 2,5-5	7,5 10	12,5 15	20	25	30	40	45,7	50	60
		690V						26	36	48	58	66	78	92
Standards					IEC EN 60947-4-1									
Operating Temperature Range				°C	-25....+55									
Storage Temperature Range				°C	-40....+70									
Electrical Life				op.	2.000.000									
Mechanical Lifet				op.	100.000									
Maximum Operating Period				op/h	1800									
Maximum Terminal Tightening Torque				Nm	2				3.5					
Accessories	Auxiliary Contacts (Standard)				1NO+1NC				2NO+2NC					
	Auxiliary Contact Options				1NO+1NC, 2NO+2NC									

XTR Thermal Relays

Thermal Relay / XTR		Symbol	Unit	XTR					
Type				XTR 22K	XTR 40K	XTR 85K	XTR 100K	XTR 150K	XTR 220K
Rated Insulation Voltage	Ui	V		690					
Rated Impulse Withstand Voltage		Uimp	kV	6					
Operating Frequency		Hz		50/60					
Current Range		A		0.1 - 22	7 - 40	24 - 85	34 - 125	34-150	100-240
Auxiliary Contact Current	AC-15		A	2					
Thermal Current	Ith	A		10					
Pollution Degree				3					
Operating Temperature Range			°C	-25....+55					
Storage Temperature Range			°C	-40....+70					
Reset Method				Automatic/Manual					
Compatible Contactor				XMC 9A-22A	XMC 32A-40A	XMC 50A-85A	XMC 100A-125A	150A	XMC 180A-220A
Compatible DIN Rail Adapter				XTR-MA 22	XTR-MA 40	XTR- MA 85	-		

General Information



XKoren contactors are produced in accordance with IEC 60947-4-1 and TS EN 60947-4-1 standards, in 3-pole and 4-pole configurations for XMC, XMC FV, XLC, and XMC-C types. They can be safely used for switching and control of motors, lighting systems, compensation systems, and various inductive loads in different utilization categories.

As a general operating principle, they are electromagnetic switches that, when energy is applied to the coil terminals, open their closed contacts, close their open contacts, and can be remotely controlled. When used together with thermal relays, they protect the circuit against overload currents.

According to their utilization categories, they are produced in rated current ranges from 9 A to 1000 A. The contactors, with a wide range of coil supply voltages from 24 V to 500 V, typically use a 220 V supply coil as standard.

Auxiliary contacts that can be attached later are available as 1NO or 1NC up to 40 A, and for contactors larger than 40 A, 1NO+1NC auxiliary contacts are offered. Auxiliary contacts, spare main contact sets, mechanical locks, and spare coils are also available as accessories.

The contactor should be selected correctly based on its rated current and the type of load that will pass through it. If the contactor selection is correct and there are no faults in the operating conditions, the contactors are switching elements that can operate millions of times without failure.

Operating Temperature Conditions

In compensation systems, special compensation contactors are used to safely energize the capacitors. These contactors are equipped with current-limiting contact blocks that restrict the inrush currents of capacitors, preventing sudden current surges.

This not only extends the lifespan of both the capacitors and contactors but also prevents sticking that may occur in the contactor contacts.

Additionally, compensation blocks and resistance cables used in compensation systems are offered as optional accessories to users. These additional components help support the more efficient and safe operation of the system, contributing to more stable compensation.

When a capacitor is energized, the presence of harmonic currents and the tolerance of the grid voltage can cause a continuous current flow of approximately 1.3 times the capacitor's nominal current (In). Due to the presence of harmonic currents and grid voltage tolerance, a capacitor's maximum power can reach 1.15 times its nominal power, depending on the production tolerance. Contactors should be selected with the capacity to carry a thermal current of Ith = 1.3×1.15×In = 1.50In.

When selecting contactors for various applications, the utilization category that defines the load controlled by the contactor is essential. Utilization categories determine the closing current, breaking current, and power factor according to the application. The correct selection of a contactor for an application ensures that the contactor can reliably supply the specified current to the load, operate throughout its expected service life without overheating, and function without causing the main poles to operate at a lower level.

GENERAL PRODUCT CATALOG

CONTACTORS





The XKoren contactor series includes models in the XMC series ranging from 9A to 220A, in the XLC series ranging from 9A to 1000A, and in the XMC C series ranging from 9A to 85A.

They are manufactured in compliance with TS EN 60947-4-1 and CE standards.

They can be used in various application areas.

They offer high electrical and mechanical lifespan advantages. They are suitable for 35 mm DIN rail and screw mounting.

XKoren Contactors offer a wide range of accessories (top contacts and side contacts).
For models between 9A and 22A, they come with 1NO+1NC standard auxiliary contacts, and for models between 32A and 220A, they come with 2NO+2NC standard auxiliary contacts.

We offer contactors in both AC and DC voltages.

Contactor Selection Criteria

1.Mechanical and Electrical Endurance

Mechanical Life:

•It refers to the total number of times the contactor can open and close by simply energizing the coil.
•It ensures operation for a specified period without requiring maintenance.

Electrical Life:

•It is the maximum number of times the contactor can open and close while drawing load current.
•It is determined through tests set according to utilization classes.

2.Breaking and Closing Capacity

Breaking Capacity:

•It is the maximum current value that a contactor can interrupt without damage.
•According to IEC 60947-4-1 standard, for the AC3 utilization class, the breaking capacity should be 8 times the motor's nominal current.

Closing Capacity:

It is the maximum current that a contactor can close without damage.
According to IEC 60947-4-1 standard, for the AC3 utilization class, the closing capacity should be 10 times the motor's nominal current.

Operating Conditions

•**Operating Ambient Temperature Range:** -25°C ~ 55°C
•**Electrical Life:** 2,000,000 cycles
•**Mechanical Life:** 20,000,000 cycles
•**Altitude:** <2000 meters

Ease of Use

The contactor's electronic system converts the AC or DC control circuit voltage applied to the coil into DC control voltage. The contactor always operates under optimized conditions, preventing it from making audible noise during operation.

General Features of Contactors:
• **Power Capacity:** The maximum current and voltage that the contactors can carry.
• **Insulation Class:** The insulation material and performance of the contactor.
• **Wear and Durability:** The operating life and durability of the contactor.
• **Mounting and Installation:** The method of mounting the contactor and the ease of installation.
• **Safety Features:** The protection features of the contactors against short circuits, overloads, and other faults.

Wide Voltage Compatibility

In older contactor technology, different contactors were required for different network voltages. Thanks to the wide operating range of XKoren contactors, a single common product can now be used across Europe, Asia, and North America. The standard coil voltage for these regions is 100-250V AC/DC at 50/60 Hz.

Coil Characteristics

Operating Range: The coil should be able to receive full and safe energy at voltages between 85% and 110% of the rated voltage.

Most Common Utilization Categories of Contactors

The use of capacitors in AC-1, AC-3, and AC-5a categories is based on standards defined according to the operating conditions of electrical equipment. These categories differ primarily in terms of load types and the environments in which they are used.
To understand these differences, let's first examine what each category means, the types of loads they are used for, and examples of their applications.

AC-1 (Non-Inductive and Resistive Loads)

AC-1 is a classification used for systems that contain non-inductive or very lightly inductive loads. The resistive loads mentioned here are typically referred to as resistive loads. These loads operate by directly converting electrical energy into heat or light.

Loads in the AC-1 Range:

Resistive Loads: These are loads that only show resistance to the electrical current and convert energy consumption into heat.

•Heaters: Electric stoves, water heaters, etc.
•Lamps and Lighting Systems: Fluorescent and LED lamps, for example.

Non-Inductive Loads: These do not generate or generate very little magnetic field.

•Resistive Motors: Motors with very low inductive components.
•Electrical Devices: Devices such as computers and televisions that exhibit low inductive characteristics.

AC-1 Systems:

•Heating devices, electric stoves, water heaters.
•General lighting systems (e.g., lights in office buildings).
•Electrical devices without inductive loads.

AC-3 (Inductive Loads, Motors)
AC-3 is a classification used for systems with inductive loads such as motors. In these systems, there are components that generate magnetic fields and high starting currents are present.

Loads in the AC-3 Category:

Inductive Loads: Systems that use electrical current to generate a magnetic field.
• **Electric Motors:** Motors that draw high inrush currents.
• **High-current Machines:** Pump motors, fan motors, compressors.

Inrush Currents and Load Changes: Motors draw high currents before starting, and this current varies depending on the operating process of the system.

Systems Using AC-3:

• Industrial machines (motor-driven systems in factories).
• Pump systems, ventilation fans, compressors.
• Electric motors with high inrush current.

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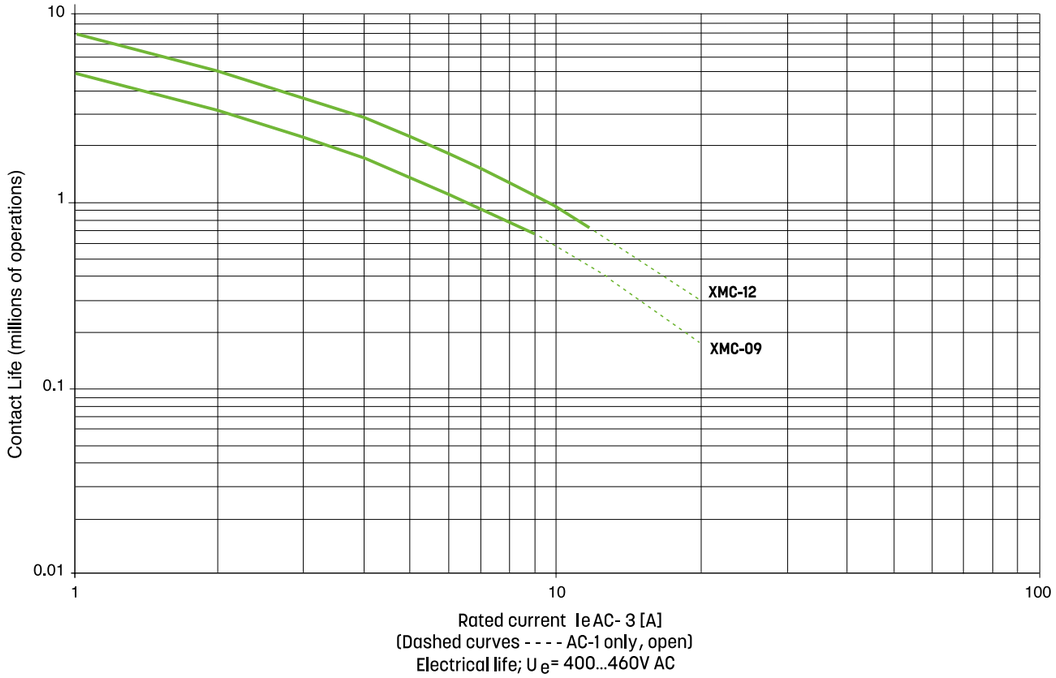
Life-Load Curves

Figure 1 - AC-3, Switching of squirrel-cage motors while starting /AC-1, Non- or slightly inductive loads, resistance furnaces



AC-5a (Compressors and Refrigeration Motors)

AC-5a is a classification developed specifically for systems that are frequently started and stopped, such as compressors and refrigeration motors. These types of systems are exposed to variable load conditions and draw high current during the motor start-up process.

Loads in the AC-5a Range:

• Cooling and Ventilation Systems:

o Air conditioning compressors.
o Refrigeration motors.

• Motors Requiring Frequent Start/Stop:

o Automatically controlled compressors.
o Cooling fans and pumps.

Systems Using AC-5a:

• Commercial and industrial refrigeration units.
• Air conditioning systems and ventilation units.
• Automatically controlled pump and compressor motors.

Comparison of AC-1, AC-3, and AC-5a:

Feature	AC-1 (Resistive and Non-Inductive Loads)	AC-3 (Inductive Loads, Motors)	AC-5a (Compressors and Cooling Motors)
Type of Load	Resistive loads and very low inductive loads	Inductive loads (motors and high inrush currents)	Compressors and cooling motors
Current Characteristics	The current is constant, flowing from resistive loads.	High and variable during startup.	Variable current with frequent switching cycles.
Applications	Heaters, lighting, electrical devices	Electric motors, industrial machinery	Air conditioning, refrigeration, and compressor systems
Starting Condition	The starting current is negligible.	High starting current and magnetic effect are present.	Requires frequent start/stop cycles, draws variable current.
Capacitor Usage	Energy storage and filtering.	Motor starting, speed control, impedance regulation.	Power factor correction and energy efficiency.
Examples	Lighting systems, heaters, resistive devices.	Electric motors, compressors, pumps.	Air conditioning compressors, commercial refrigeration motors.

Contactor Usage Classes According to IEC 60947-4-1

Current Type	Instructions For Use	Application area
Alternative Current	AC-1	Non-inductive or very low inductive loads, resistance furnaces.
	AC-3	Squirrel-cage motors, starting, stopping while the motor is running.
	AC-4	Squirrel-cage motors, starting, reversible operation, step-by-step operation.
	AC-5	Switching of electric discharge lamp control arrangements.m
	AC-6	Switching of capacitor banks.

Other utilization categories according to TS EN 60947-1

Instructions For Use	Application Area	
AC-5a	AC current	Switching of discharge lamps
AC-5b	AC current	Switching of incandescent filament lamps
AC-6a	AC current	Switching of transformers
AC-6b	AC current	Switching of capacitor banks
AC-8a	AC current	Control of hermetic compressor motors equipped with manual reset thermal relays
AC-8b	AC current	Hermetic compressor equipped with automatic reset thermal relays
DC-1	DC current	Control of hermetic compressor motors equipped with automatic reset thermal relays
DC-3	DC current	Non-inductive or very low inductive loads
DC-5	DC current	Stopping of shunt motors, reverse operation, step-by-step starting, dynamic braking of DC motors
DC-5	DC current	Stopping of asynchronous motors, reverse operation, step-by-step starting, dynamic braking of DC motors
DC-6	DC current	Switching of incandescent filament lamps

Switching Lighting Circuits According to the AC-5a Usage Class

Switching of lighting circuits according to AC-5a utilization category (Max. operating current Ie)							
Type	Power factor corrected fluorescent lamps	Uncompensated fluorescent lamps	Incandescent filament lamps	Low-pressure sodium vapor lamps	High-pressure sodium vapor lamp		High Pressure Mercury Vapor Lamps
					Compensation	No Compensation	
	(A)	(A)	(A)	(A)	(A)	(A)	(A)
XMC 9A	9	6	8	9	14	9	9
XMC 12A	12	8	10	12	16	12	12
XMC 18A	15	11	12	16	25	16	16
XMC 22A	22	15	17	20	30	20	20
XMC 32A	30	22	22	25	40	25	25
XMC 40A	38	26	32	30	55	30	30
XMC 50A	45	30	40	40	80	40	40
XMC 65A	60	40	50	50	85	50	50
XMC 75A	70	50	58	60	105	60	60
XMC 85A	80	60	65	70	115	70	70
XMC 100A	100	70	80	90	125	90	90

Fuse Selection Based on Rated Current for Three-Phase Motors

Motor Rated Power		cosΦ	Efficiency	220V			500V			380V			Connection Cable NNY-NYCY
				Motor Rated Power	Circuit Breakers		Motor Rated Power	Circuit Breakers		Motor Rated Power	Circuit Breakers		
					Direct	Y/Δ		Direct	Y/Δ		Direct	Y/Δ	
(kW)	(PS)			(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	
0.25	0.34	62	1,40	1,40	4	2	0,6	2	2	0.8	2	2	4x2,5
0,37	0,5	64	2,1	2,1	4	2	0,9	2	2	1,6	4	2	4x2,5
0.55	0,75	69	2,7	2,7	4	4	1,2	4	4	1,6	4	2	4x2,5
0.75	1	74	5,4	5,4	6	1	1,5	4	4	2	4	4	4x2,5
1,10	1,5	77	4,4	4,4	6	6	2	4	4	2,6	4	4	4x2,5
1,5	2	78	6	6	16	10	2,6	4	4	3,5	6	6	4x2,5
2,2	3	81	8,7	8,7	20	16	3,7	10	6	5	10	6	4x2,5
3	4	81	11,5	11,5	20	20	5	10	10	6,6	16	10	4x2,5
4	5,4	82	14,7	14,7	25	25	6,4	16	10	8,5	20	16	4x2,5
5,5	7,5	83	19,8	19,8	35	35	8,5	20	16	11,5	25	20	4x2,5
7,5	10	85	26,5	26,5	50	50	11,5	25	20	15,5	35	25	4x4
11	15	87	39	39	63	63	17,5	35	25	22,5	35	35	4x6
15	20	88	52	52	50	50	22,5	35	35	30	50	35	4x6
18,5	25	88	62	62	100	100	27	50	35	36	63	50	4x10
22	30	89	74	74	100	100	32	63	50	43	63	50	4x10
30	40	90	98	98	125	125	43	63	50	57	80	63	4x16
37	50	90	124	124	200	200	54	80	63	72	100	80	3x25-16
45	61	91	147	147	225	225	64	100	80	85	125	100	3x35-16
55	75	91	180	180	250	250	78	125	100	104	160	125	3x50-25
75	100	91	246	246	246	350	108	160	125	142	200	160	3x70-35
90	123	92					127	200	160	169	225	200	3x95-50
110	150	92					154	225	200	204	250	225	3x120-70
132	180	92					182	250	225	243	300	250	3x120-70

•Direct Starting: 6XIn ≤ 5 seconds.
•Star-Delta Starting: 2xIn ≤ 15 seconds.

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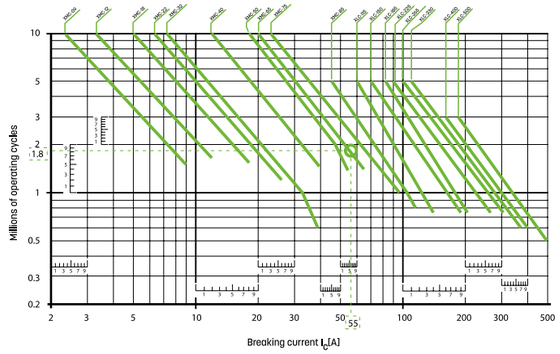
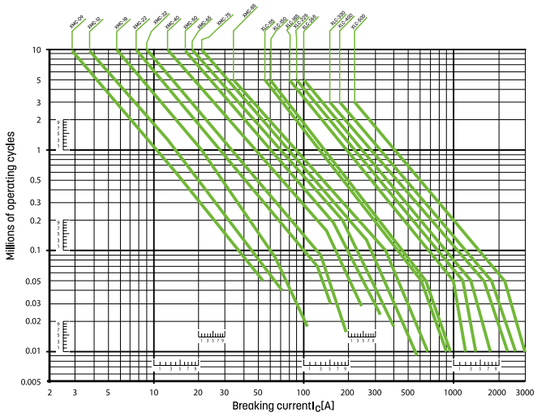
Electrical Durability - Ue ≤ 440 V (AC-3)



In the AC-3 usage category, contactors operate during the starting and stopping processes of motors. The breaking current (Ic) is equal to the motor's rated current (Ie), and electrical durability is ensured under the specified environmental conditions (according to the conditions in the datasheet).

Electrical Durability - Ue ≤ 440 V (AC-2/AC-4)



In the AC-2 and AC-4 usage categories, the breaking current is 2.5 times and 6 times the motor's nominal current, respectively. These categories are used for starting, reversing, and step-by-step operation of motors, with the maximum switching frequency (50-60Hz) determined based on the ambient temperature.

Contactor Selection for Special Applications

1.Contactor Selection for Resistive Loads

In resistive loads, the switching and breaking currents are equal.

a.For two-pole series connections: The rated current is calculated as 1.6 x Ie.

b.For three-pole series connections: The rated current is calculated as 2 x Ie.

2.Contactor Selection for Compensation Applications

Capacitors can cause high transient currents when connected to the circuit.

Specially designed contactors should be used, and a surge coil should be added if necessary.

3.Contactor Selection for Lighting Applications

The type of lamp, connection method, and power factor should be considered.

High-pressure mercury vapor lamps draw a current approximately twice the operating current.

4.Motor Starting Methods and Contactor Selection

Motor starting is a method used to control the motor's inrush current in order to protect both the motor and the network. The most common starting techniques in the industry are Direct-On-Line (DOL) and Star-Delta starting methods. The contactors used in these methods play a critical role in ensuring the motor operates safely and efficiently.

Motor Starting Methods

Direct On-Line (DOL) Starter

This method involves connecting the motor directly to the network to operate. It is commonly used for motors under 5.5 kW.
Operating Principle:
•The main contactor (K1) connects the motor directly to the network.
•The thermal relay (F1) provides overcurrent and overload protection.
•A fuse or circuit breaker is used for short circuit protection.

Advantages:

• Simple and low-cost.
• The motor operates at full torque.
• Does not require an additional control circuit.

Disadvantages:

• The inrush current may reach 6-8 times the nominal current.
• Using this method for large power motors can damage the network and the motor.

Star-Delta Starter

This method is used for motors over 5.5 kW to reduce the starting current.

Operating Principle:

Star Connection:
•The main contactor (K1) connects the motor to the network.
•The star contactor (K2) sets the motor windings to the star position, reducing the starting current to 33%.

Delta Connection:

•A time relay or current monitoring relay opens the star contactor (K2) after the set time and activates the delta contactor (K3).
•The motor starts to operate at full power with the nominal voltage.

Advantages:

•The starting current remains 2-3 times the nominal current.
•Reduces stress on the motor and network.

Disadvantages:

•Requires a more complex control circuit.
•Suitable only for motors with internal delta connection.
•Temporary current surges may occur during the transition.

5.Contactor Selection for DC Circuits

In DC circuits, arc extinction is more difficult. The L/R time constant is an important factor:
• Non-inductive loads → L/R ≈ 1 ms
• Shunt motors → L/R ≈ 7.5 ms
• Series motors → L/R ≈ 10 ms
• Electromagnets → L/R ≈ 300 ms

Conclusion

•For small power motors, the Direct On-Line (DOL) method is a simple and economical solution.

•For large power motors, the Star-Delta method reduces the starting current, thereby decreasing the load on the network.

•When selecting contactors, criteria such as motor power, current rating, and operating conditions should be taken into account.

• Alternatively, advanced solutions such as soft starters or frequency converters should be considered.

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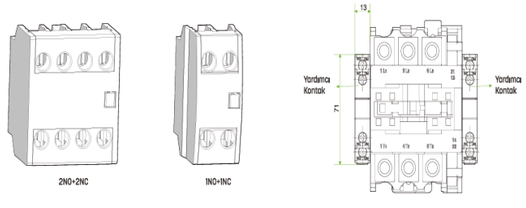
Auxiliary Contacts

In contactors, auxiliary contacts are used for control and signal transmission in addition to the switching function. These auxiliary contacts play a critical role in ensuring the proper functioning of the contactors and improving the overall efficiency of the system. Auxiliary contacts are typically of the NO (Normally Open) or NC (Normally Closed) type and operate in integration with various circuit components with different functions.

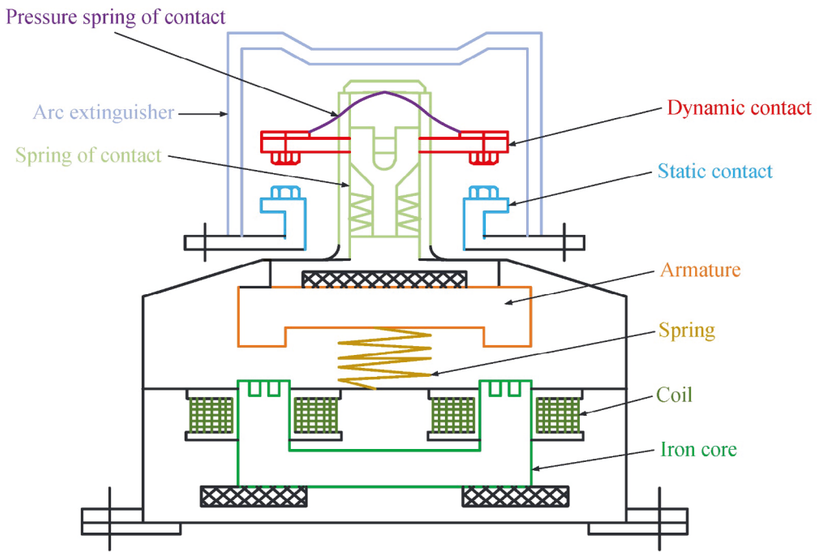
Auxiliary contacts are used in various applications such as starting and stopping operations, alarm signals, control circuits, and indicators. They are also essential for circuit control and safety functions in panels. In addition to the main switching functions of the contactor, auxiliary contacts can perform tasks such as interrupting load and control currents, monitoring indicators, and controlling bidirectional motors in more complex circuits.

Auxiliary contacts enhance the electrical durability and performance of contactors, providing greater safety and operational flexibility within the system.

Auxiliary Contact



Structure of Contactors



Compensation Contactors

Compensation contactors are electromechanical devices specially designed to control three-phase capacitors safely and efficiently. These contactors extend the lifespan of the contactor and ensure safe operation by limiting the high currents that may occur during the energization of the capacitors.

Thanks to the current-limiting resistors on them, compensation contactors control the high peak currents that occur when the capacitors are energized. By limiting these high peak currents, which can reach up to 200 times the rated current at a frequency of 1-15 kHz during the initial energization of the capacitors, to as much as 70 times the maximum rated current, they prevent the main contacts from welding and extend the life of the contactor.

Operating Principle:

Role of Auxiliary Contacts at Start-Up: When the contactor is initially energized, the auxiliary contacts close first. This allows the high peak current drawn by the capacitor during energization to pass through these contacts via the current-limiting resistors.

Closing of Main Contacts: Approximately 3-3.5 ms after the contactor coil is energized, the main contacts close. At this stage, only the nominal current of the capacitor flows through the main contacts. After the main contacts close, the auxiliary contacts are disengaged, and the normal operation process begins.

This configuration prevents the main contacts of the contactor from overloading and sticking, thereby extending the life of the contactor.

Technical Specifications:

The main technical features considered in the design of compensation contactors are as follows:

High Peak Current Limitation:

At the moment the capacitors are energized, high peak currents occur. These are limited using current-limiting resistors, preventing the main contacts from being overloaded and sticking. This feature ensures the safe operation of the contactors.

Auxiliary Contacts:

When the contactor is energized, the auxiliary contacts close first. These auxiliary contacts play a critical role in controlling the peak currents drawn by the capacitors. They are in the circuit before the main contacts close and take on the current-limiting function.

Time-Delayed Main Contacts: After the contactor coil is energized, the main contacts close with a delay of approximately 3-3.5 ms. This time delay allows the auxiliary contacts to limit the peak current, ensuring that high currents are controlled before the main contacts engage.

Electrical Life: The current-limiting mechanism and the activation of auxiliary contacts prevent the main contacts from overloading. This ensures that the contactors can operate efficiently for a long period of time.

Three-Phase Capacitor Control: Compensation contactors are especially suitable for controlling and energizing three-phase capacitors. This feature is important for enhancing the energy efficiency of capacitors and ensuring their safe use in industrial applications.

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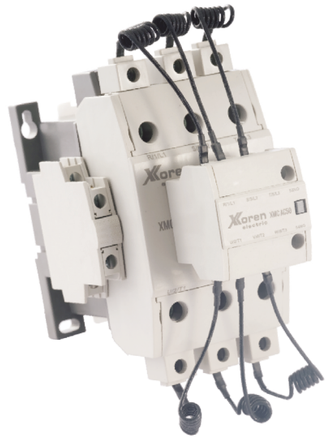


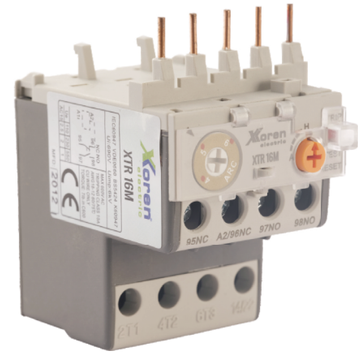
Three-Phase Capacitor Control: Compensation contactors are especially suitable for controlling and energizing three-phase capacitors. This feature is important for enhancing the energy efficiency of capacitors and ensuring their safe use in industrial applications.

Advantages of Compensation Contactors:

- **Safe Control of High Peak Currents:** High currents are prevented from occurring due to current-limiting resistors.
- **Electrical Life and Durability:** The role of auxiliary contacts extends the life of the contactor and reduces maintenance costs.
- **Safe Operation:** Time-delayed main contacts ensure safe operation of the system without any disruptions.
- **Industrial Efficiency:** By ensuring the efficient operation of capacitors, energy savings are achieved in industrial processes.

Applications

- Industrial plants and factories
- Low voltage compensation systems
- Building automation systems
- Hospitals and data centers (for critical power management)
- Energy distribution panels



Thermal Relays

In electrical circuits or systems, excessive currents may occur at times. These excessive currents can damage the electrical system or the connected devices due to the heat generated, or cause the cables to burn. XKoren thermal relays are used to minimize this damage.

XKoren thermal relays deactivate the motor through the contactor in case of overload or phase loss, and together with the thermal relay, the contactor becomes a more useful and highly protective product. This is because, with the thermal relay connected to the contactor, the contactor is protected from excessive heat caused by overcurrent, and the user is also protected from overcurrent. XKoren thermal relays are manufactured in compliance with IEC60947 standards and CE certification, up to 630A, with compensation for ambient temperature.

Auxiliary Contacts:

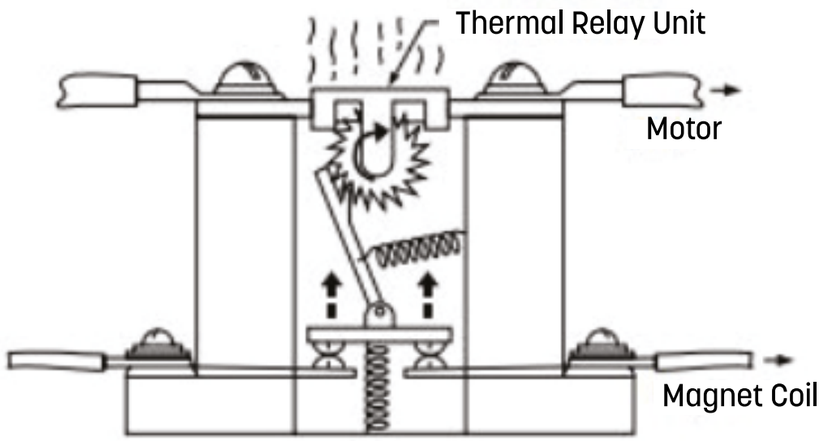
The thermal relay activates two contacts, one of which closes and the other cuts off. The cutting contact removes the contactor from the circuit and disconnects power to the motor. The closing contact can be used for other purposes. (1NO + 1NC)

Operating Principle of Thermal Relays

In thermal relays, each phase is connected to an overcurrent trip unit, and the protection mechanism is based on the bimetallic principle. Bimetallic elements are created by riveting two metals with different expansion coefficients.

The current passing through the electric motor heats the bimetallic strips, causing them to expand. Due to the differing expansion coefficients, the bimetallic strip bends in a specific direction. This bending creates a mechanical movement that triggers the thermal relay's tripping mechanism. Through springs and mechanical contacts, the circuit is interrupted, thereby preventing damage to the motor in case of overcurrent or overload conditions.

Thermal relays provide reliable and precise protection in motor protection systems, extending equipment lifespan and improving operational safety.



THERMAL RELAY/XTR	XTR					
Type	XTR 22K	XTR 40K	XTR 85K	XTR 100K	XTR 150K	XTR 220K
Compatible Contactor	XMC 9A-22A	XMC 32A-40A	XMK 50A-85A	XMC 100A-125A	XMC 150A	XMC 180A-220A
Compatible DIN Rail Adapter	XTR-MA 22	XTR-MA 40	XTR-MA 85			

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Current-Time Characteristic and Tripping Curve of Thermal Relays

In thermal relays, each phase is connected to an overcurrent trip unit, and the relay's operating principle is based on the bimetallic mechanism. Bimetals are formed by riveting two metals with different expansion coefficients. The heat generated by the current causes the bimetal to deform due to the difference in expansion rates, creating mechanical movement. This movement opens the contacts via a spring mechanism, thereby interrupting the circuit.

Overcurrent Relay Tripping Characteristics and Temperature Compensation

Thermal relays are connected to a separate overcurrent trip unit for each phase. When the bimetals heat up, they activate the differential tripping mechanism, which opens the circuit. If one phase is interrupted, only two bimetals remain in the circuit, causing the overcurrent trip unit to trigger more quickly than under normal loading conditions. The thermal relay mechanism compensates for changes in ambient temperature, preventing the relay's performance from being affected by temperature variations.

The tripping characteristics of thermal overcurrent relays in a hot operating condition are lower compared to cold operation. That is, at a given tripping current, a cold relay will trip approximately 25% later than a hot relay. This is crucial for both the safety of the relay and the equipment being protected. According to the IEC 60947-4-1 standard, when the motor is subjected to a 1.5 times rated load in hot conditions, the relay must trip within 2 minutes.

For relays operating with an adjustable current setting, the average tripping characteristics are between 10% to 30% of the values at which cold relays trip. These values depend on the setting current, which typically falls between 1.05 to 1.2 times the nominal current.

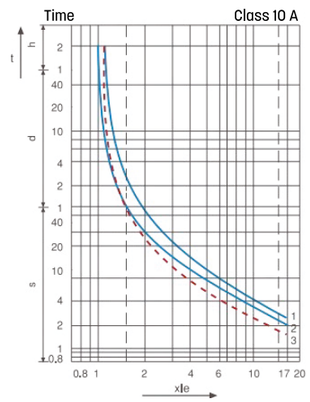
Tripping Characteristics and Limiting Current Values
The tripping time of thermal relays differs between hot and cold operating conditions. For example, when the current is 1.5In in the hot condition, the tripping time decreases from approximately 3 minutes to 2 minutes. According to the IEC 60947-4-1 standard, at an ambient temperature of 20°C, a cold relay should not trip for 2 hours at 1.05Ie, while in the hot condition, the relay should trip within 2 hours at 1.2xIn. Based on this, the limiting tripping current is calculated as follows:

Ia = (1.05 - 1.2) × In

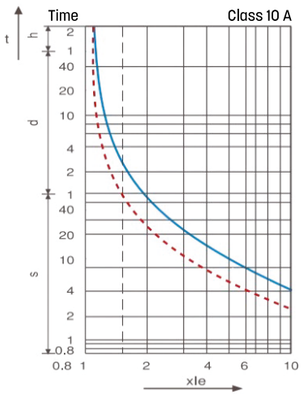
(In = Rated current, Ia = Motor starting current)

Additionally, in the hot condition, the relay must trip within 2 minutes at 1.5In overcurrent, while in the cold condition, it must trip within 2 to 5 seconds at 7.2In, depending on the delay time.

If a three-pole thermal relay is only loaded with two poles, the tripping time increases by approximately 10%, and if loaded with only one pole, the tripping time increases by about 20%. The tripping characteristics and limiting current values are typically determined with a reference ambient temperature of 20°C. Changes in ambient temperature can affect the tripping time; as the temperature increases, the relay trips earlier, while at lower temperatures, a higher current is required for tripping. For example, when the ambient temperature is 50°C, the limiting current value decreases by 20%.



Thermal Overcurrent Relay Current-Time Graph
1.Three-Phase Balanced Operation (Cold State)
2.Two-Phase Balanced Operation (Cold State)



Thermal overload relay tripping characteristics for cold and hot operating conditions

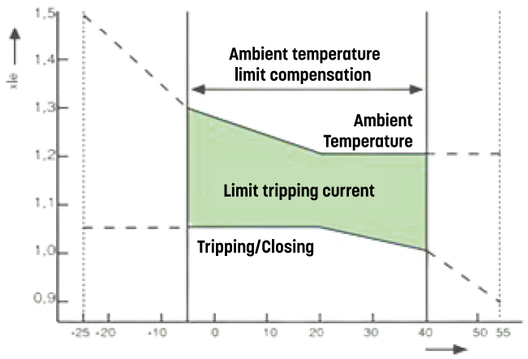
Rated current	Delay Time	Operational Status	Description
1.05 Ie	> 2 h	Cold	Limit Tripping Current
1.20 Ie	< 2 h	Warm	Limit Tripping Current
1.50 Ie	< 2 m	Warm	
7.2 Ie	> 2 s	Cold	

Temperature Compensation

It is not sufficient for the motor and relay to be in the same ambient temperature to ensure safe protection. Additionally, the relay's tripping threshold temperature must be the same as the permissible temperature of the device to be protected. However, it may not always be possible to ensure these two conditions are met. Especially in remotely controlled systems or relays housed in sealed enclosures, the ambient temperature may differ from that of the motor.

Therefore, thermal overload relays are equipped with temperature compensation to minimize the effects of temperature changes. This ensures that even at ambient temperatures between -25°C and +55°C, the relay's tripping current remains within the (1.05 - 1.2) x In range. This feature eliminates the need for additional adjustments to the setting current when the ambient temperature changes.

Temperature Compensation



Electrical Motor Protection: Thermal Relay with Three-Phase and Single-Phase Motor Protection Methods

Various protection systems are used to ensure the safe and long-lasting operation of electric motors. The combination of thermal relays, fuses, and contactors is one of the most common methods used to protect motors from overloads and short circuits.

Functions of Motor Protection Elements

When an electric motor is started, different levels of current flow occur in the circuit. The contactor, which powers the motor, acts as a remotely controlled switch and ensures the motor is energized. However, the contactor does not provide protection against overloads and short circuits.

Overload Protection is provided by the thermal relay. The thermal relay disconnects the circuit if the motor draws current beyond its rated values, preventing overheating due to overload. If the motor draws excessive current for an extended period, the windings can be damaged or even burned. The thermal relay protects the motor and associated equipment by preventing such faults.

Short Circuit Protection is provided by the fuse. The fuse quickly disconnects the circuit when excessive short circuit currents occur, protecting the motor, wires, and other elements. Proper selection of the fuse is critical for system safety.

Three-Phase Motor Protection with Thermal Relay

Three-phase motors are commonly used in industry and large electrical machines. To protect a three-phase motor, a combination of a contactor, thermal relay, and circuit breaker is used.

- **Circuit Breaker** → Protects the motor and its components against short circuits.
- **Contactor** → Controls the motor's start and stop operations.
- **Thermal Relay** → Detects the overload condition and disconnects the circuit.

In the connection diagram, each phase of the three-phase motor is connected to the inputs of the thermal relay, and the outputs go to the motor. This setup ensures that if there is an overload on any phase, the thermal relay disconnects the motor from the circuit, providing protection.

Single-Phase Motor Protection with Thermal Relay

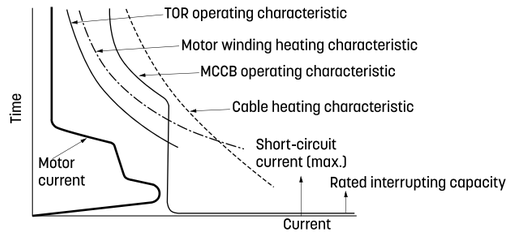
Single-phase motors are commonly used in household appliances, pumps, and small industrial systems. In single-phase motors, overload protection is provided by thermal relays, and short circuit protection is ensured by circuit breaker. However, the connection method differs from three-phase motors.

- The phase line is connected to the input of the thermal relay.
- The output of the thermal relay is connected to the phase input of the motor.
- The neutral line goes directly to the motor.
- The fuse is added to the circuit to protect the entire system against short circuits.

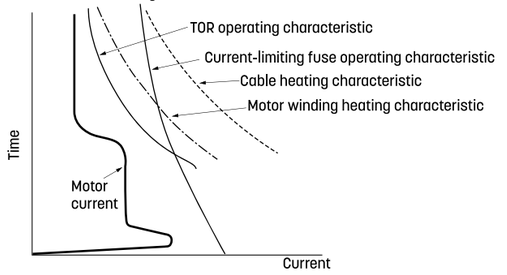
In this system, the thermal relay continuously monitors the current passing through the phase line, and when an overload condition is detected, it interrupts the circuit to prevent damage to the motor.

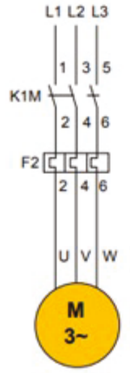
The combination of contactor, thermal relay, and fuse is crucial for ensuring the safe operation of electric motors. In three-phase motors, each phase is protected by passing through the thermal relay, whereas in single-phase motors, only the phase line passes through the thermal relay. By selecting the correct components and connection methods, the motor can operate safely against overloads and short circuits.

Protective coordination characteristic curves for motor circuits

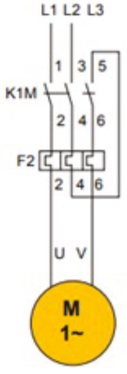


• When current-limiting fuse is used

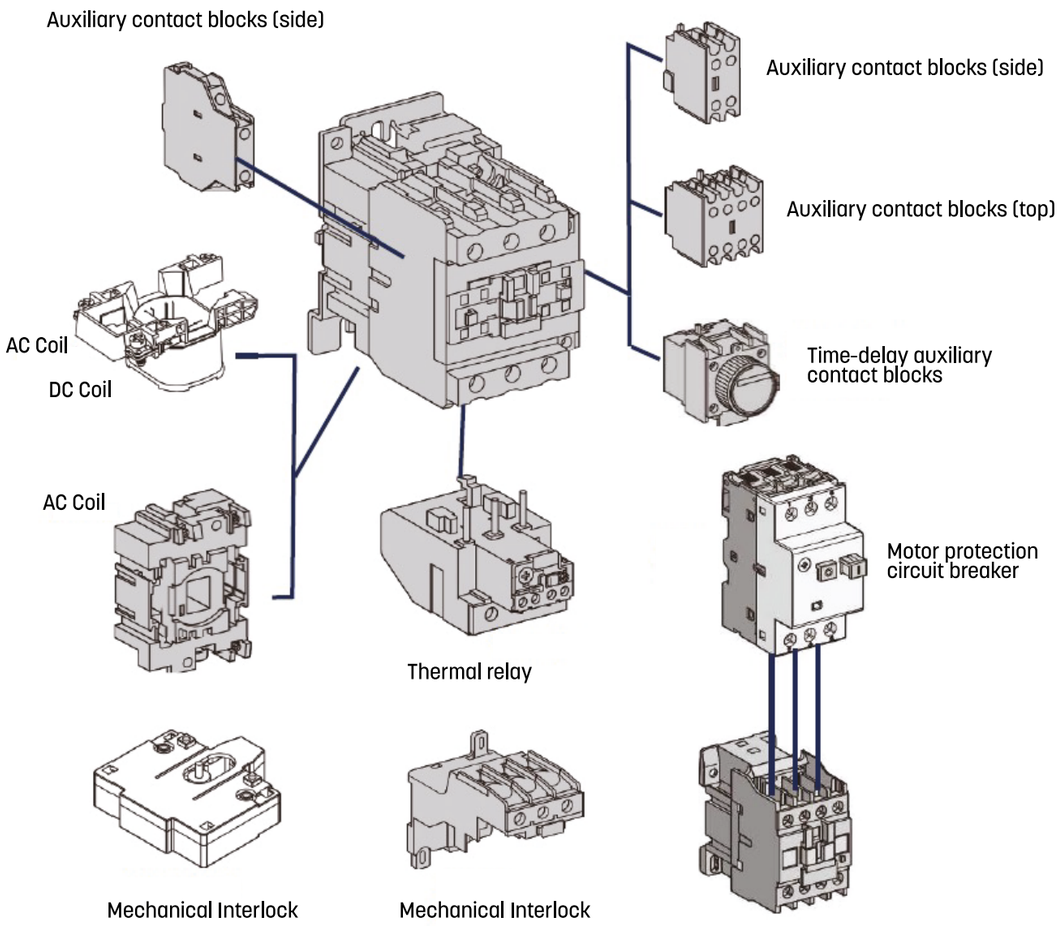




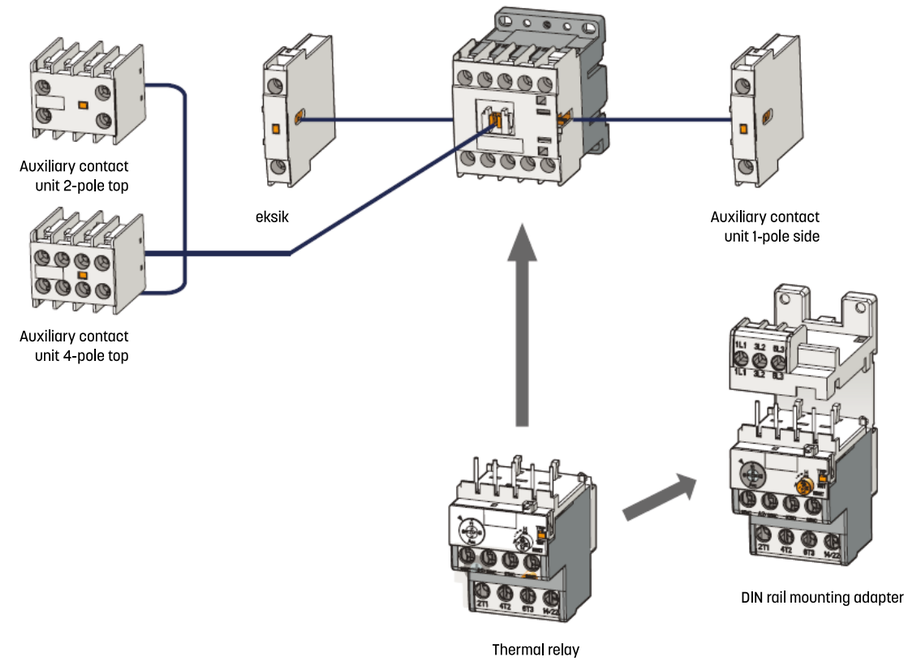
Protecting a 3-phase motor with thermal relay



Protecting a one-phase motor with a thermal relay



Thermal Relay Accessories



Order List

XMC Series Power Contactors

XMC Series 220V AC Power Contactors



Type (Order) Code	Rated Current	Explanation	Box Quantity	Carton Quantity
XMC 3AC220-22-9	9A	3P AC Type 220V 22 Frame 9A 5.5kW 1NO-1NC	1	60
XMC 3AC220-22-12	12A	3P AC Type 220V 22 Frame 12A 5.5kW 1NO-1NC	1	60
XMC 3AC220-22-18	18A	3P AC Type 220V 22 Frame 18A 7.5kW 1NO-1NC	1	60
XMC 3AC220-22-22	22A	3P AC Type 220V 22 Frame 22A 11kW 1NO-1NC	1	60
XMC 3AC220-40-32	32A	3P AC Type 220V 40 Frame 32A 15kW 2NO-2NC	1	40
XMC 3AC220-40-40	40A	3P AC Type 220V 40 Frame 40A 18.5kW 2NO-2NC	1	40
XMC 3AC220-85-50	50A	3P AC Type 220V 85 Frame 50A 22kW 2NO-2NC	1	20
XMC 3AC220-85-65	65A	3P AC Type 220V 85 Frame 65A 30kW 2NO-2NC	1	20
XMC 3AC220-85-75	75A	3P AC Type 220V 85 Frame 75A 37kW 2NO-2NC	1	20
XMC 3AC220-85-85	85A	3P AC Type 220V 85 Frame 85A 45kW 2NO-2NC	1	20

XMC Series AC/DC Type 110/220V Free Voltage Power Contactors



Type (Order) Code	Rated Current	Explanation	Box Quantity	Carton Quantity
XMC 3AC220-100-100	100A	Free Voltage 3P 100 Frame 100A 55kW 2NO-2NC	1	8
XMC FV3-0150-0125	125A	Free Voltage 3P 150 Frame 125A 60kW 2NO-2NC	1	8
XMC FV3-0150-0150	150A	Free Voltage 3P 150 Frame 150A 75kW 2NO-2NC	1	8
XMC FV3-0220-0180	180A	Free Voltage 3P 220 Frame 180A 90kW 2NO-2NC	1	4
XMC FV3-0220-0220	220A	Free Voltage 3P 220 Frame 220A 132kW 2NO-2NC	1	4

XMC Series 220V AC Power Contactors



Type (Order) Code	Rated Current	Explanation	Box Quantity	Carton Quantity
XMC 4AC220-22-009	9A	4P AC Type 220V 22 Frame 9A 4kW	1	60
XMC 4AC220-22-012	12A	4P AC Type 220V 22 Frame 12A 5.5kW	1	60
XMC 4AC220-22-018	18A	4P AC Type 220V 22 Frame 18A 7.5kW	1	60
XMC 4AC220-22-022	22A	4P AC Type 220V 22 Frame 22A 11kW	1	60
XMC 4AC220-40-032	32A	4P AC Type 220V 40 Frame 32A 15kW	1	40
XMC 4AC220-40-040	40A	4P AC Type 220V 40 Frame 40A 18.5kW	1	40
XMC 4AC220-85-050	50A	4P AC Type 220V 85 Frame 50A 22kW	1	20
XMC 4AC220-85-065	65A	4P AC Type 220V 85 Frame 65A 30kW	1	20
XMC 4AC220-85-075	75A	4P AC Type 220V 85 Frame 75A 37kW	1	20
XMC 4AC220-85-085	85A	4P AC Type 220V 85 Frame 85A 45kW	1	20

XMC Series 24V AC Power Contactors



Type (Order) Code	Rated Current	Explanation	Box Quantity	Quantity per
XMC 3AC24-22-9	9A	3P AC Type 24V 22 Frame 9A 4kW 1NO-1NC	1	60
XMC 3AC24-22-12	12A	3P AC Type 24V 22 Frame 12A 4kW 1NO-1NC	1	60
XMC 3AC24-22-18	18A	3P AC Type 24V 22 Frame 18A 4kW 1NO-1NC	1	60
XMC 3AC24-22-22	22A	3P AC Type 24V 22 Frame 22A 4kW 1NO-1NC	1	60
XMC 3AC24-40-32	32A	3P AC Type 24V 40 Frame 32A 15kW 2NO-2NC	1	40
XMC 3AC24-40-40	40A	3P AC Type 24V 40 Frame 40A 18.5kW 2NO-2NC	1	40
XMC 3AC24-85-50	50A	3P AC Type 24V 85 Frame 50A 22kW 2NO-2NC	1	20
XMC 3AC24-85-65	65A	3P AC Type 24V 85 Frame 65A 30kW 2NO-2NC	1	20
XMC 3AC24-85-75	75A	3P AC Type 24V 85 Frame 75A 37kW 2NO-2NC	1	20
XMC 3AC24-85-85	85A	3P AC Type 24V 85 Frame 85A 45kW 2NO-2NC	1	20

XMC Series 48V AC Power Contactors



Type (Order) Code	Rated Current (In)	Explanation	Box Quantity	Carton Quantity
XMC 3AC48-22-9	9A	3P AC Type 48V 22 Frame 9A 4kW 1NO-1NC	1	60
XMC 3AC48-22-12	12A	3P AC Type 48V 22 Frame 12A 4kW 1NO-1NC	1	60
XMC 3AC48-22-18	18A	3P AC Type 24V 22 Frame 18A 4kW 1NO-1NC	1	60
XMC 3AC48-22-22	22A	3P AC Type 48V 22 Frame 22A 4kW 1NO-1NC	1	60
XMC 3AC48-40-32	32A	3P AC Type 48V 40 Frame 32A 15kW 2NO-2NC	1	40
XMC 3AC48-40-40	40A	3P AC Type 48V 40 Frame 40A 18.5kW 2NO-2NC	1	40
XMC 3AC48-85-50	50A	3P AC Type 48V 85 Frame 50A 22kW 2NO-2NC	1	20
XMC 3AC48-85-65	65A	3P AC Type 48V 85 Frame 65A 30kW 2NO-2NC	1	20
XMC 3AC48-85-75	75A	3P AC Type 48V 85 Frame 75A 37kW 2NO-2NC	1	20
XMC 3AC48-85-85	85A	3P AC Type 48V 85 Frame 85A 45kW 2NO-2NC	1	20

XTR Series Thermal Relays







Type (Order) Code	Rated Current(In)	Explanation	Box Quantity	Carton Quantity
XTR XMC022-01-016	0.1~0.16	XMC 9A-22A for 0.1-0.16A Thermal Relays	1	100
XTR XMC022-016-025	0.16~0.25	XMC 9A-22A for 0.16-0.25A Thermal Relays	1	100
XTR XMC022-025-04	0.25~0.4	XMC 9A-22A for 0.25-0.4A Thermal Relays	1	100
XTR XMC022-04-063	0.4~0.63	XMC 9A-22A for 0.4-0.63A Thermal Relays	1	100
XTR XMC022-063-1	0.63~1	XMC 9A-22A for 0.63-1A Thermal Relays	1	100
XTR XMC022-1-1.6	1~1.6	XMC 9A-22A for 1-1.16A Thermal Relays	1	100
XTR XMC022-1.6-2.5	1.6~2.5	XMC 9A-22A for 1.16-2.5A Thermal Relays	1	100
XTR XMC022-2.5-4	2.5~4	XMC 9A-22A for 2.5-4A Thermal Relays	1	100
XTR XMC022-4-6	4~6	XMC 9A-22A for 4-6A Thermal Relays	1	100
XTR XMC022-5-8	5~8	XMC 9A-22A for 5-8A Thermal Relays	1	100
XTR XMC022-6-9	6~9	XMC 9A-22A for 6-9A Thermal Relays	1	100
XTR XMC022-7-10	7~10	XMC 9A-22A for 7-10A Thermal Relays	1	100
XTR XMC022-9-13	9~13	XMC 9A-22A for 9-13A Thermal Relays	1	100
XTR XMC022-12-18	12~18	XMC 9A-22A for 12-18A Thermal Relays	1	100
XTR XMC022-16-22	16~22	XMC 9A-22A for 16-22A Thermal Relays	1	100
XTR XMC040-7-10	7~10	XMC 32A-40A for 7-10A Thermal Relays	1	90
XTR XMC040-9-13	9~13	XMC 32A-40A for 9-13A Thermal Relays	1	90
XTR XMC040-12-18	12~18	XMC 32A-40A for 12-18A Thermal Relays	1	90
XTR XMC040-16-22	16~22	XMC 32A-40A için 16-22A Thermal Relays	1	90
XTR XMC040-18-25	18~25	XMC 32A-40A for 18-25A Thermal Relays	1	90
XTR XMC040-22-32	22~32	XMC 32A-40A for 22-32A Thermal Relays	1	90
XTR XMC040-28-40	28~40	XMC 32A-40A for 28-40A Thermal Relays	1	90
XTR XMC085-24-36	24~36	XMC 50A-85A for 24-36A Thermal Relays	1	60
XTR XMC085-28-40	28~40	XMC 50A-85A for 28-40A Thermal Relays	1	60
XTR XMC085-34-50	34~50	XMC 50A-85A for 34-50A Thermal Relays	1	60
XTR XMC085-45-65	45~65	XMC 50A-85A for 45-65A Thermal Relays	1	60
XTR XMC085-54-75	54~75	XMC 50A-85A for 54-75A Thermal Relays	1	60
XTR XMC085-63-85	63~85	XMC 50A-85A for 63-85A Thermal Relays	1	60
XTR XMC100-34-50	34~50	XMC 100A-125A for 34-50A Thermal Relays	1	30
XTR XMC100-39-57	39~57	XMC 100A-125A for 39-57A Thermal Relays	1	30
XTR XMC100-43-65	43~65	XMC 100A-125A for 43-65A Thermal Relays	1	30
XTR XMC100-54-80	54~80	XMC 100A-125A for 54-80A Thermal Relays	1	30
XTR XMC100-65-100	65~100	XMC 100A-125A for 65-100A Thermal Relays	1	30
XTR XMC100-85-125	85~125	XMC 100A-125A for 85-125A Thermal Relays	1	30
XTR XMC150-34-50	34~50	XMC 150A for 34-50A Thermal Relays	1	30
XTR XMC150-54-80	54-80	XMC 150A for 54-80A Thermal Relays	1	30
XTR XMC150-65-100	65-100	XMC 150A for 65-100A Thermal Relays	1	30
XTR XMC150-85-125	85-125	XMC 150A for 85-125A Thermal Relays	1	30
XTR XMC150-100-150	100-150	XMC 150A for 100-150A Thermal Relays	1	30
XTR XMC220-100-160	100~160	XMC 180A-220A for 100-160A Thermal Relays	1	4
XTR XMC220-120-180	120~180	XMC 180A-220A for 120-180A Thermal Relays	1	4
XTR XMC220-160-240	160~240	XMC 180A-220A for 160-240A Thermal Relays	1	4

XMC SERIES ACCESSORIES

Auxiliary Contact Blocks XMC Series

Type (Order) Code	Auxiliary Contact	Mounting	Product Used	Explanation	Box Quantity	Carton Quantity
AC-T/2 20	2NO	top	XMC9A-85A	AC-T Top 2NO	10	400
AC-T/2 11	1NO+1NC	top	XMC9A-85A	AC-T Top 1NO+1NC	10	400
AC-T/2 02	2NC	top	XMC9A-85A	AC-T Top 2NO	10	400
AC-T/4 40	4NO	top	XMC9A-85A	AC-T Top 4NO	10	400
AC-T/4 13	1NO+3NC	top	XMC9A-85A	AC-T Top 1NO+3NC	10	400
AC-T/4 22	2NO+2NC	top	XMC9A-85A	AC-T Top 2NO+2NC	10	400
AC-T/4 31	3NO+1NC	top	XMC9A-85A	AC-T Top 3NO+1NC	10	400
AC-T/4 04	4NC	top	XMC9A-85A	AC-T Top 4NC	10	400
AC-T1/2 11	1NO+1NC	top	XMC125A-220A	AC-T Top 1NO+1NC	10	400
AC-T1/4 22	2NO+2NC	top	XMC125A-220A	AC-T Top 2NO+2NC	10	400
AC-S 65	1NO+1NC	top	XMC9A-85A	AC-S Side 1NO+1NC	10	200
AC-S 100	1NO+1NC	top	XMC125A-220A	AC-S Side 1NO+1NC	10	200





Mechanical Locking Unit

Type (Order) Code	Used with Contactor 3P	Explanation	Box Quantity	Carton Quantity
XMR150A	XMC 100A-150A	XMC 100A-150A Mechanical Locking Unit	1	100
XMR220A	XMC 180A-220A	XMC 180A-220A Mechanical Locking Unit	1	100

Spare Contact Kit XMC Series

Type (Order) Code	Used with Contactor 3P	Explanation	Box Quantity	Carton Quantity
XMC-RKT 9A	XMC-9	XMC-9 Spare Contact Kit	1	20
XMC-RKT 12A	XMC-12	XMC-12 Spare Contact Kit	1	20
XMC-RKT 18A	XMC-18	XMC-18 Spare Contact Kit	1	20
XMC-RKT 22A	XMC-22	XMC-22 Spare Contact Kit	1	20
XMC-RKT 32A	XMC-32	XMC-32 Spare Contact Kit	1	16
XMC-RKT 40A	XMC-40	XMC-40 Spare Contact Kit	1	16
XMC-RKT 50A	XMC-50	XMC-50 Spare Contact Kit	1	12
XMC-RKT 65A	XMC-65	XMC-65 Spare Contact Kit	1	12
XMC-RKT 75A	XMC-75	XMC-75 Spare Contact Kit	1	12
XMC-RKT 85A	XMC-85	XMC-85 Spare Contact Kit	1	12
XMC-RKT 100A	XMC-100	XMC-100 Spare Contact Kit	1	8
XMC-RKT 125A	XMC-125	XMC-125 Spare Contact Kit	1	8
XMC-RKT 150A	XMC-150	XMC-150 Spare Contact Kit	1	8
XMC-RKT 180A	XMC-180	XMC-180 Spare Contact Kit	1	4
XMC-RKT 220A	XMC-220	XMC-220 Spare Contact Kit	1	4

Thermal Relay Rail Mounting Adapter

Type (Order) Code	Used with Contactor 3P	Explanation	Box Quantity	Carton Quantity
XTR MA-22 A	XTR 22K	XMTR 22K Rail Mounting Adapter	1	100
XTR MA-40 A	XTR 40K	XMTR 40K Rail Mounting Adapter	1	100
XTR MA-85 A	XTR 85K	XMTR 85K Rail Mounting Adapter	1	100

Compensation Contactor Unit

Type (Order) Code	Used with Contactor 3P	Explanation	Box Quantity	Carton Quantity
XMC-C AC-9	XMC-9 - XMC-40	XMC-9 - XMC-40 Compensation Contactor Unit	1	250
XMC-C AC-50	XMC-50 - XMC-85	XMC-50 - XMC 85 Compensation Contactor Unit	1	250

GENERAL PRODUCT CATALOG

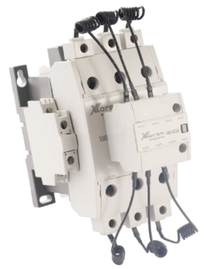
CONTACTORS

XMC Series Contactor Replacement Coil & Compensation Contactors

Type (Order) Code	Used with Thermal Relay	Rated Coil Voltage	Explanation	Box Quantity	Quantity per Carton
XMC0L 22W/220V	XMC 9A-22A	220	XMC 9A-22A 220VAC Coil	12	120
XMC0L 22W/24V	XMC 9A-22A	24	XMC 9A-22A 24VAC Coil	12	120
XMC0L 22W/48V	XMC 9A-22A	48	XMC 9A-22A 48VAC Coil	12	120
XMC0L 40W/220V	XMC 32A-40A	220	XMC 32A-40A 220VAC Coil	6	60
XMC0L 40W/24V	XMC 32A-40A	24	XMC 32A-40A 24VAC Coil	6	60
XMC0L 40W/48V	XMC 32A-40A	48	XMC 32A-40A 48VAC Coil	6	60
XMC0L 85W/220V	XMC 50A-85A	220	XMC 50A-85A 220VAC Coil	4	40
XMC0L 85W/24V	XMC 50A-85A	24	XMC 32A-40A 24VAC Coil	4	40
XMC0L 85W/48V	XMC 50A-85A	48	XMC 32A-40A 48VAC Coil	4	40
XMC0L 150A	XMC 100A-150A	220	XMC 100A-150A 220VAC Coil	1	20
XMC0L 150F	XMC 100A-150A	AC/DC 100-220V	XMC 100A-150A AC/DC 100-220V FREE VOLTAGE Coil	1	20
XMC0L 220F	XMC 180A-220A	AC/DC 100-220V	XMC 180A-220A AC/DC 100-220V FREE VOLTAGE Coil	1	20

XMC C Series Compensation Contactors

Compensation Contactors



Type (Order) Code	Rated Capacitor Power for 380/440V (kVAR) 0-55°C	Explanation	Box Quantity	Carton Quantity
XMC C3AC220-22-009	0,5 - 1 - 1,5	3P 220V 0,5 - 1 - 1,5 kVar 1NO-1NC Compensation Contactors	1	40
XMC C3AC220-22-009	2,5 - 5	3P 220V 2,5 - 5 kVar 1NO-1NC Compensation Contactors	1	40
XMC C3AC220-22-012	7,5	3P 220V 7,5 kVar 1NO-1NC Compensation Contactors	1	40
XMC C3AC220-22-012	10	3P 220V 10 kVar 1NO-1NC Compensation Contactors	1	40
XMC C3AC220-22-018	12,5	3P 220V 12,5 kVar 1NO-1NC Compensation Contactors	1	40
XMC C3AC220-22-018	15	3P 220V 15 kVar 1NO-1NC Compensation Contactors	1	40
XMC C3AC220-22-022	20	3P 220V 20 kVar 1NO-1NC Compensation Contactors	1	40
XMC C3AC220-40-032	25	3P 220V 25 kVar 2NO-2NC Compensation Contactors	1	30
XMC C3AC220-40-040	30	3P 220V 30 kVar 2NO-2NC Compensation Contactors	1	30
XMC C3AC220-85-050	40	3P 220V 40 kVar 2NO-2NC Compensation Contactors	1	20
XMC C3AC220-85-065	45,7	3P 220V 45,7 kVar 2NO-2NC Compensation Contactors	1	20
XMC C3AC220-85-075	50	3P 220V 50 kVar 2NO-2NC Compensation Contactors	1	20
XMC C3AC220-85-085	60	3P 220V 60 kVar 2NO-2NC Compensation Contactors	1	20

XLC Series Power Contactors

3-Pole XLC Series 220V AC Power Contactors



Type (Order) Code	Rated Current(In)	Explanation	Box Quantity	Carton Quantity
XLC 3NC220-025-009	9A	3P 1NC 220VAC 25 Frame 9A 4kW	1	50
XLC 3N0220-025-009	9A	3P 1NO 220VAC 25 Frame 9A 4kW	1	50
XLC 3N0220-025-012	12A	3P 1NC 220VAC 25 Frame 12A 5.5kW	1	50
XLC 3NC220-025-012	12A	3P 1NO 220VAC 25 Frame 12A 5.5kW	1	50
XLC 3N0220-025-018	18A	3P 1NC 220VAC 25 Frame 18A 7.5kW	1	50
XLC 3NC220-025-018	18A	3P 1NO 220VAC 25 Frame 18A 7.5kW	1	50
XLC 3N0220-025-025	25A	3P 1NC 220VAC 25 Frame 25A 11kW	1	50
XLC 3NC220-025-025	25A	3P 1NO 220VAC 25 Frame 25A 11kW	1	50
XLC 3NC220-025S-025	25A	3P 1NC 220VAC 25S Frame 25A 11kW	1	50
XLC 3N0220-025S-025	25A	3P 1NO 220VAC 25S Frame 25A 11kW	1	50
XLC 3N0220-040-032	32A	3P 1NC 220VAC 40 Frame 32A 15kW	1	50
XLC 3NC220-040-032	32A	3P 1NO 220VAC 40 Frame 32A 15kW	1	50
XLC 3NC220-040-040	40A	3P 1NC 220VAC 40 Frame 40A 18.5kW	1	50
XLC 3NC220-040-040	40A	3P 1NO 220VAC 40 Frame 40A 18.5kW	1	50
XLC 3NC220-085-050	50A	3P 1NC 220VAC 85 Frame 50A 22kW	1	50
XLC 3N0220-085-050	50A	3P 1NO 220VAC 85 Frame 50A 22kW	1	50
XLC 3N0220-085-065	65A	3P 1NC 220VAC 85 Frame 65A 30kW	1	50
XLC 3NC220-085-065	65A	3P 1NO 220VAC 85 Frame 65A 30kW	1	50
XLC 3NC220-085-075	75A	3P 1NC 220VAC 85 Frame 75A 37kW	1	50
XLC 3N0220-085-075	75A	3P 1NO 220VAC 85 Frame 75A 37kW	1	50
XLC 3N0220-085-085	85A	3P 1NC 220VAC 85 Frame 85A 45kW	1	50
XLC 3NC220-085-085	85A	3P 1NO 220VAC 85 Frame 85A 45kW	1	50

3-Pole XLC Series 220V AC Power Contactors



Type (Order) Code	Rated Current(In)	Explanation	Box Quantity	Carton Quantity
XLC 3AC220-0115-0115	115A	3P 220VAC 115A 55kW	1	4
XLC 3AC220-0150-0150	150A	3P 220VAC 150A 75kW	1	4
XLC 3AC220-0185-0185	185A	3P 220VAC 185A 90kW	1	4
XLC 3AC220-0225-0225	225A	3P 220VAC 225A 110kW	1	2
XLC 3AC220-0265-0265	265A	3P 220VAC 265A 132kW	1	2
XLC 3AC220-0330-0330	330A	3P 220VAC 330A 160kW	1	2
XLC 3AC220-0400-0400	400A	3P 220VAC 400A 200kW	1	2
XLC 3AC220-0500-0500	500A	3P 220VAC 500A 250kW	1	2
XLC 3AC220-0630-0630	630A	3P 220VAC 630A 335kW	1	1
XLC 3AC220-0800-0800	800A	3P 220VAC 800A 400kW	1	1
XLC 3AC220-1000-1000	1000A	3P 220VAC 1000A 500kW	1	1

4-Pole XLC Series 220V AC Power Contactors



Type (Order) Code	Rated Current(In)	Explanation	Box Quantity	Carton Quantity
XLC 4AC220-0115-0115	115A	4P 220VAC 115A 55kW	1	4
XLC 4AC220-0150-0150	150A	4P 220VAC 150A 75kW	1	4
XLC 4AC220-0185-0185	185A	4P 220VAC 185A 90kW	1	4
XLC 4AC220-0225-0225	225A	4P 220VAC 225A 110kW	1	2
XLC 4AC220-0265-0265	265A	4P 220VAC 265A 132kW	1	2
XLC 4AC220-0330-0330	330A	4P 220VAC 330A 160kW	1	2
XLC 4AC220-0400-0400	400A	4P 220VAC 400A 200kW	1	2
XLC 4AC220-0500-0500	500A	4P 220VAC 500A 250kW	1	2
XLC 4AC220-0630-0630	630A	4P 220VAC 630A 335kW	1	1
XLC 4AC220-0800-0800	800A	4P 220VAC 800A 400kW	1	1
XLC 4AC220-1000-1000	1000A	4P 220VAC 1000A 500kW	1	1

XTR SERIES THERMAL RELAYS

XTR Series Thermal Relays



Type (Order) Code	Rated Curren(In)	Explanation	Box Quantity	Carton Quantity
XTR XLC018-1.6-2.5	1,6-2,5A	XLC 9A-25A for 1.6-2.5A Thermal Relays	1	100
XTR XLC018-2.5-4	2,5-4A	XLC 9A-25A for 2.5-4A Thermal Relays	1	100
XTR XLC018-4-6	4-6A	XLC 9A-25A for 4-6A Thermal Relays	1	100
XTR XLC018-5-8	5,5-8A	XLC 9A-25A for 5.5-8A Thermal Relays	1	100
XTR XLC018-7-10	7-10A	XLC 9A-25A for 7-10A Thermal Relays	1	100
XTR XLC018-9-13	9-13A	XLC 9A-25A for 9-13A Thermal Relays	1	100
XTR XLC018-12-18	12-18A	XLC 9A-25A for 12-18A Thermal Relays	1	100
XTR XLC018-17-25	17-25A	XLC 9A-25A for 17-25A Thermal Relays	1	100
XTR XLC032-23-32	23-32A	XLC 9A-25A for 23-32A Thermal Relays	1	50
XTR XLC032-28-36	28-36A	XLC 9A-25A for 28-36A Thermal Relays	1	50

XTR Series Thermal Relays



Type (Order) Code	Rated Current(In)	Explanation	Box Quantity	Carton Quantity
XTR XLC185-30-50	30-50A	XXLC 115A-185A for 30-50A Thermal Relays	1	15
XTR XLC185-48-80	48-80A	XLC 115A-185A for 48-80A Thermal Relays	1	15
XTR XLC185-60-100	60-100A	XLC 115A-185A for 60-100A Thermal Relays	1	15
XTR XLC185-90-150	90-150A	XLC 115A-185A for 90-150A Thermal Relays	1	15
XTR XLC400-132-220	132-220A	XLC 185A-400A for 132-220A Thermal Relays	1	10
XTR XLC500-200-330	200-330A	XLC 225A-500A for 200-330A Thermal Relays	1	10
XTR XLC500-300-500	300-500A	XLC 225A-500A for 300-500A Thermal Relays	1	10
XTR XLC800-380-630	380-630A	XLC 400A-800A for 380-630A Thermal Relays	1	10

XLC SERIES ACCESSORIES

Auxiliary Contact Blocks XLC Series

Type (Order) Code	Used with Contactor	Auxiliary Contact	Explanation	Box Quantity	Quantity per Carton
AC-W1/2 11	XLC-115 - XLC-1000	1NO+1NC	XLC-115 - XLC-1000 1NO+1NC	10	500
AC-W1/4 22	XLC-115 - XLC-1000	2NO+2NC	XLC-115 - XLC-1000 2NO+2NC	6	300
AC-W/65	XLC-115 - XLC-1000	1NO+1NC	XLC-115 - XLC-1000 1NO+1NC	4	200
AC-W1/2 11	XLC-115 - XLC-1000	1NO+1NC	XLC-115 - XLC-1000 1NO+1NC	10	500
AC-W1/4 22	XLC-115 - XLC-1000	2NO+2NC	XLC-115 - XLC-1000 2NO+2NC	10	300

Mechanical Locking Units

Type (Order) Code	Used with Contactor	Explanation	Box Quantity	Carton Quantity
XMR150W	XLC-115 - XLC-150	XLC-115 - XLC-151 Mechanical Locking Units	1	20
XMR225W	XLC-185 - XLC-225	XLC-185 - XLC-226 Mechanical Locking Units	1	20
XMR265W	XLC-265	XLC-265 Mechanical Locking Units	1	20
XMR330W	XLC-330	XLC-330 Mechanical Locking Units	1	20
XMR400W	XLC-400	XLC-400 Mechanical Locking Units	1	20
XMR500W	XLC-500	XLC-500 Mechanical Locking Units	1	20
XMR630W	XLC-630	XLC-630 Mechanical Locking Units	1	20
XMR800W	XLC-800	XLC-800 Mechanical Locking Units	1	20
XMR1000W	XLC-1000	XLC-1000 Mechanical Locking Units	1	20

Spare Contact Set XLC Series

Type (Order) Code	Used with Contactor	Explanation	Box Quantity	Carton Quantity
XMC-RKT 115W	XLC-115	XLC-115 Spare Contact Set	1	20
XMC-RKT 150W	XLC-150	XLC-150 Spare Contact Set	1	20
XMC-RKT 185W	XLC-185	XLC-185 Spare Contact Set	1	20
XMC-RKT 225W	XLC-225	XLC-225 Spare Contact Set	1	20
XMC-RKT 265W	XLC-265	XLC-265 Spare Contact Set	1	20
XMC-RKT 330W	XLC-330	XLC-330 Spare Contact Set	1	20
XMC-RKT 400W	XLC-400	XLC-400 Spare Contact Set	1	20
XMC-RKT 500W	XLC-500	XLC-500 Spare Contact Set	1	20
XMC-RKT 630W	XLC-630	XLC-630 Spare Contact Set	1	20
XMC-RKT 800W	XLC-800	XLC-800 Spare Contact Set	1	20
XMC-RKT 1000W	XLC-1000	XLC-1000 Spare Contact Set	1	20

AC Spare Coils XLC Series

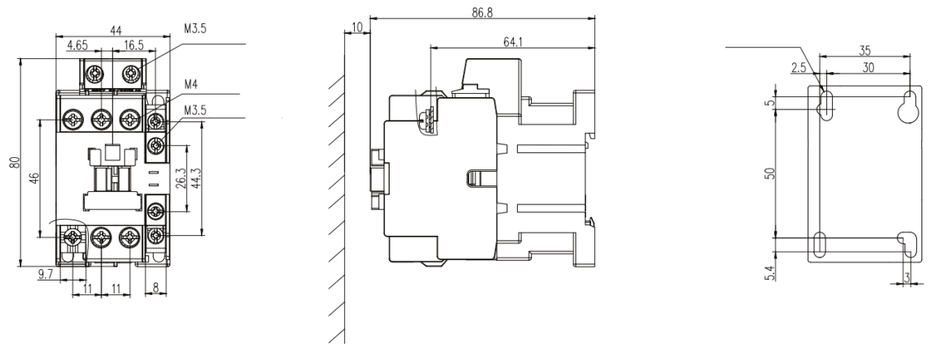
Type (Order) Code	Used with Contactor	Auxiliary Contact	Explanation	Box Quantity	Carton Quantity
XMC0L 150W	XLC-115 - XLC-150	220	XLC-115 - XLC-150 220VAC Coil	2	20
XMC0L 225W	XLC-185 - XLC-225	220	XLC-185 - XLC-225 220VAC Coil	2	20
XMC0L 330W	XLC-265 - XLC-330	220	XLC-265 - XLC-330 220VAC Coil	2	20
XMC0L 400W	XLC-400	220	XLC-400 220VAC Coil	1	10
XMC0L 500W	XLC-500	220	XLC-500 220VAC Coil	1	10
XMC0L 630W	XLC-630	220	XLC-630 220VAC Coil	1	1
XMC0L 800W	XLC-800	220	XLC-800 220VAC Coil	1	1
XMC0L 1000W	XLC-1000	220	XLC-1000 220VAC Coil	1	1

GENERAL PRODUCT CATALOG

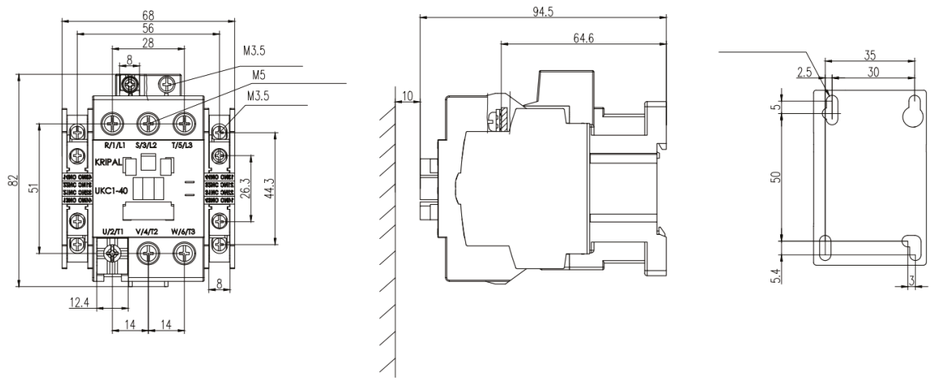
CONTACTORS

DIMENSIONS

XMC 9-22A



XMC 32-40A



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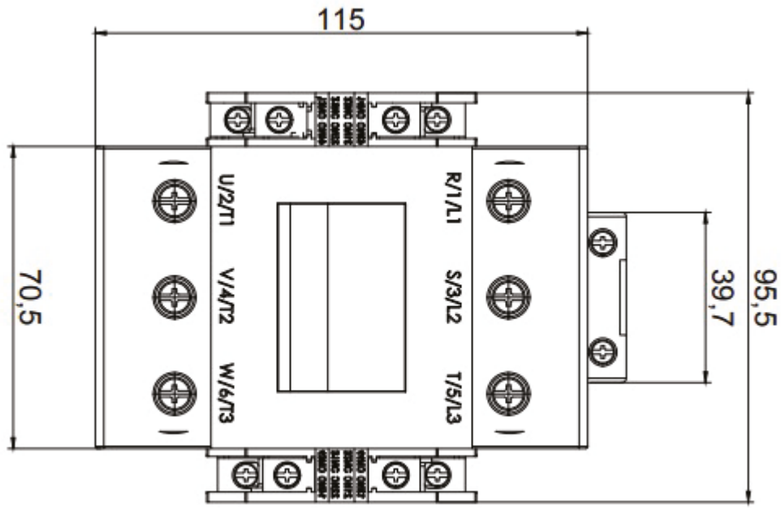
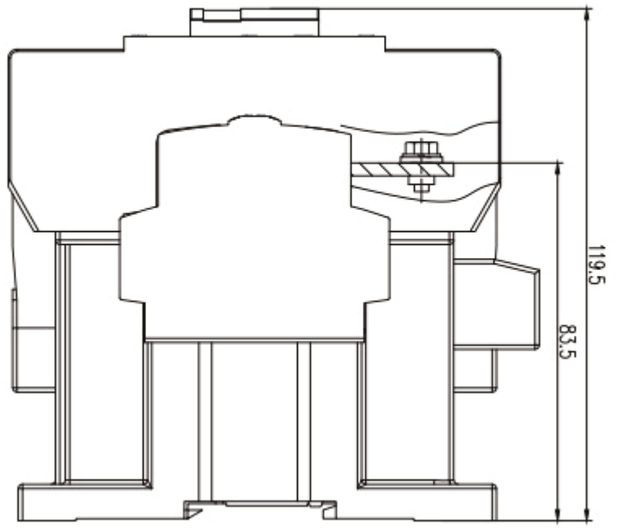
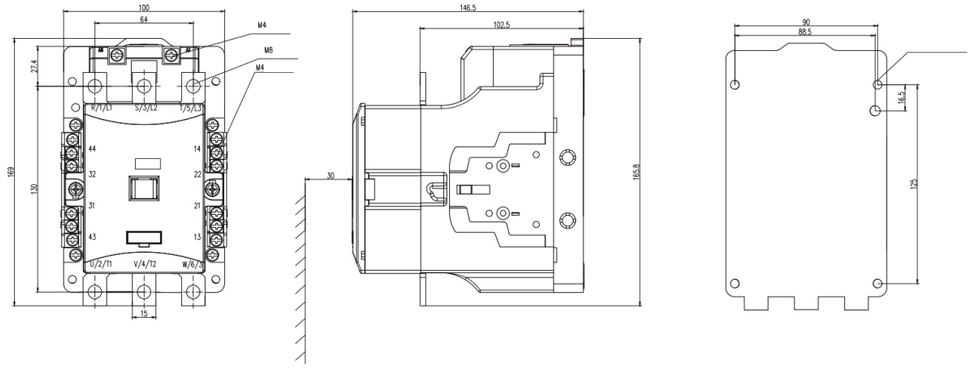




XMC 100-125A



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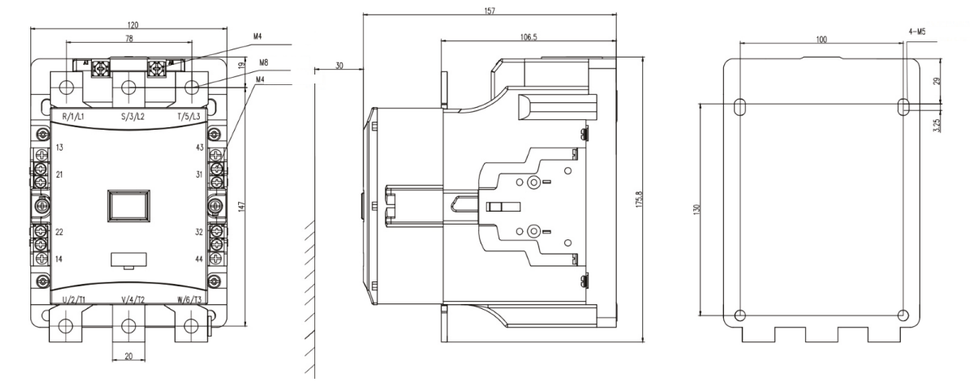

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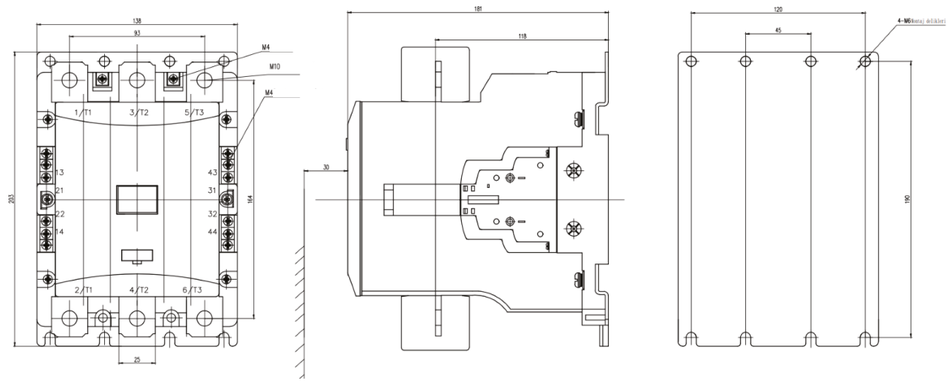
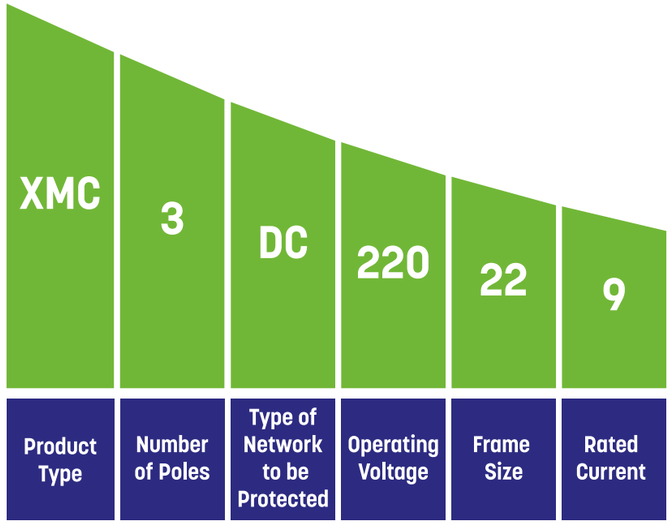
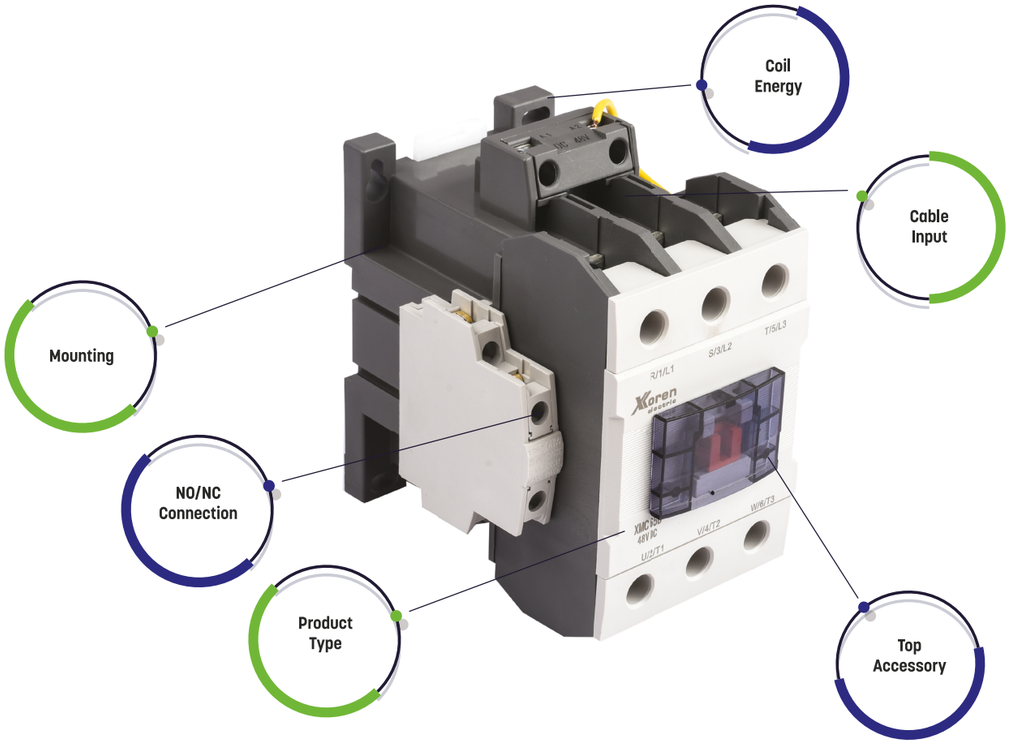


Product Code and Label Information





DC Power Contactors



DC Power Contactors												
Type				XMC 9	XMC 12	XMC 18	XMC 22	XMC 32	XMC 40	XMC 50	XMC 65	XMC 75	XMC 85
Number of Poles			P	3									
Rated Operational Voltage		Ue	VDC	24, 48									
Rated Insulation Voltage		Ui	V	690						1000			
Rated Impulse Withstand Voltage		Uimp	kV	8									
Operating Frequency			Hz	50/60									
Rated Thermal Current	Rated Current AC-1		A	25	25	40	45	55	60	100	115	125	135
Current and Power Ratings	Rated Current AC-3	220-240 V	kW	25	3.5	4.5	5.5	7.5	11	15	18.5	22	25
			A	11	13	18	22	32	40	50	65	75	85
		380-440 V	kW	4	5.5	7.5	11	15	18.5	22	30	37	45
			A	9	12	18	22	32	40	50	65	75	85
		500-550 V	kW	4	7.5	7.5	15	18.5	22	30	33	37	45
			A	7	12	13	22	28	32	43	60	65	75
		690V	kW	4	7.5	7.5	15	18.5	22	30	33	37	45
			A	5	9	9	18	20	23	28	28	42	45
Standards				IEC/EN 60947-4-1									
Electrical Life				20.000						15.000			
Mechanical Life				2.000						1.500			
Screw Type				M3.5									
Connection Cross-Section			mm²	1.14			2-22		3-38		2-42		
Accessories	Auxiliary Contact			1NO+1NC				2NO+2NC					
	Accessories	Side		✓									
		Top		✓									

General Information



DC power contactors are manufactured in compliance with the TS EN 60947-4-1 standard and are available in 3-pole and 4-pole versions. They can be used for switching motors, lighting systems, compensation systems, and other inductive loads. When used in conjunction with thermal relays, they protect circuits against overload currents.

Advantages

- Wide voltage range between 24V DC and 48V DC
- Various current ratings from 9 A to 85 A
- Manufactured in compliance with TS EN 60947-4-1 standard
- Full CE conformity
- Options available for different usage categories
- High electrical and mechanical lifespan
- Suitable for 35mm DIN rail and screw mounting
- Wide range of accessories
- Safe operation at low voltages
- IP20 protection rating

Operating Principle of DC Power Contactors

DC power contactors control the opening and closing of switch contacts via electromagnetic coils. When energy is supplied to the coil, a magnetic field is generated, causing the contacts to close and complete the circuit. When the voltage is removed, the contacts return to their original position through a spring mechanism, opening the circuit. Since it is more difficult to interrupt DC current compared to AC, DC contactors typically contain arc quenching chambers or magnetic quenching structures.

Differences Between AC and DC Contactors

1.Arc Extinguishing: DC contactors have magnetic and mechanical systems to extinguish the arc. In AC contactors, the arc is extinguished more easily due to zero-crossing.
2.Contact Structure: DC contactors have larger and more durable contacts because DC current causes a continuous flow of current between contacts.
3.Coil Voltage: AC contactors typically operate with 220V AC or 380V AC, whereas DC contactors can operate with lower voltages such as 12V, 24V, or 48V DC.
4.Application Areas: DC contactors are commonly used in renewable energy systems, battery-based systems, and DC motor drivers, while AC contactors are preferred in industrial facilities and residential electrical applications.

Operating Conditions

- **Ambient Temperature:** Between -5°C and +55°C
- **Altitude:** < 3000 m
- **Relative Humidity:** Should not exceed 80% at +40°C, and 95% at +20°C
- **Pollution Degree:** 3
- **Storage Temperature:** Between -40°C and +70°C

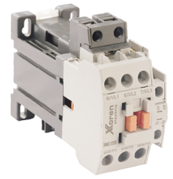
DC power contactors are designed to operate under these conditions, providing safe and long-lasting performance.

Applications

- **Solar Energy Systems:** Control and switching of energy from photovoltaic panels.
- **Electric Vehicles and Battery Systems:** Safe switching for DC motors and energy storage systems.
- **Rail Systems and Transport Vehicles:** Power control systems for trains, metros, and electric buses.
- **Industry and Automation Systems:** DC motor control, compensation systems, and automatic switching applications.
- **Telecom and Data Centers:** Use in Uninterruptible Power Supplies (UPS) and DC power infrastructure.

ORDER LIST

3-Pole XMC Series 24V DC Power Contactors



Type (Order) Code	Rated Current (In)	Explanation	Box Quantity	Carton Quantity
XMC 3DC24-22-009	9A	3P DC Type 24V 22 Frame 9A 1NO-1NC 4kW	1	40
XMC 3DC24-22-012	12A	3P DC Type 24V 22 Frame 12A 1NO-1NC 5.5kW	1	40
XMC 3DC24-22-018	18A	3P DC Type 24V 22 Frame 18A 1NO-1NC 7.5kW	1	40
XMC 3DC24-22-022	22A	3P DC Type 24V 22 Frame 22A 1NO-1NC 11kW	1	40
XMC 3DC24-40-032	32A	3P DC Type 24V 40 Frame 32A 2NO-2NC 15kW	1	20
XMC 3DC24-40-040	40A	3P DC Type 24V 40 Frame 40A 2NO-2NC 18.5kW	1	20
XMC 3DC24-85-050	50A	3P DC Type 24V 85 Frame 50A 2NO-2NC 22kW	1	20
XMC 3DC24-85-065	65A	3P DC Type 24V 85 Frame 65A 2NO-2NC 30kW	1	20
XMC 3DC24-85-075	75A	3P DC Type 24V 85 Frame 75A 2NO-2NC 37kW	1	20
XMC 3DC24-85-085	85A	3P DC Type 24V 85 Frame 85A 2NO-2NC 45kW	1	20

3-Pole XMC Series 48V DC Power Contactors



Type (Order) Code	Rated Current (In)	Explanation	Box Quantity	Carton Quantity
XMC 3DC48-22-009	9A	3P DC Type 48V 22 Frame 9A 1NO-1NC 4kW	1	40
XMC 3DC48-22-0012	12A	3P DC Type 48V 22 Frame 12A 1NO-1NC 5.5kW	1	40
XMC 3DC48-22-018	18A	3P DC Type 48V 22 Frame 18A 1NO-1NC 7.5kW	1	40
XMC 3DC48-22-022	22A	3P DC Type 48V 22 Frame 22A 1NO-1NC 11kW	1	40
XMC 3DC48-40-032	32A	3P DC Type 48V 40 Frame 32A 2NO-2NC 15kW	1	30
XMC 3DC48-40-040	40A	3P DC Type 48V 40 Frame 40A 2NO-2NC 18.5kW	1	30
XMC 3DC48-85-050	50A	3P DC Type 48V 85 Frame 50A 2NO-2NC 22kW	1	20
XMC 3DC48-85-065	65A	3P DC Type 48V 85 Frame 65A 2NO-2NC 30kW	1	20
XMC 3DC48-85-075	75A	3P DC Type 48V 85 Frame 75A 2NO-2NC 37kW	1	20
XMC 3DC48-85-085	85A	3P DC Type 48V 85 Frame 85A 2NO-2NC 45kW	1	20

XMC Series DC Type 110/220V Free Voltage Power Contactors



Type (Order) Code	Rated Current (In)	Explanation	Box Quantity	Carton Quantity
XMC FV3-0100-0100	100A	Free Voltage 3P 100 Frame 100A 55kW 2NO-2NC	1	8
XMC FV3-0150-0125	125A	Free Voltage 3P 150 Frame 125A 60kW 2NO-2NC	1	8
XMC FV3-0150-0150	150A	Free Voltage 3P 150 Frame 150A 75kW 2NO-2NC	1	8
XMC FV3-0220-0180	180A	Free Voltage 3P 220 Frame 180A 90kW 2NO-2NC	1	4
XMC FV3-0220-0220	220A	Free Voltage 3P 220 Frame 220A 132kW 2NO-2NC	1	4

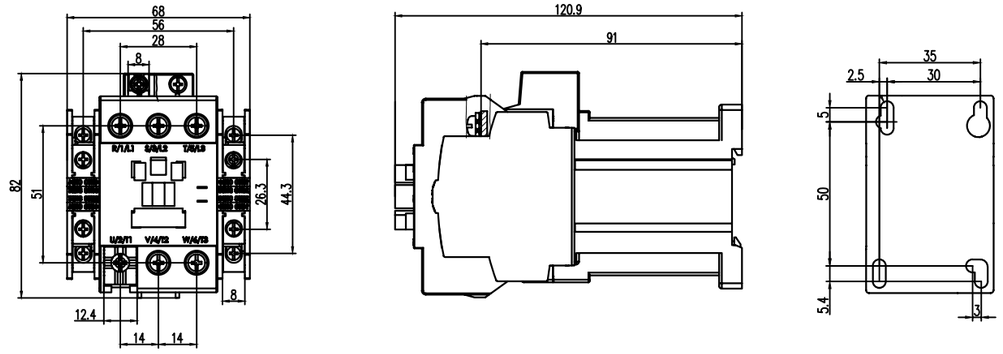
DC Spare Coils XMC Series

Type (Order) Code	Used with Contactor	Rated Coil Voltage (VDC)	Explanation	Box Quantity	Carton Quantity
XMC0L 150F	XMC 100A-150	DC 100-220V	XMC 100A-150A DC 100-220V FREE VOLTAGE Coil	1	40
XMC0L 220F	XMC 180A-220A	DC 100-220V	XMC 180A-220A DC 100-220V FREE VOLTAGE Coil	1	40
XMC0L 22D	DC XMC-9-XMC-22	24VDC	DC XMC-9-XMC-22-24VDC Coil	10	200
XMC0L 40D	DC XMC-32-XMC-40	24VDC	DC XMC-9-XMC-40 24VDC Coil	8	160
XMC0L 85D	DC XMC-50-XMC-85	24VDC	DC XMC-50-XMC-85 24VDC Coil	4	80

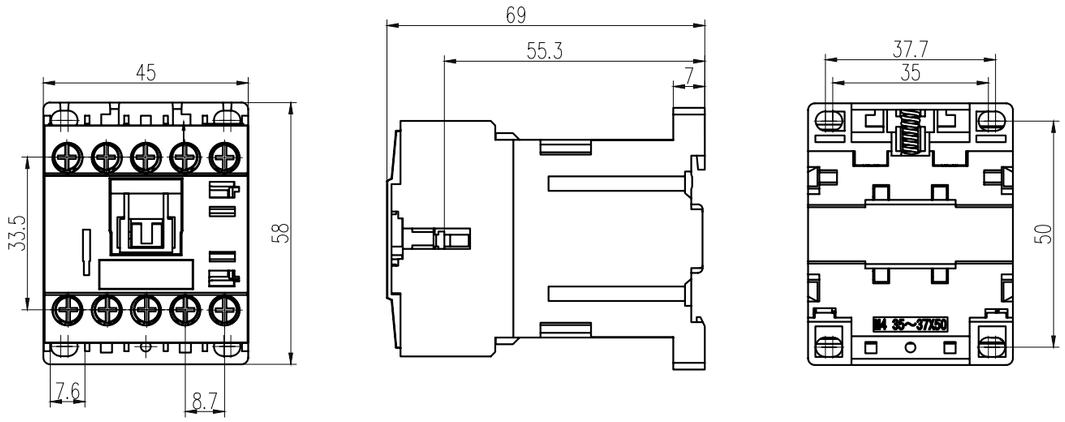
XMC-MD Mini Contactor 24V DC (3P)

Type (Order) Code	Rated Current (In)	Explanation	Box Quantity	Carton Quantity
XMC M3DC24-N0-6	6A	M Series 3P 24VDC NO 6A 3kW	1	90
XMC M3DC24-NC-6	6A	M Series 3P 24VDC NC 6A 3kW	1	90
XMC M3AC24-N0-9	9A	M Series 3P 24VDC NO 9A 4kW	1	90
XMC M3DC24-NC-9	9A	M Series 3P 24VDC NC 9A 4kW	1	90
XMC M3DC24-N0-12	12A	M Series 3P 24VDC NO 12A 5.5kW	1	90
XMC M3DC24-NC-12	12A	M Series 3P 24VDC NC 12A 5.5kW	1	90
XMC M3DC24-N0-16	16A	M Series 3P 24VDC NO 16A 7.5kW	1	90
XMC M3DC24-NC-16	16A	M Series 3P 24VDC NC 16A 7.5kW	1	90

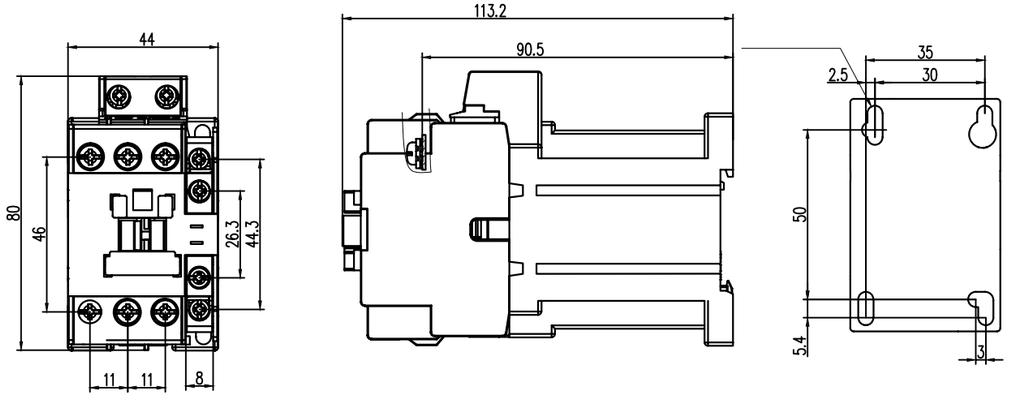
40 Frame



22 Frame



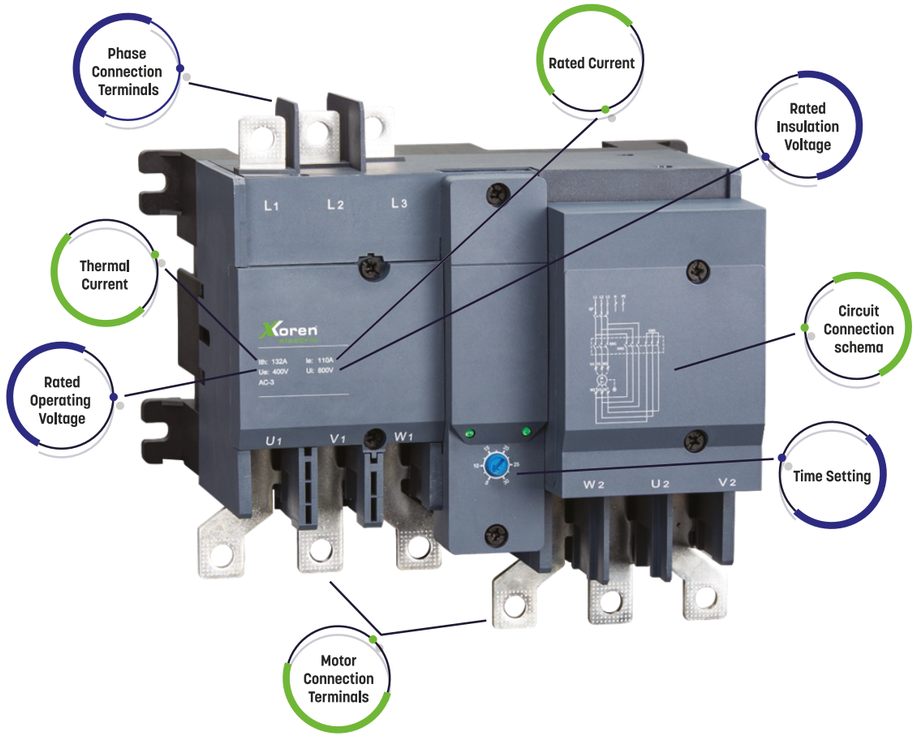
6A-16A DC XMC Mini Contactors



Product Code and Label Information

XSC	Y	3	AC	220	50	40
Product Type	Series Code	Number of Poles	Current Type	Operating Voltage	Frame Size	Rated Current

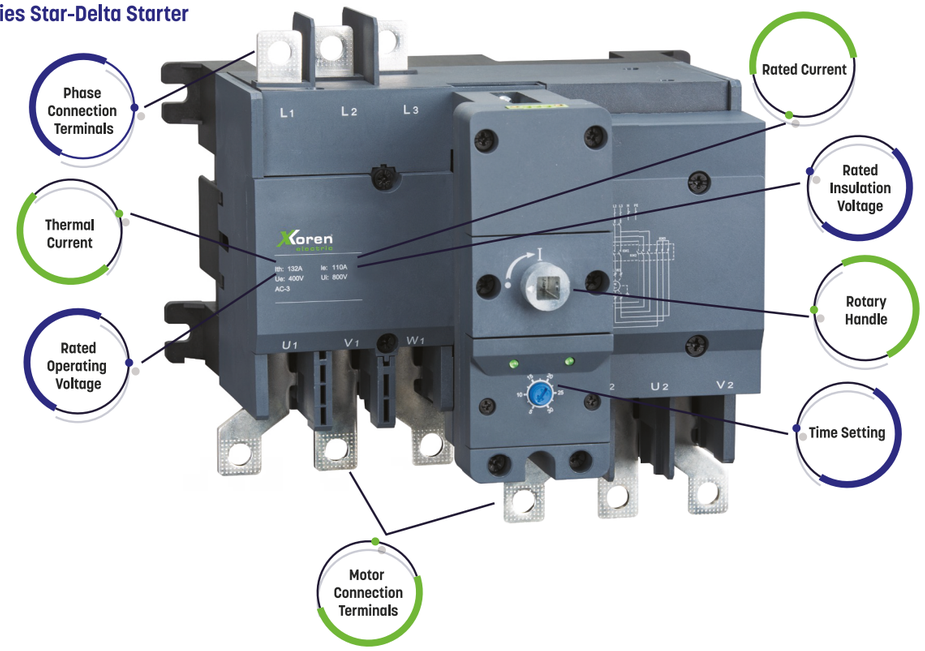
XSC Y Series Star-Delta Starter



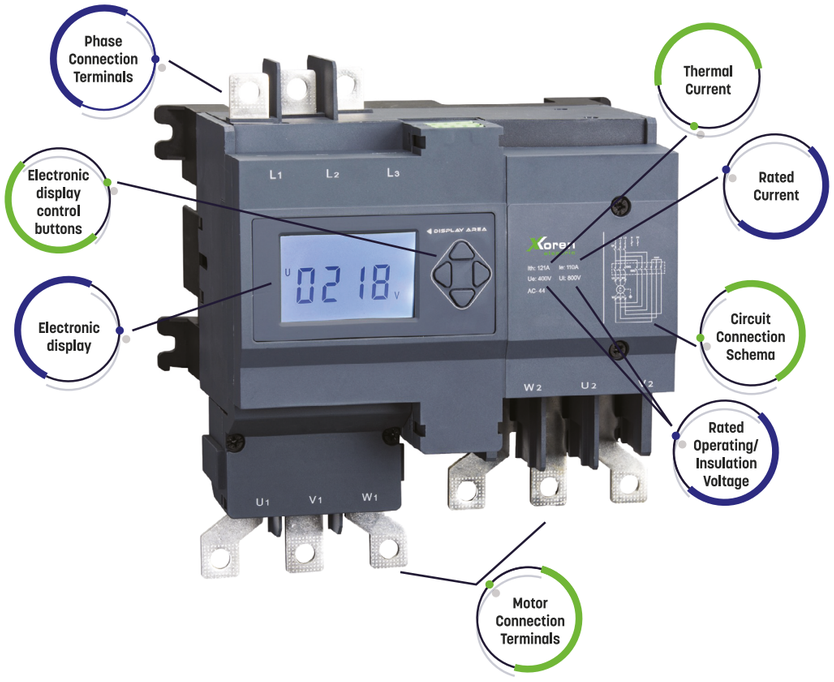
GENERAL PRODUCT CATALOG

STAR-DELTA STARTER

XSC M Series Star-Delta Starter



XSC E Series Star-Delta Starter



XSC Y SERIES STAR-DELTA STARTERS



STAR-DELTA STARTERS / XSC-Y SERIES	Symbol	Unit	XSC-Y							
			50 Frame			110 Frame				
Type			XSC-40	XSC-50	XSC-65	XSC-75	XSC-85	XSC-95	XSC-100	XSC-120
Number of Poles		P	3							
Rated Operational Voltage	Ue	VAC	380, 400							
Rated Insulation Voltage	Ui	V	800							
Rated Current (AC-3)	In	A	40	50	65	75	85	95	100	120
Motor Power (AC-3)		kW	22	30	45	45	55	55	75	90
Standards			IEC 60947-4-1							
Matching Fuse			NH1-125							
Electrical Life		op.	600000							
Mechanical Life		op.	3000							
Terminal Cross-section		mm²	35				50			

XSC M SERIES STAR-DELTA STARTERS



STAR-DELTA STARTERS / XSC-M SERIES	Symbol	Unit	XSC-M							
			50 Frame			110 Frame				
Type			XSC-40	XSC-50	XSC-65	XSC-75	XSC-85	XSC-95	XSC-100	XSC-120
Number of Poles		P	3							
Rated Operational Voltage	Ue	VAC	380, 400							
Rated Insulation Voltage	Ui	V	800							
Rated Current	In	A	40	50	65	75	85	95	100	120
Motor Power		kW	22	30	45	45	55	55	75	90
Standards			IEC 60947-4-1							
Matching Fuse			NH1-125							
Electrical Life		op.	600000							
Mechanical Life		op.	3000							
Terminal Cross-section		mm²	35				50			

XSC E SERIES STAR-DELTA STARTERS



STAR-DELTA STARTERS / XSC-E SERIES	Symbol	Unit	XSC-E							
			50 Frame			110 Frame				
Type			XSC-40	XSC-50	XSC-65	XSC-75	XSC-85	XSC-95	XSC-100	XSC-120
Number of Poles		P	3							
Rated Operational Voltage	Ue	VAC	380, 400							
Rated Insulation Voltage	Ui	V	800							
Rated Current	In	A	40	50	65	75	85	95	100	120
Motor Power		kW	22	30	45	45	55	55	75	90
Standards			IEC 60947-4-1							
Matching Fuse			NH1-125							
Electrical Life		op.	600000							
Mechanical Life		op.	3000							
Terminal Cross-section		mm^2	35				50			

GENERAL PRODUCT CATALOG

STAR-DELTA STARTER

General Information

XKoren, XSC Star-Delta Starters are produced in three series: Y, M, and E. Star-delta starters are a starting method used to prevent the high inrush current at the moment of starting for three-phase asynchronous motors that require large power. The star-delta starter is a circuit element that starts the motor with low current and then transitions to full power. At the moment of motor start-up, the stator windings are connected in a star (Y) configuration, and the motor starts running at low voltage. After a certain period, the connection switches to the delta (Δ) position, and the motor continues to run at nominal voltage. Typically used in large industrial motors, the aim is to reduce the inrush currents and minimize adverse effects on the grid. This system is preferred in industrial applications where controlling motor inrush currents is desired.

The Star-Delta Starter series is suitable for three-phase squirrel-cage induction motors with an operating frequency of AC 50Hz, 60Hz, or 50Hz/60Hz, a rated voltage of 380V/400V, and a nominal operating current up to 120A (phase current when the starter is in delta connection). It provides power control up to 90kW. The starter is used to control the operation, start, and stop of the stator winding from star to delta, reducing the starting current and minimizing its impact on the power grid. The starter adopts a modular design and an integrated structure, incorporating contactors, intelligent controllers, and smart auxiliary contacts. The intelligent controller controls the starter's operation automatically according to a pre-set program, completing the motor's star-delta start.

This product series is suitable for applications requiring voltage-reduction start-up, such as dual-speed fans, domestic water pumps, drainage pumps, and manual forced start-up for fire water supply, as well as start-up and operational protection requirements for loads requiring voltage-reduction start-up. XKoren starters can meet the needs of different fields by installing functional modules.

Operating Conditions

- The maximum ambient temperature should not exceed +40°C, and the minimum should not be below -25°C, with the average temperature over 24 hours not exceeding +35°C. If the ambient temperature exceeds this range, users should consult with the manufacturer.
- At +40°C ambient temperature, the relative humidity should not exceed 50%; at lower temperatures, higher relative humidity is acceptable. When the monthly average minimum temperature is +25°C, the average monthly maximum relative humidity should not exceed 90%. In case of occasional condensation due to temperature fluctuations, users should take special protective measures.
- There should be no abnormal vibration or shock.
- Pollution level: Level 3.

Installation Conditions

- The installation altitude should not exceed 2000 meters.

Vertical Installation

- For vertically mounted starters, the power terminal should be at the top, and the load terminal should be at the bottom. The slope angle between the installation surface and the vertical surface should not exceed ±5°, and this will not affect performance.

Installation: Screw mounting.

Transport and Storage Conditions

The applicable temperature range for transport and storage is between -25°C and +60°C, and it can reach up to +70°C for a short period (24 hours). The storage area should be ventilated, dry, and not affected by rain, snow, or direct sunlight.

Table 1

Function	Automatic Type	Smechanical Emergency Type	Z Multifunction Altype
Star-Delta Conversion	■	■	■
Adjustable star running time	■	■	■
Mechanical emergency (manual forced start)	-	■	-
overload protection	-	-	■
Locked rotor protection	-	-	■
Phase loss protection	-	-	■
Three- phase imbalance protection	-	-	■
Overvoltage protection	-	-	■
Undervoltage protection	-	-	■
Fault display	-	-	■
Fault alarm	-	-	■
Status display	-	-	■
Communictation function	-	-	

Notes: - indicates not available. □ indicates optional, and ■ indicates standard

Table 1 compares the functions of three different XSC series motor control systems. These series are named XSC Y Series (Automatic Type), XSC M Series (Mechanical Emergency Type), and XSC E Series (Multifunctional Type).

1. XSC Y Series:

•The primary function of this series is to provide automatic motor control. It is particularly used to start and operate motors with features such as star-delta transition and adjustable star-run time.

•Supported Functions:

o Star-Delta Transition: A starting system that ensures the motor operates at low current.
o Adjustable Star-Run Time: Allows adjustment of the duration the motor runs in star mode.
• Unsupported Functions: The XSC Y Series does not include advanced protection features such as overload, locked rotor, or phase loss.

2. XSC M Series:

• The XSC M Series is designed for use in mechanical emergency situations. This series has a manual forced start feature, making it suitable for mechanical emergency conditions.

• Supported Functions:

o Star-Delta Transition: Used to start the motor with low current.
o Adjustable Star-Run Time: Allows adjustment of the operation time.
o Mechanical Emergency (Manual Forced Start): Enables manual motor start during emergencies.
•Unsupported Functions: Advanced protection and status monitoring features are not available in the XSC M Series.

3. XSC E Series:

•The XSC E Series offers the most comprehensive functionality, including advanced protection, fault monitoring, and status display. This series is used in industrial environments where greater security and performance are required.

•Supported Functions:

o Star-Delta Transition and Adjustable Star-Run Time.
o Overload Protection: Prevents the motor from overloading.
o Locked Rotor Protection: Protects the motor when the rotor is locked.
o Phase Loss Protection: Ensures the motor is protected against phase loss.
o Three-Phase Imbalance Protection: Provides protection when imbalance occurs in a three-phase system.
o Overvoltage and Undervoltage Protection: Protects the motor when voltage levels are abnormal.
o Fault Display and Fault Alarm: Displays and alerts motor faults.
o Status Display: Shows the operating status of the motor.
o Communication Function: This feature allows remote communication with the system (may be indicated with a box symbol in the XSC E series, but full support may not be provided).

Overview:

• The XSC Y Series is a motor control system offering basic functions, mainly designed for automatic use.
• The XSC M Series is suitable for mechanical emergencies and provides manual start capability.
The XSC E Series is an advanced system that includes more comprehensive protection and monitoring functions. It can be preferred for industrial applications to provide higher levels of security and performance.

Structural Features and Operating Principles

Star-Delta Starting: When the control coil is energized with a 220V control voltage, the main contactor of the product closes, and a star circuit is formed with the star contactor. The motor starts operating at low voltage. Once the set switching time is reached and the motor speed approaches its normal speed, the main contactor automatically disconnects, and at the same time, the delta contactor closes to form a delta circuit. The motor continues to operate at full voltage.

Mechanical Emergency: In case the signal line or control line of the fire pump control box fails, and it becomes impossible to start the fire pump automatically or manually, the mechanical emergency start device on the fire pump control box cover can be used. The main and delta contactors can be manually closed, and the fire water pump can be started.

Star-Delta Starting Delay Adjustment
By using tools such as a flat screwdriver to rotate the knob and direct the pointer to the desired number, the star-delta starting delay can be adjusted between 5 seconds and 30 seconds. The default value at the factory is 5 seconds.

Table 2

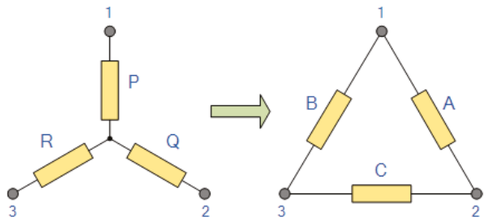
Parameters		Unit	XSC										
Rated Current Ie (AC-3)		A	18	25	32	40	50	65	75	85	95	100	110
Rated Voltage Ue		V	380/400										
Rated insulation Voltage Ui		V	690					800					
Poles		P	3										
Mechanical life	Automatic/ Multifunctional	10000 times	60										
	Mechanical Emergency (Manual Operation)	times	3000										
Suggest Controllable Operating Power of Three-Phase Squirrel Cage Motor (AC-3)		kW	7,5	11	22	30	37	45	45	55	55	75	75
Matched Fuse		A	20	32	63	80	100	100	100	125	160	160	160
Terminal Size		mm2	16				35						50
Coil Parameters	Rated Control Voltage Us	V	220V/230V										
	Pull-Involtage	%Us	80% ~ 110%										
	Release Voltage	%Us	20% ~ 75%										
	Power Consumption (pull-in)	VA	230										
	Power Consumption (keeping)	VA	19					32					

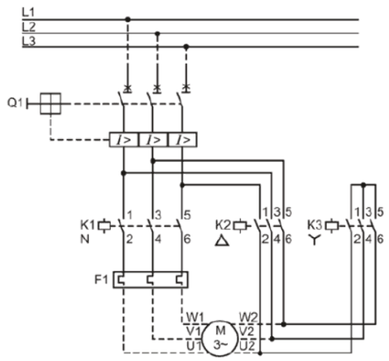
Star-Delta Starting System

Operating Principle:

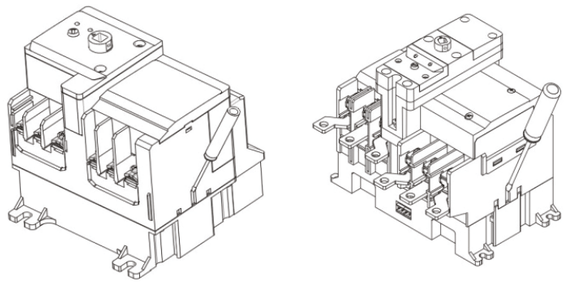
The star-delta starting method reduces the current values during the motor's initial start-up, ensuring safer and more efficient operation. When a 220V control voltage is applied, the main contactor and star contactor are activated, allowing the motor to operate in star connection mode. Once the preset transition time is completed and the motor speed approaches the nominal level, the main contactor opens, and the delta contactor is activated, enabling the motor to operate at full voltage.

Mechanical Emergency Start:
In the event of a fault in the signal or control lines of the fire pump control box, automatic or manual starting may be disabled. In such emergencies, the mechanical emergency start device on the control box can be used to manually activate the main and delta contactors, allowing the fire water pump to be started.





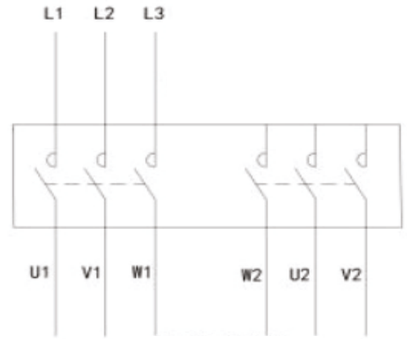
Motor Phase Detection in Case of Power Loss



Before operating the product, you can follow the steps shown in the diagram below to test the motor phase based on the motor connection:

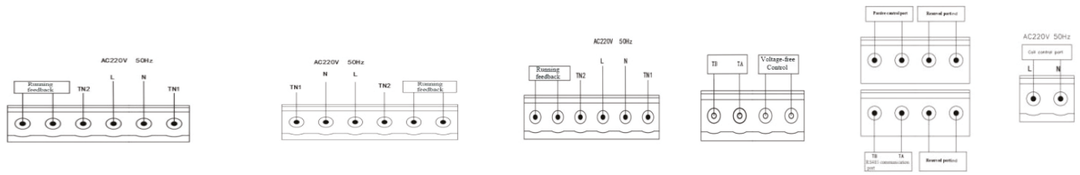
1.Manually disconnect the power.
2.For motor phase detection, place a flat screwdriver into the auxiliary contactor socket on the right side of the product and push it down about 2-3 mm to separate the contacts of the star contactor.
3.After the test is completed, remove the flat screwdriver from the socket and return the contacts of the star contactor to the closed position.

Main Circuit and Terminal Connection Diagram



L1, L2, and L3 are the main input terminals of the circuit; U1, V1, and W1 are the output terminals of the main contactor; W2, U2, and V2 are the output terminals of the star-delta contactor.

Coil Control Terminal Connection Diagram



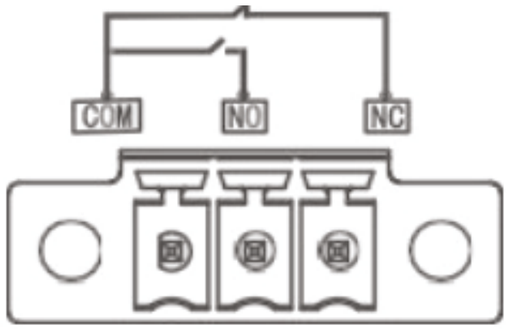
Connection and Operating Principle

•**L and N:** These are the power supply ports for coil control. When power is applied, the product operates using the star-delta method according to the control logic.
•**TN1 and TN2:** These ports are reserved for function detection of the product. No connection is required during use.
•**Operating Feedback Port:** This is a normally open (NO) auxiliary contact set. When the starter is activated, the auxiliary contacts close, and these contacts can be used for operational signal feedback or control circuit locking.

Connection Ports and Their Functions

• **RS485 Communication Port:** Provides external communication connection.
• **Passive Control Port:** Reserved for an external controller (provided by the user). It is short-circuited by default at the factory. If this port is disconnected, the product cannot operate.
• **Reserved Port:** A signal feedback port that provides additional functionality.
• **L and N:** Power supply ports for coil control.

Mechanical emergency feedback terminal wiring diagram



Multifunctional feedback terminal wiring diagram

COM is a common point, with a set of normally open (NO) and a set of normally closed (NC) auxiliary contacts. When the manual operating mechanism of the starter rotates and closes, it can serve as an emergency start feedback signal or interlock signal for the product.

Table 3

Maintenance Step	Description
Daily Dust Cleaning	Dust on product surfaces should be cleaned regularly.
Screw Check	Check for loose screws on each terminal.
Wire Condition Inspection	Inspect wires for damage and wear.
Environmental Conditions Compliance	The operating environment must meet the specifications mentioned in the manual
Inspection of Stored Products	Products stored for more than six months should be inspected before reuse
Insulating Exposed External Connection Wires	Exposed parts of external connection wires at the input and output of the starter should be insulated to prevent accidents.
Professional Maintenance	Maintenance should be carried out by qualified personnel only.

ORDER LIST

Star-Delta Starter

Y Series Star-Delta Starter



Type (Order) Code	Rated Current (In)	Product Name	Box Quantity	Carton Quantity
XSC Y3AC220-50-40	40A	Y Series 3P AC Type 220V 50 Frame 40 A 30kW	1	8
XSC Y3AC220-50-50	50A	Y Series 3P AC Type 220V 50 Frame 50 A 37kW	1	8
XSC Y3AC220-110-65	65A	Y Series 3P AC Type 220V 110 Frame 65A 45kW	1	4
XSC Y3AC220-110-75	75A	Y Series 3P AC Type 220V 110 Frame 75A 45kW	1	4
XSC Y3AC220-110-85	85A	Y Series 3P AC Type 220V 110 Frame 85A 55kW	1	4
XSC Y3AC220-110-95	95A	Y Series 3P AC Type 220V 110 Frame 95A 55kW	1	4
XSC Y3AC220-110-100	100A	Y Series 3P AC Type 220V 110 Frame 100A 75kW	1	4
XSC Y3AC220-110-120	120A	Y Series 3P AC Type 220V 110 Frame 120A 90kW	1	4

M Series Manual Star-Delta Starter



Type (Order) Code	Rated Current (A)	Product Name	Box Quantity	Carton Quantity
XSC M3AC220-50-40	40A	M Series 3P AC Type 220V 50 Frame 40 A 30kW	1	8
XSC M3AC220-50-50	50A	M Series 3P AC Type 220V 50 Frame 50 A 37kW	1	8
XSC M3AC220-110-65	65A	M Series 3P AC Type 220V 110 Frame 65A 45kW	1	4
XSC M3AC220-110-75	75A	M Series 3P AC Type 220V 110 Frame 75A 45kW	1	4
XSC M3AC220-110-85	85A	M Series 3P AC Type 220V 110 Frame 85A 55kW	1	4
XSC M3AC220-110-95	95A	M Series 3P AC Type 220V 110 Frame 95A 55kW	1	4
XSC M3AC220-110-100	100A	M Series 3P AC Type 220V 110 Frame 100A 75kW	1	4
XSC M3AC220-110-120	120A	M Series 3P AC Type 220V 110 Frame 120A 90kW	1	4

E Series Electronic Star-Delta Starter



Type (Order) Code	Rated Current (A)	Product Name	Box Quantity	Carton Quantity
XSC E3AC220-50-40	40A	E Series 3P AC Type 220V 50 Frame 40 A 30kW	1	8
XSC E3AC220-50-50	50A	E Series 3P AC Type 220V 50 Frame 50 A 37kW	1	8
XSC E3AC220-110-65	65A	E Series 3P AC Type 220V 110 Frame 65A 45kW	1	4
XSC E3AC220-110-75	75A	E Series 3P AC Type 220V 110 Frame 75A 45kW	1	4
XSC E3AC220-110-85	85A	E Series 3P AC Type 220V 110 Frame 85A 55kW	1	4
XSC E3AC220-110-95	95A	E Series 3P AC Type 220V 110 Frame 95A 55kW	1	4
XSC E3AC220-110-100	100A	E Series 3P AC Type 220V 110 Frame 100A 75kW	1	4
XSC E3AC220-110-120	120A	E Series 3P AC Type 220V 110 Frame 120A 90kW	1	4

Star-Delta Starter Auxiliary Contact

Type (Order) Code	Product Name	Number of boxes	Quantity Per Carton
AC-SC11	1NO+1NC Star-Delta Starter Auxiliary Contact	1	48
AC-SC22	2NO+2NC Star-Delta Starter Auxiliary Contact	1	24

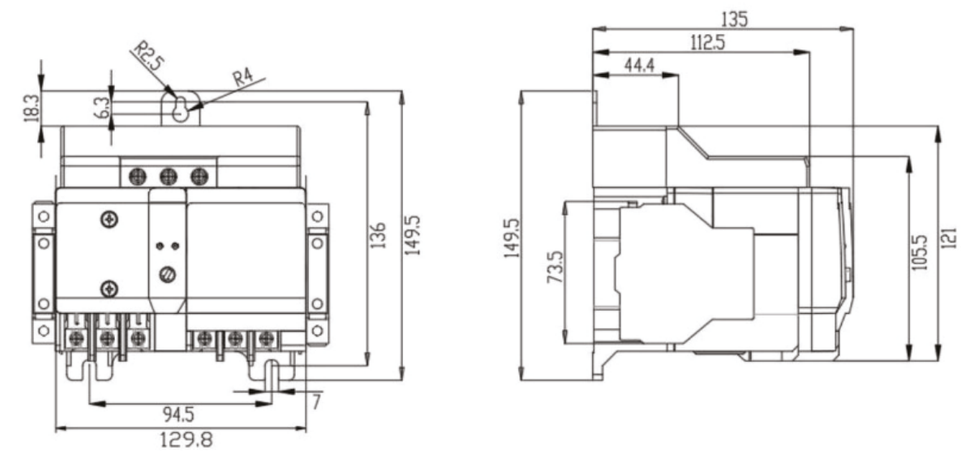
GENERAL PRODUCT CATALOG

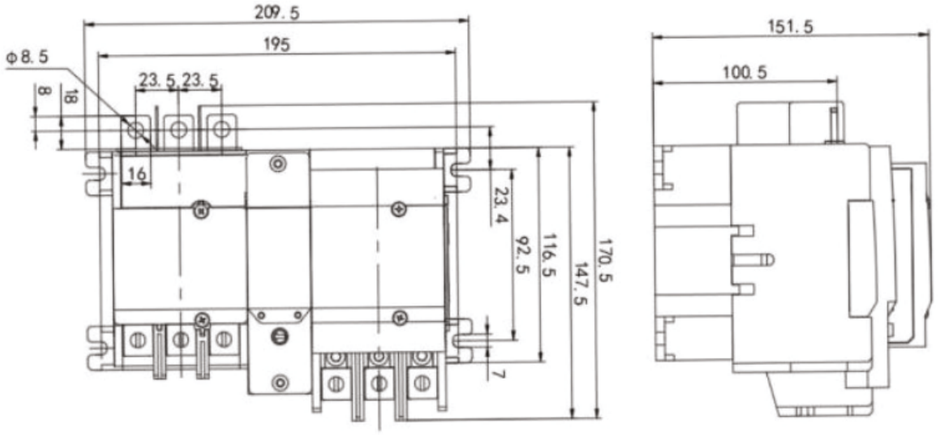
STAR-DELTA STARTER

DIMNESIONS

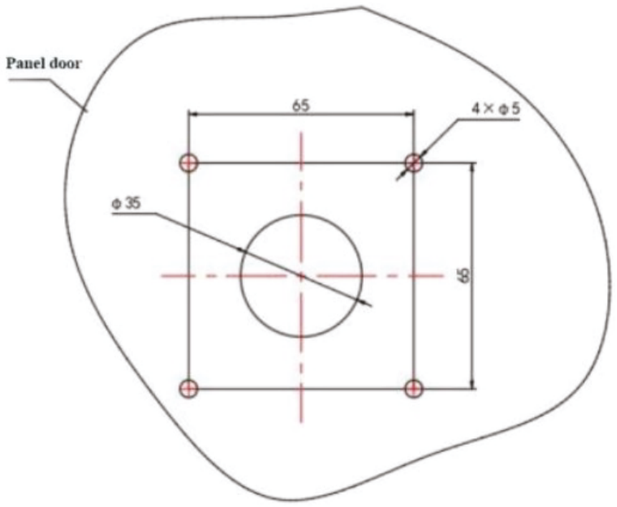
Y Series Star-Delta Starter (Star-Delta Starter)

1-95 (65A, 75A, 85A, 95A)

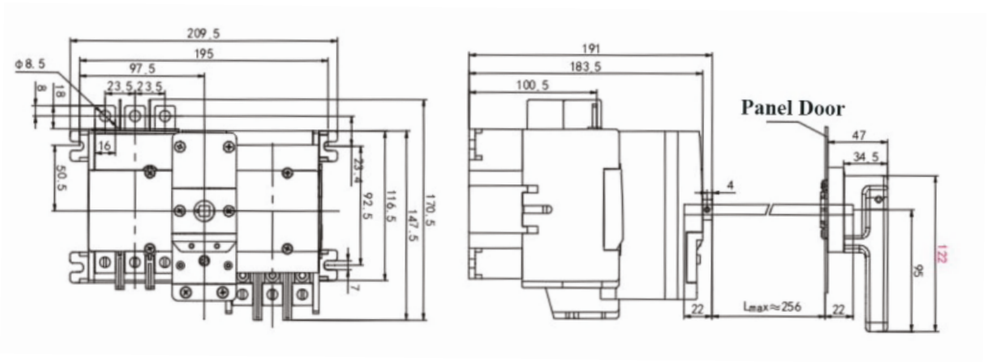




(40A, 50A) M Series Manual Star-Delta Starter (Star-Delta Starter) (With Locking Function)

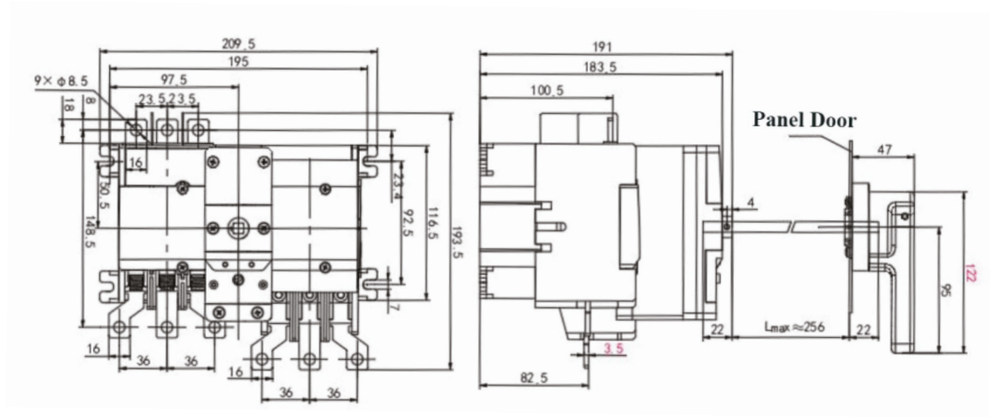


M Serisi Manuel Star-Delta Starter (Yıldız-Üçgen Yol Verici)

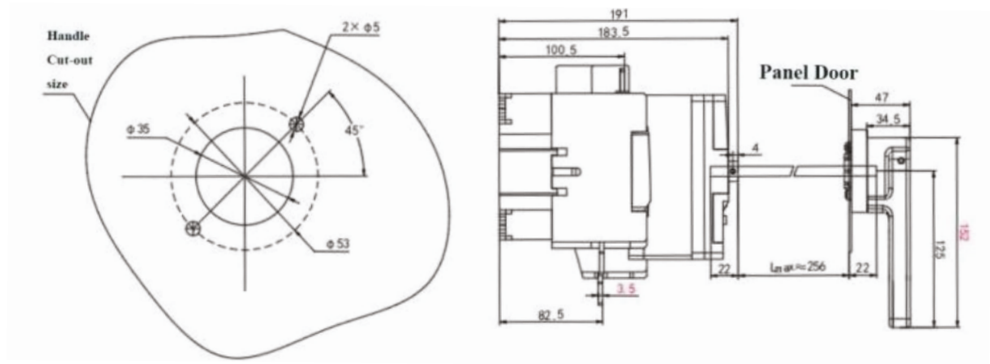


Sequence	Handle Type	Handle Length
1	Equipped with Locking Function A	L:122mm
2	Equipped with Locking Function B	L:152mm
3	Equipped with Locking Function C	L:140mm

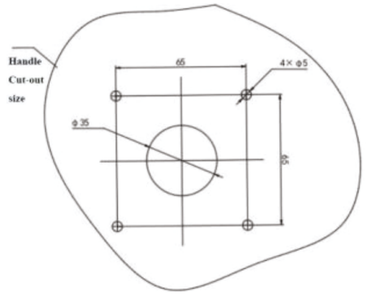
M Series Manual Star-Delta Starter (Star-Delta Starter) (With Locking Function Handle A)



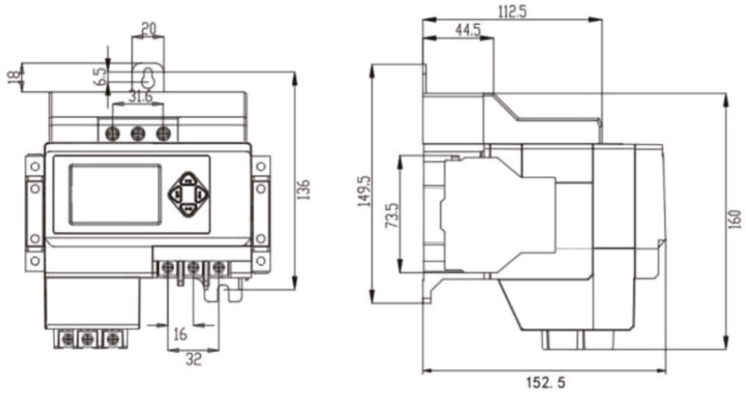
Opening Diagram of Handle A and B with Locking Function (Handle B with Locking Function)



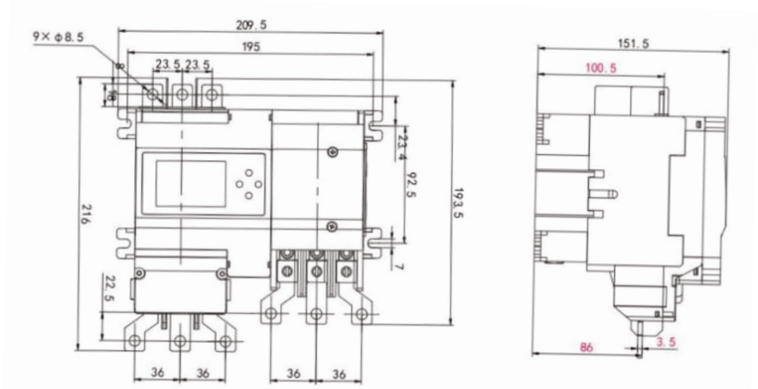
Handle C with Integrated Locking Function



E Series Electronic Star-Delta Starter (Star-Delta Starter)

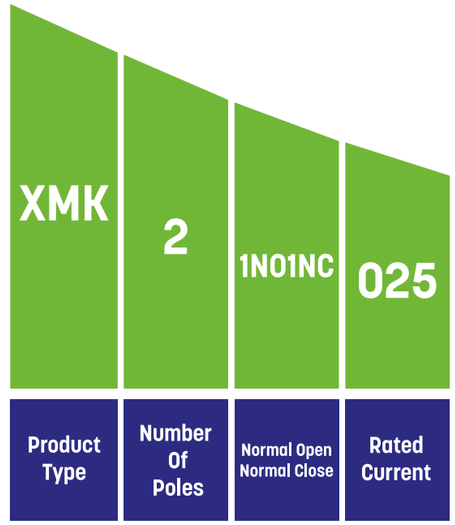


Multifunctional



Multifunctional

Product Code and Label Information





Modular Contactor



XMK MODULAR CONTACTORS			Symbol	Unit	XMK		
					XMK 2-25A	XMK 2-40A	XMK 2-63A
Number of Poles				P	2		
Rated Operational Voltage			Ue	VAC	250		
Rated Insulation Voltage			Ui	V	500		
Rated Impulse Withstand Voltage			Uimp	kV	3		
Operating Frequency				Hz	50/60		
Rated Current			In	A	25	40	63
					9	18	25
Operating Power	AC-1, AC-7a	Single-phase:230	P	kW	5,8	9,2	14,5
		Three-phase:400			-		
	AC-3, AC-7b	Single-phase:230			1,3	3,7	5
		Three-phase:400			-		
Coil Consumption		Switching		VA	9,2	34	
		Opreation			2,7	4,6	
Power Distribution Per Pole				W	2		
Standards					IEC EN 61095, IEC/EN 60947-4-1		
Operating Ambient Temperature Range				℃	-20....+60		
Storage Ambient Temperature				℃	-40....+80		
Electrical Life				op	100.000		
Mechanical Life				op	300.000		
Maximum Opreating Period				op/h	3000		
Protection Degree					IP 20		
Maximum Terminal Tightening Torque				Nm	0,8		
Altitude				m	≤2000		
Mounting				mm	35mm DIN rail		

Modular Contactor



XMK MODULAR CONTACTORS			Symbol	Unit	XMK		
					XMK 4-25A	XMK 4-40A	XMK 4-63A
Number of Poles				P	3,4		
Rated Operational Voltage			Ue	VAC	400		
Rated Insulation Voltage			Ui	V	500		
Rated Impulse Withstand Voltage			Uimp	kV	3		
Operating Frequency				Hz	50/60		
Rated Current			In	A	25	40	63
					9	18	25
Operating Power	AC-1, AC-7a	Single-phase:230	P	kW	17,3	-	
		Three-phase:400			-	27,7	43,6
	AC-3, AC-7b	Single-phase:230			4	-	
		Three-phase:400			-	11	15
Coil Consumption		Switching		VA	34	53	
		Opreation			4,6	6,5	
Power Distribution Per Pole				W	2		
Standards					IEC EN 61095, IEC/EN 60947-4-1		
Operating Ambient Temperature Range				℃	-20....+60		
Storage Ambient Temperature				℃	-40....+80		
Electrical Life				op	100.000		
Mechanical Life				op	300.000		
Maximum Opreating Period				op/h	3000		
Protection Degree					IP 20		
Maximum Terminal Tightening Torque				Nm	0,8		
Altitude				m	≤2000		
Mounting				mm	35mm DIN rail		

General Information



XMK modular contactors are contactors that enable the safe and efficient control of electrical circuits, known for their quiet operation. These devices, also referred to as "silent contactors," are primarily preferred in areas where silence is important, such as hospitals, offices, banks, hotels, and residential buildings.

Wide Range of Applications

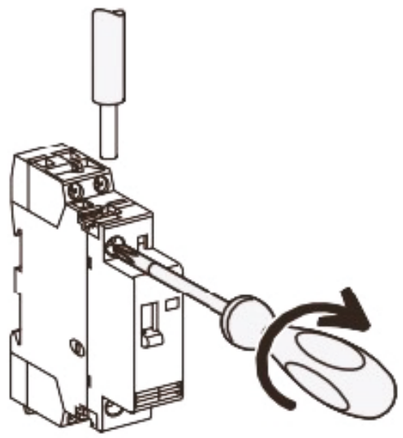
XMK modular contactors are used in various applications such as lighting, heating, ventilation, small motors, power supplies, and industrial control systems. They play a critical role in switching systems that require remote, control and operation.

Advantages

- **Quiet Operation:** Provides comfortable use due to its noise-free structure.
- **Durability and Reliability:** Offers a long electrical and mechanical lifespan.
- **Easy Installation:** Can be quickly and easily mounted onto DIN rails due to its modular design.
- **Flexible Use:** Available in various power levels, offering solutions for different needs.
- **Additional Accessory Support:** Can be expanded with 1NO+1NC auxiliary contacts mounted on the side.

XMK modular contactors are manufactured in compliance with IEC/EN 60947-4-1 standards. They enable remote opening and closing of electrical circuits, helping prevent potential faults and contributing to the smooth operation of the system.

With high performance in industrial, commercial, and residential applications, XMK modular contactors offer long-lasting and energy-efficient use, providing cost-saving solutions.



KEY FEATURES

Number Of Pole	Rated Current (In)		Control Voltage (VAC)(50/60Hz)	Condisitons (VA)		Max. Power (W)
	AC-7a AC-1	AC-7b AC-3		Stable	Moving	
2	25A	9A	24,48,220...240	3.8 2.7	15 9.2	1.3 1.2
2	40A	18A	220...240	4.6	34	1.6
2	63A	25A	24,220...240	4.6	34	1.6
4	25A	9A	24,220...240	4.6	34	1.6
4	40A	18A	220...240	6.5	53	2.1
4	63A	25A	24,220...240	6.5	53	2.1

Operating Conditions

Protection Degree = IP20
Operating Ambient Temperature Range = -20...+60°C
Storage Ambient Temperature = -40...+80°C
Electrical Life = 100,000
Mechanical Lifes = 300,000
Maximum Operating Period (op/h) = 3000

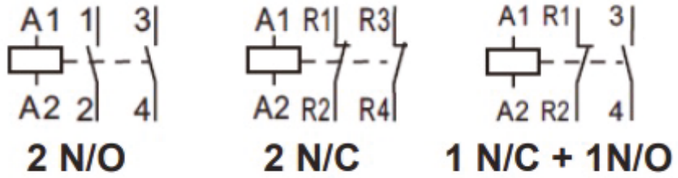
Accessories

Auxiliary Contact
Provides indication or control of the "open" or "closed" position.
Width: 9mm
Operating Frequency: 50/60Hz
VAC: 24...240V
VDC: 24...130V
Breaking Capacity: Min. 10mA at 24V DC/AC
Number of Contacts: 1NO+1NC
Operating Temperature: -10°C to 65°C
Storage Temperature: -40°C to +70°C

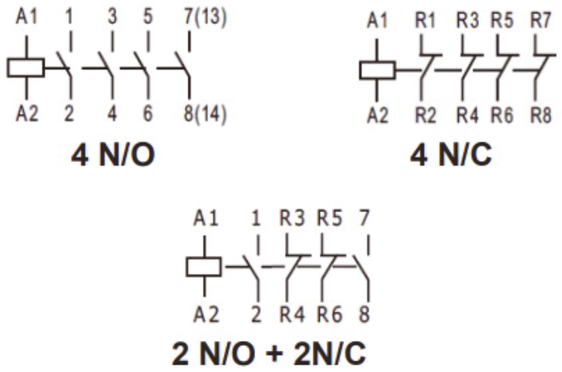


Wiring Diagrams

2-Pole Modular Contactors



4-Pole Modular Contactors



GENERAL PRODUCT CATALOG

MODULAR CONTACTOR

ORDER LIST

Moduler Contactors (Silent Contactors)

2P Modular Contactors (Silent Contactor)

Type (Order) Code	Rated Current (In)	Explanation	Box Quantity	Carton Quantity
XMK 2-1N01NC-025	25A	2P 1N0-1NC 25A 220V	1	120
XMK 2-2N0-025	25A	2P 2N0 25A 220V	1	120
XMK 2-1N01NC-040	40A	2P 1N0-1NC 40A 220V	1	60
XMK 2-2N0-040	40A	2P 2N0 40A 220V	1	60
XMK 2-1N01NC-063	63A	2P 1N0-1NC 63A 220V	1	60
XMK 2-2N0-063	63A	2P 2N0 63A 220V	1	60

3P Modular Contactors (Silent Contactor)

Type (Order) Code	Rated Current (In)	Explanation	Box Quantity	Carton Quantity
XMK 3-3NC-025	25A	3P 3NC 25A 220V	1	60
XMK 3-3NC-040	40A	3P 3NC 40A 220V	1	40
XMK 3-3NC-063	63A	3P 3NC 63A 220V	1	40

4P Modular Contactors

Type (Order) Code	Rated Current (In)	Explanation	Box Quantity	Carton Quantity
XMK 4-2N02NC-025	25A	4P 2N0-2NC 25A 220V	1	60
XMK 4-4N0-025	25A	4P 4N0 25A 220V	1	60
XMK 4-2N02NC-040	40A	4P 2N0-2NC 40A 220V	1	40
XMK 4-4N0-040	40A	4P 4N0 40A 220V	1	40
XMK 4-2N02NC-063	63A	4P 2N0-2NC 63A 220V	1	40
XMK 4-4N0-063	63A	4P 4N0 63A 220V	1	40
XMK 4-3N01NC-063	63A	4P 3N0-1NC 63A 220V	1	40

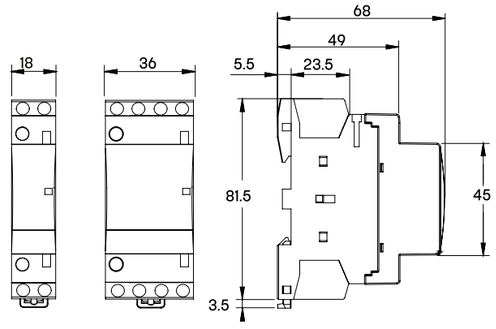
Auxiliary Contact for Modular Contactors

Type (Order) Code	Auxiliary Contact	Explanation	Box Quantity	Carton Quantity
XMK-YK 11	1NO+1NC	1NO+1NC Auxiliary Contact for Modular Contactors	1	120

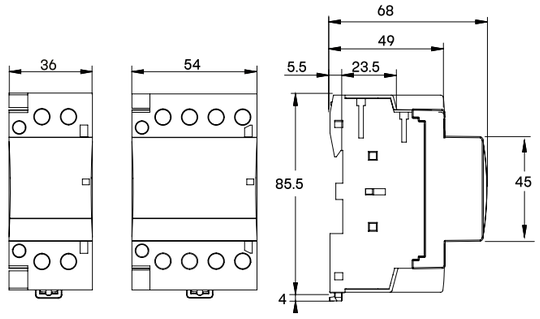


DIMENSIONS

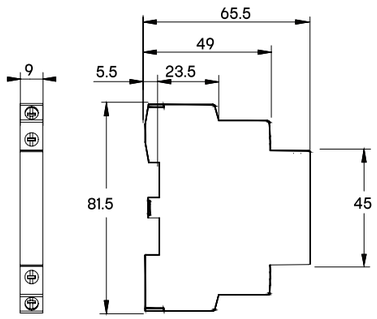
XMK 25A, 2P-4P



XMK 40A-63A, 2P-4P



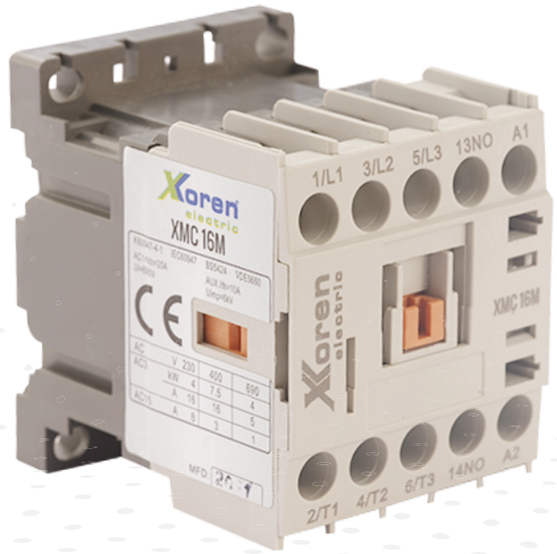
XMK Auxiliary Contact

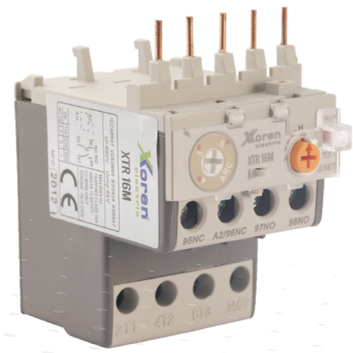


VALID FOR ALL OUR PRODUCTS
2 YEARS WARRANTY

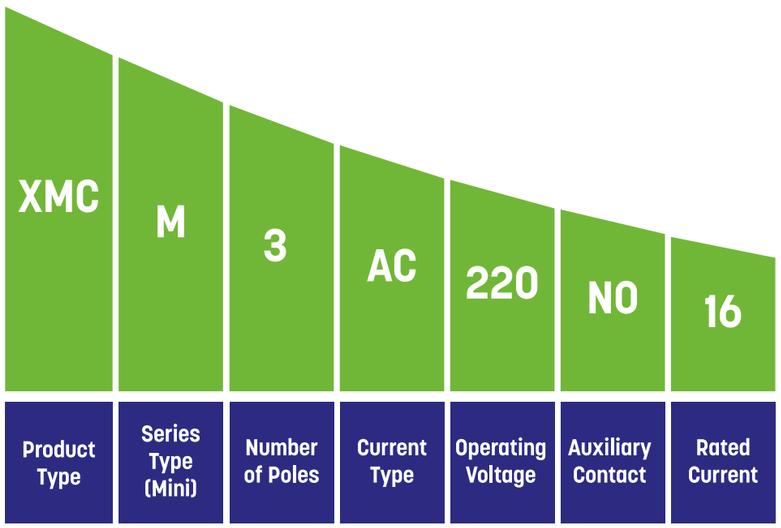
MINI CONTACTORS
MINI THERMAL RELAYS

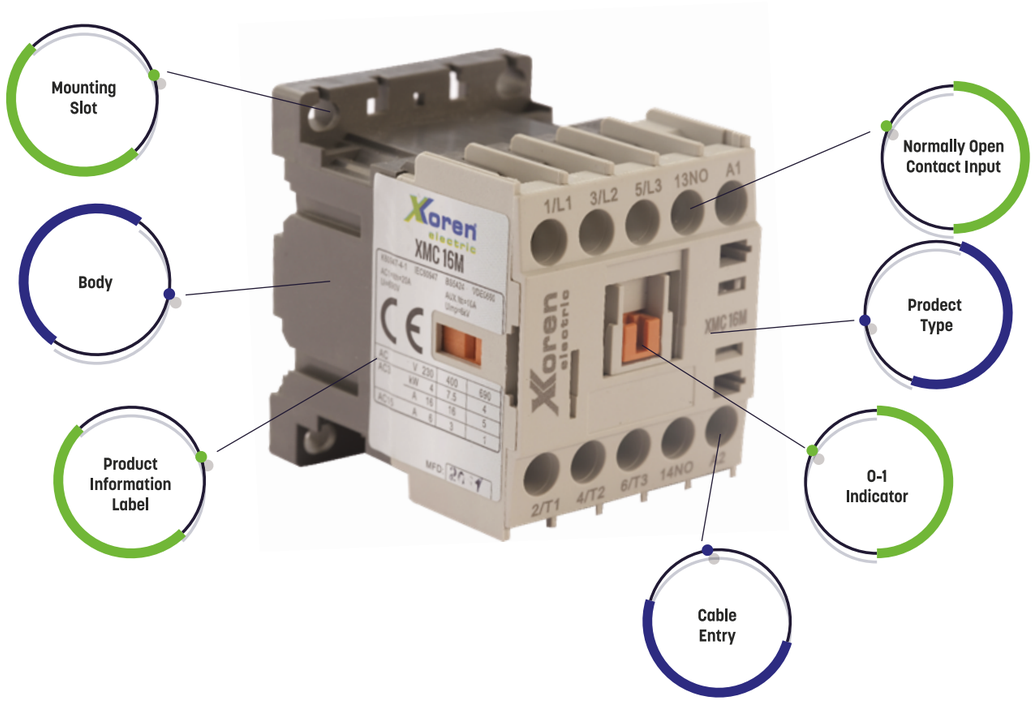
Where reliability is a must and the application area is critical, X Koren Electric mini thermal relays are ideal solutions. Designed to operate with minimal noise while offering energy and cost savings, these relays protect motors by disconnecting them via the contactor in case of overload or phase failure. They provide reliable solutions for residential, hotel, hospital, and industrial systems while offering ease of use with a wide range of accessories.





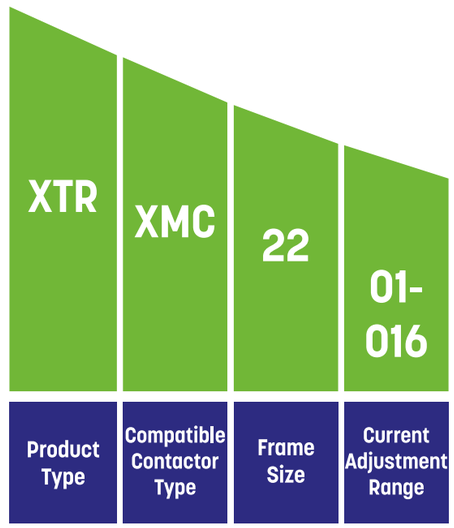
Product Code and Label Information

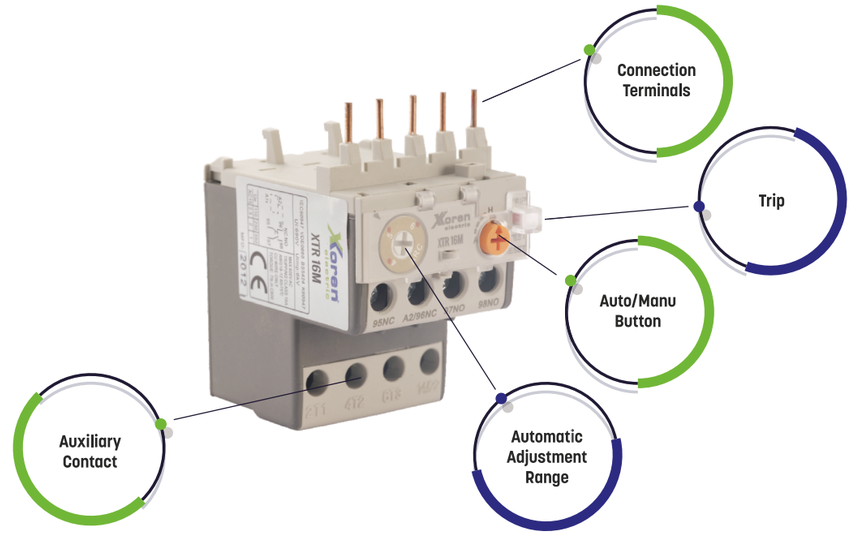




GENERAL PRODUCT CATALOG

MINI CONTACTORS AND MINI THERMAL RELAYS





Mini Contactor



3P Mini Magnetic Power Contactors								
Type					XMC M 6/3	XMC M 9/3	XMC M 12/3	XMC M 16/3
Number of Poles				P	3			
Rated Operational Voltage			Ue	VAC	24, 220			
Rated Insulation Voltage			Ui	V	690			
Rated Impulse Withstand Voltage			Uimp	kV	6			
Operating Frequency				Hz	50/60			
Rated Thermal Current	AC-1		Ith	A	20			
Current and Power Values	AC-3	230V		kW	1.5	2.2	3	4
				A	7	9	12	15
		400V		kW	3	4	5.5	7.5
				A	6	9	12	16
		690V		kW	3	4	4	4
				A	4	5	5	5
Standards					IEC EN 60947-4-1			
Operating Range Temperature Range				°C	-25....+55			
Storage Range Temperature				°C	-40....+70			
Electrical Life				op.	2.000.000			
Mechanical Life				op.	20.000.000			
Maximum Operating Period				op/h	1800			
Max. Terminal Tightening Torque				Nm	2			
Accessories	Auxiliary Contacts (Standard)				1NO,1NC			
	Auxiliary Contact Option				1NO+1NC,2NO+2NC			
	Side				✓			
	Top				✓			

GENERAL PRODUCT CATALOG

MINI CONTACTORS AND MINI THERMAL RELAYS

Thermal Relay



Thermal Adjustment Area	Type Code	Contactor it can be used with
0.1-0.16A	XTR XMC M16-01-016A	XMC M6A-16A for 0.1-0.16A Thermal Relay
0.16-0.25A	XTR XMC M16-016-025A	XMC M6A-16A for 0.16-0.25A Thermal Relay
0.25-0.4A	XTR XMC M16-025-04A	XMC M6A-16A for 0.25-0.4A Thermal Relay
0.4-0.63A	XTR XMC M16-04-063A	XMC M6A-16A for 0.4-0.63A Thermal Relay
0.63-1A	XTR XMC M16-063-1A	XMC M6A-16A for 0.63-1A Thermal Relay
1-1.6A	XTR XMC M16-1-1.6A	XMC M6A-16A for 1-1.6A Thermal Relay
1.6-2.5A	XTR XMC M16-1.6-2.5A	XMC M6A-16A for 1.6-2.5A Thermal Relay
2.5-4A	XTR XMC M16-2.5-4A	XMC M6A-16A for 2.5-4A Thermal Relay
4-6A	XTR XMC M16-4-6A	XMC M6A-16A for 4-6A Thermal Relay
5-8A	XTR XMC M16-5-8A	XMC M6A-16A for 5-8A Thermal Relay
6-9A	XTR XMC M16-6-9A	XMC M6A-16A for 6-9A Thermal Relay
7-10A	XTR XMC M16-7-10A	XMC M6A-16A for 7-10A Thermal Relay
9-13A	XTR XMC M16-9-13A	XMC M6A-16A for 9-13A Thermal Relay
12-16A	XTR XMC M16-12-16A	XMC M6A-16A for 12-16A Thermal Relay

General Information



XKoren mini contactors are manufactured in 6A, 9A, 12A, and 16A ratings. They are used in capacitor systems, motor protection, and lighting circuits. They can be driven directly from the PLC output, eliminating the need for a relay between the PLC and the contactor, which reduces costs. Compared to XKoren power contactors, their compact size takes up less space in panels. With low energy consumption, they provide energy efficiency. We offer two types of AC models: 220V and 24V AC, and a 24VDC DC model.

Smaller than power contactors, these are used for remote switching and control of power circuits. They can be used with the XTR-16M mini thermal relay.

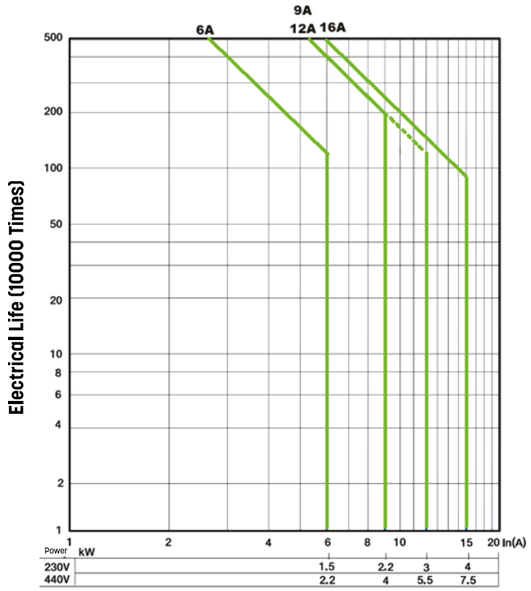
XKoren mini contactors are commonly used in gas stations, capacitor systems, motor protection, lighting circuits, elevator systems, and electrical appliances. They are also widely used in entrance-exit gates, shutter systems, coffee machines, washing machines, saw machines, air conditioning, PCB boards, cooling and heating systems, water heaters, pumps, railway applications, boats, conveyor systems, and escalators.



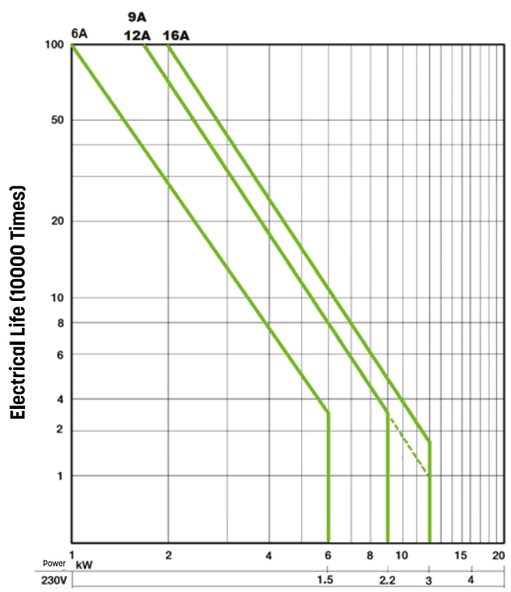
Mini Thermal Relay

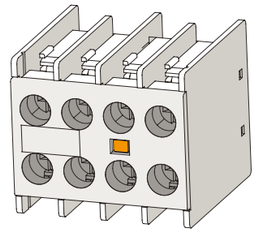
XKoren's mini thermal relay is a device used in conjunction with mini contactors to protect motors against overload currents. The mini thermal relay is a protection device used to safeguard electric motors in case of overload. When an overload current passes through, the thermal element heats up, opening the contacts and cutting off the motor's power, thereby protecting the motor from damage. It is typically used in the protection of small and medium-sized motors, especially in industrial and commercial applications, and is commonly used with mini contactors.

For AC-3 Class

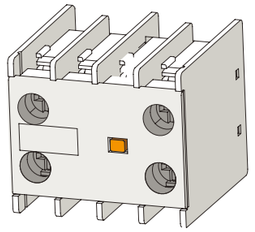


For AC-4 Class





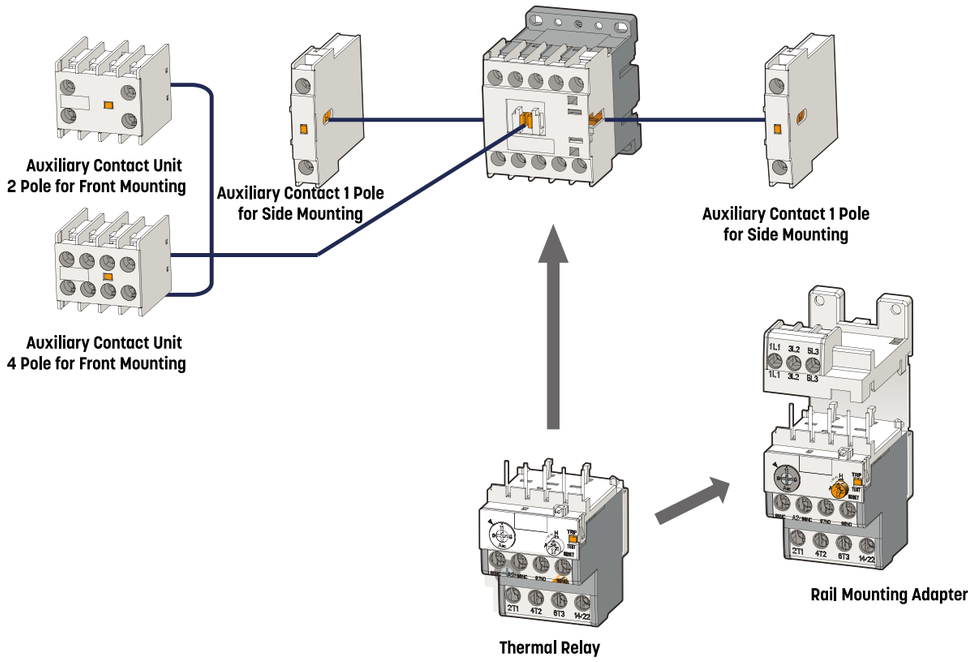
2NO+2NC

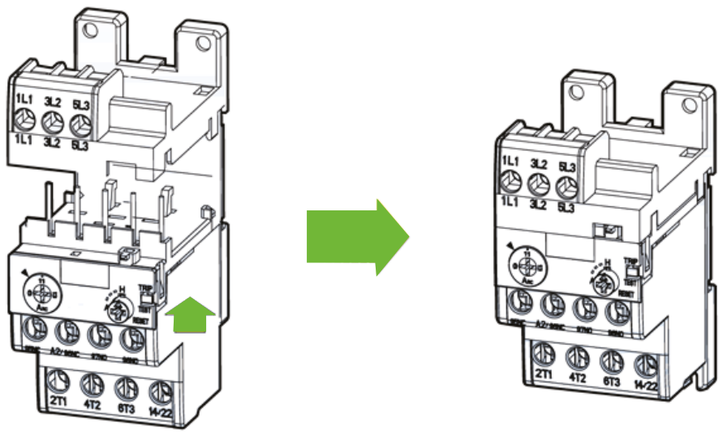


1NO+1NC

Code	Rated Operating Current (A)												
	AC-15							DC-13					
	120V	240V	380V	480V	500V	600V	Ithe	125V	250V	400V	500V	600V	Ithe
AC-S/1M	6	3	1.9	1.5	1.4	1.2	10	0.55	0.27	0.15	0.13	0.1	2.5
AC-T/2M	6	3	1.9	1.5	1.4	1.2	10	0.55	0.27	-	-	-	2.5
AC-T/4M	6	3	1.9	1.5	1.4	1.2	10	0.55	0.27	-	-	-	2.5

Code	Life (10.000 times)	
	Mechanical	Electrical
AC-S/1M	1000	50
AC-T/2M	1000	50
AC-T/4M	1000	50



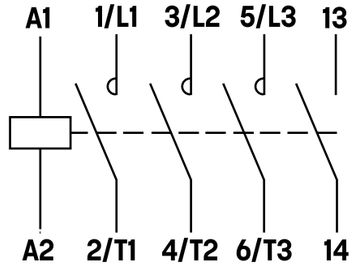


GENERAL PRODUCT CATALOG

MINI CONTACTORS AND MINI THERMAL RELAYS

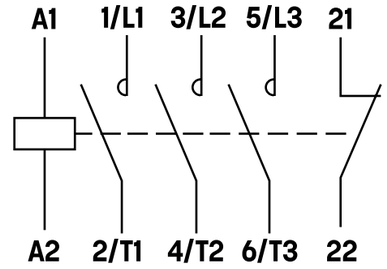
Wiring Diagram

NO Auxiliary Contact Mini Contactor



A1-A2: Coil Power Terminals
L1, L2, L3: Main Power Inputs
T1, T2, T3: Load Outputs

NC Auxiliary Contact Mini Contactor



13-14: Normally Open Contact (NO)
21-22: Normally Closed Contact (NC)

WARNING

WARNING

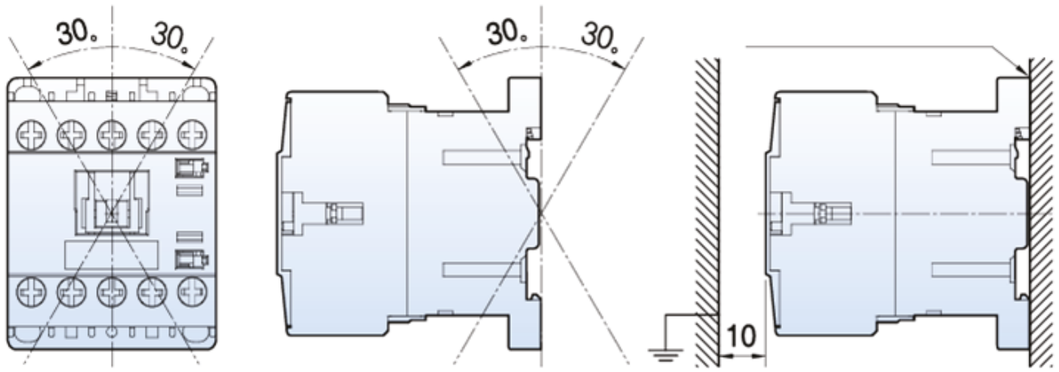


Figure 1 Figure 2

When installing, set the direction shown in Figure 1 to be perpendicular to the 30° angle. Leave a distance of 10 mm from the rear clearance shown in Figure 2.

GENERAL PRODUCT CATALOG

MINI CONTACTORS AND MINI THERMAL RELAYS

ORDER LIST

XMC-M Mini Contactor 220VAC (3P)

Type (Order) Code	Rated Current (In)	Explanation	Box Quantity	Carton Quantity
XMC M3AC220-N0-6	6A	M Series 3P 220VAC N0 6A 3kW	1	100
XMC M3AC220-NC-6	6A	M Series 3P 220VAC NC 6A 3kW	1	100
XMC M3AC220-N0-9	9A	M Series 3P 220VAC N0 9A 4kW	1	100
XMC M3AC220-NC-9	9A	M Series 3P 220VAC NC 9A 4kW	1	100
XMC M3AC220-N0-12	12A	M Series 3P 220VAC N0 12A 5.5kW	1	100
XMC M3AC220-NC-12	12A	M Series 3P 220VAC NC 12A 5.5kW	1	100
XMC M3AC220-N0-16	16A	M Series 3P 220VAC N0 16A 7.5kW	1	100
XMC M3AC220-NC-16	16A	M Series 3P 220VAC NC 16A 7.5kW	1	100

XMC-M Mini Contactor 24V AC (3P)

Type (Order) Code	Rated Current (In)	Explanation	Box Quantity	Carton Quantity
XMC M3AC24-N0-6	6A	M Series 3P 24VAC N0 6A 3kW	1	100
XMC M3AC24-NC-6	6A	M Series 3P 24VAC NC 6A 3kW	1	100
XMC M3AC24-N0-9	9A	M Series 3P 24VAC N0 9A 4kW	1	100
XMC M3AC24-NC-9	9A	M Series 3P 24VAC NC 9A 4kW	1	100
XMC M3AC24-N0-12	12A	M Series 3P 24VAC N0 12A 5.5kW	1	100
XMC M3AC24-NC-12	12A	M Series 3P 24VAC NC 12A 5.5kW	1	100
XMC M3AC24-N0-16	16A	M Series 3P 24VAC N0 16A 7.5kW	1	100
XMC M3AC24-NC-16	16A	M Series 3P 24VAC NC 16A 7.5kW	1	100

XMC-MD Mini Contactor 24V DC (3P)

Type (Order) Code	Rated Current (In)	Explanation	Box Quantity	Carton Quantity
XMC M3DC24-N0-6	6A	M Series 3P 24VDC N0 6A 3kW	1	90
XMC M3DC24-NC-6	6A	M Series 3P 24VDC NC 6A 3kW	1	90
XMC M3AC24-N0-9	9A	M Series 3P 24VDC N0 9A 4kW	1	90
XMC M3DC24-NC-9	9A	M Series 3P 24VDC NC 9A 4kW	1	90
XMC M3DC24-N0-12	12A	M Series 3P 24VDC N0 12A 5.5kW	1	90
XMC M3DC24-NC-12	12A	M Series 3P 24VDC NC 12A 5.5kW	1	90
XMC M3DC24-N0-16	16A	M Series 3P 24VDC N0 16A 7.5kW	1	90
XMC M3DC24-NC-16	16A	M Series 3P 24VDC NC 16A 7.5kW	1	90



XTR-16M Mini Series Thermal Relay



Type (Order) Code	Rated Current (In)	Explanation	Box Quantity	Carton Quantity
XTR XMC M16-01-016	0.1~0.16A	0.1-0.16A Thermal Relay for XMC M6A-16A	1	100
XTR XMC M16-016-025	0.16~0.25A	0.16-0.25A Thermal Relay for XMC M6A-16A	1	100
XTR XMC M16-025-04	0.25~0.4A	0.25-0.4A Thermal Relay for XMC M6A-16A	1	100
XTR XMC M16-04-063	0.4~0.63A	0.4-0.63A Thermal Relay for XMC M6A-16A	1	100
XTR XMC M16-063-1	0.63~1.0A	0.63-1A Thermal Relay for XMC M6A-16A	1	100
XTR XMC M16-1-1.6	1.0~1.6A	1-1.16A Thermal Relay for XMC M6A-16A	1	100
XTR XMC M16-1.6-2.5	1.6~2.5A	1.6-2.5A Thermal Relay for XMC M6A-16A	1	100
XTR XMC M16-2.5-4	2.5~4A	2.5-4A Thermal Relay for XMC M6A-16A	1	100
XTR XMC M16-4-6	4~6A	4-6A Thermal Relay for XMC M6A-16A	1	100
XTR XMC M16-5-8	5~8A	5-8A Thermal Relay for XMC M6A-16A	1	100
XTR XMC M16-6-9	6~9A	6-9A Thermal Relay for XMC M6A-16A	1	100
XTR XMC M16-7-10	7~10A	7-10A Thermal Relay for XMC M6A-16A	1	100
XTR XMC M16-9-13	9~13A	9-13A Thermal Relay for XMC M6A-16A	1	100
XTR XMC M16-12-16	12~16A	12-16A Thermal Relay for XMC M6A-16A	1	100

GENERAL PRODUCT CATALOG

MINI CONTACTORS AND MINI THERMAL RELAYS

Accessories For Mini Contactors

2P Auxiliary Contact

Type (Order) Code	Mounting	Auxiliary Contact	Explanation	Box Quantity	Carton Quantity
AC-S/1M 01	Side	1NC	M Series 1NC Side Auxiliary Contact	1	100
AC-S/1M 10	Side	1NO	M Series 1NO Side Auxiliary Contact	1	100
AC-T/2M 02	Top	2NC	M Series 2NC Top Auxiliary Contact	1	100
AC-T/2M 11	Top	1NO+1NC	M Series 1NO-1NC Top Auxiliary Contact	1	100
AC-T/2M 20	Top	2NO	M Series 2NO Top Auxiliary Contact	1	100

4P Auxiliary Contact

Type (Order) Code	Mounting	Auxiliary Contact	Explanation	Box Quantity	Carton Quantity
AC-T/4M 04	Top	4NC	M Series 4NC Top Auxiliary Contact	1	100
AC-T/4M 13	Top	1NO+3NC	M Series 3NC-1NO Top Auxiliary Contact	1	100
AC-T/4M 22	Top	2NO+2NC	M Series 2NC-2NO Top Auxiliary Contact	1	100
AC-T/4M 31	Top	3NO+1NC	M Series 1NC-3NO Top Auxiliary Contact	1	100
AC-T/4M 40	Top	4NO	M Series 4NO Top Auxiliary Contact	1	100

Spare Coil for Mini Contactor

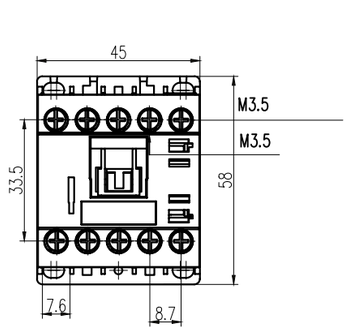
Type (Order) Code	Contactor to Be Used Together	Rated Operating Voltage	Explanation	Box Quantity	Carton Quantity
XMCOL 16M/24V	XMC-M	24VAC	24V AC Coil (XMC 6M-16M)	1	50
XMCOL 16M/220V		220VAC	220V AC Coil (XMC 6M-16M)	1	50
XMCOL 16D/24V	XMC-MD	24VDC	24V DC Coil (XMC 6MD-16MD)	1	40

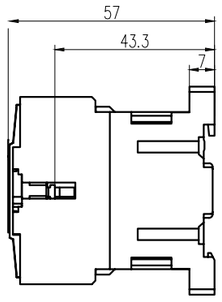


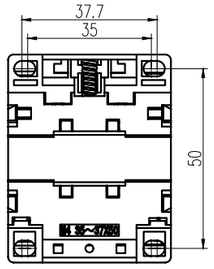


DIMENSIONS

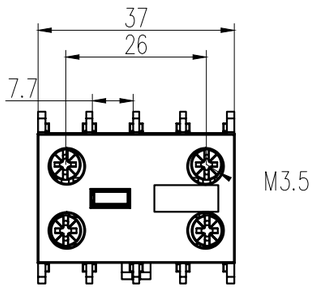
XMC Mini

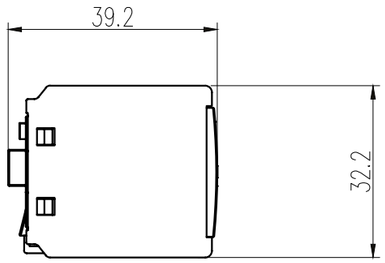


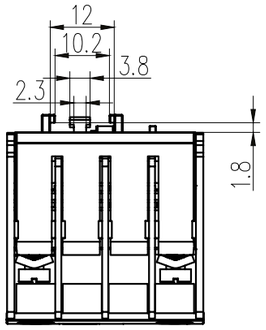




XTR Mini



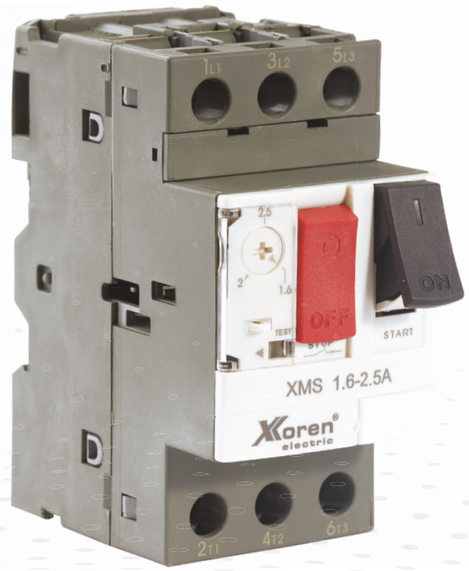




VALID FOR ALL OUR PRODUCTS
2 YEARS WARRANTY

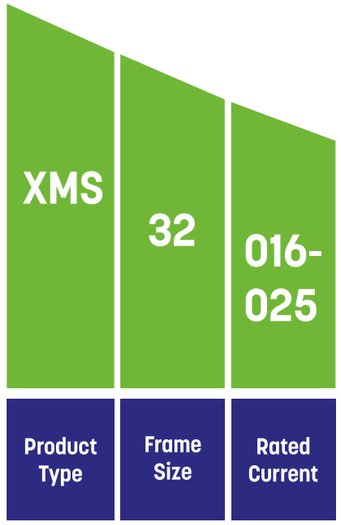
MOTOR PROTECTION SWITCHES

X Koren Electric Motor Protection Switches provide cost-effective and efficient solutions in various combinations to meet motor protection needs across all fields. They protect the motor and its circuit against phase loss, thermal overloads, and short-circuit currents through thermal and magnetic protection units. Featuring easy installation, compact dimensions, a wide current range, and high performance, they are reliably used in all industries. Applications include conveyors, ventilation systems, automatic control systems, compressors, crane panels, chemical and pharmaceutical industries, building automation, power stations, and machinery and machine tools. The X Koren motor protection switches come in models such as the XMS 32K, suitable for motors up to 15 kW, and the XMS 80K, designed for motors up to 40 kW.

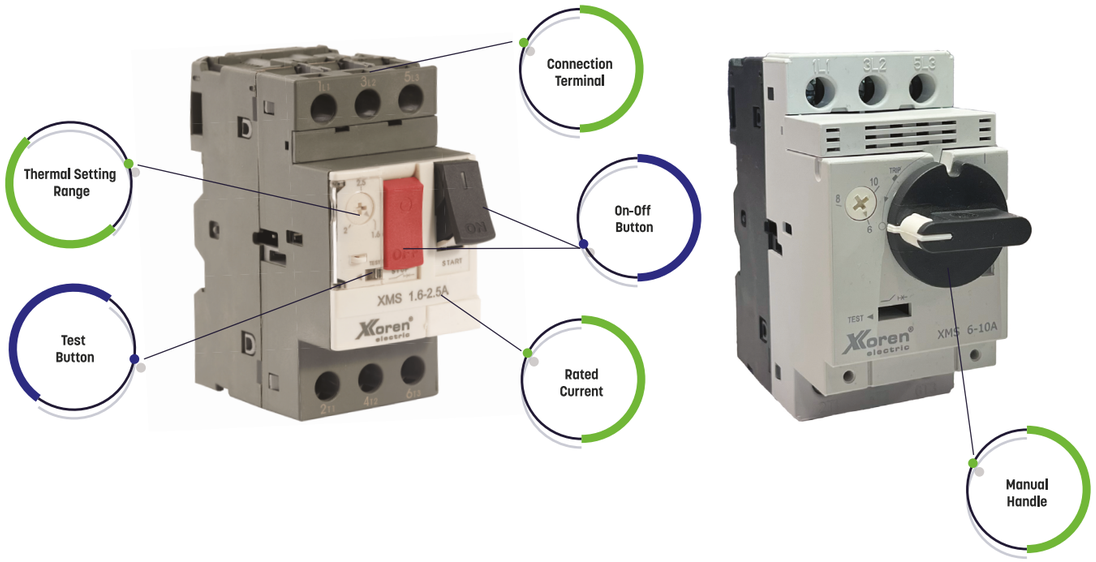




Product Code and Label Information



•**XKoren motor protection switches** are available in three different designs: toggle type, rotary handle type, and push-button type. All other functions and technical features remain the same.



GENERAL PRODUCT CATALOG

MOTOR PROTECTION SWITCHES

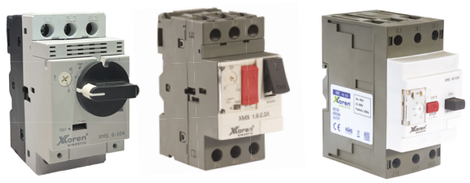
MOTOR PROTECTION SWITCHES



MOTOR PROTECTION SWITCHES			XMS 32K	XMS 80K
Number of Poles			3	
Rated Insulation Voltage	Ui	V	690	
Rated Impulse Withstand Voltage	Uimp	kV	6	
Operating Frequency		Hz	50/60	
Rated Current	In	A	0.16,.....,32	25,40,63,80
Instantaneous Short-Circuit Trip Current	Im	A	13xIn	
Standards			IEC EN 60947-2, IEC EN 60947-4-1	
Utilization Categoryi	IEC 60942-7		A	
	IEC 60947-4-1		AC-3	
Operating Temperature Range		°C	-20.....+60	
Storage Temperature Range		°C	-40.....+80	
Electrical Life		op.	100.000	25.000
Mechanical Life		op.	100.000	50.000
Maximum Operating Cycle		op/h	25	
Tripping Unit Type			Thermal-Magnetic	
Degree of Protection			IP20(IP55 with Enclosure Box)	
Pollution Degree			3	
Max. Terminal Tightening Torque		Nm	3	
Altitude		m	≤2000	
Mounting		mm	35mm DIN rail	
Breaking Indication Function			-	✓
Overload Protection			✓	
Phase Failure Function			✓	
Accessories	Auxiliary Contact		✓	
	Undervoltage Release		✓	
	Shunt Trip Coil		✓	
	Waterproof Enclosure With Emergency Stop Botton		✓	

Short-Circuit Breaking Capacity: Ics (kA)	Rated Current In (A)	Current Adjustment Range (A)	400/415V Icu	400/415V Ics	690V Icu	690V Ics	400/415V Icu	400/415V Ics	690V Icu	690V Ics
	0.16	0.1~0.16	100	100	100	100	-	-	-	-
	0.25	0.16~0.25	100	100	100	100	-	-	-	-
	0.4	0.25~0.4	100	100	100	100	-	-	-	-
	0.63	0.4~0.63	100	100	100	100	-	-	-	-
	1	0.63~1	100	100	100	100	-	-	-	-
	1.6	1~1.6	100	100	100	100	-	-	-	-
	2.5	1.6~2.5	100	100	3	2.25	-	-	-	-
	4	2.5~4	100	100	3	2.25	-	-	-	-
	6.3	4~6.3	100	100	3	2.25	-	-	-	-
	10	6~10	100	100	3	2.25	-	-	-	-
	14	9~14	15	7.5	3	2.25	-	-	-	-
	18	13~18	15	7.5	3	2.25	-	-	-	-
	23	17~23	15	6	3	2.25	-	-	-	-
	25	20~25	15	6	3	2.25	-	-	-	-
	32	24~32	10	6	3	2.25	-	-	-	-
	25	16~25	-	-	-	-	15	7.5	4	2
	40	25~40	-	-	-	-	15	7.5	4	2
	63	40~63	-	-	-	-	15	7.5	4	2
	80	63~80	-	-	-	-	15	7.5	4	2

General Information



Motor protection switches are three-pole electromechanical devices that protect electric motors from overloads, short circuits, and phase failure, while also allowing manual operation to open and close the circuit. These switches ensure the safety of the motor circuit, preventing potential faults.

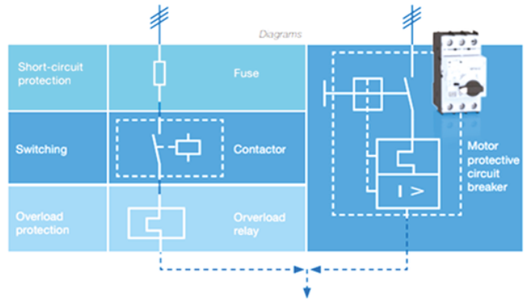
XKoren motor protection switches provide cost-effective and efficient solutions in various combinations to meet your motor protection needs across all sectors. They protect the motor and its circuit with thermal and magnetic protection units against phase losses, thermal overcurrents, and short-circuit currents. With easy installation, compact sizes, wide amperage range, and high performance, these circuit breakers are widely used across various industries.

These devices are used in applications such as conveyors, ventilation systems, automated control systems, compressors, crane panels, chemical industry, pharmaceutical industry, building automation, power stations, and machine tools. In

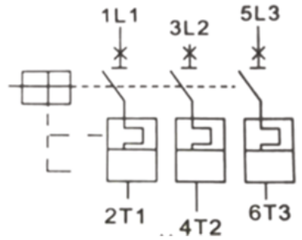
XKoren motor protection switches, the XMS 32K model is suitable for motors up to 15 kW, and the XMS 80K model is suitable for motors up to 40 kW.

In compliance with **IEC 60947-1,** these devices are intended for use in low-voltage switchgear and controlgear systems connected to circuits with rated voltages not exceeding 1000 V AC.

Three Functions in One Device
The main function provides protection against short circuits and overloads in electric motor applications. Additionally, it allows direct switching operations (clockwise operation) through its handle or buttons .



Wiring Diagram:



•Distribution Protection
Operating characteristics of the motor protection switches when the phases are balanced.

Applicable Multiplication Setting	Tripping Time	Status	Ambient Temperature
1.05	1 Hour Tripping	Start	+20°C...-2 °C
1.3	1 Hour Tripping	After the Initial	
1.5	<2 min Tripping	Tripping	

•Motor Protection
The operating characteristics of the motor protection switches balanced load in each phase.

Current Multiplication Setting	Tripping Time	Status	Ambient Temperature
1.05	No Trip Within 2 Hours	Initial	+20°C±2°C
1.2	Trip Within 2 Hours	After First Trip	+20°C±2°C
1.5	Trip Within 2 Minutes	After First Trip	+20°C±2°C
7.2	Trip Within 2-10 sec	Initial	+20°C±2°C

•Phase Loss
The operating characteristics of the motor protection switches when the load is unbalanced.

Current Multiplication Setting	Third Phase	Tripping Time	Ambient Temperature
Any Two Phases	3rd Phase		
1.0	0.9	No Trip Within 2 Hours	+20°C±2°C
1.15	0	Trip Within 2 Hours	+20°C±2°C

The Instantaneous Electromagnetic Buckle Action Characteristics of Short Circuit Device

Model	Test Current (A)	Start Status	Specified Time	Expected Results	Circumstance Temperature
XMS-32K	0.8×12×In	Cold state	t ≥ 0.2s	Does not trip	+20C ±5C
XMS-80K	1.2×12×In	Cold state	t < 0.2s	Trip	+20C ±5C

Motor Protection Switches Basic Features

Overcurrent Protection:
Motor protection switches protect the motor from overload by cutting off the circuit when the current drawn by the motor exceeds the specified limits. This prevents the motor from overheating and being damaged.

Short Circuit Protection:
Motor protection switches quickly disconnect the circuit in case of a short circuit in the motor circuit. Short circuits can cause high currents, potentially damaging both the motor and the connected circuit.

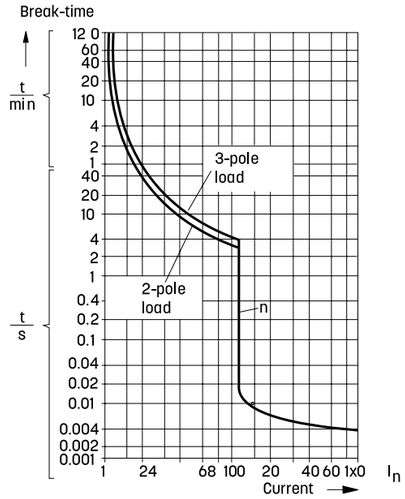
Phase Protection:
For three-phase motors, phase loss or unbalanced phase conditions are prevented. These situations can lead to inefficient motor operation or damage.

Thermal Protection:
Provides thermal protection against prolonged high current draw that could cause the motor to overheat. The breaker disconnects the circuit when the specified temperature level is reached.

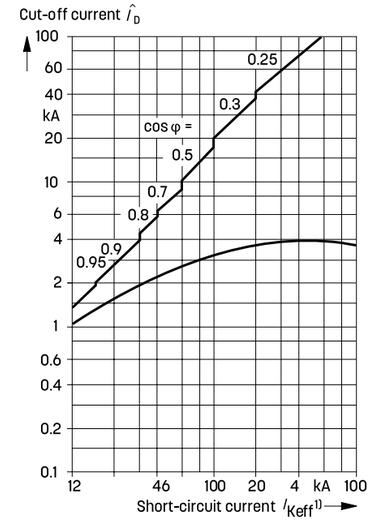
1.Adjustable Current Range:
Motor protection switches typically have an adjustable current range, allowing users to set the breaker to match the motor's rated current. For example, a protection setting can be made in the range of 1.8 - 2.5A for a specific motor.

2.Manual or Automatic Control:
Motor protection switches can operate in both manual and automatic control modes. Manual control allows the user to open or close the circuit manually, while automatic control ensures the breaker operates automatically based on the specified conditions.

Time/Current Characteristic



Current Limiting Characteristic



•Motor Protection
The operating characteristics of the motor protection switches balanced load in each phase.

XMS Motor Protection Switches Application Areas

•Industrial Applications:

***Belt Conveyors:** Motors used for material handling in factories must be protected.
***Pumps and Fans:** Used for water pumps, air flow fans, and HVAC systems.
***Devices and Machinery:** Motors of various machines are often protected with motor protection switches in production lines.

•Automation and Control Systems:
*Motor protection switches are used in automatic control systems to ensure motors operate correctly. They are commonly used in precision machines such as CNC machines, where safe motor operation is critical.
*Motors for mixers, blenders, pump systems, and other equipment in food production processes are protected with motor protection switches. Any malfunction in these systems can cause major disruptions in the production line, so motors are protected.

•Cement and Mining Industries:
*Large motors used in cement factories and the mining sector consume high power and are protected by motor protection switches against overloads and short circuits.

•Energy Sector:
*Motor protection switches are used for motors in power generation and distribution facilities, such as generators and pumps. These breakers are also deployed in renewable energy systems, like wind turbines.

•Building Management Systems (BMS):
*Motor protection switches are used in high-rise buildings to ensure safe operation of elevators, water pump systems, and ventilation systems.

•Transportation and Logistics:
*Crane, forklift, and transport machinery motors are protected by motor protection switches to prevent overloads or malfunctions.

ADVANTAGES

Inventory Optimization
Panels that utilize traditional fuses for protection require switches replacement after a short-circuit trip. This necessitates maintaining spare fuses, allocating physical storage space in the maintenance area, and managing inventory. In contrast, when motor protection switches are used, this requirement is eliminated, as MPSs can be reset after tripping due to a short circuit, ensuring uninterrupted operation without the need for fuse replacement.

Simplified Design
When selecting fuses for motor starting in electrical panels, the starting duration must be considered: direct online (55s), star-delta (10s), and reduced voltage (15s). Protecting star-delta starters with fuses often requires additional components, such as auxiliary fuses and extra wiring. However, when motor protection switches are used, the design is simplified to a single component, eliminating the need for additional elements.

Reduced Downtime
In some applications, tripping due to overload is common. Such events can cause machine downtimes, leading to significant losses in industrial processes. The use of XMS's allows machines or equipment to be restarted more quickly after a short-circuit trip, minimizing downtime and operational disruptions.

Cost Reduction
Designs incorporating motor protection switches are more compact compared to protection schemes using molded case circuit breakers (MCCBs) or fuses. XMS's enable direct mounting on a 35 mm DIN rail, eliminating the need for screw-based mounting and associated costs. Additionally, they provide more than **50% space savings** in the installation area.

GENERAL PRODUCT CATALOG

MOTOR PROTECTION SWITCHES

Cable Connection

Circuit breakers allow direct connection of cables without the need to add terminal lugs to the cable ends.

Altitude	Rated Operating Voltage	Current Correction Factor (Im)
h≤2000m	690V	1xIm
2000<h≤4000m	550V	0.96xIm
3000<h≤4000m	480V	0.93xIm
4000<h≤5000m	420V	0.90xIm

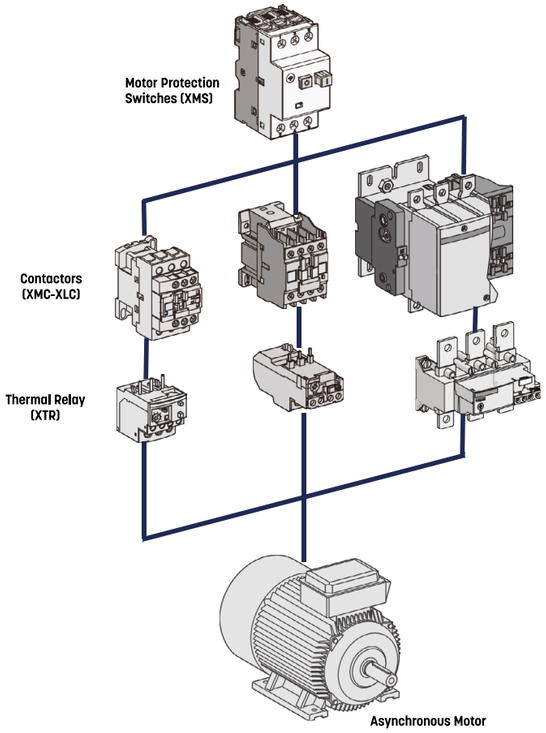
Three-Phase Rated Power Motor

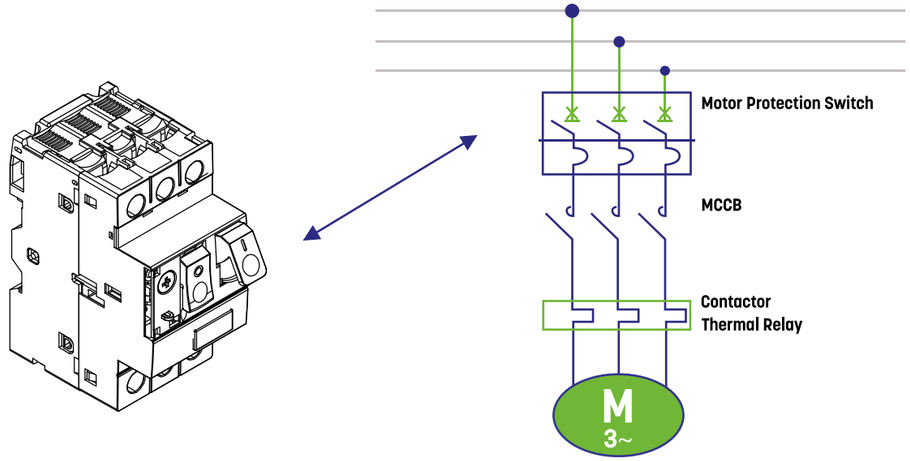
Model	Fastener Rated Current In (A)	Adjustable Current Setting Range (A)	230/240V	400V	415V	440V	500V	690V
XMS-32K	0,16	0.1~0.16	-	-	-	-	-	-
XMS-32K	0,25	0.16~0.25	-	-	-	-	-	-
XMS-32K	0,4	0.25~0.4	-	-	-	-	-	-
XMS-32K	0,63	0.4~0.63	-	-	-	-	-	0,37
XMS-32K	1	0.63~1	-	-	-	0,37	0,37	0,55
XMS-32K	1,6	1~1.6	-	0,37	-	0,55	0,75	1,1
XMS-32K	2,5	1.6~2.5	0,37	0,75	0,75	1,1	1,1	1,5
XMS-32K	4	2.5~4	0,75	1,5	1,5	1,5	2,2	3
XMS-32K	6,3	4~6.3	1,1	2,2	2,2	3	3,7	4
XMS-32K	10	6~10	2,2	4	4	4	5,5	7,5
XMS-32K	14	9~14	3	5,5	5,5	7,5	7,5	9
XMS-32K	18	13~18	4	7,5	9	9	9	11
XMS-32K	23	17~23	5,5	11	11	11	11	15
XMS-32K	25	20~25	5,5	11	11	11	15	18,5
XMS-32K	32	24~32	7,5	15	15	15	18,5	22
XMS-80K	25	16~25	-	11	11	-	-	18,5
XMS-80K	40	25~40	-	18,5	18,5	-	-	30
XMS-80K	63	40~63	-	30	30	-	-	45
XMS-80K	80	56~80	-	37	37	-	-	55

Altitude Correction Factor

XMS motor protection switches maintain their specified performance up to an altitude of **2000 meters** above sea level without any changes. However, as altitude increases, atmospheric properties such as **dielectric strength and pressure** are affected. Therefore, for altitudes above **2000 meters, current and voltage correction factors** must be applied. The corresponding values are shown in the table below.

Circuit Diagram and Connection

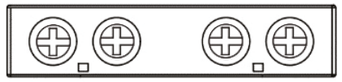


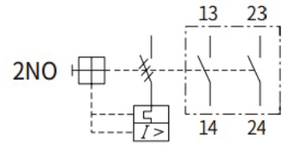


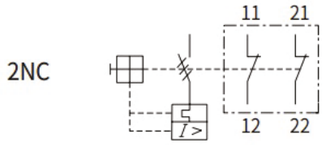
GENERAL PRODUCT CATALOG

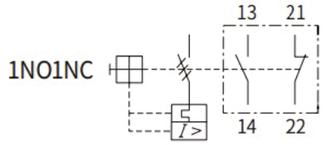
MOTOR PROTECTION SWITCHES

XMS 32K-AC-T Model Top-mountable auxiliary contact

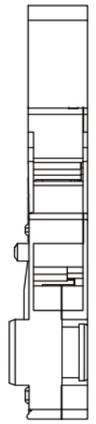


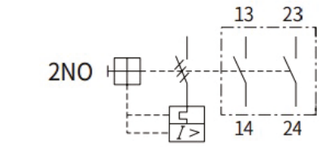


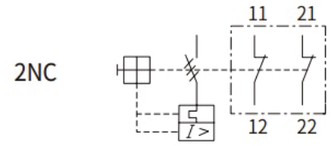


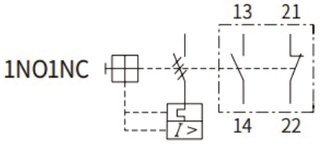


XMS 32K-AC-T Model Side-mountable auxiliary contact



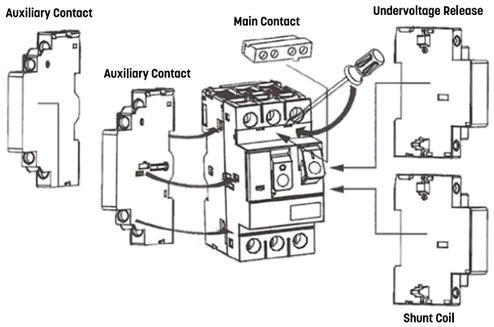






Accessories	
Top-Mounted Auxiliary Contact (2NO)	XMS-32K-AC-T20
Top-Mounted Auxiliary Contact (1NO-1NC)	XMS-32K-AC-T11
Top-Mounted Auxiliary Contact (2NC)	XMS-32K-AC-T02
Side-Mounted Auxiliary Contact (200)	XMS-32K-AC-S20
Side-Mounted Auxiliary Contact (1NO-1NC)	XMS-32K-AC-S1
Side-Mounted Auxiliary Contact (2NC)	XMS-32K-AC-502
Side-Mounted Auxiliary Contact (1NO-1NC)	XMS-80K-AC-S11
Side-Mounted Auxiliary Contact (2NO)	XMS-80K-AC-S20
Side-Mounted Alarm Contact (2NO)	XMS-80K-AL-20
Side-Mounted Alarm Contact (1NO+1NC)	XMS-80K-AL-11
Side-Mounted Alarm Contact (2NC)	XMS-80K-AL-02
Shunt Trip Release AC220-230V	XMS-32K-NC-240
Undervoltage Release AC220-230V	XMS-32K-LV-240

ACCESSORIES





Undervoltage Release Performance
•Rated Insulation Voltage (Ui): 690V

Characteristics:
•The undervoltage release must activate when the supply voltage drops within 70% to 35% of its rated voltage.
•It should prevent the starter from shutting down when the supply voltage falls below 35% of its rated value.
•The release must ensure the starter shuts down when the supply voltage reaches 85% or more of the rated voltage.



Shunt Trip Release Characteristics
•Rated Insulation Voltage (Ui): 690V

Characteristics:
•The operating voltage range of the shunt trip release is between 70% and 110% of its rated operating voltage.



Instantaneous Auxiliary Contact Characteristics
•Rated Operating Voltage (Ui): 250V
•Thermal Current (Ith): 2.5A



Fault Signal + Instantaneous Auxiliary Contact Characteristics
•Rated Operating Voltage (Ui): 690V
•Thermal Current (Ith): 6A

XMS 32-BMK Motor Protection Switches Button Enclosure Box



They provide protection for electrical connections against harsh weather conditions and prevent electric shocks. Enclosure boxes made from plastic or aluminum materials provide isolation by protecting the motor protection switches from hazardous conditions that could cause danger.

Protection Against:

•Dust, water, various chemicals, explosive and flammable materials
•High resistance to acidic, oily, dirty, and rusty environments
•Protection against UV radiation
•Protection Class: IP55
•Waterproof
•Emergency Button with Warning

ORDER LIST

Motor Protection Switches

32K



Type (Order) Code	Rated Current (In)	Explanation	Box Quantity	Carton Quantity
XMS 32-001-016	0.1~0.16A	32 Frame 0.1-0.16A 0.02kW	1	50
XMS 32-016-025	0.16~0.25A	32 Frame 0.16-0.25A 0.06kW	1	50
XMS 32-025-040	0.25~0.4A	32 Frame 0.25-0.4A 0.09kW	1	50
XMS 32-040-063	0.4~0.63A	32 Frame 0.4-0.63A 0.12kW	1	50
XMS 32-063-1	0.63~1A	32 Frame 0.63-1A 0.25kW	1	50
XMS 32-1-1.6	1~1.6A	32 Frame 1-1.6A 0.55kW	1	50
XMS 32-1.6-2.5	1.6~2.5A	32 Frame 1.6-2.5A 0.75kW	1	50
XMS 32-2.5-4	2.5~4A	32 Frame 2.5-4A 1.5kW	1	50
XMS 32-4-6.3	4~6,3A	32 Frame 4-6.3A 2.2kW	1	50
XMS 32-6.3-10	6~10A	32 Frame 6-10A 4kW	1	50
XMS 32-9-14	9~14A	32 Frame 9-14A 5.5kW	1	50
XMS 32-13-18	13-18A	32 Frame 13-18A 7.5kW	1	50
XMS 32-17-23	17-23A	32 Frame 17-23A 9kW	1	50
XMS 32-20-25	20-25A	32 Frame 20-25A 11kW	1	50
XMS 32-24-32	24-32A	32 Frame 24-32A 15kW	1	50

Motor Protection Switches (Handle Type)

32K



Type (Order) Code	Rated Current (In)	Explanation	Box Quantity	Carton Quantity
XMS D32-001-016	0.1~0.16A	32 Frame 0.1-0.16A 0.02kW	1	50
XMS D32-016-025	0.16~0.25A	32 Frame 0.16-0.25A 0.06kW	1	50
XMS D32-025-040	0.25~0.4A	32 Frame 0.25-0.4A 0.09kW	1	50
XMS D32-040-063	0.4~0.63A	32 Frame 0.4-0.63A 0.12kW	1	50
XMS D32-063-1	0.63~1A	32 Frame 0.63-1A 0.25kW	1	50
XMS D32-1-1.6	1~1.6A	32 Frame 1-1.6A 0.55kW	1	50
XMS D32-1.6-2.5	1.6~2.5A	32 Frame 1.6-2.5A 0.75kW	1	50
XMS D32-2.5-4	2.5~4A	32 Frame 2.5-4A 1.5kW	1	50
XMS D32-4-6.3	4~6,3A	32 Frame 4-6.3A 2.2kW	1	50
XMS D32-6.3-10	6~10A	32 Frame 6-10A 4kW	1	50
XMS D32-9-14	9~14A	32 Frame 9-14A 5.5kW	1	50
XMS D32-13-18	13-18A	32 Frame 13-18A 7.5kW	1	50
XMS D32-17-23	17-23A	32 Frame 17-23A 9kW	1	50
XMS D32-20-25	20-25A	32 Frame 20-25A 11kW	1	50
XMS D32-24-32	24-32A	32 Frame 24-32A 15kW	1	50

80K



Type (Order) Code	Rated Current (In)	Explanation	Box Quantity	Carton Quantity
XMS 80-25-40	25-40A	80 Frame 25-40A 18.5kW	1	20
XMS 80-40-63	40-63A	80 Frame 40-63A 30kW	1	20
XMS 80-56-80	56-80A	80 Frame 56-80A 40kW	1	20

GENERAL PRODUCT CATALOG

MOTOR PROTECTION SWITCHES

Motor Protection Switches Accesories

Enclosure Box



Type (Order) Code	Explanation	Box Quantity	Carton Quantity
XMS 32-BMK	Enclosure Box (With Button) for 32 Frame Motor Protection Switches	1	30
XMS 32-MK	Enclosure Box (Without Button) for 32 Frame Motor Protection Switches	1	30
XMS 80-BMK	Enclosure Box (With Button) for 80 Frame Motor Protection Switches	1	
XMS 80-MK	Enclosure Box (Without Button) for 80 Frame Motor Protection Switches	1	

Auxiliary Contact

Type (Order) Code	Mounting	Auxiliary Contact	Explanation	Box Quantity	Carton Quantity
XMS-32K-AC-T20	Top	2NO	FX-T20 Top 2NO	1	50
XMS-32K-AC-T11	Top	1NO1NC	FX-T11 Top 1NO1NC	1	50
XMS-32K-AC-T02	Top	2NC	FX-T02 Top 2NC	1	50
XMS-32K-AC-S20	Side	2NC	FX-S20 Side 2NO	1	50
XMS-32K-AC-S11	Side	1NO1NC	FX-S11 Side 1NO1NC	1	50
XMS-32K-AC-S02	Side	2NC	FX-S02 Side 2NC	1	50
XMS-80K-AC-S11	Side	1NO1NC	FX-S11 Side 1NO1NC	1	50
XMS-80K-AC-S20	Side	2NO	FX-S20 Side 2NO	1	50

Alarm Contact

Type (Order) Code	Mounting	Auxiliary Contact	Explanation	Box Quantity	Carton Quantity
XMS-32K-AL-20	Top	2NO	AL-T20 Top 2NO	1	50
XMS-32K-AL-11	Top	1NO1NC	AL-T11 Top 1NO1NC	1	50
XMS-32K-AL-02	Top	2NC	AL-T02 Top 2NC	1	50

Shunt Trip Release

Type (Order) Code	Mounting	Auxiliary Contact	Explanation	Box Quantity	Carton Quantity
XMS-32K-NC-240	Tripping Release	AC220-230V	AL-T20 Top 2NO	1	50

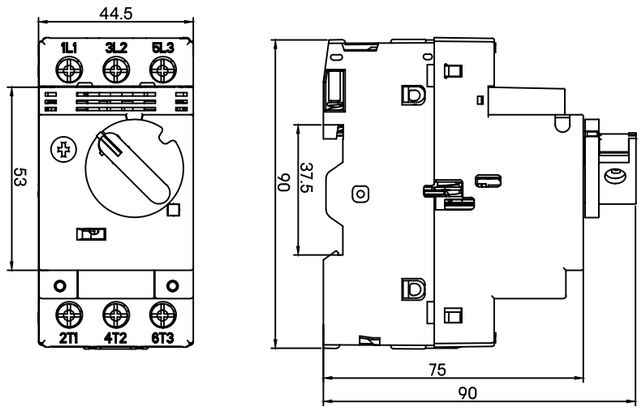
Undervoltage Release

Type (Order) Code	Mounting	Auxiliary Contact	Explanation	Box Quantity	Carton Quantity
XMS-32K-LV-240	Undervoltage Release	AC220-230V	LV-240 AC220-230V Undervoltage Release	1	50

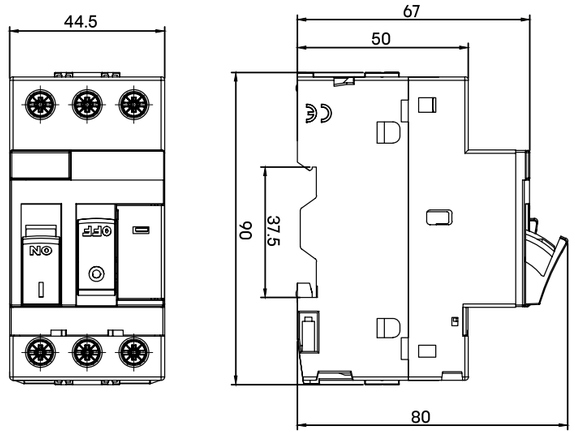


DIMENSIONS

XMS 32K



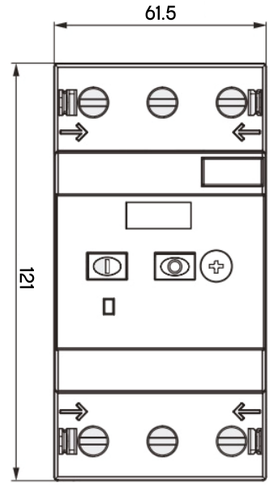
XMS 32K

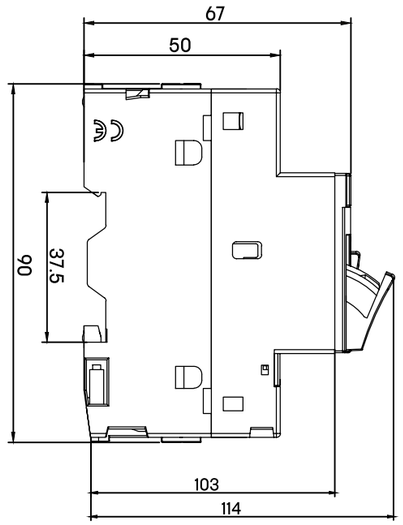


GENERAL PRODUCT CATALOG

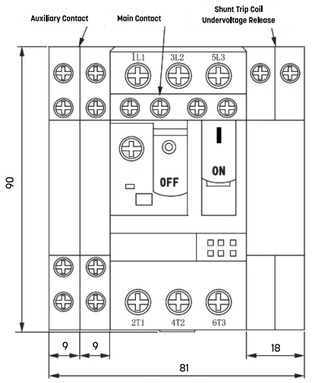
MOTOR PROTECTION SWITCHES

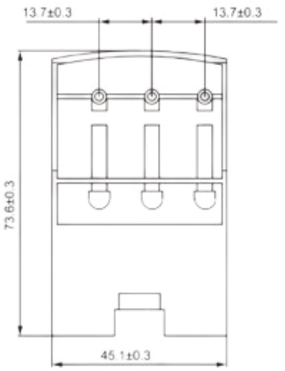
XMS 80K

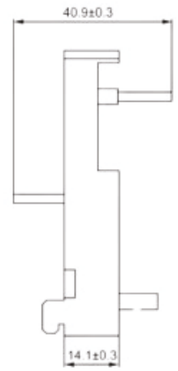




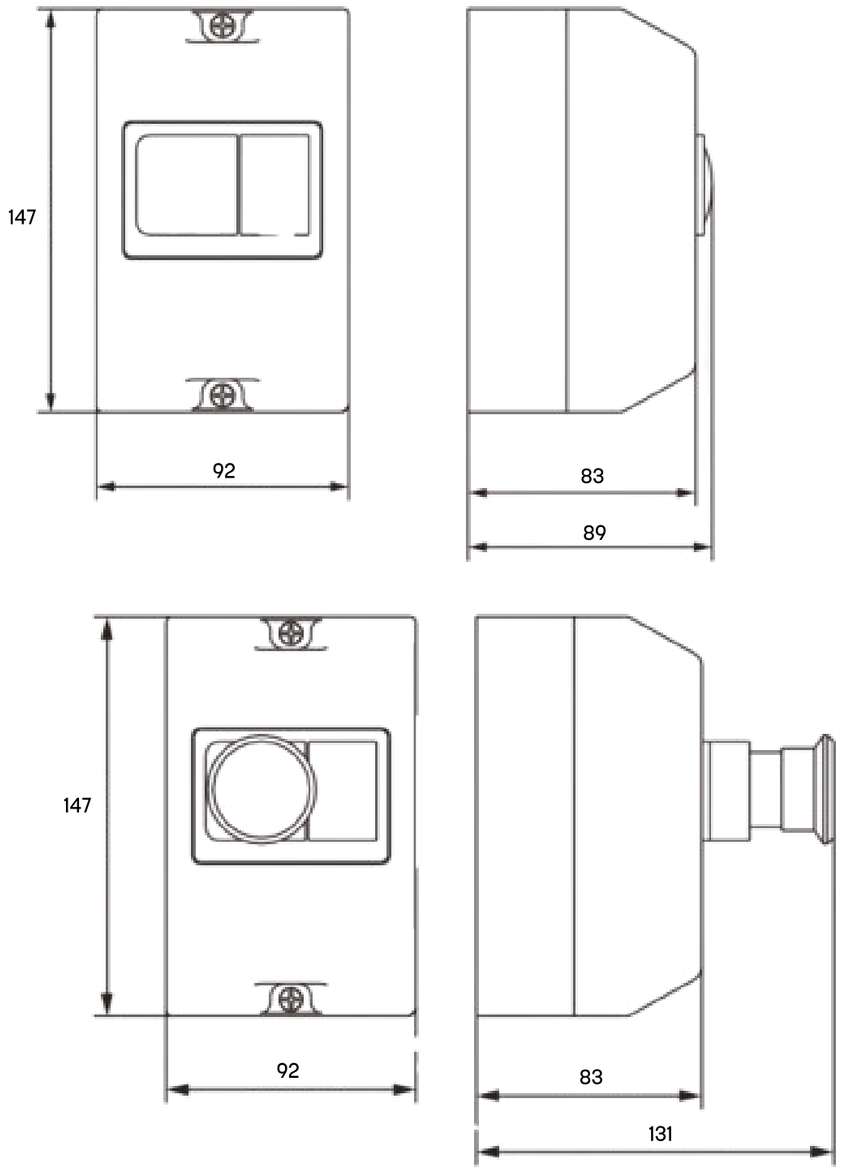
ACCESSORIES







XMS 32-BMK Motor Protection Switches Button Enclosure Box



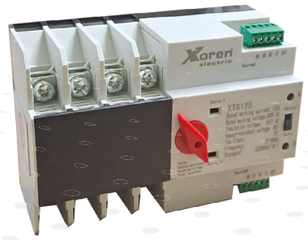
VALID FOR ALL OUR PRODUCTS
2 YEARS WARRANTY

AUTOMATIC TRANSFER SWITCH

It is an electromechanical switch that enables the transfer between two different electrical sources, such as a high-voltage network and a generator. These devices perform the functions of interrupting and conducting current, transferring energy automatically or manually from one power source to another.The new Electronic Series Automatic Transfer Switches feature a digital control panel and operate at nominal voltages of 400V/415V with current ratings ranging from 16A to 630A. At a PC-level, they provide power monitoring, detection of differences between two power sources, and rapid switching capabilities. With various operating functions, they ensure energy continuity in critical sectors such as the chemical industry, metallurgy, high-rise buildings, military facilities, and hospitals.

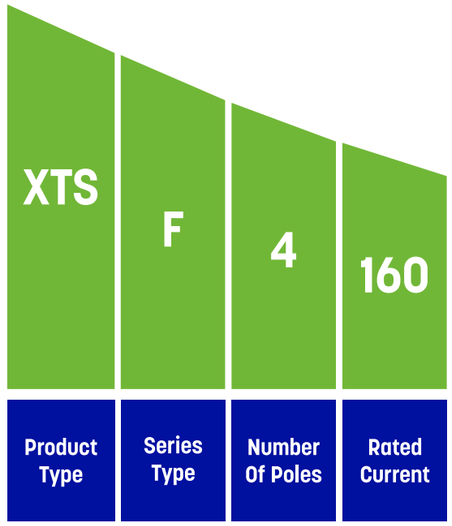


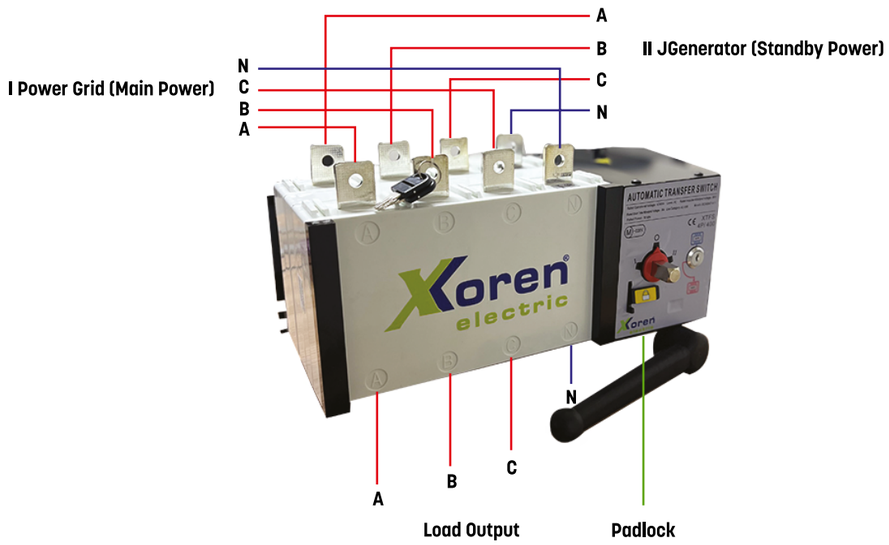




www.xkoren.com

Product Code and Label Information





GENERAL PRODUCT CATALOG

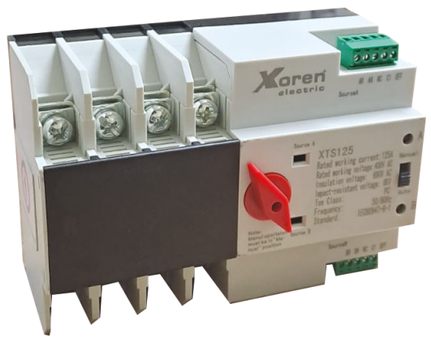
AUTOMATIC TRANSFER SWITCH

XTS Automatic Transfer Switch



AUTOMATIC TRANSFER SWITCH				XTS-4 0100	XTS-4 0160	XTS-4 0250	XTS-4 0400	XTS-4 0630	XTS-4 0800	XTS-4 1000	XTS-4 1250	XTS-4 1600	XTS-4 2000	XTS-4 2500	XTS-4 3200
Number of Poles			P	4											
Controller Type				A											
Rated Operational Voltage		Ue	VAC	400											
Rated Insulation Voltage		Ui	V	690											
Rated Impulse Withstand Voltage		Uimp	kV	6											
Operating Frequency			Hz	50/60											
Rated Current	AC-31A AC-35A AC-33B	In	A	100	160	250	400	630	800	1000	1250	1600	2000	2500	3200
Transfer Time			s	0,5	1,1				1,2				2,2		
Standarts				IEC EN 60947-4-1											
Transfer Options				Automatic / Manual											
Class				PC											
Operating Ambient Temperature Range			°C	-5....+40											
Storage Ambient Temperature Range			°C	-20....+60											
Electrical Life			op.	2.000											
Mechanical Life			op.	4.000											
Protection Degree				3											
Degree of Pollution				IP30											
Altitude			m	≤2000											

XTS F Series Automatic Transfer Switch



XTS F SERIES AUTOMATIC TRANSFER SWITCH				XTS F4 - 063	XTS F4 - 100	XTS F4 - 125
Number of Poles			P	4		
Controller Type				A		
Rated Operational Voltage		Ue	VAC	400		
Rated Insulation Voltage		Ui	V	690		
Rated Impulse Withstand Voltage		Uimp	kV	8		
Operating Frequency			Hz	50/60		
Rated Current	AC-31A AC-35A AC-33B	In	A	63	100	125
Transfer Time			ms	<30		
Standarts				IEC EN 60947-4-1		
Transfer Options				Automatic / Manual		
Class				PC		
Operating Ambient Temperature Range			˚C	-5....+40		
Storage Ambient Temperature Range			˚C	-20....+60		
Electrical Life			op.	2.000		
Mechanical Life			op.	6.000		
Degree of Pollution				3		
Protection Degree				IP30		
Altitude			m	≤2000		

GENERAL PRODUCT CATALOG

AUTOMATIC TRANSFER SWITCH

XTS U Series A Type Automatic Transfer Switch



XTS U SERIES A TYPE AUTOMATIC TRANSFER SWITCH				XTS U4 - 0125-A	XTS U4 - 0160-A	XTS U4 - 0250-A	XTS U4 - 0400-A	XTS U4 - 0630-A
Number of Poles			P	4				
Controller Type				A				
Rated Operational Voltage		Ue	VAC	400				
Rated Insulation Voltage		Ui	V	800				1.000
Rated Impulse Withstand Voltage		Uimp	kV	8				
Operating Frequency			Hz	50/60				
Rated Current	AC-32B AC-33iB	In	A	125	160	250	400	630
Transfer Time			ms	1.35	1.3		2	
Standarts				IEC EN 60947-4-1				
Transfer Options				Automatic / Manual				
Class				PC				
Operating Ambient Temperature Range			˚C	-5....+40				
Storage Ambient Temperature Range			˚C	-20....+60				
Electrical Life			op.	2.000				
Mechanical Life			op.	6.000				
Degree of Pollution				3				
Protection Degree				IP30				
Altitude			m	≤2000				

XTS U Series B Type Automatic Transfer Switch



XTS U SERIES B TYPE AUTOMATIC TRANSFER SWITCH				XTS U4 - 0125-B	XTS U4 - 0160-B	XTS U4 - 0250-B	XTS U4 - 0400-B	XTS U4 - 0630-B
Number of Poles			P	4				
Controller Type				B				
Rated Operational Voltage		Ue	VAC	400				
Rated Insulation Voltage		Ui	V	800				1.000
Rated Impulse Withstand Voltage		Uimp	kV	8				
Operating Frequency			Hz	50/60				
Rated Current	AC-32B	In	A	125	160	250	400	630
	AC-33iB							
Rated Short-Circuit Current		Iq	kA	120				
Short-Circuit Breaking Capacity		Ics	kA	12		17		26
Short-Circuit Protection				8xIn				
Overload Protection				>1.3xIn				
Transfer Time			ms	1.35	1.3		2	
Standarts				IEC EN 60947-4-1				
Transfer Options				Automatic / Manual				
Class				PC				
Operating Ambient Temperature Range			°C	-5....+40				
Storage Ambient Temperature Range			°C	-20....+60				
Electrical Life			op.	2.000				
Mechanical Life			op.	6.000				
Degree of Pollution				3				
Protection Degree				IP30				
Altitude			m	≤2000				

GENERAL PRODUCT CATALOG

AUTOMATIC TRANSFER SWITCH

XTS E Series Automatic Transfer Switch



XTS E SERIES AUTOMATIC TRANSFER SWITCH				XTS E4 - 0125	XTS E4 - 0160	XTS E4 - 0250	XTS E4 - 0400	XTS E4 - 0630
Number of Poles			P	4				
Controller Type				B				
Rated Operational Voltage		Ue	VAC	400				
Rated Insulation Voltage		Ui	V	800				1.000
Rated Impulse Withstand Voltage		Uimp	kV	8				
Operating Frequency			Hz	50/60				
Rated Current	AC-33A	In	A	125	160	250	400	630
Transfer Time			ms	≤200				
Standarts				IEC 60947-4-1				
Transfer Options				Automatic / Manual				
Class				PC				
Operating Ambient Temperature Range			°C	-5....+40				
Storage Ambient Temperature Range			°C	-20....+60				
Electrical Life			op.	2.000				
Mechanical Life			op.	6.000				
Degree of Pollution				3				
Protection Degree				IP30				
Altitude			m	≤2000				

General Information



XKoren Automatic Transfer Switches are electromechanical isolators that allow electrical loads to be transferred between two different power sources. These devices automatically transfer energy from one power source to another, performing tasks such as cutting, transmitting, and carrying current. XKoren Automatic Transfer Switches are produced in five types: XTS, XTS-F, XTS-U Series A and B Types, and XTS-E.

The XTS F series is more compact in size compared to other series and has lower rated current values. The XTS F4 series has rated current values of 63, 100, and 125A, while the XTS 4 series has rated current values of 100, 160, 250, 400, 630, 800, 1000, 1250, 1600, 2000, 2500, and 3200A. The XTS F, U, and E series have rated current values of 125, 160, 250, 400, and 630A.

The working principle of ATS is quite simple. In a facility with two power sources, the primary source is active under normal conditions, while the secondary source remains in standby mode as a backup. If the primary source fails or is disconnected, the ATS is activated to switch to the secondary source. During this process, the operation of the facility continues without any power interruption.

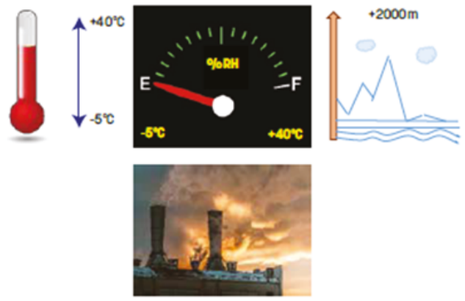
The ATS consists of several key components, including switches, control circuits, and devices that manage the transition time. The switches ensure that both sources are connected to the electrical circuit. The control circuits monitor whether both sources are active and make the necessary switch if needed. The devices that manage the transition time ensure that the power sources continue to operate seamlessly.

ATS has many advantages. Firstly, it is designed to prevent power outages. Therefore, when one power source fails, the facility's power supply remains uninterrupted, and normal operations continue. Secondly, ATS contributes to energy savings, which is crucial for large businesses facing high energy costs. Thirdly, ATS is vital for facilities that need continuous operation in emergencies. For example, hospitals, fire departments, and rescue teams require a constant power source. As a result, the use of ATS in such institutions is widespread.

The use of ATS plays a significant role in power management in facilities. However, it is also crucial that the ATS is installed and operated correctly. ATS systems require periodic checks and maintenance. Additionally, the proper installation and operation of ATS are vital for the efficiency and safety of the facility.

XKoren Automatic Transfer Switches do not perceive a temporary power fluctuation (instantaneous interruptions) as a power outage and do not immediately switch to the generator. (It operates with a 3-5 second delay in case of an interruption). This provides safe protection against negative issues like phase mismatch.

Operating Conditions



Ambient Temperature

The nominal ambient temperature is from 5°C to +40°C. Users can specially adapt the product for use in environments between -20°C and +60°C and can use it according to the temperature compensation table.

GENERAL PRODUCT CATALOG

AUTOMATIC TRANSFER SWITCH

•Altitude
The product can be used without power loss at an altitude of 2000m or below. If it needs to operate above 2000m, it can be used according to the capacity reduction table for different altitudes.

•Atmospheric Conditions
When the ambient air temperature is +40°C, the relative humidity should not exceed 50%. When the temperature is lower, the relative humidity can be higher. In the wettest month, the average maximum relative humidity should be 90%, and the average minimum temperature should be +20°C. Due to temperature fluctuations, occasional condensation may occur.

•Degree of Pollution
Class 3

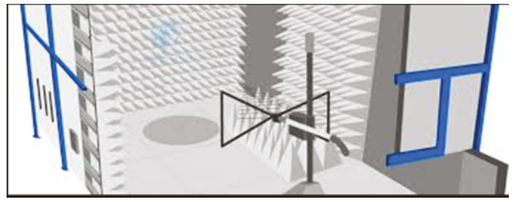
•Installation Category
The installation category of the main circuit's switching equipment is Category IV. The installation category of the auxiliary circuit is Category III. The installation category of the conversion controller is Category II.

Usage Category:

AC-33IB
AC-33B
AC-33B

Electromagnetic Compatibility (EMC)

Electrostatic Discharge (IEC 61000-4-2) Level 2
Radio Frequency Electromagnetic Field Immunity (IEC 61000-4-3) Level 3
Fast Transients (IEC 61000-4-4) Level 3
Surges (IEC 61000-4-5) Level 3
Radio Frequency Electromagnetic Field Immunity (IEC 61000-4-6) Level 3
Radiated Emissions (CISPR11) Class B.



Types of Automatic Transfer Switch (ATS)

Automatic Transfer Switches (ATS) are devices that automatically redirect loads from one power source to another in the event of a power outage. There are different types of ATS based on their usage purpose, operating principle, and application areas. ATS types are classified as A, B, C, D, E, and F.

ATS Types and Features

ATS Type	Operating Principle	Application Area	Features
A Type (Automatic Transfer)	Provides single-phase protection	Generator systems, critical facilities	The outage duration is minimal, providing uninterrupted power.
B Type (Automatic Transfer)	Provides three-phase protection	Small facilities, low-critical applications	There is no automatic transfer system, it is simple and economical.
C Type (Automatic Transfer)	It waits for a specified period of time before switching to the backup source.	Sensitive loads, systems requiring overvoltage protection	It allows time for voltage and frequency balancing.
D Type (Automatic Transfer)	he two power sources synchronize and operate for a certain period before the switch occurs.	Large industrial facilities, hospitals, data centers	It ensures seamless transition, providing frequency and voltage synchronization.
E Type (Automatic Transfer)	It uses both power sources simulta-neously to share the load.	Energy distribution systems, large manufacturing facilities	It increases energy efficiency by sharing the load.

Automatic Transfer Switch systems are crucial for providing uninterrupted power in critical facilities. Selecting the correct Automatic Transfer Switch type based on the application ensures the system operates efficiently and reliably. Specifically, Type A and Type D Automatic Transfer Switch offer the best solutions for critical loads, while Type B and Type C Automatic Transfer Switch provide more economical and simpler solutions

In XKoren ATS systems, Type A and Type B Automatic Transfer Switch are preferred.

XTS F: Represents the XKoren rail-type Automatic Transfer Switch.

XTS: Represents the XKoren large enclosure screw-mount Automatic Transfer Switch.

XTS-U: Represents the new design Automatic Transfer Switch of the XKoren XTS series.

XTS-E: Represents the XKoren electronic series Automatic Transfer Switch.

Controller Functions

Controller Code	Functions
A Type	1. Power indicator and ON/OFF status indicator; 2. Remote power indicator and ON/OFF status indicator; 3. Mains 3 phase sensing, Alternative single phase sensing; 4. Main power with 3 phase missing, under voltage monitoring; 5. Alternative with A/N phase monitoring; 6. Auto transfer Auto recovery
B Type	1. With all A functions; 2. Passive fire-linkage function; 3. Generator start/stop function
C Type	1. Power indicator and ON/OFF status indicator; 2. Remote power indicator and ON/OFF status indicator; 3. Mains 3 phase monitoring, Alternative 3 phase monitoring; 4. Auto transfer auto recovery (default), Auto transfer no auto recovery; 5. Passive fire-linkage function; 6. Generator start/stop function; 7. DC24V auxiliary power input; 8. With optional LCD display for data programming and remote control
D Type	1. With all C type functions; 2. With RS485 communication function
E Type	1. With all C type functions; 2. With engine exerciser timer funciton

GENERAL PRODUCT CATALOG

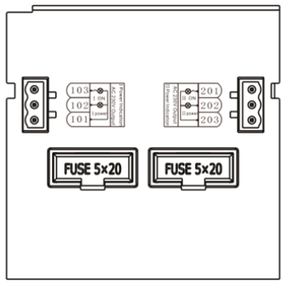
AUTOMATIC TRANSFER SWITCH

Function Data

	A	B	C	D	E
Rated Working Voltage	AC230V/400V 50Hz/60Hz				
Aux. Power Voltage	No		DC24V		
Voltage Measure Range	No		40-300V		
Power Consumption	≤10W				
Working Positions	(I-ON, II-ON, 0-OFF, three working positions)				
Operating Mode	Manual, Automatic		Manual, Automatic, Remote		
Display Mode	LED indicator		LED indicator, LCD Display		
Transfer Mode	Auto transfer auto recovery		Auto transfer auto recovery/ Auto transfer without auto recovery		
Under Voltage Range	No		176V (with LCD 165V-218V Adjustable)		
Over Voltage Range	No		264V (with LCD 242V-298V Adjustable)		
Over / Under Frequency	No				40Hz-60Hz Adjustable
Exerciser Timer	No				Engine Exercier
Transfer Delay	No		(with LCD 0-180 second Adjustable)		
Recovery Delay	No		(with LCD 0-180 second Adjustable)		
Phase Lost Monitoring	Mains 3 phase, alternative single phase		A/B/C Both Three phase detect		
Generator Control	No	Yes (One set relay dry contact)			
Fire-Linkage Control	No	Forced 0-OFF position(Passive input with one set NO passive feedback contact)			
RS485 Communication	No			Yes	Optional
Installation Mode	Integrated(No display)		Integrated/Separated with display optional		

Terminal Definition

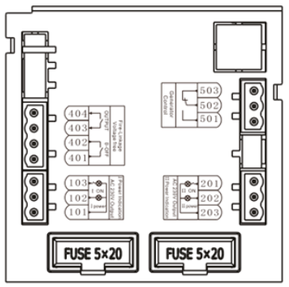
A Type



101: I-power Neutral Line
102: I-power available indicator
103: I-power Close indicator

201: II-power Neutral Line
202: II-power available indicator
203: II-power Close indicator

B Type



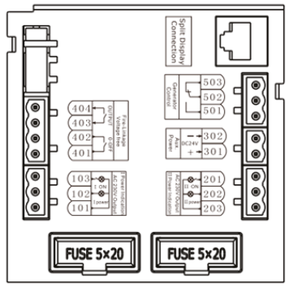
101: I-power Neutral Line
102: I-power available indicator
103: I-power Close indicator

201: II-power Neutral Line
202: II-power available indicator
203: II-power Close indicator

401: Fire-linkage input (passive)
402: Fire-linkage input (passive)
403: Fire-linkage output (passive)
404: Fire-linkage output (passive)

501: Gen. control NC point
502: Common point
503: Gen. control NO point

C Type



101: I-power Neutral Line
102: I-power available indicator
103: I-power Close indicator

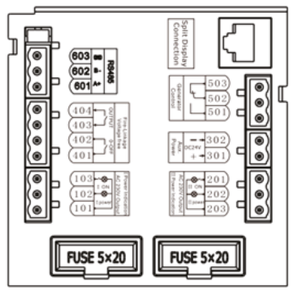
201: II-power Neutral Line
202: II-power available indicator
203: II-power Close indicator

301: DC24V+
302: DC24V-

401: Fire-linkage input (passive)
402: Fire-linkage input (passive)
403: Fire-linkage output (passive)
401: Fire-linkage output (passive)

501: Gen. control NC point
502: Common point
503: Gen. control NO point

D/E Type



101: I-power Neutral Line
102: I-power available indicator
103: I-power Close indicator

201: II-power Neutral Line
202: II-power available indicator
203: II-power Close indicator

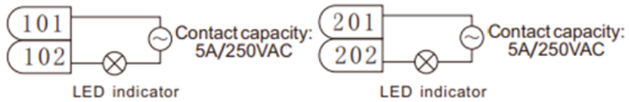
301: DC24V+
302: DC24V-

401: Fire-linkage input (passive)
402: Fire-linkage input (passive)
403: Fire-linkage output(passive)
401: Fire-linkage output (passive)

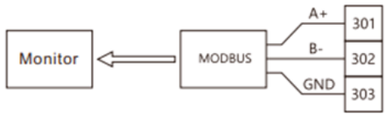
501: Gen. control NC point
502: Common point
503: Gen. control NO point

601: RS485-A+
602: RS485-B-
603: RS485-GND

101-102: Connecting an external LED indicator for the Source I power ON (no voltage output) LED indicator.
201-202: Connecting an external LED indicator for the Source II power ON (no voltage output) LED indicator.



301-303: RS485 communication port, can remotely control ATS operations, read switch status parameters, and error codes.

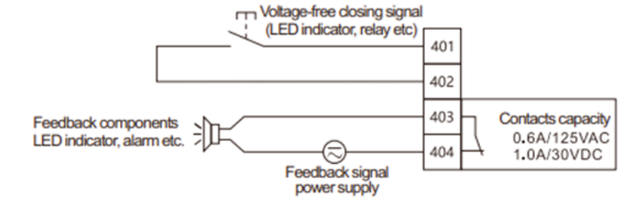


401-402: Programmable voltage-independent signal input terminals, with the default function being fire connection. Other functions include

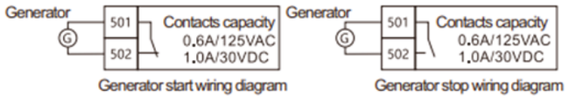
403-404: Programmable voltage-independent signal output terminals, with the default function being fire connection feedback. Other optional functions include fault alarm, grid alarm, overload alarm, and abnormal output from both power sources. When the internal contacts close, it provides an output signal.

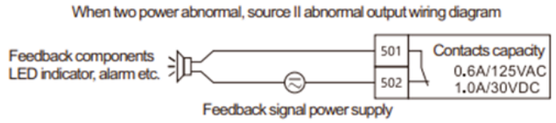
Notes:

1.Only the three-position ATS (I-0-II) can select fire-leakage, remote control, or fire-connection feedback functions.
2.The fire connection has two optional input signals:
① Pulse signal (input pulse signal to 401-402, ATS switches to both "off" positions, cutting off both power sources. After the fire signal is removed, the original settings can be restored by pressing the " AUTO MANU " button once.)
② Continuous signal (input continuous signal to 401-402, ATS switches to both "off" positions, cutting off both power sources. After the fire signal is removed, the original settings are restored.)

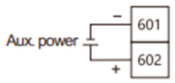


501-502: By default, provides a voltage-independent signal output for generator start/stop. When Source I is abnormal and there is no power supply, the internal contacts close and a voltage-independent closing signal is sent to start the generator. When ATS detects that Source I has returned, the internal contacts open and a signal is sent to stop the generator. When the two power source outputs are selected separately, 501-502 functions as the Source II abnormal output.

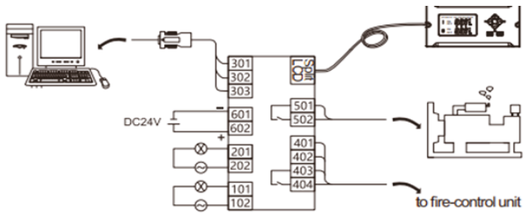




601-602: Auxiliary power input terminal. It is used when a delay is required for starting the generator or when two power sources (The sentence seems to be incomplete, please provide the rest if needed).



Typical Application Example of Secondary Terminals



Note: The 125-sized 2P switch has only phase A and phase N (the phase N position is the same as the 4P switch). The 2P switch does not have neutral terminals (I-N/II-N). For the general dimensions, please refer to section 6.

Controller System Introduction

Controller Function Introduction

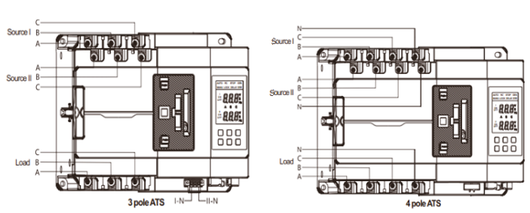
•Automatic monitoring of Main Power (I) voltage loss, low voltage, and overvoltage.
•Automatic monitoring of Alternative Power (II) voltage loss, low voltage, and overvoltage.
•LED indicator for power status and ATS operating position.
The LCD displays ATS information when it is operating normally and shows the set value/adjustment result while querying/setting system parameters; before ATS transfer occurs, the transfer/return delay time is displayed in countdown mode.

•**Fire connection function:** The controller is equipped with a group of passive fire signal input terminals that can accept external passive fire signals and control the ATS transfer to the 0-OFF position, and a group of passive feedback signal output terminals that can return the switch to the OFF position, sending a signal to the fire extinguishing equipment.

•**Generator control function:** The controller is equipped with a series of relay dry contacts to control the start and stop of the generator and can adjust the start and stop delay times (requires DC24V power supply).

•**Communication function:** Configured with an RS485 communication port and Modbus-RTU communication protocol for remote signaling, remote measurement, remote control, and remote adjustment (Type D).

Phase Sequence and Power Sources



•**Power frequency detection, adjustable over/under frequency range (Type E controller).**

•**Motor exercise timing function:** When the ATS is set to the Grid-Generator mode, it can be adjusted to run the generator for a fixed time and duration, and can also perform timing transitions between two power sources (Type E)

Controller System Introduction

Grid -Grid / Grid - Grid

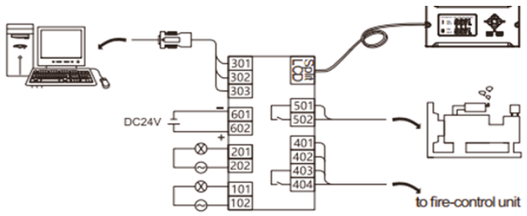
•Transfer mode - Automatic transfer and automatic recovery A-9-001 Source I priority

Otomatik Mod (AUTO)
↓
ATS I-OFF Position I-Close  II-Open
↓
Power Grid I Fault
↓ t: Transfer Delay
ATS 0 Position I-Close  OFF (0)
↓ t: OFF Delay
ATS II Position I-Open  II-Close
↓
Power Grid I Recovery
↓ t: Transfer Delay
ATS 0 Position I-Close  OFF (0)
↓ t: OFF Delay
ATS I Position I-Open  II-Close

GENERAL PRODUCT CATALOG

AUTOMATIC TRANSFER SWITCH

Typical Application Example of Secondary Terminals



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Controller System Introduction

Controller Function Introduction

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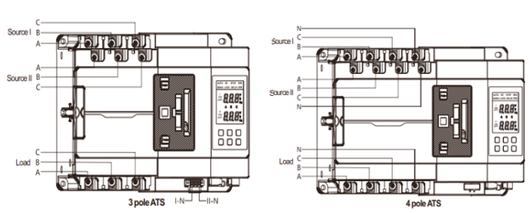
Phase Sequence and Power Sources



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Controller System Introduction

Grid -Grid / Grid - Grid

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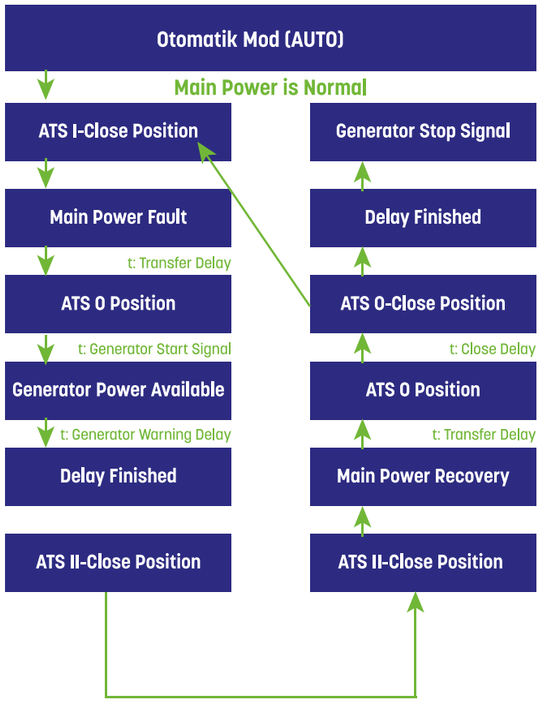
ATS II Position I-Open  II-Close
↓
Power Grid I Recovery
↓ t: Transfer Delay
ATS 0 Position I-Close  OFF (0)
↓ t: OFF Delay
ATS I Position I-Open  II-Close

Grid - Generator

• Transfer mode - Automatic transfer and automatic recovery A-9-001 Source I priority.



Note: ATS I : Power Grid ATS II : Generator

Basic Operating Method (Control Panel)

•In the main interface, press the "SET" button to enter the password entry interface, enter the password, press the "AUTO MANU" button to exit the interface, and press the "SET" button to confirm the password entry. If the password is entered correctly, you will enter the menu selection interface; otherwise, you will return to the main interface. In the settings state, you can adjust the system parameters.

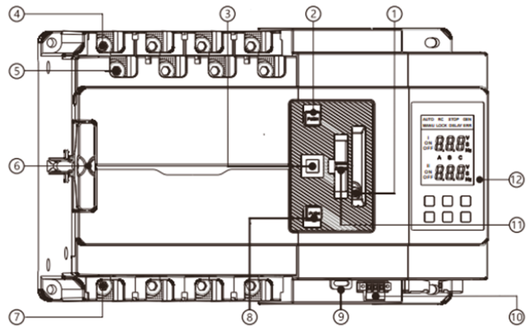
• In the menu selection interface, press the "SET" button to choose the menu type, press the button to scroll through the menu pages, and press the button to change the current parameter value under a specific parameter status. Press the "AUTO MANU" button to save the parameter and exit.

•Under the menu selection state, press the "AUTO MANU" button to return to the main interface. Under other menu interfaces, if no action is performed for a specific period, it will automatically return to the main interface.

•In the main menu interface, press and hold the AUTO MANU button until the password interface appears, enter the '888' password to enter the voltage calibration page, press the button to open the up and down pages, and press the button to calibrate the voltage when a specific phase voltage is displayed.

•In the main menu interface, press and hold the button for 5 seconds to restore the default settings (Note: Please do not operate).

Control Panel

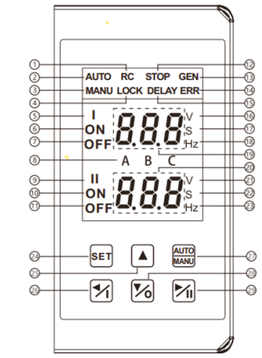


Integrated Type

1.Manual control area
2.Manual operation source II shutdown button
3.Mechanical indicator for ATS Open/Close status
4.Source I terminals
5.Source II terminals
6.Manual control lever
7.Load
8.Manual operation source I shutdown button
9.Mechanical lock hole
10. Neutral source for 3-phase ATS
11. Mechanical transfer switch
12. Control module

Descriptions:

1.Manual control area - The area where the user can manually operate the device. It is typically used when manual intervention is required.
2.Manual operation source II shutdown button - The button that allows manual activation or deactivation of Source II (the second power source).
3.Mechanical indicator for ATS Open/Close status - A mechanical indicator that shows whether the Automatic Transfer Switch (ATS) is open or closed.
4.Source I terminals - The electrical terminals where the first power source is connected.
5.Source II terminals - The electrical terminals where the second power source is connected.
6.Manual control lever - The lever used to manually operate the ATS. It is used when the automatic system fails or manual intervention is needed.
7.Load - The electrical load powered by the ATS (devices, machines, etc.).
8.Manual operation source I shutdown button - The button that allows manual activation or deactivation of Source I.
9.Mechanical lock hole - A security hole for attaching a padlock to prevent unauthorized use of the ATS.
10. Neutral source for 3-phase ATS - The terminal where the neutral connection is made in a 3-phase system.
11. Mechanical transfer switch - A mechanical switch that allows switching between manual or automatic modes.
12. Control module - The electronic module that manages the operation of the ATS. It monitors voltage levels and switches between sources.



Integrated Type Control Module



LCD/LED Symbol Description

1.RC: The controller is in remote control mode, and automatic/manual mode is disabled.
2.AUTO: The ATS is in automatic operation mode.
3.MANU: The ATS is in manual operation mode, and it can only be operated using the controller's buttons.
4.LOCK: When the mechanical transfer switch is not in the AUTOMATIC position, "LOCK" appears on the display. At this time, the ATS can only be operated manually via the lever or is in a locked state.
5.I: Power source I.
6.ON: Power source I is ON.
7.OFF: Power source I is OFF.
8.A/B/C: When A is lit, it shows the voltage/frequency of phase A at that moment. Similarly, B and C phases.
9.II: Power source II.
10.ON: Power source II is ON.
11.OFF: Power source II is OFF.

12.STOP: Fire connection status, the ATS is in double OFF position.
13.GEN: Sends generator start signal.
14.ERR: The switch is abnormal; the reasons can be traced via communication.
15.DELAY: Flashing indicates that the switch is in transfer delay, steady on means it is in protection mode (to prevent frequent transfer operations).

V: Shows the phase voltage of Source I.
S: Indicates the delay timer for Source I.
Hz: Shows the frequency of phase A of Source I.
V: Shows the phase voltage of Source II.
S: Indicates the delay timer for Source II.
Hz: Shows the frequency of phase A of Source II.

Operation Screen Buttons:

SET Setting key, used for function selection setting

▲ Press the key to increase the paramerter value.

A/M Auto/Manual key, switching between automatic/ manual mode.

I Left shift key, left shift option, used for up menu, in manual mode, switch to source I ON.

O Minus key, decrease paramerter value, in manual mode, switch to OFF position.

II Right shift key, right shift option, scroll down menu, in manual mode, switch to source II ON.

Data Monitoring and Display Function

The system includes functions such as power I/II voltage detection and display, power I/II frequency detection and display, power I/II phase sequence detection, and power I/II fault detection and display. The controller is equipped with an LED display to show the voltage and frequency in the circuit. When a power failure occurs, the corresponding power source I/II indicator flashes. In case of an operational failure, "ERR" will flash on the display.

Transfer Control Function

The function includes automatic transfer control, manual transfer control, and remote control transfer. The automatic transfer control can be further categorized into three modes:

Automatic transfer and automatic recovery operation mode

Cross-backup operation mode

Automatic transfer and no automatic recovery operation mode

When the controller is powered on, it defaults to the automatic operation mode, and the "AUTO" digital tube on the panel will light up. The controller can be switched to manual operation mode by pressing the "AUTO/MANU" button on the panel, and the "MANU" digital tube will light up.

Automatic Transfer Control Function

In automatic transfer and automatic recovery operating mode, the controller: When the power supply I fails (overvoltage, undervoltage, overfrequency, phase loss, power outage, etc.) and power supply II is normal, the controller switches the ATS to power supply II. When power supply I returns to normal, the controller switches the ATS back to power supply I.

In mutual backup operation mode, the controller: When power supply I fails (overvoltage, undervoltage, overfrequency, phase loss, power outage, etc.) and power supply II is normal, the controller switches the ATS to power supply II, and even after power supply I returns to normal, it does not change the power source. If power supply II fails, the controller switches the ATS to power supply I.

In automatic transfer without automatic recovery operating mode, the controller: When power supply I fails (overvoltage, undervoltage, overfrequency, phase loss, power outage, etc.) and power supply II is normal, the controller switches the ATS to power supply II.
Even if power supply I returns to normal or there is a power failure in power supply II, the ATS will not switch back to power supply I unless manual intervention is made.

Manual Transfer Control Function

For ATS with two operating positions (I-II): In manual operation mode, and when both power supplies are normal, pressing the " II " button will switch the ATS to power supply II, and pressing the "I" button will switch the ATS to power supply I.

For ATS with three operating positions (I-0-III): In manual operation mode, and when both power supplies are normal, when the ATS is in the double-off position, pressing the " II " button will switch the ATS to power supply II, and pressing the "I" button will switch the ATS to power supply I. When the ATS is in any off position, pressing the
" 0 " button will switch the ATS to the double-off position.

Fire Linkage Function

For controllers with fire linkage function, upon receiving a fire linkage signal, the controller immediately switches the ATS to the double-off position, thus cutting off the power supply to the load. Once the fire linkage signal is removed, the controller switches the ATS back to power supply I.
Note: This function is not available in ATS with two operating positions (I-II).

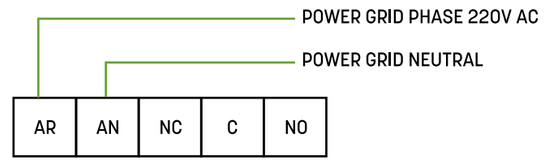
Fault Record Storage and History Query Function

For controllers with fault record and storage function, the controller will automatically record the fault information of the power supply and the controller itself and will automatically add a time tag to the relevant record before storing it. The recorded history can be queried via the RS485 communication interface. With the adoption of this storage mechanism in the controller, past events such as power failures or controller issues can be tracked and provide a reference for troubleshooting.

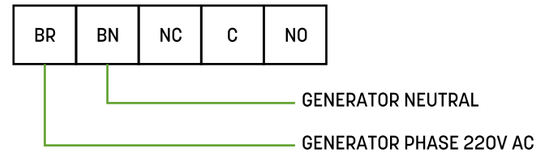
Data Communication Function

This ATS provides an optional set of half-duplex serial physical RS485 interfaces that support the Modbus communication protocol, which is widely used in industrial standards. This interface allows up to 247 nodes to be connected on the data bus.

Terminal Block Terminals for Automatic Operation Mode (XTS -F)

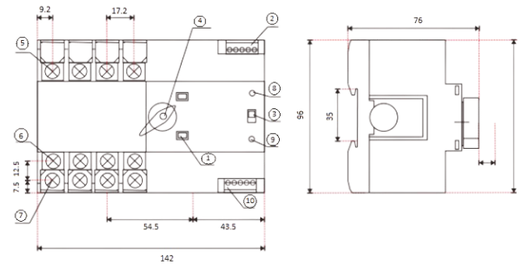


AR: Power Grid Phase 220V AC
AN: Power Power Grid Neutral

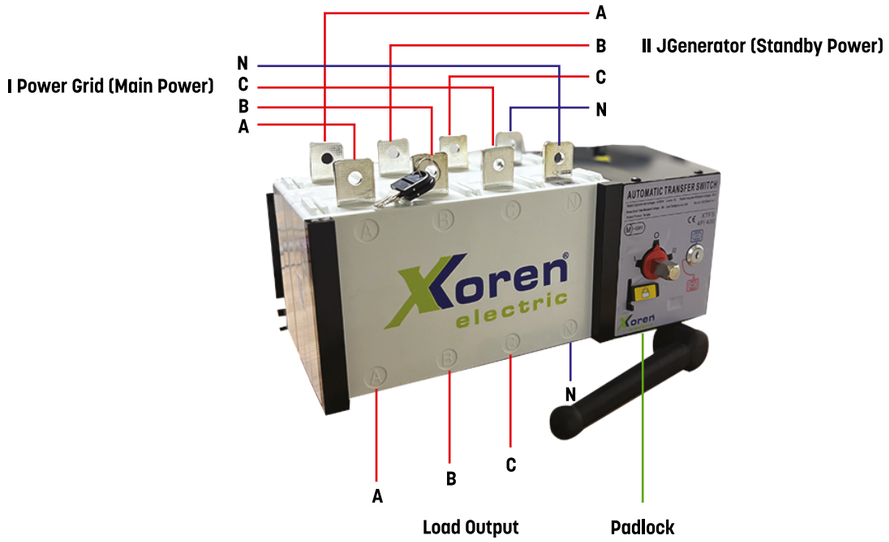


BR: Generator Phase 220V AC
BN: Generator Neutral

Technical Specifications

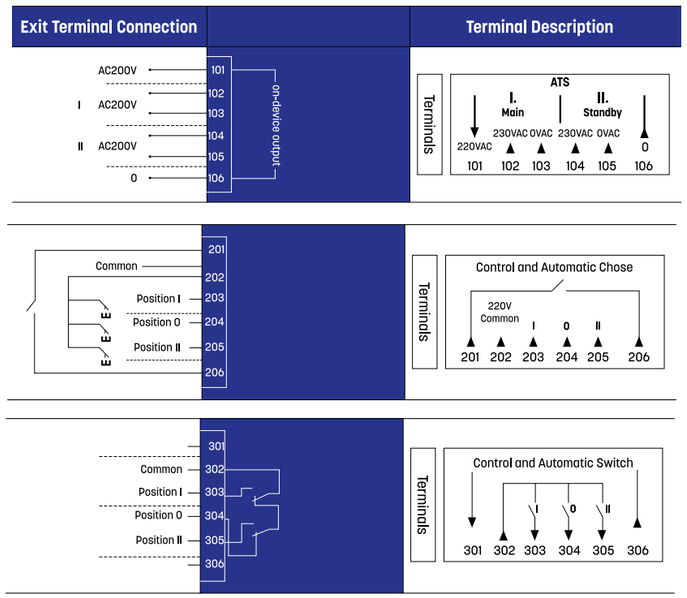


1-Operating position indicator
2-Mains connection terminals (AC220V)
3-Manual/Automatic transfer switch
4-Manual transfer lever
5-Mains power connection terminal
6-Generator power connection terminal
7-Load output terminal
8-Mains operation indicator
9-Generator operation indicator
10-Generator connection terminals (AC220V)



Pozisyon 0 : **Position 0**
Pozisyon 1 : **Position 1**
Pozisyon 2 : **Position 2**
Ortak Uç: **Common End**
Cihaz İç Çıkış: **Device Internal Output**

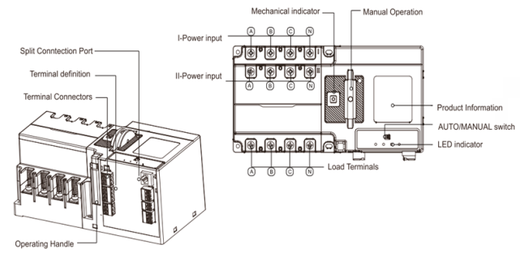
Terminal Connections



GENERAL PRODUCT CATALOG

AUTOMATIC TRANSFER SWITCH

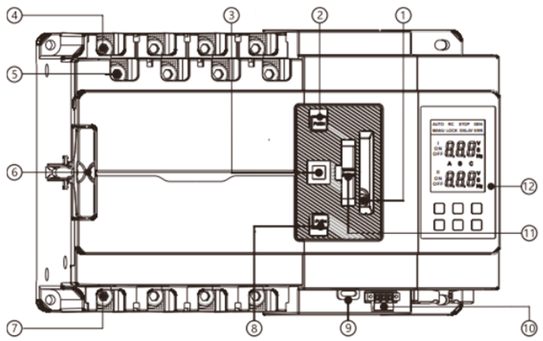
XTS-U



1.Discrete connection port
2.Terminal definition
3.Terminal connectors
4.Operating handle
5.I-power input
6.II-power input
7.Mechanical indicator
8.Manual operation
9.Load terminals
10. Product information
11. Auto/Manual switch
12.LED indicator

XTS-E

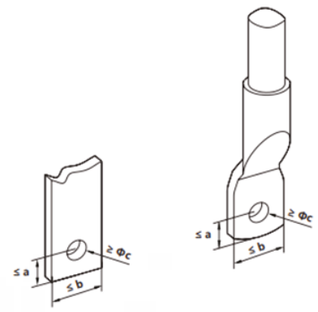
Integrated Type View



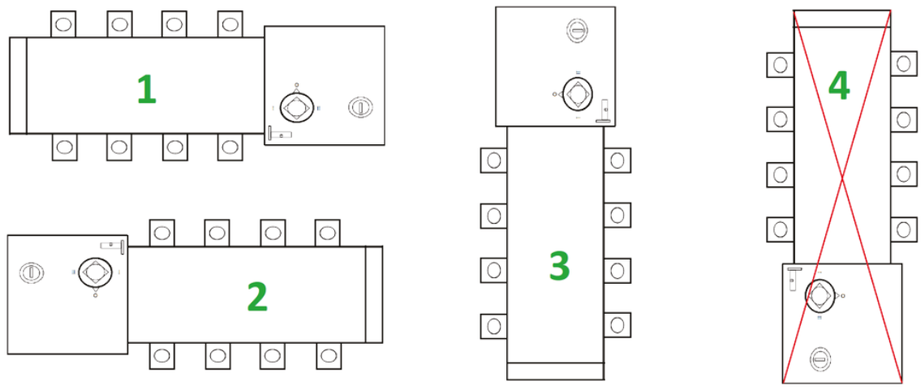
External LCD and Cable Set

1.Manual control area
2.Manual operation source II shutdown button
3.Mechanical indicator for ATS Open/Close status
4.Source I terminals
5.Source II terminals
6.Manual control lever
7.Load
8.Manual operation source I shutdown button
9.Mechanical lock hole
10. Neutral source for 3-phase ATS
11. Mechanical transfer switch
12. Control module

ATS Assembly Instructions



	a (mm)	b (mm)	c (mm)
63	6,5	14	5
100	7,5	17	8
225	11	22	8
400	11	30	12
630	13	44	12
800	12	45	12



Positions 1, 2, and 3 are the correct ways to use. Position 4 is incorrect.

Preparation and Inspection Before Use

Before installation, the ATS should be stored in a clean and dry environment to prevent exposure to dust or water. It is important that the environment is well-ventilated and at an appropriate temperature to prevent condensation on the equipment.

Before powering up the ATS:

1.Use a vacuum cleaner to remove any dirt accumulated during transportation and installation.
2.Verify that all cables are correctly connected to the copper bars.
3.Ensure that all arc separators are properly installed.

Faults	Cause of the malfunction	Troubleshooting Method
Controller power indicator light does not light up after power on	Abnormal power supply	1. Check whether the input power is normal 2. Check if the contact at the incoming line end is good 3. Check if the fuse is blown
Controller displays phase loss	Poor contact of the relevant phase cables The relevant phase voltage is lower than the set low voltage value.	Controller displays phase loss
After power on, the controller displays normally, but the key cannot be changed.	Controller is stopped	Place the toggle switch in the RUN position

GENERAL PRODUCT CATALOG

AUTOMATIC TRANSFER SWITCH

ORDER LIST

U Series

Automatic Transfer Switch (U Series A Type)



Type (Order) Code	Rated Current (In)	Explanation	Box Quantity	Carton Quantity
XTS U4-0125-A	125A	U Series 4P 125A A Type	1	6
XTS U4-0160-A	160A	U Series 4P 160A A Type	1	4
XTS U4-0250-A	250A	U Series 4P 250A A Type	1	2
XTS U4-0400-A	400A	U Series 4P 400A A Type	1	1
XTS U4-0630-A	630A	U Series 4P 630A A Type	1	1

Automatic Transfer Switch (U Series B Type)



Type (Order) Code	Rated Current (In)	Explanation	Box Quantity	Carton Quantity
XTS U4-0125-B	125A	U Series 4P 125A B Type	1	6
XTS U4-0160-B	160A	U Series 4P 160A B Type	1	4
XTS U4-0250-B	250A	U Series 4P 250A B Type	1	2
XTS U4-0400-B	400A	U Series 4P 400A B Type	1	1
XTS U4-0630-B	630A	U Series 4P 630A B Type	1	1

Automatic Transfer Switch (E Series)



Type (Order) Code	Rated Current (In)	Explanation	Box Quantity	Carton Quantity
XTS E4-0125	125A	E Series 4P 125A	1	6
XTS E4-0160	160A	E Series 4P 160A	1	4
XTS E4-0250	250A	E Series 4P 250A	1	2
XTS E4-0400	400A	E Series 4P 400A	1	1
XTS E4-0630	630A	E Series 4P 630A	1	1

Automatic Transfer Switch (F Series)



Type (Order) Code	Rated Current (In)	Explanation	Box Quantity	Carton Quantity
XTS F4-063	63A	F Series 4P 63A	1	12
XTS F4-100	100A	F Series 4P 100A	1	12
XTS F4-125	125A	F Series 4P 160A	1	12

Automatic Transfer Switch



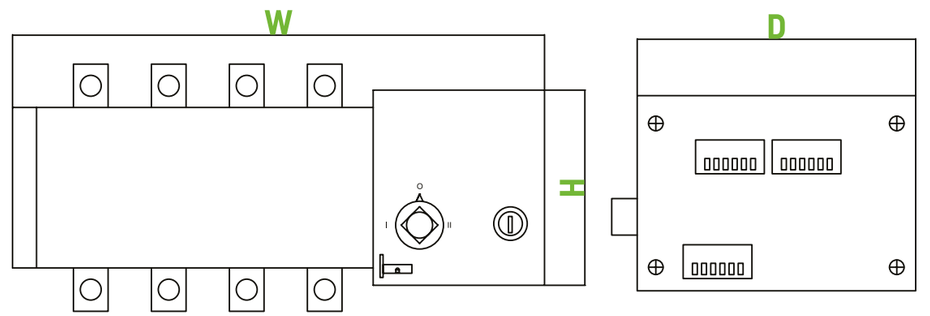
Type (Order) Code	Rated Current (In)	Explanation	Box Quantity	Carton Quantity
XTS 4-0100	100A	4P 100A	1	6
XTS 4-0160	160A	4P 160A	1	4
XTS 4-0250	250A	4P 250A	1	2
XTS 4-0400	400A	4P 400A	1	1
XTS 4-0630	630A	4P 630A	1	1
XTS 4-0800	800A	4P 800A	1	1
XTS 4-1000	1000A	4P 1000A	1	1
XTS 4-1250	1250A	4P 1250A	1	1
XTS 4-1600	1600A	4P 1600A	1	1
XTS 4-2000	2000A	4P 2000A	1	1
XTS 4-2500	2500A	4P 2500A	1	1
XTS 4-3200	3200A	4P 3200A	1	1

GENERAL PRODUCT CATALOG

AUTOMATIC TRANSFER SWITCH

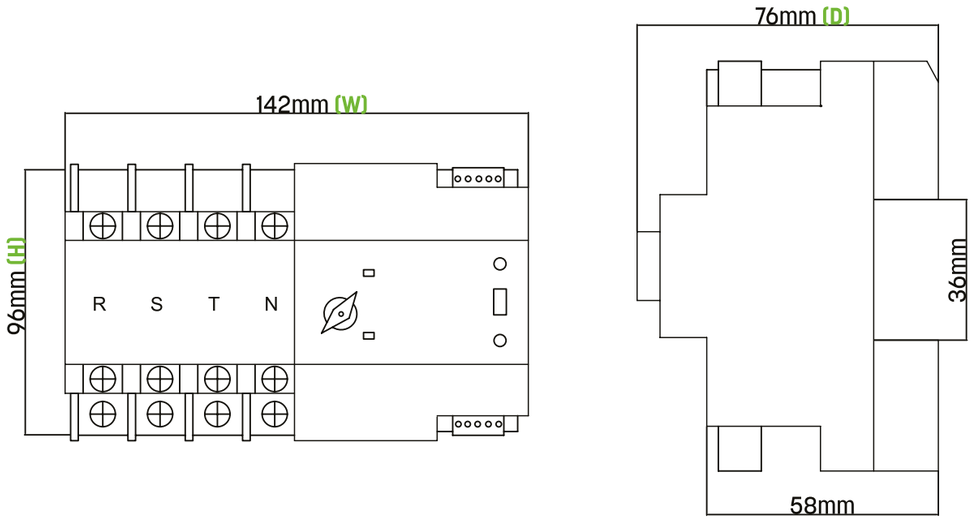
DIMENSIONS

XTS Series



XTS	External Dimensions(mm) H*W*D		
In (A)	Height	Width	Depth
100	120	245	140
160	150	300	200
250	180	360	210
400,630	270	440	270
800,1000,1250,1600	330	630	340
2000,2500,3200	460	800	542

XTS - F Series

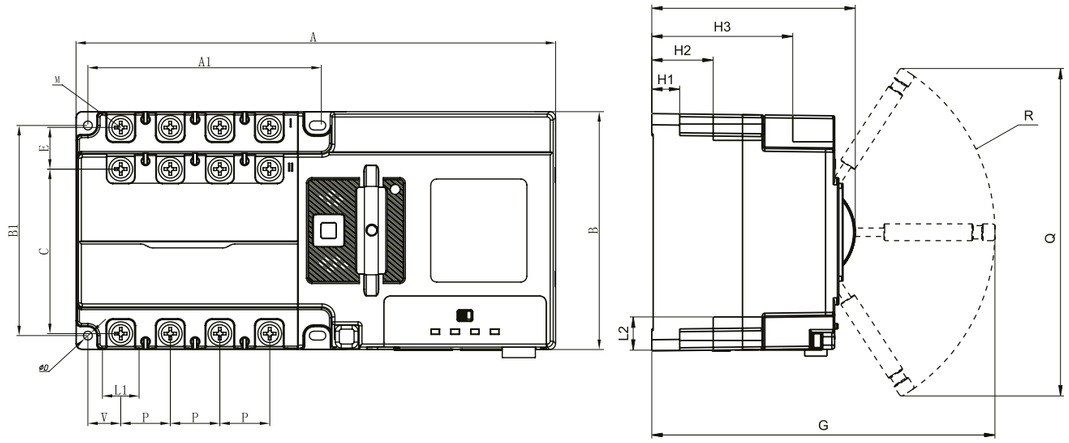


XTS-f	External Dimensions(mm) H*W*D		
In (A)	Height	Width	Depth
63,100,125	96	142	76

GENERAL PRODUCT CATALOG

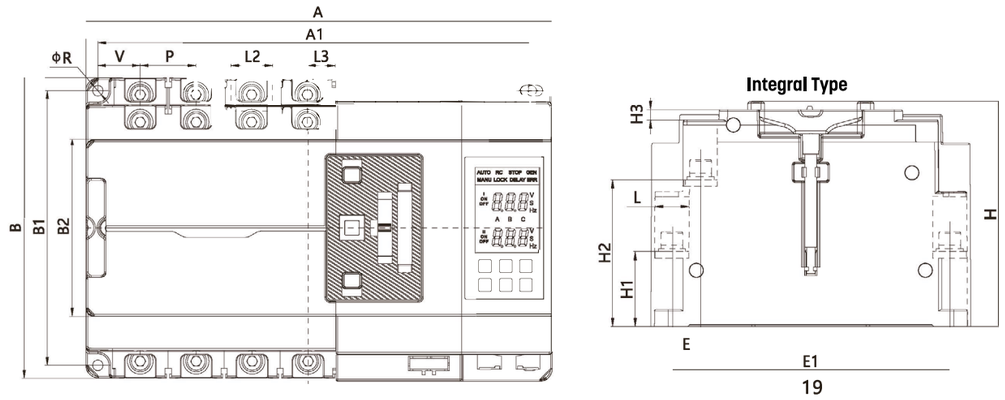
AUTOMATIC TRANSFER SWITCH

XTS - U Series



XTS-U	External Dimensions (mm)			Mounting Dimensions (mm)													Operating Area (mm)		
In	A	B	H	A1	B1	H1	H2	H3	L1	L2	C	E	V	P	D	M	G	R	Q
125A	242	120	115	116	106	15,50	33	82.2	18,50	19	83	21	16,60	25	04,5	M6	196	106	194
250A	315	170	146	298,5	155	20,00	44	101	26,00	24	121	25	22,00	35	06,5	M8	246	137	235
400/ 630A	475	230	202	444,5	203	16,50	62	130	48,00	32,6	173	27	45,5	58	08,5	M10	305	163	240

XTS - E Series



XTS-E	External Dimensions (mm)						Mounting Dimensions (mm)											
Ith	Pole	A	B	H	B2	H3	A1	B1	H1	H2	E1	E	R	V	P	L	L2	L3
125A	4P	238	140A	115	75	5	220	125	34,00	68.5	124,00	15,50	4,50	20,50	25,00	17,50	18,00	12,50
250A	4P	292	190	132	109	6	270	170	44,00	86,00	165,00	17,00	6,50	26,50	35,00	20,00	26,00	17,50
400A/ 630	4P	375	285	195	140	12	345	252	56,00	106,00	250,00	27,00	11,00	40,00	45,00	33,00	37,00	21,5

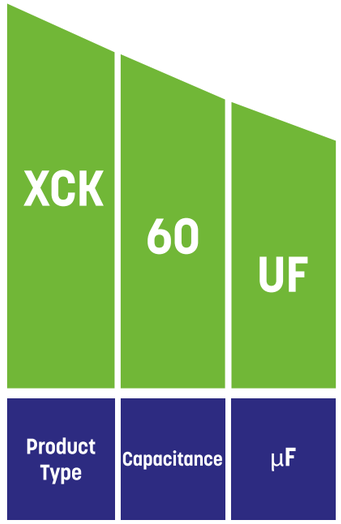
VALID FOR ALL OUR PRODUCTS
2 YEARS WARRANTY

KONDANSATÖRLER

X Koren Electric capacitors provide effective and reliable power factor correction. They consist of a series of windings made from metallized polypropylene film dielectrics. To ensure excellent electrical performance, they undergo processing under vacuum and are encapsulated in heat-cured resin to guarantee sealing. The capacitors are housed within a steel enclosure and are used to supply single-phase or three-phase power at the required voltage and frequency. X Koren Electric power, motor-fan, and air conditioning capacitors are primarily utilized in industrial applications for compensation solutions.



Product Code and Label Information





GENERAL PRODUCT CATALOG

CAPACITORS

XCM-XCT Power Capacitors



Power Capacitors			XCM	XCT
Number of Poles			Single-phase	three-phase
Rated Operational Voltage	Ue	VAC	230V / 400V	
Rated Insulation Voltage	Ui	V	500	
Overvoltage		V	1*1Ue	
Rated Current	In	A	1.1....21.7	0.7....46.3
Rated Capacitance		kVar	0.25....5	0.5.... 50
Overcurrent		A	1.3*In	
Discharge Characteristtics			≤50V, 3 mn.	
Voltage Limit Between Electrodes			2.15Ue / 2s	
Voltage Limit Between Electrode Grids			3kV(AC) in 10 seconds & 3.6 kV(AC) in 2 seconds	
Standards			IEC EN 60831-1/2	
Power Factor		%	≤0.15	
Capacitor Tolerance		%	-5....+10	
Humidity		%	95	
Operating Temperature Range		°C	-25....+65	
Operating Life		hours	100.000	
Mounting Position			Vertical - Horizontal	
Mixmum Terminal Tightening Torque		Nm	6	
Altitude		m	≤2000	
Frame			Aluminum	
Absorption			Resin Protection Without PCB	
Protection Feature			Dry Type,Overpressure,Switching,Self-Healing	

	XKOREN Code	Cn / (µF)	In (A)	230V(kVAr)	250V(kVAr)	280V(kVAr)
SINGLE-PHASE	XCM-0.25	15.1 µF	1.1A	0,25	0,3	0,37
	XCM-0.5	30.1 µF	2.2A	0,5	0,59	0,74
	XCM-1	60.2 µF	4.3A	1	1,18	1,48
	XCM-1.5	90.3 µF	6.5A	1,5	1,7	2,22
	XCM-2.5	151.5 µF	10.9A	2,5	2,95	3,71
	XCM-5	301 µF	21.7A	5	5,91	7,41
	XKOREN Code	Cn / (µF)	In (A)	400V(kVAr)	415V(kVAr)	440V(kVAr)
THREE-PHASE	XCT-0.5	10 µF	0,7	0,5	0,54	0,61
	XCT-1.0	19.9 µF	1,4	1	1,08	1,21
	XCT-1.5	29.9 µF	2,2	1,5	1,62	1,82
	XCT-2.5	49.8 µF	3,6	2,5	2,69	3,03
	XCT-5	99.5 µF	7,2	5	5,38	6,05
	XCT-7.5	149.3 µF	10,8	7,5	8,07	9,08
	XCT-10	199 µF	14,4	10	10,76	12,1
	XCT-12.5	248.8 µF	18	12,5	13,45	15,12
	XCT-15	298.6 µF	21,7	15	16,15	18,15
	XCT-20	398.1 µF	28,9	20	21,53	24,2
	XCT-25	497.6 µF	36,1	25	26,91	30,25
	XCT-30	597.1 µF	43,3	30	32,29	36,3
	XCT-40	796.2 µF	57,7	40	43,06	48,4
	XCT-50	995.2 µF	72,2	50	53,82	60,5

XCAM Motor Capacitors



Motor Capacitors				XCAM
Rated Operational Voltage		Ue	VAC	400/450
Capacitance Range		Qn	µF	1-100
Capacitor Tolerance			%	±5, ±10
Voltage Test	Between Terminals (T-T)			2.15*Ue, 10s
	Between Terminals and Container			2kV (AC), 2s
Standarts				IEC EN 60252-1
Insulation Resistance				≥3000MΩ.µF
Dissipation Factor		Tanδ		≥0.002
Climate Category				25/70/21
Operating Temperature			°C	-25 to +70
Operating Life	400V Class B		hours	10.000
	450V Class C			3.000
Altitude			m	≤2000

XCF Fan Capacitors



Fan Capacitors				XCF
Rated Operational Voltage		Ue	VAC	450
Capacitance Range		Qn	µF	1-40
Capacitor Tolerance			%	±5, ±10
Voltage Test	Between Terminals (T-T)			2*Ue, 10s
	Between Terminals and Container			2kV (AC), 10s
Standarts				IEC EN 60252
Insulation Resistance				≥2000MΩ.µF
Dissipation Factor		Tanδ		≥0.002
Climate Category				25/70/21
Operating Temperature			°C	-25....+70
Operating Life	400V Class B		hours	S0
	450V Class C			10.000
Altitude			m	≤2000

XCK Air Conditioner Capacitors

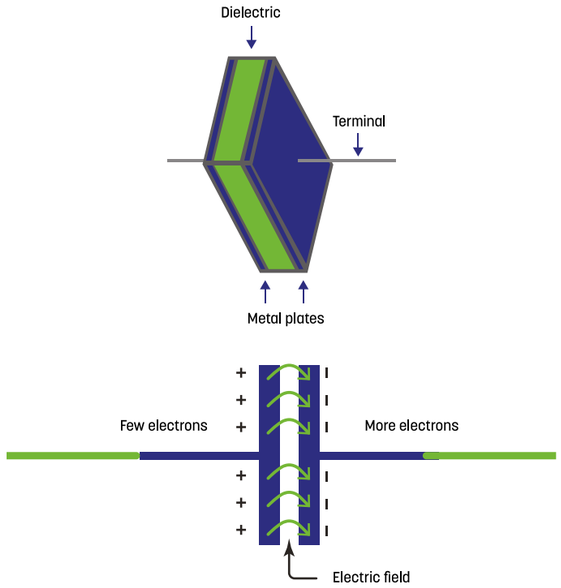


Air Conditioner Capacitors				XCK
Rated Operational Voltage		Ue	VAC	400
Capacitance Range		Qn	µF	3-100
Capacitor Tolerance			%	±5, ±10
Voltage Test	Between Terminals (T-T)			2.15*Ue, 2s
	Between Terminals and Container			2kV (AC), 2s
Standarts				IEC EN 60252
Insulation Resistance				≥2000MΩ.µF
Dissipation Factor		Tanδ		≥0.002
Climate Category				25/70/21
Operating Temperature			°C	-25....+70
Operating Life	400V Class B		hours	S1,S2
	450V Class C			10.000
Altitude			m	≤2000

General Information



XKoren capacitors are used in inductive character operations such as electrical motors, transformers, and similar devices to meet the reactive power demand and maintain it within desired values. By utilizing compensation elements like reactive power control relays and contactors, capacitors fulfill the capacitive demand of the operation, ensuring that reactive values stay below the desired thresholds. As a result of this process, transmission and distribution lines are not unnecessarily overloaded, reducing losses. Capacitors, made of dielectric material between metal plates, work by the flow of electrons in the electric field.



LOW-VOLTAGE POWER CAPACITOR

General Features and Applications

The product is designed to be mounted securely from the bottom and can be installed in both vertical and horizontal positions. The mounting screw can also be used as a grounding connection; however, the tightening torque **must not exceed 6 Nm.**

Using **XKoren capacitors** helps reduce unit costs and makes maintenance operations easier.

However:

- **Overvoltage** and **overheating** shorten the capacitor's service life.
- In **high-altitude regions,** capacitors with a higher rated voltage than the network voltage should be selected.
- After disconnecting the capacitor from the power supply, it **must be discharged by short-circuiting** before any touching or testing operation is performed.

Capacitor Power Calculation

To determine the required capacitor **power (Qc)** in a facility, the existing power factor ($\cos\varphi$) and the installed **active power** (P) must be known.

If the consumed **active energy and reactive energy** are known, the power factor angle can be calculated as:

$\tan\varphi$=Reactive energy consumed /Active energy consumed

The **installed active power i**s obtained by summing the rated powers indicated on the nameplates of all loads in the facility (motors, lighting fixtures, heaters, etc.).

Example Calculation

- Installed active power: **P = 65 kW**
- Existing power factor: **cosφ_1 = 0.7**
- Target power factor: **cosφ_2 = 0.95**

Step 1: Find the angles and tanφ values

- $\cos\varphi_1 = 0{,}7 \rightarrow \varphi_1 = 45{,}5° \rightarrow \tan\varphi_1 = 1{,}017$
- $\cos\varphi_2 = 0{,}95 \rightarrow \varphi_2 = 18{,}2° \rightarrow \tan\varphi_2 = 0{,}328$

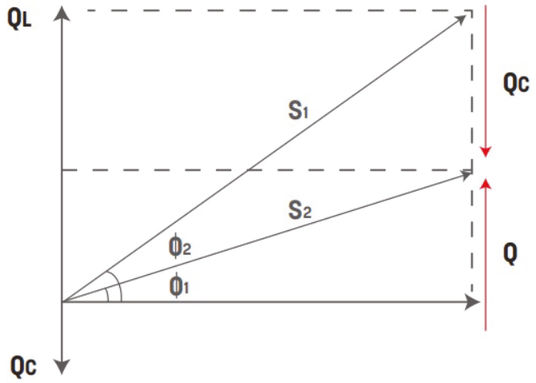
Step 2: Calculate the required capacitor power

- $Qc=P\times(\tan\varphi1-\tan\varphi2)$
- $Qc=65\times(1{,}017-0{,}328)=44{,}8$ kVAr

Thus, to improve the power factor from 0.7 to 0.95, a capacitive power of 44.8 kVAr is required.

Thus, to improve the power factor from 0.7 to 0.95, a capacitive power of 44.8 kVAr is required.

Phase Diagram



1-Phase, 230V Cylindrical (Tube) Low Voltage Power Capacitors



Operating Conditions

- **Rated voltage:** 230V / 400VAC
- **Operating tolerance:** Can operate up to **110% of rated voltage and 130% of rated current.**
- **Insulation resistance:**≥100 MΩ when tested with 500VDC.
- **Short-term voltage withstand: 3 kV AC / 10s and 3.6kV AC / 2s.**
- **Automatic discharge:** Voltage drops below **50V within 3minutes** after power is disconnected.

Technical Specifications

- **Capacitance range: 0.25-5kVAr for single-phase and 0.5-60.5kVAr for three-phase (below 440V)**
- **Capacitance tolerance: -5% to +10%**
- **Loss angle tangent (tan δ): Max. 0.15%** (high efficiency)
- **Dielectric withstand voltage between terminals:** Provides high insulation safety
- **Fast discharge capability:** Enables **safe and quick maintenance**

Safety Features

- **Self-healing technology** for extended lifetime
- **Pressure-sensitive disconnector** in all phases
- Equipped with **non-removable discharge resistors**

Easy Installation and Maintenance

- **Optimized design** for safety, reliability, and required performance
- **Compact dimensions** allow easy installation and up to 20% space saving inside enclosures
- **Built-in discharge resistors** for safety, inaccessible to external contact
- **Single-point stud connection** for both mounting and grounding
- At end of life, **all phases are disconnected simultaneously and safely**
- **Stacked design with resin filling technology** for better heat dissipation and cooling

Advantages

- **Easy installation**
- **High reliability** and safe operation
- **Quality assurance** for long-term performance
- **Easy selection** for building solutions with **XKoren components**

MOTOR CAPACİTOR



XKoren motor capacitors are compact and reliable components used in single-phase asynchronous motors to enhance performance. They are permanently connected to the auxiliary winding, creating the required phase shift during startup to increase starting torque. During operation, they provide reactive power compensation and power factor correction, supporting the efficient functioning of the motor.

Technical Specifications

- Rated Voltage (Ue): 400/450 VAC
- Capacitance Range (Qn): 1 –100 µF
- Capacitance Tolerance: ±5%, ±10%
- Voltage Withstand (T-T): 2.15 × Ue for 10 seconds
- Voltage Withstand (T-Case): 2 kV AC for 2 seconds
- Insulation Resistance (T-T): ≥3000 MΩ·µF
- Dissipation Factor (Tan δ): ≤ 0.002
- Climatic Category: 25/70/21
- Service Life (400V - Class B): 10,000 hours
- Service Life (450V - Class C): 3,000 hours

Advantages

- Self-Healing Technology: The metallized dielectric structure isolates internal micro-failures, enhancing safety and extending product life.
- Compact Design: Space-saving, ideal for installations with limited space.
- High Power Factor Improvement: Reduces reactive power losses and enhances energy efficiency.
- No External Switching Required: Eliminates the need for separate starting relays or switches.
- High Durability and Reliability: Complies with IEC 60252-1, suitable for high-temperature and industrial environments.

Application Areas

- Single-phase asynchronous motors in residential and industrial applications
- Compressors, fans, and water pumps
- HVAC systems (Heating, Ventilation, Air Conditioning)
- Power tools and portable electric machines
- Reactive power compensation systems

AIR CONDITIONER CAPACITOR



XKoren air conditioner capacitors are high-efficiency energy storage components designed to optimize motor startup and continuous operation performance in HVAC systems. They respond to high-voltage power demands by regulating the power flow of compressor and fan motors, ensuring efficient operation and extending service life.

By storing and releasing electrical energy when required, the capacitor creates a phase shift in motor windings, increasing the starting torque. As a result, air conditioning systems operate faster, more efficiently, and more stably.

XKoren AC capacitors feature high voltage endurance, self-healing technology, and a long-life design compliant with IEC EN 60252 standards.

Operating Principle

- During startup: The capacitor boosts the initial torque, enabling quick engagement of the compressor and fan motors.
- During continuous operation: It stabilizes energy fluctuations, ensures smooth motor operation, and improves the power factor, enhancing energy efficiency.
- Self-Healing: Metallized polypropylene dielectric isolates any potential micro-failures, extending the capacitor's lifespan.

Technical Specifications

- Rated voltage: 400V / 450V AC
- Capacitance range: 3–100µF
- Capacitance tolerance: ±5%, ±10%
- Voltage withstand:
  - Between terminals (T-T): 2.15 × Ue for 2s
  - Between terminal and case: 2kV AC for 2s
- Insulation resistance: ≥2000MΩ·µF
- Dissipation factor (tanδ): ≤0.002
- Climatic category: 25/70/21
- Operating temperature range: -25°C to +70°C
- Service life:
  - 400V – Class B: S1, S2
  - 450V – Class C: 10,000 hours

Advantages

- Improved motor startup performance: Provides extra power during initial motor engagement.
- Enhanced energy efficiency: Improves power factor and prevents unnecessary energy losses.
- Self-Healing technology: Isolates internal micro-damages for longer service life.
- Thermal durability: Operates reliably within -25°C to +70°C.
- High safety level: Complies with IEC EN 60252, featuring high insulation resistance and low dissipation factor.

Application Areas

- Split-type and central air conditioning systems
- Compressor motors
- Fan motors and blower systems
- HVAC systems (Heating, Ventilation, Air Conditioning)
- Cooling and refrigeration units

Air Conditioner Capacitor Selection Criteria

- Rated voltage: Select 400V or 450V according to system requirements.
- Capacitance (µF) value: Must match the value recommended by the AC manufacturer. Incorrect values can cause motor overheating.
- Connection type: Screw or cable terminals should be selected according to installation requirements.

FAN CAPACITOR



XKoren XCF fan capacitors are designed to support the initial startup of AC motors and enhance continuous operation performance. They are widely used in propeller fan systems, air conditioning units, and all equipment containing AC motors.

By adjusting the phase shift between motor windings, they increase the starting torque and improve the power factor during operation, optimizing energy efficiency. The XCF series fan capacitors provide reliable solutions with high voltage endurance, long service life, and self-healing technology.

Operating Principle

•During startup: The capacitor supplies the required torque for the motor's initial movement.
•During continuous operation: It stabilizes energy flow, ensuring vibration-free and efficient performance.
•Self-healing technology: Metallized polypropylene dielectric isolates possible micro-damages, extending capacitor life.

Technical Specifications

•Rated voltage: 450V AC
•Capacitance range: 1-40µF
•Capacitance tolerance: ±5%, ±10%
•Voltage withstand:
  Between terminals (T-T): 2×Ue, 10s
  Between terminal and case: 2kV AC, 10s
•Insulation resistance: ≥2000MΩ·µF
•Dissipation factor (tanδ): ≤0.002
•Climatic category: 25/70/21
•Operating temperature range: -25°C to +70°C
•Service life:
  400V Class B → S0
  450V Class C → 10,000 hours

Advantages

•Supports motor startup: Provides necessary torque for initial movement.
•Improves energy efficiency: Corrects the power factor and optimizes energy consumption.
•Long-lasting and reliable: Self-healing technology ensures high durability.
•Operational stability: Prevents vibration and current fluctuations for smooth motor operation.
•Compact design: Facilitates easy installation in confined spaces.
•High safety compliance: Meets IEC EN 60252 standards.

Application Areas

•Propeller-type fan systems
•Air conditioning and cooling systems
•Ventilation units and blower systems
•All devices with AC motors
•Industrial fans and exhaust systems

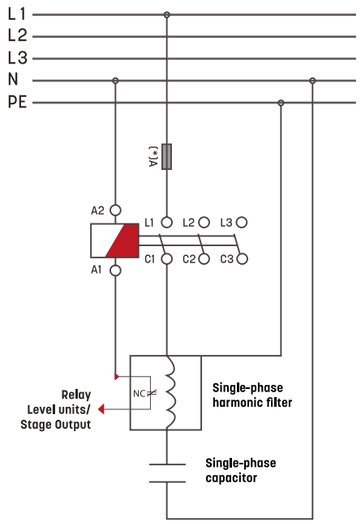
Fan Capacitor Selection Criteria
•Rated voltage: Select models suitable for 450V AC operation.
•Capacitance (µF) value: Must match the motor's requirement; incorrect values may cause inefficient operation and overheating.
•Connection type: Screw-type or cable connection models should be chosen based on installation needs.
•Operating temperature: Provides reliable performance between -25°C and +70°C.
Incorrect selection may lead to excessive current draw, overheating, and shortened motor lifespan.

GENERAL PRODUCT CATALOG

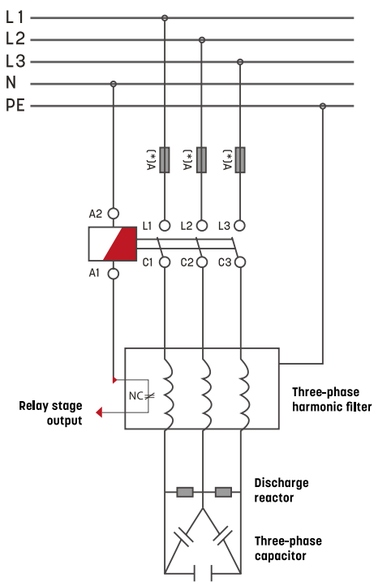
CAPACITORS

Wiring Diagram

(230V)/ Single-Phase Capacitors (230V)



Three-phase capacitors (400/440 V)



ORDER LIST

LV Power Capacitors

230V Single-Phase Capacitor

Type (Order) Code	230V (kVAR)	400V (kVAR)	Dimensions (mm)	Capacitance (µF)	Consumed Power (A)	Box Quantity	Carton Quantity
XCM-0.25	0,25	0,76	45*65	15.1 µF	1.1A	1	50
XCM-0.5	0,5	1,51	45*65	30.1 µF	2.2A	1	50
XCM-1	1	3,02	45*85	60.2µF	4.3A	1	50
XCM-1.5	1,5	4,54	50*105	90.3 µF	6.5A	1	50
XCM-2.5	2,5	7,56	55*130	151.5 µF	10.9A	1	50
XCM-5	5	15,12	76*240	301 µF	21.7A	1	6

400V Three-Phase Capacitor

Type (Order) Code	230V (kVAR)	400V (kVAR)	Dimensions (mm)	Capacitance (µF)	Consumed Power (A)	Box Quantity	Carton Quantity
XCT-0.5	0,5	0,61	50*105	10 µF	0,7	1	50
XCT-1.0	1	1,21	50*105	19.9 µF	1,4	1	50
XCT-1.5	1,5	1,82	50*125	29.9 µF	2,2	1	50
XCT-2.5	2,5	3,03	76*175	49.8µF	3,6	1	6
XCT-5	5	6,05	76*175	99.5 µF	7,2	1	6
XCT-7.5	7,5	9,08	76*240	149 .3µF	10,8	1	6
XCT-10	10	12,1	76*240	199 µF	14,4	1	6
XCT-12.5	12,5	15,12	96*240	248.8µF	18	1	6
XCT-15	15	18,15	96*240	298.6 µF	21,7	1	6
XCT-20	20	24,2	106*240	398.1 µF	28,9	1	6
XCT-25	25	30,25	116*240	497.6 µF	36,1	1	6
XCT-30	30	36,3	116*290	597.1µF	43,3	1	6
XCT-40	40	48,4	136*290	796.2 µF	57,7	1	6
XCT-50	50	60,5	136*290	995.2 µF	72,2	1	6



PERMANENT CIRCUIT MOTOR CAPACITORS

400-450V Motor - Fan Capacitors

Type (Order) Code	Capacitance (µF)	Dimensions (mm)	Box Quantity	Carton Quantity
XCF-1.5M UF	1.5 µF	37*13*23	1	1000
XCF-2.5M UF	2.5 µF	38*15*25	1	1000
XCAM-3S UF	3 µF	30*50	1	100
XCAM-4S UF	4 µF	30*50	1	100
XCAM-6S UF	6 µF	30*50	1	100
XCAM-8S UF	8 µF	30*50	1	100
XCAM-10S UF	10 µF	30*50	1	100
XCAM-12S UF	12 µF	30*50	1	100
XCAM-8L UF	8 µF	30*50	1	100
XCAM-10L UF	10 µF	30*50	1	100
XCAM-16L UF	16 µF	40*70	1	100
XCAM-20L UF	20 µF	40*70	1	100
XCAM-25L UF	25 µF	40*70	1	100
XCAM-35L UF	35 µF	45*93	1	100
XCAM-40L UF	40 µF	45*93	1	100
XCAM-45L UF	45 µF	50*92	1	100
XCAM-50L UF	50 µF	50*92	1	100
XCAM-60L UF	60 µF	50*100	1	100
XCAM-70L UF	70 µF	50*120	1	100
XCAM-80L UF	80 µF	55*120	1	50
XCAM-90L UF	90 µF	55*120	1	50
XCAM-100L UF	100 µF	55*120	1	50



Air Conditioner Capacitors

4+4 Pin Air Conditioner Capacitor

Type (Order) Code	Capacitance (µF)	Dimensions (mm)	Box Quantity	Carton Quantity
XCK-30UF	30 µF	50*85	1	50
XCK-35UF	35 µF	50*85	1	50
XCK-50UF	50 µF	50*100	1	50
XCK-55UF	55 µF	50*100	1	50
XCK-60UF	60 µF	50*110	1	50

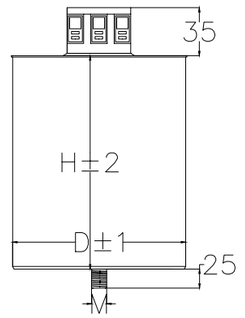
2+3+4 Pin Air Conditioning Capacitor

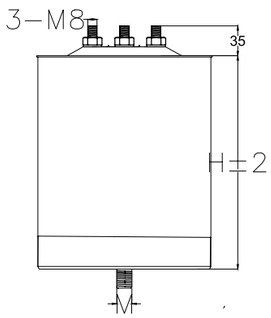
Type (Order) Code	Capacitance (µF)	Dimensions (mm)	Box Quantity	Carton Quantity
XCK-30+5 UF	30+5 µF	50*100	1	50
XCK-35+5 UF	35+5 µF	50*100	1	50
XCK-50+5 UF	50+5 µF	50*125	1	50
XCK-55+5 UF	55+5 µF	50*125	1	50
XCK-60+5 UF	60+5 µF	50*130	1	50

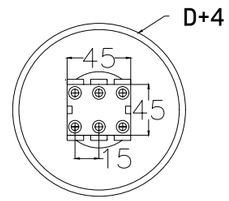


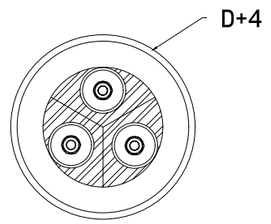
DIMENSIONS

Power Capacitors









Single-phase, 230V, Cylindrical (Tube) LV Power Capacitors

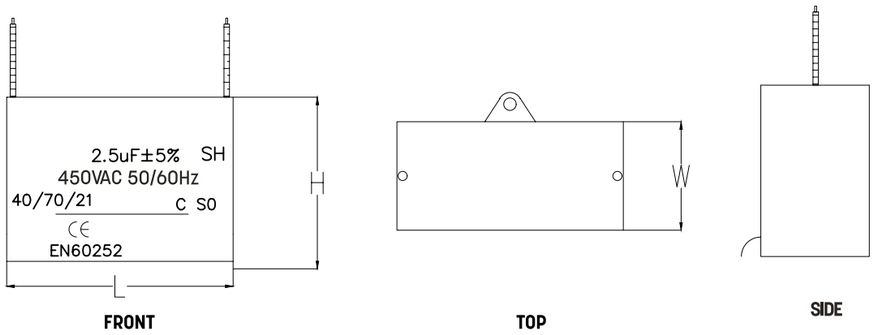
PRODUCT CODE	POWER(KVAR)	RATED VOLTAGE(V)	DIMENSIONS (DXHMM)
XCM-0.25	0.25	230	45*65
XCM-0.5	0.5	230	45*65
XCM-1	1	230	45*85
XCM-1.5	1.5	230	50*100
XCM-2.5	2.5	230	50*130
XCM-5	5	230	76*240

CAPACITORS

3-Phase, 400V Cylindrical (Tube) AC Power Capacitors

PRODUCT CODE	POWER(KVAR)	RATED VOLTAGE(V)	DIMENSIONS (DXHMM)
XCT-0.5	0.50	400	50*105
XCT-1	1	400	50*105
XCT-1.5	1.5	400	50*125
XCT-2.5	2.5	400	76*175
XCT-5	5	400	76*175
XCT-7.5	7.5	400	76*240
XCT-10	10	400	76*240
XCT-12.5	12.5	400	96*240
XCT-15	15	400	96*240
XCT-20	20	400	116*240
XCT-25	25	400	116*240
XCT-30	30	400	116*290
XCT-40	40	400	136*290
XCT-50	50	400	136*290

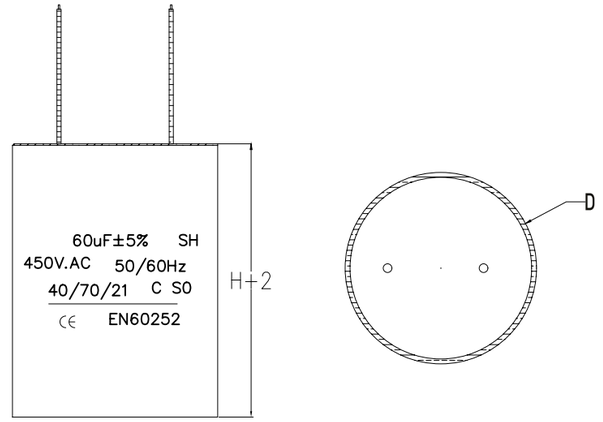
Fan Capacitors



	Dimensions (HxD mm)
XCF-1.5M UF	37*13*23
XCF-2.5M UF	37*15*25

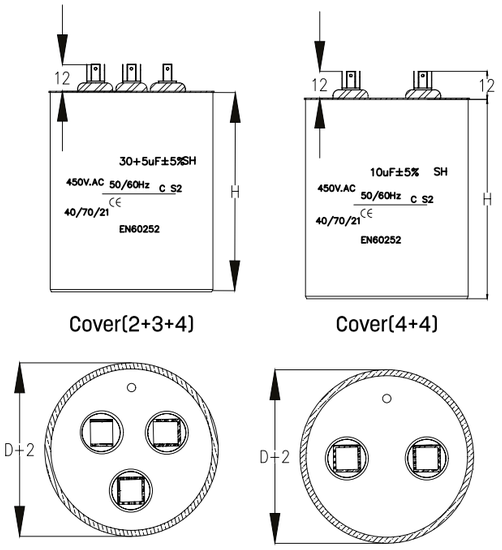
CAPACITORS

Motor Capacitors



	Boyut (H*D mm)
XCAM-3S UF	30*50
XCAM-4S UF	30*50
XCAM-6S UF	30*50
XCAM-8S UF	30*50
XCAM-10S UF	30*50
XCAM-12S UF	30*50
XCAM-8L UF	30*50
XCAM-10L UF	30*50
XCAM-16L UF	40*70
XCAM-20L UF	40*70
XCAM-25L UF	40*70
XCAM-35L UF	45*93
XCAM-40L UF	45*93
XCAM-45L UF	50*92
XCAM-50L UF	50*92
XCAM-60L UF	50*100
XCAM-70L UF	50*120
XCAM-80L UF	55*120
XCAM-90L UF	55*120
XCAM-100L UF	55*120

Air Conditioner Capacitor



4+4 Pin Air Conditioner Capacitor

	Dimensions (H*D mm)
XCK-30 UF	50*85
XCK-35 UF	50*85
XCK-50 UF	50*100
XCK-55 UF	50*100
XCK-60 UF	50*110

2+3+4 Pin Air Conditioner Capacitor

	Dimensions (H*D mm)
XCK-30+5 UF	50*100
XCK-35+5 UF	50*100
XCK-50+5 UF	50*125
XCK-55+5 UF	50*125
XCK-60+5 UF	50*130

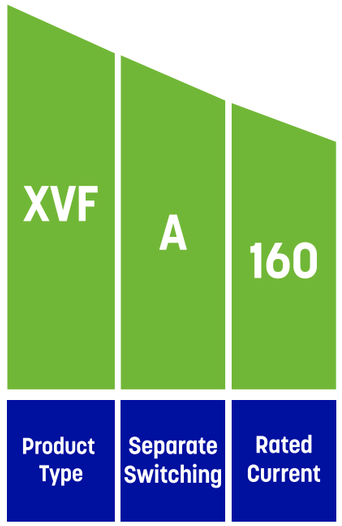
VALID FOR ALL OUR PRODUCTS
2 YEARS WARRANTY

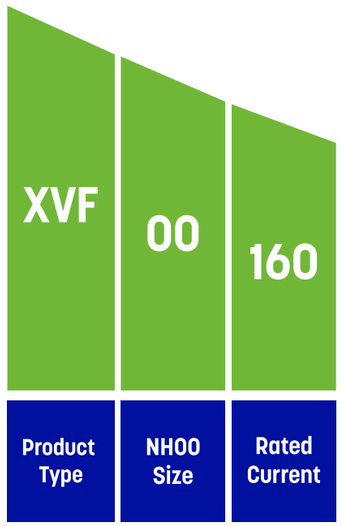
FUSE DISCONNECTORS & NH FUSES

Load disconnectors used together with circuit breakers enable the safe opening of unloaded circuits after the line current is interrupted and allow maintenance work to be performed safely on faulty systems. Available in Vertical and Horizontal types, these disconnectors combined with NH fuses provide protection against overload currents and short circuits. They offer high-performance solutions for various sectors such as industrial systems, energy distribution companies, power plants, and energy facilities.



Product Code and Label Information





GENERAL PRODUCT CATALOG

FUSE DISCONNECTORS

Vertical Type Fuse Disconnectors



VERTICAL TYPE FUSE DISCONNECTORS			XVF			
			XVF-160	XVF-250	XVF-400	XVF-630
Number of Poles		P	3			
Rated Operational Voltage	Ue	VAC	400			
Rated Insulation Voltage	Ui	V	1000			
Rated Impulse Withstand Voltage	Uimp	kV	8			
Operating Frequency		Hz	50/60			
Rated Current	Ie	A	160	250	400	630
Rated Thermal Current	Ith	A	160	250	400	630
Rated Short-Circuit Breaking Capacity	Icm	kA	85			
Max. Power Loss For Fuse Connection	Pv	W	12			
Electrical Life		op.	200			
Mechanical Life		op.	1400			
Standards			IEC EN 60269-1			
Separately Opened	A		✓			
Separately Opened Side Outlet	AY		-	✓	-	
3 Phase Opened Together	B		✓			
3 Phase Open Side Outlet	BY		-	✓	-	
Protection Class			IP20			
Coating Type (Silver/Tin/Nickel)			Tin			
Busbar Cross-Section		mm^2	40	90	150	
Weight		kg	2.2	4.5	5.9	

Horizontal Type Fuse Disconnectors



HORIZONTAL TYPE FUSE DISCONNECTORS			XHF								
			XHF-160			XHF-250			XHF-400		
Number of Poles		P	3								
Rated Operational Voltage	Ue	VAC	240	290	400	240	290	400	240	290	400
Rated Insulation Voltage	Ui	V	1000								
Rated Impulse Withstand Voltage	Uimp	kV	8								
Operating Frequency		Hz	50/60								
Rated Current	Ie	A	160			250			400		
Rated Thermal Current	Ith	A	160			250			400		
Rated Short-Circuit Breaking Capacity	Icm	kA	70								
Max. Power Loss For Fuse Connection	Pv	W	4								
Electrical Life		op.	200								
Mechanical Life		op.	20.000								
Utilization Category			AC-22B								
Standards			IEC EN 60947-3								
Protection Class			IP20								
Dimensions			NH00			NH1			NH2		
Busbar Cross-Section			70			90			150		
Weight			0.7			1.5			3.3		

General Information



XKoren Fuse Disconnectors : Vertical and Horizontal

XKoren fuse disconnectors provide a reliable protection and control mechanism in electrical systems, ensuring the safe separation of the phases under load. These disconnectors, with a high breaking capacity against overload currents and short circuits, allow for the opening and closing of the three phases either separately or together. They have a wide range of applications, including industrial plants, energy distribution panels, and power control centers.

Vertical Type Fuse Disconnectors

Vertical type fuse disconnectors are compact and reliable equipment that ensures the safe separation of loads in high-voltage electrical systems. These disconnectors, which offer installation opportunities in confined spaces, perform breaking operations under high voltage with fuse elements, provide long lifespan, and ensure safe insulation.

Highlighted Features:

- **Strong Protection Mechanism:** Provides reliable protection against overload currents and short circuits thanks to NH fuses.
- **Three-Phase Control:** Allows the opening/closing of all three phases either together or separately.
- **High Breaking Capacity:** With a breaking capacity of 85 kA, it provides superior protection against short-circuit currents.
- **Low Power Losses:** Supports energy efficiency by improving the system's performance.
- **Compact and Durable Design:** Occupies minimal space in panels and offers long-lasting use.
- **Easy Installation and Maintenance:** Offers quick installation and ease of maintenance with stainless steel **connection elements and an optimized lower body design.**
- **Current Measurement Support:** Allows measurement of currents for each phase with current transformers placed on the back bars.

Technical Specifications:

- **Fuse Compatibility:** Fully compatible with NH00, NH0, NH1, NH2, NH3 type fuses.
- **Rated Current:** Vertical type 160A, 250A, 400A, 630A; Horizontal type 160A, 250A, 400A options are available.
- **Breaking Capacity:** Vertical type 85 kA.
- **Voltage Level:** Conforms to the operating voltage set according to IEC standards.
- **Standard Compliance:** Manufactured according to TS EN 60947-3 and IEC 60269-1 standards.
- **Material Durability:** Stainless steel connection elements and high-strength insulation materials are used.
- **Ease of Installation:** There is no depth difference between models with different rated currents, providing installation flexibility.

XKoren Horizontal Type Fuse Disconnectors

Horizontal type fuse disconnectors are mechanical switching devices used to disconnect or isolate electrical circuits. They perform switching operations through horizontal movement and physically separate the circuit, ensuring safety during maintenance and repair procedures. They are used in electrical distribution panels and industrial facilities for safe circuit disconnection during maintenance or fault conditions.

Highlighted Features:

- **High Breaking Capacity:** Has a breaking capacity of 70 kA.
- **High Mechanical and Electrical Durability:** Operates safely under overload currents and short circuit conditions.
- **Compliance with IEC 60947-3 Standards:** Conforms to AC 22 B class.
- **Phase Disconnection at Two Separate Points:** Provides a safer circuit disconnection process.
- **Easy Replaceability:** Can be easily mounted and removed on NH blade fuse holders.

•More Sensitive Selectivity Compared to Thermal-Magnetic Switches: Limits short circuit currents at smaller values.

NH Fuse Sizes and Rated Currents

•NH00 (Size 00):
•Rated Current: 2A - 160A
• Rated Voltage Capacity: 240V-400V
•Application: The smallest horizontal type fuse disconnector used in low current applications.
•NH1 (Size 1):
•Rated Current: 25A - 250A
•Rated Voltage Capacity: 240~400V
•Application: Used in medium current applications.
•NH2 (Size 2):
•Rated Current: 63A - 400A
•Rated Voltage Capacity: 240~400V
•Application: Used in applications requiring higher current capacity.

Application Areas:

•Energy Distribution Panels
•Industrial Facilities
•Transformer Stations
•Power Control and Distribution Systems
•Electrical Facilities Requiring High Power

Advantages:

•Fast Short-Circuit Cutting: Reacts much faster than thermal-magnetic circuit breakers, minimizing deformations that could occur due to short-circuit currents.
•Economic Solution: More cost-effective compared to thermal-magnetic circuit breakers.
•High Reliability: Successfully passes all type tests conducted in accredited laboratories.
•Detailed Measurement Capability: Thanks to the ability to integrate current transformers in a single body size, detailed measurements can be taken from all outputs.

In conclusion, XKoren vertical and horizontal type fuse disconnectors offer superior performance in terms of safety, durability, and ease of use. With their high breaking capacity, wide range of rated current options, and full compliance with IEC standards, they provide a reliable solution for many areas, from industrial plants to energy distribution panels. Their compact design, which saves space in panels, and easy maintenance capabilities provide a long-lasting user experience.

Category of Use		AC-22B
Mechanical Life		20000
Electrical Life		200
Sizes	160A	NH00
	250A	NH1
	400A	NH2
	630A	NH3

GENERAL PRODUCT CATALOG

FUSE DISCONNECTORS

ORDER LIST

Fuse Disconnectors

Vertical Type Fuse Disconnectors



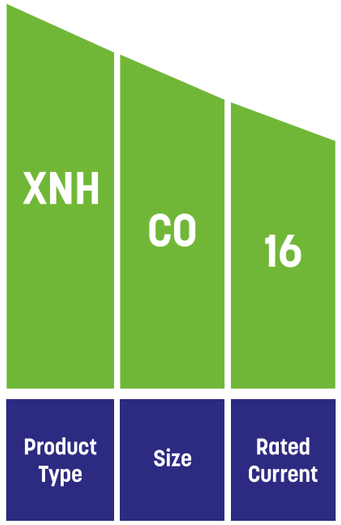
Type (Order) Code	Rated Current (In)	Explanation	NH Fuses	Box Quantity	Carton Quantity
XVF-A-160	160A	3 Phase Separately Opened	NH00	1	1
XVF-B-160	160A	3 Phases Opened Together		1	1
XVF-A-250	250A	3 Phase Separately Opened	NH1	1	1
XVF-B-250	250A	3 Phases Opened Together		1	1
XVF-AY-250	250A	3 Phase Open Side Outlet		1	1
XVF-BY-250	250A	3 Phase Separately Opened Side Outlet		1	1
XVF-A-400	400A	3 Phase Separately Opened	NH2	1	1
XVF-B-400	400A	3 Phases Opened Together		1	1
XVF-AY-400	400A	3 Phase Open Side Outlet		1	1
XVF-BY-400	400A	3 Phase Separately Opened Side Outlet		1	1
XVF-A-630	630A	3 Phase Separately Opened	NH3	1	1
XVF-B-630	630A	Phases Opened Together		1	1

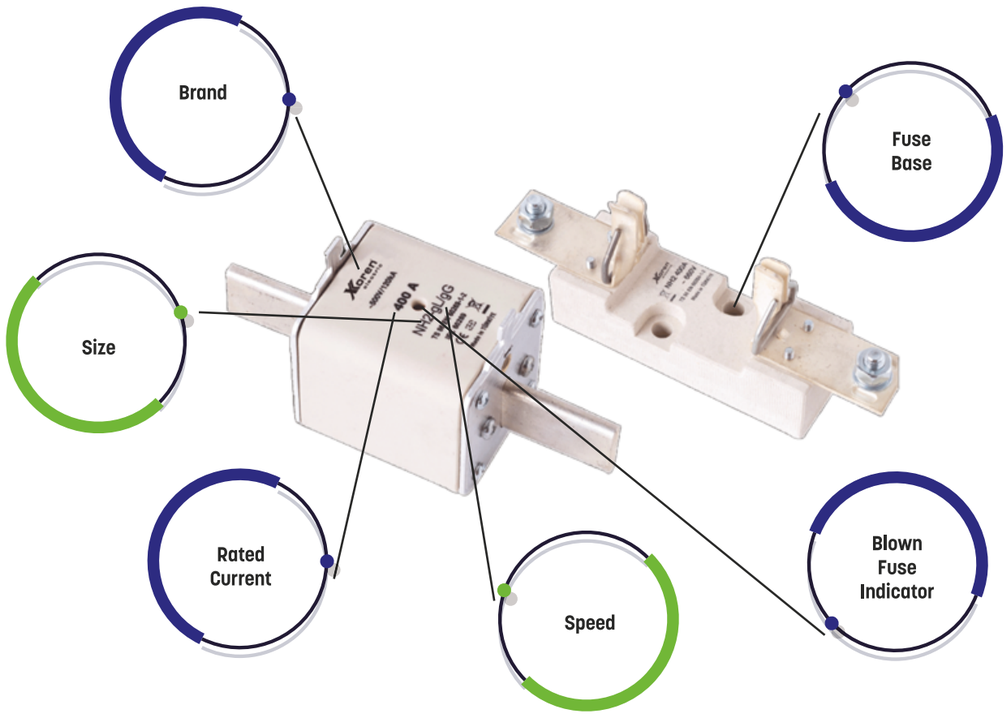
Horizontal Type Fuse Disconnectors



Type (Order) Code	Rated Current (In)	Explanation	Box Quantity	Carton Quantity
XHF-00-160	160A	Horizontal Type NH00 Size 160A	1	9
XHF-1-250	250A	Horizontal Type NH1 Size 250A	1	3
XHF-2-400	400A	Horizontal Type NH2 Size 400A	1	1

Product Code and Label Information

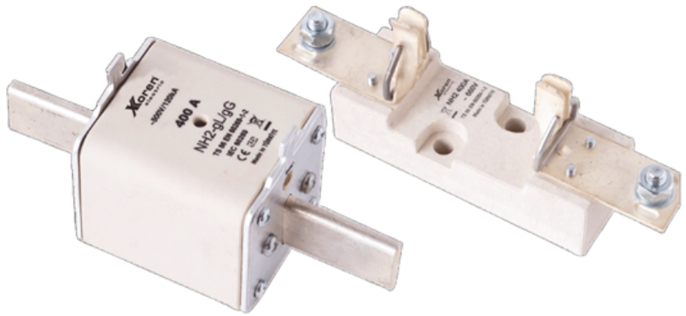




GENERAL PRODUCT CATALOG

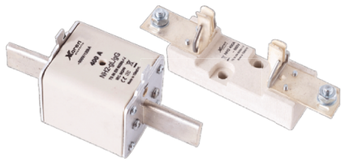
NH FUSES

NH Fuses



NH FUSES			XNH				
Type			XNH-C0	XNH-00	XNH-1	XNH-2	XNH-3
Max. Operating Voltage	Uc	VAC	500, 690				
Rated Current	In	A	16,20,32,40,50, 53,80,100	16,20,32,40,50, 53,80,100,125,160	80, 100, 125, 160, 200, 250	160, 200, 250, 400	400, 500, 630
Rated Short-Circuit Breaking Capacity	Ics	kA	120				
Operating Frequency		Hz	50/60				
Standards			IEC 60269-1				
Dimensions			NH00C	NH00	NH1	NH2	NH3
Weight		Kg	0.16				
Enclosure Material			Steatit				
Operating Class			gG-gL				

General Information



The XKoren XNH series NH Fuses are designed to safely protect electrical circuits against overcurrents and short circuits. These fuses, classified under the gG-gL operating class, are manufactured in five different sizes: NH00C, NH00, NH1, NH2, and NH3. The fuse element inside melts at a specific current level, breaking the circuit and preventing damage to the connected system. With a high selectivity ratio, they contribute to the protection of electrical networks, support automatic circuit breakers, and enhance the safety of motor circuits.

Technical Specifications

- **Installation:** Can be used with a base and handles
- **Position:** Vertical
- **Relative Humidity:** 50% at 40°C, 90% at 20°C
- **Phase:** Three-phase
- **Base Contacts:** Silver-plated copper

Design and Material Features

XKoren XNH series fuses are made of high-strength steatite material, with blade contacts manufactured using silver-plated copper. The heat- and pressure-resistant steatite body ensures the safe extinguishing of the arc generated during overcurrent interruption without posing any danger. With low power loss, it enhances energy efficiency, ensuring long-lasting and safe operation of systems.

Key Advantages:

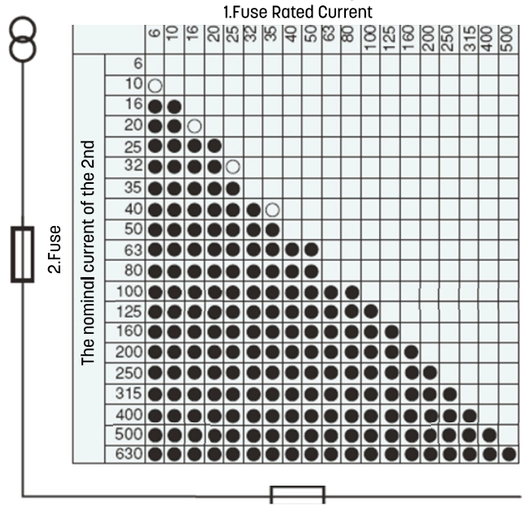
- **High selectivity:** Ensures network protection and device safety.
- **Compact design:** Allows easy installation in tight spaces.
- **Silver-plated contacts:** Provide better conductivity and minimal power loss..

Applications

- Industrial facilities
- Power supply systems
- Equipment manufacturers
- Electrical panels and control panels
- Manufactured in accordance with TS EN/IEC 60269-1 standards.
- 1:1.25 precise selectivity ratio allows accurate and cost-effective fuse selection.

The XKoren XNH series NH fuses are particularly suitable for motor starting currents and short-circuit conditions. With their robust structure and reliable performance, they ensure maximum protection and efficiency in your electrical systems..

NH Fuse Selectivity Table



Time-Current Curves

The time-current characteristic curve shows virtual times, such as melting time, as a function of the potential current under specific operating conditions. The melting times of Low Voltage NH Fuse Links are expressed on a logarithmic scale in time-current diagrams, depending on the current. The current curve at which the melting element approximately melts is asymptotic to the I^2t joule curve formed at high short-circuit currents, and the I^2t value continuously determines the melting point.

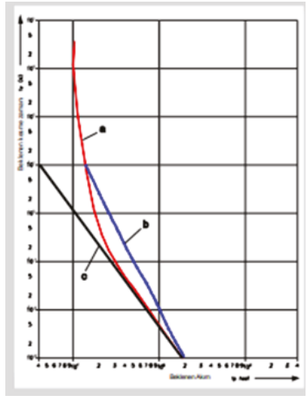
GENERAL PRODUCT CATALOG

NH FUSES

In time-current characteristic diagrams, the I^2t curve (c) is generally not shown to avoid excessive complexity..

Characteristics:

- **Imin:** Minimum tripping current
- **a:** Melting time/current characteristic curve
- **b:** Switching time characteristic curve
- **c:** I^2t curve



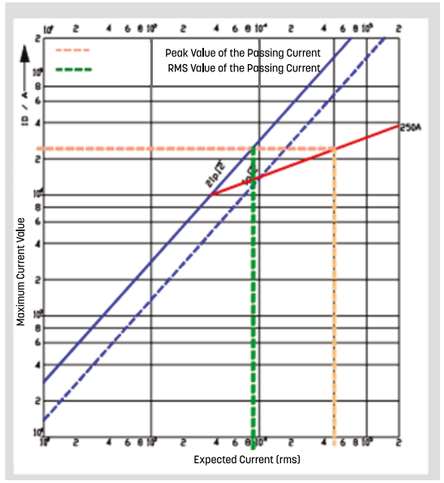
Current Limiting Curves (Current Limitation)

A fuse with a safe breaking capacity plays a critical role in the cost-effectiveness of the system.
During a short-circuit condition, while a fuse link interrupts the current, the cutting current continues to flow through the network until the fuse element melts. However, this current is limited by the system's impedance.

When all narrow sections of a fuse element are cut simultaneously, it causes the formation of small arcs. This rapid interruption process provides strong current limitation. The current-limiting feature of the fuse is directly related to the manufacturing quality. This feature is particularly high in low-voltage NH Fuse Links. This powerful current limitation provides continuous protection against overloads for the system.

The fuse's safe breaking capacity is critical to the cost-effectiveness of the system. In the case of a short circuit, the cutting current of a fuse link continues to flow through the network until the fuse element is melted. However, this current is limited by the system's impedance.

When all narrow sections of the fuse wire are cut simultaneously, it leads to the formation of small arcs. This rapid interruption process ensures strong current limitation. The current-limiting feature of the fuse is directly dependent on the manufacturing quality. Low-voltage NH Fuse Links benefit greatly from this characteristic. The provided strong current limitation offers continuous protection against overloads for the system.



Breaking Capacity and Low-Voltage NH Fuse Links

According to the TS EN/IEC 60269-1 standards, the breaking capacity value in AC must be at least 50 kA, whereas the breaking capacity of low-voltage NH Fuse Links is 120 kA. This current represents the highest short-circuit current the fuse connection can safely carry under specified conditions at its nominal breaking capacity.

One of the most important features of low-voltage NH Fuse Links is that they have the highest short-circuit breaking capacities with the smallest coverage areas. Tests performed on these fuses are conducted under general conditions, including voltage, power factor, breaking angle, and other circuit data, as specified in both national (TS EN 60269) and international (IEC 60269) standards.

Additionally, to ensure continuous safe breaking capacity from the smallest irregular overload currents to the largest breaking currents, certain quality characteristics must be considered during the design and manufacture of the fuse links. These characteristics include the form of the fuse element (melting wire), its position inside the body, the internal pressure value of the fuse body, and thermal (heat) resistance. Furthermore, the chemical purity, particle size, and density of the quartz sand play an essential role in the performance of the fuse.

Coordination for Cable and Line Protection

According to TS EN/IEC 60269-1 standards, the following conditions apply for coordinating fuses during overload protection of cables and lines:

$I_B \leq I_N \leq I_Z$ (Nominal current range)

$I_2 \leq 1.45 \times I_N$ (Tripping range)

I_B: Operating current of the circuit

I_N: Nominal current of the selected protective device

I_Z: Permitted overload capacity for cable and line protection under operating conditions

I_2: Tripping current of the protective device under defined conditions (Large test current)

The 1.45 factor is an internationally accepted factor for coordinating the use and protection level for a conductor while considering the disconnection limits (e.g., fuse links).

Low-voltage NH Fuse Links fully comply with the overload protection conditions for conventional cables as specified in TS EN 60269-1 Article 8.4.3.5.

Power Loss and Temperature Rise in NH Fuses

Electrical circuits show resistance due to the conductors carrying current, and this resistance leads to power loss. When electrical current flows, the power loss is expressed according to Ohm's Law as follows:

$$W=U \times I \times t$$

According to Ohm's Law, the relationship between voltage (U), resistance (R), and current (I) is given by the following equation:

$$W = R \times I^2 \times t$$

This expression shows that power loss is proportional to the square of the current. In NH fuses, power loss occurs due to the internal resistance within the fuse link.

Temperature Rise and Its Effects

- **Fuse Internal Structure:** In NH fuses, the heating caused by internal resistance can affect the fuse body and its internal components.
- **Effect on Insulation:** High temperatures can lead to the aging of fuse materials and weaken the insulation.
- **Fire Risk:** Excessive heating can damage the insulation materials surrounding the fuse and, in extreme cases, may lead to a fire.

Methods to Reduce Power Loss

- Use low-resistance materials (e.g., silver-plated copper contacts)
- Select fuses according to their nominal current ratings
- Ensure a well-ventilated installation environment

Compliance with TS EN/IEC 60269-1 Standards

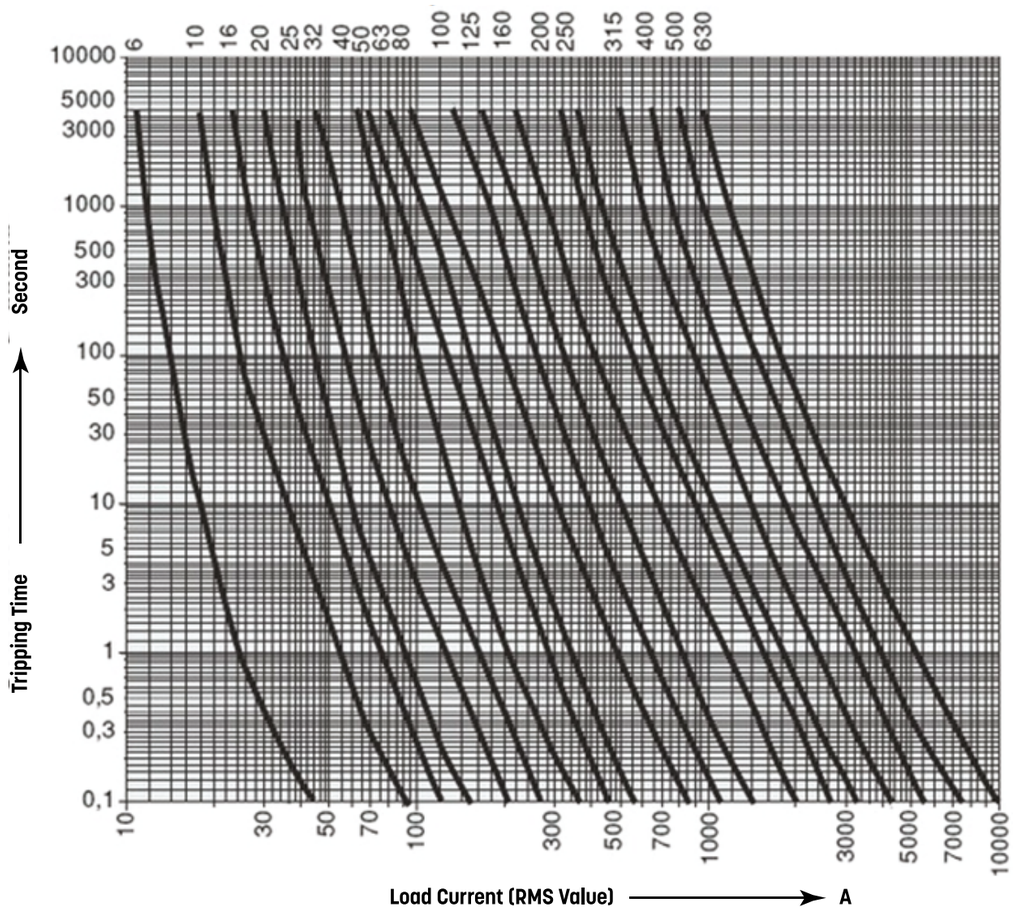
Low-voltage NH Fuse Links have minimal internal power loss and low internal temperature rise. These values comply with the requirements specified in the TS EN/IEC 60269-1 standards. The power loss and temperature rise values of NH fuse links are provided in detail on the following pages.

Size			Power Loss Table										
XNH-C0	Rated Current	In (A)	6	10	16	20	25	32	40	50	63	80	100
	IEC 60269-1	W	12										
	XKOREN	W	1.8	2.1	2.4	2.7	2.9	3.7	4.3	4.7	6	6.8	8.8
XNH-00	Rated Current	In (A)	16	20	25	32	40	50	63	80	100	125	160
	IEC 60269-1	W	12										
	XKOREN	W	3	4	4	4	5	6	7	9	10	12	12
XNH-1	Rated Current	In (A)	80	100	125	160	200	250					
	IEC 60269-1	W	23										
	XKOREN	W	10	12	14	16	18	22					
XNH-2	Rated Current	In (A)	160	200	250	400							
	IEC 60269-1	W	34										
	XKOREN	W	18	20	30	34							
XNH-3	Rated Current	In (A)	400	500	630								
	IEC 60269-1	W	48										
	XKOREN	W	30	36	48								

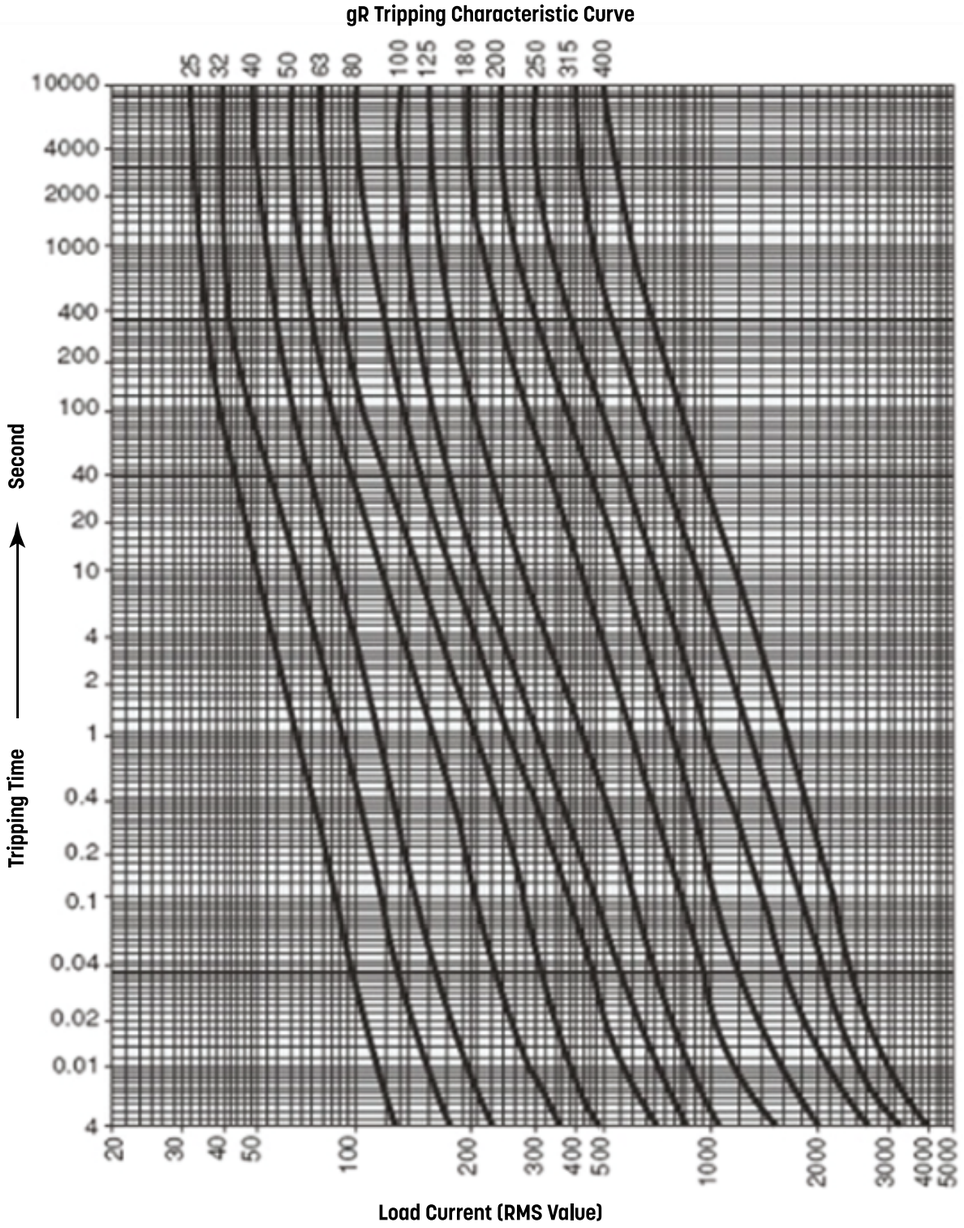
GENERAL PRODUCT CATALOG

NH FUSES

gL Tripping Characteristic Curve



gR Tripping Characteristic Curve



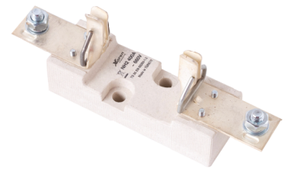
GENERAL PRODUCT CATALOG

NH FUSES

ORDER LIST

NH Fuses





Model	Type (Order) Code	Rated Current (A)	Explanation	Box Quantity	Carton Quantity
XNH-C0	XNH C0-16	16	NHC00 Size 16A	1	90
	XNH C0-20	20	NHC00 Size 20A	1	90
	XNH C0-25	25	NHC00 Size 25A	1	90
	XNH C0-32	32	NHC00 Size 32A	1	90
	XNH C0-40	40	NHC00 Size 40A	1	90
	XNH C0-50	50	NHC00 Size 50A	1	90
	XNH C0-63	63	NHC00 Size 63A	1	90
	XNH C0-80	80	NHC00 Size 80A	1	90
	XNH C0-100	100	NHC00 Size 100A	1	90
XNH-00	XNH 00-16	16	NH00 Size 16A	1	60
	XNH 00-20	20	NH00 Size 20A	1	60
	XNH 00-25	25	NH00 Size 25A	1	60
	XNH 00-32	32	NH00 Size 32A	1	60
	XNH 00-40	40	NH00 Size 40A	1	60
	XNH 00-50	50	NH00 Size 50A	1	60
	XNH 00-63	63	NH00 Size 63A	1	60
	XNH 00-80	80	NH00 Size 80A	1	60
	XNH 00-100	100	NH00 Size 100A	1	60
	XNH 00-125	125	NH00 Size 125A	1	60
	XNH 00-160	160	NH00 Size 160A	1	60
XNH-1	XNH 1-80	80	NH1 Size 80A	1	54
	XNH 1-100	100	NH1 Size 100A	1	54
	XNH 1-125	125	NH1 Size 125A	1	54
	XNH 1-160	160	NH1 Size 160A	1	54
	XNH- 1-200	200	NH1 Size 200A	1	54
	XNH 1-250	250	NH1 Size 250A	1	54
XNH-2	XNH 2-160	160	NH2 Size 160A	1	40
	XNH 2-200	200	NH2 Size 200A	1	40
	XNH 2-250	250	NH2 Size 250A	1	40
	XNH 2-400	400	NH2 Size 400A	1	40
XNH-3	XNH 3-400	400	NH3 Size 400A	1	30
	XNH 3-500	500	NH3 Size 500A	1	30
	XNH 3-630	630	NH3 Size 630A	1	30

NH Fuse Base

XB0	XB0-160	160	NH00 Size 160A NH Fuse Base	1	54
XB01	XB01-250	250	NH1 Size 250A NH Fuse Base	1	40
B02	XB02-400	400	NH2 Size 400A NH Fuse Base	1	30
XB03	XB03-630	630	NH3 Size 630A NH Fuse Base	1	12

DIMENSIONS

Type	Fuse Link			Fuse Base	
	Rated Current (A)	Rated Current (V)	Weight (Kg)	Rated Current (A)	Weight (Kg)
NH00C	2	500.690	0.16	160	0.16
	4				
	6				
	10				
	16				
	20				
	25				
	32				
	35				
	40				
	50				
	63				
	80				
	100				
NH00	10	500.690	0.16	160	0.16
	16				
	20				
	25				
	32				
	35				
	40				
	50				
	63				
	80				
	100				
	125				
	160				
NH1	20	500.690	0.16	160	0.16
	25				
	32				
	35				
	40				
	50				
	63				
	80				
	100				
	125				
	160				
	200				
	224				
	250				

GENERAL PRODUCT CATALOG

NH FUSES

Type	Fuse Link			Fuse Base	
	Rated Current (A)	Rated Current (V)	Weight (Kg)	Rated Current (A)	Weight (Kg)
NH00C	2	500.690	0.16	160	0.16
	4				
	6				
	10				
	16				
	20				
	25				
	32				
	35				
	40				
	50				
	63				
	80				
	100				
NH00	10	500.690	0.16	160	0.16
	16				
	20				
	25				
	32				
	35				
	40				
	50				
	63				
	80				
	100				
	125				
	160				
NH1	20	500.690	0.16	160	0.16
	25				
	32				
	35				
	40				
	50				
	63				
	80				
	100				
	125				
	160				
	200				
	224				
	250				

Type	Fuse Link			Fuse Base	
	Rated Current (A)	Rated Current (V)	Weight (Kg)	Rated Current (A)	Weight (Kg)
NH2	35	500.690	0.96	400	0.96
	40				
	50				
	63				
	80				
	100				
	125				
	160				
	200				
	224				
	250				
	315				
	350				
	400				
NH3	315	500.690	1.20	630	1.20
	350				
	400				
	425				
	500				
	630				
NH4	630	400	2.80	1250	2.80
	800				
	1000				
	1250				

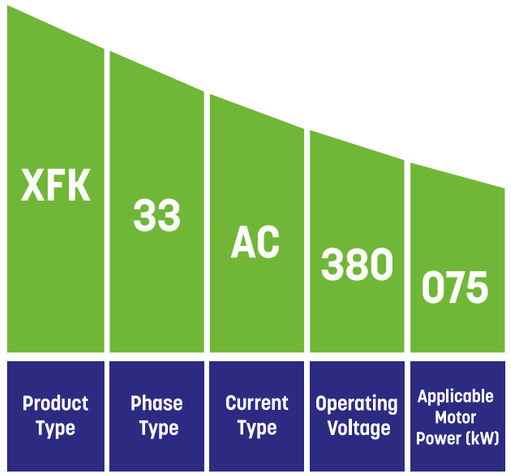
VALID FOR ALL OUR PRODUCTS
2 YEARS WARRANTY

ENERGY MANAGEMENT SYSTEMS (EMS)

- X Koren Electric XFK Frequency Converters provide speed control, energy savings, soft start and stop functions, torque control, advanced monitoring, feedback, and adaptation capabilities in industrial and commercial applications such as HVAC systems, water pumps, elevators, and conveyor belts used in production machinery.
- X Koren Electric XSI Solar Inverters optimize the efficiency of solar energy by performing DC/AC conversion. The generated electricity can be safely directed either directly to the local power grid, to storage systems, or to meet building energy demands.
- X Koren Electric XPS Uninterruptible Power Supplies (UPS) detect power outages in computer systems, network infrastructures, medical devices, telecommunication systems, and industrial facilities, ensuring uninterrupted energy supply. They provide reliable protection for critical systems.



Product Code and Label Information





XFK Frequency Converter



Frequency Converters / Single-Phase		Symbol	Unit	XFK		
Type				Frame K0		
				XFK-0.75	XFK-1.5	XFK-2.2
Rated Operational Voltage		Ue	VAC	220		
Rated Input Current (G Mode)		In	A	8,2	14	23
Rated Input Current (P Mode)		In	A	4	7	9,6
Rated Output Current (G Mode)		In*	A	14	23	39
Rated Output Current (P Mode)		In*	A	7	9,6	19,2
Power			kW	0.75	1.5	2.2
Power Capacity			kVA	1.5	3	4
Operating Frequency			Hz	50/60		
Maximum Frequency	Vector Control		Hz	0-300		
	VF Control			0-3200		
Carrier Frequency			kHz	0.5-16		
Overload Capacity	(Single-Phase)		A	%150*In 60s		
				%180*In 3s		
Control Mode				Open-Loop Vector Control (SVC)		
				Closed-Loop Vector Control (FVC)		
				VF Control		
Torque Control Accuracy				±5% (FVC)		
Front Panel				LCD Panel		
Communication Port				RS485		
Protection Class				IP21		
Altitude			m	≤1000		
Humidity			%	≤95		
Operating Ambient Temperature Range			°C	0....+45		
Storage Ambient Temperature Range			°C	-15....+45		

XMK MODULAR CONTACTOR (4P)



Frequency Converters / Three-Phase		Symbol	Unit	XFK										
Type				Frame K0			Frame K1			Frame K2	Frame K3			
				XFK-0.75	XFK-1.5	XFK-2.2	XFK-4	XFK-5.5	XFK-7.5	XFK-11	XFK-15	XFK-18.5	XFK-22	XFK-30
Rated Operational Voltage		Ue	VAC	380										
Rated Input Current (G Mode)		In	A	3,4	5	5,8	10,5	14,6	20,5	26	35	38,5	46,5	62
Rated Input Current (P Mode)		In	A	2,1	3,8	5,1	9	13	17	25	32	37	45	60
Rated Output Current (G Mode)		In*	A	5	5,8	10,5	14,6	20,5	26	35	38,5	46,5	62	76
Rated Output Current (P Mode)		In*	A	3,8	5,1	9	13	17	25	32	37	45	60	75
Power			kW	0,75-1,5	1,5-2,2	2,2-4	4-5,5	5,5-7,5	7,5-11	11-15	15-18,5	18,5-22	22-30	30-37
Power Capacity			kVA	1,5	3	4	5,9	8,9	11	17	21	24	30	40
Operating Frequency			Hz	50/60										
Maximum Frequency	Vector Control		Hz	0-300										
	VF Control			0-3200										
Carrier Frequency			kHz	0.5-16										
Overload Capacity	(Single-Phase)		A	%o120*In 60s										
				%o180*In 3s										
Control Mode				Open-Loop Vector Control (SVC)										
				Closed-Loop Vector Control (FVC)										
				VF Control										
Torque Control Accuracy				±5% (FVC)										
Front Panel				LCD Panel										
Communication Port				RS485										
Protection Class				IP20										
Altitude			m	≤1000										
Humidity			%	≤95										
Operating Ambient Temperature Range			°C	0....+45										
Storage Ambient Temperature Range			°C	-15....+45										

GENERAL PRODUCT CATALOG

FREQUENCY CONVERTER



Frequency Converters / Three-Phase		Symbol	Unit	XFK						
Type				Frame K4		Frame K5		Frame K6		Frame K7
				XFK-37	XFK-45	XFK-55	XFK-75	XFK-90	XFK-110	XFK-132
Rated Operational Voltage		Ue	VAC	380						
Rated Input Current (G Mode)		In	A	76	92	113	157	180	214	256
Rated Input Current (P Mode)		In	A	75	91	112	150	176	210	253
Rated Output Current (G Mode)		In*	A	92	113	157	180	214	256	307
Rated Output Current (P Mode)		In*	A	91	112	150	176	210	253	304
Power			kW	37-45	45-55	55-75	75-90	90-110	110-132	132-160
Power Capacity			kVA	57	69	85	114	134	160	192
Operating Frequency			Hz	50/60						
Maximum Frequency	Vector Control		Hz	0-300						
	VF Control			0-3200						
Carrier Frequency			kHz	0.5-16						
Overload Capacity	(Single-Phase)		A	%o120*In 60s						
				%o180*In 3s						
Control Mode				Open-Loop Vector Control (SVC)						
				Closed-Loop Vector Control (FVC)						
				VF Control						
Torque Control Accuracy				±5% (FVC)						
Front Panel				LCD Panel						
Communication Port				RS485						
Protection Class				IP21						
Altitude			m	≤1000						
Humidity			%	≤95						
Operating Ambient Temperature Range			°C	0....+45						
Storage Ambient Temperature Range			°C	-15....+45						

FREQUENCY CONVERTER



Frequency Converters / Three-Phase		Symbol	Unit	XFK						
Type				Frame K9			Frame K10			
				XFK-160	XFK-200	XFK-220	XFK-250	XFK-315	XFK-350	XFK-400
Rated Operational Voltage		Ue	VAC	380						
Rated Input Current (G Mode)		In	A	307	385	430	468	590	665	785
Rated Input Current (P Mode)		In	A	304	377	426	465	585	650	725
Rated Output Current (G Mode)		In*	A	385	430	468	590	665	785	883
Rated Output Current (P Mode)		In*	A	377	426	465	585	650	725	820
Power			kW	160-185	200-220	220-250	250-280	315-350	350-400	400-450
Power Capacity			kVA	231	250	280	355	445	500	565
Operating Frequency			Hz	50/60						
Maximum Frequency	Vector Control		Hz	0-300						
	VF Control			0-3200						
Carrier Frequency			kHz	0.5-16						
Overload Capacity	(Single-Phase)		A	%120*In 60s						
				%180*In 3s						
Control Mode				Open-Loop Vector Control (SVC)						
				Closed-Loop Vector Control (FVC)						
				VF Control						
Torque Control Accuracy				±5% (FVC)						
Front Panel				LCD Panel						
Communication Port				RS485						
Protection Class				IP21						
Altitude			m	≤1000						
Humidity			%	≤95						
Operating Ambient Temperature Range			°C	0....+45						
Storage Ambient Temperature Range			°C	-15....+45						

GENERAL PRODUCT CATALOG

FREQUENCY CONVERTER



Frequency Converters / Three-Phase		Symbol	Unit	XFK				
Type				Frame K10		Frame K11		
				XFK-450	XFK-500	XFK-630	XFK-710	XFK-800
Rated Operational Voltage		Ue	VAC	380				
Rated Input Current (G Mode)		In	A	883	920	1160	1320	1500
Rated Input Current (P Mode)		In	A	820	860	1100	1260	1440
Rated Output Current (G Mode)		In*	A	920	1160	1320	1500	1665
Rated Output Current (P Mode)		In*	A	860	1100	1260	1440	1575
Power			kW	450-500	500-560	630-710	710-800	800-900
Power Capacity			kVA	630	714	900	1015	1145
Operating Frequency			Hz	50/60				
Maximum Frequency	Vector Control		Hz	0-300				
	VF Control			0-3200				
Carrier Frequency			kHz	0.5-16				
Overload Capacity	(Single-Phase)		A	%120*In 60s				
				%180*In 3s				
Control Mode				Open-Loop Vector Control (SVC)				
				Closed-Loop Vector Control (FVC)				
				VF Control				
Torque Control Accuracy				±5% (FVC)				
Front Panel				LCD Panel				
Communication Port				RS485				
Protection Class				IP21				
Altitude			m	≤1000				
Humidity			%	≤95				
Operating Ambient Temperature Range			°C	0....+45				
Storage Ambient Temperature Range			°C	-15....+45				

General Information

XKoren XFK frequency converters are devices that provide speed and torque control for electric motors. They are produced in two different models: single-phase (220V) and three-phase (380V). These devices enable efficient operation of alternating current (AC) motors and energy savings by first rectifying the input voltage into direct current (DC) and then converting it back to alternating current (AC) at the desired frequency. This allows the motor to operate at different speeds.

Key Benefits

- Speed control and energy savings
- Soft start and stop
- Torque control
- Prevention of sudden current surges
- Advanced monitoring and feedback system
- Extended motor life

Operating Principle

Frequency converters first convert the fixed frequency (50 Hz or 60 Hz) AC voltage from the grid into DC voltage (rectification process), then transform it back into variable frequency AC and deliver it to the motor. By varying the output frequency, the motor's speed and torque are controlled.

Technical Specifications

- Number of Phases: 1-phase & 3-phase
- Power Rating: 0.75kW - 800kW
- Input-Output Phases: 1-phase input - 3-phase output & 3-phase input - 3-phase output
- Operating Voltage: 220V - 380V

Key Parameters

- Output Frequency (Hz): Determines motor speed control.
- Output Voltage (V): Motor supply voltage.
- Torque Control: Adjusts motor torque in response to load variations.
- Acceleration/Deceleration Times: Ensures motor acceleration or deceleration within a specific time frame.
- Protection Settings: Includes protection mechanisms such as overcurrent, overvoltage, and undervoltage.

Applications

XKoren XFK frequency converters are widely used in various industrial and commercial applications:
- Industrial facilities (pump, fan, compressor control)
- HVAC systems
- Elevators and escalators
- CNC machines
- Automation systems
- Conveyor belts

XKoren XFK frequency converters stand out as an essential technology in modern industry, providing energy savings and precise motor control.

Inverter Functions and Definitions

Virtual Input/Output (IO)

The inverter supports virtual input/output IO features by flexibly applying various simple logical functions.

Fast Current Limiting

To prevent frequent overcurrent faults in inverters, a fast current limiting function is included.

Multiple Motor Switching

The inverter is equipped with four different motor parameter sets. This feature allows switching between four motors for control.

User Parameter Restore

Users can save the parameters they configure on the inverter and restore them whenever necessary.

High Precision AI and AO

With factory and field calibration, the accuracy of analog input (AI) and analog output (AO) can be as precise as ±20mV.

Customized Display Parameters

The function parameters provided in the inverter can be changed by the user according to their needs.

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Parameter Screen Modification

Updated function parameters become visible and trackable by the user.

Fault Handling Methods

In the event of an inverter fault, the user can choose one of the following options: free stop, ramp stop, or continue operation. In the continue operation mode, frequency selection is also possible.

PID Parameter Selection

The inverter offers two accessible PID setting sets, which can be manually or automatically adjusted depending on the deviations.

PID Feedback Loss Resolution

To protect the PID function, the data bus setting can be configured for PID feedback loss.

DI/DO Positive and Negative Input

Digital input (DI) and digital output (DO) logic can be individually set to positive or negative by the user.

DI/DO Response Delay

The response delay time of digital inputs and outputs can be independently controlled by the user.

Instant Stop-No Stop

In the event of a short-term power outage or unexpected voltage drop, the inverter can continue to operate for a short period of time.

Timed Operation

The inverter offers soft timed operation support for up to 8500 minutes.

Inverter Functions and Definitions

Inverter Input Functions and Technical Specifications

Input Functions

Maximum Frequency:

- Vector control: 0 - 300 Hz
- V/F control: 0 - 3200 Hz

Carrier Frequency:

- Adjustable between 0.5 kHz and 16 kHz.
- Can be optimized depending on load characteristics.

Input Frequency Resolution:

- Digital setting: 0.01 Hz
- Analog setting: 0.025% of the maximum frequency

Control Mode:

- Open-loop vector control (SVC)
- Closed-loop vector control (FVC)
- V/F control

Starting Torque:

- G model: 0.5 Hz / 150% (SVC); 0 Hz / 180% (FVC)
- P model: 0.5 Hz / 100%

Speed Regulation Range:

- 1:100 (SVC)
- 1:1000 (FVC)

Constant Speed Acceleration:

- ±0.5% (SVC)
- ±0.02% (FVC)

Torque Control Accuracy:

- ±5% (FVC)

Overload Capacity:

•G model: 150% overload for 60 seconds; 180% overload for 3 seconds
•P model: 120% overload for 60 seconds; 150% overload for 3 seconds

Torque Boost:

•Automatic torque boost
•Manual torque boost: 0.1% - 30.0%

V/F Curve:

•Three types: Linear, multi-point, Nth power type V/F curve (1.2 power, 1.4 power, 1.6 power, 1.8 power, 2 power)

V/F Separation:

•Two methods: Full separation, half separation
Acceleration and Deceleration Curve:
•Straight line / S curve
•Four different acceleration-deceleration time ranges: 0.0 s - 6500.0 s

DC Braking:

•DC braking frequency: 0.0 Hz - Maximum frequency
•Braking time: 0.0 s - 36.0 s
•Braking current: 0.0% - 100.0%

Jog Control:

•Jog frequency range: 0.00 Hz - 50.00 Hz
•Jog acceleration and deceleration time: 0.0 s - 6500.0 s

Automatic Voltage Regulation:

•Automatically maintains output voltage steady when the grid voltage changes

Overvoltage, Overcurrent, and Stop Control:

•Automatically limits current and voltage to prevent overcurrent and overvoltage situations

Personal Functions

Fast Current Limiting Function:

•Minimizes overcurrent faults and ensures the normal operation of the inverter.

Torque Limit and Control:

•Automatically limits rotor characteristics and ID to prevent frequent overcurrent situations.

High Performance:

•Uses high-performance current vector control technology for both synchronous and asynchronous motor control.

Instantaneous Stop and Non-Stop:

•Ensures the inverter continues to operate for a short time during temporary power outages by maintaining load regenerative energy balance.

Virtual IO:

•Provides five groups of virtual DI/DO support for simple logic control.

Time Control:

•Operates within a timing function range of 0.0 - 6500.0 minutes.

Multiple Motor Switching:

•Supports four motor switching conditions.

Operating Functions

Command Source:

•The operation panel, terminal, and serial transmission port are pre-configured and can be switched by different methods.

Frequency Source:

•10 types of frequency sources are available (digital, analog voltage, pulse, serial port, etc.).

Auxiliary Frequency Source:

•Flexible frequency adjustment and synthesis can be done with 10 different auxiliary frequency sources.

Input and Output Terminals

Input Terminals:

•7 digital input terminals (1 supports high pulse input up to 100 kHz).
•2 analog input terminals (one supports 0-10V voltage input, the other supports 0-10V voltage or 4-20mA current input).

Output Terminals:

•1 high pulse output terminal (optional open collector type, supports 0-100 kHz square wave output).
•1 digital output terminal.
•1 relay output terminal.
•1 analog output terminal (supports 0-20mA current output or ±10V voltage output).

Display and Keyboard Operations

LED Display:

•Displays parameters.

LCD Display:

•Shows operational details with English and Chinese language options.

Parameter Copying:

•Allows fast parameter copying using the LCD operation panel.

Key Locking and Function Selection:

•Partial or full locking of keys prevents incorrect operations.

Protection Functions

•Short circuit detection when the power is on
•Input and output phase loss protection
•Overcurrent, overvoltage, and undervoltage protection
•Overheating and overload protection

Optional Accessories

•LCD operation panel
•Brake mounting
•IO expansion cards
•RS485, Profibus, CANlink, CANopen communication cards
•Differential input, resolver, and OC input PG cards

Environmental Conditions

Installation Location:

•Should be kept away from direct sunlight, dust, corrosive gases, flammable gases, oil vapors, and water droplets

Altitude:

•≤ 1000m

Ambient Temperature:

•Between -10°C and +40°C (should be used with power derating above 40°C)

Humidity:

•Less than 95% RH, no condensation

Vibration:

•Less than 5.9 m/s² (0.8g)

Storage Temperature:

•-20°C and below

Protection Rating:

•IP21 (Open type)

Selection Table for Braking Components of XFK Series Inverter

Inverter Model	Recommended Power Resistance Braking	Recommended Value of the Braking Resistor	Braking Unit	Note
Single-Phase 220V				
XFK 13-AC220-0.75	80W	≥200Ω	Standard Internal	No Special Structure
XFK 13-AC220-1.5	80W	≥150Ω		
XFK 13-AC220-2.2	100W	≥100Ω		
Three-Phase 380V				
XFK 33-AC380-0.75	150W	≥ 300Ω	Standard Internal	No Special Structure
XFK 33-AC380-1.5	150W	≥ 220Ω		
XFK 33-AC380-2.2	250W	≥ 200Ω		
XFK 33-AC380-4	300W	≥ 130Ω		
XFK 33-AC380-5.5	400W	≥ 90Ω		
XFK 33-AC380-7.5	500W	≥ 65Ω	Internal Optional	Add 'B' after the inverter model
XFK 33-AC380-11	800W	≥ 43Ω		
XFK 33-AC380-15	1000W	≥ 32Ω		
XFK 33-AC380-18.5	1300W	≥ 25Ω	External	
XFK 33-AC380-22	1500W	≥ 22Ω	External	
XFK 33-AC380-30	2500W	≥ 16Ω	External	
XFK 33-AC380-37	3.7kW	≥ 16Ω	External	
XFK 33-AC380-45	4.5kW	≥ 16Ω	External	
XFK 33-AC380-55	5.5kW	≥ 8Ω	External	
XFK 33-AC380-75	7.5kW	≥ 8Ω	External	
XFK 33-AC380-90	4.5kWx2	≥ 8ΩX2	External	
XFK 33-AC380-110	5.5kWx2	≥ 8ΩX2	External	
XFK 33-AC380-132	6.5kWx2	≥ 8ΩX2	External	
XFK 33-AC380-160	16kW	≥ 2.5Ω	External	
XFK 33-AC380-200	20kW	≥ 2.5Ω	External	
XFK 33-AC380-220	22kW	≥ 2.5Ω	External	
XFK 33-AC380-250	12.5kWx2	≥ 2.5ΩX2	External	
XFK 33-AC380-280	14kWx2	≥ 2.5ΩX2	External	
XFK 33-AC380-315	16kWx2	≥ 2.5ΩX2	External	
XFK 33-AC380-350	17kWx2	≥ 2.5ΩX2	External	
XFK 33-AC380-400	14kWx3	≥ 2.5ΩX3	External	
XFK 33-AC380-450	15kWx3	≥ 2.5ΩX3	External	
XFK 33-AC380-500	25kWx2	≥ 2.2ΩX2	External	
XFK 33-AC380-630	22kWx3	≥ 2.2ΩX3	External	
XFK 33-AC380-710	25kWx3	≥ 2.2ΩX3	External	
XFK 33-AC380-800	28kWx3	≥ 2.2ΩX3	External	

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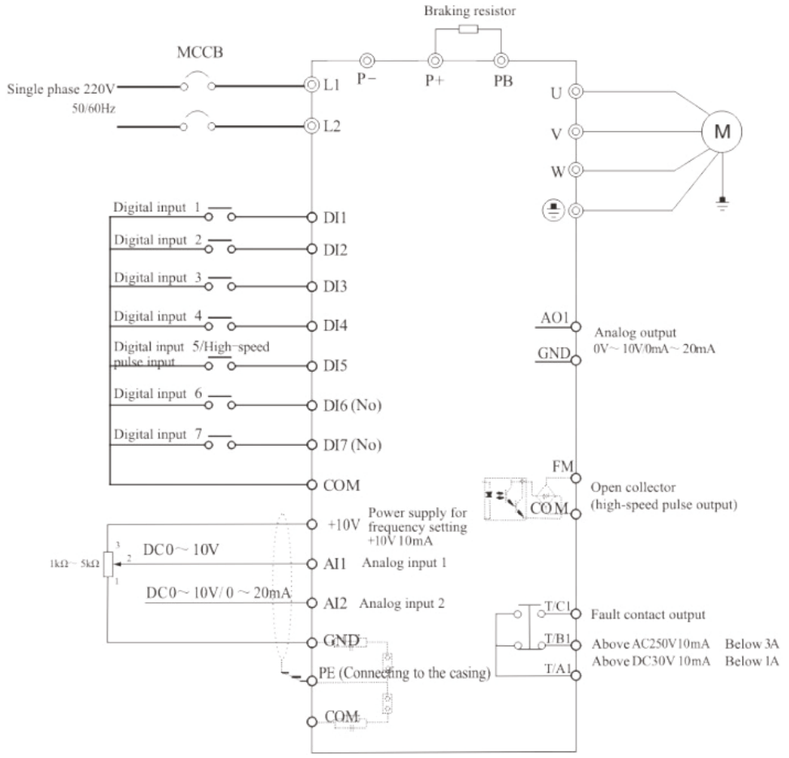
Connection Diagram

Typical connection diagram for a 220V single-phase inverter.



Single-Phase Inverter Connection Diagram

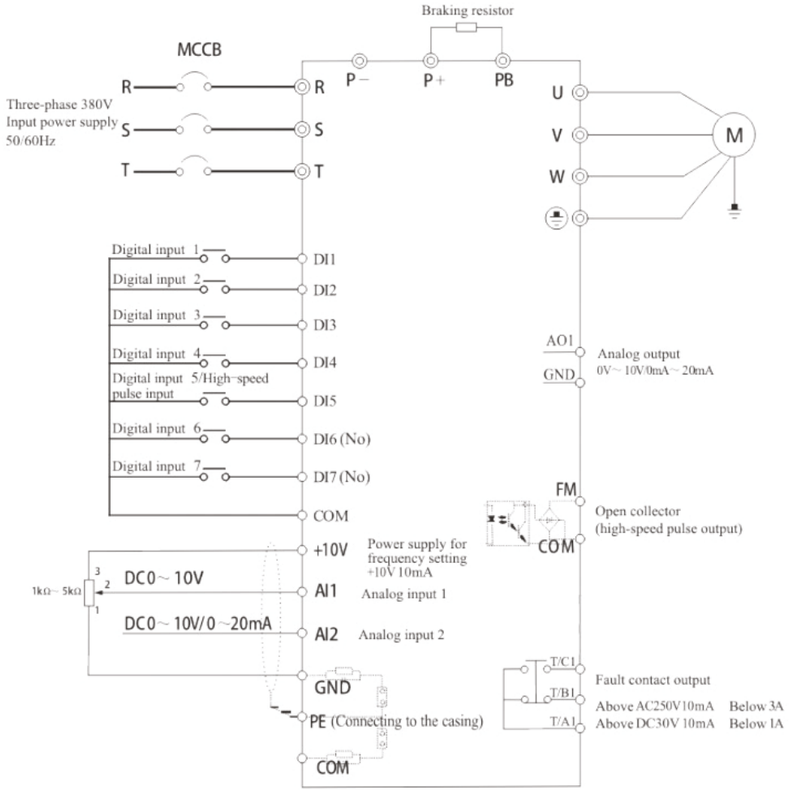
Note:

" ◎ " Terminal represents the main circuit terminal, and " ○ " represents the control circuit terminal.

The single-phase 220V 0.4kW-2.2kW integrated braking unit is the standard configuration.

The "B" symbol at the end of the product model indicates the integrated braking unit.

380V Three-Phase Inverter Connection Diagram



380V Three-Phase Inverter Connection Diagram

Note:

1.Terminal "◎" represents the main circuit terminal, and **"○" terminal** represents the control circuit terminal.

GENERAL PRODUCT CATALOG

FREQUENCY CONVERTER

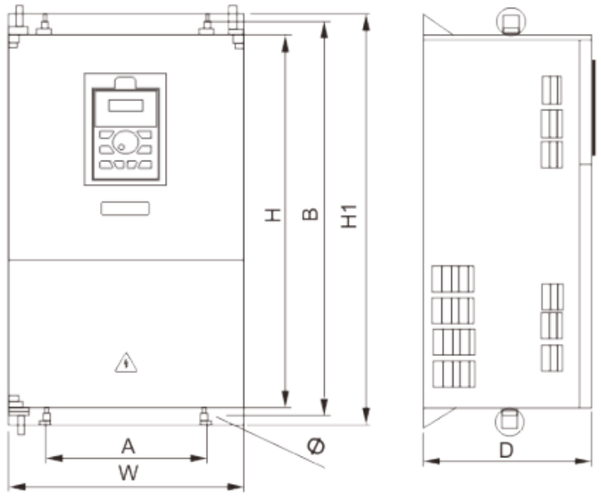
ORDER LIST

Frequency Converter



Type (Order) Code	Explanation	Box Quantity	Carton Quantity
XFK 13-AC220-0.37	Single Phase 220VAC 0.37kW	1	16
XFK 13-AC220-0.75	Single Phase 220VAC 0.75kW	1	16
XFK 13-AC220-1.5	Single Phase 220VAC 1.5kW	1	16
XFK 13-AC220-2.2	Single Phase 220VAC 2.2kW	1	16
XFK 33-AC380-0.75	Three Phase 220VAC 0.75kW	1	8
XFK 33-AC380-1.5	Three Phase 220VAC 1.5kW	1	8
XFK 33-AC380-2.2	Three Phase 220VAC 2.2kW	1	8
XFK 33-AC380-4	Three Phase 220VAC 4kW	1	6
XFK 33-AC380-5.5	Three Phase 220VAC 5.5kW	1	6
XFK 33-AC380-7.5	Three Phase 220VAC 7.5kW	1	6
XFK 33-AC380-11	Three Phase 220VAC 11kW	1	6
XFK 33-AC380-15	Three Phase 220VAC 15kW	1	2
XFK 33-AC380-18.5	Three Phase 220VAC 18.5kW	1	2
XFK 33-AC380-22	Three Phase 220VAC 22kW	1	2
XFK 33-AC380-30	Three Phase 380VAC 30kW	1	2
XFK 33-AC380-37	Three Phase 380VAC 37kW	1	1
XFK 33-AC380-45	Three Phase 380VAC 45kW	1	1
XFK 33-AC380-55	Three Phase 380VAC 55kW	1	1
XFK 33-AC380-75	Three Phase 380VAC 75kW	1	1
XFK 33-AC380-90	Three Phase 380VAC 90kW	1	1
XFK 33-AC380-110	Three Phase 380VAC 110kW	1	1
XFK 33-AC380-132	Three Phase 380VAC 132kW	1	1
XFK 33-AC380-160	Three Phase 380VAC 160kW	1	1
XFK 33-AC380-200	Three Phase 380VAC 200kW	1	1
XFK 33-AC380-220	Three Phase 380VAC 220kW	1	1
XFK 33-AC380-250	Three Phase 380VAC 250kW	1	1
XFK 33-AC380-315	Three Phase 380VAC 315kW	1	1
XFK 33-AC380-350	Three Phase 380VAC 350kW	1	1
XFK 33-AC380-400	Three Phase 380VAC 400kW	1	1
XFK 33-AC380-450	Three Phase 380VAC 450kW	1	1
XFK 33-AC380-500	Three Phase 380VAC 500kW	1	1
XFK 33-AC380-630	Three Phase 380VAC 630kW	1	1
XFK 33-AC380-710	Three Phase 380VAC 710kW	1	1
XFK 33-AC380-800	Three Phase 380VAC 800kW	1	1

DIMENSIONS



GENERAL PRODUCT CATALOG

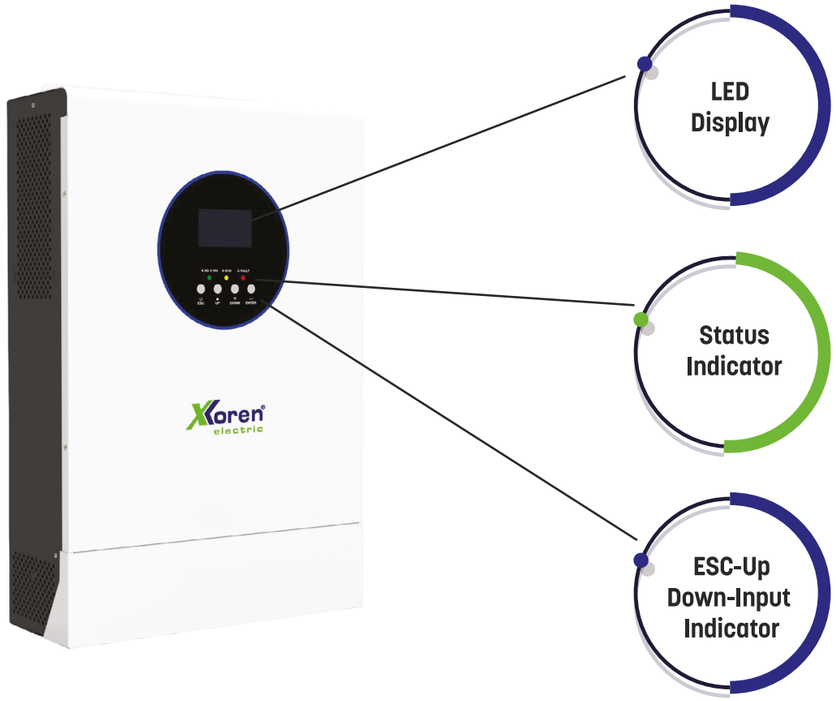
FREQUENCY CONVERTER

GENERAL AND INSTALLATION DIMENSIONS OF THE XFK SERIES

Inverter Model	Mounting Hole (mm)		Overall Dimension (mm)			Mounting Hole Diameter(mm)	Weight (kg)
	A	B	H	W	D		
Single-Phase 220V							
XFK 13-AC220-0.75	70	180	189	93	154	⌀ 5	1.6
XFK 13-AC220-1.5							
XFK 13-AC220-2.2							
Three- Phase 380V							
XFK 33-AC380-0.75	70	180	189	93	154	⌀ 5	1.6
XFK 33-AC380-1.5							
XFK 33-AC380-2.2							
XFK 33-AC380-4	80	233	245	120	173	⌀ 5	1.7
XFK 33-AC380-5.5							2.8
XFK 33-AC380-7.5							
XFK 33-AC380-11	125.5	267.5	281	145	188	⌀ 5	3.8
XFK 33-AC380-15	121	345	360	223	195	⌀ 6	3.9
XFK 33-AC380-18.5							9.5
XFK 33-AC380-22							
XFK 33-AC380-30							
XFK 33-AC380-37	200	422	440	256	230	⌀ 8	14.8
XFK 33-AC380-45							15
XFK 33-AC380-55	185	625	636	267	300	⌀ 10	36.4
XFK 33-AC380-75							37.3
XFK 33-AC380-90	239	682	695	310	300	⌀ 10	44.8
XFK 33-AC380-110							45.1
XFK 33-AC380-132	240	670	695	380	265	⌀ 10	57.5
XFK 33-AC380-160	380	720	750	460	360	⌀ 10	89
XFK 33-AC380-200							90.8
XFK 33-AC380-220							
XFK 33-AC380-250	560	1020	1055	638	410	⌀ 10	152.7
XFK 33-AC380-315							155
XFK 33-AC380-350							
XFK 33-AC380-400							162
XFK 33-AC380-450	570	1290	1320	740	420	⌀ 10	212
XFK 33-AC380-500							
XFK 33-AC380-630	/	/	1790	960	407	⌀ 10	372
XFK 33-AC380-710							380
XFK 33-AC380-800							

Product Code and Label Information





GENERAL PRODUCT CATALOG

HYBRID SOLAR INVERTER

XSI HYBRID SOLAR INVERTER



Hybrid Solar Inverter		Unit	XSI	
Type			XSI 1-3000H	XSI 1-6200H
Rated Power		W	**3000**	**6200**
Input				
Operating Voltage		VAC	208/220/230/240	
Input Voltage Range	Normal Mode		154-264VAC ±3V	
	UPS Mode		185-264VAC ±3V	
Operating Frequency		Hz	50/60	
Output				
Output Voltage		VAC	208/220/230/240	
Operating Frequency		Hz	50/60	
Output Wave			Pure Sinus Wave	
Transfer Time	Adjustable		10ms for computer equipment, 20ms for household appliances	
Maximum Power		VA	6000	11000
Battery				
Rated Operating Voltage		VDC	24	48
Constant Charge Voltage	Adjustable		28.2	56.4
Charger				
PV Charging method			MPPT	
Maximum PV Input		W	4000	6200
Maximum Power Point Tracking (MPPT) Range		VDC	120~500	
Maximum PV Input Voltage			500	
Maximum PV Charging Current		A	100	
Maximum AC Charging Current			60	
Maximum Charging Current			100	
Indicator				
LCD			Operating Mode/Load/Input/Output	
Communication Port				
RS232			5PIN/Pitch2.54mm,baud rate 2400	
Expansion Slot Communication Interface			5PIN/Pitch2.54mm, Lithium Battery BMS communication card, WIFI	
Ambient Temperature				
Operating Ambient Temperature Range		°C	0....+45	
Storage Ambient Temperature Range			-15....+60	
Humidity		%	20~95	
Noise Range		dB	<50	
Dimension and Weight				
Dimensions	h*w*g	mm	495x312x125	
Weight		kg	7.5	10.5

General Information

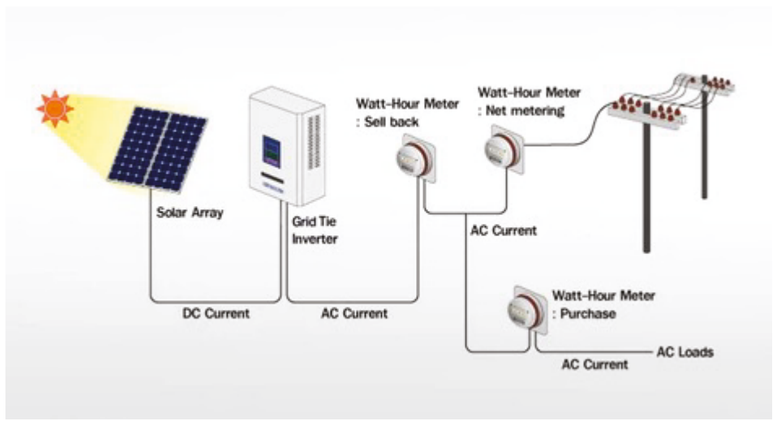
An inverter is a power electronics device that enables the conversion of electrical energy. It converts Direct Current (DC) into Alternating Current (AC), providing flexibility and efficiency in electrical systems. It is also known as a converter or power inverter. Devices that perform the opposite function, converting AC energy into DC, are called "rectifiers."

Applications of Inverters

- Converts high-voltage AC power from the grid to 220V AC, providing a suitable power source.
- Converts DC voltages such as 12V, 24V, or 48V to 220V AC, offering ease of use.
- Allows frequency adjustments between 0.5 Hz and 2000 Hz, making motor speed control possible.
- Regulates electrical fluctuations to supply clean and stable energy to sensitive circuits.

Advantages of Inverters

- Converts energy from different voltage levels to 220V AC, enabling a wide range of applications.
- Provides energy control by adjusting speed.
- Regulates grid voltage and frequency to ensure stable power flow.
- Enhances capacity control and energy efficiency, optimizing system performance.
- Supports efficient operation of industrial motors by allowing variable speed adjustments.
- Reduces motor startup current, preventing sudden overloads.
- Lowers maintenance and repair costs, reducing operational expenses.
- Enables efficient utilization of renewable energy sources such as solar and wind power.



Working Principle of a Solar Inverter

With the increasing interest in renewable energy, solar power systems have gained significant importance. A solar inverter is one of the essential components of a solar energy system. It converts the direct current (DC) generated by solar panels into alternating current (AC), which is used in homes and businesses, ensuring the functionality of the energy system.

To better understand the system:

1.Solar Panels (Photovoltaic Panels - PV): Panels that convert sunlight into electrical energy.
2.Solar Inverter: A device that converts DC electricity from PV panels into AC electricity.
3.Battery (if available): Used to store the generated energy.
4.Charge Controller (if available): Regulates the current flowing to the battery.

General Working Principle of a Solar Inverter

1. Energy Generation:

- Solar radiation is absorbed by photovoltaic cells.
- Using semiconductor materials (such as silicon), solar panels convert light energy directly into electrical energy.
- This energy is generated as direct current (DC).

2. Transmission of DC Power to the Solar Inverter:

- The DC power generated by solar panels is either directly sent to the inverter or stored in a battery.
- The use of batteries ensures uninterrupted operation and energy availability during periods without sunlight.

3. Conversion of DC to AC by the Inverter:

- The DC power is processed through a transformer and power electronics circuits within the inverter.
- Hybrid solar inverters optimize energy conversion efficiency using Maximum Power Point Tracking (MPPT) based on energy demand.
- The MPPT feature ensures that the panels operate at peak efficiency, converting energy into AC in the most effective manner.

4. Utilization of Alternating Current:

- The AC output from the inverter (208/220/230/240 VAC) supplies power to household electrical devices.
- The output frequency can be set to 50/60 Hz.
- The output waveform is a pure sine wave, ensuring safe operation of sensitive electronic devices.

5. Energy Storage and Management:

- If the system includes a battery, excess solar energy is stored for later use.
- Stored energy can be used during nighttime or power outages.
- Battery voltage can be configured to 24V or 48V, with charging voltage adjustable between 28.2V - 56.4V.

Technical Working Principle of a Solar Inverter

1. Operating Voltage and Input Voltage:

- The inverter operates within an input voltage range of 154-264 VAC (±3V).
- The operating frequency is 50/60 Hz and can be adjusted according to the grid.

2. Output Characteristics:

- The output voltage can be set to 208/220/230/240 VAC.
- Maximum power output:
  - o XSI 1-3000H model: 6000 VA
  - o XSI 1-6200H model: 11000 VA

3. Charge Control Mechanism:

- Maximum PV input:
  - o 3000W for XSI 1-3000H
  - o 6200W for XSI 1-6200H
- MPPT range: 120-500V, ensuring optimal panel efficiency.
- Maximum PV charging current: 100A
- Maximum AC charging current: 100A

4. Battery Usage and Storage:

- Nominal operating voltage: 24V or 48V, adjustable based on system requirements.
- Battery charging voltage is configurable and can be managed via battery management systems (BMS).

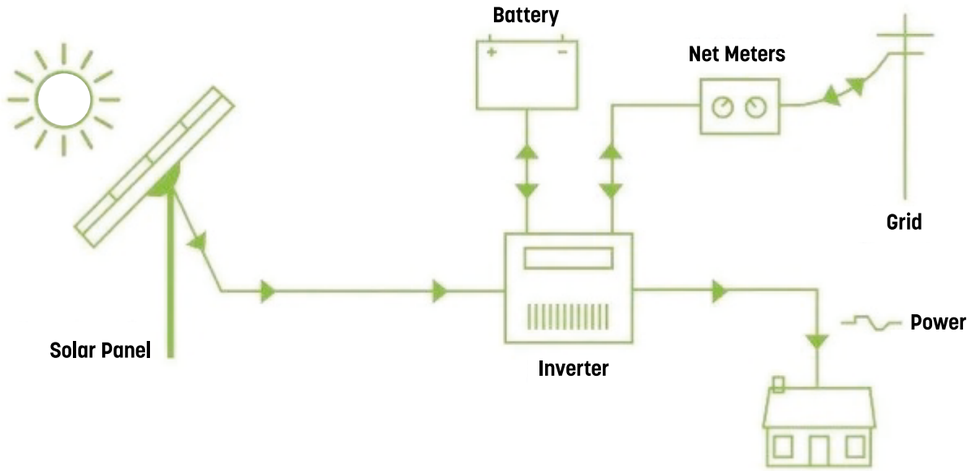
5. Communication and Control:

- LCD display provides real-time monitoring of operating mode, load status, and input/output parameters.
- Supports communication via RS232 and expansion slots.

6. Environmental Conditions and Durability:

- Operating temperature: 0...+45°C
- Storage temperature: -15...+60°C
- Humidity tolerance: 20-95%
- Noise level: <50dB

HYBRID



Conclusion

Solar inverters are critical devices that convert direct current (DC) from solar panels into alternating current (AC) used in our homes. Hybrid models utilize advanced technologies such as MPPT (Maximum Power Point Tracking) to enhance energy efficiency.

These systems are equipped with features such as high power output, wide input voltage range, battery integration, and intelligent charging management. Factors like operating voltage range, output waveform, and battery management play a crucial role in ensuring system reliability and efficiency.

As renewable energy sources continue to expand in the future, selecting the right inverter and optimizing system efficiency will provide significant advantages.

MPPT (Maximum Power Point Tracking)

MPPT is a technology and algorithm designed to maximize the efficiency of solar panels. The output power of solar panels varies depending on factors such as solar irradiance, temperature, and environmental conditions. However, each panel has a specific Maximum Power Point (MPP) at which it operates with the highest efficiency.

MPPT technology continuously monitors and adjusts the voltage and current to ensure the panels produce maximum power.

Working Principle of MPPT

- The MPPT algorithm analyzes the voltage (V) and current (I) values of the solar panel.
- Based on these values, it calculates the power curve (P = V × I) and identifies the peak point.
- The inverter or charge controller then dynamically adjusts the input voltage and current to maintain operation at this point.
- As a result, even under low-light conditions or changing weather conditions, the energy extracted from the panels is maximized.

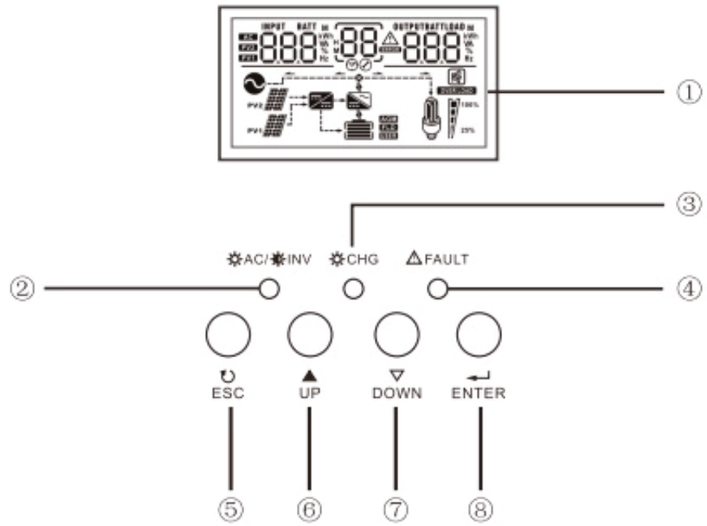
Advantages of MPPT

- Up to 30% more energy production compared to conventional charge controllers.
- More efficient charging process, ensuring optimal battery performance.
- Stable performance even under changing weather conditions such as cloudy or low-light environments.
- Compatibility with different types of solar panels, allowing flexibility in system design.

LCD Display

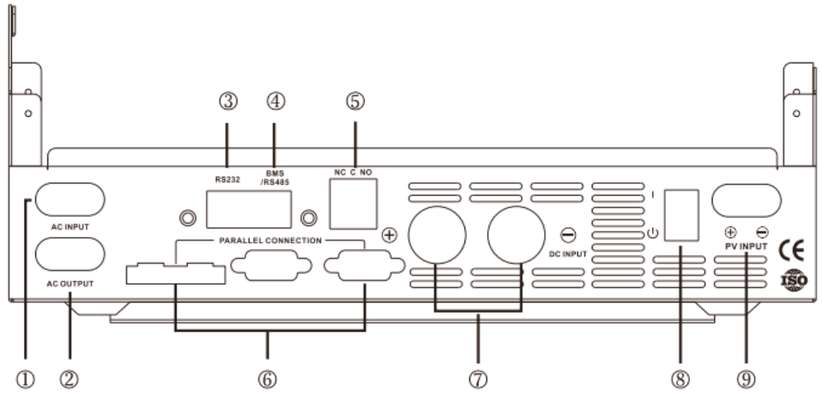
The LCD screen provides real-time monitoring of system parameters, including:

- Operating mode (grid-tied, off-grid, or hybrid).
- Input and output voltage, current, and power levels.
- Battery status and charging mode.
- System alerts and error messages for troubleshooting and maintenance.

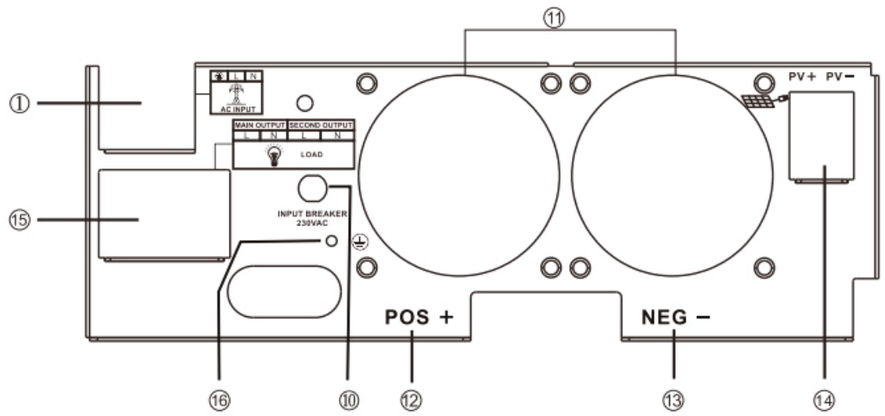


1.LCD Screen
2.Status Indicator
3.Charging Indicator
4.Fault Indicator
5.ESC
6.Up
7.Down
8.Enter

Rear Panel



Dual Output Rear Panel

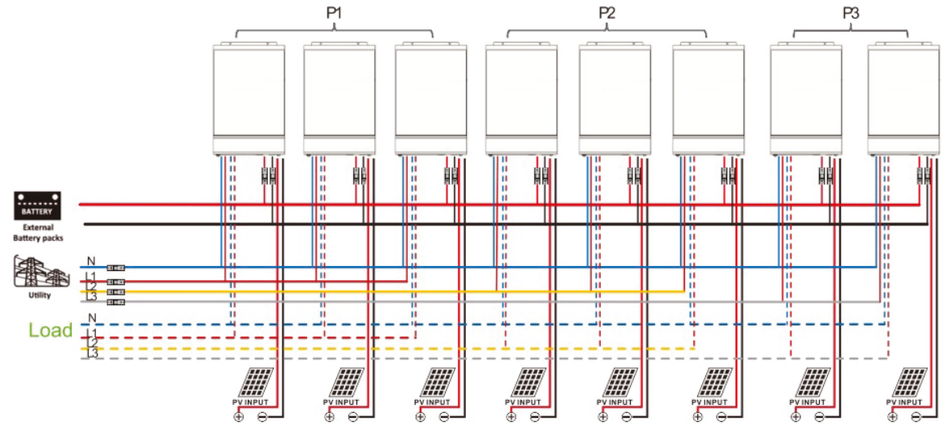


1.AC Input
2.AC Output
3.Communication Port
4.BMS/RS485 Communication Port
5.Dry Contact
6.Parallel Connection
7.Battery Input
8.Power ON/OFF Switch
9.PV Input
10. Input Breaker
11. Fan
12. Battery (+) Terminal
13. Battery (-) Terminal
14. Solar Panel Input
15.AC Main / Secondary Output
16. Output Ground Cable

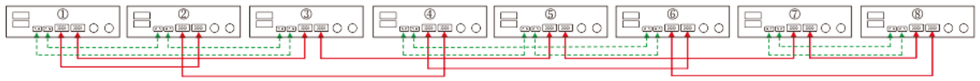
Communication Connection



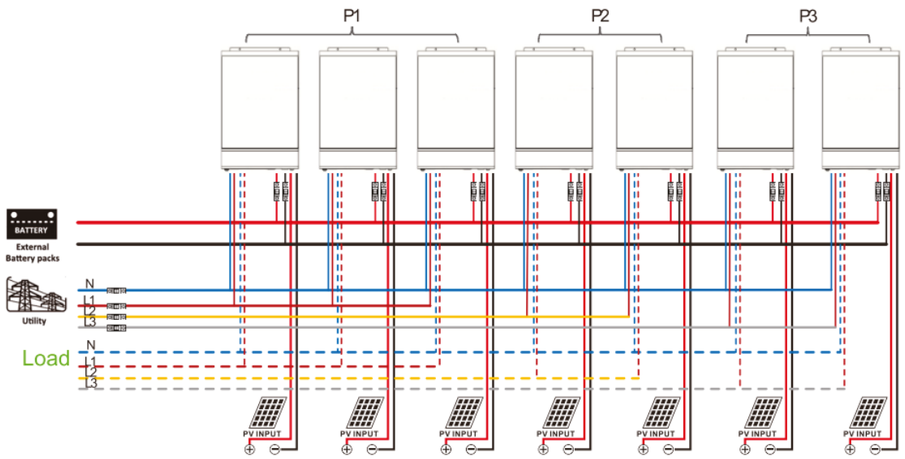
There are **3 inverters in the first phase, 3 inverters in the second phase,** and **2 inverters in the third phase.**
Power connection (Each photovoltaic panel must be connected to an independent system).



Communication Connection

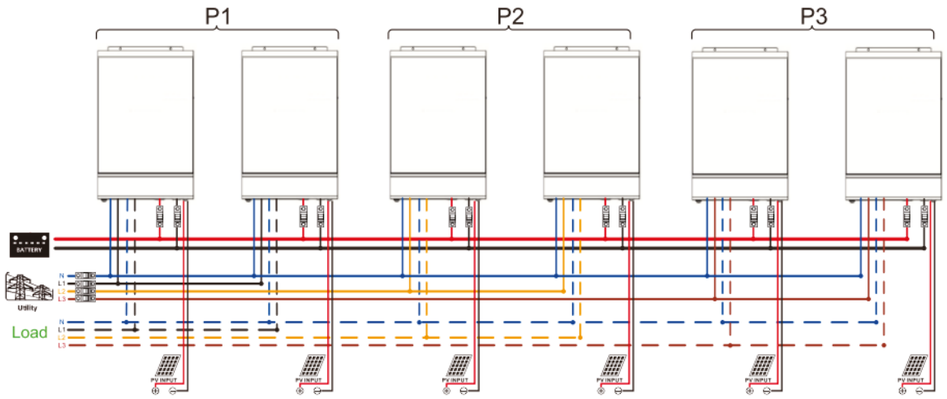


There are three inverters in the first phase, two inverters in the second phase, and two inverters in the third phase.
Power connection (Each photovoltaic panel must be connected to an independent system).



Communication Connection

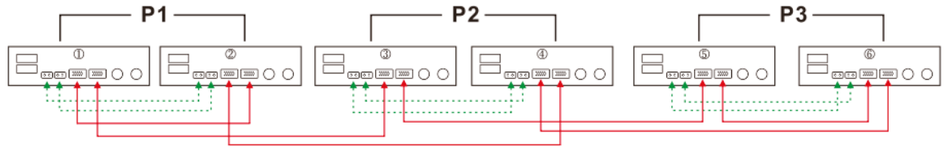
There are two inverters in each phase.
Power connection (Each photovoltaic panel must be connected to an independent system.)



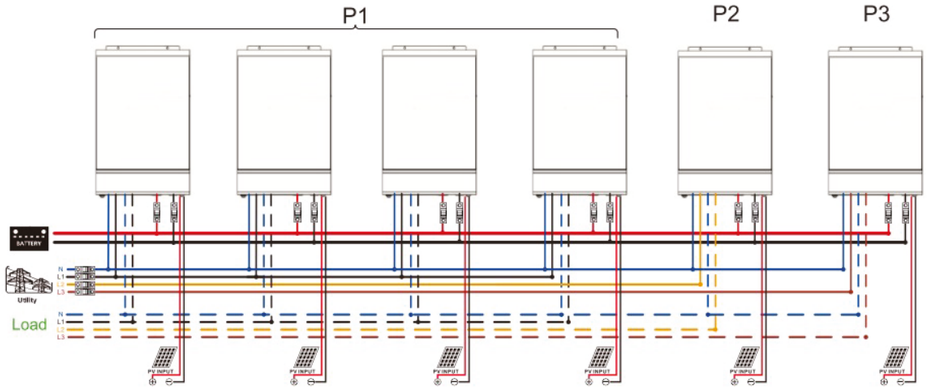
GENERAL PRODUCT CATALOG

HYBRID SOLAR INVERTER

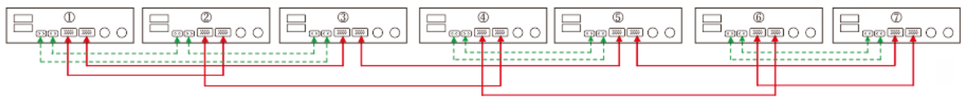
Communication Connection



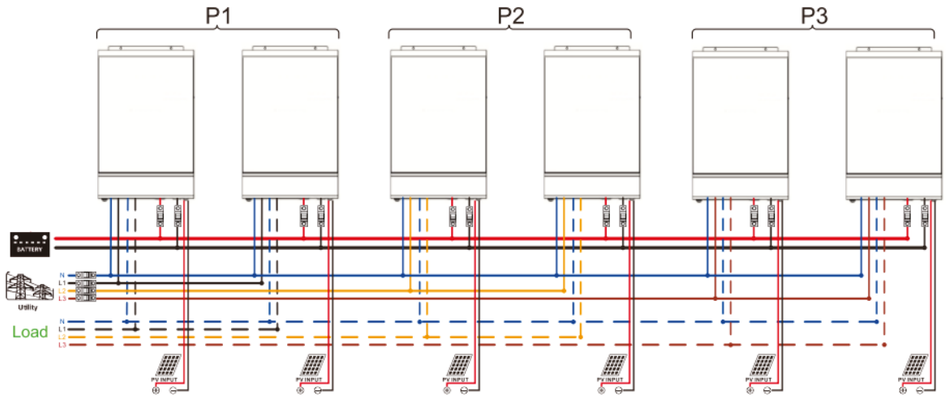
In the first phase, four inverters; in the other two phases, one inverter each:
Power connection (Each photovoltaic panel should be connected to an independent system.)



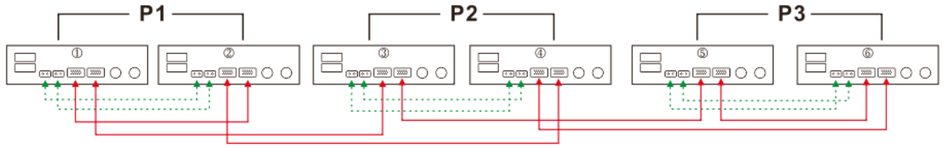
Communication Connection



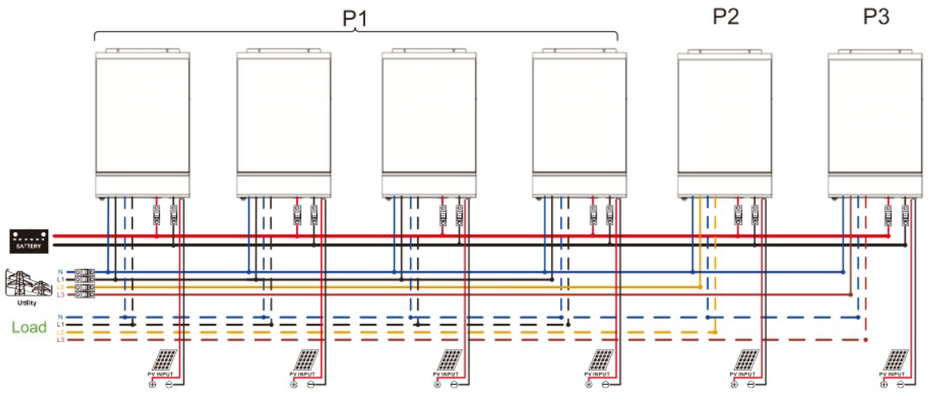
There are two inverters in each phase.
Power connection (Each photovoltaic panel must be connected to an independent system.)



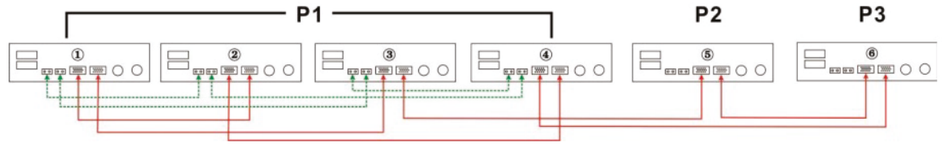
Communication Connection



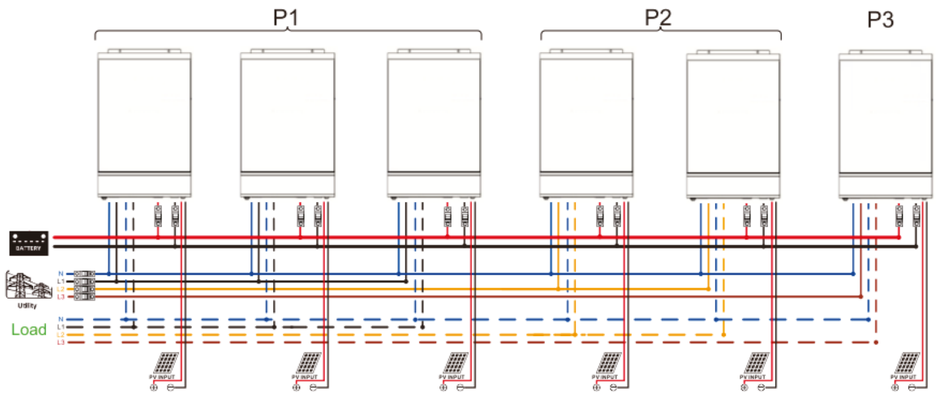
In the first phase, four inverters; in the other two phases, one inverter each:
Power Connection (Each photovoltaic panel should be connected to an independent system.)



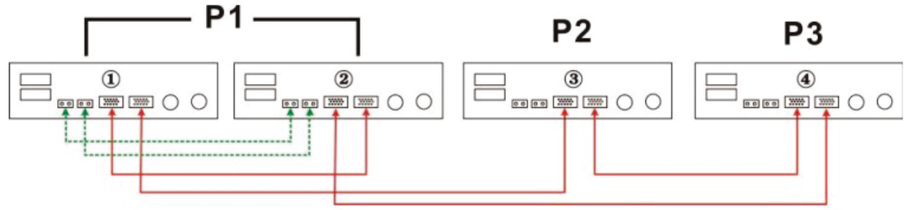
Communication Connection



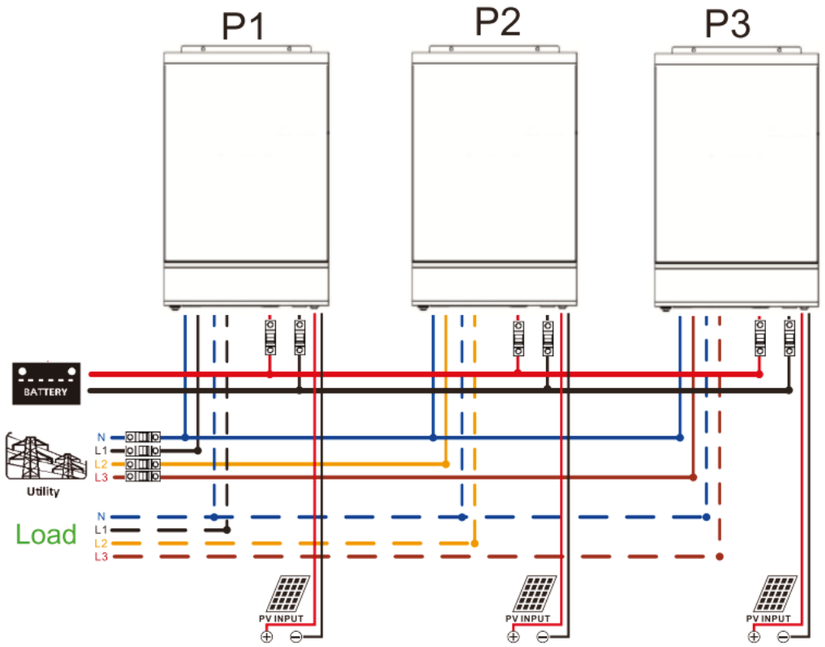
In the first phase, three inverters; in the second phase, two inverters; and in the third phase, one inverter:
Power Connection (Each photovoltaic panel should be connected to an independent system.)



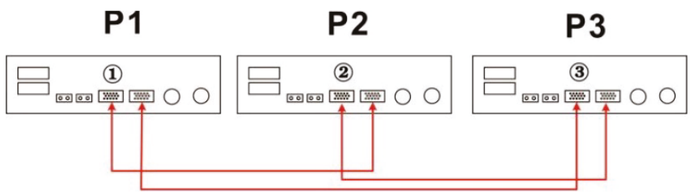
Communication Connection



There is **one inverter in each phase.**
Power connection (Each photovoltaic panel must be connected to an independent system.)



Communication Connection



Warning: Do not connect the current sharing cable between inverters in different phases. Otherwise, it may damage the inverters.

GENERAL PRODUCT CATALOG

HYBRID SOLAR INVERTER

ORDER LIST

Solar Inverter



Type (Order) Code	Explanation	Box Quantity	Carton Quantity
XSI 1-3000-H	Single Phase 3000W Hibrid	1	1
XSI 1-6200-H	Single Phase 6200W Hibrid	1	1

Product Code and Label Information





GENERAL PRODUCT CATALOG

UNINTERRUPTIBLE POWER SUPPLY

XPS Online Uninterruptible Power Supply (UPS)



Uninterruptible Power Supply / Online UPS		XPS Online			
Type		XPS 1000	XPS 3000	XPS 6000	XPS 10000
Capacity		1000VA / 800W	3000VA / 2400W	6000VA / 5400W	10000VA / 10000W
Input					
Operational Voltage	V	220-240			
Input Voltage Range	VAC	110-300			
Frequency	Hz	50/60			
Power Factor		0.95	0.97	0.99	
Output					
Output Voltage (Battery Mode)	V	220± 1%			
Frequency (Battery Mode)	VAC	50/60			
Transfer Time	Hz	4			
Waveform		Pure Sinus			
Battery					
Battery Type		12V/7AH			
Number of Batteries		2 pcs	6 pcs	12 pcs	16 pcs
Charging Time		6 hours (90% capacity)			
Backup Timesi		7-20 min (depending on computer load)			
Indeicator					
LCD		Load level, battery capacity, AC Mode, battery mode, bypass mode, fault indication			
Communication					
		Clever RS232 Interface			
Protections					
		Lightning protection, noise and surge protection; Short circuit and overload protection			
Audible Alarms					
Battery Mode		Beeps every four seconds			
Low Battery		Beeps once every second			
Overload		Beeps once every second			
Fault		Continuous beeps			
Environmental Conditions					
Operating Temperature Range	°C	0....+40			
Humidity	%	95			
Protection Class		IP20			
Noise Level	dB	<40			
Dimensions and Weight					
Dimensions h*w*g	mm	352*145*213			
Weight	kg	10.9	27.7	29.5	33.7

XPS Offline Uninterruptible Power Supply (UPS)



Uninterruptible Power Supply / Offline UPS		XPS Offline	
Type		XPS 1500	XP2000
Capacity		1500VA / 900W	2000VA / 10200W
Input			
Operational Voltage	V	220	
Input Voltage Range	VAC	145-380	
Frequency	Hz	50/60	
Output			
Output Voltage (Battery Mode)	V	220± 10%	
Frequency (Battery Mode)	VAC	50/60	
Transfer Time	Hz	6	
Waveform		Pure Sinus	
Battery			
Battery Type		12V/9AH	
Battery Type		2 piece	
Charging Time		6 hours (90% capacity)	
LED Indicator			
		Green Light	
		Red Light	
Protections			
		Overload Protection, Deep Discharge Protection, Overcharge Protection	
Audible Alarms			
Battery Mode		Beeps every six seconds	
Low Battery		Beeps once every second	
Overload		Beeps every two second	
Fault		Continuous beeps	
Environmental Conditions			
Operating Temperature Range	˚C	0....+40	
Humidity	%	95	
Protection Class		IP20	
Noise Level	dB	<40	
Dimensions and Weight			
Dimensions h*w*g	mm	460*460*315	
Weight	kg	13	13.5

GENERAL PRODUCT CATALOG

UNINTERRUPTIBLE POWER SUPPLY

General Information



XPS Online UPS Series

Power outages and voltage fluctuations can pose significant risks, particularly for sensitive devices. The XPS Online UPS series offers a reliable solution for critical applications, ranging from industrial facilities to data centers, by providing continuous, clean, and stable power to connected devices through advanced double conversion technology.

Operating Principle

Online UPS systems convert AC power to DC first, and then regenerate AC output, providing uninterrupted, fluctuation-free power. This ensures that the output voltage remains stable and 100% reliable, independent of grid interruptions or fluctuations.
The XPS 1000, XPS 3000, XPS 6000, and XPS 10000 models offer a wide range of power capacities, from 1000VA to 10,000VA, delivering solutions tailored to different needs. With a transfer time of just 4 ms, connected devices will not experience any disruption.

Technical Features and Advantages
Strong Performance and Precision Regulation

- **Input Voltage Range:** 110-300 VAC, ensuring stable operation even during low voltage fluctuations.
- **Output Voltage:** 220V ± 1%, delivering perfectly stable power to connected devices.
- **Waveform:** Pure Sine Wave, supporting the healthy and long-lasting operation of sensitive electronic equipment.
- **Power Factor:** 0.95 - 0.99, enhancing energy efficiency and ensuring low power loss during UPS operation.

Durable Battery System

- **Battery Type:** 12V / 7AH high-capacity batteries, reaching 90% charge in 6 hours.
- **Battery Quantity:** 2, 6, 12, or 16 units (depending on the model), providing extended backup time.
- **Backup Time:** 7-20 minutes, depending on the load of connected devices.

Smart Monitoring and Alert Mechanisms

- **LCD Display:** Shows real-time information such as load level, battery capacity, AC mode, battery mode, bypass mode, and error indicators.
- **Smart RS232 Communication Interface:** Enables UPS monitoring and management.
- **Audible Alerts:**
  - **Battery Mode:** Beep every 4 seconds.
  - **Low Battery:** Beep every second.
  - **Overload:** Beep every second.
  - **Error Condition:** Continuous beep.

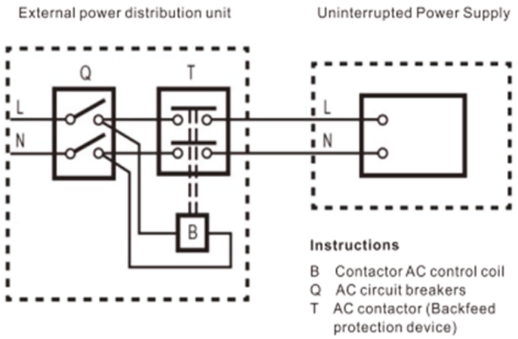
Advanced Protection Mechanisms

- **Lightning Protection:** Provides extra security against sudden voltage surges.
- **Short Circuit and Overload Protection:** Prevents damage to devices and the UPS itself.
- **Noise and Ripple Protection:** Ensures safe operation of sensitive electronic devices.

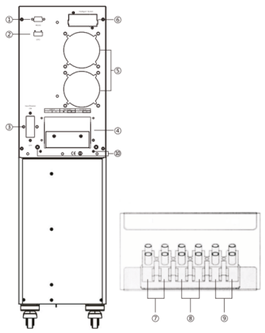
Environmental and Physical Characteristics

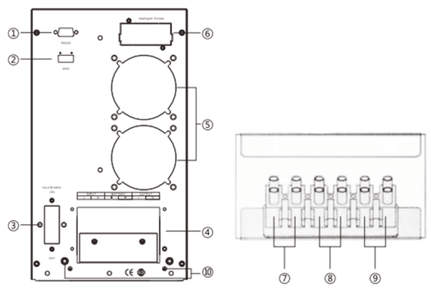
- **Operating Temperature:** 0°C - 40°C, ensuring smooth operation across a wide temperature range.
- **Humidity Resistance:** 95%, ensuring safe performance even in high-humidity environments.
- **Protection Class:** IP20, suitable for indoor use.
- **Low Noise Level:** <40 dB, making it suitable for office and data center environments.

As a result, the XPS Online UPS series offers an excellent solution for data centers, industrial facilities, and environments with sensitive electronic devices, with high efficiency, advanced protection systems, and guaranteed uninterrupted power. The double conversion technology, near-zero transfer time, and the LCD screen monitoring system make it a reliable and long-lasting power source for any critical application.



Rear View





Rear panel

Input and output

1.RS-232 communication port
2.Emergency power off function connection (EPO connection) (optional)
3.Input power circuit breaker
4.Output/Input terminals
5.Fan
6.Smart slot
7.Network input terminals
8.Battery input terminals
9.Output terminals
10.Grounded

• Independent installation

The installation and wiring should comply with local electrician regulations and should be carried out by professional electricians following the instructions below:

• To prevent electrical shock or fire accidents, ensure that the building's power distribution lines and circuit breakers are sufficient to support the UPS capacity. Please DO NOT use a wall outlet as the UPS input power source (its nominal current is lower than the maximum input current of this UPS), as the outlet may overheat.

• Before installation, please turn off the main power switch inside the building.

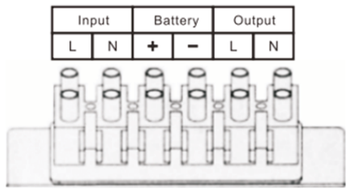
• All load equipment must be turned off before connecting to the UPS system.

• Prepare the wire according to the comparison table below.

Model	Cabling Specifications (AWG)			
	Grid input	Grid output	Battery input	Grounding cable
6K	10	12		12
6KS	10	12	12	12
10K	8	8		8
10KS	8	8	8	8

Note 1: For safety and efficiency, it is recommended to use the wire specified in the table above or one with a higher specification.

Note 2: The color of the wire should comply with local electrical regulations.



Terminal block diagram

UPS Output Connection

•Socket-type outputs: You can connect devices directly to the sockets on the UPS.

•Terminal-type input/output connections: Follow the steps below to complete the connection:

1.Remove the socket-type outputs and prepare the devices for direct connection.

2.It is recommended to use an AWG14 (2.1 mm^2) power cable.

3.After completing the connection, check that all cables are securely attached.

4.Reattach the small cover on the rear panel.

Contact Link

Communication ports:



For the UPS's shutdown/startup operations and status monitoring functions, one end of the communication cable should be connected to the RS-232 or USB port, while the other end should be connected to the computer's communication port. Once the monitoring software is installed, the UPS's startup and shutdown processes can be scheduled, and its operational status can be monitored through the computer. Additionally, this UPS system is equipped with a smart slot that supports the installation of an SNMP card. By adding the SNMP card, access to more advanced communication functions can be gained, and various monitoring options can be utilized.

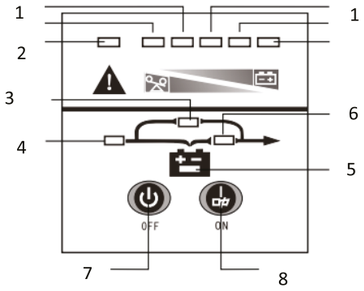
Operating Instructions

Button Operation

Button	Specifications
ON/Mute Button	•**Turning On the UPS:** To turn on the UPS, press and hold the ON/Mute button for at least 2 seconds. •**Muting the Alarm:** When the UPS is in battery mode, press and hold this button for at least 5 seconds to disable or enable the alarm system. However, this action is not applicable during warning or error conditions. •**Up:** In UPS setting mode, press this button to view the previous selection.
OF/Enter Button	•**Turning Off the UPS:** To turn off the UPS, press and hold this button for at least 2 seconds. When the power is in normal condition, the UPS will enter standby mode, or if Bypass mode is enabled, pressing this button will switch to Bypass mode. •**Confirming the Selection:** In UPS setting mode, press this button to confirm the selection.
Function Button	•**Settings Mode:** While the UPS is in standby mode, press and hold the function button for 10 seconds to enter the UPS settings mode. •**Next Selection:** In the UPS settings mode, the function button is used to select the next option.

LED Panel

The meaning of each indicator is shown below (from top to bottom).

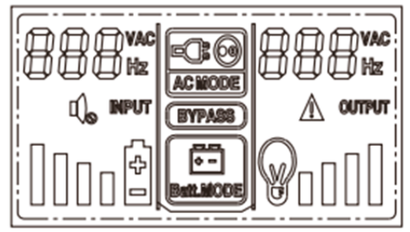


Some icons on the panel display

1.Load-Battery Indicator
2.Fault Indicator Light
3.Bypass Indicator
4.Auxiliary Slot Indicator
5.Battery Indicator
6.Inverter Indicator
7.Power Button
8.Power/Silent Button

To turn on the UPS, press and hold the "ON" button on the front panel for 1 second. For turning off, press and hold the "OFF" button for the same duration. The UPS's operational status can be monitored through various indicators on the front panel. If the bypass indicator is illuminated, it indicates that the load is being powered directly through the grid via bypass mode. When the inverter indicator is active, it means the load is powered by the UPS inverter. If the battery indicator is lit, it signifies that the UPS is supplying the load through the inverter from the battery. When the fault indicator is active, it indicates an abnormal condition in the UPS. Additionally, the load and battery capacity indicators display the load level or battery capacity in a bar graph format, showing the percentage.

• LCD Display



LCD Monitor	Specifications
888	Displays input and output voltage and frequency
INPUT	Displays power input
OUTPUT	Displays UPS output
⚠	Shows UPS fault
	Displays battery capacity
	Displays load capacity
BatMODE	Displays UPS in battery mode
ACMODE	Displays UPS in grid mode
	Displays UPS in silent mode

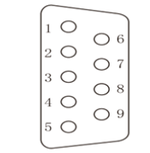
• Buzzer warning sound

Battery mode	1 beep every 6 seconds
Low battery capacity	1 beep per second
Overload	2 beeps per second
UPS fault	1 beep per second
Bypass mode	1 beep every 120 seconds

Communication Interface Port

Computer Interface
The serial UPS provides a standard DB9 output.
Each pin of the DB9 is shown as follows

PIN	MEANING
1	EMPTY
2	SEND
3	RECEIVE
4	EMPTY
5	GND
6	EMPTY
7	EMPTY
8	EMPTY
9	WAKE



◆ computer interface

Storage and Maintenance

Storage Temperature	Charging Range	Charging Time
-20 °C- 40 °C	Every 3 months	1-2 hours
40 °C - 45 °C	Every 2 months	hours

Note: Before storing, charge the 1-3 kVA UPS for 5 hours and the 6-10 kVA UPS for 7 hours.

Maintenance

The UPS system contains high voltages that can be dangerous to human life and should only be repaired by qualified maintenance personnel. The risk of electric shock must always be considered, as even if the main power source is cut off, the components inside the UPS may still be connected to the battery and pose a danger. Before performing any maintenance or service work, the battery should be removed, and it must be verified that there is no hazardous voltage in the bus capacitors. Battery replacement should only be carried out by maintenance personnel who are fully knowledgeable about this process and have taken the necessary protective precautions. Unauthorized persons should not interfere with the battery.

The battery circuit is not isolated from the grid input, and dangerous voltage may occur between the battery terminals and ground. Therefore, it should be ensured that the voltage is completely turned off before any contact. Additionally, batteries can cause electric shock and generate high currents in the event of a short circuit. To avoid this risk, metallic objects like watches and rings should be removed before maintenance, and only tools with insulated handles should be used.

During battery replacement, batteries of the same number and specifications as the existing batteries should be used. Otherwise, the system's safety could be compromised.

For safety reasons, batteries should never be thrown into fire as there is a risk of explosion. Used batteries should be disposed of in accordance with local regulations.
Furthermore, if the battery is removed or damaged, the electrolyte inside may leak and cause serious harm to the skin and eyes, and it may have toxic effects. To prevent fire risks, only fuses of the same type and amperage should be used, and the UPS system should never be disassembled by non-professional individuals.

GENERAL PRODUCT CATALOG

UNINTERRUPTIBLE POWER SUPPLY

ELECTRICAL CHARACTERISTICS

1-3kVA UPS

Model		1K(S)	2K(S)	3K(S)
Capacite		1000VA/800W	2000VA/1600W	3000VA/2400W
Input				
Voltage Range	Low-line transfer	160VAC/140VAC/120VAC/110VAC ±5% (T<35°C) (Based on load percentage: 100%-80% / 80%-70% / 70%-60% / 60%-0%)		
	Low-line comeback	175VAC/155VAC/135VAC/125VAC ±5% (T<35°C) (Based on load percentage: 100%-80% / 80%-70% / 70%-60% / 60%-0%)		
	High-line transfer	300VAC±5%		
	High-line comeback	290VAC±5%		
Frequency Range		40Hz-70Hz		
Phase		Single phase with ground		
Power Specifications		220VAC-230VAC (input voltage)		
Output				
Output Electricity		200/208/220/230/240VAC		
Mains Voltage Range		±1 % (Battery Mode)		
Frequency Range (synchronization range)		47 53Hz ~ or 57Hz		
Frequency Range (battery mode)		50HZ ±0.25Hz or 57Hz ~63Hz		
Overload		T<35°C 105%~ 110% UPS shuts down after 10 minutes in battery mode or activates the bypass system when the utility is normal.		
		Between 110% and 130%, the UPS will shut down after 1 minute in battery mode, or switch to bypass mode when the grid power is normal.		
		> 130%, UPS shuts down after 3 seconds in battery mode or switches to bypass mode when the utility is normal.		
Peak Current Ratio		03:01		
Harmonic Distortion		≤3% THD (Linear load), ≤ 6%THD (Non-linear load)		
Transfer Time	AC Mode (Battery Mode)	0		
	Inverter to bypass	4ms (Typical)		
Battery Mode		Pure sinewave		
Effectiveness				
Mains Mode		88%	89%	90%
Battery Mode		83%	87%	88%

Battery Mode				
Standard Model	Battery Model	12V/7AH	12V/7AH	12V/7AH
	Number of Battery	2	4	6
	Recharging Current	1A		
	Charging Mode	27.3VDC± 1%	54.7VDC± 1%	82.0VDC± 1%
Long-Run Model	Battery Model	12V/AH (Depends on buyer)		
	Number of Battery	3	6	8
	Recharging Current	5A	5A	5A
	Charging mode	41.0VDC ± 1%	82.1VDC ± 1%	109.4VDC± %1
Outer				
Standard Model Long-Run Model	Sizes D x W x H (mm)	352 x145 x 213	450 x 192 x 335	
Enviromental Conditions				
Operating Humidty		20-90%RH 0-40°C (non-condensing)		
Noise		Less than 50dB, 1 meter		
Management				
Intelligent RS-232		Supports Windows 2000/2003/XP/Vista/2008/7/8, Linux, Unix and MAC		
SNPM (Optional)		Power management from SNMP manager and web browser.		

The output power is reduced by 80% in frequency conversion mode: When the output voltage is set to 200VAC or 280VAC, the output power will be reduced by 80%.

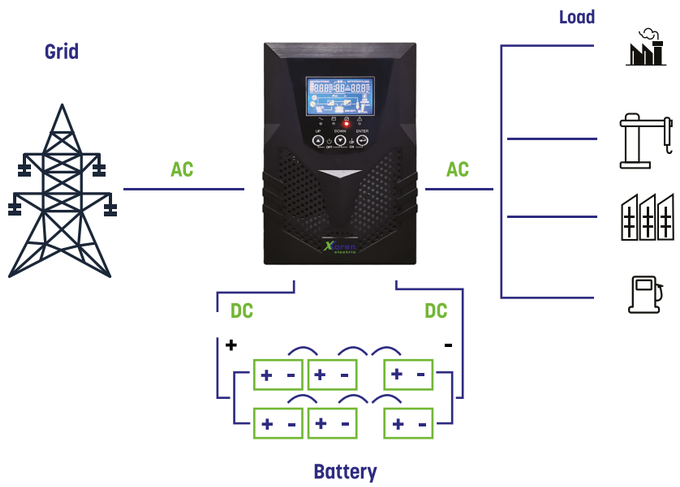
6-10kVA UPS

Model		6KVA	10KVA
Capacite		6000VA/5400W	10000VA/9000W
Input			
Voltage Range	Min. switching voltage	%50 yük,110VAC±3%;100% Yük; 176VAC±3%	
	Min. recovery voltage	Minimum switching voltage+10%	
	Max. switching voltage	300VAC±5%	
	Max. recovery voltage	Maxsimum switching voltage-10%	
Frequency Range		40Hz-60Hz-50Hz system/50-70Hz-60Hz system	
Phase		L+N+PE	
Power Specifications		100% load ≥0.99	
Output			
Output Electricity		208/220/230/240VAC	
Mains Voltage Range		±1%	
Frequency Range (synchronization range)		40Hz-60Hz-50Hz system/50-70Hz-60Hz system	
Frequency Range (battery mode)		50Hz±0.1Hz or 60Hz±0.1Hz	
Overload	AC Mode	30min. 102%-110%;10min 110%-130% load;30sn 130%-150% yük; 500ms> 150 load	
	Battery Mode	10min 102%-110% load, 1min 110%-130% load,10sn 130%-150% load,500ms >150% load	
Peak Current Ratio		3:1 (maksimum)	
Harmonic Distortion		≤2% (linear load),≤ 5%(non- linear load)	
Switching Time	Mains (←→)Battery	0ms	
	Inverter (←→)Bypass	0ms	
Effectiveness			
AC Mode		95%	
Battery Mode		94.8%(20 pcs batteries)	

Battery			
Standard Model	Number of battery	12-16 pcs	16
	Charging current	default 1A	
	Charging voltage	13,65 x N ±1%	
Long-Run Model	Number of battery	16-20 pcs	
	Charging current	Preset:6A±10%,1-12A (optional)	
	Charging voltage	13.65 x N±1%	
Apperance			
Standard Model	Sizes D x W x H (mm)	384 x190 x 730	
Long-Run Model		384 x190 x 335	
Enviromental			
Operating Temperature		0-40 °C	
Operating Moisture		<95% and no condensation	
Operating Altitude		<1000m	
Noise		less than 50dB ,1 meter	
Management			
Smart RS-232		Support Windows 2000/2003/XP/Vista/2008/7/8, Linux, Unix and MAC.	
SNPM (Optional)		Power management from SNMP manager and web browser.	

• When the output voltage is set to 280VAC, the output power will be reduced to 90%.
• If the UPS is installed and used at an altitude higher than 1000 meters, the output power should be calculated by reducing it by 1% for every 100 meters.

XPS ONLINE



XPS OFFLINE SERIES

Offline uninterruptible power upplies (UPS) are designed to protect connected devices from sudden voltage fluctuations and short-term power outages. Primarily, when the grid electricity is functioning normally, it directly powers the load while simultaneously charging its batteries. In case of a power outage or voltage fluctuations, it automatically switches to battery mode, providing uninterrupted power to the devices.

General Features

- **Protection and Safety:** Increases system safety with overvoltage, undervoltage, short circuit, and overload protections.
- **Energy Efficiency:** Minimizes energy loss by directly using grid electricity during normal operation.
- **Compact Design:** Ergonomic structure that saves space, ideal for homes, offices, and small businesses.
- **Fast Transition Time:** In the event of a power outage, it switches to battery mode in milliseconds, ensuring that connected devices continue to operate.
- **Wide Voltage Range:** Provides a stable power supply by adapting to various grid conditions.

Technical Specifications

- **Output Power:** Available in various capacities ranging from 500VA to 3000VA
- **Operating Voltage:** 220V ± 10%
- **Frequency:** 50/60 Hz auto detection
- **Waveform:** Modified sine wave
- **Battery Type:** Maintenance-free lead-acid battery
- **Charging Time:** 4-8 hours (depending on capacity)
- **Transfer Time:** <10 ms
- **Connection Options:** AC outlet outputs, USB, and communication ports (may vary by model)
- **Operating Temperature:** 0°C - 40°C
- **Humidity:** 10% - 90% relative humidity (non-condensing)

Applications

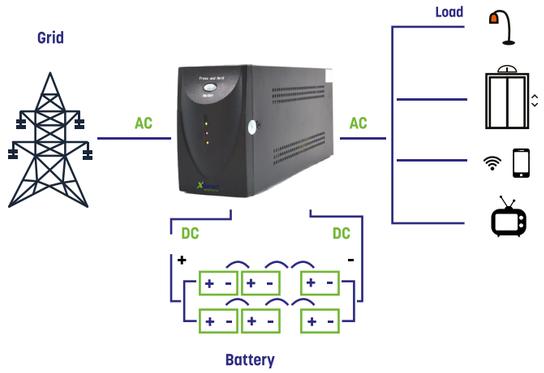
- Personal computers and home electronics
- Small office systems
- Modems, routers, and network equipment
- Cameras and security systems
- POS devices and ATMs

Offline UPS solutions provide low-cost and reliable energy support, preventing potential data loss and system damage caused by sudden power failures. Choose the most suitable model to ensure uninterrupted power for your devices!

Fault Table

Fault	Reason	Solutions
UPS won't turn on	Mechanical damage to the power ON/OFF button	Change the button
	Battery reaches end of service life	Change the battery
	MOSFET failed	Change the MOSFET
The UPS does not provide the expected backup time	It may be due to frequent power outages or the shortening of the battery's lifespan caused by high temperatures; this can result in the battery working for only a week or less.	Charge the batteries for at least 8 hours
		Charge the batteries for at least 8 hours
Grid power is available and the power cord is securely connected to the mains power supply, but the UPS is running on battery power.	The fuse or circuit breaker has tripped due to overload.	Turn off the UPS, disconnect the UPS input power cable, replace the fuse or reset the circuit breaker. Reduce the load on the UPS, reconnect the UPS to grid power, and turn it on.

XPS OFFLINE



ELECTRICAL CHARACTERISTICS

Uninterruptible Power Supply / Offline UPS						
Model	650VA	800VA	1200VA	1500VA	2000VA	3000VA
Capacity	650VA/ 360W	800VA/480W	1200VA/ 720W	1500VA / 900W	2000VA / 1200W	3000VA / 1600W
Input						
Voltage			220VAC			
AC Mains Input Voltage Range			145-280VAC (same as AC mains)			
Frequency			50Hz/60Hz			
Output						
Output Voltage (Battery Mode)			± 10 %			
Frequency (Battery Mode)			50Hz ± 1Hz (adaptive)			
Transfer Time			2-6ms,<10ms			
Waveform (Battery)			Modified sine wave			
Battery						
Battery Type & Quantity	12V7.2Ahx1	12V9Ah x1	12V7.2Ahx2	12V 9Ah x 2	12V 9Ah x 2	12V7Ahx4
Battery Charging Time			6 hours charge to % 90			4h %90
LED Indicator						
AC Mode			Green Light			
Battery Mode			Red light flash			
Audible Alarms						
Battery Mode						
Low Battery			Alarm beeps every six seconds			
Overload			Alarm beeps every seconds			
Fault			Alarm beeps twice every seconds			
Protection Function			Alarm beeps continuously			
Comprehensive Protection						
Environment			Overload, deep discharge and over-charge protection			
Temperature And Humidity						
Noise			Relavite humidity 0-90 % and temperature 0-40°C (No-condensing)			
Physical Function			Less than 40dB at one meter distance			
Dimensions D X W X H (mm)	335x87x143	335x87x143	312x122x195	360x122x195	360x122x195	405x144x213
Net Weight (kgs)	4,40	5	8,4	11	12,3	17,6

GENERAL PRODUCT CATALOG

UNINTERRUPTIBLE POWER SUPPLY

ORDER LIST

Uninterruptible Power Supply(UPS)

Online UPS



Type (Order) Code	Explanation	Box Quantity	Carton Quantity
XPS 1000VA	1000VA / 800Watt 220-240V 50-60 Hz	1	1
XPS 3000VA	3000VA / 2400Watt 220-240V 50-60 Hz	1	1
XPS 6000VA	6000VA / 5400Watt 220-240V 50-60 Hz	1	1
XPS 10000VA	10000VA / 10000Watt 220-240V 50-60 Hz	1	1

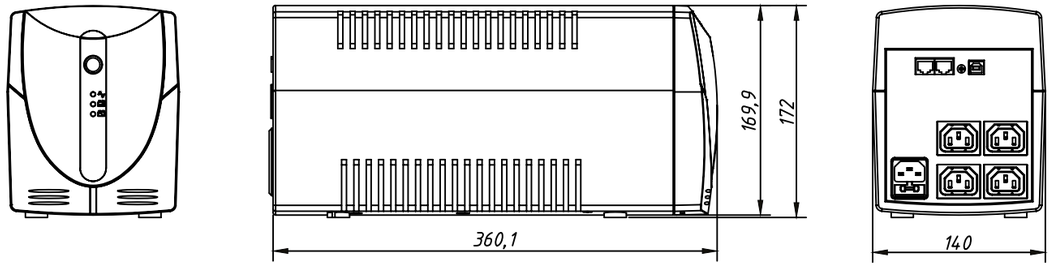
Offline UPS



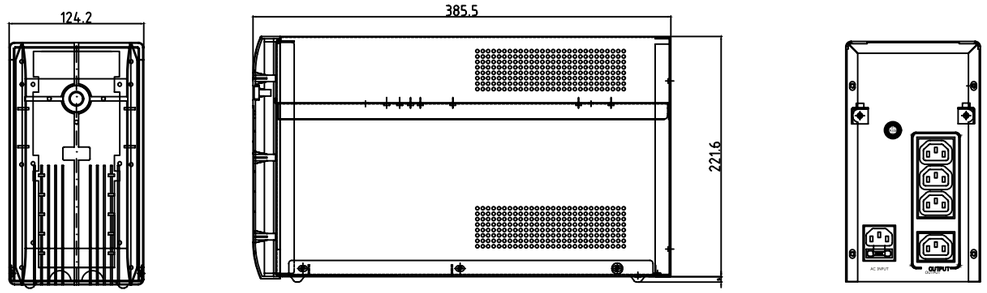
Type (Order) Code	Explanation	Box Quantity	Carton Quantity
XPS 1500VA	1500VA / 900Watt 220-240V 50Hz	1	2
XPS 2000VA	2000VA / 1200Watt 220-240V 50Hz	1	2

DIMENSIONS

UPS Offline 1500VA



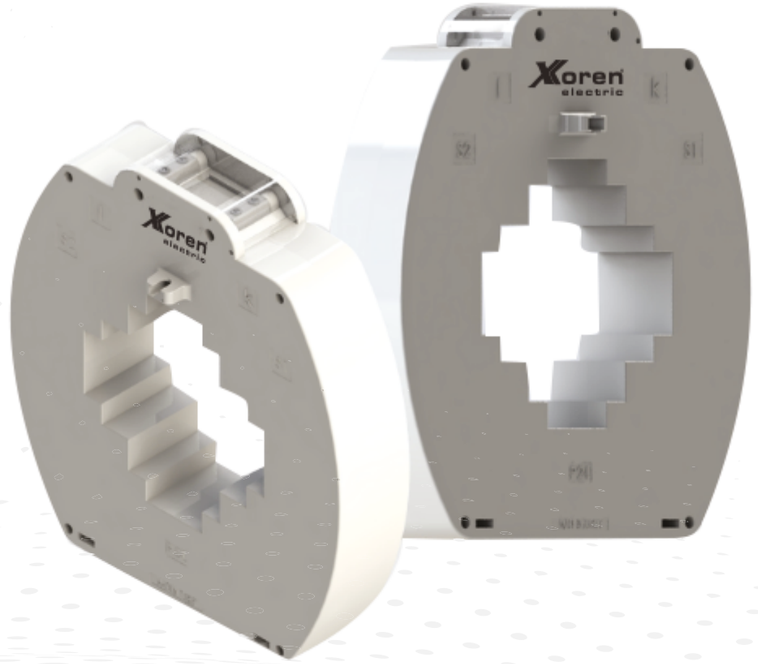
UPS Offline 2000VA



VALID FOR ALL OUR PRODUCTS
2 YEARS WARRANTY

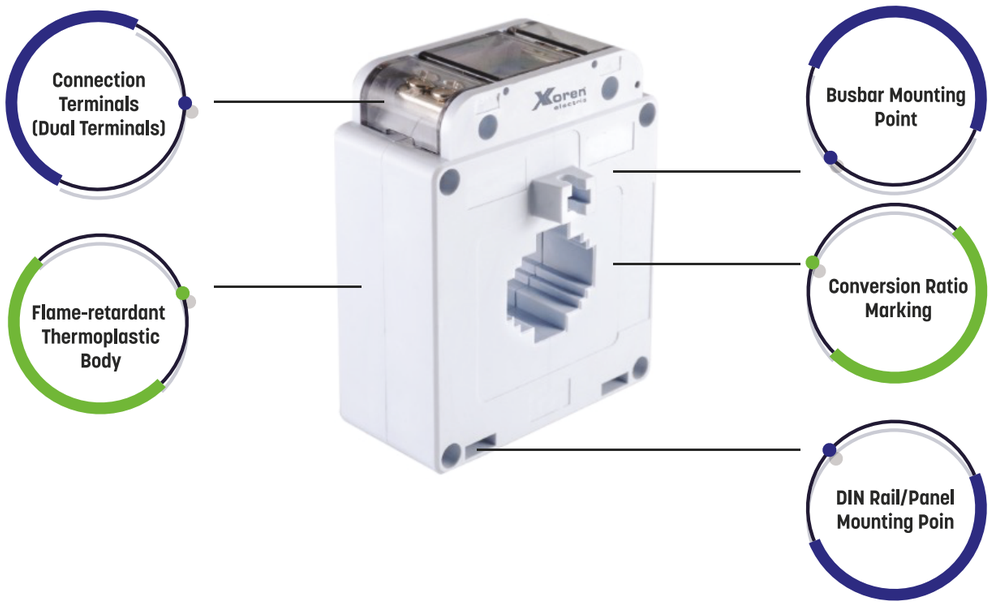
CURRENT TRANSFORMERS

X Koren Electric Current Transformers act as an isolating element against high currents, allowing the current flowing through electrical circuits and power lines to be reduced to safe, measurable levels for meters, measuring instruments, relays, and similar systems, protecting them from damage caused by high currents. With primary current ranges from 30A to 4000A, rated burdens of **5-10-15-30 VA**, and high insulation quality, the XAT series ensures reliable current protection.



Product Code and Label Information





GENERAL PRODUCT CATALOG

CURRENT TRANSFORMERS

XAT Current Transformers



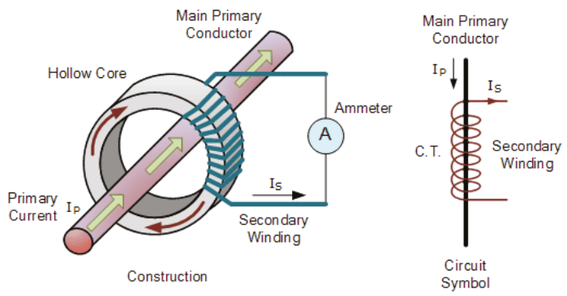
Current Transformers	XAT							
Type	XAT-30B	XAT-30	XAT-40	XAT-60	XAT-100	XAT-120	XAT-3X100	
Rated Operating Voltage	720							
Nominal Grid Withstand Voltage	3							
Rated Secondary Current	30/5,40/5,60/5,80/5,100/5,125/5,150/5	200/5,250/5,300/5	400/5,600/5	800/5,1000/5	1250/5	1600/5,2500/5	2000/5	3000/5	4000/5
Rated Load	2.5	5		10	10	15	15	20	30
Short-Time Thermal Rating Current	60 x In							
Continuous Thermal Rating Current	1.2 x In							
Dynamic Rating Current	2.5 Ith							
Operating Frequency	50/60							
Safety Factor	<5							
Accuracy Class	0.5							
Degree of Protection	IP20							
Operating Ambient Temperature Range	-25....+75							

General Information

A current transformer (CT) is an instrument transformer designed to produce alternating current in the secondary winding proportional to the current measured in the primary winding. It allows for safe measurement using a standard ammeter by stepping down high voltage currents to lower values.
The operating principle of the current transformer is based on Faraday's Law of Electromagnetic Induction. The current passing through the primary winding creates a magnetic flux in the core, and this magnetic flux induces a voltage in the secondary winding. A measuring instrument connected to the secondary winding measures this current to determine the amount of current in the circuit. According to Ohm's Law, a low impedance must be maintained in the secondary circuit; otherwise, an open-circuit condition may create excessive magnetic flux, leading to high voltage.

The current transformer transfers the current from the primary circuit to the secondary circuit with a specific ratio. The conversion ratio refers to the factor that converts the primary current into the secondary current. For example, a current transformer with a 300/5 conversion ratio will convert 300A primary current into 5A secondary current. The accuracy class of the current transformer determines the measurement precision. For instance, a current transformer with an accuracy class of 0.5 will transfer a 300A primary current to the secondary winding with a 0.5% margin of error, meaning the secondary current could be either 298.5A or 301.5A.

The secondary winding of the current transformer is connected to a measuring instrument or a load resistor. The secondary winding should never be left open-circuited. When the secondary terminals are left unloaded, the magnetic flux generated by the primary current cannot be balanced, and high voltage can occur in the secondary circuit, potentially causing insulation breakdown. This condition can lead to excessive heating of the windings and equipment failure. If maintenance or changes need to be made in the secondary circuit, the secondary terminals must be short-circuited to ensure safe operation.



Operating Principle

Current transformers are measurement transformers designed to step down the high current in the primary circuit to a safe level for use by measurement and protection devices. The ammeter used with the current transformer is designed to display the maximum current from the secondary winding with full-scale deviation.

Most current transformers have an inverse proportional conversion ratio between the primary and secondary windings. This ratio allows the current transformer to be calibrated for a specific measuring device. A standard current transformer typically sets the secondary current to 5A, and the conversion ratio is expressed in values such as 100/5, 200/5, 500/5, etc., in relation to the primary current. For example, a current transformer with a 100/5 ratio will produce 5A in the secondary circuit when 100A is passing through the primary circuit. Similarly, a 500/5 current transformer will produce 5A in the secondary circuit when 500A flows through the primary.

As the number of turns of the secondary winding (Ns) increases, the secondary current (Is) decreases proportionally. In other words, the conversion ratio between the primary and secondary windings is inversely proportional to the current. Like other transformers, the current transformer must satisfy the amp-turn (A·N) equation. This equation ensures accurate measurement by determining the corresponding value of the primary current and winding turns on the secondary side.

$$T.R. = n = \frac{N_p}{N_s} = \frac{I_s}{I_p} \qquad I_s = I_p \left[\frac{N_p}{N_s} \right]$$

From this equation we can see that the secondary current

Current transformers are typically manufactured and maintained in accordance with international standards such as IEC 61869-2 and TS EN 60044-1. Leaving the secondary winding open-circuited can cause overvoltage and damage the transformer. Therefore, when the connection to measurement or protection systems is interrupted, the secondary windings must always be short-circuited to ensure safety.

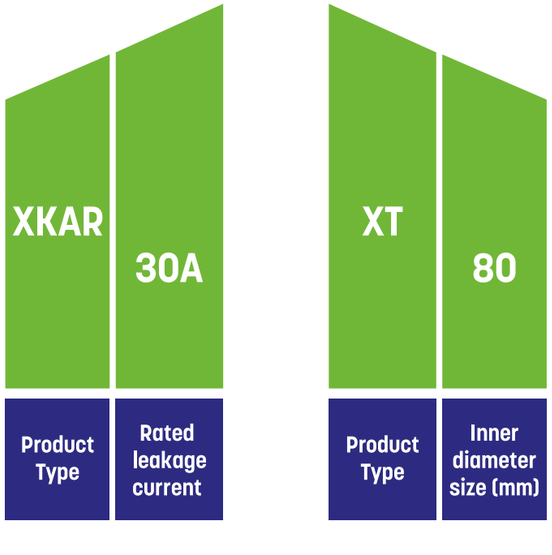
ORDER LIST

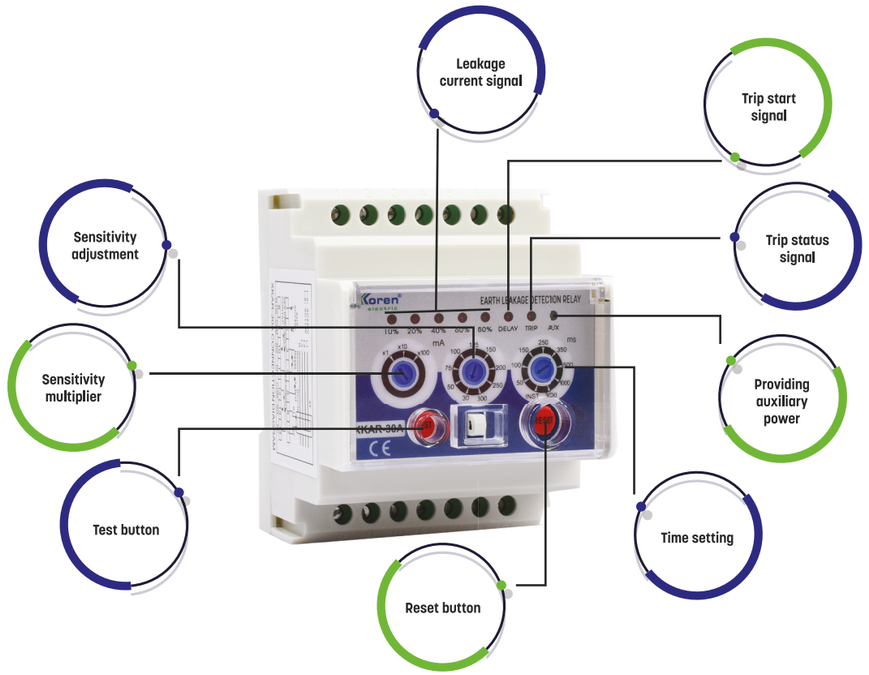
Current Transformers

Type (Order) Code	Primary Current (A)	Explanation	Box Quantity	Quantity Per Cartoon
XAT-30B-30	30	30/5A 5-10VA	1	1
XAT-30B-40	40	40/5A 5-10VA	1	1
XAT-30B-60	60	60/5A 5-10VA	1	1
XAT-30B-80	80	80/5A 5-10VA	1	1
XAT-30B-100	100	100/5A 5-10VA	1	1
XAT-30B-125	125	125/5A 5-10VA	1	1
XAT-30B-150	150	150/5A 5-10VA	1	1
XAT-30-200	200	200/5A 2.5-5-10VA	1	1
XAT-30-250	250	250/5A 2.5-5-10VA	1	1
XAT-30-300	300	300/5A 2.5-5-10VA	1	1
XAT-40-400	400	400/5A 5-10VA	1	1
XAT-40-600	600	600/5A 5-10VA	1	1
XAT-60-800	800	800/5A 5-10VA	1	1
XAT-60-1000	1000	1000/5A 5-10VA	1	1
XAT-100-1250	1250	1250/5A 10-15-30VA	1	1
XAT-100-1600	1600	1600/5A 10-15-30VA	1	1
XAT-100-2500	2500	2500/5A 10-15-30VA	1	1
XAT-120-2000	2000	2000/5A 10-15-30VA	1	1
XAT-120-3000	3000	3000/5A 10-15-30VA	1	1
XAT-3X100-4000	4000	4000/5A 10-15-30VA	1	1



Product Code and Label Information





XKAR Earth Leakage Relay



Earth Leakage Relay		Symbol	Unit	XKAR-30A
Protection				Residual current detection, circuit, trip
Rated Operational Voltage		Ue	VAC	110V ± %10 veya 240V
Rated Residual Current			A	0.03-30
Power Consumption			VA	3
DC Power Output Current			mA	50
Operating Frequency				50 / 60
Pollution Degree				2
Standards				IEC 60947-3
Electrical Life			op.	100.000
Mechanical Life			op.	5.000.000
Time delay				50ms~1sn
Tripping Time			ms	≤15
Functions	Remote Test			Output contacts before 50% arcing
	Remote Reset			Mounting on a 35 mm DIN rail

GENERAL PRODUCT CATALOG

EARTH LEAKAGE RELAY & TORODIAL CURRENT TRANSFORMERS

Toroidal Current Transformers



Toroidal Current Transformers	XT			
Type	XT-80	XT-100	XT-150	XT-200
Max. Current Supply (A)	630		800	1000
Inner Diametre (mm)				
A	80	100	150	200
B	120.5	135	183	265
C	138	140	193	275
D	3.5	5	5	6
F	35	122	170	245
I	94.5	26	27	30
K	17.5	10	13	-
L	17.5	110	150	-
M	37	5	5	-
N	10	38	39	42

GENERAL INFORMATION

XKAR-30A Earth Leakage Relay

The XKAR-30A is a device designed to detect, monitor, and disconnect electrical circuits in the event of leakage currents. It is manufactured in compliance with the **IEC 60947-3** standard and is widely used in industrial and commercial applications.

Technical Specifications:

- **Protection Function:** Earth leakage detection and circuit disconnection
- **Rated Operating Voltage:** 110V ±10% or 240V AC
- **Leakage Current Range:** 0.03A - 30A
- **Power Consumption:** 3 VA
- **DC Power Output:** 50 mA
- **Frequency:** 50 / 60 Hz
- **Standards Compliance:** IEC 60947-3
- **Electrical Durability:** 100,000 operations
- **Mechanical Durability:** 5,000,000 operations
- **Time Delay:** 50ms - 1s
- **Tripping Time:** ≤ 15ms

Signals

Supply Voltage: Green Signal
Time Delay: Red Signal
Trip: Red Signal
Leakage Current: 5 red signal is for leakage.

Operating Principle:
The XKAR-30A operates based on the differential current principle. It detects differences between phase and neutral currents and trips the circuit in case of leakage current.

1.Normal Operation: In a balanced system, the total sum of phase and neutral currents is zero. The current flowing through the phase conductor returns through the neutral conductor in equal but opposite directions.

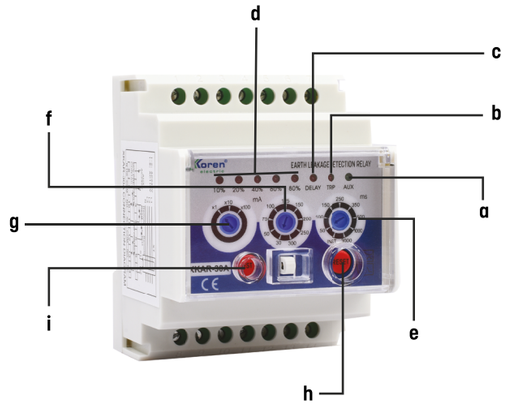
2.Insulation Fault Condition: If an insulation failure occurs (e.g., due to damaged cable insulation), a difference arises between phase and neutral currents. This difference is identified as leakage current, which may pose a hazard.

3.Differential Current Detection: The XKAR-30A employs a toroidal current transformer to detect this imbalance. Under normal conditions, the phase and neutral currents remain equal. However, if leakage current is detected, the system registers an imbalance and sends a signal.

4.Circuit Interruption: If the detected leakage current exceeds a set threshold (typically 30 mA), the relay trips the circuit, ensuring safety.

Application Areas:

- **Industrial Facilities:** Reduces fire hazards caused by leakage currents.
- **Commercial Buildings:** Protects electrical equipment.
- **Hospitals:** Ensures the safety of medical devices.
- **Energy Distribution Systems:** Provides safety in electrical panels



a-Providing auxiliary power
b-Trip status signal
c-Trip start signal
d-Leakage current signal
e-Time setting
f-Sensitivity adjustment
g-Sensitivity multiplier
h-Reset Button
i-Test Button

Providing auxiliary power (a)	Trip (b)	Delayed (c)	Status
OFF	OFF	OFF	No auxiliary power
OFF	OFF	OFF	System normal, no trip
ON	OFF	ON	Trip starts, delayed countdown begins
ON	ON	any	Leakage triggered
ON	OFF	Flash	Kct not connecting, not pressing test button or remote test button

(ii) Leakage Signal (d)

a) The leakage signal indicates the detected leakage current as a percentage of the set current threshold.
10% - Leakage current ≥ 10% of the set threshold
20% - Leakage current ≥ 20% of the set threshold
40% - Leakage current ≥ 40% of the set threshold
60% - Leakage current ≥ 60% of the set threshold
80% - Leakage current ≥ 80% of the set threshold

b) If the XKAR-30 zero-phase current transformer is not detected, the leakage indicator will blink.

Sensitivity Setting:
The XKAR-30 is equipped with two rotary selectors.
Leakage current threshold setting (IΔ):
A 9-position selector allows choosing a leakage trip threshold of 30 mA, 50 mA, 75 mA, 100 mA, 125 mA, 200 mA, 250 mA, and 300 mA (f).

Sensitivity multiplier selector:
A 3-position selector allows multiplying the selected value by 1x, 10x, or 100x (g).

Example Setting 1:
IΔn = 100 mA
Set 1: Leakage threshold = 100 mA
Set 2: Sensitivity multiplier = 1x
IΔn = 100 mA × 1 = 100 mA

Example Setting 2:
IΔn = 25 A
Set 1: Leakage threshold = 250 mA
Set 2: Sensitivity multiplier = 100x
IΔn = 250 mA × 100 = 25 A

Trip Delay Time Setting
A 9-position time delay selector provides additional delay for fault discrimination (e).
Selectable fault delay times: Instantaneous (no delay), 50 ms, 100 ms, 150 ms, 250 ms, 350 ms, 500 ms, 1 s, and 3 s.

Button Operations

a) Reset Button (h)
Resets the visual indicator and trip contact after a ground fault has occurred.
b) Test Button (i)
Simulates an earth leakage fault condition when pressed.

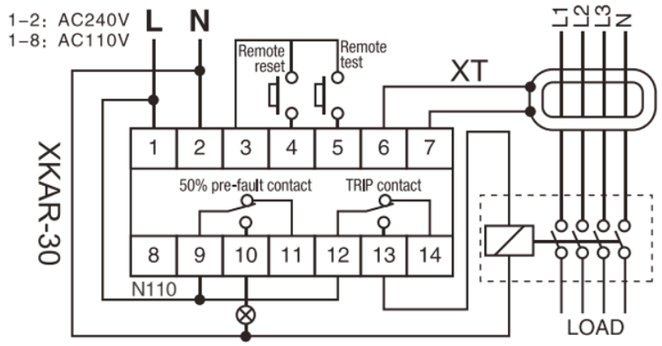
Remote Control Inputs

a) Remote Test Input
This digital input simulates pressing the test button. Connect terminals 3 and 5 to activate.
b) Remote Reset Input
This digital input resets the relay. Connect terminals 3 and 4 to activate.

Output Contacts

a) Trip Contact
This is a latching type contact that activates upon tripping.
b) 50% Pre-fault Contact
Activates when the leakage current reaches 50% of the set sensitivity threshold.

Wiring Diagram



Toroidal Current Transformer

Toroidal current transformers are precision devices used for measuring and isolating electrical current. They consist of a toroidal (ring-shaped) magnetic core around which primary and secondary windings are wrapped. Their working principle is based on the induction of a voltage in the secondary winding due to the magnetic field generated by the primary current.

1.Primary Current: The current transformer monitors the electrical current passing through a conductor (typically a cable).
2.Magnetic Field and Induction: The primary current generates a magnetic field around the core, which is transferred to the secondary winding.
3.Secondary Winding: This induced magnetic field generates a voltage in the secondary winding, which is directly proportional to the primary current.

Earth Leakage Relay and Toroidal Current Transformer Operation:

- **Leakage Current Detection:** The relay continuously monitors the difference between phase and neutral currents. If leakage occurs, it detects the imbalance.
- **Toroidal Current Transformer Function:** The transformer identifies this difference and sends a signal to the relay.
- **Rapid Response:** The relay instantly trips the circuit (typically within milliseconds).
- **Safety Assurance:** Prevents electric shocks and fire hazards.

Advantages:
Protection Against Electric Shock: Shields personnel from electrical hazards.
Fire Prevention: Quickly detects leakage currents, reducing fire risks.
High Sensitivity: Capable of detecting even minor leakage currents.
System Isolation: Prevents electrical faults from spreading.

Conclusion:
The Earth Leakage Relay (XKAR-30A) is a critical safety device that ensures system protection. By utilizing toroidal current transformers, it accurately detects leakage currents and disconnects the circuit, safeguarding both equipment and personnel.

GENERAL PRODUCT CATALOG

EARTH LEAKAGE RELAY & TORODIAL CURRENT TRANSFORMERS

ORDER LIST

Earth Leakage Relay & Torodial Current Transformers

Earth Leakage Relay

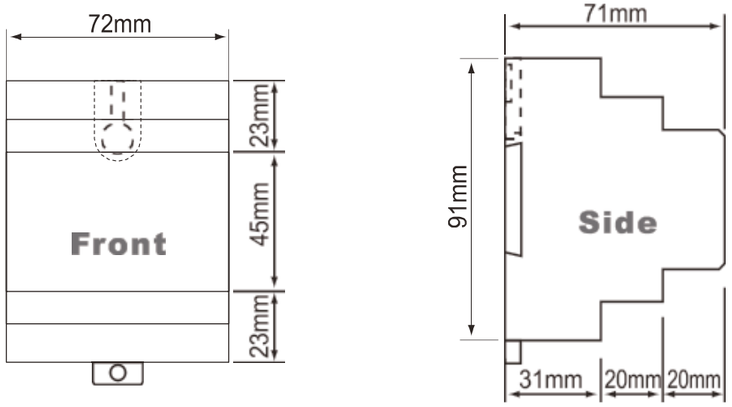


Type (Order) Code	Treshhold Current(A)	Delay(s)	Quantity Box	Carton Quantity
XKAR-30A	0.03-30	0.05-1	1	48

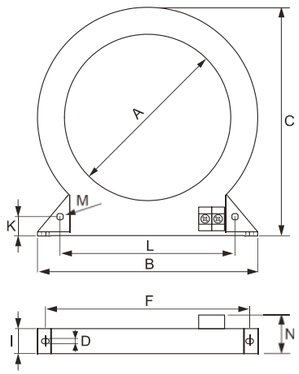
Toroidal Current Transformers

Type (Order) Code	Inner Diameter θ (mm)	Max. Current Supply (A)	Quantity Box	Carton Quantity
XT-80	80	630 A	1	24
XT-100	100	630 A	1	60
XT-150	150	800 A	1	28
XT-200	200	1000 A	1	7

DIMENSIONS



DİMENSİONS	XT-80	XT-100	XT-150	XT-200
A	80	100	150	200
B	120,5	135	183	265
C	138	140	193	275
D	3,5	5	5	5
F	35	122	170	245
I	94,5	26	27	30
K	17,5	10	13	-
L	17,5	110	150	-
M	37	5	5	-
N	10	40	41	44



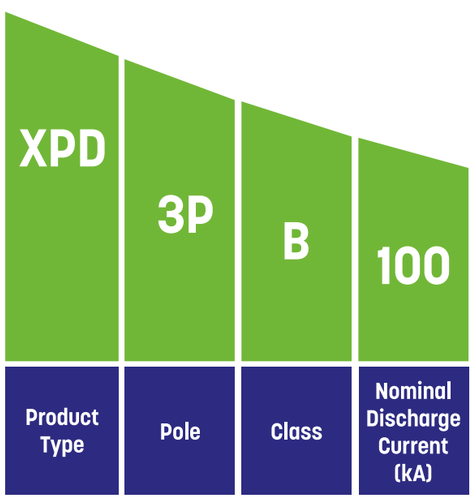
VALID FOR ALL OUR PRODUCTS
2 YEARS WARRANTY

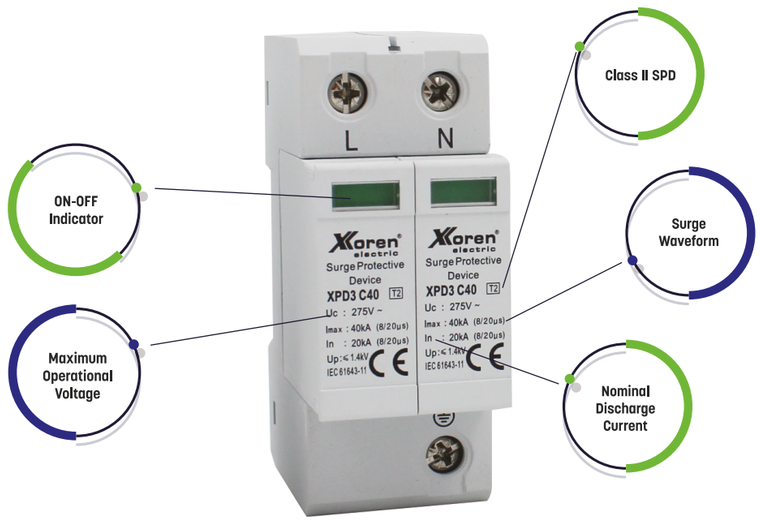
SURGE ARRESTER

Lightning-induced overvoltage events can reach hundreds of thousands of volts, causing immediate or intermittent equipment failures. However, lightning and power grid anomalies account for only about 20% of transient overvoltages. The remaining 80% of overvoltage activity is internally generated. Although these surges are smaller in magnitude, they occur more frequently and, with continuous exposure, can damage sensitive electronic equipment within a facility. Type B, BC, C, and D series Surge Arrester with replaceable cartridges provide reliable protection against such high-voltage fluctuations.



Product Code and Label Information





Surge Arrester B Class



Surge Arrester			XPD - B	
Number of Poles		P	1P	4P
Maximum Operational Voltage	Uc	VAC	255	400
Voltage Protection Level	Up	kV	≤2.5	
Nominal Discharge Current	In	kA	100	
Lightning Impulse Current	Iimp	kA	50	
Operating Frequency		Hz	50/60	
Standards			IEC 61643-1	
Response Time		ns	<25	
Operating Ambient Temperature Range		°C	-40....+85	
Humidity		%	≤95	
Mounting			35 mm DIN rail	
Terminal Cross-Section		mm^2	16....35	
Protection Class			IP 20	

Surge Arrester B-C Class



Surge Arrester			XPD - BC	
Number of Poles		P	1P+N	4P
Maximum Operational Voltage	Uc	VAC	400	
Voltage Protection Level	Up	kV	≤1.6	2.5
Maximum Discharge Current	Imax	kA	100	-
Nominal Discharge Current	In	kA	20,50	100
Lightning Impulse Current	Iimp	kA	12.5	50
Operating Frequency		Hz	50/60	
Standards			IEC 61643-1	
Response Time		ns	<25	
Operating Ambient Temperature Range		°C	-40....+85	
Humidity		%	≤95	
Mounting			35 mm DIN rail	
Terminal Cross-Section		mm^2	≥16	
Protection Class			IP 20	

Surge Arrester C Class



Surge Arrester			XPD - C		XPD - C Cartridge
Number of Poles		P	1P,1P+N	3P,3P+N	1P
Maximum Operational Voltage	Uc	VAC	275	400	275
Voltage Protection Level	Up	kV	≤1.4		
Maximum Discharge Current	Imax	kA	40		
Nominal Discharge Current	In	kA	20		
Operating Frequency		Hz	50/60		
Standards			IEC 61643-1		
Response Time		ns	<25		
Operating Ambient Temperature Range		°C	-40....+85		
Humidity		%	≤95		
Mounting			35_mm DIN rail		
Terminal Cross-Section		mm^2	≥16		
Protection Class			IP20		

Surge Arrester D Class



Surge Arrester			XPD - D
Number of Poles		P	1P
Maximum Operational Voltage	Uc	VAC	275
Voltage Protection Level	Up	kV	≤0.9
Maximum Discharge Current	Imax	kA	5
Nominal Discharge Current	In	kA	3
Operating Frequency		Hz	50/60
Standards			IEC 61643-1
Response Time		ns	<25
Operating Ambient Temperature Range		℃	-40....+85
Humidity		%	≤95
Mounting			35_mm DIN rail
Terminal Cross-Section		mm^2	≥6
Protection Class			IP20

General Information



Surge arresters are devices designed to protect electrical installations from sudden overvoltages, lightning strikes, and surge voltages that may occur within the system. This protection is critical for safety circuits such as sensitive electronic equipment, fire detection systems, and
emergency lighting. Devices connected to the installation, such as computers, televisions, and washing machines, can fail instantly or be damaged over time due to the effects of overvoltage. Surge arresters intervene to prevent such damage by safely directing the energy to the ground.

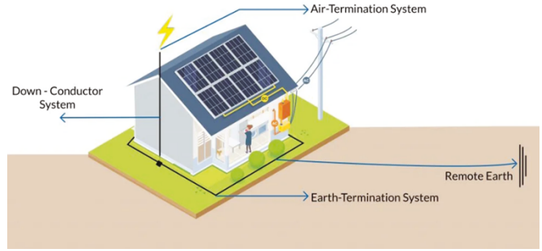
Typically connected in parallel with the electrical installation, surge arresters remain passive under normal conditions. However, when lightning strikes or sudden voltage increases occur, they become active and divert the excess energy to the ground. This ensures that electrical systems continue to operate without damage. Once the overvoltage effect subsides, the surge arrester returns to its passive state, allowing the system to function continuously.

The XPD series surge arresters, developed by XKoren, provide an innovative solution to protect electrical installations from lightning-induced surges in the network and sudden voltage changes within the installation. The replaceable XPD-C cartridge system offers long-lasting use, and the built-in alarm mechanism provides users with a safe and practical experience. Additionally, the models include protection not only against network-induced overvoltages but also against voltage fluctuations caused by external factors such as telephone lines and cable TV.

One of the most important components of surge arresters is the zinc oxide elements. This material responds instantly to high voltage surges, directing the excess current directly to the ground. If the system experiences a surge, some models automatically reset, providing protection once again. This feature enhances the safety of the installation, contributing to the long life of equipment.

In conclusion, surge arresters provide a vital protective mechanism for electrical systems. By preventing faults caused by sudden voltage changes, they ensure the safe and continuous operation of the system. Innovative solutions like XKoren's XPD series are essential technologies developed to maximize safety in modern electrical installations.

Lightning Protection with XPD Series Surge Arresters



XKoren Surge Arresters for Lightning Protection

XKoren surge arresters provide effective protection against short circuits, sudden overvoltages, and especially lightning strikes. By preventing direct exposure to lightning, they ensure the safe transmission of lightning energy to the ground. With easy installation, sleek design, and long lifespan, the XKoren XPD series offers long-term security both electrically and mechanically. While
showcasing product quality, these arresters combine system protection, energy continuity, and visual appeal. Surge arresters in panels guarantee both safety and aesthetic value for users.

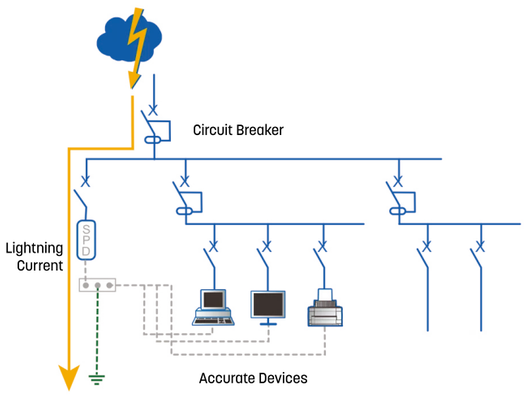
Operating Principle:
The operating principle of surge arresters is designed to ensure the safety of electrical systems by preventing sudden overvoltages and high-energy electrical loads, like lightning, from damaging the system. The basic working principle is as follows:

1.Voltage Surge Detection: Surge arresters detect voltage surges (such as lightning strikes or short circuits) on connected electrical equipment. When the voltage exceeds the normal operating level, the surge arrester quickly detects this surge.

2.Grounding the Surge: In case of an overvoltage, the surge arrester activates and directs this high energy to the ground. The excessive voltage is transferred to the grounding system through the surge arrester, ensuring that the dangerous load is safely delivered to the ground without damaging connected devices.

3.Return to Normal Voltage: Once the voltage returns to normal levels, the surge arrester deactivates, and the system resumes normal operation.
Surge arresters prevent dangers caused by sudden voltage surges and external factors like lightning, protecting equipment and ensuring energy continuity. As a result, other devices in the system continue to function properly without damage.

In conclusion, surge arresters act as a protective mechanism, safeguarding electrical devices from harmful overvoltages and ensuring safe long-term usage.



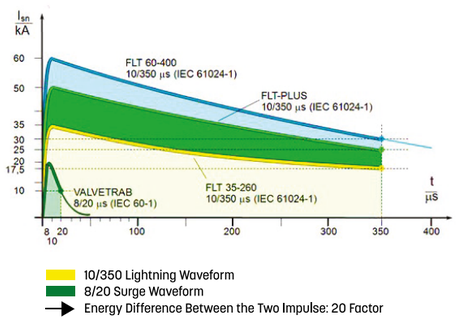
Transient Protection

A transient refers to sudden voltage and current changes that occur within electrical systems. These changes are typically brief but can be caused by external factors such as lightning strikes, short circuits, or switching operations. Transients can temporarily disrupt the normal operating conditions of a system and potentially damage devices. Therefore, special surge arresters or other protective elements are used to safeguard against transients. In short, transients are temporary, sudden voltage
fluctuations in electrical systems.

The type of protection required depends heavily on the type of transient. Approximately 65% of transients occur internally within the system, while 35% are caused externally. Internal transients typically have shorter wavelengths compared to their external counterparts, which can lead to voltage surges reaching up to 40 kV. Internal transients usually occur between phase and ground, while external transients can occur either between phase and ground or neutral and ground.

Lightning strikes follow a 10/350 waveform, while overvoltage surges follow an 8/20 waveform. This indicates that lightning strikes reach their peak more slowly and have a longer oscillation time, while overvoltage surges are much shorter in duration and reach a peak more quickly. These two distinct types of surges require different low-voltage surge arresters.

In conclusion, selecting the correct protection group is key to safeguarding against transients. Only with the correct product can the safety of the system be ensured, and electrical equipment protected from damage. This is crucial to providing effective protection against both types of surge waveforms.



10/350 Lightning Waveform and 8/20 Surge Waveform

•**10/350 Lightning Waveform:** The 10/350 waveform represents a lightning surge with a rise time of 10 microseconds (µs) and a decay time of 350 microseconds (µs). It characterizes a lightning strike that reaches its peak over a longer period (slow rise time) and then decays more gradually.

•**8/20 Surge Waveform:** The 8/20 waveform represents an overvoltage surge with a rise time of 8 microseconds (µs) and a decay time of 20 microseconds (µs). It depicts a much faster rise and a quicker decay, typical of short-duration, high-energy surges caused by switching operations or other sudden electrical events.

Energy Difference Between the Two Impulses:

The energy difference between the two impulses is substantial due to their differing characteristics:

•**10/350 Waveform:** The lightning impulse has a significantly longer duration, allowing the energy to spread over a longer time. This results in a higher total energy content despite the potentially lower peak current compared to the 8/20 impulse.

•**8/20 Waveform:** The surge impulse has a faster rise and decay, resulting in a more abrupt energy transfer. However, its shorter duration means it delivers its energy in a much shorter time frame, but with a higher peak current.

Energy Difference:

•The energy between the two impulses differs by a factor of 20. This means that the 10/350 lightning impulse carries 20 times more energy over its longer duration compared to the 8/20 surge impulse. This difference is critical for choosing appropriate surge protection devices that can handle the energy and duration of the specific surge.

In practical terms, devices designed to protect against lightning (10/350) surges must be able to **absorb and dissipate more energy than those designed to protect against overvoltage surges (8/20).**

Classification of Surge Arresters by Type

Surge arresters have a specific classification according to international standards (VDE, EN, IEC, etc.). The VDE standard includes classes B, C, and D, while the EN standard defines Types 1, 2, and 3; IEC classifies them as Class I, II, and III. At XKoren, based on these classifications, we group our products in reference to the VDE coding to offer users clearer and more reliable solutions.

Class B Surge Arresters: In low-voltage areas, surge arrester applications are made at the closest point where the supply line enters the building and in regions within 50 meters of the building to protect against lightning. In such areas, Type 1 surge arresters are required. Class B surge arresters provide protection according to the 10/350 ms waveform. Type 1 surge arresters activate at the point where the supply line enters the building, before the electricity meter in low-voltage installations. These surge arresters have a low sensitivity but a high current transmission capacity and effectively discharge current between phase-to-ground and neutral-to-ground. In installations with external lightning protection, Class B surge arresters are mandatory, ensuring the safety and continuity of the system.

Class C Surge Arresters: Class C surge arresters are used to protect against internally generated transient overvoltages and provide protection according to the 8/20 ms waveform. This type of surge arrester prevents the entry of sudden excessive currents, which Class B surge arresters cannot handle, by directing them safely to the ground. Known as Type 2 surge arresters, these are placed after the electricity meter. They also act as surge protectors in low-voltage installations. Statistics show that 65% of overvoltage damage is caused by internal sources, so Class C surge arresters should be used in coordination with Class B surge arresters. This combination provides more effective and safe protection in facilities.

Class B + C Surge Arresters: Surge arrester systems are crucial to protect electrical installations against sudden voltage fluctuations. When the distance between the main distribution panel and the secondary distribution panel exceeds 10 meters, a combination of two surge arresters is necessary. This combination provides effective protection against all transient overvoltages that may occur in the system.

Class B surge arresters withstand lower voltage levels, but their discharge capacities are limited. However, they provide more realistic test values for current discharges that may occur in the system. Class B + C surge arresters, which offer broader protection, should withstand a 50 kA lightning strike at 1.6 kV and discharge a 12.5 kA strike effectively. These surge arresters are typically used at building entrances or for general protection purposes.

Traditional spark gap technology-based older generation surge arresters have lower sensitivity to high voltage fluctuations and relatively slower damping speeds. In contrast, modern solutions like XKoren surge arresters, thanks to VG technology, activate in a very short time of 25 nanoseconds and can perform multiple damping actions with a gas discharge tube mechanism. This feature provides a significant advantage, especially in protecting sensitive electronic devices such as computers,
televisions, and telecommunication systems. However, if the distance between the protected devices and the distribution panel exceeds 30 meters, it is recommended to support them with additional Class D surge arresters.

With advancing technology, when selecting surge arresters, not only their endurance capacities but also their response speeds and protection continuity should be considered. This ensures that both the network systems and the connected devices can continue to operate in a long-lasting and secure manner.

Class D Surge Arresters: With the increasing use of electronic devices today, the Up (overvoltage) protection level has become more important. At this point, Class D surge arresters come into play, lowering the Up level to the desired value and limiting the overvoltages.
Positioned at the last point of the distribution panel, these surge
arresters have a 6 kA phase-to-ground and a total of 20 kA discharge capacity at 1.5 kV voltage. These systems are tested according to TS EN standards and are used in areas with critical systems such as PLC, communication, signal stations, camera systems, UPS, and power supplies. Additionally, they provide effective protection in fields requiring fast response times, such as telecom lines, data systems, and fire alarm systems.

Class D surge arresters are particularly preferred when the distance of Type 2 surge arresters from the distribution panel exceeds 30 meters. This ensures effective limitation against overvoltages that may occur over greater
distances, thus protecting the devices.

Furthermore, Class B and C surge arresters aim to prevent overvoltage surges coming from outside the building from reaching the devices. These surge arresters are preferred in device-specific applications, and 2-pole models are more commonly used. They are expected to have a 3 kA nominal and 5 kA maximum discharge capacity at 1 kV voltage, thus ensuring protection for devices against larger overvoltage surges.

XKoren XPD Cartridge Surge Arrester



XKoren XPD-C Cartridge Surge Arrester

The XKoren XPD-C Cartridge Surge Arrester is a cutting-edge solution for protecting electrical systems, ensuring secure and uninterrupted energy flow with its unique features. Designed to integrate protection circuit breakers and short-circuit protection, it enhances the overall security of your system.

Key Features:
1.Easy Maintenance and High Security: Thanks to its cartridge-based design, the XPD-C allows for simple and quick maintenance. When service or repairs are needed, only the relevant cartridge needs to be replaced, making the process efficient and hassle-free. This feature ensures both high security and ease of use.

2.Advantages of Cartridge Surge Arresters: The primary benefit of cartridge surge arresters is their modular structure, enabling quick and easy replacement. In the event of a failure, only the faulty cartridge needs to be changed, allowing the system to continue operating without the need to shut it down. Additionally, the compact design makes installation possible even in confined spaces.

3.Advanced Protection Technology: The XKoren XPD-C uses VG (Vacuum Gap) technology to activate in as little as 25 nanoseconds, providing an ultra-fast response time. The gas discharge tube technology ensures multiple suppression stages, offering efficient protection against high-voltage surges.

4.Applications: The XKoren XPD-C surge arrester is ideal for protecting sensitive electronic devices in areas such as PLCs, communication and signal stations, camera systems, UPS, and power supplies. It also provides robust protection for telecom lines, data systems, and fire alarm systems, where rapid response time is critical.

5.Compliance and Certification: The XKoren Surge Arrester complies with IP20 protection class and is rigorously tested according to TS EN 61643-11 standards. It is CE and RoHS certified, ensuring that it meets strict safety and environmental requirements. Constructed from high-quality plastic insulating materials, the XKoren XPD-C is highly resistant to unusual heat and flames, with a V-0 flame retardancy rating.

The **XKoren XPD-C Cartridge Surge Arrester** is an advanced protection solution that ensures your electrical systems remain safe and operational under challenging conditions. With its easy maintenance, fast response time, and advanced protection technologies, it is the ideal choice for a wide range of sensitive electronics and telecommunication systems.

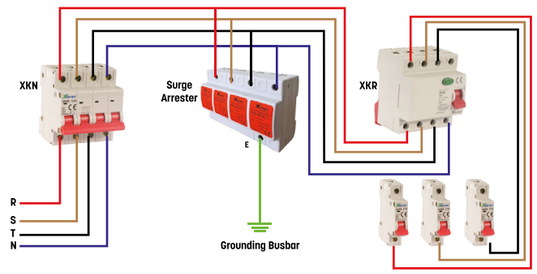
Working Conditions

Usage Location	Indoor	Outdoor
Altitude	-500 m / + 2000 m	
Frequency	50 Hz	
Temperature	-5 / +40 °C	-40 / +70 °C
Humidity	%5 - %95	%5 - %100
Hair Pollution	Level II	Level III
Installation	Fixed (35mm DIN Rail/Panel)	

Surge arrester grounding cable cross sections

Class I	16 mm²
Class II	4 mm²
Class III	4 mm²
Class I+II	16 mm²

Connection Diagram



SURGE ARRESTER

ORDER LIST

Surge Arrester

Class I (B Class)

Type (Order) Code	Pole	Max. Rated Operating Voltage Uc AC (V)	Voltage Protection Level Up (kW)	Lightning Impulse Current (Iimp)	Nominal Discharge Current (In)	Explanation	Box Quantity	Carton Quantity
XPD14-1P-B100	1P	255V	2,5	50kA (10/350µs)	100kA (8/20µs)	1P B Class 255VAC	1	120
XPD14-4P/B100	4P	400V	2,5	50kA (10/350µs)	100kA (8/20µs)	4P B Class 400VAC	1	30

Class I-II (B-C Class)

Type (Order) Code	Pole	Max. Rated Operating Voltage Uc AC (V)	Voltage Protection Level Up (kW)	Lightning Impulse Current (Iimp)	Max. Discharge Current (Imax)	Nominal Discharge Current (In)	Explanation	Box Quantity	Carton Quantity
XPD3-3NP/BC20	3P+N	400V	1,4	12,5kA (10/350µs)	100kA (8/20µs)	20kA (8/20µs)	1P B Class 400VAC	1	60
XPD3-3NP/BC50	3P+N	400V	1,4	12,5kA (10/350µs)	100kA (8/20µs)	50kA (8/20µs)	3P+N B Class 400VAC	1	60
XPD14-4P/BC100	4P	400V	2,5	50kA (10/350µs)		100kA (8/20µs)	4P B Class 400VAC	1	60

Class II (C Class)

Type (Order) Code	Pole	Max. Rated Operating Voltage Uc AC (V)	Voltage Protection Level Up (kW)	Max. Discharge Current (Imax)	Explanation	Box Quantity	Carton Quantity
XPD3-1P/C40	1P	275V	1,4	40kA (8/20µs)	1P C Class 275VAC	1	240
XPD3-1NP/C40	1P+N	275V	1,4	40kA (8/20µs)	1P+N C Class 275VAC	1	120
XPD3-3P/C40	3P	400V	1,4	40kA (8/20µs)	3P C Class 400VAC	1	60
XPD12-3NP/C40	3P+N	400V	1,4	40kA (8/20µs)	3P+N C Class 400VAC	1	60
XPD3-B0-C40	1P	275V	1,4	40kA (8/20µs)	1P C Class 400VAC Spare Cartridge	1	240

Class III (D Class)

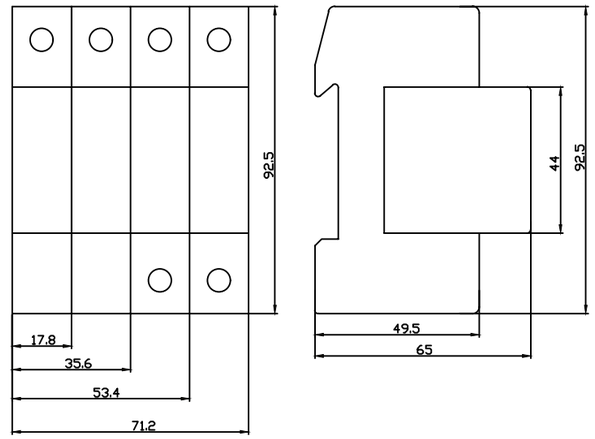
Type (Order) Code	Pole	Max. Rated Operating Voltage Uc AC (V)	Voltage Protection Level Up (kW)	Max. Discharge Current (kA)	Explanation	Box Quantity	Carton Quantity
XPD3-1P/D5	1P	275V	0,9	5kA (8/20µs)	1P D Class 275VAC	1	240



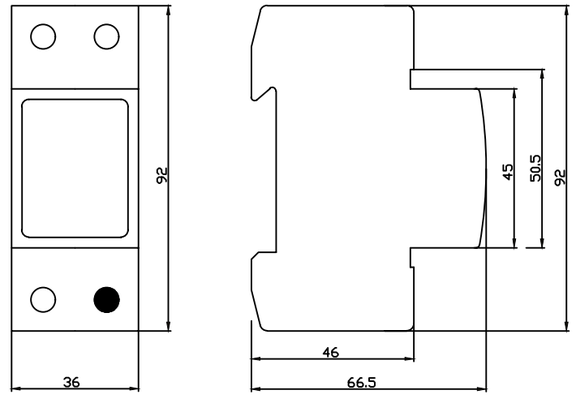
SURGE ARRESTER

DIMENSIONS

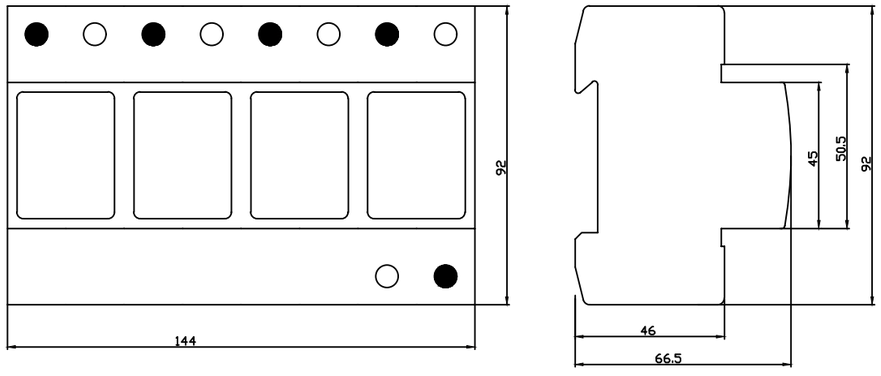
XPD Series B/B-C/C/D Class



XPD14 B100/BC100



XPD14 B100



DC Surge Arrester



Surge Arrester			XPD - DC	
Number of Poles		P	3P	
Maximum Power Point Voltage	Ucpv	VDC	1000	
Voltage Protection Level	Up	kV	≤3.2	
Maximum Discharge Current	Imax	kA	40	
Nominal Discharge Current	In	kA	20	
Operating Frequency		Hz	50/60	
Standards			IEC 61643-31	
Response Time		ns	25	
Short - Circuit Current Rating	Isccr	A	1000	
Operating State / Fault Indication			Green:Normal, Red:Invalid	
Operating Ambient Temperature Range		˚C	-40....+80	
Number of Ports			1	
For Mounting On			35mm DIN rail accc. To EN 60715	
Place of Installation			Indoor Installation	
Protection Class			IP20	
Terminal Cross - Sectional		mm^2	$6mm^2$ solid/fine-stranded	
Type of Remote Signalling Contact		FM	Yes	
Switching Capacity		AC	250V/0.5A	
Switching Capacity		DC	250V/0.1A;125V/0.2A;75V/0.5A	
Dimensions		mm	54mm	54mm Raised model

General Information



XKoren DC Surge arresters are designed in compliance with IEC 61643-31 standards to provide overvoltage protection in direct current (DC) systems. These devices offer an ideal solution, particularly for photovoltaic systems, electric vehicle charging stations, and high- voltage DC transmission lines. The DC Surge arresters have a nominal discharge current capacity of 20 kA (8/10 µs) and a maximum discharge current capacity of up to 40 kA. With a protection voltage of up to 1500 V DC, these devices rapidly activate in the event of an overvoltage, limiting the voltage to a maximum of 4.0 kV to ensure system safety. Additionally, the DC Surge arresters operate at frequencies of 50/60 Hz, are mounted on a DIN rail, and require grounding. With their high current suppression capability and fast response time, XKoren DC Surge arresters provide long-term, reliable protection for critical DC applications.

General Technical Specifications

Nominal Discharge Current (In):	20 kA (8/10 µs)
Max. Discharge Current (Imax):	40 kA (8/10 µs)
Protection Voltage (Uc):	1500 VDC
Voltage Protection Level (Up):	≤ 4.0 kV
Protection Type:	T2 (Compliant with IEC 61643-31)
Operating Frequency:	50/60 Hz
Mounting Type:	DIN Rail Installation (Grounding Required)

Operating Principle

The DC Surge arrester is a protective device designed to limit overvoltages in DC systems and safeguard system components against voltage surges. It is widely used in applications such as photovoltaic power systems, electrical distribution networks, high-voltage DC transmission systems, and electric vehicle charging stations.
The operating principle is as follows:
- **Overvoltage Condition:** When the system voltage exceeds the nominal voltage level, the Surge arrester activates.
- **Current Limitation:** The Surge arrester absorbs and suppresses the overvoltage, allowing the system to resume normal operation after the transient event.
- **Energy Absorption:** The device dissipates the transient energy, preventing damage to the DC system.
- **High Voltage Suppression:** The Surge arrester ensures that the voltage does not exceed 4.0 kV, effectively protecting all system components.

Application Areas

The most common application areas of DC Surge arresters are as follows:
- **Photovoltaic (PV) Systems:** Provides overvoltage protection for DC lines from solar panels to inverters.
- **Electric Vehicle Charging Stations:** Ensures protection against high voltage in EV charging infrastructure.
- **DC Power Distribution Networks:** Enhances the safety of high-voltage DC transmission systems.
- **High-Voltage DC Systems:** Protects high-voltage DC transmission and generation systems.
- **Industrial Electrical Systems:** Used in DC circuits of industrial facilities for overvoltage protection.

Advantages and Differences from AC Surge Arresters

Comparison with AC Surge Arresters:

- **Protection Type:**
AC Surge arresters are used in alternating current (AC) networks, while DC Surge arresters are specifically designed for direct current (DC) systems. Unlike AC voltage, which continuously changes direction, DC voltage remains constant, allowing DC Surge arresters to provide more stable performance.
- **Protection Voltage (Uc):**
DC systems typically operate at higher voltages, requiring surge arresters with a higher protection voltage. For example, this Surge arrester has a protection voltage of up to 1000 VDC, whereas AC Surge arresters usually operate at lower voltages.
- **Higher Power Capacity:**
Due to the nature of DC systems, overvoltages often involve higher currents and energy levels. As a result, DC Surge arresters feature higher Imax (maximum discharge current) and In (nominal discharge current) ratings. This model can absorb up to **40 kA** of high surge current.
- **Faster Response Time:**
DC Surge arresters typically respond more quickly than AC Surge arresters, offering superior protection. The typical response time for this device is **8/10 µs.**

Advantages:

- **High Security:** Ensures robust protection against transient overvoltages with high protection voltage and current suppression capability.
- **Fast Response:** Reacts to overvoltages within microseconds, ensuring rapid protection for connected devices.
- **Easy Installation:** Supports DIN rail mounting for quick and efficient setup.
- **Long Lifespan:** Designed for prolonged operation in environments exposed to frequent overvoltages.

Installation Method

Installation Location:
DC Surge arresters should be installed in parallel with the DC power distribution panel of the system being protected. For optimal protection, surge arresters must be placed at critical points within the network.

Mounting Type:
These surge arresters are designed for **DIN rail mounting,** which facilitates both easy installation and organized system layout. Proper orientation should be ensured during installation (input and output terminals must be correctly connected).

Connections:
- Proper cable cross-sections must be used for wiring connections, and terminal points should be securely fastened.
- Grounding must be correctly implemented to ensure reliable operation. Grounding is essential for the surge arrester's performance and system safety.

Torque Adjustment:
Connection screws must be tightened to the appropriate torque value. Over-tightening may damage screws or terminal contacts.

Conclusion the **T1+ T2-class DC Surge arrester,** compliant with **IEC 61643-31,** provides high-security overvoltage protection in DC power systems. It is particularly suitable for **solar power systems, electric vehicle charging stations, and high-voltage DC transmission lines.** With its **high current suppression capability, fast response time, easy installation, and reliable operation,** this Surge arrest offers **optimal protection** for DC applications.

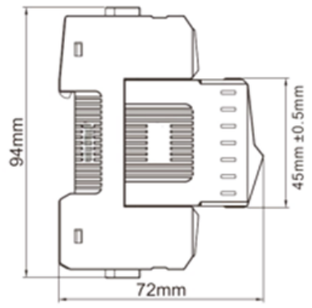
ORDER LIST

DC Surge Arrester

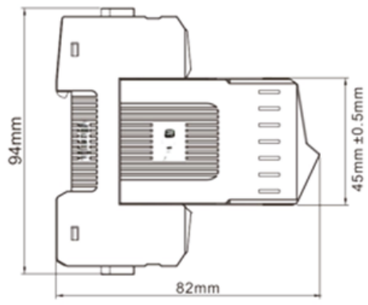
Class II (C Class) (DC)

Type (Order) Code	Pole	Max. Rated Operating Voltage Uc DC (V)	Voltage Protection Level Up (kW)	Max. Discharge Current (kA)	Explanation	Box Quantity	Carton Quantity
XPD3-DC40	3P	1000	4,0	400kA (8/20µs)	3P DC Type 40kA 1000VDC	1	60

DIMENSIONS



3P



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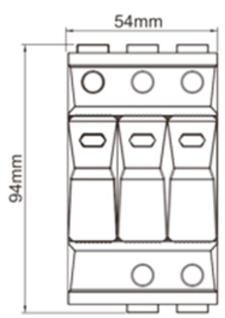


3P

VALID FOR ALL OUR PRODUCTS
2 YEARS WARRANTY

MODULAR PRODUCTS

Providing the best solution to protect end users' lives and assets is becoming increasingly important every day. In addition to energy efficiency, X Koren Electric offers smart solutions to monitor and control electricity. With Residual Current Detection Devices, Signaling and Measuring Equipment, Contactors, and Switching Devices, the company delivers first-class quality across its modular product range.











Product Code and Label Information

XDA	1	AC	220	NO	16
Product Type	Number of Poles	Current Type	Operating Voltage	Auxiliary Contact	Rated Current



Impulse Relays



Impulse Relays			XDA	
Type		P	XDA-16	XDA-32
Number of Poles			1	
Rated Operational Voltage	Ue	VAC	220	
Rated Insulation Voltage	Ui	V	440	
Rated Impulse Withstand Voltage	Ulimp	kV	4	
Operating Frequency		Hz	50/60	
Rated Current	In	A	16	32
Power Distribution per Pole		W	1.5	3
Standards			IEC EN 60669-2-2	
Protection Degree			IP20	
Electrical Life		op.	200.000	
Mechanical Life		op.	1.000.000	
Humidity		%	95	
Operatiğng Range Temperature Range		°C	-25.....+55	
Storage Range Temperature Range		°C	-30.....+80	

General Information



Impulse relays (XDA) are modular devices that can be programmed to open and close a circuit for a specific period, managing current transitions. These relays are electromagnetic switching elements primarily used in lighting circuits, directing electrical current in a controlled manner. Thanks to their advanced technology, they offer a more economical and comfortable solution compared to traditional two-way switching systems.

Technical Specifications:

- **Number of Poles:** 1P
- **Rated Voltage:** 220V
- **Rated Current:** 16A, 32A
- **Auxiliary Contact:** 1NO (Normally Open)

Advantages of Impulse Relays:

- **Cable Savings:** Impulse relays reduce wiring complexity in multi-point lighting control systems, offering up to 80% time savings and 50% cable length savings.
- **Energy Efficiency:** They consume no power during switching operations, ensuring higher energy efficiency.
- **Easy Installation:** Designed for DIN rail mounting, allowing quick and convenient integration into electrical panels and fuse boxes in homes.
- **Cost-Effective and Convenient:** Unlike conventional two-way switches, which are limited in number and involve higher installation costs, impulse relays provide a more economical and efficient alternative.

Impulse relays are commonly used in **residential buildings, offices, commercial facilities, public buildings, factories, hospitals, and shared living spaces.** They are also referred to as **impulse switches** or **teleruptors.**

Operating Principle:

The impulse relay is triggered by momentary push-buttons (wired in parallel), activating a coil that either pulls in or releases the relay contacts. Each press of the button **electrically triggers the coil,** causing the mechanism to lock the contacts. The contacts remain locked until the next electrical pulse is received, at which point the lighting circuit is activated. Pressing the button again **triggers the coil a second time,** releasing the contacts and switching off the lights.

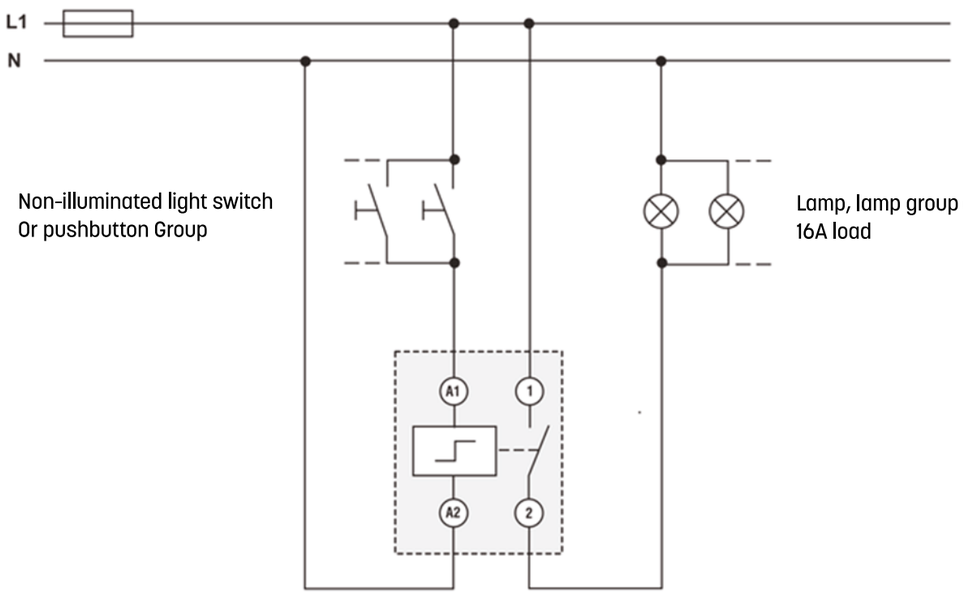
This cycle **repeats indefinitely,** thanks to the **latching mechanism,** which functions similarly to a retractable ballpoint pen: pressing once extends and locks the tip, while pressing again releases and retracts it.

Important Note:

The last push-button in the circuit should not be more than **50 meters away** from the impulse relay to ensure reliable operation.

Wiring Diagram

•Coil Terminals (A1-A2):
A short-duration voltage pulse (≥ 50 ms) applied to these terminals triggers the internal mechanism. Each pulse toggles the contact position (ON/OFF).
•Contact Terminals (1-2):
These are the load control terminals. When contacts are open ⊠ load is OFF; when contacts are closed ⊠ load is ON.



Non-illuminated light switch
Or pushbutton Group

Lamp, lamp group or
16A load

ORDER LIST

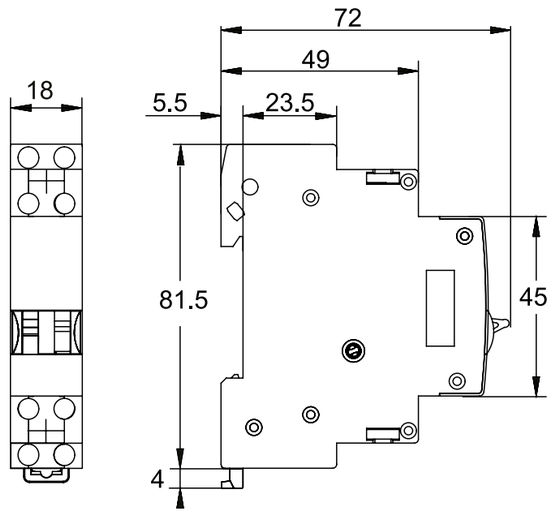
Impulse Relay

Type (Order) Code	Rated Current (In)	Explanation	Box Quantity	Carton Quantity
XDA 1AC220-N0-16	16A	1P AC Type 220V 1N0 16A	12	120
XDA 1AC220-N0-32	32A	1P AC Type 220V 1N0 32A	12	120

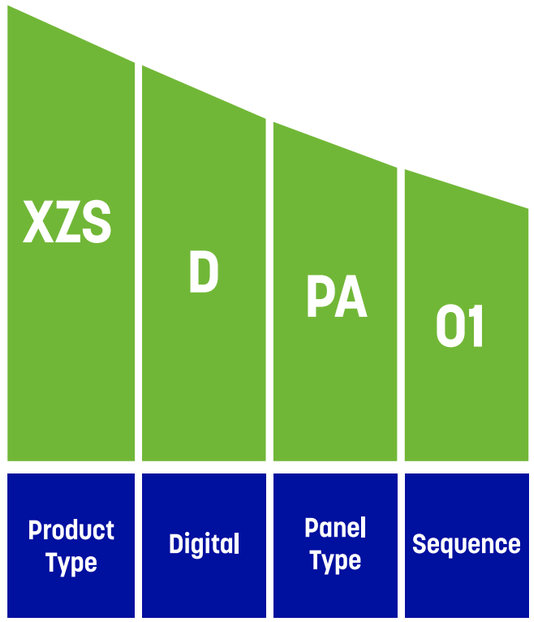


DIMENSIONS

16A - 32A



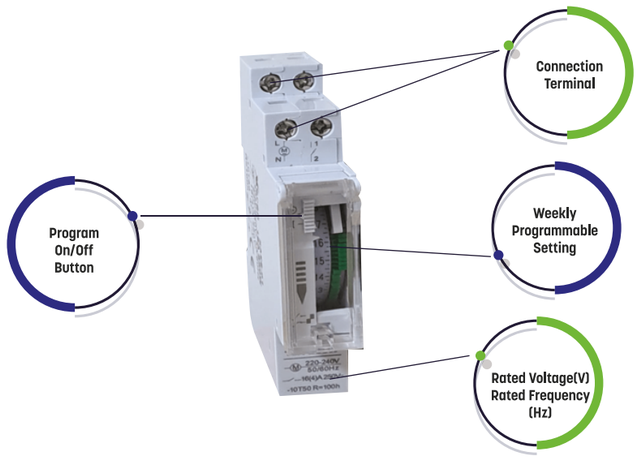
Product Code and Label Information



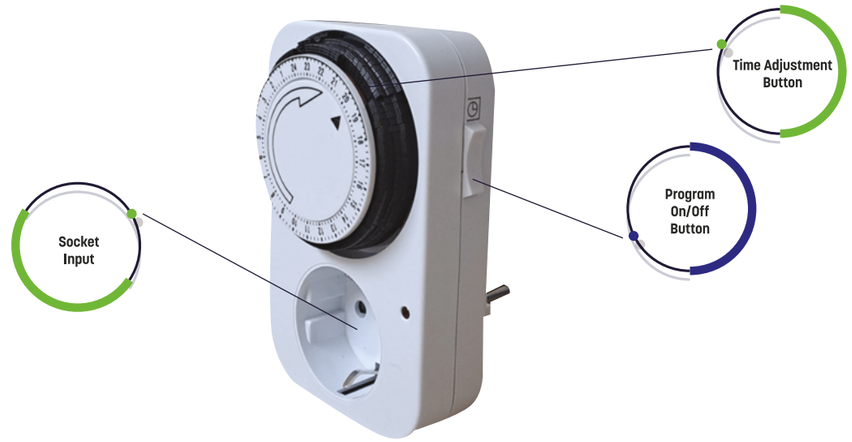
Panel-Type Weekly Programmable Digital Timer with Reserve Function



Breaker-Type Daily 15-Minute Interval Programmable Analog Timer with Reserve Function



Socket-Type 24-Hour Programmable Analog Timer with 15-Minute Interval



Socket-Type Weekly Programmable Digital Timer



Timer



TIMER			XZS			
Type			XDZS-P1	XAZS-01	XAZS-P1	XAZS-P2
Rated Operational Voltage	Ue	VAC	220-240			
Rated Current	In	A	16			
Power		W	3500			
Operating Frequency		Hz	50/60			
Standards			IEC EN 60730-61000			
Protection Class			IP20			
Protection Degree			2			
Electrical Life		op.	5.000			
Mechanical Life		op.	10.000			
Operating Ambient Temperature Range		°C	-10....+40			

GENERAL PRODUCT CATALOG

TIMER

General Information



Timer and Working Principle

Timer transmit or cut off energy for a set period of time thanks to an internal mechanism. Most of the time, the clock opens or closes the circuit to which it is connected using a relay-based system. These devices are usually produced mechanically (analog) or digitally.

There are different types that can be programmed **daily, weekly, at certain time intervals or in special time periods** depending on the purpose of use.

Types of Timer and Details

Digital Timer with Weekly Programming (Panel Type)

- It is used in electrical panels.
- Weekly programmable; Different on-off times can be set for each day.
- **Example use:** Lighting systems in factories, street lamps, automation systems.

Analog Timer with daily 15-minute interval programming (vending machine type)

- It works on a daily basis, it can turn on and off every 15 minutes.
- Works with a mechanical system (includes spring mechanism).
- **Example use:** Booster systems, vending machines, time-controlled pumps.

24-hour programming 15-minute time interval analog timer (socket type)

- Since it is a socket type, it is plugged directly into the plug.
- It can turn on-off every 15 minutes for 24 hours.
- **Example use:** Aquarium filters, garden irrigation systems, night lights.

Digital timer with Weekly Programming (Socket Type)

- It has a digital display and can be programmed weekly.
- Daily and weekly time frames can be entered.
- **Example use:** Home heaters, window lighting, electronic devices.

Uses of Timers

- **Home Automation:** Combi boilers, water heaters, night lights.
- **Industry and Factories:** Lighting systems, production lines, motors.
- **Agriculture:** Irrigation systems, greenhouse ventilation.
- **Infrastructure and Utilities:** Street lights, traffic lights.

Advantages

Energy Saving: Reduces utility bills by preventing unnecessary energy consumption.

Efficient Operation: It prolongs the life of the devices by preventing unnecessary operation.

Automation and Convenience: Eliminates the need for manual on-off.

Security: Staying on for a long time provides control of risky devices.

ORDER LIST

Timer

Type (Order) Code	Explanation	Box Quantity	Carton Quantity
XZS D-PA-01	Panel-Type Weekly Programmable Digital Timer with Reserve Function	10	100
XZS A-0T-02	Breaker-Type Daily 15-Minute Interval Programmable Analog Timer with Reserve Function	10	100
XZS A-PR-03	Socket-Type 24-Hour Programmable Analog Timer with 15-Minute Interval	12	48
XZS A-PR-04	Socket-Type Weekly Programmable Digital Timer	10	50



XDZS-P1



XAZS-01



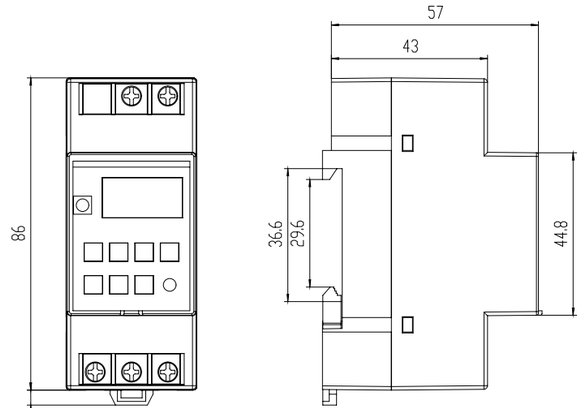
XAZS-P1



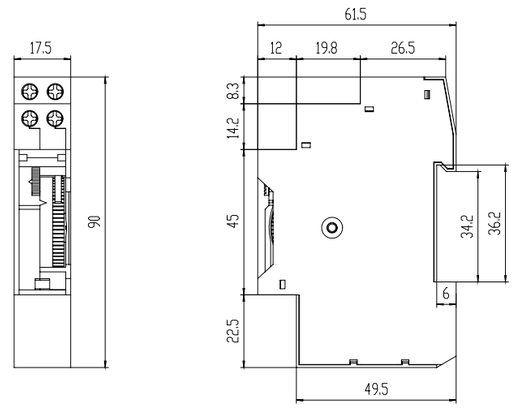
XAZS-P2

DIMENSIONS

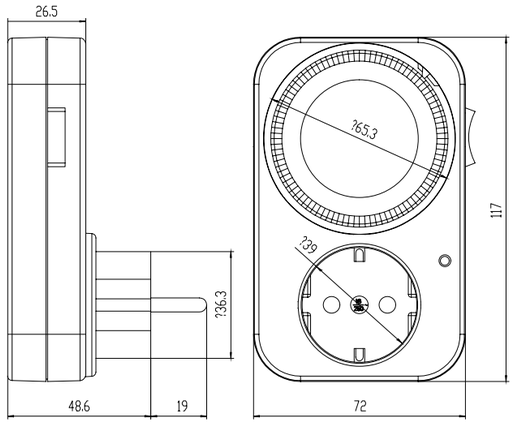
XZS D-PA-01



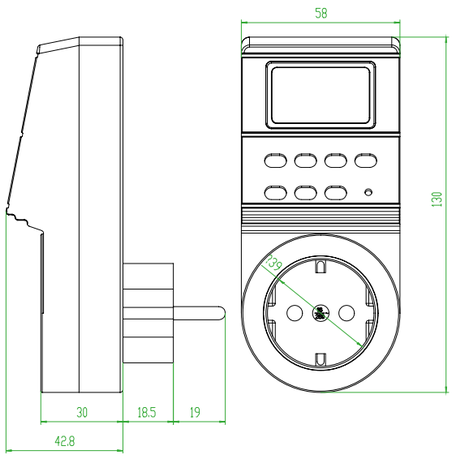
XZS A-0T-02



XZS A-PR-03



XZS A-PR-04



Adjustable Voltage And Current Protector



XGK Adjustable Voltage and Current Protector			XGK	
Rated Operating Voltage	Ue	VAC	220	
U Adjustment Range		V	130-300	80-210
Max. Operating Voltage		V	350	
Max. Operating Current		A	40-63	
Overvoltage Trip Delay		s	0.5s	
Voltage Accuracy			<1%	
Operating Frequency		Hz	50/60	
Altitude		m	≤ 2000m	
Storage Ambient Temperature Range		℃	-25 ℃...+55 ℃	
Operating Ambient Temperature Range		℃	-25℃...+50 ℃	
Dimensions	hxwxg	m	86x38x69	

General Information



XGK Adjustable Voltage and Current Protector

The XGK Adjustable voltage and current protector is a voltage monitoring and protection device used in single-phase AC networks. With its microprocessor-based structure, it analyzes real-time voltage and current values and displays them on a digital screen. It protects electrical equipment against hazardous conditions such as overvoltage and undervoltage. The user can adjust voltage, current, and delay time settings via the buttons on the device. The configured values are stored in memory and remain unchanged even after power interruptions.

Operating Principle: The device continuously monitors the main supply voltage and disconnects the load via an electromagnetic relay when the predefined limit values are exceeded. This prevents connected equipment from being affected by potential overvoltage or undervoltage conditions. In addition to displaying real-time current and voltage values, the device also provides overcurrent protection.

Protection Functions:

Undervoltage Protection: When the supply voltage falls below the specified minimum threshold, the device automatically disconnects the load. This prevents electrical equipment from being damaged due to low voltage.

Overvoltage Protection: If the supply voltage exceeds the specified maximum limit, the device disconnects the load. This prevents equipment from burning out or being damaged due to excessive voltage.

Operation in Voltmeter Mode: The device continuously displays real-time voltage and current values on a digital screen, allowing the user to monitor the system status. Voltage fluctuations can be tracked for better system management.

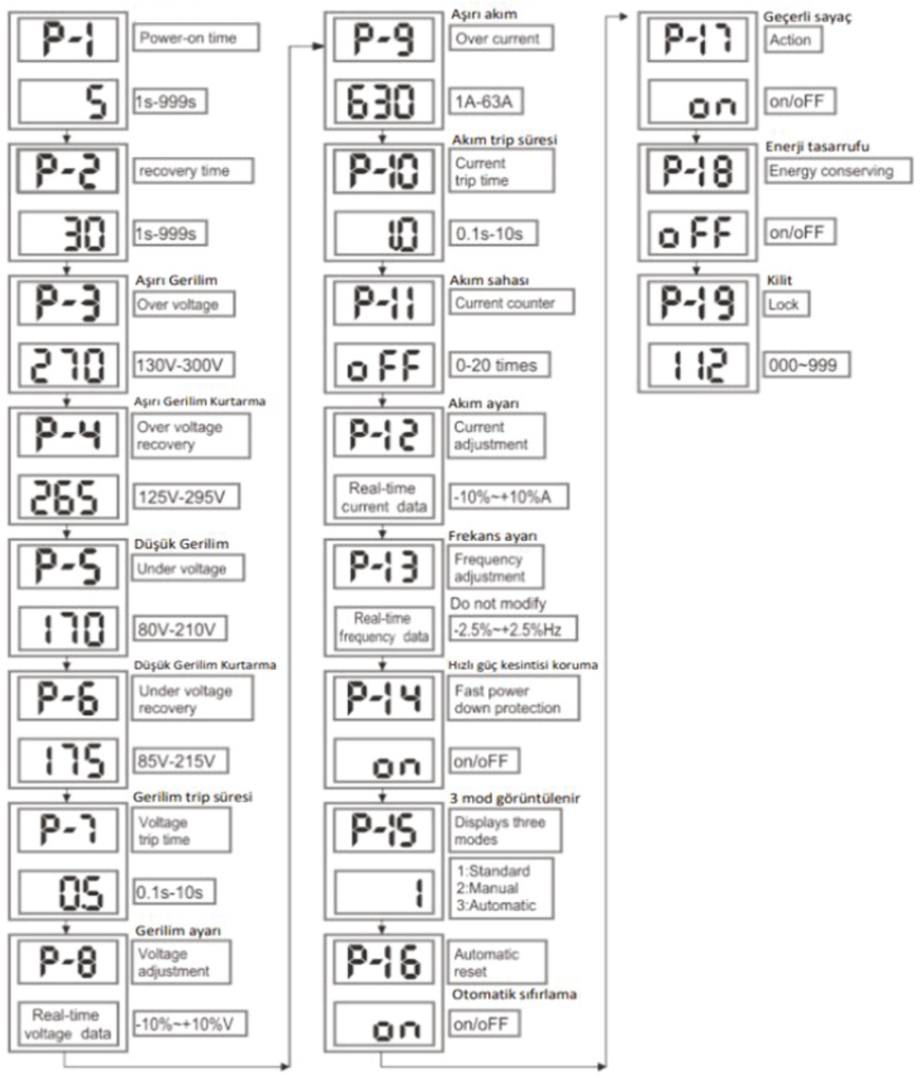
Overcurrent Protection: When the current drawn from the network exceeds the specified maximum limit, the device disconnects the load, protecting connected equipment from overheating and short-circuit risks caused by excessive current.

General Technical Specifications

Supply Terminals:	N, L
Supply Voltage:	AC 220V
Frequency:	50/60 Hz
Voltage Adjustment Range:	130V - 300V / 80V - 210V
Overvoltage Trip Delay:	0.5s
Voltage Accuracy:	<1%
Max. Operating Voltage:	350V
Max. Operating Current:	40A / 63A
Altitude:	≤2000m
Operating Temperature:	-25 °C...+50 °C
Storage Temperature:	-25 °C...+55 °C
Dimensions:	86x38x69 mm

The XGK Adjustable voltage and current protector enhances electrical system safety in offices, industrial facilities, and residential buildings. With its compact design and wide adjustment range, it provides an effective solution for protecting single-phase power lines.

Set Up Menu



ORDER LIST

Adjustable Voltage and Current Protector

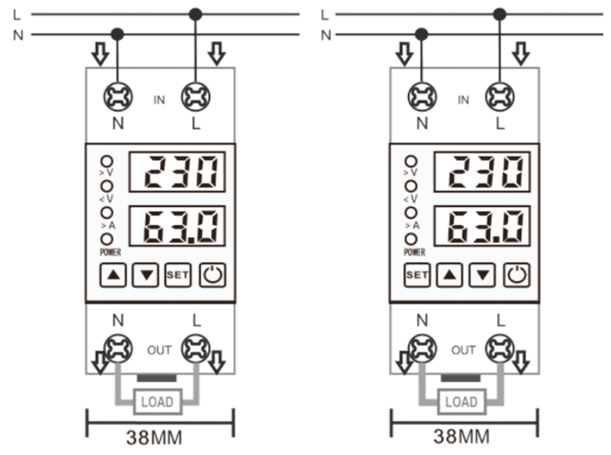


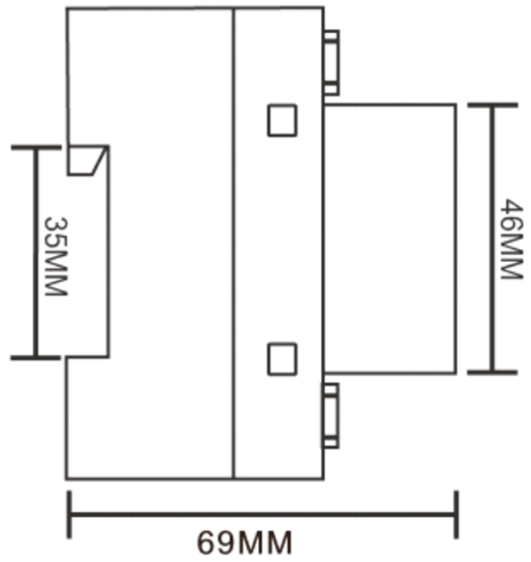
Type (Order) Code	Pole	Explanation	Box Quantity	Carton Quantity
XGK 2-040	2	2P 40A	1	100
XGK 2-063	2	2P 63A	1	100
XGK 2-080	2	2P 80A	1	100
XGK 4-040	4	4P 40A	1	50
XGK 4-063	4	4P 63A	1	50
XGK 4-080	4	4P 80A	1	50

GENERAL PRODUCT CATALOG

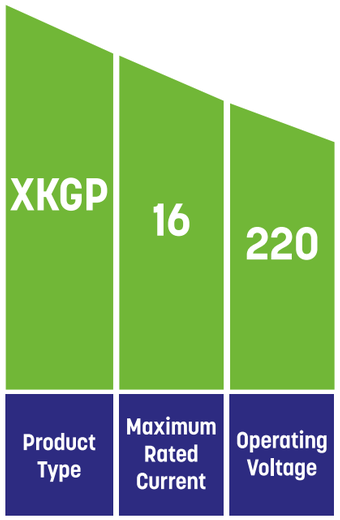
ADJUSTABLE VOLTAGE AND CURRENT PROTECTOR

Dimensions





Product Code and Label Information





Note;
Green light; power indicator light(normal working indicator light)
Red light; abnormal indicator light (protection indicator light)

GENERAL PRODUCT CATALOG

SOCKET WITH CURRENT PROTECTION

General Information



SOCKET WITH CURRENT PROTECTION			XGKP
Rated Operational Voltage	Ue	VAC	220
Maximum Voltage		kV	6
Maximum Current		kA	5
Maximum Rated Current	In	A	≤16
Operating Frequency		Hz	50/60
Electrical Noise		db	<30
Operating Ambient Temperature Range		°C	-10.....+65
Diemensions		mm^2	97*54*73

SOCKET WITH CURRENT PROTECTION

General Information



XKoren XGKP socket with current protection is a type of electrical socket designed to enhance the safety of electrical devices by providing protection against overcurrent, short circuits, electrical noise, and voltage fluctuations. These sockets protect connected devices from potential electrical damage and ensure their safe operation.

Operating Voltage and Current Capacity:

- **Operating Voltage:** It operates in accordance with 220V (±10%), which is an ideal voltage for household use.
- **Maximum Voltage:** 6 kVA, indicating the device's maximum power capacity and ensuring the electrical system can safely operate up to this level.
- **Maximum Current:** With a maximum current capacity of 5 kA, it is resistant to abnormal electrical loads and high current situations.
- **Maximum Rated Current:**16A, the rated current of the device. This represents the maximum continuous current that can pass through the socket.

Electrical Protection Features:

- **Overcurrent and Short Circuit Protection:** The current protection socket prevents connected devices from damage due to overcurrent or short circuit situations. If the current in the system exceeds the specified maximum current value, the socket will interrupt the circuit to protect the devices.
- **Electrical Noise Protection:** In environments with electrical noise (≤30 dB), the current protection socket prevents such interference from reaching devices. This ensures that sensitive electronic devices operate smoothly.
- **Voltage Fluctuations:** Voltage fluctuations or sudden voltage spikes can cause permanent damage to devices. The current protection socket provides protection against such fluctuations, ensuring that devices operate safely.

Operating Conditions:

- **Operating Temperature:** This socket can operate within a temperature range of -10°C to +65°C, making it resistant to temperature changes and suitable for use in various environmental conditions.
- **Operating Frequency:** The socket operates between 50-60 Hz, making it compatible with standard electrical grids and suitable for both domestic and commercial use.

Applications and Benefits:

- **Home Use:** Current protection sockets are commonly used to protect electronic devices such as computers, televisions, and home appliances in homes.
- **Office and Commercial Spaces:** They are crucial for protecting computers and other sensitive devices, as well as preventing electrical interference, which is necessary for efficient work in offices.
- **Industrial Use:** Current protection sockets are used to protect machinery and equipment. They provide protection against overloading or short circuits in industrial systems.

Advantages:

1.Device Protection: Protects devices against overcurrent, short circuits, and voltage fluctuations, preventing potential failures.
2.Electrical Noise Reduction: Prevents electrical interference from damaging devices, ensuring the longevity of devices.
3.Adaptation to Various Operating Conditions: With a wide temperature range and frequency support, the socket can be safely used in different environmental conditions.
4.Energy Efficiency: By providing electrical protection, it ensures that devices operate efficiently, contributing to energy savings.
5.High Safety: Having maximum voltage and current limits provides high safety and protects devices from electrical faults.

In conclusion, socket with current protection ensure safe and efficient use by protecting your devices from electrical damage. They are widely used in homes, offices, and industrial areas to improve device safety and energy efficiency. These sockets help extend the lifespan of your devices by minimizing the effects of electrical interference, overcurrent, and voltage fluctuations.

GENERAL PRODUCT CATALOG

SOCKET WITH CURRENT PROTECTION

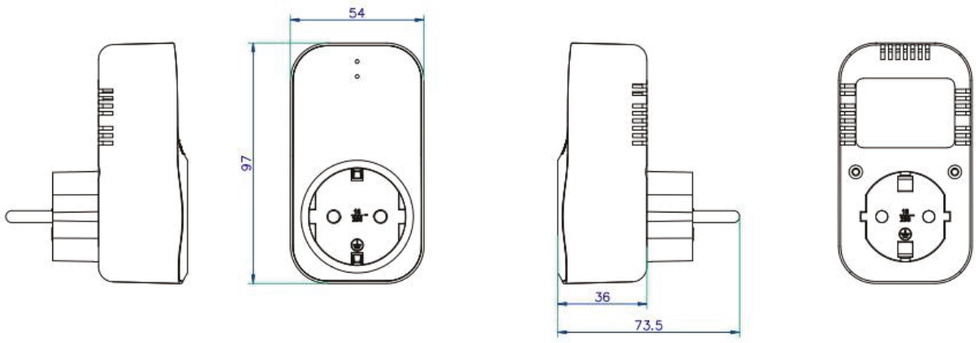
ORDER LIST

Socket With Current Protection

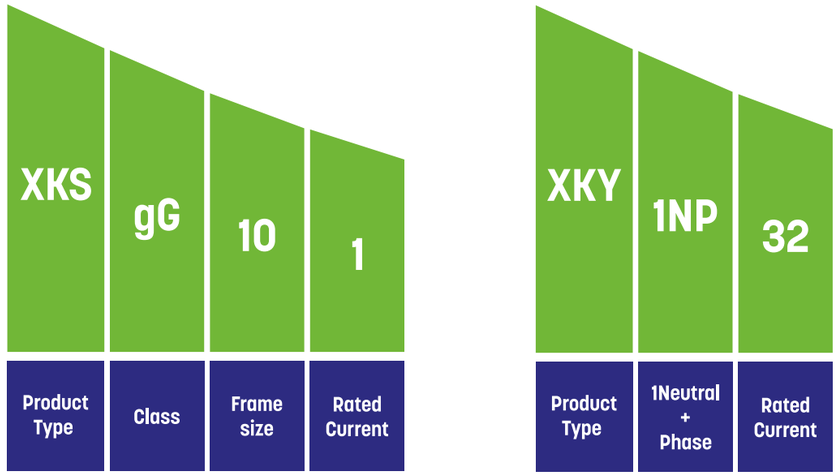
Type (Order) Code	Rated Current (In)	Explanation	Box Quantity	Carton Quantity
XGKP 16-220	16A	16A 220V 6kV	1	50

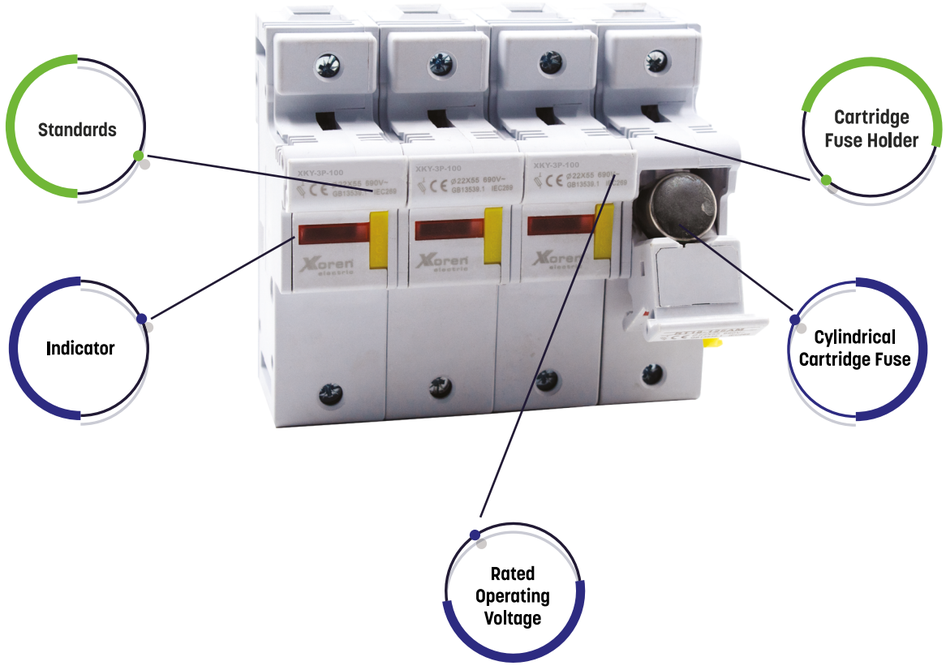


DIMENSIONS



Product Code and Label Information





Cylindrical Cartridge Fuse



Cylindrical Cartridge Fuse	XKS						
Type	XKS-gG			XKS-aM	XKS-aR	XKS-DC	
Rated Operational Voltage	500					1000	1500
Rated Current	1,2,4,6,10,16, 20,25,32	40,50,63	80,100	2,4,6,10,16, 20,25,32	2,4,6,10,16, 20,25,32	2,4,8,16,20, 25,30	20,25,30
Breaking Capacity	50					20	
Power Loss	3						
Dimensions	10x38	14x51	22x58	10x38	10x38	10x38	10x85
Application Category	gG			aM	aR	DC	
Standarts	IEC EN 60269						
Protection Class	IP20						

Cartridge Fuse Holder



Cartridge Fuse Holder	Symbol	Unit	XKY-DC		
Number of Poles		P	1,2,3,4	1,3,4	1,3
Rated Operational Voltage	Ue	V	690 AC		1000 DC
Rated Current	In	A	32	50,100	25,50
Breaking Capacity		kA	50		20
Power Loss		W	3		
Terminal Tightening Torque		Nm	1.5-2.5		
Standarts			IEC EN 60269		
Protection Class			IP20		

GENERAL PRODUCT CATALOG

CYLINDRICAL CARTRIDGE FUSE AND HOLDER

General Information

Cylindrical cartridge fuses are high-reliability components designed to protect electrical circuits from overcurrent and short circuits. These fuses are manufactured according to the IEC/EN 60269 standard, providing safe protection in industrial applications. With an IP20 protection class, these fuses are protected against dust and are not accessible to direct contact. Available in various current and voltage ratings, these fuses possess a safe breaking capacity for different electrical circuits. High breaking capacity and low power loss features allow devices to operate efficiently and have a long lifespan. Additionally, when properly sized, they provide effective protection against dangerous situations such as overcurrent and short circuits.

Technical Specifications:

• Rated Operating Voltage (Ue):
•XKS-gG: 500V AC
•XKS-DC: 1000V - 1500V

• Rated Current (In):
•Various current levels from 1A to 100A

• Breaking Capacity:
•For AC systems: 50 kA
•For DC systems: 20 kA

• Dimensions:
•10x38 mm, 14x51 mm, 22x58 mm, 10x85 mm

Usage Categories:

•gG, aM, aR, and DC cylindrical cartridge fuses are different types of fuses with various protection characteristics. Each is designed for specific applications and loads. Below is a general explanation of the protection characteristics and current characteristics of these fuses:

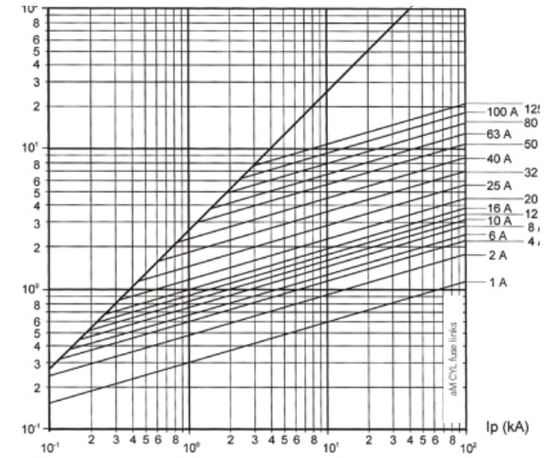
1.gG Fuse
o Protection Feature:

•gG (general-purpose) fuses provide general-purpose protection. They open the circuit during high short-circuit currents and overload conditions, protecting the electrical circuit. These fuses are typically used in industrial and commercial applications.

•This fuse does not provide advanced motor protection but is suitable for general loads. It disconnects the circuit in the case of overcurrent and short circuit conditions.

•**I^2t Characteristic:** gG fuses can withstand for a long time at low currents and for a short period at high currents. In the graph, they quickly disconnect with high current.

Cut-Off Characteristics



Prospective short circuit in kA rms

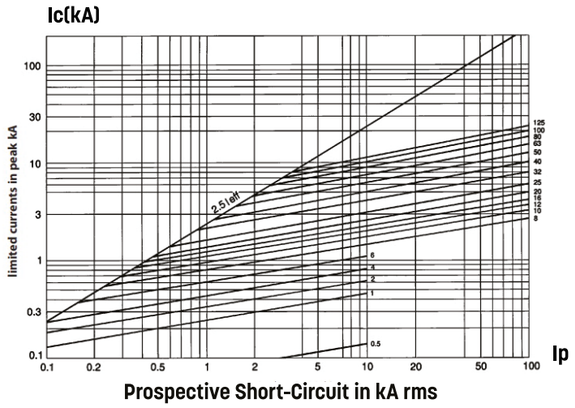
•They respond very quickly to short-circuit currents, while they can endure longer durations in overload situations.

2. aM Fuse
Protection Feature:

•aM fuses are designed for the protection of industrial machines, such as motors. Due to the temporary high currents that motors typically experience during operation (e.g., motor startup current), the fuse does not trip. However, in the event of an overload or short circuit, the fuse will open the circuit.

•**I^2t Characteristic:** aM fuses temporarily tolerate the motor's starting currents. However, in the case of overload or short circuit, they quickly open the circuit.

Cut-Off Characteristics



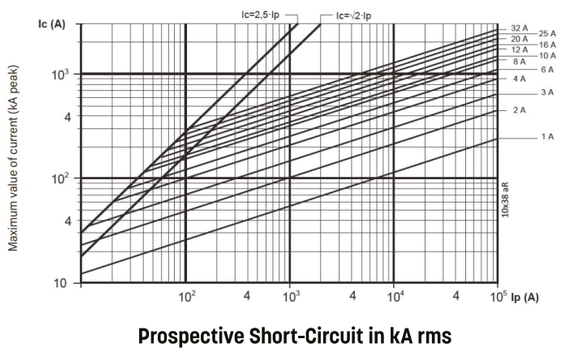
In short circuit and overload currents, they trip rapidly at high currents.

3. aR Fuse

Protection Feature:
•aR fuses are specifically designed for systems such as asynchronous motors. They are used to protect the motors from instantaneous high currents and to safeguard the system in cases of overload or short circuit. In most cases, they are used to provide short circuit and overload protection.

•**I^2t Characteristic:** aR fuses are sensitive to short circuit and overload currents. While providing protection for motors, they respond quickly to high short circuit currents.

Cut-Off Characteristics



•**gG fuses:** General-purpose, overload, and short circuit protection.
•**aM fuses:** For motors, tolerate inrush currents.
•**aR fuses:** For asynchronous motors and short circuit protection.

Each fuse's current curve is shaped according to its I^2t characteristics, and its response varies depending on the current levels and the fuse's intended application.

Cartridge Fuse Holder (XKY Series)

Cartridge fuse holders are durable protective enclosures that ensure the safe installation and replacement of cylindrical fuses. These holders are used in systems that require high safety standards.

Technical Specifications:

- **Nominal Operating Voltage (Ue):**
  - o XKY: 690V AC
  - o XKY-DC: 1000V DC
- **Nominal Current (In):**
  32A - 100A range
- **Breaking Capacity:**
  - o For AC systems: 50 kA
  - o For DC systems: 20 kA
- **Terminal Tightening Torque:**
  1.5 - 2.5 Nm
- **Protection Class:**
  IP20 (protected against direct contact)

Applications:

1.Industrial and Manufacturing Facilities:
•Motors, control panels, distribution panels
•Heavy industrial machinery, electrical equipment

2.Renewable Energy Systems:
•Solar panels and inverter systems (XKS-DC)
•Wind turbines, battery systems

3.Electrical Distribution and Grid Systems:
•Transformer stations, low voltage distribution systems
•Generator systems

4.Automation and Electronics Systems:
•PLC control systems
•Semiconductor and electronic protection

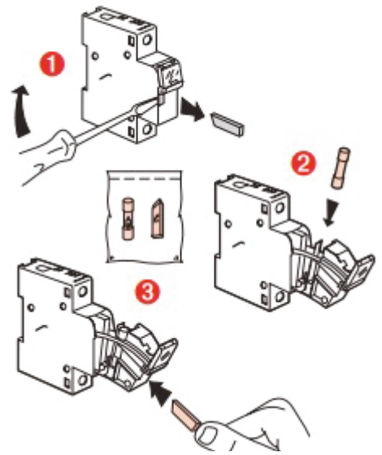
5.Transportation and Railway Systems:
•Electric rail systems
•Metro, tram power systems

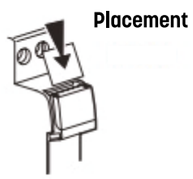
Operating Environment:

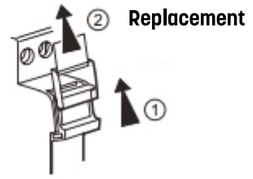
•**Industrial Environments:** Dusty, humid, and high-temperature factories
•**Outdoor Applications:** Solar energy systems, transformer stations
•**DC Power Systems:** High-voltage solar panel and battery applications
•**Control Panels:** Indoor panel installations
Advantages:
•**Reliable Protection:** Provides overcurrent and short circuit protection.
•**High Breaking Capacity:** Has a breaking capacity of 50 kA for AC and 20 kA for DC.
•**Modular and Easily Replaceable:** Practical installation with cartridge fuse holders.
•**Wide Range of Applications:** Different models available for both AC and DC applications.
•**Energy Efficiency:** Low power loss (3W) improves system efficiency.

Cylindrical cartridge fuses and their holders are ideal components for electrical applications requiring high reliability and secure protection. They ensure safe operation in both industrial facilities and renewable energy systems.

Installation:







ORDER LIST

Cylindrical Cartridge Fuse and Holder







Type (Order) Code	Dimension	Rated Current (In)	Product Name	Box Quantity	Carton Quantity
XKS gG-10-1	10x38	1A	gG Type 10x38 mm 1A 500V	10	2000
XKS gG-10-2	10x38	2A	gG Type 10x38 mm 2A 500V	10	2000
XKS gG-10-4	10x38	4A	gG Type 10x38 mm 4A 500V	10	2000
XKS gG-10-6	10x38	6A	gG Type 10x38 mm 6A 500V	10	2000
XKS gG-10-10	10x38	10A	gG Type 10x38 mm 10A 500V	10	2000
XKS gG-10-16	10x38	16A	gG Type 10x38 mm 16A 500V	10	2000
XKS gG-10-20	10x38	20A	gG Type 10x38 mm 20A 500V	10	2000
XKS gG-10-25	10x38	25A	gG Type 10x38 mm 25A 500V	10	2000
XKS gG-10-32	10x38	32A	gG Type 10x38 mm 32A 500V	10	2000
XKS gG-14-40	14x51	40A	gG Type 14x51 mm 40A 500V	10	1000
XKS gG-14-50	14x51	50A	gG Type 14x51 mm 50A 500V	10	1000
XKS gG-22-63	14x51	63A	gG Type 14x51 mm 63A 500V	10	400
XKS gG-22-80	22x58	80A	gG Type 22x58 mm 80A 500V	10	400
XKS gG-22-100	22x58	100A	gG Type 22x58 mm 100A 500V	10	400
XKS aM-10-2	10x38	2A	aM Type 10x38 mm 2A 500V	10	400
XKS aM-10-4	10x38	4A	aM Type 10x38 mm 4A 500V	10	2000
XKS aM-10-6	10x38	6A	aM Type 10x38 mm 6A 500V	10	2000
XKS aM-10-10	10x38	10A	aM Type 10x38 mm 10A 500V	10	2000
XKS aM-10-16	10x38	16A	aM Type 10x38 mm 16A 500V	10	2000
XKS aM-10-20	10x38	20A	aM Type 10x38 mm 20A 500V	10	2000
XKS aM-10-25	10x38	25A	aM Type 10x38 mm 25A 500V	10	2000
XKS aM-10-32	10x38	32A	aM Type 10x38 mm 32A 500V	10	2000
XKS aR-10-2	10x38	2A	aR Type 10x38 mm 2A 500V	10	2000
XKS aR-10-4	10x38	4A	aR Type 10x38 mm 4A 500V	10	2000
XKS aR-10-6	10x38	6A	aR Type 10x38 mm 6A 500V	10	2000
XKS aR-10-10	10x38	10A	aR Type 10x38 mm 10A 500V	10	2000
XKS aR-10-16	10x38	16A	aR Type 10x38 mm 16A 500V	10	2000
XKS aR-10-20	10x38	20A	aR Type 10x38 mm 20A 500V	10	2000
XKS aR-10-25	10x38	25A	aR Type 10x38 mm 25A 500V	10	2000
XKS aR-10-32	10x38	32A	aR Type 10x38 mm 32A 500V	10	2000

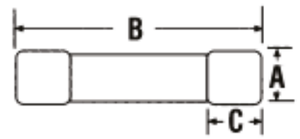
Cartridge Fuse Holder



Type (Order) Code	Rated Current (In)	Cartridge (mm)	Pole	Explanation	Box Quantity	Carton Quantity
XKY-1P-32	32A	10x38	1P	1P 32A Compatible with 10x38 mm Cartridge Fuse	12	300
XKY 1NP-32	32A	10x38	1P+N	1P+N 32A Compatible with 10x38 mm Cartridge Fuse	6	150
XKY 3P-32	32A	10x38	3P	3P 32A Compatible with 10x38 mm Cartridge Fuse	4	100
XKY 4P-32	32A	10x38	4P	4P 32A Compatible with 10x38 mm Cartridge Fuse	3	75
XKY 1P-50	50A	14x51	1P	1P 50A Compatible with 14x51 mm Cartridge Fuse	6	192
XKY 1NP-50	50A	14x51	1P+N	1P+N 50A Compatible with 14x51 mm Cartridge Fuse	3	96
XKY 3P-50	50A	14x51	3P	3P 50A Compatible with 14x51 mm Cartridge Fuse	2	64
XKY 1P-100	100A	22x58	1P	1P 100A Compatible with 22x58 mm Cartridge Fuse	6	96
XKY 1NP-100	100A	22x58	1P+N	1P+N 100A Compatible with 22x58 mm Cartridge Fuse	3	48
XKY 3P-100	100A	22x58	3P	3P 100A Compatible with 22x58 mm Cartridge Fuse	2	32

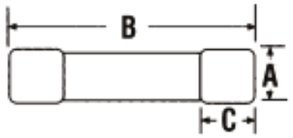
DIMENSIONS

XKS-gG



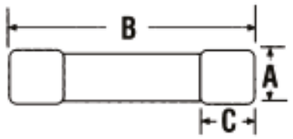
Fuse Size	A	B	C
10 x38	10.3	38	10.5
14 x51	14.3	51	13.8
22x 58	22.2	58	6.2

XKS-aM



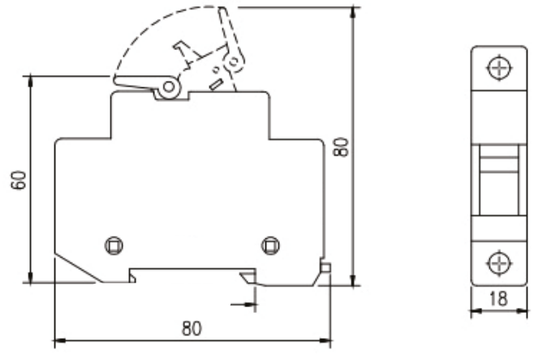
Fuse Size	A	B	C
10 x38	10.3	38	10.5

XKS-aR

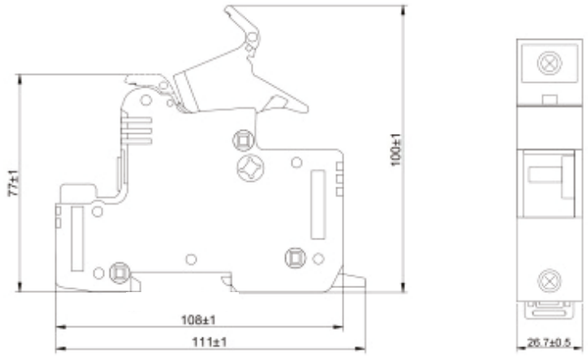


Fuse Size	A	B	C
10 x38	10.3	38.1	10.5

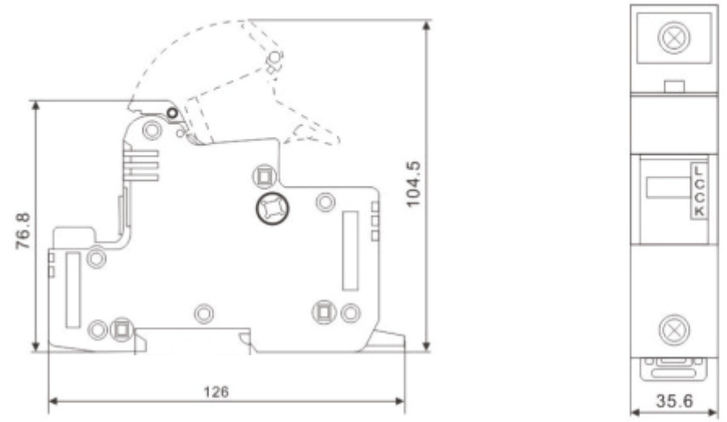
XKY



Fuse Size (mm)	Rated Voltage	Rated Current
10 x38	690VAC	32A

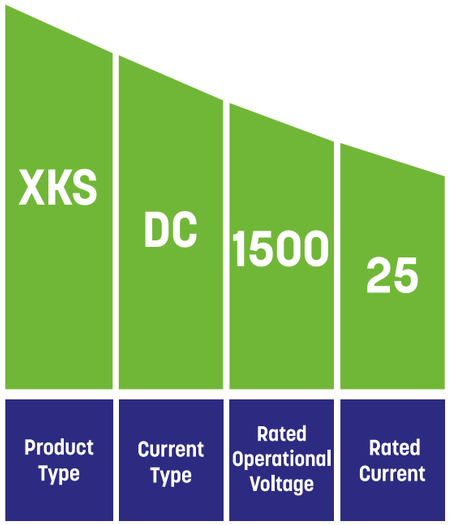


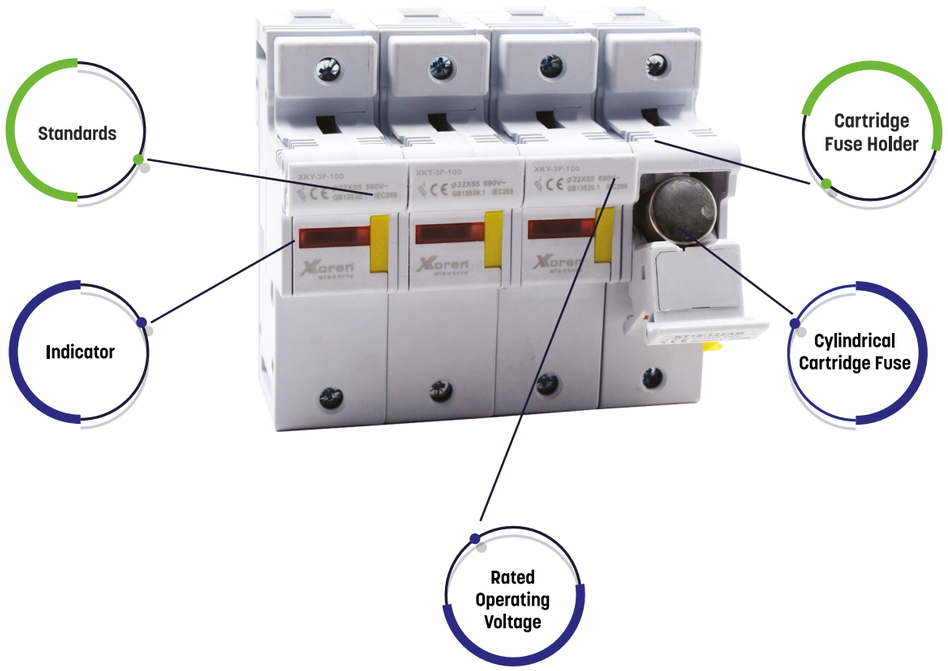
Fuse Size (mm)	Rated Voltage	Rated Current
14 x51	690VAC	63A



Fuse Size (mm)	Rated Voltage	Rated Current
22x58	690VAC	125A

Product Code and Label Information

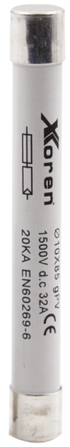




GENERAL PRODUCT CATALOG

DC CYLINDRICAL CARTRIDGE FUSE AND HOLDER

CYLINDRICAL CARTRIDGE FUSE



Cylindrical Cartridge Fuse	XKS	
Type	XKS-DC	
Rated Operational Voltage	1000	1500
Rated Current	2,4,8,16,20, 25,30	20,25,30
Breaking Capacity	20	
Power Loss	3	
Dimensions	10x38	10x85
Application Category	DC	
Standarts	IEC EN 60269	
Protection Class	IP20	

Cartridge Fuse Holder



Cartridge Fuse Holder	Symbol	Unit	XKY		
Number of Poles		P	1,2,3,4	1,3,4	1,3
Rated Operational Voltage	Ue	V			1000 DC
Rated Current	In	A	32	50,100	25,50
Breaking Capacity		kA	50		20
Power Loss		W	3		
Terminal Tightening Torque		Nm	1.5-2.5		
Standarts			IEC EN 60269		
Protection Class			IP20		

General Information

DC cylindrical cartridge fuses are designed to provide overcurrent and short-circuit protection in direct current (DC) systems. They are commonly used in renewable energy systems (such as solar panels, battery systems, wind energy), industrial applications, and electric transportation systems.
Unlike alternating current (AC), the continuous and uninterrupted nature of DC current makes arc formation more challenging. Therefore, DC fuses are optimized with long, continuous arc extinguishing chambers and precise melting wires.

Technical Operating Principle

DC fuses operate based on the principle that the fusible element (fusing element) will break at a specific temperature when the rated current value (In) is exceeded. This breakage is directly related to the I^2t energy (the value that determines the fuse's thermal endurance) and prospective short-circuit currents (Icu and Ip).

- **I^2t Characteristic:** Represents the energy withstand capability of the fuse and determines the speed at which the fuse will interrupt the short-circuit current.
- **Breaking Capacity (Icu):** The maximum short-circuit current that the fuse can safely interrupt.
- **Rated Current (In):** The nominal operating current of the fuse.
- **Power Loss:** The energy loss due to the internal resistance of the fuse (measured in watts).

Electrical and Mechanical Properties

Property	Value
Rated Voltage (Ue)	1000V DC (10x38 mm) / 1500V DC (10x85 mm)
Rated Current (In)	2A, 4A, 8A, 16A, 20A, 25A, 30A
Breaking Capacity (Icu)	20 kA
Power Loss	3W
Dimensions	10x38 mm / 10x85 mm
Application Category	aR (Fast-Acting)
Standarts	IEC 60269-4
Protection Class	IP20

Applications

DC cylindrical fuses can be used in a wide range of industrial and energy systems:

1.Renewable Energy Systems
o Solar panels and inverters
o Battery energy storage systems
o Wind turbines

2. Electric Transportation and Railway Systems
o Metro, tram, and train systems
o Electric vehicle (EV) charging stations

3. Industrial and Manufacturing Applications
o Motor control panels
o Electrical distribution and substation centers

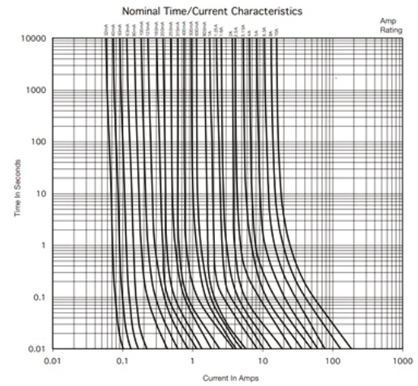
4. Automation and Control Systems
o PLC and industrial control systems
o Communication and data center

Advantages

- **High Breaking Capacity:** Short-circuit breaking capacity up to 20 kA
- **Fast Response:** Fusible element design optimized for DC systems
- **Energy Efficiency:** Low power loss (3W)
- **Long Lifetime:** Designed with high-quality conductive materials
- **Modular and Easily Replaceable:** Compatible with XKY cartridge fuse holders

DC Cylindrical Cartridge Fuses are designed to provide high security and reliability in DC applications. With high breaking capacity, low power loss, and a wide range of applications, they are a critical protection component in industrial and renewable energy systems.

Current-Time Curves



ORDER LIST

Cylindrical Cartridge Fuse and Holder



Type (Order) Code	Dimension (mm)	Rated Current (In)	Explanation	Box Quantity	Carton Quantity
XKS DC-1000-2	10x38	2A	1000VDC 10x38 mm 2A	10	2000
XKS DC-1000-4	10x38	4A	1000VDC 10x38 mm 4A	10	2000
XKS DC-1000-8	10x38	8A	1000VDC 10x38 mm 8A	10	2000
XKS DC-1000-16	10x38	16A	1000VDC 10x38 mm 16A	10	2000
XKS DC-1000-20	10x38	20A	1000VDC 10x38 mm 20A	10	2000
XKS DC-1000-25	10x38	25A	1000VDC 10x38 mm 25A	10	2000
XKS DC-1000-30	10x38	30A	1000VDC 10x38 mm 30A	10	2000
XKS DC-1500-20	10x85	20A	1500VDC 10x85 mm 20A	10	1000
XKS DC-1500-25	10x85	25A	1500VDC 10x85 mm 25A	10	1000
XKS DC-1500-30	10x85	30A	1500VDC 10x85 mm 30A	10	1000

Cartridge Fuse Holder

Type (Order) Code	Cartridge (mm)	Rated Current (In)	Pole	Explanation	Box Quantity	Carton Quantity
XKY DC-25	10x38	25A	1	1P 25A Compatible with 10x38 mm Cartridge Fuse	12	300
XKY DC-50	10x85	50A	1	1P 50A Compatible with 10x85 mm Cartridge Fuse	5	120

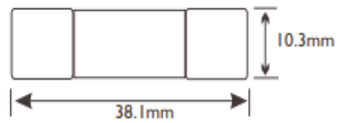
GENERAL PRODUCT CATALOG

DC CYLINDRICAL CARTRIDGE FUSE AND HOLDER

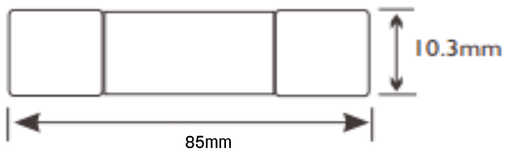
DIMENSION

XKS-DC

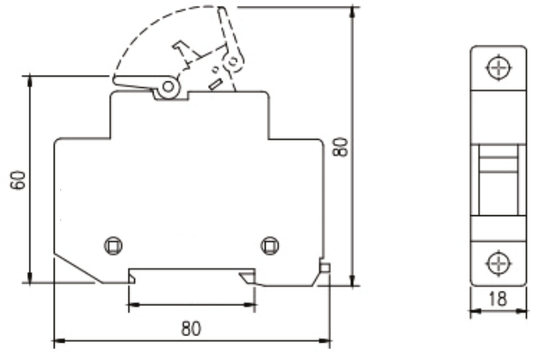
10 x 38



10 x 85

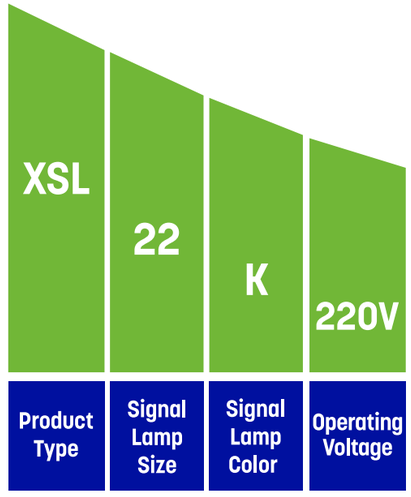


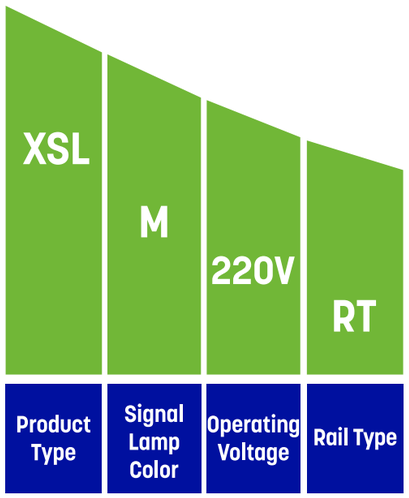
XYC-DC



Fuse Size	Rated Voltage	Rated Current	SIZE（mm）
10x38	690Vac	32A	See Above Drawing

Product Code





GENERAL PRODUCT CATALOG

SIGNALS & BUTTONS

SIGNAL LAMP



Signals	XSL				
Type	XSL-22K	XSL-22Y	XSL-22B	XSL-22S	XSL-22M
Color	●	●	○	●	●
Operating Voltage	24,110,220V				
Operating Current	AC/DC				
Diameter	16/22mm				

VOLTAGE SIGNAL LAMP



Signals	XVSL				
Type	XVSL-22K	XVSL-22Y	XVSL-22B	XVSL-22S	XVSL-22M
Color	●	●	○	●	●
Operating Voltage	24-550V				
Diameter	22mm				

AMMETER SIGNAL LAMP



Signals	XASL				
Type	XASL-22K	XASL-22Y	XASL-22B	XASL-22S	XASL-22M
Color	●	●	○	●	●
Operating Current	0-100A				
Diameter	22mm				

BUZZER WITH LED



Signals	XBZ
Type	LED's Buzzer's
Operating Voltage	24-220V
Operating Class	AC/DC
Diameter	22mm

SPRING BUTTONS



Buttons	XYB		
Type	Spring Button		
Color	●	●	●
Operating Voltage	220V		
Contact Type	1NO/1NC		

PERMANENT MUSHROOM BUTTON



Buttons	XMB
Type	XVSL-22K
Color	●
Operating Voltage	220V
Contact Type	1NC
Diameter	40mm

PERMANENT LATCH BUTTON



Buttons	XKBM
Type	Permanent Latch Button
Operating Voltage	220V
Contact Type	1NO/2NO
Diameter	40mm

BUTTON ACCESSORIES



Button Accessories	XMB-ETK/ XKB	
Color		
Operating Voltage	220V	
Contact Block Type	1NO/1NC	

EMERGENCY STOP BUTTON



Buttons	XMB
Type	Emergency Stop Button
Operating Voltage	220V
Contact Type	1NO/1NC

SHORT LATCH BUTTON



Buttons	XKBM
Type	Short Latch Button
Operating Voltage	220V
Contact Type	NO/NC
Position	2,3
Latch Type	Led-Clip-Momentary -Short-Long

LED START-STOP BUTTON



Buttons	XLSS
Type	Start-Stop Button LED
Operating Voltage	220V
Contact Type	1NO/1NC

CONTACT PERMANENT SWITCHED BUTTON



Buttons	XKBM
Type	Contact Permanent Switched Button
Operating Voltage	220V
Contact Type	NO/NC
Position	2,3
Latch Type	Clip-Key

GENERAL PRODUCT CATALOG

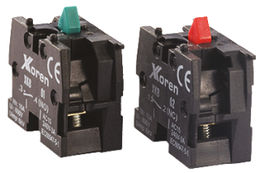
SIGNALS & BUTTONS

LED DOUBLE BUTTON



Buttons	XİB
Type	LED Double Button
Operating Voltage	220V
Contact Type	1NO/1NC

LED START-STOP BUTTON ACCESSORIES



Buttons	XYB
Type	LED Start Stop Button Accessories
Operating Voltage	220V
Contact Type	NO/NC
Button Type	Spring-Stop-Start

MUSHROOM BUTTON



Buttons	XMB					
Type	MUSHROOM BUTTON					
Color	●	●	○	●	●	●
Operating Voltage	220V					
Contact Type	NO/NC					
Button Type	LED-Momentary-Permanent-Clipped					

SPRING BUTTON



Buttons	XYB					
Type	Spring Button					
Color	●	●	○	●	●	●
Operating Voltage	220V					
Contact Type	NO/NC					
Button Type	Momentary-Permanent-Spring-Clipped-LED					

GENERAL PRODUCT CATALOG

SIGNALS & BUTTONS

METAL BUTTON



Buttons	METAL BUTTON			
Type	XYB-12-10	XMA-12-10	XMG-16-10	XYB-16-10
Operating Voltage	220V			
Diameter	12-16mm			
Contact Type	NO			

METAL LED SPRING BUTTON



Buttons	XYB				
Type	Spring Button Metal LED				
Color	●	●	○	●	●
Operating Voltage	220V				
Contact Type	NO/NC				
Diameter	16-19mm				

METAL SPRING BUTTON



Buttons	XYB
Type	Metal Spring Button
Operating Voltage	220V
Contact Type	NO
Diameter	19mm

General Information

These components are commonly used in industrial automation panels, machine control systems, and electrical distribution panels. Each one performs a different function and ensures that operators can control machines safely and efficiently. Let's provide a general explanation based on their functions:

1.Emergency Stop and Mushroom Buttons

o Emergency Stop Button: Used to instantly stop machines or systems in emergency situations. It is usually locked and requires manual reset.
o Momentary-Permanent Mushroom Button: Can be locked permanently when pressed or works momentarily due to its spring mechanism.
o LED Contact Momentary-Permanent Mushroom Button: A button with an LED indicator, which can be used both momentarily (spring-loaded) and permanently.
o Spring Momentary-Permanent Mushroom Button: A button with both normally open (NO) and normally closed (NC) contacts, functioning momentarily or can be locked.

2. Start-Stop and Latch Buttons

o Short Latch Button: A button that requires a shorter trigger motion and saves space.
o LED Start-Stop Button: A button with an LED indicator used to start or stop machines.
o Contact Keyed Permanent Button: A button that can be opened and closed with a key, used in systems requiring authorization.
o Contact Clip LED Double Button: A button with two separate functions (e.g., start on one side and stop on the other), with LED indicators and a clip.
o LED Start-Stop Button Accessory: Additional components that protect or enhance the functionality of start-stop buttons.

3. Rail Type and Other Signal Lamps

o Rail Type Signal Lamp: A display lamp that mounts directly onto a DIN rail in electrical panels.
o LED Signal Lamps: Display the operational status of systems with low energy consumption.
o Armature AC/DC Silicone Cable Signal Lamps: Signal lamps that are water and dust-resistant, used in industrial environments.
o Voltage Display Signal Lamp: Displays the presence of a specific voltage level in the panel.
o Current Display Signal Lamp: Shows the current passing through the circuit, indicating whether the system is operating.

4. Spring and Metal Buttons

o Spring Buttons: Buttons that complete the circuit when pressed and return to their original position when released.
o LED Spring Button: A spring-loaded button with an LED indicator.
o Metal Spring Button: A more durable, metal-bodied spring-loaded button suitable for industrial environments.
o Metal Momentary Button: A metal button that completes the circuit when pressed and breaks it when released.
o Metal Gold Button: A metal button with a special coating, aesthetic and durable.
o Metal LED Spring Button: A durable metal button with an LED indicator.

5. Button Accessories and Contact Blocks

o Contact Block for Start-Stop Button (1NO, 1NC):
■ **1NO (Normally Open):** Completes the circuit when the button is pressed.

■ **1NC (Normally Closed):** Breaks the circuit when the button is pressed.

General Application Areas

•**Industrial Automation:** Starting, stopping, and controlling machines.
•**Energy Distribution:** Monitoring and managing energy status in electrical panels.
•**Machine Safety:** Ensuring workplace safety with emergency stop buttons.
•**Building Management Systems:** Controlling lighting, ventilation, and other electrical systems.
•**Vehicle and Equipment Control:** Starting and stopping cranes, conveyors, and other mechanical systems.
•**Fault and Warning Notifications:** Indicating system faults and operational statuses with signal lamps.

ORDER LIST

SIGNAL & BUTTON PRODUCTS

22 mm 220V AC/DC LED Signal Lamp



Type (Order) Code	Color	Explanation	Box Quantity	Carton Quantity
XSL - 22K / 220V		22 mm 220V AC/DC	10	100
XSL - 22Y / 220V		22 mm 220V AC/DC	10	100
XSL - 22B / 220V		22 mm 220V AC/DC	10	100
XSL - 22S / 220V		22 mm 220V AC/DC	10	100
XSL - 22M / 220V		22 mm 220V AC/DC	10	100

22 mm 110V AC/DC LED Signal Lamp



Type (Order) Code	Color	Explanation	Box Quantity	Carton Quantity
XSL - 22K / 110V		22 mm 110V AC/DC	10	100
XSL -22Y / 110V		22 mm 110V AC/DC	10	100
XSL - 22B / 110V		22 mm 110V AC/DC	10	100
XSL - 22S / 110V		22 mm 110V AC/DC	10	100
XSL - 22M / 110V		22 mm 110V AC/DC	10	100

22 mm 24V AC/DC LED Signal Lamp



Type (Order) Code	Color	Explanation	Box Quantity	Carton Quantity
XSL - 22K / 24V		22 mm 24V AC/DC	10	100
XSL - 22Y / 24V		22 mm 24V AC/DC	10	100
XSL - 22B / 24V		22 mm 24V AC/DC	10	100
XSL - 22S / 24V		22 mm 24V AC/DC	10	100
XSL - 22M / 24V		22 mm 24V AC/DC	10	100

16 mm 220V AC/DC LED Signal Lamp



Type (Order) Code	Color	Explanation	Box Quantity	Carton Quantity
XSL - 16K / 220V		16 mm 220V AC/DC	10	100
XSL - 16Y / 220V		16 mm 220V AC/DC	10	100
XSL - 16B / 220V		16 mm 220V AC/DC	10	100
XSL - 16S / 220V		16 mm 220V AC/DC	10	100
XSL - 16M / 220V		16 mm 220V AC/DC	10	100

16 mm 110V AC/DC LED Signal Lamp



Type (Order) Code	Color	Explanation	Box Quantity	Carton Quantity
XSL - 16K / 110V		16 mm 110V AC/DC	10	100
XSL - 16Y / 110V		16 mm 110V AC/DC	10	100
XSL - 16B / 110V		16 mm 110V AC/DC	10	100
XSL - 16S / 110V		16 mm 110V AC/DC	10	100
XSL - 16M / 110V		16 mm 110V AC/DC	10	100

16 mm 24V AC/DC LED Signal Lamp



Type (Order) Code	Color	Explanation	Box Quantity	Carton Quantity
XSL - 16K / 24V		16 mm 24V AC/DC	10	100
XSL - 16Y / 24V		16 mm 24V AC/DC	10	100
XSL - 16B / 24V		16 mm 24 AC/DC	10	100
XSL - 16S / 24V		16 mm 24V AC/DC	10	100
XSL - 16M / 24V		16 mm 24V AC/DC	10	100

GENERAL PRODUCT CATALOG

SIGNALS & BUTTONS

Rail Type Signal Lamp



Type (Order) Code	Color	Explanation	Box Quantity	Carton Quantity
XSL M-220-RT		220 V AC/DC	12	240
XSL K-220-RT		220 V AC/DC	12	240
XSL S-220-RT		220 V AC/DC	12	240
XSL Y-220-RT		220 V AC/DC	12	240

10 mm 220V AC/DC Armature with Silicone Wired Signal Lamp



Type (Order) Code	Color	Explanation	Box Quantity	Carton Quantity
XSL-AS-10K/220V		10 mm 220V AC/DC	10	100
XSL-AS-10Y/220V		10 mm 220V AC/DC	10	100
XSL-AS-10B/220V		10 mm 220V AC/DC	10	100
XSL-AS-10S/220V		10 mm 220V AC/DC	10	100
XSL-AS-10M/220V		10 mm 220V AC/DC	10	100

10 mm 24V AC/DC Armature with Silicone Wired Signal Lamp



Type (Order) Code	Color	Explanation	Box Quantity	Carton Quantity
XSL-AS-10K/24V		10 mm 24V AC/DC	10	100
XSL-AS-10Y/24V		10 mm 24V AC/DC	10	100
XSL-AS-10B/24V		10 mm 24V AC/DC	10	100
XSL-AS-10S/24V		10 mm 24V AC/DC	10	100
XSL-AS-10M/24V		10 mm 24V AC/DC	10	100

22 mm Signal Lamp with Voltage Indicator



Type (Order) Code	Color	Explanation	Box Quantity	Carton Quantity
XVSL - 22K		22 mm 24-550V	10	100
XVSL - 22Y		22 mm 24-550V	10	100
XVSL - 22B		22 mm 24-550V	10	100
XVSL - 22S		22 mm 24-550V	10	100
XVSL - 22M		22 mm 24-550V	10	100

22 mm Signal Lamp with Current Indicator



Type (Order) Code	Color	Explanation	Box Quantity	Carton Quantity
XASL - 22K		22 mm 0-100A	10	100
XASL - 22Y		22 mm 0-100A	10	100
XASL - 22B		22 mm 0-100A	10	100
XASL - 22S		22 mm 0-100A	10	100
XASL - 22M		22 mm 0-100A	10	100

22 mm LED'li Buzzer'lar



Type (Order) Code	Explanation	Box Quantity	Carton Quantity
XBZ - 22K / 220V	22 mm 220V AC/DC	10	100
XBZ - 22K / 24V	23 mm 24V AC/DC	10	100

22 mm Spring Buttons



Type (Order) Code	Color	Explanation	Box Quantity	Carton Quantity
XYB - K - 01		1NC Contact	10	100
XYB - Y - 10		1NC Contact	10	100
XYB - S - 10		1NC Contact	10	100
XİB - YK - 11		Twin Button with 1NO/1NC Contact	10	100

40 mm Permanent Mushroom Button



Type (Order) Code	Explanation	Box Quantity	Carton Quantity
XMB - K - 01	41 mm 1NC Contacts	10	80

Permanent Latch Button



Type (Order) Code	Explanation	Box Quantity	Carton Quantity
XKBM - 10	1NO(0-1 Contact)	10	100
XKBM - 20	2NO (1-0-2 Contact)	10	100

Button Accessories



Type (Order) Code	Color	Explanation	Box Quantity	Carton Quantity
XMB - ETK		Emergency Stop Tag	1	8
XKB - 01		Contact Block 1NO (Green) for Start Button	1	250
XKB - 02		Contact Block 1NC (Red) for Stop Button	1	250

GENERAL PRODUCT CATALOG

SIGNALS & BUTTONS

Emergency Stop Button



Type (Order) Code	Explanation	Box Quantity	Carton Quantity
XMB-K-AS-01	Emergency Stop Button 1NC Contact	10	100
XMB-K-CL-AS-11C	Clip-on Emergency Stop Button 1NO+1NC Contact	10	100
XMB-L-KL-CL-AS-11C	LED Emergency Stop Button with 1NO+1NC Contact Clip	10	100
XMB-B-K-CL-AS-11C	B series Clip-on Emergency Stop Button 1NO+1NC Contact	10	100

Short Latch Button



Type (Order) Code	Explanation	Box Quantity	Carton Quantity
XKBM-K-P2-S-10C	1 NO Contact Short Latch Button (2 Position)	10	100
XKBM-K-P3-S-20C	2 NO Contact Short Latch Button (3 Position)	10	100
XKBM-K-P2-K-10C	1 NO Contact LED Short Latch Button (2 Position)	10	100
XKBM-K-P3-K-20C	2 NO Contact LED Short Latch Button (3 Position)	10	100
XKBM-KL-P2-K-10C	1 NO Contact LED Long Latch Button (2 Position)	10	100
XKBM-KL-P3-K-20C	2 NO Contact LED Long Latch Button (3 Position)	10	100
XKBM-A-P2-S-10C	1 NO Contact Momentary Short Latch Button (2 Position)	10	100
XKBM-A-P3-S-20C	2 NO Contact Momentary Short Latch Button (3 Position)	10	100
XKBM-K-CL-P2-S-11C	Clip-on Short Latch Button with 1NO+1NC Contact (2 Position)	10	100
XKBM-K-CL-P3-S-20C	2 NO Contact Short Latch Button with Clip (3 Position)	10	100
XKBM-KL-CL-P2-S-11C	1NO+1NC Contact Long Latch Button with Clip (2 Position)	10	100
XKBM-KL-CL-P3-S-20C	2 NO Contact Long Latch Button with Clip (3 Position)	10	100
XKBM-A-CL-P2-S-11C	1NO+1NC Contact Clip-on Momentary Short Latch Button (2 Position)	10	100
XKBM-A-CL-P3-S-20C	2 NO Contact Clip-on Momentary Short Latch Button (3 Positions)	10	100
XKBM-AL-CL-P2-S-11C	1NO+1NC Momentary Long Latch Push Button with Contact Clip (2 Positions)	10	100
XKBM-AL-CL-P3-S-20C	2 NO Contact Clip-on Momentary Long Latch Button (3 Position)	10	100
XKBM-KL-CL-P2-Y-11C	1NO+1NC Contact LED Clip-on Short Latch Button Green (2 Position)	10	100
XKBM-KL-CL-P3-Y-20C	2 NO Contact LED Clip-on Short Latch Button Green (3 Position)	10	100
XKBM-KL-CL-P2-K-11C	1NO+1NC Contact LED Clip-on Short Latch Button Red (2 Position)	10	100
XKBM-KL-CL-P3-K-20C	2 NO Contact LED Clip-on Short Latch Button Red (3 Position)	10	100

LED Start-Stop Button



Type (Order) Code	Explanation	Box Quantity	Carton Quantity
XLSS-11	LED Start Stop Button 1NO+1NC Contact	10	100

Contact Permanent Switched Button



Type (Order) Code	Explanation	Box Quantity	Carton Quantity
XKBM-K-P2-A1-10	1 NO Contact Permanent Switch Button (2 Position)	10	100
XKBM-K-P3-A1-20	2 NO Contact Permanent Switch Pushbutton (3 Position)	10	100
XKBM-K-P2-A-10C	1 NO Contact Switch Button (2 Position)	10	100
XKBM-K-P3-A-20C	2 NO Contact Switch Pushbutton (3 Position)	10	100
XKBM-K-CL-P2-A1-11C	1NO+1NC Contact Clip-on Permanent Switch Push Button (2 Position)	10	100
XKBM-K-CL-P3-A1-20C	2 NO Contact Clip-on Permanent Switch Pushbutton (3 Position)	10	100

SIGNALS & BUTTONS

Double Button with LEDs



Type (Order) Code	Explanation	Box Quantity	Carton Quantity
XİB-L-YK-11C	LED Twin Push Button with 1 NO+1 NC Contact	10	100
XİB-L-CL-YK-11C	LED Twin Push Button with 1NO+1NC Contact Clip	10	100
XİB-CL-YK-11C	Clip-on Twin Push Button with 1NO+1NC Contact	10	100
XİB-LK-CL-YK-11C	1NO+1NC Contact Clip-on LED Twin Push Button (Angled)	10	100

LED Start-Stop Button Accessories



Type (Order) Code	Explanation	Box Quantity	Carton Quantity
XYB-LC	LED Contact for Spring Loaded Pushbuttons	10	100
XYB-KB-01C	Contact Block for Stop Button (1NC)	10	100
XYB-KB-10C	Contact Block for Start Button (1NO)	10	100

Mushroom Button



Type (Order) Code	Color	Explanation	Box Quantity	Carton Quantity
XMB-A-K-10C	●	1Momentary Mushroom Button Red 1NO Contact	10	100
XMB-K-K-10C	●	Permanent Mushroom Button Red 1NO Contact	10	100
XMB-A-Y-10C	●	Momentary Mushroom Button Green 1NO Contact	10	100
XMB-K-Y-10C	●	Permanent Mushroom Button Green 1NO Contact	10	100
XMB-A-Y-10C	●	Momentary Mushroom Button Yellow 1NO Contact	10	100
XMB-K-Y-10C	●	Permanent Mushroom Button Yellow 1NO Contact	10	100
XMB-A-M-10C	●	Momentary Mushroom Button Blue 1NO Contact	10	100
XMB-K-M-10C	●	Permanent Mushroom Button Blue 1NO Contact	10	100
XMB-A-B-10C	○	Momentary Mushroom Button White 1NO Contact	10	100
XMB-K-B-10C	○	Permanent Mushroom Button White 1NO Contact	10	100
XMB-A-S-10C	●	Momentary Mushroom Button Black 1NO Contact	10	100
XMB-K-S-10C	●	Permanent Mushroom Button Black 1NO Contact	10	100
XMB-A-CL-K-11C	●	Clip-on Momentary Mushroom Push Button Red	10	100
XMB-K-CL-K-11C	●	Clip-on Permanent Mushroom Push Button Red	10	100

LED Mushroom Button



Type (Order) Code	Color	Explanation	Box Quantity	Carton Quantity
XMB-AL-K-10C	●	LED Momentary Mushroom Button Red 1NO Contact	10	100
XMB-KL-K-10C	●	Permanent Spring Button Red with LED 1NO Contact	10	100
XMB-AL-Y-10C	●	Momentary Spring Push Button Green with LED 1NO Contact	10	100
XMB-KL-Y-10C	●	Permanent Spring Push Button Green with LED 1NO Contact	10	100
XMB-AL-Y-10C	●	Momentary Spring Push Button Yellow with LED 1NO Contact	10	100
XMB-KL-Y-10C	●	Permanent Spring Push Button Yellow with LED 1NO Contact	10	100
XMB-AL-M-10C	●	Momentary Spring Push Button Blue with LED 1NO Contact	10	100
XMB-KL-M-10C	●	Permanent Spring Push Button Blue with LED 1NO Contact	10	100
XMB-AL-B-10C	○	Momentary Spring Push Button White with LED 1NO Contact	10	100
XMB-KL-B-10C	○	Permanent Spring Push Button White with LED 1NO Contact	10	100
XMB-AL-CL-K-11C	●	Clip-on Momentary LED Spring Loaded Push Button NO+1NC Contact	10	100
XMB-KL-CL-K-11C	●	Clip-on Permanent LED Spring Loaded Push Button NO+1NC Contact	10	100

GENERAL PRODUCT CATALOG

SIGNALS & BUTTONS

Spring Button



Type (Order) Code	Color	Explanation	Box Quantity	Carton Quantity
XYB-A-K-10C	●	Momentary Spring Button Red 1NO Contact	10	100
XYB-K-K-10C	●	Permanent Spring Button Red 1NO Contact	10	100
XYB-A-Y-10C	●	Momentary Spring Button Green 1NO Contact	10	100
XYB-K-Y-10C	●	Permanent Spring Button Green 1NO Contact	10	100
XYB-A-S-10C	●	Momentary Spring Button Yellow 1NO Contact	10	100
XYB-K-S-10C	●	Permanent Spring Button Yellow 1NO Contact	10	100
XYB-A-M-10C	●	Momentary Spring Button Blue 1NO Contact	10	100
XYB-K-M-10C	●	Permanent Spring Button Blue 1NO Contact	10	100
XYB-A-B-10C	○	Momentary Spring Button White 1NO Contact	10	100
XYB-K-B-10C	○	Permanent Spring Button White 1NO Contact	10	100
XYB-A-S-10C	●	Momentary Spring Button Black 1NO Contact	10	100
XYB-K-S-10C	●	Permanent Spring Button Black 1NO Contact	10	100
XYB-A-CL-Y-11C		Clip-on Momentary Spring Loaded Push Button 1NO+1NC Contact	10	100
XYB-K-CL-Y-11C		Clip-on Permanent Spring Loaded Push Button 1NO+1NC Contact	10	100

LED Spring Button



Type (Order) Code	Color	Explanation	Box Quantity	Carton Quantity
XYB-AL-K-10C	●	Momentary Spring Push Button Red with LED 1NO Contact	10	100
XYB-KL-K-10C	●	Permanent Spring Button Red with LED 1NO Contact	10	100
XYB-AL-Y-10C	●	Momentary Spring Push Button Green with LED 1NO Contact	10	100
XYB-KL-Y-10C	●	Permanent Spring Loaded Push Button Green with LED 1NO Contact	10	100
XYB-AL-S-10C	●	Momentary Spring Push Button Yellow with LED 1NO Contact	10	100
XYB-KL-S-10C	●	Permanent Spring Loaded Push Button Yellow with LED 1NO Contact	10	100
XYB-AL-M-10C	●	Momentary Spring Push Button Blue with LED 1NO Contact	10	100
XYB-KL-M-10C	●	Permanent Spring Button Blue with LED 1NO Contact	10	100
XYB-AL-B-10C	○	Momentary Spring Push Button White with LED 1NO Contact	10	100
XYB-KL-B-10C	○	Permanent Spring Button White with LED 1NO Contact	10	100
XYB-AL-CL-K-11C		Clip-on Momentary LED Spring Loaded Push Button 1NO+1NC Contact	10	100
XYB-KL-CL-K-11C		Clip-on Permanent LED Spring Loaded Push Button 1NO+1NC Contact	10	100

ORDER LIST

12 mm Metal Spring Button



Type Code	Explanation	Box Quantity	Carton Quantity
XYB-12-10	12 mm 1NO Contact (Stainless Steel)	50	500

12 mm Metal Momentary Push Button



Type Code	Explanation	Box Quantity	Carton Quantity
XMA-12-10	12 mm 1NO Contact (Stainless Steel)	50	500

16 mm Metal Gold Button



Type Code	Explanation	Box Quantity	Quantity Per Cartoon
XMG-16-10	16 mm 1NO Contact (Stainless Steel)	50	500

16 mm Metal Spring Button



Type Code	Explanation	Box Quantity	Carton Quantity
XYB-16-10	16 mm 1NO Contact (Stainless Steel)	50	500

16 mm Metal LED Spring Button (Stainless Steel)



Type Code	Color	Explanation	Box Quantity	Carton Quantity
XYB-K-16-10	●	16 mm 1NO Contact	50	500
XYB-Y-16-10	●	16 mm 1NO Contact	50	500
XYB-S-16-10	●	16 mm 1NO Contact	50	500
XYB-M-16-10	●	16 mm 1NO Contact	50	500
XYB-B-16-10	○	16 mm 1NO Contact	50	500

GENERAL PRODUCT CATALOG

SIGNALS & BUTTONS

ORDER LIST

16 mm Metal LED Button (Stainless Steel)



Type Code	Color	Explanation	Box Quantity	Carton Quantity
XYB-ML-16-11		16 mm 1NO+1NC Contact	50	500
XYB-MAL-16-11		Momentary 16 mm 1NO+1NC Contact	50	500
XYB-MK-16-11	●	16 mm 1NO+1NC Contact	50	500
XYB-MAK-16-11	●	Momentary 16 mm 1NO+1NC Contact	50	500
XYB-MY-16-11	●	16 mm 1NO+1NC Contact	50	500
XYB-MAY-16-11	●	Momentary 16 mm 1NO+1NC Contact	50	500
XYB-MS-16-11	●	16 mm 1NO+1NC Contact	50	500
XYB-MAS-16-11	●	Momentary 16 mm 1NO+1NC Contact	50	500
XYB-MM-16-11	●	16 mm 1NO+1NC Contact	50	500
XYB-MAM-16-11	●	Momentary 16 mm 1NO+1NC Contact	50	500
XYB-MB-16-11	○	16 mm 1NO+1NC Contact	50	500
XYB-MAB-16-11	○	Momentary 16 mm 1NO+1NC Contact	50	500

19 mm Metal Spring Button (Stainless Steel)



Type Code	Explanation	Box Quantity	Carton Quantity
XYB-19-10	16 mm 1NO Contact	50	500

19 mm Metal LED Spring Button (Stainless Steel)



Type Code	Color	Explanation	Box Quantity	Carton Quantity
XYB-K-19-10	●	19 mm 1NO Contact	50	500
XYB-Y-19-10	●	19 mm 1NO Contact	50	500
XYB-S-19-10	●	19 mm 1NO Contact	50	500
XYB-M-19-10	●	19 mm 1NO Contact	50	500
XYB-B-19-10	○	19 mm 1NO Contact	50	500

19 mm Metal LED Button (Stainless Steel)



Type Code	Color	Explanation	Box Quantity	Carton Quantity
XYB-ML-19-11		19 mm 1NO+1NC Contact	50	500
XYB-MAL-19-11		Momentary 19 mm 1NO+1NC Contact	50	500
XYB-MK-19-11	●	19 mm 1NO+1NC Contact	50	500
XYB-MAK-19-11	●	Momentary 19 mm 1NO+1NC Contact	50	500
XYB-MY-19-11	●	19 mm 1NO+1NC Contact	50	500
XYB-MAY-19-11	●	Momentary 19 mm 1NO+1NC Contact	50	500
XYB-MS-19-11	●	19mm 1NO+1NC Contact	50	500
XYB-MAS-19-11	●	Momentary 19 mm 1NO+1NC Contact	50	500
XYB-MM-19-11	●	19 mm 1NO+1NC Contact	50	500
XYB-MAM-19-11	●	Momentary 19 mm 1NO+1NC Contact	50	500
XYB-MB-19-11	○	19 mm 1NO+1NC Contact	50	500
XYB-MAB-19-11	○	Momentary 19 mm 1NO+1NC Contact	50	500

XBT SERIES PVC INSULATION TAPE

PVC Insulation Tape	XBT						
Type	XBT-001-S	XBT-001-K	XBT-001-M	XBT-001-Y	XBT-001-B	XBT-001-SA	XBT-001-SY
Color	●	●	●	●	○	●	● ●
Thickness	0.13mm						
Width	18mm						
Length	10Yrd (9.14m)						
Dielectric Strength	≥15N/cm						
Flammability	B class						
Dielectric Power	≥40kV/mm						



XSI HYBRID SOLAR INVERTER

GENERAL INFORMATION

PVC (Polyvinyl Chloride) Insulation Tape
PVC insulation tape is a specialized tape designed to provide electrical insulation and protect conductors from external factors. With its flexible and durable structure, PVC insulation tape prevents short circuits, electrical leakage, and electric shocks by covering exposed parts of electrical cables. It also offers additional protection against water, moisture, dust, and chemicals, contributing to a safer electrical installation.

Produced with single-sided adhesive, PVC insulation tapes are suitable for both household and industrial applications. They are widely used in electrical engineering, electronics, construction, and automotive industries. Available in various colors, these tapes also help in identifying different types of cables and organizing wiring systems

Applications of PVC Insulation Tape

PVC insulation tapes are widely used to ensure safe insulation in electrical circuits and protect cables from external factors:

- **Electrical and Electronics Industry:** Used in electrical installations to insulate cables, prevent short circuits, and protect connection points. It is also preferred in electronics for shielding areas during soldering and for maintaining and repairing electronic devices.
- **Automotive Industry:** Helps insulate vehicle electrical systems and prevent overheating, particularly protecting cables around the engine area.
- **Industrial Applications:** Used in factory machinery electrical connections to enhance safety and securely manage electrical current.
- **Construction and Building Sector:** Applied in electrical installations to insulate and protect cable connections.
- **Home Use and DIY Projects:** Used for organizing cables, minor repairs, and crafting projects that require insulation and protection.

PVC insulation tapes are typically manufactured in **18 mm width** and **10m-20m lengths.** Choosing the correct insulation tape for the intended application is crucial for ensuring safety and durability

Advantages of PVC Insulation Tape

PVC insulation tape is an essential material for ensuring electrical safety and protecting cables from environmental influences. Its benefits include:
- **Electrical Insulation:** Minimizes the risk of short circuits, preventing hazards such as fire and electric shocks.
- **Durable and Flexible Structure:** Easily adheres to different surfaces due to its flexible design.
- **Water and Moisture Resistance:** Suitable for outdoor applications due to its resistance to water and humidity.
- **Chemical Resistance:** Long-lasting and resistant to chemicals in industrial environments.
- **Various Color Options:** Available in multiple colors for marking and organizing electrical circuits.

Technical Specifications of PVC Insulation Tape
The durability of PVC insulation tapes depends on the materials used and environmental factors. Below are the key technical specifications:

Electrical Resistance
- Does not conduct electricity and prevents short circuits.
- Provides safe usage with high insulation properties.

Heat Resistance
- Standard PVC insulation tapes can typically withstand temperatures up to 80°C.
- Special high-temperature-resistant variants are available.

Water and Moisture Resistance

- Waterproof, making it suitable for outdoor and humid environments.
- Rubber-based and silicone-coated versions offer enhanced water protection.

Mechanical Durability

- Resistant to abrasion, ensuring long-lasting use.
- Its flexible structure makes it resistant to impacts and bending.
- High-quality PVC tapes retain their adhesive properties for a long time and do not peel off.

Fire Resistance of PVC Insulation Tape

PVC insulation tapes are manufactured according to specific fire resistance standards. One of the most common classifications is **Class B Fire Resistance**, which includes the following properties:

- **Flame-retardant** but not completely fireproof.
- **Does not ignite easily** when exposed to fire and helps limit the spread of flames.
- **Ensures safe use** in electrical installations, the automotive sector, and industrial applications.

XKoren Class B Flame-Retardant Insulation Tape

Fire resistance classifications are typically determined by standards such as **UL94** or E**N 13501-1.** Class **B** indicates materials with **low flammability.** According to the **EN 13501-1** standard, **B-class materials are difficult to ignite but do not burn completely.** This means the tape does not immediately catch fire when exposed to flames and restricts the spread of the fire.

PVC insulation tapes are essential materials for both professional and everyday use. They provide **enhanced electrical safety,** protect cables from external influences, and help create **an organized and secure** electrical system, making them an ideal choice for various applications.

GENERAL PRODUCT CATALOG

PVC INSULATION TAPE

ORDER LIST

PVC Insulation Tape



XBT-001-S	Color	Thickness	Width	Length	box Quantity	Carton Quantity
XBT-001-S	●	0,13 mm	18 mm	10Y (9.14 m)	10	500
XBT-001-K	●	0,13 mm	18 mm	10Y (9.14 m)	10	500
XBT-001-M	●	0,13 mm	18 mm	10Y (9.14 m)	10	500
XBT-001-Y	●	0,13 mm	18 mm	10Y (9.14 m)	10	500
XBT-001-B	○	0,13 mm	18 mm	10Y (9.14 m)	10	500
XBT-001-SA	●	0,13 mm	18 mm	10Y (9.14 m)	10	500
XBT-001-SY	● ●	0,13 mm	18 mm	10Y (9.14 m)	10	500

REFERENCES

MINISTRIES

MUNICIPALITIES

GOVERNMENT INSTITUTIONS

You can visit our website for more detailed information.
xkoren.com/REFERENCES

REFERENCES

PRIVATE COMPANIES

ELECTRICITY DISTRIBUTION COMPANIES

UNIVERSITIES & HOSPITALS

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xkoren.com/REFERENCES

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