

HRO

Residual Current Circuit Breaker with Overcurrent Protection

Feature	70
Selection Table	72
Dimension	76
Ordering Information	78

Feature

HRO Residual current Circuit Breaker with Overcurrent protection

RCBOs are a combination of an RCCB and a miniature circuit breaker in a compact design for personnel, fire and line protection. For personnel protection and fire protection, the residual current part of the type AC trips in the event of sinusoidal AC residual currents, type A also trips in the event of pulsating DC residual currents.





Product Feature

HD HYUNDAI ELECTRIC introduces the HRO series of RCBOs rating from 1 A to 63 A.

RCBOs with a rated residual current of maximum 30 mA are used for personnel, material and fire protection, as well as for protection against direct contact. RCBOs with a rated residual current of 10 mA are primarily used in areas that represent an increased risk for personnel and in the outdoor installations of residential buildings.

Devices with a rated residual current of maximum 300 mA are used as preventative fire protection in case of insulation faults.

The MCB part of the RCBO protects lines against overload and short circuits and is available in characteristics B and C.

2/4 Module Type, RCD Type

Compact Type



Product Performance

- Short circuit, overcurrent and earth leakage protection
- Breaking capacity up to 10 kA
- Rated current up to 125 AF
- Rated residual operating current 10~500 mA
- Type AC and type A
- Tripping characteristics: B, C, D curve

- Short circuit, overcurrent and earth leakage protection
- Breaking capacity up to 10 kA
- Rated current up to 40 AF
- Rated residual operating current 10~300 mA
- Type AC and type A
- Tripping characteristics: B, C curve



Product Structure

- Same series with Standard type MCB.
- Same rating current with MCB.
- Equipped 1P + N, 2P, 3P, 3P + N, 4P for use various load condition.

- 1 Module 18 mm compact (Long type)/1 Module 18 mm compact (Short type)
- Compact size RCBO in same physical size as a conventional single pole MCB.
- Dual termination for bus-bar as well as cable connection
- Supply can be connected on either side








Specification

- IEC/EN 61009-1
- DEKRA/INTERTEK CB certification

- IEC/EN 61009-1
- AS/NZS 61009-1
- DEKEA CB certification

Selection Table

HRO (Standard Type)

Model	2 Module Type			4 Module Type	
	HRO63S, 63 AF, 4.5 kA	HRO63A, 63 AF, 6 kA	HRO63B, 63 AF, 10 kA	HRO40F, 40 AF, 10 kA	HRO63F, 63 AF, 6 kA
					
Reference Standard	IEC/EN 61009-1	IEC/EN 61009-1	IEC/EN 61009-1	IEC/EN 61009-1	IEC/EN 61009-1
No. of Poles	1P + N	2P	2P	4P(3P+N)	4P(3P+N)
N Phase Position	Right	No N phase	No N phase	Right	Right
N Phase Type	Neutral switched	2P switched	2P switched	Neutral switched	Neutral switched
Operating Type	Electronic	Electronic	Electronic	Electro-Magnetic	Electronic
Rated Current (In)	1, 2, 3, 4, 5, 6, 10, 16, 20, 25, 32, 40, 50, 63 A	6, 10, 13, 15, 16, 20, 25, 32, 40, 50, 63 A	6, 10, 13, 15, 16, 20, 25, 32, 40, 50, 63 A	6, 10, 13, 15, 16, 20, 25, 32, 40 A	1, 2, 3, 4, 5, 6, 10, 16, 20, 25, 32, 40, 50, 63 A
Rated Voltage (Ue)	AC 240 V	AC 240 V	AC 240 V	AC 415 V	AC 415 V
Rated Frequency (F)	50/60 Hz	50/60 Hz	50/60 Hz	50/60 Hz	50/60 Hz
Rated Short Circuit Current (Icn)	4.5 kA (Ics = 100 % Icn)	6 kA (Ics = 100 % Icn)	10 kA (Ics = 75 % Icn)	10 kA (Ics = 75 % Icn)	6 kA (Ics = 100 % Icn)
Rated Residual Operating Current (IΔn)	10, 30, 100, 300, 500 mA	30, 100, 300 mA	30, 100, 300 mA	10, 30, 100, 300 mA	10, 30, 100, 300 mA
Magnetic Release Setting	(3-5)In-B Curve (5-10)In-C Curve (10-20)In-D Curve	(3-5)In-B Curve (5-10)In-C Curve (10-20)In-D Curve	(3-5)In-B Curve (5-10)In-C Curve (10-20)In-D Curve	(3-5)In-B Curve (5-10)In-C Curve	(3-5)In-B Curve (5-10)In-C Curve (10-20)In-D Curve
Rated Residual Making Breaking Capacity (IΔm)	3 kA	4.5 kA	4.5 kA	4.5 kA	6 kA
Operating Characteristics in Presence of Residual Current with d.c Components	'A' type & 'AC' type	'A' type & 'AC' type	'A' type & 'AC' type	'A' type & 'AC' type	'A' type & 'AC' type
Trip Time	1 IΔn < 300 ms, 5 IΔn < 40 ms	1 IΔn < 300 ms, 5 IΔn < 40 ms	1 IΔn < 300 ms, 5 IΔn < 40 ms	1 IΔn < 300 ms, 5 IΔn < 40 ms	1 IΔn < 300 ms, 5 IΔn < 40 ms
Rated Insulation Voltage (Ui)	500 V	500 V	500 V	500 V	500 V
Rated Impulse Voltage (Uimp)	4 kV	4 kV	4 kV	4 kV	4 kV
Dielectric Strength	2.5 kV	2.5 kV	2.5 kV	2.5 kV	2.5 kV
Electrical/Mechanical Endurance (no. of Operations) Minimum	10,000/20,000	10,000/20,000	10,000/20,000	10,000/20,000	10,000/20,000
Operating Temperature	-25 °C to + 55 °C	-25 °C to + 55 °C	-25 °C to + 55 °C	-25 °C to + 55 °C	-25 °C to + 55 °C
Humidity	95 % RH	95 % RH	95 % RH	95 % RH	95 % RH
Energy Limit Class	3	3	3	3	3
Terminal Capacity (max)	25 mm ²	25 mm ²	25 mm ²	25 mm ²	25 mm ²
Tightening Torque	2 N.m	2 N.m	2 N.m	2 N.m	2 N.m
Vibration	3 g	3 g	3 g	3 g	3 g
Shock Resistance	40 mm free fall	40 mm free fall	40 mm free fall	40 mm free fall	40 mm free fall
Protection Class	IP20	IP20	IP20	IP20	IP20
Positive Contact Indication	Red-ON, Green-OFF	Red-ON, Green-OFF	Red-ON, Green-OFF	Red-ON, Green-OFF	Red-ON, Green-OFF
Net Weight in kg	1P + N : 0.180 kg	0.258 kg	0.260 kg	0.245 kg	0.457 kg
Dimensions (H x D x W)/Pole in mm	1P + N : 81.0 x 73.5 x 35.5 mm	83.0 x 71.7 x 35.6 mm	83.0 x 71.7 x 35.6 mm	82.4 x 71.5 x 70.8 mm	99.0 x 71.5 x 70.4 mm
Mounting	Clip on DIN Rail (35 mm x 7.5 mm)	Clip on DIN Rail (35 mm x 7.5 mm)	Clip on DIN Rail (35 mm x 7.5 mm)	Clip on DIN Rail (35 mm x 7.5 mm)	Clip on DIN Rail (35 mm x 7.5 mm)
Cable Length	-	-	-	-	-
Installation Position	Vertical/Horizontal	Vertical/Horizontal	Vertical/Horizontal	Vertical/Horizontal	Vertical/Horizontal
Case & Cover	Molded, flame retardant thermoplastic material	Molded, flame retardant thermoplastic material	Molded, flame retardant thermoplastic material	Molded, flame retardant thermoplastic material	Molded, flame retardant thermoplastic material
AUX/ALT/SHT/UVT	YES (Same with standard type MCB options)	No	No	YES	NO
Certifications	DEKRA CB	INTERTEK CB	INTERTEK CB	CB, CE	CE

※ Reverse connection is not available.

Model	RCD Type		
	HRO63M, 63 AF, 6 kA	HRO63P, 63 AF, 10 kA	HRO125P, 125 AF, 10 kA
			
Reference Standard	IEC/EN 61009-1	IEC/EN 61009-1	IEC/EN 61009-1
No. of Poles	1P + N, 2P, 3P, 3P + N, 4P	1P + N, 2P, 3P, 3P + N, 4P	1P + N, 2P, 3P, 3P + N, 4P
N Phase Position	Right	Right	Right
N Phase Type	Neutral directly connected	Neutral directly connected	Neutral directly connected
Operating Type	Electronic	Electronic	Electronic
Rated Current (In)	1, 2, 3, 4, 5, 6, 10, 16, 20, 25, 32, 40, 50, 63 A	1, 2, 3, 4, 5, 6, 10, 16, 20, 25, 32, 40, 50, 63 A	63, 80, 100, 125 A
Rated Voltage (Ue)	AC 240/415 V	AC 240/415 V	AC 240/415 V
Rated Frequency (F)	50/60 Hz	50/60 Hz	50/60 Hz
Rated Short Circuit Current (Icn)	6 kA (Ics = 100 % Icn)	10 kA (Ics = 75 % Icn)	10 kA (Ics = 75 % Icn)
Rated Residual Operating Current (IΔn)	10, 30, 100, 300, 500 mA	10, 30, 100, 300, 500 mA	10, 30, 100, 300, 500 mA
Magnetic Release Setting	(3-5)In-B Curve (5-10)In-C Curve (10-20)In-D Curve	(3-5)In-B Curve (5-10)In-C Curve (10-20)In-D Curve	(3-5)In-B Curve (5-10)In-C Curve (10-20)In-D Curve
Rated Residual Making Breaking Capacity (IΔm)	3 kA	3 kA	2.5 kA
Operating Characteristics in Presence of Residual Current with d.c Components	'A' type & 'AC' type	'A' type & 'AC' type	'A' type & 'AC' type
Trip Time	1 IΔn < 300 ms, 5 IΔn < 40 ms	1 IΔn < 300 ms, 5 IΔn < 40 ms	1 IΔn < 300 ms, 5 IΔn < 40 ms
Rated Insulation Voltage (Ui)	500 V	500 V	690 V
Rated Impulse Voltage (Uimp)	4 kV	4 kV	4 kV
Dielectric Strength	2.5 kV	2.5 kV	2.5 kV
Electrical/Mechanical Endurance (no. of Operations) Minimum	10,000/20,000	10,000/20,000	10,000/20,000
Operating Temperature	-25 °C to + 55 °C	-25 °C to + 55 °C	-25 °C to + 55 °C
Humidity	95 % RH	95 % RH	95 % RH
Energy Limit Class	3	3	3
Terminal Capacity (max)	25 mm ²	25 mm ²	50 mm ²
Tightening Torque	2 N·m	2 N·m	3.5 N·m
Vibration	3 g	3 g	3 g
Shock Resistance	40 mm free fall	40 mm free fall	40 mm free fall
Protection Class	IP20	IP20	IP20
Positive Contact Indication	Red-ON, Green-OFF	Red-ON, Green-OFF	Red-ON, Green-OFF
Net Weight in kg	1P + N : 0.229 kg 2P : 0.330 kg 3P : 0.490 kg 3P + N : 0.490 kg 4P : 0.597 kg	1P + N : 0.258 kg 2P : 0.386 kg 3P : 0.574 kg 3P + N : 0.574 kg 4P : 0.709 kg	1P + N : 0.322 kg 2P : 0.468 kg 3P : 0.676 kg 3P + N : 0.709 kg 4P : 0.857 kg
Dimensions (H x D x W)/Pole in mm	1P + N : 89.0 x 73.5 x 53.8 mm 2P : 89.0 x 73.5 x 71.6 mm 3P : 89.0 x 73.5 x 116.4 mm 3P + N : 89.0 x 73.5 x 116.4 mm 4P : 89.0 x 73.5 x 134.2 mm	1P + N : 89.0 x 73.5 x 53.8 mm 2P : 89.0 x 73.5 x 71.6 mm 3P : 89.0 x 73.5 x 116.4 mm 3P + N : 89.0 x 73.5 x 116.4 mm 4P : 89.0 x 73.5 x 134.2 mm	1P + N : 106.5 x 72.0 x 53.8 mm 2P : 106.5 x 72.0 x 80.5 mm 3P : 106.5 x 72.0 x 107.8 mm 3P + N : 106.5 x 72.0 x 107.8 mm 4P : 106.5 x 72.0 x 134.8 mm
Mounting	Clip on DIN Rail (35 mm x 7.5 mm)	Clip on DIN Rail (35 mm x 7.5 mm)	Clip on DIN Rail (35 mm x 7.5 mm)
Cable Length	-	-	-
Installation Position	Vertical/Horizontal	Vertical/Horizontal	Vertical/Horizontal
Case & Cover	Molded, flame retardant thermoplastic material	Molded, flame retardant thermoplastic material	Molded, flame retardant thermoplastic material
AUX/ALT/SHT/UVT	YES (Same with standard type MCB options)	YES (Same with standard type MCB options)	NO
Certifications	DEKRA CB	DEKRA CB	CCC, CE

※ Reverse connection is not available.

Selection Table

HRO (Standard Type)

Model	Compact Type		
	HRO40L, 40 AF, 6 kA (Cable Type)	HRO40T, 40 AF, 6 kA (Cable Type)	HRO40HT, 40 AF, 10 kA (Cable Type)
			
Reference Standard	IEC/EN 61009-1	IEC/EN 61009-1	IEC/EN 61009-1
No. of Poles	1P + N (1 module)	1P + N (1 module)	1P + N (1 module)
N Phase Position	-	Right	Right
N Phase Type	Neutral directly connected	Neutral directly connected	Neutral directly connected
Operating Type	Electronic	Electronic	Electronic
Rated Current (In)	6, 10, 16, 20, 25, 32, 40 A	6, 10, 16, 20, 25, 32, 40 A	6, 10, 16, 20, 25, 32, 40 A
Rated Voltage (Ue)	AC 240 V	AC 240 V	AC 240 V
Rated Frequency (F)	50/60 Hz	50/60 Hz	50/60 Hz
Rated Short Circuit Current (Ics)	6 kA (Ics = 100 % Icn)	6 kA (Ics = 100 % Icn)	10 kA (Ics = 75 % Icn)
Rated Residual Operating Current (IΔn)	10, 30, 100, 300 mA	10, 30, 100, 300 mA	10, 30, 100, 300 mA
Magnetic Release Setting	(3-5)In-B Curve (5-10)In-C Curve	(3-5)In-B Curve (5-10)In-C Curve	(3-5)In-B Curve (5-10)In-C Curve
Rated Residual Making Breaking Capacity (IΔm)	500 A	500 A	500 A
Operating Characteristics in Presence of Residual Current with d.c Components	'A' type & 'AC' type	'A' type & 'AC' type	'A' type & 'AC' type
Trip Time	1 IΔn < 300 ms, 5 IΔn < 40 ms	1 IΔn < 300 ms, 5 IΔn < 40 ms	1 IΔn < 300 ms, 5 IΔn < 40 ms
Rated Insulation Voltage (Ui)	500 V	500 V	500 V
Rated Impulse Voltage (Uimp)	4 kV	4 kV	4 kV
Dielectric Strength	2.5 kV	2.5 kV	2.5 kV
Electrical/Mechanical Endurance (no. of Operations) Minimum	10,000/20,000	10,000/20,000	10,000/20,000
Operating Temperature	-25 °C to + 55 °C	-25 °C to + 55 °C	-25 °C to + 55 °C
Humidity	95 % RH	95 % RH	95 % RH
Energy Limit Class	3	3	3
Terminal Capacity (max)	25 mm ²	25 mm ² (Top) 10 mm ² (Bottom)	25 mm ² (Top) 10 mm ² (Bottom)
Tightening Torque	2 N·m	2 N·m (Top) 1.6 N·m (Bottom)	2 N·m (Top) 1.6 N·m (Bottom)
Vibration	3 g	3 g	3 g
Shock Resistance	40 mm free fall	40 mm free fall	40 mm free fall
Protection Class	IP20	IP20	IP20
Positive Contact Indication	Red-ON, Green-OFF	Red-ON, Green-OFF	Red-ON, Green-OFF
Net Weight in kg	0.176 kg	0.178 kg	0.180 kg
Dimensions (H x D x W)/Pole in mm	122.5 x 71.5 x 17.8 mm	110.0 x 71.5 x 17.8 mm	110.0 x 71.5 x 17.8 mm
Mounting	Clip on DIN Rail (35 mm x 7.5 mm)	Clip on DIN Rail (35 mm x 7.5 mm)	Clip on DIN Rail (35 mm x 7.5 mm)
Cable Length	N (87 cm)/FE (85 cm)	N (87 cm)/FE (85 cm)	N (87 cm)/FE (85 cm)
Installation Position	Vertical/Horizontal	Vertical/Horizontal	Vertical/Horizontal
Case & Cover	Molded, flame retardant thermoplastic material	Molded, flame retardant thermoplastic material	Molded, flame retardant thermoplastic material
AUX/ALT/SHT/UVT	NO	NO	NO
Certifications	DEKRA CB	DEKRA CB	DEKRA CB

※ Reverse connection is not available.

Compact Type

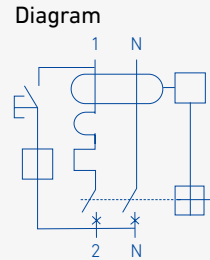
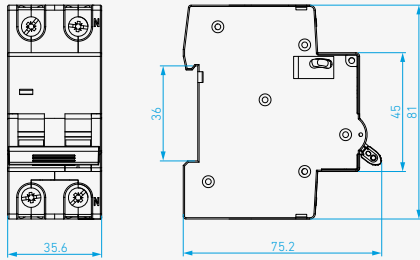
HRO40M, 40 AF, 6 kA (Non-Cable Type)	HRO40P, 40 AF, 10 kA (Non-Cable Type)	HRO40ML, 40 AF, 6 kA (Cable Type)	HRO40PL, 10 kA (Cable Type)
			
IEC/EN 61009-1	IEC/EN 61009-1	IEC/EN 61009-1	IEC/EN 61009-1
N + 1P (1 module)	N + 1P (1 module)	N + 1P (1 module)	N + 1P (1 module)
Left	Left	Left	Left
Neutral switched	Neutral switched	Neutral directly connected	Neutral directly connected
Electronic	Electronic	Electronic	Electronic
6, 10, 13, 16, 20, 25, 32, 40 A	6, 10, 13, 16, 20, 25, 32, 40 A	6, 10, 13, 16, 20, 25, 32, 40 A	6, 10, 13, 16, 20, 25, 32, 40 A
AC 240 V	AC 240 V	AC 240 V	AC 240 V
50/60 Hz	50/60 Hz	50/60 Hz	50/60 Hz
6 kA (Ics = 100 % Icn)	10 kA (Ics = 75 % Icn)	6 kA (Ics = 100 % Icn)	10 kA (Ics = 75 % Icn)
10, 30, 100, 300 mA	10, 30, 100, 300 mA	10, 30, 100, 300 mA	10, 30, 100, 300 mA
(3-5)In-B Curve (5-10)In-C Curve	(3-5)In-B Curve (5-10)In-C Curve	(3-5)In-B Curve (5-10)In-C Curve	(3-5)In-B Curve (5-10)In-C Curve
3 kA	3 kA	3 kA	3 kA
'A' type & 'AC' type	'A' type & 'AC' type	'A' type & 'AC' type	'A' type & 'AC' type
1 Δn < 300 ms, 5 Δn < 40 ms	1 Δn < 300 ms, 5 Δn < 40 ms	1 Δn < 300 ms, 5 Δn < 40 ms	1 Δn < 300 ms, 5 Δn < 40 ms
500 V	500 V	500 V	500 V
4 kV	4 kV	4 kV	4 kV
2.5 kV	2.5 kV	2.5 kV	2.5 kV
10,000/20,000	10,000/20,000	10,000/20,000	10,000/20,000
-25 °C to + 55 °C	-25 °C to + 55 °C	-25 °C to + 55 °C	-25 °C to + 55 °C
95 % RH	95 % RH	95 % RH	95 % RH
3	3	3	3
10 mm ²	10 mm ²	10 mm ² (Top) 25 mm ² (Bottom)	10 mm ² (Top) 25 mm ² (Bottom)
1.2 N·m	1.2 N·m	1.2 N·m (Top) 2 N·m (Bottom)	1.2 N·m (Top) 2 N·m (Bottom)
3 g	3 g	3 g	3 g
40 mm free fall	40 mm free fall	40 mm free fall	40 mm free fall
IP20	IP20	IP20	IP20
Red-ON, Green-OFF	Red-ON, Green-OFF	Red-ON, Green-OFF	Red-ON, Green-OFF
0.126 kg	0.138 kg	0.176 kg	0.178 kg
83.0 x 71.8 x 17.8 mm	92.5 x 71.8 x 17.8 mm	87.0 x 71.8 x 17.8 mm	87.0 x 71.8 x 17.8 mm
Clip on DIN Rail (35 mm x 7.5 mm)	Clip on DIN Rail (35 mm x 7.5 mm)	Clip on DIN Rail (35 mm x 7.5 mm)	Clip on DIN Rail (35 mm x 7.5 mm)
-	-	N (96 cm)/FE (96 cm)	N (96 cm)/FE (96 cm)
Vertical/Horizontal	Vertical/Horizontal	Vertical/Horizontal	Vertical/Horizontal
Molded, flame retardant thermoplastic material	Molded, flame retardant thermoplastic material	Molded, flame retardant thermoplastic material	Molded, flame retardant thermoplastic material
NO	NO	NO	NO
INTERTEK CB	INTERTEK CB	INTERTEK CB	INTERTEK CB

※ Reverse connection is not available.

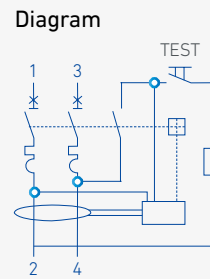
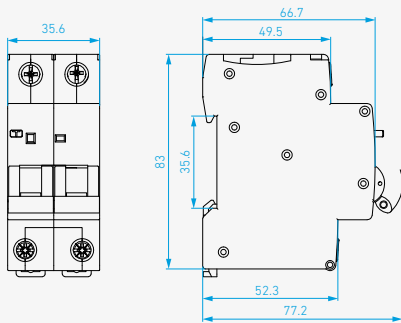
Dimension

HR0 (Standard Type)

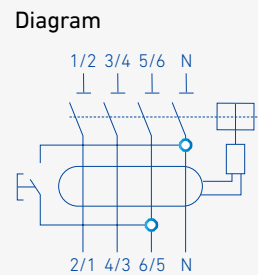
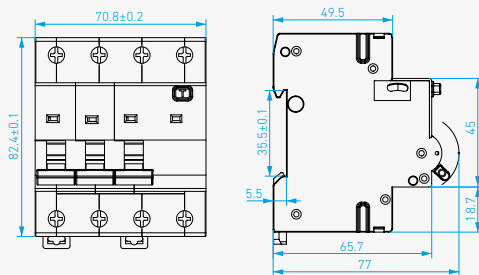
HR063S, 63 AF



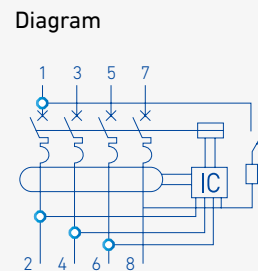
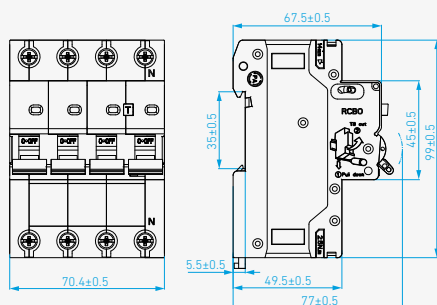
HR063A/B, 63 AF



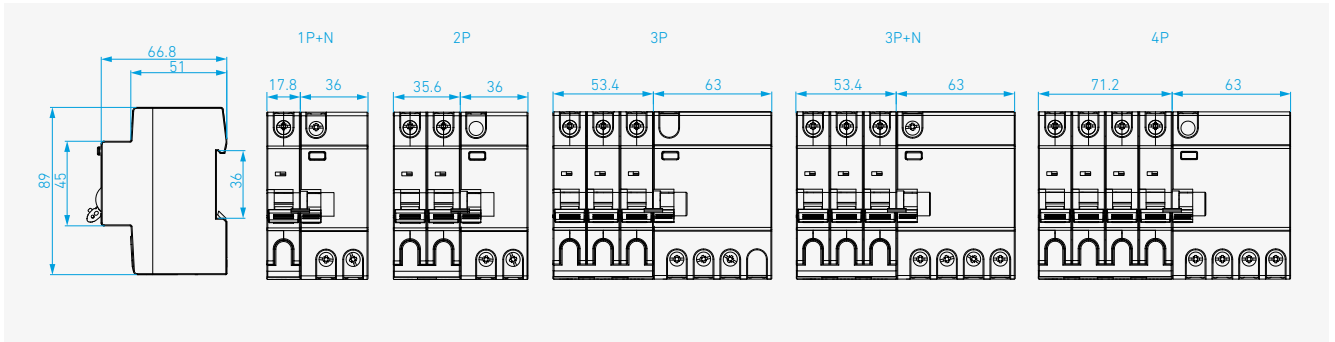
HR040F, 40 AF



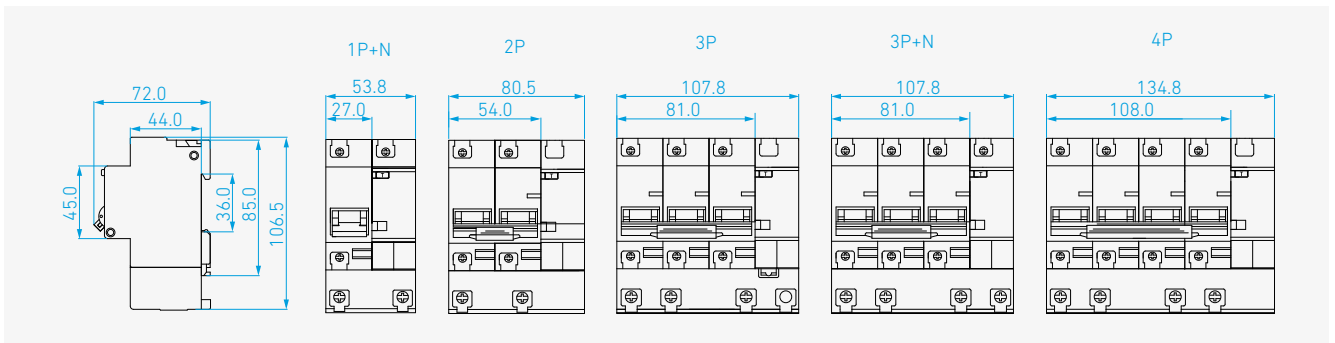
HR063F, 63 AF



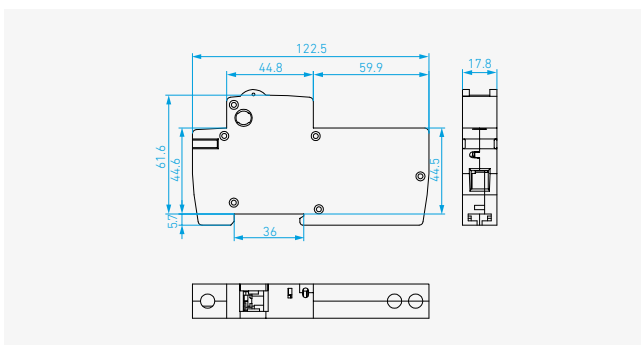
HR063M/P, 63AF



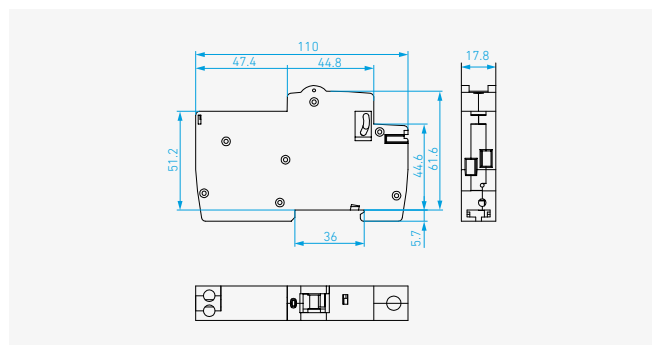
HR0125P, 125 AF



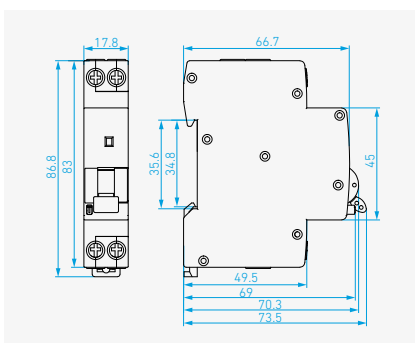
HR040L, 40 AF



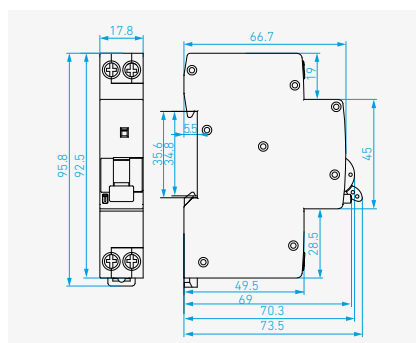
HR040T/HT, 40 AF



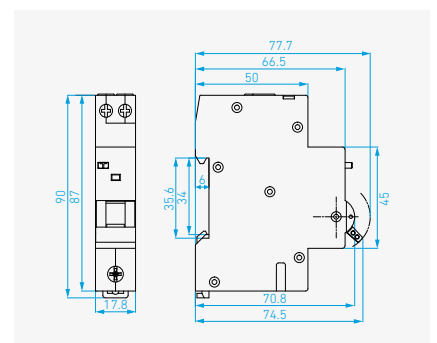
HR040M, 40 AF



HR040P, 40 AF

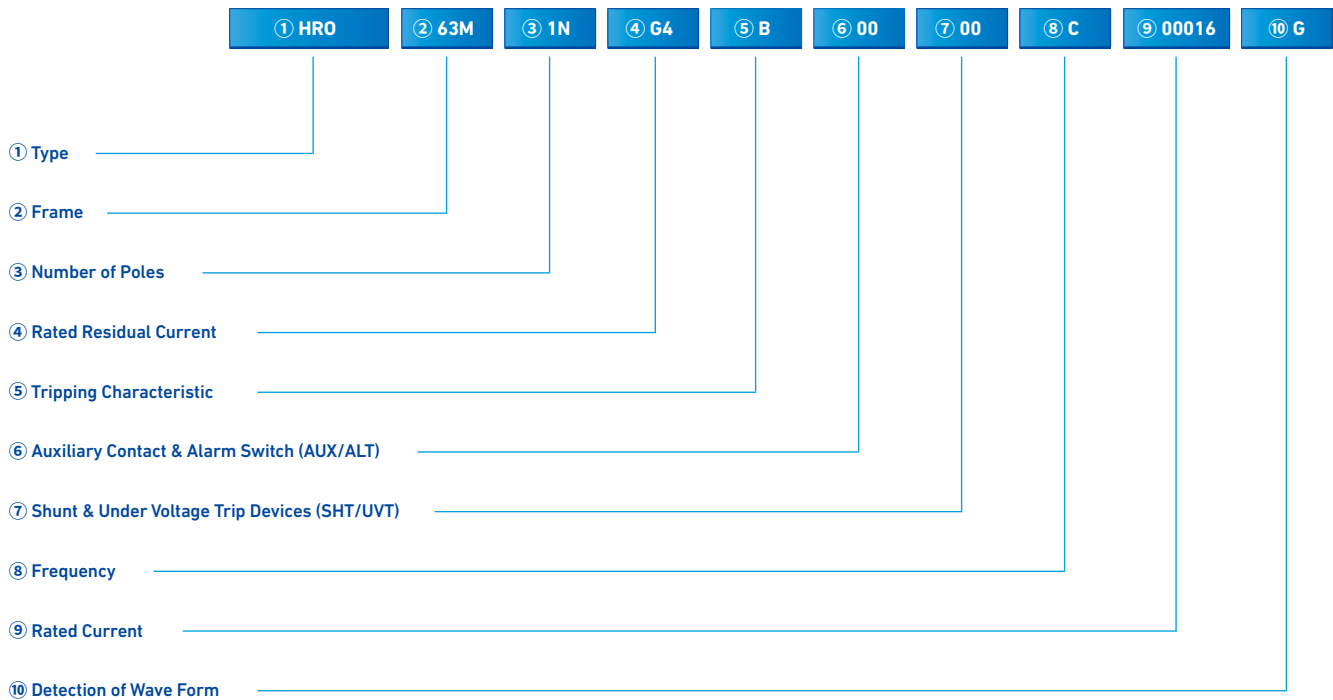


HR040ML/PL, 40 AF



RCBO Ordering Information

Ordering Guidelines (Standard Type)



① Type

HRO	Residual current circuit breaker with overcurrent protection
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② Frame

63S	63 AF, 4.5 kA (2 Module type)
63A	63 AF, 6 kA (2 Module type)
63B	63 AF, 10 kA (2 Module type)
40F	40 AF, 10 kA (4 Module type)
63F	63 AF, 6 kA (4 Module type)
63M	63 AF, 6 kA (RCD type)
63P	63 AF, 10 kA (RCD type)
125P	125 AF, 10 kA (RCD type)
40L	40 AF, 6 kA, (Line long type + cable)
40T	40 AF, 6 kA, (Load long type + cable)
40HT	40 AF, 10 kA, (Load long type + cable)
40M	40 AF, 6 kA, (Compact type)
40P	40 AF, 10 kA, (Compact type)
40ML	40 AF, 6 kA, (Compact type + cable)
40PL	40 AF, 10 kA, (Compact type + cable)

③ Number of Poles

1N	1 Pole + Neutral (63 AF)
N1	Neutral + 1 Pole (40 AF)
2P	2 Pole (63 AF, 63A/B type)
3P	3 Pole (63 AF)
3N	3 Pole + Neutral (63 AF)
4P	4 Pole (63 AF)

④ Rated Residual Current

G2	10 mA
G4	30 mA
G5	100 mA
G7	300 mA
G8	500 mA

⑤ Tripping Characteristic

B	B Curve
C	C Curve
D	D Curve

⑥ Auxiliary Contact & Alarm Switch

00	Non-attachment
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⑦ Shunt & Under Voltage Trip Devices

00	Non-attachment
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⑧ Frequency

C	50/60 Hz
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⑨ Rated Current

00001	1 A
00002	2 A
00003	3 A
00004	4 A
00005	5 A
00006	6 A
00010	10 A
00013	13 A
00015	15 A
00016	16 A
00020	20 A
00025	25 A
00032	32 A
00040	40 A
00050	50 A
00063	63 A
00080	80 A
00100	100 A
00125	125 A

⑩ Detection of Wave Form

G	AC type
F	A type