HG Modular Devices

HD HYUNDAI ELECTRIC

Essential for Today, Potential for Tomorrow

HD Hyundai Electric solely pursues the growth of our customers' business. From power generation to power distribution, we focus on developing and commercializing products and solutions aimed at increasing the efficiency of energy equipment as well as at proactively monitoring and controlling assets in an integrated manner to improve our customers' productivity and management efficiency. We are well aware that our efforts add to the driving force behind our customers' growth and contribute to the creation and maintenance of a more dynamic world. We focus on achieving innovation and strive to evolve continuously to shape a better tomorrow based on today's technological advancement.

Contents

Solution

Utility

INTEGRICT

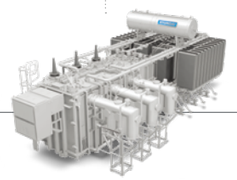
Energy Solution — Energy solution business refers to the business of designing, procuring and establishing a system that enables the efficient use of power energy through integrated management of the production, consumption, sales and operation of power energy.

Asset Management Solution — Asset management solution is a business that maximizes the overall business efficiency by systematically managing the performance, risk, maintenance cost and others as well as by providing an asset management solution suitable to the customer's circumstance depending on the product lifecycle (PLC) of various products.

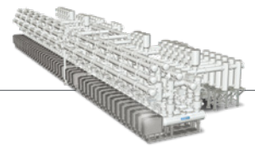
Generation(step-up)

Power Plants

- Supplied more than 70 countries around the world for the past 45 over years since 1978
- Satisfies the various demands of customers through the acquisition of quality certifications from international accredited institute
- Participates in the world's key technical committee such as GIGRE and others, pioneering the establishment of technology standard related to power network



Power Transformer
· up to 800kV, 1,500MVA



Gas Insulated Switchgear
· up to 800kV

- Can be installed in spaces smaller than the open type of substation by using SF_6 gas with outstanding insulation and arc extinguishing characteristics
- Secures advanced reliability by producing products that are resistant to external environment and climate effects through the sealing at the charge part
- Extensive project experiences around the world
- Reduces installation period and cost due to simple installation and transportation, convenient maintenance
- Design considering the safety of the workers as priority

Transmission

Primary Substation/Secondary Substation

Gas Insulated Switchgear
· up to 800kV

Power Transformer
· up to 800kV, 1,500MVA

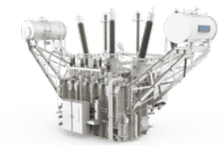
Shunt Reactor
· up to 765kV, 300Mvar

Distribution

Cubicle GIS
· up to 40.5kV

- Produces high quality products using angle-less type
- Multi-functional digital protection relay (HiMAP) applied
- High reliability secured, provides various operation information such as protection, measurement and control
- Firm external box, size and compact, making it safe
- Maintains high quality through stringent quality control system and continuous research and development

GREENTRIC



ECO Transformer
· up to 500kV, 1,000MVA

- Applies eco-friendly oil (Natural/Synthetic)
- Applies Dynamic Pressure Resistant System(DPRS)
- Guarantees excellence in safety

GREENTRIC

SF_6 Free Gas Insulated Switchgear
· GIS for 170kV 50kA 60Hz

- Applies Korea's first solely developed technology
- Uses Eco-friendly Novec mixture gas instead of SF_6 gas

Motor & Generator

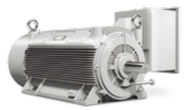
Synchronous Generator
· Rated Output: < 48MVA
· Rated Voltage: < 15kV
· Poles: > 4P

Marine

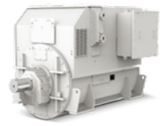
Marine Solution

- Production of high quality marine devices satisfying the regulations and standards of key marine associations (LRS, ABS, DNV, GL, BV, NK etc.) and world's renowned institutes
- High quality safety secured through the latest equipment and stringent quality control system
- Realization of optimal high efficiency by converging SWGR, Generator, Motor, Telecom, Automation, Intelligent Motor Control Unit and others

Marine Switchgear



Marine Motor

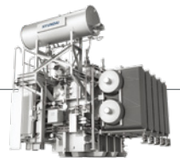


Generator

Shaft Generator

Metal Clad Switchgear
· up to 38kV
· IEC, ANSI

Low Voltage Switchgear & Motor Control Center
· H8PU : 660V, 3,000A, 80kA
· H5600 : 660V, 3,000A, 100kA
· HiMCC : 1,000V, 5,000A, 100kA



Distribution Transformer
· up to 36kV, 50MVA

Cast Resin Transformer
· up to 36kV, 20MVA

Synchronous Motor
· Rated Output: < 40MW
· Rated Voltage: < 15kV
· Poles: > 4P

MV&HV Induction Motor
· Rated Output: < 30MW
· Rated Voltage: < 15kV
· Poles: 2P-30P

VCB
· IEC, ANSI, UL
· up to 36/38kV, 50kA, 4,000A

ACB
· AC : up to 150kA, 6,300A
· DC : up to 60kA, 4,000A

VC
· up to 12kV, 400A

HGMAP
· HGMAP Series

HGCAM
· HGCAM Series

MCCB
· AC : up to 150kA, 1,600A
· DC : up to 100kA, 800A

ELCB
· up to 85kA, 800A, 1,000mA

MCCB / ELCB
· up to 10kA, 100A, 100mA

MS / MC
· up to 800A

Distribution Box
· Up to 36ways
· Surface/Flush type

MCB
· up to 15kA, 125A

RCCB / RCBO
· up to 100A, 500mA

Isolator
· up to 125A

Electronic Circuit Breaker
· up to 20A

MMS
· up to 100kA, 80A

Fuse Links & Switches
· up to 1,250A

- Can be applied to various places of demand due to various domestic and international certifications and marine certifications
- Full HG-Series line-up established
- High standard of breaking capacity and various product line offers production in any load environments
- Increased reliability with reinforced breaking performance of high-breaking MCCB
- Reinforced usage stability through internal reliability verification

Installation Contactor
· up to 63A

SPD
· up to 200kA
· AC, DC

HGDM

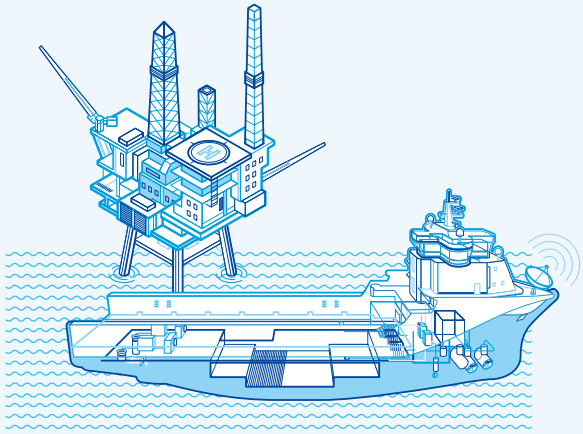
EOCR
· up to 60A

- Enhanced reliability and secured safety with production of products based on the world's best equipment and stringent quality system
- Realized high efficiency by selecting slot based on FEM
- Realized small and lightweight with optimal design based on FEM analysis method
- Satisfies the quality standards of international accredited institutes (IEC, IEEE, CSA, NEMA, API etc.)

LV Induction Motor
· Rated Output: < 750kW
· Rated Voltage: < 690V
· Poles: 2P-12P

Feature

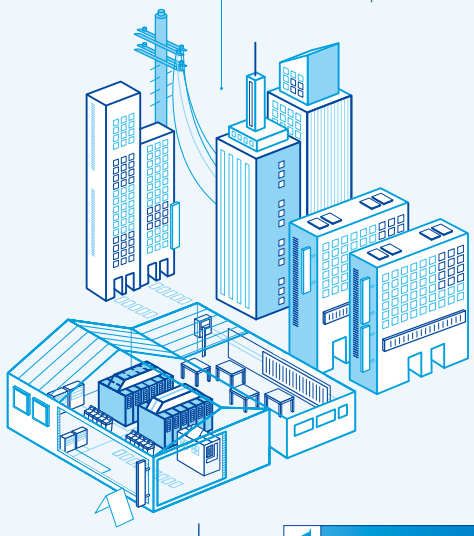
Applicable to Various Location



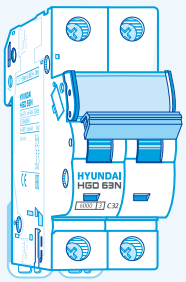
Marine

Approved marine certificate

Easy to remove, simple to install and repair with inscription window

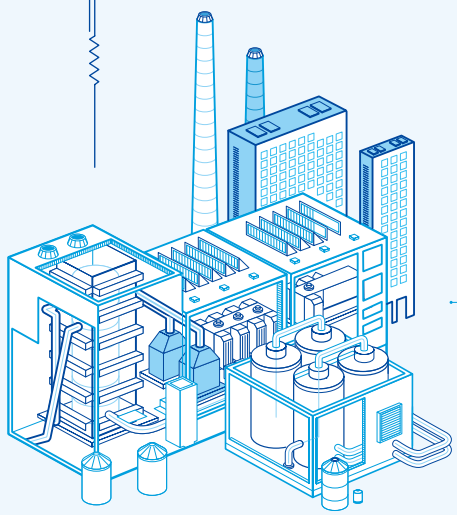


Building



Residence

Reliable short circuit capacity offering more stable and better protection to household electric appliances



Industry

IEC 60947-2 certified for industrial installation

Series Features

HD HYUNDAI ELECTRIC Miniature Series

Satisfy client requirement by focusing on safety, easy installation and user-friendliness with high reliability qualified by international test authorities based on IEC standards.

Inscription Window
Ensures circuit identification and hence reduces maintenance downtime

Safety Terminals
They guide the cable towards the cage terminal and avoid improper cable termination

Dual Termination
Two types of busbars can be used-fork type and pin type

Large Cable Terminals
The terminals are suitable for cables up to 50 mm^2 cross section area thus making it suitable for copper and aluminium cables

MCB

1. IEC 60947-2 certificated
2. Selectable AUX/ALT with knob
3. Available with enclosure (Option-IP40)
4. Breaking capacity up to 15 kA (IEC 60898-1)

RCCB

1. Advance neutral
2. Conditional short circuit capacity 10 kA

MSD

1. Longer electrical life
2. Low power consumption, thus cost effective and energy saving

New Miniature Series

Recognized with IF Design Award 2016

HGD

Miniature Circuit Breaker

Feature

HGD Miniature Circuit Breaker

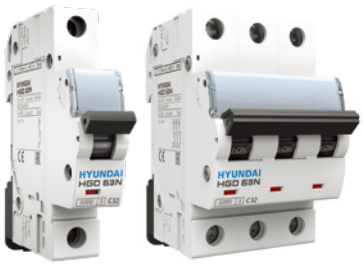
Electric distribution needs are continuously evolving in residential, commercial and industrial sectors.
Improved operational safety, continuity of service, greater convenience and operating cost have assumed a tremendous significance. Miniature circuit breakers have been designed to continuously adapt to these changing needs.

Product Feature

HGD series MCBs rating covers from 0.5 A to 125 A. The range offers a variety of feature benefits such as uniform breaking capacity of 15 kA across entire range in accordance with IEC/EN 60898-1 and IEC/EN 60947-2. HGD also incorporates features like inscription window, safety terminal, large cable terminals, bi stable clip, positive contact indication and field fittable AUX, ALT, SHT, UVT, OVT.

	Deluxe Type	Standard Type
Product Performance	- Low power consumption, thus cost effective & energy saving - Longer electrical life - Energy limiting class 3 to ensure low let through energy to limit thermal & mechanical stress on cables.	- Compact structure and external design. - Customers can choose between deluxe type and standard type depending on the need for inscription window - Under the standard of IEC 60898-1, all ranges are available with a short circuit capacity of 3 kA~15 kA and it is designed to use both pin type and fork type busbar
Product Structure	- Inscription window - Precise hammer action - Easy DIN-Rail extraction - 13 plates arc chute for effective arc quenching - Dual termination for bus-bar as well as cable connection - Trip free mechanism: MCB trips even if held in ON position	- 13 plates arc chute for effective arc quenching - Dual termination for bus-bar as well as cable connection - Trip free mechanism: MCB trips even if held in ON position
Accessories	- Selectable AUX/ALT with knob - Available with enclosure (Option-IP40)	- AUX, ALT, SHT, UVT options are available. - SHT with AUX function together
Specification	- IEC 60898-2 for DC application - IEC 60947-2 for industrial application - IEC 60898-1 for household application	- IEC 60898-1 for household application - IEC60947-2 for DC application

Product Overview



Deluxe Type (6 kA, 10 kA)

Standard Type (3 kA, 4.5 kA, 6 kA, 10 kA, 15 kA)

Selection Table

HGD (Deluxe Type)

Model	HGD63N, 63 AF, 6 kA	HGD63H, 63 AF, 10 kA	HGD125, 125 AF, 10 kA
			
Reference Standard	IEC/EN 60898-1	IEC/EN 60898-1 ; IEC/EN 60947-2	IEC/EN 60947-2
No. of Poles	1P, 1P + N, 2P, 3P, 3P + N, 4P	1P, 1P + N, 2P, 3P, 3P + N, 4P	1P, 1P + N, 2P, 3P, 3P + N, 4P
Rated Current (In)	0.5, 1, 2, 3, 4, 5, 6, 10, 16, 20, 25, 32, 40, 50, 63 A	0.5, 1, 2, 3 4, 5, 6, 10, 16, 20, 25, 32, 40, 50, 63 A	80 A, 100 A, 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 % Icu)
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 (6-9) In-C Curve (8-12) In-D Curve
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	-40 °C to + 55 °C	-40 °C to + 55 °C	-40 °C to + 55 °C
Humidity	95 % RH	95 % RH	95 % RH
Energy Limit Class	3	3	3
Terminal Capacity (max)	35 mm^2	35 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/Pole in kg	0.125 kg	0.125 kg	0.215 kg
Dimensions (H x D x W)/Pole in mm	87.5 x 71.7 x 17.7 mm	87.5 x 71.7 x 17.7 mm	90 x 76.9 x 26.7 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)
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
Busbar Connections Top/Bottom Side	Pin/Fork type (Bottom)	Pin/Fork type (Bottom)	Pin/Fork type (Bottom)
AUX/ALT/SHT/UVT/OVT	Yes	Yes	Yes (AUX/ALT)

※ HGD63N, 63H The appearance are the same.

HGD (Standard Type)

HGD63E, 63 AF, 3 kA[1)]	HGD63S, 63 AF, 4.5 kA[1)]	HGD32NS, 32 AF, 6 kA	HGD63M, 63 AF, 6 kA[2)]	HGD63P, 63 AF, 10 kA[2)]	HGD63U, 63 AF, 15 kA	HGD63D (DC), 63 AF, 10 kA	HGD100S, 125 AF, 10 kA
							
IEC/EN 60898-1	IEC/EN 60898-1	IEC/EN 60898-1	IEC/EN 60898-1, IEC/EN 60947-2	IEC/EN 60898-1, IEC/EN 60947-2	IEC/EN 60898-1 IEC/EN60947-2	IEC/EN 60947-2	IEC/EN 60947-2
1P, 1P + N, 2P, 3P, 3P + N, 4P	1P, 1P + N, 2P, 3P, 3P + N, 4P	N + 1P (N-left)	1P, 1P + N, 2P, 3P, 3P + N, 4P	1P, 1P + N, 2P, 3P, 3P + N, 4P	1P, 1P + N, 2P, 3P, 3P + N, 4P	1P, 2P, 3P, 4P	1P, 1P+N, 2P, 3P, 3P + N, 4P
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	1, 2, 3, 4, 5, 6, 10, 16, 20, 32 A	1, 2, 3, 4, 5, 6, 10, 13, 16, 20, 25, 32, 40, 50, 63 A	1, 2, 3, 4, 5, 6, 10, 13, 16, 20, 25, 32, 40, 50, 63 A	1, 2, 3, 4, 6, 10, 13, 16, 20, 25, 32, 40, 50, 63 A	1, 2, 3, 4, 6, 10, 13, 16, 20, 25, 32, 40, 50, 63 A	63, 80, 100, 125 A
AC 240/415 V	AC 240/415 V	AC 240/415 V	AC 240/415 V	AC 240/415 V	AC 240/415 V	1P : 110V/125V/220V/250Vdc 2P : 220V/250V/440V/500Vdc 3P : 660/750Vdc 4P : 880/1000Vdc	AC 240/415 V
50/60 Hz	50/60 Hz	50/60 Hz	50/60 Hz	50/60 Hz	50/60 Hz	-	50/60 Hz
3 kA (Ics=100 % Icn)	4.5 kA (Ics=100 % Icn)	6 kA (Ics=100 % Icn)	6 kA (Ics=100 % Icn)	10 kA (Ics=75 % Icn)	15 kA (Ics=50 % Icn)	10 kA (Ics=75 % Icu)	10 kA (Ics=75 % Icu)
(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 (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	C curve : Ii=6In D curve : Ii=12In	(3-5)In-B Curve (6-9)In-C Curve (8-12)In-D Curve
500 V	500 V	500 V	500 V	500 V	500 V	1,000 V	500 V
4 kV	4 kV	4 kV	4 kV	4 kV	4 kV	6 kV	4 kV
2.5 kV	2.5 kV	2.5 kV	2.5 kV	2.5 kV	2.5 kV	2 kV	2.5 kV
10,000/20,000	10,000/20,000	10,000/20,000	10,000/20,000	10,000/20,000	10,000/20,000	10,000/20,000	10,000/20,000
-40 °C to + 55 °C	-40 °C to + 55 °C	-40 °C to + 55 °C	-40 °C to + 55 °C	-40 °C to + 55 °C	-40 °C to + 55 °C	-40 °C to + 55 °C	-40 °C to + 55 °C
95 % RH	95 % RH	95 % RH	95 % RH	95 % RH	95 % RH	95 % RH	95 % RH
1	1	3	3	3	3	3	1
25 mm^2	25 mm^2	10 mm^2	25 mm^2	25 mm^2	25 mm^2	25 mm^2	50 mm^2
2 N·m	2 N·m	1.2 N·m	2 N·m	2 N·m	2.5 N·m	2.5 N·m	3.5 N·m
3 g	3 g	3 g	3 g	3 g	3 g	3 g	3 g
40 mm free fall	40 mm free fall	40 mm free fall	40 mm free fall	40 mm free fall	40 mm free fall	40 mm free fall	40 mm free fall
IP20	IP20	IP20	IP20	IP20	IP20	IP20	IP20
Red-ON, Green-OFF	Red-ON, Green-OFF	Red-ON, Green-OFF	Red-ON, Green-OFF	Red-ON, Green-OFF	Red-ON, Green-OFF	Red-ON, Green-OFF	Red-ON, Green-OFF
0.090 kg	0.090 kg	0.109 kg	0.100 kg	0.115 kg	0.130 kg	0.130 kg	0.155 kg
80.5 x 71.0 x 17.8 mm	80.5 x 71.0 x 17.8 mm	83.0 x 71.0 x 17.8 mm	81 x 71.0 x 17.8 mm	81 x 71.0 x 17.8 mm	83.0 x 71.8 x 17.8 mm	83.0 x 71.8 x 17.8 mm	81.0 x 71.0 x 26.8 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)	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)
Vertical/Horizontal	Vertical/Horizontal	Vertical/Horizontal	Vertical/Horizontal	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	Molded, flame-retardant thermoplastic material	Molded, flame-retardant thermoplastic material	Molded, flame-retardant thermoplastic material	Molded, flame-retardant thermoplastic material
Pin type	Pin type	-	Pin/Fork type	Pin/Fork type	Pin type	Pin type	-
No	No	Yes	Yes	Yes	Yes	Yes	Yes (SHT/UVT)

※ 1) HGD63E, 63S The appearance are the same.
2) HGD63M, 63P The appearance are the same.
3) HGD63U,63D The appearance are the same.

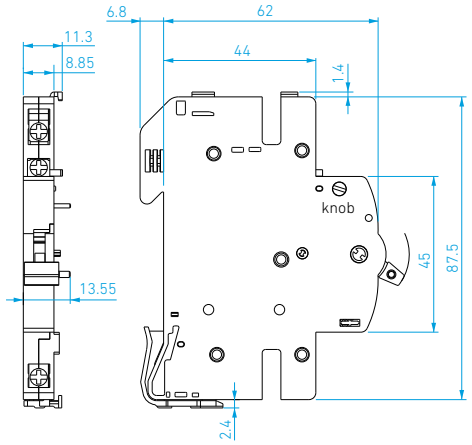
Accessory (Deluxe Type)

Auxiliary Contact + Alarm Trip (AXT-for 63 AF MCB)

Technical Specification	
Standard Conformity	IEC/EN 60947-5-4
Current Carrying Capacity (max)	6 A
Rated Voltage (Ue)	AC 240 V
Contact Configuration	1NO + 1NC
Rated Insulation Voltage (Ui)	AC 500 V
Rated Frequency (F)	50/60 Hz
Utlization Category	AC 12
Electrical Endurance (no. of operations)	10,000
Terminal Capacity(max)	2.5 mm^2
Protection Degree	IP20
Power Loss	3 Watts
Dimensions (H x D x W)	88.9 x 71 x 8.85 mm
Net Weight	36 g
AUX/ALT Selection knob	AUX(Clockwise)/ALT(Counter clockwise)
Mounting	Left side of MCB (HGD63N/H)

※ Attachment used for signalling, indication and interlocking.

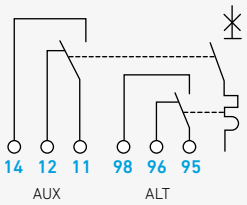
Dimension



AXT Combination (Position = POS)

AXT				MCB			
POS4	POS3	POS2	POS1	1P	2P	3P	4P
AUX4	AUX3	AUX2	AUX1	o	o	o	o
-	-	ALT2	ALT1	o	o	o	o
AUX2	AUX1	ALT2	ALT1	o	o	o	o

Circuit Diagram

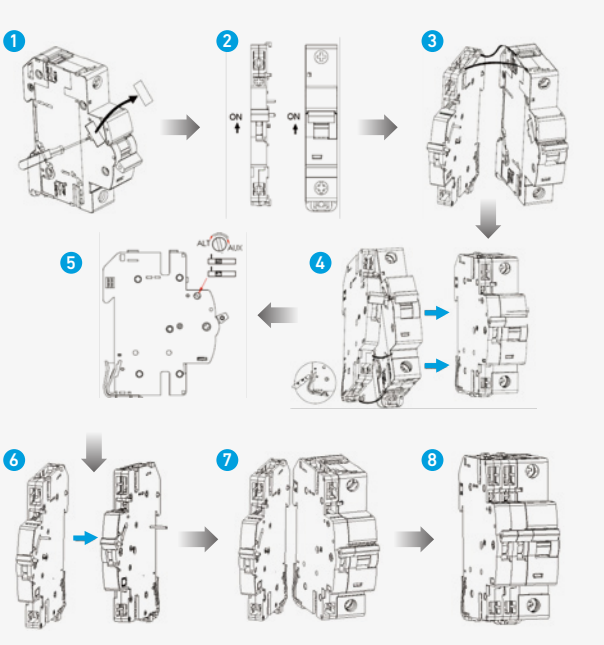


Ordering Information

AXT HGD63H	AUX/ALT

Assembling with MCB (HGD Accessories)

1. Remove the window sticker of the protection device with screw driver or by hand
2. Make sure the knob is in ON position
   Caution don't mount in OFF position
3. Adjust the U-shaped locks present at the Upper end of the AXT in such a way that they get fitted into the slots present in the protection device.
4. Rotate the AXT so as to bring it nearer to the protection device for final locking. Adjust the U-shaped locks present at the upper end of the AXT in such a way that they get fitted into the slots present in the protection during this snap lock shall remain pressed until the U-Lock of the snap lock gets fitted into the slot provided in the protection.
5. AUX-Type: The AXT contacts will signal whether the breaker is in the ON or OFF position.
   ALT-Type: The ALT-Type includes a set of contacts that will only signal when the breaker has tripped due to any fault. Typically, the contacts would be connected to an alarm to signal the operator that an overload/short circuit has occurred.
6. For multiple mounting of AXT remove the pin from secondary AXT for mounting as shown below with help of any tool.
7. Mount the secondary AXT as per previous steps such that the coupling link from secondary AXT gets linked to first one for proper linkage of mechanism with each other in ON position.
8. Check for the working of the AXT by switching it ON & OFF.
   Set the working of secondary AXT as per step no.5.



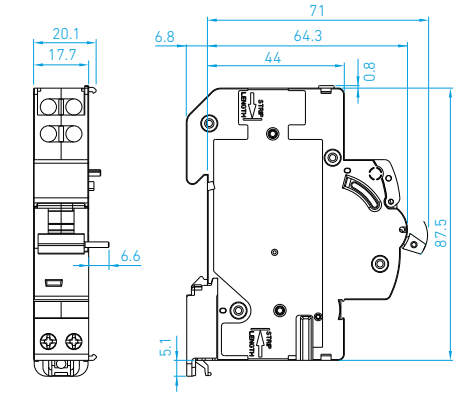
Shunt Trip (SHT)

Technical Specification	
Standard Conformity	IEC 60947-1
Rated Voltage (Ue)	AC 110-415 V
	DC 110-130 V
Rated Frequency (F)	50/60 Hz
Max Release Duration	10 ms
Operational Voltage	70 %-110 % Ue
Coil Resistance	120 Ω
Terminal Capacity(max)	6 mm^2
Mechanical Status Indicator	Front
Tightening Torque	0.8 N·m
Dimensions (H x D x W)	88.3 x 71 x 17.7 mm
Net Weight	72 g
Electrical Endurance (no. of operations)	4,000
Wiring Connection Type	Bottom
Mounting	Left side of MCB (HGD63N/H)

Ordering Information

SHT HGD63H S2	AC 240 V
SHT HGD63H S5	DC 24 V
SHT HGD63H S7	DC 48 V
SHT HGD63H S9	DC 12 V

Dimension



SINGLE PHASE

Circuit Diagram

Under Voltage Trip (UVT)

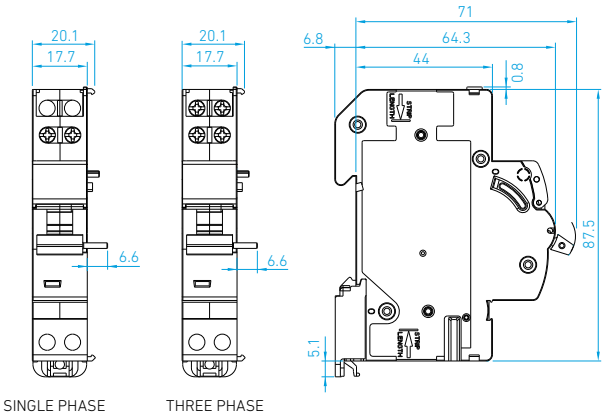
Technical Specification		
Phase	Single phase	Three phase
Standard Conformity	IEC 60947-1	
Rated Voltage (Ue)	AC 240 V	
Rated Frequency (F)	50/60 Hz	
Under Voltage Trip Voltage	V ≤ 0.7 Ue	
Terminal Capacity(max)	6 mm^2	
Protection Degree	IP20	
Mechanical Status Indicator	Front	
Tightening Torque	0.8 N·m	
Dimensions (H x D x W)	88.3 x 71 x 17.7 mm	
Net Weight	78 g	
Electrical Endurance (no. of operations)	4,000	
Wiring Connection Type	Bottom	Top
Mounting	Left side of MCB (HGD63N/H)	

※ Causes the device with which it is associated to trip when input voltage decreases (between 70 % and 35 % of Un). Associated device can be manually reclosed when voltage reaches back to 85 %.

Ordering Information

UVT HGD63H US2	Single phase
UVT HGD63H UT2	Three phase

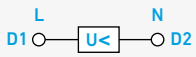
Dimension



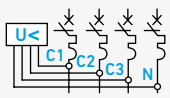
SINGLE PHASE THREE PHASE

Circuit Diagram

Single phase



Three phase



Accessory (Deluxe Type)

Under Voltage Trip + Time Delayed (UVT + t)

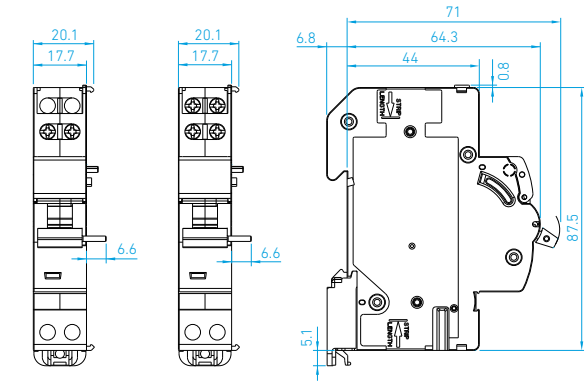
Technical Specification		
Phase	Single phase	Three phase
Standard Conformity	IEC 60947-1	
Rated Voltage (Ue)	AC 240 V	
Rated Frequency (F)	50/60 Hz	
Under Voltage Trip Voltage	V ≤ 0.7 Ue	
Trip Delay	0.2 sec	
Terminal Capacity(max)	6 mm²	
Protection Degree	IP20	
Mechanical Status Indicator	Front	
Tightening torque	0.8 N·m	
Dimensions (H x D x W)	88.3 x 71 x 17.7 mm	
Net Weight	78 g	
Electrical Endurance (no. of operations)	4,000	
Wiring Connection Type	Bottom	Top
Mounting	Left side of MCB (HGD63N/H)	

※ Causes the device with which it is associated to trip when input voltage decrease (between 70 % and 35 % of Un). No tripping in case of transient voltage drop (up to 0.2 s)

Ordering Information

UVT HGD63H DUS2	Single phase
UVT HGD63H DUT2	Three phase

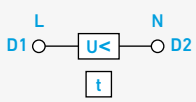
Dimension



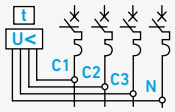
SINGLE PHASE THREE PHASE

Circuit Diagram

Single phase



Three phase



Over Voltage Trip (OVT)

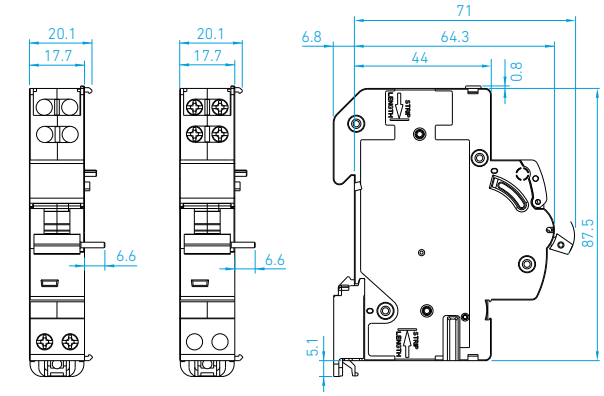
Technical Specification		
Phase	Single phase	Three phase
Standard Conformity	EN50550	
Rated Voltage (Ue)	AC 240 V	AC 240 V (L-N)
Rated Frequency (F)	50/60 Hz	
Max Non-Tripping Voltage	AC 255 V	AC 255 V (L-N)
Max Tripping Voltage	AC 280 V	AC 280 V (L-N)
Max Duration of Impulse Command	10 ms	
Terminal Capacity(max)	6 mm²	
Protection Degree	IP20	
Mechanical Status Indicator	Front	
Tightening Torque	0.8 N·m	
Dimensions (H x D x W)	88.3 x 71 x 17.7 mm	
Net Weight	78 g	
Electrical Endurance (no. of operations)	4,000	
Wiring Connection Type	Bottom	Top
Mounting	Left side of MCB (HGD63N/H)	

※ Cuts off the supply power by opening with which it is associated when the phase & neutral voltage is exceeded.

Ordering Information

OVT HGD63H OS2	Single phase
OVT HGD63H OT2	Three phase

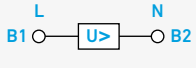
Dimension



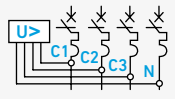
SINGLE PHASE THREE PHASE

Circuit Diagram

Single phase



Three phase



Under + Over Voltage Trip (UOVT)

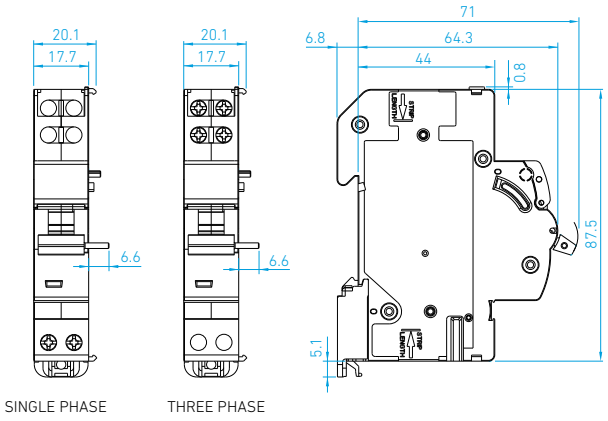
Technical Specification		
Phase	Single phase	Three phase
Standard Conformity	IEC 60947-1, EN 50550	
Rated Voltage (Ue)	AC 240 V	AC 240 V (L-N)
Rated Frequency (F)	50/60 Hz	
Max Non-Tripping Voltage	AC 255 V	AC 255 V (L-N)
Max Tripping Voltage	AC 280 V	AC 280 V (L-N)
Under Voltage Trip Voltage	V ≤ 0.7 Ue	
Max Duration of Impulse Command	10 ms	
Terminal Capacity(max)	6 mm^2	
Protection Degree	IP20	
Mechanical Status Indicator	Front	
Tightening Torque	0.8 N·m	
Dimensions (H x D x W)	88.3 x 71 x 17.7 mm	
Net Weight	78 g	
Electrical Endurance (no. of operations)	4,000	
Wiring Connection Type	Bottom	Top
Mounting	Left side of MCB (HGD63N/H)	

※ Cuts the supply power by opening with which it is associated when the phase & neutral voltage is in not with in the limits.

Ordering Information

UOVT HGD63H UOS2	Single phase
UOVT HGD63H UOT2	Three phase

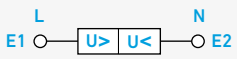
Dimension



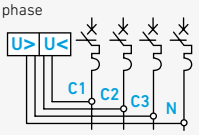
SINGLE PHASE THREE PHASE

Circuit Diagram

Single phase

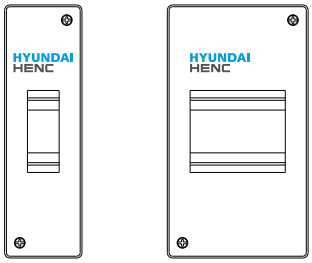


Three phase



Accessory (Deluxe Type)

Enclosure for MCB-PLASTIC (ENC)



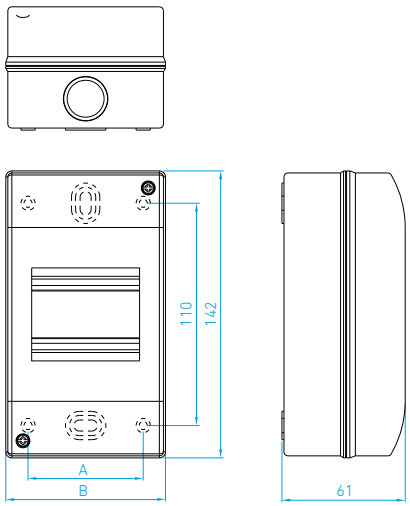
No. of Ways	Dimensions (In mm)	
	A	B
1P/2P	29.4	43.4
3P/4P	57	79

※ Enclosures for independent cut off/connection of the electrical appliances.

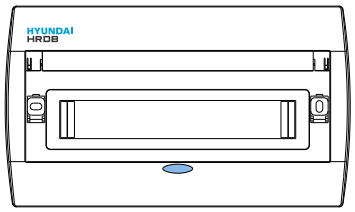
Ordering Information

ENC HGD63H 2P	For 1P, 2P MCB Enclosure
ENC HGD63H 4P	For 3P, 4P MCB Enclosure

Dimension

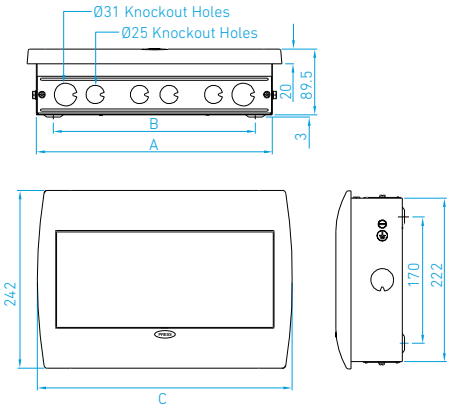


Distribution Box



No. of Ways	A	B	C	Top		Bottom		Side
				Ø25	Ø31	Ø25	Ø31	
8	247	195	272	2	2	2	2	1
12	319	267	344	4	2	4	2	1
16	391	339	416	4	2	4	2	1

Dimension



Specification

- IEC61439-3
- These are most elegantly designed DBs, to suit the décor of homes
- Raised neutral link for easy wiring
- Spring loaded outer cover swings open by just pressing the lock button
- Supplied with masking sheets to protect components from cement during plastering
- Supplied with neutral & earth link, top & bottom detachable plates
- IP 42

Ordering Information

ENC HRDB SPN8W	8 Ways
ENC HRDB SPN12W	12 Ways
ENC HRDB SPN16W	16 Ways

Accessory (Deluxe Type -125 AF)

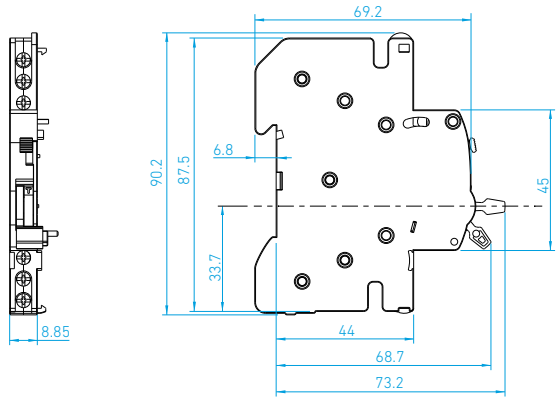
Auxiliary Contact + Alarm Trip (AXT-for 125 AF MCB)

Technical Specification	
Standard Conformity	IEC/EN 60947-5-4
Coil Consumption	6 VA
Rated Voltage (Ue)	AC240 V
Contact Configuration	1NO + 1NC
Rated Insulation Voltage (Ui)	AC500 V
Rated Frequency (F)	50/60 Hz
Utilization Category	AC 12
Electrical Endurance (no. of operations)	10,000
Terminal Capacity (max)	2.5 mm^2
Protection Degree	IP20
Dimensions (H x D x W)	90.2 x 73.2 x 8.85
Net Weight	36 g
Mounting	Left side of MCB (HGD125) common use of AXT for RCCB

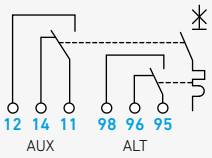
Ordering Information

AXT HGD125	AUX/ALT

Dimension

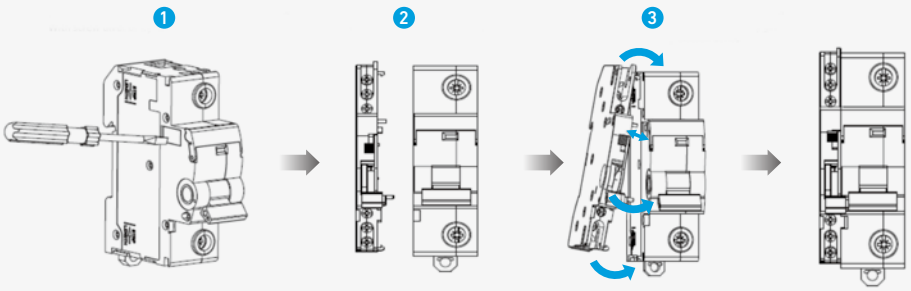


Circuit Diagram

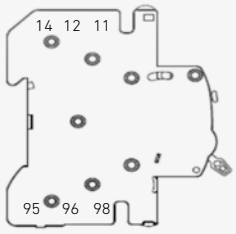


Assembling with MCB (HGD125)

1. Remove the window sticker of the protection device with screw driver or by hand
2. Make sure the knob is in OFF position
   Caution: Don't mount in ON position
3. Rotate the AXT so as to bring it nearer to the protection device for locking, Adjust the locks present at the upper end of AXT in such a way that they get fitted in slots present in protection device



Terminal No.



11-12 - ON
11-14 - OFF } AUX

95-96 - ON/OFF
95-98 - TRIP } ALT

Accessory (Standard Type)

Auxiliary Contact (AUX)

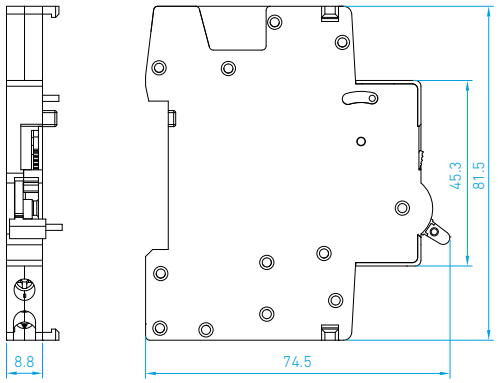
Technical Specification			
Standard Conformity		IEC/EN 60947-5-4	
Current Carrying Capacity (max)		6 A	
Rated Voltage (Ue)		AC 240 V	
Contact Configuration		1NO + 1NC	
Rated Insulation Voltage (Ui)		AC 500 V	
Rated Frequency (F)		50/60 Hz	
Utlization Category		AC 12	
Electrical Endurance (no. of operations)		10,000	
Terminal Capacity (max)		2.5 mm^2	
Protection Degree		IP20	
Dimensions (H x D x W)		81.5 x 74.5 x 8.8 mm	
Net Weight		32 g	
Mounting		Left side of MCB (HGD63M/P)/Max. 4 EA	
Operating Current	Operating Power	Voltage	Current
	AC	415 V	3 A
		240 V	6 A
	DC	130 V	1 A
		48 V	2 A
		24 V	6 A

※ Attachment used for signalling, indication and interlocking point 11 and 14 are connected when circuit is closed. Point 11 and 12 are connected when circuit is open.

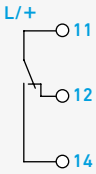
Ordering Information

AUX HGD63P	AUX

Dimension



Circuit Diagram



Alarm Trip (ALT)

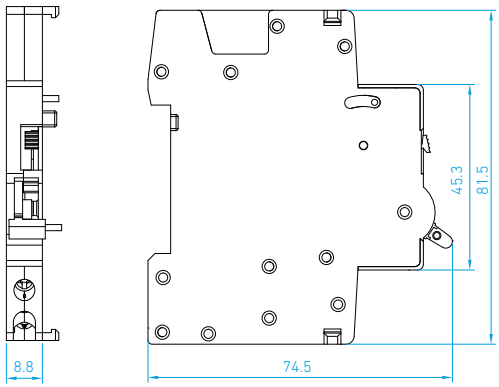
Technical Specification			
Standard Conformity		IEC/EN 60947-5-4	
Current Carrying Capacity (max)		6 A	
Rated Voltage (Ue)		AC 240 V	
Contact Configuration		1NO + 1NC	
Rated Insulation Voltage (Ui)		AC 500 V	
Rated Frequency (F)		50/60 Hz	
Utlization Category		AC 12	
Electrical Endurance (no. of operations)		10,000	
Terminal Capacity (max)		2.5 mm^2	
Protection Degree		IP20	
Dimensions (H x D x W)		81.5 x 74.5 x 8.8 mm	
Net Weight		32 g	
Mounting		Left side of MCB (HGD63M/P)/Max. 2 EA	
Operating Current	Operating Power	Voltage	Current
	AC	415 V	3 A
		240 V	6 A
	DC	130 V	1 A
		48 V	2 A
		24 V	6 A

※ Attachment used for signalling, indication and interlocking
※ Point 91 and 92 are connected when circuit is closed.
Point 91 and 94 are connected when the breaker trips due to fault.
Point 91 and 92 are connected when the breaker trips by manual operation.
Meanwhile, point 91 and 94 are disconnected.
※ ALT Should be assembled with in 18 mm on the left side of MCB.

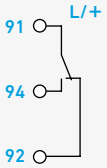
Ordering Information

ALT HGD63P	ALT

Dimension



Circuit Diagram



Shunt Trip (SHT) + Auxiliary Contact (AUX)

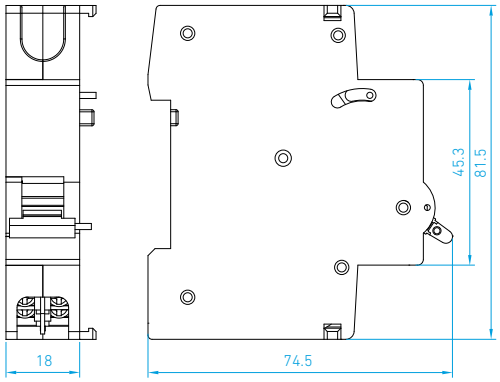
Technical Specification	
Standard Conformity	IEC/EN 60947-1, 60947-5-4
Coil Consumption	6 VA
Rated Voltage (ac) (Ue)	AC 240 V
Rated Voltage (dc) (Ue)	12, 24, 48 V
Contact Configuration	1NO + 1NC
Rated Insulation Voltage (Ui)	AC 500 V
Rated Frequency (F)	50/60 Hz
Operating Voltage Range	85 % to 110 % of rated voltage
Electrical Endurance (no. of operations)	4,000
Terminal Capacity(max)	6 mm^2
Protection Degree	IP20
Dimensions (H x D x W)	81.5 x 74.5 x 18 mm
Net Weight	64 g
Mounting	Left side of MCB (HGD63M/P)

※ Attachment used for remote tripping, signaling and indication.

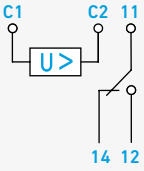
Ordering Information

SHT HGD63P S2	AC 240 V
SHT HGD63P S5	DC 24 V
SHT HGD63P S7	DC 48 V
SHT HGD63P S9	DC 12 V

Dimension



Circuit Diagram



Under Voltage Trip (UVT)

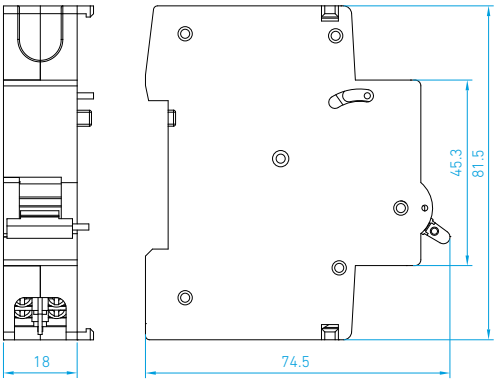
Technical Specification	
Standard Conformity	IEC 60947-1
Coil Consumption	6 VA
Rated Voltage (ac) (Ue)	AC 240 V
Rated Insulation Voltage (Ui)	AC 500 V
Rated Frequency (F)	50/60 Hz
Operating Voltage Range	V ≤ 0.7 Ue
Electrical Endurance (no. of operations)	4,000
Terminal Capacity (max)	6 mm^2
Protection Degree	IP20
Dimensions (H x D x W)	81.5 x 74.5 x 18 mm
Net Weight	60 g
Mounting	Left side of MCB (HGD63M/P)

※ Attachment used for tripping when its input voltage decreases 170 V ±5 %

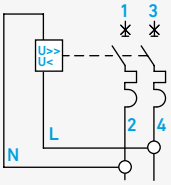
Ordering Information

UVT HGD63P U2	AC 240 V

Dimension



Circuit Diagram



Accessory (Standard Type-125 AF)

Shunt Trip (SHT)

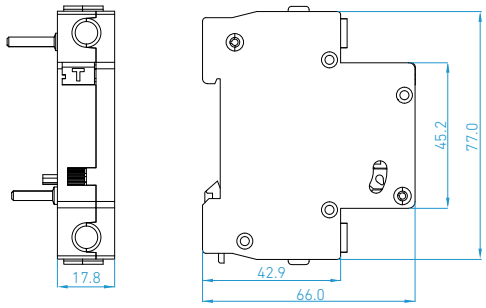
Technical Specification	
Standard Conformity	IEC/EN 60947-1
Coil Consumption	6 VA
Rated Voltage (Ue)	AC110 - 415 V
	DC110 - 130 V
Rated Insulation Voltage (Ui)	AC500 V
Rated Frequency (F)	50/60 Hz
Operating Voltage Range	85 % to 110 % of rated voltage
Electrical Endurance (no. of operations)	4,000
Terminal Capacity (max)	6 mm^2
Protection Degree	IP20
Dimensions (H x D x W)	80.2 x 66.0 x 17.8
Net Weight	60 g
Mounting	Right side of MCB (HGD100S)

※ Attachment used for remote tripping.

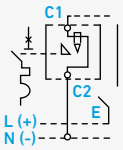
Ordering Information

SHT HGD100S S2	AC 240 V

Dimension



Circuit Diagram



Under Voltage Trip (UVT)

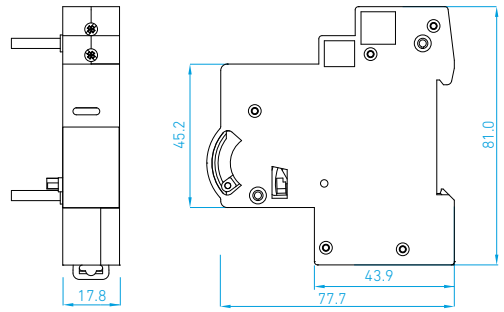
Technical Specification	
Standard Conformity	IEC/EN 60947-1
Coil Consumption	6 VA
Rated Voltage (Ue)	AC240 V
Rated Insulation Voltage (Ui)	AC500 V
Rated Frequency (F)	50/60 Hz
Operating Voltage Range	V ≤ 0.7 Ue
Electrical Endurance (no. of operations)	4,000
Terminal Capacity (max)	6 mm^2
Protection Degree	IP20
Dimensions (H x D x W)	81 x 77.7 x 17.8
Net Weight	73 g
Mounting	Right side of MCB (HGD100S)

※ Attachment used for tripping when its input voltage decreases 170 V±5 %

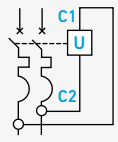
Ordering Information

UVT HGD100S U2	AC 240 V

Dimension



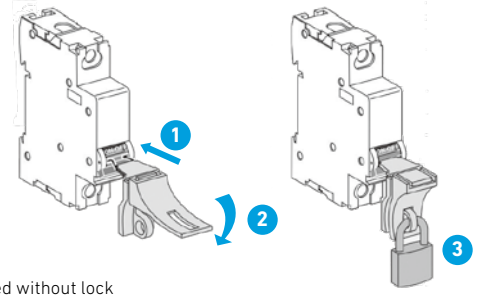
Circuit Diagram



Handle Padlock Device (For 63 AF MCB)

Function	MCB handle can be locked either at "ON" position or at "OFF" position to prevent unwanted operation of the product
General	Diameter of the padlock : 8mm max.
	Locking in the ON position does not prevent the circuit breaker from tripping in the event of a fault
Standard Conformity	IEC/EN 60947-2
Application Type	HGD63
Ordering Information	PLD M63 A
Appearance	

Installation



※ Supplied without lock

Accessory (Standard Type-HGD63U/D)

Auxiliary Contact (AUX)

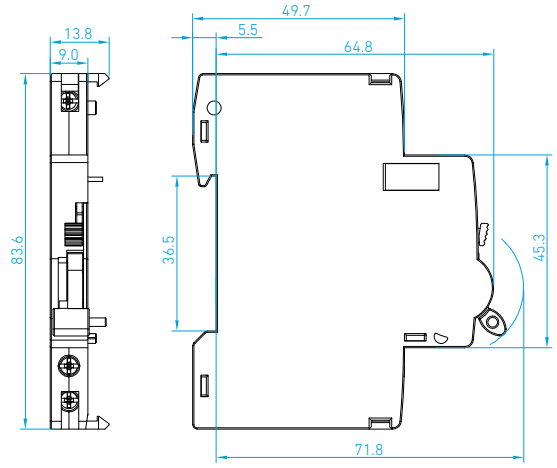
Technical Specification			
Standard Conformity		IEC/EN 60947-5-4	
Current Carrying Capacity (max)		6 A	
Rated Voltage (Ue)		AC 240 V	
Contact Configuration		1NO + 1NC	
Rated Insulation Voltage (Ui)		AC 500 V	
Rated Frequency (F)		50/60 Hz	
Utlization Category		AC 12	
Electrical Endurance (no. of operations)		10,000	
Terminal Capacity (max)		2.5 mm^2	
Protection Degree		IP20	
Dimensions (H x D x W)		83.6 x 77.3 x 9.0 mm	
Net Weight		32 g	
Mounting		Left side of MCB (HGD63U/D)/Max. 4 EA	
Operating Current	Operating Power	Voltage	Current
	AC	415 V	3 A
		240 V	6 A
	DC	130 V	1 A
		48 V	2 A
		24 V	6 A

※ Attachment used for signalling, indication and interlocking point 11 and 14 are connected when circuit is closed. Point 11 and 12 are connected when circuit is open.

Ordering Information

AUX HGD63U	AUX

Dimension



Circuit Diagram

Alarm Trip (ALT)

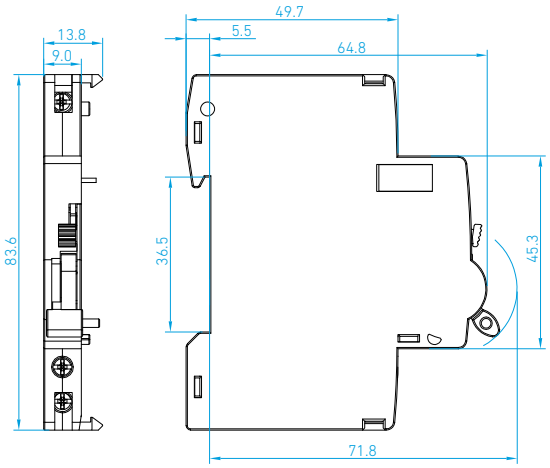
Technical Specification			
Standard Conformity		IEC/EN 60947-5-4	
Current Carrying Capacity (max)		6 A	
Rated Voltage (Ue)		AC 240 V	
Contact Configuration		1NO + 1NC	
Rated Insulation Voltage (Ui)		AC 500 V	
Rated Frequency (F)		50/60 Hz	
Utlization Category		AC 12	
Electrical Endurance (no. of operations)		10,000	
Terminal Capacity (max)		2.5 mm^2	
Protection Degree		IP20	
Dimensions (H x D x W)		83.6 x 77.3 x 9.0 mm	
Net Weight		32 g	
Mounting		Left side of MCB (HGD63U/D)/Max. 2 EA	
Operating Current	Operating Power	Voltage	Current
	AC	415 V	3 A
		240 V	6 A
	DC	130 V	1 A
		48 V	2 A
		24 V	6 A

※ Attachment used for signalling, indication and interlocking
※ Point 91 and 92 are connected when circuit is closed.
Point 91 and 94 are connected when the breaker trips due to fault.
Point 91 and 92 are connected when the breaker trips by manual operation.
Meanwhile, point 91 and 94 are disconnected.
※ ALT Should be assembled with in 18 mm on the left side of MCB.

Ordering Information

ALT HGD63U	ALT

Dimension



Circuit Diagram

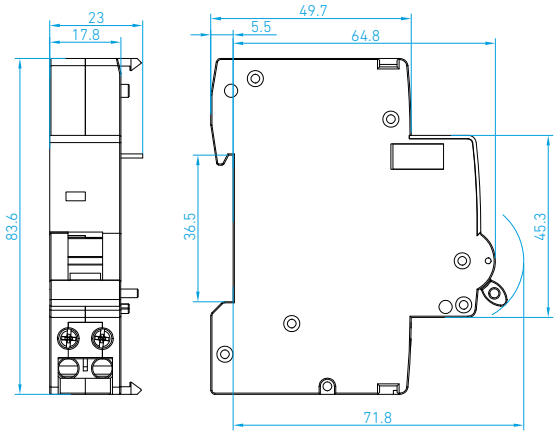
Accessory (Standard Type-HGD63U/D)

Shunt Trip (SHT)

Technical Specification	
Standard Conformity	IEC/EN 60947-1, 60947-5-4
Coil Consumption	6 VA
Rated Voltage (ac) (Ue)	AC 240 V
Rated Insulation Voltage (Ui)	AC 500 V
Rated Frequency (F)	50/60 Hz
Operating Voltage Range	85 % to 110 % of rated voltage
Electrical Endurance (no. of operations)	4,000
Terminal Capacity(max)	6 mm^2
Protection Degree	IP20
Dimensions (H x D x W)	83.6 x 77.3 x 17.8 mm
Net Weight	64 g
Mounting	Left side of MCB (HGD63U/D)

※ Attachment used for remote tripping, signaling and indication.

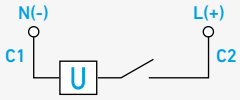
Dimension



Ordering Information

SHT HGD63U S2	AC 240 V

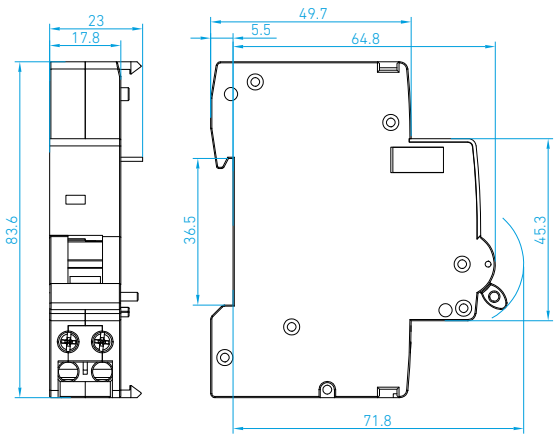
Circuit Diagram



Under + Over Voltage Trip (UOVT)

Technical Specification	
Standard Conformity	IEC 60947-1
Rated Voltage (Ue)	AC 240 V
Rated Insulation Voltage (Ui)	AC 500 V
Max Non-Tripping Voltage	AC 255 V
Max Tripping Voltage	AC 280 V
Under Voltage Trip Voltage	V ≤ 0.7 Ue
Max Duration of Impulse Command	10 ms
Terminal Capacity (max)	6 mm^2
Protection Degree	IP20
Mechanical Status Indicator	Front
Tightening Torque	0.8 N·m
Dimensions (H x D x W)	83.6 x 77.3 x 17.8 mm
Net Weight	78 g
Electrical Endurance (no. of operations)	4,000
Mounting	Left side of MCB (HGD63U/D)

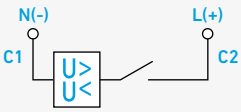
Dimension



Ordering Information

UOVT HGD63U UOS2	Single phase

Circuit Diagram



Accessory Ordering Information

Deluxe Type

Type		Code	Description
HGD63N/HGD63H	AXT	AXT HGD63H	AUX/ALT
	SHT	SHT HGD63H S2	AC 240 V
		SHT HGD63H S5	DC 24 V
		SHT HGD63H S7	DC 48 V
		SHT HGD63H S9	DC 12 V
	UVT	UVT HGD63H US2	Single phase (AC 240 V)
		UVT HGD63H UT2	Three phase (AC 415 V)
	UVT (Time Delayed Type)	UVT HGD63H DUS2	Single phase (AC 240 V)
		UVT HGD63H DUT2	Three phase (AC 415 V)
	OVT	OVT HGD63H OS2	Single phase (AC 240 V)
		OVT HGD63H OT2	Three phase (AC 415 V)
	UVT + OVT	UOVT HGD63H UOS2	Single phase (AC 240 V)
		UOVT HGD63H UOT2	Three phase (AC 415 V)
	ENCLOSURE	ENC HGD63H 2P	for 1P/2P MCB
		ENC HGD63H 4P	for 3P/4P MCB
	Distribution Box	ENC HRDB SPN8W	8 Ways
		ENC HRDB SPN12W	12 Ways
		ENC HRDB SPN16W	16 Ways
HGD125	AXT	AXT HGD125	AUX/ALT

Standard Type

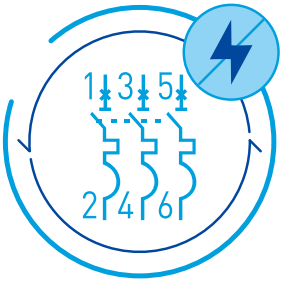
Type		Code	Description
HGD63M/HGD63P/ HGD32NS	AUX	AUX HGD63P	
	ALT	ALT HGD63P	
	SHT + AUX	SHT HGD63P S2	AC 240 V
		SHT HGD63P S5	DC 24 V
		SHT HGD63P S7	DC 48 V
		SHT HGD63P S9	DC 12 V
	UVT	UVT HGD63P U2	Single phase (AC 240 V)
	PADLOCK	PLD M63 A	Common use with Deluxe Type
HGD100S	SHT	SHT HGD100S S2	AC 240 V
	UVT	UVT HGD100S U2	Single phase (AC 240 V)
HGD63U/HGD63D	AUX	AUX HGD63U	
	ALT	ALT HGD63U	
	SHT	SHT HGD63U S2	AC 240 V
	UVT + OVT	UOVT HGD63U UOS2	Single phase (AC 240 V)

Technical Data

Description

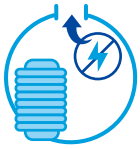
Construction

Miniature circuit breakers have precisely formed molded case & cover of flame retardant high strength thermoplastic material having high melting point, low water absorption, high dielectric strength and temperature withstand.
The switching mechanism is independent, manual and trip free, i.e.,the breaker trips internally even if the operating knob is held in ON position.
The contact mechanism comprises of fixed & moving contacts specially designed for reliability, long life and anti-weld properties. The arc extinguishing device comprises of 13 plates arc chute. The arc under the influence of the magnetic field and arc guide is moved into the arc chute where it is rapidly split and quenched. The tripping mechanism is thermal magnetic type.



Thermal Operation

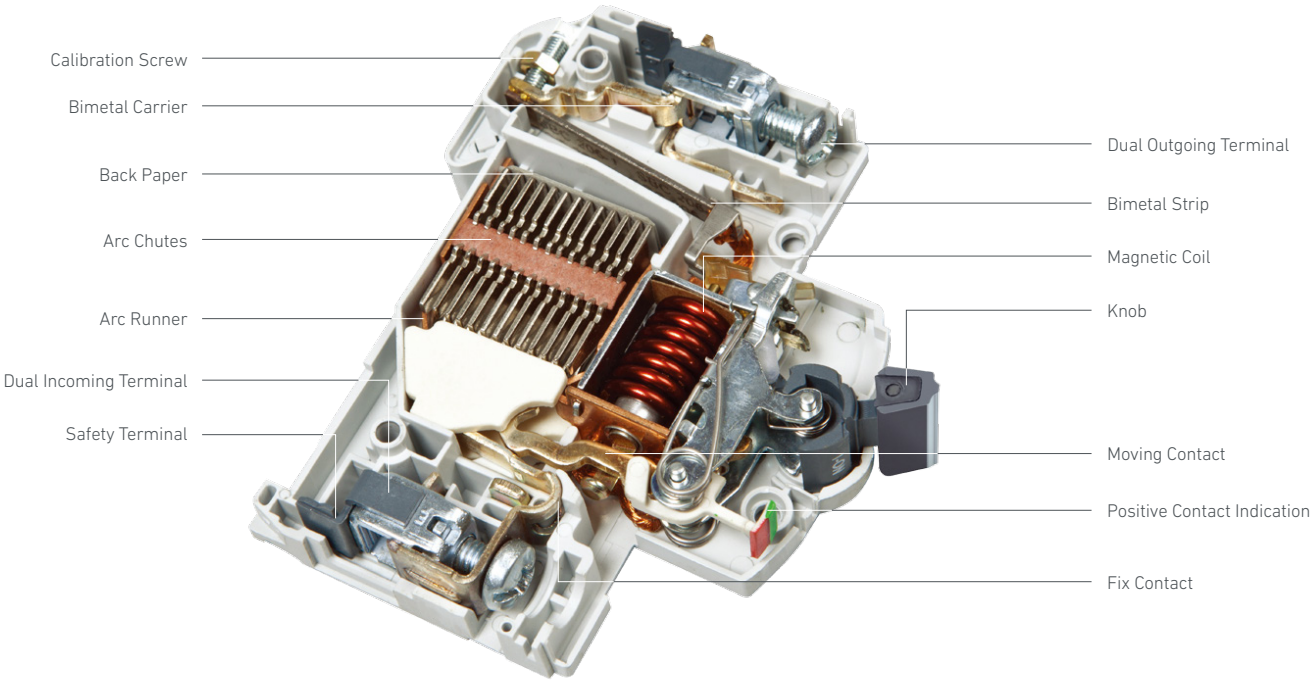
The thermal operation provides protection from moderate overloads.
Under overload condition, a thermo-metallic element (bimetallic strip) deflects until it operates a latching mechanism allowing the main contacts to open.



Magnetic Operation

In magnetic operation, large overloads or short circuit current actuates a solenoid causing a plunger to strike the latching mechanism rapidly opening the main contacts.

Internal View



Characteristics Curves

As per	Thermal Tripping			Magnetic Tripping		
	No Tripping	Tripping	Time	Hold	Trip	Time
IEC/EN 60898-1	Current	Current	Limits	Current	Current	Limits
	I_1	I_2	t	I_4	I_5	t
B Curve	1.13 x I_n		≥1 h	3 x I_n		≥0.1 s
		1.45 x I_n	<1 h		5 x I_n	<0.1 s
C Curve	1.13 x I_n		≥1 h	5 x I_n		≥0.1 s
		1.45 x I_n	<1 h		10 x I_n	<0.1 s
D Curve	1.13 x I_n		≥1 h	10 x I_n		≥0.1 s
		1.45 x I_n	<1 h		20 x I_n	<0.1 s
$I_3 = 2.55xI_n$	1 s < t < 60 s for I_n ($I_n \leq 32$ A) 1 s < t < 120 s for I_n ($I_n > 32$ A)					

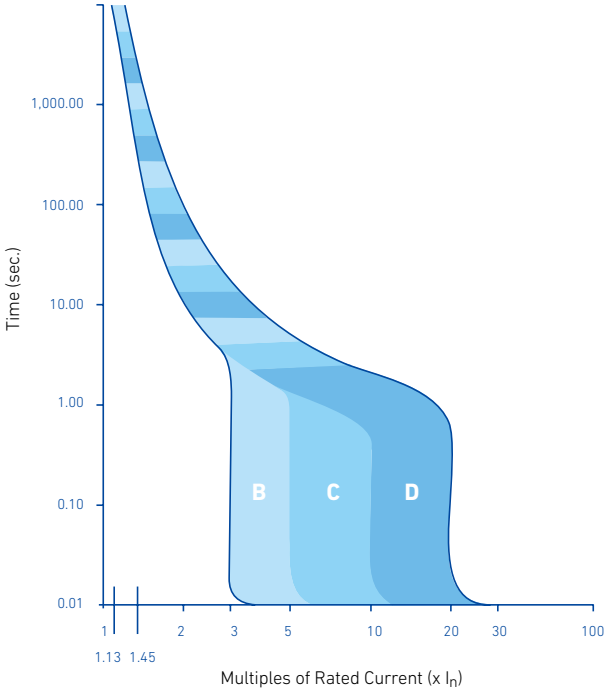
Tripping Characteristics

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

- **'B' Curve**: for protection of electrical circuits with equipment that does not cause surge current (lighting and distribution circuits). Short circuit release is set to (3-5) In

- **'C' Curve**: for protection of electrical circuits with equipment that causes surge current (inductive loads and motor circuits). Short circuit release is set to (5-10) In

- **'D' Curve**: for protection of electrical circuits which causes high inrush current, typically 12-15 times the thermal rated current (transformers, X-ray machines etc.) Short circuit release is set to (10-20) In



Technical Data

Temperature Derating Table

Rated Current (A)	Ambient Temperature (°C)													
	-5 °C	0 °C	5 °C	10 °C	15 °C	20 °C	25 °C	30 °C	35 °C	40 °C	45 °C	50 °C	55 °C	60 °C
0.5	0.64	0.62	0.60	0.58	0.56	0.54	0.52	0.5	0.48	0.46	0.44	0.42	0.40	0.38
1.0	1.28	1.24	1.20	1.16	1.12	1.08	1.04	1.0	0.96	0.92	0.88	0.84	0.80	0.76
2.0	2.56	2.48	2.40	2.32	2.24	2.16	2.08	2.0	1.92	1.84	1.76	1.68	1.60	1.52
3.0	3.84	3.72	3.60	3.48	3.36	3.24	3.12	3.0	2.88	2.76	2.64	2.52	2.40	2.28
4.0	5.12	4.96	4.80	4.64	4.48	4.32	4.16	4.0	3.84	3.68	3.52	3.36	3.20	3.04
5.0	6.40	6.20	6.00	5.80	5.60	5.40	5.20	5.0	4.80	4.60	4.40	4.20	4.00	3.80
6.0	7.68	7.44	7.20	6.96	6.72	6.48	6.24	6.0	5.76	5.52	5.28	5.04	4.80	4.56
10.0	12.80	12.40	12.00	11.60	11.20	10.80	10.40	10.0	9.60	9.20	8.80	8.40	8.00	7.60
16.0	20.50	19.80	19.60	18.60	17.90	17.70	16.60	16.0	15.40	14.70	14.10	13.40	12.80	12.20
20.0	25.60	24.80	24.00	23.20	22.40	21.60	20.80	20.0	19.20	18.40	17.60	16.80	16.00	15.20
25.0	32.00	31.00	30.00	29.00	28.00	27.00	26.00	25.0	24.00	23.00	22.00	21.00	20.00	19.00
32.0	41.00	39.70	38.40	37.10	35.00	34.60	33.30	32.0	30.70	29.40	28.20	26.90	25.60	24.30
40.0	51.20	49.60	48.00	46.40	44.80	43.20	41.60	40.0	38.40	36.80	35.20	33.60	32.00	30.40
50.0	64.00	62.00	60.00	58.00	56.00	54.00	52.00	50.0	48.00	46.00	44.00	42.00	40.00	38.00
63.0	80.60	78.10	75.60	73.10	70.60	68.00	65.50	63.0	60.50	58.00	55.40	52.90	50.90	47.90
80.0	95.10	93.10	91.00	88.90	86.80	84.60	82.30	80.0	77.60	75.10	72.60	70.00	67.20	64.40
100.0	121.10	118.30	115.50	112.50	109.50	106.50	103.30	100.0	96.60	93.10	89.60	85.60	81.60	77.50
125.0	144.30	141.70	139.00	136.60	133.60	130.80	127.90	125.0	121.90	118.90	115.70	112.40	109.10	105.60

Current Limiting Design

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

The figure shows the current limiting effect of circuit breakers.

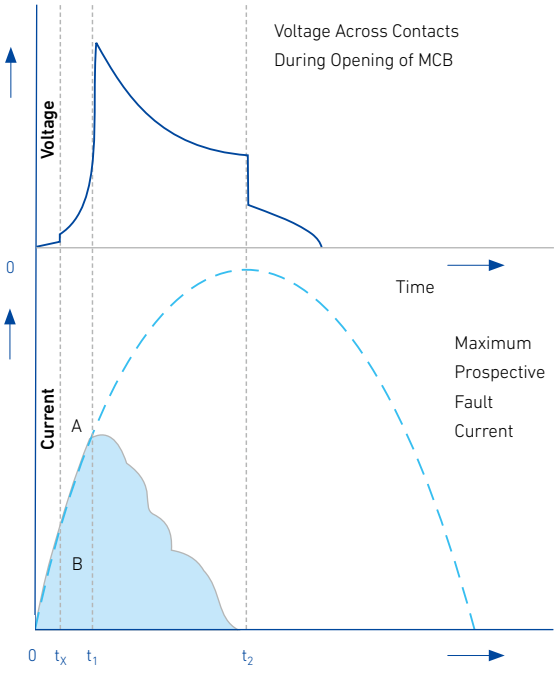
Fault traces for voltage & current

0 = Point of fault initiation

t_x = Contact opening time (i.e., creation of arc)

t_1 = Current/Voltage peak (i.e., current limitation)

t_2 = Time to total extinction of arc (i.e., complete shutdown of fault current)

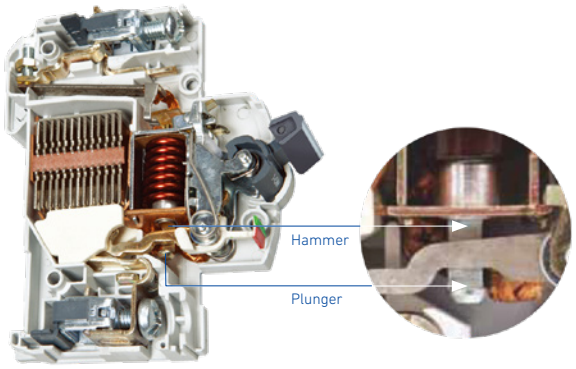


Standard Use Environment

Hammer Trip Mechanism

Current limiting design in itself may not fulfill the requirement of quick breaking (instantaneous action) mainly due to inertia of the latch mechanism and interconnected sequence of operations.

A hammer directly connected to the plunger strikes the moving contact arm with a force proportional to the peak current there by forcibly separating the moving contact from the fixed contact much before the latch mechanism operates. This further reduces the opening time of the circuit breaker.



Effect of Frequency Variation

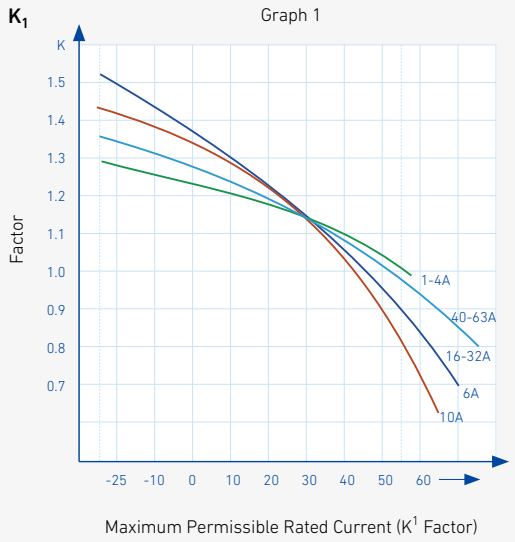
MCBs are designed to operate at AC frequency 50/60 Hz. However, MCBs specially suitable for DC applications and for frequencies upto 400 Hz can be supplied on request.

These can be used on different frequencies in supply from 50-60 Hz without any deration.

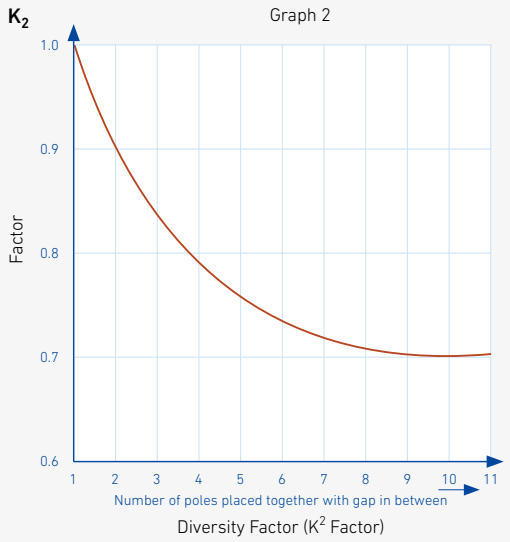
For higher frequencies, normal MCBs can be used with a multiplication factor which shall only affect its magnetic trip current.

Supply	AC			DC
Frequency	100 Hz	200 Hz	400 Hz	
Multiplication Factor	1.1	1.2	1.5	1.5

Ambient Temperature Compensation/Diversity Factor Chart



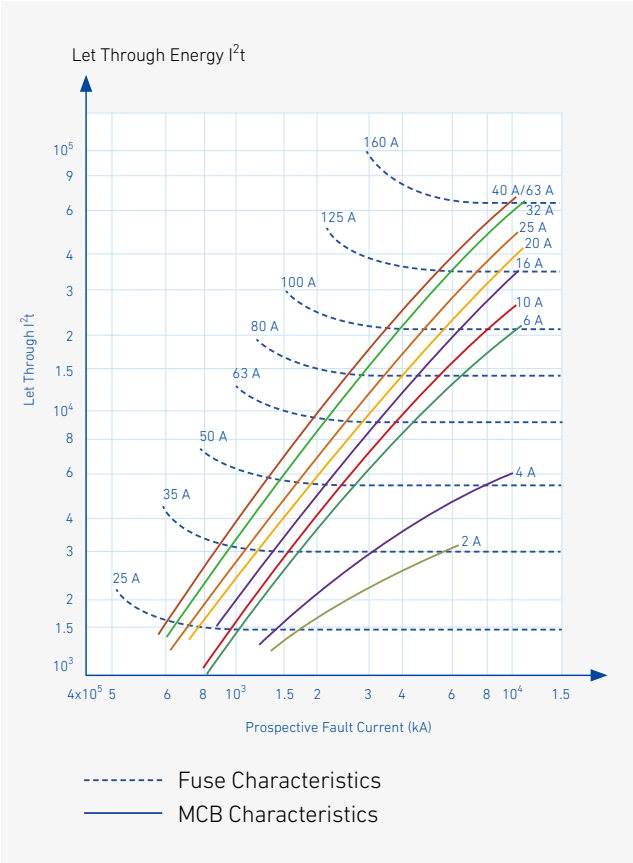
Maximum Permissible Rated Current (K^1 Factor)



Diversity Factor (K^2 Factor)

Calculation	I_n/MCB = K_1 x K_2 x I_n	Solution	K1 = 0.89 (from graph 1)
Example	4 MCBs with I_n = 10 A, and the amb. temp. is 50 ˚C kept with no gap in between		K2 = 0.78 (from graph 2) I_n/pole = 0.89 x 0.78 x 10 = 6.94 A

Technical Data



Energy Limiting Class 3

MCBs are designed to have low let through energy during faults, thus ensuring better protection of cables and equipment.

Maximum Backup Protection

At site, no. of MCBs are used for outgoing connection. To protect the MCBs under short circuit (higher breaking capacity), we need to put fuses in the incoming side. The current rating of fuses should not be more than the values given in the table.

MCB Current Rating	Backup Fuse Rating
1 A	25 A
2 A	35 A
4 A	50 A
6 A	80 A
10-63 A	100 A

Cold Resistance & Power Loss Details

The power loss value declared at rated current.

Rated Current I_n (A)	Cold Resistance R_I (mΩ)	Power Loss per Pole P_v (W)
0.5	3,100.00	0.8
1	860.80	1.0
2	280.00	1.2
4	70.00	1.2
6	25.00	1.3
10	11.68	1.4
13	10.10	1.6
16	8.00	2.2
20	4.50	2.3
25	3.78	3.1
32	2.57	3.3
40	1.94	3.6
63	1.30	6.2
80	1.00	10.0
100	0.85	11.0
125	0.80	12.5

※ Remarks: Tolerance ±5 %

DC Application

MCBs for DC application are specially designed to meet tough arc quenching conditions. While selecting circuit breaker for DC applications following parameters have to be taken into consideration.

Normal Circuit Currents

The rating and normal running temperature of the MCB are unaffected by DC. The MCB can be selected using the thermal section of the standard time/current curves.
Magnetic tripping on DC is different from the equivalent AC by a peak factor of 1.4
ie., for 'B' curve AC MCB, magnetic range = (3-5)I_n
for DC MCB, magnetic range = 1.4 (3-5)I_n = (4-7)I_n
for 'C' curve AC MCB, magnetic range = (5-10)I_n
for DC MCB, magnetic range = 1.4 (5-10)I_n = (7-14)I_n

Short Circuit Currents

The maximum short circuit current possible on a DC system is determined by the voltage of the battery and the total internal resistance of the cells.
It is given by Ohm's law: I_{SC} = Vb/Rb
Where, I_{SC} is the short circuit current
V_b is the voltage of the battery (with 100 % charged battery)
R_b is the internal resistance of the battery cells
(this is usually stated by the manufacturer)

Circuit Time Constant

The time constant is given by: L/R = 15 ms max where L is the inductance of the circuit

R is The Resistance Of The Circuit

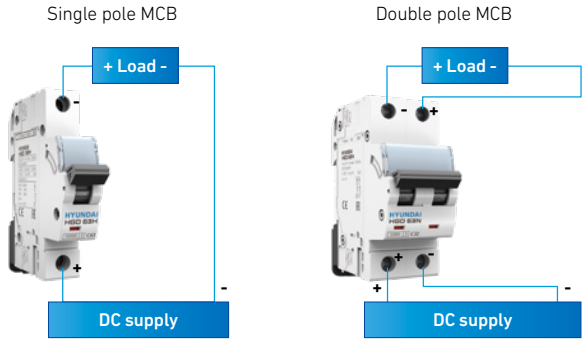
The time constant is usually given in milliseconds (ms.). Ideally, DC circuits would be mainly resistive (i.e. a low number), as inductive circuits produce a back emf when the current suddenly falls. This in turn tends to prolong arcing during switching operations, and so reduce contact life.

Circuit Voltage

The voltage of the circuit is dependent on the power supply. The lower the voltage the easier switching operations will be, but the voltage makes no difference to the running of the MCBs. Contact life can be significantly increased by reducing the voltage, drop across each pole. This can be achieved by wiring poles in series.

Technical Data

Correct polarity connections for DC MCBs
• Connection diagram

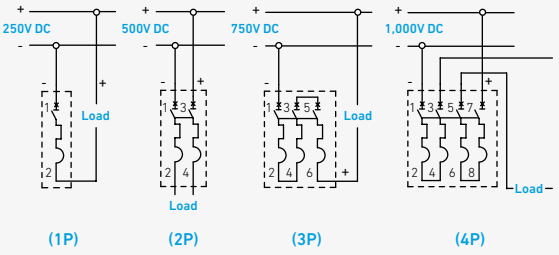


• All HGD type MCB can be applied in DC.

Rated Current (In)	A	0.5-63
Rated Voltage (Ue)	V⎓	250/500/750/1,000
No. of Poles		1P, 2P, 3P, 4P
Rated Short Circuit Breaking Capacity	kA	10

※ Also available in DC 24-130 V

Connection Diagram



Technical Data

Discrimination Table

MCB Downstream	MCB Upstream C Curves								
C Curve	10 A	13 A	16 A	20 A	25 A	32 A	40 A	50 A	63 A
0.5 to 5 A	50	65	80	100	125	160	200	250	315
6 A		65	80	100	125	160	200	250	315
10 A				100	125	160	200	250	315
13 A					125	160	200	250	315
16 A						160	200	250	315
20 A							200	250	315
25 A								250	315
32 A									315
40 A									
50 A									

MCB Downstream	MCB Upstream B Curves									
B Curve	6 A	10 A	13 A	16 A	20 A	25 A	32 A	40 A	50 A	63 A
0.5 to 5 A		30	39	48	60	75	96	120	150	189
6 A		30	39	48	60	75	96	120	150	189
10 A				48	60	75	96	120	150	189
13 A					60	75	96	120	150	189
16 A						75	96	120	150	189
20 A							96	120	150	189
25 A								120	150	189
32 A										189

MCB Downstream	MCCB Upstream																				
C Curve	16 A	20 A	25 A	32 A	40 A	50 A	63 A	80 A	100 A	125 A	160 A	200 A	250 A	320 A	400 A	500 A	630 A	800 A	1,000A	1,250A	1,600A
0.5 to 6 A	1,100	1,200	1,400	1,700	2,000	2,500	3,400	4,800	5,800	6,700	T	T	T	T	T	T	T	T	T	T	T
10 A		1,100	1,200	1,400	1,700	2,100	2,500	3,000	3,500	4,300	T	T	T	T	T	T	T	T	T	T	T
16 A				1,300	1,600	1,900	2,100	2,400	2,700	3,200	8,300	T	T	T	T	T	T	T	T	T	T
20 A					1,600	1,900	2,100	2,400	2,700	2,500	8,300	T	T	T	T	T	T	T	T	T	T
25 A						1,700	1,800	2,000	2,200	2,500	5,400	8,700	T	T	T	T	T	T	T	T	T
32 A							1,800	2,000	2,200	2,500	5,400	8,700	T	T	T	T	T	T	T	T	T
40 A								1,500	1,700	2,000	4,300	7,000	T	T	T	T	T	T	T	T	T
50 A									1,300	1,500	3,600	5,900	9,000	T	T	T	T	T	T	T	T
63 A										1,100	2,800	5,200	8,200	T	T	T	T	T	T	T	T

※ Prospective fault levels to which selectivity is achieved (T=Total selectivity)

Discrimination With Fuses (HRC FUSE Upstream Type gG)

MCBs Downstream	HRC FUSE Link Upstream									
	20 A	25 A	32 A	40 A	50 A	63 A	80 A	100 A	125 A	160 A
0.5 to 6 A	700	850	960	1,200	1,350	1,750	2,800	4,500	5,200	6,000
10 A		700	960	1,200	1,350	1,750	2,800	4,500	5,200	6,000
13 A			850	1,200	1,200	1,750	2,800	4,500	5,200	6,000
16 A				960	1,100	1,500	2,500	3,200	5,200	6,000
20 A					1,100	1,500	2,500	3,200	4,500	5,200
25 A					960	1,350	2,000	3,200	4,500	5,200
32 A						1,200	1,750	2,800	4,500	5,200
40 A							1,750	2,800	4,500	5,200
50 A								2,500	3,200	4,500
63 A									3,200	4,500

Technical Data

MCB Selection Chart For Household Applications

Appliances	Capacity/Watt (Load) (240 V~1 ph)	Current Rating of MCB	Type of MCB
Air Conditioner	1.0 ton	10 A[1)]	"C" series
	1.5 ton	16 A[1)]	"C" series
	2.0 ton	20 A[1)]	"C" series
Refrigerator	165 litres	3 A[1)]	"C" series
	350 litres	4 A[1)]	"C" series
Oven Cum Griller	4,500 W	32 A	"B" series
	1,750 W	10 A	"B" series
Oven only Hot Plate only Room Heater	750 W	6 A	"B" series
	2,000 W	10 A	"B" series
	1,000 W	6 A	"B" series
	2,000 W	10 A	"B" series
Washing Machine	300 W	2 A	"C" series
Washing Machine (with heater)	1,300 W	8 A	"C" series
(Storage/Instant)	1,000 W	6 A	"B" series
	2,000 W	10 A	"B" series
	3,000 W	16 A	"B" series
	6,000 W	32 A	"B" series
Electric Iron	750 W	6 A	"B" series
	1,250 W	8 A	"B" series
(2 Slices)	1,200 W	8 A	"B" series
Electric Kettle	1,500 W	10 A	"B" series

※ 1) The values vary depending on manufacturers.

Rating of MCBs for Specified No. of Fittings (“B” Series MCBs)

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

※ “B” series MCB is used for all lighting applications

MCB Selection Chart for Motor Protection

S. No.	kW	HP	1 Phase 230 V DOL Starting		3 Phase 400 V DOL Starting		3 Phase 400 V Assisted Starting Star Delta		
			Full Load Current	MCB Selection	Full Load Current	MCB Selection	Full Load Current	MCB Selection	
1	0.18	0.24	2.8	10	0.9	2			
2	0.25	0.34	3.2	10	1.2	2			
3	0.37	0.50	3.5	10	1.2	2			
4	0.55	0.74	4.8	16	1.8	3			
5	0.75	1.01	6.2	20	2.0	3			
6	1.1	1.47	8.7	25	2.6	6			
7	1.5	2.01	11.8	32	3.5	10			
8	2.2	2.95	17.5	50	4.4	10			
9	3	4.02	20.0	63	6.3	16	6.3	16	10
10	3.75	5.03	24.0	80	8.2	20	8.2	20	10
11	5.5	7.37	26.0	80	11.2	25	11.2	32	16
12	7.5	10.05	47.0	125	14.4	40	14.4	40	25
13	10	13.40			21.0	50	21.0	50	32
14	15	20.11			27.0	100	27.0	63	40
15	18.5	24.80			32.0	125	32.0		50
16	22	29.49			38.0	125	38.0		63
17	30	40.21			51.0	125	51.0		63

※ Calculation formulae:

- Incomer current rating, for single phase: $\frac{Total\ Load\ in\ Watts}{240\ V}$

- Incomer current rating, for single phase: $\frac{Total\ Load\ in\ Watts}{\sqrt{3}\times 240\ V}$

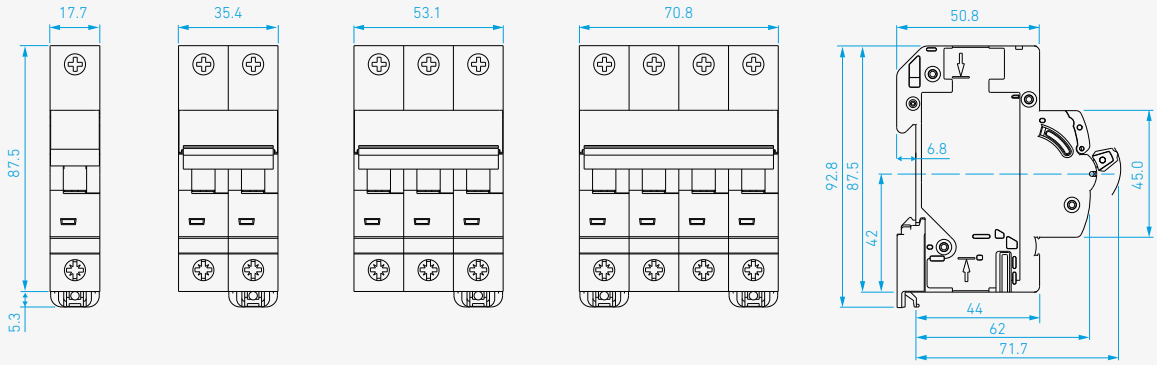
“C” series MCB is used for all motor applications

※ Note: One lighting circuit can have up to 800 W or up to 10 lighting points.
One power circuit can have up to 2,000 W or 1 power points.

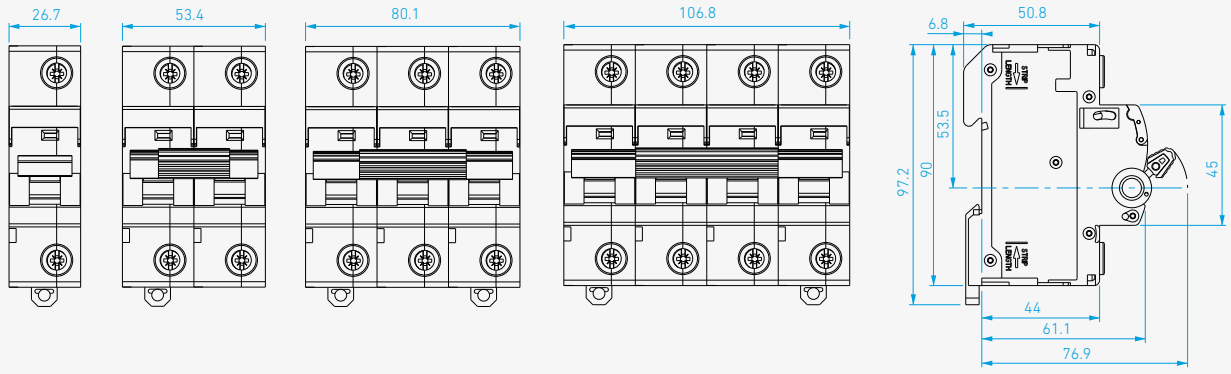
Dimension

HGD (Deluxe Type)

HGD63N/H, 63 AF

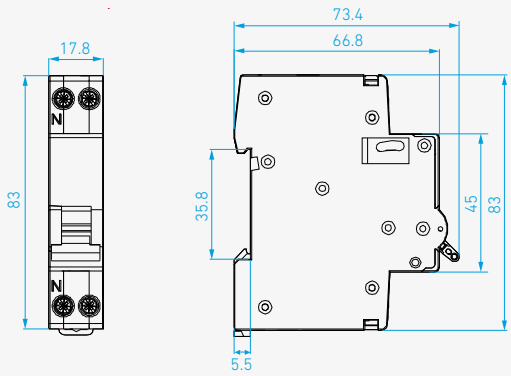


HGD125, 125 AF

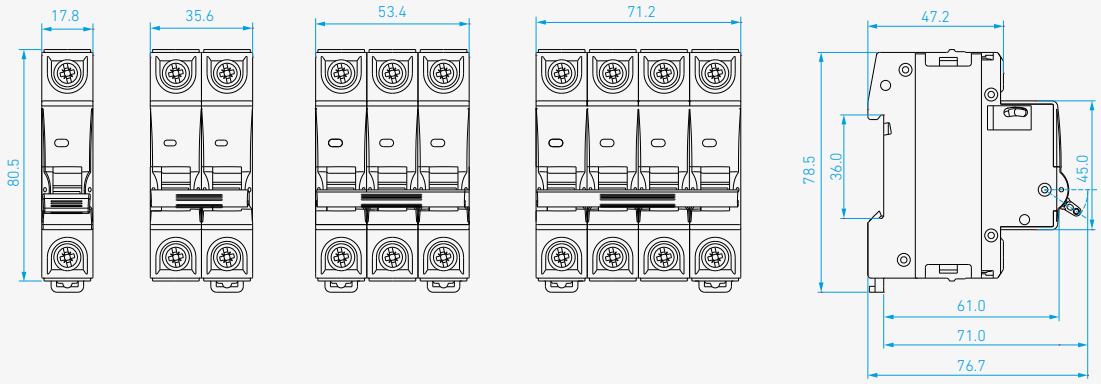


HGD (Standard Type)

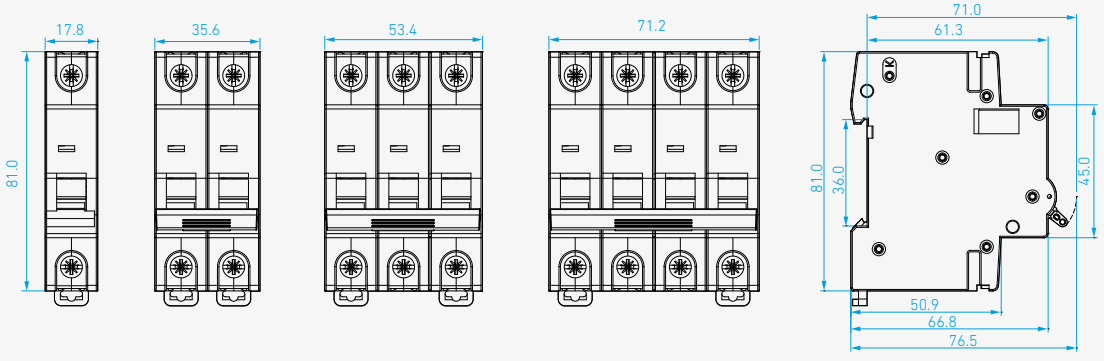
HGD32NS, 32 AF



HGD63E/S, 63 AF



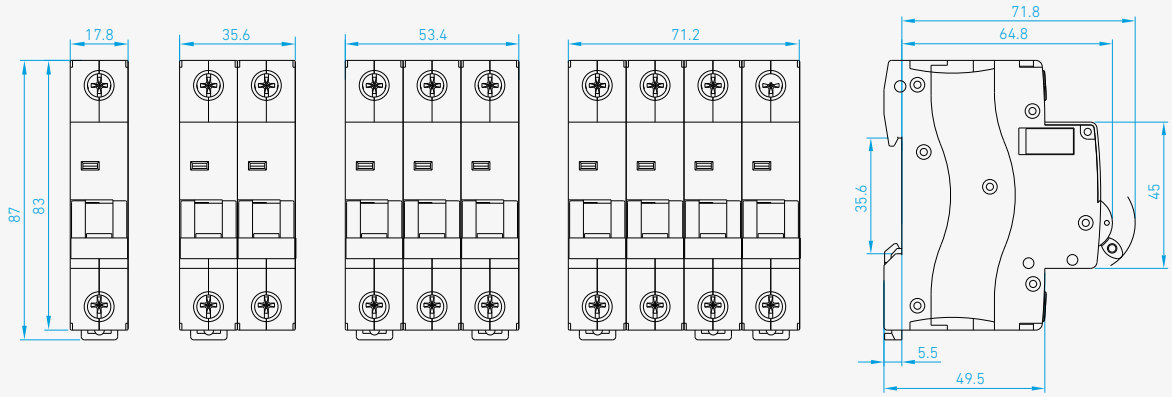
HGD63M/P, 63 AF



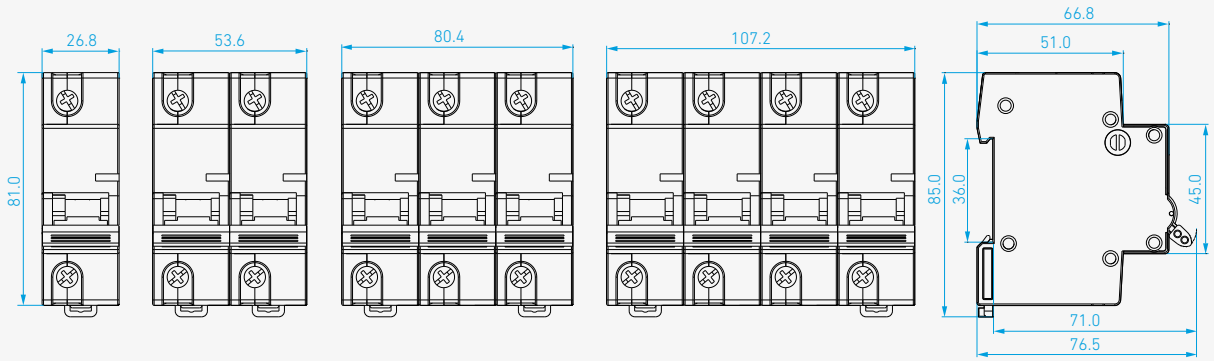
Dimension

HGD (Standard Type)

HGD63U/D, 63 AF

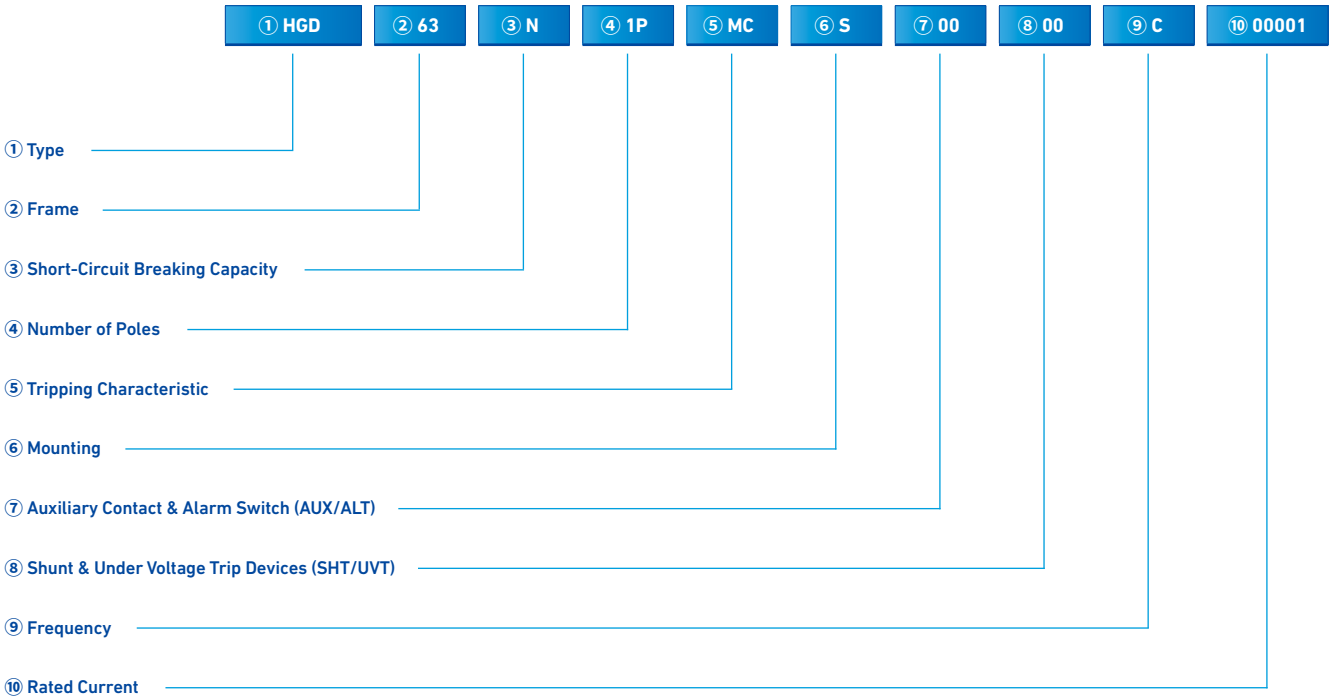


HGD100S, 125 AF



MCB Ordering Information

Ordering Guidelines (Deluxe Type)



① Type

HGD	Miniature circuit breaker

② Frame

63	63 AF (Deluxe type)
125	125 AF (Deluxe type)

③ Short-Circuit Breaking Capacity

N	6 kA (Deluxe type), 63 AF
H	10 kA (Deluxe type), 63 AF

④ Number of Poles

1P	1 Pole
1N	1 Pole + Neutral
N1	Neutral +1 Pole
2P	2 Pole
3P	3 Pole
3N	3 Pole + Neutral
N3	Neutral +3 Pole
4P	4 Pole

⑤ Tripping Characteristic

MB	B Curve
MC	C Curve
MD	D Curve

⑥ Mounting

S	Front connection

⑦ Auxiliary Contact & Alarm Switch

00	Non-attachment

⑧ Shunt & Under Voltage Trip Devices

00	Non-attachment

⑨ Frequency

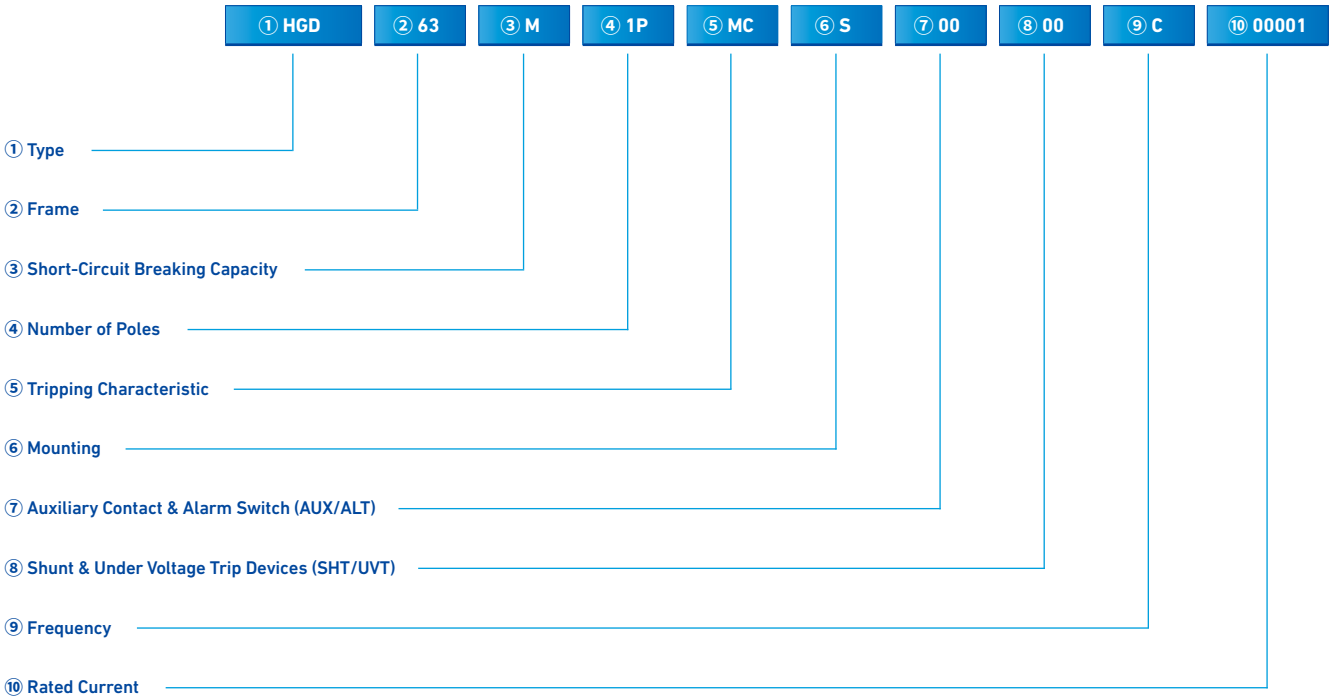
C	50/60 Hz

⑩ Rated Current

000P5	0.5 A
00001	1 A
00002	2 A
00003	3 A
00004	4 A
00005	5 A
00006	6 A
00010	10 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

MCB Ordering Information

Ordering Guidelines (Standard Type)



① Type

HGD	Miniature circuit breaker

② Frame

32NS	32 AF(Neutral + 1 Pole)
63	63 AF (Standard type)
100S	125 AF (Standard type)

③ Short-Circuit Breaking Capacity

E	3 kA (Standard type), 63 AF
S	4.5 kA (Standard type), 63 AF
M	6 kA (Standard type), 63 AF
P	10 kA (Standard type), 63 AF
U	15 kA (Standard type), 63 AF
D	10 kA (Standard type), 63 AF - DC

④ Number of Poles

1P	1 Pole
1N	1 Pole + Neutral
N1	Neutral + 1 Pole
2P	2 Pole
3P	3 Pole
3N	3 Pole + Neutral
N3	Neutral + 3 Pole
4P	4 Pole

⑤ Tripping Characteristic

MB	B Curve
MC	C Curve
MD	D Curve

⑥ Mounting

S	Front connection

⑦ Auxiliary Contact & Alarm Switch

00	Non-attachment

⑧ Shunt & Under Voltage Trip Devices

00	Non-attachment

⑨ Frequency

C	50/60 Hz

⑩ Rated Current

00001	1 A
00002	2 A
00003	3 A
00004	4 A
00005	5 A
00006	6 A
00010	10 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

HRC

Residual Current Circuit Breaker

Feature

HRC Residual Current Circuit Breaker

RCCB (also popularly known as ELCB) is a mechanical switching device designed to make, carry and break currents under normal service conditions and to cause the opening of the contacts when the leakage current attains a given value under specified conditions. Hyundai offers a wide range of RCCBs for protecting human life against fatal electric shocks as well as for providing protection against fire caused by earth faults.

Product Feature

HD HYUNDAI ELECTRIC introduces the HRC series of RCCBs rating from 16 A to 125 A.
The range offers a variety of feature such as conditional short circuit breaking capacity of 10 kA across entire range in accordance with IEC/EN 61008-1, it also incorporates features like inscription window, safety terminal, dual termination, positive contact indication, field fittable auxiliary contacts, test button for regular inspection. We have CB certification for all types of RCCB such as AC/A/A-APR/F/B.

	Deluxe Type	Standard Type
Product Performance	- Test button for regular inspection - Conditional short-circuit current capacity 10 kA - Advance neutral	- Type AC/A/A-APR/F/B type - RCCB test button for regular inspection - Compact structure and external design - Conditional short-circuit current capacity 10 kA - Time delayed Type (S)
Product Structure	- Inscription window - Simple and robust operating mechanism - Dual termination for bus-bar as well as cable connection - N phase at the left pole - Test button	- Dual termination for bus-bar as well as cable connection - N phase at the left pole - There are two indication windows on the surface, the upper one is for ON/OFF indication and the lower one is for leakage fault indication - The special shape is added to the cage lug so that the cable is firmly fastened and does not fall easily - Test button
Accessories	- AUX/ALT	
Specification	- IEC/EN 61008-1	- IEC/EN 61008-1

Product Overview

Deluxe Type

Standard Type

Selection Table

HRC (Deluxe Type)

Model	HRC63, 63 AF	HRC100, 125 AF
		
Reference Standard	IEC/EN 61008-1	IEC/EN 61008-1
No. of Poles	2P (1P + N), 4P (3P + N)	2P (1P + N), 4P (3P + N)
N Phase Position	Left	Left
Rated Current (In)	16, 25, 32, 40, 50, 63 A	80, 100, 125 A
Rated Voltage (Ue)	AC 240/415 V	AC 240/415 V
Rated Frequency (F)	50/60 Hz	50/60 Hz
Rated Conditional Short Circuit Current (Inc)	10 kA	10 kA
Rated Residual Operating Current (I⊿n)	30, 100, 300	30, 100, 300
Rated Making Breaking Capacity (Im)	630 A or 10 In whichever is greater	630 A or 10 In whichever is greater
Operating Characteristics in Presence of Residual Current with d.c Components	AC / A	AC / A
Trip Time	1 IΔn < 300 ms, 5 IΔn < 40 ms	1 IΔn < 300 ms, 5 IΔn < 40 ms
Rated Insulation Voltage (Ui)	500 V	500 V
Rated Impulse Voltage (Uimp)	4 kV	4 kV
Dielectric Strength	2.5 kV	2.5 kV
Electrical/Mechanical Endurance (no. of operations) Minimum	10,000/20,000	10,000/20,000
Operating Temperature	-40 °C to + 55 °C	-40 °C to + 55 °C
Humidity	95 % RH	95 % RH
Terminal Capacity (max)	35 mm^2	50 mm^2
Tightening Torque	2 N·m	2.5 N·m
Vibration	3 g	3 g
Shock Resistance	40 mm free fall	40 mm free fall
Protection Class	IP20	IP20
Positive Contact Indication	Red-ON, Green-OFF	Red-ON, Green-OFF
Net Weight in kg	0.215 kg (for 2P) ; 0.335 kg (for 4P)	0.230 kg (for 2P) ; 0.404 kg (for 4P)
Dimensions (H x D x W)/Pole in mm	87.5 x 73.0 x 35.9 mm (for 2P) ; 87.5 x 73.0 x 71.8 mm (for 4P)	87.5 x 73.0 x 35.9 mm (for 2P) ; 87.5 x 73.0 x 71.8 mm (for 4P)
Mounting	Clip on DIN Rail (35 mm x 7.5 mm)	Clip on DIN Rail (35 mm x 7.5 mm)
Installation Position	Vertical/Horizontal	Vertical/Horizontal
Case & Cover	Molded, flame retardant thermoplastic material	Molded, flame retardant thermoplastic material
Busbar Connections	Pin/Fork type	Pin/Fork type
Auxiliary Contacts	Yes	Yes

HRC (Standard Type)

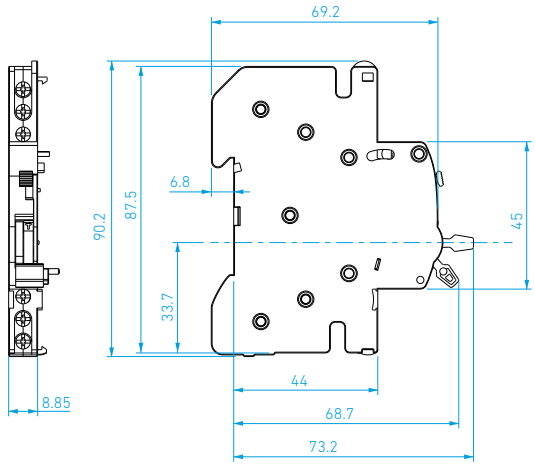
Model	HRC63S, 63 AF	HRC100S, 125 AF
		
Reference Standard	IEC/EN 61008-1	IEC/EN 61008-1
No. of Poles	2P (N + 1P), 4P (N + 3P)	2P (N + 1P), 4P (N + 3P)
N Phase Position	Left	Left
Rated Current (In)	6, 10, 13, 15, 16, 20, 25, 32, 40, 50, 63 A	80, 100, 125 A
Rated Voltage (Ue)	AC 240/415 V	AC 240/415 V
Rated Frequency (F)	50/60 Hz	50/60 Hz
Rated Conditional Short Circuit Current (Inc)	10 kA	10 kA
Rated Residual Operating Current (I⊿n)	10, 30, 100, 300, 500 mA (10 mA: up to 40 A)	30, 100, 300, 500 mA
Rated Making Breaking Capacity (Im)	500 A or 10 In whichever is greater	500 A or 10 In whichever is greater
Operating Characteristics in Presence of Residual Current with d.c Components	AC / A / A-APR / F / B type	AC / A / A-APR / F / B type
Trip Time	1 IΔn < 300 ms, 5 IΔn < 40 ms	1 IΔn < 300 ms, 5 IΔn < 40 ms
Rated Insulation Voltage (Ui)	690 V	690 V
Rated Impulse Voltage (Uimp)	4 kV	4 kV
Dielectric Strength	2.5 kV	2.5 kV
Electrical/Mechanical Endurance (no. of operations) Minimum	10,000/20,000	10,000/20,000
Operating Temperature	-40 °C to + 55 °C	-40 °C to + 55 °C
Humidity	95 % RH	95 % RH
Terminal Capacity (max)	25 mm^2	50 mm^2
Tightening Torque	2.5 N·m	2.5 N·m
Vibration	3 g	3 g
Shock Resistance	40 mm free fall	40 mm free fall
Protection Class	IP20	IP20
Positive Contact Indication	Red-ON, Green-OFF	Red-ON, Green-OFF
Net Weight in kg	0.200 kg (for 2P) ; 0.310 kg (for 4P)	0.230 kg (for 2P) ; 0.370 kg (for 4P)
Dimensions (H x D x W)/Pole in mm	81.0 x 74.0 x 35.8 mm (for 2P) 81.0 x 74.0 x 71.6 mm (for 4P)	90.9 x 74.0 x 35.8 mm (for 2P) 90.9 x 74.0 x 71.6 mm (for 4P)
Mounting	Clip on DIN Rail (35 mm x 7.5 mm)	Clip on DIN Rail (35 mm x 7.5 mm)
Installation Position	Vertical/Horizontal	Vertical/Horizontal
Case & Cover	Molded, flame retardant thermoplastic material	Molded, flame retardant thermoplastic material
Busbar Connections	Pin/Fork type	Pin/Fork type
Auxiliary Contacts	No	No

Accessory (Deluxe Type)

Auxiliary Contact + Alarm Trip (AXT)

Technical Specification	
Standard Conformity	IEC/EN 60947-5-4
Current Carrying Capacity (max)	6 A
Rated Voltage (Ue)	AC 240 V
Contact Configuration	1NO + 1NC
Rated Insulation Voltage	AC 500 V
Rated Frequency (F)	50/60 Hz
Utlization Category	AC 12
Electrical Endurance (no. of operations)	10,000
Terminal Capacity (max)	2.5 mm^2
Protection Class	IP20
Power Loss	3 Watts
Dimensions (H x D x W)	90.2 x 73.2 x 8.85 mm
Net Weight	36 g
Mounting	Left side of RCCB (HRC63/100), Common use of AXT HGD125

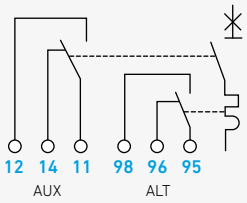
Dimension



Ordering Information

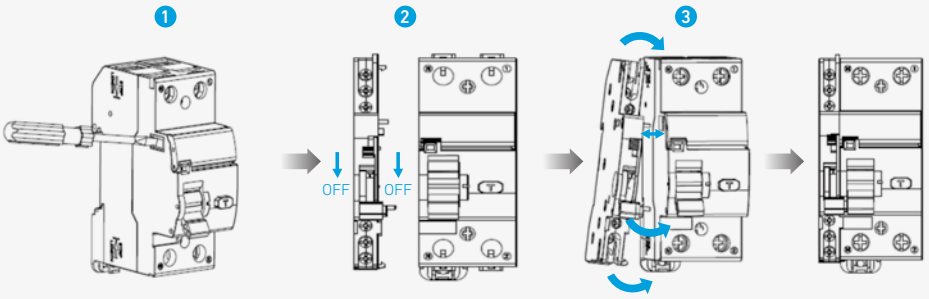
AXT HGD125	AUX/ALT

Circuit Diagram

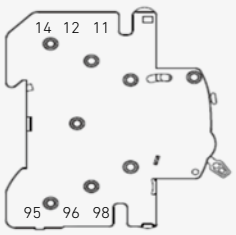


Assembling with RCCB (HRC Accessories)

1. Remove the window sticker of the protection device with screw driver or by hand
2. Make sure the knob is in OFF position
   Caution: Don't mount in ON position
3. Rotate the AXT so as to bring it nearer to the protection device for locking. Adjust the locks present at the upper end of AXT in such a way that they get fitted in slots present in protection device



Terminal No.



11-12 - ON
11-14 - OFF
} AUX

95-96 - ON/OFF
95-98 - TRIP
} ALT

Accessory Ordering Information

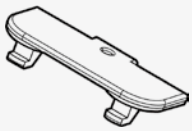
Deluxe Type

Type		Code	Description
HRC63	AXT	AXT HGD125	AUX/ALT

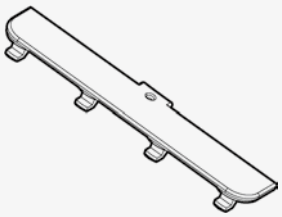
Standard Type

Type		Code	Description
HRC63S	TCF	TCF HRC63S 2P TCF HRC63S 4P	RCCB terminal cover with sealing structure

2P



4P



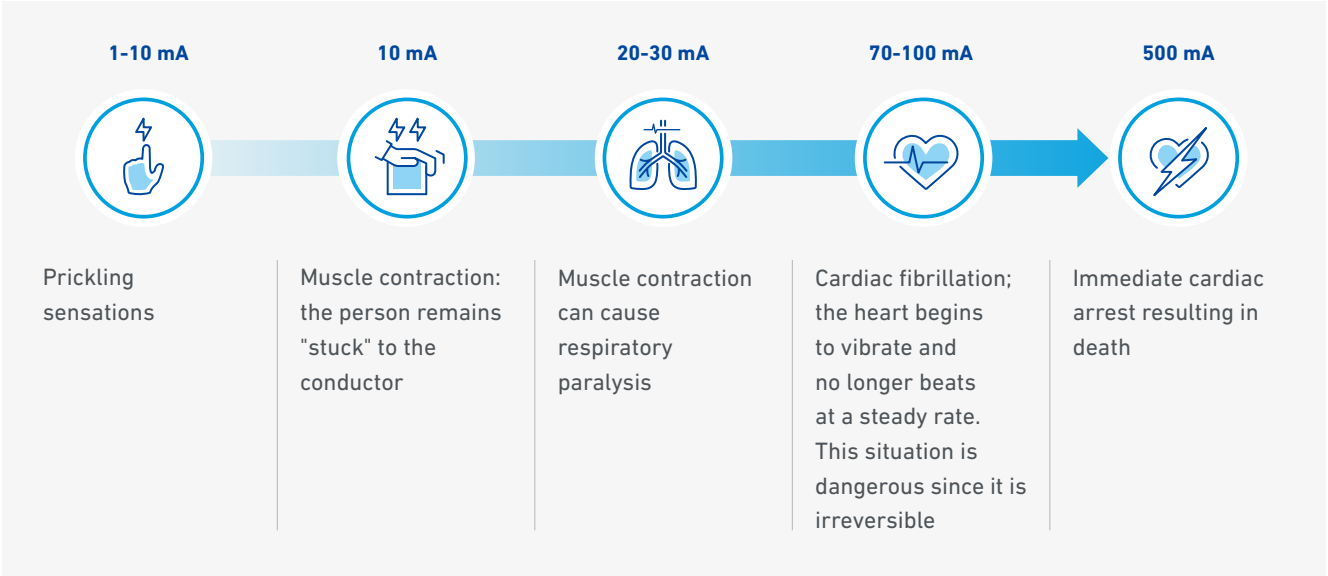
Technical Data

Standard Use Environment

The use of exposed, substandard, badly wired, wrongly connected or damaged equipment as well as frayed or badly repaired cables reduces the safety of an installation and increases the risk of person receiving an electric shock.
RCCBs are electrical devices which afford a very high degree of protection against the risks of electrocution and fire caused by earth faults.

Protection Against Electrocution

Electrocution is a passage of current through human body, which is dangerous. The flow of current through human body affects vital functions of breathing & heartbeat.
Effect of electric current through human body has been well researched and following chart summarizes the results:



However, electrocution should not be viewed in terms of "current" alone, but in terms of "contact voltage". A person gets electrocuted by coming in contact with an object that has a different potential from his/her own. The difference in potential causes the current to flow through the body.

The human body has known limits:
- Under normal dry conditions, voltage limit = 50 V
- In damp surroundings, voltage limit = 25 V

A correctly chosen RCCB can detect small currents flowing to earth and reduces the risk of electrocution.

Protection Against Indirect Contact

Over current protection devices like MCB are unable to act promptly on small earth leakage currents. To comply with wiring regulations, the earth fault loop impedance in Ohms, multiplied by the rated tripping current of the RCCB in amperes must not exceed 50.

Example

For an RCCB with a rated tripping current of 30 mA, the maximum permissible earth fault loop impedance is calculated as follows:
Zs (max) = 50/In = 50/0.03 = 1,666

Protection Against Fire

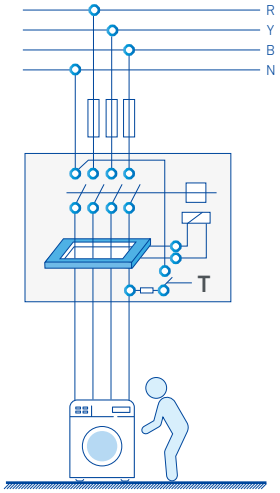
The majority of fires which occur as a result of faulty wiring are started by current flowing to earth. Fire can be started by fault current of less than 1 amp. The normal domestic overload protective device such as a fuse or MCB will not detect such a small current. A correctly chosen RCCB will detect this fault current and interrupt the supply, hence, reducing the risk of a fire starting.

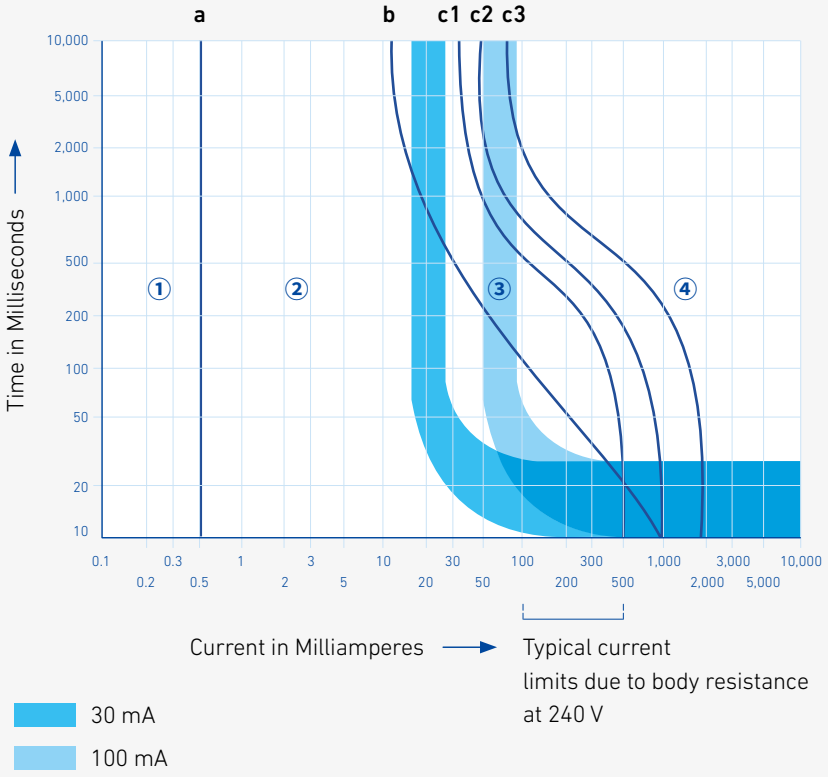
Rated Tripping Current of the RCCB	Maximum Permissible Earth Fault Loop Impedance in
10 mA	5,000
30 mA	1,666
100 mA	500
300 mA	166

Working Principle

The RCCB works on the current balance principle. The supply conductors, i.e. the phases and the neutral, are passed through a toroid and form the primary windings of a current transformer. Its secondary winding is connected to a highly sensitive electromagnetic trip relay, which operates the trip mechanism.

In a normal circuit, sum of the currents in phases, is equal to the current in the neutral and the vector sum of all currents is equal to zero. If there is any insulation fault in the current and leakage current flows to earth, the currents do not balance and their vector sum is not equal to zero. This imbalance is detected by the core balanced current transformer, and the RCCB is tripped and supply to load is interrupted. The trip mechanism is operated at a residual current between 50-100 % of its rated tripping current.





Zone	Physiological effects
Zone 1	Usually no reactions
Zone 2	Usually no harmful physiological effects
Zone 3	Usually no organic damage to be expected. Likelihood of muscular contraction and difficulty in breathing, reversible disturbances of formation and conduction of impulse in the heart and transient cardiac arrest without ventricular fibrillation increases with current magnitude and time.
Zone 4	In addition to the effects of Zone 3, probability of ventricular fibrillation increased upto 5 % (curve C_2) upto 50 % (curve C_3) and above 50 % beyond curve C_3. It increases with magnitude and time, and pathophysiological effects such as cardiac arrest, breathing arrest and heavy burns may occur.

Technical Data

Residual Current Circuit Breaker 16 A-100 A

Sensitivity Selection

• 30 mA

A 30 mA RCCB will provide a high degree of protection against electrocution in an accidental shock hazard situation.
The current flowing through human body could be between 80 mA and 240 mA depending on the resistance of the human body and the voltage across it.

To be within zone of the IEC curve, it is necessary for the RCCB to operate within 50 ms at 240 mA and 150 ms at 80 mA.
Both these conditions are satisfied by 30 mA RCCB.
For households, individual outlets, wet areas and temporary installations, RCCB with sensitivity not exceeding 30 mA is advisable.

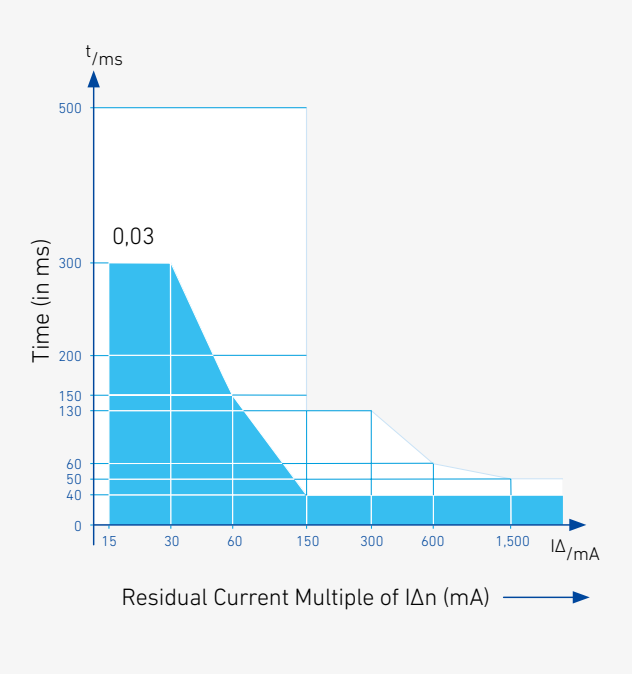
• 100 mA

A 100 mA RCCB will normally give high degree of protection against electrocution but there is a possibility that the shock current could fall below the tripping level of RCCB. This could occur if additional resistances to that of human body are included in the earth path.
The 100 mA RCCB protects against leakage currents and indirect contact with earth loop impedance up to 500 ohms.

• 300/500 mA

A 300/500 mA RCCB may be used where only fire protection is required. e.g., on lighting circuits, where the risk of electric shock is small. 300/500 mA RCCB will not give any protection against electrocution.

Actuation Time Characteristics



Selection of RCCB Type

RCCB Type AC

AC type RCCB are used for residual sinusoidal alternating current.

RCCB Type A

A type RCCB is used for residual sinusoidal alternating currents and residual pulsating direct currents, whether suddenly applied or slowly rising. It can therefore handle the residual current waveforms which can occur in the power supply units of single-phase loads with electronic components (e.g. ECG, dimmer switches). This type of residual current protective.

Residual Current Device Solution

Overview

Type B

Full type F features.
+ Detection of smooth DC currents.

Type F

Full type A-APR features.
+ Detection of high frequency currents up to 1 kHz.

Type A-APR

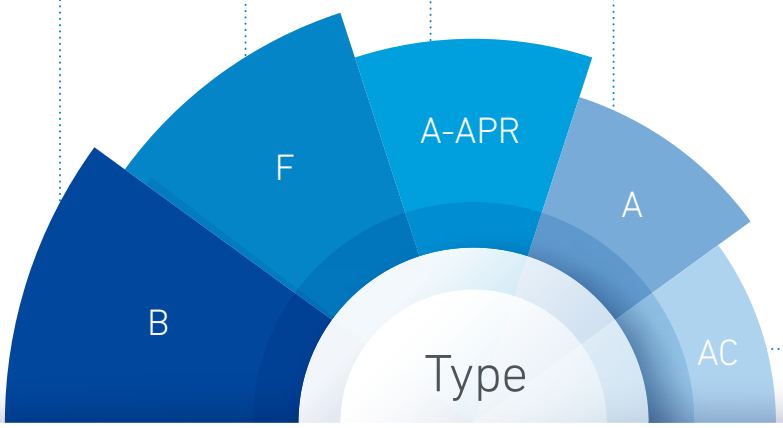
Full type A features.
+ High immunity to unwanted tripping.

Type A

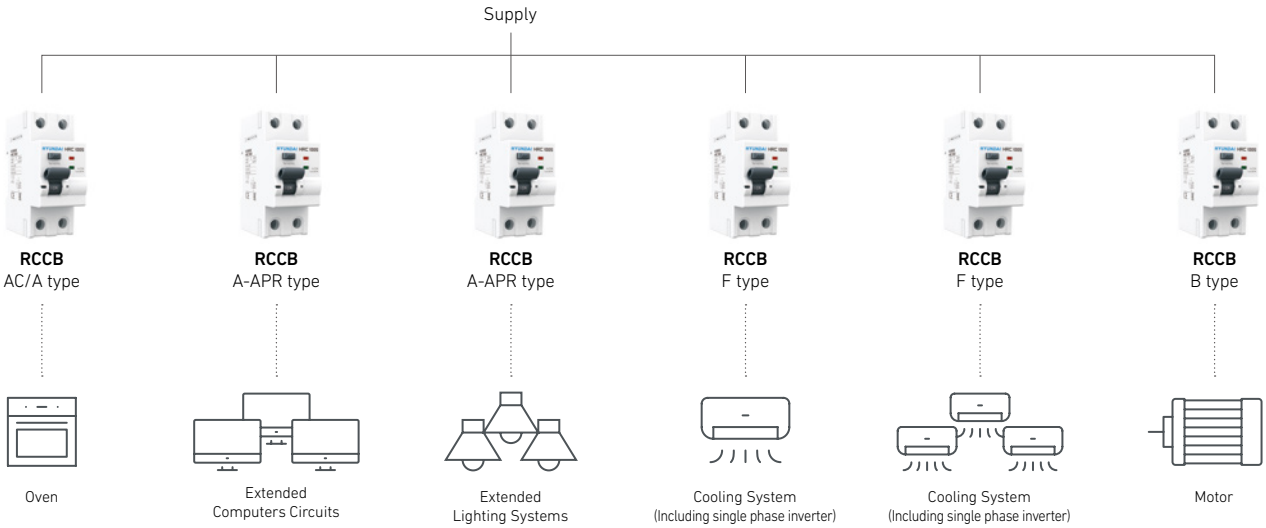
Full type AC features.
+ Detection of pulsating current with DC components.

Type AC

Alternating current only.



Application



F

Generating high frequency interference (Current peaks, harmonics)
- Single-phase variable speed industrial drives (air conditioning, heating, pump)
- Powerful IT equipment, telecommunication equipment
- Heated floor
- Fluorescent lighting powered by extra low voltage transformer, by electronic ballast
- Variable luminosity lighting
- Capacitor banks
- Freezer, cold room

AC

No special characteristics
- General purpose power sockets
- LED lighting
- Hair dryer, TV, etc.
- Electric heater, water heater

A

Including a rectifier (Single-phase)
- Induction cooking appliances
- Washing machines
- Tumble-dryer
- Single-phase UPS
- Single-phase Photovoltaic system
- Machines including diodes, capacitors and rectifiers
- Motors
- Machine tools

A-APR APR

Including an anti-harmonic filter in the power supply or with high availability requirement
- Computer peripheral devices (printers, scanners, etc.)
- Rack of computers and servers
- Hospital
- Supermarket cash registers

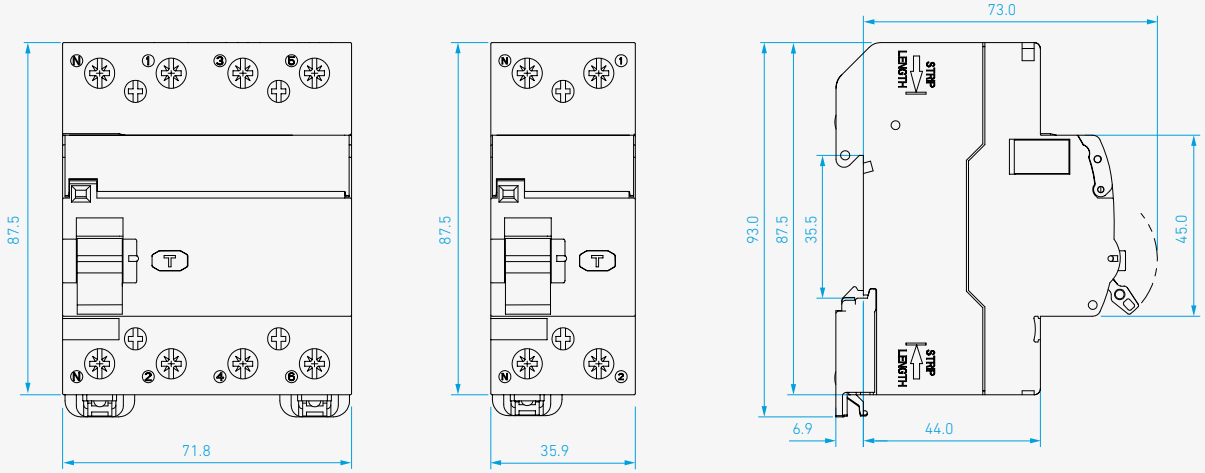
B

Including a rectifier (Three-phase)
- Three-phase variable speed industrial drives (motors : cranes, elevators, heating, ventilation, air conditioning, pumps)
- Single/three-phase chargers for EV
- Three-phase UPS (rectifier and inverter)
- Three-phase Photovoltaic system
- Medical equipment with DC current loads

Dimension

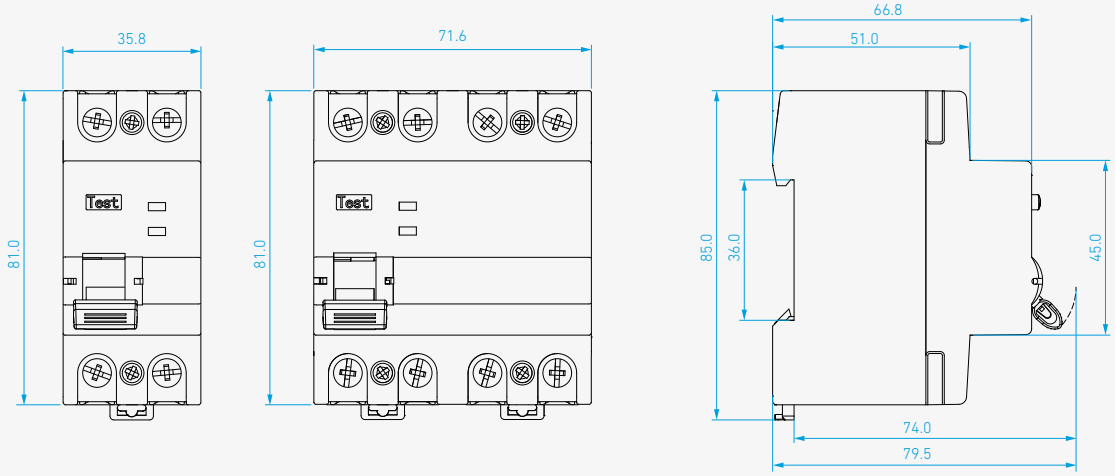
HRC (Deluxe Type)

HRC63, 63 AF/HRC100,125 AF

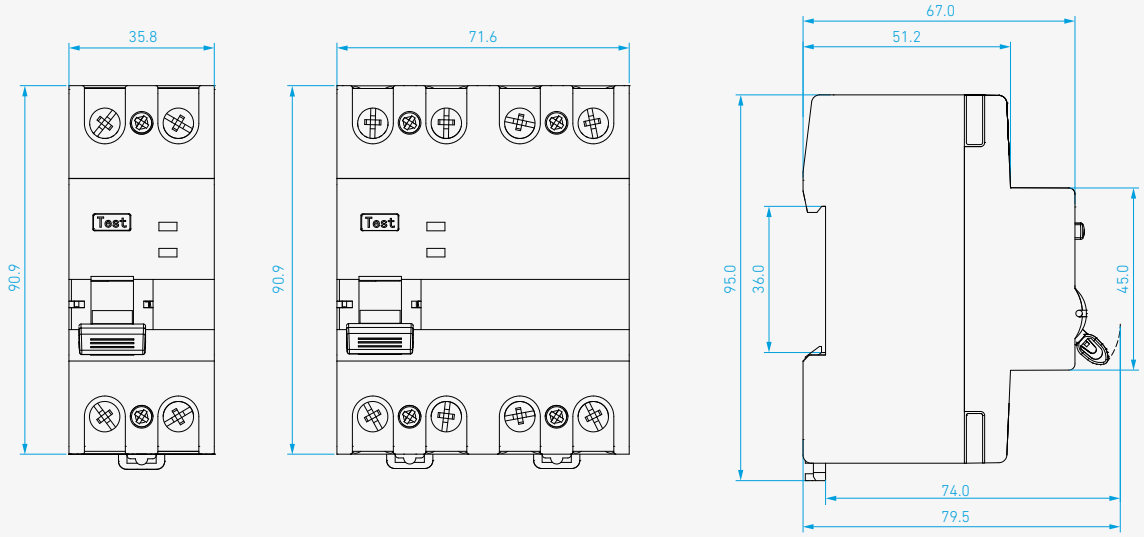


HRC (Standard Type)

HRC63S, 63 AF

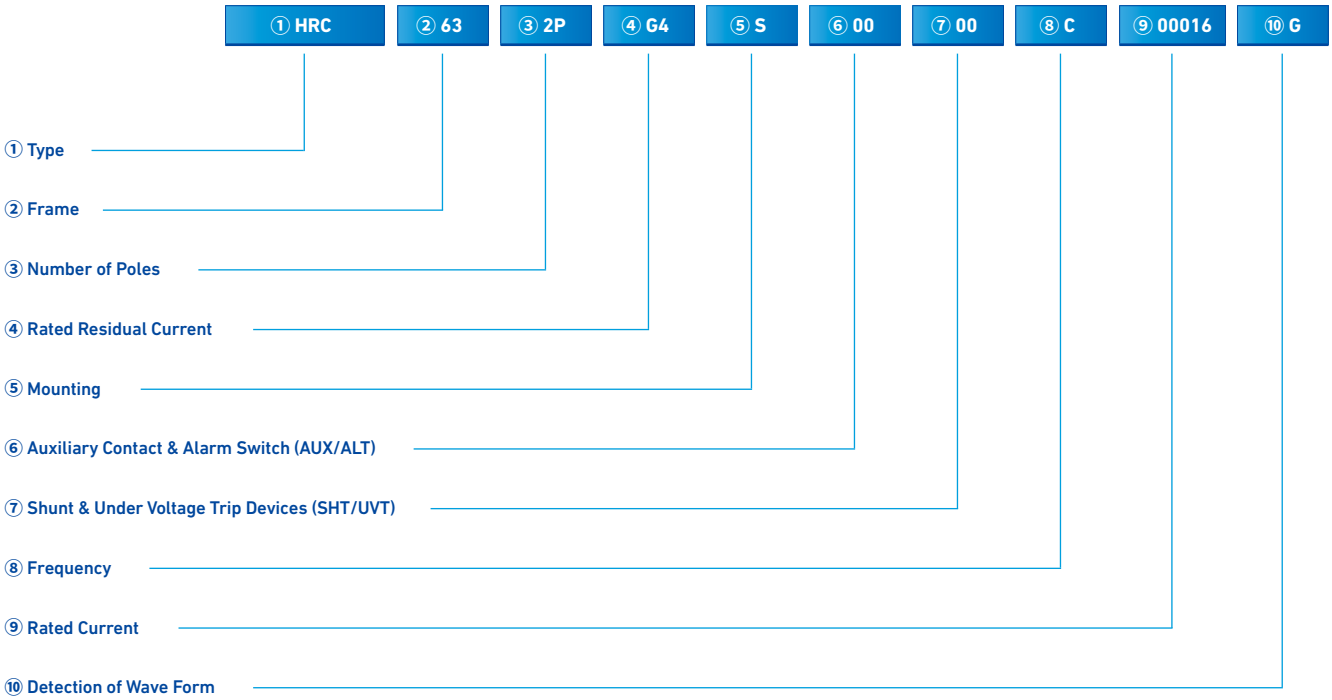


HRC100S, 125 AF



RCCB Ordering Information

Ordering Guidelines (Deluxe Type)



① Type

HRC	Residual current circuit breaker

② Frame

63	63 AF (Deluxe type), N-left
100	100 AF (Deluxe type), N-left

③ Number of Poles

2P	2 Pole (N + 1 Pole)
4P	4 Pole (N + 3 Pole)

④ Rated Residual Current

G4	30 mA
G5	100 mA
G7	300 mA

⑤ Mounting

S	Front connection

⑥ Auxiliary Contact & Alarm Switch

00	Non-attachment

⑦ Shunt & Under Voltage Trip Devices

00	Non-attachment

⑧ Frequency

C	50/60 Hz

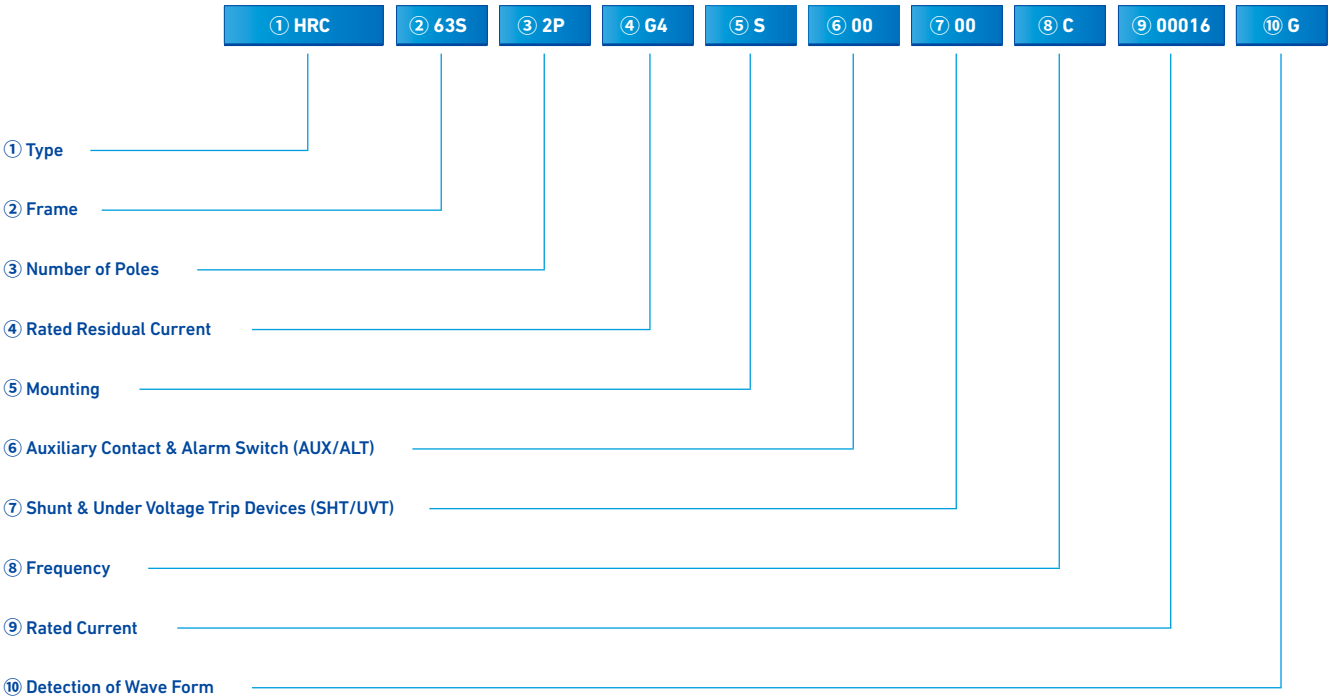
⑨ Rated Current

00016	16 A
00025	25 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

Ordering Guidelines (Standard Type)



① Type	
HRC	Residual current circuit breaker

② Frame	
63S	63 AF (Standard type), N-left
100S	100 AF (Standard type), N-left

③ Number of Poles	
2P	2 Pole (N + 1 Pole)
4P	4 Pole (N + 3 Pole)

④ Rated Residual Current	
G2	10 mA
G4	30 mA
G5	100 mA
G7	300 mA
G8	500 mA

⑤ Mounting	
S	Front connection
T	Time delayed (63 AF & A type only)

⑥ Auxiliary Contact & Alarm Switch	
00	Non-attachment
BB	Individual package

⑦ Shunt & Under Voltage Trip Devices	
00	Non-attachment

⑧ Frequency	
C	50/60 Hz

⑨ Rated Current	
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	
R	A-APR type	APR
H	F type	
B	B type	

HRO

Residual Current Circuit Breaker with Overcurrent Protection

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 (Icn)	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.

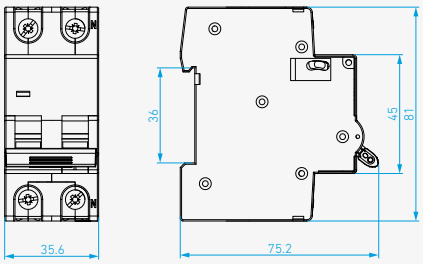
Compact Type			
HRO40M, 40 AF, 6 kA (Non-Cable Type)	**HRO40P, 40 AF, 10 kA (Non-Cable Type)**	**HRO40ML, 40 AF, 6 kA (Cable Type)**	**HRO40PL, 10 kA (Cable Type)**
			
IEC/EN 61009-1	IEC/EN 61009-1	IEC/EN 61009-1	IEC/EN 61009-1
N + 1P (1 module)	N + 1P (1 module)	N + 1P (1 module)	N + 1P (1 module)
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 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
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.

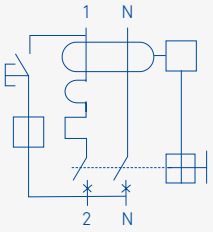
Dimension

HRO (Standard Type)

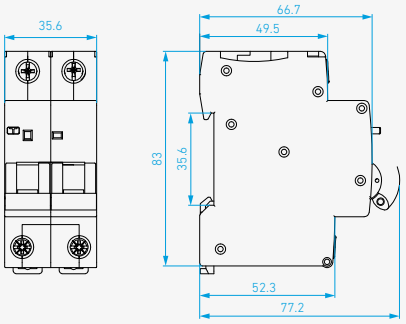
HRO63S, 63 AF



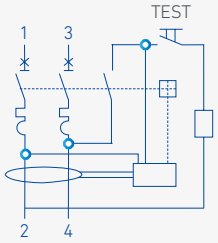
Diagram



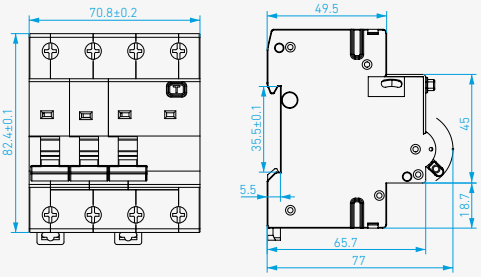
HRO63A/B, 63 AF



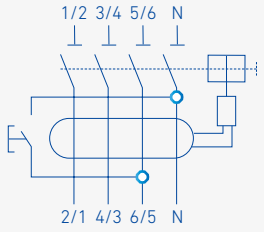
Diagram



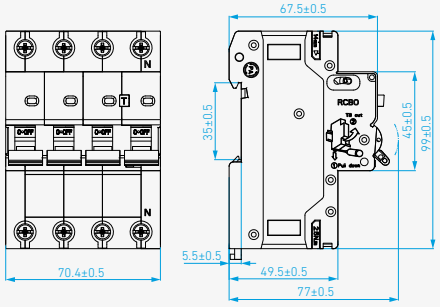
HRO40F, 40 AF



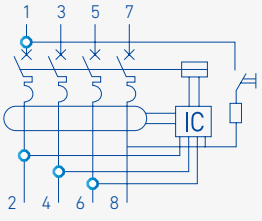
Diagram



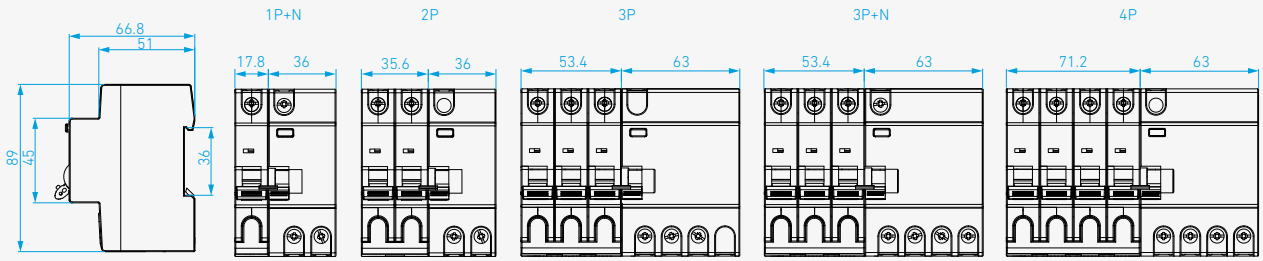
HRO63F, 63 AF



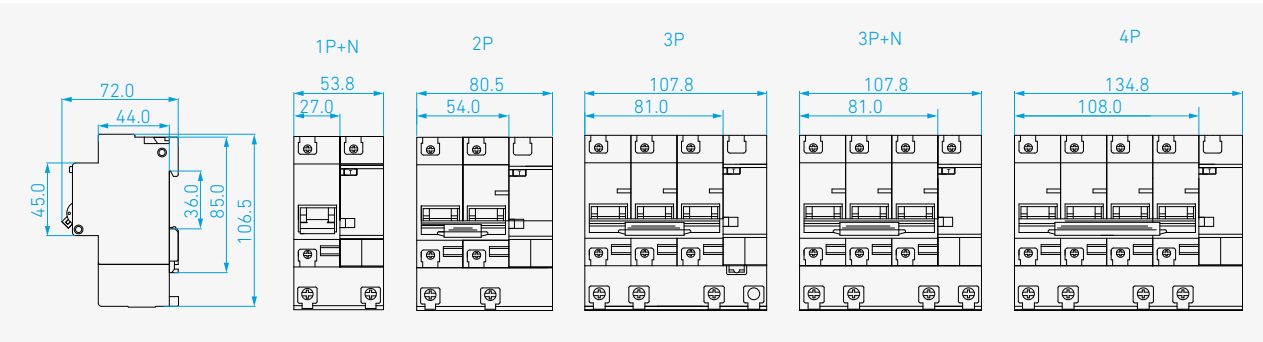
Diagram



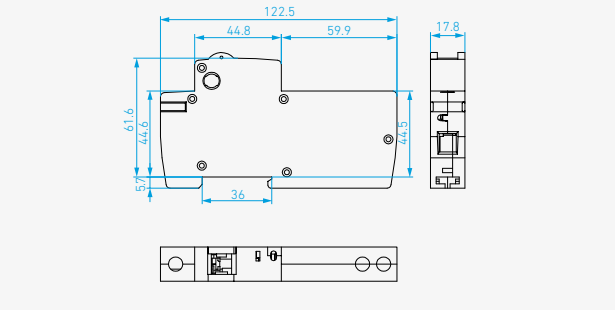
HRO63M/P, 63AF



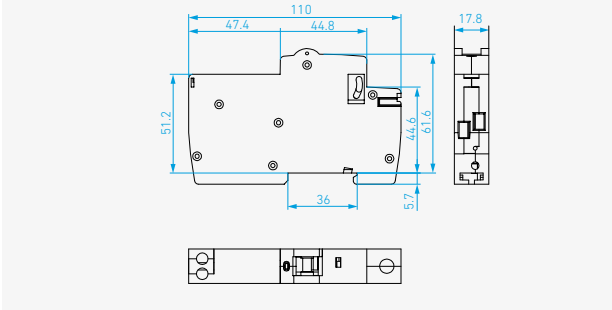
HRO125P, 125 AF



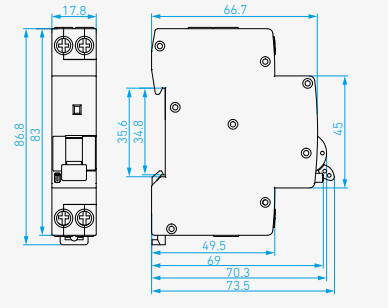
HRO40L, 40 AF



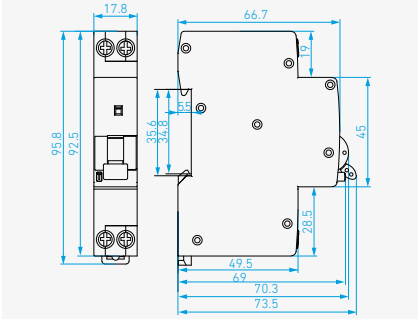
HRO40T/HT, 40 AF



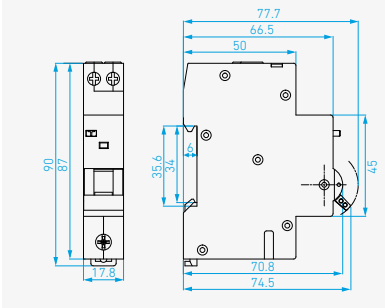
HRO40M, 40 AF



HRO40P, 40 AF

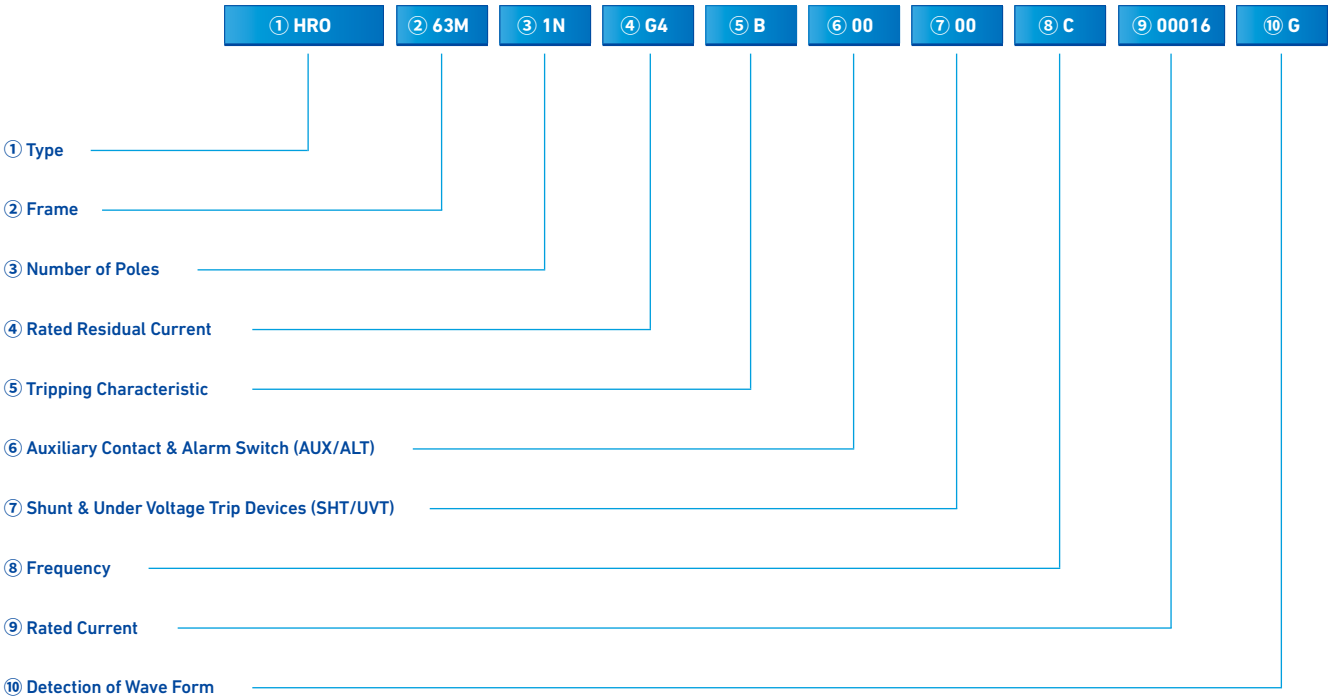


HRO40ML/PL, 40 AF



RCBO Ordering Information

Ordering Guidelines (Standard Type)



① Type

HRO	Residual current circuit beaker with overcurrent protection

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 + 1Pole (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

⑦ Shunt & Under Voltage Trip Devices

00	Non-attachment

⑧ Frequency

C	50/60 Hz

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