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Bareilly	Cuttack	Jalandhar	Meerut	Salem	Udaipur	



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E-mail : hpl@hplindia.com; enquiry@hplindia.com

Customer Care No. :  
18004190198

www.hplindia.com



## Air Circuit Breaker 630A - 2000A



ACB/mellismart/01-18

**intelliSMART**  
intelligent protection RANGE



## Corporate Information

HPL's vision of creating a niche, as a major player in India Electrical Industry with commitment to state-of-the-art technology & world class products.

HPL Group possess 7 State-of-the-art Manufacturing Facilities, ISO 9001 : 2000; ISO 14001; OHSAS 18001 certified located at Gurgaon, Kundli, Panipat, Jabli Himachal Pradesh and Guwahati having 5,00,000 sq. feet covered area to manufacture products conforming to International and India standards.

HPL Products Profile has the following Strategic Business Units :

- LV Switchgears
- LV Protection Devices
- Metering and Energy Management Systems
- Lighting
- Luminaires
- Wires & Cables
- Solar Solutions
- Electrical Wiring Accessories

HPL Products are tested at CPRI, ERDA, ERTL, NPL etc. according to Indian Standards, whereas MCB's Rewireable Switches & Electronic Energy Meters carry ISI marking. Further HPL products have approvals from CPWD state PWD's, MES, BSNL & many more Institutional users.

HPL Group with Head Office at Noida (U.P.) has extensive Sales & Marketing Network of 90 Branch offices & Representative Offices, over 2000+ Authorised Dealers and 27000+ Retailers across country, who are committed to provide solutions and services to customer's delight. HPL is also exporting its products to Middle East, SAARC and European Countries.

## 7 STATE-OF-THE-ART MANUFACTURING FACILITIES

2  
Units

Gurgaon (Haryana)

1  
Units

Kundli (Sonapat)

1  
Units

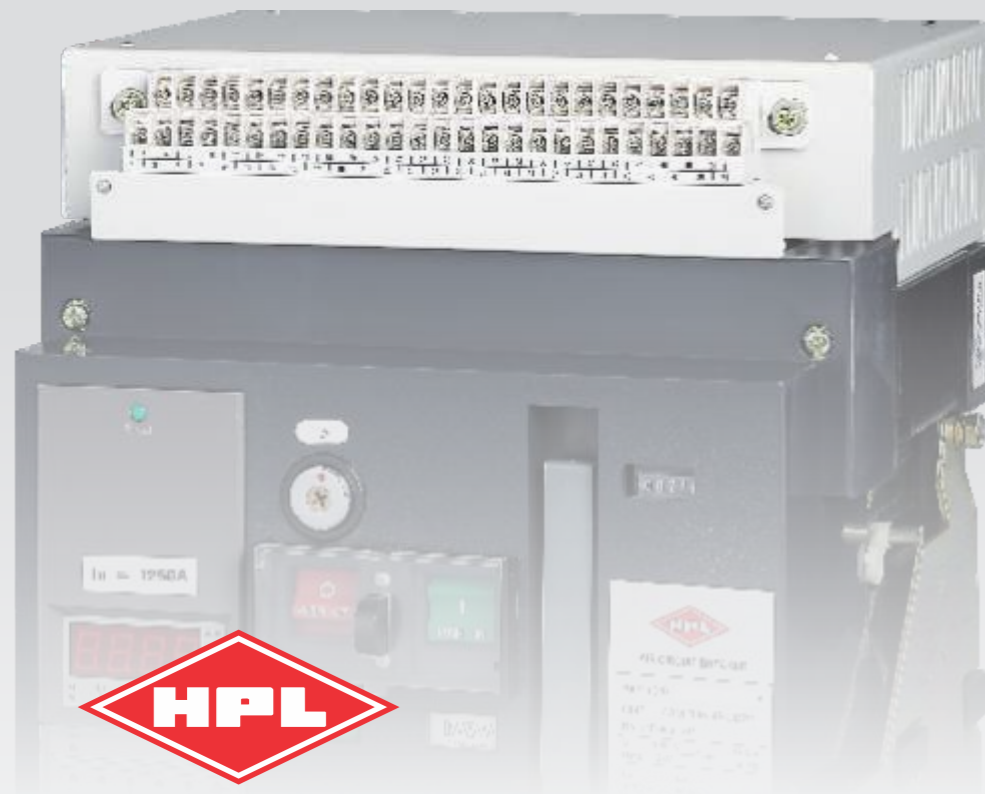
Panipat (Haryana)

1  
Units

Murthal (Sonapat)

2  
Units

Jabli (Himachal Pradesh)



Air Circuit Breaker  
**intelliSMART**  
intelligent protection RANGE





Air Circuit Breaker  
**intelliSMART**  
 intelligent protection RANGE

Range of HPL Air Circuit Breaker meets your demands for high breaking capacity and optimized panel size. Wide range of accessories and connection methods offerings meet the various installation needs & simplified switch board design.

It provides total solutions with an advanced trip relay for measurement, diagnosis, analysis and communication as well as protective functions for absolute protective coordination and electric power monitoring system.



Air Circuit Breaker  
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## Overview

### Product Introduction

HPL Air Circuit Breaker is suitable for AC 50Hz/60Hz with rated service voltage 415V and rated service current upto 2000A. It is mainly used to distribute electric energy and protect circuits and electric equipment against over-load, under-voltage, short-circuit, Single-phase earth fault.

With intelligentized and selective protection functions, the breaker can improve the reliability of power supply, and avoid unnecessary power failure. The breaker is applicable for power stations, factories, mines and modern high-buildings, especially for the distribution system of intelligentized building.

Standard : IEC/IS 60947-2

### Operating Conditions

- Temperature Condition:  
-5°C~40°C; the average value within 24th shall not exceed +35°C (Special situation excluded).
- Altitude : ≤ 2000m.
- Pollution grade: Grade 3.
- Air Conditions:  
At mounting site, relative humidity should not exceed 50% at the max temperature of +40°C, higher relative humidity is allowable under lower temperature, RH could be 90% at +20°C, special measures should be take to occurrence of dews.
- Note: Without the microprocessor relay, the breaker functions as a switch-disconnector.



## External Configuration



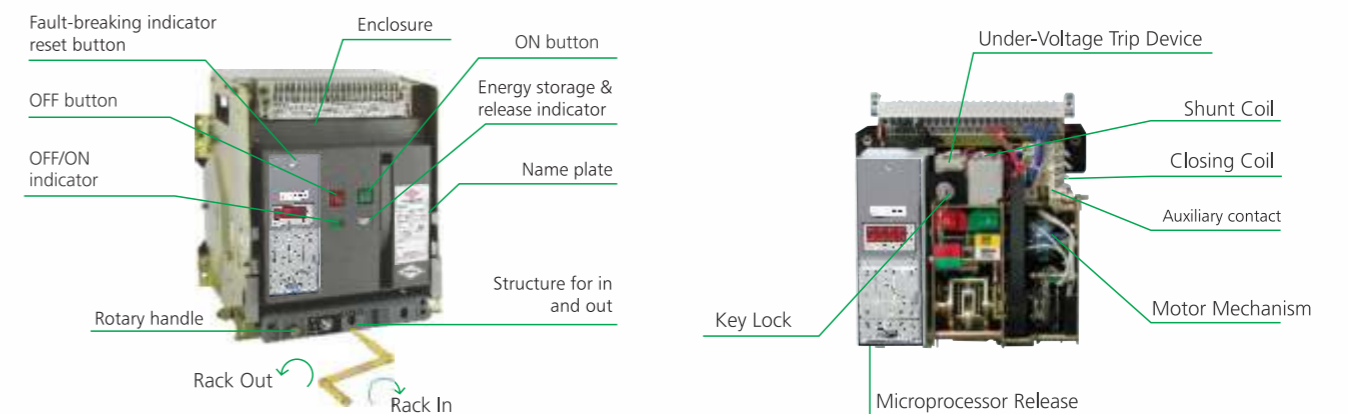
Cradle



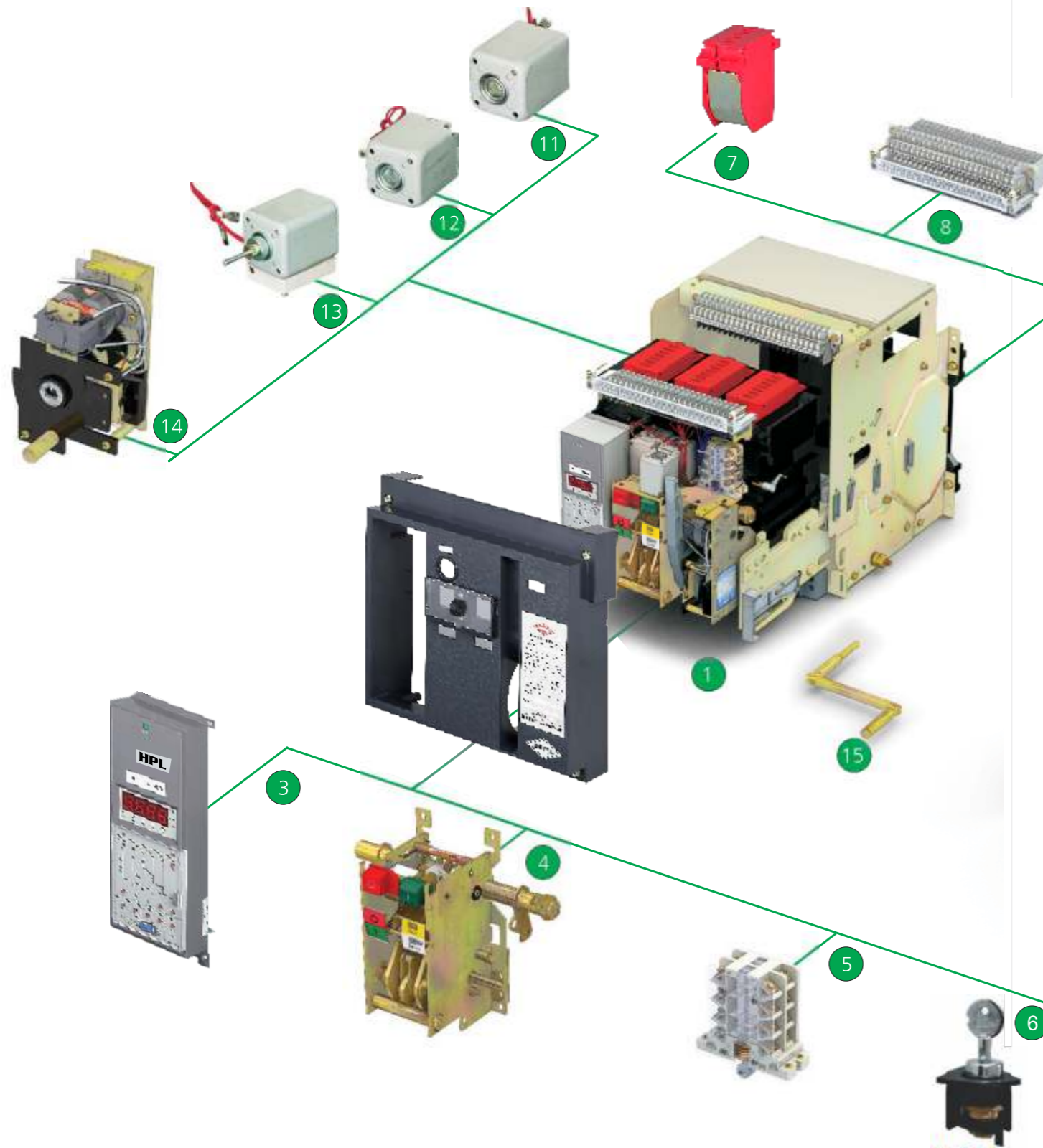
Body  
Drawout type breaker/switch-disconnector



Fixed plates for the fixed type breaker / Switch-disconnector

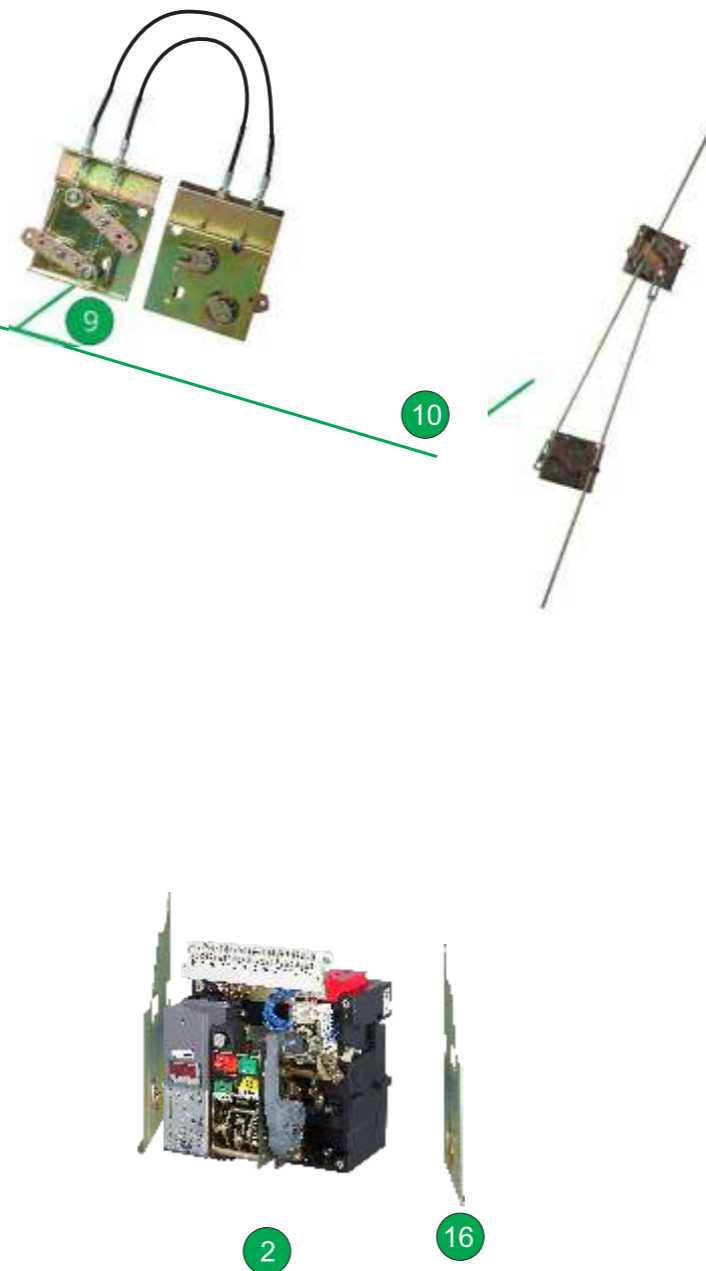


# Internal Configuration



## Air Circuit Breaker

- 1 Drawout type
- 2 Fixed type
- 3 Microprocessor Release
- 4 Operating mechanism
- 5 Auxiliary contact
- 6 Key Lock
- 7 Arc Chute
- 8 Secondary connecting part
- 9 Wire-cable mechanical interlock
- 10 Connecting-rod type mechanical interlock
- 11 Shunt Coil
- 12 Closing Coil
- 13 Under-Voltage Trip Device
- 14 Motor Mechanism
- 15 Rotary handle
- 16 Fixed plate



## Ratings



Rated ultimate short circuit breaking capacity	Icu=50kA		415V
Rated service short circuit breaking capacity	Ics=50kA		415V
Rated short-time withstand current	Icw=50kA / 1s		415V
Rated current In (A)	630	800	1000 1250 1600 2000
Number of poles	3, 4		
Rated voltage Ue (V)*	415		
Rated insulation voltage Ui (V)	1000		
Rated current of N-pole In (A)	100%In		
Total Breaking Time (ms)	23~32		
Total Closing Time (ms)	80 (max)		
Life Cycle Nos.	Electric life	6500	
	Mechanical life	Without maintenance	15,000
With Maintenance		30,000	
Connection pattern	Horizontal, Vertical		
Motor Charging Type / Weight(kg)	Drawout 3P/4P	67 / 80	70 / 84 79 / 90
	Fixed 3P/4P	42 / 52	44 / 52 45 / 54

\*690 Volt on request

## Function of Microprocessor Release - B Type

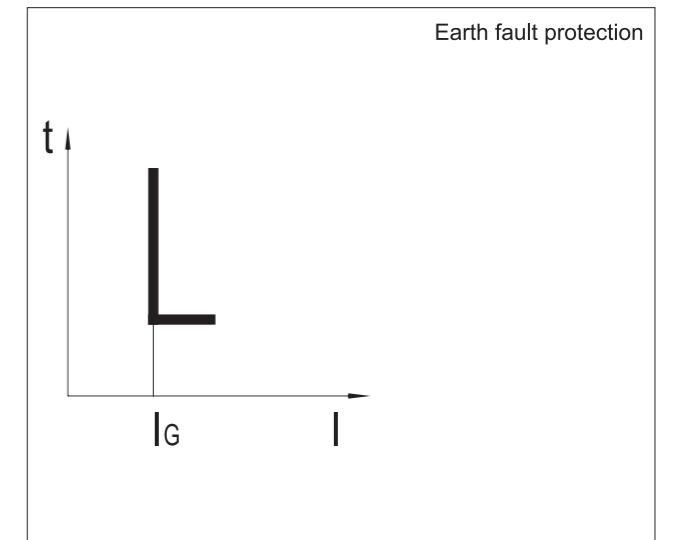
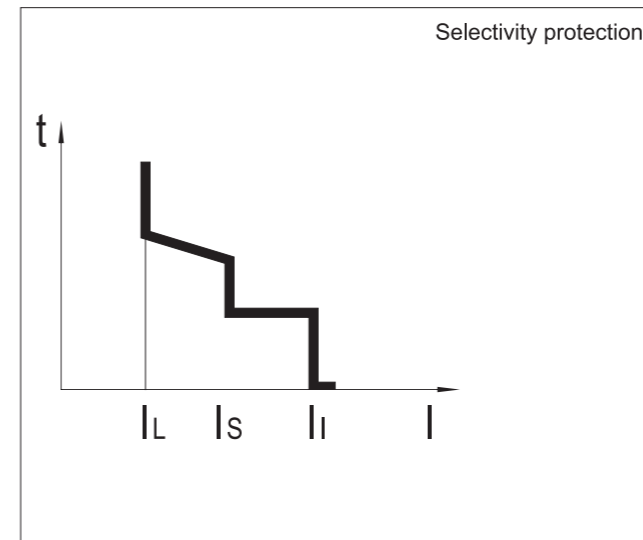
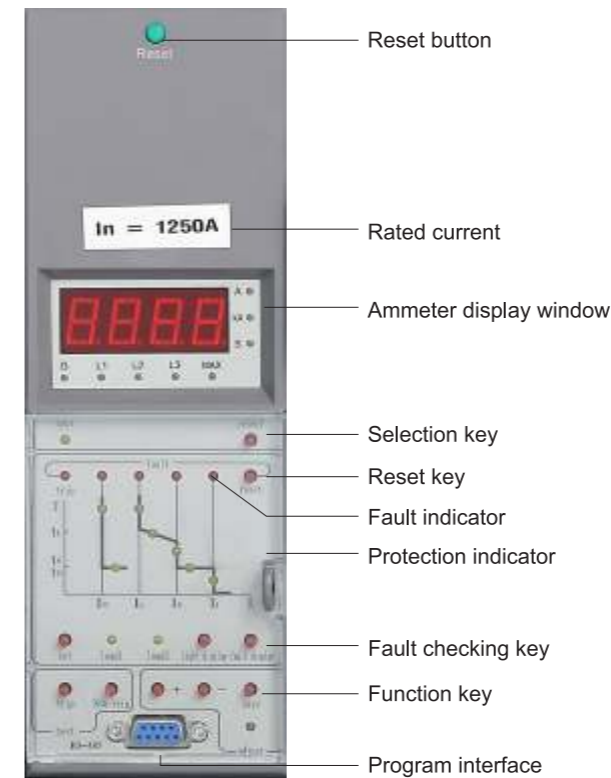
### Function configuration

- Current display function
- Overload long time delay protection (inverse)
- Short circuit short time delay protection (inverse and definite)
- Instantaneous protection
- Single-phase earth fault protection
- Parameter setting function
- Test (simulate trip) function
- Inquiry function
- MCR (Making current release) and HSISC (High-setting instantaneous short circuit)

## Trip Release

The Microprocessor release is the core part of the Air Circuit Breaker to protect the electric circuit and the power supply against the dangers such as overload, short circuit, single-phase earth fault. The relay adopts highly-integrated and high-performance digital signal processor that featuring power functions and reliable performance to perform real-time processing to the signal so as to achieve various protection function and numerous auxiliary functions.

### Appearance and panel illustration



# Trip Release

## Symbol designation table

No.	Symbol	Designation
1	In	Rated current
2	IL(Ir),Is(Isd),li(li)	Fault current of long time-delay, short time-delay and instantaneous
3	IG	Ground fault
4	tL,ts,ti,tG	Fault time of long time-delay, short time-delay, instantaneous and grounding
5	L1(Ir),L2(Isd),L3(li),G	Phase R, Y, B and N (or earth)
6	Ic1,Ic2	Fault current of load monitor 1 and load monitor 2
7	T,I	Time, current
8	A,kA,s	Unit Indicator: Ampere, kilo-Ampere, second

## Operating power supply

The operating power supply input to the AC 415V/220V, AC 110V, 50Hz; DC220V, 110V, 24V.

## Basic functions of microprocessor release

- Main protection function
- Query function
- Parameter setting function
- Test function
- Load monitor function (optional)
- Making current release (MCR) and High-Set Instantaneous
- Short Circuit (HSISC) function (optional)
- Signal alarm function (optional)

## Operation instructions

Parameter setting operation

**Step 1:** Make sure the microprocessor release is under reset status.

if the microprocessor release isn't under reset status, press "reset" key till the ammeter displays operation current.

Note: When the microprocessor release is under malfunction alarm status, then the setup function is locked and the setup operation can't be conducted.

**Step 2:** Press "set" key till the ammeter display window displays required action current or time setting.

**Step 3:** Press "+" and "-" to set the items to be changed.

**Step 4:** Press "save" key. At that time, the "save" indicator will flash once to indicate that the parameters are saved.

If not desiring to save, then directly press "reset" key.

Then the parameters won't be changed and will remain the original values.

**Step 5:** Repeat step 3 ~ step 5 in case requiring changing other parameters. If not, press "reset" key till the characteristic curve indicator is off.

Note: In case of occurrence of malfunction under setup status, it will automatically exit the setup status and enter into malfunction status.

During the adjustment of the parameters, the longer the time of pressing or holding the "+" or "-" key is, the faster the up or down speed is.

Failure inquiry operation

### Query operation method

**Step 1:** Make sure the microprocessor release is under reset status.

**Step 2:** Press "fault display" key till the ammeter display window indicates the failure action value and the action time alternately.

Press "select" to inquiry relevant parameters.

**Step 3:** Press "reset" key to exit the inquiry status.

Test operation method

**Step 1:** Make sure the microprocessor release is under reset status.

**Step 2:** Press "set" key till the indicator of the short time-delay characteristic curve current is on. Press "+""-"" to adjust the required current.

Press "trip" key, then the breaker will trip. The ammeter display window will display the action current and action time in turn.

**Step 3:** Press "reset" key to exit the test status.

# Trip Release

## Protection Setting

Long Time	
Current Setting (A) Accuracy ± 10%	Ir = In X.... 0.4 0.5 0.6 0.7 0.8 0.9 1.0 tr@ (≤ 1.05X Ir) <2h Non - Trip
Time Delay (S)	tr@ (> 1.30 X Ir) <1h Trip
Accuracy ± 10%	tr@ (1.5 X Ir)* 15 30 60 120 240 480
	tr@ (2.0 X Ir)* 8.4 16.9 33.7 67.5 135 270
Phase N overload and over-current Characteristic	100% or 50% (applicable to 3P + N or 4P)

\*Different time delay options are also available on request

Short Time	
Current Setting (A) Accuracy ± 10%	I <sub>sd</sub> = 1.3I <sub>r</sub> ~ 15I <sub>r</sub> + OFF tsd@ (≤ 0.9 X I <sub>sd</sub> ) In the 2ts Non - Trip
Time Delay (S)	tsd@ (> 1.10 X I <sub>sd</sub> ) In the 2ts delayed - trip
Accuracy ± 25%	Time setting (S) 0.1 0.2 0.3 0.4
	Resultant time 0.06 0.14 0.19 0.25

Instantaneous	
Current Setting (A) Accuracy ± 15%	I <sub>i</sub> = 1.3I <sub>n</sub> ~ 50kA ≤0.85I <sub>i</sub> In the 0.2s Non-Trip
Time Delay (S)	>1.15I <sub>i</sub> In the 0.2s Trip

Ground Fault	
Current Setting (A) Accuracy ± 10%	I <sub>g</sub> = In X... 0.2 0.3 0.4 0.5 0.6 0.7 0.8 +OFF, Min160A tg@ (≤ 0.9 X I <sub>g</sub> ) In the 2tg Non-Tripping
Time Delay (S)	tg@ (> 1.1 X I <sub>g</sub> ) In the tg ± 0.032s or tg (1± 25%) Tripping
Accuracy ± 25%	Setting Time (S) 0.1 0.2 0.3 0.4
	Resultant Time 0.06 0.14 0.19 0.25

# Trip Release

## Protection Setting

Power distribution or motor protection		
Setting current	$I_r =$	$(0.4 \sim 1.0)I_n + \text{OFF}$ (Exit position)
	Acting property	$I \leq 1.05I_r$ without actions in 2h $I > 1.3I_r$ with actions while it's less than 1h
Inverse-time (s) (Corresponding $2I_r$ )	Property curve	Curve 1~curve 5, could be rectified, rectified as curve 3 for ex-factory
	Curve speed	IEC255 standard, 80 level points totally, could be rectified
	Precision	$\pm 10\%$ (intrinsic 40ms)

Note: When N-phase is 50%, protective settings are treated as 50% for N-phase. If long delay setting is 2000A, long delay setting for phase R, Y and B is 2000A, and 1000A for phase N.

Instruction to short Time-Delay Property		
Setting current	$I_{sd} =$	$(1.5 \sim 15) I_r + \text{OFF}$ (exit position)
	Acting property	$\leq 0.9I_{sd}$ In the 2tsd without actions $> 1.1I_{sd}$ In the 2tsd delay action
Inverse-time delay (s) (Corresponding $2I_r$ )	$t_{sd} =$	$(0.1 \sim 0.4)s$ (0.1s level error)
	Precision	$\pm 25\%$ (intrinsic 40ms)
Inverse-time property		Curve is the same as overload long delay, but curve speed is 10 times faster
Short delay inverse-time thermal memory (15min)		Standard + OFF

Note: When microprocessor release is upto ( $I_n=2000A$ ), rectified value of short time-delay protection is  $1.5 I_r \sim 15 I_r$ .

Instruction to Instantaneous Property		
Setting current	$I_i =$	$1.01I_n \sim 50kA + \text{OFF}$ (Exit position)
	Acting property	$\leq 0.85I_i$ In the 0.2s without actions $> 1.15I_i$ In the 0.2s with actions

Note: When microprocessor release is upto ( $I_n=2000A$ ), rectified value of instantaneous protection is  $1.0I_n \sim 50kA + \text{OFF}$ .

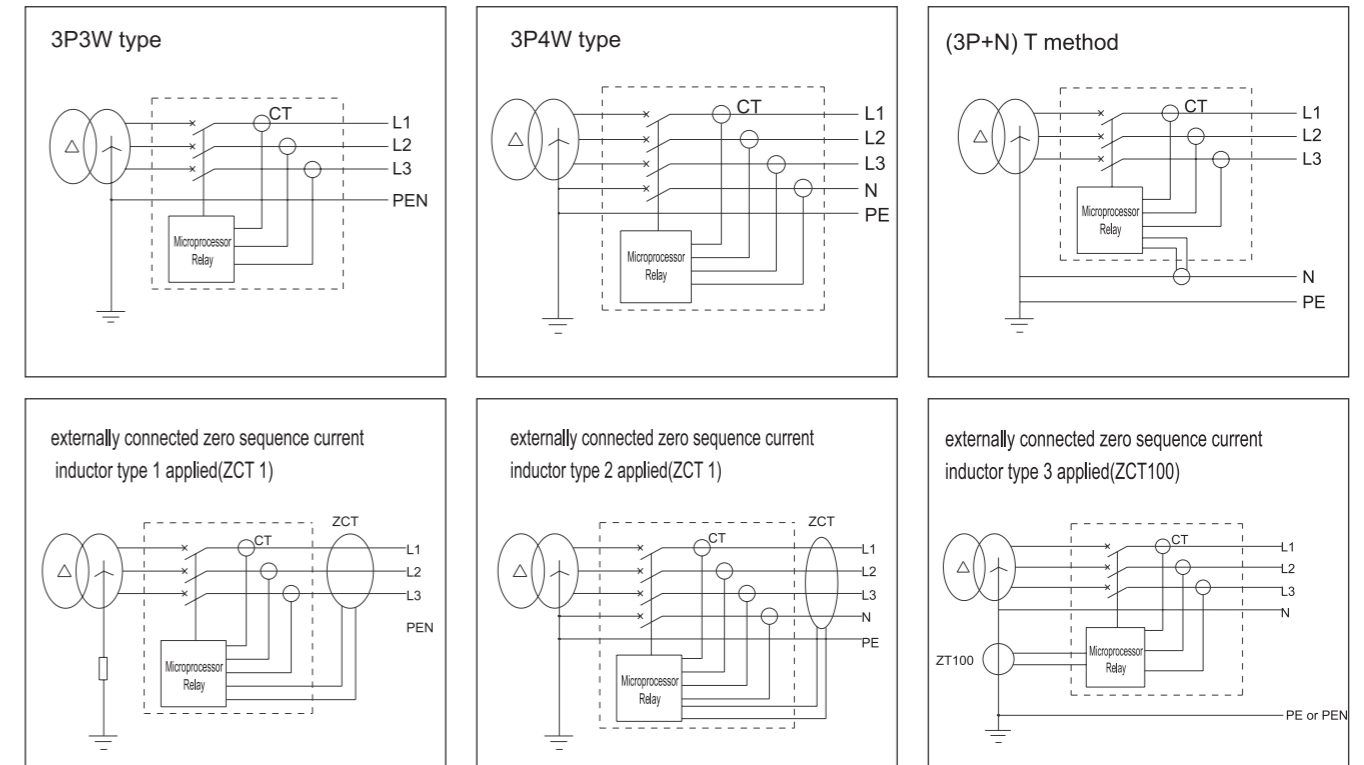
## Ground fault or residual current protective property: $t = TG \times KG \times I_f / I$

Ground fault protection		
Setting current	$I_f =$	$(0.2 \sim 0.8)I_n + \text{OFF}$ (with 160A as the minimum and 1200A as the maximum. OFF means it only alarms without tripping)
	Acting property	$< 0.9 I_f$ In the $2t_g$ without actions $\geq 1.1 I_f$ In the $t_g$ ( $1 \pm 25\%$ ) delayed action

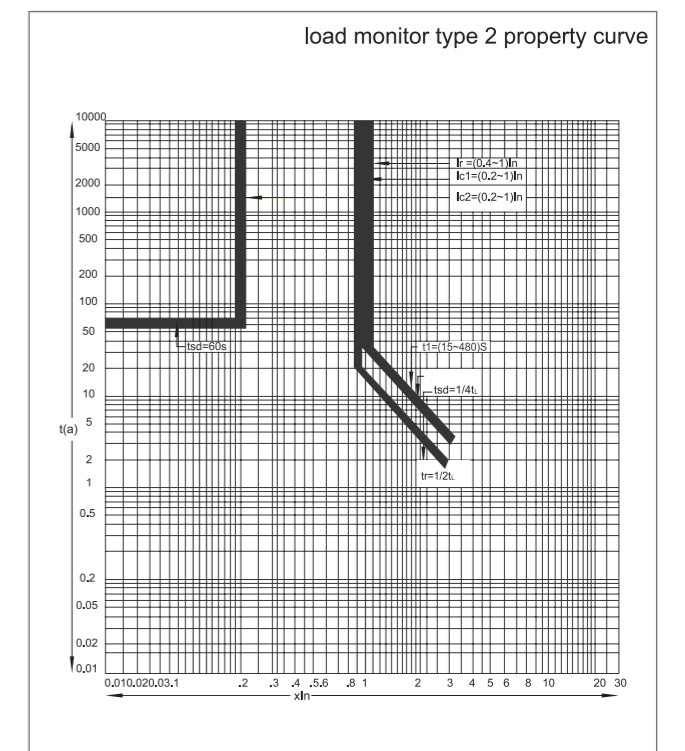
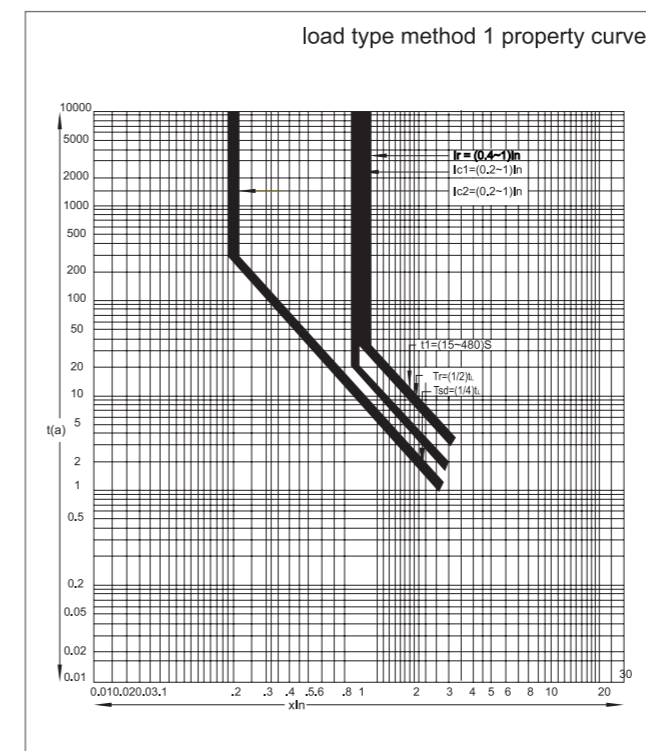
Ground fault protection		
Inverse-time (s) (Corresponding $2I_r$ )	$TG =$	$(0.1 \sim 1.0)s + \text{OFF}$ (Level difference 0.1s, OFF means it only alarms without tripping.)
	Inverse-time cutting coefficient KG	$(1.5 \sim 6)s + \text{OFF}$ (Level difference 0.5, OFF means earth fault is definite-time)
	Precision	$\pm 10\%$ (intrinsic 40ms)
Setting current	$I_f =$	$(0.1 \sim 1.0)I_o + \text{OFF}$ (Level different 0.01A, OFF means exit position)
	Acting property	$< 0.9 I_f$ In the $2t_g$ without actions $\geq 1.1 I_f$ In the $t_g$ ( $1 \pm 25\%$ ) delayed action
Delay (s)	Property curve	Curve 1~curve 5, could be rectified, rectified as curve 3 for ex-factory
	$TG =$	$(1.5 \sim 6)s + \text{OFF}$ (Level difference 0.5s, OFF means is definite-time)
	Precision	$\pm 25\%$

# Trip Release

## Wiring diagram of earth fault protection



## Load monitor protection property





# Trip Release

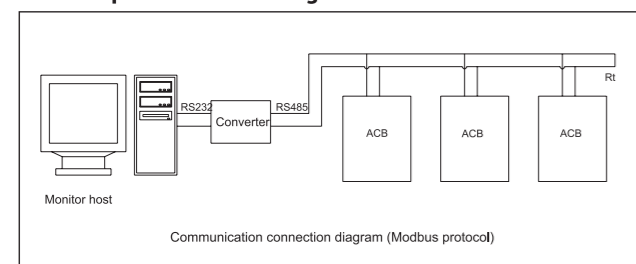
## Technical Parameter:

Load monitor type 1		
Rectified current	IC1=	(0.2~1.0)In + OFF (OFF means exit position)
	Acting property	≤1.05Ic1 without action > 1.21c1 delay relay action
Inverse-time (s)	Property curve	The same as overload long delay
	Curve speed	Could be set separately (Setting content is the same as that of overload long delay)
Rectified current	Ic2=	(0.2~1.0)In + OFF (OFF means exit position)
	Acting property	≤1.05Ic2 without action > 1.21c2 delayed relay
Maximal inverse-time delay (s)	Property curve	The same as overload long delay
	Curve speed	Could be set separately (Setting content is the same as that of overload long delay)
Load monitor type 2		
Rectified current	Ic1=	(0.2~1.0)In + OFF (OFF means exit position)
	Acting property	≤1.05Ic1 without action > 1.21c1 delay relay action
Inverse-time (s)	Property curve	The same as overload long delay
	Curve speed	Could be set separately (Setting content is the same as that of overload long delay)
Rectified current	Ic2=	(0.2~1.0)In + OFF (OFF means exit position)
	Acting property	≤0.9Ic2 without action
Fixed delay (s)		Fixed as 60s
Precision		±10% (Intrinsic 40ms)
Thermal memory (30min, could be eliminated while power-off)		Standard + OFF
Protective property on unbalance current		
Rectified current	δ=	40%~100% + OFF (Level difference 0.1, OFF means exit)
	Action or alarm property	≤0.9δ without actions > 1.1δ delay action
Delay time (s)	Tδ=	(0.1~1.0)s (Level difference 0.1, OFF means exit)
Precision		±10% (Intrinsic 40ms)

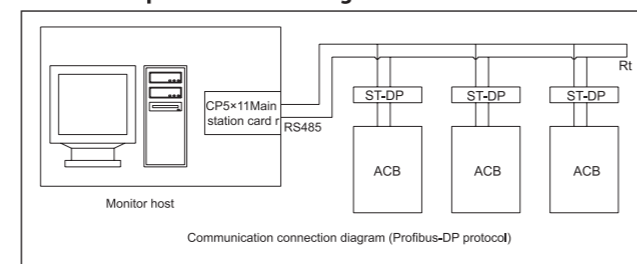
### Communication networking

Make key-lock at "communication" position, connect to secondary terminals "10" and "11" through cable to achieve the communication function.

### Modbus protocol networking



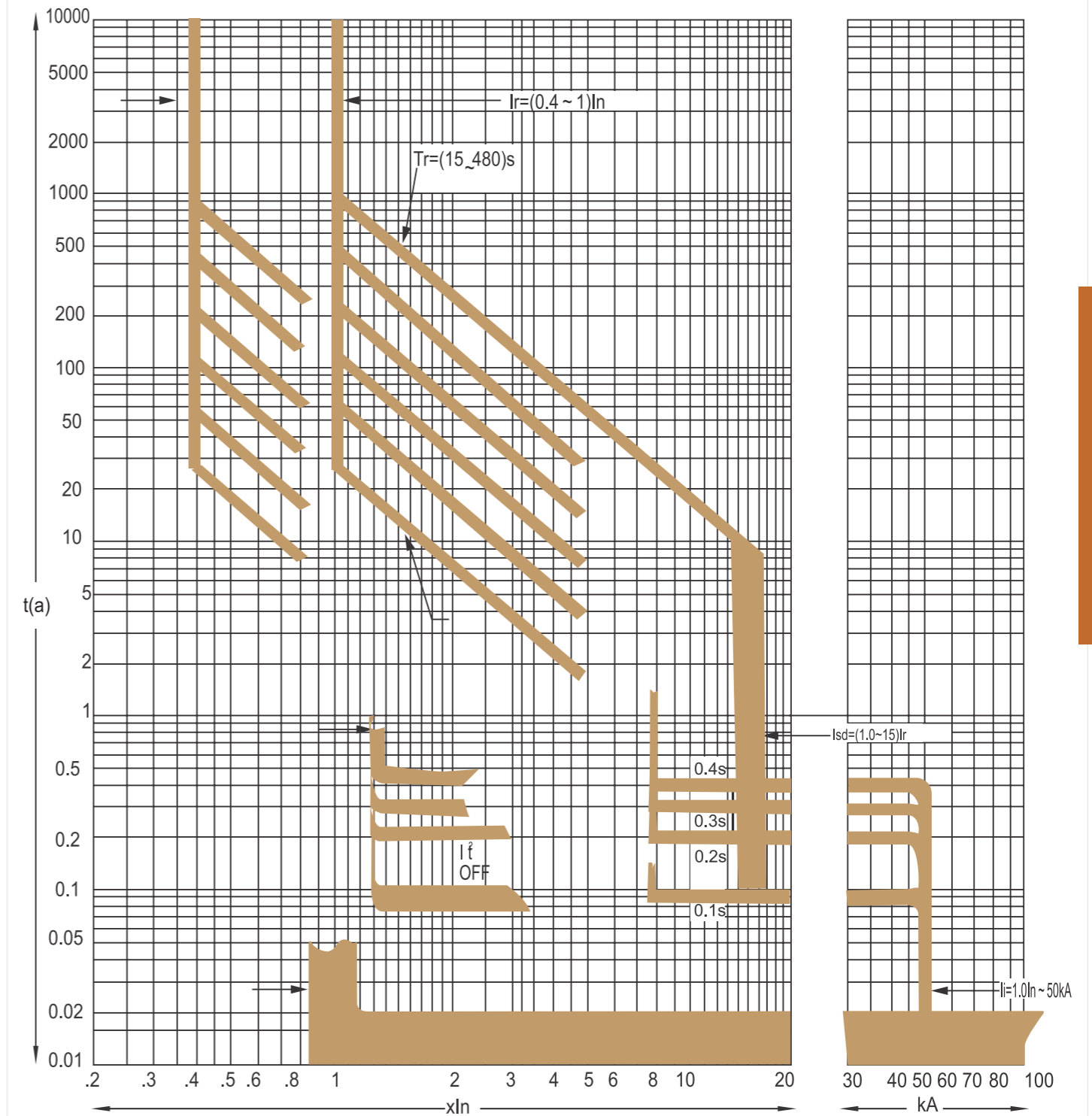
### Profibus-DP protocol networking



# Trip Release

## Characteristic Curve

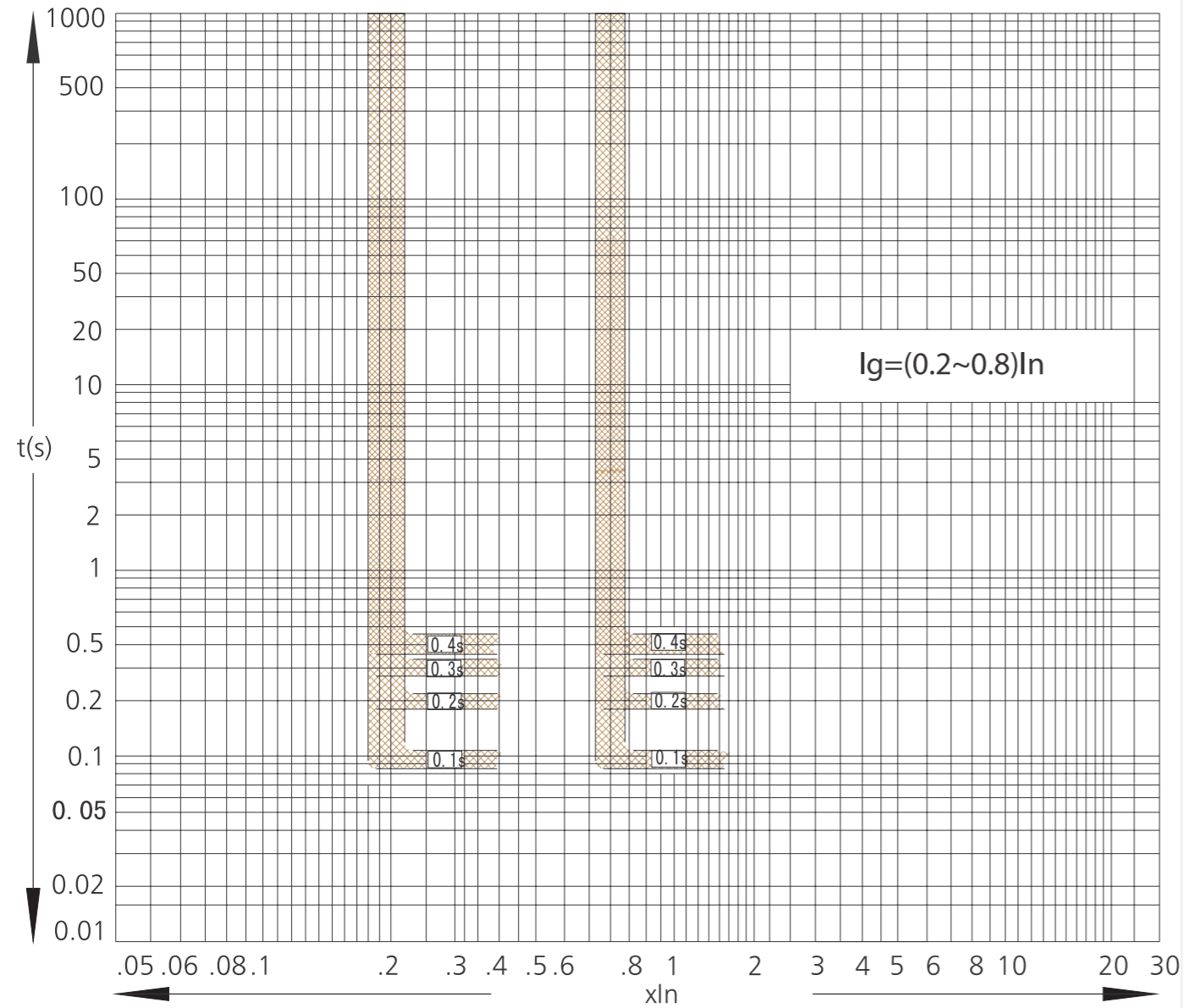
Long time delay



# Trip Release

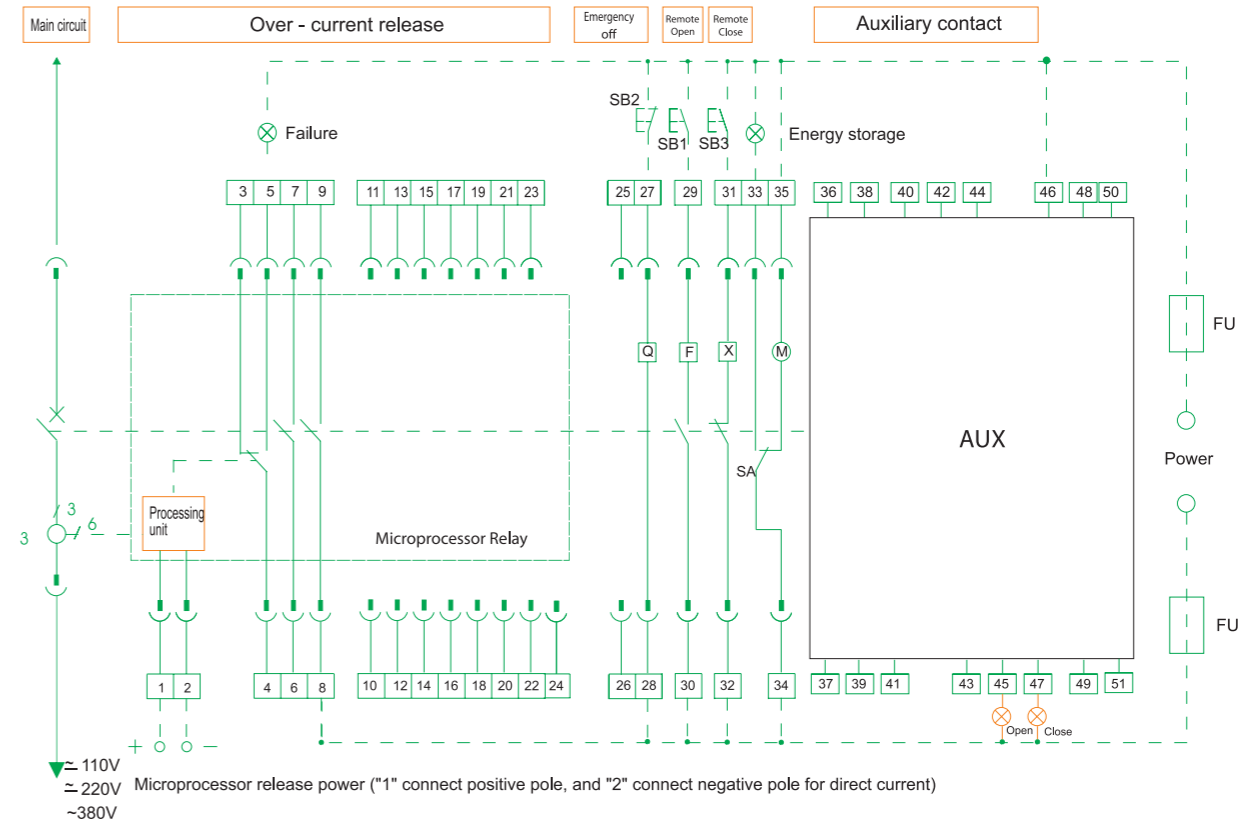
## Characteristic Curve

Ground fault



# Wiring Diagram

The secondary circuit wiring with B type Microprocessor release and instantaneous under-voltage release



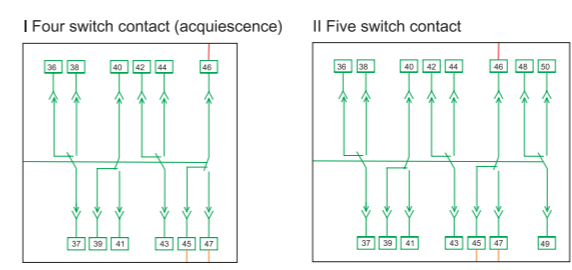
- SB1 : Shunt Button
- SB2 : Under-Voltage Button
- Sb3 : ON Button
- Q : Under-voltage Trip Device
- F : Shunt Coil
- X : Closing Coil
- M : Motor
- XT : Connection terminal
- SA : Position Switch

Note : If control voltage of Q, F, X is different from each other, they can be connected to different power.

- 1<sup>#</sup>, 2<sup>#</sup> : Auxiliary power input
- 3<sup>#</sup>, 4<sup>#</sup>, 5<sup>#</sup> : Fault trip contact output (4<sup>#</sup> common terminal)
- 6<sup>#</sup>, 7<sup>#</sup>, 8<sup>#</sup>, 9<sup>#</sup> : Auxiliary contact (normal open)
- 10<sup>#</sup>~24<sup>#</sup> : empty
- 25<sup>#</sup>, 26<sup>#</sup> : to be connected with current transformer (selective)
- 27<sup>#</sup>, 28<sup>#</sup> : Under-voltage Trip Device
- 29<sup>#</sup>, 30<sup>#</sup> : Shunt Coil
- 31<sup>#</sup>, 32<sup>#</sup> : Closing Coil
- 33<sup>#</sup>, 34<sup>#</sup> : Charge / Discharge indicator
- 34<sup>#</sup>, 35<sup>#</sup> : Motor
- 36<sup>#</sup>, 51<sup>#</sup> : Auxiliary contact

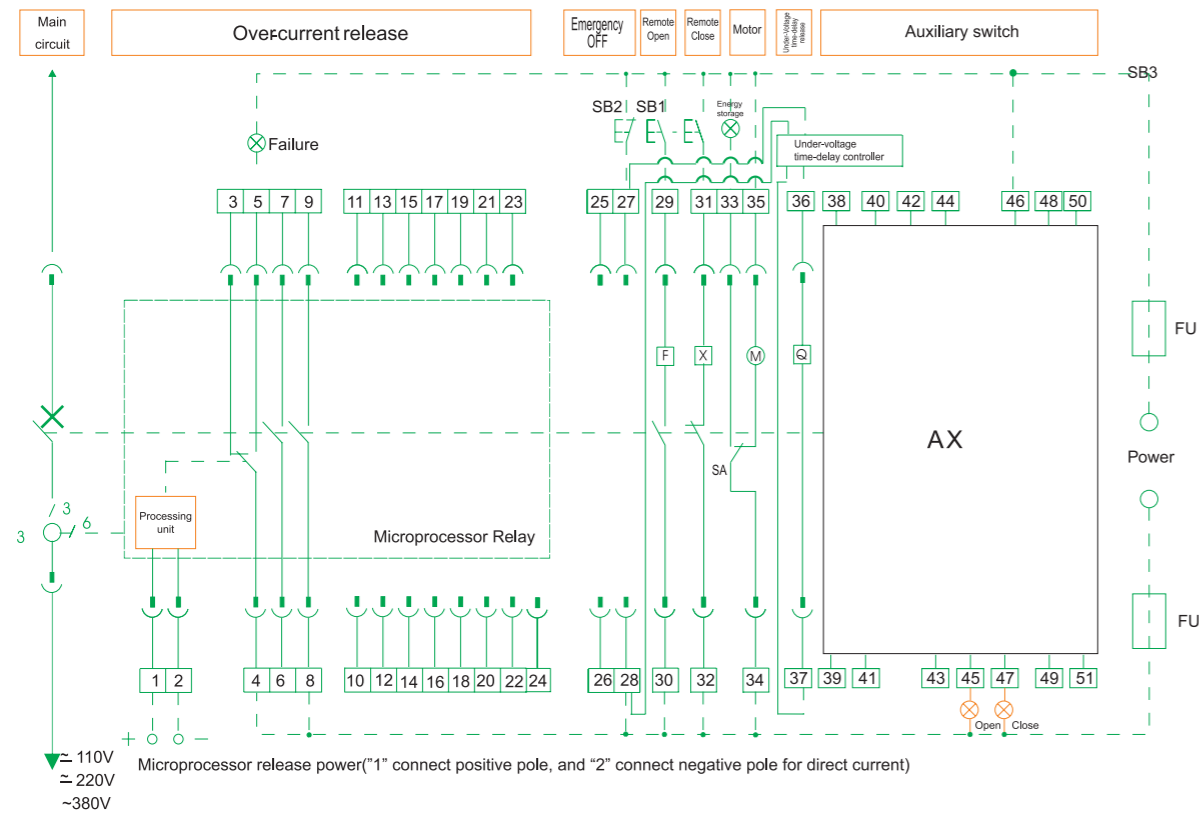
- Circuit explanation for signal output:
- Broken-line parts shall be provided by customers.
  - Terminals 6<sup>#</sup>, 7<sup>#</sup> can output NC (normal close) contact if that is required by users.
  - Terminal 35<sup>#</sup> can be directly connected to power (automatic pre-storing energy), alternatively connect power after connecting NO button (manual-controlled pre-storing energy).
  - Terminals 21<sup>#</sup>~24<sup>#</sup> is only for wiring with function meter display. (excluding the special wiring)

### The auxiliary contact modes for customer use

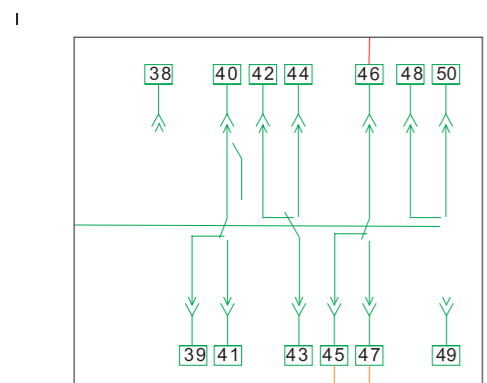


# Wiring Diagram

The secondary circuit wiring with B type Microprocessor release and time delay under-voltage release



The auxiliary contact modes for customer use Four switch contact (acquiescence)



- Sb1 : Shunt Button
- SB2 : Under-Voltage Button
- Sb3 : ON Button
- Q : Under-voltage Trip Device
- F : Shunt Coil
- X : Closing Coil
- M : Motor
- XT : Connection terminal
- SA : Position Switch

Note : If control voltage of Q, F, X is different from each other, they can be connected to different power.

- 1<sup>#</sup>, 2<sup>#</sup> : Auxiliary power input
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- 34<sup>#</sup>, 35<sup>#</sup> : Motor
- 36<sup>#</sup>, 37<sup>#</sup> : Under-voltage Trip Device
- 38<sup>#</sup>~51<sup>#</sup> : Auxiliary contact

Circuit explanation for signal output:

- a. Broken-line parts shall be provided by customers.
- b. Terminals 6<sup>#</sup>, 7<sup>#</sup> can output NC (normal close) contact if that is required by users.
- c. Terminal 35<sup>#</sup> can be directly connected to power (automatic pre-storing energy), alternatively connect power after connecting NO button (manual-controlled pre-storing energy).
- d. The 21<sup>#</sup>~24<sup>#</sup> is only for wiring with function meter display. (excluding the special wiring)

# Accessories

## Under-voltage Trip Device (UVT)

Without power supply, under-voltage release can't close.

It is classified into instantaneous and time-delay type.

Delay time 1s, 3s, 5s, are fixed for all ratings

Within 1/2 time-delay range, circuit breaker does not trip when power voltage recovers and exceeds 85%Vn.

### Rated Voltage & Characteristic of UVT Coil

Rated voltage (Vn)	AC 415, 230, 110	DC 220, 110
Action voltage(V)	(0.35-0.7)Vn	
Reliable making voltage(V)	(0.85-1.1)Vn	
Reliable non-making voltage(V)	≤0.35Vn	
Power loss(W)	48VA	48W

Optional configure: Auto suction type under-voltage coil, and this device can substitute normal one, it can prevent mechanism from misoperation.

Make sure there is power supply on the under-voltage coil, before making the circuit breaker.



## Shunt Coil (SHT)

Shunt Coil can realize the remote control to break the circuit breaker.

### Rated Voltage & Characteristic of SHT Coil

Rated Voltage (Vn)	AC 415, 230, 110	DC 220	DC 110
Work voltage(V)	(0.7-1.1)Vn		
Power loss(W)	300VA	132W	70W
Breaking time	(30~50)ms		

Forbid making the power for long time to avoid the shunt Coil being damaged.



## Closing Coil (CC)

After the motor finishing the energy storage, closing release can instantly close the circuit breaker.

### Rated Voltage & Characteristic of CC Coil

Rated Voltage (Vn)	AC 415, 230, 110	DC 220	DC 110
Work voltage (V)	(0.7-1.1)Vn		
Power loss (W)	300VA	132W	70W
Closing time	≤70ms		

Forbid making the power for long time to avoid the closing release being damaged.



## Motor (M)

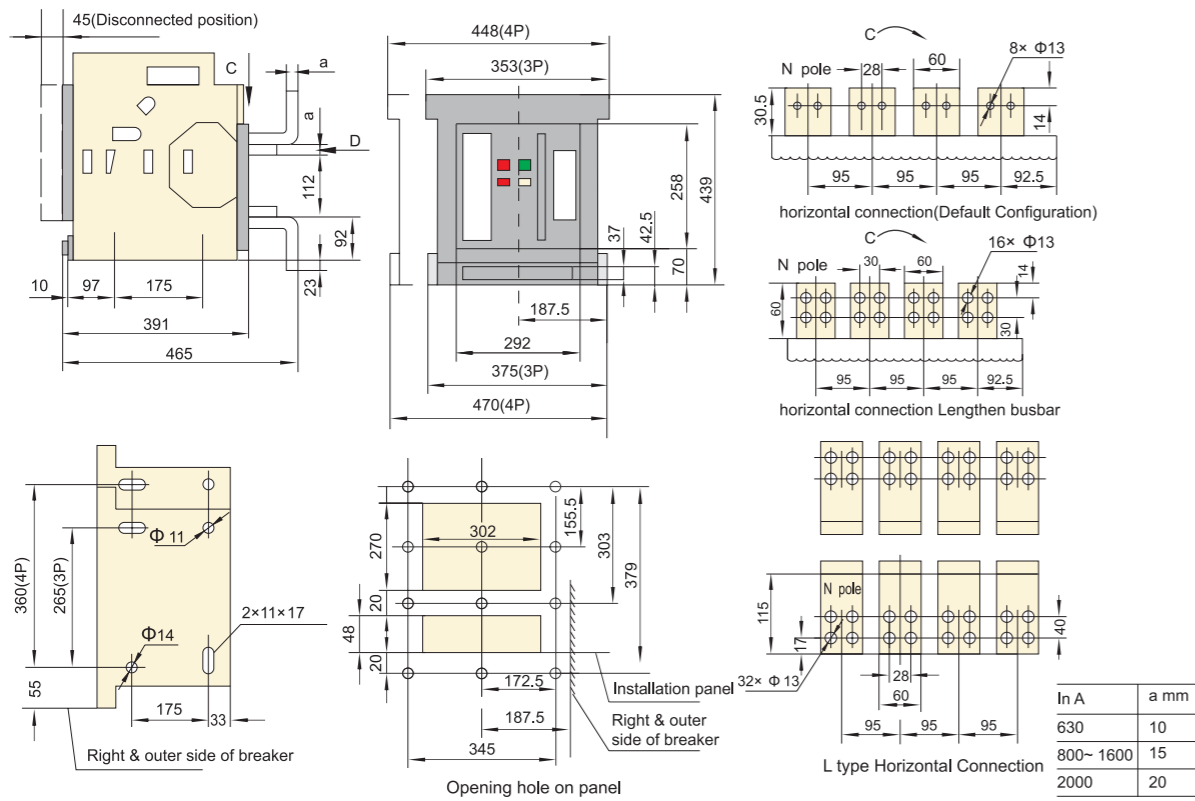
With the function of motor mechanism energy storing and auto restoring energy after closing the circuit breaker, the mechanism can ensure closing the circuit breaker instantly after breaking the circuit breaker. Manual energy-store is available

Rated Voltage(Vn)	AC 415, 230, 110	DC 220, 110
Work voltage (V)	(0.85-1.1) Vn	
Power loss (W)	85/110/150W	
Energy-storage time	<5s	
Operation frequency	Not more than 3 times per munute	

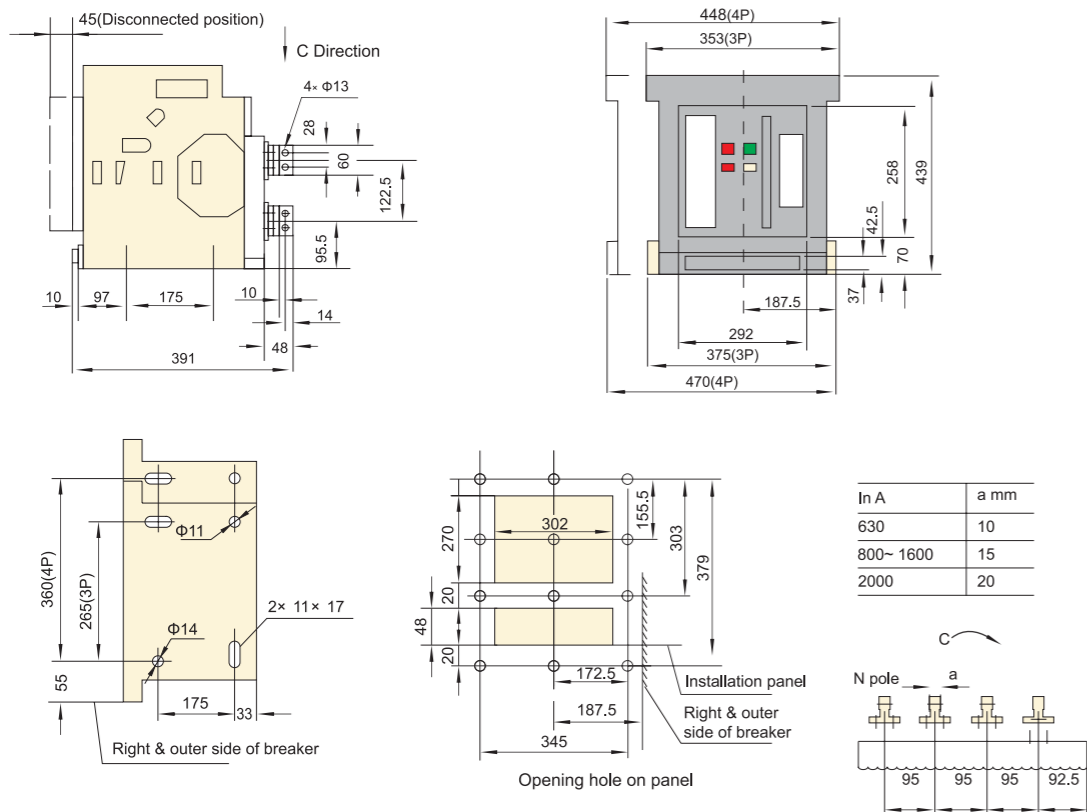


# Dimension Details

## Drawout - Type

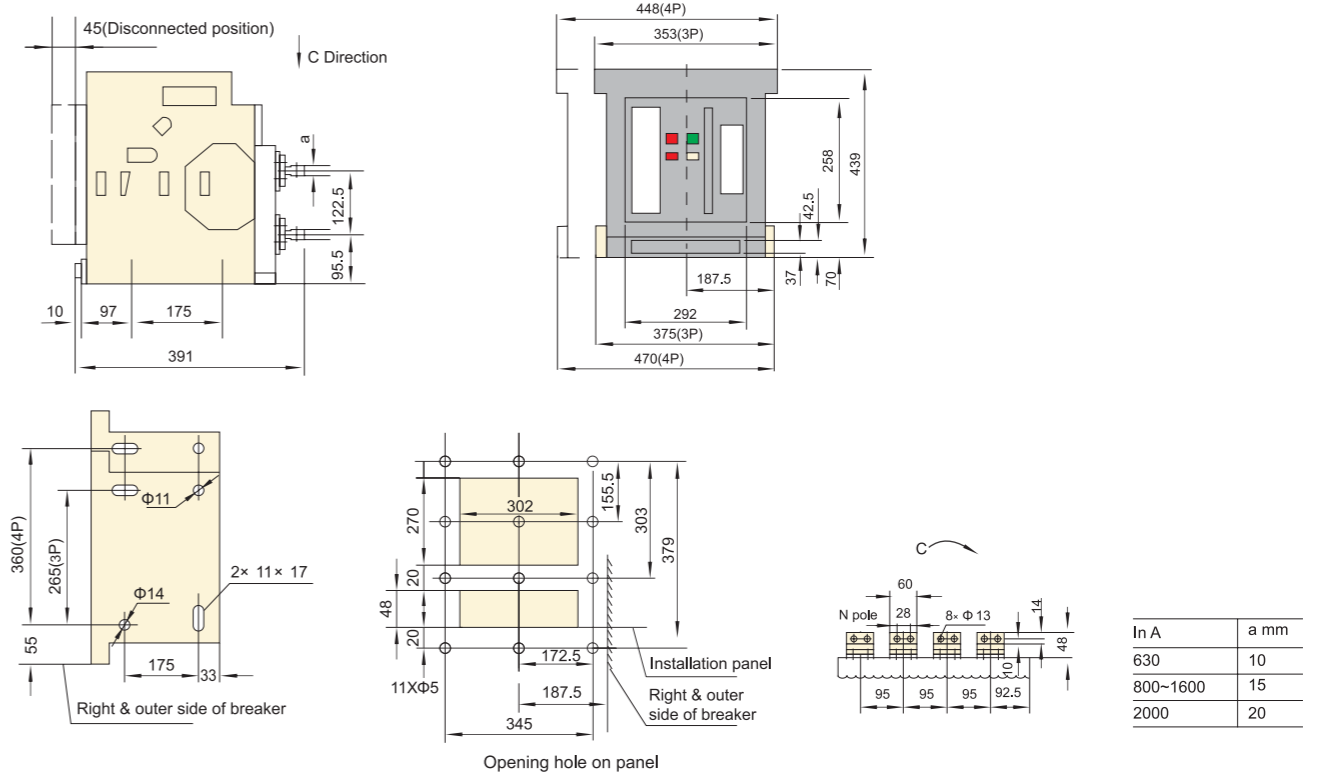


## Drawout - Type, vertical, rear connection

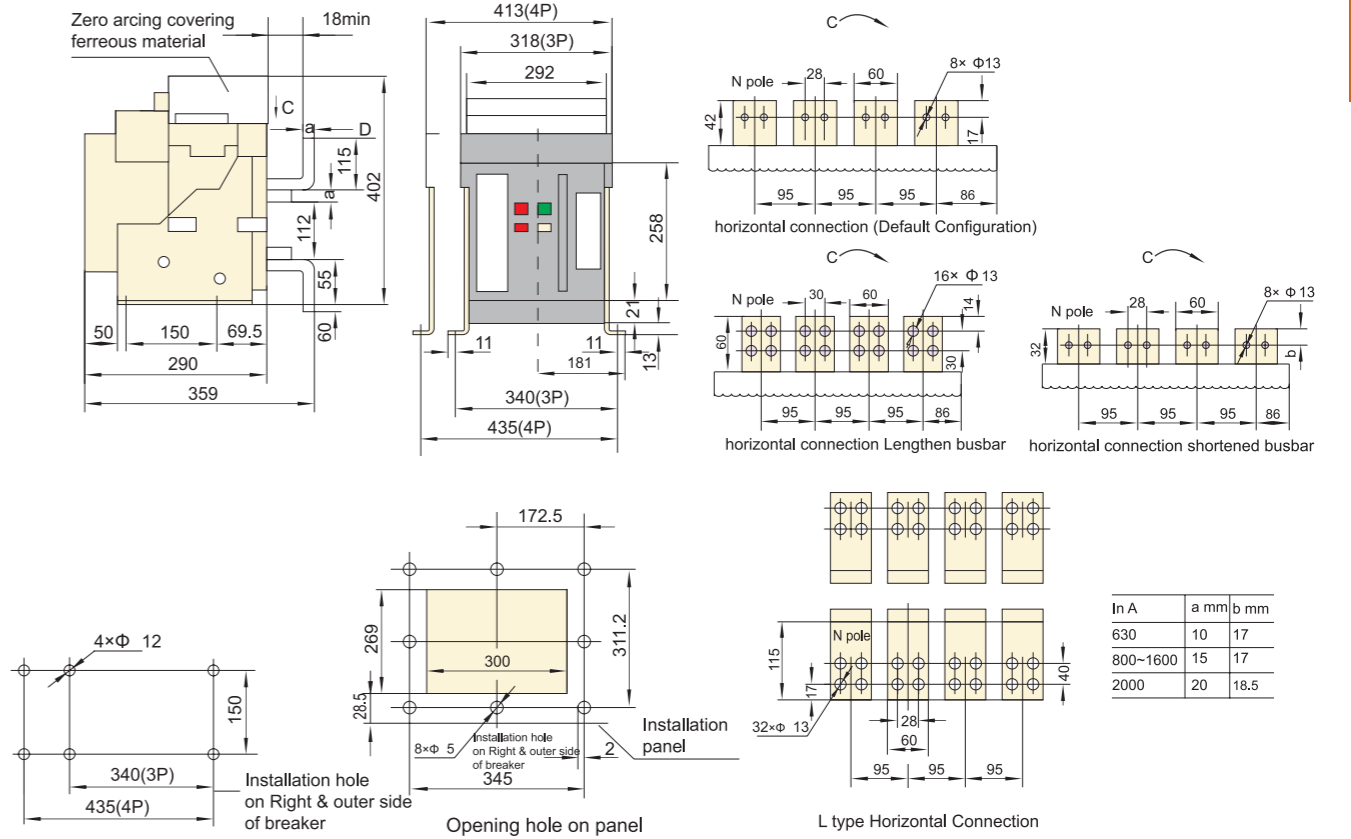


# Dimension Details

## Drawout-Type, horizontal, rear connection



## Fixed-type



## Instruction Manual

### ■ Installation

Unload the breaker from the soleplate of package. If it is drawout type, first pull out the handle under the drawer-base of breaker, and plug it into the hole on central part of plastic cover under the drawer-base crossbeam, anti clock wise turns the handle, the body will slowly slide along the outside of drawer-base.

When the guide rod points to separated position and handle can't be rotated any longer, pull out the handle and firmly grasp the aluminum handle on drawer-base, pull out the breaker body and remove it from the base, then move the base from the sole plate and clean up the dirty things inside the drawer-base

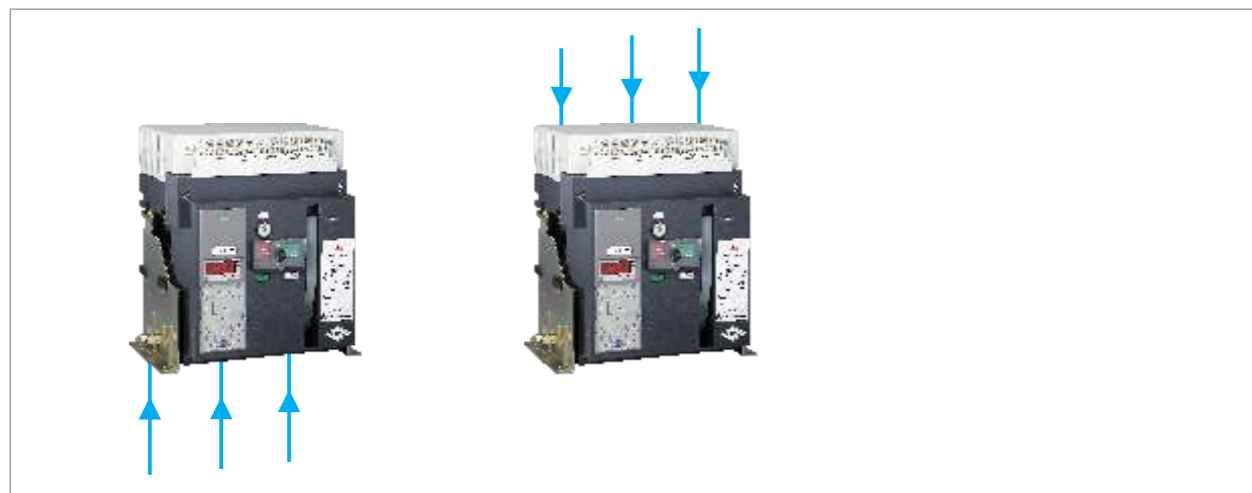


Possible positions

### ■ Power Supply

Check the insulation resistance with a 500V megger, resistance should not be less than 20MΩ when ambient temperature is 20°C ± 5°C and relative humidity is 50%~70%. Otherwise dry it.

ACB can be supplied either from the top or from the bottom without reduction in performance in order to facilitate connection when installed in a switchboard.



## Instruction Manual

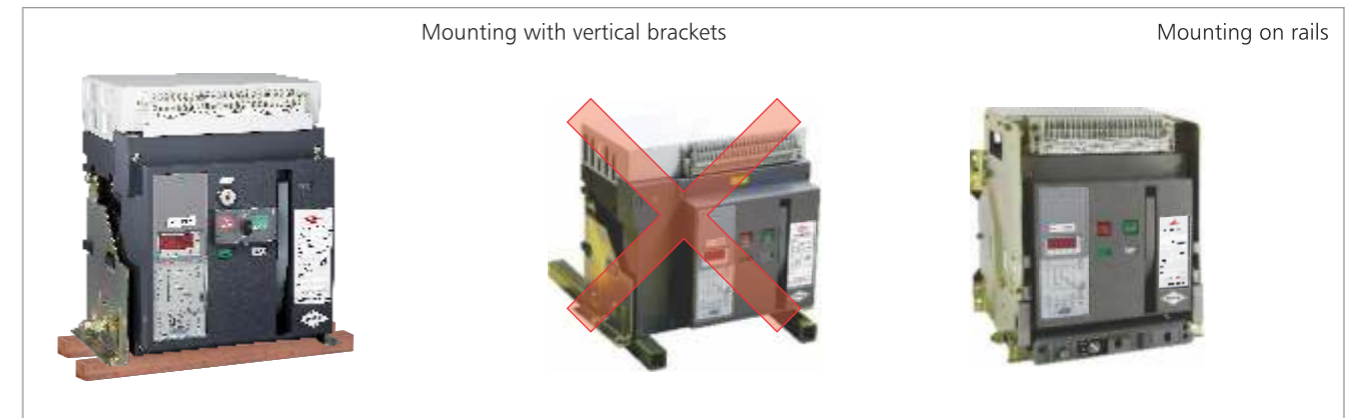
Put the breaker (fixed -type) or drawer-base (drawout-type) into the installation-bracket, and make it fixed, directly connect the cable wire of main circuit to the bus wire of fixed-type circuit breaker. Alternatively put breaker body onto the slideway of drawer-base. Plug the handle into installation hole, clockwise turns it until the under-part of drawer-base points at the connection position and "click" sound is heard. It indicates that breaker body has been connected to its place, then connect the cable of main circuit to drawer-base.

Mounting the circuit-breaker

It is important to distribute the weight of the device uniformly over a rigid mounting surface such as rails or a base plate.

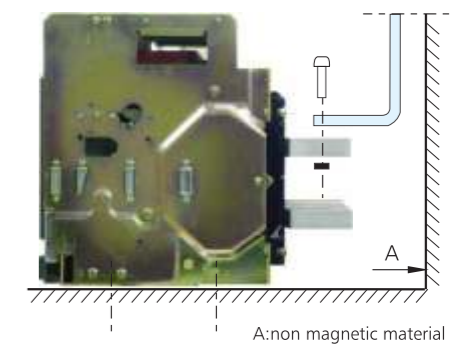
This mounting plane should be perfectly flat (tolerance on support flatness: 2mm). This eliminates any risk of deformation which could interfere with correct operation of the circuit breaker.

ACB device can also be mounted on a vertical plane using the special brackets.



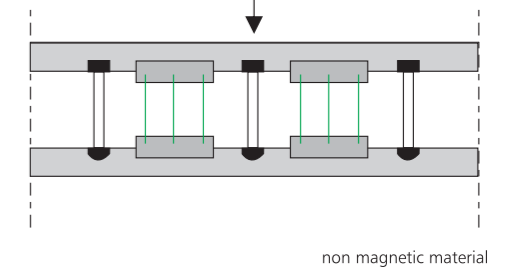
### ■ Partitions

Sufficient openings must be provided in partitions to ensure good air circulation around the circuit breaker; Any partition between upstream and downstream connections of the device must be made of nonmagnetic material.



### ■ Busbars

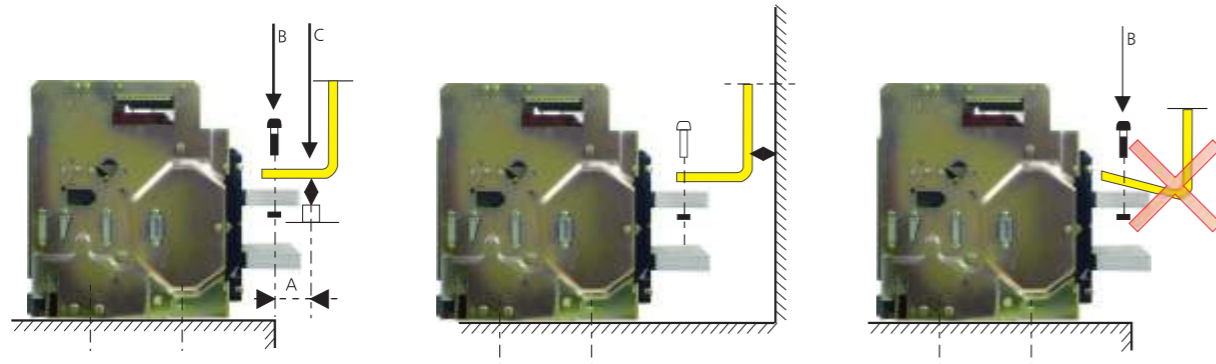
The mechanical connection must be exclude the possibility of formation of magnetic loop around a conductor



# Instruction Manual

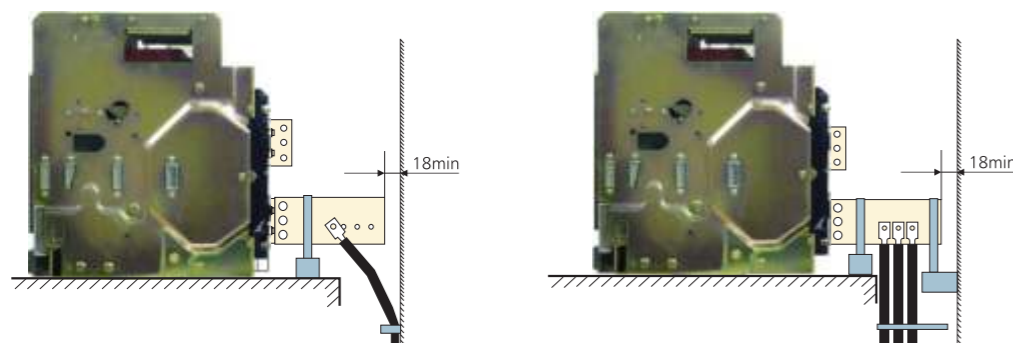
## ■ Busbar Connections

The busbars should be suitably adjusted to ensure the connection points are positioned on the terminals before the bolts are inserted. The connections are held by the supporter which is fixed to the framework of the switchboard, in this way the circuit breaker terminals do not have to support its weight. (This support should be placed close to the terminals).



## ■ Main Circuit adopts cable connection

Users should not apply too strong mechanical strength on the terminals of Air Circuit Breaker. Extend the bus-bar of circuit breaker with connecting bus-bar, position the wiring piece of cable before inserting bolts; the cable should be fixed on the frame of distributing cabinet firmly.

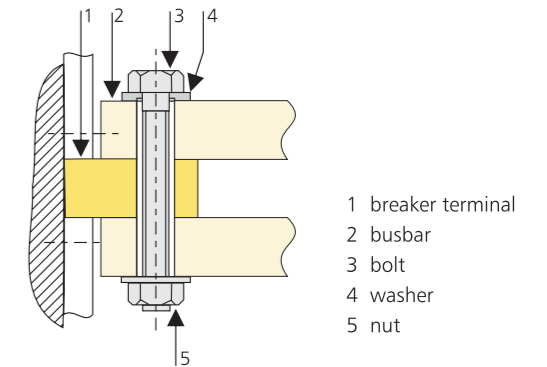


# Instruction Manual

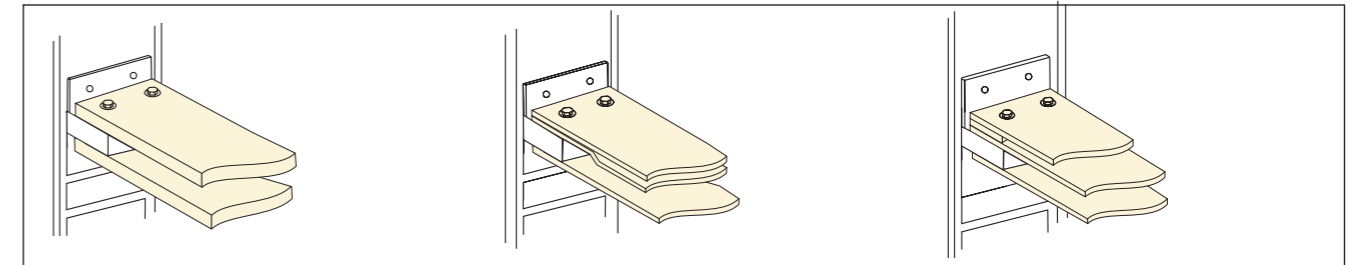
## ■ Clamping

Correct clamping of busbars depends on the tightening torques used for the nuts and bolts, etc. Over-tightening may have the same consequences as under-tightening.

For connecting busbars to the circuit breaker, the circuit breaker, the tightening torques to be used are shown in the table below. These values are for use with copper busbars and steel nuts and bolts, class 8.8.



### Examples



Preferred tightening torque for ACB's tightening components

Type of Screw	Application	Preferred Tightening Torque
M4	Screws for secondary terminals	11 Nm
M10	Installing bolts of Air Circuit Breaker	45 Nm
M12	Connection terminals	50 Nm

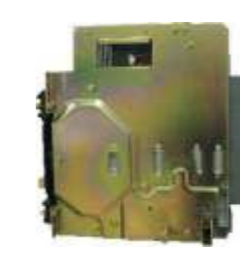
Connected position



Test position



Disconnected position



Drawout position



1. Both main circuit and control circuit are connected.  
2. Normal application conditions



1. The main circuit is disconnected, and the control circuit is connected.  
2. Test application conditions.



Neither the main circuit nor the control circuit is connected.



Main body is out of the drawer seat.

# Instruction Manual

Wiring the secondary circuit according to electric principle diagram

Note: Bolts, Nuts, Gaskets shouldn't be left inside the drawer seat to avoid being blocked.

### Operation

Check the rated voltage of the following components whether conforms to the power voltage. Such as under Voltage Release Shunt Release, Closing Electromagnet, Motor-driven mechanism and intelligent controller.

### Maintenance

Check the technical parameters in time or add some lubricating oil, etc.

This breaker structure is arranged vertically and modularized composition with each functioncell separated, which make the maintenance easy.

It has compact structure, reliable operation and strong free maintenance capability. Please check the technical parameters on the nameplate in according with the requirements of order before installation.

Making the secondary circuit power, the motor-driven mechanism can store energy automatically until hearing the click and energy stored indicating on the panel.

Otherwise press the storage handle for 6 times until hearing the click and the indicator display energy stored.

And the closing operation can be realized either by closing electromagnet or manual button.

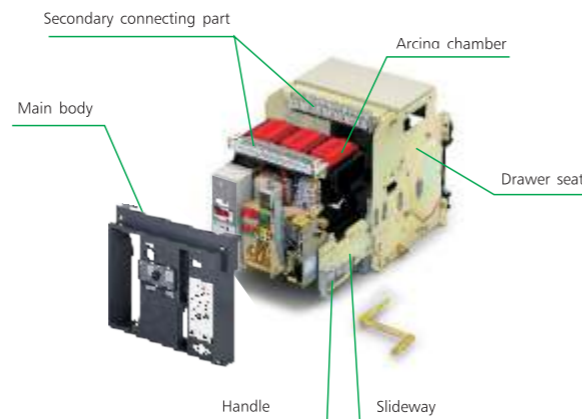
### Recommendation for user's connecting bus-bar

In(A)		630	800	1000	1250	1600	2000
Busbar	Thickness(mm)	5	6	8	10	12	10
	Width(mm)	60	60	60	60	60	60
	Number	2	2	2	2	2	3

Note: the specifications in the table is obtained as the ambient temperature of air circuit breaker is 40°C, with open installation; this is in compliance with the specification of copper busbar adopted under the heating conditions regulated in IEC/IS60947-2.

### Power Loss

In(A)		630	800	1000	1250	1600	2000
Power loss (W)	Drawout type	70	110	172	268	440	530
	Fixed type	34.4	50	78	122	200	262



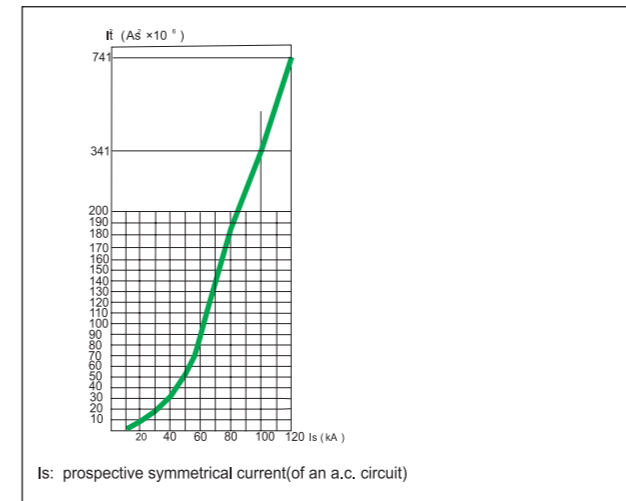
Manual energy-storage



Shake with the manual energy-storage handle up and down about six times to "click".

# Instruction Manual

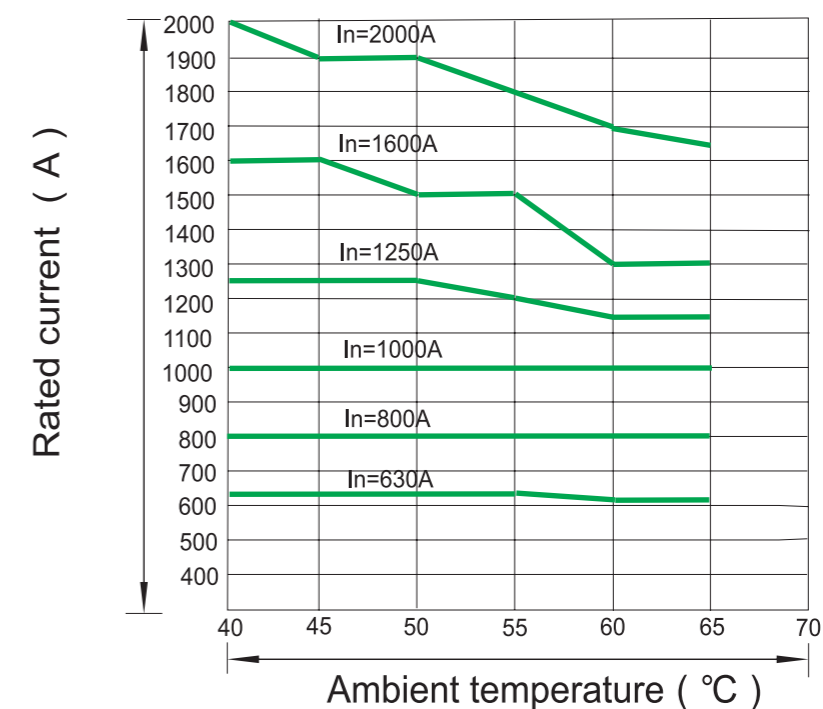
### 10. A $\beta$ Curve



### 11. Temperature compensation correction

Standard	Ambient temperature	Rated Current					
		630	800	1000	1250	1600	2000
IEC/IS60947-2	40°C	630	800	1000	1250	1600	2000
	45°C	630	800	1000	1250	1600	1900
	50°C	630	800	1000	1250	1500	1900
	55°C	630	800	1000	1200	1500	1800
	60°C	610	800	1000	1150	1300	1700
	65°C	610	800	1000	1150	1300	1650
	70°C	473	640	750	938	1200	1400

Note: The ACB is to calibrated at 40°C, special application please refer to the table above and the curve below.



Instruction Manual

Instruction Manual

