

# HDW3

## Air Circuit Breaker

# User Manual

Standard: IEC/EN 60947-2

□ please carefully read the User Manual before the installation and use of the products, and then keep it properly as backup.



## Precautions:

The manual is specially designed for electrical professionals

Please make sure the end users receive this manual

Before using the product, please make sure to read the manual carefully and strictly abide by the contents herein.

## Symbol



Danger



Attention



Prohibited

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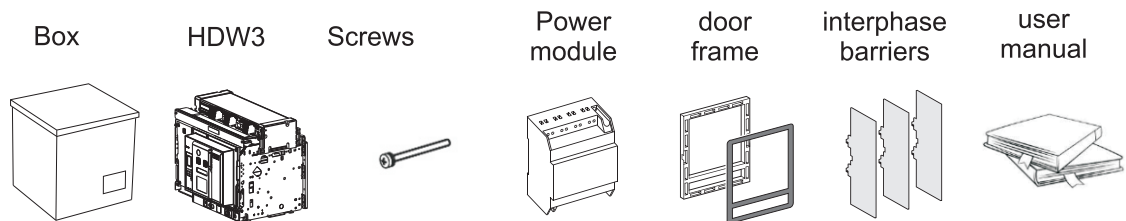
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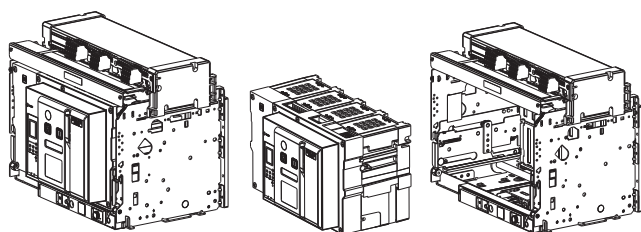
# Knowing HDW3

## Unpacking

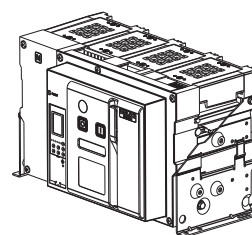


## Knowing ACB

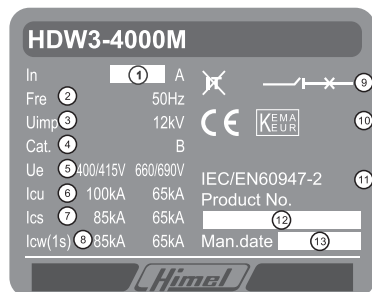
Draw-out type



Fixed type



## Knowing nameplate



1	Rated Current	8	Rated short-time withstand current
2	Rated frequency	9	Applicability
3	Rated impulse withstand voltage	10	Certificates
4	Utilization category	11	Standard
5	Rated voltage	12	Factory code
6	Rated ultimate short-circuitbreaking capacity	13	Manufacture date
7	Rated service short-circuit breaking capacity		

## Dimension and weight

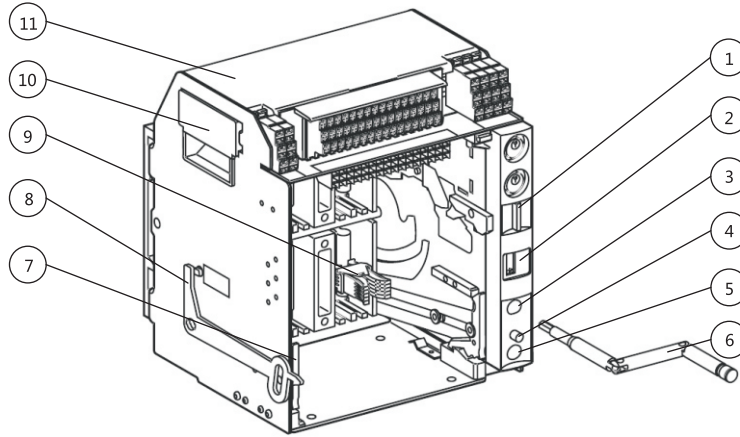
Product type	1000M		1600M&S		2000M&S		3200M&S		4000M&S		6300M&S	
	3P	4P	3P	4P	3P	4P	3P	4P	3P	4P	3P	4P
Dimension of draw-out type (mm)	322*288*	322*358*	322*288	322*358	436*405	436*500	436*465	436*580	439*441	439*556	436*	436*
	329	329	*330	*330	*425	*425	*425	*425	*428.6	*428.6	815*498	930*498
Weight of draw-out type (kg)	27.8	33.1	34	41	73.6	85.5	93.8	115	78	95	233	271.8
Dimension of fixed type (mm)	301*276*	301*346*	301*276	301*346	397*364	397*459	397*428	397*543	352*422	352*537	/	/
	235	235	*229	*229	*327	*327	*327	*327	329.5	329.5	/	/
Weight of fixed type (kg)	13	15.8	14	17	41.4	52	53.4	68	42	52	/	/

High\*length\*depth

# Knowing HDW3

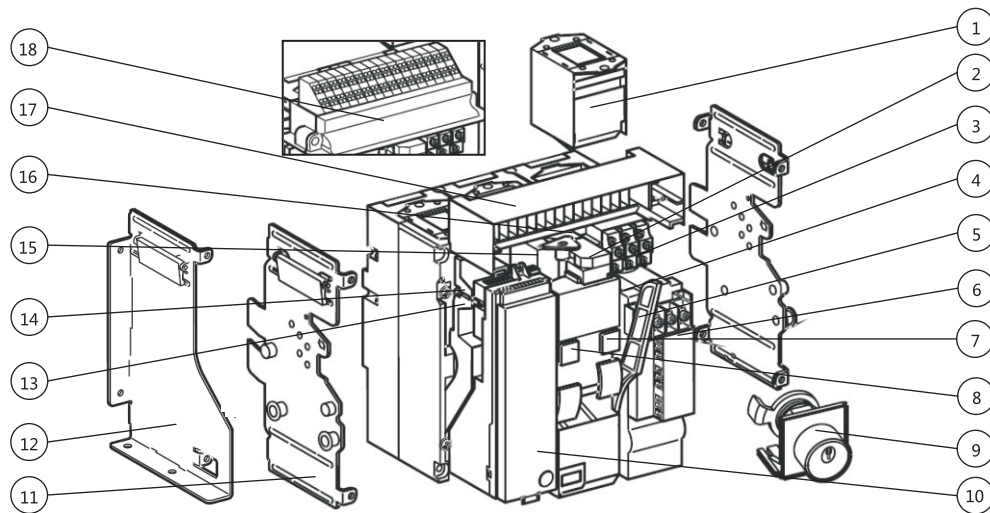
## ACB structure

### Draw-out base



1	key lock	5	rocker storage	9	cluster contact
2	Indicator	6	rocker	10	chassis handle
3	rocker entry	7	draw out handle	11	arc extinguish chamber cover
4	three -position unlocking button	8	door interlock		

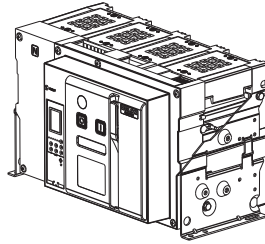
### Main body



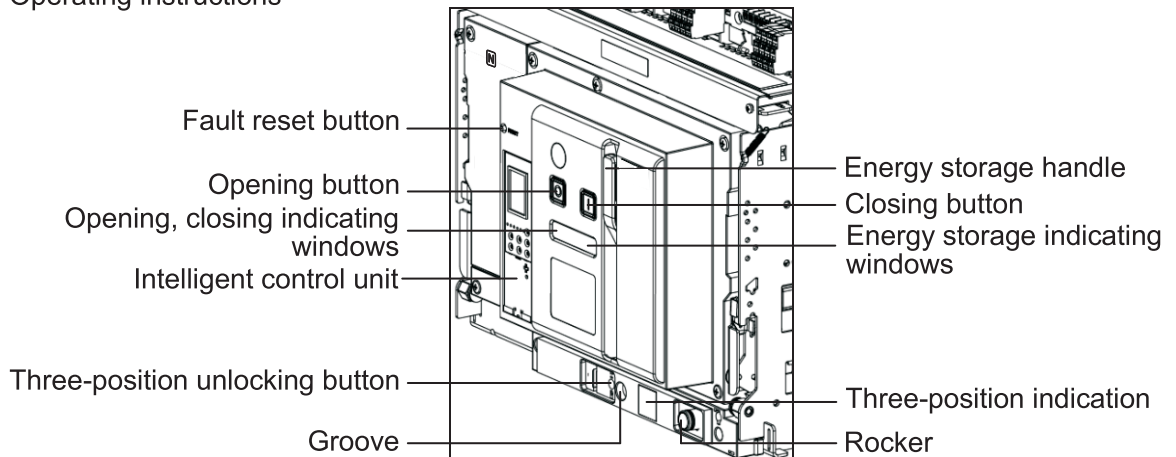
1	arc extinguish chamber	7	Closing button	13	SWT Fault tripping contact
2	XF Closing release	8	Opening button	14	SWT/2 Fault tripping contact or remote restoration
3	OF auxiliary contact	9	Opening button	15	MN undervoltage release
4	PF Ready to close contact	10	iTR controller	16	MX shunt release
5	Energy storage handle	11	Draw-out type side plate	17	Draw-out type secondary circuit terminals
6	MCH motor mechanism	12	Fix type side plate	18	Fixed type secondary circuit terminals

# Recognizing HDW3

Fixed



Operating instructions



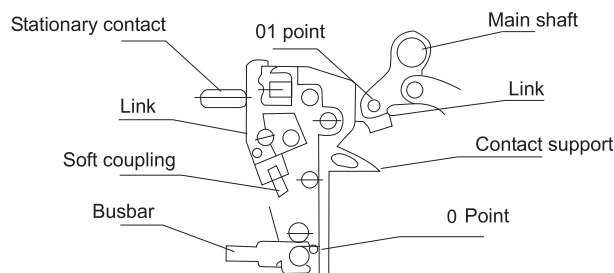
Switch operation  (the under-voltage coils should be energized first)

1. Firstly watch the indicating window to confirm whether the circuit breaker is in an opening state or not, if closing, press the opening button.
2. Rotate the energy storage handle downwards to store the energy, watch the "Energy storage" window to identify it is in the "Energy storage" state or not.
3. Press the closing button, the circuit breaker will be closed.
4. Press the opening button, the circuit breaker will be opened.
5. If closing is needed again, "Energy storing" will be needed as well.

Drawer shelf operation

1. When the circuit is in the connection position, the indicator shows "connection", the rocker is pulled out and inserted in the groove.
2. Rotate the rocker anti-clockwise to move the circuit breaker from the "connection" position to the "test" position; the indicator shows "test" and the three-position unlocking button pops up, the rock can not be rotated anymore.
3. Press the three-position unlocking button, continue to rotate the rocker anti-clockwise to the "separation" position. The indicator indicates "separation", the three-position unlocking button pops up.
4. Press the unlocking button draw out the body of the circuit breaker.

Inner structure

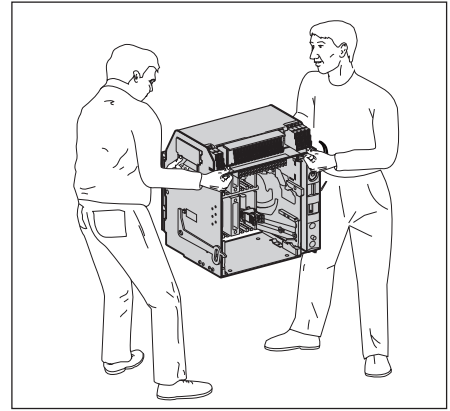
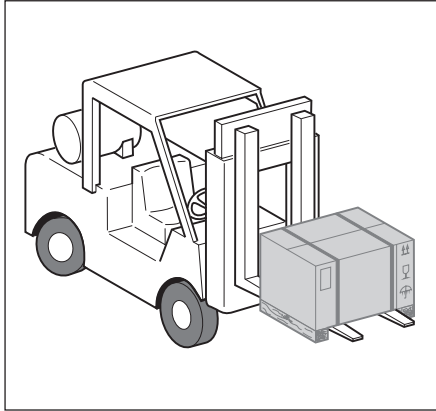


# TRANSPORT HDW3

Handle the product carefully during transportation, as shown in the following figures.



Avoid severe collision.  
It is forbidden to put the circuit breaker upside down or tumble the circuit breaker.

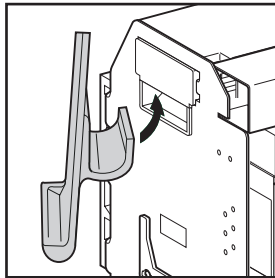


The circuit breaker can be lifted only when the main body and chassis are at "connection" position.

## • Draw-out Type

### 1. Handling the chassis

Insert the handling tool into the chassis handle of the circuit breaker, then lift the breaker up.

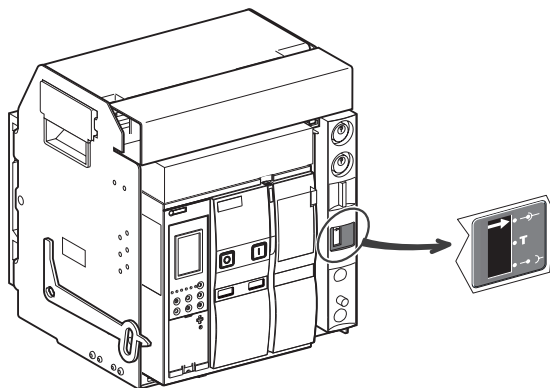


### 2. Handling together with the body of the circuit breaker

How to remove the main body refers to Page 13, 14.

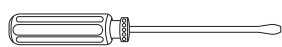


Handling fixed type circuit breaker is same as handling draw-out type circuit breaker

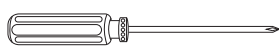


# Installing HDW3 to the enclosure

## Tools in need



Flathead screwdriver



Phillips head  
screwdriver



Spanner

## Transportation conditions

Ambient temperature:  $-25^{\circ}\text{C}\sim 55^{\circ}\text{C}$

Relative humidity: not exceed 90% ( $25^{\circ}\text{C}$ )

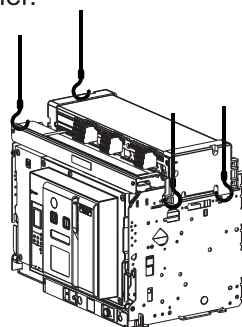
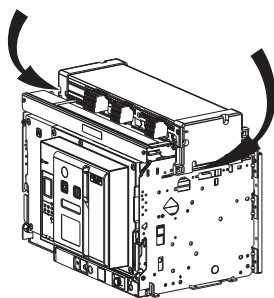
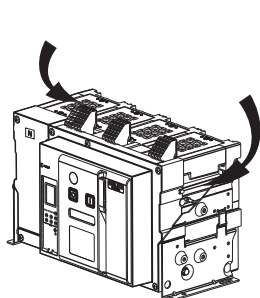
In the process of transportation, handle with care, no upside down, avoid violent collision

## Handing



Handle carefully

The circuit breaker busbar is a little heavier.



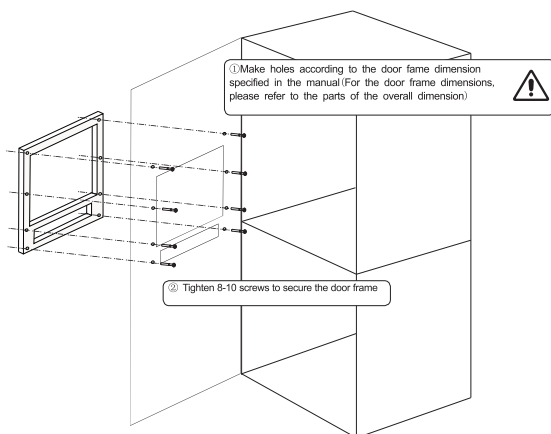
## Installation conditions

The installation site shall be vertical, with inclination at all directions not exceeding 5.

Pollution degree: 3

Installation grade: The circuit breaker main circuit and under-voltage release coil as well as the primary coil of the power transformer are rated as grade IV the auxiliary circuit and the control circuit are rate as grade III

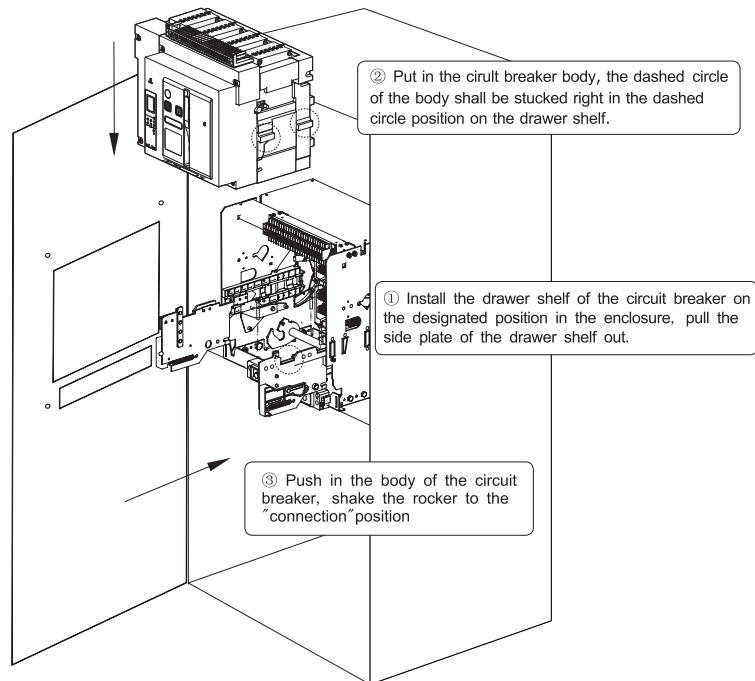
## Installation mode



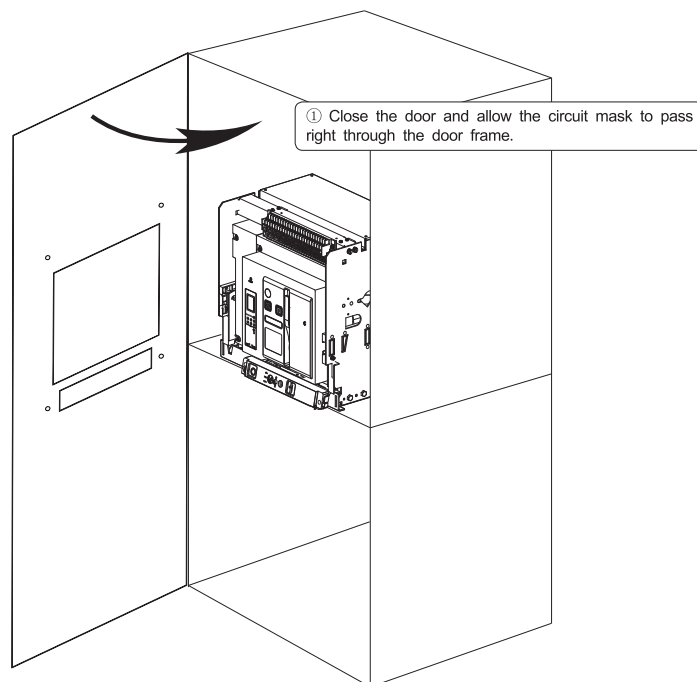


# Installing HDW3 to the enclosure

## Installing the drawer shelf



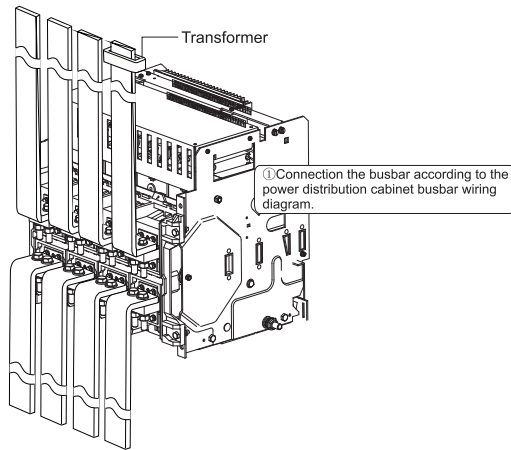
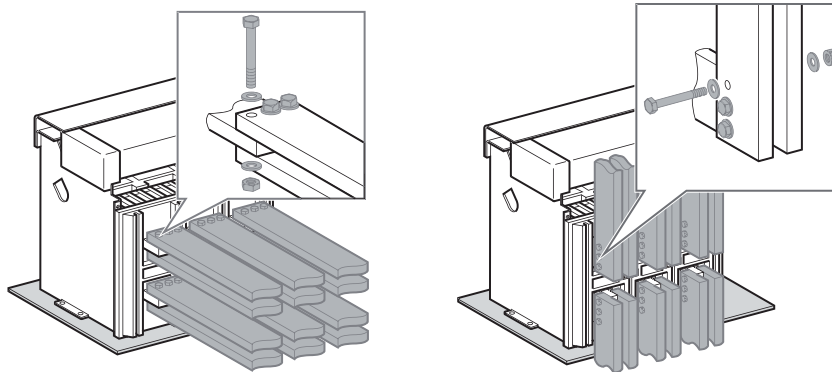
## Positioning and fixation



# Installing HDW3

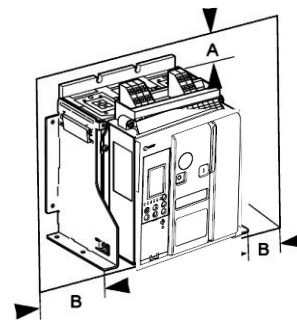
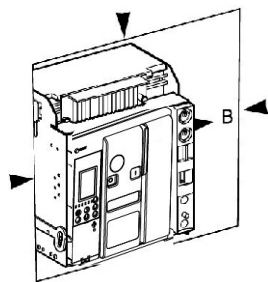
## Busbar connection

Draw-out and fixed type



Remark: vertical connection only for 1600AF/4000AF

## Safety clearances



Safety clearances (mm)	draw-out type*		fixed type	
	A	B	A	B
Non-conductor	0	10	0	0
Metals	0	10	0	0
Energized conductor	30	60	100	60

\*only suitable for 1000AF and 1600AF

# Installing HDW3

## Recommended dimension of busbar

Busbar type table in different temperature

Busbar max temperature

Material of busbar is bare copper

Frame (AF)	Rated current (A)	ambient temperature +40℃				ambient temperature +50℃				ambient temperature +60℃			
		5mm Busbar		10mm Busbar		5mm Busbar		10mm Busbar		5mm Busbar		10mm Busbar	
		Quantity	dimension	Quantity	dimension	Quantity	dimension	Quantity	dimension	Quantity	dimension	Quantity	dimension
1000	400	2	30*5	1	30*10	2	30*5	1	30*10	2	30*5	1	30*10
	630	2	40*5	1	40*10	2	40*5	1	40*10	2	40*5	1	40*10
	800	2	50*5	1	50*10	2	50*5	1	50*10	2	50*5	1	50*10
	1000	3	50*5	2	40*10	3	50*5	2	40*10	4	50*5	2	50*10
1600	400	2	30*5	1	30*10	2	30*5	1	30*10	2	30*5	1	30*10
	630	2	40*5	1	40*10	2	40*5	1	40*10	2	40*5	1	40*10
	800	2	50*5	1	50*10	2	50*5	1	50*10	2	50*5	1	50*10
	1000	3	50*5	2	40*10	3	50*5	2	40*10	3	50*5	2	40*10
	1250	4	40*5	2	40*10	4	50*5	2	50*10	4	50*5	2	50*10
	1600	4	50*5	2	50*10	4	50*5	2	50*10	4	50*5	2	50*10
2000	630	2	40*5	1	40*10	2	50*5	1	50*10	2	60*5	1	60*10
	800	2	50*5	1	50*10	2	50*5	1	50*10	2	60*5	1	60*10
	1000	3	50*5	2	40*10	3	50*5	2	40*10	3	60*5	2	50*10
	1250	3	60*5	2	50*10	3	60*5	2	50*10	3	60*5	2	50*10
	1600	4	60*5	2	60*10	4	60*5	2	60*10	4	60*5	2	60*10
	2000	6	60*5	3	60*10	6	60*5	3	60*10	6	60*5	3	60*10
3200	2000	4	100*5	2	100*10	4	100*5	2	100*10	4	100*5	2	100*10
	2500	4	100*5	2	100*10	4	100*5	2	100*10	4	100*5	2	100*10
	3200	8	100*5	4	100*10	8	100*5	4	100*10	8	100*5	4	100*10
4000	1600	2	100*5	1	100*10	2	100*5	1	100*10	2	100*5	1	100*10
	2000	4	100*5	2	100*10	4	100*5	2	100*10	4	100*5	2	100*10
	2500	4	100*5	2	100*10	4	100*5	2	100*10	4	100*5	2	100*10
	3200	8	100*5	4	100*10	8	100*5	4	100*10	8	100*5	4	100*10
	4000			5	100*10			5	100*10			6	100*10
6300	4000			5	100*10			5	100*10			6	100*10
	5000			7	100*10			7	100*10			8	100*10
	6300			8	100*10			8	100*10				

Remark: The data above come from experiment and theory, only for instruction.

### Screw table

	1000M	1600M&S	2000M&S	3200M&S	4000M&S	6300M&S
Screw dimension	M10	M10	M12	M12	M10	M12
Torque	50N·m	50N·m	95N·m	95N·m	50N·m	95N·m

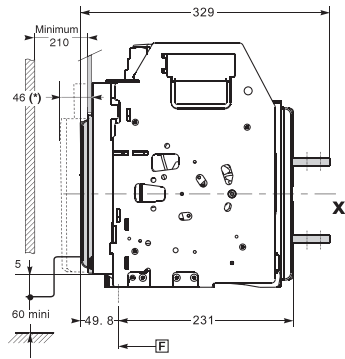
### Holes dimension on busbar and installation torque

	1000M	1600M&S	2000M&S	3200M&S	4000M&S	6300M&S
Hole dimension	φ 11	φ 11	φ 13	φ 13	φ 11	φ 13
Torque	50N·m	50N·m	95N·m	95N·m	50N·m	95N·m

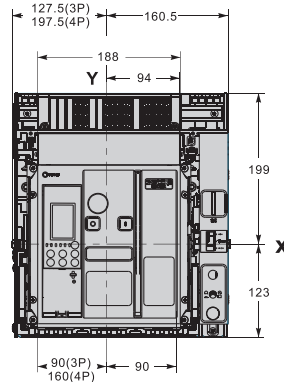
# Installing HDW3

1000M Dimension  
1000M Draw-out type 3P&4P

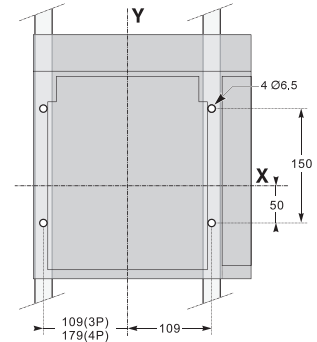
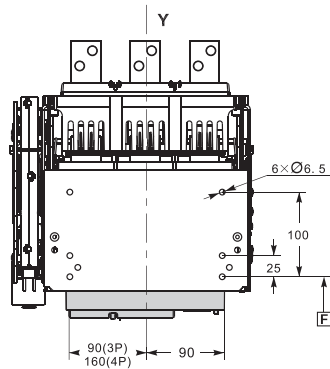
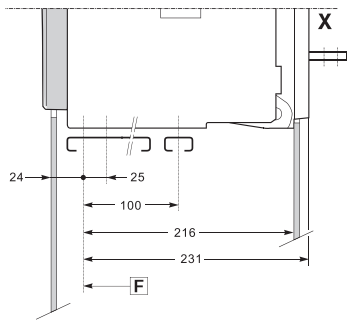
**F** Datum point



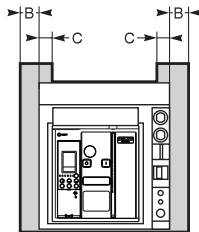
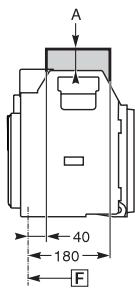
(\*) Disengaged position



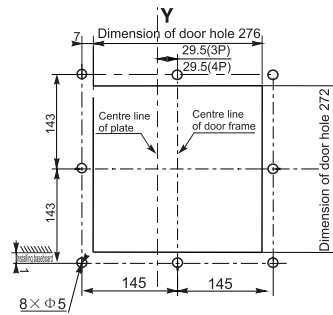
## Horizontal Installation



## Safety clearance



## Holes size on door

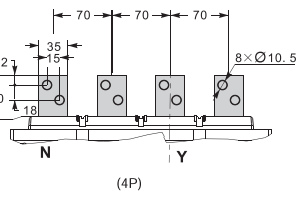
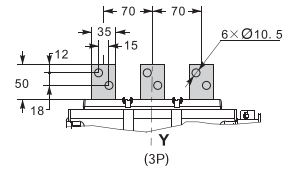
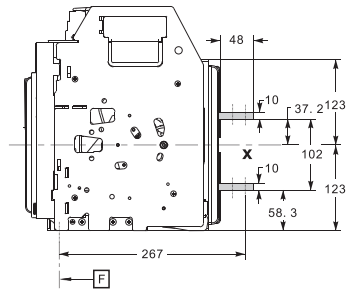
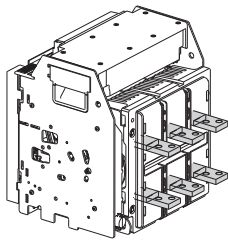


Safety clearance (mm)	Draw-out type		
	A	B	C
Non-conductor	0	10	0
Metals	0	10	0
Energized conductor	30	60	30

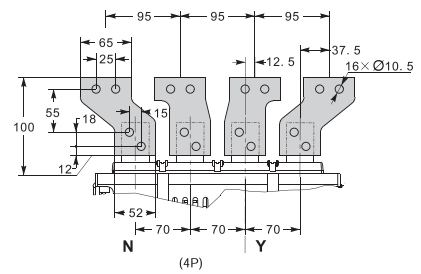
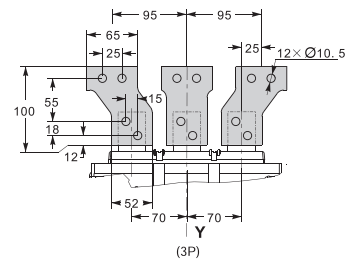
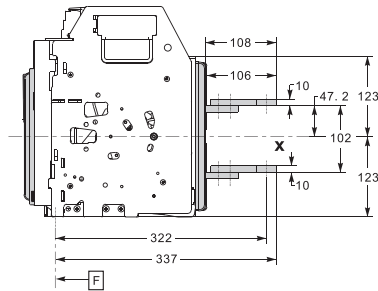
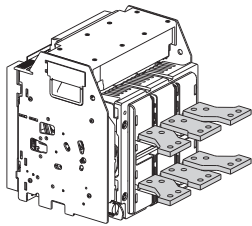
# Installing HDW3

1000M Draw-out type connection **F** Datum point

Horizontal connection

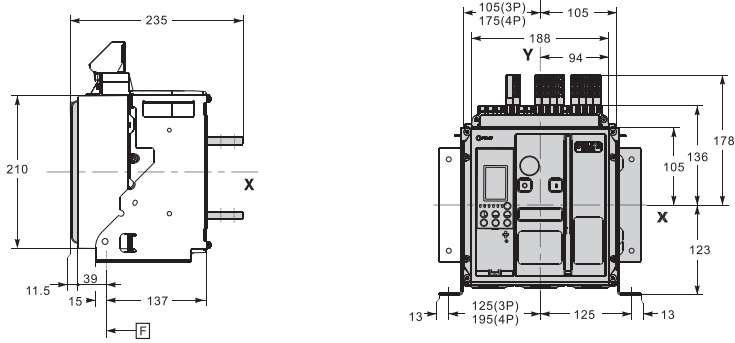


connection with expanding terminals

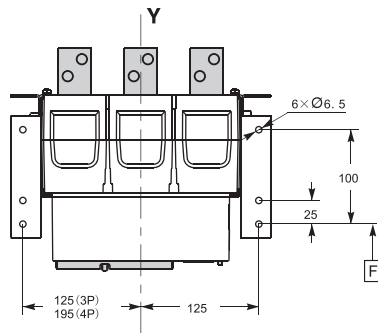
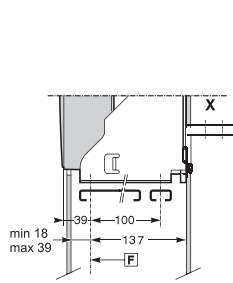


# Installing HDW3

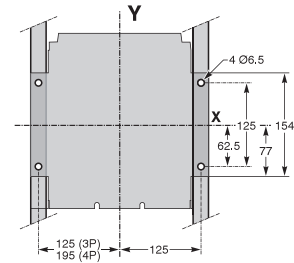
1000M Fixed type 3P&4P dimension F Datum point



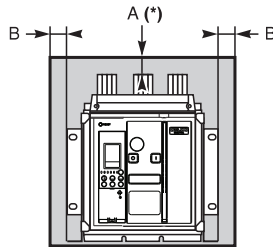
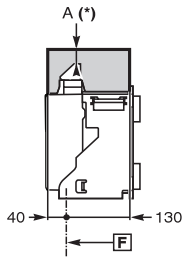
## Horizontal installation



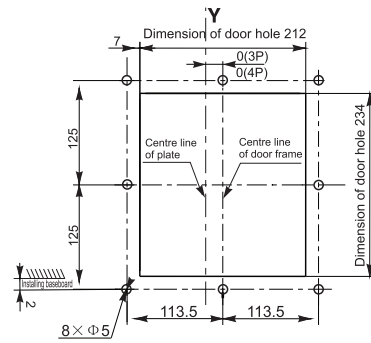
## Vertical installation



## Safety clearance



## Holes size on door



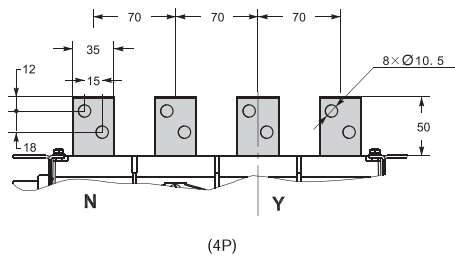
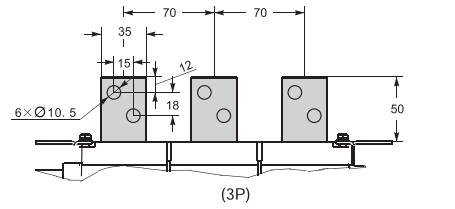
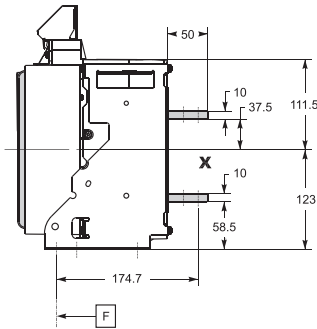
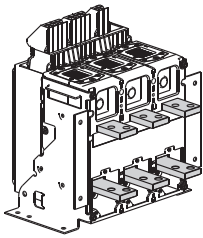
Safety clearance (mm)	Fixed type	
	A	B
Non-conductor	0	0
Metals	0	0
Energized conductor	100	60

# Installing HDW3

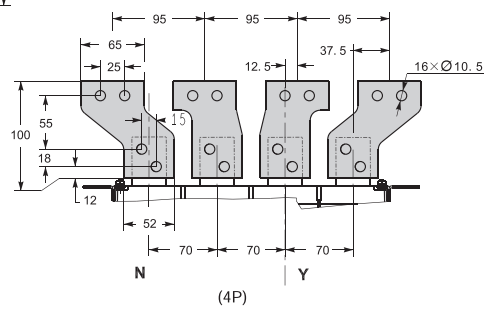
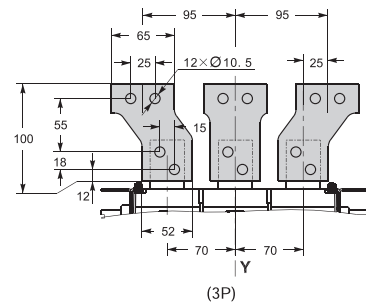
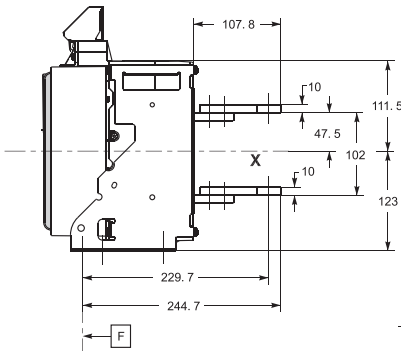
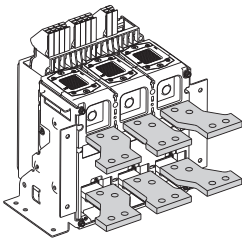
1000M fixed connection

**F** Datum point

## Horizontal connection



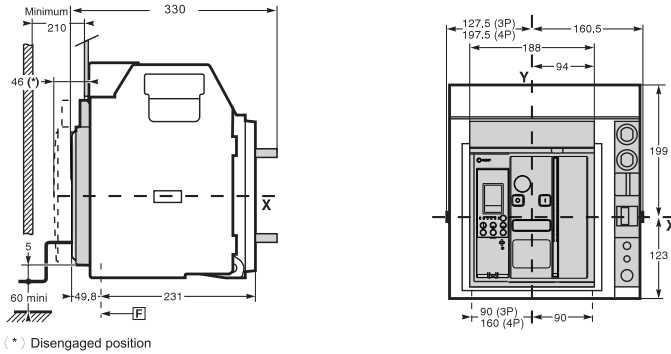
## Connection with expanding terminals



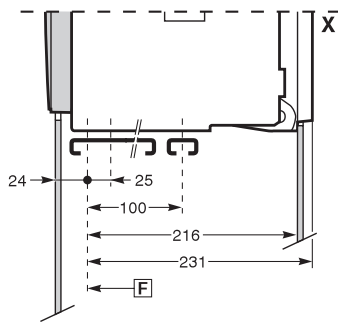
# Installing HDW3

## 1600M&S Dimension

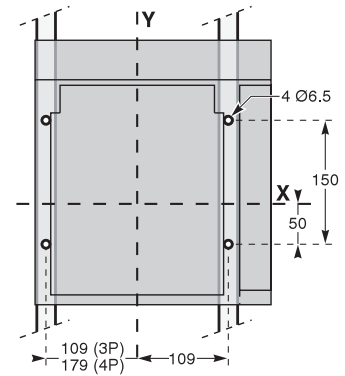
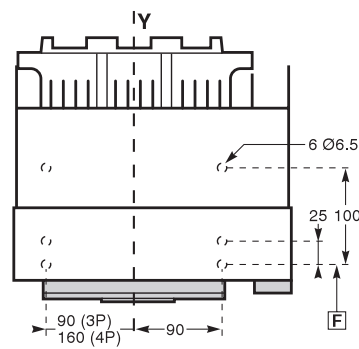
1600M&S Draw-out type 3P&4P Dimension  Datum Point



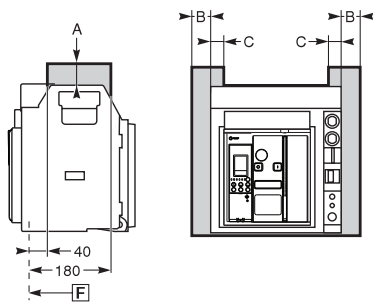
### Horizontal installation



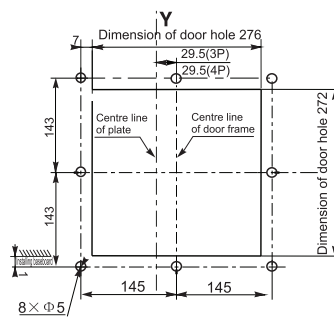
### Vertical installation



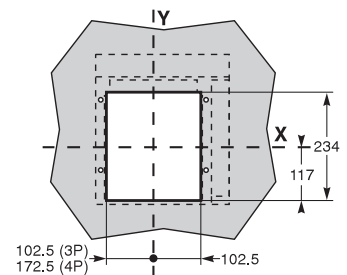
### Safety clearance



### Holes size on door



### Holes size on back plate



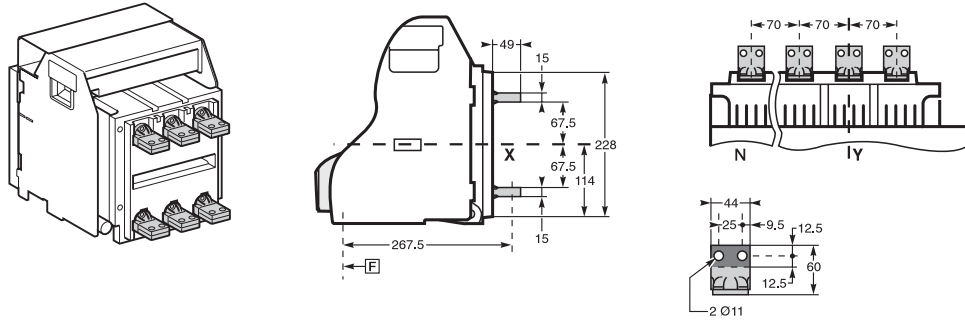
Safety clearance (mm)	Draw-out type		
	A	B	C
Non-conductor	0	10	0
Metals	0	10	0
Energized conductor	30	60	30



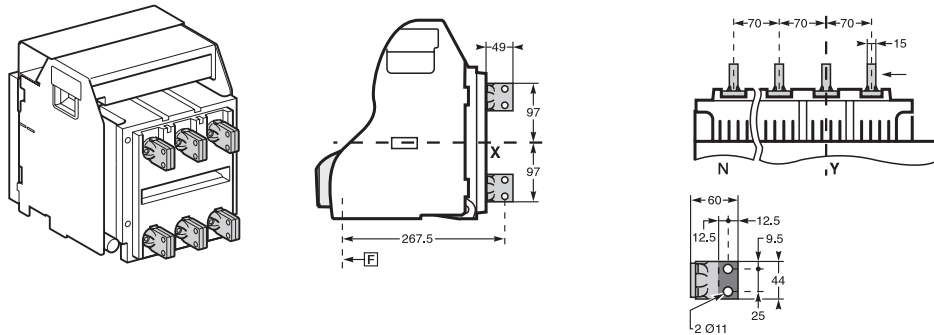
# Installing HDW3

1600M&S Draw-out type connection **F** Datum Point

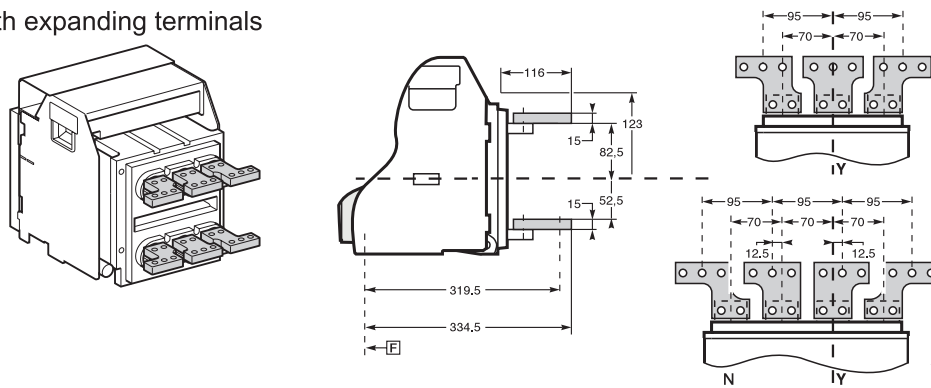
Horizontal connection



Vertical

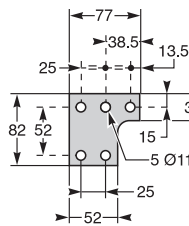


Connection with expanding terminals

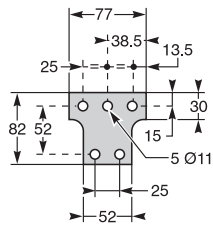


Refer to ' connection with expanding terminals'

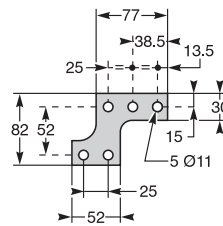
4 Poles centre-left or centre-right expanding terminal



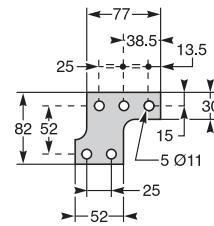
3 Poles centre expanding terminal



4 Poles left or right expanding terminal



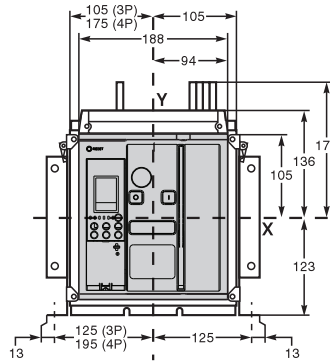
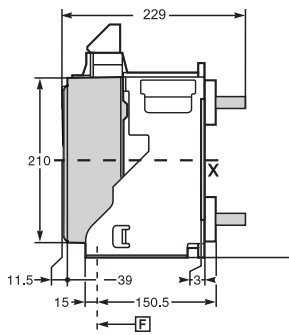
3 Poles left or right expanding terminal



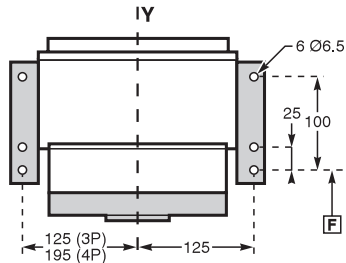
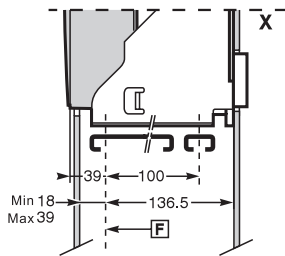
# Installing HDW3

1600M&S Fixed type 3P&4P dimension

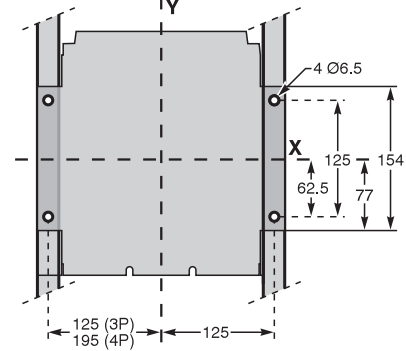
**F** Datum Point



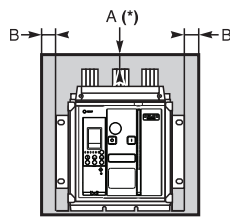
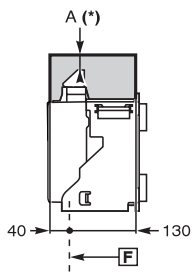
Horizontal installation



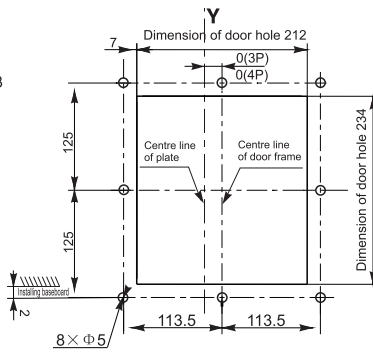
Vertical installation



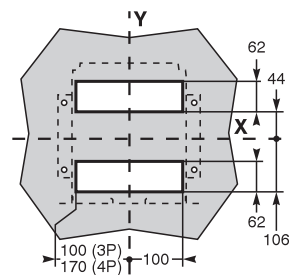
Safety clearance



Holes size on door



Holes size on back plate

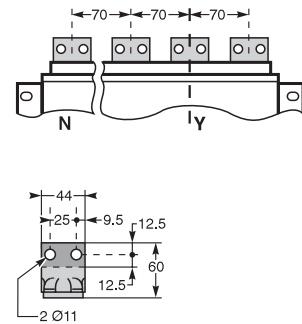
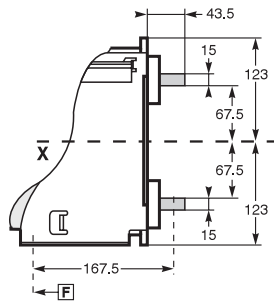
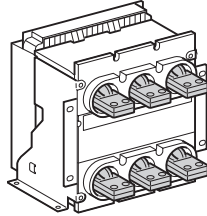


Safety clearance (mm)	Fixed type	
	A	B
Non-conductor	0	0
Metals	0	0
Energized conductor	100	60

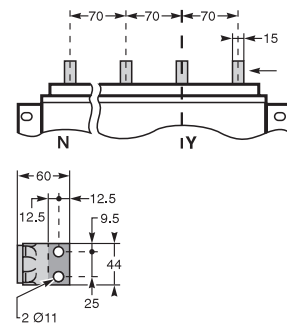
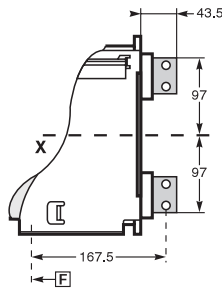
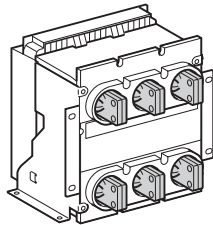
# Installing HDW3

1600M&S Fixed type type connection **F** Datum Point

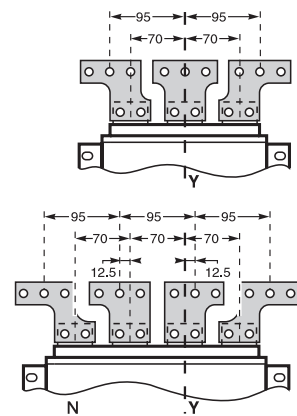
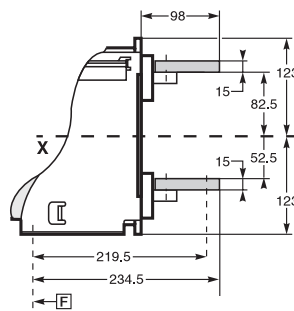
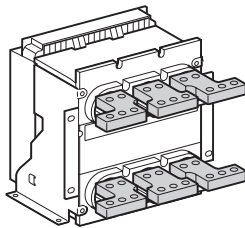
## Horizontal connection



## Vertical

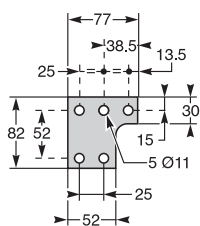


## Connection with expanding terminals

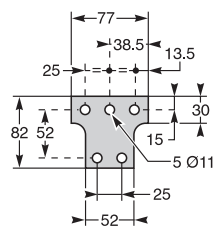


## Refer to 'connection with expanding terminals'

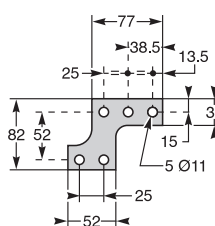
4 Poles centre-left or centre-right expanding terminal



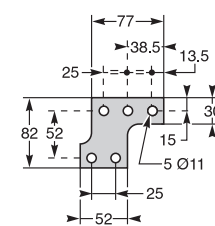
3 Poles centre expanding terminal



4 Poles left or right expanding terminal



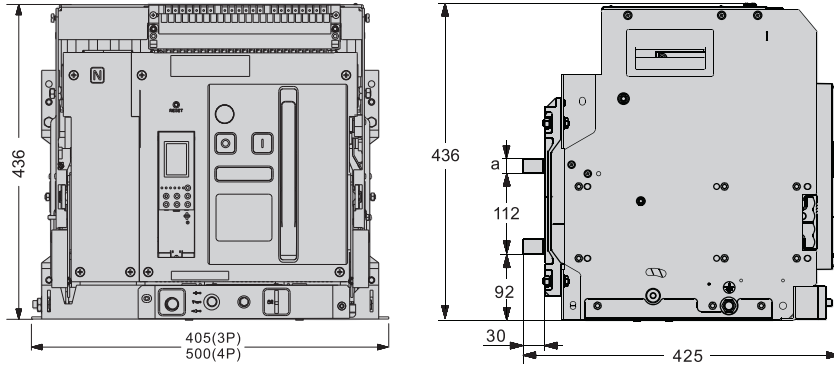
3 Poles left or right expanding terminal



# Installing HDW3

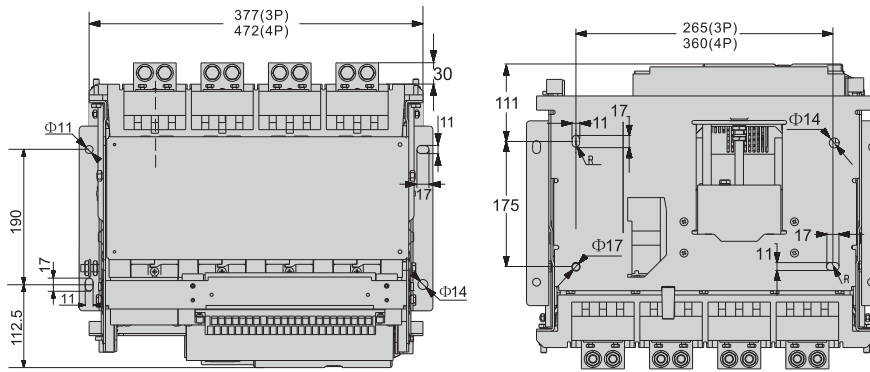
## 2000M&S Dimension

2000M&S Draw-out type 3P&4P Dimension



Horizontal installation

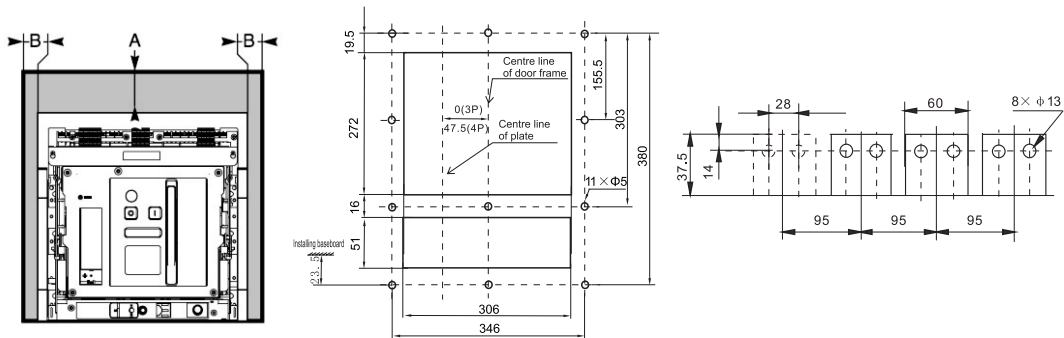
\*Cover is 5mm beyond door frame.



Safety clearance

Holes size on door

Holes size on back plate

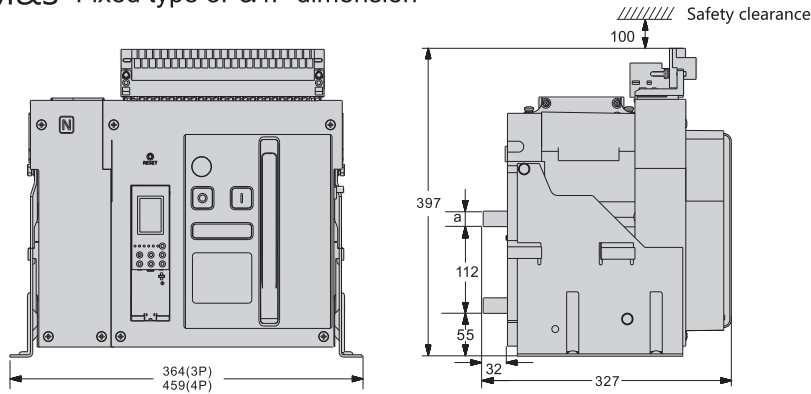


Safety clearance (mm)	Draw-out type	
	A	B
Non-conductor	0	0
Metals	0	0
Energized conductor	100	60

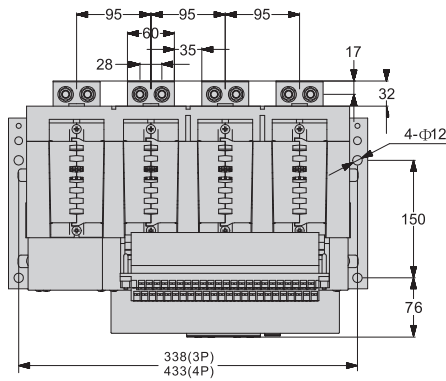
In ( A )	a ( mm )
630-800	10
1000-1600	15
2000	20

# Installing HDW3

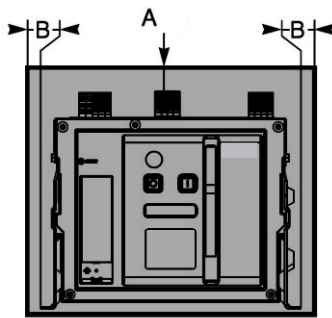
## 2000M&S Fixed type 3P&4P dimension



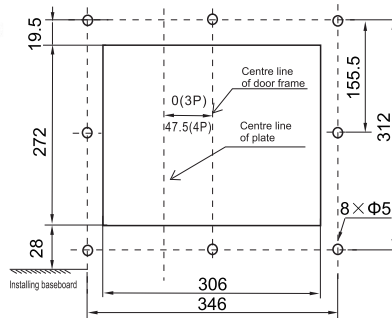
### Horizontal installation \*Cover is 5mm beyond door frame.



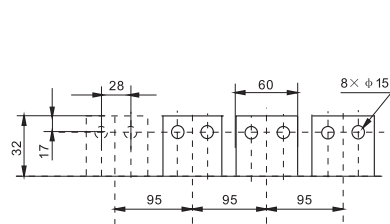
### Safety clearance



### Holes size on door



### Holes size on back plate



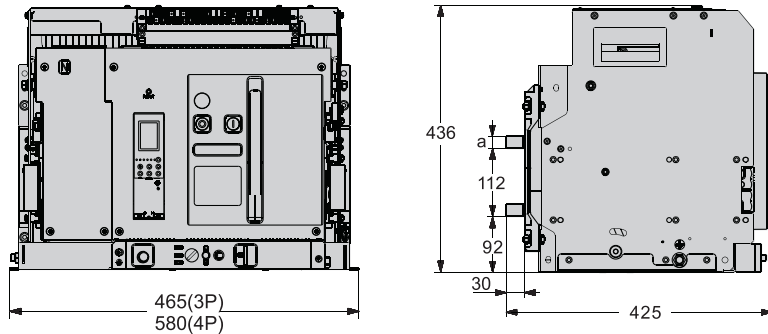
Safety clearance (mm)	Fixed type	
	A	B
Non-conductor	0	0
Metals	0	0
Energized conductor	100	60

In ( A )	a ( mm )
630-800	10
1000-1600	15
2000	20

# Installing HDW3

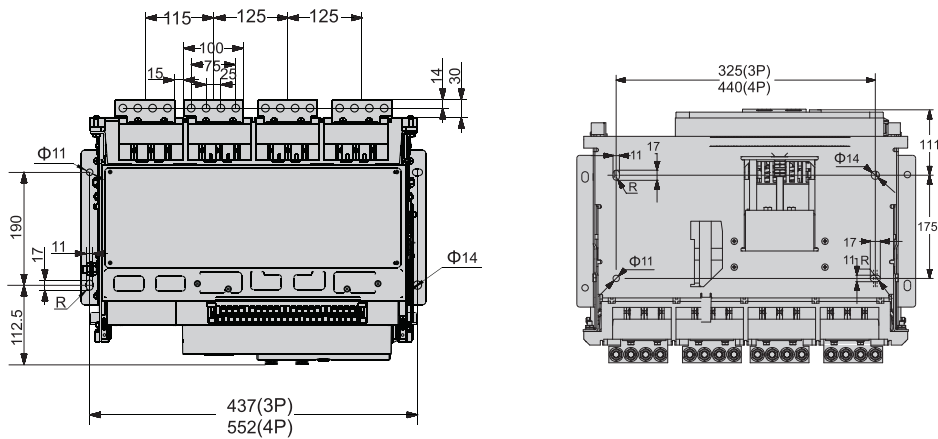
## 3200M&S Dimension

3200M&S Draw-out type 3P&4P Dimension



Horizontal installation

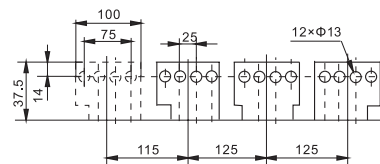
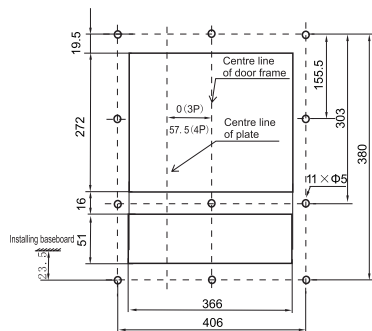
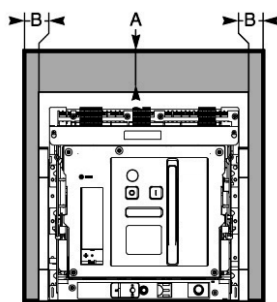
\*Cover is 5mm beyond door frame.



Safety clearance

Holes size on door

Holes size on back plate

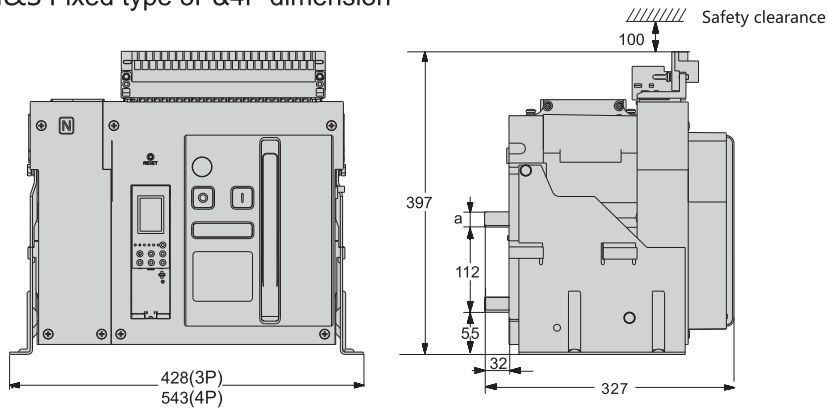


Safety clearance (mm)	Draw-out type	
	A	B
Non-conductor	0	0
Metals	0	0
Energized conductor	100	60

In ( A )	a ( mm )
2000-2500	20
3200	30

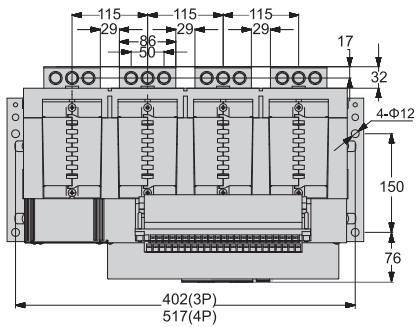
# Installing HDW3

## 3200M&S Fixed type 3P&4P dimension

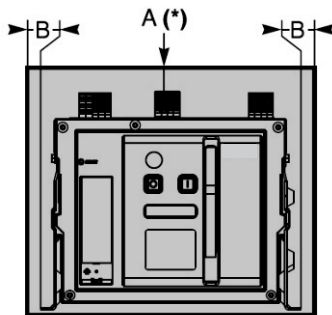


## Horizontal installation

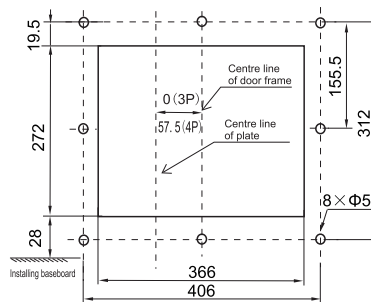
\*Cover is 5mm beyond door frame.



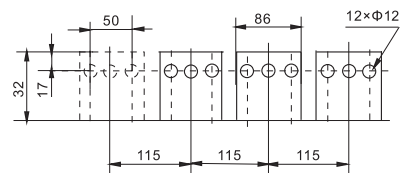
## Safety clearance



## Holes size on door



## Holes size on back plate



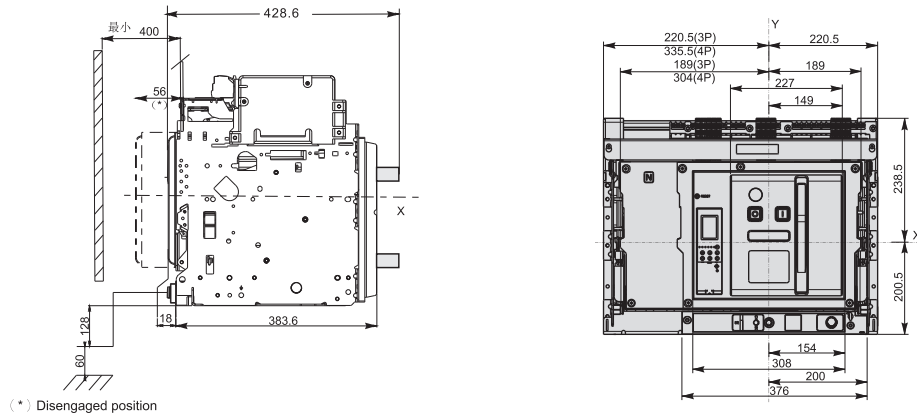
Safety clearance (mm)	Fixed type	
	A	B
Non-conductor	0	0
Metals	0	0
Energized conductor	100	60

In ( A )	a ( mm )
2000-2500	20
3200	30

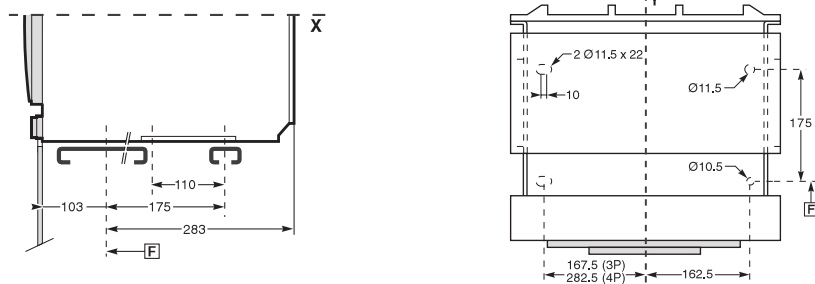
# Installing HDW3

## 4000M&S Dimension

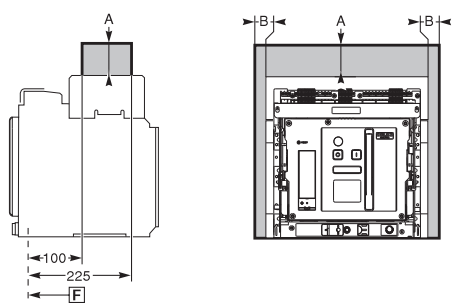
4000M&S Draw-out type 3P&4P Dimension **F** Datum Point



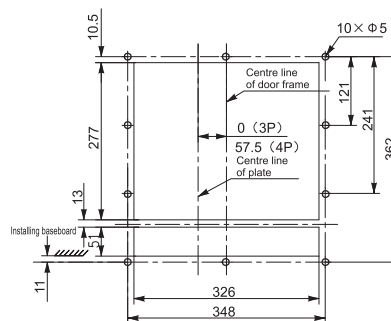
### Horizontal installation



### Safety clearance



### Holes size on door



Safety clearance (mm)	Draw-out type	
	A	B
Non-conductor	0	0
Metals	0	0
Energized conductor	100	60

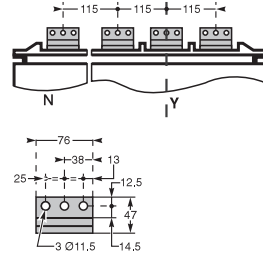
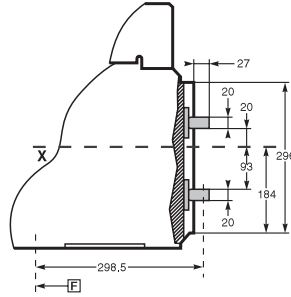
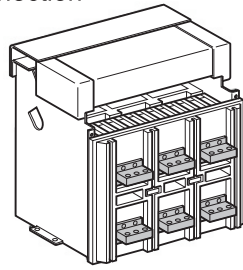


# Installing HDW3

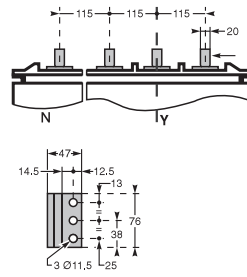
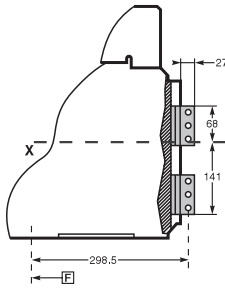
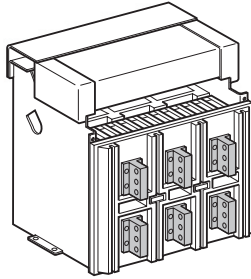
4000M&S Draw-out type connection **F** Datum Point

1600A-3200A

Horizontal connection

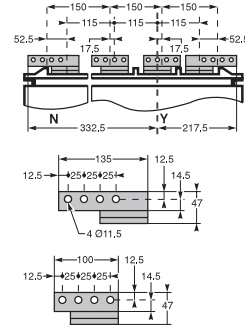
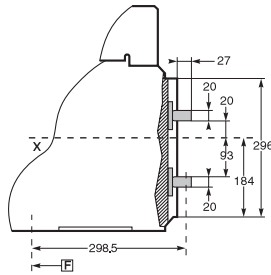
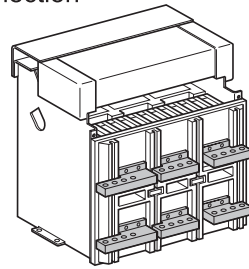


Vertical

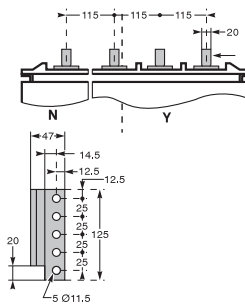
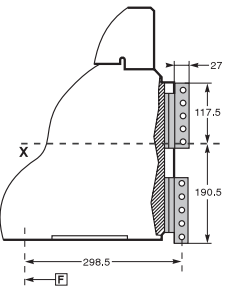
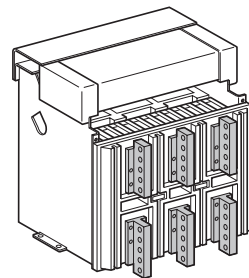


4000A

Horizontal connection



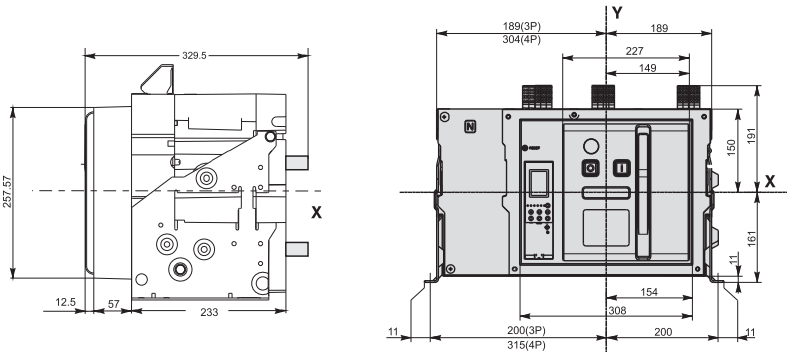
Vertical



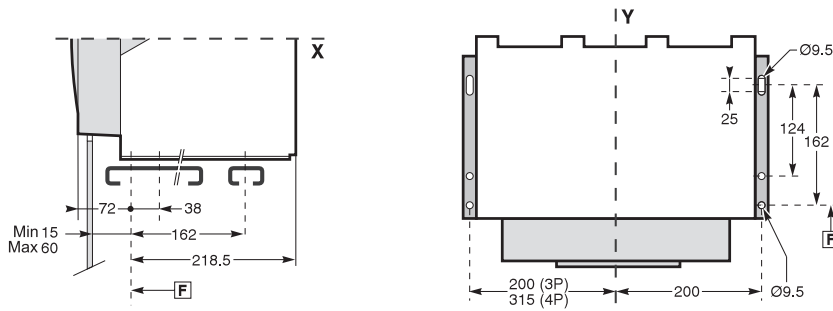
# Installing HDW3

4000M&S Fixed type 3P&4P dimension

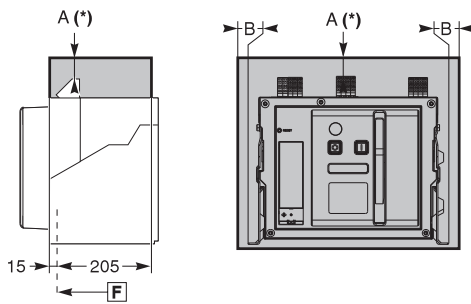
**F** Datum Point



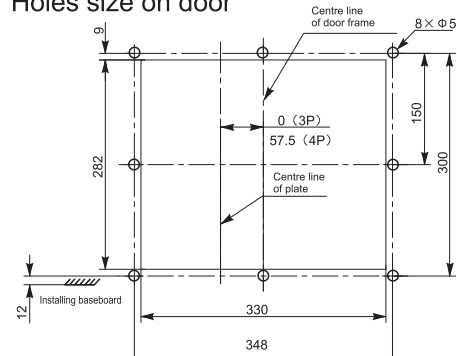
## Horizontal installation



## Safety clearance



## Holes size on door



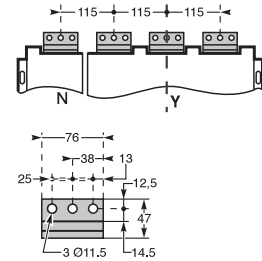
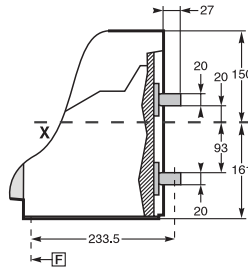
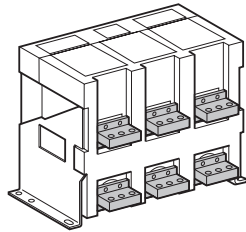
Safety clearance (mm)	Fixed type	
	A	B
Non-conductor	0	0
Metals	0	0
Energized conductor	100	60

# Installing HDW3

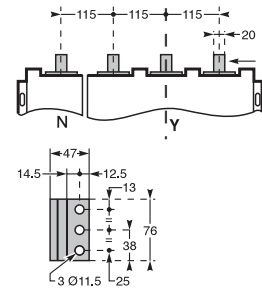
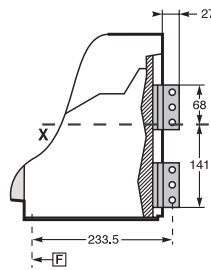
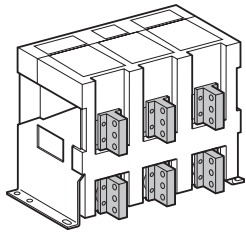
4000M&S Fixed type connection **F** Datum Point

1600A-3200A

Horizontal connection

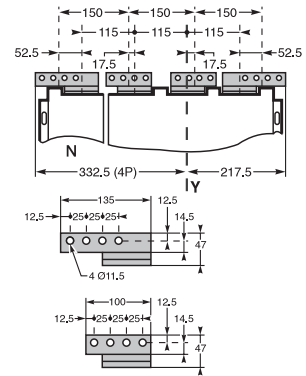
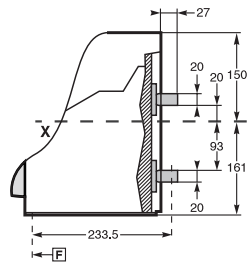
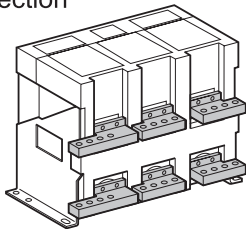


Vertical

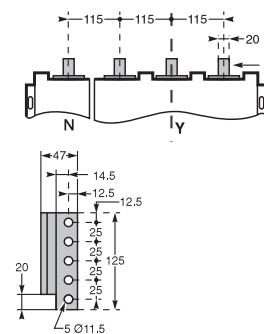
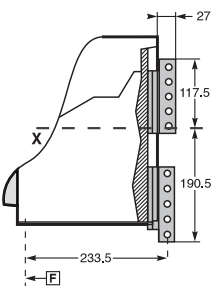
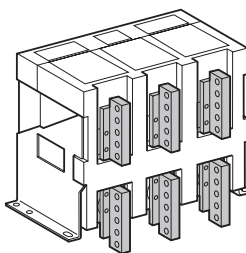


4000A

Horizontal connection




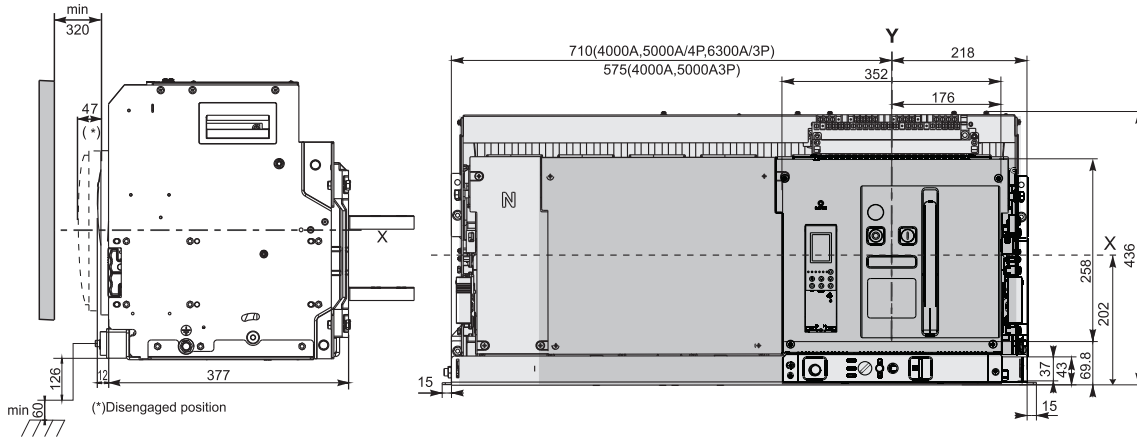
Vertical



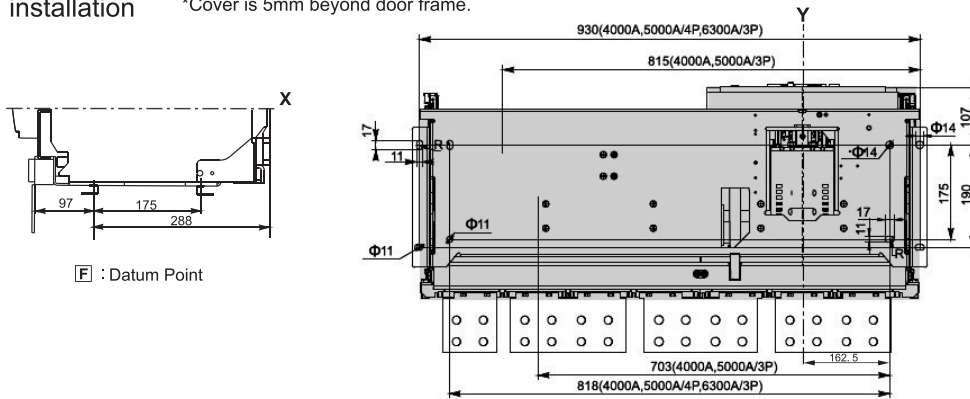
# Installing HDW3

## 6300M&S Dimension

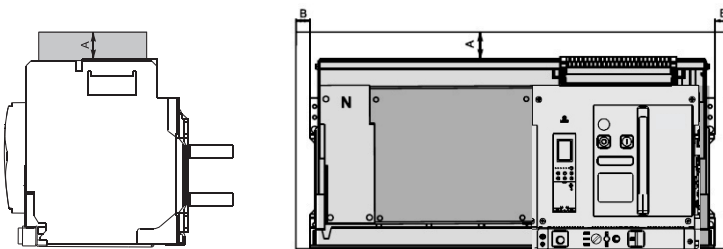
6300M&S Draw-out type 3P&4P Dimension  Datum Point



Horizontal installation \*Cover is 5mm beyond door frame.

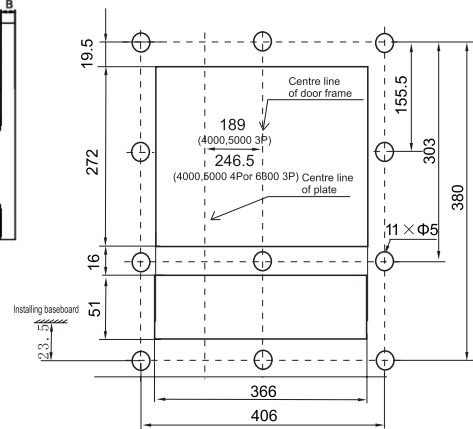


### Safety clearance



Safety clearance (mm)	Draw-out type	
	A	B
Non-conductor	0	0
Metals	0	0
Energized conductor	100	60

### Holes size on door

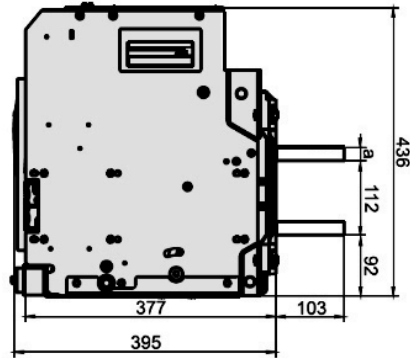
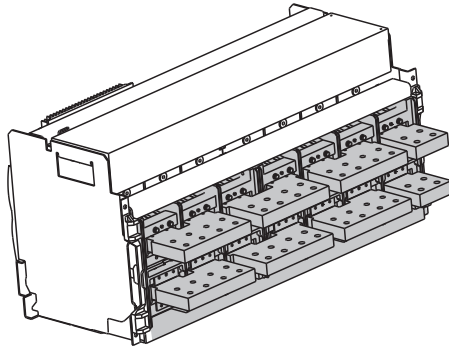


# Installing HDW3

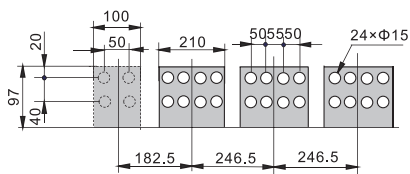
6300M&S Draw-out type connection  Datum Point

4000A-6300A

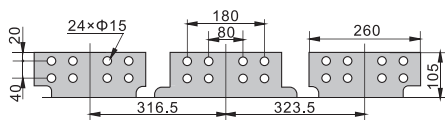
Horizontal connection



In=4000A/5000A



In=6300A



In (A)	a (mm)
4000	20
5000	30
6300	30

# Accessory installation

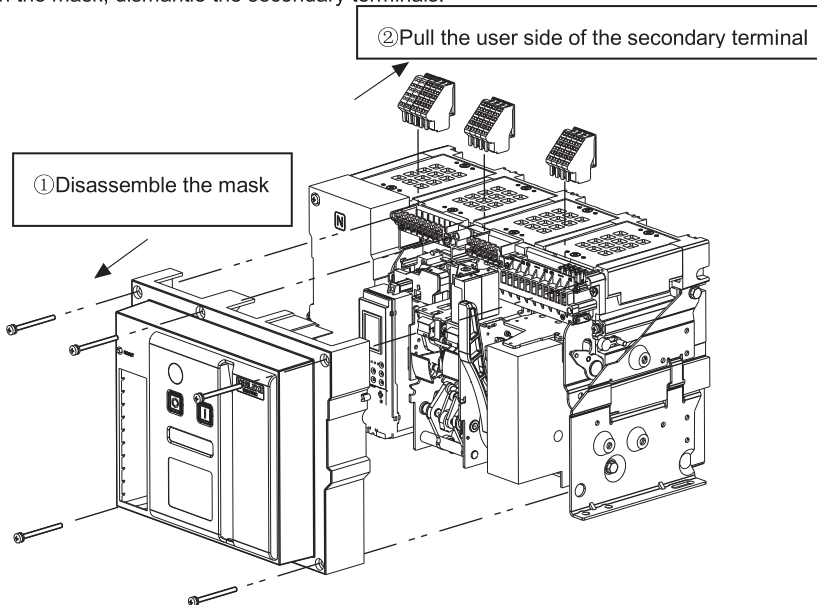


Danger: cut off the power before installation! For a drawer type, put the circuit breaker in the Off position.

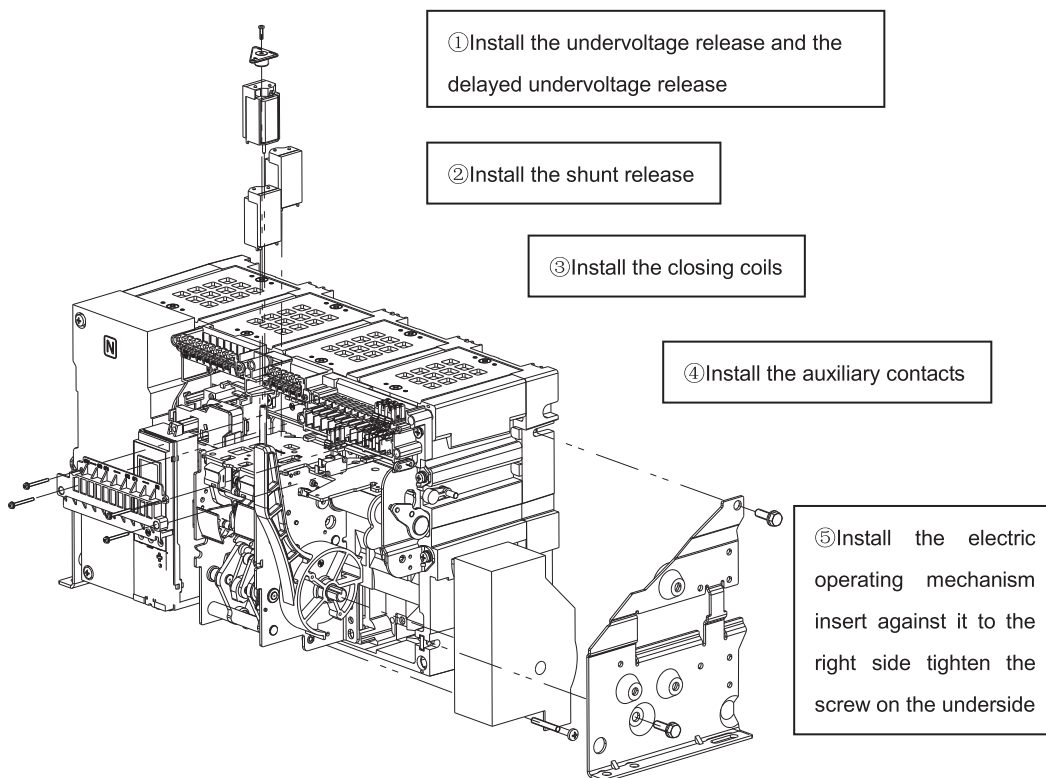
## Internal accessories

(The following figure is an illustration, please prevail in kind )

Open the mask, dismantle the secondary terminals.



Installation of the coils, electrical operating mechanism and auxiliary contacts..



# Accessory installation

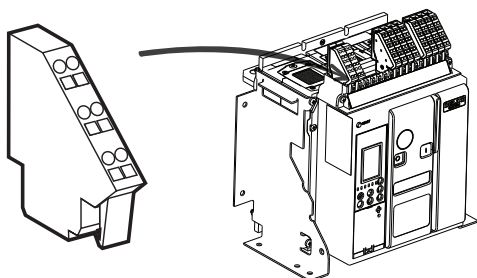
1) HDW3-1000M&1600M/S

## Secondary circuit wiring

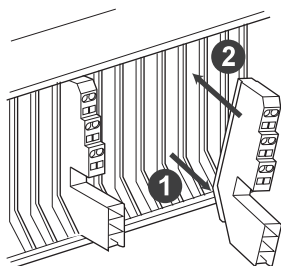
Fixed the auxiliary terminal

Fixed

Just insert the fixed auxiliary terminal directly into the recess of the circuit breaker.



Drawer type

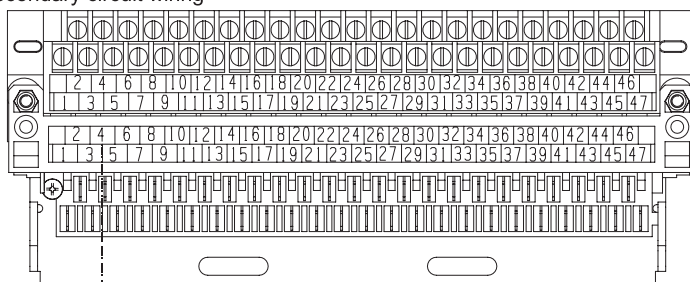


1. Firstly Fixed the lower side of the auxiliary terminal, place the upper side of the auxiliary terminal into the recess of the circuit breaker.

2. Press the upper side of the auxiliary terminal inwards, when a click is heard, it means that the auxiliary terminal is already fixed.

2) HDW3-2000M/S & HDW3-3200M/S

## Secondary circuit wiring



② Insert the connection ports with the same serial

① Check the serial number of the wiring heads

Equal No.

27=D2

28=D1

29=C2

30=C1

31=A2

32=A1

33=B3

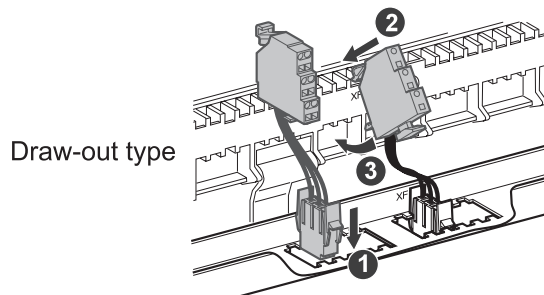
34=B1

35=B2

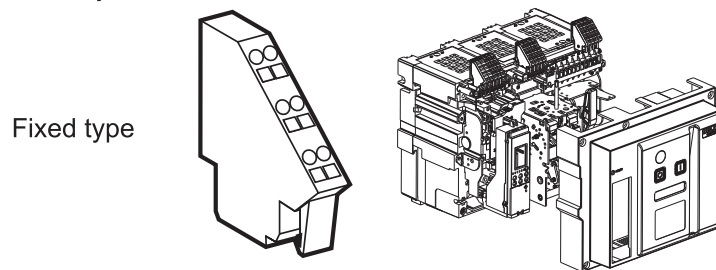
Pow	SWT	Com	ZSI	ZS	UM	CT	MN	MX	XF	MCH	OF4	OF3	OF2	OF1																																				
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	D2	D1	C2	C1	A2	A1	B3	B1	B2	37	38	39	40	41	42	43	44	45	46	47					
							MN	MX	XF	MCH																																								

# Installing HDW3

## 3 ) 4000M&S

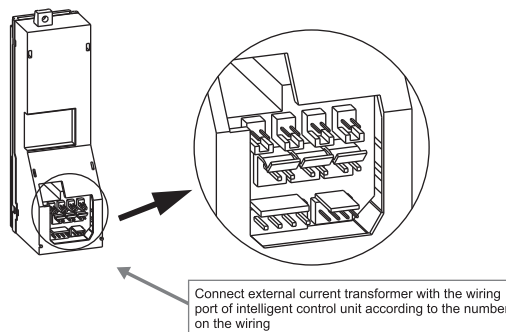


1. Hold the clamp on two sides of the lower auxiliary terminal, and insert it downwards into the circuit breaker
2. Fix the upper auxiliary terminal and insert the upper clamp to the indentation of the circuit breaker
3. Press the auxiliary terminal inwards when there is the sound of 'click', it means the auxiliary terminal is fixed



1. Insert the fixed type auxiliary terminal directly into the slot on circuit breaker

### Current transformer installation

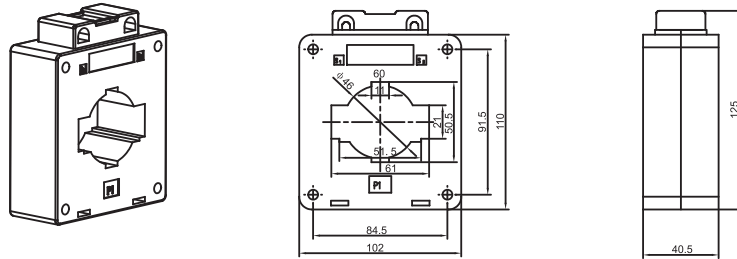




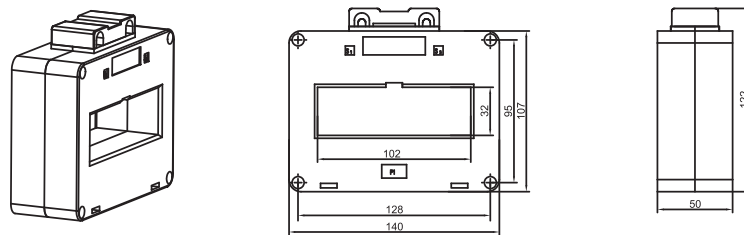
# Installing HDW3

N-phase extend current transformer

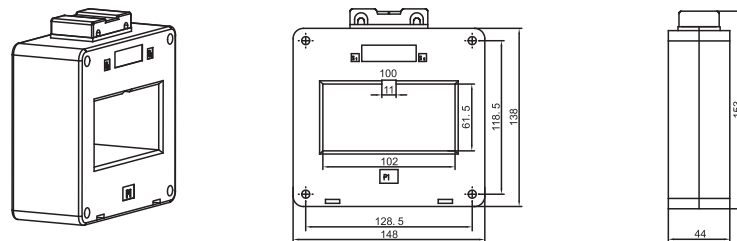
1 ) 1000M/1600M&S



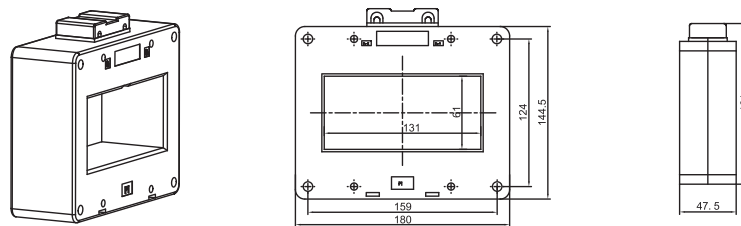
2 ) 2000M&S



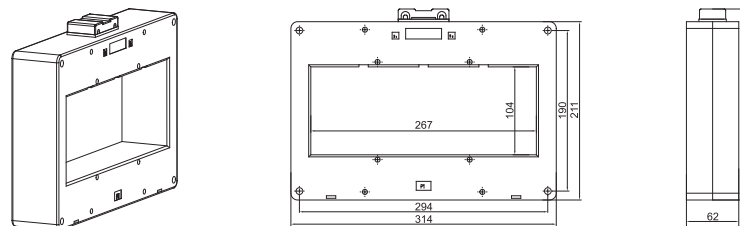
3 ) 3200M&S



4 ) 4000M&S

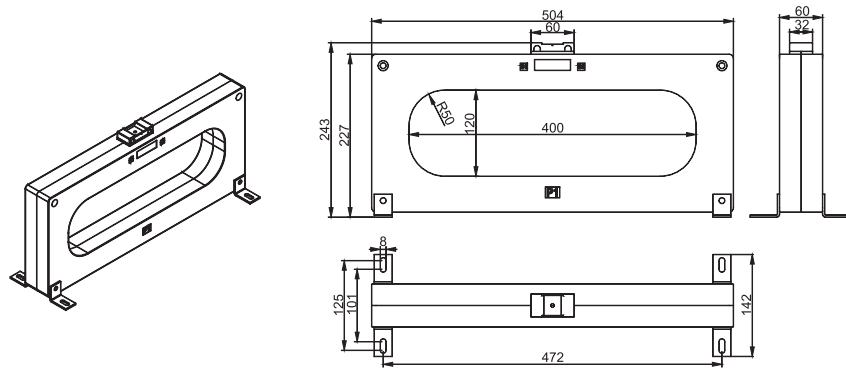


5 ) 6300M&S

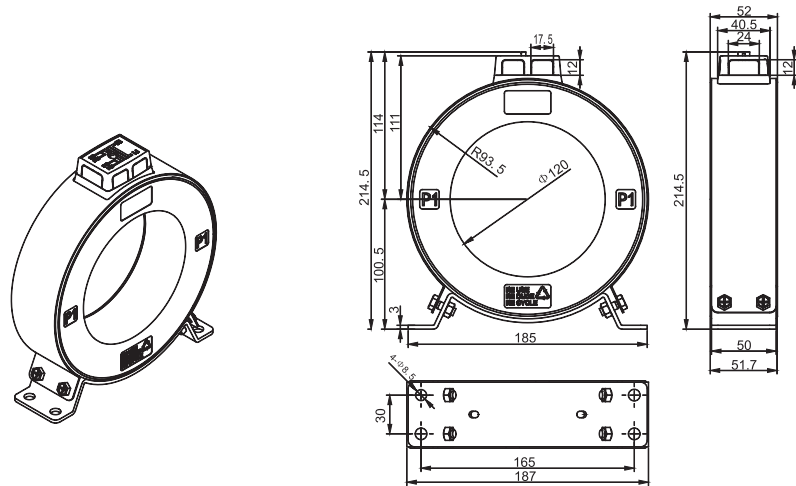


# Installing HDW3

## Earth-leakage current transformer

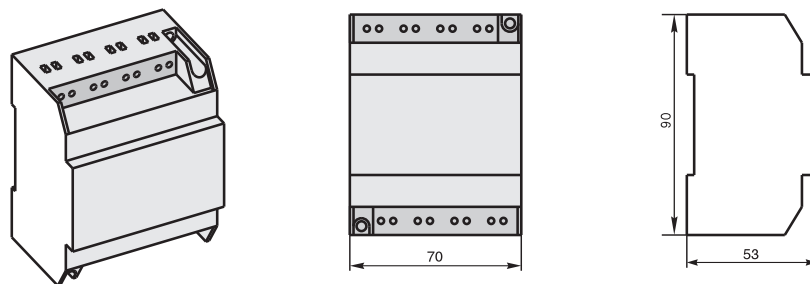


## Ground return current transformer

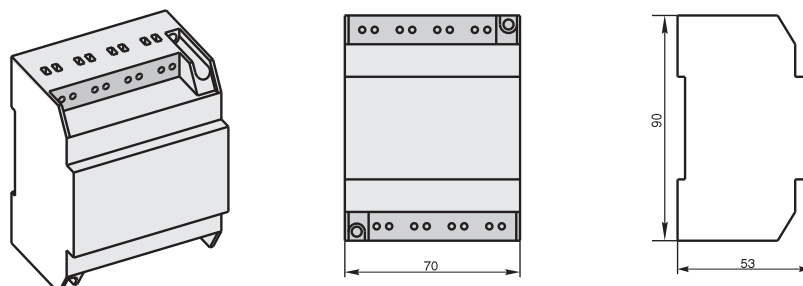


Remark: Dimension of 4000A, 5000A, 6000A is the same with earth-leakage current transformer

## Power supply module

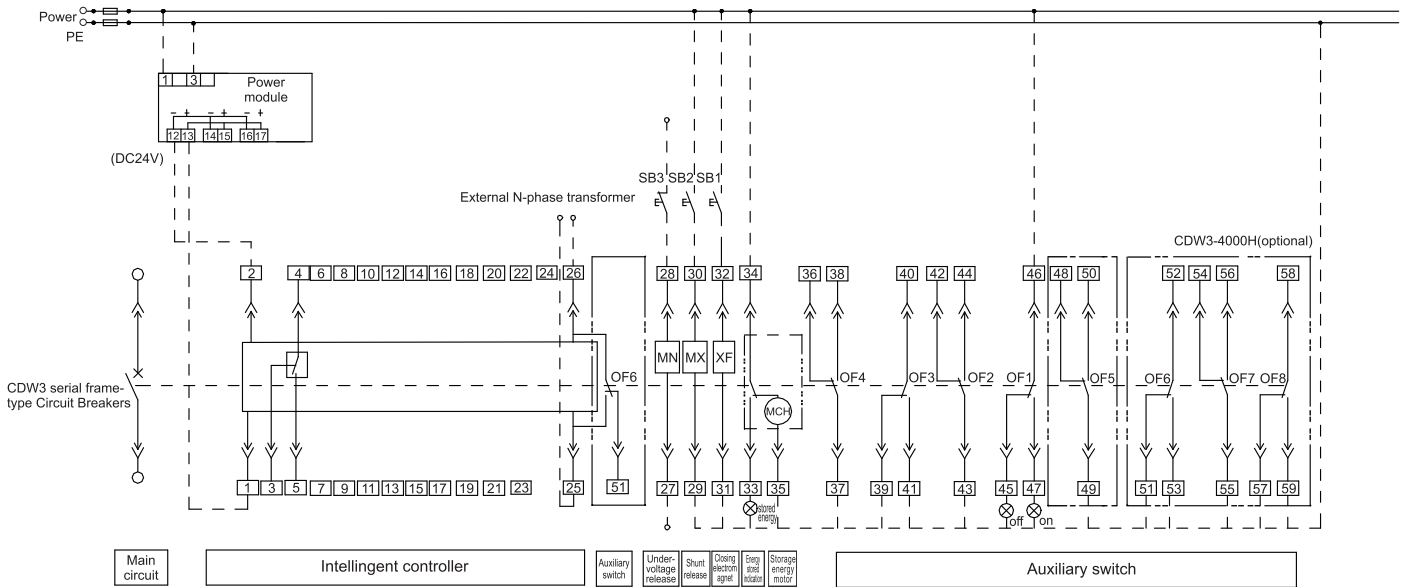


## Signal convert module



# Secondary circuit wiring diagram

## Wiring diagrams of iTR326, iTR326A intelligent controllers



### Controller wiring annotations

UM: Voltage test signal input

21#(UN), 22#(UA), 23#(UB), 24#(UC) represent the input ends of N, A, B, C phase voltage respectively.

POW: External power input

1#(V1+), 2#(V2-): Auxiliary power input/output terminals, 1#(V1) is the positive terminal for DC

SWT: Fault trip contact output

3#(S2), 4#(S1), 5#(S3): Fault trip contact output (4#(S1) is the common terminal), contact capacity: AC400V, 5A

CT: External transformer, including external N-phase transformer or ZT100 or ZCT1(one out of three), where

25# - 26#: apply to external N-phase transformer input;

25# - 26#: apply to external ground transformer ZT100 input;

25# - 26#: apply to external leakage transformer ZCT1 input;

Note 1: MN under-voltage release 27#, 28# wired on the main circuit line

Note 2: Different powers can be applied respectively if the control power voltages for MN, MX, XF, MCH are different from each other, HDW3-1600 auxiliary switch offer 4a4b only; HDW3-2000&HDW3-3200 auxiliary switches can offer 4a4b and 6a6b; HDW3-4000 auxiliary switch can offer 4a4b, 6a6b and 8a8b, where 4a4b is a standard configuration, others need to be purchased separately (the dashed parts in the diagram are connected by the users);

Note 3: Terminal 35# not only can be connected directly to the power (pre-store energy automatically), but also can be connected with the NO button in series then connected to the power (hand control energy pre-storage)

Note 4: The controller should be connected to the power module, adopt iAPU334 power module when the power voltage is AC220~400V; adopt iAPU332D power module when the power voltage is DC110V and DC220V;

Note 5: The auxiliary switch is 4a4b when HDW3-2000 and HDW3-2000 are circuit 47;

Note 6: The auxiliary switch is 6a6b (5a5b) when HDW3-2000 and HDW3-3200 are circuit 51: 25#, 26#, 51# can not take the external transformer after forming a NO NC contact.

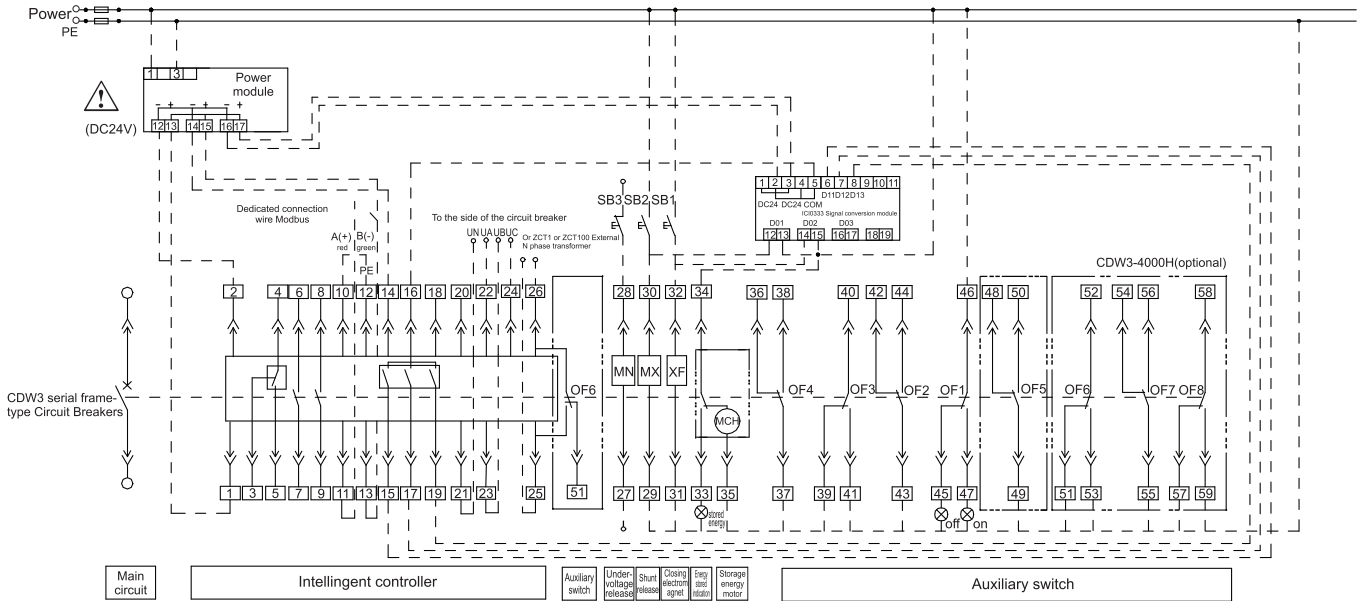
### Elements:

MN	Under-voltage release
MX	Shunt release
XF	Closed electromagnet
OF1-OF8	auxiliary switch
SB1	closing button
SB2	opening button
SB3	emergency disconnect button

Equal No.
27=D2
28=D1
29=C2
30=C1
31=A2
32=A1
33=B3
34=B1
35=B2

# Secondary circuit wiring diagram

Wiring diagrams of iTR326H intelligent controllers



## Controller wiring annotations:

UM: Voltage test signal input

21#(UN), 22#(UA), 23#(UB), 24#(UC) represent the input ends of N, A, B, C phase voltage respectively.

ZSI: Zone selective interlock

13#(Z+) ,14#(Z-) are the zone selective interlock input DC24V

16#(Z1),15#(Z1),17#(Z2),19#(Z3) are 3D0 output, adopt the optocoupler output, where16# (Z11) is the common terminal

POW: External power input

1#(V1+), (2# V2-): Auxiliary power input/output terminals, 1#(V1+) is the positive pole for DC.

SWT: Fault trip contact output

3#(S2), 4#(S1), 5#(S3): Fault trip contact output (4#( S1) is the common terminal ,contact capacity: AC400V, 5A)

COM: Communication output

10#, 11#: Communication outgoing lines of RS485A(485+),RS485B(485-) respectively, 12#: PE line, shield ground wire

CT: External transformer, including an external N-phase transformer or ZT100 or ZCT1(one out of three), where

25# - 26#: Apply to external N-phase transformer input;

25# - 26#: Apply to external ground transformer ZT100 input;

25# - 26#: Apply to external leakage transformer ZCT1 input;

Note 1: MN under-voltage release 27#, 28#, wired on the main circuit line

Note 2: Different powers can be applied respectively if the control power voltages for MN, MX, XF, MCH are different from each other, HDW3-1600 auxiliary switch offer 4a4b only; HDW3-2000 and HDW3-3200 auxiliary switches can offer 4a4b and 6a6b; HDW3-4000 auxiliary switch can offer 4a4b, 6a6b and 8a8b, where 4a4b is a standard configuration others need to be purchased separately (the dashed parts in the diagram are connected separately by the users);

Note 3: Terminal 35# not only can be connected directly to the power (pre-store energy automatically), but also can be connected with the NO button in series then connected to the power (hand control energy pre-storing)

Note 4: The controller should be connected to the power module,adopt iAPU334 power module when the power voltage is AC220~400V; adopt iAPU332D power module when the power voltage is DC110V and DC220V;

Note 5: The auxiliary switch is 4a4b when HDW3-2000 and HDW3-3200 are circuit 47; 25#, 26# are the external transformer input terminals, used for ground fault protection (3P+N)T;

Note 6: The auxiliary switch is 6a6b (5a5b) when HDW3-2000 and HDW3-3200 are circuit 51: 25#, 26#, 51# can not take the external transformer after forming a NO NC contact.

Note 7: When the remote control is working, the signal conversion modules are needed, signal conversion module contact capacity is AC240V, 10A

Note 8: The communication protocol is Modbus, iCAU486 or iCAU485 is needed to be ordered when Profibus or Devicenet protocol is used, the module uses DC24V electricity supply, the input end is connected to the secondary circuit 10#(485+), terminal 11#(485-), the output end is connected to the corresponding protocol bus.

## Elements:

- MN Under-voltage release
- XF Closed electromagnet
- OF1—OF8 Auxiliary switch
- ZT100 Ground transformer
- SB1 Closing button
- SB2 Opening button
- SB3 Emergent disconnect button
- MX Shunt release
- MCH Motor
- ZCT1 Leakage transformer

Equal No.
27=D2
28=D1
29=C2
30=C1
31=A2
32=A1
33=B3
34=B1
35=B2

# Debugging HDW3

## ITR326 serial controllers

### Function introduction

iTR326



iTR326A



iTR326H



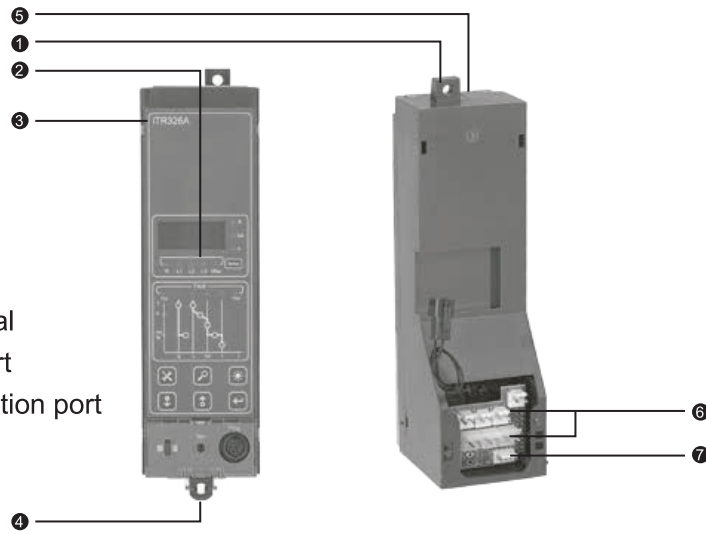
	L	M	H
Protection functions	Long delay protection L	Long delay protection L	Long delay protection L
	Short delay protection S	Short delay protection S	Short delay protection S
	Instantaneous protection I	Instantaneous protection I	Instantaneous protection I
	Grounding fault protection G	Grounding fault protection G	Grounding fault protection G
	MCR protection	MCR protection	MCR protection
	HSISC protection	HSISC protection	HSISC protection
			Low voltage protection/alarm
			Low voltage protection/alarm
			Voltage unbalance(default phase) protection/alarm
			Phase sequence protection/alarm
Measurement functions		Current measurement	Current measurement
			Voltage measurement
			Power measurement
			Frequency measurement
			harmonic measurement
Auxiliary functions	pre-alarm	pre-alarm	pre-alarm
		Self-diagnosis capacity	Self-diagnosis capacity
	Failure history recording	Failure history recording	Failure history recording
	Test functions	Test functions	Test functions
Display functions		LED digital tube display	LCD Liquid crystal display
Special functions			Load monitoring
			Zone interlock
Communication functions			Modbus

# Debugging HDW3

ITR326 serial controllers

## Structure instructions

- ① Top retainer
- ② LED indicating lamp
- ③ Controller label
- ④ Bottom retainer
- ⑤ External connection terminal
- ⑥ Transformer connection port
- ⑦ Magnetic flux/micro connection port



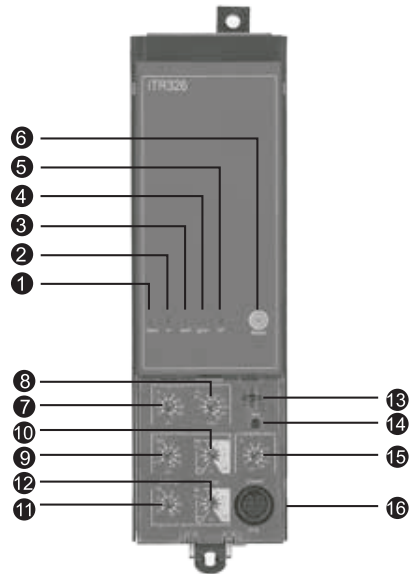
## L -type(basic type) iTR326

### Button instructions

- ① Alarm indicating lamp
- ② Long delay releasing indication
- ③ Short delay or instantaneous releasing indication
- ④ Grounding or leakage fault releasing indication
- ⑤ Advanced protection
- ⑥ Reset button

### Button instruction adjusting panel

- ⑦ Long delay current setting
- ⑧ Long delay tripping delay
- ⑨ Short delay releasing Isd
- ⑩ Short delay tripping delay tsd
- ⑪ Grounding fault releasing Ig
- ⑫ Grounding fault tripping delay tg
- ⑬ Padlock position
- ⑭ Test button
- ⑮ Instantaneous releasing current
- ⑯ Test connection port



# Debugging HDW3

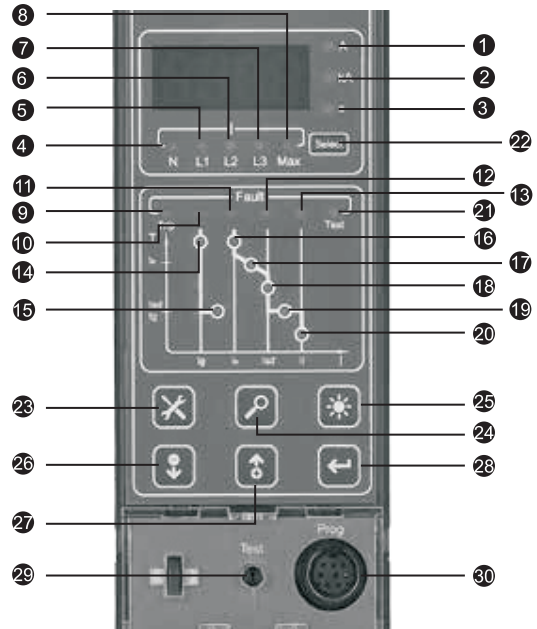
ITR326 serial controllers

M-type(Standard):iTR326A  
Indicating lamp instructions

- ① Current unit
- ② Current unit kA
- ③ Time unit s
- ④ N-phase current
- ⑤ A-phase current
- ⑥ B-phase current
- ⑦ C-phase current
- ⑧ Maximum current
- ⑨ Releasing indication
- ⑩ Grounding protection
- ⑪ Long delay protection
- ⑫ Short delay protection
- ⑬ Instantaneous protection
- ⑭ Grounding current set value
- ⑮ Grounding time set value
- ⑯ Long delay current set value
- ⑰ Long delay time set value
- ⑱ Short delay current set value
- ⑲ Short delay time set value
- ⑳ Instantaneous current set value
- ㉑ Test operation state

Navigation button instructions

- ㉒ Switch button
- ㉓ Setting button
- ㉔ Querying button
- ㉕ Back/Clear lamp
- ㉖ -/page down
- ㉗ +/Page up
- ㉘ Confirm button
- ㉙ TEST button
- ㉚ Test port



H-type (Advanced):  
iTR326H

Button instructions

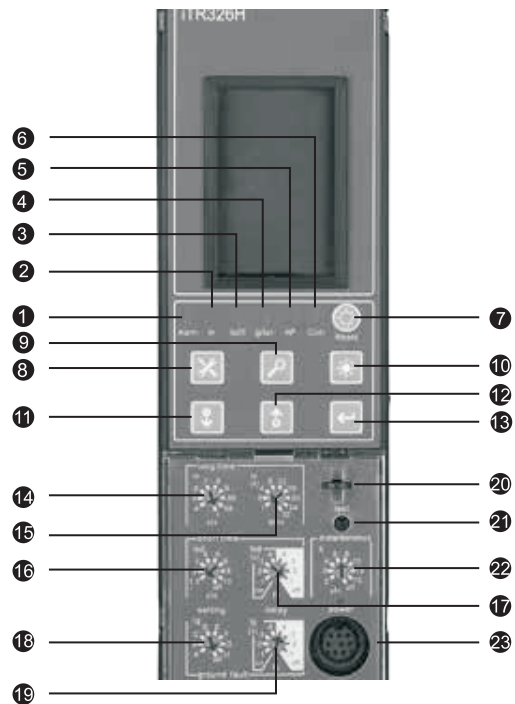
- ① Alarm indicating lamp
- ② Long delay releasing indication
- ③ Short delay or instantaneous releasing indication
- ④ Grounding or leakage fault releasing indication
- ⑤ Advanced protection
- ⑥ Communication functions
- ⑦ Reset button

Navigation button instructions

- ⑧ Setting button
- ⑨ Querying button
- ⑩ Back/Clear lamp
- ⑪ -/page down
- ⑫ +/Page up
- ⑬ Confirm button



















Button instruction adjusting panel

- ⑭ Long delay current set  $I_R$
- ⑮ Long delay tripping delay  $t_R$
- ⑯ Short delay releasing  $I_{sd}$
- ⑰ Short delay tripping delay  $t_{sd}$
- ⑱ Grounding fault releasing  $I_g$
- ⑲ Grounding fault tripping delay  $t_g$
- ㉑ Padlock position
- ㉒ Test button
- ㉓ Instantaneous releasing current
- ㉔ Test connection port



# Debugging of HDW3

## ITR326 serial theme menu

iTR326		
	Reset button	When a fault occurs, reset; when no faults exist, long press to check a previous failure.
	Test button	Test the button and act instantaneously
iTR326A		
	Select button	Switching the displayed parameters of the power meter.
	Setup button	used to enter into the parameter setup mode
	Querying button	used to check the fault history record data
	Back button	used to return to the previous menu or clear the fault record
	-/page down	used to set the parameter value to decrease by 1 (i.e. decrease by 1 step)
	+/Page up	used to set the parameter value to increase by 1 (i.e. increase by 1 step)
	Confirm button	confirm that the parameter is altered and stored.
	Test button	used to enter into the test procedure
iTR326H		
	Setup button	enter into the protection interface and return
	Querying button	enter into measurement, return, in bitwise edit: shift right
	Back button	system parameters setting, history record and conversion in the maintenance in bitwise edit: shift left
	-/page down	in a regular situation: shift down In an edit situation:-
	+/Page up	in a regular situation: shift up In an edit situation:+
	Confirm button	confirm that the parameter is altered and stored.
	Reset button	In a default interface: reset In other interfaces: return
	Test button	Test the button and act instantaneously



# Debugging HDW3

## ITR326 controller operation

### Protect specifications of the intelligent controller

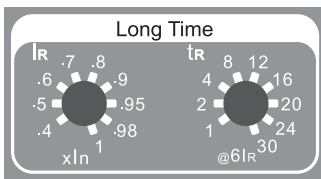
The protection specifications of the intelligent controller include inverse time and definite time. When the fault current exceeds the inverse time set value, the controller performs delay protection according to the definite time. The inverse time curve complies with the characteristic curve  $I^2t$

### Overload long delay protection characteristics

Overload long delay protection operating threshold value

< 1.05  $I_R$ : > 2h Non-operation;  
 >1.2  $I_R$ : <1h Operation;  
 $\geq 1.2 I_R$ : Delay operation;

$I_R$  Current set value range: 0.4 $I_n$ 、0.5 $I_n$ 、0.6 $I_n$ 、0.7 $I_n$ 、0.8 $I_n$ 、0.9 $I_n$ 、0.95 $I_n$ 、0.98 $I_n$ 、1.0 $I_n$



Inverse time operation characteristics	$I^2t: t=(6/N)^2 * t_R$									
Set current multiple	Operation time s									
1.5 $I_R$	16s	32s	64s	128s	192s	256s	320s	384s	480s	
2 $I_R$	9s	18s	36s	72s	108s	144s	180s	216s	270s	
6 $I_R$	1s	2s	4s	8s	12s	16s	20s	24s	30s	

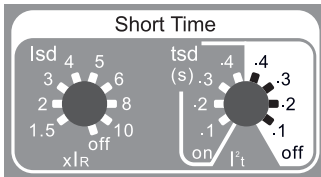
Note: N-The fault current is divided by the set current multiple/ $I_R$   
 t...Fault operation delay time  
 $t_R$ \_Long delay operation time set value  
 Operation time permissible error  $\pm 10\%$

### Short circuit short delay protection characteristics

Short circuit short delay protection operation threshold value

<0.9  $I_{sd}$ : Non-operation;  
 >1.1  $I_{sd}$ : Operation;  
 $\geq 1.1 I_{sd}$ : Delay operation;

$I_{sd}$  Current set value range 1.5 $I_R$ 、2 $I_R$ 、3 $I_R$ 、4 $I_R$ 、5 $I_R$ 、6 $I_R$ 、8 $I_R$ 、10 $I_R$  +OFF



Current	Operation time	Operation characteristics	Set time s				
$I_{sd} < 1.5 I_R$	Inverse time	Inverse time characteristics $I^2t=(8I_R)^2 t_{sd}$	0.1, 0.2, 0.3, 0.4				
			Set time s	0.1	0.2	0.3	0.4
1.1 $I_{sd}$	Definite time, minimum time is return time	Minimum s	0.08	0.14	0.23	0.35	
			Maximum s	0.14	0.2	0.32	0.5

Note:  $I_{sd}$ —Short delay current set value  
 $I$ —Fault current set value  
 $I_R$ —Long delay set value  
 $t$ —Fault operation delay time  
 $t_{sd}$ —Short delay inverse time set value.

Operation time permissible error  $\pm 20\%$

(off in the time segment indicates  $I^2t$  off i.e. inverse time switch off, the moment is definite time; using off in the current shift to shut off the short delay protection function)

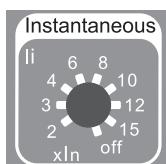
### Short circuit instantaneous protection characteristics

Short circuit instantaneous protection operation threshold value

< 0.85  $I_i$ : Non-operation;  
 > 1.15  $I_i$ : Operation;

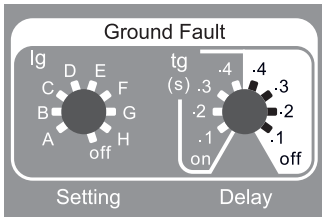
Instantaneous operation current set value 2 $I_n$ 、3 $I_n$ 、4 $I_n$ 、6 $I_n$ 、8 $I_n$ 、10 $I_n$ 、12 $I_n$ 、15 $I_n$ +OFF

Note: operation time error  $\leq 50ms$ .



# Debugging HDW3

ITR326 controller operation



## Grounding fault protection operation characteristics

Grounding fault protection operation threshold value

<0.9I<sub>g</sub>: Non-operation;

>1.1 I<sub>g</sub>: operation;

≥ 1.1 I<sub>g</sub>: delay operation;

Current set value	A	B	C	D	E	F	G	H	OFF
I <sub>n</sub> <1250	0.2I <sub>n</sub>	0.3I <sub>n</sub>	0.4I <sub>n</sub>	0.5I <sub>n</sub>	0.6I <sub>n</sub>	0.8I <sub>n</sub>	0.9I <sub>n</sub>	I <sub>n</sub>	
I <sub>n</sub> ≥1250	500A	600A	700A	800A	900A	1000A	1100A	1200A	
tg(s)	Inverse time	Operation characteristic							

$$t = \frac{(I_J)^2}{I^2} \times tg$$

	Set time (s)	0.1,0.2,0.3,0.4			
Definite time,	Set time (s)	0.1	0.2	0.3	0.4
Minimum time is	Minimum (s)	0.08	0.14	0.23	0.35
Return time	Maximum (s)	0.14	0.2	0.32	0.5

Note: I<sub>J</sub> ground protection set value, I<sub>J</sub>=1200A, if I<sub>n</sub>≥1250A; I<sub>J</sub>=I<sub>n</sub>, if I<sub>n</sub><1250A  
I fault current value

T fault operation delay time

tg grounding inverse time set value

Inverse time operation enforcement permissible error ±20%

(Off in the time segment indicates I<sup>2</sup>t off i.e inverse time switch-off, this moment is definite time; using off on the current shift to shut down the ground protection function)

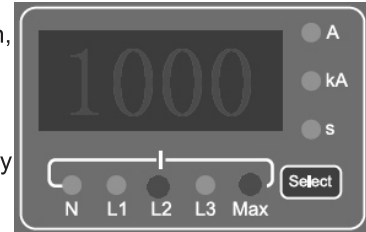
## Factory-set values of the intelligent controller

	Long delay		Short delay		Instantaneousness	Grounding fault		Thermal memory
Releasing curve I <sup>2</sup> t	I <sub>R</sub>	T <sub>R</sub>	I <sub>sd</sub>	t <sub>s</sub>	I <sub>i</sub>	I <sub>g</sub>	tg	
	1I <sub>n</sub>	30s	6I <sub>n</sub>	0.2s	10I <sub>n</sub>	G gear	0.4s	20min

# Debugging of HDW3

## Menu parameters setup and selection ITR326A operation

- ITR326A intelligent controller operation display  
For this controller, the values of various running parameters, setting parameters etc, need to be displayed on the panel by using the LED digital tubes.  
and the types of the displayed values are displayed via the LED lamps.
- Current meter maximum current display mode In the default condition, the intelligent controller enters into the current meter's maximum current display mode and displays the maximum phase current. When the maximum current display mode is not demonstrated during running, and no buttons are operated within 10 minutes, the controller will automatically return to the maximum current mode.



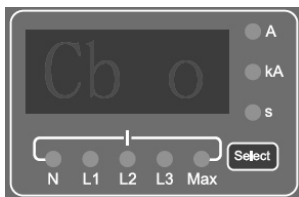
**A** When the lamp is on, it means the displayed data unit is A

**kA** When the lamp is on, it means the displayed data unit is kA

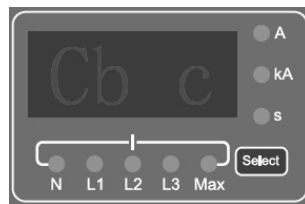
### ITR326A current meter maximum current display mode and current meter display mode display

No.	Display		LED indicating lamp	Remark
1	L1 phase current		LED_L1、LED_A/LED_kA	
2	L2 phase current		LED_L2、LED_A/LED_kA	
3	L3 phase current		LED_L3、LED_A/LED_kA	
4	N-phase current		LED_N、LED_A/LED_kA	LED_N blinks (4P only or 3P+N)
5	Maximum current	L1 phase	LED_L1、LED_MAX、LED_A/LED_kA	
		L2 phase	LED_L2、LED_MAX、LED_A/LED_kA	
		L3 p[hase	LED_L3、LED_MAX、LED_A/LED_kA	
6	Ground current		LED_N、LED_A/LED_kA	LED_N lights permanently

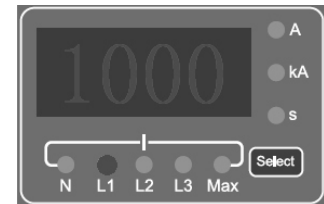
- Current meter display mode  
normal running mode, use **Select** current selection button to browse the current values in a and the state of the circuit breaker, L1,L2, L3, N-phase current (LED\_N flashes (4P only)), ground current, maximum phase current If no buttons are operated within 10 minutes, the controller will automatically return to the maximum display mode.



The circuit breaker is in a switch-off state



The circuit breaker is in a switch-on state



Display of L1 phase current

- Parameters setup and display mode  
As far as the setup parameters in the controller are concerned, these parameters include the customer parameters that can be set on site by the customers and the implicit parameters that are the factory-set parameters by the manufacturer. All these can be achieved by operating the buttons and displaying them in the LED digital tubes and indicating lamps.
- Protection parameter setup and display  
These parameters are set on site by the customers, mainly are protection parameters. The customer parameters is set through four buttons (i.e. **X**、**↑**、**↓**、**←**), to realize the customer parameters and the corresponding LED indicating lamps. Here are the main operating steps:

# Debugging of HDW3

ITR326A intelligent controller customer setup parameters

No.	Parameters	LED indicating lamp	Remark
1	Ground protection current set value	LED <sub>I<sub>g</sub></sub> 、LED <sub>A</sub>	
2	Ground protection time set value	LED <sub>T<sub>g</sub></sub> 、LED <sub>s</sub>	
3	Long delay protection current set value	LED <sub>I<sub>R</sub></sub> 、LED <sub>A</sub>	
4	Long delay protection time set value	LED <sub>T<sub>R</sub></sub> 、LED <sub>s</sub>	
5	Short delay protection current set value	LED <sub>I<sub>sd</sub></sub> 、LED <sub>A</sub> /LED <sub>kA</sub>	
6	Short delay protection time set value	LED <sub>t<sub>sd</sub></sub> 、LED <sub>s</sub>	
7	Instantaneous protection current set value	LED <sub>L<sub>i</sub></sub> 、LED <sub>A</sub> /LED <sub>kA</sub>	

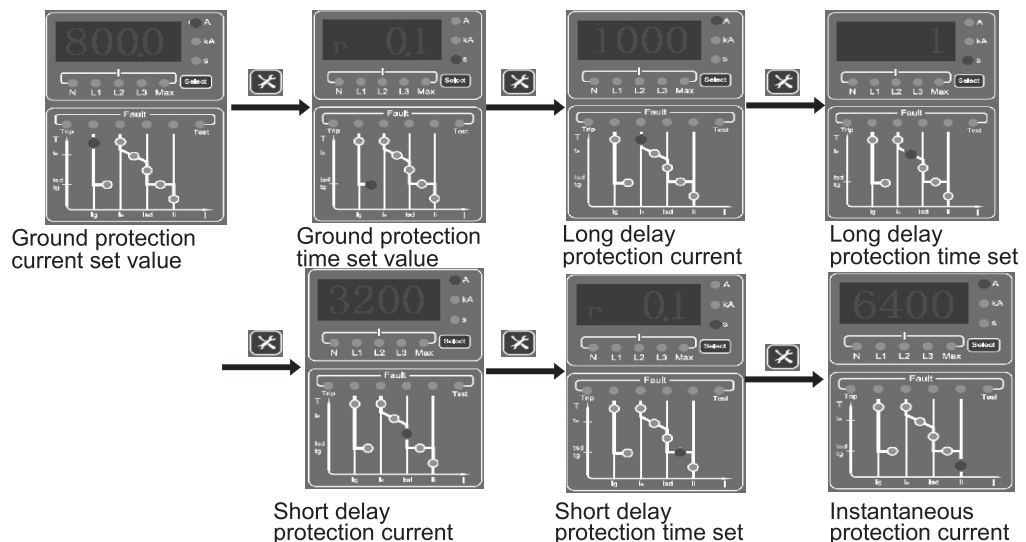
### 1) Setup parameter view:

- In a normal running mode, press to enter into the parameter query mode, the current meter LED digital tube displays the first setup parameter value, the corresponding LED indicating lamp shows the data type;
- Then press to browse the setup parameters (when the last parameter is viewed, it will automatically return to the first parameter).

### 2) Parameter setup operation:

- In a normal running mode, press to enter into the parameter query mode, and view the parameter to be set through ;
- Enter into the parameter setup mode through ; adjust the parameter values to the required ones through and ;
- Press to store the set value to the memory if the set parameter is confirmed; press "Back button" to return if the parameter alteration is discarded
- After the setup parameters are stored, the other setup parameters can be viewed through , repeat the above steps; press to return to the normal running mode when the parameters are all set.
- When the protection current set value is OFF, it means the corresponding protection is shut down.

Protection parameter setup and alteration procedure are shown in the following figure:



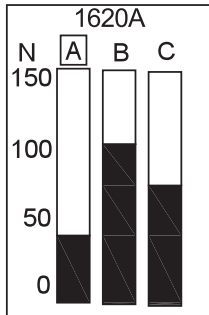
### 3) Precautions:

- The alteration/query of the controller protection parameters should be done on the controller non-alarm/fault interface, No query or alteration can be done if the controller has problems and is not yet fixed.
- After the parameters are all set, better power off the controller and reset it once, power on and check the controller again to assure the exactness of the alteration of the parameters. press once after checking to enable the controller enter into the operational state, or it will automatically return to the normal running state without any operation in 10 min.

# Debugging of HDW3

## ITR326H operation

- Default interface



-The default interface displays when the controller is powered on.

-In each of the theme menus, press button or the corresponding them button to return to the default interface

-If there is no button operation in 5 minutes, a block cursor will indicate the current maximum phase.

-Under a non-fault pop-up interface, it will return to the default interface automatically if there is no button operation in 20 minutes.

- "Measurement" menu

Press to enter into the main measurement menu

<table border="1"> <tr><td>Current I</td></tr> <tr><td>Voltage U</td></tr> <tr><td>Frequency F</td></tr> <tr><td>Electricity E</td></tr> <tr><td>Power P</td></tr> </table> <table border="1"> <tr><td>Harmonic H</td></tr> </table>	Current I	Voltage U	Frequency F	Electricity E	Power P	Harmonic H	<ul style="list-style-type: none"> <li>-Press  or  button to return to the default interface</li> <li>-Under the non-default and non-editing interface, press  to jump to the measurement menu</li> </ul>
Current I							
Voltage U							
Frequency F							
Electricity E							
Power P							
Harmonic H							

- "System parameter setup" menu




Press to enter into System Parameter Setup menu

<table border="1"> <tr><td>Clocking setting</td></tr> <tr><td>Measuring meter setting</td></tr> <tr><td>Test &amp; lock</td></tr> <tr><td>Language setting</td></tr> <tr><td>Communication setting</td></tr> <tr><td>Electricity E</td></tr> <tr><td>Power P</td></tr> </table> <table border="1"> <tr><td>I/O setting</td></tr> </table>	Clocking setting	Measuring meter setting	Test & lock	Language setting	Communication setting	Electricity E	Power P	I/O setting	<ul style="list-style-type: none"> <li>-Press  button to return to the default interface</li> <li>-Under other non-default and non-editing interfaces, press  to jump to "parameter setup" and "history record maintenance" menu.</li> </ul>
Clocking setting									
Measuring meter setting									
Test & lock									
Language setting									
Communication setting									
Electricity E									
Power P									
I/O setting									



# Debugging of HDW3

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- "Protection parameter setup" menu

<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="padding: 2px 5px;">Current protection</td> </tr> <tr> <td style="padding: 2px 5px;">Load monitoring</td> </tr> <tr> <td style="padding: 2px 5px;">Voltage protection</td> </tr> <tr> <td style="padding: 2px 5px;">other protection</td> </tr> </table>	Current protection	Load monitoring	Voltage protection	other protection	<ul style="list-style-type: none"> <li>- Press  or  button to return to the default interface</li> <li>- Under other non-default and non-editing interfaces, press  to jump to "protection parameter setup" menu</li> </ul>
Current protection					
Load monitoring					
Voltage protection					
other protection					

- "History record and maintenance" menu

<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="padding: 2px 5px;">Current alarm</td> </tr> <tr> <td style="padding: 2px 5px;">operation times</td> </tr> <tr> <td style="padding: 2px 5px;">Contact wear</td> </tr> <tr> <td style="padding: 2px 5px;">Displacement record</td> </tr> <tr> <td style="padding: 2px 5px;">Release record</td> </tr> </table>	Current alarm	operation times	Contact wear	Displacement record	Release record	<ul style="list-style-type: none"> <li>-Press  button to return to the default interface</li> <li>-Under other non-default and non-editing interfaces, press  to jump to "system parameter setup" and "history record and maintenance" menu</li> </ul>
Current alarm						
operation times						
Contact wear						
Displacement record						
Release record						
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="padding: 2px 5px;">Alarm record</td> </tr> <tr> <td style="padding: 2px 5px;">Fault record</td> </tr> </table>	Alarm record	Fault record				
Alarm record						
Fault record						

# Functions and Characteristics

## Technical parameter



Poles	3、4
Rated operation voltage Ue	AC400V/AC415V、AC660V/AC690V
Rated insulation voltage Ui	1000V
Rated impulse withstand voltage Uimp(KV)	12kV
Rated frequency	50/60
Suitable for isolation	
Standard	IEC 60947-2

Frame current	1000M		1600M		1600S		2000M		2000S		3200M		3200S		4000M		4000S		6300M		6300S		
Rated current In(A)																							
400	•		•		•																		
630	•		•		•		•		•														
800	•		•		•		•		•														
1000	•		•		•		•		•														
1250			•		•		•		•														
1600			•		•		•		•						•		•						
2000							•		•		•		•		•		•						
2500											•		•		•		•						
3200											•		•		•		•						
4000															•		•		•		•		•
5000																			•		•		•
6300																			•		•		•
Breaking	400V	690V	400V	690V	400V	690V	400V	690V	400V	690V	400V	690V	400V	690V	400V	690V	400V	690V	400V	690V	400V	690V	
Icu(kA)	42	25	50	35	42	35	80	50	65	40	80	65	65	50	100	65	85	65	120	85	85	75	
Ics(kA)	30	25	42	35	42	35	65	40	65	40	65	50	65	50	85	65	85	65	100	75	85	75	
Icw(1s)(kA)	30	20	42	35	42	35	65	40	65	40	65	50	65	50	85	65	85	65	85	75	85	75	
Tripping time																							
Tripping time with arc extinguishing	≤25ms																						
Closing time	≤70ms																						
Service life																							
Mechanical life(with maintenance)	30000		25000		30000		30000		20000		20000		5000										
Mechanical life(without maintenance)	15000		12500		15000		15000		10000		10000		2500										
Electrical life(400V)	6500		6000		6500		6500		5000		5000		800										
Electrical life(690V)	4000		4000		4000		4000		3000		3000		500										

# Functions and Characteristics



Frame current	1000M	1600M&S	2000M&S	3200M&S	4000M&S	6300M&S	
Dimension(Height*Width*Depth)(mm)							
Draw-out type	3P	322×288×329	322×288×330	436×405×425	436×465×425	439×441×428.6	441.5×815×508
	4P	322×358×329	322×358×330	436×500×425	436×580×425	439×556×428.6	441.5×930×508
Fixed type	3P	301×276×235	301×276×229	397×364×327	397×428×327	352×422×329.5	/
	4P	301×346×235	301×346×229	397×459×327	397×543×327	352×537×329.5	/
Weight(KG)							
Draw-out type	3P	27.8	34	73.6	93.8	78	233
	4P	33.1	41	85.5	115	95	271.8
Fixed type	3P	13	14	41.4	53.4	42	/
	4P	15.8	17	52	68	52	/
Derating application If altitude over 2000m,the product parameter (resistance ,cooling capacity,etc)will change							
Altitude(m)	2000	2500	3000	3500	4000	4500	5000
Insulation voltage(V)	1000	910	910	830	830	770	770
Withstand voltage(KV)	12	10.5	10.5	9.5	9.5	9	9
Maximum operation voltage(V)	690	690	690	660	600	600	550
Current on 40 °C	1In	0.98In	0.93In	0.91In	0.87In	0.84In	0.81In
If altitude over 4000m,please contact the manufacture.							
Derating table for different application							
Frame	Current/temperature	-5°C~+40°C	+45°C	+50°C	+55°C	+60°C	
HDW3-1000	400	400	400	400	400	400	
	630	630	630	630	630	550	
	800	800	800	800	800	700	
	1000	1000	1000	1000	950	900	
HDW3-1600	400	400	400	400	400	400	
	630	630	630	630	630	550	
	800	800	800	800	800	700	
	1000	1000	1000	1000	950	900	
	1250	1250	1200	1200	1150	1050	
	1600	1600	1550	1500	1450	1350	
HDW3-2000	630	630	630	630	630	630	
	800	800	800	800	800	700	
	1000	1000	1000	1000	1000	1000	
	1250	1250	1250	1250	1250	1150	
	1600	1600	1600	1500	1500	1300	
	2000	2000	1900	1900	1800	1700	
HDW3-3200	2000	2000	2000	2000	2000	2000	
	2500	2500	2400	2300	2200	2200	
	3200	3200	3000	3000	2800	2800	
HDW3-4000	1600	1600	1600	1600	1600	1600	
	2000	2000	2000	2000	2000	2000	
	2500	2500	2500	2500	2500	2200	
	3200	3200	3200	3200	3000	2500	
HDW3-6300	4000	4000					
	5000	5000					
	6300	6300					
All derating data is calculated based on experiment and theory, only for selection guide.							



# Functions and Characteristics

## Accessories



### Remote operations

#### Shunt coil MX

After the energy is stored in the circuit breaker, the shunt coil will cut off the circuit breaker instantly under the specified supply voltage, which can be operated remotely.

- Rated control supply voltage AC220/AC230V, AC380/AC400V, DC220V
- Operation voltage (0.7-1.1) Us
- Breaking duration:  $50 \pm 10$ ms



### Closing release XF

After the energy is stored in the circuit breaker, the closing coil will cut off the circuit breaker instantly under the specified supply voltage, which can be operated remotely.

- Rated control supply voltage AC220/AC230V, AC380/AC400V, DC220V
- Operation voltage (0.85-1.1) Us
- Closing time:  $55 \pm 10$ ms



### Undervoltage coil MN

The undervoltage coils can be classified into two types: instantaneous undervoltage and delayed undervoltage types.

When the circuit breaker is on, and its voltage decreases to 70%-35% of the rated voltage, it can be cut off by activation. The circuit breaker only can be closed again when the supply voltage of the undervoltage coil restores to 85% of the rated voltage.

- Rated control supply voltage AC220/AC230V, AC380/AC400V
- Operation voltage: (0.35-0.7) Ue
- Reliable closing voltage: (0.85-1.1) Ue
- Can-not closing voltage  $\leq 0.35$ Ue
- Delayed time: 0.5s, 1s, 1.5s, 1s, 3s (1000AF/1600AF/4000AF), 5s(2000AF/3200AF/6300AF)



### Delayed undervoltage coil MNR

The delayed undervoltage coil can allow the circuit breaker to be cut off after 0.5s, 1s, 1.5s, 3s (1000AF/1600AF/4000AF), 1s, 3s, 5s (2000AF/3200AF/6300AF)

### Motor operating mechanism MCH

The motor operating mechanism can store the energy for the circuit breaker automatically provided that the circuit breaker is cut off and the power supply is supported so as to cut off or close the circuit breaker under the operation of the shunt release, undervoltage release and closing electromagnet. When no power supplies are available, the energy can be stored in the circuit breaker by using a handle.

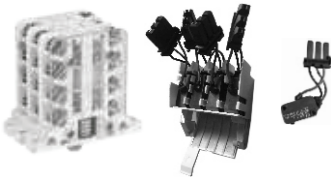
- Rated control supply voltage AC220/AC230V, AC380/AC400V, DC220V
- Operation voltage: (0.85-1.1) Us
- Power consumption: 75W/180W(1000AF/1600AF), 85W(2000AF), 110W(3200AF/6300AF), 180W(4000AF).
- Energy storage time: <5s
- Utilization category: AC15, DC13



# Functions and Characteristics

## Accessories

1000AF/1600AF/4000AF



### Indicative contacts

#### Auxiliary switch OF

1000AF/1600AF/4000AF default with 4NO-4NC  
2000AF/3200AF/6300AF default with 4NO-4NC

It can be used to monitor the state of the circuit breaker, such as linking to the circuit breaker position signal lamps and breaking indicative lamps etc.  
Rated thermal current-I<sub>th</sub>:

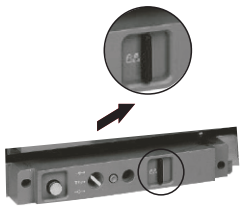
1000AF/1600AF/4000AF: AC-12:AC250V 6A, AC-15: AC380V 1A, DC-12: DC250V 0.3A  
2000AF/3200AF/6300AF:AC-15: AC230V 1.5A, AC400V 0.9A, DC-13: DC110V 0.55A, DC220V 0.27A

### Lock

#### Drawer seat padlock

The padlock shall be provided by the customers

If the padlock is selected and the circuit breaker is on "disconnect" position, pull out the lock plate, after the locking, the crank can not insert.



#### Key lock

When the circuit breaker is on disconnect position, the switch-off lock can lock it; the circuit breaker can be switched on only when the lock is opened by the key and the key is not pulled out.

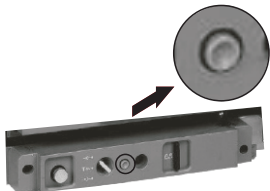
There are three types of switch-off locks (the last two are used in the distribution system with two lines and one liaison )

- One lock one key
- Two locks one key
- Three locks two keys



#### Drawer position latching mechanism

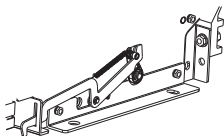
The locking device of the breaker on "connect", "test", "disconnect" position in the drawer type circuit breaker. These three positions are indicated by the indicator, the racking handle is locked in an exact place and can be unlocked by means of the reset button.



#### Door interlock

Applicable for 2000AF, 3200AF frames

For the drawer type circuit breaker, the interlock is installed on the side face of the breaker and interact with the distribution cabinet door to guarantee that it is not opened when the circuit breaker is on the connection or test position. In switch-off position, the distribution cabinet door can be opened. This can prevent bad things from happening such as the breaker falling etc, which will result in injury.



#### Mechanical interlock

There are two types of interlock: lever interlock and cable interlock

• Only two or three circuit breakers can be installed vertically by using the lever interlock; by using the cable interlock, the circuit breakers can be installed vertically or horizontally and both can be applied in the distribution system with two lines and one liaison.

• Two or three circuit breakers can be connected to interact with each other, one of these breakers is closed, the rest will be cut off by linkage.



# Functions and Characteristics

## Accessories



### Operation and protection

#### Door frame

- The door frame installed on the distribution cabinet door increases the IP protection grade to IP40
- Suitable for fixed and drawer type breakers.



### Interphase barriers

- The insulating plates installed in the middle of the busbar of the circuit breaker can increase creepage distance and improve insulating ability.



### Controller accessories

#### N-phase external transformer

In the grounding mode of 3P+N, the external transformer for the measurement of the neutral phase current is set on the connection busbar by the customer.



### Earthed transformer

- In a grounding mode of earth current feedback, the special external transformer for the measurement of the neutral phase current can protect the upper and lower circuit breakers against the grounding fault simultaneously
- Only available for ITR326H controller



### Leakage transformer

•An additional special rectangle transformer in an earth fault protection mode of leakage•Only for ITR326H controller



### Power module

Can provide auxiliary power for the intelligent controller

output is DC24V

iAPU334 input is AC220~AC400V

iAPU332D input is DC110V/DC220V



### Signal conversion module

- The output signal unit is used in the signal processing of communication functions such as zone interlock, "four remote" functions etc, or fault alarm or indication
- Only for ITR326H controller

# Maintenance and care

## Working conditions

Ambient temperature	-5°C~40°C, daily average value≤35°C Note: When using the circuit breaker under the ambient air temperature higher than +40°C or lower than -5°C, the user shall negotiate with the manufacturer.
Altitude	≤2000m
Ambient humidity	the relative humidity of the atmosphere is not exceed 50% when the ambient maximum temperature is at +40°C ;higher relative humidity is permissible under the lower temperature(e.g. 90% at 20°C) In consideration of the dew formed on the surface of the product due to temperature change.
Electromagnetic interference	apply to Environment A the circuit breaker is installed in the cabinet room, the door frame is added, the protection level is increased up to IP40
Protection level	

## Maintenance procedure

Regular check is needed.

Interval time	Operation mode
Annually	Turn on and turn off the local and remote devices, use various additives one after another to test the operation procedure sequence Use the small test suite for the control unit test

Every two years or when all the control unit repair indicators

reach 100 Check the arc-extinguishing chamber Check the connection Check the sealing performance of the connection

The parts need to be changed according to the number of running cycles

The following parts need to be change on regular basis to increase the service life of the device (maximum number of the running cycles)

Accessories	Engaged entity
Arc-extinguishing chamber	users
Electrically operated mechanism	users
Mechanical interlock	users
Link spring	users
Shunt coils/under-voltage coils/closing coils	users

### Maintenance handling

1 Each of the rotating parts shall be lubricated periodically during service  
2 Carry out the maintenance regularly, remove the dirt and keep the insulating level of the circuit breaker.

3 Check the contact system regularly, especially after every short circuit breaking, here are the contents to be checked:

- The smoke train on the two walls of the arc-extinguishing chamber is clear, whether the wall is broken or not, whether the chute sheet has a big burn loss or not, a timely change is needed depends on the situation.
- Whether the contact is well contacted or not, contacts will be sent to the manufacturer for changing if the thickness of the contact point is less than 1 mm.
- Check each of the connecting parts is loose

4 After fault breaking of the circuit breaker, the controller can send a light indication of fault causes, the memory function will be reserved after power break. Press "Fault check" button on the control panel after repower, the previous fault trip information will be indicated. The past fault memory will be cleared if a new fault occurs, and the new faulty memory will be kept.

Note: There is no memory in a simulated power outage under the test condition. Press "Reset" button to enable the controller into a normal state

# Maintenance and care

## Fault resolution

Fault phenomenon	Reason analysis	Shooting methods	Remark
The motor can not store energy. or abnormal	The voltage specifications and circuit breaker are inconsistent	Check whether the data label on the circuit breaker complies with the order requirements, otherwise a replacement is needed.	The external power shall meet the requirement, the wiring is correct
	The wiring of the circuit breaker or external line is not correct.	Use a multimeter to check the route against the wiring diagram	
	The motor burns out	Replace the motor	
	Energy storing is complete and the motor keeps running	The rip switch in the mechanism is broken, replace it.	
The circuit breaker can not be closed	the under-voltage does not pull	Transmit power to the - under-voltage coil, replace it if this coil burns out	
	an load short-circuit has occurred or the "Reset" button of the controller does not reset.	Eliminating the short circuit fault and press the controller "Reset" button to reset.	
	The shunt release is energized too long	No long-term power or check the circuit, replace it if the shunt burns out.	
The circuit breaker can not be opened	The shunt release, under-voltage release do not operate	Transmit power to the shunt - coil, replace it if the shunt burns out	
		De-energize the under-voltage, if the under-voltage still dose not operate, replace it	
	The flux transformer does not operate	The intelligent controller sends no signals,replace it. Adjust the position of the flux transformer	
The circuit breaker trips frequently	The red reset button of the controller pops up	TFind out which protection - lamp is on, eliminate the cause of the fault	
		Change the controller if there is no fault in the circuit.	
	Protection of the under-voltage release	Check if the grid voltage fluctuates or the under-voltage power is loose.  Check if the fault is removed after the under-voltage release is dismantled	

### Replacement parts order:

-Among the electrical accessories, some might need to be replaced

Electrically operated mechanism

Shunt coil

Closing coil

Under-voltage coil

Auxiliary contact

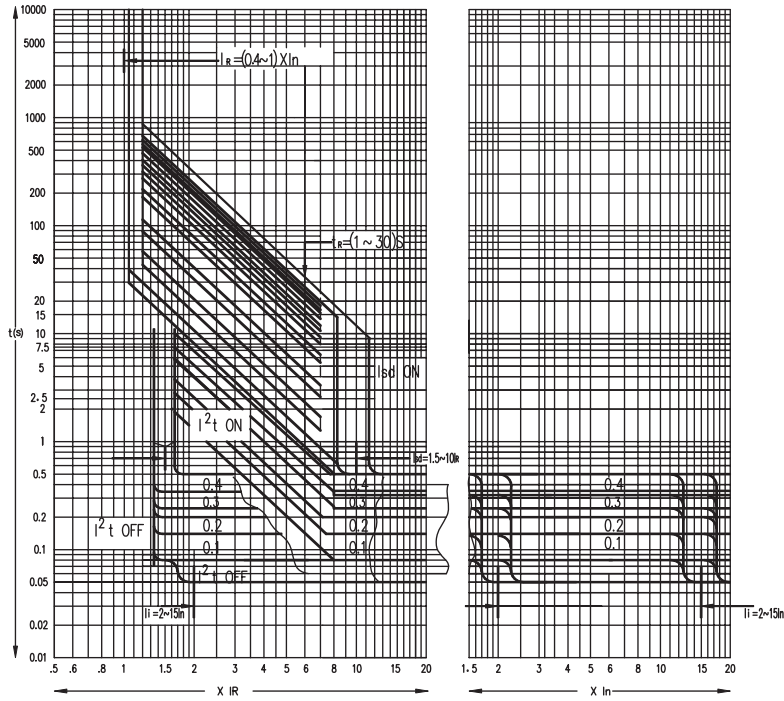
Intelligent release mounting accessory

Key lock

# Appendix

## Tipping curve

### Normal protections



### Ground fault protection

