

## LFW1 Air Circuit Breaker



### 1. General

LFW1 series intelligent air circuit breakers(hereinafter called ACB)are applied for the network circuit of AC 50Hz, rated voltage 400V,690V and rated current between 630A and 6300A.Mainly used for distributing energy and protecting the circuit and power supply device against short-circuit,undervoltage,single-phase ground fault,etc. The ACB has intelligent protection function and the key parts adopt intelligent release.The release can make the accurate selective protection,which can avoid cutting off the power and improve the reliability of power supply.

The products conform with IEC60947-1,IEC60947-2 standards.

### 2. Type designation

**LFW1- 2000 / 3 + Installation + Control unit +Common use accessory + Optional accessory**

| Rated current<br>in scope of<br>frame current                                                                                                             | Pole number           | Installation                                                                                                                                                            | Control unit                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Common use accessory                                                                                                                                                                                                                                                                                                                                                                                               | Optional accessory                                                                                                                                                                                                                                                                                                                                   |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2000 Type-In:<br>630A,800A,<br>1000A,1250A,<br>1600A,2000A;<br><br>3200 Type-In:<br>2000A,2500A,<br>3200A;<br><br>6300 Type-In:<br>4000A,5000A,<br>6300A; | 3-default<br>4-4 pole | Fixed type-<br>horizontal,<br>vertical<br>Draw out type-<br>horizontal,<br>vertical<br>Note:2000<br>type have<br>vertical wiring,<br>others are<br>horizontal<br>wiring | L type-protection of overload<br>long time-delay,short circuit<br>short time-delay,short circuit<br>instantaneous and function<br>of current flash columns<br>instruction.<br><br>M type- protection of overload<br>long time-delay,short circuit<br>short time-delay,short circuit<br>instantaneous, earth fault<br>and function of digital<br>current display,and self-<br>diagnosis,fault memory.<br><br>H type- protection of overload<br>long time-delay,short circuit<br>short time-delay,short circuit<br>instantaneous, earth fault<br>and function of digital current<br>display,and self-diagnosis,<br>fault memory and load<br>monitoring<br>(communication) | Shunt release-<br>AC230V,AC400V,DC220V<br><br>Undervoltage release-<br>AC230V,AC400V,<br>undervoltage instantaneous,<br>undervoltage time-delay<br><br>Release (close)<br>magnetic iron-AC230V,<br>AC400V,DC220V<br><br>Electric operation<br>mechanism-AC230V,<br>AC400V,DC110V,DC220V<br><br>Auxiliary switch-<br>standard type (4a4b),<br>special type (5a5b,6a6b)<br><br>Note:a-normal open,<br>b-normal close | Mechanical inter-lock:<br>one circuit breaker<br>(1lock+1key)<br>two circuit breakers<br>(steel cable inter-lock,<br>connecting rod inter-<br>lock,2 locks+1key)<br>three circuit breakers<br>(3locks+2keys,<br>connecting rod<br>inter lock)<br><br>Automatic power<br>transfer system<br><br>Current transformer<br>connected with<br>neutral lead |

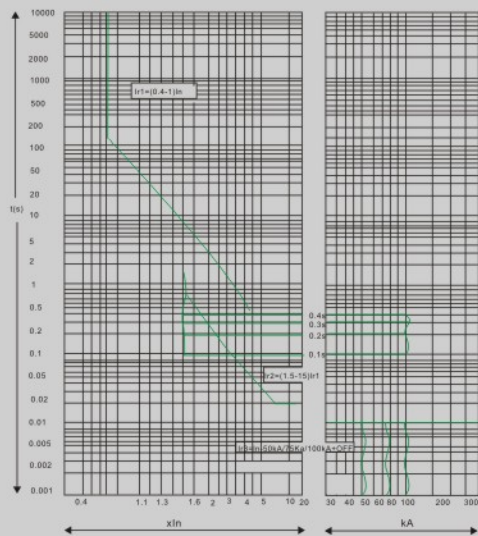
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### 3. Operation Conditions

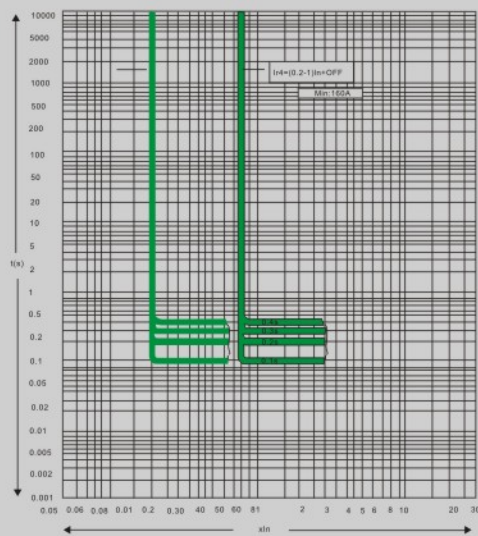
| Item                     | Description                                                                                  |
|--------------------------|----------------------------------------------------------------------------------------------|
| Ambient temperature      | -5℃~+40℃(except special order products)                                                      |
| Altitude                 | ≤2000m                                                                                       |
| Pollution grade          | 3                                                                                            |
| Safety category          | Main circuit and undervoltage tripping coil is IV,other auxiliary and control circuit is III |
| Installation position    | Vertical installed,tilt not exceed 5 degree                                                  |
| Environmental protection | Most of parts use recyclable and degradable materials                                        |
| Isolating function       | With isolating function                                                                      |

### 4. Specifications

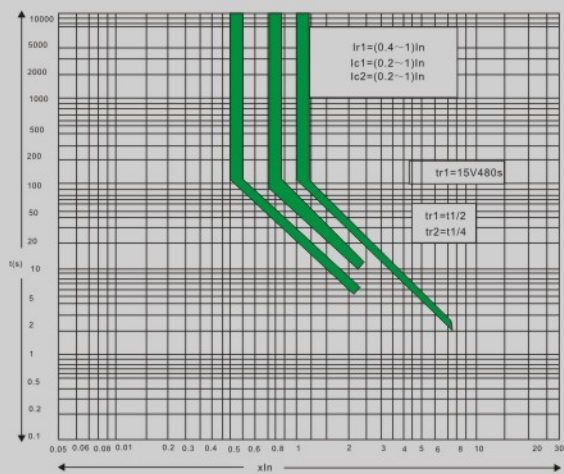
#### Curves



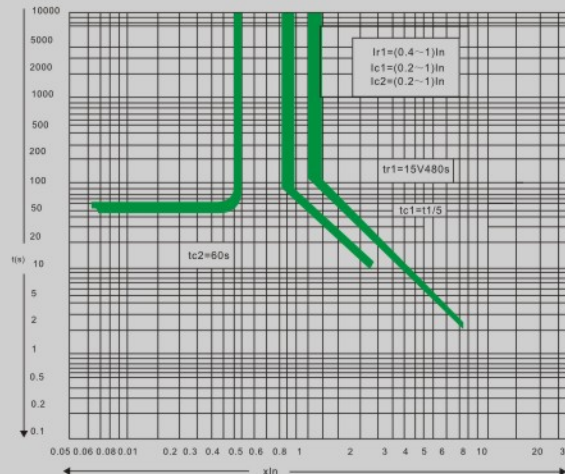
LFW1-2000~6300 Over current release time/current characteristic curve



LFW1-2000~6300 Earth fault protection time/current characteristic curve



LFW1-Load monitoring (1) time/current characteristic curve



LFW1-Load monitoring (2) time/current characteristic curve

**LFW1 Air Circuit Breaker****4.1 Data**

| Type                                                             |                  |              | LFW1-2000                   | LFW1-3200      | LFW1-6300      |
|------------------------------------------------------------------|------------------|--------------|-----------------------------|----------------|----------------|
| Pole                                                             |                  |              | 3P,4P                       | 3P,4P          | 3P,4P          |
| Using category                                                   |                  |              | B                           | B              | B              |
| Rated current In                                                 |                  | A            | 630,800,1000,1250,1600,2000 | 2000,2500,3000 | 4000,5000,6300 |
| Rated frequency                                                  | AC               | Hz           | 50                          | 50             | 50             |
| Rated operation voltage Ue                                       |                  | V            | 400,690                     | 400,690        | 400,690        |
| Rated insulation voltage Ui                                      |                  | V            | 800                         | 800            | 800            |
| Arcing distance                                                  |                  | mm           | 0                           | 0              | 0              |
| Rated impulse withstanding voltage Uimp                          |                  | V            | 8000                        | 8000           | 8000           |
| Rated operation short circuit breaking capacity Ics(O-t-CO-t-CO) | 400V             | kA           | 50                          | 80             | 100            |
|                                                                  | 690V             | kA           | 40                          | 50             | 75             |
| Rated limiting short circuit breaking capacity Icu(O-t-CO)       | 400V             | kA           | 80                          | 100            | 120            |
|                                                                  | 690V             | kA           | 50                          | 65             | 85             |
| Rated short circuit closing capacity Icm                         | 400V             | kA           | 176                         | 220            | 264            |
|                                                                  | 690V             | kA           | 105                         | 143            | 187            |
| Rated short time withstanding current Icw (O-t-CO,AC400V 0.4S)   |                  | kA           | 50                          | 65             | 85             |
| Operation life                                                   | Per hour         | Times        | 20                          | 20             | 10             |
|                                                                  | Electrical       | Times        | 1000                        | 500            | 500            |
|                                                                  | Mechanical       | Times        | 10000                       | 5000           | 5000           |
| Full breaking time                                               |                  | ms           | 20~30                       | 20~30          | 20~30          |
| Full closing time                                                |                  | ms           | 55~70                       | 55~70          | 55~70          |
| Power consumption                                                | 3P               | W            | 360                         | 1200           | 2000           |
|                                                                  | 4P               | W            | 450                         | 1750           | 2300           |
| Resistance of each pole                                          | Fixed type       | $\mu \Omega$ | 11                          | 9              | -              |
|                                                                  | Draw out type    | $\mu \Omega$ | 20                          | 14             | 10             |
| Dimensions (LxWxH)                                               | 3P fixed type    | mm           | 362x323x402                 | 422x323x402    |                |
|                                                                  | 3P draw out type | mm           | 375x461x452                 | 435x471x452    |                |
|                                                                  | 4P fixed type    | mm           | 457x323x402                 | 537x323x402    |                |
|                                                                  | 4P draw out type | mm           | 470x461x452                 | 550x471x452    |                |
| Approximate weight                                               | 3P fixed type    | kg           | 41                          | 55             |                |
|                                                                  | 3P draw out type | kg           | 71                          | 95             | 245            |
|                                                                  | 4P fixed type    | kg           | 51.5                        | 65             | -              |
|                                                                  | 4P draw out type | kg           | 86                          | 115            | 260            |

**4.2 Overload protection data**

| Overload protection                  |   |   | LFW1-2000~6300                                                      |
|--------------------------------------|---|---|---------------------------------------------------------------------|
| Adjust scope Ir1                     |   |   | (0.4-1)In (pole difference 2%)                                      |
| 1.05 Ir1                             | h |   | ≥2h non-tripping                                                    |
| 1.3 Ir1                              | h |   | ≤1h tripping                                                        |
| Delay time tr1 when current is 2.0In |   | s | 3.32,5.32,8.00,13.3,20,26.6,33.3,45,60,93.3,133,200,266,333,400,433 |
| Delay time tr1 when current is 3.0In |   | s | 1.25,2,3,5,7.5,10,12.5,16.8,22.5,35,50,75,100,125,150,162           |
| Accuracy                             |   | % | ±10                                                                 |

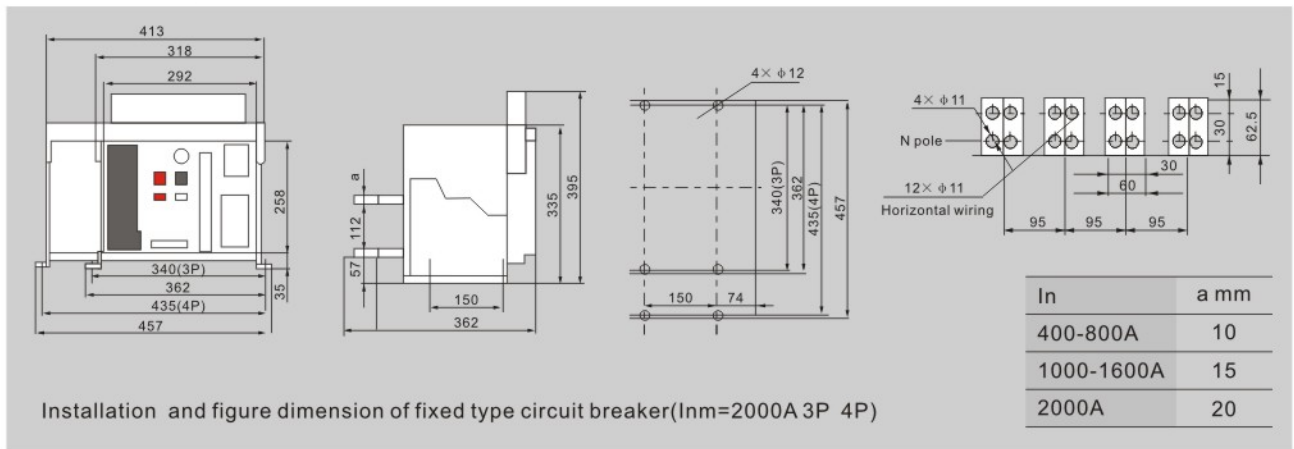
| Short circuit, short time delay |    |                                 |
|---------------------------------|----|---------------------------------|
| Adjust scope Ir1 Ir2            |    | (0.4-15)In (pole difference 2%) |
| Delay time tr2                  | ms | 100,200,300,400                 |
| Accuracy                        | %  | ±10                             |

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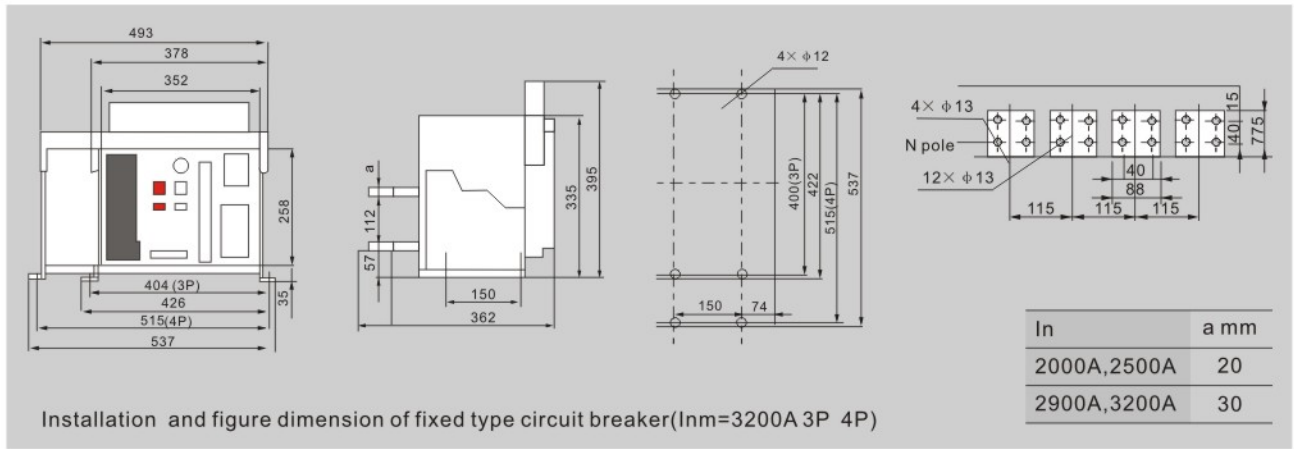
| Short circuit, instantaneous |    |                                      |           |           |
|------------------------------|----|--------------------------------------|-----------|-----------|
|                              |    | LFW1-2000                            | LFW1-3200 | LFW1-6300 |
| Adjust scope Ir1 Ir3         |    | 1In-50kA                             | 1In-75kA  | 1In-100kA |
| Accuracy                     | %  | ± 15                                 | ± 15      | ± 15      |
| Grand fault protection       |    |                                      |           |           |
| Adjust scope Ir1 Ir4         |    | (0.2-0.8) In (max. 1200A, min. 160A) |           |           |
| Delay time tr4               | ms | 100,200,300,400                      |           |           |
| Accuracy                     | %  | ± 10                                 |           |           |
| Load monitoring output       |    |                                      |           |           |
| Load adjust scope Ic1        |    | (0.2-1) In (pole difference 2%)      |           |           |
| Delay time tc1               |    | tr1X0.5                              |           |           |
| Load adjust scope Ic2        |    | (0.2-1) In (pole difference 2%)      |           |           |
| Delay time tc2               |    | tr1X0.25 (anti- time limit)          |           |           |
| Accuracy                     | s  | 60 (set time limit )                 |           |           |
|                              | %  | ± 10                                 |           |           |

### 5. Overall and mounting dimensions(mm)

Installation and figure dimension of LFW1-2000A fixed type circuit breaker

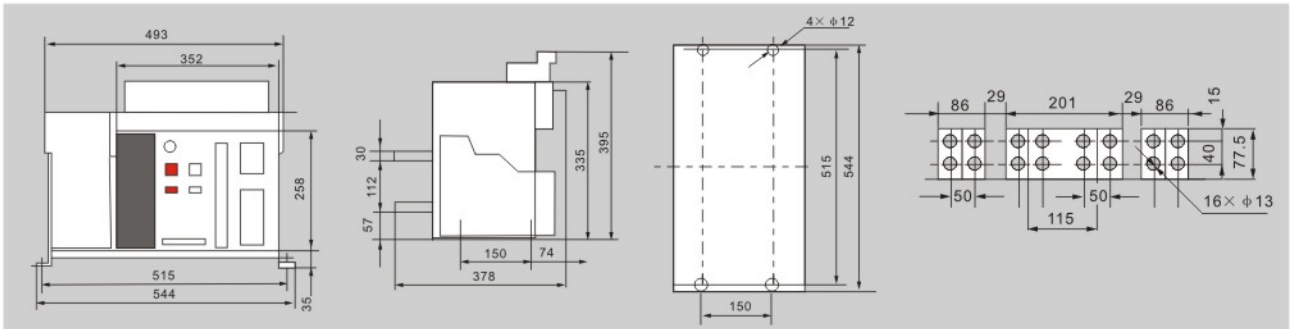


Installation and figure dimension of LFW1-3200A fixed type circuit breaker

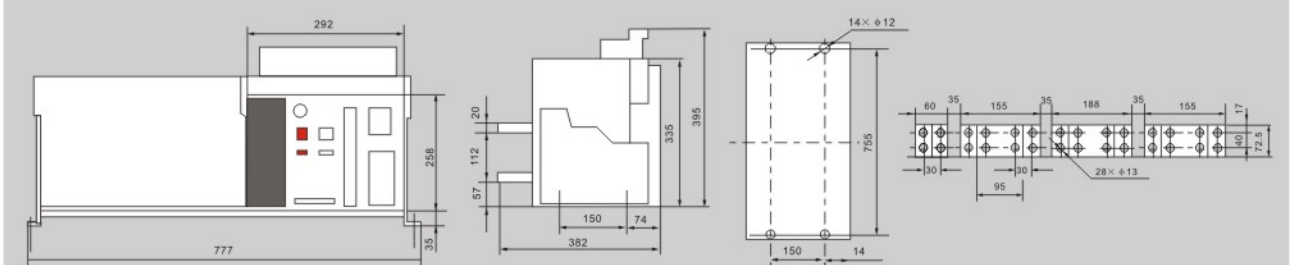


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Installation and figure dimension of LFW1-4000A fixed type circuit breaker



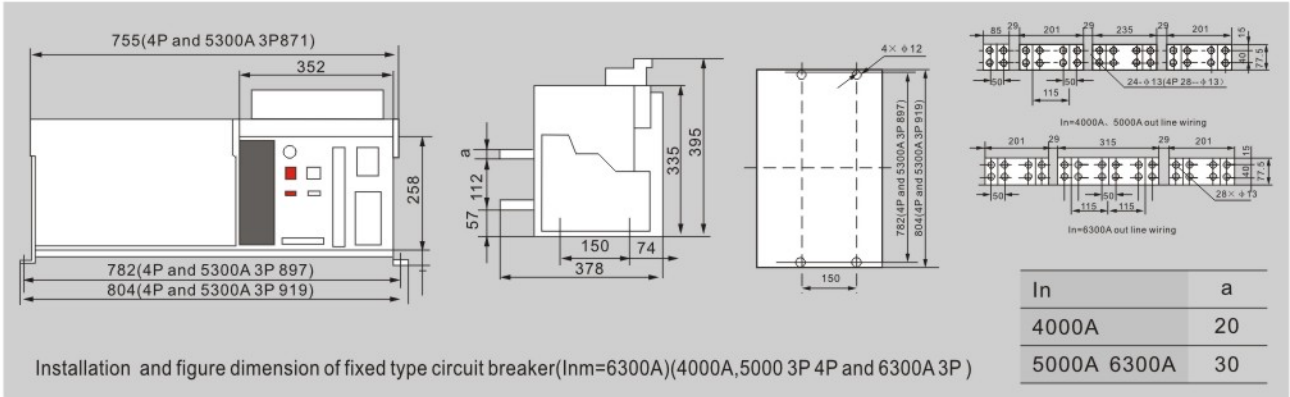
installation and figure dimension of fixed type circuit breaker(Inm=4000A 3P)



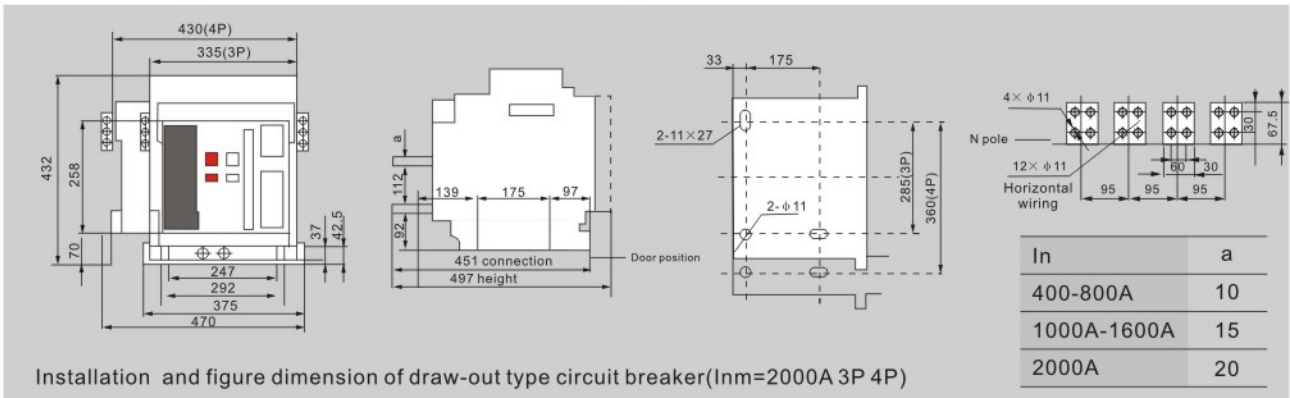
Installation and figure dimension of fixed type circuit breaker(Inm=4000A 4P)



Installation and figure dimension of LFW1-6300A fixed type circuit breaker

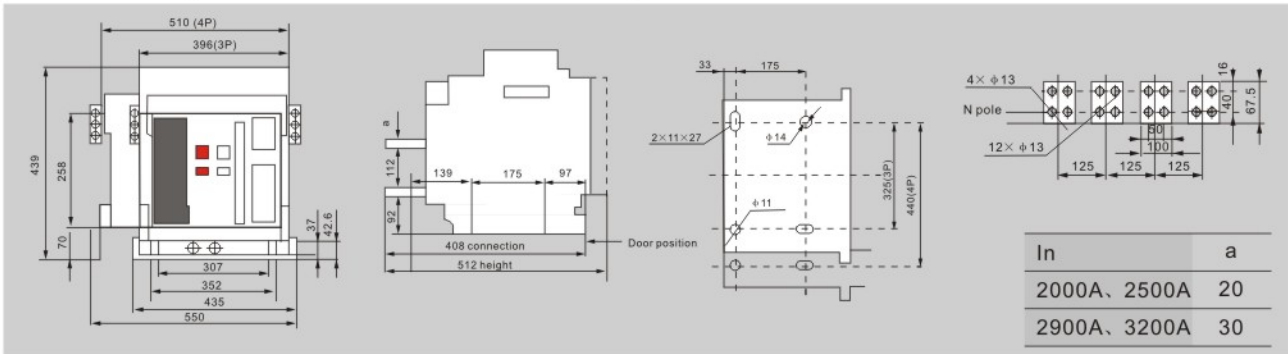


Installation and figure dimension of LFW1-2000A draw-out type circuit breaker

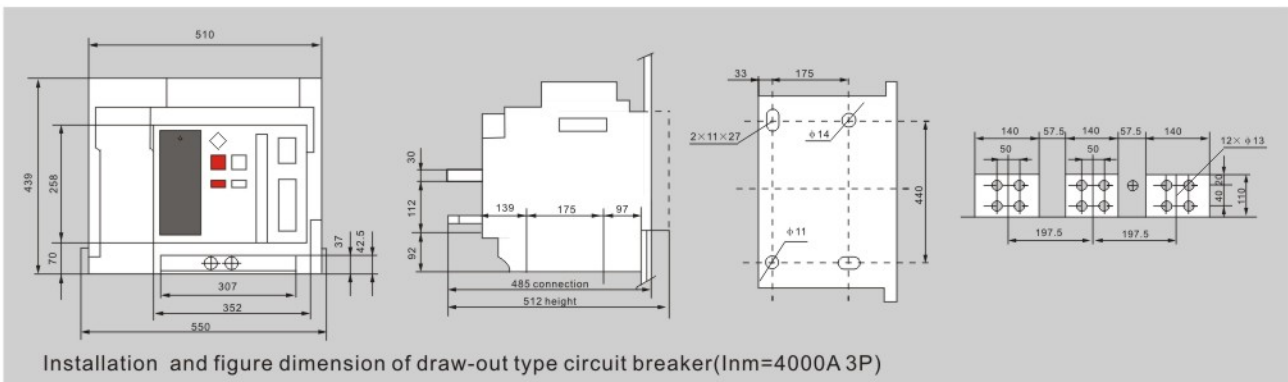


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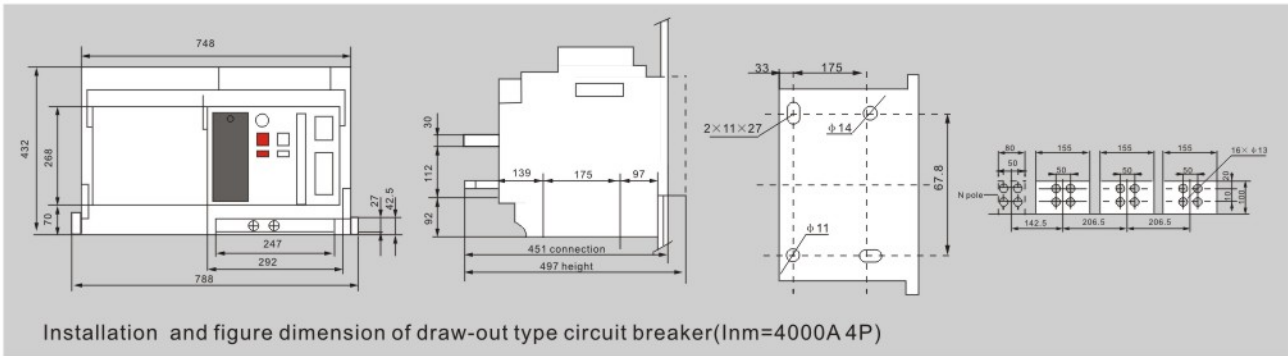
Installation and figure dimension of LFW1-3200A draw-out type circuit breaker



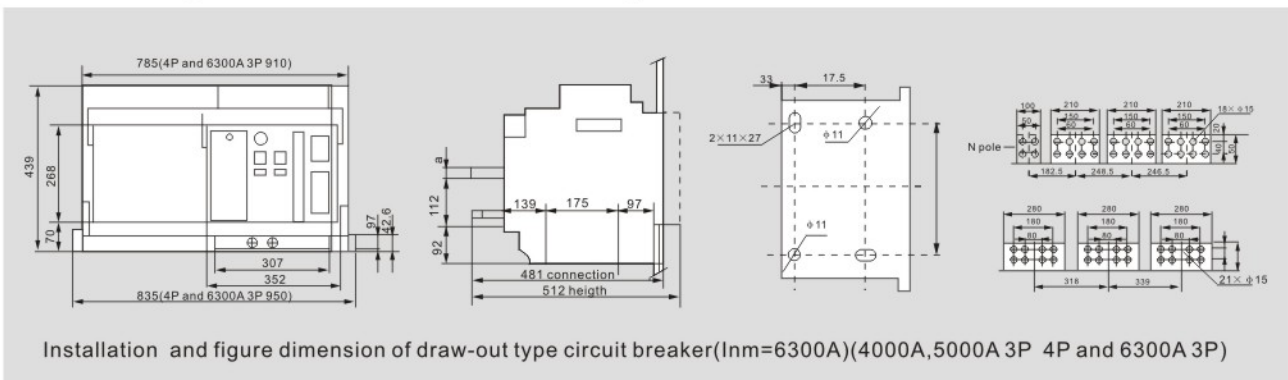
Installation and figure dimension of LFW1-4000A draw-out type circuit breaker



Installation and figure dimension of LFW1-4000A (4P) draw-out type circuit breaker



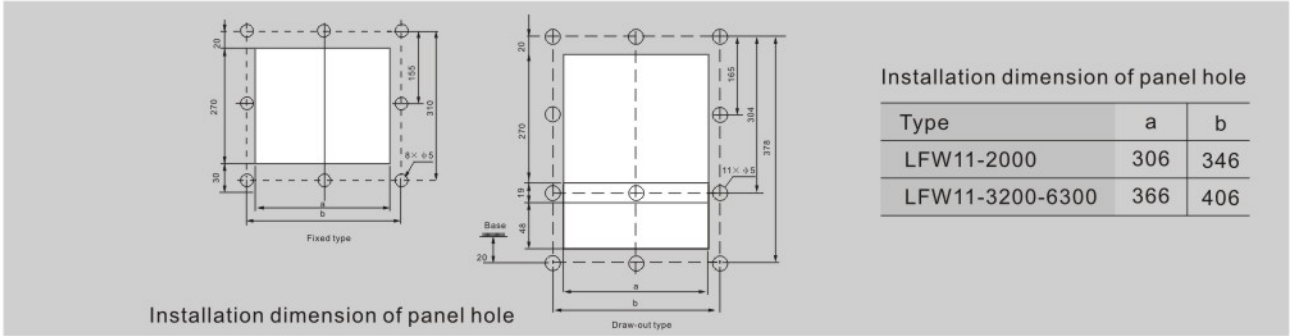
Installation and figure dimension of LFW1-6300A draw-out type circuit breaker



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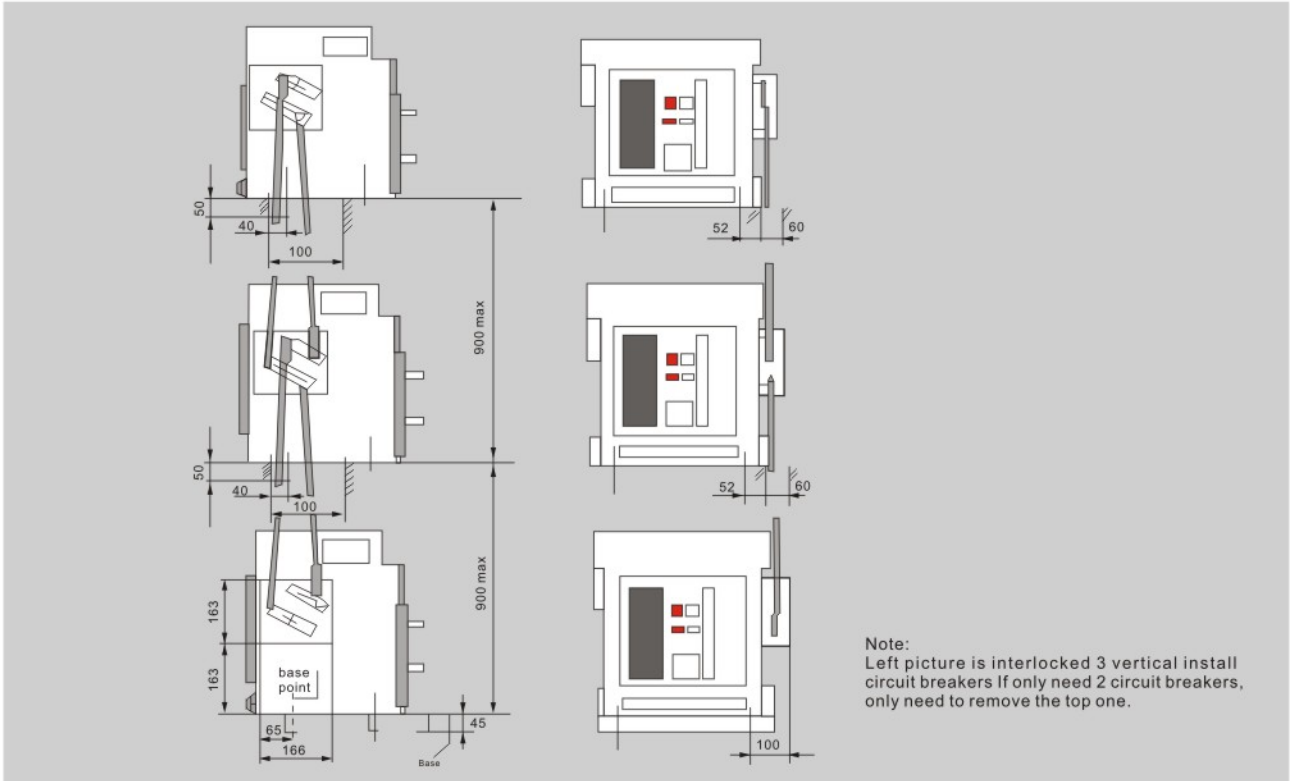
Installation and figure dimension of draw-out type circuit breaker(Inm=3200A 3P 4P)

Dimension of panel hole see picture and table Unit:mm

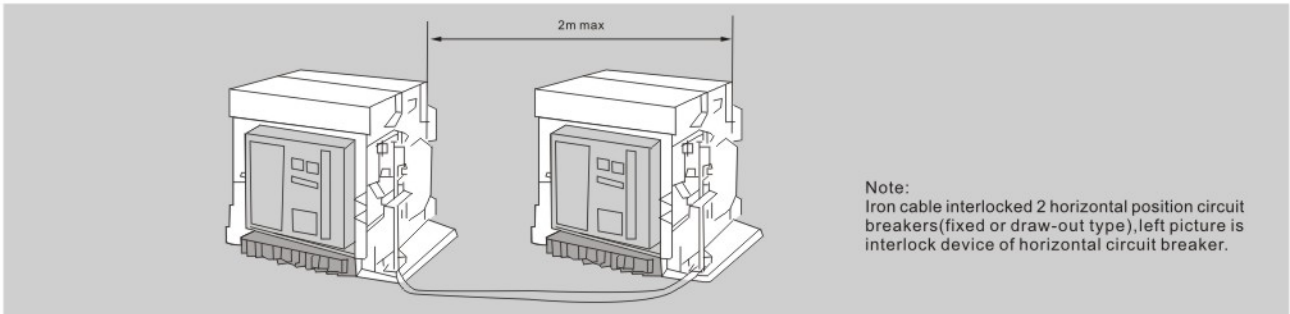


Interlock device of circuit breaker see picture Unit:mm

Interlock device of vertical install circuit breaker



Interlock device of horizontal install circuit breaker



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6. Characteristic of intelligent controller

|  | Basic function                                            |                                                                                         |
|-----------------------------------------------------------------------------------|-----------------------------------------------------------|-----------------------------------------------------------------------------------------|
|                                                                                   | Overload long time-delay anti-time limit protection       |                                                                                         |
|                                                                                   | Short circuit short time-delay anti-time limit protection |                                                                                         |
|                                                                                   | Short circuit short time-delay timing protection          |                                                                                         |
|                                                                                   | Short circuit instantaneous protection                    |                                                                                         |
|                                                                                   | Insulate earth fault protection                           |                                                                                         |
| Display function                                                                  |                                                           |                                                                                         |
| Current (select 1)                                                                | Digital display                                           | Can display L1,L2,L3,I <sub>max</sub><br>IG (earth),IG (Neutral)                        |
| Voltage (select 2)<br>Power (select 2)                                            | Digital display                                           | Can display U <sub>12</sub> ,U <sub>23</sub> ,U <sub>31</sub> ,U <sub>min</sub><br>P    |
| Power factor (select 2)                                                           |                                                           | COSΦ                                                                                    |
| Warning function                                                                  |                                                           |                                                                                         |
| Over current<br>fault warning                                                     | Light-emitting<br>diodes on panel                         | After fault trip indicator<br>light corresponding                                       |
| Fault category<br>identification                                                  | Light-emitting<br>diodes on panel                         | Overload long time-delay                                                                |
|                                                                                   |                                                           | Short circuit short time-delay                                                          |
|                                                                                   |                                                           | Short circuit instantaneous                                                             |
|                                                                                   |                                                           | Earth fault                                                                             |
| Fault phase sequence                                                              | Digital display                                           | Display the fault phase sequence                                                        |
| Current                                                                           |                                                           | Breaking current                                                                        |
| Time display                                                                      |                                                           | Breaking time                                                                           |
| Contact loss indication                                                           | Digital display                                           | Display percentage of loss                                                              |
| Self-diagnosis function                                                           | Digital display                                           | Send the error signal                                                                   |
| Testing function                                                                  |                                                           |                                                                                         |
| Panel key                                                                         | Tripping                                                  | Test the time current<br>characteristic of release and<br>situation of operation device |
| Remote monitoring function                                                        | Non-tripping                                              | Test the time current<br>characteristic of release                                      |
| Remote monitoring<br>code signal optocoupler                                      | Relay (contain power) module                              | Output of various working condition                                                     |
| Communication function                                                            |                                                           |                                                                                         |
| Communicate type                                                                  | RS485<br>(communication)I/O                               | User should consult with<br>the manufacturer                                            |

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7. Electrical accessories

| Under-voltage release                                                             | Rated working voltage Ue(V) | AC400 AC230         |
|-----------------------------------------------------------------------------------|-----------------------------|---------------------|
|  | Acting voltage (V)          | (0.35~0.7) Ue       |
|                                                                                   | Reliable close voltage (V)  | (0.85~1.1) Ue       |
|                                                                                   | Non close voltage (V)       | ≤0.35Ue             |
|                                                                                   | Power loss                  | 12VA(YCW1-1000 5VA) |

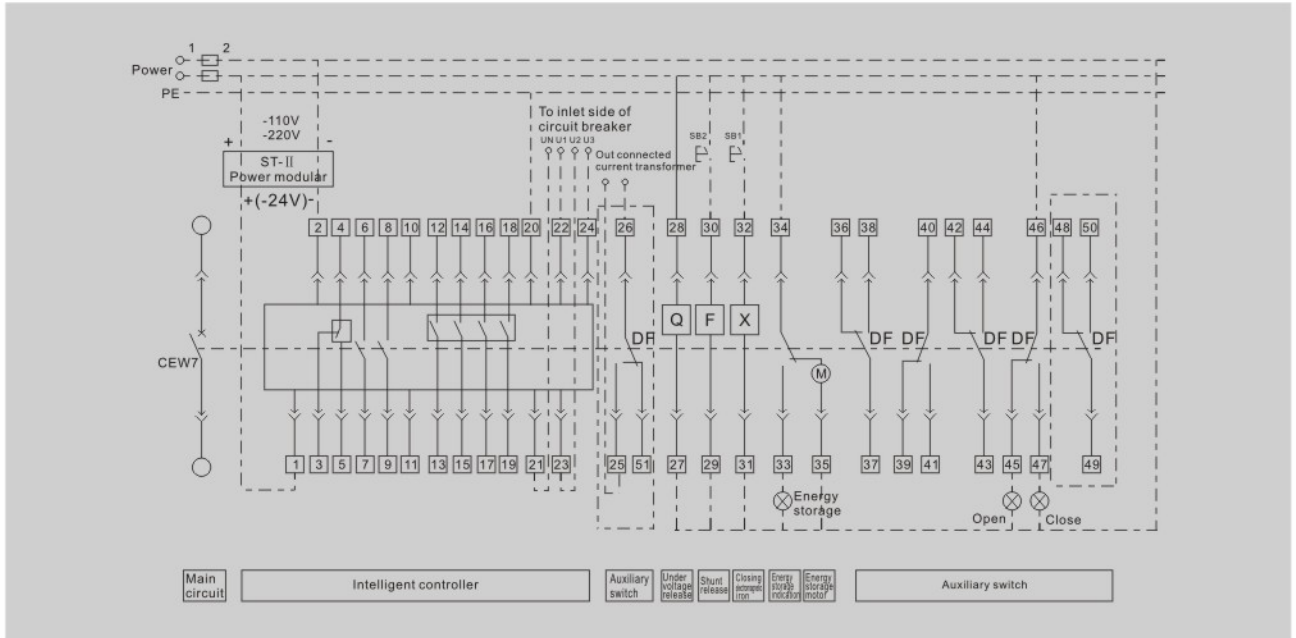
| Shunt release                                                                      | Rated control power voltage Us(V) | AC400 AC230 DC220 DC110 |
|------------------------------------------------------------------------------------|-----------------------------------|-------------------------|
|  | Acting voltage (V)                | (0.7~1.1)Ue             |
|                                                                                    | Power loss                        | 40VA 40W(YCW1-1000 5VA) |
|                                                                                    | Open time                         | less than 30ms          |

| Close electromagnetic iron                                                          | Rated control power voltage Us(V) | AC400 AC230 DC220 DC110 |
|-------------------------------------------------------------------------------------|-----------------------------------|-------------------------|
|  | Acting voltage (V)                | (0.85~1.1)Ue            |
|                                                                                     | Power loss                        | 40VA 40W(YCW1-1000 5VA) |
|                                                                                     | Open time                         | less than 70ms          |

| Motor operating device | Rated control power voltage Us(V) | AC400 AC230 DC220 DC110    |
|------------------------|-----------------------------------|----------------------------|
|                        | Acting voltage (V)                | (0.85~1.1)Ue               |
|                        | Power loss                        | 192VA 192W(YCW1-1000 80VA) |
|                        | Energy saving time                | less than 5s               |

## LFW1 Air Circuit Breaker

### 8. LFW1-2000~6300 L, M type wiring scheme of secondary loop



#### 8.1 Lead connector function:

- 1# and 2# auxiliary power input terminal, 1# is positive under AC.
- 3#, 4# and 5# faulty tripping contact output (4# is public terminal), contact capacity:
- 6#, 7#, 8# and 9# two groups circuit breaker status auxiliary terminal, contact capacity:
- 12#, 13# (contact 1); 14#, 15# (contact 2); 16#, 17# (contact 3)
- 18#, 19# (contact 4)--4 faulty of controller (overload, short time-delay, instantaneous, earthing faulty)
- Signal contact output (Programmable)
- Contact capacity: 5A/240VAC, 72A/24VDC
- 20#--protected earthing line
- 21#, 22#, 23#, 24# voltage signal input terminal, note: the order can't be wrong ( correct order is UN, U1, U2, U3)
- 25#, 26#--out connected current transformer input terminal (with earthing protected)

#### 8.2 Components:

- Q-Under voltage release (can be series connected with emergency stop pushbutton)
- F-Shunt release (Don't connected with normal open auxiliary contact when delivered )
- X-Closing electromagnetic iron (Don't connected with normal close auxiliary contact when delivered)
- DF-Auxiliary switch
- M-Motor

#### Note:

- If the voltage of control power of Q, F, X, M is different, they can be connected with different power (the dotted line in picture should be connected by user)
- Terminal 35 can be connected with power directly (pre-energy storage automatically), and also can be series connected with normal open switch before connected with power (manual pre-energy storage )
- The product with 6 open and 6 close auxiliary switch without earthing protect function, 5 open 5 close and 6 open 6 close is 51 circuit.
- ST-II power modular is DC modular, AC power connected with 1# and 2# terminal directly, pole and in-out line terminal can not be wrong. (the ST-II of draw out type was connected when delivered )
- 25# and 16# is out connected current transformer terminal under 47 circuit (with earthing protected)
- 25#, 26# and 51# connected as a normal open and close contact under 51 circuit (without earthing protected)