

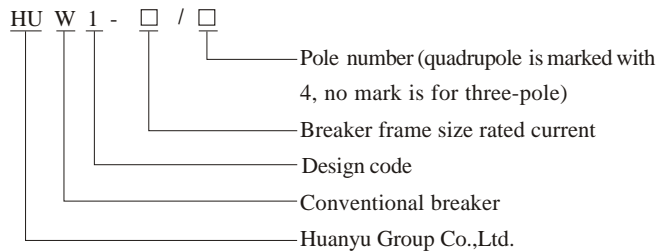
HUW1 series intelligent conventional breaker



Application

HUW1 series intelligent breaker is applicable in the distribution network of AC 50Hz, rated voltage of 400V and 690V, and rated current from 630A~3200A, to distribute electric energy protection circuit and prevent power equipments from harm of overload, under-voltage, short circuit and single-phase earthing etc. Provided with intelligent protecting function and precise selective protection, breaker can enhance the dependability of power supply and avoid the unexpected power cut. This product accords with the standard of GB14048. 4.

Model designation



Working and installation condition

- (1).Installation mode: fixed type, drawable type.
- (2).Operation mode: motor operated, manually operated(for serving).
- (3).Pole number: three pole, four pole.
- (4).Release type: intelligent type over-current controller, under-voltage instantaneous(or time-delay) operation release: shunt release.
- (5).The properties of intelligent type over-current controller:
 - a. Long time delay over-current protection inverse time limit, short time delay over-current protection inverse time limit, short time delay over-current protection fixed time limit, instantaneous.
 - b. Single-phase earthing protection function.
 - c. Presenting function:setting current I_r , action current, setting time, action time.

- d. Alarming function: overload alarming
- e. Self-checking function: over-heat protection, microcomputer self-diagnosing
- f. Testing function
- g. Load monitoring function
- h. Thermal simulation function
- i. MCR function
- j. Fault memory function

(6)Ambient Temperature:

- a. Temperature: $40 \geq T \geq 5^\circ\text{C}$ average value for 24 hours $\leq 35^\circ\text{C}$
Note: working condition of minimum temperature is -10°C or -25°C , users must declare while ordering;
working condition of maximum temperature exceed 40°C or minimum temperature under -25°C , the users should consult with our factory.
- b. Altitude: $\leq 2000\text{m}$.
- c. Air relative humidity: $\leq 50\%$, when the max temperature is 40°C And can be more while the temperature is lower, monthly average temperature in the most humid month $\leq 25^\circ\text{C}$, monthly average maximum relative humidity $\leq 90\%$.
- d. Pollution grade:3.
- e. Installation type:the type of circuit breaker, main circuit, under-voltage tripping coil and supply transformer is IV, the type of other ancillary circuit, controlling circuit is III.
- f. Installation condition: installation of circuit breaker shall accord to the instruction, and the vertical gradient of installation place should not exceed 5° .

Functions of three types of controllers, see chart 1

Usage	Series	Remarks	Functions	
General industrial usage	H	All belongs to digital units, Type L adopts coding switch and stirring pushbutton setting mode Type M and H adopts digital display and pushbutton setting mode	H series	
	M		M series	
	L		L series	★ Telecommunication interface: providing multi-protocol digital transmission
		★ Virtual value protection ★ 3 steps protection + earthing creepage protection ★ Load current light indication ★ Multi-alarming function ★ Testing function ★ Malfunction Memory ★ Auto-diagnosis MCR making breaking and limit-exceeding power-off function	★ Current meter ★ Voltage meter ★ More protection function, 5 types of properties available ★ Load monitoring and control ★ Contacts abrasion and indication for mechanical lifetime programming interface	

Technical parameter and property

1. Basic parameters of circuit breaker

Frame size rated current Inm A	Rated current In A	Rated voltage Ue V	Rated limiting short-circuit breaking capacity Icu KA o-co		Rated operating short-circuit breaking capacity Ics KA o-co-co		Rated short-time withstand current Icw KA(IS) 0.4s o-co	Power Loss (In) W	
								Fixed type	Drawble type
2000	630	AC 50Hz	400V	690V	400V	690V	50	40	80
	800							60	130
	1000							90	205
	1250		90	205					
	1600		140	310					
	2000		170	310					
3200	2000	400	100	65	80	50	65	170	400
	2500							260	510
	2900							320	650
	3200							420	760
4000	3200	690	100	75	80	65	65	430	780
	3600							440	790
	4000							450	800
6300	4000	400	120	85	100	75	85	1225	
	5000							1250	
	6300							1625	

Note: arcing-over distance is zero.

The reducing capacity coefficient of circuit breaker under different environment temperature, refer to the following table.

Environment temperature	+40℃	+45℃	+50℃	+55℃	+60℃
Allowed lasting working current	1In	0.95In	0.9In	0.85In	0.8In

Note: Under different environment temperatures, taking measured temperature of in-out line end of circuit breaker up to 110℃ as benchmark.

2. Protection characteristics of intelligent over-current release

2.1 Current setting of release and permissible error

Long time delay		Short time delay		Instantaneous		Earthing fault	
Ir1	Permissible error	Ir2	Permissible error	Ir3	Permissible error	Ir4	Permissible error
(0.4~1)In (Minimum160A)	±10%	(0.4~15)In	±10%	10In~50KA	±15%	(0.2~0.8) In maximum 1200A minimum160A)	±10%

Note: When there is three section protection at the same time, setting value can't cross.

2.2 Inverse time-limit acting characteristics of long time-delay over-current protection

I	Action time						permissible error
1.05I _{r1}	>2h non-action						
1.3I _{r1}	<1h action						
1.5I _{r1}	15s	30s	60s	120s	240s	480s	± 15%
2.0I _{r1}	8.4s	16.9s	33.7s	67.5s	135s	270s	

Note: The time of 2.0I_{r1} is calculated as $I^{2tL} = (1.5 I_{r1})^2 tL$, tL is the action time of 1.5I_{r1}, set by user.

2.3 Current protection characteristics of short time delay

Current	Action characteristics	Action time						Permissible error
I=I _{r2} I=8I _{r1}	Inverse time limit	Setting time $T2=(8I_{r1})^2/t^2$						
I=I _{r2} I=8I _{r1}	Fixed time limit	Setting time t ₂	0.1	0.2	0.3	0.4		
		Return time t ₂	0.06	0.14	0.23	0.35		

2.4 Earthing trouble protection characteristic is short time delay fixed time limit, see fixed time limit action time and return time in Form 6, the time setting value of earthing trouble is "OFF" when it is out of the factory.

Long time delay	Fixed value	I _{r1}	I _n
	Time delay	t1 (1.5)	15s
Short time delay	Fixed value	I _{r2}	8I _n
	Time delay	T2	0.4s
Instantaneous	Fixed value	I _{r3}	12I _n
Earthing trouble	Fixed value	I _{r4}	0.4I _n
	Time delay	t4	Only show, open constantly
Load monitoring	Fixed value		I _n
	Fixed value		I _n

Note: In the form, I_{r1} is long time delay protection setting current, I_{r2} is short time delay protection setting current, I_{r3} is instantaneous protection setting current, I_{r4} is earthing protection setting value, I_{LC1}, I_{LC2} is load inspect setting current.

2.5 Function of intelligent over-current releaser

2.5.1 Function of M type over-current release

a. Ampere function

Show each phase operating current and earthing leak out current, regularly show maximum current, show the current value or time value of setting, testing and trouble.

b. Voltmeter function

Show each line voltage, show the maximum voltage normally.

c. Load monitoring function

Set two setting value, setting range of is I_{LC1}(0.2~1)I_n, setting range of is I_{LC2}(0.2~1)I_n, I_{LC1} time delay characteristic is inverse time limit, its time setting value is 1/2 of long time delay setting value; I_{LC2} time delay characteristics are two: first is inverse time limit, its time setting value is 1/4 of long time delay setting value, second is fixed time limit, its delay time is 60s. The two time delay function, the former is used in breaking subordinate unimportant load while the current is closing to overload setting value, the

latter is used when current exceeds I_{LC1} setting value, make the time delay breaking subordinate unimportant load, fall of current, make the main circuit and the important load circuit keeping current supply, when the current falls down to I_{LC2}, after some time delay, send out the order to put through the circuit which the subordinate has switched off and resume the current supply for the whole system.

The above two monitoring protection, the users can choose one see monitoring characteristic in Picture 1 (C) (a).

d. Setting function

Use four buttons to set all parameter of the release.

e. Testing function

Use to check all protection Characteristics of release.

f. Far-end monitoring and diagnosing function

(1) Local computer trouble diagnosing function

Show error "E" or alarm when the computer gets out of order, and restart the computer. If it is needed, which can break the circuit breaker.

(2) Send out alarming when partial environment temperature is up to 85 °C and can break the circuit breaker when current is less up to (user's need).

(3) Intelligent release has signal to pass contact or optical coupler output of overload, earthing, short cut, load monitoring, pre-warning, release indicating (OCR), it is convenient for the user to external connecting and remote controlling. Contact capacity DC28V, 1A, AC125V, 1A.

g. MCR release and simulation protection, which can shut off as users' request, and it is usual shut off while making the test of time delay breaking.

(1) MCR making and breaking protection is mainly used while the line fault is switching on (the instantaneousness of release gets electricity), release has the function of breaking the circuit breaker in low-power Short-circuit current. setting current as 10KA, error ±20%, it can be set as user's request.

(2) Release has the function that when signal is not through the host computer chip, it can release signal directly in the situation of super short-circuit current.

h. Thermal memory function release has the memory function of simulating bimetal characteristic after overload or short-circuit time delay releasing and before electricity outage of release, overload energy release will be out in 30min, short time delay energy release out in 15min. During this time, trouble of overload or short time delay will make the release time shorter, release power-off, energy zero clearance automatically.

2.5.2H type over-current release not only has all the function of M type, but also has serial communication interface, through special equipment to form a complete set with printer, language system or PC, can transmit parameter such as serial number of release, open-close state, setting value of release, operating current, voltage, fault current, action time and fault conditions, show or type out by way of figure, characteristics, etc, realize telemeter measurement, distant adjusting, remote control, distant news function, suitable for the network system.

(1) Communication interface hardware support

- 16 one-chip computers of central processing unit, frequency of clock is clock 25 Mhz
- Maximum communication baud rate is 1 MHz
- Port comply with EIA RS485 protocol support duplex, half duplex mode

(2) Data transfer mode support

- Support serial synchronization and serial synchronization mode
- Support 8-bit, 9-bit data transfer mode, support odd-even checking.

Realize parallel mode communication if it's necessary.

Communication interface protocol is divided into three layers: application layer, link layer, physics layer, and each layer protocol is for special-purpose.

Function of communication interface: it mainly realizes four functions what low-voltage distribution system required, such as telemeter measurement, distant adjusting, remote control, distant news function.

2.2.3Function of L type over-current release: L type release adopts encode switch setting mode, has four protection characteristics of overload long time delay, short-circuit short time delay, instantaneous, earth leakage, and has fault conditions, load current light cross indicating function, but does not have digit display, and the function is not so complete as M and H type.

3. Operating property

Operating property is denoted by recycling times

Recycling times per hour	Recycling frequency of electrification operation		Recycling frequency of non-electrification operation		Total
	2000A	500	2000A	9500	
20	3200A		3200A	4500	5000
	4000A		4000A	4000	4500
	6300A		6300A	2500	3000

4 Operating voltage of shunt release, under-voltage release, electromotive mechanism, releasing, switching-in electromagnet, intelligent electronic controller, see Chart 8 as follows:

Type	Rated voltage AC(50Hz)V		DC V
Shunt release	Us	220, 380	110,220
Under-voltage release	Ue	220, 380	-
Electromotive mechanism	Us	220, 380	110,220
Switching-in electromagnet	Us	220, 380	110,220
Intelligent type electron release	Us	220, 380	110,220

Note: The reliable operation voltage range of shunt excitation release is (70%-110%)Us, while that of closed electromagnet and electric operating mechanism is(85%-110%)Us.

5. Tripping properties of under-voltage releaser

Type	Under-voltage instantaneous release	Under-voltage instantaneous release
Action time releaser	Time delay 1,3,5s	Instantaneous
Action voltage value of release	35%-70% Ue	Can make the circuit breaker break
	≤35% Ue	The circuit breaker can't be closed
	≥85% Ue	The circuit breaker can be closed reliably
In 1/2 delay time, if supply voltage return to 85%	The circuit breaker is not breaking	

Note: The accuracy of delay time is ±10%

6. Property of auxiliary contacts

- 6.1 Conventional heating current auxiliary contact is 6A.
- 6.2 Auxiliary contact form: four normal open and four normal closed
- 6.3 Abnormal making and breaking ability auxiliary contacts making and breaking capacity of auxiliary contact under decided abnormal operating conditions.

Operating type	Making			Breaking			Making-breaking operating cycle frequency and operating frequency		
	I/e	U/e	COS Φ or t0.95	I/e	U/e	I/e	Operating recycling frequency	Operating recycling frequency per minute	Making time
AC-15	10	1.1	0.3	10	1.1	0.3	10	6(Or the same as operating frequency of main loop)	0.05
DC-13	1.1	1.1	6Pe	1.1	1.1	6Pe			

Note: when the upper limit Pe=50W, T0.95 = 6Pe=300ms

6.4 Making and breaking capacity of auxiliary contact under normal operating conditions

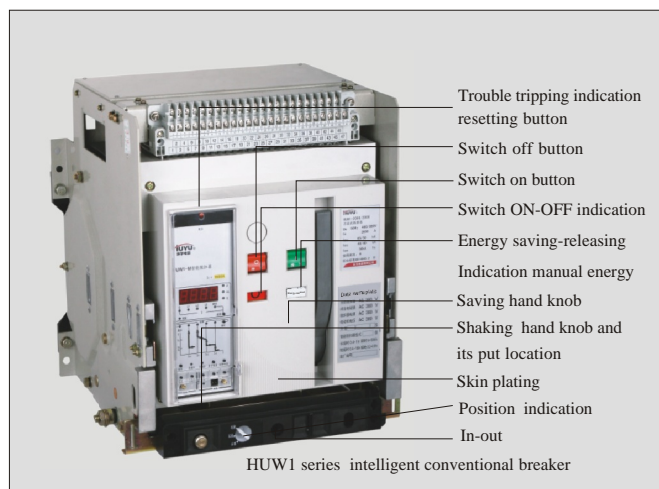
Operating type	Making			Breaking		
	I/e	U/e	COS Φ or T0.95	I/e	U/e	COS Φ or T0.95
AC-15	1	1	0.3	1	1	0.3
DC-13	1	1	6Pe	1	1	6Pe

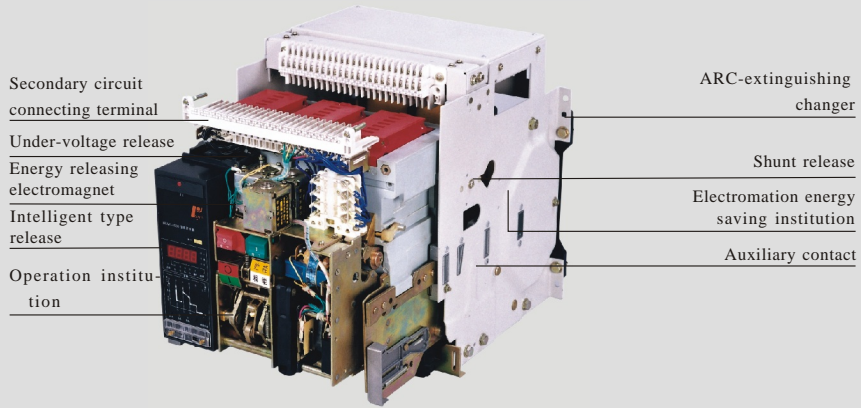
7. Key lock on breaking position

Circuit breaker has "breaking position key lock" accessory(Supplied according to order). It can lock the circuit breaker in the breaking position. At this moment it can't make the circuit breaker clog no matter by switch knob or closing electromagnet.

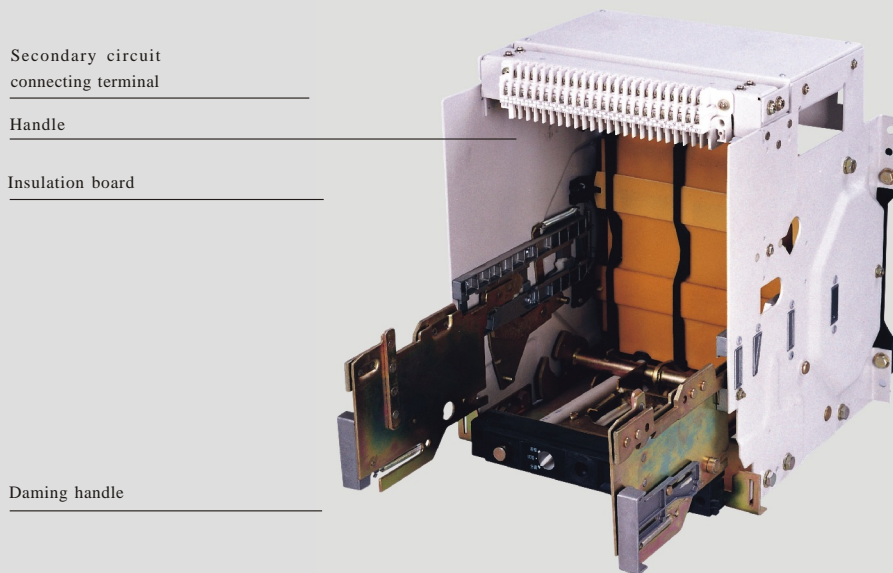
Mechanism summarization

Breaker structure is compact, which has the characteristic of stereo isolating type. contact system seals in the two insulating bases with isolating structure, each phase contact is parted to form a small chamber. Intelligent release, operating mechanism, manual and electric operating mechanism sequentially rank its front and form each independent unit. If one unit is broken, it can pull down this unit entirely and change a new one.





HUW1 Series intelligent conventional circuit breaker drawing location



HUW1 Series intelligent conventional circuit breaker drawble seat