



HUM8L/HUM8LY

Series Earth Leakage Circuit Breaker

Installation and Operation Instruction

Before installing and using the product, please read the instruction carefully and well keep it for future reference.

Product Certificate

This product has passed the inspection and meets the requirements of GB/T 14048.2, and therefore is allowed to leave the factory.

Inspector:



Date of inspection: See the product or packaging.

HUANYU HIGH-TECH CO., LTD.

1 Overview

The HUM8L Series Earth Leakage Circuit Breaker (hereinafter referred to as "circuit breaker") is a new product successfully developed by our company with international advanced technology in 1990s. This product is characterized by perfect protection, reliable performance, high technical specification, beautiful appearance and small size, which is an ideal product for upgrading old products.

Users must carefully read this instruction before installation, use and maintenance to ensure correct use and avoid safety accidents.

2 Purpose and Scope of Application

This circuit breaker is suitable for the power system with AC 50 Hz, rated voltage of 400 V, and rated current up to 630 A. It is used to distribute electric energy, protect the power system from overload, short circuit and other faults, and control the infrequent operation of the motor.

The earth leakage (residual current) protection function of the circuit breaker is to provide indirect contact protection for personal electric shock with fatal danger, and also to prevent electrical fire caused by long-standing grounding fault current that cannot be detected by the overcurrent protection device.

When the rated residual operating current is set to 30 mA (for the non-delay circuit breaker) and the relevant protection device fails, the circuit breaker can also be used as a direct contact protection device.

However, the circuit breaker cannot protect against the electric shock caused by the simultaneous contact with two load conductors (two phase wires or any phase wire and neutral wire).

The rated value of the residual operating current of the circuit breaker as well as the operating time of the HUM8LY earth leakage protection can be adjusted. Therefore, selective protection during earth leakage can be realized in the power distribution system.

Classification by DC component: Type AC, ensuring the tripped CBR for the sinusoidal residual current without DC component whether suddenly applied or slowly raised. Type AC, ensuring the tripped CBR for the sinusoidal residual AC current with specified pulsating DC residual current whether suddenly applied or slowly raised.

3 Standards Followed

The circuit breaker complies with the following standards:

IEC 60947-2, GB/T 14048.2 *Low-voltage Switchgear and Controlgear — Part 2: Circuit-breakers*;

IEC 755, GB/Z 6829-2008 *General Requirements for Residual Current Operated Protective Devices*.

4 Normal Working Conditions

4.1 The circuit breaker is suitable for the following working conditions:

4.1.1 The ambient air temperature shall not be higher than +40°C or lower than -5°C.

4.1.2 The altitude of the installation location shall not exceed 2,000 m.

4.1.3 The relative air humidity shall not exceed 50% at the maximum temperature of +40°C. A higher relative humidity is allowed at a lower temperature. The average temperature of the wettest month shall not exceed +25°C, and the average maximum relative humidity of that month shall not exceed 90%.

4.1.4 Contamination grade: Grade 3. There is no explosion danger and no gas or conductive dust that corrodes metals or damages insulation in the surrounding air.

4.1.5 The installation category is Grade III.

4.1.6 The "1, 3, 5 and N1" terminals of the circuit breaker are connected to the power supply, and the "2, 4, 6 and N2" terminals are connected to the load, which cannot be reversed.

4.1.7 The intensity of external field at the installation site shall not exceed 5 times of the geomagnetic field.

4.1.8 The installation location shall be free of significant vibration and impact (with the acceleration not more than 5 g).

4.1.9 The installation surface of the circuit breaker shall be vertical to the horizontal plane. The circuit breaker is basically installed vertically, with the power supply terminal at the top and the load terminal at the bottom, and can also be installed horizontally.

4.2 The three-phase load of the 3-pole circuit breaker must not have the neutral wire to avoid malfunction.

4.3 Testing device

When the main circuit is energized, for non-delay circuit breakers, after the test button of the circuit breaker is pressed, the circuit breaker shall trip within 0.1 s. For delay circuit breakers, the circuit breaker will not trip until the test button is pressed and the set delay value must be maintained.

4.4 The earth leakage circuit breaker cannot be used in parallel with another one, nor can it be used in parallel with other switchgears.

5 Model Description

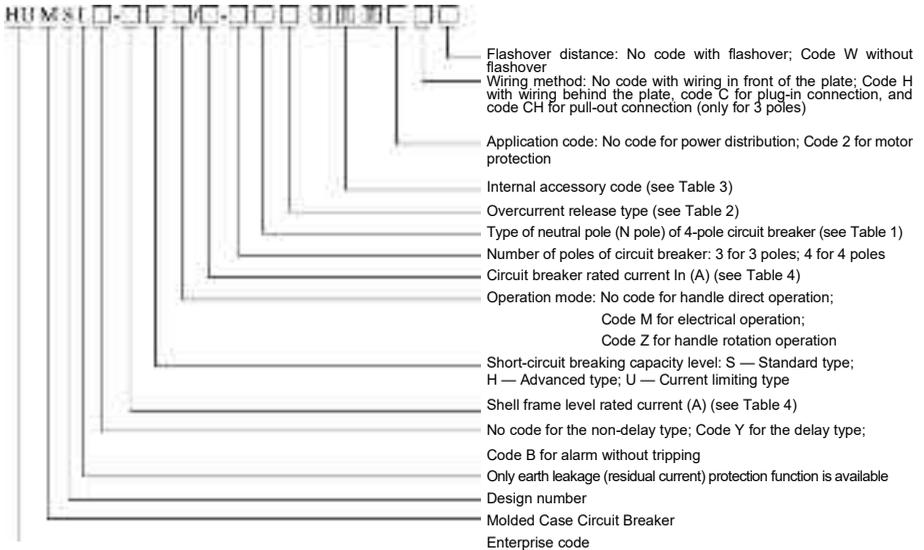


Table 1

Code	Type	Description
A	Type A	The N pole is not equipped with an overcurrent release and is normally on, and is not closed/opened with the other three poles.
B	Type B	The N pole is not equipped with an overcurrent release, and is closed/opened with the other three poles.

Table 2

Code	Type	Description
1	Delay release	With the overcurrent inverse time limit protection characteristic
2	Instantaneous release	i.e. electromagnetic release
3	Complex release	With the above two functions

Table 3

Inm (A)	I		II		III		Notes
	Code	Description	Code	Description	Code	Description	
100	0	N/A	0~1	Number of auxiliary contacts	0~1	Number of alarm contacts	
250	1	Shunt trip			0~1		
400	0	N/A	0~3		0~2		II+III≤5
	1	Shunt trip	0~1		0~1		II+III≤2
	2	Undervoltage release	0~1		0~1		II+III≤2
630	0	N/A	0~4		0~3		II+III≤7
	1	Shunt trip	0~2		0~2		II+III≤4
	2	Undervoltage release	0~2		0~2		II+III≤4

6 Main Technical Performance Indicators

6.1 See Table 4 for basic specifications and parameters of the circuit breaker.

6.2 See Table 5 and Table 6 for the operating time of earth leakage protection.

6.3 Working reliability in the case of power voltage failure

6.3.1 When the three-phase power supply is disconnected from any phase at 0.85 U_e and the residual current I_Δ = I_{Δn}, the circuit breaker can still be reliably interrupted.

6.3.2 After the voltage of phase wire to neutral wire of the three-phase power supply drops to 50 V, when residual current I_Δ = I_{Δn}, the circuit breaker can still be reliably interrupted.

Table 4

Shell frame level rated current I _{nm} (A)	100(125)					250			400			630					
Product model	HUMBL-100S HUMBL-125S	HUMBL-100H HUMBL-125H	HUMBL-100U HUMBL-125U			HUMBL-250S	HUMBL-250H	HUMBL-250U	HUMBL-400S	HUMBL-400H	HUMBL-400U	HUMBL-630S	HUMBL-630H	HUMBL-630U			
Rated current I _n (A)	10, 16, 20, 25, 32, 40, 50, 63, 80, 100, (125)					100, 125, 150, 160, 175, 200, 225, 250			250, 300, 350, 400			400, 500, 630					
Number of poles	3	4	3	4	3	3	4	3	4	3	3	3	4	3			
Rated insulation voltage U _i (V)	AC 800 50Hz																
Rated working voltage U _e (V)	AC 400 50Hz																
Rated impact withstand voltage U _{imp} (kV)	8																
Flashover distance (mm)	≤ 50 (0) *					≤ 50 (0) *			≤ 100 (0) *			≤ 100 (0) *					
Rated ultimate/operating short-circuit breaking capacity I _{cs} (kA)	50/35	85/65	125/125			50/35	85/65	125/125	70/70	100A00	125/125	70/70	100/100	125/125			
Rated residual operating current I _{Δn} (mA)	Non-delay type		30 mA (non-delay type only) /50 mA/100 mA/300 mA/500 mA (500, 800, 1,000, three gears adjustable) **														
	Delay type																
Rated residual non-operating current I _{Δno} (mA)	$\frac{1}{2} I_{\Delta n}$																
Rated residual short-circuit switching capacity I _{Δm} (kA)	$\frac{1}{4} I_{cu}$																
Operation performance (times)	Energizing		1,500			1,000			500			500					
	De-energizing		8,500			7,000			4,000			2,500					
Outline dimensions (mm)	a	90	120	90	120	90	105	140	105	140	1105	140	185	140	210	280	210
	b	155			216		165			240		257	297		275	322	
	c	68					68					103	200		103	200	
Installation dimensions (mm)	A	30					35					44			70		
	B	132			193		126			201		194	234		243	290	
	Φ	5					5					7			7		

Table 5 Operating time of non-delay residual current protection (t)

$I_{\Delta n}$	I_n	100 ~ 630	
		30	50, 100, 300, 500, 800, 1,000
$1\Delta n$		≤ 0.1	≤ 0.3
$0.25I_n$		≤ 0.04	—
$2I_{\Delta n}$		—	≤ 0.15
$5I_{\Delta n}$		—	≤ 0.01
$10I_{\Delta n}$		—	≤ 0.04

Table 6 Operating time of delay residual current protection (t)

$I_{\Delta n}$	I_n	100 ~ 630		
		≤ 1.4	1	2
$1\Delta n$		< 0.6	< 1.2	< 2.2
$2I_{\Delta n}$		> 0.2	> 0.5	> 1
$> 5I_{\Delta n}, 10I_{\Delta n}$		$0.2 \leq t \leq 0.44$	$0.5 \leq t \leq 1.04$	$1 \leq t \leq 2.04$

T_n in the table is the delay setting value.

7 Overcurrent Protection Characteristics

- 7.1 See Table 7 for the overcurrent protection characteristics of circuit breakers for power distribution.
- 7.2 See Table 8 for the overcurrent protection characteristics of circuit breakers for motor protection.

8 Circuit Breaker Accessories

- 8.1 See Table 9 for the list of accessory models.
- 8.2 Rated values of auxiliary contacts and alarm contacts
 Conventional thermal current $I_{th} = 6$ A;
 Rated working current $I_e = 0.79$ A (230 V, AC); $I_e = 0.47$ A (400 V, AC); $I_e = 0.15$ (220 V, DC).
- 8.3 Shunt trip parameters
 Rated voltage U_s : AC: 110 V, 230 V, 400 V;
 DC: 24 V, 48 V, 110 V.
 The circuit breaker can interrupt reliably under (70% ~ 110%) U_s , and the operating time is 10 ms ~ 30 ms.

Table 7 Overcurrent protection characteristics of circuit breakers for the power distribution

Rated current I_n (A)	Thermal release (ambient temperature +40°C)		Operating current of electromagnetic release (A)
	1.05 I_n non-operating time (h) (initial state: cold state)	1.30 I_n operating time (h) (initial state: thermal state)	
≤ 63	> 1	≤ 1	$(10 \pm 2) I_n$
> 63	> 2	≤ 2	

Table 8 Overcurrent protection characteristics of circuit breakers for the motor protection

Rated current I_n (A)	1.0 I_n non-operating time (h) (initial state: cold state)	1.2 I_n operating time (h) (initial state: thermal state)	1.5 I_n operating time (min) (initial state: thermal state)	7.2 I_n operating time T_p (s) (initial state: cold state)	Operating current of electromagnetic release (A)
$I_n \leq 63$	>2	≤ 2	≤ 2	$2 < T_p \leq 10$	$(12 \pm 2.4) I_n$
$63 < I_n \leq 250$			≤ 4	$4 < T_p \leq 10$	
$250 < I_n \leq 400$			≤ 8	$6 < T_p \leq 20$	

Table 9 List of accessory models

Shell frame level rated current I_{nm} (A)		100	250	400	630
Internal accessories	Alarm contact	B2	B3	B4	
	Auxiliary contact	F2	F3	F4	
	Shunt trip	LFL		FL4	
	Undervoltage release	N/A	N/A	QY4	
	Terminal block	JX			
External accessories	Rotation operating handle	CS1-100	CS1-250	CS1-400	CS1-630
	Electric operating mechanism	MDX1	MDX2	MDX3	MDX4
	Earth leakage alarm module	LB			

8.4 Parameters of the undervoltage release

Rated voltage U_e : AC: 110 V, 230 V, 400 V;

DC: 24 V, 48 V, 110 V.

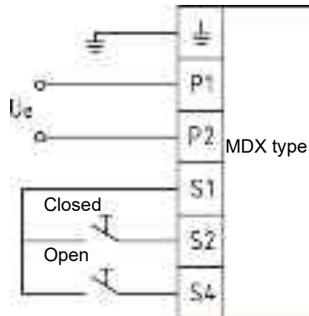
The circuit breaker can interrupt reliably under (35% ~ 70%) U_s , and the operating time is 10 ms ~ 30 ms. When the power supply voltage is less than 35% U_e , the circuit breaker can be prevented from closing. When the power supply voltage is more than or equal to 85% U_e , the circuit breaker can be reliably closed.

8.5 See Table 10 for the parameters of the electric operating mechanism.

Table 10 Main technical parameters of the MDX Electric Operating Mechanism

Shell frame level rated current I_{nm} (A)	100	250	400	630
Model of electric operating mechanism	MDX1	MDX2	MDX3	MDX4
Rated working voltage U_e (V)	AC 110V~230V, 50Hz; DC 110V~220V			
Operating current (A)	≤ 0.5		≤ 2	
Operating time (S)	≤ 0.8			
Rated operating frequency (times/h)	180		120	
Mechanical life (times)	15,000	9,000	5,000	3,000

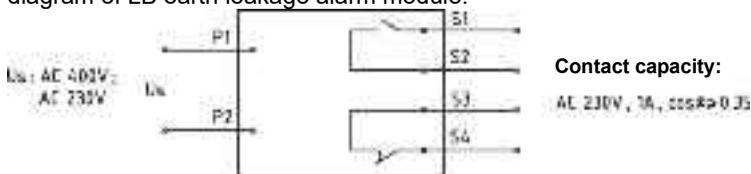
The power supply capacity of the electric operating mechanism shall be large enough to ensure that the voltage applied to the electric operating mechanism under the starting current and operating current is not less than 85% Ue.



Wiring diagram of the MDX Electric Operating Mechanism

8.6 LB earth leakage alarm module

The HUM8LB Earth Leakage Circuit Breaker needs to be plugged with LB earth leakage alarm module on the right side of the open circuit, and the terminals P1-P2 of this module are externally connected with AC 400 V or AC 230 V power supply. When earth leakage occurs in the main circuit of the circuit breaker and $I\Delta \geq I\Delta_n$, the circuit breaker does not trip, the relay in the alarm module acts, and the terminals S1-S2 and S3-S4 are internally connected with relay contacts to send out alarm signals. Wiring diagram of LB earth leakage alarm module:



9 Use and Maintenance

9.1 Considerations before installation of the circuit breaker

The appearance of the circuit breaker is in good condition, and no-load operation works normally.

The rated values of the circuit breaker and its accessories shall be consistent with the working conditions of the installation site.

For the circuit breaker is equipped with electronic circuit board, if the insulation test is carried out, it's required to

- Use a 500 V megger;
- Measure the insulation resistance between terminals 1-2, 3-4 and 5-6 when the circuit breaker is switched off;
- And measure the insulation resistance between the terminals of the main circuit and the shell (covered with metal foil) when the circuit breaker is closed.
- The measured insulation resistance shall not be less than 1.5 MΩ.

9.2 The cross-section area of the connecting conductor of the main circuit of the circuit breaker shall not be less than that specified in Table 11, and the connecting screws shall be tightened.

Table 11 Cross-section area of the connecting conductor of the main circuit

Rated current In (A)	10	16	32	40	63	75	100	125	175	200	250	300	400
Cross-section area S of conductor (mm ²)	1.5	2.5	6	10	16	25	35	50	70	95	120	185	240

Rated current In (A)		500	630
Copper conductor	Pcs	2	2
	Cross-section area (mm ²)	150	185
Copper busbar	Pcs	2	2
	Cross-section area (mm ²)	30×5	40×5

- 9.3 Various characteristics of the circuit breaker and its accessories are set by our company according to the order requirements, and cannot be adjusted freely during use.
- 9.4 The handle of the circuit breaker can be in three positions: "Closed", "Open" and "Tripped". When the handle is in the trip position, it shall be pulled in the "Open" direction to make the circuit breaker trip again, and then the "Closing" operation can be carried out.
- 9.5 As required by the user, the rated residual operating current I_{Δn} and earth leakage operating time shall be set (HUM8L non-delay earth leakage operating time is not adjustable, while HUM8LY earth leakage operation time is adjustable).
- 9.6 According to Chapter 4 "Normal Working Conditions" of this instruction and the above articles of this chapter, the circuit breaker can be closed and put into operation after completing inspections. During the operation of the circuit breaker, the testing device shall be operated once a month according to Article 4.3 to confirm that the earth leakage protection function of the circuit breaker is normal.
- 9.7 For installing the internal accessories, the circuit breaker must be tripped and interrupted before installation.

Company Commitment

On the premise that users abide by the use and storage conditions and that the product seals are intact, if the product is damaged or cannot be used normally due to manufacturing quality problems within 18 months from the production date of the product, our company will be responsible for the repairing or replacement free of charge. If the warranty period expires, users shall pay for the repair. However, if the damage is caused by the following circumstances, the fees for repair still shall be charged even within the warranty period:

- (1) Misuse, self-modification, improper maintenance, etc.
- (2) Use beyond the standard specification requirements.
- (3) Falling, damage during transportation, etc. after purchase.
- (4) Earthquake, fire, lightning strike, abnormal voltage, other natural disasters and secondary disasters, etc.

In case of any questions, please contact the dealer or our customer service department.

Dear customers:

To protect our environment, please recycle the product or its components when the product is scrapped. For materials that cannot be recycled, please handle them properly. Thank you very much for your cooperation and support.

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