



Overview

- The DLM1C Series Smart Molded Case Circuit Breaker with Auto-Reclosure Function (hereinafter referred to as the "circuit breaker") is a leakage circuit breaker that integrates a residual current protection device and a molded case circuit breaker, featuring an auto-reclosure function.
- It is designed for AC 50Hz, rated working voltage AC 400V, three-phase, four-wire systems with a grounded neutral point. The circuit breaker provides protection against ground faults, overcurrent, short circuits, phase loss, and overvoltage for electrical lines or equipment. It also prevents electrical fires and equipment damage caused by ground faults and offers indirect protection against electric shock hazards. (This product is available in both economy and standard models.)
- The overcurrent trip unit of the smart molded case circuit breaker is electronic, and the rated current can be adjusted based on the load conditions of the circuit. The breaker offers three adjustable protection curves and can be coordinated with downstream breakers for tiered protection. The electronic overcurrent trip unit provides high protection accuracy with minimal impact from environmental temperature and installation location, serving as an upgraded version of the traditional thermal-magnetic overcurrent trip unit.

The molded case smart circuit breaker is equipped with an RS485 serial interface, allowing protection characteristic parameters to be set via a programmer, while also meeting communication networking requirements.

Product Model

DL M 1 C – □ □ / □ □
① ② ③ ④ ⑤ ⑥ ⑦ ⑧

Table 1

Number of Code	Code Explanation
① Company Code	Derlicn Electric Co., Ltd.
② Product Name	Molded Case Circuit Breaker
③ Design Code	Series 1
④ Fuction Code	With Auto-Reclosure Function
⑤ Shell-frame Current	125, 250, 400, 630, 800
⑥ Rated Ultimate Short Circuit Breaking Capctiy Class	L-type (Standard Type), M-type (Higher Type)
⑦ Number of Poles	3N: 3P+N, 3 Phase 4 Wire
⑧ Rated Current	63~125A, 100~250A, 160~400A, 250~630A, 500~800A

Working Conditions & Installation Conditions

- ◎ **Ambient Temperature:** -15°C to +40°C, with the daily average maximum not exceeding +35°C. If the temperature exceeds +40°C or drops below -5°C, consult the manufacturer.
- ◎ **Installation Conditions:** The external magnetic field should not exceed five times the Earth's magnetic field in any direction. The installation site should be free from conductive dust, corrosive gases, and flammable/explosive gases. Ensure no rain, snow, or direct sunlight on the device. Adequate ventilation and heat dissipation are required.
- ◎ **Pollution Degree:** Pollution degree 3.

- ◎ **Relative Humidity:** When the average minimum temperature of the wettest month is ≤ 25°C, the maximum average relative humidity should not exceed 90%. Special measures are needed for occasional condensation due to temperature changes.
- ◎ **Installation Location:** Altitude should not exceed 2000 meters. For higher altitudes, consider reduced dielectric strength and cooling efficiency.
- ◎ **Installation Category:** Category III.
- ◎ **Power Supply:** The harmonic distortion of the power supply sine wave should be less than 5%.

Product Features

- **Comprehensive Protection Features:** The circuit breaker integrates overload protection, short circuit protection, phase loss protection, overvoltage/undervoltage protection, residual current protection, power-side neutral protection, leakage alarm, and auto-follow-up protection. This ensures reliable switching operations and minimizes the occurrence of faults.
- **Intelligent Circuit Design:** The intelligent control circuit, based on a microcontroller, accurately and real-time measures various operating parameters. In the event of a fault, the breaker will trip quickly, ensuring the safety of both the circuit and personnel. It can be designed to monitor load current, residual current, residual current time delay, and other parameters based on actual requirements. The system can also detect the cause of the fault and display fault parameters during tripping.
- **Retains Protection Settings after Power Loss:** The protection values and a series of parameters are not lost after power interruption or shutdown.
- **Convenient Human-Machine Interface:** The display interface automatically cycles through parameters such as operating voltage, current, and real-time residual current. Users can easily query the fault parameters and total number of trips for various fault conditions. The circuit breaker also offers both automatic and manual disconnection functions for user convenience in different situations.
- **Compact Shell Design:** The combination of residual current relay, AC contactor, and air circuit breaker into a single unit significantly reduces the installation space required in switchgear cabinets and simplifies wiring, saving customers on total product cost.
- **Advanced Remote Communication:** Equipped with an RS485 communication interface, the breaker can connect to a computer or remote monitoring screen. It also supports GPRS communication modules for remote control and real-time monitoring via mobile phones, allowing users to control and check the breaker's status remotely. (For communication functionality, refer to the communication-type manual attached.)

Technical Datasheet

Table 2

Model Number	DLM1-125	DLM1-250	DLM1-400	DLM1-630	DLM1-800
Shell-frame Current In (A)	125	250	400	630	800
Rated Current Ir (A) 0.4In	63-125	100-250	160-400	250-630	500-800
Rated Working Voltage Ue (V)	AC 400V (3 Phase 4 Wire)				
Rated Frequency (Hz)	50				
Rated Insulation Voltage Ui (V)	1000				
Rated Impulse Withstand Voltage Uimp (kV)	6				
Reclosure Time (s)	20~60				
Residual Current Operating Characteristics	AC				
Utilization Category	A				
Rated Ultimate Short-circuit Breaking Capacity (kA)	50	50	65	65	65
Rated Service Short-Circuit Breaking Capacity (kA)	50	50	65	65	65
Rated Residual Short-Circuit Breaking Capacity IΔm (kA)	7.5	8.75	12.5	16.25	16.25
Rated Residual Operating Current IΔn (Standard Type)	75mA, 150mA, 300mA, 500mA		100mA, 200mA, 300mA, 500mA	100mA, 300mA, 500mA, 800mA	
Rated Residual Operating Current IΔn (Electronic Type)	50, 100, 150, 200, 300, 500, 700, 900				
Rated Residual Non-Operation Current	0.5 IΔn				
Residual Current Breaking Time	≤ 0.2s				
Limit Non-Drive Time	Δt > 0.06s (2 IΔn)				
Under-Voltage Tripping Value (Standard Type)	145V±5% (Automatic Reclosure After Voltage Recovery)				
Over-Voltage Tripping Value (Standard Type)	280V±5% (Automatic Reclosure After Voltage Recovery)				

Overcurrent Protection Characteristics

Table 3

Environmental Condition	Test Current	Tripping Time	Status
Surrounding air temperature +40°C ~ -5°C	1.05I _r	≤2h	Cold Start
	1.30I _r	<2h	Hot Start
Any suitable temperature	10I _n	<0.2s	Cold Start

Overcurrent Protection Characteristics

Table 4

Rated Current (A)	40, 50	63	80	100	125	160	180, 200, 225	250	315, 350	400	500	630
Conductor Cross-Section (mm²)	10	16	25	35	50	70	70	120	185	240	Copper Busbar 30×50×2	Copper Busbar 40×50×2

Product Functions

1. Residual Current Protection Function

1.1. Fixed Mode

- Leakage Current Trip Value: Greater than 0.75IΔn
- Leakage Current Non-trip Value: Less than 0.5IΔn
- Leakage Current Alarm Value: Greater than or equal to 0.6IΔn
- Limit Non-drive Time: 60ms, 100ms, 200ms

Table 5

Limit Non-drive Time	Leakage Current	IΔn	2IΔn	5-10IΔn
0.06s	Maximum Break Time	0.5s	0.2s	0.15s
	Limit Non-drive Time	-		-
0.1s	Maximum Break Time	0.8s	0.3s	0.3s
	Limit Non-drive Time	-		-
0.2s	Maximum Break Time	1s	0.4s	0.4s
	Limit Non-drive Time	-		-

1.2. Auto-Tracking Mode

- Auto-Tracking Precision Levels: 200mA, 400mA, 500mA
- Auto-Tracking Switching Conditions:
 - Downshift: Less than 0.5IΔn and lasts for 2 minutes
 - Upshift: Greater than 0.5IΔn and lasts for 1 minute

In the auto-tracking mode, the breaker starts at the highest level when powered on. If the downshift condition is met, i.e., the actual residual current is less than 0.5 times the next precision level for 2 minutes, the level will automatically adjust to the next level.If the upshift condition is met, i.e., the actual residual current is greater than 0.5 but less than 0.75 times the current level and lasts for 1 minute, the level will shift to the previous level.

In any level (except the highest), if the residual current exceeds 0.75, the switch will delay the trip, and the trip time will refer to the fixed mode. After reclosure, the level will shift to the previous level.

1.3. Performance Indicators

Residual Current Measurement Accuracy:

- 50mA, 100mA: The deviation of the residual current sampling value is no more than ±5mA
- Above 100mA: The deviation of the residual current sampling value is no more than ±2%

2. Overload Long-time Delay Protection Function

The overload long-time delay protection function is generally used to protect cables from overload. This protection is based on the true effective value (RMS) of the current.

Overload Long-time Delay Setting Parameters and Characteristics:

Overload Long-time Delay Tripping Set Current I_r

- 125A frame: 50A, 63A, 80A, 100A, 125A
- 250A frame: 125A, 140A, 160A, 180A, 200A, 225A, 250A
- 400A frame: 250A, 315A, 350A, 400A
- 630A frame: 250A, 315A, 350A, 400A, 500A, 630A
- 800A frame: 315A, 400A, 500A, 630A, 650A, 700A, 750A, 800A

Table 6 Tripping Time Table for the 250A Rated Current Circuit Breaker

I _r (A)	T _r (s)	I _n (A)	Test 1		Test 2	
			Test Current	Action Time	Test Current	Action Time
			I=1.3I _r (A)	T (s)	I=2I _r (A)	T (s)
100	3s	250	130	63.9±10%	200	27±10%
250	3s	250	325		500	
100	18s	250	130	383. 4±10%	200	162±10%
250	18s	250	325		500	

Table 7 Tripping Time Table for the 400A Rated Current Circuit Breaker

I _r (A)	T _r (s)	I _n (A)	Test 1		Test 2	
			Test Current	Action Time	Test Current	Action Time
			I=1.3I _r (A)	T (s)	I=2I _r (A)	T (s)
160	3s	400	208	63.9±10%	320	27±10%
400	3s	400	520		800	
160	18s	400	208	383. 4±10%	300	162±10%
400	18s	400	520		800	

3. Short-Circuit Short-Time Delay Protection

The short-time delay protection prevents impedance short circuits in the distribution system, typically caused by local short circuit faults in the line. The current generally exceeds the overload range but is not very large. Short-circuit delay protection is based on the true RMS value of the current.

4. Short-Circuit Instantaneous Protection

The instantaneous protection function prevents conductor short circuits in the distribution system. This type of fault is usually a phase-to-phase fault, with a relatively large short-circuit current requiring a quick trip. This protection is based on the true RMS value of the current.

5. Reclosure/Lockout

5.1 Reclosure/Lockout Under Residual Current Fixed Mode

Residual current reclosure function description: After a residual current fault causes a trip, the circuit breaker can automatically reclose under the control of the controller.Residual current reclosure function enabled: This function is enabled by default.Residual current reclosure time: 20s - 60s.Lockout time: 5s. That is, if another residual current fault occurs within 5 seconds after reclosure, the controller will enter a lockout state after a delayed trip and will no longer attempt to reclose.

5.2 Reclosure/Lockout Under Residual Current Auto-Tracking Mode

The reclosure/lockout function under the residual current auto-tracking mode is similar to the reclosure/lockout function under the fixed mode.

6 Voltage Protection Function

Mainly protects against single-phase overvoltage and undervoltage faults. The reliable protection value does not exceed the controller's normal operating voltage range. If the controller slowly loses power or the voltage slowly drops below the normal operating voltage range, the controller may not work properly. Once the voltage returns to normal, please restart the controller.

6.1 Overvoltage Protection

Table 8

Setting Range		Voltage Value/Setting Value	Tripping Characteristics	Tripping Time Error Range
Tripping Threshold	0.15Ue~1.3Ue	≤0.9	No trip	±10%
		≥1.1	Trip	
Tripping Time	1s	≥1.1	Time-limited Characteristics	
Return Threshold	1.15Ue~Tripping Threshold	≥1.1	No return	
		≤0.9	Return	
Tripping Tim	5s	≤0.9	Time-limited Characteristics	

6.2 Undervoltage Protection

Table 9

Setting Range		Voltage Value/Setting Value	Tripping Characteristics	Tripping Time Error Range
Tripping Threshold	0.35Ue~0.7Ue	< 0.9	Trip	±10%
		≥1.1	No trip	
Tripping Time	5s	≤0.9	Time-limited Characteristics	
Return Threshold	Tripping Threshold~0.85Ue	< 0.9	Return	
		> 1.1	No return	
Tripping Tim	5s	≥1.1	Time-limited Characteristics	

6.3 Phase Loss Protection

Phase loss protection refers to the protection tripping when any of the A, B, or C phases is missing on the power supply side of the circuit breaker. The tripping time is less than 1s, and the switch will automatically reclose once the voltage is restored to normal.

6.4 Performance Specifications

- Voltage measurement accuracy: ±2%
- Undervoltage trip value accuracy: ±10%
- Overvoltage trip value accuracy: ±10%.

6.5 Power-off Trip, Power-on Reclosure Function

When the line power supply is cut off, the circuit breaker trips for protection. After the line is powered back on, it can automatically reclose for operation. The factory default setting for this function is off.

7 Communication Function

Supports RS485 communication interface.

Product Installation Dimension

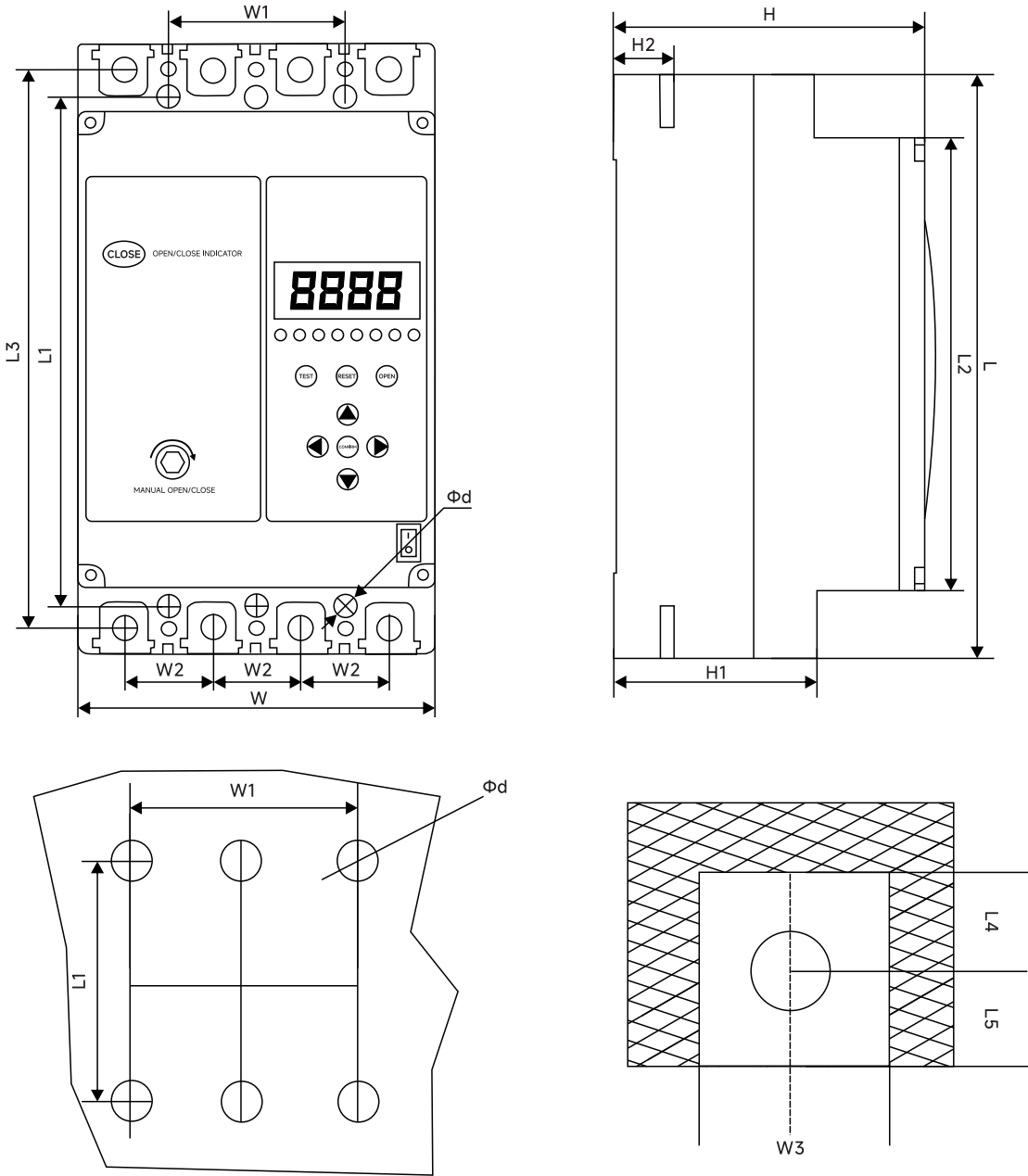


Table 10

Product Model	Product Shape & Installation Dimension													
	L	W	H	L1	L2	L3	L4	L5	W1	W2	W3	H1	H2	Φd
DLM1C-125	220	122	120	200	169	203	7.5	8	60	30	18	65	27	4.5
DLM1C-250	240	142	122	200	178	218	11.5	10	70	35	23	71	23	5
DLM1C-400	336	198	178	272	253	305	12	16	96	48	33	98.5	37	8
DLM1C-630	353	238	185	285	255	320	13.5	18	116	57	42	103	42	7.5
DLM1C-800	370	280	192	332	270	330	15	18	140	70	44	105	45	7.5