Table 4.3 Meaning of value for controller setting table

Value	0	1	2	3	4	5	6	7	8	9
I_n	40	50	56	64	72	80	90	100	0	0
T_a	12	12	60	60	80	80	100	100	100	100
I_{sd}	20	30	40	50	60	70	80	90	100	0
T_{sd}	5	5	10	15	20	20	15	10	5	3
I_i	40	50	60	70	80	90	100	110	120	0
I_{sw}	2	2	2	2	1	1	1	1	0	0

Notes:
1. Expect that "0" in the Gear column in the above table means gear 0, all 0s mean this gear function is inactive.
2. I_n value is as follows: the value a in the gear value column is reduced by 100 times, and multiplied by current shell frame. The formula $I_n = a^* Inm/100$ is used for this;
3. I_n value in the Gear column in the above table is based on CDM6Ei-250 shell frame as an example, and the read value will prevail for other shell frames.
4. T_a value is the value in the gear value corresponding table; Unit: s;
5. I_{sd} value is as follows: The value b in the gear value corresponding table is reduced by 10 times, and then multiplied by the corresponding overload long delay setting current I_n or the current shell frame I_{nm} (when the I_{sd} is off). The formula $I_{sd}=b^*I_n/10$ or $I_{sd}=b^*I_{nm}/10$ is used for this;
6. T_{sd} value is as follows: the c (cycle) in the gear value corresponding table is multiplied by 0.02. The formula $T_{sd}=c*0.02$ is available;
7. I_i value is as follows: The value d in the gear value corresponding table is reduced by 10 times; with the current shell frame of I_{nm}, the formula $I_{sc} = d*1/10$;
8. I_{sw} value is as follows: The reciprocal value of the value e in the gear value corresponding table is multiplied by the corresponding overload long delay setting current IR or the current shell frame I_{nm} (when the I_{sd} is off). The formula $I_{sw}=I_n/e$ or $I_{sw}=I_{nm}/e$ is used for this.

4.9.3 Circuit breaker state addressing
Through the 485 communication interface, the OFF/ON state of the circuit breaker can be easily accessed to realize the remote control functions. The circuit breaker OFF/ON addressing way is shown in Table 4.4.

Table 4.4 Circuit breaker state addressing table

Address	Parameter name	Function code	Access way	Remark
0×2710	OFF/ON control	0×06	Write	1: OFF; 2: ON
0×2712	ON signal	0×03	Read	1: ON; 2: OFF
0×2713	Trip signal	0×03	Read	1: Trip; 2: No trip

4.9.4 Fault record addressing
The latest 24 fault records of the product can be accessed through the 485 communication interface, and the cause of each fault can be clearly identified. Each fault cause can be expressed by 32-bit bytes. For specific meaning, see Table 4.5. The fault record access way is shown in Table 4.6.

Table 4.5 Fault record analysis table

Address	Type	Parameter	Bits	Data bit	Meaning	Unit
0×238D +M*2	UINT32	Action current	14	31:18		A
		Action time	14	17:04		20ms
		Phase sequence	2	3:2	0: phase N; 1: phase A; 2: phase B; 3: phase C	–
		Type	2	1:0	1: overload long delay; 2: short-circuit short delay; 3:instantaneous	–

Note: 1. M: 0~23; 0 is the latest fault record.

Table 4.6 Circuit breaker fault records addressing table

Address	Name	Address	Name	Function code	Access way
0×238C	Number of faults			0×03	Read
0×238D	Nth fault record (upper bit)	0×23A5	N-12th fault record (upper bit)		
0×238E	Nth fault record (lower bit)	0×23A6	N-12th fault record (lower bit)		
0×238F	N-1th fault record (upper bit)	0×23A7	N-13th fault record (upper bit)		
0×2390	N-1th fault record (lower bit)	0×23A8	N-13th fault record (lower bit)		
0×2391	N-2th fault record (upper bit)	0×23A9	N-14th fault record (upper bit)		
0×2392	N-2th fault record (lower bit)	0×23AA	N-14th fault record (lower bit)		
0×2393	N-3th fault record (upper bit)	0×23AB	N-15th fault record (upper bit)		
0×2394	N-3th fault record (lower bit)	0×23AC	N-15th fault record (lower bit)		
0×2395	N-4th fault record (upper bit)	0×23AD	N-16th fault record (upper bit)		
0×2396	N-4th fault record (lower bit)	0×23AE	N-16th fault record (lower bit)		
0×2397	N-5th fault record (upper bit)	0×23AF	N-17th fault record (upper bit)		
0×2398	N-5th fault record (lower bit)	0×23B0	N-17th fault record (lower bit)		
0×2399	N-6th fault record (upper bit)	0×23B1	N-18th fault record (upper bit)		
0×239A	N-6th fault record (lower bit)	0×23B2	N-18th fault record (lower bit)		
0×239B	N-7th fault record (upper bit)	0×23B3	N-19th fault record (upper bit)		
0×239C	N-7th fault record (lower bit)	0×23B4	N-19th fault record (lower bit)		
0×239D	N-8th fault record (upper bit)	0×23B5	N-20th fault record (upper bit)		
0×239E	N-8th fault record (lower bit)	0×23B6	N-20th fault record (lower bit)		
0×239F	N-9th fault record (upper bit)	0×23B7	N-21th fault record (upper bit)		
0×23A0	N-9th fault record (lower bit)	0×23B8	N-21th fault record (lower bit)		
0×23A1	N-10th fault record (upper bit)	0×23B9	N-22th fault record (upper bit)		
0×23A2	N-10th fault record (lower bit)	0×23BA	N-22th fault record (lower bit)		
0×23A3	N-11th fault record (upper bit)	0×23BB	N-23th fault record (upper bit)		
0×23A4	N-11th fault record (lower bit)	0×23BC	N-23th fault record (lower bit)		

Notes:
1. N listed in the above table means the latest fault record;
2. Each 32-byte fault record information can be saved by two 16-byte registers.

5 Operation and maintenance

5.1 Operation
5.1.1 Inspection and preparation before operation
The following inspection shall be performed before operation:
1)Check for correct wiring;
2)Check that all terminal connectors are tightened firmly without loose terminal;
3)Ensure that there is no short circuit to the ground for insulation between phases and live part, and that there is appropriate distance between circuit breakers.
5.1.2 Trial run
1)Trial run can be performed only after confirming all items specified in 5.1.1 are in the normal state;
2)The address 00 is defaulted for code switch when the module is shipped. The user can select the communication address as required;
3)After power-on, the communication module Ready indicator is green; after the connection between the communication module and the circuit breaker, the Com. Indictor is green;
4)When the intelligent controller enters the protection state, any setting operation is invalid for parameter. The setting can be made only after the product is tripped or the fault is eliminated.
If passing the trial run test, the circuit breaker can be put into the normal operation.
5.2 Maintenance
The maintenance and inspection must be carried out by the professional.
To replace the communication module, use the model specified by our company to ensure quality.
The company will not bear any responsibility for the use of the part not specified by our company or for modification without permission.
Cut off the connection (including breaker circuit and main circuit of the communication module) with the module power before maintenance.

6 Company's commitment

Under the premise that the use and storage conditions are met and the product is completely sealed, the company will repair or replace any damaged product due to poor manufacturing quality or any product that cannot work normally free of charge within 36 months from the product manufacturing date. Paid repair will be provided if the warranty period expires. For any damage caused by one of the following situations, a paid repair is required even during the warranty period.
1)Caused by improper use, maintenance or storage;
2)Modification without permission, improper repair;
3)Damage caused by falling off and installation process after purchasing;
4)Damage caused by force majeures such as earthquake, fire, lightning stroke, abnormal voltage and secondary disasters.

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3SERIES
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User manual

HDM3E
Communication Module

Complied Standard: IEC 60947-2
□Please read the instructions carefully before the installation and use of the products, keep it properly as backup.

Safety Notice

Please read this User Manual carefully before the installation, operation, running, maintenance and inspection of this product, and install and use this product properly in line with this manual.

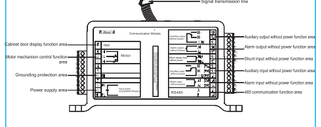
⚠ Danger

- Do not operate the communication module or touch the live part (such as conductor and port) with your wet hands, or risks such as electric shock and burns may occur;
- Cut off the circuit breaker and communication module power and ensure the product is not electrified before maintaining and serving this product to prevent serious results or even personnel harm;
- This product cannot provide protection for electric shock caused by touching the power side or simultaneously touching two live conductors.

⚠ Attention

- Do not dismantle communication module base and cover without permission;
- Confirm that the product working voltage and ON-OFF indicator meet the working requirement before use;
- If found any damage during unpacking this product, please stop operation and contact the supplier;
- To replace the communication module, use the supporting product provided by our company to ensure quality. Our company will not bear any consequence caused by failure to use our company's product;
- For product insulation test, refer to the test method specified in CDM6Ei product manual. Do not perform any separate test for communication module;
- When scrapping the product, please properly process any waste. Thanks for your cooperation.

Focus on any content marked with ⚠.



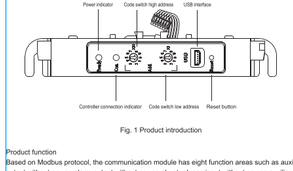


Fig. 1 Product introduction

Product function
Based on Modbus protocol, the communication module has eight function areas such as auxiliary output without power, alarm output without power, shunt release input without power, auxiliary input without power, alarm input without power, 485 communication, cabinet door display and motor mechanism control. With some accessories such as motor mechanism and auxiliary alarm, the communication module can be connected with CDM6Ei circuit breaker to achieve the remote control, remote regulation, remote measurement and remote communication functions of the product.

2 Technical parameters

Table 2.1 Technical parameters table

No.	Name	Parameter
1	Supply power	AC230V/400V
2	Alarm output without power	AC250V0.2A/DC30V2A
3	Auxiliary output without power	AC250V0.2A/DC30V5A
4	Baud rate	9600

3 Product installation guide

3.1 Communication module outline dimensions

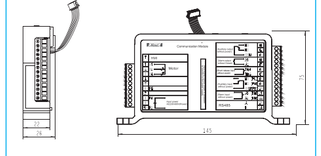


Fig. 3.1 Communication module dimensions

3.2 Dimensions of product with communication module

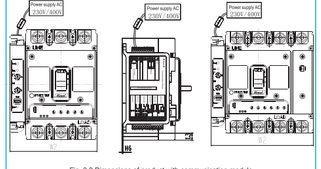


Fig. 3.2 Dimensions of product with communication module

Table 3.1 Table of dimensions of product with communication module

Unit: mm

Product model	Number of poles	Dimensions W2	H6	L3
HDM3E-125/250	3P	130	5.8	11.5
	4P	165		
HDM3E-400/630	3P	173	28.3	56.5
	4P	221		
HDM3E-800	3P	233	31.8	67
	4P	303		

Note 1. If there is an motor mechanism, the product installation size refers to the HDM3E manual.

4 Function commissioning

4.1 Cabinet door display function area
With the fixed addressing mode available, the cabinet door display will be connected to the communication module through the communication interface T, thereby achieving the information interaction between the display and the communication module. User can use our company's dedicated display for communication module and can self-develop the display (development agreement sees 4.9) with the RJ45 wiring method. The effective interface of this communication module is shown in Fig. 4.1. The interfaces 1/2/3 correspond to the interface A, the interfaces 6/7/8 correspond to the interface B, and the interfaces 4 and 5 are empty.

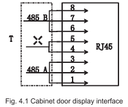


Fig. 4.1 Cabinet door display interface

4.2 Motor mechanism control function area
Contacts 1 (S1), 2 (S2) and 3(S4) are connecting contacts in the motor mechanism control area, and they are connected to the interfaces respectively corresponding to the motor mechanism through the interfaces at the communication module motor mechanism control function area. The product ON/OFF can be controlled remoted through the communication module. The communication module and motor mechanism assembly effect is shown in Fig. 4.2.

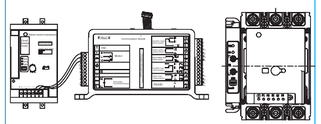


Fig. 4.2 Communication module and motor mechanism assembly effect diagram

4.3 Auxiliary input without power function area
The auxiliary input without power function area receives the signal from the auxiliary accessories. Contact 18 (F12) is a normally-open contact, contact 19 (F14) is a normally-closed contact, and contact 20 (F11) is a common contact to connect contacts 18, 19 and 20 of the communication module with the auxiliary contacts F12, F14 and F11. Therefore, the product remote communication function can be achieved. With the motor mechanism, the remote control and remote communication can be available. In addition, this function area can transfer the auxiliary signal to the auxiliary output without power function area, with the wiring method shown in Fig. 4.3.
4.4 Alarm input without power function area
The alarm input without power function area receives the signal from the alarm accessory. Contacts 21 (B14) and 22 (B11) are connected to the normally-open contact B14 for alarm and the common contact B11 respectively. This function area can transfer the alarm signal to the alarm output without power function area, with the wiring method shown in Fig. 4.3.
4.5 Auxiliary output without power function area
The auxiliary output without power function area receives the signal from the auxiliary input without power function area to indicate the Open and Closed states of the circuit breaker. Contact 11 is a normally-open contact, contact 12 is a normally-closed contact, and contact 13 is a common contact. The client's external wiring is shown in Fig. 4.3. When the circuit breaker is working normally, the indicator L1 is lit and the indicator L2 is off; when the circuit breaker is open, the indicator L1 is off and the indicator L2 is lit.

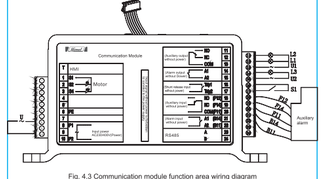


Fig. 4.3 Communication module function area wiring diagram

Note: 1. Input without power function area is forbidden to connect to the power supply.
4.6 Alarm output without power function area
The alarm output without power function area receives the signal from the alarm input without power function area to indicate the trip state of the circuit breaker, as shown in Fig. 4.3. Connect contacts 14 and 15. When the circuit breaker works normally, the indicator L3 is off; when the circuit breaker trips, the indicator L3 is lit.
4.7 Shunt release input without power function area
The shunt release input without power function area can control the circuit breaker for trip. The wiring method is shown in Fig. 4.3. When the switch S1 is turned on, the circuit breaker will execute the trip command.
4.8 Code switch area
The code switch consists of high address and low address. When networking through 485 communication interface, 99 groups of searching addresses (01-99) are provided.
4.9 485 communication function area
485 communication function area provides a communication interface for smart communication of the circuit breaker. Four functions such as remote measurement, remote communication, remote control and remote regulation of the product can be achieved through the upper computer software with accessories such as motor mechanism and auxiliary alarm for user. The user can achieve the information interaction between this circuit breaker and other circuit breaker through the networking way. To achieve this function, please comply with this communication module protocol and use the correct addressing method.
4.9.1 Circuit breaker parameter addressing
Basic parameters of circuit breaker include the current shell frame, the number of poles and the phase current. Its addressing method is listed in Table 4.1.

Table 4.1 Circuit breaker basic parameters addressing table

Address	Parameter name	Unit	Function code	Define	Remarks
0×222E	Current shell frame	A	0×03	Read	125/250/400/630 /800
0×222E	The number of poles	-			3:3P/4:4P+N
0×03F8	Phase A current effective value	A			
0×03F9	Phase B current effective value	A			
0×03FA	Phase C current effective value	A			
0×03FB	Phase N current effective value	A			

Note: 1. The parameters of the consecutive address bits can be read one by one and can be continuously read.
4.9.2 Controller addressing
Controller addressing is shown in Table 4.2 it can be used to verify the accuracy of the gear, and the specific meaning of the gear can be determined by inquiring the "Gear function meaning table" (as shown in Table 4.3).

Table 4.2 Controller setting parameter addressing table

Address	Parameter name	Function code	Define	Remark
0×7526	Overload long delay setting current I_n	0×03	Read	Value: 0~9
0×7527	Overload long delay setting time T_a			
0×7528	Short-circuit short delay setting current Isd			
0×7529	Short-circuit short delay setting time Tsd			
0×752A	Short-circuit instantaneous setting current Ii			
0×752B	Neutral pole setting protection I_{sw}			