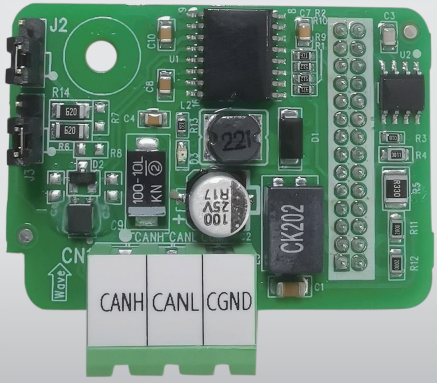
INOVANCE

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MD38CAN1 CANlink Communication Expansion Card

User Guide

Industrial Automation | Intelligent Elevator | New Energy Vehicle | Industrial Robot | Rail Transit

Data code 19012214 B00

Preface

About This Guide

MD38CAN1 is an expansion card designed for the AC drive to support CAN communication. With the card, the AC drive can connect to high-speed CAN or CANlink communication networks for fieldbus control.

This user guide describes the specifications, dimensions, installation, wiring, communication protocol, communication parameters, and communication examples of the expansion card.

Revision History

Date of Revision	Version	Revision
November 2021	B00	• Added 1.2 Applicable AC Drives, dimension drawing in 1.3 Dimensions, and 2.2.2 EMC Cabling Instructions. • Updated 1.4 Terminal Descriptions. • Adjusted the manual structure.
May 2021	A02	Made minor corrections.
January 2021	A01	Made minor corrections.
November 2020	A00	First release



This guide takes installing the MD38CAN1 expansion card to the MD380 AC drive as an example. If you need to install the expansion card to other AC drives, check with your technical support engineers and obtain technical documentation.

How to Obtain

This guide is not delivered with the product. You can obtain the PDF version in the following way:

Visit *www.inovance.com*, go to **Services and Support** > **Download**, search by keyword, and then download the PDF file.

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Safety Precautions

Safety Disclaimer

1. This chapter presents essential safety instructions for proper use of the AC drive. Before using the product, please read the guide and make sure you understand the safety instructions correctly. Failure to comply with the safety instructions may result in death, serious injury, or equipment damage.
2. "CAUTION", "WARNING", and "DANGER" items in the guide are just supplementary and do not cover all safety instructions.
3. Use this product in an environment that complies with the design specifications. Malfunction or component damage caused by improper usage is not covered by warranty.
4. Inovance shall take no responsibility for any personal injuries or property loss caused by noncompliance with this guide or improper use of this product.

Safety Levels and Definitions



indicates that failure to comply with the notice will result in severe personal injuries or even death.



indicates that failure to comply with the notice may result in severe personal injuries or even death.



indicates that failure to comply with the notice may result in minor personal injury or damage to the equipment.

Safety Precautions

- The drawings in this guide sometimes show the product without covers or protective guards to display more details. When using this product, be sure to install the casing or cover according to the regulations, and operate in accordance with the guide.
- The product drawings in this guide are for reference only and may be slightly different from the product you ordered.

Unpacking and Acceptance
 • Do not install the product if any damage, rust, or sign of use is found on the product and accessories. • Do not install the product in case of water seepage in the product, part missing or part damage. • Do not install the product if you find the packing list does not conform to the product you received.

CAUTION

- Before unpacking, check whether the packing is intact without damage, water seepage, damp, and deformation.
- Unpack the package in sequence. Do not hit the package with force.
- Check the surface of the equipment and accessories for any damage or rust.
- Check the equipment, accessories, and materials in the package against the packing list to ensure that no item is missing.

Storage and Transportation

WARNING

- Use professional hoisting equipment operated by qualified professionals to carry large-scale or heavy products. Failure to comply may result in personal injury or product damage.
- Before hoisting the product vertically, confirm that the front cover, terminal block, and other parts of the product have been firmly fixed with screws. Failure to comply may cause the parts to fall off and result in personal injury or product damage.
- Never stand or stay below the product that is lifted by hoisting equipment.
- Lift the product with a steel rope steadily at a constant speed to protect the product against vibration, impact, or turnover. Do not keep the product lifted for a long time. Failure to comply may result in personal injury or product damage.

CAUTION

- Handle the product with care and mind your steps. Failure to comply may result in personal injury or product damage.
- When carrying the product with bare hands, hold the product casing firmly with care to prevent parts from falling. Failure to comply may result in personal injury or product damage.
- Store and transport the product as required. Failure to comply may result in product damage.
- Avoid storage and transportation in environments subject to water splash, rain, direct sunlight, strong electric field, strong magnetic field, and strong vibration.
- Avoid storing the product for more than 3 months. Long-term storage shall require stricter protection and necessary inspections.
- Pack the product strictly before transportation. Use a sealed box for long-distance transportation.
- Never transport this product with equipment or materials that may damage or have negative impacts on this product.

Installation

DANGER

- Only professional personnel with electrical expertise can operate this product. Operations by non-professionals are strictly prohibited.



- Read through the user guide and safety precautions before installation.
- Do not install this product in places subject to strong electric field or strong electromagnetic wave interference.
- Before installation, make sure that the installation position is mechanically strong enough to bear the weight of the equipment. Failure to comply may result in mechanical hazards.
- Do not wear loose clothes or accessories during installation. Failure to comply may result in an electric shock.
- When installing the product in a closed environment (such as a cabinet or a chassis), cool the environment with a fan or an air conditioner to prevent overheat or fire.
- Do not modify this product.
- Do not fiddle with the bolts used to fix equipment components or the bolts marked in red.
- When installing this product in a cabinet or terminal equipment, equip the cabinet or terminal equipment with protective devices such as fireproof enclosures, electrical protective enclosures, and mechanical protective enclosures with the protection level that meets requirements of relevant IEC standards and local laws and regulations.
- Before installing equipment with strong electromagnetic interference, such as a transformer, install an electromagnetic shielding device to prevent malfunctions of this product.
- Install the product on incombustible objects such as metal and keep it away from combustible materials. Failure to comply may result in a fire.



- Cover the top of the product with a piece of cloth or paper during installation to prevent unwanted objects such as metal chippings, oil, and water from falling into the equipment and causing faults. After installation, remove the cloth or paper to prevent overtemperature caused by poor ventilation due to blocked ventilation holes.
- Resonance may occur when the equipment operating at a constant speed executes variable speed operations. In this case, install the anti-vibration rubber under the motor frame or use the vibration suppression function to reduce the resonance.

Wiring



- Do not allow non-professionals to perform equipment installation, wiring, maintenance, inspection, or parts replacement.
- Cut off all power supplies before wiring. Wait for at least the time specified on the product warning label after power-off so that residual voltage can discharge safely. Measure the DC voltage on the main circuit to ensure that it is within the safe voltage range. Failure to comply may result in an electric shock.
- Do not perform wiring, remove the product cover, or touch the circuit board with power ON. Failure to comply may result in an electric shock.
- Ensure that the product is well grounded. Failure to comply may result in an electric shock.

WARNING

- Never connect the power cable to an output terminal. Failure to comply may result in product damage or even fire.
- When connecting a drive with the motor, ensure that the phase sequences of the drive and motor are consistent to prevent motor reverse rotation.
- Ensure that the diameter and shielding of the cables used meet corresponding requirements, and that the shielding layer of the shielded cables is grounded reliably at one end.
- Tighten terminal screws with tightening torque specified in this guide. Failure to comply may result in overheat and damage to the connection parts or even fire.
- After wiring, check that each cable is connected properly, no screws or gaskets fall into the product, and no cables are exposed. Failure to comply may result in an electric shock or product damage.

CAUTION

- Follow the proper electrostatic discharge (ESD) procedures, and wear an anti-static wrist strap during wiring. Failure to comply may result in damage to the product or the circuit of the product.
- Use shielded twisted pair cables for the control circuit. Connect the shielding layer to the product grounding terminal. Failure to comply may result in product malfunction.

Power-on

DANGER

- Before power-on, ensure that the product is properly installed, all cables are securely connected, and the motor can be restarted.
- Before power-on, ensure that the power supply meets requirements. Failure to comply may result in product damage or even fire.
- Do not open the cabinet or protective cover, touch any terminal, or dismantle any device or component when the product is powered on. Failure to comply may result in an electric shock.

WARNING

- After wiring and parameter setting, perform a trial run to check whether the device can run properly. Failure to comply may result in personal injury or device damage.
- Before power-on, check that the rated voltage of the product is consistent with that of the power supply. Failure to comply may result in fire.
- Before power-on, check that no one is near the equipment, motor, or machine. Failure to comply may result in personal injury or even death.

Operation

DANGER

- Do not allow non-professionals to operate the product. Failure to comply may result in personal injury or even death.
- Do not touch any wiring terminals or disassemble any unit or component of the equipment during operation. Failure to comply may result in an electric shock.



- Never touch the product shell, fan, or resistor to check the temperature. Failure to comply may result in burn.
- Prevent metal or other objects from falling into the product during operation. Failure to comply may result in product damage or fire.

Maintenance



- Do not allow non-professionals to perform equipment installation, wiring, maintenance, inspection, or parts replacement.
- Never perform maintenance during power-on. Failure to comply may result in an electric shock.
- Before maintenance, cut off all equipment power supplies and wait for at least the time specified on the product warning label.
- In case of a permanent magnet motor, do not touch the motor terminals immediately after power-off because the motor terminals will generate induced voltage during rotation even after the equipment power supply is off. Failure to comply may result in an electric shock.



- Perform daily and periodic inspection and maintenance on the equipment according to maintenance requirements and keep a maintenance record.

Repair



- Do not allow non-professionals to perform equipment installation, wiring, maintenance, inspection, or parts replacement.
- Never perform any inspection or maintenance operations during power-on. Failure to comply may result in an electric shock.
- Before inspection or maintenance, cut off all equipment power supplies and wait for at least the time specified on the product warning label.



- Require repair services according to the product warranty agreement.
- When the fuse is blown or the circuit breaker or earth leakage current breaker (ELCB) trips, wait for at least the time specified on the product warning label before power-on or further operations. Failure to comply may result in equipment damage, personal injury, or even death.
- When the equipment fails or is damaged, designate qualified technicians to troubleshoot and repair the equipment in accordance with the maintenance instructions and keep a maintenance record.
- Replace quick-wear parts of the equipment according to the replacement guide.
- Do not use a damaged machine. Failure to comply may result in worse damages, personal injury, or even death.
- Make sure to re-check the wiring and parameter setting after device replacement.

Disposal
WARNING • Scrap the equipment or product in accordance with relevant national regulations and standards. Failure to comply may result in property damage, personal injury, or even death. • Recycle retired equipment by observing industry waste disposal standards to avoid environmental pollution.

Safety Signs

For safety operations, follow the safety signs on the equipment. Do not stain or remove the safety signs. The safety signs are described as follows:

Safety Signs	Description
	• Read through the safety instructions before operating the equipment. Failure to comply may result in equipment damage, personal injury, or even death. • Do not touch terminals or remove the cover during power-on or within 10 minutes after power-off. Failure to comply may result in an electric shock.

1 Product Information

1.1 Introduction

MD38CAN1 is an expansion card designed for the AC drive to support CAN communication. With the card, the AC drive can connect to high-speed CAN or CANlink communication networks for fieldbus control.

CANlink is a CAN bus-based network protocol developed by Inovance. It is an open protocol that allows devices that support the protocol to access the CANlink network. AC drives, servo drives, HMIs, and PLCs of Inovance can be connected through CANlink. The MD38CAN1 card complies with the standard CANlink fieldbus standards.

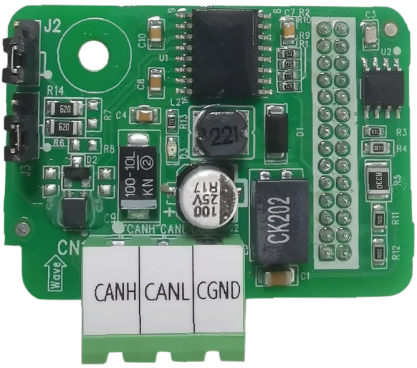


Figure 1-1 MD38CAN1 card appearance

1.2 Applicable AC Drive

Expansion Card	Applicable AC Drive	Remarks
MD38CAN1	MD290	-
	MD380	-
	MD380E	-
	MD480P	-
	MD500	-
	MD500E	-
	MD500-PLUS	-
	MD510	-

Caution

This guide takes installing the MD38CAN1 expansion card to the MD380 AC drive as an example. If you need to install the expansion card to other AC drives, check with your technical support engineers and obtain technical documentation.

1.3 Dimensions

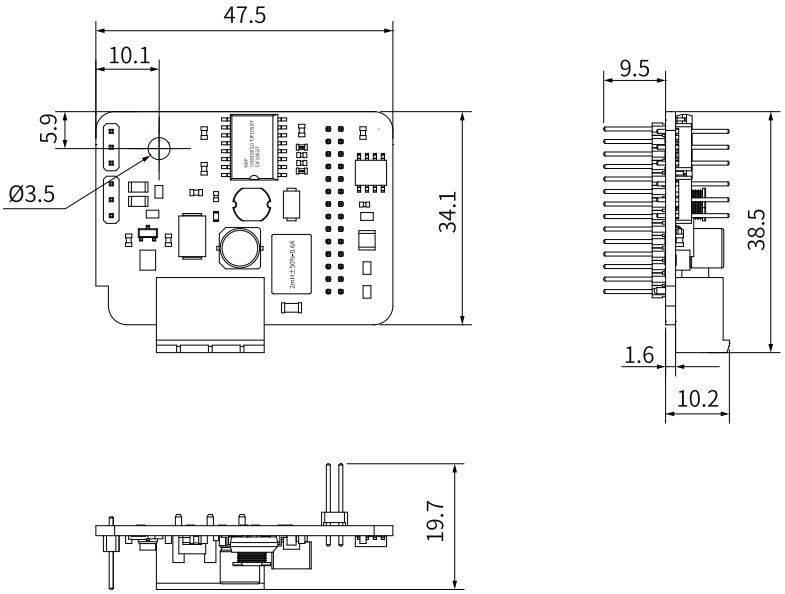


Figure 1-2 Dimensions of MD38CAN1 card (mm)

1.4 Terminals and Indicators

Terminal layout

The following figure describes the terminal layout of the MD38CAN1 card. The CN1 terminal is used for CAN bus communication and jumper J2/J3 is used to configure the CAN bus termination resistor.

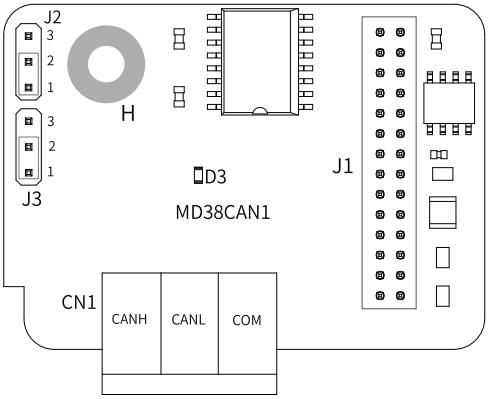


Figure 1-3 MD38CAN1 card terminal layout

Terminal descriptions

Table 1–1 Descriptions of of MD38CAN1 card terminals

Terminal Mark	Terminal Name	Description
J1	Pin header	It is used to connect the card to the AC drive.
J2/J3	Bus termination resistor	To disable the termination resistor, short terminals 2 and 3. To enable the termination resistor, short terminals 1 and 2.
CN1	Wiring terminal	It is the CANlink bus wiring terminal.
H	Screw fixing hole	It is used to fix the card with the M3x8 self-taping screw.

Descriptions of communication terminal CN1

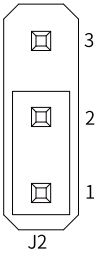
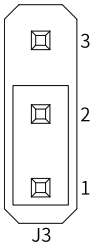
CN1 is the CAN bus communication terminal. The following table describes the signal definition.

No.	Terminal Name	Description
1	CANH	It is used to connect to the positive end of the CAN bus.
2	CANL	It is used to connect to the negative end of the CAN bus.
3	COM	It is used to connect to the CAN communication cable shield.

Jumper descriptions

For ease of use in the field, the MD38CAN1 is configured with the termination resistor, which can be enabled by jumper J2/J3. It is recommended that the termination

resistor be used at two sides of the network topology structure. The following table describes the jumper settings.

Terminal Mark	Position	Termination Resistor
	Short terminals 2 and 3 of J2	Disable the termination resistor.
	Short terminals 1 and 2 of J2	Enable the termination resistor.
	Short terminals 2 and 3 of J3	Disable the termination resistor.
	Short terminals 1 and 2 of J3	Enable the termination resistor.

Descriptions of status indicators

Table 1–2 Descriptions of status indicators

Indicator		Status Description
D3 (red)	On	Power-on normal
	Off	Power-on abnormal. Check whether the installation is correct.

2 Installation and Wiring

2.1 Installation

You can insert the MD38CAN1 card into the AC drive of Inovance. Before installation, turn off the AC drive and wait at least 10 minutes until the charging indicator on the AC drive becomes off. Install the MD38CAN1 card to the AC drive, and then secure the related screws, as shown below.

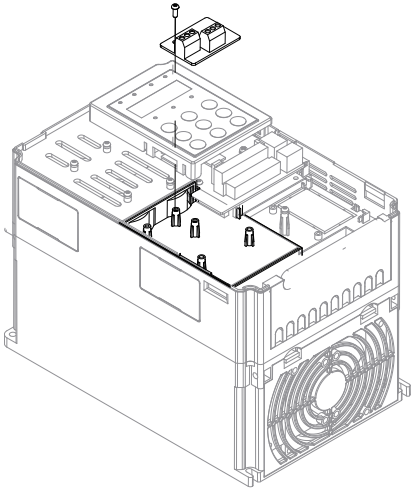


Figure 2-1 MD38CAN1 card installation

Caution

Do not remove or install the card with power ON.

2.2 Wiring

2.2.1 Connection Topology and Transmission Distance of the CANlink Bus

The following figure describes the CANlink bus topology. It is recommended to connect the CAN bus by shielded twisted cables. Connect two 120 Ω termination resistors to both ends of the bus to prevent signal reflection. Reliable single-point grounding is often used for the shield.

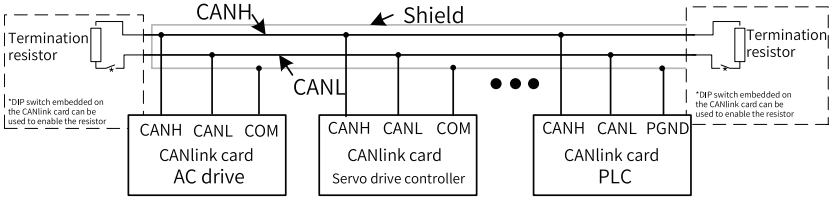


Figure 2-2 CANlink bus connection topology

The transmission distance of the CANlink bus is directly related to the baud rate and communication cable. The following table describes the relationship between the bus length and the baud rate.

Table 2–1 Relationship between the bus length and baud rate

Baud Rate (bps)	Bus Length (m)
1 Mbps	30
500 kbps	100
250 kbps	250
125 kbps	500

2.2.2 EMC Cabling Instructions

- During installation and commissioning on site, route communication signal cables and power cables through different routes. Failure to comply will result in communication interference.
- Connect the motor casing to the ground terminal (PE terminal) of the AC drive, and connect the ground cable of the motor casing properly. Failure to comply will result in poor grounding performance.
- It is recommended to use shielded twisted pair cables for differential signal cables. Connect the twisted pair cables based on the differential pairs, and connect the shield to the ground terminal (PE terminal) of the AC drive.

3 Communication Descriptions

3.1 CANlink Communication Protocol

CANlink is a CAN bus-based network protocol developed by Inovance. It is an open protocol that allows devices that support the protocol to access the CANlink network. AC drives, servo drives, HMIs, and PLCs of Inovance can be connected through CANlink.

The CANlink 3.0 protocol is a CAN real-time bus protocol for the application layer developed by Inovance based on the CAN 2.0 bus protocol. A CANlink 3.0 network consists of the application software Autoshop, a PLC master station, and several slave stations. A maximum of 62 slave stations are supported. *"Figure 2–2 " on page 14* describes the networking.

CANlink3.0 features:

- Supports monitoring of master/slave status through heartbeat messages.
- Supports warning and monitoring of real-time bus occupancy.
- Supports reconnection after disconnection.
- Supports hot swap of communication cables.
- The master can send at most 256 pieces of configuration data, including time-, event-, and synchronization-triggering data.
- A slave can send at most 16 pieces of configuration data, including time-, event-, and synchronization-triggering data. All slaves can send at most 256 pieces of configuration data.
- Each station supports receiving of point-to-multipoint data from other eight stations.
- Supports master/slave and slave/slave data interactions.
- The master supports up to 128 pieces of data to be written, and a single slave can receive 8 write commands from the master.
- The CANlink 3.0 is compatible with CANlink 2.0. Products that support CANlink 3.0 can also use the FROM/TO instructions for data exchange. However, data exchange through the CANlink 3.0 and FROM/TO instructions cannot be used simultaneously in the same network.

3.2 Communication-related Parameters

MD38CAN1 card configuration

Parameter Code	Parameter Name	Value Range	
Fd-00	Baud rate	Ones position: Modbus Tens position: Reserved Hundreds position: Reserved	Thousands position: CANlink baud rate 0: 1 Mbps 1: 500 kbps 3: 125 kbps 4: 100 kbps 5: 50 kbps 6: 20 kpbs
Fd-02	Local address	CANlink station address: 1 to 63	

Parameters related to communication control

The following table describes communication-related parameters. For details on other parameters, see the MD380 series AC drive user guide.

Table 3–1 Communication-related parameters

Parameter Code	Parameter Name	Value Range
F0-02	Command source	0: Operation panel 1: Terminal 2: Communication
F0-03	Main frequency source X selection	0: Digital setting (preset frequency, which can be modified by UP/DOWN key; non-retentive at power failure) 1: Digital setting (preset frequency, which can be modified by UP/DOWN key; retentive at power failure) 2: AI1 3: AI2 4: AI3 5: Pulse reference (HDI) 6: Multi-reference 7: Simple PLC 8: PID 9: Communication
F0-04	Auxiliary frequency source Y selection	Same as F0-03 (main frequency source X selection)

3.3 Communication Instances

3.3.1 AC Drive Parameter Operations

3.3.1.1 AC Drive Parameter Addresses

The AC drive parameters can be divided into parameter data and non-parameter data. The latter includes the operating commands, operating status, operating parameters, and alarms. The address indexes used to access these two types of data are different.

Parameter data

The following table describes the parameter data.

Parameter Code (Group No.-SN)	Map Address (Corresponding to Parameter Address)	Value
FA-01	0xFA01	2
FA-11	0xFA0B	2000

The mapped address (corresponding to the parameter address) is the parameter group number + offset. The parameter group number (the first 2 digits) is hexadecimal and the offset (the last 2 digits) is decimal. For address mapping, the offset needs to be converted to a value in hexadecimal. For example,

- The mapping address of F0-02 is 0xF002.
- The mapping address of F0-13 is 0xF00D.

Non-parameter data

The non-parameter data includes mapping addresses of running commands, running state, running parameters, and alarm information. The mapping addresses are expressed in the hexadecimal format.

Control command input to the drive (write-only):

AC Drive Parameter Address	Command Parameter
2000	0001: Forward running
	0002: Reverse running
	0003: Forward jogging
	0004: Reverse jogging
	0005: Coast to stop
	0006: Decelerate to stop
	0007: Fault reset

Reading the drive state (read-only):

AC Drive Parameter Address	State Word Function
3000	0001: Forward running
	0002: Reverse running
	0003: Stop

Parameter verification locked by password: If "8888H" is returned, the password verification passes.

AC Drive Parameter Address	Password
1F00	*****

DO control (write-only):

AC Drive Parameter Address	Command
2001	Bit 0: DO1 output control Bit 1: DO2 output control Bit 2: Relay 1 output control Bit 3: Relay 2 output control Bit 4: FMR output control Bit 5: VDO1 Bit 6: VDO2 Bit 7: VDO3 Bit 8: VDO4 Bit 9: VDO5

AO1 control (write-only):

AC Drive Parameter Address	Command
2002	0 to 7FFF indicates 0% to 100%.

AO2 control (write-only):

AC Drive Parameter Address	Command
2003	0 to 7FFF indicates 0% to 100%.

Pulse output control (write-only):

AC Drive Parameter Address	Command
2004	0 to 7FFF indicates 0% to 100%.

The following table describes the AC drive faults.

AC Drive Parameter Address	Fault Information	
8000	0000: No fault 0001: Reserved 0002: Overcurrent during acceleration 0003: Overcurrent during deceleration 0004: Overcurrent at constant speed 0005: Overvoltage during acceleration 0006: Overvoltage during deceleration 0007: Overvoltage at constant speed 0008: Pre-charge resistor overload 0009: Undervoltage 000A: AC drive overload 000B: Motor overload 000C: Input phase loss 000D: Output phase loss 000E: Module overtemperature 000F: External fault 0010: Communication exception 0011: Contactor exception 0012: Current detection fault 0013: Motor auto-tuning fault 0014: Encoder/PG card fault	0015: Parameter read-write fault 0016: AC drive hardware fault 0017: Motor short-circuited to ground 0018: Reserved 0019: Reserved 001A: Running time reach 001B: User-defined fault 1 001C: User-defined fault 2 001D: Power-on time reach 001E: Load loss 001F: PID feedback loss during running 0028: Fast current limit timeout 0029: Motor switchover fault during running 002A: Excessive speed deviation 002B: Motor overspeed 002D: Motor overtemperature 005A: Incorrect setting of PPR of the encoder 005B: Encoder not connected 005C: Initial position error 005E: Speed feedback error

3.3.1.2 Write Operations on the AC Drive

To write information to the AC drive, the master sends the following CANlink frame.

Table 3–2 Sent CANlink frame for write operations

CAN	CANlink	Description
Bits 28-25 in CAN ID	Arbitration sign	The arbitration sign of the command frame is fixed to 1000.
Bit 24 in CAN ID	Q&A sign	It is the Q&A sign, and 1 is the question frame.
Bits 23-16 in CAN ID	Command code	The write register command is 0x05.
Bits 15-8 in CAN ID	Target address	CANlink target station address
Bits 7-0 in CAN ID	Source address	CANlink local station address

CAN	CANlink	Description
DATA1	Data	It is the high-order byte of the write data.
DATA2	Data	It is the low-order byte of the write data.
DATA3	Address	It is the high-order byte of the write address.
DATA4	Address	It is the low-order byte of the write address.

The slave responds with the following message when the AC drive information is written successfully. The command codes returns 0x05, and the returned data and address are the same as the sent data and address.

If the write operation fails, the returned command code for command code error is 0xFF, the returned data for data writing error is "data + 1", and the returned address for address writing error is "address+1".

Table 3–3 Returned CANlink frame for write operations

CAN	CANlink	Description
Bits 28-25 in CAN ID	Arbitration sign	The arbitration sign of the command frame is fixed to 1000.
Bit 24 in CAN ID	Q&A sign	It is the Q&A sign, and 0 is the answer frame.
Bits 23-16 in CAN ID	Command code	It indicates the write register command 0x05.
Bits 15-8 in CAN ID	Target address	CANlink target station address
Bits 7-0 in CAN ID	Source address	CANlink local station address
DATA1	Data	High-order byte of the write data
DATA2	Data	Low-order byte of the write data
DATA3	Address	High-order byte of the write address
DATA4	Address	Low-order byte of the write address

3.3.1.3 Read Operations on the AC Drive

To read information of the AC drive, the master sends the following CANlink frame.

Table 3–4 Sent CANlink frame for read operations

CAN	CANlink	Description
ID bits 28-25	Arbitration sign	The arbitration sign in the command frame is fixed to 1000.
ID bit 24	Q&A sign	It is the Q&A sign, and 1 is the question frame.
ID bits 23-16	Command code	It indicates the read register command 0x04.
ID bits 15-8	Target address	CANlink target station address
ID bits 7-0	Source address	CANlink local station address
DATA1	Data	0 is reserved.
DATA2	Data	0 is reserved.
DATA3	Address	High-order byte of the read address
DATA4	Address	Low-order byte of the read address

The slave responds with the following message when the AC drive information is read successfully. The command code returns 0x04. If the address in the read request command is the same as that in the read response command, DATA1 and DATA2 in the read response command are the requested data.

If the read operation fails, the returned command code for command code error is 0xFF, and the returned address for address reading error is "address + 1". DATA1 and DATA2 in the read response command are the fault code.

Table 3–5 Returned CANlink frame for read operations

CAN	CANlink	Description
ID bits 28-25	Arbitration sign	The arbitration sign of the command frame is fixed to 1000.
ID bit24	Q&A sign	It is the Q&A sign, and 0 is the answer frame.
ID bits 23-16	Command code	It indicates the read register command 0x04.
ID bits 15-8	Target address	CANlink target station address
ID bits 7-0	Source address	CANlink local station address
DATA1	Data	High-order byte of read data
DATA2	Data	Low-order byte of read data

CAN	CANlink	Description
DATA3	Address	High-order byte of the read address
DATA4	Address	Low-order byte of the read address

3.3.1.4 Operation Examples on the AC Drive

For example, the master address is 0x01 and the slave (AC drive) address is 0x02.

To read parameter F0-02 of the AC drive, the master sends the following CANlink message.

Table 3–6 Message sent by the master to read F0-02

Message ID (Hex)	Data Length	Data (Hex)
0x11040201	4	00 00 F0 02

The AC drive responds to the master with the following CANlink message. The value of F0-02 is 0x0002 and the command source of the AC drive is communication.

Table 3–7 Message responded by the AC drive to read F0-02

Message ID (Hex)	Data Length	Data (Hex)
0x10040102	4	00 02 F0 02

The command source is the operating panel. To write F0-02 to 0, the master sends the following CANlink message.

Table 3–8 Message sent by the master to write F0-02

Message ID (Hex)	Data Length	Data (Hex)
0x11050201	4	00 00 F0 02

The AC drive responds to the master with the following CANlink message. F0-02 is set to 0 and the command source of the AC drive is the operating panel.

Table 3–9 Message responded by the AC drive to write F0-02

Message ID (Hex)	Data Length	Data (Hex)
0x10050102	4	00 00 F0 02

The H1U/H2U series PLCs require CAN communication cards to support CAN communication. The PLC main module supports the CANTX/CANRX instructions, remote module access instructions FROM/TO, and CANlink network function. However, the PLC supports only FROM/TO instructions for the MD380.

3.3.2 Operations on the PLC to Control the AC Drive

Communication configurations of the AC drive

For details, see section *" MD38CAN1 card configuration" on page 16*.

Communication configurations of the PLC

There are two ways to configure communication on the PLC:

- Hardware
- Software

To set the baud rate and station address, set the DIP switch on the CANlink card mounted on the PLC main module.

The CANlink card provides a 6-position DIP switch for communication address settings. Position 6 indicates the highest position and position 1 indicates the lowest position. Positions 6 to 1 correspond to bit 5 to bit 0 of a 16-bit binary integer. The range of addresses that can be set by the DIP switch is from 1 to 63, as shown below.

Position						Address
6	5	4	3	2	1	
0	0	0	0	0	0	Reserved
0	0	0	0	0	1	1
0	0	0	0	1	0	2
0	0	0	0	1	1	3
...						…
1	1	1	1	1	1	63

OFF of position 7: High speed mode; baud rate of 500 k. ON of position 7: Low speed mode; baud rate of 100 k.

OFF of position 8: 120-ohm termination resistor not connected. ON of position 8: 120-ohm termination resistor connected

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Note

If the DIP switch does not work, check whether the setting of the M8285 element in the PLC is 0 (M8285=0).

You can set some soft components of the PLC to set communication-related parameters, as shown below.

M Component	M Component Definition	D Component	D Component Definition
M8280	0: CANlink VER2.00 protocol 1: CANlink VER1.00 protocol	D8280	CANlink protocol version
M8281	Identifies the CAN expansion card.	D8281	Expansion card type. The H2U can automatically identify the expansion card type, but the H1U cannot. In this case, D8281 is used to set the expansion card type.
M8284	0: The DIP switch is used to set the CANlink address. 1: The software is used to set the CANlink address.	D8284	It is used to set the CANlink address or display the set address.
M8285	0: The DIP switch is used to set the baud rate. 1: The software is used to the baud rate.	D8285	It is used to set the baud rate or display the set baud rate.

See the PLC programming user guide for more details.

Operation example

The FROM and TO instructions can be used by the PLC to read and write parameters of the AC drive. For the parameter mapping address, refer to descriptions of AC drive parameter addresses.

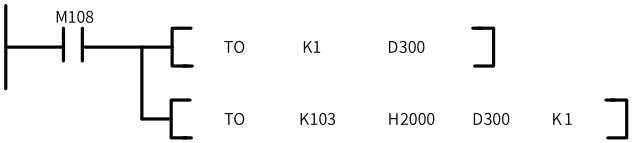
Example 1: The AC drive station address is 3. After F0-13 of the AC drive is read, it is represented as HF00D in the PLC, and the read parameter value is stored in the D101 register.



Example 2: The AC drive station address is 3. After F0-15 of the AC drive is written, it is represented as HF00E in the PLC, and the written value is stored in the D203 register.



Example 3: The AC drive station address is 3. The AC drive starts in the forward direction with the control word 2000, which is represented as H2000 in the PLC. The written value is stored in the D300 register.



Note

- Group FF: The parameters in group FF cannot be read or changed.
- Group U: The parameters in group U can only be read.

4 Troubleshooting

4.1 Troubleshooting

Table 4–1 Troubleshooting

Fault Type		Cause	Solution
The operating panel displays ERR16 and the value of U0-45 is 21.		The station number is not in the range of 1-63.	Change the related parameter.
The operating panel displays ERR16 and the value of U0-45 is 20.		Station numbers conflict.	Change the related parameter.
The ERR indicator of the master flashes at the frequency of 1 Hz.	The operating panel reports ERR16 and the value of U0-45 is 2.	The slave is offline.	Check and ensure that the slave station is connected.
	No slave stations report errors.	A slave station is not connected to the network.	Connect the slave station to the network as required. If the slave station does not need to be connected to the network, delete it from the configuration table and then download the table again.
The ERR indicator of the master station is steady on, the operating panel displays ERR16, and the value of U0-45 is 2.		The master station is disconnected.	Check and ensure that the master station is connected.
The ERR indicator of the master station flashes slowly.		A configuration error exists.	See *"Table 4–2 " on page 27*. View the value of the master D8308. View the problem based on the definition of the register, address the problem, and download the configuration again.
No slave stations report alarms and the ERR indicator of the master station is steady on.		The master station detects that no slave stations are connected to the network.	Check and ensure that the master station is connected. Check and ensure that the baud rate is consistent among stations.

Fault Type	Cause	Solution
No error is displayed on all stations and the component for synchronous write does not reset automatically.	A synchronous write error occurs.	See *"Table 4–3 " on page 27*. View the value of the master D8307. View the problem based on the definition of the register, address the problem, and download the configuration again.
During communication, slave stations that are far away from the master station become offline.	The termination resistor is connected incorrectly. The cable length and baud rate are not appropriate.	Correctly connect the termination resistor. After a power failure, check that the resistance between CANH and CANL of the network is around 60 Ω. Check that the common terminals (CGND) of communication cards for all stations are connected. Decrease the communication baud rate or replace the cable.

Table 4–2 Error codes and solutions of the master station D8308

Error Code	Description	Solution
xx00	No error	No error
xx03	Incorrect information	Check that the sent register address is within the valid range of the station.
xx06	Timeout	Check that the connection is normal.
Other codes	Reserved	Reserved
Note: xx in the table indicates the number of the station where the error occurs. For example, error code 306 indicates that the slave station 3 response times out.		

Table 4–3 Error codes and solutions of the master station D8307

Error Code	Description	Solution
xx00	No error	No error
xx02	Incorrect address	Check that the received register address is within the valid range of the station.
xx03	Abnormal data	Check that the data of the sent register is within the valid range of the receiving register for the receiving station.
xx04	Operations are not allowed.	Check that the receiving register is allowed for receiving data by the slave station.
xx06	Timeout	Check that the connection is normal.
Other codes	Reserved	Reserved
Note: xx in the table indicates the number of the station where the error occurs. For example, error code 306 indicates that the slave station 3 response times out.		

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