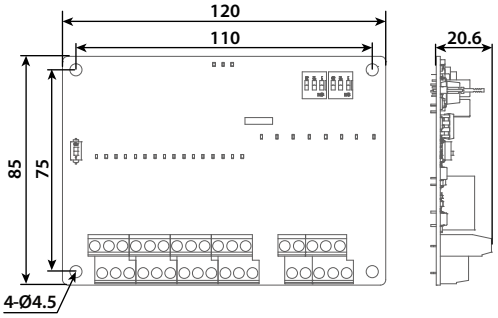
HC10 Series IO Remote Expansion Module Installation and User Manual

（HC10-R1608R-D1A）

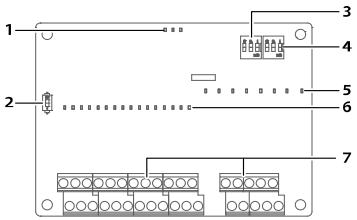
IO remote expansion module, referred to as module in the manual.

Warning	• Be sure to check the terminal label carefully when wiring. • Avoid installation in places exposed to direct sunlight, moisture, or water. • Avoid installation in places with flammable and explosive gases and liquids. • Avoid installation in areas with oily dust, fibers and metal particles. • Install with M4 screws. • The system involves safety control circuits, such as equipment emergency stop, etc. It is not recommended to use module control.

Dimensions Size (mm)



Structure Description



1	Status indicator	**5**	Output indicator
2	SW3 DIP switch (matching resistance selection)	**6**	Input indicator
3	SW2 DIP switch (slave address selection)	**7**	Input/output terminal
4	SW1 DIP switch (baud rate selection)		

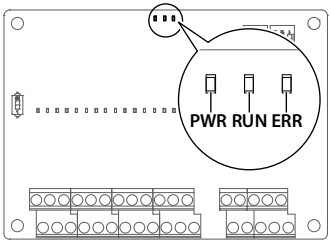
Terminal Description [7]

CAN+	24V	S/S	0V	X1	X3	X5	X7	X11	X13	X15	X17	
CAN-	GND	24V	X0	X2	X4	X6	X10	X12	X14	X16	·	

Y0	Y2	COM0	Y4	Y6	
Y1	Y3	COM1	Y5	Y7	

Terminal	Description	Terminal	Description
CAN+, CAN-	CAN communication interface	X0~X7, S/S X10~X17, S/S	Digital input
GND	CAN communication ground	Y0~Y3, COM0 Y4~Y7, COM1	Relay output
24V, 0V	24V power input		

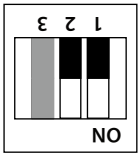
Description of Status Indicator [1]



Indicator	Description
PWR Power on indicator	• After the module is powered on, the indicator light is on
RUN Heartbeat indicator	• When the heartbeat timeout detection time is 0, the indicator is always on • The heartbeat timeout detection time is not 0, when the frame data is received, the indicator is on • The heartbeat timeout, the indicator is off
ERR Fault indicator	• When the CAN bus fails, the indicator is on • When the fault is restored, the indicator is off

Description of DIP Switch [2/3/4]

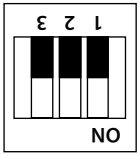
SW1 set the baud rate [4]



Dial to the "ON" side is 1

Toggle Position (2&1)	Baud Rate (kbps)
00	50 (Factory settings)
01	125
10	250
11	500

SW2 set slave address [3]



Dial to the "ON" side is 1

Toggle Position (3&2&1)	Slave Address
000	1 (Factory settings)
001	2
010	3
011	4
100	5
101	6
110	7
111	8

SW3 set CAN communication matching resistance [2]

- When dialed to the "1" side (factory setting), do not connect the matching resistance
- When dialed to the "ON" side, connect the matching resistance

Product Specifications

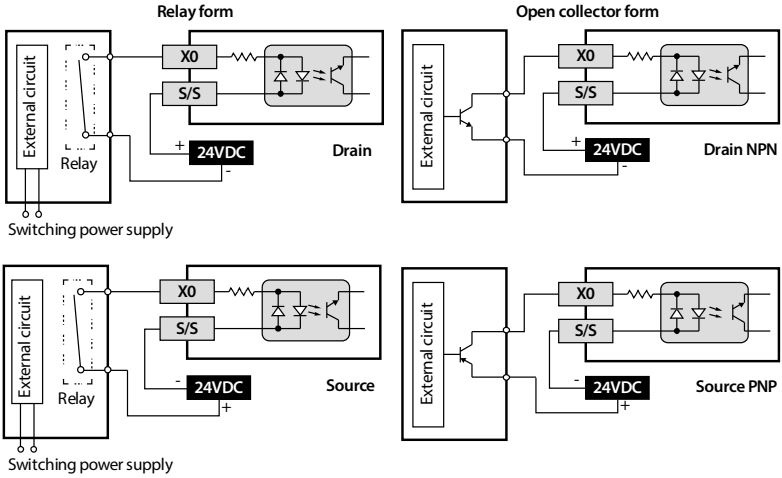
General Specifications	
Environmental temperature	Run: -10 ~ +55℃; Storage: -40 ~ +70℃
Relative humidity	<95%, no condensation
Altitude	Run: <2000m; Storage: 0 ~ 3000m (not less than 70kPa)
Pollution level	Pollution level 2

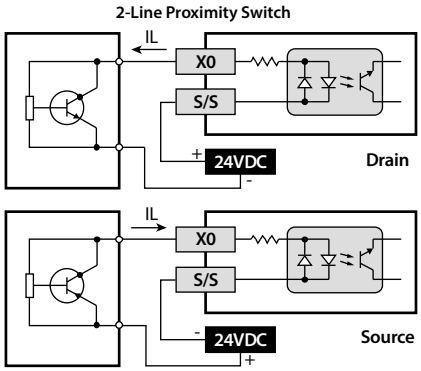
Terminal Input Specifications	
Points	Digital input
Action display	LED light goes on with system's operation, LED light goes out when system is shut-down
Common	S/S
Signal form	Contact input or source (drain) mode
Circuit insulation	Photoelectrical coupling insulation
Voltage range	15 ~ 30VDC
Current	ON: >3.5mA (>15V); OFF: <1.2mA (<5V)
Resistance	4.7kΩ
Hardware filtering time	About 200us

Terminal Output Specifications		
Points		Relay output
Action display		LED light goes on with system's operation, LED light goes out when system is shut-down
Common		Every four groups of one common, group and group isolated
Circuit insulation		Mechanical insulation
Response time		/
External voltage		250VAC, below 30VDC
Max. load	Resistive	3A/1 point (5A/COM)
	Inductive	80VAC
	Light bulb	2W (DC)/100W (AC)

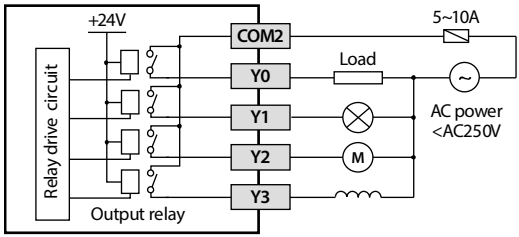
Instructions

1. The module wiring is as follows.
   - Digital input wiring





   - Digital output wiring



Note:
In order to prevent the output unit from being burnt out by faults such as load short circuit, please select a suitable fuse for each load.

2. Connect the CAN bus.
   - The "CAN+" of the module is connected to the "CAN+" of the HC10 host;
   - The "CAN-" of the module is connected to the "CAN-" of the HC10 host.

3. Set the baud rate (SW1), slave address (SW2) and CAN communication matching resistance (SW3).
   - In the CAN bus, only the last module needs to be connected to a matching resistor.

4. Power on.

5. Module address mapping.
   - The module data will not be saved after power off and will be restored to the default value.

Module Data Address	Data Content	Read	Write
0x0000	Module type (0x110)	■	
0x0001	Software version	■	
0x0002 - 0x0003	Reserved	/	/
0x0004	Baud rate	■	
0x0005	Node address	■	
0x0006	X terminal status (X0 ~ X7, X10 ~ X17) • Bit15 - Bit8: X17 - X10 • Bit7 - Bit0: X7 - X0	■	
0x0007 - 0x000f	Reserved	/	/
0x0010	Y terminal status（Y0~Y7） • Bit15 - Bit8: Reserved • Bit7 - Bit0: Y7 - Y0	■	■
0x0011	Heartbeat timeout detection time (unit: 1ms) • Range: 0 - 30000ms (over the upper limit setting) • Default value: 1000ms • 0: No detection (Y output hold)	■	■
0x0012	Heartbeat timeout Y output selection • 0: Y output remains • 1: Y output is disconnected (default value: 1)	■	■
0x0013	X terminal filter time setting (unit: 1ms) • Range: 0 - 100ms (over the upper limit setting) • Default value: 10ms	■	■
0x0014	Reserved	/	/

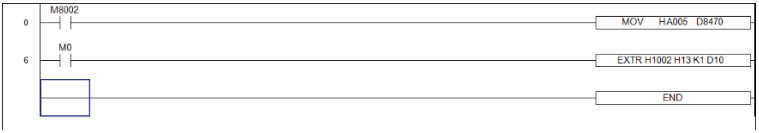
6. Use connection protocol.
   - In CAN communication, the module is a slave.
   - It is composed of ADF (Access data frame) and QDF (Quick data frame). Can be used alone or at the same time, it is recommended to use QDF to exchange the status data of the X and Y terminals.
   - Only 11-bit standard frame ID is supported.
   - For detailed protocol instructions, please refer to "5.2 CAN Communication Function" in "HC10 Series Intelligent Controller Programming Manual".

ADF Protocol

- Read and write register data through EXTR instruction, supported operation command words: 0x03 (read), 0x10 (write).

Operand	Setting Data	Type of Data
S1	High byte: Command code Low byte: Slave station address (0x00~0xFF)	16 byte
S2	Slave data address	16 byte
S3	Access points • Word data: 1~2 • Bit data: 1~32	16 byte
S4	Data storage soft component start	16 byte

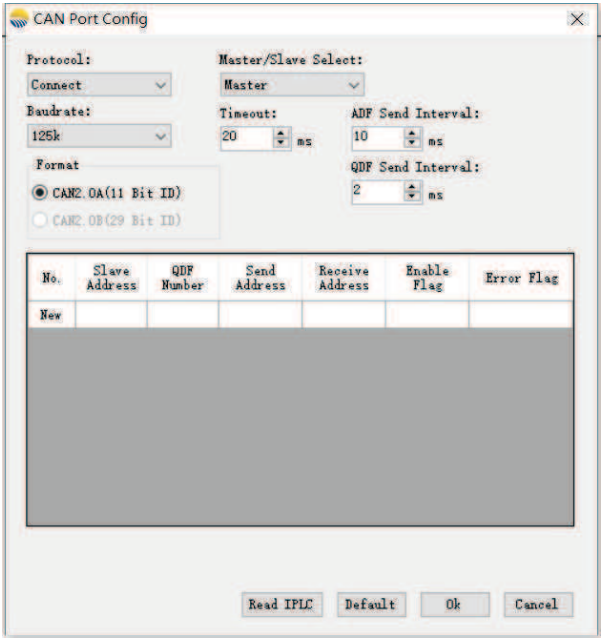
- Program example:
  - The HC10 host computer and the module conduct master-slave communication, turn on through M0, and set the filter time of the X terminal.
  - The host programming:



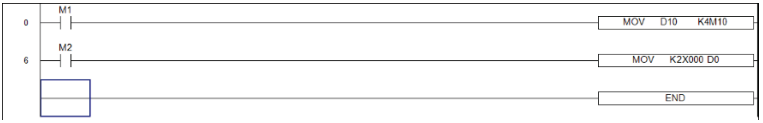
1. The module sets the baud rate (SW1) to 125kbps, and the slave address (SW2) to 2.
2. The host sets D8470 (communication parameters) to HA005 (connection protocol, baud rate 125kbps) through M8002.
3. The host is turned on through M0 to control the EXTR instruction, and write the data of D10 to 0x0013 (set the filter time of the X terminal).

QDF Protocol

- The module does not support broadcast frames.
- Only one set of mailboxes (QDF1) is supported, which is used to exchange the status data of the X terminal (0x0006) and the Y terminal (0x0010).
- The host sends QDF1 to control the output data of the Y terminal of the module.
- The slave sends QDF1 to upload the input data of the X terminal of the module.
- Program example:
  - Upload the status data of the X terminal of the No.2 slave to the soft components M10~M25, and control the output of the Y0~Y7 terminals of the module through the master X0~X7. Upload the status data of No.2 slave X terminal to the soft components M10~M25, and control the output of the Y0~Y7 terminal of the module through the master X0~X7.



- The host programming is as follows:



1. Through the HCStudio host computer, configure the QDF communication data table and set it in the "CAN Port Config".
   - Slave Address: 2 (0x02).
   - QDF Number: 1.
   - Send Address: D0~D3. D0 is the status data of the Y terminal of the module, D1~D3 are reserved.
   - Receive Address: D10~D13. D10 is the status data of the X terminal of the module, D11~D13 are reserved.
2. The host is turned on through M1, and assigns the status data of the X terminal uploaded by the No. 2 slave to the soft components M10~M25.

3. The host is turned on through M2, and the status data of the X0~X7 terminals of the host are assigned to the Y terminal of the module, and control the terminal outputs.