



RTU-485

INSTRUCTION SHEET

安裝說明 安装说明

- ▲ Modbus Remote I/O Communication Module
- ▲ Modbus遠端I/O通訊模組
- ▲ Modbus远程I/O通讯模块



② Specifications

■ RTU-485 Connector

Type	Removable 3-pin connector
Transmission method	RS-485
Transmission cable	2 twisted isolation cables
Electrical isolation	500V DC

■ Communication

Valid communication address	1 ~ F0 (decimal: 1 ~ 240)
Series transmission speed	1,200/2,400/4,800/9,600/19,200/38,400/57,600/115,200 bps (bits per second)
Communication mode	7,E,1-ASCII / 7,O,1-ASCII / 7,E,2-ASCII / 7,O,2-ASCII / 7,N,2-ASCII / 8,E,1-ASCII / 8,O,1-ASCII / 8,N,1-ASCII / 8,N,1-ASCII / 8,N,2-ASCII / 8,E,1-RTU / 8,O,1-RTU / 8,N,1-RTU / 8,N,2-RTU

■ Electrical Specification

Power voltage	24V DC (-15% ~ 20%) (with DC input polarity reverse protection)
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■ Environment

Noise immunity	ESD (IEC 61131-2, IEC 61000-4-2): 8KV Air Discharge, 4KV Contact Discharge EFT (IEC 61131-2, IEC 61000-4-4): Power L14ne: 2KV, Digital I/O: 1KV Analog & Communication I/O: 1KV Damped-Oscillatory Wave: Power Line: 1KV, Digital I/O: 1KV RS (IEC 61131-2, IEC 61000-4-3): 80MHz ~ 1000MHz, 1.4GHz ~ 2.0GHz, 10V/m
Operation/storage	Operation: 0°C ~ 55°C (temperature), 50 ~ 95% (humidity), pollution degree 2 Storage: -25°C ~ 70°C (temperature), 5 ~ 95% (humidity)
Shock/vibration immunity	International standards: IEC61131-2 · IEC 68-2-6 (TEST Fc)/IEC61131-2 & IEC 68-2-27 (TEST Ea)
Standards	IEC 61131-2, UL508

③ Components

■ RUN/STOP Switch



Status	Explanation
	1. RUN indicator on RTU-485 is On. 2. AI/AO extension unit in RUN status.
RUN ↷ STOP	1. AI/AO extension unit switches from RUN to STOP status. 2. Y points on DI/DO extension unit are all Off.
	1. RUN indicator on RTU-485 is Off. 2. AI/AO extension unit in STOP status. 3. Communication control is not allowed in AI/AO extension unit. 4. Communication control is not allowed in DI/DO extension unit.
STOP ↷ RUN	1. RTU-485 re-detects the number of points in DI/DO unit and the number of AI/AO units. 2. AI/AO extension unit switches from STOP to RUN status.

■ Address Setup DIP Switch

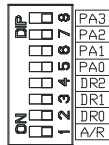
DIP Switch Setting	Explanation
H'01 ~ H'F0	For valid RTU-485 address, the definition of ID0 ~ ID7 are: 2', 2', 2', ... 2', 2'.
H'00, H'F1 ~ H'FF	In the Modbus protocol, H'00 is defined as broadcast mode. H'F1 ~ H'FF are incorrect RTU-485 addresses.



■ Communication Mode Setup DIP Switch

The communication setup switch is a set of 8-bit DIP switches. PA0 ~ PA3 are for setting up RTU-485 communication mode, DR0 ~ DR2 are for setting up the series transmission speed, and A/R is for setting up ASCII/RTU mode. There are 13 communication modes and 8 series transmission speeds available.

PA3	PA2	PA1	PA0	A/R	Communication mode
OFF	OFF	OFF	OFF	ON	7,E,1-ASCII
OFF	OFF	OFF	ON	ON	7,O,1-ASCII
OFF	OFF	ON	OFF	ON	7,E,2-ASCII
OFF	OFF	ON	ON	ON	7,O,2-ASCII
OFF	ON	OFF	OFF	ON	7,N,2-ASCII
OFF	ON	OFF	ON	ON	8,E,1-ASCII
OFF	ON	ON	OFF	ON	8,O,1-ASCII
OFF	ON	ON	ON	ON	8,N,1-ASCII
ON	OFF	OFF	OFF	ON	8,N,2-ASCII
OFF	ON	OFF	ON	OFF	8,E,1-RTU
OFF	ON	ON	OFF	OFF	8,O,1-RTU
OFF	ON	ON	ON	OFF	8,N,1-RTU
ON	OFF	OFF	OFF	OFF	8,N,2-RTU



DR2	DR1	DR0	Series Transmission speed
OFF	OFF	OFF	1,200 bit/s
OFF	OFF	ON	2,400 bit/s
OFF	ON	OFF	4,800 bit/s
OFF	ON	ON	9,600 bit/s
ON	OFF	OFF	19,200 bit/s
ON	OFF	ON	38,400 bit/s
ON	ON	OFF	57,600 bit/s
ON	ON	ON	115,200 bit/s

④ Function Codes Supported by RTU-485

RTU-485 complies with the standard Modbus protocol, supporting the 7 function codes, H'01, H'02, H'03, H'05, H'06, H'0F, and H'10. Please refer to the standard Modbus protocol for the specific data format of each function code.

Function code	Function	Data type	Applicable address
H'01	Read the output status of bit device	bit	DO area: H'0500 ~ H'057F
H'02	Read the input status of bit device.	bit	DI area: H'0400 ~ H'047F
H'03	Read register	word	Special function area: H'0000 ~ H'001F CR of the 1 st AI/AO unit: H'1600 ~ H'1630 CR of the 2 nd AI/AO unit: H'1640 ~ H'1670 CR of the 3 rd AI/AO unit: H'1680 ~ H'16B0 CR of the 4 th AI/AO unit: H'16C0 ~ H'16F0 CR of the 5 th AI/AO unit: H'1700 ~ H'1730 CR of the 6 th AI/AO unit: H'1740 ~ H'1770 CR of the 7 th AI/AO unit: H'1780 ~ H'17B0 CR of the 8 th AI/AO unit: H'17C0 ~ H'17F0
H'05	Write single datum into bit device	bit	DO area: H'0500 ~ H'057F
H'06	Write single datum into register	word	RUN/STOP RTU module: H'0003 Applicable to CR with write attribute in the 1 st ~ 8 th AI/AO extension unit.
H'0F	Write many data into bit device	bit	DO area: H'0500 ~ H'057F
H'10	Write many data into register	word	RUN/STOP RTU module: H'0003 Applicable to CR with write attribute in the 1 st ~ 8 th AI/AO extension unit.

Example: Use function code 03 to read CR0 and CR1 in the 1st AI/AO extension unit: (ASCll mode)
The request message sent from master PLC to RTU-485 is ": 01 03 16 00 00 02 E4 CR LF"
The responding message sent from RTU-485 to the master PLC is ": 01 03 04 00 88 00 00 70 CR LF"

⚠ Note:

1. RTU-485 can only read and write one AI/AO extension unit at the same time.
2. RTU-485 is able to read/write maximum 16 words at a time in the communication control.

⑤ LED Indicators

■ POWER Indicator

LED status	Indication	How to deal with it
Off	No power	Check if the power and connection of RTU-485 work normally. If both work normally, your RTU-485 malfunctions. Please change to a new RTU-485.
Constantly On in green	RTU-485 module is powered	-

■ RUN Indicator

LED status	Indication	How to deal with it
Off	RTU-485 and the connected AI/AO extension unit are in STOP status.	-
Constantly On in green	RTU-485 and the connected AI/AO extension unit are in RUN status.	-

■ ALARM Indicator

LED status	Indication	How to deal with it
Red light flashes	Low power voltage	Adjust the voltage supplied to RTU-485 to normal voltage.
	Incorrect communication format	Reset to the communication format supported by RTU-485 and re-power the module after the setup.
	Incorrect station No.	Check if the station No. is within H'01 ~ H'F0.
Constantly On in red	1. No extension unit connected 2. More than 8 extension unit connected 3. More than 128 I/O points in the extension unit.	1. Make sure the extension unit is correctly connected. 2. Make sure the number of connected extension units is less than 8. 3. Make sure the number of I/O points is less than 128.

■ RS-485 Indicator

LED status	Indication	How to deal with it
Red light flashes during communication	The LED will flash once when RTU-485 and the master completes the communication of 1 message.	-

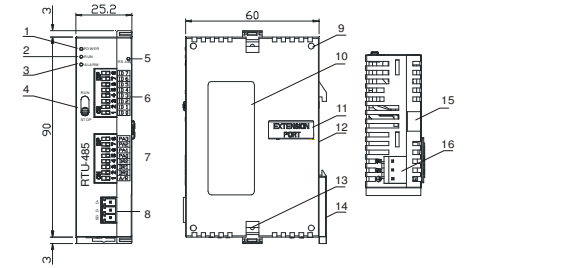
⚠ 注意事項

- ✓ 請在使用之前，詳細閱讀本使用說明書。
- ✓ 實地配線，務必關閉電源。
- ✓ 本機為開放型 (OPEN TYPE) 機殼，因此使用者使用本機時，必須安裝於具防塵、防潮及免於電擊／衝擊意外的外殼配線箱內，另必須具備保護措施 (如：特殊的工具或鑰匙才可打開)，防止非維護人員操作或意外衝擊本體，造成危險及損壞。
- ✓ 輸入電源切斷後，一分鐘之內，請勿觸摸內部電路。
- ✓ 交流輸入電源不可連接於輸入／輸出信號端，否則可能造成嚴重損壞。請在上電前再次確認電源配線，且請勿在上電時觸摸任何端子。本體上的接地端子Ⓞ務必正確的接地，以提高產品抗雜訊能力。

① 產品簡介

感謝您使用台達 RTU-485 通訊模組，RTU-485 為 Modbus 遠端 I/O 通訊模組，可實現台達可程式控制器對 Slim 系列 DI/DO、AI/AO 擴充模組的遠端控制。此外，RTU-485 做為標準的 Modbus 從站設備，也可以相容其他遵循 Modbus 協定的主控設備。

■ 產品外觀及各部介紹



尺寸單位：mm

1. POWER 指示燈	9. 擴充機定位孔
2. RUN 指示燈	10. 銘牌說明
3. ALARM 指示燈	11. 擴充機連介面
4. RUN/STOP 開關	12. DIN 軌槽 (35mm)
5. Communication 指示燈	13. 擴充機固定扣
6. 站號設置開關	14. DIN 固定扣
7. 通訊模式設置開關	15. 擴充機固定槽
8. RS-485 通訊口	16. 電源輸入口

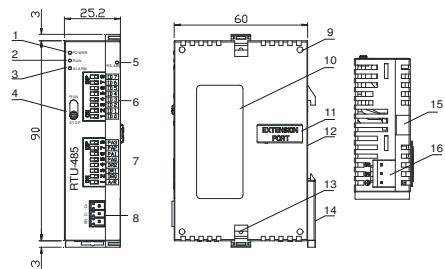
⚠ Warning

- ✓ Please read this instruction sheet carefully before use.
- ✓ Switch off the power before wiring.
- ✓ RTU-485 is an OPEN-TYPE device and therefore should be installed in an enclosure free of airborne dust, humidity, electric shock and vibration. The enclosure should prevent non-maintenance staff from operating the device (e.g. key or specific tools are required to open the enclosure) in case danger and damages on the device may occur.
- ✓ DO NOT touch the internal circuit in one minute after the power is switched off.
- ✓ DO NOT connect input AC power supply to any of the I/O terminals; otherwise serious damage may occur. Check all the wiring again before switching on the power and DO NOT touch any terminal when the power is switched on. Make sure the ground terminal Ⓞ is correctly grounded in order to prevent electromagnetic interference.

① Introduction

Thank you for choosing Delta RTU-485 communication module. RTU-485 is a Modbus remote I/O communication module for Delta's PLC to remote-control Slim series DI/DO and AI/AO extension units. As a standard Modbus slave, RTU-485 is compatible with other master station complying with Modbus protocol.

Product Profile & Outline



Unit: mm

1. POWER indicator	9. Mounting hole for extension unit
2. RUN indicator	10. Nameplate
3. ALARM indicator	11. Extension port for extension unit
4. RUN/STOP switch	12. DIN rail slot (35mm)
5. Communication indicator	13. Fastening hole for extension unit
6. Address setup DIP switch	14. DIN rail clip
7. Communication mode setup DIP switch	15. Mounting rail for extension unit
8. RS-485 communication port	16. Power input

② 功能規格

■ RTU-485 連接器

接頭	可插拔式 3Pin 連接器
傳輸方式	RS-485
傳輸電纜	2 絞線式隔離線
電氣隔離	500V DC

■ 通訊

有效通訊位址	1 ~ F0 (十進位為 1 ~ 240)
串列傳輸速率	支援 1,200、2,400、4,800、9,600、19,200、38,400、57,600、115,200 bps (位元/秒)
通訊模式	支援 7,E,1-ASCII、7,O,1-ASCII、7,E,2-ASCII、7,O,2-ASCII、7,N,2-ASCII、8,E,1-ASCII、8,O,1-ASCII、8,N,1-ASCII、8,N,2-ASCII、8,E,1-RTU、8,O,1-RTU、8,N,1-RTU、8,N,2-RTU

■ 電氣規格

電源電壓	24V DC (-15% ~ 20%) (具直交流輸入電源極性反接保護)
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■ 環境規格

雜訊免疫力	ESD (IEC 61131-2, IEC 61000-4-2): 8KV Air Discharge, 4KV Contact Discharge EFT (IEC 61131-2, IEC 61000-4-4): Power Line: 2KV, Digital I/O: 1KV Analog & Communication I/O: 1KV Damped-Oscillatory Wave: Power Line: 1KV, Digital I/O: 1KV RS (IEC 61131-2, IEC 61000-4-3): 80MHz~1000MHz, 1.4GHz~2.0GHz, 10V/m
操作/儲存環境	操作: 0°C ~ 55°C (溫度)、50 ~ 95% (濕度)、污染等級 2 儲存: -25°C ~ 70°C (溫度)、5 ~ 95% (濕度)
耐震動/衝擊	國際標準規範 IEC61131-2 · IEC 68-2-6 (TEST Fc)/IEC61131-2 & IEC 68-2-27 (TEST Ea)
標準	IEC 61131-2 · UL508 標準

③ 各元件介紹

■ RUN/STOP 開關



狀態	說明
RUN	1. RTU-485模組的RUN燈亮 2. AI/AO擴充模組處於RUN狀態
RUN ↷ STOP	1. AI/AO擴充模組由RUN切換到STOP狀態 2. DI/DO的Y點全部變為OFF狀態
STOP	1. RTU-485模組的RUN燈熄滅 2. AI/AO擴充模組處於STOP狀態 3. AI/AO擴充模組不可通訊控制 4. DI/DO擴充機不可通訊控制
STOP ↷ RUN	1. RTU-485模組重新偵測擴充機DI/DO點數和AI/AO台數 2. AI/AO擴充模組由STOP切換到RUN狀態

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