ICP DAS

U-7504M

OPC UA I/O Module
with 4-ch DI, 4-ch AI, 4-ch AO,
and 2-port Ethernet Switch

Features

- Built-in Web Server to Provide the Web User Interface
- Support OPC UA Server and MQTT Client Protocol
- Support to Execute OPC UA and MQTT Communication Simultaneously
- Support Scaling
- Support Logic Function Rule Setting: IF, THEN, ELSE
- Support RESTful API: Read/Write I/O and Virtual Point via HTTP
- Support Event Log: Record the I/O Value Change for Easy Device Tracking
- Built-in I/O Channels (4 x DI, 4 x AI, 4 x AO)
- 2-port Ethernet Switch for Daisy-Chain Topology
- IEEE 802.3af-compliant Power over Ethernet (PoE)

Introduction

U-7504M is a UA I/O module that provides 4 digital input, 4 analog input, and 4 analog output channels. It has a built-in two-port Ethernet switch to implement daisy-chain topology. The cabling is much easy and can reduce the total cable and switch cost. It follows IEEE 802.3af compliant Power over Ethernet (PoE) specification. It allows receiving power from PoE enabled network by Ethernet pairs. This feature provides greater flexibility and efficiency to simplify system design, save space, and reduce wirings and power sockets. It provides a Web UI to configure/control/monitor the modules, connections, and I/O status via a web browser. It is easy, fast, and no extra APP needed.

In industrial communication, UA I/O provides OPC UA Server and MQTT Client protocols (can execute both communications at the same time.). Users can choose the networking mode according to their cases. And to transmit the values of the built-in I/O channels to the Cloud IT system or field control system for reading and writing. Support Scaling to convert the analog signal into a more readable value.

Software Specifications

Protocol	
OPC UA Server	● OPC Unified Architecture: 1.02 ● Core Server Facet ● Data Access Server Facet ● Method Server Facet ● UA-TCP UA-SC UA Binary ● User Authentication: 　- Anonymous 　- Username/Password 　- X.509 Certificate ● Security Policy: 　- None 　- Basic128Rsa15 (Sign, Sign & Encrypt) 　- Basic256 (Sign, Sign & Encrypt) ● Max. Session Connections: 3 ● Can Execute with MQTT Communication Simultaneously
MQTT Client	● Connect to the MQTT Broker to read or control the I/O channel value by the publish/subscribe messaging mechanism. (MQTT Ver. 3.1.1; TLS Ver. 1.2) ● Can Execute with OPC UA Communication Simultaneously

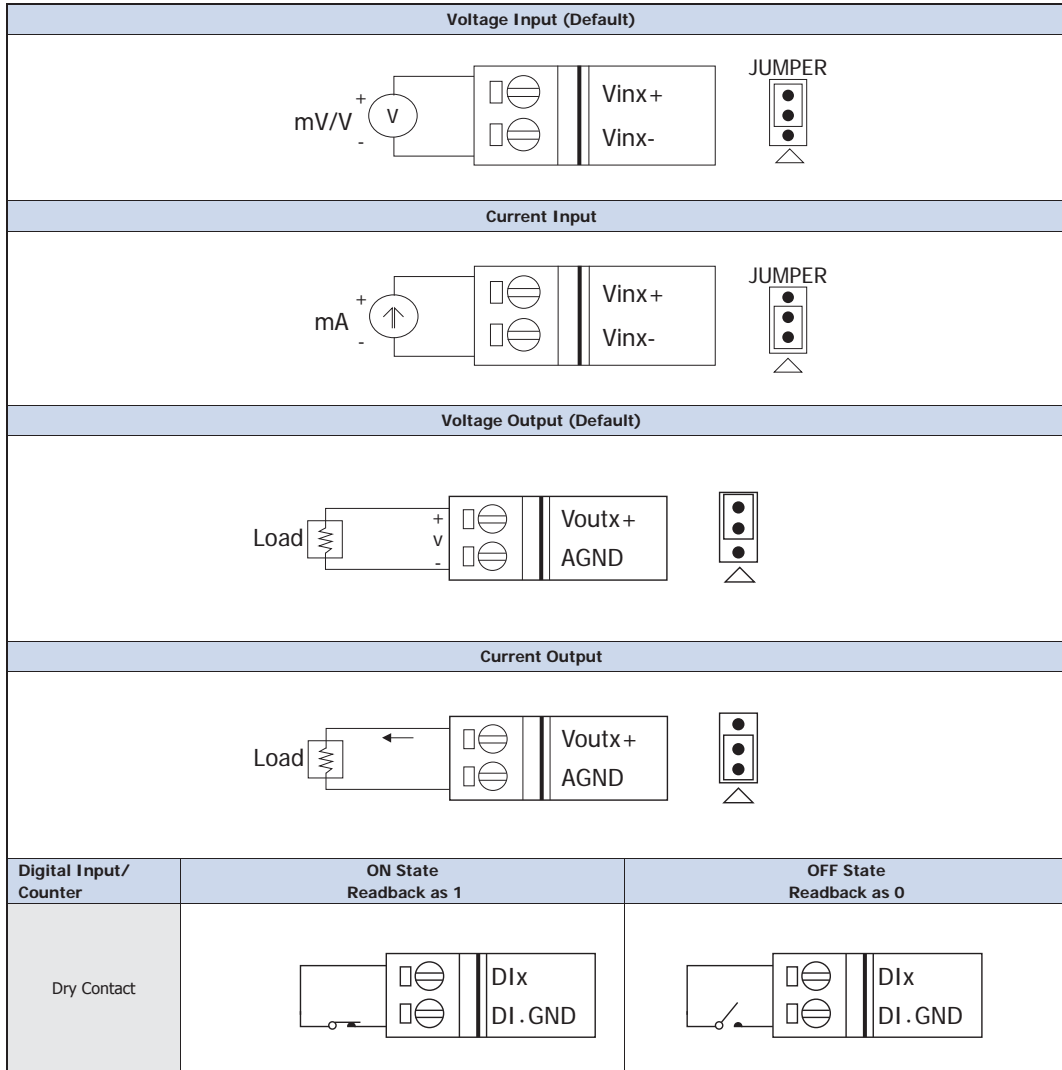| Function	
Web Interface for Configuration	● The system operation can be performed through the browser without installing software tools. ● Use AES 256 encryption algorithm to encrypt web page setting data for general communication. ● HTTPS upgrades the security of web communication.
Scaling	● Convert the analog signal to a more readable value. ● Function is only available for modules with AI/O.
Security	● Based on security considerations, only the service ports needed by the I/O modules are open up, and the rest are not open. ● Forbidden to use ping: turn off this function so that others cannot scan the device, so as to reduce the possibility of network attacks. ● Firewall settings, allowing specific IP to have permission to connect to the module
RESTful API	● User can read/write the I/O & Virtual points through HTTP.
Rule Setting	● Provide simple logic condition rule setting, let UA I/O do automatic condition judgment and action control, to achieve simple AI.
Event Log	● When the I/O value changes, record the current I/O value for easy device tracking in the future.

▤ System Specifications

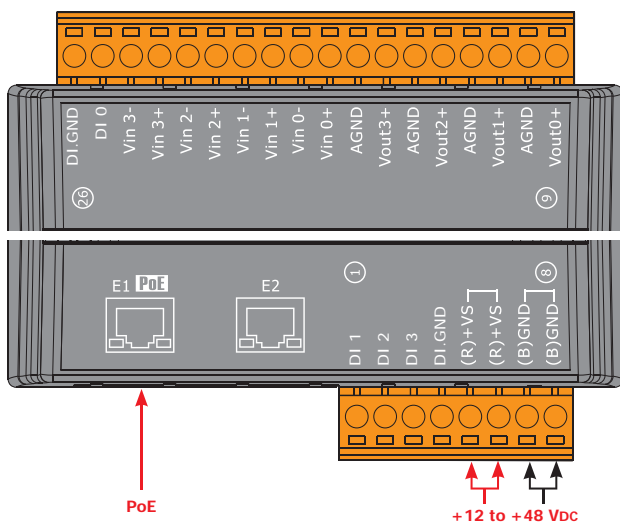| CPU Module	
CPU	32-bit CPU (400 MHz)
Isolation	
Intra-module Isolation	2500 VDC
EMS Protection	
EFT (IEC 61000-4-4)	±2 kV for Power Line
ESD (IEC 61000-4-2)	±4 kV Contact for each terminal and ±8 kV Air for random point
Surge (IEC 61000-4-5)	±2 kV for Power Line
LED Indicators	
Status	1 x PoE Power 1 x System Running 1 x Ethernet Link/Act 12 x I/O Channel Status
Ethernet	
Ports	RJ-45 x 2, 10/100 Base-TX, Swtich Ports (LED indicators)
PoE	Yes
Power	
Reverse Polarity Protection	Yes
Input Range	12 ~ 48 VDC
Consumption	5.1 W
Powered from PoE	Yes, IEEE 802.3af, Class 1
Powered from Terminal Block	Yes, 12 ~ 48 VDC
Mechanical	
Dimensions (mm)	97 x 120 x 42 (W x L x H)
Installation	Wall Mounting
Environmental	
Operating Temperature	-25 °C ~ +75 °C
Storage Temperature	-30 °C ~ +80 °C
Humidity	10 ~ 90% RH, Non-condensing

▤ I/O Specifications

Analog Input	
Channels	4 (Differential)
Type	±500 mV, ±1 V, ±5 V, ±10 V +0 mA ~ +20 mA, ±20 mA, 4 ~ 20 mA(Jumper Selectable)
Resolution	16-bit
Accuracy	±0.1%
Sampling Rate	10 Samples/Second (Total)
Input Impedance	Voltage: 2 MΩ Current: 125 Ω
Common Mode Rejection	86 dB Min.
Normal Mode Rejection	100 dB
Common Voltage Protection	±200 VDC
Overvoltage Protection	240 Vrms
Overcurrent Protection	Yes, 50 mA Max. at 110 VDC/VAC Max
Individual Channel Configuration	Yes
Channel-to-Channel Isolation	Yes, ±400 VDC
Open Wire Detection	Yes, for 4 ~ 20 mA only
Zero Drift	±20 µV/°C
Span Drift	±25 ppm/°C
Analog Output	
Channels	4
Type	+0 VDC ~ +5 VDC, ±5 VDC, +0 VDC ~ +10 VDC,±10 VDC +0 mA ~ +20 mA, +4 mA ~ +20 mA (Jumper Selectable)
Resolution	12-bit
Accuracy	±0.1% of FSR
Open Wire Detection	Yes, for 4 ~ 20 mA only
Voltage Output Capability	20 mA @ 10 V
Current Load Resistance	400 Ω

Digital Input/Counter	
Channels	4
Type	Dry + Wet Contact
ON Voltage Level	Dry: Close to GND Wet: +1 VDC Max.
OFF Voltage Level	Dry: Open Wet: +3.5 VDC ~ +30 VDC
Max. Count	16-bit (65535)
Frequency	50 Hz
Min. Pulse Width	10 ms
Effective Distance	500 M Max.
Overvoltage Protection	+30 VDC

Wire Connections

Voltage Input (Default)

mV/V $\overset{+}{\underset{-}{V}}$ → Vinx+ / Vinx-   JUMPER

Current Input

mA $\overset{+}{\underset{-}{\uparrow}}$ → Vinx+ / Vinx-   JUMPER

Voltage Output (Default)

Load $\overset{+}{\underset{-}{v}}$ → Voutx+ / AGND

Current Output

Load → Voutx+ / AGND

Digital Input/ Counter	ON State Readback as 1	OFF State Readback as 0
Dry Contact	DIx / DI.GND	DIx / DI.GND

Pin Assignments

DI.GND, DI 0, Vin 3-, Vin 3+, Vin 2-, Vin 2+, Vin 1-, Vin 1+, Vin 0-, Vin 0+, AGND, Vout3+, AGND, Vout2+, AGND, Vout1+, AGND, Vout0+

26 ... 9

E1 PoE   E2   1

DI 1, DI 2, DI 3, DI.GND, (R)+VS, (R)+VS, (B)GND, (B)GND   8

PoE

+12 to +48 V$_{DC}$

Jumper Location

U-7504M								
Channel	Vin3	Vin2	Vin1	Vin0	Vout3	Vout2	Vout1	Vout0
Jumper	J4	J3	J2	J1	J8	J7	J6	J5
Location	Jumper							

(Remove the top case and upper board)

◼ Appearance

- I/O Connector
- Run Indicator
- Ethernet Indicators
- PoE Indicator
- I/O Indicators
- Ethernet Switch
- I/O Connector

◼ Dimensions (mm)

Top View

42.0
40.0

97.0
86.0
73.0

⌀4.5
⌀4.5
⌀8.5

120.0 101.0 71.0 14.0

Left Side View

Front View

Bottom View
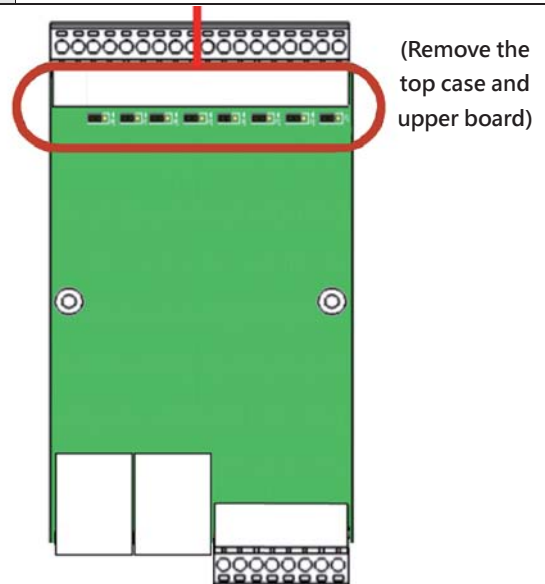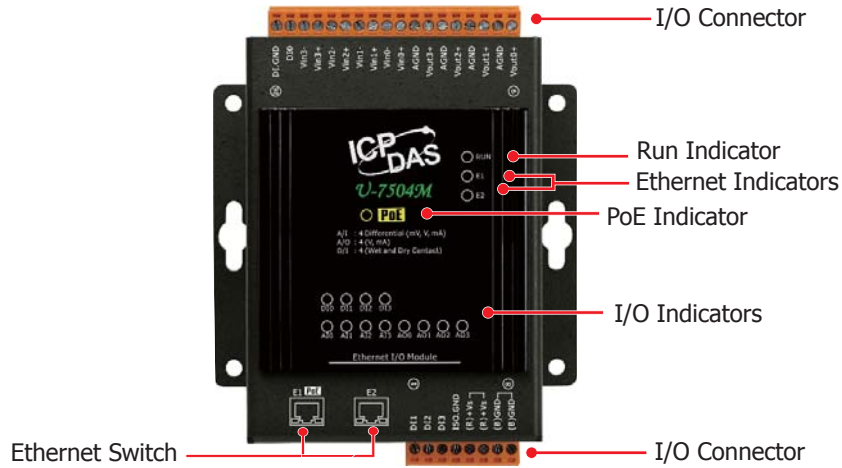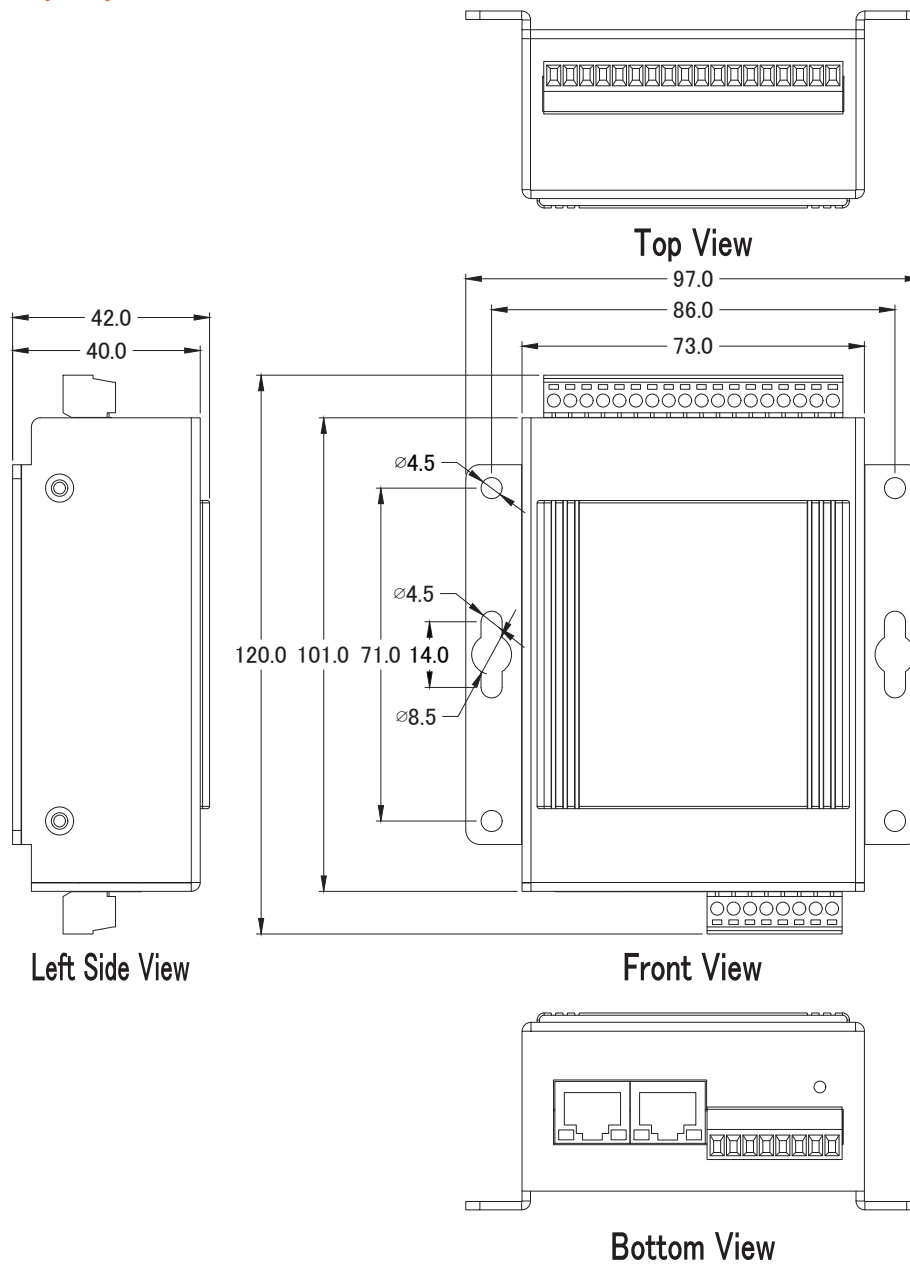
◼ Ordering Information

U-7504M CR	OPC UA I/O Module with 4-ch DI, 4-ch AI, 4-ch AO, and 2-port Ethernet Switch. (RoHS)