



Raynen IoT All-in-One Machine User Manual

(Current Version: V1.0)

Fujian Raynen Technology Co., Ltd.

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1 Technical Specifications

1.1 Product Name and Order Numbers

Name	IoT All-in-One Machine (an order suffix of -N indicates the UN series PLC programming ; -X indicates the X series PLC programming)
Ordering No.	UA 407W-WA-24RDM UA 407W-WA-18RAM UA 407W-WA-24TDM UA 407W-WA-18TAM

1.2 HMI Specifications

Applies to all four models.

Item	Specification
Display	7" TFT
Touchscreen	4-wire resistive
Resolution	1024 × 600
Brightness	400 cd/m ²
LCD lifespan	30,000 hours
Backlight	IPS
Display colors	24-bit color
CPU	R16, 1 GHz
USB Host	USB 2.0 × 1, Type-A (USB1); supports firmware and configuration updates via USB flash drive
USB Slave	USB 2.0 × 1, Type-B (USB2); supports program upload/download
Memory	256 MB FLASH + 256 MB RAM
Power isolation	Not supported
Ethernet port	Supported
Remote upload/download	Supported
Remote data monitoring	Supported

1.3 UN-PLC Specifications

Item	UA 407W-WA-24RDM-N	UA 407W-WA-18RAM-N	UA 407W-WA-24TDM-N	UA 407W-WA-18TAM-N
Memory	Program 16K, data 10K			
DI	14 DI, 24 V DC	10 DI, 24 V DC	14 DI, 24 V DC	10 DI, 24 V DC
DO	10 DO, relay	8 DO, relay	10 DO, transistor (sink)	8 DO, transistor (sink)
AI	—	4 AI, 0–20 mA	—	4 AI, 0–20 mA
AO	—	2 AO: voltage 0–10V; current 0–20 mA	—	2 AO: voltage 0–10V; current 0–20 mA
High-speed counter inputs	Supports 2 channels of 20 kHz single-phase input, or 1 channel of 20 kHz A/B-phase input (HC0/HC3)			
High-speed pulse outputs	—	—	2 channels, 50 kHz	2 channels, 50 kHz
Total timers	256 in total: 4 × 1 ms, 16 × 10 ms, 236 × 100 ms			
Total counters	256			
Memory retention on power loss	Support			
Time interrupts	2 × 1 ms resolution			
Edge interrupts	4 rising and/or 4 falling edges			
Real-time clock	Built-in			
Power-off retention	Support			
Communication ports	PORT0: RS-485 interface brought out through the DB9 port. PORT1, PORT2: RS-485 interfaces connected internally for HMI communication (user operation prohibited).			
PPI baud rate	9.6, 19.2 and 187.5 kbps			
Max. cable length per segment	With isolated repeater: 1,000 m @ 187.5 kbps, 1,200 m @ 38.4 kbps. Without isolated repeater: 50 m.			
Max. stations	32 stations per segment, 126 stations per network			
Max. masters	32			
PPI master mode	Supported			
BD boards	Supports 2; Interface 1 supports 485 BD board (UN series Modbus library, Port 2, master/slave, up to 32 slave stations).			

1.4 X1-PLC Specifications

Item	UA 407W-WA-24RDM-X	UA 407W-WA-18RAM-X	UA 407W-WA-24TDM-X	UA 407W-WA-18TAM-X
Memory	32K program memory			
DI	14 DI, 24 VDC	10 DI, 24 VDC	14 DI, 24 VDC	10 DI, 24 VDC
DO	10 DO, relay	8 DO, relay	10 DO, transistor (sink)	8 DO, transistor (sink)
AI	—	4 AI, 0–20 mA	—	4 AI, 0–20 mA
AO	—	2 AO: voltage 0–10V; current 0–20 mA	—	2 AO: voltage 0–10V; current 0–20 mA
High-speed counter inputs	Supports 2 channels of 20 kHz single-phase input, or 1 channel of 20 kHz A/B-phase input			
High-speed pulse outputs	Supports 2 channels of 50 kHz high-speed pulse output (transistor models)			
Serial communication	COM0: supports Mitsubishi programming port protocol, Freeport communication and MODBUS communication (program online download over RS-485). COM1: BD board interface 1, optional 485BD board; supports Mitsubishi programming port protocol, Freeport communication and MODBUS communication. COM2: communication port between BD board 2 and the IoT All-in-One Machine; supports digital and analog signals. COM3: communication monitoring data interface between the HMI and the X1-PLC (internal interface). Common baud rates: 9600, 19200, 115200; when multiple communication ports are used simultaneously, 115200 is not recommended.			
Max. cable length per segment	RS-485 with isolated repeater: 1,200 m @ 19.2 kbps. Without isolated repeater: 50 m.			
Real-time clock	Built-in			
Total timers	512 in total: 260 × 1 ms, 46 × 10 ms, 206 × 100 ms			
Total counters	256 (for available high-speed counters, see the appendix)			
Timer interrupts	3 × 1 ms resolution (recommended to use above 10 ms)			
Counter interrupts	6 in total (3 × high-speed input terminals)			
Edge interrupts	6 rising or 6 falling edges (3 high-speed input terminals)			
Power-off retention	Support			
BD boards	Supports 2 (optional); interface 1 supports a 485BD board, Mitsubishi programming port protocol, Freeport communication and MODBUS communication.			

1.5 Power Characteristics

Item	UA 407W-WA-24RDM	UA 407W-WA-18RAM	UA 407W-WA-24TDM	UA 407W-WA-18TAM
Rated power	8 W	8 W	9 W	9 W
Rated voltage	DC 24 V			
Input range	20–28 V DC			
Operating current	0.35 A (typ.)	0.35 A (typ.)	0.4 A (typ.)	0.4 A (typ.)
Power-loss tolerance	< 3 ms			
Insulation resistance	> 50 MΩ @ 500 V DC			
Withstand voltage	500 V AC, 1 min			

1.6 Digital Input Characteristics

Item	Specification
Input type	PNP/NPN
Rated voltage	24 V DC, 4 mA (typ.)
Max. continuous allowable voltage	30 V DC
Surge voltage	35 V DC for 0.5 s
Logic 1 [min]	2.5 mA at 15 V DC
Logic 0 [max]	1 mA at 5 V DC
Input filter	Selectable (1–13 ms)
Isolation	Yes
Opto-isolation	500 VAC, 1 min
Isolation groups	See wiring diagrams
Simultaneously energized inputs	All
Cable length [max]	Shielded: 500 m (standard inputs); 50 m (high-speed counter inputs). Unshielded: 300 m (standard inputs).

1.7 Digital Output Characteristics

Item	UA 407W-WA-24RDM	UA 407W-WA-18RAM	UA 407W-WA-24TDM	UA 407W-WA-18TAM
Rated voltage	24 V DC	24 V DC or 250 V AC	24 V DC	24 V DC or 250 V AC
Voltage range	20.4–28.8 V DC	5–30 V DC, 5–250 V AC	20.4–28.8 V DC	5–30 V DC, 5–250 V AC
Max. rated current per point	0.5 A	2 A	0.5 A	2 A
Rated current per common terminal	7 A max			
Parallel connection of two PLC outputs	No	No	No	No

1.8 Analog Input Characteristics

Applies to the models with analog I/O (UA 407W-WA-18RAM / -18TAM); values before / after the slash apply to the models without / with analog I/O.

Item	UA 407W-WA-24RDM	UA 407W-WA-18RAM	UA 407W-WA-24TDM	UA 407W-WA-18TAM
Number of AI points	/	/	4	4
AI type	/	/	Current input	Current input
Current range	/	/	0–20 mA	0–20 mA
Full-scale range	/	/	0–+32000	0–+32000
DC input impedance	/	/	> 100 kΩ	> 100 kΩ
Max. input voltage	/	/	30 V DC	30 V DC
Resolution	/	/	15 bits + 1 sign bit	15 bits + 1 sign bit
Common-mode voltage	/	/	signal voltage + common-mode voltage ≤ 12 V	signal voltage + common-mode voltage ≤ 12 V
Max. input current	/	/	30 mA	30 mA

1.9 Analog Output Characteristics

Applies to the models with analog I/O (UA 407W-WA-18RAM / -18TAM); values before / after the slash apply to the models without / with analog I/O.

Item	UA 407W-WA-24RDM	UA 407W-WA-18RAM	UA 407W-WA-24TDM	UA 407W-WA-18TAM
Analog outputs	—		2 (voltage and current)	
Signal range	—		voltage 0–10 V; current 0–20 mA	
Data word format Full-scale range	—		0~+32000 (full-scale)	
Full-scale resolution	—		12 bits	

1.10 Structural Characteristics

Item	UA 407W-WA-24RDM	UA 407W-WA-18RAM	UA 407W-WA-24TDM	UA 407W-WA-18TAM
Housing color	Dark gray			
Housing material	ABS + PC plastic			
External dimensions	203 × 149 (mm)			
Panel cutout	192 × 138 (mm)			
Weight	1.2 kg			

2 Wiring Diagrams

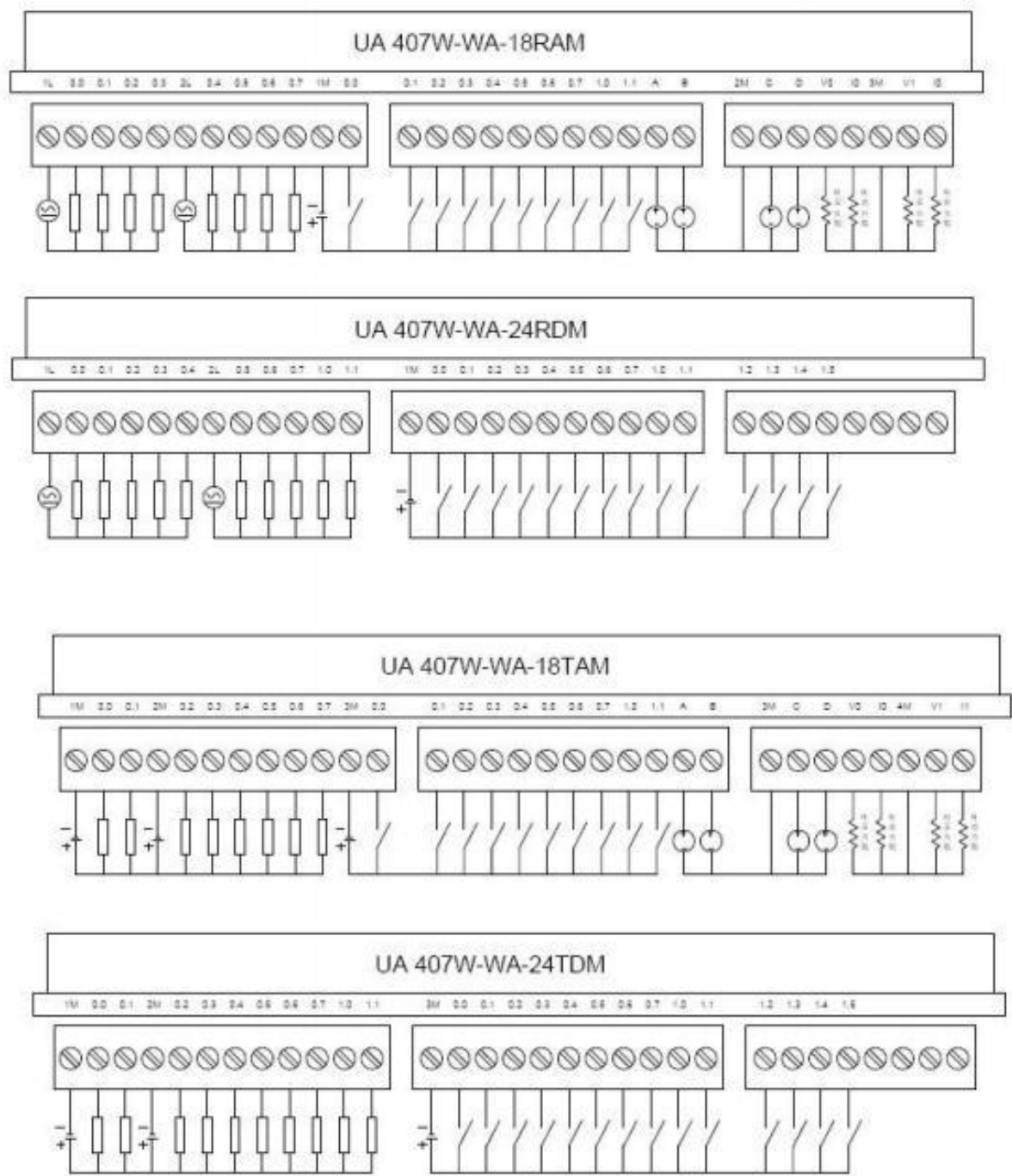
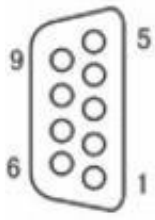


Figure 2-1 Wiring diagrams: UA 407W-WA-18RAM / UA 407W-WA-24RDM / UA 407W-WA-18TAM / UA 407W-WA-24TDM (from the top down).

3 Interface Definitions

3.1 DB9 Interface (RS-485)



PIN	Pin definition (RS-485 interface)
1	Ground
2	24 V return (logic ground)
3	RS-485 signal A
4	RTS (TTL level)
5	5 V return (logic ground)
6	+5 V power
7	+24 V power
8	RS-485 signal B
9	NC

3.2 Serial Port Correspondence

Port	DB9	Internal communication		BD board #1
	PLC serial port	PLC serial port	HMI serial port	PLC serial port
UN-PLC	PORT0	PORT1	COM1	PORT2
X1-PLC	COM0	COM3 (internal interface)	COM1	COM1

3.3 Ethernet Port (HMI)



Item	Specification
HMI	Connect to a router or switch. Network access — supports WAN internet access. Upload and download programs between the HMI and the PLC.

Note: The Ethernet port is the HMI's port and can be used for transparent download of PLC programs. See Section 7, "Downloading PLC Programs via the Ethernet Port", for details.

4 Analog Addresses

The machine has built-in analog I/O (4 AI / 2 AO) and supports two BD boards.

4.1 Built-in Analog Address Mapping

	AI1	AI2	AI3	AI4	AO1	AO2
UN-PLC	AIW0	AIW2	AIW4	AIW6	AQW0	AQW2
X1-PLC	D7950	D7951	D7952	D7953	D7954	D7955

4.2 BD Board Extension Address Mapping

Digital BD (UA-6DI-BD,X-6DI-BD)

	Address	DI0	DI1	DI2	DI3	DI4	DI5
UN-PLC	BD#1	I2.0	I2.1	I2.2	I2.3	I2.4	I2.5
UN-PLC	BD#2	I4.0	I4.1	I4.2	I4.3	I4.4	I4.5
X1-PLC	BD#1	X370	X371	X372	X373	X374	X375
X1-PLC	BD#2	X360	X361	X362	X363	X364	X365

Digital BD (UA-6DO-BD,X-6DO-BD)							
	Address	DO0	DO1	DO2	DO3	DO4	DO5
UN-PLC	BD#1	Q2.0	Q2.1	Q2.2	Q2.3	Q2.4	Q2.5
UN-PLC	BD#2	Q4.0	Q4.1	Q4.2	Q4.3	Q4.4	Q4.5
X1-PLC	BD#1	Y370	Y371	Y372	Y373	Y374	Y375
X1-PLC	BD#2	Y360	Y361	Y362	Y363	Y364	Y365
Digital BD (UA-2DI/4DO-BD,X-2DI/4DO-BD)							
	Address	DI0	DI1	DO1	DO2	DO3	DO4
UN-PLC	BD#1	I2.0	I2.1	Q2.0	Q2.1	Q2.2	Q2.3
UN-PLC	BD#2	I4.0	I4.1	Q4.0	Q4.1	Q4.2	Q4.3
X1-PLC	BD#1	X370	X371	Y370	Y371	Y372	Y373
X1-PLC	BD#2	X360	X361	Y360	Y361	Y362	Y363
Analog BD (UA-4AI-BD,X-4AI-BD)							
	Address	AI1	AI2	AI3	AI4	—	—
UN-PLC	BD#1	VW10006	VW10008	VW10010	VW10012	—	—
UN-PLC	BD#2	VW10106	VW10108	VW10110	VW10112	—	—
X1-PLC	BD#1	SD8222	SD8223	SD8224	SD8225	—	—
X1-PLC	BD#2	SD8242	SD8243	SD8244	SD8245	—	—
Analog BD (UA-2AI/1AO-BD,X-2AI/1AO-BD)							
	Address	AI1	AI2	AO1	—	—	—
UN-PLC	BD#1	VW10006	VW10008	VW10010	—	—	—
UN-PLC	BD#2	VW10106	VW10108	VW10110	—	—	—
X1-PLC	BD#1	SD8222	SD8223	SD8224	—	—	—
X1-PLC	BD#2	SD8242	SD8243	SD8244	—	—	—
Analog BD (UA-2RTD-BD,X-2RTD-BD)							
	Address	RTD1	RTD2	Configuration register	—	—	—
UN-PLC	BD#1	VW10006	VW10008	—	—	—	—
UN-PLC	BD#2	VW10106	VW10108	—	—	—	—
X1-PLC	BD#1	SD8222	SD8223	SD8224	—	—	—
X1-PLC	BD#2	SD8242	SD8243	SD8244	—	—	—
Analog BD (UA-1AI/1RTD-BD,X-1AI/1RTD-BD)							
	Address	AI1	RTD1	Configuration register	—	—	—
UN-PLC	BD#1	VW10006	VW10008	—	—	—	—
UN-PLC	BD#2	VW10106	VW10108	—	—	—	—
X1-PLC	BD#1	SD8222	SD8223	SD8224	—	—	—
X1-PLC	BD#2	SD8242	SD8243	SD8244	—	—	—
Analog BD (UA-2AO-BD,X-2AO-BD)							
	Address	AO1	AO2	—	—	—	—
UN-PLC	BD#1	VW10006	VW10008	—	—	—	—
UN-PLC	BD#2	VW10106	VW10108	—	—	—	—
X1-PLC	BD#1	SD8222	SD8223	—	—	—	—
X1-PLC	BD#2	SD8242	SD8243	—	—	—	—

5 High-Speed Counters

5.1 X1-PLC High-Speed Counters

Counter	X0	X1	X2	X3
C235	U/D			
C236		U/D		
C237			U/D	
C243	U/D	R		
C244			U/D	R
C251	A	B	R	
C252	A	B		

Note: The two single-phase counters that occupy the X0 and X1 ports cannot be used simultaneously.

5.2 UN-PLC High-Speed Counters

uses inputs -I0.2; HSC3 uses input I0.1.

Inputs

	HSC0	I0.0 inputs	I0.1 inputs	I0.2 inputs
Mode	HSC3	I0.0 inputs		
0	Single-phase counter with internal direction control	Clock		
1		Clock		Reset
3	Single-phase counter with external direction control	Clock	Direction	
4		Clock	Direction	Reset
6	Two-phase counter with up/down counting clocks	Up clock	Down clock	
7		Up clock	Down clock	Reset
9	A/B-phase quadrature counter	Clock A	Clock B	
10		Clock A	Clock B	Reset

6 High-Speed Outputs

Item	UA 407W-WA-24TDM-N	UA 407W-WA-18TAM-N
PLS, PWM, PTO	Support	Support
MAP library	Not support	Not support
UN120L series dedicated motion control library	Not yet supporte; to be added in a later version	

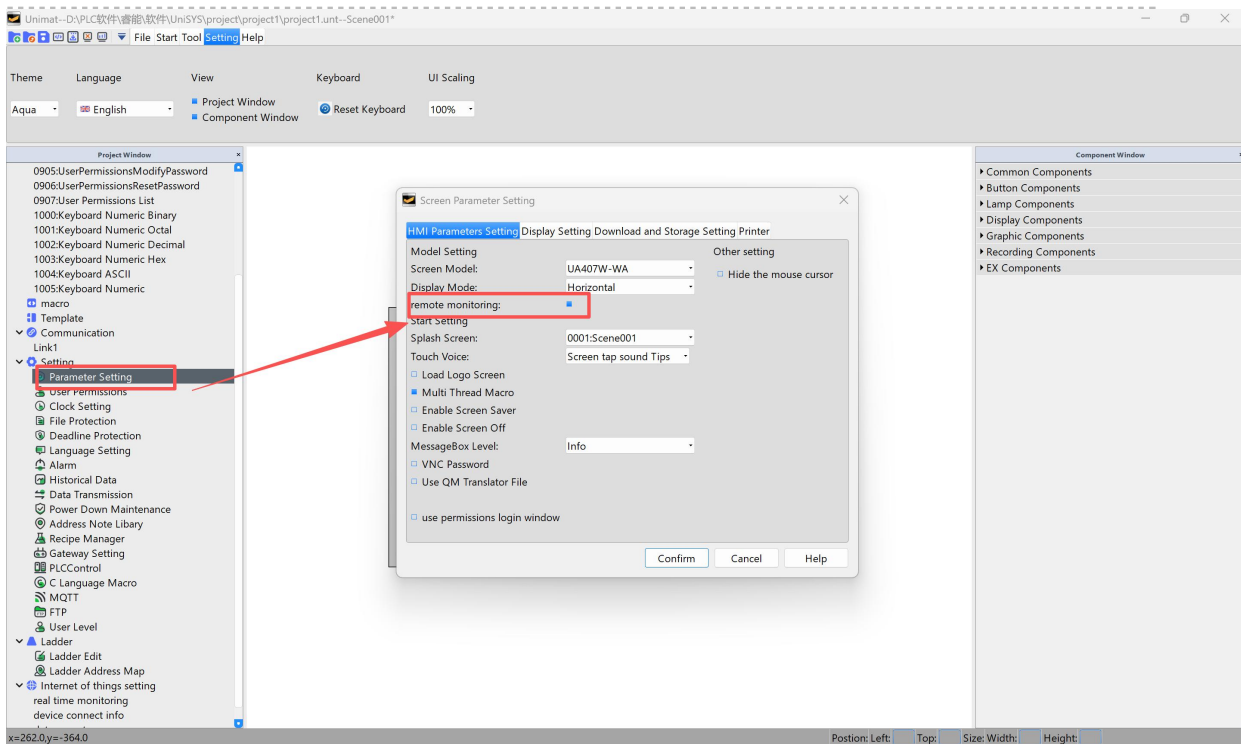
Item	UA 407W-WA-24TDM-X	UA 407W-WA-18TAM-X
PLSY, PLSR	Support	Support
PWM	Support	Support
Positioning instructions	Supports DSZR, DVIT, ZRN, PLSV, DRVI, DRVA	

Note: For detailed usage, refer to the X1-series PLC programming manual.

7 Downloading PLC Programs via the Ethernet Port

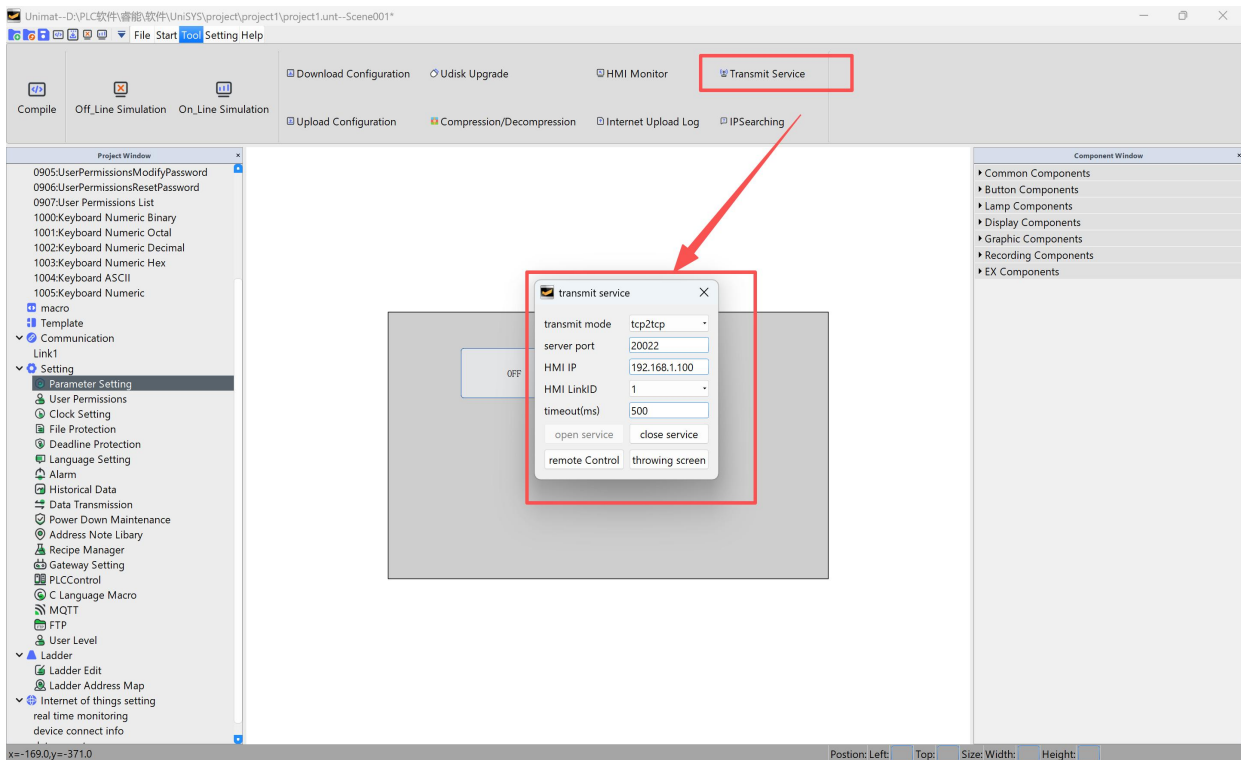
Transparent transmission function (operations such as downloading, uploading and monitoring the PLC through the HMI screen over the LAN)

1. Project settings. Open the parameter settings, tick “Remote monitoring”, and download the project to the HMI screen.



2. Enable the transparent transmission service through the configuration software (the service runs in the background; the configuration software can be closed after enabling).

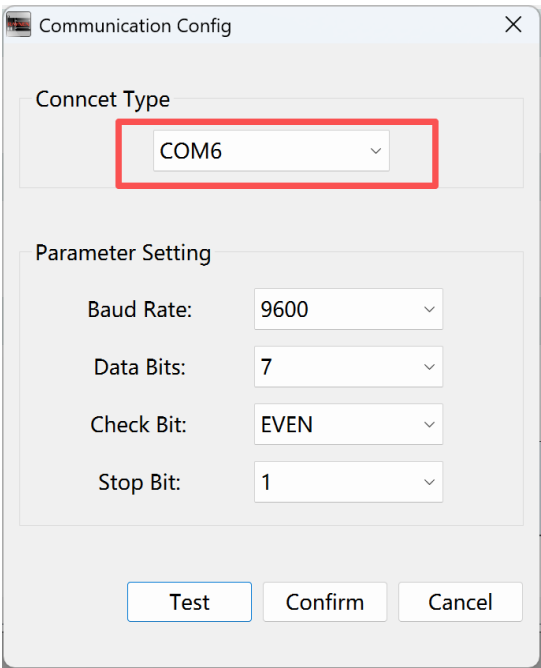
Enter the IP address of the IoT All-in-One Machine to which the program is to be downloaded (HMI default IP: 192.168.1.100), and enter the LinkID as the connection ID of the PLC communication connection in the configuration project, as shown below:



3. In the PLC programming software, select serial port COM6 for download,upload, monitoring and other operations.

Default virtual serial port pair: port1 = COM6, port2 = UNIMATS; if occupied, downloading will be affected

Sometimes an UNKNOWN device may be found — this does not affect usage.



4. Possible problems and solutions

A. Transparent transmission fails and the programming software cannot find the device.

Open Device Manager and check whether the COM6-UNIMATS virtual serial port pair was created properly. If it was created properly but the PLC programming software still cannot find the device through COM6, use a serial port debugging utility (many are available for download online)to test whether the COM6-UNIMATS virtual serial port works properly.
If the COM6-UNIMATS virtual serial port was not created properly, create it manually (download virtual serial port software yourself; vspd is recommended).

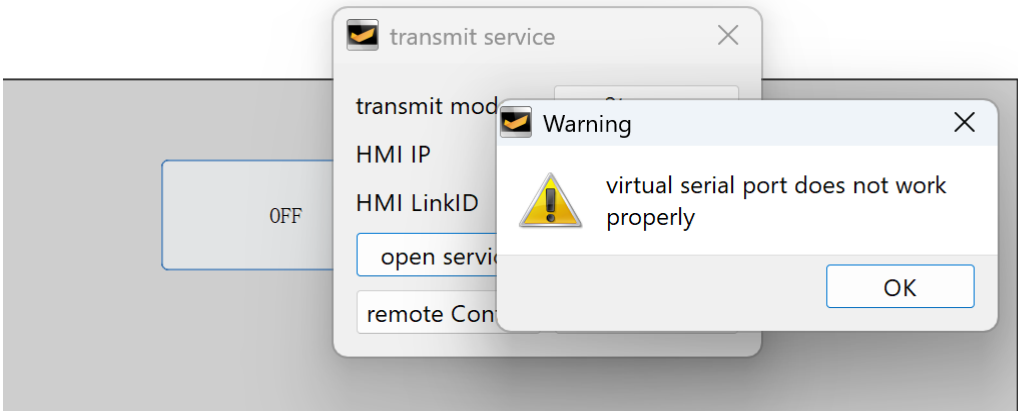


Figure 7-1 Serial-port warning dialog (from the source document)

B. After the virtual serial port COM6 is created, the serial port still cannot be opened. The port may be unusable (some computers cannot use it). Create another serial port pair, then modify the configuration file in the Uniface installation directory so that it matches the new serial port pair.

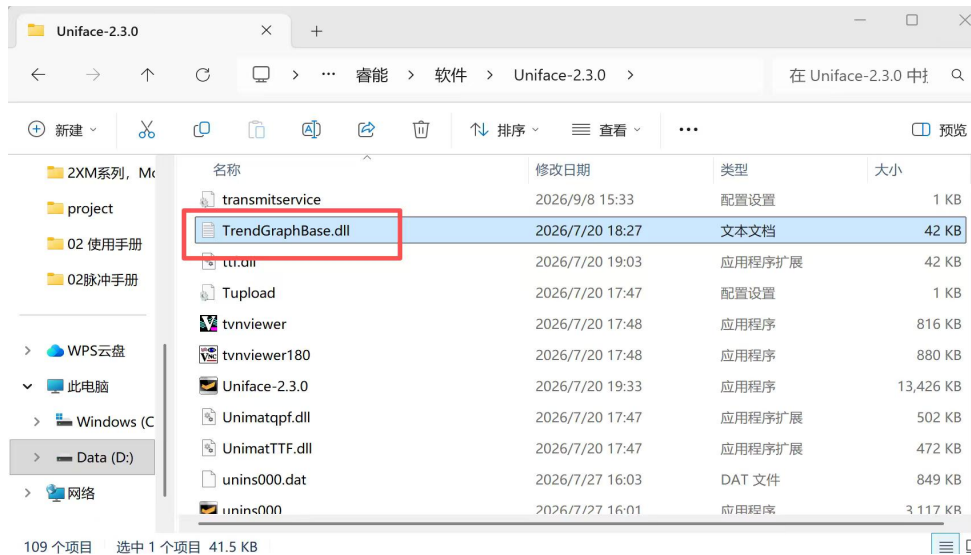


Figure 7-2 Uniface installation directory (from the source document)

Note: After this file has been modified, do not save directly over it; use “Save As” first, then copy and paste to overwrite the original file.

5. X-PLC parameter settings are the same as those of the HMI connected to a UN-PLC; only the PLC model differs!

UniSYS — Tools — Communication Configuration

Original figure not reproduced (the source screenshot does not match the surrounding text); see the source PDF.

8 Translator's Notes

This is a complete English translation of the Chinese document “睿能物联网一体机使用说明” (Fujian Raynen Technology Co., Ltd.). Section numbering follows the source.

Apparent typos in the source have been corrected in the body text:

- Section 4.1: the source header reads “AO2 AO2”; rendered as “AO1, AO2”, consistent with the channel addresses (AQW0/AQW2, D7954/D7955).
- Section 4.2 (UA-2DI/4DO-BD table): the source reads “Q22”; rendered as “Q2.2”.
- Section 1.4 (X1-PLC): the source reads “中断继电器”; rendered as “repeater”, consistent with Section 1.3.

Section 7 screenshots: only the two screenshots related to the surrounding text (the serial-port warning and the installation directory) are reproduced; the other screenshots in the source appear to be mismatched placeholder images and are marked as placeholders in this translation — they remain unchanged in the source PDF. Reproduced screenshots contain Chinese UI text.

Order suffix convention: -N = UN-series PLC programming environment; -X = X-series (X1) PLC programming environment.