Technical Features

MODEL TYPE	ESP32 PLC 14
Input Voltage	12 to 24Vdc (Fuse protection (2.5A) Polarity protection)
Input rated voltage	24Vdc
Rated Power	8 W
I max.	1.5A
Size	100x45x115
Clock Speed	External: 240 MHz Internal: 8 MHz
Flash Memory	4 MB
SRAM	4 MB
PSRAM	2 MB
Communications	USB - RS485 - ETHERNET - WiFi 2.5GHz - BLE 2480 MHz

General Features

Power supply voltage	DC power supply	12 to 24 Vdc
Operating voltage range	DC power supply	11.4 to 25.4 Vdc
Power consumption	DC power supply	30 W MAX.
External power supply	Power supply voltage	24 Vdc
	Power supply current	300 mA
Dielectric strength		1500 Vac at 50/60 Hz for one minute with a leakage current of 10 mA max.
Shock resistance		50 m/s² in the X, Y and Z direction 3 times each, complying with the IEC-60068-2-27:2008 standard.
Ambient temperature (operating)		-20 ° to 70 °C
Ambient humidity (operating)		10 % to 90 % (no condensation)
Ambient environment (operating)		With no corrosive gas
Ambient temperature (storage)		-20 ° to 70 °C
Power supply holding time		2 ms min.
Weight		350 g max

ⓘ I/Os

|		
IO - 0 Digital		Input: GPB 3 - MCP23017SS Output: GPIO 12 - ESP32
IO - 1 Digital		Input: GPB 2 - MCP23017SS Output: GPIO 25 - ESP32
IO - 2 Digital		Input: GPB 4 - MCP23017SS Output: GPIO 26 - ESP32
IO - 3 Digital		Input: GPB 5 - MCP23017SS Output: GPIO 27 - ESP32
IO - 4 Digital		Input: GPA 4 - MCP23017SS
IO - 5 Digital		Input: GPA 6 - MCP23017SS
IO - 6 Digital		Input: GPA 5 - MCP23017SS
IO - 7	Analog 4-20 mA	Input: GPIO 32 - ESP32
	Analog 0-10 V / Digital 3.3-24V	Input: GPIO 34 - ESP32
		Factory Default Configuration
IO - 8	Analog 4-20 mA	Input: GPIO 33 - ESP32
	Analog 0-10 V / Digital 3.3-24V	Input: GPIO 35 - ESP32
	Analog 0-10 V / Digital 3.3-24V	Factory Default Configuration
IO - 9 Relay		Output: GPA 7 - MCP23017SS

Outputs Q0.0 - Q0.1 - Q0.2 - Q0.3

By default, Outputs 0 to 3 give 5V at HIGH level, but they can be changed to provide Vdc by software.

- Q0 - 0: GPB 7 - MCP23017SS
- Q0 - 1: GPB 6 - MCP23017SS
- Q0 - 2: GPA 1 - MCP23017SS
- Q0 - 3: GPA 0 - MCP23017SS

Vdc is Power Suply Voltage and it can be from 12 to 24Vdc

Pitch for FK-MC 0,5/10-ST-2,5 conector: 2.50 mm
Pitch for MC 1,5/ 2-ST-3,81 conector: 3.81 mm
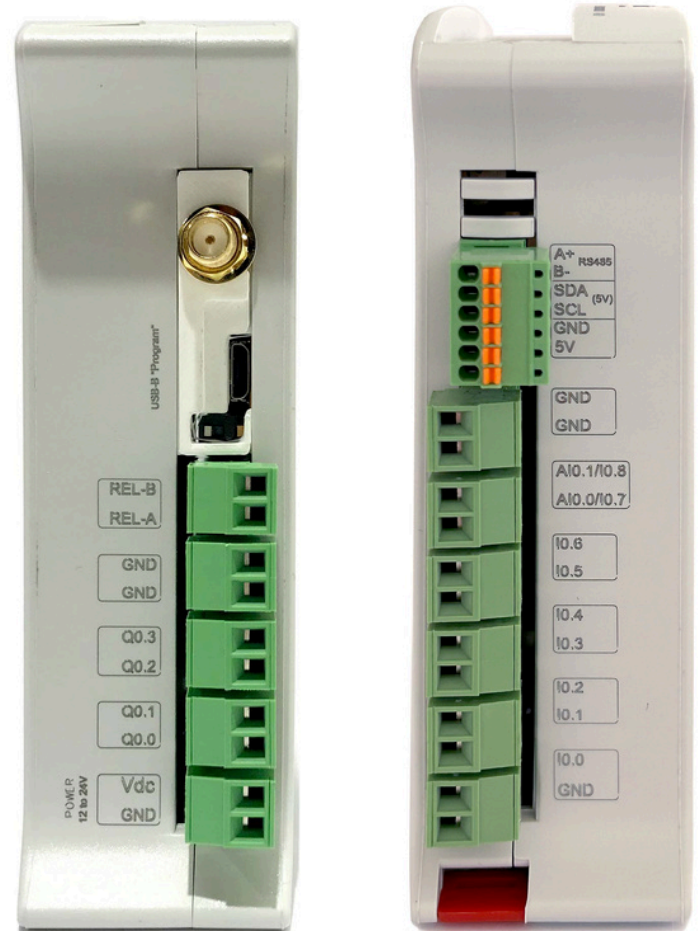
Wireless Operation details

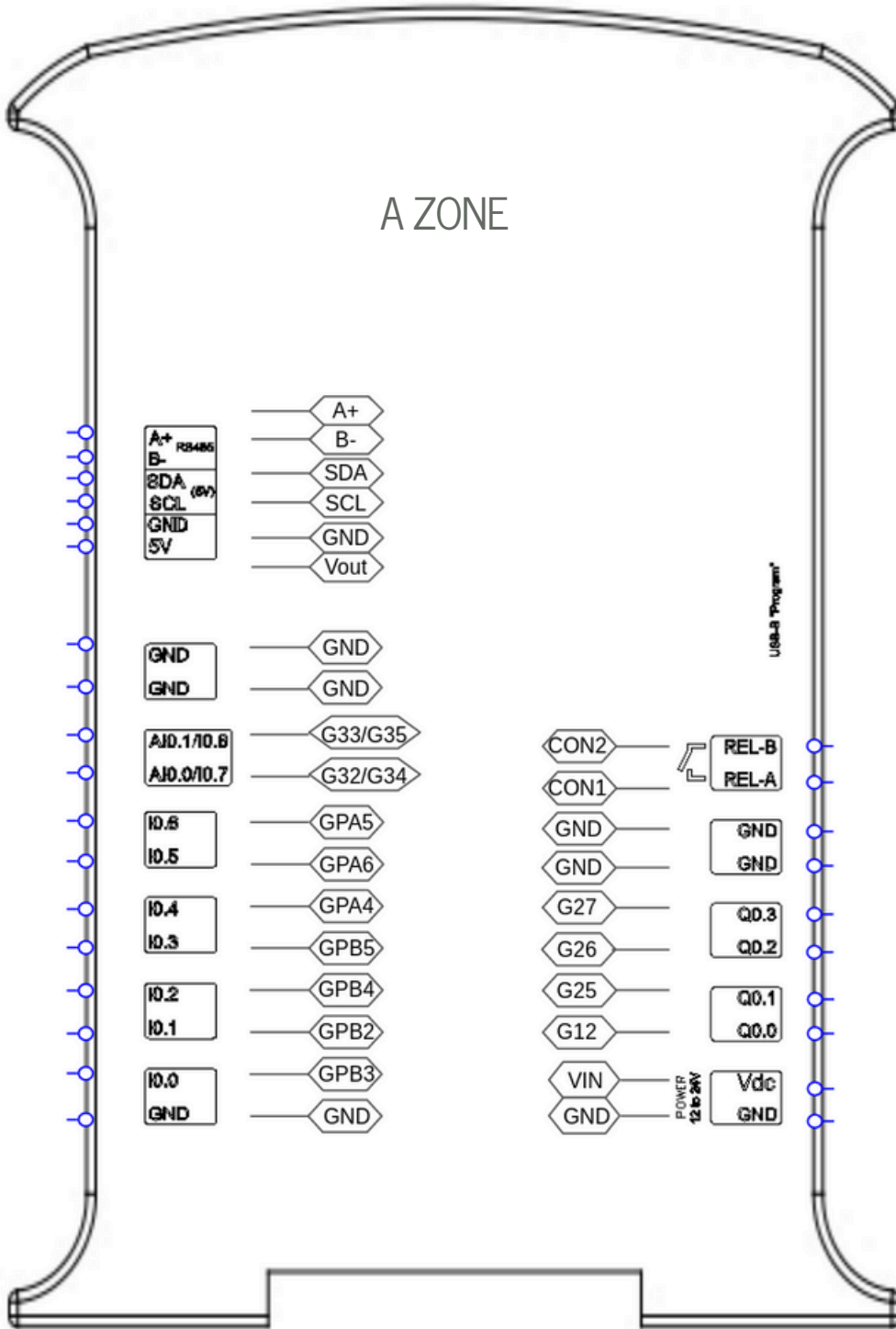|		
Operating Frequency	WiFi	2.4 GHz to 2.5 GHz
	BLE	2402-2480 MHz (40 Channels)
Transmission Power (EIRP)	WiFi	at 2.5 GHz; Power : 9dBm
	BLE	at 2480 MHz; Power: 2,7dBm

Expandability

ModbusRTU with RS485: 32 elements

⚠️ **Warning**

Consider that depending on your selection when acquiring the PLC, the model you use will have either two analog inputs of 0-10Vdc or 4-20mA, but both cannot coexist in the same PLC, nor be modified by software.

A ZONE

RS-485
- RxD: GPIO 16
- TxD: GPIO 17
- RE, DE: GPIO 5

Relay Output:
- Pin GPA7 from MCP23017

Left block	
A+ RS485	A+
B-	B-
SDA (5V)	SDA
SCL	SCL
GND	GND
5V	Vout

GND	GND
GND	GND

AI0.1/I0.8	G33/G35
AI0.0/I0.7	G32/G34
I0.6	GPA5
I0.5	GPA6
I0.4	GPA4
I0.3	GPB5
I0.2	GPB4
I0.1	GPB2
I0.0	GPB3
GND	GND

U8B-B "Program"

CON2	REL-B
CON1	REL-A
GND	GND
GND	GND
G27	Q0.3
G26	Q0.2
G25	Q0.1
G12	Q0.0
VIN	Vdc
GND	POWER 12 to 24V	GND

Performance Specifications

CPU	ESPRESSIF ESP-WROOM-32U
Control method	Stored program method
I/O control method	Combination of the cyclic scan and immediate refresh processing methods.
Programming language	Arduino IDE. Based on wiring (Wiring is an Open Source electronics platform composed of a programming language. "similar to the C")
Microcontroller	ESP32

⚠️ **Warnings**

It must be used a long micro USB-B type cable with the thin plastic part (contour of 2mm).

Long version   **Standard version**
8mm   6mm
✅   ❌

Unused pins should not be connected. Ignoring the directive may damage the controller.

Before using this product, it is the responsibility of the user to read the product's User Guide and all accompanying documentation.

Industrial Shields PLCs must be powered between 12Vdc and 24Vdc. If a higher voltage is supplied to the equipment can suffer irreversible damage.

Maintenance must be performed by qualified personnel familiarized with the construction, operation, and hazards involved with the control.

Maintenance should be performed with the control out of operation and disconnected from all sources of power.

The Industrial Shields Family PLCs are Open Type Controllers. It is required that you install the ESP32 PLC 14 in a housing, cabinet, or electric control room. Entry to the housing, cabinet, or electric control room should be limited to authorized personnel.

Inside the housing, cabinet or electric control room, the Industrial Shields PLC must be at a minimum distance from the rest of the components of a minimum of 25 cm, it can be severely damaged.

Failure to follow these installation requirements could result in severe personal injury and/or property damage. Always follow these requirements when installing ESP32 PLC 14.

In case of installation or maintenance of the ESP32 PLC 14 please follow the instructions marked in the Installation and Maintenance section on the User Guide.

Do not disconnect equipment when a flammable or combustible atmosphere is present.

Disconnection of equipment when a flammable or combustible atmosphere is present may cause a fire or explosion which could result in death, serious injury and/or property damage.

⚠️ **Warnings**

This equipment does **not include galvanic isolation between the grounds** of the different systems. This means that if an external device or sensor that shares the same ground reference (GND) with the system is connected, any potential difference between these grounds could damage the connected components. To avoid issues with interference, ground loops, or damage to external equipment, ensure that all connected devices share the same ground reference or use systems with appropriate isolation. The recommendations in this case are:

- **Connection Review:** Verify that all ground connections are properly made and that there are no significant potential differences between them.
- **Use of Isolation:** Consider using **galvanic isolators** or **isolation transformers** if it is necessary to connect equipment with different ground references.

Install Arduino IDE and the Industrial Shields boards

The steps to follow to install our equipment's to Arduino IDE are:

• Open the Arduino IDE, versión 1.8.0 or superior. If you don't have it yet , you can download here https://www.arduino.cc/en/Main/Software .

• Press the "Preferences" option to "File" menu and open the preferences window.

• In the text box "Additional boards manager URLs", add the direction: http://apps.industrialshields.com/main/arduino/boards/package_industrialshields_index.json

• Close the preferences window with the "OK" button.

• Click on "Tools" menu, and open the "Boards" submenu, and click the "Boards Manager" option, to open the Boards Manager window.

• Search "industrialshields-esp32" to the search filter and select to the list and click "Install"

• Close the "Boards Manager". Once ait is performed that steps, you are available to select each PLC that you wish to work on "Tools" -> "Boards" : Industrial Shields ESP32...

Symbology

▬▬▬	Indicates that the equipment is suitable for direct current only; to identify relevant terminals
∼	Indicates that the equipment is suitable for alternating current only; to identify relevant terminals
⊓	To identify the control by which a pulse is started.
⏚	To identify an earth (ground) terminal in cases where neither the symbol 5018 nor 5019 is explicitly required.
⊗	To identify the switch by means of which the signal lamp(s) is (are) switched on or off.
CE	CE marking indicates that a product complies with applicable European Union regulations
⚠️	Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury
⚡	To indicate hazards arising from dangerous voltages

Technical Support

You can contact with us using the best channel for you:

@ support@industrialshields.com

🌐 www.industrialshields.com

📝 Visit our Blog, Forum orTicketing system

📄 Check the user guides

▶️ Visit our Channel

Technical Features ESP32 PLC Family

MODEL TYPE	034001000300 ESP32 ETHERNET&WIFI&BLUETOOTH PLC
Input Voltage	12 to 24Vdc (Fuse protection (2.5A) Polarity protection)
Input rated voltage	24 Vdc
Rated Power	30 W
I max.	1.5 A
Size	101x119.5x70.1 | 101x119.5x94.7 | 101x119.5x119.3
SRAM	520 KB
Communications & Accessories	I2C, Ethernet, SPI, RS485 (Half Duplex), RS232,, mircoSD, RTC Bluetooth V4.2 BR/EDR and Bluetooth LE, Wi-Fi802.11b/g/n, SerialTTL, VN/VP
Network	ESP32 wifi/Eth cannot be connected to any cellular network

General Features

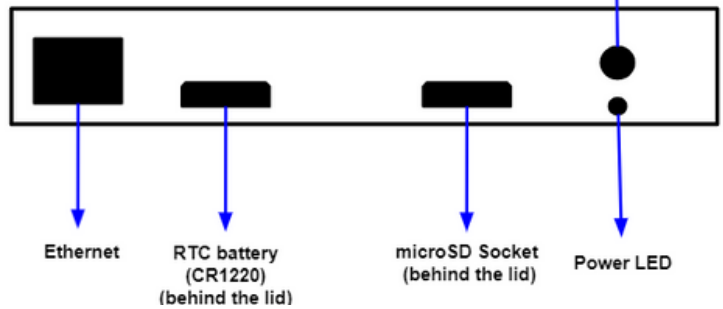|		
Power supply voltage	DC power supply	12 to 24 Vdc
Operating voltage range	DC power supply	11.4 to 25.4 Vdc
Power consumption	DC power supply	30 W MAX.
External power supply	Power supply voltage	24 Vdc
	Power supply current	700 mA
Dielectric strength		1500 Vac at 50/60 Hz for one minute with a leakage current of 10 mA max.
Shock resistance		50 m/s² in the X, Y and Z direction 3 times each, complying with the IEC-60068-2-27:2008 standard.
Ambient temperature (operating)		-20 ° to 70 °C
Ambient humidity (operating)		10 % to 90 % (no condensation)
Ambient environment (operating)		With no corrosive gas
Ambient temperature (storage)		-20 ° to 70 °C
Power supply holding time		2 ms min.
Weight		380g/490g/600g (Check dimensions/weight table)
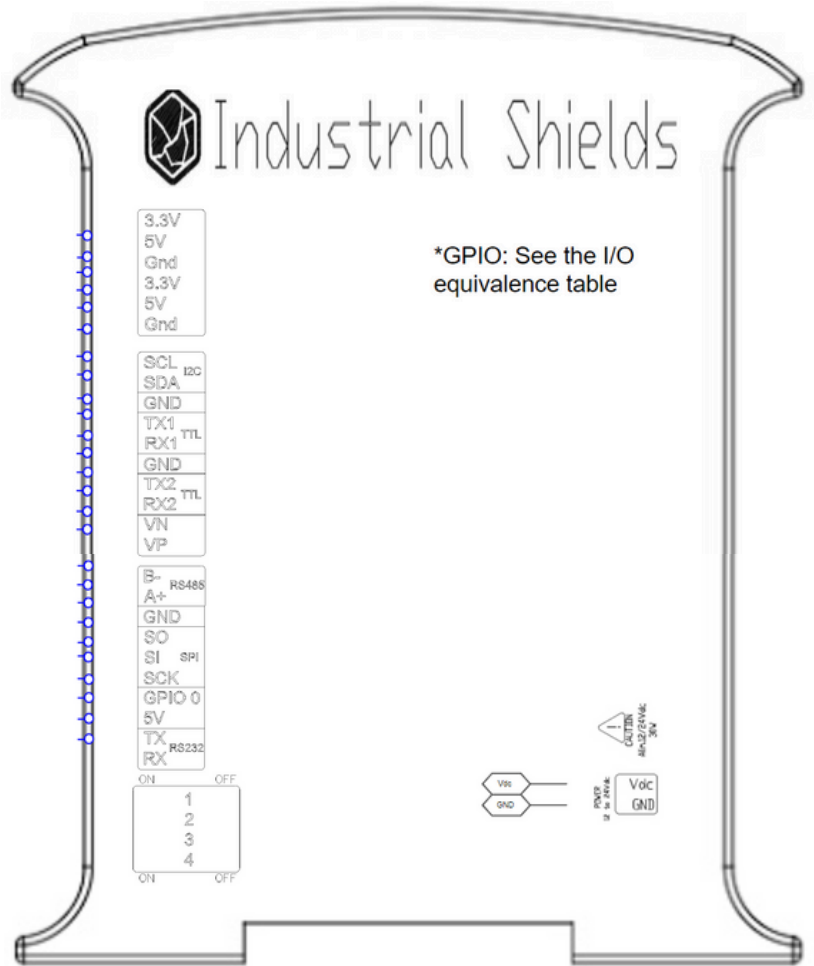
*GPIO: See the I/O equivalence table

ℹ️ x2 EXPANSION BOARDS SLOTS

Customize up to two additional communication expansions on your Raspberry PLC and prepare your custom-made project:

- **SARA-R412M-02B-03 4G LTE:**
  - **Model:** SARA-R412M-02B-03
  - **Type:** 2G EGPRS, GSM/4G LTE, M1/NB1 (Narrow-Band)
  - **Key Features:** : LTE FDD Bands (2/3/4/5/8/12/13/20/26/28), 2G Bands (850-1900MHz), LTE Category M1/NB1, 2G GMSK, 2G 8-PSK, LTE Category M1, LTE Category NB1, GPRS Multi-slot class 33, EGPRS multi-slot class 33
  - **Applications:** Remote monitoring automation, asset tracking, surveillance and security, home automation systems, point of sales terminals etc.
- **CAN:**
  - **Model:** MCP2515
  - **Type:** CAN V2.0B
  - **Key Features:** Speed of 1Mb/s, receive buffers, masks and filters, data byte filtering on the first two data bytes, three transmit buffers with prioritization and abort features, high speed SPI interface (10MHz), etc.
  - **Applications:** communication with all kinds of CAN devices and the protocols that can be applied to this communication method
- **LoRa:**
  - **Model:** RN2483 (for Europe/Asia), RN2903 (for NA/Australia)
  - **Type:** LoRa
  - **Key Features:** On-board LoRaWAN protocol stack, ASCII command interface over UART, Castellated SMT pads for easy and reliable PCB mounting, Environmentally friendly, RoHS compliant, Device Firmware Upgrade (DFU) over UART, etc.
  - **Applications:** Automated Meter Reading, Home and Building Automation, Wireless Alarm and Security System, Industrial Monitoring and Control, Machine to Machine (M2M), Internet of Things (IoT), etc.
- **GPS:**
  - **Model**: L80-M39
  - **Type:** GPS
  - **Key Features**: GPS L1 1575.42 MHz C/A Code, 66 search channels, 22 simultaneous tracking channel, Max Update Rate up to 10 Hz, 1 Hz by default, Velocity Accuracy without aid: 0.1 m/s, Acceleration Accuracy without aid: 0.1 m/s², etc.
  - **Applications:** GPS L1 1575.42 MHz C/A Code, 66 search channels, 22 simultaneous tracking channel, Max Update Rate up to 10 Hz, 1 Hz by default, Velocity Accuracy without aid: 0.1 m/s, Acceleration Accuracy without aid: 0.1 m/s², etc

Upper Side

RESET button

Ethernet | RTC battery (CR1220) (behind the lid) | microSD Socket (behind the lid) | Power LED

ℹ️ GPIO(x1)

Digital GPIO 0 (3.3V)

Expandability
I2C - 127 elements ModbusRTU with RS485: 32 elements

Wireless Operation details

Operating Frequency	WiFi	2.4 GHz to 2.5 GHz
	BLE	2402-2480 MHz (40 Channels)
Transmission Power (EIRP)	WiFi	at 2.5 GHz; Power : 9dBm
	BLE	at 2480 MHz; Power: 2,7dBm

Peripherial ports - USB & SIM Card Slot & Antennas

- The microUSB type B port for programming is located at the right side of the PLC enclosure
- The SIM Card Slot is also located at the right side of the PLC enclosure
- Additional Wi-Fi Antenna with SMA famale connector (on the frontal top side) included on the PLC
- Expansion Board Antenna (if required) with SMA female connector (on the frontal top side) included on the PLC

Industrial Shields®

I/Os Table

Model	Reference	Digital/Analog Input*	Digital Isolated Input	Digital Isolated Output	Digital/Analog Output*	Relay output
19R+	01200X000100	4	2	0	3	8
21+	01200X000200	6	7	5	3	0
38AR+	01200X000700	10	9	5	6	8
38R+	01200X000300	8	4	0	6	16
42+	01200X000400	12	14	10	6	0
50RRA+	01200X000900	14	11	5	9	16
53ARR+	01200X001000	14	11	5	9	16
54ARA+	01200X001100	16	16	10	9	8
57AAR+	01200X000800	16	16	10	9	8
57R+	01200X000500	12	6	0	9	24
58+	01200X000600	18	21	15	9	0

Mechanical dimensions and weights

MODEL	Height (mm)	Width (mm)	Depth (mm)	Max Weight (g)
19R+	119.5	70.1	101	380
21+	119.5	70.1	101	380
38AR+	119.5	94.7	101	490
38R+	119.5	94.7	101	490
42+	119.5	94.7	101	490
50RRA+	119.5	119.3	101	600
53ARR+	119.5	119.3	101	600
54ARA+	119.5	119.3	101	600
57AAR+	119.5	119.3	101	600
57R+	119.5	119.3	101	600
58+	119.5	119.3	101	600

Zones table

MODEL	Zone A	Zone B	Zone C	Zone D
19R+	✓	Relay	-	-
21+	✓	Analog/Digital	-	-
38AR+	✓	Analog/Digital	Relay	-
38R+	✓	Relay	Relay	-
42+	✓	Analog/Digital	Analog/Digital	-
50RRA+	✓	Relay	Relay	Analog/Digital
53ARR+	✓	Analog/Digital	Relay	Relay
54ARA+	✓	Analog/Digital	Relay	Analog/Digital
57AAR+	✓	Analog/Digital	Analog/Digital	Relay
57R+	✓	Relay	Relay	Relay
58+	✓	Analog/Digital	Analog/Digital	Analog/Digital

Internal Scheme
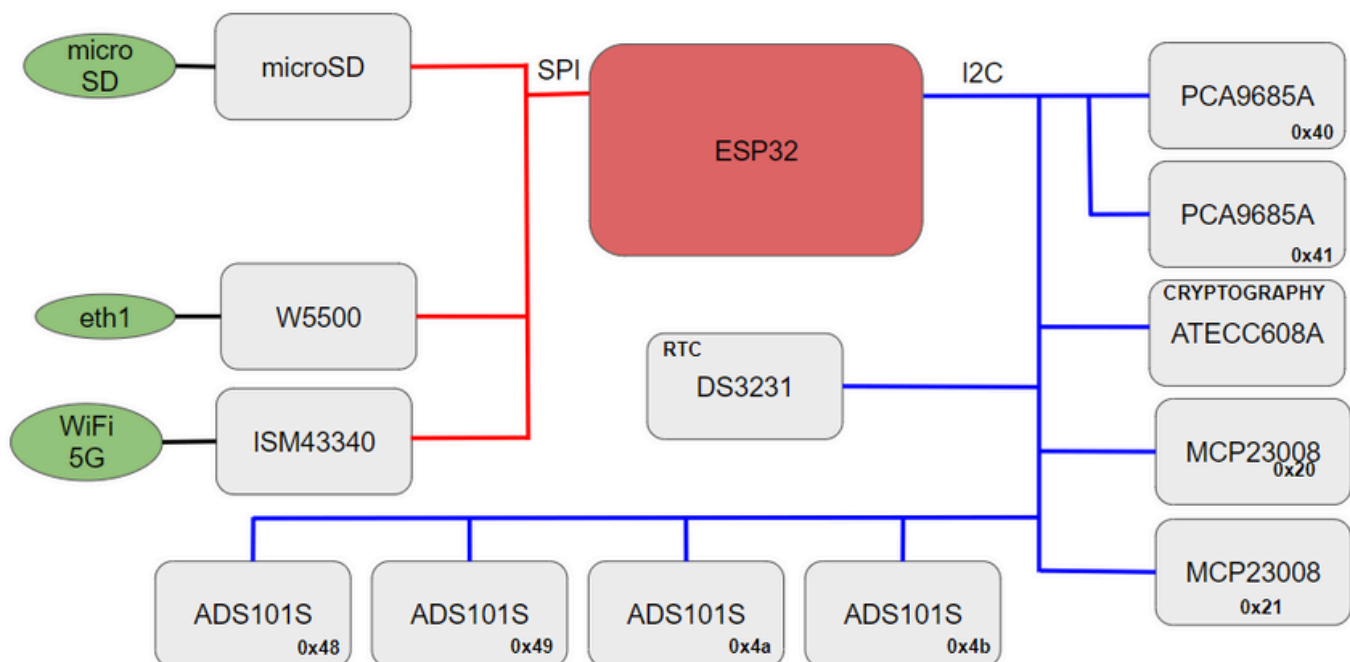
Performance Specifications

Raspberry Board	ESP32-WROOM-32UE
I/O control method	Combination of the cyclic scan and immediate refresh processing methods.
Programming language	Arduino IDE
Website	https://www.espressif.com/

Industrial Shields ®

Unused pins should not be connected. Ignoring the directive may damage the controller.

Before using this product, it is the responsibility of the user to read the product's User Guide and all accompanying documentation.

Industrial Shields PLCs must be powered between 12Vdc and 24Vdc. If a higher voltage is supplied to the equipment can suffer irreversible damage.

Maintenance must be performed by qualified personnel familiarized with the construction, operation, and hazards involved with the control.

Maintenance should be performed with the control out of operation and disconnected from all sources of power.

The Industrial Shields Family PLCs are Open Type Controllers. It is required that you install the ESP32 PLC in a housing, cabinet, or electric control room. Entry to the housing, cabinet, or electric control room should be limited to authorized personnel.

Inside the housting, cabinet or electric control room, the Industrial Shields PLC must be at a minimum distance from the rest of the components of a minimum of 25 cm, it can be severely damaged.

Failure to follow these installation requirements could result in severe personal injury and/or property damage. Always follow these requirements when installing ESP32 family PLCs.

In case of installation or maintenance of the PLC please follow the instructions marked in the Installation and Maintenance section on the User Guide.

Do not disconnect equipment when a flammable or combustible atmosphere is present.

Disconnection of equipment when a flammable or combustible atmosphere is present may cause a fire or explosion which could result in death, serious injury and/or property damage.

Inside the encapsulated, there are supercapacitors if 25F which can be dangerous. Be careful with them.

⚠️ **Warnings**

This equipment does **not include galvanic isolation between the grounds** of the different systems. This means that if an external device or sensor that shares the same ground reference (GND) with the system is connected, any potential difference between these grounds could damage the connected components. To avoid issues with interference, ground loops, or damage to external equipment, ensure that all connected devices share the same ground reference or use systems with appropriate isolation. The recommendations in this case are:

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
Communication Switch mapping

SWITCH CONFIGURATION	1	2	3	4
RS485	X	X	OFF	X
TX1/RX1	X	X	ON	X
RS232	X	OFF	X	X
TX2/RX2	X	ON	X	OFF
EXP 2	X	ON	X	ON

RTC
This PLC has integrated the DS3231 Real Time Clock model which is powered by a button battery (CR1216 or CR1220).

Symbology

Symbol	Description
▬▬▬	Indicates that the equipment is suitable for direct current only; to identify relevant terminals
∼	Indicates that the equipment is suitable for alternating current only; to identify relevant terminals
⊓	To identify the control by which a pulse is started.
⏚	To identify an earth (ground) terminal in cases where neither the symbol 5018 nor 5019 is explicitly required.
⊗	To identify the switch by means of which the signal lamp(s) is (are) switched on or off.
CE	CE marking indicates that a product complies with applicable European Union regulations
⚠	Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury
⚡	To indicate hazards arising from dangerous voltages

Technical Support

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