Electrical Features

Power supply voltage	12 to 24 Vdc ((2.2 A) Polarity protection)
Input rated voltage	24 Vdc
Power consumption	Refer to Model Comparison table
Rated Power	30W
I max.	1.5 A

Physical Characteristics

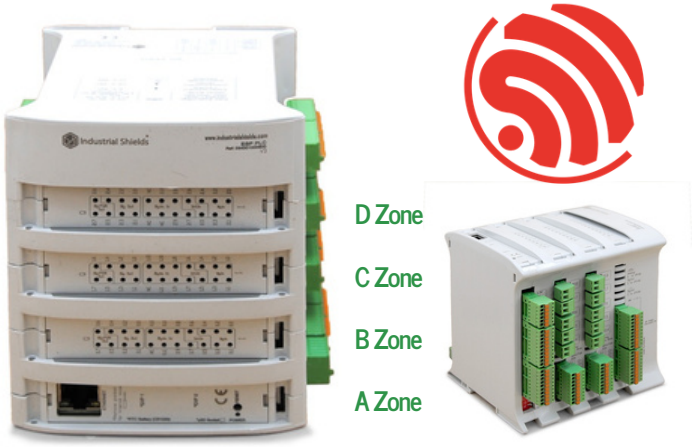
Dimensions H x W x D	Refer to Model Comparison table	
Weight	Refer to Model Comparison table	
Connector specifications	Communication connector	20 - 26 AWG spring push-in
	Power supply connector	16 - 28 AWG screw
DIN Rail	TS35	
IP grade protection	IP20	
Ambient humidity (operating)	10 % to 90 % (no condensation)	
Ambient environment (operating)	With no corrosive gas	
Ambient temperature (storage)	-20 ° to 60 °C	

Technical Features

CPU	ESP32, 16MB Flash Memory
Clock speed	External: 80-240 MHz Internal: 8 MHz
SRAM	520 KB
RTC	DS3231 Real Time Clock, powered with button battery (CR1216 or CR1220)

Interface Features

RS-485	Half Duplex port, 120Ω termination resistor
RS-232	Selectable via DIP switches
I2C	5V, direct from ESP32 CPU
SPI	3.3V, direct from ESP32 CPU
Serial TTL	Selectable via DIP switches. 3.3V, direct from ESP32 CPU
Ethernet	x1 100Mbit, RJ45 connector



Mechanical dimensions and weights

	Measurements			
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

	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

Model Comparison Table

Model	Reference	Total Inputs	Total Outputs	Analog/Digital Inputs	Digital Isolated Inputs (Interrupts)	Analog/Digital/ PWM Outputs	Digital Isolated Outputs	Relays	*Power Consumption (W)
19R	034001000100	6	11	4	2 (2)	3	0	8	4.58
21	034001000200	13	8	6	7 (2)	3	5	0	2.45
38AR	034001000700	19	19	10	9 (4)	6	5	8	5.02
38R	034001000300	12	22	8	4 (4)	6	0	16	7.30
42	034001000400	26	16	12	14 (4)	6	10	0	2.78
50RRA	034001000900	23	30	12	11 (6)	9	5	16	7.87
53ARR	034001001000	25	30	14	11 (6)	9	5	16	7.66
54ARA	034001001100	30	27	14	16 (6)	9	10	8	5.42
57AAR	034001000800	32	27	16	16 (6)	9	10	8	5.30
57R	034001000500	18	33	12	6 (6)	9	0	24	9.96
58	034001000600	37	24	16	21 (6)	9	15	0	2.88

*Measured at 24 Vdc with all cores at 100% load. Not the absolute maximum.

Dig. Isolated Inputs

Parameter	Value
Range	5 to 24 Vdc
Rated Voltage	24 Vdc
I min.	2 mA
Max. Freq.	1 KHz
Isolation	Optocoupled

An/Dig Inputs

Parameter	Value
Resolution	11 bit
Range (An)	0 to 10 Vdc
Rated Voltage (An)	10 Vdc
Range (Dig)	0 to 24 Vdc
Rated Voltage (Dig)	24 Vdc
I min.	2 mA
Max Freq. (An)	50 Hz
Max. Freq. (Dig)	1 KHz
Isolation	Optocoupled

Dig. Isolated Outputs

Parameter	Value
Range	5 to 24 Vdc
Rated Voltage	24 Vdc
I max.	70 mA
Max. Freq.	16 KHz
Isolation	Optocoupled
Protection	Diode Protected for Inductive Loads

An/Dig/PWM Outputs

Parameter	Value
Resolution	12 bit
Range	0 to 10 Vdc
Rated Voltage (An)	10 Vdc
Range (Dig)	0 to 24 Vdc
Rated Voltage (Dig)	24 Vdc
I. max.	20 mA
Max Freq. (An)	2 Hz
Max Freq. (Dig)	16 KHz
Isolation	Optocoupled

Relays

Parameter	Value
Operating Mode	*Resistive Load
Voltage Range	230 Vac (AC)
	24 Vdc (DC)
Maximum Current	4 A (AC)
	2 A (DC)
Isolation	Optocoupled

Use an RC snubber for inductive loads. Choose RC values based on the load specifications.

Available Expansion Boards

LTE CAT M1 / NB-IoT

- **Model:** SARA-R412M
- **Type:** 2G EGPRS, GSM/LTE,
- **Key Features:** GSM Quad-band 850/1900, 900/1800 MHz, Maximum output power -8dBm, IPv4/IPv6, dual-stack
- **Applications:** Remote monitoring automation, asset tracking, surveillance and security, home automation systems, point of sales terminals etc.

GSM-GPRS

- **Model:** SARA-G450
- **Type:** GSM/GPRS module Quadband LGA
- **Key Features:** Industry proven SARA form factor, optimized power consumption for IoT applications, GPRS class 12, standard grade, global region, audio and SIM interfaces, jamming detection, and more.
- **Applications:** Can be used for 2G cellular module M2M applications such as utility metering and tracking systems.

LoRa

- **Model:** RN2483 (EU/Asia), RN2903 (USA/AU)
- **Type:** LoRa Module
- **Key Features:** Integrated LoRaWAN stack, UART with ASCII command interface, DFU over UART, castellated SMT pads, RoHS compliant, etc.
- **Applications:** Smart metering, building automation, security systems, industrial monitoring, M2M, IoT deployments, etc.

GPS

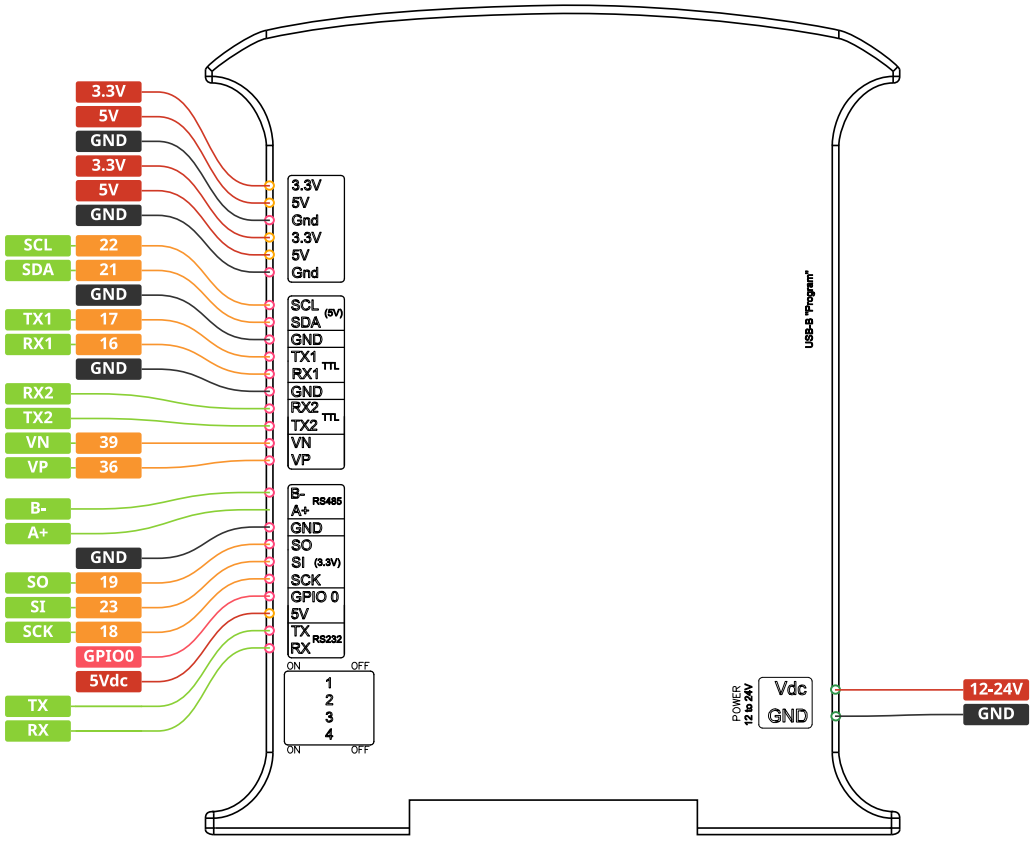
- **Model:** L80-M39
- **Type:** GPS Module
- **Key Features:** L1 1575.42 MHz, 66 search / 22 tracking channels, up to 10 Hz update rate, 0.1 m/s velocity and 0.1 m/s² acceleration accuracy (no aid)
- **Applications:** Industrial positioning with high sensitivity, fast TTFF, and low power consumption

M-BUS Master / M-BUS Slave

- **Model:** TSS721ADR
- **Type:** Power Line Communication (PLC) Transceiver.
- **Key Features:** Supports IEC 61334-5-1 standard, 1200-bps data rate over power lines, low-power operation.
- **Applications:** Remote meter reading, home automation, industrial control, power line-based communication systems.

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:** CAN-based device communication and protocol interfacing.



ESP32 PLC Communication Zone Pinout

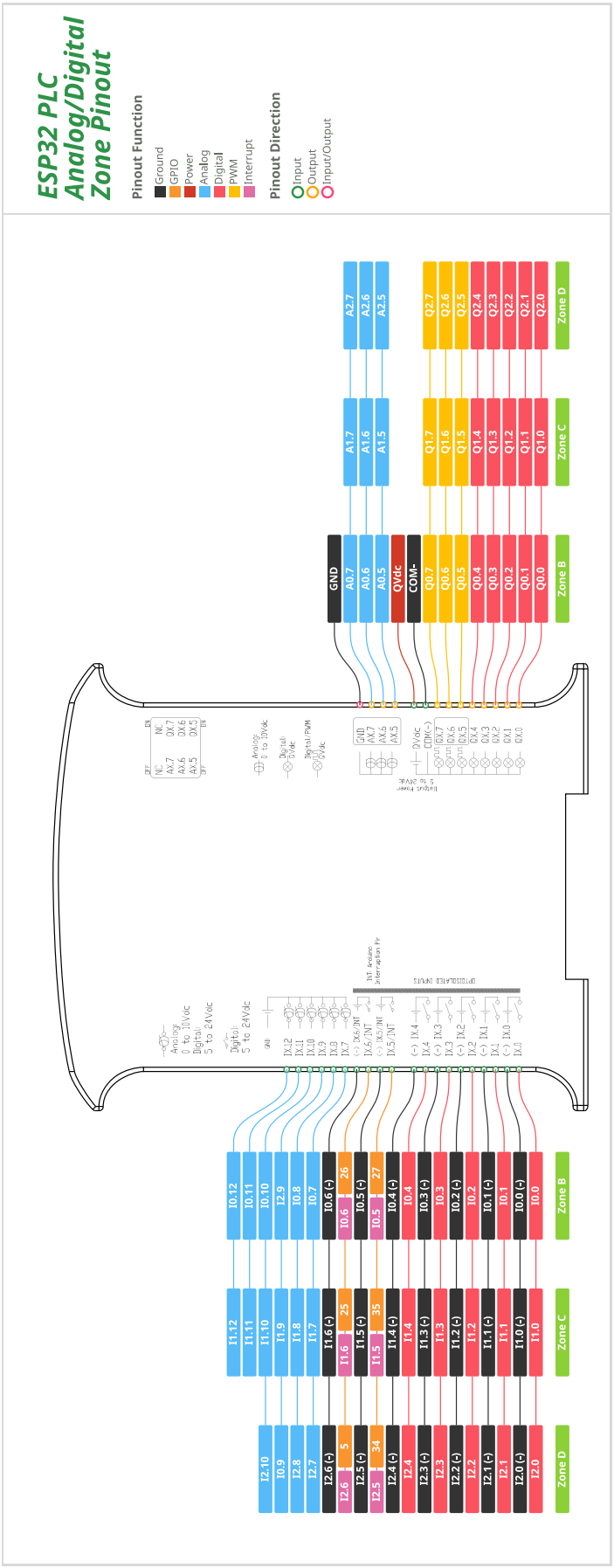
Pinout Function

Communication, GPIO, Digital, Ground, Power

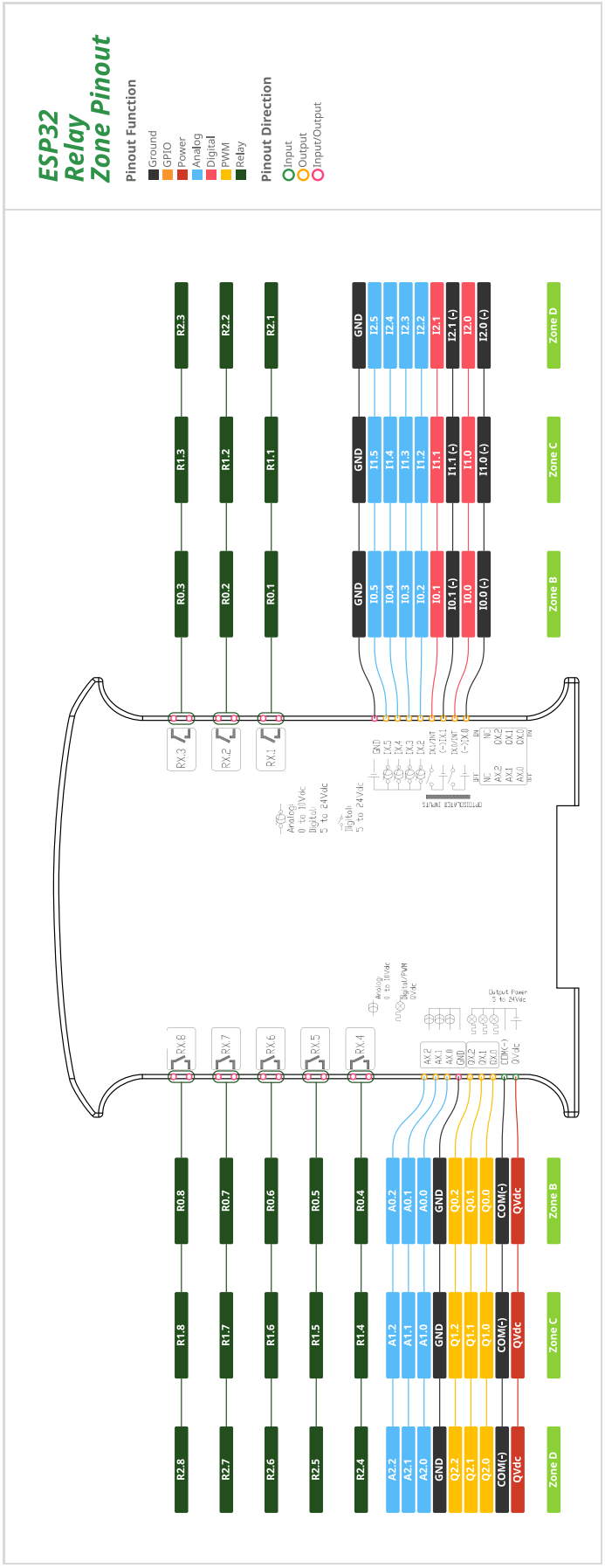
Pinout Direction

Input, Output, Input/Output

ESP32 PLC Analog/Digital Zone Pinout



ESP32 Relay Zone Pinout



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

Install Arduino IDE and the Industrial Shields boards

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

1. Open the Arduino IDE, versión 1.8.0 or superior. You can download here: https://www.arduino.cc/en/Main/Software.
2. Press the "Preferences" option in "File" menu.
3. In the text box "Additional boards manager URLs", add the direction: http://apps.industrialshields.com/main/arduino/boards/package_industrialshields_index.json
4. Close the preferences window with the "OK" button.
5. Click on "Tools" -> "Boards". Click the "Boards Manager" option, to open the Boards Manager window.
6. Search for "industrialshields-esp32" to the search filter and select to the list and click "Install"
7. Once it has performed that steps, you are available to select each PLC with: "Tools" -> "Board" -> Industrial Shields ESP32...

References

The references are: 0340000XYY00

X stands for Expansion Board Slot:

- X = 0: No Expansion Board Slot
- X = 1-9: With Expansion Board Slot

Occupied I2C addresses

- 0x20
- 0x21
- 0x23
- 0x40
- 0x41
- 0x48
- 0x49
- 0x4A
- 0x4B
- 0x68

Warnings

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.

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.

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 explicily 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
ϟ	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

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