

Electrical Features

Power supply voltage	12 to 24 Vdc ((2.5 A) Polarity protection)
Input rated voltage	24 Vdc
Power consumption	Refer to Model Comparison table
Rated Power	30W
I max.	15 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 (operating/storage)	0 ° to 50 °C / -20 ° to 60 °C	

Technical Features

CPU	Broadcom BCM2711, Quad core (ARM v8) 64-bit SoC
Clock speed	1.8 GHz
Default OS	Debian Bookworm 64 bit (With custom configurations)
UPS	Controlled by software to safely shutdown the Raspberry PI when power failure
RTC	DS3231 Real Time Clock, powered with button battery (CR1216 or CR1220)

Interface Features

RS-485	x2 RS-485 Half Duplex ports, 120Ω termination resistor on both
I2C	5V, direct from Raspberry PI board
SPI	3.3V, direct from Raspberry PI board
TTL	3.3V, direct from Raspberry PI board
Ethernet	x1 Gbit Ethernet, x1 100Mbit, RJ45 connectors
USB	x2 USB-A 2.0, x2 USB-A 3.0

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+	01200XXX0100	6	11	4	2 (2)	3	0	8	9.48
21+	01200XXX0200	13	8	6	7 (2)	3	5	0	6.96
38AR+	01200XXX0700	19	19	10	9 (4)	6	5	8	9.84
38R+	01200XXX0300	12	22	8	4 (4)	6	0	16	12.00
42+	01200XXX0400	26	16	12	14 (4)	6	10	0	7.68
50RRA+	01200XXX0900	25	30	14	11 (6)	9	4	16	12.53
53ARR+	01200XXX1000	25	30	14	11 (6)	9	5	16	7.80
54ARA+	01200XXX1100	32	27	16	16 (6)	9	9	8	10.15
57AAR+	01200XXX0800	32	27	16	16 (6)	9	10	8	10.03
57R+	01200XXX0500	18	33	12	6 (6)	9	0	24	15.00
58+	01200XXX0600	39	24	18	21 (6)	9	14	0	8.11

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



D Zone

C Zone

B Zone

A Zone



Mechanical dimensions and weights

Model	Measurements			
	Height (mm)	Width (mm)	Depth (mm)	Max Weight (g)
Ethernet CPU	119.5	84.60	101	373
19R+	119.5	109.20	101	490
21+	119.5	109.20	101	490
38AR+	119.5	133.80	101	598
38R+	119.5	133.80	101	598
42+	119.5	133.80	101	598
50RRA+	119.5	158.40	101	710.5
53ARR+	119.5	158.40	101	710.5
54ARA+	119.5	158.40	101	710.5
57AAR+	119.5	158.40	101	710.5
57R+	119.5	158.40	101	710.5
58+	119.5	158.40	101	710.5

Zones table

Model	Zones table			
	Zone A	Zone B	Zone C	Zone D
Ethernet CPU	✓	-	-	-
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

A Zone Extra Ins/Outs

Pin	Description
PREL A, PREL B	Relay (24 V max, bidirectional)
IN 1 / IN 2	Digital Optoisolated Inputs (5-24 Vdc)
OUT 1 / OUT 2	Digital Optoisolated Outputs (5-24 Vdc)
VCC ISO / GND ISO	OUT1/2 output VCC ISO when HIGH

Dig. Isolated Inputs

Parameter	Value
Range	5 to 24 Vdc
Rated Voltage	24 Vdc
I min.	2 mA
Max. Freq.	760 Hz
Isolation	Optocoupled

An/Dig Inputs

Parameter	Value
Resolution	12 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)	7 Hz
Max Freq. (Dig)	760 Hz
Isolation	Optocoupled

Dig. Isolated Outputs

Parameter	Value
Range	5 to 24 Vdc
Rated Voltage	24 Vdc
I max.	70 mA
Max. Freq.	1.5 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)	5 Hz
Max Freq. (Dig)	1.5 KHz
Isolation	Optocoupled

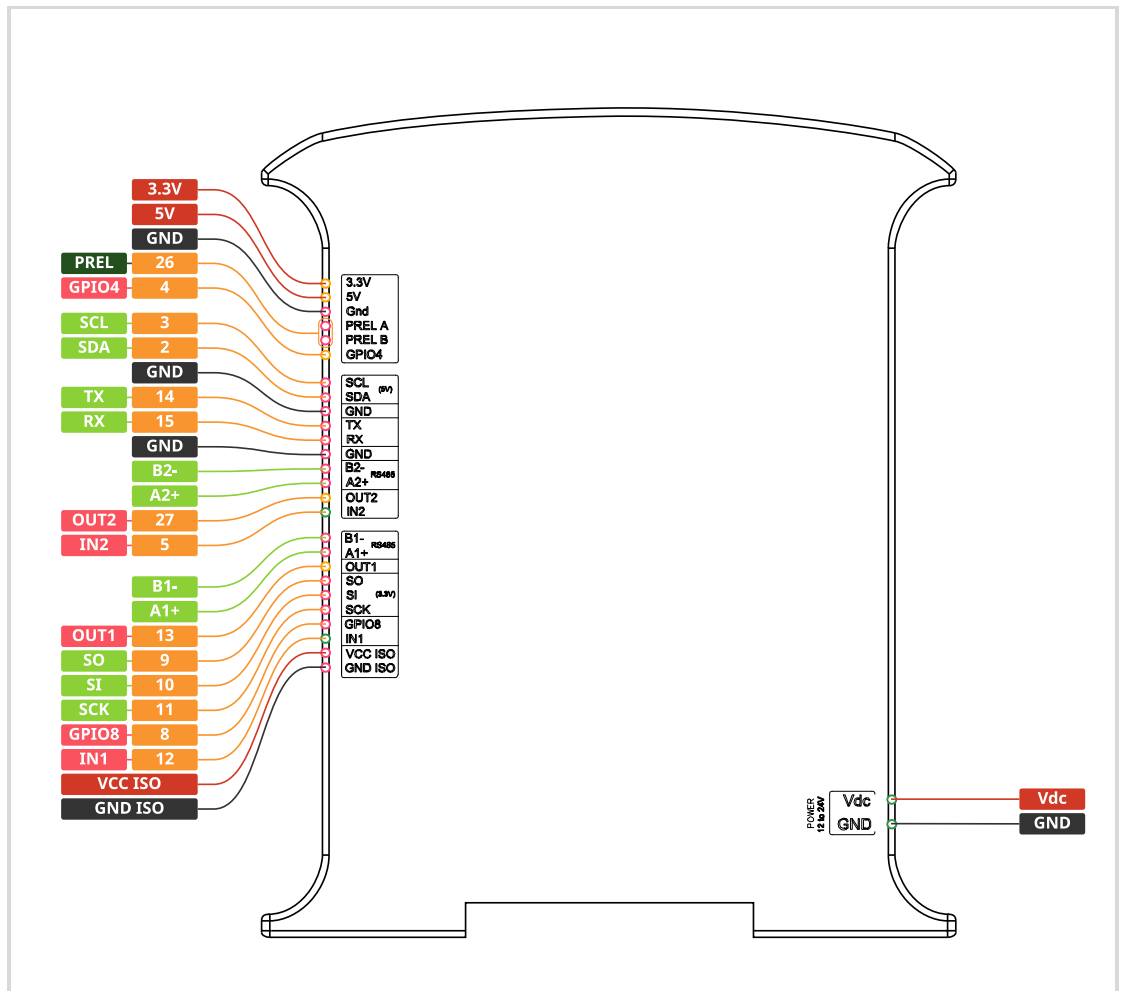
Relays

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

NB-IoT/LTE-M	LTE Cat 4	LoRa
<ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> Model: LARA-L6 Type: LTE Cat 4 (FDD/TDD) Key Features: Multi-band LTE (700-2600 MHz), 23 dBm output, 150 Mbps DL / 50 Mbps UL, GNSS (GPS/GLONASS), IPv4/IPv6 dual-stack Applications: IoT, industrial automation, metering, tracking, fleet, security, smart cities, health, etc. 	<ul style="list-style-type: none"> 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	M-BUS Master / M-BUS Slave	CAN
<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> 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, lighting control, and other power line-based communication systems. 	<ul style="list-style-type: none"> 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.



Raspberry PLC Communication Zone Pinout

Pinout Function

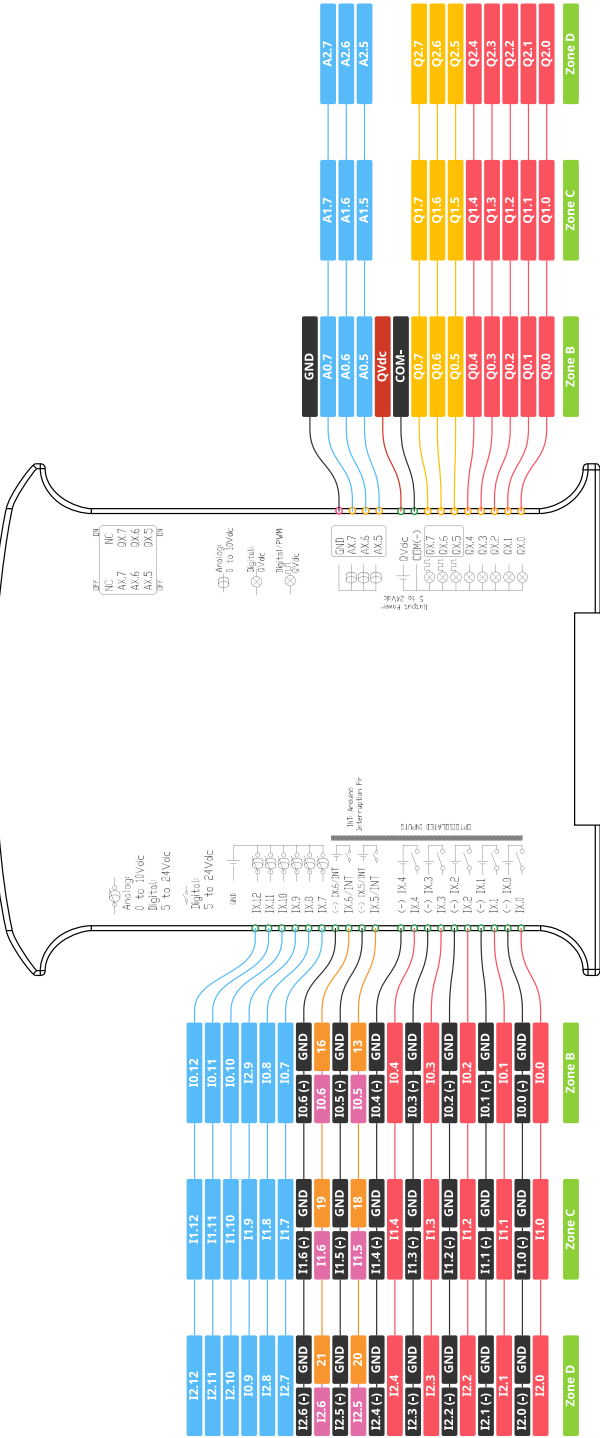
- Communication
- GPIO
- Analog
- Relay
- Power
- Digital

Pinout Direction

- Input
- Output
- Input/Output

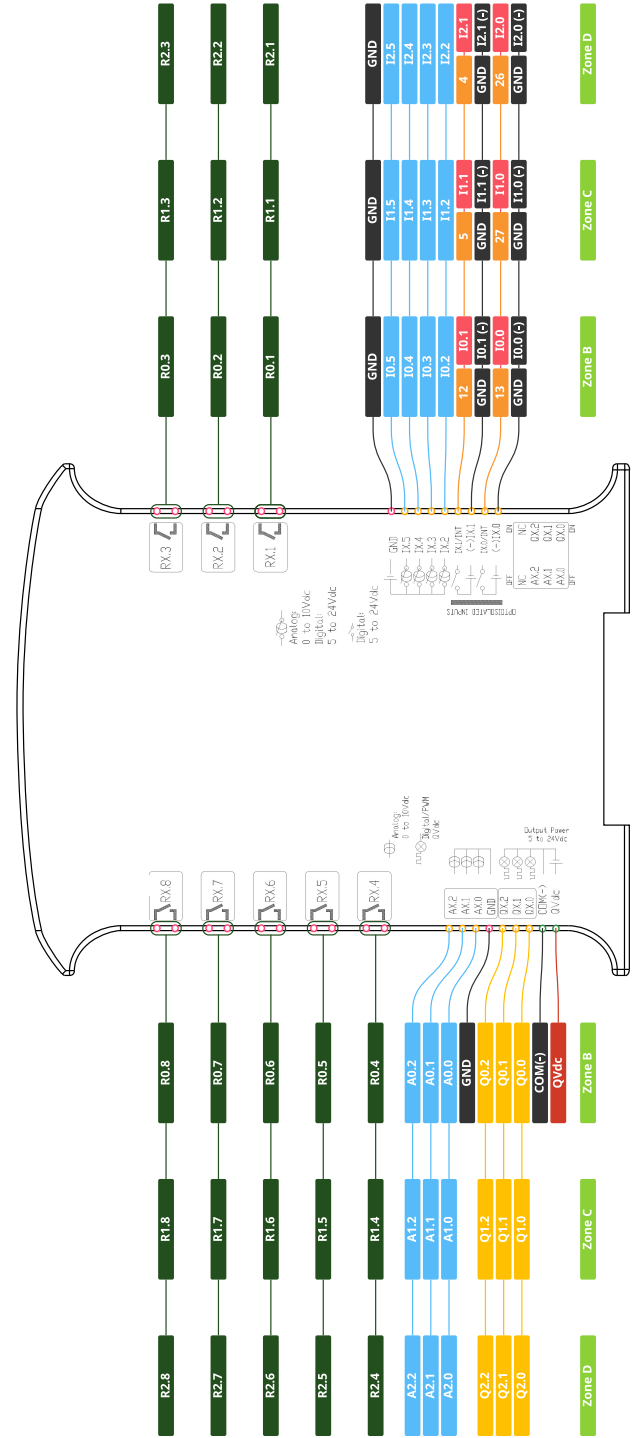
Raspberry PLC Analog/Digital Zone Pinout

- Pinout Function**
- Ground
 - GPIO
 - Power
 - Analog
 - Digital
 - PWM
 - Interrupt
- Pinout Direction**
- Input
 - Output
 - Input/Output



Raspberry PLC Relay Zone Pinout

- Pinout Function**
- Ground
 - GPIO
 - Power
 - Analog
 - Digital
 - PWM
 - Relay
- Pinout Direction**
- Input
 - Output
 - Input/Output



Raspberry PLC Access

Accessing the Raspberry PLC:

- **Linux users:** Connect via SSH using the IP addresses 10.10.10.20/24 (eth0) or 10.10.11.20/24 (eth1).
- **Windows users:** We recommend using the PuTTY SSH client. Specify the IP address: 10.10.10.20/24 (eth0) or 10.10.11.20/24 (eth1). Download the latest PuTTY release here: <https://www.chiark.greenend.org.uk/~sgtatham/putty/latest.html>

Additional Features

Raspberry PLC Includes built-in features for improved reliability.

- **UPS Shield:** Protects against voltage drops to prevent data corruption during sudden power loss.
- **RTC:** Integrated DS3231 Real-Time Clock powered by a CR1216 or CR1220 battery.
- **Cooling:** External heatsink included for CPU and internal components.
- **Ethernet (eth1):** Configured to 10BT Half-Duplex with auto-negotiation disabled.
- **Outputs:** After reboot or power loss, outputs retain their last state until system initialization completes. See User Guide for details.

References

The references are: 01200RXYYMM00

R stands for the RAM Memory:

- R = 2 → 2 GB
- R = 3 → 4 GB
- R = 4 → 8 GB

XY stands for the Expansion Boards:

- X → Expansion Module on Slot 1
- Y → Expansion Module on Slot 2











MM stands for the PLC Model:

- Check Comparison Table for reference number for each model

Occupied I2C addresses

- 0x08
- 0x0A
- 0x20
- 0x21
- 0x28
- 0x40
- 0x41
- 0x68
- 0x6B
- 0x70

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 terminals designated for digital input signals.
	To identify terminals or ports used for analog input and output signals.
	To identify the switch by means of which the signal lamp(s) is (are) switched on or off.
	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

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 Raspberry 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 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 Raspberry 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 of 25F which can be dangerous. Be careful with them.

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.


Technical Support

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

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 www.industrialshields.com

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