Industrial Shields Raspberry PLC Family Datasheet

Technical Features CONECTABLE PLC RASPBERRY PI 24 Vcc

MODEL TYPE	Raspberry PLC
Input Voltage	12 to 24 Vdc (Fuse protection (2.5 A) Polarity protection)
Input rated voltage	24 Vdc
Rated Power	30 W
I max.	1.5 A
Size	Check the Measures Table
SRAM	2/4/8 GB
Communications	I2C, Ethernet (x2), USB (x4), RS485 (x2 HALF-Duplex), SPI , Wi-Fi, Bluetooth, Serial TTL, µSD, RTC, µHDMI (x2)

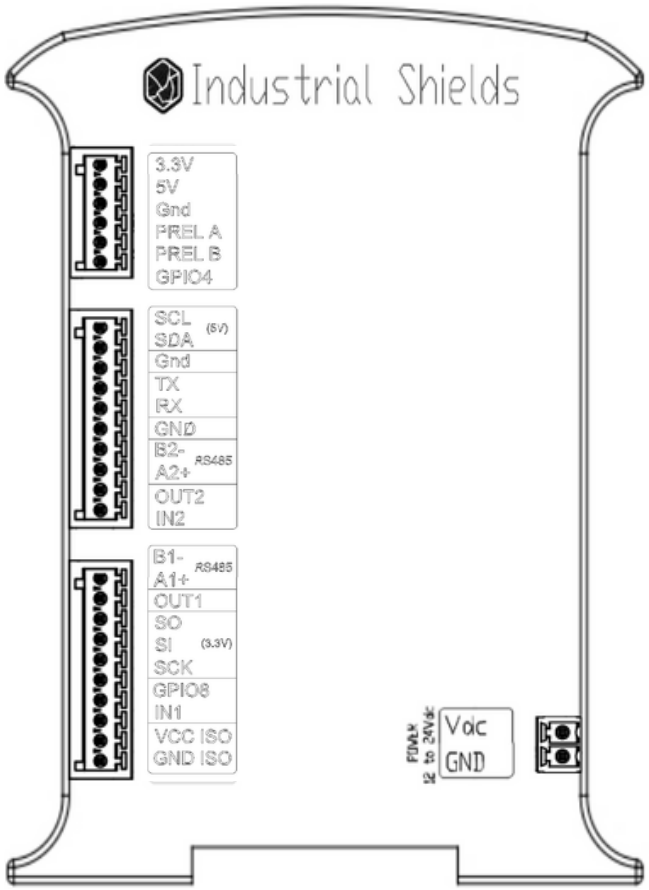
General Features

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)	0 ° to 50 °C with Raspberry OS Lite 0 ° to 45 ° with Raspberry OS Desktop	
Ambient humidity (operating)	10 % to 90 % (no condensation)	
Ambient environment (operating)	With no corrosive gas	
Ambient temperature (storage)	-20 ° to 60 °C	
Power supply holding time	2 ms min.	
Weight	Review at the Measures Table	

x2 EXPANSION BOARDS SLOTS

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

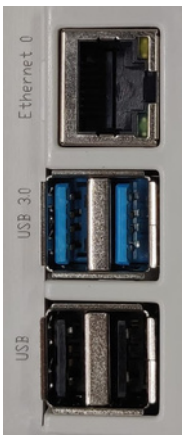
- **SARA-R412M-02B-03 4G LTE:**
  - **Model:** SARA-R412M-02B-03
  - **Type:** 2G EGPRS, GSM/4G LTE, M1/NB1 (Narrow-Band)
  - **Key Features: :** LTE FDD Bands (2/3/4/5/8/12/13/20/26/28), 2G Bands (850-1900MHz), LTE Category M1/NB1, 2G GMSK, 2G 8-PSK, LTE Category M1, LTE Category NB1, GPRS Multi-slot 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.



Left side

Upper side 2

Right Side



GPIO(x2)

Digital GPIO4 (3.3V) / Interrupt 31
Digital GPIO8 (3.3V) / Chip Select (SPI)

Relay(x1)

PREL A, PRELB
48 V max bidirectional

Expandability

I2C - 127 elements
(x2) RS485 - 32 elements using Modbus RTU

Digital OPTO

IN1 - OUT1
IN2 - OUT2

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

I/Os Table

Model	Reference	Digital/Analog Input*	Digital Isolated Input	Digital Isolated Output	Digital/Analog Output*	Relay output
19R+	01200XXX0100	4	2	0	3	8
21+	01200XXX0200	6	7	5	3	0
38AR+	01200XXX0700	10	9	5	6	8
38R+	01200XXX0300	8	4	0	6	16
42+	01200XXX0400	12	14	10	6	0
50RRA+	01200XXX0900	14	11	5	9	16
53ARR+	01200XXX1000	14	11	5	9	16
54ARA+	01200XXX1100	16	16	10	9	8
57AAR+	01200XXX0800	16	16	10	9	8
57R+	01200XXX0500	12	6	0	9	24
58+	01200XXX0600	18	21	15	9	0

Notes

1. The "**XXX**" in the reference number indicates key specifications:
   - **First Character:** CPU RAM size (2 = 2 GB, 3 = 4 GB, 4 = 8 GB).
     Example:
     - xxxx2XXxxxx → 2 GB RAM
     - xxxx3XXxxxx → 4 GB RAM
     - xxxx4XXxxxx → 8 GB RAM
   - **Second Character:** Expansion module on Slot 1.
   - **Third Character:** Expansion module on Slot 2.

2. The analog inputs has a 3 % of tolerance.

I/Os Ranges

- Analogic I/Os voltage: 0 - 10 Vdc
- Digital I/Os voltage: 5 - 24 Vdc (300 mA)
- Relay's voltage:
  30 Vdc (3A) / 250 Vac (5 A)

Reference Table

Reference Table			
Model	**RAM Memory**		
	2GB RAM	**4GB RAM**	**8GB RAM**
PLC Raspberry General Family			
Raspberry PLC Ethernet CPU (Raspberry Pi 4B X GB RAM Included + pSLC SD W/Linux)	012002XX0000	012003XX0000	012004XX0000
Raspberry PLC Ethernet 21 I/Os Analog/Digital PLUS (Raspberry Pi 4B X GB RAM Included + pSLC SD W/Linux)	012002XX0200	012003XX0200	012004XX0200
Raspberry PLC Ethernet 42 I/Os Analog/Digital PLUS (Raspberry Pi 4B X GB RAM Included + pSLC SD W/Linux)	012002XX0400	012003XX0400	012004XX0400
Raspberry PLC Ethernet 58 I/Os Analog/Digital PLUS (Raspberry Pi 4B X GB RAM Included + pSLC SD W/Linux)	012002XX0600	012003XX0600	012004XX0600
Raspberry PLC Ethernet 19R I/Os Analog/Digital PLUS (Raspberry Pi 4B X GB RAM Included + pSLC SD W/Linux)	012002XX0100	012003XX0100	012004XX0100
Raspberry PLC Ethernet 38R I/Os Analog/Digital PLUS (Raspberry Pi 4B X GB RAM Included + pSLC SD W/Linux)	012002XX0300	012003XX0300	012004XX0300
Raspberry PLC Ethernet 57R I/Os Analog/Digital PLUS (Raspberry Pi 4B X GB RAM Included + pSLC SD W/Linux)	012002XX0500	012003XX0500	012004XX0500
Raspberry PLC Ethernet 38AR I/Os Analog/Digital PLUS (Raspberry Pi 4B X GB RAM Included + pSLC SD W/Linux)	012002XX0700	012003XX0700	012004XX0700
Raspberry PLC Ethernet 57AAR I/Os Analog/Digital PLUS (Raspberry Pi 4B X GB RAM Included + pSLC SD W/Linux)	012002XX0800	012003XX0800	012004XX0800
Raspberry PLC Ethernet 50RRA I/Os Analog/Digital PLUS (Raspberry Pi 4B X GB RAM Included + pSLC SD W/Linux)	012002XX0900	012003XX0900	012004XX0900
Raspberry PLC Ethernet 53ARR I/Os Analog/Digital PLUS (Raspberry Pi 4B X GB RAM Included + pSLC SD W/Linux)	012002XX1000	012003XX1000	012004XX1000
Raspberry PLC Ethernet 54ARA I/Os Analog/Digital PLUS (Raspberry Pi 4B X GB RAM Included + pSLC SD W/Linux)	012002XX1100	012003XX1100	012004XX1100

Main changes compared to previous versions

- **Customize** up to two additional communication expansions on your Raspberry PLC and prepare your custom-made project.
- **Communication pins upgrade!** Now located next to USB Ports instead of microSD layer.
- **CAN Bus** is not available by default. Select it as expansion board if required.
- **No FAN required** at RPI PLC V6 family products! Heater passive elements installed by default.
- **Improved stability** and **noise reduction** on analog inputs by modifying the input reference for each analog input expander (**12-bit resolution**).
- Added in the communications layer:
  - **1 Solid Relay** (48 V max)
  - **2 OPTO IN**
  - **2 OPTO OUT** (fed by **VCC ISO** and **GND ISO**).
- **Improvement of security systems** with direct pins to the Raspberry Pi, such as **I2C**, **UART**, and **SPI**.
- **Better electronic insulation** and **PCB layout optimization**.
- UPS improvements:
  - **Higher charging voltage** allows longer discharge time during shutdown.
  - Outputs change their state in a **controlled manner** when the equipment is turned off, avoiding **unexpected values** at power-on. In case of **restart**, outputs **retain their state** (applies to default UPS configuration in **config.txt**).

Zones Table for Raspberry PLC V6 Family products

	Zones Table			
Model	**Zone 0**	**Zone A**	**Zone B**	**Zone C**
Raspberry PLC Ethernet CPU	☑	-	-	-
Raspberry PLC 21+	☑	Analog / Digital	-	-
Raspberry PLC 42+	☑	Analog / Digital	Analog / Digital	-
Raspberry PLC 58+	☑	Analog / Digital	Analog / Digital	Analog / Digital
Raspberry PLC 19R+	☑	Relay	-	-
Raspberry PLC 38R+	☑	Relay	Relay	-
Raspberry PLC 57R+	☑	Relay	Relay	Relay
Raspberry PLC 38AR+	☑	Analog / Digital	Relay	-
Raspberry PLC 53ARR+	☑	Analog / Digital	Relay	Relay
Raspberry PLC 57AAR+	☑	Analog / Digital	Analog / Digital	Relay
Raspberry PLC 54ARA+	☑	Analog / Digital	Relay	Analog / Digital
Raspberry PLC 50RRA+	☑	Relay	Relay	Analog / Digital

Industrial Shields

Performance Specifications

Raspberry Board	Raspberry Pi 4 B
I/O control method	Combination of the cyclic scan and immediate refresh processing methods.
Programming language	Linux applications: Bash Scripts, Python, C++, Node-Red and more!.
CPU	Broadcom BCM2711, Quad core Cortex-A72 (ARM v8) 64-bit SoC @ 1.5GHz
Website	https://www.raspberrypi.org/

Raspberry PLC Access

How to access to the Raspberry PLC:

-Linux users: using ssh specifying the IP address: 10.10.10.20/24 (eth0) and 10.10.11.20/24 (eth1).

-Windows users: we recommend to use PuTTY ssh client. The IP address have to be specified: 10.10.10.20/24 (eth0) and 10.10.11.20/24 (eth1).
You can download the latest release of PuTTY here: https://www.chiark.greenend.org.uk/~sgtatham/putty/latest.html

UPS Shield

This PLC has integrated an UPS Shield, a device which provides an anti-voltage drop protection system designed to avoid data corruption when the current is suddenly cut off.

RTC

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

Heater

This PLC family products include an external heater to refrigerate the CPU and the other components connected internally.

Eth1

This Ethernet port is configured at 10BT Half-Duplex auto-negotiation disabled.

Outputs

After a reboot/power disconnection and reconnection, the UPS will be activated and, until the device is fully initialized again (it will take some seconds), the outputs will maintain their last activation state. For more information about that consult the User Guide.

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 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 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 if 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.

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:

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