Technical Features

Input Voltage	12 to 24Vdc (Fuse protection (2.5A) Polarity protection)
Input Rated Voltage	24 Vdc
Rated Power	30 W (Refer to Model Comparison table)
Maximum Current	1.5 A
Insulation Resistance	20MΩ min.at 500Vdc between the AC terminals and the protective earth terminal.
Dielectric Strength	2.300 VAC at 50/60 Hz for one minute with a leakage current of 10mA max. Between all the external AC terminals and the protective ground terminal.
Communications & Features	RS-485 (Half-Duplex or Full-Duplex), RS-232, I2C, SPI, Serial TTL, USB 2.0 Type-Micro (see the UserGuide for switches and jumpers configuration)

Environmental Specifications

Operating Ambient Temp.	0° to 60°C
Storage Ambient Temp.	-20° to 60°C
Operating Ambient Humidity	10% to 90% (No condensation)
Ambient Environment (Oper.)	Free from corrosive gases

Controller Specifications

Arduino Board	Arduino Leonardo
Microcontroller	ATmega32u4
Flash Memory	32 KB (4 KB used by the bootloader)
SRAM	2.5 KB
EEPROM	1 KB
Clock Speed	16 MHz

Original **Arduino Leonardo** included

Analog/Digital Inputs

Parameter	Value
Resolution	10 bit
Range (An)	0 to 10 Vdc
Rated Voltage (An)	10 Vdc
Range (Dig)	0 to 24 Vdc
Rated Voltage (Dig)	24 Vdc
Input Impedance	39 kΩ
I max.	2 mA
Max. Freq.	15 KHz
Isolation	Optocoupled

Dig. Isolated Inputs

Parameter	Value
Range	5 to 24 Vdc
Rated Voltage	24 Vdc
I min.	2 mA
Max. Freq.	15 KHz
Isolation	Optocoupled

An/Dig/PWM Outputs

Parameter	Value
Resolution	8 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.	4 Hz
Protection	Diode Protected for Relay
Isolation	Optocoupled

Dig. Isolated Outputs

Parameter	Value
Range	5 to 24 Vdc
Rated Voltage	24 Vdc
I max.	70 mA
Max. Freq.	2 KHz
Isolation	Optocoupled
Protection	Diode Protected for Relay

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

*If inductive loads are used, we recommend installing an RC snubber filter. The RC values must be calculated based on the characteristics of the connected load.

Available Expansion Boards

WiFi & BLE

- **Model:** ESP32-WROOM-32
- **Type:** CPU / Microcontroller Module
- **Key Features:** Wi-Fi 802.11 b/g/n (2.4 GHz), up to 150 Mbps, Bluetooth v4.2 (BR/EDR and BLE), Up to 520 KB SRAM, 4 MB Flash, Integrated Hall sensor and temperature sensor, Ultra-low-power co-processor for deep sleep modes
- **Applications:** IoT devices (sensors, smart home appliances), Wearables and portable electronics, Industrial automation and monitoring, Wireless data logging, Remote control and telemetry

GPRS/GSM

- **Model:** SIM800L
- **Type:** GSM/GPRS Cellular Communication Module
- **Key Features:** Quad-band GSM/GPRS (850 / 900 / 1800 / 1900 MHz) – works worldwide, GPRS multi-slot class 12 / class 10 (optional), Built-in TCP/IP stack (supports HTTP, FTP, SMS, voice, etc.), Supports UART interface (AT command set compatible).
- **Applications:** IoT and M2M projects requiring remote communication, SMS-based control systems, Remote data logging (e.g., weather stations, sensors)

LoRa

- **Model:** RFM95
- **Type:** SX1276 LoRa Module
- **Key Features:** Compliant with LoRaWAN® protocol (Long Range Wide Area Network), Integrated Semtech SX1276 LoRa transceiver, Configurable spreading factor, bandwidth, and coding rate for flexible deployment, Operates in multiple frequency bands (868 MHz, 915 MHz, etc.)
- **Applications:** IoT sensor networks (smart agriculture, environmental monitoring), Remote telemetry and industrial automation, Wireless sensor nodes in low-power wide-area networks (LPWAN)

DALI

- **Model:** DALI 2 CLICK
- **Type:** DALI Communication Interface Module
- **Key Features:** Compliant with DALI-2 standard (Digital Addressable Lighting Interface – IEC 62386), Supports bidirectional communication with DALI networks, Integrated TPS65582 DALI transceiver (by Texas Instruments), Galvanically isolated interface using optocouplers.
- **Applications:** Smart lighting control in building automation systems, Energy-efficient lighting systems, Automated lighting scenes and scheduling, IoT-enabled lighting systems

Expansion Board Resources

WiFi & BLE

- 1 x Serial TTL
  - RX: GPIO 14
  - TX: GPIO 16

GPRS/GSM

- 1 x Serial TTL
  - RX: GPIO 14
  - TX: GPIO 16
- 1 x Direct Arduino Pin
  - RST: GPIO 2

LoRa

- 3 x Direct Arduino Pin
  - RST: GPIO 3
  - SS: GPIO 23
  - INT: GPIO 2

DALI

- 1 x Serial TTL
  - RX: GPIO 14
  - TX: GPIO 16

Certain I/O pins may be unavailable depending on the expansion board.

Electrical Features

Power supply voltage	12 to 24 Vdc ((2.5 A) Polarity protection)
Input rated voltage	24 Vdc
Power consumption	20W
Rated Power	30W
I max.	1.5 A

Physical Characteristics

Dimensions H x W x D	119.5 x 45 x 101	
Weight	350 g max	
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	ATmega32u4
Clock speed	16 MHz
SRAM	2.5 KB
EEPROM	1 KB

Interface Features

RS-485	Half / Full Duplex port, 120Ω termination resistor. Selectable via internal jumpers
RS-232	Selectable via internal jumpers
I2C	5V, direct from ATmega32u4
SPI	5V, direct from ATmega32u4

Analog/Digital Inputs

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Resolution	10 bit
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Rated Voltage (An)	10 Vdc
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Expansion Board Resources

WiFi & BLE	GPRS/GSM	LoRa	DALI

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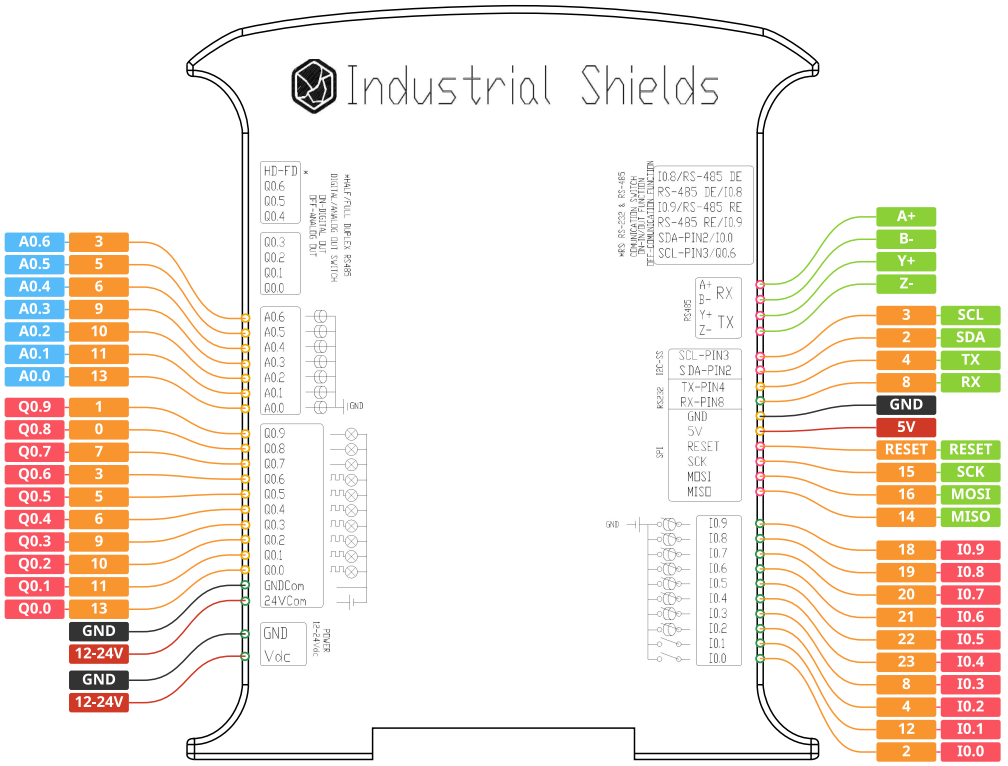
  ◦ TX: GPIO 16
	• 1 x Serial TTL
	  ◦ RX: GPIO 14
	  ◦ TX: GPIO 16
	• 1 x Direct Arduino Pin
	  ◦ RST: GPIO 2
		• 3 x Direct Arduino Pin
		  ◦ RST: GPIO 3
		  ◦ SS: GPIO 23
		  ◦ INT: GPIO 2
			• 1 x Serial TTL
			  ◦ RX: GPIO 14
			  ◦ TX: GPIO 16

Certain I/O pins may be unavailable depending on the expansion board.



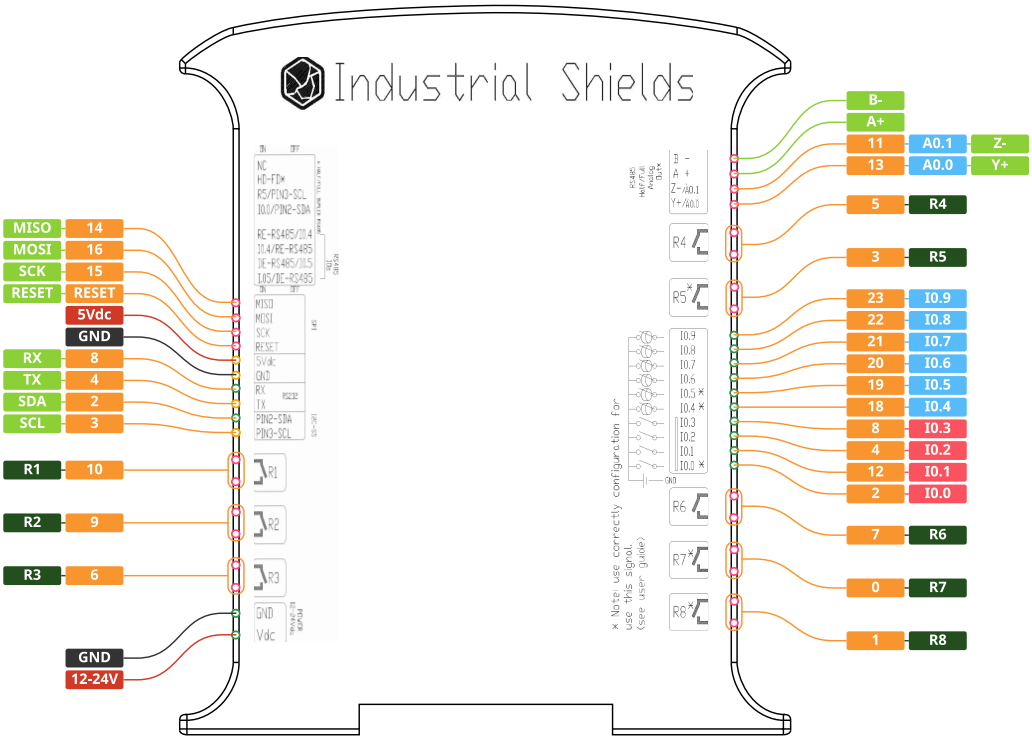
Ardbox Analog Communication Zone Pinout

Pinout Function

Communication GPIO Analog PWM
Ground Power Digital

Pinout Direction

Input Output Input/Output



Ardbox Relay Communication Zone Pinout

Pinout Function

Communication GPIO Analog Relay
Ground Power Digital

Pinout Direction

Input Output Input/Output

Install Arduino IDE and the Industrial Shields boards

Steps to install Industrial Shields equipment in the Arduino IDE:

1. Open the Arduino IDE (version 1.8.19 or later). You can download it from: https://www.arduino.cc/en/Main/Software
2. In the Arduino IDE, go to the File menu and click Preferences.
3. In the **"Additional Board Manager URLs"** field, add this URL: http://apps.industrialshields.com/main/arduino/boards/package_industrialshields_index.json
4. Click **OK** to close the Preferences window.
5. Go to the **Tools** menu, open the **Board** submenu, and click **Boards Manager**.
6. In the Boards Manager window, type **industrialshields-avr** into the search bar. Select the result from the list and click **Install**.
7. Once the installation is complete, close the Boards Manager.

You will now be able to select the desired PLC from **Tools > Board**, such as M-Duino, Ardbox, etc.

For more information, visit:
https://www.industrialshields.com/blog/arduino-industrial-1/how-to-install-industrial-shields-boards-in-the-arduino-ide-63

References

The references are: 0EE00100MM00
E stands for the Expansion Board:

- EE = 04 → DALI
- EE = 06 → GPRS
- EE = 07 → WiFi-BLE
- EE = 15 → LoRa

M stands for Model:

- MM = 12 → Analog
- MM = 13 → Relay

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 Ardbox family 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 Ardbox 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

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