INDUSTRIAL SHIELDS

USER GUIDE

ARDBOX FAMILY

INDUSTRIAL SHIELDS

Ardbox User Guide:

Contents

COMPACT PLC.

INDUSTRIAL SHIELDS

ARDBOX FAMILY GUIDE

A compact PLC based in Open Source Hardware technology. With different Input/Outputs Units.

Supply Voltage
24 Vcc

Compact
DIN rail mounting

I2C

Safety
Industrial communications

I/Os
Digital
Analog
Relay

COMPACT PLC ARDUINO 24Vcc ARDBOX				
MODEL TYPE	**PNP**	**TCH**	**Relay**	**ANALOG**
Input Voltage	24Vcc			
I max.	0,5A			
Size	100x45x115			
Clock Speed	16MHz			
Flash Memory	32KB of wich 0,5KB used by bootlader			
SRAM	2KB			
EEPROM	1KB			
Comunicaciones	I2C hasta 127 elementos. – Puerto Serie RS-232 (1)			
TOTAL Input points	6	10	8 (+2)	10
TOTAL Output points	14	10	8 (+2)	10
Type of signals				
Input/Output configurable (5Vcc)	-	-	2	-
*** Analog Input 10bit** (0-10Vcc)	6	6	6	9
*** Digital Input** (24Vcc)	**6**	**10**	**-**	**10**
*** Interrupt Input HS** (24Vcc)	-	2	2 (5Vcc) I/O's configurable	1
*** Analog Output** (0-10Vcc)	-	-	-	6
*** Digital Output** (24Vcc)	14	**8**	-	**10**
*** PWM Output 8bit** (24Vcc)	-	-	-	6
*** Relay (220Vac - 5A)**	-	**2**	**8**	-
Expandability	I2C - 127 elements - Serial Port RS-232			
Reference	IS.AB20PNP.base	IS.AB20TCH.base	IS.AB18REL.base	IS.AB20AN.base

*** By using this type of signal can no longer use Digital signal (24Vcc)**
You must to read product Datasheet.
(1) With previous request. IMPORTANT

INDUSTRIAL SHIELDS

ARDBOX PNP GUIDE

Ref. IS.AB20PNP.base

Numero de elementos	Entrada / salida	Tipo de señal	Voltaje trabajo	Pines Arduino
14	Out	Digital	24 Vcc	0,1,2,3,4,5,6 ,7,8,9,10,11, 12,13
6	In	Analog/ digital	0-10Vcc (10 bits: 0-1023) 24Vcc	A0-A5 * 10 Bits: 0-1023
* Configuration by software				

6 Inputs:
- **(6x)** Semi-analog (0-10Vcc) / Digital (24Vcc) Inputs, configurable by software
You need recalibrate your analog values.

14 Outputs:
- **(14x)** Digitals (24Vcc)

CPU Characteristics

Microcontroller	ATmega328
Flash Memory	32 KB of which 0,5 KB used by bootloader
SRAM	2 KB
EEPROM	1 KB
Clock Speed	16 MHz

Comunication Characteristics

Comunicaciones Serial	0 RX 1 TC	Not Active
External interrupts	2,3 Attachinterrupt()	Not Active, Only
SPI Comunication	10 SPI 11 MOSI 12 MISO 13 SCK	Not Active
TWI Comunication / Wire library I2C	A4 TWI A5 SCL	Not Active

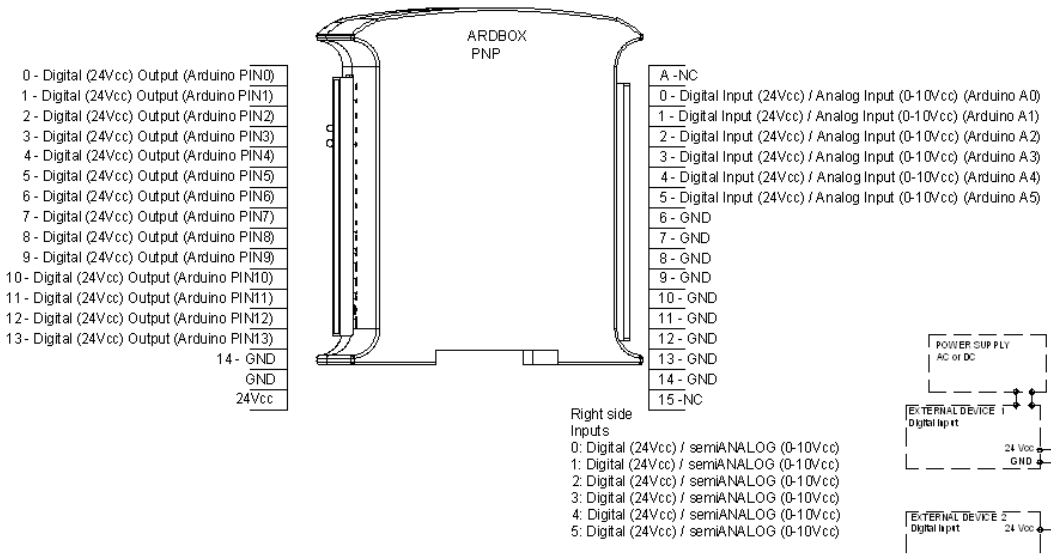
You need Arduino IDE for programming these PLCs

INDUSTRIAL SHIELDS

PINOUT:

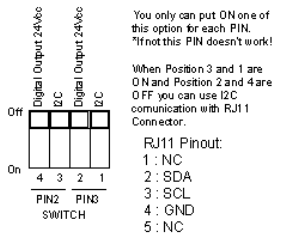
Type of signal:	Imax
Out: Digital 24Vcc	Imax: 80mA
Input:	It have internal resistance: 24Vcc 0-10Vcc

PINOUT I/Os



Right side
Inputs
0: Digital (24Vcc) / semiANALOG (0-10Vcc)
1: Digital (24Vcc) / semiANALOG (0-10Vcc)
2: Digital (24Vcc) / semiANALOG (0-10Vcc)
3: Digital (24Vcc) / semiANALOG (0-10Vcc)
4: Digital (24Vcc) / semiANALOG (0-10Vcc)
5: Digital (24Vcc) / semiANALOG (0-10Vcc)

Configuration about I2C Comunication

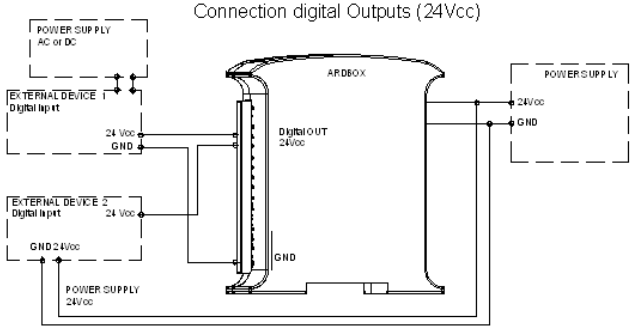


You only can put ON one of this option for each PIN. *If not this PIN doesn't work!

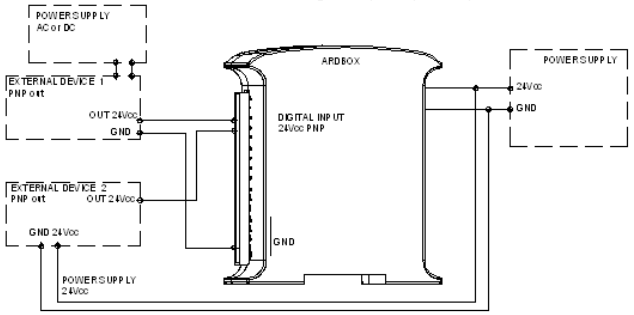
When Position 3 and 1 are ON and Position 2 and 4 are OFF you can use I2C comunication with RJ11 Connector.

RJ11 Pinout:
1 : NC
2 : SDA
3 : SCL
4 : GND
5 : NC
6 : 5Vcc

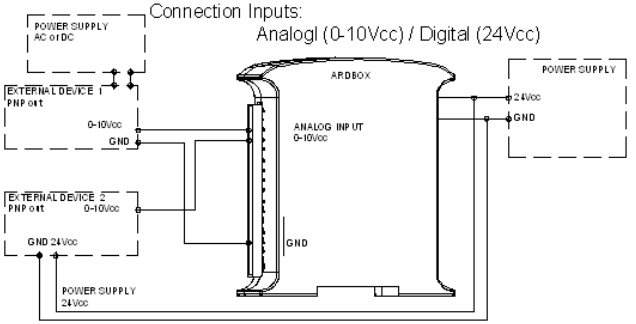
Connection digital Outputs (24Vcc)



Connection digital Inputs (24Vcc)



Connection Inputs:
Analogl (0-10Vcc) / Digital (24Vcc)



INDUSTRIAL SHIELDS

ARDBOX TCH GUIDE

Ref. IS.AB20TCH.base

Numero de elementos	Entrada / salida	Tipo de señal	Voltaje trabajo	Pines Arduino
10	Out	Digital	24 Vcc	4, 5, 6, 7, 8, 9, 10, 11
	Out	Relay	(220Vac – 5A)	12,13
10	In	Analog/ digital	0-10Vcc (10 bits: 0-1023) 24Vcc	A0-A5 * 10 Bits: 0-1023
	In	Digital	24Vcc	0,1,2,3
* Configuration by software				

10 Inputs:
- **(6x)** Semi-analog (0-10Vcc) / Digital (24Vcc) Inputs, configurable by software You need recalibrate your analog values.
- **(4x)** Digital (24Vcc) Inputs

10 Outputs:
- **(8x)** Digitals (24Vcc)
- **(2x)** Relay (220Vac-5A)

Compact
DIN rail mounting

Safety
Industrial communications

CPU Characteristics

Microcontroller	ATmega328
Flash Memory	32 KB of which 0,5 KB used by bootloader
SRAM	2 KB
EEPROM	1 KB
Clock Speed	16 MHz

Comunication Characteristics

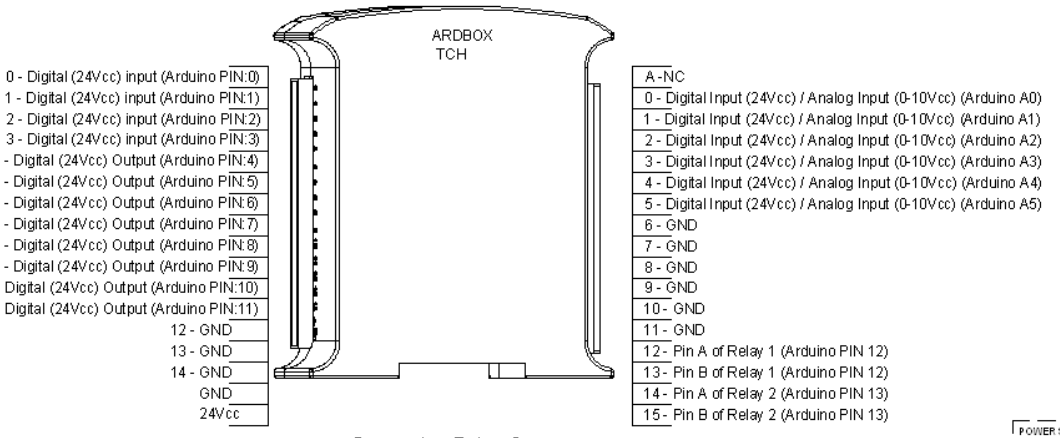
Comunicaciones Serial	0 RX 1 TC	Not Active
External interrupts	2,3 Attachinterrupt()	Not Active, Only
SPI Comunication	10 SPI 11 MOSI 12 MISO 13 SCK	Not Active
TWI Comunication / Wire library I2C	A4 TWI A5 SCL	Not Active

You need Arduino IDE for programming these PLCs

PINOUT:

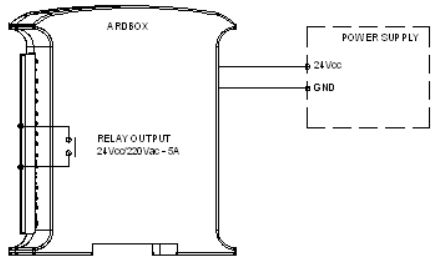
Type of signal:	Imax
Out: Digital 24Vcc	Imax: 80mA
Input:	It have internal resistance: 24Vcc 0-10Vcc
Relay output	220Vac – 5A

PINOUT I/Os

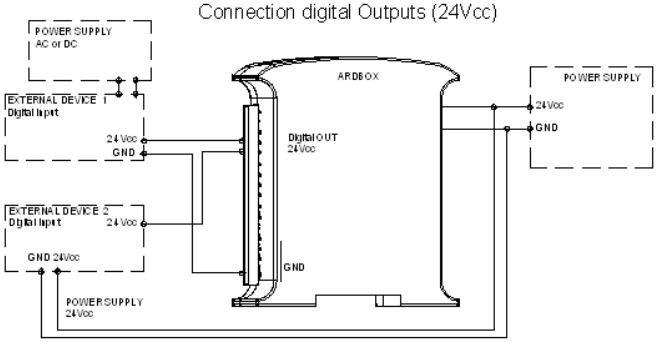


Comunication connector
RJ11 Pinout:
1 : NC
2 : SDA
3 : SCL
4 : GND
5 : NC
6 : 5Vcc

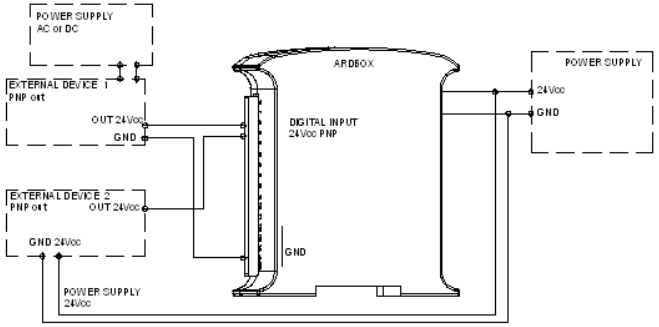
Connection Relay Output



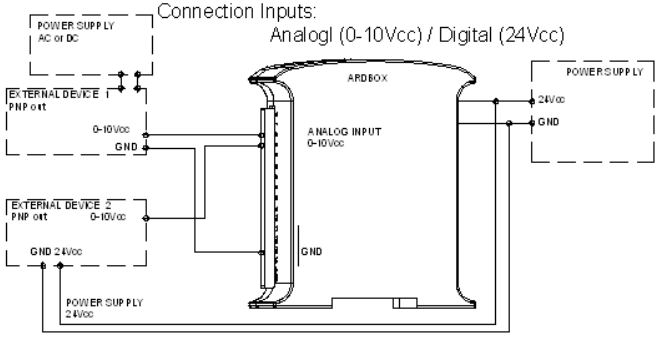
Connection digital Outputs (24Vcc)



Connection digital Inputs (24Vcc)



Connection Inputs:
Analogl (0-10Vcc) / Digital (24Vcc)



INDUSTRIAL SHIELDS

ARDBOX ANALOG GUIDE

Ref.IS.AB20AN.base

Numero de elementos	Entrada / salida	Tipo de señal	Voltaje trabajo	Pines Arduino
10	Out	Analog / PWM/ digital	0-10 Vcc / 24Vcc (0-254)	3,5,6,9,10,11, 13 8 Bits:0-254
	Out	Digital	24Vcc	0,1,7
10	In	Analog/ digital	0-10Vcc (10 bits: 0-1023) 24Vcc	A0-A5 * 10 Bits: 0-1023 4,8,12 8 Bits:0-254
	In	Digital	24Vcc	2
* Configuración por software y hardware (jumpers)				

10 Inputs:
- **(9x)** Analog (0-10Vcc) / Digital (24Vcc) Inputs, configurable by jumpers[1]
- **(1x)** Digital inputs PNP (24Vcc.

10 Outputs:
- **(4x)** Digitals (24Vcc) / Analog (0-10Vcc) / PWM (24Vcc).
- **(3x)** Analog (0-10Vcc)
- **(3x)** Digitals (24Vcc)

Compact
DIN rail mounting

Safety
Industrial communications

CPU Characteristics

Microcontroller	ATmega328
Flash Memory	32 KB of which 0,5 KB used by bootloader
SRAM	2 KB
EEPROM	1 KB
Clock Speed	16 MHz

Comunication Characteristics

Comunicaciones Serial	0 RX 1 TC	Not Active
External interrupts	2,3 Attachinterrupt()	Not Active, Only Pin 2
SPI Comunication	10 SPI 11 MOSI 12 MISO 13 SCK	Not Active
TWI Comunication / Wire library I2C	A4 TWI A5 SCL	Not Active

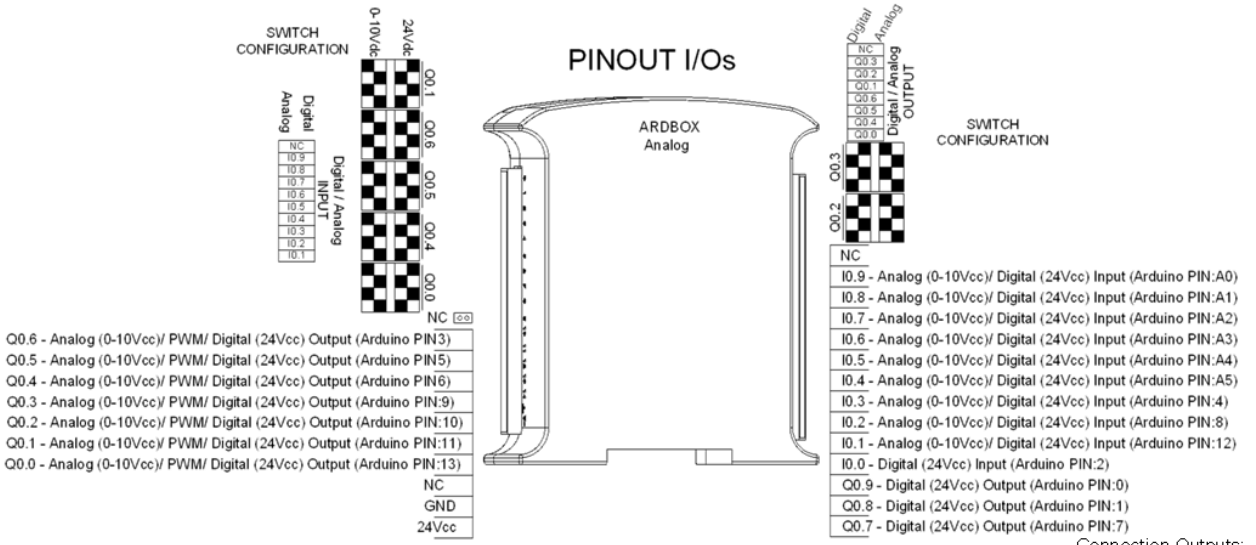
You need Arduino IDE for programming these PLCs

INDUSTRIAL SHIELDS

PINOUT:

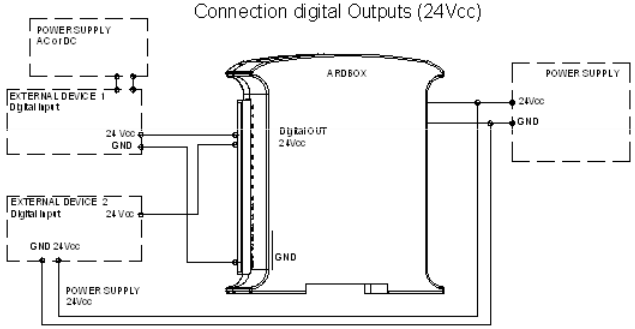
Type of signal:	Imax
OUT: Analog 0-10Vcc / PWM / Digital 24Vcc	Imax: 12mA (24Vcc) 30mA (10Vcc)
Out: Digital 24Vcc	Imax: 80mA
Input:	It have internal resistance: 24Vcc 0-10Vcc

PINOUT I/Os

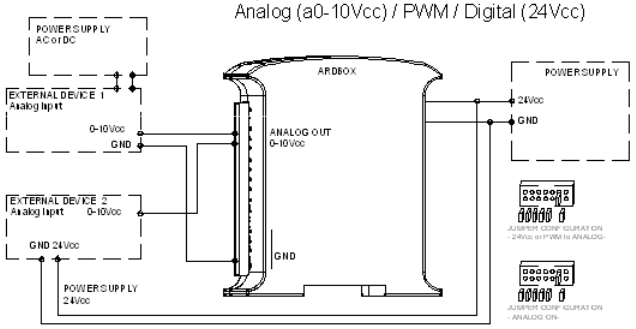


Comunication connector
RJ11 Pinout:
1 : NC
2 : SDA
3 : SCL
4 : GND
5 : NC
6 : 5Vcc

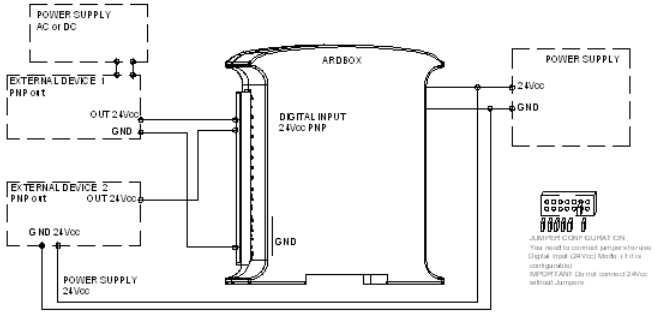
Connection digital Outputs (24Vcc)



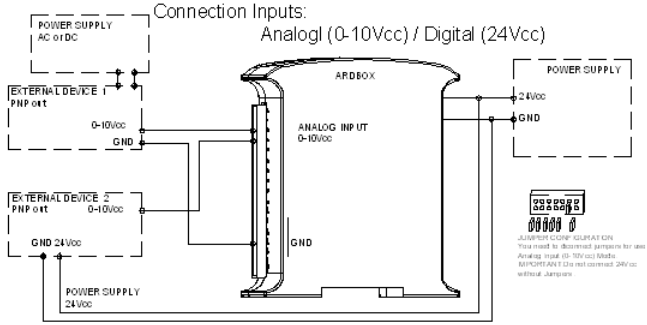
Connection Outputs:
Analog (a0-10Vcc) / PWM / Digital (24Vcc)



Connection digital Inputs (24Vcc)



Connection Inputs:
Analogl (0-10Vcc) / Digital (24Vcc)



INDUSTRIAL SHIELDS

ARDBOX RELAY GUIDE

Ref. IS.AB18REL.base

Numero de elementos	Entrada / salida	Tipo de señal	Voltaje trabajo	Pines Arduino
8	Out	Relay	(220Vac – 5A)	4, 5, 6, 7, 8, 9, 10, 11
8	In	Analog/ digital	0-10Vcc (10 bits: 0-1023) 24Vcc	A0-A5 * 10 Bits: 0-1023
	In	Digital	24Vcc	0,1,2,3
2	In/Out	Digital	5Vcc	12,13
* Configuration by software and jumpers				

8 Inputs:
- **(6x)** Semi-analog (0-10Vcc) / Digital (24Vcc) Inputs, configurable by software
You need recalibrate your analog values.
- **(4x)** Digital (24Vcc) Inputs

8 Outputs:
- **(8x)** Relay (220Vac-5A)

2 In/Out:
5Vcc Directly from Arduino

Compact
DIN rail mounting

Safety
Industrial communications

CPU Characteristics

Microcontroller	ATmega328
Flash Memory	32 KB of which 0,5 KB used by bootloader
SRAM	2 KB
EEPROM	1 KB
Clock Speed	16 MHz

Comunication Characteristics

Comunicaciones Serial	0 RX 1 TC	Not Active
External interrupts	2,3 Attachinterrupt()	Not Active, Only
SPI Comunication	10 SPI 11 MOSI 12 MISO 13 SCK	Not Active
TWI Comunication / Wire library I2C	A4 TWI A5 SCL	Not Active

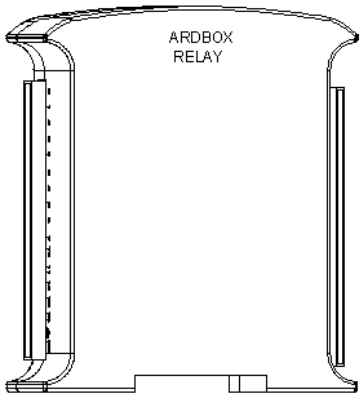
You need Arduino IDE for programming these PLCs

INDUSTRIAL SHIELDS

PINOUT:

Type of signal:	Imax
Out: Relay	220Vac – 5A
Input:	It have internal resistance: 24Vcc 0-10Vcc
In/Out configurable	5Vcc – 0.40mA

PINOUT I/Os



0 - Pin A of Relay 1 (Arduino PIN 4)
1 - Pin B of Relay 1 (Arduino PIN 4)
2 - Pin A of Relay 2 (Arduino PIN 5)
3 - Pin B of Relay 2 (Arduino PIN 5)
4 - Pin A of Relay 3 (Arduino PIN 6)
5 - Pin B of Relay 3 (Arduino PIN 6)
6 - Pin A of Relay 4 (Arduino PIN 7)
7 - Pin B of Relay 4 (Arduino PIN 7)
8 - Pin A of Relay 5 (Arduino PIN 8)
9 - Pin B of Relay 5 (Arduino PIN 8)
10 - Pin A of Relay 6 (Arduino PIN 9)
11 - Pin B of Relay 6 (Arduino PIN 9)
12 - Pin A of Relay 7 (Arduino PIN 10)
13 - Pin B of Relay 7 (Arduino PIN 10)
14 - Arduino PIN12 (directly)
GND
24Vcc

NOTE: CON2 and CON3 is a wire directly of Arduino Board. You can use it like an Digital Input (5Vcc) or Digital Out (5Vcc) . Màx 0.4mA. (configurable by software) IMPORTANT: DO NOT CONNECT MORE THAN 5Vcc

(CON)

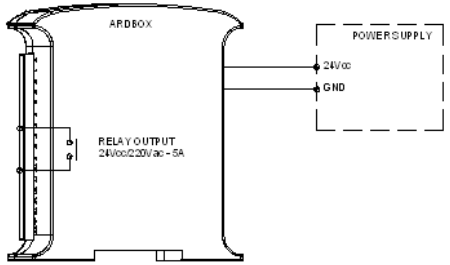
A - Pin A of Relay 8 (Arduino PIN 11)
0 - Pin B of Relay 8 (Arduino PIN 11)
1 - Arduino PIN 13 (directly)
2 - GND
3 - GND
4 - Digital Input (24Vcc) (Arduino PIN3)
5 - Digital Input (24Vcc) (Arduino PIN2)
6 - Digital Input (24Vcc) / Analog Input (0-10Vcc)* (Arduino A0)
7 - Digital Input (24Vcc) / Analog Input (0-10Vcc)* (Arduino A1)
8 - Digital Input (24Vcc) / Analog Input (0-10Vcc)* (Arduino A2)
9 - Digital Input (24Vcc) / Analog Input (0-10Vcc)* (Arduino A3)
10 - Digital Input (24Vcc) / Analog Input (0-10Vcc)* (Arduino A4)
11 - Digital Input (24Vcc) / Analog Input (0-10Vcc)* (Arduino A5)

NOTE:* You need to connect jumpers for use Digital Input (24Vcc) Mode. IMPORTANT.Do not connect 24Vcc without Jumpers.

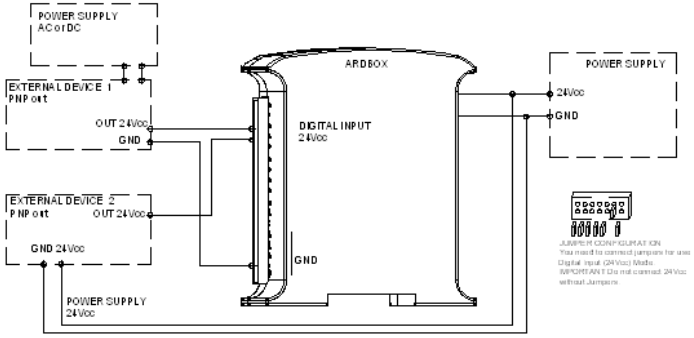
J0 - Jumper configuration for Pin connector 6
J1 - Jumper configuration for Pin connector 7
J2 - Jumper configuration for Pin connector 8
J3 - Jumper configuration for Pin connector 9
J4 - Jumper configuration for Pin connector 10
J5 - Jumper configuration for Pin connector 11

Comunication connector
RJ11 Pinout:
1 : NC
2 : SDA
3 : SCL
4 : GND
5 : NC
6 : 5Vcc

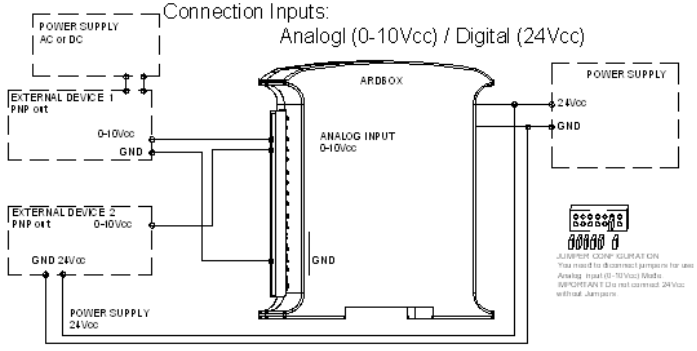
Connection Relay Output



Connection digital Inputs (24Vcc)

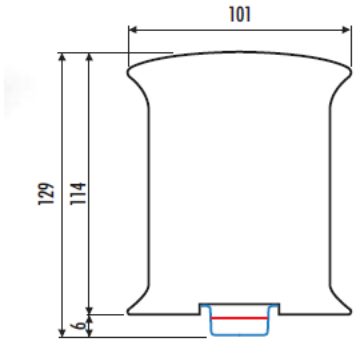


Connection Inputs:
Analogl (0-10Vcc) / Digital (24Vcc)



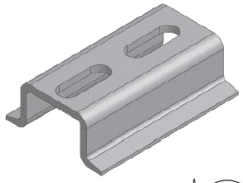
INDUSTRIAL SHIELDS

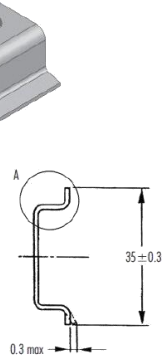
- **Dimension ARDBOX Family:**

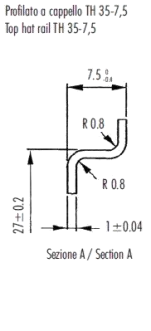


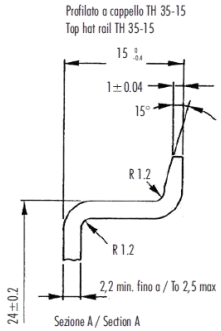
45mm de ancho

- **DIN rail mounting:**









CARATTERISTICHE		METODO	UNITA' DI MISURA	BLEND PC/ABS
Meccaniche	Resistenza a trazione allo snervamento	ASTM D638	MPa	68
	Resistenza a trazione a rottura	ASTM D638	MPa	48
	Allungamento a rottura	ASTM D638	%	59
	Modulo in flessione	ASTM D790	MPa	2894
	Prova Izod con intaglio	ISO 180/1A	KJ/m²	5,5
Termiche	Temp. di rammollimento Vicat, metodo B	ASTM D1525	°C	114
	Temperatura Ricotta 1,81 MPa	ASTM D648	°C	97
Fisiche	Peso specifico	ASTM D792	gr/cm3	1,21
	Ritiro nello stampo	ASTM D955	%	0,4/0,6
	Melt Flow Indice 260°C - 98N	ASTM D1238	gr/10'	11,1
Comportamento alla fiamma	Autoestinguenza (mm di spessore)	UL94	-	V-0 (0,8)
	Filo Incandescen. 3,2 mm	IEC695.2.1	°C	960

Italtronic si riserva il diritto di modificare il materiale con cui realizza i propri prodotti senza obbligo di preavviso.

FEATURES		TEST METHOD	UNITS	BLEND PC/ABS
Mechanical test	Resistance to tensile stress at yield	ASTM D638	MPa	68
	Tensile strength	ASTM D638	MPa	48
	Ultimate elongation	ASTM D638	%	59
	Flexing modulus	ASTM D790	MPa	2894
	Izod test notched	ISO 180/1A	KJ/m²	5,5
Thermal test	Vicat softening temperature method B	ASTM D1525	°C	114
	Reheating temperature 1,81 MPa	ASTM D648	°C	97
Physical test	Specific gravity	ASTM D792	gr/cm3	1,21
	Mould shrinkage	ASTM D955	%	0,4/0,6
	Melt Flow Index 260°C - 98N	ASTM D1238	gr/10'	11,1
Flame test	Self extinguisher (thickness in mm)	UL94	-	V-0 (0,8)
	Incandescente thread 3,2 mm	IEC695.2.1	°C	960

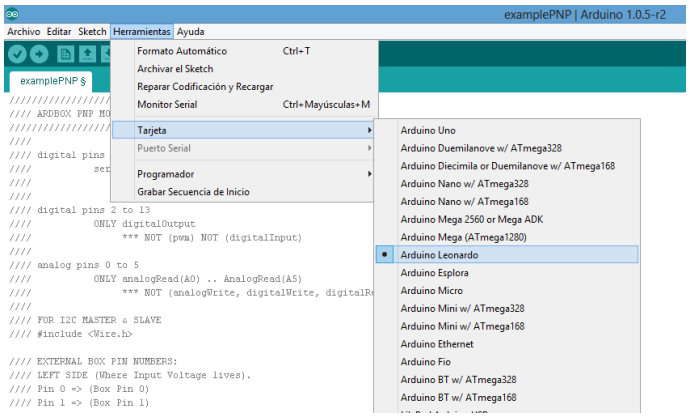
Italtronic can operate any change of the materials without being obliged to forewarn.

Software Interface:

Arduino IDE is compatible for programm these PLCs. You must to download a start code in www.industrialshields.com at product page in “document files”section and then It’s necessary open it with Arduino IDE.

Configuration about Arduino IDE:

All Ardbox PLCs use an Arduino Leonardo and you need to choose these opcion in Arduino IDE.



About Industrial Shields:
SPAIN
Avda. Castell de Barberà 26, nave 9
08210 Barberà del Vallès (Barcelona)
Tel.+34 635693611
Mail: industrialshields@industrialshields.com