Product data sheet
Characterstics

SMART CONTROLS
SC-SE-I8-RO6-TO2

SC-SE-I8-RO6-TO2

8 Digital Inputs

6 Relay outputs

2 Transistor outputs

RS-485 communication

Built in OLED Display

Expansions supported

LoRa communications REYAX RYLR896	NB-IOT BC95 module	Temperature MAX31856	Analog 4-20mA / 0 - 10V	Load cell HX-711

Main

Range of product	Smart Controls
Product type	Programmable Controller
Rated supply voltage	24V DC
Discrete input number	8 discrete input
Discrete output type	Relay and Transistor
Discrete output number	6 Relay outputs , 2 Transistor outputs
Discrete output voltage	24V DC for transistor output
Discrete output current	0.5A with T0.0... T0.1 Transistor 2 A with R0....R5
Communication	1 x RS-485
OLED Display protocol	I2C

Complementary

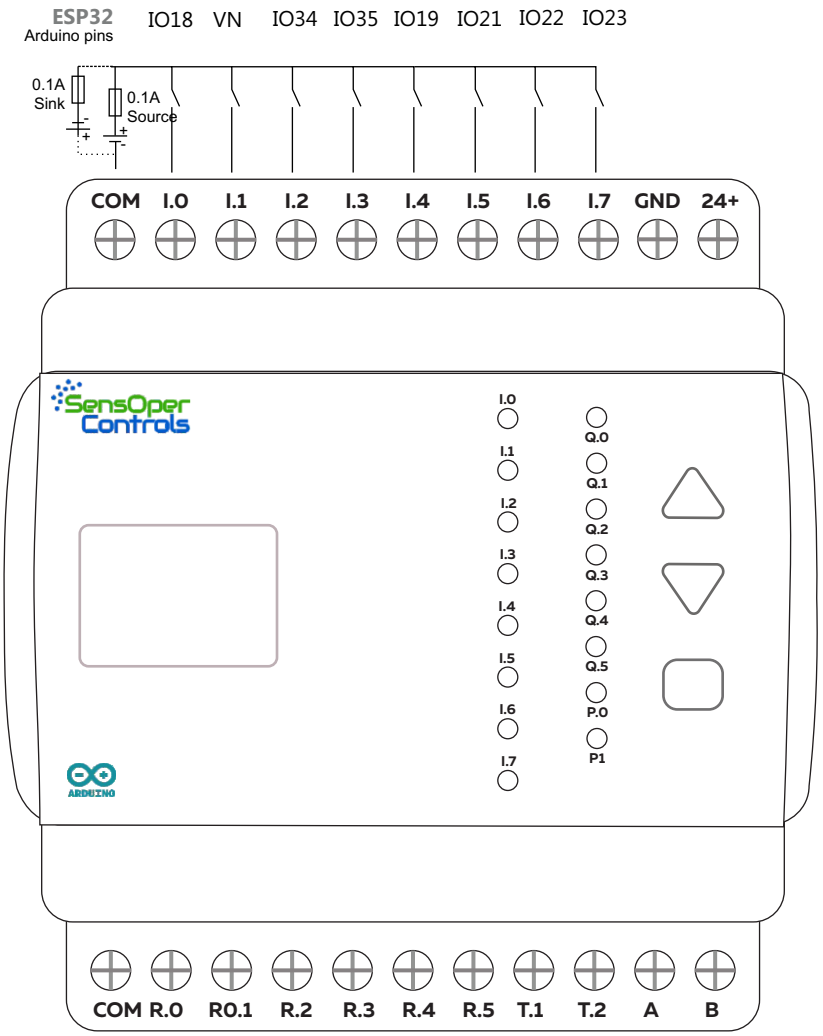
Discrete IO number	16
Number of Expansions	-----
Supply voltage limits	20.4....28.8V
Inrush current	<=50A
Power consumption in W	32.6.....40.4 with all outputs ON
Discrete logic input	Sink or source
Discrete input voltage	24V
Discrete input voltage type	DC
Voltage state 1 guaranteed	>=15 V for input
Voltage state 0 guaranteed	<=5 V for input
Discrete input current	5 mA for input
Input impedance	4.7k Ohm for input
Memory capacity	Refer datasheet of base micro-controller
Battery type	-----
Backup time	-----
Local signalling	1 LED green for PWR 8 LED green for I0.....I7 6 LED green for R0.....R5 2 LED green for T0....T1
Electrical connection	Removable screw terminal block for inputs and outputs (pitch 5.08 mm)
Mounting support	Top hat type TH35-15 rail conforming to IEC 60715 Top hat type TH35-7.5 rail conforming to IEC 60715 Plate or panel with fixing kit
Height	90.50 mm
Depth	56.60 mm
Width	60.60 mm
Product weight	0.43 Kg

Environment

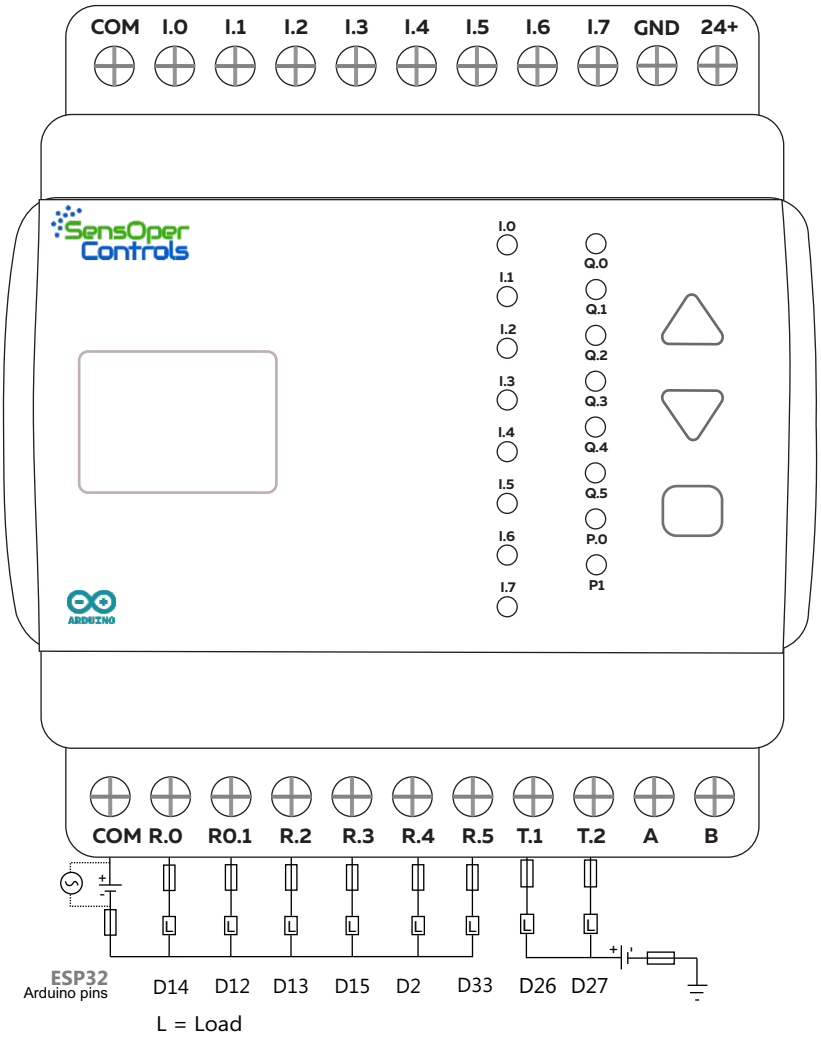
Resistance to electrostatic discharge	4kV on contact 8kV on air
Resistance to electro magnetic fields	10 V/m (80 MHz ..... 1GHz) 3 V/m (1.4 MHz ..... 2 GHz) 1 V/m (2 MHz ..... 3 GHz)
Immunity to microbreaks	10 ms
Relative humidity	10....95% without condensation in operation
IP degree of protection	IP20
Operating altitude	0...2000m
Storage altitude	0...3000m
Shock resistance	15 gn for 11 ms

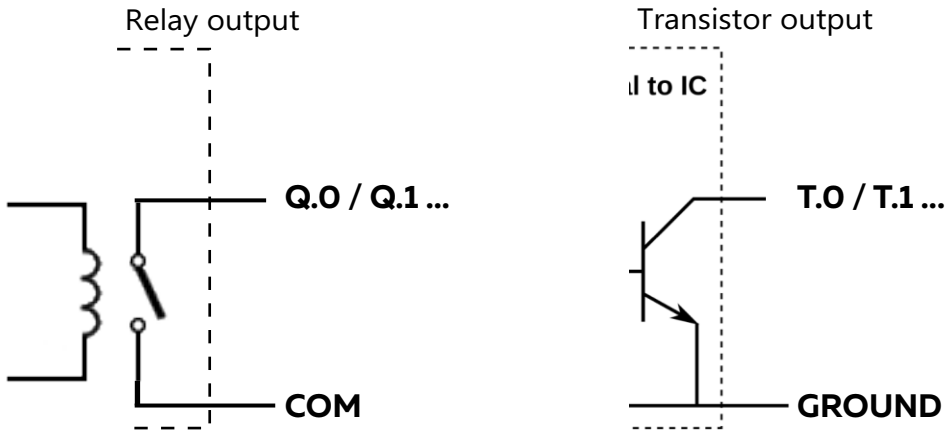
Digital inputs wiring diagram

24V DC Sink/Source



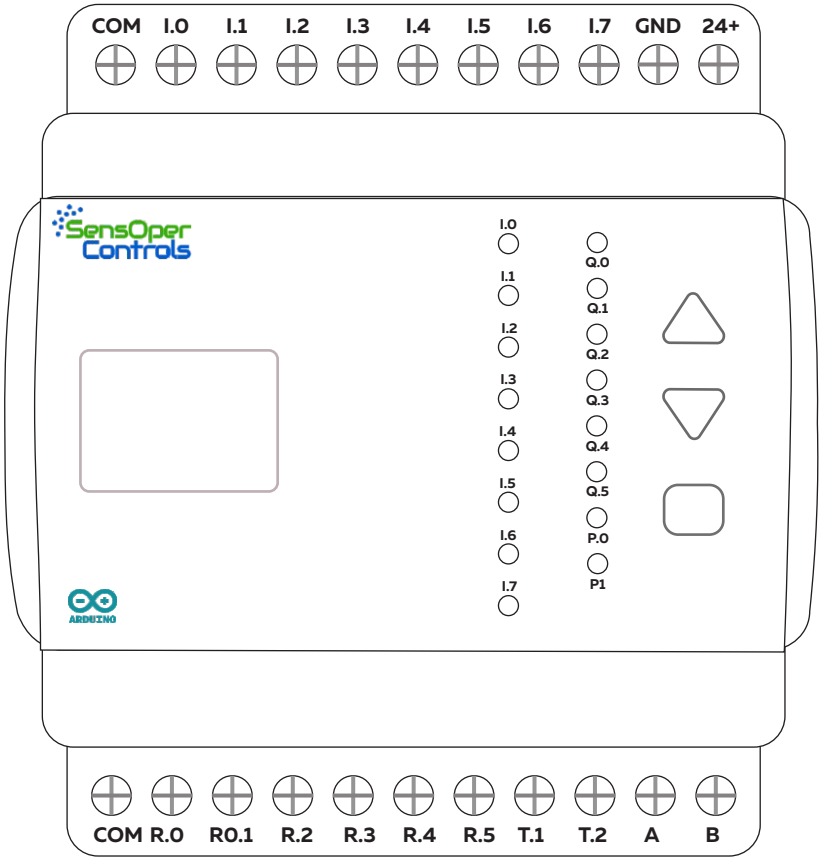
Relay and Transistor outputs wiring diagram





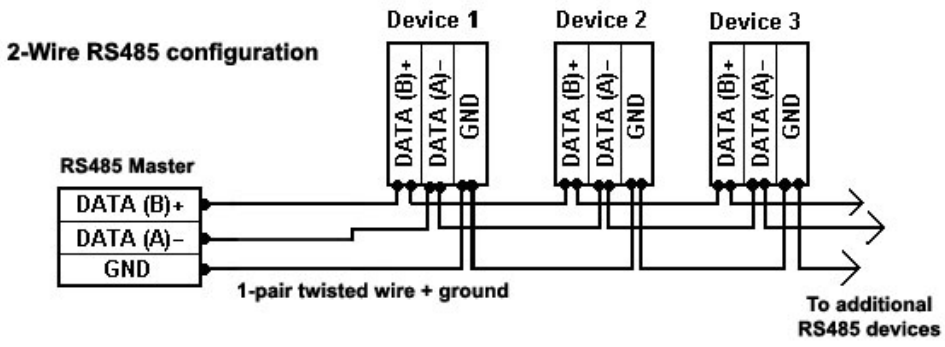
RS-485 communication wiring diagram

Driver	MAX485
UART Connection	IO3 - RXD IO1 - TXD
Flow Control	IO4



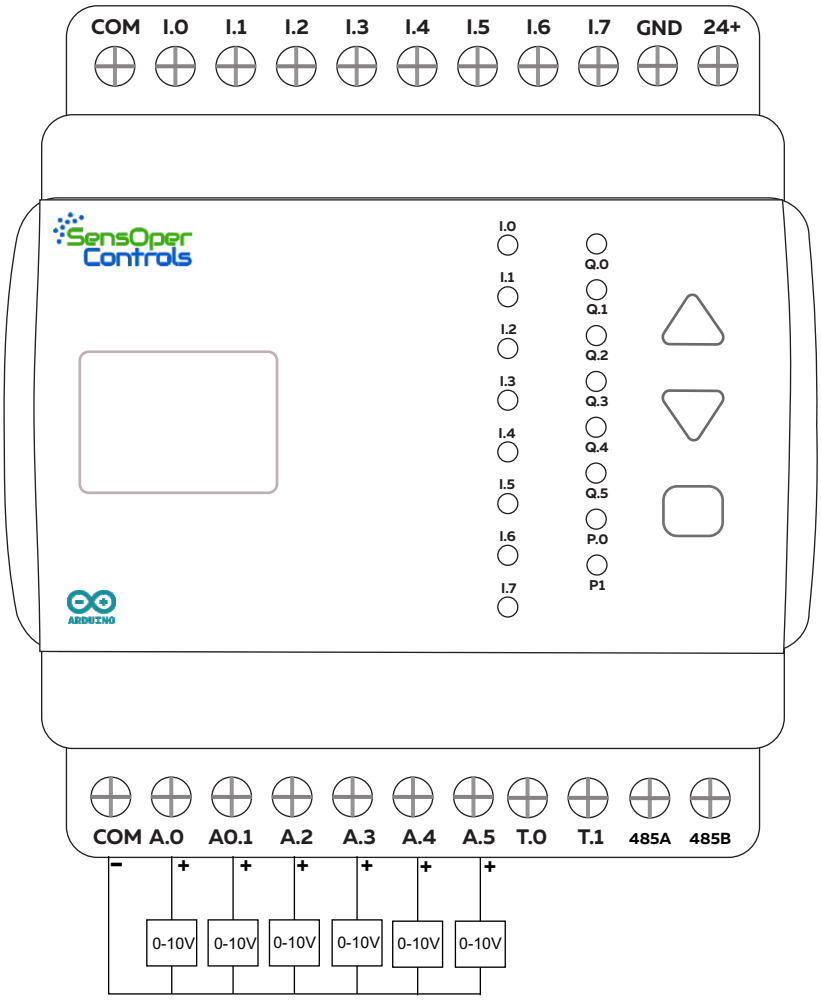
HALF-DUPLEX

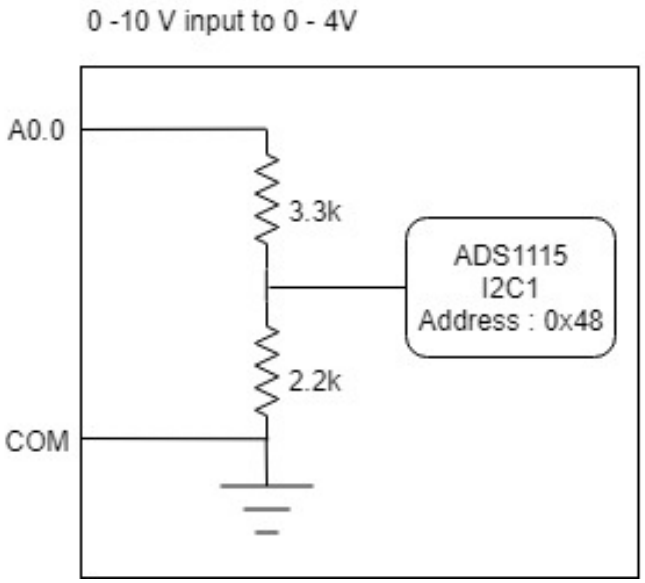
Flow control
Arduino pin D26



Analog input wiring diagram (0-10V)

*AE-02 / AE-03 Models Only



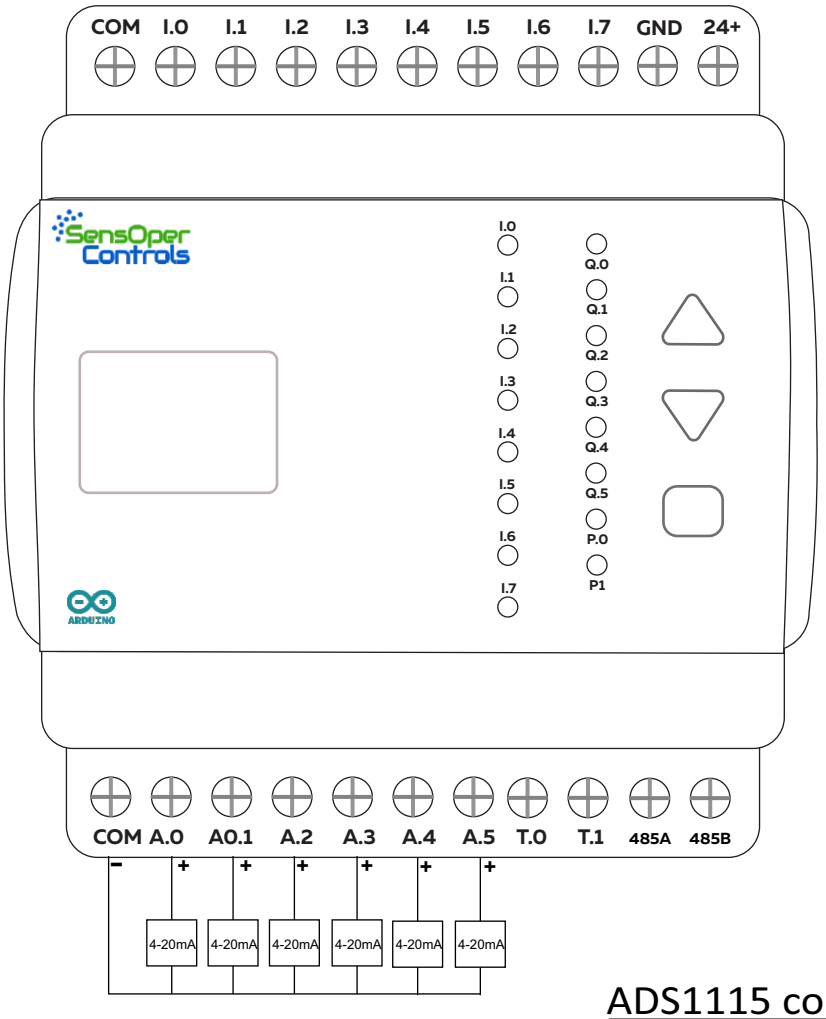


ADS1115 connections

IC Type	ADS 1115
Communication	I2C IO16 - IO17
Module Address	0x48 / 0x49
Resolution	16 bit

Analog input wiring diagram (4-20mA)

***AE-02 / AE-03 Models Only**



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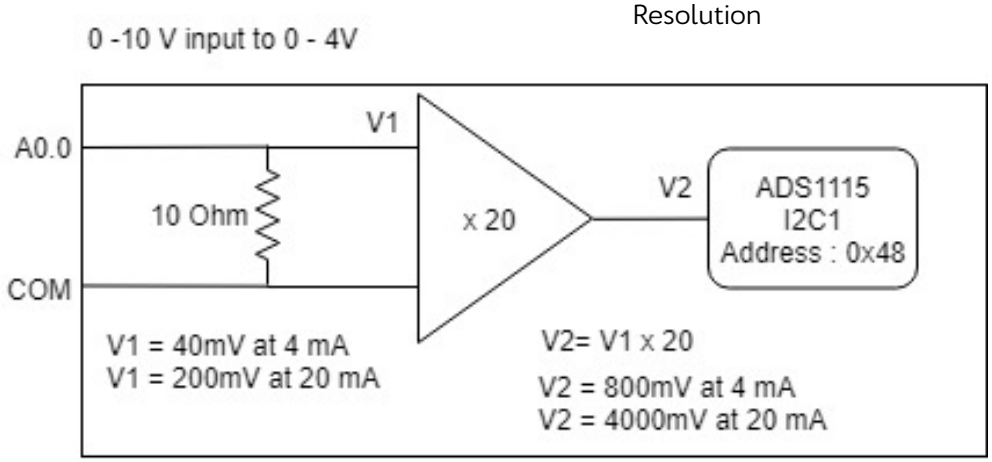
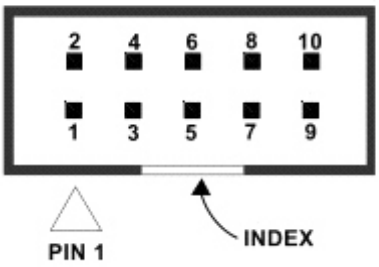
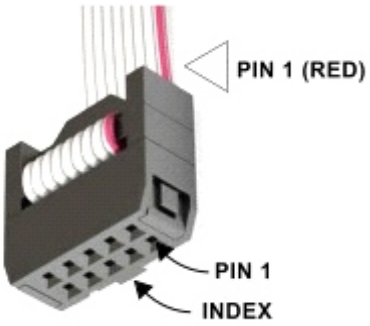


Product data sheet
Expansion

SMART CONTROLS
SC-SE-I8-RO6-TO2

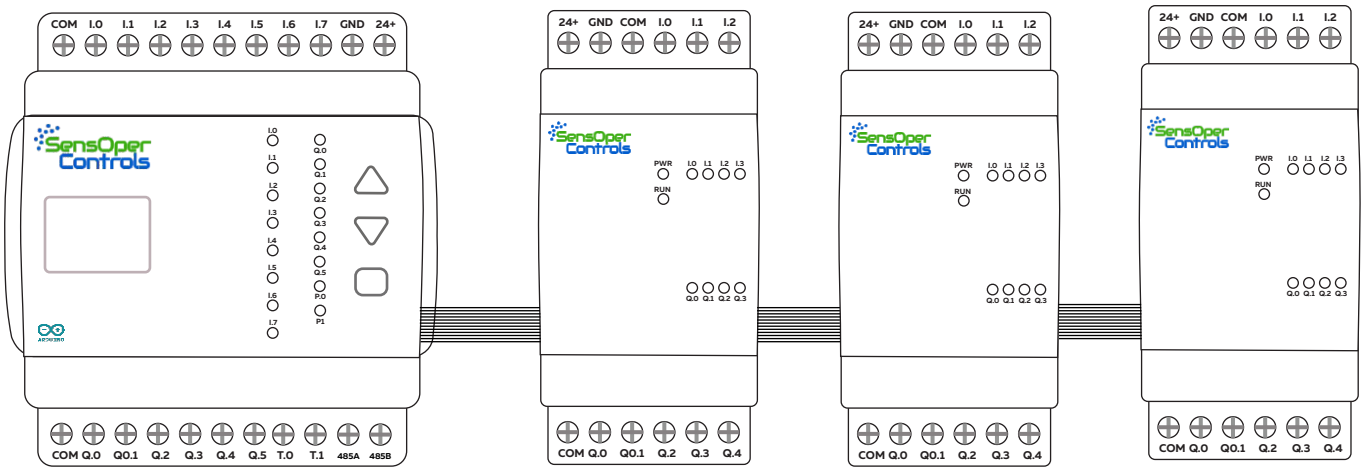
Expansion port





PIN	ESP32 Connection
1	IO25
2	TXD0
3	Not Connected
4	RXD0
5	BOOT IO0
6	IO32
7	Not Connected
8	SCL IO17
9	Ground
10	SDA IO16

Expansion modules



Main Controller | **Expansion Module** | **Expansion Module** | **Expansion Module**

Expansion modules connects to the right side of the controller

Upto 6 expansion modules can be connected on one controller

Expansion modules use I2C, UART and GPIO on the expansion port

Depending on the model, some expansion modules require external power

LoRa communications
REYAX RYLR896

NB-IOT
BC95 module

Temperature
MAX31856

Analog
4-20mA / 0 - 10V

Load cell
HX-711

TFT Display parameters

Display driver	ST7789
Communication	SPI IO18/IO19/IO23 SCK/MISO/MOSI
Module Address	NA
Resolution	80 x 160
Connection	TFT_SCK IO18 TFT_RST IO32 TFT_MOSI IO23 TFT_DC IO13 TFT_CS IO27

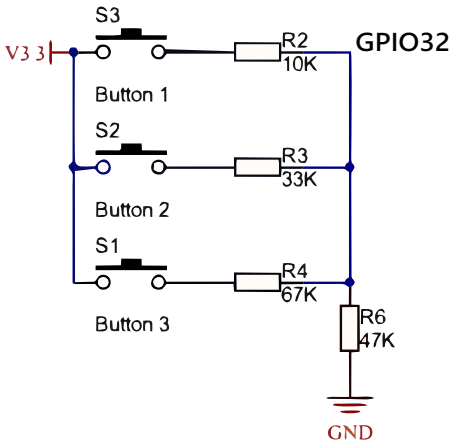
0.96 OLED Display parameters

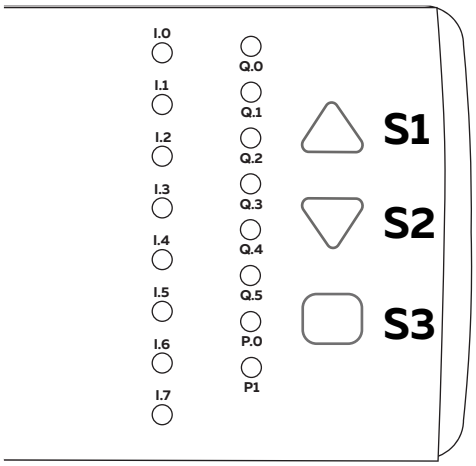
Display driver	SSD1306
Communication	I2C IO16(SDA) - IO17(SCL)
Module Address	0x3C
Resolution	128 x 64

Built in buttons

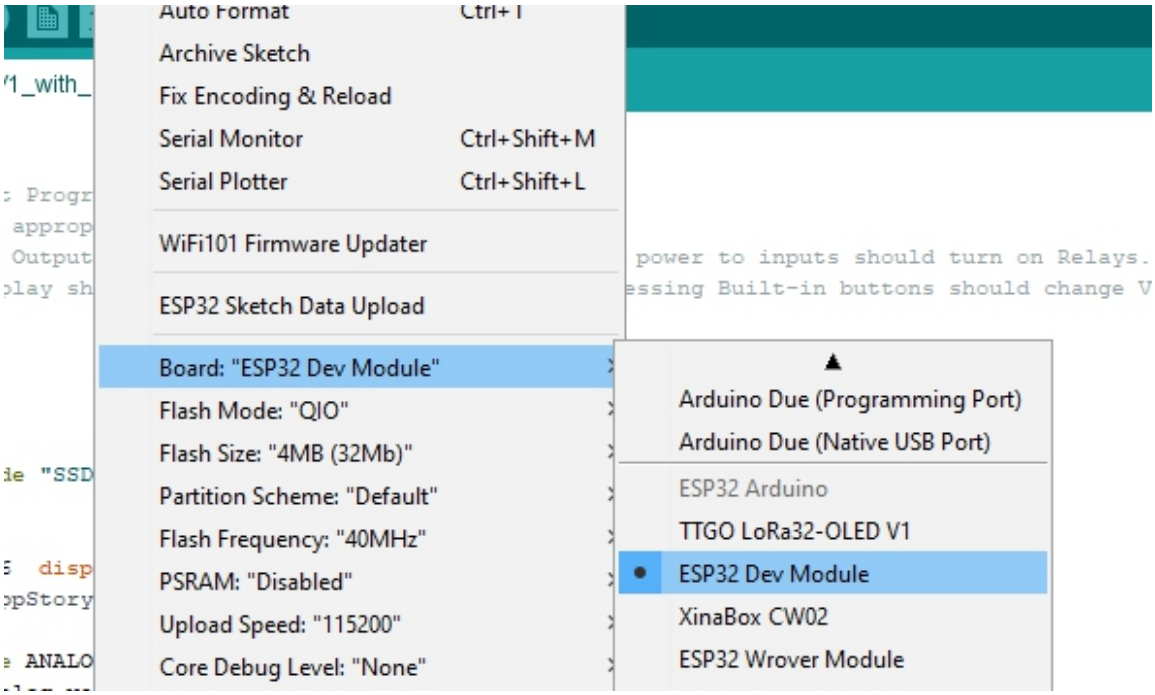
Read mode	ADC (Analog to Digital Conversion)
Analog IO	GPIO32

Voltage levels



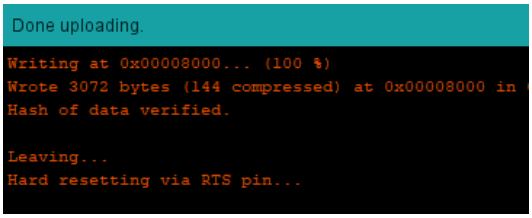


Programming procedure



Board	ESP32 Dev Module
Flash Mode	QIO
Flash Size	4MB
Flash Frequency	10MHz
PSRAM	Disabled
Upload Speed	115200

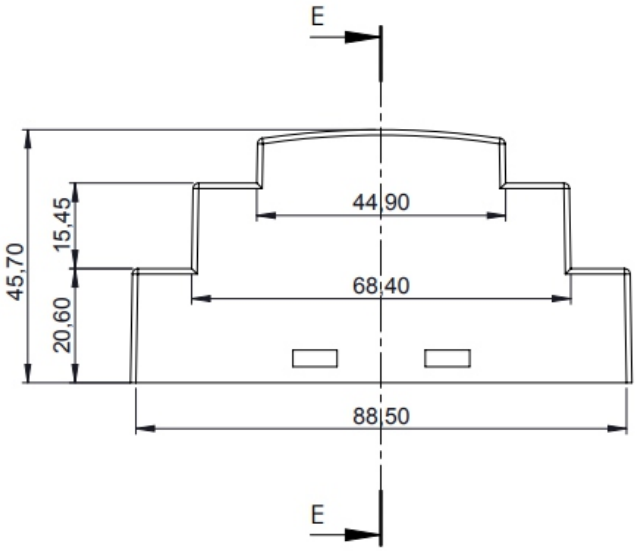
After successful uploading of program following message appears.



esp32 Boards must be installed under board manager, it is recommended to use the latest version of esp32 board driver for Arduino.

Due to installation of different drivers and older versions of libraries, Arduino fails to upload the program to the controller. In most cases it is due to failure to enter boot mode of the device.
The device can be forced to boot mode by connecting the BOOT IO0 of the expansion port to the GND pin with a jumper wire. Arduino is able to upload the program to controller while the controller is in boot mode.
After uploading the program , the connection between the BOOT IO0 and GND must be removed to run the uploaded program.

Dimensions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44,90
68,40
88,50
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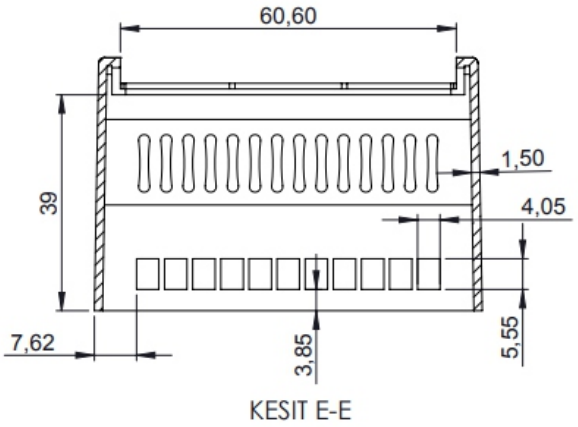
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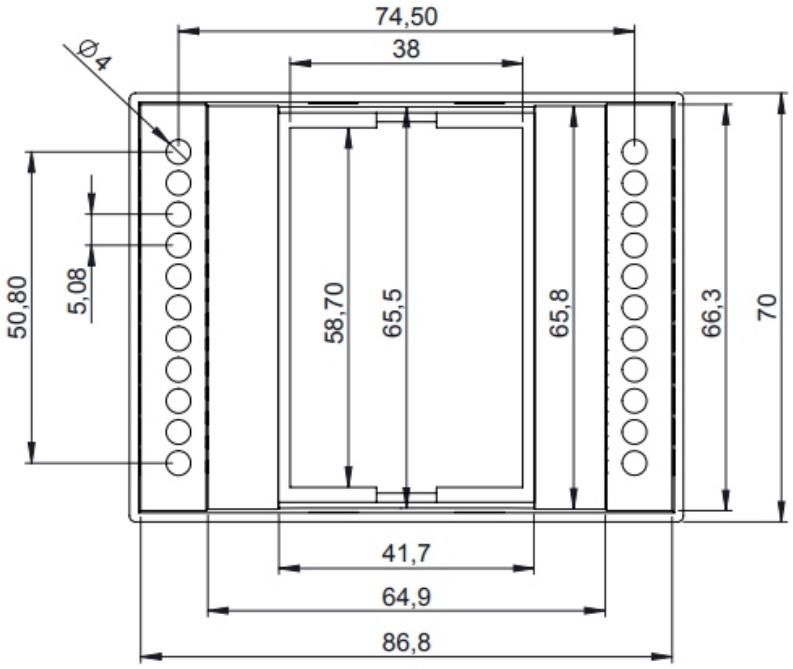
74,50
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