Product data sheet
Characterstics

SMART CONTROLS
SC-EN Range

SC EN Series

8 Digital Inputs

4 Tranistor/Relay outputs

4 Analog inputs

Built in OLED Display

micro SD card support

W5500 Ethernet

P/N	MCU	Digital Input	0-10V DC Input	4-20mA Input	Relay	Transistor	RS-485	EXPANSION	microSD	Ethernet	OLED
SC-EN-I6-RO4	ESP32-WROOM32	6	--	--	4	--	YES	YES	--	YES	YES
SC-EN-I6-TO4	ESP32-WROOM32	6	--	--	--	4	YES	YES	--	YES	YES
SC-EN-I6-AV4	ESP32-WROOM32	6	4	--	--	--	YES	YES		YES	YES
SC-EN-I6-AM4	ESP32-WROOM32	6	--	4	--	--	YES	YES	YES	YES	YES
SC-EN-I6-RO4-E	ESP32-WROOM32	6	--	--	4	--	YES	YES	--	YES	YES
SC-EN-I6-TO4-E	ESP32-WROOM32	6	--	--	--	4	YES	YES	--	YES	YES
SC-EN-I6-AV4-E	ESP32-WROOM32	6	4	--	--	--	YES	YES	--	YES	YES
SC-EN-I6-AM4-E	ESP32-WROOM32	6	--	4	--	--	YES	YES	YES	YES	YES

Expansions supported

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	Transistor
Discrete output number	6 Transistor outputs
Discrete output voltage	24V DC for transistor output
Discrete output current	0.5A with T0.0... T0.1 Transistor
Communication	WiFI / Bluetooth
OLED Display protocol	I2C
TFT Display protocol	SPI
Analog input range	4 - 20mA (AE06-I) / 0 - 10V (AE06-V)
Analog input resolution	16 bit

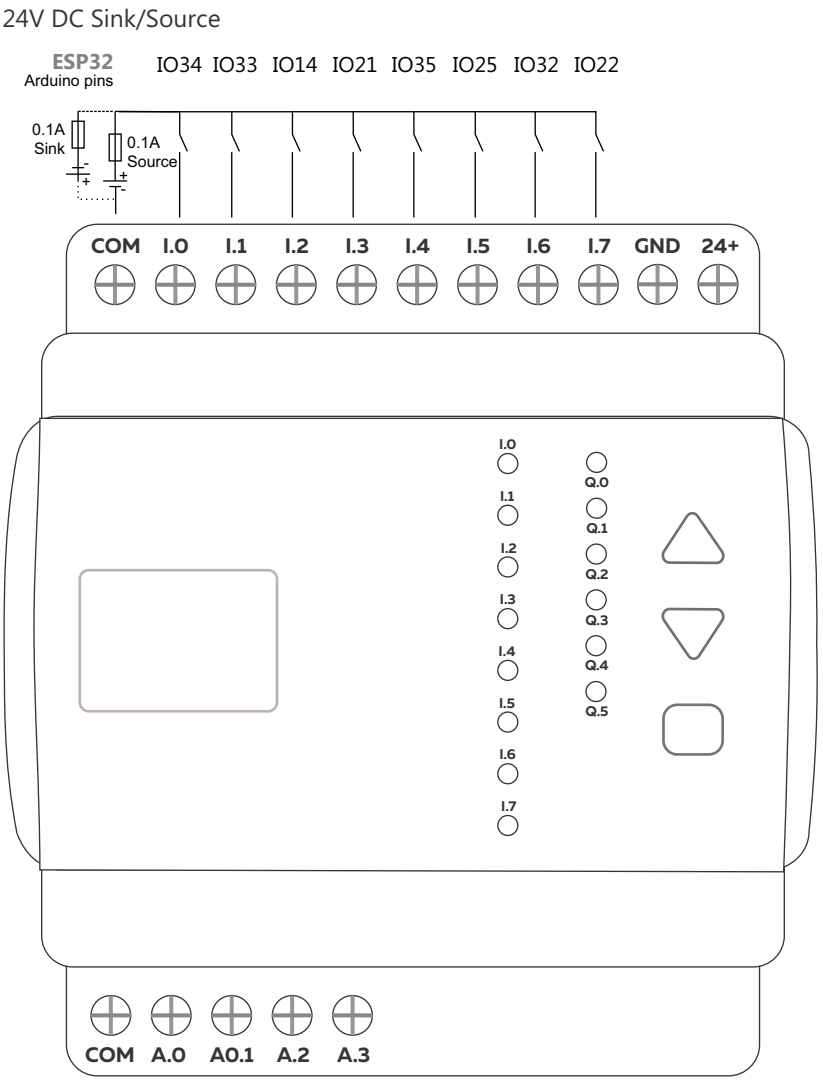
Complementary

Discrete IO number	6
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 1 LED green for RUN 8 LED green for I0.....I7 6 LED green for T0.....T5
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

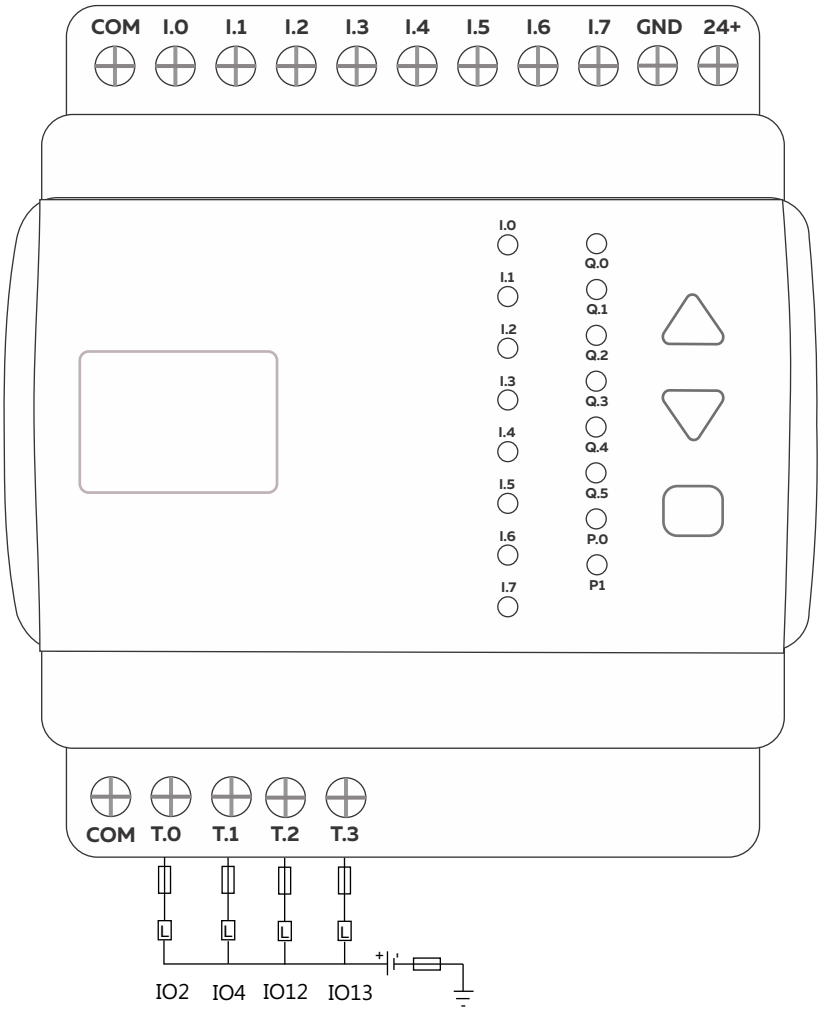
Environment

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 Temperature	–10 … +85° C (14...185 °F)
Storage Temperature	–25 … +85° C (–13...185 ° F)
Operating altitude	0...2000m
Storage altitude	0...3000m
Shock resistance	15 gn for 11 ms

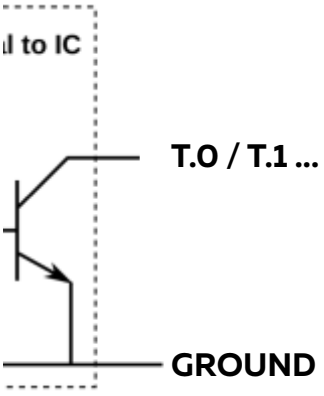
Digital inputs wiring diagram



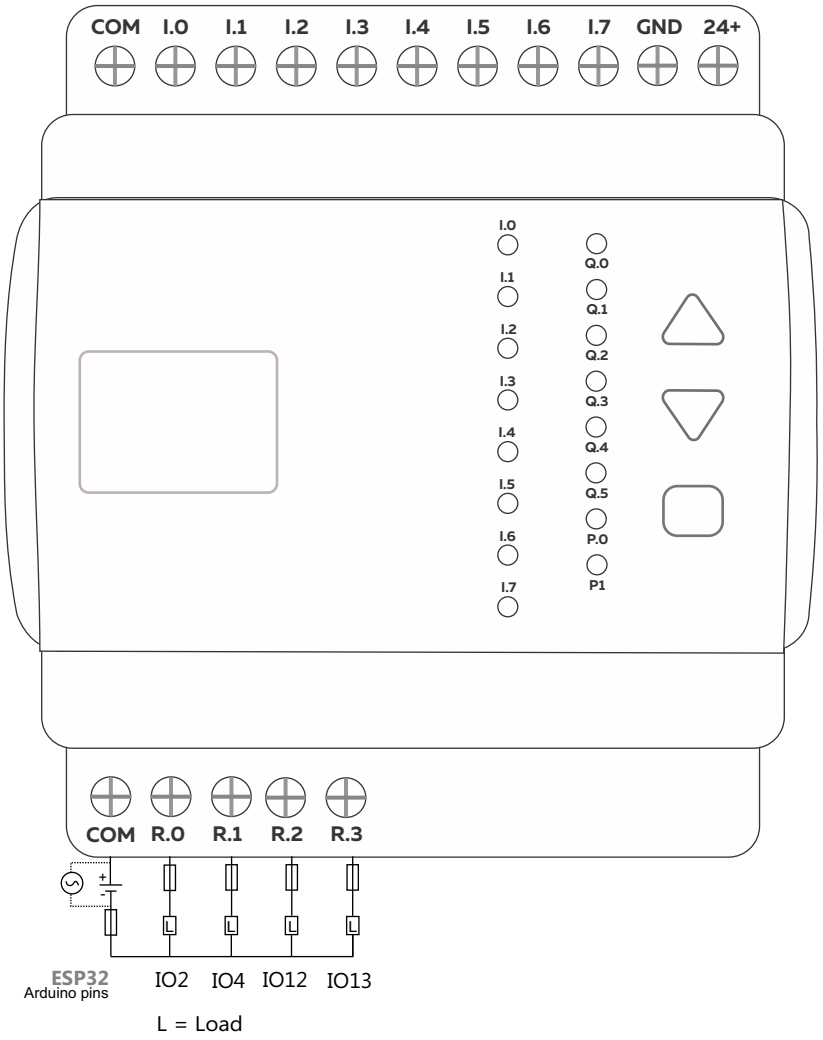
Transistor outputs wiring diagram

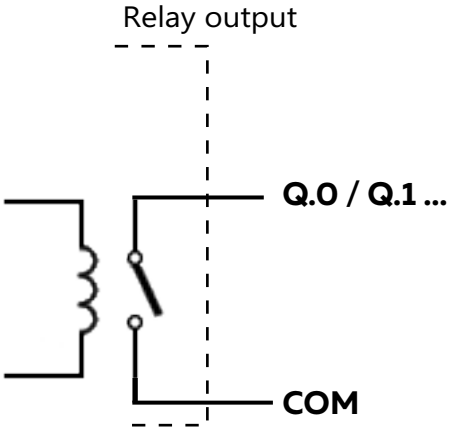


Transistor output

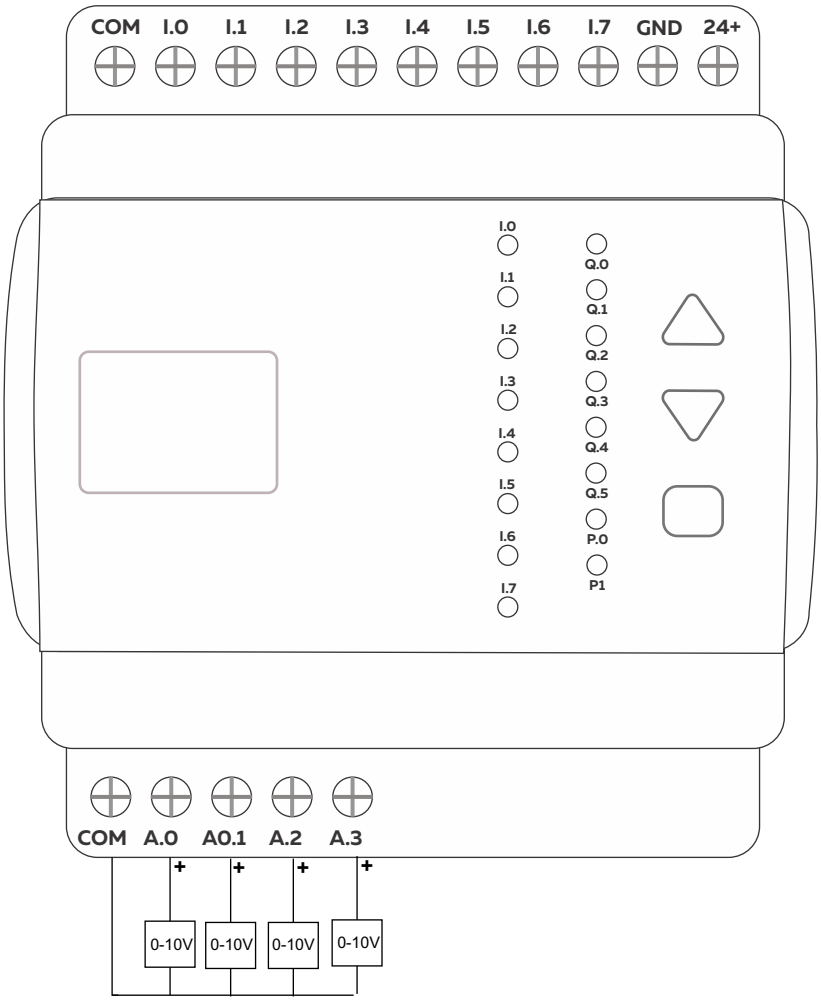


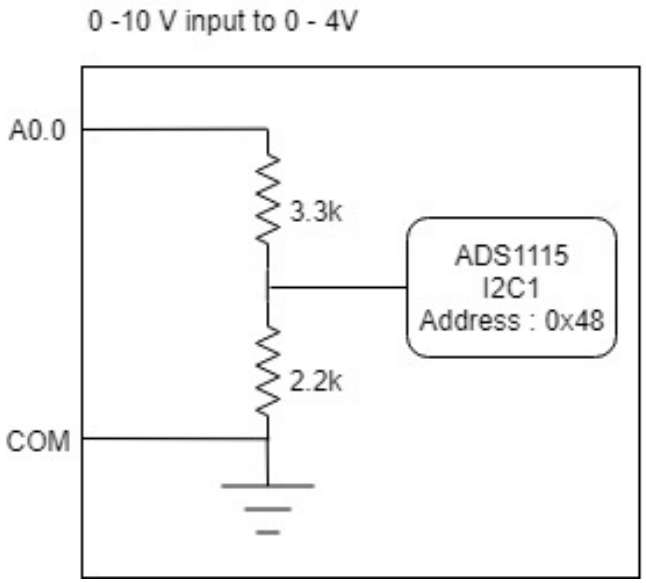
Relay outputs wiring diagram





Analog input wiring diagram (0-10V)

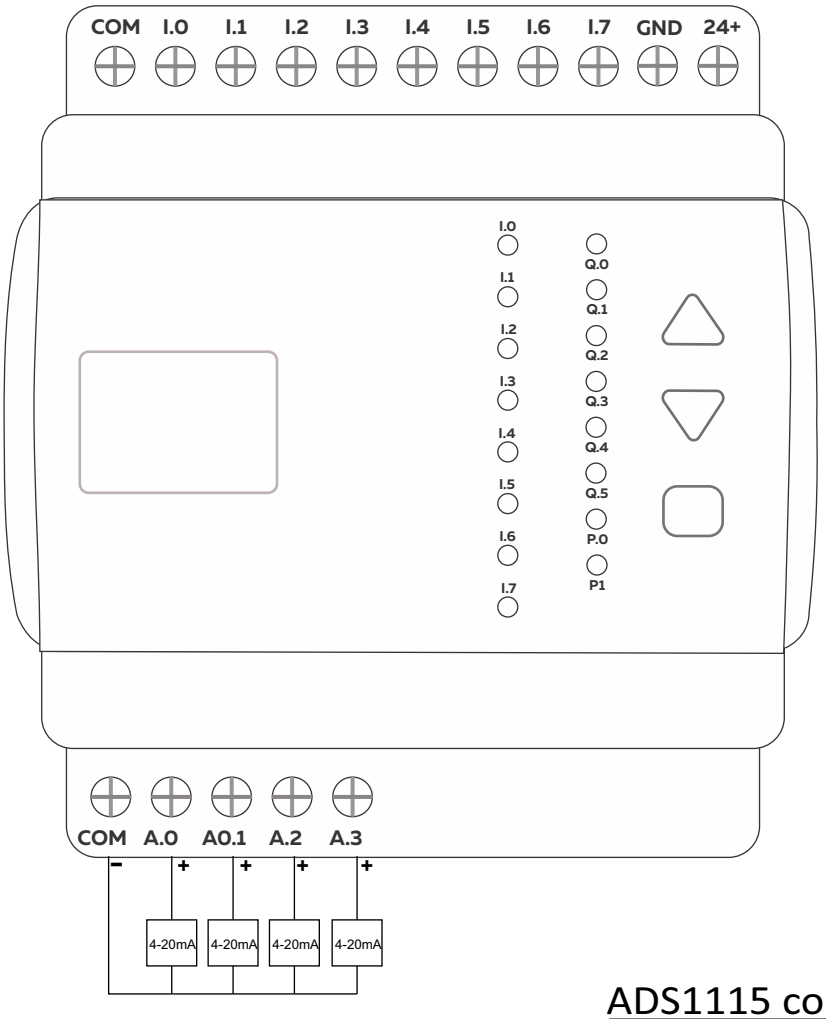




ADS1115 connections

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

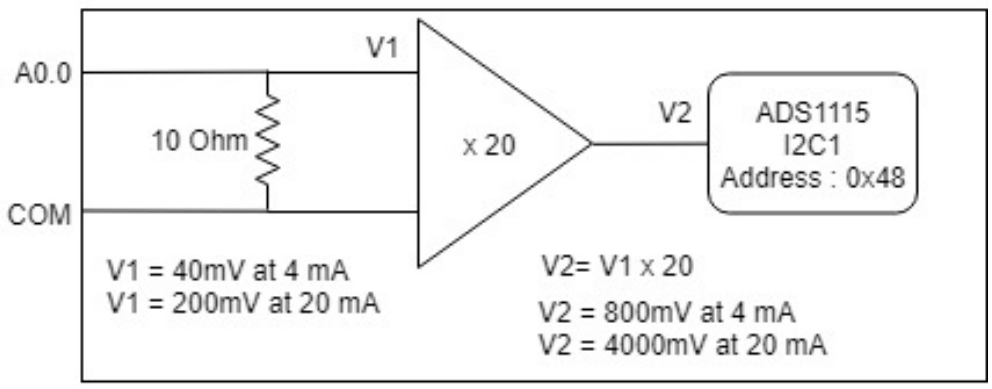
Analog input wiring diagram (4-20mA)



ADS1115 connections

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

0 - 20mA to 0 to 4V



0.96 OLED Display parameters

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

W5500 Ethernet

Ethernet PHY	W5500
Connection	SCK IO18 MISO IO19 MOSI IO23 CS IO26 *IO5 CS of microSD should be High for the W5500.

RTC parameters

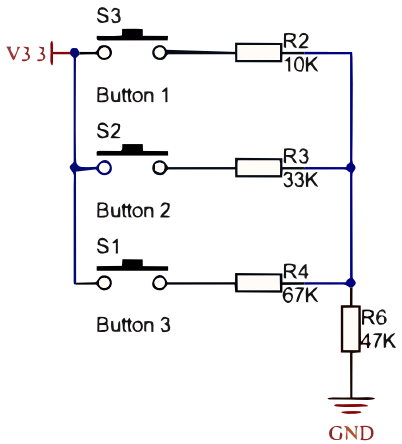
Display driver	DS3231
Communication	I2C IO16(SDA) - IO17(SCL)
Module Address	0x68
Battery Backup	YES

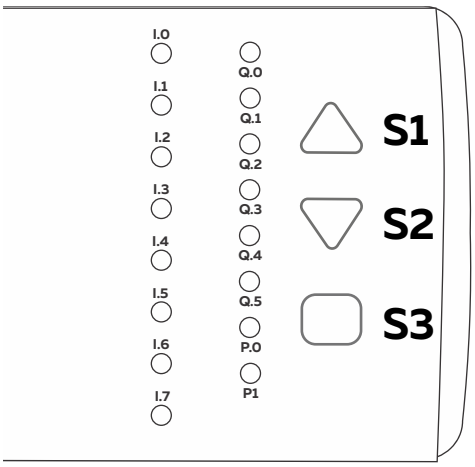
microSD card access

Connection	SCK IO18	CS IO5	
	MISO IO19	SD Detect IO14	
	MOSI IO23		

Built in buttons

Read mode	ADC (Analog to Digital Conversion)
Analog IO	GPIO 36
Voltage levels	3

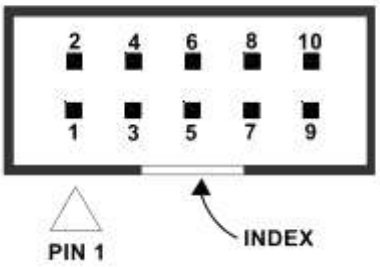


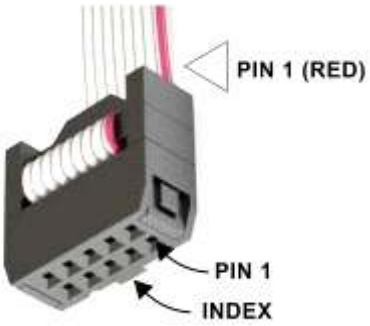


Product data sheet
Expansion

SMART CONTROLS
SC-EN Range

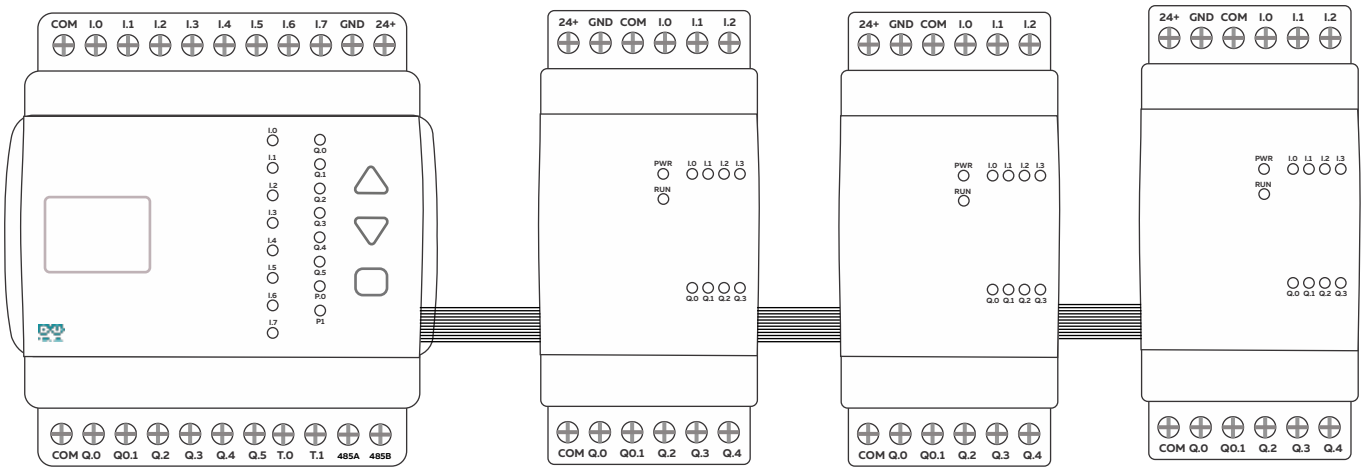
Expansion port





PIN	ESP32 Connection
1	Not Connected
2	TXD0
3	5V
4	RXD0
5	BOOT IO0
6	IO15
7	3.3V
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

Product data sheet
Programming

SMART CONTROLS
SC-EN Range

Programming procedure

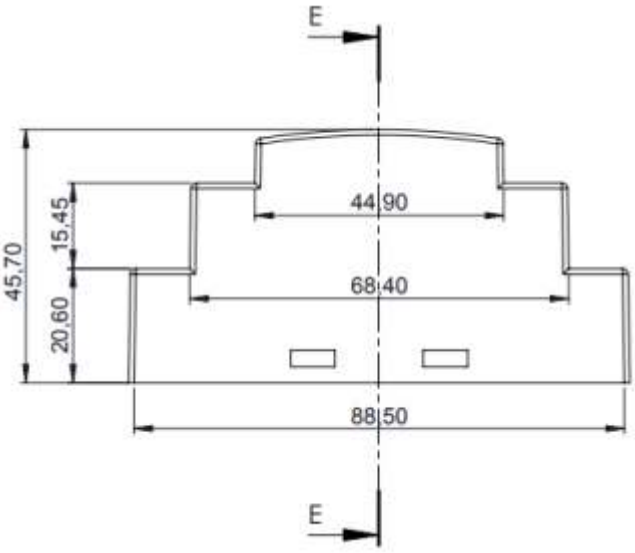
Board	ESP32 Dev Module
Flash Mode	QIO
Flash Size	4MB
Flash Frequency	10MHz
PSRAM	Disabled
Upload Speed	115200

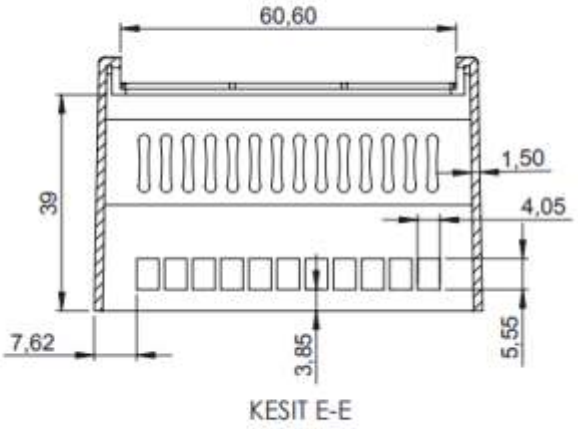
Due to installation of different drivers and older versions of libraries, Arduino fails to upload the program to the controller.
In most cases it is due to failure to enter boot mode of the device.
The device can be forced to boot mode by connecting the BOOT IO0 of the expansion port to the GND pin with 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.

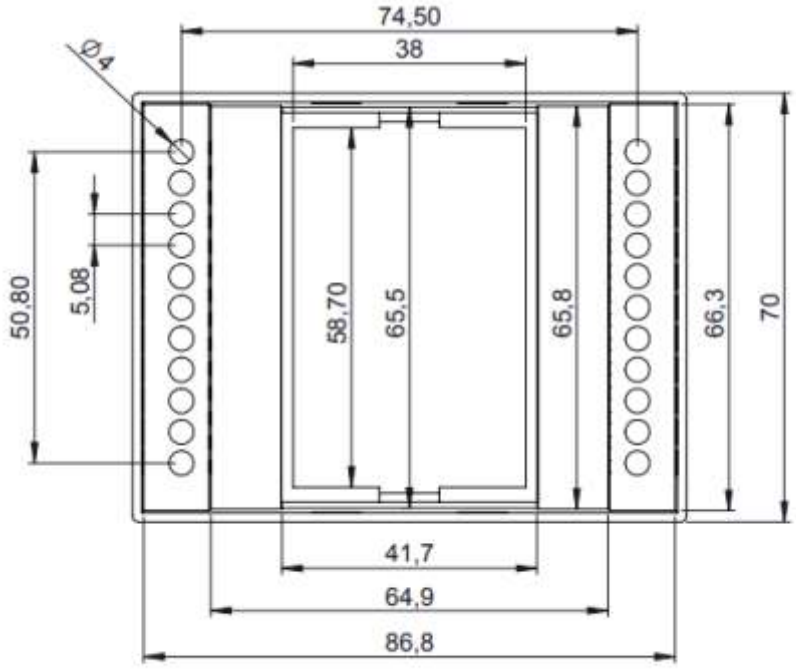
Product data sheet
Dimensions Drawings

SMART CONTROLS
SC-EN Range

Dimensions







Reach-Us

Technical Support

E-mail : support@sensoper.com

Sales Inquiries

E-mail : sales@sensoper.com

www.sensoper.com