

## AE-06 Series

8 Digital Inputs

4 Transistor/Relay outputs

4 Analog inputs

Built in OLED Display

micro SD card support

DS3231 RTC with battery backup

W5500 Ethernet



### 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        | NORVI IIOT                                                            |                                                                                |
| Product type            | Programmable Controller                                               |                                                                                |
| Certifications          | EN 61131-2:2007<br>EN 61010-1:2010+A1:2019<br>EN IEC 61010-2-201:2018 | 2014/30/EU- Electromagnetic Compatibility (EMC)<br>Annex III, Part B, Module C |
| 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

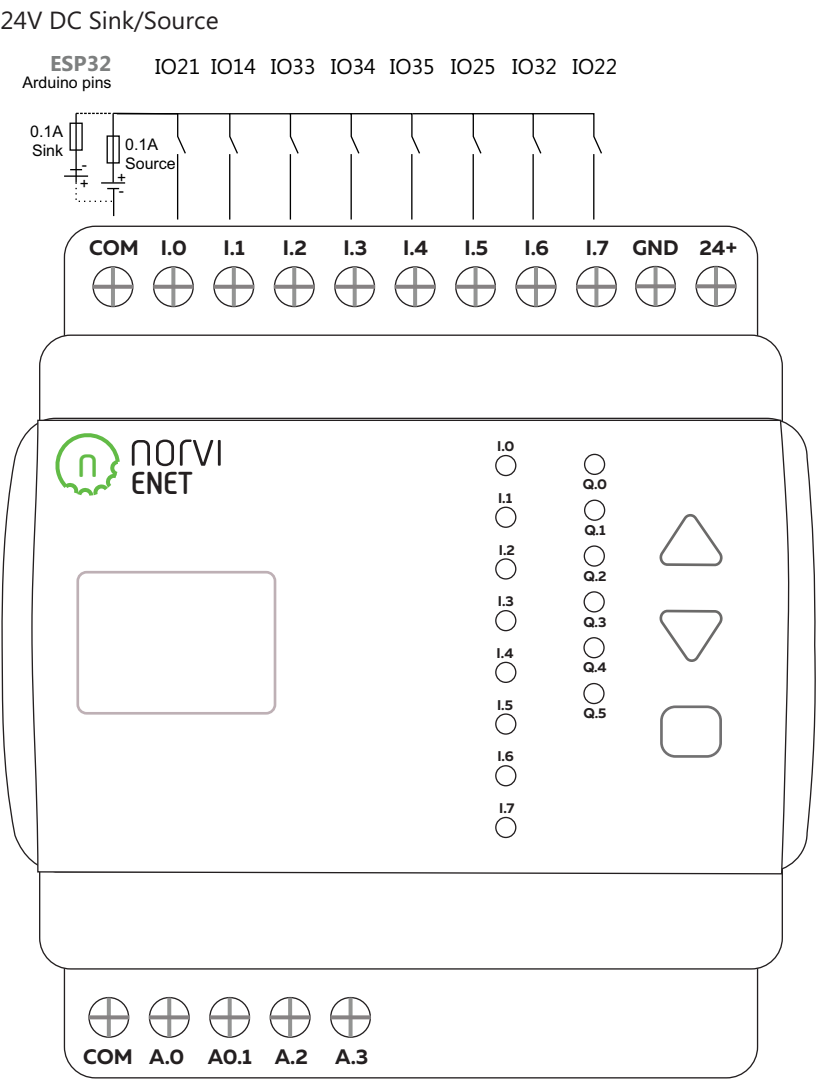
|                             |                                                                                                                                           |
|-----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| 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<br>1 LED green for RUN<br>8 LED green for IO.....I7<br>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<br>Top hat type TH35-7.5 rail conforming to IEC 60715<br>Plate or panel with fixing kit |
| Height                      | 90.50 mm                                                                                                                                  |
| Depth                       | 56.60 mm                                                                                                                                  |
| Width                       | 60.60 mm                                                                                                                                  |
| Product weight              | 0.43 Kg                                                                                                                                   |

## Environment

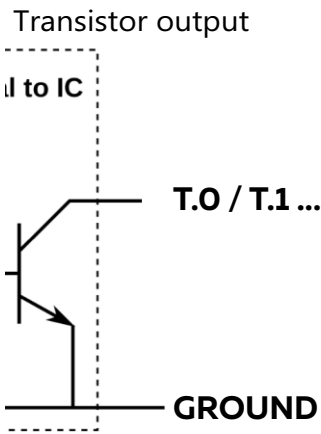
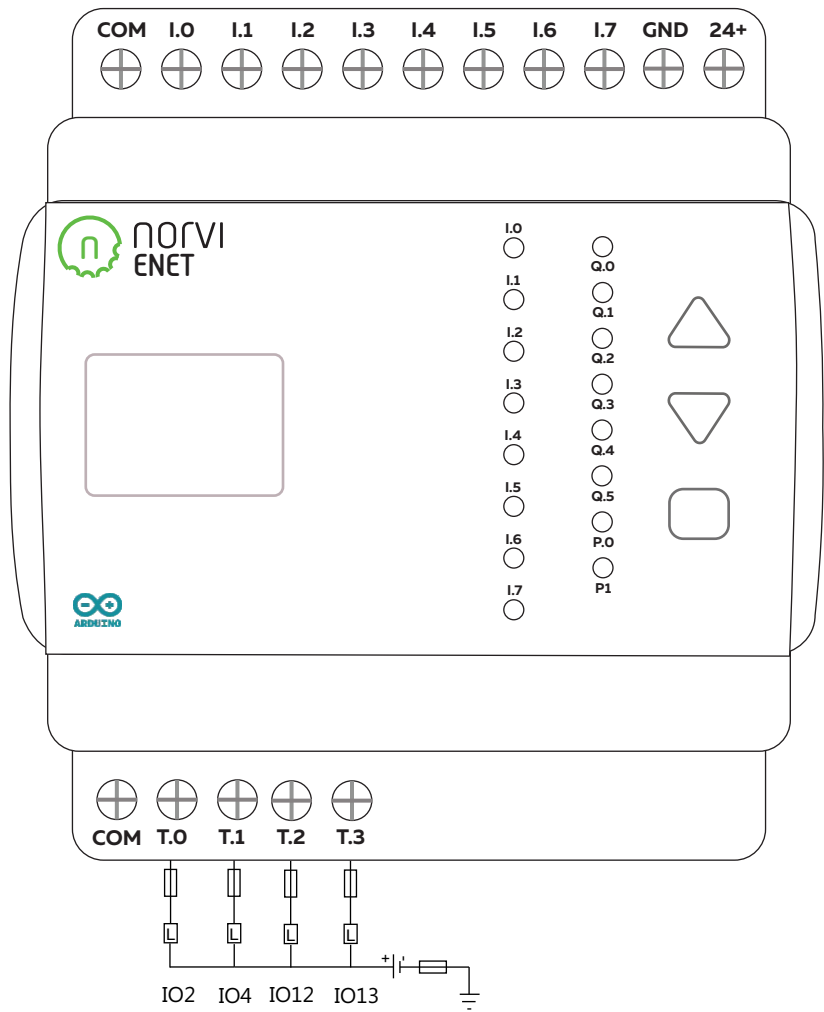
|                                       |                                                                                        |
|---------------------------------------|----------------------------------------------------------------------------------------|
| Resistance to electrostatic discharge | 4kV on contact<br>8kV on air                                                           |
| Resistance to electro magnetic fields | 10 V/m (80 MHz ..... 1GHz)<br>3 V/m (1.4 MHz ..... 2 GHz)<br>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                                                                        |

| GPIO | Description                           | ENET-AE06-R                      | ENET-AE06-V                                | ENET-AE06-I                                | ENET-AE06-T                      |
|------|---------------------------------------|----------------------------------|--------------------------------------------|--------------------------------------------|----------------------------------|
| 0    | outputs PWM signal at boot            | Expansion Port - NRST            | Expansion Port - NRST                      | Expansion Port - NRST                      | Expansion Port - NRST            |
| 1    | debug output at boot                  | Expansion Port - TX0             | Expansion Port - TX0                       | Expansion Port - TX0                       | Expansion Port - TX0             |
| 2    | connected to on-board LED             | OUTPUT 1                         | N/A                                        | N/A                                        | Transistor Output - O1           |
| 3    | HIGH at boot                          | Expansion Port - RX0             | Expansion Port - RX0                       | Expansion Port - RX0                       | Expansion Port - RX0             |
| 4    |                                       | OUTPUT 2                         | N/A                                        | N/A                                        | Transistor Output - O2           |
| 5    | outputs PWM signal at boot            | MicroSD, Ethernet - CS2          | MicroSD - CS2                              | MicroSD, RTC-CS2                           | microSD - CS2                    |
| 6    | connected to the integrated SPI flash | N/A                              | N/A                                        | N/A                                        | N/A                              |
| 7    | connected to the integrated SPI flash | N/A                              | N/A                                        | N/A                                        | N/A                              |
| 8    | connected to the integrated SPI flash | N/A                              | N/A                                        | N/A                                        | N/A                              |
| 9    | connected to the integrated SPI flash | N/A                              | N/A                                        | N/A                                        | N/A                              |
| 10   | connected to the integrated SPI flash | N/A                              | N/A                                        | N/A                                        | N/A                              |
| 11   | connected to the integrated SPI flash | N/A                              | N/A                                        | N/A                                        | N/A                              |
| 12   | boot fail if pulled high              | OUTPUT 3                         | N/A                                        | N/A                                        | Transistor Output - O3           |
| 13   |                                       | OUTPUT 4                         | N/A                                        | N/A                                        | Transistor Output - O4           |
| 14   | outputs PWM signal at boot            | INPUT 2                          | INPUT 2                                    | INPUT 2                                    | INPUT 2                          |
| 15   | outputs PWM signal at boot            | Expansion Port- GPIO 32          | Expansion Port - GPIO 32                   | Expansion Port - GPIO 32                   | Expansion Port - GPIO 32         |
| 16   |                                       | Expansion Port, RTC, OLED - SDA2 | Expansion Port, Analog INPUTS, OLED - SDA2 | Expansion Port, Analog INPUTS, OLED - SDA2 | Expansion Port, OLED, RTC - SDA2 |
| 17   |                                       | Expansion Port, RTC, OLED - SCL2 | Expansion Port, Analog INPUTS, OLED - SCL2 | Expansion Port, Analog INPUTS, OLED - SCL2 | Expansion Port, OLED, RTC - SCL2 |
| 18   |                                       | MicroSD, Ethernet - SCLK         | MicroSD, Ethernet - SCLK                   | MicroSD-SCLK                               | MicroSD - SCLK                   |
| 19   |                                       | MicroSD, Ethernet - MISO         | MicroSD, Ethernet - MISO                   | MicroSD-MISO                               | microSD - MISO                   |
| 20   |                                       |                                  |                                            |                                            |                                  |
| 21   |                                       | INPUT 1                          | INPUT 1                                    | INPUT 1                                    | INPUT 1                          |
| 22   |                                       | INPUT 8                          | N/A                                        | INPUT 8                                    | N/A                              |
| 23   |                                       | MicroSD, Ethernet-MOSI           | MicroSD, Ethernet-MOSI                     | MicroSD-MOSI                               | MicroSD-MOSI                     |
| 24   |                                       |                                  |                                            |                                            |                                  |
| 25   |                                       | INPUT 6                          | INPUT 6                                    | INPUT 6                                    | INPUT 6                          |
| 26   |                                       | MicroSD, Ethernet - CS1          | MicroSD, Ethernet - CS1                    | MicroSD, RTC-CS1                           | microSD - CS1                    |
| 27   |                                       | Ethernet - RSTN                  | RSTN                                       | RSTN                                       | N/A                              |
| 28   |                                       | INPUT 7                          | N/A                                        | INPUT 7                                    | N/A                              |
| 29   |                                       | N/A                              | N/A                                        | N/A                                        | N/A                              |
| 30   |                                       | N/A                              | N/A                                        | N/A                                        | N/A                              |
| 31   |                                       | N/A                              | N/A                                        | N/A                                        | N/A                              |
| 32   |                                       | INPUT 7                          | Expansion Port                             | Expansion Port                             | N/A                              |
| 33   |                                       | INPUT 3                          | INPUT 3                                    | INPUT 3                                    | INPUT 3                          |
| 34   | input only                            | INPUT 4                          | INPUT 4                                    | INPUT 4                                    | INPUT 4                          |
| 35   | input only                            | INPUT 5                          | INPUT 5                                    | INPUT 5                                    | INPUT 5                          |
| 36   | input only                            | Button IN - Sensor_VP            | Button IN - Sensor_VP                      | Button IN - Sensor_VP                      | Button IN - Sensor_VP            |
| 37   | input only                            | N/A                              | N/A                                        | N/A                                        | N/A                              |
| 38   |                                       | N/A                              | N/A                                        | N/A                                        | N/A                              |
| 39   |                                       | AA                               | AA                                         | AA                                         | N/A                              |

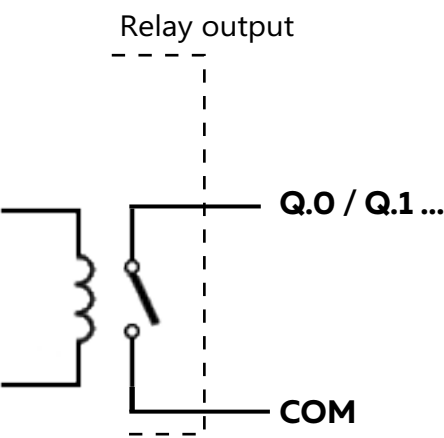
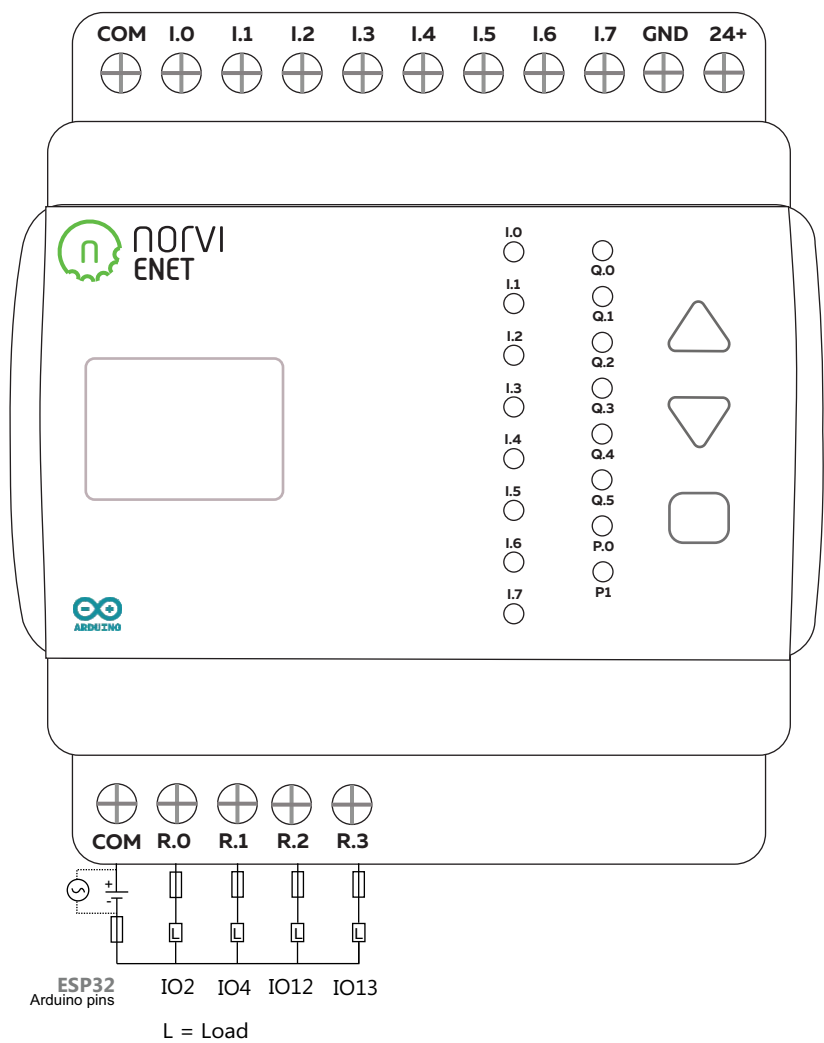
Digital inputs wiring diagram



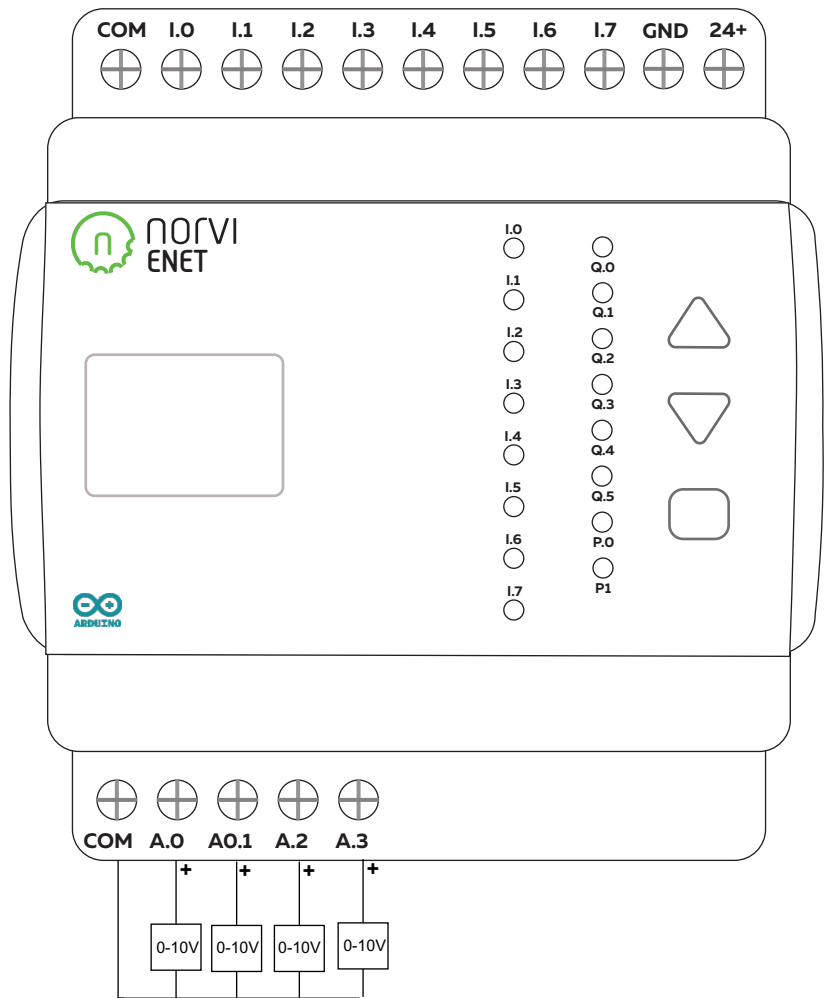
Transistor outputs wiring diagram



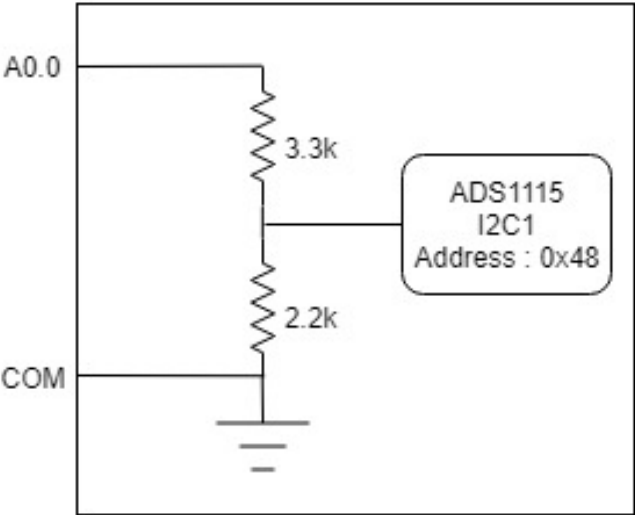
Relay outputs wiring diagram



Analog input wiring diagram (0-10V)



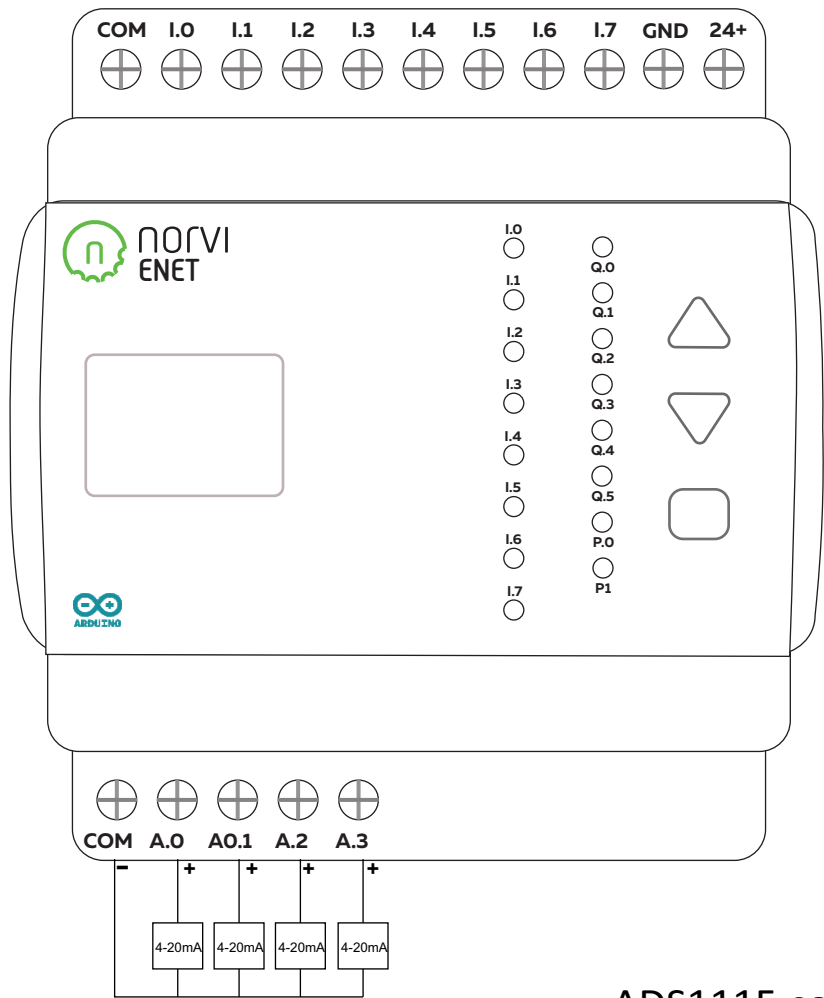
0 - 10 V input to 0 - 4V



ADS1115 connections

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

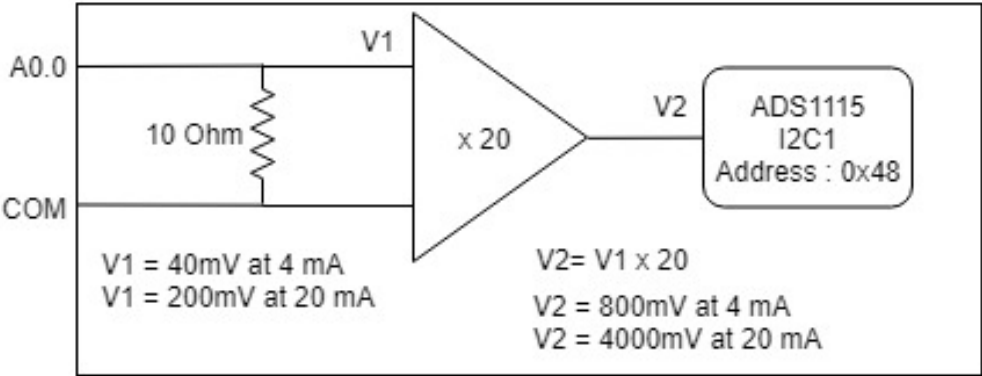
Analog input wiring diagram (4-20mA)



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<br>MISO IO19<br>MOSI IO23<br>CS IO26 |

\*IO5 CS of microSD should be High for the W5500.

### RTC parameters

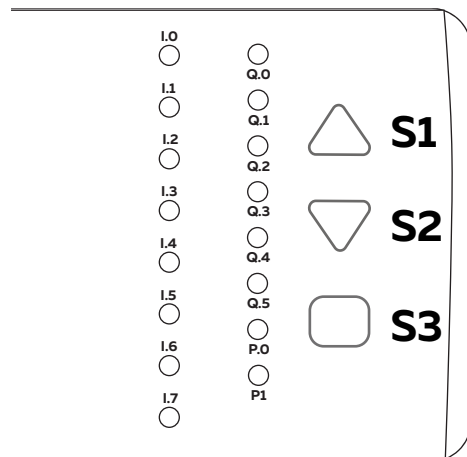
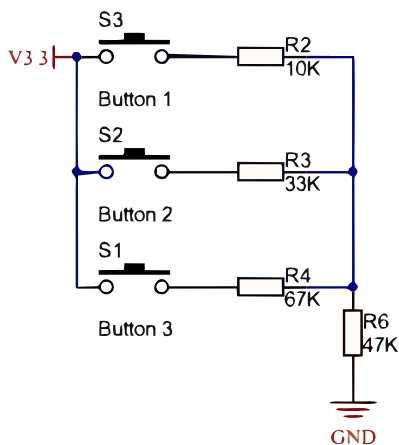
|                |                           |
|----------------|---------------------------|
| Display driver | DS3231                    |
| Communication  | I2C IO16(SDA) - IO17(SCL) |
| Module Address | 0x68                      |
| Battery Backup | YES                       |

### microSD card access

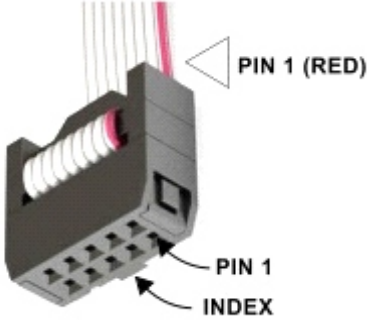
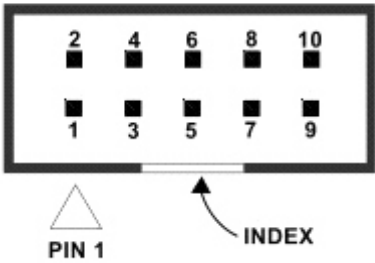
|            |                                           |
|------------|-------------------------------------------|
| Connection | SCK IO18 CS IO5<br>MISO IO19<br>MOSI IO23 |
|------------|-------------------------------------------|

### Built in buttons

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

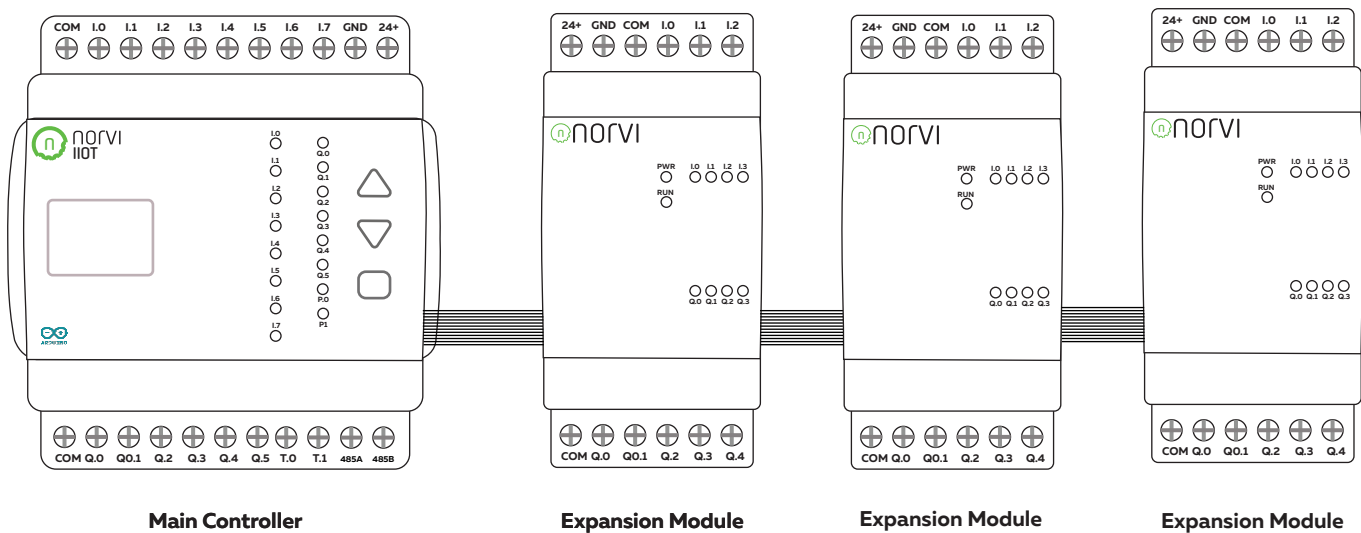


### Expansion port



| 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         |

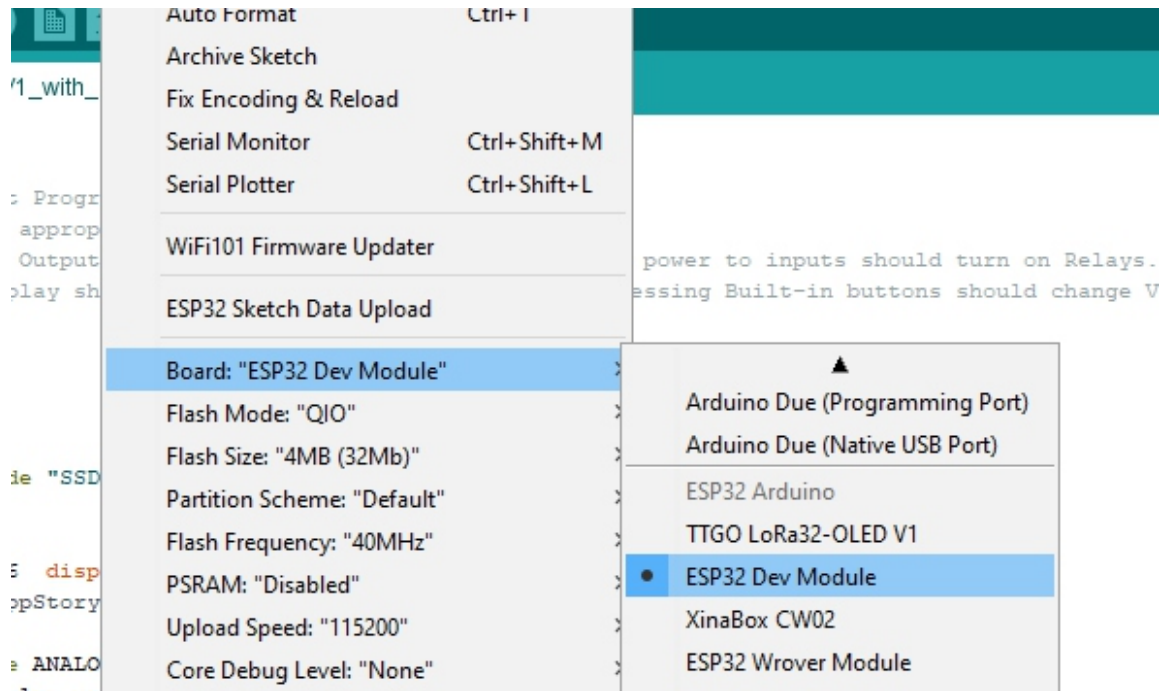
### Expansion modules



- 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

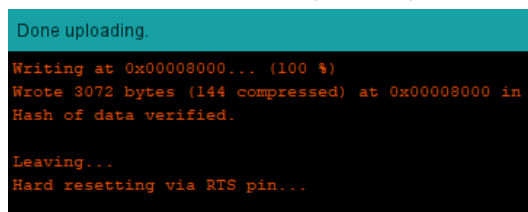


## Programming procedure



|                 |                  |
|-----------------|------------------|
| 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.



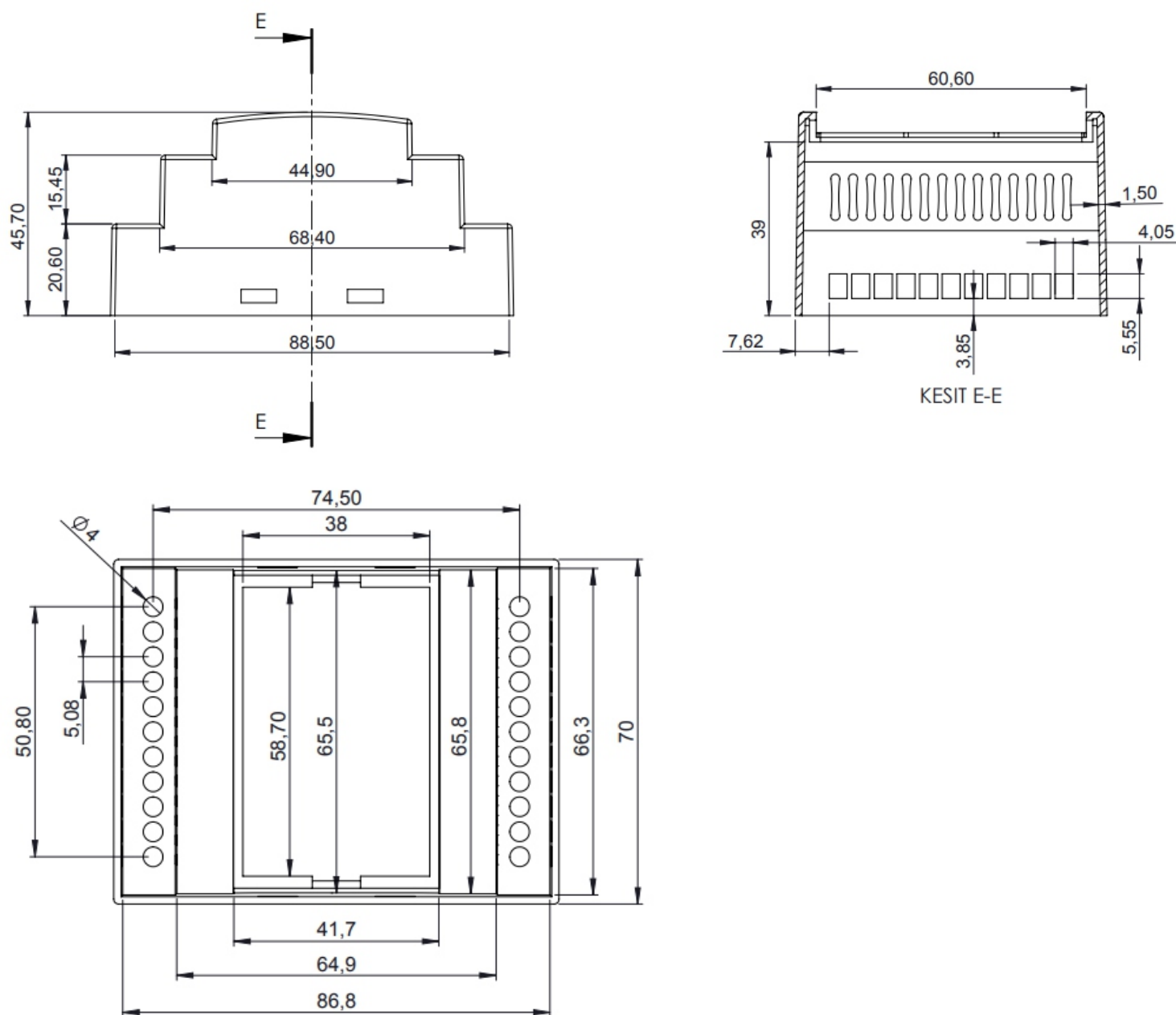
esp32 Boards must be installed under board manager, it is recommended to use the latest version of esp32 board driver for Arduino.

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





## Reach-Us

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