

## All menu options:

**CONFIG** Configure EVSE with Type 2 *Socket* or *Fixed* cable

**LOCK** Enable or disable the locking actuator (config = socket)

*Disabled* No lock is used

*Solenoid* Dostar, DUOSIDA DSIEC-ELB or Ratio lock

*Motor* Signal wire reversed, DUOSIDA DSIEC-EL or Phoenix Contact

**MODE** Use Normal EVSE mode, or Smart/Solar Mode (requires sensorbox)

*Normal* The EV will charge with the current set at MAX

*Smart* The EV will charge with a dynamic charge current, depending on sensorbox data, and MAINS, MAX, MIN settings.

*Solar* The EV will charge on solar power.

**START** set the current on which the EV should start Solar charging

*-0 -48A (sum of all phases)*

**STOP** Stop charging when there is not enough solar power available

*Disabled - 60 minutes (Disabled = never stop charging)*

**IMPORT** Allow additional grid power when solar charging (0-20A)

**LOAD BAL** Load Balancing mode for 2 to 8 EVSE's

*Disabled* load balancing is not used

*Master* Set the first of the EVSE's to Master,

*Node1-7* And the rest to Node 1-7, when using load balancing.

**MAINS** Set Max Mains current *10-200A (per phase)*

**MIN** Set MIN charge current for the EV. *6-16A (per phase)*

**CIRCUIT** Set the max current the EVSE circuit can handle (load balancing)  
*10-200A*

**MAX** Set MAX charge current for the EV. *10-80A (per phase)*

**SWITCH** Set the function of an external switch connected to pin SW

*Disabled* A push button on io pin SW can be used to STOP charging.

*Access B/S* An external switch is used to enable/disable access to the charging station. B=momentary pushbutton, S=toggle switch.

*Sma-Sol B/S* A switch is used to switch between Smart and Solar modes.

**RCMON** RCM14-03 Residual Current Monitor is plugged into connector P1.

*Disabled* The RCD option is not used.

*Enabled* When a fault current is detected, the contactor will be opened.

**RFID** use a RFID card reader to enable/disable access to the EVSE.

A maximum of 20 RFID cards can be stored.

*Disabled / Enabled / Learn / Delete / Delete All*

**MAINSMET** Set type of MAINS meter

*Sensorbox* the Sensorbox will send measurement data to the SmartEVSE.

*Phoenix C / Finder / Eastron / Custom* a Modbus kWh meter is used.

**MAINSADR** Set the Modbus address for the kWh meter

**EV METER** Set type of EV kWh meter (measures power and charged energy)

*Disabled / Phoenix / Finder / Eastron / ABB / Custom*

**EV ADR** Set the Modbus address for the EV Meter

**GRID** 3 or 4 wire. Only visible when Sensorbox with CT's is used.

**CAL** Calibrate CT1. CT2 and CT3 will use the same cal value.

6.0-99.9A A minimum of 6A is required in order to change this value.

Hold both < and > buttons to reset to default settings.

**WIFI** Connect to WiFi access point *Disabled/Enable/SetupWifi*

*SetupWifi* will enable a Wifi portal to setup the Wifi settings.

## Load Balancing

Up to eight SmartEVSE modules can share one mains supply.

### Software configuration

Set one modules **LOAD BAL** setting to **MASTER**, the others to **NODE 1-7**. Make sure there is only one Master, and the Node numbers are unique.

*On the Master configure the following:*

**MODE** Set this to *Smart* if a Sensorbox (or configured kWh meter) is used to measure the current draw on the mains supply.

It will then dynamically vary the charge current for all connected EV's. If you are using a dedicated mains supply for the EV's you can leave this set to *Normal*.

**MAINS** Set to the maximum current of the MAINS connection (per phase). If the sensorbox measures a higher current then this value on one of the phases, it will immediately reduce the current to the EVSE's

**CIRCUIT** Set this to the maximum current of the EVSE circuit (per phase). This will be split between the connected and charging EV's.

**MAX** Set the maximum charging current for the EV connected to -this- SmartEVSE (per phase).

**MIN** Set to the lowest allowable charging current for all connected EV's.

*On the Node's configure the following:*

**MAX** Set the maximum charging current for the EV connected to -this- SmartEVSE (per phase).

### Hardware connections

Connect the **A**, **B** and **GND** connections from the Master to the Node(s). So A connects to A, B goes to B etc.

If you are using Smart/Solar mode, you should connect the **A**, **B**, **+12V** and **GND** wires from the sensorbox to the same screw terminals of the SmartEVSE.

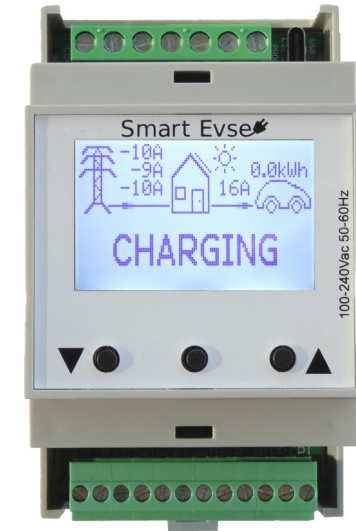
⚠ Make sure that the **+12V** wire from the sensorbox is connected to only -one- SmartEVSE.

# Smart EVSE v3

Charge controller for electric vehicles

SOFTWARE VERSION 3.00

Manual v1.01



## Description

The SmartEVSE is a J1772 / IEC61851 compatible charge controller for electric vehicles. It features connections for a mains contactor and locking actuator.

Up to eight SmartEVSE modules can be connected together, to allow for load balancing between charging stations. All module parameters can be configured using the display and buttons.

## Safety notes and warning instructions

⚠ Read the installation instructions completely.

- Installation, operation and maintenance may only be carried out by qualified electricians. Follow the installation instructions as described.
- When installing the controller, use a suitable voltage measuring device to ensure that no mains voltage is present.

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## Building the EVSE

In order to build a complete EVSE (charging station) you will also need:

- 2/4 pole contactor with 230V AC coil, rated for the max charging current.
- Fixed charging cable or socket with locking actuator.
- Enclosure with DIN rail. (EPN2205 or Famatel type 3958)
- optional Residual Current Monitor to protect against DC residual currents
- Terminal blocks (Wago TOPJOB S)

When using a **fixed** charging cable, please check if there is a resistor between PP and PE in the Charging Plug. Otherwise the EV will not start charging.

220 Ohm = 32A Cable

680 Ohm = 16A Cable

This resistor determines the max charge current the cable can handle, and is already fitted on all factory made cables.

Do not connect the PP wire to the SmartEVSE, if using a fixed cable!

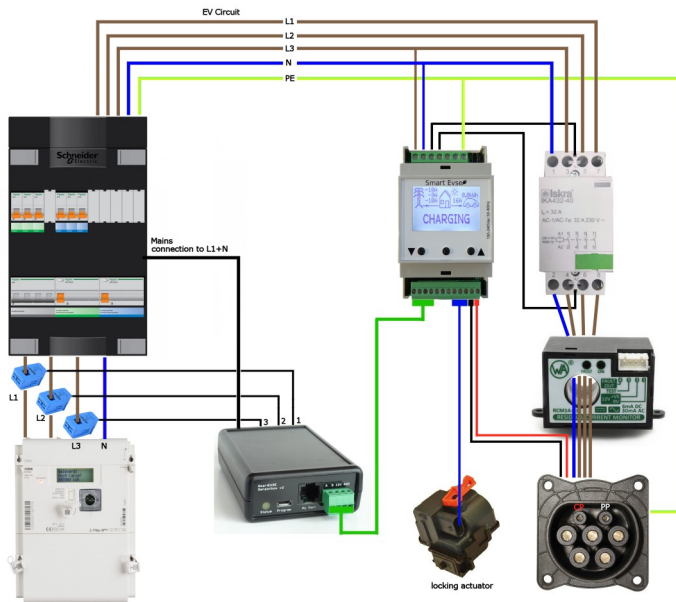
The contactor should be connected to terminals N and C1.

The C2 output is for future use, and will drive a second contactor.

Please note that energy efficient (AC/DC) contactors will **not** work correctly!

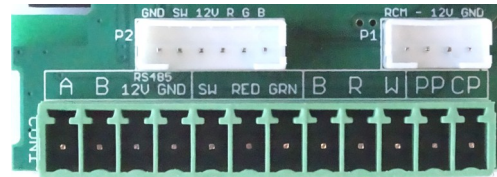
⚠ The EVSE needs to be protected with a circuit breaker and residual-current circuit breaker, usually located near or in the distribution board.

## Diagram



1

## Low voltage connections



All low voltage connections are made with a 12 pin pluggable connector.

**A, B, 12V** and **GND** connections are used to connect the sensorbox. (optional) **A, B** and **GND** should be connected to each module if you choose to use load balancing between SmartEVSE modules.

A 12V LED can be connected between the **12V(+)** and the **RED(-)** and **GRN(-)** terminals. You can also connect a ready made cable to connector **P2**. An (optional) switch can be connected to the **SW** terminal and **GND**. It can be used to start/stop charging and toggle between charge modes. The (optional) RCM14-03 residual current sensor should be connected to connector **P1**.

**B, R, W** (lock) need to be connected to the locking solenoid or 12V motor that will lock the charging cable in it's socket. (see next page)

**PP** (proximity pilot) signal will determine what max current the charging cable can handle, and needs to be connected to the charging socket. In case of a fixed cable, this signal is not used.

**CP** (control pilot) signal communicates with the EV, and will also inform the EV the maximum allowed charging current. This signal needs to be connected to the CP pin of the charging socket, or connected to the CP wire if using a fixed cable. The maximum total length of the CP wire+ charging cable is 15meter.

### Sensorbox (optional)

The SmartEVSE is capable of dynamically adjusting the chargecurrent, depending on other loads that use the same mains connection. We call this smart mode, and it will require the following extra items:

- 'Sensorbox plus' with Current Transformers, one for each phase or 'Sensorbox 2' and a compatible smart meter with P1 port.
- 4+ wire cable for the connection between SmartEVSE and Sensorbox.

The Sensorbox should be placed where the mains connection enters the building. Usually this is just after the kWh meter, this allows it to measure the total current for each phase and send this information to the SmartEVSE.

Clip the current transformers on the L1,L2 and L3 wires, and plug the other end of each cable into the Sensorbox.

For the Sensorbox2, plug the RJ12 cable into the smart meter and Sensorbox2

The data cable coming from the Sensorbox should be connected to terminals **A, B, +12V** and **- GND** of the SmartEVSE.

This data cable can be more then 100 meters if needed.

2

## The Locking Actuator

A locking actuator can be used to lock the charging plug into the socket. It will lock the cable when charging starts, and will unlock the cable after charging has stopped.

The SmartEVSE supports at least five types of locking actuators:

The **Dostar DSIEC-EL** lock has three wires and can be connected directly to the **B**(lue) **R**(ed) **W**(hite) terminals on the module.

Sometimes it locks, while it should unlock, you will then have to swap the Red and White wires.

Set the Lock option in the menu to SOLENOID



The **DUOSIDA DSIEC-EL** lock has 4 wires, connect them as follows:

**B:** Blue **R:** Yellow+White **W:** Red

Set the Lock option in the menu to MOTOR

The **DSIEC-ELB** lock has 3 wires, connect them as follows:

**B:** Blue **R:** White **W:** Red

Set the Lock option in the menu to SOLENOID

The **DSIEC-ELC** lock will not work with the SmartEVSE !

The **Ratio lock** has 3 wires, connect them as follows:

**B:** Blue **R:** Black **W:** Red

Set the Lock option in the menu to SOLENOID

The **Phoenix contact locking motor** has 4 wires and needs to be connected as follows:

**B:** BL/YL **R:** BL/GR + BL/BR **W:** BL/RD

Set the Lock option in the menu to MOTOR



When using a fixed charging cable, this function is not visible in the menu.

## Error Messages

If an error occurs, the SmartEVSE will stop charging, and display one of the following messages:

**ERROR NO SERIAL COM CHECK WIRING** No signal from the Sensorbox or other SmartEVSE (when load balancing is used) has been received for 10 seconds. Please check the wiring to the Sensorbox or other SmartEVSE.

**ERROR NO CURRENT** There is not enough current available to start charging, or charging was interrupted because there was not enough current available to keep charging. The SmartEVSE will try again in 60 seconds.

**ERROR HIGH TEMP** The temperature inside the module has reached 65° Celsius. Charging is stopped.

Once the temperature has dropped below 55°C charging is started again.

**RESIDUAL FAULT CURRENT DETECTED** An optional DC Residual Current Monitor has detected a fault current, the Contactor is switched off.

The error condition can be reset by pressing any button on the SmartEVSE.

3