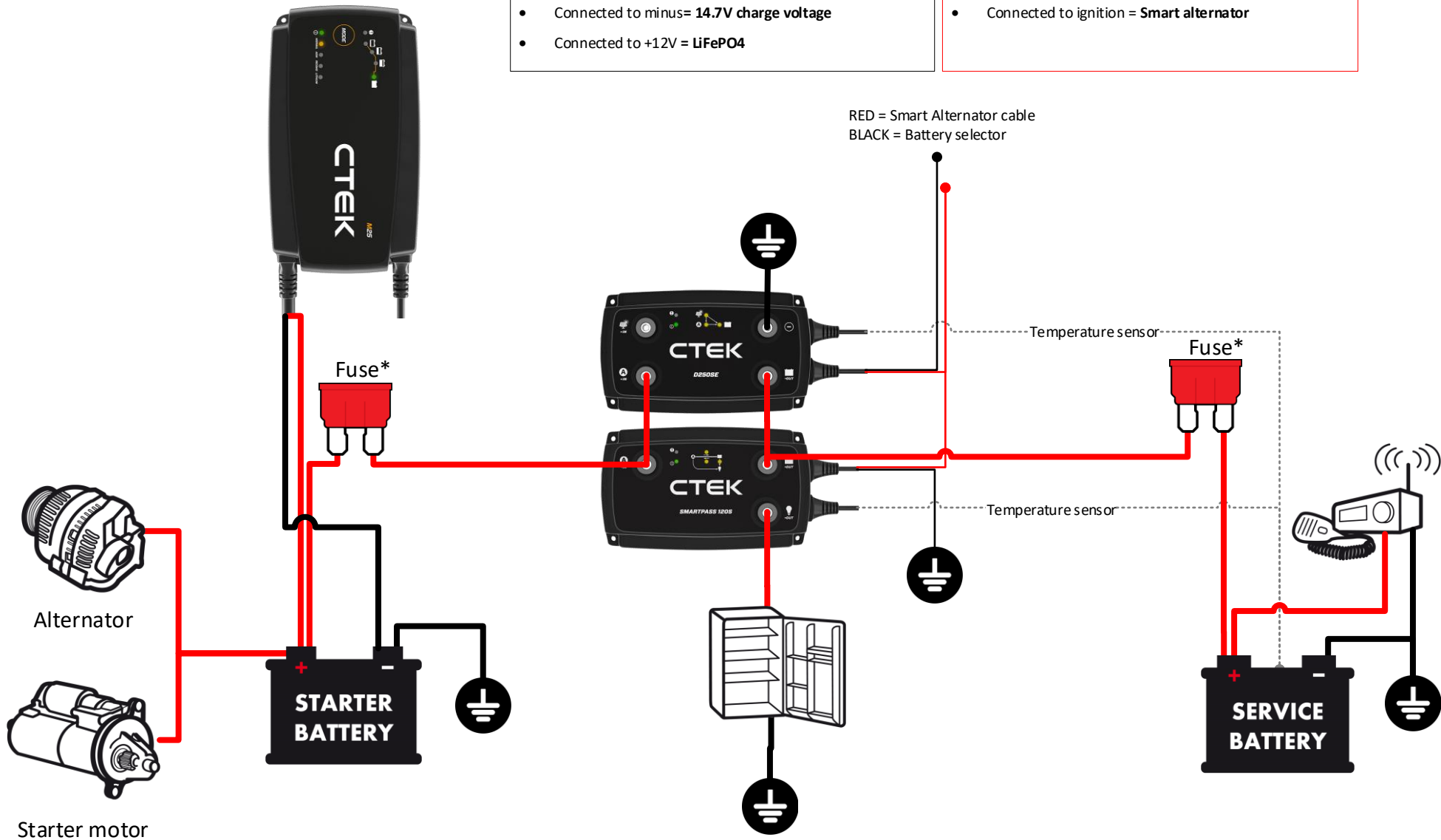


**Battery selector cable (black)**

- Not connected = 14.4V charge voltage
- Connected to minus= 14.7V charge voltage
- Connected to +12V = LiFePO4

**Smart alternator cable (red)**

- Not connected = Conventional alternator
- Connected to ignition = Smart alternator



\* Fuse recommended. Please verify directive for applicable installation regarding fuses

## General Information

**Starter battery:**

A start battery should never be deeply discharged and should be capable of delivering high current for a short period of time.

The starter battery should be a Lead Acid battery designed for automotive applications. This does not affect the chemistry chosen for the Service battery

**SMARTPASS 120S:**

Is a smart combination of relays (actually MOSFETS) that connects starter and service batteries. This enables current from your alternator to charge both batteries.

The SMARTPASS 120S will not control the voltage applied to the service battery. For that you need a D250SE installed in parallel.

The current through the SMARTPASS 120S to a service battery depends on the alternator output voltage, cable length/ dimension and the charge acceptance of your battery. The max continuous current is 120A.

Start assistance.

SMARTPASS 120S automatically connects the service and starter battery, if the starter battery on its own is unable to start the engine. After the start assistance function has been activated, SMARTPASS 120S will display a fault indication that remains until starting has been achieved without the use of the start assistance function.

Install according to instruction manual.

**D250SE:**

The D250SE is a DCDC charger, i.e. it is a dual input battery charger with an alternator or a solar panel as its power source. Please note that the alternator needs to be directly connected to a starter battery and that the D250SE is design to separate a starter and service battery

The charger will work in parallel with both SMARTPASS 120S as well as another D250SE.

The maintenance charge of your starter battery, that is facilitated with the help from a solar panel, is a small pulse charge (3sec with a 15 sec interval) that will compensate for the self discharge of your starter battery. Note, this should not be mistaken for a normal charge of the battery.

Install according to manual.

**Service battery:**

Also known as secondary battery, it should be of the type deep cycle batteries. The size should be 20Ah to 300Ah or even up to 800Ah with SMARTPASS 120S installed.

You can install several batteries in parallel in order to increase the total capacity (Ah) of your service battery bank.

If possible, the service battery should be installed in a well-ventilated space away from the engine bay, unless the battery is designed for it.

Install the service battery as close as possible to the charger, preferably not further away than 2m, which is the length of temperature sensor cable.

**Charge voltage:**

You can choose between 14.4V (WET) /14.7V (AGM) / 14,2V (LiFePO4) on D250SE as the nominal charging voltage. This is done by connecting the black battery select cable to +12V for LiFePO4 mode or earth for AGM mode or not connected at all for WET mode.

Please note that the charge voltage levels are applied to the absorption phase (constant voltage phase), during bulk (constant current) the charge voltage will be lower but slowly increasing with the state of charge of the battery. See manual and Charge program charts for more information.

WET and AGM mode have a temperature regulated charge voltage, where the nominal voltage is reached at 25 degrees Celsius. Below that it is increased by 23mV per degree Celsius and vice versa if the temperature is higher.

**Fuses:**

We recommend that all cables directly attached to a battery holds a fuse as close as possible to the battery in order to protect the cable.

See manual for fuse size.

**Temperature sensor:**

For D250SE and SMARTPASS 120S the temperature sensor ensures that the battery is only charged within its temperature range and helps detect a damaged battery that is overheating. In the latter case the charger will stop charging the battery and indicate fault. D250SE also uses the temperature sensor to enable temperature regulation of the charge voltage

### General Information

#### **Battery charger (AC):**

An AC/DC battery charger can be connected to the service battery in parallel with the D250SE/SMARTPASS 120S or to the starter battery.

Connecting it to the starter battery is preferred for storage reasons or when you have loads applied to both starter and service battery.

Connecting it to the service battery is preferred when only the service battery is in use.

Select an AC/DC battery charger that is suitable for the size of the battery and all consumers that are active whilst charging. For example: A 10A charger will not charge a battery at all if you have a 10A light turned on.

A typical charger for installations is the I1225 that have no mode button, i.e. it needs no further action after it have been installed.

#### **Consumers:**

Consumers (max 80A continuously) should be connected to the consumer output terminal of the SMARTPASS 120S. If the service battery voltage becomes critically low, the consumer output terminal is deactivated in order to protect the service battery, i.e. under voltage protection.

Consumers that should not be affected by this under voltage protection should be connected directly to your service battery, typically high priority consumers like VHF radio.

Consumers connected to the consumer output receives current from the alternator instead of the service battery during driving. This makes the charging of the service battery faster and if the battery is fully charged it is put in a rest state, which increases the lifetime of the service battery.

#### **Alternator:**

The Alternator is the power source for both D250SE and SMARTPASS 120S, i.e. should be able to power the application where these units are installed.

Smart alternators was introduced in the Euro 5 & 6 engines, where they help the engine reduce its emissions by enabling brake regeneration. If you have a Smart alternator connect the red Smart Alternator signal cable to a +12V source that is live when the engine is running (for example contact no. 15 Ignition in the DIN 72552 standard) in order to get proper functionality from the D250SE / SMARTPASS 120S. Please note, that connecting this wire to a source that is live continuously will make the units active continuously as well, possibly rendering a starter battery with low state of charge.

If the Alternator has a sense wire connected to the Service battery make sure it is moved to the Starter battery when installing the D250SE/SMARTPASS120S. Note, a sense wire is typically found in Volvo Penta marine applications.

#### **Cables:**

For the best possible functionality follow the instructions in the manual regarding cable dimensions and make sure the cables are as short as possible in order to minimize voltage drops.

All cables should be firmly mounted and preferably in a cable protection tube minimizing wear and tear from the vibrations in your vehicle.

Busbars can be used to make the installation neat and tidy and the use of tubular ring terminals (size M8) properly crimped will reduce unnecessary resistance in the connections.

Note, the weaker cable recommendation to the negative terminal (D250SE) is chosen since it only carries current to the control electronics, not the charge current. The latter will flow through earth, which is connected to the negative terminal of your battery