ELECTRICAL SAFETY DEVICES

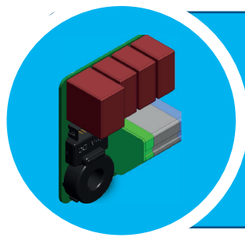
Eve Single S-line + Eve Single Pro-line

Eve Double Pro-line

INSIDE CHARGING STATION

1 Socket

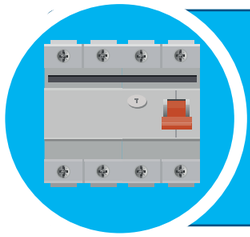
Powerboard (relays) + Controllerboard (FW) + kWh (measuring A) = Overcurrent Protection



6mA DC
(direct current)
Residual Current detection

Socket 1

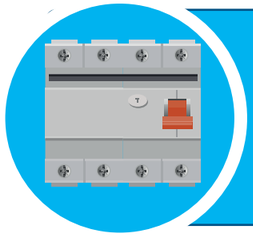
Powerboard (relays) + Controllerboard (FW) + kWh (measuring A) = Overcurrent Protection



30mA AC + 6 mA DC
Residual Current Device
(Type B)

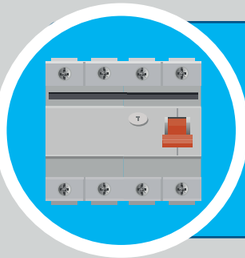
Socket 2

Powerboard (relays) + Controllerboard (FW) + kWh (measuring A) = Overcurrent Protection

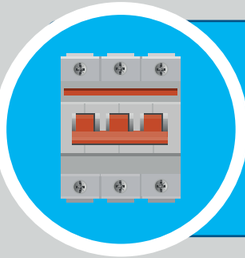


30mA AC + 6 mA DC
Residual Current Device
(Type B)

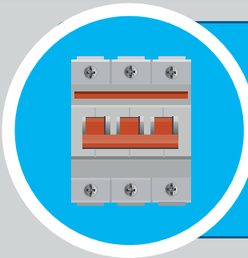
TO BE PLACED IN INSTALLATION



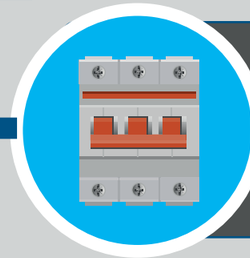
30mA AC
(alternating current)
Residual Current Device
(Type A)



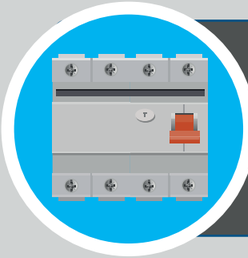
20 or 40A
Short circuit protection



40A Short circuit protection
Per feeder cable



<u>Optional:</u>
Double
Feeder Cable



<u>Optional:</u>
>= 100mA AC
Residual Current Device
Optional, depending
on installation and local
regulations

ELECTRICAL SAFETY DEVICES EXPLAINED

OVERCURRENT PROTECTION

An overcurrent protection device such as a circuit breaker or fuse protects against overload and short circuit. In modern installations, the use of a circuit breaker is common as protection device. A circuit breaker is a combination of two elements connected in series (one after the other).

1 **Short circuit**

The first element is a magnetic protection in the form of an electromagnet (coil). This element works as soon as the overcurrent suddenly starts to increase to very large values due to a short circuit, for example. As soon as a short-circuit current starts to flow, the coil will shoot a small pin against the switch-off mechanism due to the magnetism it generates. The magnetic shutdown is very fast (approximately 10 ms).

2 **Overcurrent**

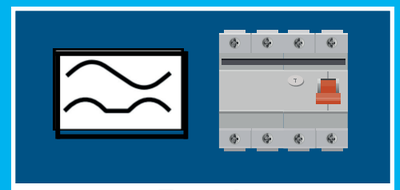
The second element in the cirquit breaker protects against overcurrent. This is a thermal protection with bimetal. If the current is too high for a long period of time, the bimetal heats up. This bends further and actuates a pin against the switch-off mechanism which will switch off the device. Thermal switch-off is slow, this is because it takes some time before the bimetal becomes hot enough for it to bend, this causes a slower reaction time to switch-off.

LEAKAGE CURRENT PROTECTION

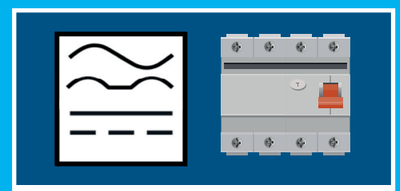
A residual current device (RCD) or residual current circuit breaker (RCCB) detects leakage current. The purpose of residual current devices is to provide protection against electrocution. A residual current devices monitors the total current through the phase wire or phase wires and the neutral wire. The sum should be zero. Any differential current should flow back through the protective earth (leakage current to earth). The earth leakage protection responds to this by shutting off the power supply in the event of such a leak.
There are different types of protection devices for either alternating current (AC) or direct current (DC) leakages.

Type A: Switches off at a leakage current
=> 30 mA AC

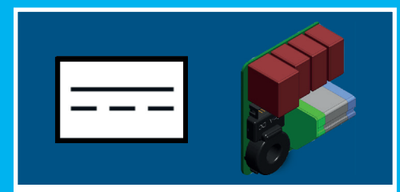
Type B: Switches off at a leakage current
=> 30 mA AC or 6 mA DC



Type A



Type B



DC detection

ALFEN TIP:

Because of the thermal protection Alfen advises to use a 20A or 40A suitable short circuit protection. If an installation does not allow this, the maximum power of the charger can also be reduced by 2A, for example, in order to avoid reaching the thermal switch-off point.

ALFEN
POWER TO ADAPT