Installing AC chargers for electric cars like ABB Terra AC is not rocket science

Electric vehicles are on the rise globally, with an estimated 2,6 million new cars to be registered in 2021. When new technologies come on to the market, misinformation and "do it yourself" rules sometimes occur.

It a safety hazard if electrical installations do not follow local legislation and standards, and it is therefore important that electrical installers and electricians can advise correctly.

As far as AC chargers for electric cars are concerned, there might be some level of uncertainty surrounding the installation of these. Let's look at a few things to make the process easy and safe.

First, it is important to emphasize that the installation of an AC charger must always be performed by an authorized electrician.

Selecting a charger

There are some factors to keep in mind when choosing the right charger. Electric cars can either be charged with AC or DC current. When charging with AC current, an AC-to-DC converter within the car is required. Car manufacturers size these converters differently and it is common to find options during the car configuration to increase the maximum power of the onboard AC/DC converter. Check the cars datasheet to find information on its AC charging capabilities and use this information to find the correctly sized charger. It is not a problem to choose a

charger with a higher power, but keep in mind that if this case, the charger will not be able to deliver its full power.

Another important factor to consider when choosing the output power of a charger, is the maximum grid capacity or maximum allowed amperage at the installation location. This limit can differ widely by country and even region, therefore it's always recommended to check with a recognized installer or your utility provider about the electrical limitations at the site of installation. In some cases, it might be possible to have the limits increased.

Local regulations

In some countries, utility companies issue regulations that limit the maximum current for appliances, including EV charging equipment. It is common to see a limitation of 16A for a single-phase and a maximum 32A for a three-phase device. That limits the maximum charging power of an AC home charger to 3.7kW on single-phase and 22kW on a three-phase connection.

In addition to a fixed limit, it may be a local requirement to get the utilities approval first before installing a charger. This could be a general rule for all EV charging equipment but also only apply for chargers above a certain limit, for example 11kW.

Installation requirements

Once you have selected the charger, you need to look at the installation. Following local installation regulations is always the guide, which can answer most questions regarding special installations, such as chargers for electric vehicles. These local regulations will commonly clarify requirements for upstream protection devices, maximum cable length, minimum cable diameter, as well as if it is a requirement to have a dedicated cable just for the charger and what load-factor needs to be considered when sizing cable and upstream devices.

Upstream MCB and RCD

Local regulations usually require each charger to have its own, dedicated miniature circuit breaker (MCB) and its own, dedicated residual current device (RCD) with a rated tripping current not exceeding 30 mA. The nominal current of both protection devices must match the maximum current of the charger and must be coordinated with the cable diameter according to local regulations. In this case, it is not possible to use the chargers circuit for any other power-consuming equipment.

RCD type A or type B

Whether the RCD should be a type A or type B relay depends on the chosen charger. For example, each version of ABB'S Terra AC wall box has built-in DC leakage current detection, and therefore there is no requirement for a type B RCD and a Type A RCD is enough for a safe installation. It is advantageous to use a combined MCB and RCD device, commonly called RCBO, such as the ABB DS203NC series. This product combines a three phase plus neutral miniature circuit breaker with a residual current device in compact form that is much smaller than two separate devices.

Surge protection

Last but not least, it is important to consider surge protection. Check the applicable local regulations to find out if an additional surge protection for the charger is required. Solutions

like ABB's Terra AC includes surge protection as standard but local requirements may demand a dedicated surge protection device (SPD) to be installed in the distribution board next to the MCB and RCD. ABB's versatile OVR range of surge protection devices could be a suitable choice here.

In conclusion, it is clear that selecting the right charger is not difficult. You just need to match the charger's maximum power to the on-board charger of the vehicle and then add cables and upstream protection devices that match the selected charger. ABB can not only deliver the state-of-the-art Terra AC Wallbox but also every device upstream to make any charging session safe and reliable.