klima agence

Installation of charging terminals

1. Description of the procedures in place

Charging points for electric vehicles must be installed according to manufacturing standards and in compliance with existing regulations, in particular the technical connection conditions. A private charging point ≥ 7 kW/400 VAC or 4.6 kW/230 VAC must be subject to registration with the network operator in accordance with the technical connection conditions for high-current installations with a maximum nominal voltage of 1,000 V.

01

Project manager
Defines the project and chooses between available service providers and products.

02

Employee
Prepares the declaration for installation to be authorised by the network operator. (The maximum recommended power rating is 11 kW for single-family homes. The maximum power for multi-occupant residences, businesses and other buildings is determined at the request of the network operator.)

03

Network operator
Authorises the installation and confirms the maximum power available at the connection point. If necessary, a connection upgrade may be required for the requested power.

04

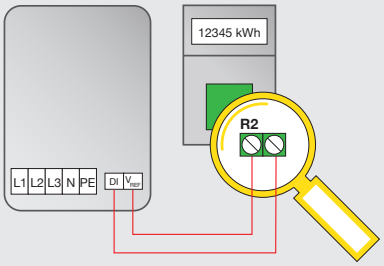
Employee
- Carries out the work according to the customer's needs and in compliance with the connection requirements (TAB).
- Reports the completion of the work to the network operator.
- Performs a pre-test of compliance himself:
  - either by remote closure of the contact R2 by the network operator;
  - or by simulating the closure of the R2 contact on the Smarty. This is achieved by temporarily bypassing the relay output, interrupting the charging process or reducing the power according to the TAB.

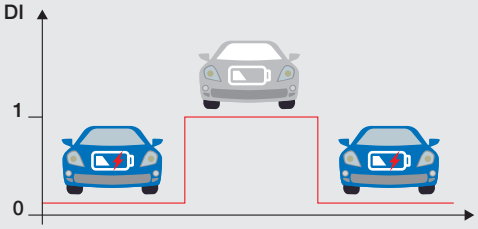
Connection with “R2” relay for the Smarty mandatory if power ≥ 7 kW/400 VAC!
Note that the R2 relay is open by default. If the grid should enter a critical state, the grid operators can close the contact in order to limit the charging output of the charging terminals and thus reduce the load on the grid.

Some charging terminals have a load shedding function and need a signal for the temporary reduction of the charging output if the grid should enter a critical state.

Variant A

The charging procedure is temporarily interrupted or the charging output reduced if the relay “R2” was closed by the grid operator and the digital input (DI) of the charging terminal has a high level.



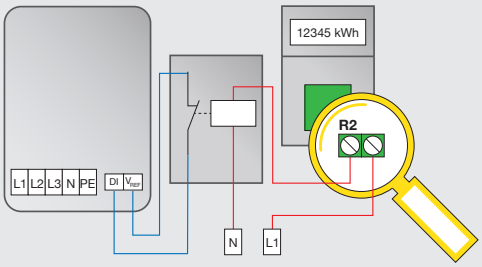


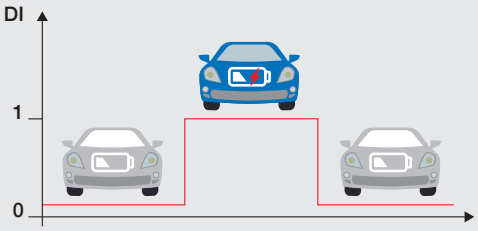
DI : Digital input or dry contact
V_{REF} : Reference potential to activate the digital input or the dry contact

Some charging terminals have a load shedding function and need a signal to activate the charging procedure at times when the grid is in a normal state.

Variant B

The charging procedure is temporarily interrupted or the charging output reduced if the digital input (DI) of the charging terminal has a low level. The charging procedure is active when the digital input has a high level. In order for the charging terminal to work properly, the signal of the relay “R2” (which is open in the normal state) must be inverted.



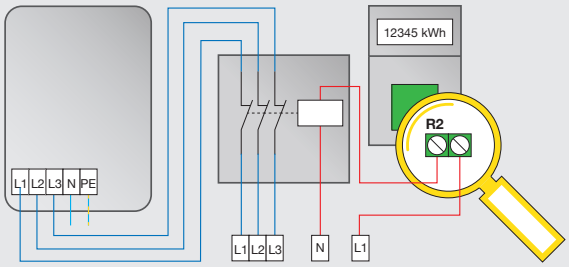


DI : Digital input or dry contact
V_{REF} : Reference potential to activate the digital input or the dry contact

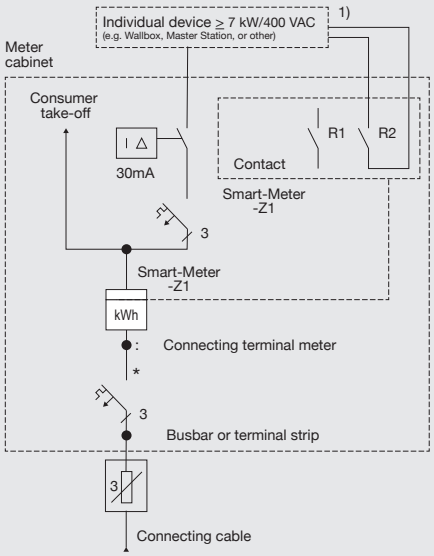
Some charging terminals do not have an integrated load shedding function.

Variant C

An external relay must be used to interrupt the power supply.

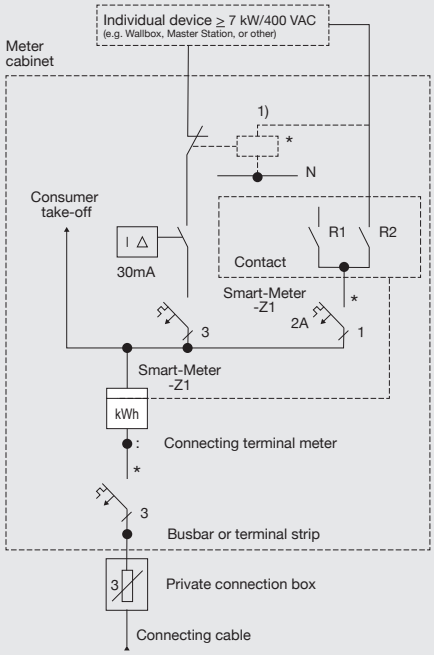


Device power reduction control ≥ 7 kW/400 VAC – electric potential provided by the device



R1 : Release for the control of heating or air conditioning units
R2 : Request for power reduction
* : Sealable
1) : An auxiliary relay must be used if an opening contact is required for the control of the specific consumer. Connection of the auxiliary relay must be done in the same way as the control of a power contactor shown in the figure on the right.

Device power reduction control ≥ 7 kW/400 VAC – electric potential provided by the customer's installation



R1 : Release for the control of heating or air conditioning units
R2 : Request for power reduction
* : Sealable
1) : Alternatively, where a power reduction is not technically feasible, provide for complete load shedding.

Simulation of the closing of the contact R2 and output reduction:
In order to check the correct function of the charging terminal's output reduction, the relay contacts can be bridged, which results in the desired output reduction in the same way as when the relay is triggered. The applicable safety rules must be adhered to.

If, in order to reduce the output, a power relay is used to interrupt the power supply to the charging terminal by triggering the relay SMARTY R2 (variant C), it is necessary in this test to check that the charging terminal is free from voltage when the relay is triggered.

If the output reduction is effected by a signal that is supplied to the charging terminal via a digital input (variants A and B), then there are in principle two methods of checking the functionality.

Ideally, a test device is connected to the charging terminal via a charging plug in order to simulate a charging electric vehicle and evaluate the maximum charging current provided by the charging terminal. In case of triggering, as with the bridging of the SMARTY R2, the maximum charging current provided may not exceed 8 A.

If no test device is available, an electric vehicle whose battery should not be charged to more than 80 % can be connected to the charging terminal. If the charging terminal has no permanently connected charging cable, a charging cable with a minimum current rating of 20 A should be used. The actual charging current or the charging output can be measured or evaluated in this case as follows:

— By measuring the current (e.g. current clamp): the current consumption must fall to about 8 A when the SMARTY R2 is triggered.
— By means of the displayed value of the active power on the electricity meter: the active power must drop significantly when the SMARTY R2 is triggered, e.g. by 5 kW. However, other influences must be excluded and the measurement must be repeated if necessary.
— By means of the display on the dashboard of the electric car: here, a reading of the current, the charging output or the forecast residual charging time can be taken directly. The latter must be significantly prolonged by the triggering of the SMARTY R2.

Once the charging infrastructure has been installed by the electrician and the completion of the work has been reported to the grid operator, the charging infrastructure can be used.

05

Network operator
May check compliance with the technical connection conditions after completion of the work.

2. Technical recommendations (connection variants, Smarty connection)

You can find all the technical recommendations and requirements in the "Planning principles for the charging infrastructure in residential and functional buildings" at: *bit.ly/infrastructure-charge-FR*

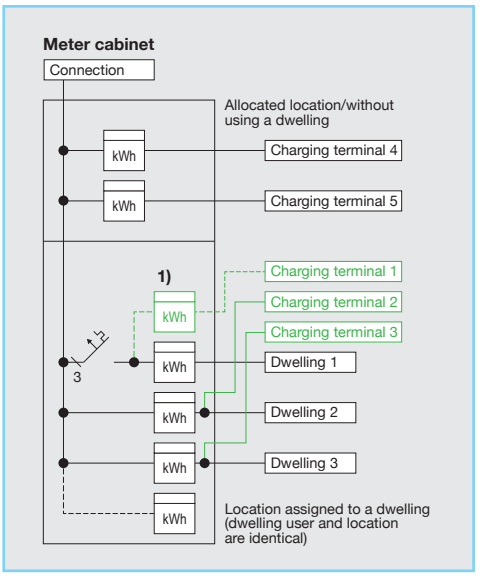
The following paragraphs describe the technical details for connecting the charging terminals to a private meter or a meter dedicated to electric vehicles.

Simple diagrams relating to the power reduction control of devices with ≥ 7 kW/400 VAC can be found in the appendix of the network operator TAB (technical connection conditions for high current installations with a maximum nominal voltage of 1,000 V in the Grand Duchy of Luxembourg). The appendix of the TAB is available here: *bit.ly/regl-TAB*

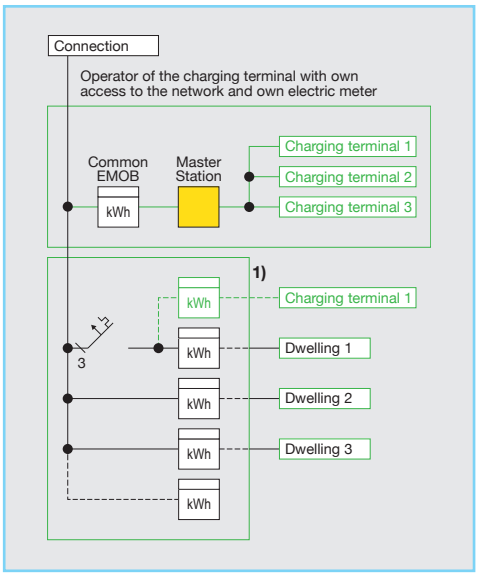
Connection to a private meter

— Separate three-phase circuit, 5 wires, from the TGBT to the charging point, according to the maximum current capacity approved by the network operator.
— Separate fuse including RCD type B or type A/EV protection in the TGBT if the charging station is not equipped with a fuse that also detects DC fault currents.
— Wiring required for communication with smart meters with a load capacity of 7 kW or more.
— The protection class must be at least IP54 for outdoor use.

A)



B)



Additional recommendations for a terminal in a multi-family building

— Establishment of a data connection (usually via Ethernet) for the individual charging stations for charge management, with the Open Charge Point Protocol (OCPP) recommended from version 1.6 onwards, as charge management/"smart charging" is defined from this version on.
— Cables must be routed through the general area of the building, taking into account wall openings or firewalls that must be crossed.
— Compulsory consideration of fire safety provisions (RIA, sprinkler system, etc.); for garages with more than 20 parking spaces, charging terminals must be integrated into the fire protection system and deactivated in the event of an alarm.

Connection to a meter dedicated to electric vehicles (more information)

— Connection of the load infrastructure's new meter to the building's main distributor, including insulation conduits or the support rail system. Cables should be routed through the general area of the building, taking into account wall openings or firewalls that must be crossed.
— Depending on the charging infrastructure used, additional space may be required for the installation of a meter for each charging point if these meters are not integrated into the individual charging terminals. MID-compliant meters must be used to read electricity consumption.
— It is necessary to lay the connecting cables, including insulation conduits or mounting rails (electrical and data cables), between the new meter cabinet and each parking space to be supplied.
— Additional space to accommodate charge management infrastructure (switch, server, etc.).

If a separate meter is required for the connection of an electric vehicle charging point, e.g. for tariff reasons, it must be installed as shown in figure A) in the illustrations depicted above.

3. Government subsidies for private charging terminals

Find all the information and eligibility criteria at:
www.klimabonus.lu

The Luxembourg government is putting forward a support scheme for the installation of private charging terminals in order to help with the transition to electric mobility and to guarantee the autonomy of electric vehicles.

Subsidy application forms and information about the process can be found at:
bit.ly/primes_bornes

The application process is identical to that for other state subsidies. There are two forms to be filled in by the applicant and the installer and sent to the Environmental Agency.

The aid application must be submitted no later than 12 months after the last invoice. Items to be provided:
— a copy of the paid invoice in due form, attesting to the purchase and, if applicable, the installation of the charging station;
— if the beneficiary is a property owner, a land-register extract indicating the property;
— if the beneficiary is a tenant, a copy of the lease contract.