

ACCELEV v2 6kW / 8 kW

EVSE dual phase charger
with BatteryCare and Grid Monitoring
User Manual (04.2019)



Accelev v2 6kW / 8 kW User Manual (Firmware v2.02)

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Thank you for choosing our EVSE – Accelev v2.
We believe that our portable wall box is the best choice for your car.

1. Overview

Accelev v2 EVSE is a processor-controlled, advanced AC wall box with features not available in other chargers. Beside of grid monitoring (power shedding) and BatteryCare™ unique charging modes it gives an opportunity to equally load 2 phases at 3-phase 400V source to give more power to the car with single phase on-board charger, and thus – to charge much faster.

It is updatable and expandable via USB port and can be flexibly completed according to customer wishes (both cables are detachable/replaceable).

We believe that Accelev v2 is the most modern EVSE home station of our times.

2. Standard features

- Grid monitoring (immediate load reduction while grid overload detected – no more fuse switches keeping turning off)
- BatteryCare™ - unique full charging / no full charging modes with maximum life protection for your battery
- Updateable via micro USB extension port.
- Portable (some restrictions apply, see “Precautions & Installation”)
- Detachable cables (both – input and output side). Use one charger in all situations.
- 2.8 inch TFT human interface with „geek mode” - you can monitor all parameters while loading
- Overload and over-temperature protection and advanced safety solutions implemented

For more features, updates, extensions please refer to <http://evtun.com>

3. Precautions & Installation

Accelev v2 EVSE should be installed indoors and should be protected from water. It has IP42 protection. To fix it at the wall, please install quick-click hanging system bar with 2 x 6mm x 50mm bolts or similar length screws (if installed on a wooden fence). Please remember that Accelev is a portable unit, but still, its weight is about 15 kg, so it needs accurate mounting of the quick-click bar and being screwed to the wall (bottom). It should not be connected to electricity when moving.



Plug with a **green label** is an output to car or third phase extension, a **red label** side is for input (380-415V 3-phase). Same colours code can be found at the end of connecting wires. There is no risk to improperly connect plugs to sockets, as they are different.

Accelev, if used as a stationary unit, should be connected to 16A or 32A 3-phase EU connector (red). You can order Accelev with any of these: 16A/32A and 4pin/5pin. Phases can be changed directly in plug (it has a unique, rotating connectors face-side). There is no need to have 32A 3-phase delivery at home, but 32A plugs can be used. For proper installation consult or call an electrician. Accelev EVSE can be used lying flat or hanging (preferred setup due to better cooling). Remember to avoid covering inlet and outlets of heat.

Maintenance and cleaning can be done only if a power source is disconnected. It is not permitted to wash the unit with a direct stream of water. Use cleaning wipes for notebook/tv screens instead.



At bottom side you'll find a **security mounting**. While using this EVSE as a wall box this security mounting must be installed to avoid serious injuries caused by charger drop. It should be installed by drilling $\phi=6$ hole, install gold anchor (with appropriate glue, depending on surface).

Unlocking the cables

To unlock cables, please switch the power supply off first. Use a flat screwdriver to unlock latch (see picture). Pull down the plug while keeping latch unlocked. To plug in the cable again a screwdriver is not necessary. Do not turn/rotate plugs like in Accelev v1.



Input phase switching

Factory configuration of input phases is L1, L2. It means that Accelev will load these phases equally. Alternatively, you can change the input configuration to be L1, L3. To do that, please use a screwdriver and rotate pins inside the power plug. Gray disc inside input plug can be rotated and thus - phase L2 is replaced with L3.

Phase L1 is connected permanently. If you want to use L2, L3 configuration - please call an electrician to reconnect wires inside input power plug.



4. Do/Don't

You can:

- Switch off a power source of Accelev while not charging, also by its input connector (you can use it also to reset counter – in such situation, please switch off for at least 5 seconds).
- Disconnect your car at any moment.
- Press button at the delivery plug to restart charging
- Move or carry Accelev while not charging and not connected to the mains and all cables disconnected.
- Use Accelev as a portable charger while putting on the ground on the back

You should not

- Use Accelev wall-mounted without securing it with bottom security hold
- Switch off a power source of Accelev while charging.
- Move or carry Accelev while charging, connected to the mains or cables connected.
- Open Accelev, modify or change its firmware
- Pour water, wash it with water, etc.



5. Charging speed

Accelev EVSE tries to optimise your charging speed and load automatically, therefore, the following situations may occur:

- your AC network is not loaded, the car battery is not full – charging speed is maximised
- your AC network is overloaded – charging speed is reduced by Accelev
- your car battery is almost full – charging speed is reduced by car.

Below you can find time estimates for some popular cars, which can be used to predict charging your car from 5% to 95% state of charge. Notice, that car may charge slower or faster due to battery temperature and power supply voltage & load. This table does not cover all car models and your car is compatible even if it is not listed. Estimated charging speed in hours is presented.

Notice: If speed of charging is limited by low onboard charger amperage, Accelev still can be faster than other charger due to higher voltage operation (voltage boost). This applies especially to cars with 3,3kW or weaker onboard charger. Notice, that „16A charger” may load your phase up to full 16A, but faster, fully loaded Accelev 6kW will load it with 13A per 230V phase (230V x 13A x 2 phases = 6kW), or with 7,5A per each 230V phase only while doing exactly same speed as 16A charger does.

Geek info: $7,5A \times 2 = 15A$, and not 16A, but the voltage at Accelev input will stay higher due to much lower load, so powers will be equal.

Vehicle	Max rate (kW)	Battery size (kWh)	Charger included with car (h)	16A charger (h)	Accelev 6kW (h)	Accelev 8kW (h)
					2.5	2.5
					2	2
					2.5	2.5
					2.5	2.5
					5.5	4.5
					4	3
					4	3
					5.5	4.5
					2	2
					2.5	2.5
					4.5	4.5
					4.5	4.5
					10.5	8.5
					7	7
					4	4
					4.5	4.5
					4.5	4.5
					3	2.5
					3	2.5
					3	2.5
					5.5	4.5
					4	3.5
					5	5
					2	2
					4	3.5
					6	5
					2	2
					1.25	1
					4.5	4
					3	2.5
					5	4
					2.5	2.5
					11	9
					3	3
					15.5	13
					3.5	3
					2.5	2.5
					3	3
					4.5	4
					5	3.5

					2	2
					2.5	2.5
					2.5	2.5
					2.5	2.5
					2.5	2.5
					5	5
					3.5	3.5
					7.5	7.5
					7.5	7.5
					9	9
					5	4.5
					7	6
					4	3.5
					5	4.5
					4	3.5
					2	2
					3	3
					2	1.5
					4	4
					2.5	2
					2.5	2.5
					1.5	1.25
					2.25	2
					5.5	5.5
					3	2.5
					2.5	2.5
					12	9
					8.5	6.5
					17	13
					10.5	8
					10.5	8
					12	9
					12	9
					13	9.5
					14.5	11
					14.5	11
					15.5	11.5
					15.5	11.5
					17	13
					10.5	8
					10.5	8
					13	9.5
					13	9.5
					15.5	11.5
					15.5	11.5
					9.5	7.5
					1.5	1.5
					2.5	2.5
					7	5.5
					4	3
					4	3
					3	3
					3.5	3.5
					3	3

					3	3
					6.5	6.5
					4	3.5
					6	5

6. Main Screen

Values, Statuses (from top left):

(See "Usage and functions" chapter below to learn more about all options)

BatteryCare – BatteryCare option status

NoFull – no full charge option status

GridM – grid monitoring (shedding) status

234/242V – voltage of shedding / actual voltage

32/31.8A – actual max. amperes / actual amperage

25C – core of charger temperature

00:00:28 – total charging time

0.059kWh – total kWh charged

7.7kW – actual charging power

Battery symbol – shows phase of charging and if BatteryCare is on or off

MAX 32A – max. amperes permitted

[-] [+] - change max. amperes: 6, 9, 12, 15, 18, 21, 24 (27, 30, 32 - for 8kW)

Start – starts charging or idle, resets counters

Setup – opens Setup screens:

BatteryCare(TM) – enables and disables BatteryCare routines and functions

No Full Charging – self described, perfect for battery life.

ReVive Balancing – a special pulse balancing of battery to cure and recover lost capacity

Grid Mon – enables and disables grid monitoring (shedding)

More Sens – more sensitive grid monitoring

[-] [+] - sets level of grid monitoring

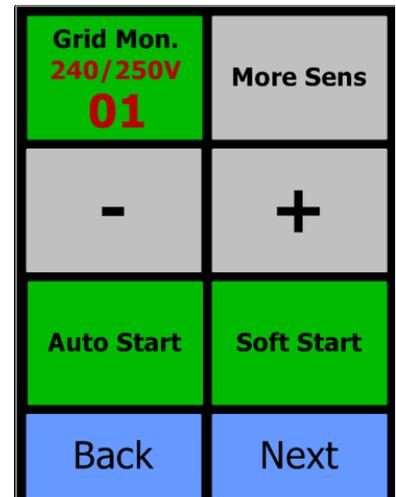
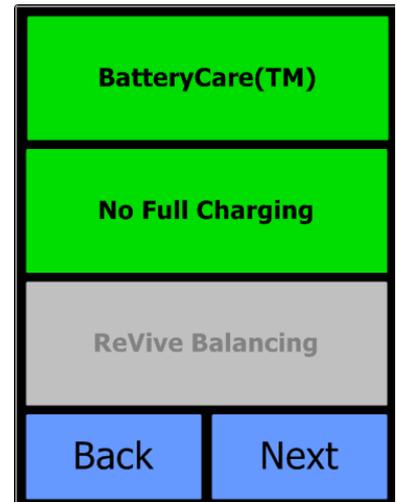
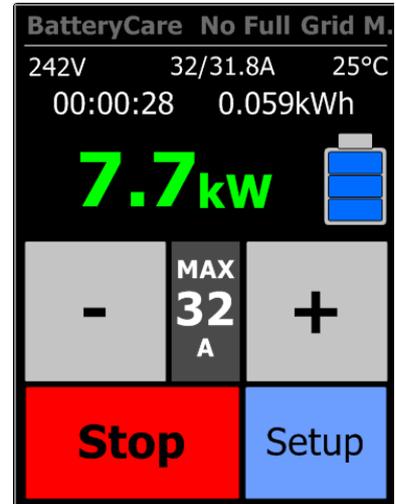
234V – actual prediction for power shedding start

01 – tolerance of grid monitoring (01 = smallest gap, quickest reaction)

Grid monitoring depends on actual voltage in your electric grid. It is a good idea to set it more conservative. 08 is a factory setting, good for most situations.

It will give about 15V gap between idle and reaction to load at 240V, and an approximately 8V gap at 210V. Increasing tolerance is increasing the gap by 1-2V (depending on actual voltage). A higher step can be observed at higher voltages, as this method of grid load control based on actual voltage to estimate load. Decreasing reduces the gap by 1-2V.

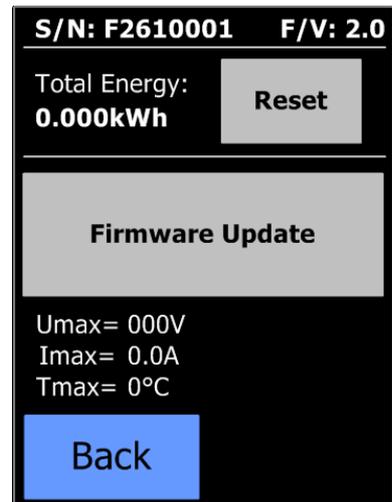
In the case of electric fuses turned off please decrease tolerance first. If you see, that charger reacts to load and reduces the speed of charging, but this amperage reduction is not enough for your fuse system - please switch "More Sens" on to increase the amount of amperage reduction by twice.



Auto Start - If enabled, forces charger to stay ready to charge even if not plugged, unplugged from car, stopped from the car. No need to start charging every time. **It must be off for firmware update.**

Soft Start - enables low current start with step-by-step load increase and grid monitoring, to find maximum possible current from an unknown power source. Analysis of source capabilities may take up to 8 minutes.

S/N: F2610001 – serial number of charger
 F/V: 2.0 – firmware version installed
 Total Energy – global energy counter
 Reset – resets global energy counter
 Firmware Update – switches to boot mode, waits for update via USB port
 Umax – highest voltage ever measured
 Imax – highest amperage ever measured
 Tmax – highest temperature ever measured



7. Usage and functions

Status line shows actual status of three main functions:

BatteryCare:

BatteryCare – off, charger is a standard Mode2 charger
BatteryCare – enabled and iddle
BatteryCare – enabled and in action

BatteryCare, once switched on, focuses on start charging speeds and finalising of charging, with constant voltage phase, to reduce risk of single battery cell over-voltage to minimum. It seamlessly reduces the speed of charging before battery voltage reaches the maximum - and thus it protects cells much better, than any OEM EVSE, still permitting full charge. SOH (State Of Health) of your car battery will drop slower.

BatteryCare enables No Full Charging button. See more explanation in chapter 9.

No Full Charging

Battery symbol stays green if BatteryCare is enabled. Otherwise – it is blue.

No Full – off, charger is a standard Mode2 charger
No Full – enabled and idle
No Full – enabled and almost full battery detected

No Full Charging can be switched on via Setup menu, while BatteryCare is enabled. This function is preventing your battery to be fully charged. Once finalising (constant voltage) phase is detected, car charge stops. For your information status “No Full” stays orange until reset with Start button.



Maximum amperage setting/display:

User can set and change maximum amperage at any moment of charge or idle.

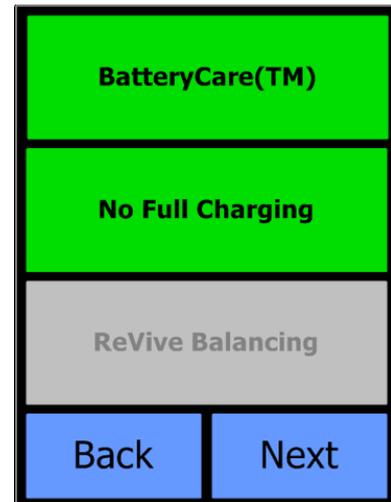
Please notice, that maximum amperage set by USER and ACTUAL maximum amperage (presented below status bar, along with actual current) may differ (be reduced) if BatteryCare is on or Grid Monitoring is on.

Update

For update please disconnect your Accelev from power source. Connect microUSB cable between your Accelev and Windows PC. MicroUSB (covered with plastic plug) port is on the right side of Accelev. Go to Setup, **switch off Autostart (if it is on)** and then press Firmware Update button. Install Accelev Updater on your PC and start it with Administrator privileges. Choose proper update file and wait till Update Accelev button will be enabled (verification of data occurs). After update is finished, disconnect USB and re-connect Accelev to power. Update program and new firmware versions are available at EVTUN.COM page or your distributor/shop page, once published.

ReVive Ultra-balancing

This function is intended to balance battery and revive missing capacity. Such curing bases on pulse charging algorithm and slow balancing and may take up to 10 hours to finish. It can be interrupted at any moment, but the battery will be not entirely balanced. A car may not be fully charged after the end of ReVive. A car should be discharged till <10% state of charge before using ReVive (you can discharge your car stationary, using a heating system and setting it to a max. temp.). During charging with this function enabled, grid monitoring can be activated, but BatteryCare is off. We suggest to balance your battery every three months, but there is no need to repeat that procedure more frequently than once a month (overnight).



8. FAQ – Frequently Asked Questions

7.1. What is a typical setup of charger you suggest?

We highly suggest to use BatteryCare with No Full Charging for everyday use and commuting, and BatteryCare without No Full Charging for occasional, long trip occurrences. Charging battery full, along with it's high temperature reduces usable capacity and State Of Health of your battery.

2. Can I restart ReVive balancing again after it finished to balance and cure my battery even more?

Yes, this is ok and it will work for you.

3. Can I use Accelev with 230V 3-phase network (like in some parts of Norway).

No. It won't work. Or better to answer – it will work with a reduced speed to 4 kWh and show an error.

4. Can I use Accelev outdoors?

No, it designed to use indoor, sheltered. You can use it as a portable charger, but restrictions apply – see paragraph "3. Precautions & Installation".

5. Can I charge Type1/Type2/Tesla US cars with one charger?

Yes. You need just cables we provide. Tesla US connector, Mennekes (Type 2) and J1772 (Type 1) are available. Your charger is delivered with one of these types. If you want more – ask us.

6. Can I have longer/shorter cables for supply/car connection?

Of course. Just tell us what do you need and we will produce that.

7. Do you plan to expand this charger to be 3-phase? Why don't you offer 3-phase chargers?

Yes, we plan do add third phase extension as separate module, but without oblige. Charger is ready to have an extension module to 3-phase.

3-phase charger with such power in single housing will be heavy or inefficient.

8. DO I need to install current meter at house power input to use grid monitoring?

No. Grid monitoring in Accelev uses voltage drop algorithm, basing on a rule, that voltage drop is proportional to current load. You can use grid monitoring and Soft Start (special for unknown capability power sources) at any time and place. This simplifies usage of grid monitoring.

More Questions? News? Updates? Extensions? Other charger types? Ideas for updates?

Go to <http://www.evtun.com>

9. Specifications & Technical Data

Dimensions (in mm)	330 x 240 x 130	380 x 270 x 130
Weight (net, in kg)	15	18
Human interface	2.8 inch colour TFT screen with touchscreen	
Update/extension port	USB micro B (USB 2.0 or higher)	
BatteryCare™	Installed, factory disabled (refer to manual)	
Housing	PC + GFS, steel	
Installation method	Indoor wall mounted	
Application allowance	Indoor or sheltered place, min. 1m over the ground, no direct sun.	
Portability	Yes, restrictions apply. Refer to manual.	
Input plug type	IEC 60309, 3P+N+E (red plug, 5 pins). Contact if you need other standard. Replaceable.	
Input voltage range	200 ~ 240 V (AC) per phase	
Input cable length (in m)	2 (other options available)	
Typical power	6,0 kW	8,0 kW
Rated max. power	6,25 kW	8,40 kW
Rated max. current (release ver)	24 A	32 A
Output plug type	Type2 (IEC 62196) or Type1 (J1772). Replaceable.	
Output cable length in m	5 (other options available)	
Output voltage range	210 ~ 250 V (AC) single phase	
Charging standards / modes	Mode 3 (with power shedding), Mode 2.	
Protection	Overvoltage, undervoltage, overload, grounding, over temp.	
Efficiency	≥95%	
Power factor	≥0.99	
Working temperature	-30 ° C ~ +50 ° C	
Working humidity	5% ~ 95% (no condensation)	
Housing protection level	IP42	
Cooling, sound level	Active, fan, processor controlled, 49dB from 1 m (wall mounted)	
Measuring accuracy (power)	1%	
Standards met		
Branding	Possible, contact us for MOQ	

Standard delivery includes Type 2 EVSE-to-car cable. If you need Tesla USA plug or Type 1 plug, please inform us or your distributor. You can also order two or all three types of plugs, with additional fee.

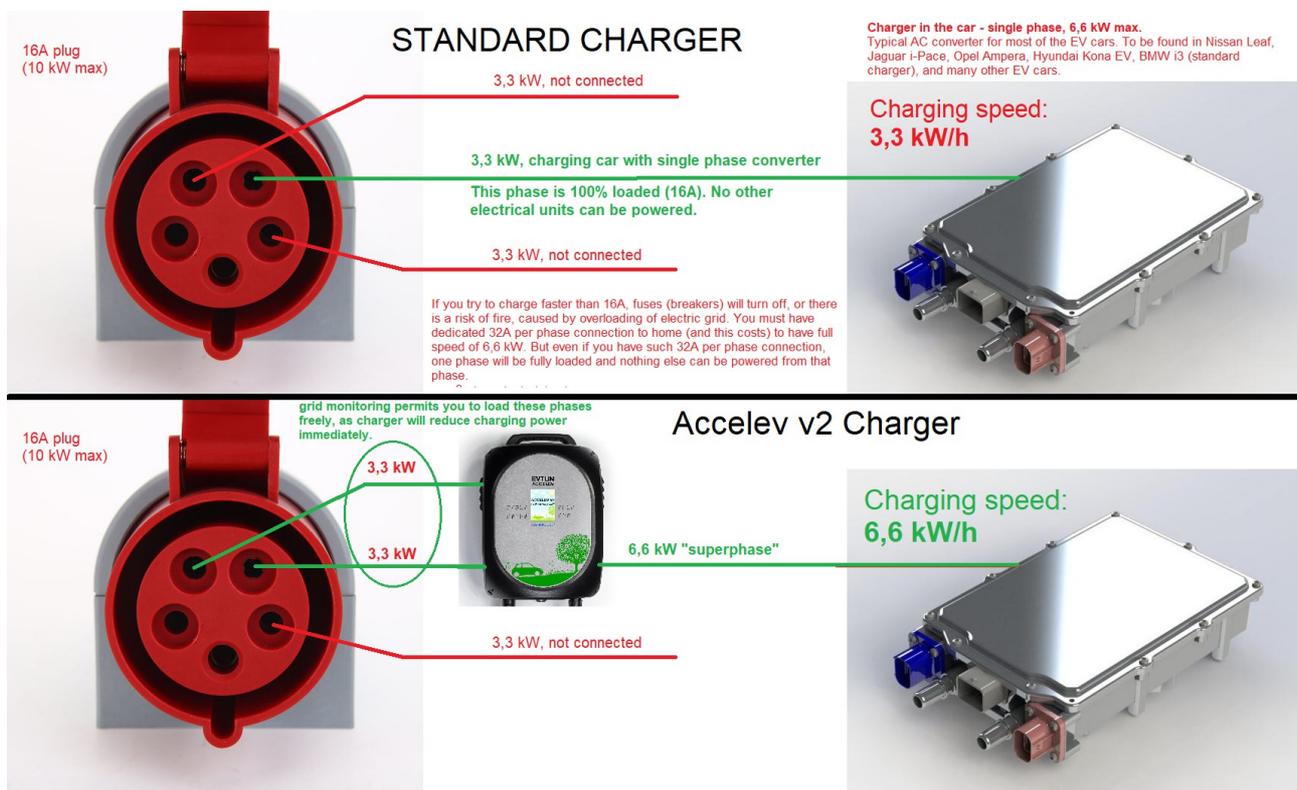
10. More technical explanation of BatteryCare, ReVive balancing, Grid Monitoring, Soft Start functions

BatteryCare focuses on finalising of battery charging. This phase starts, when the voltage reaches the maximum permitted (usually 4,12 V per cell). During that phase, when imbalance, different cell temperatures along with a group of cells controlled by single BMS node, or just partial cell failure occurs, it is quite possible to cause overvoltage at some individual cells, and through that - cause ageing and breakdown of whole battery (after some time).

BatteryCare during the first pass (first full charge) tries to learn car charging characteristics, and memorise it. Also, it reduces charging amps to minimise the time of being at full voltage to about 15% of the original time. Such finalising stage can be up to 15% longer than conventional charging.

When learning is done, BatteryCare charges the car till full with current adapted to keep not more than 4,0V during finalizing. This adaptive method reduces time loss at the finalising stage to 5-10% while the battery will be less than 5% of finalising time in "danger zone".

As we have received dozens of questions about how Accelev compares to typical 16A or 32A single phase charger (EVSE), there is a simple graphic explanation.



Typical 16A charger connected to 16A x 3 phase home grid (10 kW max capability, standard in Europe), drains one phase totally. Charging speed is about 3,3 - 3,5 kW. Nothing else can be connected to that phase (breaker will turn off the power). Also, no 3-phase tool can be used while charging an EV car.

With Accelev two phases are equally loaded. So with 3,3 kW charging speed, each phase will be loaded with half of its capability (about 8A)

But you can load two phases fully and charge 6,6-7,0 kW because Accelev includes Grid Monitoring. If any additional load is detected, charger reduces charging speed (or stops charging) for a period of the additional load operation. It gives you fastest possible home charging for cars with single phase onboard charger. Among these cars, we can find Nissan Leaf, Jaguar I-Pace, Opel Ampera, Hyundai Kona EV and many many others.

32A charging from a single phase with a conventional charger is possible when you own a dedicated 32A

per phase home supply. It costs.

11. Errors and Troubleshooting

Errors are presented as a separate red screen with the error code and an explanation. There is a button "Dismiss" visible. It can be used for a technician, to bypass the error.

Following errors may occur:

01 - Input voltage too high.

It means that your grid voltage is above 240V at the input. Standard voltage is 220-230V per single phase. Please contact us if you see this error.

02 - Input voltage too low.

Your grid voltage is below 200V per phase. It is an unusual situation, as a standard voltage is around 230V while the grid is not loaded. Contact your local electrician or energy delivery company to solve this problem.

03 - Current too high.

It means, that your car sinks more energy than is permitted by the charger. It must be a shortcut or energy leak somewhere at the battery. Please contact your car dealer to solve the problem.

04 - Temperature too high.

The core of your charger has a too high temperature. Let it cool down, cover from direct sun. Contact us if all seems ok, but the error occurs.

05 - Temperature too low.

It seems that ambient temperature is below -30C. Please use your charger in a sheltered area, or at least, let it warm up somewhere at home, inside of your car etc. Electronics dislike working in the excessive cold.

06 - PE protection.

PE line error/grounding error detected or your PE/grounding in power socket is not correct. Contact your electrician.

12. Firmware Releases

05.10 - v2.03 - bug in Autostart solved (no more fan running after charging finished/cable disconnected). Minor updates. **Autostart must be switched off prior to firmware update to avoid Error 02.**

04.25 - v2.02 - the speed of reaction of Grid Monitoring vastly improved (0,01 sec now). Power presentation in orange instead of green while BatteryCare or Grid Monitoring active and controlling the load. Mode 1 charging added for Mitsubishi i-Miev first gen (with 3.0 kW onboard charger).

04.20 - v2.01 - impulse based option of ultra-balancing added (with access code for beta-testers), presentation of actual voltage at grid monitoring button added, SoftStart and AutoStart functions added (see manual). Outlander PHEV special, faster charging routine added (omits in-charge balancing, forces battery balancing at the end of charging, saves about 15 min extra, and 30 min in total vs any other charger).

04.10 - v2.00 - first official release.



