

# OptiMATE6

amp/matic

MODEL : TM180

~ AC : 220 - 240VAC ~ 50-60Hz 0,85A

== DC : 5,0A == 12V

**INSTRUCTIONS FOR USE**  
IMPORTANT: Read completely  
before charging

EN



1 x 12V  
STD / AGM-MF / GEL / CYCLIC CELL  
15 - 240Ah (48 hour charge)

**Automatic charger for 12V lead/acid batteries**

 **tecMATE™**

# Optimate6

ampmatic

## LED PANEL

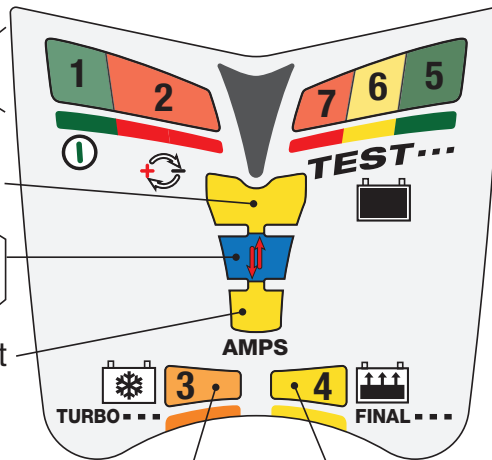
LED #1 - AC power present  
 LED #2 - Battery connected  
 in reverse polarity

LED #10 - 5A charge current

LED #9 - Current between  
 0.4 - 5 Amp per  
 Ampmatic control

LED #8 - 0.4A charge current

LED #3 - Full on: Low voltage low current or pulse  
 desulfation  
 Flashing: Turbo high voltage desulfation



LEDs #5, 6 & 7  
**Flashing:** Testing  
 (no charge delivered)  
 Single flash: initial test  
 Double flash: 12 hour test  
**Full on:** Maintenance  
 charge is delivered and  
 TEST result is displayed

LED #4 - Full on: Bulk Charge  
 Flashing: Final Charge & verification

## Other TecMate Products

### PROFESSIONAL BATTERY CARE:

Optimate PRO-2  
 ampmatic



Optimate PRO-8



### WORKSHOP TOOLS:

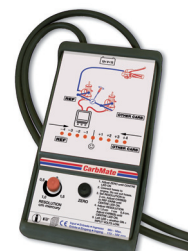
IgnitionMATE  
 duo



VacuumMATE



CarbMATE



info: [www.tecmate.com](http://www.tecmate.com)

# Optimate 6

## ampmatic

### AUTOMATIC DIAGNOSTIC CHARGER FOR 12V LEAD-ACID BATTERIES FROM 15Ah TO 240Ah, AS FOUND IN:

EN



### DO NOT USE FOR NiCd, NiMH, Li-Ion OR NON-RECHARGEABLE BATTERIES.

Charge rate: 5 Ah / hour, will recharge a 240Ah battery in 48 hours.

Input: 220-240V~ maximum 0,85A. The maximum output current is automatically adjusted according to the characteristics of the connected battery, in the range of 0,4A to 5A, by the *ampmatic*<sup>TM</sup> output control circuit (see §4.1 below).

### IMPORTANT: READ THE FOLLOWING INSTRUCTIONS BEFORE USING THE CHARGER

This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety. Children should be supervised to ensure that they do not play with the appliance.

#### SAFETY WARNING AND NOTES: Batteries emit EXPLOSIVE GASES - prevent flame or sparks near batteries.

Disconnect AC power supply before making or breaking DC/battery connections. Battery acid is highly corrosive. Wear protective clothing and eyewear and avoid contact. In case of accidental contact, wash immediately with soap and water. Check that the battery posts are not loose; if so, have the battery professionally assessed. If the battery posts are corroded, clean with a copper wire brush; if greasy or dirty clean with a rag damped in detergent. Use the charger only if the input and output leads and connectors are in good, undamaged condition. If the input cable is damaged, it is essential to have it replaced without delay by the manufacturer, his authorised service agent or a qualified workshop, to avoid danger. Protect your charger from acid and acid fumes and from damp and humid conditions both during use and in storage. Damage resulting from corrosion, oxidation or internal electrical short-circuiting is not covered by warranty. Distance the charger from the battery during charging to avoid contamination by or exposure to acid or acidic vapours. If using it in the horizontal orientation, place the charger on a hard, flat surface, but NOT on plastic, textile or leather. Use the fixing holes provided in the enclosure base to attach the charger to any convenient, sound vertical surface.

**EXPOSURE TO LIQUIDS:** This charger is designed to withstand exposure to liquids accidentally spilled or splashed onto the casing from above, or to light rainfall. Prolonged exposure to falling rain is inadvisable and longer service life will be obtained by minimizing such exposure. Failure of the charger due to oxidation resulting from the eventual penetration of liquid into the electronic components, connectors or plugs, is not covered by warranty.

**BATTERY CONNECTIONS:** 2 interchangeable connection sets are available, supplied with the charger is a set of battery clips for charging the battery off-vehicle, the other connection set comes with metal eyelet lugs for permanent connection to the battery posts, and re-sealable weatherproof cap on the connector that connects to the charger output cable. This connection set allows easy and sure connection of the charger to maintain the battery on-vehicle. The resealable weatherproof cap is designed to protect the connector from dirt and damp whenever the charger is not attached. Consult a professional service agent for assistance in attaching the metal eyelets to the battery posts. Secure the connector with weatherproof cap so that it cannot foul any moving part of the vehicle or the cable can be pinched or damaged by sharp edges. The in-line fuse in the eyelets connection set protects the battery against such accidental shorting across positive and negative conductors. Replace any burnt fuse only with a similar new fuse of 15A rating.

#### CONNECTING THE CHARGER TO THE BATTERY

1. Disconnect AC power supply before making or breaking DC / battery connections.
2. If charging a battery in the vehicle with the battery clips, before making connections, first check that the battery clips can be safely and securely positioned clear from surrounding wiring, metal tubing or the chassis. Make connections in the following order: First connect to the battery terminal not connected to the chassis (normally positive), then connect the other battery clip (normally negative) to the chassis well away from the battery and fuel line. Always disconnect in reverse sequence.
3. When charging a battery out of the vehicle with the battery clips, place it in a well ventilated area. Connect the charger to the battery: RED clamp to POSITIVE (POS, P or +) terminal and BLACK clamp to NEGATIVE (NEG, N or -) terminal. Make sure the connections are firm and secure. Good contact is important.
4. If the battery is deeply discharged (and possibly sulphated), remove from the vehicle and inspect the battery before connecting the charger for a recovery attempt. Visually check the battery for mechanical defects such as a bulging or cracked casing, or signs of electrolyte leakage. If the battery has filler caps and the plates within the cells can be seen from the outside, examine the battery carefully to try to determine if any cells seem different to the others (for

example, with white matter between the plates, plates touching). If mechanical defects are apparent do not attempt to charge the battery, have the battery professionally assessed.

5. If the battery is new, before connecting the charger read the battery manufacturer's safety and operational instructions carefully. If applicable, carefully and exactly follow acid filling instructions.

## USING THE OPTIMATE 6: PROCEEDING TO CHARGE

For safety reasons, the OptiMate output will only activate if a battery retaining at least 2V is connected, whereupon the micro processor instantly diagnoses the battery condition and engages the appropriate charge mode and lights the corresponding charge status LED.

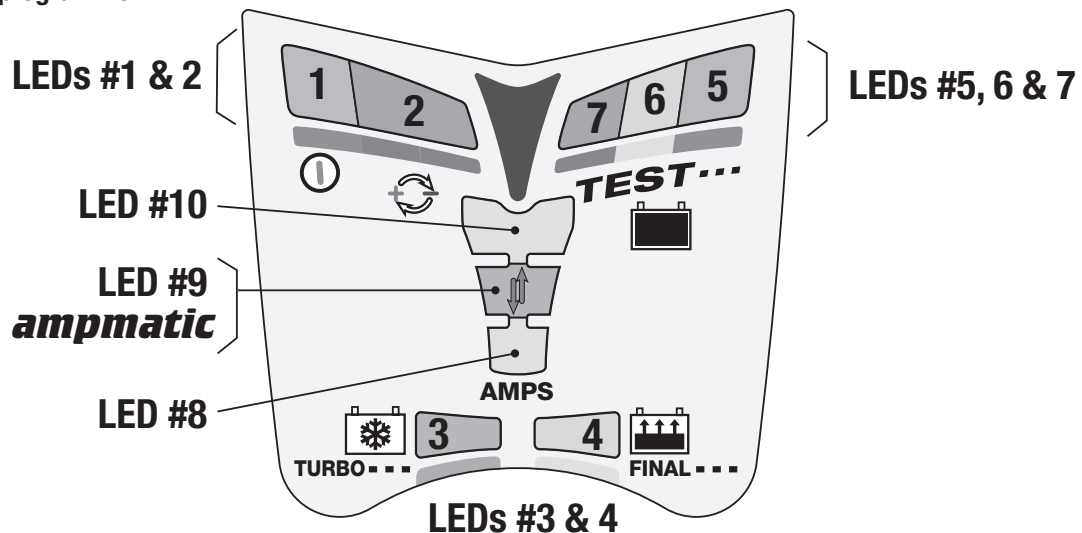
The charger's special recovery mode cannot engage if it senses that the battery is still connected to a vehicle wiring circuit which effectively offers a lower electrical resistance than the battery on its own. However, if the deep-discharged battery is not removed for recovery, neither battery nor vehicle electronics will be damaged.

**VERY FLAT NEGLECTED BATTERIES:** Pay particularly close attention to the following which is especially important for relatively small batteries such as those used on motorcycles, lawn tractors, jet-ski's, snowmobiles and similar: A battery left deep-discharged for an extended period may develop permanent damage in one or more cells. Such batteries may heat up excessively during high current charging.

Monitor the battery temperature during the first hour, then hourly there-after. Check for unusual signs, such as bubbling or leaking electrolyte, heightened activity in one cell compared to others, or hissing sounds. If at any time the battery is uncomfortably hot to touch or you notice any unusual signs, DISCONNECT THE CHARGER IMMEDIATELY.

**ECO POWER SAVING MODE WHEN THE CHARGER IS CONNECTED TO AC SUPPLY:** To reduce long term power consumption OptiMate 6 employs two converter circuits, a power converter to charge the battery and an auxiliary converter to power the control circuitry and LED display. The power converter is switched off when the charger is not connected to a battery resulting in a very low power draw of less than 1,7W, equivalent to power consumption of 0,042 kWh per day. When a battery is connected to the charger power consumption depends on the current demand of the battery and its connected vehicle / electronic circuitry. After the battery has been charged and the charger is in long term maintenance charge mode (to keep the battery at 100% charge) the total power consumption is estimated to be 0,060 kWh or less per day.

The LED indicators referred to below, and the clauses dealing with them, are sequenced as they may come on through the course of the programme.



### 1 and 2. INVERSE connections and input power

1. Connect the charger to a mains supply socket providing AC supply of 220 to 240V. The "POWER ON" LED #1 should illuminate and LEDs #3,4,5,6,7 should blink twice to confirm micro processor health.  
HIGH and LOW intensity indication: The "POWER ON" LED #1 will reduce intensity to a low level to indicate low power "ECO" mode. This will occur if there is no battery connected, or when a battery is connected and the programme finds itself in the Initial and Extended voltage retention test mode or the 'rest' periods of Maintenance Charge mode. The "POWER ON" LED #1 will indicate brightly during Recovery charge, Bulk and Pulsed absorption charge and Maintenance charge modes.
2. If the INVERSE POLARITY LED #2 indicates, the battery connections are incorrect. The charger is electronically protected so no damage will result, and the output will remain disabled until the connections are corrected.

### 3. Recovery charge

If the battery is extremely flat (deep-discharged and sulphated), the recovery mode will engage and the DESULFATE LED #3 will light. A special high voltage is applied to force a very small fixed current into the battery in a recovery attempt that may last for a maximum of two hours. Initially the voltage is limited to about 16V for 5 seconds while the circuit assesses whether this level is sufficient to recover the battery.



- 3.1 If the assessment is positive the voltage remains limited at 16V and the DESULFATE LED #3 remains on.
- 3.2 If the assessment is negative, typically for a badly neglected battery that has not received any charge for many months, the second more powerful TURBO stage will engage with the voltage limit reset to 22V. TURBO RECOVERY mode is indicated by a flashing DESULFATE LED #3.
- 3.3 Once the battery accepts the very low set current (0,4A LED #8 indicating) the voltage will reduce until the moment when the automatic circuit judges that the battery can accept the final stage of the recovery programme. If the DESULFATE LED #3 was flashing during the TURBO mode (§3.2), it will now revert to steady indication. During 15 minutes the **ampmatic™** current control will now deliver current in pulses (as displayed by LEDs #8, 9 and 10) whilst maintaining the voltage below 14,3V, to further prepare the battery to accept normal charge. This mode is particularly effective for initiating recovery of factory activated / “hi performance” pure lead or cyclic cell AGM batteries.

**NOTE:** If the battery remains connected to the vehicle electrical system (even with ignition key in off position) the TURBO recovery stage cannot engage.

## 4. Bulk and pulsed absorption charge

The **BULK CHARGE** stage (steady LED #4) will engage if the micro processor determines that the battery can accept charge at normal voltages levels.

- 4.1 The **ampmatic™** charge current monitoring and control mode automatically determines the most efficient rate of charge current for the connected battery, according to its state of charge, state of health, and electrical storage capacity. The delivered current may be anywhere from 0,4A to 5A. For most discharged (but not totally flat) batteries of rated capacity 12Ah or more, CURRENT LED #10 should also light up.
- 4.2 The PULSED ABSORPTION stage (flashing CHARGE LED #4) starts when the voltage has reached 14,3V for the first time during BULK CHARGE stage. The **ampmatic™** current control circuit now delivers pulses of current for 10 minutes so as to cause the battery voltage to vary between 13,7V and 14,3V, to equalise the individual cells within the battery and bring it to full charge as rapidly as possible. Charge current LED #8 and possibly #9 (**ampmatic™**) and #10 (5A) will light when current is delivered.
- 4.3 CHARGE VERIFICATION (flashing LED #4) follows PULSED ABSORPTION. The charging voltage is now limited at 13,6V during 5 minutes whilst the battery’s charge level is verified. If the battery requires further charging (indicated by the 0,4A charge current LED pulsing strongly) the programme will revert to the PULSED ABSORPTION stage (§ 4.2). These reversions may occur as many times as is necessary to reduce the battery’s current demand below 400mA at 13,6V (which is consistent with a battery that has accepted as much charge as its basic condition allows). **As soon as the circuit has verified that the charge is adequate the voltage retention test (see § 5) automatically follows.**

**NOTE 1** For safety reasons there is an overall time limit of 48 hours for programme stages 3.1 through 4.3.

## 5. 6. 7. Initial and extended voltage retention tests and battery maintenance charging

During the **VOLTAGE RETENTION TEST** delivery of current to the battery is interrupted to allow the circuit to monitor the battery’s voltage decline to determine its ability to retain charge and deliver power.

The initial 30 minute **VOLTAGE RETENTION TEST** follows § 4.3 during which a small load of 100mA is applied to improve the accuracy of the result. For batteries with a good state of health the green TEST LED #5 should flash at the start and continue throughout the test period, otherwise LEDs #5 + 6 or 6 or 6 + 7 or 7 will flash and indicate voltage measured during the test (see table below).

### INTERPRETATION OF POSSIBLE LED INDICATIONS DURING OR AFTER THE VOLTAGE RETENTION TEST:

	RED #7	RED #7 + YELLOW #6	YELLOW #6	YELLOW #6 + GREEN #5	GREEN #5
<b>BATTERY TYPE</b>	VOLTAGE BELOW 12,2V	VOLTAGE 12,2 – 12,4V	VOLTAGE 12,4 – 12,5V	VOLTAGE 12,5 – 12,7V	12,7V +
<b>WITH FILLER CAPS</b>	READ NOTE BELOW	REPLACE	MAY NEED REPLACING SOON	GOOD	VERY GOOD
<b>AGM SEALED MF</b>	READ NOTE BELOW	REPLACE NOW	REPLACE	MAY NEED REPLACING SOON	GOOD
<b>GEL SEALED MF</b>	READ NOTE BELOW	REPLACE NOW	REPLACE	MAY NEED REPLACING SOON	GOOD

If the result after the initial 30 minute voltage retention test is anything other than green LED #5, the LED(s) flashing at that moment will now remain on, indicating the result is locked and testing has been concluded and a **MAINTENANCE CHARGING** cycle has started.

**EXTENDED VOLTAGE RETENTION TEST:** If only the GREEN LED #5 is flashing at the end of the initial 30 minute voltage retention test, the test will be extended, indicated by the LED flashing mode changing from single pulse (- - -) to double pulse (-- --). The extended voltage retention test checks for excessive self discharge (caused by the battery

itself, even a partly damaged battery may initially retain sufficient power, but lose power faster than normal there-after) or higher than expected power loss through the vehicle's electrical system.

The extend test will end after 11 ½ hours, or the moment the battery voltage falls below 12,4V (YELLOW LED #8).

At the end of the extended voltage retention test the LED(s) flashing at that moment will now remain steady on, indicating the result is locked and testing has been concluded and a MAINTENANCE CHARGING cycle has started.

### Notes on test results

**NOTE 1:** FOR ANY TEST RESULT OTHER THAN GREEN #5, DISCONNECT THE BATTERY FROM THE ELECTRICAL SYSTEM IT SUPPORTS, and RECONNECT THE OPTIMATE. IF A BETTER TEST RESULT IS NOW OBTAINED, THIS SUGGESTS THAT THE POWER LOSSES ARE PARTLY DUE TO AN ELECTRICAL PROBLEM IN THE ELECTRICAL SYSTEM AND NOT IN THE BATTERY ITSELF. YOU ARE ADVISED TO READ THE FOLLOWING NOTES AND TO CONSULT AN ELECTRICAL SPECIALIST.

**NOTE 2:** For a good battery remaining in circuit with the vehicle's electrical system, if the decline in voltage resulted from a current drain out of the battery which was only of a temporary nature, the LED indication can revert to a better level, ideally green.

**NOTE 3:** If the red LED #7 alone, or the yellow #6 and red LED #7 together start to flash during a 30 minute test (or steadily during a maintenance charging period), a significant problem exists. The red / yellow+red LEDs (or yellow LED alone for a sealed battery) mean that after being charged the battery's voltage is not being sustained or that despite recovery attempts the battery was irrecoverable. This may be due to a defect in the battery itself, such as a short-circuited cell or total sulphation, or, in the case of a battery still connected to the electrical system it supports, the red LED #7 may be signalling a loss of current through deteriorated wiring or a degraded switch or contact, or in-circuit current-consuming accessories. A sudden load such as vehicle headlights being switched on while the charger is connected can also cause the battery voltage to dip significantly. Always remove the battery from the electrical system it supports, reconnect the OptiMate and allow it to proceed through its programme once more. If the poor result persists, you are advised to take the battery to a professional service workshop equipped with professional equipment for a more thorough investigation.

### Final note on the voltage retention test

This test is a strongly indicative but not necessarily a conclusive test of battery condition, which for starter batteries can be more precisely established by using a TestMate™mini which tests 12V batteries on the vehicle during cranking, as well as the charging system operation. Alternatively, contact a workshop equipped with a professional battery tester.

**MAINTENANCE CHARGE:** The MAINTENANCE CHARGE CYCLE consists of 30 minute float charge periods followed by and alternating with a 30 minute 'rest' periods, during which there is no charge current. This "50% duty cycle" prevents loss of electrolyte in sealed batteries and minimizes gradual loss of water from the electrolyte in batteries with filler caps, and thereby contributes significantly to optimizing the service life of irregularly or seasonally used batteries. The circuit offers current to the battery within a safe 13,6V voltage limit ("float charge"), allowing it to draw whatever small current is necessary to sustain it at (or close to) full charge and compensate for any small electrical loads imposed by vehicle accessories or on-board computer, or the natural gradual self-discharge of the battery itself. During the maintenance charge cycle the original locked TEST result will continue to be displayed unless the result worsens (unexpected condition in the vehicle or battery), until the TEST and MAINTENANCE cycle is repeated.

**REPEAT OF TEST and MAINTENANCE CYCLES:** The voltage retention test cycle, followed by the maintenance charge cycle, will repeat 24 hours after the start of the very first test and continue to repeat for as long as the charger remains connected.

**Maintaining a battery for extended periods:** The OptiMate will maintain a battery whose basic condition is good, for months at a time.

At least once every two weeks, check that the connections between the charger and battery are secure, and, in the case of batteries with filler caps on each cell, disconnect the battery from the charger, check the level of the electrolyte and if necessary, top up the cells (**with distilled water, NOT acid**), then reconnect. When handling batteries or in their vicinity, always take care to observe the SAFETY WARNINGS above.

### Charging time

The minimum time required for the OptiMate 6 to complete a charge and test cycle and provide a result, even on a fully charged battery, is 45 minutes. Charge time on a flat but otherwise undamaged battery is slightly less than 20% of the battery's Ah rating, so a 120Ah battery should take no more than about 20 hours to progress to the self-discharge check (§ 5). Deep-discharged batteries may take significantly longer.

If using the OptiMate 6 on a severely discharged automobile battery of larger capacity, a full charge may not be achieved within the 48 hour charge safety limit. In this case follow the reset procedure below. In such cases, prolonged continuous charger operation at maximum output and in warm ambient temperatures may cause the charger to become quite hot. Switch off and allow the charger to cool thoroughly to room temperature before reconnecting it to complete the charge.

### Disconnection or resetting the charge or test cycle

Do not make or break connections directly at the battery posts with charger powered up. Always disconnect from the 220-240V AC mains before removing the clips from the battery posts. Upon reconnection to AC power all LEDs except #1,2, 8, 9 and 10 will flash twice to confirm micro processor health, irrespective if the charger remains connected to a battery or not.

You may use one of the following methods to reset the charge and test programme:

- 1) Disconnect the OptiMate first from the AC mains supply, wait for the green POWER LED (#1) to go out, then reconnect again to AC supply.
- 2) Disconnect the charge connector at the end of the charge cable from the connector on the battery connection set, then wait until the charge and test status LEDs (all except #1,2, 8, 9 and 10) flash twice to confirm reset, and then reconnect.

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## LIMITED WARRANTY

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TecMate (International) SA, Sint-Truidensesteenweg 252, B-3300 Tienen, Belgium, makes this limited warranty to the original purchaser at retail of this product. This limited warranty is not transferable. TecMate (International) warrants this battery charger for three years from date of purchase at retail against defective material or workmanship. If such should occur the unit will be repaired or replaced at the option of the manufacturer. It is the obligation of the purchaser to forward the unit together with proof of purchase (see NOTE), transportation or mailing costs prepaid, to the manufacturer or its authorized representative. This limited warranty is void if the product is misused, subjected to careless handling, or repaired by anyone other than the factory or its authorized representative. The manufacturer makes no warranty other than this limited warranty and expressly excludes any implied warranty including any warranty for consequential damages.

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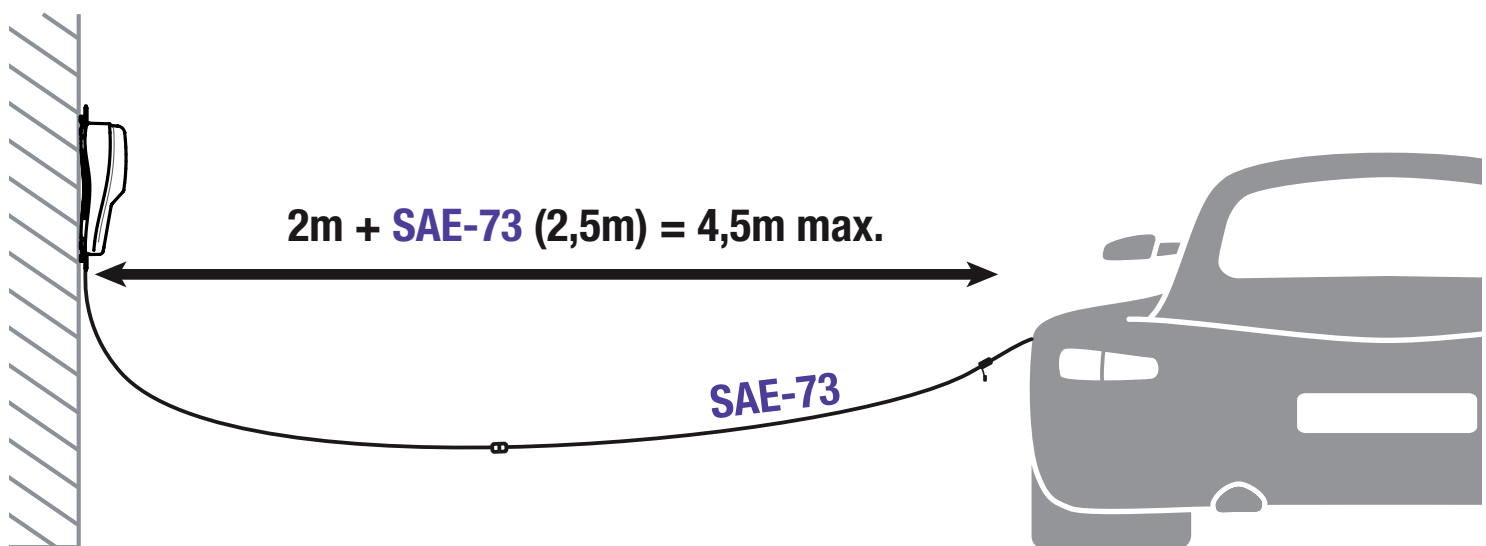
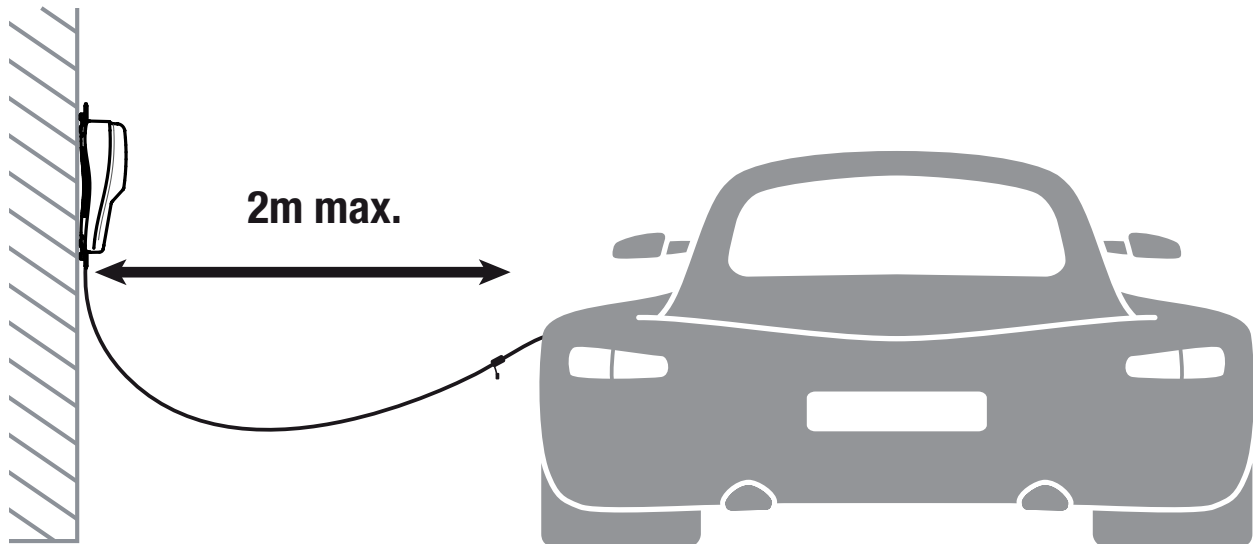
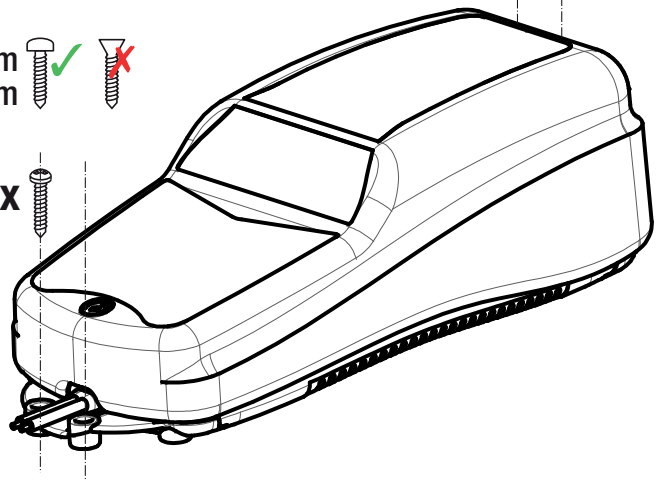
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# MOUNTING NOTICE

Ø 4,5mm ✓  
L +20mm

4x





# **OptiMATE** **accessories**



Discover our full range of accessories at  
[optimize1.com](http://optimize1.com)



# **OptiMATE**<sup>™</sup>

**Battery Performance  
Guaranteed !**