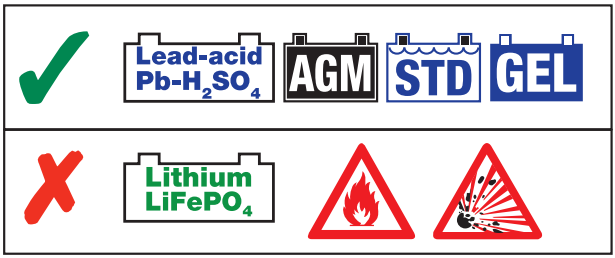
OptiMATE 4 dual program

MODEL: TM340 / TM341 / TM342 / TM348
~ AC: 100 – 240V ~ 50-60Hz
0.15A @ 240V / 0.28A @ 100V
⎓ DC: 12V ⎓ 1A

1 x 12V
STD / AGM-MF / GEL
3 - 50Ah (max. Ah rating based on 48 hour charge).



Automatic charger for 12V lead-acid batteries • Chargeur automatique pour batteries 12V plomb-acide • Cargador automático para baterías 12V plomo-ácido • Carregador automático para baterias de 12V chumbo-ácido • Automatische Ladegerät für 12V Blei-Säure Batterien • Automatische lader voor 12V loodzuur accu's • Caricabatterie automatico per batterie 12V piombo-acido • Automatisk diagnostisk laddare för 12V blybatterier

INSTRUCTIONS FOR USE EN
IMPORTANT: Read completely before charging

MODE D'EMPLOI FR
IMPORTANT: à lire avant d'utiliser l'appareil

MODO DE EMPLEO ES
IMPORTANTE: a leer antes de utilizar el aparato

INSTRUÇÕES DE UTILIZAÇÃO PT
IMPORTANTE: Ler antes de utilizar.

ANWENDUNGSVORSCHRIFTEN DE
WICHTIG: Vollständig vor der Benutzung lesen

GEBRUIKSAANWIJZING NL
BELANGRIJK: Lees volledig voor gebruik

ISTRUZIONI PER L'USO IT
IMPORTANTE: da leggere prima di utilizzare l'apparecchio

INSTRUKTIONER SV
VIKTIGT: läs följande fullständiga instruktioner för användningen innan du använder laddaren

PROGRAM 1 - STANDARD / DIRECT CHARGE : 9 STEPS

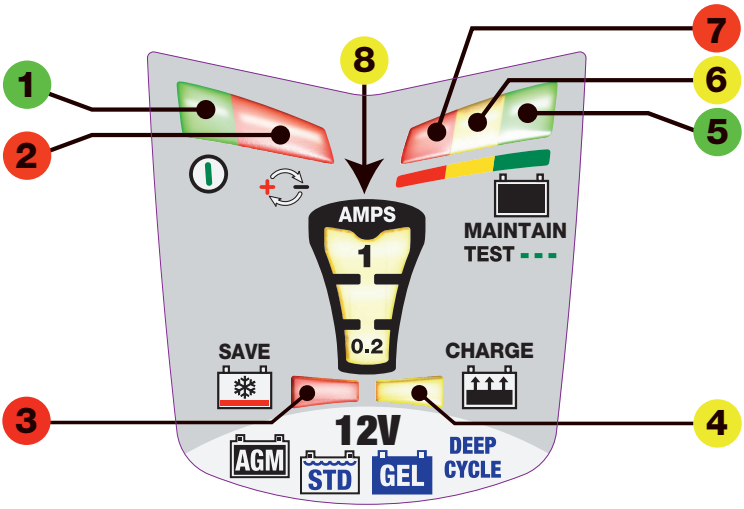
1	2	3	4	5	6	7	8	9
Low Volt Start (0.5V)	PULSE 'wake up'	TEST before charge	SAVE sulphated battery	Pulse SAVE	Controlled CHARGE	OPTIMIZE	TEST after CHARGE	OptiMate '365' maintenance

PROGRAM 2 - CAN-bus (BMW) : 8 STEPS

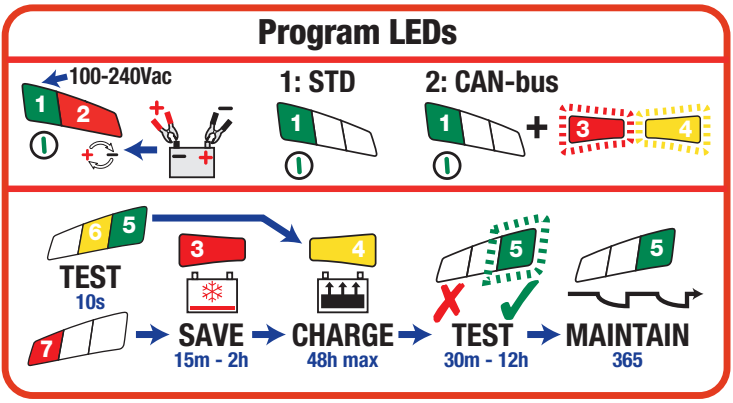
1	2	3	4	5	6	7	8
CAN-bus 'wake up' pulse	CAN-bus low volt check	TEST before charge	Pulse SAVE	Controlled CHARGE	CAN-bus OPTIMIZE	CAN-bus TEST after CHARGE	OptiMate '365' maintenance

tecMATE™

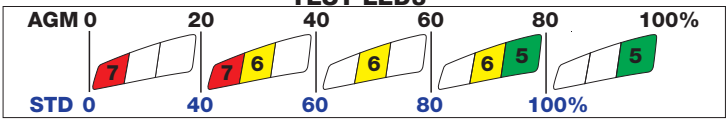
LEDs



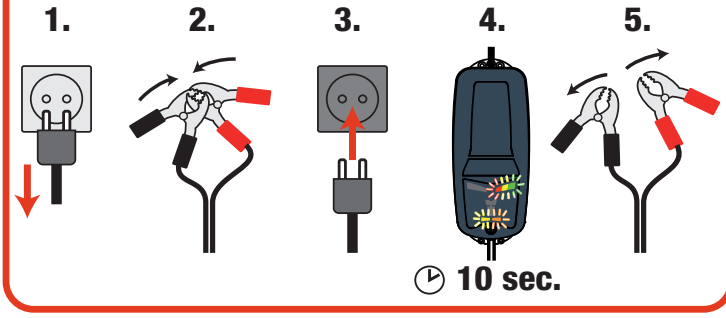
Program LEDs



TEST LEDs



Change program: Standard ↔ CAN-bus



OptiMATE 4 dual program

IMPORTANT SAFETY INSTRUCTIONS FOR CANADA & USA

THIS PORTION OF THE MANUAL CONTAINS IMPORTANT SAFETY INSTRUCTIONS FOR THE OPTIMATE 4 BATTERY CHARGER. IT IS OF THE UTMOST IMPORTANCE THAT EACH TIME, BEFORE USING THE CHARGER, YOU READ AND EXACTLY FOLLOW THESE INSTRUCTIONS. SAVE THESE INSTRUCTIONS.

Automatic charger for 12V lead-acid batteries

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

1. CAUTION : CLASS II APPLIANCE. DO NOT CONNECT TO GROUND.
2. Do not expose charger to rain or snow.
3. Use of an attachment not recommended or sold by the battery charger manufacturer may result in a risk of fire, electric shock, or injury to persons.
4. To reduce risk of damage to electric plug and cord, pull by plug rather than cord when disconnecting charger.
5. An extension cord should not be used unless absolutely necessary. Use of improper extension cord could result in a risk of fire and electric shock. If extension cord must be used make sure that :
   a) pins on plug of extension cord are the same number, size and shape as those of plug on charger.
   b) the extension cord is properly wired and in good electrical condition, and
   c) the conductor wire size is large enough for the AC ampere rating of the charger as specified in the table below.

AC INPUT RATING IN AMPERES		LENGTH OF CORD, FEET (m)	AWG SIZE OF CORD
Equal to or greater than	But less than		
2A	3A	25 (17.6) 50 (15.2) 100 (30.5)	18 18 14

6. Do not operate charger with damaged cord or plug – replace the cord or plug immediately.
7. Do not operate charger if it has received a sharp blow, been dropped,or otherwise damaged in any way; take it to a qualified serviceman.
8. Do not disassemble charger; take it to a qualified serviceman when service or repair is required. Incorrect reassembly may result in a risk of electric shock or fire.
9. To reduce risk of electric shock, unplug the charger from outlet before attempting any maintenance or cleaning. Turning off controls will not reduce this risk.Clean only with slightly moist,not wet, cloth.Do not use solvents.
10. WARNING - RISK OF EXPLOSIVE GASES.
    a) WORKING IN VICINITY OF A LEAD-ACID BATTERY IS DANGEROUS. BATTERIES GENERATE EXPLOSIVE GASES DURING NORMAL BATTERY OPERATION. FOR THIS REASON, IT IS OF UTMOST IMPORTANCE THAT YOU FOLLOW THE INSTRUCTIONS EACH TIME YOU USE THE CHARGER.
    b) To reduce risk of battery explosion, follow these instructions and those published by the battery manufacturer and manufacturer of any equipment you intend to use in vicinity of the battery. Review cautionary marking on these products and on engine.

11. PERSONAL PRECAUTIONS.

a) Someone should be within range of your voice OR close enough to come to your aid when you work near a lead-acid battery.
b) Have plenty of fresh water and soap nearby in case battery acid contacts skin, clothing or eyes.
c) Wear complete eye protection and clothing protection. Avoid touching eyes while working near battery.
d) If battery acid contacts or enters eye, flood eye with cold running water for at least 10 minutes and get medical attention immediately. If battery acid contacts skin or clothing, wash immediately with soap and water.
e) NEVER smoke or allow a spark or flame in vicinity of battery or engine.
f) Be extra cautious to reduce risk of dropping a metal tool onto battery. It might spark or short-circuit battery or other electrical part that may cause explosion.
g) Remove personal metal items such as rings, bracelets, necklaces, and watches when working with a lead-acid battery. A lead-acid battery can produce a short-circuit current high enough to weld a ring or the like to metal, causing a severe burn.
i) NEVER charge a frozen battery.

12. PREPARING TO CHARGE

a) If necessary to remove battery from vehicle to charge,always remove grounded terminal from battery first.
Make sure all accessories in the vehicle are off, so as not to cause an arc.
b) **Be sure area around battery is well ventilated while battery is being charged. Gas can be forcefully blown away by using a piece of cardboard or other non-metallic material as a fan.**
c) Clean battery terminals. Be careful to keep corrosion from coming in contact with eyes.
d) Add distilled water in each cell until battery acid reaches level specified by battery manufacturer. This helps purge excessive gas from cells. Do not overfill. For a battery without cell caps, such as valve regulated lead acid (VRLA) or absorbed glass mat (AGM) batteries, carefully follow manufacturer's recharging instructions.
e) Study all battery manufacturer's specific precautions such as removing or not removing cell caps while charging and recommended rates of charge.
f) **Determine voltage of battery by referring to vehicle or battery user's manual and BEFORE MAKING THE BATTERY CONNECTIONS, MAKE SURE THAT THE VOLTAGE OF THE BATTERY YOU ARE GOING TO CHARGE MATCHES THE OUTPUT VOLTAGE OF THE CHARGER.**

13. CHARGER LOCATION.
a) Locate charger as far away from battery as DC cables permit.
b) Never place charger directly above batterv being charged; gases from battery will corrode and damage the charger.
c) Never allow battery acid to drip on charger when reading gravity or filling battery. Do not operate charger in a closed-in area or restrict ventilation in any way.
d) Do not set a battery on top of charger. IMPORTANT : Place charger on a hard flat surface or mount onto a vertical surface. Do not place on plastic, leather or textile surface.

14. DC CONNECTION PRECAUTIONS

a) Connect and disconnect DC output clips only after setting any charger switches to off position and removing AC cord from electric outlet. Never allow clips to touch each other, however should this happen no damage will result to the charger circuit & the automatic charging programme will just reset to «start».
b) Attach clips to battery and chassis as indicated in 15(e), 15(f), and 16(b) through 16(d).
NOTE : This battery charger has an automatic safety feature that will prevent it from operating if the battery has been inversely connected. Set charger switches to off position and/or remove AC cord from electrical outlet, disconnect the battery clips, then reconnect correctly according to the instructions below.

15. FOLLOW THESE STEPS WHEN BATTERY IS INSTALLED IN VEHICLE. A SPARK NEAR A BATTERY MAY CAUSE BATTERY EXPLOSION. TO REDUCE RISK OF A SPARK NEAR BATTERY :
a) Position AC and DC cords so as to reduce risk of damage by hood, door or moving engine part.
b) Stay clear of fan -blades, belts,pulleys,and other parts that can cause injury to persons.
c) Check polarity of battery posts.POSITIVE (POS, P, +) battery post usually has larger diameter than NEGATIVE (NEG, N,–) post.
d) Determine which post of battery is grounded (connected) to the chassis. If negative post is grounded to chassis (as in most vehicles), see (e). If positive post is grounded to the chassis, see (f).
e) For negative-grounded vehicle, connect POSITIVE (RED) clip from battery charger to POSITIVE (POS, P, +) ungrounded post of battery. Connect NEGATIVE (BLACK) clip to vehicle chassis or engine block away from battery. Do not connect clip to carburetor, fuel lines, or sheet-metal body parts. Connect to a heavy gage metal part of the frame or engine block.
f) For positive-grounded vehicle, connect NEGATIVE (BLACK) clip from battery charger to NEGATIVE (NEG. N , -) ungrounded post of battery. Connect POSITIVE (RED) clip to vehicle chassis or engine block away from battery. Do not connect clip to carburetor, fuel lines, or sheet-metal body parts. Connect to a heavy gage metal part of the frame or engine block.
g) When disconnecting charger, turn switches to off, disconnect AC cord,remove clip from vehicle chassis,and then remove clip from battery terminal.
h) See operating instructions for length of charge information.

16. FOLLOW THESE STEPS WHEN BATTERY IS OUTSIDE VEHICLE. A SPARK NEAR THE BATTERY MAY CAUSE BATTERY EXPLOSION. TO REDUCE RISK OF A SPARK NEAR BATTERY :
a) Check polarity of battery posts. POSITIVE (POS, P, +) battery post usually has a larger diameter than NEGATIVE (NEG,N, -) post.
b) **This battery charger has an automatic safety feature that will prevent it from operating if the battery has been inversely connected. The charger does not allow charge current unless a voltage of at least 2V is sensed.**
c) Connect POSITIVE (RED) charger clip to POSITIVE (POS, P, +) post of battery.
d) Connect NEGATIVE (BLACK) charger clip to NEGATIVE (NEG, N, -) battery post of the battery.
e) Do not face battery when making final connection.
f) When disconnecting charger, always do so in reverse sequence of connecting procedure & break first connection while as far away from battery as practical.
g) A marine (boat) battery must be removed & charged on shore. To charge it on board requires equipment specially designed for marine use.

OptiMATE 4 dual program

AUTOMATIC DIAGNOSTIC CHARGER FOR 12V LEAD-ACID BATTERIES.

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SAFETY

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

IMPORTANT: READ THE FOLLOWING INSTRUCTIONS BEFORE USING THE CHARGER

This appliance can be used by children aged from 8 years and above and persons with reduced physical,sensory or mental capabilities or lack of experience and knowledge if they have been given supervision or instruction concerning use of the appliance in a safe way and understand the hazards involved. Children shall not play with the appliance. Cleaning and user maintenance shall not be made by children without supervision.

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.

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.

PROCEEDING TO CHARGE:

DUAL PROGRAM: OptiMate 4 is equiped with two charging programs. Only one program can operate at a time. Selected models of OptiMate 4 will be delivered with program 1 (STANDARD) or program 2 (CAN-bus) set as default.

Program 1 (STANDARD) is the normal charging program for direct connection to a battery in any condition. All program features are active, including Standard, TURBO and PULSE desulfation mode.

Program 2 (CAN-bus) automatically activates a 12V outlet on vehicles fitted with CAN-bus, to charge, test and maintain the battery when the vehicle is in storage. The standard and high voltage TURBO desulfation mode are de-activated. The low voltage PULSE desulfation mode remains active, to recover a discharged battery that remains connected to vehicle wiring.

Program 2 can also be used to directly charge and maintain a battery in or out the vehicle, *but cannot recover a sulfated battery.* To recover a sulfated battery select program 1 and follow instructions under **VERY FLAT NEGLECTED BATTERIES.**

Program indication when not connected to a 12V outlet or battery.

STANDARD – only the power LED#1 remains on.

CAN-bus – the POWER LED#1 remains on and DESULFATE LED#3 and CHARGE LED#4 briefly flash together at regular intervals.

POWER ON: LED #1 - Confirms AC power supply to the charger.
HIGH and LOW intensity indication: The"POWER ON" LED #1 will indicate brightly when current is delivered to the battery.
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 program finds itself in the voltage retention test mode or the 'rest' periods of Maintenance Charge mode.

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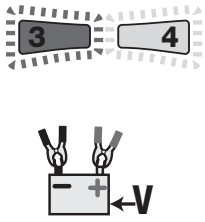
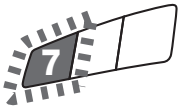
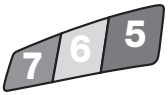
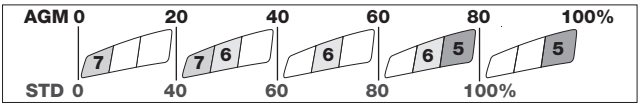
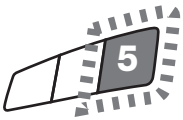
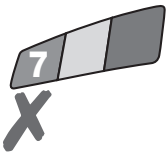
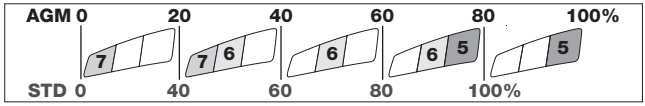
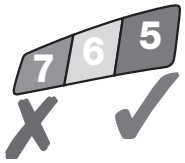
REVERSE POLARITY PROTECTION: LED #2 - Lights when the battery connections are incorrect. The charger is electronically protected so no damage will result, and the output will remain disabled until the connections are corrected.
CAN-bus : LED #3, 4, 5, 6 and 7 flashing: A short circuit has been detected across the output terminals, or if LED #2 (REVERSE POLARITY) is also indicating 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.

STEP 1 **CAN-bus wake up pulse** ***Standard:*** *Low Volt START - Bat ≥ 0.5V*		**CAN-Bus: LED #3 and 4 flashing:** The program is sending a signal to detect and activate a CAN-bus controlled 12V outlet. Non activation may be due to one of the following: Program 1 is selected / Poor connection to the 12V outlet / Battery too low to power CAN-bus / Outdated CAN-bus programming on the vehicle - consult with the vehicle manufacturer. ***STD:*** **Battery voltage check - OptiMate 4 automatically activates if connected battery voltage is at least 0.5 Volt.** Batteries measuring below 2 Volts at connection will proceed to STEP 2 for 'Pulse wake up' that includes a battery short circuit test. Batteries measuring 2 Volts or more will proceed directly to STEP 3.
STEP 2 **CAN-bus low volt check** ***Standard:*** *Pulse Wake up (< 2V)*	**LED #7 *FLASHING*** 	**Pulse wake up - LED #7 (red) flashing: OptiMate 4 is injecting a test signal to see if the battery is recoverable.** Once the voltage holds above 2 Volts and no short circuit has been detected the program will commence to STEP 3. **If flashing continues the following conditions may prevent the charge program from progressing:** 1) **Vehicle circuitry remains connected to the battery / Battery too low to power CAN-bus.** *NOTE: If the battery under charge is in a low voltage or sulphated state, for the most effective charge and test results disconnect the battery from the vehicle circuitry and then charge.* 2) **Battery has multiple short circuited cells.** The battery has permanent damage and should be replaced.
STEP 3 **TEST before charge**	**TEST LEDs** **5 : GREEN** **6 : YELLOW** **7 : RED**  **TEST** **10s**	**TEST LEDs #5/6/7 indicate successful activation of the CAN-bus controlled 12V outlet and the condition of the battery prior to charging.** Consult the table below to match TEST LED indication to an estimated state of charge percentage (SOC%). **Charging commences after 10 seconds.**  Decisions made during the test: Severity of discharge is determined; a battery with 60% (AGM=40%) or more charge progresses directly to STEP 6 where-as a severely discharged battery progresses to STEP 4 and 5. Severely discharged batteries will undergo a longer test (up to 12 hours) during STEP 8.
Standard ONLY *STEP 4 ADVANCED SAVE*	**LED #3 : RED** 	**CAN-Bus: Disabled in CAN-bus program.** **Engages if the battery was diagnosed as sulphated, unable to accept or hold charge.** Charge time: maximum 2 hours. Output voltage increases to a maximum of 22V with current limited to 0.2A, but only if no vehicle electronics have been detected, otherwise it moves directly to STEP 5. IMPORTANT: Read section VERY FLAT NEGLECTED BATTERIES below.
STEP 4 **PULSE SAVE** ***Standard:*** *STEP 5*	**LED #3 : RED** 	**Engages if the battery state of charge was 40% or less OR battery has sufficiently recovered during ADVANCED SAVE.** CHARGE TIME : min 15 minutes, max. 2 hours. Current is delivered in pulses to prepare the battery to accept normal charge. *This step is particularly effective for recovery of factory activated / "hi-performance" pure lead or cyclic cell AGM batteries.*

STEP 5 **CHARGE** ***Standard:*** *STEP 6*	**LED #4 : YELLOW** 	**Engages if the battery state of charge was 50% or higher (as tested in STEP 3) or once the battery has been sufficiently recovered during STEP 4 (5).** A constant current of 1A up to a voltage of 14.2 -14.4V is delivered to the battery. ***NOTE CAN-bus:*** The program automatically resets 2 minutes after manual disconnection, OR if the vehicle CAN-bus system has de-activated the controlled 12V outlet and the program could not re-activate the outlet within 2 minutes.
STEP 6 **OPTIMIZE** ***Standard:*** *STEP 7*	**LED #4 : YELLOW** 	**Engages when the voltage has reached 14.3V for the first time during CHARGE mode.** Pulsed absorption: Current is delivered in pulses, varying between 0.2 and 1A and up to a voltage of 14.2 - 14.4V, to bring the battery to full charge in the shortest possible time. Verification: Once the current demand is less than 0.2A the charging voltage is now limited at 13.6V whilst the battery's charge level is verified. If the battery requires further charging the program will revert to pulsed absorption. *NOTE: Charge time is usually extended if there is higher than expected current draw by connected circuitry or battery health is less than optimal.* **For safety reasons there is an overall charge time limit of 48 hours.**
STEP 7 **TEST after charge** ***Standard:*** *STEP 8*	**LED #5 *FLASHING***  **TEST** **30m - 12h** 	**TEST after charge : Delivery of current to the battery is interrupted for *30 minutes*** to allow the program to determine the battery's ability to retain charge.** This will prompt the CAN-bus system to disable the 12V outlet within it's own set time limit, disconnecting the battery from the charger. At the conclusion of the test period the program will once again initialize the CAN-bus controlled 12V outlet to measure the battery's voltage and then proceed to MAINTENANCE CHARGE during which the result of the test is displayed. Consult the table below (or on page 2) to match TEST LED indication to an estimated state of charge percentage (SOC%). A significant problem exists if the battery is unable to retain sufficient charge during this voltage retention test. More information is provided in the section "NOTES ON TEST RESULTS".  ****** STANDARD PROGRAM ONLY: *IF the result in STEP 3 was RED (LED #7) or RED & YELLOW (LED #6 & 7), indicating a deep discharged battery, the voltage retention test is extended to 12 hours to confirm battery health. The TEST result (indicated on LED # 5, 6, 7) is adjusted in real time according to the measured battery voltage. The TEST will be interrupted if LED #7 (red) lights.*
STEP 8 **OptiMATE '365' MAINTAIN** ***Standard:*** *STEP 9*	**LED #5 / 6 / 7 *ON***  For batteries with a good state of health LED #5 (green) will remain on. ***Exception:*** STD wet cell batteries with filler caps have a lower fully charged voltage: LED #5 remains on together with LED #6.	**MAINTENANCE CHARGE: LED #5 / 6 / 7 steady on** according to state of charge measured during STEP 7 (8). Float voltage setting: 13.6V STD maintenance mode consists of 30 minute float charge periods followed by and alternating with 30 minute 'rest' periods, during which there is no charge delivered. 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. During "float charge" a continuous LOW CURRENT PULSE IS DELIVERED TO PREVENT SULFATION, further extending battery power and life. ***NOTE CAN-bus:*** The program automatically resets 2 minutes after manual disconnection, OR if the vehicle CAN-bus system has de-activated the controlled 12V outlet and the program could not re-activate the outlet within 2 minutes.

CHARGE CURRENT BAR: LEDs #8 - Lights when pulsed or continuous current is delivered to the battery.

DUAL PROGRAM : TO CHANGE FROM ONE PROGRAM TO ANOTHER:

1. Disconnect the charger from AC supply.
2. Attach the battery clip set to the charger and connect the negative clip directly to the positive clip.
3. Re-connect the charger to AC supply.

4. Observe the following LED indications:

LEDs #3,4,5,6 and 7 flash 12 times during selection of the alternate program (5x slow, 5x fast, 2x slow).

After the program change the following indications can be observed (with battery clips still connected together):

– Changed from CAN-bus to STANDARD : only the POWER LED#1 remains on.

– Changed from STANDARD to CAN-bus : LED #3 and LED #4 flash together at regular intervals with LED #8 immediately following.

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5. Disconnect the battery clips. OptiMate 4 is ready to charge a battery according to the selected program.

VERY FLAT NEGLECTED BATTERIES: If the battery is deeply discharged (and possibly sulfated), remove from the vehicle or equipment and inspect the battery before connecting the charger for a recovery attempt.

The charger's Advanced recovery mode cannot engage if it senses that the battery is still connected to a 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 or equipment electronics will be damaged. **Pay particularly close attention to the following** 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.

NOTES ON TEST RESULTS:

1. Due to small voltage losses within the vehicle's CAN-bus system a slightly lower result may be observed. For a more accurate test result connect the OptiMate directly to the battery.

2. For any test result other than green #5 (or green #5 and yellow #6 together if the battery is a STD type with filler caps), 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.

3. If the red LED #7 alone, or the yellow #6 and red LED #7 indicate together (or yellow LED alone for a sealed battery), a significant problem exists. The red / yellow+red LEDs 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 being switched on while the charger is connected can also cause the battery voltage to dip significantly.

4. GOOD TEST RESULT, but the battery cannot deliver sufficient power: a) Permanent damage within the battery may be causing excessive self discharge that is not detected within the test period. Disconnect OptiMate from the battery. After at least 48 hours reconnect and observe the result during the TEST BEFORE CHARGE. b) Long term vibration may cause hairline cracks in inter cell connectors within the battery. A high loss of voltage occurs only when power demand is high (e.g. cranking the engine).

MAINTAINING A BATTERY FOR EXTENDED PERIODS: The OptiMate will maintain a battery whos 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.

ECO POWER SAVING MODE WHEN THE CHARGER IS CONNECTED TO AC SUPPLY:
The power converter switches to ECO mode when the charger is not connected to a battery resulting in a very low power draw of less than 0.5W, equivalent to power consumption of 0.012 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 0.024kWh or less per day.

LIMITED WARRANTY

TecMate (International) SA, B-3300 Tienen, Belgium, offers 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.
THIS IS THE ONLY EXPRESS LIMITED WARRANTY AND THE MANUFACTURER NEITHER ASSUMES NOR AUTHORIZES ANYONE TO ASSUME OR MAKE ANY OTHER OBLIGATION TOWARDS THE PRODUCT OTHER THAN THIS EXPRESS LIMITED WARRANTY. YOUR STATUTORY RIGHTS ARE NOT AFFECTED.

NOTE: Details at www.tecmate.com/warranty.

WARRANTY in Canada, USA, Central America and South America:

TecMate North America, Oakville, ON, Canada, as a wholy owned subsidiary of TecMate International, assumes the responsibility for product warranty in these regions.

More information on TecMate products can be found at **www.tecmate.com**.

PRODUCT INFORMATION	
Certification / Conformity	
Holder:	TecMate (International) S.A. , B-3300 Tienen, Belgium
Issued by:	TUV SUD Product Service GmbH, DE (Safety and EMC)
Safety (CE-LVD) :	Low voltage directive 2006/95/EC; EN 60335-2-29:2004/A2:2010; EN 60335-1:2012/A11:2014; EN 62233:2008
Safety (NRTL) :	UL 1236:R2011; CAN/CSA C22.2 no. 107.2-01 (R2011)
Safety (SAA) :	AS/NZS 60335.2.29:2004 Inc A1-2; AS/NZS 60335.1.2011 Inc A1
EMC (CE) :	EMC Directive 2004/108/EC; EN55014-1/A2:2011; EN55014-2/ A2:2008; EN61000-3-2/A2:2009; EN6100-2-2:2013
EMC (NRTL) :	FCC CFR Title 47 Part 15 Subpart B
Efficiency - BC mark (California Energy Commision)	CEC-400-2012-011-CMF; 10 CFR Section 430.23 (aa) Appendix Y to Subpart B of Part 430. Tests by: Mantek International Canada Inc, Oakville ON, Canada. Listed models: TM34x, TM35x
Energy usage:	Not charging: P < 0.5W Long term maintenance: P < 0.5W (< 0.012 kWh / day, < 4.4 kWh / year)
Mechanical	
IP rating	IP54
t° operating range	-40°C <-> 40°C / -40°F <-> 104°F
Weight (packed)	0.48kg (0.9kg) / 1.05lbs (1.98 lbs)
Size without cable	200 x 75 x 61mm / 7.87" x 2.95" x 2.40"
Cable Length	**Input:** 183cm / 72" **Output:** 183cm / 72"
Wall mount	4 mount positions
Accessories	O-01 weatherproof battery lead; O-04 battery Clips
Electrical (additional)	
Reverse drain	Id < 0.5mA
Max input rating	90 - 264Vac 47-63Hz
Output volt range	0.5V - 14.4V @ 1A; 14.5V - 22V @ 0.2A
Protection Input	AC fuse: 3A 250V (non accessible)
Protection output	AUTOMATIC: reverse polarity; no output if no battery is connected; limited output current (1A max).
Origin	
Design copyright & trademark	TecMate (International) S.A., B-3300 Tienen, Belgium www.tecmate.com

OptiMATE accessories

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OptiMate HOOK
TS-252