

TRONIK 812

CF-MTL-2401/6003/42401/42403

USER MANUAL



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INTRODUCTION

Before using your **TRONIK** battery charger, please take the time to read these instructions carefully. The owner's manual is an important part of the charger. It's recommended to keep it in good condition for the lifetime of the charger. It should be kept in a dry and clean place, always available to the users.

To indicate important instructions, the following colored blocks are used throughout this manual.

DANGER! *This operation can be dangerous for the user*

ATTENTION! *This operation is important for the functionality and reliability of the charger*

SAFETY INSTRUCTIONS AND WARNINGS

GENERAL

Battery chargers like the **TRONIK** can cause serious injury or death, or damage to other equipment or property, if the operator does not strictly observe all safety rules and take precautionary actions. Safe practices must be learned through study and training before using this equipment. Only qualified personnel should install, use, or service this equipment.

SHOCK PREVENTION

Bare conductors, or terminals in the output circuit, or ungrounded, electrically-live equipments can fatally shock a person. To protect against shock, have competent electrician verify that the equipment is adequately grounded and learn what terminals and parts are electrically HOT.

The body's electrical resistance is decreased when wet, permitting dangerous current to flow through the body. Do not work in damp area without being extremely careful. Stand on dry rubber mat or dry wood and use insulating gloves when dampness or sweat cannot be avoided. Keep clothing dry.

INSTALLATION AND GROUNDING: A power disconnect switch must be located at the equipment. Check the data label for voltage and phase requirements. If only 3-phase power is available, connect single-phase equipment to **ONLY TWO WIRES** of the 3-phase line. **DO NOT CONNECT** the equipment grounding conductor to the third live wire of the 3-phase line as this makes the equipment frame electrically HOT, which can cause a fatal shock. If a grounding conductor is part of the power supply cable, be sure to connect it to a properly grounded switch box or building ground. If not part of the supply cable, use a separate grounding conductor. Don't remove a ground prong from any plug. Use correct mating receptacles. Check ground for electrical continuity before using equipment. The grounding conductor must be of a size equal to or larger than the size of the line conductors.

CHARGING LEADS: Inspect leads often for damage to the insulation. Replace or repair cracked or worn leads immediately. Use leads having sufficient capacity to carry the operating current without overheating.

BATTERY TERMINALS: Do not touch battery terminals while equipment is operating.

SERVICE AND MAINTENANCE: 1) Shut OFF all power at the disconnect switch or line breaker **BEFORE** inspecting, adjusting, or servicing the equipment. Lock switch OPEN (or remove line fuses) so that the power cannot be turned ON accidentally. 2) Disconnect power to equipment if it is to be left unattended or out of service. 3) Disconnect battery from charger. 4) Keep inside parts clean and dry. Dirt and/or moisture can cause insulation failure. This failure can result in high voltage at the charger output.

BURN AND INJURY PREVENTION

The battery produces very high currents when short circuited, and will burn the skin severely if in contact with any metal conductor that is carrying this current. Do not wear any jewelry that could come in contact with battery terminals or the cell connectors on top of the battery.

Battery acid is very corrosive. Always wear correct eye and body protection when near batteries.

SAFETY INSTRUCTIONS AND WARNINGS

FIRE AND EXPLOSION PREVENTION

When batteries are being recharged, they generate hydrogen gas that is explosive in certain concentrations in air (the flammability or explosive limits are 4.1% to 72% hydrogen in air). The spark-retarding vents help slow the rate of release of hydrogen, but the escaping hydrogen may form an explosive atmosphere around the battery if ventilation is poor.

The ventilation system should be designed to provide an adequate amount of fresh air for the number of batteries being charged. This is essential to prevent an explosion. Always keep sparks, flames, burning cigarettes, and other sources of ignition away from the battery recharging area. Do not break "live" circuits at the terminals of batteries. Do not lay tools or anything that is metallic on top of any battery.

ARCING AND BURNING OF CONNECTOR

To prevent arcing and burning of the connector contacts, be sure the charger is OFF before connecting or disconnecting the battery. The ammeter should NOT indicate current flow.

MEDICAL AND FIRST AID TREATMENT

First aid facilities and qualified first aid personnel should be available for each shift for immediate treatment of electrical shock victims.

EMERGENCY FIRST AID: Call a physician and ambulance immediately and use first aid techniques recommended by the American Red Cross.

DANGER: ELECTRICAL SHOCK CAN BE FATAL

If person is unconscious and electric shock is suspected, do not touch person if he or she is in contact with charging equipment, battery, charging leads, or other live electrical parts. Disconnect power at wall switch and then use First Aid. Dry wood, wooden broom, and other insulating material can be used to move cables, if necessary, away from person.

IF BREATHING IS DIFFICULT, give oxygen.

IF NOT BREATHING, BEGIN ARTIFICIAL BREATHING, such as mouth-to-mouth.

IF PULSE IS ABSENT, BEGIN ARTIFICIAL CIRCULATION, such as external heart massage.

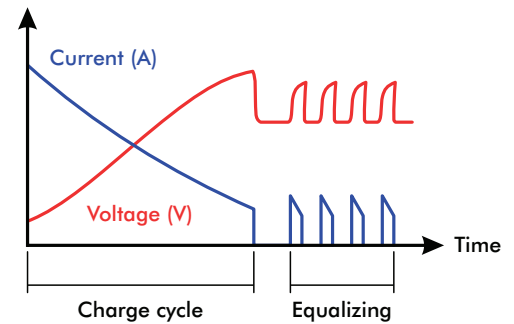
In case of acid in the eyes, flush very well with clean water and seek professional medical attention immediately.

CHARGER DESCRIPTION

TRONIK chargers have been designed to charge lead-acid batteries. These units convert the A.C. input to a D.C. output at the correct voltage with a Wa type charge curve.

TRONIK charger operation is managed by the **MTL** digital charge controller, which is a microprocessor based electronic board of the last generation. Important features of the controller are:

- ▶ Gassing point (80%) programming by DIP switches
- ▶ Proportional Algorithm for charge time calculation
- ▶ Programmable Equalize System (Automatic Pulsed & Manual)
- ▶ Automatic voltage-controlled maintenance
- ▶ Wrong battery detection
- ▶ Battery desulphation cycle
- ▶ Independent safety timer
- ▶ Automatic data-saving in case of A.C. input black out
- ▶ Cyclical indication of V/cell, AMPS, Ah returned, time
- ▶ Cool down time counter
- ▶ Scrolling messages in plain text



The **MTL** charge controller monitors the entire charging curve, and it incorporates several safety features.

The front panel contains the digital display (4-Digits), the STOP button and the MANUAL-EQUALIZE button.

CHARGER INSTALLATION

Conditions of use:

- ▶ Operating temperature: 5°C to 45°C
- ▶ Storage temperature: -20°C to 60°C
- ▶ Relative humidity: less than 75%

DANGER!

Risk of electrical shock! The charger can be installed by qualified personnel only.

To prevent fire or shock hazard, do not expose the unit to rain or moisture.

Don't use the unit in presence of flammable gas, because it can generate sparks.

ATTENTION!

Make sure that the unit's maximum input power (reported on the data label) is available from your power supply, and verify that the unit's operating voltage is correct.

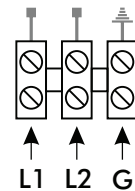
Allow adequate air circulation to prevent internal heat buildup.

Don't place the unit near heat sources such as radiators or air ducts, or in a place subject to direct sunlight, excessive dust, mechanical vibration or shock.

A.C. INPUT WIRING CONNECTION

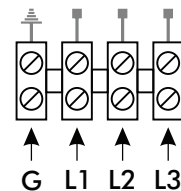
CF-MTL-2401 / 42401

Connect the A.C. input ground wire (G) and line wires (L1, L2) on the three (3) position terminal.



CF-MTL-42403 / 6003

Connect the A.C. input ground wire (G) and line wires (L1, L2, L3) on the four (4) position terminal.



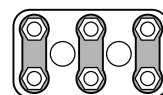
CHARGER INSTALLATION

A.C. INPUT CONFIGURATION multi-input chargers only)

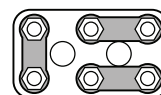
CF-MTL-42401

Configure the A.C. input adjustment by changing the position of the three (3) metal jumpers on the six (6) position terminal block.

* Do not move any wires, only the metal jumpers



208/240V

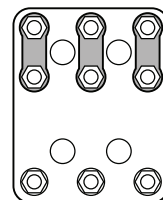


480V

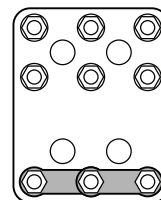
CF-MTL-42403

Configure the A.C. input adjustment by changing the position of the three (3) metal jumpers on the nine (9) position terminal block.

* Do not move any wires, only the metal jumpers



208/240V



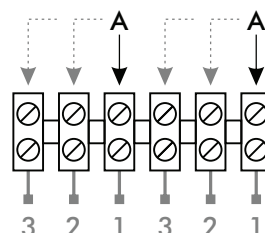
480V

A.C. INPUT CALIBRATION

CF-MTL-2401 / 42401

Calibrate the input tuning according to A.C. source by changing the position of the two (2) wires on the six (6) position terminal strip (A, A).

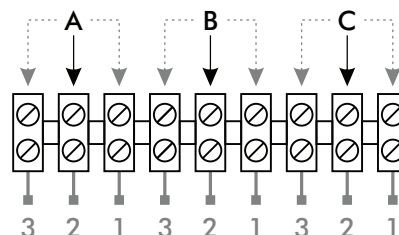
	3	2	1
CF-MTL-2401	220V	240V	250V
CF-MTL-42401	208/452V	225/480V	240/506V



CF-MTL-4803 / 6003

Calibrate the input tuning according to A.C. source by changing the position of the three (3) wires (A, B, C) on the nine (9) position terminal strip.

	3	2	1
CF-MTL-42403	208/452V	225/480V	240/506V
CF-MTL-6003	575V	600V	610V



USING THE CHARGER

PROGRAMMING THE GASSING POINT (80%)

ATTENTION!

The proper programming of the gassing point is important for the correct operation of the charger.

Only qualified personnel should modify these settings.

The possibility to program the gassing point may help the user to adjust the charging curve to the requirements of the battery during all its life. The default value is 2.40 Volt/cell.

This value can be modified by changing positions on the 4 position dipswitch **DS1** on the **MTL** control. Switches **DS1-SW2** and **DS1-SW3** are used for the programming of the gassing point.

To modify the value, follow these steps:

- ▶ Disconnect the charger from main A.C. supply and battery
- ▶ Locate the dipswitches on the digital electronic board (see next picture)
- ▶ Set the dipswitches according with the following table and picture
- ▶ Connect the charger to main supply.

Gassing Point (V/cell)

	2.35V	2.40V	2.45V	2.38V
SW2	OFF	OFF	ON	ON
SW3	OFF	ON	OFF	ON

** Default value in bold*

DS1

ON

1 2 3 4

↑ ↑

SW2 SW3

When a battery will be connected to the charger, the programmed gassing voltage will be shown on the display during the startup sequence.

USING THE CHARGER

BATTERY CONNECTION AND AUTOSTART

ATTENTION!

TRONIK chargers are programmed to execute a complete cycle of charge automatically, however it's recommended to survey the operations when the battery remains connected to the charger for more than 12 hours.

Connect the battery to the charger, using an adequate plug. When the battery is correctly connected, the display turns on and shows the battery voltage. If the battery voltage lower than the minimum threshold of 1,62 V/cell, the charger doesn't start, and the display will show the error message "V LO" (voltage low):



If the battery voltage is higher than the maximum off charge threshold of 2,60 V/cell, the charger doesn't start, and the display will show the (flashing) error message "V hi" (voltage hi):



If the voltage of the battery is between the minimum and maximum thresholds, the charger will wait for three 3 seconds before to start charging, while the display will show the programmed gassing voltage:



If, during the charge, the voltage of the battery exceeds the maximum charging threshold of 2,80 V/cell, the charger shuts down automatically, and the error message "V hi" (voltage high) will appear on the display.



USING THE CHARGER

CHARGE OPERATION

The MTL control of the TRONIK charger has a digital display that supplies critical charging state information.

Durant the charge, the following parameters are displayed in sequence:

BATTERY VOLTAGE, in D.C. Volts/cell (U)

CHARGE CURRENT, in D.C. amps (A)

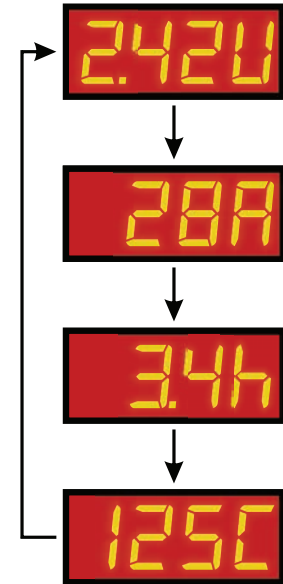
CHARGE TIME, in hours (h)

Time is calculated and displayed like so: (Hours) . (Minutes/ by tens)

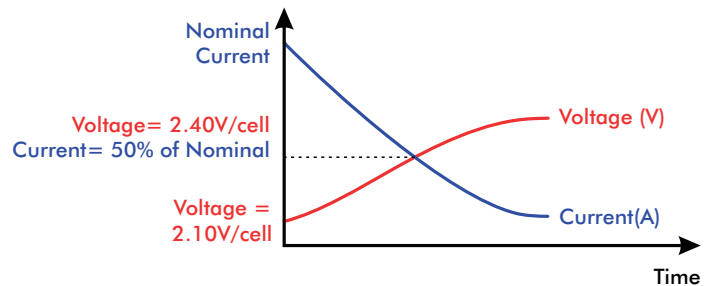
Example 1: 3h 40min is displayed as 3.4h

Example 2: 7h 30min is displayed as 7.3h

CAPACITY RETURNED, in Amp/hours - Ah (C)



The charge current follows the Wa curve, as described in the norm DIN 41774, while the charge parameters continue to be shown on the digital display.



When the battery reaches the gassing voltage, the charge continues for one half of the time needed to reach the gassing voltage, with a minimum total time of 30 minutes.

Examples:

If the battery reaches the gassing voltage in 1 minute, the final charge will continue for 30 minutes.

If the battery reaches the gassing voltage in 5 hours, the final charge will continue for 2 hours and 30 minutes.

If the battery reaches the gassing voltage in 10 hours, the final charge will continue for 5 hours.

If the battery reaches the gassing voltage in 11h59m59s, the final charge will continue for 5h 59m59s (this is the maximum total time allowed before going to Emergency state).

These time limits enable the use of the charger with batteries of different capacities (depending on the time available for the charge, from 8 to 18 hours), requiring no adjustments on the MTL control.

USING THE CHARGER

SAFETY TIMER - EMERGENCY STOP

If the battery doesn't reach the gassing voltage in 12 hours, the charge is terminated by the safety timer, and the display shows the error message "t.Err" (time error).

If this error message appear, it's recommended to call **TECNIK's** service dept. for a complete check of the system.

The cause if this problem may be a wrong calibration of the input voltage: if the input is set to a certain value (for example: 610 V) but the real voltage is lower (for example: 575 V), the charging current will be significantly lower than the nominal value, thus taking a longer time to reach the gassing voltage.



AUTOMATIC DATA SAVING

If, during the charge or equalization, one or more A.C. input black-outs occur, the microprocessor automatically saves all the relevant charging cycle data. While the input power is absent and if the battery remains connected to the charger, the display will show the message "b.Out" (black out).

When the power reestablished, the charger will re-start automatically from the exact point of interruption, and the charge will continue normally.



BLOWN D.C. FUSE DETECTION

If the D.C. output fuse is blown or absent, the display will show the message "FUSE".

This message may appear also if the battery has been left discharged for long time, causing the sulphation process on the plates or in case of a wrong A.C. input configuration (ex: charger is configured for 480V and only 240V is feeded).



USING THE CHARGER

AUTOMATIC CHARGE TERMINATION

When the charge is complete, the charger shuts down, and the display shows the scrolling message "End ELAPSEd x.x h".

The time indicated by the display is the time elapsed after the charge has been terminated. This indication is useful when there are two or more forklift operated with FIFO (First In First Out) rotation: when the user picks up a forklift, he will always chose the one with highest he time elapsed after charge termination.

The final values of Voltage/cell, time of charge and capacity charged remain stored in memory. If the red STOP pushbutton is pressed, the display will show these values in sequence.



AUTOMATIC SHUTDOWN ON BATTERY DISCONNECTION

DANGER!

*NEVER disconnect the battery while it's being charged.
Disconnecting the battery while it's being charged is hazardous*

If the battery is disconnected while the charge is in progress, the **TRONIK** charger switches off automatically.

MANUAL CHARGE TERMINATION

While the charge is in progress, it's possible to shut down the charger by pressing the red button "MANUAL STOP" on the front panel. The display will show the message: "StOP".



The final values of Voltage/cell, Time of charge and Capacity Charged remain stored in memory. If the "MANUAL STOP" button is pressed again, these values will be displayed in sequence. When the charge is terminated manually, the equalization and refresh functions are automatically disabled.

USING THE CHARGER

ATTENTION!

The proper programming of the equalize & refresh modes is important for the correct operation of the charger. Only qualified personnel should modify these settings.

MANUAL EQUALIZE

The manual equalize function is intended for the users that prefer to manage the equalization of the batteries personally. It will extend the time of the charge cycle by 4 hours, and can be enabled by pushing the button located on the front panel during the first minutes of charge.



The display will show the message "Eq.On" (equalize on) to the display cycle of the charge parameters, and the charge will proceed normally.

DAILY EQUALIZE

The daily equalize function will extend all the charge cycles by 4 hours, and is useful to recover highly sulphated batteries. Since it is a very intense equalize program and may tend to overcharge the battery, it's recommended to limit its use for short periods and then to return to a normal equalize program. It's also recommended to survey the operation of the charger and keep the temperature of the battery under precise control while the daily equalize function is enabled.

It can be enabled by moving the dipswitch DS1-SW1 to the ON position (see the figure and picture on page 15).
The daily equalize function is disabled by default.

AUTO EQUALIZE AND REFRESH

The auto equalize and refresh mode is totally managed by the MTL control. Once the regular charge has been completed, the charger will add 5 additional charge cycles of 30 minutes, with 14 hours and 30 minutes interval between each cycle.

This mode can be activated by moving the dipswitch DS1-SW4 of the MTL control (see the figure and picture on page 15).
Auto equalize and refresh is enabled by default.

During the time interval between each equalization cycle, the display will show the scrolling message "End ELAPSEd x.x h" (end elapsed) and when the equalization cycles are in progress, the display will show the scrolling message "EqUAL ChArGInG" (equalize charging), followed by the charging current.



USING THE CHARGER

REFRESH OPERATION

If a battery is not used for a long time (example: seasonal works, holiday periods), it should be kept fully charged to avoid a reduction of performance, therefore it's very important to charge the battery before leaving in standby for more than 72 hours. The self-discharge process makes it harder to keep a battery full over extended standby periods (weeks or months). The refresh function is useful to keep the battery in optimal condition when it's in standby.

It is sufficient to leave the battery connected to the charger after the charge and the equalization is complete. The **MTL** control's microprocessor will keep the battery voltage under control and will activate the charger automatically if the voltage drops below a predefined minimum threshold.

While the battery is monitored by the charger, the display will show the scrolling message "VoLt COntrol":



If the voltage drops down below the minimum threshold, the charger will give an extra charge cycle to keep the battery in optimal condition, and the display will show the scrolling message "rEFrESh".

