

INTRODUCTION

Congratulations on acquiring your new LT360-TC battery discharge tester. The LT360-TC battery discharge tester has been designed to provide the operator with accurate battery discharge testing and ease of operation.

Some of the features of the LT360-TC are:

- Constant current draw of 75 Amps.
- Automatic Temperature Correction
- Battery powered operation. No AC power required.
- LED digital display of battery voltage and run time.
- 100mv display resolution.
- Over temperature protection.
- 6 minute individual battery test mode.
- *Optional* Audio warning when discharge test is complete or tester malfunction.
- 1 year warranty.

Before operating your new LT360-TC battery discharge tester, familiarize yourself with this operators manual and the discharge tester. If any questions are still unanswered, please call technical support for further help.

Questions? Call 

in the United States: **(951) 681-6071** Mon.- Fri. 8:00 A.M. to 5:00 P.M. PST

Thank you,
COFKO ELECTRONICS

CONTENTS

	Page
SAFETY NOTES	3,4,5,6
UNPACKING	7
LT360-TC OVERVIEW	8
BATTERY DISCHARGING	9
GETTING STARTED	10 - 15
RECORDS	16
LT360-TC CARE	17
TECHNICAL DATA	18
LT360-TC WARRANTY	19

SAFETY NOTES

Your new LT360-TC battery discharge tester has been designed with operator safety as a function of its design, construction, and operation. Understanding how to safely operate the LT360-TC battery discharge tester is important. Failure to follow the operation and safety guidelines when using the LT360-TC can result in **personal injury to the operator and damage to the LT360-TC.** Always review the battery manufacturer's discharge guidelines before discharge testing batteries.



Look for this symbol to identify Safety and Danger precautions. Be Alert-Your safety is involved! Personal injury or equipment damage can occur if guidelines are not followed.

PERSONAL SAFETY:



- **SAFETY GLASSES** should always be worn by the operator when discharge testing batteries.



- **PROTECTIVE CLOTHING** should be worn by the operator at all times. Battery acid can cause chemical burns to the skin and eyes.



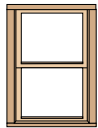
- **NO SMOKING** when discharge testing batteries. Batteries produce explosive gasses that can ignite causing a battery explosion.



- **TRAINED PERSONNEL** should only be allowed to operate this equipment.

SAFETY NOTES (continued)**- SAFETY HINT**

fill a pail or bucket with a mixture of baking soda and water and keep it close at hand. Baking soda and water will neutralize any acid that may come in contact with skin or eyes. Flush the area of acid contact with the baking soda and water mixture and flush the area with clean water. See your physician immediately if acid comes in contact with the eyes.

**- VENTILATION**

always discharge batteries in a well ventilated area. Discharge testing batteries can produce explosive gases. Never introduce a spark or flame near batteries under discharge testing. See your local building codes for proper ventilation rules.

**- WASH**

hands after contacting lead acid batteries. Personal exposure to lead can cause health problems. See local regulations about lead exposure guidelines.

**- FIRE EXTINGUISHERS**

should always be available and in good working condition before discharge testing batteries.

**- DANGER**

never stand directly over the batteries when connecting discharge tester main power clamps to battery terminals. Always use one hand in an extended position when connecting power clamp to each terminal.

**- DANGER**

never set the LT360-TC on the car seat or any other flammable surface that might be damaged or set on fire during a discharge test.

SAFETY NOTES (continued)



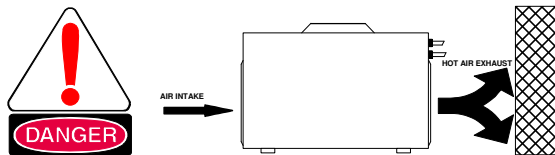
- DANGER never disconnect discharge tester main power clamps with battery discharge current applied. Stop the discharge test by placing the power switch to the **Off** position before disconnecting main power clamps. Disconnecting the discharge tester with discharge current applied can cause a spark and possible battery explosion.



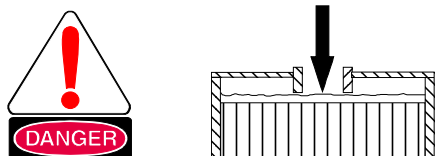
-DANGER never discharge test batteries without first inspecting all battery wires and connections for condition and tightness. Replace all defective wires and bad connections before discharge testing batteries. Defective wiring and bad connections can cause wire to over heat during a discharge test.



-DANGER never connect the discharge tester to batteries with voltage or discharge currents outside the ratings of the tester. The LT360-TC tester is designed for 36 volt, 75 Amp rated battery packs. Connecting the tester to batteries with different ratings will permanently damage the tester and endanger the operator. If any questions arise about battery or discharge ratings, call the COFKO technical advice number **(951) 681-6071** before proceeding.



-DANGER never obstruct the discharge tester air intake or hot air exhaust openings. Obstructing either opening can cause the discharge tester to overheat.



-DANGER always inspect the electrolyte level in each battery cell before discharge testing batteries. Discharge testing batteries with low electrolyte levels can damage batteries and possibly lead to a battery explosion.



REMEMBER

SAFETY COUNTS

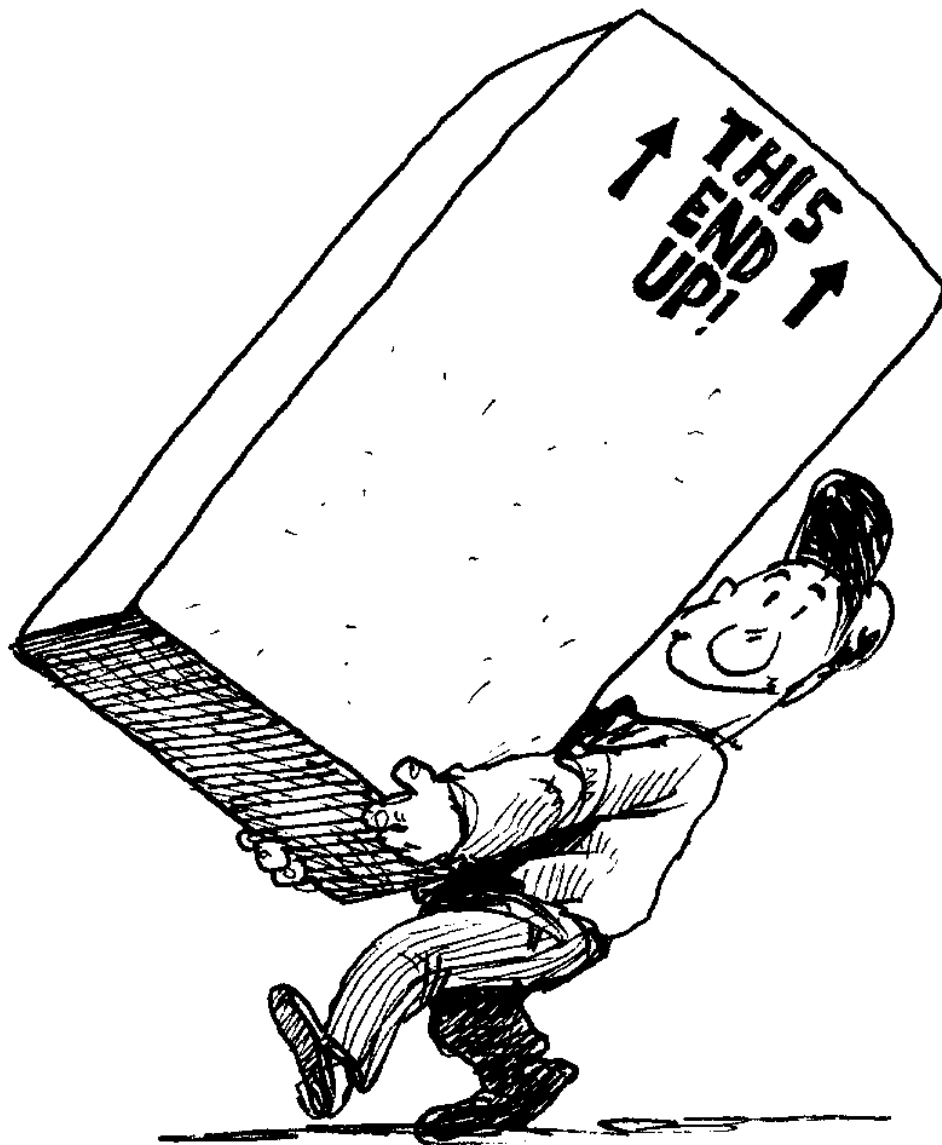
One..
Two..
THREE...



UNPACKING

As you unpack your new LT360-TC battery discharge tester, inspect the tester for signs of shipping damage. If shipping damage is present, stop and contact the shipping company for damage claims information. The box should contain the LT360-TC tester and operators instruction manual.

IMPORTANT: Save the shipping box and packaging materials. They should be used to repack the tester if it needs to be shipped back to COFKO for warranty or service.



LT360-TC OVERVIEW

Your new LT360-TC battery discharge tester is designed to provide years of trouble free service. It utilizes microprocessor technology to simplify battery discharge testing. The LT360-TC allows unrestricted movement of the test area. The batteries being tested provide the power source to operate the LT360-TC. Gone are the days of bringing the batteries to the AC power outlet. With its constant current control, the LT360-TC battery discharge tester provides the **most accurate discharge testing of any golf car testers on the market today.**

Upon completion of a discharge test, the ***optional*** audio warning system will signal the operator for maximum productivity. Accurate battery discharge information takes the guess work out of battery management and budgets. The LT360-TC battery discharge tester is the cornerstone to complete battery management.

BATTERY DISCHARGE TESTING

The purpose for discharge testing batteries covers several aspects of good battery management. The objectives are:

GOAL

- Customer Service
- Battery Energy Capacity
- Fleet Battery Management
- New Battery Warranties

Batteries used in rental and private fleets of electric vehicles should be discharge tested periodically to insure that sufficient energy capacity is present to meet the paying customers needs. A vehicle that fails to perform will make an unhappy customer. Customer service is number one in rental and private fleet operations.

Batteries are designed to meet certain energy capacities and discharge testing allows the fleet manager to check battery capacities. Battery manufacturer's will provide discharge test capacity specifications on all batteries. Batteries that do not meet these specifications should be removed from service and replaced.

Good fleet battery management covers periodic maintenance such as cleaning, cell watering, recharging, and discharge testing. If the full potential of battery service life is to be obtained, proper battery management must be exercised.

New batteries should be discharge tested after the battery manufacturer's recommended number of initial charge and recharge cycles are completed (i.e.. 50 to 100 cycles). Examined outwardly, there is **NO WAY** to determine good batteries from defective batteries. Battery discharge testing provides the best way of checking the condition of a battery. Batteries that do not meet their designed capacity ratings should be removed from service and warranted.

GETTING STARTED

The ease with which your new LT360-TC battery discharge tester allows you to perform accurate discharge tests will be evident after the first test is completed. To start your first test follow this list of steps.



1. **Read, understand, and follow all the safety rules when discharge testing batteries.** Failure to follow all the guidelines can cause damage to the LT360-TC and possible injury to the operator. **Remember SAFETY FIRST!**

2. Clean the battery surface of any electrolyte residue or dirt. Use a mixture of baking soda and water to neutralize surface electrolyte. Rinse the batteries with clean water to remove any baking soda left on the battery surface.



3. **Visually inspect all the battery wires and connection for condition and tightness.** Replace all defective parts and tighten all connections before discharge testing the batteries.

4. Remove all the battery fill caps and check the battery electrolyte level for proper height. Refer to the battery manufacturer's recommended electrolyte height level. If any cells are found to be below the height specifications add distilled water to bring the cell level to its proper level.



Note: If water has been added to the battery at this step, do not discharge test the batteries until at least 2 recharge cycles have been completed. Adding water to a cell will affect its capacity.

5. With your volt meter check the battery pack for proper voltage levels. For 36 volt battery packs this voltage can range from 36vdc to 40vdc depending on how soon after the batteries have been removed from recharge. Now take readings on each individual battery for proper voltage levels. All readings should be recorded for future reference.

GETTING STARTED (continued)

6. With a battery hydrometer, check each cells electrolyte specific gravity. Readings should be within the battery manufacturer's recommendations (i.e. 1.260 to 1.300). Be sure to correct the reading for temperature. Record each reading and note any readings below the specifications.
7. Place the LT360-TC discharge tester on a stable surface next to the batteries being tested. Make sure the air intake and hot air exhaust openings are not obstructed.
8. Make sure the **POWER** switch is placed in the **OFF** position and the mode switch is in the **STOP TEST** position.
9. Take the LT360-TC main power battery clamp colored **BLACK** and attach it securely to the **NEGATIVE** battery pack terminal. Wiggle the clamp to insure good connection to the post. See Fig. 1 example for proper battery connection instructions.



Safety Note: Never stand directly over the batteries when connecting the LT360-TC main power battery clamps. Always wear **safety eye glasses** when working around batteries.

10. Now take the LT360-TC main power battery clamp colored **RED** and **NOT STANDING DIRECTLY OVER THE BATTERIES**, connect it to the **POSITIVE** battery pack terminal. Wiggle the clamp to insure proper connection.



If upon connecting the RED main power battery clamp on the positive battery pack terminal the LT360-TC cooling fan motor starts to run **STOP!** The LT360-TC must be serviced before discharge testing can resume.

11. Remove one of the battery caps and place the temperature probe into the cell making sure the tip contacts the cell electrolyte. See figure 2

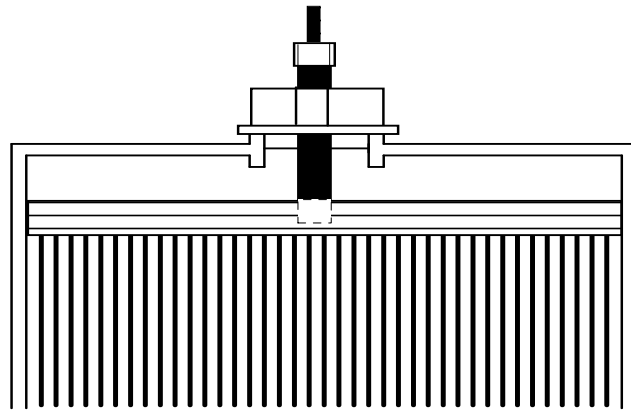
GETTING STARTED (continued)

Figure 2



the cell.

Do not force the temperature probe into the cell plates. This action will damage



Safety Note: Never stand directly over the batteries when connecting the LT360-TC main power battery clamps. Always wear **safety eye glasses** when working around batteries.

12. Place the **POWER** switch to the **ON** position. The LED display should flash all the segments and then display three single segments across the center of the display. If your discharger is equipped with the optional buzzer, the machine will also beep twice.



NOTE: Failure of the LT360-TC to initialize, check the test mode switch to see that it's placed in the **STOP TEST** position.

GETTING STARTED (continued)

13. To start the discharge test place the mode switch from the **STOP TEST** to the **START** position. The clicking sound of the main power relay closing should be heard along with the startup of the cooling fan motor. If the relay closure sound or the cooling fan motor fails to start, place the **POWER** switch to the **OFF** position and disconnect the LT360-TC from the batteries. The LT360-TC must be serviced before testing can resume.

14. With the LT360-TC now discharging the batteries, the LED display will be displaying the battery voltage. The battery discharge test run time can be displayed by depressing the **PUSH FOR TIME** button.

15. Upon reaching 31.5 volts, the LT360-TC will terminate the discharge test.



- DANGER if the cooling fan motor does not stop running when the cut off voltage (31.5vdc) is reached, **do not** attempt to remove the LT360-TC main power cables from the battery terminals. This indicates there is still battery discharge current being applied to the tester. Remove the positive (RED) cable only after the fan motor stops running. **Do not leave the tester unattended if this situation occurs.**



NOTE: If the **POWER** switch is set to the **OFF** position or the LT360-TC is disconnected from the batteries, all test data will be lost.



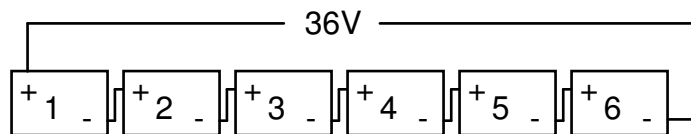
16. To display the battery discharge time press the **PUSH FOR TIME** button and record the time for future reference. The time number displayed is in minutes.

GETTING STARTED (continued)

17. Place the mode switch in the **STOP TEST** position.
18. Place the mode switch in the **6 MINUTE TEST** position to run the individual battery analysis test. The LT360-TC discharge tester will restart and display the battery voltage.
19. When the battery voltage reaches 31.8vdc on the display, take voltage readings with a hand held volt meter (DVM or Analog) on each battery and record these readings.



NOTE: Before running the six minute individual battery test, number the batteries from 1-6 to minimize confusion when recording readings.



20. Place the mode switch to the **STOP TEST** position. The LT360-TC cooling fan motor will stop running when the discharge current is removed. Place the **POWER** switch to the **OFF** position.



- DANGER if the cooling fan motor does not stop running when the mode switch is placed in the **STOP TEST** or the **POWER** switch to the **OFF** position, **DO NOT** attempt to remove the LT360-TC main power cables from the battery terminals. This indicates there is still battery discharge current being applied to the tester. Remove the positive (RED) cable only after the fan motor stops running. **Do not leave the tester unattended if this situation occurs.**

21. Disconnect the LT360-TC main power cables from the battery terminals, and place the batteries on a recharge cycle.

GETTING STARTED (continued)

Safety Note: Never stand directly over the batteries when connecting the LT360-TC main power battery clamps. Always wear **safety eye glasses** when working around batteries.



NOTE: Do not place the batteries back in service until a complete recharge cycle has occurred.

RECORDS

Battery discharge test records are important to quality battery management. With a well organized record sheet, good record keeping is easy! Below is an example of a battery discharge test data sheet that will provide all the information needed for a discharge test.

BATTERY DISCHARGE DATA

CLUB NAME: _____ DATE: ___/___/___

CAR#: _____ SERIAL# _____

BATTERY Mfg: _____ MODEL#: _____ DATE CODE: _____

CELL TEMPERATURE: _____ °F

SPECIFIC GRAVITY

	Cell 1	Cell 2	Cell 3	Cell 4
BATT#				
1	_____	_____	_____	_____
2	_____	_____	_____	_____
3	_____	_____	_____	_____
4	_____	_____	_____	_____
5	_____	_____	_____	_____
6	_____	_____	_____	_____

BATTERY VOLTAGE


BATT#	Start (OPEN CIRCUIT)	Under Load at 31.5VDC
1	_____ vdc	_____ vdc
2	_____ vdc	_____ vdc
3	_____ vdc	_____ vdc
4	_____ vdc	_____ vdc
5	_____ vdc	_____ vdc
6	_____ vdc	_____ vdc

BATTERY PACK END OF TEST VOLTAGE: _____ vdc

CORRECTED DISCHARGE TIME: _____ minutes.

LT360-TC CARE

Your new LT360-TC battery discharge tester should be treated as a precision test equipment. Misuse will shorten its ability to perform accurate battery testing. Some simple guidelines of care will insure years of trouble free operation.

1. Do not drop the LT360-TC or expose it to rough handling.
2. Do not expose the LT360-TC to water or fluids of any kind.
3. Do not operate the LT360-TC in a closed up area.
4. Do not connect the LT360-TC to battery packs of improper voltage ratings.
5. Do not allow the LT360-TC air intake or exhaust outlet to become blocked.
6. Do not carry the LT360-TC by the main power cables.
7. Do not operate the LT360-TC near flammable materials.
8. Do not expose the LT360-TC to direct sunlight during operation.
9. Do not expose the LT360-TC to heat sources such as heaters.
10. Do not attempt to drive a vehicle with the LT360-TC connected to the batteries.
11. Always call the technical support line for questions on LT360-TC safety and operation.
12.  Only trained personnel should operate the LT360-TC discharge battery tester.

REMEMBER SAFETY FIRST!

TECHNICAL DATA**LT360-TC SPECIFICATIONS:**

Maximum Battery Input Voltage	40VDC
Minimum Battery Input Voltage	30VDC
Maximum Discharge Time	150 MIN
Constant Current Draw	75ADC
Case Length	12 in(304.8mm)
Case Width	9 in(228.6mm)
Case Height	10 in(254mm)
Weight	8 lbs(3.6kg)

LIMITED WARRANTY

STATEMENT OF WARRANTY:

COFKO ELECTRONICS warrants to the original purchaser(end user) of the LT360-TC battery discharge tester that it will be free of defects in workmanship and materials. This warranty is void if COFKO ELECTRONICS finds that the LT360-TC battery discharge tester has been subjected to improper care or abnormal operation.

WARRANTY PERIOD:

The warranty period covers the original purchaser(end user) from the date of shipping.

1 Year: Covers each LT360-TC battery discharge tester for workmanship, materials, and labor.

TO OBTAIN WARRANTY COVERAGE:

You are required to notify COFKO ELECTRONICS, of any defects within the warranty period. Written notification is recommended.

WARRANTY REPAIRS:

If upon inspection COFKO ELECTRONICS confirms the existence of a defect covered by this warranty, the defect will be corrected by repair or replacement at COFKO ELECTRONICS option.

WARRANTY COST:

The purchaser must bear the cost of shipping the LT360-TC to COFKO ELECTRONICS as well as the return shipping cost.

IMPORTANT WARRANTY LIMITATIONS:

-COFKO ELECTRONICS will not accept responsibility for repairs made without authorization.

-COFKO ELECTRONICS shall not be liable for consequential damages (such as lost business, ect.) caused by a defect or reasonable delay in correcting a defect to the LT360-TC battery discharge tester.

-COFKO ELECTRONICS liability under this warranty shall not exceed the cost of correcting the defective LT360-TC battery discharge tester.

-This written warranty is only expressed warranty covering the LT360-TC battery discharge tester. All warranties implied by law such as Warranty of Merchantability are limited to the duration of this limited warranty of the LT360-TC battery discharge tester. Check your local legal rights for further rights you may have.