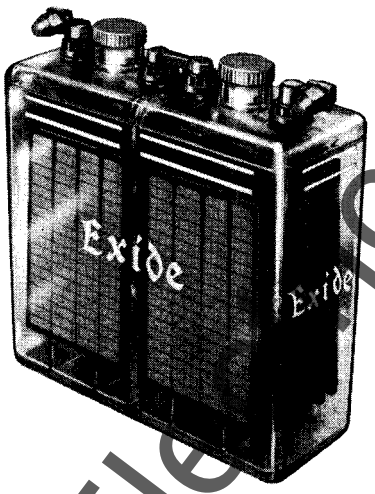
INSTRUCTIONS

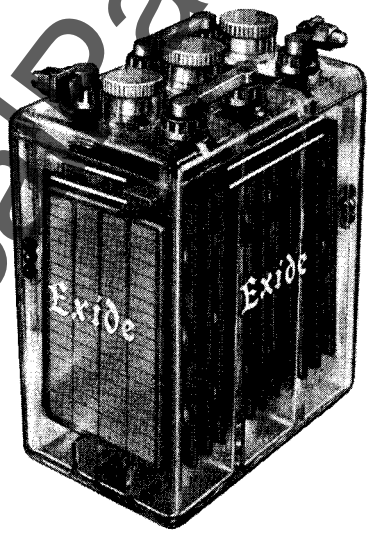
Installing and Operating

Exide
BATTERIES

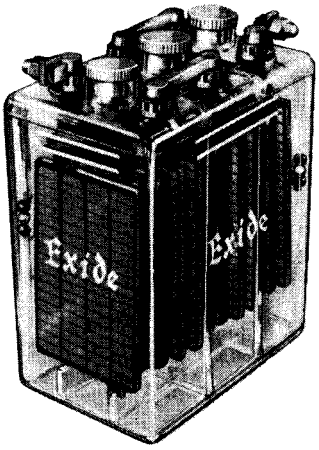
Types CIE, CME, COE
In Plastic Containers



Type 2-COE-7 (End to End)



Type 3-CME-5 (Side to Side)



Type 3-CIE-3 (Side to Side)

THE ELECTRIC STORAGE BATTERY CO.

Philadelphia 2, Pa.

First Edition

Form 5035

www . ElectricalPartManuals . com

RATINGS

1. Rating

Based on electrolyte temperature of 77°F. at beginning of discharge and on full charge specific gravity of 1.210. See Par. 7*a*.

Type of Cell	Plates per Cell	Charge Rate (Par. 8) Amperes	DISCHARGE CAPACITY 8-Hour Ampere Hours	DISCHARGE CAPACITY 8-Hour Approx. Points in Gravity	Max. Water (Par.) for Floated Battery Pints per Cell per Month
CIE	3	1	8.6		.008
CME	3	1	8		.008
	5	2	16		.015
	7	3	24		.022
COE	3	1	10		.010
	5	2	20		.019
	7	3	30		.028

Limiting Voltage per Cell..... 1.75 (Approx.)

INSTALLATION

2. Handling — Unpacking

a. These cells are shipped "charged and wet," meaning assembled, charged, and filled with electrolyte* to the upper line on the container. Upon delivery from carrier, examine electrolyte level or height to see that none is spilled. If electrolyte has been lost in transit and level is less than ½ inch below top of plates, add water or preferably electrolyte of 1.210 specific gravity, then give a thorough charge. If the level is more than ½ inch below top of plates, claim should be made against carrier for a new cell, as the "spilled" cell is more than likely to have been permanently damaged.

b. Clean covers by wiping off with damp rag to remove electrolyte in case any was spilled.

*If shipped without electrolyte for special reasons, see Par. 9 for Filling and Charging instructions.

3. Location of Battery

a. Battery room or compartment must be ventilated, but in such a way as to keep out water, oil, dirt, etc. It should also be dry, and, if practicable, moderate in temperature. Locate and install the battery so that all cells are readily accessible for adding the water necessary to restore level lowered by charging and evaporation.

b. For cells connected in one series, arrange so that all cells will be at about the same temperature. For example, do not have several alongside a radiator or in sunshine.

4. Connecting Units Together and to System

a. Arrange the units on the racks or stands so that the positive terminal of one will be connected to the negative terminal of the next throughout the battery. A clear space of ½ inch should be provided between adjoining units. The positive terminals are painted red on top or are marked POS. or +. The negatives are painted black or marked NEG. or —. Set units so that pilot balls (Par. 6*e*) face the observer.

b. Interunit connection is made by bolting connectors or jumpers to the respective terminal posts. Scrape the posts bright and clean. Then apply a thin film of No-Ox-Id grease (or vaseline), which should also be put on the threads of the bolts. Wipe the connector clean and apply a film of No-Ox-Id grease for about ½ inch around the bolt hole. Tighten connections. Wipe off surplus grease that squeezed out. Check connections to see that polarity is correct. Retighten connections.

c. Arrange terminal connections so that positive of charging source will connect with positive of battery, and negative of charging source with negative of battery. Test charging wires for positive and negative with a voltmeter, or dip the ends of the wires in a glass of water to which a few grains of salt have been added, but do not allow ends of wires to touch each other and do not use a strong solution of salt. In the water, fine bubbles will be given off from the negative wire.

d. See that any exposed metal in the connectors, other than lead, is thoroughly protected by a film of vaseline or No-Ox-Id grease.

www.ElectricalPartManuals.com

5. Freshening Charge

a. During transit the battery may have lost some of its charge. If specific gravity of electrolyte is below 1.200, give a freshening charge by charging (Par. 8) as long as the specific gravity (Par. 7) of the lowest gravity cell shows any increase, and continuing for three hours after the last increase is shown. If the charge rate used is considerably below the rate on page 2, this three-hour period should be lengthened in proportion. The specific gravity at the end of this charge should be as shown in Par. 7.

b. When the Freshening Charge is complete, make a written record of the specific gravity of each cell and note the temperature and level of electrolyte in two or three cells for future comparison.

CONDENSED OPERATING RULES

6. General Care

a. Keep the outside of the battery *clean and dry* by wiping with a dry cloth. Keep vent plugs in place.

b. Add regularly *only approved water* (distilled, if necessary). Do not add higher than the upper or top line on the container. *Add before the level lowers to the bottom line on the container.*

c. The amount of water necessary to add bears a definite relation to the amount of overcharge and may be used as a rough check against excessive charging. Under these conditions, if the amounts shown on Page 2 are exceeded for a floated (Par. 8*a*) battery, the overcharging is harmful. For example, a 60-cell CME-5 battery should not require more than 60 x .015 = 0.9 pint of water per month. A hard-worked battery (manually-cycled, Par. 8*c*) will require three to four times the amount shown on Page 2.

d. Except in emergency, *stop discharge* before the voltage becomes too low for satisfactory service. The drop in specific gravity should not exceed the number of points shown in the table in Par. 1. A point is considered equal to .001 specific gravity. For example, the difference between 1.200 and 1.150 specific gravity is 50 points.

e. The red, white and blue *pilot balls* give a rough check on the state of charge when the level of electrolyte is at the upper line; the battery being discharged approximately two-thirds or more when all three balls are down and fully charged when all are up. The blue ball sinks when the battery is slightly discharged and the white when approximately one-third discharged.

f. Always *charge at rate low enough* to keep the electrolyte temperature below 110 degrees Fahrenheit and while the cells are gassing never charge at rates higher than shown in table in Par. 1.

g. CAUTION. In the operation of the battery, gases are formed which may be explosive if ignited. Never bring burning material, such as lighted matches, cigarettes, and the like, or sparks of any kind near the battery. Ventilate the battery compartment when charging, in order to dispose of gas generated by battery.

h. Never allow metals, special solutions, powders, jellies or *impurities* of any kind to get into the cells.

i. Ammonia or soda solution will neutralize the effects of *spilled acid* or electrolyte if applied promptly.

j. If the battery is to *stand idle* for some time, give it a charge until *all* the cells gas and add enough water during this charge to raise the level of electrolyte to the upper line. Give a freshening charge every six months and before putting into service again. During the idle period, be sure all battery circuits are open to prevent the possibility of any current leaking away.

k. At yearly intervals tighten the connector bolts.

7. Specific Gravity of Electrolyte

a. The specific gravity of the electrolyte with the cells fully charged, and the electrolyte level at the upper line on the container should be as shown in the following table for the temperature indicated.

Temperature →	107° F.	**77° F.**	47° F.
Electrolyte Level at Upper line	1.190 to 1.210	**1.200 to 1.220**	1.210 to 1.230

b. It is adjusted within these limits at the factory and will not require adjusting during the life of the battery unless electrolyte is actually lost out of the battery. If, however, electrolyte is lost it should be replaced with electrolyte of about the same specific gravity as in the surrounding cells.

c. A lowering in level (between additions of water) increases the full charge gravity about 15 points for each 1/4 inch decrease in level. Addition of water will lower the full charge gravity similarly.

d. The table (Par. 7*a*) shows the effect on gravity of changes in electrolyte temperatures. For example, a change of 30°F. changes the gravity 10 points (.010 sp. gr.).

e. The full charge specific gravity will decrease in value as the battery ages. No definite value can be given but this decrease is very small, not over a few points per year at the most. This change is mentioned so that it will be understood.

8. Charging Methods

Floated Batteries

a. By "floated" batteries are meant those which are permanently connected to the electrical system with which they are used in such a manner that they are normally kept fully or nearly fully charged (except for momentary or emergency discharge) by being constantly maintained at a voltage that will result in a small net charge. The *"floating rate"* is the sum of the very low current (generally termed *"trickle rate"*) required to counteract the small internal

www.ElectricalPartManuals.com

battery losses plus the average current requirements for the remainder of the circuit. If the latter is zero, the floating rate required becomes the trickle rate for the battery. The required floating or trickle current is automatically provided when the proper voltage is maintained across the battery.

b. The voltage *directly at the battery terminals* should average 2.15 volts per cell continuously. Some variations from this value may occur in daily use and to insure the battery being fully charged, give an Equalizing Charge once a month. This can be given either as in Par. 8*d*, or by raising the battery voltage to 2.33 volts per cell (140 volts for 60 cells) for a period of 8 to 24 hours, resuming normal floating at the end of this period.

Manually-Cycled Batteries

c. By "manually-cycled" batteries are meant those which are normally allowed to reach a certain state of discharge before being placed on charge, the charge being started manually.

d. If the battery requires *charging only once a week* or less frequently, charge until *all* the cells gas freely and until half-hourly readings of the specific gravity of any certain cell and of the voltage for the battery *both* show no further increase over a period of one hour. This is termed an *Equalizing Charge.*

e. If the battery requires *charging more often than once a week*, charge until the cells are gassing and until the specific gravity of a certain cell is within 5 points of the highest obtained on that cell during the Equalizing Charge last given, allowance being made for change in level (Par. 7*c*). *Then stop the charge.* Every sixth or seventh charge should be continued into an Equalizing Charge.

9. Filling and Charging if Shipped Without Electrolyte in Cells

a. If the battery is ordered shipped without electrolyte it may be supplied either (1) "charged and dry" (dry-charged) or (2) "uncharged and dry." The difference in preparing for service is that the "uncharged and dry" requires a longer time. When ready to prepare for service, proceed as follows:

b. Remove vent plug and fill each cell with dilute sulphuric acid electrolyte of between 1.200 and 1.205 specific gravity, and with its temperature below 90°F. fill to the upper line on the container. Replace vent plug.

c. For "charged and dry" allow battery to stand one to four hours after filling before charging at rates in Par. 1. Charge until four consecutive hourly readings show no rise in both specific gravity and voltage of the lowest cell. The length of the charging time will be at least 12 hours at the rates in Par. 1.

d. For "uncharged and dry" allow battery to stand about twelve hours to cool. Charge at about 60% of the rates in Par. 1. Start taking readings at the end of 50 hours. Charge until the voltage and gravity of the lowest cell does not rise over a ten-hour period. The length of the charging time may require 80 hours or more.

e. For either condition, if temperature exceeds 110°F., reduce the charging rate and lengthen the time proportionately.

f. Make certain of the polarity of all connections as described in Par. 4.

g. At completion of charge, the specific gravity should be as shown in Par. 7*a*. If specific gravity is higher, remove some and replace with water. If lower, remove some and add electrolyte. Charge for an hour to mix solution before reading gravity again.

www . ElectricalPartManuals . com