

Microtex Semi-Traction Batteries Instruction and Maintenance Manual



Special Features:

- Special Antimonial alloys for good cycle life and low maintenance.
- Tubular spine grids casted at 100 bars High Pressure die casting on German technology machines, for high compacted & corrosion resistant grids.
- Proprietary chemical mixes for added service life.
- Heavy-duty custom-made separators.
- Heat sealed to eliminate container leakage.
- Available in wide range of 6, 8- & 12-volts configurations.

MICROTEX SEMI TRACTION TUBULAR PLATE BATTERIES									
Battery Type	Material of Container	Voltage	Capacity in Ah at 30°C 5Hr	Overall Dimension in mm			Battery Weight (appx.) Kgs.		Electrolyte Qty 1.250 Sp. Gr. (Appx.) in Liters
				L ±	W ±	H ±	Without Electrolyte	With Electrolyte	
				5 mm	5 mm	10 mm			
STST 12V32P	PPCP	12	32	303	170	240	15.2	20.3	4.3
STST 12V48P	PPCP	12	48	410	173	245	21.0	27.3	5.3
STST 12V64P	PPCP	12	64	510	220	255	24.0	38.5	12.1
STST 12V80P	PPCP	12	80	510	220	255	33.0	42.6	8.0
STTT 12V96P	PPCP	12	96	510	194	410	34.2	61.2	22.5
STTT 12V104P	PPCP	12	104	510	194	410	37.0	62.8	25.8
STTT 12V128P	PPCP	12	128	510	194	410	45.6	72.0	22.0
STJT 12V96P	PPCP	12	96	510	220	293	35.6	48.4	10.7
STJT 12V104P	PPCP	12	104	510	220	255	42.6	55.4	10.7
STJT 12V140P	PPCP	12	140	518	274	293	51.0	70.0	15.8
STGT6V165P	PPCP	6	165	262	181	295	23.0	29.0	4.8
STGT6V180P	PPCP	6	180	262	181	295	25.0	31.0	4.8
STGT6V196P	PPCP	6	196	262	181	295	26.0	33.0	5.5
STGT8V115P	PPCP	8	115	262	181	295	22.0	28.0	4.8
STGT8V128P	PPCP	8	128	262	181	295	24.5	31.0	5.1
STGT8V140P	PPCP	8	140	262	181	295	26.5	33.0	5.1
STGT12V120P	PPCP	12	120	330	181	295	31.4	39.4	6.3

PPCP- Poly Propylene Copolymer

All batteries are supplied in charged condition

The electrical characteristics are nominal indicative value and can vary within ±5.0%.

In case of batteries in Dry and Uncharged condition the initial filling

and charging is to be carried out as per the parameters mentioned in Instruction Manual

STST	Semi Traction in Short Container			
STTT	Semi Traction in Tall Container			
STJT	Semi Traction in Jumbo Container			
STGT	Semi Traction in GC Container			

Safety information

	Pay attention to the operation instruction. Work on batteries to be carried out by trained personnel only!		Risk of explosion and fire avoid short circuits! Caution: Metal parts of the battery are always live. Do not place tools or other metal objects on the battery!
	Use protective glasses and clothes when working on batteries. Pay attention to the accident prevention rules.		Electrolyte is highly corrosive.
	No smoking! Do not expose batteries to naked flames, glowing embers or sparks, as it may cause the battery to explode.		Batteries and cells are heavy. Ensure secure installation! Use only suitable handling equipment e.g. lifting gears.
	Keep children away!		
	Acid splashes in the eyes or on the skin must be washed with water. In case of accident consult a doctor immediately! Clothing contaminated by acid should be washed in water.		Batteries with this sign must be recycled and returned back to the manufacturer. Batteries which are not returned for the recycling process must be disposed of as hazardous waste! As per applicable rules in the user's country.

Do's & Do not's for Semi-Traction Batteries

Do's:

- Read the instruction manual carefully before using the battery.
- Allow trained personnel only to work on a battery.
- Use protective clothing and safety gears when working on a battery.
- Use insulated tools only to work on the battery.
- Match the battery to the correct charger. Undersize charger will reduce the backup & life of the battery.
- Ensure correct polarity while connecting to charger and machine.
- Put discharged battery immediately on charge.
- Batteries kept idle shall be charged at eight weeks interval.
- Remove the battery compartment lid while charging.
- Charge batteries in ventilated place having exhaust fan.
- Use only distilled or de-ionized water to top up the battery.
- Refer national or international standard for purity of water and acid.
- Top up at the end of charge cycle and never on a discharged battery.
- Charge the battery to gas freely for at least one hour after topping up.
- Keep the battery & tray clean and dry at all times.
- Check terminal connections & bolted terminals tightness periodically.
- Keep the battery firmly secured to the truck and avoid vibration.
- Use petroleum jelly or anti sulphuric grease to protect metal parts.
- Top metal connections shall always have plastics shrouds on them.

Do not's:

- Do not leave a battery in discharged state.
- Do not over-discharge the battery. Use battery discharge indicator.
- Do not overfill the cells while topping up.
- Do not keep the vent plug lid open during charging and discharging.
- Do not add tap water to the battery.
- Do not top up in discharged state.
- Never add acid for topping up.
- Do not use metal vessels for holding acid or acid contaminated water.
- Never smoke in the battery charging room.
- Avoid flames and hot works like welding, gas cutting in charging room.
- Do not break a live circuit at the terminal of the battery.
- Do not drop tools or other metal parts on the battery.

1. DESCRIPTION

“**MICROTEX**” Flooded Low Maintenance Lead Acid Semi-Traction batteries are well designed to meet the rigorous working conditions. They consist essentially of Tubular positive plates, pasted negative plates, microporous Separators, assembled in Heat Sealed PPCP Monoblock containers and flip-top Vent plugs. These batteries are supplied in Charged Condition-Ready for use.

Description of Main Components

Positive Plate: Spine grids are made of corrosion resistant low antimony Selenium content alloy and are pressure die casted. This gives fine-grain structure to the grids and good mechanical properties. Multi-acrylic tubular bag fitted to the grids have outstanding characteristics of porosity, acid resistance, Oxidation resistance and high rupture strength. This design of tubular positive plates enables the active material to be retained within the bags so that shedding is restricted during service.

Negative Plate: Consists of a grid structure with pockets which hold the active material firmly. The active material is prepared under controlled conditions with necessary additives for efficient electrical performance including long life features.

Separators: These are made from specially blended raw materials and carefully processed in a modern plant to meet the desired characteristics of porosity, pore structure, low electrical resistance and chemical standards.

Battery Containers/Cover: These are made of Polypropylene material, which are sturdy and vibration resistant to withstand the tough working conditions. They conform generally to IS:1146 specification. Adequate sediment space has been provided at the base to prevent bridging short circuits.

Flip-Top Vent Plug: Flip-Top Vent plugs provides easy opening for checking the electrolyte level and for topping up.

Separator Protector: Made of plastic, it protects separators while servicing of the cell is being done.

Pole Sealing: All poles are effectively sealed by lead welding to the cell lid.

Terminals: Terminals suitable for bolted connections of Antimonial lead are provided on the batteries.

2. UNPACKING

The battery should be kept upright while unpacking. The batteries should be carefully examined for any evidence of damage in transit. Any damages should be immediately reported.

2A. Commissioning of batteries received in filled and charged condition

The battery should be inspected to ensure that it is in perfect physical condition. The charger cables must be connected to ensure a good contact, taking care that the polarity is correct. Otherwise battery, vehicle or charger could get damaged.

The level of the electrolyte must be checked. If it is below the separator it must first be topped up to this height with purified water – refer national or international standard for specifying purity of water). If the gap is 8 weeks or more, between manufacturing date and commissioning date of the battery, an equalizing charge must be provided.

3. INITIAL FILLING AND FIRST CHARGE IN CASE OF DRY UNCHARGED CONDITION

1. The batteries if supplied dry uncharged without electrolyte. Give the batteries a complete initial charge by using D.C supply before commissioning.
2. The initial charge is one of the most important factors ensuring satisfactory performance and longevity of service.

4. TECHNICAL DATA – As mentioned above

5. ELECTROLYTE PREPARATION

1. Cleaned vessels of hard rubber / plastic, Porcelain or Lead lined boxes are to be used.
2. The acid to be used in the battery for initial filling, is of battery grade sulphuric acid of specific gravity 1.240 at 27° C

3. If the acid is obtained in concentrated form it is necessary to dilute it to the required specific gravity. The acid and the distilled water to be used for diluting should conform to IS-266–1993 and IS-1069– 1993 respectively.
4. Remember: NEVER POUR WATER TO ACID, ALWAYS ADD ACID TO WATER. For diluting, use only glass rod / lead lined paddle for mixing.
5. When working with acid or electrolyte always use protective goggles, rubber gloves and rubber apron.

MIXING OF ELECTROLYTE

To make 10 volumes of Dilute Electrolyte

Specific Gravity after mixing	Take volume of water	Add Volume of 1.840 Sp.Gr. Acid
1.200	8.67	1.87
1.240	8.16	2.36
1.260	8.33	2.50

TEMPERATURE CORRECTION

The readings observed on Hydrometer should be corrected to 27° C. For each 1° C above 27° C add 0.0007 to the observed reading. For each 1° C below 27° C deduct 0.0007 from the observed reading.

Reading specific gravity of sulphuric acid and the correction for temperature: The acid gravity is read by the hydrometer and the temperature is read by a mercury-in-glass type thermometer.

Avoid parallax error by keeping the acid level in the hydrometer in the same level of the eye.

The correction is done by adding 0.0007 in case of acid being at a temperature higher than the reference temperature and subtracting 0.0007 in case the acid is at lower temperature than the reference temperature for each deg C. Suppose we measure a batch of acid as 1.250 at 40 deg C, the corrected specific gravity at 30 deg C for that particular batch of acid will be - $1.250 + (40-30) \times 0.0007 = 1.257$.

So, the generalised formula is

$$\text{S.G.}(30 \text{ deg C}) = \text{S.G.}(t \text{ deg C}) + (t - 30) \times 0.0007$$

Where, t is the temperature of the acid

S.G. (30 deg C) = Specific gravity at 30 deg C

S.G. (t deg C) = specific gravity measured at t deg C.

6. INITIAL FILLING AND FIRST CHARGE:

- 1 Before filling new batteries check the cells for polarity and short circuit.

- The quantity of acid required per cell is as below. The total quantity of acid required is obtained by multiplying the quantity per cell by no. of cell, added 10% to compensate for spillage.

Battery Type	Voltage	Capacity in Ah at 30°C 5Hr	Electrolyte Qty 1.250 Sp. Gr. (Appx.) in Litres
STST 12V32P	12	32	4.3
STST 12V48P	12	48	5.3
STST 12V64P	12	64	12.1
STST 12V80P	12	80	8.0
STTT 12V96P	12	96	22.5
STTT 12V104P	12	104	25.8
STTT 12V128P	12	128	22.0
STJT 12V96P	12	96	10.7
STJT 12V104P	12	104	10.7
STJT 12V140P	12	140	15.8
STGT6V165P	6	165	4.8
STGT6V180P	6	180	4.8
STGT6V196P	6	196	5.5
STGT8V115P	8	115	4.8
STGT8V128P	8	128	5.1
STGT8V140P	8	140	5.1
STGT12V120P	12	120	6.3

- Remove the dummy vent plugs and fill in required quantity of 1.240 specific gravity acid.
- Fill acid up to 25 mm above top of the separator protector.
- Allow the cells to cool down for a period of not less than 12 hours and not more than 24 hours. The plates in the cells will absorb the electrolyte and electrolyte level will drop. So, top up the cells by adding acid of the same specific gravity as originally filled to the same level as before.
The batteries are ready for initial charging.

7. FIRST CHARGE:

- Ensure that the positive terminal of battery is connected to the positive lead of the charging source to avoid reverse charges.
- Commence charging not later than 24 hours after filling in the cells with acid.
- Record the open circuit voltage and specific gravity of the cells before giving the charging connection. Connect the battery for charging continuously as specified below using Direct current supply.

Battery Type	Voltage	Capacity in Ah at 30°C 5Hr	Charging Rate in Amps	No of Hours
STST 12V32P	12	32	2.0	50
STST 12V48P	12	48	2.5	50
STST 12V64P	12	64	3.0	50
STST 12V80P	12	80	4.0	50
STTT 12V96P	12	96	5.0	50
STTT 12V104P	12	104	5.0	50
STTT 12V128P	12	128	6.5	50
STJT 12V96P	12	96	5.0	50
STJT 12V104P	12	104	5.0	50
STJT 12V140P	12	140	7.0	50

STGT6V165P	6	165	8.0	50
STGT6V180P	6	180	9.0	50
STGT6V196P	6	196	10.0	50
STGT8V115P	8	115	6.0	50
STGT8V128P	8	128	6.5	50
STGT8V140P	8	140	7.0	50
STGT12V120P	12	120	6.0	50

- As soon as the battery is put on charge take another set of voltage readings, this is to check if there are any reversed cells and to avoid reverse connection of the entire battery.
- During the first charge take individual cell voltage, specify gravity and temperature readings every four hours and record.

Note: The charge may be interrupted provided the charge period is of at least 8 hours duration and the rest period does not exceed 16 hours.

- The batteries are considered to be fully charged when values of cell voltage and specific gravity of electrolyte corrected to 27° C remains constant for three consecutive hours at the end of initial charging time as specified
- The temperature of electrolyte in the cells at any period of charge should not be allowed to rise beyond 55° C. Should the temperature rise above 50° C reduce the rate of charging and should it be above 55° C discontinue charging for period and increase the charge time proportionately
- The electrolyte level may go down below the specified limit during charge and the same should be topped up by adding electrolyte of the same specific gravity as originally used for initial filling
- At the end of charging the specific gravity of the electrolyte is to be 1.250 ± 0.005 at 27° C. If the specific gravity at the end of charging is above, add distilled water and charge for a couple of hours and check the gravity again.

8. TRIAL DISCHARGE

- Allow the batteries to cool down for a period not less than 12 hours.
- Before putting batteries in service, it is advisable to make a discharge at 10 hr. rate until the total voltage of the battery falls to 1.75 volts per cell multiplied by number of cells or until the voltage across cell has fallen down to 1.75 volts whichever is earlier This discharge and the following charges will bring the battery to good working condition.

9. RECHARGE:

- After the trial discharge, charge the cell at the normal rate as specified below. The cells are considered fully charged when all cells gas freely and the cell voltages and specific gravity remain constant for 3 successive hourly reading.

Battery Type	Voltage	Capacity in Ah at 30°C 5Hr	Normal Charging Rate in Amps	Sp. Gravity of electrolyte ± 0.005 at the end of charge
STST 12V32P	12	32	3.2	1.280
STST 12V48P	12	48	4.8	1.280
STST 12V64P	12	64	6.4	1.280
STST 12V80P	12	80	8.0	1.280
STTT 12V96P	12	96	9.6	1.280

STTT 12V104P	12	104	10.4	1.280
STTT 12V128P	12	128	12.8	1.280
STJT 12V96P	12	96	9.6	1.280
STJT 12V104P	12	104	10.4	1.280
STJT 12V140P	12	140	14.0	1.280
STGT6V165P	6	165	16.5	1.280
STGT6V180P	6	180	18.0	1.280
STGT6V196P	6	196	19.6	1.280
STGT8V115P	8	115	11.5	1.280
STGT8V128P	8	128	12.8	1.280
STGT8V140P	8	140	14.0	1.280
STGT12V120P	12	120	12.0	1.280

2. Allow the battery to cool down for about 12 hours. Fit up all the Flip top vent plugs.

10. INSTALLATION:

1. Before installing, the top and sides of all batterie should be wiped clean and dry. Arrange the batterie in the battery box.
2. Use only recommended inter unit connectors, nuts, bolts and washers for connection of batteries.
3. Smear a little petroleum jelly on the nuts, bolts and washers after bolting up the Batteries.
4. Make sure that vent plugs are secured tightly. Failure to do so will result in electrolyte loss and causes corrosion to battery compartment and other fittings.
5. The battery compartment shall have proper ventilation arrangement so as to keep the batteries cool. But at the same time, it shall prevent accumulation of dust, dirt or rainwater over cells. The floor of the compartment shall have proper drainage holes to avoid stagnation of wash water.
6. The battery shall be arranged on the tray so that they are seated and secured firmly and evenly. This is to avoid shifting, twisting/ straining of inter connectors & terminals, which would impair the performance of the batteries

11. MAINTENANCE:

1. The battery top and surrounding shall always be kept dry and clean.
 2. To maintain electrolyte level during service always add only distilled water. NEVER ADD ACID FOR TOPPING UP. All the electrical connections shall be tight to avoid heating up and short circuit.
 3. During idle period, freshening charge at normal rate must be given at least once a month.
 4. If any container is broken, the battery shall be removed and kept immersed in distilled water till container replacement.
 5. Care should be taken not to short circuit cells while using spanner etc.
 6. Equalizing charge
- If the Sp.Gr. and voltage show irregular values between cells, i.e.,
- i) Sp. Gr. Varies by 20 (or) more point among the cells and or

- ii) Voltage variation between cells varies by more than 0.1 Volt lower than of other the average value

Then equalizing charge is to be done, to normalize the lapping cells with that of other cells. Equalizing charge shall be done at normal charging rate and continued till Sp. Gr. And voltage remains constant for three consecutive hourly reading.

7. Inspection, checking and adjustments of specific gravity should be done at regular intervals and may be recorded in logbook for reference.
8. Correct setting of voltage regulator in service ensures proper amount of charge, minimum water loss and prolonged life.

12. SAFETY PRECAUTIONS:

1. Do not keep cells near naked flames
2. Do not use Metallic Vessels for carrying Distilled Water/Acid. When working on cells or connections care should be taken not to bridge the cell connectors with spanner. For the same reason metals vessel should not be used for topping up.
3. Do not keep tools on the cells. Always use distilled water confirming to the IS 1069 – 1969 to top up the cells.
4. After topping up and taking specific gravity readings ensure micro porous vent plugs are secured tightly.
5. Do not use broken or defective micro porous plugs.
6. Record readings of specific gravity and voltage of cells/total battery during regular maintenance.

Note: 1. Normally the battery gives their capacity in the first discharge cycle: if not, within three discharge cycles.

3. Batteries shall be put to use before expiry of 24 months from the date of supply.

BATTERY TROUBLES AND REMEDIES

	SYMPTOMS	PROBABLE CAUSE	REMEDIES
a]	Excessive gassing and progressive increase in Sp. Gr. during charging	Voltage setting is too high	Reduce voltage setting to lower value and check accuracy of voltmeter in charger.
b]	Progressive decline in the value of Sp. Gr.	Voltage setting is too low	Increase voltage setting and check accuracy of voltmeter in charger.
c]	Battery getting discharged	Leakage of current through grounded circuits	Check for leakage of electrolyte or grounding of current carrying conductors in charger or battery circuit.
d]	Decline in value of Battery voltage	Loose connections or corroded terminals	Clean corroded parts with dilute Alkaline solution and water. After drying coat with Vaseline or petroleum jelly.

e]	Continuously low electrolyte level	1. Leakage of electrolyte 2. Loss of water in electrolyte due to evaporation by very high voltage or excessive charging	1. In case of leakage, replace the Battery 2. Add distilled water to maintain electrolyte & ensure correct setting of voltage regulator.
f]	Continued low reading of Sp. Gr., loss of capacity after full charge, low open circuit voltage.	Internal short circuit	1. Disassemble the cell 2. Examine the plate for accidental contacts, missing or sheared Separators. 3. Replace with new plates/separators
g]	Premature gassing	Sulphation due to low electrolyte level, over discharging and under charging and unwarranted addition of acid when only water should have been added.	Pour out the electrolyte. Fill with distilled water and allow to stand for one hour. Charge at half the initial charging current specified, till three consecutive hourly reading. Pour out electrolyte. Fill with acid of final Sp.Gr. Specified in table. After a rest period of one-hour charge at normal charging rate till constancy of Sp. Gr. is attained.
h]	Cells overflowing	Increase in electrolyte level	Adjust electrolyte level to correct height.
i]	Rev. polarity in battery	Battery may be lagging from the healthy battery	Give equalizing charge every month to bring the lagging cells. Equalizing charge shall be given @ normal charging rate and continued till 3 hourly constant reading for cell voltage and Sp. Gr. are obtained.

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