Caring for your Freeway Med-Tech Batteries

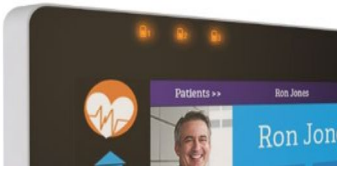
Whilst it is important to note that all Lithium Ion Battery products should be thought of as consumables, there are best practices that will ensure you get the most out of the innovative Freeway Med-Tech 202 batteries. The following points should be part of staff training with the new device as follows:-

1. Do not let batteries get completely drained

Lithium batteries do not have memory effect. So there is never a need to drain them fully and recharge, In our system and with our batteries, it has been with a battery management scheme implemented which is able to prevent the batteries from over-charging and over-discharging. So best practice to ensure the batteries stay in good health and extends overall battery life. We advise when either of the 3 lights in the top left hand corner of the monitor of the Freeway Med-Tech is ORANGE, it's time to change the battery.

Clear visual battery status lights.

If the ORANGE light is flashing, this means the battery must be changed immediately, before continuing work. The battery states for the lights displayed on the front of the MT700-24T monitor are as follows:-



- **Blinking Blue:** battery is connected to mains power and is charging.
- **Steady Blue:** battery is between 25% or above
- **Steady Orange:** battery is 24%-10%
- **Blinking Orange:** battery is 9% or less

2. Recharge the Freeway Med-Tech batteries as soon as possible

All Lithium batteries should be put on charge as soon as possible after removing. This will extend the life span and performance of the battery.

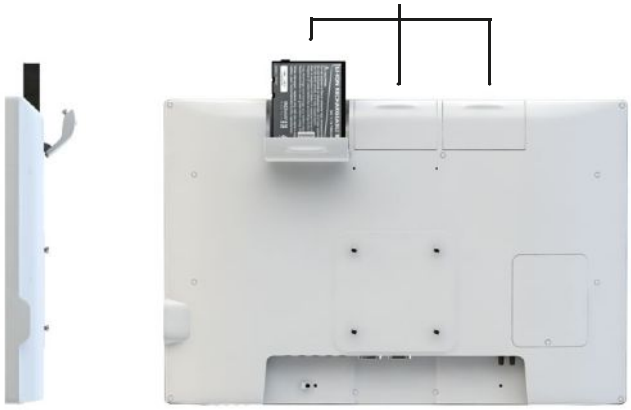
3. Only replace batteries one at a time

If ALL 3 batteries are removed at the same time, the Freeway Med-Tech MT700-24T will lose all power and turn off.
This could harm your precious medical data!

Ensure that when you replace the batteries, insert the new battery with the label facing out, if you do not the door will not close, this is designed to alert the user that the battery is incorrectly inserted, as this battery will not power the unit.

Once the new battery is inserted correctly, and the rear battery door is closed, check that the front Blue lights on the front of the monitor are all lit up, confirming that the battery is inserted correctly and ready to be used.

3 x removable lithium battery packs



Each battery simply lifts out from it's enclosure to either swap for a fresh one, or remotely charge.

4. Conserve power when possible

Good power management is key to good mobile cart run times, so remember to turn off the LED panel, pressing this will not turn off the computer, but simply turns off the LED front panel and back light, saving power when not in use or talk with your own IT team about enabling Power save settings on the windows system to power down if left unused automatically.

Remember to switch off the LED reading light during the day and if not needed, as this will help conserve power.

5. Always use Fully Charged Batteries

Not only with this ensure the maximum working time on the Freeway Med-Tech MT700-24T powered monitor before needing to change batteries, but this will reduce the Depth of Discharge essentially reducing the number of full cycles (running the battery to 0% or close to 0%) This is referred to as reduced Depth of Discharge (DOD) and is an important factor to increase battery health in all Li-ion battery products, a chart below to highlight the important of reducing depth of discharge on cycle life on any Li-ion battery.

TABLE 1:

Depth of discharge	Discharge cycles
100%	~300
80%	~400
60%	~600
40%	~1000
20%	~2000
10%	~6000

Table 1 estimates the number of discharge/charge cycles Li-ion can deliver at various DoD levels before the battery capacity drops to 70 percent. DoD constitutes a full charge followed by a discharge to the indicated state-of-charge (SoC) level in the table.

Capacity ≥ 1785mAh(70% of the capacity at 25°C)

Storage Characteristics

Capacity after storage for 30 days at 25°C from the standard charge, measured with discharge current 1300mA with 2.75V cut-off at 25°C.
Capacity retention (after the storage) ≥ 2040mAh (80% of the capacity at 25°C)

Cycle life as a function of depth of discharge

*A partial discharge reduces stress and prolongs battery life, elevated temperature and high currents also affect cycle life.

Note: 100% DoD is a full cycle; 10% is very brief. Cycling more frequently and in mid-state-of-charge would have best longevity for the batteries, so if users can plug the carts in or swap the batteries frequently, the batteries will stay in good health for longer.

Temperature Dependence of Charge Capacity

Capacity comparison at each temperature, measured with discharge constant current 520mA and 2.75V cut-off after the standard charge is as follows:

	Charge temperature			Discharge temperature
	0°C	25°C	45°C	25°C
Relative Capacity	80%	100%	80%	

Note: If charge temperature and discharge temperature is not the same, the interval for temperature change is 3 hours.
Percentage as an index of the capacity at 25°C (=2550mAh) is 100%.

Battery Power management for MT700-24T

For increased battery longevity the Freeway Med-Tech MT700-24T powered monitor has been specifically designed to discharge all 3 batteries at the same time, this prevents single batteries being used consistently, meaning all 3 batteries will have a far more even cycle pattern over the life cycle, ensuring that over a 2-3 hour use pattern (the most common in clinical environments) all 3 batteries will be depleted by 20-30% dependent upon use and load, as opposed to having a system depleting battery 1 to 10% or less and keeping batteries 2 & 3 at a higher state of charge.

Official Factory Battery charge time

For MT700-24T, the three batteries are charging simultaneously inside the screen. Each charger can deliver 16W/h to the battery so charging a 90Wh battery from 10% to 90% would take around 4.25 hours. (Note: the charging rate will be reduced if system load is very high. Or, if the battery is in high capacity.)

Important note for the MT700-24T Powered monitor power management

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