

TROUBLE SHOOTING

Even though HBL Power Systems Limited nickel cadmium batteries themselves are very reliable and trouble free, they are part of a larger system that can introduce abnormal conditions, and batteries are also exposed to different quality of maintenance.

The following list of possible problems, causes and action will be of good use.

Sl.No	Symptom	Probable Cause	Recommended Corrective Action
01	Erratic charger behavior	Wrong polarity of cell, block, row of battery.	Check each cell or block for correct polarity.
		Interruption at connector	Check that no connector or cable is missing and that all connections are tight and cables securely fastened in cable lugs.
		Interruption due to empty cell	Check if the cell is empty because of leakage. If so, remove or short circuit the cell and use the battery with one cell less, until replacement is made. If the cell is part of the block, do not remove the block, just by-pass the suspected cell.
		Empty cell	If the battery is filled with electrolyte on site, it could be that one cell has been forgotten. If so, disconnect the cell and fill it with electrolyte.
		Faulty charger	See charger instructions for troubleshooting.

02	Earth fault indication	Small leak or leaks	Check for wetness on battery stand, or with a voltmeter, area of the battery having the lowest potential to ground. See (1) for procedure if a cell is leaking.
		Battery wet due to overfilling	Disconnect few connectors to avoid high or over boiling voltage and clean the battery. See (8).
		Other equipment of system	Isolate various parts of the DC system to find the fault.
03	Continuous heavy gassing	Charging voltage is above the recommended float voltage .	See charger instructions for information on charging mode and settings.
04	No power or capacity at all	Interruption at connector	See SL.No: 1 .
		Interruption due to empty cell	See SL.No: 1 .
		Battery completely discharged.	discharged. The reason could be faulty charger or fuse, wrong float voltage or interruption in the battery. Recharge the battery according to instructions.
05	Too short discharge time. The voltage decreases quickly at the end.	Too large load. Too fast charging.	The load may be larger that what the battery was intended for. Check the discharge against battery performance data. Note that the rated number of Ah can only be delivered at discharges, of 5 hours or longer. For short discharges, batteries will give higher currents but less Ah.
			Determine why the battery is not charged to a correct level. The reason could be low float voltage, no high-rate recharge after previous heavy discharge, too short high-rate recharge, of high-rate recharge to voltage that is too low. Recharge the battery as per instructions and discharge again. Ensure that charging current is not limited, during charging for effective capacity revival.

		Too low battery capacity.	If the same result is achieved after full and complete charging, the battery capacity is low. It may still be able to work its application, especially if it is high-rate discharges such as in switchgear operation or engine starting. The reason for low capacity could be age, heavy use, insufficient charging or unsuitable storage.
06	Low discharge voltage during a major part of discharge.	Very low voltage for one or few cells.	Check the individual cell voltages during discharge and full recharge. If the voltage of an individual cell does not come up nearly as high discharge. As others, the cells have a partial short circuit and therefore not accepting charge. (If the charging voltage is fine but the cell voltage collapses early in the discharge the cell capacity is abnormally low). The reason could be unsuitable handling at installation or contamination in the electrolyte.
		Battery designed with high cell end voltage. The discharge preceded by long-term float charge without discharge.	This condition sometimes occurs if the design cell end voltage is 1.14 – 1.18 volt per cell and the battery has been in service for some time. It does not mean that the capacity has decreased. It is best handled by using more cells in the battery and thus lowering the final cell voltages, and high rate or boost charging periodically.
07	Too low for engine starting. The engine does not turn at all, or with too low speed to fire	Discharged battery due to insufficient charging	Insufficient charging, See(06)
		Loose connector	Tighten all connectors. For high power discharges this is very important, both from a performance and safety viewpoint. A loose connector will cause voltage drops and can spark and ignite charging gasses.

		Too low temperature	If the temperature is lower than the design temperature for the starting system, it will be difficult to start because the battery gives less power whereas the engine requires more power to turn. Use the correct engine oil for the temperature and try to arrange preheating of the engine and battery if possible.
		Engine trouble	If cranking speed appears to be good, failure to start may depend on the fuel or engine. The battery cannot do more than crank engine at sufficient speed.
08	Wet battery	Overfilling or over boiling	Disconnect a few connectors to avoid high voltage and clean the battery. Use proper filling equipment to avoid overfilling. Over boiling is the result of too high electrolyte level and high rate charging. Normal level and charging at too high rate may also cause over boiling.
		Loose connector	Tighten all connectors. For high power discharges this is very important, both from a performance and safety view point. A loose connector will cause voltage drops and can spark and ignite charging gasses.
		Sudden eruption of electrolyte from one cell	<p>Disconnect a few connectors to avoid high voltage and clean the battery. Fill the electrolyte or DM/DI water in the cell, which has lost the electrolyte and charge the cell individually. Then replace the cell in the battery and recharge the complete battery. Check the individual cell voltages.</p> <p>If one cell in a battery with high current load such as engine starting is completely discharged it may spew out electrolyte when the high current is applied.</p>

		Electrolyte leakage at posts and vents.	After sometime in service, electrolyte may penetrate the seals around the posts, vents and connectors. In the normal cleaning of the battery, it does not affect the performance of the battery to any extent.
		Electrolyte leakage through pores or cracks.	A leakage through a pore or small crack could be so small that it does not affect the electrolyte level noticeably, but will cause earth faults and the cell or block should be replaced.
09	Uneven electrolyte levels in the battery	Poor filling or topping up.	If the levels of electrolyte vary throughout the battery, the reason is probably poor topping up or leveling off after filling.
		Different float voltages	Batteries are often divided in two halves, which is good from reliability and maintenance viewpoints. If each half has a separate charger and the voltage is different, the electrolyte levels in the two halves will be different
		Leaking cell	If one cell has a lower electrolyte level than all the others, it is probably leaking. The leak could be small and difficult to find, but the battery stand is probably wet from electrolyte under the cell. One individual cell could not consume more water than the others as the same current goes through all cells.
		Short circuit in one cell	A cell with partial or complete short circuit will consume less water than the others. Let the cell remain until replacement is arranged.

10	Cell voltages < 1.35 V	Soft short between electrodes	Remove the affected cells from the bank and administer boost voltage with external cell booster to the affected cells and reinsert the cells if their charge retention is > 1.29 V per cell in open circuit after 3 days
11	Battery bank heating	Not giving good commissioning charging	<p>Clear the leakage paths, greyish crystals, if any.</p> <p>Check the cell voltages and remove weak cells, if any.</p> <p>Carry out deep discharging of the bank and giving constant current re-charging to the bank.</p> <p>Check the ripple content in the battery charging current</p>