



LOCOMOTIVE SMART BATTERY MONITORING SYSTEM

IMPEDANCE MONITOR

UNDERCHARGE INDICATOR

To operate efficiently, locomotives rely on dependable deep cycle batteries for engine starting. Proper charging and maintenance is key to maximizing battery performance including capacity, starting crank Amps and cycle life. Utilizing a simple and easy-to-read LED visual indicator and audible alerts, Rolls integrated Locomotive Smart Battery Monitor offers maintenance crews supportive information relating to battery health as well as state-of-charge and engine starting ability.

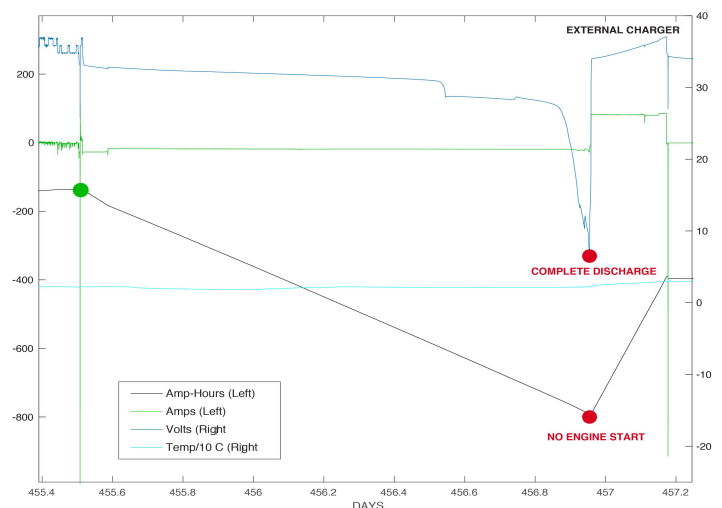
LIFE-LONG BATTERY STATUS MONITORING & PERFORMANCE ALERTS

From day one, Rolls Locomotive Smart Battery Monitor continuously tracks charge and discharge of the battery using a microprocessor-based high-precision internal sensor. Tracking continuous measurements of voltage, current and temperature combined with a large knowledge base of field data, the smart sensor is able to observe and report on battery condition at all times.

FULLY INTEGRATED SENSOR

Fully integrated during assembly and housed inside the protective battery case, Rolls Locomotive Smart Battery Monitor offers effective and convenient visual status updates. A pulsing LED indicator is centrally-mounted on the battery case for clear visibility, providing real-time battery conditions and alerting visually & audibly in events where service hours, over discharge or starting ability may be a concern.

IMPROVED BATTERY MANAGEMENT WITH SIMPLE AUDIO/VISUAL COMMUNICATION



SAMPLE FIELD DATA: UNINTENDED DEEP DISCHARGE



LOCOMOTIVE SMART BATTERY MONITORING SYSTEM

DISCHARGE MONITORING

PERFORMANCE & MAINTENANCE ALERTS



NORMAL OPERATION			
•	•		NORMAL OPERATION
••	••		BATTERY UNDERCHARGE INDICATOR*
•••••			CHARGE COMPLETE
*SUGGESTED: MAINTENANCE CHARGE & BATTERY TEST			
MAINTENANCE ALERTS			
•	•		SERVICE HOURS REACHED
••	••		LOW STARTING PERFORMANCE*
•••••			BATTERY OVER DISCHARGED*
*SUGGESTED: MAINTENANCE CHARGE & BATTERY TEST			

NOTE: UNDER NORMAL OPERATION, ELECTROLYTE LEVELS SHOULD BE CHECKED AS PART OF ROUTINE MAINTENANCE.

KEY FEATURES:

BATTERY UNDERCHARGE INDICATOR: Chronic undercharging reduces cycle life and is a specific concern with automatic engine start/stop (AESS) control systems. Rolls Locomotive Smart Battery Monitor alerts where incidents of undercharge may be occurring, helping guide operators to perform regular and restorative maintenance charges to avoid capacity loss and maintain starting performance.

CHARGE COMPLETE: Accurately tracking charge current and battery voltage, Rolls Locomotive Smart Battery Monitor assists in identifying when the battery has reached full state-of-charge and charging may be terminated. A unique LED sequence helps to confirm the charge is complete and the battery is now ready to be put into service.

SERVICE HOURS: Tracking battery age and charge cycles, Rolls Locomotive Smart Battery Monitor features a visual LED & audible alarm to identify batteries in service which have reached their specified or expected end-of-life period. This audio/visual indicator helps to ensure timely battery replacement and safeguard against unexpected fail-to-start events.

LOW STARTING PERFORMANCE: Rolls Locomotive Smart Battery Monitor continually monitors battery starting capability. Using a rising audible alert & LED, the monitor notifies operators of below specification starting performance due to increased battery impedance, suggesting a restorative maintenance charge & testing should be completed.

OVER DISCHARGE ALERT: Unintentional deep discharges reduce battery life and create fail-to-start conditions. Ensuring adequate charging and avoiding heavy discharge will maintain battery capacity and cranking performance. Using a combined LED indicator and continuous audible alarm, Rolls Locomotive Smart Battery Monitor alerts operators during incidents of abnormally low discharge which may lead to a fail-to-start event, suggesting a restorative maintenance charge & testing be performed before use.