BRPE3S

Features:

Patented 3-Stage Charging for FLA or VRLA Batteries

Increased Battery Life, Decreased Dead Won't Start Events

Simple bolt on Upgrade. No Software Changes Required

Automatic Soft-Start/Stop Command from Locomotive Computer

Industry Standard ASIC-Based SCR Firing Circuit

Isolated Gate Drive Circuitry

Phase Loss, Over temperature, Over Voltage, and Power-On Reset Protection

BRPE3S Rail-Hardened SCR Rectifier Assembly with Three Stage Battery Charging

Description

The BRPE3S brings proven 3-stage battery charging technology to GE Dash 8 and 9 locomotives. The ruggedized, shock and vibration hardened, solid state rectifier provides a proper battery charging profile and greatly reduces battery sulfation. Existing locomotive wiring is maintained and a new battery current sensor provides battery charging current feedback to the charger. Battery manufacturer recommended 3-stage charging results in increased battery capacity, longer battery life, and ultimately decreased dead won't start events.

Operational Features

Three Stage Charge: The 3-stage charge profile produced by the BRPE3S regulates the 1st, or bulk stage current, to 120ADC. In the 2nd, or absorption stage, the rectifier voltage is regulated to 76V (VRLA setting) or 78V (FLA setting). This elevated voltage converts the maximum amount of active battery material thus minimizing sulfation and capacity loss. In the 3rd, or float stage, the BRPE3S regulates voltage at 72V.

Selectable Battery Type: The charging profile for flooded batteries (FLA) and valve regulated batteries (VRLA) is selectable via a circuit board mounted hard switch.

Technical Features

Variable Frequency Firing Circuit: The rectifier assembly uses Enerpro's industry-standard variable-frequency firing circuit which can accommodate a variety of AC mains frequency ranges, typically between 20 and 120 Hz.

Soft-Start: Voltage and current output are gradually ramped up to the set point value resulting in smooth electrical system power up.

Automatic Enable: Signals from the locomotive computer enable and disable the charger, preserving the standard locomotive start up sequence.

Phase Loss Inhibit: A phase loss circuit instantly inhibits SCR firing if a loss of one or more phases or gross phase imbalance is sensed on the AC lines. Firing will soft-start when such a fault is cleared.

Board Construction: All circuit boards are assembled at the Enerpro plant in Goleta, California and are manufactured by a UL-approved fabricator from 0.092" thick FR-4 fire resistant fiberglass epoxy laminate. All boards are conformal coated (MIL-1-46058, Type UR). WAGO cage-clamp connectors are used for all board connections.

Assembly Construction : The assembly is constructed around an extruded aluminum heat sink. Powder coated steel side plates and aluminum grab bars protect the circuit board and SCR modules. Isolated-base SCR modules are utilized, ensuring that the heat sink is not electrically hot and isolated from the AC mains and DC output. Integrated ruggedized snubber protects the SCR modules.

Enerpro *applications engineers are available by e-mail or phone for technical support and product assistance.*

Product Data	
Maximum Ratings	
AC mains voltage	400 Vac
DC output voltage	72-78 Vdc
DC output current	400 A
SCR pulse transformer hipot	3500 Vac (60 seconds)
Minimum operating temperature	-40 C
Maximum operating temperature	+75 C
Control Board Characteristics	
Regulation	Voltage or Current
Voltage feedback type	Resistive attenuation
Current feedback type	Hall-effect sensor
Gate drive phase balance	±1° (max)
Lock acquisition time	30 ms (typ)
Soft-start time	2.0 seconds
Phase rotation effect	None
Phase loss inhibit	Automatic
Enable inputs	Locomotive computer or manual
Gate pulse burst frequency	384 times line frequency
Conformal coating	per MIL-1-46058, Type UR
Control power	Three phase AC/DC isolated on board supply
Assembly Characteristics	
Control connector	Existing locomotive Cabling
AC and DC mains connections	Bus bar with 3/8-16 insulated stud posts
Envelope (in)	20 L x 12 W x 7.5 H
SCR Module	Infineon TT250N16KOF
Heat sink thermal impedance, zero airflow	0.33 C/W

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