Power Management System

Description

The modern fighting vehicle is dependent upon its electrical system for mission success. Conventional wiring methods can no longer effectively cater for the significant increase in electrical and electronic systems fitted in the modern military vehicle. Its demand for manual control and operation imposes significant crew work load, and fault finding is difficult due to limited work space within the vehicle and limited available diagnostics.

Eaton’s Aerospace Group has been involved in the research and development of vehicle power management for three decades, working closely with government and industry to develop a system that will meet the need of retro-fit, new, and emerging vehicles.

The Eaton Power Management System (PMS) has been designed to be an integral part of the fighting vehicle system, linking into the vehicle vetronics network for the control and management of vehicle power resources.

Its modular approach and software configuration allows the use of common modules across a wide variety of platforms, is easily scalable for systems of different complexity, and is easily expanded to cater for vehicle upgrades. The use of the PMS Bus Controller (either a stand alone LRU or embodied in the distribution unit) allows the addition of new equipment and/or PMS modules with minimum impact on the more complex vetronics processors, and isolates low level power management data bus traffic from the high level command and control networks.

Eaton’s Power Management System has been selected for deployment on the new TERRIER® combat engineering tractor.

Application

- Military vehicles
Power Management System (PMS) Components

Remote terminals, each capable of controlling sixteen electrical loads and sensing up to sixteen switch or digital inputs are intended to be sited close to the electrical loads they control – hence reducing wiring. For each load connected to it, the remote terminal can provide open circuit detection and over-current protection in addition to load on/off control.

The setting of the over-current protection is programmable (5-50 amp) using the PMS data bus network that links all of the remote terminals to the bus controllers.

The bus controllers are linked to remote terminals using a dual redundant MilCAN data bus. The bus controllers use this data network to:

- Send ON/OFF commands to individual or groups of loads
- Receive status (on/off/open circuit/trip) of loads
- Receive status of inputs
- Send output trip point and other configuration data
- Receive diagnostic data from remote terminals
- Military vehicles

The PMS bus controllers provide a dual redundant data bus to the command and control (C2I) computers. This allows the C2I computers to send control information to the PMS and to receive load states, diagnostic and Health and Usage Monitoring Systems (HUMS) data from the PMS.

The PMS controls the loads and power distribution according to commands from the C2I data bus, switches, inputs and diagnostic states. The PMS can control the power-up and down of the vehicle including a low-power sleep mode.

Electrical power sources in the vehicle are also managed by the PMS, and distributed to the remote terminals as high current power feeds. For critical areas two separately protected feeds are used to provide additional redundancy within the distribution network.