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Profibus Protocol

The Profibus Protocol is a vendor independent, open fieldbus standard for a wide range of applications in manufacturing and process automation. It has been designed to allow for communication between devices of different manufacturers without any special interface adjustments.

The structure of the Profibus Protocol is such that it permits up to 32 devices (master or slaves) per segment. Additionally, it permits the addition and removal of devices from the segment without influencing other devices.

Profibus Protocol Architecture

DP Known as the Decentralized Periphery, this is the most frequently used of the Profibus communication profiles. It is optimized for speed, efficiency and low cost by utilizing layer 1 and 2 of the protocol as well as the user interface.

DDLM Known as the Direct Data Link Mapper, it provides the user interface with easy access to layer 2. The application functions available to the user, as well as the system and device behavior of the various DP device types are specified in the user interface.

FDL Known as the Fieldbus Data Link, it provides the data security layer.

FDT Known as the Fieldbus Device Type, it is a vendor independent method for device descriptions.

MAC Known as the Medium Access Control, it decides when a device is given the right to send data.

DPM1 Known as the DP Master Class 1, it is the central programmable controller for DP.

DPM2 Known as the DP Master Class 2, it is a configuration device for DP.

System Behavior The DP specification includes a detailed description of system behavior to ensure device interchangeability. System behavior is determined primarily by the operating status of the DPM1.

DPM1 can be controlled either locally or via the bus by the configuration device. There are three main states:

Stop In this state, no data transmission occurs between the DPM1 and the slaves.

Clear In this state, the DPM1 reads the input information of the slaves and holds the outputs in fail safe status.

Operate In this state, the DPM1 is in the data transfer phase. In cyclic data communication, inputs of the slaves are read, and output information is written to the slaves.

The DPM1 cyclically sends its status to all slaves assigned to it using a multicast command at a configurable time interval.

The system reaction to an error during the data transfer phase of the DPM1 (such as failure of a slave) is determined by the auto clear configuration parameter.

If this parameter is set to true, the DPM1 switches the outputs of all assigned slaves to fail safe state as soon as a slave is no longer ready for user data.

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