PROFIBUS – SYSTEM OVERVIEW

Profibus is a standardized global open network communication system that boasts one of the largest installed system bases, with well over 2,000,000 devices being installed to date, covering many areas of modern factory automation. Profibus DP permits Mono-master or Multi-master systems, which provides a high degree of flexibility during system configurations. Profibus allows all automation devices, sensors, actuators, PLC's, etc to communicate with each other over a single bus.

Profibus DP offers the user an open standard per EN50170. This means the user has a great deal of choice from leading manufacturers and is able to choose the right product for the application.

Profibus DP has been developed for high-speed communication and fast cyclic updates up to12 Mbits per second; the system offers response times less than 1ms per 1000 I/O points.

Profibus devices all have different performance characteristics. Features differ in regard to the available functionality (i.e. The number of I/O diagnostic messages available) or possible bus parameters such as baud rates. These parameters are usually documented in the technical specification manual. In order to achieve a simple plug-and-play configuration of Profibus, the characteristics are specified in an electronic data sheet called a device database, or GSD file. Standardized GSD data expand open communication up to the operator control level. Using configuration tools based on GSD files makes integration of devices from different vendors in a bus system simple and very user friendly.

Profibus Messaging

Profibus offers both polling and peer-to-peer communication. Profibus DP is a polling network. Its assigned master periodically requests the status of each node, ensuring that each device on the network (which can send up to 244 bytes per scan) is updated consistently and reliably. Each message contains up to 12 bytes of overhead for a maximum message length of 256 bytes.

ADDRESSING

Addressing

Profibus DP supports up to 126 nodes that can be addressed. The Brad Harrison® Profibus DP I/O module allows up to 99 addresses and will indicate a communication error if a module is given a duplicate address. Software node commissioning can be accomplished through rotary switches. The addressing is performed manually by setting two rotary switches located under the IP68 protective caps. Power must be cycled to a module when its address is changed.

The Profibus DP network allows the use of repeaters. When repeaters are used they must be assigned an appropriate address. Addressing must be completed prior to commissioning. All Profibus I/O modules are supported by GSD files, which are specifically formatted files containing detailed device information. Information that is found in the GSD file includes how to configure the module, module description, I/O characteristics, and the module's configurable parameters.

COMMUNICATION RATE

Communication Rate

Profibus supports data rates from 9600 to 12 Mbits/second. Slave stations all have automatic baud rate adjustment. Data transmission rates are governed by the length of the bus network as shown in the following table:

MAXIMUM RATINGS

TRANSMISSION SPEED (BAUD RATE)	BUS SEGMENT (BUS LINE LENGTH)	REPEATERS (MAX. NUMBER)	NODES (MAX. NUMBER)
9.6 Kbps	1200m	7	32 WITHOUT REPEATERS, 126 WITH REPEATERS
19.2 Kbps	1200m	7	32 WITHOUT REPEATERS, 126 WITH REPEATERS
93.75	1200m	7	32 WITHOUT REPEATERS, 126 WITH REPEATERS
187.5 Kbps	1000m	7	32 WITHOUT REPEATERS, 126 WITH REPEATERS
500 Kbps	400 m	7	32 WITHOUT REPEATERS, 126 WITH REPEATERS
1.5 Mbps	200 m	4	32 WITHOUT REPEATERS, 126 WITH REPEATERS
12 Mbps	100 m	4	32 WITHOUT REPEATERS, 126 WITH REPEATERS