lumbergautomation

A BELDEN BRAND

DeviceNet™

DeviceNet Modules with Plug-N-Play Connectivity Reduce Overall Installation and Maintenance Costs.

DeviceNet Introduction

Common Industrial Protocol

DeviceNet™ is part of the CIP protocol family. CIP stands for "Common Industrial Protocol". It is the platform for several communication protocols including DeviceNet, EtherNet/IP and CompoNet, as well as protocol enhancements for safety applications (CIP Safety) and motion control (CIP Motion).

DeviceNet™ is a fieldbus system for the direct connection of sensors and actuators in the field (e.g. proximity switches, motor starters, valves, etc.). DeviceNetTM originated in the North-American market and is presently used worldwide in all areas of plant automation.

DeviceNet™ is based on the **CAN** specifications (**C**ontroller **A**rea **N**etwork). However, unlike CAN it is restricted in functionality for easier implementation.

About Lumberg Automation DeviceNet Products

To ensure the best application of DeviceNet in the decentralized sector, components must meet maximum electromechanical demands. DeviceNet components from Lumberg Automation offer maximum protection to the electronic system by the material used for the housing and sealing technology. The modules are equipped with either 7/8" or M12 connectors for the bus connection.

Technical Data

Transmission media The individual stations are generally connected via a hybrid cable to transmit data (according to RS485) and for power supply (module electronics and sensors). It is constructed of 2 twisted and shielded pairs of wires contained inside another 360° shielding. There are four standardized types of cable:

- **THICK Cable** - sometimes called Trunk Cable
- **MID Cable**
- **THIN** Cable - sometimes called Drop cable
- **Type V Cable** - used for Tray Rated Cable (TC) applications

DeviceNet Module dipicted with 7/8" bus connection and terminating resistor.

Network Topology

Line structure with drop lines. The trunk line is terminated by resistors on both ends; the drop lines do not require a terminating resistor.

Bus Access

DeviceNet is a multi-master system. The communication between the participants can be implemented in various modes:

- Polled I/O Message Connection: The data of the slaves is cyclically polled by the master (masterslave method).
- Explicit Message Connection: Acyclic communication between master and slave e.g. for parameterization.
- Bit Strobed I/O Message Connection: (broadcast) The master simultaneously sends a message to all slaves and the slaves send their input information back.
- Change of state / Cyclic Message Connection: In the change-of-state mode the slave automatically sends its current data to the master in case of a change at the input. In the cyclic message mode the slave sends the applicable input information at regular, predefined intervals (e.g. every 25 ms).

Modes can be set individually for each slave. The CSMA/BA process is applied to avoid telegram collisions on the bus. It ensures that messages of high priority (e.g. input data telegrams) are transmitted before messages of low priority (e.g. parametric data).

Number of Participants

64 nodes (including master)

Admissible Transmission Rates and Line Lengths

Depending on the transmission rate (Baud rate) the admissible cable lengths (main and drop lines) change as specified in Table 1: Admissible transmission rates and line lengths.

Bus Cycle Time

The bus cycle time depends on the following important factors – among others:

- Number of participants
- The relevant amount of data of the individual slaves
- Type of communication
- Transmission rate

Configuration of the Nodes

The individual participants are configured via EDS files (Electronic Data Sheet) which are provided by the manufacturer for each slave. The EDS files for the Lumberg Automation bus modules can be obtained through **www.lumberg-automationusa.com**.

Addressing

Addressing is implemented via software or rotary address switches. Software addressing can be implemented via addressing tools or the master. The modules are integrated consecutively into the network and automatically checked / tested to determine whether another participant is on the bus with the same address. If that is the case, the participant deactivates itself. If the test is negative, the unit can be addressed via the master.

Diagnostic System

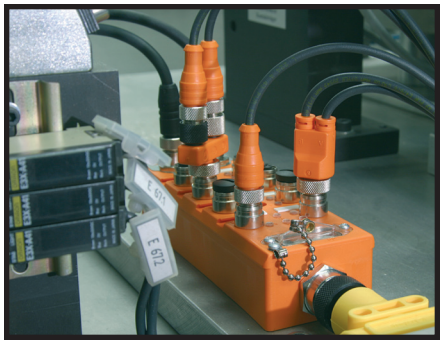
With DeviceNet, the diagnostic message is transported via additional input bytes (status bytes) which are added to the input data Lumberg Automation compact I/O modules are using one status byte. In addition LED's on the modules make it easy to locate an error.

Transmission Rate	125 kbit/s	250 kbit/s	500 kbit/s
Max. Trunk line using “THICK Cable”	500 m (1,640 ft.)	250 m (820 ft.)	100 m (328 ft.)
Max. Trunk line using “MID Cable”	300 m (984 ft.)	250 m (820 ft.)	100 m (328 ft.)
Max. Trunk line using “THIN Cable”	100 m (328 ft.)	100 m (328 ft.)	100 m (328 ft.)
Max. Trunk line using “Type V Cable”	420m (1,378 ft.)	200 m (656 ft.)	100 m (328 ft.)
Max. drop length	6 m (20 ft.)	6 m (20 ft.)	6 m (20 ft.)
Max. cumulative drop length	156 m (512 ft.)	78 m (256 ft.)	39 m (128 ft.)

Table 1: Admissable transmission rates and line lengths

Product Characteristics

- Especially suitable for robotic applications (resistance to torsion).
- Very good resistance to oils, coolants and lubricants as well as emulsions.
- Suitable for use in C-Tracks.
- Very good resistance to flying weld slag (e.g.) unfinished constructions).
- Very good resistance to acids, lye and chemical cleaning agents.
- Very good electromagnetic resistance (EMC) and shieldedsystems.
- Very good vibration and shock resistance.
- UL approved.
- UL/CSA approved.



Module dipicted with M12” bus connection and on-board 7/8” power auxillary power connection with T-Connector.