Beckhoff — EK EtherCAT Couplers

EK1541



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The **EK1541** optical coupler is produced by Beckhoff for the EK EtherCAT Couplers series. It forms the interface between an EtherCAT fiber segment and the company's slice-based I/O terminals, allowing controllers to exchange process data with attached modules through a single head station. Within an automation cell, the device propagates deterministic telegrams while providing the system ID logic required for station addressing and diagnostics.

Data traffic moves across the optical link at **100 MBaud** using the **EtherCAT Device Protocol**. Two simplex fibers terminate on a **2 x Versatile Link POF connector**, and the medium is **Polymeric Optical Fiber**, a cost-effective plastic conductor that facilitates on-site assembly. A red LED source operating at approximately **650 nm** injects light into the cable. The typical port-to-port delay is only **1 µs**, so telegram timing remains within EtherCAT limits even when distributed clocks are enabled. Receiver circuitry tolerates inputs down to -26 dBm, while the transmitter launches at a minimum of -13.5 dBm to maintain the stated optical budget. An ID selector with three rotary switches provides eight distinct addresses for simple local identification. The Hot Connect feature can enumerate up to 4,096 removable subsegments without restarting the network, and the internal terminal bus accommodates as many as 65,535 I/O channels.

For plant wiring, the maximum optical span between two EK1541 couplers is **50 m**, allowing cabinet-to-cabinet links without repeaters. The coupler passes field power to downstream terminals through contacts rated at **24 VDC** and capable of supplying up to **10 A**, so sensor and actuator loads can be powered directly from the backplane. The IP20 protection class indicates that the housing is intended for installation inside an enclosure with controlled ingress.

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The polymer optical fiber also eliminates ground-loop currents that could otherwise interfere with analog signals.

Specifications

Baud Rate:	100 MBaud	**Bus Connection:**	2 x Versatile Link POF	**Delay (typ.):**	1 µs
Fiber Medium:	Polymeric Optical Fiber	**Id Switch Count:**	3	**Max Coupler Distance:**	50 m
Max Hotconnect Ids:	4096	**Max Terminal Count:**	65535	**Min Input Sensitivity:**	-26 dBm
Min Output Power:	-13.5 dBm	**Power Contact Current:**	10 A	**Power Contact Voltage:**	24 VDC
Protection Class:	IP20	**Protocol:**	EtherCAT Device Protocol	**Transceiver Wavelength:**	650 nm
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