

SEL-2829/2830/2831

Single-Mode Fiber-Optic Transceivers



High-performance transceivers that increase safety and security

- Fiber-optic connections isolate communications from ground potential rise and electrical interference.
- EIA-232 port-powered transceivers communicate serial data up to 110 kilometers.
- Direct connection to DB-9 serial ports requires no special mounting or separate power supply.



Features and Benefits

Flexible, Long-Range Fiber-Optic Communication

Send serial data up to 110 kilometers using single-mode optical fiber with standard ST® connectors. The transceivers offer data rates from 0 to 40,000 bits per second. A selector switch lets you choose between DCE and DTE standard pin configurations, eliminating the need for adapters.

Easy to Apply

Plug the transceivers directly into a standard 9-pin serial connector (DB-9). No special mounting is required. The transceivers receive power from the host device via the connector, so no separate power supply or power wiring is needed. The transceivers transmit continuous light pulses for simple testing with an optical meter.

Increased Data Transfer Reliability

The transceivers provide reliable operation in harsh electrical and physical environments. They are far less susceptible to electromagnetic interference (EMI) and radio frequency interference (RFI) than copper links.

Improved Safety

SEL transceivers are eye-safe, Class 1 laser or LED products. They provide improved isolation from ground potential rise and other electrical hazards compared to copper connections.

Product Overview



Connector caps (not shown) prevent stray light reflections from interfering with communications.

| | | EIA-232 | | | |
|----------------------|---|------------------|-------|------------------|------------------|
| | | PIN | FUNC. | DCE ¹ | DTE ¹ |
| CONNECTED INTERNALLY | 1 | DCD ³ | → | | |
| | 2 | RXD | → | | ← |
| | 3 | TXD | ← | | → |
| | 4 | DTR ³ | ← | | → |
| | 5 | GND | | | |
| | 6 | DSR ³ | → | | ← |
| | 7 | RTS ² | ← | | → |
| | 8 | CTS | → | | ← |
| | 9 | N/C | | | |

← = INPUT TO SEL-2829
 → = OUTPUT FROM SEL-2829

1. THE DCE/DTE SWITCH DETERMINES WHETHER THE SEL-2829 IS A DCE OR DTE DEVICE.
2. RTS MUST BE ACTIVE HIGH.
3. CURRENT LIMITED TO 4mA AT DTR=12Vdc WHEN CONFIGURED AS DCE.

R T

Label With EIA-232 Pin Usage Imprinted on the bottom of the device.

Application Information

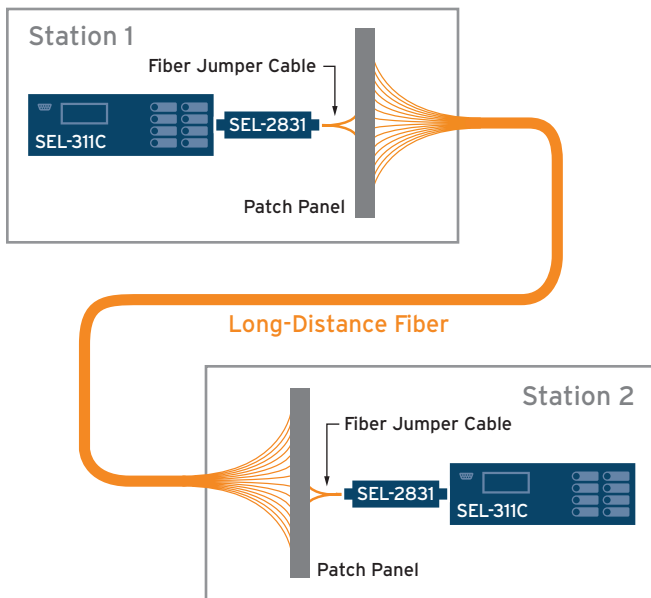
Flexible Distance Options

The SEL-2829, SEL-2830, and SEL-2831 operate with single-mode optical fibers terminated with ST connectors. Select the model that matches the distance required for your application.

| | SEL-2829 | SEL-2830 | SEL-2831 |
|-----------------------|----------|----------|----------|
| Typical distance (km) | 23 | 80 | 110 |
| Wavelength (nm) | 1,300 | 1,300 | 1,550 |

Interstation Teleprotection Example

Connect the transceivers to the EIA-232 port of SEL relays on opposite ends of a protected line, and connect them with two fibers. You can use MIRRORING BITS® communications for teleprotection schemes, including POTT, DCUB, or DCB.



Interstation teleprotection example.

DTE/DCE Switch Selection

A DTE/DCE switch is available on the SEL-2829, SEL-2830, and SEL-2831. It selects whether the transceiver is operating as data terminal equipment (DTE) or as data communications equipment (DCE).

When the transceiver is connected to an SEL relay or communications processor port, the DCE position must be selected.

Determining Maximum Cable Length

The table below shows a distance calculation for an example optical fiber with the following characteristics:

Fiber core diameter..... 9.3 μm
 Connector loss 2 dB/connector
 Splice loss (fusion)..... 0.2 dB/splice
 Fiber loss @ 1300 nm..... 0.4 dB/km
 Fiber loss @ 1550 nm..... 0.3 dB/km

| | SEL-2829 | SEL-2830 | SEL-2831 |
|-------------------------------------|------------|------------|------------|
| Optical budget (dB) | 14.0 | 40.0 | 40.0 |
| Less connector loss (2 x 2 dB) | -4.0 | -4.0 | -4.0 |
| Less splice loss (4 x 0.2 dB) | -0.8 | -0.8 | -0.8 |
| Available power = budget - losses | P=14-4-0.8 | P=40-4-0.8 | P=40-4-0.8 |
| Available power (dB) | 9.2 | 35.2 | 35.2 |
| Length = available power/fiber loss | 9.2/0.4 | 35.2/0.4 | 35.2/0.3 |
| Maximum distance (km) | 23 | 88 | 117 |

Conformal-Coating Option

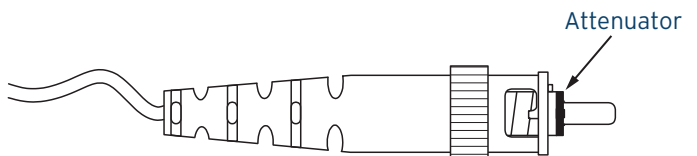
Order the SEL-2829, SEL-2830, or SEL-2831 with optional conformal coating for additional protection against environmental and chemical contaminants.

Depth Restriction Adapter Cables

When mounting depth is an issue, such as in switchgear applications, you can use an SEL-C780, SEL-C641, or SEL-C641R adapter cable.

Fiber-Optic Attenuator Kit

The SEL fiber-optic attenuator kit (SEL part number 91560) is necessary for SEL-2830 and SEL-2831 Fiber-Optic Transceivers in single-mode fiber applications less than 16 km. Every SEL-2830 and SEL-2831 includes an attenuator kit. The kit has four attenuation spacers, enough for two fiber pairs.



SEL-2829/2830/2831 Specifications

General

Projection From DB-9 Connector 12.7 mm (0.5 in) typical, including fiber-optic connector and minimum cable bend radius

Data Rate 0–40,000 bits per second, full duplex, no jumpers or settings

Data Delay 36 μ s plus 5 μ s/km of fiber

| Optical Source | Transceiver | Wavelength and Type | Typical Average Transmit Level |
|----------------|-------------|---------------------------|--------------------------------|
| | SEL-2829 | 1,300 nm (infrared) LED | –27 dBm |
| | SEL-2830 | 1,300 nm (infrared) Laser | –10 dBm |
| | SEL-2831 | 1,550 nm (infrared) Laser | –10 dBm |

Power Requirements Receives power from the transmit-data input pin plus one other power input pin in the DB-9 connector. These SEL single-mode transceivers do not support hardware handshaking. Non-SEL devices should provide at least the current and voltage indicated below.

DCE Pin 3 or DTE Pin 2 (Transmit Data): 11 mA at ± 5.2 Vdc

DCE Pin 4 or DTE Pin 6: 11 mA at -5.2 Vdc

DCE Pin 7 or DTE Pin 8: 11 mA at $+5.2$ Vdc

Transmit Data Power Input

| Pin | Switch Position |
|-----|-----------------|
| 2 | DTE |
| 3 | DCE |

Other Power Input

| Pin | Polarity and Voltage (Vdc) |
|------------|----------------------------|
| 1 | +5 to +10 |
| 4, 6, 7, 8 | ± 5 to ± 10 |

Operating Temperature -40° to $+85^{\circ}$ C (-40° to $+185^{\circ}$ F)

Connectors and Cable ST connectors and SEL-C809 single-mode fiber

Compliance Designed and manufactured under an ISO 9001 certified quality management system
CE Mark
FCC CFR 47 Part 15 Class A



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