PDD1 Passive Data Diode

One-way fibre link from OT to IT, enforced in hardware

PDD1 is a single-channel passive fibre-optic data diode. It connects an SFP port on the OT network to an SFP port on the IT network and allows data to travel in one direction only. A Faraday optical isolator blocks any light sent back from the IT side, so the one-way path does not depend on software, settings or power.

The module sits outside the plant's control and protection functions. It needs no power supply and has nothing to configure or maintain.



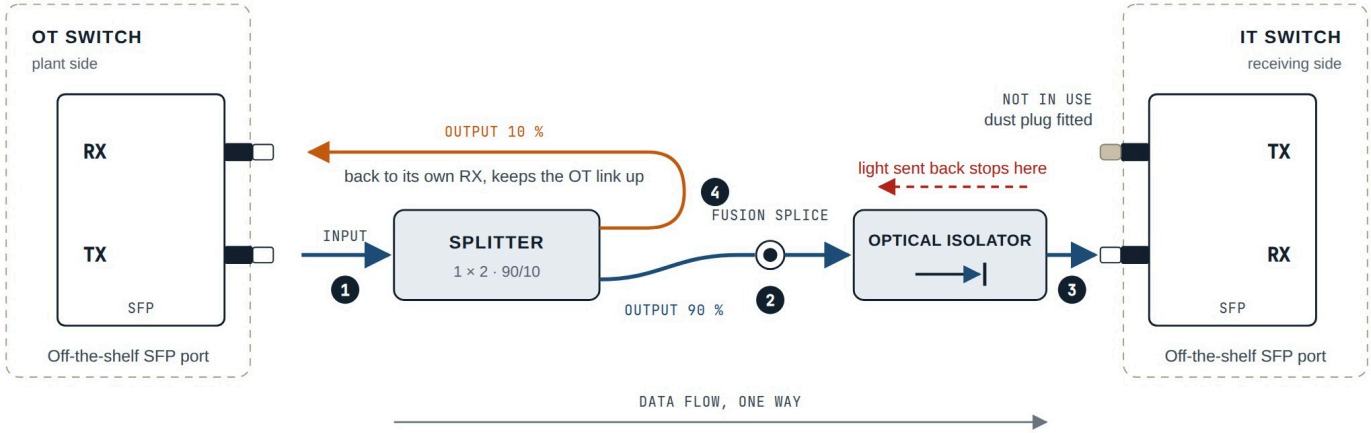
PDD1 module with leads A-TX, A-RX and B-RX

KEY FEATURES

- → **One-way by physics.** The optical isolator stops the return path. No setting can open it.
- → **Fully passive.** No electronics, firmware, power supply or battery.
- → **Standard SFP interfaces.** 1310 nm single-mode optics, LC/UPC leads, on switches, media converters or SFP network cards.
- → **OT link stays up.** 10 % of the OT light returns to the OT receiver, so the sending port sees a normal link.
- → **Gigabit tested.** 942.2 Mbit/s sustained, 175 million frames with zero loss.
- → **Nothing to maintain.** No patching, licensing or updates over the life of the plant.

0 W	**0.78** dB	**942.2** Mbit/s	**0** lost
No power connection, no heat	Typical insertion loss OT → IT	Sustained receive rate in our tests	Of 175 million test frames

HOW IT WORKS



1. **A-TX** OT TX to splitter input, LC/UPC
2. **90 %** Splitter output to isolator, fusion splice
3. **B-RX** Isolator output to IT RX, LC/UPC
4. **A-RX** 10 % back to OT RX, keeps the link up

TYPICAL APPLICATIONS

- → Historian and SCADA data from the plant to business systems
- → Syslog, alarms and events to a security operations centre
- → One-way file and report transfer from OT to IT
- → Remote monitoring without an inbound path to the plant

WORKS WITH EXISTING EQUIPMENT

Unmanaged switch
Any switch with a 1310 nm SFP slot on each side.

Media converter
Copper to SFP, in front of an existing LAN port.

SFP network card
Directly in a server, PC or RTU. No switch needed.

TECHNICAL SPECIFICATIONS

OPTICAL	
Channels	1 one-way channel, OT to IT
Wavelength	1270 to 1350 nm (tested at 1310 nm)
Fibre	Single-mode 9/125 µm (OS2)
Insertion loss	0.78 dB typical
Split ratio	90 % to IT, 10 % back to OT
Reverse direction	Blocked by Faraday optical isolator
Data rate	Set by the SFP optics. No electronics in the path
Compatible optics	1310 nm SM SFP, e.g. 1000BASE-LX
Protocols	Any one-way protocol, e.g. UDP. No acknowledgement path

FIBRE LEADS	
A-TX	OT in, from OT side TX
A-RX	OT link indication, to OT side RX
B-RX	IT out, to IT side RX
Leads	0.3 m, 900 µm buffered fibre, LC/UPC
PHYSICAL AND ENVIRONMENTAL	
Dimensions	100 x 80 x 10 mm (L x W x H)
Housing	ABS, leads exit on the short edge
Mounting	4 notches Ø3.4 mm, pattern 74.6 x 70 mm
Power consumption	0 W, no power connection
Maintenance	None

VERIFIED PERFORMANCE

Results from BM Global engineering verification TR-PDD-003.003 Rev 0, 6 November 2026. PDD1 design between two Linux endpoints with 1000BASE-LX SFP optics, links at 1000 Mbit/s. Load traffic counted at the receiver; files checked by SHA-256.

Test stage	Offered load	Mean receive	Peak 5 s	Frames received	Lost	Result
S08	500 Mbit/s	500.0	501.1	25,000,000	0	PASS
S08A	600 Mbit/s	600.0	601.7	25,000,000	0	PASS
S08B	700 Mbit/s	700.0	700.3	25,000,000	0	PASS
S08C	800 Mbit/s	800.0	800.7	25,000,000	0	PASS
S08D	900 Mbit/s	900.2	908.3	25,000,000	0	PASS
S09	Unthrottled	**942.2**	956.8	50,000,000	0	PASS*
Total, six load stages				**175,000,000**	**0**	

File delivery	Content	Verified	Result
S04, S05	Single objects, 10 KB and 10 MiB	2 / 2 SHA-256 match	PASS
S07	Production file service, 5 x 10 MiB	5 / 5 SHA-256 match	PASS

Mean receive rates in Mbit/s over five-second samples. Zero CRC, RX and FIFO errors and zero transmit packets from the IT endpoint during all load windows. * Integrity pass: every frame arrived. The 942.2 Mbit/s ceiling was the maximum rate of the test sender; no loss was seen at the receiver. Measured frame rates are not a guaranteed application file throughput.

INSTALLATION

1. Connect the OT side SFP port: TX to lead A-TX, RX to lead A-RX.
2. Connect lead B-RX to RX of the IT side SFP port.
3. Leave the IT side TX unconnected and fit its dust cap.
4. Run one-way software on both hosts, for example UDP streams or one-way file transfer.
5. Optional check: send light into lead B-RX and confirm with an optical power meter that none reaches the OT side.

ORDERING INFORMATION

ORDER CODE	DESCRIPTION
BMG-PDD1	PDD1, 1 channel, module
BMG-PDD6-1U	PDD6, 6 channels, 19″ 1U
BMG-PDD12-1U	PDD12, 12 channels, 19″ 1U

Quotes and test units: shop.securertu.com

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