

Why Fend?

Fend protects you from cyberattack by providing physical network segmentation for critical infrastructure. Fend's products are:

- Made in the USA
- Sold with all protocols and software included, no extra licenses required
- Compatible with our optional Fend Cloud service

Tested by

US Army TSMO • Intertek
National Cyber Range
US Navy CSTB • GSA
USACE ERDC-CERL
SERDP-ESTCP

Fend Product Advantages

Fend Hardware



- Transmit data in a physically-enforced, one-way fashion.
- Send files between segmented networks using FTP and TCP/IP
- Stream industrial Modbus or BACnet data
- Convert legacy industrial data to modern JSON formats
- Connect to equipment without external servers or software
- Send data via Ethernet, serial RS485, or cellular.

Fend Cloud



- Obtain data feeds previously out of reach due to cybersecurity concerns
- Rapidly bring equipment into the industrial IoT
- Send data securely to Fend's cloud-based platform
- Monitor the status of your diodes remotely via Fend's web-based app
- Connect with third-party analytics providers using Fend's API

Codes

DUNS: 080992384 • CAGE: 80LY7 • NAICS: 541715, 334210 • RISE OTA Member

Ready to protect your infrastructure with Fend?

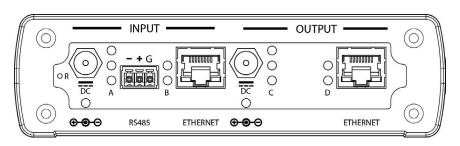
Learn more at www.fend.tech or write info@fend.tech

TECHNICAL INFORMATION

Fend Diode XE15

Fend's patented hardware was designed from the ground up for industrial and rugged applications needing an affordable, stable, easy-to-use solution that physically keeps attackers away from protected networks and equipment. The following table describes Fend's diode design specifications:

Specifications (Model FD-15M-SE1-XE2-B4 / Ethernet)



	Maximum data throughput ¹	15.0 Mbps	Δ
	Dimensions (L x W x H), inches	5.1 x 5.8 x 1.6	
	Operating voltage	12-48VDC, 1.5A max	Δ
	Provided power supplies	100-240VAC 1.0A in, 12VDC 1.5A out ²	F
	Diode power consumption (max)	4.0 W	F
	Design operating temperature range	-30C to +70C	C
	Designed and manufactured	USA	С
			Е
	Connections:		C
	Inputs	DC Barrel Jack (O.D. 5.5mm, I.D. 2.1mm, L 9.5mm, Center Positive Polarity)	F 9
		Ethernet RJ-45	
		Serial RS-485 Combicon MC connector	1
	Outputs	DC Barrel Jack (O.D. 5.5mm, I.D. 2.1mm, L 9.5mm, Center Positive Polarity)	2
		Ethernet RJ-45	0
	Protocols supported:3	FTP/FTPS ⁴	3
		TCP/UDP	4
		Modbus Serial, Modbus TCP	5
		BACnet-MSTP, BACnet-IP	
		LON-IP	
		MQTT (Fend Cloud on AWS) ⁵	

Additional Features:

Denial of service (DOS) protection

Anti-Tamper protection

Power loss / fluctuation protection

Factory or field configurable

Optional secure hosting of data in AWS cloud

ETL Listed (US, EU, Canada)

CE, RoHS

Full optical isolation with independent grounding of each side of the diode

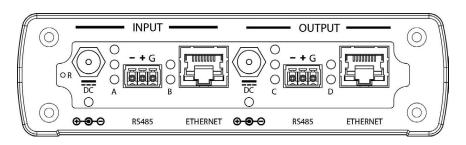
- 1 Data throughput may vary based on protocol and application. Supported serial baud rates: 9600, 19200, 36400, 57600, 115200.
- 2 Customer can provide their own power supply as long as the output meets the input ratings of the diode. The Fend Data Diode is designed to be installed in industrial settings such as equipment rooms, control rooms, and IT closets where only adults are normally present.
- 3 See detailed protocol chart for full list of supported input and output protocols.
- 4 Supports Linux and Windows. Tested with Windows and Linux native FTP, WinSCP, XLReporter, and CoreFTP
- 5 Requires subscription to Fend Cloud service.

TECHNICAL INFORMATION

Fend Diode SE15

Fend's patented hardware was designed from the ground up for industrial and rugged applications needing an affordable, stable, easy-to-use solution that physically keeps attackers away from protected networks and equipment. The following table describes Fend's diode design specifications:

Specifications (Model FD-15M-SE1-SE2-B4 / Ethernet + Serial)



Dimensions (L x W x H), inches Operating voltage 12-48VDC, 1.5A max Anti-Tamper protection 100-240VAC 1.0A in, 12VDC 1.5A out ² Power loss / fluctuation Pactory or field configu Optional secure hosting cloud ETL Listed (US, EU, Ca Connections: Inputs DC Barrel Jack (O.D. 5.5mm, I.D. 2.1mm, L 9.5mm, Center Positive Polarity) Ethernet RJ-45 Serial RS-485 Combicon MC connector Protocols supported: ³ Protocols supported: ³ Denial of service (DOS) Anti-Tamper protection Power loss / fluctuation Power loss / fluctuat	Maximum data throughput ¹	15.0 Mbps	Additional Features:
Provided power supplies Diode power consumption (max) Design operating temperature range Designed and manufactured DC Barrel Jack (O.D. 5.5mm, I.D. 2.1mm, L 9.5mm, Center Positive Polarity) Ethernet RJ-45 Serial RS-485 Combicon MC connector DC Barrel Jack (O.D. 5.5mm, I.D. 2.1mm, L 9.5mm, Center Positive Polarity) Ethernet RJ-45 Serial RS-485 Combicon MC connector DC Barrel Jack (O.D. 5.5mm, I.D. 2.1mm, L 9.5mm, Center Positive Polarity) Ethernet RJ-45 Serial RS-485 Combicon MC connector Protocols supported:3 Protocols supported:3 Protocols supported:3 TCP/UDP Modbus Serial, Modbus TCP BACnet-MSTP, BACnet-IP LON-IP Power loss / fluctuation Factory or field configu Optional secure hosting Coptional secure hosting Column Column Tall Listed (US, EU, Ca Coe, RoHS Full optical isolation with grounding of each side 19200, 38400, 57600, 1152 2 Customer can provide their long as the output may vary be application. Supported series 19200, 38400, 57600, 152 2 Customer can provide their long as the output meets the long as	Dimensions (L x W x H), inches	5.1 x 5.8 x 1.6	Denial of service (DOS)
Diode power consumption (max) Design operating temperature range Designed and manufactured USA Connections: Inputs DC Barrel Jack (O.D. 5.5mm, I.D. 2.1mm, L 9.5mm, Center Positive Polarity) Ethernet RJ-45 Serial RS-485 Combicon MC connector DC Barrel Jack (O.D. 5.5mm, I.D. 2.1mm, L 9.5mm, Center Positive Polarity) Ethernet RJ-45 Serial RS-485 Combicon MC connector DC Barrel Jack (O.D. 5.5mm, I.D. 2.1mm, L 9.5mm, Center Positive Polarity) Ethernet RJ-45 Serial RS-485 Combicon MC connector Protocols supported: Protocols supported: TCP/UDP Modbus Serial, Modbus TCP BACnet-MSTP, BACnet-IP LON-IP Factory or field configur Optional secure hosting cloud ETL Listed (US, EU, Cannell Connector Center) Ce, RoHS Full optical isolation with grounding of each side of application. Supported serial paper and serial setting on serial protocol chart input and output protocols. Supports Linux and Window and Linux native FTP, WinSC CoreFTP. 5 Requires subscription to Fellow- 1 Data throughput may vary to application. Supported serial paper and adults are normally present. See detailed protocol chart input and output protocols. Supports Linux and Window and Linux native FTP, WinSC CoreFTP. 5 Requires subscription to Fellow- 1 Data throughput may vary to application. Supported serial paper and adults are normally present. See detailed protocol chart input and output protocols. Supports Linux and Window and Linux native FTP, WinSC CoreFTP. 5 Requires subscription to Fellow- 1 Data throughput may vary to application. Supported serial paper and adults are normally present. See detailed protocol chart input and output protocols. Supports Linux and Window and Linux native FTP, WinSC CoreFTP. 5 Requires subscription to Fellow- 1 Data throughput may vary to application. Supported serial paper and adults are normally present. S	Operating voltage	12-48VDC, 1.5A max	Anti-Tamper protection
Design operating temperature range Designed and manufactured USA Connections: Inputs DC Barrel Jack (O.D. 5.5mm, I.D. 2.1mm, L 9.5mm, Center Positive Polarity) Ethernet RJ-45 Serial RS-485 Combicon MC connector DC Barrel Jack (O.D. 5.5mm, I.D. 2.1mm, L 9.5mm, Center Positive Polarity) Ethernet RJ-45 Serial RS-485 Combicon MC connector DC Barrel Jack (O.D. 5.5mm, I.D. 2.1mm, L 9.5mm, Center Positive Polarity) Ethernet RJ-45 Serial RS-485 Combicon MC connector FTP/FTPS4 TCP/UDP Modbus Serial, Modbus TCP BACnet-MSTP, BACnet-IP LON-IP Optional secure hosting cloud ETL Listed (US, EU, Cate Color Color Cell Color Co	Provided power supplies	100-240VAC 1.0A in, 12VDC 1.5A out ²	Power loss / fluctuation
Designed and manufactured USA Connections: Inputs DC Barrel Jack (O.D. 5.5mm, I.D. 2.1mm, L 9.5mm, Center Positive Polarity) Ethernet RJ-45 Serial RS-485 Combicon MC connector DC Barrel Jack (O.D. 5.5mm, I.D. 2.1mm, L 9.5mm, Center Positive Polarity) DC Barrel Jack (O.D. 5.5mm, I.D. 2.1mm, L 9.5mm, Center Positive Polarity) Ethernet RJ-45 Serial RS-485 Combicon MC connector Positive Polarity) Ethernet RJ-45 Serial RS-485 Combicon MC connector Serial RS-485 Combicon MC connector FTP/FTPS4 TCP/UDP Modbus Serial, Modbus TCP BACnet-MSTP, BACnet-IP LON-IP	Diode power consumption (max)	4.0 W	Factory or field configu
Connections: Inputs DC Barrel Jack (O.D. 5.5mm, I.D. 2.1mm, L 9.5mm, Center Positive Polarity) Ethernet RJ-45 Serial RS-485 Combicon MC connector DC Barrel Jack (O.D. 5.5mm, I.D. 2.1mm, L 9.5mm, Center Positive Polarity) Ethernet RJ-45 Serial RS-485 Combicon MC connector DC Barrel Jack (O.D. 5.5mm, I.D. 2.1mm, L 9.5mm, Center Positive Polarity) Ethernet RJ-45 Serial RS-485 Combicon MC connector Protocols supported: Protocols supported: FTP/FTPS4 TCP/UDP Modbus Serial, Modbus TCP BACnet-MSTP, BACnet-IP LON-IP ETL Listed (US, EU, Cac CE, RoHS Full optical isolation with grounding of each side ground	Design operating temperature range	-30C to +70C	· ·
Connections: Inputs DC Barrel Jack (O.D. 5.5mm, I.D. 2.1mm, L 9.5mm, Center Positive Polarity) Ethernet RJ-45 Serial RS-485 Combicon MC connector DC Barrel Jack (O.D. 5.5mm, I.D. 2.1mm, L 9.5mm, Center Positive Polarity) Ethernet RJ-45 Serial RS-485 Combicon MC connector 2.1 Data throughput may vary be application. Supported serie 19200, 3400, 57600, 1152 2.2 Customer can provide their long as the output meets the diode. The Fend Data Diode installed in industrial setting rooms, control rooms, and I adults are normally present. 3 See detailed protocol chart input and output protocols. 4 Supports Linux and Window and Linux native FTP, WinSC CoreFTP. 5 Requires subscription to Fe BACnet-MSTP, BACnet-IP LON-IP	Designed and manufactured	USA	cloud
Inputs DC Barrel Jack (O.D. 5.5mm, I.D. 2.1mm, L 9.5mm, Center Positive Polarity) Ethernet RJ-45 Serial RS-485 Combicon MC connector DC Barrel Jack (O.D. 5.5mm, I.D. 2.1mm, L 9.5mm, Center Positive Polarity) Ethernet RJ-45 Serial RS-485 Combicon MC connector Polarity) Ethernet RJ-45 Serial RS-485 Combicon MC connector Protocols supported: Full optical isolation with grounding of each side 1 Data throughput may vary be application. Supported serial application. Sup			ETL Listed (US, EU, Ca
DC Barrel Jack (O.D. 5.5nm, I.D. 2.1mm, L 9.5mm, Center Positive Polarity) Ethernet RJ-45 Serial RS-485 Combicon MC connector DC Barrel Jack (O.D. 5.5mm, I.D. 2.1mm, L 9.5mm, Center Positive Polarity) Ethernet RJ-45 Serial RS-485 Combicon MC connector Protocols supported: Protocols supported: Protocols supported: TCP/UDP Modbus Serial, Modbus TCP BACnet-MSTP, BACnet-IP LON-IP Grounding of each side application. Supported serial papers, 1500, 1152 2 Customer can provide their long as the output meets the diode. The Fend Data Diode installed in industrial setting rooms, control rooms, and I adults are normally present. 3 See detailed protocol chart input and output protocols. 4 Supports Linux and Window and Linux native FTP, WinSC CoreFTP. 5 Requires subscription to Fe	Connections:		CE, RoHS
Serial RS-485 Combicon MC connector Outputs DC Barrel Jack (O.D. 5.5mm, I.D. 2.1mm, L 9.5mm, Center Positive Polarity) Ethernet RJ-45 Serial RS-485 Combicon MC connector Protocols supported:3 FTP/FTPS ⁴ TCP/UDP Modbus Serial, Modbus TCP BACnet-MSTP, BACnet-IP LON-IP 1 Data throughput may vary ba application. Supported seria 19200, 36400, 57600, 11520 2 Customer can provide their 19200, 36400, 57600, 11520 2 Customer can provide their 19200, 36400, 57600, 11520 2 Customer can provide their 19200, 36400, 57600, 11520 2 Customer can provide their 19200, 36400, 57600, 11520 2 Customer can provide their 19200, 36400, 57600, 11520 2 Customer can provide their 19200, 36400, 57600, 11520 2 Customer can provide their 19200, 36400, 57600, 11520 3 See detailed protocol chart input and output protocols. 4 Supports Linux and Window and Linux native FTP, WinSC CoreFTP. 5 Requires subscription to Fe	Inputs	2.1mm, L 9.5mm, Center Positive	•
Serial RS-485 Combicon MC connector DC Barrel Jack (O.D. 5.5mm, I.D. 2.1mm, L 9.5mm, Center Positive Polarity) Ethernet RJ-45 Serial RS-485 Combicon MC connector Protocols supported:³ FTP/FTPS4 TCP/UDP Modbus Serial, Modbus TCP BACnet-MSTP, BACnet-IP LON-IP Serial RS-485 Combicon MC connector Positive Positive Positive Positive Positive Polarity (O.D. 5.5mm, I.D. 2 Customer can provide their long as the output meets the diode. The Fend Data Diode installed in industrial setting rooms, control rooms, and I adults are normally present. See detailed protocol chart input and output protocols. 4 Supports Linux and Window and Linux native FTP, WinSC CoreFTP. 5 Requires subscription to Fe		Ethernet RJ-45	application. Supported seria 19200, 36400, 57600, 115200 Customer can provide their long as the output meets the diode. The Fend Data Diode installed in industrial setting rooms, control rooms, and I adults are normally present.
Outputs DC Barrel Jack (O.D. 5.5mm, I.D. 2.1mm, L 9.5mm, Center Positive Polarity) Ethernet RJ-45 Serial RS-485 Combicon MC connector Protocols supported:3 FTP/FTPS ⁴ TCP/UDP Modbus Serial, Modbus TCP BACnet-MSTP, BACnet-IP LON-IP 2 Customer can provide their long as the output meets the diode. The Fend Data Diode installed in industrial setting rooms, control rooms, and I adults are normally present. 3 See detailed protocol chart input and output protocols. 4 Supports Linux and Window and Linux native FTP, WinSC CoreFTP. 5 Requires subscription to Fe		Serial RS-485 Combicon MC connector	
Ethernet RJ-45 Serial RS-485 Combicon MC connector Protocols supported: FTP/FTPS4 TCP/UDP Modbus Serial, Modbus TCP BACnet-MSTP, BACnet-IP LON-IP adults are normally present. See detailed protocol chart input and output protocols. 4 Supports Linux and Window and Linux native FTP, WinSC CoreFTP. 5 Requires subscription to Fe	Outputs	2.1mm, L 9.5mm, Center Positive	
Serial RS-485 Combicon MC connector FTP/FTPS ⁴ TCP/UDP Modbus Serial, Modbus TCP BACnet-MSTP, BACnet-IP LON-IP Serial RS-485 Combicon MC connector input and output protocols. Supports Linux and Window and Linux native FTP, WinSC CoreFTP. FRequires subscription to Fe		Ethernet RJ-45	
Protocols supported: ³ FTP/FTPS ⁴ TCP/UDP Modbus Serial, Modbus TCP BACnet-MSTP, BACnet-IP LON-IP		Serial RS-485 Combicon MC connector	input and output protocols.
TCP/UDP Modbus Serial, Modbus TCP BACnet-MSTP, BACnet-IP LON-IP	Protocols supported:3	FTP/FTPS ⁴	and Linux native FTP, WinSC
BACnet-MSTP, BACnet-IP LON-IP		TCP/UDP	
LON-IP		Modbus Serial, Modbus TCP	
		BACnet-MSTP, BACnet-IP	
MOTT (Ford Olevel en AM/O)5		LON-IP	
IVIQTT (Fend Cloud on AVVS)		MQTT (Fend Cloud on AWS) ⁵	

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ith independent e of the diode

- based on protocol and rial baud rates: 9600, 200.
- ir own power supply as he input ratings of the de is designed to be gs such as equipment IT closets where only
- rt for full list of supported
- ws. Tested with Windows CP, XLReporter, and
- end Cloud service.

TECHNICAL INFORMATION

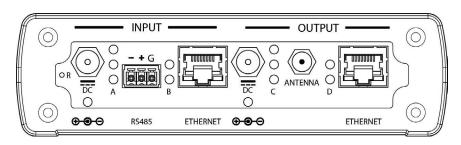
15 0 Mhnc

Fend Diode CE15

Maximum data throughout

Fend's patented hardware was designed from the ground up for industrial and rugged applications needing an affordable, stable, easy-to-use solution that physically keeps attackers away from protected networks and equipment. The following table describes Fend's diode design specifications:

Specifications (Model FD-15M-SE1-CE2-B4 / Ethernet + Cellular)



Additional Foatures

Maximum data throughput ¹	15.0 Mbps	Additional Features:	
Dimensions (L x W x H), inches	5.1 x 5.8 x 1.6	Denial of service (DOS) protection	
Operating voltage	12-48VDC, 1.5A max	Anti-Tamper protection	
Provided power supplies	100-240VAC 1.0A in, 12VDC 1.5A out ²	Power loss / fluctuation protection	
Diode power consumption (max)	8.0 W	Factory or field configurable	
Design operating temperature range	-30C to +70C	Optional secure hosting of data in AWS cloud	
Designed and manufactured	USA		
		ETL Listed (US, EU, Canada)	
Connections:		CE, RoHS	
Inputs	DC Barrel Jack (O.D. 5.5mm, I.D. 2.1mm, L 9.5mm, Center Positive Polarity)	Full optical isolation with independent grounding of each side of the diode	
	Ethernet RJ-45		
	Serial RS-485 Combicon MC connector	1 Data throughput may vary based on protocol and application. Supported serial baud rates: 9600, 19200, 36400, 57600, 115200.	
Outputs	DC Barrel Jack (O.D. 5.5mm, I.D. 2.1mm, L 9.5mm, Center Positive Polarity)	2 Customer can provide their own power supply as long as the output meets the input ratings of the diode. The Fend Data Diode is designed to be installed in industrial settings such as equipment rooms, control rooms, and IT closets where only	
	Ethernet RJ-45	adults are normally present.	
	4G cellular LTE modem (Verizon / AT&T)	3 See detailed protocol chart for full list of supported input and output protocols.	
Protocols supported:3	FTP/FTPS ⁴	4 Supports Linux and Windows. Tested with Windows and Linux native FTP, WinSCP, XLReporter, and	
	TCP/UDP	CoreFTP. 5 Requires subscription to Fend Cloud service.	
	Modbus Serial, Modbus TCP		
	BACnet-MSTP, BACnet-IP		
	LON-IP		
	MQTT (Fend Cloud on AWS) ⁵	© Fend Inc. 2023	

DATA DIODES PROTECT

Critical Infrastructure

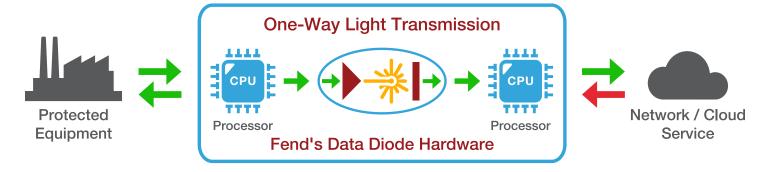
The Problem

Attackers continue to show an ability to stay one step ahead of traditional cybersecurity defenses, disabling critical equipment, injecting ransomware, and stealing sensitive information. Legacy solutions fall short. **You deserve better protection than:**

- Firewalls whose patches prepare you for yesterday's war
- Air gaps that keep you in the dark and invite mistakes
- Intrusion detection systems that alert you after it's too late

The Solution

Fend safely transmits data in a physically-enforced one-way fashion.



How do data diodes work?

One-way communication diodes send data in only one direction using light. All inbound traffic is stopped by the diode. Hackers cannot physically reach your network or protected equipment.

Who depends on Fend today?

- Manufacturers
- Oil and Gas
- Water Treatment
- Electric Infrastructure

