

# ICF-1170I Series

## Industrial CAN-to-fiber converters



### Features and Benefits

- Transmits data up to 2 km over optical fiber
- Converts CAN signals to fiber and fiber to CAN signals
- Baudrate up to 1 Mbps
- Dual power inputs for redundancy
- DIP switch for 120 ohm terminal resistance
- DIP switch for fiber test mode
- LEDs for Fiber Tx, Fiber Rx, Power 1, Power 2
- Wide-temperature model available for -40 to 85°C environments
- Fully compatible with the ISO 11898 standard

### Certifications



## Introduction

The ICF-1170I Series CAN-to-fiber converters are used to convert CAN signals from copper to optical fiber. The converters come with 2 kV optical isolation for the CAN bus system and dual power inputs with alarm contact relay to ensure that your CAN bus system will remain online.

### Fiber Test Mode

Fiber Test Mode can be used to test the fiber cable between two ICF-1170I units, and it provides a simple way to determine if the fiber cable is transmitting data correctly. When in Fiber Test Mode, the fiber transceiver (Tx) will continuously send out a data signal and the Fiber Tx LED will light up. On the other side of the connection, when the ICF-1170I fiber transceiver (Rx) receives the data signal from the Tx side, the Fiber Rx LED will light up.

## Specifications

### Serial Interface

#### Optical Fiber

#### ICF-1170I-M-ST: 100BaseFX ports (multi-mode ST connector)

Low-Speed Fiber Module		Multi-Mode
Fiber Cable Requirements		50/125 μm, 800 MHz
Fiber Cable Requirements		62.5/125 μm, 500 MHz
Typical Distance		5 km
Wavelength	Typical (nm)	850
	TX Range (nm)	840 to 860
	RX Range (nm)	800 to 900
Optical Power	TX Range (dBm)	0 to -5
	RX Range (dBm)	0 to -20
	Link Budget (dB)	15
	Dispersion Penalty (dB)	1

## CAN Interface

Isolation	2 kV (built-in)
No. of Ports	1
Signals	CAN_L, CAN_H, CAN Signal GND
Terminator	N/A, 120 ohms (by DIP)

## Power Parameters

Input Current	221 mA @ 12 VDC
Power Consumption	221 mA @ 12 VDC
Input Voltage	12 to 48 VDC
No. of Power Inputs	2
Overload Current Protection	Supported
Power Connector	Terminal block (for DC models)

## Physical Characteristics

Housing	Metal
IP Rating	IP30
Dimensions	30.3 x 70 x 115 mm (1.19 x 2.76 x 4.53 in)
Weight	178 g (0.39 lb)
Installation	DIN-rail mounting

## Environmental Limits

Operating Temperature	ICF-1170I-M-ST: 0 to 60°C (32 to 140°F) ICF-1170I-M-ST-T: -40 to 85°C (-40 to 185°F)
Storage Temperature (package included)	-40 to 85°C (-40 to 185°F)
Ambient Relative Humidity	5 to 95% (non-condensing)

## Standards and Certifications

EMC	EN 55032/24
EMI	CISPR 32, FCC Part 15B Class A
EMS	IEC 61000-4-2 ESD: Contact: 8 kV; Air: 15 kV IEC 61000-4-3 RS: 80 MHz to 1 GHz: 3 V/m IEC 61000-4-4 EFT: Power: 4 kV; Signal: 2 kV IEC 61000-4-5 Surge: Power: 2 kV; Signal: 1 kV IEC 61000-4-6 CS: 150 kHz to 80 MHz: 3 V/m; Signal: 3 V/m IEC 61000-4-8 PFMF
Environmental Testing	IEC 60068-2-1 IEC 60068-2-2 IEC 60068-2-3
Safety	EN 60950-1, IEC 60950-1
Vibration	IEC 60068-2-6

## MTBF

Time	792,085 hrs
Standards	Telcordia (Bellcore), GB

## Warranty

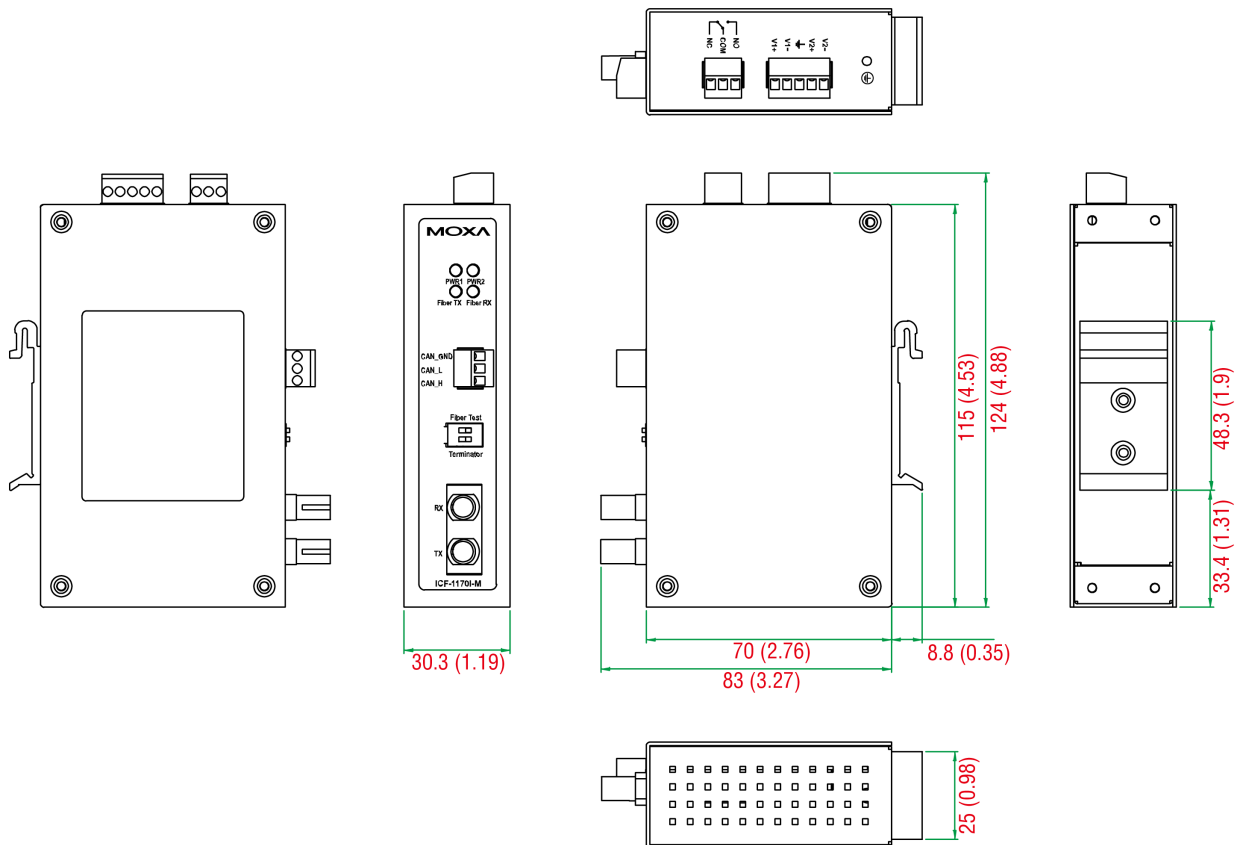
Warranty Period	5 years
Details	See <a href="http://www.moxa.com/warranty">www.moxa.com/warranty</a>

## Package Contents

Device	1 x ICF-1170I Series converter
Documentation	1 x quick installation guide 1 x warranty card

## Dimensions

Unit: mm (inch)



## Ordering Information

Model Name	Operating Temp.
ICF-1170I-M-ST	0 to 60°C
ICF-1170I-M-ST-T	-40 to 85°C

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# ICF-1180I Series

## Industrial PROFIBUS-to-fiber converters



### Features and Benefits

- Fiber-cable test function validates fiber communication
- Auto baudrate detection and data speed of up to 12 Mbps
- PROFIBUS fail-safe prevents corrupted datagrams in functioning segments
- Fiber inverse feature
- Warnings and alerts by relay output
- 2 kV galvanic isolation protection
- Dual power inputs for redundancy (Reverse power protection)
- Extends PROFIBUS transmission distance up to 45 km
- Wide-temperature model available for -40 to 75°C environments
- Supports Fiber Signal Intensity Diagnosis

### Certifications



## Introduction

The ICF-1180I industrial PROFIBUS-to-fiber converters are used to convert PROFIBUS signals from copper to optical fiber. The converters are used to extend serial transmission up to 4 km (multi-mode fiber) or up to 45 km (single-mode fiber). The ICF-1180I provides 2 kV isolation protection for the PROFIBUS system and dual power inputs to ensure that your PROFIBUS device will perform uninterrupted.

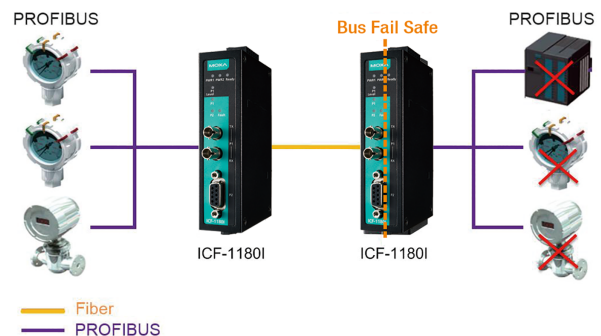
### Fiber Cable Test Function

Fiber-optic cables are usually deployed for long-distance communication. To ensure proper communication across the fiber-optic cables, engineers use fiber sensors. A fiber cable test function through DIP switch adjustments helps ICF-1180I converters eliminate the need to rely on fiber-optic sensors.

This function not only detects fiber communication abnormalities but also validates the format of the received packet. It can also determine which side (Tx or Rx) is causing the problem.

### PROFIBUS Fail-Safe

When the PROFIBUS device malfunctions or the serial interface fails, it will generate electrical noise, resulting in bus failure. Traditional media converters will let the noise signal pass through the fiber and on to the other converter. This will disrupt data transmissions between the two buses and eventually communication ceases across the entire system. When this occurs, the engineer will not be able to easily locate the failed device because the entire PROFIBUS network is down. To avoid this situation, the ICF-1180I was designed to detect and recognize noise signals. If the bus fails on one side, the noise signal will not propagate through the ICF-1180I and affect additional bus segments. In addition, the ICF-1180I will also trigger an alarm notification to the field engineer on the location of the failure.



### Auto/Manual Baudrate Settings

The ICF-1180I Series simply converts the signal back and forth between PROFIBUS and fiber. The ICF-1180I Series works under baudrates between 9.6 kbps to 12 Mbps. Engineers do not need to know the baudrate of the connected PROFIBUS device.

The ICF-1180I Series can automatically detect the baudrate of the PROFIBUS device and apply this baudrate directly. This is an extremely convenient feature. If necessary, baudrates can be set to a fixed value via DIP switches.

### Fiber Inverse Function

The ICF-1180I provides a fiber inverse function to choose fiber-optic light ON or light OFF when sending logic signal '1'. For default settings, fiber-optic is light OFF when sending logic signal '1'; in Fiber Inverse mode, fiber-optic is light ON when sending logic signal '1'.

This feature provides greater compatibility when the ICF-1180I converter is integrated with PROFIBUS converters of other manufacturers. Please refer to third-party user manuals when using this feature.

## Fiber Link Monitor

The ICF-1180I converters provide a fiber link monitor function to detect the communication errors on either the fiber side or PROFIBUS side. Once there is an error in communication, the corresponding LED will turn red, and the relay alarm will be activated.

## Fiber Signal Intensity Diagnosis

In some circumstances, you may need to measure the reception level of the fiber-optic port with a voltmeter, which can be connected while the device is operating (doing so will not affect data transmission). The measurement can be taken with a voltmeter and read on a PLC that uses floating high impedance analog inputs, which allow you to do the following:

- Record the incoming optical power for later measurement (e.g., to indicate aging or damage).
- Carry out a good/bad test (limit value).

## Specifications

### Serial Interface

Connector	ICF-1180I-M-ST: Multi-mode ST connector ICF-1180I-M-ST-T: Multi-mode ST connector ICF-1180I-S-ST: Single-mode ST connector ICF-1180I-S-ST-T: Single-mode ST connector		
Optical Fiber		Multi-Mode	Single-Mode
	Wavelength	820 nm	1310 nm
	Tx Output	-14 dBm	-7 dBm
	Rx Sensitivity	-28 dBm	-29 dBm
	Link Budget	14 dBm	21 dBm
	Typical Distance	4 km	45 km

### PROFIBUS Interface

Industrial Protocols	PROFIBUS DP
No. of Ports	1
Connector	DB9 female
Baudrate	9600 bps to 12 Mbps
Isolation	2 kV (built-in)
Signals	PROFIBUS D+, PROFIBUS D-, RTS, Signal Common, 5V

### Power Parameters

Input Current	221 mA @ 12 VDC
Input Voltage	12 to 48 VDC
No. of Power Inputs	2
Overload Current Protection	Supported
Power Connector	Terminal block (for DC models)
Power Consumption	221 mA @ 12 VDC

### Physical Characteristics

Housing	Metal
IP Rating	IP30

Dimensions	30.3 x 115 x 70 mm (1.19 x 4.53 x 2.76 in)
Weight	180 g (0.39 lb)
Installation	DIN-rail mounting (with optional kit), Wall mounting

#### Environmental Limits

Operating Temperature	Standard Models: 0 to 60°C (32 to 140°F) Wide Temp. Models: -40 to 75°C (-40 to 167°F) 0 to 60°C (32 to 140°F) -40 to 75°C (-40 to 167°F) 0 to 60°C (32 to 140°F) -40 to 75°C (-40 to 167°F)
Storage Temperature (package included)	-40 to 85°C (-40 to 185°F)
Ambient Relative Humidity	5 to 95% (non-condensing)

#### Standards and Certifications

EMC	EN 55032/24
EMI	CISPR 32, FCC Part 15B Class A
EMS	IEC 61000-4-2 ESD: Contact: 6 kV; Air: 8 kV IEC 61000-4-3 RS: 80 MHz to 1 GHz: 3 V/m IEC 61000-4-4 EFT: Power: 2 kV; Signal: 2 kV IEC 61000-4-5 Surge: Power: 2 kV; Signal: 2 kV IEC 61000-4-6 CS: 150 kHz to 80 MHz: 10 V/m; Signal: 10 V/m IEC 61000-4-8 PFMF
Environmental Testing	IEC 60068-2-1 IEC 60068-2-2 IEC 60068-2-3
Hazardous Locations	ATEX, Class I Division 2, IECEx
Safety	EN 60950-1, IEC 60950-1
Vibration	IEC 60068-2-6

#### MTBF

Time	1,722,769 hrs
Standards	Telcordia (Bellcore), GB

#### Warranty

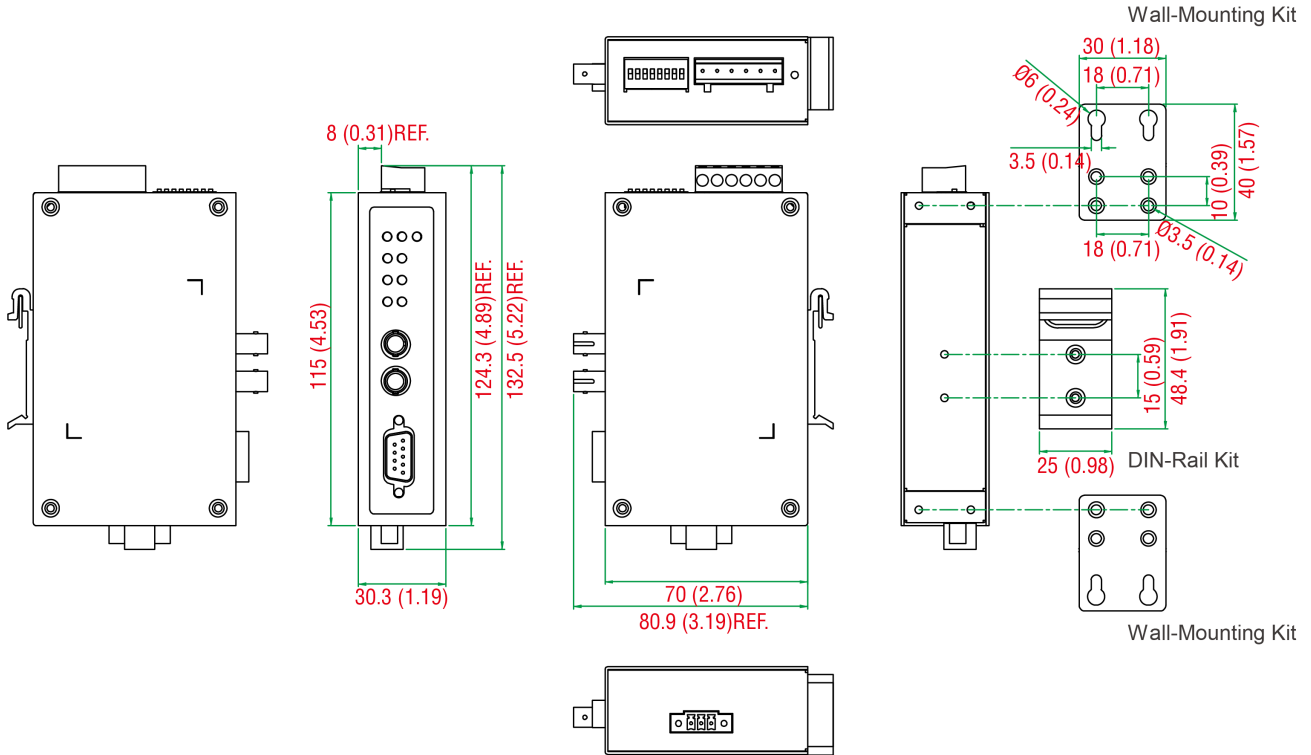
Warranty Period	5 years
Details	See <a href="http://www.moxa.com/warranty">www.moxa.com/warranty</a>

#### Package Contents

Device	1 x ICF-1180I Series converter
Documentation	1 x quick installation guide 1 x warranty card

## Dimensions

Unit: mm (inch)



## Ordering Information

Model Name	Operating Temp.	Fiber Module Type
ICF-1180I-M-ST	0 to 60°C	Multi-mode ST
ICF-1180I-S-ST	0 to 60°C	Single-mode ST
ICF-1180I-M-ST-T	-40 to 75°C	Multi-mode ST
ICF-1180I-S-ST-T	-40 to 75°C	Single-mode ST

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# ICF-1280I Series

## Industrial PROFIBUS-to-fiber converters with redundant fiber ring



### Features and Benefits

- Redundant fiber ring with zero recovery time
- Examines network-wide fiber communication from a single converter
- Auto baudrate detection and data speed of up to 12 Mbps
- PROFIBUS fail-safe prevents corrupted datagrams in functioning segments
- Alarm by relay output
- 2 kV galvanic isolation protection
- Dual power inputs for redundancy
- Extends PROFIBUS transmission distance up to 45 km
- Wide-temperature model available for -40 to 75°C environments
- Supports Fiber Signal Intensity Diagnosis

### Certifications



## Introduction

The ICF-1280I industrial PROFIBUS-to-fiber converters are used to convert PROFIBUS signals from copper to optical fiber. The converters are used to extend serial transmission up to 4 km (multi-mode fiber) or up to 45 km (single-mode fiber). The ICF-1280I Series provides 2 kV isolation protection for the PROFIBUS system and dual power inputs to ensure that your PROFIBUS device will perform uninterrupted.

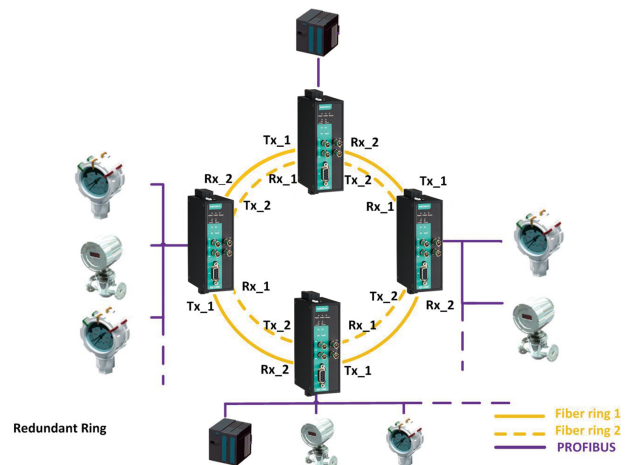
### Remote Fiber Diagnosis

Optical fiber cables are often deployed for long-distance communication and a fiber-optic inspection pen is used by engineers to ensure proper communication quality of the fiber cable. The ICF-1280I Series eliminates the need for a fiber-optic inspection pen by providing a Remote Fiber Diagnosis function that uses DIP switch adjustments.

There are two major functions provided by Remote Fiber Diagnosis: (1) determining which side (Tx or Rx) is causing the problem on the converter; (2) examining the fiber connections for the overall topology from any individual converter. Fiber cable abnormalities can be automatically detected and identified by the LED indicator even if it is not adjacent to the converter. Remote Fiber Diagnosis facilitates fiber cable deployment and management, and also significantly shortens troubleshooting time by examining fiber connections for the overall topology from any individual converter.

### Redundant Ring

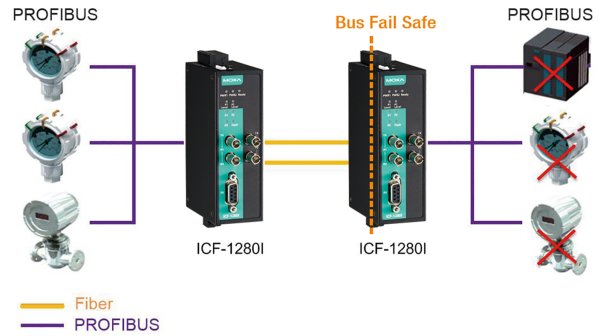
The ICF-1280I Series of converters can connect PROFIBUS devices in a redundant fiber ring topology. Use the DIP switch to configure all the ICF-1280I converters to redundant ring mode. When a PROFIBUS master transmits a signal from one converter to the PROFIBUS slave devices, this signal will travel to all the converters around the ring until it returns to the original converter and terminate. The redundant ring structure ensures no packet loss with zero recovery time.





## PROFIBUS Fail-safe

Electrical noise may be generated when a PROFIBUS device malfunctions or the serial interface fails, resulting in bus failure. Traditional media converters transmit noise signals through the fiber wire to the other converter. This not only disrupts data communication between the two buses, but will also bring communication across the entire system to a halt. When this occurs, the engineers will not be able to easily locate the failed device because the entire PROFIBUS network is down. To avoid this situation, the ICF-1280I Series has a mechanism to detect and recognize noise signals. If the bus fails on one side, the noise signal will not propagate through the ICF-1280I converter and affect additional bus segments. In addition, the ICF-1280I converter will also trigger an alarm to provide the location of the failure to the field engineer.



## Auto/Manual Baudrate Settings

The ICF-1280I converters convert signals back and forth between PROFIBUS and fiber at baudrates between 9.6 kbps to 12 Mbps. Engineers do not need to know the baudrate of the connected PROFIBUS device; the ICF-1280I converters can automatically detect the baudrate of the PROFIBUS device and apply this baudrate directly. This is an extremely convenient feature. If necessary, baudrates can be set to a fixed value via DIP switches to shorten the baudrate detection period when the system initializes.

## Fiber Link Monitor

The ICF-1280I converters support a fiber link monitoring function to detect communication errors on both sides of the fiber connection and determine which side (Tx or Rx) is causing the problem. When a communication error occurs, a red LED status indicator will turn on and the relay alarm will activate. If a fiber abnormality occurs at a remote fiber segment, the Fault LED will flash to indicate the abnormality was in the remote segment. Engineers can use the fiber test function for troubleshooting.

## Fiber Signal Intensity Diagnosis

In some circumstances, you may need to measure the receive level of the fiber-optic port with a voltmeter, which can be connected while the device is operating (doing so will not affect data transmission). The measurement can be taken with a voltmeter and read on a PLC that uses floating high impedance analog inputs, which allow you to do the following:

- Record the incoming optical power for later measurement (e.g., to indicate aging or damage).
- Carry out a good/bad test (limit value).

## Specifications

### Serial Interface

Optical Fiber	ICF-1280I Series: 100BaseFX ports	
	Multi-Mode	Single-Mode
ICF-1280I-M-SC Series: 100BaseFX ports (multi-mode SC connector)		
ICF-1280I-M-ST Series: 100BaseFX ports (multi-mode ST connector)		
ICF-1280I-S-SC Series: 100BaseFX ports (single-mode SC connector)		
ICF-1280I-S-ST Series: 100BaseFX ports (single-mode ST connector)		
Wavelength	820 nm	1310 nm
Tx Output	-14 dBm	-7 dBm
Rx Sensitivity	-28 dBm	-29 dBm
Link Budget	14 dBm	21 dBm
Typical Distance	4 km	45 km

### PROFIBUS Interface

Baudrate	9600 bps to 12 Mbps
Connector	DB9 female
Industrial Protocols	PROFIBUS DP
Isolation	2 kV (built-in)
No. of Ports	1

## Power Parameters

Input Current	315 mA @ 12 VDC
Input Voltage	12 to 48 VDC
No. of Power Inputs	2
Overload Current Protection	Supported
Power Connector	Terminal block (for DC models)
Power Consumption	315 mA @ 12 VDC

## Physical Characteristics

Housing	Metal
IP Rating	IP30
Dimensions	39 x 115 x 70 mm (1.54 x 4.53 x 2.76 in)
Weight	225 g (0.49 lb)
Installation	DIN-rail mounting

## Environmental Limits

Operating Temperature	Standard Models: 0 to 60°C (32 to 140°F) Wide Temp. Models: -40 to 75°C (-40 to 167°F)
Storage Temperature (package included)	-40 to 75°C (-40 to 167°F)
Ambient Relative Humidity	5 to 95% (non-condensing)

## Standards and Certifications

EMC	EN 55032/24
EMI	CISPR 32, FCC Part 15B Class A
EMS	IEC 61000-4-2 ESD: Contact: 6 kV; Air: 8 kV IEC 61000-4-3 RS: 80 MHz to 1 GHz: 10 V/m IEC 61000-4-4 EFT: Power: 2 kV; Signal: 2 kV IEC 61000-4-5 Surge: Power: 2 kV; Signal: 2 kV IEC 61000-4-6 CS: 150 kHz to 80 MHz: 10 V/m; Signal: 10 V/m IEC 61000-4-8 PFMF
Environmental Testing	IEC 60068-2-1 IEC 60068-2-2 IEC 60068-2-3
Hazardous Locations	ATEX, Class I Division 2, IECEx
Safety	EN 60950-1, IEC 60950-1
Vibration	IEC 60068-2-6

## MTBF

Time	1,870,854 hrs
Standards	Telcordia (Bellcore), GB

## Warranty

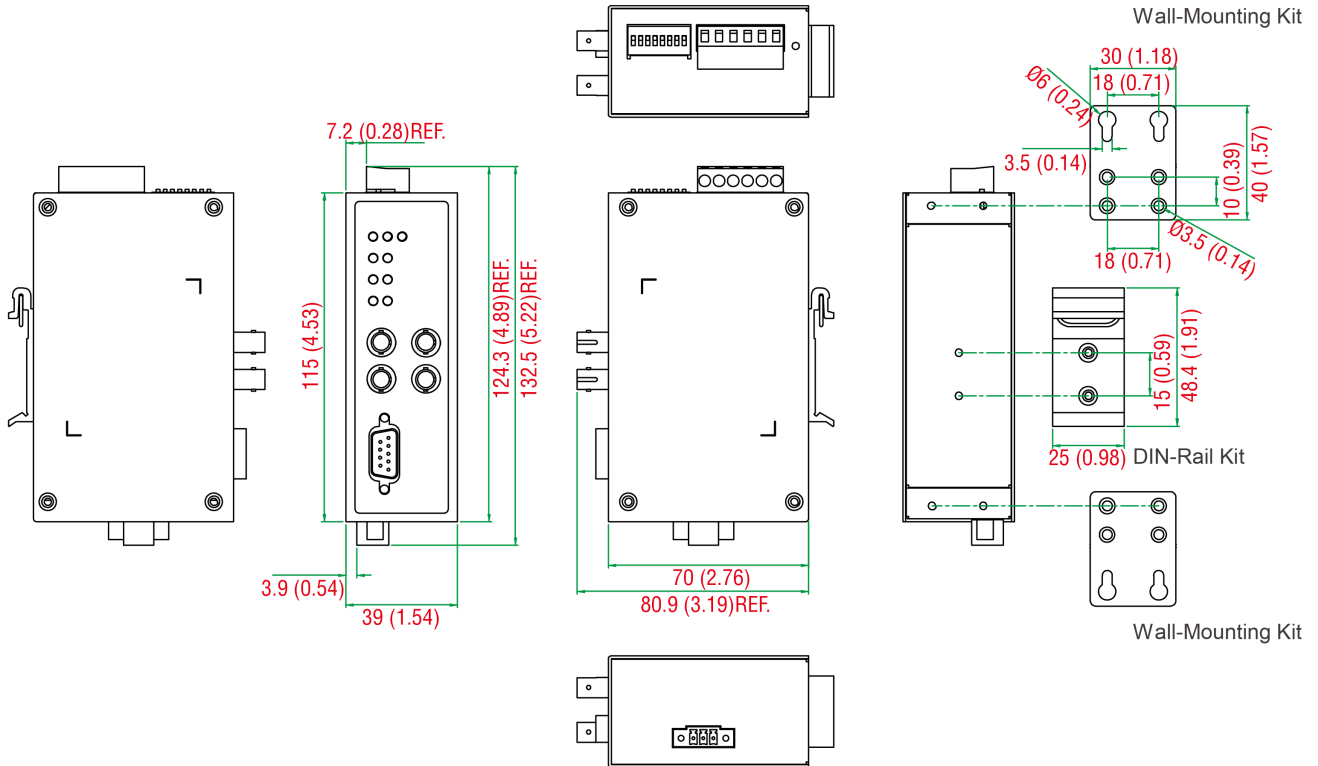
Warranty Period	5 years
Details	See <a href="http://www.moxa.com/warranty">www.moxa.com/warranty</a>

## Package Contents

Device	1 x ICF-1280I Series converter
Documentation	1 x quick installation guide 1 x warranty card

## Dimensions

Unit: mm (inch)



## Ordering Information

Model Name	Operating Temp.	Fiber Module Type
ICF-1280I-M-ST	0 to 60°C	Multi-mode ST
ICF-1280I-S-ST	0 to 60°C	Single-mode ST
ICF-1280I-M-ST-T	-40 to 75°C	Multi-mode ST
ICF-1280I-S-ST-T	-40 to 75°C	Single-mode ST

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