ICF-1180I/1280I Series

Industrial PROFIBUS-to-fiber converters with redundant fiber ring

- Redundant fiber ring with zero recovery time
- Examine network-wide fiber communication from a single converter
- Auto baudrate detection and data speed up to 12 Mbps
- PROFIBUS Bus Fail prevents corrupted datagram in functioning segment
- Alarm by relay output
- 2 kV galvanic isolation protection
- Dual-power inputs for redundancy
- Extends PROFIBUS transmission distance up to 45 km
- Wide temperature range model available for -40 to 75°C environments
- Supports Fiber Signal Intensity Diagnosis
- Fiber inverse feature (ICF-1180I)
- Fiber cable test function validates fiber communication

Fiber Ring

Overview

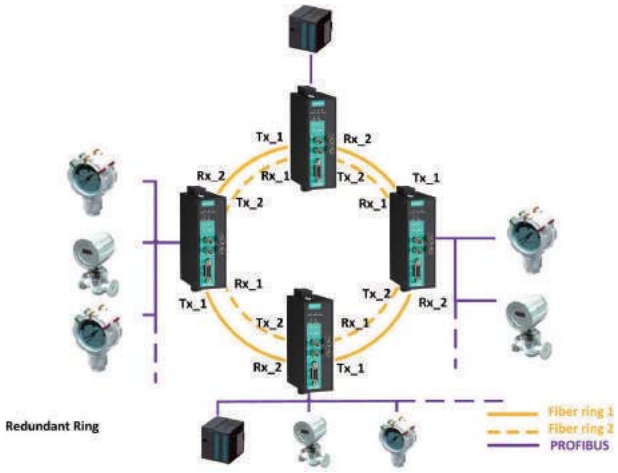
The ICF-1180I/1280I series industrial PROFIBUS-to-fiber converters are used to convert PROFIBUS signals from copper to optical fiber. The converters are used to extend serial transmission up to 4 km (multi-mode fiber) or up to 45 km (single-mode fiber). The ICF-1180I/1280I provides 2 kV isolation protection 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-1180I/1280I series converters eliminate 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 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.



Redundant Ring

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-1180I/1280I series converter 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-1180I/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-1180I/1280I series converters simply convert the signal 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-1180I/1280I series 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-1180I/1280I series converter provides a fiber link monitoring function to detect the 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 in a remote fiber segment, the Fault LED will flash to indicate the abnormality is happening 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 allows you to do the following:

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

Specifications

Technology

Standards: IEC 61158-2 for PROFIBUS DP

Interface

P1/P2/P3 Ports:
ICF-1180I:
P1 port: ST optical fiber
P2 port: PROFIBUS DP (DB9 female)
ICF-1280I:
P1/P2 ports: ST optical fiber
P3 port: PROFIBUS DP (DB9 female)
Relay Alarm: One relay output with current-carrying capacity of 2 A @ 30 VDC (Normal open)
LED Indicators: PWR1, PWR2, Ready, P1, P2, P3, Fault
DIP Switches:
DIPs 1 to 4: Baudrate setting
DIP 5: Fiber link monitor
ICF-1180I:
DIP 6: Fiber Inverse function
DIP 7: Reserved
DIP 8: Remote Fiber Diagnosis
ICF-1280I:
DIPs 6 to 7: Linear/Star mode (w/ optional P1/P2 disabled), Redundant Ring mode
DIP 8: Remote Fiber Diagnosis

PROFIBUS Communication

Data Rate: 9.6, 19.2, 45.45, 93.75, 187.5, 500, 1500, 3000, 6000, and 12000 Kbps
Auto Baudrate: Yes
Isolation Protection: 2 kV

Optical-Fiber Side

Point-to-Point, Linear (Bus), Star, Redundant Topologies:

Low-Speed Fiber Module		Multi-Mode
Fiber Cable Requirements		50/125 µm, 800 MHz
		62.5/125 µm, 500 MHz
Typical Distance		5 km
Wave-length	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

Physical Characteristics

Housing: Metal
Mounting: DIN rail, wall (with optional kit)
Dimensions:
ICF-1180I: 30.3 x 115 x 70 mm (1.19 x 4.53 x 2.76 in)
ICF-1280I: 39 x 115 x 70 mm (1.54 x 4.53 x 2.76 in)
Weight:
ICF-1180I: 180 g (0.39 lb)
ICF-1280I: 225 g (0.49 lb)

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: -40 to 75°C (-40 to 167°F)
Ambient Relative Humidity: 5 to 95% (non-condensing)

Power Requirements

Input Voltage: 12 to 48 VDC
Input Current:
ICF-1180I: 221 mA @ 12 VDC
ICF-1280I: 315 mA @ 12 VDC
Connector: Terminal Block
Power Line Protection: Level 3 (2 kV) Surge Protection
Overcurrent Protection: 1.1 A

Standards and Certifications

Safety: UL 508
Hazardous Location: UL/cUL Class I Division 2 Groups A/B/C/D, ATEX Zone 2 EEx nC IIC, IECEx
EMC: EN 55022/24
EMI: CISPR 22, FCC Part 15B Class A
EMS:
EN 61000-4-2 (ESD): Contact: 6 kV; Air: 8 kV
EN 61000-4-3 (RS): 80 MHz to 1 GHz: 10 V/m
EN 61000-4-4 (EFT): Power: 2 kV; Signal: 2 kV
EN 61000-4-5 (Surge): Power: 2 kV; Signal: 2 kV
EN 61000-4-6 (CS): 150 kHz to 80 MHz: 10 V/m
EN 61000-4-8 (PFMF)
Green Product: RoHS, CRoHS, WEEE
Freefall: IEC 60068-2-32

MTBF (mean time between failures)

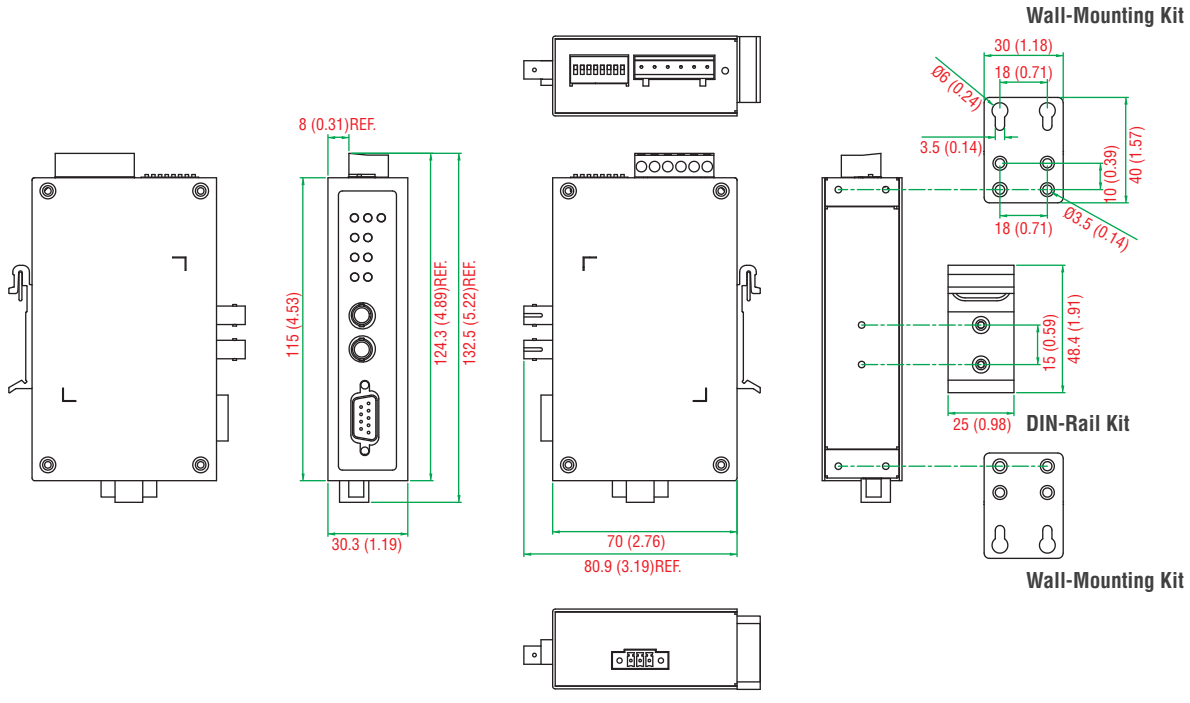
Time:
ICF-1180I: 1,870,854 hrs
ICF-1280I: 1,567,875 hrs
Standard: Telcordia (Bellcore), GB

Warranty

Warranty Period: 5 years
Details: See www.moxa.com/warranty

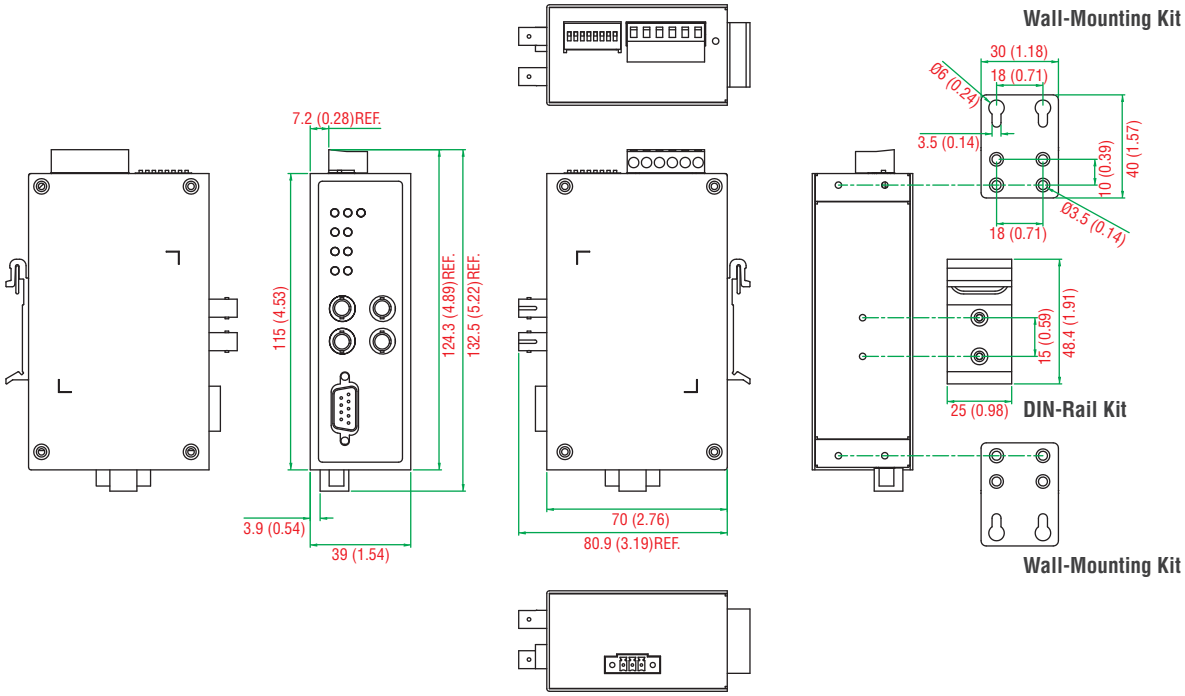
ICF-1180I Dimensions

Unit: mm (inch)



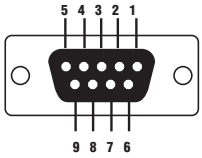
ICF-1280I Dimensions

Unit: mm (inch)



Pin Assignment

PROFIBUS Connector (DB9 Female)



PIN	Signal Name
1	N–C
2	N–C
3	Profibus D+
4	RTS
5	Signal common
6	5 V
7	N–C
8	Profibus D-
9	N–C

Ordering Information

Available Models

ICF-1180I-M-ST: PROFIBUS to fiber converter, multi-mode, ST connector, 0 to 60°C
ICF-1180I-S-ST: PROFIBUS to fiber converter, single-mode, ST connector, 0 to 60°C
ICF-1180I-M-ST-T: PROFIBUS to fiber converter, multi-mode, ST connector, -40 to 75°C
ICF-1180I-S-ST-T: PROFIBUS to fiber converter, single-mode, ST connector, -40 to 75°C
ICF-1280I-M-ST: PROFIBUS to fiber converter, multi-mode, 2 ST connector, 0 to 60°C
ICF-1280I-S-ST: PROFIBUS to fiber converter, single-mode, 2 ST connector, 0 to 60°C
ICF-1280I-M-ST-T: PROFIBUS to fiber converter, multi-mode, 2 ST connector, -40 to 75°C
ICF-1280I-S-ST-T: PROFIBUS to fiber converter, single-mode, 2 ST connector, -40 to 75°C

Package Checklist

- ICF-1180I/1280I series PROFIBUS-to-fiber converter
- Hardware installation guide (printed)
- Warranty card