ICF-1180I Series
Hardware Installation Guide

First Edition, May 2012

P/N: 1802011800012

Introduction

There are two variations of PROFIBUS protocol, PROFIBUS DP (Decentralized Peripherals) and PROFIBUS PA (Process Automation). PROFIBUS PA is used in the application that the end device needs power supply from the PROFIBUS PA device and where intrinsic safe mechanism is also required. Due to the power supply criteria, the number of attached devices is limited. PROFIBUS DP is used in the production automation, and with centralized controllers to manage the system. It supports up to 126 attached devices and is the commonly used PROFIBUS specification.

The ICF-1180I series PROFIBUS-to-fiber converters are based on the PROFIBUS DP. It is used to convert PROFIBUS signals from copper to optical fiber. The converters are used to extend PROFIBUS signal transmission up to 4 km (for ICF-1180I multi-mode model) or up to 45 km (for ICF-1180I single-mode model). The ICF-1180I converter provides 2 KV isolation protection for the PROFIBUS system and with dual power inputs to ensure uninterrupted operation of the PROFIBUS device.

Why Convert PROFIBUS to Fiber?

Optical fiber communication not only extends the communication distance, but also provides many advantageous features.

IMMUNITY FROM ELECTRICAL INTERFERENCE: Fiber is immune from electromagnetic interference or radio frequency interference. It provides a clean communication path and is immune to cross-talk.

INSULATION: Optical fiber is an insulator interface; the glass fiber eliminates the need for using electric currents as the communication medium.

SECURITY: Fiber cannot be tapped by conventional electric means and is very difficult to tap into optically while radio and satellite communication signals can be captured easily for decoding.

RELIABILITY & MAINTENANCE: Fiber is immune from adverse temperature and moisture conditions; hence, it does not corrode or lose its signal, and is not affected by short circuits, power surges, or static electricity.

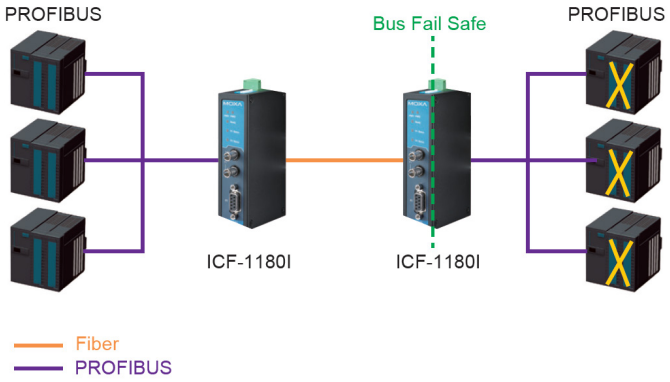
Auto/Manual Baudrate Settings

The ICF-1180I series simply convert the signal back and forth between PROFIBUS and fiber. The ICF-1180I series work 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.

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 communication between the two buses and eventually communication ceases across the entire system. 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 is 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.



Reverse Power Protection

The Reverse Power Protection feature provides extra protection against accidentally connecting the power cables to the wrong terminal. The converter is designed to detect automatically which power wire is positive and which is negative, and then adjust the power supply accordingly.

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 setting, 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 Test Function

Fiber optic cables are usually deployed for long distance communication and a fiber optic sensor is usually used by engineers to ensure proper communication across the fiber cable. The ICF-1180I series eliminates the need for a fiber optic sensor with a fiber test function through DIP switch adjustments. The fiber test function can detect fiber communication abnormalities and can also determine the side (Tx or Rx) causing the problem.

The fiber test function: switch SW8 to the "ON" state on both ICF-1180I converters and refer to the tables below. A red light on a converter means that the Rx fiber cable on that side is broken. For example, if the P1 LED of converter A is showing a red light, the Rx fiber cable of converter A (Tx fiber cable of converter B) is broken. Consequently, if red light of both ICF-1180I converters are on, it means both Tx and Rx fiber cables are broken.

Setting		
	Converter A	Converter B
SW8	ON	ON

Result		
P1 LED of converter A	P1 LED of converter B	Status
Green	Green	Tx and Rx fiber cables work correctly
Red	Green	Tx(B)→Rx(A) fiber cable error
Green	Red	Tx(A)→Rx(B) fiber cable error
Red	Red	Both Tx and Rx fiber cables error

Features

- Auto baudrate detection and data speed up to 12 Mbps
- PROFIBUS bus fail safe
- Alarm by relay output
- Provide 2 KV galvanic isolation
- Power polarity protection
- Extend PROFIBUS transmission distance:
  Up to 45 km with single-mode—ICF-1180I-S series
  Up to 4 km with multi-mode—ICF-1180I-M series
- Fiber optic test function
- Topology: Point-to-Point
- Dual power input for redundant
- Wide operating temperature from -40 to 75°C (for "T" models)

Package Checklist

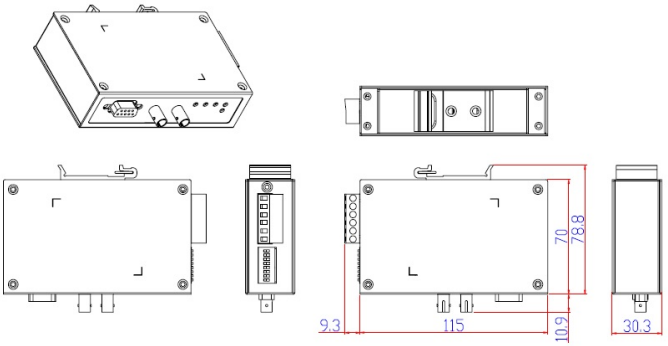
Before installing the ICF-1180I converter, verify that the package contains the following items:

- ICF-1180I PROFIBUS-to-fiber converter
- Hardware installation guide
- Warranty card

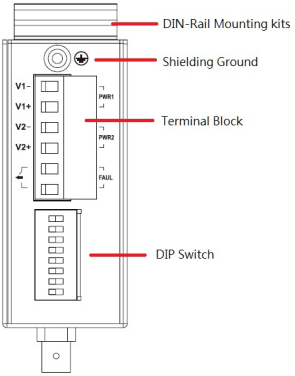
NOTE: *Please notify your sales representative if any of the above items are missing or damaged.*

Mounting Dimensions (Unit: mm)

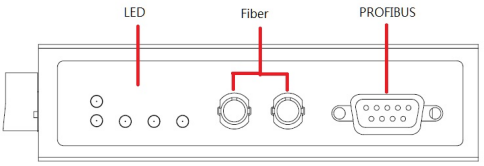
ICF-1180I



Top View



Front View



ATTENTION

Electrostatic Discharge Warning!

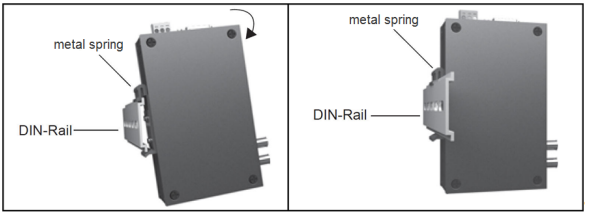
To protect the product from damage due to electrostatic discharge, we recommend wearing a grounding device when handling your ICF-1180I series.

Mounting

The aluminum DIN-Rail attachment plate should be fixed onto the back panel of the ICF-1180I when you take it out of the box. If you need to reattach the DIN-Rail attachment plate to the ICF-1180I, make sure the stiff metal spring is situated towards the top, as shown in the figures below.

STEP 1:
Insert the top of the DIN-Rail into the slot just below the stiff metal spring.

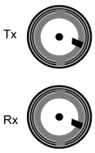
STEP 2:
The DIN-Rail attachment unit will snap into place as shown below.



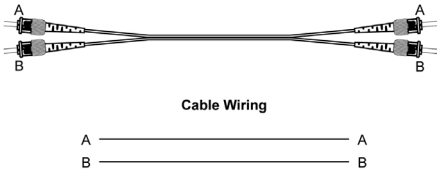
To remove the ICF-1180I series from the DIN-Rail, simply reverse Steps 1 and 2 above.

Fiber Cable

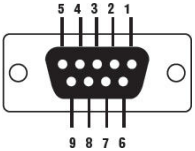
ST-Port Pinouts



ST-Port to ST-Port Cable Wiring



Pin Assignment



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.

Federal Communications Commission Statement

FCC - This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

1) This device may not cause harmful interference, and
2) This device must accept any interference received, including interference that may cause undesired operation.

DIP Switch Settings

There are 8 DIP switches on the top panel of the ICF-1180I. All DIP switches are in "OFF" state as factory setting.

Transmission Speed (Kbps)	SW1	SW2	SW3	SW4
Auto (default)	OFF	OFF	OFF	OFF
12000	OFF	OFF	OFF	ON
6000	OFF	OFF	ON	OFF
3000	OFF	OFF	ON	ON
1500	OFF	ON	OFF	OFF
500	OFF	ON	OFF	ON
187.5	OFF	ON	ON	OFF
93.75	OFF	ON	ON	ON
45.45	ON	OFF	OFF	OFF
19.2	ON	OFF	OFF	ON
9.6	ON	OFF	ON	OFF

Setting	ON	OFF
SW5	Fiber Link Monitor	Disable
SW6	Fiber Inverse Function*	Normal
SW7	Reserved	Reserved
SW8	Fiber Test Function*	Disable

Any change of DIP Switch will activate after reboot.

*: Please refer to page 3 for the definition and usage of Fiber Inverse Function and Fiber Test Function.

LED Indicators

There are 5 LEDs on the front panel of the ICF-1180I.

LED	Color	Function
PWR1/PWR2	Green	Steady on: power is on
	Off	Power is off, or power error condition exists*
Ready	Green	Steady on: Converter is ready for communication Blinking: System Baud rate detection mode is activated
	Off	System power is off
P1 Status (Fiber)	Red**	Fiber port data communication error (refer to the following table)
	Green	Fiber port data is communicating
	Off	No data communication
P2 Status (PROFIBUS)	Red**	PROFIBUS port data communication error (refer to next table)
	Green	PROFIBUS port data is communicating
	Off	No data communication

*: If both power inputs experience outage, the relay will become an open circuit.

**: Red light warning will be active if SW5 is in "ON" state.

Alarm & LED Related Table (Please enable SW5 "Fiber Link Monitor Function")

LED	Status	Color	Alarm
P1 Status	Tx and Rx Cables Swapped over	Red	Yes
	Open Bus Cable	Red	Yes
	No partner module connected, defective, or not turned on	Red	Yes
	Fiber cable is loose	Red	Yes
	Partner Module not in the fiber link monitor mode	Red	Yes
	Fiber Signal Break	Red	Yes
P2 Status	Inner transceiver IC defective	Red	Yes
	PROFIBUS port Data communication error	Red	Yes
	Insufficient shielding of the bus cable	Red	No

ATTENTION

This is a Class 1 laser/LED product. Do not stare into the laser beam.

Specifications

PROFIBUS Communication

PROFIBUS Interface	PROFIBUS DP
Number of Ports	1
Connector	DB9 female
Isolation Protection	2 KV
Baudrate	9.6 Kbps to 12 Mbps
Auto Baudrate	Yes

Fiber Communication

Connector type	ST
Distance	Single-mode fiber for 45 km Multi-mode fiber for 4 km
Support Cable:	
Single mode	8.3/125, 8.7/125, 9/125 or 10/125 μm
Multimode	50/125, 62.5/125, or 100/140 μm
Wavelength	ICF-1180I-S: 1310 nm ICF-1180I-M: 820 nm
Tx Output	ICF-1180I-S: -7 dBm ICF-1180I-M: -14 dBm
Rx overload	ICF-1180I-S: -3 dBm ICF-1180I-M: -3 dBm
Rx Sensitivity	ICF-1180I-S: -29 dBm ICF-1180I-M: -28 dBm
Point-to-Point Transmission	Half duplex

Environmental

Operating Temperature	0 to 60°C (32 to 140 °F) -40 to 75°C (-40 to 167 °F) for T Models
Storage Temperature	-40 to 75°C (-40 to 167 °F),
Ambient Relative Humidity	5 to 95% (non-condensing)

Power

Input Power Voltage	12 to 48 VDC
Connector	Terminal block
Power Line Protection	Level 3 (2 KV) Surge Protection
Reverse Power Protection	Protects against V+/V- reversal
Over Currents Protection	1.1 A
Power Consumption	Single mode: 216 mA@12 V Multi mode:186 mA@12 V
Relay Alarm	Support 1 Digital relay Output to alarm (Normal close): Current carrying capacity 2 A@30 VDC:

Mechanical

Dimensions (W × D × H)	30.3 × 70 × 115 mm
Material	Aluminum (1 mm)
Gross Weight	180 g

Regulatory Approvals

Safety	UL 508; EN 60950-1
EMC	CE; FCC Part 15, sub part B, Class A
EMI	EN 55022, Class A; EN 55024
EMS	EN 61000-4-2 (ESD), Level 3, Criteria A EN 61000-4-3 (RS), Level 3, Criteria A EN 61000-4-4 (EFT), Level 3, Criteria B EN 61000-4-5 (Power Surge), Level 3, Criteria B EN 61000-4-5 (Communication Surge), Level 3, Criteria B EN 61000-4-6 (CS), Level 3, Criteria B
Freefall	IEC 60068-2-32
MTBF	792,085 hrs

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