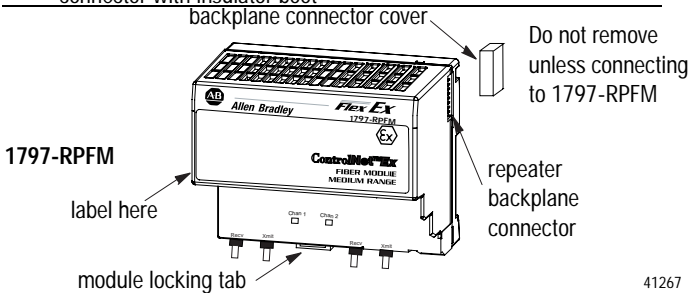
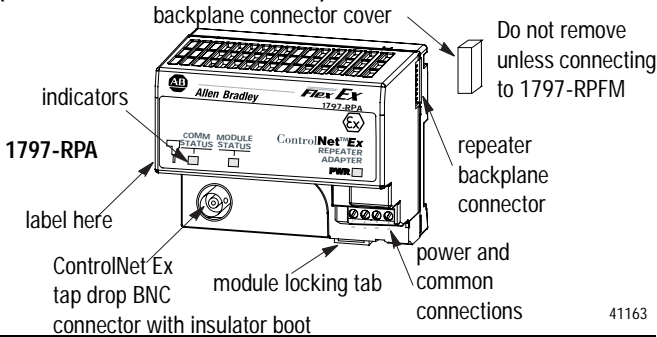




## Installation Instructions

# ControlNet Ex Modular Repeater Adapter & Fiber Repeater Module, Med. Distance

(Cat. No. 1797-RPA, -RPFM)



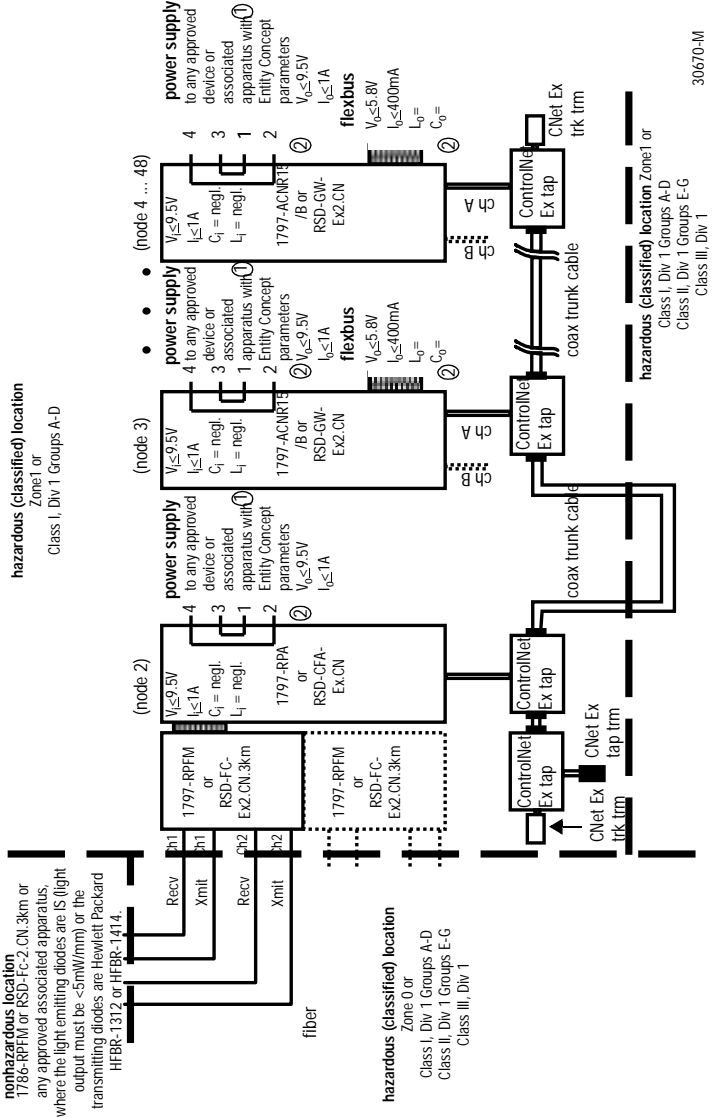
### About the ControlNet Ex Fiber Repeater Hub

Use the repeater adapter (1797-RPA) and the fiber module (1797-RPFM) together to form a repeater hub within the hazardous area to extend the length of the ControlNet Ex™ segments to interlink systems all operating within the area.

The 1797-RPA, configured with at least one repeater adapter, functions as the intelligent starter block for a multiport repeater. The 1797-RPFM is a non-intelligent fiber to backplane conversion device, converting glass-fiber infrared LED media signals to backplane signals for use by the 1797-RPA.

A maximum of two 1797-RPFM modules may be used with one 1797-RPA adapter.

# ControlNet Ex System Diagram



## Describing the ControlNet Ex System Diagram

A maximum of 48 ControlNet Ex™ nodes may be connected together by coax cable and taps.

The fiber media of the 1797-RPFM can be installed in a hazardous location (Zone 0 and Zone 1) to connect two 1797-RPFM modules or they can be installed through different locations into the non-hazardous location to connect the 1797-RPFM with any approved associated apparatus.

All cables and fiber media that are not light blue must be marked as IS using the 1797-EXMK marking kit or other locally approved IS identification and/or segregation method.

During the installation of the ControlNet Ex system, all metallic parts must be isolated to prevent an earth connection (high voltage withstanding of isolating material must be > 500V ac).

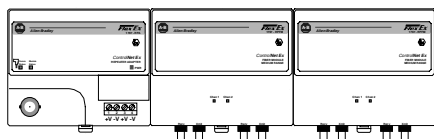
①= The entity concept allows interconnection of IS apparatus with associated apparatus not specially examined in combination as a system when the approved values of  $V_{oc}$  and  $I_{sc}$  for the associated apparatus are  $\leq V_{max}$  and  $I_{max}$  for the IS apparatus and the approved values of  $C_a$  and  $L_a$  for the associated apparatus are  $> C_i + C_{cable}$  and  $L_i + L_{cable}$  respectively for the IS apparatus.

②= Wiring methods must be in accordance with the National Electric Code, NFPA 70, Article 504 and ANSI/ISA-RP 12.6.

System Drawing Name	Catalog Number	Catalog Name	Description
1797-RPA	1797-RPA	ControlNet Ex Modular Repeater Adapter	Represents one ControlNet Ex node and must be connected to a coax trunk cable by 1797-TPx
1797-RPFM	1797-RPFM	ControlNet Ex Fiber Repeater Module, Medium Distance	Allows connection of a maximum of two devices per 1797-RPA and is powered directly by 1797-RPA

System Drawing Name	Catalog Number	Catalog Name	Description
1797-ACNR15/B	1797-ACNR15/B	Redundant Media ControlNet Ex Adapter	Represents one ControlNet Ex node and must be connected to a coax trunk cable by 1797-TPx -each one with two redundant output channels that are connected to different ControlNet Ex networks (coax cables and 1797-TPx)
CNet Ex Tap Trm	1797-TCAP	ControlNet Ex Tap (Dummy) Terminator	Represents one ControlNet Ex node and is a simple capacitor (56pF) with a coax connector
ControlNet Ex Tap	1797-TPx	ControlNet Ex Coax Tap	Four types of connections available: S (straight t-tap), R (right angle t-tap), YS (straight y-tap), and YR (right angle y-tap) - a maximum of 48 taps can be connected together by coax trunk cable
CNet Ex Trk Trm	1797-XT	ControlNet Ex Trunk Terminator	Simple resistor (75Ω) with coax connector that must be on each end of the ControlNet Ex coax trunk for termination
Coax Trunk Cable	1797-RG6	Quad-Shield, RG-6 75Ω Coax Trunk Cable	Maximum (functional) length between 2 1797-TPx is 3280ft (1000m) - each 1797-TPx reduces the (functional) coax cable length by 53.4ft (16.3m)
None	None	Standard Coax Trunk Cable BNC Couplers	Different standard cable couplers, 90°, 180°, etc.

Make certain that you only connect repeater adapters to other intrinsically safe system fiber modules to maintain the integrity of the intrinsically-safe backplane.



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## Installation in Zone 1

The 1797-RPA and -RPFM must not be exposed to the environment. Provide a suitable metal enclosure. This repeater hub has a protection factor of IP20.

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**ATTENTION:** These modules cannot be used in an intrinsically safe environment after they have been exposed to non-intrinsically safe signals.

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## Electrostatic Charge

Protect the system against electrostatic charge. Post a sign near this module: **Attention! Avoid electrostatic charge.** For your convenience, a sign which can be cut out is included in this installation instruction.

## European Community Directive Compliance

If this product has the CE mark it is approved for installation within the European Community or EEA regions. It has been designed and tested to meet the following directives.

### EMC Directive

This product is tested to meet the Council Directive 89/336/EC Electromagnetic Compatibility (EMC) by applying the following standards, in whole or in part, documented in a technical construction file:

- EN50081-2

EMC - Generic Emission Standard, Part 2 - Industrial Environment

- EN50b082-2

EMC - Generic Immunity Standard, Part 2 - Industrial Environment

This product is intended for use in an industrial environment.

## Ex Directive

This product is tested to meet the Council Directive 94/9 EC (ATEX 100a) Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres by applying the following standards:

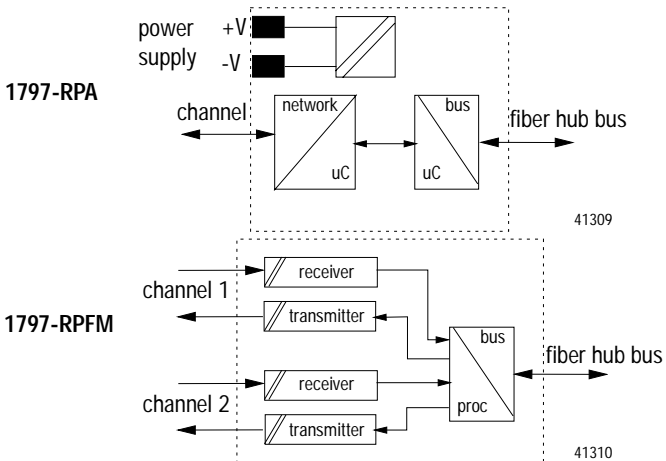
- EN50014:1992, Electrical Apparatus for Potentially Explosive Atmospheres
- EN50020:1994, Electrical Apparatus for Potentially Explosive Atmospheres - Intrinsic Safety "i"
- EN50039:1980, Electrical Apparatus for Potentially Explosive Atmospheres - Intrinsically Safe Electrical Systems "i"
- pr EN50284:1997, Special requirements for construction, test, and marking of electrical apparatus of equipment group II, category 1 G

## Inputs/Outputs

Do not apply any non-intrinsically safe signals to the adapter or fiber modules.

When using as an intrinsically safe electrical apparatus according to EN50020, the European directives and regulations must be followed.

## Customer Connections



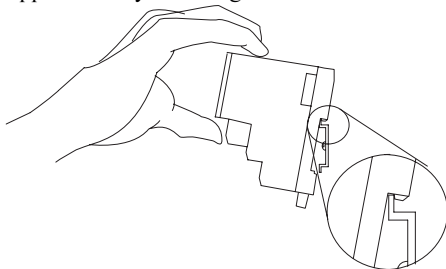
## DIN Rail Mounting the 1797-RPA and -RPFM

Refer to “Mounting Dimensions” on page 15. For panel mounting information, see publication 1794-5.13.



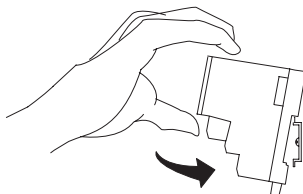
**ATTENTION:** Make certain that the adapter and fiber modules are secured together with DIN rail anchors. Failure to do so may result in the loss of communications and/or cause damage to the modules.

1. Position the module on a 35 x 7.5mm DIN rail (A-B part number 199-DR1) at approximately a 30° angle.



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2. Hook the lip on the rear of the adapter onto the top of the DIN rail, and rotate the module onto the rail.



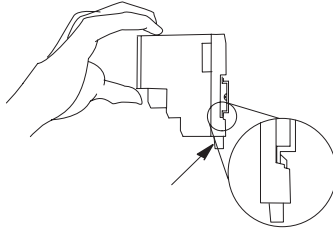
41166

3. Press the adapter down onto the DIN rail until flush.

The locking tab should snap into position and lock the module to the DIN rail.

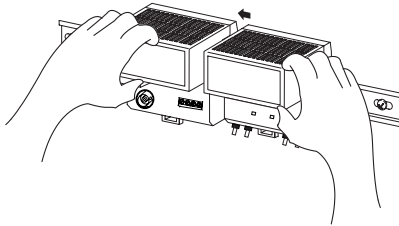
4. If the adapter does not snap into position, use a screwdriver or similar device to move the locking tab down while pressing the module flush onto the DIN rail. Release the locking tab to lock the module in place.

If necessary, push up on the locking tab to lock.



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5. Remove the adapter backplane connector cover.
6. Follow steps 1-4 to attach fiber modules to the DIN rail.
7. Once attached to the DIN rail, slide fiber modules to the left to mate with the adapter.



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**Important:** A DIN-rail end anchor (A-B part number 1492-EA35) must be used on the left side of the adapter and on the right side of the fiber module to keep the units from moving.

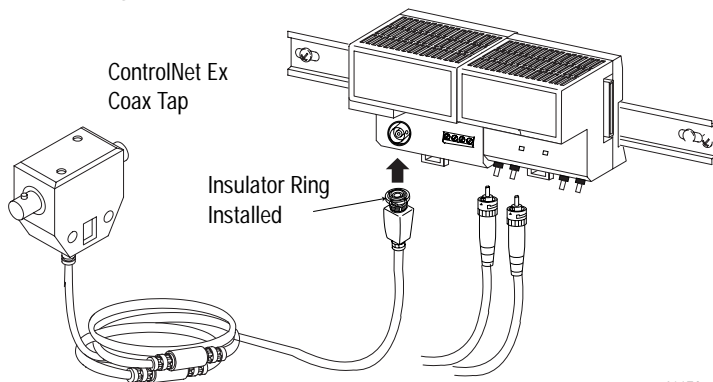
8. Make sure the last fiber module has its backplane connector cover in place.
9. Connect the adapter wiring as shown below in the “Wiring” section.

**Important:** You can only attach two media modules to the repeater adapter. If you exceed the module limit, you may cause damage to the adapter or fiber modules and void the IS certification.



## Wiring

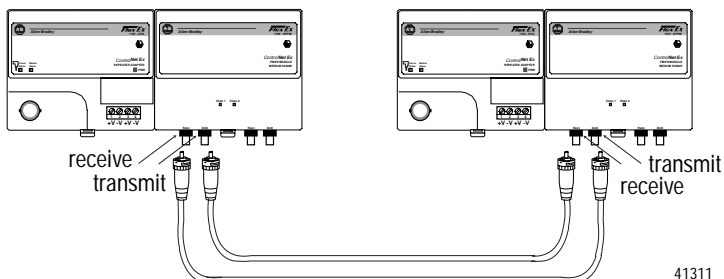
1. Connect the ControlNet Ex tap drop cable to the connector after removing the insulator boot.



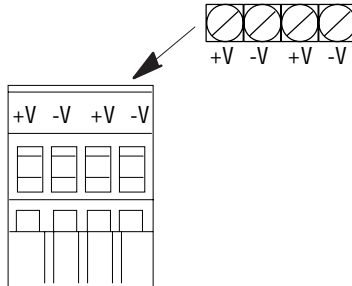
**Important:** The tap drop BNC must have its insulator ring in position when inserted in the adapter BNC connector.

2. Connect the fiber media to the fiber module by selecting either the left or right set of receive/transmit ports and attaching the receive and transmit fibers, as appropriate.

**Important:** Make note of which fiber is receive and which is transmit as they must be interchanged at the opposite end.



3. Apply +V and -V power to the adapter through a removable terminal block from the Ex power supply.



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Screw terminals and spring terminals are provided.

4. Strip the +V and -V wires to a length so no bare conductor shows after inserting the wires into position.
5. If you are using the spring terminals of the plug, insert a screwdriver into the slot and *carefully* pry until the spring clamp opens to accept the wire.



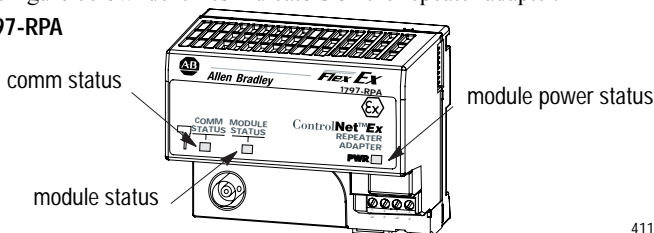
- Do not use any unused terminals on this adapter. Using these terminals as supporting terminals can result in damage to the module and/or unintended operation of your system.
- Make certain that you power this adapter with an intrinsically safe power supply. Do not exceed the values listed in the specifications for this adapter.
- Do not remove or replace a module when power is applied. Interruption of the bus can result in unintended operation or machine motion.

**Important:** Make sure all fiber modules are attached and secured prior to applying intrinsically safe power to the adapter. Failure to do so may cause damage to the adapter and modules.

## 1797-RPA Indicators

The figure below identifies indicators on the repeater adapter.

### 1797-RPA



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## 1797-RPA Comm and Module Status Indicators

If Both Are	This Indicates
Alternately Red/Green	The adapter is being powered-up or reset. The LEDs alternately flash red and green for about 5 seconds.
Steady Green	Normal operation.
Off	The unit is not powered. Check the module power status.
Red	There is an adapter fault. <ul style="list-style-type: none"> <li>• If the fault indication is caused by a jabber condition, the fault indication will automatically be cleared when the jabber condition is removed from the coax or fiber port.</li> <li>• If a jabber condition is not causing the fault, replace the repeater adapter.</li> </ul>
If Either Is	The Respective Segment (1 or 2) is
Flashing Green/Off	Experiencing temporary network errors. The situation will normally correct itself. If the situation persists, troubleshoot your nodes and cable system. When troubleshooting your cable system, make sure: <ul style="list-style-type: none"> <li>• all BNC connector pins are properly sealed</li> <li>• all taps are A-B taps</li> <li>• all terminators are 75Ω and are installed at both ends of all segments</li> </ul>
Flashing Red/Off	Experiencing a high level of network errors. This may indicate a broken cable, broken tap, or missing segment terminator. <p><b>Important:</b> The indicators will flash red/off when a system has no network activity. This would be normal for a system that has no ControlNet nodes installed or enabled.</p>

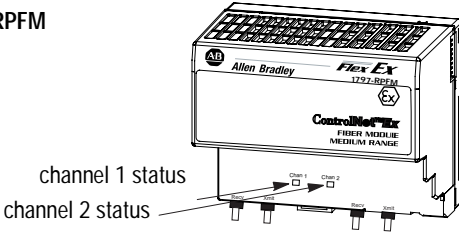
## 1797-RPA Power Indicator

If	This Indicates
Steady Green	Power is applied.
Off	No power is applied.

## 1797-RPFM Indicators

The figure below identifies indicators on the fiber module.

### 1797-RPFM



41312

## 1797-RPFM Comm and Status Indicators

If Both Are	This Indicates
Off	There is no power or the module is faulted.
Green	The channel is operational.
Flashing Green/Off	There is no data activity on the associated channel.

## Repair

The adapter and fiber module are not field-repairable. Any attempt to open this adapter or fiber module will void the warranty and the IS certification.

If repair is necessary, return the modules to the manufacturer.

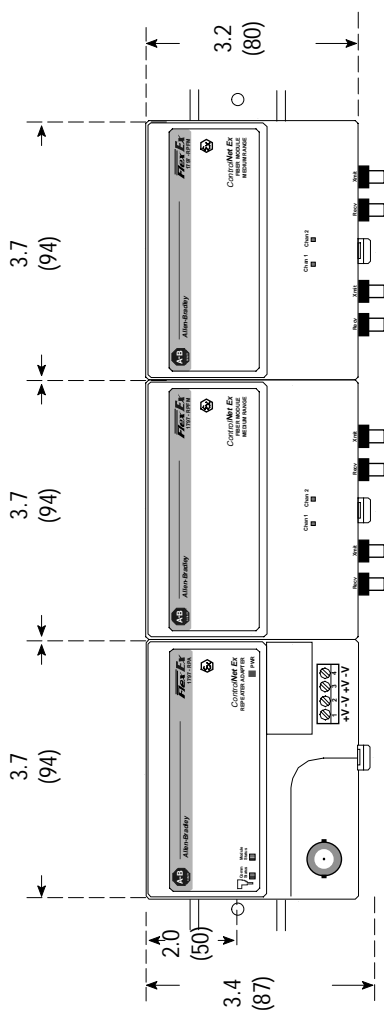
**1797-RPA Specifications**

I/O Capacity	2 fiber modules
IS Media Type	EEx ib IIB/IIC, Class I, II, III Division 1 Group A-G
IS Module Type	EEx ib IIB/IIC T4, Class I Division 1 Group A-D
Communication Rate	5m bit/s
ControlNet Ex BNC	Oscillation powered by: $U_i \leq 5.4V$ dc $I_i \leq 201mA$ ac coupled with high-pass filter $f \geq 900kHz$
Indicators	Comm green/red Module green/red Power green
Output (Intrinsically Safe) (30 pin male TTL bus connector)	Manufacturer specific bus $U_o \leq 5.4V$ $I_o \leq 201mA$ $P_o \leq 1.06W$ $L_o \leq 0.45mH$ $C_o \leq 71\mu F$
Isolation Path Bus to Power Supply Adapter to Adapter ControlNet Ex Node to Other Nodes ControlNet to Power Supply	Galvanic to DIN EN50020 Galvanic functional Galvanic functional Galvanic to DIN EN50020
Power Supply (-V, +V Intrinsically Safe)	$U_i \leq 9.5V$ dc $I_i \leq 1A$ $P_i \leq 9.5W$ $L_i =$ negligible $C_i \leq 120nF$
Power Consumption	8.5W
Power Dissipation	8.5W
Thermal Dissipation	29 BTU/hr
Conductors      Wire Size	12 gauge (4mm <sup>2</sup> ) stranded maximum 3/64in (1.2mm) insulation maximum
Dimensions	94mm x 94mm x 91mm (3.7in x 3.7in x 3.58in)
Weight	Approximately 200g
Environmental Conditions Operational Temperature Storage Temperature Relative Humidity Shock              Operating Non-Operating Vibration	-20 to 70°C (-4 to 158°F) -40 to 85°C (-40 to 185°F) 5 to 95% noncondensing Tested 15g peak acceleration, 11 (±1)ms pulse width Tested 15g peak acceleration, 11 (±1)ms pulse width Tested 2g @ 10-500Hz per IEC 68-2-6
Agency Certification	II (1) 2G EEx ia/ib IIB/IIC T4
Certificate of Conformity	DMT 99 ATEX E011 X

**1797-RPFM Specifications**

IS Media Type	EEx ia IIB/IIC, Class I, II, III Division 1 Group A-G
IS Module Type	EEx ib IIB/IIC T4, Class I Division 1 Group A-D
Communication Rate	5m bit/s
Approximate Fiber Media Length	3km
Fiber Type	62.5/125 mm
Fiber Termination Type	ST (plastic or ceramic)
Fiber Operating Wavelength	1300 nm
Optical Power Budget	13.3 dB
Fiber Optic Transmitter Ch1 and Ch2	Optical peak output power $P_{\text{optical}} \leq 1\text{mW}$
Indicators	Channel 1 status - green Channel 2 status - green
Input (Intrinsically Safe) (30 pin female TTL bus connector)	$U_i \leq 5.4\text{V}$ $I_i \leq 201\text{mA}$ $P_i \leq 1.1\text{W}$ $L_i \leq 15\mu\text{H}$ $C_i \leq 41\mu\text{F}$
Output (Intrinsically Safe) (30 pin male TTL bus connector)	$U_o \leq 5.4\text{V}$ $I_o \leq 201\text{mA}$ $P_o \leq 1.1\text{W}$ $L_o \leq 0.45\text{mH}$ $C_o \leq 71\mu\text{F}$
Isolation Path Bus to ControlNet	Galvanic to DIN EN50020
Power Consumption	Included in 1797-RPA
Power Dissipation	Included in 1797-RPA
Thermal Dissipation	Included in 1797-RPA
Weight	Approximately 100g
Dimensions	94mm x 94mm x 91mm (3.7in x 3.7in x 3.58in)
Environmental Conditions Operational Temperature Storage Temperature Relative Humidity Shock Vibration	-20 to 70°C (-4 to 158°F) -40 to 85°C (-40 to 185°F) 5 to 95% noncondensing Tested 15g peak acceleration, 11 ( $\pm 1$ )ms pulse width Tested 15g peak acceleration, 11 ( $\pm 1$ )ms pulse width Tested 2g @ 10-500Hz per IEC 68-2-6
Agency Certification	II (1) 2G EEx ia/ib IIB/IIC T4
Certificate of Conformity	DMT 99 ATEX E011 X

## Mounting Dimensions



Inches  
(Millimeters)

41426

**ATTENTION:** Be careful of metal chips when drilling mounting holes. Do not drill holes above a system that has any modules installed.

**Attention: Avoid electrostatic charge.**

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Publication 1797-5.15 - February 1999



**Rockwell  
Automation**

PN 955126-40

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