



Installation Instructions

ControlNet IP67 Tap and Cable Assembly Kit Installation Instructions

Cat. No.1786-TCT2BD1, -TPST2T, -TPRT2T

What's in This Document

This document describes how to install the ControlNet IP67 Tap and Cable Assembly Kit. The kit is available in three versions, as shown in the table below. All kits are identical, except for the 1-meter drop cable.

for this version of the drop cable	order this kit
TNC to Straight BNC (TNC at tap body; BNC at node end)	1786-TCT2BD1
TNC to Straight TNC (TNC at tap body; TNC at node end)	1786-TPST2T
TNC to Right-angle TNC (TNC at tap body; TNC at node end)	1786-TPRT2T

The kit is made up of a tap body and a 1-meter drop cable with overmolded connectors. The drop cable has a TNC connector at the tap body end and either a BNC or TNC connector at the ControlNet node end (depending on the version of the kit you order). The tap and cable are rated to IP67 when mated to a sealed connector, which means they are water-tight.

2 ControlNet IP67 Tap and Cable Assembly Kit Installation Instructions

Topic	Page
Why Use Sealed Media Components?	5
Select a Location to Install Sealed Components	7
Install the Components	8
Terminate the Cable	9
Apply Heat-shrink Tubing	12
Connect ControlNet Segments in a Network Topology	14
Specifications	15

The modular design of the kit lets you disconnect the devices at either the end of the drop cable, or at the tap port located on the tap body, without disrupting communications to the rest of the network. You can permanently disconnect a tap from a device by installing a tap dummy load (1786-TCAP) at the tap end of the drop cable.

TIP

The 1786-TCAP is compatible only with the 1786-TCT2BD1 drop cable. You can use the 1786-TCT2BD1 drop cable with the 1786-TPRT2T tap body.

IMPORTANT

No more than one tap should be disconnected at the body at a time and no more than 10% of the taps in a network may be terminated with tap dummy loads (1786-TCAP). Failure to adhere to these rules may cause excessive network errors and/or loss of network communications.

The kit also includes other items, such as a DIN rail mounting bracket and screws. See Table 1 below for a complete listing of the kit's contents.

Table 1 ControlNet IP67 Tap and Cable Assembly Kit Contents

Catalog/ Publication Number	Description	Qty.
1786-TPIP67	IP67 Tap Body (not sold separately)	1
1786-TPSDT2B 1786-TPRDT2T 1786-TPSDT2T	One of the following 1-meter drop cables, depending on the version of the kit you order (not sold separately): TNC to Straight BNC Drop Cable TNC to Right-angle TNC Drop Cable TNC to Straight TNC Drop Cable	1
1786-TNCL10	TNC Plugs (bagged)	2
1799-BRKD	DIN Rail Mounting Bracket	1
	DIN Rail Mounting Screws, #4-40 x .375 Pan Head, Cross Recess, Stainless Steel	2
	Gray dust cap (for the drop cable)	1
1786-IN017B-EN-P	ControlNet IP67 Tap and Cable Assembly Kit Installation Instructions	1

Important User Information

Solid state equipment has operational characteristics differing from those of electromechanical equipment. *Safety Guidelines for the Application, Installation and Maintenance of Solid State Controls* (Publication SGI-1.1 available from your local Rockwell Automation sales office or online at <http://www.ab.com/manuals/gi>) describes some important differences between solid state equipment and hard-wired electromechanical devices. Because of this difference, and also because of the wide variety of uses for solid state equipment, all persons responsible for applying this equipment must satisfy themselves that each intended application of this equipment is acceptable.

In no event will Rockwell Automation, Inc. be responsible or liable for indirect or consequential damages resulting from the use or application of this equipment.

The examples and diagrams in this manual are included solely for illustrative purposes. Because of the many variables and requirements associated with any particular installation, Rockwell Automation, Inc. cannot assume responsibility or liability for actual use based on the examples and diagrams.





No patent liability is assumed by Rockwell Automation, Inc. with respect to use of information, circuits, equipment, or software described in this manual.

Reproduction of the contents of this manual, in whole or in part, without written permission of Rockwell Automation, Inc. is prohibited.

Throughout this manual we use notes to make you aware of safety considerations.

4 ControlNet IP67 Tap and Cable Assembly Kit Installation Instructions

Important User Information

WARNING 	Identifies information about practices or circumstances that can cause an explosion in a hazardous environment, which may lead to personal injury or death, property damage, or economic loss.
IMPORTANT	Identifies information that is critical for successful application and understanding of the product.
ATTENTION 	Identifies information about practices or circumstances that can lead to personal injury or death, property damage, or economic loss. Attentions help you: <ul style="list-style-type: none">• identify a hazard• avoid a hazard• recognize the consequence
SHOCK HAZARD 	Labels may be located on or inside the equipment to alert people that dangerous voltage may be present.
BURN HAZARD 	Labels may be located on or inside the equipment to alert people that surfaces may be dangerous temperatures.

Why Use Sealed Media Components?

Sealed media components are ControlNet taps and TNC connectors, rated to IP67, that are suitable for use in harsh environments. IP67 is an industry-standard protection rating that describes the degree of protection provided to the components within the IP67-rated device. The IP67 rating means that the components are dust- and water-tight and water-immersible. While the tap bodies and TNC connectors in all three versions of the kit are water-tight, the BNC connector in the 1786-TCT2BD1 kit is not. Use the BNC version of the kit (1786-TCT2BD1) in applications in which you can mount the BNC connector inside a cabinet, or in another non-harsh environment. The sealed tap body contained in all versions of the kit can be mounted in any environment requiring an IP67 rating.

ATTENTION

Be sure to mate or terminate all connections. The taps and drop cables are rated to IP67 only when properly mated. Unterminated connections could be a source of contamination. Use the gray dust caps supplied in this kit to terminate unused connections. Never install extra taps in IP67 environments because there is no way to seal and protect the tap connections.

The IP67 rating is guaranteed only when you use Rockwell Automation-supplied connectors and heat-shrink tubing.

6 ControlNet IP67 Tap and Cable Assembly Kit Installation Instructions

Here are some example applications in which you would use the dust- and water-tight ControlNet IP67 Tap and Cable Assembly kit:

ATTENTION



Contact your Rockwell Automation representative for information on chemical environments in which the taps are suited for use. Cutting fluids and oils are not recommended for use with the taps.

TIP

Because TNC connectors have a greater operational vibration tolerance than BNC connectors (10g vs. 2.5g), TNC connectors are recommended for applications with a great deal of vibration, such as stamping or automotive presses.

- robotic welding
- bottling
- automotive paint spray booth
- food processing (with washdown)
- metal processing
- wastewater treatment facility
- automotive manufacturing
- paper/pulp processing

IMPORTANT

For information on how to plan and install your ControlNet cable System, see the ControlNet Coax Media Planning and Installation Guide, publication CNET-IN002.

Select a Location to Install Sealed Components

Use these guidelines to select where to install the components.

IMPORTANT

ControlNet is an isolated system. Connectors and the shield must not come in direct contact with a metal enclosure or other grounded equipment. The 1786-BNC2TNC and 1786-TNCJI4 isolated bulkhead connectors (available from Rockwell Automation) provide an isolation from ground when properly installed.

ATTENTION

Do not allow any metal portions of the tap, such as the universal mounting bracket screws or connectors to contact any conductive material. This contact could cause noise on the network.

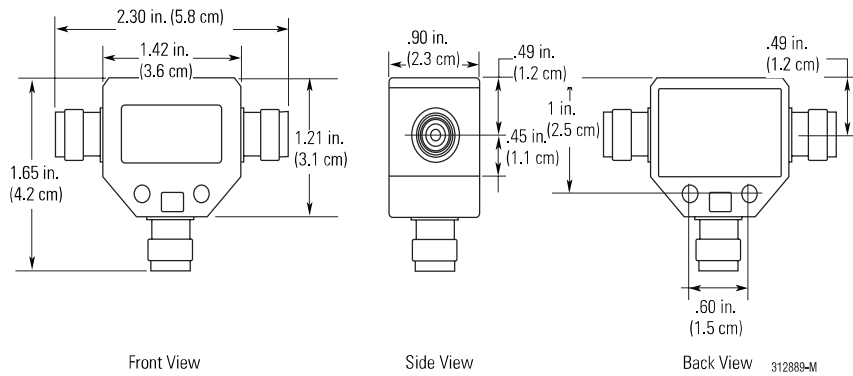
IMPORTANT

Do not cut, lengthen, or substitute the drop cable supplied in this kit. Doing so may diminish the integrity of your ControlNet network connection.

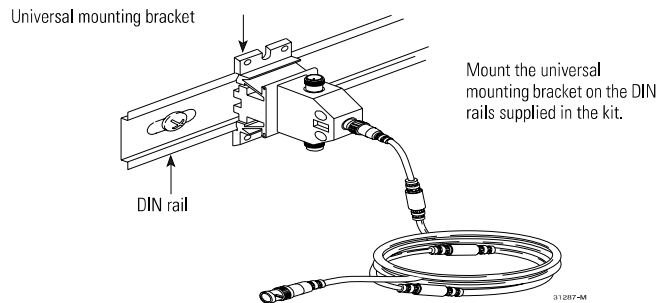
- Be certain that the installation location is convenient for routing your cable and meets the bend radius of the coax trunk line.
- Do not install sealed components so that the dropline cable is routed over any ac power terminals on nearby modules.

Install the Components

1. Determine an adequate mounting location for the tap. Refer to the dimension drawing shown below.



2. To mount the tap to the DIN rail, use the hardware provided in the kit and attach as shown in the following illustration.



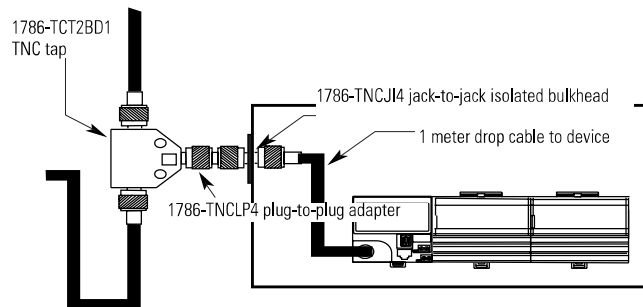
ATTENTION



Do not over-tighten the screws. Over-tightening the screws can damage the tap. The applied torque should be 0.2-0.4 N-m (1-2 ft.-lbs).

3. To mount the tap through an enclosure wall, drill a hole of approximately 17.2 mm for the 1786-TNCJ14 isolated bulkhead connector.

4. Attach the tap body to the isolated bulkhead connector using the 1786-TNCLP4 plug-to-plug adapter.
5. Attach the drop cable to the bulkhead connector. Attach the other end to the ControlNet node.



Terminate the Cable

IMPORTANT

To make IP67-approved crimps when installing connectors onto a cable, order the ControlNet Coax Tool Kit, catalog number 1786-CTK). You can also use this tool kit to make standard coax cables.

For more information on the ControlNet Coax Tool Kit, contact your Rockwell Automation representative or refer to the ControlNet Coax Media Planning and Installation Guide, publication CNET-IN002. You can order a paper copy or view an electronic copy of this manual at www.theautomationbookstore.com, or call 1-800-963-9548.

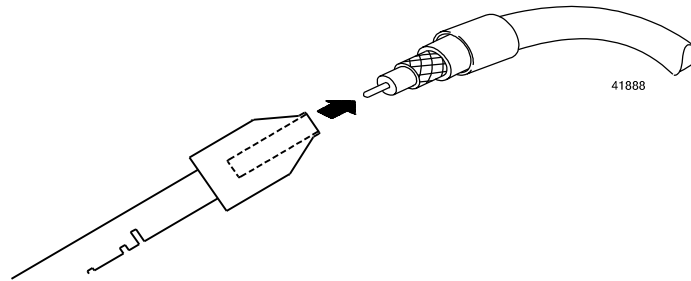
For more information on how to properly terminate cables, refer to the ControlNet BNC installation training video on compact disk, publication CNET-DM001. This CD is available from www.theautomationbookstore.com or by calling 1-800-963-9548.

IMPORTANT

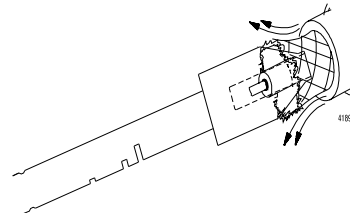
Do not cut, lengthen, or substitute the drop cable supplied in this kit. Doing so may diminish the integrity of your ControlNet network connection.

10 ControlNet IP67 Tap and Cable Assembly Kit Installation Instructions

1. If your installation requires IP67-rated connectors, slide the heat-shrink tubing onto the cable.
2. Place the crimp ferrule on to the cable.
3. Strip the cable using the 1786-CTK stripper tool.
4. Trim the center conductor to the required length as directed on the connector bag.
5. Push the flare tool onto the cable with a slight twisting motion (with sufficient inward pressure to expand the braid).



Push the flare/calibration tool gently and rotate slightly onto the connector while applying pressure. This will work the base of the connector underneath the wire braid slowly.

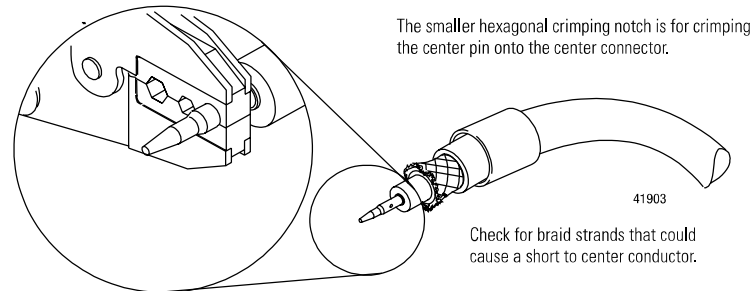


6. Place the center pin over the center conductor.

IMPORTANT

Be certain that the center pin slips onto the center conductor completely. The back shoulder of the center pin should be up against the white insulation. If it is not, recheck the length of the center conductor.

7. With the center pin in place, use the crimp tool to crimp the pin into place.



8. Slide the ControlNet connector onto the cable. Push the connector body on tight until the center pin tip is flush with the inner ground ring.
9. Slide the crimp ferrule over the three outer shields and connector base until it meets the shoulder on the connector.
10. Using the crimp tool, crimp the ferrule. Position the crimp tool on the ferrule as close as possible to the connector base and ferrule meeting line. Press the tool tightly around the ferrule until the crimp tool allows release.

TIP

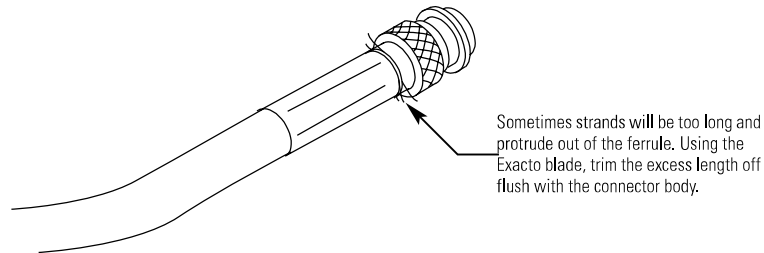
The larger hexagonal crimping notch is for crimping the ferrule which holds the connector to the cable.

TIP

Many network problems are due to improperly installed connectors. You should have tight-fitting connectors on the ends of all your cables. Pull the connector to verify that it is attached. If it is loose or comes off, snip off the connector and install a new one. The connector should withstand a minimum 60lbs pull force if properly installed.

12 ControlNet IP67 Tap and Cable Assembly Kit Installation Instructions

11. Inspect the cable at the TNC connector end for any loose cable braids. Loose braids may cause voids in the heat-shrink tubing.



12. Place the heat-shrink tubing with heat-active glue (provided in the IP67 Tap and Cable Assembly Kit) over the TNC connector body and cable.

IMPORTANT

Use only the ACUM heat-shrink tubing provided in the kit. Do not substitute other types of heat-shrink tubing. Substitutions may cause a loss of the IP67 rating.

Apply Heat-shrink Tubing

1. Follow these guidelines when heating the tubing:

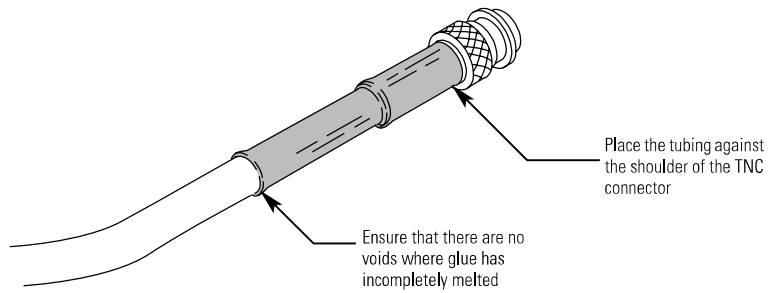
ATTENTION

Be careful when using heat guns. High temperatures can lead to burns, risk of fire, or other property damage.



- a. Place the tubing against the shoulder of the TNC connector.
- b. Allow the heat gun to come to a temperature of between 110 and 160 degrees Celsius.
- c. Hold the cable assembly approximately 2 inches away from the heat exhaust area of the heat gun while shrinking the tubing.
- d. Continuously rotate the cable assembly around the heat exhaust area of the heat gun. The entire process should take about 4 minutes.

- e. Inspect the heat-shrink tubing to ensure that there are no voids where the glue has incompletely melted. Voids could cause a loss of the IP67 rating.



31297-M

2. Attach the trunk line to the tap. Tighten the trunk-line connector to 1 N-m (0.74 ft.-lbs.).

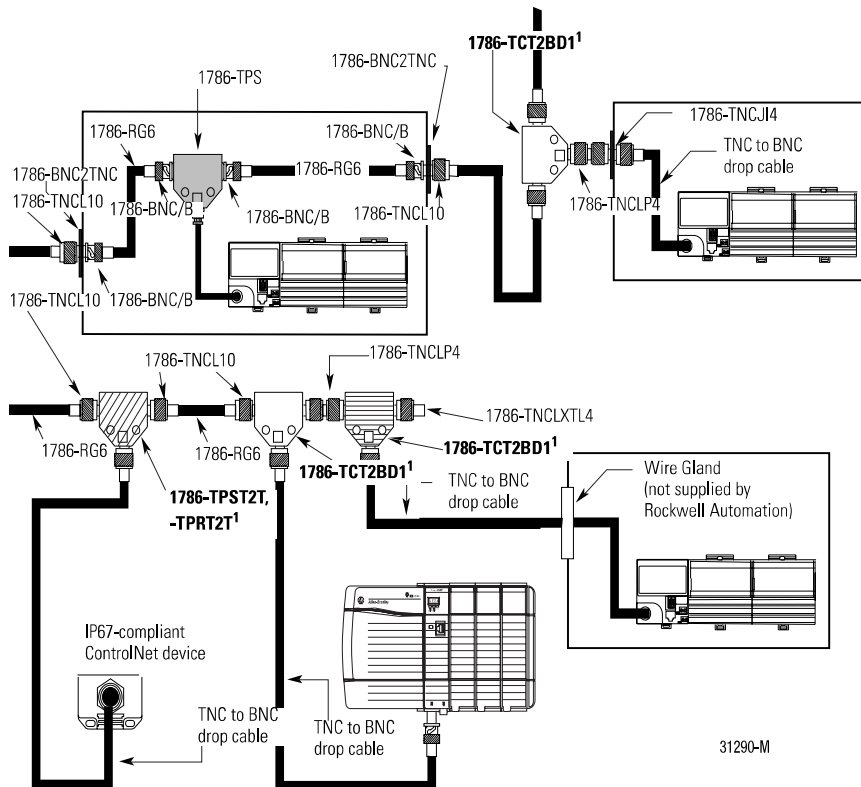
IMPORTANT

Be sure to install the dust cap on any unused connectors. Doing so will:

- prohibit the center conductor or the outer conductor from inadvertently shorting to ground during installation
 - provide partial environmental protection if a tap is left disconnected for a prolonged time
-

Connect ControlNet Segments in a Network Topology

See the following illustration for a sample network topology installation.



¹ Although the arrow in this illustration points to the tap body, the catalog number called out corresponds to the appropriate ControlNet Tap and Cable Assembly Kit.

TIP

Except where indicated in the illustration above, use only the hardware that we provide with the connector. Other hardware can diminish the integrity of your connection. For catalog numbers shown in the illustration above but not supplied in the kit, contact your local Rockwell Automation distributor.

Specifications

operational temperature	IEC 60068-2-1 (Test Ad, Operating Cold), IEC 60068-2-2 (Test Bd, Operating Dry Heat), IEC 60068-2-14 (Test Nb, Operating Thermal Shock): -20 to 70 °C (-4 to 158 °F)
storage temperature	IEC 60068-2-2 (Test Ab, Un-packaged Non-operating Cold), IEC 60068-2-2 (Test Bb, Un-packaged Non-operating Dry Heat), IEC 60068-2-14 (Test Na, Un-packaged Non-operating Thermal Shock): -40 to 85 °C (-40 to 185 °F)
relative humidity	IEC 60068-2-30 (Test Db, Un-packaged Non-operating Damp Heat): 5 to 95% non-condensing
vibration	IEC 60068-2-6 (Test Fc, Operating): 10g @ 10-500Hz
operating shock	IEC 60068-2-27 (Test Ea, Unpackaged Shock): 30g
non-operating shock	IEC 60068-2-27 (Test Ea, Unpackaged Shock): 50g

Rockwell Automation Support

Rockwell Automation provides technical information on the web to assist you in using our products. At <http://support.rockwellautomation.com>, you can find technical manuals, a knowledge base of FAQs, technical and application notes, sample code and links to software service packs, and a MySupport feature that you can customize to make the best use of these tools.

For an additional level of technical phone support for installation, configuration and troubleshooting, we offer TechConnect Support programs. For more information, contact your local distributor or Rockwell Automation representative, or visit <http://support.rockwellautomation.com>.

Installation Assistance

If you experience a problem with a hardware module within the first 24 hours of installation, please review the information that's contained in this manual. You can also contact a special Customer Support number for initial help in getting your module up and running:

United States	1.440.646.3223 Monday – Friday, 8am – 5pm EST
Outside United States	Please contact your local Rockwell Automation representative for any technical support issues.

New Product Satisfaction Return

Rockwell tests all of our products to ensure that they are fully operational when shipped from the manufacturing facility. However, if your product is not functioning and needs to be returned:

United States	Contact your distributor. You must provide a Customer Support case number (see phone number above to obtain one) to your distributor in order to complete the return process.
Outside United States	Please contact your local Rockwell Automation representative for return procedure.

www.rockwellautomation.com

Power, Control and Information Solutions Headquarters

Americas: Rockwell Automation, 1201 South Second Street, Milwaukee, WI 53204-2496 USA, Tel: (1) 414.382.2000, Fax: (1) 414.382.4444
Europe/Middle East/Africa: Rockwell Automation, Vorstlaan/Boulevard du Souverain 36, 1170 Brussels, Belgium, Tel: (32) 2 663 0600, Fax: (32) 2 663 0640
Asia Pacific: Rockwell Automation, Level 14, Core F, Cyberport 3, 100 Cyberport Road, Hong Kong, Tel: (852) 2887 4788, Fax: (852) 2508 1846

Publication 1786-IN017B-EN-P - May 2004

PN 957899-44

Supersedes Publication 1786-IN017A-EN-P - March 2002

Copyright © 2004 Rockwell Automation, Inc. All rights reserved. Printed in the U.S.A.