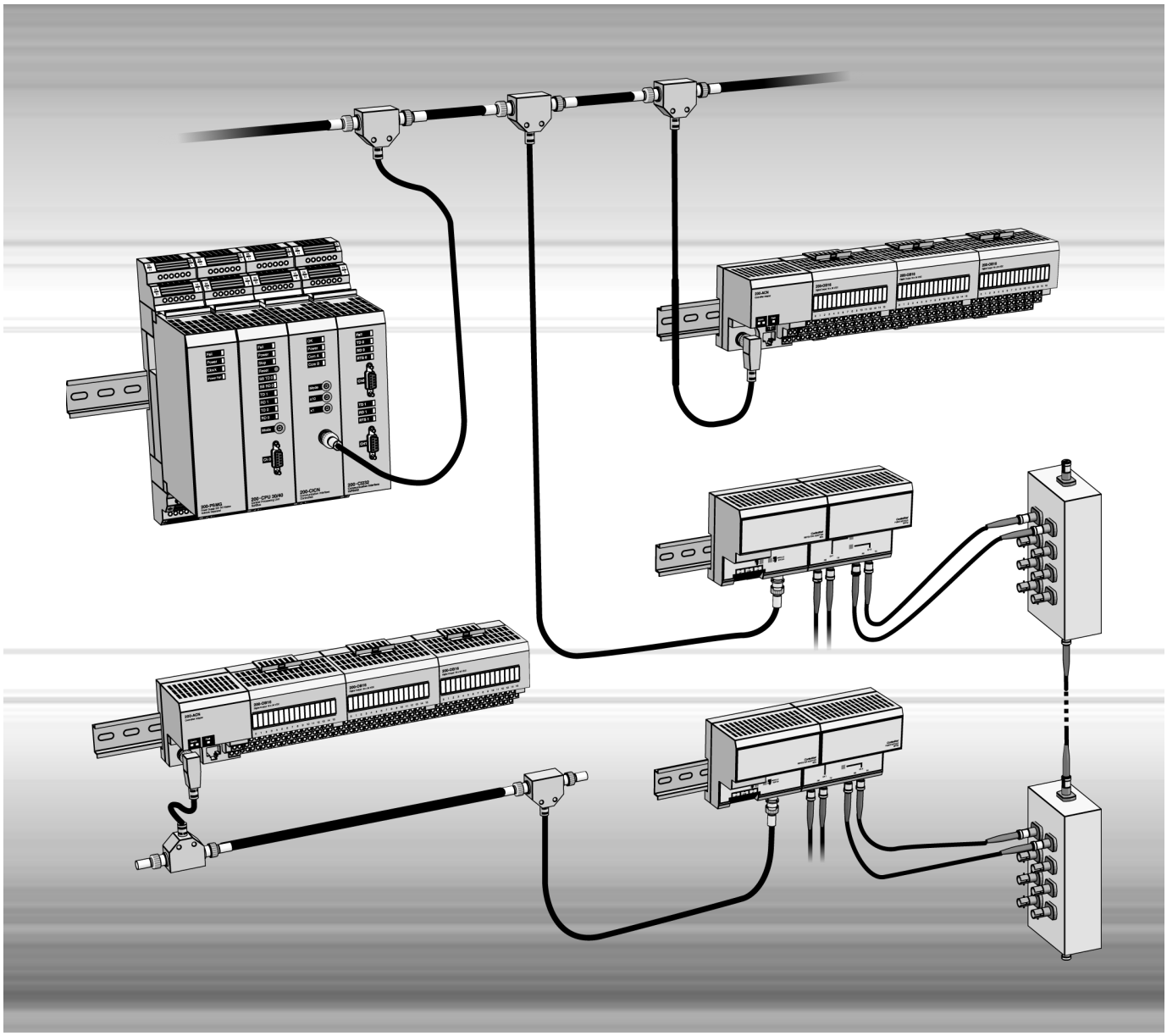
ControlNet

Network for remote I/O



ControlNet is a high-performance network for industrial applications. It is used for distributed I/O, i.e. for communication between control systems and distributed I/O units.

ControlNet has the following main features:

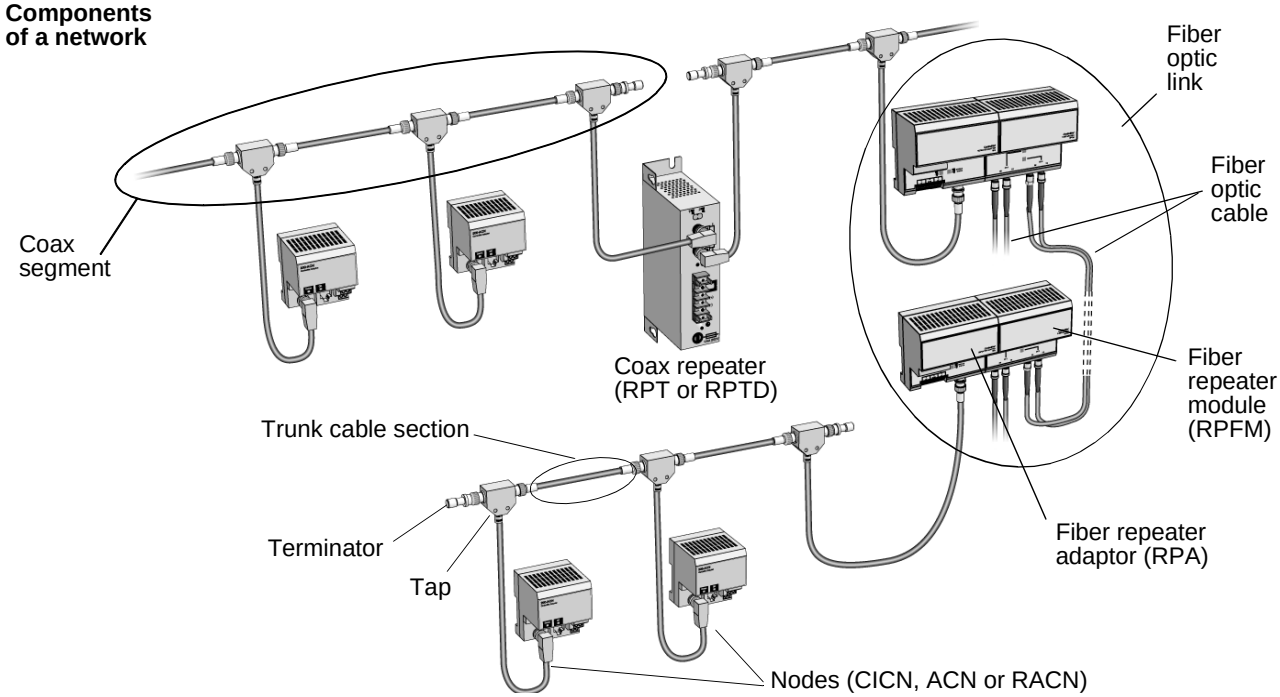
- Tested to meet the EMC directive.
- High bit rate: 5 Mbit/s.
- 99 addressable nodes per network.*
- Up to 48 taps in a 250 m coax segment.
- RG6 coaxial cable and BNC connectors – simple to install.
- Up to 1 km coax segment length without repeaters.
- Fiber optic links can be included to increase network length and obtain galvanic isolation. The total attenuation of a fiber cable section must be less than 13.3 dB, implying section lengths up to about 7000 m.
- 62.5/125 µm multimode optic fiber is used with ST connectors, operating at 1300 nm wavelength.

* Note that there are restrictions on the number of nodes that can be handled by for example 200-CICN.

CE

ABB

Definitions and Denominations



Network	A collection of nodes — with unique addresses in the range of 1–99 *.	**Node**	Any physical device connecting to the ControlNet cable system which requires a network address in order to function on the network — a network may contain a maximum of 99 nodes. Examples of nodes are 200-ACN and 200-CICN. This address must be in the range of **1–99** * and be unique to that network. CICN is always node no. 1.
Segment	Trunk cable sections connected via taps with terminators at each end.		
Trunk cable	The bus or central part of a cable system.		
Trunk cable section	A length of a coax cable between any two taps.		
Coax repeater	A two-port active component that reconstructs and retransmits all traffic it hears on one segment side to another segment side. It is used to extend the length and/or number of nodes on a network.	**Terminator**	A 75 Ω resistor mounted in a BNC plug.
		Fiber link	A data transmission link between two coax segments. Fiber repeater adaptors are connected to trunk cable taps, and up to four fiber repeater modules with two communication channels each can be plugged to a repeater adaptor. Fiber links extend the maximum network length considerably and provide galvanic isolation between nodes.
Tap	The connection between a node or a repeater and the ControlNet cable system.		

Installation Overview

Units such as CICN, ACN, RACN, RPT, RPTD and RPA are connected to taps fitted to the trunk cable. The tap facilitates unit connection, and it also suppresses high frequency noise that might be present on a running network. A tap can be mounted on a DIN-rail, using the mounting bracket which is included in the tap package together with two coaxial cable connectors for the trunk cable.

All necessary tools for attachment of coax connectors are included in the *Coax tool kit* .

The maximum allowable coax segment length depends on the number of taps that are installed. The diagram, on the right, can be used to estimate the maximum length of ControlNet standard cable for a certain number of taps. If the maximum allowable length is exceeded, coax repeaters (RPT or RPTD) can be installed.

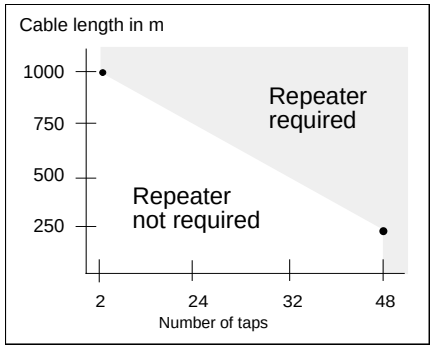
When configuring a network using repeaters, only one path is allowed between any two nodes.

Fiber optic links can extend network length considerably and provide galvanic isolation between nodes. They are mandatory to interconnect equipment in different buildings, in order to avoidproblems due to lightning and electrical interference.

A fiber link consisting of a fiber repeater adaptor (RPA) and a fiber repeater module (RPFM) at each end can be installed in place of a coax repeater. The two ends are interconnected by a fiber optic cable pair. The link can be up to 7 km in length if the installation is excellent with few connectors and splices and a cable attenuation less than 1.5 dB/km at 1300 nm wavelength.

Fiber optic cables should be installed by specially trained personnel. An interbuilding backbone cable with spare fibers ends normally at connector panels, to which the repeater modules are connected by means of flexible, ready-terminated interconnect cables.

Coax Segment Lengths



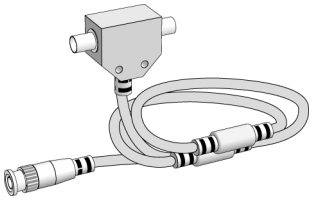
Maximum allowable segment length = 1000 m – 16.3 m x (number of taps – 2). If L m High-Flex cable is used, reduce the allowed segment length by 1.6 x L m.

* Note that there are restrictions on the number of nodes that can be handled by for example 200-CICN.

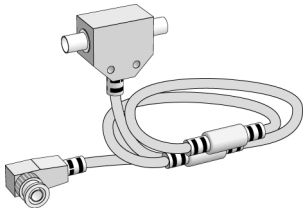
ControlNet Components

Taps

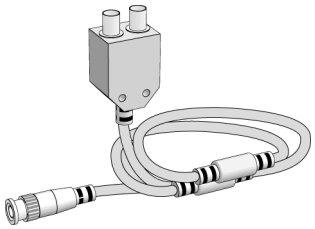
Straight T-tap
Order code: *TPS*



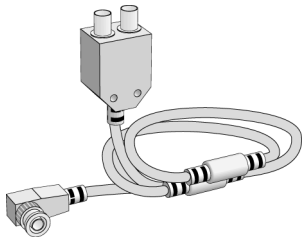
Right angle T-tap
Order code: *TPR*



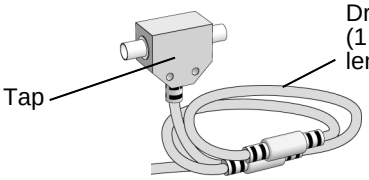
Straight Y-tap
Order code: *TPYS*

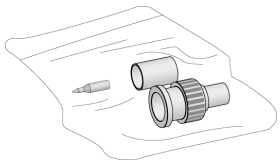


Right angle Y-tap
Order code: *TPYR*

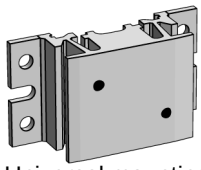


Each tap kit contains:





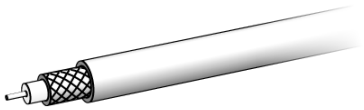
BNC connector kit (x 2)
Order code: *BNC-RG6*



Universal mounting bracket

Cables

Trunk Cable RG-6:



Standard PVC
(–40 to +80°C). For normal indoor industrial applications.
Order codes: ALA *RG6-PVC*, Belden *1189A*, Comm/Scope *5740*

Flooded burial
(–55 to +80°C). For moist and outdoor industrial applications.
Order codes: Belden *1190A*, Comm/Scope *5740B*

Plenum-FEP
(–70 to +200°C). Fire-resistant for high- and low-temperature applications, as well as corrosive areas (harsh chemicals).
Order codes: ALA *RG6-FEP*, Belden *1152A*, Comm/Scope *2227K*

High-Flex
(–40 to +75°C). For mobile device applications.
Order code: ALA *RG6F*, Belden *YR28890*, Comm/Scope *5740F*

Messengered
(–40 to +80°C). For aerial runs where a great tensile strength is required.
Order codes: Belden *1191A*, Comm/Scope *5740M*

Interlocking armor
(–40 to +80°C). Standard cable armored PVC/aluminum or PVC/steel for heavy duty applications.
Order codes: Belden PVC/aluminum *121189A*, Belden PVC/steel *131189A*, Comm/Scope *5740A*

Siamese
(–40 to +80°C). Dual standard cable.
Order codes: Belden *9072*, Comm/Scope *5740S*

Fiber Optic Cables:

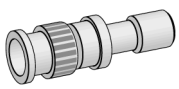
Fiber type: Multimode 62.5/125 µm

Connector type: ST (plastic or ceramic)

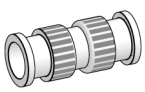
Several vendors can supply interconnect cables ready-terminated in required lengths.

Terminators and Connectors for Coax Cables

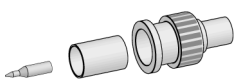
BNC-75 Ω terminator:
Order code: *BNCT*



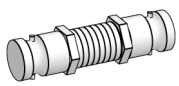
Barrel (plug to plug):
Order code: *BNCP*



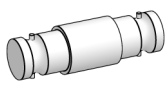
BNC/RG6-PLUG:
Order code: *BNC-RG6*



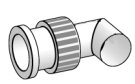
Isolated bulkhead (jack to jack):
Order code: *BNCJI*



Bullet (jack to jack):
Order code: *BNCJ*

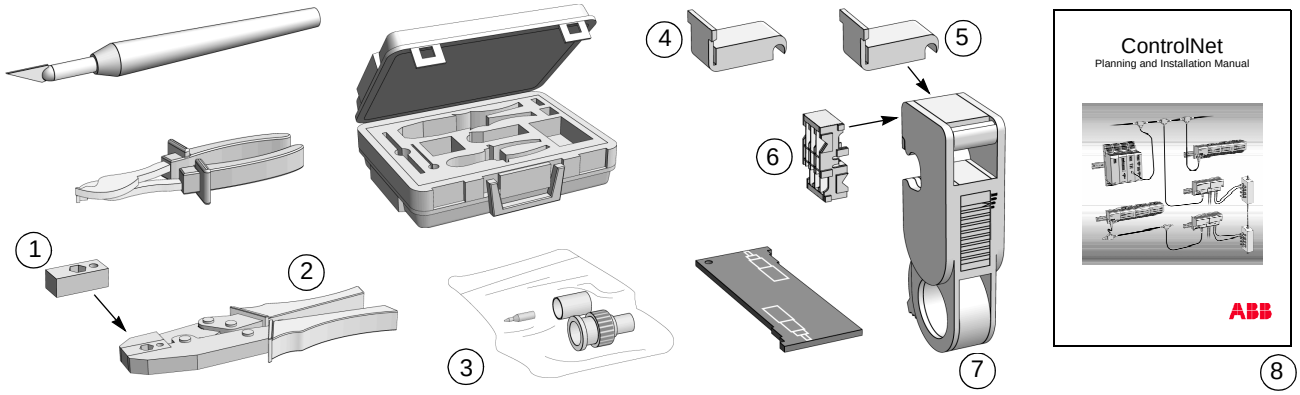


Right angle (jack to plug):
Order code: *BNCRJP*



Tools

Coax tool kit
Tools for installation of cable connectors, including extra connectors and the *ControlNet Planning and Installation Manual.*
Order code: *CTK*

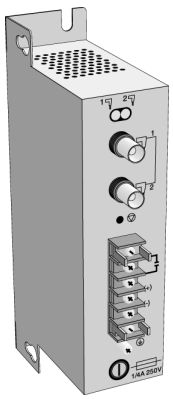


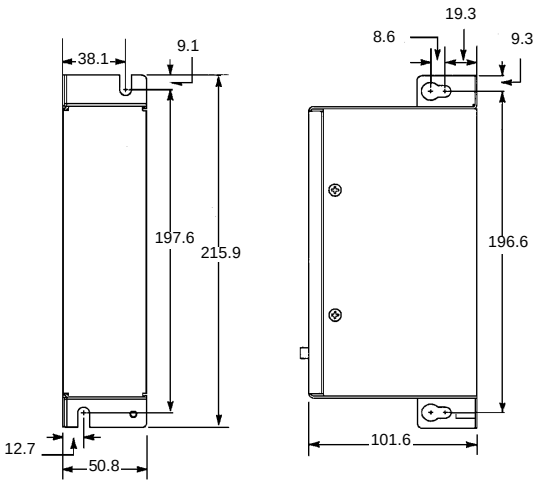
The following parts can be ordered separately	**Order code**
1) Crimp die	*CDIE*
2) Crimp tool	*CTOOL*
3) BNC/RG6 plug	*BNC-RG6*
4) Memory blade holder -FEP	*BHFEP*
5) Memory blade holder -PVC	*BHPVC*
6) Blade cassette	*BC*
7) Strip tool with blade cassette and PVC memory holder	*STOOL*
8) Planning and Installation Manual	*CN-IME*

Repeaters

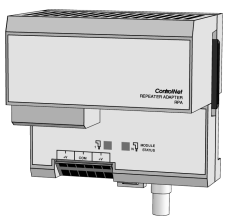
Coax repeater RPT
For 85-250 V AC.
Order code: *RPT*

Coax repeater RPTD
For 20-72 V DC.
Order code: *RPTD*

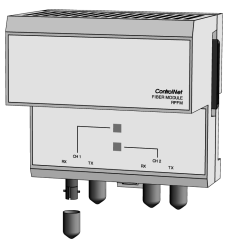


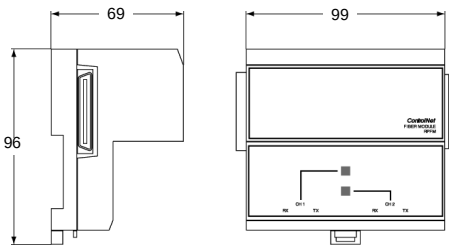


Fiber repeater adapter RPA
Order code: *RPA*



Fiber repeater module RPFM
Order code: *RPFM*





All sizes are given in mm.

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00000. AE Andersson Grafiska AB. Printed in Sweden 1998.

493-0752-11
9811 Ver. 2-2