



ControlNet High-flex RG-6 Coax Cable (Catalog Number 1786-RG6F/A/B) Series A and Series B

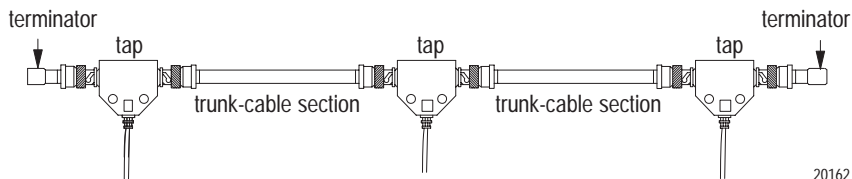
About this Document

This document contains application information you need to consider when you are installing high-flex RG-6 coax cable in your ControlNet™ network.

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Determining Trunk-cable Section Lengths

A ControlNet segment is comprised of several sections of trunk cable separated by taps. The total cable length of a segment is equal to the sum of all of the trunk-cable sections.



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Important: When determining the cable length of trunk-cable sections, make sure you measure the actual cable path as it is routed in your network. Consider vertical dimensions as well as horizontal dimensions. You should always calculate the three-dimensional routing path distance when determining cable lengths.

► The amount of high-flex RG-6 cable (1786-RG6F/A/B) you can use in a system is less than the amount of standard RG-6 cable, so you should keep high-flex cable use to a minimum. Use BNC bullet connectors to isolate areas that require high-flex RG-6 cable from areas that require standard RG-6 cable; this allows the high-flex RG-6 section to be replaced before flexure life is exceeded.

The following tables and examples are provided to help you determine what lengths of cable you can use in your system. The first example applies to the use of any Allen-Bradley standard

If you are using	The total allowable length of a segment depends on the
standard RG-6 cable (1786-RG6)	number of taps in your segment (there is no minimum trunk-cable section length requirement).
	The maximum allowable total length of a segment is 1,000 m (3,280 ft) with two taps connected. Each additional tap decreases the maximum length of the segment by 16.3 m (53 ft). The maximum number of taps allowed on a segment is 48 with a maximum length of 250 m (820 ft).
	maximum allowable segment length = 1000 m (3280 ft) – [16.3 m (53.4 ft) x [number of taps – 2]]
any RG-6 or RG6F cable (1786-RG6F/A/B)	number of taps in your segment and length of any RG-6 cable. maximum allowable segment length = $\frac{(20.29 \text{ db} - \text{number of taps}^1 \cdot .32 \text{ db})}{\text{cable attenuation}^2 @ 10 \text{ MHz per } 1000 \text{ ft (304 m)}} \times 1000 \text{ ft (304 m)}$

¹ The total number of taps in the segment

² Cable attenuation is defined as the signal loss as measured at 10 MHz per 1000 ft (304.8 m) of cable. Cable attenuation for 1786-RG6 cables can be found on the table on the following page.

Cable attenuation for 1786-RG6 cables

Cable Type	Attenuation at 10 MHz per 1000 ft (304 m)
1786-RG6	5.99 db
1786-RG6F/A	8.985 db
1786-RG-6F/B	7.18 db

The total trunk-cable length or number of taps can be increased by installing repeaters on the segment. This creates another segment.

The following examples explain how you can calculate allowable lengths of segments for standard RG-6 (1786-RG6), and high flex RG-6 (1786-RG6F/A/B) cable, as well as for a system that combines the two types of cables.

Example 1: Using only standard RG-6 cable in your system

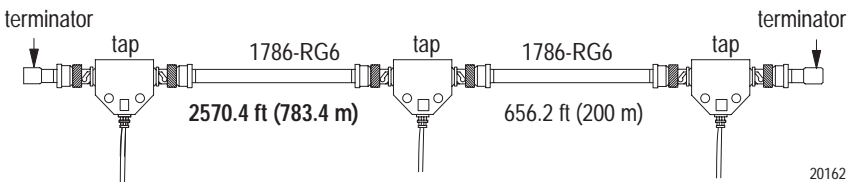
In this example, the segment:

- has 3 nodes (requires 3 taps)
- uses standard RG-6 cable

To calculate the allowable cable length of standard 1786-RG6 cable (1786-RG6):

$$3280 \text{ ft} - [53.4 \text{ ft} * [3 - 2]] = \text{maximum length}$$

$$3280 \text{ ft} - 53.4 \text{ ft} = \mathbf{3226.6 \text{ ft (983.4 m)}}$$



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Example 2: Using any cable other than RG-6 standard (5.99 db per 1000 ft) in your system

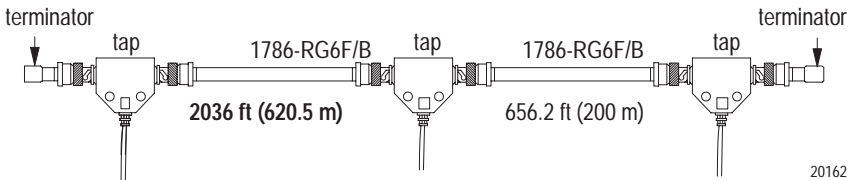
In this example, the segment:

- has 3 nodes (requires 3 taps)
- uses high-flex 1786-RG6F/B cable

To calculate the maximum allowable cable length of high-flex RG-6 cable (1786-RG6F/B):

$([20.29 \text{ db} - 3 * .32 \text{ db}] / 7.18 \text{ db}) * 1000 = \text{maximum length}$

$(19.33 \text{ db} / 7.18 \text{ db}) * 1000 = \mathbf{2692.2 \text{ ft (820.5 m)}}$



Example 3: Determining the maximum allowable length of standard cable when mixing standard and non-standard cable in the same system

In this example, the segment:

- has 3 nodes (requires 3 taps)
- requires 656.2 ft (200 m) high-flex 1786-RG6F/B

1. Calculate the amount of standard 1786-RG6 cable that is equivalent to 656.2 ft (200 m) of 1786-RG6F/B by multiplying the ratio between the two attenuations by the length of RG-6F/B cable

$$(7.18 \text{ db} / 5.99 \text{ db}) * 656.2 \text{ ft (200 m)} = \text{equivalent length of standard RG-6}$$

Equivalent length of standard 1786-RG6 = 786.6 ft (239.7 m)

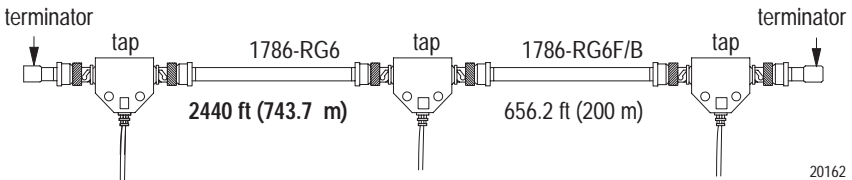
2. Calculate the remaining allowable maximum length of standard 1786-RG6 cable

$$3280 \text{ ft (1000m)} - 786.6 \text{ ft (239.7 m)} = 2493.4 \text{ ft (760 m)}$$

3. Calculate the remaining allowable length on a segment with 3 taps.

$$2493.4 \text{ ft} - (53.4 \text{ ft} * 3 - 2) = \text{allowable length}$$

$$2493.4 \text{ ft} - 53.4 \text{ ft} = \mathbf{2440 \text{ ft (743.7 m)}}$$



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CSA Hazardous Location Approval

CSA certifies products for general use as well as for use in hazardous locations. **Actual CSA certification is indicated by the product label** as shown below, and not by statements in any user documentation.

Example of the CSA certification product label

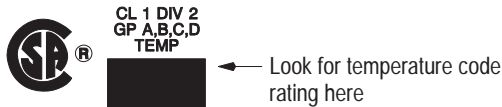


To comply with CSA certification for use in hazardous locations, the following information becomes a part of the product literature for CSA-certified Allen-Bradley industrial control products.

- This equipment is suitable for use in Class I, Division 2, Groups A, B, C, D, or non-hazardous locations only.
- The products having the appropriate CSA markings (that is, Class I Division 2, Groups A, B, C, D), are certified for use in other equipment where the suitability of combination (that is, application or use) is determined by the CSA or the local inspection office having jurisdiction.

Important: Due to the modular nature of a PLC® control system, the product with the highest temperature rating determines the overall temperature code rating of a PLC control system in a Class I, Division 2 location. The temperature code rating is marked on the product label as shown.

Temperature code rating



The following warnings apply to products having CSA certification for use in hazardous locations.



ATTENTION: Explosion hazard —

- Substitution of components may impair suitability for Class I, Division 2.
- Do not replace components unless power has been switched off or the area is known to be non-hazardous.
- Do not disconnect equipment unless power has been switched off or the area is known to be non-hazardous.
- Do not disconnect connectors unless power has been switched off or the area is known to be non-hazardous. Secure any user-supplied connectors that mate to external circuits on an Allen-Bradley product using screws, sliding latches, threaded connectors, or other means such that any connection can withstand a 15 Newton (3.4 lb.) separating force applied for a minimum of one minute.

PLC is a registered trademark of Allen-Bradley Company, Inc.

CSA logo is a registered trademark of the Canadian Standards Association.

Approbation d'utilisation dans des emplacements dangereux par la CSA

La CSA certifie les produits d'utilisation générale aussi bien que ceux qui s'utilisent dans des emplacements dangereux. **La certification CSA en vigueur est indiquée par l'étiquette du produit** et non par des affirmations dans la documentation à l'usage des utilisateurs.

Exemple d'étiquette de certification d'un produit par la CSA



Pour satisfaire à la certification de la CSA dans des endroits dangereux, les informations suivantes font partie intégrante de la documentation des produits industriels de contrôle Allen-Bradley certifiés par la CSA.

- Cet équipement convient à l'utilisation dans des emplacements de Classe 1, Division 2, Groupes A, B, C, D, ou ne convient qu'à l'utilisation dans des endroits non dangereux.
- Les produits portant le marquage approprié de la CSA (c'est à dire, Classe 1, Division 2, Groupes A, B, C, D) sont certifiés à l'utilisation pour d'autres équipements où la convenance de combinaison (application ou utilisation) est déterminée par la CSA ou le bureau local d'inspection qualifié.

Important: Par suite de la nature modulaire du système de contrôle PLC®, le produit ayant le taux le plus élevé de température détermine le taux d'ensemble du code de température du système de contrôle d'un PLC dans un emplacement de Classe 1, Division 2. Le taux du code de température est indiqué sur l'étiquette du produit.

Taux du code de température



← Le taux du code de température est indiqué ici

Les avertissements suivants s'appliquent aux produits ayant la certification CSA pour leur utilisation dans des emplacements dangereux.



AVERTISSEMENT: Risque d'explosion —

- La substitution de composants peut rendre ce matériel inacceptable pour les emplacements de Classe I, Division 2.
- Couper le courant ou s'assurer que l'emplacement est désigné non dangereux avant de remplacer les composants.
- Avant de débrancher l'équipement, couper le courant ou s'assurer que l'emplacement est désigné non dangereux.
- Avant de débrancher les connecteurs, couper le courant ou s'assurer que l'emplacement est reconnu non dangereux. Attacher tous connecteurs fournis par l'utilisateur et reliés aux circuits externes d'un appareil Allen-Bradley à l'aide de vis, loquets coulissants, connecteurs filetés ou autres moyens permettant aux connexions de résister à une force de séparation de 15 newtons (3,4 lb. - 1,5 kg) appliquée pendant au moins une minute.

Le sigle CSA est la marque déposée de l'Association des Standards pour le Canada.

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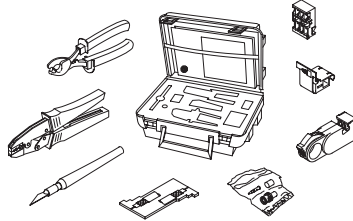
Installing ControlNet Cable

Use these components to help you install your ControlNet cable.



*ControlNet Cable
System Planning and
Installation Manual,*
publication 1786-6.2.1

ControlNet coax toolkit,
catalog no. 1786-CTK



Cable Specifications

cable life 1786-RG6F/A	4" radius = 250,000 flextures ¹
cable life 1786-RG6F/B	3.5" radius = 1.5M flextures ²
operating temperature	0 – 60°C (32 – 140°F)
storage temperature	-40 – 85°C (-40 – 185°F)
relative humidity	5 – 95% noncondensing

¹ 1786-RG6F/A cable life is calculated using a tick-tock test (0° to 90° to 0° to -90° to 0°).

² 1786-RG6F/B cable life is calculated using a rolling "C" track test with a 3.5" radius.

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