

Technical Reference

The know how. Understanding cable design, coaxial design and fiber optic design is pages away. You can also find the recommended connectors, tools and much more technical information that will help you understand cable design and implementation. We want to make your installation free from problems. If you are looking for more information on termination techniques, connector selection, or other technical data, see our web-sites. www.westpenn-wpw.com and www.westpenn-training.com.

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Understanding the National Electrical Code

The National Electrical Code (NEC) is a set of guidelines written to govern the installation of wiring and equipment in commercial buildings and residential areas. These guidelines were developed to ensure the safety of humans as well as property against fires and electrical hazards. Understanding the National Electrical Code is important from the cable manufacturer engineer and distributor, to the designer and installer. Anyone involved in specifying cable to installation of cable should be aware of the basics of the code.

In 1987, the National Electrical Code introduced some major changes that had a major impact on the wire and cable industry. The code now has listing requirements for communication and power-limited circuit cable. These requirements developed fire resistance levels for cable. The code covers initiation of fire by electronic cable as well as flame spread characteristics of the cable.

Code Organization

The NEC code book is made up of nine chapters, with each chapter divided into separate articles pertaining to specific subjects. There are about five articles that pertain to communication and power-limited cable. Each article describes wire and cable construction, material use, cable markings, installation environments and applications.

Article Categories

There are four articles that cover communication, power-limited and CATV wiring. There is another category that deals strictly with optical fiber. The following is a list of those articles and the applications or systems they cover:

Article 725 - Class 1, Class 2, Class 3, Remote-control, Signaling and Power-Limited circuits

Article 760 - Fire Protective Signaling Systems

Article 770 - Fiber Optic Systems

Article 800 - Communication Circuits

Article 820 - Community Antenna Television

Article Overviews

The NEC code can be somewhat confusing to the novice who has not studied the code in depth. In most cases, within an article, a listing will allow for a higher listed cable to be substituted for lower listed cable. Or some listings from one article may be substituted for another article listing with possible restrictions. This section will briefly cover the basis of the code to try to make things clearer for you. You should consult the NEC book for exact specifications, wording, and accuracy of the code. This is not in any way an exact excerpt from the code.

Article 725

Article 725 covers Class 1, Class 2, and Class 3 remote control and signaling cables as well as power-limited tray cable. Power-limited tray cable can be used as a Class 3 or Class 2 cable. Cable listed multi-purpose, communications, or power-limited fire protective can be used for Class 2 and Class 3 applications. A Class 3 listed cable can be used as a Class 2 cable.

Article 760

Article 760 covers power-limited fire protective cable. Cable listed as power-limited fire protective cable can also be used as Class 2 and Class 3 cable. Cable listed as communications and Class 3 can be used as power-limited fire protective cable with restrictions to conductor material and type, gauge size and number of conductors.

Article 770

Article 770 covers fiber optic cable. This article covers three general types: non-conductive, conductive, and composite. Non-conductive type refers

to cable containing no metallic members and no other electrically conductive materials. Conductive type refers to cable containing non-current carrying conductive members such as metallic strength members, etc. Composite type refers to cable containing optical fibers and current carrying electrical conductors. Composite types are classified according to the type of electrical circuit that the metallic conductor is designed for.

Article 800

Article 800 covers multi-purpose and communication cable. Multi-purpose cable is the highest listing for a cable and can be used for communication, Class 2, Class 3, and power-limited fire protective cable. Communication cable can be used for Class 2 and Class 3 cable and also as a power-limited fire protective cable with restrictions.

Article 820

Article 820 covers community antenna television and RF cable. CATV cable may be substituted with multi-purpose or communication listed coaxial cable.

Designation and Environmental Areas

Not only does listing by circuit types have to be adhered to, but installation in various environments have to also be considered. The NEC has designated four categories for various environments. These will be listed from the highest to the lowest listing. A higher listing can be used as a substitute for a lower listing.

Plenum - This listing is suitable for use in ducts, plenums, and other space used for environmental air without conduit and has adequate fire-resistant and low-smoke producing characteristics. It can also be used for applications below.

Riser - This listing is suitable for use in a vertical run, in a shaft or from floor to floor, and has fire-resistant characteristics capable of preventing the carrying of fire from floor to floor. It can also be used for applications below.

General Purpose - This listing is suitable for general-purpose use, with the exception of risers, ducts, plenums, and other space used for environmental air, and is resistant to the spread of fire. It can also be used for all applications below.

Restricted Applications - This listing is for limited use and is suitable for use in dwellings and for use in raceways and is flame retardant. Restricted use is limited to non-concealed spaces of 10 feet or less, fully enclosed in conduit or raceway, or cable with diameters less than .25" for a residential dwelling.

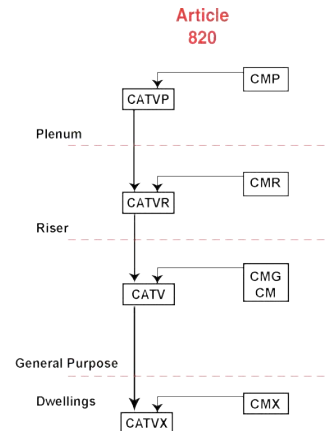
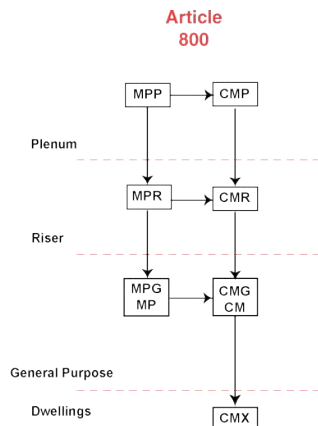
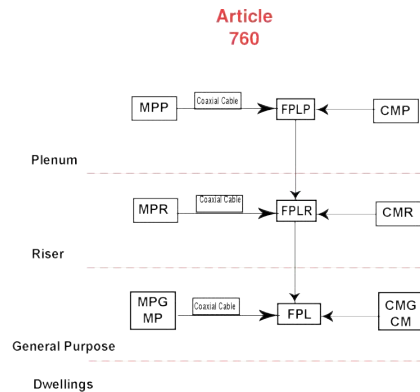
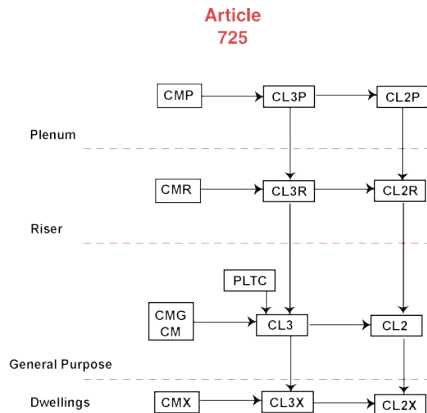
SPECIAL NOTES FOR COMMUNICATION CABLES:

- * MULTI-CONDUCTOR CABLES WITH 24-16AWG CONDUCTORS CAN BE RATED UL AND C(UL).
- * MULTI-CONDUCTOR CABLES WITH 14-8AWG CONDUCTORS ARE UL LISTED ONLY
- * 10-8AWG SPEAKER CABLES ARE CL2 ONLY AND MUST INDICATE AUDIO USE ONLY

Understanding the National Electrical Code

National Electrical Code Substitution Chart

The following chart explains the NEC cable hierarchy and will give you a "picture" view of how this all fits together. The chart starts with the higher listed cable at the top descending to the lower listed cable. Following the arrows will allow you to find what listing can be substituted for others. Also note restrictions in which case you will have to review the NEC code in order to see if your cable is applicable.



Final Considerations

The National Electrical Code is widely accepted as the suggested regulations governing the proper installation of wire and cable in the United States. The code is revised every three years to keep safety in the forefront in wire and cable manufacturing and installation. Even though the code is generally accepted, each state, county, city and municipality has the option to adopt all of the code, part of the code, or develop one of its own. The local inspectors have final authority of your installation. Therefore, the NEC is a good reference when questions arise about the proper techniques for a particular installation, but local authorities should be contacted for verification.

When choosing cable for your installation there are four guidelines to follow to keep problems to a minimum:

1. The application and environment determines which type of cable you can use and what rating it should have. Make sure the cable you're installing meets the proper ratings for your application.
2. If you will be substituting a cable with another, you must have a cable that is rated higher than what the code calls for. Check with your local inspector as to what is allowed in your local area.
3. The NEC code is a general guideline that can be adopted in whole or in part. Your local state, county, city, or municipal approved code is what you must follow. Contact your local authorities for verification of the code in your area.
4. The local inspector or fire marshal has the final authority to approve or disapprove any installation of cable based on the National Electric Code or on the local code.

If you remember these four guidelines, you should have fewer complications and headaches when installing cable in your area. Remember to always work closely with your local authorities.

Calculating Conduit Capacity

One Cable Type in Conduit

The following information is to provide you with a quick and easy reference for conduit fill requirements. This information is to be used as a general guideline. Each installation has different restrictions for installation environments and/or local codes to follow.

The Conduit Capacity Chart provided on the following page is for applications when only one type of cable is to be used in a conduit. For example, if you know the diameter of the cable you will be installing, use the cable O.D. column, and find the exact or next largest diameter cable O.D.. Follow this row over to the number of cables you need to install in a conduit. Then follow this column to the top of the chart and read the conduit size required for the number of cables you need to install.

Multiple Types of Cable in One Conduit

If you will be mixing various cable diameters in a conduit, then this overall chart does not apply. You will have to use the following guidelines to calculate the conduit fill requirements.

To determine the conduit size required for a particular installation of cable follow these steps:

1. Square the O.D. of each cable and total the results.
2. Multiply the total by .7854*. This is the total area of the cables in square inches.
3. From the Permissible Area row on the Conduit Capacity Chart shown on the following page, select the conduit size with an area equal to or greater than the total area you calculated.
 - * See Important Notes and Installation Suggestions
 - ** Permissible Area to be occupied (sq. in.) is based on the NEC standard of 40% fill, which applies to three or more non-lead covered cable installed in the same conduit.

Important Notes and Installation Suggestions

• A single cable is permitted to occupy 53% and two cables are limited to 31% conduit fill. For a single cable use .5927 in step 2, for two cables use 1.1034, and three or more cables use .7854.

• This chart is based on the maximum number of cable permitted in conduit under the National Electrical Code, and is calculated on the area of the cable with 40% of the conduit filled. For conduit runs of 50 to 100 feet, the installed number should be reduced by 15%, or use the next larger size conduit. If more than two 90 degree bends are to be used in the conduit run, or if the run is to be over 100 feet in length, insert a pull box.

• An anti-friction agent is recommended in pulling operations.

*CAUTION: Select an anti-friction agent which is suitable for the cable jacket material. The electronic characteristics of unjacketed cable may change due to the application of anti-friction agents.

* **COLD ENVIRONMENT PRECAUTION:** Due to the nature of PVC compounds to become non-pliable when stored or handled in ambient temperatures of 32 degrees F or less, we recommend the following:

"Prior to installation, condition the cable for at least 24 hours at room temperature to provide the best flex properties for ease of installation."

• Permissible area chart does not apply to metallic and non-metallic surface raceways; consult the NEC for recommendations.

THE NATIONAL ELECTRICAL CODE FORBIDS
THE INSTALLATION OF COMMUNICATION CABLE
IN THE SAME CONDUIT AS POWER CABLE.

Pulling Tensions

Under the stress of approximately 15,000 lbs./sq. in. annealed copper will begin to permanently stretch. The table below lists the absolute maximum recommended pulling tensions for conductor sizes. For multiple conductor cable, multiply the appropriate value by the total number of conductors. These pulling tensions must be equally distributed among the conductors.

THESE LIMITS MUST NEVER BE EXCEEDED
EVEN MOMENTARILY!
DON'T JERK THE CABLE!

The electronic characteristics of a cable may change due to excessive tension and crushing.

Gauge	Max. Pulling Tension
24 AWG	4 lbs
22 AWG	7 lbs
20 AWG	12 lbs
18 AWG	19 lbs
16 AWG	30 lbs
14 AWG	48 lbs
12 AWG	77 lbs

Technical Reference

Conduit Capacity Chart

Conduit Size		1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4
I.D. Inches		.622	.824	1.049	1.380	1.610	2.067	2.469	3.068	3.548	4.026
Permissible Area*		0.12	0.21	0.34	0.60	0.82	1.34	1.92	2.95	3.96	5.09
Cable O.D. Inch	Cable Area sq. Inch										
.100	.00785	15	27	44	76	103	171	298	450	588	751
.125	.01227	10	17	28	48	66	109	191	288	376	481
.150	.01767	7	12	19	34	46	76	132	200	261	334
.175	.02405	5	9	14	25	34	56	97	147	192	245
.200	.03142	4	6	11	19	26	42	74	112	147	188
.225	.03976	3	5	8	15	20	33	59	89	116	148
.250	.04909	2	4	7	12	16	27	47	72	94	120
.275	.0594	1	3	6	10	13	22	39	59	77	99
.300	.07069	1	3	5	8	11	19	33	50	65	83
.325	.08296	1	2	4	7	10	16	28	42	55	71
.350	.09621	1	1	3	6	8	14	24	36	48	61
.375	.011045	1	1	3	5	7	12	21	32	42	53
.400	.012566	1	1	2	4	6	10	18	28	36	47
.425	.14186	1	1	2	4	5	9	16	25	32	41
.450	.15904	1	1	1	3	5	8	14	22	29	37
.475	.17721	1	1	1	3	4	7	13	20	26	33
.500	.19635	1	1	1	3	4	7	12	18	23	30
.525	.21648	0	1	1	2	3	6	11	16	21	27
.550	.23758	0	1	1	2	3	5	10	15	19	25
.575	.25967	0	1	1	1	3	5	9	13	17	22
.600	.28274	0	1	1	1	3	4	8	12	16	21
.625	.3068	0	1	1	1	2	4	7	11	15	19
.650	.33183	0	1	1	1	2	4	7	10	14	17
.675	.35785	0	0	1	1	1	3	6	10	13	16
.700	.38484	0	0	1	1	1	3	6	9	12	15
.725	.41282	0	0	1	1	1	3	5	8	11	14
.750	.44179	0	0	1	1	1	3	5	8	10	13
.775	.47173	0	0	1	1	1	3	5	7	9	12
.800	.50265	0	0	1	1	1	2	4	7	9	11
.825	.53456	0	0	1	1	1	2	4	6	8	11
.850	.56745	0	0	1	1	1	2	4	6	8	10
.875	.60132	0	0	0	1	1	1	4	6	7	10
.900	.63617	0	0	0	1	1	1	3	5	7	9
.925	.67201	0	0	0	1	1	1	3	5	7	9
.950	.70882	0	0	0	1	1	1	3	5	6	8
.975	.74662	0	0	0	1	1	1	3	4	6	8
1.00	.7854	0	0	0	1	1	1	3	4	6	7
1.025	0.825	0	0	0	0	0	1	3	4	6	7
1.05	0.866	0	0	0	0	0	1	2	3	4	5
1.075	0.908	0	0	0	0	0	1	2	3	4	5
1.100	0.950	0	0	0	0	0	1	2	3	4	5
1.125	0.994	0	0	0	0	0	1	1	2	3	5
1.150	1.039	0	0	0	0	0	1	1	2	3	4
1.175	1.084	0	0	0	0	0	1	1	2	3	4
1.20	1.131	0	0	0	0	0	1	1	2	3	4
1.225	1.179	0	0	0	0	0	1	1	2	3	4
1.250	1.227	0	0	0	0	0	1	1	2	3	4
1.275	1.277	0	0	0	0	0	1	1	2	3	3
1.300	1.327	0	0	0	0	0	1	1	2	3	3
1.325	1.379	0	0	0	0	0	0	1	2	3	3
1.350	1.431	0	0	0	0	0	0	1	2	2	3
1.375	1.485	0	0	0	0	0	0	1	1	2	3
1.400	1.539	0	0	0	0	0	0	1	1	2	3
1.425	1.595	0	0	0	0	0	0	1	1	2	3
1.450	1.651	0	0	0	0	0	0	1	1	2	3
1.475	1.709	0	0	0	0	0	0	1	1	2	2
1.500	1.767	0	0	0	0	0	0	1	1	2	2

EXAMPLES:

Example A.

Sample Cable:
227- .260" O.D.

Go down the Cable O.D. inch column. Find the number equal to or greater than the cable O.D. Go across to find the number of cables in the appropriate conduit size.

.269"- Closest .275"
13 in a 1 1/2" Conduit.

Example B.

Three different Cables:

227 - .260" sqd. = .0676
D434 - .411" sqd. = .1689
6350 - .275" sqd. = .0756
+
.3169
x .7854

.2489

On the Permissible Area- equal to or greater. The closest area is .034
Use a 1" Conduit

Important Note: This conduit capacity chart is to be used as a general guideline. Because local codes can vary from the NEC. West Penn Wire cannot be held responsible for this information as it pertains to your installation. Proper conduit fill is the sole responsibility of the installer and it is your responsibility to see that your installation will pass local codes.

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ST Connectors - Straight Tip

These connectors are normally used in the Security Industry. They would be used for connecting Fire Alarm Control Panels - RS-485, Access Control Panels, CCTV Distribution.

ST connectors are similarly designed to match a BNC Connector.

Kits Offered: Optimax - FI-3635
Brilliance - FI-4270



LC Connectors - Lucent Connector

These connector type is normally found in the broadcast environment, and data networking.

They are SFF - Small Form Factor Connectors. SFF connectors are smaller in size for environments where space is a premium.

Kits Offered: Brilliance FI-4270
Optimax FI-3635

SC Connectors - Square Connector

These connector type is normally found in the data networking environment.

SC connectors are similarly designed to match a RJ45 modular plug.

Kits Offered: Brilliance FI-4270
Optimax FI-3635



FI-4270

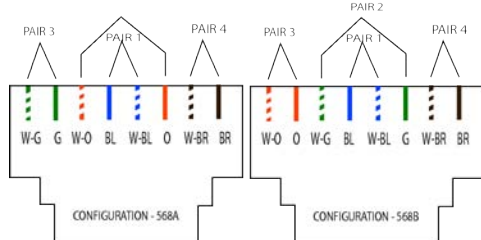
FI-3635



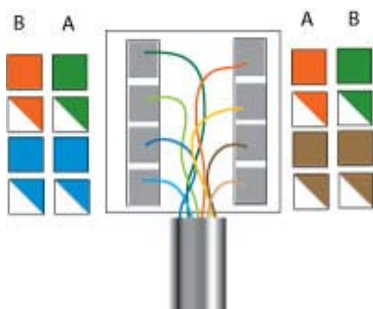
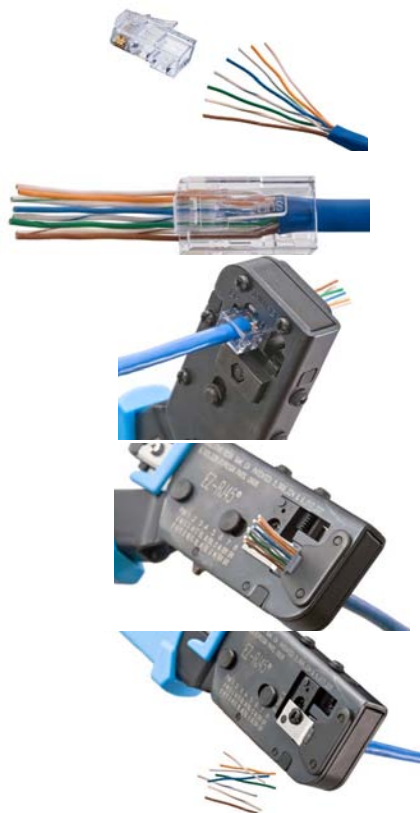
Category Cable Termination

Plug Termination:

1. Strip off 2.00" of jacket
2. Straighten and align wires to T568B or T568A - Trim Pairs
3. Insert wires into connector body
4. Pull tight to ensure jacket is .250" inside connector body
5. Verify wire location and orientation
6. Insert 32-EZP connector into crimp tool- TL-EZRJ45
7. Verify connector is completely seated and cable is fully inserted



8. Squeeze handle of TL-EZRJ45
9. Remove excess wires
10. Check jacket strain relief
11. Check that contacts are all engaged
12. Check that contact dividers are not damaged
13. Check to see if both ends of the cable have been terminated



Color alignment may change depending on the connector type and manufacturer



TL-110/66

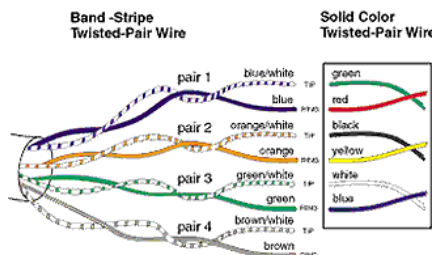
IDC

All Jacks have IDC- Insulation Displacement Connections. These connections are made with a punch down tool. The Punch down tool displaces the insulation while the individual cable is being pressed between two metal clips. The metal clips make contact with the conductor.

Terminating RJ45 Jacks

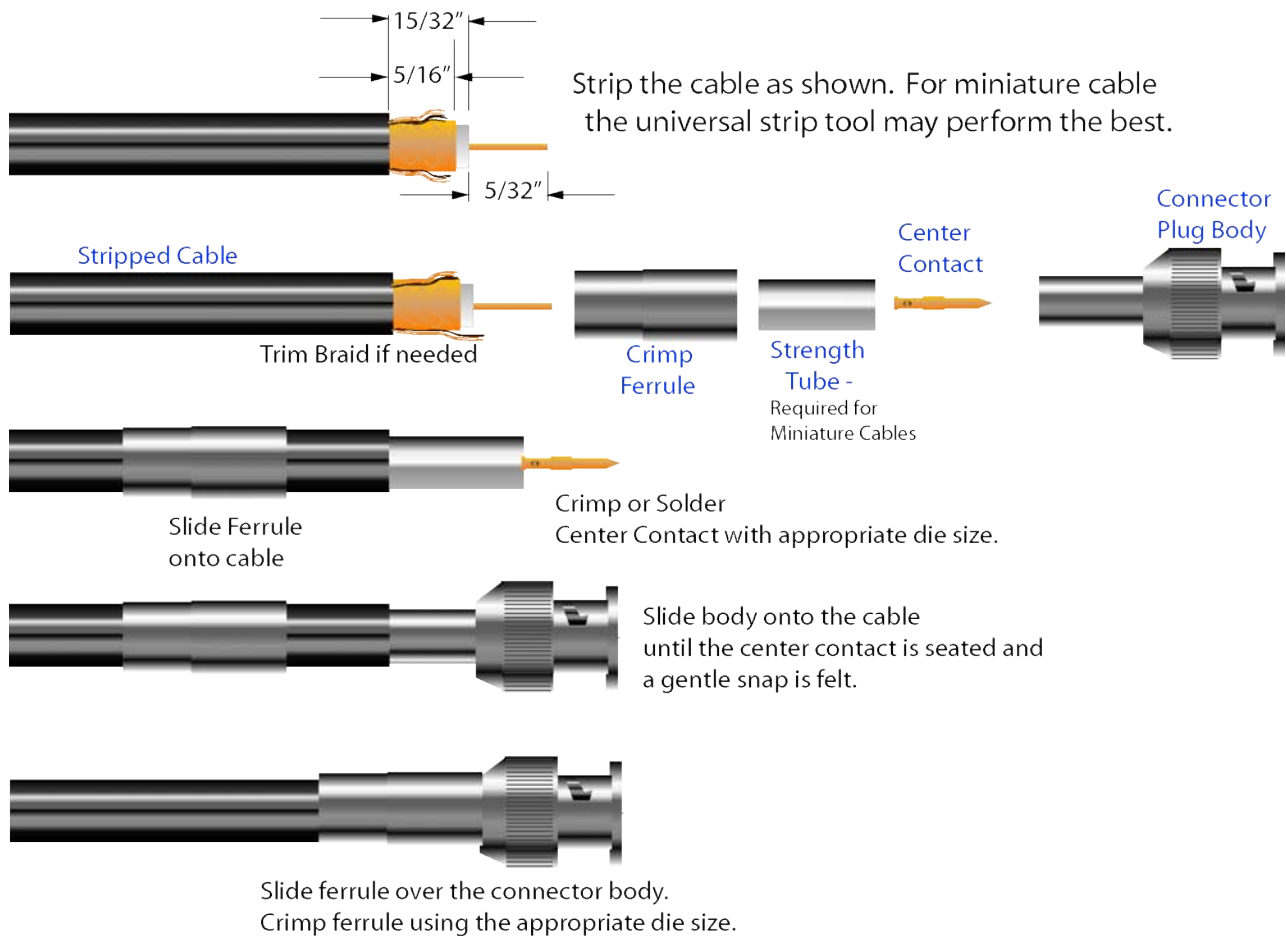
1. Strip cable .750" - 1.00" - Do not damage conductors
2. Fan out the individual Pairs. Do not untwist the individual pairs more than .500"
3. Place each wire into appropriate IDC slot color code
 - Choose between T568A or T568B
4. Punch down the individual wire - Do not punch down more than twice.
5. Place Protector Hood over the punched down wires

Cross-Compatibility:



Technical Reference

BNC Crimp Connector Termination



Crimp Tool Die Sizes: inches

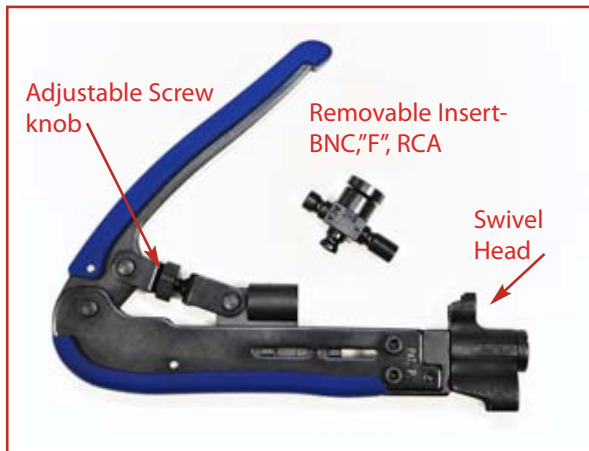
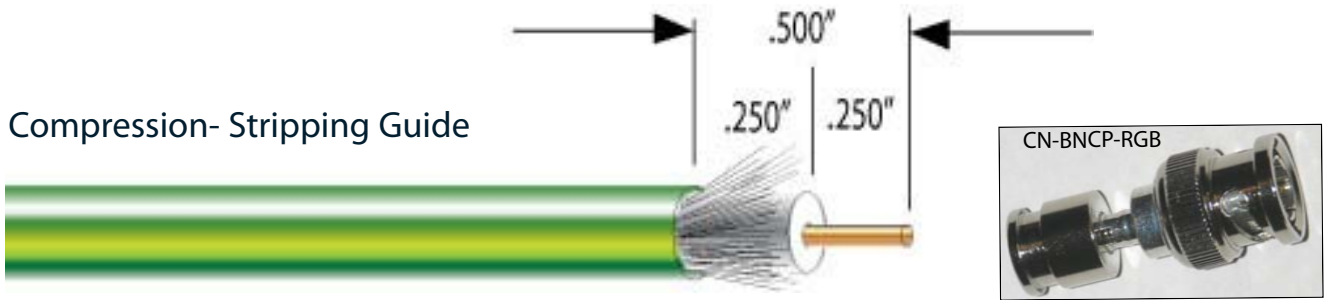
TL-104:	.068, .213, .255
TL-105:	.068, .178
TL-803:	.065, .068, .178, .213, .255
TL-107:	.068, .093, .213, .255, .311
TL-113:	.102, .359, .406
TL-115:	.068, .100, .324, .384
TL-119:	.068, .110, .213, .255, .324



Technical Reference

Compression Connector Termination

Compression- Stripping Guide



TL-5486 Lever Style Compression Tool

- Recommended for the Small Profile (Window) Compression Connectors
- Accepts Miniature, RG59/U, RG6/U, and RG11/U Cables

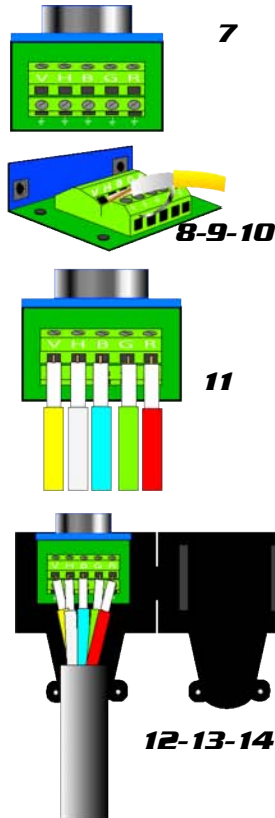
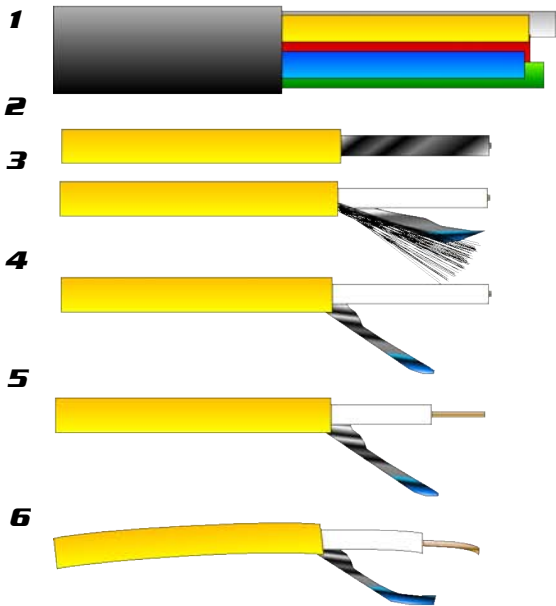


TL-SNSA Ratchet Style Compression Tool

- Will do both Longer and Smaller Profile Compression Connectors
- Accepts Miniature, RG59/U, and RG6/U Cables

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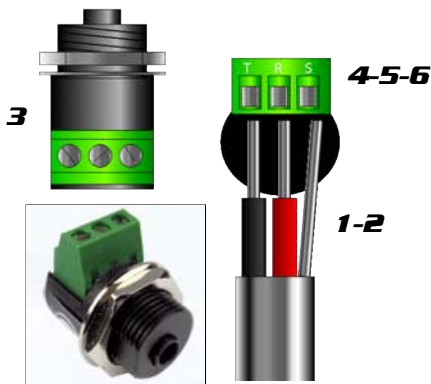
Technical Reference



VGA - Terminal Block Termination

1. Strip Jacket - 1.5"
2. Strip individual coax jacket .75"
3. Release spiral shield from the dielectric.
4. Twist shields to form a conductor
5. Strip .25" of the dielectric to expose the center conductor.
6. Bend the coax to fit properly into the connector body.
7. Unscrew terminal screws.
8. Feed Yellow coax into (V)Slot
Screw terminal tightly
9. Feed Yellow Shield into (GND)
Screw terminal tightly
10. Continue to place coaxial cables into terminals.
11. Align coaxial cables straight in the connector.
12. Slide the connector into the hood (CN-MX915H).
13. Close hood lid until the hood snaps into place.
14. Screw down the back hood onto cable jacket.

Catalog No.
CN-MX15M Male
CN-MX15F Female
CN-HD15FST



3.5mm - Terminal Block Termination - Panel Mount

1. Strip Jacket - .5" - Strip off the Foil Shield
2. Strip Individual primaries .25"
3. Unscrew terminal screws
4. Feed Black conductor into T-Tip
Screw terminal tightly.
5. Feed Red or White conductor into R-Ring
Screw terminal tightly.
6. Feed ground conductor into S-Sleeve
Screw terminal tightly.

Catalog No.
CN-MX35



Other Terminal Block Connections:

1. 3.5mm Cable mount terminal block
2. RCA panel mount terminal block
3. DB9- RS-232 terminal block
4. S-Video cable mount terminal block

Technical Reference

Coaxial Connectors

Cable Part No.	Connector Type	Connector Part No.	Crimp Tool	Strip Tool
1100	"F"	CN-F11ALX	TL-112	TL-124**
	Comp. "F"	CN-FS11V	TL-CCT-SS59/11	TL-PS11
1110	"F"	CN-F11ALX	TL-112	TL-124**
	Comp. "F"	CN-FS11V	TL-CCT-SS59/11	TL-PS11
252815	3 Pc. BNC	CN-BM53-30	TL-104	TL-7503
252815E	75Ω 3Pc. BNC	CN-BM74-32	TL-104	TL-7503
	Comp. BNC	CN-BNC59MCV	TL-SNSA or TL-548G	TL-CSST
252825	75Ω 3Pc. BNC	CN-BM74-18	TL-105	TL-825
	Comp. BNC	CN-BNCP-825	TL-SNSA or TL-548G	TL-CSST
	4-PIN MINI DIN	CN-SVHS-M		
253CRGB 255CRGB 252CSVHS	75Ω 3Pc. BNC	CN-BM74-19	TL-105 or TL-803	TL-825
	Comp. BNC	CN-BNCP-RGB	TL-SNSA or TL-548G	TL-CSST
	Comp. RCA	CN-RCP-RGB	TL-SNSA or TL-548G	TL-CSST
	HD15 Term Block Male	CN-MX15M	CN-MX915H Hood	255CRGB
	HD15 Term Block Female	CN-MX15F	CN-MX915H Hood	255CRGB
	HD15 Solder Male	40-9515HDM	40-9709HS Hood	255CRGB
256350	HD15 Solder (F)	40-9515HDF	40-9709HS Hood	255CRGB
	"F"	CN-F56TFE	TL-111	TL-7502
	Comp. "F"	CN-F6MCV	TL-SNSA	TL-SNSST
	75Ω 3Pc. BNC	CN-BM73-4	107	TL-7503
	Comp. BNC	CN-BNC6MCV	TL-SNSA or TL-548G	TL-CSST
	Comp. RCA	CN-RCA6MCV	TL-SNSA or TL-548G	TL-CSST
256100	Compression "F"	CN-F6MCV	TL-SNSA	TL-CSST
256300	Compression "F"	CN-F6MCV	TL-CPLRBC	TL-CSST
25806	75Ω 3Pc. BNC	CN-BM73-4	TL-107	TL-7503
	Comp. BNC	CN-BNC6MCV	TL-SNSA or TL-548G	TL-CSST
	Comp. RCA	CN-RCA6MCV	TL-SNSA or TL-548G	TL-CSST
25810	50Ω BNC	CN-25810KBNC	TL-115	TL-124
	50Ω TNC	CN-25810TNC	TL-115	TL-124
	50Ω "N"	CN-NM53-25810	TL-115	TL-124
	UHF	CN-UM52-25810	TL-115	--
25811	Comp. BNC	CN-CSBNC-11	TL-CCT-SS59/11	TL-PS11
	Comp. "F"	CN-FS11PL	TL-CCT-SS59/11	TL-PS11

Note: ** Center Conductor blade must be removed before using

Cable Part No.	Connector Type	Connector Part No.	Crimp Tool	Strip Tool
25812	3Pc. BNC	CN-BM53-25	TL-105	TL-7503
	50Ω TNC	CN-TM53-25812	TL-105	TL-7503
	50Ω "N"	CN-NM53-25812	TL-105	TL-7503
25815	3Pc. BNC	CN-BM53-30	TL-104	TL-7502
25815E	75Ω 3Pc. BNC	CN-BM74-32	TL-104 or TL-803	TL-7503
	Comp. BNC	CN-BNC59MCV	TL-SNSA or TL-548G	TL-CSST
PTZ25815	Comp. RCA	CN-RCA59MCV	TL-SNSA or TL-548G	TL-CSST
25819	Comp. "F"	CN-FCP-59	TL-SNSA or TL-548G	TL-CSST
	75Ω 3Pc. BNC	CN-BM74-32	TL-104 or TL-803	TL-7503
	Comp. BNC	CN-BNC59MCV	TL-SNSA or TL-548G	TL-CSST
	Comp. RCA	CN-RCA59MCV	TL-SNSA or TL-548G	TL-CSST
25821	"F"	CN-F11TFE	TL-115	TL-124**
	Comp. "F"	CN-FS11PL	TL-CSST-SS59/11	TL-PS11
25825 PTZ25825	75Ω 3Pc. BNC	CN-BM74-18	TL-105	TL-825
	Comp. BNC	CN-BNCP-825	TL-SNSA or TL-548G	TL-CSST
	Comp. RCA	CN-RCP-825	TL-SNSA or TL-548G	TL-CSST
	Female BNC	CN-BF74-18	TL-105	TL-825
25841	"F"	CN-F56ALM	TL-111	TL-7502
	Comp. "F"	CN-F6MCV	TL-SNSA	TL-CSST
250821	"F"	CN-F11TFE	TL-115	TL-124**
	Comp. "F"	CN-FS11PL	TL-PS11	TL-CSST-SS59/11
250841	"F"	CN-F56ALM	TL-111	TL-7502
	Comp. "F"	CN-F6MCV	TL-SNSA	TL-CSST
2806B	75Ω 3Pc. BNC	CN-BM73-5	TL-107	TL-7503
	Comp. BNC	CN-BNC6MCV	TL-SNSA or TL-548G	TL-CSST
	Comp. RCA	CN-RCA6MCV	TL-SNSA or TL-548G	TL-CSST

75 ohm: Dielectric inside connector body - Teflon

50 ohm: Dielectric to the face of the connector



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Technical Reference

Coaxial Connectors

Cable Part No.	Connector Type	Connector Part No.	Crimp Tool	Strip Tool
2815B 2815E	3PC. BNC	CN-BM53-2	TL-104	TL-7503
	75Ω 3Pc. BNC	CN-BM73-2 CN-BM74-32	TL-104	TL-7503
	Comp. BNC	CN-BNC59MCV	TL-SNSAor TL-548G	TL-CSST
3CRGB	75Ω 3Pc. BNC	CN-BM74-19	TL-105 or TL-803	TL-825
	Comp. BNC	CN-BNCP-RGB	TL-SNSA	TL-CSST-RGB
	Comp. RCA	CN-RCP-RGB	TL-SNSA	TL-CSST-RGB
4806	75Ω 3Pc. BNC	CN-BM73-5	TL-107	TL-7503
4811	3PC. BNC	CN-BM53-26	TL-113	TL-124**
4815	3PC. BNC	CN-BM53-2	TL-104	TL-124
	75Ω 3Pc. BNC	CN-BM74-32	TL-104	TL-7503
5CRGB	75Ω 3Pc. BNC	CN-BM74-19	TL-105 or TL-803	TL-825
	Comp. BNC	CN-BNCP-RGB	TL-SNSA	TL-CSST-RGB
	Comp. RCA	CN-RCP-RGB	TL-SNSA	TL-CSST-RGB
	HD15 Term Block Male	CN-MX15M	CN-MX915H Hood	
	HD15 Term Block Female	CN-MX15F	CN-MX915H Hood	
	HD15 Solder Male	40-9515HDM	40-9709HS Hood	
	HD15 Solder (F)	40-9515HDF	40-9709HS Hood	
6100	"F"	CN-F56ALM	TL-111	TL-7502
	Comp. "F"	CN-F6MCV	TL-SNSA	TL-CSST
6140	"F"	CN-F56AQ	TL-111	TL-7502
	Comp. "F"	CN-F6MCV	TL-SNSA	TL-CSST
6300 6310	"F"	CN-F56ALX	TL-111	TL-7502
	Comp. "F"	CN-F6MCV	TL-548G	TL-CSST
6350	"F"	CN-F56ALM	TL-111	TL-7502
	Comp. "F"	CN-F6MCV	TL-SNSA	TL-CSST
	75Ω 3Pc. BNC	CN-BM73-5	TL-107	TL-7503
	Comp. BNC	CN-BNC6MCV	TL-SNSA or TL-548G	TL-CSST
	Comp. RCA	CN-RCA6MCV	TL-SNSA or TL-548G	TL-CSST

Cable Part No.	Connector Type	Connector Part No.	Crimp Tool	Strip Tool
6CRGB2P 6CRGB4P	75Ω 3Pc. BNC	CN-BM74-19	TL-105 or TL-803	TL-825
	Comp. BNC	CN-BNCP-RGB	TL-SNSA	TL-CSST-RGB
	Comp. RCA	CN-RCP-RGB	TL-SNSA	TL-CSST-RGB
	HD15 Term Block Male	CN-MX15M	CN-MX915H Hood	
	HD15 Term Block Female	CN-MX15F	CN-MX915H Hood	
	HD15 Solder Male	40-9515HDM	40-9709HS Hood	
	HD15 Solder (F)	40-9515HDF	40-9709HS Hood	
806	75Ω 3Pc. BNC	CN-BM73-5	TL-107	TL-7503
	Comp. BNC	CN-BNC6MCV	TL-SNSA or TL-548G	TL-CSST
	Comp. RCA	CN-RCA6MCV	TL-SNSA or TL-548G	TL-CSST
807	3PC. BNC	CN-BM53-8X	TL-119	--
	50Ω TNC	CN-TM53-807	TL-119	--
	"N" Type	CN-NM53-8X	TL-119	--
	UHFT Type	CN-UM52-807	TL-119	--
810 810F	3PC. BNC	CN-25810KBNC	TL-115	TL-124
	50Ω TNC	CN25810KTNC	-	-
	"N" Type	CN-NM53/110	-	-
	UHFT Type	CN-UM52-810	-	-
811	3PC. BNC	CN-BM53-26	TL-113	TL-124
	Comp. BNC	CN-CSBNC-11	TL-CSBNC11	TL-PS11
812	3PC. BNC	CN-BM53-13	TL-104	TL-7503
	50Ω TNC	CN-TM53-1		
	"N" Type	CN-NM53-812		
	UHFT Type	CN-PL259-1		
813	3PC. BNC	CN-BM53-13	TL-104	TL-7503
	50Ω TNC	CN-TM53-1		
	"N" Type	CN-NM53-812		
	UHFT Type	CN-PL259-1		
815 815E PTZ815	3PC. BNC	CN-BM53-2	TL-104	TL-7503
	75Ω 3Pc. BNC	CN-BM74-32	TL-104 or TL-803	TL-7503
	Comp. BNC	CN-BNC59MCV	TL-SNSA or TL-548G	TL-CSST
	Comp. RCA	CN-RCA59MCV	TL-SNSA or TL-548G	TL-CSST

Note: ** Center Conductor blade must be removed before using

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Technical Reference

Coaxial Connectors

Cable Part No.	Connector Type	Connector Part No.	Crimp Tool	Strip Tool
819	"F"	CN-F59ALM	TL-111	TL-7502
	Comp. "F"	CN-FCP-59	TL-SNSA	TL-CSST
	75Ω 3Pc. BNC	CN-BM74-32	TL-104	TL-7503
	Comp. BNC	CN-BNC59MCV	TL-SNSA or TL-548G	TL-CSST
	Comp. RCA	CN-RCA59MCV	TL-SNSA or TL-548G	TL-CSST
821	"F"	CN-F11ALX	TL-112	TL-124**
	Comp. "F"	CN-FS11V	TL-CCT-SS59/11	TL-PS11
825	75Ω 3Pc. BNC	CN-BM74-18	TL-105	TL-825 or TL-KLEIN
825182	Comp. BNC	CN-BNCP-825	TL-SNSA or TL-548G	TL-CSST or TL-KLEIN
45825	Comp. RCA	CN-RCP-825	TL-SNSA or TL-548G	TL-CSST or TL-KLEIN
2825	Female BNC	CN-BF74-18	TL-105	TL-CSST or TL-KLEIN
841	"F"	CN-F56ALM	TL-111	TL-7502
	Comp. "F"	CN-F6MCV	TL-SNSA	TL-CSST
AQC2806 AQC806	75Ω 3Pc. BNC	CN-BM73-5	TL-107	TL-7503
	Comp. BNC	CN-BNC6MCV	TL-SNSA or TL-548G	TL-CSST
	Comp. RCA	CN-RCA6MCV	TL-SNSA or TL-548G	TL-CSST
AQC815 AQC819	3Pc. BNC	CN-BM53-2	TL-104	TL-7502
	75Ω 3Pc. BNC	CN-BM74-32	TL-104 or TL-803	TL-7503
	Comp. BNC	CN-BNC59MCV	TL-SNSA or TL-548G	TL-CSST
	Comp. RCA	CN-RCA59MCV	TL-SNSA or TL-548G	TL-CSST
AQC841	"F"	CN-F56AQ	TL-111	TL-7502
	Comp. "F"	CN-F6MCV	TL-SNSA	TL-CSST
HD825 HD25825	75Ω 3Pc. BNC	CN-BM74-18	TL-105	TL-825
	Comp. BNC	CN-BNCP-825	TL-SNSA or TL-548G	TL-CSST
	Comp. RCA	CN-RCP-825	TL-SNSA or TL-548G	TL-CSST
	Female BNC	CN-BF74-18	TL-105	TL-825
HQ841 HQ841R Q841	"F"	CN-F56ALX	TL-111	TL-7502
	Comp. "F"	CN-F6MCV	TL-548G	TL-CSST
Q821 Q821F	Comp. "F"	CN-FS11V	TL-CCT-SS59/11	TL-PS11

Cable Part No.	Connector Type	Connector Part No.	Crimp Tool	Strip Tool
WP258265	75Ω 3Pc. BNC	CN-BM74-19	TL-105	TL-825
	Comp. BNC	CN-CSBNC-26	TL-SNSA or TL-548G	TL-CSST-RGB
	Comp. RCA	CN-CSRCA-26	TL-SNSA or TL-548G	TL-CSST-RGB
	HD15 Term Block Male	CN-MX15M	CN-MX915H Hood	
	HD15 Term Block Female	CN-MX15F	CN-MX915H Hood	
	HD15 Solder Male	40-9515HDM	40-9709HS Hood	
	HD15 Solder (F)	40-9515HDF	40-9709HS Hood	
WP258255	75Ω 3Pc. BNC	CN-BM74-18	TL-105	TL-825 or TL-KLEIN
	Comp. BNC	CN-BNCP-825	TL-SNSA or TL-548G	TL-CSST
	Comp. RCA	CN-RCP-825	TL-SNSA or TL-548G	TL-CSST

SPECIALTY CABLES:

PAN TILT ZOOM CABLE:

PTZ815 - SEE [815](#) CABLE
PTZ25815- SEE [25815](#) CABLE

HOMENETWORKING COMPOSITE CABLES:

•HN5161 • HN5162 • HN5261 • HN5262 • HN5262F
SEE [HQ841](#) CABLE

MEDIA CONTROL CABLE: (ELAN) E1854
SEE [815](#) CABLE

AV COMPOSITE CABLES
LSAV and LS25AV - SEE [825](#)

Technical Reference

Category 5E Connectors

Cable Part No.	RJ45 Jack	Punchdown Tool	Modular Plug	Crimp Tool
4245	KJS458MT-C5E-xx xx- Colors WH,BK,BL,GY,GN,OR,RD,YE	TL-3650 or TRJ45P	32-EZP	TL-EZRJ45
	CN-705-xx - Tool less xx- Colors WH,BK,BL,GY,GN,OR,RD,YE		32-1900-xx Boots	
254245	KJS458MT-C5E-xx xx- Colors WH,BK,BL,GY,GN,OR,RD,YE	TL-3650 or TRJ45P	32-EZP	TL-EZRJ45
	CN-705-xx - Tool less xx- Colors WH,BK,BL,GY,GN,OR,RD,YE		32-1900-xx Boots	
M58762	KJS458MT-C5E-xx xx- Colors WH,BK,BL,GY,GN,OR,RD,YE	TL-3650 or TRJ45P	32-EZP	TL-EZRJ45
	CN-705-xx - Tool less xx- Colors WH,BK,BL,GY,GN,OR,RD,YE		32-1900-xx Boots	
M57562 M57561	KJS458MT-C5E-xx xx- Colors WH,BK,BL,GY,GN,OR,RD,YE	TL-3650 or TRJ45P	32-EZP 32-1900-xx Boots	TL-EZRJ45
M58145 M58144 M58186 M58196	KJS458-C5E-xx xx- Colors WH,BK,BL,GY,GN,OR,RD,YE	TL-3650 or TRJ45P	32-EZSTP 32-1900-xx Boots	TL-EZRJ45



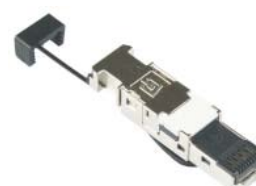
Category 6 Connectors

Cable Part No.	RJ45 Jack	Punchdown Tool	Modular Plug	Crimp Tool
4246	AX101320 (WH), AX101321 (BK), AX101323 (RD), AX101324 (YE) AX101326 (BL)	TL-3650 or TRJ45P	32-6EZP	TL-EZRJ45
	CN-706-xx - Tool less xx- Colors WH,BK,BL,GY,GN,OR,RD,YE			
254246	AX101320 (WH), AX101321 (BK), AX101323 (RD), AX101324 (YE) AX101326 (BL)	TL-3650 or TRJ45P	32-6EZP	TL-EZRJ45
	CN-706-xx - Tool less xx- Colors WH,BK,BL,GY,GN,OR,RD,YE			
M58772	AX101320 (WH), AX101321 (BK), AX101323 (RD), AX101324 (YE) AX101326 (BL)	TL-3650 or TRJ45P	32-6EZP	TL-EZRJ45
	CN-706-xx - Tool less xx- Colors WH,BK,BL,GY,GN,OR,RD,YE			
M57622	AX101320 (WH), AX101321 (BK), AX101323 (RD), AX101324 (YE) AX101326 (BL)	TL-3650 or TRJ45P	32-6EZP	TL-EZRJ45



Category 6 & Cat6A F/UTP Connectors

Cable Part No.	RJ45 Jack	Punchdown Tool	Modular Plug	Crimp Tool
M58163	KJS458TL-C6C - Tool less		CN-111S90H34	TL-EZRJ45
M58183	KJS458TL-C6C - Tool less		CN-111S90H34	TL-EZRJ45
M58900	KJS458TL-C6A - Tool less		CN-1401405012	
M58892	KJS458TL-C6A - Tool less		CN-1401405012	



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Cat 6 F/UTP

Cat 6A F/UTP

Technical Reference

UTP and F/UTP Selection

Recommended

Exceeds Recommended

	UTP and F/UTP	Category 5E		Category 6		Category 6A	
	Test Freq. MHz	100	200	100	250	100	500
10 Base T 100 Base T 155 Mbps ATM	Insertion Loss max.	22.0	--	19.8	32.8	19.0	45.3
	NEXT min.	35.3	--	44.3	38.3	44.3	33.8
	PS-NEXT min.	32.3	--	42.3	36.3	42.3	31.8
	PS-ACR min.	10.3	--	22.5	3.5	24.8	10.8
	PS-ELFEXT min.	20.8	--	24.8	16.8	62.5	52.0
	Return Loss min.	20.1	--	20.1	17.3	20.0	15.2
TIA/EIA 568 c.2 Full Duplex Ethernet Specs. 1G Base T 500MHz Broadband Video	Insertion Loss max.	22.0	--	19.8	32.8	19.0	45.3
	NEXT min.	35.3	--	44.3	38.3	44.3	33.8
	PS-NEXT min.	32.3	--	42.3	36.3	42.3	31.8
	PS-ACR min.	10.3	--	22.5	3.5	24.8	10.8
	PS-ELFEXT min.	20.8	--	24.8	16.8	62.5	52.0
	Return Loss min.	20.1	--	20.1	17.3	20.0	15.2
10G Base T	Insertion Loss max.			19.8	32.8	19.0	45.3
	NEXT min.			44.3	38.3	44.3	33.8
	PS-NEXT min.			42.3	36.3	42.3	31.8
	PS-ACR min.			22.5	3.5	24.8	10.8
	PS-ELFEXT min.			24.8	16.8	62.5	52.0
	Return Loss min.			20.1	17.3	20.0	15.2
TIA 568-C.2 CATEGORY 6A FULL 100 meters	Insertion Loss max.					19.0	45.3
	NEXT min.					44.3	33.8
	PS-NEXT min.					42.3	31.8
	PS-ACR min.					24.8	10.8
	PS-ELFEXT min.					62.5	52.0
	Return Loss min.					20.0	15.2
MAX TEST FREQUENCY:		200 MHZ		550 MHZ		750 MHZ	

Line Level Audio Connectors



Speaker Level Audio Connectors



Cable Part No.	3 Pin XLR Plug	3 Pin XLR Jack	3.5mm Plug	1/4" Plug TRS
77291	44-A3M CN-NC3MX	44-A3F CN-NC3FX	CN-NYS231	CN-NP3C
D25291	44-A3M CN-NC3MX	44-A3M CN-NC3MX	CN-NYS231	CN-NP3C
(x)454	44-A3M CN-NC3MX	44-A3M CN-NC3MX	CN-NYS231	CN-NP3C
D25454	44-A3M CN-NC3MX	44-A3M CN-NC3MX	CN-NYS231	CN-NP3C
455	44-A3M CN-NC3MX	44-A3M CN-NC3MX	CN-NYS231	CN-NP3C
DA2401	44-A3M CN-NC3MX	44-A3M CN-NC3MX		
DA252401	44-A3M CN-NC3MX	44-A3M CN-NC3MX		
452	44-A3M CN-NC3MX	44-A3M CN-NC3MX	CN-NYS231	CN-NP3C

Cable Part No.	Speakon Cable Mount	Banana Plugs -Black	Banana Plugs -Red	
225 25225B	CN-NL4FX	19-1240	19-1239	
226 25226B	CN-NL4FX	19-1240	19-1239	
227 25227B	CN-NL4FX	19-1240	19-1239	
HA225	CN-NL4FX	19-1240	19-1239	
HA226	CN-NL4FX	19-1240	19-1239	
HA227	CN-NL4FX	19-1240	19-1239	
HA210	CN-NL4FX	19-1240	19-1239	
C208	CN-NL4FX	CN-8PX-24B		

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Technical Reference

Shipping Policy and Return Policy

Shipping Policy (Wire and Cable)- Freight Allowance: Shipments totaling \$750.00, (\$3000.00 Distributors) or more will be Freight Prepaid via negotiated overland truck only in the continental U.S. (excluding Alaska and Hawaii**). All other shipments will be freight collect with no freight allowance. NO C.O.D. shipments. Air shipments only with written authorization. Accessorial Charges (Inside delivery, Call before delivery, Lift gate, Construction site, Limited access, Residential deliveries, Reconsignment, or Re-delivery, and High cost service delivery areas) are not included in Pre-paid Shipments.

**West Penn Wire will pay for standard shipments to Hawaii or Alaska when the order size meets and/or exceeds \$5,000. This does not include partial shipments at the request of the customer.

Odd Length Spools - Random lengths other than standard packages may be available with an additional 15% discount. We reserve the right to ship up to 10% of total order on odd length spools.

Cancelled orders - Subject to a minimum \$100.00 service fee.

Standard Terms - Net 30 days, subject to additional terms as stated on reverse side of invoice.

Take advantage of our Quick Pay discount!

1.5% 15 days, net 30

Shipping Policy (Racks/Cabinets)-

West Penn wire will provide estimated freight charges and will not be liable for charges due to problems that may occur in transit or upon delivery or not known at the time of the initial quote (accessorial charges). All shipments leaving WPW-Belden are FOB origin.

Sales Return Policy

Request to Return Material

Customers wishing to return material to West Penn Wire are required to obtain a "Return Material Authorization" (RMA) number prior to the material being returned. RMA numbers are issued in numerical sequence and expire 90 days from the date of issuance.

All material must be returned in original unopened West Penn Wire packaging. Returned material will only be accepted if received within six months of the original invoice date.

The issued RMA will provide instructions as to where and how the material is to be returned.

No return authorizations will be issued for discontinued items, warehouse clearance items, special made lengths, non-catalog items, and fiber.

Returns Due to WPW Error

If a return is necessary due to an error by West Penn Wire the customer will be reimbursed through trade credits for the material returned and any freight originally paid by the customer. The RMA will provide instructions as to where and how the material is to be returned. If the material is not returned pursuant to the provided instructions, the customer will be responsible for all freight charges incurred.

Returns Due to Customer Decision

If a return is requested by the customer due to any reason other than a WPW error, the customer will be responsible for the pro rata share of the original outbound freight if prepaid by WPW and the return freight. Returns will also be subject to the following restocking charges if received in conformity with the return policy:

- * 25% restock charge if there is no replacement order.

- * 10% restock charge if there is an equal dollar amount replacement order.

- * No restock charge if there is a replacement order that is twice the dollar amount of the original order.

All Content is subject to Change: Consult West Penn Wire

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Limited Product Warranty - West Penn Wire

I. Limited Product Warranty

The following warranty is exclusive and in lieu of all other warranties, whether express or implied, or statutory, including, but not by way of limitation, any warranty of merchantability or fitness for any particular purpose.

West Penn Wire (WPW) warrants that the Products are, at the time of delivery to Buyer, free of material and workmanship defects, provided that no warranty is made with respect to:

- (a) any Product which has been repaired or altered in such a way, in WPW's judgment, as to affect the Product adversely;
- (b) any Product which has, in WPW's judgment, been subject to negligence, accident or improper storage;
- (c) any Product which has not been installed, operated and maintained in accordance with normal practice and in conformity with recommendations and published specifications of WPW.

At its option, WPW shall repair, replace or refund the purchase price of any non-conforming Products for a period of ten (10) years from the date of shipment of the Products to Buyer, and such obligation shall be the full extent of WPW's liability. WPW's liability with respect to any material not of WPW's manufacture shall be limited to the liability assumed by the vendor(s) of such material. Repairs to, alteration of, or work done on Products warranted by WPW but without WPW's prior written authorization shall void WPW's warranty on the Products.

Upon discovery of a defect, Buyer shall notify WPW in writing within 30 days of discovery of the defect of any claim whatsoever that Buyer may have with respect to any Products delivered hereunder, and failure to give such notice within the specified time shall constitute an unqualified acceptance and waiver of all claims with respect to the Products. Upon receipt of notice from Buyer of non-conforming Products, WPW may inspect such Products at Buyer's location or require that they be returned to WPW F.O.B. WPW's designated location.

II. Exclusivity of Remedy; Limitation of Liability

The remedies provided for in the preceding paragraph shall constitute the sole recourse of Buyer against WPW for breach of any of WPW's obligations under this Agreement, whether the claim is made in tort or in contract, including claims based on warranty, negligence, strict liability, fraud, misrepresentation, or otherwise.

In no event shall WPW be liable for special, indirect, incidental, consequential or punitive damages (regardless of the form of action, whether in contract or in tort, including negligence), nor for lost profits, nor shall WPW's liability for any claims or damage arising out of or connected with this Agreement or the manufacture, sale, delivery or use of the Products exceed the purchase price of the Products.

Racks/Cabinets/Enclosure Warranty:

Limited Warranty

West Penn Wire - Belden warrants that, for a period of one (1) year following the date of delivery to the original customer, the products it offers for sale in the catalog are free from defects in material and workmanship. The foregoing warranty is subject to the terms, limitations and conditions set forth below.

Components Not Manufactured by West Penn Wire -Belden

Electrical components, air conditioners, fan assemblies, blower units and other components not manufactured by WPW, but installed in our products, are excluded from this warranty. Only such warranty that may be offered to WPW's customers by the manufacturer of such item(s) shall apply, subject to the terms, limitations and conditions thereof

SignaMax Product Warranty: 25 years - www.signamax.com

If it's part of the link - the lifeline that keeps your networks running - then it's covered by the Signamax 25-Year Connectivity/Cabling System Limited Warranty. From our patch panels and 110 cross connect systems to our outlet products - to the cable that links it all together - our warranty program gives you the assurance that you need in the world of constant changing network technology. For system warranty, please contact SignaMax. 800-446-2377.

All Content is subject to Change: Consult West Penn Wire

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VIDEO



A RGB/HV- Red, Green, Blue, Horizontal and Vertical Sync

Application: Connection between video scalars and PC's to plasma screens or other video output devices

- Bulk Cable pgs- 102-104 • Cable Assemblies- pgs 107-108
- 75Ω BNC Connectors - pg.105 • Install Kits- pgs. 112-113
- Wall plates - pgs. 135-137

B VGA (Video Graphics Array) - High Density 15 pin - HD15 inputs.

Application: Connection between PC's to plasma screen or projectors.

- Bulk Cable pgs- 102-104 • Cable Assemblies- pgs 107-108
- VGA Connectors - pg.105 • Install Kits- pgs. 112-113
- Wall plates - pgs. 135-137
- Digital Signage VGA Products over Nanoskew- pg. 110-111

C HDMI- High Definition Multimedia Interface

Application: Connection for HDTV, Digital Audio, and IR communication between AV equipment.

- Cable Assemblies/ Extender over Cat5E/6- pg. 134-137

DVI- Digital Visual Interface

Application: Connection for HDTV, and other Digital Video

- Cable Assemblies/ Extender over Cat5E/6- pg. 138-139

Displayport pg. 140

USB pg. 140

D Component Video- RCA or BNC - Y, Pb, Pr

Application: Consumer Analog Television for resolutions up to 1080i.

- Bulk Cable pgs- 114 • Cable Assemblies- pgs 115
- RCA Connectors - pg.115

E S-Video- SVHS- Super Video

Application: Y/C - Separation of Luminance/Chrominance for better quality video signals

- Bulk Cable pgs- 118 • Cable Assemblies- pgs 119
- 4 Pin Mini Connectors - pg.119

F Composite Video - BNC or RCA

Application: Standard video signalling. All video signals travel within one coaxial cable.

- Bulk Cable pgs- 120 • Cable Assemblies- pgs 102
- RCA Connectors - pg.111 • 75Ω BNC Connectors - Pg.105
- Wall plates - pgs. 135-137

G CATV- Cable Antenna Television

Application: CATV/MATV, Broadband signals

- Bulk Cable pgs- 204-209 • "F" Connectors - pg. 210
- Installation Tools - pg. 211

H RS-232 - Control/ Serial DATA:

- Bulk Cable pgs-188-191 • dB9 Connectors - pg. 192

AUDIO AND DATA



A 3.5mm- Mini Phone Jack

Application: Audio from computer to output - line level Small sized

- Bulk Cable pgs- 142-151 • Cable Assemblies- pgs 153
- 3.5mm Connectors - pg.152-153

B 1/4"- Phone Jack

Application: Microphone inputs

- Bulk Cable pgs- 142-151 • 1/4" Connectors - pg.152-153

C XLR- 3 Pin - Cannon "X" Series- L-Latched- R- Rubber

Most common audio connector used in professional, commercial, and music applications

Application: Line level balanced audio signalling.

- Bulk Cable pgs- 142-151 • XLR Connectors - pg.152-153

D Speakon- Loadspeaker

Application: Connection between amplifier and loadspeaker Long wearing, locking connector

- Bulk Cable pgs- 156-164 • Speakon Connectors - pg.165
- Cable Assemblies- pg.165

E RJ45- Data Connector- Registered Jack - 8 pin

Application: Data connections

Category 5E: pg.174-175

Category 6: pg. 176-179

Category 6A: pg. 176-179

USB - A and B - Connect Computer Devices and Smartboards

- Over Cat5E Extender - pg. 140

F ST- Fiber optic connector- Bayonet Style- Straight Tip

Application: Fiber Optic Connections

G SC- Fiber optic connector- Subscriber connector- Push Pull Style

Application: Fiber Optic Connections

H LC- Fiber Optic Connector- Local connector - Small formed factor

Application: Fiber Optic Connections

- Bulk Cable pgs. 194-197 • Cable Assemblies- pg. 198
- Connectors/ Kits - pg.200

- Install Tools - pgs. 201 • Testing Equipment - pg. 202