COMMSCOPE®

Inside LSA-PLUS®

Because your network is worth it

Lower costs

Better network performance
Higher quality and consistency
Secure, uninterrupted services

LSA-PLUS
The communications contact

You don’t install a telecommunications network every day. It must therefore fulfill at least two criteria:

- Interference-free functionality
- Long-term reliability

You should not settle for less. CommScope’s LSA-PLUS technology is precisely what you need to fulfill these requirements.

For decades, LSA-PLUS has been synonymous with

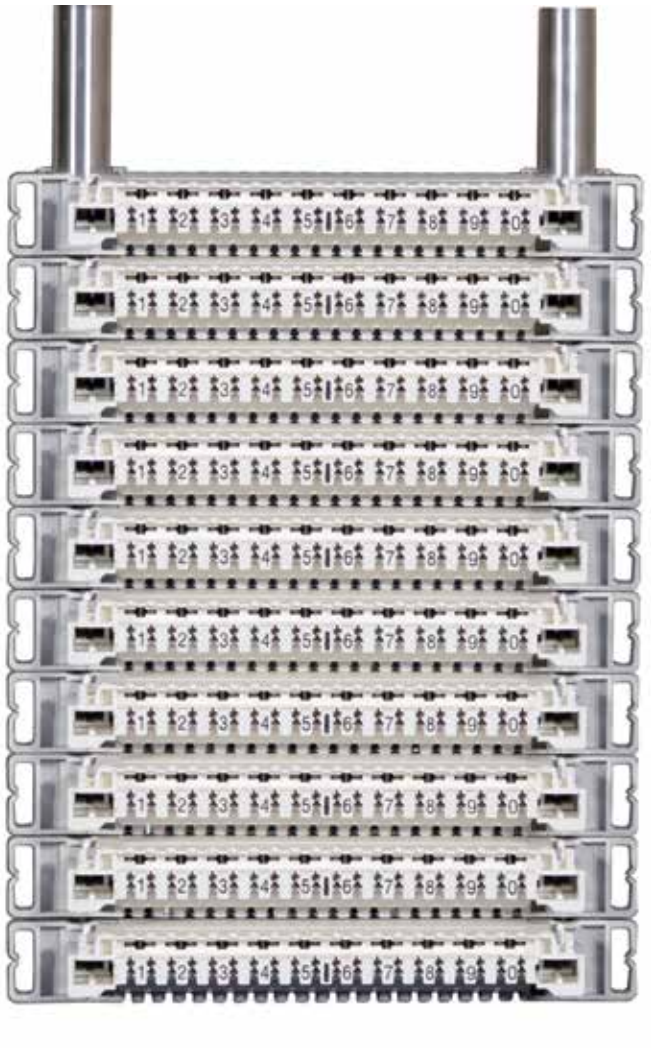
- Security
- Reliability
- Quality
- Economic efficiency

As a pioneer in quick connection techniques, CommScope set the benchmark more than 30 years ago with the invention of LSA-PLUS. Today, we are still the technological front-runner when it comes to secure, quick and reliable connections in telecommunications networks. The continuous development of innovative applications with LSA-PLUS technology ensures that you will be able to rely on a secure network with original quality from CommScope today and in the future. With these innovations, we enable telecommunications service providers to introduce next-generation networks. We focus on the flexibility of the networks, simple handling and cost effectiveness.

In more than 140 countries worldwide, the technically and economically superior LSA-PLUS quick connection technique has won over millions of users—make up your own mind:

- Unlimited transmission of all known communications services that use shielded or unshielded two or four-wire copper cables as a medium
- Connection of cable leads without soldering, wire-stripping or the use of screws using a multi-functional sensor insertion tool
- Patented contacts with optimum electrical conductance values
- High contact reliability in the event of vibration, cold, heat, moisture and other atmospheric or climatic influences
- High wear resistance thanks to high-performance plastics
- Compliance gas-tight contact points
- Economical and user-friendly thanks to drastically reduced installation times and maintenance intervals (low operating costs)
- Compliance with ISO/IEC 352, Part 4
- Certified production in accordance with ISO 9001 and ISO 14001
- Fulfillment of additional environmental standards (such as RoHS)

Thanks to a consistent product policy and a high level of innovation, CommScope fulfills the requirements for a modern network topology with an extensive product portfolio. This is rounded off by a broad range of accessories.



Connection techniques

The table below shows which sources of interference may arise with conventional mechanical connection techniques.

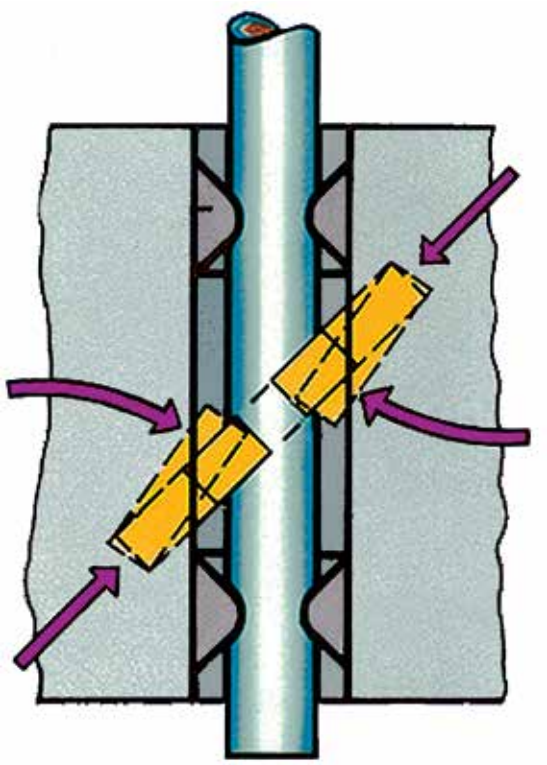
Connection techniques / Stresses on the connections	False-twisting and soldering together 	Soldering 	Splicing 	Using screws 	Crimping 
Wire break	x	x	x	x	x
Poor-quality soldered joints	x	x	x		
High-resistance connections	x	x	x	x	x
Susceptibility to corrosion	x	x	x	x	x
Vibration	x		x	x	x

x = source of interference

The LSA-PLUS insulation displacement technique from CommScope

Connects leads without solder, screws or wire-stripping, which means that typical sources of interference in these types of connections cannot occur. A correct insulation displacement connection prevents corrosion, loosening caused by vibration, high-resistance joints and a weakening of the wires.

This technique forms the basis for the flexible networks of tomorrow.



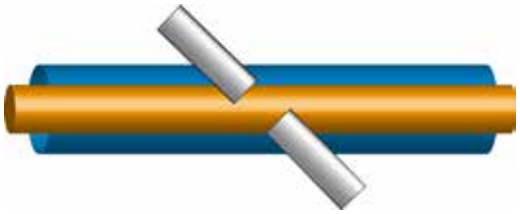
The LSA-PLUS contact

LSA-PLUS contacts work according to the same basic principle, regardless of which connection modules are used.

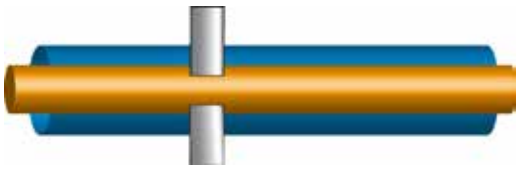
How the CommScope contact differs

The CommScope 3-point insulation displacement contact guarantees a durable and reliable connection.

1. Clamping ribs fix the wire in position and protect the contact points against vibration and other forms of mechanical stress.
2. Flexible contacts in a special alloy, arranged at an angle of 45° to the brace axis, form a gas-tight and corrosion-resistant connection.
3. The constant torsion and axial reset forces of the contacts inside the plastic casing ensure a long-lasting connection.

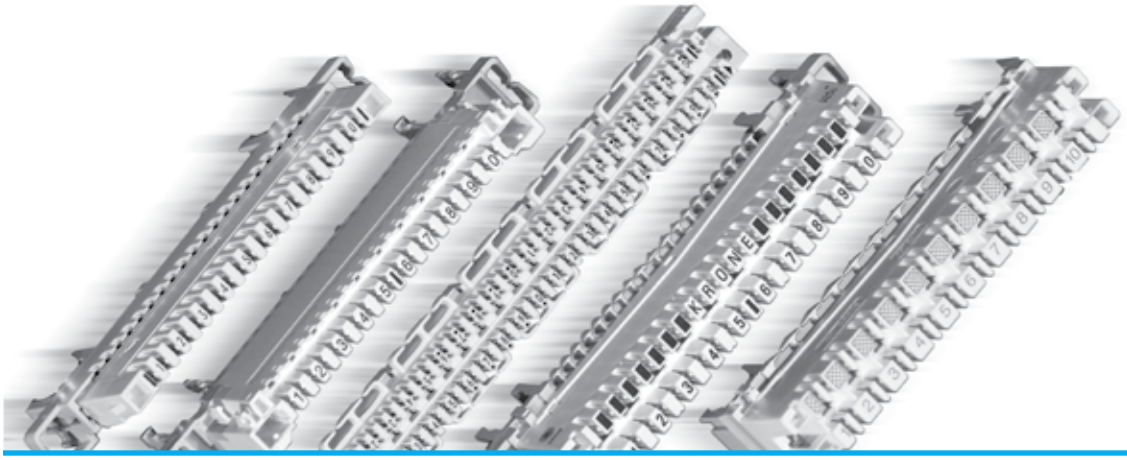


Positioning the contacts at a 45° angle only causes a slight cross sectional change and therefore no weakening of the stability of the connected conductor.



Positioning the contacts at a 90° angle causes a considerable reduction in the cross section, which can lead to a possible wire break.

Application in modern FTTC broadband solutions



The LSA-PLUS portfolio

LSA-PLUS stands for a technically and economically superior quick connection technique for all modern communications networks. The LSA-PLUS connection technology ensures a high level of contact reliability over decades even under the most difficult of environmental and climatic conditions.

The LSA-PLUS portfolio is continuously adjusted to the increasing requirements for telecommunications networks in the 21st century.

Thanks to the comprehensive LSA-PLUS portfolio, an individual network tailored to special requirements can be realized. Depending on the requirement, it is possible to choose between the LSA-PLUS NT, Series 10, Series 2, Series 1 and HighBand®. The five series are outlined in detail below.

The LSA-PLUS NT and series 10

Characterized by the high connection density made possible by the compact and space-saving design.

The LSA-PLUS HighBand

Optimized especially for use in high-speed IP networks.

The LSA-PLUS series 2

Characterized, among other things, by an extensive product spectrum and an extremely broad range of accessories. It is popular around the world and has been tried and tested a million times over.

The LSA-PLUS series 1

Based on the idea of replacing solder lug strips with the insulation displacement technique. It is the oldest of the series and was designed especially for flat mounting. series 1 is intended for internal installation.

Features and functional description

The LSA-PLUS series module casing is made of flame-retardant thermoplastic polyester and is extremely resistant against environmental influences (climate; aggressive atmosphere; exposure to sunlight). The insulation displacement contacts arranged at an angle in the casing are made of silver-plated special brass and are characterized by their low transition resistances and their high level of transmission quality, which is due not least to the gas-tight insulation displacement connection. Naturally, LSA-PLUS technology fulfills the high requirements of the standard ISO/IEC 352, part 4.

Connection module

The functional principle of the LSA-PLUS connection module is based on an unbreakable connection. On the system/cable side and the jumper side, the cable leads are connected to the contacts arranged opposite one another. In the center are separate contacts for each pair, which, for example, can be used for measurement and testing work, for switching using switching adapters or for inserting overvoltage protection magazines (3-point protection with overvoltage protection contact arrestors or semiconductor elements). The casing is grey.

Disconnection module

With the LSA-PLUS disconnection module, the connection can be broken by placing a disconnection plug in the normally closed contact between the connection contacts. Using patch and test cords, it is possible to create a wide variety of different circuits for measuring and testing. The disconnection module principle is particularly suitable for realizing high-quality protection concepts. The casing is white.

Switching module

With the LSA-PLUS switching module, the individual connection contacts and up to 40 idle circuits are disconnected. By adding plugs or cords, circuits can be connected if necessary or used for measuring and testing purposes. The installation of 5-point or graded protection is also possible. The casing is brown or, in the LSA-PLUS NT modules, yellow.

Earth module

Depending on the design, the LSA-PLUS earth modules enable up to 84 cable leads to be laid to a common electrical potential. Via a securely connected flexible earth line, the earth potential to a backmount frame or to an earth terminal is established. The casing is red.

Mounting systems

CommScope offers two mounting systems: the LSA PROFIL® fixing system and the LSA-PLUS backmount frame system.

The LSA PROFIL technique is an extremely flexible fixing system (for fixing dimensions of 75 mm and 95 mm). Two round rods (Ø 12 mm) are used to accommodate the modules of the LSA PROFIL system. Universal mixed equipping with other LSA PROFIL series, coax connectors or CommScope fiber-optic components is also possible.

The LSA-PLUS backmount frame for 8-pair and 10-pair modules is made of U-shaped stainless steel, which guarantees a high level of stability and full corrosion resistance.

Note: All LSA PROFIL series 2 and HighBand modules can also be snapped on to backmount frames.

Advantages and benefits

- Reliable LSA-PLUS quick connection technique that has been tried and tested worldwide
- Reliable and economical networking
- Standardized mounting dimensions enable universal mounting
- Compact and space-saving
- Extremely easy to handle when mounting, minimizing installation work
- Huge savings on time and costs
- Satisfied users
- Quality that has been proven over decades
- Universal suitability for internal and external use
- Low operating and maintenance costs
- Integrated cable management

LSA-PLUS

Because your network is worth it!

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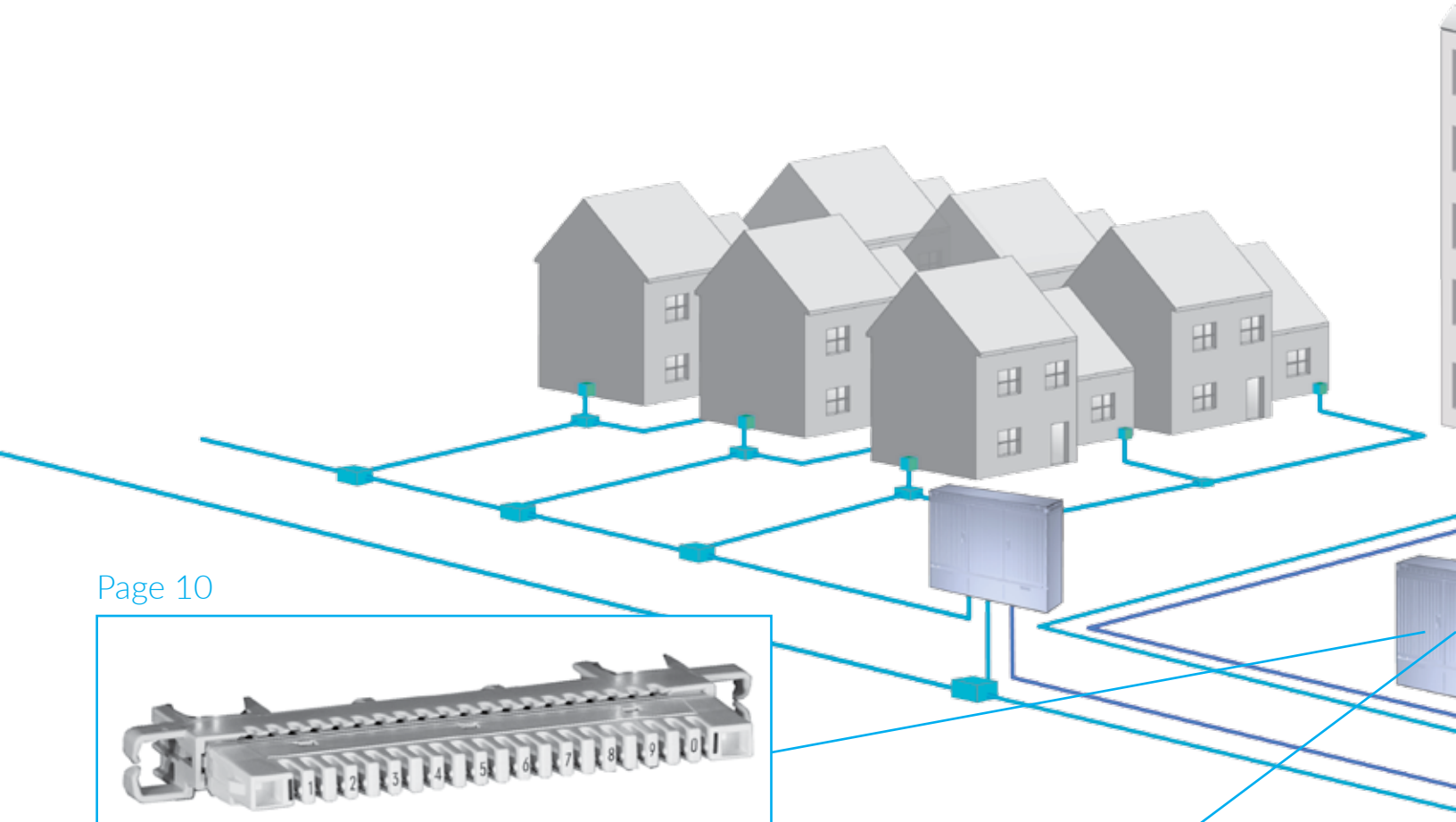

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LSA-PLUS NT

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Series 10

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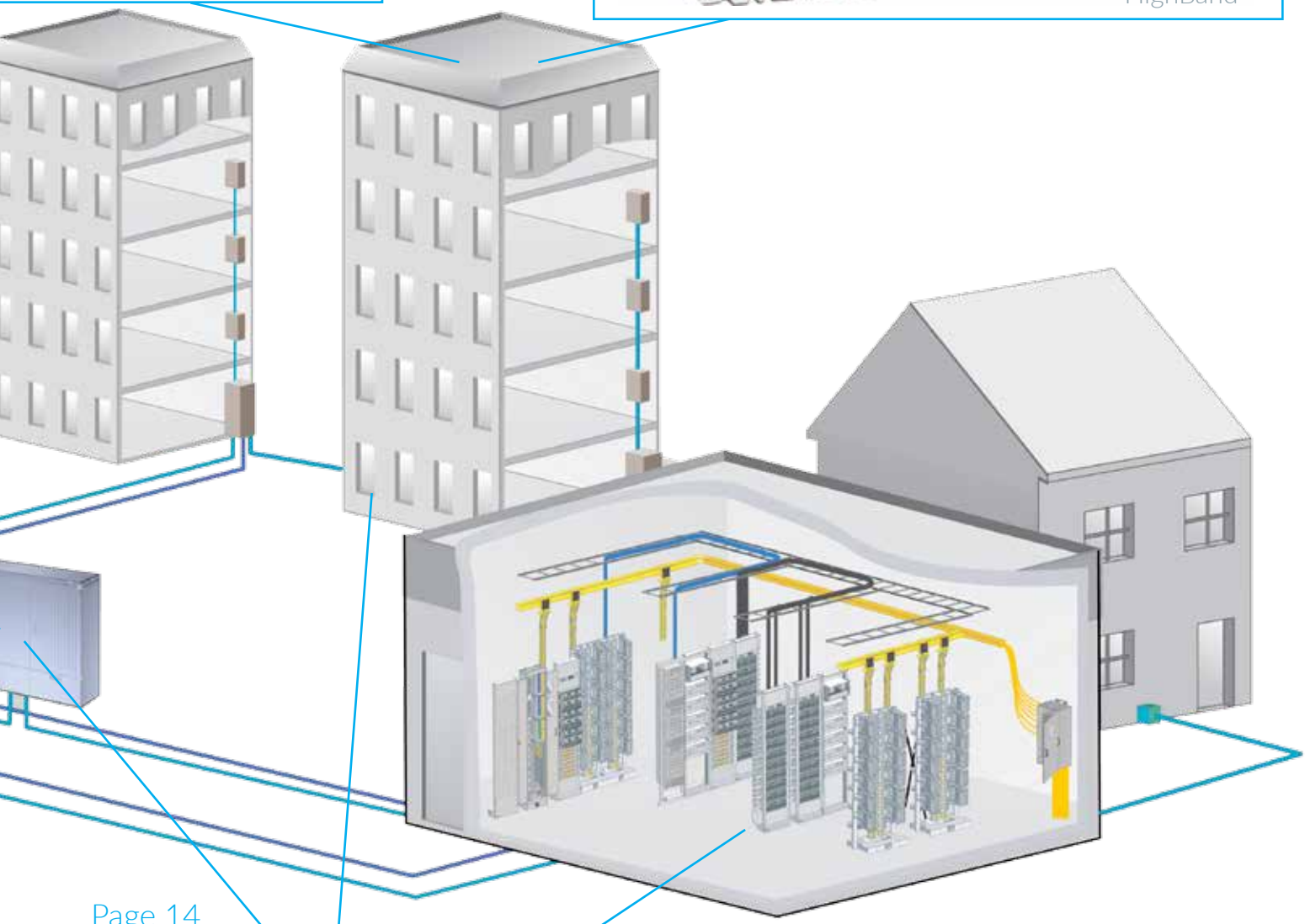
Series 1

HighBand



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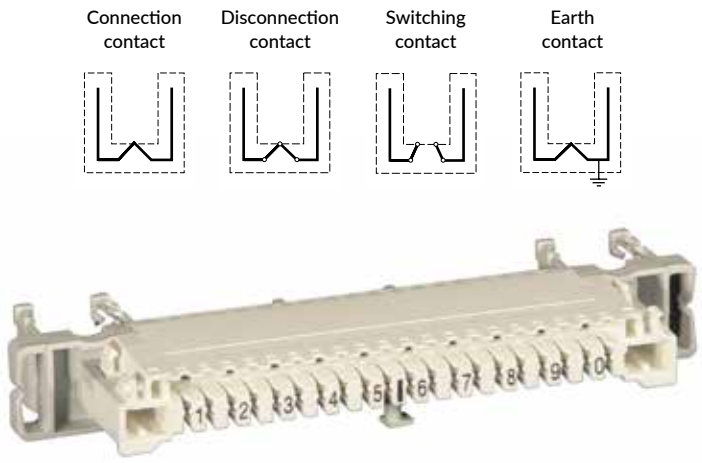
Series 2



The secure LSA-PLUS NT series

If you want to reduce operating costs for your copper network by up to 50% without limiting the application options or if you no longer have enough space in the distributor, we recommend the LSA-PLUS NT series.

This series is characterized in particular by its extremely high connection density. Thanks to the wide variety of contact types and an extensive range of accessories, the LSA-PLUS NT series can be used in all kinds of telecommunications distributors.

Application

The LSA-PLUS NT series is ideally suited to applications where a large number of copper wires have to be connected or distributed and there is limited space available, e.g. when installing in cross-connection cabinets for new broadband networks with ADSL and/or VDSL technology. Thanks to its compact, space-saving design and its hidden cable side, the LSA-PLUS NT series is also ideal for use in collocation areas.

Contact types

The LSA-PLUS NT series is available as a disconnection, connection, switching and earth module for 8 and 10 pairs. For shielded cables, the LSA-PLUS NT is available as an 8x a-b-s disconnection module.

Features and functional description

The unique design of the LSA-PLUS NT series guarantees quick and secure operability with an extremely low circuit fault rate.

In the LSA-PLUS NT series, the contacts for the cable leads are arranged at an angle of 90° to the contacts for the jumper leads. The cable leads are fed in from behind so that, when mounted, only the contacts for jumpering work are immediately accessible from the front. This means that, when carrying out switching work, the cabling is reliably protected against unauthorized or accidental access. This is important, for example, in collocation areas with cabling of various network operators. Should it be necessary to carry out work on the cable side, the module can be released from its mounted position at any time.

Because the cable and jumper sides are on different levels, more space is available for the jumper wires. This means that shielded jumper wires can also be connected more easily. Despite generous jumper conduits, the modules are mounted in a narrow pitch of 17.5 mm, creating a space saving of up to 33%. The connection density is 570 pairs per meter of rack length.

Mounting systems

Two types of mounting systems are available:

a) Backmount frame (pitch dimension 17.5 mm) at various mounting depths (23 mm – 80 mm) and a different hole pattern suitable for a wide range of diverse installation variants and cable volumes

b) LSA PROFIL mounting system (Ø 12 mm; center-to-center distance 95 mm or 75 mm)

Accessories

Labeling and marking options

Fold-away shield frames enable individual pairs to be marked separately, while the PROFIL module shield frame is used for block marking. All shield frames are supplied complete with small white paper shield frames and a transparent cover.

Marking caps are used to mark individual pairs to identify special cables or protect them against accidental switching. Pre-printed number flags are available to count the connection points.

Disconnection plugs are used to break connections at the center contact of the disconnection modules.

One-pair dummy plugs can be used to mark important cables and to prevent the accidental disconnection of important connections in disconnection modules.

Testing and switching

For testing purposes, 2 and 4-pin adapter cords are available. The 2-pin cord is used for accessing connection and disconnection modules in parallel. The 4-pin cord is used for targeted measurement of the outgoing or incoming direction in disconnection modules.

For uninterrupted switching, switching adapters and disconnection adapters for one pair are available. For temporary connections, CommScope offers a wide variety of patch cords.

Overvoltage protection

For the LSA-PLUS NT series, magazines are available for 3-pin arrestors as a complete protection element. When plugged into connection modules, a surge voltage resistance of 5kA (8/20µs) is achieved.

Moreover, one-pair protection plugs for flexible use are available in the following categories: general protection plugs, general and current protection plugs, graded protection and maintenance-free graded protection.

Advantages and benefits

- Compact and space-saving with extremely high connection density
- Versatile
- Optimum for collocation areas
- Reduction in investment costs due to optimized utilization of the installation space (also in the case of existing distributor devices)
- Small contact pitch
- Extensive range of accessories
- Simple and flexible mounting system (LSA PROFIL)

High density series 10 modules

Thanks to its extremely high connection density, the LSA-PLUS series 10 is the ideal solution for wherever space is limited. This series enables you to utilize your space in the distributor to the optimum.

Application

The LSA PROFIL series 10 high-density module has been designed especially for applications where an extremely high connection density is necessary due to spatial limitations and the number of subscriber connections to be installed, e.g. in the case of integrated ADSL and VDSL technology. Typical areas of application for this series are small distributors, terminating boxes and cross-connection cabinets.

Contact types

The LSA PROFIL series 10 is available as a connection module for 10 pairs.

Features

In the LSA PROFIL high-density module, two LSA-PLUS contact rows are arranged next to one another in a multiple of 20 in a plastic casing. This concept allows space-saving and cost-saving jumper connections to be realized.

Since the contacts for the cable leads are at an angle of 180° to the contacts for the jumper leads, the cable side is protected in an ideal way against accidental access. Only the jumper wire side is freely accessible. If work on the cable side is necessary, the module can be released from its mounted position at any time.

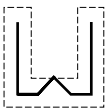
The series 10 is available both with and without a termination one-way safety feature.

By using the variant without the one-way safety feature, a connection density of up to 830 pairs per meter of rack length can be achieved. When using the one-way safety feature, the connection density is 580 pairs per meter of rack length.

Mounting systems

The modules mount using the LSA PROFIL mounting systems with a 75 mm center-to-center distance (Ø 12 mm).

Connection contact



Accessories

Testing and switching

A test cord is available for testing purposes.

Labeling and marking

Accessories for marking the modules, shield frames (complete with small white paper shield frames and a transparent cover) are available.

Specific jumper tracks that must not be changed accidentally can also be identified with one-pair marking caps.

Advantages and benefits

- Compact and space-saving with maximum connection density
- Reduction in investment costs due to optimized utilization of the installation space (also in the case of existing distributor devices)
- Small contact pitch
- Simple and flexible mounting system (LSA PROFIL)

High performance HighBand series

With the HighBand product range, CommScope has once again proven, that its reputation as a technology leader is well deserved. In terms of transmission properties, HighBand modules surpass virtually all connection technology systems on the market. Through optimum performance, the HighBand series makes modern communications networks fit for the requirements of the future.

Application

With greatly improved transmission properties and a considerably increased transmission bandwidth, HighBand modules are perfect for high-speed LAN and WAN systems. In structured cabling systems or carrier networks, the HighBand series forms the basis for future-ready networks for high-bit-rate IP data traffic, multimedia content or high-resolution, interactive TV services.

Contact types

The LSA-PLUS HighBand series is available as a disconnection module and switching module for 8 and 10 pairs.

Features

HighBand modules with a disconnection contact make it possible to connect up to ten incoming and ten outgoing cable pairs. This module is ideal if maximum transmission performance and a line disconnection option are required. HighBand modules with switching contacts make it possible to connect up to 20 incoming and 20 outgoing cable pairs. This module is suitable for applications where maximum transmission performance is required, but no line disconnection option is necessary. Most HighBand modules are suitable for use in Category 6 networks. The connection density is 440 pairs per meter of rack length.

Mounting systems

The modules mount using the LSA PROFIL mounting systems with a 75 mm center-to-center distance (Ø 12 mm).

Note: All LSA PROFIL modules from the HighBand series can also be snapped on to backmount frames from this series.

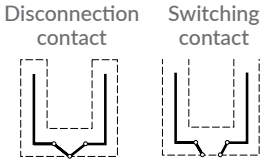
Accessories

Testing and switching

For testing purposes, 2, 4 and 8-pin adapter cords are available.

The 2-pin cord is used for accessing connection or disconnection modules in parallel. The 4-pin cord can be used for targeted measurement of the outgoing or incoming direction in disconnection modules. The 8-pin cord is used in Ethernet networks (LAN).

For temporary connections, CommScope offers a wide variety of patch cords.



Labeling and marking

Labels and transparent covers are available for comprehensive marking of circuits.

Specific jumper tracks can also be identified with one-pair marking caps and protected against accidental access.

Disconnection plugs are used to break connections at the center contact of the disconnection modules.

Overvoltage protection

For the HighBand modules, CommScope offers a magazine or single protection plugs.

Advantages and benefits

- Maximum transmission performance
- Economical utilization of the installation space
- Minimum installation work
- Simple and flexible mounting system (LSA PROFIL)

Standard series 2 modules

The LSA-PLUS series 2 module was developed for universal use in all telecommunications or data network applications. Thanks to the broad product portfolio and the extensive range of accessories, the application possibilities of the Series 2 modules are virtually unlimited.

Application

The LSA-PLUS series 2 modules are used worldwide to connect and link up cable leads securely in internal and external areas: in main distribution frames of exchanges, in cross-connection cabinets and terminating boxes, in building entrance distributors, in floor distributors or in PABXs for voice and data distribution.

Contact types

The LSA-PLUS series 2 is available as a connection module, disconnection module or switching module for 8 and 10 pairs, and as an earth module, for unshielded lines. For shielded circuits, it is available as a 2/6x3 disconnection module or switching module, and as a 2/8x3 disconnection module.

Features

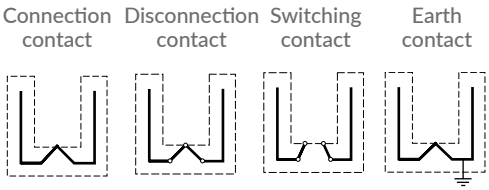
The LSA-PLUS series 2 module is characterized primarily by its broad product portfolio and extensive range of accessories.

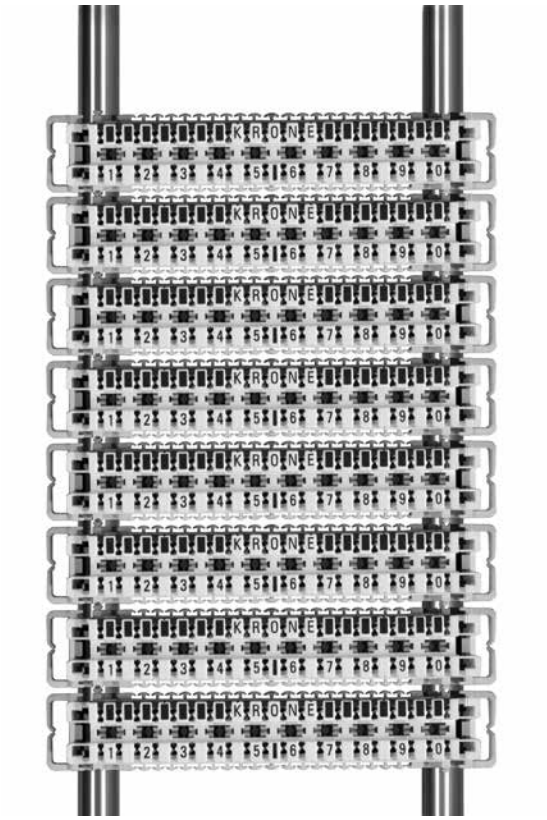
The unique design of the LSA-PLUS series 2 module guarantees quick and secure operability with an extremely low circuit fault rate. The test contact and/or the disconnection contact are immediately accessible via the jumper contact, separately for each pair. This means that testing and jumpering can be carried out easily and conveniently.

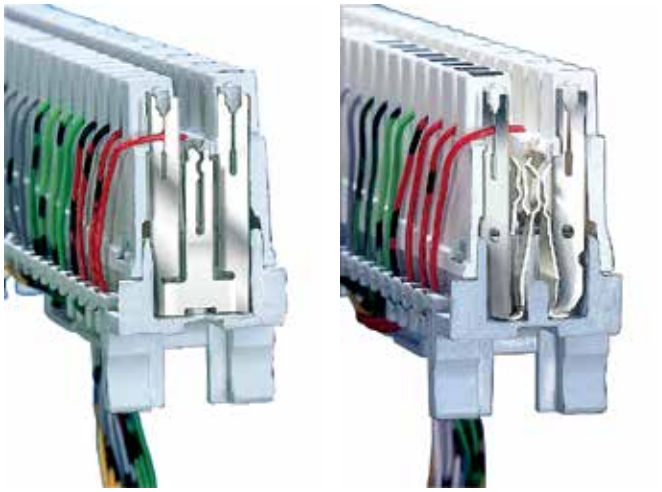
The connection density is 440 pairs per meter of rack length.

Mounting systems

In view of the numerous installation variants and different cable volumes for Series 2, backmount frames with various pitch dimensions (22.5 mm, 25 mm or 27.5 mm), various mounting depths (12 to 50 mm) and with a varying hole pattern are available for snapping on the modules.







Another mounting option is the LSA PROFIL fixing system (Ø 12 mm) for mounting LSA PROFIL modules.

Note: All LSA PROFIL modules of Series 2 can also be snapped on to backmount frames.

Accessories

Labeling and marking

Folding shield frames that are snapped on to the module allow each separate pair to be identified individually. The PROFIL module shield frame is used for block marking and can also be used for both backmount frames and profile rod systems. All shield frames are supplied complete with small white paper shield frames and a transparent cover and are available in variants for 8 and 10 pairs.

Marking caps are used to mark individual pairs inorder to identify specific lines or protect them against accidental switching.

Disconnection plugs are used to break connections at the center contact of the disconnection modules.

One-pair dummy plugs can be used to mark important cables and to prevent the accidental disconnection of important connections in disconnection modules.

Number flags can be used to number the modules or the cable pairs in the connection block. Cover strips protect the connections against unauthorized access.

Testing and switching

For uninterrupted switching, switching adapters and disconnection adapters for 1 pair or 10 pairs are available. For temporary connections, CommScope offers a wide variety of patch cords.

For testing purposes, 2 and 4-pin adapter cords are available. There is a variety of cords with 2 or 4 plugs or sockets to choose from. All cords have a plug adapted to the Series 2 modules.

The 2-pin cord is used for accessing connection or disconnection modules in parallel. The 4-pin cord is used for targeted measurement of the outgoing or incoming direction in disconnection modules.

Overvoltage protection

For Series 2 modules, magazines for 2 and 3-pin arrestors are available. When plugged into connection modules, a surge voltage resistance of 5kA or 10kA (8/20µs) is achieved depending on the variant.

Moreover, one-pair protection plugs for flexible use are available in the following categories: general protection plugs, general and current protection plugs, graded protection and maintenance-free graded protection.

Other accessories

For shielded leads, CommScope offers special cable take ups, shield connections, cable guides and shield frames.

Advantages and benefits

- Maximum transmission performance
- Economical utilization of the installation space
- Minimum installation work
- Simple and flexible mounting system (LSA PROFIL)

Series 1 modules

It was the LSA-PLUS series 1 module that led initially to the overwhelming success of the LSA-PLUS connection technique. This series was designed especially for flat mounting and was intended for installation in dry rooms.

Application

LSA-PLUS series 1 connection modules are used primarily in smaller to medium-sized domestic distribution systems. The modules are the ideal solution for almost any extra-low-voltage applications: for example telephone services, bell systems, clock systems or fire detection and alarm systems.

Contact types

The LSA-PLUS series 1 modules are available as 1/10 and 1/20 connection modules for connecting or splitting 10 or 20 pairs per module or as earth modules with 44 or 84 pins (in each case with connection dimensions of 96 mm or 170 mm).

Features

In the center of the connection module is a separate contact for each pair so that testing can be carried out easily and conveniently using a test cord.

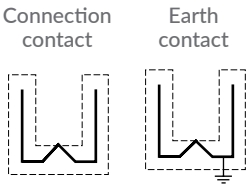
For connecting earth or special lines, the series 1 modules have point-to-point contacts at each end of the modules. These are made up of an additional LSA-PLUS contact, which is connected with a screw termination connection for two wires.

Mounting systems

The mounting dimensions of the LSA-PLUS series 1 connection modules are regulated by the DIN 47608 standard.

The connection modules are mounted with fixing bolts (Ø 4 mm) in distribution boxes or on racks with fixing dimensions of 96 mm or 170 mm.

Accessories



Labeling and marking

For marking the modules, folding shield frames (complete with small white paper shield frames and a transparent cover) are available.

Marking caps are used to mark individual pairs to identify special cables or protect them against accidental switching.

Testing and switching

A test cord is available to make testing easy.

Advantages and benefits

- Ideal for all extra-low-voltage applications
- Standardized mounting dimensions enable universal mounting
- Compact and space-saving
- Minimum installation work
- Quality that has been proven over decades
- Small contact pitch

LSA-PLUS insertion tool

The LSA-PLUS insertion tool with sensor is the key to unparalleled contact reliability and guarantees fast and clean working.

Simply applying pressure with the tool enables the wire to be trimmed and connected in a gas-tight connection in a single action.

Important
All LSA-PLUS series can be wired using the same tool, the LSA-PLUS insertion tool s.

How does the LSA-Plus insertion tool with sensor work?

With the LSA-Plus insertion tool s, the wire can be trimmed and connected in a gas-tight connection in a single action. There is no need to strip the wire or use screws. Simply applying pressure once with the tool is enough. A correctly terminated contact is indicated by an audible click.

How is the sensor used?

The sensor detects whether the wire has been pressed far enough into the contact. The cutting mechanism that trims the excess wire ends is not activated until the contact is correct.

How is the scissors inhibitor used?

In cases where you do not want to trim the residual wire end, for example, when several neighboring contacts are to be bridged, the inhibitor clip is positioned horizontally. Now, the wire can be fed loosely into the corresponding contact row and then connected using the LSA-Plus insertion tools. This means you can create circuits whenever you need to, without having to search for a suitable bridge.

How are the hooks used?

With the hook, you can remove connected wires from the contact, or 1-pair ComProtect® plugs from the module. The hook is also suitable for replacing the arrestors in the magazine.

How is the blade used?

The blade is used to release Series 2 modules from the backmount frame.

How are the cams on the end used?

The cams are used to remove an overvoltage protection magazine in special mounting positions.

Can 0.9 conductor diameters or stranded cores also be terminated?

Depending on the LSA-PLUS series, the tool can be used to connect all conductors with a nominal diameter of 0.35 mm to 0.9 mm. Connecting stranded cores in a 7-wire setup is possible for most series. For all cable types that do not fulfill our technical specifications, we can carry out compatibility tests in our laboratory on request.

Is it possible to terminate two wires in one contact (double connection)?

Some LSA-PLUS series can be connected with two wires for each contact slot. If you want to connect a second wire, the sensor must be deactivated by moving the clip to the OFF position.

Technical data

Materials:	Casing made of PBT; scissors, blade and hook made of hardened (nickel-plated) steel
Connection:	Forces depend on wire type, 50 N to 120 N
Service life:	Depends on wire type, 50,000-200,000 terminations
Connectable diameter:	0.35 mm to 0.9 mm conductor diameter

Other CommScope copper connection technologies

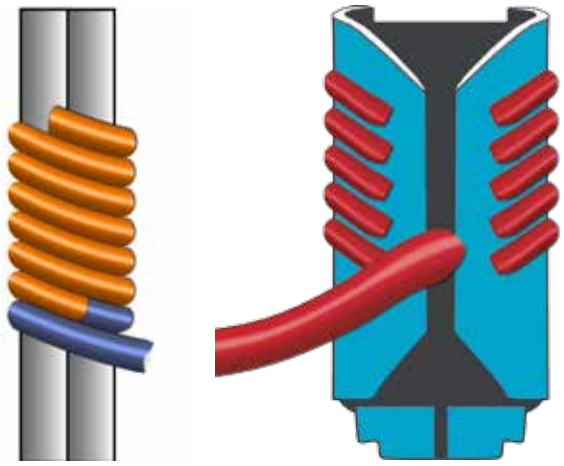
In addition to LSA-Plus® technology, CommScope offers two additional tried and tested copper connection methods: Wire-wrap technology and Quick Connect Punchdown (QCP) contact technology.

Wire-wrap connection technology is used in electronic components. Rigid single conductors are wound mechanically around a square or rectangular pin. High pressure ensures gas-tight contact points at the edges. CommScope's Digital Signal Cross-Connect (DSX) products feature wire-wrap technology and are widely deployed in global communication networks. DSX solutions are also available with LSA-PLUS technology.

The QCP contact method is another quick connection system based on the LSA principle. The QCP technique is used in the field of audio and video technology.

As with LSA-PLUS technology, both techniques eliminate the need for soldering, which has been necessary for decades. Another advantage is that, instead of the prefabricated cable, it is easy to take wire from the roll.

For more information, please refer to www.commscope.com



Everyone communicates. It's the essence of the human experience. *How* we communicate is evolving. Technology is reshaping the way we live, learn and thrive. The epicenter of this transformation is the network—our passion. Our experts are rethinking the purpose, role and usage of networks to help our customers increase bandwidth, expand capacity, enhance efficiency, speed deployment and simplify migration. From remote cell sites to massive sports arenas, from busy airports to state-of-the-art data centers—we provide the essential expertise and vital infrastructure your business needs to succeed. The world's most advanced networks rely on CommScope connectivity.

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BR-111137-EN (03/17)